LIME TOWNSHIP PLANNING COMMISSION
Regular Meeting August 27, 2026 - 5:00 p.m.
Mankato Regional Airport
3030 North Airport Road, Mankato MN
****

Any person speaking to the Commission shall give to the Secretary of the Commission the NAME and HOME ADDRESS of such person prior to speaking.
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1. **CALL TO ORDER**

2. **APPROVAL OF AGENDA**

3. **APPROVAL OF MINUTES**

   1. June 29th, 2026 Draft Planning Commission Minutes

4. **BUSINESS ITEMS**

   1. CYL-0008-26

Request of Mark Pahl with Dem Con, on behalf of property owner, OMG Midwest Inc, for an amendment to the previously approved Conditional Use Permit for the existing demolition landfill. The subject property is described as the North half of the Southeast quarter of Section 25, Township 109 North, Range 27 West lying easterly of the easterly water's edge of the Minnesota River and northeasterly of the centerline of the Creek, more particularly described as: Beginning at the East quarter corner of Section 25; (the East line of Section 25 to have an assumed bearing of North 00 degrees 02 minutes 41 seconds East) thence North 89 degrees 50 minutes 25 seconds West, along the East-West centerline of Section 25, a distance 1,180 feet to a point on the easterly water's edge of the Minnesota River; thence South 02 degrees 30 minutes 00 seconds West along said water's edge, 457.8 feet to the intersection with the Creek centerline; thence South 34 degrees 30 minutes East along said Creek centerline 337.4 feet; thence South 04 degrees 20 minutes 56 seconds West, along said Creek centerline, 339.0 feet; thence South 81 degrees 34 minutes 32 seconds East, along said Creek centerline, 114.5 feet ;thence South 41 degrees 08 minutes East along said Creek centerline 208.0 feet; thence South 19 degrees 23 minutes 23 seconds East along said Creek centerline, 50.3 feet to the intersection with the South line of the North half of the Southeast quarter of Section 25; thence easterly along said South line, 7666.7 feet to the Southeast corner of the North half of the Southeast quarter of Section 25; thence North 00 degrees 02 minutes 41 seconds East along the East line of Section 25, a distance of 1291.61 feet to the point of beginning. The North half of the Southwest quarter of Section 30, Township 109 North, Range 26 West excepting therefrom the North 74.58 feet of the East 94.39 feet. The West 251.62 feet of the Southeast quarter of Section 30, Township 109 North, Range 26 West, excepting therefrom the North 74.58 feet and except the South of 1365.50 feet, Lime Township, Blue Earth County (PID 400430300001) and Tract 1, Registered Land Survey 178, Lime Township, Blue Earth County (PID R400431200039, R400431100014, R400430300007).
The anticipated date of Lime Township Board action is September 8, 2026 at 7:30 p.m. at the Mankato

Regional Airport.

2. CYL-0009-26

Request of Xcel Energy, on behalf of property owner, Gerald Rausch, for a Conditional Use Permit to replace a deteriorating power pole and equipment on site. The subject property is described as the SW ¼ SW ¼ of section 27, Township 109, Range 26, excepting therefrom: A tract of land slightly in excess of 4 acres situate in the Southwest Quarter of the Southwest Quarter of Section 27-109-26 described as follows: Commencing at the Northwest corner of said Southwest Quarter of the Southwest Quarter and running thence South a distance of 400 feet; thence at right angles East a distance of 450 feet; thence at right angles North a distance of 400 feet; and thence West at right angles a distance of 450 feet to the point of the beginning. Included herein is a permanent right for easement for second parties to use the existing cartway and adjoining the above described tract on the North which cartway runs in a Easterly and Westerly direction; and the cost of maintenance of said cartway shall be borne by the users thereof, 23351 583rd Avenue, Lime Township, Blue Earth County (PID R400427300001).
The anticipated date of Lime Township Board action is September 8, 2026 at 7:30 p.m. at the Mankato Regional Airport.

3. CYL-0010-26

Request of Xcel Energy, on behalf of the property owner, Vetter Stone, for a Conditional Use Permit to replace a couple of deteriorating power poles and equipment on site. The subject property is described as That part of the Northeast quarter of the Southwest quarter (NE1/4 of the SW 1/4) of Section Twenty (20),Township One Hundred Nine (109) North, Range Twenty-Six (26) West, lying west of the Railroad right-of-way, 23894 3rd Avenue, Lime Township, Blue Earth County (PID R40042032600).
The anticipated date of Lime Township Board action is September 8, 2026 at 7:30 p.m. at the Mankato Regional Airport.

4. CYL-0011-26

Request of Xcel Energy, on behalf of the property owner, OMG Midwest Inc, for a Conditional Use Permit to replace a deteriorating power pole and equipment on site. The subject property is described as Tract 1, Registered Land Survey 178, 57032 231st Lane, Lime Township, Blue Earth County (PID R400431200039).
The anticipated date of Lime Township Board action is September 8, 2026 at 7:30 p.m. at the Mankato Regional Airport.

5. CYL-0012-26

Request of Kyle Kaldor, on behalf of the property, Joe Holtmeier, for an amendment to the previously approved Conditional Use Permit's Reclamation plan. The applicant is requesting for an Interim Use permit for the proposed use of an outdoor recreation and campground development. Additionally, there are three variance requests: one, to reduce the front yard fencing setback of 65 feet to 35 feet off of 230th lane, second, to reduce the front yard fencing setback of 130 feet to 45 feet off of 3rd avenue, and third, to increase the allowable height of an accessory

structure in the Rural Conservation District of 35 feet to 100 feet given that the applicant is requesting to place a historic Quarry Derrick Crane. The subject property is described as Beginning at the center of the Big Sioux and Mendota Road where it crosses the North line of the SE ¼ of Section 30, Township 109 North, Range 26 West, thence running West on said line 14 rods, thence South 12 rods, thence East to the center of said road, thence Northerly along the center of said road to the point of the beginning, Lime Township, Blue Earth County (PID R40043040002), and That part of the Southeast Quarter of Section 30 lying west of the center line of County Highway No. 5, all in Township 109 North Range 26 West, Blue Earth County, Minnesota all more particularly described as: Commencing at the Northeast Corner of Section 30; (the east line of the Southeast Quarter of Section 30 to have an assumed bearing of South 00 degrees 31 minutes 34 seconds East) thence East a distance of 500.55 feet to a point on the center line of County Highway No. 5; thence South 22 degrees 20 minutes 00 seconds West, along said highway center line, 2581.5 feet; thence South 13 degrees 04 minutes 00 seconds West, a distance of 740.45 feet to the point of beginning; thence South 88 degrees 50 minutes 00 seconds West, 265.04 feet to an Iron pipe monument; thence South 11 degrees 20 minutes 00 seconds West, 85.00 feet to an Iron pipe monument; thence North 78 degrees 40 minutes 00 seconds West, 150.09 feet; thence South 88 degrees 50 minutes 00 seconds West, 584.34 feet; thence North 00 degrees 20 minutes 19 seconds West, 527.08 feet to a point on the north line of the Southeast Quarter of Section 30; thence easterly along said north line, 892.67 feet to a point distant 231.00 feet westerly of the Intersection of said North line with the center line of County Highway No. 5; thence southerly at right angles to said north line, 198.00 feet; thence easterly along a line parallel with the North line of the Southeast Quarter of Section 30 a distance of 184 feet to a point on the center line of County Highway No. 5; thence South 13 degrees 04 minutes 00 seconds West, along said highway center line, 270 feet to the point of beginning, according to the United States Government Survey thereof and situate in Blue Earth County, Minnesota. Commencing at the Northeast corner of Section 30, Township 109 North, Range 26 West, thence East a distance of 500.55 feet to a point on the public road, thence South 22°20' West along the public road a distance of 2581.5 feet, thence South 13°04' West a distance of 740.45 feet to the place of beginning, thence South 13°04' West a distance of 41.59 feet to a point in the center of the public road, thence South 10°50' West a distance of 298.10 feet, thence North 78°40' West a distance of 410.09 feet, thence North 11°20' East a distance of 196.99 feet, thence South 78°40' East a distance of 150.09 feet, thence North 11°20' East a distance of 85.00 feet, thence North 88°50' East a distance of 265.04 feet to the point of beginning. Commencing at the Northeast Corner of Section 30; (the east line of the Southeast Quarter of Section 30 to have an assumed bearing of South 00 degrees 31 minutes 34 seconds East) thence East a distance of 500.55 feet to a point on the center line of County Highway No. 5; thence South 22 degrees 20 minutes 00 seconds West, along said highway center line, 2581.5 feet; thence South 13 degrees 04 minutes 00 seconds West, a distance of 740.45 feet; thence South 88 degrees 50 minutes 00 seconds West, 265.04 feet; thence South 11 degrees 20 minutes 00 seconds West, a distance of 281.99 feet to the point of beginning; thence North 11 degrees 20 minutes 00 seconds East, back along the previously described course and its northeasterly extension, a distance of 396.42 feet; thence North 88 degrees 50 minutes 00 seconds East, a distance of 264.25 feet to a point on the center line of County Highway No. 5 and there terminating, Lime Township, Blue Earth County (PID R400430400018), and The North 74.53* feet of the East 94.39 feet of the North Half of the Southwest Quarter of Section 30, and that part of the Southeast Quarter of Section 30 lying west of the centerline of County Highway No. 5, all in Township 109 North Range 26 West, Blue Earth County Minnesota all more particularly described as: Commencing at the Northeast Corner of Section 30; (the east line of the Southeast Quarter of Section 30 to have an assumed bearing of South 00 degrees 31 minutes 34 seconds East) thence East a distance of 500.55 feet to a point on the centerline of County Highway No. 5; thence South 22 degrees 20 minutes 00 seconds West, along said highway centerline, 2581.5 feet; thence South 13 degrees 04 minutes 00 seconds West, a distance of 740.45 feet to the point of beginning; thence South 88 degrees 50 minutes 00 seconds West, 265.04 feet to an iron pipe monument; thence South 11 degrees 20 minutes 00 seconds West, 85.00 feet to an iron pipe monument; thence North 78 degrees 40 minutes 00 seconds West, 150.09 feet; thence South 11 degrees 20 minutes 00 seconds West, 462.54 feet; thence South 78 degrees 40 minutes 00 seconds East, 160.09 feet to an iron pipe monument; thence South 11 degrees 20 minutes 00 seconds West,

348.48 feet to an iron pipe monument; thence South 87 degrees 40 minutes 00 seconds East, 250.00 feet to a point on the centerline of County Highway No. 5; thence South 11 degrees 20 minutes 00 seconds West along said highway centerline 602.18 feet to the point of intersection with the north line of the South 629.60 feet of the Southeast Quarter of Section 30; thence North 89 degrees 13 minutes 29 seconds West, along said North line, 757.63 feet to the point of intersection with the East line of the West 957.00 feet of the Southeast Quarter of Section 30; thence North 00 degrees 03 minutes 46 seconds East, along said East line, 747.80 feet to the point of intersection with a line drawn at right angles to the West line of the Southeast Quarter of Section 30 at a point distant 1365.50 feet north of the South Quarter Corner of Section 30 as measured along the West line of the Southeast Quarter of Section 30***, thence North 89 degrees 56 minutes 14 seconds West, along said line, 705.38 feet to the point of intersection with the East line of the West 251.62 feet of the Southeast Quarter of Section 30; thence North 00 degrees 03 minutes 46 seconds East along said East line, 1144.45 feet to a point on the South line of the North 74.58 feet of the Southeast Quarter of Section 30; thence westerly along said South line, 251.62 feet to a point on the West line of the Southwest Quarter of Section 30 a distance of 94.39 feet; thence North 00 degrees 03 minutes 46 seconds East, along a line parallel with the East line of the Southwest Quarter of Section 30 a distance of 74.58 feet to a point on the North line of the Southwest Quarter of Section 30; thence southerly along said North line, 94.39 feet to the Northwest Corner of the Southeast Quarter of Section 30; thence continuing easterly along the North line of the Southeast Quarter of Section 30 a distance of 1894.5 feet to a point distant 231.00 feet westerly of the intersection of said North line with the centerline of County Highway No. 5; thence southerly at right angles to said north line, 199.00**** feet; thence easterly along a line parallel with the north line of the Southeast Quarter of Section 30 a distance of 184 feet to a point on the centerline of County Highway No. 5; thence South 13 degrees 04 minutes 00 seconds West, along said Highway centerline, 270 feet to the point of beginning, according to the United States Government Survey thereof and situate in Blue Earth County, Minnesota. EXCEPTING the following: That part of the Southeast Quarter of Section 30 lying west of the centerline of County Highway No. 5, all in Township 109 North Range 26 West, Blue Earth County, Minnesota all more particularly described as: Commencing at the Northeast Corner of Section 30; (the east line of the Southeast Quarter of Section 30 to have an assumed bearing of South 00 degrees 31 minutes 34 seconds East) thence East a distance of 500.55 feet to a point on the center line of County Highway No. 5; thence South 22 degrees 20 minutes 00 seconds West, along said highway center line, 2581.5 feet; thence South 13 degrees 04 minutes 00 seconds West, a distance of 740.45 feet to the point of beginning; thence South 88 degrees 50 minutes 00 seconds West, 265.04 feet to an Iron pipe monument; thence South 11 degrees 20 minutes 00 seconds West, 85.00 feet to an Iron pipe monument; thence North 78 degrees 40 minutes 00 seconds West, 150.09 feet; thence South 88 degrees 50 minutes 00 seconds West, 584.34 feet; thence North 00 degrees 20 minutes 19 seconds West, 527.08 feet to a point on the north line of the Southeast Quarter of Section 30; thence easterly along said north line, 892.67 feet to a point distant 231.00 feet westerly of the Intersection of said North line with the center line of County Highway No. 5; thence southerly at right angles to said north line, 198.00 feet; thence easterly along a line parallel with the North line of the Southeast Quarter of Section 30 a distance of 184 feet to a point on the center line of County Highway No. 5; thence South 13 degrees 04 minutes 00 seconds West, along said highway center line, 270 feet to the point of beginning, according to the United States Government Survey thereof and situate in Blue Earth County, Minnesota, Lime Township, Blue Earth County (PID R400430400014), and Commencing at the Northeast corner of Section 30, Township 109 North, Range 26 West, thence East a distance of 500.55 feet to a point on the public road, thence South 22 degrees-20 minutes West along the public road a distance of 2581.5 feet, thence South 13 degrees-04 minutes West a distance of 782.04 feet to a point in the center of the public road, thence South 10 degrees-50 minutes West along the center of the public road a distance of 298.10 feet to the place of beginning; thence continuing South 11 degrees-20 minutes West along the center of the public road a distance of 265.55 feet; thence North 78 degrees-40 minutes West a distance of 410.09 feet, thence North 11 degrees-20 minutes East a distance of 265.55 feet, thence South 78 degrees-40 minutes East a distance of 410.09 feet to the point of beginning. Said tract of land lying in the East one-half of the Southeast Quarter of Section 30, Township 109 North, Range 26 West, Blue Earth County, Minnesota, Lime Township, Blue**

Earth County (PID R400430400004), and All that part of the Southeast Quarter (SE1/4) of Section Thirty (30), Township One Hundred Nine (109) North, Range Twenty-six (26) West, Blue Earth County, Minnesota described as follows: Commencing at the Southeast Corner of said Section Thirty (30), thence due West (assumed bearing) along the South line of Section Thirty (30), 1047.00 feet to the point of intersection of the South line with the center Line of Highway No. 5, said point being the point of beginning; thence continuing due West along South line of Section Thirty (30), 633.40 feet; thence North 0 degrees 46.5 minutes West 629.60 feet; thence due East, and parallel to the South line of Section Thirty (30), 757.63 feet, to a point on the center line of Highway 5; thence South 10 degrees 25 minutes West along the Highway center line 640.07 feet to the point of beginning, according to the United States Government Survey thereof and situate in Blue Earth County, Minnesota, Lime Township, Blue Earth County (PID R400430400006), and Tract A, Registered Land Survey No. 172, Blue Earth County, Minnesota (PID R400431200033), and Beginning at the northwest corner of the SW1/4 NE1/4 of Sec. 31-109-26 West; thence north on the north and south 1/4 line of said Sec. 495 feet; thence north 89°54 minutes east 1434.16 feet to the center of the highway between Mankato and St. Peter (now known as Blue Earth County Aid Road No. 123); thence southwesterly 1177.10 feet down the center line of said highway to the north line of the S1/2 of said SW1/4 of the NE1/4; thence on said north line south 89°54 minutes west 461 feet; thence northwesterly 63°27 minutes to the right 251 feet; thence South 89°54 minutes west 116 feet; thence north 44°38 minutes west 290 feet; thence North 50°16 minutes west 288.5 feet; thence north 63°57 minutes west 100 feet to the point of beginning, except all existing highways and cartways. EXCEPT a strip of land 1 rod in width adjacent to the South line of Pilgrim's Rest Cemetery and extending the length of said Cemetery, allocated in the NE1/4 Sec. 31-109-26 West, more particularly described as follows: Commencing at an iron pipe at the intersection of the West line of the Mendota and Big Sioux Road, also known as the Mankato St. Peter Highway, and the North line of Sec. 31-109-26 West, said iron being approximately 1087 feet West of the northeast corner of said Section 31; thence running West a distance of 585 feet, thence South 3°45' West a distance of 792 feet to the place of beginning; thence continuing along the same line a distance of 16.5 feet, thence East and parallel to the North line of said Section 31 a distance of 485.2 feet to the West line of the Mendota and Big Sioux Road, thence North 10°38' East along the West line of said Mendota and Big Sioux Road a distance of 16.8 feet, thence West and parallel to the North line of said Section 31, a distance of 488.3 feet to the place of beginning. EXCEPT Tracts A & B, Registered Land Survey No. 36. And an easement in and to a roadway over the following described property: A road 20 feet in width 10 feet on either side of a line described as follows: Commencing at the intersection of the centerline of County Highway No. 5 and the North line of a tract of land described as follows: "The North 70 acres of the South 110 acres, West of County Highway No. 5, in the Northeast quarter of Section 31, Township 109 North, Range 26 West"; thence West along said North line approximately 1100 feet; thence Northwesterly approximately 340 feet to a point on the West line of a tract of land described as follows: "The West 16.92 acres of the North 24 acres of the Northwest Quarter of the Northeast Quarter of Section 31, Township 109 North, Range 26 west"; said point being approximately 100 feet North of the Southwest corner of said last described tract; thence continuing Westerly across the Northeast quarter of the Northwest quarter of said Section 31, approximately 100 feet to a point of termination, said terminal point being located as follows: commencing at a point on the North line of Section 31, Township 109 North, Range 26 West, 2179.8 feet East of the Northwest corner of said Section 31; thence South 184.6 feet; thence South 44 degrees 26 minutes East 520.5 feet; thence south 0 degrees 30 minutes West, 147.3 feet to said point of termination. In the event that should a survey of the above described roadway as it now exists show the above description to be inaccurate the vendor agrees at the request of the vendee to execute and deliver a Quit Claim Deed transferring to said vendee the road area in accordance with such survey. The covenants of warranty in this instrument shall be deemed not to apply to the last above described tract, said tract being the roadway conveyed hereby, Lime Township, Blue Earth County (PID R400431200005), and Lots A & B, Registered Land Survey No. 36, according to the plat thereof on file and of record in the office of the Register of Deeds of Blue Earth County, Minnesota (PID R400431200007 and R400431200006).

The anticipated date of Lime Township Board action is September 8, 2026 at 7:30 p.m. at the Mankato Regional Airport.

5. **MISCELLANEOUS**

6. **ADJOURNMENT**

Lime Township Planning Commission **3. 1.**

Meeting Date: 08/27/2026

Title

June 29th, 2026 Draft Planning Commission Minutes

Attachments

June 29th, 2026 Draft Planning Commission Minutes

Lime Township Blue Earth County Minnesota

Planning Commission Minutes

June 29, 2026 5:00 pm

ALL MOTIONS ASSUMED TO BE UNANIMOUS UNLESS NOTED

Present: Jimmy Blount III, Amanda Dyslin, Jody Swanson Victoria Potts, Jill Hilgers, ZOOM: Christine Gregory.

Chair Amanda called the Meeting to Order at 5:00 pm and led the Pledge of Allegiance.

Motion 26.06.01 Jimmy, Second Jody to Approve the Agenda as presented.

Motion 26.06.02 Jimmy, Second Jody to Approve the Minutes as presented.

Item CYL-0007-26 Request of Brian Keenan on behalf of MNSCG 2019-57 LLC, with permission of property owner, to extend the current approved IUP for an additional 12 months to comply with the IUP Conditions set forth by the Lime Township Board. The discussion centered around the fact that they still need to comply with item 20: Agreement with the UP Railroad for crossings to access the property, located off of the rail line on 238th Street east of 3rd Avenue. The interconnection agreement with Xcel Energy is in the works. On Amanda's question of how soon they expect a decision from the railroad, the petitioner stated that they are being told by the railroad that permission could be granted as soon as this fall, but more likely in the early part of 2027. Jody wanted to clarify questions about which Solar Ordinance the IUP was granted under, and if the updated Solar Ordinance would change their IUP. Staff stated that they were approved under the original 2022 Solar Ordinance and have complied with all of the conditions set forth in previous requests. Jody also wanted to make sure the solar company would maintain all vegetation without the Township having to send inspectors and letters to be a "good neighbor" within the Township and to keep Township costs to a minimum. Jimmy wanted to state that he feels that this should be the last extension, and if no movement on the railroad agreement was made before the next deadline that they should reapply for a new IUP.

Motion 26.06.03 Jody, Second Jimmy to approve the extension of the MNSCG 2019-57 LLC Interim Use Permit for another 12 months.

Miscellaneous Items: Staff was asked if there were new permit applications expected shortly. Staff informed the Commission that there were no submissions for the June deadline and July Planning Commission meeting, but there is a good possibility the Commission will have three larger items for the August meeting. Expected permit applications would be the Rockwell RV and Adventure Park project with an amended reclamation plan for the Stoffle Quarry, and Kasota Stone Fabricators for the K5 Quarry mine to the east of 3rd Avenue, and CHS to add rail line to the existing spur line to the south of the WW Lorentz property, located in the Industry Zone.

Motion 26.06.04 Jimmy, Second Jody to Adjourn at 5:47 pm.

Minutes prepared by: Planning Commission Chair:

_____ _____

Jill Hilgers, Clerk Amanda Dyslin

DRAFT

Lime Township Planning Commission **4. 1.**

Meeting Date: 08/27/2026

Title

CYL-0008-26

Request of Mark Pahl with Dem Con, on behalf of property owner, OMG Midwest Inc, for an amendment to the previously approved Conditional Use Permit for the existing demolition landfill. The subject property is described as the North half of the Southeast quarter of Section 25, Township 109 North, Range 27 West lying easterly of the easterly water's edge of the Minnesota River and northeasterly of the centerline of the Creek, more particularly described as: Beginning at the East quarter corner of Section 25; (the East line of Section 25 to have an assumed bearing of North 00 degrees 02 minutes 41 seconds East) thence North 89 degrees 50 minutes 25 seconds West, along the East-West centerline of Section 25, a distance 1,180 feet to a point on the easterly water's edge of the Minnesota River; thence South 02 degrees 30 minutes 00 seconds West along said water's edge, 457.8 feet to the intersection with the Creek centerline; thence South 34 degrees 30 minutes East along said Creek centerline 337.4 feet; thence South 04 degrees 20 minutes 56 seconds West, along said Creek centerline, 339.0 feet; thence South 81 degrees 34 minutes 32 seconds East, along said Creek centerline, 114.5 feet ;thence South 41 degrees 08 minutes East along said Creek centerline 208.0 feet; thence South 19 degrees 23 minutes 23 seconds East along said Creek centerline, 50.3 feet to the intersection with the South line of the North half of the Southeast quarter of Section 25; thence easterly along said South line, 7666.7 feet to the Southeast corner of the North half of the Southeast quarter of Section 25; thence North 00 degrees 02 minutes 41 seconds East along the East line of Section 25, a distance of 1291.61 feet to the point of beginning. The North half of the Southwest quarter of Section 30, Township 109 North, Range 26 West excepting therefrom the North 74.58 feet of the East 94.39 feet. The West 251.62 feet of the Southeast quarter of Section 30, Township 109 North, Range 26 West, excepting therefrom the North 74.58 feet and except the South of 1365.50 feet, Lime Township, Blue Earth County (PID 400430300001) and Tract 1, Registered Land Survey 178, Lime Township, Blue Earth County (PID R400431200039, R400431100014, R400430300007).
The anticipated date of Lime Township Board action is September 8, 2026 at 7:30 p.m. at the Mankato Regional Airport.

Applicant

The applicant, Mark Pahl with Dem Con, on behalf of the property owners, OMG Midwest Inc.

Request

Request of Mark Pahl with Dem Con, on behalf of property owner, OMG Midwest Inc, for an amendment to the previously approved Conditional Use Permit for the existing demolition landfill.

Location

The subject property is described as the North half of the Southeast quarter of Section 25, Township 109 North, Range 27 West lying easterly of the easterly water's edge of the Minnesota River and northeasterly of the centerline of the Creek, more particularly described as: Beginning at the East quarter corner of Section 25; (the East line of Section 25 to have an assumed bearing of North 00 degrees 02 minutes 41 seconds East) thence North 89 degrees 50 minutes 25 seconds West, along the East-West centerline of Section 25, a distance 1,180 feet to a point on the easterly water's edge of the Minnesota River; thence South 02 degrees 30 minutes 00 seconds West along said water's edge, 457.8 feet to the intersection with the Creek centerline; thence South 34 degrees 30

minutes East along said Creek centerline 337.4 feet; thence South 04 degrees 20 minutes 56 seconds West, along said Creek centerline, 339.0 feet; thence South 81 degrees 34 minutes 32 seconds East, along said Creek centerline, 114.5 feet ;thence South 41 degrees 08 minutes East along said Creek centerline 208.0 feet; thence South 19 degrees 23 minutes 23 seconds East along said Creek centerline, 50.3 feet to the intersection with the South line of the North half of the Southeast quarter of Section 25; thence easterly along said South line, 7666.7 feet to the Southeast corner of the North half of the Southeast quarter of Section 25; thence North 00 degrees 02 minutes 41 seconds East along the East line of Section 25, a distance of 1291.61 feet to the point of beginning. The North half of the Southwest quarter of Section 30, Township 109 North, Range 26 West excepting therefrom the North 74.58 feet of the East 94.39 feet. The West 251.62 feet of the Southeast quarter of Section 30, Township 109 North, Range 26 West, excepting therefrom the North 74.58 feet and except the South of 1365.50 feet, Lime Township, Blue Earth County (PID 400430300001) and Tract 1, Registered Land Survey 178, Lime Township, Blue Earth County (PID R400431200039, R400431100014, R400430300007).

Existing Land Use

The land consists of a parcel located West of 3rd Avenue and northwest of 231st Lane. The property is currently being used as a landfill.

Zoning

The southern portion of the property is zoned Industrial and the northern parcels are zoned in the rural conservation district within Lime Township.

Environmentally Sensitive Areas

There are ravines located throughout the proposed parcels. The properties also contain flood zones, wetlands, and the shoreland district on the west side of the property.

City Code

The Lime Township Ordinance can be found at this link: Lime Township Ordinances

Review

The applicant, Mark Pahl with Dem Con is requesting, on behalf of property owner, OMG Midwest Inc, for an amendment to the previously approved Conditional Use Permit for the existing demolition landfill. The total acreage for the proposal is 192.29 acres with a 75 acre waste footprint. The request is to take the current footprint of the existing demolition landfill and modernize the waste pile with a synthetic liner, a leachate collection system, and a synthetic cap which will enhance the environmental impacts of the surrounding areas. The owner of the operation will be Dem Con and the individuals responsible for the actual operation and maintenance of the operations will be Mark Pahl, the applicant, and Bill Keegan for at least for the first year of Dem-Con's ownership of the site. Going forward, it is anticipated that a facility manager will be assigned to the site for daily questions or concerns. A condition has been included herein for the Lime Township Board to receive the point of contact's information and in the future if the individual changes contact information shall be forwarded to the board. Dem-Con's employees will receive the MPCA training for certification to operate a landfill in addition to the monthly safety training offered by the employer.

The parcels where the demolition landfill will be operating out of is currently zoned as Rural Conservation, which currently does not describe a landfill to be permitted via land development permit nor Conditional Use Permit nor an Interim Use Permit. However, a Conditional Use Permit (CUP) was previously approved in 2004 by the Lime Township Board to allow Southern Minnesota Construction for a demolition landfill, that collected yard and tree waste composting, wood recycling, concrete and asphalt recycling and sales of landscaping supplies. Making the use a legal nonconformity. Lime Township Zoning Ordinance states "A legal non-conforming use, and

accessory use, shall not be structurally or physically enlarged or expanded. Legal non-conformities may be continued or restored in accordance with this Section" (Article 1, Section 8, Part A, subpart 1). So, the applicant has applied to amend the previously approved CUP to continue the use of a demolition landfill and to update the current conditions of the site.

The applicant has resubmitted a permit with the Minnesota Pollution Contral Agency as required by Blue Earth County ordinance, "no person shall establish, operate, or maintain a sanitary landfill or demolition landfill without first obtaining a permit from the agency and a license from the county board" (Chapter 16 Solid Waste Management, Section 16-13 Sanitary landfill or demolition landfill, part 1). The applicant has submitted for a CUP to receive proper licensing from the Lime Township Board as they are the Local governing unit (LGU) of the proposed parcels. Once the applicant has secured approval from both the MPCA and the Lime Township Board the requirement shall be fulfilled. A condition has been added herein the applicant shall obtain both MPCA approval and Lime Township approval prior to the commencement of operating the demolition landfill.

Enclosed in the submittal items is a schedule of daily operations that shall occur between the hours of 6am and 7pm Monday through Friday and 7am-5pm on Saturday. Additionally the applicant has stated that "extended hours may needed for special projects or emergency purposes" (Lime Township Conditional Use Permit (CUP) Narrative, Operational Schedule and facility charges). The hours of operation and noise levels shall conform to Minnesota Rules Chapter 7030 and a condition has been listed herein for the operation of business to adhere to such requirement. Noise generated from the site will remain the same given similar activities will continue to occur.

Dem Con does not anticipate nuisance litter given the type of waste they will be accepting into their facility, however they have proposed to inspect 231st Lane and CSAH 5 (3rd Avenue) on a weekly basis and will monthly check the site for scattered waste.

The facility will charge fees by the cubic yard or by the ton. Tip fees will vary depending on waste type and volume. The range for cubic yards will vary from $6.00 to $50.00 and the fees per ton will vary from $10-$100. Thus, meeting Blue Earth County Code of submitting a "schedule of charges to be levied at the solid waste facility" and for demolition landfills to "charge disposal fees for all users in a fair and equitable manner" (Chapter 16 Solid Waste Management, Section 16-13 Sanitary landfill or demolition landfill, part 1). Since the applicant will be charging all users the same fees, they will be meeting this requirement.

Drainage on-site will continue to remain the same causing water to drain on the east side of the property where a stormwater pond currently exists. Once the site has been completed, the applicant is proposing to drain stormwater to the newly proposed stormwater ponds to the west and to the north of the mound. The applicant shall receive final approval from Blue Earth County for the stormwater ponds and drainage plan and copy of the approval shall be forwarded to the Lime Township Board.

Site access will remain unchanged, continuing from 231st Lane, as identified in the submitted plans. Any modifications to access will require additional review and approval by the Township Board and Blue Earth County.

Landscaping surrounding the landfill will remain the same; left in a natural state and in well-kept conditions. The existing berms and topography surrounding the demolition landfill will remain the same; acting as fencing around the property.
A phasing site plan and narrative have been submitted by the applicant illustrating the changes of how the previously buried demolition items will be excavated, then lined with a synthetic fabric, filled back in and covered.

Cross section plans were submitted illustrating a current height of 840 feet with a proposed 868 feet in height. The cross section displays how the applicant is proposing to redistribute the current waste in phases in order to add a synthetic liner to prevent the continuation of contamination to the groundwater and to be able to accept additional waste. The site plans shows what the current excavation levels are approximately at 792 feet and the applicant is proposing to keep the levels the same to avoid any damage to the groundwater tables.

An ultimate land use plan has been submitted illustrating the five different phases and subphases the applicant will be completing as they collect waste. Phasing will commence on the east central side of the landfill mound and will continue westward.

The applicant is proposing to service a population of 350,000 residents, meaning they are planning on serving the residents and the businesses within Blue Earth County and the surrounding counties.

An email from the Kasota Fire Department was received by the applicant stating they will service the area since it is located within their jurisdiction.

Enclosed in the Minnesota Pollution Contral Agency's (MPCA) permit application proposing for the applicant to accept commercial and demolition (C&D) debris, industrial waste, composting yard waste, composting Source-Separated Organic Material, and recyclables. A full list of the items that the landfill will be accepting and rejecting can be found in the submitted Industrial Solid Waste Management Plan (SW-254) Part 2.0 Acceptable and Unacceptable Wastes on pages 2 through 7 out of 13. The applicant has stated that they will not be accepting any hazardous waste nor any waste that can combust. The current 2004 CUP ultimate capacity design for an unlined commercial and demolition landfill is 5,514,388 cubic yards and the proposed capacity for an unlined C&D debris landfill is for 1,044,918 cubic yards and 5,352,518 cubic yards of lined class III C&D debris and industrial waste. Odors on the property will remain the same given that similar material will be accepted and the applicant plans to rotate piles while managing moisture content of the composting activities.

The applicant has submitted soil borings and a soil boring map illustrating the areas where the previously approved CUP had tested soil throughout the property.

It is a requirement by the MPCA to cover waste, cover soils consist of on-site materials and adequate cover soils currently onsite. The applicant will continue to utilize the previously approved cover soils onsite and during the winter months Dem Con will rip the frost with equipment to access unfrozen soils or use frost protections measures, such as frost blankets, hay, woodchips to prevent the cover piles from freezing.

A variety of equipment will be utilized at the site, including, but not limited to a landfill compactor, a dozer, a water truck, and a skid and front end loader. The applicant has stated in their narrative that additional equipment may be brought in during construction activities.

Information relating to MPCA ss 1,2, 4 and SW 6 is a requirement listed within the Blue Earth County's Solid Waste Management ordinance and is currently being reviewed by the County's staff. County staff has stated that the requirement was a reference to Minnesota Rule that existed at that time and not statue. The applicant has submitted a full copy of their MPCA Permit application as a fulfillment of this requirement.

The applicant shall submit documentation illustrating compliance of a Subsurface Treatment System (SSTS) on the site. A recommended condition requires the applicant to coordinate with Blue Earth County to obtain approval for the septic system location. Coordination with the County will also be required for the compliance of a well prior to applying for land development permit.

Findings

Staff respectfully submits the following findings:

1. The establishment, maintenance, or operation of the conditional use allowing the continuation of a demolition landfill will not be detrimental or endanger the public health, safety, comfort or general welfare.
2. The Conditional Use will not be injurious to the use and enjoyment of other property in the immediate vicinity for the purpose already permitted, nor substantially diminish and impair property values within the neighborhood given that the demolition landfill will be a continued use.
3. The establishment of the conditional use permit will not impede the normal and orderly development and

improvement of surrounding property for uses permitted in the district.

4. Adequate utilities, access roads, drainage and necessary facilities have been or will be provided given that the applicant will be utilizing the property in the same manner as previously approved.
5. Adequate measures have been or will be taken to provide ingress or egress so designated as to minimize traffic congestion in the public streets. Access will remain the same off of 231st Lane.
6. The use of the property shall, in all respects other than conditional use, conforms to the applicable regulations of the district in which it is located, because the current use has been previously approved in the Conservation Residential district and will not change based on the proposal.
7. The proposed use does not create a potential pollution hazard. Since the applicant is proposing to modernize the current landfill with a synthetic liner to prevent the continuation of groundwater contamination.
8. The establishment of the conditional use will not impede the normal and orderly development and improvement of surrounding vacant property for predominant uses in the area because the use will remain the same.
9. Adequate measures have been or will be taken to prevent or control offensive odor, fumes, dust, noise, and vibration so that none of these will constitute a nuisance, and to control lighted signs and other exterior lights in such a manner that no disturbance to neighboring properties will result. Since the applicant will take best management practices to control dust and litter throughout the surrounding area of the landfill.
10. The Conditional Use conforms to the joint resolution for orderly annexation.
11. Site-specific conditions and such other conditions are established as required for the protection of the public's health, safety, morals, and general welfare.

Recommendation

If the Planning Commission elects to proceed with the item, staff recommends approval for an amendment to the previously approved Conditional Use Permit for the existing demolition landfill with the following conditions：

1. The Lime Township Board shall receive the facility manager's contact information and any changes to the individual or contact information shall be forwarded to the board.
2. The applicant shall obtain both MPCA approval and Lime Township approval prior to the commencement of operating the demolition landfill.
3. The hours of operation and noise levels shall adhere to Minnesota Rules Chapter 7030.
4. The applicant shall receive final approval from Blue Earth County for the stormwater ponds and drainage plan and copy of the approval shall be forwarded to the Lime Township Board.
5. Any modifications to access will require additional review and approval by the Township Board and Blue Earth County.
6. The applicant shall seek written approval from Blue Earth County on the septic and well compliance prior to applying for a land use development permit.

Attachments

General Location Map

Aerial Map

Site Plan

Project Narrative

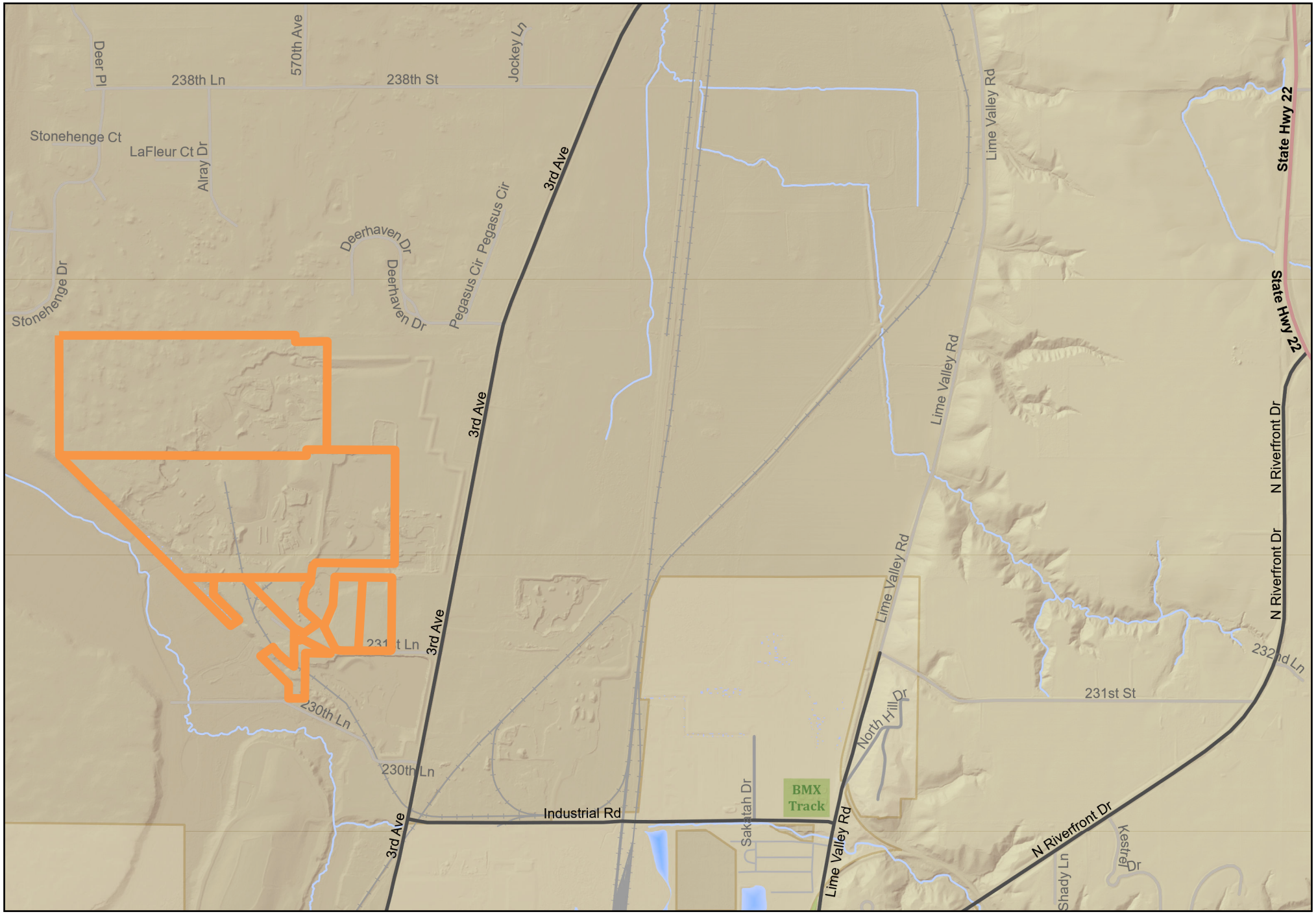
Kasota Fire Department

MPCA Permit Application

Industrial Solid Waste Management Plan

Soil Borings

General Location Map



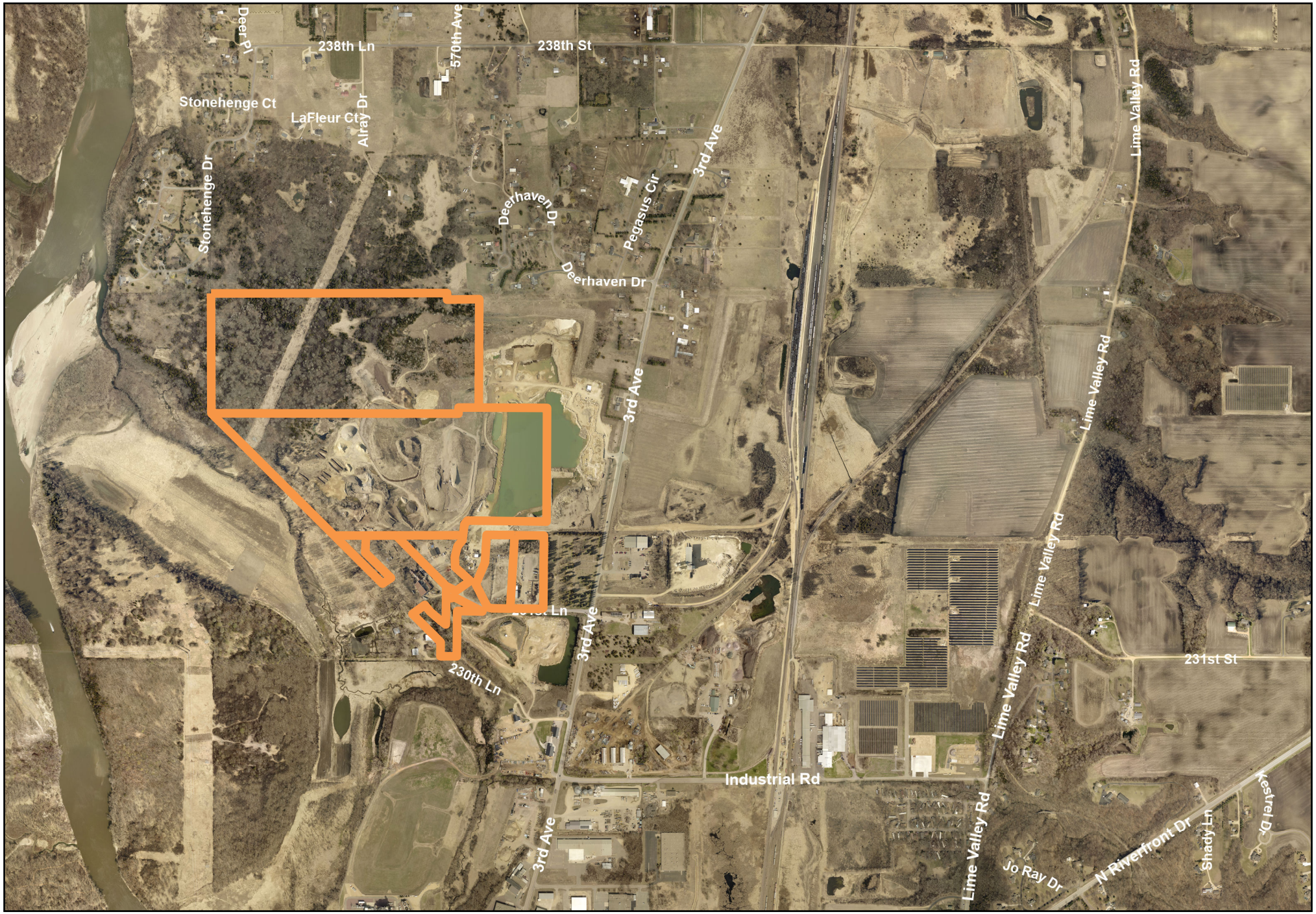
N W E S

0 0.4 0.8 2 mi

This information is to be used for reference purposes only. The City of Mankato does not guarantee accuracy of the material contained herein and is not responsible for misuse or misinterpretation.

Produced by: City of Mankato GIS
Published: August 13, 2026

Aerial Map



N W E S

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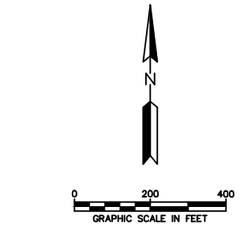
Produced by: City of Mankato GIS
Published: August 13, 2026

Plot Date & Time: 27 July 2026 2:02 PM





PROPERTY BOUNDARY (SURVEYED)
PROPERTY BOUNDARY (BEACON/GIS)
PERMITTED WASTE LIMITS
EXISTING WETLAND AREA
EXISTING ROAD EDGE
MW-1 EXISTING MONITORING WELL
COMPLIANCE BOUNDARY
INCOMING TRAFFIC FLOW
OUTGOING TRAFFIC FLOW

SURVEY NOTES:

1. HORIZONTAL DATUM IS BLUE EARTH COUNTY NORTH AMERICAN DATUM NAD83(2011), US SURVEY FEET,
2. VERTICAL DATUM IS NORTH AMERICAN VERTICAL DATUM 88 (NAVD88). CONTOUR INTERVAL IS TWO FEET.
3. TOPOGRAPHY SURVEY AND AERIAL FROM 2023 LIDAR DATA, UPDATED VIA GROUND SURVEY BY BOLTON AND MENK IN DECEMBER 2025.

REV	REVISION DESCRIPTION	DWN	APP	REV DATE
1	REVISED PER CLIENT COMMENTS	JJT	EDK	07/29/26
0	ISSUED FOR CUP	JJT	EDK	07/17/26

SEAL

I HEREBY CERTIFY THAT THIS PLAN, SPECIFICATION, OR REPORT WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA.

PRINT NAME ETHAN KETELSEN

SIGNATURE

DATE 07-17-2026 LICENSE # 56630

PRIME CONSULTANT

Stantec

PROJECT TITLE

CUP FIGURES

DEM-CON PILGRIM LANDFILL, LLC.

MANKATO, MINNESOTA

SHEET TITLE

EXISTING CONDITIONS

DWN BY	CHK'D	APP'D	DWG DATE	SCALE
JJT	BWS	EDK	JULY 2026	AS SHOWN

PROJECT NO.	SHEET NO.	REV NO.
227708930	FIGURE 1	1

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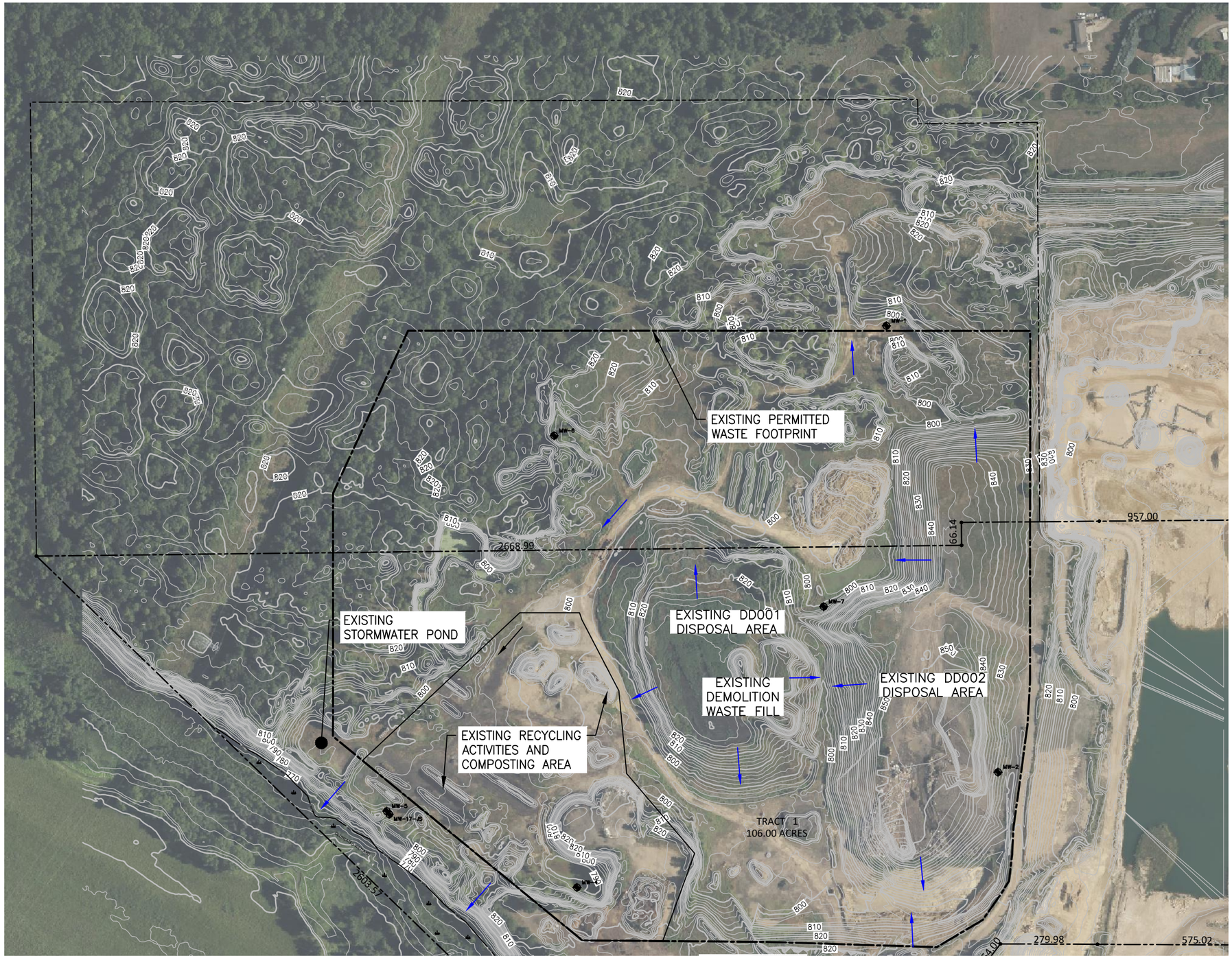

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PROPERTY BOUNDARY (SURVEYED)
PROPERTY BOUNDARY (BEACON/GIS)
PERMITTED WASTE LIMITS
EXISTING WETLAND AREA
EXISTING ROAD EDGE
MW-1 EXISTING MONITORING WELL
COMPLIANCE BOUNDARY
INCOMING TRAFFIC FLOW
OUTGOING TRAFFIC FLOW
STORMWATER FLOW DIRECTION

SURVEY NOTES:

1. HORIZONTAL DATUM IS BLUE EARTH COUNTY NORTH AMERICAN DATUM NAD83(2011), US SURVEY FEET,
2. VERTICAL DATUM IS NORTH AMERICAN VERTICAL DATUM 88 (NAVD88). CONTOUR INTERVAL IS TWO FEET.
3. TOPOGRAPHY SURVEY AND AERIAL FROM 2023 LIDAR DATA, UPDATED VIA GROUND SURVEY BY BOLTON AND MENK IN DECEMBER 2025.

REV	REVISION DESCRIPTION	DWN	APP	REV DATE
1	REVISED PER CLIENT COMMENTS	JJT	EDK	07/29/26
0	ISSUED FOR CUP	JJT	EDK	07/17/26

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SIGNATURE
DATE 07-17-2026 LICENSE # 56630

PRIME CONSULTANT

Stantec

PROJECT TITLE
CUP FIGURES

DEM-CON PILGRIM LANDFILL, LLC.

MANKATO, MINNESOTA

SHEET TITLE
EXISTING CONDITIONS – NORTH

DWN BY	CHK'D	APP'D	DWG DATE	JULY 2026
JJT	BWS	EDK	SCALE	AS SHOWN

PROJECT NO.	SHEET NO.	REV NO.
227708930	FIGURE 1A	1

Plot Date & Time: 29 July 2026 2:40 PM

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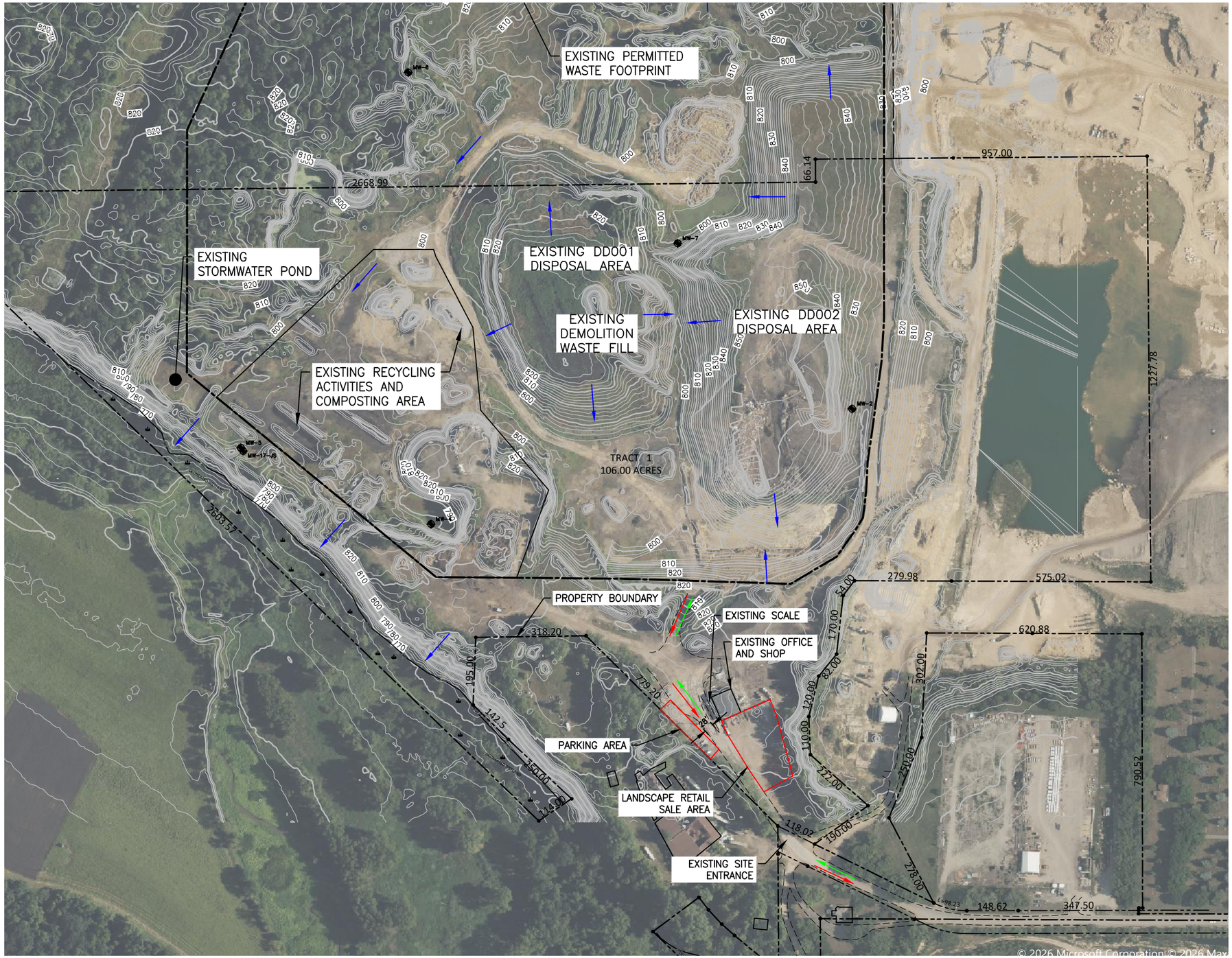

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- PROPERTY BOUNDARY (SURVEYED)
- PROPERTY BOUNDARY (BEACON/GIS)
- PERMITTED WASTE LIMITS
- EXISTING WETLAND AREA
- EXISTING ROAD EDGE
- MW-1 EXISTING MONITORING WELL
- COMPLIANCE BOUNDARY
- INCOMING TRAFFIC FLOW
- OUTGOING TRAFFIC FLOW
- STORMWATER FLOW DIRECTION

SURVEY NOTES:

1. HORIZONTAL DATUM IS BLUE EARTH COUNTY NORTH AMERICAN DATUM NAD83(2011), US SURVEY FEET,
2. VERTICAL DATUM IS NORTH AMERICAN VERTICAL DATUM 88 (NAVD88). CONTOUR INTERVAL IS TWO FEET.
3. TOPOGRAPHY SURVEY AND AERIAL FROM 2023 LIDAR DATA, UPDATED VIA GROUND SURVEY BY BOLTON AND MENK IN DECEMBER 2025.

REV	REVISION DESCRIPTION	DWN	APP	REV DATE
1	REVISED PER CLIENT COMMENTS	JJT	EDK	07/29/26
0	ISSUED FOR CUP	JJT	EDK	07/17/26

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SIGNATURE
DATE 07-17-2026 LICENSE # 56630

PRIME CONSULTANT

Stantec

PROJECT TITLE
CUP FIGURES

DEM-CON PILGRIM LANDFILL, LLC.

MANKATO, MINNESOTA

SHEET TITLE
EXISTING CONDITIONS – SOUTH

DWN BY	CHK'D	APP'D	DWG DATE
JJT	BWS	EDK	JULY 2026

SCALE AS SHOWN

PROJECT NO. 227708930

SHEET NO. FIGURE 1B

REV NO. 1

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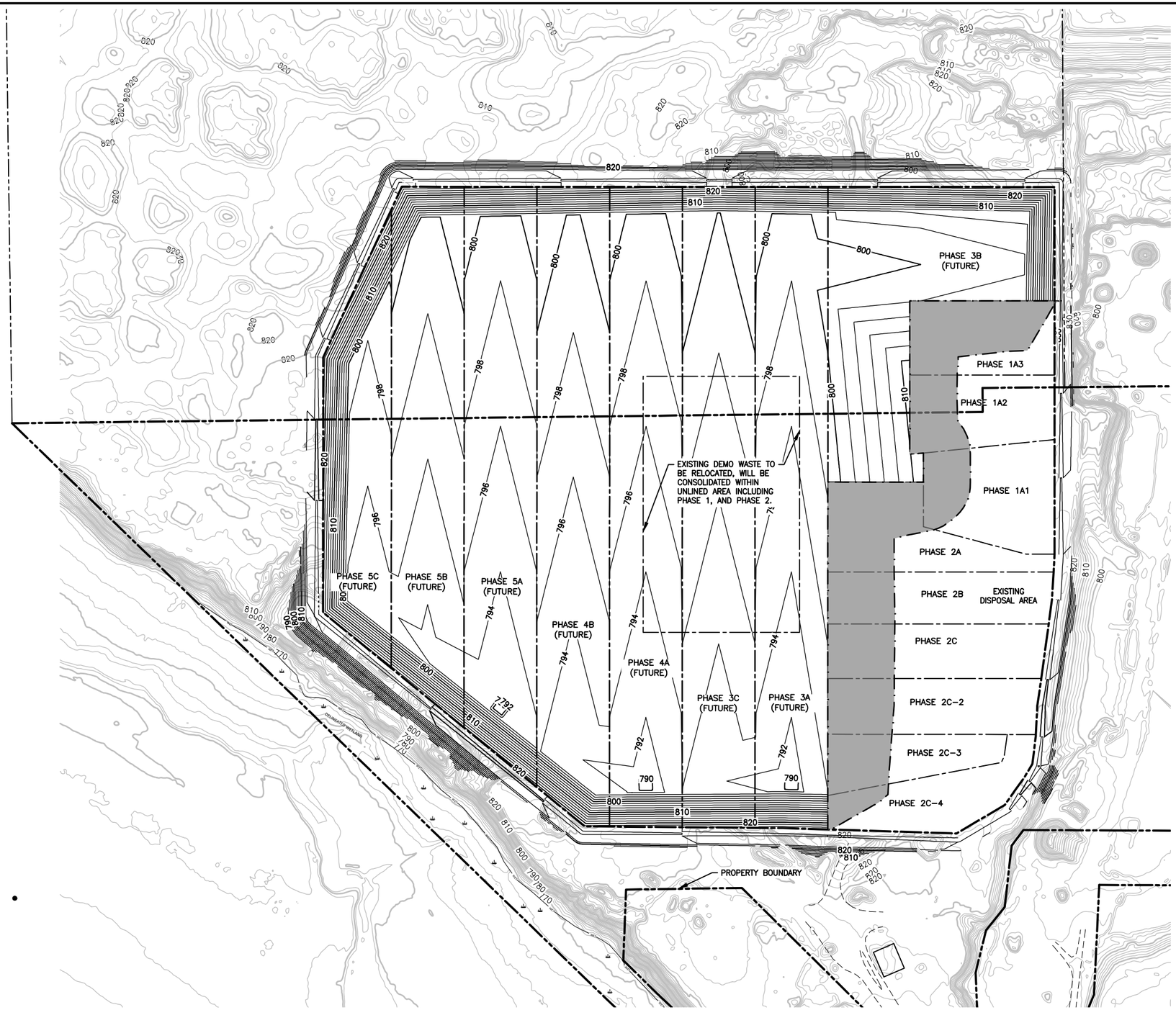

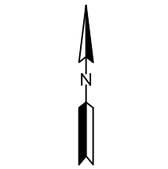

- PROPERTY BOUNDARY (SURVEYED)
- PROPERTY BOUNDARY (BEACON/GIS)
- PERMITTED WASTE LIMITS
- EXISTING PHASE BOUNDARY
- EXISTING MINOR CONTOUR
- EXISTING MAJOR CONTOUR
- EXISTING WETLAND AREA
- PROPOSED PHASE BOUNDARY
- PROPOSED MINOR CONTOUR
- PROPOSED MAJOR CONTOUR
- PROPOSED OVERLINER AREA

SURVEY NOTES:

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3. TOPOGRAPHY SURVEY FROM 2023 LIDAR DATA, UPDATED VIA GROUND SURVEY BY BOLTON AND MENK IN DECEMBER 2025.

NOTES:

1. PROPOSED GRADES SHOWN ARE TOP OF HDPE LINER GRADES.
2. BASE GRADES ARE DESIGNED A MINIMUM 5-FEET ABOVE HISTORICAL HIGH GROUNDWATER ELEVATIONS.
3. SEE FIGURE 6A FOR WASTE RELOCATION CROSS SECTIONS.

REV	REVISION DESCRIPTION	DWN	APP	REV DATE
1	REVISED PER CLIENT COMMENTS	JJT	EDK	07/29/26
0	ISSUED FOR CUP	JJT	EDK	07/17/26

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SIGNATURE

DATE 07-17-2026 LICENSE # 56630

PRIME CONSULTANT

Stantec

PROJECT TITLE
CUP FIGURES

DEM-CON PILGRIM LANDFILL, LLC.

MANKATO, MINNESOTA

SHEET TITLE
BASE GRADING PLAN

DWN BY	CHK'D	APP'D	DWG DATE
JJT	BWS	EDK	JULY 2026

SCALE AS SHOWN

PROJECT NO.	SHEET NO.	REV NO.
227708930	FIGURE 2	1

Plot Date & Time: 28 July 2026 3:02 PM

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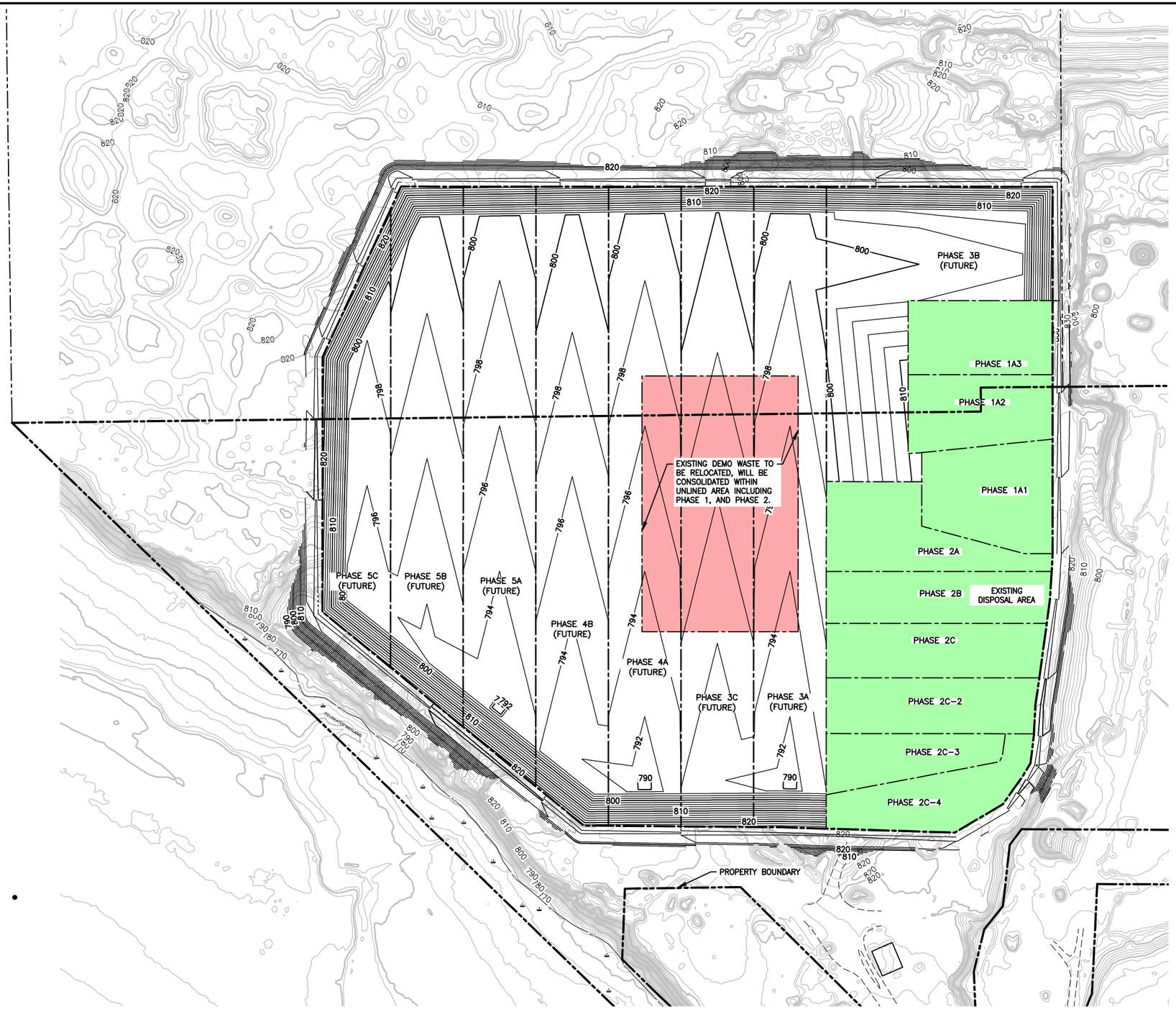

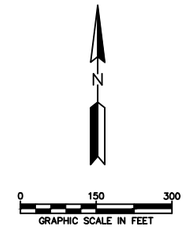

- PROPERTY BOUNDARY (SURVEYED)
- PROPERTY BOUNDARY (BEACON/GIS)
- PERMITTED WASTE LIMITS
- EXISTING PHASE BOUNDARY
- EXISTING MINOR CONTOUR
- EXISTING MAJOR CONTOUR
- EXISTING WETLAND AREA
- PROPOSED PHASE BOUNDARY
- PROPOSED MINOR CONTOUR
- PROPOSED MAJOR CONTOUR
- EXISTING DEMOLITION PILE (TO BE RELOCATED)
- EXISTING DISPOSAL AREA (ACTIVE AREA)

SURVEY NOTES:

1. HORIZONTAL DATUM IS BLUE EARTH COUNTY NORTH AMERICAN DATUM NAD83(2011), US SURVEY FEET,
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NOTES:

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2. BASE GRADES ARE DESIGNED A MINIMUM 5-FEET ABOVE HISTORICAL HIGH GROUNDWATER ELEVATIONS.
3. SEE FIGURE 6A FOR WASTE RELOCATION CROSS SECTIONS.

REV	REVISION DESCRIPTION	DWN	APP	REV DATE
1	REVISED PER CLIENT COMMENTS	JJT	EDK	07/29/26
0	ISSUED FOR CUP	JJT	EDK	07/17/26

SEAL

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PRINT NAME ETHAN KETELSEN

SIGNATURE

DATE 07-17-2026 LICENSE # 56630

PRIME CONSULTANT

Stantec

PROJECT TITLE

CUP FIGURES

DEM-CON PILGRIM LANDFILL, LLC.

MANKATO, MINNESOTA

SHEET TITLE

WASTE RELOCATION AND CAPPING PLAN

DWN BY	CHK'D	APP'D	DWG DATE
JJT	BWS	EDK	JULY 2026

SCALE AS SHOWN

PROJECT NO.	SHEET NO.	REV NO.
227708930	FIGURE 2A	1

Plot Date & Time: 28 July 2026 3:02 PM

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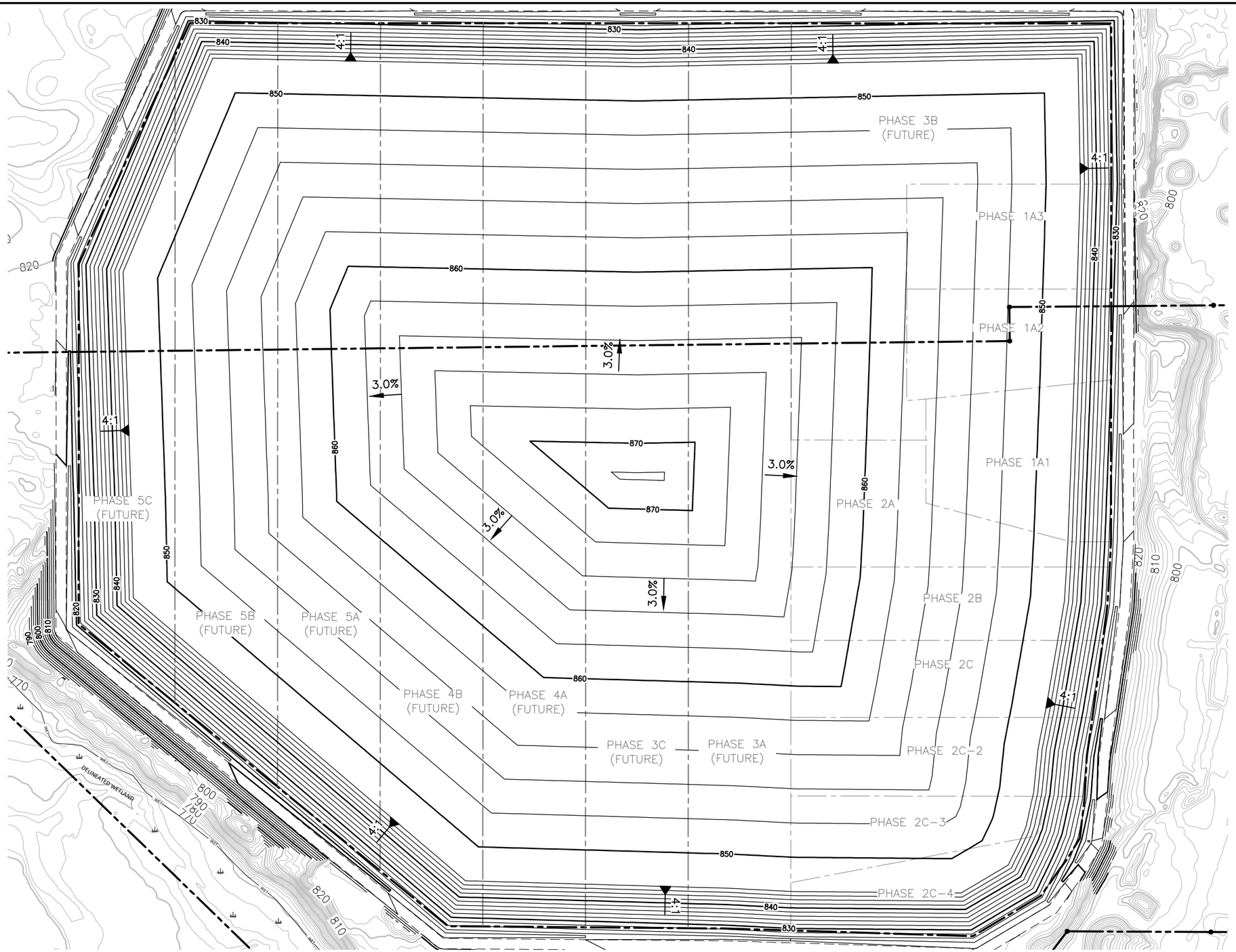

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GRAPHIC SCALE IN FEET

- PROPERTY BOUNDARY (SURVEYED)
- PROPERTY BOUNDARY (BEACON/GIS)
- PERMITTED WASTE LIMITS
- EXISTING PHASE BOUNDARY
- EXISTING MINOR CONTOUR
- EXISTING MAJOR CONTOUR
- EXISTING WETLAND AREA
- PROPOSED PHASE BOUNDARY
- PROPOSED MINOR CONTOUR
- PROPOSED MAJOR CONTOUR

SURVEY NOTES:

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NOTES:

1. PROPOSED GRADES SHOWN ARE TOP OF FINAL COVER GRADES.

REV	REVISION DESCRIPTION	DWN	APP	REV DATE
1	REVISED PER CLIENT COMMENTS	JJT	EDK	07/29/26
0	ISSUED FOR CUP	JJT	EDK	07/17/26

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SIGNATURE

DATE 07-17-2026 LICENSE # 56630

PRIME CONSULTANT

Stantec

PROJECT TITLE
CUP FIGURES

DEM-CON PILGRIM LANDFILL, LLC.

MANKATO, MINNESOTA

SHEET TITLE
FINAL COVER GRADING PLAN

DWN BY	CHK'D	APP'D	DWG DATE
JJT	BWS	EDK	JULY 2026

SCALE AS SHOWN

PROJECT NO.	SHEET NO.	REV NO.
227708930	FIGURE 3	1

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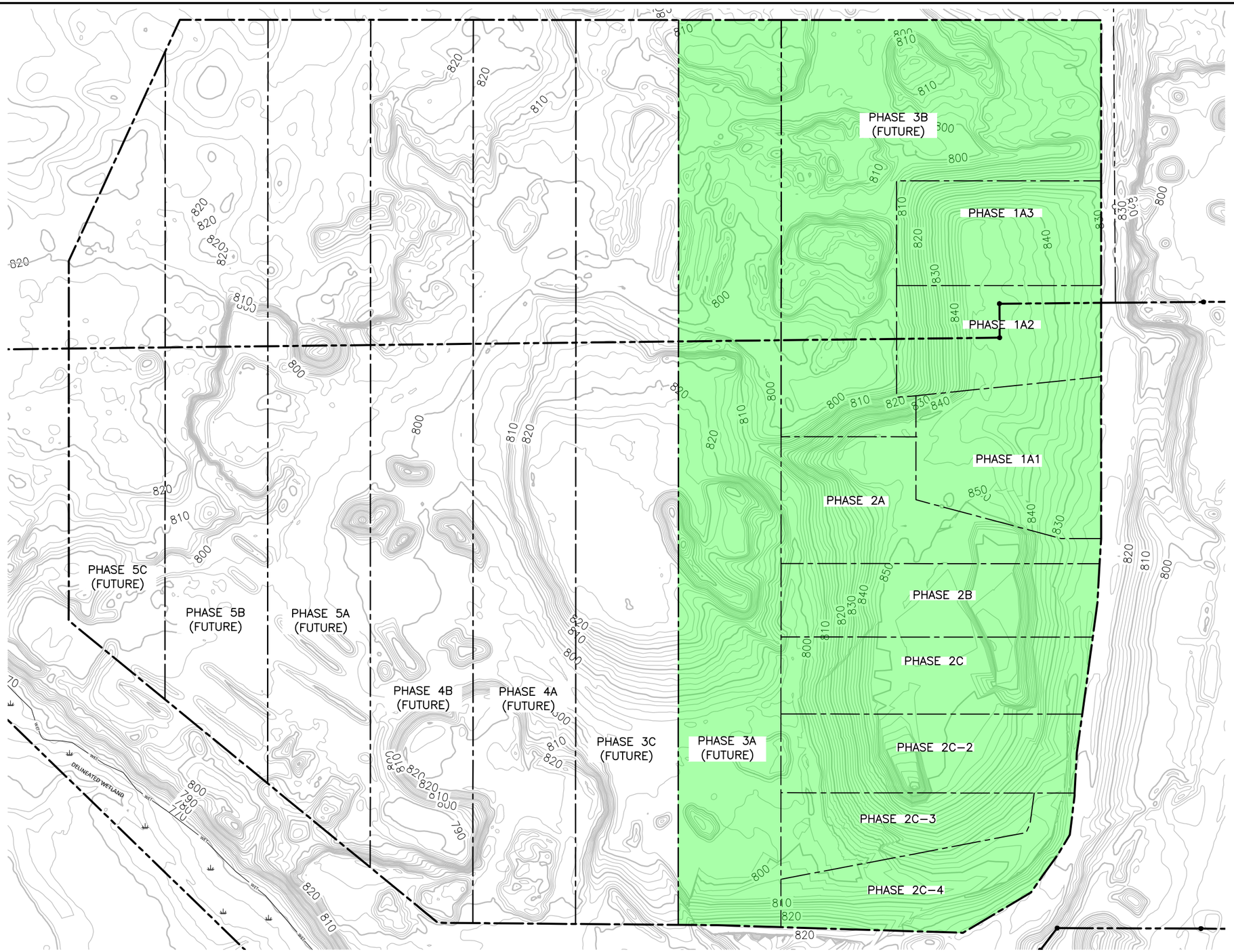

SURVEY NOTES:

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NOTES:

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REV	REVISION DESCRIPTION	DWN	APP	REV DATE
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0	ISSUED FOR CUP	JJT	EDK	07/17/26

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DATE 07-17-2026 LICENSE # 56630

PRIME CONSULTANT

Stantec

PROJECT TITLE

CUP FIGURES

DEM-CON PILGRIM LANDFILL, LLC.

MANKATO, MINNESOTA

SHEET TITLE

FUTURE FILL PHASING PLAN

DWN BY	CHK'D	APP'D	DWG DATE
JJT	BWS	EDK	JULY 2026

SCALE AS SHOWN

PROJECT NO. 227708930

SHEET NO. FIGURE 3A

REV NO. 1

Plot Date & Time: 28 July 2026 11:31 AM

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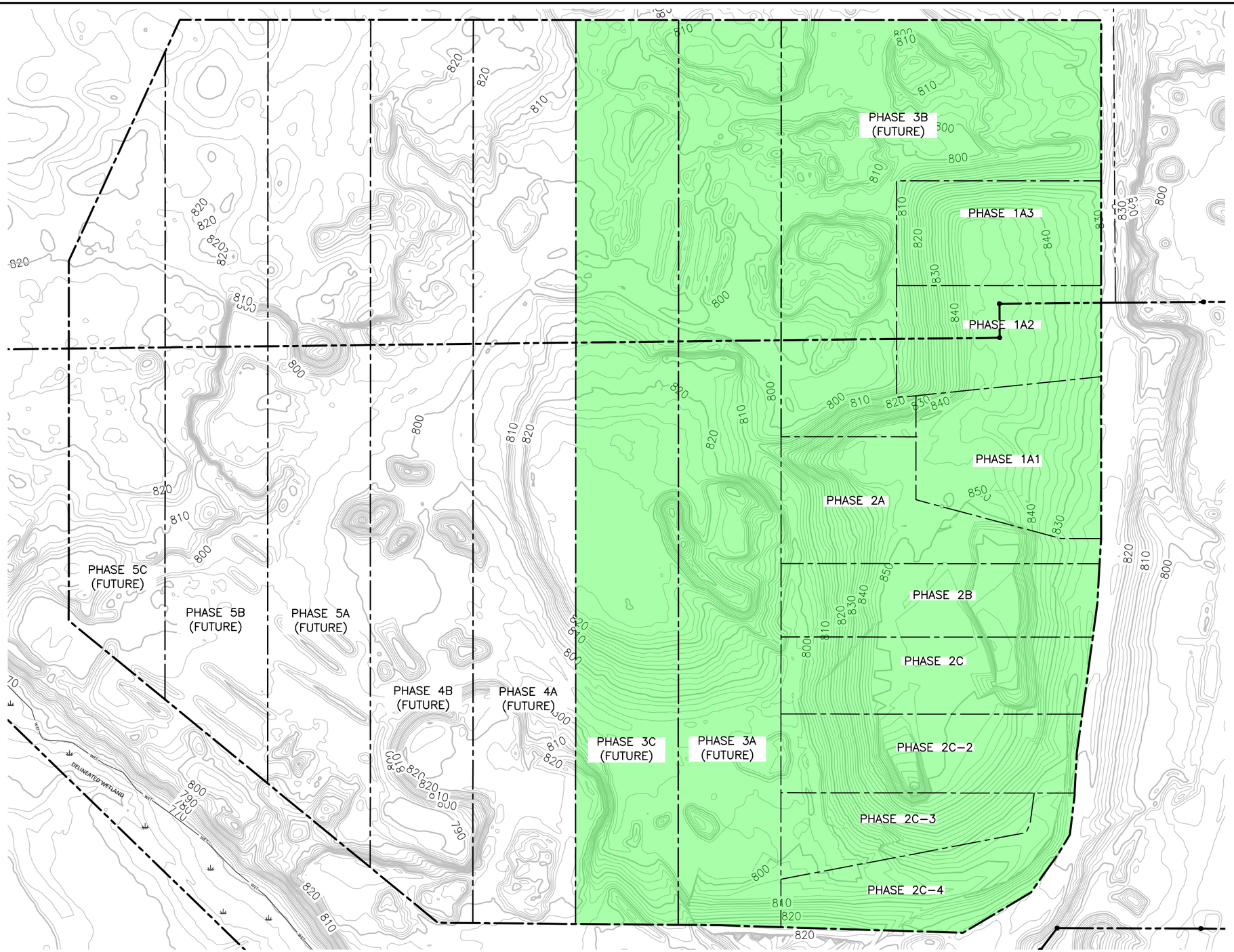

SURVEY NOTES:

1. HORIZONTAL DATUM IS BLUE EARTH COUNTY NORTH AMERICAN DATUM NAD83(2011), US SURVEY FEET,
2. VERTICAL DATUM IS NORTH AMERICAN VERTICAL DATUM 88 (NAVD88). CONTOUR INTERVAL IS TWO FEET.
3. TOPOGRAPHY SURVEY FROM 2023 LIDAR DATA, UPDATED VIA GROUND SURVEY BY BOLTON AND MENK IN DECEMBER 2025.

NOTES:

1. PROPOSED GRADES SHOWN ARE TO BE TOP OF WASTE GRADES.

REV	REVISION DESCRIPTION	DWN	APP	REV DATE
1	REVISED PER CLIENT COMMENTS	JJT	EDK	07/29/26
0	ISSUED FOR CUP	JJT	EDK	07/17/26

SEAL

I HEREBY CERTIFY THAT THIS PLAN, SPECIFICATION, OR REPORT WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA.

PRINT NAME ETHAN KETELSEN

SIGNATURE

DATE 07-17-2026 LICENSE # 56630

PRIME CONSULTANT

Stantec

PROJECT TITLE

CUP FIGURES

DEM-CON PILGRIM LANDFILL, LLC.

MANKATO, MINNESOTA

SHEET TITLE

FUTURE FILL PHASING PLAN

DWN BY	CHK'D	APP'D	DWG DATE
JJT	BWS	EDK	JULY 2026

SCALE AS SHOWN

PROJECT NO. 227708930

SHEET NO. FIGURE 3B

REV NO. 1

Plot Date & Time: 28 July 2026 11:35 AM

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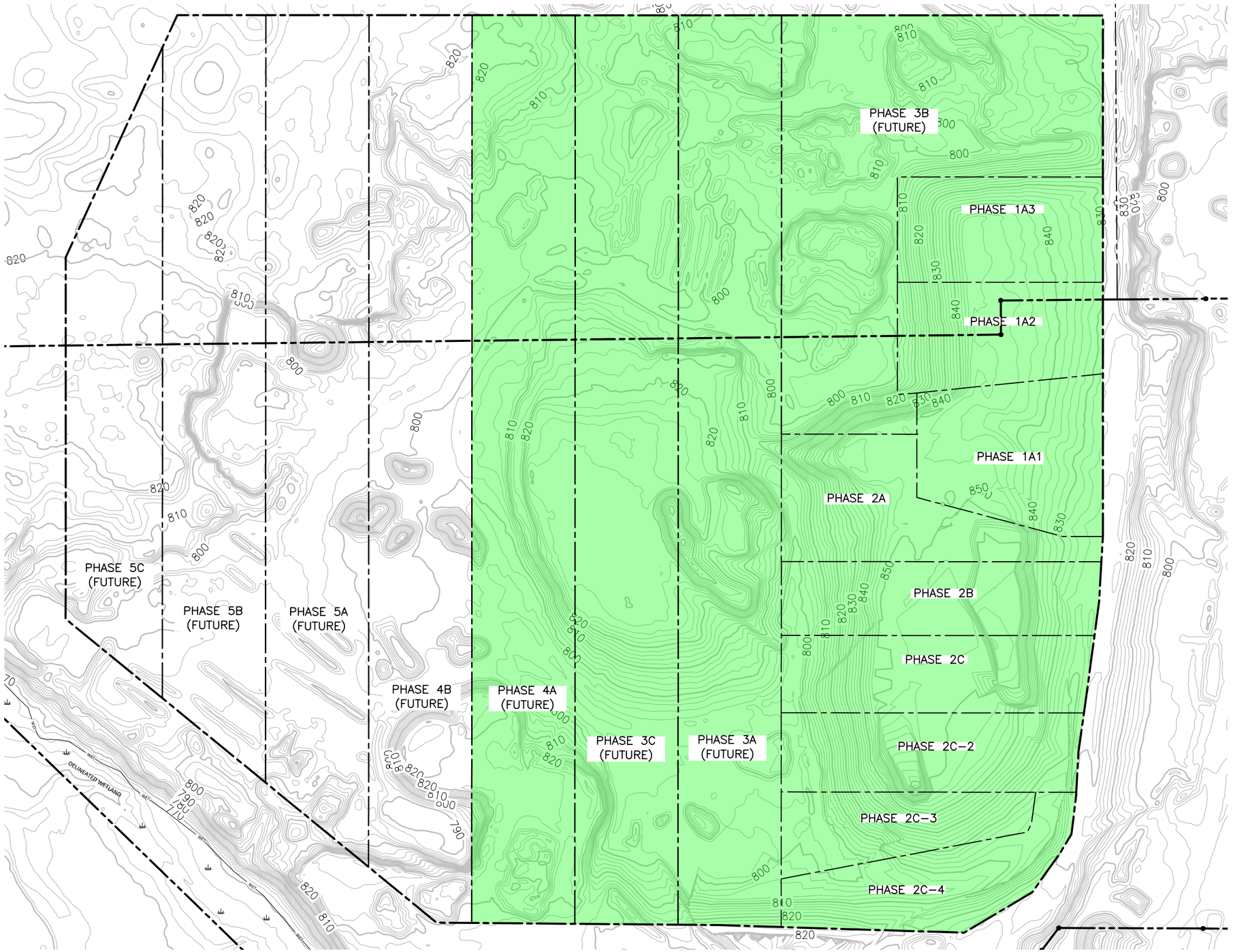

PROPERTY BOUNDARY (SURVEYED)
PROPERTY BOUNDARY (BEACON/GIS)
PERMITTED WASTE LIMITS
EXISTING PHASE BOUNDARY
EXISTING MINOR CONTOUR
EXISTING MAJOR CONTOUR
EXISTING WETLAND AREA
PROPOSED PHASE BOUNDARY
PROPOSED MINOR CONTOUR
PROPOSED MAJOR CONTOUR

SURVEY NOTES:

1. HORIZONTAL DATUM IS BLUE EARTH COUNTY NORTH AMERICAN DATUM NAD83(2011), US SURVEY FEET,
2. VERTICAL DATUM IS NORTH AMERICAN VERTICAL DATUM 88 (NAVD88). CONTOUR INTERVAL IS TWO FEET.
3. TOPOGRAPHY SURVEY FROM 2023 LIDAR DATA, UPDATED VIA GROUND SURVEY BY BOLTON AND MENK IN DECEMBER 2025.

NOTES:

1. PROPOSED GRADES SHOWN ARE TO BE TOP OF WASTE GRADES.

REV	REVISION DESCRIPTION	DWN	APP	REV DATE
1	REVISED PER CLIENT COMMENTS	JJT	EDK	07/29/26
0	ISSUED FOR CUP	JJT	EDK	07/17/26

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PRINT NAME ETHAN KETELSEN

SIGNATURE Ethan Ketelsen

DATE 07-17-2026 LICENSE # 56630

PRIME CONSULTANT

Stantec

PROJECT TITLE

CUP FIGURES

DEM-CON PILGRIM LANDFILL, LLC.

MANKATO, MINNESOTA

SHEET TITLE

FUTURE FILL PHASING PLAN

DWN BY	CHK'D	APP'D	DWG DATE	JULY 2026
JJT	BWS	EDK	SCALE	AS SHOWN

PROJECT NO.	SHEET NO.	REV NO.
227708930	FIGURE 3C	1

Plot Date & Time: 28 July 2026 11:35 AM

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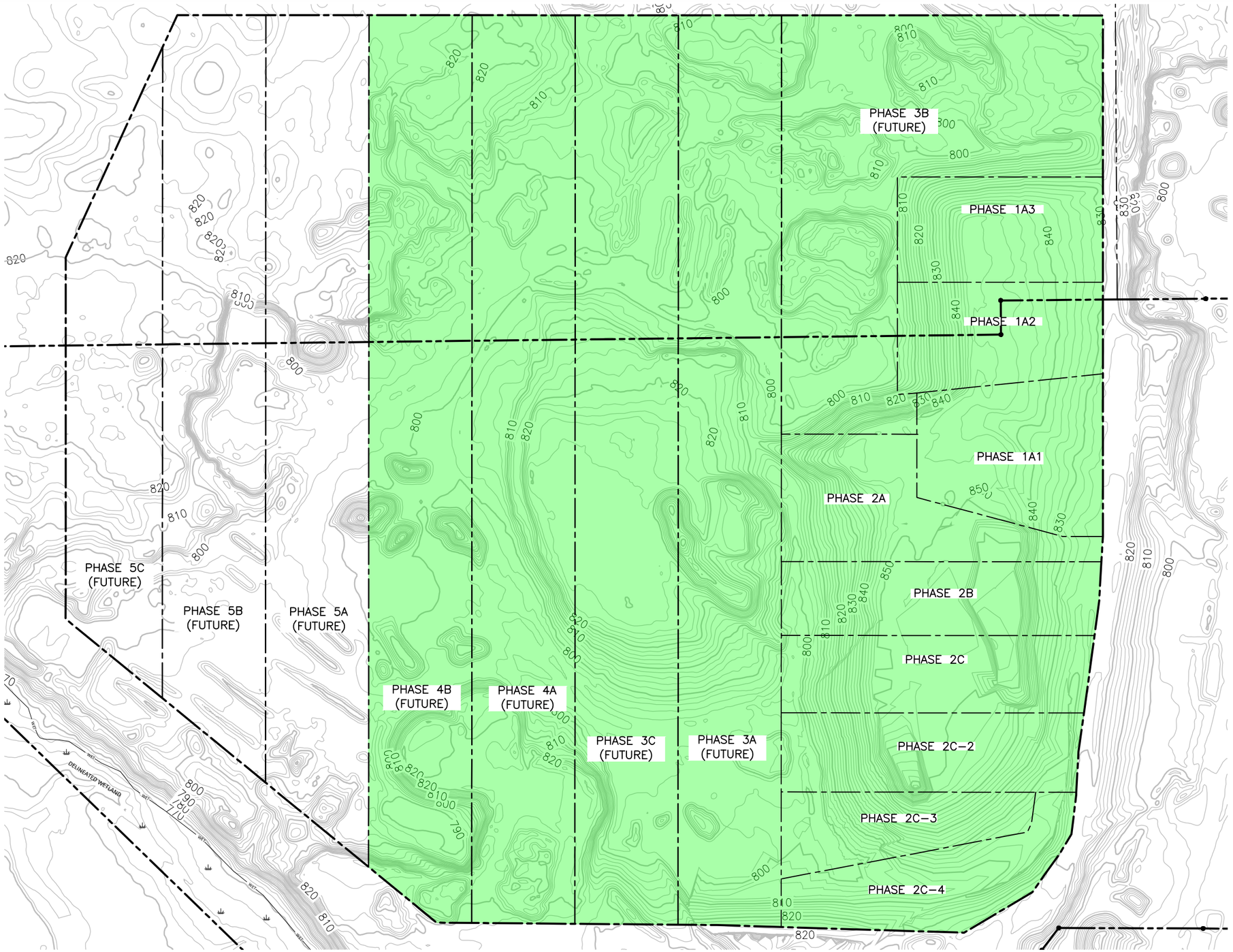

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0 100 200
GRAPHIC SCALE IN FEET

- PROPERTY BOUNDARY (SURVEYED)
- PROPERTY BOUNDARY (BEACON/GIS)
- PERMITTED WASTE LIMITS
- EXISTING PHASE BOUNDARY
- EXISTING MINOR CONTOUR
- EXISTING MAJOR CONTOUR
- EXISTING WETLAND AREA
- PROPOSED PHASE BOUNDARY
- PROPOSED MINOR CONTOUR
- PROPOSED MAJOR CONTOUR

SURVEY NOTES:

1. HORIZONTAL DATUM IS BLUE EARTH COUNTY NORTH AMERICAN DATUM NAD83(2011), US SURVEY FEET,
2. VERTICAL DATUM IS NORTH AMERICAN VERTICAL DATUM 88 (NAVD88). CONTOUR INTERVAL IS TWO FEET.
3. TOPOGRAPHY SURVEY FROM 2023 LIDAR DATA, UPDATED VIA GROUND SURVEY BY BOLTON AND MENK IN DECEMBER 2025.

NOTES:

1. PROPOSED GRADES SHOWN ARE TO BE TOP OF WASTE GRADES.

REV	REVISION DESCRIPTION	DWN	APP	REV DATE
1	REVISED PER CLIENT COMMENTS	JJT	EDK	07/29/26
0	ISSUED FOR CUP	JJT	EDK	07/17/26

SEAL

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SIGNATURE Ethan Ketelsen

DATE 07-17-2026 LICENSE # 56630

PRIME CONSULTANT

Stantec

PROJECT TITLE

CUP FIGURES

DEM-CON PILGRIM LANDFILL, LLC.

MANKATO, MINNESOTA

SHEET TITLE

FUTURE FILL PHASING PLAN

DWN BY	CHK'D	APP'D	DWG DATE	JULY 2026
JJT	BWS	EDK	SCALE	AS SHOWN

PROJECT NO.	SHEET NO.	REV NO.
227708930	FIGURE 3D	1

Plot Date & Time: 28 July 2026 11:37 AM

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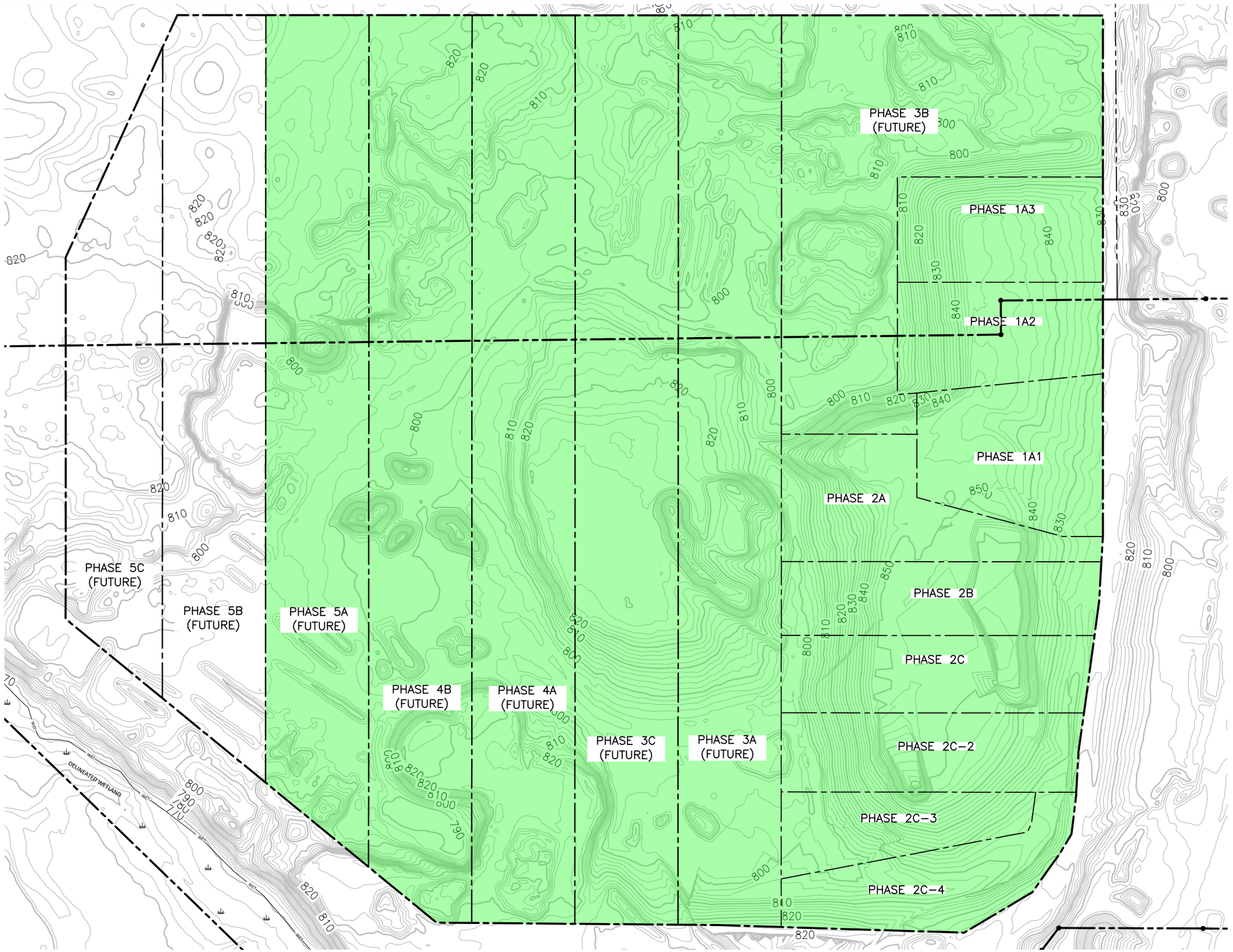

PROPERTY BOUNDARY (SURVEYED)
PROPERTY BOUNDARY (BEACON/GIS)
PERMITTED WASTE LIMITS
EXISTING PHASE BOUNDARY
EXISTING MINOR CONTOUR
EXISTING MAJOR CONTOUR
EXISTING WETLAND AREA
PROPOSED PHASE BOUNDARY
PROPOSED MINOR CONTOUR
PROPOSED MAJOR CONTOUR

SURVEY NOTES:

1. HORIZONTAL DATUM IS BLUE EARTH COUNTY NORTH AMERICAN DATUM NAD83(2011), US SURVEY FEET,
2. VERTICAL DATUM IS NORTH AMERICAN VERTICAL DATUM 88 (NAVD88). CONTOUR INTERVAL IS TWO FEET.
3. TOPOGRAPHY SURVEY FROM 2023 LIDAR DATA, UPDATED VIA GROUND SURVEY BY BOLTON AND MENK IN DECEMBER 2025.

NOTES:

1. PROPOSED GRADES SHOWN ARE TO BE TOP OF WASTE GRADES.

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0	ISSUED FOR CUP	JJT	EDK	07/17/26

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PRINT NAME ETHAN KETELSEN

SIGNATURE Ethan Ketelsen

DATE 07-17-2026 LICENSE # 56630

PRIME CONSULTANT

Stantec

PROJECT TITLE

CUP FIGURES

DEM-CON PILGRIM LANDFILL, LLC.

MANKATO, MINNESOTA

SHEET TITLE

FUTURE FILL PHASING PLAN

DWN BY	CHK'D	APP'D	DWG DATE	JULY 2026
JJT	BWS	EDK	SCALE	AS SHOWN

PROJECT NO.	SHEET NO.	REV NO.
227708930	FIGURE 3E	1

Plot Date & Time: 28 July 2026 11:38 AM

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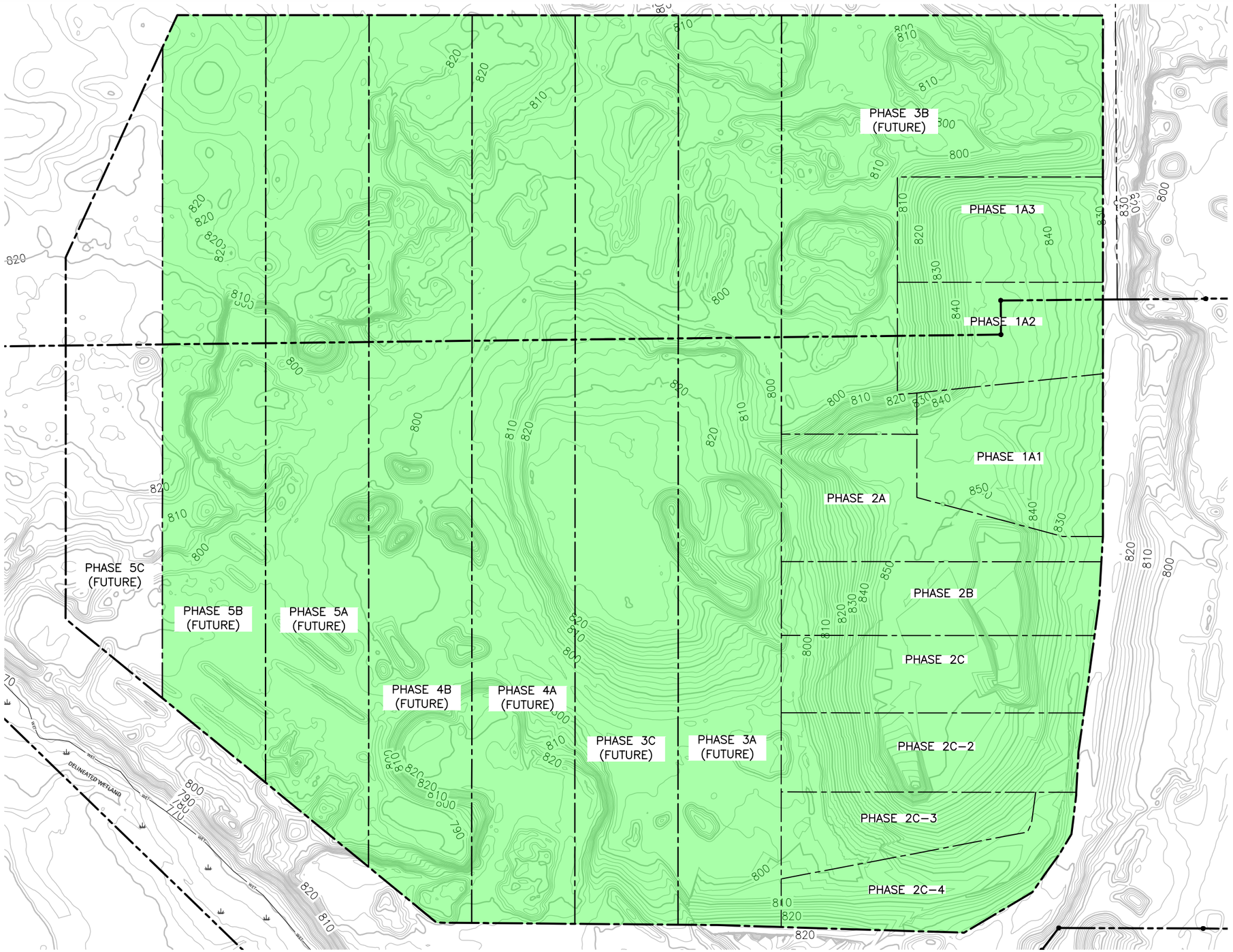

SURVEY NOTES:

1. HORIZONTAL DATUM IS BLUE EARTH COUNTY NORTH AMERICAN DATUM NAD83(2011), US SURVEY FEET,
2. VERTICAL DATUM IS NORTH AMERICAN VERTICAL DATUM 88 (NAVD88). CONTOUR INTERVAL IS TWO FEET.
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NOTES:

1. PROPOSED GRADES SHOWN ARE TO BE TOP OF WASTE GRADES.

REV	REVISION DESCRIPTION	DWN	APP	REV DATE
1	REVISED PER CLIENT COMMENTS	JJT	EDK	07/29/26
0	ISSUED FOR CUP	JJT	EDK	07/17/26

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PRINT NAME ETHAN KETELSEN

SIGNATURE

DATE 07-17-2026 LICENSE # 56630

PRIME CONSULTANT

Stantec

PROJECT TITLE

CUP FIGURES

DEM–CON PILGRIM LANDFILL, LLC.

MANKATO, MINNESOTA

SHEET TITLE

FUTURE FILL PHASING PLAN

DWN BY	CHK'D	APP'D	DWG DATE
JJT	BWS	EDK	JULY 2026

SCALE AS SHOWN

PROJECT NO.	SHEET NO.	REV NO.
227708930	FIGURE 3F	1

Plot Date & Time: 28 July 2026 11:39 AM

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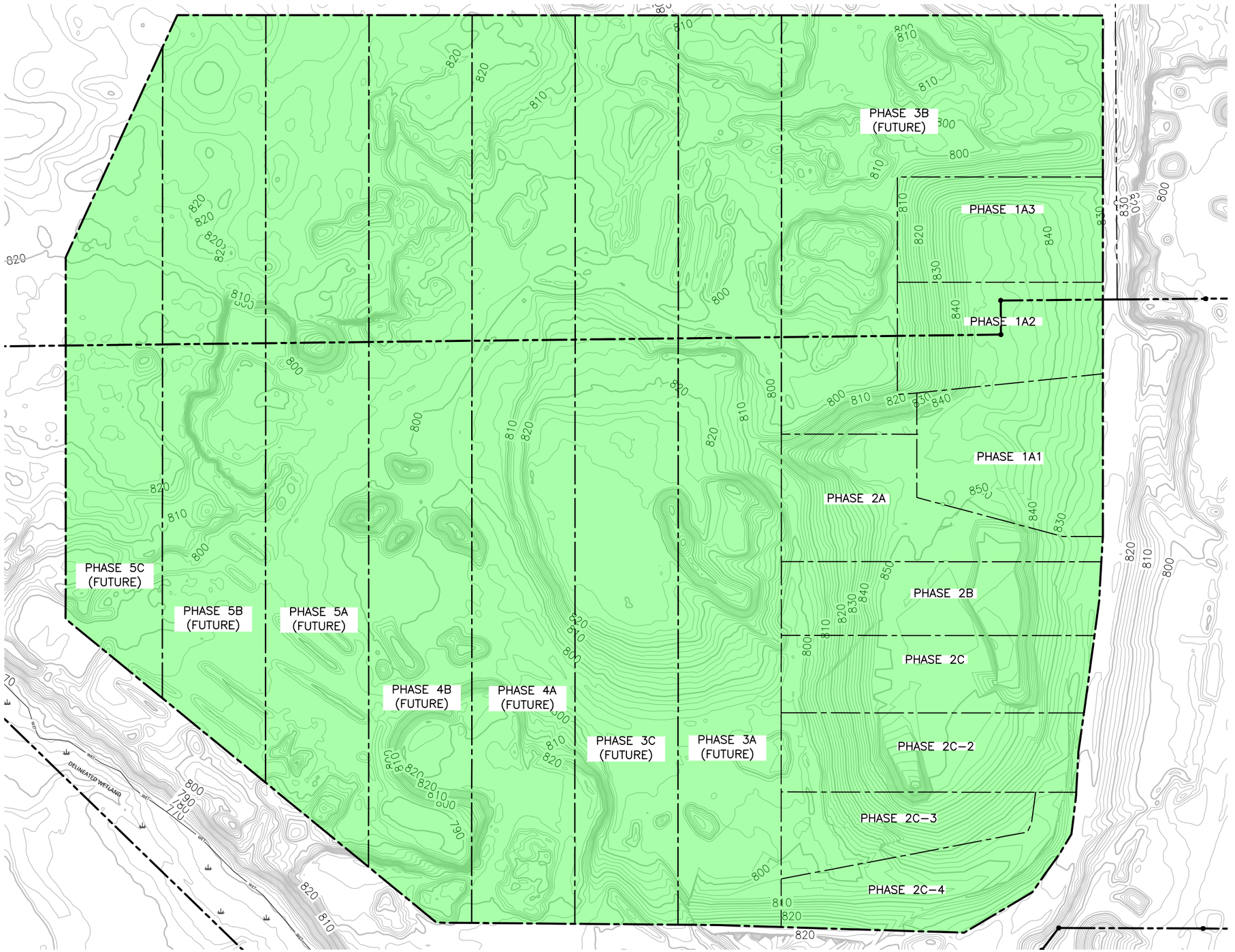

N

0 100 200
GRAPHIC SCALE IN FEET

- PROPERTY BOUNDARY (SURVEYED)
- PROPERTY BOUNDARY (BEACON/GIS)
- PERMITTED WASTE LIMITS
- EXISTING PHASE BOUNDARY
- EXISTING MINOR CONTOUR
- EXISTING MAJOR CONTOUR
- EXISTING WETLAND AREA
- PROPOSED PHASE BOUNDARY
- PROPOSED MINOR CONTOUR
- PROPOSED MAJOR CONTOUR

SURVEY NOTES:

1. HORIZONTAL DATUM IS BLUE EARTH COUNTY NORTH AMERICAN DATUM NAD83(2011), US SURVEY FEET,
2. VERTICAL DATUM IS NORTH AMERICAN VERTICAL DATUM 88 (NAVD88). CONTOUR INTERVAL IS TWO FEET.
3. TOPOGRAPHY SURVEY FROM 2023 LIDAR DATA, UPDATED VIA GROUND SURVEY BY BOLTON AND MENK IN DECEMBER 2025.

NOTES:

1. PROPOSED GRADES SHOWN ARE TO BE TOP OF WASTE GRADES.

REV	REVISION DESCRIPTION	DWN	APP	REV DATE
1	REVISED PER CLIENT COMMENTS	JJT	EDK	07/29/26
0	ISSUED FOR CUP	JJT	EDK	07/17/26

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PRINT NAME ETHAN KETELSEN

SIGNATURE Ethan Ketelsen

DATE 07-17-2026 LICENSE # 56630

PRIME CONSULTANT

Stantec

PROJECT TITLE

CUP FIGURES

DEM-CON PILGRIM LANDFILL, LLC.

MANKATO, MINNESOTA

SHEET TITLE

FUTURE FILL PHASING PLAN

DWN BY	CHK'D	APP'D	DWG DATE	JULY 2026
JJT	BWS	EDK	SCALE	AS SHOWN

PROJECT NO.	SHEET NO.	REV NO.
227708930	FIGURE 3G	1

Plot Date & Time: 28 July 2026 11:39 AM

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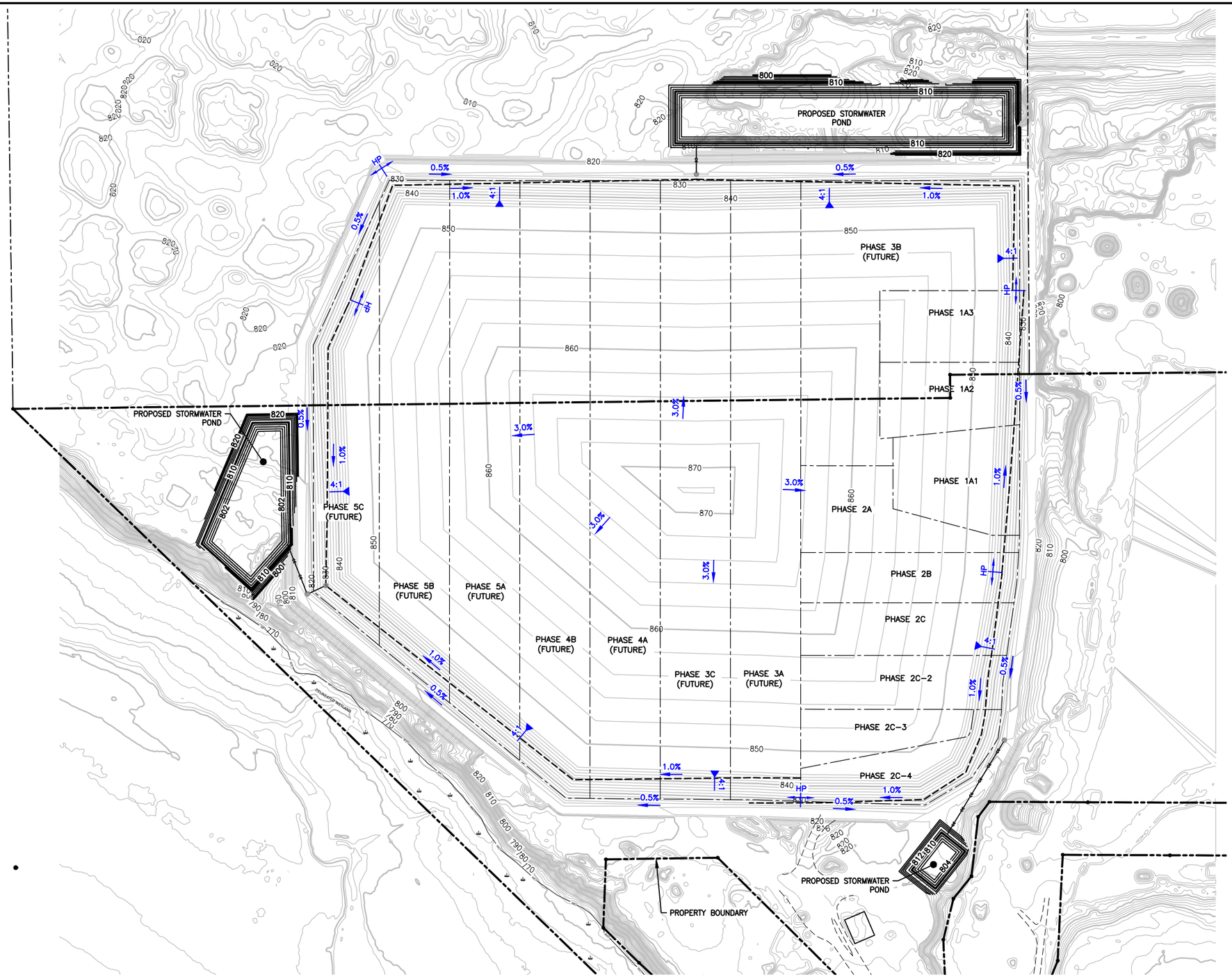

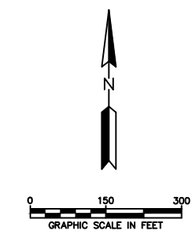

- PROPERTY BOUNDARY (SURVEYED)
- PROPERTY BOUNDARY (BEACON/GIS)
- PERMITTED WASTE LIMITS
- EXISTING PHASE BOUNDARY
- EXISTING MINOR CONTOUR
- EXISTING MAJOR CONTOUR
- EXISTING WETLAND AREA
- PROPOSED PHASE BOUNDARY
- PROPOSED MINOR CONTOUR
- PROPOSED MAJOR CONTOUR
- PROPOSED STORMWATER SWALE
- PROPOSED STORMWATER PIPE
- PROPOSED STORMWATER INLET

SURVEY NOTES:

1. HORIZONTAL DATUM IS BLUE EARTH COUNTY NORTH AMERICAN DATUM NAD83(2011), US SURVEY FEET,
2. VERTICAL DATUM IS NORTH AMERICAN VERTICAL DATUM 88 (NAVD88). CONTOUR INTERVAL IS TWO FEET.
3. TOPOGRAPHY SURVEY FROM 2023 LIDAR DATA, UPDATED VIA GROUND SURVEY BY BOLTON AND MENK IN DECEMBER 2025.

NOTES:

1. PROPOSED GRADES SHOWN ARE TOP OF FINAL COVER GRADES.
2. PROPOSED STORMWATER POND GRADING IS INTENDED TO SHOW STORAGE, FINAL POND GRADING MAY VARY AT TIME OF CONSTRUCTION.

REV	REVISION DESCRIPTION	DWN	APP	REV DATE
1	REVISED PER CLIENT COMMENTS	JJT	EDK	07/29/26
0	ISSUED FOR CUP	JJT	EDK	07/17/26

SEAL

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PRINT NAME ETHAN KETELSEN

SIGNATURE

DATE 07-17-2026 LICENSE # 56630

PRIME CONSULTANT

Stantec

PROJECT TITLE

CUP FIGURES

DEM-CON PILGRIM LANDFILL, LLC.

MANKATO, MINNESOTA

SHEET TITLE

SURFACE WATER MANAGEMENT PLAN

DWN BY	CHK'D	APP'D	DWG DATE	JULY 2026
JJT	BWS	EDK	SCALE	AS SHOWN

PROJECT NO.	SHEET NO.	REV NO.
227708930	FIGURE 4	1

Plot Date & Time: 29 July 2026 1:06 PM

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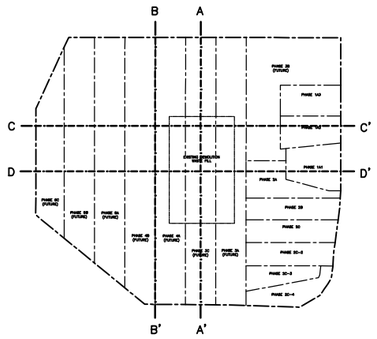
Plot Date & Time: 29 July 2026 1:23 PM



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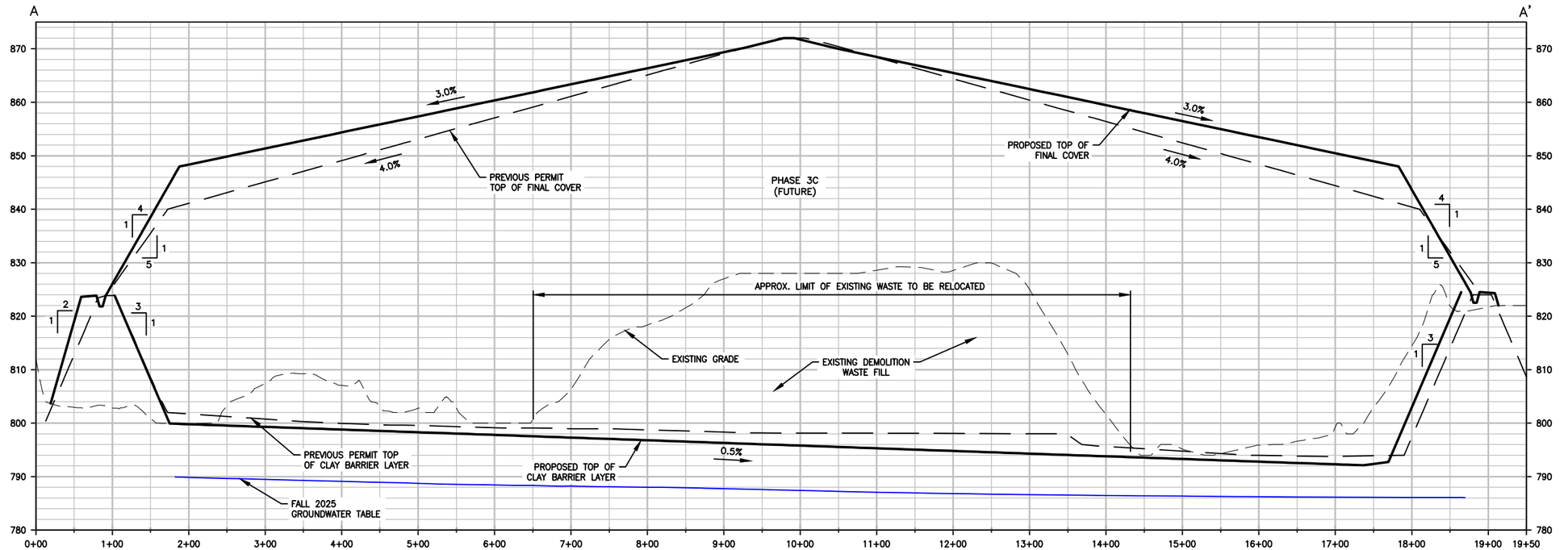
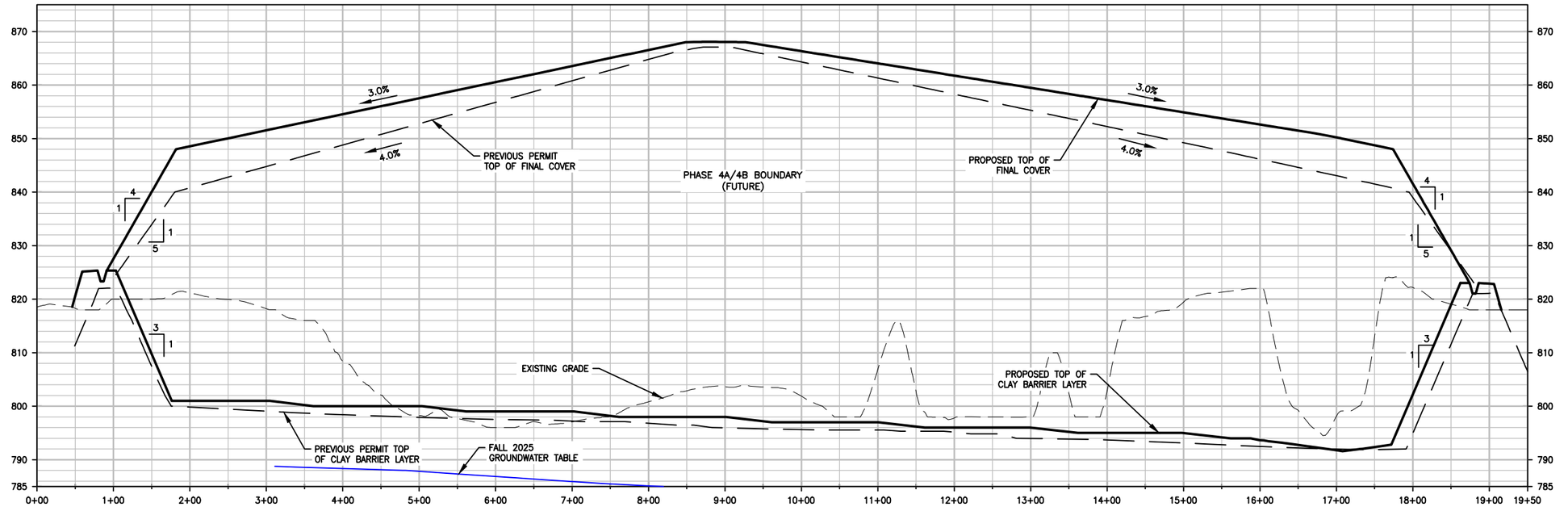
GRAPHIC SCALE IN FEET

NOTES:

SEE FIGURE 11 FOR FALL 2025 GROUNDWATER CONTOUR MAP.





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GRAPHIC SCALE IN FEET

VERTICAL EXAGGERATION: 7.0X

REV	REVISION DESCRIPTION	DWN	APP	REV DATE
1	REVISED PER CLIENT COMMENTS	JJT	EDK	07/29/26
0	ISSUED FOR CUP	JJT	EDK	07/17/26

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SIGNATURE

DATE 07-17-2026 LICENSE # 56630

PRIME CONSULTANT

Stantec

PROJECT TITLE
CUP FIGURES

DEM-CON PILGRIM LANDFILL, LLC.

MANKATO, MINNESOTA

SHEET TITLE
CROSS SECTIONS

DWN BY	CHK'D	APP'D	DWG DATE
JJT	BWS	EDK	JULY 2026

SCALE AS SHOWN

PROJECT NO. 227708930

SHEET NO. FIGURE 5

REV NO. 1

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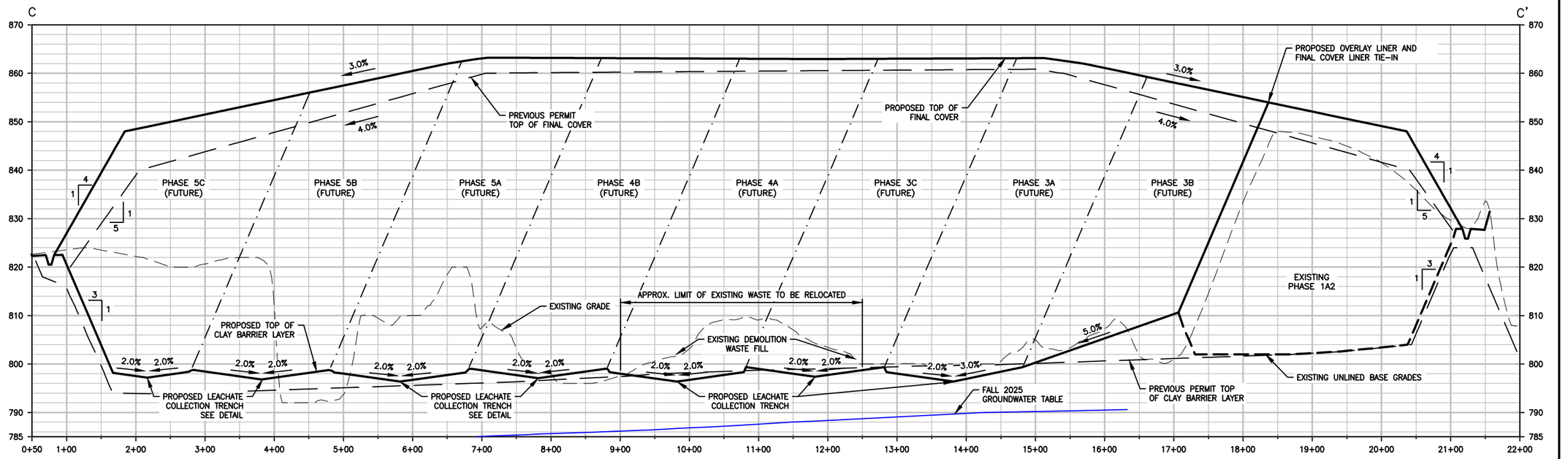
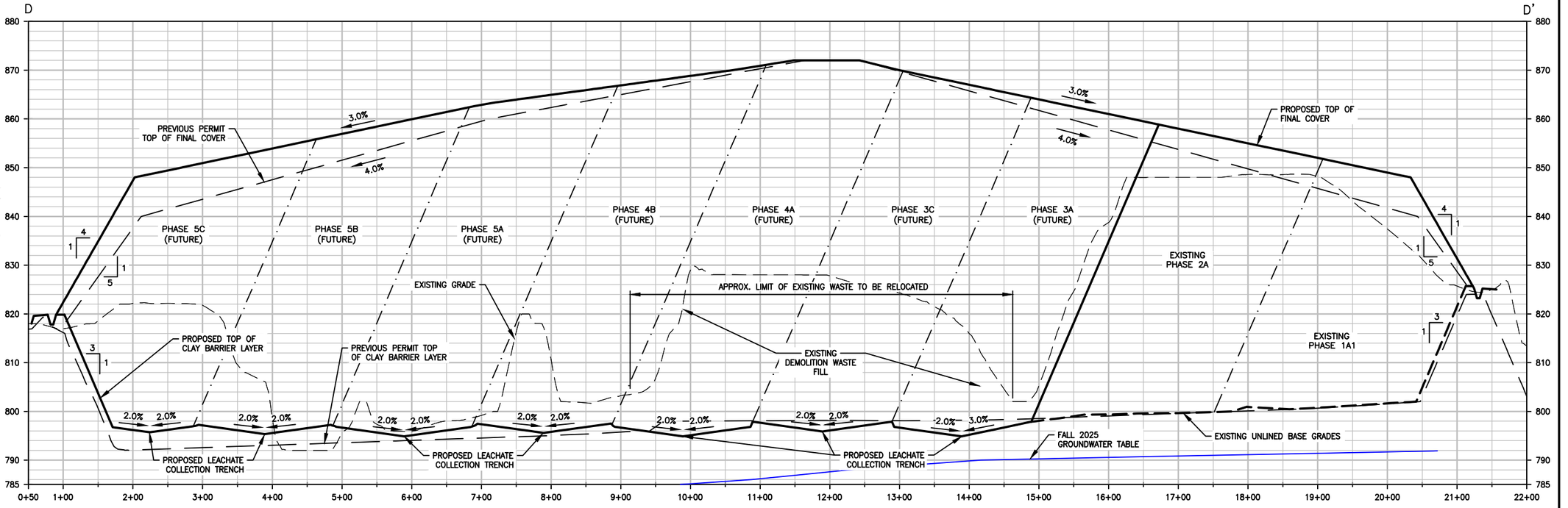
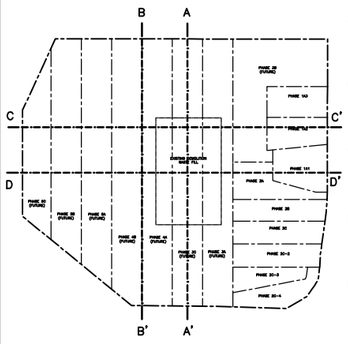
Plot Date & Time: 29 July 2026 1:23 PM







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0 500 1000
GRAPHIC SCALE IN FEET

NOTES:

SEE FIGURE 11 FOR FALL 2025 GROUNDWATER CONTOUR MAP.

0 80 160
GRAPHIC SCALE IN FEET

VERTICAL EXAGGERATION: 7.0X

REV	REVISION DESCRIPTION	DWN	APP	REV DATE
1	REVISED PER CLIENT COMMENTS	JJT	EDK	07/29/26
0	ISSUED FOR CUP	JJT	EDK	07/17/26

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PRINT NAME ETHAN KETELSEN

SIGNATURE

DATE 07-17-2026 LICENSE # 56630

PRIME CONSULTANT

Stantec

PROJECT TITLE

CUP FIGURES

DEM-CON PILGRIM LANDFILL, LLC.

MANKATO, MINNESOTA

SHEET TITLE

CROSS SECTIONS

DWN BY	CHK'D	APP'D	DWG DATE
JJT	BWS	EDK	JULY 2026

SCALE AS SHOWN

PROJECT NO. 227708930

SHEET NO. FIGURE 6

REV NO. 1

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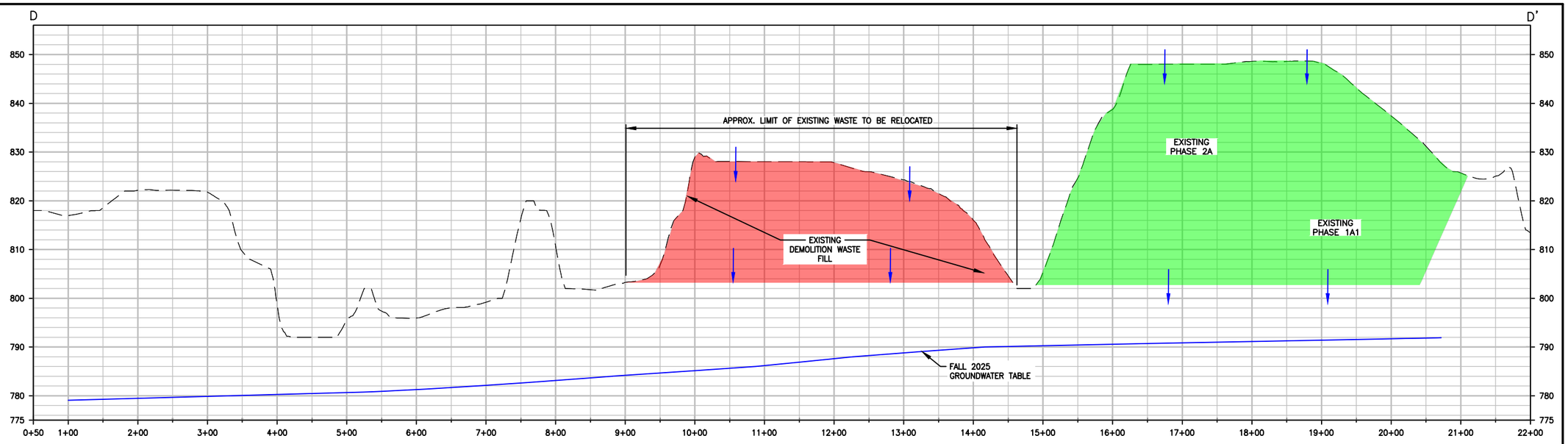
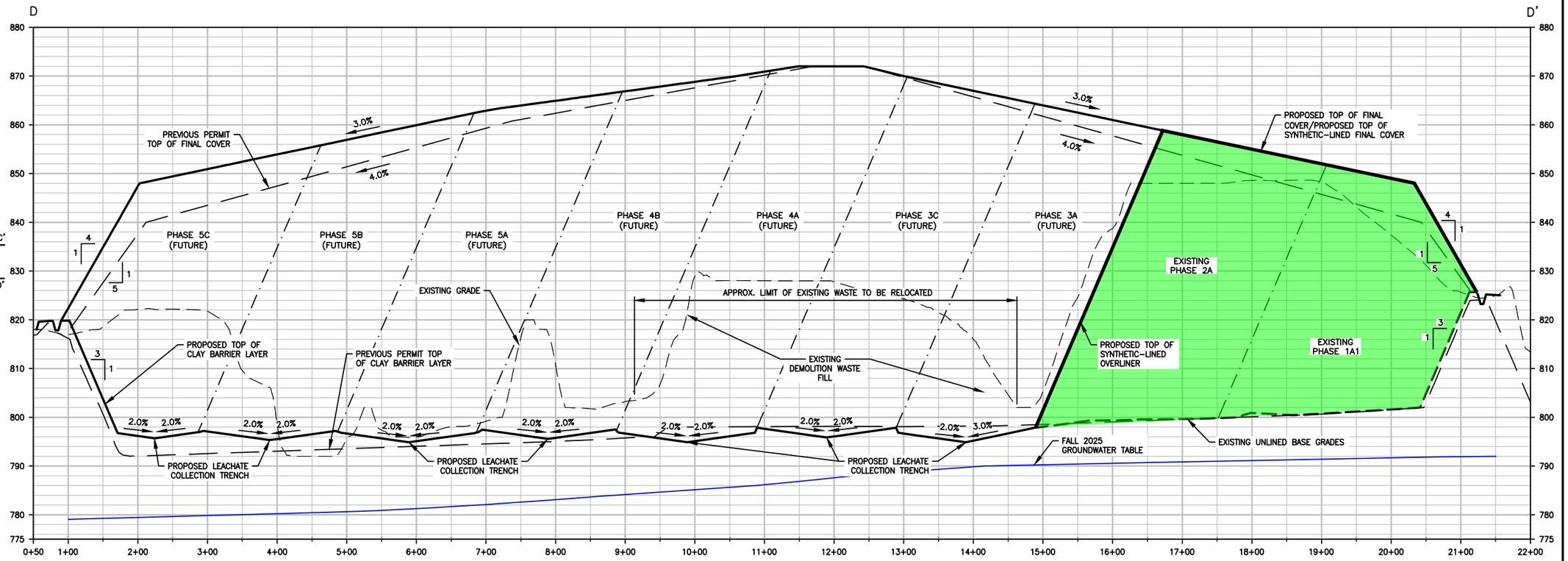
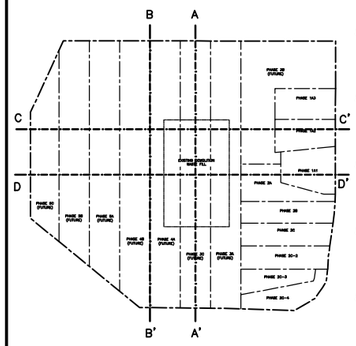
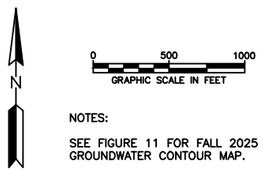
Plot Date & Time: 29 July 2026 1:23 PM



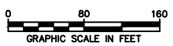






NOTES:

SEE FIGURE 11 FOR FALL 2025 GROUNDWATER CONTOUR MAP.



VERTICAL EXAGGERATION: 7.0X

REV	REVISION DESCRIPTION	DWN	APP	REV DATE
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0	ISSUED FOR CUP	JJT	EDK	07/17/26

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SIGNATURE

DATE 07-17-2026 LICENSE # 56630

PRIME CONSULTANT

Stantec

PROJECT TITLE

CUP FIGURES

DEM-CON PILGRIM LANDFILL, LLC.

MANKATO, MINNESOTA

SHEET TITLE

WASTE RELOCATION CROSS SECTIONS

DWN BY	CHK'D	APP'D	DWG DATE
JJT	BWS	EDK	JULY 2026

SCALE AS SHOWN

PROJECT NO. 227708930

SHEET NO. FIGURE 6A

REV NO. 1

I:\227708930\drafting\cad\Figures\Figure 5_Cross Sections.dwg

Plot Date & Time: 28 July 2026 1:37 PM



N

0 200 400
GRAPHIC SCALE IN FEET

- PROPERTY BOUNDARY (SURVEYED)
- PROPERTY BOUNDARY (BEACON/GIS)
- PERMITTED WASTE LIMITS
- EXISTING WETLAND AREA
- EXISTING ROAD EDGE
- MW-1 EXISTING MONITORING WELL
- COMPLIANCE BOUNDARY

SURVEY NOTES:

1. HORIZONTAL DATUM IS BLUE EARTH COUNTY NORTH AMERICAN DATUM NAD83(2011), US SURVEY FEET,
2. VERTICAL DATUM IS NORTH AMERICAN VERTICAL DATUM 88 (NAVD88). CONTOUR INTERVAL IS TWO FEET.
3. TOPOGRAPHY SURVEY AND AERIAL FROM 2023 LIDAR DATA, UPDATED VIA GROUND SURVEY BY BOLTON AND MENK IN DECEMBER 2025.

REV	REVISION DESCRIPTION	DWN	APP	REV DATE
1	REVISED PER CLIENT COMMENTS	JJT	EDK	07/29/26
0	ISSUED FOR CUP	JJT	EDK	07/17/26

SEAL

I HEREBY CERTIFY THAT THIS PLAN, SPECIFICATION, OR REPORT WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA.

PRINT NAME ETHAN KETELSEN

SIGNATURE

DATE 07-17-2026 LICENSE # 56630

PRIME CONSULTANT

Stantec

PROJECT TITLE

CUP FIGURES

DEM-CON PILGRIM LANDFILL, LLC.

MANKATO, MINNESOTA

SHEET TITLE

PROPOSED RECYCLING AREAS

DWN BY	CHK'D	APP'D	DWG DATE
JJT	BWS	EDK	JULY 2026

SCALE AS SHOWN

PROJECT NO.	SHEET NO.	REV NO.
227708930	FIGURE 7	1

I:\227708930\drafting\cdr\Figures\Figure 7_Proposed Recycling Areas.dwg



N

0 40 80

GRAPHIC SCALE IN FEET

PROPERTY BOUNDARY (SURVEYED)

PERMITTED WASTE LIMITS

EXISTING ROAD EDGE

MW-1 EXISTING MONITORING WELL

SURVEY NOTES:

1. HORIZONTAL DATUM IS BLUE EARTH COUNTY NORTH AMERICAN DATUM NAD83(2011), US SURVEY FEET,
2. VERTICAL DATUM IS NORTH AMERICAN VERTICAL DATUM 88 (NAVD88). CONTOUR INTERVAL IS TWO FEET.
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PRINT NAME ETHAN KETELSEN

SIGNATURE

DATE 07-17-2026 LICENSE # 56630

PRIME CONSULTANT

Stantec

PROJECT TITLE

CUP FIGURES

DEM-CON PILGRIM LANDFILL, LLC.

MANKATO, MINNESOTA

SHEET TITLE

ELECTRONICS, APPLIANCES, BATTERIES, AND TIRE RECYCLING AREA

DWN BY	CHK'D	APP'D	DWG DATE
JJT	BWS	EDK	JULY 2026

SCALE AS SHOWN

PROJECT NO.	SHEET NO.	REV NO.
227708930	FIGURE 8	1

Plot Date & Time: 28 July 2026 2:07 PM

I:\227708930\drafting\cad\Figures\Figure 8_Proposed Electronic Area.dwg

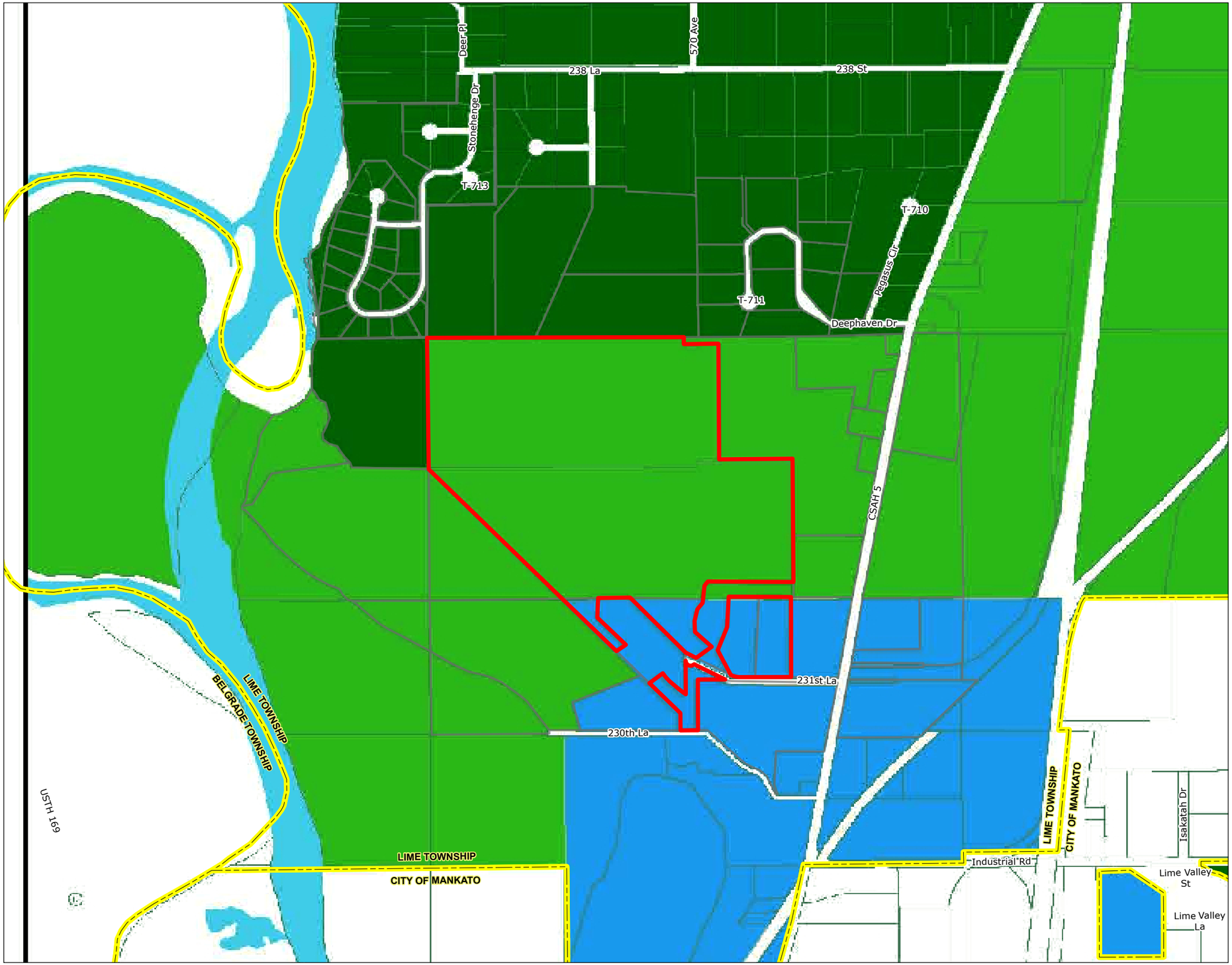


Figure No.
9

Title
Zoning

Client/Project
Dem-Con Pilgrim Landfill, LLC

227708930

Project Location
T109N, R26W, S30 & S31
Mankato, Blue Earth Co., MN

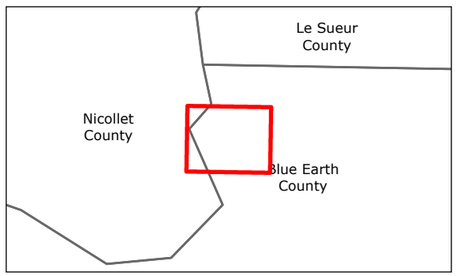
Prepared by BS on 2026-07-13

N

0 350 700 Feet
(At original document size of 11x17)
1:12,000

Legend
- Property Boundary
- Township Boundary
- Parcel Boundary

Lime Township 2026 Zoning
- Rural Conservation
- Rural Conservation Residential
- Industry
- Waterbody



Notes
1. Coordinate System: NAD 1983 HARN Adj MN Blue Earth Feet
2. Data Sources: MnGEO, Blue Earth County, Lime Township
3. Background: Minnesota 2025 Imagery

Stantec

U:\227\227708930\03_data\gis_cad\gis\ArcPro\Pilgrims Demolition Landfill\Pilgrims Demolition Landfill.aprx Revised: 2026-07-13 By: kburglund

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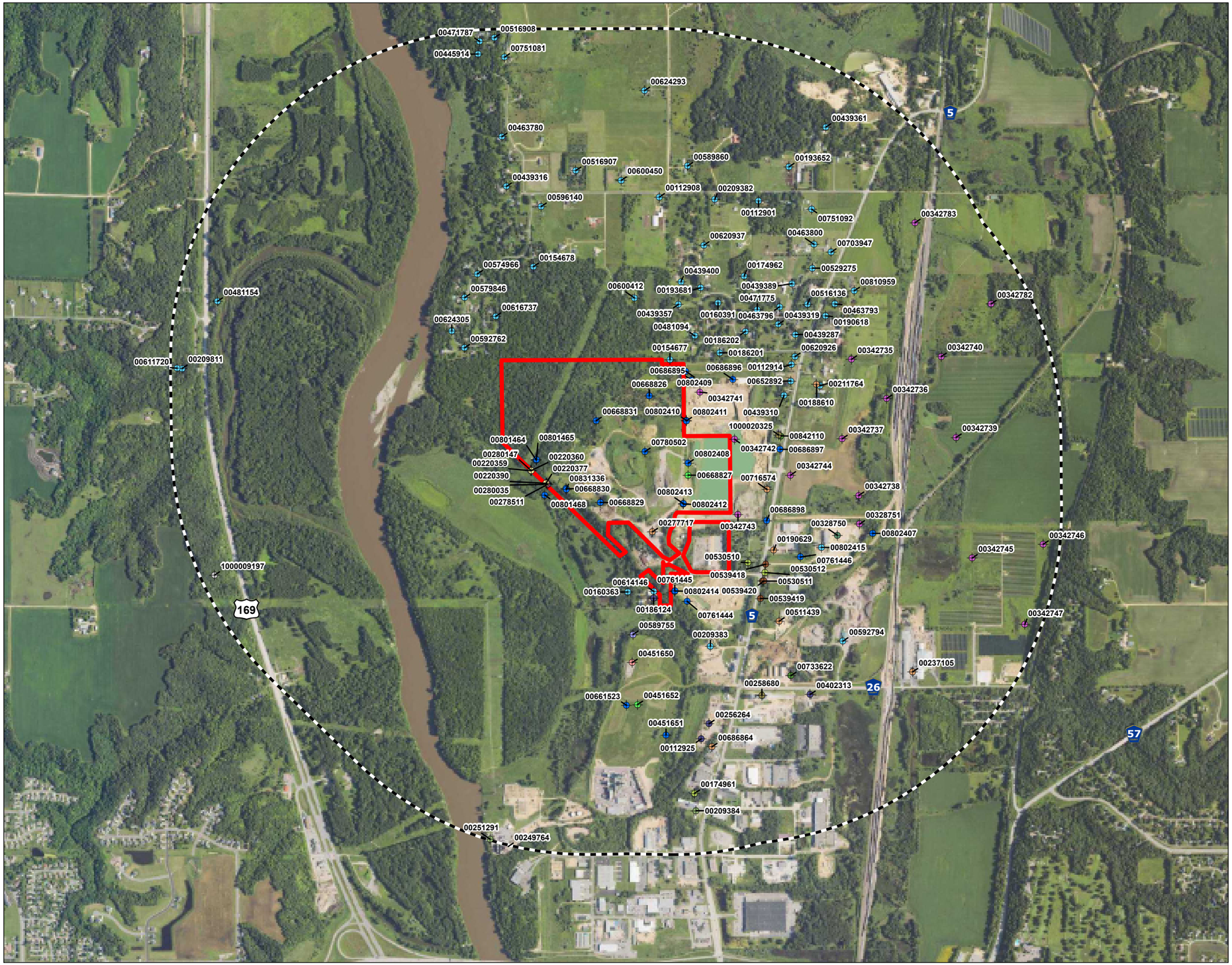


Figure No.
10

Title
Wells Within 1 Mile

Client/Project 227708930
Dem-Con Pilgrim Landfill, LLC

Project Location
T109N, R26W, S30 & S31
Mankato, Blue Earth Co., MN

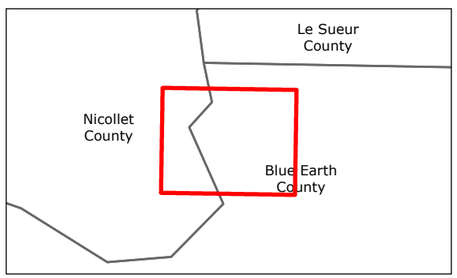
Prepared by BS on 2026-07-13

N

0 1,000 2,000 Feet
(At original document size of 11x17)
1:19,200

Legend
- Property Boundary
- 1 Mile Radius

Wells Within 1 Mile
- Unknown
- Abandoned, Sealed
- Commercial, Active
- Domestic, Active
- Domestic, Sealed
- Environmental Bore Hole, Sealed
- Exploration, Sealed
- Industrial, Active
- Monitoring Well, Active
- Monitoring Well, Sealed
- Monitoring Well, Unknown
- Observation Well, Actve
- Other, Sealed
- Public Supply/Community, Active
- Public Supply/Non-Community/Non-Transient, Active
- Public Supply/Non-Community/Non-Transient, Sealed
- Piezometer, Active
- Piezometer, Sealed
- Test Well, Active



Notes
1. Coordinate System: NAD 1983 HARN Adj MN Blue Earth Feet
2. Data Sources: MnGEO, CWI
3. Background: Minnesota 2025 Imagery

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Figure No.
11

Title
Fall Groundwater Contours
October 30, 2025

Client/Project 227708564
Minnesota Paving & Materials
Annual Report

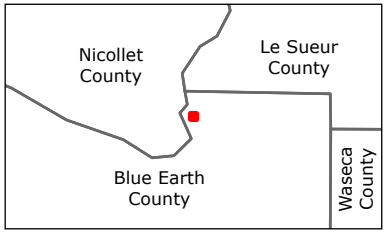
Project Location Prepared by BS on 2026-02-12
T109N, R26W, S30
Mankato, Blue Earth Co., MN

N

0 200 400 Feet
(At original document size of 8.5x11)
1:4,200

Legend

- Permitted Demolition Waste Fill Limit
- Monitoring Well Location
- Groundwater Elevation Contour (Dashed Where Inferred)



Notes
1. Coordinate System: NAD 1983 HARN Adj MN Blue Earth Feet
2. Data Sources: MnGEO, MnDNR
3. Background: Minnesota 2023 Imagery

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U:\227\227708564\03_data\gis_cad\gis\ArcPro\annualreport_2026\annualreport_2026.aprx Revised: 2026-02-12 By: bschafermeyer

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Lime Township Conditional Use Permit (CUP) Narrative

Dem-Con Pilgrim Landfill, LLC (Dem-Con) is requesting to amend the CUP for the existing demolition landfill facility (Facility) located in Lime Township. The Facility is currently owned by OMG Midwest who has entered into agreements with Dem-Con to purchase the Facility. The CUP amendment to be described in more detail throughout this document includes an increase in capacity of the Facility to accommodate a modern landfill design consisting of a synthetic liner, leachate collection system, and synthetic cap which will enhance the protection of the groundwater and the environment at the Facility. In addition, the Facility will have an expanded list of materials accepted for recycling and disposal. The facility currently does not accept and Dem-Con is not proposing to accept Municipal Solid Waste(MSW).The CUP amendment does not propose any increase of the landfill area or landfill maximum height from historically approved plans. Finally, the proposed changes to acceptable materials will provide more disposal and recycling options for local residents and businesses.

Intro to Dem-Con:

Dem-Con is a third-generation Minnesota family-owned business that has been providing waste disposal, recycling, education, and processing solutions for Minnesota since 1965. Mark Pahl and Jason Haus are the third generation actively engaged owners of Dem-Con. Dem-Con's main operations started in the Shakopee area and has grown throughout Minnesota. The center of Dem-Con operations, also known as the Dem-Con Environmental Campus, consists of disposal, processing and recycling operations located in Shakopee, Minnesota. The Shakopee operations consist of a Construction and Demolition (C&D) recycling facility, aMunicipal Solid Waste (MSW) transfer facility, shingle recycling facility, wood recycling facility, metals scrap and recycling yard, the Dem-Con Materials Recovery Facility (DCMRF) which processes curb side commercial and residential recyclables. In addition, Dem-Con recently started construction of an anaerobic digestion facility for the processing of food waste and other organics into renewable natural gas and biochar. Dem-Con also operates disposal and recycling facilities in northern and western Minnesota as well as transfer stations and metal recycling facilities in the Twin-Cities metro area. Dem-Con's leading core value of "Do the Right Thing" guides all decisions and business strategies. Dem-Con is proud of its 100% family-owned Minnesota history and is looking forward to the opportunity to utilize this operational experience to enhance the environmental protections at the existing Pilgrims Landfill site while expanding on waste processing and recycling for the local community.

Facility Background and Existing Conditions:

The Facility is an existing demolition debris landfill. The historic land use of the Facility consists of mining and solid waste activities. Blue Earth County approved a CUP for a rubber tire secondary materials reclamation facility to Mankato Aglime and Rock Company in 1981. In 1982, a CUP was issued for a demolition debris landfill on the property. In addition to the CUP, the Facility was permitted by the Minnesota Pollution Control Agency (MPCA), permit #SW-254, for use as a demolition landfill by the Brielmaier Corporation. The Brielmaier Corporation operated the Facility for 10 years and voluntarily discontinued filling operations in 1993.

In 2004, Lime Township reissued the CUP to Southern Minnesota Construction for the operation of the demolition landfill. In addition to the CUP, the MPCA reissued permit SW-254 for the landfill with a waste capacity of 5,561,700 cubic yards.

The Facility has continuously operated since 2004. The operations on the site consist of the demolition landfill, yard and tree waste composting, wood recycling, concrete and asphalt recycling and sales of landscape supplies. The customer base utilizing the Facility includes both residential and commercial customers. The Facility has a contract with the City of Mankato for composting yard and tree waste.

A site plan showing existing operations on Figure 1. The site is accessed off 3rd Avenue via a private drive to the site. Figure 1 shows existing traffic patterns to enter and exit the site. Other notable features at the site include the scale, employee parking, office and maintenance buildings serviced by well and septic system. Dem-Con is not proposing any changes to existing structures. Access to the site is controlled by a locked entrance gate.

General Operations Description:

The facility currently serves residents and businesses in Blue Earth and surrounding counties and Dem-Con plans to continue to service the same customer base with the facility being open to the general public. The population of the service area of the facility is approximately 350,000 residents.

The wastes proposed to be accepted at the Facility include general construction and demolition debris as well as industrial waste. Examples of industrial wastes include but are not limited to manufacturing scrap, recycling residue, off-spec products, contaminated soils, foundry sands, and others. Dem-Con has submitted an Industrial Waste Management Plan (ISWMP) as part of the MPCA permit application. The ISWMP lists and limits potential wastes to be accepted at the Facility as well as the criteria for acceptance. The ISWMP is attached to this application. The facility will not accept or generate toxic or hazardous wastes.

The waste needs to be covered as required by the MPCA permit. The cover soils consist of on-site materials as well as clean fill imported into the site. There are adequate cover soils currently on site. During winter months, frost will be ripped to access cover soils.

A variety of equipment will be utilized at the site. At a minimum, the equipment onsite will include a landfill compactor, dozer, water truck, skid and front end loader. Additional equipment will be brought onto the site during construction activities.

The primary contacts for initial operation and maintenance at the site will be Mark Pahl and Bill Keegan for at least the first year of Dem-Con's ownership of the site. A scalehouse attendant and operator(s) will also be available at the site. It is anticipated that a facility manager will be assigned to the site for daily questions or concerns. The MPCA requires that a certified operator be present when waste is accepted. Dem-Con employees at the site will receive the MPCA training for landfill operator certification. In addition Dem-Con has monthly safety training for each employee.

Operational Schedule and Facility Charges:

The Facility daily operations for waste acceptance will occur between 6am and 7pm Monday thru Friday and 7am-5pm on Saturday. Extended hours may be needed for special projects or emergency purposes. The Facility will charge fees by the cubic yard or by the ton. Tip fees will vary depending on waste type and volume and will range from $6.00-$50.00 per cubic yard and $10-$100 per ton.

Noise and Dust:

Noise sources from the Facility operations will be associated with vehicle traffic arriving and exiting the Facility, emptying loads, and heavy equipment associated with placing, compacting, and covering of waste. Nuisance noise from Facility operations is expected to be minimal and there are no new sources of noise associated with changes from this application.

Dust can be generated at the site from vehicle entering, unloading and exiting the Facility as well as from heavy equipment operation at the site. Dem-Con will use best management practices including watering roads and routine sweeping of paved surfaces to control fugitive dust emissions.

Odor:

The Facility only accepts C&D and Industrial Waste and odors from landfill activities are expected to be negligible. The composting operations at the site can cause odors if not managed properly. Dem-Con plans to continue implementing best management practices for odor control of the composting operations through timing pile rotation on calm days and managing moisture content of the composting activities. Dem-Con is not aware of any historic odor issues at the site related to composting or other Facility activities.

Litter Control:

Dem-Con will utilize best management practices such as berms, waste placement strategy, and litter fences to control litter blowing off of the landfill footprint. Since the

facility will not be accepting MSW, Dem-Con does not anticipate nuisance litter. In the unlikely event of litter blowing off of the site or out of vehicles entering and exiting the site, Dem-Con will inspect 231st street and County 5 at least weekly and cleanup any litter caused from operations at the site at least monthly.

Filling Progression:

The landfill will be developed in phases as shown in Figures 2. The general phasing of the site will progress from the east to west over time and is depicted on Figures 3-3G.

Ultimate Land Use Plan:

The final elevations of the site are shown on Figure 3. The ultimate land use for any areas where waste has been placed is open space due to the installation of the final cover system. The facility will be mowed and maintained on an annual basis and provide habitat for local wildlife.

Groundwater Monitoring and Protection: The site is currently unlined with upgradient and downgradient monitoring wells. The wells are tested routinely for groundwater quality. Dem-Con is proposing to install a liner with the collection of "leachate"– the precipitation that is collected from the liner under the waste, as well as a synthetic final cap of the landfill significantly enhancing protection of the groundwater and the environment. See Figure 2 shows the proposed liner grades that facilitate the leachate collection, and Figure 3 shows the proposed final grades. Details of the relocation and capping of existing waste as well as synthetic cap are described in more detail in this document. Routine groundwater monitoring will continue at the site. A Hydrogeologic investigation was completed in 2002 with the current CUP was issued. A copy of this report is attached to this application.

Proposed Modifications:

In addition to this CUP application, Dem-Con has applied to the MPCA for the renewal of the existing solid waste permit. At the time of this application, the MPCA is reviewing the permit application and drafting a renewed permit for public review and comment. There are two changes to the existing CUP and operations causing the request for this CUP amendment. The first is related to an increase in capacity resulting from enhanced environmental controls and the second is related to additional materials accepted for recycling and disposal. Each of these are explained in detail in the following text and related plans.

Facility Design and Environmental Protection:

Dem-Con is proposing to enhance the design of the landfill to include a liner and leachate collection system as well as a synthetic final cap over the entire waste disposal area. The base liner system (see Figure 2 for liner grades) includes a Geosynthetic Clay Liner (GCL) overlain by a 60-mil high density polyethylene (HDPE) geomembrane. Collection pipes and drainage sand are placed on top of the liner to collect the landfill leachate. Once construction is completed and before waste is accepted, leak location detection is performed to ensure the liner system was not damaged during construction.

In addition to the enhanced landfill design, Dem-Con is proposing to relocate the existing waste deposited from 1982-1993 and consolidate it with the existing waste placed at the site from 2004 to current and install a synthetic cap over the top of the relocated waste. The top cross-section in Figure 6A shows existing conditions with unlined and uncapped waste highlighted in red and green. The bottom cross section in Figure 6A shows the reclaimed condition where the existing waste is consolidated into the area in green and the bold line represented the geomembrane barrier preventing future rainwater from percolating thru the waste. The relocation of this waste will eliminate the migration of precipitation through this waste into the groundwater in this location and the synthetic cap over the relocated waste will prevent future infiltration of rainwater through this waste into the groundwater table. Rainwater will be directed down the slope of the landfill to diversion berms and perimeter ditches, where it will be routed to one of three proposed ponds as shown on Figure 4.

Capacity Increase:

The design of the liner and leachate collection system required different base liner grades compared to the previous design. In addition, Dem-Con revised the final grades to accommodate the relocated waste and synthetic cap. These two changes in the design of the Facility resulted in an increase of landfill capacity from 5,561,670 cubic yards to 6,397,436 cubic yards. It is important to note that the increased capacity of the landfill did not increase the maximum height or waste footprint from what was previously proposed. Figures 5 and 6 show cross sections of the proposed Facility design. In addition to the complete plans and specifications included in the MPCA permit application, the following table summarized the changes to landfill design.

Landfill Feature	Current (2004 MPCA permit)	Proposed Application
Area	75-acre waste footprint	75-acre waste footprint
Height	872' max height	872’ max height
Capacity	5,561,670 cubic yard capacity	6,397,436 cubic yard capacity
Base layer	4-foot soil base layer	synthetic liner system
Leak Detection	no liner or leak detection	construction leak detection
Leachate Management	no leachate collection	leachate collection
Final Cover	2' soil cover	synthetic cap in addition to 2' soil cover

Dem-Con anticipates the relocation of the existing waste and associated enhanced cover installation to be completed within the first three years of final approval of the new Facility permits. This capping and covering of the unlined waste at the Facility will provide long-term protection of the local groundwater and serve as a screening berm for the ongoing landfill operations. Figure 2 highlights the currently unlined area that will be capped and covered with this enhanced system.

Acceptable materials:

The MPCA permit application requires the permittee to list all materials proposed to be accepted at the Facility for disposal or recycling. The enhanced design of the Facility allows additional wastes to be accepted at the Facility. The wastes proposed to be accepted at the Facility include general construction and demolition debris as well as industrial waste. Examples of industrial wastes include but are not limited to manufacturing scrap, recycling residue, off-spec products, contaminated soils, foundry sands, and others. Dem-Con has submitted an Industrial Waste Management Plan (ISWMP) as part of the MPCA permit application. The ISWMP lists and limits potential wastes to be accepted at the Facility as well as the criteria for acceptance. The ISWMP is attached to this application.

In addition to wastes accepted at the Facility, Dem-Con is proposing to store, process and transfer recyclable materials. Existing recycling activities at the site include wood recycling, concrete and asphalt recycling and yard waste composting. Dem-Con will continue the existing recycling activities and add additional recyclable materials that will be accepted such as appliances, tires, clean cardboard, electronics and batteries, which will be stored at the site for transport to a licensed recycler off-site. Dem-Con is not proposing to process any of these additional materials at the Facility. In addition, Dem-Con is proposing to accept shingles for recycling which would be stockpiled on-site and ground to size for reincorporation into hot mix asphalt or mixed with gravel for dust suppression on gravel roads. See Figures 7 and 8 for proposed recycling activity locations. The table below summarizes the changes to the materials accepted at the Facility:

Material Description	**Current (2004 CUP)**	**Proposed**
C&D Debris	Limited list in CUP	Additional list in ISWMP to include construction packaging, treated lumber, empty containers, etc.
Industrial Waste	Limited	Additional list in ISWMP to include packaging, treated lumber, empty containers, manufacturing scraps, contaminated soils, etc.
Composting activities	20,000 cubic yards	80,000 cubic yards annually, 5-acre capacity
Concrete Recycling	100,000 tons	100,000 tons annually, 10-acre capacity
Wood Recycling	20,000 cubic yards	20,000 cubic yards annually, 2000 tons storage capacity
Appliance Recycling	NA	1000 units annually, 100 units storage capacity
Ferrous Metal Recycling	NA	10,000 tons annually, 2,000 tons storage capacity
Asphalt shingle recycling	NA	100,000 tons annually, 50,000 storage capacity
Battery Recycling	NA	500 units annually, 50 units storage capacity
Electronic Recycling	NA	5000 units annually, 200 units storage capacity
Cardboard Recycling	NA	5000 tons annually, 5,000 ton storage capacity
Tire Recycling	NA	6000 tires annually, 500 tire storage capacity

Dem-Con is looking forward to working with Lime Township on this CUP amendment. The proposed changes to the Facility will enhance protection of the groundwater and offer increased disposal and recycling options for local businesses and residents. For any questions regarding the Facilty or the the CUP amendment application, please feel free to contact Mark Pahl at 612-282-0864 or markpahl@dem-con.com

From: Sheila LeRoss <sheila3cc@yahoo.com>
Sent: Tuesday, July 28, 2026 9:52 AM
To: Phillips, Chad (Minnesota Paving & Materials) <chad.phillips@minnpm.com>
Subject: Kasota Fire Protection

Minnesota Paving and Materials at 57032 231st Lane, Mankato, MN is within the City of Kasota Fire Department service area.

Thank you, Sheila, City of Kasota, City Clerk

Reply | Reply all | Forward

Permit Reissuance and Modification Application

Dem-Con Pilgrim Landfill
SW-254

Prepared for:
Dem-Con Companies

Prepared by:
Stantec Consulting Services, Inc.

Date:
April 2026

Project/File:
227708930



Stantec Consulting Services Inc.

Disclaimer

The conclusions in the Report titled Permit Reissuance and Modification are Stantec's professional opinion, as of the time of the Report, and concerning the scope described in the Report. The opinions in the document are based on conditions and information existing at the time the scope of work was conducted and do not take into account any subsequent changes. The Report relates solely to the specific project for which Stantec was retained and the stated purpose for which the Report was prepared. The Report is not to be used or relied on for any variation or extension of the project, or for any other project or purpose, and any unauthorized use or reliance is at the recipient's own risk.

Stantec has assumed all information received from Dem-Con Pilgrim Landfill, LLC (the "Client") and third parties in the preparation of the Report to be correct. While Stantec has exercised a customary level of judgment or due diligence in the use of such information, Stantec assumes no responsibility for the consequences of any error or omission contained therein.

This Report is intended solely for use by the Client in accordance with Stantec's contract with the Client. While the Report may be provided by the Client to applicable authorities having jurisdiction and to other third parties in connection with the project, Stantec disclaims any legal duty based upon warranty, reliance or any other theory to any third party, and will not be liable to such third party for any damages or losses of any kind that may result.

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1 Written Application – MN Rule 7001.0050

1.1 General Information

1.1.1 Current Owner of the Facility

Name OMG Midwest

Address 2401 SE Tones Dr #13

Ankeny, IA 50021

Telephone 507-625-4848

Status private entity

1.1.2 Proposed Owner of the Facility

Name Dem-Con Pilgrim Landfill, LLC

Address 13020 Dem-Con Drive

Shakopee, MN, 55379

Telephone 952-445-5755

Status private entity

1.1.3 Operator of the Facility

Name Dem-Con Pilgrim Landfill, LLC

Address 13020 Dem-Con Drive

Shakopee, MN, 55379

Telephone 952-445-5755

Status private entity

1.1.4 Application Prepared by

Name Stantec Consulting Services, Inc., on behalf of Dem-Con Companies LLC

Address 1 Carlson Parkway Suite 100

Plymouth, MN 55447

Telephone 763-479-4200

1.1.5 Description of the Facility

Pilgrim Demolition Landfill (the Landfill or the Facility) is an existing Class I construction and demolition debris (C&D) landfill. The Landfill is located in Township 109 North, Range 26 West, Sections 30 and 31 in Lime Township of Blue Earth, Minnesota. The Landfill was initially permitted by the MPCA (permit #SW-254) for use as a demolition landfill by the Brielmaier Corporation in 1983. The total capacity of the Landfill at the time was approximately 232,000 cubic yards. Brielmaier Corporation voluntarily discontinued filling operations in 1993. Three fill areas were authorized for disposal. “Site 1”, located in the south portion of the property, was closed in 1992. “Site 2”, located in the central portion of the property, was closed in 1996. “Site 3” was never utilized for disposal. Prior to placement of demolition waste materials, Brielmaier Corporation placed four feet of “compacted sandy clay and crushed limestone” throughout the base areas for both Site 1 and Site 2. The construction for Site 2 was certified by a professional engineer in correspondence to the MPCA on February 6, 1991. These historical unlined disposal areas are designated in the current permit as Disposal Designation (DD) DD 001, representing the existing unlined Class I C&D disposal area.

The Facility was later permitted on May 4, 2004, for an ultimate waste capacity of 5,561,700 cubic yards, incorporating fill area DD 002 in the current permit. The existing demolition waste in Sites 1 and 2 was designated as DD 001. DD 002 was to be constructed with a 4-foot compacted soil attenuation layer and would ultimately fill over DD 001 as waste filling activities advanced from east to west.

The existing permit expired in 2009, and multiple renewal submittals have been completed since then, including a minor permit modification to adjust the waste limit boundary on the southeast side of the site, approved on November 5, 2024. This submittal is intended to apply for a permit reissuance and major modification, including ownership transfer, an increase in ultimate capacity (without increasing waste footprint or maximum elevation), and change in facility design and operation.

1.1.6 Proposed Modifications and Variance Requests

As part of this permit action, the Landfill is proposing to excavate and relocate all waste from DD 001 and place in the existing DD 002 area. The Landfill is then proposing to re-classify the existing unlined area from DD 002 to DD 001 (incorporating re-located waste from the current DD 001 area and existing waste in DD 002). The facility is proposing to construct lined cells west of the re-classified DD 001 area for a Class III lined C&D and industrial waste disposal area, to be referred to as DD 002. DD 001 would be considered a

Class I C&D disposal area which would ultimately be closed via a proposed overlay which ties into the base liner system of DD 002. Prior to construction of the overlay liner the unlined area will continue to be filled with Class 1 C&D waste, including the waste relocated from the existing DD 001 area as mentioned above. Upon completion of the closure of the unlined portion of the facility, the Landfill will operate DD 002 as a lined disposal area, accepting Class III demo and industrial waste (see Appendix A for more details).

The current Landfill operates as an unlined Class I unlined C&D Landfill. As a Class III lined C&D Landfill (DD 002), the Landfill will accept all non-hazardous C&D debris. In addition, the facility is proposing to accept industrial waste which is co-disposed with C&D materials in the lined DD 002 disposal area in accordance with the facility's ISWMP.

Leachate collected on the proposed lined DD 002 disposal area will drain into a series of sumps and be pumped into a leachate storage tank or tanks. Leachate will then be loaded out into tanker trucks and hauled for disposal at a wastewater treatment plant.

Two requests for variances to Minnesota Rules are included as part of this application:

1. Exceed a 100-foot leachate flowpath through the cell floor in the northeast corner of the site.
    - MN Rules 7035.2815 Subp. 9.E. requires maximum 100-foot leachate drainage length.
    - Request to prevent the need for a leachate cleanout extending through the final cover system and to facilitate construction of the overlay system for DD 001. All other phases of the proposed DD 002 disposal area will meet the maximum 100-foot drainage length.
    - Cell floor slopes in the new base grade design are increased to 5% in the areas with a drainage length greater than 100 feet
2. 4:1 slopes on the final cover system
    - MN Rules 7035.2815 Subp. 5.G requires maximum 5:1
    - Request to maximize the ultimate waste capacity of the site without changing the currently permitted footprint or maximum height of the Landfill. This change would increase the proposed capacity by 856,048 cubic yards to a total ultimate design capacity of 6,397,436 cubic yards.
    - It should be noted that future MN C&D Rules are anticipated to allow for 4:1 final cover slopes without variance

These proposed variances will not create any change in effect on air, water or land resources of the state compared to the current site and current use. The change in ultimate capacity will be due to the increased final cover slopes and revised base grades, facilitating a base liner system with geosynthetic liner and leachate collection. The base grades were designed to be a minimum of five (5) feet above the historical high groundwater elevations based on the data for the existing monitoring wells. Technical evaluations which support these proposed variances are included in the application are a Hydrologic Evaluation of Landfill Performance (HELP) Model and a Geotechnical Evaluation, provided in Appendices C and D, respectively. The HELP model presents that the requirement to maintain less than 1-foot of leachate head on the base liner will be met with the extended leachate flow path. The Geotechnical Evaluation presents that steeper side slopes will be stable against global and veneer failure based on exceeding minimum factors of safety for various conditions.

This application contains an updated Industrial Solid Waste Management Plan (ISWMP) and updated Permit Drawings which are included in Appendix A and Appendix B, respectively.

1.1.7 Topographic Map

Figure 1, *USGS Quadrangle Excerpt*, illustrates the general topography of the site and surrounding area. Sheet C-101 illustrates two-foot contours of the existing landfill and surrounding area.

2 Items Handled, Stored, and Disposed of at the Facility

2.1 Types of Materials

The facility currently accepts demolition and construction debris as defined below:

"Demolition debris" means solid waste resulting from the demolition of buildings, roads, and other structures including concrete, brick, bituminous concrete, untreated wood, masonry, glass, trees, rock, and plastic building parts. Demolition debris does not include asbestos wastes (Minn. Rule 7035.0300 Subp. 30).

“Construction debris” means waste building materials, packaging, and rubble resulting from construction, remodeling, repair, and demolition of buildings and roads (Minn. Stat. § 115A.03, Subd. 7).

Examples of C&D debris include materials generated from construction of new buildings, renovations of existing buildings, buildings torn down for redevelopment, and rubble from streets, sidewalks, and parking lot replacement.

In addition, the facility is proposing to accept industrial wastes in accordance with the ISWMP included in Appendix A. A few examples of industrial wastes proposed to be accepted include, but are not limited to, manufacturing scraps, recycling residue, off-spec products, contaminated soils, and water treatment and filtering sludges.

Some waste types are bulky, difficult to compact, and require excessive management at the working face. The shredding may be completed at a transfer facility or at the landfill. The following items may be shredded prior to final disposal:

- Bulky plastic material
    - Plastic tubing (plumbing, pipe, conduit)
    - Plastic duct work (spiral wire core)
    - Empty plastic containers (buckers, bins)
    - Plastic hardware (electrical boxes)
    - Plastic sheeting (roof, wall, untreated)
    - Plastic playground equipment
- Housing materials
    - Carpet and carpet padding (not rolls)
    - Siding and doors (vinyl, untreated wood)
    - Shingles (wood, asphalt)
    - Wood material (flooring, plywood, particle board, fencing, stumps)
    - Fiberglass material (tubs, tub surrounds)
    - Porcelain (sinks, toilets)
- Incidental packaging or wood (associated with the above items)

If shredding occurs at the landfill, shredding operations will occur on the liner with the exact location moving as the facility fills and expands; as a result, mobile shredding equipment would need to be utilized. The ultimate goal of the shredding operations is to produce a small, uniformly sized waste material that has a greater density.

Prior to placement in the landfill, the following procedures will be followed:

1. Note the quantity (volume) of material following shredding operations.
2. Incorporate into active working face with heavy equipment.
3. Complete Shredding Operations Form including the dates of shredding and quantities (Appendix E).

In accordance with Minnesota Statutes 115A.936, construction material containing gypsum such as sheetrock will not be shredded (or mechanically pulverized or size reduced) at any time.

It is proposed that recyclable materials handling and storage be incorporated into the permit. These materials will be stored on-site in the designated recyclables storage area within the western portion of the ultimate landfill footprint that has not yet been developed. Several dumpsters, roll-off containers, or similar containers will also be kept on the working face for separating recyclable materials such as metal from the incoming waste. The recycling storage area is depicted on Drawing C-101 in Appendix B. Recyclables handled on-site include but are not limited to appliances, metals, batteries, asphalt pavement, tires, electronics, cardboard, concrete, brick, clean wood debris, and shingles. Storage methods and the maximum quantities stored at a given time are included in Table 3.

The Landfill will also manage a composting area for yard waste and grain waste. Concrete, asphalt, and brick materials will be stockpiled at the site and periodically crushed for recycling. Wood waste will also be collected in a stockpile and periodically mulched for reuse. Storage locations are depicted on Drawing C-101.

2.2 Quantity of Material

Table 1 is a waste capacity table that includes the ten-year permitted waste capacity and the ultimate design capacity sought after in this permit modification and reissuance application. There is no proposed increase to the peak vertical elevation or ultimate horizontal footprint of the landfill due to the change in outer slope angles. The maximum elevation will be maintained at approximately 872 ft-amsl.

The estimated quantity of C&D debris, industrial waste, compost, and recycled materials handled at the facility on an annual basis is listed on Table 2. The quantity of recycled materials stored on the site and the storage method is listed in form w-sw3-33.

Table 1. Waste Capacity Table

Type of Waste		ID	Ultimate Design Area (acres)	2026-2036 Remaining Ultimate Capacity as of December 2025 (CY)	Ultimate Design Capacity (CY)[1]
Current Permit	C&D Debris Unlined Landfill	DD 001 & DD 002	74.4	4,374,666	5,514,388
Proposed	C&D Debris Unlined Landfill	DD 001	17.2	201,390	1,044,918
	Class III C&D Debris and Industrial Waste Lined Landfill	DD 002	63.9[2]	5,352,518	5,352,518

[1] Includes final cover.

[2] Includes overlay liner above existing unlined area, the total waste footprint remains the same.

[3] Relocated waste from existing DD 001 would be placed in the unlined area, proposed DD 001.

Table 2. Estimated Annual Quantities

Type of Waste	Estimated Annual Volume (CY)
C&D Debris	60,000 – 100,000
Industrial Waste	20,000 – 50,000
Composting Yard Waste	100,000
Composting SSOM	25,000
Recyclables	Varies by material- see form w-sw3-33

2.3 Methods of Control

The methods of control for waste acceptance include checking in at the scale house at the site entrance where the type and the quantity of waste is recorded and inspected. The waste hauling vehicle will be directed to the appropriate disposal location based on the material being accepted. Personnel are on-site at the active tipping area to oversee the tipping procedure and visually inspect the waste to verify that no unacceptable wastes are tipped. If unacceptable waste is encountered at the working face, the hauler or facility staff will remove them from the working face and properly manages the materials in accordance with Minnesota Rules. Regular landfill customers may be assigned individual roll-off boxes located near the tipping area and unacceptable wastes may be placed in these boxes. When the box is full, the hauler must arrange to have the roll-off box hauled to an appropriate facility for disposal.

The landfill does not assume acceptance of waste until the load is inspected, spread and compacted, and additional material is placed vertically on existing grades.

Industrial waste is proposed to be accepted at the facility in accordance with the ISWMP. This process includes an analysis of the physical nature of the wastes, the process that generates the wastes, and a comparison of any analytical results to the acceptance limits established in the ISWMP.

Materials to be recycled or composted are directed to the appropriate locations where the material is unloaded and stockpiled until a sufficient quantity has accumulated to justify further processing or shipment to end-markets. Records are maintained of the volume of material recycled at the Facility in accordance with MPCA permit requirements.

3 General Information Requirements for Final Application MN Rule 7001.3300

3.1 General Description of Facility

The Pilgrim Demolition Landfill Facility (the Landfill) is located in Lime Township, Blue Earth County, Minnesota, within Township 109 North, Range 26 West, Sections 30 and 31. The Landfill property consists of multiple parcels totaling approximately 220 acres, with the active landfill fill area encompassing approximately 78 acres located near the center of the property. The fill area is separated from adjacent properties by established buffer areas. The location of the Landfill is illustrated on Figure 1, prepared using the USGS 7.5-minute quadrangle maps for Mankato East and Mankato West, Minnesota. Zoning information of adjacent parcels is provided on Figure 2. Land uses surrounding the site varies from mixed residential or rural vacant land to the north and west with industrial to the east and south. As shown on Figure 3, there are no parks, recreation areas, and refugees within 1-mile of the project area. Further information on adjacent properties, including a figure and a mailing list for these properties, is provided in Appendix F.

As illustrated on Figure 4, surface karst features may be present in the area, however, Section 5 further discusses site investigations which were previously completed and determined active karst is not present within the disposal area. Site-specific hydrogeologic investigations have been conducted for the Landfill, including groundwater receptor surveys completed within one mile of the facility and identification of high-capacity wells within three miles. These evaluations have been periodically updated and are documented in the Facility's hydrogeologic reports and annual operating documentation. Groundwater and surface-water protection considerations for the Landfill are addressed through site-specific analyses and ongoing operational controls. Water features surrounding the site are illustrated on Figure 5, while wells within 1-mile of the site are shown on Figure 6. The Minnesota River is located approximately 1-mile west of the facility while an unnamed creek is located south and west of the site. Further site information is provided in Section 5.

Floodplain mapping for the Landfill property was evaluated using Federal Emergency Management Agency Flood Insurance Rate Maps. This analysis confirms that the landfill fill area is located entirely outside the mapped 100-year floodplain of the Minnesota River. The Landfill is located in an area zoned for industrial use, and operation of the demolition landfill has been authorized through applicable county and township approvals. A floodplain map is provided as Figure 7.

3.2 Industrial Solid Waste Management Plan

An ISWMP has been developed for this facility along with this permit modification request to accept industrial waste at the facility. The ISWMP establishes waste acceptance criteria, screening procedures, handling practices, and operational controls for materials received at the landfill. A copy of the proposed ISWMP plan is included as Appendix A.

3.3 Description of Security Procedures and Equipment

There is a locking gate at the entrance to the facility. Berms, wooded areas, and gravel pits separate the landfill from adjacent properties and roads, prohibiting trucks from entering the fill area after hours.

3.4 Inspection Schedule

The landfill operator inspects the landfill at least weekly. Inspections include safety and emergency equipment, security devices, operating and monitoring equipment, as well as general site conditions. Inspection reports will be kept on record for a minimum of five years. A copy of the Inspection Report is available upon request.

Fire extinguishers are inspected and certified on an annual basis by a fire protection company. All appropriate testing is performed by this company to verify that the firefighting equipment is maintained in operating condition.

Equipment necessary for the facility operations will be maintained to ensure compliance with all permits and regulations. Any deterioration or malfunction of equipment is typically repaired within two weeks of the inspection if required supplies are available and weather permits.

3.5 Contingency Action Plan

The purpose of this Contingency Action Plan is to identify potential occurrences at Dem-Con, which may endanger human health and the environment. In the event of an occurrence, specific actions to be taken to minimize hazards are outlined in the following plan. The MPCA will be notified within 48 hours of a significant fire, explosion or reportable release at the facility.

3.5.1 Identification of Potential Events or Releases Which May Require Corrective Action and Implementation of the Contingency Action Plan

1. Fires and/or Explosions
2. Vandalism
3. Settlement of Completed Fill Areas
4. Violation of Groundwater Quality Standards
5. Violation of Surface Water Quality Standards
6. Surface Drainage Problems
7. Large Scale Erosion
8. Pump Failure
9. Leachate Storage Tank Failure
10. Liner Damage
11. Damage From Severe Rainfall
12. Leachate Spills in Reportable Quantities

13. Landfill Gas Vent Replacement

3.5.2 Response Actions to be Taken in the Event of the Occurrence of Items 1-13

This section lists the order of actions to be taken. Depending upon the extent or severity of the event, all actions listed below may not be required.

3.5.2.1 Fires and/or Explosions

- Contact Fire Department, emergency personnel and ambulance by dialing 911 if required.
- Control access to the area. Personnel not trained in firefighting methods will not be allowed at the site.
- All equipment which can be safely removed from the area will be removed from the vicinity of the fire and/or explosion.
- Trained personnel will attempt to extinguish or control fires with extinguishers, water from the water truck or by smoldering with nearby soils until the local fire department arrives.
- Notify MPCA within 48 hours of a significant fire or an explosion.
- Affected areas will be repaired. Repairs will consist of regrading as required, replacement of cover system and revegetation, and replacement or repair of equipment as necessary.

3.5.2.2 Vandalism

- Fencing: Damaged fencing will be repaired. Temporary access control measures will be installed as required.
- Access gate: Damaged locks or gate will be repaired. Temporary access control measures will be installed as required.
- Other acts of vandalism which may endanger human health or the environment will be repaired accordingly.

3.5.2.3 Settlement of Completed Fill Areas

Completed fill areas which settle and cause the disruption of positive surface water flow will be corrected as follows:

- Repairs to capping system if required
- Addition of soil to eroded areas
- Reseeding of repair area
- Mulch and erosion control matting as necessary

3.5.2.4 Violation of Groundwater Quality Standard

If groundwater monitoring indicates a violation of groundwater quality Dem-Con will take the actions in MN Rule 7035.2815 subp. 4(G) as follows:

(1) immediately notify the commissioner in writing;

(2) immediately resample if previous samples at the facility did not exceed the intervention limits;

(3) evaluate the need to resample if previous samples exceeded the intervention limits;

Furthermore, the following actions may be taken:

- The well will be retested during the next routine monitoring round to verify the violation.
- Continue routine monitoring.
- Construct an additional well.
- Perform an alternatives analysis for remediation activities.
- Work with assigned MPCA hydrogeologist to develop a response plan to address violation of groundwater standard.

3.5.2.5 Violation of Surface Water Quality Standard

If a violation of surface water quality occurs the following actions may be taken:

- Resample to verify that a violation has occurred.
- Prepare and implement stormwater Best Management Practices (BMPs) to correct the violation and prevent future violations.

Revise Stormwater Pollution Prevention Plan (SWPPP) to address violation and design and implement additional BMPs as necessary.

3.5.2.6 Surface Drainage Problems

If surface drainage problems occur, including evidence of leachate seeps such as odor or stressed vegetation, the following actions may be taken:

- Repair or add additional stormwater diversion berms.
- Regrade slopes.
- Repair settlement or leachate seep areas.
- Clean out perimeter stormwater ponds.

Add temporary or permanent erosion control measures.

3.5.2.7 Large Scale Erosion

If large-scale erosion occurs the following actions may be taken:

- Eroded area will be corrected (regraded, vegetation established).
- Design and install additional erosion control, (riprap, energy dissipaters, erosion control matting, etc.).

3.5.2.8 Pump Failure

If a pump failure occurs the following actions may be taken:

- The failed pump will be repaired or replaced.

3.5.2.9 Tank Failure

If a leachate storage tank should fail, the following actions may be taken:

- If the leak detection riser on a double-walled tank indicates the presence of water within the secondary containment, the tank and containment will be pumped to remove leachate.
- A temporary leachate bypass system will be installed to direct leachate directly into a tanker truck or a temporary tank.
- The tank will be inspected and repaired or replaced if necessary.

If a leachate release has occurred, procedures in 2.12 will be followed.

3.5.2.10 Liner Damage

If liner is damaged after construction during active filling, the operator must have damaged portions repaired by a qualified individual. Repair may include the following:

- Repair liner and granular drainage materials on slopes or other areas of damage to original construction specifications.

3.5.2.11 Severe Rainfall Event

In the event of damage caused by a severe rainfall event, the following actions may be taken:

- Leachate will be hauled from the site as required to maintain volume in storage tank and keep collection system operational.
- Damage to slopes in unfilled portions of the liner where granular drainage layer washes down will be repaired.
- Stormwater management facilities, ponds, ditches, outlets, etc. will be inspected and repairs made as needed.

3.5.2.12 Leachate or Other Spills

If leachate or other spills occur, the following actions may be taken:

- Spills on soils will be cleaned up by excavation of impacted soils. Soils may be placed in an area of the facility on clay material and allowed to dry.
- Spills in the tanker loading area will collect in the sump which drains into the leachate storage tank.

- Report to EPA and MPCA as required by law, including completing notifications to the Minnesota Duty Officer or National Response Center (NRC) as applicable for the type and quantity of the spilled material.

3.5.2.13 Landfill Gas Vent Replacement

If replacement or modification of a portion of the landfill gas venting system is required, the following actions may be taken:

- Install vertical or horizontal piping

3.5.3 Estimated Time Frame Required to Complete Response

3.5.3.1 Significant Fires and/or Explosions

Action	Time
Contact Fire Department, Emergency/Medical Personnel	Immediately
Control access to the area	Immediately
Remove mobile equipment	Immediately
Control fires with extinguishers, water, or nearby soils	Immediately
Repair damaged area and/or equipment	0-6 Months

3.5.3.2 Vandalism

Action	Time
Repair Fencing	0-4 weeks
Repair Access Gate	0-4 weeks
Install temporary access control measures	0-48 hours
Other acts of vandalism which may endanger human health or the environment	Variable

3.5.3.3 Settlement of Completed Fill Areas

Action	Time
Repairs to capping system if required	variable
Addition of soil to eroded areas	3 weeks
Reseeding of repair area	2 weeks
Mulch and erosion control matting	2 weeks

3.5.3.4 Violation of Groundwater Quality

Action	Time
Notify MPCA in writing	immediately
Resample	Immediately or next sampling event
Continue Routine Monitoring	Next scheduled sampling event
Construct an additional well	1-6 months
Alternatives analysis	6-12 months

3.5.3.5 Violation of Surface Water Quality Action

Action	Time
Resample	0-1 month
Prepare and implement stormwater measures	0-6 months
Revise SWPPP	0-6 months

3.5.3.6 Surface Drainage Problems

Action	Time
Repair/add diversion berms	0-2 months
Repair/add energy dissipaters	0-2 months
Repair settlement areas	0-2 months
Clean out stormwater ponds	0-2 months

3.5.3.7 Large Scale Erosion

Action	Time
Correction or eroded area	0-1 month
Install erosion control practices	0-6 months

3.5.3.8 Pump Failure

Action	Time
Temporarily replace with on-site square pump	1 day
Repair/replace pump permanently	1 month

3.5.3.9 Leachate Storage Tank Failure

Action	Time
Pumping of secondary containment area	1 day
Diversion of leachate and repair of tank	1-2 months

3.5.3.10 Liner Damage

Action	Time
Repair leachate liner or cover liner	48 hours-4 weeks Depending upon severity and weather

3.5.3.11 Severe Rainfall Event Action

Action	Time
Leachate hauled from the site	0-5 days
Repair unfilled portions of the liner	1-2 weeks
Stormwater management facilities	1-3 weeks

3.5.3.12 Leachate or Other Spills

Action	Time
Spills on soils	Immediately
Spills within the containment area	Immediately
Spills in the tank loading area	Immediately

3.5.3.13 Landfill Gas Vent Replacement

Action	Time
Repair/replace damaged vent or lateral	1-2 months

3.5.4 Equipment Needed

- Telephone
- Fire extinguishers
- Water truck
- Bulldozer
- Square pumps
- Spill kits (absorbents, booms, floor dry brooms/shovels)
- Specialty equipment/contractors as needed

3.5.5 Prior Arrangements

Fire emergency responses are anticipated to be provided by the City of Mankato Fire Department. In the event of a medical emergency, Emmanuel–St. Joseph's Hospital, located in Mankato, will be contacted. In matters involving a police emergency, the Blue Earth County Sheriff's Office will respond. Emergency

services may be contacted by calling 911. Heavy equipment operators and facility staff maintain communication via two-way radios, and fire control equipment is available on-site and inspected to ensure readiness.

3.5.6 Scheduled and Unscheduled Down Times for Maintenance at the Facility

Equipment is maintained on a regular basis. A variety of equipment is used during maintenance intervals which may include a spare compactor, track dozer, loader, excavator, off-road truck, and scraper which are kept on-site. These machines are regularly maintained and a working machine is always available. Equipment is readily shared between all Dem-Con sites adding layers of redundancy in the case of equipment failure. On-staff mechanics are able to perform most repairs on-site. Unscheduled down times are not anticipated in the future, however they may be required in the event of a catastrophe or natural disaster. If the facility needs to shut down for any reason the gate will be locked. The facility will only reopen when it is safe to do so and is able to operate in accordance with facility permits.

3.5.7 Estimated Contingency Action Costs

Costs associated with each event are listed under item 3. Costs for each type of contingency action are based on the following:

Significant Fires and/or Explosions:

Surface Fire fighting (8 hours @ $400/hour)		$3,200
Revegetation (2 acres @ $1,000/acre)		$2,000
Sub-Surface Fire fighting (3 days @ $2,500/day)		$7,500
	Total:	$12,700

Vandalism:

Repair well tops, fence structure		$3,000
	Total:	$3,000

Settlement of Completed Fill Areas:

Repair Cost (0.2 acres @ $50,000/acre)		$10,000
	Total:	$10,000

Violations of Groundwater Quality Standards:

Capital		$150,000
Install Additional Wells (3 wells @ $10,000/well)		$ 30,000
O&M (10 years @ $15,000/year)		$150,000
Sample Collection (3 events @ $550/event)		$ 1,650
Sample Analysis (33 samples @ $125/sample)		$ 4,125
Evaluation and Report		$ 20,000
	Total:	$355,775

Violations of Surface Water Quality Standards:

Work Plan		$5,000
Corrective Action Monitoring (10 years @ $9,000/year)		$90,000
Reporting		$20,000
	Total:	$115,000

Surface Drainage Problems:

Repair or addition of a diversion berm		$2,000
Energy dissipater device (400 LF @ $12.00/LF)		$4,800
Cleaning out ponds (30 hours at $150/hr.)		$4,500
	Total:	$11,300

Large Scale Erosion:

Cover Fill (1,500 CY @ $5/CY)		$7,500
Revegetation (3 acres @$1,000/acre)		$3,000
Clean Surface Water Controls		$ 250
	Total:	$10,750

Pump Failure:

Pump Replacement		$15,000

	Total:	$15,000

Tank Failure:

Excavation and soil disposal		$ 5,000
Tank repair and installation		$50,000
	Total:	$55,000

Liner Damage:

Quantify/locate damage		$10,000
Waste excavation/relocation		$25,000
Liner repair (assuming 10,000 SF at $0.5/SF)		$ 5,000
	Total:	$40,000

Severe Rainfall:

Excess Leachate Hauling		$2,000
Cover Fill (1,500 CY @ $3/CY)		$4,500
Revegetation (3 acres @ $1,000/acre)		$3,000
	Total:	$9,500

Leachate or Other Spills:

Liquid recovery (4 hours $250/hour)		$1,000
Disposal (2 trucks @ $500/truck)		$1,000
Contaminated soil excavation (100 CY @ $5/CY)		$ 500
Clean soil fill (100 CY @ $4/CY)		$ 350
Mobilization		$1,000
	Total:	$3,850

Landfill Gas Vent:

Install wells and/or lateral piping	$50,000

	Total:	$50,000
TOTAL CONTINGNECY ACTION COSTS:		$691,875
FUNDED @ 60% OF CONTINGNECY ACTION COSTS:		$415,125

3.5.8 Review and Amendment

The Contingency Action Plan will be reviewed and amended whenever the permit is re-issued or modified, a failure or release occurs which is not accounted for within this plan, or when a failure or release occurs for which an appropriate response is not provided for within this plan.

3.6 Description of Procedures, Structures, or Equipment

3.6.1 Prevent Operational Hazards

There are a variety of potential operational hazards associated with activities at the site. The hazards include but are not limited to truck congestion, truck accidents, heavy equipment accidents, slips, trips, and falls, inclement weather issues, asbestos and sharps disposal, and hazardous atmosphere. All employees at the landfill have regular safety and operations meetings to discuss incidents, close calls, and mitigation measures. Dem-Con management reviews all incidents and mitigation measures to ensure hazards are addressed appropriately.

3.6.2 Prevent Run-on and Run-off at the Solid Waste Tipping Area

The active phase is sloped and/or temporary diversion berms are constructed to isolate stormwater run-off within the active fill area and to divert stormwater around and away from the active fill areas, preventing run-on into the active fill area.

3.6.3 Prevent Contamination of Groundwater and Surface Water Supplies

Existing landfill operations are conducted as an unlined Class I construction and demolition debris landfill. A 4-foot thick clay barrier layer without leachate collection is present below the disposal area. Protection of groundwater and surface water resources is provided through engineered soil attenuation layers beneath historical disposal areas, site-specific geologic and hydrogeologic conditions, and implementation of operational controls.

As part of this permit reissuance, future lined landfill cells are proposed to be constructed with a composite liner system and a leachate collection and removal system. The proposed lining system will consist of, from bottom to top, a six-inch soil barrier layer, geosynthetic clay liner (GCL), 60-mil HDPE geomembrane, and 12’ inch granular drainage layer. The leachate collection system will involve a series of HDPE perforated pipes surrounded by coarse aggregate draining to leachate collection sumps. The leachate collection sumps will pump leachate into holding tanks where it will be loaded into tanker trucks and hauled to an

offsite wastewater treatment facility for disposal. In addition, the unlined area is proposed to be overlain with the base liner system for future disposal which limits exposure of waste in the unlined area to the elements and will further protect groundwater and surface water resources.

Following construction and certification, these lined cells will provide an enhanced level of protection for groundwater and surface water resources. Final cover systems incorporating low-permeability components will be installed in accordance with approved closure plans as landfill phases reach final grade.

Operational measures that further protect groundwater and surface water include waste acceptance controls in accordance with the approved ISWMP, inspection of incoming loads, controlled waste placement and compaction, application of cover materials, and management of run-on and run-off through stormwater diversion berms, grading, and drainage features. Groundwater conditions are evaluated through an established monitoring program, and response procedures are implemented if monitoring results indicate potential impacts.

3.6.4 Mitigate Effects of Equipment Failure and Power Outages

Maintenance of equipment is performed on a routine basis. If a power outage occurs and power is required, a portable generator will be used to supply power until service is restored.

3.6.5 Prevent Ignition or Explosions of Waste and Emergency Response Plan

1. The site is run in a manner to minimize the chance of ignition or explosion of waste. Waste loads are inspected as they are tipped. This prevents unpermitted materials which may be flammable or explosive from being buried at the facility.
2. There is communication maintained between the operators, scale attendant, and the office. All personnel are equipped with telephones for summoning emergency assistance as required.
3. Extinguishers for firefighting are available at the office and on the equipment.
4. All communication and fire equipment are checked at least annually to ensure working order.
5. Dem-Con Landfill is served by the Blue Earth County sheriff and City of Mankato fire department..
6. A written report will be submitted to the Commissioner within two weeks after a reportable emergency has occurred. The report will contain a description of events and procedures followed in responding to the emergency. Pertinent actions within the Contingency Action Plan will be referenced and performed. The Contingency Action Plan will be reviewed for adequacy and modified as required.

3.7 Traffic Patterns and Control

The site is accessed via Township Road 448, with the primary transportation route for trucks arriving at and leaving the facility being 3rd Avenue (County Road 5). Inbound and outbound trucks utilize a single scale located near the facility entrance. Traffic is anticipated to be composed of approximately 80% standard dump trucks and roll-offs, 10% semi-end dumps and about 10% private vehicles, which use the site.

Vehicles drive to the gatehouse, their volumes and/or weights are recorded and then they are directed to the appropriate tipping area.

3.8 Storage

Metals such as tin, ferrous, brass, copper and aluminum are removed from the demolition material, stockpiled, and then hauled to a scrap metal processor. Tires are stored until a sufficient quantity is obtained to make a truckload, approximately 300 tires. The tires are then loaded and hauled away for recycling. Appliances are stored on-site and hauled away for recycling once a sufficient number accumulate to fill a truck. Batteries are stored in a covered leak proof container prior to removal from the site. Cardboard is stockpiled until a large enough quantity accumulate to bale and ship. Wood is stockpiled until a large enough quantity accumulates to grind into a final product. Concrete and asphalt are stockpiled on-site until a large enough quantity accumulates to crush and recycle. Shingles are stockpiled on-site and processed as materials are needed. Processing of shingles, wood and concrete and asphalt may occur within the site. Compost material such as grain residuals and wood waste is managed in a stockpile until material is suitable for reuse as soil amendment material. Compost management is discussed further in Section 8.

4 Closure and Post Closure Plan

The purpose of this Closure and Post-Closure Plan is to provide a program that fulfills the requirements and responsibilities of minimizing and/or eliminating potential environmental and health hazards at the Dem-Con Pilgrim Landfill. In addition, the plan aims to ensure proper closure of the landfill, monitoring of its post-closure effects, and maintaining the site in a safe condition.

4.1 Closure Operational Plan

4.1.1 Notification of Closure

As per Minnesota Rules, the operator will notify the MPCA 90-days prior to closure. Regular customers of the landfill will be given written notification of the site's closure date no less than 60 days prior to completion of landfill activities. Notification of closure will be repeated not less than thirty days prior to the cessation of landfilling activity. All notifications will contain information on alternative disposal sites.

Notices will be published in major newspapers circulated in the landfill's service area. These notices will include date of site closure and locations of alternative disposal areas. The landfill operator will post a sign at the gate attendant’s window at least 60 days prior to and one hundred and twenty days after completion of landfilling activity. These signs will include notification of anticipated closure date and locations of alternative disposal locations.

4.1.2 Security

Only those persons authorized by the landfill operator and/or owner will be permitted on the site after closure of the facility. Unauthorized access to the site and further disposal of demolition debris at the site will be restricted by the use of locked gates and fences.

4.1.3 Responsible Party

At the time of closure, the landfill operator will provide the name, address, and telephone number of the party responsible for the facility during the post closure period.

4.1.4 Overlay and Closure of Unlined Disposal Area

As part of this permit modification request, it is proposed to consolidate construction and demolition waste and cease operations of the unlined Class I area on the east side of the site (existing DD 001, proposed DD 002). The facility is then proposing to construct lined disposal cells which overlay the unlined area and serve as a base liner system for the future lined disposal area. The proposed overlay system, from bottom to top, will consist of a six-inch soil barrier layer, GCL, 60-mil HDPE geomembrane, and a 12-inch granular drainage layer.

4.1.5 Final Cover

Final cover placement will be an on-going process as portions of the fill are brought to final grade. The placement of final cover follows the completion of filling to final grade of each individual phase as final elevations are reached.

The final cover system for all landfill areas, including unlined disposal areas and future lined disposal cells will consist of a six-inch buffer layer (1 inch minus material), a 40-mil LLDPE liner (textured and smooth), a 12-inch granular drainage layer, a six-inch rooting zone layer, and six inches of topsoil. Yard waste compost may be incorporated into the topsoil as a soil amendment. The final cover system for the unlined area will tie into the overlay system and future final cover of the lined disposal area.

4.1.6 Vegetation

Vegetation will be established on completed fill areas in a progressive manner. Within ninety days after termination of landfilling activity, the finished surface will be seeded, mulched, and fertilized. Areas where vegetation has been established prior to closure will be inspected at this time. If any of these areas do not have adequate vegetation, measures will be taken (reseeding, fertilizing, etc.) to reestablish vegetation.

4.1.7 Grading

Final grading of the landfill and placement of the final cover system will be to the grades shown on the Sheet C-105. The final grades for the top of the fill area are designed at 3% or greater and side slopes remaining to be constructed will not exceed 25% (4:1). Slopes will be interrupted with drainage swales placed no greater than every 200’ lineal feet apart down the slope. The final grades are intended to promote surface water runoff and inhibit excessive erosion. The continuity of the final grades over the top portion of the fill area will render the area suitable for ultimate land uses such as open recreational space or green space.

4.1.8 Surface Water Drainage

Dem-Con proposes to manage stormwater under the MPCA General Industrial Stormwater Permit. A Stormwater Pollution Prevention Plan (SWPPP) will be developed for the site.

Surface water drainage from the landfill and surrounding setback areas is generally divided into drainage areas that route runoff toward on-site stormwater management features. The majority of runoff from the landfill is directed toward a stormwater management and sedimentation basin located on the west side of the site. A second stormwater sedimentation basin will be located on the northeast corner of the site to manage stormwater from the northern and eastern portions of the site. Finally, a third smaller sedimentation basin will be located in the southeastern portion of the site to collect runoff from perimeter ditches in the southern and eastern portions of the site, as well as any drainage from the existing yard area. Discharge from on-site stormwater management features ultimately flows through existing drainage channels toward the Minnesota River.

Stormwater drainage patterns and control features described in the approved engineering plans will be maintained throughout landfill development. Pond grading is subject to change as needed at the time of construction. Any modifications to grading or sequencing associated with future landfill development will be performed in accordance with the approved SWPPP and applicable permit requirements. Updated stormwater calculations for the proposed final cover system and sedimentation basins are provided in Appendix G.

4.1.8.1 Inspection

Prior to closure of the landfill, the regulatory agencies shall be notified to allow inspection of the site prior to personnel and equipment removal from the property. The final condition of the landfill shall be approved by the County and the MPCA before removal of personnel and equipment.

4.1.8.2 Description

The landfill owner and/or operator shall submit a detailed description and plat of the completed landfill to Blue Earth County Registrar of Deeds and to the Commissioner of the MPCA within one month of final closure of the landfill. The description and plat shall be produced by a Land Surveyor registered in the State of Minnesota and include the general type, quantity, and location of deposited solid waste, depth of waste fill, original and final terrain descriptions, and other pertinent characteristics of the completed demolition landfill site of interest to future property owners.

4.1.8.3 Certificate of Closure

Dem-Con Pilgrim Landfill shall submit to the regulatory agencies' certification from a registered Professional Engineer, licensed in the State of Minnesota, that the landfill has been closed in accordance with approved plans, ordinances, and license conditions. The certification shall be submitted no later than sixty days following completion of closure activities. The regulatory agencies shall review and approve the closure following receipt of said certification.

4.2 Post-Closure Operational Plan

Dem-Con Pilgrim Landfill, LLC or its successor-in-interest will be responsible for the post-closure care of the site for a period of twenty years or until such times as this responsibility has been assumed by another public or private entity acceptable to the regulatory agencies. The following activities shall be performed during the post-closure period.

4.2.1 Inspection

Routine inspections of the site will be conducted on a quarterly basis, excluding winter quarter in conjunction with the schedule for monitoring well sampling, for five years. Annual inspections will be made after the fifth year. A representative of the owner will inspect the site. During these inspections, the following items will be observed and commented on:

1. Effectiveness of access control and site security;
2. Condition of final cover
3. Condition of vegetation;
4. Evidence of vermin;
5. Evidence of illegal dumping;
6. Evidence of illegal use of property;
7. Inspect storm water drainage system;
8. Inspect groundwater monitoring system;
9. Inspect leachate collection, transfer, and storage system.

A summary report of the self-inspections will be submitted to the MPCA on an annual basis as part of the Annual Monitoring Report.

4.2.2 Maintenance

If inspections reveal problems with any of the above-mentioned items, appropriate action will be taken to rectify them. In the event that gullying or excessive erosion occurs, the liner will be repaired as needed and additional cover soil will be placed and compacted. Vegetation will be reestablished. Measures may be taken to prevent further occurrence of the problem. If there are areas of inadequate turf establishment, they will be reseeded.

4.2.3 Reporting

An annual report will be submitted to the MPCA describing inspection conditions, corrective actions, maintenance activities, monitoring activities, performed at the landfill by March 1st annually.

4.3 Closure Cost Estimates

The following section presents an itemized cost estimates used to determine the financial holdings necessary to provide for the closure and post closure of the Dem-Con Pilgrim Landfill. Material quantities are based on the current size of open landfill that has not yet received final cover. At this time, it is based on the total open area of the current unlined demolition area footprint (approximately 17.2-acres). Once the closure and overlay of the unlined disposal area is complete, the cost estimate will be revised to reflect the total open area of the active lined disposal area. Costs in this permit application are presented in 2026 dollars. Cost estimates will be reviewed annually and revised as necessary in Dem-Con Pilgrim Landfill's Annual Report.

Mobilization:

Lump sum	$	25,000

Placement of cover soil:

Based on 17.2 acres.

6” Buffer soil	13,888 cy @ $5.00/cy	(Owner Supplied)	$	69,440
40 Mil textured LLDPE	750,000 sf @ $0.28/sf		$	210,000
12” Drainage sand	27,777 cy @ $10.00/cy		$	277,770
6” Rooting Zone	13,888 cy @ $3.00/cy	(Owner Supplied)	$	41,664
6” Topsoil	13,888 cy @ $3.15/cy	(Owner Supplied)	$	43,747

Seeding and mulching:

17.2 acres @ $630/acre	$	10,836

Surveying/CQA/testing/inspection/certification:

Lump sum	$	100,000

Construction of diversion berms:

Berm material (100 LF/acre) 1,720 LF @ $5/LF	$	8,600
HDPE pipe (50 LF/acre) 860 LF @ $22.50/LF	$	19,350
TOTAL CLOSURE COSTS	**$**	**806,407**

4.4 Annual Post-Closure Costs

The following information summarizes costs associated with annual post- closure care of the facility.

Inspections:

Facility Inspection Costs (80 hours @ $35/hour)	$	2,800
Landfill Supervisor (26 hours @ $50/hour)	$	1,300

Routine Maintenance and Repair Costs:

Mowing (assume 1x/year) and 75-acres	$	5,000

Cover Maintenance (assume 1x/year)	$	1,000
Security	$	500
Surface Water Management and Maintenance	$	1,000
Access Road Maintenance	$	500
Rodent Control	$	250
Leachate Management Costs:		
Leachate Disposal (10,000 gal/ac/year @ $0.04/gal, 75-ac)	$	30,000
Leachate Monitoring	$	5,000
Reporting	$	1,000
Pump Replacement (assume 1 pump/5 years @ $15,000/pump)	$	5,000
Landfill Gas Management Costs:		
LFG Monitoring	$	500
Reporting	$	250
Groundwater Monitoring Costs (2 sampling events/year):		
GW Monitoring Well Sample Collection (6 wells @ $425/well)	$	2,550
Semi-annual Lab Analysis (6 wells @ $700/well)	$	4,200
System Maintenance (6 hours @ $25/hour)	$	150
Monitoring Well Replacement (assume 1 well/5 years @ $10,000/well)	$	2,000
Reporting	$	4,500
Reporting Services Costs:		
Third Party Project Management	$	5,000
TOTAL ANNUAL POST-CLOSURE COSTS	**$**	**72,500**

4.5 Financial Assurance

The facility will maintain a financial assurance mechanism in accordance with MN Rule 7001.3300.

5 Site Location Information

5.1 Topographic and Development Map

The Pilgrim Demolition Landfill is located in Blue Earth County, Minnesota, within Lime Township. The site lies within the Minnesota River basin and is situated in an area generally characterized by gently sloping terrain that has been locally modified by historical aggregate mining operations and subsequent landfill development activities. Topographic conditions across the landfill property vary due to excavation associated with past mining and landfill construction. Existing site contours and elevations are shown on the Existing Conditions Plan included in the engineering drawings. The landform within the landfill footprint differs from surrounding properties as a result of mining and grading, while adjacent areas generally reflect natural and agricultural topography typical of the region.

5.2 Geologic and Location Information

A hydrogeologic study has previously been prepared for the site by Environmental Resource Group (ERG), dated August 2002. This document was submitted to MPCA as part of the 2004 re-permitting efforts and may be referenced for further regional and site hydrogeologic conditions. A summary of findings discussed in this document are provided within this section.

5.2.1 Regional Geology

There are three primary geologic groups near the surface in Blue Earth County. The Prairie du Chien Group (OPDC) is described in Blue Earth County as predominantly composed of dolomite and sandy dolomite with quartzose sandstone. The OPDC, where present, is in turn underlain by up to an approximate 75 foot thickness of the Jordan Formation (Jordan). The Jordan is described as a soft to poorly cemented quartzose sandstone. The Jordan crops out in the north-central part of Blue Earth County along the Minnesota River valley. In some areas, absence of OPDC has exposed the sandstone to further erosion. In these areas, only a portion of the Jordan is present and in some areas, the St. Lawrence Formation (St. Lawrence) forms the upper bedrock unit. The St. Lawrence is described as predominantly interbedded dolomite, siltstone and shale. Regional geologic cross-sections can be found in the Pilgrim Demolition Landfill Hydrogeologic Evaluation (Environmental Resource Group, 2002).

5.2.2 Site Geology

A typical geologic column for the site consists of unconsolidated material at the surface (0 to 50 feet) underlain in places by either the OPDC (0 to 40 feet thick), and/or Jordan (0 to 80 feet thick) and/or the St. Lawrence (60 to 100 feet thick). The St. Lawrence is underlain by the Franconia Formation (80 to 120 feet thick), Ironton and Galesville Formations (60 to 80 feet thick), Eau Claire Formation (80 to 120 feet thick), the Mt. Simon Formation (100 to several hundred feet thick) and Precambrian Rock (unknown thickness). Well log based geologic cross-sections can be found in the Pilgrim Demolition Landfill Hydrogeologic Evaluation (Environmental Resource Group, 2002).

5.2.3 Regional Hydrogeology

Regional hydrogeologic conditions at the Dem-Con Pilgrim Landfill are controlled by sedimentary bedrock typical of south-central Minnesota and groundwater discharge to the Minnesota River. Site-specific hydrogeologic investigations indicate that groundwater beneath the landfill occurs primarily within the Jordan Sandstone, which represents the first significant water-bearing unit in the area. The OPDC group, which overlies the Jordan Sandstone regionally, is thin to locally absent in the vicinity of the site due to erosional features and historic quarrying activities. The St. Lawrence Formation underlies the Jordan Sandstone and functions as a regional confining unit that hydraulically separates the Jordan aquifer from deeper bedrock aquifer systems.

Groundwater flow in the regional and site vicinity is generally from east to west toward the Minnesota River, which represents the regional groundwater discharge area. Hydrogeologic data collected at the site indicate that groundwater flow occurs predominantly through porous media within the sandstone rather than through fracture-dominated pathways. The presence of eroded bedrock valleys in the region does not materially alter groundwater flow direction or hydraulic gradients beneath the site.

Reconnaissance of the surrounding area identified no surficial karst features. Solution features observed within quarry walls are limited in extent, are not laterally continuous, and do not exhibit collapse characteristics. Static groundwater conditions occur within the sandstone, indicating that localized solution features in overlying dolomite do not influence regional groundwater behavior at the site. The regional hydrogeologic setting, combined with site-specific monitoring and design controls, provides a basis for groundwater protection and monitoring at the facility in accordance with MPCA requirements.

5.2.4 Site Hydrogeology

Site-specific hydrogeologic conditions at the Pilgrim Demolition Landfill have been evaluated through field investigations and groundwater monitoring conducted as part of a hydrogeologic evaluation. Monitoring wells installed at the site are screened within the Jordan Sandstone, which represents the primary water-bearing unit beneath the landfill.

Groundwater elevations measured during site investigations indicate that groundwater beneath the site occurs at elevations on the order of approximately 780 feet (NGVD). Groundwater flow across the site is generally from east to west toward the Minnesota River, consistent with regional groundwater discharge patterns. Water level measurements collected during multiple monitoring events indicate that groundwater flow direction and hydraulic gradients remain relatively consistent, with only minor seasonal variation. Hydrogeologic data indicate that groundwater movement at the site occurs primarily through porous media flow within the sandstone rather than through fracture-dominated pathways. Overlying Prairie du Chien Group dolomite is thin to absent within much of the site due to erosional features and historic quarrying activities. As a result, static groundwater conditions occur within the underlying sandstone, and localized solution features in remaining dolomite do not exert a controlling influence on groundwater behavior at the site.

The existing groundwater monitoring system provides ongoing evaluation of groundwater elevations and quality beneath the landfill. Monitoring data is used to confirm groundwater flow direction and to provide

early detection of any potential changes in groundwater conditions in accordance with permit requirements. Historical groundwater elevations in the current monitoring wells can be found in the SW-254 Pilgrims Demolition Landfill 2025 Annual Report (Stantec, 2026).

6 Operations and Maintenance

6.1 Facility Description

The site currently accepts C&D debris and is proposing to accept industrial wastes in accordance with the ISWMP. The site operates Monday through Sunday with season fluctuations in volumes.

The following methods and procedures are incorporated into the landfilling operation. Open burning is prohibited at the site. Windblown materials will be minimized by restricting the working area to reasonable, workable limits. Generally, the working face is approximately one acre, with an average lift thickness of 8 to 12 feet. The slope of a typical working face may vary but will not exceed 3:1 (H:V). Waste is compacted and other construction tasks performed by on-site equipment owned by Dem-Con. Available equipment changes periodically at the site. New equipment is purchased and old equipment is sold as needed for proper operation of the site. All the machinery is equipped with standard safety devices and noise control systems. The equipment is typically stored and maintained on-site but may also be serviced at the shop located at Dem-Con's Environmental Campus in Shakopee, Minnesota. Equipment available on-site changes periodically and typically consist of:

1- Compactor

1- Front End Loader

1- Off-Road Truck

1- Skidsteer

Additional equipment such as dozers and excavators are readily available on as as-needed basis from Dem-Con's Shakopee facility.

On-site personnel typically consists of two to three landfill operators. A minimum of one MPCA certified Type III landfill operator is on-site at all times during operational hours.

Windblown materials are routinely picked up as deemed necessary by the operator to maintain permit compliance. Cover material is obtained from on-site soil excavation or from clean soil hauled onto the site. Intermittent cover is placed on the active areas of the landfill on an as needed basis to control nuisance issues. However, at a minimum, the cover is placed on any wastes that are exposed for 30 days. Stockpiling measures are taken as necessary to ensure adequate cover material throughout the entire year, including winter months.

Site security is maintained by a gate that is securely locked during non-operational hours.

Inspection records, the Closure Plan, Post-closure Plan and Contingency Action Plan are all kept at the Dem-Con offices. Copies of all permits, permit applications, plans, licenses, etc. are also kept at the Dem-Con offices. A copy of the Contingency Action Plan is kept at the landfill gatehouse.

Termination procedures at the site include constructing a final cover system over completed portions of the landfill as they reach final grade. The final cover system will consist of a six-inch buffer layer, a 40–mil LLDPE cap, 12-inches of drainage sand, six inches of rooting zone soil and six inches of topsoil native to the area capable of supporting vegetative growth. The topsoil may be amended by incorporating yard waste compost into the topsoil.

Covered areas will then be seeded and vegetation established to decrease erosion and infiltration rates. Before final closure of the site, the MPCA and the County will be notified to allow their staff to conduct site inspections. Specific activities regarding closure and post-closure care for the site are addressed in Section 4 of this document.

A description, including a plat, will be filed with the County Registrar of Deeds upon closure of the landfill. The description will include information concerning the nature of the site with respect to the type of waste deposited, the location of fill areas, depth of fill and other information of interest to future landowners.

6.2 Emergency Procedures

Emergency services for the proposed project are provided by the City of Mankato.

Emergency Preparedness and Prevention:

Dem-Con is operated in a manner that reduces the possibility of fire, explosion or threatening pollutant release. Dem-Con has prepared for emergencies in the following manner:

Certain equipment contains CB radios and operators are equipped with mobile telephones. The use of CB radios allows landfill operators to maintain contact with truck drivers while the trucks are on-site. The office maintains radio contact with the equipment operators. The office has a telephone for immediate contact of emergency personnel in the event of an emergency.

All operating equipment and buildings are equipped with fire extinguishers that are rated for types of fires anticipated. A spare extinguisher for the heavy equipment is stored in the shop. Dem-Con Landfill is served by the City of Mankato Fire Department , which will be called in for assistance in the event of a significant fire.

6.3 Operation Variables

Basic operating methods do not vary seasonally. In periods of rain, operation of the facility continues uninterrupted. Water falling on the active fill area is generally quickly absorbed. The main access road leading to the facility as well as the internal roads used to access the disposal areas are constructed of all-weather materials and maintained to ensure access throughout the year. During periods of snow, haul roads are cleared by trucks with snowplows or other equipment as needed. The loader and a compactor continue to operate in the active fill area. Blowing litter is typically not a problem even during periods of high winds due to the nature of the demolition material. However, litter fences and temporary litter screens are

available and used on-site to control blowing litter should winds create a problem with occasional lighter fractions of demolition-constructions debris (such as Styrofoam or insulation).

6.4 Trouble Shooting Procedures

Employee meetings are held as needed but at a minimum on a monthly basis. Employees bring any items of concern up during these meetings or, if the situation warrants, immediately upon discovery.

6.5 Preventative Maintenance

Equipment is routinely maintained. Finished landfill slopes are not less than 3% or greater than 4:1 (H:V). Stormwater diversion berms and controls are to be constructed across the landfill slopes to intercept stormwater and decrease erosion and sedimentation potential. Final grades have been designed to promote surface water runoff and inhibit surface water infiltration and slope erosion. Surface water runoff from the demolition fill area is directed to on-site stormwater management ponds.

In the event that rodent control problems occur, control measures will be adapted to mitigate the issue in conformance with practices approved by the various agencies.

6.6 Safety Requirements and Procedures

Personnel are trained in the safe operation of the equipment. Equipment is equipped with standard safety features including fire extinguishers.

6.7 Equipment Maintenance Records

Maintenance records for facility equipment and general landfill maintenance are maintained digitally and accessible at the office.

6.8 Site Inspection Records

Site inspection records are completed by Dem-Con personnel and are accessible at the landfill office. The site is inspected by Dem-Con personnel on a monthly basis. The MPCA also inspects the landfill on a periodic basis.

7 Construction Inspection, Quality Control, and Quality Assurance Plan

A Construction Quality Assurance Plan for both base liner and final cover construction is provided in Appendix H. Construction documentation for each phase of construction or closure will be submitted to the MPCA in the form of a documentation report signed by an Engineer registered in the State of Minnesota.

8 Composting Operations

8.1 Composting Plan

The facility will continue to compost yard waste received from the general public and commercial landscaping companies. The facility has the capacity to accept and compost up to 10,000 cubic yards of yard waste on an annual basis. In order to facilitate the composting process, agricultural grain waste may be received and composted with the yard wastes. Agricultural grain wastes are subject to the conditions of the provisions of the ISWMP presented in Appendix A.

Overall, the Site has been prepared for management of surface water to prevent ponding within the compost piles and windrows. Precipitation falling on the compost piles is readily absorbed into the compost material and there is typically no run-off from the compost windrows, even with heavy rain events. Similarly, there is no leachate which is typically generated by the yard waste composting windrows.

The grading for existing conditions prevents the run-on of surface water into composting operations areas. The composting area grading provides sheet flow drainage to a low area to the west where water collects and infiltrates. The localized surface water flow directions are indicated on the existing conditions plan sheet.

Upon arrival at the facility, all incoming vehicles are asked about the quantity and nature of their load. Unacceptable materials are removed from the load near the scale and office area before proceeding to the main yard waste composting area. The access road within the facility are not paved. The interior traffic routes are watered, as needed, to control dust.

Prior to processing, yard waste may be stockpiled at the facility. The yard waste is generally moist enough not to create dusty conditions. If handling the yard waste creates dusty conditions, sufficient water would be applied to control the dust. The distance between the facility and any residential or other development is expected to further ensure that facility noise is not a nuisance.

The active composting area has the potentials to generate odors. Windrow or static pile composting is intended to be used for curing, and maturing the yard waste. Aeration of the windrows/static piles, attention to moisture content, and turning of material as needed would all assist maintenance of aerobic conditions and would minimize odors.

When active composting is completed, the compost is removed from the main operations area. The compost would be moved by a front-end loader and hauled to a screening unit. Material would be screened and stored in the finished compost product storage area near the scale and office. Compost is available to commercial landscape companies and the general public.

9 Other Site Information

9.1 Site Operating Life

The Pilgrim Demolition Landfill operated by Dem-Con includes disposal area DD 001, which is classified as a Class I Construction and Demolition (C&D) disposal area and proposed to be consolidated and closed as part of this permit action. Proposed disposal area DD002 is classified as a Class III lined C&D disposal area and includes engineered liner and leachate management systems. DD 001, the unlined area, has an anticipated remaining life of 1-2 years. DD 002, the proposed lined area, has an anticipated remaining life of over 50 years.

9.2 Wind Dispersion of Particulate Matter and Fugitive Dust

The primary sources of fugitive dust emissions is associated with internal haul roads throughout the landfill and legacy mining and processing operations that preceded the construction of landfill phases. Standard Best Management Practices (BMPs) such as watering, using selective materials for road construction, or paving roads are implemented to control fugitive dust. A water truck is available to water haul roads during dry periods.

9.3 Phase Development Plan

The site will be worked in phases as shown on the drawings in Appendix B. The first phase action will be the waste relocation of the existing DD 001 material to the existing DD 002 disposal area as described above. Proposed future lined cell phasing, as shown on the Drawings in Appendix B, is named in the likely sequence of construction of cells. Note that partial cells may be constructed rather than full phases as is shown. Final cover will be placed over each cell as final grades are reached and the area will be seeded in the spring or fall following completion of final cover placement.

9.4 Cross Sections

Cross Sections are included as Sheets C-107 and C-108 of the plan set. These plans show the existing grade, final grade, and approximate excavation grade with north south and east west sections through each phase. All finished grades will not exceed slopes of 25%. Base grades and the overlay liner will be constructed at a maximum 3:1 (H:V) slope.

9.5 Noise and Access Control Methods

The site operates within the State of Minnesota's Noise Standards, Minn. Rule 7030.0040. The site and existing landfill and expansion area are located in an area surrounded by industrial and agricultural land uses (Noise Area Classification 3). Equipment is fitted with standard noise control devices (mufflers, etc.) Access is controlled by a locking gate. Berms adjacent to the access road prohibit illegal access to the facility after hours.

9.6 Monitoring System Description

The environmental monitoring system (EMS) at the Dem-Con Pilgrim Landfill consists of seven groundwater monitoring wells completed in the water table aquifer and surface water sampling at the west sedimentation basin. Monitoring well construction details and sampling procedures are documented in the facility's approved Sampling and Analysis Plan.

Monitoring well MW-7 was constructed at the site in August 2010 in response to MPCA comments regarding the monitoring system. The casing for MW-7 was extended approximately five feet in 2015 to accommodate site development, and the well was resurveyed following the modification. One on-site water supply well, designated as the shop well, is sampled in conjunction with the monitoring wells.

Monitoring well MW-2 was abandoned due to progression of landfill development and was replaced by MW-14-JS, located in the vicinity of the former MW-2 location. Piezometer MW-17-JS was installed in 2019 as a nested well near MW-5 to provide additional groundwater elevation data.

The monitoring wells serve the following functions within the EMS:

MW-1: Provides upgradient groundwater quality information.

MW-14-JS: Provides upgradient groundwater quality information (replacement for MW-2).

MW-17-JS: Provides groundwater elevation information (nested with MW-5).

MW-4: Provides groundwater elevation information.

MW-5: Provides downgradient groundwater quality information.

MW-6: Provides downgradient groundwater quality information.

MW-7: Provides downgradient groundwater quality information closest to active disposal areas.

Monitoring wells range in depth from approximately 15 to 95 feet and are screened near the water table and, for the nested well, at greater depth. The wells were constructed using stainless steel screens and were developed and stabilized in accordance with applicable requirements. Well construction complies with the Minnesota Department of Health Water Well Construction Code, and the wells are suitable for monitoring volatile organic compounds, inorganic parameters, dissolved metals, general chemistry, and field parameters.

The Sampling and Analysis Plan will be updated as necessary to document changes to the EMS, and groundwater monitoring continues to be conducted in accordance with the approved plan.

9.7 Listing of Required Permits

The site is an established demolition landfill. All required permits have been obtained. The following is a list of the required permits.

MPCA Solid Waste Permit

MPCA Industrial Stormwater Permit

Wastewater Hauling Permit, as applicable, to be issued by the WWTP for leachate disposal.

9.8 Environmental Review

An MPCA Environmental Review Pre-screening Form (p-ear1-08) was completed for the site and is included in Appendix I. The form indicates further Environmental Review is not required for the proposed changes at the site.

10 General Solid Waste Management Facility Requirements – MN Rule 7035.2535

10.1 Subp. 1 Unacceptable Wastes

The unacceptable wastes listed in this section of the Minnesota Rules will not be accepted at the facility. Additional unacceptable wastes are discussed in Section 2.2 of the facility's ISWMP included as Appendix A of this application.

10.2 Subp. 2 Security

Only those persons authorized by the landfill operator and/or owner will be permitted on the site. Unauthorized access is controlled by the use of locking gates, fencing, and physical barriers.

10.3 Subp. 3 General Inspection Requirements

The operator of Dem-Con Landfill conducts weekly inspections of the facility. The operational life of the facility is reviewed annually as part of the Annual Monitoring Report. The post-closure inspections for the facility are described in Section 4 of this application.

10.4 Subp. 4 Industrial Solid Waste Management Plan (ISWMP)

The ISWMP is included as Appendix A of this application.

10.5 Subp. 5 Household Hazardous Management Plan

Household Hazardous Waste is not accepted at the Facility as described in the facility ISWMP. Additionally, the facility staff is familiar with the Blue Earth County Household Hazardous Waste management programs and designated collection facilities. If any household hazardous waste arrives at the facility it will be redirected to that facility.

10.6 Subp. 6A Active Karst Features, Disappearing Streams, or Caves

The geologic features of the site are discussed in detail in Section 5 of this application.

10.7 Subp. 6B Groundwater and Surface Water Protection

Groundwater and Surface water protection is discussed in detail in Section 3 of this application.

10.8 Subp. 7A Site Preparation

Initial site preparation activities have already taken place in existing Phases 1A, 1B, and 2 of the landfill footprint. As filling of each phase nears completion, a subsequent phase is prepared for construction. Construction preparation activities may include relocating the haul road, excavating to establish base grades, and backfilling with specified subgrade materials. Note that as part of the construction of Phase 3 the existing waste in existing disposal area DD 001 will be relocated in order to achieve the proposed base grades.

10.9 Subp. 7B Phase Development Plans

Each phase shall provide for filling in a manner to achieve final waste elevations as rapidly as possible. The phases shall be designed and constructed to minimize moisture infiltration into the fill areas while maintaining stable slopes and appropriate operating conditions. Dem-Con will bring each phase to the final waste contours as shown on the approved phase development plans and close the phase according to the approved facility closure plan. A phase development plan is shown on sheet C-104 of the drawings.

10.10 Subp. 7C Surface Water Drainage System

Surface water is diverted around and away from the active fill area. Perimeter berms are developed around the landfill which direct stormwater to one of several stormwater ponds designed to treat stormwater and control rates of runoff from the final landfill grades.

10.11 Subp. 7D Slopes and Drainageways

Slopes are designed at a maximum slope of 25% and a minimum slope of 3%. Perimeter slopes are interrupted with drainage ways and diversion berms every 200 lineal feet down the slope.

10.12 Subp. 7E Final Contours

Sheet C-105 illustrates the final contours of the landfill. The maximum proposed final elevation is approximately 872 ft-msl, consistent with existing maximum proposed final elevation.

10.13 Subp. 8 Operations and Maintenance Plan

See Section 6.

10.14 Subp. 9 Hydrogeologic Evaluation

See Section 3.

10.15 Subp. 10 Final Cover

The final cover system of the entire landfill consists of a 6 inch buffer layer overlain by a 40-mil LLDPE liner, a 12 inch granular drainage layer, 6 inches of rooting-zone, and 6 inches of topsoil. The topsoil layer will be capable of supporting vegetation and may include yard waste compost as a soil amendment and for nutrient value.

10.16 Subp. 11 Water Quality Monitoring

See Section 9.6

10.17 Subp. 12 Financial Assurance

See Section 4.

10.18 Subp. 13 Planned Ultimate Use

A planned ultimate use of the site has not been determined. The final grades are compatible with development of a final use consistent with the current industrial zoning of the site such as outdoor storage, environmental recycling campus, open space, etc.

11 Certification

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based upon my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate and complete. I am aware that there are significant penalties for submitting false information including the possibility of fines and imprisonment.

Ethan Ketelsen , P.E.

Name



Signature of Engineer

Stantec Consulting Services, Inc.

1 Carlson Parkway, Suite 100

Plymouth, MN 55447

Address

04/24/2026

Date

763-657-9598

Telephone

56630

Registration Number

Permit Reissuance and Modification
11 Certification

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based upon my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate and complete. I am aware that there are significant penalties for submitting false information including the possibility of fines and imprisonment.

Mark A. Pahl

Name

Signature of Applicant

4-24-26

Date

3230 Dem-Con Drive

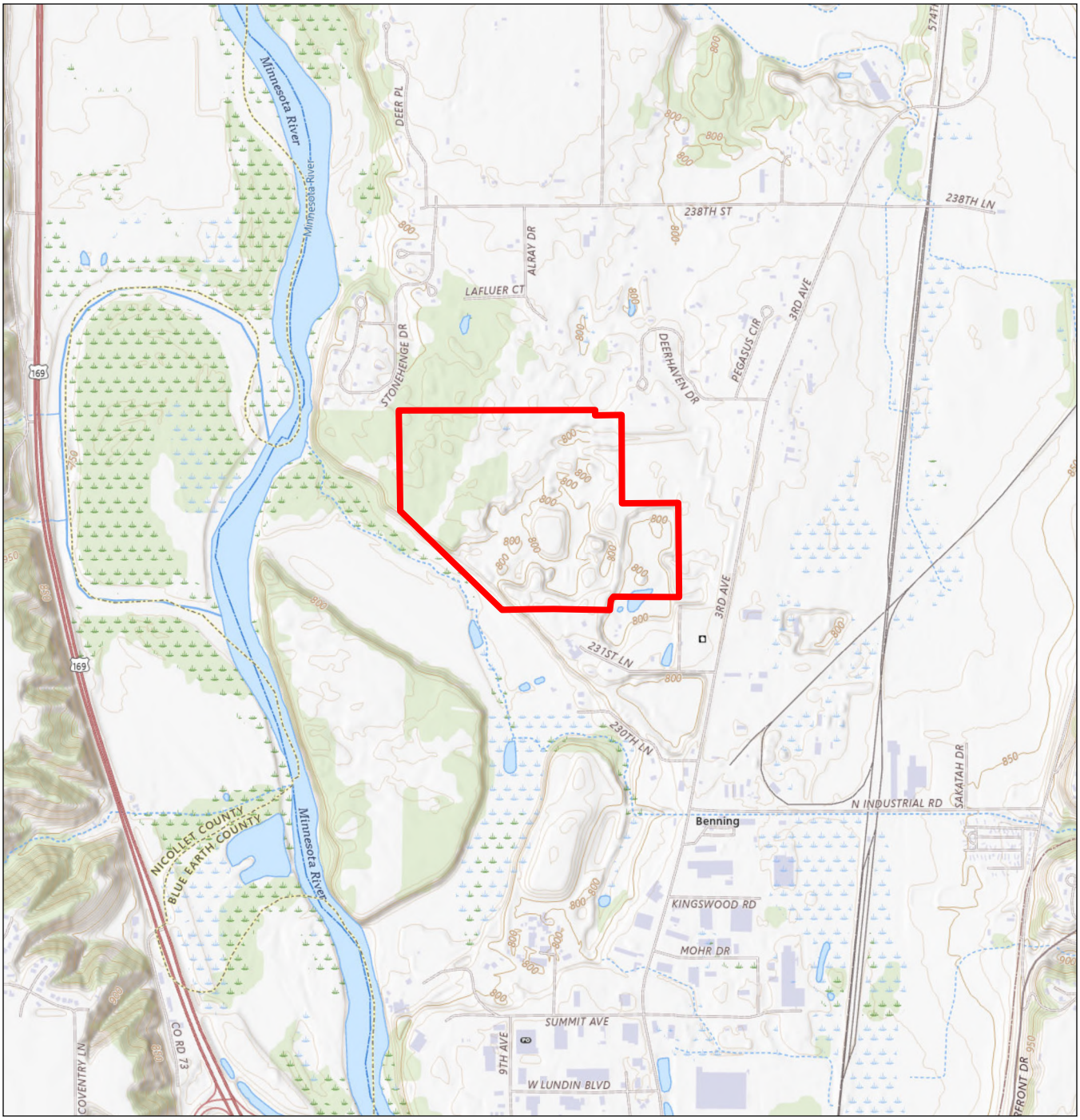
Shakopee, MN 55379

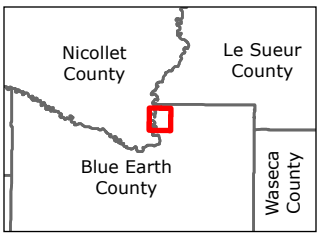
Address

952-445-5755

Telephone

Figures





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Project Location
T109N, R26W, S30 & S31
Mankato, Blue Earth Co., MN

Prepared by BS on 2026-04-17

Client/Project
Dem-Con Pilgrim Landfill, LLC

227708930

Figure No.
1

Title
Site Location

Notes
1. Coordinate System: NAD 1983 HARN Adj MN Blue Earth Feet
2. Data Sources: USGS
3. Background: USGS 7.5 Minute Quadrangle

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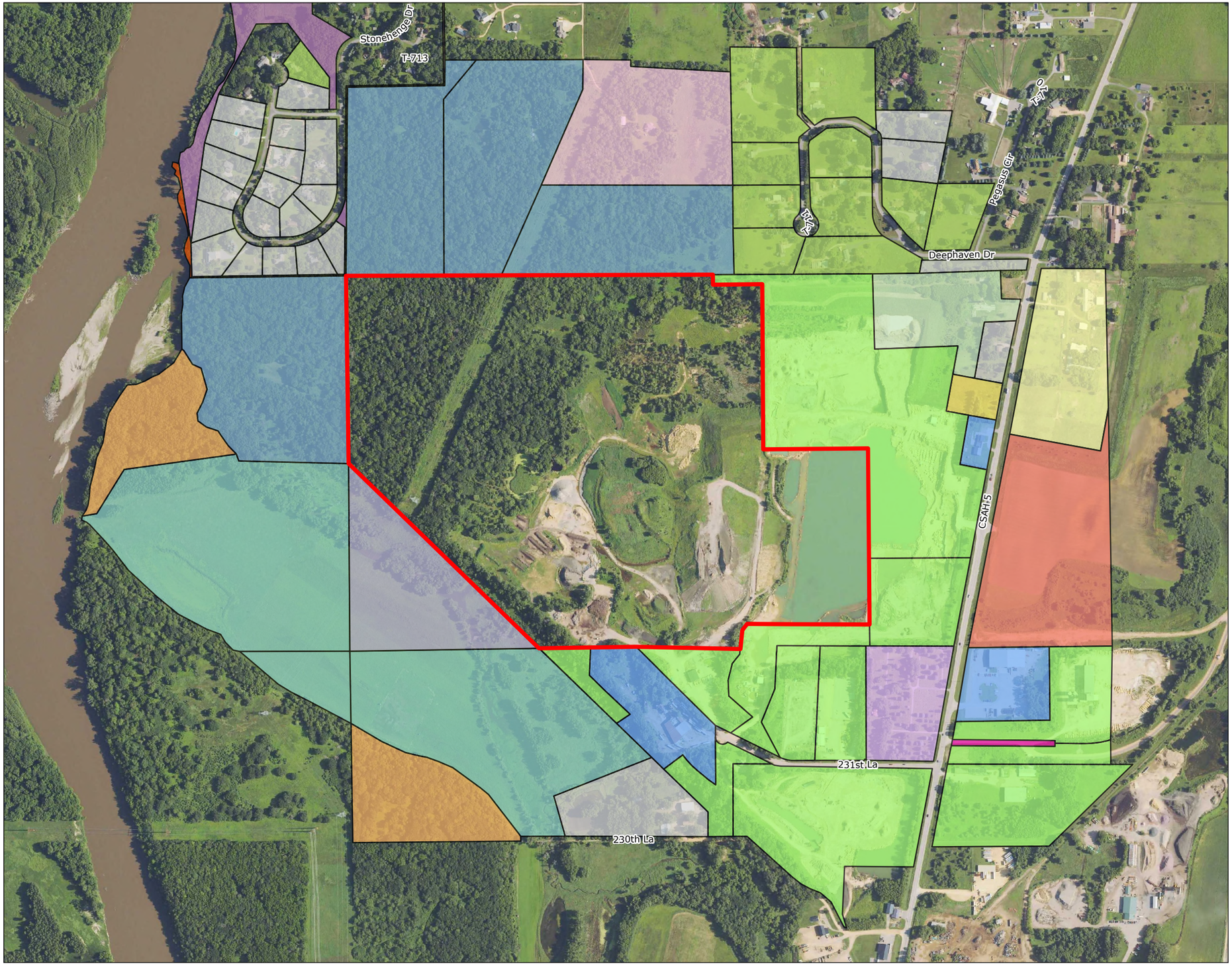

Figure No.
2

Title
Zoning

Client/Project 227708930
Dem-Con Pilgrim Landfill, LLC

Project Location
T109N, R26W, S30 & S31
Mankato, Blue Earth Co., MN

Prepared by BS on 2026-04-07

N

0 350 700 Feet
(At original document size of 11x17)
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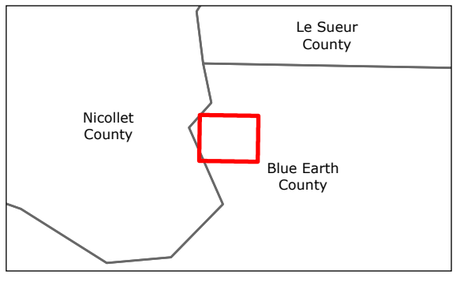
Legend

Property Boundary

Zoning

- 101- 2A/1B/4BB AGRICULTURAL; 2B/1B RURAL VACANT LAND
- 101- (HSTD) 2A/1B/4BB AGRICULTURAL; 5E MANURE PITS
- 101- 2A/1B/4BB AGRICULTURAL; 2B/1B RURAL VACANT LAND
- 101- 2A/1B/4BB AGRICULTURAL; 2B/1B RURAL VACANT LAND; 3A INDUSTRIAL LAND AND BUILDING
- 111- 2B/1B RURAL VACANT LAND
- 112- 2C MANAGED FOREST LAND
- 201- (HSTD) 1A/1B/4BB RESIDENTIAL SINGLE UNIT
- 201- (HSTD) 1A/1B/4BB RESIDENTIAL SINGLE UNIT; 2B/1B RURAL VACANT LAND
- 201- 1A/1B/4BB RESIDENTIAL SINGLE UNIT
- 201- 1A/1B/4BB RESIDENTIAL SINGLE UNIT
  Acreage 23.04
- 201- 1A/1B/4BB RESIDENTIAL SINGLE UNIT; 3A INDUSTRIAL LAND AND BUILDING
- 206- 4B4 UNIMPROVED RESIDENTIAL LAND
- 233- 3A COMMERCIAL LAND AND BUILDING
- 234- 3A INDUSTRIAL LAND AND BUILDING
- 911- 5E CEMETERY-PUBLIC
- 955- 5E COUNTY-PUBLIC SERVICE-OTHER
- 961- 5E COMMON AREA



Notes
1. Coordinate System: NAD 1983 HARN Adj MN Blue Earth Feet
2. Data Sources: MnGEO, Blue Earth County
3. Background: Minnesota 2025 Imagery

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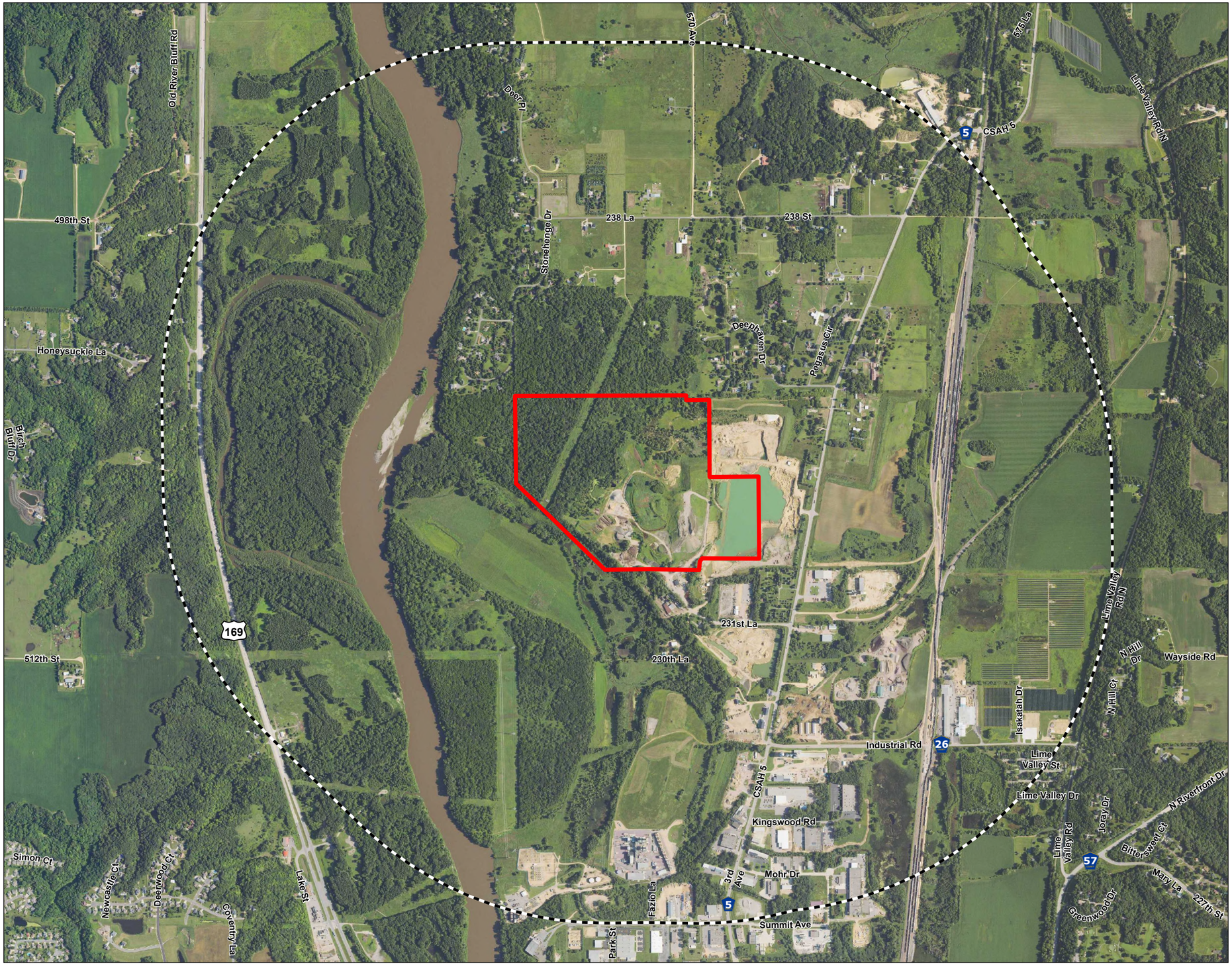

Figure No.
3

Title
Parks, Recreational Areas, and Refuges Within 1 Mile

Client/Project 227708930
Dem-Con Pilgrim Landfill, LLC

Project Location
T109N, R26W, S30 & S31
Mankato, Blue Earth Co., MN

Prepared by BS on 2026-04-17

N

0 1,000 2,000 Feet
(At original document size of 11x17)
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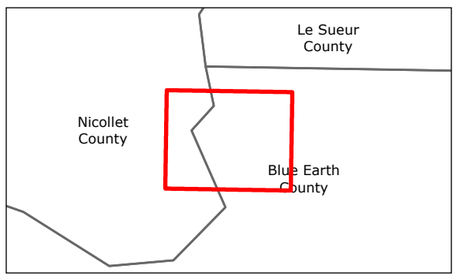
Legend
- Property Boundary
- 1 Mile Radius
- Minnesota State Park/Recreation Area
- National Wildlife Refuge



Notes
1. Coordinate System: NAD 1983 HARN Adj MN Blue Earth Feet
2. Data Sources: MnGEO, MDNR, USFWS
3. Background: Minnesota 2025 Imagery

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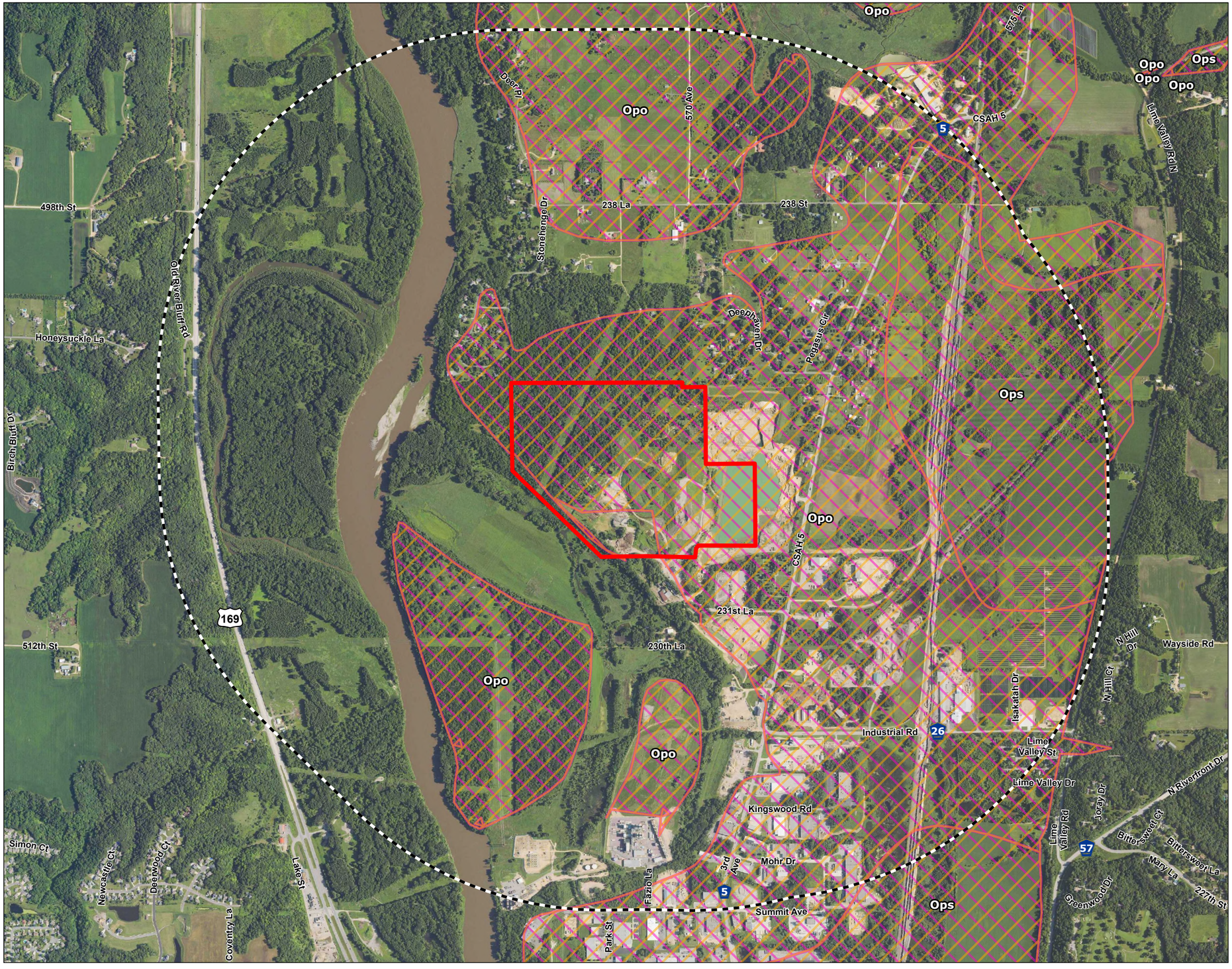


Figure No.
4

Title
Potential Karst Features Within 1 Mile

Client/Project 227708930
Dem-Con Pilgrim Landfill, LLC

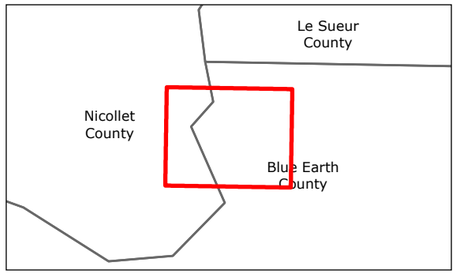
Project Location
T109N, R26W, S30 & S31
Mankato, Blue Earth Co., MN

Prepared by BS on 2026-04-17

N

0 1,000 2,000 Feet
(At original document size of 11x17)
1:18,000

Legend
- Property Boundary
- 1 Mile Radius
- Surface Karst (Carbonate Only)
- Surface Karst (Carbonate Sandstone)



Notes
1. Coordinate System: NAD 1983 HARN Adj MN Blue Earth Feet
2. Data Sources: MnGEO, MDNR
3. Background: Minnesota 2025 Imagery

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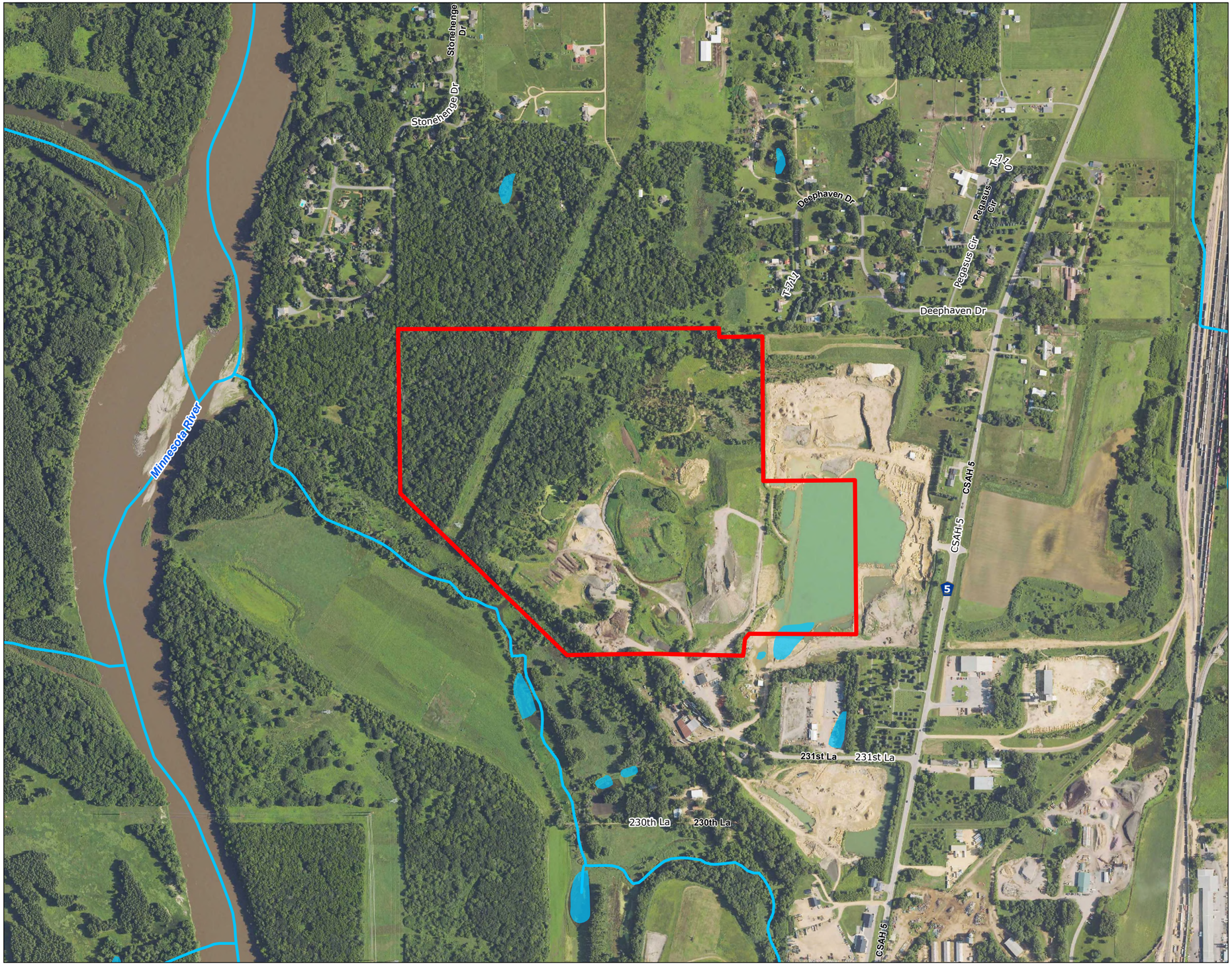

Figure No.
5

Title
Water Features

Client/Project
Dem-Con Pilgrim Landfill, LLC

227708930

Project Location
T109N, R26W, S30 & S31
Mankato, Blue Earth Co., MN

Prepared by BS on 2026-04-07

N

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(At original document size of 11x17)
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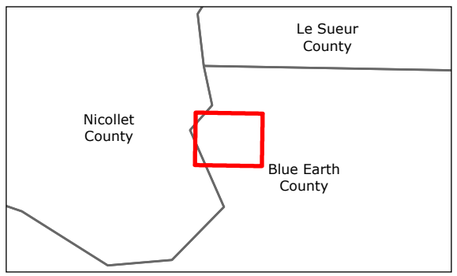
Legend
- Property Boundary
- Waterbody
- Stream/River



Notes
1. Coordinate System: NAD 1983 HARN Adj MN Blue Earth Feet
2. Data Sources: MnGEO, MDNR, NHD
3. Background: Minnesota 2025 Imagery

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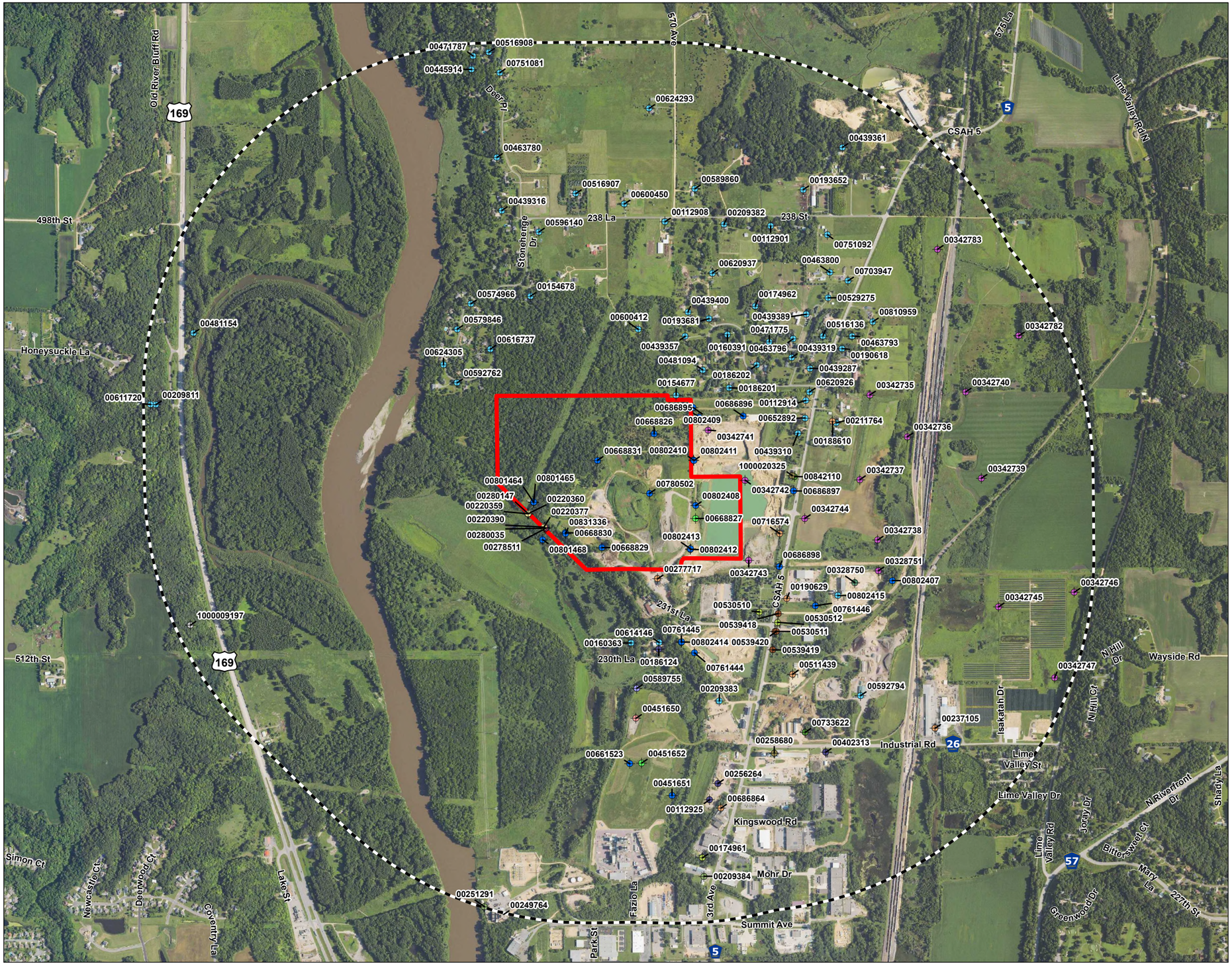


Figure No.
6

Title
Wells Within 1 Mile

Client/Project 227708930
Dem-Con Pilgrim Landfill, LLC

Project Location
T109N, R26W, S30 & S31
Mankato, Blue Earth Co., MN

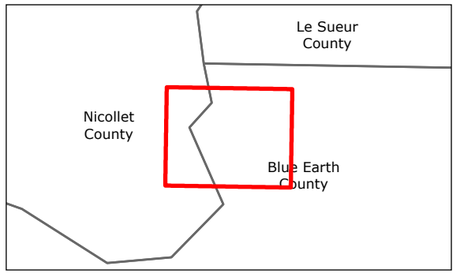
Prepared by BS on 2026-04-07

N

0 1,000 2,000 Feet
(At original document size of 11x17)
1:18,000

Legend
- Property Boundary
- 1 Mile Radius

Wells Within 1 Mile
- Unknown
- Abandoned, Sealed
- Commercial, Active
- Domestic, Active
- Domestic, Sealed
- Environmental Bore Hole, Sealed
- Exploration, Sealed
- Industrial, Active
- Monitoring Well, Active
- Monitoring Well, Sealed
- Monitoring Well, Unknown
- Observation Well, Actve
- Other, Sealed
- Public Supply/Community, Active
- Public Supply/Non-Community/Non-Transient, Active
- Public Supply/Non-Community/Non-Transient, Sealed
- Piezometer, Active
- Piezometer, Sealed
- Test Well, Active



Notes
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2. Data Sources: MnGEO, CWI
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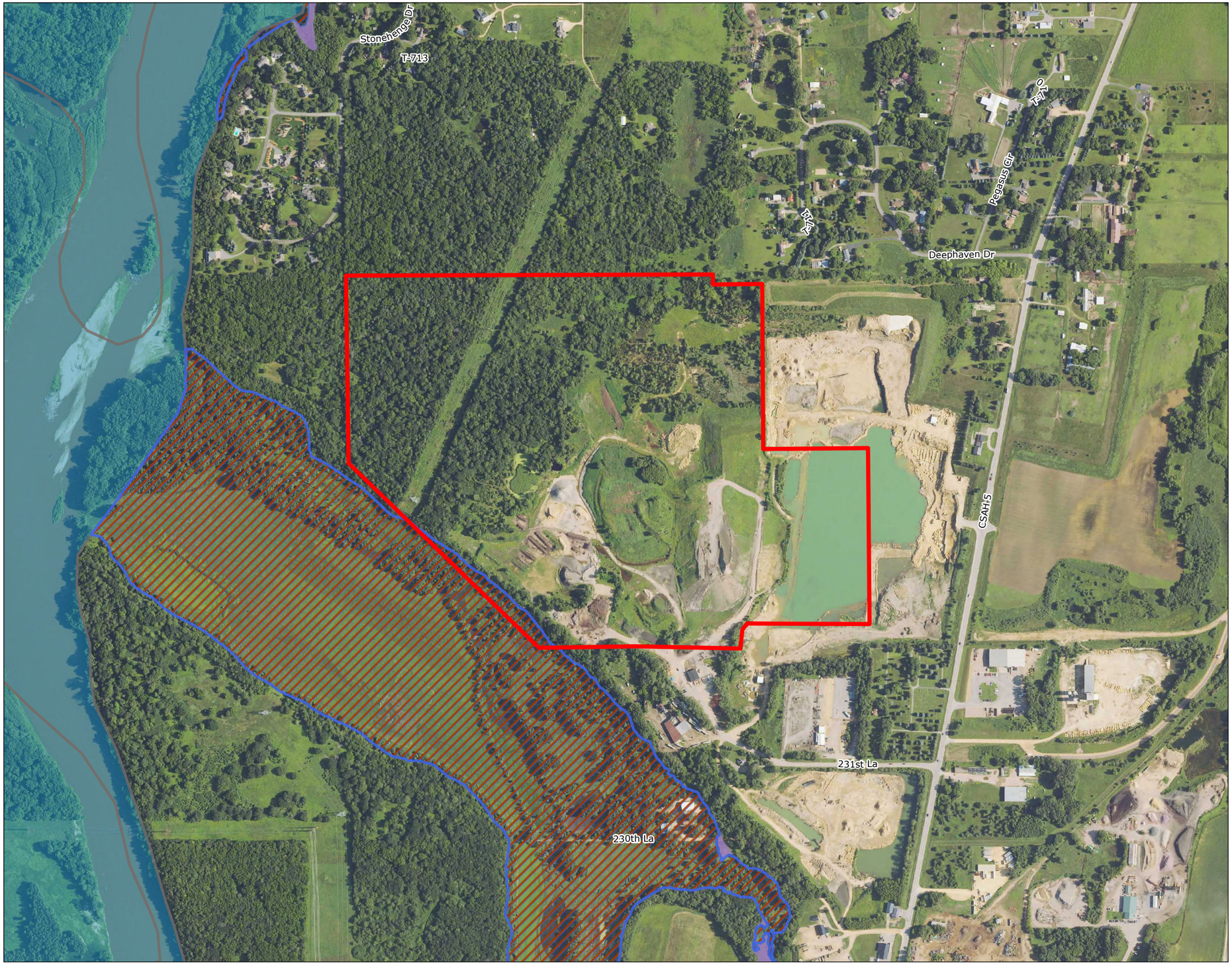


Figure No.
7

Title
Floodplain Map

Client/Project 227708930
Dem-Con Pilgrim Landfill, LLC

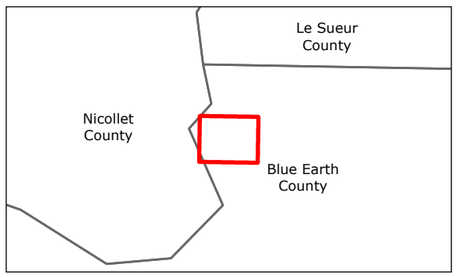
Project Location
T109N, R26W, S30 & S31
Mankato, Blue Earth Co., MN

Prepared by BS on 2026-04-17

N

0 350 700 Feet
(At original document size of 11x17)
1:8,400

Legend
- Property Boundary
- 0.2% Annual Chance Flood Hazard
- 1% Annual Chance Flood Hazard
- Regulatory Floodway



Notes
1. Coordinate System: NAD 1983 HARN Adj MN Blue Earth Feet
2. Data Sources: MnGEO, FEMA, Blue Earth County
3. Background: Minnesota 2025 Imagery

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Appendix A Industrial Solid Waste Management Plan

INDUSTRIAL SOLID WASTE MANAGEMENT PLAN

Dem-Con Pilgrim Landfill (SW-254)
Mankato, Minnesota

Dem-Con Companies
13020 Dem-Con Drive
Shakopee, Minnesota 55379

April 22, 2026

Version 1

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Appendix G Method 1030, Ignitability of Solids
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Appendix J Guidelines-Disposal Methods for Water Filter Backwash Solids
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1.0 INTRODUCTION

The "Industrial Solid Waste Management Plan" (ISWMP) for the Dem-Con Pilgrim Landfill (SW-254) was prepared to provide the specific details and procedures for the management of industrial wastes at the facility. The ISWMP was developed according to Minnesota Solid Waste Rules Part 7035.2535, subpart 5. The ISWMP discusses specific industrial waste types that will or will not be accepted at the facility, and procedures to evaluate new waste types for acceptance. It is therefore expected that the plan be revised from time to time in accordance with changes in waste stream characteristics and the evolution of the industrial waste market.

Background

Dem-Con Pilgrim Landfill, LLC (Dem-Con) operates a demolition landfill located in Township 109 North, Range 26 West, Sections 30 and 31 in Lime Township of Blue Earth, Minnesota. The initial portion of the landfill is unlined. The permit was modified in 2026 to include a lined Class III demolition landfill area, as defined in the "Demolition Landfill Guidance (MPCA, 2005), and, as stated on page 3 of that document, can accept construction, demolition (C&D) and non-hazardous industrial wastes.

Amendments to the Industrial Solid Waste Management Plan

The ISWMP may be amended at any time during the life of the facility. An amended ISWMP will be submitted whenever changes in operation or design affect the ISWMP procedures. The MPCA must review and approve the amended ISWMP prior to implementation.

2.0 ACCEPTABLE AND UNACCEPTABLE WASTES

Acceptable Wastes

Dem-Con is permitted for landfilling in two areas. The eastern, unlined area (DD 001) is permitted as a Class I demolition landfill, and the western, lined area (DD 002) is permitted as a Class III demolition landfill by the MPCA. The following sections list types of wastes that are acceptable in each area.

2.1.1 Unlined Areas

Waste types accepted in the unlined area are limited to the following demolition debris types:

- Bituminous concrete (includes asphalt pavement and blacktop)
- Concrete (including rerod)
- Stone
- Uncontaminated soil
- Masonry (bricks, stucco and plaster)
- Untreated wood (including painted, stained and/or varnished dimensional lumber, pallets, tree stumps, grubbing, root balls, particle board, plywood, fencing and dock materials)
- Siding (Includes vinyl, masonite, untreated wood, aluminum and steel.)
- Wall coverings
- Electrical wiring and components
- Roofing materials
- Duct work
- Wall board, sheet rock
- Built-in cabinetry
- Plumbing fixtures
- Affixed carpet and padding
- Ceramic items
- Conduit and pipes
- Glass (limited to window and door glass from buildings and structures)
- Insulation (Includes fiberglass, mineral wool, cellulose, polystyrene and newspaper.)
- Plastic building parts
- Sheathing
- Molded fiberglass

- Rubber
- Drain tile
- Recognizable portions of burned structures
- Metal
- Ceiling tile
- Wood and vinyl flooring
- Asbestos-containing materials (pursuant to Appendix A of this ISWMP)

2.1.2 Lined Areas

In the lined areas, Dem-Con can accept:

- All wastes accepted in the unlined areas (no further evaluation needed);
- Packaging from construction materials and activities (no further evaluation needed);
- Empty containers from construction and demolition activities (no further evaluation needed);
- Empty containers managed in accordance with MPCA "Managing Empty Containers" document (no further evaluation needed);
- Emergency Disaster Debris
- Depackaging waste
- Treated lumber (no further evaluation needed);
- Railroad ties (no further evaluation needed);
- Contaminated soils (evaluate as per Table 1);
- Dredged Materials (evaluate as per Appendix B);
- Foundry sands (evaluate as per Table 1);
- Sandblasting sands (evaluate as per Table 1);
- Grinding sludges (evaluate as per Table 1);
- Car wash sand sediment (no further evaluation needed);
- Non-hazardous mercury contaminated soils and construction/demolition debris free of elemental mercury (evaluate as per Appendix B and Table 1, respectively);
- Wastes containing PCB's less than 50 ppm
- Demolition debris with PCB containing caulking wastes in excess of 50 ppm that are adhered to structure;
- Demolition debris with lead paint that is adhered to the structure;
- Ash from burnt structures (evaluate as per Table 1);

- Non-PCB ballasts (no further evaluation needed);
- Naturally Occurring Radioactive Material (NORM) with radium-226 not exceeding 30 Pico curries;
- Carpet – abated (no further evaluation needed);
- Street sweepings (no further evaluation needed);
- Absorbents (evaluate as per Table 1);
- Waste traps from garages (evaluate as per Table 1);
- Sanitary & Storm Sewer Grit (evaluate as per Table 1);
- Wastewater treatment residues (evaluate as per Table 1 and MPCA Guidance Document "Guidelines-Disposal Methods for Water Filter Backwash Solids");
- Autoclaved medical waste;
- Residue from single sort recycling, tire recycling, auto recycling, and other recycling operations;
- Other wastes from manufacturing and industrial processes that do not exceed the maximum concentrations of the toxicity characteristics for a given waste using the regulatory levels included in 40 CFR part 261 (see Section 2.3 and Table 1);
- Shredded demolition debris that can be identified and or verified from generator as acceptable materials;
- Fiberglass structures (boat hulls, hot tubs, etc.)
- Treated seeds, managed in accordance with Appendix K
- "Demo-like" materials from manufacturers of building materials and structural components of buildings (including cabinets, doors, prefabricated walls, countertops, carpet, shingles, etc.), including, but not limited to, wood, wood products, tree stumps, asbestos, glass, concrete, metal, brick, clay, porcelain fixtures, block, tile, rock, insulation, shingles, sheet rock, styrofoam, plastic pipe, conduit, fiberboard, plaster and dirt;
- Residuals from yardwaste compost screening operations; and
- Other waste types specifically listed in this ISWMP.

2.2 Unacceptable Wastes

MPCA rules prohibit certain wastes from disposal in C&D landfills, including:

- Municipal Solid Waste (MSW)
- Hazardous wastes;
- Sewage that does not meet Class B pathogen reduction listed in part 7041.1300 subpart 3 such as, sewage sludge, septic tank pumping, sewage sludge compost;
- Wastes containing free liquids;

- Raw animal manure;
- Infectious wastes;
- Used oil;
- Radioactive wastes;
- Animal carcasses, parts, renderings and slaughterhouse wastes;
- Appliances (for disposal);
- Hot ashes or wastes that could spontaneously combust or ignite other wastes due to high temperatures;
- Batteries;
- Recyclable cardboard;
- Explosives;
- Fluorescent tubes and ballasts containing PCB's;
- Food waste;
- Mattresses;
- High-intensity discharge lamps;
- Live coal tar (including applicators, containers, and tubes);
- Household hazardous waste;
- Machinery or engine parts;
- Medical waste (non-autoclaved);
- Wastes containing elemental or free mercury (thermostats, switches);
- MSW incinerator ash;
- PCB containing wastes greater than the regulatory limit of 50 ppm;
- Tires (for disposal);
- Unrecognizable waste, unless processed at an MPCA permitted solid waste facility prior to delivery;
- Vehicles; and
- Yard waste (for disposal).

2.3 Mandatory Waste Types

Minnesota Rules part 7035.2535, subpart 5, item B requires that the following 12 specific waste types be addressed in an ISWMP:

Waste Type	Accepted/Not Accepted		Disposal Method
	Unlined Area	Lined Area	
Empty pesticide containers	Not accepted	Accepted	Codisposal
Asbestos	Category 1 & 2 non-friable only	Accepted (all forms)	See Appendix A
Waste containing (PCBs) at a concentration less than 50 ppm	Not accepted	Accepted	See Table 1
Spilled non-hazardous materials	Not accepted	Accepted	See Table 1
Rendering and slaughterhouse wastes	Not accepted	Not Accepted	
Wastes that could spontaneously combust or that could ignite other wastes because of high temperatures	Not accepted	Not accepted	
Foundry wastes	Not accepted	Accepted	See Table 1
Ash from incinerators, resource recovery facilities and power plants	Not accepted	Accepted	See Table 1 (coal ash only accepted in cells with a Subtitle D -equivalent liner)
Paint residues, paint filters and paint dust	Not accepted	Accepted	See Table 1
Sludges, including ink sludges, lime sludge, wood sludge and paper sludge	Not accepted	Accepted	See Table 1
Fiberglass, urethane, polyurethane, and epoxy resin waste	Accepted	Accepted	See Table 1
Spend activated carbon filters	Not accepted	Accepted	See Table 1

2.4 Exempted Waste Types

Minnesota Rules part 7035.2535, subpart 5, item D exempts the following from evaluation in the ISWMP (although whether or not the waste type is accepted must be noted):

Waste Type	Accepted/Not Accepted		Notes
	Unlined Area	Lined Area	
Paper and cardboard wastes from manufacturing processes or packaging	Not accepted	Accepted	
Food and beverage packaging and handling materials	Not accepted	Accepted	Includes packaging, wrapping and food handling (i.e. tissue wrap, etc.) materials not containing organic food waste

Food not containing free liquids	Not accepted	Not accepted	
Aluminum, iron, steel, glass, wood, and hardened, cured plastic waste	Accepted	Accepted	
Dewatered sewage sludge that has been treated by a process to significantly reduce pathogens pursuant to Minnesota Rules	Not accepted	Accepted	Needs to meet the class B pathogen reduction listed in part 7041.1300 subpart 3
Compost including sewage sludge compost produced in accordance with Minnesota Rules, part 7035.2836	Not accepted	Accepted*	*Only Class II compost. Limited, if any, markets exist for Class II compost
Grit and bar screenings from a wastewater treatment plant	Not accepted	Accepted	
Ash from boilers and incinerators using wood or biomass as a fuel source	Not accepted	Accepted	See Table 1

2.5 Waste That Requires a Subtitle D Liner

- Coal Ash and Auto Shredder Residue both require a Subtitle D liner for management in Minnesota. Dem-Con's liner and cap design meet the requirements of subtitle D. A copy of the liner equivalency calculations by Carlson McCain that demonstrate that the liner and cap design exceeds the Subtitle D standard are included in Appendix F.

2.6 Hazardous Wastes

The following discussion is provided to assist facility managers in understanding what is and is not a hazardous waste. The definitions were originally specified in the Resource Conservation and Recovery Act (RCRA), as administered by the United States Environmental Protection Agency (USEPA). These definitions are incorporated into Minnesota state statutes and discussed in detail in rules promulgated by the Minnesota Pollution Control Agency (MPCA), as cited below.

A substance is a hazardous waste if:

- The waste exhibits any of the characteristics of hazardous waste in Minnesota Rules, part 7045.0131 (ignitability, it is an oxidizer, corrosivity, reactivity, lethality or toxicity);
- The waste is nonspecific source (F), specific source (K), commercial chemical product (P,U), listed in Minnesota Rules, part 7045.0135; or
- The waste is a polychlorinated biphenyl waste (PCB waste) at a concentration of 50 ppm or greater as described in Minnesota Rules, part 7045.0135 subpart 5.

The characteristics of a hazardous waste are:

- Ignitability: According to MN Rule 7045.0131 Subp 2, a liquid exhibits the characteristic of ignitability if it is an aqueous solution containing less than 24 percent alcohol by volume, and has a flash point less than 60 degrees Celsius (140 degrees Fahrenheit). The flash point test determines the lowest temperature at which a chemical ignites when exposed to flame. A non-liquid waste exhibits the characteristic of ignitability if it is capable, under standard temperature and pressure, of causing fire through friction, absorption of moisture, or spontaneous chemical changes and, when ignited, burns so vigorously and persistently that it creates a hazard. Test method 1030 from SW-846 is the most appropriate test for a non-liquid waste for which the ignitability characteristic is suspected.
- Corrosivity: A waste exhibits the characteristic of corrosivity if a representative sample of the waste is aqueous and has a pH less than or equal to 2.0 or greater than or equal to 12.5. The pH is a measurement that determines the acidity or alkalinity of a sample.
- Oxidizers: Any waste defined in the Code of Federal Regulations (CFR), Title 49, Section 173.115 as an oxidizer or any waste that readily supplies oxygen to a reaction in the absence of air.
- Reactivity: A waste is reactive if it is normally unstable; reacts violently with water; forms an explosive or toxic mixture with water; can easily be detonated or exploded; or contains quantities of cyanide gas or sulfide that could be released into the air at toxic levels when exposed to a pH range of 2.0 to 12.5;.
- Lethality: Lethality is a hazardous waste characteristic specific to Minnesota, and considers the toxicological, or poisonous, effects of the waste. In accordance with MN Rule 7045.0131, Subp 6, Lethality shall be determined by applying knowledge of materials and processes used, including reasonably available information on the lethality of the components of the waste. A waste is hazardous for the lethality characteristic when a representative sample exhibits any of the following:

  -an oral LD50 (rat) less than 500 mg/kg

  -a dermal LD50 (rabbit) less than 1000 mg/kg

  -an inhalation LC50 (rat) less than 2000 mg/m^3

  -an inhalation LC50 (rat) less than 1000 ppm for gasses and vapors

- Toxicity: The Toxicity Characteristic Leaching Procedure (TCLP) is a laboratory test where the concentrations of various constituents such as heavy metals, pesticides, and organic solvents are measured in an acid solution that has passed through a sample of the waste material. If the concentration of any constituents exceeds the maximum concentrations listed in MN Rule 7045.0131, Subp 8, the waste is hazardous.

There are exemptions to the hazardous waste classification for specific wastes, as listed in Minnesota Rules, part 7045.0120. Regulated hazardous waste must be disposed of at a permitted hazardous waste

disposal facility. Any material contaminated by a hazardous waste and is deemed to be a hazardous waste by the MPCA will not be managed by Dem-Con.

Dem-Con does not accept hazardous wastes, including household hazardous wastes and hazardous wastes from conditionally exempt generators. Anyone bringing in hazardous wastes for disposal will be directed to the Blue Earth County Household Hazardous Waste Facility, 651 Summit Ave, Mankato, Minnesota, or to contact their county solid waste officer.

3.0 WASTE EVALUATION PROCEDURES

3.1 Notification

Regular customers of the landfill receive notification of the types of materials that are and are not acceptable and any changes in policy. They are also informed of the policies for ensuring that only acceptable waste are hauled to and disposed of at the site.

New customers are notified of Dem-Con's policies and procedures as the new account is opened and/or via postings in the gatehouse or on the company website. Any changes to the original policy will be presented to the generator in the form of a notification letter as appropriate.

3.2 Evaluation of New Industrial Wastes

Dem-Con will evaluate each new waste type considered for disposal on a case-by-case basis. Procedures for evaluating certain specific waste types are included in Table 1 and the appendices. When a request for acceptance for a new waste type is received, Dem-Con will determine the acceptability using the following procedures, as necessary:

- Determine if the waste is construction, demolition or "demo-like" waste that can be accepted without further chemical evaluation. Acceptance of these wastes will be based on physical characteristics such as moisture, odor, dust and other potential nuisance conditions to ensure we are in compliance with our approved MPCA permit for the Facility.

- Request that a waste profile sheet be completed if applicable (See example in Appendix D)
- Determine if the waste is listed as an accepted exempt waste (Section 2.4) that can be accepted without further evaluation. Acceptance of these wastes will be based on physical characteristics such as moisture, odor, dust and other potential nuisance conditions to ensure we are in compliance with our approved MPCA permit for the Facility.
- Determine if the waste is addressed in the Table 1 as an acceptable type. Follow the evaluation procedures listed as appropriate.
- If the waste is a new waste type not covered in the above three categories, request information on the chemical makeup of the waste from the generator. Material Safety Data Sheets (MSDS's) and other product data should be obtained from the generator whenever possible. If waste contains any of the chemical parameters listed in Table 2, chemical analysis should be requested, which can be limited to the specific parameters in the waste. The TCLP test is the most definitive test and should be conducted if there is no data available or if the available data is from a different method and cannot be interpreted as being below the acceptance limits in Table 2. If the results of the chemical analysis are below the acceptance limits, the waste can be accepted for disposal pending a review of the physical characteristics.
- Concurrently with the request for chemical information, request information on the physical characteristics of the waste. Information on quantity, delivery method and frequency, physical state (dry, powder, solid, etc.), odor, flammability of the waste, and on the process that

produces it, should be considered. Determine if the waste can be safely managed and if special management procedures are needed.

- The final determination on acceptability of the waste will be based on comparisons with the acceptance limits (Table 2) and any potential concerns with the physical characteristics.

The need for laboratory testing will be determined on a case-by-case basis. Only the tests needed to accurately characterize the waste will be requested. Unknown waste or waste generated from an unknown process will be required to have complete TCLP analysis.

After it is determined that the waste is acceptable, the following additional steps must be completed:

- Develop procedures for managing the waste including inspection, handling, disposal, and any other conditions of acceptance.
- If the ISWMP needs to be modified, a revision will be prepared and submitted to the MPCA.
- Maintain generator file and waste acceptance records at the facility.

3.3 Review of Laboratory Data

The parameters listed Table 2 are ones for which there is a hazardous waste limit set by the USEPA. The TCLP test is the laboratory method used to determine if a material is hazardous or not, as it uses a leaching procedure to simulate landfill conditions. However, in most cases, the laboratory data provided by generators for solid materials will be for the total concentrations of parameters in the materials (reported in milligrams per kilogram, or mg/kg, or micrograms per kilogram, or ug/kg). The total concentrations will always be higher than the TCLP concentrations (reported as milligrams per liter, or mg/l).

As an initial comparison of total concentrations versus TCLP concentrations, divide the total concentration by 20. This "Rule of 20" is based on the fact that the weight of the fluid used for the leaching process in the TCLP test is 20 times the weight of the sample. Therefore, the theoretical maximum concentration in the fluid at the completion of the leaching process is 1/20 of the total concentration in the sample, assuming 100 percent of the parameters being tested leaches during the test. If the result of dividing the total concentrations by 20 is less than the acceptance limits, the waste is acceptable.

In practice, the ratio of the total concentration to the TCLP concentration is more than 20, since less than 100 percent leaches from the sample. If the result of dividing the total concentration by 20 is greater than the acceptance limit, the waste may still be acceptable. Request a TCLP test for the parameters in question, which will give a definitive result.

3.4 Evaluation of Wastes as Alternative Daily Cover

Some waste types, including contaminated soil, some foundry sands, C&D fines etc., are suitable for use as Alternative Daily Cover (ADC). ADC replaces native soil as daily/intermittent/intermediate cover. The waste must first be determined to be acceptable at the landfill. Then, the waste can be

evaluated for use as ADC if it can fulfill the function of native soil as a cover material, in that it must have the following characteristics:

- Be “soil-like”
- Able to control vectors, odors, and fire
- Is not subject to undue erosion or dust creation
- Does not pose a physical hazard to vehicles or workers.
- Must not be odorous
- Must not contain chemical parameters that exceed the ADC limits in Table 2

ADC will be placed in a 6-inch layer over active working areas, and cannot be used on external side slopes. See Table 1 and Appendix B for information on evaluation and management of materials as ADC. The action limits for ADC are different than the action limits for disposal. See Table 2 for the ADC action limits

3.5 Emergency Disaster Response Material Acceptance

In the event of a natural disaster such as but not limited to; tornado, high winds, flooding, fire, earthquake or act of terrorism Dem-Con Pilgrim Landfill may accept material per Dem-Con’s ISWMP.

4.0 MANAGEMENT OF INDUSTRIAL WASTES

Information on general procedures to manage industrial wastes is provided below. Additional information for certain specific wastes is included in Table 1. As new waste types are approved for acceptance, corresponding entries will be added.

4.1 General Inspection Procedure

Waste management is an important aspect of the operating procedures at Dem-Con Pilgrim Landfill. When a new account is established, customers are required to accept Dem-Con's policy of inspecting their loads for unacceptable wastes and to work with generators to eliminate those wastes from the loads. Various measures, such as providing generators with lists of acceptable and unacceptable wastes, providing two boxes at a site, one for acceptable and one for unacceptable wastes, are suggested for use by the haulers in complying with the Dem-Con acceptance policy. Haulers must walk around their loads and inspect them for unacceptable items after they have tipped. Dem-Con requires that haulers remove the entire load from the fill area if too many unacceptable items are found. This encourages haulers to work with generators to produce clean, acceptable waste streams. The site operators then inspect the load as they work the material into the current tipping area. Unacceptable items are removed when identified by the operator. Operators are trained and certified by the MPCA in waste identification and management procedures.

When unacceptable items are found in the waste after the hauler has left, they will be removed and stored in roll-off boxes prior to removal. The items will typically be removed to a recycler or appropriate disposal facility.

4.2 Disposal Procedure

All loads are checked in at the landfill gatehouse. In some cases, loads of industrial waste will be tracked using a Waste Manifest Form (see example Appendix C), which must be presented at check-in. The date, time, customer name and type and quantity of waste are documented. Dem-Con does not assume acceptance of materials until the load is inspected, spread and compacted, and additional material is placed over the top.

In general, industrial waste loads are disposed of in the same area and manner as demolition debris accepted at the landfill. This minimizes the size of the working face and allows for efficient inspection and compaction.

Tables

TABLE 1
INDUSTRIAL WASTE TESTING AND MANAGEMENT PROCEDURES
Dem-Con Pilgrim Landfill (SW-254)

Waste Type	General Parameters	TCLP Parameters				Notes	Disposal Method
		Metals	VOCs	SVOCs	Herbicides/ Pesticides		
Absorbents	Paint filter, flash point		X			Determine specific parameters on case by case basis	Codisposal
Asbestos						See Appendix A	See Appendix A
Ash - coal (power plants, boilers)		X				(In future cells w/MSW-equivalent liner only)	
- Wood/biomass		See notes				Ash from wood/biomass fueled power plants/boilers accepted with no testing. If mixed with coal or other fuels, review on a case-by-case basis.	Codisposal
Ash from fires		X				Add other parameters based on building contents. Ash from intentional fires (fire department training, etc.), new building construction sites, tree and pallet burning require no testing.	Codisposal
Contaminated Soils						See Appendix B (see Section 3.4 regarding use as ADC)	Codisposal/Alternative Cover
Mercury Contaminated C&D Debris		X				Evaluate as per the MPCA Program Management Decision Memo dated May 8, 2007 (Appendix E)	Codisposal
Dredged Materials	Copper, Arsenic, PAHs (carcinogenic and non-carcinogenic)					See Dredged Materials Section in Appendix B (see Section 3.4 regarding use as ADC)	Codisposal/Alternative Cover
Epoxy, Fiberglass and Urethane Resins		X	X			Review MSDS's for additional parameters to test	Codisposal
Foundry Wastes		X				Review process for additional parameters to test. Review for use as ADC (see Section 3.4).	Codisposal/Alternative Cover
Refractory Materials		X					Codisposal
Glass - Windshield and Specialty		Pb				Add Cr analysis for mirrored glass	Codisposal
Old Dumps	Molybdenum, iron, boron	X					Codisposal
Off-Spec Products							
- Adhesives		X	X	X			
- Wood treatment		X	X	X	X		
Paint Residue, Filters, Dust	Flashpoint	X	X			Review MSDS's for additional parameters to test	Codisposal
Wastewater Treatment Residues	PCBs, RCRA Metals, E-Coli/Fecal Coliform	X				Must be treated by process to reduce pathogens or not contain pathogens as listed in Mn Rule	Codisposal
Sandblasting Waste		X				If from inner wall of tank, add parameters based on contents	Codisposal
Shredder Fluff	PCBs	X				Evaluate per MPCA P.M.D.	Codisposal
Sludges - Paper Mill	Paint filter	X					Codisposal
- Ink	Paint filter, flash point	X	X				Codisposal
- Metal finishing	Reactive cyanide, Reactive sulfur, pH, flash point	X	X				Codisposal
Spent Carbon Filters		X	X			Determine specific parameters based on use of filters	Codisposal
Spilled Non-Hazardous Materials / Other Wastes	*	*	*	*	*	* Review MSDS and other information to determine sampling requirements	Codisposal
Storm Sewer Grit	PCBs, RCRA Metals	X				PCB's based on site specific conditions	Codisposal
Waste Traps from Garages	Metals, TPH, VOC, PCBs	X	X	X		Determine specific parameters on case by case basis	Codisposal

UPDATED APRIL 2026

TABLE 2 - ACCEPTANCE LIMITS

Dem-Con Pilgrim Landfill (SW-254)

Parameter	CAS No.	RCRA No.	Acceptance Limits for Disposal		Acceptance Limits for ADC
			TCLP (mg/l)	Total (mg/kg)(1)	Total (mg/kg)(3)
TCLP Metals					
Arsenic	7440-38-2	D004	5	100	9
Barium	7440-39-3	D005	100	2000	41000
Cadmium	7440-43-9	D006	1	20	23
Chromium	7440-47-3	D007	5*	100*	200
Lead	7439-92-1	D008	5	100	460
Mercury	7439-97-6	D009	0.2**	4**	3.1
Selenium	7782-49-2	D010	1	20	1200
Silver	7440-22-4	D011	5	100	1200
TCLP VOCs					
Benzene	71-43-2	D018	0.5	10	42
Carbon tetrachloride	56-23-5	D019	0.5	10	230
Chlorobenzene	108-90-7	D021	100	2000	700
Chloroform	67-66-3	D022	6	120	31
1,4-Dichlorobenzene	106-46-7	D027	7.5	150	200
1,2-Dichloroethane	107-06-2	D028	0.5	10	72
1,1-Dichloroethylene	75-35-4	D029	0.7	14	1200
Methyl ethyl ketone	78-93-3	D035	200	4000	28000
Tetrachloroethylene	127-18-4	D039	0.7	14	170
Trichloroethylene	79-01-6	D040	0.5	10	20
Vinyl chloride	75-01-4	D043	0.2	4	56
TCLP SVOCs					
o-Cresol *(2-methylphenol)*	95-48-7	D023	200	4000	8700
m-Cresol *(3-methylphenol)*	108-39-4	D024	200	4000	8700
p-Cresol *(4-methylphenol)*	106-44-5	D025	200	4000	3500
Cresol(2)		D026	200	4000	3500
2,4-Dinitrotoluene	121-14-2	D030	0.13	2.6	78
Hexachlorobenzene	118-74-1	D032	0.13	2.6	3.2
Hexachlorobutadiene	87-68-3	D033	0.5	10	17
Hexachloroethane	67-72-1	D034	3	60	150
Nitrobenzene	98-95-3	D036	2	40	380
Pentachlorophenol	87-86-5	D037	100	2000	46
Pyridine	110-86-1	D038	5	100	n/a
2,4,5-Trichlorophenol	95-95-4	D041	400	8000	18000
2,4,6-Trichlorophenol	88-06-2	D042	2	40	180
TCLP Pesticides/Herbicides					
Chlordane	57-74-9	D020	0.03	0.6	100
2,4-D	94-75-7	D016	10	200	n/a
Endrin	72-20-8	D012	0.02	0.4	54
Heptachlor (and its epoxide)	76-44-8	D031	0.008	0.16	4.2
Lindane	58-89-9	D013	0.4	8	0.17
Methoxychlor	72-43-5	D014	10	200	n/a
Toxaphene	8001-35-2	D015	0.5	10	16
2,4,5-TP (Silvex)	93-72-1	D017	1	20	n/a
Other Parameters					
PCBs			50 ppm		0 ppm
TPH (DRO, GRO, Oily Wastes)			no limit***		5,000 ppm
Flammability of a Solid (SW -846 & Test Method 1030)					

Notes: 1. Total concentration (mg/kg) is 20 times the mg/l value and is a guidance value. **UPDATED APRIL 2026**

If the guidance value is exceeded, run the TCLP test. The TCLP result takes precedent.

2. If o, m, and p-cresol cannot be separated, total cresol is used.

3. With the exception of arsenic, ADC acceptance is based on the Industrial SRVs as provided by the MPCA. Because natural arsenic concentrations are above the SRV, the background threshold value (BTV) is used.

**4. Wastes containing chromium which is exclusively or nearly exclusively trivalent chromium and do not generate hexavalent chromium are not D007 hazardous wastes if managed in non-oxidizing environments.*

*** 5. The acceptance limit for mercury contaminated soils and C&D debris is 10 ppm (or >10 ppm with written pre-approval from the MPCA) as per the MPCA Program Management Decision Memo dated May 8, 2007.*

**** 6. There is no limit on TPH, DRO, or GRO as long as materials meet all other criteria of the ISWMP such as free liquids, odor, etc.*

Appendix A

Asbestos-Containing Materials Guidance

ASBESTOS-CONTAINING MATERIALS GUIDANCE FOR LANDFILL DISPOSAL

Background

Asbestos is a mineral mined out of the ground for use in various products. The use in products has dropped significantly since the early 1970's when it was banned from further use in certain products. The bans were issued because long term exposure to airborne asbestos can result in respiratory diseases. Many of these products are now being removed as they wear out, or age.

From a landfill operator's standpoint, the primary hazard related to asbestos is possible inhalation, since asbestos is linked to lung diseases. Management of ACM is regulated by the United States Environmental Protection Agency (USEPA) under the code of federal regulations (CFR). Specifically, Title 40, section 61 (cited as 40 CFR 61), is a portion of the National Emission Standards for Hazardous Air Pollutants (NESHAP) that deals specifically with asbestos. There are requirements for all manner of asbestos related uses and management, including demolition and renovation (40 CFR 61.145), disposal procedures by generators (40 CFR 61.150), and requirements for landfill (40 CFR 61.154).

ACM is any material that contains at least 1% asbestos and any filters or packaging used during asbestos abatement. ACM comes in two forms; friable and non-friable. Friable ACM is any material that, when dry, can be crumbled or pulverized by hand pressure. Non-friable ACM cannot be crumbled or pulverized by hand pressure.

The NESHAP regulation divides non-friable ACM into two categories. Category 1 includes packings, gaskets, resilient floor covering and asphalt roofing products with at least 1% asbestos. Category 2 includes any non-friable ACM excluded from Category 1. Category 1 and 2 non-friable ACM is not subject to the NESHAP requirements, unless it has become friable. Dem-Con will accept only Category 1 and 2 non-friable ACM in the unlined areas. The lined areas of the landfill can accept Category 1 and 2 non-friable ACM as well as friable ACM..

For the remainder of this section, the requirements discussed refer to regulated ACM, which includes all friable materials and non-friable materials that may become friable. Information specific to category 1 and 2 non-friable materials is included in parentheses as necessary.

Manifesting and Documentation

EPA regulations require that, if a facility which is being demolished or renovated that has a minimum of 260 linear feet of ACM on pipes, 160 square feet of ACM on facility components, or 35 cubic feet of ACM from facility components which could not previously be measured, notification must be made to the regional program administrator of the demolition or renovation activity. If this notification is required, all shipments of ACM to the landfill must have a waste shipment record, or manifest. Dem-Con requires that all shipments have a manifest regardless of the quantity involved. See Appendix C for an example of a manifest form available for use by haulers.

Dem-Con will maintain shipping records for a period of 2 years in accordance with NESHAP regulations. Dem-Con will maintain until closure a record of fill locations and elevations, as well as volume of ACM

disposed. Documenting ACM disposal locations is important to ensure that the ACM is not disturbed during any future excavations. If separate cells are used, the horizontal and vertical location of ACM will be defined by the most recent airspace survey preceding ACM placement and the first airspace survey after ACM placement.

Documentation of the locations of ACM disposal will be submitted with the closure report for the facility. The documentation will also be submitted to the Blue Earth County Recorder as required as part of the final closure process.

Disposal Requirements

The following procedures must be followed for proper delivery and inspection of regulated ACM loads:

- Advance notification of the delivery of ACM loads is required.
- The regulated ACM must be sealed in leak-tight containers, or wrapping (≥ 6 mil) plastic bags or wrapping).
- A manifest must accompany every load, and the volume reported must be accurate to within 10% of the volume of the load. The generator (or authorized agent) and hauler must sign the manifest. (For Category 1 & 2 non-friable ACM, provide 1 manifest per day per job.)
- The manifest must be signed after verification of the load. The appropriate copy must be mailed to the Generator within 30 days. The manifest must be retained by the landfill for a minimum of two (2) years.
- The material must be shipped in such a manner (e.g., open top box, compactor box with inspection ports, drums) that will allow verification of proper packaging, labeling, and volume.
- A loading sign must be used during loading and unloading, worded as follows:

Danger
Asbestos Dust Hazard
Cancer and Lung Disease Hazard
Authorized Personnel Only

- If any unacceptable waste is observed, it will be the sole responsibility of the hauler to remove said waste. If the rejected waste is regulated asbestos, the rejection will be noted on the manifest and a copy sent to the MPCA. The hauler will immediately contact a certified asbestos abatement contractor to properly contain and remove ACM if necessary. Dem-Con must notify the MPCA within 48 hours of a hauler tipping unacceptable regulated ACM at the landfill. All rejected loads will be recorded by Dem-Con on a load rejection report, including the date, volume, hauler, ticket number and reason for rejection.
- The hauler is responsible for handling and unloading of all non-friable ACM. The ACM must be handled in a manner that will prevent visible emissions from the waste material. The hauler is responsible for training their personnel so they are properly informed of the health and safety issues associated with ACM.
- The location, depth, area and volume of ACM disposed of in the landfill must be recorded.
- Asbestos must be covered with six (6) inches of compacted, non-asbestos containing material or soil as soon as practical, but no later than the end of the working day. The ACM will be covered prior to compaction to prevent the release of asbestos fibers as well as to protect the waste so that

non-friable ACM does not become subject forces that will crumble or pulverize it, converting it to a friable state.
- No ACM will be placed within 5 feet of the base, side slope or final grade to ensure long-term protection.

A separate cell may be established at a location apart from the active working face. ACM will be dumped as described above. A minimum of six (6) inches of non-asbestos containing material or soil will be placed over the ACM as soon as practical, but no later than the end of the working day. The location designated for ACM disposal will move as landfilling progresses over the site.

Emergency Procedures

Emergency situations include, but are not limited to, the disturbance of previously buried ACM and discovery of unacceptable or undocumented ACM at the landfill. In the event of an emergency situation, a certified asbestos abatement contractor will be immediately notified. At a minimum, the area will be secured to keep landfill personnel and haulers away until the abatement contractor arrives. Under no circumstances will Dem-Con personnel handle or package any ACM.

Dem-Con personnel are trained in the facility's ACM management procedures. The procedures will be reviewed on a routine basis during regular site safety meetings.

In the event it becomes necessary to disturb buried ACM, the following procedures will be followed:

- Written notification, including a project description and schedule of proposed activity, will be submitted in writing to the MPCA a minimum of 45 days in advance. The advance notice period may be waived if the MPCA agrees that an emergency condition exists at the landfill.
- A certified asbestos abatement contractor will be on-site throughout the project to observe work and ensure that all proper regulations are followed.

Appendix B

Contaminated Soils

CONTAMINATED SOILS

Background

Soils contaminated with a variety of chemicals are acceptable in the lined area of the landfill. For the purposes of evaluation for acceptance, contaminated soils can be divided into two categories; petroleum contaminated soils and soils contaminated with other chemicals.

Evaluation of Laboratory Data

The analysis conducted on soils is typically for total concentrations, reporting in mg/kg or ug/kg. To evaluate if soil is acceptable, convert the results to mg/kg (if necessary), and see if the results are less than 20 times higher than the acceptance limits. If so, the soil is acceptable. If some parameters are more than 20 times the acceptance limits, request a TCLP test. Typically, the ratio of the total concentration to TCLP concentration is greater than 20, so the soil still may be acceptable pending the TCLP results. When applicable, if multiple samples of the totals analysis exceed the rule of 20, TCLP should be done for the highest 30% of the total samples that exceed this rule of 20 for any contaminant. There should be a minimum of 3 TCLP samples done for each project that has multiple exceedances of the rule of 20.

Analytical Requirements - Petroleum Contaminated Soils

These are soils from sites with contamination from various petroleum products at levels that are too high to be used as fill or to remain on-site. The testing required is based on the type of product present in the soil. It is important to determine the source of the contamination and the history of operations at the location as part of the evaluation process. The testing requirements for each source of contaminated soil should be evaluated on a case-by-case basis, as follows:

Analytical Requirements – Petroleum Contaminated Soil

PRODUCT	TEST REQUIRED
Regular Gasoline or Aviation Gasoline	VOCs, GRO, lead
Unleaded Gasoline	VOCs, GRO
Unused Product (Fuel Oil, Motor Oil, Diesel Fuel, Kerosene, Jet Fuels, Mineral Oil/Spirits, Crude Oil, Stoddard Solvents)	VOCs, DRO, PAH*
Used Oil	VOCs, DRO, RCRA metals, PCBs, PAHs
Hydraulic Fluids	VOCs, DRO, PAH*, PCB**
Unknown	Case by case
All Products	Flashpoint*, paint filter liquids test*

Notes:

** Optional based on-site conditions or soil moisture condition*

***For hydraulic fluid used in elevators, subject to high heat prior to the 1980s*

Analytical Requirements – Other Contaminated Soils

These are soils from sites with contamination from products or substances other than petroleum. The testing required is typically based on the past use of the site. It is important to determine the source of the contamination and the history of operations at the location as part of the evaluation process. The testing requirements for each source of contaminated soil should be evaluated on a case-by-case basis, as follows:

Analytical Requirements – Other Contaminated Soil

SOURCE	TESTS REQUIRED
Plating shops	RCRA metals, pH
PCB sources (transformers, etc.)	RCRA metals, total PCBs
Pesticides	TCLP pesticides
Used batteries	Lead
Unknown	Case-by-case

Testing Frequency

The number of tests recommended based on the estimated volume of soil is shown below.

Frequency of Testing

VOLUME (CY)	NUMBER OF TESTS
0 – 500	1
500 – 1,000	2
1,000 - 2,000	3
2,000 – 4,000	4
Each additional 2,000	1 additional

Use of Contaminated Soils as Alternative Daily Cover

Soil can often be used as alternative daily cover (ADC), depending on the physical characteristics and contaminant concentrations. A specific set of action limits is used to determine if soils or other suitable materials can be used as ADC, as shown on Table 2. Soil must meet the ADC actions limits and have the appropriate characteristics discussed in Section 3.4.

Soil accepted as ADC will be placed in a 6-inch layer over exposed waste and cannot be placed on external sideslopes.

Analytical and Sampling Requirements for Dredged Materials

Dredged materials include material that is excavated at or below the Ordinary High-Water Level of water basins, watercourses, public waters, or public waters wetlands, as defined by Minn. Stat. 103G.005. The testing and sampling of these soils will be performed in accordance with the Minnesota Pollution Control Agency Managing of Dredged Materials (MPCA Dredged Materials) document dated June 2009 and as amended from time to time.

Dredged materials removed from municipal or urban stormwater systems will follow the sampling requirements detailed in the Modified Characterization and Permit Approach for Urban Stormwater Ponds section of the MPCA Dredged Materials document. This section requires a minimum baseline sampling for Copper, Arsenic, and Polycyclic Aromatic Hydrocarbons (PAHs), both carcinogenic and non-carcinogenic. However, because the land use within the drainage area of a stormwater pond can be unique, additional sampling may be required based on the risk assessment approach provided in Chapter 3 of the MPCA Dredged Materials document.

The dredged materials may be used as ADC if they meet the ADC action limits listed in Table 2 and have the appropriate characteristics discussed in Section 3.4 of the ISWMP. Soil accepted as ADC will be placed in a 6-inch layer over exposed waste and cannot be placed on external side slopes. All dredged material, whether accepted as ADC or not, must pass the paint filter free liquids test.

Disposal and Sampling Requirements for Non-hazardous Mercury Contaminated Soils

Mercury contaminated soils will be acceptable in the lined area of the Dem-Con Pilgrim landfill in accordance with the May 8, 2007 MPCA Program Management Decision Memo regarding the disposal of mercury-contaminated soils and renovation/demolition debris in Minnesota landfills (Appendix E). These soils will be tested for mercury as well as other constituents as determined by a case specific evaluation of the project. The analytical results for the soils will be compared with the waste acceptance limits listed in Table 2. The waste acceptance limits and disposal practices for mercury contaminated soil in the lined landfill shall be in accordance with the following parameters:

- Waste with total levels of 0-4 ppm. No special handling requirements.
- Waste with total levels of 4-10 ppm, if immediately covered with six (6) inches of soil upon acceptance.
- Waste at total levels >10 ppm may be acceptable with written pre-approval from the MPCA, on a case-by-base basis, depending on volume and concentration. Additional requirements include:
    - Transporting vehicles must be lined and the waste covered with polyethylene sheeting;
    - The waste must be immediately covered with six (6) inches of soil upon acceptance.

Only non-hazardous mercury-contaminated soils and construction/demolition debris that meet the above parameters and are free of elemental or free mercury will be accepted at the Dem-Con Pilgrim landfill.

Appendix C

Special Waste Manifest Form

DEM-CON

WASTE MANIFEST FORM
MPCA PERMIT SW-254

Manifest #:

GENERATION

Work Site Name: Work Site Address: City, State, Zip: Contact Name: Contact Phone #:	Waste Disposal Site **Dem-Con Landfill - Pilgrim** **57032 231st Lane** **Mankato, MN 56001** **952-445-5755**
Contractor Name: Street Address: City, State, Zip: Contact Name: Contact Phone #:	Responsible Agency **MPCA** **520 Lafayette Road North** **St. Paul, MN 55155** **(651) 296-6300**
BILL TO #: **PROFILE #:**	Additional Generator Information:

Description of Materials:	Total Quantity: ☐ CY ☐ TON	Special Handling/Additional Info:

Generator/Contractor Certification: I hereby declare that the contents of this consignment are fully and accurately described above by proper shipping name and are classified, packed, marked and labeled, and are in all respects in proper condition for transport by highway according to applicable international and national government regulations. I further certify that the contents of this consignment do not contain hazardous waste as defined in 40 CFR Part 261 or MN Rule Chapter 7045.

Signature:	Date:
Printed Name:	Title:

TRANSPORTATION

TRANSPORTER INFORMATION

NAME ON TRUCK:	**TRUCK NUMBER:**

TRANSPORTER 1 (Acknowledgement of receipt of materials)

Company Name:	Company Address:	Company Phone #:
Driver's Name (Printed):	Signature:	Date:

TRANSPORTER 2 (Acknowledgement of receipt of materials)

Company Name:	Company Address:	Company Phone #:
Driver's Name (Printed):	Signature:	Date:

FACILITY

FOR DEM-CON ONLY

Discrepancy Indication Space:

Waste Disposal Site Owner or Operator: Certification of materials covered by this manifest except as noted in "Discrepancy Indication Space"

Print Name:	Signature:	Date:

COMPLETE TWO COPIES FOR EACH LOAD

DEM-CON: ONE COPY | TRANSPORTER: ONE COPY

Appendix D

Waste Profile Sheet

DEM-CON COMPANIES

DEM-CON PILGRIM LANDFILL
WASTE PROFILE SHEET

CUSTOMER JOB #:

DEM-CON PROFILE #:

Generator Information		Customer/Hauler Information ☐ Same as Generator	
1. Generator Name		8. Customer Name	
2. Site Address		9. Customer Address	
3. City, State, Zip		10. City, State, Zip	
4. Contact Name		11. Contact Name	
5. Telephone		12. Telephone	
6. Fax		13. Fax	
7. Email		14. Email	

Waste Stream Information

1. Waste Name:
2. Description of facility/site history:
3. Describe the process and source of the generated waste:
4. Typical Color(s):
5. Strong Odor: ☐ Yes ☐ No If yes, describe:
6. Physical State at 70°F: ☐ Solid ☐ Liquid ☐ Powder ☐ Semi-Solid or Sludge ☐ Other:
7. Waste Composition: ☐ Homogeneous/Uniform ☐ Non-Homogeneous or Layered
8. Water Reactive? ☐ Yes ☐ No If yes, describe:
9. pH Range: ☐ ≤ 2 ☐ 2.1 - 12.4 ☐ ≥ 12.5 ☐ N/A (solid) ☐ Actual:
10. Liquid Flash Point: ☐ < 140°F ☐ ≥ 140°F ☐ N/A (solid) ☐ Actual:
11. Flammable Solid: ☐ Yes ☐ No

12. Waste Composition and Constituents (List all known or attach document):	%	ppm

Waste Stream Properties (Answer ALL questions)

13. Is this waste a stream that contains any D, F, K, U or P listed as hazardous waste; either in pure form, as a mixture or treatment residue?	☐Yes ☐ No	20. Does this waste stream contain PCB material? If yes, concentration: ppm	☐Yes ☐ No
14. Is this waste explosive?	☐Yes ☐ No	21. Does this waste contain radioactive material?	☐Yes ☐ No
15. Is this waste sewer sludge?	☐Yes ☐ No	22. Does this waste contain absorbents?	☐Yes ☐ No
16. Is this waste demolition & /or construction debris?	☐Yes ☐ No	23. Does this waste stream contain fuming acids?	☐Yes ☐ No
17. Is this putrescible waste?	☐Yes ☐ No	24. Does this waste contain oxidizers?	☐Yes ☐ No
18. Is this waste lethal (by Minn. Rules 7045.0131 Subp. 6)?	☐Yes ☐ No	25. Does this waste contain asbestos?	☐Yes ☐ No
19. Does this waste contain untreated, regulated, medical or infectious waste?	☐Yes ☐ No		

26. Sample Information (check ALL that apply):
☐ Sample submitted with profile ☐ Laboratory analysis submitted ☐ Material Safety Data Sheet Submitted ☐ Other:

Waste Volume and Shipping Information

Check One: ☐ One Time Event ☐ Ongoing Waste Generation
Estimate Annual Quantity _____ ☐ Tons ☐ Cubic Yards ☐ Other:
Shipping Frequency _____ Units Per ☐ Month ☐ Quarter ☐ Year ☐ One Time ☐ Other:
Method of Shipment ☐ Roll-off ☐ End Dump ☐ Other:
DOT Hazardous Material? ☐ Yes ☐ No

Certification of Non-Hazardous Waste & Approval Conditions

I hereby certify that the information submitted in this profile and all attached documents contain true and accurate description of the waste material and that the waste is nonhazardous as defined in Title 42, United States Code Section 6903 and Minnesota Statute Section 116.06, Subdivision 11. Furthermore, I certify the following: that analytical data attached pertaining to the profiled waste was derived from testing a representative sample in accordance with 40 CFR 261.20 (c) or equivalent rules; that I am an agent signing on behalf of the Generator and have been delegated this authority by the generator; that any changes that occur in the character of the waste (i.e. changes in the process or new analytical) will be identified by myself or the Generator and disclosed to Dem-Con Companies prior to shipment of the waste to Dem-Con Companies. I understand that any changes in the character of the waste that are not reported to Dem-Con Companies in writing prior to shipment of the waste will invalidate this approval. I, on behalf of the generator, hereby agree to fully indemnify Dem-Con Companies for any damages and/or costs incurred as a result of any misrepresentations or falsifications made herein.

Signature | Printed Name | Title | Date

FOR DEM-CON USE ONLY

Approval Decision: ☐ Approved ☐ Not Approved
Management Method: ☐ Landfill ☐ Recycling Processing ☐ Off-Site Transfer ☐ Other:
Management Facility Precautions, Special Handling Procedures or Limitations:
☐ Shall not contain free liquid ☐ Approval Number must accompany each shipment
☐ Shipment must be scheduled into disposal facility ☐ Waste Manifest must accompany each load

Dem-Con Authorization Name/Title | Signature | Date

Appendix E

MPCA Program Management Decision Memo

Disposal of Mercury-Contaminated Soils and Renovation/Demolition Debris in Minnesota Landfills

Minnesota Pollution Control Agency

PROGRAM MANAGEMENT DECISION MEMO

ISSUE: Disposal of mercury-contaminated soils and renovation/demolition debris in Minnesota landfills

EFFECTIVE DATE: 5/8/2007

REPLACES: Program Management Decision Memo "Disposal of Mercury-contaminated Soils in Minnesota Landfills," effective March 1, 2004

DECISION

Non-hazardous mercury-contaminated soils and construction/demolition debris free of elemental mercury from products subject to regulation under Minn. Stat. 115A. 932 can be accepted in lined Minnesota landfills as part of an approved industrial solid waste management plan (ISWMP) within the following parameters:

- Waste with total levels of 0-4 ppm. No special handling requirements.

- Waste with total levels of 4-10 ppm, if immediately covered with six (6) inches of soil upon acceptance.

- Waste at total levels >10 ppm may be acceptable with written pre-approval from the MPCA, on a case-by-case basis, depending on volume and concentration. Transporting vehicles must be lined, and the waste covered, with polyethylene sheeting. The waste must be immediately covered with six (6) inches of soil upon acceptance. This approval will be considered on a case-by-case basis. In order to determine mercury emission levels during waste acceptance, the MPCA may monitor emissions before, during, and after waste acceptance at a landfill. In addition, the MPCA will examine landfill-gas monitoring data to ascertain whether increased amounts of mercury are being vented. Based on the results, it is possible that waste at total levels >10 ppm may not be allowed at landfills with active gas extraction.

This decision provides for disposal in appropriate Minnesota landfills of soils and construction/demolition debris contaminated by mercury at concentrations which are non-hazardous. This decision does not apply to wastes other than soils and construction/demolition debris. For example industrial wastes such as ash are not subject to this policy. This policy does not apply to materials which have Standing Beneficial Use Determinations, or those that have received a Case Specific Beneficial Use Determination. This allowance does **not** include elemental mercury or materials contaminated with free mercury, which must be managed as hazardous waste.

BACKGROUND

The recent history of changing policies governing mercury disposal has led to confusion among regulators, local units of government, waste generators, consultants, and landfill operators. As a result, the MPCA is adopting one policy for mercury-contaminated soils and construction/demolition debris. In addition, past policies were extremely conservative, which often led to the transportation of waste out of state, for disposal in similarly, or even less-protective, disposal environments. This policy includes special waste handling procedures to reduce potential emissions, based upon the mercury levels in the waste.

Disposal of wastes contaminated by mercury must be approved of within a landfill's ISWMP. In evaluating requests for approval, solid waste staff should consider a range of potential risk factors, including, but not limited to, releases due to methylation of mercury, vaporization during disposal and through gas vents, and leaching into ground water. Written request by the landfill, and approval by the MPCA, must be received prior to acceptance of waste covered by this policy.

In some circumstances, it may be possible to segregate wastes contaminated at high levels from those that are not, reducing the amount of material which must be disposed of out of state. All such determinations should be made in consultation with MPCA staff.

A formal letter outlining this final policy, including the website link, will be immediately sent to landfills and County Solid Waste Administrators. MPCA remediation, solid waste, and hazardous waste program staff will implement this policy change when advising outside parties of appropriate disposal options for mercury-contaminated waste.

RELEVANT STATUTES AND RULES

- Minn. Stat. § 115A.932: Prohibition of disposal of mercury or mercury-containing devices in Minnesota landfills;
- Minn. Rules, chapter 7045.0120, subpart 1, article F: Exempts disposal of coal ash from governance by hazardous waste rules; and
- Minn. Rules, chapter 7001.3300: industrial solid waste management plans.

RATIONALE

The following is a summary of historical policies governing mercury-contaminated waste:

Minnesota Statutes, section 115A.932 restricts disposal of mercury, in some forms and from certain sources, in Minnesota landfills. At the same time, some of the sites being redeveloped around the state contain mercury contaminated soils or materials within

structures may be contaminated from past improper disposal practices. In some cases, these soils or materials may need to be removed from the site, depending upon the levels of contamination and the planned land and site uses. In addition, routinely generated industrial wastes such as foundry sand, wastewater sludge, and slag can contain residual mercury.

How should such materials be disposed of, and under what circumstances should the MPCA require that such material be shipped out of state for disposal? There are also ethical and environmental issues regarding whether it makes sense to ship Minnesota's mercury contaminated waste to another state, if it might be managed safely here.

MPCA staff often had interpreted Minnesota Statutes, section 115A.932 to mean that essentially no mercury could be disposed of in Minnesota landfills, regardless of its nature or source, and that the mercury contaminated material must be disposed of in accordance with Minnesota Rules, chapter 7045.

It appears, however, that Minnesota Statutes, section 115A.932 had been interpreted too broadly, to prohibit disposal of materials it was not intended to prohibit. At the time the statute was developed, the Legislature was concerned about potential mercury contamination from mercury-containing devices, mercury-containing compounds, or bulk mercury, being intentionally placed in solid waste for disposal. It can be argued that the legislature did not intend for the statute to apply, for example, to soils contaminated by historical use of coal ash as fill material.

This broad reading of the law has led to confusing and conflicting requirements for disposal practices. On the one hand, the MPCA sent a memo to landfill operators (June 1, 2000) stating that materials which "passed" a TCLP test may be disposed of in a landfill, and that this level for mercury (0.2 ppm in the TCLP leachate) is used in industrial solid waste management plans as a cut-off for acceptance of mercury-containing materials. Again, the concern was mainly over acceptance of bulk mercury or mercury-containing devices and debris.

A leaching test is simply a method for determining whether a concentration of a contaminant in soils or other materials are high enough that the contaminant can leach out of the material at concentrations that exceed thresholds established by the United States Environmental Protection Agency (EPA). Therefore, the test helps determine whether the material should be evaluated and handled as a hazardous waste.

On the other hand, an MPCA remediation program had begun using a concentration of 0.7 ppm in soil (rather than in leachate) as the criterion for determining whether to ship the soil out of state for disposal in a hazardous waste landfill. At that time, this level corresponded to the MPCA's risk-based "soil reference value" (SRV) for residential land use. It may be argued, however, that using the 0.7 ppm concentration as the cut-off level for sending such soil out of state for disposal did not necessarily make sense. SRVs represent conservative screening levels up to which contamination might safely remain in place under certain exposure conditions. Establishment of final cleanup levels may

involve reducing on-site concentrations, altering exposure conditions, or some combination of the two. The 0.7 ppm level had been developed solely to be used as a risk screening level for mercury contamination in soils in a setting to be redeveloped for residential use. So, it was possible to build a house or a child's play area on soils containing mercury at concentrations up to 0.7 ppm.

The MPCA's "Risk-based Guidance" documents from which this level was drawn also suggested that soils with mercury contamination of up to 2 ppm might remain in place under commercial or industrial land-use scenarios. Therefore, using 0.7 ppm as the criterion for determining whether to ship soils from some sites out of state (not allowing them to be placed in landfills) could result in the paradox of allowing soils at other sites contaminated at concentrations of up to at least 2 ppm to remain in place beneath new developments. It stands to reason, then, from a risk standpoint, that soils contaminated at concentrations at least somewhat higher than 0.7 ppm might safely be placed in lined landfills, where even long-term exposures would be quite limited.

In order to recommend a disposal cut-off level for concentrations of mercury in soils, in March of 2004, a Program Management Decision Memo was issued which allowed soils contaminated with mercury at concentrations of up to 4 ppm to be disposed of in municipal solid waste landfills (and possibly some other types), because 4 ppm was a pragmatic benchmark that should protect human health from an air emission pathway, and yet did not unduly restrict management of soils contaminated by ash and other waste often encountered at cleanup sites.

This approach represented a reasonable compromise among the current range of disposal practices involving mercury contaminated soils. For example, the MPCA currently allows coal ash (commonly a source of mercury in soils from redevelopment sites) to be spread as a portion of the daily cover on municipal solid waste (MSW) landfills. In addition, there are landfills in Minnesota operated by utility companies specifically for disposal of coal ash. Indeed, Minnesota already approves application of soils with mercury concentrations significantly higher than those recommended in this policy (17 ppm) to agricultural lands as a soil amendment. Moreover, disposing of contaminated soil in an appropriate landfill is essentially moving an old, unmanaged release to be managed in safer, more controlled conditions, rather than creating a new release of mercury. This decision applied to mercury-contaminated soils only.

In late 2005, a request for a reevaluation of MPCA policy was received. The request was made after two large projects involving renovations of buildings that were contaminated from past, improper disposal of mercury and/or mercury-containing devices were undertaken. The request stated that using the Residential SRV as a disposal standard was too stringent, and caused an economic hardship due to increased costs from transporting debris out of Minnesota. The MPCA's reevaluation of the policy suggested that using the Residential SRV for mercury disposal was indeed too stringent a standard when applied to controlled disposal of waste in a lined landfill. The MPCA examined the totals data from one of the above projects and the vast majority of the waste fell below 1.5 ppm, which is the current Industrial SRV. That appeared to be a reasonable threshold. As a result, the MPCA decided that it would allow disposal of mercury-contaminated

renovation/demolition debris in a lined landfill at levels up to 1.5 ppm. This was communicated to landfills and County Solid Waste Administrators in a letter dated July 14, 2006.

In September of 2006, the MPCA was approached regarding disposal of large amounts of mercury-contaminated soil that were being generated as a result of remediation of a salvage yard. A large amount of the soil exceeded the 4 ppm threshold allowance, so was therefore being disposed of out of state. The MPCA learned it was being disposed of in a biopile in Wisconsin, which is a less protective environment than a lined landfill. Additional data provided showed completed and pending soil remediation projects totaling over 85,000 cubic yards of contaminated soil that exceeded 4 ppm, that would be disposed of outside of Minnesota.

The MPCA concludes that with special handling at landfills, based on totals levels, mercury-contaminated wastes can be safely accepted within Minnesota. The Minnesota Department of Health was consulted regarding this policy, and found it to be reasonable.

APPROVAL

I have reviewed this management decision and I concur.

Signed: Tim Scherkenbach
Date: 5/8/07

Tim Scherkenbach
Assistant Commissioner

Signed: James L. Warner
Date: 5/8/07

James L. Warner, P.E.
Director, Industrial Division

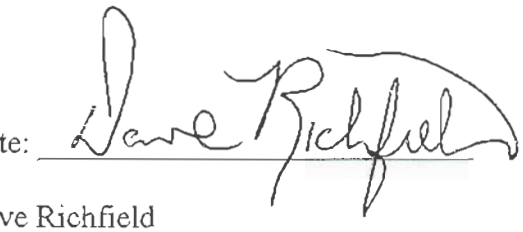
Signed: Lisa J. Thorvig
Date: 5/8/07

Lisa Thorvig
Director, Municipal Division

Signed: Gary Pulford
Date: 5/8/07

Gary Pulford
Manager
Policy, Local Government Assistance and Solid Waste Section

Signed: _____

Date: 

Dave Richfield
Supervisor, Land Policy Unit
Policy, Local Government Assistance and Solid Waste Section

Mercury-catalyzed Polyurethane Flooring and Mercury-contaminated Demolition Debris and Soil

Disposal in Minnesota

Mercury is an element that can cause harmful environmental and health effects when disposed of improperly. Because of previous practices, mercury contamination can be found in some soils and demolition debris in Minnesota. In one particular application, mercury was used as a catalyst in some types of synthetic flexible flooring between the 1960s and early 2000s. This flooring, called mercury-catalyzed polyurethane flooring (MCPF), is most commonly found in athletic facilities.

Normally, mercury and mercury-contaminated wastes are prohibited from land disposal in Minnesota under regulations of the Minnesota Pollution Control Agency (MPCA). However, the MPCA will allow some such wastes to be disposed in Minnesota landfills under the conditions discussed in this fact sheet.

Do I have MCPF in my building?

MCPF was most commonly used as a poured-in-place, rubber-like flooring and could be tinted to any color. It was made by many manufacturers under multiple brand names. The only way to determine whether a particular flooring contains mercury is to test a representative (full-thickness) sample using a reputable testing laboratory. The Minnesota Department of Health (MDH) administers a voluntary laboratory certification program. Although you are not required to use a certified laboratory, the MDH or MPCA can help you locate one if you choose.

Must I remove MCPF if I find it?

While Minnesota laws do not require you to remove MCPF, it may continue to release harmful gaseous mercury into a building's air for decades after installation. MDH has published indoor air quality guidance for mercury at http://www.health.state.mn.us/.

Mercury vapor from MCPF can penetrate and contaminate other materials, such as plastic and wood. Attempting to cover or seal MCPF instead of removing it may create more contamination and cost.

Ensure that anyone who may be exposed to the flooring or debris during removal (including employees, contractors, and students) is properly protected from exposure to mercury.

How must I dispose of suspected MCPF and related debris?

Before disposing of suspected MCPF and related debris, test representative samples of the flooring and any other debris for both total and leachable mercury content. The type of disposal allowed for the waste will depend on both of these values and is shown in Table 1 on the following page. Total mercury should be determined in parts per million (ppm) and leachable mercury in milligrams per Liter (mg/L).

Regardless of whether the waste is disposed of in a solid or hazardous waste landfill, ensure that the landfill is permitted to accept the waste and that you have performed any pre-treatment required by the receiving landfill. Additionally, transport the waste in a totally enclosed manner, such as in a truck bed lined and covered with plastic sheeting.

In addition to MCPF and related debris, soils contaminated by naturally-occurring mercury or historical practices, such as the use of coal combustion residuals as fill, may also be disposed according to Table 1.

Table 1: Allowed management of MCPF, related debris, and soils in Minnesota

Total mercury content	Non-hazardous waste (< 0.2 mg/L leachable mercury)	Hazardous waste (≥ 0.2 mg/L leachable mercury)
≤ 4 ppm total mercury	Minnesota solid waste landfill or out-of-state solid waste landfill ▪ No special handling required	Out-of-state hazardous waste landfill or treatment facility
4 < 10 ppm total mercury	Minnesota solid waste landfill or out-of-state solid waste landfill ▪ If in Minnesota, immediate coverage with 6 inches of soil	
10 - 1000 ppm total mercury*	Minnesota solid waste landfill or out-of-state solid waste landfill ▪ If in Minnesota, immediate coverage with 6 inches of soil and landfill maintains location & quantity records ***MCPF only:*** No MPCA preapproval needed ***All other related debris & soil:*** Must be preapproved by MPCA	Out-of-state hazardous waste landfill or treatment facility ▪ Land Disposal Restriction (LDR) may apply
> 1000 ppm total mercury	Out-of-state solid waste landfill	

More information

Guidance and requirements in this fact sheet were compiled from Minnesota Statutes, Chapters 115A and 116, and Minnesota Rules, Chapters 7035 and 7045, and incorporate regulatory interpretation decisions made by the MPCA on September 3, 2013. To review Minnesota Statutes and Rules, visit the Office of the Revisor of Statutes at https://www.revisor.mn.gov/pubs.

The MPCA's Small Business Environmental Assistance Program (SBEAP) can provide free, confidential compliance assistance. The Minnesota Technical Assistance Program (MnTAP) can help reduce your waste generation. Report all hazardous waste incidents to the Minnesota Duty Officer.

Metro County Hazardous Waste Offices

Anoka 763-422-7093
Carver 952-361-1800
Dakota 952-891-7557
Hennepin 612-348-3777
Ramsey 651-266-1199
Scott 952-496-8475
Washington 651-430-6655
Websites ..... http://www.co.[county].mn.us

Minnesota Technical Assistance Program

Toll free 1-800-247-0015
Metro 612-624-1300
Website ..... http://www.mntap.umn.edu

Small Business Environmental Assistance

Toll free 1-800-657-3938
Metro 651-282-6143
Website ..... http://www.pca.state.mn.us/sbeap/

Minnesota Pollution Control Agency

Toll free (all offices) 1-800-657-3864
Brainerd 218-828-2492
Detroit Lakes 218-847-1519
Duluth 218-723-4660
Mankato 507-389-5977
Marshall 507-537-7146
Rochester 507-285-7343
St. Paul 651-296-6300
Willmar 320-214-3786
Website ..... http://www.pca.state.mn.us

Minnesota Duty Officer

Toll free 1-800-422-0798
Metro 651-649-5451
Website ..... https://dps.mn.gov/divisions/bca/

Minnesota Department of Health

Toll free 1-888-345-0823
Metro 651-201-5000
Website ..... http://www.health.state.mn.us/

Appendix F

Liner Equivalency Calculations

Date: 5/23/12
By: Dan Riggs
Client: Dem-Con

LINER EQUIVALENCY CALCULATIONS – Confining Pressure

Objective:
Determine the amount of waste needed to achieve a hydraulic conductivity of 3 x 10^{-9} cm/sec on the geosynthetic clay liner, which occurs at 10 psi confining pressure.

Basis:
Vertical pressure on the liner can be expressed as:

$$(\gamma_{sand,sat} * d_{sand,sat}) + (\gamma_{sand} * d_{sand}) + (\gamma_{waste} * d_{waste}) = \sigma_{GCL}$$

or

$$d_{waste} = \frac{\sigma_{GCL} - (\gamma_{sand,sat} * d_{sand,sat}) + (\gamma_{sand} * d_{sand})}{\gamma_{waste}}$$

Where: γ = unit weight of material
d = depth of material
σ = pressure on material

Assumptions

1.) Leachate = 1 ft (depth permitted on liner)
2.) Thickness of sand = 2 ft
3.) Unit weight of sand above leachate, γ_{sand} = 1.5 tons/cu. yd = 111.11 pcf
4.) Unit weight of leachate = unit weight of water = 62.4 pcf
5.) Unit weight of sand below leachate, $\gamma_{sand,sat}$ = 111.11 pcf – 62.4 pcf = 48.71 pcf
6.) Unit weight of waste = 1.3 tons/cu. yd = 96.3 pcf

Depth of waste needed:

$$d_{\text{waste}} = \frac{10 \text{ psi} * 144 \frac{\text{psf}}{\text{psi}} - (48.71 \text{ pcf} * 1\ ft) - (111.11\ pcf * 1\ ft)}{96.3\ pcf}$$

$$\boldsymbol{d_{\text{waste}} = 13.3\ ft}$$

Results: 13.3 ft of waste will be needed above the 2 ft of sand to confine the GCL at 10 psi

Signature: _____

Daniel J. Riggs, PE

License No. 49559

Date: 5/23/12
By: Dan Riggs
Client: Dem-Con

LINER EQUIVALENCY CALCULATIONS – Leachate Flux

Objective:
Demonstrate that a single-layer geosynthetic clay liner (GCL) performs equally well or better than a 2-foot compacted clay liner at restricting exfiltration from the landfill.

Basis:
Estimate leachate flux through each liner material based on the following equations

$$Q = Ki$$

and

$$i = \frac{h + d}{d}$$

Where: Q = leachate flux through liner ($L^3/L^2/T$)
K = vertical hydraulic conductivity ($L^3/L^2/T$)
i = hydraulic gradient (L/L)
h = leachate head on liner (L)
d = saturated liner depth (L)

Assumptions

1) K for compacted clay = 1 x 10^{-7} cm/sec (maximum allowed by MN Rules)
2) K for GCL = 3 x 10^{-9} cm/sec (maximum value from manufacturer's specification, see attached Confining Pressure calculations and attached GCL specifications)
3) h = 1 ft (leachate permitted on liner)
4) d for compacted clay liner = 2 ft (fully saturated)
5) d for GCL = 0.25 in, or 0.0208 ft (fully saturated)

Leachate flux through GCL

$$Q_{GCL} = \left(3 \times 10^{-9} \frac{cm}{sec}\right)\left(\frac{1ft + 0.0208ft}{0.0208ft}\right)$$

$$Q_{GCL} = 1.47 \times 10^{-7} \frac{cm}{sec}$$

Leachate flux through compacted clay liner

$$Q_{Clay} = \left(1 \times 10^{-7} \frac{cm}{sec}\right)\left(\frac{1ft + 2ft}{2ft}\right)$$

$$Q_{Clay} = 1.50 \times 10^{-7} \frac{cm}{sec}$$

$\boldsymbol{Q_{GCL} < Q_{Clay}}$ ∴ **GCL results in less leachate flux through the liner than compacted clay.**

Signature: _____

Daniel J. Riggs, PE

License No. 49559

Appendix G

Method 1030

METHOD 1030

IGNITABILITY OF SOLIDS

SW-846 is not intended to be an analytical training manual. Therefore, method procedures are written based on the assumption that they will be performed by analysts who are formally trained in at least the basic principles of chemical analysis and in the use of the subject technology.

In addition, SW-846 methods, with the exception of required method use for the analysis of method-defined parameters, are intended to be guidance methods which contain general information on how to perform an analytical procedure or technique, which a laboratory can use as a basic starting point for generating its own detailed standard operating procedure (SOP), either for its own general use or for a specific project application. Performance data included in this method are for guidance purposes only and must not be used as absolute quality control (QC) acceptance criteria for purposes of laboratory QC or accreditation.

1.0 SCOPE AND APPLICATION

1.1 This method is suitable for the determination of the ignitability of solids and is appropriate for pastes, granular materials, solids that can be cut into strips, and powdery substances. Also, if it is impractical to perform this test because of the physical form of the sample, generator knowledge should be used to determine the ignitability hazard posed by the material. The test method described here is based on the test procedure adopted by the Department of Transportation (DOT) from the United Nations regulations for the international transportation of dangerous goods (see Appendix E to Part 173 of 49 CFR).

1.2 This method is not required by the Federal regulations to determine if a waste passes or fails the characteristic of ignitability according to the RCRA regulatory definition at 40 CFR 261.21. To clarify, the test results of this method cannot be used to directly classify a waste as a D001 hazardous waste, nor can the results be used by themselves to definitively classify a waste as non-hazardous. No specific test for ignitable solids is required by the RCRA regulations, and only a waste meeting the narrative regulatory definition at 40 CFR 261.21(a)(2) is an ignitable hazardous waste because it is an ignitable solid. In addition, the test in this method for a liquid may be helpful in determining whether a liquid waste has hazardous properties; however, a liquid waste is only a D001 hazardous waste if it is an oxidizer, as defined at 40 CFR 261.21(a)(4), or based on its flash point, as defined at 40 CFR 261.21(a)(1). This test method was developed to specifically illustrate the ignitability properties of materials, including wastes, and its results provide relevant and useful information that may be applied to knowledge of a waste in determining whether a waste meets the 40 CFR 261.21 criteria.

1.3 Prior to employing this method, analysts should consult the disclaimer statement at the front of the manual and the information in Chapter Two for 1) guidance on the intended flexibility in the choice of methods, apparatus, materials, reagents, and supplies; and 2) the responsibilities of the analyst for demonstrating that the techniques employed are appropriate for the analytes of interest, in the matrix of interest, and at the levels of concern.

In addition, analysts and data users are advised that, except where explicitly specified in a regulation, the use of SW-846 methods is *not* mandatory in response to Federal testing requirements. The information contained in this method is provided by the Environmental Protection Agency (EPA) as guidance to be used by the analyst and the regulated community in

making judgments necessary to generate results that meet the data quality objectives (DQOs) for the intended application.

1.4 This method is restricted to use by, or under supervision of, appropriately experienced and trained personnel. Each analyst must demonstrate the ability to generate acceptable results with this method.

2.0 SUMMARY OF METHOD

In a preliminary test, the test material is formed into an unbroken strip or powder train, 250 mm in length. An ignition source is applied to one end of the test material to determine whether combustion will propagate along 200 mm of the strip within a specified time period. Materials that propagate burning along a 200-mm strip within the specified time period are then subjected to a burning rate test. Materials that do not ignite or propagate combustion as described above do not require further testing. In the burning rate test, the burning time is measured over a distance of 100 mm and the rate of burning is determined. The test method described here is based on the test procedure adopted by the Department of Transportation from the United Nations regulations for the international transportation of dangerous goods and is contained in Appendix E to Part 173 of 49 CFR.

3.0 DEFINITIONS

Refer to Chapter One and the manufacturer's instructions for definitions that may be relevant to this procedure.

4.0 INTERFERENCES

4.1 In laboratory tests, the burning rate of duplicate runs is usually repeatable to within 10%. However, large differences in burning rates may occur if experimental conditions are not held constant. Variation in airflow rates, particle size, and moisture content of the test material will affect test results. Therefore, at least triplicate determinations of the burning rate should be conducted.

4.2 Particle size of test material can affect not only the burning rate, but also the ignition of the material. Therefore, the particle size of the test material should be the same for each test run. The particle size of the test material should be reported in a simple descriptive format (e.g., fine powder, sand, coarse granular).

4.3 Temperature of some test material (such as sulfur powder) affects the burning rate. For reproducible results, all tests should be performed at approximately the same initial temperature (ambient room or laboratory temperature).

4.4 All tests must be carried out inside a fume hood with the test apparatus situated perpendicular (90°) to the direction of airflow. Airflow parallel (0°) to the test apparatus results in non-reproducible burning rates.

4.5 The rate of airflow through the fume hood affects the burning rate. An airflow rate that is too high distorts the flame and retards its horizontal propagation. The optimum airflow rate appears to be in the range of 0.7-1 meters per second.

4.6 Materials that are moisture sensitive (i.e., readily absorb moisture from air) should be tested as quickly as possible after removal from the sample container. All materials should be tested as received by the laboratory.

5.0 SAFETY

5.1 This method does not address all safety issues associated with its use. The laboratory is responsible for maintaining a safe work environment and a current awareness file of OSHA regulations regarding the safe handling of the chemicals specified in this method. A reference file of material safety data sheets (MSDSs) should be available to all personnel involved in these analyses.

5.2 Prior to starting the preliminary screening test, all sample materials must be tested to determine if that material is explosive or extremely flammable (see WARNING below). Use a very small portion of material (1 g or less) for this test.

WARNING: If the sample material is explosive or extremely flammable, do not conduct this test.

5.3 This method could involve the combustion of highly flammable materials and the generation of toxic fumes. All tests must be conducted in a suitable fume hood fitted with a pull-down sash to prevent the escape of toxic fumes into working areas. The analyst should wear appropriate protective clothing, including a laboratory jacket or apron, safety glasses, and protective gloves. The laboratory should have appropriate firefighting equipment (such as a Class A fire extinguisher) readily available to extinguish small fires.

6.0 EQUIPMENT AND SUPPLIES

The mention of trade names or commercial products in this manual is for illustrative purposes only, and does not constitute an EPA endorsement or exclusive recommendation for use. The products and instrument settings cited in SW-846 methods represent those products and settings used during method development or subsequently evaluated by the Agency. Glassware, reagents, supplies, equipment, and settings other than those listed in this manual may be employed provided that method performance appropriate for the intended application has been demonstrated and documented.

This section does not list common laboratory glassware (e.g., beakers and flasks) that might be used.

6.1 Low-heat conducting, non-combustible, impervious ceramic tile or equivalent material, an approximate dimension of 25 cm x 25 cm x 2.5 cm (the tile must be at least 25 cm in length to support a 250-mm test sample).

6.2 High temperature marker or equivalent marking device for marking ceramic plates.

6.3 Powder train mold (see Figure 1) for molding powdered and granular materials for the burn rate test. The material of construction can be aluminum, brass, stainless steel, or plastic. The mold is 250 mm in length and has a triangular cross-section, with a width of 20 mm, and a depth of 10 mm as measured from the bottom of the triangular opening to where the sides meet. On both sides of the mold, in the longitudinal direction, two sheets are mounted as lateral limitations which extend 2 mm beyond the upper edge of the triangular cross-section.

This device can be fabricated by most machine shops. The complete burn rate apparatus is available from: Associated Design and Manufacturing Co., Lorton, Virginia, 22079.

6.4 A Bunsen (propane gas and air) burner with a minimum diameter of 5 mm capable of attaining a temperature of at least 1,000 °C.

6.5 Stop watch.

6.6 Thermocouple to measure the temperature of the gas flame.

6.7 Thermometer to measure initial temperature of material (i.e., room temperature).

6.8 Anemometer to measure airflow in the fume hood.

7.0 REAGENTS AND STANDARDS

No special reagents or standards are required to conduct this test.

8.0 SAMPLE COLLECTION, PRESERVATION, AND STORAGE

8.1 Samples should be tested on an as-received basis unless requested otherwise. No sample preservation is required, but sample containers should be completely filled and tightly sealed to preserve sample integrity.

8.2 Samples should be tested as soon as possible after removal from the sample container (i.e., samples should not be allowed to dry or absorb moisture for excessive periods or to lose volatiles). Samples that are chilled or cooled upon receipt to the laboratory should be allowed to equilibrate to the ambient laboratory temperature in the sample container.

9.0 QUALITY CONTROL

9.1 Refer to Chapter One for additional guidance on quality assurance (QA) and quality control (QC) protocols. When inconsistencies exist between QC guidelines, method specific QC criteria take precedence over both technique specific criteria and Chapter One criteria; technique specific QC criteria take precedence over Chapter One criteria. Any effort involving the collection of analytical data should include development of a structured and systematic planning document, such as a Quality Assurance Project Plan (QAPP) or a Sampling and Analysis Plan (SAP), which translates project objectives and specifications into directions for those implementing the project and assessing the results.

Each laboratory should maintain a formal quality assurance program. The laboratory should also maintain records to document the quality of the data generated. Development of in-house QC limits for each method is encouraged. Use of instrument specific QC limits is encouraged, provided such limits will generate data appropriate for use in the intended application. All data sheets and quality control data should be maintained for reference or inspection.

9.2 All tests must be performed on a clean ceramic plate at room temperature.

9.3 All replicate runs must be at the same initial temperature (ambient laboratory temperature).

9.4 All replicate tests must be run at approximately the same airflow through the fume hood.

9.5 Only materials of the same particle size distribution should be used for all replicate tests.

9.6 The burn rate test must be conducted in triplicate if the preliminary screening test is positive. Any burn rate for non-metallic samples that exceeds 2.2 mm/sec (or a burn time of less than 45 seconds for 100 mm) is considered to have a positive result. For metals, a burn rate of more than 0.17 mm/sec (or burn time of less than 10 minutes for 100 mm) is considered to have a positive result.

10.0 CALIBRATION AND STANDARDIZATION

There are no calibration or standardization steps directly associated with this procedure. See the equipment manufacturer's instructions for the calibration of certain equipment used in this method (e.g., the thermocouple).

11.0 PROCEDURE

WARNING: Prior to starting the preliminary screening test, all sample materials must be tested to determine if that material is explosive or extremely flammable. Use a very small portion of material (1 g or less). If the sample material is explosive or extremely flammable, do not conduct this test.

11.1 Preliminary screening test

11.1.1 The preliminary screening test for ignitability is conducted on all waste materials. On a clean, impervious ceramic tile (Sec. 6.1), clearly mark a 250 mm long test path. Make another mark at exactly 200 mm from the start of the sample path.

11.1.2 Prepare the test material in its "as received" form by forming an unbroken strip or powder train of sample 250 mm long by 20 mm wide by 10 mm high on the ceramic tile. Use the mold to form the material as described in Sec. 11.2.3.1, if appropriate.

11.1.3 Place the ceramic tile with the loaded sample in a fume hood about 20 cm (~8 inches) from the front of the hood and in an area of laminar airflow. Position the sample perpendicular to the airflow (See Figure 2). The airflow across the perpendicular axis of the sample should be sufficient to prevent fumes from escaping into the laboratory and should not be varied during the test. The air velocity should be approximately 0.7 meters/second. Measure the air velocity with an anemometer.

11.1.4 Light the Bunsen burner and adjust the height of the flame (6.5 to 7.5 cm) by adjusting the propane gas and air flows. Measure the temperature of the flame (tip of the flame) by a thermocouple. The temperature of the flame must be at least 1000 °C.

11.1.5 Apply the tip of the flame to one end of the sample strip. The test period will depend on the sample matrix (whether non-metallic or metallic) as described below in Sec. 11.1.5.1 and 11.1.5.2.

11.1.5.1 If the waste is non-metallic, hold the flame tip on the sample strip until the sample ignites or for a maximum of 2 minutes. If combustion occurs, begin timing with a stop watch and note whether the combustion propagates up to the 200 mm mark within the 2 minute test period.

11.1.5.2 If the waste is a metal or metal alloy powder, hold the flame tip on the sample strip until the sample ignites or for a maximum of 5 minutes. If combustion occurs, begin timing with a stop watch and note whether the combustion propagates up to the 200-mm mark within the 20 minute test period.

11.1.6 If the waste does not ignite and propagate combustion either by burning with open flame or by smoldering along the 200-mm sample strip within the 2 minute test period (or 20 minute test period for metal powders), the waste is not considered flammable and no further testing is required. If the waste propagates burning of 200 mm of the test strip within the 2 minute test period (20 minute test period for metals), the material must be evaluated by the burning rate test (proceed to Sec. 11.2).

11.2 Burning rate test

11.2.1 The preparation of the test sample for the burning rate test will depend on the physical characteristics of the waste. Wastes that exist in a powdered or granular state are molded in a powder train mold as shown in Figure 1. Pasty materials are formed into a rope that is 250 mm in length with a cross-section of 1 cm^2. All tests for the burn rate test are performed on clean, ambient temperature, ceramic plates.

11.2.2 On a clean, impervious ceramic tile (Sec. 6.2), clearly mark a 250-mm long test path. Make two additional timing marks at 80 mm and 180 mm from the start of the sample path. The distance between the two marks (100 mm) will be used to calculate the rate of burn in Sec. 12.0.

11.2.3 Sample preparation based on physical characteristics

11.2.3.1 Powder or granular material -- Tighten the side plates on the mold. Place the mold on the base plate. Pour the material to fill the triangular cross section of the mold loosely. Drop the unit from a height of 2 cm onto a solid surface three times to settle the powder. Remove the side supports. Lift the mold off the base plate. Place a clean ceramic test plate with the appropriate timing marks (Sec. 11.2.2) face down on top of the mold. Invert the setup and remove the mold.

11.2.3.2 Pasty wastes - Spread the waste on a marked ceramic tile (Sec. 11.2.2) in the form of a rope 250 mm in length with a cross-section of 1 cm^2.

11.2.4 Place the ceramic tile with the loaded sample prepared in Sec. 11.2.3 in a fume hood about 20 cm (~8 in) from the front of the hood and in an area of laminar airflow. Position the sample perpendicular to the airflow (See Figure 2). The airflow across the perpendicular axis of the sample should be sufficient to prevent fumes from escaping into the laboratory and should not be varied during the test. The air velocity should be

approximately in the range of 0.7-1 meters/second. Measure the air velocity with an anemometer.

11.2.5 Light the Bunsen burner and adjust the height of the flame (6.5 to 7.5 cm) by adjusting the propane gas and air flows. Measure the temperature of the flame (tip of the flame) by a thermocouple. The temperature of the flame must be at least 1000 °C.

11.2.6 Apply the tip of the flame to one end of the sample strip to ignite the test strip as described in Sec. 11.1.5.1 or 11.1.5.2 (based on whether the sample is non-metallic or metallic).

11.2.7 When the test strip or powder train has burned up to the 80-mm time marker, begin timing the rate of combustion with a stop watch. Stop the timer when the burned strip reaches the 180-mm time marker. Record the amount of time (in sec) required to burn the 100-mm test strip.

12.0 DATA ANALYSIS AND CALCULATIONS

Calculate the rate of burning by dividing the length of the burn test strip (100 mm) by the total time (sec). Results of the burn rate test should be reported in mm/sec. Wastes that have a rate of burning of more than 2.2 mm/sec (or burn time of less than 45 sec for 100 mm) are considered to have a positive result for ignitability according to DOT regulations. For metals, this time is 10 minutes or less for 100 mm (or a burn rate of more than 0.17 mm/sec). The following format may be used to document the data.

Test Material Information

Source of material (e.g., company, operation or process):
Description of material (e.g., powder or paste, metallic or non-metallic):
Particle size (e.g., fine powder, granular, sand, etc.):
Preliminary burning time (sec):

Test Conditions

Date of Test:
Temperature of test material (°C):
Air velocity through fume hood (m/s):

Ignitability Test Data				
Test Number	Time (sec) Elapsed Between Application of Flame and Start of Ignition	Burning Time over 100 mm (sec)	Burning Rate (mm/sec)	Comments
1				
2				
3				

13.0 METHOD PERFORMANCE

13.1 Performance data and related information are provided in SW-846 methods only as examples and guidance. The data does not represent required performance criteria for users of the methods. Instead, performance criteria should be developed on a project-specific basis, and the laboratory should establish in-house QC performance criteria for the application of this method. Performance data must not be used as absolute QC acceptance criteria for laboratory QC or accreditation.

13.2 An independent laboratory validation was conducted on the robustness of the burn rate test procedure. The materials selected for this evaluation included:

1. A 50/50 mixture of metallic silicon and lead dioxide (PbO_2)
2. Excelsior
3. Dextrin (yellow powder)
4. Sulfur (fine yellow powder)
5. Aluminum metal (coarse)
6. Magnesium metal (coarse)
7. Polyethylene high density (granular)
8. Polyethylene low density (fluffy white powder)
9. Scott fertilizer (32-3-10:N-P-K)
10. JP-4 contaminated soil (approximately 5000 ppm)

Of these materials, the 50/50 mixture of metallic silicon and lead dioxide (PbO_2), elemental sulfur, and excelsior gave a positive ignitability result under the conditions of the test. The remaining materials gave negative (nonflammable) results under the conditions of the test. Several test variables including: ignition source, ambient temperature, and apparatus orientation, were studied using these materials. Partial results of this study are summarized in Table 1. These data are provided for guidance purposes only.

13.3 In another evaluation of the DOT burn rate test, potentially ignitable finishing wastes from the furniture industry were collected and tested for burning rates. Each waste was tested in triplicate to establish a mean value for the burning rate. The results for the flammable wastes are summarized in Table 2. These data are provided for guidance purposes only.

13.4 In order to evaluate the ruggedness of the DOT burn rate test, select ignitable finishing wastes were split and tested by a state laboratory and an independent contract laboratory. The results of this comparison are summarized in Table 3. These data are provided for guidance purposes only.

14.0 POLLUTION PREVENTION

14.1 Pollution prevention encompasses any technique that reduces or eliminates the quantity and/or toxicity of waste at the point of generation. Numerous opportunities for pollution prevention exist in laboratory operations. The EPA has established a preferred hierarchy of environmental management techniques that places pollution prevention as the management option of first choice. Whenever feasible, laboratory personnel should use pollution prevention techniques to address their waste generation. When wastes cannot be feasibly reduced at the source, the Agency recommends recycling as the next best option.

14.2 For information about pollution prevention that may be applicable to laboratories and research institutions consult *Less is Better: Laboratory Chemical Management for Waste Reduction*, a free publication available from the American Chemical Society (ACS), Committee on Chemical Safety, http://portal.acs.org/portal/fileFetch/C/WPCP_012290/pdf/WPCP_012290.pdf.

15.0 WASTE MANAGEMENT

The Environmental Protection Agency requires that laboratory waste management practices be conducted consistent with all applicable rules and regulations. Laboratories are urged to protect air, water, and land by minimizing and controlling all releases from hoods and bench operations, complying with the letter and spirit of any sewer discharge permits and regulations, and by complying with all solid and hazardous waste regulations, particularly the hazardous waste identification rules and land disposal restrictions. For further information on laboratory waste management, consult *The Waste Management Manual for Laboratory Personnel* available from the American Chemical Society at the address listed in Sec. 14.2.

16.0 REFERENCES

1. "Test Methods for Readily Combustible Solids. Burning Rate Test." (14.2.2.5). Recommendations on the Transport of Dangerous Goods, Fifth Revised Edition, United Nations, New York, 1988.

2. 49 CFR, Appendix E to Part 173 (12-31-91 Edition), pp. 597-598.

3. "Flammability (solids). Method A.10," Official Journal of the European Communities, No. L251/63, September 19, 1984.

4. Foster Wheeler Enviresponse, Inc., Edison NJ., "Validation of Ignitability Method For Solids," submitted to the Office of Solid Waste, US EPA, February 1994.

5. Internal Report (AMFA Report), North Carolina Department of Environmental Health and Natural Resources (Bill Hamner).

17.0 TABLES, DIAGRAMS, FLOW CHARTS, AND VALIDATION DATA

The following pages contain the tables and figures referenced by this method. A flow diagram of the procedure is included after the figures.

TABLE 1

TEST VARIABLES FOR IGNITABILITY

Material Tested	Test Number	Variable combination[1]	Burn Time over 100 mm (sec)	Burn Rate (mm/sec)
50% Metallic Silicon and 50% Lead IV Oxide	1	ABC	0.84	119
	2	Abc	0.50	200
	3	aBc	0.69	145
	4	abC	0.65	154
Excelsior (wood shavings)	1	ABC	13.45	7.43
	2	Abc	9.14	10.9
	3	aBc	13.37	7.47
	4	abC	13.59	7.36

[1]Key:

A - Flame ignition
a - Hot wire ignition source
B - Ambient temperature of 20 ° C
b - Ambient temperature of 100 ° C
C - Orientation of test apparatus of 90 ° to air flow
c - Orientation of test apparatus of 0 ° to air flow

These data are provided for guidance purposes only.

TABLE 2

EXAMPLE BURNING RATES FOR IGNITABLE WASTES

Sample No.	Description of Waste	Burn Time over 100 mm (sec)	Burn Rate (mm/sec)
A2	Segregated Lacquer Dust	4.7	21.3
J2	Segregated Lacquer Dust	4.6	21.7
U	Segregated Lacquer Dust	8.6	11.6
K	Consolidated Lacquer Dust	6.0	16.7
H	Catalyzed Lacquer Dust	6.7	14.9
F	Water Based Lacquer Dust	19.4	5.15
P	Booth Coat-Stain Overspray	12.5	8.0
O	Pallet Covered Cardboard	11.1	9.0
Q	Pallet Covered Cardboard	12.3	8.13

These data are provided for guidance purposes only.

TABLE 3

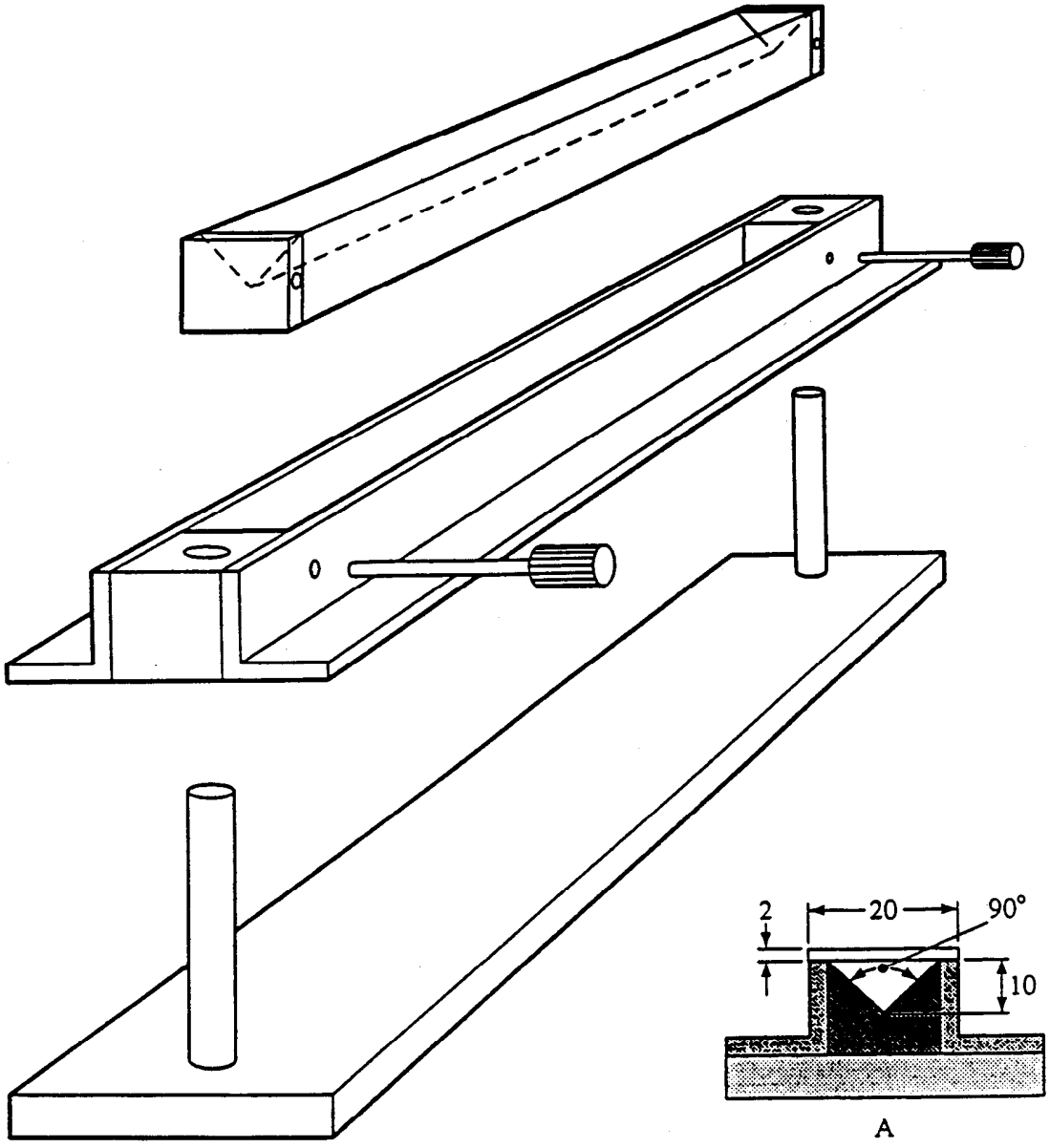
EXAMPLE COMPARISON OF BURN RATES

Sample No.	Description of Waste	Mean Burn Time Over 100 mm (Seconds)	
		State Laboratory	Contract Laboratory
A1	Segregated Lacquer Dust	4.7	5
J1	Segregated Lacquer Dust	4.6	4.3
12	Booth Coat-Glaze Overspray	0[1]	0[1]

[1] Waste was found to be nonflammable under conditions of the test.
These data are provided for guidance purposes only.

FIGURE 1

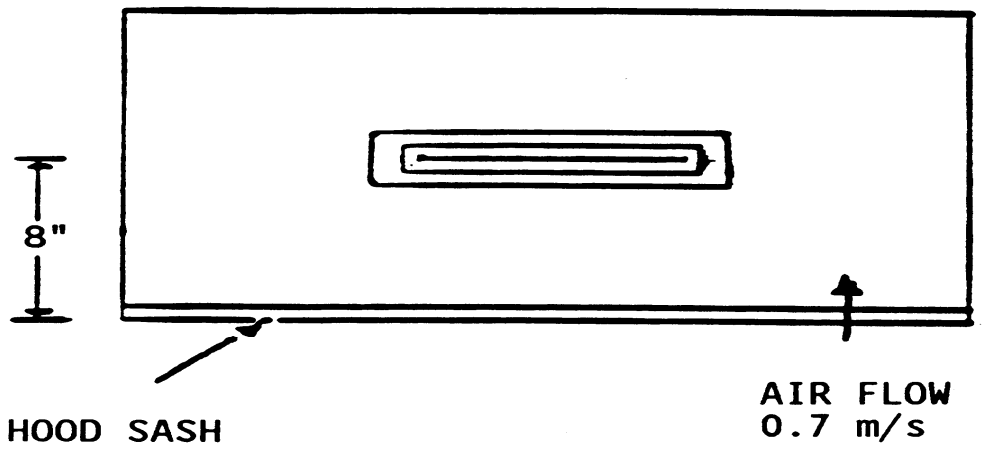
POWDER TRAIN MOLD



(A) Cross-section of 250 mm long mould

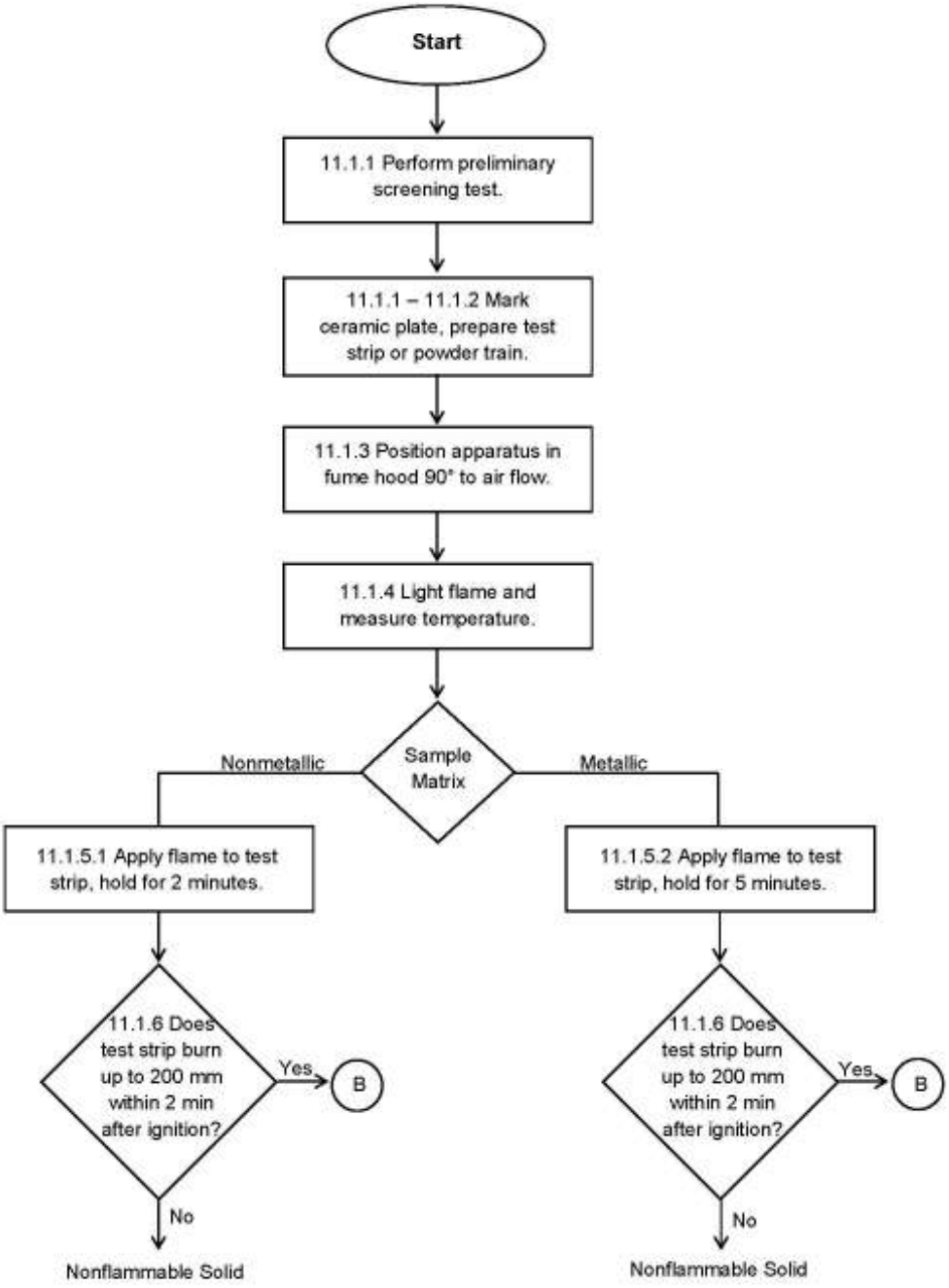
FIGURE 2

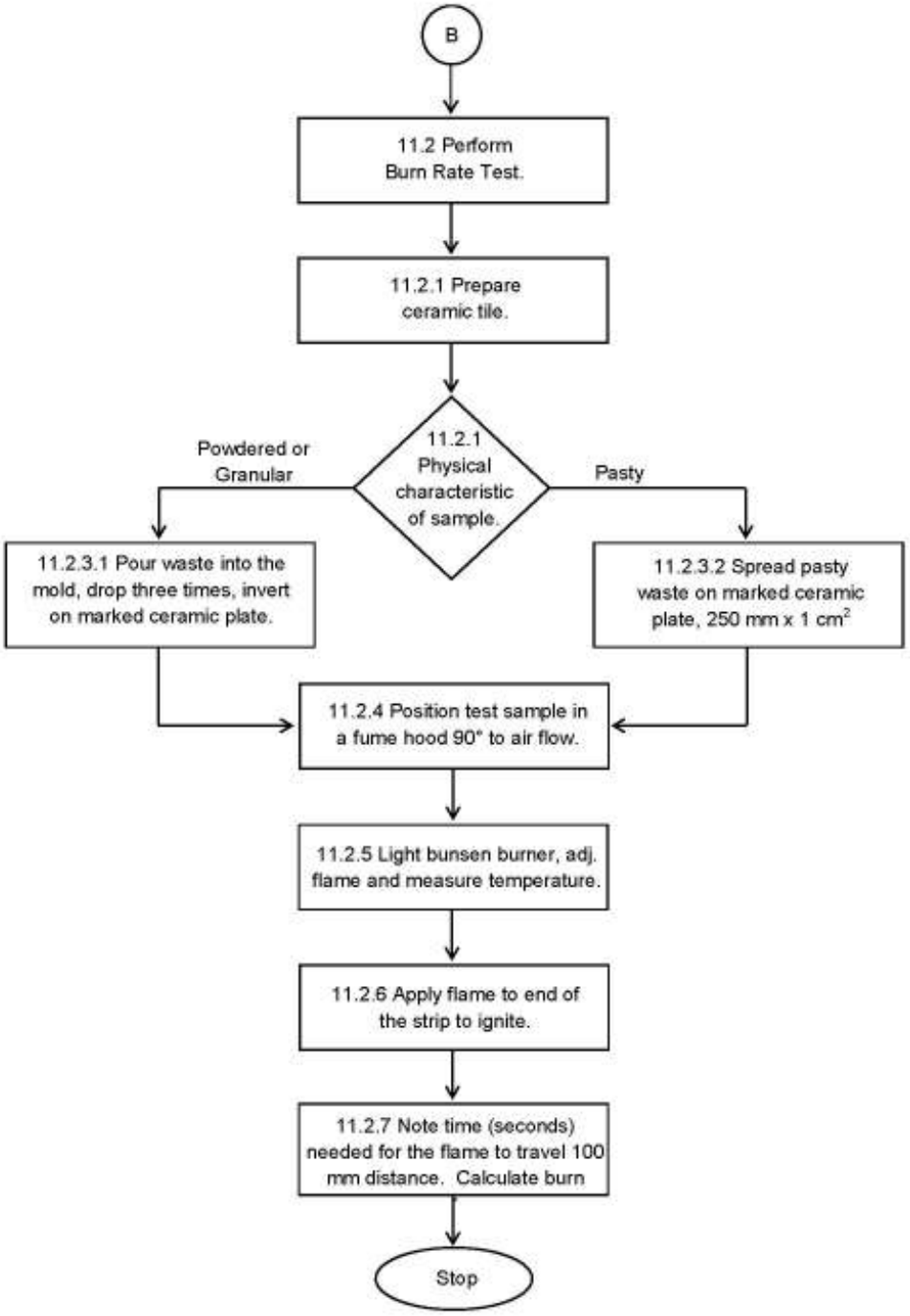
TEST APPARATUS POSITION IN FUME HOOD



SAMPLE 90° TO AIR FLOW

IGNITABILITY OF SOLIDS




B
11.2 Perform Burn Rate Test.
11.2.1 Prepare ceramic tile.
11.2.1 Physical characteristic of sample.
Powdered or Granular
Pasty
11.2.3.1 Pour waste into the mold, drop three times, invert on marked ceramic plate.
11.2.3.2 Spread pasty waste on marked ceramic plate, 250 mm x 1 cm2
11.2.4 Position test sample in a fume hood 90° to air flow.
11.2.5 Light bunsen burner, adj. flame and measure temperature.
11.2.6 Apply flame to end of the strip to ignite.
11.2.7 Note time (seconds) needed for the flame to travel 100 mm distance. Calculate burn
Stop

Appendix A:

Summary of Revisions to Method 1030 (From Revision 0 December 1996)

1. Improved overall method formatting for consistency with new SW-846 methods style guidance. The format was updated to Microsoft Word .docx.

2. Minor editorial and technical revisions were made throughout to improve method clarity.

3. The flowcharts on pages 14 and 15 were updated to improve visual clarity and edited for content.

4. The revision number was changed to 1 and the date published was changed to July 2014.

5. This appendix was added showing changes from the previous revision.

6. Items regarding regulatory use of this method in Sec. 1.1 and 1.2 were updated to reflect current guidance.

Appendix H

MPCA Guidance Document – The Lethality Characteristic

The Lethality Characteristic

A Minnesota-specific hazardous-waste characteristic

Waste/Hazardous Waste #2.05 • May 2009

Minnesota Pollution Control Agency

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Lethality, a hazardous waste characteristic specific to Minnesota, considers the toxicological, or poisonous, effect of a waste. Minnesota waste generators must ensure that wastes are evaluated for the Lethality characteristic as well as for the federal characteristics of Ignitability, Oxidizers, Corrosivity, Reactivity, and Toxicity. While the more familiar characteristic of Toxicity also contains the root 'toxic,' that characteristic refers to the presence and concentration of specific toxic contaminants as determined by the Toxicity Characteristic Leaching Procedure (TCLP). The Lethality characteristic is concerned with the overall toxicological effect of the waste as determined by biological testing. In this document, wastes displaying the Lethality characteristic are termed 'Lethal.'

Seek ways to reduce the total amount of waste you generate and the toxicity of the products you use to reduce the amount of potentially lethal hazardous wastes you generate. For free assistance, contact the Minnesota Technical Assistance Program (MnTAP). Contact information on page 4.

For more information on the federal characteristics, see MPCA hazardous waste fact sheet #2.04, *Characteristic Wastes*, available at www.pca.state.mn.us/publications/w-hw2-04.pdf

Lethality thresholds

The toxicological effect of a material is often measured in terms of the median lethal dose (LD_{50}), which is the amount of a material which will kill half of a test population of a specific animal, presented as a ratio with the body weight of the animal. Median lethal dose information is determined for a specific exposure method and test animal. The Lethality characteristic considers the oral, dermal, and inhalation exposure methods. The median lethal dose for the inhalation exposure is commonly referred to as the median lethal concentration (LC50).

Under Minnesota Rules, a waste is hazardous for the Lethality characteristic when a representative sample of the waste exhibits any of the following:

- an oral LD_{50} (rat) less than 500 milligrams per kilogram (mg/kg)
- a dermal LD_{50} (rabbit) less than 1000mg/kg
- an inhalation LC50 (rat) less than 2000 milligrams per cubic meter (mg/m3) for dusts and mists
- an inhalation LC50 (rat) less than 1000 parts per million (ppm) for gases and vapors

Evaluating for lethality

To help you evaluate waste for the Lethality characteristic, the Minnesota Pollution Control Agency (MPCA) has compiled a list of attributes that indicate a waste may be Lethal. See Table 1.

You may consider a waste does *not* meet the Lethality characteristic when you can document that the product from which the waste is generated does not display any of the Table 1 attributes. Maintain documentation at the generation site.

If a product *does* display any of the attributes, the waste *may* be Lethal; you must evaluate it further. Manage waste that

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displays any of the attributes as a Lethality characteristic hazardous waste unless and until you evaluate further under Minn. R. 7045.0131, Subp. 6 and demonstrate that the waste does not display the Lethality characteristic.

Instead of performing a full evaluation, you may choose to assume a waste is lethal and manage it as fully regulated hazardous waste

Table 1: Attributes of potential lethality

- A **drug*** regulated by the Minnesota Board of Pharmacy
- A **pesticide** regulated by the Minnesota Department of Agriculture
- A **poisonous material** regulated for transport by the U.S. Department of Transportation
- A material bearing any of the descriptive or signal terms "**Poison**", "**Poisonous**", "**Toxic**", "**Lethal**", **"Fatal"** or **"Deadly"** on the product shipping container, product label, or in product documentation
- A material bearing the '**skull and crossbones**' graphic on the product shipping container, product label, or in product documentation



- A material bearing a U.S. Department of Transportation "**Hazard Class 6.1**" label or placard on the product shipping container, product label, or in product documentation



- A material bearing a National Fire Rating (NFR), Hazardous Materials Identification System (HMIS), or Hazardous Material Identification/Information Guide (HMIG) rating **Health Division ≥3** or **Special Hazard Division "POI"** (NFR only) label on the product shipping container, product label, or in product documentation



- A material bearing **LD_{50} data** on a Material Safety Data Sheet (MSDS) which you have, or which you are required by OSHA regulations to have, which states that the LD_{50} of any of the ingredients is less than the lethality thresholds on page 1 of this fact sheet
- A material having **specific information known to you** that the waste may reasonably be Lethal, including but not limited to information that your processes may alter a product or other material which does not exhibit any of the above attributes in such a way that the waste generated may reasonably be Lethal
- A material having **specific information published by the MPCA** in Table 2 of this fact sheet that the waste may reasonably be Lethal

Wastes which display no attributes may be considered non-Lethal.
Wastes which display one or more attributes may be Lethal and must be evaluated further.

*A 'drug' as specified in Table 1 above is considered by the MPCA to be a 'pharmaceutical' eligible for further evaluation for lethality under an approved Petition for the "*Alternate Method to Evaluate Pharmaceutical Waste for the Lethality Characteristic*" if you have such an approved Petition. For more information on the Alternate Method, see MPCA hazardous waste fact sheet #4.45b, *Alternate Method to Evaluate Pharmaceutical Waste for the Lethality Characteristic*, available at www.pca.state.mn.us/publications/w-hw4-45b.pdf

Further evaluation for lethality

Further evaluation of a waste for the Lethality characteristic may include calculating the estimated LD_{50} of the waste or applying specific and documented knowledge of materials and processes used in the generation of the waste. If you evaluate the waste further and can demonstrate that it does not meet the Lethality characteristic as identified in Minn. R. 7045.0131, Subp. 6, you may manage the waste as non-Lethality characteristic without further action on your part.

Note: A waste that is not hazardous due to the Lethality characteristic may be hazardous for other reasons. Always perform a complete evaluation.

Calculating the estimated LD_{50} of a waste

To calculate the estimated LD_{50} of a waste, you must have the appropriate LD_{50} data for all of the waste components that reasonably may produce a toxic effect. The LD_{50} data you use must be for the correct exposure method and test animal. You may exclude ingredients that reasonably will not produce a harmful toxicological effect. If your reference material gives a range for the % concentration of an ingredient, you must use the maximum range value in your calculation.

Note: Ingredients identified as 'inert' on product labels, such as propellants, solvents, and carriers, may *not* be assumed to produce no harmful toxicological effect. Many product labels identify these ingredients as 'inert' only because they do not perform the main function of the product. However, many of these 'inert' ingredients, such as petroleum-based solvents, may have significant harmful toxicological effects and must be included in your LD_{50} calculation.

To calculate the estimated LD_{50} of the waste, use the following formula:

$$\frac{1}{T_W} = \frac{1}{100} \text{ X } \left(\frac{C_A}{T_A} + \frac{C_B}{T_B} + \frac{C_C}{T_C} \right)$$

$T_W = LD_{50}$ of the waste

$T_{A,B,...Z} = LD_{50}$ of ingredient A, B, ...Z in the waste

$C_{A,B,...Z}$ = % concentration of ingredient A, B, ...Z in the waste

Note: The total % concentrations of ingredients A, B, ...Z you use in your calculation may be less than 100% if the remainder of the waste will not produce a harmful toxicological effect.

Applying specific knowledge to determine the lethality of a waste

As an alternative to calculating the estimated LD_{50} of a waste, you may apply specific and documented knowledge of the materials and processes used in generating the waste. If the waste is an unaltered discarded product, you must determine whether the product would reasonably meet the Lethality characteristic when disposed of. Certifications or informed statements by a product manufacturer that a waste is "non-toxic" or "practically non-toxic" to humans or mammals may constitute knowledge that the waste is reasonably non-Lethal.

If you are able to locate some toxicological information but are unable to calculate the estimated LD_{50} of the waste, you may still be able to use the available data to evaluate the waste for the Lethality characteristic. As an example, if the only LD_{50} data you are able to locate is for an exposure method other than the one you are considering, or if the test animal is different than the required animal for the exposure method you are considering, you may apply accepted principles of biochemistry, toxicology, and physiology to the LD_{50} data you do have to determine whether the waste would reasonably be Lethal.

Note: You may not use information that a product is certified for a specific use by a governmental agency, such as the U.S. Food and Drug Administration (FDA), U.S. Environmental Protection Agency (EPA) or other similar Federal or state agency, as evidence that the product is non-Lethal when disposed of unless the certified use by its nature and lack of limitation shows that the product would reasonably be non-Lethal. As an example, you may not use approval for limited medical use of a pharmaceutical by the FDA as evidence that the waste pharmaceutical is non-Lethal; however, the approval for unlimited food use of an additive would reasonably indicate the additive waste is non-Lethal.

When sufficient information and knowledge are not available to determine lethality

When, after exercising due diligence, you are unable to locate sufficient information and knowledge to determine whether a waste displays the Lethality characteristic, you may either simply manage the waste as a Lethal hazardous waste or notify the MPCA in writing. The MPCA may require specific additional evaluation to reasonably determine whether the waste may be managed as non-Lethal.

Specific published lethality information

Table 2 lists specific lethality information currently known to the MPCA for wastes which may not exhibit any of the other attributes from Table 1, with the approximate lethality threshold concentrations for the oral exposure method for each waste. This table does not list all known or potentially Lethal wastes, only those which the MPCA believes may otherwise not be identified and of which it has specific knowledge.

Table 2: Specific known lethality information

Waste name	CAS registry number	Approximate lethality threshold concentration
Beryllium	7440-41-7	2%
Formaldehyde	50-00-0	20%
Glutaraldehyde	111-30-8	27%
Perfluorobutanesulfonate (PFBS)	29420-49-3	86%
Perfluorodecanoic acid (PFDA)	335-76-2	11%
Perfluorooctanesulfonate (PFOS)	1763-23-1	50%
Perfluorooctanesulfonylamide (FOSA or PFOSA)	754-91-6	34%
Perfluorooctanoic acid (PFOA)	3825-26-1	50%

More information

The MPCA, in cooperation with metropolitan county hazardous waste staff, Minnesota Technical Assistance Program (MnTAP) staff and other partners have developed guidance materials about the hazardous waste regulations available on MPCA's Web site at www.pca.state.mn.us/waste/pubs/business.html

The MPCA and your metropolitan county hazardous waste offices have staff that can help you. Contact your metropolitan county or the MPCA office nearest your facility at the numbers below. MnTAP staff can provide information and resources to help you reduce waste.

Metro County Hazardous Waste Offices

Anoka County..... 763-422-7093
Carver County 952-361-1800
Dakota County..... 952-891-7557
Hennepin County..... 612-348-3777
Ramsey County..... 651-266-1199
Scott County 952-496-8475
Washington County 651-430-6655
Web sites..…..... www.co.[county].mn.us

Minnesota Pollution Control Agency

Toll free (all offices) 1-800-657-3864
Brainerd.....218-828-2492
Detroit Lakes.....218-847-1519
Duluth..... 218-723-4660
Mankato..... 507-389-5977
Marshall..... 507-537-7146
Rochester.....507-285-7343
St. Paul 651-296-6300
Willmar 320-214-3786
Web site..... www.pca.state.mn.us

Minnesota Technical Assistance Program

Toll-free..... 1-800-247-0015
Minneapolis.....612-624-1300
Web site ..... www.mntap.umn.edu

Appendix I

MPCA Guidance Document – Managing Sealants and Coatings Containing PCBs

Managing Sealants and Coatings Containing PCBs

Guidance for building owners and contractors

What are PCBs?

Polychlorinated biphenyls (PCBs) are a class of 209 toxic man-made chemicals that persist in the environment and bioaccumulate in animals and humans. They were used extensively in many industrial products from the 1950's through 1978. During this period, PCBs were added to some sealants and coatings such as paint and caulking to make them more flexible and last longer. Exposure to PCBs can cause a range of human health effects and environmental impacts. For more information on other potentially PCB-containing materials and how to test for PCBs, visit the Minnesota Pollution Control Agency (MPCA) at http://www.pca.state.mn.us/publications/w-hw4-48a.pdf to view hazardous waste fact sheet #w-hw4-48a, Identifying, Using, and Managing PCBs.

Where are sealants and coatings that may contain PCBs located?

PCBs were used as plasticizers in many industrial paints and are most commonly found in areas that required waterproof or high-impact coatings. Caulking commonly surrounds doors and windows and often was used in masonry work; it also may have been used in repairs throughout a structure. You will not be able to determine whether building materials contain PCBs by their appearance, brand, or manufacturer. Deliberate use of PCBs ended in 1978; you may assume structures or portions of structures built after 1979 do not have sealants or coatings deliberately containing PCBs.

When are sealants and coatings that may contain PCBs regulated?

Sealants and coatings that may contain PCBs are not regulated by the MPCA when they are in good condition and will remain in place in part of a structure that will not be demolished or renovated. The U.S. Environmental Protection Agency (EPA), however, has raised concerns regarding indoor airborne exposure to building materials containing PCBs. For more information on PCB exposure and indoor air quality, see EPA Publication #EPA-747-F-09-005, *Preventing Exposure to PCBs in Caulking Material*, available from the EPA website at http://www.epa.gov.

Sealants and coatings that may contain PCBs become regulated by the MPCA as wastes when they are disposed of, either with a structure, such as during a full or partial building demolition, or after they are separated from the structure, such as during an abatement project. Different requirements apply to wastes in these two categories that potentially contain PCBs.

Demolition debris that may contain PCBs

The MPCA will allow, without testing, disposal of demolition debris that may contain PCBs in sealants and coatings, including mastics, sealers, waxes, and manufactured rubber and plastic components in any solid waste landfill permitted by the MPCA or another state, including a demolition, municipal solid waste, and industrial solid waste landfill. Demolition debris contaminated by these wastes may also be disposed in a permitted landfill. However, landfill operators may refuse any waste regardless of MPCA allowances.

If the structure you will demolish or renovate is located in one of the Metropolitan Counties – Anoka, Carver, Dakota, Hennepin, Ramsey, Scott, or Washington – contact your county to determine the county requirements applicable to debris from the structure.

Note: Before demolishing all or part of a structure, in addition to removing other problem materials, you must also remove all separable components that may contain PCBs, including fluorescent and high-intensity discharge (HID) lighting ballasts, motor start capacitors, and electrical transmission or distribution equipment, such as transformers. Manage these wastes as PCB hazardous wastes unless you document they do not contain PCBs at or above 50 parts per million (ppm).

For more information on problem materials that must be removed before demolishing all or part of a structure, visit the MPCA at http://www.pca.state.mn.us/publications/w-sw4-20.pdf to view MPCA solid waste fact checklist #w-sw4-20, Pre-Renovation/Demolition Environmental Checklist.

For guidance on managing lighting ballasts and capacitors once you have removed them, see MPCA hazardous waste fact sheet #w-hw4-48f, Managing PCBs in Ballasts and Small Capacitors at http://www.pca.state.mn.us/publications/w-hw4-48f.pdf.

You may reuse uncontaminated recognizable concrete and masonry demolition debris as a substitute for conventional aggregate without MPCA review. Reuse of any debris potentially contaminated with PCBs, including painted or oil-stained debris, must be approved on a case-by-case basis by the MPCA.

Abatement waste and other separate wastes that may contain PCBs

Sealants or coating wastes from abatement work that may contain PCBs must be managed as a PCB hazardous waste in Minnesota unless you can document they contain less than 50 ppm PCBs. Abatement wastes include removed caulk materials, paint chips, and sandblasting debris. For information on storing and disposing of PCB hazardous waste generated in Minnesota, see MPCA hazardous waste fact sheets #w-hw4-48c, Storing PCBs, at http://www.pca.state.mn.us/publications/w-hw4-48c.pdf and #w-hw4-48d, Manifest and Dispose of PCBs, at http://www.pca.state.mn.us/publications/w-hw4-48d.pdf.

Report all PCB hazardous wastes you generate to the MPCA or your metropolitan county.

For more information on other requirements for performing sandblasting or other air-based blasting in Minnesota, see MPCA hazardous waste fact sheet #w-hw4-39a, Sandblasting and Other Air-based Blasting, at http://www.pca.state.mn.us/publications/w-hw4-39a.pdf. For more information on other requirements for performing hydroblasting or other water-based blasting in Minnesota, see MPCA hazardous waste fact sheet #w-hw4-39b, Powerwashing and Other Water-based Blasting, at http://www.pca.state.mn.us/publications/w-hw4-39b.pdf.

Structures to be burned for live burn firefighter training

In Minnesota no structure may be burned except for live burn firefighter training. Do not burn any structure for firefighter training until you have collected at least one composite representative sample from each building material in the structure that may contain PCBs and have documented that they do not contain PCBs at 50 ppm or more.

Note: Live burn firefighter training in Minnesota must be conducted according to the *Live Fire Burn Training Procedures* manual prepared by the Minnesota State Colleges and University System and under a burn permit properly obtained from the Minnesota Department of Natural Resources (DNR). You may obtain a copy of the current manual from the DNR at http://www.dnr.state.mn.us/.

More information

Guidance and requirements in this fact sheet were compiled from the Code of Federal Regulations, Chapter 40, Part 761, and Minnesota Rules, Chapters 7035 & 7045, and incorporates regulatory interpretation decisions made by the MPCA on February 28, 2013. Visit the U.S. Government Printing Office at http://www.gpo.gov/fdsys/ to review the Code of Federal Regulations directly. Visit the Office of the Revisor of Statutes at https://www.revisor.mn.gov/pubs to review the Minnesota Rules.

The MPCA and your Metropolitan County have staff available to answer waste management questions. For more information, contact your nearest MPCA regional staff.

Metro County Hazardous Waste Offices

Anoka 763-422-7093
Carver 952-361-1800
Dakota 952-891-7557
Hennepin 612-348-3777
Ramsey 651-266-1199
Scott.....952-496-8475
Washington.....651-430-6655
Websites ..... http://www.co.[county].mn.us

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Detroit Lakes 218-847-1519
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Marshall 507-537-7146
Rochester 507-285-7343
St. Paul 651-296-6300
Willmar 320-214-3786
Website ..... http://www.pca.state.mn.us

Appendix J

MPCA Guidance Document – Guidelines-Disposal Methods for Water Filter Backwash Soilids

Guidelines-Disposal Methods for Water Filter Backwash Solids

Water Quality/Wastewater Permits #2.02 • May 2007

Minnesota Pollution Control Agency

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WFB:
Water Filter Backwash consists of both a liquid supernatant that contains dissolved and suspended solids, and a more solid sludge that has precipitated out of solution.

WFBS:
Water Filter Backwash Solids. These are the solids present following the backwash of water treatment media. This is considered a solid waste.

This fact sheet is intended to provide guidance for the proper disposal of water treatment backwash by-product.

Background

Water filter backwash (WFB) is generated when potable water treatment plants treat their well water to reduce suspended and dissolved solids.

Sand filter systems pump well water into the top of a tank that is pressurized or gravity fed down through a porous (usually sand-rock) media. Periodically the filter media is backwashed to remove the entrained solids.

Water filter backwash is conveyed to wastewater treatment facilities (WWTF) or is slurried to smaller settling tanks or ponds. To reduce wastewater treatment costs some municipalities' route the supernatant to settling facilities and the sludge to a WWTF, or the other way around. WFB routed to a settling facility need to be periodically cleaned out. The frequency will depend on the size of the tank or pond; and the volume and concentration of solids in the effluent.

Options for managing WFB include slurrying the material to a WWTF, landfilling, using as non-residential construction fill, or land application. Before deciding to dispose of WFB at a WWTF, you should contact the WWTF to fully discuss this option including: (1) available capacity of the WWTF; and (2) potential need to submit a sanitary sewer extension (SSE) permit application.

As described in Minn. R. 7035.0300 subp. 100 water filter backwash solids (WFBS) are considered a solid waste. If the material is either landfilled or land applied, it must be tested and handled in accordance with this guidance document.

Options for WFB/WFBS disposal:

1. **Wastewater Treatment Facility**
2. **Landfill**
3. **Construction Fill**
4. **Land Application**

Steps for landfilling WFBS

1. The WFBS must pass the paint filter test (i.e. is a solid) to be accepted in a landfill.
2. Test and compare the material for the analytes and standards listed in the landfill's industrial solid waste management plan.
3. For unlined landfills radium 226 (Ra) concentrations cannot exceed 5 piC/g. For lined landfills Ra concentrations cannot exceed 30 piC/g. If radium in the WFBS exceeds 30 piC/g options for its disposal must be arranged with the Minnesota Department of Health's Radiation Section.
4. If the test results are in alignment with the landfill's industrial solid waste management plan, the WFBS may be taken to a MPCA permitted landfill.

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Steps for using WFBS as construction fill

1. Test the material for the analytes listed in Table 1.
2. Using the analytical results, and formulas provided, determine whether the cumulative land applications limits listed in Table 1 are met.

If the results are below the limits in Table 1, the material may be used as fill for non-residential projects.

Steps for land applying WFB

1. Test the material for the analytes listed in Table 1.
2. Using the analytical results, and formulas provided, determine whether the cumulative land applications limits listed in Table 1 are met.
3. Determine the suitability of your site for land application using Tables 2-4.
4. Send in written notification to the county solid waste officer, and either the township clerk or city mayor, which ever is applicable, to provide local officials an opportunity to comment on the proposed application site.
5. Land apply the WFB in accordance with these guidelines.
6. Keep adequate records for future use.

Testing water filter backwash

Each time the WFB is to be land applied, a representative sample of the WFB must be collected in a way that provides a sample of the material which is actually land applied. For WFB this requires that an adequate number of subsamples be collected and composited into a single sample. The sample is then sent to a certified laboratory for testing. In addition to the parameters listed in Table 1, any chemical additives present in the WFB must also be analyzed. The results of these tests will be used to calculate the acceptable application rates for the by-product.

Table 1
Analytic parameters and cumulative limits for WFB

Parameter (Totals in mg/kg)	Cumulative Limits for land application
Radium 226	4.5 (milliCi/acre)
Arsenic	37 lb/acre
Barium	No Limit Established
Cadmium	No Limit Established
Copper	No Limit Established
Lead	No Limit Established
Manganese	No Limit Established
Mercury	No Limit Established
Molybdenum	No Limit Established
Nickel	No Limit Established
Selenium	No Limit Established
Zinc	No Limit Established
% percent solids	No Limit Established

If you have questions about what to test for, please contact the MPCA. If you have questions about sampling procedures, please contact your lab.

Formulas used to determine cumulative limits:

Maximum Application Rates Based on Radium and Arsenic:

Max. application = 37 lb/acre ÷ (arsenic conc. x 0.002)
Based on arsenic (mg/kg)

Max. application = 4.5 milliCi/ac ÷ (radium 226 conc. x 0.0009)
Based on radium 226 (pCi/g)

*** The maximum allowable WTB application is the lesser of the two results above minus any amount applied to the site from previous applications.**

Actual Arsenic Loading rate (lbs/acre) = Arsenic Concentration (mg/kg) x Actual application rate of solids (dry tons/acre) x 0.002

Actual Ra-226 Loading rate (milliCi/acre) = Ra-226 Concentration (pCi/g) x Actual application rate of solids (dry tons/acre) x 0.0009

Solids Applied (dry tons/acre) = gal/acre x % total solids ÷ 240 Applied (as a decimal fraction)

Solids Applied (dry tons/acre) = Wet tons/acre x % total solids Applied (as a decimal fraction)

Site suitability criteria

All criteria in this section, including slope restrictions, site suitability criteria, and separation distances as provided in the following tables must be met for a site to be suitable for land application.

Table 2
Slope restrictions for application sites

Slope (percent)	Injection or Immediate Incorporation
0-12	Allowed
>12	Not Allowed

Table 3
Soil Suitability Criteria

Characteristic	Minimum Requirement [1]
Soil texture at the zone of by-product application	fine sand, loamy sand, sandy loam, loam, silt, silt loam, sandy clay loam, clay loam, sandy clay, silty clay loam, silty clay, or clay
Depth to bedrock	3 feet
Depth to seasonal high water table[2]	3 feet

[1] This information can be determined by obtaining information from soil surveys published by the Natural Resources Conservation Service or by characterization of the site by a state of Minnesota licensed soil scientist or other qualified individual.

Site Selection and Use

It is recommended that a Type IV certified operator determine the suitability of each site for application and be responsible for properly land spreading the WFB. The site selection process should also include the following steps:

1. Determine that the soils located on the site meet all site suitability criteria;
2. If the site has received WTB in the past, determine the amount of pollutant that can be applied to the site. This is done by subtracting the cumulative amount of pollutant applied to the site from previous application from the cumulative pollutant limit in Table 1.

Provide written notification to the county solid waste officer, and either the township clerk or city mayor (depending on the location of the site). Notifications must include a description of the WFB, and how the WFB will be land applied including any staging or storage that will occur prior to land application.

Miscellaneous management practices/restrictions

1. WFB must be incorporated or injected within 48 hours;
2. Application of WFB is not allowed on areas of a site ponded with water or liquid;
3. No runoff of the WFB from the application site is allowed;
4. No significant surface ponding of liquid WFB is allowed after 6 hours of the application;
5. All WFB which are land applied must be uniformly distributed over the area of the site used during application; and
6. Wind-blown WFB is not allowed.

Record keeping requirements

1. A map which identifies the exact site location and year of application;
2. Testing results and application rates;
3. The crop of vegetation grown on the site;
4. Daily hauling records which indicate quantities transferred to storage or land applied with the storage or site location identified;
5. The cumulative quantity of pollutant applied to the site from all applications of WTB;
6. A cumulative total of the quantity of material applied on each site for the cropping year;
7. A copy of written information provided to each end user of the WFB, this includes any test results;
8. A copy of notification letters submitted to each city, county, and township.

Table 4
Minimum separation distances from land application sites

Feature	Incorporated or Injected With 48 Hours	
Private drinking water supply wells	200 ft.	
Public drinking water supply Wells	1000 ft.	
Lakes, rivers, streams, ditches, wetlands, intermittent streams, or tile inlets connected to these surface water features[1]	slope 0%-6% slope 6%-12%	50 ft. 100 ft
Grassed Water Ways[2]	33 ft.	

[1] Intermittent stream means a drainage channel with definable banks that provides for runoff flow to any of the surface waters listed in the above table during snow melt or rainfall events.
[2] Grassed waterways are natural or constructed and seeded to grass as protection against erosion. Separation distances are from the centerline of grassed waterways. For a grassed waterway which is wider than the separation distances required, application is allowed to the edge of the grass strip.

Annual report

An annual report is only required for those facilities with a surface or subsurface discharge permitted by the MPCA.

A report of all water filter backwash solids disposal activities for the past cropping year must be submitted by December 31 of each year on the Annual Report Form. An electronic version of this form is available at the following address: http://www.pca.state.mn.us. The annual report must include the following information:

1. Method of disposal;
2. Total quantity disposed; and
3. Location of disposal; and
4. Analytical results.
5. Cumulative amount of arsenic and Radium-226 pollutant applied to the application site.

For assistance you may contact

For further assistance, contact the MPCA Customer Assistance Center at 651-297-2274, or 800-646-6247.

Terms/Definitions

Cropping Year means a year beginning on September 1 of the year prior to the growing season and ending August 31 the year the crop is harvested. For example, the 1994 cropping year began September 1, 1993 and ended August 31, 1994.

End User means the person that has accepted the IBP for their use as a soil amendment.

Immediately Incorporated means incorporated into the soil with tillage within 48 hours after surface application of an IBP.

Industrial By-product (IBP) has the same meaning as "solid waste" given in Minnesota Rules part 703 5.0300.

Type IV Certified Operator or Inspector means a person certified according to Minnesota Rules chapter 7048 for land application.

Wetlands generally include swamps, marshes, bogs, and similar areas. Wetlands must have the following attributes: (1) a predominance of hydric soils; (2) inundated or saturated by surface water or groundwater at a frequency and duration sufficient to support a prevalence of hydrophytic vegetation typically adapted for life in a saturated soil condition; and (3) under normal circumstances support a prevalence of such vegetation.

Appendix K

Treated Seed Disposal

TREATED SEED DISPOSAL

Background

Treated seeds are seeds, including grain, forage, oil-plant, and vegetable seeds, that have been treated with pesticides or fungicides. Treated seeds can usually be identified by their distinctive color. Federal law requires that a distinctive color be applied to seeds that are treated and sold. Treated seeds that will not be used by planting are considered industrial solid wastes in Minnesota.

Disposal requirements

The MPCA considers waste treated seed and packaging to be an industrial solid waste with no need for further hazardous waste evaluation by the generator, landfill, or WTE incineration facility. In accordance with Minnesota Rules and MPCA Guidance Documents, operators will manage these wastes with the following considerations:

- Gas generation. Waste treated seed may present a fermentation and methane gas generation risk. Landfill operators must determine on a project-by-project basis what prospective volume of waste treated seed and potential resulting gas generation the landfill can safely accept on a per-load or per-day basis.
- Stability and settlement. Landfill operators must determine when thin-spreading of waste treated seed over the active disposal area or incorporation into other received waste may be needed to maintain slope stability and minimize localized settlement.
- Daily cover. To prevent wildlife foraging and exposure, waste treated seed of any volume must be immediately covered.

Treated seeds

Treated seeds are seeds, including grain, forage, oil-plant, and vegetable seeds, that have been treated with pesticides or fungicides. Treated seeds can usually be identified by their distinctive color. Federal law requires that a distinctive color be applied to seeds that are treated and sold.

Treated seeds that will be used by planting

Treated seed that will be used must be planted according to the label directions on the treated seed packaging. Depending on the label directions, planting may be allowed for crop production, wildlife habitat, or erosion or weather protection. There may also be restrictions on planting rate and depth.

Treated seeds that will not be used by planting

While the Minnesota Department of Agriculture (MDA) and the U.S. Environmental Protection Agency (EPA) regulate the pesticides and fungicides that are used to treat seeds, treated seeds themselves are exempt from these requirements. Instead, management of treated seeds that will not be used by planting is regulated by the Minnesota Pollution Control Agency (MPCA).

Treated seeds that will not be used by planting are considered industrial solid wastes in Minnesota. Because of the risk of concentrating the chemicals they are treated with, waste treated seeds in Minnesota may not be:

- Buried for disposal, except in a permitted solid waste landfill, even if burial is stated as a disposal option on the treated seed label, except that farmers in Minnesota may bury treated seeds from their own farm on the farm property. Spreading and incorporation into soil, except by a farmer of their own treated seeds on their own farm, is considered being buried for disposal and is not allowed.
- Composted.
- Burned, except in a permitted Waste-To-Energy (WTE) incineration facility. Waste treated seed may not be burned openly, in corn or wood stoves, or in residential or commercial boilers, including by farmers.
- Used for ethanol, biodiesel, or other fermentation or oil processing, unless specifically approved by the MPCA. Though some treated seed labels still list ethanol production as a management option if no measurable residues of pesticides remain in resulting by-products used in agronomic practice, the MPCA is not aware of any currently available use that does not raise this risk.

Packaging and equipment

Disposable packaging from treated seed, such as bags, is also considered a regulated solid waste in Minnesota, and may not be buried or burned except in permitted facilities. Farmers who do not need to dispose of any treated seeds may dispose of treated seed bags with their normal solid waste, but may not burn any plastic.

Reusable packaging, such as totes and cartons, may be reused with or without rinsing for the same product. When washing equipment, such as seed treatment equipment, planting equipment, or reusable packaging, the MPCA recommends using only the minimum amount of rinsewater necessary.

Rinsewater may be discharged to a publicly owned treatment works, commonly known as a sewage treatment plant, after notifying the works operator and following any conditions or restrictions they apply. Rinsewater may also be applied at label rates to a crop for which the active ingredients in the seed treatment are registered. Rinsewater may not be allowed to discharge to uncropped ground, surface water, or septic systems.

Arranging for proper disposal

Manufacturers, distributors, retailers, farmers, and any other person generating waste treated seed and packaging, called the waste *generators*, are responsible for arranging for proper disposal of their waste. The MPCA considers waste treated seed and packaging to be an industrial solid waste with no need for further hazardous waste evaluation by the generator, landfill, or WTE incineration facility.

You may find a list of Minnesota landfills in MPCA fact sheet #w-sw6-04, Minnesota landfills accepting mixed municipal solid waste, at: https://www.pca.state.mn.us/sites/default/files/w-sw6-04.pdf.

You may find a list of permitted Minnesota WTE incineration facilities on the website of the Minnesota Resource Recovery Association (MRRA), at: http://mnresourcerecovery.com/.

Many of these landfills and WTE facilities may accept industrial solid waste treated seed, however **generators must contact the landfill or WTE facility first to ensure that they will agree to accept waste treated seeds and can safely manage this waste stream**.

Management in landfills

If not already explicitly included, treated seeds must be addressed in a revision to a landfill's Industrial Solid Waste Management Plan. The revised plan must be reviewed and approved by the MPCA before a landfill may receive this waste stream. Revisions for treated seeds must include:

- Gas generation. Waste treated seed may present a fermentation and methane gas generation risk. Landfill operators must determine what prospective volume of waste treated seed and potential resulting gas generation the landfill can safely accept on a per-load or per-day basis.
- Stability and settlement. Landfill operators must determine when thin-spreading of waste treated seed over the active disposal area or incorporation into other received waste may be needed to maintain slope stability and minimize localized settlement.
- Daily cover. To prevent wildlife foraging and exposure, waste treated seed of any volume must be immediately covered.

Some landfills may also be required to additionally obtain county approval to receive waste treated seed, depending on location.

More information

Guidance and requirements in this fact sheet were compiled from Minnesota Rules, Chapters 7035 and 7045, and incorporate regulatory interpretation decisions made by the MPCA on January 12, 2022. To review Minnesota Rules, visit the Office of the Revisor of Statutes at: https://www.revisor.mn.gov/pubs.

The MPCA's Small Business Environmental Assistance Program can offer free, confidential compliance assistance. For information about waste minimization, contact the Minnesota Technical Assistance Program.

Immediately report all spills that may damage the environment to the Minnesota Duty Officer.

Minnesota Pollution Control Agency

Toll free (all offices) 1-800-657-3864
All offices 651-296-6300
..... https://www.pca.state.mn.us/

Small Business Environmental Assistance Program

Toll free 1-800-657-3938
Metro 651-282-6143
..... https://www.pca.state.mn.us/sbeap/

Minnesota Technical Assistance Program

Toll free 1-800-247-0015
Metro 612-624-1300
..... http://www.mntap.umn.edu

Minnesota Duty Officer

Toll free 1-800-422-0798
Metro 651-649-5451

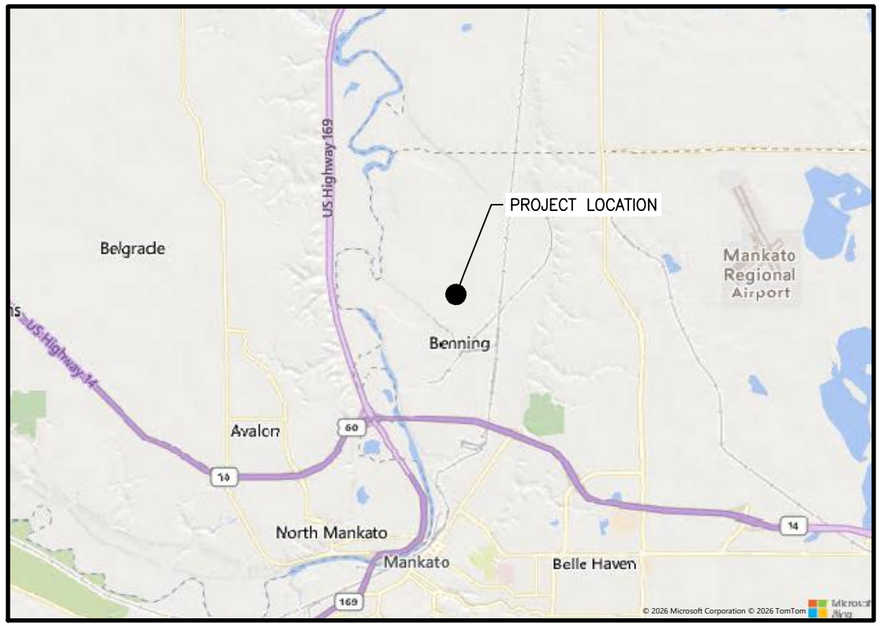
Appendix B Permit Drawings

Plot Date & Time: 21 April 2026 1:29 PM

2026 PERMIT REISSUANCE & MODIFICATION APPLICATION

PREPARED FOR
DEM-CON PILGRIM LANDFILL, LLC.
MANKATO, MINNESOTA

APRIL 2026



DEM-CON PILGRIM LANDFILL
VICINITY MAP

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GRAPHIC SCALE IN FEET



DEM-CON PILGRIM LANDFILL
PROJECT LOCATION MAP

N

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GRAPHIC SCALE IN FEET

INDEX OF SHEETS

G-101	COVER AND INDEX SHEET
C-101	EXISTING CONDITIONS
C-102	BASE GRADING PLAN
C-103	LEACHATE MANAGEMENT PLAN
C-104	INTERIM FILL PLAN
C-105	FINAL COVER GRADING PLAN
C-106	SURFACE WATER MANAGEMENT PLAN
C-107	CROSS SECTIONS
C-108	CROSS SECTIONS
D-101	BASE LINER DETAILS
D-102	PERIMETER DETAILS
D-103	MISCELLANEOUS DETAILS
D-104	LEACHATE COLLECTION DETAILS
D-105	LEACHATE COLLECTION DETAILS
D-106	FINAL COVER DETAILS

REV	REVISION DESCRIPTION	DWN	APP	REV DATE
0	ISSUED FOR PERMIT APPLICATION	JJT	EDK	04/24/26

SEAL

I HEREBY CERTIFY THAT THIS PLAN, SPECIFICATION, OR REPORT WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA.

PRINT NAME ETHAN KETELSEN

SIGNATURE

DATE 04-24-2026 LICENSE # 56630

PRIME CONSULTANT

Stantec

PROJECT TITLE
2026 PERMIT REISSUANCE & MODIFICATION APPLICATION

DEM-CON PILGRIM LANDFILL, LLC.

MANKATO, MINNESOTA

SHEET TITLE
COVER AND INDEX SHEET

DWN BY	CHK'D	APP'D	DWG DATE
JJT	BWS	EDK	APR. 2026

SCALE AS SHOWN

PROJECT NO.	SHEET NO.	REV NO.
227708930	G-101	0

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Plot Date & Time: 21 April 2026 3:39 PM



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GRAPHIC SCALE IN FEET

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- PROPERTY BOUNDARY (BEACON/GIS)
- PERMITTED WASTE LIMITS
- EXISTING PHASE BOUNDARY
- EXISTING MINOR CONTOUR
- EXISTING MAJOR CONTOUR
- EXISTING WETLAND AREA
- EXISTING ROAD EDGE
- MW-1 EXISTING MONITORING WELL

SURVEY NOTES:

1. HORIZONTAL DATUM IS BLUE EARTH COUNTY NORTH AMERICAN DATUM NAD83(2011), US SURVEY FEET,
2. VERTICAL DATUM IS NORTH AMERICAN VERTICAL DATUM 88 (NAVD88). CONTOUR INTERVAL IS TWO FEET.
3. TOPOGRAPHY SURVEY AND AERIAL FROM 2023 LIDAR DATA, UPDATED VIA GROUND SURVEY BY BOLTON AND MENK IN DECEMBER 2025.

REV	REVISION DESCRIPTION	DWN	APP	REV DATE
0	ISSUED FOR PERMIT APPLICATION	JJT	EDK	04/24/26

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Stantec

PROJECT TITLE
2026 PERMIT REISSUANCE & MODIFICATION APPLICATION

DEM-CON PILGRIM LANDFILL, LLC.

MANKATO, MINNESOTA

SHEET TITLE
EXISTING CONDITIONS

DWN BY	CHK'D	APP'D	DWG DATE
JJT	BWS	EDK	APR. 2026

SCALE AS SHOWN

PROJECT NO. 227708930

SHEET NO. C-101

REV NO. 0

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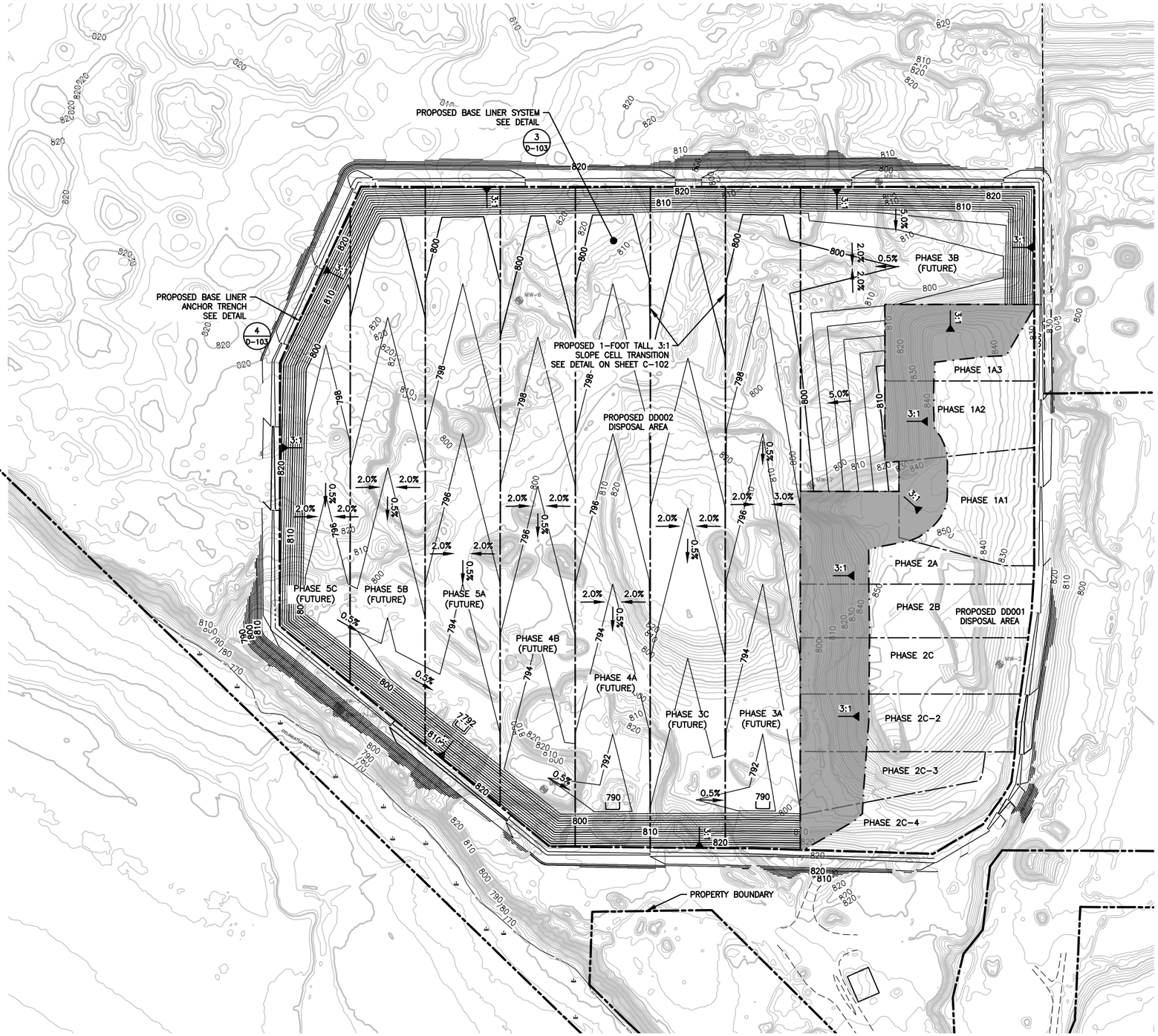

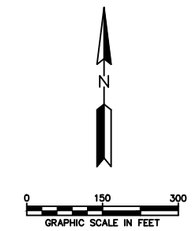

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PROPERTY BOUNDARY (BEACON/GIS)
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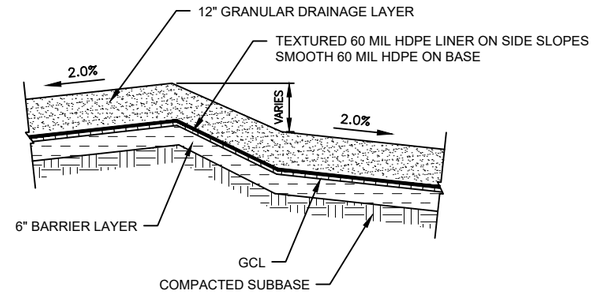
EXISTING PHASE BOUNDARY
EXISTING MINOR CONTOUR
EXISTING MAJOR CONTOUR
EXISTING WETLAND AREA
PROPOSED PHASE BOUNDARY
PROPOSED MINOR CONTOUR
PROPOSED MAJOR CONTOUR
PROPOSED OVERLINER AREA

SURVEY NOTES:

1. HORIZONTAL DATUM IS BLUE EARTH COUNTY NORTH AMERICAN DATUM NAD83(2011), US SURVEY FEET,
2. VERTICAL DATUM IS NORTH AMERICAN VERTICAL DATUM 88 (NAVD88). CONTOUR INTERVAL IS TWO FEET.
3. TOPOGRAPHY SURVEY FROM 2023 LIDAR DATA, UPDATED VIA GROUND SURVEY BY BOLTON AND MENK IN DECEMBER 2025.

NOTES:

1. PROPOSED GRADES SHOWN ARE TOP OF HDPE LINER GRADES.
2. BASE GRADES ARE DESIGNED A MINIMUM 5-FEET ABOVE HISTORICAL HIGH GROUNDWATER ELEVATIONS.



CELL FLOOR TRANSITIONAL OFFSET DETAIL

REV	REVISION DESCRIPTION	DWN	APP	REV DATE
0	ISSUED FOR PERMIT APPLICATION	JJT	EDK	04/24/26

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PRINT NAME ETHAN KETELSEN

SIGNATURE Ethan Ketelsen

DATE 04-24-2026 LICENSE # 56630

PRIME CONSULTANT

Stantec

PROJECT TITLE
2026 PERMIT REISSUANCE & MODIFICATION APPLICATION

DEM-CON PILGRIM LANDFILL, LLC.

MANKATO, MINNESOTA

SHEET TITLE
BASE GRADING PLAN

DWN BY	CHK'D	APP'D	DWG DATE	APR. 2026
JJT	BWS	EDK	SCALE	AS SHOWN

PROJECT NO.	SHEET NO.	REV NO.
227708930	C-102	0

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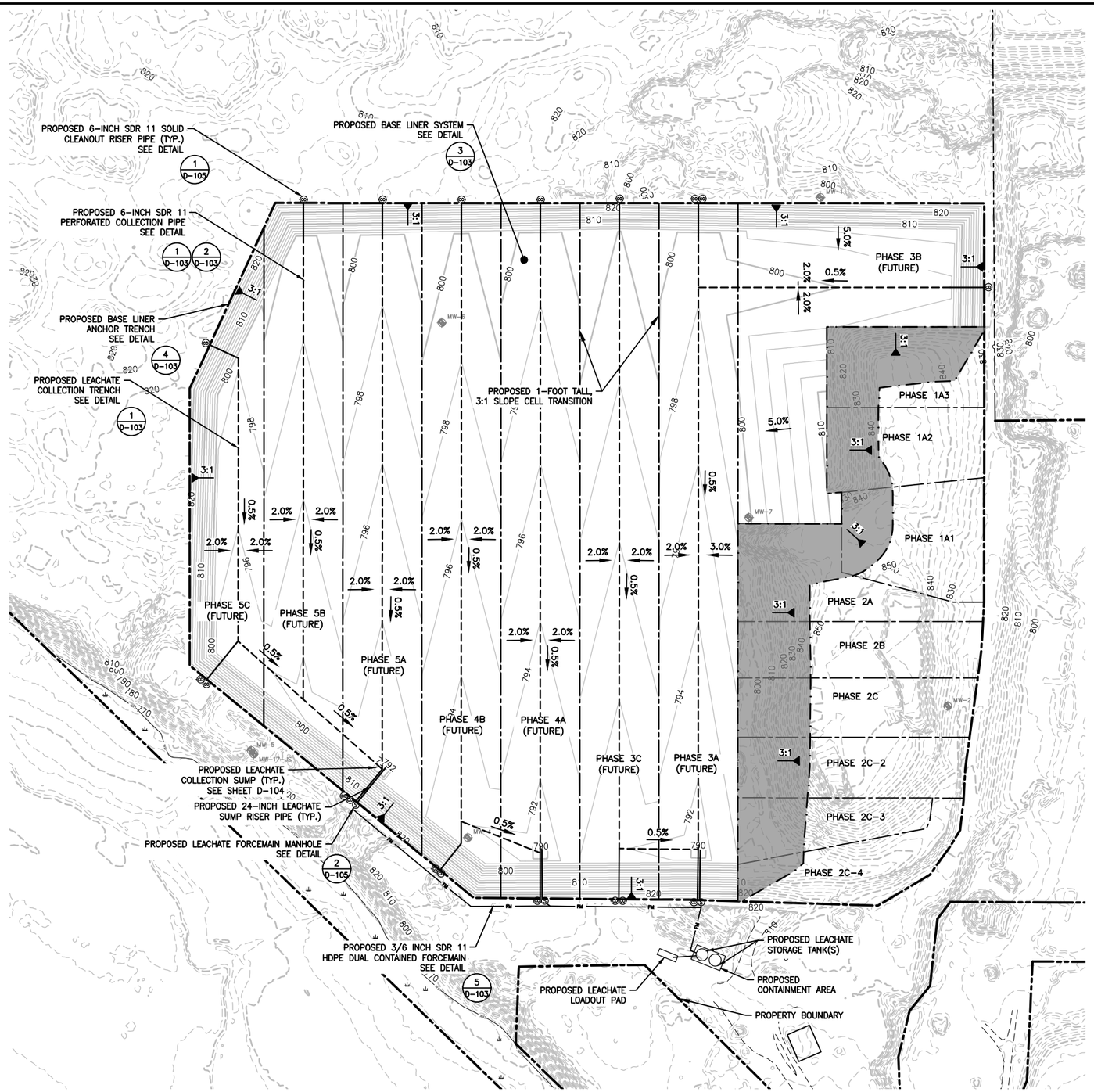
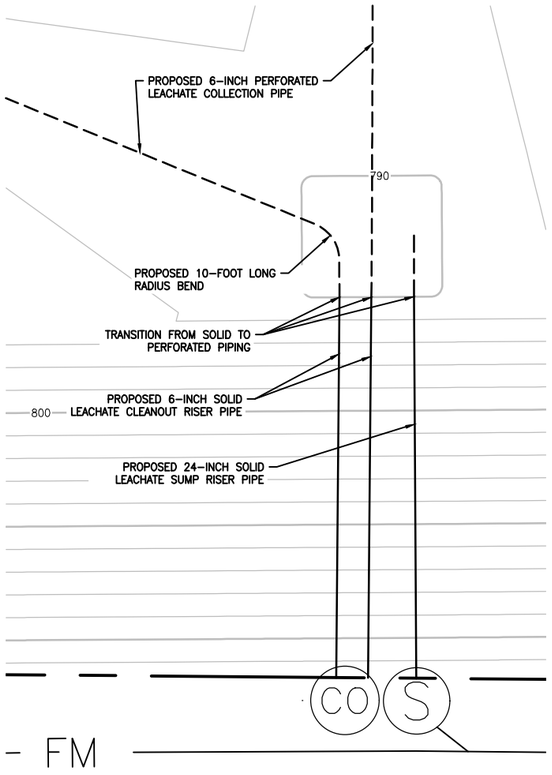


SURVEY NOTES:

1. HORIZONTAL DATUM IS BLUE EARTH COUNTY NORTH AMERICAN DATUM NAD83(2011), US SURVEY FEET,
2. VERTICAL DATUM IS NORTH AMERICAN VERTICAL DATUM 88 (NAVD88). CONTOUR INTERVAL IS TWO FEET.
3. TOPOGRAPHY SURVEY FROM 2023 LIDAR DATA, UPDATED VIA GROUND SURVEY BY BOLTON AND MENK IN DECEMBER 2025.

NOTE:

1. THE PROPOSED LIMIT OF THE OVERLAY LINER IS APPROXIMATE. THE ACTUAL LIMIT OF OVERLAY LINER WILL BE CONFIRMED FOLLOWING THE EXISTING DEMO WASTE RELOCATION AND BEFORE OVERLAY LINER INSTALLATION.



TYPICAL LEACHATE SUMP PIPING PLAN

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REV	REVISION DESCRIPTION	DWN	APP	REV DATE
0	ISSUED FOR PERMIT APPLICATION	JJT	EDK	04/24/26

SEAL

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PRINT NAME ETHAN KETELSEN

SIGNATURE

DATE 04-24-2026 LICENSE # 56630

PRIME CONSULTANT

Stantec

PROJECT TITLE
2026 PERMIT REISSUANCE & MODIFICATION APPLICATION

DEM-CON PILGRIM LANDFILL, LLC.

MANKATO, MINNESOTA

SHEET TITLE
LEACHATE MANAGEMENT PLAN

DWN BY	CHK'D	APP'D	DWG DATE	APR. 2026
JJT	BWS	EDK	SCALE	AS SHOWN

PROJECT NO.	SHEET NO.	REV NO.
227708930	C-103	0

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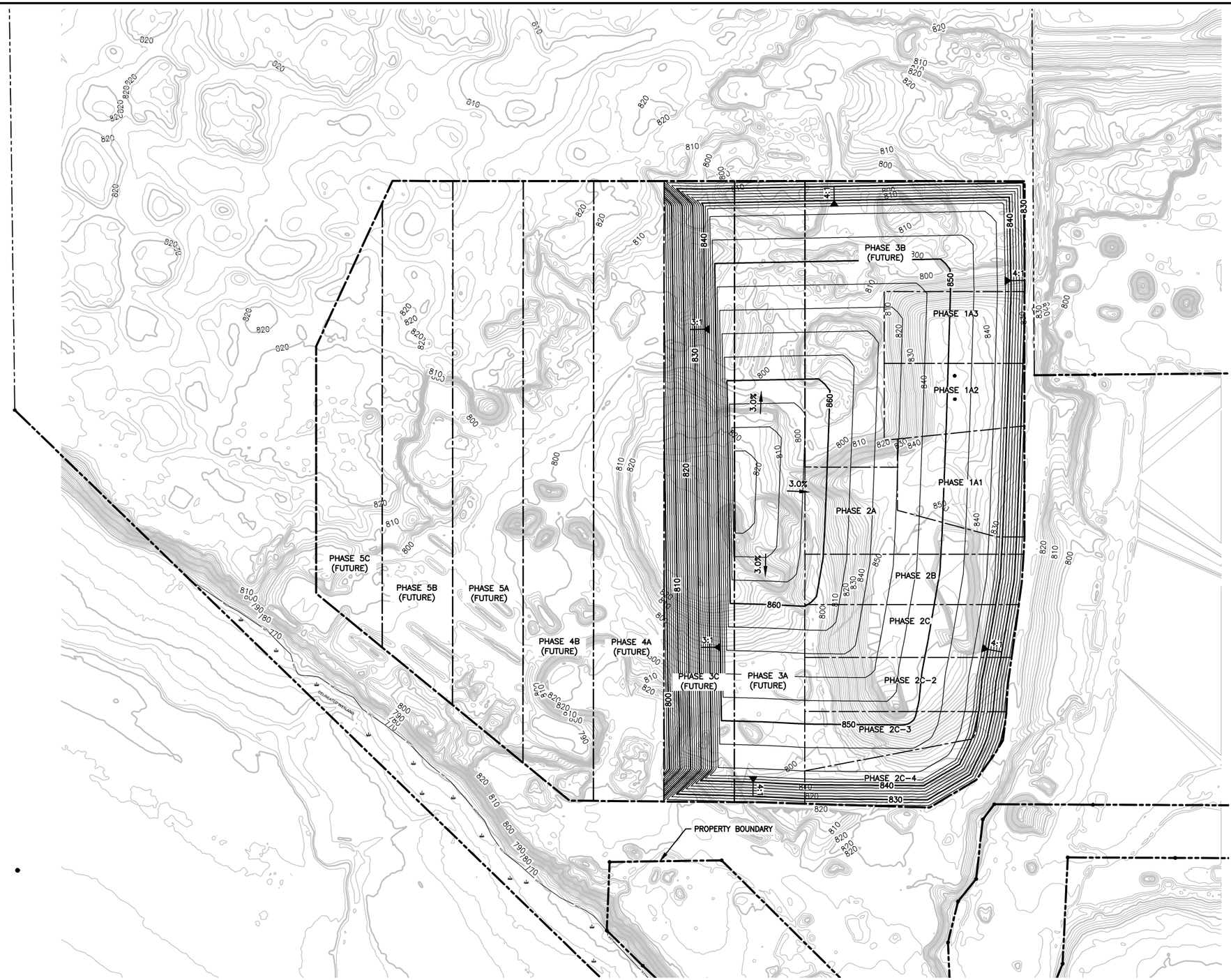

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- EXISTING PHASE BOUNDARY
- EXISTING MINOR CONTOUR
- EXISTING MAJOR CONTOUR
- EXISTING WETLAND AREA
- PROPOSED PHASE BOUNDARY
- PROPOSED MINOR CONTOUR
- PROPOSED MAJOR CONTOUR

SURVEY NOTES:

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3. TOPOGRAPHY SURVEY FROM 2023 LIDAR DATA, UPDATED VIA GROUND SURVEY BY BOLTON AND MENK IN DECEMBER 2025.

NOTES:

1. PROPOSED GRADES SHOWN ARE TO BE TOP OF WASTE GRADES.

REV	REVISION DESCRIPTION	DWN	APP	REV DATE
0	ISSUED FOR PERMIT APPLICATION	JJT	EDK	04/24/26

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PRINT NAME ETHAN KETELSEN

SIGNATURE

DATE 04-24-2026 LICENSE # 56630

PRIME CONSULTANT

Stantec

PROJECT TITLE
2026 PERMIT REISSUANCE & MODIFICATION APPLICATION

DEM-CON PILGRIM LANDFILL, LLC.

MANKATO, MINNESOTA

SHEET TITLE
INTERIM FILL PLAN

DWN BY	CHK'D	APP'D	DWG DATE
JJT	BWS	EDK	APR. 2026

SCALE AS SHOWN

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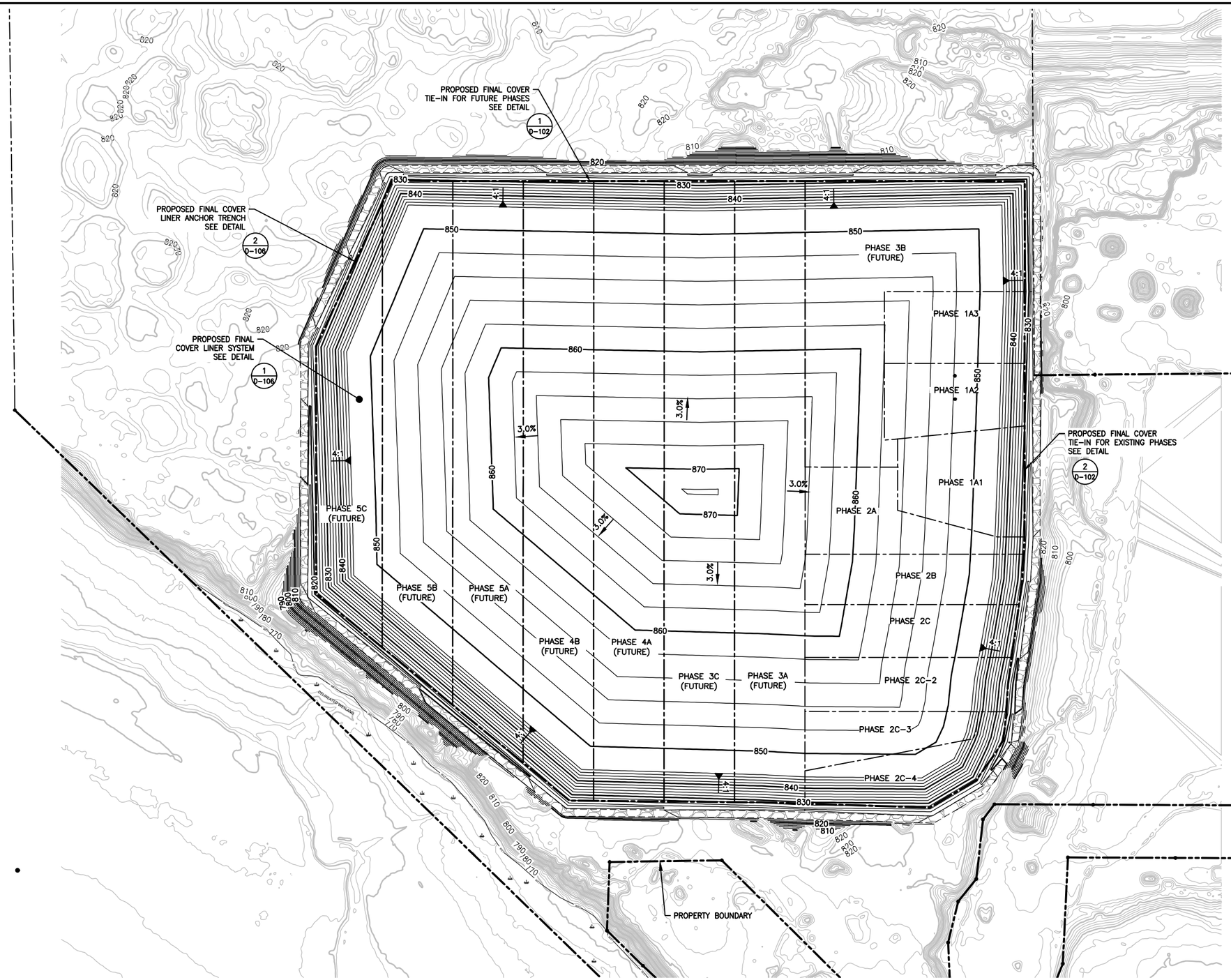

SURVEY NOTES:

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3. TOPOGRAPHY SURVEY FROM 2023 LIDAR DATA, UPDATED VIA GROUND SURVEY BY BOLTON AND MENK IN DECEMBER 2025.

NOTES:

1. PROPOSED GRADES SHOWN ARE TOP OF FINAL COVER GRADES.

REV	REVISION DESCRIPTION	DWN	APP	REV DATE
0	ISSUED FOR PERMIT APPLICATION	JJT	EDK	04/24/26

SEAL

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PRINT NAME ETHAN KETELSEN

SIGNATURE

DATE 04-24-2026 LICENSE # 56630

PRIME CONSULTANT

Stantec

PROJECT TITLE
2026 PERMIT REISSUANCE & MODIFICATION APPLICATION

DEM-CON PILGRIM LANDFILL, LLC.

MANKATO, MINNESOTA

SHEET TITLE
FINAL COVER GRADING PLAN

DWN BY	CHK'D	APP'D	DWG DATE	APR. 2026
JJT	BWS	EDK	SCALE	AS SHOWN

PROJECT NO.	SHEET NO.	REV NO.
227708930	C-105	0

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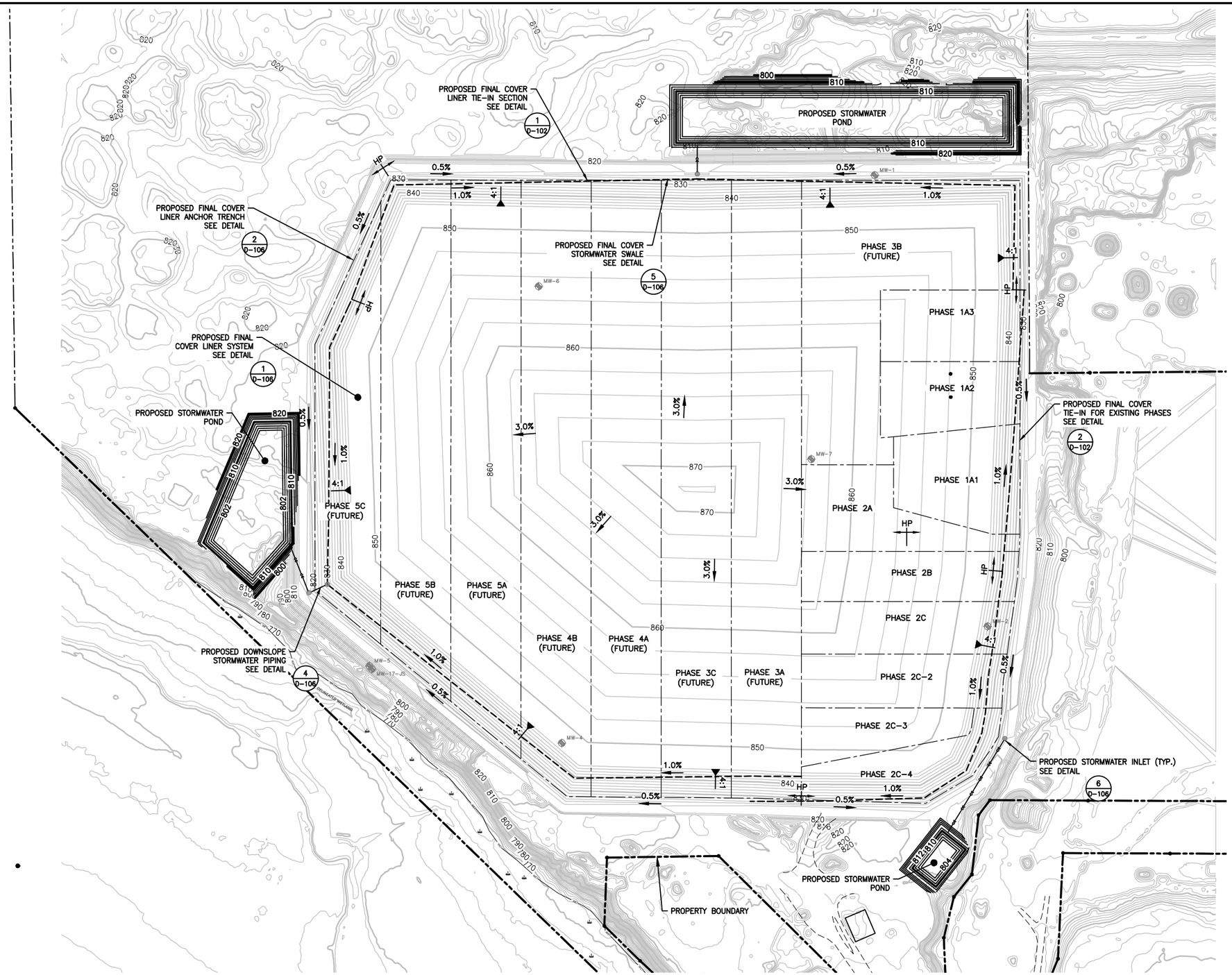

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GRAPHIC SCALE IN FEET

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- PROPERTY BOUNDARY (BEACON/GIS)
- PERMITTED WASTE LIMITS
- EXISTING PHASE BOUNDARY
- EXISTING MINOR CONTOUR
- EXISTING MAJOR CONTOUR
- EXISTING WETLAND AREA
- PROPOSED PHASE BOUNDARY
- PROPOSED MINOR CONTOUR
- PROPOSED MAJOR CONTOUR
- PROPOSED STORMWATER SWALE
- PROPOSED STORMWATER PIPE
- PROPOSED STORMWATER INLET

SURVEY NOTES:

1. HORIZONTAL DATUM IS BLUE EARTH COUNTY NORTH AMERICAN DATUM NAD83(2011), US SURVEY FEET,
2. VERTICAL DATUM IS NORTH AMERICAN VERTICAL DATUM 88 (NAVD88). CONTOUR INTERVAL IS TWO FEET.
3. TOPOGRAPHY SURVEY FROM 2023 LIDAR DATA, UPDATED VIA GROUND SURVEY BY BOLTON AND MENK IN DECEMBER 2025.

NOTES:

1. PROPOSED GRADES SHOWN ARE TOP OF FINAL COVER GRADES.
2. PROPOSED STORMWATER POND GRADING IS INTENDED TO SHOW STORAGE, FINAL POND GRADING MAY VARY AT TIME OF CONSTRUCTION.

REV	REVISION DESCRIPTION	DWN	APP	REV DATE
0	ISSUED FOR PERMIT APPLICATION	JJT	EDK	04/24/26

SEAL

I HEREBY CERTIFY THAT THIS PLAN, SPECIFICATION, OR REPORT WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA.

PRINT NAME ETHAN KETELSEN

SIGNATURE

DATE 04-24-2026 LICENSE # 56630

PRIME CONSULTANT

Stantec

PROJECT TITLE
2026 PERMIT REISSUANCE & MODIFICATION APPLICATION

DEM-CON PILGRIM LANDFILL, LLC.

MANKATO, MINNESOTA

SHEET TITLE
SURFACE WATER MANAGEMENT PLAN

DWN BY	CHK'D	APP'D	DWG DATE
JJT	BWS	EDK	APR. 2026

SCALE AS SHOWN

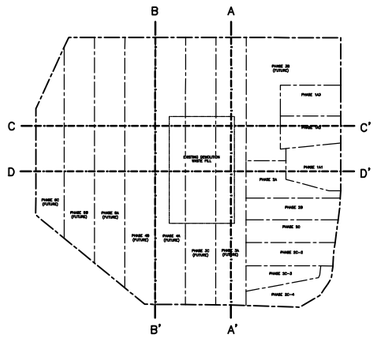
PROJECT NO. 227708930

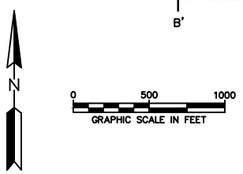
SHEET NO. C-106

REV NO. 0

I:\227708930\drafting\civ\C-106_Surface Water Management.dwg

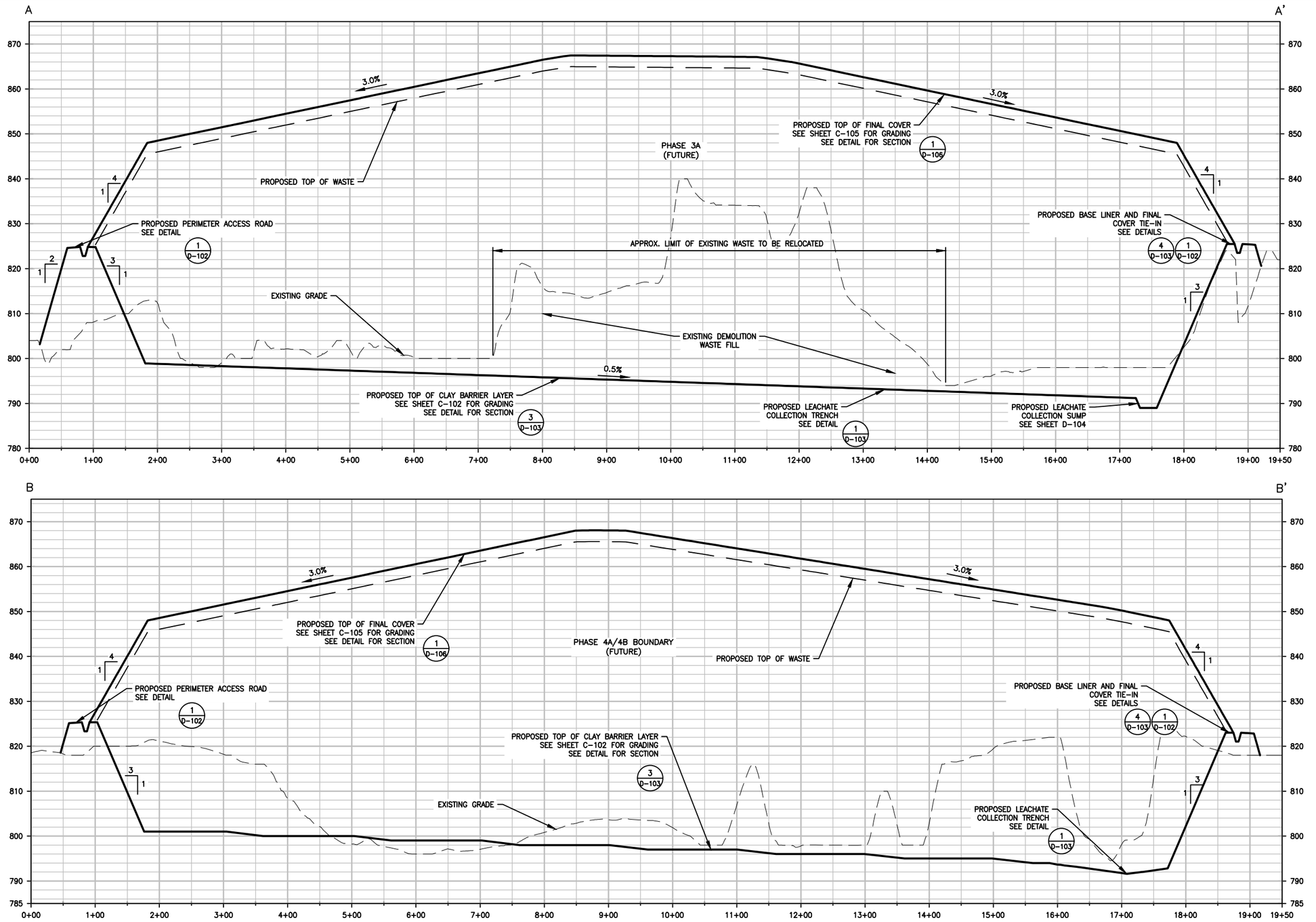
Plot Date & Time: 22 April 2026 4:30 PM

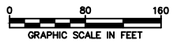




NOTE:

BASE GRADES ARE DESIGNED A MINIMUM 5–FEET ABOVE HISTORICAL HIGH GROUNDWATER ELEVATIONS.





VERTICAL EXAGGERATION: 7.0X

REV	REVISION DESCRIPTION	DWN	APP	REV DATE
0	ISSUED FOR PERMIT APPLICATION	JJT	EDK	04/24/26

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SIGNATURE

DATE 04-24-2026 LICENSE # 56630

PRIME CONSULTANT

Stantec

PROJECT TITLE
2026 PERMIT REISSUANCE & MODIFICATION APPLICATION

DEM–CON PILGRIM LANDFILL, LLC.

MANKATO, MINNESOTA

SHEET TITLE
CROSS SECTIONS

DWN BY	CHK'D	APP'D	DWG DATE
JJT	BWS	EDK	APR. 2026

SCALE AS SHOWN

PROJECT NO.	SHEET NO.	REV NO.
227708930	C–107	0

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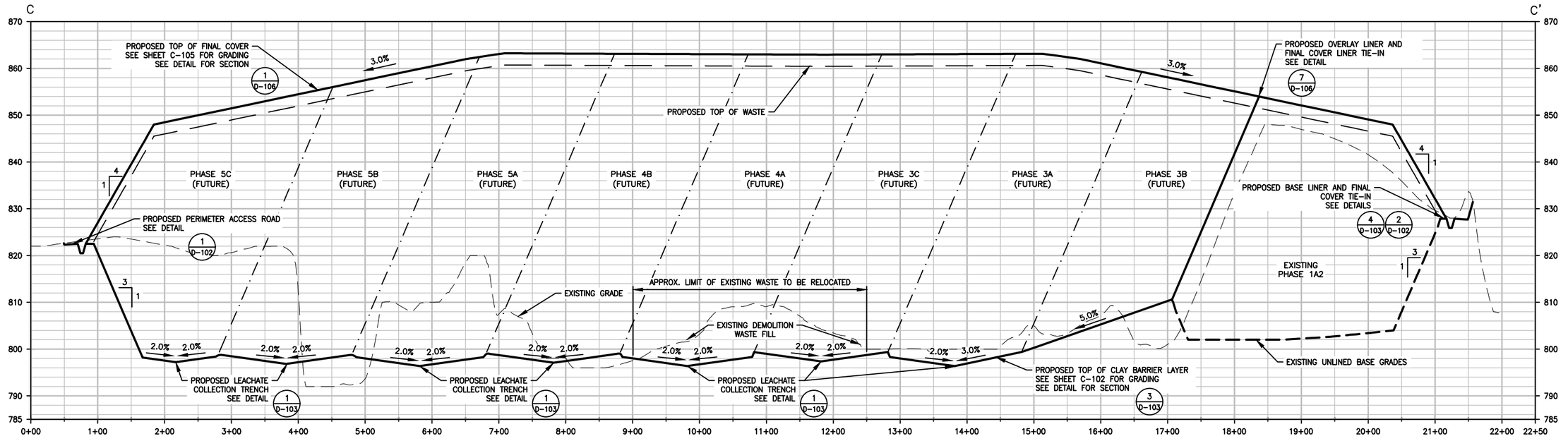
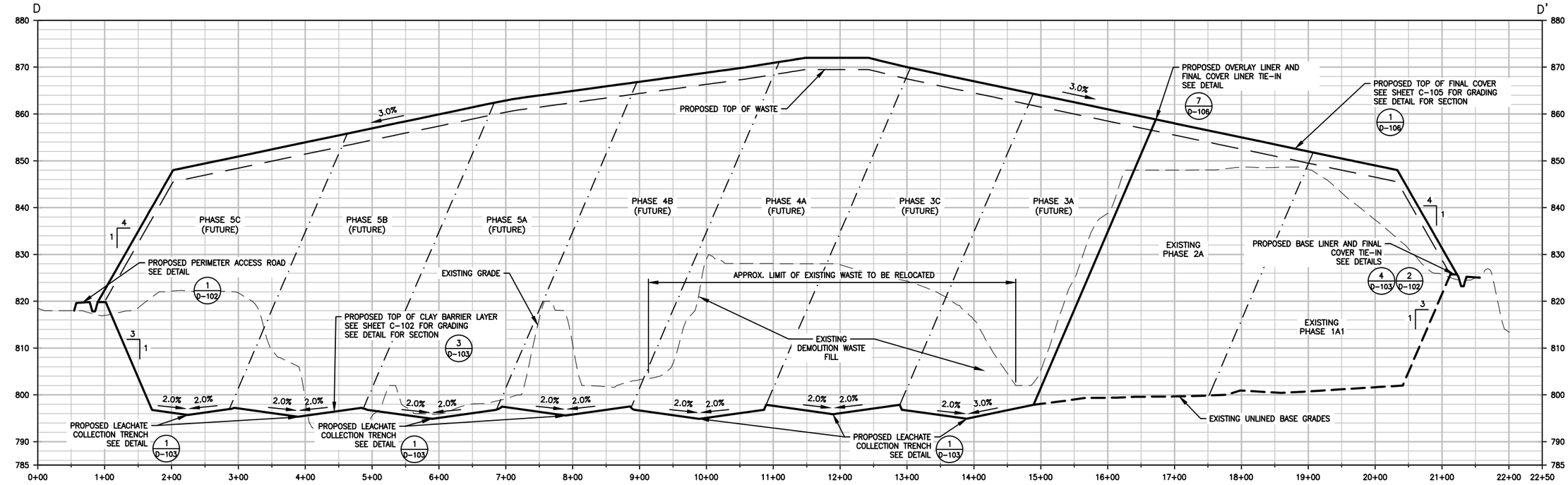
Plot Date & Time: 22 April 2026 4:30 PM





NOTE:

BASE GRADES ARE DESIGNED A MINIMUM 5-FEET ABOVE HISTORICAL HIGH GROUNDWATER ELEVATIONS.

0 80 160
GRAPHIC SCALE IN FEET

VERTICAL EXAGGERATION: 7.0X

REV	REVISION DESCRIPTION	DWN	APP	REV DATE
0	ISSUED FOR PERMIT APPLICATION	JJT	EDK	04/24/26

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SIGNATURE

DATE 04-24-2026 LICENSE # 56630

PRIME CONSULTANT

Stantec

PROJECT TITLE
2026 PERMIT REISSUANCE & MODIFICATION APPLICATION

DEM-CON PILGRIM LANDFILL, LLC.

MANKATO, MINNESOTA

SHEET TITLE
CROSS SECTIONS

DWN BY	CHK'D	APP'D	DWG DATE
JJT	BWS	EDK	APR. 2026

SCALE AS SHOWN

PROJECT NO. 227708930

SHEET NO. C-108

REV NO. 0

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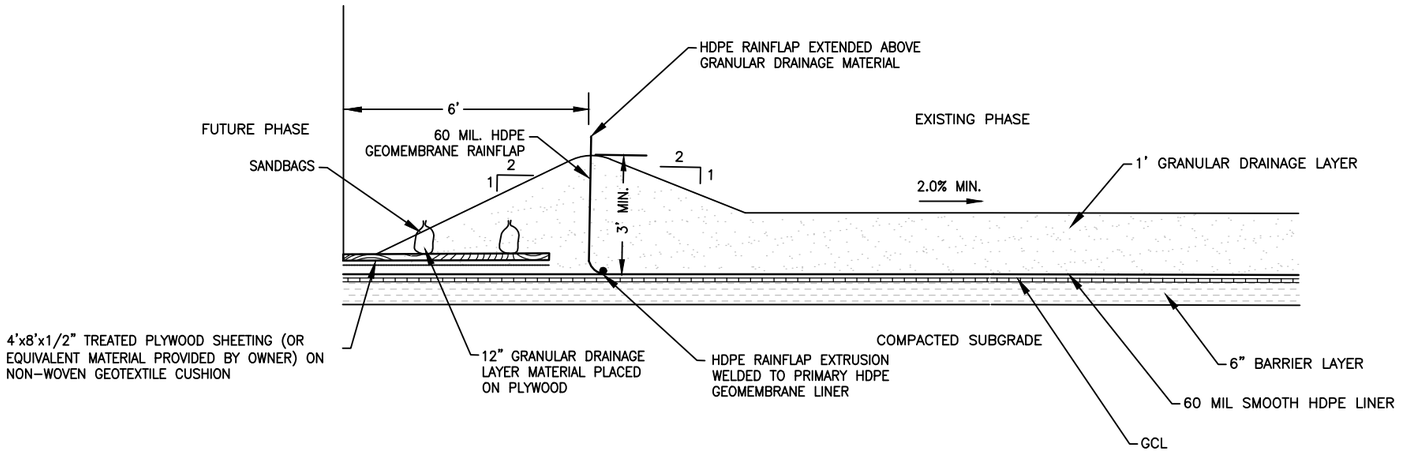
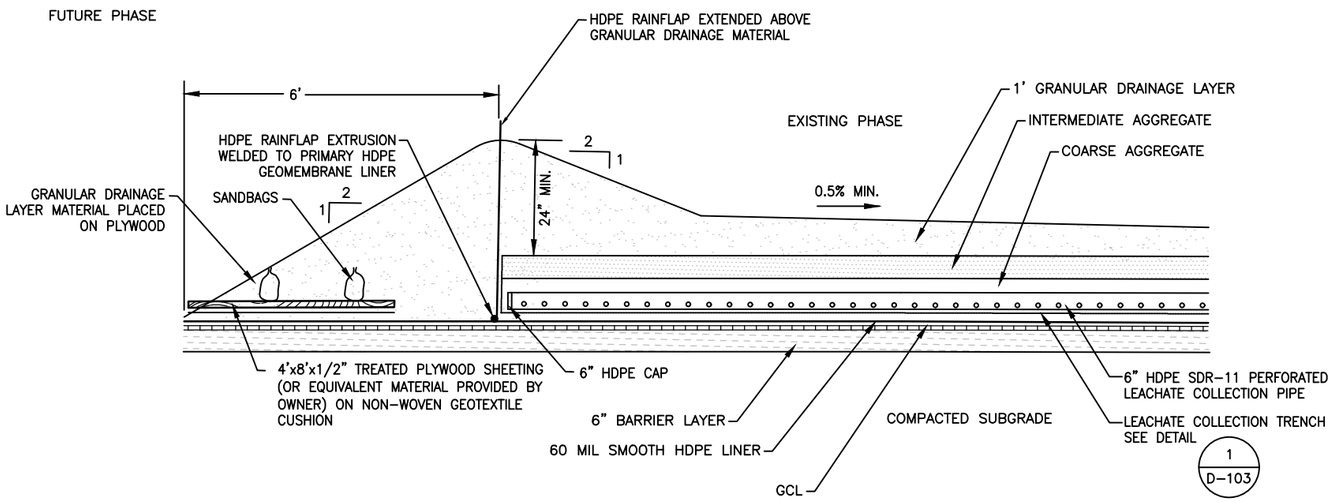
Plot Date & Time: 21 April 2026 1:37 PM



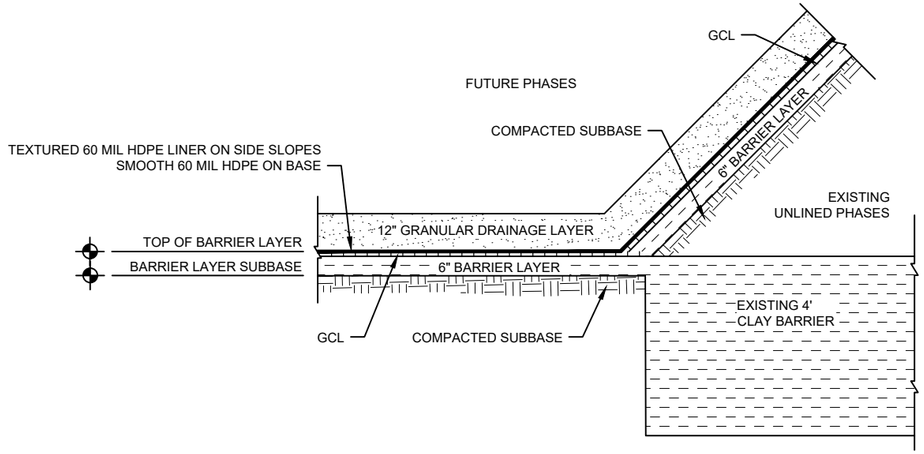
TEMPORARY PHASE DELINEATION BERM (TYPICAL) — 1 / D-101

NOT TO SCALE



TEMPORARY PHASE DELINEATION BERM AT LEACHATE HEADER TRENCH (TYPICAL) — 2 / D-101

NOT TO SCALE



PROPOSED UNLINED PHASES, LINED PHASES, AND OVERLAY LINER TIE-IN SECTION DETAIL (TYPICAL) — 3 / D-101

NOT TO SCALE

NOTE:

SIZE, TYPE, AND MATERIAL OF TYPICAL DETAILS MAY VARY AS NEEDED.

REV	REVISION DESCRIPTION	DWN	APP	REV DATE
0	ISSUED FOR PERMIT APPLICATION	JJT	EDK	04/24/26

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PRINT NAME ETHAN KETELSEN

SIGNATURE

DATE 04-24-2026 LICENSE # 56630

PRIME CONSULTANT

Stantec

PROJECT TITLE
2026 PERMIT REISSUANCE & MODIFICATION APPLICATION

DEM-CON PILGRIM LANDFILL, LLC.

MANKATO, MINNESOTA

SHEET TITLE
BASE LINER DETAILS

DWN BY	CHK'D	APP'D	DWG DATE
JJT	BWS	EDK	APR. 2026

SCALE AS SHOWN

PROJECT NO. 227708930

SHEET NO. D-101

REV NO. 0

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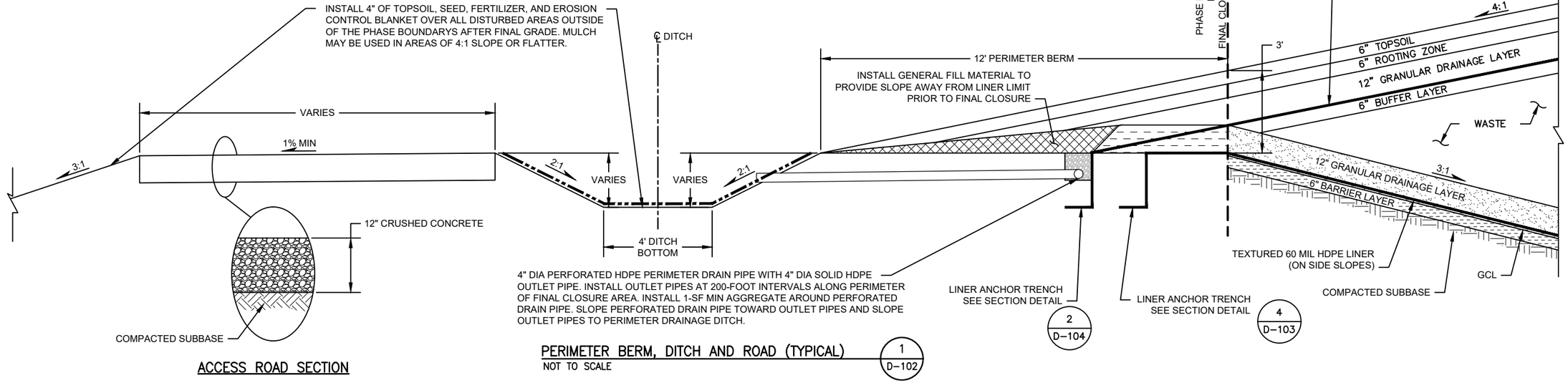
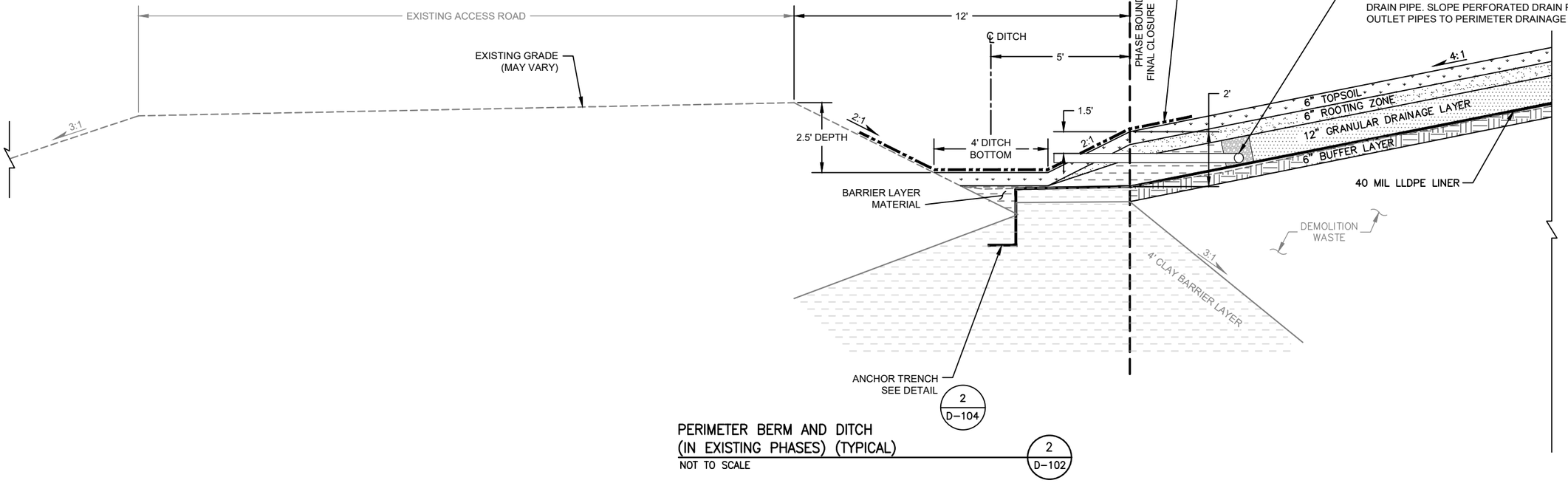
Plot Date & Time: 21 April 2026 1:37 PM



ACCESS ROAD SECTION

PERIMETER BERM, DITCH AND ROAD (TYPICAL)
NOT TO SCALE
1 D-102



PERIMETER BERM AND DITCH (IN EXISTING PHASES) (TYPICAL)
NOT TO SCALE
2 D-102

NOTE:

SIZE, TYPE, AND MATERIAL OF TYPICAL DETAILS MAY VARY AS NEEDED.

REV	REVISION DESCRIPTION	DWN	APP	REV DATE
0	ISSUED FOR PERMIT APPLICATION	JJT	EDK	04/24/26

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SIGNATURE

DATE 04-24-2026 LICENSE # 56630

PRIME CONSULTANT

Stantec

PROJECT TITLE
2026 PERMIT REISSUANCE & MODIFICATION APPLICATION

DEM-CON PILGRIM LANDFILL, LLC.

MANKATO, MINNESOTA

SHEET TITLE
PERIMETER DETAILS

DWN BY	CHK'D	APP'D	DWG DATE
JJT	BWS	EDK	APR. 2026

SCALE AS SHOWN

PROJECT NO.	SHEET NO.	REV NO.
227708930	D-102	0

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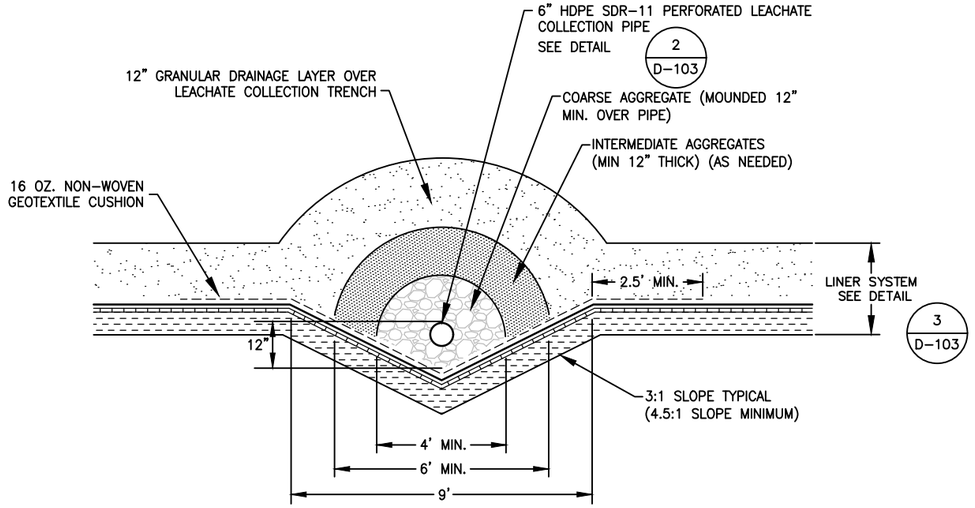
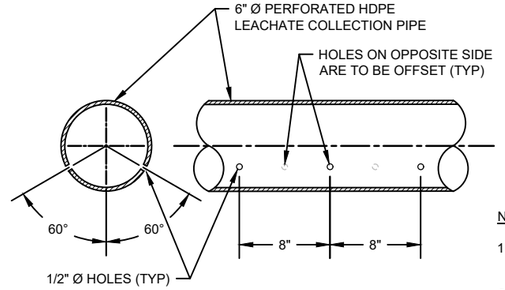
Plot Date & Time: 21 April 2026 1:37 PM



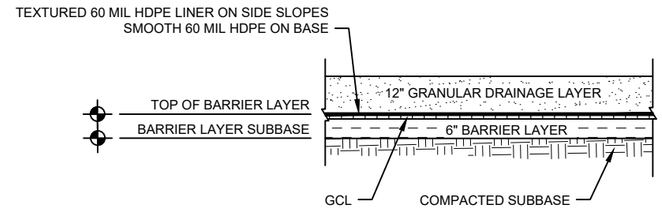
LEACHATE COLLECTION TRENCH (TYPICAL) — 1 D-103
NOT TO SCALE



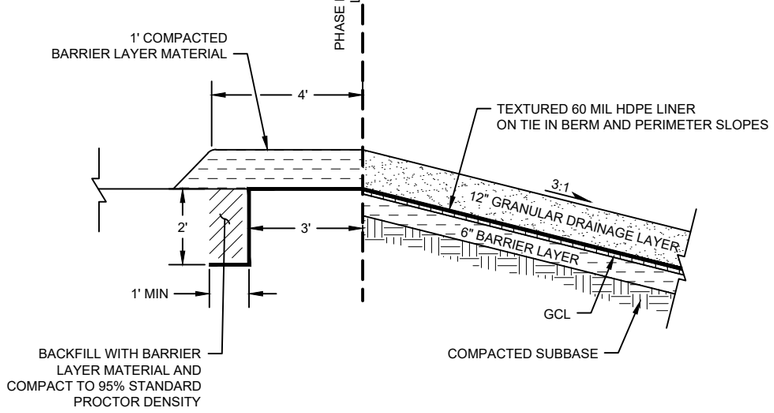
NOTES:

1. HOLES ON OPPOSITE SIDE ARE TO BE OFFSET.
2. SPACING BETWEEN HOLES TO BE 8".

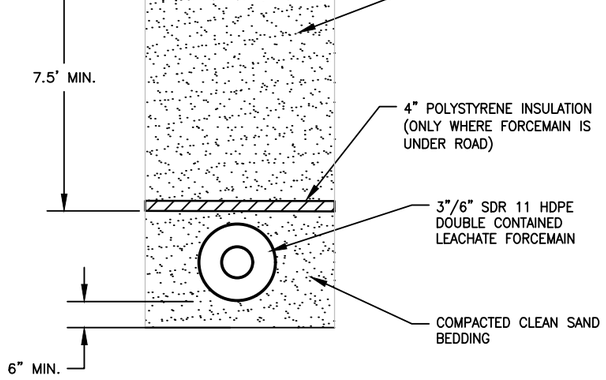
LEACHATE COLLECTION PIPE PERFORATION (TYPICAL) — 2 D-103
NOT TO SCALE



BASE LINER SYSTEM DETAIL (TYPICAL) — 3 D-103
NOT TO SCALE



BASE LINER ANCHOR TRENCH (TYPICAL) — 4 D-103
NOT TO SCALE



LEACHATE FORCEMAIN PIPE BEDDING (TYPICAL) — 5 D-103
NOT TO SCALE

NOTE:

SIZE, TYPE, AND MATERIAL OF TYPICAL DETAILS MAY VARY AS NEEDED.

REV	REVISION DESCRIPTION	DWN	APP	REV DATE
0	ISSUED FOR PERMIT APPLICATION	JJT	EDK	04/24/26

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PRINT NAME ETHAN KETELSEN

SIGNATURE

DATE 04-24-2026 LICENSE # 56630

PRIME CONSULTANT

Stantec

PROJECT TITLE
2026 PERMIT REISSUANCE & MODIFICATION APPLICATION

DEM-CON PILGRIM LANDFILL, LLC.

MANKATO, MINNESOTA

SHEET TITLE
MISCELLANEOUS DETAILS

DWN BY	CHK'D	APP'D	DWG DATE	APR. 2026
JJT	BWS	EDK	SCALE	AS SHOWN

PROJECT NO.	SHEET NO.	REV NO.
227708930	D-103	0

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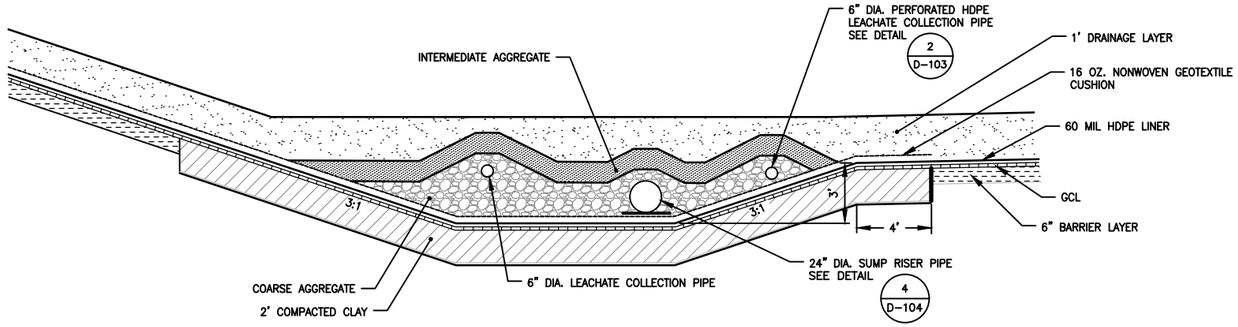
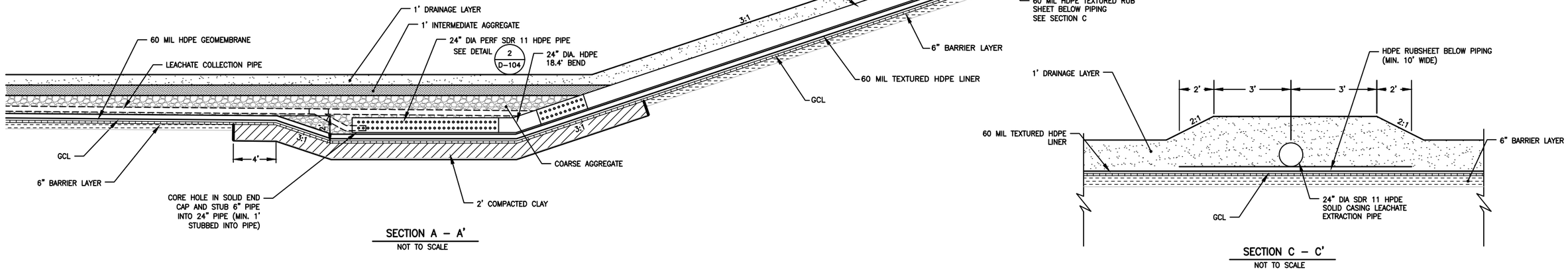
Plot Date & Time: 21 April 2026 1:37 PM



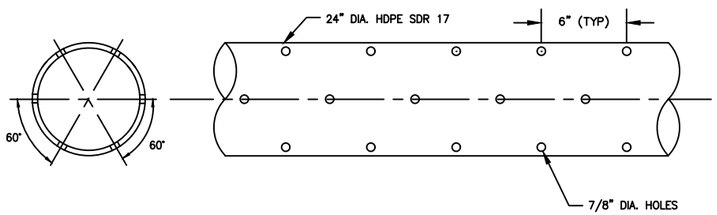
SECTION B – B'
NOT TO SCALE



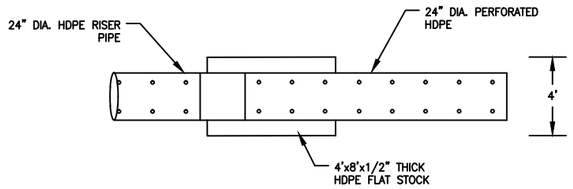
SECTION A – A'
NOT TO SCALE

SECTION C – C'
NOT TO SCALE

LEACHATE COLLECTION SUMP SECTION (TYPICAL) — 1 / D-104
NOT TO SCALE

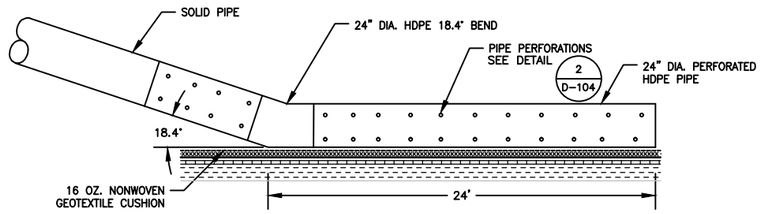


SUMP RISER PIPE PERFORATION DETAIL (TYPICAL) — 2 / D-104
NOT TO SCALE



NOTE: HDPE FLAT STOCK CORNERS TO BE ROUNDED. BOTTOM EDGES TO BE BEVELED TO CREATE A SMOOTH EDGE.

RISER PIPE BASE PLATE (TYPICAL) — 3 / D-104
NOT TO SCALE



NOTE:

SIZE, TYPE, AND MATERIAL OF TYPICAL DETAILS MAY VARY AS NEEDED.

REV	REVISION DESCRIPTION	DWN	APP	REV DATE
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DATE 04-24-2026 LICENSE # 56630

PRIME CONSULTANT

Stantec

PROJECT TITLE
2026 PERMIT REISSUANCE & MODIFICATION APPLICATION

DEM-CON PILGRIM LANDFILL, LLC.

MANKATO, MINNESOTA

SHEET TITLE
LEACHATE COLLECTION DETAILS

DWN BY	CHK'D	APP'D	DWG DATE
JJT	BWS	EDK	APR. 2026

SCALE AS SHOWN

PROJECT NO.	SHEET NO.	REV NO.
227708930	D-104	0

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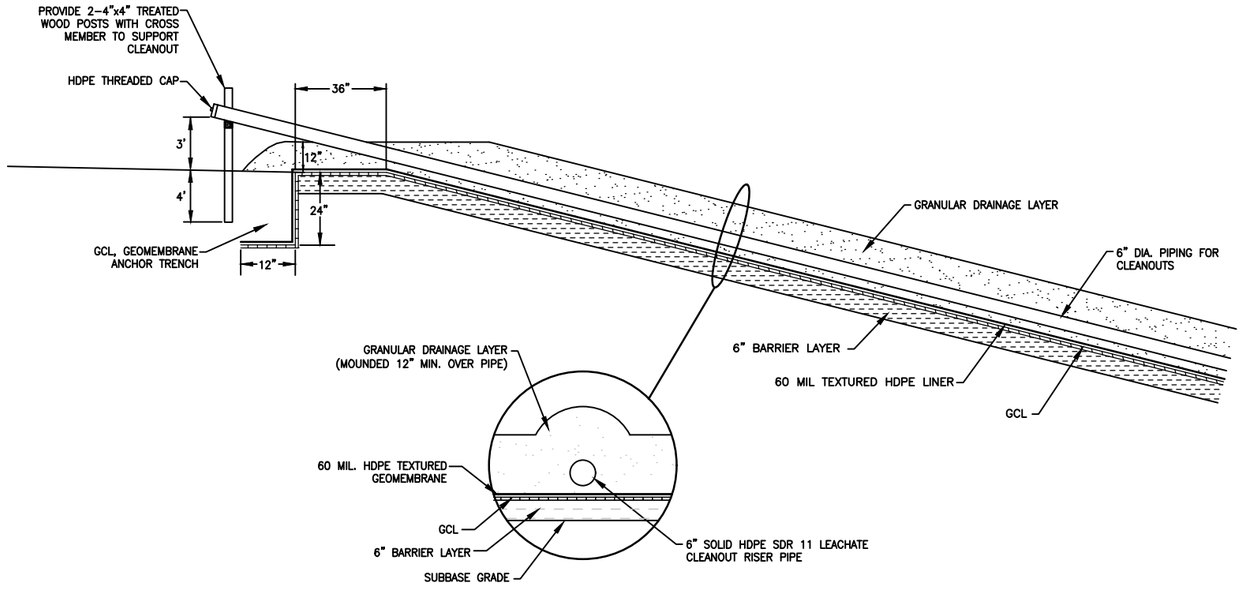
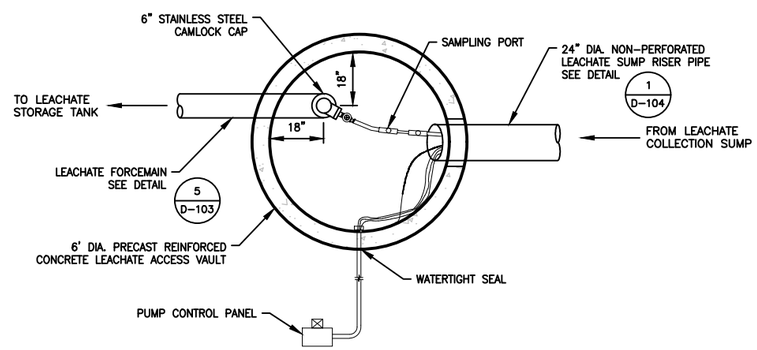
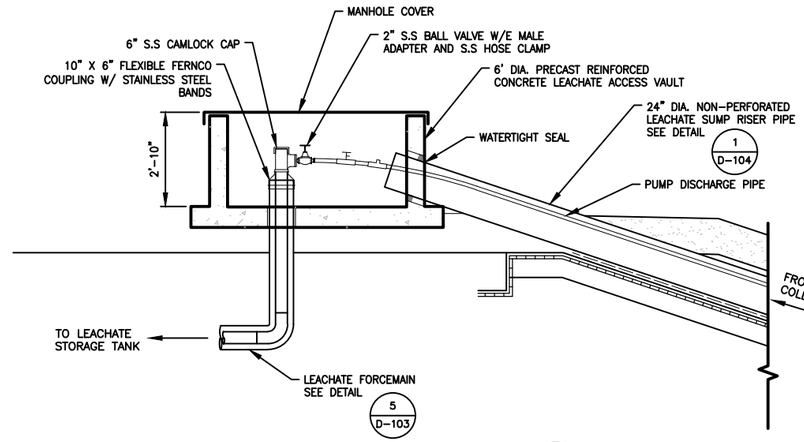
Plot Date & Time: 21 April 2026 1:37 PM



LEACHATE COLLECTION CLEANOUT (TYPICAL) — 1 / D-105
NOT TO SCALE



PLAN VIEW
NOT TO SCALE



LEACHATE FORCEMAIN MANHOLE (TYPICAL) — 2 / D-105
NOT TO SCALE

NOTE:

SIZE, TYPE, AND MATERIAL OF TYPICAL DETAILS MAY VARY AS NEEDED.

REV	REVISION DESCRIPTION	DWN	APP	REV DATE
0	ISSUED FOR PERMIT APPLICATION	JJT	EDK	04/24/26

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PRINT NAME ETHAN KETELSEN
SIGNATURE
DATE 04-24-2026 LICENSE # 56630

PRIME CONSULTANT
Stantec

PROJECT TITLE
2026 PERMIT REISSUANCE & MODIFICATION APPLICATION

DEM-CON PILGRIM LANDFILL, LLC.

MANKATO, MINNESOTA

SHEET TITLE
LEACHATE COLLECTION DETAILS

DWN BY	CHK'D	APP'D	DWG DATE
JJT	BWS	EDK	APR. 2026

SCALE AS SHOWN

PROJECT NO.	SHEET NO.	REV NO.
227708930	D-105	0

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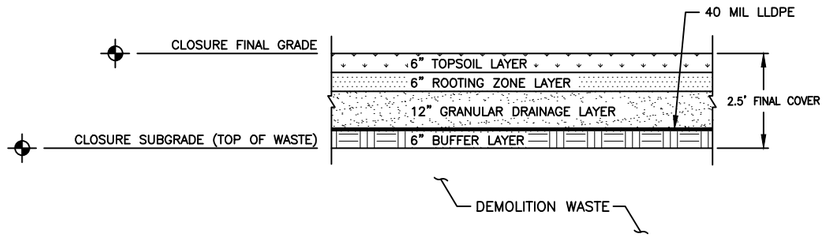
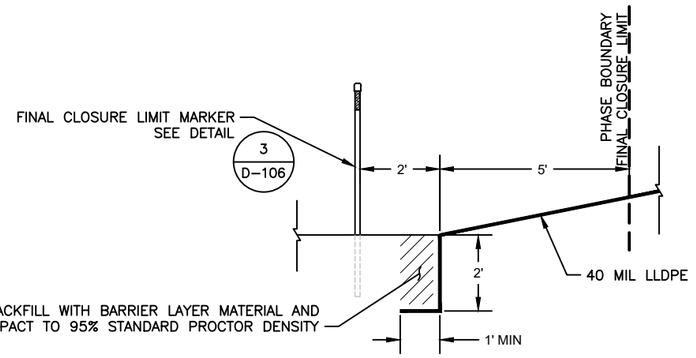
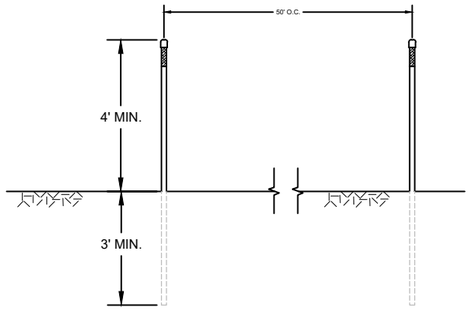
Plot Date & Time: 21 April 2026 1:37 PM



FINAL COVER LINER SYSTEM (TYPICAL) — 1 / D-106
NOT TO SCALE



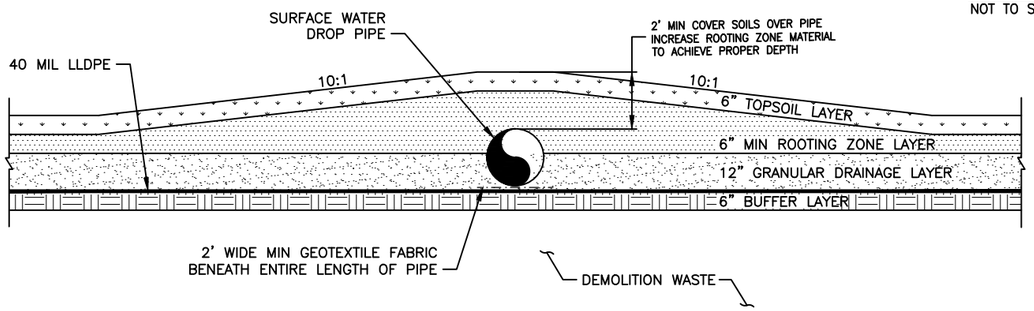
FINAL COVER LINER ANCHOR TRENCH (TYPICAL) — 2 / D-106
NOT TO SCALE



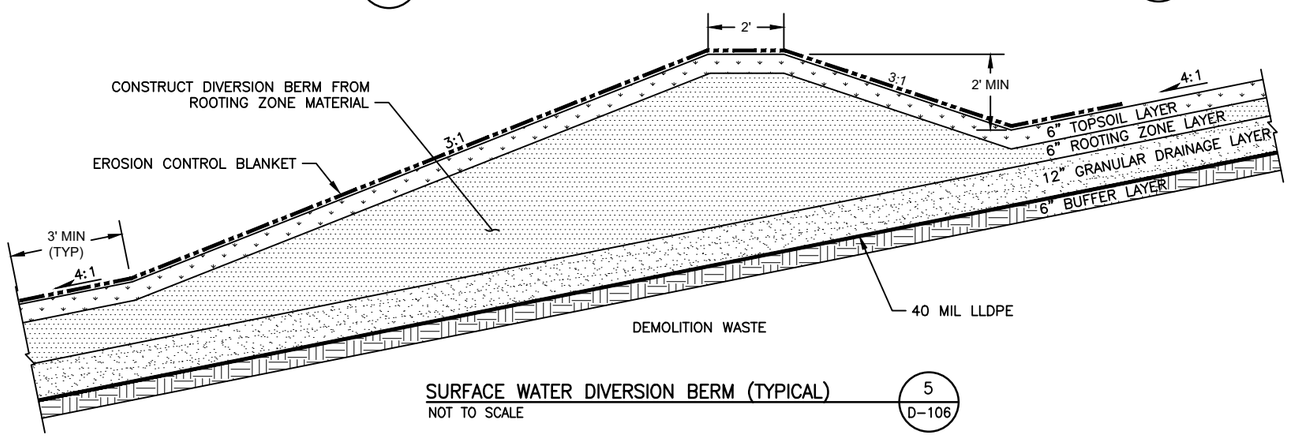
NOTES:

1. LIMITS OF LINER MARKERS PLACED AT INTERVALS OF 50-FEET ON-CENTER AND AT ALL CORNERS AROUND PERIMETER OF FINAL CLOSURE AREA.
2. MARKERS CONSTRUCTED OF 2" DIA GALVANIZED STEEL PIPE WITH CAP.
3. PLACE 6-INCH MIN HEIGHT BAND OF RED REFLECTOR TAPE NEAR THE TOP OF PIPE.
4. INSTALL LANDFILL MARKERS 2-FEET OUTSIDE LIMITS OF LINER BOUNDARY. DO NOT PENETRATE LINER. ANY DAMAGE TO THE LINER DURING INSTALLATION SHALL BE REPAIRED AT THE EXPENSE OF THE CONTRACTOR.

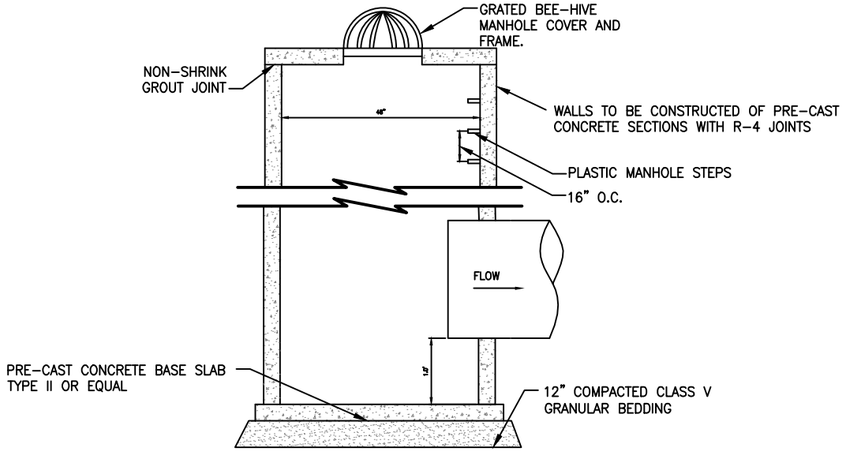
FINAL CLOSURE LIMIT MARKERS (TYPICAL) — 3 / D-106
NOT TO SCALE



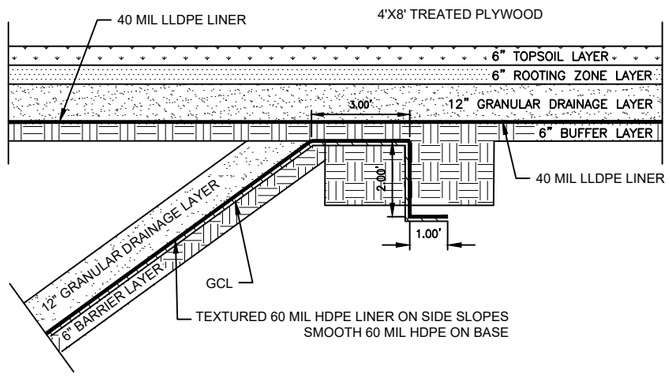
DOWN SLOPE DRAINAGE PIPE SECTION (TYPICAL) — 4 / D-106
NOT TO SCALE



SURFACE WATER DIVERSION BERM (TYPICAL) — 5 / D-106
NOT TO SCALE



STORMWATER INLET DETAIL (TYPICAL) — 6 / D-106
NOT TO SCALE



OVERLAY LINER & FINAL COVER LINER TIE-IN (TYPICAL) — 7 / D-106
NOT TO SCALE

NOTE:

SIZE, TYPE, AND MATERIAL OF TYPICAL DETAILS MAY VARY AS NEEDED.

REV	REVISION DESCRIPTION	DWN	APP	REV DATE
0	ISSUED FOR PERMIT APPLICATION	JJT	EDK	04/24/26

SEAL

I HEREBY CERTIFY THAT THIS PLAN, SPECIFICATION, OR REPORT WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA.

PRINT NAME ETHAN KETELSEN

SIGNATURE

DATE 04-24-2026 LICENSE # 56630

PRIME CONSULTANT

Stantec

PROJECT TITLE
2026 PERMIT REISSUANCE & MODIFICATION APPLICATION

DEM-CON PILGRIM LANDFILL, LLC.

MANKATO, MINNESOTA

SHEET TITLE
FINAL COVER DETAILS

DWN BY	CHK'D	APP'D	DWG DATE
JJT	BWS	EDK	APR. 2026

SCALE AS SHOWN

PROJECT NO.	SHEET NO.	REV NO.
227708930	D-106	1

I:\227708930\Working\civil\D-101_Civil Details.dwg

Appendix C HELP Model

Stantec

Memo

To:	File	From:	Kyle Morberg, PE – Stantec
File:	227708930	Date:	April 10, 2026

Re: Hydraulic Efficiency Analysis for Dem-Con Pilgrim Base Liner System and Final Cover

This memorandum was prepared to present the hydraulic efficiency of the proposed base liner and cover systems for the Dem-Con Pilgrim Landfill (facility or landfill) as presented in the construction plans and specifications provided with this Major Permit Modification request.

To evaluate the performance of the proposed liner system, Stantec performed water balance calculations to illustrate the hydraulic efficiency the profiles. The water balance was calculated using the Hydrologic Evaluation of Landfill Performance (HELP) model, Version 4.0.1, developed for the United States Environmental Protection Agency (EPA). The HELP model, although limited in its use as a quantitative model, is generally used more as a qualitative model for determining landfill performance efficiencies or in this case, the base liner and cover system efficiency. In addition, the HELP model was completed to calculate if the proposed leachate collection pipe layout would maintain less than 1-foot of head on the base liner system during operations and less than 1-foot of head on the cover system during closed conditions. Furthermore, in one area of the landfill, it is proposed to exceed the 100-foot maximum leachate drainage length on the base liner to facilitate tie-in of an overlay system. This scenario was also evaluated and compared to the maximum 1-foot of head requirement.

There were several profiles and scenarios evaluated, including:

1. Scenario 1 – Closed Conditions (3% Slope, 200-foot length) with final cover over 75-feet of waste.
    a. Cover with 6-inches of buffer soil, 40-mil LLDPE geomembrane, 12-inches of drainage layer, 6-inches of rooting zone, and 6-inches of topsoil. Good grass established.
    b. Base liner system as defined in Scenario 2.
2. Scenario 2 - Landfill Floor (2% Slope, 100-foot length), open conditions with 25-feet of waste
    a. 6-inches buffer soil, overlain by geocomposite clay liner (GCL), 60-mil HDPE geomembrane and 12-inches of drainage layer sand.
3. Scenario 3 - Landfill Floor (5% Slope, 330-foot length), open conditions with 25-feet of waste
    a. 6-inches buffer soil, overlain by GCL, 60-mil HDPE geomembrane and 12-inches of drainage layer sand.

For the open landfill, the HELP model was used to illustrate performance of the base liner system based on the minimum specification requirements for materials as well as using estimated soil and geosynthetic barrier layer parameters included within the HELP model. The simulated conditions were for one acre so that output could easily be extrapolated on a per acre basis. It was assumed that 0% of the modeled area was subject to runoff to simulate open landfill conditions. For closed conditions, 100% of the modeled area was subject to runoff.

Reference: Hydraulic Efficiency Analysis for Pilgrim Landfill

LINER SYSTEM SOIL DESCRIPTION

The base liner system is illustrated as Figure 1 while the cover system is shown as Figure 2.

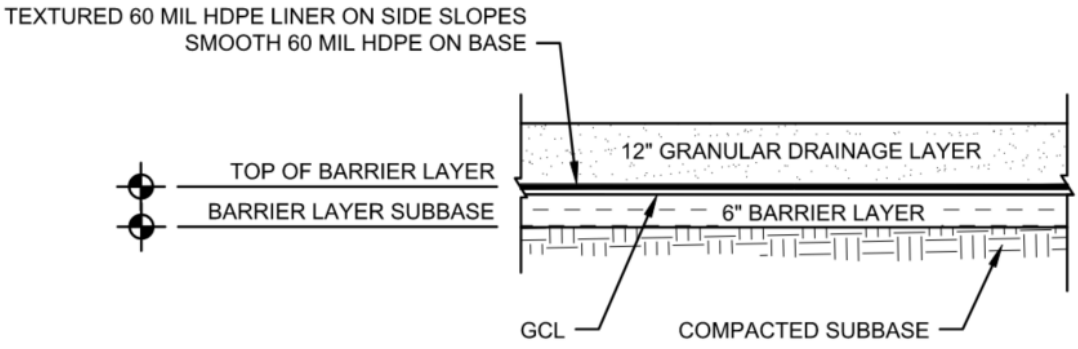


Figure 1: Base Liner System

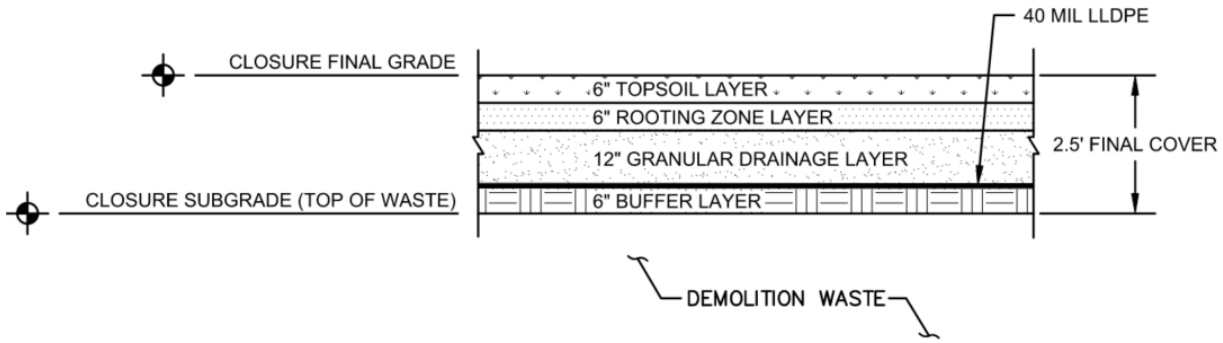


Figure 2: Cover System

HELP MODEL INPUTS

Weather and Solar Data

Synthetic climatological input values were created utilizing the Synthetic Weather Generation (WGEN) program within HELP v4.0.1. Weather parameter values used in WGEN are imported from a database of calculated weather parameters for over 13,000 points located on a 0.25 x 0.25 degree grid across the continental U.S. The program retrieves parameter values from the closest grid point in the dataset based on the latitude and longitude specified for the landfill location. For this site, a latitude of 44.13 and a longitude of 93.98 was used (located in Mankato, MN). The climatological simulation was performed over a period of 5 years. A 25-year, 24-hr storm event of 5.34-inches was manually entered to the dataset to simulate worst-case conditions.

Soil and Design

Soil types for the liner systems were selected for modeling based on review of project specifications and visual classification from field observations. The layering used in the HELP model for the assessed profiles

are shown in Table 1. Soil parameters for the granular drainage layer are assumed based on typical regional soils. Parameters for the industrial waste layer were manually entered based conditions of typical industrial waste. The GCL was assumed to have a permeability of 3 x 10^{-9} cm/sec permeability based on material specifications.

Open conditions (no final cover) were simulated assuming 25-feet of waste on top of the base liner system with 6" of daily cover soil in order to model typical conditions while the cell is in operation. Closed Conditions were modeled on the shallowest slope surface with the longest drainage length as a worst-case.

Table 1: Soil Layers Used in HELP Model

Layer number	Description	Thickness	Standard HELP Layer Soil Characteristics
Profile 1 – Closed Conditions			
1	Cover Soil	6"	Silty Clay Loam
2	Rooting Zone	6"	Sandy Loam
3	Drainage Sand	12"	Sand
4	Liner	40-mil	LLDPE Geomembrane (2 defects & pinholes /ac)
5	Buffer Soil	6"	Silty Clay Loam
6	Waste	840"	Industrial Waste
7	Drainage Sand	12"	Sand (Water collected in this layer is routed to leachate collection system)
8	Geomembrane	60-mil	HDPE (2 defects & pinholes /ac)
9	Buffer Layer	6"	Silty Clay (Moderate)
Profile 2– Open Condition, 25-feet Waste, 2% Floor Slope and 100-foot Drainage Length			
1	Buffer Soil	6"	Silty Clay Loam
2	Waste	300"	Industrial Waste
3	Drainage Sand	12"	Sand (Water collected in this layer is routed to leachate collection system)
4	Geomembrane	60-mil	HDPE (2 defects & pinholes /ac)
5	GCL	0.5"	Bentonite (Assumed 3 x 10^{-9} cm/sec permeability)
6	Buffer Layer	6"	Silty Clay (Moderate)
Profile 3 – Open Condition, 25-feet Waste, 5% Floor Slope and 330-foot Drainage Length			
1	Buffer Soil	6"	Silty Clay Loam
2	Waste	300"	Industrial Waste
3	Drainage Sand	12"	Sand (Water collected in this layer is routed to leachate collection system)
4	Geomembrane	60-mil	HDPE (2 defects & pinholes /ac)
5	GCL	0.5"	Bentonite (Assumed 3 x 10^{-9} cm/sec permeability)
6	Buffer Layer	6"	Silty Clay (Moderate)

MODEL RESULTS

The results of the HELP model simulations for each of the profiles can be found in Attachments 1-3 while Table 2 summarizes the HELP model results under average annual conditions for each scenario and profile,

while Table 3 provides a summary of peak results during a worst-case rainfall event. The percentage identified for the efficiency is based on leakage through the bottom-most liner layer, or in the case of the final cover, total efficiency of the closed landfill.

Table 2: HELP Model Outputs (Average Annual Totals)

Profile	Liner Efficiency (%)	Average Head on Base Liner (inches)	Average Head on Cover Liner (inches)
Closed Condition			
1	>99.99	<0.01	0.04
Open Condition, 2% Floor Slope, 100-foot drainage length			
2	>99.90	0.45	N/A
Open Condition, 5% Floor Slope, 330-foot drainage length			
3	>99.90	0.57	N/A

Table 3: HELP Model Outputs (Peak - 25-year, 24-hr storm event of 5.34-inches)

Profile	Maximum Head on Liner (inches)	Distance from Drain (feet)
Closed Condition		
1	0.2*	2.6
Open Condition, 2% Floor Slope, 100-foot drainage length		
2	3.25	22.2
Open Condition, 5% Floor Slope, 330-foot drainage length		
3	4.94	23.5

*Head on cover liner

SUMMARY

The proposed base liner design exceeds MPCA design standards prescribed in MN Rule 7035.2815. Note that per MN Rule 7035.2815 Subp 7.A, this expected performance also exceeds the standards for closure of an MSW disposal facility which requires rejection of 98.5% of precipitation when considering the cover and base liner system. Based on the HELP Model results for the systems described above, the actual performance of the proposed base liner system on the slope is expected to exceed this minimum value.

Furthermore, the maximum head on the base liner under average annual conditions and during a peak event while in operation is predicted to be maintained at less than 1-foot as required by the facility Solid Waste Permit. This indicates that the maximum drainage length of 100-feet on the cell floor with a 2% slope and 330-feet with a 5% slope prior to leachate entering a collection pipe is adequate. The 3% slope with a 200-foot drainage length on the cover system is also adequate to maintain less than 1-foot of head on the cover liner.

Reference: Hydraulic Efficiency Analysis for Pilgrim Landfill

ATTACHMENT 1

HELP Output Scenario 1 – Closed Conditions

HYDROLOGIC EVALUATION OF LANDFILL PERFORMANCE
HELP MODEL VERSION 4.0 BETA (2018)
DEVELOPED BY USEPA NATIONAL RISK MANAGEMENT RESEARCH LABORATORY

Title: Pilgrim Landfill **Simulated On:** 4/10/2026 14:13

Layer 1

Type 1 - Vertical Percolation Layer (Cover Soil)
SiCL - Silty Clay Loam (Moderate)
Material Texture Number 26

Thickness	=	6	inches
Porosity	=	0.445	vol/vol
Field Capacity	=	0.393	vol/vol
Wilting Point	=	0.277	vol/vol
Initial Soil Water Content	=	0.3186	vol/vol
Effective Sat. Hyd. Conductivity	=	1.90E-06	cm/sec

Layer 2

Type 1 - Vertical Percolation Layer
SL - Sandy Loam
Material Texture Number 6

Thickness	=	6	inches
Porosity	=	0.453	vol/vol
Field Capacity	=	0.19	vol/vol
Wilting Point	=	0.085	vol/vol
Initial Soil Water Content	=	0.085	vol/vol
Effective Sat. Hyd. Conductivity	=	7.20E-04	cm/sec

Layer 3

Type 2 - Lateral Drainage Layer
S - Sand
Material Texture Number 2

Thickness	=	12	inches
Porosity	=	0.437	vol/vol
Field Capacity	=	0.062	vol/vol
Wilting Point	=	0.024	vol/vol
Initial Soil Water Content	=	0.0433	vol/vol
Effective Sat. Hyd. Conductivity	=	5.80E-03	cm/sec
Slope	=	3	%
Drainage Length	=	200	ft

Layer 4

Type 4 - Flexible Membrane Liner

LDPE Membrane

Material Texture Number 36

Thickness	=	0.04	inches
Effective Sat. Hyd. Conductivity	=	4.00E-13	cm/sec
FML Pinhole Density	=	2	Holes/Acre
FML Installation Defects	=	2	Holes/Acre
FML Placement Quality	=	3	Good

Layer 5

Type 1 - Vertical Percolation Layer

SL - Sandy Loam

Material Texture Number 6

Thickness	=	6	inches
Porosity	=	0.453	vol/vol
Field Capacity	=	0.19	vol/vol
Wilting Point	=	0.085	vol/vol
Initial Soil Water Content	=	0.19	vol/vol
Effective Sat. Hyd. Conductivity	=	7.20E-04	cm/sec

Layer 6

Type 1 - Vertical Percolation Layer (Waste)

Industrial Waste

Material Texture Number 83

Thickness	=	840	inches
Porosity	=	0.578	vol/vol
Field Capacity	=	0.076	vol/vol
Wilting Point	=	0.025	vol/vol
Initial Soil Water Content	=	0.076	vol/vol
Effective Sat. Hyd. Conductivity	=	4.10E-03	cm/sec

Layer 7

Type 2 - Lateral Drainage Layer

S - Sand

Material Texture Number 2

Thickness	=	12	inches
Porosity	=	0.437	vol/vol
Field Capacity	=	0.062	vol/vol
Wilting Point	=	0.024	vol/vol
Initial Soil Water Content	=	0.062	vol/vol
Effective Sat. Hyd. Conductivity	=	5.80E-03	cm/sec
Slope	=	2	%
Drainage Length	=	100	ft

Layer 8

Type 4 - Flexible Membrane Liner

HDPE Membrane
Material Texture Number 35

Thickness	=	0.06	inches
Effective Sat. Hyd. Conductivity	=	2.00E-13	cm/sec
FML Pinhole Density	=	2	Holes/Acre
FML Installation Defects	=	2	Holes/Acre
FML Placement Quality	=	3	Good

Layer 9
Type 3 - Barrier Soil Liner
Bentonite (High)
Material Texture Number 17

Thickness	=	0.5	inches
Porosity	=	0.75	vol/vol
Field Capacity	=	0.747	vol/vol
Wilting Point	=	0.4	vol/vol
Initial Soil Water Content	=	0.75	vol/vol
Effective Sat. Hyd. Conductivity	=	3.00E-09	cm/sec

Layer 10
Type 1 - Vertical Percolation Layer
SiC - Silty Clay (Moderate)
Material Texture Number 28

Thickness	=	6	inches
Porosity	=	0.452	vol/vol
Field Capacity	=	0.411	vol/vol
Wilting Point	=	0.311	vol/vol
Initial Soil Water Content	=	0.3697	vol/vol
Effective Sat. Hyd. Conductivity	=	1.20E-06	cm/sec

Note: Initial moisture content of the layers and snow water were computed as nearly steady-state values by HELP.

General Design and Evaporative Zone Data

SCS Runoff Curve Number	=	87.2	
Fraction of Area Allowing Runoff	=	100	%
Area projected on a horizontal plane	=	1	acres
Evaporative Zone Depth	=	18	inches
Initial Water in Evaporative Zone	=	2.565	inches
Upper Limit of Evaporative Storage	=	8.01	inches
Lower Limit of Evaporative Storage	=	2.316	inches
Initial Snow Water	=	0	inches
Initial Water in Layer Materials	=	71.272	inches
Total Initial Water	=	71.272	inches

Total Subsurface Inflow	=	0	inches/year

Note: SCS Runoff Curve Number was calculated by HELP.

Evapotranspiration and Weather Data

Station Latitude	=	44.13	Degrees
Maximum Leaf Area Index	=	1	
Start of Growing Season (Julian Date)	=	124	days
End of Growing Season (Julian Date)	=	182	days
Average Wind Speed	=	11	mph
Average 1st Quarter Relative Humidity	=	65	%
Average 2nd Quarter Relative Humidity	=	65	%
Average 3rd Quarter Relative Humidity	=	62	%
Average 4th Quarter Relative Humidity	=	65	%

Note: Evapotranspiration data was obtained for Mankato, Minnesota

Normal Mean Monthly Precipitation (inches)

Jan/Jul	Feb/Aug	Mar/Sep	Apr/Oct	May/Nov	Jun/Dec
0.683107	0.60023	1.856155	3.092133	3.787518	6.501913
5.935874	3.191535	2.613059	1.132846	1.140449	1.223736

Note: Precipitation was simulated based on HELP V4 weather simulation for:
Lat/Long: 44.13/-93.98

Normal Mean Monthly Temperature (Degrees Fahrenheit)

Jan/Jul	Feb/Aug	Mar/Sep	Apr/Oct	May/Nov	Jun/Dec
20.6	20.2	36	56.7	62.8	76.6
82.4	78.5	81.4	49.6	38.6	32.4

Note: Temperature was simulated based on HELP V4 weather simulation for:
Lat/Long: 44.13/-93.98
Solar radiation was simulated based on HELP V4 weather simulation for:
Lat/Long: 44.13/-93.98

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Daily Output for Year 1

Column key: Head #1: drainage from Layer 4 | Head #2: drainage from Layer 8
Drain #1: drainage from Layer 3 | Drain #2: drainage from Layer 7
Leak #1: leakage thru Layer 4 | Leak #2: leakage thru Layer 9 | Leak #3: leakage thru Layer 10

Title: Pilgrim Landfill
Simulated On: 4/10/2026 14:14

Day	Freezing Status*		Rain	Runoff	ET	Evap. Zone Water	Head #1	Drain #1	Leak #1	Head #2	Drain #2	Leak #2	Head #3	Drain #3	Leak #3
	Air	Soil	(inches)	(inches)	(inches)	(in/in)	(inches)	(inches)	(inches)	(inches)	(inches)	(inches)	(inches)	(inches)	(inches)
1	*	*	0.00	0.000	0.004	0.1425	0.0109	0.0001	2.46E-05	0.0003	0.0000	6.90E-09	0.0000	0.0000	1.96E-04
2	*	*	0.00	0.000	0.000	0.1425	0.0107	0.0001	2.42E-05	0.0003	0.0000	6.91E-09	0.0000	0.0000	1.95E-04
3	*	*	0.00	0.000	0.000	0.1425	0.0105	0.0001	2.39E-05	0.0004	0.0000	6.91E-09	0.0000	0.0000	1.95E-04
4	*	*	0.00	0.000	0.000	0.1425	0.0103	0.0001	2.35E-05	0.0004	0.0000	6.92E-09	0.0000	0.0000	1.94E-04
5	*	*	0.00	0.000	0.000	0.1425	0.0101	0.0000	2.32E-05	0.0004	0.0000	6.93E-09	0.0000	0.0000	1.94E-04
6	*	*	0.00	0.000	0.000	0.1425	0.0099	0.0000	2.28E-05	0.0004	0.0000	6.93E-09	0.0000	0.0000	1.93E-04
7	*	*	0.00	0.000	0.000	0.1425	0.0097	0.0000	2.25E-05	0.0005	0.0000	6.94E-09	0.0000	0.0000	1.93E-04
8	*	*	0.00	0.000	0.000	0.1425	0.0095	0.0000	2.22E-05	0.0005	0.0000	6.95E-09	0.0000	0.0000	1.92E-04
9	*	*	0.13	0.000	0.003	0.1425	0.0093	0.0000	2.18E-05	0.0005	0.0000	6.95E-09	0.0000	0.0000	1.92E-04
10	*	*	0.01	0.000	0.006	0.1425	0.0091	0.0000	2.15E-05	0.0005	0.0000	6.96E-09	0.0000	0.0000	1.91E-04
11	*	*	0.03	0.000	0.003	0.1425	0.0090	0.0000	2.12E-05	0.0006	0.0000	6.97E-09	0.0000	0.0000	1.91E-04
12	*	*	0.00	0.000	0.005	0.1425	0.0088	0.0000	2.09E-05	0.0006	0.0000	6.97E-09	0.0000	0.0000	1.90E-04
13	*	*	0.00	0.000	0.026	0.1425	0.0086	0.0000	2.06E-05	0.0006	0.0000	6.98E-09	0.0000	0.0000	1.90E-04
14	*	*	0.00	0.000	0.034	0.1425	0.0085	0.0000	2.03E-05	0.0006	0.0000	6.99E-09	0.0000	0.0000	1.89E-04
15	*	*	0.00	0.000	0.016	0.1425	0.0083	0.0000	2.00E-05	0.0007	0.0000	7.00E-09	0.0000	0.0000	1.89E-04
16	*	*	0.00	0.000	0.008	0.1425	0.0081	0.0000	1.97E-05	0.0007	0.0000	7.00E-09	0.0000	0.0000	1.88E-04
17	*	*	0.00	0.000	0.004	0.1425	0.0080	0.0000	1.94E-05	0.0007	0.0000	7.01E-09	0.0000	0.0000	1.88E-04
18	*	*	0.00	0.000	0.003	0.1425	0.0078	0.0000	1.91E-05	0.0008	0.0000	7.02E-09	0.0000	0.0000	1.87E-04
19	*	*	0.00	0.000	0.004	0.1425	0.0077	0.0000	1.88E-05	0.0008	0.0000	7.02E-09	0.0000	0.0000	1.87E-04
20	*	*	0.00	0.000	0.023	0.1425	0.0075	0.0000	1.85E-05	0.0008	0.0000	7.03E-09	0.0000	0.0000	1.86E-04
21	*	*	0.00	0.000	0.009	0.1425	0.0074	0.0000	1.83E-05	0.0008	0.0000	7.04E-09	0.0000	0.0000	1.86E-04
22	*	*	0.06	0.000	0.019	0.1425	0.0072	0.0000	1.80E-05	0.0009	0.0000	7.04E-09	0.0000	0.0000	1.85E-04
23	*	*	0.03	0.000	0.020	0.1425	0.0071	0.0000	1.77E-05	0.0009	0.0000	7.05E-09	0.0000	0.0000	1.85E-04
24	*	*	0.02	0.000	0.000	0.1425	0.0069	0.0000	1.75E-05	0.0009	0.0000	7.05E-09	0.0000	0.0000	1.84E-04
25	*	*	0.00	0.000	0.025	0.1425	0.0068	0.0000	1.72E-05	0.0009	0.0000	7.06E-09	0.0000	0.0000	1.84E-04
26	*	*	0.00	0.000	0.023	0.1425	0.0067	0.0000	1.69E-05	0.0009	0.0000	7.06E-09	0.0000	0.0000	1.83E-04
27	*	*	0.13	0.000	0.022	0.1425	0.0065	0.0000	1.67E-05	0.0009	0.0000	7.07E-09	0.0000	0.0000	1.83E-04
28	*	*	0.02	0.000	0.010	0.1425	0.0064	0.0000	1.64E-05	0.0010	0.0000	7.07E-09	0.0000	0.0000	1.83E-04
29	*	*	0.00	0.000	0.020	0.1425	0.0063	0.0000	1.62E-05	0.0010	0.0000	7.07E-09	0.0000	0.0000	1.82E-04
30	*	*	0.00	0.000	0.018	0.1425	0.0062	0.0000	1.59E-05	0.0010	0.0000	7.08E-09	0.0000	0.0000	1.82E-04

31	*	*	0.05	0.000	0.000	0.1425	0.0060	0.0000	1.57E-05	0.0010	0.0000	7.08E-09	0.0000	0.0000	1.81E-04
32	*	*	0.00	0.000	0.013	0.1425	0.0059	0.0000	1.55E-05	0.0010	0.0000	7.08E-09	0.0000	0.0000	1.81E-04
33	*	*	0.00	0.000	0.024	0.1425	0.0058	0.0000	1.52E-05	0.0010	0.0000	7.09E-09	0.0000	0.0000	1.80E-04
34		*	0.00	0.005	0.045	0.1474	0.0057	0.0000	1.50E-05	0.0010	0.0000	7.09E-09	0.0000	0.0000	1.80E-04
35		*	0.00	0.000	0.000	0.1474	0.0056	0.0000	1.48E-05	0.0011	0.0000	7.09E-09	0.0000	0.0000	1.79E-04
36	*	*	0.00	0.000	0.000	0.1474	0.0055	0.0000	1.45E-05	0.0011	0.0000	7.09E-09	0.0000	0.0000	1.79E-04
37	*	*	0.01	0.000	0.014	0.1474	0.0053	0.0000	1.43E-05	0.0011	0.0000	7.10E-09	0.0000	0.0000	1.78E-04
38		*	0.00	0.000	0.000	0.1474	0.0052	0.0000	1.41E-05	0.0011	0.0000	7.10E-09	0.0000	0.0000	1.78E-04
39		*	0.00	0.000	0.000	0.1474	0.0051	0.0000	1.39E-05	0.0011	0.0000	7.10E-09	0.0000	0.0000	1.78E-04
40		*	0.00	0.000	0.000	0.1474	0.0050	0.0000	1.37E-05	0.0011	0.0000	7.10E-09	0.0000	0.0000	1.77E-04
41	*	*	0.00	0.000	0.000	0.1474	0.0049	0.0000	1.35E-05	0.0011	0.0000	7.10E-09	0.0000	0.0000	1.77E-04
42	*	*	0.00	0.000	0.000	0.1474	0.0048	0.0000	1.32E-05	0.0011	0.0000	7.10E-09	0.0000	0.0000	1.76E-04
43		*	0.00	0.000	0.000	0.1474	0.0047	0.0000	1.30E-05	0.0011	0.0000	7.10E-09	0.0000	0.0000	1.76E-04
44	*	*	0.00	0.000	0.000	0.1474	0.0046	0.0000	1.28E-05	0.0011	0.0000	7.10E-09	0.0000	0.0000	1.75E-04
45	*	*	0.00	0.000	0.000	0.1474	0.0045	0.0000	1.26E-05	0.0011	0.0000	7.11E-09	0.0000	0.0000	1.75E-04
46	*	*	0.00	0.000	0.000	0.1474	0.0044	0.0000	1.24E-05	0.0011	0.0000	7.11E-09	0.0000	0.0000	1.74E-04
47	*	*	0.00	0.000	0.000	0.1474	0.0044	0.0000	1.23E-05	0.0011	0.0000	7.11E-09	0.0000	0.0000	1.74E-04
48	*	*	0.00	0.000	0.000	0.1474	0.0043	0.0000	1.21E-05	0.0011	0.0000	7.11E-09	0.0000	0.0000	1.74E-04
49	*	*	0.00	0.000	0.000	0.1474	0.0042	0.0000	1.19E-05	0.0011	0.0000	7.11E-09	0.0000	0.0000	1.73E-04
50	*	*	0.00	0.000	0.000	0.1474	0.0041	0.0000	1.17E-05	0.0011	0.0000	7.11E-09	0.0000	0.0000	1.73E-04
51		*	0.00	0.000	0.000	0.1474	0.0040	0.0000	1.15E-05	0.0011	0.0000	7.11E-09	0.0000	0.0000	1.72E-04
52		*	0.00	0.000	0.000	0.1474	0.0039	0.0000	1.13E-05	0.0011	0.0000	7.11E-09	0.0000	0.0000	1.72E-04
53		*	0.17	0.166	0.003	0.1474	0.0038	0.0000	1.11E-05	0.0011	0.0000	7.11E-09	0.0000	0.0000	1.72E-04
54		*	0.00	0.000	0.000	0.1474	0.0038	0.0000	1.10E-05	0.0011	0.0000	7.11E-09	0.0000	0.0000	1.71E-04
55		*	0.00	0.000	0.000	0.1474	0.0037	0.0000	1.08E-05	0.0011	0.0000	7.11E-09	0.0000	0.0000	1.71E-04
56		*	0.00	0.000	0.000	0.1474	0.0036	0.0000	1.06E-05	0.0011	0.0000	7.11E-09	0.0000	0.0000	1.70E-04
57		*	0.00	0.000	0.002	0.1475	0.0035	0.0000	1.05E-05	0.0011	0.0000	7.11E-09	0.0000	0.0000	1.70E-04
58		*	0.00	0.000	0.000	0.1475	0.0035	0.0000	1.03E-05	0.0011	0.0000	7.10E-09	0.0000	0.0000	1.70E-04
59	*	*	0.10	0.000	0.056	0.1475	0.0034	0.0000	1.01E-05	0.0011	0.0000	7.10E-09	0.0000	0.0000	1.69E-04
60		*	0.00	0.000	0.047	0.1475	0.0033	0.0000	9.96E-06	0.0011	0.0000	7.10E-09	0.0000	0.0000	1.69E-04
61	*	*	0.00	0.000	0.005	0.1475	0.0032	0.0000	9.80E-06	0.0011	0.0000	7.10E-09	0.0000	0.0000	1.68E-04
62		*	0.45	0.447	0.003	0.1475	0.0032	0.0000	9.65E-06	0.0011	0.0000	7.10E-09	0.0000	0.0000	1.68E-04
63	*	*	0.00	0.000	0.000	0.1475	0.0031	0.0000	9.49E-06	0.0011	0.0000	7.10E-09	0.0000	0.0000	1.68E-04
64	*	*	0.00	0.000	0.004	0.1475	0.0030	0.0000	9.34E-06	0.0011	0.0000	7.10E-09	0.0000	0.0000	1.67E-04
65	*	*	0.02	0.000	0.007	0.1475	0.0030	0.0000	9.19E-06	0.0011	0.0000	7.10E-09	0.0000	0.0000	1.67E-04
66	*	*	0.17	0.000	0.006	0.1475	0.0029	0.0000	9.04E-06	0.0011	0.0000	7.10E-09	0.0000	0.0000	1.66E-04
67	*	*	0.00	0.000	0.046	0.1475	0.0029	0.0000	8.90E-06	0.0011	0.0000	7.09E-09	0.0000	0.0000	1.66E-04
68	*	*	0.01	0.000	0.010	0.1475	0.0028	0.0000	8.75E-06	0.0011	0.0000	7.09E-09	0.0000	0.0000	1.66E-04

69	*	*	0.00	0.000	0.030	0.1475	0.0027	0.0000	8.61E-06	0.0011	0.0000	7.09E-09	0.0000	0.0000	1.65E-04
70		*	0.00	0.000	0.096	0.1475	0.0027	0.0000	8.47E-06	0.0010	0.0000	7.09E-09	0.0000	0.0000	1.65E-04
71		*	0.00	0.000	0.000	0.1475	0.0026	0.0000	8.33E-06	0.0010	0.0000	7.09E-09	0.0000	0.0000	1.64E-04
72	*	*	0.00	0.000	0.000	0.1475	0.0026	0.0000	8.20E-06	0.0010	0.0000	7.09E-09	0.0000	0.0000	1.64E-04
73	*	*	0.00	0.000	0.000	0.1475	0.0025	0.0000	8.06E-06	0.0010	0.0000	7.08E-09	0.0000	0.0000	1.64E-04
74	*	*	0.00	0.000	0.000	0.1475	0.0025	0.0000	7.93E-06	0.0010	0.0000	7.08E-09	0.0000	0.0000	1.63E-04
75	*	*	0.00	0.000	0.000	0.1475	0.0024	0.0000	7.80E-06	0.0010	0.0000	7.08E-09	0.0000	0.0000	1.63E-04
76	*	*	0.00	0.000	0.000	0.1475	0.0024	0.0000	7.67E-06	0.0010	0.0000	7.08E-09	0.0000	0.0000	1.63E-04
77	*	*	0.00	0.000	0.000	0.1475	0.0023	0.0000	7.54E-06	0.0010	0.0000	7.08E-09	0.0000	0.0000	1.62E-04
78	*	*	0.00	0.000	0.000	0.1475	0.0023	0.0000	7.42E-06	0.0010	0.0000	7.07E-09	0.0000	0.0000	1.62E-04
79	*	*	0.00	0.000	0.000	0.1475	0.0022	0.0000	7.30E-06	0.0010	0.0000	7.07E-09	0.0000	0.0000	1.61E-04
80	*	*	0.07	0.000	0.008	0.1475	0.0022	0.0000	7.18E-06	0.0010	0.0000	7.07E-09	0.0000	0.0000	1.61E-04
81		*	0.00	0.000	0.062	0.1475	0.0021	0.0000	7.06E-06	0.0010	0.0000	7.07E-09	0.0000	0.0000	1.61E-04
82	*	*	0.00	0.000	0.000	0.1475	0.0021	0.0000	6.94E-06	0.0009	0.0000	7.07E-09	0.0000	0.0000	1.60E-04
83	*	*	0.00	0.000	0.000	0.1475	0.0020	0.0000	6.82E-06	0.0009	0.0000	7.06E-09	0.0000	0.0000	1.60E-04
84		*	0.00	0.000	0.000	0.1475	0.0020	0.0000	6.71E-06	0.0009	0.0000	7.06E-09	0.0000	0.0000	1.60E-04
85		*	0.00	0.000	0.000	0.1475	0.0019	0.0000	6.60E-06	0.0009	0.0000	7.06E-09	0.0000	0.0000	1.59E-04
86		*	0.00	0.000	0.000	0.1475	0.0019	0.0000	6.48E-06	0.0009	0.0000	7.06E-09	0.0000	0.0000	1.59E-04
87		*	0.00	0.000	0.000	0.1475	0.0018	0.0000	6.38E-06	0.0009	0.0000	7.05E-09	0.0000	0.0000	1.59E-04
88		*	0.00	0.000	0.000	0.1475	0.0018	0.0000	6.27E-06	0.0009	0.0000	7.05E-09	0.0000	0.0000	1.58E-04
89		*	0.00	0.000	0.000	0.1475	0.0018	0.0000	6.16E-06	0.0009	0.0000	7.05E-09	0.0000	0.0000	1.58E-04
90		*	0.00	0.000	0.000	0.1475	0.0017	0.0000	6.06E-06	0.0009	0.0000	7.05E-09	0.0000	0.0000	1.57E-04
91		*	0.00	0.000	0.000	0.1475	0.0017	0.0000	5.95E-06	0.0009	0.0000	7.04E-09	0.0000	0.0000	1.57E-04
92		*	0.00	0.000	0.000	0.1475	0.0016	0.0000	5.85E-06	0.0009	0.0000	7.04E-09	0.0000	0.0000	1.57E-04
93		*	0.41	0.405	0.003	0.1475	0.0016	0.0000	5.75E-06	0.0008	0.0000	7.04E-09	0.0000	0.0000	1.56E-04
94		*	0.11	0.002	0.003	0.1530	0.0016	0.0000	5.65E-06	0.0008	0.0000	7.04E-09	0.0000	0.0000	1.56E-04
95		*	0.00	0.000	0.000	0.1530	0.0015	0.0000	5.56E-06	0.0008	0.0000	7.03E-09	0.0000	0.0000	1.56E-04
96		*	0.04	0.000	0.003	0.1549	0.0015	0.0000	5.46E-06	0.0008	0.0000	7.03E-09	0.0000	0.0000	1.55E-04
97			0.21	0.078	0.083	0.1577	0.0015	0.0000	5.37E-06	0.0008	0.0000	7.03E-09	0.0000	0.0000	1.55E-04
98			0.34	0.123	0.187	0.1593	0.0014	0.0000	5.28E-06	0.0008	0.0000	7.03E-09	0.0000	0.0000	1.55E-04
99			0.00	0.000	0.236	0.1462	0.0014	0.0000	5.18E-06	0.0008	0.0000	7.02E-09	0.0000	0.0000	1.54E-04
100			0.00	0.000	0.203	0.1349	0.0014	0.0000	5.09E-06	0.0008	0.0000	7.02E-09	0.0000	0.0000	1.54E-04
101			0.00	0.000	0.089	0.1300	0.0013	0.0000	5.01E-06	0.0008	0.0000	7.02E-09	0.0000	0.0000	1.54E-04
102			0.00	0.000	0.017	0.1287	0.0114	0.0001	2.44E-05	0.0008	0.0000	7.02E-09	0.0000	0.0000	1.53E-04
103			0.00	0.000	0.000	0.1287	0.0172	0.0001	3.48E-05	0.0008	0.0000	7.02E-09	0.0000	0.0000	1.53E-04
104			0.00	0.000	0.000	0.1287	0.0169	0.0001	3.44E-05	0.0007	0.0000	7.02E-09	0.0000	0.0000	1.53E-04
105			0.00	0.000	0.000	0.1287	0.0166	0.0001	3.39E-05	0.0007	0.0000	7.01E-09	0.0000	0.0000	1.52E-04
106	*		0.00	0.000	0.000	0.1287	0.0163	0.0001	3.34E-05	0.0007	0.0000	7.01E-09	0.0000	0.0000	1.52E-04

107			0.00	0.000	0.000	0.1287	0.0160	0.0001	3.30E-05	0.0007	0.0000	7.01E-09	0.0000	0.0000	1.52E-04
108			0.00	0.000	0.000	0.1287	0.0157	0.0001	3.25E-05	0.0007	0.0000	7.01E-09	0.0000	0.0000	1.51E-04
109			0.00	0.000	0.000	0.1287	0.0154	0.0001	3.20E-05	0.0007	0.0000	7.00E-09	0.0000	0.0000	1.51E-04
110			0.00	0.000	0.000	0.1287	0.0152	0.0001	3.16E-05	0.0007	0.0000	7.00E-09	0.0000	0.0000	1.51E-04
111			0.08	0.000	0.005	0.1328	0.0149	0.0001	3.11E-05	0.0007	0.0000	7.00E-09	0.0000	0.0000	1.50E-04
112			0.00	0.000	0.002	0.1327	0.0146	0.0001	3.07E-05	0.0007	0.0000	7.00E-09	0.0000	0.0000	1.50E-04
113			0.00	0.000	0.009	0.1322	0.0143	0.0001	3.03E-05	0.0007	0.0000	7.00E-09	0.0000	0.0000	1.50E-04
114			0.00	0.000	0.011	0.1316	0.0141	0.0001	2.98E-05	0.0007	0.0000	7.00E-09	0.0000	0.0000	1.50E-04
115			0.00	0.000	0.012	0.1309	0.0138	0.0001	2.94E-05	0.0007	0.0000	7.00E-09	0.0000	0.0000	1.49E-04
116			0.07	0.000	0.009	0.1342	0.0135	0.0001	2.90E-05	0.0007	0.0000	7.00E-09	0.0000	0.0000	1.49E-04
117			0.15	0.014	0.012	0.1412	0.0133	0.0001	2.86E-05	0.0007	0.0000	7.00E-09	0.0000	0.0000	1.49E-04
118	*		0.00	0.000	0.003	0.1412	0.0130	0.0001	2.82E-05	0.0007	0.0000	7.00E-09	0.0000	0.0000	1.48E-04
119	*		0.44	0.000	0.021	0.1423	0.0128	0.0001	2.78E-05	0.0007	0.0000	7.01E-09	0.0000	0.0000	1.48E-04
120	*		0.02	0.000	0.033	0.1434	0.0126	0.0001	2.74E-05	0.0007	0.0000	7.01E-09	0.0000	0.0000	1.48E-04
121			0.00	0.158	0.074	0.1509	0.0123	0.0001	2.70E-05	0.0007	0.0000	7.01E-09	0.0000	0.0000	1.47E-04
122			0.00	0.000	0.079	0.1465	0.0123	0.0001	2.70E-05	0.0007	0.0000	7.01E-09	0.0000	0.0000	1.47E-04
123			0.00	0.000	0.012	0.1458	0.0122	0.0001	2.68E-05	0.0007	0.0000	7.01E-09	0.0000	0.0000	1.47E-04
124			0.00	0.000	0.012	0.1451	0.0120	0.0001	2.65E-05	0.0008	0.0000	7.02E-09	0.0000	0.0000	1.46E-04
125			0.25	0.114	0.015	0.1520	0.0118	0.0001	2.61E-05	0.0008	0.0000	7.02E-09	0.0000	0.0000	1.46E-04
126			0.14	0.003	0.121	0.1528	0.0116	0.0001	2.58E-05	0.0008	0.0000	7.02E-09	0.0000	0.0000	1.46E-04
127			0.00	0.000	0.015	0.1519	0.0121	0.0001	2.67E-05	0.0008	0.0000	7.02E-09	0.0000	0.0000	1.46E-04
128			0.14	0.016	0.015	0.1581	0.0161	0.0001	3.30E-05	0.0008	0.0000	7.02E-09	0.0000	0.0000	1.45E-04
129			0.08	0.000	0.125	0.1553	0.0169	0.0001	3.44E-05	0.0008	0.0000	7.02E-09	0.0000	0.0000	1.45E-04
130			0.31	0.156	0.019	0.1626	0.0167	0.0001	3.39E-05	0.0008	0.0000	7.02E-09	0.0000	0.0000	1.45E-04
131			0.00	0.000	0.171	0.1531	0.0170	0.0001	3.45E-05	0.0008	0.0000	7.02E-09	0.0000	0.0000	1.44E-04
132			0.00	0.000	0.011	0.1525	0.0170	0.0001	3.45E-05	0.0007	0.0000	7.01E-09	0.0000	0.0000	1.44E-04
133			0.00	0.000	0.010	0.1519	0.0167	0.0001	3.40E-05	0.0007	0.0000	7.01E-09	0.0000	0.0000	1.44E-04
134			0.61	0.429	0.018	0.1608	0.0164	0.0001	3.36E-05	0.0007	0.0000	7.01E-09	0.0000	0.0000	1.43E-04
135			0.00	0.000	0.266	0.1461	0.0161	0.0001	3.31E-05	0.0007	0.0000	7.01E-09	0.0000	0.0000	1.43E-04
136			0.00	0.000	0.246	0.1325	0.0158	0.0001	3.27E-05	0.0007	0.0000	7.00E-09	0.0000	0.0000	1.43E-04
137			1.02	0.669	0.147	0.1436	0.0157	0.0001	3.24E-05	0.0007	0.0000	7.00E-09	0.0000	0.0000	1.43E-04
138			0.15	0.015	0.167	0.1417	0.0227	0.0001	4.24E-05	0.0007	0.0000	7.00E-09	0.0000	0.0000	1.42E-04
139			0.27	0.114	0.133	0.1428	0.0343	0.0002	5.88E-05	0.0007	0.0000	7.00E-09	0.0000	0.0000	1.42E-04
140			0.18	0.039	0.117	0.1442	0.0337	0.0002	5.80E-05	0.0007	0.0000	6.99E-09	0.0000	0.0000	1.42E-04
141			0.00	0.000	0.101	0.1387	0.0331	0.0002	5.72E-05	0.0007	0.0000	6.99E-09	0.0000	0.0000	1.41E-04
142			0.10	0.000	0.118	0.1376	0.0325	0.0002	5.64E-05	0.0006	0.0000	6.99E-09	0.0000	0.0000	1.41E-04
143			0.00	0.000	0.121	0.1308	0.0319	0.0002	5.57E-05	0.0006	0.0000	6.99E-09	0.0000	0.0000	1.41E-04
144			0.00	0.000	0.027	0.1292	0.0349	0.0002	5.96E-05	0.0006	0.0000	6.98E-09	0.0000	0.0000	1.41E-04

145	0.42	0.185	0.063	0.1387	0.0364	0.0002	6.15E-05	0.0006	0.0000	6.98E-09	0.0000	0.0000	1.40E-04
146	0.00	0.000	0.027	0.1373	0.0359	0.0002	6.08E-05	0.0006	0.0000	6.98E-09	0.0000	0.0000	1.40E-04
147	0.05	0.000	0.026	0.1386	0.0369	0.0002	6.22E-05	0.0006	0.0000	6.98E-09	0.0000	0.0000	1.40E-04
148	0.07	0.000	0.024	0.1413	0.0370	0.0002	6.23E-05	0.0006	0.0000	6.97E-09	0.0000	0.0000	1.39E-04
149	0.09	0.000	0.017	0.1453	0.0370	0.0002	6.23E-05	0.0006	0.0000	6.97E-09	0.0000	0.0000	1.39E-04
150	0.03	0.000	0.061	0.1436	0.0367	0.0002	6.19E-05	0.0006	0.0000	6.97E-09	0.0000	0.0000	1.39E-04
151	0.00	0.000	0.020	0.1425	0.0361	0.0002	6.11E-05	0.0006	0.0000	6.97E-09	0.0000	0.0000	1.39E-04
152	0.00	0.000	0.023	0.1412	0.0355	0.0002	6.03E-05	0.0006	0.0000	6.96E-09	0.0000	0.0000	1.38E-04
153	0.19	0.056	0.024	0.1473	0.0366	0.0002	6.18E-05	0.0005	0.0000	6.96E-09	0.0000	0.0000	1.38E-04
154	0.00	0.000	0.083	0.1427	0.0371	0.0002	6.24E-05	0.0005	0.0000	6.96E-09	0.0000	0.0000	1.38E-04
155	0.05	0.000	0.020	0.1441	0.0370	0.0002	6.23E-05	0.0005	0.0000	6.96E-09	0.0000	0.0000	1.38E-04
156	0.00	0.000	0.017	0.1431	0.0367	0.0002	6.19E-05	0.0005	0.0000	6.96E-09	0.0000	0.0000	1.37E-04
157	0.00	0.000	0.018	0.1421	0.0360	0.0002	6.11E-05	0.0005	0.0000	6.95E-09	0.0000	0.0000	1.37E-04
158	0.47	0.285	0.025	0.1507	0.0355	0.0002	6.04E-05	0.0005	0.0000	6.95E-09	0.0000	0.0000	1.37E-04
159	0.22	0.081	0.107	0.1523	0.0354	0.0002	6.02E-05	0.0005	0.0000	6.95E-09	0.0000	0.0000	1.37E-04
160	0.08	0.000	0.099	0.1510	0.0374	0.0002	6.28E-05	0.0005	0.0000	6.96E-09	0.0000	0.0000	1.36E-04
161	0.00	0.000	0.159	0.1421	0.0383	0.0002	6.40E-05	0.0006	0.0000	6.98E-09	0.0000	0.0000	1.36E-04
162	0.73	0.417	0.148	0.1514	0.0377	0.0002	6.31E-05	0.0007	0.0000	7.00E-09	0.0000	0.0000	1.36E-04
163	1.39	1.093	0.181	0.1578	0.0370	0.0002	6.23E-05	0.0008	0.0000	7.02E-09	0.0000	0.0000	1.35E-04
164	0.04	0.000	0.105	0.1541	0.0363	0.0002	6.14E-05	0.0008	0.0000	7.03E-09	0.0000	0.0000	1.35E-04
165	0.15	0.001	0.102	0.1566	0.0360	0.0002	6.11E-05	0.0009	0.0000	7.05E-09	0.0000	0.0000	1.35E-04
166	0.02	0.000	0.186	0.1470	0.0366	0.0002	6.17E-05	0.0010	0.0000	7.07E-09	0.0000	0.0000	1.35E-04
167	0.02	0.000	0.119	0.1413	0.0424	0.0002	6.91E-05	0.0010	0.0000	7.08E-09	0.0000	0.0000	1.34E-04
168	0.00	0.000	0.182	0.1313	0.0439	0.0002	7.09E-05	0.0011	0.0000	7.10E-09	0.0000	0.0000	1.34E-04
169	0.01	0.000	0.052	0.1291	0.0431	0.0002	6.99E-05	0.0012	0.0000	7.12E-09	0.0000	0.0000	1.34E-04
170	0.37	0.162	0.062	0.1370	0.0491	0.0002	7.72E-05	0.0012	0.0000	7.13E-09	0.0000	0.0000	1.34E-04
171	0.82	0.385	0.317	0.1434	0.0523	0.0003	8.11E-05	0.0013	0.0000	7.15E-09	0.0000	0.0000	1.33E-04
172	0.00	0.000	0.157	0.1347	0.0514	0.0003	8.00E-05	0.0013	0.0000	7.16E-09	0.0000	0.0000	1.33E-04
173	0.00	0.000	0.090	0.1297	0.0505	0.0002	7.90E-05	0.0014	0.0000	7.17E-09	0.0000	0.0000	1.33E-04
174	0.78	0.444	0.148	0.1403	0.0497	0.0002	7.79E-05	0.0015	0.0000	7.19E-09	0.0000	0.0000	1.33E-04
175	1.15	0.746	0.291	0.1468	0.0488	0.0002	7.69E-05	0.0015	0.0000	7.20E-09	0.0000	0.0000	1.32E-04
176	0.13	0.000	0.175	0.1443	0.0482	0.0002	7.61E-05	0.0016	0.0000	7.21E-09	0.0000	0.0000	1.32E-04
177	0.00	0.000	0.113	0.1379	0.0515	0.0003	8.01E-05	0.0016	0.0000	7.23E-09	0.0000	0.0000	1.32E-04
178	0.01	0.000	0.140	0.1307	0.0528	0.0003	8.17E-05	0.0017	0.0000	7.24E-09	0.0000	0.0000	1.32E-04
179	0.43	0.155	0.147	0.1377	0.0519	0.0003	8.06E-05	0.0017	0.0000	7.25E-09	0.0000	0.0000	1.31E-04
180	0.00	0.000	0.096	0.1324	0.0510	0.0003	7.95E-05	0.0018	0.0000	7.26E-09	0.0000	0.0000	1.31E-04
181	0.00	0.000	0.041	0.1299	0.0567	0.0003	8.62E-05	0.0018	0.0000	7.28E-09	0.0000	0.0000	1.31E-04
182	0.00	0.000	0.015	0.1290	0.0597	0.0003	8.96E-05	0.0019	0.0000	7.29E-09	0.0000	0.0000	1.31E-04

183	0.00	0.000	0.005	0.1288	0.0587	0.0003	8.85E-05	0.0019	0.0000	7.30E-09	0.0000	0.0000	1.30E-04
184	0.05	0.000	0.007	0.1310	0.0584	0.0003	8.82E-05	0.0020	0.0000	7.31E-09	0.0000	0.0000	1.30E-04
185	0.00	0.000	0.003	0.1309	0.0579	0.0003	8.76E-05	0.0020	0.0000	7.32E-09	0.0000	0.0000	1.30E-04
186	0.00	0.000	0.006	0.1306	0.0569	0.0003	8.65E-05	0.0021	0.0000	7.33E-09	0.0000	0.0000	1.30E-04
187	0.11	0.000	0.009	0.1363	0.0560	0.0003	8.54E-05	0.0021	0.0000	7.34E-09	0.0000	0.0000	1.30E-04
188	1.26	1.109	0.028	0.1432	0.0550	0.0003	8.43E-05	0.0022	0.0000	7.35E-09	0.0000	0.0000	1.29E-04
189	0.59	0.142	0.336	0.1497	0.0541	0.0003	8.32E-05	0.0022	0.0000	7.36E-09	0.0000	0.0000	1.29E-04
190	0.12	0.000	0.084	0.1517	0.0532	0.0003	8.21E-05	0.0022	0.0000	7.37E-09	0.0000	0.0000	1.29E-04
191	0.30	0.109	0.177	0.1524	0.0523	0.0003	8.11E-05	0.0023	0.0000	7.38E-09	0.0000	0.0000	1.29E-04
192	0.06	0.000	0.128	0.1486	0.0515	0.0003	8.01E-05	0.0023	0.0000	7.39E-09	0.0000	0.0000	1.28E-04
193	0.05	0.000	0.114	0.1449	0.0506	0.0002	7.90E-05	0.0024	0.0000	7.40E-09	0.0000	0.0000	1.28E-04
194	0.02	0.000	0.103	0.1400	0.0527	0.0003	8.15E-05	0.0024	0.0000	7.41E-09	0.0000	0.0000	1.28E-04
195	0.04	0.000	0.134	0.1346	0.0535	0.0003	8.25E-05	0.0025	0.0000	7.42E-09	0.0000	0.0000	1.28E-04
196	0.00	0.000	0.062	0.1312	0.0526	0.0003	8.14E-05	0.0025	0.0000	7.43E-09	0.0000	0.0000	1.27E-04
197	0.25	0.096	0.031	0.1378	0.0562	0.0003	8.56E-05	0.0025	0.0000	7.44E-09	0.0000	0.0000	1.27E-04
198	0.00	0.000	0.024	0.1365	0.0579	0.0003	8.76E-05	0.0026	0.0000	7.45E-09	0.0000	0.0000	1.27E-04
199	0.00	0.000	0.021	0.1353	0.0569	0.0003	8.64E-05	0.0026	0.0000	7.45E-09	0.0000	0.0000	1.27E-04
200	0.00	0.000	0.023	0.1341	0.0562	0.0003	8.56E-05	0.0026	0.0000	7.46E-09	0.0000	0.0000	1.26E-04
201	0.08	0.000	0.024	0.1371	0.0554	0.0003	8.47E-05	0.0027	0.0000	7.47E-09	0.0000	0.0000	1.26E-04
202	0.00	0.000	0.017	0.1362	0.0545	0.0003	8.36E-05	0.0027	0.0000	7.48E-09	0.0000	0.0000	1.26E-04
203	0.00	0.000	0.012	0.1356	0.0540	0.0003	8.31E-05	0.0027	0.0000	7.48E-09	0.0000	0.0000	1.26E-04
204	0.20	0.067	0.018	0.1420	0.0533	0.0003	8.22E-05	0.0028	0.0000	7.49E-09	0.0000	0.0000	1.26E-04
205	0.00	0.000	0.011	0.1414	0.0524	0.0003	8.12E-05	0.0028	0.0000	7.50E-09	0.0000	0.0000	1.25E-04
206	0.00	0.000	0.011	0.1408	0.0518	0.0003	8.04E-05	0.0028	0.0000	7.51E-09	0.0000	0.0000	1.25E-04
207	0.45	0.264	0.025	0.1496	0.0511	0.0003	7.96E-05	0.0029	0.0000	7.51E-09	0.0000	0.0000	1.25E-04
208	0.13	0.002	0.071	0.1530	0.0502	0.0002	7.86E-05	0.0028	0.0000	7.50E-09	0.0000	0.0000	1.25E-04
209	0.00	0.000	0.073	0.1490	0.0493	0.0002	7.75E-05	0.0028	0.0000	7.49E-09	0.0000	0.0000	1.24E-04
210	0.00	0.000	0.100	0.1434	0.0487	0.0002	7.68E-05	0.0027	0.0000	7.48E-09	0.0000	0.0000	1.24E-04
211	0.11	0.000	0.100	0.1437	0.0480	0.0002	7.59E-05	0.0027	0.0000	7.47E-09	0.0000	0.0000	1.24E-04
212	0.01	0.000	0.052	0.1411	0.0471	0.0002	7.49E-05	0.0026	0.0000	7.46E-09	0.0000	0.0000	1.24E-04
213	0.00	0.000	0.040	0.1389	0.0463	0.0002	7.39E-05	0.0026	0.0000	7.45E-09	0.0000	0.0000	1.24E-04
214	0.00	0.000	0.034	0.1369	0.0462	0.0002	7.37E-05	0.0025	0.0000	7.44E-09	0.0000	0.0000	1.23E-04
215	0.00	0.000	0.023	0.1356	0.0507	0.0002	7.91E-05	0.0025	0.0000	7.43E-09	0.0000	0.0000	1.23E-04
216	0.06	0.000	0.024	0.1377	0.0502	0.0002	7.85E-05	0.0024	0.0000	7.42E-09	0.0000	0.0000	1.23E-04
217	0.09	0.000	0.024	0.1411	0.0494	0.0002	7.76E-05	0.0024	0.0000	7.41E-09	0.0000	0.0000	1.23E-04
218	0.00	0.000	0.022	0.1399	0.0486	0.0002	7.66E-05	0.0024	0.0000	7.40E-09	0.0000	0.0000	1.23E-04
219	0.11	0.000	0.018	0.1448	0.0502	0.0002	7.85E-05	0.0023	0.0000	7.39E-09	0.0000	0.0000	1.22E-04
220	0.00	0.000	0.012	0.1442	0.0508	0.0003	7.93E-05	0.0023	0.0000	7.38E-09	0.0000	0.0000	1.22E-04

221	0.00	0.000	0.010	0.1436	0.0501	0.0002	7.84E-05	0.0022	0.0000	7.37E-09	0.0000	0.0000	1.22E-04
222	0.29	0.136	0.016	0.1512	0.0493	0.0002	7.75E-05	0.0022	0.0000	7.36E-09	0.0000	0.0000	1.22E-04
223	0.58	0.298	0.169	0.1577	0.0484	0.0002	7.65E-05	0.0022	0.0000	7.35E-09	0.0000	0.0000	1.21E-04
224	0.17	0.036	0.102	0.1594	0.0476	0.0002	7.54E-05	0.0021	0.0000	7.34E-09	0.0000	0.0000	1.21E-04
225	0.00	0.000	0.134	0.1519	0.0471	0.0002	7.48E-05	0.0021	0.0000	7.33E-09	0.0000	0.0000	1.21E-04
226	0.00	0.000	0.102	0.1462	0.0464	0.0002	7.40E-05	0.0020	0.0000	7.33E-09	0.0000	0.0000	1.21E-04
227	0.01	0.000	0.107	0.1406	0.0456	0.0002	7.30E-05	0.0020	0.0000	7.32E-09	0.0000	0.0000	1.21E-04
228	0.00	0.000	0.165	0.1314	0.0448	0.0002	7.21E-05	0.0020	0.0000	7.31E-09	0.0000	0.0000	1.20E-04
229	0.00	0.000	0.039	0.1293	0.0440	0.0002	7.11E-05	0.0019	0.0000	7.30E-09	0.0000	0.0000	1.20E-04
230	0.00	0.000	0.006	0.1287	0.0524	0.0003	8.10E-05	0.0019	0.0000	7.29E-09	0.0000	0.0000	1.20E-04
231	0.00	0.000	0.000	0.1287	0.0569	0.0003	8.64E-05	0.0019	0.0000	7.29E-09	0.0000	0.0000	1.20E-04
232	0.00	0.000	0.000	0.1287	0.0559	0.0003	8.53E-05	0.0018	0.0000	7.28E-09	0.0000	0.0000	1.20E-04
233	0.00	0.000	0.000	0.1287	0.0549	0.0003	8.42E-05	0.0018	0.0000	7.27E-09	0.0000	0.0000	1.19E-04
234	0.00	0.000	0.000	0.1287	0.0540	0.0003	8.31E-05	0.0018	0.0000	7.26E-09	0.0000	0.0000	1.19E-04
235	0.00	0.000	0.000	0.1287	0.0531	0.0003	8.20E-05	0.0017	0.0000	7.26E-09	0.0000	0.0000	1.19E-04
236	0.00	0.000	0.000	0.1287	0.0522	0.0003	8.09E-05	0.0017	0.0000	7.25E-09	0.0000	0.0000	1.19E-04
237	0.32	0.145	0.014	0.1377	0.0513	0.0003	7.98E-05	0.0017	0.0000	7.24E-09	0.0000	0.0000	1.19E-04
238	0.00	0.000	0.010	0.1372	0.0504	0.0002	7.88E-05	0.0017	0.0000	7.24E-09	0.0000	0.0000	1.18E-04
239	0.00	0.000	0.010	0.1366	0.0495	0.0002	7.78E-05	0.0016	0.0000	7.23E-09	0.0000	0.0000	1.18E-04
240	0.00	0.000	0.012	0.1359	0.0487	0.0002	7.67E-05	0.0016	0.0000	7.22E-09	0.0000	0.0000	1.18E-04
241	0.00	0.000	0.013	0.1352	0.0478	0.0002	7.57E-05	0.0016	0.0000	7.22E-09	0.0000	0.0000	1.18E-04
242	0.00	0.000	0.014	0.1346	0.0470	0.0002	7.47E-05	0.0015	0.0000	7.21E-09	0.0000	0.0000	1.18E-04
243	0.00	0.000	0.013	0.1339	0.0462	0.0002	7.38E-05	0.0015	0.0000	7.20E-09	0.0000	0.0000	1.17E-04
244	0.00	0.000	0.013	0.1332	0.0454	0.0002	7.28E-05	0.0015	0.0000	7.20E-09	0.0000	0.0000	1.17E-04
245	0.00	0.000	0.012	0.1325	0.0447	0.0002	7.19E-05	0.0015	0.0000	7.19E-09	0.0000	0.0000	1.17E-04
246	0.00	0.000	0.012	0.1319	0.0440	0.0002	7.10E-05	0.0014	0.0000	7.18E-09	0.0000	0.0000	1.17E-04
247	0.08	0.000	0.015	0.1356	0.0432	0.0002	7.01E-05	0.0014	0.0000	7.18E-09	0.0000	0.0000	1.17E-04
248	0.02	0.000	0.014	0.1362	0.0425	0.0002	6.92E-05	0.0014	0.0000	7.17E-09	0.0000	0.0000	1.16E-04
249	0.78	0.626	0.019	0.1437	0.0418	0.0002	6.83E-05	0.0014	0.0000	7.17E-09	0.0000	0.0000	1.16E-04
250	0.64	0.326	0.196	0.1501	0.0410	0.0002	6.74E-05	0.0013	0.0000	7.16E-09	0.0000	0.0000	1.16E-04
251	0.45	0.190	0.139	0.1566	0.0403	0.0002	6.65E-05	0.0013	0.0000	7.16E-09	0.0000	0.0000	1.16E-04
252	0.99	0.628	0.248	0.1630	0.0396	0.0002	6.56E-05	0.0013	0.0000	7.15E-09	0.0000	0.0000	1.16E-04
253	0.03	0.000	0.210	0.1532	0.0393	0.0002	6.53E-05	0.0013	0.0000	7.14E-09	0.0000	0.0000	1.15E-04
254	0.00	0.000	0.175	0.1435	0.0389	0.0002	6.47E-05	0.0012	0.0000	7.14E-09	0.0000	0.0000	1.15E-04
255	0.00	0.000	0.090	0.1385	0.0382	0.0002	6.38E-05	0.0012	0.0000	7.13E-09	0.0000	0.0000	1.15E-04
256	0.00	0.000	0.129	0.1313	0.0375	0.0002	6.30E-05	0.0012	0.0000	7.13E-09	0.0000	0.0000	1.15E-04
257	1.56	1.210	0.147	0.1425	0.0369	0.0002	6.21E-05	0.0012	0.0000	7.12E-09	0.0000	0.0000	1.15E-04
258	0.00	0.000	0.155	0.1338	0.0368	0.0002	6.20E-05	0.0012	0.0000	7.12E-09	0.0000	0.0000	1.15E-04

259	0.00	0.000	0.062	0.1301	0.0466	0.0002	7.41E-05	0.0011	0.0000	7.11E-09	0.0000	0.0000	1.14E-04
260	0.00	0.000	0.019	0.1290	0.0510	0.0003	7.95E-05	0.0011	0.0000	7.11E-09	0.0000	0.0000	1.14E-04
261	0.00	0.000	0.003	0.1287	0.0553	0.0003	8.46E-05	0.0011	0.0000	7.10E-09	0.0000	0.0000	1.14E-04
262	0.11	0.000	0.008	0.1341	0.0575	0.0003	8.71E-05	0.0011	0.0000	7.10E-09	0.0000	0.0000	1.14E-04
263	0.00	0.000	0.019	0.1330	0.0565	0.0003	8.60E-05	0.0011	0.0000	7.09E-09	0.0000	0.0000	1.14E-04
264	0.04	0.000	0.023	0.1337	0.0555	0.0003	8.48E-05	0.0010	0.0000	7.09E-09	0.0000	0.0000	1.13E-04
265	0.00	0.000	0.021	0.1325	0.0546	0.0003	8.37E-05	0.0010	0.0000	7.09E-09	0.0000	0.0000	1.13E-04
266	0.00	0.000	0.015	0.1317	0.0538	0.0003	8.29E-05	0.0010	0.0000	7.08E-09	0.0000	0.0000	1.13E-04
267	0.00	0.000	0.015	0.1309	0.0536	0.0003	8.26E-05	0.0010	0.0000	7.08E-09	0.0000	0.0000	1.13E-04
268	0.33	0.157	0.030	0.1386	0.0528	0.0003	8.16E-05	0.0010	0.0000	7.07E-09	0.0000	0.0000	1.13E-04
269	0.00	0.000	0.013	0.1378	0.0519	0.0003	8.06E-05	0.0010	0.0000	7.07E-09	0.0000	0.0000	1.12E-04
270	0.00	0.000	0.011	0.1372	0.0514	0.0003	8.00E-05	0.0009	0.0000	7.06E-09	0.0000	0.0000	1.12E-04
271	0.00	0.000	0.013	0.1365	0.0507	0.0002	7.92E-05	0.0009	0.0000	7.06E-09	0.0000	0.0000	1.12E-04
272	0.00	0.000	0.014	0.1357	0.0499	0.0002	7.82E-05	0.0009	0.0000	7.06E-09	0.0000	0.0000	1.12E-04
273	0.00	0.000	0.013	0.1350	0.0490	0.0002	7.71E-05	0.0009	0.0000	7.05E-09	0.0000	0.0000	1.12E-04
274	0.00	0.000	0.013	0.1343	0.0482	0.0002	7.61E-05	0.0009	0.0000	7.05E-09	0.0000	0.0000	1.12E-04
275	0.03	0.000	0.016	0.1349	0.0473	0.0002	7.51E-05	0.0009	0.0000	7.04E-09	0.0000	0.0000	1.11E-04
276	0.01	0.000	0.016	0.1345	0.0465	0.0002	7.41E-05	0.0008	0.0000	7.04E-09	0.0000	0.0000	1.11E-04
277	0.00	0.000	0.012	0.1339	0.0457	0.0002	7.32E-05	0.0008	0.0000	7.04E-09	0.0000	0.0000	1.11E-04
278	0.00	0.000	0.010	0.1333	0.0449	0.0002	7.22E-05	0.0008	0.0000	7.03E-09	0.0000	0.0000	1.11E-04
279	0.00	0.000	0.010	0.1327	0.0449	0.0002	7.22E-05	0.0008	0.0000	7.03E-09	0.0000	0.0000	1.11E-04
280	0.00	0.000	0.010	0.1322	0.0446	0.0002	7.18E-05	0.0008	0.0000	7.03E-09	0.0000	0.0000	1.11E-04
281	0.00	0.000	0.010	0.1316	0.0438	0.0002	7.08E-05	0.0008	0.0000	7.02E-09	0.0000	0.0000	1.10E-04
282	0.00	0.000	0.010	0.1311	0.0430	0.0002	6.99E-05	0.0008	0.0000	7.02E-09	0.0000	0.0000	1.10E-04
283	0.07	0.000	0.013	0.1340	0.0423	0.0002	6.89E-05	0.0007	0.0000	7.02E-09	0.0000	0.0000	1.10E-04
284	0.25	0.111	0.013	0.1410	0.0415	0.0002	6.80E-05	0.0007	0.0000	7.01E-09	0.0000	0.0000	1.10E-04
285	0.00	0.000	0.067	0.1373	0.0412	0.0002	6.76E-05	0.0007	0.0000	7.01E-09	0.0000	0.0000	1.10E-04
286	0.00	0.000	0.010	0.1368	0.0407	0.0002	6.70E-05	0.0007	0.0000	7.01E-09	0.0000	0.0000	1.09E-04
287	0.00	0.000	0.010	0.1362	0.0400	0.0002	6.61E-05	0.0007	0.0000	7.00E-09	0.0000	0.0000	1.09E-04
288	0.05	0.000	0.013	0.1380	0.0394	0.0002	6.53E-05	0.0007	0.0000	7.00E-09	0.0000	0.0000	1.09E-04
289	0.06	0.000	0.013	0.1407	0.0387	0.0002	6.45E-05	0.0007	0.0000	7.00E-09	0.0000	0.0000	1.09E-04
290	0.00	0.000	0.011	0.1401	0.0381	0.0002	6.36E-05	0.0007	0.0000	6.99E-09	0.0000	0.0000	1.09E-04
291	0.19	0.053	0.014	0.1467	0.0374	0.0002	6.28E-05	0.0007	0.0000	6.99E-09	0.0000	0.0000	1.09E-04
292	0.05	0.000	0.057	0.1460	0.0370	0.0002	6.23E-05	0.0006	0.0000	6.99E-09	0.0000	0.0000	1.08E-04
293	0.00	0.000	0.038	0.1439	0.0375	0.0002	6.29E-05	0.0006	0.0000	6.98E-09	0.0000	0.0000	1.08E-04
294	0.00	0.000	0.041	0.1416	0.0379	0.0002	6.34E-05	0.0006	0.0000	6.98E-09	0.0000	0.0000	1.08E-04
295	0.00	0.000	0.040	0.1394	0.0372	0.0002	6.26E-05	0.0006	0.0000	6.98E-09	0.0000	0.0000	1.08E-04
296	0.00	0.000	0.031	0.1377	0.0366	0.0002	6.17E-05	0.0006	0.0000	6.98E-09	0.0000	0.0000	1.08E-04

297			0.00	0.000	0.026	0.1362	0.0359	0.0002	6.09E-05	0.0006	0.0000	6.97E-09	0.0000	0.0000	1.08E-04
298			0.00	0.000	0.023	0.1350	0.0353	0.0002	6.01E-05	0.0006	0.0000	6.97E-09	0.0000	0.0000	1.07E-04
299			0.00	0.000	0.021	0.1338	0.0347	0.0002	5.93E-05	0.0006	0.0000	6.97E-09	0.0000	0.0000	1.07E-04
300			0.00	0.000	0.019	0.1328	0.0341	0.0002	5.85E-05	0.0006	0.0000	6.97E-09	0.0000	0.0000	1.07E-04
301	*		0.00	0.000	0.000	0.1328	0.0335	0.0002	5.77E-05	0.0005	0.0000	6.96E-09	0.0000	0.0000	1.07E-04
302	*		0.00	0.000	0.000	0.1328	0.0329	0.0002	5.69E-05	0.0005	0.0000	6.96E-09	0.0000	0.0000	1.07E-04
303	*		0.00	0.000	0.000	0.1328	0.0323	0.0002	5.62E-05	0.0005	0.0000	6.96E-09	0.0000	0.0000	1.07E-04
304	*		0.00	0.000	0.000	0.1328	0.0317	0.0002	5.54E-05	0.0005	0.0000	6.96E-09	0.0000	0.0000	1.06E-04
305	*		0.00	0.000	0.000	0.1328	0.0312	0.0002	5.47E-05	0.0005	0.0000	6.95E-09	0.0000	0.0000	1.06E-04
306			0.00	0.000	0.018	0.1318	0.0306	0.0002	5.39E-05	0.0005	0.0000	6.95E-09	0.0000	0.0000	1.06E-04
307			0.00	0.000	0.017	0.1309	0.0301	0.0001	5.32E-05	0.0005	0.0000	6.95E-09	0.0000	0.0000	1.06E-04
308			0.01	0.000	0.019	0.1306	0.0295	0.0001	5.25E-05	0.0005	0.0000	6.95E-09	0.0000	0.0000	1.06E-04
309			0.00	0.000	0.018	0.1296	0.0290	0.0001	5.18E-05	0.0005	0.0000	6.94E-09	0.0000	0.0000	1.06E-04
310			0.00	0.000	0.010	0.1289	0.0311	0.0002	5.46E-05	0.0005	0.0000	6.94E-09	0.0000	0.0000	1.06E-04
311			0.00	0.000	0.003	0.1288	0.0323	0.0002	5.61E-05	0.0005	0.0000	6.94E-09	0.0000	0.0000	1.05E-04
312			0.00	0.000	0.001	0.1287	0.0317	0.0002	5.54E-05	0.0005	0.0000	6.94E-09	0.0000	0.0000	1.05E-04
313			0.00	0.000	0.000	0.1287	0.0311	0.0002	5.46E-05	0.0004	0.0000	6.94E-09	0.0000	0.0000	1.05E-04
314			0.04	0.000	0.005	0.1305	0.0306	0.0002	5.39E-05	0.0004	0.0000	6.93E-09	0.0000	0.0000	1.05E-04
315	*		0.00	0.000	0.002	0.1304	0.0301	0.0001	5.32E-05	0.0004	0.0000	6.93E-09	0.0000	0.0000	1.05E-04
316			0.04	0.000	0.006	0.1324	0.0295	0.0001	5.25E-05	0.0004	0.0000	6.93E-09	0.0000	0.0000	1.05E-04
317	*		0.00	0.000	0.000	0.1324	0.0290	0.0001	5.18E-05	0.0004	0.0000	6.93E-09	0.0000	0.0000	1.04E-04
318			0.00	0.000	0.008	0.1320	0.0285	0.0001	5.11E-05	0.0004	0.0000	6.93E-09	0.0000	0.0000	1.04E-04
319	*		0.00	0.000	0.000	0.1320	0.0280	0.0001	5.04E-05	0.0004	0.0000	6.92E-09	0.0000	0.0000	1.04E-04
320	*		0.00	0.000	0.000	0.1320	0.0275	0.0001	4.97E-05	0.0004	0.0000	6.92E-09	0.0000	0.0000	1.04E-04
321			0.00	0.000	0.007	0.1315	0.0270	0.0001	4.90E-05	0.0004	0.0000	6.92E-09	0.0000	0.0000	1.04E-04
322	*		0.00	0.000	0.000	0.1315	0.0265	0.0001	4.84E-05	0.0004	0.0000	6.92E-09	0.0000	0.0000	1.04E-04
323	*		0.00	0.000	0.000	0.1315	0.0261	0.0001	4.77E-05	0.0004	0.0000	6.92E-09	0.0000	0.0000	1.03E-04
324	*		0.00	0.000	0.000	0.1315	0.0256	0.0001	4.70E-05	0.0004	0.0000	6.91E-09	0.0000	0.0000	1.03E-04
325	*		0.00	0.000	0.000	0.1315	0.0251	0.0001	4.64E-05	0.0004	0.0000	6.91E-09	0.0000	0.0000	1.03E-04
326	*		0.00	0.000	0.010	0.1310	0.0247	0.0001	4.58E-05	0.0004	0.0000	6.91E-09	0.0000	0.0000	1.03E-04
327	*	*	0.00	0.000	0.000	0.1310	0.0243	0.0001	4.53E-05	0.0003	0.0000	6.91E-09	0.0000	0.0000	1.03E-04
328	*	*	0.00	0.000	0.000	0.1310	0.0239	0.0001	4.46E-05	0.0003	0.0000	6.91E-09	0.0000	0.0000	1.03E-04
329	*	*	0.00	0.000	0.000	0.1310	0.0234	0.0001	4.40E-05	0.0003	0.0000	6.91E-09	0.0000	0.0000	1.03E-04
330	*	*	0.00	0.000	0.000	0.1310	0.0230	0.0001	4.34E-05	0.0003	0.0000	6.90E-09	0.0000	0.0000	1.02E-04
331	*	*	0.00	0.000	0.000	0.1310	0.0226	0.0001	4.28E-05	0.0003	0.0000	6.90E-09	0.0000	0.0000	1.02E-04
332	*	*	0.00	0.000	0.000	0.1310	0.0222	0.0001	4.22E-05	0.0003	0.0000	6.90E-09	0.0000	0.0000	1.02E-04
333	*	*	0.00	0.000	0.000	0.1310	0.0218	0.0001	4.16E-05	0.0003	0.0000	6.90E-09	0.0000	0.0000	1.02E-04
334	*	*	0.00	0.000	0.000	0.1310	0.0214	0.0001	4.11E-05	0.0003	0.0000	6.90E-09	0.0000	0.0000	1.02E-04

335	*	*	0.17	0.000	0.044	0.1310	0.0210	0.0001	4.05E-05	0.0003	0.0000	6.90E-09	0.0000	0.0000	1.02E-04
336		*	0.00	0.002	0.082	0.1335	0.0206	0.0001	3.99E-05	0.0003	0.0000	6.89E-09	0.0000	0.0000	1.02E-04
337		*	0.00	0.000	0.000	0.1335	0.0203	0.0001	3.94E-05	0.0003	0.0000	6.89E-09	0.0000	0.0000	1.01E-04
338		*	0.00	0.000	0.000	0.1335	0.0199	0.0001	3.88E-05	0.0003	0.0000	6.89E-09	0.0000	0.0000	1.01E-04
339		*	0.00	0.000	0.000	0.1335	0.0195	0.0001	3.83E-05	0.0003	0.0000	6.89E-09	0.0000	0.0000	1.01E-04
340		*	0.00	0.000	0.000	0.1335	0.0192	0.0001	3.78E-05	0.0003	0.0000	6.89E-09	0.0000	0.0000	1.01E-04
341		*	0.00	0.000	0.000	0.1335	0.0188	0.0001	3.72E-05	0.0003	0.0000	6.89E-09	0.0000	0.0000	1.01E-04
342		*	0.02	0.000	0.003	0.1347	0.0185	0.0001	3.67E-05	0.0003	0.0000	6.89E-09	0.0000	0.0000	1.01E-04
343		*	0.00	0.000	0.000	0.1347	0.0181	0.0001	3.62E-05	0.0003	0.0000	6.89E-09	0.0000	0.0000	1.00E-04
344		*	0.00	0.000	0.000	0.1347	0.0178	0.0001	3.57E-05	0.0003	0.0000	6.90E-09	0.0000	0.0000	1.00E-04
345		*	0.00	0.000	0.000	0.1347	0.0175	0.0001	3.52E-05	0.0003	0.0000	6.90E-09	0.0000	0.0000	1.00E-04
346		*	0.00	0.000	0.000	0.1347	0.0172	0.0001	3.47E-05	0.0003	0.0000	6.90E-09	0.0000	0.0000	1.00E-04
347		*	0.00	0.000	0.000	0.1347	0.0168	0.0001	3.42E-05	0.0003	0.0000	6.90E-09	0.0000	0.0000	9.99E-05
348	*	*	0.00	0.000	0.000	0.1347	0.0165	0.0001	3.37E-05	0.0003	0.0000	6.90E-09	0.0000	0.0000	9.98E-05
349		*	0.01	0.000	0.003	0.1353	0.0162	0.0001	3.33E-05	0.0003	0.0000	6.91E-09	0.0000	0.0000	9.96E-05
350	*	*	0.00	0.000	0.000	0.1353	0.0159	0.0001	3.28E-05	0.0004	0.0000	6.91E-09	0.0000	0.0000	9.95E-05
351		*	0.12	0.001	0.003	0.1415	0.0156	0.0001	3.23E-05	0.0004	0.0000	6.91E-09	0.0000	0.0000	9.94E-05
352	*	*	0.00	0.000	0.000	0.1415	0.0153	0.0001	3.19E-05	0.0004	0.0000	6.92E-09	0.0000	0.0000	9.92E-05
353	*	*	0.03	0.000	0.018	0.1415	0.0151	0.0001	3.14E-05	0.0004	0.0000	6.92E-09	0.0000	0.0000	9.91E-05
354	*	*	0.02	0.000	0.007	0.1415	0.0148	0.0001	3.10E-05	0.0004	0.0000	6.93E-09	0.0000	0.0000	9.89E-05
355	*	*	0.24	0.000	0.003	0.1415	0.0145	0.0001	3.05E-05	0.0004	0.0000	6.93E-09	0.0000	0.0000	9.88E-05
356	*	*	0.04	0.000	0.002	0.1415	0.0142	0.0001	3.01E-05	0.0004	0.0000	6.94E-09	0.0000	0.0000	9.86E-05
357	*	*	0.00	0.000	0.004	0.1415	0.0140	0.0001	2.97E-05	0.0005	0.0000	6.94E-09	0.0000	0.0000	9.85E-05
358	*	*	0.00	0.000	0.006	0.1415	0.0137	0.0001	2.93E-05	0.0005	0.0000	6.95E-09	0.0000	0.0000	9.84E-05
359	*	*	0.00	0.000	0.000	0.1415	0.0134	0.0001	2.88E-05	0.0005	0.0000	6.95E-09	0.0000	0.0000	9.82E-05
360	*	*	0.00	0.000	0.042	0.1415	0.0132	0.0001	2.84E-05	0.0005	0.0000	6.96E-09	0.0000	0.0000	9.81E-05
361		*	0.00	0.194	0.048	0.1415	0.0129	0.0001	2.80E-05	0.0005	0.0000	6.96E-09	0.0000	0.0000	9.80E-05
362		*	0.00	0.000	0.000	0.1415	0.0127	0.0001	2.76E-05	0.0006	0.0000	6.97E-09	0.0000	0.0000	9.78E-05
363		*	0.00	0.000	0.000	0.1415	0.0125	0.0001	2.72E-05	0.0006	0.0000	6.98E-09	0.0000	0.0000	9.77E-05
364		*	0.02	0.000	0.003	0.1424	0.0122	0.0001	2.68E-05	0.0006	0.0000	6.98E-09	0.0000	0.0000	9.75E-05
365		*	0.00	0.000	0.000	0.1424	0.0120	0.0001	2.65E-05	0.0006	0.0000	6.99E-09	0.0000	0.0000	9.74E-05

* = Frozen (air or soil)

Annual Totals for Year 1			
	inches	cubic feet	percent
Precipitation	26.23	95,214.0	100.00

Runoff	12.865	46,699.6	49.05
Evapotranspiration	13.302	48,284.6	50.71
Drainage Collected from Layer 3	0.0489	177.4	0.19
Percolation/Leakage through Layer 4	0.017021	61.8	0.06
Average Head on Top of Layer 4	0.0272	---	---
Drainage Collected from Layer 7	0.0025	8.9836	0.01
Percolation/Leakage through Layer 9	0.000003	0.0094	0.00
Average Head on Top of Layer 8	0.0010	---	---
Percolation/Leakage through Layer 10	0.049519	179.8	0.19
Change in Water Storage	-0.0376	-136.4	-0.14
Soil Water at Start of Year	72.4123	262,856.7	276.07
Soil Water at End of Year	72.3747	262,720.3	275.93
Snow Water at Start of Year	0.0000	0.0000	0.00
Snow Water at End of Year	0.0000	0.0000	0.00
Annual Water Budget Balance	0.0000	0.0000	0.00

Daily Output for Year 2

Column key: Head #1: drainage from Layer 4 | Head #2: drainage from Layer 8
Drain #1: drainage from Layer 3 | Drain #2: drainage from Layer 7
Leak #1: leakage thru Layer 4 | Leak #2: leakage thru Layer 9 | Leak #3: leakage thru Layer 10

Title: Pilgrim Landfill
Simulated On: 4/10/2026 14:14

Day	Freezing Status*		Rain	Runoff	ET	Evap. Zone Water	Head #1	Drain #1	Leak #1	Head #2	Drain #2	Leak #2	Head #3	Drain #3	Leak #3
	Air	Soil	(inches)	(inches)	(inches)	(in/in)	(inches)	(inches)	(inches)	(inches)	(inches)	(inches)	(inches)	(inches)	(inches)
1	*	*	0.00	0.000	0.000	0.1424	0.0118	0.0001	2.61E-05	0.0007	0.0000	6.99E-09	0.0000	0.0000	9.73E-05
2	*	*	0.00	0.000	0.000	0.1424	0.0116	0.0001	2.57E-05	0.0007	0.0000	7.00E-09	0.0000	0.0000	9.71E-05
3	*	*	0.00	0.000	0.000	0.1424	0.0113	0.0001	2.53E-05	0.0007	0.0000	7.01E-09	0.0000	0.0000	9.70E-05
4	*	*	0.00	0.000	0.000	0.1424	0.0111	0.0001	2.50E-05	0.0007	0.0000	7.01E-09	0.0000	0.0000	9.69E-05
5	*	*	0.53	0.000	0.027	0.1424	0.0109	0.0001	2.46E-05	0.0008	0.0000	7.02E-09	0.0000	0.0000	9.67E-05
6		*	0.00	0.500	0.000	0.1424	0.0107	0.0001	2.42E-05	0.0008	0.0000	7.03E-09	0.0000	0.0000	9.66E-05
7		*	0.00	0.000	0.000	0.1424	0.0105	0.0001	2.39E-05	0.0008	0.0000	7.03E-09	0.0000	0.0000	9.65E-05
8		*	0.26	0.260	0.003	0.1424	0.0103	0.0001	2.35E-05	0.0009	0.0000	7.04E-09	0.0000	0.0000	9.63E-05
9		*	0.41	0.406	0.003	0.1424	0.0101	0.0000	2.32E-05	0.0009	0.0000	7.05E-09	0.0000	0.0000	9.62E-05
10		*	0.00	0.000	0.000	0.1424	0.0099	0.0000	2.29E-05	0.0009	0.0000	7.05E-09	0.0000	0.0000	9.61E-05
11		*	0.00	0.000	0.000	0.1424	0.0097	0.0000	2.25E-05	0.0009	0.0000	7.06E-09	0.0000	0.0000	9.59E-05
12		*	0.00	0.000	0.000	0.1424	0.0095	0.0000	2.22E-05	0.0009	0.0000	7.06E-09	0.0000	0.0000	9.58E-05
13	*	*	0.00	0.000	0.000	0.1424	0.0093	0.0000	2.19E-05	0.0009	0.0000	7.07E-09	0.0000	0.0000	9.57E-05
14	*	*	0.00	0.000	0.000	0.1424	0.0092	0.0000	2.16E-05	0.0010	0.0000	7.07E-09	0.0000	0.0000	9.55E-05
15		*	0.00	0.000	0.000	0.1424	0.0090	0.0000	2.12E-05	0.0010	0.0000	7.07E-09	0.0000	0.0000	9.54E-05
16		*	0.00	0.000	0.000	0.1424	0.0088	0.0000	2.09E-05	0.0010	0.0000	7.08E-09	0.0000	0.0000	9.53E-05
17		*	0.00	0.000	0.000	0.1424	0.0086	0.0000	2.06E-05	0.0010	0.0000	7.08E-09	0.0000	0.0000	9.51E-05
18		*	0.00	0.000	0.000	0.1424	0.0085	0.0000	2.03E-05	0.0010	0.0000	7.08E-09	0.0000	0.0000	9.50E-05
19		*	0.05	0.000	0.003	0.1450	0.0083	0.0000	2.00E-05	0.0010	0.0000	7.09E-09	0.0000	0.0000	9.49E-05
20	*	*	0.00	0.000	0.000	0.1450	0.0082	0.0000	1.97E-05	0.0010	0.0000	7.09E-09	0.0000	0.0000	9.47E-05
21	*	*	0.00	0.000	0.000	0.1450	0.0080	0.0000	1.94E-05	0.0010	0.0000	7.09E-09	0.0000	0.0000	9.46E-05
22	*	*	0.16	0.000	0.039	0.1450	0.0078	0.0000	1.91E-05	0.0011	0.0000	7.09E-09	0.0000	0.0000	9.45E-05
23		*	0.00	0.000	0.044	0.1463	0.0077	0.0000	1.88E-05	0.0011	0.0000	7.09E-09	0.0000	0.0000	9.44E-05
24		*	0.00	0.000	0.054	0.1463	0.0075	0.0000	1.86E-05	0.0011	0.0000	7.09E-09	0.0000	0.0000	9.42E-05
25	*	*	0.00	0.000	0.000	0.1463	0.0074	0.0000	1.83E-05	0.0011	0.0000	7.10E-09	0.0000	0.0000	9.41E-05
26	*	*	0.00	0.000	0.000	0.1463	0.0072	0.0000	1.80E-05	0.0011	0.0000	7.10E-09	0.0000	0.0000	9.40E-05
27		*	0.00	0.000	0.000	0.1463	0.0071	0.0000	1.77E-05	0.0011	0.0000	7.10E-09	0.0000	0.0000	9.39E-05
28		*	0.00	0.000	0.000	0.1463	0.0070	0.0000	1.75E-05	0.0011	0.0000	7.10E-09	0.0000	0.0000	9.37E-05
29	*	*	0.00	0.000	0.000	0.1463	0.0068	0.0000	1.72E-05	0.0011	0.0000	7.10E-09	0.0000	0.0000	9.36E-05
30	*	*	0.00	0.000	0.000	0.1463	0.0067	0.0000	1.70E-05	0.0011	0.0000	7.10E-09	0.0000	0.0000	9.35E-05

31		*	0.10	0.001	0.003	0.1518	0.0066	0.0000	1.67E-05	0.0011	0.0000	7.10E-09	0.0000	0.0000	9.33E-05
32	*	*	0.01	0.000	0.012	0.1518	0.0064	0.0000	1.65E-05	0.0011	0.0000	7.10E-09	0.0000	0.0000	9.32E-05
33	*	*	0.00	0.000	0.000	0.1518	0.0063	0.0000	1.62E-05	0.0011	0.0000	7.10E-09	0.0000	0.0000	9.31E-05
34	*	*	0.00	0.000	0.000	0.1518	0.0062	0.0000	1.60E-05	0.0011	0.0000	7.10E-09	0.0000	0.0000	9.30E-05
35	*	*	0.00	0.000	0.000	0.1518	0.0061	0.0000	1.57E-05	0.0011	0.0000	7.10E-09	0.0000	0.0000	9.28E-05
36	*	*	0.00	0.000	0.000	0.1518	0.0059	0.0000	1.55E-05	0.0011	0.0000	7.10E-09	0.0000	0.0000	9.27E-05
37	*	*	0.00	0.000	0.000	0.1518	0.0058	0.0000	1.52E-05	0.0011	0.0000	7.10E-09	0.0000	0.0000	9.26E-05
38	*	*	0.00	0.000	0.000	0.1518	0.0057	0.0000	1.50E-05	0.0011	0.0000	7.10E-09	0.0000	0.0000	9.25E-05
39	*	*	0.00	0.000	0.000	0.1518	0.0056	0.0000	1.48E-05	0.0011	0.0000	7.10E-09	0.0000	0.0000	9.24E-05
40		*	0.00	0.000	0.000	0.1518	0.0055	0.0000	1.46E-05	0.0011	0.0000	7.09E-09	0.0000	0.0000	9.22E-05
41		*	0.00	0.000	0.000	0.1518	0.0054	0.0000	1.43E-05	0.0011	0.0000	7.09E-09	0.0000	0.0000	9.21E-05
42		*	0.06	0.000	0.003	0.1548	0.0053	0.0000	1.41E-05	0.0011	0.0000	7.09E-09	0.0000	0.0000	9.20E-05
43		*	0.06	0.000	0.003	0.1582	0.0051	0.0000	1.39E-05	0.0010	0.0000	7.09E-09	0.0000	0.0000	9.19E-05
44		*	0.00	0.000	0.000	0.1582	0.0050	0.0000	1.37E-05	0.0010	0.0000	7.09E-09	0.0000	0.0000	9.17E-05
45	*	*	0.09	0.000	0.036	0.1582	0.0049	0.0000	1.35E-05	0.0010	0.0000	7.09E-09	0.0000	0.0000	9.16E-05
46	*	*	0.00	0.000	0.012	0.1582	0.0048	0.0000	1.33E-05	0.0010	0.0000	7.08E-09	0.0000	0.0000	9.15E-05
47	*	*	0.00	0.000	0.008	0.1582	0.0047	0.0000	1.31E-05	0.0010	0.0000	7.08E-09	0.0000	0.0000	9.14E-05
48	*	*	0.00	0.000	0.008	0.1582	0.0046	0.0000	1.29E-05	0.0010	0.0000	7.08E-09	0.0000	0.0000	9.13E-05
49	*	*	0.03	0.000	0.000	0.1582	0.0045	0.0000	1.27E-05	0.0010	0.0000	7.08E-09	0.0000	0.0000	9.11E-05
50		*	0.05	0.000	0.099	0.1582	0.0045	0.0000	1.25E-05	0.0010	0.0000	7.08E-09	0.0000	0.0000	9.10E-05
51		*	0.00	0.000	0.000	0.1582	0.0044	0.0000	1.23E-05	0.0010	0.0000	7.07E-09	0.0000	0.0000	9.09E-05
52	*	*	0.00	0.000	0.000	0.1582	0.0043	0.0000	1.21E-05	0.0010	0.0000	7.07E-09	0.0000	0.0000	9.08E-05
53	*	*	0.03	0.000	0.025	0.1582	0.0042	0.0000	1.19E-05	0.0010	0.0000	7.07E-09	0.0000	0.0000	9.07E-05
54	*	*	0.01	0.000	0.010	0.1582	0.0041	0.0000	1.17E-05	0.0010	0.0000	7.07E-09	0.0000	0.0000	9.05E-05
55	*	*	0.00	0.000	0.000	0.1582	0.0040	0.0000	1.15E-05	0.0009	0.0000	7.06E-09	0.0000	0.0000	9.04E-05
56		*	0.00	0.000	0.000	0.1582	0.0039	0.0000	1.13E-05	0.0009	0.0000	7.06E-09	0.0000	0.0000	9.03E-05
57		*	0.00	0.000	0.000	0.1582	0.0039	0.0000	1.12E-05	0.0009	0.0000	7.06E-09	0.0000	0.0000	9.02E-05
58		*	0.03	0.000	0.003	0.1598	0.0038	0.0000	1.10E-05	0.0009	0.0000	7.06E-09	0.0000	0.0000	9.01E-05
59		*	0.04	0.000	0.003	0.1619	0.0037	0.0000	1.08E-05	0.0009	0.0000	7.05E-09	0.0000	0.0000	9.00E-05
60		*	0.68	0.675	0.003	0.1619	0.0036	0.0000	1.06E-05	0.0009	0.0000	7.05E-09	0.0000	0.0000	8.98E-05
61		*	0.00	0.000	0.000	0.1619	0.0035	0.0000	1.05E-05	0.0009	0.0000	7.05E-09	0.0000	0.0000	8.97E-05
62		*	0.24	0.239	0.003	0.1619	0.0035	0.0000	1.03E-05	0.0009	0.0000	7.04E-09	0.0000	0.0000	8.96E-05
63	*	*	0.07	0.000	0.043	0.1619	0.0034	0.0000	1.01E-05	0.0009	0.0000	7.04E-09	0.0000	0.0000	8.95E-05
64		*	0.19	0.059	0.110	0.1648	0.0033	0.0000	9.98E-06	0.0008	0.0000	7.04E-09	0.0000	0.0000	8.94E-05
65	*	*	0.00	0.000	0.000	0.1648	0.0033	0.0000	9.82E-06	0.0008	0.0000	7.03E-09	0.0000	0.0000	8.93E-05
66	*	*	0.00	0.000	0.000	0.1648	0.0032	0.0000	9.66E-06	0.0008	0.0000	7.03E-09	0.0000	0.0000	8.91E-05
67	*	*	0.23	0.000	0.023	0.1648	0.0031	0.0000	9.51E-06	0.0008	0.0000	7.03E-09	0.0000	0.0000	8.90E-05
68	*	*	0.10	0.000	0.011	0.1648	0.0031	0.0000	9.35E-06	0.0008	0.0000	7.02E-09	0.0000	0.0000	8.89E-05

69	*	*	0.01	0.000	0.015	0.1648	0.0030	0.0000	9.20E-06	0.0008	0.0000	7.02E-09	0.0000	0.0000	8.88E-05
70		*	0.00	0.260	0.029	0.1648	0.0029	0.0000	9.06E-06	0.0008	0.0000	7.02E-09	0.0000	0.0000	8.87E-05
71		*	0.00	0.000	0.001	0.1648	0.0029	0.0000	8.91E-06	0.0007	0.0000	7.01E-09	0.0000	0.0000	8.86E-05
72		*	0.01	0.000	0.003	0.1653	0.0028	0.0000	8.76E-06	0.0007	0.0000	7.01E-09	0.0000	0.0000	8.85E-05
73		*	0.03	0.000	0.003	0.1669	0.0027	0.0000	8.62E-06	0.0007	0.0000	7.01E-09	0.0000	0.0000	8.84E-05
74		*	0.00	0.000	0.000	0.1669	0.0027	0.0000	8.48E-06	0.0007	0.0000	7.00E-09	0.0000	0.0000	8.82E-05
75	*	*	0.00	0.000	0.000	0.1669	0.0026	0.0000	8.34E-06	0.0007	0.0000	7.00E-09	0.0000	0.0000	8.81E-05
76	*	*	0.00	0.000	0.000	0.1669	0.0026	0.0000	8.21E-06	0.0007	0.0000	7.00E-09	0.0000	0.0000	8.80E-05
77		*	0.00	0.000	0.000	0.1669	0.0025	0.0000	8.07E-06	0.0007	0.0000	6.99E-09	0.0000	0.0000	8.79E-05
78		*	0.00	0.000	0.000	0.1669	0.0025	0.0000	7.94E-06	0.0007	0.0000	6.99E-09	0.0000	0.0000	8.78E-05
79	*	*	0.22	0.000	0.019	0.1669	0.0024	0.0000	7.81E-06	0.0006	0.0000	6.99E-09	0.0000	0.0000	8.77E-05
80	*	*	0.00	0.000	0.062	0.1669	0.0024	0.0000	7.68E-06	0.0006	0.0000	6.99E-09	0.0000	0.0000	8.76E-05
81		*	0.00	0.000	0.135	0.1669	0.0023	0.0000	7.56E-06	0.0006	0.0000	6.98E-09	0.0000	0.0000	8.75E-05
82	*	*	0.00	0.000	0.000	0.1669	0.0023	0.0000	7.43E-06	0.0006	0.0000	6.98E-09	0.0000	0.0000	8.73E-05
83	*	*	0.00	0.000	0.000	0.1669	0.0022	0.0000	7.31E-06	0.0006	0.0000	6.98E-09	0.0000	0.0000	8.72E-05
84		*	0.00	0.000	0.000	0.1669	0.0022	0.0000	7.19E-06	0.0006	0.0000	6.97E-09	0.0000	0.0000	8.71E-05
85		*	0.00	0.000	0.000	0.1669	0.0021	0.0000	7.07E-06	0.0006	0.0000	6.97E-09	0.0000	0.0000	8.70E-05
86		*	0.00	0.000	0.000	0.1669	0.0021	0.0000	6.95E-06	0.0006	0.0000	6.97E-09	0.0000	0.0000	8.69E-05
87		*	0.00	0.000	0.000	0.1669	0.0020	0.0000	6.83E-06	0.0006	0.0000	6.97E-09	0.0000	0.0000	8.68E-05
88		*	0.17	0.170	0.003	0.1669	0.0020	0.0000	6.72E-06	0.0006	0.0000	6.96E-09	0.0000	0.0000	8.67E-05
89		*	0.00	0.000	0.000	0.1669	0.0019	0.0000	6.61E-06	0.0005	0.0000	6.96E-09	0.0000	0.0000	8.66E-05
90		*	0.00	0.000	0.000	0.1669	0.0019	0.0000	6.50E-06	0.0005	0.0000	6.96E-09	0.0000	0.0000	8.65E-05
91	*	*	0.71	0.000	0.040	0.1669	0.0018	0.0000	6.39E-06	0.0005	0.0000	6.96E-09	0.0000	0.0000	8.64E-05
92	*	*	0.00	0.000	0.017	0.1669	0.0018	0.0000	6.28E-06	0.0005	0.0000	6.95E-09	0.0000	0.0000	8.63E-05
93	*	*	0.63	0.000	0.000	0.1669	0.0018	0.0000	6.17E-06	0.0005	0.0000	6.95E-09	0.0000	0.0000	8.62E-05
94		*	0.23	0.750	0.000	0.1669	0.0017	0.0000	6.07E-06	0.0005	0.0000	6.95E-09	0.0000	0.0000	8.60E-05
95	*	*	0.00	0.000	0.034	0.1669	0.0017	0.0000	5.96E-06	0.0005	0.0000	6.95E-09	0.0000	0.0000	8.59E-05
96	*	*	0.00	0.000	0.018	0.1669	0.0016	0.0000	5.86E-06	0.0005	0.0000	6.95E-09	0.0000	0.0000	8.58E-05
97	*	*	0.01	0.000	0.000	0.1669	0.0016	0.0000	5.76E-06	0.0005	0.0000	6.94E-09	0.0000	0.0000	8.57E-05
98		*	0.04	0.762	0.004	0.1669	0.0016	0.0000	5.66E-06	0.0005	0.0000	6.94E-09	0.0000	0.0000	8.56E-05
99		*	0.15	0.147	0.003	0.1669	0.0015	0.0000	5.57E-06	0.0005	0.0000	6.94E-09	0.0000	0.0000	8.55E-05
100	*	*	0.31	0.000	0.034	0.1669	0.0015	0.0000	5.47E-06	0.0004	0.0000	6.94E-09	0.0000	0.0000	8.54E-05
101	*	*	0.00	0.000	0.042	0.1669	0.0015	0.0000	5.38E-06	0.0004	0.0000	6.93E-09	0.0000	0.0000	8.53E-05
102		*	0.00	0.000	0.056	0.1669	0.0014	0.0000	5.28E-06	0.0004	0.0000	6.93E-09	0.0000	0.0000	8.52E-05
103	*	*	0.00	0.000	0.064	0.1669	0.0014	0.0000	5.19E-06	0.0004	0.0000	6.93E-09	0.0000	0.0000	8.51E-05
104		*	0.00	0.000	0.111	0.1669	0.0014	0.0000	5.10E-06	0.0004	0.0000	6.93E-09	0.0000	0.0000	8.50E-05
105		*	0.00	0.000	0.000	0.1669	0.0013	0.0000	5.01E-06	0.0004	0.0000	6.93E-09	0.0000	0.0000	8.49E-05
106		*	0.00	0.000	0.000	0.1669	0.0013	0.0000	4.93E-06	0.0004	0.0000	6.92E-09	0.0000	0.0000	8.48E-05

107		*	0.00	0.000	0.000	0.1669	0.0013	0.0000	4.84E-06	0.0004	0.0000	6.92E-09	0.0000	0.0000	8.47E-05
108		*	0.00	0.000	0.000	0.1669	0.0013	0.0000	4.76E-06	0.0004	0.0000	6.92E-09	0.0000	0.0000	8.46E-05
109		*	0.00	0.000	0.000	0.1669	0.0012	0.0000	4.67E-06	0.0004	0.0000	6.92E-09	0.0000	0.0000	8.45E-05
110	*	*	0.13	0.000	0.057	0.1669	0.0012	0.0000	4.59E-06	0.0004	0.0000	6.92E-09	0.0000	0.0000	8.44E-05
111		*	0.03	0.005	0.097	0.1669	0.0012	0.0000	4.51E-06	0.0004	0.0000	6.92E-09	0.0000	0.0000	8.43E-05
112			0.00	0.000	0.115	0.1605	0.0011	0.0000	4.43E-06	0.0004	0.0000	6.91E-09	0.0000	0.0000	8.42E-05
113			0.00	0.000	0.092	0.1554	0.0011	0.0000	4.35E-06	0.0004	0.0000	6.91E-09	0.0000	0.0000	8.41E-05
114	*		0.01	0.000	0.049	0.1535	0.0011	0.0000	4.27E-06	0.0003	0.0000	6.91E-09	0.0000	0.0000	8.40E-05
115	*		0.06	0.000	0.061	0.1535	0.0011	0.0000	4.20E-06	0.0003	0.0000	6.91E-09	0.0000	0.0000	8.39E-05
116	*		0.44	0.000	0.022	0.1546	0.0010	0.0000	4.12E-06	0.0003	0.0000	6.91E-09	0.0000	0.0000	8.38E-05
117			0.03	0.245	0.030	0.1628	0.0010	0.0000	4.05E-06	0.0003	0.0000	6.90E-09	0.0000	0.0000	8.36E-05
118	*		0.65	0.000	0.034	0.1639	0.0010	0.0000	3.98E-06	0.0003	0.0000	6.90E-09	0.0000	0.0000	8.35E-05
119	*		0.00	0.000	0.027	0.1650	0.0010	0.0000	3.91E-06	0.0003	0.0000	6.90E-09	0.0000	0.0000	8.34E-05
120	*		0.06	0.000	0.028	0.1661	0.0009	0.0000	3.84E-06	0.0003	0.0000	6.90E-09	0.0000	0.0000	8.33E-05
121			0.00	0.282	0.142	0.1736	0.0009	0.0000	3.77E-06	0.0003	0.0000	6.90E-09	0.0000	0.0000	8.32E-05
122			0.08	0.000	0.234	0.1649	0.0015	0.0000	5.26E-06	0.0003	0.0000	6.90E-09	0.0000	0.0000	8.31E-05
123			0.15	0.000	0.193	0.1625	0.0049	0.0000	1.32E-05	0.0003	0.0000	6.90E-09	0.0000	0.0000	8.30E-05
124			0.46	0.118	0.244	0.1681	0.0063	0.0000	1.62E-05	0.0003	0.0000	6.90E-09	0.0000	0.0000	8.29E-05
125	*		0.00	0.000	0.104	0.1624	0.0061	0.0000	1.59E-05	0.0003	0.0000	6.90E-09	0.0000	0.0000	8.28E-05
126			0.00	0.000	0.226	0.1493	0.0155	0.0001	3.07E-05	0.0003	0.0000	6.91E-09	0.0000	0.0000	8.27E-05
127			0.00	0.000	0.210	0.1376	0.0308	0.0002	5.41E-05	0.0003	0.0000	6.91E-09	0.0000	0.0000	8.26E-05
128			0.00	0.000	0.111	0.1314	0.0302	0.0001	5.34E-05	0.0003	0.0000	6.91E-09	0.0000	0.0000	8.26E-05
129			1.28	1.013	0.064	0.1425	0.0297	0.0001	5.27E-05	0.0003	0.0000	6.91E-09	0.0000	0.0000	8.25E-05
130			0.30	0.115	0.204	0.1409	0.0450	0.0002	7.20E-05	0.0003	0.0000	6.90E-09	0.0000	0.0000	8.24E-05
131			0.07	0.000	0.055	0.1420	0.0534	0.0003	8.24E-05	0.0003	0.0000	6.90E-09	0.0000	0.0000	8.23E-05
132			0.28	0.129	0.056	0.1472	0.0525	0.0003	8.13E-05	0.0003	0.0000	6.90E-09	0.0000	0.0000	8.22E-05
133			0.00	0.000	0.111	0.1410	0.0516	0.0003	8.02E-05	0.0003	0.0000	6.90E-09	0.0000	0.0000	8.21E-05
134			0.24	0.061	0.226	0.1381	0.0507	0.0002	7.92E-05	0.0003	0.0000	6.90E-09	0.0000	0.0000	8.20E-05
135			0.00	0.000	0.109	0.1321	0.0498	0.0002	7.81E-05	0.0003	0.0000	6.90E-09	0.0000	0.0000	8.19E-05
136			0.39	0.155	0.138	0.1372	0.0568	0.0003	8.63E-05	0.0003	0.0000	6.90E-09	0.0000	0.0000	8.18E-05
137			0.00	0.000	0.057	0.1340	0.0605	0.0003	9.06E-05	0.0003	0.0000	6.89E-09	0.0000	0.0000	8.17E-05
138			0.00	0.000	0.076	0.1298	0.0605	0.0003	9.06E-05	0.0003	0.0000	6.89E-09	0.0000	0.0000	8.16E-05
139			0.00	0.000	0.017	0.1288	0.0600	0.0003	9.00E-05	0.0003	0.0000	6.89E-09	0.0000	0.0000	8.15E-05
140			0.00	0.000	0.002	0.1287	0.0602	0.0003	9.02E-05	0.0003	0.0000	6.89E-09	0.0000	0.0000	8.14E-05
141			0.09	0.000	0.008	0.1334	0.0598	0.0003	8.98E-05	0.0003	0.0000	6.89E-09	0.0000	0.0000	8.13E-05
142			0.04	0.000	0.017	0.1349	0.0588	0.0003	8.87E-05	0.0003	0.0000	6.89E-09	0.0000	0.0000	8.12E-05
143			0.67	0.500	0.038	0.1421	0.0578	0.0003	8.75E-05	0.0003	0.0000	6.89E-09	0.0000	0.0000	8.11E-05
144			0.16	0.028	0.060	0.1461	0.0569	0.0003	8.64E-05	0.0003	0.0000	6.89E-09	0.0000	0.0000	8.10E-05

145	0.00	0.000	0.096	0.1408	0.0559	0.0003	8.53E-05	0.0003	0.0000	6.88E-09	0.0000	0.0000	8.09E-05
146	0.00	0.000	0.153	0.1323	0.0550	0.0003	8.42E-05	0.0003	0.0000	6.88E-09	0.0000	0.0000	8.08E-05
147	0.00	0.000	0.050	0.1295	0.0540	0.0003	8.31E-05	0.0002	0.0000	6.88E-09	0.0000	0.0000	8.07E-05
148	0.00	0.000	0.013	0.1287	0.0565	0.0003	8.59E-05	0.0002	0.0000	6.88E-09	0.0000	0.0000	8.06E-05
149	0.00	0.000	0.000	0.1287	0.0579	0.0003	8.76E-05	0.0002	0.0000	6.88E-09	0.0000	0.0000	8.05E-05
150	0.00	0.000	0.000	0.1287	0.0569	0.0003	8.64E-05	0.0002	0.0000	6.88E-09	0.0000	0.0000	8.04E-05
151	0.00	0.000	0.000	0.1287	0.0560	0.0003	8.53E-05	0.0002	0.0000	6.88E-09	0.0000	0.0000	8.03E-05
152	0.00	0.000	0.000	0.1287	0.0550	0.0003	8.43E-05	0.0002	0.0000	6.88E-09	0.0000	0.0000	8.02E-05
153	0.00	0.000	0.000	0.1287	0.0541	0.0003	8.31E-05	0.0002	0.0000	6.88E-09	0.0000	0.0000	8.02E-05
154	0.00	0.000	0.000	0.1287	0.0532	0.0003	8.21E-05	0.0002	0.0000	6.87E-09	0.0000	0.0000	8.01E-05
155	0.00	0.000	0.000	0.1287	0.0522	0.0003	8.10E-05	0.0002	0.0000	6.87E-09	0.0000	0.0000	8.00E-05
156	0.00	0.000	0.000	0.1287	0.0513	0.0003	7.99E-05	0.0002	0.0000	6.87E-09	0.0000	0.0000	7.99E-05
157	0.00	0.000	0.000	0.1287	0.0505	0.0002	7.89E-05	0.0002	0.0000	6.87E-09	0.0000	0.0000	7.98E-05
158	0.00	0.000	0.000	0.1287	0.0496	0.0002	7.78E-05	0.0002	0.0000	6.87E-09	0.0000	0.0000	7.97E-05
159	0.00	0.000	0.000	0.1287	0.0487	0.0002	7.68E-05	0.0002	0.0000	6.87E-09	0.0000	0.0000	7.96E-05
160	0.00	0.000	0.000	0.1287	0.0479	0.0002	7.58E-05	0.0002	0.0000	6.87E-09	0.0000	0.0000	7.95E-05
161	0.00	0.000	0.000	0.1287	0.0471	0.0002	7.48E-05	0.0002	0.0000	6.87E-09	0.0000	0.0000	7.94E-05
162	0.00	0.000	0.000	0.1287	0.0463	0.0002	7.38E-05	0.0002	0.0000	6.87E-09	0.0000	0.0000	7.93E-05
163	0.00	0.000	0.000	0.1287	0.0455	0.0002	7.28E-05	0.0002	0.0000	6.87E-09	0.0000	0.0000	7.92E-05
164	0.39	0.202	0.021	0.1382	0.0447	0.0002	7.19E-05	0.0002	0.0000	6.87E-09	0.0000	0.0000	7.91E-05
165	0.13	0.005	0.011	0.1443	0.0439	0.0002	7.09E-05	0.0002	0.0000	6.87E-09	0.0000	0.0000	7.91E-05
166	0.16	0.041	0.011	0.1504	0.0431	0.0002	7.00E-05	0.0002	0.0000	6.87E-09	0.0000	0.0000	7.90E-05
167	0.28	0.146	0.020	0.1568	0.0424	0.0002	6.91E-05	0.0002	0.0000	6.86E-09	0.0000	0.0000	7.89E-05
168	0.10	0.000	0.176	0.1524	0.0417	0.0002	6.82E-05	0.0002	0.0000	6.86E-09	0.0000	0.0000	7.88E-05
169	0.00	0.000	0.013	0.1518	0.0409	0.0002	6.73E-05	0.0002	0.0000	6.86E-09	0.0000	0.0000	7.87E-05
170	0.00	0.000	0.013	0.1511	0.0402	0.0002	6.64E-05	0.0002	0.0000	6.86E-09	0.0000	0.0000	7.86E-05
171	0.37	0.204	0.020	0.1593	0.0398	0.0002	6.58E-05	0.0002	0.0000	6.86E-09	0.0000	0.0000	7.85E-05
172	0.00	0.000	0.189	0.1488	0.0396	0.0002	6.55E-05	0.0002	0.0000	6.86E-09	0.0000	0.0000	7.84E-05
173	0.00	0.000	0.010	0.1482	0.0390	0.0002	6.48E-05	0.0002	0.0000	6.86E-09	0.0000	0.0000	7.83E-05
174	0.00	0.000	0.010	0.1477	0.0383	0.0002	6.40E-05	0.0002	0.0000	6.86E-09	0.0000	0.0000	7.82E-05
175	0.00	0.000	0.010	0.1471	0.0377	0.0002	6.31E-05	0.0002	0.0000	6.86E-09	0.0000	0.0000	7.82E-05
176	0.68	0.499	0.018	0.1563	0.0370	0.0002	6.23E-05	0.0002	0.0000	6.86E-09	0.0000	0.0000	7.81E-05
177	0.00	0.000	0.144	0.1483	0.0363	0.0002	6.14E-05	0.0002	0.0000	6.86E-09	0.0000	0.0000	7.80E-05
178	0.95	0.511	0.286	0.1570	0.0357	0.0002	6.06E-05	0.0002	0.0000	6.86E-09	0.0000	0.0000	7.79E-05
179	0.87	0.469	0.288	0.1635	0.0351	0.0002	5.98E-05	0.0002	0.0000	6.86E-09	0.0000	0.0000	7.78E-05
180	0.93	0.499	0.317	0.1699	0.0345	0.0002	5.91E-05	0.0002	0.0000	6.86E-09	0.0000	0.0000	7.77E-05
181	0.00	0.000	0.224	0.1575	0.0339	0.0002	5.83E-05	0.0002	0.0000	6.86E-09	0.0000	0.0000	7.76E-05
182	0.00	0.000	0.209	0.1458	0.0362	0.0002	6.13E-05	0.0002	0.0000	6.86E-09	0.0000	0.0000	7.75E-05

183	0.00	0.000	0.225	0.1333	0.0372	0.0002	6.26E-05	0.0002	0.0000	6.86E-09	0.0000	0.0000	7.75E-05
184	0.00	0.000	0.065	0.1293	0.0419	0.0002	6.83E-05	0.0002	0.0000	6.86E-09	0.0000	0.0000	7.74E-05
185	0.00	0.000	0.006	0.1287	0.0641	0.0003	9.46E-05	0.0002	0.0000	6.85E-09	0.0000	0.0000	7.73E-05
186	0.00	0.000	0.000	0.1287	0.0673	0.0003	9.83E-05	0.0002	0.0000	6.85E-09	0.0000	0.0000	7.72E-05
187	0.00	0.000	0.000	0.1287	0.0663	0.0003	9.71E-05	0.0002	0.0000	6.85E-09	0.0000	0.0000	7.71E-05
188	0.01	0.000	0.006	0.1287	0.0652	0.0003	9.59E-05	0.0002	0.0000	6.85E-09	0.0000	0.0000	7.70E-05
189	0.03	0.000	0.006	0.1297	0.0641	0.0003	9.47E-05	0.0002	0.0000	6.85E-09	0.0000	0.0000	7.69E-05
190	0.82	0.608	0.032	0.1398	0.0630	0.0003	9.34E-05	0.0001	0.0000	6.85E-09	0.0000	0.0000	7.68E-05
191	0.00	0.000	0.145	0.1318	0.0620	0.0003	9.22E-05	0.0001	0.0000	6.85E-09	0.0000	0.0000	7.68E-05
192	0.04	0.000	0.021	0.1328	0.0609	0.0003	9.10E-05	0.0001	0.0000	6.85E-09	0.0000	0.0000	7.67E-05
193	0.54	0.349	0.029	0.1416	0.0599	0.0003	8.98E-05	0.0001	0.0000	6.85E-09	0.0000	0.0000	7.66E-05
194	0.02	0.000	0.168	0.1332	0.0588	0.0003	8.87E-05	0.0001	0.0000	6.85E-09	0.0000	0.0000	7.65E-05
195	0.35	0.143	0.190	0.1340	0.0617	0.0003	9.20E-05	0.0001	0.0000	6.85E-09	0.0000	0.0000	7.64E-05
196	0.00	0.000	0.037	0.1319	0.0630	0.0003	9.34E-05	0.0001	0.0000	6.85E-09	0.0000	0.0000	7.63E-05
197	0.16	0.008	0.063	0.1366	0.0643	0.0003	9.49E-05	0.0001	0.0000	6.85E-09	0.0000	0.0000	7.62E-05
198	0.04	0.000	0.042	0.1363	0.0646	0.0003	9.53E-05	0.0001	0.0000	6.85E-09	0.0000	0.0000	7.62E-05
199	0.41	0.224	0.050	0.1437	0.0636	0.0003	9.40E-05	0.0001	0.0000	6.85E-09	0.0000	0.0000	7.61E-05
200	0.00	0.000	0.151	0.1353	0.0625	0.0003	9.28E-05	0.0001	0.0000	6.85E-09	0.0000	0.0000	7.60E-05
201	0.00	0.000	0.026	0.1338	0.0621	0.0003	9.24E-05	0.0001	0.0000	6.85E-09	0.0000	0.0000	7.59E-05
202	0.00	0.000	0.023	0.1325	0.0614	0.0003	9.17E-05	0.0001	0.0000	6.85E-09	0.0000	0.0000	7.58E-05
203	0.00	0.000	0.027	0.1312	0.0604	0.0003	9.05E-05	0.0001	0.0000	6.85E-09	0.0000	0.0000	7.57E-05
204	0.09	0.000	0.028	0.1348	0.0594	0.0003	8.93E-05	0.0001	0.0000	6.85E-09	0.0000	0.0000	7.57E-05
205	0.36	0.202	0.030	0.1419	0.0584	0.0003	8.81E-05	0.0001	0.0000	6.85E-09	0.0000	0.0000	7.56E-05
206	0.07	0.000	0.162	0.1367	0.0595	0.0003	8.94E-05	0.0001	0.0000	6.85E-09	0.0000	0.0000	7.55E-05
207	0.28	0.136	0.029	0.1432	0.0646	0.0003	9.52E-05	0.0001	0.0000	6.85E-09	0.0000	0.0000	7.54E-05
208	0.35	0.111	0.276	0.1412	0.0635	0.0003	9.40E-05	0.0001	0.0000	6.85E-09	0.0000	0.0000	7.53E-05
209	0.00	0.000	0.138	0.1335	0.0643	0.0003	9.49E-05	0.0001	0.0000	6.85E-09	0.0000	0.0000	7.52E-05
210	0.00	0.000	0.058	0.1303	0.0666	0.0003	9.75E-05	0.0001	0.0000	6.85E-09	0.0000	0.0000	7.52E-05
211	0.65	0.404	0.063	0.1401	0.0655	0.0003	9.62E-05	0.0001	0.0000	6.85E-09	0.0000	0.0000	7.51E-05
212	0.42	0.117	0.256	0.1429	0.0644	0.0003	9.50E-05	0.0001	0.0000	6.85E-09	0.0000	0.0000	7.50E-05
213	0.00	0.000	0.158	0.1341	0.0633	0.0003	9.37E-05	0.0001	0.0000	6.85E-09	0.0000	0.0000	7.49E-05
214	0.00	0.000	0.067	0.1302	0.0682	0.0003	9.92E-05	0.0001	0.0000	6.85E-09	0.0000	0.0000	7.48E-05
215	0.01	0.000	0.026	0.1291	0.0706	0.0003	1.02E-04	0.0001	0.0000	6.85E-09	0.0000	0.0000	7.48E-05
216	0.02	0.000	0.012	0.1293	0.0751	0.0004	1.07E-04	0.0001	0.0000	6.85E-09	0.0000	0.0000	7.47E-05
217	0.02	0.000	0.008	0.1298	0.0773	0.0004	1.09E-04	0.0001	0.0000	6.85E-09	0.0000	0.0000	7.46E-05
218	0.65	0.426	0.042	0.1398	0.0760	0.0004	1.08E-04	0.0001	0.0000	6.85E-09	0.0000	0.0000	7.45E-05
219	0.57	0.271	0.179	0.1462	0.0747	0.0004	1.06E-04	0.0001	0.0000	6.85E-09	0.0000	0.0000	7.44E-05
220	1.01	0.620	0.275	0.1527	0.0735	0.0004	1.05E-04	0.0001	0.0000	6.85E-09	0.0000	0.0000	7.44E-05

221	0.86	0.501	0.243	0.1592	0.0722	0.0004	1.04E-04	0.0001	0.0000	6.85E-09	0.0000	0.0000	7.43E-05
222	0.25	0.106	0.180	0.1571	0.0710	0.0003	1.02E-04	0.0001	0.0000	6.85E-09	0.0000	0.0000	7.42E-05
223	0.21	0.070	0.171	0.1554	0.0698	0.0003	1.01E-04	0.0001	0.0000	6.85E-09	0.0000	0.0000	7.41E-05
224	0.00	0.000	0.090	0.1504	0.0686	0.0003	9.97E-05	0.0002	0.0000	6.86E-09	0.0000	0.0000	7.40E-05
225	0.01	0.000	0.102	0.1449	0.0736	0.0004	1.05E-04	0.0002	0.0000	6.88E-09	0.0000	0.0000	7.40E-05
226	0.00	0.000	0.155	0.1363	0.0760	0.0004	1.08E-04	0.0003	0.0000	6.90E-09	0.0000	0.0000	7.39E-05
227	0.00	0.000	0.117	0.1298	0.0747	0.0004	1.06E-04	0.0004	0.0000	6.92E-09	0.0000	0.0000	7.38E-05
228	0.81	0.464	0.147	0.1408	0.0735	0.0004	1.05E-04	0.0005	0.0000	6.94E-09	0.0000	0.0000	7.37E-05
229	0.23	0.103	0.076	0.1436	0.0759	0.0004	1.08E-04	0.0005	0.0000	6.96E-09	0.0000	0.0000	7.36E-05
230	0.25	0.106	0.124	0.1448	0.0807	0.0004	1.13E-04	0.0006	0.0000	6.98E-09	0.0000	0.0000	7.36E-05
231	0.52	0.114	0.298	0.1510	0.0793	0.0004	1.11E-04	0.0007	0.0000	7.00E-09	0.0000	0.0000	7.35E-05
232	0.05	0.000	0.076	0.1496	0.0780	0.0004	1.10E-04	0.0008	0.0000	7.02E-09	0.0000	0.0000	7.34E-05
233	0.04	0.000	0.152	0.1434	0.0767	0.0004	1.09E-04	0.0008	0.0000	7.04E-09	0.0000	0.0000	7.33E-05
234	0.40	0.116	0.269	0.1444	0.0754	0.0004	1.07E-04	0.0009	0.0000	7.05E-09	0.0000	0.0000	7.32E-05
235	0.52	0.273	0.126	0.1509	0.0741	0.0004	1.06E-04	0.0010	0.0000	7.07E-09	0.0000	0.0000	7.32E-05
236	0.00	0.000	0.102	0.1452	0.0729	0.0004	1.04E-04	0.0010	0.0000	7.09E-09	0.0000	0.0000	7.31E-05
237	0.21	0.071	0.111	0.1468	0.0762	0.0004	1.08E-04	0.0011	0.0000	7.10E-09	0.0000	0.0000	7.30E-05
238	0.00	0.000	0.151	0.1384	0.0777	0.0004	1.10E-04	0.0012	0.0000	7.12E-09	0.0000	0.0000	7.29E-05
239	0.00	0.000	0.148	0.1301	0.0784	0.0004	1.10E-04	0.0012	0.0000	7.13E-09	0.0000	0.0000	7.29E-05
240	0.15	0.000	0.034	0.1364	0.0783	0.0004	1.10E-04	0.0013	0.0000	7.15E-09	0.0000	0.0000	7.28E-05
241	0.00	0.000	0.080	0.1317	0.0825	0.0004	1.15E-04	0.0013	0.0000	7.16E-09	0.0000	0.0000	7.27E-05
242	0.00	0.000	0.042	0.1294	0.0843	0.0004	1.17E-04	0.0014	0.0000	7.18E-09	0.0000	0.0000	7.26E-05
243	0.00	0.000	0.010	0.1289	0.0829	0.0004	1.15E-04	0.0015	0.0000	7.19E-09	0.0000	0.0000	7.25E-05
244	0.00	0.000	0.002	0.1287	0.0828	0.0004	1.15E-04	0.0015	0.0000	7.21E-09	0.0000	0.0000	7.25E-05
245	0.00	0.000	0.000	0.1287	0.0821	0.0004	1.14E-04	0.0016	0.0000	7.22E-09	0.0000	0.0000	7.24E-05
246	0.00	0.000	0.000	0.1287	0.0809	0.0004	1.13E-04	0.0016	0.0000	7.23E-09	0.0000	0.0000	7.23E-05
247	0.22	0.051	0.006	0.1379	0.0796	0.0004	1.12E-04	0.0017	0.0000	7.24E-09	0.0000	0.0000	7.22E-05
248	0.00	0.000	0.012	0.1373	0.0782	0.0004	1.10E-04	0.0017	0.0000	7.26E-09	0.0000	0.0000	7.22E-05
249	0.00	0.000	0.013	0.1366	0.0769	0.0004	1.09E-04	0.0018	0.0000	7.27E-09	0.0000	0.0000	7.21E-05
250	0.13	0.000	0.019	0.1428	0.0756	0.0004	1.07E-04	0.0018	0.0000	7.28E-09	0.0000	0.0000	7.20E-05
251	0.19	0.060	0.015	0.1490	0.0743	0.0004	1.06E-04	0.0019	0.0000	7.29E-09	0.0000	0.0000	7.19E-05
252	1.28	1.141	0.026	0.1555	0.0731	0.0004	1.05E-04	0.0019	0.0000	7.30E-09	0.0000	0.0000	7.19E-05
253	0.21	0.066	0.098	0.1577	0.0721	0.0004	1.04E-04	0.0020	0.0000	7.32E-09	0.0000	0.0000	7.18E-05
254	0.00	0.000	0.134	0.1503	0.0711	0.0004	1.02E-04	0.0020	0.0000	7.33E-09	0.0000	0.0000	7.17E-05
255	0.12	0.000	0.117	0.1502	0.0699	0.0003	1.01E-04	0.0021	0.0000	7.34E-09	0.0000	0.0000	7.16E-05
256	0.14	0.000	0.137	0.1507	0.0687	0.0003	9.98E-05	0.0021	0.0000	7.35E-09	0.0000	0.0000	7.16E-05
257	0.08	0.000	0.115	0.1486	0.0745	0.0004	1.06E-04	0.0022	0.0000	7.36E-09	0.0000	0.0000	7.15E-05
258	0.04	0.000	0.099	0.1455	0.0774	0.0004	1.09E-04	0.0022	0.0000	7.37E-09	0.0000	0.0000	7.14E-05

259		0.00	0.000	0.143	0.1376	0.0761	0.0004	1.08E-04	0.0023	0.0000	7.38E-09	0.0000	0.0000	7.13E-05
260		0.00	0.000	0.088	0.1326	0.0784	0.0004	1.10E-04	0.0023	0.0000	7.39E-09	0.0000	0.0000	7.13E-05
261		0.08	0.000	0.053	0.1341	0.0793	0.0004	1.11E-04	0.0024	0.0000	7.40E-09	0.0000	0.0000	7.12E-05
262		0.00	0.000	0.027	0.1324	0.0802	0.0004	1.12E-04	0.0024	0.0000	7.41E-09	0.0000	0.0000	7.11E-05
263		0.00	0.000	0.016	0.1315	0.0855	0.0004	1.18E-04	0.0024	0.0000	7.42E-09	0.0000	0.0000	7.10E-05
264		0.00	0.000	0.011	0.1309	0.0841	0.0004	1.16E-04	0.0025	0.0000	7.43E-09	0.0000	0.0000	7.10E-05
265		0.00	0.000	0.009	0.1304	0.0827	0.0004	1.15E-04	0.0025	0.0000	7.44E-09	0.0000	0.0000	7.09E-05
266		0.00	0.000	0.008	0.1302	0.0817	0.0004	1.14E-04	0.0026	0.0000	7.44E-09	0.0000	0.0000	7.08E-05
267		0.07	0.000	0.007	0.1336	0.0811	0.0004	1.13E-04	0.0026	0.0000	7.45E-09	0.0000	0.0000	7.08E-05
268		0.28	0.136	0.021	0.1406	0.0798	0.0004	1.12E-04	0.0026	0.0000	7.46E-09	0.0000	0.0000	7.07E-05
269		0.19	0.073	0.014	0.1466	0.0785	0.0004	1.10E-04	0.0027	0.0000	7.47E-09	0.0000	0.0000	7.06E-05
270		0.11	0.000	0.051	0.1497	0.0772	0.0004	1.09E-04	0.0027	0.0000	7.48E-09	0.0000	0.0000	7.05E-05
271		0.02	0.000	0.083	0.1464	0.0759	0.0004	1.08E-04	0.0027	0.0000	7.48E-09	0.0000	0.0000	7.05E-05
272		0.00	0.000	0.096	0.1410	0.0746	0.0004	1.06E-04	0.0028	0.0000	7.49E-09	0.0000	0.0000	7.04E-05
273		0.00	0.000	0.042	0.1387	0.0734	0.0004	1.05E-04	0.0028	0.0000	7.50E-09	0.0000	0.0000	7.03E-05
274	*	0.01	0.000	0.039	0.1370	0.0730	0.0004	1.05E-04	0.0028	0.0000	7.51E-09	0.0000	0.0000	7.02E-05
275		0.01	0.000	0.030	0.1361	0.0723	0.0004	1.04E-04	0.0029	0.0000	7.52E-09	0.0000	0.0000	7.02E-05
276	*	0.02	0.000	0.041	0.1349	0.0711	0.0004	1.02E-04	0.0029	0.0000	7.52E-09	0.0000	0.0000	7.01E-05
277	*	0.12	0.000	0.043	0.1359	0.0699	0.0003	1.01E-04	0.0029	0.0000	7.53E-09	0.0000	0.0000	7.00E-05
278		0.00	0.000	0.074	0.1352	0.0687	0.0003	9.98E-05	0.0030	0.0000	7.54E-09	0.0000	0.0000	7.00E-05
279		0.05	0.000	0.024	0.1367	0.0675	0.0003	9.85E-05	0.0030	0.0000	7.54E-09	0.0000	0.0000	6.99E-05
280		0.00	0.000	0.022	0.1355	0.0664	0.0003	9.72E-05	0.0030	0.0000	7.55E-09	0.0000	0.0000	6.98E-05
281		0.00	0.000	0.020	0.1344	0.0653	0.0003	9.60E-05	0.0031	0.0000	7.56E-09	0.0000	0.0000	6.97E-05
282		0.00	0.000	0.020	0.1332	0.0642	0.0003	9.47E-05	0.0031	0.0000	7.56E-09	0.0000	0.0000	6.97E-05
283		0.04	0.000	0.024	0.1343	0.0641	0.0003	9.46E-05	0.0031	0.0000	7.57E-09	0.0000	0.0000	6.96E-05
284		0.00	0.000	0.017	0.1334	0.0646	0.0003	9.53E-05	0.0031	0.0000	7.57E-09	0.0000	0.0000	6.95E-05
285		0.00	0.000	0.014	0.1325	0.0646	0.0003	9.52E-05	0.0032	0.0000	7.58E-09	0.0000	0.0000	6.95E-05
286		0.00	0.000	0.011	0.1321	0.0641	0.0003	9.46E-05	0.0032	0.0000	7.59E-09	0.0000	0.0000	6.94E-05
287		0.00	0.000	0.012	0.1314	0.0633	0.0003	9.38E-05	0.0032	0.0000	7.59E-09	0.0000	0.0000	6.93E-05
288		0.00	0.000	0.011	0.1307	0.0624	0.0003	9.28E-05	0.0033	0.0000	7.60E-09	0.0000	0.0000	6.93E-05
289		0.17	0.028	0.009	0.1382	0.0614	0.0003	9.16E-05	0.0033	0.0000	7.60E-09	0.0000	0.0000	6.92E-05
290		0.00	0.000	0.009	0.1378	0.0604	0.0003	9.04E-05	0.0033	0.0000	7.61E-09	0.0000	0.0000	6.91E-05
291		0.00	0.000	0.007	0.1374	0.0596	0.0003	8.95E-05	0.0033	0.0000	7.61E-09	0.0000	0.0000	6.90E-05
292		0.00	0.000	0.008	0.1369	0.0587	0.0003	8.85E-05	0.0033	0.0000	7.62E-09	0.0000	0.0000	6.90E-05
293		0.00	0.000	0.009	0.1364	0.0577	0.0003	8.73E-05	0.0034	0.0000	7.62E-09	0.0000	0.0000	6.89E-05
294	*	0.00	0.000	0.000	0.1364	0.0567	0.0003	8.62E-05	0.0034	0.0000	7.63E-09	0.0000	0.0000	6.88E-05
295	*	0.00	0.000	0.000	0.1364	0.0557	0.0003	8.51E-05	0.0034	0.0000	7.63E-09	0.0000	0.0000	6.88E-05
296	*	0.04	0.000	0.015	0.1375	0.0548	0.0003	8.40E-05	0.0034	0.0000	7.64E-09	0.0000	0.0000	6.87E-05

297	*		0.00	0.000	0.008	0.1376	0.0538	0.0003	8.29E-05	0.0035	0.0000	7.64E-09	0.0000	0.0000	6.86E-05
298	*		0.00	0.000	0.000	0.1376	0.0529	0.0003	8.18E-05	0.0035	0.0000	7.65E-09	0.0000	0.0000	6.86E-05
299	*		0.00	0.000	0.000	0.1376	0.0520	0.0003	8.07E-05	0.0035	0.0000	7.65E-09	0.0000	0.0000	6.85E-05
300	*		0.00	0.000	0.000	0.1376	0.0511	0.0003	7.97E-05	0.0035	0.0000	7.66E-09	0.0000	0.0000	6.84E-05
301	*		0.00	0.000	0.000	0.1376	0.0502	0.0002	7.86E-05	0.0035	0.0000	7.66E-09	0.0000	0.0000	6.84E-05
302	*		0.00	0.000	0.000	0.1376	0.0494	0.0002	7.76E-05	0.0036	0.0000	7.67E-09	0.0000	0.0000	6.83E-05
303	*		0.00	0.000	0.003	0.1376	0.0485	0.0002	7.66E-05	0.0036	0.0000	7.67E-09	0.0000	0.0000	6.82E-05
304	*		0.00	0.000	0.000	0.1376	0.0477	0.0002	7.55E-05	0.0036	0.0000	7.68E-09	0.0000	0.0000	6.81E-05
305	*		0.00	0.000	0.000	0.1376	0.0469	0.0002	7.46E-05	0.0036	0.0000	7.68E-09	0.0000	0.0000	6.81E-05
306	*		0.00	0.000	0.000	0.1376	0.0460	0.0002	7.36E-05	0.0036	0.0000	7.68E-09	0.0000	0.0000	6.80E-05
307			0.00	0.000	0.010	0.1370	0.0453	0.0002	7.26E-05	0.0037	0.0000	7.69E-09	0.0000	0.0000	6.79E-05
308			0.00	0.000	0.012	0.1365	0.0445	0.0002	7.16E-05	0.0037	0.0000	7.69E-09	0.0000	0.0000	6.79E-05
309			0.12	0.000	0.014	0.1423	0.0437	0.0002	7.07E-05	0.0037	0.0000	7.70E-09	0.0000	0.0000	6.78E-05
310			0.00	0.000	0.007	0.1419	0.0429	0.0002	6.98E-05	0.0037	0.0000	7.70E-09	0.0000	0.0000	6.77E-05
311			0.00	0.000	0.006	0.1416	0.0424	0.0002	6.91E-05	0.0037	0.0000	7.70E-09	0.0000	0.0000	6.77E-05
312			0.00	0.000	0.007	0.1412	0.0418	0.0002	6.83E-05	0.0037	0.0000	7.71E-09	0.0000	0.0000	6.76E-05
313			0.01	0.000	0.011	0.1409	0.0411	0.0002	6.74E-05	0.0038	0.0000	7.71E-09	0.0000	0.0000	6.75E-05
314	*		0.00	0.000	0.009	0.1404	0.0404	0.0002	6.65E-05	0.0038	0.0000	7.71E-09	0.0000	0.0000	6.75E-05
315	*		0.00	0.000	0.000	0.1404	0.0397	0.0002	6.57E-05	0.0038	0.0000	7.72E-09	0.0000	0.0000	6.74E-05
316	*		0.00	0.000	0.000	0.1404	0.0390	0.0002	6.48E-05	0.0038	0.0000	7.72E-09	0.0000	0.0000	6.73E-05
317	*		0.00	0.000	0.000	0.1404	0.0383	0.0002	6.39E-05	0.0038	0.0000	7.72E-09	0.0000	0.0000	6.73E-05
318	*	*	0.00	0.000	0.000	0.1404	0.0376	0.0002	6.31E-05	0.0038	0.0000	7.73E-09	0.0000	0.0000	6.72E-05
319	*	*	0.00	0.000	0.000	0.1404	0.0370	0.0002	6.22E-05	0.0038	0.0000	7.72E-09	0.0000	0.0000	6.71E-05
320	*	*	0.00	0.000	0.000	0.1404	0.0363	0.0002	6.14E-05	0.0037	0.0000	7.71E-09	0.0000	0.0000	6.71E-05
321	*	*	0.00	0.000	0.000	0.1404	0.0357	0.0002	6.06E-05	0.0037	0.0000	7.69E-09	0.0000	0.0000	6.70E-05
322	*	*	0.00	0.000	0.000	0.1404	0.0350	0.0002	5.98E-05	0.0036	0.0000	7.68E-09	0.0000	0.0000	6.69E-05
323	*	*	0.00	0.000	0.000	0.1404	0.0344	0.0002	5.90E-05	0.0036	0.0000	7.66E-09	0.0000	0.0000	6.69E-05
324	*	*	0.00	0.000	0.000	0.1404	0.0338	0.0002	5.82E-05	0.0035	0.0000	7.65E-09	0.0000	0.0000	6.68E-05
325	*	*	0.00	0.000	0.000	0.1404	0.0332	0.0002	5.74E-05	0.0034	0.0000	7.64E-09	0.0000	0.0000	6.68E-05
326	*	*	0.00	0.000	0.000	0.1404	0.0326	0.0002	5.66E-05	0.0034	0.0000	7.62E-09	0.0000	0.0000	6.67E-05
327	*	*	0.23	0.000	0.041	0.1404	0.0321	0.0002	5.59E-05	0.0033	0.0000	7.61E-09	0.0000	0.0000	6.66E-05
328		*	0.00	0.089	0.032	0.1444	0.0315	0.0002	5.51E-05	0.0033	0.0000	7.60E-09	0.0000	0.0000	6.66E-05
329		*	0.01	0.000	0.004	0.1449	0.0309	0.0002	5.44E-05	0.0032	0.0000	7.59E-09	0.0000	0.0000	6.65E-05
330		*	0.17	0.164	0.004	0.1449	0.0304	0.0001	5.36E-05	0.0031	0.0000	7.57E-09	0.0000	0.0000	6.64E-05
331		*	0.00	0.000	0.002	0.1450	0.0299	0.0001	5.29E-05	0.0031	0.0000	7.56E-09	0.0000	0.0000	6.64E-05
332		*	0.00	0.000	0.000	0.1450	0.0293	0.0001	5.22E-05	0.0030	0.0000	7.55E-09	0.0000	0.0000	6.63E-05
333		*	0.00	0.000	0.000	0.1450	0.0288	0.0001	5.15E-05	0.0030	0.0000	7.54E-09	0.0000	0.0000	6.62E-05
334	*	*	0.00	0.000	0.000	0.1450	0.0283	0.0001	5.08E-05	0.0029	0.0000	7.53E-09	0.0000	0.0000	6.62E-05

335		*	0.00	0.000	0.000	0.1450	0.0278	0.0001	5.01E-05	0.0029	0.0000	7.52E-09	0.0000	0.0000	6.61E-05
336	*	*	0.01	0.000	0.008	0.1450	0.0273	0.0001	4.94E-05	0.0028	0.0000	7.50E-09	0.0000	0.0000	6.60E-05
337	*	*	0.00	0.000	0.000	0.1450	0.0268	0.0001	4.87E-05	0.0028	0.0000	7.49E-09	0.0000	0.0000	6.60E-05
338	*	*	0.05	0.000	0.028	0.1450	0.0263	0.0001	4.81E-05	0.0027	0.0000	7.48E-09	0.0000	0.0000	6.59E-05
339	*	*	0.00	0.000	0.020	0.1450	0.0259	0.0001	4.74E-05	0.0027	0.0000	7.47E-09	0.0000	0.0000	6.59E-05
340		*	0.00	0.000	0.000	0.1450	0.0254	0.0001	4.68E-05	0.0026	0.0000	7.46E-09	0.0000	0.0000	6.58E-05
341		*	0.00	0.000	0.000	0.1450	0.0249	0.0001	4.61E-05	0.0026	0.0000	7.45E-09	0.0000	0.0000	6.57E-05
342		*	0.13	0.130	0.004	0.1450	0.0245	0.0001	4.55E-05	0.0025	0.0000	7.44E-09	0.0000	0.0000	6.57E-05
343		*	0.01	0.000	0.004	0.1453	0.0240	0.0001	4.49E-05	0.0025	0.0000	7.43E-09	0.0000	0.0000	6.56E-05
344		*	0.02	0.000	0.004	0.1461	0.0236	0.0001	4.43E-05	0.0025	0.0000	7.42E-09	0.0000	0.0000	6.55E-05
345		*	0.00	0.000	0.002	0.1462	0.0232	0.0001	4.36E-05	0.0024	0.0000	7.42E-09	0.0000	0.0000	6.55E-05
346	*	*	0.57	0.000	0.040	0.1462	0.0228	0.0001	4.30E-05	0.0024	0.0000	7.41E-09	0.0000	0.0000	6.54E-05
347	*	*	0.24	0.000	0.015	0.1462	0.0224	0.0001	4.25E-05	0.0024	0.0000	7.40E-09	0.0000	0.0000	6.53E-05
348	*	*	0.73	0.000	0.025	0.1462	0.0220	0.0001	4.19E-05	0.0023	0.0000	7.39E-09	0.0000	0.0000	6.53E-05
349	*	*	0.05	0.000	0.010	0.1462	0.0216	0.0001	4.13E-05	0.0023	0.0000	7.39E-09	0.0000	0.0000	6.52E-05
350	*	*	0.00	0.000	0.022	0.1462	0.0212	0.0001	4.07E-05	0.0023	0.0000	7.38E-09	0.0000	0.0000	6.52E-05
351	*	*	0.00	0.000	0.025	0.1462	0.0208	0.0001	4.02E-05	0.0023	0.0000	7.38E-09	0.0000	0.0000	6.51E-05
352		*	0.03	0.238	0.000	0.1462	0.0204	0.0001	3.96E-05	0.0022	0.0000	7.37E-09	0.0000	0.0000	6.50E-05
353	*	*	0.00	0.000	0.041	0.1462	0.0200	0.0001	3.91E-05	0.0022	0.0000	7.37E-09	0.0000	0.0000	6.50E-05
354		*	0.09	0.160	0.000	0.1462	0.0197	0.0001	3.85E-05	0.0022	0.0000	7.36E-09	0.0000	0.0000	6.49E-05
355		*	0.00	1.125	0.000	0.1462	0.0193	0.0001	3.80E-05	0.0022	0.0000	7.36E-09	0.0000	0.0000	6.49E-05
356		*	0.00	0.000	0.000	0.1462	0.0190	0.0001	3.74E-05	0.0022	0.0000	7.36E-09	0.0000	0.0000	6.48E-05
357	*	*	0.00	0.000	0.000	0.1462	0.0186	0.0001	3.69E-05	0.0022	0.0000	7.36E-09	0.0000	0.0000	6.47E-05
358	*	*	0.00	0.000	0.000	0.1462	0.0183	0.0001	3.64E-05	0.0022	0.0000	7.35E-09	0.0000	0.0000	6.47E-05
359	*	*	0.00	0.000	0.000	0.1462	0.0179	0.0001	3.59E-05	0.0022	0.0000	7.35E-09	0.0000	0.0000	6.46E-05
360	*	*	0.00	0.000	0.000	0.1462	0.0176	0.0001	3.54E-05	0.0021	0.0000	7.35E-09	0.0000	0.0000	6.45E-05
361		*	0.22	0.221	0.004	0.1462	0.0173	0.0001	3.49E-05	0.0021	0.0000	7.35E-09	0.0000	0.0000	6.45E-05
362		*	0.00	0.000	0.000	0.1462	0.0170	0.0001	3.44E-05	0.0021	0.0000	7.35E-09	0.0000	0.0000	6.44E-05
363	*	*	0.00	0.000	0.000	0.1462	0.0166	0.0001	3.39E-05	0.0021	0.0000	7.35E-09	0.0000	0.0000	6.44E-05
364		*	0.00	0.000	0.000	0.1462	0.0163	0.0001	3.35E-05	0.0021	0.0000	7.35E-09	0.0000	0.0000	6.43E-05
365		*	0.05	0.000	0.004	0.1489	0.0160	0.0001	3.30E-05	0.0021	0.0000	7.35E-09	0.0000	0.0000	6.42E-05

* = Frozen (air or soil)

Annual Totals for Year 2			
	inches	cubic feet	percent
Precipitation	34.27	124,383.8	100.00

Runoff	18.682	67,816.2	54.52
Evapotranspiration	15.377	55,820.3	44.88
Drainage Collected from Layer 3	0.0659	239.3	0.19
Percolation/Leakage through Layer 4	0.021002	76.2	0.06
Average Head on Top of Layer 4	0.0366	---	---
Drainage Collected from Layer 7	0.0031	11.4	0.01
Percolation/Leakage through Layer 9	0.000003	0.0095	0.00
Average Head on Top of Layer 8	0.0013	---	---
Percolation/Leakage through Layer 10	0.028667	104.1	0.08
Change in Water Storage	0.1082	392.7	0.32
Soil Water at Start of Year	72.3747	262,720.3	211.22
Soil Water at End of Year	72.4829	263,113.0	211.53
Snow Water at Start of Year	0.0000	0.0000	0.00
Snow Water at End of Year	0.0000	0.0000	0.00
Annual Water Budget Balance	0.0000	0.0000	0.00

Daily Output for Year 3

Column key: Head #1: drainage from Layer 4 | Head #2: drainage from Layer 8
Drain #1: drainage from Layer 3 | Drain #2: drainage from Layer 7
Leak #1: leakage thru Layer 4 | Leak #2: leakage thru Layer 9 | Leak #3: leakage thru Layer 10

Title: Pilgrim Landfill
Simulated On: 4/10/2026 14:14

Day	Freezing Status*		Rain	Runoff	ET	Evap. Zone Water	Head #1	Drain #1	Leak #1	Head #2	Drain #2	Leak #2	Head #3	Drain #3	Leak #3
	Air	Soil	(inches)	(inches)	(inches)	(in/in)	(inches)	(inches)	(inches)	(inches)	(inches)	(inches)	(inches)	(inches)	(inches)
1	*	*	0.00	0.000	0.000	0.1489	0.0157	0.0001	3.25E-05	0.0021	0.0000	7.35E-09	0.0000	0.0000	6.42E-05
2		*	0.00	0.000	0.000	0.1489	0.0155	0.0001	3.21E-05	0.0021	0.0000	7.35E-09	0.0000	0.0000	6.41E-05
3	*	*	0.00	0.000	0.000	0.1489	0.0152	0.0001	3.16E-05	0.0021	0.0000	7.35E-09	0.0000	0.0000	6.41E-05
4	*	*	0.00	0.000	0.000	0.1489	0.0149	0.0001	3.12E-05	0.0021	0.0000	7.35E-09	0.0000	0.0000	6.40E-05
5	*	*	0.01	0.000	0.010	0.1489	0.0146	0.0001	3.07E-05	0.0021	0.0000	7.35E-09	0.0000	0.0000	6.39E-05
6	*	*	0.00	0.000	0.000	0.1489	0.0143	0.0001	3.03E-05	0.0021	0.0000	7.35E-09	0.0000	0.0000	6.39E-05
7		*	0.00	0.000	0.000	0.1489	0.0141	0.0001	2.98E-05	0.0021	0.0000	7.35E-09	0.0000	0.0000	6.38E-05
8	*	*	0.00	0.000	0.000	0.1489	0.0138	0.0001	2.94E-05	0.0021	0.0000	7.35E-09	0.0000	0.0000	6.38E-05
9	*	*	0.00	0.000	0.000	0.1489	0.0135	0.0001	2.90E-05	0.0021	0.0000	7.35E-09	0.0000	0.0000	6.37E-05
10	*	*	0.19	0.000	0.007	0.1489	0.0133	0.0001	2.86E-05	0.0021	0.0000	7.35E-09	0.0000	0.0000	6.36E-05
11	*	*	0.12	0.000	0.003	0.1489	0.0130	0.0001	2.82E-05	0.0021	0.0000	7.34E-09	0.0000	0.0000	6.36E-05
12	*	*	0.00	0.000	0.021	0.1489	0.0128	0.0001	2.78E-05	0.0021	0.0000	7.34E-09	0.0000	0.0000	6.35E-05
13	*	*	0.02	0.000	0.000	0.1489	0.0126	0.0001	2.74E-05	0.0021	0.0000	7.34E-09	0.0000	0.0000	6.35E-05
14	*	*	0.02	0.000	0.000	0.1489	0.0123	0.0001	2.70E-05	0.0021	0.0000	7.34E-09	0.0000	0.0000	6.34E-05
15	*	*	0.21	0.000	0.000	0.1489	0.0121	0.0001	2.66E-05	0.0021	0.0000	7.34E-09	0.0000	0.0000	6.33E-05
16	*	*	0.03	0.000	0.000	0.1489	0.0119	0.0001	2.62E-05	0.0021	0.0000	7.33E-09	0.0000	0.0000	6.33E-05
17	*	*	0.00	0.000	0.033	0.1489	0.0116	0.0001	2.58E-05	0.0021	0.0000	7.33E-09	0.0000	0.0000	6.32E-05
18	*	*	0.00	0.000	0.023	0.1489	0.0114	0.0001	2.55E-05	0.0021	0.0000	7.33E-09	0.0000	0.0000	6.32E-05
19		*	0.00	0.304	0.013	0.1489	0.0112	0.0001	2.51E-05	0.0020	0.0000	7.33E-09	0.0000	0.0000	6.31E-05
20		*	0.00	0.144	0.032	0.1489	0.0110	0.0001	2.47E-05	0.0020	0.0000	7.32E-09	0.0000	0.0000	6.31E-05
21	*	*	0.03	0.000	0.028	0.1489	0.0108	0.0001	2.44E-05	0.0020	0.0000	7.32E-09	0.0000	0.0000	6.30E-05
22	*	*	0.15	0.000	0.030	0.1489	0.0106	0.0001	2.40E-05	0.0020	0.0000	7.32E-09	0.0000	0.0000	6.29E-05
23	*	*	0.00	0.000	0.036	0.1489	0.0104	0.0001	2.37E-05	0.0020	0.0000	7.31E-09	0.0000	0.0000	6.29E-05
24		*	0.00	0.000	0.065	0.1500	0.0102	0.0001	2.33E-05	0.0020	0.0000	7.31E-09	0.0000	0.0000	6.28E-05
25	*	*	0.00	0.000	0.000	0.1500	0.0100	0.0000	2.30E-05	0.0020	0.0000	7.31E-09	0.0000	0.0000	6.28E-05
26	*	*	0.00	0.000	0.000	0.1500	0.0098	0.0000	2.27E-05	0.0019	0.0000	7.30E-09	0.0000	0.0000	6.27E-05
27	*	*	0.00	0.000	0.000	0.1500	0.0096	0.0000	2.23E-05	0.0019	0.0000	7.30E-09	0.0000	0.0000	6.27E-05
28	*	*	0.00	0.000	0.000	0.1500	0.0094	0.0000	2.20E-05	0.0019	0.0000	7.29E-09	0.0000	0.0000	6.26E-05
29	*	*	0.00	0.000	0.000	0.1500	0.0092	0.0000	2.17E-05	0.0019	0.0000	7.29E-09	0.0000	0.0000	6.25E-05
30		*	0.00	0.000	0.000	0.1500	0.0091	0.0000	2.14E-05	0.0019	0.0000	7.28E-09	0.0000	0.0000	6.25E-05

31		*	0.00	0.000	0.000	0.1500	0.0089	0.0000	2.10E-05	0.0018	0.0000	7.28E-09	0.0000	0.0000	6.24E-05
32	*	*	0.00	0.000	0.000	0.1500	0.0087	0.0000	2.07E-05	0.0018	0.0000	7.27E-09	0.0000	0.0000	6.24E-05
33	*	*	0.00	0.000	0.000	0.1500	0.0085	0.0000	2.04E-05	0.0018	0.0000	7.27E-09	0.0000	0.0000	6.23E-05
34	*	*	0.13	0.000	0.027	0.1500	0.0084	0.0000	2.01E-05	0.0018	0.0000	7.26E-09	0.0000	0.0000	6.23E-05
35	*	*	0.00	0.000	0.021	0.1500	0.0082	0.0000	1.98E-05	0.0018	0.0000	7.26E-09	0.0000	0.0000	6.22E-05
36		*	0.19	0.256	0.015	0.1500	0.0081	0.0000	1.95E-05	0.0017	0.0000	7.25E-09	0.0000	0.0000	6.21E-05
37		*	0.00	0.000	0.000	0.1500	0.0079	0.0000	1.92E-05	0.0017	0.0000	7.25E-09	0.0000	0.0000	6.21E-05
38		*	0.00	0.000	0.000	0.1500	0.0077	0.0000	1.90E-05	0.0017	0.0000	7.24E-09	0.0000	0.0000	6.20E-05
39		*	0.00	0.000	0.000	0.1500	0.0076	0.0000	1.87E-05	0.0017	0.0000	7.24E-09	0.0000	0.0000	6.20E-05
40		*	0.00	0.000	0.000	0.1500	0.0074	0.0000	1.84E-05	0.0016	0.0000	7.23E-09	0.0000	0.0000	6.19E-05
41		*	0.00	0.000	0.000	0.1500	0.0073	0.0000	1.81E-05	0.0016	0.0000	7.23E-09	0.0000	0.0000	6.19E-05
42	*	*	0.02	0.000	0.021	0.1500	0.0072	0.0000	1.79E-05	0.0016	0.0000	7.22E-09	0.0000	0.0000	6.18E-05
43	*	*	0.00	0.000	0.000	0.1500	0.0070	0.0000	1.76E-05	0.0016	0.0000	7.22E-09	0.0000	0.0000	6.17E-05
44	*	*	0.00	0.000	0.000	0.1500	0.0069	0.0000	1.73E-05	0.0015	0.0000	7.21E-09	0.0000	0.0000	6.17E-05
45	*	*	0.00	0.000	0.000	0.1500	0.0067	0.0000	1.71E-05	0.0015	0.0000	7.20E-09	0.0000	0.0000	6.16E-05
46	*	*	0.00	0.000	0.000	0.1500	0.0066	0.0000	1.68E-05	0.0015	0.0000	7.20E-09	0.0000	0.0000	6.16E-05
47	*	*	0.25	0.000	0.033	0.1500	0.0065	0.0000	1.66E-05	0.0015	0.0000	7.19E-09	0.0000	0.0000	6.15E-05
48		*	0.01	0.182	0.000	0.1500	0.0063	0.0000	1.63E-05	0.0014	0.0000	7.19E-09	0.0000	0.0000	6.15E-05
49		*	0.01	0.000	0.053	0.1500	0.0062	0.0000	1.61E-05	0.0014	0.0000	7.18E-09	0.0000	0.0000	6.14E-05
50		*	0.00	0.000	0.000	0.1500	0.0061	0.0000	1.58E-05	0.0014	0.0000	7.17E-09	0.0000	0.0000	6.14E-05
51	*	*	0.00	0.000	0.000	0.1500	0.0060	0.0000	1.56E-05	0.0014	0.0000	7.17E-09	0.0000	0.0000	6.13E-05
52		*	0.00	0.000	0.000	0.1500	0.0059	0.0000	1.53E-05	0.0013	0.0000	7.16E-09	0.0000	0.0000	6.12E-05
53	*	*	0.00	0.000	0.000	0.1500	0.0057	0.0000	1.51E-05	0.0013	0.0000	7.16E-09	0.0000	0.0000	6.12E-05
54	*	*	0.00	0.000	0.000	0.1500	0.0056	0.0000	1.49E-05	0.0013	0.0000	7.15E-09	0.0000	0.0000	6.11E-05
55	*	*	0.00	0.000	0.000	0.1500	0.0055	0.0000	1.46E-05	0.0013	0.0000	7.15E-09	0.0000	0.0000	6.11E-05
56		*	0.00	0.000	0.000	0.1500	0.0054	0.0000	1.44E-05	0.0013	0.0000	7.14E-09	0.0000	0.0000	6.10E-05
57		*	0.00	0.000	0.000	0.1500	0.0053	0.0000	1.42E-05	0.0012	0.0000	7.13E-09	0.0000	0.0000	6.10E-05
58	*	*	0.00	0.000	0.000	0.1500	0.0052	0.0000	1.40E-05	0.0012	0.0000	7.13E-09	0.0000	0.0000	6.09E-05
59		*	0.00	0.000	0.000	0.1500	0.0051	0.0000	1.38E-05	0.0012	0.0000	7.12E-09	0.0000	0.0000	6.09E-05
60		*	0.00	0.000	0.000	0.1500	0.0050	0.0000	1.36E-05	0.0012	0.0000	7.12E-09	0.0000	0.0000	6.08E-05
61	*	*	0.00	0.000	0.004	0.1500	0.0049	0.0000	1.33E-05	0.0011	0.0000	7.11E-09	0.0000	0.0000	6.08E-05
62	*	*	0.03	0.000	0.030	0.1500	0.0048	0.0000	1.31E-05	0.0011	0.0000	7.11E-09	0.0000	0.0000	6.07E-05
63	*	*	0.42	0.000	0.010	0.1500	0.0047	0.0000	1.29E-05	0.0011	0.0000	7.10E-09	0.0000	0.0000	6.06E-05
64	*	*	0.96	0.000	0.000	0.1500	0.0046	0.0000	1.27E-05	0.0011	0.0000	7.10E-09	0.0000	0.0000	6.06E-05
65	*	*	0.00	0.000	0.037	0.1500	0.0045	0.0000	1.25E-05	0.0011	0.0000	7.10E-09	0.0000	0.0000	6.05E-05
66	*	*	0.00	0.000	0.013	0.1500	0.0044	0.0000	1.23E-05	0.0011	0.0000	7.09E-09	0.0000	0.0000	6.05E-05
67	*	*	0.00	0.000	0.022	0.1500	0.0043	0.0000	1.22E-05	0.0010	0.0000	7.09E-09	0.0000	0.0000	6.04E-05
68	*	*	0.03	0.000	0.000	0.1500	0.0042	0.0000	1.20E-05	0.0010	0.0000	7.08E-09	0.0000	0.0000	6.04E-05

69		*	0.00	0.300	0.007	0.1500	0.0041	0.0000	1.18E-05	0.0010	0.0000	7.08E-09	0.0000	0.0000	6.03E-05
70		*	0.00	1.027	0.000	0.1500	0.0041	0.0000	1.16E-05	0.0010	0.0000	7.07E-09	0.0000	0.0000	6.03E-05
71		*	0.00	0.000	0.000	0.1500	0.0040	0.0000	1.14E-05	0.0010	0.0000	7.07E-09	0.0000	0.0000	6.02E-05
72		*	0.00	0.000	0.000	0.1500	0.0039	0.0000	1.12E-05	0.0009	0.0000	7.06E-09	0.0000	0.0000	6.02E-05
73	*	*	0.00	0.000	0.000	0.1500	0.0038	0.0000	1.11E-05	0.0009	0.0000	7.06E-09	0.0000	0.0000	6.01E-05
74		*	0.32	0.312	0.004	0.1500	0.0037	0.0000	1.09E-05	0.0009	0.0000	7.06E-09	0.0000	0.0000	6.01E-05
75		*	0.10	0.002	0.004	0.1553	0.0036	0.0000	1.07E-05	0.0009	0.0000	7.05E-09	0.0000	0.0000	6.00E-05
76		*	0.01	0.000	0.003	0.1555	0.0036	0.0000	1.05E-05	0.0009	0.0000	7.05E-09	0.0000	0.0000	6.00E-05
77		*	0.16	0.153	0.004	0.1555	0.0035	0.0000	1.04E-05	0.0009	0.0000	7.04E-09	0.0000	0.0000	5.99E-05
78		*	0.00	0.000	0.000	0.1555	0.0034	0.0000	1.02E-05	0.0009	0.0000	7.04E-09	0.0000	0.0000	5.98E-05
79		*	0.00	0.000	0.000	0.1555	0.0034	0.0000	1.00E-05	0.0008	0.0000	7.04E-09	0.0000	0.0000	5.98E-05
80		*	0.00	0.000	0.000	0.1555	0.0033	0.0000	9.88E-06	0.0008	0.0000	7.03E-09	0.0000	0.0000	5.97E-05
81		*	0.00	0.000	0.000	0.1555	0.0032	0.0000	9.72E-06	0.0008	0.0000	7.03E-09	0.0000	0.0000	5.97E-05
82		*	0.16	0.158	0.004	0.1555	0.0031	0.0000	9.57E-06	0.0008	0.0000	7.03E-09	0.0000	0.0000	5.96E-05
83		*	0.62	0.614	0.004	0.1555	0.0031	0.0000	9.41E-06	0.0008	0.0000	7.02E-09	0.0000	0.0000	5.96E-05
84			0.13	0.000	0.078	0.1582	0.0030	0.0000	9.26E-06	0.0008	0.0000	7.02E-09	0.0000	0.0000	5.95E-05
85			0.00	0.000	0.149	0.1499	0.0031	0.0000	9.48E-06	0.0008	0.0000	7.02E-09	0.0000	0.0000	5.95E-05
86			0.00	0.000	0.115	0.1435	0.0031	0.0000	9.55E-06	0.0007	0.0000	7.01E-09	0.0000	0.0000	5.94E-05
87			0.00	0.000	0.200	0.1324	0.0031	0.0000	9.39E-06	0.0007	0.0000	7.01E-09	0.0000	0.0000	5.94E-05
88			0.00	0.000	0.049	0.1297	0.0030	0.0000	9.24E-06	0.0007	0.0000	7.01E-09	0.0000	0.0000	5.93E-05
89			0.00	0.000	0.011	0.1287	0.0141	0.0001	2.89E-05	0.0007	0.0000	7.01E-09	0.0000	0.0000	5.93E-05
90			0.00	0.000	0.001	0.1287	0.0205	0.0001	3.97E-05	0.0007	0.0000	7.01E-09	0.0000	0.0000	5.92E-05
91			0.00	0.000	0.000	0.1287	0.0204	0.0001	3.96E-05	0.0007	0.0000	7.01E-09	0.0000	0.0000	5.92E-05
92			0.00	0.000	0.000	0.1287	0.0202	0.0001	3.92E-05	0.0007	0.0000	7.01E-09	0.0000	0.0000	5.91E-05
93	*		0.00	0.000	0.003	0.1287	0.0198	0.0001	3.87E-05	0.0007	0.0000	7.02E-09	0.0000	0.0000	5.91E-05
94			0.02	0.000	0.007	0.1294	0.0194	0.0001	3.82E-05	0.0008	0.0000	7.02E-09	0.0000	0.0000	5.90E-05
95			0.10	0.000	0.006	0.1345	0.0191	0.0001	3.76E-05	0.0008	0.0000	7.02E-09	0.0000	0.0000	5.90E-05
96			0.00	0.000	0.012	0.1339	0.0187	0.0001	3.71E-05	0.0008	0.0000	7.02E-09	0.0000	0.0000	5.89E-05
97			0.35	0.166	0.030	0.1422	0.0184	0.0001	3.66E-05	0.0008	0.0000	7.03E-09	0.0000	0.0000	5.89E-05
98			0.05	0.000	0.014	0.1444	0.0180	0.0001	3.61E-05	0.0008	0.0000	7.03E-09	0.0000	0.0000	5.88E-05
99			0.00	0.000	0.010	0.1438	0.0177	0.0001	3.56E-05	0.0008	0.0000	7.03E-09	0.0000	0.0000	5.88E-05
100	*		0.00	0.000	0.000	0.1438	0.0174	0.0001	3.51E-05	0.0008	0.0000	7.04E-09	0.0000	0.0000	5.87E-05
101			0.00	0.000	0.010	0.1433	0.0171	0.0001	3.46E-05	0.0009	0.0000	7.04E-09	0.0000	0.0000	5.87E-05
102			0.63	0.452	0.025	0.1520	0.0168	0.0001	3.41E-05	0.0009	0.0000	7.05E-09	0.0000	0.0000	5.86E-05
103			1.34	1.038	0.187	0.1584	0.0165	0.0001	3.37E-05	0.0009	0.0000	7.05E-09	0.0000	0.0000	5.86E-05
104	*		0.05	0.000	0.090	0.1564	0.0162	0.0001	3.32E-05	0.0009	0.0000	7.06E-09	0.0000	0.0000	5.85E-05
105			0.00	0.000	0.098	0.1510	0.0159	0.0001	3.27E-05	0.0009	0.0000	7.06E-09	0.0000	0.0000	5.85E-05
106			0.00	0.000	0.121	0.1443	0.0156	0.0001	3.23E-05	0.0010	0.0000	7.07E-09	0.0000	0.0000	5.84E-05

107			0.17	0.011	0.104	0.1475	0.0153	0.0001	3.18E-05	0.0010	0.0000	7.07E-09	0.0000	0.0000	5.84E-05
108	*		0.00	0.000	0.101	0.1419	0.0150	0.0001	3.14E-05	0.0010	0.0000	7.08E-09	0.0000	0.0000	5.83E-05
109			0.00	0.000	0.123	0.1348	0.0166	0.0001	3.38E-05	0.0010	0.0000	7.08E-09	0.0000	0.0000	5.83E-05
110			0.00	0.000	0.091	0.1296	0.0319	0.0002	5.57E-05	0.0010	0.0000	7.08E-09	0.0000	0.0000	5.82E-05
111			0.00	0.000	0.014	0.1288	0.0329	0.0002	5.69E-05	0.0010	0.0000	7.08E-09	0.0000	0.0000	5.82E-05
112			0.00	0.000	0.002	0.1287	0.0348	0.0002	5.95E-05	0.0010	0.0000	7.08E-09	0.0000	0.0000	5.81E-05
113			0.00	0.000	0.000	0.1287	0.0358	0.0002	6.07E-05	0.0010	0.0000	7.07E-09	0.0000	0.0000	5.81E-05
114			0.30	0.121	0.020	0.1375	0.0351	0.0002	5.99E-05	0.0010	0.0000	7.07E-09	0.0000	0.0000	5.80E-05
115			0.31	0.154	0.038	0.1439	0.0345	0.0002	5.91E-05	0.0009	0.0000	7.06E-09	0.0000	0.0000	5.80E-05
116	*		0.43	0.000	0.038	0.1450	0.0339	0.0002	5.83E-05	0.0009	0.0000	7.06E-09	0.0000	0.0000	5.79E-05
117	*		0.00	0.000	0.023	0.1461	0.0333	0.0002	5.75E-05	0.0009	0.0000	7.06E-09	0.0000	0.0000	5.79E-05
118	*		0.15	0.000	0.016	0.1472	0.0327	0.0002	5.67E-05	0.0009	0.0000	7.05E-09	0.0000	0.0000	5.78E-05
119	*		0.19	0.000	0.000	0.1483	0.0321	0.0002	5.60E-05	0.0009	0.0000	7.05E-09	0.0000	0.0000	5.78E-05
120	*		0.04	0.000	0.026	0.1494	0.0316	0.0002	5.52E-05	0.0009	0.0000	7.04E-09	0.0000	0.0000	5.77E-05
121	*		0.00	0.000	0.000	0.1505	0.0310	0.0002	5.45E-05	0.0008	0.0000	7.04E-09	0.0000	0.0000	5.77E-05
122			0.00	0.382	0.064	0.1579	0.0305	0.0002	5.37E-05	0.0008	0.0000	7.04E-09	0.0000	0.0000	5.76E-05
123			0.00	0.000	0.066	0.1543	0.0299	0.0001	5.30E-05	0.0008	0.0000	7.03E-09	0.0000	0.0000	5.76E-05
124			0.00	0.000	0.207	0.1428	0.0294	0.0001	5.23E-05	0.0008	0.0000	7.03E-09	0.0000	0.0000	5.75E-05
125			0.00	0.000	0.196	0.1319	0.0289	0.0001	5.16E-05	0.0008	0.0000	7.03E-09	0.0000	0.0000	5.75E-05
126			0.03	0.000	0.060	0.1302	0.0289	0.0001	5.17E-05	0.0008	0.0000	7.02E-09	0.0000	0.0000	5.74E-05
127			0.09	0.000	0.016	0.1337	0.0412	0.0002	6.74E-05	0.0008	0.0000	7.02E-09	0.0000	0.0000	5.74E-05
128			0.00	0.000	0.019	0.1326	0.0471	0.0002	7.49E-05	0.0008	0.0000	7.02E-09	0.0000	0.0000	5.73E-05
129			0.35	0.154	0.043	0.1411	0.0463	0.0002	7.39E-05	0.0007	0.0000	7.01E-09	0.0000	0.0000	5.73E-05
130			0.40	0.120	0.226	0.1441	0.0455	0.0002	7.29E-05	0.0007	0.0000	7.01E-09	0.0000	0.0000	5.72E-05
131			0.00	0.000	0.047	0.1417	0.0447	0.0002	7.20E-05	0.0007	0.0000	7.01E-09	0.0000	0.0000	5.72E-05
132			0.11	0.000	0.082	0.1434	0.0440	0.0002	7.11E-05	0.0007	0.0000	7.00E-09	0.0000	0.0000	5.71E-05
133			0.02	0.000	0.174	0.1345	0.0434	0.0002	7.04E-05	0.0007	0.0000	7.00E-09	0.0000	0.0000	5.71E-05
134			0.62	0.301	0.148	0.1440	0.0432	0.0002	7.01E-05	0.0007	0.0000	7.00E-09	0.0000	0.0000	5.70E-05
135			0.99	0.558	0.317	0.1504	0.0427	0.0002	6.94E-05	0.0007	0.0000	7.00E-09	0.0000	0.0000	5.70E-05
136			0.32	0.116	0.238	0.1484	0.0433	0.0002	7.02E-05	0.0007	0.0000	6.99E-09	0.0000	0.0000	5.69E-05
137			0.22	0.093	0.051	0.1526	0.0432	0.0002	7.01E-05	0.0006	0.0000	6.99E-09	0.0000	0.0000	5.69E-05
138	*		0.03	0.000	0.046	0.1517	0.0467	0.0002	7.43E-05	0.0006	0.0000	6.99E-09	0.0000	0.0000	5.68E-05
139			0.03	0.000	0.051	0.1504	0.0484	0.0002	7.64E-05	0.0006	0.0000	6.98E-09	0.0000	0.0000	5.68E-05
140	*		0.01	0.000	0.007	0.1504	0.0476	0.0002	7.54E-05	0.0006	0.0000	6.98E-09	0.0000	0.0000	5.68E-05
141	*		0.00	0.000	0.090	0.1454	0.0468	0.0002	7.44E-05	0.0006	0.0000	6.98E-09	0.0000	0.0000	5.67E-05
142			0.00	0.000	0.108	0.1394	0.0460	0.0002	7.35E-05	0.0006	0.0000	6.98E-09	0.0000	0.0000	5.67E-05
143			0.00	0.000	0.153	0.1308	0.0452	0.0002	7.26E-05	0.0006	0.0000	6.97E-09	0.0000	0.0000	5.66E-05
144			0.04	0.000	0.051	0.1303	0.0445	0.0002	7.16E-05	0.0006	0.0000	6.97E-09	0.0000	0.0000	5.66E-05

145	0.00	0.000	0.015	0.1293	0.0486	0.0002	7.66E-05	0.0006	0.0000	6.97E-09	0.0000	0.0000	5.65E-05
146	0.00	0.000	0.009	0.1288	0.0507	0.0002	7.91E-05	0.0006	0.0000	6.97E-09	0.0000	0.0000	5.65E-05
147	0.00	0.000	0.002	0.1287	0.0498	0.0002	7.81E-05	0.0006	0.0000	6.96E-09	0.0000	0.0000	5.64E-05
148	0.20	0.044	0.008	0.1367	0.0489	0.0002	7.71E-05	0.0005	0.0000	6.96E-09	0.0000	0.0000	5.64E-05
149	0.07	0.000	0.019	0.1396	0.0483	0.0002	7.62E-05	0.0005	0.0000	6.96E-09	0.0000	0.0000	5.63E-05
150	0.00	0.000	0.013	0.1389	0.0475	0.0002	7.53E-05	0.0005	0.0000	6.96E-09	0.0000	0.0000	5.63E-05
151	0.00	0.000	0.013	0.1381	0.0467	0.0002	7.44E-05	0.0005	0.0000	6.96E-09	0.0000	0.0000	5.62E-05
152	0.00	0.000	0.016	0.1372	0.0459	0.0002	7.34E-05	0.0005	0.0000	6.95E-09	0.0000	0.0000	5.62E-05
153	0.00	0.000	0.017	0.1363	0.0451	0.0002	7.24E-05	0.0005	0.0000	6.95E-09	0.0000	0.0000	5.61E-05
154	0.03	0.000	0.021	0.1365	0.0443	0.0002	7.14E-05	0.0005	0.0000	6.95E-09	0.0000	0.0000	5.61E-05
155	1.17	0.995	0.027	0.1448	0.0435	0.0002	7.05E-05	0.0005	0.0000	6.95E-09	0.0000	0.0000	5.60E-05
156	1.27	1.030	0.129	0.1513	0.0428	0.0002	6.96E-05	0.0005	0.0000	6.95E-09	0.0000	0.0000	5.60E-05
157	0.01	0.000	0.076	0.1477	0.0420	0.0002	6.86E-05	0.0005	0.0000	6.94E-09	0.0000	0.0000	5.60E-05
158	0.00	0.000	0.111	0.1416	0.0414	0.0002	6.79E-05	0.0005	0.0000	6.94E-09	0.0000	0.0000	5.59E-05
159	0.00	0.000	0.103	0.1358	0.0413	0.0002	6.77E-05	0.0005	0.0000	6.94E-09	0.0000	0.0000	5.59E-05
160	0.00	0.000	0.109	0.1298	0.0407	0.0002	6.69E-05	0.0005	0.0000	6.94E-09	0.0000	0.0000	5.58E-05
161	0.00	0.000	0.015	0.1290	0.0400	0.0002	6.60E-05	0.0004	0.0000	6.94E-09	0.0000	0.0000	5.58E-05
162	0.61	0.379	0.065	0.1384	0.0397	0.0002	6.57E-05	0.0004	0.0000	6.93E-09	0.0000	0.0000	5.57E-05
163	0.20	0.053	0.130	0.1391	0.0433	0.0002	7.01E-05	0.0004	0.0000	6.93E-09	0.0000	0.0000	5.57E-05
164	0.01	0.000	0.133	0.1323	0.0446	0.0002	7.18E-05	0.0004	0.0000	6.93E-09	0.0000	0.0000	5.56E-05
165	0.00	0.000	0.044	0.1298	0.0438	0.0002	7.08E-05	0.0004	0.0000	6.93E-09	0.0000	0.0000	5.56E-05
166	0.00	0.000	0.015	0.1290	0.0430	0.0002	6.99E-05	0.0004	0.0000	6.93E-09	0.0000	0.0000	5.55E-05
167	0.00	0.000	0.003	0.1287	0.0445	0.0002	7.17E-05	0.0004	0.0000	6.93E-09	0.0000	0.0000	5.55E-05
168	0.00	0.000	0.001	0.1287	0.0451	0.0002	7.24E-05	0.0004	0.0000	6.93E-09	0.0000	0.0000	5.55E-05
169	0.00	0.000	0.000	0.1287	0.0444	0.0002	7.16E-05	0.0004	0.0000	6.92E-09	0.0000	0.0000	5.54E-05
170	0.00	0.000	0.000	0.1287	0.0437	0.0002	7.07E-05	0.0004	0.0000	6.92E-09	0.0000	0.0000	5.54E-05
171	0.16	0.014	0.007	0.1366	0.0430	0.0002	6.98E-05	0.0004	0.0000	6.92E-09	0.0000	0.0000	5.53E-05
172	1.24	1.096	0.032	0.1430	0.0422	0.0002	6.89E-05	0.0004	0.0000	6.92E-09	0.0000	0.0000	5.53E-05
173	0.72	0.454	0.154	0.1494	0.0415	0.0002	6.79E-05	0.0004	0.0000	6.92E-09	0.0000	0.0000	5.52E-05
174	0.59	0.118	0.359	0.1558	0.0408	0.0002	6.70E-05	0.0004	0.0000	6.92E-09	0.0000	0.0000	5.52E-05
175	0.60	0.199	0.283	0.1622	0.0401	0.0002	6.62E-05	0.0004	0.0000	6.92E-09	0.0000	0.0000	5.51E-05
176	0.07	0.000	0.108	0.1602	0.0394	0.0002	6.53E-05	0.0004	0.0000	6.92E-09	0.0000	0.0000	5.51E-05
177	0.00	0.000	0.234	0.1474	0.0387	0.0002	6.44E-05	0.0004	0.0000	6.93E-09	0.0000	0.0000	5.50E-05
178	0.03	0.000	0.205	0.1375	0.0380	0.0002	6.35E-05	0.0005	0.0000	6.95E-09	0.0000	0.0000	5.50E-05
179	0.07	0.000	0.133	0.1338	0.0373	0.0002	6.27E-05	0.0006	0.0000	6.97E-09	0.0000	0.0000	5.50E-05
180	0.06	0.000	0.055	0.1337	0.0418	0.0002	6.83E-05	0.0007	0.0000	6.99E-09	0.0000	0.0000	5.49E-05
181	0.45	0.256	0.064	0.1409	0.0502	0.0002	7.86E-05	0.0007	0.0000	7.01E-09	0.0000	0.0000	5.49E-05
182	0.00	0.000	0.129	0.1338	0.0494	0.0002	7.76E-05	0.0008	0.0000	7.03E-09	0.0000	0.0000	5.48E-05

183	0.39	0.184	0.050	0.1425	0.0485	0.0002	7.65E-05	0.0009	0.0000	7.05E-09	0.0000	0.0000	5.48E-05
184	0.70	0.351	0.229	0.1490	0.0477	0.0002	7.55E-05	0.0009	0.0000	7.06E-09	0.0000	0.0000	5.47E-05
185	0.51	0.228	0.163	0.1554	0.0469	0.0002	7.45E-05	0.0010	0.0000	7.08E-09	0.0000	0.0000	5.47E-05
186	0.53	0.239	0.172	0.1619	0.0460	0.0002	7.36E-05	0.0011	0.0000	7.09E-09	0.0000	0.0000	5.46E-05
187	0.04	0.000	0.110	0.1579	0.0452	0.0002	7.26E-05	0.0011	0.0000	7.11E-09	0.0000	0.0000	5.46E-05
188	0.11	0.000	0.108	0.1583	0.0445	0.0002	7.16E-05	0.0012	0.0000	7.13E-09	0.0000	0.0000	5.46E-05
189	0.00	0.000	0.126	0.1513	0.0437	0.0002	7.07E-05	0.0013	0.0000	7.14E-09	0.0000	0.0000	5.45E-05
190	0.00	0.000	0.140	0.1432	0.0525	0.0003	8.12E-05	0.0013	0.0000	7.16E-09	0.0000	0.0000	5.45E-05
191	0.18	0.023	0.113	0.1458	0.0573	0.0003	8.69E-05	0.0014	0.0000	7.17E-09	0.0000	0.0000	5.44E-05
192	0.00	0.000	0.213	0.1340	0.0564	0.0003	8.58E-05	0.0014	0.0000	7.18E-09	0.0000	0.0000	5.44E-05
193	0.41	0.155	0.148	0.1399	0.0554	0.0003	8.47E-05	0.0015	0.0000	7.20E-09	0.0000	0.0000	5.43E-05
194	0.03	0.000	0.148	0.1330	0.0619	0.0003	9.21E-05	0.0015	0.0000	7.21E-09	0.0000	0.0000	5.43E-05
195	0.26	0.110	0.053	0.1383	0.0665	0.0003	9.73E-05	0.0016	0.0000	7.22E-09	0.0000	0.0000	5.43E-05
196	5.34	4.859	0.365	0.1448	0.0653	0.0003	9.60E-05	0.0017	0.0000	7.24E-09	0.0000	0.0000	5.42E-05
197	0.00	0.000	0.148	0.1364	0.0680	0.0003	9.90E-05	0.0017	0.0000	7.25E-09	0.0000	0.0000	5.42E-05
198	0.00	0.000	0.115	0.1300	0.0690	0.0003	1.00E-04	0.0018	0.0000	7.26E-09	0.0000	0.0000	5.41E-05
199	0.00	0.000	0.018	0.1290	0.0679	0.0003	9.89E-05	0.0018	0.0000	7.27E-09	0.0000	0.0000	5.41E-05
200	0.00	0.000	0.003	0.1287	0.0718	0.0004	1.03E-04	0.0019	0.0000	7.29E-09	0.0000	0.0000	5.40E-05
201	0.01	0.000	0.009	0.1287	0.0736	0.0004	1.05E-04	0.0019	0.0000	7.30E-09	0.0000	0.0000	5.40E-05
202	0.07	0.000	0.008	0.1321	0.0724	0.0004	1.04E-04	0.0020	0.0000	7.31E-09	0.0000	0.0000	5.40E-05
203	0.00	0.000	0.003	0.1319	0.0711	0.0004	1.02E-04	0.0020	0.0000	7.32E-09	0.0000	0.0000	5.39E-05
204	0.02	0.000	0.015	0.1322	0.0699	0.0003	1.01E-04	0.0021	0.0000	7.33E-09	0.0000	0.0000	5.39E-05
205	0.70	0.524	0.035	0.1400	0.0688	0.0003	9.99E-05	0.0021	0.0000	7.34E-09	0.0000	0.0000	5.38E-05
206	0.09	0.000	0.154	0.1366	0.0676	0.0003	9.86E-05	0.0022	0.0000	7.35E-09	0.0000	0.0000	5.38E-05
207	0.01	0.000	0.024	0.1359	0.0665	0.0003	9.73E-05	0.0022	0.0000	7.36E-09	0.0000	0.0000	5.37E-05
208	1.40	1.224	0.031	0.1439	0.0653	0.0003	9.60E-05	0.0022	0.0000	7.37E-09	0.0000	0.0000	5.37E-05
209	0.00	0.000	0.177	0.1340	0.0642	0.0003	9.48E-05	0.0023	0.0000	7.38E-09	0.0000	0.0000	5.37E-05
210	0.00	0.000	0.065	0.1304	0.0646	0.0003	9.52E-05	0.0023	0.0000	7.39E-09	0.0000	0.0000	5.36E-05
211	0.00	0.000	0.023	0.1291	0.0644	0.0003	9.50E-05	0.0024	0.0000	7.40E-09	0.0000	0.0000	5.36E-05
212	0.08	0.000	0.020	0.1319	0.0698	0.0003	1.01E-04	0.0024	0.0000	7.41E-09	0.0000	0.0000	5.35E-05
213	0.00	0.000	0.005	0.1317	0.0724	0.0004	1.04E-04	0.0024	0.0000	7.42E-09	0.0000	0.0000	5.35E-05
214	0.11	0.000	0.019	0.1370	0.0712	0.0004	1.03E-04	0.0025	0.0000	7.43E-09	0.0000	0.0000	5.34E-05
215	0.00	0.000	0.019	0.1360	0.0700	0.0003	1.01E-04	0.0025	0.0000	7.44E-09	0.0000	0.0000	5.34E-05
216	0.00	0.000	0.016	0.1351	0.0688	0.0003	9.99E-05	0.0026	0.0000	7.45E-09	0.0000	0.0000	5.34E-05
217	0.40	0.209	0.035	0.1439	0.0677	0.0003	9.86E-05	0.0026	0.0000	7.45E-09	0.0000	0.0000	5.33E-05
218	0.07	0.000	0.021	0.1468	0.0666	0.0003	9.75E-05	0.0026	0.0000	7.46E-09	0.0000	0.0000	5.33E-05
219	0.00	0.000	0.089	0.1419	0.0656	0.0003	9.63E-05	0.0027	0.0000	7.47E-09	0.0000	0.0000	5.32E-05
220	0.00	0.000	0.018	0.1409	0.0648	0.0003	9.55E-05	0.0027	0.0000	7.48E-09	0.0000	0.0000	5.32E-05

221	0.23	0.086	0.021	0.1478	0.0639	0.0003	9.44E-05	0.0027	0.0000	7.49E-09	0.0000	0.0000	5.31E-05
222	0.00	0.000	0.019	0.1468	0.0629	0.0003	9.33E-05	0.0028	0.0000	7.49E-09	0.0000	0.0000	5.31E-05
223	0.00	0.000	0.018	0.1457	0.0624	0.0003	9.27E-05	0.0028	0.0000	7.50E-09	0.0000	0.0000	5.31E-05
224	0.00	0.000	0.014	0.1449	0.0628	0.0003	9.32E-05	0.0028	0.0000	7.51E-09	0.0000	0.0000	5.30E-05
225	0.06	0.000	0.018	0.1474	0.0618	0.0003	9.20E-05	0.0029	0.0000	7.52E-09	0.0000	0.0000	5.30E-05
226	0.81	0.658	0.024	0.1546	0.0607	0.0003	9.08E-05	0.0029	0.0000	7.52E-09	0.0000	0.0000	5.29E-05
227	0.37	0.125	0.163	0.1591	0.0597	0.0003	8.97E-05	0.0029	0.0000	7.53E-09	0.0000	0.0000	5.29E-05
228	0.00	0.000	0.106	0.1532	0.0587	0.0003	8.85E-05	0.0030	0.0000	7.54E-09	0.0000	0.0000	5.29E-05
229	0.00	0.000	0.092	0.1481	0.0582	0.0003	8.80E-05	0.0030	0.0000	7.54E-09	0.0000	0.0000	5.28E-05
230	0.14	0.000	0.187	0.1453	0.0575	0.0003	8.72E-05	0.0030	0.0000	7.55E-09	0.0000	0.0000	5.28E-05
231	0.01	0.000	0.188	0.1351	0.0566	0.0003	8.60E-05	0.0031	0.0000	7.56E-09	0.0000	0.0000	5.27E-05
232	0.00	0.000	0.083	0.1301	0.0677	0.0003	9.86E-05	0.0031	0.0000	7.56E-09	0.0000	0.0000	5.27E-05
233	0.00	0.000	0.019	0.1290	0.0738	0.0004	1.05E-04	0.0031	0.0000	7.57E-09	0.0000	0.0000	5.27E-05
234	0.33	0.148	0.032	0.1371	0.0778	0.0004	1.10E-04	0.0031	0.0000	7.57E-09	0.0000	0.0000	5.26E-05
235	0.00	0.000	0.019	0.1360	0.0796	0.0004	1.12E-04	0.0032	0.0000	7.58E-09	0.0000	0.0000	5.26E-05
236	0.00	0.000	0.021	0.1348	0.0782	0.0004	1.10E-04	0.0032	0.0000	7.59E-09	0.0000	0.0000	5.25E-05
237	0.24	0.097	0.027	0.1412	0.0769	0.0004	1.09E-04	0.0032	0.0000	7.59E-09	0.0000	0.0000	5.25E-05
238	0.00	0.000	0.015	0.1403	0.0756	0.0004	1.07E-04	0.0032	0.0000	7.60E-09	0.0000	0.0000	5.24E-05
239	0.15	0.023	0.019	0.1465	0.0748	0.0004	1.06E-04	0.0033	0.0000	7.60E-09	0.0000	0.0000	5.24E-05
240	0.00	0.000	0.072	0.1426	0.0738	0.0004	1.05E-04	0.0033	0.0000	7.61E-09	0.0000	0.0000	5.24E-05
241	0.00	0.000	0.018	0.1416	0.0728	0.0004	1.04E-04	0.0033	0.0000	7.61E-09	0.0000	0.0000	5.23E-05
242	0.26	0.118	0.021	0.1483	0.0717	0.0004	1.03E-04	0.0033	0.0000	7.62E-09	0.0000	0.0000	5.23E-05
243	0.00	0.000	0.120	0.1418	0.0705	0.0003	1.02E-04	0.0034	0.0000	7.62E-09	0.0000	0.0000	5.22E-05
244	0.15	0.003	0.025	0.1482	0.0715	0.0004	1.03E-04	0.0034	0.0000	7.63E-09	0.0000	0.0000	5.22E-05
245	0.24	0.114	0.077	0.1512	0.0723	0.0004	1.04E-04	0.0034	0.0000	7.63E-09	0.0000	0.0000	5.22E-05
246	0.04	0.000	0.124	0.1464	0.0740	0.0004	1.06E-04	0.0034	0.0000	7.64E-09	0.0000	0.0000	5.21E-05
247	0.01	0.000	0.100	0.1413	0.0744	0.0004	1.06E-04	0.0034	0.0000	7.63E-09	0.0000	0.0000	5.21E-05
248	0.00	0.000	0.042	0.1389	0.0732	0.0004	1.05E-04	0.0033	0.0000	7.62E-09	0.0000	0.0000	5.20E-05
249	0.16	0.005	0.036	0.1452	0.0730	0.0004	1.05E-04	0.0033	0.0000	7.60E-09	0.0000	0.0000	5.20E-05
250	0.82	0.659	0.043	0.1517	0.0725	0.0004	1.04E-04	0.0032	0.0000	7.59E-09	0.0000	0.0000	5.20E-05
251	0.00	0.000	0.062	0.1483	0.0712	0.0004	1.03E-04	0.0032	0.0000	7.58E-09	0.0000	0.0000	5.19E-05
252	0.00	0.000	0.130	0.1409	0.0736	0.0004	1.05E-04	0.0031	0.0000	7.57E-09	0.0000	0.0000	5.19E-05
253	0.00	0.000	0.095	0.1356	0.0746	0.0004	1.06E-04	0.0030	0.0000	7.55E-09	0.0000	0.0000	5.18E-05
254	0.00	0.000	0.089	0.1307	0.0733	0.0004	1.05E-04	0.0030	0.0000	7.54E-09	0.0000	0.0000	5.18E-05
255	0.00	0.000	0.032	0.1289	0.0721	0.0004	1.03E-04	0.0029	0.0000	7.53E-09	0.0000	0.0000	5.18E-05
256	0.00	0.000	0.002	0.1287	0.0746	0.0004	1.06E-04	0.0029	0.0000	7.52E-09	0.0000	0.0000	5.17E-05
257	0.00	0.000	0.000	0.1287	0.0756	0.0004	1.07E-04	0.0028	0.0000	7.51E-09	0.0000	0.0000	5.17E-05
258	0.00	0.000	0.000	0.1287	0.0743	0.0004	1.06E-04	0.0028	0.0000	7.50E-09	0.0000	0.0000	5.16E-05

259		0.00	0.000	0.000	0.1287	0.0731	0.0004	1.05E-04	0.0027	0.0000	7.49E-09	0.0000	0.0000	5.16E-05
260		0.00	0.000	0.000	0.1287	0.0719	0.0004	1.03E-04	0.0027	0.0000	7.47E-09	0.0000	0.0000	5.16E-05
261		0.00	0.000	0.000	0.1287	0.0706	0.0003	1.02E-04	0.0026	0.0000	7.46E-09	0.0000	0.0000	5.15E-05
262		0.00	0.000	0.000	0.1287	0.0694	0.0003	1.01E-04	0.0026	0.0000	7.45E-09	0.0000	0.0000	5.15E-05
263		0.00	0.000	0.000	0.1287	0.0683	0.0003	9.93E-05	0.0026	0.0000	7.44E-09	0.0000	0.0000	5.15E-05
264		0.00	0.000	0.000	0.1287	0.0671	0.0003	9.80E-05	0.0025	0.0000	7.43E-09	0.0000	0.0000	5.14E-05
265		0.00	0.000	0.000	0.1287	0.0660	0.0003	9.68E-05	0.0025	0.0000	7.42E-09	0.0000	0.0000	5.14E-05
266		0.00	0.000	0.000	0.1287	0.0649	0.0003	9.55E-05	0.0024	0.0000	7.41E-09	0.0000	0.0000	5.13E-05
267		0.18	0.032	0.006	0.1366	0.0638	0.0003	9.43E-05	0.0024	0.0000	7.40E-09	0.0000	0.0000	5.13E-05
268		0.01	0.000	0.012	0.1363	0.0627	0.0003	9.30E-05	0.0023	0.0000	7.39E-09	0.0000	0.0000	5.13E-05
269		0.14	0.014	0.013	0.1425	0.0616	0.0003	9.18E-05	0.0023	0.0000	7.39E-09	0.0000	0.0000	5.12E-05
270		0.00	0.000	0.010	0.1419	0.0606	0.0003	9.06E-05	0.0023	0.0000	7.38E-09	0.0000	0.0000	5.12E-05
271		0.10	0.000	0.012	0.1469	0.0597	0.0003	8.97E-05	0.0022	0.0000	7.37E-09	0.0000	0.0000	5.11E-05
272		0.09	0.000	0.013	0.1509	0.0588	0.0003	8.87E-05	0.0022	0.0000	7.36E-09	0.0000	0.0000	5.11E-05
273		0.01	0.000	0.011	0.1507	0.0580	0.0003	8.77E-05	0.0021	0.0000	7.35E-09	0.0000	0.0000	5.11E-05
274		0.00	0.000	0.011	0.1501	0.0571	0.0003	8.67E-05	0.0021	0.0000	7.34E-09	0.0000	0.0000	5.10E-05
275		0.00	0.000	0.011	0.1495	0.0561	0.0003	8.55E-05	0.0021	0.0000	7.33E-09	0.0000	0.0000	5.10E-05
276		0.00	0.000	0.011	0.1489	0.0552	0.0003	8.44E-05	0.0020	0.0000	7.32E-09	0.0000	0.0000	5.09E-05
277	*	0.00	0.000	0.000	0.1489	0.0542	0.0003	8.33E-05	0.0020	0.0000	7.32E-09	0.0000	0.0000	5.09E-05
278	*	0.00	0.000	0.010	0.1483	0.0533	0.0003	8.22E-05	0.0020	0.0000	7.31E-09	0.0000	0.0000	5.09E-05
279	*	0.00	0.000	0.010	0.1478	0.0524	0.0003	8.11E-05	0.0019	0.0000	7.30E-09	0.0000	0.0000	5.08E-05
280	*	0.00	0.000	0.000	0.1478	0.0515	0.0003	8.01E-05	0.0019	0.0000	7.29E-09	0.0000	0.0000	5.08E-05
281	*	0.00	0.000	0.004	0.1478	0.0506	0.0002	7.90E-05	0.0019	0.0000	7.28E-09	0.0000	0.0000	5.08E-05
282	*	0.00	0.000	0.002	0.1478	0.0497	0.0002	7.80E-05	0.0018	0.0000	7.28E-09	0.0000	0.0000	5.07E-05
283	*	0.00	0.000	0.000	0.1478	0.0489	0.0002	7.70E-05	0.0018	0.0000	7.27E-09	0.0000	0.0000	5.07E-05
284	*	0.00	0.000	0.000	0.1478	0.0480	0.0002	7.60E-05	0.0018	0.0000	7.26E-09	0.0000	0.0000	5.06E-05
285		0.00	0.000	0.010	0.1472	0.0472	0.0002	7.50E-05	0.0017	0.0000	7.26E-09	0.0000	0.0000	5.06E-05
286		0.27	0.126	0.014	0.1546	0.0464	0.0002	7.40E-05	0.0017	0.0000	7.25E-09	0.0000	0.0000	5.06E-05
287	*	0.00	0.000	0.012	0.1540	0.0456	0.0002	7.30E-05	0.0017	0.0000	7.24E-09	0.0000	0.0000	5.05E-05
288	*	0.06	0.000	0.048	0.1546	0.0448	0.0002	7.20E-05	0.0016	0.0000	7.23E-09	0.0000	0.0000	5.05E-05
289		0.22	0.077	0.016	0.1617	0.0452	0.0002	7.25E-05	0.0016	0.0000	7.23E-09	0.0000	0.0000	5.05E-05
290	*	0.02	0.000	0.023	0.1617	0.0451	0.0002	7.24E-05	0.0016	0.0000	7.22E-09	0.0000	0.0000	5.04E-05
291		0.00	0.000	0.047	0.1591	0.0443	0.0002	7.14E-05	0.0016	0.0000	7.21E-09	0.0000	0.0000	5.04E-05
292	*	0.01	0.000	0.011	0.1591	0.0435	0.0002	7.05E-05	0.0015	0.0000	7.21E-09	0.0000	0.0000	5.03E-05
293	*	0.00	0.000	0.000	0.1591	0.0428	0.0002	6.96E-05	0.0015	0.0000	7.20E-09	0.0000	0.0000	5.03E-05
294	*	0.00	0.000	0.000	0.1591	0.0420	0.0002	6.86E-05	0.0015	0.0000	7.20E-09	0.0000	0.0000	5.03E-05
295	*	0.00	0.000	0.000	0.1591	0.0413	0.0002	6.77E-05	0.0015	0.0000	7.19E-09	0.0000	0.0000	5.02E-05
296		0.00	0.000	0.048	0.1565	0.0411	0.0002	6.75E-05	0.0014	0.0000	7.18E-09	0.0000	0.0000	5.02E-05

297			0.04	0.000	0.101	0.1533	0.0407	0.0002	6.69E-05	0.0014	0.0000	7.18E-09	0.0000	0.0000	5.02E-05
298			0.00	0.000	0.047	0.1507	0.0400	0.0002	6.60E-05	0.0014	0.0000	7.17E-09	0.0000	0.0000	5.01E-05
299	*		0.01	0.000	0.046	0.1485	0.0393	0.0002	6.52E-05	0.0014	0.0000	7.17E-09	0.0000	0.0000	5.01E-05
300			1.10	0.891	0.043	0.1575	0.0386	0.0002	6.43E-05	0.0013	0.0000	7.16E-09	0.0000	0.0000	5.00E-05
301			0.00	0.000	0.096	0.1520	0.0405	0.0002	6.68E-05	0.0013	0.0000	7.15E-09	0.0000	0.0000	5.00E-05
302			0.00	0.000	0.043	0.1496	0.0471	0.0002	7.48E-05	0.0013	0.0000	7.15E-09	0.0000	0.0000	5.00E-05
303			0.00	0.000	0.050	0.1468	0.0480	0.0002	7.59E-05	0.0013	0.0000	7.14E-09	0.0000	0.0000	4.99E-05
304			0.00	0.000	0.046	0.1443	0.0472	0.0002	7.49E-05	0.0012	0.0000	7.14E-09	0.0000	0.0000	4.99E-05
305			0.00	0.000	0.053	0.1413	0.0464	0.0002	7.39E-05	0.0012	0.0000	7.13E-09	0.0000	0.0000	4.99E-05
306			0.00	0.000	0.102	0.1356	0.0455	0.0002	7.30E-05	0.0012	0.0000	7.13E-09	0.0000	0.0000	4.98E-05
307			0.00	0.000	0.109	0.1296	0.0448	0.0002	7.20E-05	0.0012	0.0000	7.12E-09	0.0000	0.0000	4.98E-05
308			0.00	0.000	0.008	0.1287	0.0577	0.0003	8.72E-05	0.0012	0.0000	7.12E-09	0.0000	0.0000	4.97E-05
309			0.04	0.000	0.013	0.1301	0.0649	0.0003	9.55E-05	0.0011	0.0000	7.11E-09	0.0000	0.0000	4.97E-05
310			0.07	0.000	0.009	0.1334	0.0638	0.0003	9.43E-05	0.0011	0.0000	7.11E-09	0.0000	0.0000	4.97E-05
311			0.00	0.000	0.019	0.1323	0.0627	0.0003	9.30E-05	0.0011	0.0000	7.10E-09	0.0000	0.0000	4.96E-05
312			0.00	0.000	0.019	0.1312	0.0616	0.0003	9.18E-05	0.0011	0.0000	7.10E-09	0.0000	0.0000	4.96E-05
313	*		0.00	0.000	0.000	0.1312	0.0606	0.0003	9.06E-05	0.0011	0.0000	7.09E-09	0.0000	0.0000	4.96E-05
314	*		0.00	0.000	0.009	0.1307	0.0595	0.0003	8.95E-05	0.0010	0.0000	7.09E-09	0.0000	0.0000	4.95E-05
315	*		0.00	0.000	0.007	0.1303	0.0585	0.0003	8.83E-05	0.0010	0.0000	7.08E-09	0.0000	0.0000	4.95E-05
316	*		0.28	0.000	0.031	0.1314	0.0575	0.0003	8.72E-05	0.0010	0.0000	7.08E-09	0.0000	0.0000	4.95E-05
317			0.00	0.044	0.061	0.1384	0.0565	0.0003	8.60E-05	0.0010	0.0000	7.08E-09	0.0000	0.0000	4.94E-05
318			0.00	0.000	0.013	0.1376	0.0559	0.0003	8.53E-05	0.0010	0.0000	7.07E-09	0.0000	0.0000	4.94E-05
319			0.00	0.000	0.013	0.1369	0.0552	0.0003	8.44E-05	0.0010	0.0000	7.07E-09	0.0000	0.0000	4.93E-05
320	*		0.00	0.000	0.000	0.1369	0.0542	0.0003	8.33E-05	0.0009	0.0000	7.06E-09	0.0000	0.0000	4.93E-05
321			0.00	0.000	0.015	0.1361	0.0533	0.0003	8.23E-05	0.0009	0.0000	7.06E-09	0.0000	0.0000	4.93E-05
322			0.00	0.000	0.015	0.1353	0.0524	0.0003	8.12E-05	0.0009	0.0000	7.05E-09	0.0000	0.0000	4.92E-05
323			0.00	0.000	0.015	0.1344	0.0515	0.0003	8.01E-05	0.0009	0.0000	7.05E-09	0.0000	0.0000	4.92E-05
324			0.00	0.000	0.014	0.1337	0.0506	0.0002	7.91E-05	0.0009	0.0000	7.05E-09	0.0000	0.0000	4.92E-05
325			0.00	0.000	0.014	0.1329	0.0498	0.0002	7.81E-05	0.0009	0.0000	7.04E-09	0.0000	0.0000	4.91E-05
326			0.00	0.000	0.013	0.1322	0.0490	0.0002	7.71E-05	0.0008	0.0000	7.04E-09	0.0000	0.0000	4.91E-05
327			0.00	0.000	0.013	0.1315	0.0482	0.0002	7.61E-05	0.0008	0.0000	7.04E-09	0.0000	0.0000	4.91E-05
328			0.73	0.524	0.023	0.1419	0.0474	0.0002	7.51E-05	0.0008	0.0000	7.03E-09	0.0000	0.0000	4.90E-05
329			0.02	0.000	0.033	0.1414	0.0465	0.0002	7.42E-05	0.0008	0.0000	7.03E-09	0.0000	0.0000	4.90E-05
330			0.00	0.000	0.034	0.1395	0.0458	0.0002	7.32E-05	0.0008	0.0000	7.02E-09	0.0000	0.0000	4.90E-05
331			0.10	0.000	0.055	0.1421	0.0456	0.0002	7.31E-05	0.0008	0.0000	7.02E-09	0.0000	0.0000	4.89E-05
332			0.03	0.000	0.071	0.1400	0.0452	0.0002	7.26E-05	0.0008	0.0000	7.02E-09	0.0000	0.0000	4.89E-05
333			0.00	0.000	0.047	0.1374	0.0452	0.0002	7.25E-05	0.0007	0.0000	7.01E-09	0.0000	0.0000	4.89E-05
334			0.00	0.000	0.042	0.1350	0.0448	0.0002	7.20E-05	0.0007	0.0000	7.01E-09	0.0000	0.0000	4.88E-05

335			0.00	0.000	0.062	0.1315	0.0458	0.0002	7.32E-05	0.0007	0.0000	7.01E-09	0.0000	0.0000	4.88E-05
336			0.00	0.000	0.037	0.1294	0.0460	0.0002	7.35E-05	0.0007	0.0000	7.00E-09	0.0000	0.0000	4.87E-05
337			0.00	0.000	0.010	0.1289	0.0452	0.0002	7.25E-05	0.0007	0.0000	7.00E-09	0.0000	0.0000	4.87E-05
338			0.00	0.000	0.002	0.1287	0.0472	0.0002	7.50E-05	0.0007	0.0000	7.00E-09	0.0000	0.0000	4.87E-05
339	*		0.00	0.000	0.000	0.1287	0.0481	0.0002	7.60E-05	0.0007	0.0000	7.00E-09	0.0000	0.0000	4.86E-05
340			0.00	0.000	0.000	0.1287	0.0472	0.0002	7.50E-05	0.0007	0.0000	6.99E-09	0.0000	0.0000	4.86E-05
341			0.00	0.000	0.000	0.1287	0.0464	0.0002	7.40E-05	0.0006	0.0000	6.99E-09	0.0000	0.0000	4.86E-05
342			0.00	0.000	0.000	0.1287	0.0456	0.0002	7.31E-05	0.0006	0.0000	6.99E-09	0.0000	0.0000	4.85E-05
343			0.00	0.000	0.000	0.1287	0.0448	0.0002	7.21E-05	0.0006	0.0000	6.98E-09	0.0000	0.0000	4.85E-05
344			0.00	0.000	0.000	0.1287	0.0441	0.0002	7.12E-05	0.0006	0.0000	6.98E-09	0.0000	0.0000	4.85E-05
345			0.00	0.000	0.000	0.1287	0.0433	0.0002	7.02E-05	0.0006	0.0000	6.98E-09	0.0000	0.0000	4.84E-05
346	*		0.00	0.000	0.000	0.1287	0.0426	0.0002	6.93E-05	0.0006	0.0000	6.98E-09	0.0000	0.0000	4.84E-05
347	*		0.00	0.000	0.000	0.1287	0.0418	0.0002	6.84E-05	0.0006	0.0000	6.97E-09	0.0000	0.0000	4.84E-05
348			0.00	0.000	0.000	0.1287	0.0411	0.0002	6.75E-05	0.0006	0.0000	6.97E-09	0.0000	0.0000	4.83E-05
349			0.07	0.000	0.006	0.1323	0.0404	0.0002	6.66E-05	0.0006	0.0000	6.97E-09	0.0000	0.0000	4.83E-05
350			0.02	0.000	0.006	0.1328	0.0397	0.0002	6.57E-05	0.0006	0.0000	6.96E-09	0.0000	0.0000	4.83E-05
351			0.00	0.000	0.008	0.1324	0.0390	0.0002	6.48E-05	0.0005	0.0000	6.96E-09	0.0000	0.0000	4.82E-05
352			0.00	0.000	0.008	0.1319	0.0383	0.0002	6.39E-05	0.0005	0.0000	6.96E-09	0.0000	0.0000	4.82E-05
353			0.00	0.000	0.009	0.1314	0.0376	0.0002	6.31E-05	0.0005	0.0000	6.96E-09	0.0000	0.0000	4.82E-05
354			0.08	0.000	0.015	0.1353	0.0370	0.0002	6.22E-05	0.0005	0.0000	6.95E-09	0.0000	0.0000	4.81E-05
355			0.25	0.114	0.012	0.1421	0.0363	0.0002	6.14E-05	0.0005	0.0000	6.95E-09	0.0000	0.0000	4.81E-05
356			0.00	0.000	0.007	0.1417	0.0359	0.0002	6.09E-05	0.0005	0.0000	6.95E-09	0.0000	0.0000	4.81E-05
357	*		0.00	0.000	0.007	0.1414	0.0354	0.0002	6.02E-05	0.0005	0.0000	6.95E-09	0.0000	0.0000	4.80E-05
358			0.00	0.000	0.009	0.1409	0.0348	0.0002	5.94E-05	0.0005	0.0000	6.95E-09	0.0000	0.0000	4.80E-05
359	*		0.00	0.000	0.000	0.1409	0.0341	0.0002	5.86E-05	0.0005	0.0000	6.94E-09	0.0000	0.0000	4.79E-05
360	*		0.04	0.000	0.011	0.1420	0.0335	0.0002	5.78E-05	0.0005	0.0000	6.94E-09	0.0000	0.0000	4.79E-05
361	*		0.00	0.000	0.022	0.1415	0.0330	0.0002	5.70E-05	0.0005	0.0000	6.94E-09	0.0000	0.0000	4.79E-05
362			0.00	0.000	0.007	0.1411	0.0324	0.0002	5.63E-05	0.0004	0.0000	6.94E-09	0.0000	0.0000	4.78E-05
363			0.00	0.000	0.008	0.1406	0.0320	0.0002	5.58E-05	0.0004	0.0000	6.94E-09	0.0000	0.0000	4.78E-05
364	*		0.00	0.000	0.000	0.1406	0.0315	0.0002	5.52E-05	0.0004	0.0000	6.93E-09	0.0000	0.0000	4.78E-05
365	*		0.06	0.000	0.019	0.1417	0.0310	0.0002	5.44E-05	0.0004	0.0000	6.93E-09	0.0000	0.0000	4.77E-05

* = Frozen (air or soil)

Annual Totals for Year 3			
	inches	cubic feet	percent
Precipitation	38.80	140,856.4	100.00

Runoff	23.721	86,107.1	61.13
Evapotranspiration	15.093	54,788.0	38.90
Drainage Collected from Layer 3	0.0706	256.4	0.18
Percolation/Leakage through Layer 4	0.022877	83.0	0.06
Average Head on Top of Layer 4	0.0393	---	---
Drainage Collected from Layer 7	0.0034	12.4	0.01
Percolation/Leakage through Layer 9	0.000003	0.0095	0.00
Average Head on Top of Layer 8	0.0014	---	---
Percolation/Leakage through Layer 10	0.020139	73.1	0.05
Change in Water Storage	-0.1049	-380.7	-0.27
Soil Water at Start of Year	72.4829	263,113.0	186.80
Soil Water at End of Year	72.3588	262,662.6	186.48
Snow Water at Start of Year	0.0000	0.0000	0.00
Snow Water at End of Year	0.0192	69.8	0.05
Annual Water Budget Balance	0.0000	0.0000	0.00

Daily Output for Year 4

Column key: Head #1: drainage from Layer 4 | Head #2: drainage from Layer 8
Drain #1: drainage from Layer 3 | Drain #2: drainage from Layer 7
Leak #1: leakage thru Layer 4 | Leak #2: leakage thru Layer 9 | Leak #3: leakage thru Layer 10

Title: Pilgrim Landfill
Simulated On: 4/10/2026 14:14

Day	Freezing Status*		Rain	Runoff	ET	Evap. Zone Water	Head #1	Drain #1	Leak #1	Head #2	Drain #2	Leak #2	Head #3	Drain #3	Leak #3
	Air	Soil	(inches)	(inches)	(inches)	(in/in)	(inches)	(inches)	(inches)	(inches)	(inches)	(inches)	(inches)	(inches)	(inches)
1	*		0.11	0.000	0.007	0.1428	0.0304	0.0002	5.37E-05	0.0004	0.0000	6.93E-09	0.0000	0.0000	4.77E-05
2	*		0.00	0.000	0.004	0.1439	0.0299	0.0001	5.30E-05	0.0004	0.0000	6.93E-09	0.0000	0.0000	4.77E-05
3	*		0.00	0.000	0.012	0.1450	0.0294	0.0001	5.22E-05	0.0004	0.0000	6.93E-09	0.0000	0.0000	4.76E-05
4	*		0.05	0.000	0.000	0.1461	0.0288	0.0001	5.15E-05	0.0004	0.0000	6.94E-09	0.0000	0.0000	4.76E-05
5	*		0.00	0.000	0.009	0.1472	0.0283	0.0001	5.08E-05	0.0004	0.0000	6.94E-09	0.0000	0.0000	4.76E-05
6	*	*	0.00	0.000	0.018	0.1472	0.0278	0.0001	5.01E-05	0.0005	0.0000	6.94E-09	0.0000	0.0000	4.75E-05
7	*	*	0.02	0.000	0.029	0.1472	0.0273	0.0001	4.95E-05	0.0005	0.0000	6.94E-09	0.0000	0.0000	4.75E-05
8		*	0.00	0.000	0.028	0.1472	0.0268	0.0001	4.88E-05	0.0005	0.0000	6.95E-09	0.0000	0.0000	4.75E-05
9		*	0.00	0.000	0.000	0.1472	0.0264	0.0001	4.81E-05	0.0005	0.0000	6.95E-09	0.0000	0.0000	4.74E-05
10		*	0.00	0.000	0.000	0.1472	0.0259	0.0001	4.75E-05	0.0005	0.0000	6.95E-09	0.0000	0.0000	4.74E-05
11	*	*	0.00	0.000	0.000	0.1472	0.0254	0.0001	4.68E-05	0.0005	0.0000	6.96E-09	0.0000	0.0000	4.74E-05
12		*	0.00	0.000	0.000	0.1472	0.0250	0.0001	4.62E-05	0.0005	0.0000	6.96E-09	0.0000	0.0000	4.73E-05
13		*	0.15	0.113	0.004	0.1491	0.0245	0.0001	4.55E-05	0.0006	0.0000	6.97E-09	0.0000	0.0000	4.73E-05
14	*	*	0.00	0.000	0.000	0.1491	0.0241	0.0001	4.49E-05	0.0006	0.0000	6.97E-09	0.0000	0.0000	4.73E-05
15		*	0.00	0.000	0.000	0.1491	0.0237	0.0001	4.43E-05	0.0006	0.0000	6.98E-09	0.0000	0.0000	4.72E-05
16		*	0.00	0.000	0.000	0.1491	0.0232	0.0001	4.37E-05	0.0006	0.0000	6.98E-09	0.0000	0.0000	4.72E-05
17		*	0.00	0.000	0.000	0.1491	0.0228	0.0001	4.31E-05	0.0007	0.0000	6.99E-09	0.0000	0.0000	4.72E-05
18	*	*	0.10	0.000	0.022	0.1491	0.0224	0.0001	4.25E-05	0.0007	0.0000	7.00E-09	0.0000	0.0000	4.71E-05
19	*	*	0.00	0.000	0.009	0.1491	0.0220	0.0001	4.19E-05	0.0007	0.0000	7.00E-09	0.0000	0.0000	4.71E-05
20	*	*	0.00	0.000	0.004	0.1491	0.0216	0.0001	4.13E-05	0.0007	0.0000	7.01E-09	0.0000	0.0000	4.71E-05
21	*	*	0.00	0.000	0.002	0.1491	0.0212	0.0001	4.08E-05	0.0008	0.0000	7.02E-09	0.0000	0.0000	4.70E-05
22	*	*	0.00	0.000	0.010	0.1491	0.0208	0.0001	4.02E-05	0.0008	0.0000	7.02E-09	0.0000	0.0000	4.70E-05
23	*	*	0.00	0.000	0.012	0.1491	0.0204	0.0001	3.96E-05	0.0008	0.0000	7.03E-09	0.0000	0.0000	4.70E-05
24	*	*	0.01	0.000	0.000	0.1491	0.0201	0.0001	3.91E-05	0.0008	0.0000	7.04E-09	0.0000	0.0000	4.69E-05
25	*	*	0.12	0.000	0.006	0.1491	0.0197	0.0001	3.86E-05	0.0008	0.0000	7.04E-09	0.0000	0.0000	4.69E-05
26	*	*	0.00	0.000	0.010	0.1491	0.0193	0.0001	3.80E-05	0.0009	0.0000	7.04E-09	0.0000	0.0000	4.69E-05
27	*	*	0.02	0.000	0.000	0.1491	0.0190	0.0001	3.75E-05	0.0009	0.0000	7.05E-09	0.0000	0.0000	4.68E-05
28	*	*	0.00	0.000	0.036	0.1491	0.0186	0.0001	3.70E-05	0.0009	0.0000	7.05E-09	0.0000	0.0000	4.68E-05
29	*	*	0.00	0.000	0.018	0.1491	0.0183	0.0001	3.65E-05	0.0009	0.0000	7.05E-09	0.0000	0.0000	4.68E-05
30	*	*	0.00	0.000	0.017	0.1491	0.0180	0.0001	3.59E-05	0.0009	0.0000	7.06E-09	0.0000	0.0000	4.68E-05

31	*	*	0.00	0.000	0.018	0.1491	0.0176	0.0001	3.54E-05	0.0009	0.0000	7.06E-09	0.0000	0.0000	4.67E-05
32	*	*	0.00	0.000	0.017	0.1491	0.0173	0.0001	3.49E-05	0.0009	0.0000	7.06E-09	0.0000	0.0000	4.67E-05
33	*	*	0.00	0.000	0.029	0.1491	0.0170	0.0001	3.45E-05	0.0009	0.0000	7.06E-09	0.0000	0.0000	4.67E-05
34	*	*	0.01	0.000	0.011	0.1491	0.0167	0.0001	3.40E-05	0.0009	0.0000	7.06E-09	0.0000	0.0000	4.66E-05
35	*	*	0.00	0.000	0.005	0.1491	0.0164	0.0001	3.35E-05	0.0009	0.0000	7.06E-09	0.0000	0.0000	4.66E-05
36	*	*	0.09	0.000	0.010	0.1491	0.0161	0.0001	3.30E-05	0.0009	0.0000	7.06E-09	0.0000	0.0000	4.66E-05
37	*	*	0.04	0.000	0.000	0.1491	0.0158	0.0001	3.26E-05	0.0009	0.0000	7.06E-09	0.0000	0.0000	4.65E-05
38	*	*	0.01	0.000	0.000	0.1491	0.0155	0.0001	3.21E-05	0.0009	0.0000	7.06E-09	0.0000	0.0000	4.65E-05
39	*	*	0.01	0.000	0.026	0.1491	0.0152	0.0001	3.16E-05	0.0009	0.0000	7.06E-09	0.0000	0.0000	4.65E-05
40	*	*	0.00	0.000	0.033	0.1491	0.0149	0.0001	3.12E-05	0.0009	0.0000	7.06E-09	0.0000	0.0000	4.64E-05
41	*	*	0.00	0.000	0.014	0.1491	0.0146	0.0001	3.08E-05	0.0009	0.0000	7.06E-09	0.0000	0.0000	4.64E-05
42	*	*	0.00	0.000	0.019	0.1491	0.0144	0.0001	3.03E-05	0.0009	0.0000	7.06E-09	0.0000	0.0000	4.64E-05
43	*	*	0.00	0.000	0.016	0.1491	0.0141	0.0001	2.99E-05	0.0009	0.0000	7.06E-09	0.0000	0.0000	4.63E-05
44	*	*	0.00	0.000	0.004	0.1491	0.0138	0.0001	2.95E-05	0.0009	0.0000	7.06E-09	0.0000	0.0000	4.63E-05
45	*	*	0.19	0.000	0.005	0.1491	0.0136	0.0001	2.90E-05	0.0009	0.0000	7.05E-09	0.0000	0.0000	4.63E-05
46	*	*	0.21	0.000	0.000	0.1491	0.0133	0.0001	2.86E-05	0.0009	0.0000	7.05E-09	0.0000	0.0000	4.62E-05
47	*	*	0.00	0.000	0.005	0.1491	0.0131	0.0001	2.82E-05	0.0009	0.0000	7.05E-09	0.0000	0.0000	4.62E-05
48	*	*	0.00	0.000	0.000	0.1491	0.0128	0.0001	2.78E-05	0.0009	0.0000	7.05E-09	0.0000	0.0000	4.62E-05
49	*	*	0.12	0.000	0.007	0.1491	0.0126	0.0001	2.74E-05	0.0009	0.0000	7.04E-09	0.0000	0.0000	4.61E-05
50	*	*	0.19	0.000	0.000	0.1491	0.0123	0.0001	2.70E-05	0.0008	0.0000	7.04E-09	0.0000	0.0000	4.61E-05
51	*	*	0.19	0.000	0.000	0.1491	0.0121	0.0001	2.66E-05	0.0008	0.0000	7.04E-09	0.0000	0.0000	4.61E-05
52	*	*	0.03	0.000	0.000	0.1491	0.0119	0.0001	2.62E-05	0.0008	0.0000	7.03E-09	0.0000	0.0000	4.60E-05
53		*	0.04	1.003	0.000	0.1491	0.0117	0.0001	2.59E-05	0.0008	0.0000	7.03E-09	0.0000	0.0000	4.60E-05
54		*	0.06	0.000	0.004	0.1520	0.0114	0.0001	2.55E-05	0.0008	0.0000	7.03E-09	0.0000	0.0000	4.60E-05
55		*	0.01	0.000	0.004	0.1523	0.0112	0.0001	2.51E-05	0.0008	0.0000	7.02E-09	0.0000	0.0000	4.60E-05
56		*	0.00	0.000	0.003	0.1524	0.0110	0.0001	2.48E-05	0.0008	0.0000	7.02E-09	0.0000	0.0000	4.59E-05
57		*	0.01	0.000	0.004	0.1528	0.0108	0.0001	2.44E-05	0.0007	0.0000	7.02E-09	0.0000	0.0000	4.59E-05
58		*	0.00	0.000	0.000	0.1528	0.0106	0.0001	2.41E-05	0.0007	0.0000	7.01E-09	0.0000	0.0000	4.59E-05
59		*	0.00	0.000	0.000	0.1528	0.0104	0.0001	2.37E-05	0.0007	0.0000	7.01E-09	0.0000	0.0000	4.58E-05
60		*	0.00	0.000	0.000	0.1528	0.0102	0.0001	2.34E-05	0.0007	0.0000	7.01E-09	0.0000	0.0000	4.58E-05
61	*	*	0.00	0.000	0.000	0.1528	0.0100	0.0000	2.30E-05	0.0007	0.0000	7.00E-09	0.0000	0.0000	4.58E-05
62		*	0.00	0.000	0.000	0.1528	0.0098	0.0000	2.27E-05	0.0007	0.0000	7.00E-09	0.0000	0.0000	4.57E-05
63		*	0.00	0.000	0.000	0.1528	0.0096	0.0000	2.24E-05	0.0007	0.0000	7.00E-09	0.0000	0.0000	4.57E-05
64		*	0.00	0.000	0.000	0.1528	0.0094	0.0000	2.20E-05	0.0007	0.0000	6.99E-09	0.0000	0.0000	4.57E-05
65		*	0.00	0.000	0.000	0.1528	0.0092	0.0000	2.17E-05	0.0007	0.0000	6.99E-09	0.0000	0.0000	4.56E-05
66	*	*	0.13	0.000	0.041	0.1528	0.0091	0.0000	2.14E-05	0.0006	0.0000	6.99E-09	0.0000	0.0000	4.56E-05
67	*	*	0.07	0.000	0.037	0.1528	0.0089	0.0000	2.11E-05	0.0006	0.0000	6.98E-09	0.0000	0.0000	4.56E-05
68		*	0.55	0.644	0.024	0.1528	0.0087	0.0000	2.08E-05	0.0006	0.0000	6.98E-09	0.0000	0.0000	4.55E-05

69		*	0.00	0.000	0.000	0.1528	0.0086	0.0000	2.05E-05	0.0006	0.0000	6.98E-09	0.0000	0.0000	4.55E-05
70		*	0.00	0.000	0.000	0.1528	0.0084	0.0000	2.02E-05	0.0006	0.0000	6.98E-09	0.0000	0.0000	4.55E-05
71		*	0.13	0.009	0.004	0.1591	0.0082	0.0000	1.99E-05	0.0006	0.0000	6.97E-09	0.0000	0.0000	4.55E-05
72			0.08	0.000	0.164	0.1543	0.0081	0.0000	1.96E-05	0.0006	0.0000	6.97E-09	0.0000	0.0000	4.54E-05
73			0.11	0.000	0.060	0.1573	0.0079	0.0000	1.93E-05	0.0006	0.0000	6.97E-09	0.0000	0.0000	4.54E-05
74			0.04	0.000	0.112	0.1534	0.0078	0.0000	1.90E-05	0.0006	0.0000	6.97E-09	0.0000	0.0000	4.54E-05
75			0.26	0.106	0.108	0.1556	0.0119	0.0001	2.61E-05	0.0005	0.0000	6.96E-09	0.0000	0.0000	4.53E-05
76	*		0.00	0.000	0.000	0.1556	0.0142	0.0001	3.01E-05	0.0005	0.0000	6.96E-09	0.0000	0.0000	4.53E-05
77	*		0.01	0.000	0.006	0.1556	0.0140	0.0001	2.97E-05	0.0005	0.0000	6.96E-09	0.0000	0.0000	4.53E-05
78	*		0.02	0.000	0.015	0.1561	0.0137	0.0001	2.92E-05	0.0005	0.0000	6.96E-09	0.0000	0.0000	4.52E-05
79	*		0.00	0.000	0.000	0.1561	0.0134	0.0001	2.88E-05	0.0005	0.0000	6.96E-09	0.0000	0.0000	4.52E-05
80	*		0.17	0.000	0.005	0.1572	0.0132	0.0001	2.84E-05	0.0005	0.0000	6.96E-09	0.0000	0.0000	4.52E-05
81	*		0.29	0.000	0.000	0.1583	0.0129	0.0001	2.80E-05	0.0005	0.0000	6.96E-09	0.0000	0.0000	4.52E-05
82	*		0.00	0.000	0.012	0.1594	0.0127	0.0001	2.76E-05	0.0005	0.0000	6.96E-09	0.0000	0.0000	4.51E-05
83	*	*	0.01	0.000	0.015	0.1594	0.0125	0.0001	2.72E-05	0.0005	0.0000	6.96E-09	0.0000	0.0000	4.51E-05
84	*	*	0.05	0.000	0.018	0.1594	0.0122	0.0001	2.68E-05	0.0005	0.0000	6.95E-09	0.0000	0.0000	4.51E-05
85		*	0.01	0.370	0.015	0.1604	0.0120	0.0001	2.64E-05	0.0005	0.0000	6.95E-09	0.0000	0.0000	4.50E-05
86		*	0.00	0.000	0.000	0.1604	0.0118	0.0001	2.61E-05	0.0005	0.0000	6.95E-09	0.0000	0.0000	4.50E-05
87		*	0.00	0.000	0.000	0.1604	0.0115	0.0001	2.57E-05	0.0005	0.0000	6.95E-09	0.0000	0.0000	4.50E-05
88		*	0.00	0.000	0.000	0.1604	0.0113	0.0001	2.53E-05	0.0005	0.0000	6.94E-09	0.0000	0.0000	4.49E-05
89		*	0.00	0.000	0.001	0.1604	0.0111	0.0001	2.49E-05	0.0005	0.0000	6.94E-09	0.0000	0.0000	4.49E-05
90		*	0.65	0.647	0.004	0.1604	0.0109	0.0001	2.46E-05	0.0005	0.0000	6.94E-09	0.0000	0.0000	4.49E-05
91		*	0.03	0.000	0.004	0.1621	0.0107	0.0001	2.42E-05	0.0005	0.0000	6.94E-09	0.0000	0.0000	4.49E-05
92		*	0.03	0.000	0.004	0.1637	0.0105	0.0001	2.39E-05	0.0004	0.0000	6.94E-09	0.0000	0.0000	4.48E-05
93		*	0.00	0.000	0.000	0.1637	0.0103	0.0001	2.35E-05	0.0004	0.0000	6.93E-09	0.0000	0.0000	4.48E-05
94		*	0.00	0.000	0.000	0.1637	0.0101	0.0000	2.32E-05	0.0004	0.0000	6.93E-09	0.0000	0.0000	4.48E-05
95		*	0.00	0.000	0.000	0.1637	0.0099	0.0000	2.28E-05	0.0004	0.0000	6.93E-09	0.0000	0.0000	4.47E-05
96		*	0.00	0.000	0.000	0.1637	0.0097	0.0000	2.25E-05	0.0004	0.0000	6.93E-09	0.0000	0.0000	4.47E-05
97	*	*	0.00	0.000	0.000	0.1637	0.0095	0.0000	2.22E-05	0.0004	0.0000	6.93E-09	0.0000	0.0000	4.47E-05
98		*	0.00	0.000	0.000	0.1637	0.0093	0.0000	2.19E-05	0.0004	0.0000	6.92E-09	0.0000	0.0000	4.46E-05
99		*	0.00	0.000	0.000	0.1637	0.0092	0.0000	2.15E-05	0.0004	0.0000	6.92E-09	0.0000	0.0000	4.46E-05
100			0.00	0.000	0.103	0.1582	0.0090	0.0000	2.12E-05	0.0004	0.0000	6.92E-09	0.0000	0.0000	4.46E-05
101			0.00	0.000	0.225	0.1455	0.0128	0.0001	2.77E-05	0.0004	0.0000	6.92E-09	0.0000	0.0000	4.46E-05
102			0.06	0.000	0.268	0.1341	0.0149	0.0001	3.12E-05	0.0004	0.0000	6.92E-09	0.0000	0.0000	4.45E-05
103			0.57	0.257	0.148	0.1432	0.0147	0.0001	3.08E-05	0.0004	0.0000	6.92E-09	0.0000	0.0000	4.45E-05
104			0.86	0.162	0.579	0.1497	0.0144	0.0001	3.04E-05	0.0004	0.0000	6.92E-09	0.0000	0.0000	4.45E-05
105			0.00	0.000	0.275	0.1340	0.0185	0.0001	3.66E-05	0.0004	0.0000	6.92E-09	0.0000	0.0000	4.44E-05
106			0.09	0.000	0.102	0.1332	0.0369	0.0002	6.21E-05	0.0004	0.0000	6.93E-09	0.0000	0.0000	4.44E-05

107			0.07	0.000	0.033	0.1353	0.0395	0.0002	6.54E-05	0.0004	0.0000	6.92E-09	0.0000	0.0000	4.44E-05
108			0.01	0.000	0.031	0.1339	0.0433	0.0002	7.02E-05	0.0004	0.0000	6.92E-09	0.0000	0.0000	4.43E-05
109			0.00	0.000	0.027	0.1324	0.0453	0.0002	7.26E-05	0.0004	0.0000	6.92E-09	0.0000	0.0000	4.43E-05
110			0.02	0.000	0.028	0.1318	0.0445	0.0002	7.16E-05	0.0004	0.0000	6.92E-09	0.0000	0.0000	4.43E-05
111			0.00	0.000	0.007	0.1314	0.0438	0.0002	7.08E-05	0.0004	0.0000	6.92E-09	0.0000	0.0000	4.43E-05
112			0.01	0.000	0.011	0.1312	0.0439	0.0002	7.09E-05	0.0004	0.0000	6.92E-09	0.0000	0.0000	4.42E-05
113	*		0.00	0.000	0.004	0.1310	0.0434	0.0002	7.03E-05	0.0004	0.0000	6.91E-09	0.0000	0.0000	4.42E-05
114			0.60	0.410	0.031	0.1400	0.0427	0.0002	6.94E-05	0.0004	0.0000	6.91E-09	0.0000	0.0000	4.42E-05
115			0.33	0.122	0.154	0.1429	0.0419	0.0002	6.85E-05	0.0004	0.0000	6.91E-09	0.0000	0.0000	4.41E-05
116	*		0.41	0.000	0.052	0.1440	0.0412	0.0002	6.76E-05	0.0003	0.0000	6.91E-09	0.0000	0.0000	4.41E-05
117			0.54	0.627	0.119	0.1515	0.0405	0.0002	6.67E-05	0.0003	0.0000	6.91E-09	0.0000	0.0000	4.41E-05
118			0.02	0.000	0.033	0.1509	0.0399	0.0002	6.59E-05	0.0003	0.0000	6.91E-09	0.0000	0.0000	4.41E-05
119			0.00	0.000	0.094	0.1457	0.0392	0.0002	6.51E-05	0.0003	0.0000	6.90E-09	0.0000	0.0000	4.40E-05
120			0.32	0.130	0.136	0.1485	0.0385	0.0002	6.42E-05	0.0003	0.0000	6.90E-09	0.0000	0.0000	4.40E-05
121			0.00	0.000	0.087	0.1437	0.0379	0.0002	6.34E-05	0.0003	0.0000	6.90E-09	0.0000	0.0000	4.40E-05
122			0.00	0.000	0.071	0.1396	0.0395	0.0002	6.54E-05	0.0003	0.0000	6.90E-09	0.0000	0.0000	4.39E-05
123			0.55	0.159	0.243	0.1476	0.0402	0.0002	6.63E-05	0.0003	0.0000	6.90E-09	0.0000	0.0000	4.39E-05
124			0.22	0.067	0.186	0.1456	0.0395	0.0002	6.54E-05	0.0003	0.0000	6.90E-09	0.0000	0.0000	4.39E-05
125			0.09	0.000	0.101	0.1451	0.0389	0.0002	6.47E-05	0.0003	0.0000	6.90E-09	0.0000	0.0000	4.39E-05
126			0.02	0.000	0.109	0.1398	0.0409	0.0002	6.73E-05	0.0003	0.0000	6.89E-09	0.0000	0.0000	4.38E-05
127			0.23	0.071	0.179	0.1386	0.0417	0.0002	6.82E-05	0.0003	0.0000	6.89E-09	0.0000	0.0000	4.38E-05
128			0.00	0.000	0.095	0.1333	0.0410	0.0002	6.73E-05	0.0003	0.0000	6.89E-09	0.0000	0.0000	4.38E-05
129			0.02	0.000	0.056	0.1315	0.0434	0.0002	7.04E-05	0.0003	0.0000	6.89E-09	0.0000	0.0000	4.37E-05
130			0.58	0.275	0.148	0.1402	0.0446	0.0002	7.18E-05	0.0003	0.0000	6.89E-09	0.0000	0.0000	4.37E-05
131			0.14	0.008	0.049	0.1446	0.0439	0.0002	7.09E-05	0.0003	0.0000	6.89E-09	0.0000	0.0000	4.37E-05
132			0.00	0.000	0.126	0.1376	0.0449	0.0002	7.21E-05	0.0003	0.0000	6.89E-09	0.0000	0.0000	4.37E-05
133			0.10	0.000	0.169	0.1338	0.0450	0.0002	7.23E-05	0.0003	0.0000	6.89E-09	0.0000	0.0000	4.36E-05
134			0.06	0.000	0.031	0.1356	0.0442	0.0002	7.13E-05	0.0003	0.0000	6.88E-09	0.0000	0.0000	4.36E-05
135			0.00	0.000	0.027	0.1340	0.0464	0.0002	7.40E-05	0.0003	0.0000	6.88E-09	0.0000	0.0000	4.36E-05
136			0.00	0.000	0.025	0.1326	0.0474	0.0002	7.52E-05	0.0003	0.0000	6.88E-09	0.0000	0.0000	4.35E-05
137			0.13	0.000	0.031	0.1379	0.0466	0.0002	7.42E-05	0.0002	0.0000	6.88E-09	0.0000	0.0000	4.35E-05
138			0.00	0.000	0.017	0.1370	0.0458	0.0002	7.32E-05	0.0002	0.0000	6.88E-09	0.0000	0.0000	4.35E-05
139	*		0.00	0.000	0.000	0.1370	0.0450	0.0002	7.22E-05	0.0002	0.0000	6.88E-09	0.0000	0.0000	4.35E-05
140	*		0.00	0.000	0.000	0.1370	0.0442	0.0002	7.13E-05	0.0002	0.0000	6.88E-09	0.0000	0.0000	4.34E-05
141			0.47	0.277	0.035	0.1456	0.0435	0.0002	7.04E-05	0.0002	0.0000	6.88E-09	0.0000	0.0000	4.34E-05
142	*		0.03	0.000	0.074	0.1429	0.0432	0.0002	7.01E-05	0.0002	0.0000	6.88E-09	0.0000	0.0000	4.34E-05
143			0.29	0.131	0.096	0.1466	0.0427	0.0002	6.94E-05	0.0002	0.0000	6.88E-09	0.0000	0.0000	4.33E-05
144			0.00	0.000	0.084	0.1419	0.0420	0.0002	6.86E-05	0.0002	0.0000	6.87E-09	0.0000	0.0000	4.33E-05

145	0.00	0.000	0.097	0.1364	0.0429	0.0002	6.97E-05	0.0002	0.0000	6.87E-09	0.0000	0.0000	4.33E-05
146	0.00	0.000	0.040	0.1342	0.0430	0.0002	6.99E-05	0.0002	0.0000	6.87E-09	0.0000	0.0000	4.33E-05
147	0.00	0.000	0.031	0.1324	0.0423	0.0002	6.89E-05	0.0002	0.0000	6.87E-09	0.0000	0.0000	4.32E-05
148	0.00	0.000	0.022	0.1312	0.0416	0.0002	6.80E-05	0.0002	0.0000	6.87E-09	0.0000	0.0000	4.32E-05
149	0.00	0.000	0.029	0.1296	0.0409	0.0002	6.72E-05	0.0002	0.0000	6.87E-09	0.0000	0.0000	4.32E-05
150	0.00	0.000	0.015	0.1287	0.0414	0.0002	6.79E-05	0.0002	0.0000	6.87E-09	0.0000	0.0000	4.32E-05
151	0.00	0.000	0.000	0.1287	0.0448	0.0002	7.21E-05	0.0002	0.0000	6.87E-09	0.0000	0.0000	4.31E-05
152	1.20	0.965	0.031	0.1398	0.0443	0.0002	7.14E-05	0.0002	0.0000	6.87E-09	0.0000	0.0000	4.31E-05
153	0.00	0.000	0.053	0.1368	0.0435	0.0002	7.04E-05	0.0002	0.0000	6.87E-09	0.0000	0.0000	4.31E-05
154	0.70	0.344	0.195	0.1459	0.0427	0.0002	6.95E-05	0.0002	0.0000	6.87E-09	0.0000	0.0000	4.30E-05
155	0.05	0.000	0.083	0.1441	0.0420	0.0002	6.86E-05	0.0002	0.0000	6.87E-09	0.0000	0.0000	4.30E-05
156	0.00	0.000	0.120	0.1374	0.0413	0.0002	6.77E-05	0.0002	0.0000	6.87E-09	0.0000	0.0000	4.30E-05
157	0.00	0.000	0.123	0.1305	0.0428	0.0002	6.96E-05	0.0002	0.0000	6.87E-09	0.0000	0.0000	4.30E-05
158	0.26	0.059	0.097	0.1365	0.0433	0.0002	7.02E-05	0.0002	0.0000	6.86E-09	0.0000	0.0000	4.29E-05
159	0.39	0.123	0.189	0.1409	0.0432	0.0002	7.01E-05	0.0002	0.0000	6.86E-09	0.0000	0.0000	4.29E-05
160	0.00	0.000	0.128	0.1338	0.0456	0.0002	7.30E-05	0.0002	0.0000	6.86E-09	0.0000	0.0000	4.29E-05
161	1.01	0.685	0.139	0.1440	0.0460	0.0002	7.35E-05	0.0002	0.0000	6.86E-09	0.0000	0.0000	4.28E-05
162	0.33	0.109	0.256	0.1421	0.0452	0.0002	7.26E-05	0.0002	0.0000	6.86E-09	0.0000	0.0000	4.28E-05
163	1.00	0.549	0.334	0.1484	0.0444	0.0002	7.16E-05	0.0002	0.0000	6.86E-09	0.0000	0.0000	4.28E-05
164	0.00	0.000	0.148	0.1401	0.0443	0.0002	7.14E-05	0.0002	0.0000	6.86E-09	0.0000	0.0000	4.28E-05
165	0.00	0.000	0.159	0.1312	0.0497	0.0002	7.80E-05	0.0002	0.0000	6.86E-09	0.0000	0.0000	4.27E-05
166	0.00	0.000	0.041	0.1289	0.0514	0.0003	8.00E-05	0.0002	0.0000	6.86E-09	0.0000	0.0000	4.27E-05
167	0.00	0.000	0.002	0.1287	0.0544	0.0003	8.35E-05	0.0002	0.0000	6.86E-09	0.0000	0.0000	4.27E-05
168	0.00	0.000	0.000	0.1287	0.0558	0.0003	8.51E-05	0.0002	0.0000	6.86E-09	0.0000	0.0000	4.27E-05
169	0.00	0.000	0.000	0.1287	0.0548	0.0003	8.40E-05	0.0002	0.0000	6.86E-09	0.0000	0.0000	4.26E-05
170	0.00	0.000	0.000	0.1287	0.0539	0.0003	8.29E-05	0.0002	0.0000	6.86E-09	0.0000	0.0000	4.26E-05
171	0.00	0.000	0.000	0.1287	0.0529	0.0003	8.18E-05	0.0002	0.0000	6.86E-09	0.0000	0.0000	4.26E-05
172	0.00	0.000	0.000	0.1287	0.0520	0.0003	8.07E-05	0.0002	0.0000	6.86E-09	0.0000	0.0000	4.25E-05
173	0.00	0.000	0.000	0.1287	0.0511	0.0003	7.97E-05	0.0002	0.0000	6.86E-09	0.0000	0.0000	4.25E-05
174	0.00	0.000	0.000	0.1287	0.0503	0.0002	7.86E-05	0.0002	0.0000	6.86E-09	0.0000	0.0000	4.25E-05
175	0.13	0.000	0.007	0.1357	0.0494	0.0002	7.76E-05	0.0002	0.0000	6.86E-09	0.0000	0.0000	4.25E-05
176	0.13	0.006	0.016	0.1420	0.0485	0.0002	7.66E-05	0.0002	0.0000	6.86E-09	0.0000	0.0000	4.24E-05
177	0.00	0.000	0.011	0.1414	0.0477	0.0002	7.56E-05	0.0002	0.0000	6.86E-09	0.0000	0.0000	4.24E-05
178	0.00	0.000	0.015	0.1408	0.0469	0.0002	7.46E-05	0.0002	0.0000	6.86E-09	0.0000	0.0000	4.24E-05
179	0.92	0.735	0.026	0.1494	0.0461	0.0002	7.36E-05	0.0002	0.0000	6.86E-09	0.0000	0.0000	4.24E-05
180	0.17	0.037	0.070	0.1530	0.0453	0.0002	7.26E-05	0.0003	0.0000	6.89E-09	0.0000	0.0000	4.23E-05
181	0.03	0.000	0.072	0.1507	0.0446	0.0002	7.18E-05	0.0003	0.0000	6.91E-09	0.0000	0.0000	4.23E-05
182	0.11	0.000	0.115	0.1502	0.0443	0.0002	7.14E-05	0.0004	0.0000	6.93E-09	0.0000	0.0000	4.23E-05

183	0.15	0.000	0.098	0.1532	0.0435	0.0002	7.05E-05	0.0005	0.0000	6.95E-09	0.0000	0.0000	4.23E-05
184	0.00	0.000	0.146	0.1449	0.0456	0.0002	7.30E-05	0.0006	0.0000	6.97E-09	0.0000	0.0000	4.22E-05
185	0.00	0.000	0.096	0.1396	0.0464	0.0002	7.40E-05	0.0006	0.0000	6.99E-09	0.0000	0.0000	4.22E-05
186	0.00	0.000	0.040	0.1374	0.0456	0.0002	7.31E-05	0.0007	0.0000	7.01E-09	0.0000	0.0000	4.22E-05
187	0.09	0.000	0.036	0.1403	0.0449	0.0002	7.22E-05	0.0008	0.0000	7.02E-09	0.0000	0.0000	4.21E-05
188	0.00	0.000	0.032	0.1386	0.0442	0.0002	7.13E-05	0.0009	0.0000	7.04E-09	0.0000	0.0000	4.21E-05
189	0.23	0.089	0.033	0.1449	0.0436	0.0002	7.06E-05	0.0009	0.0000	7.06E-09	0.0000	0.0000	4.21E-05
190	0.00	0.000	0.025	0.1435	0.0430	0.0002	6.98E-05	0.0010	0.0000	7.08E-09	0.0000	0.0000	4.21E-05
191	0.00	0.000	0.024	0.1421	0.0423	0.0002	6.89E-05	0.0011	0.0000	7.09E-09	0.0000	0.0000	4.20E-05
192	0.00	0.000	0.024	0.1408	0.0415	0.0002	6.80E-05	0.0011	0.0000	7.11E-09	0.0000	0.0000	4.20E-05
193	0.02	0.000	0.027	0.1404	0.0419	0.0002	6.85E-05	0.0012	0.0000	7.12E-09	0.0000	0.0000	4.20E-05
194	2.50	2.321	0.028	0.1488	0.0445	0.0002	7.16E-05	0.0012	0.0000	7.14E-09	0.0000	0.0000	4.20E-05
195	0.08	0.000	0.193	0.1426	0.0439	0.0002	7.09E-05	0.0013	0.0000	7.15E-09	0.0000	0.0000	4.19E-05
196	0.00	0.000	0.184	0.1323	0.0437	0.0002	7.07E-05	0.0014	0.0000	7.17E-09	0.0000	0.0000	4.19E-05
197	0.04	0.000	0.080	0.1298	0.0452	0.0002	7.25E-05	0.0014	0.0000	7.18E-09	0.0000	0.0000	4.19E-05
198	2.50	2.160	0.148	0.1405	0.0447	0.0002	7.19E-05	0.0015	0.0000	7.19E-09	0.0000	0.0000	4.19E-05
199	0.00	0.000	0.074	0.1362	0.0489	0.0002	7.70E-05	0.0015	0.0000	7.21E-09	0.0000	0.0000	4.18E-05
200	0.00	0.000	0.107	0.1302	0.0510	0.0003	7.95E-05	0.0016	0.0000	7.22E-09	0.0000	0.0000	4.18E-05
201	0.02	0.000	0.039	0.1289	0.0501	0.0002	7.85E-05	0.0016	0.0000	7.23E-09	0.0000	0.0000	4.18E-05
202	0.00	0.000	0.002	0.1287	0.0521	0.0003	8.08E-05	0.0017	0.0000	7.25E-09	0.0000	0.0000	4.18E-05
203	0.28	0.091	0.065	0.1355	0.0529	0.0003	8.18E-05	0.0018	0.0000	7.26E-09	0.0000	0.0000	4.17E-05
204	0.00	0.000	0.054	0.1327	0.0520	0.0003	8.07E-05	0.0018	0.0000	7.27E-09	0.0000	0.0000	4.17E-05
205	0.00	0.000	0.037	0.1306	0.0511	0.0003	7.96E-05	0.0019	0.0000	7.28E-09	0.0000	0.0000	4.17E-05
206	0.00	0.000	0.013	0.1299	0.0502	0.0002	7.86E-05	0.0019	0.0000	7.29E-09	0.0000	0.0000	4.17E-05
207	0.00	0.000	0.008	0.1294	0.0504	0.0002	7.88E-05	0.0020	0.0000	7.31E-09	0.0000	0.0000	4.16E-05
208	0.07	0.000	0.010	0.1330	0.0502	0.0002	7.85E-05	0.0020	0.0000	7.32E-09	0.0000	0.0000	4.16E-05
209	0.15	0.022	0.010	0.1397	0.0493	0.0002	7.75E-05	0.0021	0.0000	7.33E-09	0.0000	0.0000	4.16E-05
210	0.00	0.000	0.012	0.1390	0.0485	0.0002	7.66E-05	0.0021	0.0000	7.34E-09	0.0000	0.0000	4.15E-05
211	0.00	0.000	0.013	0.1383	0.0477	0.0002	7.56E-05	0.0021	0.0000	7.35E-09	0.0000	0.0000	4.15E-05
212	0.00	0.000	0.015	0.1375	0.0469	0.0002	7.46E-05	0.0022	0.0000	7.36E-09	0.0000	0.0000	4.15E-05
213	0.00	0.000	0.015	0.1366	0.0461	0.0002	7.36E-05	0.0022	0.0000	7.37E-09	0.0000	0.0000	4.15E-05
214	0.05	0.000	0.019	0.1384	0.0453	0.0002	7.27E-05	0.0023	0.0000	7.38E-09	0.0000	0.0000	4.14E-05
215	0.14	0.010	0.018	0.1448	0.0445	0.0002	7.17E-05	0.0023	0.0000	7.39E-09	0.0000	0.0000	4.14E-05
216	0.00	0.000	0.009	0.1443	0.0443	0.0002	7.14E-05	0.0024	0.0000	7.40E-09	0.0000	0.0000	4.14E-05
217	0.20	0.064	0.014	0.1510	0.0439	0.0002	7.09E-05	0.0024	0.0000	7.41E-09	0.0000	0.0000	4.14E-05
218	0.00	0.000	0.097	0.1456	0.0431	0.0002	7.00E-05	0.0024	0.0000	7.42E-09	0.0000	0.0000	4.13E-05
219	0.00	0.000	0.013	0.1449	0.0425	0.0002	6.92E-05	0.0025	0.0000	7.43E-09	0.0000	0.0000	4.13E-05
220	0.00	0.000	0.013	0.1442	0.0418	0.0002	6.83E-05	0.0025	0.0000	7.43E-09	0.0000	0.0000	4.13E-05

221	0.00	0.000	0.012	0.1435	0.0412	0.0002	6.76E-05	0.0026	0.0000	7.44E-09	0.0000	0.0000	4.13E-05
222	0.00	0.000	0.012	0.1429	0.0406	0.0002	6.68E-05	0.0026	0.0000	7.45E-09	0.0000	0.0000	4.12E-05
223	0.00	0.000	0.011	0.1422	0.0399	0.0002	6.59E-05	0.0026	0.0000	7.46E-09	0.0000	0.0000	4.12E-05
224	0.09	0.000	0.016	0.1461	0.0392	0.0002	6.50E-05	0.0027	0.0000	7.47E-09	0.0000	0.0000	4.12E-05
225	0.25	0.118	0.017	0.1528	0.0385	0.0002	6.42E-05	0.0027	0.0000	7.48E-09	0.0000	0.0000	4.12E-05
226	0.71	0.454	0.143	0.1592	0.0378	0.0002	6.33E-05	0.0027	0.0000	7.48E-09	0.0000	0.0000	4.11E-05
227	0.00	0.000	0.163	0.1501	0.0372	0.0002	6.25E-05	0.0028	0.0000	7.49E-09	0.0000	0.0000	4.11E-05
228	0.28	0.114	0.199	0.1483	0.0373	0.0002	6.27E-05	0.0028	0.0000	7.50E-09	0.0000	0.0000	4.11E-05
229	0.00	0.000	0.159	0.1395	0.0372	0.0002	6.25E-05	0.0028	0.0000	7.51E-09	0.0000	0.0000	4.11E-05
230	0.24	0.060	0.170	0.1397	0.0473	0.0002	7.49E-05	0.0029	0.0000	7.51E-09	0.0000	0.0000	4.10E-05
231	0.00	0.000	0.133	0.1323	0.0529	0.0003	8.18E-05	0.0029	0.0000	7.52E-09	0.0000	0.0000	4.10E-05
232	0.28	0.106	0.099	0.1362	0.0548	0.0003	8.40E-05	0.0029	0.0000	7.53E-09	0.0000	0.0000	4.10E-05
233	0.00	0.000	0.034	0.1343	0.0556	0.0003	8.49E-05	0.0030	0.0000	7.53E-09	0.0000	0.0000	4.10E-05
234	0.10	0.000	0.033	0.1379	0.0570	0.0003	8.66E-05	0.0030	0.0000	7.54E-09	0.0000	0.0000	4.09E-05
235	0.00	0.000	0.019	0.1368	0.0575	0.0003	8.72E-05	0.0030	0.0000	7.55E-09	0.0000	0.0000	4.09E-05
236	0.00	0.000	0.016	0.1359	0.0571	0.0003	8.66E-05	0.0031	0.0000	7.55E-09	0.0000	0.0000	4.09E-05
237	0.00	0.000	0.019	0.1349	0.0564	0.0003	8.59E-05	0.0031	0.0000	7.56E-09	0.0000	0.0000	4.09E-05
238	0.00	0.000	0.019	0.1338	0.0555	0.0003	8.48E-05	0.0031	0.0000	7.57E-09	0.0000	0.0000	4.08E-05
239	0.00	0.000	0.018	0.1328	0.0545	0.0003	8.37E-05	0.0031	0.0000	7.57E-09	0.0000	0.0000	4.08E-05
240	0.24	0.089	0.021	0.1401	0.0536	0.0003	8.26E-05	0.0032	0.0000	7.58E-09	0.0000	0.0000	4.08E-05
241	0.37	0.226	0.028	0.1466	0.0527	0.0003	8.15E-05	0.0032	0.0000	7.58E-09	0.0000	0.0000	4.08E-05
242	0.10	0.000	0.136	0.1447	0.0518	0.0003	8.05E-05	0.0032	0.0000	7.59E-09	0.0000	0.0000	4.07E-05
243	0.00	0.000	0.134	0.1372	0.0513	0.0003	7.99E-05	0.0032	0.0000	7.60E-09	0.0000	0.0000	4.07E-05
244	0.00	0.000	0.091	0.1322	0.0506	0.0002	7.90E-05	0.0033	0.0000	7.60E-09	0.0000	0.0000	4.07E-05
245	0.00	0.000	0.048	0.1295	0.0497	0.0002	7.80E-05	0.0033	0.0000	7.61E-09	0.0000	0.0000	4.07E-05
246	0.00	0.000	0.015	0.1287	0.0536	0.0003	8.26E-05	0.0033	0.0000	7.61E-09	0.0000	0.0000	4.06E-05
247	0.00	0.000	0.005	0.1287	0.0556	0.0003	8.49E-05	0.0033	0.0000	7.62E-09	0.0000	0.0000	4.06E-05
248	0.08	0.000	0.008	0.1327	0.0546	0.0003	8.38E-05	0.0034	0.0000	7.62E-09	0.0000	0.0000	4.06E-05
249	0.07	0.000	0.007	0.1363	0.0537	0.0003	8.27E-05	0.0034	0.0000	7.63E-09	0.0000	0.0000	4.06E-05
250	0.00	0.000	0.012	0.1357	0.0528	0.0003	8.16E-05	0.0034	0.0000	7.63E-09	0.0000	0.0000	4.05E-05
251	0.03	0.000	0.016	0.1366	0.0519	0.0003	8.05E-05	0.0034	0.0000	7.62E-09	0.0000	0.0000	4.05E-05
252	0.00	0.000	0.014	0.1358	0.0510	0.0003	7.95E-05	0.0033	0.0000	7.61E-09	0.0000	0.0000	4.05E-05
253	0.09	0.000	0.015	0.1399	0.0501	0.0002	7.85E-05	0.0032	0.0000	7.59E-09	0.0000	0.0000	4.05E-05
254	1.06	0.903	0.027	0.1472	0.0494	0.0002	7.77E-05	0.0032	0.0000	7.58E-09	0.0000	0.0000	4.04E-05
255	0.00	0.000	0.059	0.1440	0.0489	0.0002	7.70E-05	0.0031	0.0000	7.57E-09	0.0000	0.0000	4.04E-05
256	0.63	0.314	0.163	0.1526	0.0482	0.0002	7.62E-05	0.0031	0.0000	7.56E-09	0.0000	0.0000	4.04E-05
257	0.00	0.000	0.113	0.1464	0.0474	0.0002	7.52E-05	0.0030	0.0000	7.55E-09	0.0000	0.0000	4.04E-05
258	0.00	0.000	0.140	0.1386	0.0468	0.0002	7.44E-05	0.0030	0.0000	7.53E-09	0.0000	0.0000	4.03E-05

259		0.00	0.000	0.099	0.1331	0.0479	0.0002	7.58E-05	0.0029	0.0000	7.52E-09	0.0000	0.0000	4.03E-05
260		0.00	0.000	0.044	0.1306	0.0479	0.0002	7.58E-05	0.0029	0.0000	7.51E-09	0.0000	0.0000	4.03E-05
261		0.00	0.000	0.026	0.1292	0.0471	0.0002	7.49E-05	0.0028	0.0000	7.50E-09	0.0000	0.0000	4.03E-05
262		0.00	0.000	0.004	0.1287	0.0537	0.0003	8.26E-05	0.0028	0.0000	7.49E-09	0.0000	0.0000	4.02E-05
263		0.15	0.003	0.009	0.1366	0.0571	0.0003	8.66E-05	0.0027	0.0000	7.48E-09	0.0000	0.0000	4.02E-05
264		0.33	0.171	0.043	0.1430	0.0561	0.0003	8.55E-05	0.0027	0.0000	7.47E-09	0.0000	0.0000	4.02E-05
265		0.00	0.000	0.044	0.1406	0.0551	0.0003	8.44E-05	0.0026	0.0000	7.46E-09	0.0000	0.0000	4.02E-05
266		0.00	0.000	0.075	0.1364	0.0542	0.0003	8.33E-05	0.0026	0.0000	7.45E-09	0.0000	0.0000	4.02E-05
267		0.00	0.000	0.096	0.1310	0.0533	0.0003	8.22E-05	0.0025	0.0000	7.44E-09	0.0000	0.0000	4.01E-05
268		0.00	0.000	0.032	0.1292	0.0523	0.0003	8.11E-05	0.0025	0.0000	7.43E-09	0.0000	0.0000	4.01E-05
269		0.00	0.000	0.008	0.1287	0.0529	0.0003	8.18E-05	0.0024	0.0000	7.42E-09	0.0000	0.0000	4.01E-05
270		0.00	0.000	0.000	0.1287	0.0545	0.0003	8.37E-05	0.0024	0.0000	7.41E-09	0.0000	0.0000	4.01E-05
271		0.00	0.000	0.000	0.1287	0.0536	0.0003	8.26E-05	0.0024	0.0000	7.40E-09	0.0000	0.0000	4.00E-05
272		0.00	0.000	0.000	0.1287	0.0527	0.0003	8.15E-05	0.0023	0.0000	7.39E-09	0.0000	0.0000	4.00E-05
273		0.00	0.000	0.000	0.1287	0.0518	0.0003	8.05E-05	0.0023	0.0000	7.38E-09	0.0000	0.0000	4.00E-05
274		0.00	0.000	0.000	0.1287	0.0509	0.0003	7.94E-05	0.0022	0.0000	7.37E-09	0.0000	0.0000	4.00E-05
275		0.00	0.000	0.000	0.1287	0.0500	0.0002	7.84E-05	0.0022	0.0000	7.36E-09	0.0000	0.0000	3.99E-05
276		0.60	0.400	0.028	0.1385	0.0492	0.0002	7.73E-05	0.0022	0.0000	7.35E-09	0.0000	0.0000	3.99E-05
277		0.00	0.000	0.083	0.1339	0.0483	0.0002	7.63E-05	0.0021	0.0000	7.34E-09	0.0000	0.0000	3.99E-05
278		0.00	0.000	0.015	0.1330	0.0475	0.0002	7.53E-05	0.0021	0.0000	7.34E-09	0.0000	0.0000	3.99E-05
279		0.00	0.000	0.014	0.1322	0.0467	0.0002	7.43E-05	0.0020	0.0000	7.33E-09	0.0000	0.0000	3.98E-05
280	*	0.24	0.000	0.036	0.1333	0.0459	0.0002	7.33E-05	0.0020	0.0000	7.32E-09	0.0000	0.0000	3.98E-05
281		0.00	0.000	0.081	0.1394	0.0451	0.0002	7.24E-05	0.0020	0.0000	7.31E-09	0.0000	0.0000	3.98E-05
282		0.00	0.000	0.014	0.1386	0.0443	0.0002	7.15E-05	0.0019	0.0000	7.30E-09	0.0000	0.0000	3.98E-05
283		0.00	0.000	0.016	0.1377	0.0436	0.0002	7.06E-05	0.0019	0.0000	7.30E-09	0.0000	0.0000	3.97E-05
284		0.00	0.000	0.016	0.1368	0.0429	0.0002	6.97E-05	0.0019	0.0000	7.29E-09	0.0000	0.0000	3.97E-05
285		0.00	0.000	0.016	0.1359	0.0421	0.0002	6.87E-05	0.0018	0.0000	7.28E-09	0.0000	0.0000	3.97E-05
286		0.01	0.000	0.017	0.1357	0.0431	0.0002	6.99E-05	0.0018	0.0000	7.27E-09	0.0000	0.0000	3.97E-05
287		0.00	0.000	0.012	0.1351	0.0428	0.0002	6.96E-05	0.0018	0.0000	7.27E-09	0.0000	0.0000	3.97E-05
288		0.00	0.000	0.013	0.1344	0.0420	0.0002	6.86E-05	0.0017	0.0000	7.26E-09	0.0000	0.0000	3.96E-05
289		0.00	0.000	0.011	0.1337	0.0418	0.0002	6.84E-05	0.0017	0.0000	7.25E-09	0.0000	0.0000	3.96E-05
290		0.00	0.000	0.011	0.1331	0.0414	0.0002	6.78E-05	0.0017	0.0000	7.24E-09	0.0000	0.0000	3.96E-05
291		0.00	0.000	0.011	0.1325	0.0408	0.0002	6.71E-05	0.0017	0.0000	7.24E-09	0.0000	0.0000	3.96E-05
292	*	0.05	0.000	0.029	0.1336	0.0402	0.0002	6.63E-05	0.0016	0.0000	7.23E-09	0.0000	0.0000	3.95E-05
293	*	0.00	0.000	0.002	0.1336	0.0395	0.0002	6.54E-05	0.0016	0.0000	7.22E-09	0.0000	0.0000	3.95E-05
294	*	0.00	0.000	0.000	0.1336	0.0388	0.0002	6.46E-05	0.0016	0.0000	7.22E-09	0.0000	0.0000	3.95E-05
295		0.00	0.000	0.010	0.1330	0.0381	0.0002	6.37E-05	0.0015	0.0000	7.21E-09	0.0000	0.0000	3.95E-05
296	*	0.01	0.000	0.011	0.1330	0.0375	0.0002	6.29E-05	0.0015	0.0000	7.20E-09	0.0000	0.0000	3.94E-05

297	*		0.00	0.000	0.014	0.1324	0.0368	0.0002	6.20E-05	0.0015	0.0000	7.20E-09	0.0000	0.0000	3.94E-05
298	*		0.43	0.000	0.039	0.1335	0.0362	0.0002	6.12E-05	0.0015	0.0000	7.20E-09	0.0000	0.0000	3.94E-05
299			0.00	0.200	0.024	0.1416	0.0355	0.0002	6.04E-05	0.0015	0.0000	7.19E-09	0.0000	0.0000	3.94E-05
300			0.00	0.000	0.028	0.1400	0.0353	0.0002	6.01E-05	0.0015	0.0000	7.19E-09	0.0000	0.0000	3.94E-05
301			0.00	0.000	0.037	0.1380	0.0349	0.0002	5.96E-05	0.0014	0.0000	7.19E-09	0.0000	0.0000	3.93E-05
302			0.07	0.000	0.056	0.1388	0.0345	0.0002	5.90E-05	0.0014	0.0000	7.18E-09	0.0000	0.0000	3.93E-05
303			0.00	0.000	0.053	0.1358	0.0340	0.0002	5.83E-05	0.0014	0.0000	7.18E-09	0.0000	0.0000	3.93E-05
304			0.00	0.000	0.038	0.1337	0.0343	0.0002	5.88E-05	0.0014	0.0000	7.18E-09	0.0000	0.0000	3.93E-05
305	*		0.00	0.000	0.029	0.1321	0.0350	0.0002	5.97E-05	0.0014	0.0000	7.18E-09	0.0000	0.0000	3.92E-05
306			0.01	0.000	0.035	0.1306	0.0344	0.0002	5.89E-05	0.0014	0.0000	7.17E-09	0.0000	0.0000	3.92E-05
307			0.21	0.055	0.024	0.1378	0.0339	0.0002	5.83E-05	0.0014	0.0000	7.17E-09	0.0000	0.0000	3.92E-05
308	*		0.00	0.000	0.000	0.1378	0.0336	0.0002	5.78E-05	0.0014	0.0000	7.17E-09	0.0000	0.0000	3.92E-05
309	*		0.00	0.000	0.015	0.1370	0.0338	0.0002	5.81E-05	0.0014	0.0000	7.17E-09	0.0000	0.0000	3.91E-05
310	*		0.00	0.000	0.000	0.1370	0.0337	0.0002	5.80E-05	0.0014	0.0000	7.17E-09	0.0000	0.0000	3.91E-05
311	*		0.00	0.000	0.000	0.1370	0.0331	0.0002	5.72E-05	0.0014	0.0000	7.17E-09	0.0000	0.0000	3.91E-05
312	*		0.23	0.000	0.015	0.1381	0.0325	0.0002	5.64E-05	0.0014	0.0000	7.17E-09	0.0000	0.0000	3.91E-05
313	*		0.56	0.000	0.016	0.1392	0.0319	0.0002	5.57E-05	0.0014	0.0000	7.17E-09	0.0000	0.0000	3.91E-05
314	*		0.00	0.000	0.025	0.1403	0.0314	0.0002	5.49E-05	0.0014	0.0000	7.17E-09	0.0000	0.0000	3.90E-05
315	*	*	0.00	0.000	0.027	0.1403	0.0308	0.0002	5.42E-05	0.0014	0.0000	7.17E-09	0.0000	0.0000	3.90E-05
316	*	*	0.00	0.000	0.024	0.1403	0.0303	0.0001	5.34E-05	0.0014	0.0000	7.17E-09	0.0000	0.0000	3.90E-05
317	*	*	0.07	0.000	0.022	0.1403	0.0297	0.0001	5.27E-05	0.0014	0.0000	7.17E-09	0.0000	0.0000	3.90E-05
318	*	*	0.00	0.000	0.033	0.1403	0.0292	0.0001	5.20E-05	0.0014	0.0000	7.17E-09	0.0000	0.0000	3.89E-05
319		*	0.00	0.621	0.000	0.1413	0.0287	0.0001	5.13E-05	0.0014	0.0000	7.18E-09	0.0000	0.0000	3.89E-05
320		*	0.00	0.000	0.000	0.1413	0.0282	0.0001	5.06E-05	0.0014	0.0000	7.18E-09	0.0000	0.0000	3.89E-05
321		*	0.00	0.000	0.000	0.1413	0.0277	0.0001	4.99E-05	0.0014	0.0000	7.18E-09	0.0000	0.0000	3.89E-05
322		*	0.00	0.000	0.000	0.1413	0.0272	0.0001	4.92E-05	0.0015	0.0000	7.19E-09	0.0000	0.0000	3.88E-05
323		*	0.00	0.000	0.000	0.1413	0.0267	0.0001	4.86E-05	0.0015	0.0000	7.19E-09	0.0000	0.0000	3.88E-05
324	*	*	0.02	0.000	0.024	0.1413	0.0262	0.0001	4.79E-05	0.0015	0.0000	7.19E-09	0.0000	0.0000	3.88E-05
325		*	0.21	0.208	0.005	0.1413	0.0257	0.0001	4.72E-05	0.0015	0.0000	7.19E-09	0.0000	0.0000	3.88E-05
326		*	0.00	0.000	0.000	0.1413	0.0253	0.0001	4.66E-05	0.0015	0.0000	7.20E-09	0.0000	0.0000	3.88E-05
327		*	0.00	0.000	0.000	0.1413	0.0248	0.0001	4.60E-05	0.0015	0.0000	7.20E-09	0.0000	0.0000	3.87E-05
328		*	0.00	0.000	0.000	0.1413	0.0244	0.0001	4.53E-05	0.0015	0.0000	7.20E-09	0.0000	0.0000	3.87E-05
329		*	0.00	0.000	0.000	0.1413	0.0239	0.0001	4.47E-05	0.0015	0.0000	7.20E-09	0.0000	0.0000	3.87E-05
330	*	*	0.00	0.000	0.000	0.1413	0.0235	0.0001	4.41E-05	0.0015	0.0000	7.20E-09	0.0000	0.0000	3.87E-05
331	*	*	0.25	0.000	0.014	0.1413	0.0231	0.0001	4.35E-05	0.0015	0.0000	7.20E-09	0.0000	0.0000	3.86E-05
332		*	0.00	0.219	0.018	0.1413	0.0227	0.0001	4.29E-05	0.0015	0.0000	7.20E-09	0.0000	0.0000	3.86E-05
333		*	0.09	0.000	0.005	0.1463	0.0223	0.0001	4.23E-05	0.0015	0.0000	7.20E-09	0.0000	0.0000	3.86E-05
334		*	0.00	0.000	0.000	0.1463	0.0219	0.0001	4.17E-05	0.0015	0.0000	7.19E-09	0.0000	0.0000	3.86E-05

335	*	*	0.00	0.000	0.000	0.1463	0.0215	0.0001	4.11E-05	0.0015	0.0000	7.19E-09	0.0000	0.0000	3.86E-05
336		*	0.00	0.000	0.000	0.1463	0.0211	0.0001	4.06E-05	0.0015	0.0000	7.19E-09	0.0000	0.0000	3.85E-05
337		*	0.00	0.000	0.000	0.1463	0.0207	0.0001	4.00E-05	0.0014	0.0000	7.19E-09	0.0000	0.0000	3.85E-05
338		*	0.00	0.000	0.000	0.1463	0.0203	0.0001	3.95E-05	0.0014	0.0000	7.18E-09	0.0000	0.0000	3.85E-05
339		*	0.00	0.000	0.000	0.1463	0.0199	0.0001	3.89E-05	0.0014	0.0000	7.18E-09	0.0000	0.0000	3.85E-05
340			0.00	0.000	0.040	0.1440	0.0196	0.0001	3.84E-05	0.0014	0.0000	7.18E-09	0.0000	0.0000	3.84E-05
341	*		0.00	0.000	0.000	0.1440	0.0192	0.0001	3.78E-05	0.0014	0.0000	7.17E-09	0.0000	0.0000	3.84E-05
342			0.00	0.000	0.044	0.1416	0.0189	0.0001	3.73E-05	0.0014	0.0000	7.17E-09	0.0000	0.0000	3.84E-05
343	*		0.00	0.000	0.000	0.1416	0.0185	0.0001	3.68E-05	0.0014	0.0000	7.16E-09	0.0000	0.0000	3.84E-05
344	*		0.00	0.000	0.001	0.1416	0.0182	0.0001	3.63E-05	0.0013	0.0000	7.16E-09	0.0000	0.0000	3.84E-05
345	*		0.20	0.000	0.010	0.1427	0.0179	0.0001	3.58E-05	0.0013	0.0000	7.16E-09	0.0000	0.0000	3.83E-05
346	*		0.00	0.000	0.011	0.1438	0.0175	0.0001	3.53E-05	0.0013	0.0000	7.15E-09	0.0000	0.0000	3.83E-05
347	*		0.05	0.000	0.018	0.1448	0.0172	0.0001	3.48E-05	0.0013	0.0000	7.14E-09	0.0000	0.0000	3.83E-05
348	*		0.00	0.000	0.019	0.1459	0.0169	0.0001	3.43E-05	0.0013	0.0000	7.14E-09	0.0000	0.0000	3.83E-05
349			0.00	0.000	0.046	0.1501	0.0166	0.0001	3.38E-05	0.0012	0.0000	7.13E-09	0.0000	0.0000	3.82E-05
350	*		0.00	0.000	0.027	0.1486	0.0166	0.0001	3.38E-05	0.0012	0.0000	7.13E-09	0.0000	0.0000	3.82E-05
351	*		0.00	0.000	0.004	0.1486	0.0164	0.0001	3.36E-05	0.0012	0.0000	7.12E-09	0.0000	0.0000	3.82E-05
352			0.21	0.062	0.046	0.1542	0.0161	0.0001	3.31E-05	0.0012	0.0000	7.12E-09	0.0000	0.0000	3.82E-05
353			0.39	0.183	0.089	0.1606	0.0158	0.0001	3.27E-05	0.0011	0.0000	7.11E-09	0.0000	0.0000	3.82E-05
354			0.16	0.031	0.065	0.1641	0.0158	0.0001	3.26E-05	0.0011	0.0000	7.11E-09	0.0000	0.0000	3.81E-05
355			0.21	0.080	0.058	0.1679	0.0178	0.0001	3.57E-05	0.0011	0.0000	7.10E-09	0.0000	0.0000	3.81E-05
356			0.00	0.000	0.042	0.1655	0.0184	0.0001	3.65E-05	0.0011	0.0000	7.10E-09	0.0000	0.0000	3.81E-05
357			0.00	0.000	0.029	0.1639	0.0180	0.0001	3.60E-05	0.0011	0.0000	7.10E-09	0.0000	0.0000	3.81E-05
358			0.00	0.000	0.030	0.1622	0.0177	0.0001	3.55E-05	0.0011	0.0000	7.09E-09	0.0000	0.0000	3.81E-05
359			0.00	0.000	0.040	0.1600	0.0174	0.0001	3.50E-05	0.0010	0.0000	7.09E-09	0.0000	0.0000	3.80E-05
360	*		0.00	0.000	0.029	0.1584	0.0170	0.0001	3.45E-05	0.0010	0.0000	7.08E-09	0.0000	0.0000	3.80E-05
361	*		0.00	0.000	0.000	0.1584	0.0167	0.0001	3.40E-05	0.0010	0.0000	7.08E-09	0.0000	0.0000	3.80E-05
362	*		0.00	0.000	0.031	0.1566	0.0174	0.0001	3.50E-05	0.0010	0.0000	7.08E-09	0.0000	0.0000	3.80E-05
363	*		0.05	0.000	0.028	0.1577	0.0176	0.0001	3.54E-05	0.0010	0.0000	7.07E-09	0.0000	0.0000	3.79E-05
364	*	*	0.23	0.000	0.010	0.1577	0.0173	0.0001	3.49E-05	0.0010	0.0000	7.07E-09	0.0000	0.0000	3.79E-05
365	*	*	0.11	0.000	0.012	0.1577	0.0170	0.0001	3.44E-05	0.0009	0.0000	7.06E-09	0.0000	0.0000	3.79E-05

* = Frozen (air or soil)

Annual Totals for Year 4			
	inches	cubic feet	percent
Precipitation	34.04	123,555.1	100.00

Runoff	18.570	67,407.6	54.56
Evapotranspiration	14.821	53,800.4	43.54
Drainage Collected from Layer 3	0.0600	217.7	0.18
Percolation/Leakage through Layer 4	0.020561	74.6	0.06
Average Head on Top of Layer 4	0.0332	---	---
Drainage Collected from Layer 7	0.0029	10.5	0.01
Percolation/Leakage through Layer 9	0.000003	0.0095	0.00
Average Head on Top of Layer 8	0.0012	---	---
Percolation/Leakage through Layer 10	0.015528	56.4	0.05
Change in Water Storage	0.5682	2,062.6	1.67
Soil Water at Start of Year	72.3588	262,662.6	212.59
Soil Water at End of Year	72.6438	263,697.1	213.42
Snow Water at Start of Year	0.0192	69.8	0.06
Snow Water at End of Year	0.3024	1,097.9	0.89
Annual Water Budget Balance	0.0000	0.0000	0.00

Daily Output for Year 5

Column key: Head #1: drainage from Layer 4 | Head #2: drainage from Layer 8
Drain #1: drainage from Layer 3 | Drain #2: drainage from Layer 7
Leak #1: leakage thru Layer 4 | Leak #2: leakage thru Layer 9 | Leak #3: leakage thru Layer 10

Title: Pilgrim Landfill
Simulated On: 4/10/2026 14:14

Day	Freezing Status*		Rain	Runoff	ET	Evap. Zone Water	Head #1	Drain #1	Leak #1	Head #2	Drain #2	Leak #2	Head #3	Drain #3	Leak #3
	Air	Soil	(inches)	(inches)	(inches)	(in/in)	(inches)	(inches)	(inches)	(inches)	(inches)	(inches)	(inches)	(inches)	(inches)
1	*	*	0.00	0.000	0.036	0.1577	0.0163	0.0001	3.35E-05	0.0009	0.0000	7.05E-09	0.0000	0.0000	3.79E-05
2		*	0.00	0.007	0.030	0.1635	0.0160	0.0001	3.30E-05	0.0009	0.0000	7.05E-09	0.0000	0.0000	3.78E-05
3		*	0.00	0.007	0.041	0.1678	0.0157	0.0001	3.25E-05	0.0009	0.0000	7.05E-09	0.0000	0.0000	3.78E-05
4		*	0.01	0.000	0.005	0.1683	0.0155	0.0001	3.21E-05	0.0009	0.0000	7.04E-09	0.0000	0.0000	3.78E-05
5	*	*	0.00	0.000	0.000	0.1683	0.0152	0.0001	3.16E-05	0.0008	0.0000	7.04E-09	0.0000	0.0000	3.78E-05
6	*	*	0.00	0.000	0.000	0.1683	0.0149	0.0001	3.12E-05	0.0008	0.0000	7.04E-09	0.0000	0.0000	3.77E-05
7	*	*	0.00	0.000	0.000	0.1683	0.0146	0.0001	3.07E-05	0.0008	0.0000	7.03E-09	0.0000	0.0000	3.77E-05
8	*	*	0.00	0.000	0.000	0.1683	0.0143	0.0001	3.03E-05	0.0008	0.0000	7.03E-09	0.0000	0.0000	3.77E-05
9	*	*	0.05	0.000	0.010	0.1683	0.0141	0.0001	2.99E-05	0.0008	0.0000	7.02E-09	0.0000	0.0000	3.77E-05
10	*	*	0.00	0.000	0.000	0.1683	0.0138	0.0001	2.94E-05	0.0008	0.0000	7.02E-09	0.0000	0.0000	3.77E-05
11		*	0.00	0.000	0.039	0.1683	0.0136	0.0001	2.90E-05	0.0008	0.0000	7.02E-09	0.0000	0.0000	3.76E-05
12		*	0.00	0.000	0.000	0.1683	0.0133	0.0001	2.86E-05	0.0007	0.0000	7.01E-09	0.0000	0.0000	3.76E-05
13	*	*	0.00	0.000	0.000	0.1683	0.0130	0.0001	2.82E-05	0.0007	0.0000	7.01E-09	0.0000	0.0000	3.76E-05
14		*	0.00	0.000	0.000	0.1683	0.0128	0.0001	2.78E-05	0.0007	0.0000	7.01E-09	0.0000	0.0000	3.76E-05
15	*	*	0.00	0.000	0.000	0.1683	0.0126	0.0001	2.74E-05	0.0007	0.0000	7.00E-09	0.0000	0.0000	3.76E-05
16	*	*	0.00	0.000	0.000	0.1683	0.0123	0.0001	2.70E-05	0.0007	0.0000	7.00E-09	0.0000	0.0000	3.75E-05
17	*	*	0.00	0.000	0.000	0.1683	0.0121	0.0001	2.66E-05	0.0007	0.0000	7.00E-09	0.0000	0.0000	3.75E-05
18	*	*	0.00	0.000	0.000	0.1683	0.0119	0.0001	2.62E-05	0.0007	0.0000	7.00E-09	0.0000	0.0000	3.75E-05
19	*	*	0.00	0.000	0.000	0.1683	0.0116	0.0001	2.58E-05	0.0007	0.0000	6.99E-09	0.0000	0.0000	3.75E-05
20		*	0.00	0.000	0.003	0.1685	0.0114	0.0001	2.55E-05	0.0006	0.0000	6.99E-09	0.0000	0.0000	3.75E-05
21		*	0.00	0.000	0.000	0.1685	0.0112	0.0001	2.51E-05	0.0006	0.0000	6.99E-09	0.0000	0.0000	3.74E-05
22	*	*	0.00	0.000	0.000	0.1685	0.0110	0.0001	2.47E-05	0.0006	0.0000	6.98E-09	0.0000	0.0000	3.74E-05
23		*	0.00	0.000	0.000	0.1685	0.0108	0.0001	2.44E-05	0.0006	0.0000	6.98E-09	0.0000	0.0000	3.74E-05
24		*	0.00	0.000	0.000	0.1685	0.0106	0.0001	2.40E-05	0.0006	0.0000	6.98E-09	0.0000	0.0000	3.74E-05
25		*	0.00	0.000	0.000	0.1685	0.0104	0.0001	2.37E-05	0.0006	0.0000	6.98E-09	0.0000	0.0000	3.73E-05
26		*	0.00	0.000	0.000	0.1685	0.0102	0.0001	2.33E-05	0.0006	0.0000	6.97E-09	0.0000	0.0000	3.73E-05
27		*	0.00	0.000	0.002	0.1685	0.0100	0.0000	2.30E-05	0.0006	0.0000	6.97E-09	0.0000	0.0000	3.73E-05
28		*	0.00	0.000	0.000	0.1685	0.0098	0.0000	2.27E-05	0.0006	0.0000	6.97E-09	0.0000	0.0000	3.73E-05
29		*	0.00	0.000	0.000	0.1685	0.0096	0.0000	2.23E-05	0.0006	0.0000	6.96E-09	0.0000	0.0000	3.73E-05
30		*	0.00	0.000	0.000	0.1685	0.0094	0.0000	2.20E-05	0.0005	0.0000	6.96E-09	0.0000	0.0000	3.72E-05

31	*	*	0.00	0.000	0.001	0.1685	0.0092	0.0000	2.17E-05	0.0005	0.0000	6.96E-09	0.0000	0.0000	3.72E-05
32		*	0.00	0.000	0.003	0.1686	0.0091	0.0000	2.14E-05	0.0005	0.0000	6.96E-09	0.0000	0.0000	3.72E-05
33	*	*	0.00	0.000	0.000	0.1686	0.0089	0.0000	2.10E-05	0.0005	0.0000	6.95E-09	0.0000	0.0000	3.72E-05
34	*	*	0.00	0.000	0.000	0.1686	0.0087	0.0000	2.07E-05	0.0005	0.0000	6.95E-09	0.0000	0.0000	3.72E-05
35	*	*	0.00	0.000	0.000	0.1686	0.0085	0.0000	2.04E-05	0.0005	0.0000	6.95E-09	0.0000	0.0000	3.71E-05
36	*	*	0.00	0.000	0.000	0.1686	0.0084	0.0000	2.01E-05	0.0005	0.0000	6.95E-09	0.0000	0.0000	3.71E-05
37	*	*	0.00	0.000	0.000	0.1686	0.0082	0.0000	1.98E-05	0.0005	0.0000	6.95E-09	0.0000	0.0000	3.71E-05
38	*	*	0.00	0.000	0.000	0.1686	0.0081	0.0000	1.95E-05	0.0005	0.0000	6.94E-09	0.0000	0.0000	3.71E-05
39	*	*	0.00	0.000	0.000	0.1686	0.0079	0.0000	1.92E-05	0.0005	0.0000	6.94E-09	0.0000	0.0000	3.71E-05
40	*	*	0.01	0.000	0.007	0.1686	0.0077	0.0000	1.90E-05	0.0005	0.0000	6.94E-09	0.0000	0.0000	3.70E-05
41	*	*	0.00	0.000	0.003	0.1686	0.0076	0.0000	1.87E-05	0.0004	0.0000	6.94E-09	0.0000	0.0000	3.70E-05
42	*	*	0.10	0.000	0.009	0.1686	0.0074	0.0000	1.84E-05	0.0004	0.0000	6.93E-09	0.0000	0.0000	3.70E-05
43	*	*	0.07	0.000	0.000	0.1686	0.0073	0.0000	1.81E-05	0.0004	0.0000	6.93E-09	0.0000	0.0000	3.70E-05
44	*	*	0.00	0.000	0.023	0.1686	0.0072	0.0000	1.79E-05	0.0004	0.0000	6.93E-09	0.0000	0.0000	3.70E-05
45	*	*	0.00	0.000	0.009	0.1686	0.0070	0.0000	1.76E-05	0.0004	0.0000	6.93E-09	0.0000	0.0000	3.69E-05
46	*	*	0.00	0.000	0.024	0.1686	0.0069	0.0000	1.73E-05	0.0004	0.0000	6.93E-09	0.0000	0.0000	3.69E-05
47	*	*	0.00	0.000	0.019	0.1686	0.0067	0.0000	1.71E-05	0.0004	0.0000	6.92E-09	0.0000	0.0000	3.69E-05
48	*	*	0.00	0.000	0.007	0.1686	0.0066	0.0000	1.68E-05	0.0004	0.0000	6.92E-09	0.0000	0.0000	3.69E-05
49	*	*	0.00	0.000	0.011	0.1686	0.0065	0.0000	1.66E-05	0.0004	0.0000	6.92E-09	0.0000	0.0000	3.69E-05
50	*	*	0.00	0.000	0.024	0.1686	0.0063	0.0000	1.63E-05	0.0004	0.0000	6.92E-09	0.0000	0.0000	3.68E-05
51		*	0.00	0.000	0.042	0.1686	0.0062	0.0000	1.61E-05	0.0004	0.0000	6.92E-09	0.0000	0.0000	3.68E-05
52		*	0.00	0.000	0.000	0.1686	0.0061	0.0000	1.58E-05	0.0004	0.0000	6.92E-09	0.0000	0.0000	3.68E-05
53	*	*	0.00	0.000	0.000	0.1686	0.0060	0.0000	1.56E-05	0.0004	0.0000	6.91E-09	0.0000	0.0000	3.68E-05
54		*	0.00	0.000	0.000	0.1686	0.0059	0.0000	1.53E-05	0.0004	0.0000	6.91E-09	0.0000	0.0000	3.68E-05
55		*	0.00	0.000	0.000	0.1686	0.0057	0.0000	1.51E-05	0.0003	0.0000	6.91E-09	0.0000	0.0000	3.67E-05
56		*	0.30	0.296	0.005	0.1686	0.0056	0.0000	1.49E-05	0.0003	0.0000	6.91E-09	0.0000	0.0000	3.67E-05
57	*	*	0.00	0.000	0.000	0.1686	0.0055	0.0000	1.46E-05	0.0003	0.0000	6.91E-09	0.0000	0.0000	3.67E-05
58	*	*	0.00	0.000	0.000	0.1686	0.0054	0.0000	1.44E-05	0.0003	0.0000	6.91E-09	0.0000	0.0000	3.67E-05
59	*	*	0.00	0.000	0.000	0.1686	0.0053	0.0000	1.42E-05	0.0003	0.0000	6.90E-09	0.0000	0.0000	3.67E-05
60	*	*	0.00	0.000	0.000	0.1686	0.0052	0.0000	1.40E-05	0.0003	0.0000	6.90E-09	0.0000	0.0000	3.66E-05
61	*	*	0.00	0.000	0.000	0.1686	0.0051	0.0000	1.38E-05	0.0003	0.0000	6.90E-09	0.0000	0.0000	3.66E-05
62	*	*	0.00	0.000	0.000	0.1686	0.0050	0.0000	1.36E-05	0.0003	0.0000	6.90E-09	0.0000	0.0000	3.66E-05
63	*	*	0.00	0.000	0.000	0.1686	0.0049	0.0000	1.34E-05	0.0003	0.0000	6.90E-09	0.0000	0.0000	3.66E-05
64	*	*	0.01	0.000	0.006	0.1686	0.0048	0.0000	1.31E-05	0.0003	0.0000	6.90E-09	0.0000	0.0000	3.66E-05
65	*	*	0.00	0.000	0.000	0.1686	0.0047	0.0000	1.29E-05	0.0003	0.0000	6.89E-09	0.0000	0.0000	3.65E-05
66	*	*	0.00	0.000	0.000	0.1686	0.0046	0.0000	1.27E-05	0.0003	0.0000	6.89E-09	0.0000	0.0000	3.65E-05
67		*	0.00	0.000	0.003	0.1686	0.0045	0.0000	1.25E-05	0.0003	0.0000	6.89E-09	0.0000	0.0000	3.65E-05
68	*	*	0.03	0.000	0.029	0.1686	0.0044	0.0000	1.23E-05	0.0003	0.0000	6.89E-09	0.0000	0.0000	3.65E-05

69	*	*	0.00	0.000	0.000	0.1686	0.0043	0.0000	1.22E-05	0.0003	0.0000	6.89E-09	0.0000	0.0000	3.65E-05
70	*	*	0.00	0.000	0.000	0.1686	0.0042	0.0000	1.20E-05	0.0003	0.0000	6.89E-09	0.0000	0.0000	3.64E-05
71	*	*	0.00	0.000	0.000	0.1686	0.0041	0.0000	1.18E-05	0.0003	0.0000	6.89E-09	0.0000	0.0000	3.64E-05
72	*	*	0.00	0.000	0.000	0.1686	0.0041	0.0000	1.16E-05	0.0003	0.0000	6.88E-09	0.0000	0.0000	3.64E-05
73	*	*	0.00	0.000	0.000	0.1686	0.0040	0.0000	1.14E-05	0.0003	0.0000	6.88E-09	0.0000	0.0000	3.64E-05
74		*	0.20	0.194	0.005	0.1686	0.0039	0.0000	1.12E-05	0.0003	0.0000	6.88E-09	0.0000	0.0000	3.64E-05
75		*	0.00	0.000	0.000	0.1686	0.0038	0.0000	1.11E-05	0.0002	0.0000	6.88E-09	0.0000	0.0000	3.63E-05
76		*	0.00	0.000	0.000	0.1686	0.0037	0.0000	1.09E-05	0.0002	0.0000	6.88E-09	0.0000	0.0000	3.63E-05
77		*	0.06	0.000	0.005	0.1715	0.0036	0.0000	1.07E-05	0.0002	0.0000	6.88E-09	0.0000	0.0000	3.63E-05
78		*	0.10	0.008	0.005	0.1765	0.0036	0.0000	1.05E-05	0.0002	0.0000	6.88E-09	0.0000	0.0000	3.63E-05
79	*	*	0.00	0.000	0.000	0.1765	0.0035	0.0000	1.04E-05	0.0002	0.0000	6.88E-09	0.0000	0.0000	3.63E-05
80	*	*	0.00	0.000	0.000	0.1765	0.0034	0.0000	1.02E-05	0.0002	0.0000	6.88E-09	0.0000	0.0000	3.62E-05
81	*	*	0.15	0.000	0.035	0.1765	0.0034	0.0000	1.00E-05	0.0002	0.0000	6.87E-09	0.0000	0.0000	3.62E-05
82	*	*	0.09	0.000	0.011	0.1765	0.0033	0.0000	9.88E-06	0.0002	0.0000	6.87E-09	0.0000	0.0000	3.62E-05
83	*	*	0.00	0.000	0.022	0.1765	0.0032	0.0000	9.73E-06	0.0002	0.0000	6.87E-09	0.0000	0.0000	3.62E-05
84		*	0.00	0.042	0.134	0.1765	0.0031	0.0000	9.57E-06	0.0002	0.0000	6.87E-09	0.0000	0.0000	3.62E-05
85		*	0.01	0.000	0.004	0.1768	0.0031	0.0000	9.42E-06	0.0002	0.0000	6.87E-09	0.0000	0.0000	3.61E-05
86		*	0.08	0.005	0.005	0.1807	0.0030	0.0000	9.26E-06	0.0002	0.0000	6.87E-09	0.0000	0.0000	3.61E-05
87		*	0.27	0.261	0.005	0.1807	0.0030	0.0000	9.11E-06	0.0002	0.0000	6.87E-09	0.0000	0.0000	3.61E-05
88		*	0.00	0.000	0.000	0.1807	0.0029	0.0000	8.97E-06	0.0002	0.0000	6.87E-09	0.0000	0.0000	3.61E-05
89		*	0.11	0.020	0.005	0.1856	0.0028	0.0000	8.82E-06	0.0002	0.0000	6.87E-09	0.0000	0.0000	3.61E-05
90		*	0.00	0.000	0.000	0.1856	0.0028	0.0000	8.68E-06	0.0002	0.0000	6.86E-09	0.0000	0.0000	3.60E-05
91		*	0.03	0.000	0.005	0.1868	0.0027	0.0000	8.54E-06	0.0002	0.0000	6.86E-09	0.0000	0.0000	3.60E-05
92		*	0.13	0.035	0.005	0.1917	0.0027	0.0000	8.40E-06	0.0002	0.0000	6.86E-09	0.0000	0.0000	3.60E-05
93		*	0.01	0.000	0.004	0.1919	0.0026	0.0000	8.26E-06	0.0002	0.0000	6.86E-09	0.0000	0.0000	3.60E-05
94		*	0.11	0.022	0.005	0.1962	0.0025	0.0000	8.13E-06	0.0002	0.0000	6.86E-09	0.0000	0.0000	3.60E-05
95		*	0.40	0.392	0.005	0.1962	0.0025	0.0000	7.99E-06	0.0002	0.0000	6.86E-09	0.0000	0.0000	3.59E-05
96		*	0.00	0.000	0.000	0.1962	0.0024	0.0000	7.86E-06	0.0002	0.0000	6.86E-09	0.0000	0.0000	3.59E-05
97			0.22	0.083	0.147	0.1956	0.0024	0.0000	7.73E-06	0.0002	0.0000	6.86E-09	0.0000	0.0000	3.59E-05
98			0.16	0.022	0.168	0.1939	0.0023	0.0000	7.61E-06	0.0002	0.0000	6.86E-09	0.0000	0.0000	3.59E-05
99			0.08	0.000	0.124	0.1916	0.0023	0.0000	7.48E-06	0.0002	0.0000	6.86E-09	0.0000	0.0000	3.59E-05
100			0.10	0.000	0.097	0.1914	0.0097	0.0000	2.19E-05	0.0002	0.0000	6.86E-09	0.0000	0.0000	3.58E-05
101			0.04	0.000	0.067	0.1898	0.0153	0.0001	3.18E-05	0.0002	0.0000	6.85E-09	0.0000	0.0000	3.58E-05
102			0.00	0.000	0.202	0.1785	0.0150	0.0001	3.13E-05	0.0002	0.0000	6.85E-09	0.0000	0.0000	3.58E-05
103			0.00	0.000	0.188	0.1680	0.0192	0.0001	3.78E-05	0.0002	0.0000	6.85E-09	0.0000	0.0000	3.58E-05
104			0.00	0.000	0.281	0.1524	0.0188	0.0001	3.73E-05	0.0002	0.0000	6.86E-09	0.0000	0.0000	3.58E-05
105			0.00	0.000	0.131	0.1450	0.0236	0.0001	4.41E-05	0.0002	0.0000	6.86E-09	0.0000	0.0000	3.57E-05
106			0.00	0.000	0.054	0.1420	0.0248	0.0001	4.60E-05	0.0002	0.0000	6.87E-09	0.0000	0.0000	3.57E-05

107			0.00	0.000	0.042	0.1397	0.0244	0.0001	4.53E-05	0.0002	0.0000	6.88E-09	0.0000	0.0000	3.57E-05
108			0.00	0.000	0.035	0.1376	0.0245	0.0001	4.55E-05	0.0003	0.0000	6.89E-09	0.0000	0.0000	3.57E-05
109			0.00	0.000	0.031	0.1358	0.0311	0.0002	5.46E-05	0.0003	0.0000	6.89E-09	0.0000	0.0000	3.57E-05
110			0.00	0.000	0.028	0.1341	0.0377	0.0002	6.31E-05	0.0003	0.0000	6.90E-09	0.0000	0.0000	3.57E-05
111			0.00	0.000	0.026	0.1325	0.0438	0.0002	7.09E-05	0.0003	0.0000	6.89E-09	0.0000	0.0000	3.56E-05
112			0.20	0.045	0.029	0.1394	0.0496	0.0002	7.79E-05	0.0003	0.0000	6.89E-09	0.0000	0.0000	3.56E-05
113			0.08	0.000	0.027	0.1420	0.0559	0.0003	8.53E-05	0.0003	0.0000	6.89E-09	0.0000	0.0000	3.56E-05
114			0.08	0.000	0.026	0.1441	0.0718	0.0004	1.03E-04	0.0003	0.0000	6.89E-09	0.0000	0.0000	3.56E-05
115			0.05	0.000	0.017	0.1455	0.0952	0.0005	1.28E-04	0.0003	0.0000	6.89E-09	0.0000	0.0000	3.56E-05
116			0.34	0.180	0.026	0.1528	0.0969	0.0005	1.30E-04	0.0003	0.0000	6.89E-09	0.0000	0.0000	3.55E-05
117			0.00	0.000	0.090	0.1478	0.0953	0.0005	1.28E-04	0.0003	0.0000	6.89E-09	0.0000	0.0000	3.55E-05
118			0.00	0.000	0.014	0.1471	0.0937	0.0005	1.26E-04	0.0003	0.0000	6.89E-09	0.0000	0.0000	3.55E-05
119			0.00	0.000	0.013	0.1463	0.0921	0.0005	1.25E-04	0.0003	0.0000	6.88E-09	0.0000	0.0000	3.55E-05
120			0.00	0.000	0.013	0.1456	0.0906	0.0004	1.23E-04	0.0003	0.0000	6.88E-09	0.0000	0.0000	3.55E-05
121			2.07	1.884	0.023	0.1546	0.0891	0.0004	1.22E-04	0.0002	0.0000	6.88E-09	0.0000	0.0000	3.54E-05
122	*		0.01	0.000	0.012	0.1546	0.0876	0.0004	1.20E-04	0.0002	0.0000	6.88E-09	0.0000	0.0000	3.54E-05
123	*		0.03	0.000	0.029	0.1549	0.0861	0.0004	1.19E-04	0.0002	0.0000	6.88E-09	0.0000	0.0000	3.54E-05
124	*		0.00	0.000	0.057	0.1519	0.0847	0.0004	1.17E-04	0.0002	0.0000	6.88E-09	0.0000	0.0000	3.54E-05
125			0.20	0.059	0.105	0.1542	0.0833	0.0004	1.16E-04	0.0002	0.0000	6.88E-09	0.0000	0.0000	3.54E-05
126			0.00	0.000	0.103	0.1485	0.0819	0.0004	1.14E-04	0.0002	0.0000	6.88E-09	0.0000	0.0000	3.53E-05
127			0.08	0.000	0.216	0.1406	0.0896	0.0004	1.22E-04	0.0002	0.0000	6.87E-09	0.0000	0.0000	3.53E-05
128			0.00	0.000	0.142	0.1327	0.0936	0.0005	1.26E-04	0.0002	0.0000	6.87E-09	0.0000	0.0000	3.53E-05
129			0.00	0.000	0.056	0.1296	0.0920	0.0005	1.25E-04	0.0002	0.0000	6.87E-09	0.0000	0.0000	3.53E-05
130			0.00	0.000	0.010	0.1287	0.0998	0.0005	1.33E-04	0.0002	0.0000	6.87E-09	0.0000	0.0000	3.53E-05
131			0.00	0.000	0.001	0.1287	0.1038	0.0005	1.37E-04	0.0002	0.0000	6.87E-09	0.0000	0.0000	3.53E-05
132			0.00	0.000	0.000	0.1287	0.1023	0.0005	1.35E-04	0.0002	0.0000	6.87E-09	0.0000	0.0000	3.52E-05
133			0.00	0.000	0.000	0.1287	0.1008	0.0005	1.34E-04	0.0002	0.0000	6.87E-09	0.0000	0.0000	3.52E-05
134			0.20	0.044	0.008	0.1368	0.0992	0.0005	1.32E-04	0.0002	0.0000	6.87E-09	0.0000	0.0000	3.52E-05
135			0.00	0.000	0.013	0.1360	0.0975	0.0005	1.30E-04	0.0002	0.0000	6.87E-09	0.0000	0.0000	3.52E-05
136	*		0.01	0.000	0.005	0.1360	0.0959	0.0005	1.29E-04	0.0002	0.0000	6.87E-09	0.0000	0.0000	3.52E-05
137	*		0.01	0.000	0.024	0.1353	0.0943	0.0005	1.27E-04	0.0002	0.0000	6.87E-09	0.0000	0.0000	3.51E-05
138	*		0.00	0.000	0.000	0.1353	0.0927	0.0005	1.25E-04	0.0002	0.0000	6.86E-09	0.0000	0.0000	3.51E-05
139			0.51	0.315	0.031	0.1443	0.0912	0.0004	1.24E-04	0.0002	0.0000	6.86E-09	0.0000	0.0000	3.51E-05
140			0.02	0.000	0.086	0.1406	0.0897	0.0004	1.22E-04	0.0002	0.0000	6.86E-09	0.0000	0.0000	3.51E-05
141	*		0.04	0.000	0.061	0.1396	0.0882	0.0004	1.21E-04	0.0002	0.0000	6.86E-09	0.0000	0.0000	3.51E-05
142			0.28	0.131	0.023	0.1466	0.0867	0.0004	1.19E-04	0.0002	0.0000	6.86E-09	0.0000	0.0000	3.51E-05
143			0.00	0.000	0.090	0.1416	0.0853	0.0004	1.18E-04	0.0002	0.0000	6.86E-09	0.0000	0.0000	3.50E-05
144			0.13	0.000	0.146	0.1409	0.0863	0.0004	1.19E-04	0.0002	0.0000	6.86E-09	0.0000	0.0000	3.50E-05

145	0.30	0.126	0.119	0.1440	0.0864	0.0004	1.19E-04	0.0002	0.0000	6.86E-09	0.0000	0.0000	3.50E-05
146	0.04	0.000	0.109	0.1399	0.0874	0.0004	1.20E-04	0.0002	0.0000	6.86E-09	0.0000	0.0000	3.50E-05
147	0.37	0.170	0.065	0.1476	0.0875	0.0004	1.20E-04	0.0002	0.0000	6.86E-09	0.0000	0.0000	3.50E-05
148	0.00	0.000	0.091	0.1426	0.0860	0.0004	1.18E-04	0.0002	0.0000	6.86E-09	0.0000	0.0000	3.49E-05
149	0.00	0.000	0.038	0.1404	0.0846	0.0004	1.17E-04	0.0002	0.0000	6.86E-09	0.0000	0.0000	3.49E-05
150	0.00	0.000	0.028	0.1388	0.0859	0.0004	1.18E-04	0.0002	0.0000	6.86E-09	0.0000	0.0000	3.49E-05
151	0.07	0.000	0.028	0.1411	0.0861	0.0004	1.18E-04	0.0002	0.0000	6.86E-09	0.0000	0.0000	3.49E-05
152	0.04	0.000	0.028	0.1417	0.0846	0.0004	1.17E-04	0.0002	0.0000	6.86E-09	0.0000	0.0000	3.49E-05
153	1.55	1.388	0.034	0.1490	0.0832	0.0004	1.15E-04	0.0002	0.0000	6.86E-09	0.0000	0.0000	3.48E-05
154	0.12	0.000	0.173	0.1462	0.0818	0.0004	1.14E-04	0.0002	0.0000	6.85E-09	0.0000	0.0000	3.48E-05
155	0.01	0.000	0.175	0.1368	0.0828	0.0004	1.15E-04	0.0002	0.0000	6.85E-09	0.0000	0.0000	3.48E-05
156	0.04	0.000	0.144	0.1311	0.0826	0.0004	1.15E-04	0.0002	0.0000	6.85E-09	0.0000	0.0000	3.48E-05
157	0.00	0.000	0.028	0.1295	0.0812	0.0004	1.13E-04	0.0002	0.0000	6.85E-09	0.0000	0.0000	3.48E-05
158	0.00	0.000	0.009	0.1288	0.0848	0.0004	1.17E-04	0.0001	0.0000	6.85E-09	0.0000	0.0000	3.48E-05
159	0.00	0.000	0.002	0.1287	0.0863	0.0004	1.19E-04	0.0001	0.0000	6.85E-09	0.0000	0.0000	3.47E-05
160	0.77	0.523	0.045	0.1398	0.0848	0.0004	1.17E-04	0.0001	0.0000	6.85E-09	0.0000	0.0000	3.47E-05
161	0.18	0.048	0.079	0.1429	0.0835	0.0004	1.16E-04	0.0001	0.0000	6.85E-09	0.0000	0.0000	3.47E-05
162	0.20	0.047	0.140	0.1434	0.0822	0.0004	1.14E-04	0.0001	0.0000	6.85E-09	0.0000	0.0000	3.47E-05
163	0.00	0.000	0.124	0.1365	0.0808	0.0004	1.13E-04	0.0001	0.0000	6.85E-09	0.0000	0.0000	3.47E-05
164	0.00	0.000	0.087	0.1317	0.0795	0.0004	1.12E-04	0.0001	0.0000	6.85E-09	0.0000	0.0000	3.46E-05
165	0.00	0.000	0.043	0.1293	0.0781	0.0004	1.10E-04	0.0001	0.0000	6.85E-09	0.0000	0.0000	3.46E-05
166	0.00	0.000	0.008	0.1287	0.0818	0.0004	1.14E-04	0.0001	0.0000	6.85E-09	0.0000	0.0000	3.46E-05
167	0.58	0.370	0.044	0.1381	0.0835	0.0004	1.16E-04	0.0001	0.0000	6.85E-09	0.0000	0.0000	3.46E-05
168	0.00	0.000	0.104	0.1323	0.0821	0.0004	1.14E-04	0.0001	0.0000	6.85E-09	0.0000	0.0000	3.46E-05
169	0.00	0.000	0.024	0.1310	0.0807	0.0004	1.13E-04	0.0001	0.0000	6.85E-09	0.0000	0.0000	3.46E-05
170	0.34	0.165	0.037	0.1386	0.0793	0.0004	1.11E-04	0.0001	0.0000	6.85E-09	0.0000	0.0000	3.45E-05
171	0.00	0.000	0.123	0.1317	0.0782	0.0004	1.10E-04	0.0001	0.0000	6.85E-09	0.0000	0.0000	3.45E-05
172	0.16	0.014	0.027	0.1382	0.0795	0.0004	1.11E-04	0.0001	0.0000	6.85E-09	0.0000	0.0000	3.45E-05
173	0.38	0.109	0.298	0.1368	0.0794	0.0004	1.11E-04	0.0001	0.0000	6.85E-09	0.0000	0.0000	3.45E-05
174	0.03	0.000	0.094	0.1332	0.0801	0.0004	1.12E-04	0.0001	0.0000	6.85E-09	0.0000	0.0000	3.45E-05
175	0.17	0.025	0.043	0.1387	0.0800	0.0004	1.12E-04	0.0001	0.0000	6.85E-09	0.0000	0.0000	3.45E-05
176	0.71	0.527	0.066	0.1451	0.0786	0.0004	1.11E-04	0.0001	0.0000	6.85E-09	0.0000	0.0000	3.44E-05
177	0.00	0.000	0.123	0.1382	0.0775	0.0004	1.09E-04	0.0001	0.0000	6.85E-09	0.0000	0.0000	3.44E-05
178	0.93	0.615	0.138	0.1479	0.0769	0.0004	1.09E-04	0.0001	0.0000	6.85E-09	0.0000	0.0000	3.44E-05
179	0.28	0.112	0.200	0.1460	0.0770	0.0004	1.09E-04	0.0001	0.0000	6.85E-09	0.0000	0.0000	3.44E-05
180	0.36	0.122	0.197	0.1482	0.0764	0.0004	1.08E-04	0.0001	0.0000	6.85E-09	0.0000	0.0000	3.44E-05
181	0.11	0.000	0.137	0.1467	0.0781	0.0004	1.10E-04	0.0001	0.0000	6.85E-09	0.0000	0.0000	3.43E-05
182	0.00	0.000	0.152	0.1383	0.0786	0.0004	1.11E-04	0.0001	0.0000	6.85E-09	0.0000	0.0000	3.43E-05

183	0.42	0.146	0.263	0.1388	0.0773	0.0004	1.09E-04	0.0001	0.0000	6.85E-09	0.0000	0.0000	3.43E-05
184	0.32	0.126	0.151	0.1411	0.0760	0.0004	1.08E-04	0.0001	0.0000	6.85E-09	0.0000	0.0000	3.43E-05
185	0.00	0.000	0.120	0.1342	0.0831	0.0004	1.15E-04	0.0001	0.0000	6.85E-09	0.0000	0.0000	3.43E-05
186	0.08	0.000	0.101	0.1328	0.0866	0.0004	1.19E-04	0.0001	0.0000	6.85E-09	0.0000	0.0000	3.43E-05
187	0.16	0.002	0.041	0.1393	0.0852	0.0004	1.18E-04	0.0001	0.0000	6.85E-09	0.0000	0.0000	3.42E-05
188	0.01	0.000	0.066	0.1363	0.0863	0.0004	1.19E-04	0.0001	0.0000	6.85E-09	0.0000	0.0000	3.42E-05
189	0.21	0.073	0.045	0.1416	0.0864	0.0004	1.19E-04	0.0001	0.0000	6.85E-09	0.0000	0.0000	3.42E-05
190	0.02	0.000	0.037	0.1403	0.0849	0.0004	1.17E-04	0.0001	0.0000	6.85E-09	0.0000	0.0000	3.42E-05
191	0.00	0.000	0.025	0.1389	0.0851	0.0004	1.17E-04	0.0001	0.0000	6.84E-09	0.0000	0.0000	3.42E-05
192	0.00	0.000	0.017	0.1379	0.0846	0.0004	1.17E-04	0.0001	0.0000	6.84E-09	0.0000	0.0000	3.42E-05
193	0.00	0.000	0.020	0.1368	0.0839	0.0004	1.16E-04	0.0001	0.0000	6.84E-09	0.0000	0.0000	3.41E-05
194	0.09	0.000	0.024	0.1402	0.0830	0.0004	1.15E-04	0.0001	0.0000	6.84E-09	0.0000	0.0000	3.41E-05
195	0.00	0.000	0.016	0.1394	0.0816	0.0004	1.14E-04	0.0001	0.0000	6.84E-09	0.0000	0.0000	3.41E-05
196	0.00	0.000	0.011	0.1388	0.0806	0.0004	1.13E-04	0.0001	0.0000	6.84E-09	0.0000	0.0000	3.41E-05
197	0.00	0.000	0.013	0.1381	0.0795	0.0004	1.12E-04	0.0001	0.0000	6.84E-09	0.0000	0.0000	3.41E-05
198	0.00	0.000	0.014	0.1373	0.0781	0.0004	1.10E-04	0.0001	0.0000	6.84E-09	0.0000	0.0000	3.40E-05
199	0.00	0.000	0.014	0.1365	0.0768	0.0004	1.09E-04	0.0001	0.0000	6.84E-09	0.0000	0.0000	3.40E-05
200	0.00	0.000	0.014	0.1358	0.0755	0.0004	1.07E-04	0.0001	0.0000	6.84E-09	0.0000	0.0000	3.40E-05
201	0.00	0.000	0.013	0.1350	0.0743	0.0004	1.06E-04	0.0001	0.0000	6.84E-09	0.0000	0.0000	3.40E-05
202	0.00	0.000	0.013	0.1343	0.0730	0.0004	1.05E-04	0.0001	0.0000	6.84E-09	0.0000	0.0000	3.40E-05
203	0.00	0.000	0.012	0.1336	0.0718	0.0004	1.03E-04	0.0001	0.0000	6.84E-09	0.0000	0.0000	3.40E-05
204	0.41	0.237	0.023	0.1422	0.0706	0.0003	1.02E-04	0.0001	0.0000	6.84E-09	0.0000	0.0000	3.39E-05
205	0.47	0.329	0.022	0.1487	0.0694	0.0003	1.01E-04	0.0001	0.0000	6.84E-09	0.0000	0.0000	3.39E-05
206	0.00	0.000	0.103	0.1429	0.0683	0.0003	9.93E-05	0.0001	0.0000	6.84E-09	0.0000	0.0000	3.39E-05
207	1.27	0.952	0.152	0.1519	0.0671	0.0003	9.80E-05	0.0001	0.0000	6.84E-09	0.0000	0.0000	3.39E-05
208	0.00	0.000	0.099	0.1464	0.0660	0.0003	9.68E-05	0.0001	0.0000	6.85E-09	0.0000	0.0000	3.39E-05
209	0.00	0.000	0.193	0.1356	0.0653	0.0003	9.60E-05	0.0001	0.0000	6.85E-09	0.0000	0.0000	3.39E-05
210	0.00	0.000	0.078	0.1313	0.0666	0.0003	9.75E-05	0.0001	0.0000	6.85E-09	0.0000	0.0000	3.38E-05
211	0.00	0.000	0.035	0.1293	0.0663	0.0003	9.71E-05	0.0001	0.0000	6.85E-09	0.0000	0.0000	3.38E-05
212	0.67	0.422	0.065	0.1395	0.0651	0.0003	9.58E-05	0.0001	0.0000	6.85E-09	0.0000	0.0000	3.38E-05
213	0.00	0.000	0.073	0.1351	0.0737	0.0004	1.05E-04	0.0001	0.0000	6.85E-09	0.0000	0.0000	3.38E-05
214	0.00	0.000	0.082	0.1306	0.0782	0.0004	1.10E-04	0.0001	0.0000	6.85E-09	0.0000	0.0000	3.38E-05
215	0.14	0.000	0.042	0.1359	0.0769	0.0004	1.09E-04	0.0001	0.0000	6.85E-09	0.0000	0.0000	3.38E-05
216	0.00	0.000	0.079	0.1313	0.0786	0.0004	1.11E-04	0.0001	0.0000	6.85E-09	0.0000	0.0000	3.37E-05
217	0.45	0.155	0.149	0.1394	0.0790	0.0004	1.11E-04	0.0001	0.0000	6.85E-09	0.0000	0.0000	3.37E-05
218	0.21	0.074	0.085	0.1422	0.0777	0.0004	1.10E-04	0.0001	0.0000	6.85E-09	0.0000	0.0000	3.37E-05
219	0.00	0.000	0.084	0.1375	0.0764	0.0004	1.08E-04	0.0001	0.0000	6.85E-09	0.0000	0.0000	3.37E-05
220	0.00	0.000	0.096	0.1322	0.0761	0.0004	1.08E-04	0.0001	0.0000	6.85E-09	0.0000	0.0000	3.37E-05

221	0.16	0.011	0.045	0.1379	0.0755	0.0004	1.07E-04	0.0001	0.0000	6.85E-09	0.0000	0.0000	3.36E-05
222	0.00	0.000	0.037	0.1358	0.0742	0.0004	1.06E-04	0.0001	0.0000	6.85E-09	0.0000	0.0000	3.36E-05
223	0.00	0.000	0.022	0.1345	0.0771	0.0004	1.09E-04	0.0001	0.0000	6.85E-09	0.0000	0.0000	3.36E-05
224	0.05	0.000	0.028	0.1359	0.0783	0.0004	1.10E-04	0.0001	0.0000	6.85E-09	0.0000	0.0000	3.36E-05
225	0.14	0.001	0.025	0.1423	0.0770	0.0004	1.09E-04	0.0001	0.0000	6.85E-09	0.0000	0.0000	3.36E-05
226	0.00	0.000	0.013	0.1415	0.0765	0.0004	1.08E-04	0.0001	0.0000	6.85E-09	0.0000	0.0000	3.36E-05
227	0.00	0.000	0.013	0.1408	0.0757	0.0004	1.07E-04	0.0001	0.0000	6.85E-09	0.0000	0.0000	3.35E-05
228	0.00	0.000	0.015	0.1399	0.0745	0.0004	1.06E-04	0.0001	0.0000	6.85E-09	0.0000	0.0000	3.35E-05
229	0.00	0.000	0.015	0.1391	0.0732	0.0004	1.05E-04	0.0001	0.0000	6.85E-09	0.0000	0.0000	3.35E-05
230	0.00	0.000	0.015	0.1383	0.0720	0.0004	1.03E-04	0.0001	0.0000	6.85E-09	0.0000	0.0000	3.35E-05
231	0.00	0.000	0.014	0.1375	0.0708	0.0003	1.02E-04	0.0001	0.0000	6.85E-09	0.0000	0.0000	3.35E-05
232	0.05	0.000	0.019	0.1392	0.0696	0.0003	1.01E-04	0.0001	0.0000	6.85E-09	0.0000	0.0000	3.35E-05
233	0.00	0.000	0.013	0.1385	0.0684	0.0003	9.95E-05	0.0001	0.0000	6.85E-09	0.0000	0.0000	3.34E-05
234	0.00	0.000	0.012	0.1379	0.0673	0.0003	9.82E-05	0.0001	0.0000	6.85E-09	0.0000	0.0000	3.34E-05
235	0.00	0.000	0.009	0.1373	0.0668	0.0003	9.77E-05	0.0001	0.0000	6.85E-09	0.0000	0.0000	3.34E-05
236	0.02	0.000	0.016	0.1379	0.0661	0.0003	9.69E-05	0.0001	0.0000	6.85E-09	0.0000	0.0000	3.34E-05
237	0.02	0.000	0.017	0.1381	0.0650	0.0003	9.57E-05	0.0001	0.0000	6.85E-09	0.0000	0.0000	3.34E-05
238	0.00	0.000	0.009	0.1376	0.0639	0.0003	9.44E-05	0.0001	0.0000	6.85E-09	0.0000	0.0000	3.34E-05
239	0.00	0.000	0.007	0.1372	0.0631	0.0003	9.35E-05	0.0001	0.0000	6.85E-09	0.0000	0.0000	3.33E-05
240	0.04	0.000	0.013	0.1387	0.0622	0.0003	9.25E-05	0.0001	0.0000	6.85E-09	0.0000	0.0000	3.33E-05
241	0.00	0.000	0.009	0.1382	0.0612	0.0003	9.13E-05	0.0001	0.0000	6.85E-09	0.0000	0.0000	3.33E-05
242	0.01	0.000	0.012	0.1383	0.0602	0.0003	9.03E-05	0.0001	0.0000	6.85E-09	0.0000	0.0000	3.33E-05
243	0.00	0.000	0.009	0.1378	0.0595	0.0003	8.94E-05	0.0001	0.0000	6.85E-09	0.0000	0.0000	3.33E-05
244	0.00	0.000	0.007	0.1374	0.0585	0.0003	8.83E-05	0.0001	0.0000	6.85E-09	0.0000	0.0000	3.33E-05
245	0.00	0.000	0.007	0.1370	0.0577	0.0003	8.73E-05	0.0001	0.0000	6.85E-09	0.0000	0.0000	3.32E-05
246	0.00	0.000	0.008	0.1365	0.0568	0.0003	8.63E-05	0.0001	0.0000	6.85E-09	0.0000	0.0000	3.32E-05
247	0.00	0.000	0.008	0.1361	0.0558	0.0003	8.52E-05	0.0001	0.0000	6.85E-09	0.0000	0.0000	3.32E-05
248	0.00	0.000	0.009	0.1356	0.0549	0.0003	8.41E-05	0.0001	0.0000	6.85E-09	0.0000	0.0000	3.32E-05
249	0.04	0.000	0.014	0.1372	0.0539	0.0003	8.30E-05	0.0001	0.0000	6.85E-09	0.0000	0.0000	3.32E-05
250	0.00	0.000	0.008	0.1367	0.0530	0.0003	8.19E-05	0.0001	0.0000	6.85E-09	0.0000	0.0000	3.32E-05
251	0.00	0.000	0.006	0.1364	0.0521	0.0003	8.08E-05	0.0001	0.0000	6.85E-09	0.0000	0.0000	3.31E-05
252	0.00	0.000	0.007	0.1361	0.0515	0.0003	8.01E-05	0.0001	0.0000	6.85E-09	0.0000	0.0000	3.31E-05
253	0.00	0.000	0.007	0.1357	0.0508	0.0003	7.93E-05	0.0001	0.0000	6.85E-09	0.0000	0.0000	3.31E-05
254	0.00	0.000	0.007	0.1353	0.0499	0.0002	7.83E-05	0.0002	0.0000	6.85E-09	0.0000	0.0000	3.31E-05
255	0.00	0.000	0.007	0.1349	0.0491	0.0002	7.72E-05	0.0002	0.0000	6.85E-09	0.0000	0.0000	3.31E-05
256	0.00	0.000	0.007	0.1345	0.0482	0.0002	7.62E-05	0.0002	0.0000	6.85E-09	0.0000	0.0000	3.31E-05
257	0.00	0.000	0.008	0.1341	0.0474	0.0002	7.52E-05	0.0002	0.0000	6.85E-09	0.0000	0.0000	3.30E-05
258	0.10	0.000	0.013	0.1387	0.0466	0.0002	7.42E-05	0.0002	0.0000	6.85E-09	0.0000	0.0000	3.30E-05

259		0.21	0.074	0.012	0.1455	0.0458	0.0002	7.32E-05	0.0002	0.0000	6.85E-09	0.0000	0.0000	3.30E-05
260		0.00	0.000	0.005	0.1453	0.0452	0.0002	7.25E-05	0.0002	0.0000	6.86E-09	0.0000	0.0000	3.30E-05
261		0.00	0.000	0.006	0.1449	0.0445	0.0002	7.17E-05	0.0002	0.0000	6.86E-09	0.0000	0.0000	3.30E-05
262		0.00	0.000	0.007	0.1445	0.0437	0.0002	7.07E-05	0.0002	0.0000	6.86E-09	0.0000	0.0000	3.30E-05
263		0.00	0.000	0.007	0.1441	0.0430	0.0002	6.98E-05	0.0002	0.0000	6.86E-09	0.0000	0.0000	3.29E-05
264		0.00	0.000	0.007	0.1437	0.0422	0.0002	6.89E-05	0.0002	0.0000	6.87E-09	0.0000	0.0000	3.29E-05
265		0.00	0.000	0.007	0.1433	0.0415	0.0002	6.79E-05	0.0002	0.0000	6.87E-09	0.0000	0.0000	3.29E-05
266		0.00	0.000	0.007	0.1429	0.0408	0.0002	6.70E-05	0.0002	0.0000	6.88E-09	0.0000	0.0000	3.29E-05
267		0.00	0.000	0.007	0.1425	0.0400	0.0002	6.61E-05	0.0002	0.0000	6.88E-09	0.0000	0.0000	3.29E-05
268		0.00	0.000	0.007	0.1421	0.0393	0.0002	6.53E-05	0.0003	0.0000	6.89E-09	0.0000	0.0000	3.29E-05
269		0.00	0.000	0.007	0.1417	0.0387	0.0002	6.44E-05	0.0003	0.0000	6.89E-09	0.0000	0.0000	3.28E-05
270		0.05	0.000	0.012	0.1440	0.0380	0.0002	6.35E-05	0.0003	0.0000	6.90E-09	0.0000	0.0000	3.28E-05
271		0.08	0.000	0.013	0.1475	0.0373	0.0002	6.27E-05	0.0003	0.0000	6.91E-09	0.0000	0.0000	3.28E-05
272		0.00	0.000	0.008	0.1470	0.0367	0.0002	6.19E-05	0.0004	0.0000	6.92E-09	0.0000	0.0000	3.28E-05
273		0.00	0.000	0.008	0.1466	0.0361	0.0002	6.11E-05	0.0004	0.0000	6.93E-09	0.0000	0.0000	3.28E-05
274		0.00	0.000	0.007	0.1461	0.0363	0.0002	6.14E-05	0.0004	0.0000	6.93E-09	0.0000	0.0000	3.28E-05
275		0.00	0.000	0.006	0.1458	0.0360	0.0002	6.10E-05	0.0005	0.0000	6.94E-09	0.0000	0.0000	3.28E-05
276		0.00	0.000	0.006	0.1454	0.0353	0.0002	6.02E-05	0.0005	0.0000	6.95E-09	0.0000	0.0000	3.27E-05
277		0.00	0.000	0.006	0.1451	0.0347	0.0002	5.93E-05	0.0005	0.0000	6.96E-09	0.0000	0.0000	3.27E-05
278	*	0.00	0.000	0.000	0.1451	0.0341	0.0002	5.85E-05	0.0006	0.0000	6.97E-09	0.0000	0.0000	3.27E-05
279	*	0.00	0.000	0.006	0.1447	0.0335	0.0002	5.78E-05	0.0006	0.0000	6.98E-09	0.0000	0.0000	3.27E-05
280	*	0.00	0.000	0.006	0.1444	0.0329	0.0002	5.70E-05	0.0006	0.0000	6.99E-09	0.0000	0.0000	3.27E-05
281	*	0.00	0.000	0.000	0.1444	0.0323	0.0002	5.62E-05	0.0007	0.0000	7.00E-09	0.0000	0.0000	3.27E-05
282		0.00	0.000	0.006	0.1440	0.0318	0.0002	5.55E-05	0.0007	0.0000	7.01E-09	0.0000	0.0000	3.26E-05
283	*	0.00	0.000	0.000	0.1440	0.0312	0.0002	5.47E-05	0.0008	0.0000	7.02E-09	0.0000	0.0000	3.26E-05
284		0.00	0.000	0.006	0.1437	0.0307	0.0002	5.40E-05	0.0008	0.0000	7.03E-09	0.0000	0.0000	3.26E-05
285	*	0.00	0.000	0.006	0.1433	0.0301	0.0001	5.32E-05	0.0009	0.0000	7.04E-09	0.0000	0.0000	3.26E-05
286		0.00	0.000	0.006	0.1430	0.0296	0.0001	5.25E-05	0.0009	0.0000	7.06E-09	0.0000	0.0000	3.26E-05
287		0.00	0.000	0.006	0.1427	0.0291	0.0001	5.18E-05	0.0010	0.0000	7.07E-09	0.0000	0.0000	3.26E-05
288		0.00	0.000	0.006	0.1423	0.0285	0.0001	5.11E-05	0.0010	0.0000	7.08E-09	0.0000	0.0000	3.25E-05
289		0.00	0.000	0.006	0.1420	0.0280	0.0001	5.04E-05	0.0011	0.0000	7.09E-09	0.0000	0.0000	3.25E-05
290		0.04	0.000	0.011	0.1438	0.0275	0.0001	4.97E-05	0.0011	0.0000	7.10E-09	0.0000	0.0000	3.25E-05
291		0.00	0.000	0.006	0.1435	0.0270	0.0001	4.91E-05	0.0012	0.0000	7.12E-09	0.0000	0.0000	3.25E-05
292		0.02	0.000	0.012	0.1438	0.0266	0.0001	4.84E-05	0.0012	0.0000	7.13E-09	0.0000	0.0000	3.25E-05
293		0.83	0.674	0.014	0.1515	0.0261	0.0001	4.77E-05	0.0013	0.0000	7.14E-09	0.0000	0.0000	3.25E-05
294		0.00	0.000	0.110	0.1454	0.0259	0.0001	4.75E-05	0.0013	0.0000	7.15E-09	0.0000	0.0000	3.24E-05
295		0.01	0.000	0.108	0.1397	0.0260	0.0001	4.76E-05	0.0014	0.0000	7.17E-09	0.0000	0.0000	3.24E-05
296		0.00	0.000	0.135	0.1321	0.0280	0.0001	5.04E-05	0.0014	0.0000	7.18E-09	0.0000	0.0000	3.24E-05

297		0.00	0.000	0.049	0.1294	0.0283	0.0001	5.08E-05	0.0015	0.0000	7.19E-09	0.0000	0.0000	3.24E-05
298		0.03	0.000	0.020	0.1296	0.0338	0.0002	5.81E-05	0.0015	0.0000	7.20E-09	0.0000	0.0000	3.24E-05
299		0.01	0.000	0.008	0.1296	0.0368	0.0002	6.20E-05	0.0015	0.0000	7.20E-09	0.0000	0.0000	3.24E-05
300		0.05	0.000	0.008	0.1317	0.0361	0.0002	6.12E-05	0.0015	0.0000	7.21E-09	0.0000	0.0000	3.24E-05
301		0.08	0.000	0.008	0.1357	0.0355	0.0002	6.04E-05	0.0015	0.0000	7.21E-09	0.0000	0.0000	3.23E-05
302		0.18	0.042	0.018	0.1426	0.0349	0.0002	5.96E-05	0.0016	0.0000	7.21E-09	0.0000	0.0000	3.23E-05
303		0.00	0.000	0.012	0.1419	0.0343	0.0002	5.88E-05	0.0016	0.0000	7.22E-09	0.0000	0.0000	3.23E-05
304		0.09	0.000	0.018	0.1458	0.0337	0.0002	5.80E-05	0.0016	0.0000	7.22E-09	0.0000	0.0000	3.23E-05
305		0.03	0.000	0.018	0.1465	0.0331	0.0002	5.72E-05	0.0016	0.0000	7.23E-09	0.0000	0.0000	3.23E-05
306		0.00	0.000	0.010	0.1460	0.0327	0.0002	5.67E-05	0.0016	0.0000	7.23E-09	0.0000	0.0000	3.23E-05
307		0.00	0.000	0.014	0.1452	0.0323	0.0002	5.62E-05	0.0017	0.0000	7.24E-09	0.0000	0.0000	3.22E-05
308		0.00	0.000	0.014	0.1445	0.0317	0.0002	5.54E-05	0.0017	0.0000	7.24E-09	0.0000	0.0000	3.22E-05
309		0.00	0.000	0.014	0.1437	0.0312	0.0002	5.47E-05	0.0017	0.0000	7.25E-09	0.0000	0.0000	3.22E-05
310		0.00	0.000	0.013	0.1430	0.0306	0.0002	5.39E-05	0.0017	0.0000	7.26E-09	0.0000	0.0000	3.22E-05
311		0.00	0.000	0.013	0.1423	0.0301	0.0001	5.32E-05	0.0018	0.0000	7.26E-09	0.0000	0.0000	3.22E-05
312		0.00	0.000	0.012	0.1416	0.0295	0.0001	5.25E-05	0.0018	0.0000	7.27E-09	0.0000	0.0000	3.22E-05
313		0.10	0.000	0.017	0.1459	0.0290	0.0001	5.18E-05	0.0018	0.0000	7.28E-09	0.0000	0.0000	3.21E-05
314		1.00	0.844	0.022	0.1534	0.0285	0.0001	5.11E-05	0.0019	0.0000	7.29E-09	0.0000	0.0000	3.21E-05
315		0.01	0.000	0.050	0.1514	0.0280	0.0001	5.04E-05	0.0019	0.0000	7.30E-09	0.0000	0.0000	3.21E-05
316	*	0.17	0.000	0.025	0.1525	0.0275	0.0001	4.97E-05	0.0019	0.0000	7.30E-09	0.0000	0.0000	3.21E-05
317	*	0.03	0.000	0.000	0.1535	0.0270	0.0001	4.90E-05	0.0020	0.0000	7.31E-09	0.0000	0.0000	3.21E-05
318	*	0.43	0.000	0.016	0.1546	0.0265	0.0001	4.83E-05	0.0020	0.0000	7.32E-09	0.0000	0.0000	3.21E-05
319	*	0.00	0.000	0.033	0.1557	0.0260	0.0001	4.77E-05	0.0021	0.0000	7.33E-09	0.0000	0.0000	3.21E-05
320	*	0.33	0.000	0.000	0.1568	0.0256	0.0001	4.70E-05	0.0021	0.0000	7.34E-09	0.0000	0.0000	3.20E-05
321		0.00	0.657	0.000	0.1643	0.0251	0.0001	4.64E-05	0.0022	0.0000	7.35E-09	0.0000	0.0000	3.20E-05
322	*	0.00	0.000	0.000	0.1643	0.0247	0.0001	4.57E-05	0.0022	0.0000	7.36E-09	0.0000	0.0000	3.20E-05
323		0.00	0.000	0.034	0.1623	0.0253	0.0001	4.67E-05	0.0022	0.0000	7.37E-09	0.0000	0.0000	3.20E-05
324		0.00	0.000	0.039	0.1602	0.0255	0.0001	4.69E-05	0.0023	0.0000	7.38E-09	0.0000	0.0000	3.20E-05
325		0.00	0.000	0.036	0.1582	0.0251	0.0001	4.63E-05	0.0023	0.0000	7.39E-09	0.0000	0.0000	3.20E-05
326	*	0.00	0.000	0.026	0.1567	0.0246	0.0001	4.57E-05	0.0024	0.0000	7.40E-09	0.0000	0.0000	3.19E-05
327	*	0.00	0.000	0.000	0.1567	0.0242	0.0001	4.50E-05	0.0024	0.0000	7.41E-09	0.0000	0.0000	3.19E-05
328	*	0.02	0.000	0.044	0.1553	0.0237	0.0001	4.44E-05	0.0024	0.0000	7.42E-09	0.0000	0.0000	3.19E-05
329	*	0.00	0.000	0.000	0.1553	0.0233	0.0001	4.38E-05	0.0025	0.0000	7.43E-09	0.0000	0.0000	3.19E-05
330	*	0.00	0.000	0.000	0.1553	0.0229	0.0001	4.32E-05	0.0025	0.0000	7.44E-09	0.0000	0.0000	3.19E-05
331		0.00	0.000	0.055	0.1522	0.0225	0.0001	4.26E-05	0.0026	0.0000	7.45E-09	0.0000	0.0000	3.19E-05
332		0.00	0.000	0.091	0.1471	0.0221	0.0001	4.20E-05	0.0026	0.0000	7.45E-09	0.0000	0.0000	3.19E-05
333		0.00	0.000	0.073	0.1430	0.0217	0.0001	4.14E-05	0.0026	0.0000	7.46E-09	0.0000	0.0000	3.18E-05
334		0.00	0.000	0.073	0.1390	0.0213	0.0001	4.09E-05	0.0027	0.0000	7.47E-09	0.0000	0.0000	3.18E-05

335			0.00	0.000	0.058	0.1358	0.0209	0.0001	4.03E-05	0.0027	0.0000	7.48E-09	0.0000	0.0000	3.18E-05
336			0.00	0.000	0.068	0.1319	0.0216	0.0001	4.14E-05	0.0028	0.0000	7.49E-09	0.0000	0.0000	3.18E-05
337			0.01	0.000	0.058	0.1291	0.0272	0.0001	4.92E-05	0.0028	0.0000	7.50E-09	0.0000	0.0000	3.18E-05
338			0.04	0.000	0.015	0.1301	0.0358	0.0002	6.07E-05	0.0028	0.0000	7.50E-09	0.0000	0.0000	3.18E-05
339			0.03	0.000	0.010	0.1314	0.0365	0.0002	6.17E-05	0.0028	0.0000	7.50E-09	0.0000	0.0000	3.17E-05
340			0.00	0.000	0.004	0.1312	0.0359	0.0002	6.08E-05	0.0028	0.0000	7.49E-09	0.0000	0.0000	3.17E-05
341			0.10	0.000	0.014	0.1358	0.0352	0.0002	6.00E-05	0.0028	0.0000	7.49E-09	0.0000	0.0000	3.17E-05
342			0.01	0.000	0.020	0.1352	0.0346	0.0002	5.92E-05	0.0028	0.0000	7.49E-09	0.0000	0.0000	3.17E-05
343			0.43	0.246	0.036	0.1432	0.0340	0.0002	5.84E-05	0.0028	0.0000	7.49E-09	0.0000	0.0000	3.17E-05
344			0.00	0.000	0.035	0.1413	0.0334	0.0002	5.76E-05	0.0028	0.0000	7.49E-09	0.0000	0.0000	3.17E-05
345			0.10	0.000	0.040	0.1446	0.0330	0.0002	5.70E-05	0.0028	0.0000	7.49E-09	0.0000	0.0000	3.17E-05
346	*		0.00	0.000	0.000	0.1446	0.0325	0.0002	5.64E-05	0.0028	0.0000	7.49E-09	0.0000	0.0000	3.16E-05
347	*		0.00	0.000	0.000	0.1446	0.0319	0.0002	5.56E-05	0.0028	0.0000	7.50E-09	0.0000	0.0000	3.16E-05
348	*		0.02	0.000	0.011	0.1449	0.0313	0.0002	5.49E-05	0.0028	0.0000	7.50E-09	0.0000	0.0000	3.16E-05
349	*		0.00	0.000	0.000	0.1449	0.0308	0.0002	5.41E-05	0.0028	0.0000	7.50E-09	0.0000	0.0000	3.16E-05
350	*		0.00	0.000	0.000	0.1449	0.0302	0.0001	5.34E-05	0.0028	0.0000	7.50E-09	0.0000	0.0000	3.16E-05
351	*		0.00	0.000	0.000	0.1449	0.0297	0.0001	5.27E-05	0.0028	0.0000	7.51E-09	0.0000	0.0000	3.16E-05
352	*		0.09	0.000	0.006	0.1460	0.0292	0.0001	5.20E-05	0.0029	0.0000	7.51E-09	0.0000	0.0000	3.16E-05
353	*		0.06	0.000	0.013	0.1471	0.0286	0.0001	5.13E-05	0.0029	0.0000	7.51E-09	0.0000	0.0000	3.15E-05
354	*	*	0.00	0.000	0.014	0.1471	0.0281	0.0001	5.06E-05	0.0029	0.0000	7.52E-09	0.0000	0.0000	3.15E-05
355	*	*	0.11	0.000	0.006	0.1471	0.0276	0.0001	4.99E-05	0.0029	0.0000	7.52E-09	0.0000	0.0000	3.15E-05
356	*	*	0.00	0.000	0.008	0.1471	0.0271	0.0001	4.92E-05	0.0029	0.0000	7.53E-09	0.0000	0.0000	3.15E-05
357	*	*	0.00	0.000	0.004	0.1471	0.0267	0.0001	4.85E-05	0.0030	0.0000	7.53E-09	0.0000	0.0000	3.15E-05
358	*	*	0.00	0.000	0.007	0.1471	0.0262	0.0001	4.79E-05	0.0030	0.0000	7.54E-09	0.0000	0.0000	3.15E-05
359	*	*	0.00	0.000	0.000	0.1471	0.0257	0.0001	4.72E-05	0.0030	0.0000	7.54E-09	0.0000	0.0000	3.14E-05
360	*	*	0.00	0.000	0.034	0.1471	0.0253	0.0001	4.66E-05	0.0030	0.0000	7.55E-09	0.0000	0.0000	3.14E-05
361	*	*	0.01	0.000	0.037	0.1471	0.0248	0.0001	4.59E-05	0.0031	0.0000	7.56E-09	0.0000	0.0000	3.14E-05
362	*	*	0.10	0.000	0.016	0.1471	0.0244	0.0001	4.53E-05	0.0031	0.0000	7.56E-09	0.0000	0.0000	3.14E-05
363	*	*	0.00	0.000	0.007	0.1471	0.0239	0.0001	4.47E-05	0.0031	0.0000	7.57E-09	0.0000	0.0000	3.14E-05
364	*	*	0.00	0.000	0.010	0.1471	0.0235	0.0001	4.41E-05	0.0032	0.0000	7.58E-09	0.0000	0.0000	3.14E-05
365	*	*	0.00	0.000	0.017	0.1471	0.0231	0.0001	4.35E-05	0.0032	0.0000	7.58E-09	0.0000	0.0000	3.14E-05

* = Frozen (air or soil)

Annual Totals for Year 5			
	inches	cubic feet	percent
Precipitation	25.46	92,408.5	100.00

Runoff	13.481	48,935.5	52.96
Evapotranspiration	12.202	44,292.9	47.93
Drainage Collected from Layer 3	0.0771	280.0	0.30
Percolation/Leakage through Layer 4	0.024041	87.3	0.09
Average Head on Top of Layer 4	0.0429	---	---
Drainage Collected from Layer 7	0.0017	6.1427	0.01
Percolation/Leakage through Layer 9	0.000003	0.0093	0.00
Average Head on Top of Layer 8	0.0007	---	---
Percolation/Leakage through Layer 10	0.012559	45.6	0.05
Change in Water Storage	-0.3172	-1,151.6	-1.25
Soil Water at Start of Year	72.6438	263,697.1	285.36
Soil Water at End of Year	72.4649	263,047.7	284.66
Snow Water at Start of Year	0.3024	1,097.9	1.19
Snow Water at End of Year	0.1641	595.7	0.64
Annual Water Budget Balance	0.0000	0.0000	0.00

Average Annual Totals Summary

Title: Pilgrim Landfill
Simulated on: 4/10/2026 14:14

	Average Annual Totals for Years 1 - 5*			
	(inches)	[std dev]	(cubic feet)	(percent)
Precipitation	31.76	[5.73]	115,283.6	100.00
Runoff	17.464	[4.441]	63,393.2	54.99
Evapotranspiration	14.159	[1.357]	51,397.2	44.58
Subprofile1				
Lateral drainage collected from Layer 3	0.0645	[0.0108]	234.1	0.20
Percolation/leakage through Layer 4	0.021100	[0.002681]	76.6	0.07
Average Head on Top of Layer 4	0.0358	[0.006]	---	---
Subprofile2				
Lateral drainage collected from Layer 7	0.0027	[0.0007]	9.8731	0.01
Percolation/leakage through Layer 9	0.000003	[0]	0.0094	0.00
Average Head on Top of Layer 8	0.0011	[0.0003]	---	---
Subprofile3				
Percolation/leakage through Layer 10	0.025282	[0.014852]	91.8	0.08
Water storage				
Change in water storage	0.0433	[0.331]	157.3	0.14

* Note: Average inches are converted to volume based on the user-specified area.

Peak Values Summary

Title: Pilgrim Landfill
Simulated on: 4/10/2026 14:14

	Peak Values for Years 1 - 5*		
	(inches)		(cubic feet)
Precipitation	5.34		19,384.2
Runoff	4.859		17,638.1
Subprofile1			
Drainage collected from Layer 3	0.0005		1.8563
Percolation/leakage through Layer 4	0.000137		0.4961
Average head on Layer 4	0.1038		---
Maximum head on Layer 4	0.2046		---
Location of maximum head in Layer 3	2.62	(feet from drain)	
Subprofile2			
Drainage collected from Layer 7	0.0000		0.0916
Percolation/leakage through Layer 9	0.000000		0.0000
Average head on Layer 8	0.0038		---
Maximum head on Layer 8	0.0077		---
Location of maximum head in Layer 7	0.19	(feet from drain)	
Subprofile3			
Percolation/leakage through Layer 10	0.000196		0.7115
Other Parameters			
Snow water	1.4979		5,437.3
Maximum vegetation soil water	0.1962	(vol/vol)	
Minimum vegetation soil water	0.1287	(vol/vol)	

Final Water Storage in Landfill Profile at End of Simulation Period

Title: Pilgrim Landfill
Simulated on: 4/10/2026 14:15
Simulation period: 5 years

	Final Water Storage	
Layer	(inches)	(vol/vol)
1	1.9910	0.3318
2	0.3691	0.0615
3	0.7405	0.0617
4	0.0000	0.0000
5	1.1400	0.1900
6	63.9441	0.0761
7	0.7452	0.0621
8	0.0000	0.0000
9	0.3750	0.7500
10	2.0919	0.3487
Snow water	0.1641	---

Reference: Hydraulic Efficiency Analysis for Pilgrim Landfill

ATTACHMENT 2

HELP Output Scenario 2 -Open Conditions 2% Floor and 100-foot drainage length

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HYDROLOGIC EVALUATION OF LANDFILL PERFORMANCE
HELP MODEL VERSION 4.0 BETA (2018)
DEVELOPED BY USEPA NATIONAL RISK MANAGEMENT RESEARCH LABORATORY

Title: Pilgrim Landfill **Simulated On:** 4/10/2026 14:00

Layer 1

Type 1 - Vertical Percolation Layer (Cover Soil)
SiCL - Silty Clay Loam
Material Texture Number 12

Thickness	=	6	inches
Porosity	=	0.471	vol/vol
Field Capacity	=	0.342	vol/vol
Wilting Point	=	0.21	vol/vol
Initial Soil Water Content	=	0.2587	vol/vol
Effective Sat. Hyd. Conductivity	=	4.20E-05	cm/sec

Layer 2

Type 1 - Vertical Percolation Layer (Waste)
Industrial Waste
Material Texture Number 83

Thickness	=	300	inches
Porosity	=	0.578	vol/vol
Field Capacity	=	0.076	vol/vol
Wilting Point	=	0.025	vol/vol
Initial Soil Water Content	=	0.0846	vol/vol
Effective Sat. Hyd. Conductivity	=	4.10E-03	cm/sec

Layer 3

Type 2 - Lateral Drainage Layer
S - Sand
Material Texture Number 2

Thickness	=	12	inches
Porosity	=	0.437	vol/vol
Field Capacity	=	0.062	vol/vol
Wilting Point	=	0.024	vol/vol
Initial Soil Water Content	=	0.062	vol/vol
Effective Sat. Hyd. Conductivity	=	5.80E-03	cm/sec
Slope	=	2	%
Drainage Length	=	100	ft

Layer 4

Type 4 - Flexible Membrane Liner

HDPE Membrane
Material Texture Number 35

Thickness	=	0.06	inches
Effective Sat. Hyd. Conductivity	=	2.00E-13	cm/sec
FML Pinhole Density	=	2	Holes/Acre
FML Installation Defects	=	2	Holes/Acre
FML Placement Quality	=	3	Good

Layer 5
Type 3 - Barrier Soil Liner
Bentonite (High)
Material Texture Number 17

Thickness	=	0.5	inches
Porosity	=	0.75	vol/vol
Field Capacity	=	0.747	vol/vol
Wilting Point	=	0.4	vol/vol
Initial Soil Water Content	=	0.75	vol/vol
Effective Sat. Hyd. Conductivity	=	3.00E-09	cm/sec

Layer 6
Type 1 - Vertical Percolation Layer
SiC - Silty Clay (Moderate)
Material Texture Number 28

Thickness	=	6	inches
Porosity	=	0.452	vol/vol
Field Capacity	=	0.411	vol/vol
Wilting Point	=	0.311	vol/vol
Initial Soil Water Content	=	0.3736	vol/vol
Effective Sat. Hyd. Conductivity	=	1.20E-06	cm/sec

Note: Initial moisture content of the layers and snow water were computed as nearly steady-state values by HELP.

General Design and Evaporative Zone Data

SCS Runoff Curve Number	=	95.4	
Fraction of Area Allowing Runoff	=	0	%
Area projected on a horizontal plane	=	1	acres
Evaporative Zone Depth	=	24	inches
Initial Water in Evaporative Zone	=	3.526	inches
Upper Limit of Evaporative Storage	=	13.23	inches
Lower Limit of Evaporative Storage	=	1.71	inches
Initial Snow Water	=	0	inches
Initial Water in Layer Materials	=	30.302	inches
Total Initial Water	=	30.302	inches

Total Subsurface Inflow	=	0	inches/year

Note: SCS Runoff Curve Number was calculated by HELP.

Evapotranspiration and Weather Data

Station Latitude	=	44.13	Degrees
Maximum Leaf Area Index	=	1	
Start of Growing Season (Julian Date)	=	124	days
End of Growing Season (Julian Date)	=	182	days
Average Wind Speed	=	11	mph
Average 1st Quarter Relative Humidity	=	65	%
Average 2nd Quarter Relative Humidity	=	65	%
Average 3rd Quarter Relative Humidity	=	62	%
Average 4th Quarter Relative Humidity	=	65	%

Note: Evapotranspiration data was obtained for Mankato, Minnesota

Normal Mean Monthly Precipitation (inches)

Jan/Jul	Feb/Aug	Mar/Sep	Apr/Oct	May/Nov	Jun/Dec
0.683107	0.60023	1.856155	3.092133	3.787518	7.569913
4.867874	3.191535	2.613059	1.132846	1.140449	1.223736

Note: Precipitation was simulated based on HELP V4 weather simulation for:
Lat/Long: 44.13/-93.98

Normal Mean Monthly Temperature (Degrees Fahrenheit)

Jan/Jul	Feb/Aug	Mar/Sep	Apr/Oct	May/Nov	Jun/Dec
20.6	20.2	36	56.7	62.8	76.6
82.4	78.5	81.4	49.6	38.6	32.4

Note: Temperature was simulated based on HELP V4 weather simulation for:
Lat/Long: 44.13/-93.98
Solar radiation was simulated based on HELP V4 weather simulation for:
Lat/Long: 44.13/-93.98

Average Annual Totals Summary

Title: Pilgrim Landfill
Simulated on: 4/10/2026 14:01

	Average Annual Totals for Years 1 - 5*			
	(inches)	[std dev]	(cubic feet)	(percent)
Precipitation	31.76	[5.73]	115,283.6	100.00
Runoff	0.000	[0]	0.0000	0.00
Evapotranspiration	26.141	[2.928]	94,891.1	82.31
Subprofile1				
Lateral drainage collected from Layer 3	1.0739	[1.6523]	3,898.2	3.38
Percolation/leakage through Layer 5	0.000047	[0.00007]	0.1717	0.00
Average Head on Top of Layer 4	0.4472	[0.6885]	---	---
Subprofile2				
Percolation/leakage through Layer 6	0.029239	[0.019776]	106.1	0.09
Water storage				
Change in water storage	4.5146	[4.0683]	16,388.1	14.22

* Note: Average inches are converted to volume based on the user-specified area.

Peak Values Summary

Title: Pilgrim Landfill
Simulated on: 4/10/2026 14:01

	Peak Values for Years 1 - 5*		
	(inches)		(cubic feet)
Precipitation	5.34		19,384.2
Runoff	0.000		0.0000
Subprofile1			
Drainage collected from Layer 3	0.0137		49.9
Percolation/leakage through Layer 5	0.000001		0.0022
Average head on Layer 4	2.0903		---
Maximum head on Layer 4	3.2530		---
Location of maximum head in Layer 3	22.16	(feet from drain)	
Subprofile2			
Percolation/leakage through Layer 6	0.000270		0.9807
Other Parameters			
Snow water	1.4979		5,437.3
Maximum vegetation soil water	0.3837	(vol/vol)	
Minimum vegetation soil water	0.1180	(vol/vol)	

Final Water Storage in Landfill Profile at End of Simulation Period

Title: Pilgrim Landfill
Simulated on: 4/10/2026 14:02
Simulation period: 5 years

	Final Water Storage	
Layer	(inches)	(vol/vol)
1	1.5583	0.2597
2	47.1624	0.1572
3	1.5199	0.1267
4	0.0000	0.0000
5	0.3750	0.7500
6	2.0955	0.3493
Snow water	0.1641	---

Reference: Hydraulic Efficiency Analysis for Pilgrim Landfill

ATTACHMENT 3

HELP Output Scenario 3 - Open Conditions 5% Floor and 330-foot drainage length

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HYDROLOGIC EVALUATION OF LANDFILL PERFORMANCE
HELP MODEL VERSION 4.0 BETA (2018)
DEVELOPED BY USEPA NATIONAL RISK MANAGEMENT RESEARCH LABORATORY

Title: Pilgrim Landfill **Simulated On:** 4/10/2026 14:19

Layer 1

Type 1 - Vertical Percolation Layer (Cover Soil)
SiCL - Silty Clay Loam
Material Texture Number 12

Thickness	=	6	inches
Porosity	=	0.471	vol/vol
Field Capacity	=	0.342	vol/vol
Wilting Point	=	0.21	vol/vol
Initial Soil Water Content	=	0.2587	vol/vol
Effective Sat. Hyd. Conductivity	=	4.20E-05	cm/sec

Layer 2

Type 1 - Vertical Percolation Layer (Waste)
Industrial Waste
Material Texture Number 83

Thickness	=	300	inches
Porosity	=	0.578	vol/vol
Field Capacity	=	0.076	vol/vol
Wilting Point	=	0.025	vol/vol
Initial Soil Water Content	=	0.0846	vol/vol
Effective Sat. Hyd. Conductivity	=	4.10E-03	cm/sec

Layer 3

Type 2 - Lateral Drainage Layer
S - Sand
Material Texture Number 2

Thickness	=	12	inches
Porosity	=	0.437	vol/vol
Field Capacity	=	0.062	vol/vol
Wilting Point	=	0.024	vol/vol
Initial Soil Water Content	=	0.062	vol/vol
Effective Sat. Hyd. Conductivity	=	5.80E-03	cm/sec
Slope	=	5	%
Drainage Length	=	330	ft

Layer 4

Type 4 - Flexible Membrane Liner

HDPE Membrane
Material Texture Number 35

Thickness	=	0.06	inches
Effective Sat. Hyd. Conductivity	=	2.00E-13	cm/sec
FML Pinhole Density	=	2	Holes/Acre
FML Installation Defects	=	2	Holes/Acre
FML Placement Quality	=	3	Good

Layer 5
Type 3 - Barrier Soil Liner
Bentonite (High)
Material Texture Number 17

Thickness	=	0.5	inches
Porosity	=	0.75	vol/vol
Field Capacity	=	0.747	vol/vol
Wilting Point	=	0.4	vol/vol
Initial Soil Water Content	=	0.75	vol/vol
Effective Sat. Hyd. Conductivity	=	3.00E-09	cm/sec

Layer 6
Type 1 - Vertical Percolation Layer
SiC - Silty Clay (Moderate)
Material Texture Number 28

Thickness	=	6	inches
Porosity	=	0.452	vol/vol
Field Capacity	=	0.411	vol/vol
Wilting Point	=	0.311	vol/vol
Initial Soil Water Content	=	0.3736	vol/vol
Effective Sat. Hyd. Conductivity	=	1.20E-06	cm/sec

Note: Initial moisture content of the layers and snow water were computed as nearly steady-state values by HELP.

General Design and Evaporative Zone Data

SCS Runoff Curve Number	=	95.4	
Fraction of Area Allowing Runoff	=	0	%
Area projected on a horizontal plane	=	1	acres
Evaporative Zone Depth	=	24	inches
Initial Water in Evaporative Zone	=	3.526	inches
Upper Limit of Evaporative Storage	=	13.23	inches
Lower Limit of Evaporative Storage	=	1.71	inches
Initial Snow Water	=	0	inches
Initial Water in Layer Materials	=	30.302	inches
Total Initial Water	=	30.302	inches

Total Subsurface Inflow	=	0	inches/year

Note: SCS Runoff Curve Number was calculated by HELP.

Evapotranspiration and Weather Data

Station Latitude	=	44.13	Degrees
Maximum Leaf Area Index	=	1	
Start of Growing Season (Julian Date)	=	124	days
End of Growing Season (Julian Date)	=	182	days
Average Wind Speed	=	11	mph
Average 1st Quarter Relative Humidity	=	65	%
Average 2nd Quarter Relative Humidity	=	65	%
Average 3rd Quarter Relative Humidity	=	62	%
Average 4th Quarter Relative Humidity	=	65	%

Note: Evapotranspiration data was obtained for Mankato, Minnesota

Normal Mean Monthly Precipitation (inches)

Jan/Jul	Feb/Aug	Mar/Sep	Apr/Oct	May/Nov	Jun/Dec
0.683107	0.60023	1.856155	3.092133	3.787518	7.569913
4.867874	3.191535	2.613059	1.132846	1.140449	1.223736

Note: Precipitation was simulated based on HELP V4 weather simulation for:
Lat/Long: 44.13/-93.98

Normal Mean Monthly Temperature (Degrees Fahrenheit)

Jan/Jul	Feb/Aug	Mar/Sep	Apr/Oct	May/Nov	Jun/Dec
20.6	20.2	36	56.7	62.8	76.6
82.4	78.5	81.4	49.6	38.6	32.4

Note: Temperature was simulated based on HELP V4 weather simulation for:
Lat/Long: 44.13/-93.98
Solar radiation was simulated based on HELP V4 weather simulation for:
Lat/Long: 44.13/-93.98

Average Annual Totals Summary

Title: Pilgrim Landfill
Simulated on: 4/10/2026 14:20

	Average Annual Totals for Years 1 - 5*			
	(inches)	[std dev]	(cubic feet)	(percent)
Precipitation	31.76	[5.73]	115,283.6	100.00
Runoff	0.000	[0]	0.0000	0.00
Evapotranspiration	26.141	[2.928]	94,891.1	82.31
Subprofile1				
Lateral drainage collected from Layer 3	1.0303	[1.5966]	3,740.0	3.24
Percolation/leakage through Layer 5	0.000060	[0.000091]	0.2191	0.00
Average Head on Top of Layer 4	0.5676	[0.88]	---	---
Subprofile2				
Percolation/leakage through Layer 6	0.029229	[0.019785]	106.1	0.09
Water storage				
Change in water storage	4.5582	[4.0323]	16,546.3	14.35

* Note: Average inches are converted to volume based on the user-specified area.

Peak Values Summary

Title: Pilgrim Landfill
Simulated on: 4/10/2026 14:20

	Peak Values for Years 1 - 5*		
	(inches)		(cubic feet)
Precipitation	5.34		19,384.2
Runoff	0.000		0.0000
Subprofile1			
Drainage collected from Layer 3	0.0132		48.1
Percolation/leakage through Layer 5	0.000001		0.0028
Average head on Layer 4	2.6659		---
Maximum head on Layer 4	4.9406		---
Location of maximum head in Layer 3	23.45	(feet from drain)	
Subprofile2			
Percolation/leakage through Layer 6	0.000270		0.9807
Other Parameters			
Snow water	1.4979		5,437.3
Maximum vegetation soil water	0.3837	(vol/vol)	
Minimum vegetation soil water	0.1180	(vol/vol)	

Final Water Storage in Landfill Profile at End of Simulation Period

Title: Pilgrim Landfill
Simulated on: 4/10/2026 14:20
Simulation period: 5 years

	Final Water Storage	
Layer	(inches)	(vol/vol)
1	1.5583	0.2597
2	47.1624	0.1572
3	1.7379	0.1448
4	0.0000	0.0000
5	0.3750	0.7500
6	2.0957	0.3493
Snow water	0.1641	---

Appendix D Geotechnical Evaluation

Stantec

Memo

To: File

From: Stantec Consulting Services, Inc.

Date: April 14, 2026

File: 227708930

Reference: Geotechnical Analysis for 4H:1V Side Slope Variance Request
Dem-Con Pilgrim Landfill (SW-254)

This technical memorandum summarizes the slope stability analysis performed for the modification of the side slope grades to a maximum of 4H:1V at the Pilgrim Landfill (landfill or facility). The Landfill is currently permitted for 5H:1V side slopes in accordance with MN Rule 7035.2825 subp.8 (E). The geotechnical analyses discussed herein confirm that the proposed 4H:1V side slope profile, submitted as part of the 2026 MPCA Major Permit Modification Application, exceeds the minimum standard factor of safety (FS) for long-term slope stability.

Methods and Material Properties

Two slope stability analyses were completed to demonstrate the veneer stability of the proposed final cover system at the modified slope. The first analysis was completed using Slope/W slope stability analysis software by Bentley Systems. The second analysis was a numerical analysis including construction equipment loads on the proposed cover system. In addition to the veneer analysis, a global stability analysis was performed using Slope/W to demonstrate the stability of the waste mass with a 4H:1V slope configuration.

Interface friction properties were not available for the materials to be used for the cover installation. For the purpose of this analysis, Stantec used interface friction properties of similar cover materials tested at other landfill sites. Soil parameters were determined upon review of regional soil data and site knowledge. The modelled system components and geometry represent the proposed final cover profile and proposed cover systems outlined below (top to bottom):

Cover System

- 6” Topsoil
- 6” Rooting Zone
- 12” Drainage Sand
- 40-Mil LLDPE Geomembrane
- 6” Buffer Soils
- Waste

Reference: Dem-Con Pilgrim Landfill SW-254 Geotechnical Analysis for 4H:1V Side Slope Variance Request

Stability Analysis Results

Veneer Stability Analysis

A cross section was created through the north slope of the landfill from the proposed top of Phase 3A to the sedimentation pond at the bottom of the slope as shown in **Attachment 1**. The geometry from the cross section was drawn in Slope/W to model the veneer stability of proposed cover system and the 4:1 slope. The minimum desired factor of safety for long-term slope stability is 1.5. The Slope/W model for the cover system indicated a minimum factor of safety of 1.68 for the proposed cover system with a 4:1 slope. A numerical analysis was also completed for the cover system to provide a second form of analysis and also to evaluate the veneer stability of the proposed cover with the weight of the equipment that will be used during construction. The numerical analysis indicated higher factors of safety for long-term slope stability compared to the Slope/W model with a minimum long-term factor of safety of 1.88 calculated for the interface between the buffer soils and the waste material. The equipment loading reduced the factor of safety to 1.71. However, construction is a temporary loading and the resulting factor of safety remains above the desired long-term factor of safety of 1.5. The results of the Slope/W model and the numerical analysis for the cover system are included in **Attachments 2A and 2B** for reference.

Global Stability Analysis

The global limit equilibrium slope stability analysis was performed using Slope/W at the cross section through the west slope as shown in **Attachment 1**. A global stability analysis evaluates the stability of the waste mass and the subgrade soils for the proposed 4:1 slope. The cross section for this analysis was extended through the sedimentation pond at the bottom of the slope. A piezometric surface representing a maximum one-foot of leachate head on the base liner was included to represent potential leachate conditions. The model indicated a factor of safety of 1.87 for the critical slip surface. The critical slip surface remains within the waste mass and does not extend into the base soils. The model results for the global stability analysis is included in **Attachment 3** for reference.

Summary

The proposed cover system was evaluated for slope stability using the proposed 4:1 slope gradient. Both the Slope/W analysis and the numerical analysis indicated factors of safety greater than the desired minimum of 1.5 for long term veneer stability for both cover systems. In addition, the global stability analysis indicated that the proposed 4:1 slope will provide long-term factor of safety exceeding the minimum desired FS of 1.5.

Reference: **Dem-Con Pilgrim Landfill SW-254 Geotechnical Analysis for 4H:1V Side Slope Variance Request**

Regards,

Stantec Consulting Services Inc.



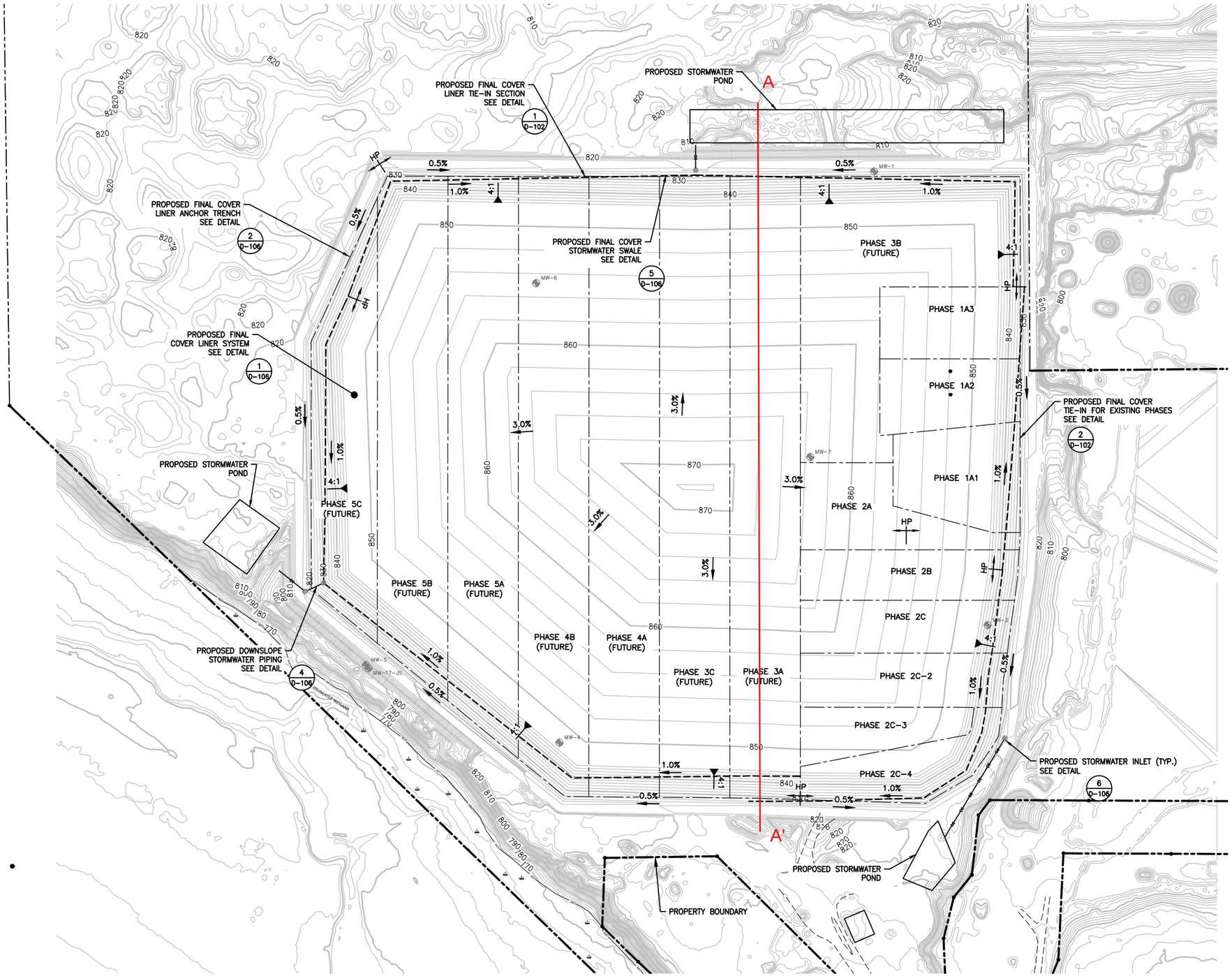
Kyle Morberg, PE

Associate, Environmental Engineer
Phone: (218) 591-0790
Kyle.morberg@stantec.com

Attachment:

Attachment 1 - Cross-Section Figure
Attachment 2A - Slope/W Veneer Stability Analysis – Drainage Sand
Attachment 2B - Numerical Veneer Stability Analysis – Drainage Sand
Attachment 3 - Slope/W Global Stability Analysis

Attachment 1 – Cross-Section



SURVEY NOTES:

1. HORIZONTAL DATUM IS BLUE EARTH COUNTY NORTH AMERICAN DATUM NAD83(2011), US SURVEY FEET,
2. VERTICAL DATUM IS NORTH AMERICAN VERTICAL DATUM 88 (NAVD88). CONTOUR INTERVAL IS TWO FEET.
3. TOPOGRAPHY SURVEY FROM 2023 LIDAR DATA, UPDATED VIA GROUND SURVEY BY BOLTON AND MENK IN DECEMBER 2025.

NOTES:

1. PROPOSED GRADES SHOWN ARE TOP OF FINAL COVER GRADES.

REV	REVISION DESCRIPTION	DWN	APP	REV DATE
0	ISSUED FOR PERMIT APPLICATION	JJT	EDK	04/24/26

SEAL

I HEREBY CERTIFY THAT THIS PLAN, SPECIFICATION, OR REPORT WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA.

PRINT NAME ETHAN KETELSEN

SIGNATURE

DATE 04-24-2026 LICENSE # 56630

PRIME CONSULTANT

Stantec

PROJECT TITLE
2026 PERMIT REISSUANCE & MODIFICATION APPLICATION

DEM-CON PILGRIM LANDFILL, LLC.

MANKATO, MINNESOTA

SHEET TITLE
SURFACE WATER MANAGEMENT PLAN

DWN BY	CHK'D	APP'D	DWG DATE
JJT	BWS	EDK	APR. 2026

SCALE AS SHOWN

PROJECT NO.	SHEET NO.	REV NO.
227708930	C-106	0

Plot Date & Time: 10 April 2026 12:38 PM

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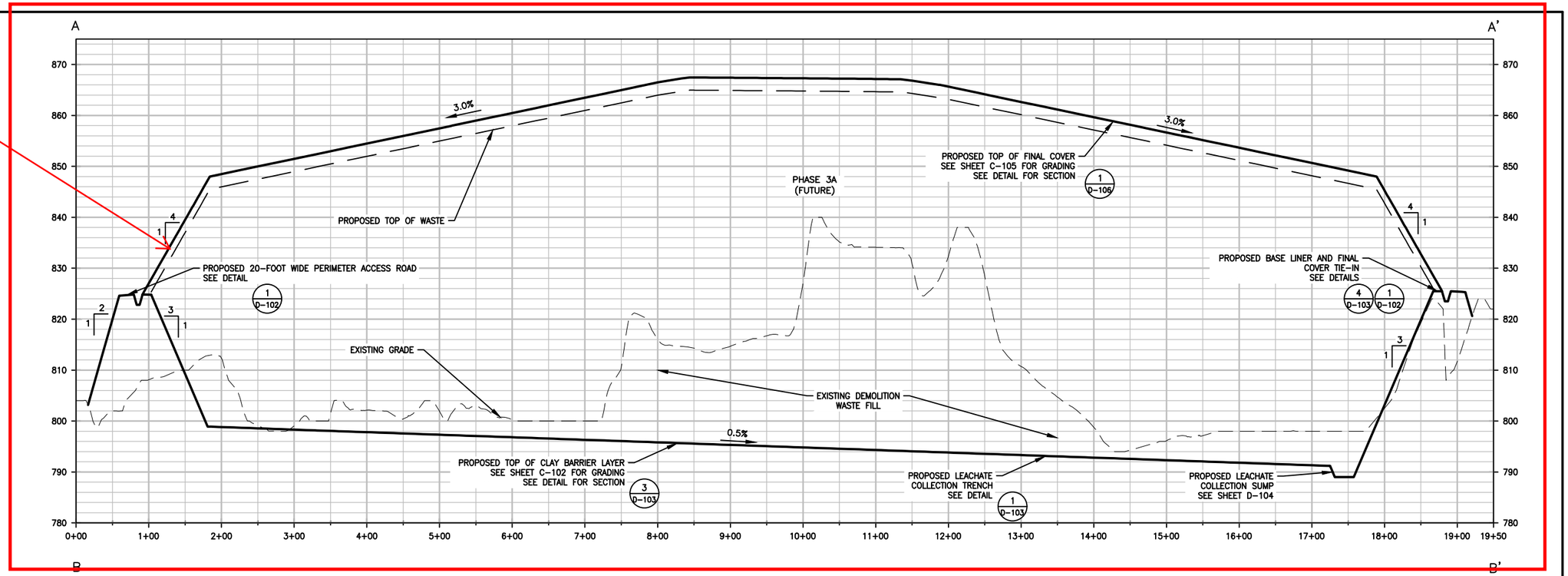
Slope A Evaluated



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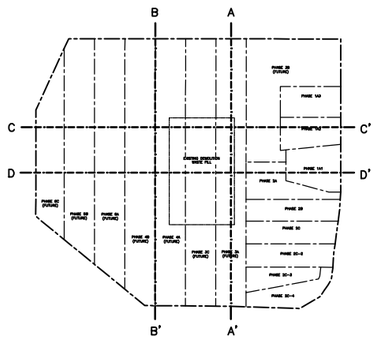
GRAPHIC SCALE IN FEET

VERTICAL EXAGGERATION: 7.0X



REV	REVISION DESCRIPTION	DWN	APP	REV DATE
0	ISSUED FOR PERMIT APPLICATION	JJT	EDK	04/24/26

SEAL

I HEREBY CERTIFY THAT THIS PLAN, SPECIFICATION, OR REPORT WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA.

PRINT NAME ETHAN KETELSEN

SIGNATURE

DATE 04-24-2026 LICENSE # 56630

PRIME CONSULTANT

Stantec

PROJECT TITLE
2026 PERMIT REISSUANCE & MODIFICATION APPLICATION

DEM-CON PILGRIM LANDFILL, LLC.

MANKATO, MINNESOTA

SHEET TITLE
CROSS SECTIONS

DWN BY	CHK'D	APP'D	DWG DATE
JJT	BWS	EDK	APR. 2026

SCALE AS SHOWN

PROJECT NO.	SHEET NO.	REV NO.
227708930	C-107	0

Plot Date & Time: 10 April 2026 4:30 PM

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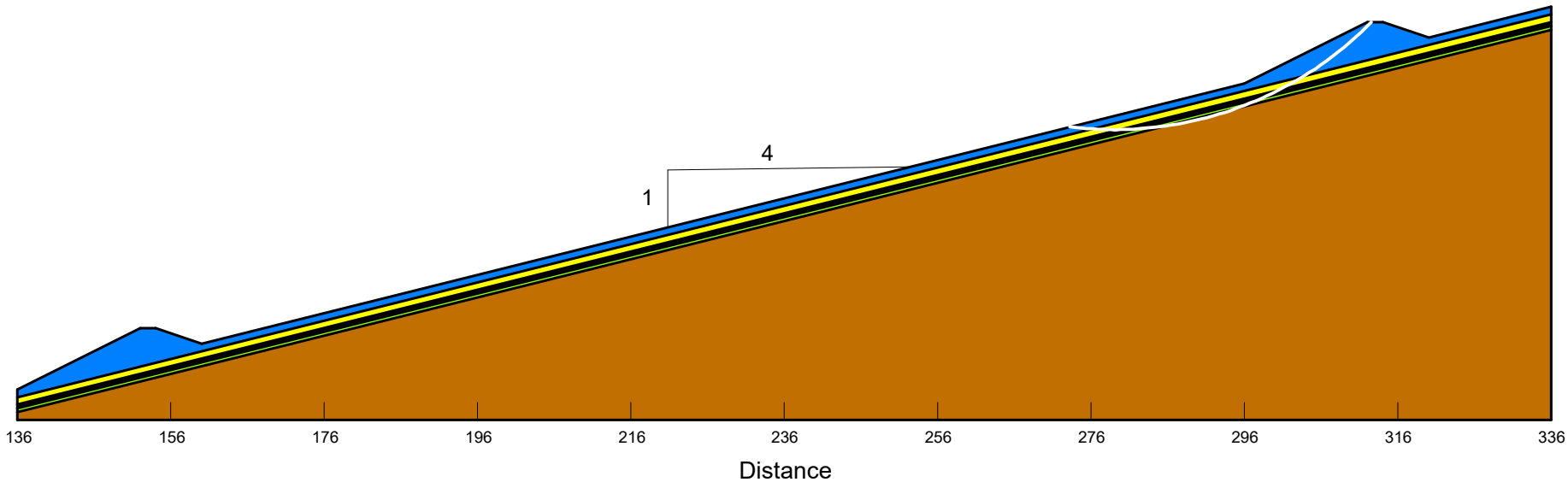
Attachment 2A – Slope/W Veneer Stability (Drainage Sand)

Color	Name	Unit Weight (pcf)	Effective Cohesion (psf)	Effective Friction Angle (°)
	Buffer Soils	100	10	23
	Drainage Sand	120	0	32.3
	Geomembrane	1	0	30
	Rooting Zone/Topsoil	100	25	23
	Waste	75	0	25

Dem-Con Pilgrim Landfill (SW-254)
Veneer Stability Analysis
Worst case 40 vert. feet between diversion berms
Sand drainage layer

1.68



Attachment 2B – Numerical Veneer Stability (Drainage Sand)

Stantec

Slope Stability Analyses for Landfill Cover System using Peak Shear Strength Parameters

Liner System (Layer 1. Topsoil, Layer 2. Rooting Soil, Layer 3. Sand Drainage, Layer 4. Geomembrane, Layer 5. Intermediate Cover, Layer 6. Waste)

Slope Geometry

14.04 degrees :Slope Angle, β
4.0H:1V :Slope Run
90 feet :Slope Length, L

Layering System and Interfaces

Layer 1. Topsoil
6 inches :Thickness, t
100 pcf :Unit Weight, γs
4,500 lbs :Weight per Slope Length

Layer 1/2 Interface Information
23 degrees :*Friction Angle*
25 psf :*Adhesion (Root Strength)*

Layer 2. Rooting Soil
6 inches :Thickness, t
105 pcf :Unit Weight, γs
4,725 lbs :Weight per Slope Length

Layer 2/3 Interface Information
23.0 degrees :*Friction Angle*
25 psf :*Adhesion*

Layer 3. Sand Drainage
12 inches :Thickness, t
120 pcf :Unit Weight, γs
10,800 lbs :Weight per Slope Length

Layer 3/4 Interface Information
32.3 degrees :*Friction Angle*
0 psf :*Adhesion*

Layer 4. Geomembrane

Layer 4/5 Interface Information
30.0 degrees :*Friction Angle*
0 psf :*Adhesion*

Layer 5. Intermediate Cover
6 inches :Thickness, t
110 pcf :Unit Weight, γs
4,950 lbs :Weight per Slope Length

Layer 5/6 Interface Information
23 degrees :*Friction Angle*
10 psf :*Adhesion*

Layer 6. Waste

External Equipment, E
42,000 lbs :Weight of CAT D6
2.5 feet :Single Track Width
8.0 feet :Width of Equipment
15.3 feet :Length of Equipment
8,400 psf :In-Line Ground Pressure
548 psf :Equivalent Ground Pressure

Long-Term Factor of Safety

Considers dry conditions only

1.50 :Required Factor of Safety
1.88 :Minimum Calculated Factor of Safety
Okay

Resisting Force; Slope = [γs x t x L x cos(β) x tan(δ)] + [L x a]
Resisting Force; Buttress = [γs x H^2 x tan(ϕs)/sin(2 β)] x [cos(ϕs)/cos(ϕs + β)]
Driving Force = γs x t x L x sin(β)
Factor of Safety = Resisting / Driving

Layer 1. Topsoil vs. Layer 2. Rooting Soil
4,103 lbs :Resisting Force; Slope
26 lbs :Resisting Force; Buttress
1,091 lbs :Driving Force
3.78 :Factor of Safety

Layer 2. Rooting Soil vs. Layer 3. Sand Drainage
6,049 lbs :Resisting Force; Slope
53 lbs :Resisting Force; Buttress
2,237 lbs :Driving Force
2.73 :Factor of Safety

Layer 3. Sand Drainage vs. Layer 4. Geomembrane
12,281 lbs :Resisting Force; Slope
282 lbs :Resisting Force; Buttress
4,857 lbs :Driving Force
2.59 :Factor of Safety

Layer 4. Geomembrane vs. Layer 5. Intermediate Cover
11,216 lbs :Resisting Force; Slope
282 lbs :Resisting Force; Buttress
4,857 lbs :Driving Force
2.37 :Factor of Safety

Layer 5. Intermediate Cover vs. Layer 6. Waste
11,185 lbs :Resisting Force; Slope
207 lbs :Resisting Force; Buttress
6,057 lbs :Driving Force
1.88 :Factor of Safety

Short-Term Factor of Safety

Considers seepage through cover system

1.20 :Required Factor of Safety
1.62 :Minimum Calculated Factor of Safety
Okay

Resisting Force = [γs x t x L x cos(β) x tan(δ)] + [L x a]
Resisting Force; Buttress = [γs x H^2 x tan(ϕs)/sin(2 β)] x [cos(ϕs)/cos(ϕs + β)]
Driving Force = γs x t x L x sin(β)
Factor of Safety = Resisting / Driving

75% :Percent Saturated
63% :Reduction Factor based on Seepage

4,103 lbs :Resisting Force; Slope
26 lbs :Resisting Force; Buttress
1,091 lbs :Driving Force
3.78 :Factor of Safety
2.36 :Reduced Factor of Safety based on Seepage

6,049 lbs :Resisting Force; Slope
53 lbs :Resisting Force; Buttress
2,237 lbs :Driving Force
2.73 :Factor of Safety
1.70 :Reduced Factor of Safety based on Seepage

12,281 lbs :Resisting Force; Slope
282 lbs :Resisting Force; Buttress
4,857 lbs :Driving Force
2.59 :Factor of Safety
1.62 :Reduced Factor of Safety based on Seepage

11,216 lbs :Resisting Force; Slope
282 lbs :Resisting Force; Buttress
4,857 lbs :Driving Force
2.37 :Factor of Safety*
*No seepage below the membrane

11,185 lbs :Resisting Force; Slope
207 lbs :Resisting Force; Buttress
6,057 lbs :Driving Force
1.88 :Factor of Safety*
*No seepage below the membrane

Short-Term Factor of Safety

Considers equipment loading

1.20 :Required Factor of Safety
1.71 :Minimum Calculated Factor of Safety
Okay

Resisting Force = {[(γs x t) + E] x L x cos(β) x tan(δ)} + [L x a]
Resisting Force; Buttress = [γs x H^2 x tan(ϕs)/sin(2 β)] x [cos(ϕs)/cos(ϕs + β)]
Driving Force = [(γs x t x L) +(1.3 x E)] x sin(β)
Factor of Safety = Resisting / Driving

7,562 lbs :Resisting Force; Slope
26 lbs :Resisting Force; Buttress
3,740 lbs :Driving Force
2.03 :Factor of Safety

9,508 lbs :Resisting Force; Slope
53 lbs :Resisting Force; Buttress
4,886 lbs :Driving Force
1.96 :Factor of Safety

17,433 lbs :Resisting Force; Slope
282 lbs :Resisting Force; Buttress
7,505 lbs :Driving Force
2.36 :Factor of Safety

15,921 lbs :Resisting Force; Slope
282 lbs :Resisting Force; Buttress
7,505 lbs :Driving Force
2.16 :Factor of Safety

14,644 lbs :Resisting Force; Slope
207 lbs :Resisting Force; Buttress
8,706 lbs :Driving Force
1.71 :Factor of Safety

Stantec

Slope Stability Analyses for Landfill Cover System using Large-Displacement Shear Strength Parameters

Liner System (Layer 1. Topsoil, Layer 2. Rooting Soil, Layer 3. Drainage Sand, Layer 4. Geomembrane, Layer 5. Intermediate Cover, Layer 6. Waste)

Slope Geometry

14.04 degrees :Slope Angle, β
4.0H:1V :Slope Run
90 feet :Slope Length, L

Layering System and Interfaces

Layer 1. Topsoil
6 inches :Thickness, t
100 pcf :Unit Weight, γs
4,500 lbs :Weight per Slope Length

Layer 1/2 Interface Information
20 degrees :*Friction Angle*
50 psf :*Adhesion (Root Strength)*

Layer 2. Rooting Soil
6 inches :Thickness, t
105 pcf :Unit Weight, γs
4,725 lbs :Weight per Slope Length

Layer 2/3 Interface Information
23 degrees :*Friction Angle*
50 psf :*Adhesion*

Layer 3. Drainage Sand
12 inches :Thickness, t
115 pcf :Unit Weight, γs
10,350 lbs :Weight per Slope Length

Layer 3/4 Interface Information
31 degrees :*Friction Angle*
0 psf :*Adhesion*

Layer 4. Geomembrane

Layer 4/5 Interface Information
26 degrees :*Friction Angle*
50 psf :*Adhesion*

Layer 5. Intermediate Cover
12 inches :Thickness, t
110 pcf :Unit Weight, γs
9,900 lbs :Weight per Slope Length

Layer 5/6 Interface Information
30 degrees :*Friction Angle*
50 psf :*Adhesion*

Layer 6. Waste

External Equipment, E

42,000 lbs :Weight of CAT D6
2.5 feet :Single Track Width
8.0 feet :Width of Equipment
15.3 feet :Length of Equipment
8,400 psf :In-Line Ground Pressure
548 psf :Equivalent Ground Pressure

Long-Term Factor of Safety

Considers dry conditions only

1.20 :Required Factor of Safety
2.42 :Minimum Calculated Factor of Safety
Okay

Resisting Force; Slope = [γs x t x L x cos(β) x tan(δ)] + [L x a]
Resisting Force; Buttress = [γs x H^2 x tan(φs)/sin(2 β)] x [cos(φs)/cos(φs + β)]
Driving Force = γs x t x L x sin(β)
Factor of Safety = Resisting / Driving

Layer 1. Topsoil vs. Layer 2. Rooting Soil

6,089 lbs :Resisting Force; Slope
22 lbs :Resisting Force; Buttress
1,091 lbs :Driving Force
5.60 :Factor of Safety

Layer 2. Rooting Soil vs. Layer 3. Drainage Sand

8,299 lbs :Resisting Force; Slope
53 lbs :Resisting Force; Buttress
2,237 lbs :Driving Force
3.73 :Factor of Safety

Layer 3. Drainage Sand vs. Layer 4. Geomembrane

11,411 lbs :Resisting Force; Slope
79 lbs :Resisting Force; Buttress
4,748 lbs :Driving Force
2.42 :Factor of Safety

Layer 4. Geomembrane vs. Layer 5. Intermediate Cover

13,762 lbs :Resisting Force; Slope
62 lbs :Resisting Force; Buttress
4,748 lbs :Driving Force
2.91 :Factor of Safety

Layer 5. Intermediate Cover vs. Layer 6. Waste

21,009 lbs :Resisting Force; Slope
238 lbs :Resisting Force; Buttress
7,149 lbs :Driving Force
2.97 :Factor of Safety

Short-Term Factor of Safety

Considers seepage through cover system

1.10 :Required Factor of Safety
1.51 :Minimum Calculated Factor of Safety
Okay

Resisting Force = [γs x t x L x cos(β) x tan(δ)] + [L x a]
Resisting Force; Buttress = [γs x H^2 x tan(φs)/sin(2 β)] x [cos(φs)/cos(φs + β)]
Driving Force = γs x t x L x sin(β)
Factor of Safety = Resisting / Driving

75% :Percent Saturated
63% :Reduction Factor based on Seepage

Layer 1. Topsoil vs. Layer 2. Rooting Soil

6,089 lbs :Resisting Force; Slope
22 lbs :Resisting Force; Buttress
1,091 lbs :Driving Force
5.60 :Factor of Safety
3.50 :Reduced Factor of Safety based on Seepage

Layer 2. Rooting Soil vs. Layer 3. Drainage Sand

8,299 lbs :Resisting Force; Slope
53 lbs :Resisting Force; Buttress
2,237 lbs :Driving Force
3.73 :Factor of Safety
2.33 :Reduced Factor of Safety based on Seepage

Layer 3. Drainage Sand vs. Layer 4. Geomembrane

11,411 lbs :Resisting Force; Slope
79 lbs :Resisting Force; Buttress
4,748 lbs :Driving Force
2.42 :Factor of Safety
1.51 :Reduced Factor of Safety based on Seepage

Layer 4. Geomembrane vs. Layer 5. Intermediate Cover

13,762 lbs :Resisting Force; Slope
62 lbs :Resisting Force; Buttress
4,748 lbs :Driving Force
2.91 :Factor of Safety*
*No seepage below the membrane

Layer 5. Intermediate Cover vs. Layer 6. Waste

21,009 lbs :Resisting Force; Slope
238 lbs :Resisting Force; Buttress
7,149 lbs :Driving Force
2.97 :Factor of Safety*
*No seepage below the membrane

Short-Term Factor of Safety

Considers equipment loading

1.10 :Required Factor of Safety
2.22 :Minimum Calculated Factor of Safety
Okay

Resisting Force = {[(γs x t) + E] x L x cos(β) x tan(δ)} + [L x a]
Resisting Force; Buttress = [γs x H^2 x tan(φs)/sin(2 β)] x [cos(φs)/cos(φs + β)]
Driving Force = [(γs x t x L) +(1.3 x E)] x sin(β)
Factor of Safety = Resisting / Driving

Layer 1. Topsoil vs. Layer 2. Rooting Soil

9,055 lbs :Resisting Force; Slope
22 lbs :Resisting Force; Buttress
3,740 lbs :Driving Force
2.43 :Factor of Safety

Layer 2. Rooting Soil vs. Layer 3. Drainage Sand

11,758 lbs :Resisting Force; Slope
53 lbs :Resisting Force; Buttress
4,886 lbs :Driving Force
2.42 :Factor of Safety

Layer 3. Drainage Sand vs. Layer 4. Geomembrane

16,307 lbs :Resisting Force; Slope
79 lbs :Resisting Force; Buttress
7,396 lbs :Driving Force
2.22 :Factor of Safety

Layer 4. Geomembrane vs. Layer 5. Intermediate Cover

17,737 lbs :Resisting Force; Slope
62 lbs :Resisting Force; Buttress
7,396 lbs :Driving Force
2.41 :Factor of Safety

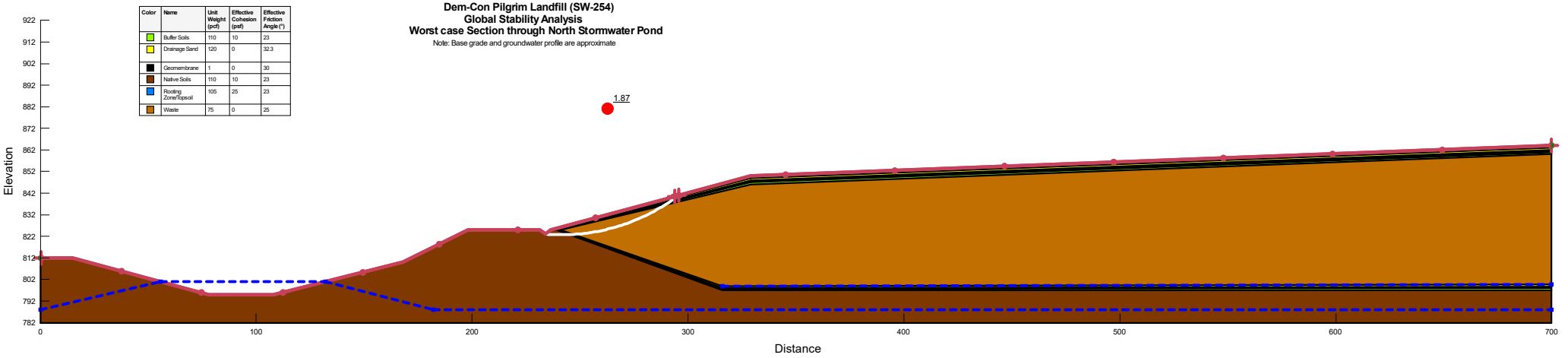
Layer 5. Intermediate Cover vs. Layer 6. Waste

25,714 lbs :Resisting Force; Slope
238 lbs :Resisting Force; Buttress
9,797 lbs :Driving Force
2.65 :Factor of Safety

Attachment 3 – Slope/W Global Stability

Dem-Con Pilgrim Landfill (SW-254)
Global Stability Analysis
Worst case Section through North Stormwater Pond
Note: Base grade and groundwater profile are approximate

Color	Name	Unit Weight (pcf)	Effective Cohesion (psf)	Effective Friction Angle (°)
	Buffer Soils	110	10	23
	Drainage Sand	120	0	32.3
	Geomembrane	1	0	30
	Native Soils	110	10	23
	Rooting Zone/Topsoil	105	25	23
	Waste	75	0	25



Appendix E Shredding Operations Form

SHREDDING OPERATIONS FORM

DISPOSAL DATE:_____

LOCATION OF SHREDDING OPERATIONS (check one):

☐ DEM-CON PILGRIM LANDFILL (SW-254)

☐ OTHER:_____

WASTE QUANTITY:

_____ ☐TONS ☐CUBIC YARDS

WASTE CATEGORY

☐ CONSTRUCTION & DEMOLITION DEBRIS

☐ INDUSTRIAL SOLID WASTE

DESCRIPTION:_____

_____

WASTE MATERIALS APPROVED FOR SHREDDING (check all that apply):

☐ Plastic tubing (plumbing, pipe, conduit)

☐ Plastic duct work (spiral wire core)

☐ Empty plastic containers (buckets, bins)

☐ Plastic hardware (electrical boxes)

☐ Plastic sheeting (roof, wall, untreated)

☐ Plastic playground equipment

☐ Incidental nonrecyclable packaging

☐ Siding and doors (vinyl, untreated wood)

☐ Shingles (wood, asphalt)

☐ Carpet and carpet padding

☐ Fiberglass (tubs, tub surrounds)

☐ Porcelain (sinks, toilets)

☐ Wood (flooring, plywood, particle board, fencing, stumps)

☐ Other (list):_____

_____

_____

Completed by:_____ Date:_____

Appendix F Adjacent Properties

Figure No.
1

Title
Abutting Properties

Client/Project 227708930
Dem-Con Pilgrim Landfill, LLC

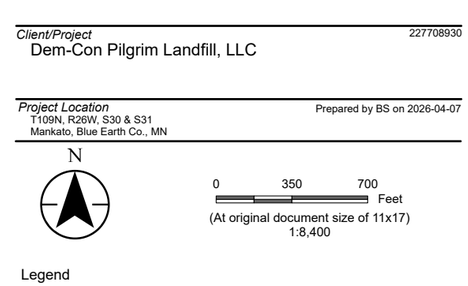
Project Location
T109N, R26W, S30 & S31
Mankato, Blue Earth Co., MN

Prepared by BS on 2026-04-07

N

0 350 700 Feet
(At original document size of 11x17)
1:8,400

Legend
- Property Boundary
- Approximate Parcel Boundary



Notes
1. Coordinate System: NAD 1983 HARN Adj MN Blue Earth Feet
2. Data Sources: MnGEO, Blue Earth County
3. Background: Minnesota 2025 Imagery

Stantec

Disclaimer: This document has been prepared based on information provided by others as cited in the Notes section. Stantec has not verified the accuracy and/or completeness of this information and shall not be responsible for any errors or omissions which may be incorporated herein as a result. Stantec assumes no responsibility for data supplied in electronic format, and the recipient accepts full responsibility for verifying the accuracy and completeness of the data.

U:\227\227708930\03_data\gis_cad\gis\ArcPro\Pilgrims Demolition Landfill\Pilgrims Demolition Landfill.aprx Revised: 2026-04-07 By: tschaffermeyer

PID	Owner	OwnerAddress	Zone
R400430300003	SCHMIDT J & W & KIECKER M & D TSTS	23070 506TH LN LAKE CRYSTAL, MN 56055	101- 2A/1B/4BB AGRICULTURAL; 2B/1B RURAL VACANT LAND
R400325400002	WONG ANDREW J & MELANIE J IMKER	216 STONEHENGE DR MANKATO, MN 56001	111- 2B/1B RURAL VACANT LAND
R400325400005	SCHMIDT J & W & KIECKER M & D TSTS	23070 506TH LN LAKE CRYSTAL, MN 56055	101- 2A/1B/4BB AGRICULTURAL; 2B/1B RURAL VACANT LAND
R400336200007	SCHMIDT J & W & KIECKER M & D TSTS	23070 506TH LN LAKE CRYSTAL, MN 56055	101- 2A/1B/4BB AGRICULTURAL; 2B/1B RURAL VACANT LAND
R400431100008	SCHMIDT J & W & KIECKER M & D TSTS	23070 506TH LN LAKE CRYSTAL, MN 56055	101- 2A/1B/4BB AGRICULTURAL; 2B/1B RURAL VACANT LAND
R400431100009	SCHMIDT J & W & KIECKER M & D TSTS	23070 506TH LN LAKE CRYSTAL, MN 56055	112- 2C MANAGED FOREST LAND
R400431100007	WINKLER CATHY L	57076 230TH LN MANKATO, MN 56001	201- 1A/1B/4BB RESIDENTIAL SINGLE UNIT
R400431100014	OMG MIDWEST INC	PO BOX 55038 LEXINGTON, KY 40555	234- 3A INDUSTRIAL LAND AND BUILDING
R400431200039	OMG MIDWEST INC	PO BOX 55038 LEXINGTON, KY 40555	234- 3A INDUSTRIAL LAND AND BUILDING
R400431200040	OMG MIDWEST INC	PO BOX 55038 LEXINGTON, KY 40555	234- 3A INDUSTRIAL LAND AND BUILDING
R400431200033	CAMPQUARRY LLC	3301 3RD AVE MANKATO, MN 56001	234- 3A INDUSTRIAL LAND AND BUILDING
R400431200030	IMMANUEL EVANG LUTHERAN CHURCH	421 N SECOND ST MANKATO, MN 56001	911- 5E CEMETERY-PUBLIC
R400431200005	CAMPQUARRY LLC	3301 3RD AVE MANKATO, MN 56001	234- 3A INDUSTRIAL LAND AND BUILDING
R400431200042	MANKATO ACOUSTICS INC	3501 THIRD AVE MANKATO, MN 56001	234- 3A INDUSTRIAL LAND AND BUILDING
R400431200044	CHS INC	SAINT PAUL, MN 55164	234- 3A INDUSTRIAL LAND AND BUILDING
R400431200666	LIME INDUSTRIAL PARK ASSOCIATION	3640 BAYSIDE RD ORONO, MN 55356	961- 5E COMMON AREA
R400431200036	K7 QUARRIES LLC	818 WILLOW ST MANKATO, MN 56001	234- 3A INDUSTRIAL LAND AND BUILDING
R400431200027	HIGH WIRE PROPERTIES LLC (CFD)	MANKATO, MN 56002	233- 3A COMMERCIAL LAND AND BUILDING
R400430400006	IMMANUEL EVANG LUTH CHURCH OF MKTO	421 N 2ND ST MANKATO, MN 56001	234- 3A INDUSTRIAL LAND AND BUILDING
R400430400014	CAMPQUARRY LLC	3301 3RD AVE MANKATO, MN 56001	234- 3A INDUSTRIAL LAND AND BUILDING
R400430400005	AZUL REIGN PROPERTIES LLC	716 N BROAD ST MANKATO, MN 56001	233- 3A COMMERCIAL LAND AND BUILDING
R400430400004	CAMPQUARRY LLC	3301 3RD AVE MANKATO, MN 56001	206- 4B4 UNIMPROVED RESIDENTIAL LAND
R400430400018	CAMPQUARRY LLC	3301 3RD AVE MANKATO, MN 56001	201- 1A/1B/4BB RESIDENTIAL SINGLE UNIT; 3A INDUSTRIAL LAND AND BUILDING
R400430400017	CAMPQUARRY LLC	3301 3RD AVE MANKATO, MN 56001	201- 1A/1B/4BB RESIDENTIAL SINGLE UNIT
R400430400016	K5 QUARRIES LLC	818 WILLOW ST MANKATO, MN 56001	101- 2A/1B/4BB AGRICULTURAL; 2B/1B RURAL VACANT LAND; 3A INDUSTRIAL LAND AND BUILDING
R400430400010	COLLINS ERWIN H JR & PROCTOR BERTHA L	23471 3RD AVE MANKATO, MN 56001	101- (HSTD) 2A/1B/4BB AGRICULTURAL; 5E MANURE PITS
R400430200037	CALHOUN PAMELA	150 PEGASUS CIR MANKATO, MN 56001	201- 1A/1B/4BB RESIDENTIAL SINGLE UNIT
R400430200032	CALHOUN PAMELA	150 PEGASUS CIR MANKATO, MN 56001	201- (HSTD) 1A/1B/4BB RESIDENTIAL SINGLE UNIT
R400430200014	ALLEN JUSTIN C & MARY A	57132 DEERHAVEN DR MANKATO, MN 56001	201- (HSTD) 1A/1B/4BB RESIDENTIAL SINGLE UNIT
R400430200023	CHATLEAIN RICHARD E & LORETTA	57096 DEERHAVEN DR MANKATO, MN 56001	201- 1A/1B/4BB RESIDENTIAL SINGLE UNIT
R400430200022	WOOD LANE LLC (CFD)	170 PEGASUS CIR MANKATO, MN 56001	201- 1A/1B/4BB RESIDENTIAL SINGLE UNIT
R400430200021	GLASER RANDY & LYNN	57072 DEERHAVEN DR MANKATO, MN 56001	201- (HSTD) 1A/1B/4BB RESIDENTIAL SINGLE UNIT
R400430200026	MCVENES DAVID	57062 DEERHAVEN DR MANKATO, MN 56001	201- (HSTD) 1A/1B/4BB RESIDENTIAL SINGLE UNIT
R400430200048	BUSCH W V FAMILY TRUST	57133 DEERHAVEN DR MANKATO, MN 56001	201- (HSTD) 1A/1B/4BB RESIDENTIAL SINGLE UNIT
R400430200013	ALLEN SUSAN MARIE	57115 DEERHAVEN DR MANKATO, MN 56001	201- (HSTD) 1A/1B/4BB RESIDENTIAL SINGLE UNIT
R400430200012	MILLER ROBERT DWIGHT & RENAE ANN	57105 DEERHAVEN DR MANKATO, MN 56001	201- (HSTD) 1A/1B/4BB RESIDENTIAL SINGLE UNIT
R400430200047	ROSENAU BARRY	57014 DEERHAVEN DR MANKATO, MN 56001	201- (HSTD) 1A/1B/4BB RESIDENTIAL SINGLE UNIT
R400430200046	ITES RICK R & AMY J	57026 DEERHAVEN DR MANKATO, MN 56001	201- (HSTD) 1A/1B/4BB RESIDENTIAL SINGLE UNIT
R400430200020	SCHABERT LEO J & DONNA M (LE)	57054 DEERHAVEN DR MANKATO, MN 56001	201- (HSTD) 1A/1B/4BB RESIDENTIAL SINGLE UNIT
R400430176001	MANKATO AREA MOUNTAIN BIKERS	607 N RIVERFRONT DR MANKATO, MN 56001	201- (HSTD) 1A/1B/4BB RESIDENTIAL SINGLE UNIT; 2B/1B RURAL VACANT LAND
R400430176002	MANKATO AREA MOUNTAIN BIKERS	607 N RIVERFRONT DR MANKATO, MN 56001	111- 2B/1B RURAL VACANT LAND
R400430151003	ANDERSON JEFFREY J & ROOT LEAH JEAN	29094 BIEHN DR MADISON LAKE, MN 56063	111- 2B/1B RURAL VACANT LAND
R400430151002	ANDERSON JEREMY JUSTIN & JEFF	29094 BIEHN DR MADISON LAKE, MN 56063	111- 2B/1B RURAL VACANT LAND
			201- 1A/1B/4BB RESIDENTIAL SINGLE UNIT
R400325226003	STONEHENGE ASSOCIATION INC	232 STONEHENGE DR MANKATO, MN 56001	Acreage 23.04
R400325226002	BLUE EARTH COUNTY	PO BOX 3524 MANKATO, MN 56002	955- 5E COUNTY-PUBLIC SERVICE-OTHER
R400325400007	SCHMIDT JEFFREY D & WENDY E	23070 506TH LN LAKE CRYSTAL, MN 56055	112- 2C MANAGED FOREST LAND
R400325226009	CLEMENSEN LISA R	256 STONEHENGE DR MANKATO, MN 56001	201- 1A/1B/4BB RESIDENTIAL SINGLE UNIT
R400325276002	KIECKER LEROY E & CHERYL R	236 STONEHENGE DR MANKATO, MN 56001	201- 1A/1B/4BB RESIDENTIAL SINGLE UNIT
R400325276003	JEPPSON LANCE & STACIA	232 STONEHENGE DR MANKATO, MN 56001	201- 1A/1B/4BB RESIDENTIAL SINGLE UNIT
R400325276004	HOLTMEIER JOSEPH F & BETHANY L	228 STONEHENGE DR MANKATO, MN 56001	201- 1A/1B/4BB RESIDENTIAL SINGLE UNIT
R400325276005	SONTAG DRS MICHAEL & SANDRA REV TRUSTS	224 STONEHENGE DR MANKATO, MN 56001	201- 1A/1B/4BB RESIDENTIAL SINGLE UNIT
R400325276006	PECK RONALD J & JULIE R	1608 NORTHRIDGE LN NORTH MANKATO, MN 56003	201- 1A/1B/4BB RESIDENTIAL SINGLE UNIT
R400325276007	WONG ANDREW J & MELANIE I	216 STONEHENGE DR MANKATO, MN 56001	201- 1A/1B/4BB RESIDENTIAL SINGLE UNIT
R400325276008	WONG ANDREW J & MELANIE I	216 STONEHENGE DR MANKATO, MN 56001	201- 1A/1B/4BB RESIDENTIAL SINGLE UNIT
R400325276009	EBEL DONALD J & TERESA	208 STONEHENGE DR MANKATO, MN 56001	201- 1A/1B/4BB RESIDENTIAL SINGLE UNIT
R400325276010	HICKS CLAUDIA & JONATHAN	204 STONEHENGE DR MANKATO, MN 56001	201- 1A/1B/4BB RESIDENTIAL SINGLE UNIT
R400325276011	WONG ANDREW J & MELANIE J IMKER	216 STONEHENGE DR MANKATO, MN 56001	201- 1A/1B/4BB RESIDENTIAL SINGLE UNIT
R400325277002	KOTTKE MARVIN & LINDA	225 STONEHENGE DR MANKATO, MN 56001	201- 1A/1B/4BB RESIDENTIAL SINGLE UNIT
R400325226008	TOLZMAN TATE	252 STONEHENGE DR MANKATO, MN 56001	201- (HSTD) 1A/1B/4BB RESIDENTIAL SINGLE UNIT
R400325277008	VOLK JEFFREY J & CONNIE J	213 STONEHENGE DR MANKATO, MN 56001	201- 1A/1B/4BB RESIDENTIAL SINGLE UNIT
R400325277009	FLAHERTY TIMOTHY M & TAMMY L	205 STONEHENGE DR MANKATO, MN 56001	201- 1A/1B/4BB RESIDENTIAL SINGLE UNIT
R400325277007	BJERKE ROBERT	209 STONEHENGE DR MANKATO, MN 56001	201- 1A/1B/4BB RESIDENTIAL SINGLE UNIT
R400325277004	MINKS CLARK & CODY	217 STONEHENGE DR MANKATO, MN 56001	201- 1A/1B/4BB RESIDENTIAL SINGLE UNIT
R400325277003	BIRD SCOTT & HOLLY	221 STONEHENGE DR MANKATO, MN 56001	201- 1A/1B/4BB RESIDENTIAL SINGLE UNIT
R400325277001	KOTTKE MARVIN & LINDA	225 STONEHENGE DR MANKATO, MN 56001	201- 1A/1B/4BB RESIDENTIAL SINGLE UNIT
R400431100002	SPRING STREET PROPERTIES LLC	20499 555TH LN MANKATO, MN 56001	233- 3A COMMERCIAL LAND AND BUILDING

Appendix G Stormwater Calculations

Stantec

Memo

To:	Mark Pahl, Dem-Con Companies	From:	Ethan Ketelsen, PE – Stantec Noah Garay, EIT – Stantec
Project/File:	227708930	Date:	April 22, 2026

Reference: Dem-Con Pilgrim Surface Water Analysis

Stantec prepared this Surface Water Analysis (SWA) for the Dem-Con Companies Pilgrim Landfill (Facility), located in Mankato, MN. Per Minnesota Pollution Control Agency (MPCA) rules, the surface water management system must be designed to manage the 25-year 24-hour storm event. At the site, the regulatory storm event is 5.29-inches. Stormwater generated by the facility will be controlled primarily via drainage berms and ditches, routing to three stormwater ponds as shown in the drawings. Storm features at the facility have been sized to minimize erosion from the site based on the required 25-year storm event.

Sub-watershed areas representative of the facility run-off are shown on the attached sub-watershed map. The facility is divided into three (3) primary drainage areas based on the receiving pond with sub-watersheds delineated within those areas, as shown on the figure. The south and southwest areas of the facility drain to a proposed basin in the southwest portion of the facility. The majority of the remainder of the landfill will drain to a proposed basin on the north side of the landfill, and a small part of the perimeter berm and ditching will drain to a proposed basin in the southeast portion of the facility.

The surface water analysis was based on the Natural Resources Conservations Service (NRCS) methodology using curve numbers (CN), time of concentration (Tc), and Atlas 14 precipitation data with MSE3 24-hour distributions in HydroCAD. To determine surface water runoff for this analysis, the primary sub-watersheds were further delineated based on the flow routing consistent with the design plans. Flows are routed from each sub-watershed through the facility's stormwater features and then discharged to the stormwater basins. Routing and calculations were performed to determine the maximum water elevations in each pond.

For developed conditions, the facility final cover will be planted with shallow-rooted, drought-resistance grasses that will be mowed periodically. A runoff CN of 74 was selected for the facility, based on grasslands with HSG C soils. Time of concentration in the final cover area was calculated using the HydroCAD model by inputting hydraulic distance and slope for each sub-watershed for applicable sheet flow and shallow concentrated flow conditions

Runoff calculations were used in sizing the various components of the surface water management system discussed below.

Drainage Berms and Perimeter Ditching

Surface water diversion berms, located on the outer side slopes around the perimeter of the site provide 2-feet of flow depth. At the toe of the side slopes, a perimeter ditch, providing a minimum of 2 feet flow depth, exists between the facility's liner limits and the outer perimeter road, as shown on the drawings.

The drainage berms have been designed to handle the flow for each sub-watershed and to minimize erosion and direct the runoff to the appropriate storm control. It is anticipated that erosion control blanket will be installed over any final cover slopes greater than 10% to address erosion concerns and provide stabilization prior to vegetation establishment.

Stormwater Ponds

The proposed design consists of three stormwater ponds. The southwest pond was previously constructed and currently provides stormwater management for developed portions of the site. Ponds located at the north and southeast portions of the facility are proposed, receiving runoff from the north and southeastern portions of the facility, respectively.

Design details and HydroCAD model outputs for the ponds are tabulated below. The HydroCAD report is included as an attachment to this memo.

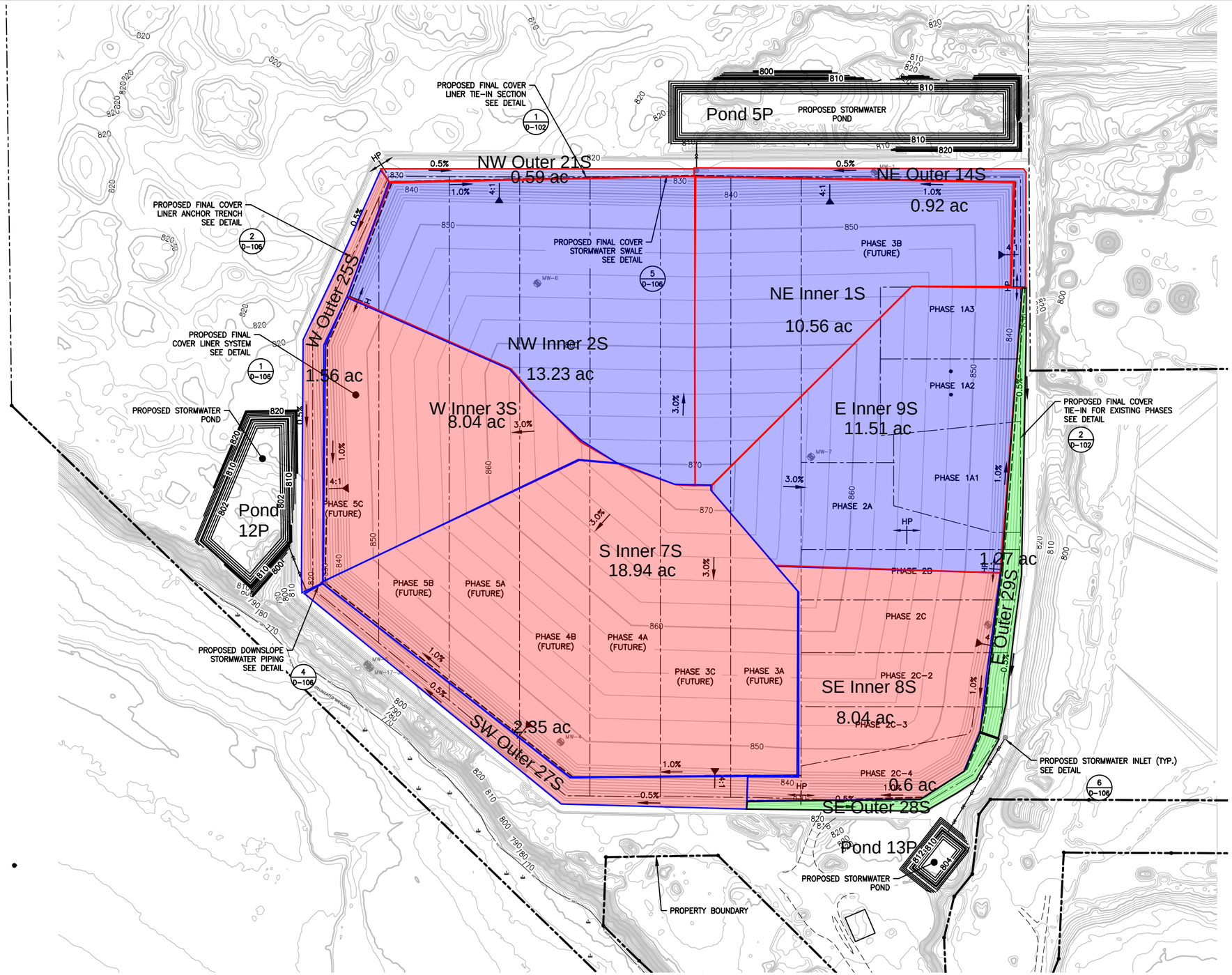
Table 1. Pond Design Parameters Summary

Pond	Bottom Elevation (ft)	Top Elevation (ft)	Total Storage Capacity (acre-ft)
North (N Pond)	804	814	31.525
Southeast (SE Pond)	804	812	1.720
West (W Pond)	802	810	11.877

Table 2. 25-year Storm Event Summary

Pond	Peak Inflow (cfs)	Discharge (cfs)	Peak Storage Volume (acre-ft)	HWL (ft)
North (N Pond)	4.48	4.48	16.583	809.84
Southeast (SE Pond)	1.82	1.82	0.588	807.74
West (W Pond)	5.33	5.33	9.597	808.68

Plot Date & Time: 17 April 2026 3:26 PM



- PROPERTY BOUNDARY (SURVEYED)
- PROPERTY BOUNDARY (BEACON/GIS)
- PERMITTED WASTE LIMITS
- EXISTING PHASE BOUNDARY
- EXISTING MINOR CONTOUR
- EXISTING MAJOR CONTOUR
- EXISTING WETLAND AREA
- PROPOSED PHASE BOUNDARY
- PROPOSED MINOR CONTOUR
- PROPOSED MAJOR CONTOUR
- PROPOSED STORMWATER SWALE
- PROPOSED STORMWATER PIPE
- PROPOSED STORMWATER INLET

SURVEY NOTES:

1. HORIZONTAL DATUM IS BLUE EARTH COUNTY NORTH AMERICAN DATUM NAD83(2011), US SURVEY FEET,
2. VERTICAL DATUM IS NORTH AMERICAN VERTICAL DATUM 88 (NAVD88). CONTOUR INTERVAL IS TWO FEET.
3. TOPOGRAPHY SURVEY FROM 2023 LIDAR DATA, UPDATED VIA GROUND SURVEY BY BOLTON AND MENK IN DECEMBER 2025.

NOTES:

1. PROPOSED GRADES SHOWN ARE TOP OF FINAL COVER GRADES.

REV	REVISION DESCRIPTION	DWN	APP	REV DATE
0	ISSUED FOR PERMIT APPLICATION	JJT	EDK	04/24/26

SEAL

I HEREBY CERTIFY THAT THIS PLAN, SPECIFICATION, OR REPORT WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA.

PRINT NAME ETHAN KETELSEN

SIGNATURE

DATE 04-24-2026 LICENSE # 56630

PRIME CONSULTANT

Stantec

PROJECT TITLE
2026 PERMIT REISSUANCE & MODIFICATION APPLICATION

DEM-CON PILGRIM LANDFILL, LLC.

MANKATO, MINNESOTA

SHEET TITLE
SURFACE WATER MANAGEMENT PLAN

DWN BY	CHK'D	APP'D	DWG DATE
JJT	BWS	EDK	APR. 2026

SCALE AS SHOWN

PROJECT NO.	SHEET NO.	REV NO.
227708930	C-106	0

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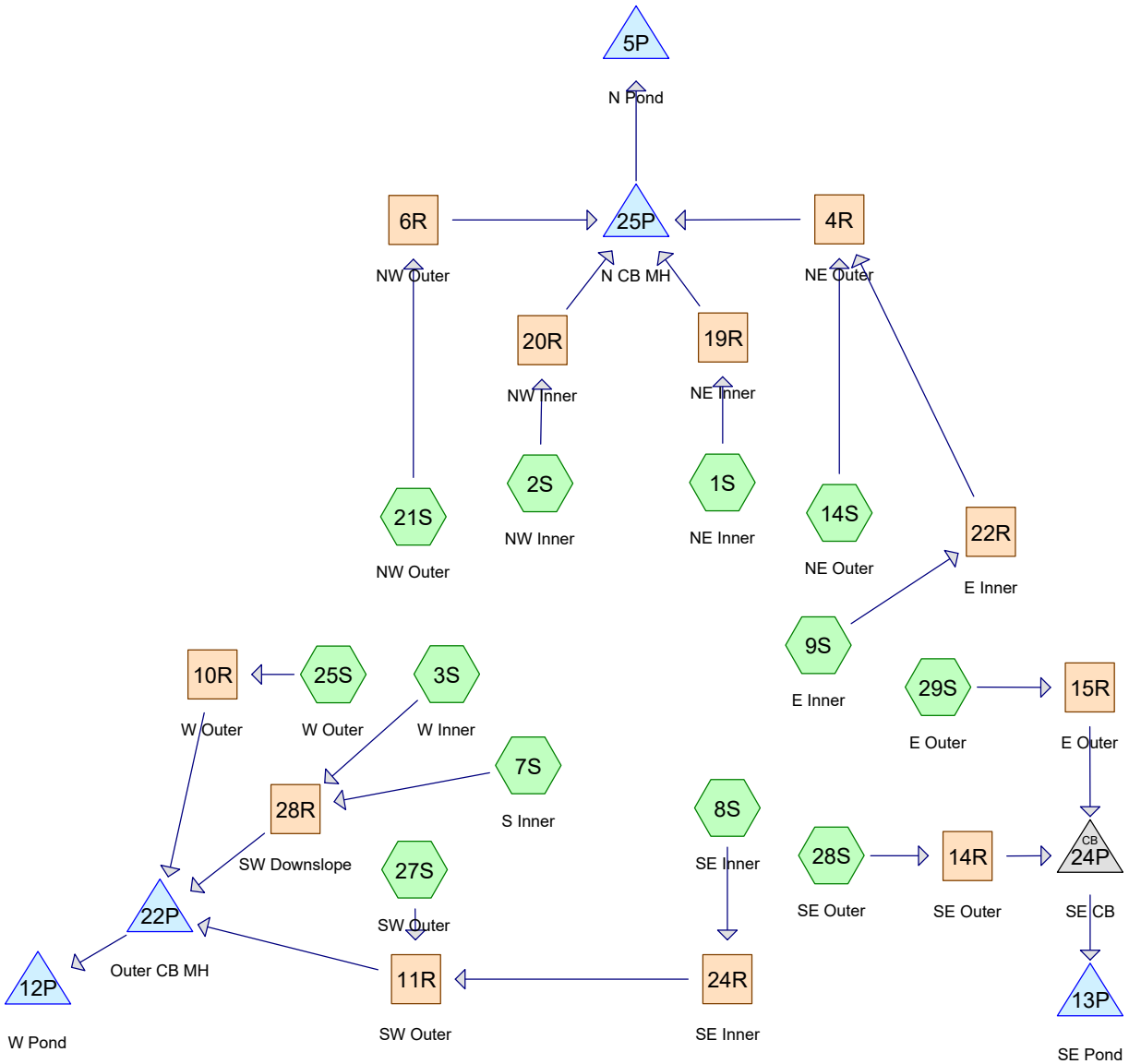


Subcat Reach Pond Link

Routing Diagram for Demcon Final Cover Stormwater
Prepared by Stantec Consultants, Printed 4/21/2026
HydroCAD® 10.20-6a s/n 02201 © 2024 HydroCAD Software Solutions LLC

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
77.490	74	>75% Grass cover, Good, HSG C (1S, 2S, 3S, 7S, 8S, 9S, 14S, 21S, 25S, 27S, 28S, 29S)
77.490	**74**	**TOTAL AREA**

Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.000	HSG A	
0.000	HSG B	
77.490	HSG C	1S, 2S, 3S, 7S, 8S, 9S, 14S, 21S, 25S, 27S, 28S, 29S
0.000	HSG D	
0.000	Other	
77.490		**TOTAL AREA**

Ground Covers (all nodes)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
0.000	0.000	77.490	0.000	0.000	77.490	>75% Grass cover, Good	1S, 2S, 3S, 7S, 8S, 9S, 14S, 21S, 25S, 27S, 28S, 29S
0.000	**0.000**	**77.490**	**0.000**	**0.000**	**77.490**	**TOTAL AREA**	

Pipe Listing (all nodes)

Line#	Node Number	In-Invert (feet)	Out-Invert (feet)	Length (feet)	Slope (ft/ft)	n	Width (inches)	Diam/Height (inches)	Inside-Fill (inches)	Node Name
1	5P	809.00	804.00	100.0	0.0500	0.011	0.0	36.0	0.0	
2	12P	805.50	805.00	100.0	0.0050	0.011	0.0	12.0	0.0	
3	13P	807.00	804.00	300.0	0.0100	0.011	0.0	12.0	0.0	
4	22P	810.00	809.00	165.0	0.0061	0.012	0.0	36.0	0.0	
5	24P	816.00	812.00	330.0	0.0121	0.012	0.0	36.0	0.0	
6	25P	814.00	813.00	75.0	0.0133	0.012	0.0	36.0	0.0	

Time span=0.00-48.00 hrs, dt=0.05 hrs, 961 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment1S: NE Inner Runoff Area=10.560 ac 0.00% Impervious Runoff Depth=2.60"
Flow Length=870' Tc=19.2 min CN=74 Runoff=31.16 cfs 2.286 af

Subcatchment2S: NW Inner Runoff Area=13.230 ac 0.00% Impervious Runoff Depth=2.60"
Flow Length=867' Tc=19.1 min CN=74 Runoff=39.17 cfs 2.864 af

Subcatchment3S: W Inner Runoff Area=8.020 ac 0.00% Impervious Runoff Depth=2.60"
Flow Length=825' Tc=18.6 min CN=74 Runoff=24.05 cfs 1.736 af

Subcatchment7S: S Inner Runoff Area=18.840 ac 0.00% Impervious Runoff Depth=2.60"
Flow Length=874' Tc=19.3 min CN=74 Runoff=55.47 cfs 4.078 af

Subcatchment8S: SE Inner Runoff Area=8.040 ac 0.00% Impervious Runoff Depth=2.60"
Flow Length=636' Tc=15.1 min CN=74 Runoff=26.68 cfs 1.740 af

Subcatchment9S: E Inner Runoff Area=11.510 ac 0.00% Impervious Runoff Depth=2.60"
Flow Length=836' Tc=18.8 min CN=74 Runoff=34.32 cfs 2.492 af

Subcatchment14S: NE Outer Runoff Area=0.920 ac 0.00% Impervious Runoff Depth=2.60"
Flow Length=1,268' Slope=0.0500 '/' Tc=20.5 min CN=74 Runoff=2.63 cfs 0.199 af

Subcatchment21S: NW Outer Runoff Area=0.590 ac 0.00% Impervious Runoff Depth=2.60"
Flow Length=883' Slope=0.0500 '/' Tc=15.4 min CN=74 Runoff=1.94 cfs 0.128 af

Subcatchment25S: W Outer Runoff Area=1.560 ac 0.00% Impervious Runoff Depth=2.60"
Flow Length=1,247' Slope=0.0500 '/' Tc=20.3 min CN=74 Runoff=4.48 cfs 0.338 af

Subcatchment27S: SW Outer Runoff Area=2.350 ac 0.00% Impervious Runoff Depth=2.60"
Flow Length=1,670' Slope=0.0500 '/' Tc=25.6 min CN=74 Runoff=5.94 cfs 0.509 af

Subcatchment28S: SE Outer Runoff Area=0.600 ac 0.00% Impervious Runoff Depth=2.60"
Flow Length=805' Slope=0.0500 '/' Tc=14.3 min CN=74 Runoff=2.04 cfs 0.130 af

Subcatchment29S: E Outer Runoff Area=1.270 ac 0.00% Impervious Runoff Depth=2.60"
Flow Length=1,274' Slope=0.0500 '/' Tc=20.6 min CN=74 Runoff=3.62 cfs 0.275 af

Reach 4R: NE Outer Avg. Flow Depth=1.43' Max Vel=3.27 fps Inflow=35.27 cfs 2.691 af
n=0.030 L=1,265.0' S=0.0047 '/' Capacity=62.87 cfs Outflow=31.86 cfs 2.691 af

Reach 6R: NW Outer Avg. Flow Depth=0.26' Max Vel=1.27 fps Inflow=1.94 cfs 0.128 af
n=0.030 L=883.0' S=0.0048 '/' Capacity=62.95 cfs Outflow=1.48 cfs 0.128 af

Reach 10R: W Outer Avg. Flow Depth=0.43' Max Vel=1.71 fps Inflow=4.48 cfs 0.338 af
n=0.030 L=1,242.0' S=0.0048 '/' Capacity=63.44 cfs Outflow=3.56 cfs 0.338 af

Reach 11R: SW Outer Avg. Flow Depth=1.27' Max Vel=3.10 fps Inflow=31.08 cfs 2.249 af
n=0.030 L=1,671.0' S=0.0048 '/' Capacity=63.16 cfs Outflow=25.88 cfs 2.249 af

Reach 14R: SE Outer Avg. Flow Depth=0.27' Max Vel=1.42 fps Inflow=2.04 cfs 0.130 af
n=0.030 L=687.0' S=0.0058 '/' Capacity=69.65 cfs Outflow=1.69 cfs 0.130 af

Reach 15R: E Outer Avg. Flow Depth=0.36' Max Vel=1.66 fps Inflow=3.62 cfs 0.275 af
n=0.030 L=1,281.0' S=0.0055 '/' Capacity=67.48 cfs Outflow=2.83 cfs 0.275 af

Reach 19R: NE Inner Avg. Flow Depth=1.45' Max Vel=3.89 fps Inflow=31.16 cfs 2.286 af
n=0.030 L=1,204.0' S=0.0100 '/' Capacity=67.41 cfs Outflow=28.60 cfs 2.286 af

Reach 20R: NW Inner Avg. Flow Depth=1.61' Max Vel=4.17 fps Inflow=39.17 cfs 2.864 af
n=0.030 L=867.0' S=0.0100 '/' Capacity=67.64 cfs Outflow=37.43 cfs 2.864 af

Reach 22R: E Inner Avg. Flow Depth=1.53' Max Vel=4.02 fps Inflow=34.32 cfs 2.492 af
n=0.030 L=805.0' S=0.0099 '/' Capacity=67.31 cfs Outflow=32.90 cfs 2.492 af

Reach 24R: SE Inner Avg. Flow Depth=1.37' Max Vel=3.85 fps Inflow=26.68 cfs 1.740 af
n=0.030 L=757.0' S=0.0106 '/' Capacity=69.41 cfs Outflow=25.21 cfs 1.740 af

Reach 28R: SW Downslope Avg. Flow Depth=0.91' Max Vel=8.18 fps Inflow=79.49 cfs 5.814 af
n=0.069 L=70.0' S=0.2286 '/' Capacity=802.92 cfs Outflow=79.34 cfs 5.814 af

Pond 5P: N Pond Peak Elev=809.84' Storage=16.583 af Inflow=90.74 cfs 7.968 af
36.0" Round Culvert n=0.011 L=100.0' S=0.0500 '/' Outflow=4.48 cfs 4.374 af

Pond 12P: W Pond Peak Elev=808.68' Storage=9.599 af Inflow=86.47 cfs 8.401 af
12.0" Round Culvert n=0.011 L=100.0' S=0.0050 '/' Outflow=5.33 cfs 7.352 af

Pond 13P: SE Pond Peak Elev=807.74' Storage=0.588 af Inflow=3.98 cfs 0.405 af
12.0" Round Culvert n=0.011 L=300.0' S=0.0100 '/' Outflow=1.82 cfs 0.403 af

Pond 22P: Outer CB MH Peak Elev=817.95' Storage=0.005 af Inflow=86.49 cfs 8.401 af
36.0" Round Culvert n=0.012 L=165.0' S=0.0061 '/' Outflow=86.47 cfs 8.401 af

Pond 24P: SE CB Peak Elev=816.74' Inflow=3.98 cfs 0.405 af
36.0" Round Culvert n=0.012 L=330.0' S=0.0121 '/' Outflow=3.98 cfs 0.405 af

Pond 25P: N CB MH Peak Elev=822.60' Storage=0.005 af Inflow=90.67 cfs 7.968 af
36.0" Round Culvert n=0.012 L=75.0' S=0.0133 '/' Outflow=90.74 cfs 7.968 af

Total Runoff Area = 77.490 ac Runoff Volume = 16.775 af Average Runoff Depth = 2.60"
100.00% Pervious = 77.490 ac 0.00% Impervious = 0.000 ac

Summary for Subcatchment 1S: NE Inner

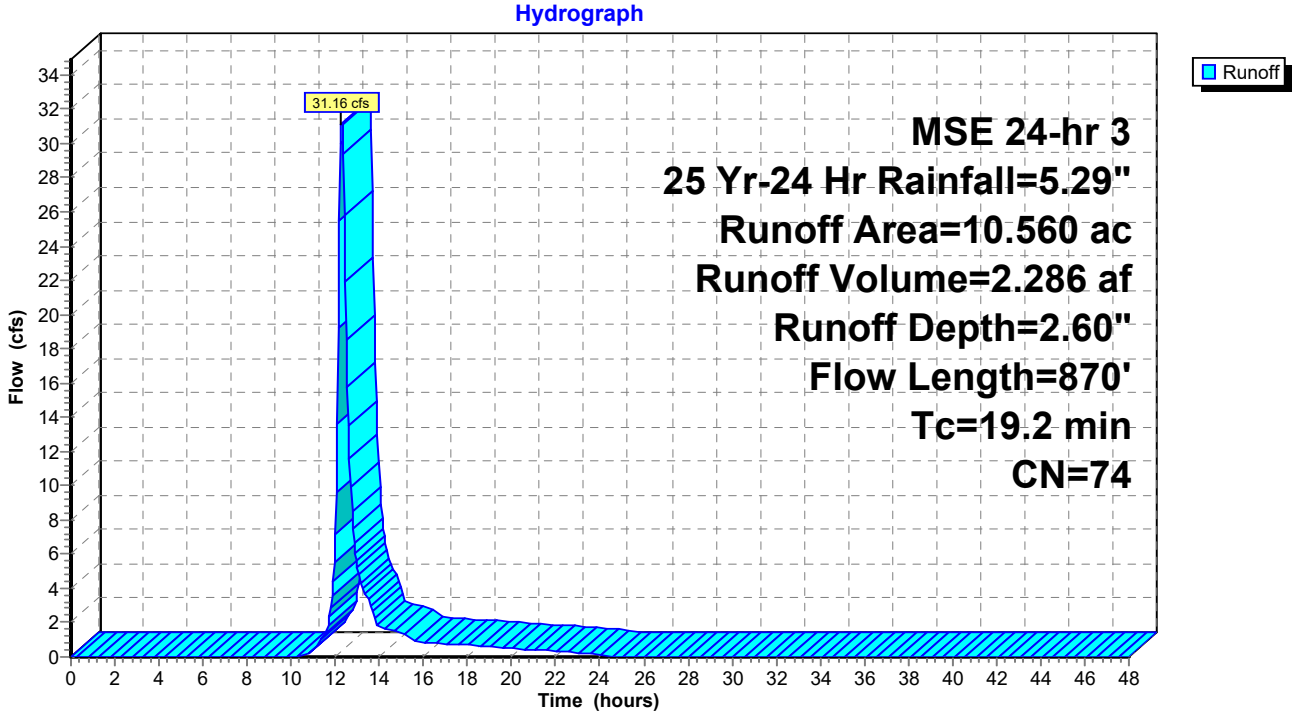
Runoff = 31.16 cfs @ 12.29 hrs, Volume= 2.286 af, Depth= 2.60"
Routed to Reach 19R : NE Inner

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 25 Yr-24 Hr Rainfall=5.29"

Area (ac)	CN	Description
10.560	74	>75% Grass cover, Good, HSG C
10.560		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
18.2	790	0.0300	0.73		**Lag/CN Method, 33:1**
1.0	80	0.2500	1.32		**Lag/CN Method, 4:1**
19.2	870	Total			

Subcatchment 1S: NE Inner



Summary for Subcatchment 2S: NW Inner

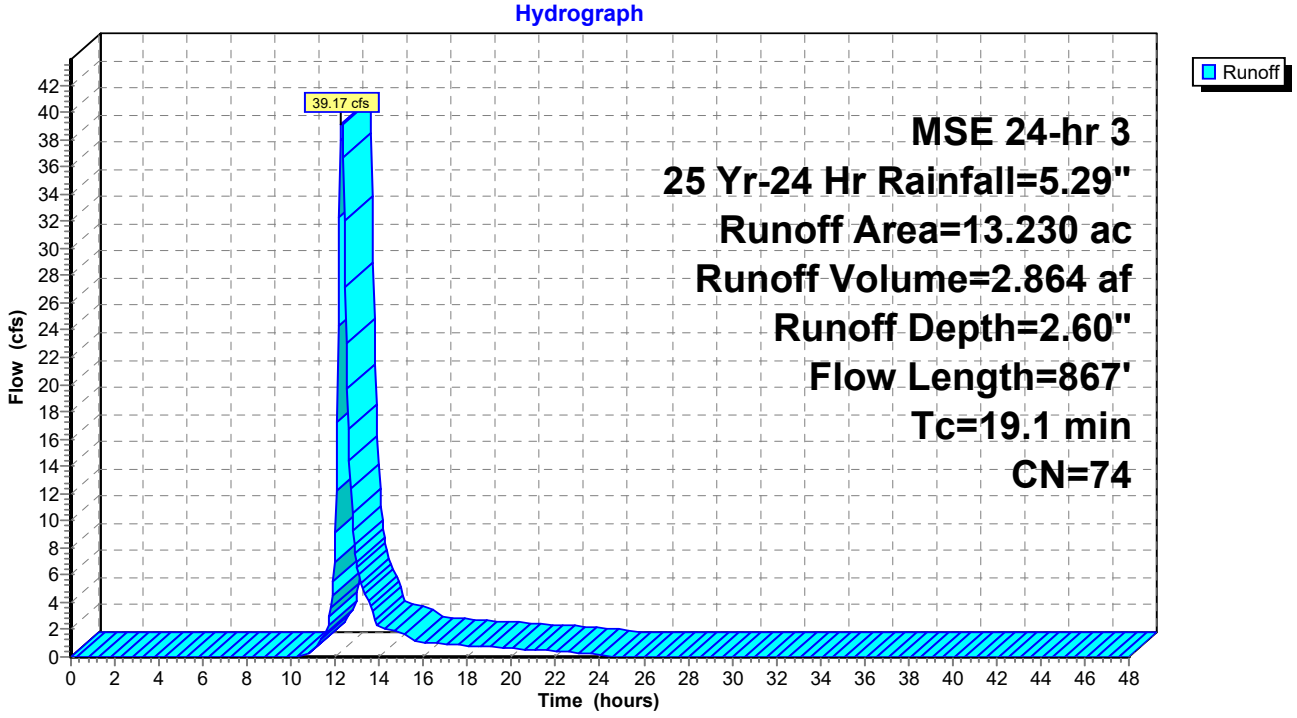
Runoff = 39.17 cfs @ 12.29 hrs, Volume= 2.864 af, Depth= 2.60"
Routed to Reach 20R : NW Inner

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 25 Yr-24 Hr Rainfall=5.29"

Area (ac)	CN	Description
13.230	74	>75% Grass cover, Good, HSG C
13.230		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
18.1	787	0.0300	0.72		**Lag/CN Method, 33:1**
1.0	80	0.2500	1.32		**Lag/CN Method, 4:1**
19.1	867	Total			

Subcatchment 2S: NW Inner



Summary for Subcatchment 3S: W Inner

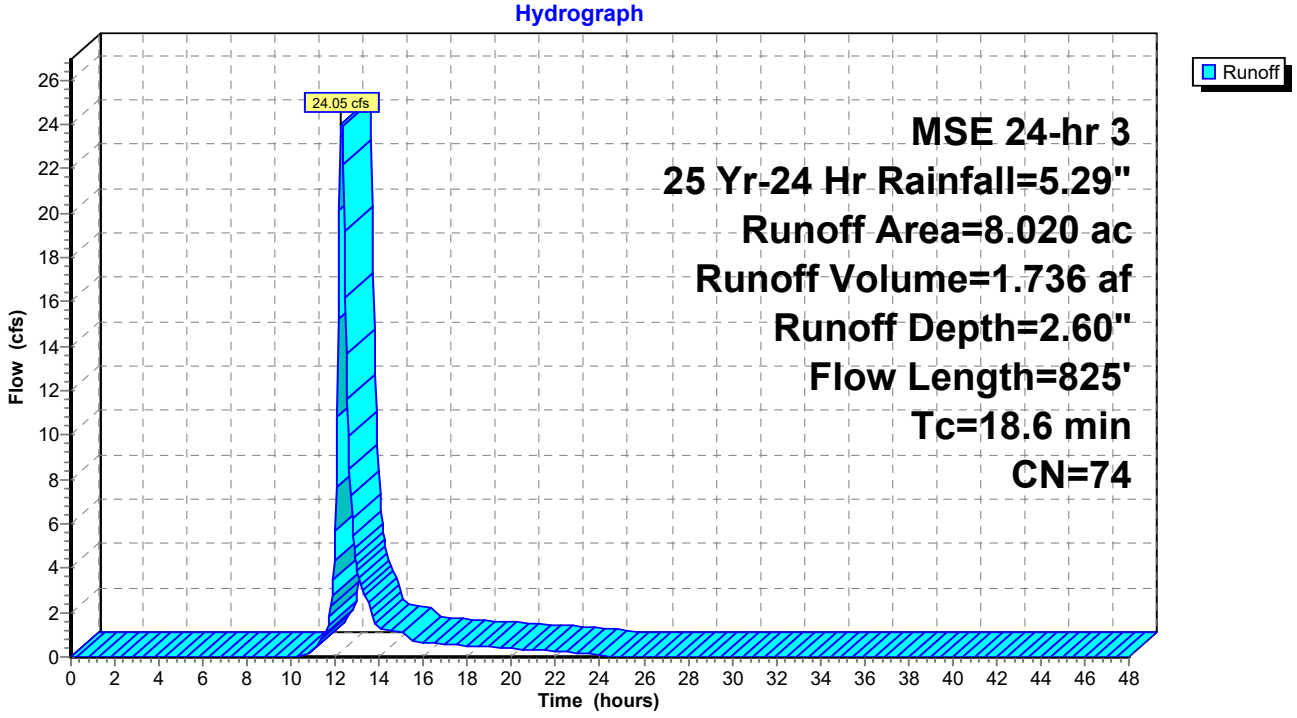
Runoff = 24.05 cfs @ 12.29 hrs, Volume= 1.736 af, Depth= 2.60"
Routed to Reach 28R : SW Downslope

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 25 Yr-24 Hr Rainfall=5.29"

Area (ac)	CN	Description
8.020	74	>75% Grass cover, Good, HSG C
8.020		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
17.8	769	0.0300	0.72		**Lag/CN Method, 33:1 Slope**
0.8	56	0.2500	1.23		**Lag/CN Method, 4:1 slope**
18.6	825	Total			

Subcatchment 3S: W Inner



Summary for Subcatchment 7S: S Inner

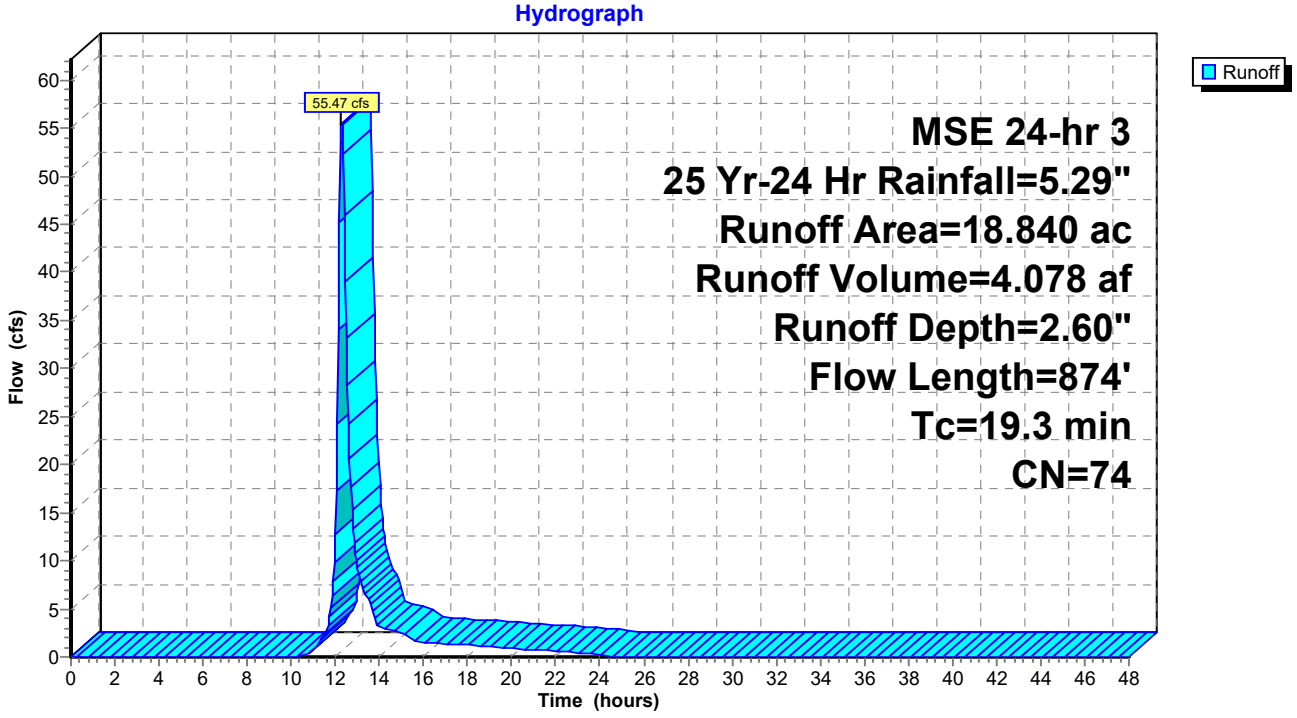
Runoff = 55.47 cfs @ 12.29 hrs, Volume= 4.078 af, Depth= 2.60"
Routed to Reach 28R : SW Downslope

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 25 Yr-24 Hr Rainfall=5.29"

Area (ac)	CN	Description
18.840	74	>75% Grass cover, Good, HSG C
18.840		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
18.4	802	0.0300	0.73		**Lag/CN Method, 33:1**
0.9	72	0.2500	1.30		**Lag/CN Method, 4:1**
19.3	874	Total			

Subcatchment 7S: S Inner



Summary for Subcatchment 8S: SE Inner

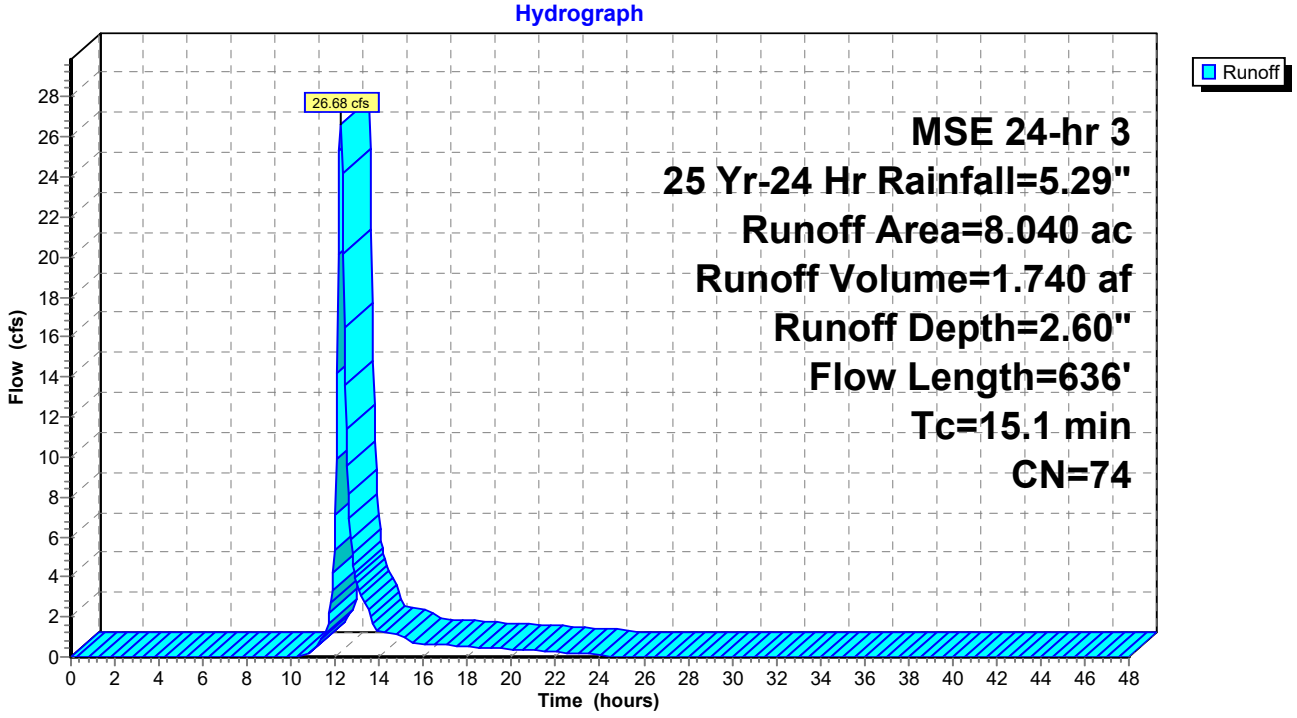
Runoff = 26.68 cfs @ 12.24 hrs, Volume= 1.740 af, Depth= 2.60"
Routed to Reach 24R : SE Inner

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 25 Yr-24 Hr Rainfall=5.29"

Area (ac)	CN	Description
8.040	74	>75% Grass cover, Good, HSG C
8.040		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
14.5	596	0.0300	0.69		**Lag/CN Method, 33:1**
0.6	40	0.2500	1.15		**Lag/CN Method, 4:1**
15.1	636	Total			

Subcatchment 8S: SE Inner



Summary for Subcatchment 9S: E Inner

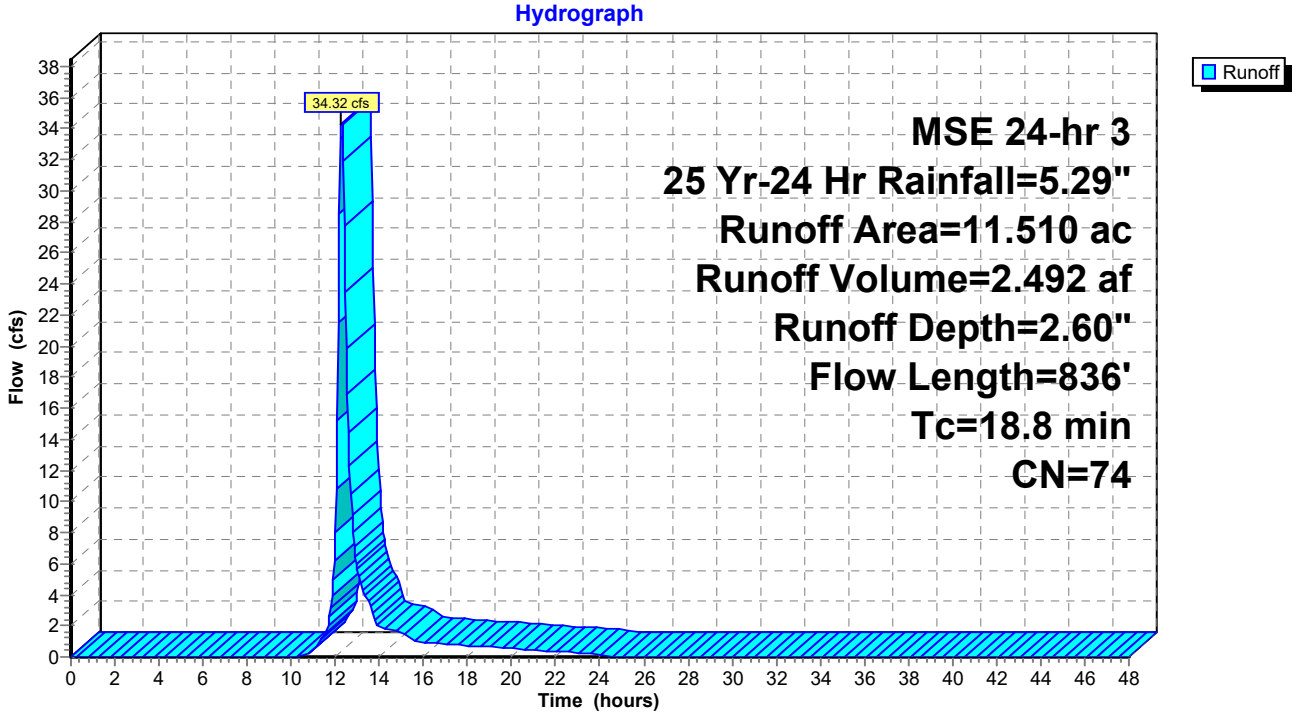
Runoff = 34.32 cfs @ 12.29 hrs, Volume= 2.492 af, Depth= 2.60"
Routed to Reach 22R : E Inner

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 25 Yr-24 Hr Rainfall=5.29"

Area (ac)	CN	Description
11.510	74	>75% Grass cover, Good, HSG C
11.510		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
18.1	786	0.0300	0.72		**Lag/CN Method, 33:1**
0.7	50	0.2500	1.21		**Lag/CN Method, 4:1**
18.8	836	Total			

Subcatchment 9S: E Inner



Summary for Subcatchment 14S: NE Outer

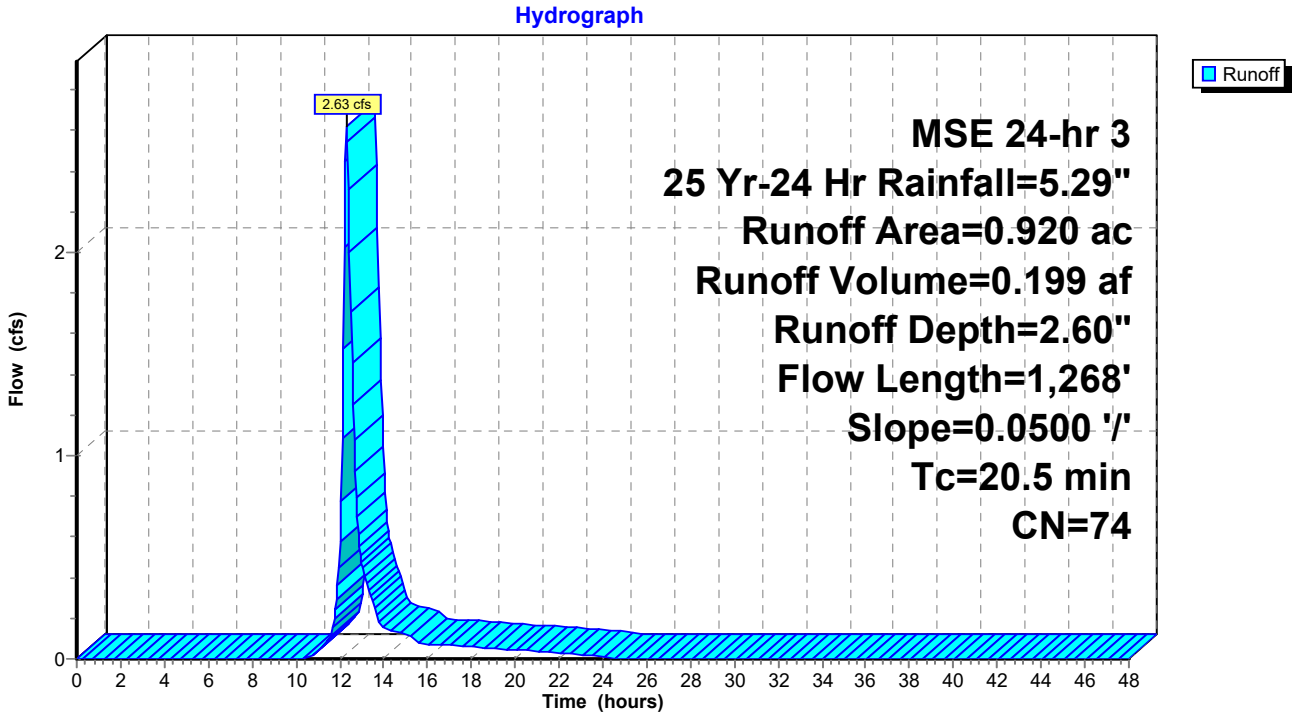
Runoff = 2.63 cfs @ 12.31 hrs, Volume= 0.199 af, Depth= 2.60"
Routed to Reach 4R : NE Outer

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 25 Yr-24 Hr Rainfall=5.29"

Area (ac)	CN	Description
0.920	74	>75% Grass cover, Good, HSG C
0.920		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
20.5	1,268	0.0500	1.03		**Lag/CN Method,**

Subcatchment 14S: NE Outer



Summary for Subcatchment 21S: NW Outer

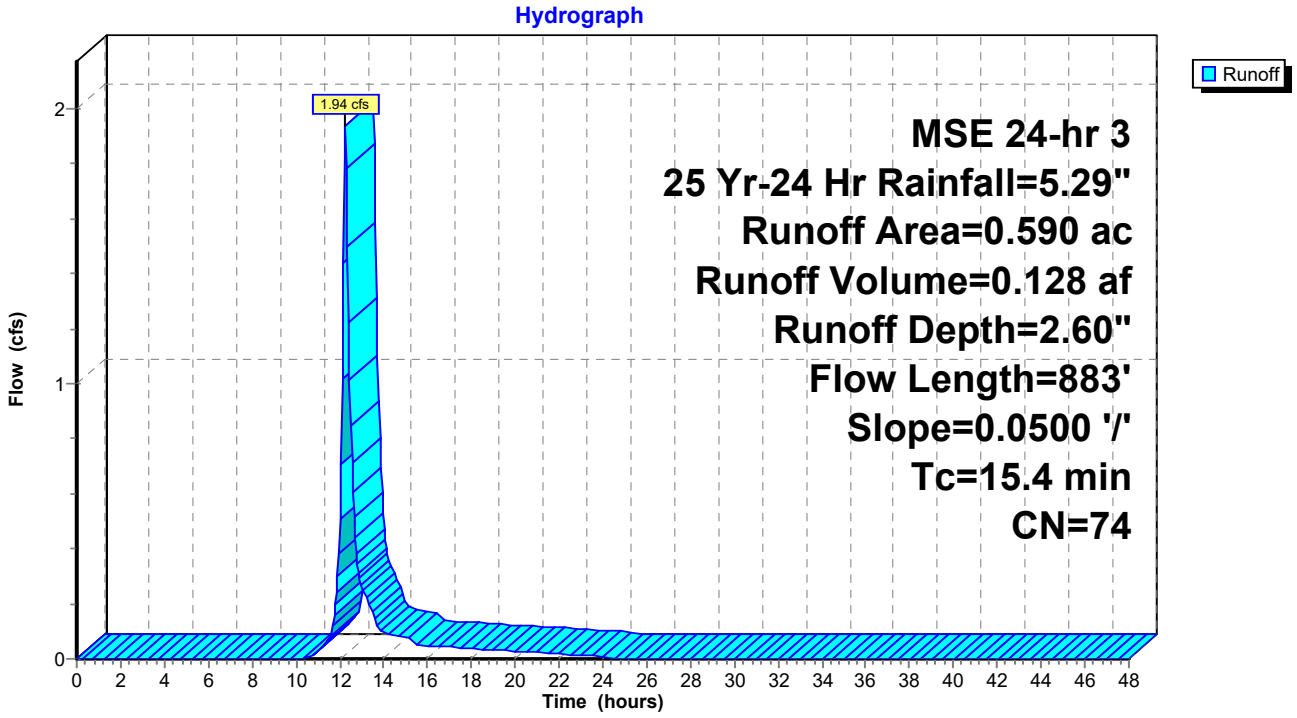
Runoff = 1.94 cfs @ 12.25 hrs, Volume= 0.128 af, Depth= 2.60"
Routed to Reach 6R : NW Outer

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 25 Yr-24 Hr Rainfall=5.29"

Area (ac)	CN	Description
0.590	74	>75% Grass cover, Good, HSG C
0.590		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.4	883	0.0500	0.96		**Lag/CN Method,**

Subcatchment 21S: NW Outer



Summary for Subcatchment 25S: W Outer

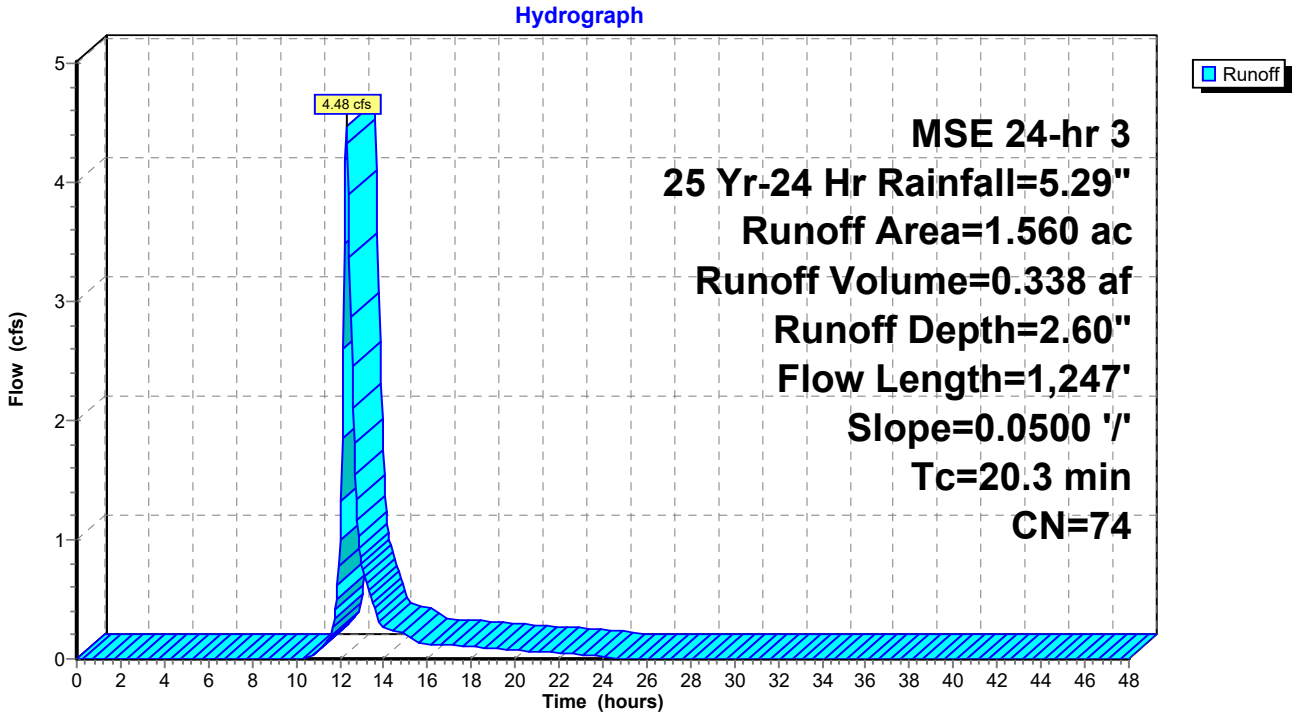
Runoff = 4.48 cfs @ 12.31 hrs, Volume= 0.338 af, Depth= 2.60"
Routed to Reach 10R : W Outer

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 25 Yr-24 Hr Rainfall=5.29"

Area (ac)	CN	Description
1.560	74	>75% Grass cover, Good, HSG C
1.560		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
20.3	1,247	0.0500	1.03		**Lag/CN Method,**

Subcatchment 25S: W Outer



Summary for Subcatchment 27S: SW Outer

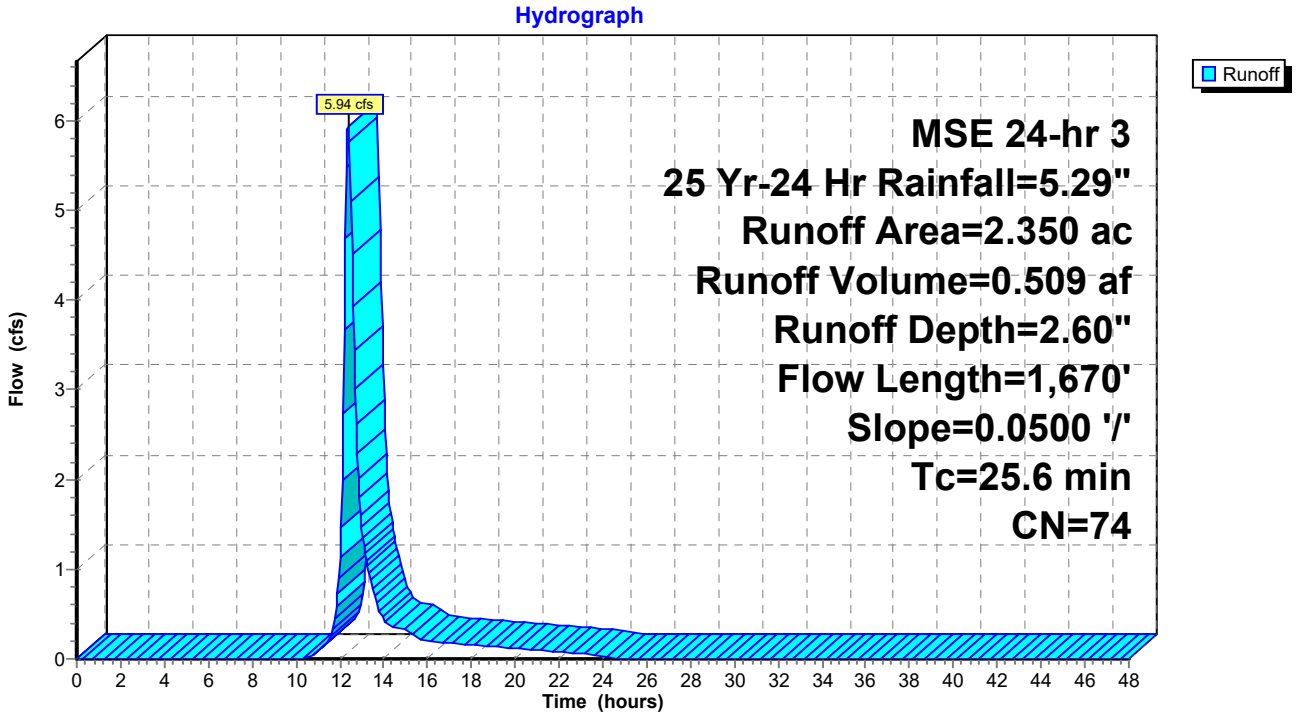
Runoff = 5.94 cfs @ 12.38 hrs, Volume= 0.509 af, Depth= 2.60"
Routed to Reach 11R : SW Outer

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 25 Yr-24 Hr Rainfall=5.29"

Area (ac)	CN	Description
2.350	74	>75% Grass cover, Good, HSG C
2.350		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
25.6	1,670	0.0500	1.09		**Lag/CN Method,**

Subcatchment 27S: SW Outer



Summary for Subcatchment 28S: SE Outer

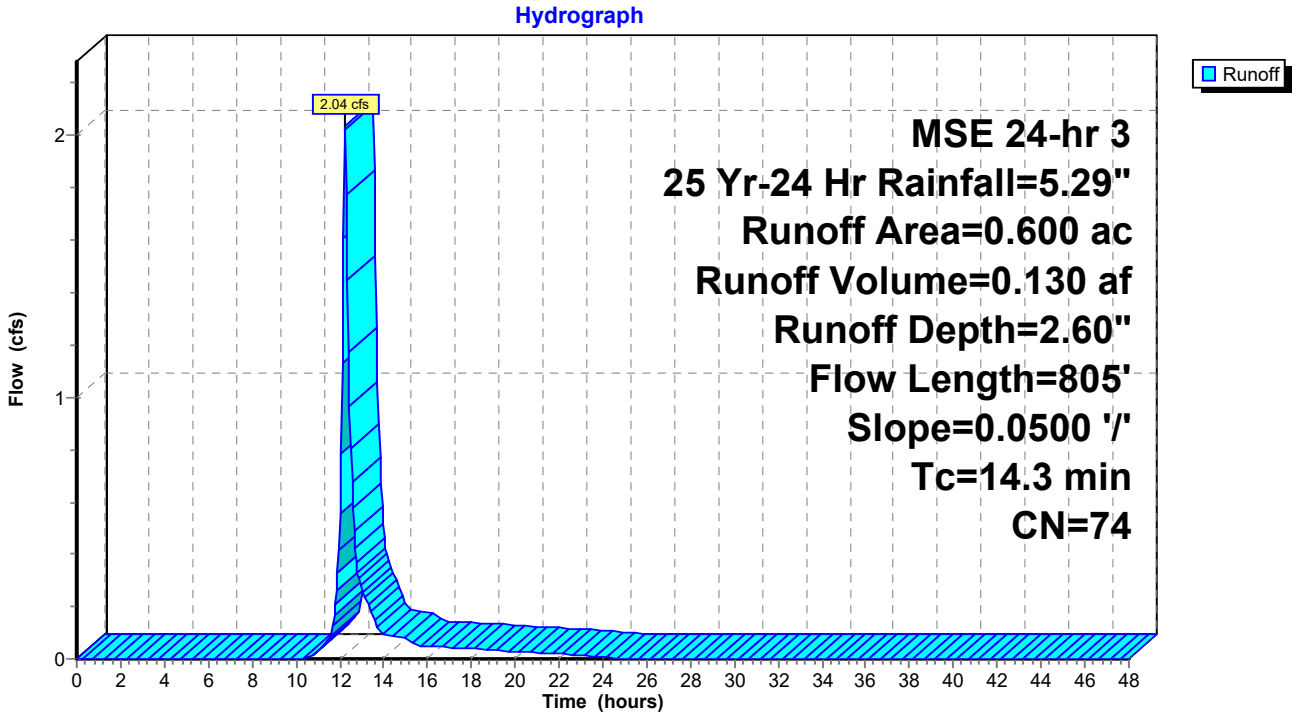
Runoff = 2.04 cfs @ 12.23 hrs, Volume= 0.130 af, Depth= 2.60"
Routed to Reach 14R : SE Outer

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 25 Yr-24 Hr Rainfall=5.29"

Area (ac)	CN	Description
0.600	74	>75% Grass cover, Good, HSG C
0.600		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
14.3	805	0.0500	0.94		**Lag/CN Method,**

Subcatchment 28S: SE Outer



Summary for Subcatchment 29S: E Outer

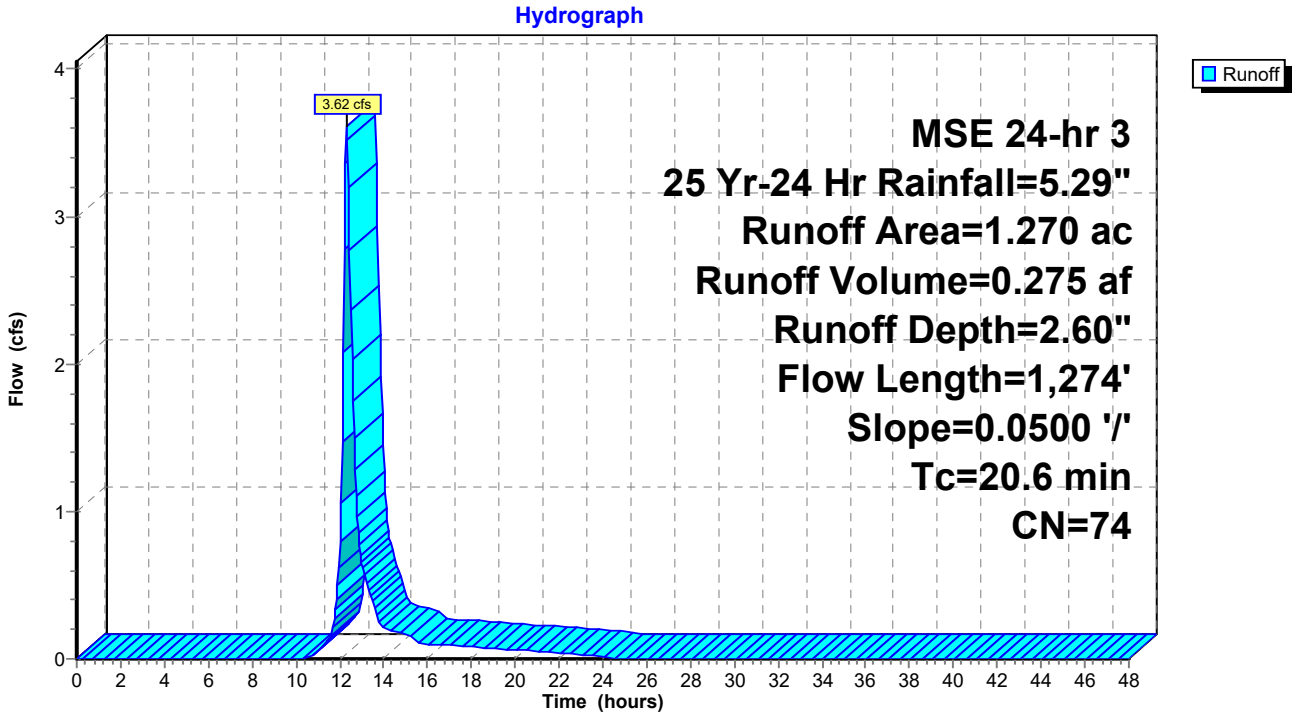
Runoff = 3.62 cfs @ 12.31 hrs, Volume= 0.275 af, Depth= 2.60"
Routed to Reach 15R : E Outer

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
MSE 24-hr 3 25 Yr-24 Hr Rainfall=5.29"

Area (ac)	CN	Description
1.270	74	>75% Grass cover, Good, HSG C
1.270		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
20.6	1,274	0.0500	1.03		**Lag/CN Method,**

Subcatchment 29S: E Outer



Summary for Reach 4R: NE Outer

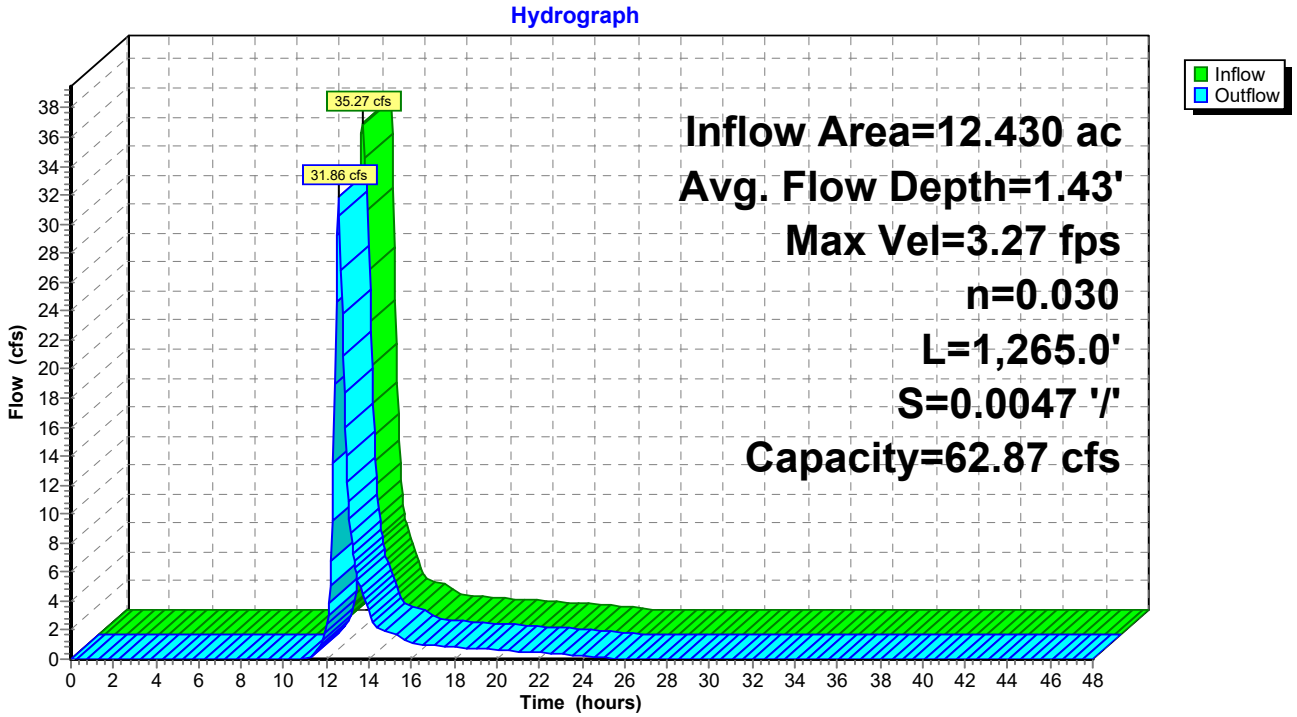
Inflow Area = 12.430 ac, 0.00% Impervious, Inflow Depth = 2.60" for 25 Yr-24 Hr event
Inflow = 35.27 cfs @ 12.39 hrs, Volume= 2.691 af
Outflow = 31.86 cfs @ 12.57 hrs, Volume= 2.691 af, Atten= 10%, Lag= 11.2 min
Routed to Pond 25P : N CB MH

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Max. Velocity= 3.27 fps, Min. Travel Time= 6.4 min
Avg. Velocity = 0.75 fps, Avg. Travel Time= 28.1 min

Peak Storage= 12,358 cf @ 12.47 hrs
Average Depth at Peak Storage= 1.43' , Surface Width= 9.70'
Bank-Full Depth= 2.00' Flow Area= 16.0 sf, Capacity= 62.87 cfs

4.00' x 2.00' deep channel, n= 0.030 Earth, grassed & winding
Side Slope Z-value= 2.0 '/' Top Width= 12.00'
Length= 1,265.0' Slope= 0.0047 '/'
Inlet Invert= 828.00', Outlet Invert= 822.00'





Summary for Reach 6R: NW Outer

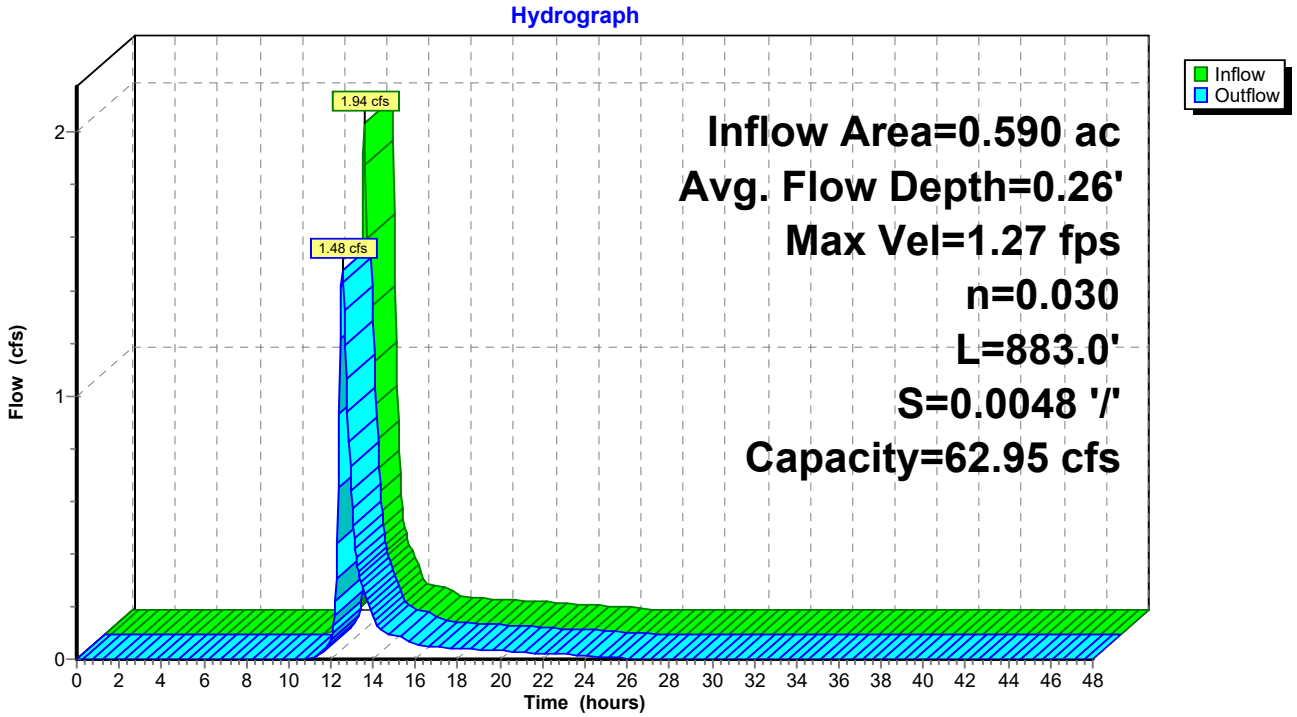
Inflow Area = 0.590 ac, 0.00% Impervious, Inflow Depth = 2.60" for 25 Yr-24 Hr event
Inflow = 1.94 cfs @ 12.25 hrs, Volume= 0.128 af
Outflow = 1.48 cfs @ 12.55 hrs, Volume= 0.128 af, Atten= 24%, Lag= 18.4 min
Routed to Pond 25P : N CB MH

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Max. Velocity= 1.27 fps, Min. Travel Time= 11.6 min
Avg. Velocity = 0.35 fps, Avg. Travel Time= 42.0 min

Peak Storage= 1,032 cf @ 12.36 hrs
Average Depth at Peak Storage= 0.26' , Surface Width= 5.03'
Bank-Full Depth= 2.00' Flow Area= 16.0 sf, Capacity= 62.95 cfs

4.00' x 2.00' deep channel, n= 0.030 Earth, grassed & winding
Side Slope Z-value= 2.0 '/' Top Width= 12.00'
Length= 883.0' Slope= 0.0048 '/'
Inlet Invert= 826.20', Outlet Invert= 822.00'





Summary for Reach 10R: W Outer

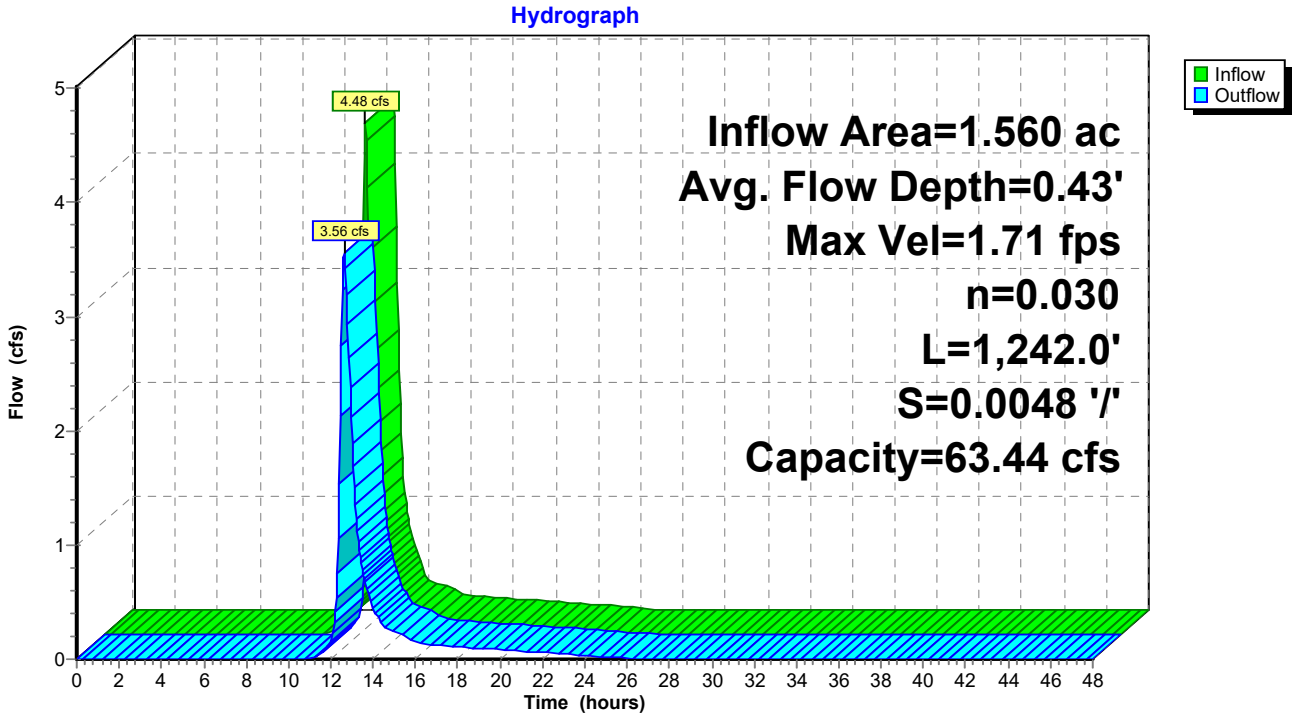
Inflow Area = 1.560 ac, 0.00% Impervious, Inflow Depth = 2.60" for 25 Yr-24 Hr event
Inflow = 4.48 cfs @ 12.31 hrs, Volume= 0.338 af
Outflow = 3.56 cfs @ 12.64 hrs, Volume= 0.338 af, Atten= 21%, Lag= 19.8 min
Routed to Pond 22P : Outer CB MH

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Max. Velocity= 1.71 fps, Min. Travel Time= 12.1 min
Avg. Velocity = 0.43 fps, Avg. Travel Time= 47.8 min

Peak Storage= 2,582 cf @ 12.44 hrs
Average Depth at Peak Storage= 0.43' , Surface Width= 5.71'
Bank-Full Depth= 2.00' Flow Area= 16.0 sf, Capacity= 63.44 cfs

4.00' x 2.00' deep channel, n= 0.030 Earth, grassed & winding
Side Slope Z-value= 2.0 '/' Top Width= 12.00'
Length= 1,242.0' Slope= 0.0048 '/'
Inlet Invert= 824.00', Outlet Invert= 818.00'





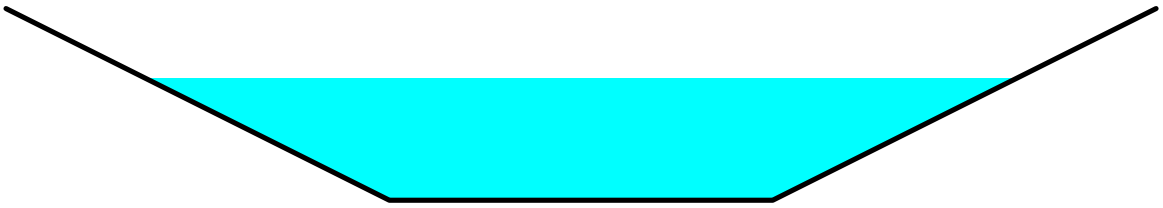
Summary for Reach 11R: SW Outer

Inflow Area = 10.390 ac, 0.00% Impervious, Inflow Depth = 2.60" for 25 Yr-24 Hr event
Inflow = 31.08 cfs @ 12.35 hrs, Volume= 2.249 af
Outflow = 25.88 cfs @ 12.60 hrs, Volume= 2.249 af, Atten= 17%, Lag= 15.2 min
Routed to Pond 22P : Outer CB MH

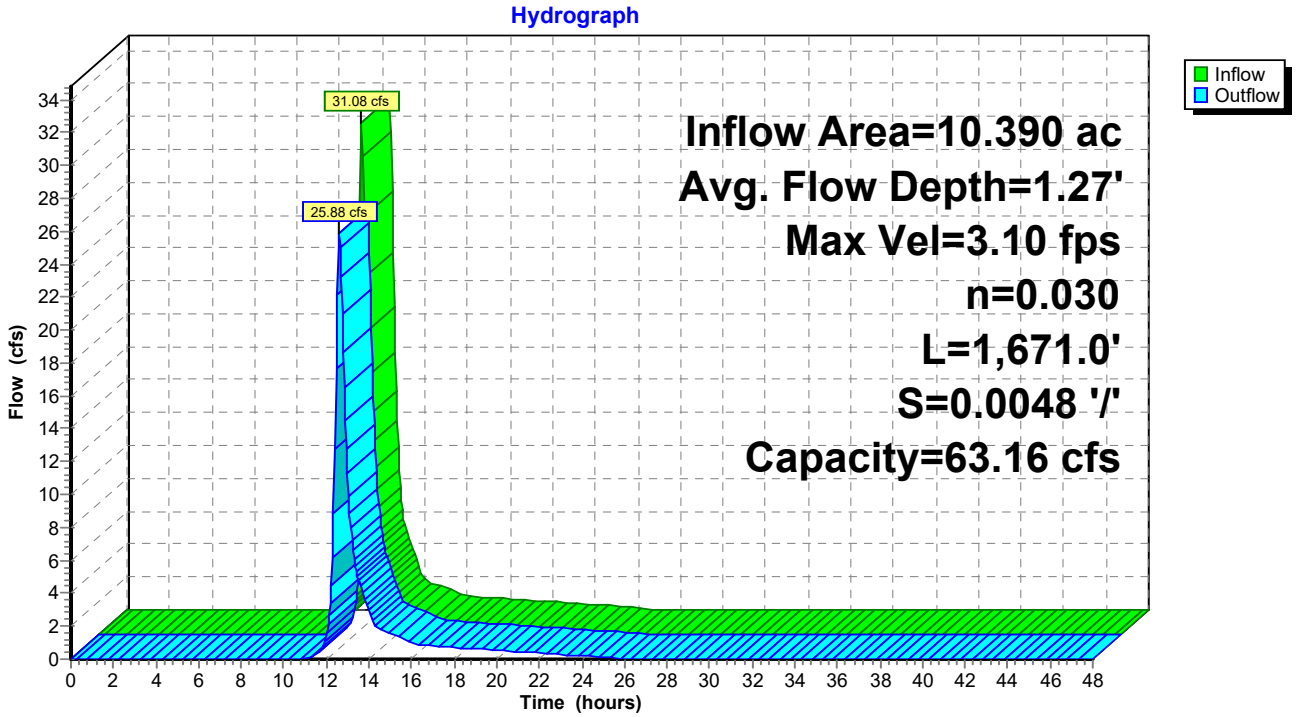
Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Max. Velocity= 3.10 fps, Min. Travel Time= 9.0 min
Avg. Velocity = 0.67 fps, Avg. Travel Time= 41.9 min

Peak Storage= 13,948 cf @ 12.45 hrs
Average Depth at Peak Storage= 1.27' , Surface Width= 9.10'
Bank-Full Depth= 2.00' Flow Area= 16.0 sf, Capacity= 63.16 cfs

4.00' x 2.00' deep channel, n= 0.030 Earth, grassed & winding
Side Slope Z-value= 2.0 '/' Top Width= 12.00'
Length= 1,671.0' Slope= 0.0048 '/'
Inlet Invert= 824.00', Outlet Invert= 816.00'



Reach 11R: SW Outer



Summary for Reach 14R: SE Outer

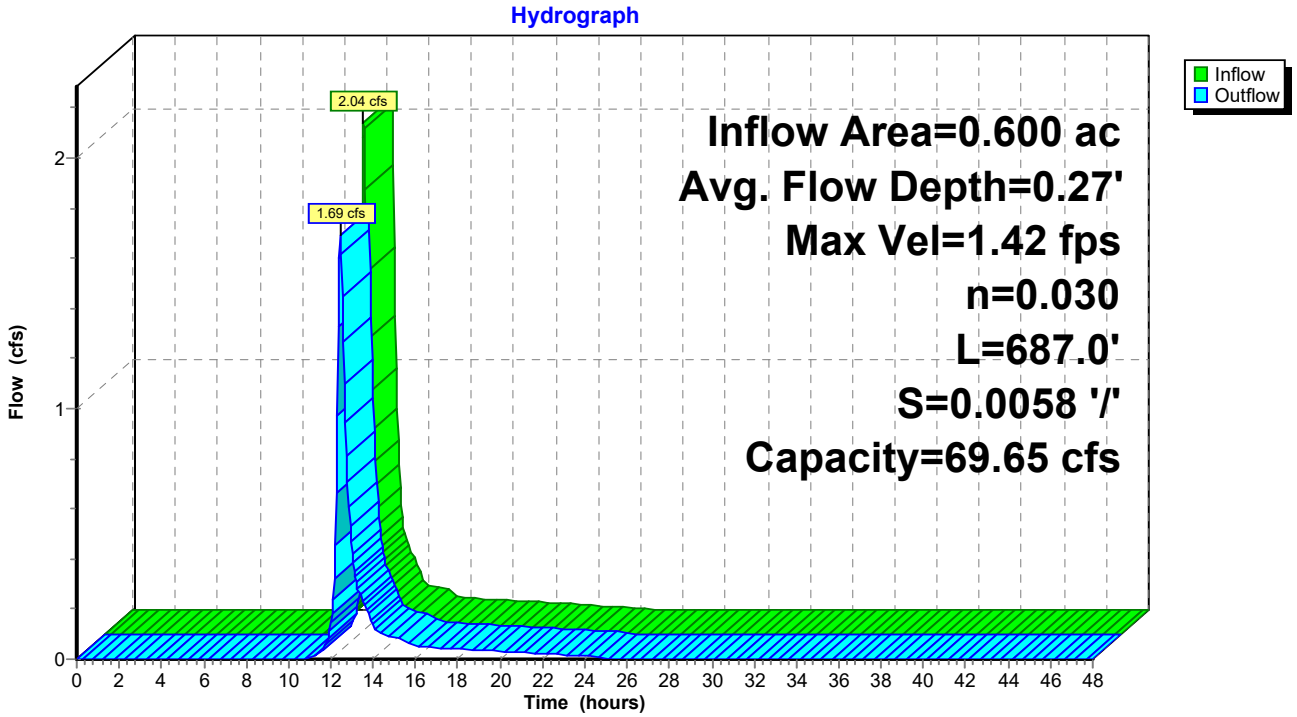
Inflow Area = 0.600 ac, 0.00% Impervious, Inflow Depth = 2.60" for 25 Yr-24 Hr event
Inflow = 2.04 cfs @ 12.23 hrs, Volume= 0.130 af
Outflow = 1.69 cfs @ 12.45 hrs, Volume= 0.130 af, Atten= 17%, Lag= 13.2 min
Routed to Pond 24P : SE CB

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Max. Velocity= 1.42 fps, Min. Travel Time= 8.0 min
Avg. Velocity = 0.39 fps, Avg. Travel Time= 29.5 min

Peak Storage= 825 cf @ 12.31 hrs
Average Depth at Peak Storage= 0.27' , Surface Width= 5.06'
Bank-Full Depth= 2.00' Flow Area= 16.0 sf, Capacity= 69.65 cfs

4.00' x 2.00' deep channel, n= 0.030 Earth, grassed & winding
Side Slope Z-value= 2.0 '/' Top Width= 12.00'
Length= 687.0' Slope= 0.0058 '/'
Inlet Invert= 820.00', Outlet Invert= 816.00'





Summary for Reach 15R: E Outer

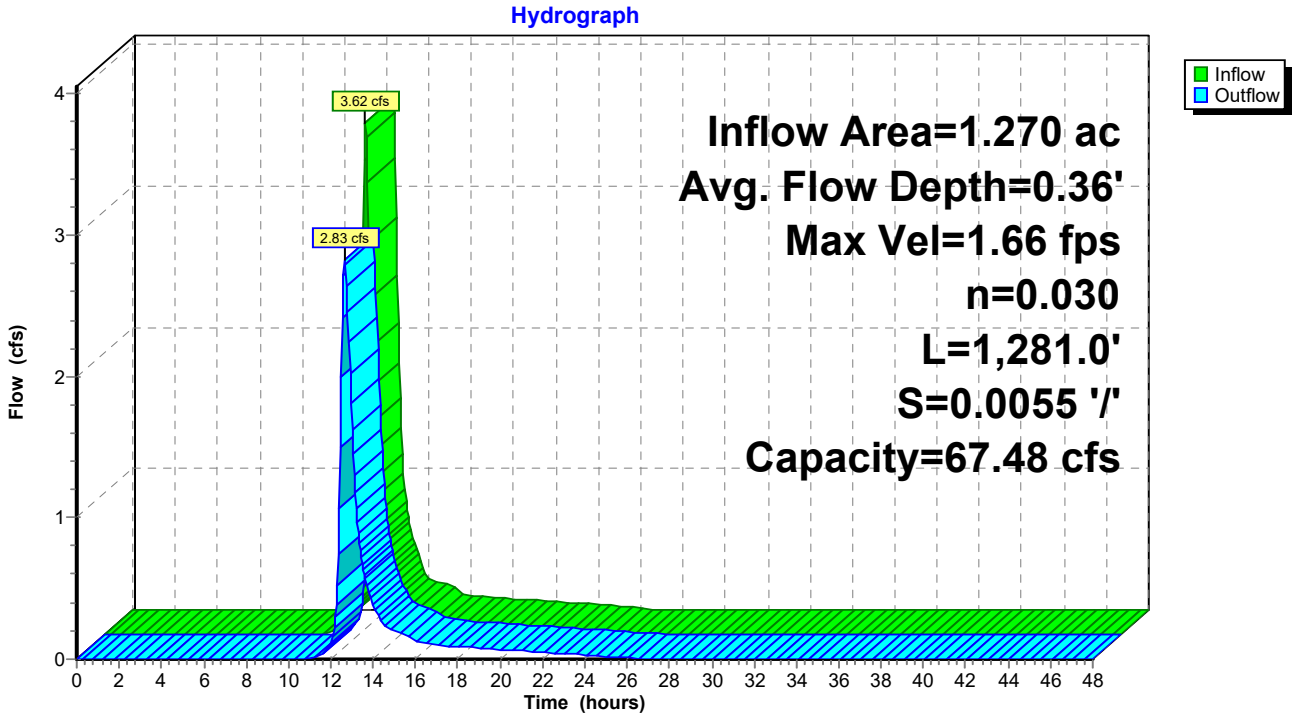
Inflow Area = 1.270 ac, 0.00% Impervious, Inflow Depth = 2.60" for 25 Yr-24 Hr event
Inflow = 3.62 cfs @ 12.31 hrs, Volume= 0.275 af
Outflow = 2.83 cfs @ 12.66 hrs, Volume= 0.275 af, Atten= 22%, Lag= 21.0 min
Routed to Pond 24P : SE CB

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Max. Velocity= 1.66 fps, Min. Travel Time= 12.9 min
Avg. Velocity = 0.43 fps, Avg. Travel Time= 49.5 min

Peak Storage= 2,194 cf @ 12.45 hrs
Average Depth at Peak Storage= 0.36' , Surface Width= 5.45'
Bank-Full Depth= 2.00' Flow Area= 16.0 sf, Capacity= 67.48 cfs

4.00' x 2.00' deep channel, n= 0.030 Earth, grassed & winding
Side Slope Z-value= 2.0 '/' Top Width= 12.00'
Length= 1,281.0' Slope= 0.0055 '/'
Inlet Invert= 823.00', Outlet Invert= 816.00'





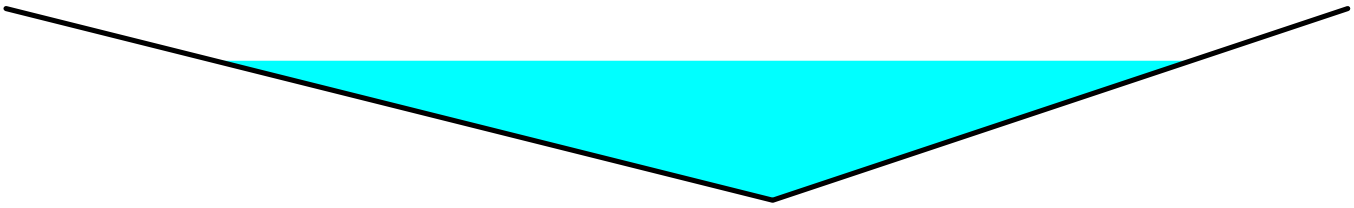
Summary for Reach 19R: NE Inner

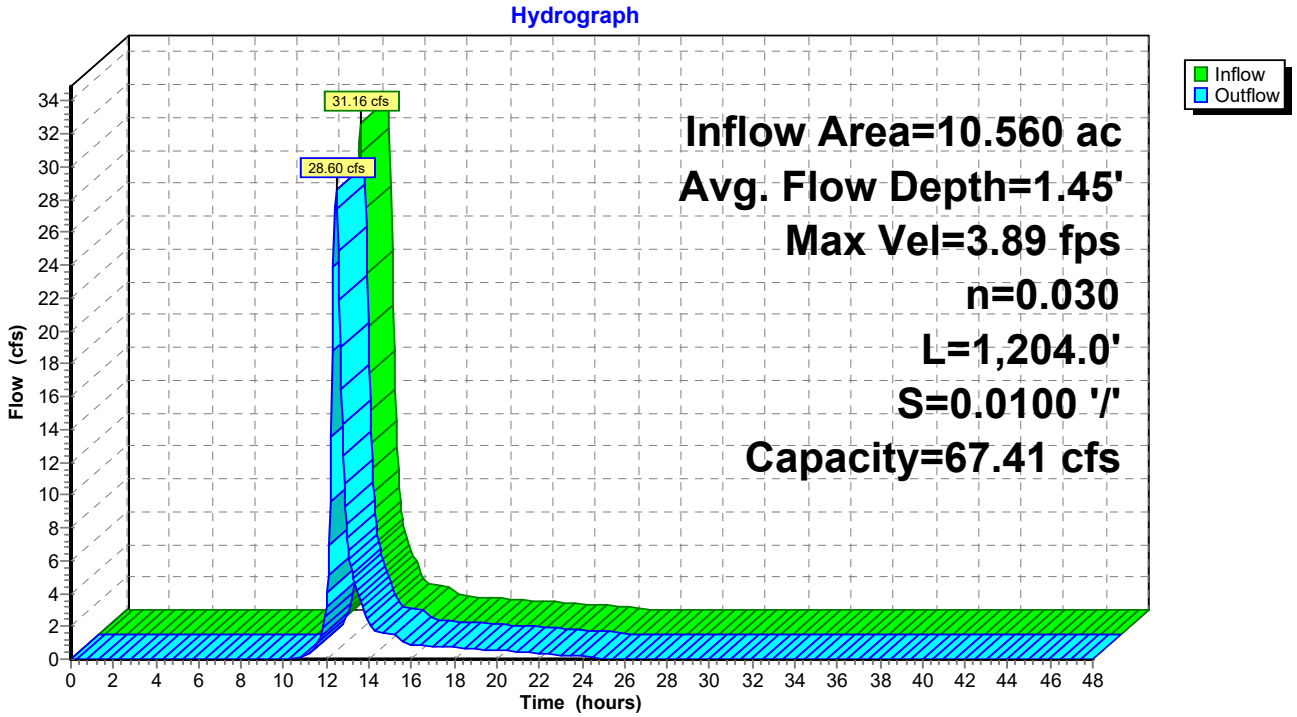
Inflow Area = 10.560 ac, 0.00% Impervious, Inflow Depth = 2.60" for 25 Yr-24 Hr event
Inflow = 31.16 cfs @ 12.29 hrs, Volume= 2.286 af
Outflow = 28.60 cfs @ 12.45 hrs, Volume= 2.286 af, Atten= 8%, Lag= 9.3 min
Routed to Pond 25P : N CB MH

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Max. Velocity= 3.89 fps, Min. Travel Time= 5.2 min
Avg. Velocity = 1.18 fps, Avg. Travel Time= 17.0 min

Peak Storage= 8,920 cf @ 12.36 hrs
Average Depth at Peak Storage= 1.45' , Surface Width= 10.18'
Bank-Full Depth= 2.00' Flow Area= 14.0 sf, Capacity= 67.41 cfs

0.00' x 2.00' deep channel, n= 0.030 Earth, grassed & winding
Side Slope Z-value= 4.0 3.0 '/' Top Width= 14.00'
Length= 1,204.0' Slope= 0.0100 '/'
Inlet Invert= 838.00', Outlet Invert= 826.00'





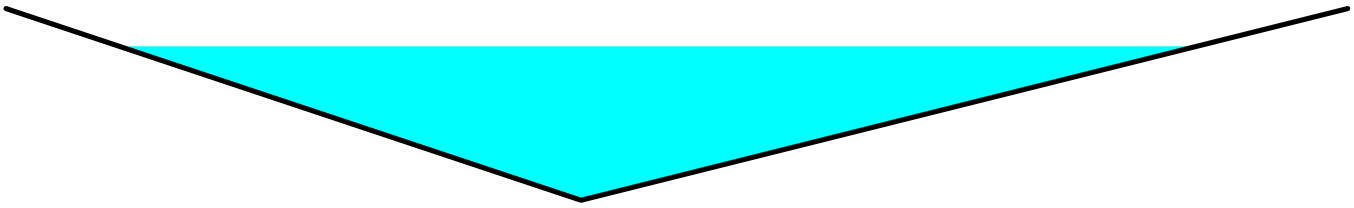
Summary for Reach 20R: NW Inner

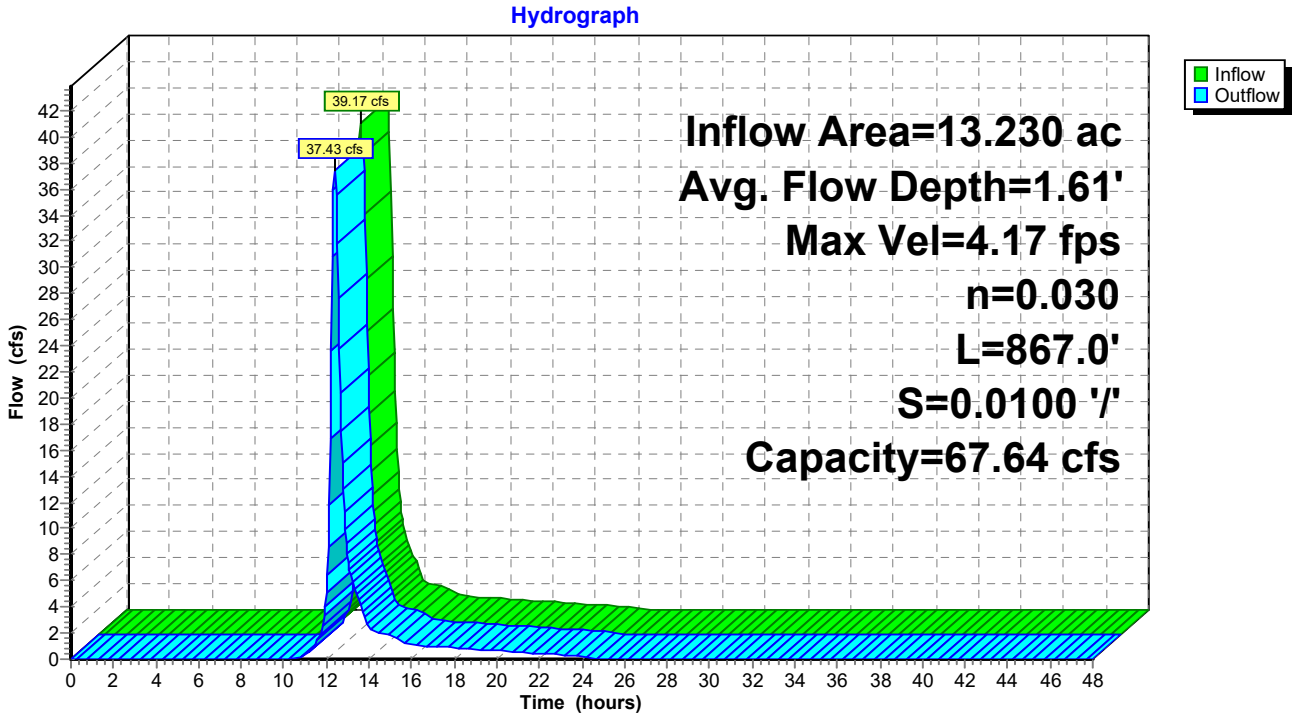
Inflow Area = 13.230 ac, 0.00% Impervious, Inflow Depth = 2.60" for 25 Yr-24 Hr event
Inflow = 39.17 cfs @ 12.29 hrs, Volume= 2.864 af
Outflow = 37.43 cfs @ 12.40 hrs, Volume= 2.864 af, Atten= 4%, Lag= 6.4 min
Routed to Pond 25P : N CB MH

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Max. Velocity= 4.17 fps, Min. Travel Time= 3.5 min
Avg. Velocity = 1.34 fps, Avg. Travel Time= 10.8 min

Peak Storage= 7,821 cf @ 12.34 hrs
Average Depth at Peak Storage= 1.61' , Surface Width= 11.24'
Bank-Full Depth= 2.00' Flow Area= 14.0 sf, Capacity= 67.64 cfs

0.00' x 2.00' deep channel, n= 0.030 Earth, grassed & winding
Side Slope Z-value= 3.0 4.0 '/' Top Width= 14.00'
Length= 867.0' Slope= 0.0100 '/'
Inlet Invert= 834.70', Outlet Invert= 826.00'





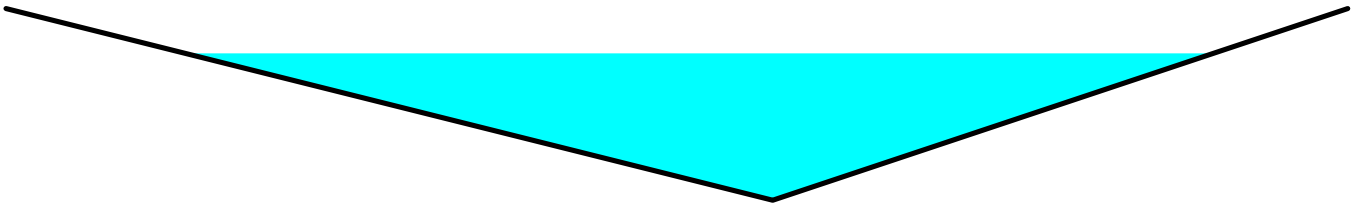
Summary for Reach 22R: E Inner

Inflow Area = 11.510 ac, 0.00% Impervious, Inflow Depth = 2.60" for 25 Yr-24 Hr event
Inflow = 34.32 cfs @ 12.29 hrs, Volume= 2.492 af
Outflow = 32.90 cfs @ 12.39 hrs, Volume= 2.492 af, Atten= 4%, Lag= 6.1 min
Routed to Reach 4R : NE Outer

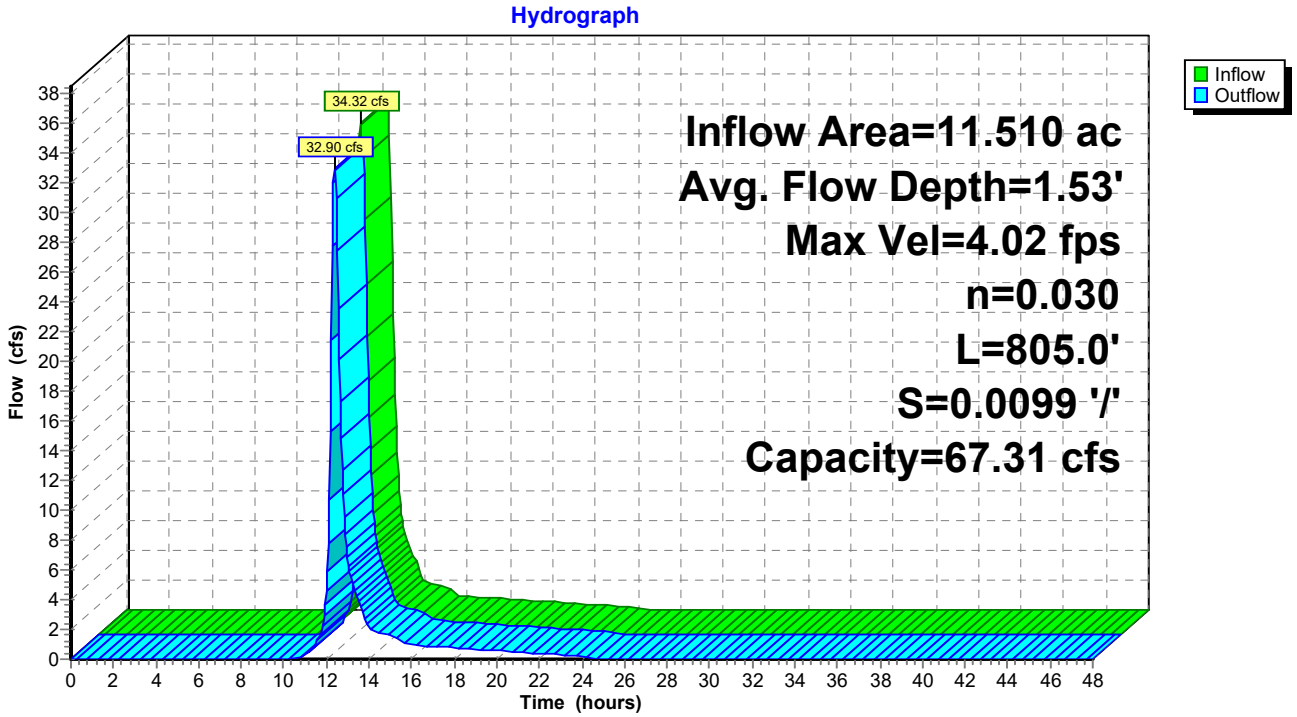
Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Max. Velocity= 4.02 fps, Min. Travel Time= 3.3 min
Avg. Velocity = 1.31 fps, Avg. Travel Time= 10.2 min

Peak Storage= 6,610 cf @ 12.33 hrs
Average Depth at Peak Storage= 1.53' , Surface Width= 10.72'
Bank-Full Depth= 2.00' Flow Area= 14.0 sf, Capacity= 67.31 cfs

0.00' x 2.00' deep channel, n= 0.030 Earth, grassed & winding
Side Slope Z-value= 4.0 3.0 '/' Top Width= 14.00'
Length= 805.0' Slope= 0.0099 '/'
Inlet Invert= 838.00', Outlet Invert= 830.00'



Reach 22R: E Inner



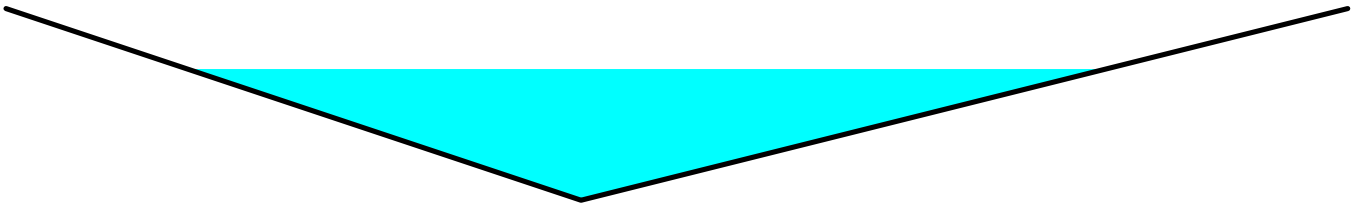
Summary for Reach 24R: SE Inner

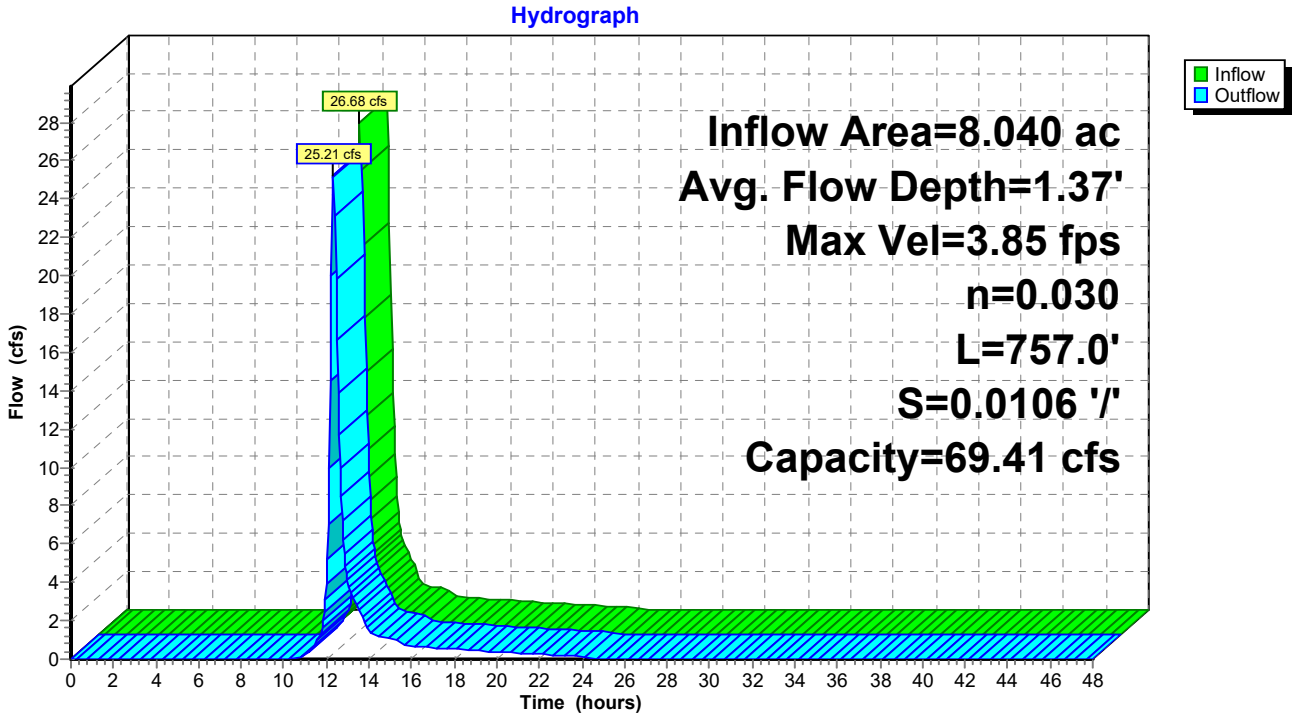
Inflow Area = 8.040 ac, 0.00% Impervious, Inflow Depth = 2.60" for 25 Yr-24 Hr event
Inflow = 26.68 cfs @ 12.24 hrs, Volume= 1.740 af
Outflow = 25.21 cfs @ 12.34 hrs, Volume= 1.740 af, Atten= 6%, Lag= 5.9 min
Routed to Reach 11R : SW Outer

Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Max. Velocity= 3.85 fps, Min. Travel Time= 3.3 min
Avg. Velocity = 1.25 fps, Avg. Travel Time= 10.1 min

Peak Storage= 4,976 cf @ 12.29 hrs
Average Depth at Peak Storage= 1.37' , Surface Width= 9.59'
Bank-Full Depth= 2.00' Flow Area= 14.0 sf, Capacity= 69.41 cfs

0.00' x 2.00' deep channel, n= 0.030 Earth, grassed & winding
Side Slope Z-value= 3.0 4.0 '/' Top Width= 14.00'
Length= 757.0' Slope= 0.0106 '/'
Inlet Invert= 834.00', Outlet Invert= 826.00'





Summary for Reach 28R: SW Downslope

Inflow Area = 26.860 ac, 0.00% Impervious, Inflow Depth = 2.60" for 25 Yr-24 Hr event
Inflow = 79.49 cfs @ 12.29 hrs, Volume= 5.814 af
Outflow = 79.34 cfs @ 12.30 hrs, Volume= 5.814 af, Atten= 0%, Lag= 0.3 min
Routed to Pond 22P : Outer CB MH

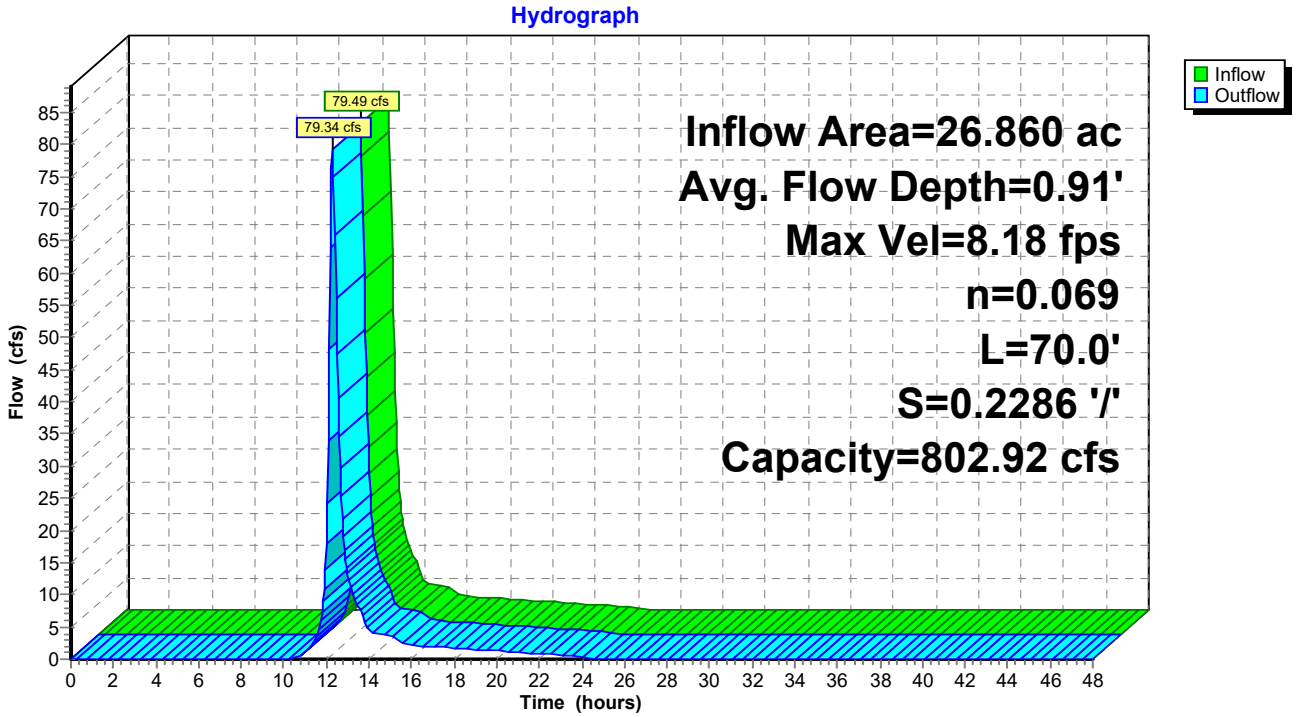
Routing by Stor-Ind+Trans method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Max. Velocity= 8.18 fps, Min. Travel Time= 0.1 min
Avg. Velocity = 2.37 fps, Avg. Travel Time= 0.5 min

Peak Storage= 681 cf @ 12.29 hrs
Average Depth at Peak Storage= 0.91' , Surface Width= 13.44'
Bank-Full Depth= 3.00' Flow Area= 51.0 sf, Capacity= 802.92 cfs

8.00' x 3.00' deep channel, n= 0.069 Riprap, 6-inch
Side Slope Z-value= 3.0 '/' Top Width= 26.00'
Length= 70.0' Slope= 0.2286 '/'
Inlet Invert= 832.00', Outlet Invert= 816.00'



‡



Summary for Pond 5P: N Pond

Inflow Area = 36.810 ac, 0.00% Impervious, Inflow Depth = 2.60" for 25 Yr-24 Hr event
Inflow = 90.74 cfs @ 12.47 hrs, Volume= 7.968 af
Outflow = 4.48 cfs @ 15.42 hrs, Volume= 4.374 af, Atten= 95%, Lag= 177.0 min
Primary = 4.48 cfs @ 15.42 hrs, Volume= 4.374 af

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Starting Elev= 808.00' Surf.Area= 2.996 ac Storage= 10.815 af
Peak Elev= 809.84' @ 15.42 hrs Surf.Area= 3.272 ac Storage= 16.583 af (5.767 af above start)

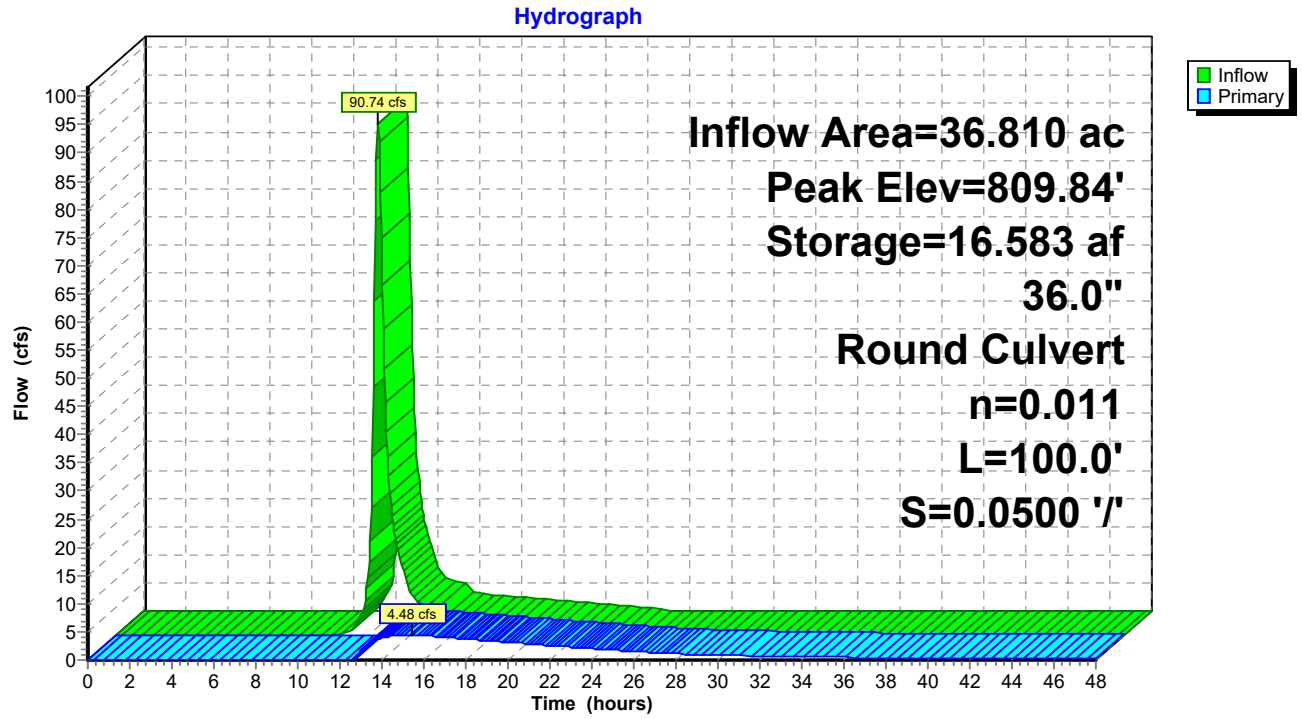
Plug-Flow detention time= (not calculated: initial storage exceeds outflow)
Center-of-Mass det. time= 480.1 min (1,317.3 - 837.2)

Volume	Invert	Avail.Storage	Storage Description
#1	804.00'	31.525 af	**115.00'W x 915.00'L x 10.00'H Prismatoid Z=3.0**

Device	Routing	Invert	Outlet Devices
#1	Primary	809.00'	**36.0" Round RCP_Round 36"** L= 100.0' RCP, mitered to conform to fill, Ke= 0.700 Inlet / Outlet Invert= 809.00' / 804.00' S= 0.0500 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 7.07 sf

Primary OutFlow Max=4.46 cfs @ 15.42 hrs HW=809.84' (Free Discharge)
1=RCP_Round 36" (Inlet Controls 4.46 cfs @ 2.75 fps)

Pond 5P: N Pond



Summary for Pond 12P: W Pond

Inflow Area = 38.810 ac, 0.00% Impervious, Inflow Depth = 2.60" for 25 Yr-24 Hr event
Inflow = 86.47 cfs @ 12.32 hrs, Volume= 8.401 af
Outflow = 5.33 cfs @ 15.13 hrs, Volume= 7.352 af, Atten= 94%, Lag= 169.0 min
Primary = 5.33 cfs @ 15.13 hrs, Volume= 7.352 af

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Starting Elev= 805.00' Surf.Area= 1.409 ac Storage= 3.918 af
Peak Elev= 808.68' @ 15.13 hrs Surf.Area= 1.679 ac Storage= 9.599 af (5.682 af above start)

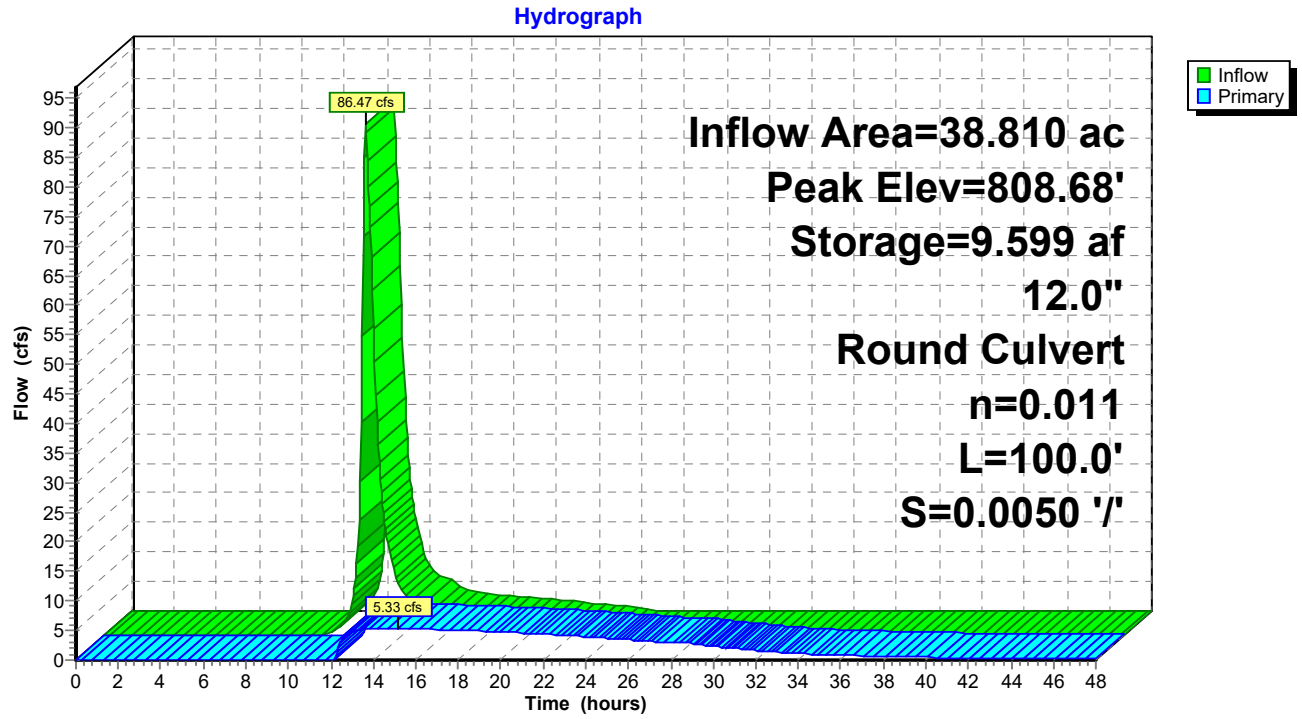
Plug-Flow detention time= 991.5 min calculated for 3.435 af (41% of inflow)
Center-of-Mass det. time= 520.9 min (1,351.7 - 830.8)

Volume	Invert	Avail.Storage	Storage Description
#1	802.00'	11.877 af	**175.00'W x 300.00'L x 8.00'H Prismatoid Z=3.0**

Device	Routing	Invert	Outlet Devices
#1	Primary	805.50'	**12.0" Round RCP_Round 12"** L= 100.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 805.50' / 805.00' S= 0.0050 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 0.79 sf

Primary OutFlow Max=5.33 cfs @ 15.13 hrs HW=808.68' (Free Discharge)
1=RCP_Round 12" (Barrel Controls 5.33 cfs @ 6.79 fps)

Pond 12P: W Pond



Summary for Pond 13P: SE Pond

Inflow Area = 1.870 ac, 0.00% Impervious, Inflow Depth = 2.60" for 25 Yr-24 Hr event
Inflow = 3.98 cfs @ 12.61 hrs, Volume= 0.405 af
Outflow = 1.82 cfs @ 13.06 hrs, Volume= 0.403 af, Atten= 54%, Lag= 26.9 min
Primary = 1.82 cfs @ 13.06 hrs, Volume= 0.403 af

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Starting Elev= 807.00' Surf.Area= 0.184 ac Storage= 0.445 af
Peak Elev= 807.74' @ 13.06 hrs Surf.Area= 0.204 ac Storage= 0.588 af (0.143 af above start)

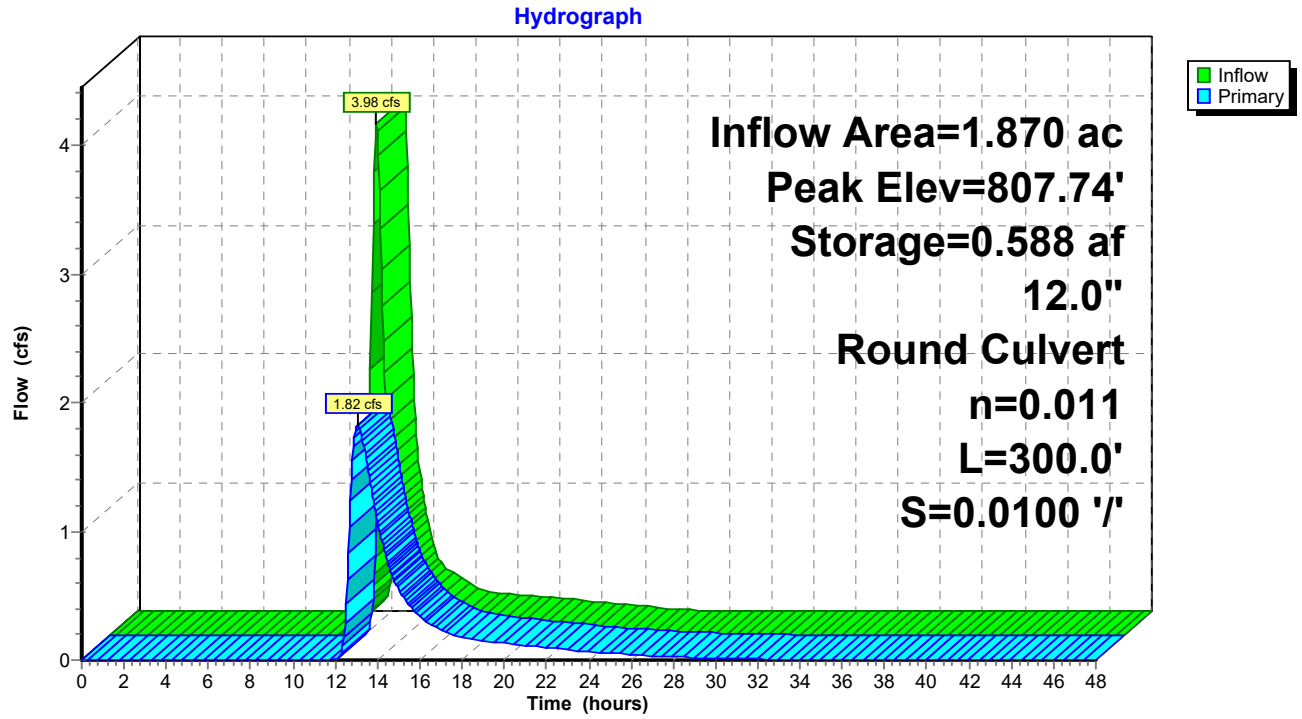
Plug-Flow detention time= (not calculated: initial storage exceeds outflow)
Center-of-Mass det. time= 105.6 min (959.8 - 854.2)

Volume	Invert	Avail.Storage	Storage Description
#1	804.00'	1.720 af	**50.00'W x 100.00'L x 8.00'H Prismatoid Z=3.0**

Device	Routing	Invert	Outlet Devices
#1	Primary	807.00'	**12.0" Round RCP_Round 12"** L= 300.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 807.00' / 804.00' S= 0.0100 '/' Cc= 0.900 n= 0.011 Concrete pipe, straight & clean, Flow Area= 0.79 sf

Primary OutFlow Max=1.82 cfs @ 13.06 hrs HW=807.74' (Free Discharge)
1=RCP_Round 12" (Inlet Controls 1.82 cfs @ 2.93 fps)

Pond 13P: SE Pond



Summary for Pond 22P: Outer CB MH

Inflow Area = 38.810 ac, 0.00% Impervious, Inflow Depth = 2.60" for 25 Yr-24 Hr event
Inflow = 86.49 cfs @ 12.31 hrs, Volume= 8.401 af
Outflow = 86.47 cfs @ 12.32 hrs, Volume= 8.401 af, Atten= 0%, Lag= 0.1 min
Primary = 86.47 cfs @ 12.32 hrs, Volume= 8.401 af
Routed to Pond 12P : W Pond

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Peak Elev= 817.95' @ 12.32 hrs Surf.Area= 0.001 ac Storage= 0.005 af

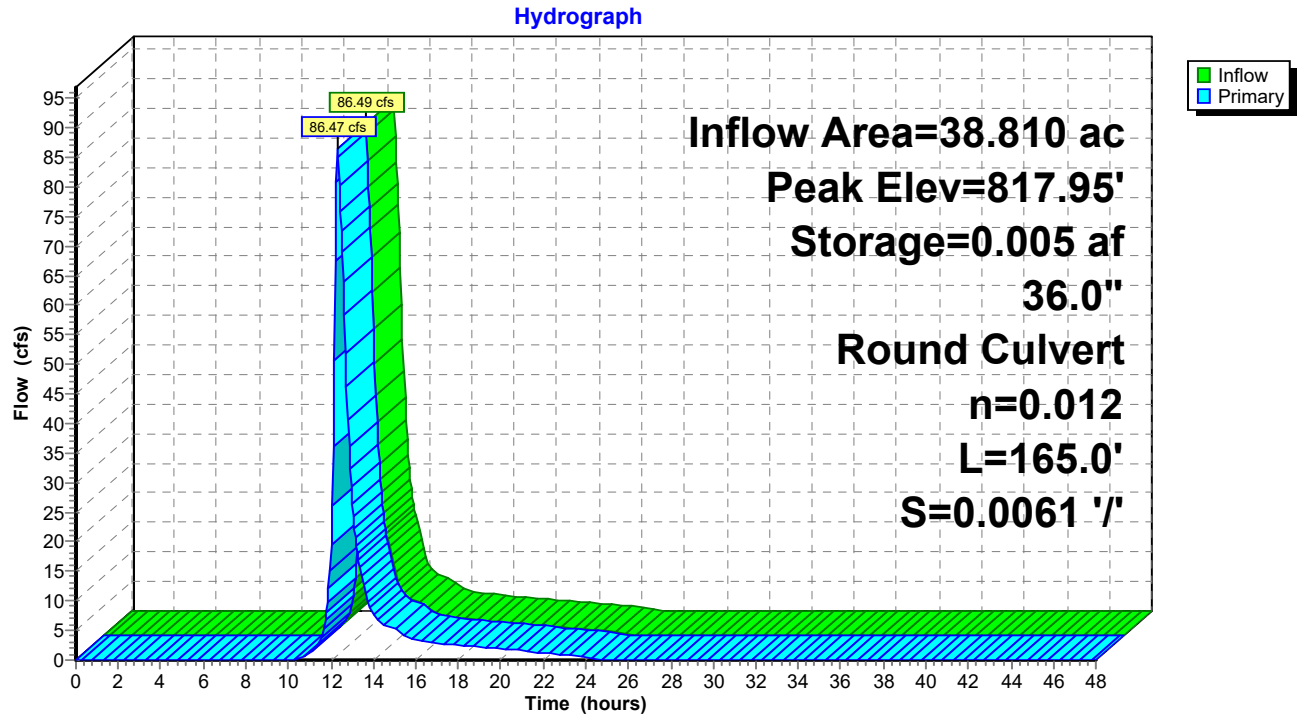
Plug-Flow detention time= 0.1 min calculated for 8.401 af (100% of inflow)
Center-of-Mass det. time= 0.1 min (830.8 - 830.7)

Volume	Invert	Avail.Storage	Storage Description
#1	810.00'	0.006 af	**6.00'D x 9.00'H Vertical Cone/Cylinder**

Device	Routing	Invert	Outlet Devices
#1	Primary	810.00'	**36.0" Round Culvert** L= 165.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 810.00' / 809.00' S= 0.0061 '/' Cc= 0.900 n= 0.012, Flow Area= 7.07 sf

Primary OutFlow Max=85.78 cfs @ 12.32 hrs HW=817.85' (Free Discharge)
1=Culvert (Inlet Controls 85.78 cfs @ 12.14 fps)

Pond 22P: Outer CB MH



Summary for Pond 24P: SE CB

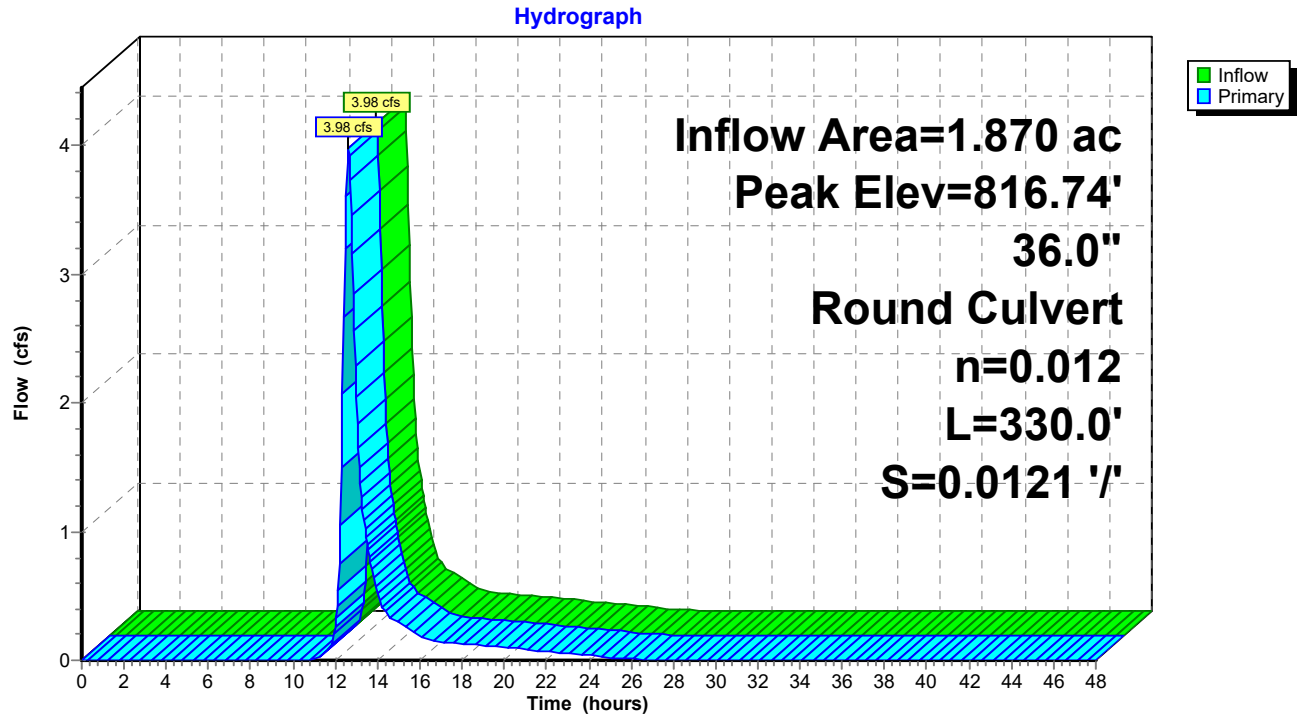
Inflow Area = 1.870 ac, 0.00% Impervious, Inflow Depth = 2.60" for 25 Yr-24 Hr event
Inflow = 3.98 cfs @ 12.61 hrs, Volume= 0.405 af
Outflow = 3.98 cfs @ 12.61 hrs, Volume= 0.405 af, Atten= 0%, Lag= 0.0 min
Primary = 3.98 cfs @ 12.61 hrs, Volume= 0.405 af
Routed to Pond 13P : SE Pond

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Peak Elev= 816.74' @ 12.61 hrs

Device	Routing	Invert	Outlet Devices
#1	Primary	816.00'	**36.0" Round RCP_Round 36"** L= 330.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 816.00' / 812.00' S= 0.0121 '/' Cc= 0.900 n= 0.012 Concrete pipe, finished, Flow Area= 7.07 sf

Primary OutFlow Max=3.96 cfs @ 12.61 hrs HW=816.74' (Free Discharge)
1=RCP_Round 36" (Inlet Controls 3.96 cfs @ 2.93 fps)

Pond 24P: SE CB



Summary for Pond 25P: N CB MH

Inflow Area = 36.810 ac, 0.00% Impervious, Inflow Depth = 2.60" for 25 Yr-24 Hr event
Inflow = 90.67 cfs @ 12.47 hrs, Volume= 7.968 af
Outflow = 90.74 cfs @ 12.47 hrs, Volume= 7.968 af, Atten= 0%, Lag= 0.0 min
Primary = 90.74 cfs @ 12.47 hrs, Volume= 7.968 af
Routed to Pond 5P : N Pond

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.05 hrs
Peak Elev= 822.60' @ 12.47 hrs Surf.Area= 0.001 ac Storage= 0.005 af

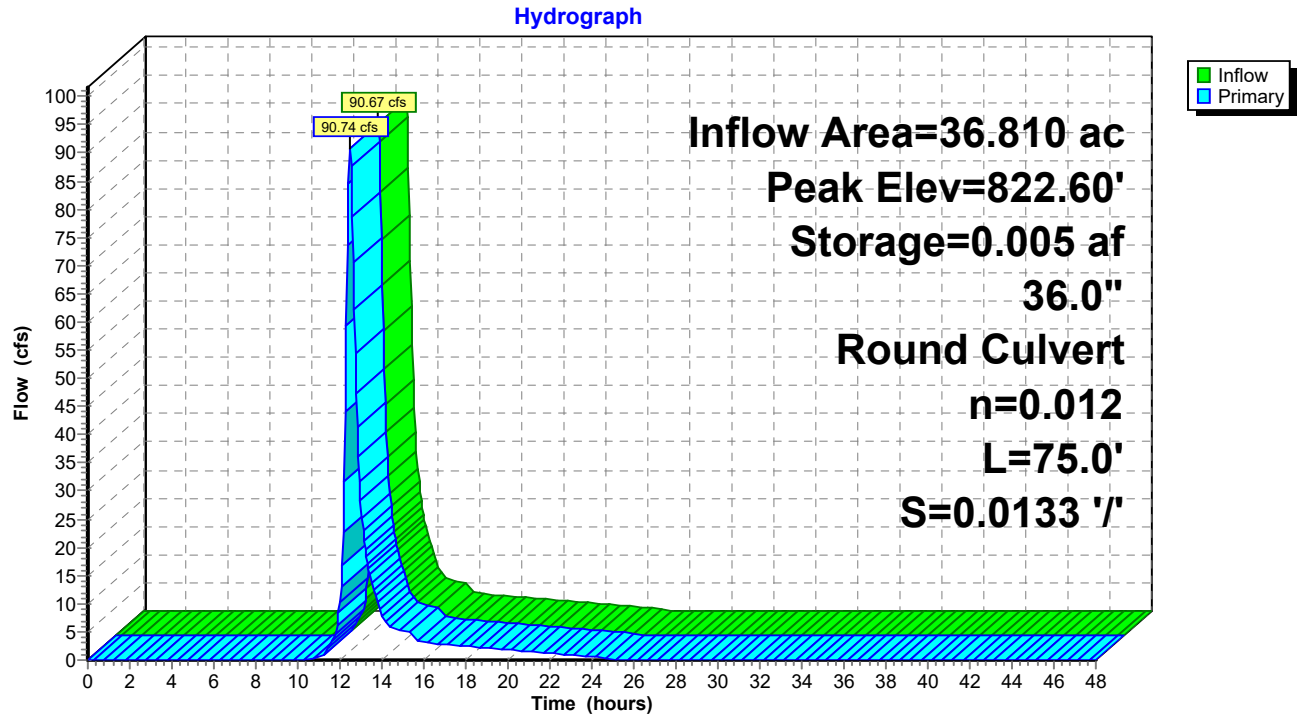
Plug-Flow detention time= 0.1 min calculated for 7.968 af (100% of inflow)
Center-of-Mass det. time= 0.1 min (837.2 - 837.1)

Volume	Invert	Avail.Storage	Storage Description
#1	814.00'	0.005 af	**6.00'D x 8.00'H Vertical Cone/Cylinder**

Device	Routing	Invert	Outlet Devices
#1	Primary	814.00'	**36.0" Round Culvert** L= 75.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 814.00' / 813.00' S= 0.0133 '/' Cc= 0.900 n= 0.012 Concrete pipe, finished, Flow Area= 7.07 sf

Primary OutFlow Max=90.01 cfs @ 12.47 hrs HW=822.49' (Free Discharge)
1=Culvert (Inlet Controls 90.01 cfs @ 12.73 fps)

Pond 25P: N CB MH



Appendix H Construction Quality Assurance Plan

Construction Quality Assurance Program

Cell Construction
Dem-Con Pilgrim Landfill (SW-254)

April 2026

Prepared for:

Dem-Con Companies
13020 Dem-Con Drive
Shakopee, MN 55379

Prepared by:

Stantec Consulting Services Inc.
One Carlson Parkway Suite 100
Plymouth, MN 55447

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1.0 INTRODUCTION

This manual outlines Construction Quality Assurance (CQA) procedures for the installation of the landfill liner system for new cell development at the Dem-Con Companies Pilgrim Landfill (facility or Landfill) near Mankato in Blue Earth County, Minnesota. This manual addresses survey requirements, soils, piping, and geosynthetic components of the leachate collection and liner systems, and is to be used as the basis of the overall CQA program.

The overall goal of this construction quality assurance program is to ensure that proper construction techniques and procedures are used and to verify that the materials and installation techniques used meet the project design requirements. At completion of the work, the program will culminate in a certification report which documents that the project has been constructed in substantial accordance with the design standards and specifications. Construction specifications for cell construction are provided in Attachment 1.

1.1 DEFINITIIONS

Quality Assurance: Means and actions employed by Owner to assure conformity of the materials and installation with the approved drawings, specifications, and other project requirements.

Quality Control: Actions taken by the product manufacturers, installers, contractor, and subcontractors to ensure that materials and workmanship meet the requirements of the drawings, specifications, and other project requirements.

Lining System: Refers to a base liner system.

Technical Specifications: A document produced by the Designer declaring minimum values of performance of construction materials.

Subgrade: The surface of the underlying soil prepared to receive the lining system.

Certification Report: A report documenting construction procedures, and that the construction was carried out according to approved drawings and specifications, and this CQA plan.

1.2 PARTIES

The parties discussed in this section are associated with the ownership, design, supply, manufacture, transportation, installation, and quality assurance of a component of the landfill such as the lining or leachate collection system. The typical parties involved and their functions are described below:

Owner: The party that owns and operates the facility that is responsible for the overall coordination of CQA activities. The Owner is also responsible for selecting the necessary parties associated with construction.

Designer: The firm responsible for preparing the engineering design, associated plans, and specifications for the facility. The Designer for the project shall be a registered professional engineer in the State of Minnesota. The Designer may provide clarification necessitated during construction.

Quality Assurance Contractor (QAC): A firm, independent of the Owner, that observes tests and documents construction activities on behalf of the Owner. The QAC will identify and notify the Owner of any deviations or problems that arise during construction and assist in resolution. The QAC is also responsible for preparation of the construction certification report required for submittal to the Minnesota Pollution Control Agency (MPCA). The QAC will have an individual identified as the CQA Officer. The CQA Officer will be a registered professional engineer in the State of Minnesota. The QAC may also be denoted as the ENGINEER in the Technical Specifications. For this project, the QAC is also responsible for marking and recording the necessary grades. The QAC will provide grade verification of necessary subgrade and liner system component thicknesses as well as locations and elevations of piping components.

Contractor: This firm is mainly responsible for the earthwork preparation and construction of the soil components of the lining system. The Contractor typically prepares the subgrade or foundation soil on which the geosynthetics are placed. The contractor may also be responsible for placing the soil materials over the lining system. In addition, the contractor may install other components associated with the leachate collection system.

Geosynthetic Manufacturer (GM): The GM is the firm or firms responsible for the production and supply of the various geosynthetic components. The geosynthetic manufacturer will be responsible for providing QC documentation that the materials meet the material requirements of the drawings, specifications, and other project requirements. The GM is responsible for the condition of the product until the material is accepted by the Owner on-site.

Geosynthetic Installer (GI): The GI is responsible for field handling, storing, placing, seaming, loading, and other aspects of the installation of geosynthetics.

Quality Assurance Laboratory (QAL): Firm that performs necessary testing on samples taken from the site.

2.0 FOUNDATION AND BERMS

2.1 GENERAL

The foundation and berms serve as the components on which the liner systems are constructed.

2.2 MATERIAL QUALITY CONTROL

Material for foundation and berms may either be on-site or imported, depending on use and material availability. Testing may be required prior to use, depending on the source and the designated use. On-site soils are suitable for use as long as there are no foreign objects visible and no organic soils are encountered, which must be removed and replaced with suitable soil.

2.3 OBSERVATION AND DOCUMENTATION

No unsuitable material will be used in structural berms or in the subgrade of the liner system. Construction activities will be documented. The QAC shall document the grades and elevations after surface preparation.

2.4 SURVEY

The survey of specific locations will provide the basis for record drawings. The survey will be performed by the QAC. The survey will be conducted on a grid and at major breaks. Grading tolerances are provided in Table 1.

2.5 TESTING

The material will be tested in accordance with the project requirements. The surface will be prepared to be capable of supporting construction of the overlaying layers. Soil material specifications are provided in Table 2.

3.0 BARRIER SOIL LAYER

3.1 GENERAL

This layer serves as the earthen barrier in the base liner system and is the surface upon which the geosynthetic components of the liner system are deployed. The barrier soil layer is replaced with a low-permeability clay barrier layer in the leachate collection sumps. See project specifications for further information on material and construction requirements for the clay barrier layer.

3.2 MATERIAL QUALITY CONTROL

Samples of the material will be tested for USCS classification and moisture-density relationship. Testing parameters and frequencies are listed in Table 2. The contractor is responsible for selection of barrier layer material to complete construction. Source testing of soil materials will be in accordance with the Specifications.

3.3 SUBGRADE

The CONTRACTOR shall be responsible for preparing the subgrade for the soil barrier layer. Once complete, the ENGINEER shall examine the surface and verify the adequacy of the survey data provided. When the ENGINEER deems the surface acceptable, the ENGINEER shall prepare an acceptance certificate. The acceptance certificate shall state the following at a minimum:

1. The required survey has been performed and the results meet the specifications.
2. The subgrade has been tested and meets the project requirements.

The CONTRACTOR must prepare and grade the soils below the liner to create a smooth, stable subgrade. The surface must be free of foreign objects and wood and must not have objects protruding above the surface. At any time during construction of the soil liner, the ENGINEER shall inform the Owner of any areas that are unacceptable. Such defects in the subgrade shall be corrected by the CONTRACTOR such that repaired areas meet the project specifications. Subgrade testing will be completed as identified in Table 2.

3.4 OBSERVATION AND DOCUMENTATION

The ENGINEER shall document the following during the construction of the barrier layer:

Excavation: The ENGINEER shall document the slope and the depth of the excavation and document that the subgrade surface meets specification.

Borrow Sources: For each borrow source the ENGINEER shall document the following:

- Location;

- Description of soil;
- Moisture-density relationship;
- Removal of deleterious or off-specification material;
- Placed and compacted volume of soil.

The laboratory test requirements are given in Table 2.

Compaction: The following will be documented during compaction of the soil:

- Type and weight of compaction equipment;
- Method of surface preparation;
- Method of adjusting soil moisture and controlling desiccation;
- Compacted lift thickness;
- General number of passes and uniformity of coverage;
- Reduction in clod size;
- Repair;
- Observation of the thickness of lifts as loosely placed and as compacted;
- Observation of the action of the compaction and heavy hauling equipment on the construction surface (sheepsfoot penetration, pumping, cracking, etc.);
- Verification that all frozen soil is removed prior to placement of subsequent material;
- Verification that frozen soil is not placed.

3.5 TESTING

Laboratory test methods and frequencies to develop data upon which acceptability evaluations can be based will be as provided in Table 2.

Barrier layer material will be thoroughly and uniformly compacted within the specified moisture content window and shall be compacted to greater than or equal to 95% of the standard proctor as outlined in the project specifications. The clay barrier layer used in the leachate collection sumps must also meet a 0-5% wet of optimum moisture content requirement. Each lift (maximum eight-inch loose lifts) will be integrated into the previous lift by techniques such as scarifying each lift and by using compaction equipment that is capable of penetrating the thickness of each compacted lift, except that such a compactor shall not be used in the first 2 lifts immediately above the synthetic liner, secondary collection system, or other sensitive liner system component, if applicable. CONTRACTOR shall compact with sheepsfoot roller, or similar kneading-type compactor. The feet of the compactor shall be greater than the thickness of each lift. CONTRACTOR shall compact the layers of soil to form continuous monolithic material with excessively dry or wet soil removed before placement of additional lifts; knead each lift into previously placed lift. Nuclear density methods will be preferred for moisture and density testing due to the ease of testing and the relatively large number of tests which can be run in a given period of time. Areas that are not sufficiently compacted must be re-worked and re-compacted over an area that extends one-half of the distance in all directions to the nearest passing test locations. Questions concerning the accuracy of any single test will be addressed by retesting in the same location until a passing test is obtained.



Final surface shall be smooth-rolled prior to geosynthetic placement. Finished surface will be smooth and even with no sheepsfoot roller indentations. Surface must be smooth and free of debris, roots, and stones or rocks larger than 3/8 inch in diameter or angular stone of any size or any other material that would be deleterious to the overlying geomembrane liner. CONTRACTOR shall be responsible for the integrity of the barrier soil layer. CONTRACTOR shall maintain the subbase in an acceptable condition and make repairs, as needed, until the geosynthetic materials are placed, tested, and approved by the Owner.

CQA testing will be conducted on samples taken from the material during the course of construction. Sampling locations will be selected by ENGINEER according to the number of required tests. Locations of tests will be documented for report purposes.

A special testing frequency will be used when visual observations of construction performance indicate a potential problem. Additional testing for suspected areas will be considered when:

- Lift thickness is greater than specified;
- Earth fill is at variable moisture content;
- Dirt-clogged rollers are used to compact the material;
- Rollers may not have used optimum ballast;
- The degree of compaction is questionable.

During construction, the frequency of testing may also be increased in the following situations:

- Adverse weather conditions;
- Breakdown of equipment;
- At the start and finish of grading;
- Material fails to meet specifications;
- The size of the work area is increased.

Perforations in the soil liner will occur during construction due to in-place testing. The perforation would be caused by:

1. Nuclear density test probe locations.

Unless otherwise directed by the ENGINEER or Owner, all perforations of the soil liner by probe shall be backfilled with a soil-bentonite mixture. The mixture shall be compacted in-place with a tamping rod, or hand tamper, depending on the size of the perforation.

The test locations will be on a grid that will maximize the coverage of the construction area, or as directed by the ENGINEER to test suspect areas. Soil density and moisture content will be documented for each lift on an offset grid to provide adequate coverage of the construction.

3.6 DAMAGE AND REPAIR

Should the subgrade become damaged during construction, the unsuitable material will be removed and the Owner may choose to either; replace the removed material with native fill and document the grades;

or replace the material with the same material used in the soil barrier layer documenting the additional thickness in the affected area.

Areas of the soil liner that become damaged due to precipitation or desiccation will be reworked and retested until satisfactory results are obtained. If it appears unlikely to correct the damage by reworking the soil, the affected area will be removed, replaced, and tested.

3.7 SURVEY

The survey of specific locations will provide the basis for the record drawings and provide documentation of soil barrier layer thicknesses. The major components of the survey will include the following at a minimum:

1. Top of subgrade.
2. Top of soil barrier layer.

The survey will be conducted on a grid with survey points at major breaks in slope (i.e., top and toe of slope) and top and base of sumps (if applicable). The grid will be extended vertically to enable calculation of vertical thicknesses of the liner or cover component. Grading tolerances are provided in Table 1.

3.8 CONFORMANCE WITH PROJECT SECIFICATIONS

The ENGINEER shall document that the barrier soil layer installation was done in accordance with the project specifications.



4.0 GEOSYNTHETIC CLAY LINER

4.1 GENERAL

A geosynthetic clay liner (GCL) is used as the earthen barrier layer in a composite base liner. This section applies to a GCL which consists of a sodium bentonite core encapsulated by a geotextile.

4.2 MATERIAL QUALITY CONTROL

4.2.1 Raw Material

The GCL shall be manufactured with geotextile on each side of the bentonite. The bentonite shall meet the manufacturer's specifications as outlined by the GCL supplier for each batch of material. The material test reports on each batch shall accompany each roll. All product used onsite will be reinforced with needle-punching of the geotextiles together. Sideslopes will include a GCL product containing non-woven geotextiles for both surfaces.

4.2.2 Final Product

The GCL shall be tested to conform to the manufacturer's specifications. The GEOSYNTHETIC MANUFACTURER shall provide the ENGINEER with all GCL product certification sheets with each roll delivered to the site.

The ENGINEER shall examine the results and report any nonconformance to the Owner. QC results shall be reviewed and accepted or rejected by the ENGINEER prior to deployment.

4.3 SUBGRADE

When the GCL is placed on a soil subgrade, the CONTRACTOR shall be responsible for preparing the subgrade for the GCL. Once complete, the ENGINEER shall examine the surface, and verify the adequacy of the survey data provided. When the ENGINEER deems the surface acceptable, the ENGINEER shall prepare an acceptance certificate for the Owner. The acceptance certificate shall state the following at a minimum:

1. The required survey has been performed and the results meet the specifications.
2. The subgrade has been tested and meets the project requirements.

When the GCL is placed on a geosynthetic subgrade, the GEOSYNTHETIC INSTALLER shall be responsible for preparing the subgrade for the GCL. Once complete, the ENGINEER shall examine the surface, and verify the adequacy of the documentation completed and any test data required. When the ENGINEER deems the surface acceptable, the ENGINEER shall prepare an acceptance certificate for the Owner. The acceptance certificate shall state the following at a minimum:

1. Documentation of the underlying geosynthetics is complete, and any necessary tests show satisfactory results.



At any time during construction of the soil liner, the ENGINEER shall inform the Owner of any areas which are unacceptable. Such defects in the subgrade shall be corrected by the appropriate contractor such that repaired areas meet the project specifications.

4.4 OBSERVATIONS AND DOCUMENTATION

4.4.1 Roll Inspections

Prior to placement of the GCL, rolls shall be observed for defects by both the ENGINEER and the GEOSYNTHETIC INSTALLER. Rolls shall be wrapped in an impermeable, opaque cover material to prevent premature hydration and protect the rolls from UV radiation. Additional covering may be necessary during heavy precipitation events.

Each roll shall have a roll label which clearly identifies all standard manufacturer's information. This information should include: manufacturer's name, type of material, thickness, batch, date of fabrication, and physical dimensions. This information shall be recorded by the ENGINEER for each roll.

4.4.2 Installation Equipment

The GEOSYNTHETIC INSTALLER shall use equipment that will not damage the GCL or subgrade by handling, trafficking, excessive heat, and leakage of oils or other means. Vehicle use directly over a GCL that overlies a geomembrane is prohibited as a standard means of deployment unless otherwise approved by the MPCA.

4.4.3 Placement

The GEOSYNTHETIC INSTALLER shall cover the GCL each night with the overlying liner to prevent hydration of the GCL. No material shall be placed in areas of ponded water or excessively wet subgrade. If any material becomes hydrated it shall be removed and replaced.

The GEOSYNTHETIC INSTALLER shall inspect liner material for defects or flaws after installation.

4.4.4 Crest Anchorage System

The anchor trench is typically excavated by the CONTRACTOR according to the approved drawings. The GCL shall be placed in the anchor trench and the trench shall be backfilled and compacted by light compaction equipment to the required grade.

4.4.5 Field Seaming

The GEOSYNTHETIC INSTALLER shall overlap the GCL panels edges as specified by the manufacturer. The overlap shall be inspected by the ENGINEER to ensure proper length of overlap. The GEOSYNTHETIC INSTALLER shall overlap the GCL panel roll in accordance with the manufacturer’s specifications. All seaming shall conform to the manufacturer's installation specifications.

4.5 DAMAGE AND REPAIR

Areas of flaws or damage shall be repaired by the GEOSYNTHETIC INSTALLER. Repairs shall be made by placement of a patch of the same materials at least 1 foot beyond the edge of the flaw or damage. The



GEOSYNTHETIC INSTALLER shall ensure that the patch conforms with the manufacturers installation specifications. Additionally, any GCL that hydrates prior to placement of the geomembrane shall be removed and replaced.



5.0 GEOMEMBRANE

5.1 GENERAL

Geomembranes are the geosynthetic component of the composite base lining system. This section is applicable to the Polyethylene (PE) geomembranes used in base liner systems. CQA testing requirements are included in Table 3.

5.2 MATERIAL QUALITY CONTROL

5.2.1 Raw Material

The resin used to make geomembrane sheet shall be tested in accordance with the manufacturer's guidelines. Material ingredients of the geomembrane shall be randomly sampled by the manufacturing plant to ensure compliance with these specifications. Test reports of quality control tests, such as specific grading, melt flow index and carbon black content will be provided.

5.2.2 Geomembrane Material Specifications

The GEOSYNTHETIC MANUFACTURER shall provide the ENGINEER with the following:

1. A quality control certificate indicating conformance with the Geosynthetics Research Institute's (GRI) GEOSYNTHETIC MANUFACTURER 13 for HDPE or GEOSYNTHETIC MANUFACTURER 17 for LLDPE.
2. Certification that property values given in the properties sheet are guaranteed by the GEOSYNTHETIC MANUFACTURER.
3. Certification that 100 percent of every roll has been visually inspected for holes, cracks, thin spots, tears, punctures, blisters, or any other foreign material.

The GEOSYNTHETIC MANUFACTURER shall provide the following information to the ENGINEER for each roll delivered to the site:

- Name of the manufacturer and fabricator;
- Name and type of liner;
- Thickness of liner;
- Batch code;
- Date of fabrication;
- Physical dimensions;
- Panel number;
- Location and method of storage at the site.

This information shall accompany each roll delivered to the job site.



The ENGINEER will examine results and report any nonconformance to Owner. QC results will be reviewed and accepted or rejected by the ENGINEER prior to deployment.

5.3 SUBGRADE

When the geomembrane is placed on a geosynthetic subgrade, the GEOSYNTHETIC INSTALLER shall be responsible for preparing the subgrade for the geomembrane and shall install the geosynthetic subgrade simultaneously with the geomembrane. Once complete, the ENGINEER shall examine the surface and verify the adequacy of the documentation completed and any test data required. When the ENGINEER deems the surface acceptable, the ENGINEER shall prepare an acceptance certificate for the Owner. The acceptance certificate shall state the following at a minimum:

1. Documentation of the underlying geosynthetics is complete and any necessary tests show satisfactory results.

The GEOSYNTHETIC INSTALLER will also inspect the subgrade and will sign the subgrade acceptance forms.

At any time during installation of the geomembrane, the ENGINEER shall inform the owner of any areas that are unacceptable. Such defects in the subgrade shall be corrected by the appropriate contractor such that repaired areas meet the project specifications. If additional work is required on a soil subgrade it is the GEOSYNTHETIC INSTALLER's responsibility to notify the CONTRACTOR and OWNER of such work and also provide this notification to the ENGINEER.

5.4 OBSERVATIONS AND DOCUMENTATION

5.4.1 Roll Inspections

Prior to placement of any lining material, rolls shall be observed for defects and damage by both the ENGINEER and the GEOSYNTHETIC INSTALLER. Storage of the rolls shall be in a location that minimizes on-site handling and the possibility of damage.

Each roll shall have a roll label which clearly identifies the manufacturing information. This information along with the panel number and location/method of on-site storage, shall be recorded by the ENGINEER.

The ENGINEER shall also visually observe each roll for imperfections or damage including holes, cracks, thin spots, tears, punctures, blisters, or the presence of foreign material.



5.4.2 Placement

5.4.2.1 Equipment

The installer shall use equipment that does not damage the geomembrane by handling, trafficking, excessive heat, leakage of oils or other means. The method and equipment used to unroll the material shall not cause scratches, crimps, or any damage to the underlying GCL, or excessive rutting of the soil subgrade.

5.4.2.2 Method of Deployment

No personnel working on the geosynthetic liner shall smoke, wear damaging shoes, or engage in other activities that could damage the geomembrane. The method used to place the panels shall minimize wrinkles.

Adequate temporary loading and/or anchoring shall be provided to prevent uplift of the liner by wind. The anchoring system shall not damage the liner.

The installer shall inspect each panel after placement and prior to seaming for damage. Damaged panels or portions of damaged panels that have been rejected shall be marked and their removal from the work area recorded.

5.4.2.3 Crest Anchorage System

The anchor trench shall be excavated to the lines and widths shown on the drawings prior to geomembrane placement. The trench shall be drained to prevent ponding or softening of adjacent soils where trench is open. The corners of the trench shall be slightly rounded to avoid sharp bends in the geomembrane. The trench shall be backfilled and compacted by light compaction equipment to the required grade.

Since backfilling the anchor trench can affect material bridging at the toe of slope, consideration should be given to backfilling the liner at its most contracted state; preferably during the cool of the morning or extended period of overcast skies. Care should be taken when backfilling the trenches to prevent damage to the geosynthetics.

5.4.3 Trial Seams

To verify that seaming conditions are adequate, trial seams shall be performed on fragmented pieces of geomembrane. Trial seams shall be made as follows:

1. Twice per day (typically first thing in the morning and again after lunch).
2. Anytime equipment is turned off.
3. For each seaming apparatus.
4. Other times as deemed necessary by the ENGINEER.



A test weld, long enough to obtain required samples shall be run at the frequency described above (typically at least 5 feet).

The test weld shall be recorded on the GEOSYNTHETIC INSTALLER's trial weld log with date, ambient temperature, and welding machine number.

Three adjoining specimens each 1-inch wide shall be cut from the trial seam sample. The specimens shall be tested respectively in shear and in peel using a field tensiometer and they shall not fail in the seam. If any specimen fails, the entire operation shall be repeated. If the additional specimen fails, the seaming apparatus and seamer shall not be accepted and shall not be used for seaming until the deficiencies are corrected and two consecutive successful full trial welds are achieved. The ENGINEER will observe and document results of trial seam procedures.

5.4.4 Field Seaming

5.4.4.1 Seam Layout

Prior to liner installation, panel layout drawings shall be submitted and approved by the ENGINEER and Owner. Seams should typically be oriented parallel to the line of maximum slope. All seam-numbering and panel-numbering systems shall be agreed upon prior to installation. Individual liner panels shall be laid out and overlapped as required prior to welding. The area to be welded shall be cleaned prior to welding. Panel locations shall be recorded by the ENGINEER on the record drawings.

5.4.4.2 Seaming Equipment and Accessories

The fusion welding apparatus will be an automated, vehicle-mounted device that produces a double seam enclosing a void. This apparatus shall be equipped with gauges permitting a direct reading of the applicable temperatures.

The extrusion welding apparatus shall be equipped with gauges giving the temperatures of the apparatus at the nozzle.

5.4.4.3

Seaming shall not take place during precipitation, in the presence of excess moisture or in the presence of excessive winds. Seaming shall not take place at ambient temperatures less than 40°F unless authorized by the Owner and ENGINEER.

5.4.4.4 General Seaming Procedures

The rolls of geomembrane shall be overlapped as required by the manufacturer’s specifications.



A base T-seam shall not be closer than 10 feet from the toe of the slope. Seams shall be aligned with the least possible number of wrinkles and "fish mouths". Excessively large wrinkles and all fish mouths shall be relieved and cap-stripped.

The ENGINEER shall document field seam locations and panel overlaps. Panels that are factory fabricated or factory seamed will undergo the same observation and documentation as panels that are field seamed.

5.5 TESTING

5.5.1 Nondestructive Testing

The installer shall nondestructively test all field fusion seams over their full length by air-pressure testing. Extrusion-welded seams shall be tested by vacuum gauge. All seams must be inspected by the QAC and the Installer, and any defects marked and repaired.

5.5.1.1 Air Pressure Testing

This type of testing will be performed on the majority of the seams since the double fusion-seaming method is the method of choice.

Generally, the equipment shall be comprised of the following:

- An air pump capable of providing the required pressure;
- A rubber hose with fittings and connections;
- A sharp hollow needle or other approved pressure-feed device.

The following procedures shall be followed:

1. Seal both ends of the seam to be tested.
2. Insert needle or other approved pressure-feed device into the tunnel created by the fusion weld.
3. Energize the air pump to minimum 30 psi; close the valve and sustain pressure for a minimum of five minutes.

If loss of pressure exceeds 3 psi or does not stabilize, locate the faulty area, repair, and retest (either vacuum or air test).

5.5.1.2 Vacuum Testing

The equipment shall be comprised of the following:

- A vacuum box assembly consisting of a rigid housing, a transparent viewing window, a soft neoprene gasket attached to the bottom, port hole or valve assembly, and a gauge to indicate chamber vacuum;
- A pump assembly equipped with a pressure controller and pipe connections;
- A rubber pressure/vacuum hose with fittings and connections;



- A bucket and wide brush or spray assembly;
- A soapy solution.

The following procedures will generally be followed:

1. Wet a strip of geomembrane approximately 12 x 48 inches with the soapy solution.
2. Place the box over the wetted area.
3. Close the bleed valve and open the vacuum valve.
4. Ensure that a leak-tight seal is created.
5. Energize the vacuum pump and reduce the tank pressure to approximately 5 psi.
6. For a period of approximately 10 seconds, examine the geomembrane through the viewing window for the presence of soap bubbles.

If no bubble appears after 10 seconds, close the vacuum valve, and open the bleed valve, move the box over the next adjoining area with a minimum of 1-inch overlap, and repeat the process. Areas where soap bubbles appear shall be marked and repaired in accordance with Section 5.6.

The ENGINEER shall document the following for each non-destructive seam test:

- Date;
- Seam number;
- Welder I.D.;
- Seamer;
- Air Pressure.

5.5.2 Destructive Testing

Destructive seam tests, including extrusion weld seams, shall be performed every 500 lineal feet of seam, or at least one per seaming device per crew per day. This requirement will apply to all seams with the exception of the seam connecting the base liner to the cover system liner. The purpose of these tests is to check that welds are fully integrated with each other and to evaluate seam strength. Seam strength testing shall be done as the seaming work progresses, not at the completion of field seaming.

5.5.2.1 Location and Frequency

The ENGINEER shall select locations where seam samples will be cut. These locations shall be estimated as follows:

1. A minimum frequency of one test location per 500 feet of seam length, or at least one per seaming device per crew per day. This minimum frequency is to be determined as an average taken throughout the entire facility.
2. The seaming technician shall not be informed in advance of the locations where the seam samples will be taken.



5.5.2.2 Sampling Procedure

Sampling shall be cut by the installer as the seaming progresses in order to have laboratory test results before the geomembrane is covered by another material. The GEOSYNTHETIC INSTALLER shall:

1. Cut samples.
2. Assign a number to each sample that is to be based upon seam and sample number and mark it accordingly.
3. Record sample location on construction record drawings.
4. All holes in the geomembrane resulting from destructive seam sampling shall be immediately repaired in accordance with repair procedures described in Section 5.6. The continuity of the new seams in the repaired area shall be tested according to this section.

5.5.2.3 Size of Samples

The samples for field-testing shall be taken by the installer. These samples shall be 1 by 12 inches with the seam-centered perpendicular to the length.

If both samples pass the field tensiometer test, the initial samples shall be cut into two parts and distributed as follows:

1. One portion to the installer for laboratory testing (12 x 12 inches)
2. One portion to the Owner for archive storage (12 x 12 inches)

Final determination of the sample sizes shall be determined prior to liner installation at the preconstruction meeting.

5.5.3 Field Testing

The 1-inch wide strips shall be tested in the field for peel and shear and shall not fail in the seam. If any field test sample fails to pass, then the procedures outlined in this section shall be followed.

5.5.4 Laboratory Testing

Passing tensiometer testing in the field qualifies the sample for laboratory testing.

Destructive test samples shall be packaged and shipped to the geomembrane testing laboratory consultants by overnight mail. The laboratory shall provide test results to the ENGINEER.

Destructive testing involves two techniques: 1) shear testing, and 2) peel testing. Shear testing applies a tensile stress from the top sheet through the weld and into the bottom sheet. Peel testing peels the top sheet back against the overlapped edge of the bottom sheet in order to observe how separation occurs. The peel test indicates whether or not the sheets are continuously and homogeneously connected through the seam. A total of 10 coupons will be subject to testing, for which 5 will be tested in shear and 5 in peel (ASTM 6392). Fusion seam specimens will have both tracks tested in peel.



Both tests (shear and peel) must have a Film Tearing Bond (FTB) type of separation to pass. With an FTB, the polymer material tears indicating a fully integrated connection between top and bottom sheets. It is important that no weld bead/sheet or sheet/sheet interface exists as such an interface might be separated by absorbed chemicals, causing failure of the seam. The criteria for pass/fail are outlined in Table 3.

The ENGINEER shall document the following for each non-destructive seam test:

- Location;
- Seam number;
- Welder I.D.;
- Seamer;
- Sample I.D.

5.5.5 Procedures for Destructive Test Failure

The following procedures shall apply whenever a sample fails a destructive test. The GEOSYNTHETIC INSTALLER has two options:

1. Reconstruct the seam between the two adjacent passed test locations.
2. Trace the welding path to intermediate locations (10 feet minimum from the point of the failed test in each direction) and take a sample for an additional field test at each location. If these additional samples pass the field test, then full laboratory samples shall be taken. If these laboratory samples pass the tests, then the seam is reconstructed between these locations. If either laboratory sample fails, then the process is repeated to establish the zone in which the seam shall be reconstructed.

All acceptable seams must be bound by two locations from which samples passing laboratory destructive tests have been taken.

The GEOSYNTHETIC INSTALLER shall document all actions taken in conjunction with destructive test failures; e.g., capping of failed seam area.

5.6 DEFECT AND REPAIRS

All seams and non-seam areas of the geomembrane shall be examined by the installer for identification of defects, holes, blisters, undispersed raw materials, and any sign of contamination by foreign matter.

5.6.1 Evaluation

Each suspect location both in seam and non-seam areas shall be nondestructively tested using the methods described in this section as appropriate. Each location that fails the nondestructive testing shall be marked by the GEOSYNTHETIC INSTALLER and repaired. Work shall not proceed with any materials that will cover locations that have been repaired until non-destructive test results are recorded.



5.6.2 Repair Procedures

All portions of the geomembrane exhibiting a flaw or failing a destructive or nondestructive test shall be repaired. Several procedures exist for the repair of these areas. The final decision as to the appropriate repair procedure shall be agreed upon between the ENGINEER, GEOSYNTHETIC INSTALLER, and Owner. The procedures available include:

1. Patching: Used to repair large holes, tears, and contamination by foreign matter.
2. Buffing and re-welding: Used to repair small sections of extruded seams.
3. Spot welding or seaming: Used to repair small tears, pinholes, or other minor localized flaws.
4. Capping: Used to repair areas of inadequate seams that have an exposed edge.

In addition, the following provisions shall be satisfied:

1. Surfaces of the geomembrane that are to be repaired shall be abraded no more than one hour prior to the repair.
2. Surfaces must be clean and dry at the time of repair.
3. Seaming equipment used in repairing procedures must be approved.

The repair procedures, materials, and techniques shall be approved in advance of the specific repair by the ENGINEER.

Patches or caps shall extend at least 6 inches beyond the edge of the defect, and all corners of patches shall be rounded with a radius of at least 3 inches.

5.6.3 Verification of Repairs

Each major repair requiring a patch or cap shall be identified in the GEOSYNTHETIC INSTALLER's repair log. Each repair shall use nondestructive test methods described in this section as appropriate. Repairs that pass the nondestructive test shall be taken as an indication of an adequate repair. Failed tests indicate that the repair shall be re-done and re-tested until a passing test result is obtained. The ENGINEER may choose to take a destructive test in an area of repair. The ENGINEER shall document the location of each type of repair and the type of repair made.

5.7 FINAL ACCEPTANCE

The geomembrane must be final observed for completion of liner construction activities. The final inspection shall be performed by the ENGINEER, GEOSYNTHETIC INSTALLER and Owner. The ENGINEER and GEOSYNTHETIC INSTALLER shall document completion or incompletion. The GEOSYNTHETIC INSTALLER shall repair or complete any testing that has been determined incomplete. The ENGINEER and GEOSYNTHETIC INSTALLER shall then re-inspect the repairs or testings to complete final inspection. GEOSYNTHETIC INSTALLER will submit to ENGINEER results of all testing conducted, including the pre-welding tests, non-destructive tests, and destructive tests performed onsite. GEOSYNTHETIC INSTALLER must provide a report following completion of the project that includes the



results for the destructive test samples from an independent laboratory, pre-seaming tests, on-site destructive and non-destructive tests, certificate of completion and an as-built drawing.

Geomembrane material shall be final inspected prior to being covered by overlying geosynthetic materials or soil layers. Vehicle use directly over the geomembrane is prohibited as a standard means of deployment.

The geosynthetic lining system shall be accepted when the final observation and documentation is complete and approved by the ENGINEER and Owner.

5.8 CONFORMANCE WITH PROJECT SPECIFICAITONS

The ENGINEER shall document that the installation and necessary repairs were done in accordance with the project specifications.



6.0 GRANULAR DRAINAGE MEDIA

6.1 GENERAL

The granular drainage media consists of natural material used as a drainage layer in a base liner system.

6.2 MATERIAL QUALITY CONTROL

Samples of the granular drainage media will be tested for grain size distribution and hydraulic conductivity. Testing frequencies are provided in Table 2. Material source testing is to be performed in accordance with the specifications.

The ENGINEER shall examine the results and report any nonconformance to the Owner. QC results shall be reviewed and accepted or rejected by the ENGINEER prior to installation.

6.3 OBSERVATION AND DOCUMENTATION

Observation of the construction work by ENGINEER or Owner include the following:

- Hauling of material to ensure no damage to underlying geosynthetics;
- Spreading of granular drainage media material to ensure excess wrinkling of underlying geosynthetics does not occur;
- Placement of filter aggregates to ensure pipes are properly bedded and covered;
- Documentation will include; laboratory test data, material information, placement methods and thicknesses, and construction procedures used to prevent migration of fines by run-off into the leachate collection system.

6.4 TESTING

Laboratory test methods and frequencies upon which acceptability evaluations can be based are as provided in Table 2.

CQA testing will be conducted on samples taken from the material during the course of construction. Sampling locations will be selected by ENGINEER or Owner according to the number of required tests. Locations of all tests will be documented for report purposes.

6.5 DAMAGE AND REPAIRS

Granular drainage media that does not meet the requirements of the CQA Plan or the Specifications will be removed and replaced with suitable material.

6.6 SURVEY

The minimum thickness of soil drainage media shall be as shown on the drawings and extending over the lining system. The thickness of granular drainage media shall be verified on a grid using methods that shall not damage the liner. Grading tolerances are provided in Table 1.

6.7 CONFORMANCE WITH PROJECT SPECIFICATIONS

The ENGINEER shall document that the granular drainage media installation was done in accordance with the project specifications.



7.0 PIPING SYSTEMS

7.1 GENERAL

This section addresses the HDPE piping installed in the leachate collection pipe trenches and leachate forcemain.

7.2 MATERIAL QUALITY CONTROL

The CONTRACTOR (or other piping contractor, if applicable) shall inspect all piping and fittings received at the site and shall verify that piping materials are:

1. In accordance with drawings and specifications (size, SDR ratio, schedule, material).
2. Free of material defects.
3. Undamaged.
4. Resistant to corrosion

CONTRACTOR shall be responsible for storing piping materials in a protected location where they will not be damaged.

The ENGINEER shall examine the results and report any nonconformance to the Owner. QC results shall be reviewed and accepted or rejected by the ENGINEER prior to installation.

7.3 OBSERVATION AND DOCUMENTATION

CONTRACTOR shall install piping at locations and elevations as shown on drawings. All piping connections shall be made in accordance with manufacturer's recommendations. Installation of backfill around piping shall be done carefully to ensure damage to the piping does not occur. ENGINEER will document piping types installed, methods of connection/fitting types, and backfilling procedures. Documentation of the piping will include information on the method used to join sections of the pipe.

7.4 DAMAGE AND REPAIRS

Damaged or defective portions of the piping, as determined by ENGINEER, will be removed and replaced.

7.5 SURVEY

The piping trenches will be surveyed for horizontal and vertical position. Critical points of the piping will be surveyed. Invert tolerances are provided in Table 1.



7.6 CONFORMANCE WITH PROJECT SPECIFICATIONS

The ENGINEER shall document that the piping installation was done in accordance with the project specifications.



8.0 VEGETATIVE SOILS

8.1 GENERAL

The vegetative layer will be topsoil capable of sustaining vegetative grasses on the back side of the perimeter berm and any other disturbed areas as designated on the drawings.

8.2 OBSERVATION AND DOCUMENTATION

The ENGINEER will observe and document the placement methods of the vegetative soils. The CONTRACTOR (or other contractor, if applicable) shall ensure conformance to the project requirements regarding topsoil quality and placement, fertilizer content and application, seed mixture, seeding operations, mulching, and reseeding/repair work to sustain vegetation.

The ENGINEER shall examine the results and report any nonconformance to the Owner. QC results shall be reviewed and accepted or rejected by the ENGINEER prior to installation.

8.3 DAMAGE AND REPAIR

Seeded areas must be guaranteed by the CONTRACTOR to be alive and in satisfactory growth for a period of 1 year. If areas of non-growth or spotty growth are present, they will be reseeded.



9.0 CONSTRUCTION DOCUMENTATION, DOCUMENTATION REPORT, AND RECORD DRAWINGS

9.1 CONSTRUCTION DOCUMENTATION

The QAC will maintain a daily log of activities of the site. The daily log will generally include the following:

1. Date and weather conditions
2. List of contractor's equipment and all subcontractors at work at the site
3. A summary of the work completed during the day, including:
   a. Work by contractor / subcontractors
   b. Grade verification data collected
   c. CQA testing and/or samples collected
   d. A description of materials used.
4. A list of personnel who visited the site.
5. A summary of project communications that resulted in decisions impacting the construction activities.
6. A description of any work that deviated from the plans and specifications as well as a summary of communications regarding such work.

Photographs should be collected daily or as construction activities change to document overall progress and to show material and construction procedures used. Photographs should also be used to document discussion items, deviations from the plans and specifications, and/or materials and methods used to rectify construction issues. Photographs should be organized and named appropriately, based on subject.

9.2 DOCUMENTATION REPORT

The documentation report is the summary of the construction activities that were documented throughout the project. The construction portion of the report will include discussion of all documented procedures. The report will include results from field and laboratory tests and summarize survey documentation. A summary of the documentation report is as follows:

1. Summary of relevant construction specifications
2. Photo documentation of all critical aspects of construction (select photographs, appropriately labeled
3. Narrative description of all as-built variances from the plans and/or specifications
4. Survey documentation of liner system soil components and/or a table of layer thickness measurements
5. As-built elevations for all pipe inlets and outlets and pump-on/pump-off controls
6. All material testing results and a review of the results
7. Geomembrane installation information.
8. A schedule of major events during construction, including start and finish dates
9. A list of contractors and subcontractors involved in the project
10. A summary description of procedures and equipment used



11. Description or figure of the locations of moisture/density tests for each lift and for permeability test samples
12. Leak Location Survey Report
13. Record drawings

The documentation report will be certified by a Professional Engineer registered in the State of Minnesota.



TABLES

TABLE 1

System Grading Tolerances

Base Lining System Grading Tolerances				
Soil Layer/Surface	**Measurement**	**Method**	**Pass/Fail Criteria**	**Frequency**
Top of Subgrade	Elevation	Survey	-0.2’ to 0.0’	100′ grid*
Top of Soil liner (base grade)	Thickness[1]	Survey	0.0’ to +0.2′	100′ grid*
Granular drainage layer	Thickness	Survey	0.0’ to +0.2′, 1’ minimum thickness	100′ grid*
Piping System Grading Tolerances				
Surface	**Measurement**	**Method**	**Pass/Fail Criteria**	**Frequency**
Leachate Collection System Piping / Other Piping	Elevation	Survey	±0.2’	50’ and changes in direction and all pipe fittings

* Also breaks in grade and bases of sumps.

[1] Minimum thickness as specified on the Drawings per the selected base liner system profile.

TABLE 2

Soils Quality Assurance Testing Requirements

Subgrade / Controlled fill			
Test	**ASTM Method**	**Pass/Fail Criteria**	**Frequency**
Standard Proctor	D698	NA	Minimum 1 per each material type used
USCS Classification	D2487		
Dry Density	D6938 (nuclear)	≥95% Standard Proctor	1/Acre (Top of Cell Subgrade) 1/2,000 CY Placed, minimum 1 per placed lift (Subgrade and Berm Construction/Embankment)

Soil Barrier Layer			
Test	**ASTM Method**	**Pass/Fail Criteria**	**Frequency**
Standard Proctor	D698	max particle size 3/8-inch	1/3,000 cubic yards
USCS Classification	D2487		
Dry Density	D6938 (nuclear)	≥95% Standard Proctor	Test on 100-foot grid pattern Offset every lift-min 5 tests/acre

Clay Barrier Layer Testing (Sump Area)			
Test	**ASTM Method**	**Pass/Fail Criteria**	**Frequency**
Grain Size	D6913/D7928 and D1140	≥50% passing the #200 sieve; max particle size 3/8-inch	1/3,000 cubic yards
Atterberg Limits	D4318	LL≥25% PI≥12	
USCS Classification	D2487	CL, CH, SC	
Standard Proctor	D698	NA	
Permeability (see Note 2)	D5084	Max. 1 x 10^{-7} cm/sec	1 per acre/foot
Dry Density and Moisture Content	D6938 (nuclear)	≥95% Standard Proctor and 0% to +5% of the OMC	Test on 100-foot grid pattern Offset every lift-min 5 tests/acre

Sand Drainage Layer Testing			
Test	**Method**	**Pass/Fail Criteria**	**Frequency**
Permeability	D2434	1x10^{-3} cm/sec at 90% Standard Proctor density	1 per acre
Grain Size and USCS Classification	D6913, D1140, D2487	Per Specifications	1/2,000 cubic yards

Coarse and Intermediate Aggregate Testing			
Test	**Method**	**Pass/Fail Criteria**	**Number of Tests**
Grain Size and USCS Classification	D6913 and D2487	Per Specifications	1/1000 feet (Min. 3)

TABLE 3

Geosynthetic Quality Assurance Testing Requirements

Geomembrane Testing		
Test	**Reference**	**Frequency**
Material Properties	GRI GM 13	By manufacturer Every roll provided
Visual Inspection	--	Entire sheet
Trial Seam Welding	--	Start of seaming process, any time equipment turned off, at the end of each work day, twice per day minimum, each seamer or seaming apparatus
Non-Destructive Seam Testing	--	All seams/patches
Destructive Seam Strength Test	ASTM D6392; GRI GM 19a	1 test per 500 L.F. seam minimum

Geotextile/Geonet/Geonet Geocomposite / GCL		
Test	**Reference**	**Frequency**
Material Properties	Spec Section 02921 02924 02273	By manufacturer Every Roll Provided
Visual Inspection of Material and Seams	Spec Section 02921 02924 02273	Entire installation

Attachment 1: Technical Specifications

SECTION 02201

GRANULAR DRAINAGE LAYER

PART 1 - GENERAL

1.01 SUMMARY

A. Work under this section includes descriptions and requirements for the installation of the granular drainage layer placed as shown on the drawings directly over the primary liner system for cell construction.

1.02 REFERENCES

A. American Society for Testing and Materials (ASTM):

1. ASTM D6913- Standard Test Methods for Particle-Size Distribution (Gradation) of Soils using Sieve Analysis
2. ASTM D7928 - Standard Test Methods for Particle-Size Distribution (Gradation) of Fine-Grained Soils using the Sedimentation (Hydrometer) Analysis
3. ASTM D698 – Test Method for Laboratory Compaction Characteristics of Soil Using Standard Effort.
4. ASTM D2434 – Standard Test Method for Permeability of Granular Soils (constant head).
5. ASTM D2487 – Standard Practice for Classification of Soils for Engineering Purposes (Unified Soil Classification System

1.03 SUBMITTALS

A. Location of off-site source of materials.
B. Name, address, telephone number and contact person of independent soils laboratory.
C. Material test results as detailed in Section 1.04.
D. Method of off-site source soils material sampling and analyses.
E. Off-site source material quality control analyses shall be submitted at least 14 days prior to installation.
F. Proposed haul road planned for transportation of all off-site materials to the project site.

1.04 SOIL MATERIAL SOURCE QUALITY ASSURANCE

A. Independent soils laboratory to be approved by OWNER.

B. Source testing to be performed by CONTRACTOR at no cost to the OWNER.

C. Permeability testing to be done at 90% of standard Proctor density in accordance with ASTM D698.

D. Provide the following source test results for material test requirements:

Property	Test Method	Frequency
Grain Size Analysis	ASTM D6913/ D7928	1/2000 cy
Permeability	ASTM D2434	1/2000 cy
USCS Soil Classification and Uniformity Coefficient	ASTM D2487	1/2000 cy

PART 2 – PRODUCTS

2.01 GRANULAR DRAINAGE MATERIAL

A. CONTRACTOR to supply Granular Drainage Material meeting the requirements of Part 2.01.B below.

B. Granular sand, consisting of rounded to sub-rounded particle material, durable particles, inorganic non-calcareous material (no limestone source rock). Free from organic substance and other deleterious matter.

1. Uniformity coefficient: Less than 6
2. Grain Size: Range from minimum 99% passing the 3/8-inch sieve to maximum 5% by weight passing #200 sieve.
3. Minimum permeability of $1x10^{-3}$ cm/sec at 90 percent of Standard Proctor density.

PART 3 - EXECUTION

3.01 FILL USAGE

A. Directly over geomembrane as shown on Drawings.

3.02 PREPARATION

A. CONTRACTOR to receive OWNER'S permission to begin installation of granular drainage layer.

B. CONTRACTOR shall be responsible for surface water control within construction limits and shall keep the construction area well drained and minimize surface water ponding.

C. Subgrade elevation shall be documented by the CONTRACTOR or ENGINEER prior to placement of granular drainage layer material.

3.03 PLACEMENT

A. Placement of granular materials on geomembrane shall not proceed at ambient temperatures below 5°C (40°F).

B. Spread with one pass of low ground pressure tracked equipment or equivalent as approved by ENGINEER prior to placement. Do not allow rubber-tired vehicles on granular blanket after placement. Operation of hauling equipment will be allowed only on areas with a 3-foot minimum thickness of granular drainage material; no sharp turns shall be permitted. Provide a minimum thickness of 12 inches of drainage sand for tracked equipment on the geomembrane.

C. Spread upslope (90° to slope) only. No abrupt stops on slope. No stockpiling on slope.

D. Do not compact material on geosynthetics.

E. Protect buried pipes, geotextiles, geosynthetics, and similar installations.

F. Granular materials shall not be placed over a fold in the geomembrane; CONTRACTOR to utilize spotter(s) as necessary to prevent folding of the geomembrane as the drainage material is spread.

G. CONTRACTOR shall place granular material by such method as to prevent wrinkling and possible damage to the HDPE liner once the geosynthetic lining system has been accepted by the ENGINEER. It shall be the CONTRACTOR'S responsibility to ensure that the geosynthetics are not damaged. Should they become damaged, the CONTRACTOR shall at his own expense:

1. Immediately notify the ENGINEER, and
2. Have the geosynthetic installer make any necessary repairs at the CONTRACTOR'S expense.

3.04 FIELD QUALITY CONTROL

A. Comply with approved Quality Assurance Manual. CONTRACTOR shall cooperate and assist the ENGINEER with obtaining required documentation and testing.

B. Specified soil layers shall be graded to the minimum thicknesses as shown on drawings and specified herein. Thickness tolerance of the granular drainage layer must be between –0.0 and +0.2 feet.

C. Testing:
1. Granular drainage layer in-place testing will be performed through the Project by ENGINEER to monitor material parameters
2. Tests performed and frequency of tests specified are listed in the Construction Quality Assurance Manual.

3.05 ADJUSTMENT AND CLEANING

A. Remove excess material not suitable for use to OWNER designated on-site stockpile. Grade to drain.

END OF SECTION

SECTION 02202

COARSE AGGREGATE

PART 1 - GENERAL

1.01 SUMMARY

A. Work under this section includes descriptions and requirements for supply and installation of the coarse aggregate as shown on the Drawings in the leachate collection system.

1.02 REFERENCES

A. American Society for Testing and Materials (ASTM):

1. ASTM D6913- Standard Test Methods for Particle-Size Distribution (Gradation) of Soils using Sieve Analysis
2. ASTM D2487- Standard Practice for Classification of Soils for Engineering Purposes (Unified Soil Classification System)

1.03 SUBMITTALS

A. Location of off-site source of materials.

B. Name, address, telephone number and contact person of independent soils laboratory.

C. Material test results as detailed in section 1.04.

D. Method of off-site source soils material sampling and analyses.

E. Off-site source material quality control analyses shall be submitted at least 14 days prior to installation.

F. Proposed haul road planned for transportation of all off-site materials to the project site.

1.04 SOIL MATERIAL SOURCE QUALITY CONTROL

A. Independent soils laboratory to be approved by OWNER.

B. Source testing to be performed by CONTRACTOR at no cost to the OWNER.

C. Provide the following source test results for material test requirements:

Property	Test Method	Frequency
Grain Size Analysis*	ASTM D6913	1/1000 LF of trench
USCS Soil Classification and Uniformity Coefficient*	ASTM D2487	1/1000 LF of trench

*Min. 3 samples per source

PART 2 - PRODUCTS

2.01 SOIL MATERIALS

A. CONTRACTOR Supplied Coarse Aggregate

Granular material, bank-run gravel, consisting of sub-angular to rounded particle material (crushed aggregate not allowed), durable particles (no limestone source rock).

1. Uniformity coefficient: Less than 4.
2. Grain Size: Range from minimum 99% passing the 1.5-inch sieve to maximum 1% by weight passing 5/8-inch sieve.
3. Contains no organic matter
4. Non-calcareous material

PART 3 – EXECUTION

3.01 FILL USAGE

A. Coarse Aggregate: Leachate collection line trenches and leachate collection sump as shown on Drawings.

3.02 PREPARATION

A. CONTRACTOR shall receive OWNER'S permission to begin installation of coarse aggregate.

3.03 PLACEMENT

A. Transport material into landfill cell in a manner that will not damage underlying soil or synthetic layers. Low ground pressure equipment shall be used and no sharp turns with tracked equipment shall be made.

B. The coarse aggregate must be placed over a geotextile and not come into contact with the geomembrane.

C. Do not compact.

D. CONTRACTOR shall place coarse aggregate by such method as to prevent wrinkling and possible damage to the underlying geosynthetics. Once the geosynthetic lining system has been accepted by the OWNER, it shall be the CONTRACTOR'S responsibility to ensure that the geosynthetics are not damaged. Should they become damaged, the CONTRACTOR shall at his own expense:

1. Immediately notify ENGINEER

2. Have the geosynthetic installer make any necessary repairs at the CONTRACTOR'S expense.

E. If a rock box is used, a granular drainage layer thickness of 3 feet shall be present over the underlying geosynthetics below the box.

3.04 FIELD QUALITY CONTROL

A. Comply with approved Construction Quality Assurance Manual. Cooperate with quality control program.

B. Testing:

1. In-place tests performed, and frequency of tests, specified in the Construction Quality Assurance Manual.
2. CONTRACTOR is responsible for all costs related to retests of materials not meeting specifications.

3.05 ADJUSTMENT AND CLEANING

A. Stockpile excess material not suitable for use for any part of the project in OWNER designated location at the site.

END OF SECTION

SECTION 02203

INTERMEDIATE FILTER AGGREGATE

PART 1 - GENERAL

1.01 SUMMARY

A. Work under this section includes descriptions and requirements for the installation of the intermediate filter aggregate as shown on the Drawings.

1.02 REFERENCES

A. American Society for Testing and Materials (ASTM):

1. ASTM D6913- Standard Test Methods for Particle-Size Distribution (Gradation) of Soils using Sieve Analysis
2. ASTM D2487- Standard Test Method for Classification of Soils for Engineering Purposes

1.03 SUBMITTALS

A. Location of off-site source of materials.

B. Name, address, telephone number and contact person of independent soils laboratory.

C. Method of off-site source soils material sampling and analyses.

D. Off site material source quality control analyses shall be submitted at least 14 days prior to installation.

E. Intermediate filter aggregate relationship to coarse aggregate and granular drainage layer material shall be submitted to show compliance with this spec section.

F. Proposed haul route planned for transportation of all off-site materials to the project site.

1.04 SOIL MATERIAL SOURCE QUALITY CONTROL

A. Independent soils laboratory to be approved by OWNER.

B. Source testing to be performed by CONTRACTOR at no cost to the OWNER.

C. Provide the following source test results for material test requirements:

Property	Test Method	Frequency
Grain Size Analysis*	ASTM D6913	1/1000 LF of trench
USCS Soil Classification and Uniformity Coefficient*	ASTM D2487	1/1000 LF of trench

*Min 3 samples per source.

PART 2 - PRODUCTS

2.01 SOIL MATERIALS

A. CONTRACTOR Supplied Intermediate Filter Aggregate: Durable, washed, coarse rounded to subangular, durable gravel (no limestone source rock).
   a. Contains no organic matter
   b. Non-calcareous material
   c. Crushed aggregate and/or limestone are not allowed.

B. The intermediate filter aggregate shall exhibit the following relationships to the coarse aggregate:

   1. $\frac{D_{15}\text{ (coarse aggregate)}}{D_{85}\text{ (intermediate filter aggregate)}} \leq 5$

   2. $\frac{D_{50}\text{ (coarse aggregate)}}{D_{50}\text{ (intermediate filter aggregate)}} \leq 25$

   3. $\frac{D_{15}\text{ (coarse aggregate)}}{D_{15}\text{ (intermediate filter aggregate)}} \geq 5$

C. The intermediate filter aggregate shall exhibit the following relationships to the granular drainage material:

   1. $\frac{D_{15}\text{ (intermediate filter aggregate)}}{D_{85}\text{ (granular drainage material)}} \leq 5$

   2. $\frac{D_{50}\text{ (intermediate filter aggregate)}}{D_{50}\text{ (granular drainage material)}} \leq 25$

   3. $\frac{D_{15}\text{ (intermediate filter aggregate)}}{D_{15}\text{ (granular drainage material)}} \geq 5$

   Where D_{15}, D_{50}, and D_{85} are the diameters with which 15%, 50%, and 85% by weight are finer than, respectively.

PART 3 - EXECUTION

3.01 FILL USAGE

A. Intermediate Filter Aggregate: Leachate collection trenches and sump in the landfill between coarse aggregate and granular drainage layers as shown on the Drawings.

3.02 PREPARATION

A. CONTRACTOR to receive OWNER'S permission to begin installation of intermediate filter aggregate.

3.03 PLACEMENT

A. Transport material into landfill cell in a manner that will not damage underlying soil or synthetic layers. Low ground pressure equipment shall be used and no sharp turns with tracked equipment shall be made.

B. Aggregates must not come into contact with the geomembrane.

B. Do not compact.

C. CONTRACTOR shall place material by such method as to prevent wrinkling and possible damage to the underlying geosynthetics. Once the geosynthetic lining system has been accepted by the OWNER, it shall be the CONTRACTOR'S responsibility to ensure that the geosynthetics are not damaged. Should they become damaged, the CONTRACTOR shall at his own expense:

1. Immediately notify ENGINEER
2. Have the geosynthetic installer make any necessary repairs at the CONTRACTOR'S expense.

D. If a rock box is used, a granular drainage layer thickness of 3 feet shall be present below the box.

3.04 FIELD QUALITY CONTROL

A. Comply with approved Quality Assurance Manual. Cooperate with quality control program.

B. Testing:

1. In-place tests performed, and frequency of tests, specified in the Quality Assurance Manual.
2. CONTRACTOR is responsible for all costs related to retests of materials not meeting specifications.

3.05 ADJUSTMENT AND CLEANING

A. Stockpile excess material not suitable for use in OWNER designated location.

END OF SECTION

SECTION 02205

COMPACTED SOIL BARRIER LAYER

PART 1 - GENERAL

1.01 SUMMARY

A. Work under this section includes descriptions and requirements for installation of the clay barrier layer located in the sumps as shown on the Drawings.

1.02 REFERENCES

A. American Society for Testing and Materials (ASTM):

1. ASTM D6913- Standard Test Methods for Particle-Size Distribution (Gradation) of Soils using Sieve Analysis
2. D7928- Standard Test Methods for Particle-Size Distribution (Gradation) of Fine-Grained Soils using the Sedimentation (Hydrometer) Analysis
3. ASTM D698 – Standard Test Method for Laboratory Compaction Characteristics of Soil Using Standard Effort.
4. ASTM D854 – Standard Test Method for Specific Gravity of Soils.
5. ASTM D1140 - Standard test method for amount of material in soils finer than the No. 200 (75 um) sieve.
6. ASTM D1587 - Standard Practice for Thin-Walled Tube Sampling of Soils for Geotechnical Purposes.
7. ASTM D2216 - Standard test method for laboratory determination of water (moisture) content of soil and rock by mass.
8. ASTM D2487 - Standard Practice for Classification of Soils for Engineering Purposes (Unified Soil Classification System).
9. ASTM D2488 - Standard practice for description and identification of soils (visual-manual procedure).
1. ASTM D4318 - Standard test method for liquid limit, plastic limit, and plasticity index of soils.
11. ASTM D5084 - Standard test method for measurement of hydraulic conductivity of saturated porous materials using a flexible wall permeameter.
12. ASTM D6938 – Standard Test Method for In-place Density and Water Content of Soil and Soil-Aggregate by Nuclear Methods (Shallow Depth)

1.03 SUBMITTALS

A. Description of proposed blending equipment 7 days prior to clay placement.

1.04 SOIL MATERIAL QUALITY CONTROL

A. Clay barrier material to be provided and installed by CONTRACTOR
B. Source testing to be performed by CONTRACTOR
C. Permeability testing to be done at minimum 95% of standard Proctor dry density in accordance with ASTM D698.
D. Material shall meet the following properties:

Property	Test Method	Frequency
Hydraulic Conductivity (Permeability)	ASTM 5084	1 per 5,000 cubic yards

Grain Size Analysis	ASTM D6913/D1140	1 per 3,000 cubic yards
Atterberg Limits	ASTM D4318	1 per 3,000 cubic yards
USCS Soil Classification	ASTM D2487	1 per 3,000 cubic yards
Standard Proctor	ASTM D698	1 per 3,000 cubic yards

E. ENGINEER will perform in-place material testing in accordance with the Construction Quality Assurance Manual. CONTRACTOR may perform additional in-place material testing at no cost to the OWNER. If CONTRACTOR does perform additional in-place testing, CONTRACTOR shall submit all testing results to the OWNER and ENGINEER.

PART 2 - PRODUCTS

2.01 SOURCE OF MATERIAL

A. CONTRACTOR supplied material.

2.02 COMPACTED SOIL BARRIER LAYER

A. Compacted soil barrier layer (clay) material shall have a USCS classification of CL or CH, although SC or other soils that exhibit the following are acceptable:

Property	**Specification**
In-place permeability	$1x10^{-7}$ cm/sec or less when compacted to 95% of Standard Proctor dry density at a moisture content of 0% to +5% of the optimum moisture content
Grain size	Minimum 50% passing the #200 sieve, maximum particle size is 3/8-inch
Liquid limit	25% or greater
Plasticity index	12 or greater
Compaction	95% standard proctor density or greater at a moisture content 0% to +5% of the optimum moisture content

B. Clay barrier layer material shall contain no clods larger than 2 inches and be free of debris, roots, organic material, solid mineral material larger than 1 inch in diameter, angular stones of any diameter and other materials considered deleterious to the overlying geomembrane liner.

PART 3 – EXECUTION

3.01 FILL USAGE

A. Compacted soil (clay) barrier layer: Directly below geomembrane liner within the limits indicated on the Drawings for new cell construction within the sump areas. The layer thickness as shown on Drawings is the compacted thickness.

3.02 PREPARATION

A. Prepare surface to lines and grades as shown on Drawings.

B. CONTRACTOR shall be responsible for surface water control within construction limits and shall keep the construction well drained and minimize surface water ponding.

C. Proof roll surfaces to receive fill and subgrades within limits of excavation to determine existence of soft areas, areas loosened by frost action or softened by flooding, weather or of unsuitable materials.

1 Determination of soft, wet or loose areas will be based on ENGINEER'S judgment.

2. Soft areas will generally be detected by soil deflection of greater than 2 inches and accompanied with stress cracks in soil when rolled over by heavy construction equipment intended for the placement and compaction of clay.

D. Replace materials determined to be unsuitable or soft soils by sub-cutting 2 feet and replacing with common fill or other material approved by the ENGINEER in writing.

E. Subgrade elevation shall be documented by CONTRACTOR or ENGINEER prior to placement of clay barrier layer material.

3.03 PLACEMENT

A. CONTRACTOR shall place clay barrier layer material as follows:

Property	**Specification**
Maximum Compacted Lift Thickness	6 inches compacted (8-inch loose)
Minimum Compaction	95% of dry density, ASTM D698 Standard Proctor
Moisture Content	0% to +5% of the optimum moisture content*
Maximum Clod Size	Reasonably free of clods; max size 3 inches
Maximum Permeability	$1x10^{-7}$ cm/sec, (ASTM D5084-falling head)

*Acceptable moisture content may be adjusted based on source testing data from the actual clay borrow area to be used for construction.

B. The clay barrier material shall be within the specified moisture window prior to placement. Clay conditioning may be performed in the area designated by OWNER.

C. Material distribution and gradation throughout clay barrier shall be such that material is free from lenses, pockets, streaks or layers of material differing substantially in texture or gradation from surrounding material. Blend clay prior to compaction.

D. Uniformly distribute moisture content of clay material prior to and during compaction throughout each lift of material. Dry excavated materials too wet for immediate compaction to permit compaction conditions and at proper moisture content.

E. Place layers of clay to form continuous monolithic material. Remove excessively dry or wet soil before placement of additional lifts. Knead each lift into previously placed lift.

F. Compact with sheepsfoot roller, or similar kneading type compactor capable of influencing entire lift.

G. Final surface shall be smooth-rolled prior to geosynthetic placement. Finished surface will be smooth and even with no sheepsfoot roller indentations.

H. Construct sidewall liners by pushing clay material up the sidewall from the cell base. Placement or movement of clay down from the top of the sidewall will not be allowed. Placement and compaction of sidewall liner shall be performed in accordance with the specifications.

I. Do not place clay below air temperatures of 32°F, unless CONTRACTOR can demonstrate fill material temperature above freezing.

J. CONTRACTOR shall be responsible for the integrity of the clay liner and shall not allow the surface to dry or desiccate.

K. CONTRACTOR shall be responsible for maintaining the clay surface until it is covered by CONTRACTOR'S geosynthetic installation contractor.

L. Surface of clay liner must be approved by the Geosynthetics INSTALLER prior to installation of geosynthetics. Surface rutting or drying will not be acceptable. Surface must be smooth and free of debris, roots, and angular or sharp rocks larger than 3/8 inches in diameter to a depth of 4 inches below surface to be lined.

3.04 FIELD QUALITY CONTROL

A. Comply with approved Construction Quality Assurance Manual. CONTRACTOR shall cooperate and assist ENGINEER and OWNER with obtaining required documentation and testing.

B. Specified soil layers shall be graded to the minimum thicknesses as shown on drawings and specified herein. Thickness tolerance of the soil layers must be between -0.0 and +0.2 feet.

C. Testing:

1. Clay barrier layer in-place testing will be performed through the Project by ENGINEER to monitor clay parameters.
2. Tests performed and frequency of tests specified are listed in the Construction Quality Assurance Manual.
3. CONTRACTOR is responsible for all costs related to retests of materials not meeting specifications for in-place density, moisture, and permeability.
4. CONTRACTOR shall backfill all perforations of the clay layer by probe or sample tube with a 100% bentonite mixture. The mixture shall be compacted in-place with a tamping rod, or hand tamper, depending on the size of the perforation.

3.05 ADJUSTMENT AND CLEANING

A. Remove excess material not suitable for use to on-site stockpile in OWNER designated location. Grade to drain.

*** END OF SECTION ***

SECTION 02206

Buffer Soil Layer

PART 1 - GENERAL

1.01 SUMMARY

A. This section includes the placement of the buffer soils.

1.02 QUALITY ASSURANCE

A. In accordance with the Construction Quality Assurance Manual for this project.

PART 2 - PRODUCTS

2.01 SOIL MATERIALS

A. Buffer Soils:

1. Material will be supplied by the Owner and available from on-site stockpile/borrow areas. CONTRACTOR shall be responsible for selecting suitable buffer soil material to supplement in place soils as necessary.
2. Free from gravel, cinders, stone over 3/8-inch in any dimension and other undesirable material.

PART 3 - EXECUTION

3.01 FILL USAGE

A. Buffer soils: Directly below the geosynthetic liner components of the base liner system. The layer thickness as shown on Drawings is the compacted thickness.

3.02 PREPARATION

A. Surface Water Control:

1. CONTRACTOR responsible for surface water control within construction limits.
2. Keep construction and borrow areas well drained and minimize surface water pooling.

3.03 PLACEMENT OF BUFFER SOILS

A. Construct to limits and to the elevations as shown on Drawings.

B. Final surface must be firm and free of stones greater than 3/8-inch diameter or any other material which would be deleterious to the overlying geosynthetics layers.

C. Compact material to a minimum 95% of the Standard Proctor in accordance with ASTM D698.

D. Smooth drum surface to provide smooth surface for geomembrane installation. Remove and replace excessively soft or wet areas.

E. Final surface shall be smooth, uniform, and free from sudden changes in grade (such as vehicular ruts).

F. Before geomembrane installation begins, verify grade and accept subgrade per Section 02922.

3.04 FIELD QUALITY CONTROL

A. Comply with approved Quality Assurance Manual. Cooperate with quality control program.

B. Specified soil layers shall be graded to the minimum thicknesses as shown on drawings and specified herein. Thickness tolerance of the buffer soil layer must be between -0.0 and +0.2 feet.

C. Survey Requirements: ENGINEER shall perform documentation survey in accordance with the Quality Assurance Manual.

3.05 ADJUSTMENT AND CLEANING

A. Remove excess material not suitable for use to OWNER designated location on-site.

*** END OF SECTION ***

SECTION 02207

CONTROLLED FILL

PART 1 - GENERAL

1.01 SUMMARY

A. Work under this section includes descriptions and requirements of the OWNER-supplied native soils required for construction with controlled fill soils.

1.02 REFERENCES

A. American Society for Testing and Materials (ASTM):

1. ASTM D6913- Standard Test Methods for Particle-Size Distribution (Gradation) of Soils using Sieve Analysis
2. D7928- Standard Test Methods for Particle-Size Distribution (Gradation) of Fine-Grained Soils using the Sedimentation (Hydrometer) Analysis
3. ASTM D1140- Standard Test Method for Amount of Material in Soils Finer than the No. 200 (75 um) Sieve.
4. ASTM D698 - Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12 400 ft-lbf/ft3 (600 kN-m/m3)).
6. ASTM D2216- Standard Test Method for Laboratory Determination of Water (Moisture) Content of Soil, Rock, and Soil-Aggregate Mixtures.
7. ASTM D2487- Standard Practice for Classification of Soils for Engineering Purposes (Unified Soil Classification System).
9. ASTM D6938 – Standard Test Method for In-Place Density and Water Content of Soil and Soil-Aggregate by Nuclear Methods (Shallow Depth)

B. Minnesota Department of Transportation “Standard Specifications for Construction”, latest edition.

1.03 SUBMITTALS

A. None required.

PART 2 - PRODUCTS

2.01 CONTROLLED FILL

A. Shall consist of mineral soil free from organic materials, loam, wood, trash, and other objectionable materials which may be compressible or which cannot be properly compacted.

B. OWNER-supplied native excavated subsoil from designated borrow, excavation, and/or stockpile areas to be used for berms, embankments, backfill, and subgrade excavation replacement where applicable. CONTRACTOR to assist with sample collection for standard proctor testing for completion of project CQA program.

C. Material free from roots, debris, and stones larger than six (6) inches.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Examine and verify acceptability of surface to receive installation of material.

B. Proof-roll and examine surfaces to receive fill and subgrades within influence zone to determine existence of soft areas, areas loosened by frost action or softened by flooding, groundwater or weather or existence of unsuitable materials.

3.02 PREPARATION

A. Prepare surfaces to receive materials to lines and grades shown on Drawings prior to placement.

3.03 BACKFILLING AND COMPACTION

A. Notify ENGINEER before placing fill material.

B. Do not use frozen material or place fill on frozen subgrade.

C. Where pipes or electrical conduits are located, protect by backfilling influence zone down to undisturbed soil with controlled fill.

D. Place fill simultaneously on both sides of free-standing structures.

E. Provide mechanical compaction for cohesive material and vibratory compaction for granular materials. When approved by ENGINEER, jetting, flooding, puddling, or vibroflotation methods may be used for compacting if CONTRACTOR furnishes test results to confirm required degree of compaction being obtained uniformly throughout entire mass.

F. Lift Thickness and Compaction: Place and compact fill material in maximum lift thickness and to minimum densities listed below. Where “Quality Compaction Method” is listed, reference “Standard Specifications” Section 2106.3.G.2.

	Fill Placement	**Maximum Compacted Lift Thickness (inches)**	**Standard Proctor (%)**
1	Controlled Fill for Anchor Trench Backfill and Piping Installation Backfill	6	“Quality Compaction Method”
2	Controlled Fill for Temporary Berm Construction	6	“Quality Compaction Method”
3	Controlled Fill for Subgrade and Berm Construction	8	95
4	Controlled Fill for Unsuitable Material Subcut Replacement	8	100

3.04 FIELD QUALITY CONTROL

A. In-place testing shall be performed by ENGINEER in accordance with the Construction Quality Assurance manual; any laboratory retesting due to test failure will be paid for by the CONTRACTOR.

3.05 TRANSPORTATION AND HAUL ROADS

A. Observe State, County, and Local traffic rules and weight restrictions.

B. All vehicle trips loaded or unloaded shall be on designated haul roads only.

C. CONTRACTOR to coordinate selection of haul roads with the appropriate governing body and acquire any necessary permits.

D. On-site road utilized should be left in same or better condition than at start of project.

END OF SECTION

SECTION 02211

SITE PREPARATION

PART 1 - GENERAL

1.01 SUMMARY

A. Section includes the requirements for preparing the site for construction, stripping existing cover soils, and miscellaneous surface features.

1.02 DEFINITIONS

A. Structures and Surface Features: For purpose of this section, shall mean existing structures and surface features, including but not limited to buildings, pavements, curb and gutter, signs, posts, fences, trees, shrubs, other landscaped features.

B. Salvaged Topsoil: Natural loam, sandy loam, silt loam, silty clay loam, or clay loam humus-bearing soils available from overlying portions of areas to be excavated for construction.

C. Unsuitable Material: Topsoil, peat, organic soils, and materials containing slag, cinders, foundry sand, debris, and rubble or soil with less than required bearing capacity as determined by ENGINEER.

D. Utilities: Existing gas mains; water mains; electric lines; conduits, telephone, and other communication lines; sewer pipe; cable television, other utilities, and appurtenances.

1.03 PROJECT/SITE CONDITIONS

A. Provide 72 hour notice, prior to beginning construction, to OWNERS of utilities, structures, and surface features.

1.04 COORDINATION

A. Coordinate work with others performing work at project site.

B. Call Gopher One to check for utilities prior to beginning Work.

C. Coordinate with OWNER to complete private utility locate prior to beginning work.

PART 2 - PRODUCTS

(Not Used)

PART 3 - EXECUTION

3.01 PREPARATION

A. Provide protection and support during construction for existing utilities, structures, and surface features adjacent to construction area or easements and rights-of-way.

B. Remove obstructions such as mounds of dirt, stone or debris located within working limits.

C. Obstructions such as street signs, small culverts, and guard posts located within construction easements of rights-of-way may be removed if promptly replaced to original condition unless otherwise specified.

D. All material stockpile areas shall be stripped of topsoil prior to stockpiling.

E. Provide transportation of material and sites for stockpiles if adequate areas not available within the construction limits as shown on the Drawings.

3.02 RESTORATION

A. Restore existing utilities, surface feature, and structures to condition equal to or exceeding condition which existed prior to construction.

3.03 MAINTENANCE AND RESTORATION OF ON-SITE AND OFF-SITE HAUL ROADS

A. While hauling operations are in progress, CONTRACTOR shall maintain haul roads in condition satisfactory to the OWNER. Work shall include any or all of the following items:

1. Application of water
2. Bituminous material
3. Calcium chloride
4. Sweeping
5. Others as necessary

B. When hauling operations are completed, CONTRACTOR shall:

1. Restore to condition that existed at the time hauling operations were started; or
2. Compensate the local road authority in the amount satisfactory to that road authority.

C. The OWNER shall make the determination as to the kind and amount of Work required to restore the haul road to a condition equal to the time hauling operations began.

D. When hauling operations are complete and restoration is complete to the satisfaction of the OWNER, the CONTRACTOR will be relieved of any additional obligation in connection to the maintenance and restoration of the haul road.

END OF SECTION

SECTION 02220

EXCAVATION

PART 1 - GENERAL

1.01 SUMMARY

A. Work described in this section includes excavation for cell construction, anchor trench excavation, pipe installation and all excavations as shown on the Drawings. This section also includes any subgrade preparation required prior to backfilling.

1.02 REFERENCES

A. Minnesota Department of Transportation “Standard Specifications for Construction”, latest edition.

1.03 SUBMITTALS

A. Shoring, Bracing, and Sheeting Layout and Details: ENGINEER will review submitted material to ascertain effect on new construction. ENGINEER will not review shoring, bracing, and sheeting for structural integrity or effect on existing facilities.

B. Additional soil testing results as may be required.

1.04 QUALITY CONTROL

A. Sheeting, Shoring, and Bracing:

1. If determined necessary by CONTRACTOR, sheeting, shoring, and bracing shall be designed by a Professional Engineer registered in the state of Minnesota.
2. Sheeting, shoring, and bracing shall conform to safety requirements of federal, state, or local public agency having jurisdiction over such matters. Most stringent of these requirements shall apply.

1.05 DEFINITIONS

A. Influence Zone Under Foundations or Pavements: Area below foundation or pavement as bounded by 1 horizontal to 2 vertical slope extending outward from 1 ft beyond outer edges of foundation or pavement.

B. Influence Zone Around Piping or Electrical Ducts: Area below limits bounded by line 12 in. above pipe or duct and by 1 horizontal to 2 vertical slope extending outward from that line 1 ft beyond outer edge of pipe or duct.

C. Unsuitable Material: Topsoil, peat, organic soils, and materials containing slag, cinders, foundry sand, debris, and rubble or soil with less than required bearing capacity as determined by ENGINEER.

1.06 FIELD MEASUREMENTS

A. Verify control monuments and intended elevations for Work as shown on Drawings.

PART 2 - PRODUCTS

(NOT USED)

PART 3 - EXECUTION

3.01 EXAMINATION

A. Examine and verify acceptability and condition of surfaces to perform Work.

3.02 PREPARATION

A. Identify required lines, grades, levels, contours, and datum.

B. Protect benchmarks, structures, equipment, and partially completed Work.

C. Over-excavate soft areas of subgrade not capable of in-situ compaction as directed by ENGINEER. CONTRACTOR shall notify and receive approval from ENGINEER prior to any undercutting or over-excavation activities due to soft, saturated soils or other reasons.

D. Notify corporations, companies, individuals, or authorities owning above- or belowground conduits, wires, pipes, or other utilities running to property or encountered during excavating operations.

E. Cap or remove and relocate services in accordance with instructions by owners of services.

F. Protect, support, and maintain conduits, wires, pipes, and other remaining utilities in accordance with requirements of owners of said services.

G. CONTRACTOR may encounter groundwater and upward seepage during construction and is responsible for dewatering:

1. Keep excavations free from water.
2. Maintain groundwater minimum of 12 inches below excavations.
3. Remove soil disturbed by pressure or flow of groundwater and replace with free-draining material.
4. Maintain dewatering system to prevent uplifting of structures.
5. Protect adjacent properties from damage resulting from dewatering operations.
6. Dewatering wells shall be drilled, maintained, and abandoned in accordance with federal, state, and local ordinances.

H. Keep construction site free-draining.

I. Fill settled areas where excavations or trenches were backfilled and holes made by demolition, tree removal, and site preparation work.

J. Remove all topsoil, organic material, and soft, wet, or loose soils below proposed berm and roadway areas. During excavation or exposure of in-situ soils, the CONTRACTOR shall subcut 2 feet beneath plan subgrade if soft, wet, or loose soils are encountered. Replace unsuitable materials with controlled fill material. Soft,

wet, loose, and competent soils will be determined by the ENGINEER. CONTRACTOR shall notify and receive approval from ENGINEER prior to any undercutting or over-excavation activities due to soft, saturated soils or other reasons.

K. Disc level surfaces.

L. The CONTRACTOR shall stage construction to prevent slippage or sloughing of the berms during construction.

3.03 COMMON EXCAVATION

A. Excavations shall conform to lines and grades as staked, and as shown on Drawings.

B. Excavations beyond those lines and grades without the ENGINEER's authorization will be considered unauthorized work.

C. Method of excavation shall be consistent with soil types encountered and result in competent subgrade.

D. Remove stumps, roots, debris, large stones or boulders, and any other deleterious material from excavated materials to be used in embankments.

E. Do not excavate within influence zone of existing footings or foundations without prior approval of ENGINEER.

F. Upon completion of excavation, notify ENGINEER before proceeding with further work.

3.04 MUCK EXCAVATION

A. Excavate all saturated and unsaturated mixtures of soil and organic matter not suitable for foundation materials in accordance with Standard Specifications 2106.2.A.4. CONTRACTOR shall notify and receive approval from ENGINEER prior to any undercutting or over-excavation activities due to soft, saturated soils or other reasons.

3.05 ANCHOR TRENCH EXCAVATION

A. Excavate anchor trench to elevations and dimensions necessary to anchor geomembrane as shown on Drawings.

B. Coordinate all work with geomembrane installer.

3.06 WASTE EXCAVATION AND RELOCATION

A. Excavate waste from areas designated on the Drawings to achieve subgrade appropriate for geosynthetics installation and as necessary to expose tie-in to existing liner systems.

B. Relocate excavated waste to OWNER designated location and coordinate hauling and placement with site operations. CONTRACTOR shall compact relocated waste and place cover materials over exposed waste if directed by OWNER. Compaction and cover thickness requirements shall be designated by OWNER prior to waste excavation and relocation activities.

3.07 TRENCHING

A. Excavate to elevations and dimensions necessary to complete construction.

B. Trenching Tolerances:

1. Excavate so pipes, ducts, and conduits can be laid straight at uniform grade, without sags or humps, between elevations shown on Drawings.
2. Maximum width of excavation on top of pipe shall be outside diameter of pipe plus 24 inches, or as otherwise shown on the Drawings. When stringers and sheathing required, width of trench may be increased to allow for their use, provided provisions for this excess width of trench are met.
3. Where trench width for that portion of trench depth between trench bottom and outside top of pipe barrel, for any reason within CONTRACTOR'S control, exceeds specified limits, CONTRACTOR, at his expense, shall furnish pipe with strength adequate for actual trench width.
4. Excavate electrical conduit trenches as required so top of conduit shall be minimum of 36 inches below final grade or as shown on Drawings.

C. Do not advance excavation of trenches more than 300 feet ahead of completed pipe installation.

D. Do not excavate for manholes and other structures until scheduled for construction.

E. Do not excavate within influence zone of existing footings or foundations without prior approval of ENGINEER.

F. Excavation of Rigid Surfacing:

a. Remove width 1 foot beyond anticipated edge of excavation.
b. Saw to ensure straight joint.
c. Surface replacement shall match existing surfacing.

G. Excavation Across Roadways: Excavation shall conform to the requirements of local highway authority. In no case shall surface replacement edges bear on less than 12 inches of undisturbed soil.

3.08 FIELD QUALITY CONTROL

A. Subgrade elevations shall be surveyed prior to placement of fill material. Elevations of subgrade to be as shown on Drawings.

B. Subgrade elevations shall be between –0.2 and +0.0 feet.

C. Testing: in-place density/moisture testing of the final prepared subgrade surface within the cell construction limits will be performed as specified in the Construction Quality Assurance Manual, prior to clay barrier layer placement. CONTRACTOR shall prepare subgrade to 95% Standard Proctor. CONTRACTOR is responsible for all costs related to retests of materials not meeting specifications for in-place density/moisture.

3.09 ADJUSTMENT AND CLEANING

A. Stockpile excavated material suitable for backfill on site in OWNER designated location and grade to drain.

B. Haul excavated material not suitable for backfilling and unsuitable materials to OWNER designated location within the active working face or to on-site stockpile, as designated by OWNER.

END OF SECTION

SECTION 02273

GEOSYNTHETIC CLAY LINER

PART 1 - GENERAL

1.01 SUMMARY

A. Work covered under this section includes the manufacture, fabrication (if needed), and supply and installation of the geosynthetic clay liner (GCL). As part of the landfill composite liner system, all work shall be performed in accordance with the lines, grades, cross-sections, and dimensions on the DRAWINGS, or as directed by OWNER.

B. Sufficient geosynthetic clay liner and accessory bentonite shall be furnished to cover all areas to be lined as shown on the Drawings, including overlaps at field seams and anchor trenches.

C. It is the intent of these Technical Specifications to ensure that the performance criteria for these Projects are achieved. It shall be the CONTRACTOR'S responsibility to ensure that these criteria are met.

1.02 REFERENCES

A. American Society for Testing and Materials (ASTM):

1. ASTM D4632 – Standard Test Method for Grab Breaking Load and Elongation of Geotextiles
2. ASTM D5321 - Standard Test Method for Determining the Shear Strength of Soil-Geosynthetic and Geosynthetic-Geosynthetic Interfaces by Direct Shear
3. ASTM D5887 – Standard Test Method for Measurement of Index Flux Through Saturated Geosynthetic Clay Liner Specimens Using a Flexible Well Permeameter
4. ASTM D5890 – Standard Test Method for Swell Index of Clay Mineral Component of Geosynthetic Clay Liners
5. ASTM D5891 – Standard Test Method for Fluid Loss of Clay Component of Geosynthetic Clay Liners
6. ASTM D5993 – Standard Test Method for Measuring Mass Per Unit Area of Geosynthetic Clay Liners
7. ASTM D6243 - Standard Test Method for Determining the Internal and Interface Shear Strength of Geosynthetic Clay Liner by the Direct Shear Method
8. ASTM D6495 - Standard Guide for Acceptance Testing Requirements for Geosynthetic Clay Liners
9. ASTM D6496 – Standard Test Method for Determining Average Bonding Peel Strength Between Top and Bottom Layers of Needle-Punched Geosynthetic Clay Liners
10. ASTM D6768 – Standard Test Method for Tensile Strength of Geosynthetic Clay Liners

1.03 SEQUENCING AND SCHEDULING

A. Submit material delivery and installation schedule for incorporation into the project schedule.

1.04 SUBMITTALS

A. CONTRACTOR shall submit certification in writing that the surface upon which the geosynthetic clay liner is to be installed is acceptable (complete form contained at the end of this Section).

B. CONTRACTOR shall submit Certificate of Compliance from supplier for each roll of geosynthetic clay liner delivered to the site, indicating material compliance with the specified manufacturer specifications prior to or at the time of delivery of the material.

C. Test methods and results defining physical properties as specified herein, of the GCL to be used for this project. Test results shall be representative of each roll of GCL furnished for this project (e.g., a test sample taken between two consecutive rolls from a continuous run will be considered representative of both rolls). Test results shall be reported with corresponding roll identification numbers.

D. Statement of the GCL manufacturer's quality control procedures and frequency of sampling

E. CONTRACTOR shall submit certified test results from the supplier to OWNER to obtain approval for use of the product prior to mobilization of the product to the project site. Any proposed alternate geosynthetic clay liner not approved by OWNER shall not be used.

F. CONTRACTOR shall submit a plan for installation layout identifying placement patterns and overlap orientations prior to placement. The layout diagram shall be to scale and used as a construction plan and shall include all necessary dimensions and details. The layout diagram shall be compatible with the panel and seam layout requirements specified in Article 3.02 of this Section.

G. Submit for documentation a material and workmanship warranty prior to substantial completion.

1.05 EXPERIENCE

A. The GCL installation shall be performed under the direct supervision of a single field supervisor who must remain onsite throughout installation, including inspection of the surface upon which the GCL is to be installed, GCL handling and storage, panel layout and placement, seaming, seam testing, panel and seam repair, installation of appurtenances, anchorage and other GCL-related work. The field supervisor shall have a personal GCL installation record totaling at least 1 million square feet.

B. The GCL manufacturer shall have at least two (2) years continuous experience in manufacturing GCL rolls and a manufacturing record totaling no less than 10 million square feet of GCL.

C. The GCL manufacturer and any GCL installation subcontractors to the CONTRACTOR must be approved by OWNER prior to mobilization for GCL installation. OWNER has the right to reject any GCL manufacturer or Installer, and request that CONTRACTOR select an alternate.

1.06 Pre-Installation Meeting

A. Representatives of the CONTRACTOR and any GCL subcontractors shall attend a meeting prior to installation of the geomembrane to discuss details of the proposed design, installation, quality control documentation requirements and schedule.

PART 2 - PRODUCTS

2.01 GEOSYNTHETIC CLAY LINER (GCL)

A. The GCL must meet the requirements of ASTM D6495. The CONTRACTOR shall submit certified test results from the supplier to ENGINEER to obtain approval for use of the

product prior to mobilization of the product to the project site. Any proposed alternate GCL not approved by OWNER shall not be used.

B. The Side-Slope GCL shall meet the material properties listed on Table 1, for use on slopes steeper than 10%. The Floor GCL shall meet the material properties listed on Table 2, for slopes no steeper than 10% slope. Testing frequencies shall be per the approved manufacturer data sheet. (MARV = Minimum Average Roll Value)

Table 1: Side-Slope GCL

Material Property	Test Method	Required Values
Product Description	--	Needle-punched reinforced composite GCL comprised of a uniform layer of granular sodium bentonite encapsulated between a nonwoven and a scrim-nonwoven geotextile for dimensional stability. Intended for steep slopes and high load applications.
Bentonite Swell Index	ASTM D 5890	24 mL/2 g minimum
Bentonite Fluid Loss	ASTM D 5891	18 mL maximum
Bentonite Mass/Area	ASTM D 5993	0.75 lb/ft^2
GCL Grab Strength	ASTM D 6768	50 lbs/in MARV
GCL Peel Strength	ASTM D 6496	12 lbs/in minimum
	ASTM D 4632	60 lbs MARV
GCL Index Flux	ASTM D 5887	10^{-8} m^3/m^2/sec maximum
GCL Hydraulic Conductivity	ASTM D 5887	$5x10^{-9}$ cm/sec maximum
GCL Internal Shear Strength	ASTM D 5321/D 6243	500 psf @ 200 psf typical

Table 2: Floor GCL

Material Property	Test Method	Required Values
Bentonite Swell Index	ASTM D 5890	24 mL/2 g minimum
Bentonite Fluid Loss	ASTM D 5891	18 mL maximum
Bentonite Mass/Area	ASTM D 5993	0.75 lb/ft^2
GCL Grab Strength	ASTM D 6768	30 lbs/in MARV
GCL Peel Strength	ASTM D 6496	3.5 lbs/in minimum
	ASTM D 4632	21 lbs MARV
GCL Index Flux	ASTM D 5887	10^{-8} m^3/m^2/sec maximum
GCL Hydraulic Conductivity	ASTM D 5887	$5x10^{-9}$ cm/sec maximum
GCL Internal Shear Strength	ASTM D 5321/D 6243	500 psf @ 200 psf typical

C. GCLs shall consist of natural sodium bentonite between polypropylene geotextiles that are connected by needle-punching.

D. A six (6) inch lap line and a nine (9) inch match line shall be printed or marked in the field on both edges of the upper geotextile of the GCL (as installed) to assist in overlap quality control.

E. Each roll shall be marked with the following information:
   I. Manufacturer's name and brand name
   II. Lot and roll number
   III. Roll length and width
   IV. Total roll weight

F. All rolls shall be bagged in packaging that water resistant and UV resistant.

G. Accessory bentonite used to augment seam overlaps, penetrations, and panel edges at structures shall be powdered or granulated bentonite of the same type used in the manufacture of the GCL.

PART 3 - EXECUTION

3.01 SUBGRADE INSPECTION

A. CONTRACTOR shall certify in writing that the surface upon which the GCL is to be installed is acceptable (acceptance form contained at the end of this Section).

B. The subgrade shall be prepared and compacted in accordance with Section 02205: Clay Barrier Layer. Debris, roots, solid mineral particles larger than 3/8-inch diameter, and other material that may damage the GCL shall be removed. Prior to the deployment of

the GCL, the subgrade shall be final-graded to fill any voids or cracks and rolled to provide a smooth surface for the installation of the GCL.

C. After subgrade surface has been accepted by CONTRACTOR, it shall be their responsibility to indicate any change in subgrade condition that may require repair work. Special care shall be taken to maintain prepared GCL subgrade (i.e., dry and free of foreign matter). Daily observations shall ascertain the integrity of subgrade. Damage to subgrade caused by precipitation and desiccation shall be repaired at the CONTRACTOR'S expense. Any damage to subgrade caused by CONTRACTOR shall be repaired at CONTRACTOR's expense. GCL placement over subgrades having damage or excessive moisture as determined by OWNER or ENGINEER is not acceptable.

D. Particular attention shall be paid to subgrade condition at the panel edges. Panel edges shall lay flat against the subgrade with no puckering, creasing, or curling.

3.02 HANDLING, TRANSPORTATION, STORAGE, AND PLACEMENT

A. GCL rolls shall be packaged and labeled prior to transporting to the site. GCL rolls delivered to the site shall be wrapped in an impermeable and opaque protective cover. Rolls shall be stored on a flat dry surface raised several inches above the ground. Tarping stored materials is suggested to avoid any unnecessary stress on the packaging and to protect materials from moisture in the event of rain.

B. Rolls shall be handled utilizing a solid steel bar inserted through the core bar and slings or chains attached to the ends of the bar. The core bar shall be suspended from a spreader bar so that the edges of the GCL are not damaged by the suspending straps or chains. Where the GCL has a non-woven geotextile on one side and a woven geotextile on the other, panels shall be placed with the non-woven side against the subgrade, and the woven side oriented upwards.

C. Onsite storage of the GCL rolls shall be in a safe manner according to manufacturer's recommendations, with rolls protected from grease, dirt, moisture, excessive heat, direct sunlight, vehicle traffic, and other possible sources of damage including theft and vandalism. Storage areas shall be at the location approved by the OWNER. In addition, the onsite storage of the GCL is subject to the OWNER's approval of storage arrangement, including pallets, timbers, or other support and separation from ground, stacking height, packaging/covering, etc.

D. GCL and appurtenant materials delivered to the site shall be checked for proper labeling and visually inspected for transport or manufacturing damage. OWNER reserves the right to reject any unacceptable material at no cost to OWNER.

E. Only that quantity of GCL that is to be placed that day shall be removed from the packaging. GCL rolls shall be transported from the storage area to the construction area using wide lifting straps and properly sized forklifts, front-end loaders, or other appropriate equipment. Under no circumstances shall any heavy equipment be allowed directly on the GCL. Prior to placement, the GCL shall be visually inspected for damage and manufacturing defects. GCL material that, in the opinion of OWNER or OWNER's Representative, is damaged or otherwise unsuitable shall not be used for the project.

3.03 INSTALLATION

A. Edge seams shall be perpendicular to the toe of the slope at all times.

B. Seam areas or runs shall also be flat and clear of any large rocks, debris or ruts. Contacting surfaces shall be clean and clear of dirt or native soil with all edges pulled tight to maximize contact and to smooth out any wrinkles or creases. Edge overlaps shall be a minimum of six (6) inches and verified by OWNER or ENGINEER. A proper seam shall cover the six (6) inch lap line and leave the nine (9) inch match line exposed. End overlaps shall be a minimum of 24 inches and in a rainlap orientation and verified by OWNER or ENGINEER.

C. All seams shall be augmented with granular bentonite to ensure seam integrity as necessary or as required by manufacturer's recommendations. Granular bentonite, where required, shall be dispersed evenly from the panel edge to the lap line at a minimum rate of 1/4 pound per lineal foot continuously along all seams or overlap areas. Accessory bentonite shall be of the same type as the material within the geosynthetic clay liner.

D. The CONTRACTOR shall only work on an area that can be completed in one working day or before an inclement weather condition. Completion can be defined as the full installation and anchoring of the bentonite blanket and placement of the overlying geomembrane. Any GCL that is hydrated prior to placement of the geomembrane will be removed and replaced at the CONTRACTOR'S expense.

E. Large rips or tears or thin worn areas shall be repaired by completely exposing the affected area, removing all foreign objects or soil, and by then placing a patch over the damage. The patch shall overlap the GCL at least 12 inches on all edges. Accessory bentonite shall be placed between the patch and the repaired material at a rate of 1/2 pound per lineal foot of edge, spread in a six (6) inch width. The above procedures shall also be implemented in the event that a rip or tear or thin worn area occurs on a sloped surface. In this instance, the edges of the patch shall be fastened to the repaired liner with construction adhesive, as recommended by the GCL supplier in addition to the bentonite-enhanced seam.

F. During startup of the geosynthetic clay liner installation, an agent or representative of the manufacturer shall provide onsite assistance as needed and instruction to the CONTRACTOR and OWNER regarding product application techniques.

3.04 PROTECTION AFTER INSTALLATION

A. Prevent movement of GCL after installation by sandbagging or other approved methods.

B. The GCL shall be kept clean and free of soil, debris, and foreign material until covered by the geomembrane. The geomembrane shall be installed in direct contact with the GCL.

C. No vehicle traffic will be permitted directly on the GCL. Only soft-soled/rubber-soled boots and shoes shall be worn on the GCL.

D. GCL Installer shall coordinate with CONTRACTOR and geomembrane Installer regarding deployment, seaming, and testing of geomembrane and placement of cover soils over GCL such that geomembrane installation and cover soil placement occurs expeditiously and without damage to the GCL.

E. Geomembrane deployment and positioning shall be done such that no disruption of the GCL occurs, particularly at the overlapped seams.

3.05 CLEANUP

A. CONTRACTOR shall place ALL material scraps in OWNER designated area at the end of each working day. Disposal of scraps in the anchor trenches will not be acceptable. No scraps of materials will be allowed to be left on top of GCL.

B. Once the installation is complete the CONTRACTOR shall:

1. Remove all sand bags from site; or
2. Remove all sand bags and place in OWNER designated area.

PART 4 - WARRANTY

4.01 MATERIAL/WORKMANSHIP WARRANTY

A. A five (5) year material and one (1) year workmanship warranty shall be provided by the CONTRACTOR.

END OF SECTION

Attachment 1 to Section 02273

Certificate of Acceptance of
GCL Subgrade Surface by CONTRACTOR

DESCRIPTION OF AREA TO BE CERTIFIED:_____
_____
LOCATION:_____
PROJECT:_____
ADDRESS:_____

The undersigned, _____ certifies that he is a representative of _____ _____, duly authorized to execute this certificate, that he visually inspected the subgrade surface described above on _____ and found the surface to be acceptable for installation of the geosynthetic clay liner (GCL).

This certification is based on observations of the surface of the subgrade only. No sub terrain inspections or tests have been performed and_____ (OWNER) makes no representations or warranties regarding conditions which may exist below the surface of the subgrade.

Date: _____ Signature: _____
Name: _____ Title:_____

CERTIFICATE RECEIVED BY CONTRACTOR	CERTIFICATE RECEIVED BY OWNER
Date:_____	OWNER:_____
Name:_____	Name:_____
Signature_____	Signature_____
Title_____	Title:_____

SECTION 02276

EROSION CONTROL

PART 1 - GENERAL

1.01 SUMMARY

A. Work includes providing temporary and permanent erosion control as shown on the Drawings and for compliance with the site specific NPDES permit for industrial stormwater and in accordance with the Minnesota Department of Transportation “Standard Specifications”, latest edition.

B. OWNER has a NPDES permit for industrial stormwater discharge and applicable site specific SWPPP. CONTRACTOR to comply with permit and SWPPP requirements; a copy of the permit and SWPPP is available for review from the OWNER.

1.02 SUBMITTALS

A. Manufacturer's certificates indicating specification conformance test results of furnished material.

PART 2 - PRODUCT

2.01 SILT FENCE

A. Machine Sliced (MS) silt fence in accordance with the MNDOT “Standard Specifications” Section 3886.

2.03 SEDIMENT CONTROL LOG

A. Wood Fiber Log in accordance with the “Standard Specification” Section 3897.2.B.

B. Wood Stakes to be in accordance with “Standard Specification” Section 3897.2.H.

2.03 EROSION CONTROL BLANKET

A. Category 20 in accordance with the MNDOT “Standard Specification” Section 3885.

2.04 USAGE

A. Silt fence and bio-roll as determined necessary and in accordance with the site specific SWPPP.

B. Category 20 erosion control blanket on disturbed areas for protection for vegetation establishment.

PART 3 – EXECUTION

3.01 SILT FENCE INSTALLATION

A. Erosion control measures to be installed prior to site disturbance.

B. Installation of silt fence shall be in accordance with MNDOT “Standard Specifications” Section 2573.3.B.2 for machine sliced.

C. CONTRACTOR shall be responsible for maintenance and repair of silt fence until final acceptance of the project.

3.02 REMOVAL OF SILT FENCE

A. CONTRACTOR shall remove and dispose of silt fence after completion of project and the establishment of vegetation.

3.03 SEDIMENT CONTROL LOG

A. Place in accordance with Manufacturer’s recommendations.

B. Installation shall be in accordance with “Standard Specifications” Section 2573.3.F.1.

3.04 EROSION CONTROL BLANKET

A. Place in accordance with Manufacturer’s recommendations.

B. At a minimum, anchor upstream edges of all materials at least 4 inches into the soil to prevent underflow.

C. Shingle materials downslope.

D. Overlaps shall be as follows:
   a. End lap – 24 inches minimum
   b. Edges - 4 inches minimum

E. Staple sizes and spacing to be in accordance with “Standard Specifications” Section 3885.

F. Install rolled erosion control products in accordance with “Standard Specification” Section 2575.

END OF SECTION

SECTION 02486

TURF RESTORATION

PART 1 - GENERAL

1.01 SUMMARY

A. This section contains requirements for topsoil, seeding, fertilizing, and mulching.

B. Seed all areas disturbed by construction activities at the site outside of the waste disposal area, as designated by OWNER.

1.02 REFERENCES

A. Minnesota Department of Transportation Standard Specifications for Construction, latest edition. (Standard Specifications)

1.03 SUBMITTALS

A. Location of off-site source of materials.
B. Name, address, telephone number and contact person of independent soils laboratory.
C. Method of off-site source soils material sampling and analyses.
D. Off-site source material quality control analyses shall be submitted at least 14 days prior to installation.
E. Proposed haul road planned for transportation of all off-site materials to the project site.

F. Test Results:

1. Suppliers analysis for standard products.
2. Source testing of topsoil (minimum 1 sample result per source) if necessary per Part 2.01.A and as necessary to determine fertilizer requirements.

G. Seed mix.

H. Submit in accordance with Section 01300.

1.04 DELIVERY, STORAGE, AND HANDLING

A. Delivery:

1. Deliver fertilizer to site in original, unopened containers bearing manufacturer's guaranteed chemical analysis, name, trade name, trademark, and conformance to state law.
2. Deliver seed to site in unopened, original bags bearing supplier's name and address, type of seed contained, percentage of purity and germination, percentage of hard seed if any, and percentage of inert material.
3. Fertilizer and seed delivered to site shall be stored in a waterproof location as directed by OWNER.
4. Locate mulch on site where indicated by OWNER.

1.05 GUARANTEE

A. Guarantee seeded area for duration of one year after seeding to be alive and in satisfactory growth at end of guarantee period.

1. For purpose of establishing acceptable standard, scattered bare spots, none larger than 1 square foot will be allowed up to maximum of 3 percent of seeded area.
2. Acceptance will be based upon meeting this standard one year after initial seeding or reseeding.

PART 2 - PRODUCTS

2.01 TOPSOIL

A. Topsoil may be available on-site. CONTRACTOR supplied topsoil shall be used if on-site material is unavailable.

B. Topsoil performance will be determined based on proper vegetation establishment. Topsoil sampling will be conducted only if proper vegetation is not established.

2.02 FERTILIZER

A. In accordance with Standard Specification 3881.

B. Fertilize at the ratio recommended by the soil testing lab after submittal of a topsoil sample (if necessary to establish vegetation).

2.03 GRASS SEED

A. General

1. Local nursery grown seed sources in the specified seed mix.
2. Weeds shall not exceed 0.25%.
3. Comply with current U.S. Department of Agriculture rules and regulations.
4. Mix grass seeds in proportions by weight to meet or exceed minimum percentages of purity and germination. Only certified seed as defined in Standard Specifications Section 3876.3 shall be used.

B. MNDOT 25-121 seed mix. Sow the appropriate seed mixture, including additional seed which may be required as a nurse crop, depending on the sowing date, as specified by MNDOT 2575.3.

2.04 WATER

A. CONTRACTOR shall be responsible for water.

2.05 MULCH

A. Type 1 or Type 5 per "Standard Specification" Section 3882.

PART 3 – EXECUTION

3.01 INSPECTION

A. Do not begin ground preparation until boulders, debris, and similar materials have been removed, depressions and ruts filled, and area to be seeded is shaped, trimmed, and finished uniformly to grades and cross-sections shown on Drawings, or to match original grade.

3.02 SITE PREPARATION FOR SEEDING

A. Topsoil

1. Scarify subgrade to depth of 3 inches for bonding of subsoil with topsoil.
2. No topsoil shall be placed or worked in frozen or muddy condition.
3. Prepare areas to be seeded to required depth of approximately 3 inches by disking, rototilling, harrowing or other approved means.
4. Remove and dispose of rock, trash, or other materials brought to surface from preparation activities.
5. Fine grade with no more than 15% of rocks or lumps between 2 inches and 1 ½ inches in greatest dimension.

3.03 TOPSOIL/FINISH GRADING

A. Topsoil/Finish grade is established final grade as shown on Contract Drawings. Grades not otherwise indicated are uniform levels or slopes between points where elevations are given or between such points and existing finished grades. Finish grade shall be approved by the ENGINEER prior to seeding.

B. Grade, rake, and roll with roller weighing not more than 100 lbs./lf and not less than 25 lbs./lf.

C. Maximum allowable variation from correct elevation is -0.0 to +0.2.

3.04 APPLYING FERTILIZER

A. Apply fertilizer uniformly over the designated area using mechanical spreading devices. Mix thoroughly with disk into upper 2 inches of soil.

B. Apply at a rate recommended by the soil testing as defined in Section 2.02.A.

C. Apply fertilizer no more than 48 hours prior to seeding.

3.05 SEEDING

A. Do not seed on saturated or frozen soil.

B. Do not seed when wind velocity exceeds 6 mph.

C. Seed all areas disturbed by construction.

D. The grass seed shall be drilled horizontally across the slope.

E. Do not seed if surface has been compacted by recent rain event.

3.06 MULCHING

A. Mulch seeded areas not designated to receive erosion control blanket within 3 days after seeding is complete.

B. Application rate shall be 2 tons per acre or no more than 1 inch in depth.

C. Mulch shall be spread uniformly in a continuous blanket. Mulch shall be started on the windward side of relatively flat area or on the upper part of a steep slope and continued uniformly until area is covered. The mulch shall not be bunched.

D. Do not mulch during periods of excessively high winds.

E. Immediately following the spreading of the mulch, the material shall be anchored securely into the soil a minimum of 3-inches by means of a mulch anchoring machine equipped with large coulter-type discs spaced on approximate 8-inch centers. All anchoring shall be at right angles to slope. Edges of the discs shall be dull to prevent cutting of the mulching and equipment operation shall be such as to embed the mulch to the required depth. In areas where equipment cannot be used, mulch shall be secured by shallow covering of earth or by embedding with approved hand methods, including straight-bladed spade with dull edge.

F. Mulch in accordance with Section 2575 of the Standard Specifications.

3.07 CLEANUP

A. Paved surface and other site areas shall be kept clean of seeding, fertilizing, and mulching materials.

B. Clean up shall occur at the end of each work day or as required by OWNER. Pavement shall be swept with a street sweeper as directed by ENGINEER throughout the project.

C. Restore existing utilities, surface features, and structures to condition equal to condition which existed prior to construction.

D. Replace to original condition or better, damaged vegetation or landscape work.

E. Complete project punch-list prepared by ENGINEER.

3.08 MAINTENANCE OF SEEDED AREA

A. Maintenance of seeded areas shall begin immediately following last seeding application. Continue until Work is accepted.

B. Maintain seeded area by watering, mowing, and replanting as necessary to produce uniform stand of grass until Work is accepted.

C. Rework/replace topsoil where original topsoil has eroded or washed away as directed by ENGINEER.

D. Re-mulch any areas where the original mulch has washed away as directed by the ENGINEER.

E. Implement erosion control measures as required to keep area free of rutted and eroded soils and protection fences and barriers as necessary.

3.09 RESEEDING AND REPAIR

A. Reseed areas that fail to show more than 75 plants/square feet and open areas or gaps larger than 6 inches in diameter.

B. Where plant density is less than 50 plants/square foot, retill and reseed areas in accordance with seeding and maintenance requirements.

3.10 ACCEPTANCE OF SEEDED AREAS

A. CONTRACTOR shall notify OWNER in writing 7 days prior to inspecting seeded area for acceptance.

B. CONTRACTOR and OWNER shall inspect seeded areas for contract compliance and acceptance of work. Upon completion of inspecting seeded areas, OWNER shall provide written acceptance or rejection to CONTRACTOR with further requirement for completing the seeding work. Seeding work remaining to be completed shall be reinspected by OWNER before final acceptance.

END OF SECTION

SECTION 02775

ELECTRICAL LEAK LOCATION SURVEYING OF SOIL-COVERED GEOMEMBRANE LINER

PART 1 - GENERAL

1.01 SUMMARY

A. Performing electrical leak location testing in accordance with ASTM D7007 to detect calibration holes (if used), installation/construction related holes, and other damage.

B. Reporting results of leak location surveying.

1.02 REFERENCES

A. American Society for Testing and Materials, current edition, hereafter referred to as ASTM.

B. ASTM D7007: Standard Practice for Electrical Methods for Locating Leaks in Geomembranes Covered with Water or Earth Materials (most current edition).

1.03 SUBMITTALS

A. Submit contact information for proposed leak location testing firm; include statement of factors that influence leak detection sensitivity and accuracy, and which may be adjusted or corrected in the field to improve the accuracy and sensitivity of leak detection.

B. Submit qualifications for proposed leak location testing firm.

C. Submit leak location survey plan, including equipment, setup requirements, survey grid spacing, data management method, QA/QC plan, crew size, and other pertinent information.

D. Submit an example of proposed format for reporting results of the leak location survey prior to completion of testing.

E. Submit final report with results of leak location survey following completion of testing/repairs.

1.04 JOB CONDITIONS

A. It shall be solely the CONTRACTOR’s responsibility to review available tests and reports, conduct additional tests, and otherwise determine to its own satisfaction the location and nature of all surface and subsurface features and the soil and water conditions that may be encountered.

B. It shall be solely the CONTRACTOR’s responsibility to review project construction plans and specifications, sequencing and scheduling plans, and other construction-related information, and determine to its own satisfaction CONTRACTOR’s ability to perform the required work within the context of the overall construction project.

PART 2 PRODUCTS

Not Applicable

PART 3 – EXECUTION

3.01 ACCEPTANCE OF SITE AND SURVEY CONDITIONS

A. Prior to performing sensitivity testing or leak location surveying, CONTRACTOR shall be responsible for watering and maintaining the required moisture within the drainage layer material to facilitate testing. CONTRACTOR is also responsible for electrically isolating the test area as required to complete testing. Isolated areas shall be kept free of sand and water during testing activities.

B. CONTRACTOR shall provide generator, fuel, testing grid materials, and any other equipment or materials required to complete testing.

3.02 LEAK LOCATION SURVEYING

A. CONTRACTOR shall perform the leak location survey procedure in conformance with the surveying plan submitted above and in general conformance with ASTM D7007. Survey shall be performed in the presence of OWNER and/or ENGINEER.

C. CONTRACTOR shall mark detected leak locations with lath, flagging, or similar marking, and shall remove cover soil from the area to expose the underlying geosynthetics. CONTRACTOR shall replace cover soil following completion of repairs.

D. Resurveying shall be performed in the areas near leak locations to verify that repairs were adequate and that an additional leak is not present which may have been masked by the detected leak.

3.03 REPORTING

A. CONTRACTOR shall field-report to OWNER and ENGINEER summary results of surveying on a daily basis. Daily reports shall include:

1. The results of beginning and end-of-day leak detection sensitivity tests.
2. A summary of leaks detected and repair/resurvey status with a description of the area surveyed that day.

B. A final report with supporting data shall be submitted to OWNER and ENGINEER within 5 calendar days of completion of leak location surveying.

C. The final report shall contain the following items:

1. A description of the leak location methods and procedures, the survey methodology, the liner components and configuration, and cover and subgrade soil types and conditions.
2. A discussion of the results of leak location sensitivity tests and actions taken in response to the tests.
3. A map of the area showing the limits of the leak location survey, the layout of the surveying grid, the location of the source electrode, and other pertinent layout information.
4. A complete description of the leaks found, including location, size, configuration, and photographs. The report shall clearly distinguish between calibration holes, if used and installation/construction-related holes.
5. The final report shall include electronic data files containing plots of leak signals from sensitivity testing, calibration holes, and construction-related holes

along with maps, grids, and other information necessary to locate each data set within the project limits.

END OF SECTION

SECTION 02920

HIGH DENSITY POLYETHYLENE GEOMEMBRANE (HDPE)

PART 1 - GENERAL

1.01 SUMMARY

A. Work includes manufacture, fabrication (if needed), supply, and installation of textured and smooth High Density Polyethylene (HDPE) geomembrane liner for base liner system construction. Textured geomembrane shall have a smooth edge for seaming.

1.02 DEFINITIONS/REFERENCES

A. American Society for Testing and Materials (ASTM) Standards specifically referenced in this Section:

1. ASTM D6693 - Standard Test Method for Tensile Properties of Nonreinforced Polyethylene and Nonreinforced Flexible Polypropylene Geomembranes
2. ASTM D751 - Standard Test Methods for Coated Fabrics
3. ASTM D792 - Standard Test Methods for Density and Specific Gravity (Relative Density) of Plastics by Displacement
4. ASTM D1004 - Standard Test Method for Tear Resistance (Graves Tear) of Plastic Film and Sheeting
5. ASTM D1238 - Standard Test Method for Melt Flow Rates of Thermoplastics by Extrusion Plastometer
6. ASTM D1505 - Standard Test Method for Density of Plastics by the Density Gradient Technique
7. ASTM D1603 - Standard Test Method for Carbon Black Content in Olefin Plastics
8. ASTM D3895 - Standard Test Method for Oxidative Induction Time of Polyolefins by Differential Scanning Calorimetry
9. ASTM D4218 - Standard Test Method for Determination of Carbon Black Content in Polyethylene Compounds by the Muffle-Furnace Technique.
10. ASTM D4437 - Standard Practice for Non-destructive Testing (NDT) for Determining the Integrity of Seams Used in Joining Flexible Polymeric Sheet Geomembranes
11. ASTM D4833 - Standard Test Method for Index Puncture Resistance of Geomembranes and Related Products
12. ASTM D5199 - Standard Test Method for Measuring Nominal Thickness of Geosynthetics
13. ASTM D5397 - Standard Test Method for Evaluation of Stress Crack Resistance of Polyolefin Geomembranes Using Notched Constant Tensile Load Test
14. ASTM D5596 - Standard Test Method for Microscopic Evaluation of the Dispersion of Carbon Black in Polyolefin Geosynthetics
15. ASTM D5641 - Standard Practice for Geomembrane Seam Evaluation by Vacuum Chamber
16. ASTM D5721 - Standard Practice for Air-Oven Aging of Polyolefin Geomembranes
17. ASTM D5885 - Standard Test Method for Oxidative Induction Time of Polyolefin Geosynthetics by High Pressure Differential Scanning Calorimetry
18. ASTM D5994 - Standard Test Method for Measuring the Core Thickness of Textured Geomembranes
19. ASTM D6365 - Standard Practice for the Nondestructive Testing of Geomembrane Seams using the Spark Test
20. ASTM D6747 - Standard Guide for Selection of Techniques for Electrical Leak Location of Leaks in Geomembranes
21. ASTM D7002 - Standard Practice for Electrical Leak Location on Exposed Geomembranes Using the Water Puddle Method
22. ASTM D7007 - Standard Practices for Electrical Methods for Locating Leaks in Geomembranes Covered with Water or Earthen Materials

23. ASTM D7238 - Standard Test Method for Effect of Exposure of Unreinforced Polyolefin Geomembrane Using Fluorescent UV Condensation Apparatus
24. ASTM D7466 - Standard Test Method for Measuring Asperity Height of Textured Geomembranes
25. ASTM D3350 - Standard Specification for Polyethylene Plastics Pipe and Fittings Materials

B. Geosynthetic Research Institute (GRI) Standards:

1. GRI GM 6: Standard Practice for Pressurized Air Channel Test for Dual Seamed Geomembranes
2. GRI GM 9: Standard Practice for Cold Weather Seaming of Geomembranes
3. GRI GM 10: Standard Guide for The Stress Crack Resistance of HDPE Geomembrane Sheet
4. GRI GM 13: Standard Specifications for Test Methods, Test Properties and Testing Frequency for High Density Polyethylene (HDPE) Smooth and Textured Geomembranes
5. GRI GM 14: Standard Guide for Selecting Variable Intervals for Taking Geomembrane Destructive Seam Samples Using the Method of Attributes
6. GM 19a: Standard Specifications for Seam Strength and Related Properties of Thermally Bonded Polyolefin Geomembranes/Barriers

C. U.S. Environmental Protection Agency Technical Guidance Document “Quality Control Assurance and Quality Control for Waste Containment Facilities,” EPA/600/R-93/182, September 1993, 305 pgs.

1.03 SUBMITTALS

A. The following submittals shall be provided to and approved by OWNER or ENGINEER prior to delivery of geomembrane to the site or mobilization of the geomembrane CONTRACTOR’S crew or equipment:

1. CONTRACTOR shall supply information from the resin manufacturer regarding the resin type, properties as specified herein, and production dates of the resin used for this project. The resin type identification shall include the cell classification of the resin in accordance with the requirements of the latest ASTM Designation D3350.
2. CONTRACTOR shall submit from the geomembrane sheet manufacturer, test methods and results defining physical properties as specified herein, of the geomembrane to be used for this project. Test results at the frequency specified in the GRI standards of geomembrane furnished for this project shall be submitted, and test results shall be reported with corresponding roll identification numbers.
3. CONTRACTOR shall supply a statement of the geomembrane manufacturer's quality control procedures, identification of any resin admixtures, frequency of sampling, methods of material transportation and storage, and acceptance criteria for roll goods delivered to the site.
4. CONTRACTOR shall provide submittals describing the geomembrane sheet manufacturer's details of any factory seaming process proposed. Roll test results which may not be available prior to construction (i.e., environmental stress crack) shall be presented as preliminary prior to construction, with final test results submitted or affected rolls within the construction time frame.
5. CONTRACTOR shall submit from the extrudate weld rod manufacturer, verification that the weld rod was manufactured using the same resin as was used in the geomembrane sheets prior to using material.
6. CONTRACTOR shall submit a proposed panel and seam layout diagram specifying the type and location of all field and factory seams. The layout diagram shall be to scale and used as a construction Plan and shall include all necessary dimensions and details. The layout diagram shall be compatible with the panel and seam layout requirements specified in this Section.
7. CONTRACTOR shall submit an installation schedule.

8. CONTRACTOR shall submit a list of personnel performing field supervision, and quality control, along with experience records and resumes.
9. CONTRACTOR shall submit a list of equipment types proposed to be used in panel layout, membrane seaming, and destructive and nondestructive testing.

B. The CONTRACTOR shall remit the following during geomembrane Installation:

1. CONTRACTOR shall, at the end of each working day provide a detailed report of work completed that day, including:
   a) Panel Placement
   b) Trial Welds Results
   c) Subgrade Acceptance Form
   d) Seams
   e) Seam Testing (air and vacuum tests)
   f) Destructive Tests
   g) Repair Log

2. ENGINEER shall review with the CONTRACTOR and sign the above report at the end of each day. OWNER shall be provided with a copy of the report.

C. CONTRACTOR shall update their liner layout drawings on a daily basis. The drawings shall include all panel locations and numbering, seam locations and numbering, and test locations and numbering. The CONTRACTOR shall maintain a current liner layout drawing on the construction site at all times. At the request of OWNER, a copy of the current liner layout drawing will be submitted with 24 hours.

D. CONTRACTOR shall submit final as-built liner layout drawing(s) to OWNER within 14 calendar days of completion of the liner work. Drawings shall be submitted in paper and digital form.

E. Quality control certificates indicating resin type, properties as specified herein, and production dates shall be provided with each shipment of extrudate rods delivered to the site no later than the time of delivery.

F. Prior to the installation of any geomembrane, the CONTRACTOR shall submit CONTRACTOR'S certification in writing that the surface upon which the geomembrane is to be installed is acceptable (complete form contained at end of this Section).

G. Submit material delivery and installation schedule for incorporation into the Project schedule.

1.04 EXPERIENCE

A. The geomembrane installation shall be performed under the direct supervision of a single field supervisor who must remain on-site throughout installation, including inspection of the surface upon which the geomembrane is to be installed, geomembrane handling and storage, panel layout and placement, seaming, seam testing, panel and seam repair, installation of appurtenances, anchorage, and other geomembrane-related work. The field supervisor shall have a personal HDPE geomembrane installation record totaling at least 2 million square feet.

1.05 Pre-Installation Meeting

A. Representatives of the CONTRACTOR shall attend a meeting prior to installation of the geomembrane to discuss details of the proposed design, installation, and schedule.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Raw Materials:

1. Smooth and textured HDPE geomembrane, and extrudate rods used for this project shall be manufactured of new, first quality resins containing no more than 2 percent clean recycled polymer by weight, with a minimum specific gravity of 0.940 and carbon black content of 2.0-3.0 percent, designed specifically for use in flexible membrane liner installations.

2. HDPE resin used in manufacturing geomembranes used for this Project shall meet requirements set forth in the latest revision of the Geosynthetics Research Institute (GRI) for HDPE (GRI GM 13).

B. Geomembrane Roll Goods:

1. HDPE geomembrane sheets used for this project shall meet the requirements set forth in the latest revision of the Geosynthetics Research Institute (GRI) for HDPE, both smooth and textured (GRI GM 13).
2. The geomembranes shall consist of unreinforced high density polyethylene containing at a maximum 3 percent by weight additives, fillers, or extenders.
3. The geomembranes shall be free of holes, blisters, striations, undispersed raw material, and contamination by foreign matter.
4. The geomembranes shall be supplied as a continuous sheet with no factory seams in rolls. Each roll shall be identified and labeled with the thickness of the geomembrane, length and width, manufacturer, lot number, and roll identification number. This identification number shall be used to identify roll location on the panel layout record drawing.

C. Extrudate: Resin used in the polyethylene extrudate shall be the same as that used to manufacture the geomembrane sheets. Extrudate rods are to be delivered in original sealed containers with the manufacturer's labeling. Extrudate rods shall be free of dirt, grease, moisture, other contaminants, and shall be free of damage.

D. Neoprene Foam: Closed cell, weatherproof, black neoprene foam with adhesive backing suitable for long-term sun and liquid exposure. Dimensions shall be as specified on the DRAWINGS.

E. Clamped Boots: Boots required to seal the HDPE geomembrane to the structures passing through it shall be made of the same materials as the geomembrane. The boots shall be fabricated so that all field assembly, welding, and seam testing can be accomplished using equipment and procedures regularly employed in the field for equipment and HDPE geomembrane installation. Smooth geomembrane shall be used in all geomembrane boots.

F. Banding Straps: Type 302 stainless steel banding straps suitable for use on the pipe diameters shown on the DRAWINGS. Banding strap dimensions shall be as specified on the DRAWINGS. All surfaces of the banding straps shall be machined smooth to prevent tearing or puncturing of the HDPE pipe boots. Outer lip of boot shall be sealed with silicone sealant as shown on Drawings.

2.02 EQUIPMENT

A. Extruding equipment shall be equipped with a temperature gauge at the barrel and nozzle.

B. Fusion equipment shall be equipped with a temperature gauge capable of continuous monitoring.

C. Provide digital or dial continuous temperature recording instruments, in satisfactory working condition, with each welding unit. Welding equipment shall not be operated without functioning temperature recording instruments for measuring geomembrane sheet temperature.

D. A coupon cutter and a calibrated tensiometer shall be provided for in-field seaming pre-qualification testing and destructive sample testing.

E. Store, transport, and operate all equipment to avoid damage to geomembranes.

F. Glass top of each vacuum box must be clear and free of scratches for easy reading of pressure gauge. The sealing gasket shall be intact and functioning to form close seals during testing.

G. OWNER reserves the right to order the CONTRACTOR to remove any equipment that in OWNER or ENGINEER'S opinion is not satisfactory. The CONTRACTOR will remove the equipment promptly from the construction site and replace the unsatisfactory equipment with suitable equipment within 24 hours.

PART 3 - EXECUTION

3.01 SUBGRADE INSPECTION

A. CONTRACTOR shall certify in writing that the surface upon which the geomembrane is to be installed is acceptable (acceptance form contained at end of this Section).

B. CONTRACTOR shall provide daily written acceptance for the surface to be covered by the geomembrane in that day's operations. The surface shall be maintained in a manner during geomembrane installation to ensure subgrade suitability.

C. After subsurface has been accepted by CONTRACTOR, it shall be CONTRACTOR'S responsibility to indicate any change in subsurface conditions that may require repair work and perform required repair work. Damage to subsurface caused by work involved in installing geomembrane shall be repaired at CONTRACTOR'S expense. Geomembrane placement over damaged subsurface, as determined by ENGINEER or CONTRACTOR, is not acceptable. Nothing will waive CONTRACTOR'S contractual requirements with respect to warranty on installed system.

3.02 CREST ANCHORAGE SYSTEM

A. Backfilling of Anchor Trench:

1. Backfill and compaction of anchor trench will be performed by the CONTRACTOR.
2. Generally, the anchor trench is not backfilled until at least one day after deployment to allow shrinkage of the material overnight.

2. CONTRACTOR shall monitor the backfilling of anchor trench to ensure proper method is employed. Any damage noticed shall be reported to OWNER or ENGINEER.

3.03 HANDLING, TRANSPORTATION, AND STORAGE

A. Geomembrane rolls shall be packaged and labeled prior to transporting to the site. Geomembrane rolls delivered to the site shall be wrapped in a relatively impermeable and opaque protective cover which may consist of a sacrificial wrap of geomembrane. The sacrificial wrap shall be removed prior to geomembrane installation.

B. Geomembrane transportation shall be in a manner that minimizes the possibility of material damage during shipment. When offloading geomembrane from the truck, straps and a spanbar shall be used. Direct contact with forklifts or front end loaders to offload the material will not be allowed without written consent from OWNER.

C. On-site storage of the geomembrane rolls shall be in a safe manner, with rolls protected from grease, dirt, moisture, excessive heat, direct sunlight, vehicle traffic, and other possible sources of damage including theft and vandalism. The rolls will be placed in neat order and placed such that identification tags for each roll can be read. Storage areas shall be at the OWNER'S designated location.

D. Geomembrane and appurtenant materials delivered to the site shall be checked for proper labeling and visually inspected for transport or manufacturing damage. OWNER or ENGINEER reserves the right to reject any unacceptable material at no cost to OWNER. Any roll that arrives on site without factory roll identification will not be used for the work and will be removed from the site promptly.

E. Only that quantity of geomembrane that is to be placed on a particular day shall be removed from the packaging. Geomembrane rolls shall be transported from the storage area to the construction area and deployed using wide lifting straps and properly sized forklifts, front end loaders, or other appropriate equipment.

F. Under no circumstances shall any heavy equipment be allowed directly on the geomembranes unless approved by OWNER or ENGINEER.

G. Prior to placement, the geomembranes shall be visually inspected for compliance with this Section. Geomembrane material which, in the opinion of the OWNER or ENGINEER is damaged or does not meet Specifications will be rejected by the OWNER. Minor damage may be repaired as specified in this Section. Damage to geomembranes caused by CONTRACTOR during handling shall be repaired or replaced at CONTRACTOR'S expense.

3.04 PANEL LAYOUT AND PLACEMENT

A. Panel and Seam Layout Diagram:

1. Prepare panel and seam layout diagram so that panel seams run parallel to the direction of maximum slope (i.e., down the slope).
2. All slopes steeper than or equal to 4H:1V, the seams shall be oriented in the direction of the slope. Horizontal seams shall not be allowed on 4:1 slopes unless unavoidable, where seam shall be diagonal at 45 degrees.
3. All slopes steeper than 10% shall use geomembrane textured on both sides, unless specifically identified otherwise on the DRAWINGS. Textured panels shall extend a minimum of 5 feet past the toe of the slope or edge of trench, or as otherwise indicated on the DRAWINGS. The seam connecting to the smooth

geomembrane shall be on a surface of less than 10%. Smooth or textured geomembrane may be used in the leachate collection trench. A single panel should run along the entire length of the primary leachate collection trench and be centered about the trench centerline, minimizing seaming and/or repairs within the trench. Where panels must cross the leachate header trench at the toe of the slope, panels shall be overlapped in the direction of flow.

4. Slope panels shall not be constructed from more than two pieces of geomembrane (i.e., not more than one cross-seam shall be permitted on any one slope panel).
5. Cross seams in slope panels, where allowed, shall be oriented at 45°. Cross seams shall be located on at least the bottom half of the slope, wherever possible.
6. Cross seams in adjacent panels shall be staggered.
7. Assign identification number to each seam for reference to test results and record Drawings.
8. Seams shall not be located at low points in the subgrade unless required by site geometry and approved by OWNER or ENGINEER.

B. PANEL PLACEMENT:

1. Panel size and placement shall be in general accordance with the panel layout diagram submitted to OWNER as defined in this Specification.
2. Geomembrane shall be anchored with sand bags or other approved methods to prevent uplift and damage by wind.
3. A panel identification number shall be assigned to each panel for reference to test results and Record Drawings. The panel identification number and geomembrane roll number shall be written on each panel with a grease pencil, immediately following deployment of the panel.
4. Smoking during placement of panels is prohibited. Wearing damaging shoes or engaging in any behavior which may damage the geomembrane is prohibited.
5. Eating, drinking, disposal of food wraps, drinking bottles and cans on top of geomembrane is not allowed.
6. Place panels with appropriate slack incorporated into geomembrane to accommodate expansion and contraction without jeopardizing the integrity of the geomembrane.
7. Vehicle traffic over geosynthetics as a means of panel deployment is expressly prohibited without the consent of the OWNER.
8. To prevent a ‘trampoline effect’ from forming, the CONTRACTOR shall place sufficient sand bags on the liner along the toe of slopes to ensure full contact of geomembrane to the subgrade.

C. OWNER or ENGINEER and CONTRACTOR will visually inspect in-place panels prior to seaming. Any damaged panels shall be repaired, and if requested by OWNER, replaced at no additional cost to OWNER. Repairs shall be performed as specified in this Section. All damages and repairs shall be recorded on the Record Drawings.

3.05 SEAMING

A. Seaming Methods: All seams shall be joined using a heat extrusion or hot fusion (split wedge) weld process in accordance with the geomembrane manufacturer's recommendations. The CONTRACTOR shall maintain in working order at the site at least one spare seaming apparatus for each type of welder used. The hot fusion weld process will be used whenever possible. The use of extrusion welded seams shall be limited to repairs and any areas or seam configuration inaccessible to fusion welding equipment.

B. Factory and field seams shall meet the minimum specifications set forth by the latest revision of the GRI GM 19a.

C. Seam Configuration and Preparation:

1. Overlap panels to be seamed at least 4 inches but not more than 6 inches. The loose end of the upper panel shall extend no more than 3 inches from the weld. All seams shall be made in a rainlap manner with the loose end of the upper panel downgradient of potential water flow.
2. Cross seams on slopes, where allowed, shall be made at a 45 degree angle to the edge of the panel.
3. The contact area between panels shall be clean and free of moisture, dust, dirt, debris, and foreign material. A protective layer of filter fabric or a sacrificial HDPE strip shall be used directly beneath each seam overlap to achieve proper support and a clean work surface, if necessary.
4. Where extrusion welding is used, the contact surfaces between panels shall be ground to remove oxidation prior to welding. Grinding shall not result in grooving of the liner nor reduction of the liner thickness by more than 10 percent. The grinding motion shall be made perpendicular to the seam. Grinding in a direction parallel to the seam shall not be permitted. All ground areas shall be covered completely with extrudate.
5. Seams shall be aligned to minimize the number and size of wrinkles. The CONTRACTOR shall ensure that wrinkles greater than 4-inches tall are addressed as drainage layer material is placed in order to minimize wrinkle propagation and accumulation towards the end of drainage material placement. Wrinkles greater than 4-inches tall will not be accepted. In no case will wrinkles of any size be allowed to be folded over or left in a manner that would impact the integrity of the liner system or impede leachate drainage within the cell.
6. All seam ends shall be staggered a minimum of 5 feet in length between contiguous panels.

D. Test Seam:

1. A prequalification test seam sample shall be prepared with each piece of seaming equipment/seamer approximately every four hours at the beginning of each seaming period (usually morning and afternoon), unless otherwise directed by OWNER or ENGINEER. Each sample shall be prepared by the operator of the equipment for that seaming period and shall be at least 3 feet long (in the direction of the seam) by at least 1 foot wide and may be performed on scrap pieces of geomembrane.
2. Ten 1-inch wide specimens (coupons) from each test seam sample shall be prepared for on-site field testing for shear and peel strength. Coupons shall be prepared using a sheet cutter so that consistent, uniform 1-inch wide coupons are obtained. Samples should be distributed evenly over the 6 feet length.
3. The CONTRACTOR will make these test seams in the presence of OWNER or ENGINEER.
4. The extension rates for these tests will not exceed 2-inches per minute unless permission from the OWNER is given.
5. Five coupons shall be tested in shear and five in peel. All coupons shall exhibit the required strength at yield and failure mechanism FTB as set forth in *Paragraph 3.05B*. Seam separation equal to or greater than 10% of the track width shall be considered a failing test. If any of the coupons fail, the reason for the failure shall be identified and corrected prior to preparing another test seam. The new test seam shall be prepared reflecting adjustments made to the seamer/seaming equipment and a new set of coupons shall be cut and tested.

6. Seaming equipment shall not be used until satisfactory prequalification test seams have been prepared, witnessed by OWNER or ENGINEER.
7. The test results on all prequalification test seams will be reported to OWNER and ENGINEER.

E. Climatic Conditions for Seaming:

1. Seaming shall be performed only when panel temperatures are between 32°F and 170°F, unless otherwise approved by OWNER. If seaming is permitted to be performed at panel temperatures below 32°F, the panel contact surface shall be preheated and CONTRACTOR shall certify in writing that the low-temperature seaming procedures will not cause any short-term or long-term damage to the geomembrane or the welded seam. CONTRACTOR shall demonstrate to OWNER or ENGINEER that field seams comply with project specifications using pre-qualification test seams. CONTRACTOR shall submit to OWNER or ENGINEER, for approval, detailed procedures for seaming at low temperatures, including the following:
    a. Preheating of the geomembrane
    b. Provision of a tent or other device if necessary to prevent heat losses during seaming and rapid heat losses subsequent to seaming.
    c. Number of additional test welds to determine appropriate seaming parameters.
2. Seaming during rainy weather or when dew is present on panels shall not be allowed.
3. CONTRACTOR shall provide any special lighting required for seaming during low-light or dark hours.
4. CONTRACTOR shall leave slack in the geomembrane as necessary to account for thermal expansion or contraction of geomembrane. Stress on panels due to thermal expansion and contraction shall be minimized by performing field seaming operations during the coolest parts of the day or night, if necessary. Special scheduling or extended hours of operation require approval by OWNER.

F. All welding shall provide a tight, leak proof, homogeneous bond between panels. All seams shall extend to ends of panels.

G. Welding equipment shall be continuously monitored to control the temperature of extrudate and wedge. If recording equipment allows for a hard copy of the monitoring, a copy of the monitoring labeled with the weld identification number will be submitted to OWNER or ENGINEER.

3.06 PIPE AND STRUCTURE PENETRATION SEALING SYSTEM

A. Penetration sealing systems shall be constructed from the base geomembrane material, flat stock, prefabricated boots, and accessories as shown on the Drawings.
B. All penetration sealing systems must be tested. Where field non-destructive testing cannot be performed, field spark testing shall be performed using standard holiday leak detectors in accordance with ASTM 6365. Spark testing should be performed in areas where both air pressure testing and vacuum testing are not possible.

3.07 NONDESTRUCTIVE TESTING OF PRODUCTION SEAMS

A. All field seams shall be non-destructively tested by the CONTRACTOR over the full seam length before the seams are covered. Each seam shall be numbered or otherwise designated. The location, date, test unit, name of test, and outcome of all non-destructive testing shall be recorded and submitted to the OWNER or ENGINEER.

B. Testing shall be done as the seaming work progresses, not at the completion of all field seaming. All defects found during testing shall be numbered and marked immediately after detection. All defects found shall be repaired, retested, and remarked to indicated acceptable completion of the repair.

C. Non-destructive tests shall be performed by experienced technicians familiar with the specified test methods.

D. Visual Inspection: A visual inspection of all seams shall be performed. This inspection shall look for obvious flaws in seaming patches, penetration sealing, material defects, or other problems. Deviations from acceptable workmanship standards shall be noted and corrected.

E. Pressure Testing (Double-Fusion Welds): Where a double-fusion weld seaming system is employed, the continuity of the seam shall be tested with air pressure in accordance with the following procedure. The flow channel must not be obstructed by foreign objects or geomembrane material throughout the length of seam being tested. The vacuum test described in *Paragraph 3.07F* must be employed for testing of all seams that do not have a continuous flow channel.

1. A test device consisting of an inflation needle and pressure gauge mounted on a "T" fitting shall be used for air pressure testing. Insert the needle into the flow channel and seal the end of the channel around the needle. Connect a pump (such as a small bicycle pump) to the test device.
2. Ascertain that the flow channel is continuous by leaving the other end of the channel open and pumping air through the channel. If air does not pass through the channel the test length must be shortened until a continuous length of flow channel is found.
3. Seal and clamp both ends of the flow channel to assure an airtight seal. Inflate the flow channel to 27 to 40 psig. Allow one minute for the seam to stabilize.
4. Re-inflate as needed to achieve 27 to 40 psig on the seam and test for a period of five minutes.
5. At the end of the test period, if the pressure has not dropped more than 3 psi, the test shall be considered a pass and the following procedure will be implemented;
    a. Remove the test device and clamps.
    b. Make any repairs, if necessary, to the area where the flow channel was clamped or inflated.
    c. Record the test results, mark the seam as a pass, the date tested, and proceed to the next seam.
6. If the pressure drops below the 3 psi allowance, the test shall be considered a failure and the following procedure shall be implemented to identify the failure:
    a. Check to determine if there is excessive seepage around the inflation needle.
    b. Check both ends of the seam to ensure the flow channel is completely sealed off.
    c. Walk the length of the seam; look and listen for air leaks.
    d. If either of these procedures fail to identify the leak, trim the seam overlap and vacuum test the seam to locate the leak.
    e. Once the leak is identified, make the necessary repairs, and retest the seam.
7. Seam to be approved before testing by OWNER or ENGINEER; test to be performed in presence of OWNER or ENGINEER personnel.

F. Vacuum Testing: Vacuum testing shall be used to test the continuity of extrusion welded and mechanical seams. A clear topped vacuum box, supplied by CONTRACTOR, shall be placed over the seam to be tested after application of a soapy solution. Upon

evacuation, bubbles will be evident through the viewing window if the seam lacks integrity. The following procedure shall be followed:

1. Wet seam to be tested with a soapy solution mixed at a ratio of 1 ounce soap to 1 gallon water. No antifreeze solution is allowed to be added to the water.
2. Place vacuum box over seam to be tested, evacuate box to a vacuum equal to 5 psig, and tug up to ensure a leak tight seal has been developed.
3. Examine the seam for a minimum of 10 seconds to detect soap bubbles.
4. If the bubbles are not evident, move to next test location. Adjacent test sections are to overlap by at least 1 inch.
5. If bubbles are present, mark area clearly for repair.
6. If the vacuum testing indicates leakage, the area shall be spot patched; or if major leaks are detected, the entire seam shall be reworked.
7. Seam to be approved before testing by OWNER or ENGINEER; test to be done in presence of OWNER or ENGINEER personnel.

3.08 DESTRUCTIVE TESTING OF PRODUCTION SEAMS

A. The purpose of destructive testing is to verify that the seaming process has produced seams of acceptable mechanical integrity. One seam sample shall be taken at random for each 500 feet of seam. Sample locations shall be designated by OWNER or ENGINEER. Each sample shall be shown on the panel layout drawing. All holes in the installed geomembrane resulting from obtaining samples shall be repaired immediately. The sample ID number shall be marked on the patch. All repairs shall be 100 percent vacuum tested for continuity.

B. *Maximum frequency of test locations shall be agreed upon by the CONTRACTOR, OWNER, and ENGINEER prior to commencement of installation*. Additional test locations, not to exceed agreed upon maximum frequency, shall be determined during seaming at OWNER or ENGINEER'S discretion. Selection of such locations may be prompted by suspicion of excess crystallinity, contamination, offset welds, or other potential cause of imperfect welding.

C. CONTRACTOR shall not be informed in advance of locations where seam samples will be taken.

D. Cut samples as seaming progresses in order to obtain documentation test results prior to completion of liner installation. Number each sample and identify sample number and location on panel layout drawing.

E. Samples shall be 12 inches wide by 36 inches long with seam centered lengthwise. Cut one 25 mm (1 in.) wide strip from each end of sample and test in field, by hand or tensiometer, for peel and shear, respectively. The tested sample shall not fail through the seam. If tensiometer is not available and if 25 mm (1.0 in.) wide specimen is too difficult to test by hand, 10 mm (0.5 in.) wide specimen is acceptable. Cut remaining sample into 3 parts and distribute as follows.

1. One portion to CONTRACTOR for field documentation testing, 12 inches by 12 inches.
2. One portion to OWNER independent laboratory testing, 12 inches by 12 inches.
3. One portion to OWNER for archive storage, 12 inches by 12 inches.

F. For field testing, the CONTRACTOR shall cut 10 identical 1-inch wide replicated specimens from his sample. The CONTRACTOR shall test five specimens for seam shear strength and five for peel strength. Peel tests shall be performed on both inside

and outside weld tracks. To be acceptable four out of five specimens must pass the test criteria with less than 10% separation. The CONTRACTOR shall submit field documentation test results to the OWNER or ENGINEER as soon as they become available, but no later than 2 working days after the sample was taken. Field seams shall meet the minimum specifications of GRI GM 19a.

Note: All seams must exhibit a film tear bond (FTB).

G. All testing equipment required for these quality control tests shall be provided by CONTRACTOR. Any seams failing the quality control tests shall be repaired at CONTRACTOR'S expense until passing test results are obtained. At all times, care shall be exercised to avoid damaging the geomembrane.

H. ENGINEER shall be present for all field documentation testing of seam strength.

I. CONTRACTOR shall submit results of test it performs as a result of its quality control assurance program to OWNER and ENGINEER.

3.09 PROCEDURES FOR DESTRUCTIVE TEST FAILURE

A. The following procedures shall apply when sample fails lab destructive test.

1. Obtain additional destructive test samples at locations approximately 10 feet on either side of the failed test location.
2. Perform destructive tests.
3. If test passes, the seam shall be considered adequate.
4. If tests fail, all seams represented by the original destructive test shall be repaired with a cap-strip extrusion welded to all sides of the capped area. All cap-strip seams shall be non-destructively tested until adequacy of the seams is achieved. Cap strip seams exceeding 150 feet in length shall be destructively tested.

B. In any case, acceptable seams shall be bounded by 2 passed test locations (i.e., above procedure shall be followed in both directions from original failed location), and one sample for destructive testing shall be taken within reconstructed area.

C. If sample fails laboratory destructive test (whether conducted by independent laboratory or by CONTRACTOR'S laboratory), above procedures shall be followed considering laboratory tests exclusively. Since final seam must be bounded by 2 passed test locations, it may be necessary to take one or more new samples for laboratory testing in addition to one required in reconstructed seam area.

3.10 DEFECTS AND REPAIRS

A. Identification: Broom or wash geomembrane if amount of dust or mud inhibits inspection.

B. Evaluation: Non-destructively test each suspect location in seam and non-seam areas. Repair each location failing nondestructive testing.

C. Repair Procedures:

1. Repair defective seams by reconstruction.
2. Repair tears or pinholes by seaming or patching.
3. Repair blisters, larger holes, undispersed raw materials, and contamination by foreign matter with patches.
4. Surfaces of geomembrane to be patched shall be abraded no more than 1 hour prior to repair.

5. Seams used in repairing patches shall be approved extrusion welded seams and may be subjected to same destructive test procedures as outlined for other seams.
6. Patches shall be made of same geomembrane, extend minimum of 150 mm (6 in.) beyond edge of defects, and applied using approved extrusion welding methods only. Report areas of repair to OWNER and ENGINEER immediately.

D. SEAM RECONSTRUCTION PROCEDURES:

1. Seam reconstruction for extrusion welding process shall be achieved by installing a cap strip over the defective weld a minimum of 6 inches either side of the weld and extrusion welding.
2. Seam reconstruction for fusion process shall be achieved by cutting out existing seam and welding in replacement strip, or reseaming by extrusion welding along the overlap at the outside seam edge left by the fusion welding process,or welding a cap strip over the defective seam length.

E. Verification of Repairs: Test each repair non-destructively. Repairs passing nondestructive test shall be taken as indication of adequate repair. Failed tests indicate repair shall be redone and retested until passing test results.

3.11 GEOMEMBRANE ACCEPTANCE

A. CONTRACTOR shall retain ownership and responsibility for geomembrane until acceptance by OWNER. Geomembrane liner will be accepted by OWNER when:

1. Written certification letter, including "as-built" drawings, is received by OWNER.
2. Installation of the geomembrane is complete.
3. All required documentation of installation is submitted to OWNER, including inspector's final report.
4. Verification of adequacy of field seams and repairs, including associated testing, is complete and all paperwork accepted and approved by OWNER or ENGINEER.
5. The five year material and one-year workmanship warranties are received.

3.12 CLEANUP

A. The CONTRACTOR shall place ALL material scraps in OWNER designated area at the end of each working day. Disposal of scraps in the anchor trenches will not be acceptable. No scraps of materials will be allowed to be left on top of liner.

B. Once liner installation is complete the CONTRACTOR shall:

1. Remove all sand bags from site; or
2. Remove all sand bags and place in OWNER designated area; or
3. If sand in sand bags is acceptable as a drainage layer material the CONTRACTOR may empty each bag and remove and dispose of the empty bags. This will only be allowed if the material meets the criteria for a granular drainage layer. The CONTRACTOR must receive permission from OWNER prior to emptying the sand bags onto the liner.

END OF SECTION

Certificate of Acceptance of
Geomembrane Subgrade Surface by CONTRACTOR

DESCRIPTION OF AREA TO BE CERTIFIED:_____
_____

LOCATION:_____

PROJECT:_____

ADDRESS:_____

The undersigned, _____ certifies that he is a representative of _____ _____, duly authorized to execute this certificate, that he visually inspected the subgrade surface described above on _____ and found the surface to be acceptable for installation of the geomembrane.

This certification is based on observations of the surface of the subgrade only. No sub terrain inspections or tests have been performed and_____ (company) makes no representations or warranties regarding conditions which may exist below the surface of the subgrade.

Date: _____ Signature: _____

Name:_____ Title:_____

CERTIFICATE RECEIVED BY CONTRACTOR CERTIFICATE RECEIVED BY OWNER

Date:_____ Date:_____

Contractor:_____ Company:_____

Name:_____ Name: _____

Signature_____ Signature_____

Title_____ Title:_____

SECTION 02921

GEOTEXTILE

PART 1 - GENERAL

1.01 SUMMARY

Under this section, Work includes manufacture; fabrication (if needed); furnishing; installation of geotextile for the leachate collection system and other areas as shown on the Drawings.

1.02 REFERENCES

A. American Society for Testing and Materials (ASTM):

1. ASTM D3776—Standard Test Method of Mass per Unit Area (Weight) of Fabric.
2. ASTM D4491—Standard Test Method for Water Permeability of Geotextiles by Permittivity.
3. ASTM D4632—Standard Test Method for Breaking Load and Elongation of Geotextiles (Grab Method)
4. ASTM D4751—Standard Test Method for Determining Apparent Opening Size of a Geotextile.
5. ASTM D4833—Standard Test Method for Index Puncture Resistance of Geotextiles, Geomembranes, and Related Products.
6. ASTM D3786 -Standard Test Method for Bursting Strength of Textile Fabrics-Diaphragm Bursting Strength Tester Method
7. ASTM D4884 -Standard Test Method for Strength of Sewn or Bonded Seams of Geotextiles

1.03 SUBMITTALS

A. Manufacturer's certificates indicating conformance test results of furnished material to Specifications.

B. Submit in accordance with Section 01300.

1.04 QUALITY CONTROL AND MATERIAL HANDLING

A. Roll Identification:

1. Provide geotextiles in rolls wrapped in relatively impermeable and opaque protective covers and marked or tagged with following information:
   a. Manufacturer's name
   b. Product identification
   c. Lot number
   d. Roll number
   e. Roll dimensions
2. Indicate special handling marked on geotextile itself, e.g., "This Side Up".
3. Conformance testing to indicated conformance with specifications.

B. Handle geotextiles in such manner as to ensure geotextiles are not damaged.

PART 2 - PRODUCT

2.01 GENERAL

A. Unless otherwise noted on Drawings, furnish materials whose minimum average roll values as defined by Federal Highway Administration (FHWA), meet or exceed Geotextile Fabric Properties.

B. Except when specifically authorized, supplier shall not furnish special run or value added products.

C. Unless longer durability is specified, geotextiles shall be capable of withstanding direct exposure to sunlight for 30 days with no measurable deterioration.

2.02 GEOTEXTILE FABRIC MINIMUM PROPERTIES:

A. Leachate Collection System (minimum 16-ounce geotextile)

1. Minimum general.
   a. Nonwoven, nonbiodegradable.
   b. Polypropylene.
2. Minimum dimensional.
   a. Mass/unit area – minimum 16 ounces per square yard (ASTM D3776)
3. Minimum mechanical.
   a. Puncture resistance – 200 pounds (ASTM D4833) or 1025 pounds (ASTM D6241).
   b. Grab strength – 380 pounds (ASTM D4632).
   c. Grab elongation – 50% (ASTM D4632).

PART 3 - EXECUTION

3.01 GEOTEXTILES INSTALLATION

A. General

1. On slopes, roll down slope in such manner as to continually keep geotextile sheet in tension.
2. In presence of wind, weight geotextiles with sandbags or equivalent. Install sandbags during placement and keep in place until replaced with cover materials.
3. Take necessary precautions to prevent damage to underlying layers during placement of geotextile.
4. During placement of geotextiles, care shall be taken not to entrap in geotextile, stones, excessive dust or moisture that could damage geomembrane or hamper subsequent seaming.
5. Do not expose geotextiles to precipitation prior to being installed and do not expose to direct sunlight for more than 15 days, unless otherwise specified.
6. All geotextile installation shall be completely covered at the end of each work day unless otherwise approved by the ENGINEER.

B. Seams and Overlaps:

1. On slopes steeper than 10 horizontal/1 vertical, seam geotextiles.
   a. Seam by sewing, adhesive, fusion or other approved means.
   b. Continuously seam; do not spot seam.

1) Spot seaming when overlapping may be considered as measure against wind uplift.

c. Overlap geotextile minimum 8-inches prior to seaming.
d. Sew horizontal seams along slope, not across slope.
e. Using polymeric thread with properties equal to or exceeding those of geotextile.
f. Orient overlaps in direction of earth filling.

C. Geotextile Repair:

1. A spot seam fabric patch in place with minimum of 24-inch overlap in each direction.
2. Remove soil or other material that may have penetrated torn geotextile.

D. Appurtenances:

1. Install geotextile around appurtenances protruding through geotextile as shown on Drawings.
2. After material is placed and seamed, complete final field seam connection between appurtenance sleeve or shield or geotextile. Maintain sufficient initial overlap of appurtenance sleeve so shifts in location of geotextile can be accommodated.

END OF SECTION

SECTION 15064

HIGH DENSITY POLYETHYLENE PIPE

PART 1 - GENERAL

1.01 SUMMARY

A. Work under this section includes installation of CONTRACTOR supplied piping for the leachate collection system.

B. Extent of pipe and fittings required by this section indicated on Drawings.

1.02 REFERENCES

A. American Water Works Association (AWWA).

B. American Society for Testing and Materials (ASTM):

1. ASTM D638- Test Method for Tensile Properties of Plastics.
2. ASTM D790- Test Method for Flexural Properties of Unreinforced and Reinforced Plastics and Electrical Insulating.
3. ASTM D1238- Test Method for Flow Rates of Thermoplastics by Extrusion Plastometer.
4. ASTM D1248 – Standard Specification for Polyethylene Plastics Extrusion Materials for Wire and Cable
5. ASTM D1505 – Standard Test Method for Density of Plastics by the Density-Gradient Technique.
6. ASTM D1693 – Standard Test Method for Environmental Stress Cracking of Ethylene Plastics.
7. ASTM D1784 – Standard Specification for Rigid Poly(Vinyl Chloride) (PVC) Compounds and Chlorinated Poly (Vinyl Chloride) (CPVC) Compounds.
8. ASTM D1785 – Standard Specifications for Poly(Vinyl Chloride) (PVC) Plastic Pipe, Schedules 40, 80, and 120.
9. ASTM D2837 – Standard Test Method for Obtaining Hydrostatic Design Basis for Thermoplastic Pipe Materials or Pressure Design Basis for Thermoplastic Pipe Products
10. ASTM D3350 - Standard Specification for Polyethelene Pipe and Fittings Material.
11. ASTM D2122 - Standard Test Method of Determining Dimensions of Thermoplastic Pipe and Fittings.
12. ASTM D3035 – Standard Specification for Polyethylene (PE) Plastic Pipe (DR-PR) Based on Controlled Outside Diameter.
13. ASTM D3261 - Standard Specification for Butt Heat Fusion Polyethylene (PE) Plastic Fittings for Polyethylene (PE) Plastic Pipe and Tubing.
14. ASTM F714 – Standard Specification for Polyethylene (PE) Plastic Pipe (SDR-PR) Based on Outside Diameter.
15. ASTM 5105 – Standard Practice for Performing Accelerated Outdoor Weathering of Pressure-Sensitive Tapes Using Concentrated Natural Sunlight

1.03 SUBMITTALS

A. List of materials to be furnished, the names of the suppliers and the date of delivery of materials to the site.

B. Documentation from the resin's manufacturer showing results of the following tests for resin identification:
   a. Melt Flow Index (ASTM D1238)
   b. Density (ASTM D5105)

C. Complete, detailed shop drawings of all polyethylene pipe, including the location of all fittings, joints, and connections to structures.

D. Manufacturer's recommendations for handling, storing, and installing pipe and fittings.

1.04 PRODUCT DELIVERY, STORAGE, AND HANDLING

A. Handle and protect product to ensure product is not damaged.

B. Provide factory applied basic end caps on each length of HDPE pipe. Maintain caps during shipping, storage, and handling to prevent end damage.

C. Provide protection for flanges and fittings by storing inside or packaging with impermeable opaque material.

PART 2 - PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS/SUPPLIERS

A. All HDPE pipe and fittings required for construction will be supplied by the CONTRACTOR.

B. HDPE Pipe:

   1. Acceptable Manufacturers:
      a. Phillips Driscopipe, Inc., Dallas, Texas.
      b. Poly Pipe Industries, Gainesville, Texas.
      c. Or approved equal.
   2. High performance, high molecular weight, high density polyethylene pipe.
   3. Material designation PPI-PE 4710.
   4. ASTM D3350, minimum cell classification value 445574C.
   5. Marking: Intervals of 5 feet or less.
      a. Manufacturer's name or trademark.
      b. Nominal pipe size.
      c. Legend: Industrial pipe SDR as indicated on Drawings.
      d. ASTM F714.
      e. Extrusion date, period of manufacture or lot number.
   6. Perforated pipe:
      a. Pattern as shown on Drawings.

C. Fittings:

   1. Molded from polyethylene compound having cell classification equal or exceeding compound used in pipe to insure compatibility of resins.

2. Be of same manufacture as pipe.
3. Fusion weld joints.
4. Markings:
    a. Manufacturer's name or trademark.
    b. Nominal size.
    c. Material designation "HDPE".
    d. ASTM D3261.

PART 3 - EXECUTION

3.01 EXECUTION

A. Examine and verify acceptability of surface to receive product.

3.02 HDPE PIPE INSTALLATION

A. Location, lines, and grades as shown on Drawings.

B. Welded joints.

1. Weld in accordance with manufacturer's recommendations for butt fusion methods.
2. Butt fusion equipment used in joining procedures capable of meeting conditions recommended by manufacturer, including, but not limited to: temperature required, alignment, and fusion pressures.
3. Electrofusion couplers to be installed as shown on Drawings for pipe penetrations through the perimeter berm; any other use of electrofusion couplers shall be approved by the OWNER or ENGINEER prior to installation.

C. CONTRACTOR to supply flange adapters (if necessary) and fittings necessary to connect new pipe to existing piping where shown on Drawings in accordance with manufacturer's recommendations. Butt fusion welding of new to existing, preferred.

D. No defective pipe installed. Defective pipe removed from site and replaced at CONTRACTOR'S expense.

E. Install aggregate and bedding material as shown on Drawings.

F. Attach HDPE flatstock, if applicable, with the following:
1. Continuously weld to pipe and configure such that it will have full bearing contact onto sump bottom.
2. Round edges of flatstock to prevent damage to underlying geosynthetics.
3. Groove bottom of flatstock to provide smooth bottom.

G. Perforations:
1. Penetrate pipe in pattern shown on Drawings.
2. Remove all cuttings and shavings prior to placement.

3.03 EXCAVATION AND PREPARATION OF SUBGRADE

A. Excavate and prepare subgrade as specified in Section 02220 and as shown on Drawings.

3.04 BACKFILL

A. Backfill with required pipe bedding and cover material as shown on Drawings.

3.05 FIELD QUALITY CONTROL

A. Pipe may be rejected for failure to conform to specification, or:

1. Fractures or cracks passing through pipe wall, except single crack not exceeding 2 inches in length at either end of pipe which could be cut off and discarded. Pipes within one shipment will be rejected if defects exist in more than 5 percent of shipment or delivery.
2. Cracks sufficient to impair strength, durability, or serviceability of pipe.
3. Defects indicating improper proportioning, mixing, and molding.
4. Damaged ends, where damage would prevent making satisfactory joint.
5. Noticeable variations from true alignment and grade sufficient cause for rejection of Work.

B. Acceptance of fittings, stubs or other specially fabricated pipe sections based on visual inspection at site and documentation that they conform to these specifications.

END OF SECTION

Construction Quality Assurance Plan

Final Closure
Dem-Con Pilgrim Landfill (SW-254)

April 2026

Prepared for:

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ATTACHMENTS

Attachment 1: Technical Specifications

1.0 Introduction

This CQA Plan outlines the necessary procedures, standards and methods for appropriate monitoring and documentation of the installation of a final cover lining system and intermediate cover lining system at the Dem-Con Pilgrim Landfill (facility or Landfill) near Mankato in Blue Earth County, Minnesota. The overall goals of this construction quality assurance program are to ensure that proper construction techniques and procedures are implemented and to verify that materials and installation techniques used meet the project design requirements. At the completion of the work, the program will culminate in a certification report which documents that the grading, liner, and piping systems have been constructed in general accordance with design standards and specifications with any deviations noted.

This plan also outlines the responsibilities of the various key parties involved in landfill construction. This plan is intended in conjunction with the project drawings, specifications, and other project documents to comprise the CQA program. Construction specifications for cover construction are provided in Attachment 1.

1.1 Definitions

Quality Assurance: Means and actions employed by OWNER to assure conformity of the lining system production and installation with the approved drawings, specifications and other project requirements.

Quality Control: Actions taken by the liner manufacturer, installer, earthwork contractor to ensure that materials and workmanship meet the requirements of the drawings, specifications, and other project requirements.

Cover System: Refers to a final or intermediate cover system.

Technical Specifications: A document produced by the Designer declaring minimum values of performance of construction materials.

Subgrade: The surface of the underlying soil prepared to receive the final cover.

Certification Report: A report documenting that construction was carried out according to approved drawings and specifications, and this CQA plan.

1.2 Parties

The parties discussed in this section are associated with the ownership, design, supply, manufacture, transportation, installation, and quality assurance of a lining system. The parties involved and their functions are described below:

OWNER: The party that owns and operates the facility that is responsible for the overall coordination of CQA activities. The OWNER is also responsible for selecting the necessary parties associated with construction.

Designer: The firm responsible for preparing the engineering design, associated plans, and specifications for the facility. The Designer for the project shall be a registered professional engineer in the State of Minnesota. The Designer may provide clarification necessitated during construction. The Designer may also be referred to as the ENGINEER in the Technical Specifications.

Quality Assurance Contractor (QAC): A person designated by OWNER to observe tests and document construction activities on behalf of the OWNER. The QAC will identify and notify the OWNER of any deviations or problems that arise during construction and assist in resolution. The QAC is also responsible for preparation of the construction certification report required for submittal to the MPCA. The QAC will have an individual identified as the CQA Officer. The CQA Officer will be a registered professional engineer in the State of Minnesota. The QAC may also be denoted as the ENGINEER in the Technical Specifications.

Earthwork Contractor (EC): This firm is mainly responsible for the earthwork preparation and construction of the soil components of the lining system. The EC typically prepares the subgrade or foundation soil on which the geosynthetics are placed. The EC is also responsible for placing the soil materials over the lining system. In addition, the EC may install piping and backfill material.

Geosynthetic Manufacturer (GM): The GM is the firm or firms responsible for the production and supply of the various geosynthetic components. The geosynthetic manufacturer will be responsible for providing QC documentation that the materials meet the requirements of the drawings, specifications, and other project requirements. The GM is responsible for the condition of the product until the material is accepted by the OWNER on-site.

Geosynthetic Installer (GI): The GI is responsible for field handling, storing, placing, seaming, loading, and other aspects of the installation of geosynthetics.

Quality Assurance Laboratory (QAL): Firm which performs necessary testing on samples taken from the site.

Land Surveyor (LS): Responsible for documenting the subgrade and cover system component thicknesses.

2.0 Documentation

2.1 General

The QAC will be on site to document construction activities. The QAC will prepare the daily activity logs, assemble the test reports, prepare the record drawings, and prepare the certification report. This section addresses the content of the various reports.

2.2 Documentation Reports

Daily Activity Log: The QAC will prepare daily activity logs, for the days they are present on-site, which will typically contain the following:

- Name and title of construction supervisor; contractor(s) personnel and equipment onsite
- Date of activity
- Weather, including maximum and minimum temperatures and amount of precipitation, if any
- Type of activity conducted.
- Summary of all quality assurance tests conducted, indicating which tests passed and failed specifications.
- Documentation of all repairs made on the liner system.

Photographs: The QAC shall create a photographic record of key construction activities to document the overall progress of construction.

Test Reports: The quality assurance laboratory will prepare a test report for each sample tested and provide copies to the QAC.

The test reports will typically contain the following information.

- Date
- Sample I.D.
- Project name and location
- Sample size and description
- Test being performed.
- Applicable ASTM standards
- Method of sample preparation
- Test results, including a statement that the test either passed or failed the project requirements.

The laboratory shall certify the accuracy of the test reports and compliance with relevant standards.

The liner installation record drawing will be provided by the GI. The QAC will work closely with the GI to ensure that panel numbers, seam locations, and destructive test numbers and locations are correctly located on the record drawing.

Certification Report: The QAC will prepare a certification report that documents construction and includes certification from a professional engineer registered in the State of Minnesota that the construction was in general accordance with this CQA plan, engineering drawings, and specifications.

The report shall include:

- A schedule of major events during construction, including start and finish dates, as appropriate.
- A list of the contractor and subcontractors involved.
- A summary description of the procedures and equipment used during each phase of construction (a summary of the daily activity logs).
- Final cover soils records
    - sampling and testing results as applicable dependent on material[1]
    - thickness verification information
- Geomembrane installation records: including panel layout record (to be supplied by the GI)
- Piping system records
- Record drawings containing the information previously listed.
- Select photographs, appropriately labeled.

[1] Final cover construction projects may be phased and span multiple construction seasons dependent on waste fill rates, weather, and other site-specific considerations. Projects that span multiple seasons may be considered as the same project with separate “phases”. In that case, soil material from the same borrow source may be used during subsequent phases as in the initial phase, without additional soil testing completed. Separate construction documentation reports may be developed and submitted for each phase of construction. The construction documentation report(s) for the subsequent phase(s) will contain the soil testing information from the initial phase, as applicable.

3.0 Geomembrane

3.1 General

Geomembranes are the geosynthetic component of the final cover system. This section is applicable to the Polyethylene (PE) geomembranes used in the final cover system. Material specifications for the geomembrane are displayed in Table 2.

3.2 Material Quality Control

3.2.1 Raw Material

The resin used to make geomembrane sheet shall be tested in accordance with the manufacturer's guidelines. Material ingredients of the geomembrane shall be randomly sampled by the manufacturing plant to ensure compliance with these specifications. Test reports of quality control tests, such as specific grading, melt flow index and carbon black content will be provided.

3.2.2 Geomembrane Material Specifications

The GI shall provide the QAC with the following:

1. A quality control certificate including the specified measure using test methods indicated at a frequency to meet conformance with the Geosynthetics Research Institute's (GRI) GM 17 for LLDPE.
2. Certification that property values given in the properties sheet are guaranteed by the GI.
3. Certification that 100 percent of every roll has been visually inspected for holes, cracks, thin spots, tears, punctures, blisters, or any other foreign material.

The GI shall provide the following information to the QAC for each roll delivered to the site:

- Name of the manufacturer and fabricator
- Name and type of liner
- Thickness of liner
- Batch code
- Date of fabrication
- Physical dimensions
- Panel number
- Location and method of storage at the site

This information shall accompany each roll delivered to the job site.

The QAC will examine results and report any nonconformance to OWNER. QC results will be reviewed and accepted or rejected by the QAC prior to deployment.

3.3 Subgrade

When the geomembrane is placed on a soil subgrade, the EC shall be responsible for preparing the subgrade for the geomembrane. Once complete, the QAC shall examine the surface, and verify the adequacy of the survey data provided. When the QAC deems the surface acceptable the QAC shall certify at a minimum:

1. The required subgrade survey has been completed and the results meet the specifications.
2. The subgrade has been inspected and meets the project requirements.

The GI will also inspect the subgrade and will sign the subgrade acceptance forms.

At any time during installation of the geomembrane, the QAC shall inform the OWNER of any areas that are unacceptable. Such defects in the subgrade shall be corrected by the appropriate contractor such that repaired areas meet the project specifications. If additional work is required on a soil subgrade it is the GI's responsibility to notify the EC and OWNER of such work and also provide this notification to the QAC.

3.4 Observations and Documentation

3.4.1 Roll Inspections

Prior to placement of any lining material, rolls shall be observed for defects and damage by both the QAC and the GI. Storage of the rolls shall be in a location that minimizes on-site handling and the possibility of damage.

Each roll shall have a roll label which clearly identifies the manufacturing information. This information, along with the panel number and location/method of on-site storage, shall be recorded by the QAC.

The QAC shall also visually observe each roll for imperfections or damage including holes, cracks, thin spots, tears, punctures, blisters, or the presence of foreign material.

3.4.2 Placement

3.4.2.1 Equipment

The GI shall use equipment that does not damage the geomembrane by handling, trafficking, excessive heat, leakage of oils or other means. The method and equipment used to unroll the material shall not cause scratches, crimps or any damage to the underlying geosynthetics, or excessive rutting of the soil subgrade.

3.4.2.2 Method of Deployment

No personnel working on the geosynthetic liner shall smoke, wear damaging shoes or engage in other activities that could damage the geomembrane. The method used to place the panels shall minimize wrinkles.

Adequate temporary loading and/or anchoring shall be provided to prevent uplift of the liner by wind. The anchoring system shall not damage the liner.

The GI shall inspect each panel after placement and prior to seaming for damage. Damaged panels or portions of damaged panels that have been rejected shall be marked and their removal from the work area recorded.

3.4.2.3 Crest Anchorage System

An anchor trench may not be required dependent on the footprint of the cover system and tie-in locations. If required, the anchor trench shall be excavated to the lines and widths shown on the drawings, prior to geomembrane placement. The trench shall be drained to prevent ponding or softening of adjacent soils where trench is open. The corners of the trench shall be slightly rounded to avoid sharp bends in the geomembrane. The trench shall be backfilled and compacted by light compaction equipment to the required grade.

Since backfilling the anchor trench can affect material bridging at the toe of slope, or at the drainage terraces, consideration should be given to backfilling the liner at its most contracted state, preferably during the cool of the morning or extended period of overcast skies. Care should be taken when backfilling the trenches to prevent damage to the geosynthetics.

3.4.3 Trial Seams

To verify that seaming conditions are adequate, trial seams shall be performed on fragmented pieces of geomembrane. Trial seams shall be made as follows:

1. Approximately every 4-hours at the beginning of each seaming period (usually morning and afternoon)
2. Anytime equipment is turned off.
3. For each seaming apparatus
4. Other times as deemed necessary by the QAC.

A test weld, long enough to obtain required samples shall be run at the frequency described above (typically approximately 6 feet long).

The test weld shall be recorded on the GI's trial weld log with date, ambient temperature, and welding machine number. Testing shall be completed in accordance with the project specifications. The QAC will observe and document results of trial seam procedures.

3.4.4 Field Seaming

3.4.4.1 Seam Layout

Prior to liner installation, panel layout drawings shall be submitted and approved by the QAC and OWNER. Seams should typically be oriented parallel to the line of maximum slope. All seam-numbering and panel-numbering systems shall be agreed upon prior to installation. Individual liner panels shall be laid out and overlapped as required prior to welding. The area to be welded shall be cleaned prior to welding. Panel locations shall be recorded by the GI/QAC.

3.4.4.2 Seaming Equipment and Accessories

The fusion welding apparatus will be an automated, vehicle-mounted device that produces a double seam enclosing a void. This apparatus shall be equipped with gauges permitting a direct reading of the applicable temperatures.

The extrusion welding apparatus shall be equipped with gauges giving the temperatures of the apparatus at the nozzle.

3.4.4.3 Weather Conditions for Seaming

Seaming shall not take place during precipitation, in the presence of excess moisture or in the presence of excessive winds. Excessive moisture is a condition where condensation or other moisture on the sheet is the cause of poor seams or seams failing non-destructive or destructive testing. Excessive winds shall be determined by the GI, but if the QAC feels panel deployment poses a safety concern with the wind or that the geomembrane cannot be adequately held in place with sandbags, deployment shall cease until wind conditions allow further seaming. Seaming shall not take place when panel temperatures are less than 32°F or more than 170°F unless authorized by the OWNER and QAC.

3.4.4.4 General Seaming Procedures

The rolls of geomembrane shall be overlapped as required by the manufacturer’s specifications.

A base T-seam shall not be closer than 10 feet from the toe of the slope. Seams shall be aligned with the least possible number of wrinkles and "fish mouths". Excessively large wrinkles and all fish mouths shall be relieved and cap stripped.

The QAC shall document field seam locations and panel overlaps. Panels that are factory fabricated or factory seamed will undergo the same observation and documentation as panels that are field seamed.

3.5 Testing

3.5.1 Nondestructive Seam Continuity Testing

The GI shall nondestructively test all field fusion seams over their full length by air-pressure testing. Extrusion-welded seams shall be tested by vacuum gauge.

Air pressure testing will be performed on most of the seams, since the double fusion-seaming method is the method of choice. Vacuum testing will be performed on extrusion welded seams. Air pressure and vacuum testing shall be in accordance with the project specifications.

The QAC shall document the following for each non-destructive seam test:

- Date
- Seam number
- Welder I.D.
- Seamer
- Air Pressure

3.5.2 Destructive Testing

Destructive seam tests shall be performed every 500 lineal feet of seam. The purpose of these tests is to check that welds are fully integrated with each other and to evaluate seam strength. Seam strength testing shall be done as the seaming work progresses, not at the completion of field seaming.

3.5.2.1 Location and Frequency

The QAC shall select locations where seam samples will be cut. These locations shall be estimated as follows:

a) A minimum frequency of one test location per 500 feet of seam length. This minimum frequency is to be determined as an average taken throughout the entire facility.
b) The seaming technician shall not be informed in advance of the locations where the seam samples will be taken.

Sampling shall be cut by the GI as the seaming progresses in order to have timely laboratory test results. The GI shall:

a) Cut samples.
b) Assign a number to each sample that is to be based upon seam and sample number and mark it accordingly.
c) Record sample location on construction record drawings.
d) All holes in the geomembrane resulting from destructive seam sampling shall be immediately repaired in accordance with the project specifications. The continuity of the new seams in the repaired area shall be tested accordingly.

3.5.2.2 Size of Samples

Samples shall be approximately 16 X 44 inches for testing to be distributed in accordance with the project specifications for field documentation testing, OWNER independent laboratory testing and OWNER archive storage.

Final determination of the sample sizes shall be determined prior to liner installation at the preconstruction meeting.

3.5.2.3 Field Testing

For field testing, the GI shall cut 10 identical 1-inch wide replicated specimens from the sample. The GI shall test five specimens for seam shear strength and five for peel strength. Peel tests shall be performed on both inside and outside weld tracks. To be acceptable 5 out of 5 specimens must pass the test criteria with less than 10% separation. If any field test sample fails to pass, then the procedures outlined in the specifications shall be followed.

3.5.2.4 Laboratory Testing

Passing tensiometer testing in the field qualifies the sample for laboratory testing.

Destructive test samples shall be packaged and shipped to the geomembrane testing laboratory consultants by overnight mail. The laboratory shall provide test results to the QAC.

Destructive testing involves two techniques: 1) shear testing, and 2) peel testing. Shear testing applies a tensile stress from the top sheet through the weld and into the bottom sheet. Peel testing peels the top sheet back against the overlapped edge of the bottom sheet in order to observe how separation occurs. The peel test indicates whether or not the sheets are continuously and homogeneously connected through the seam. A total of 10 coupons will be subject to testing, for which five will be tested in shear and 5 in peel (ASTM D6392). Fusion seam specimens will have both tracks tested in peel.

Both tests (shear and peel) must have a Film Tearing Bond (FTB) type of separation to pass. With an FTB, the polymer material tears indicating a fully integrated connection between top and bottom sheets. It is important that no weld bead/sheet or sheet/sheet interface exists as such an interface might be separated by absorbed chemicals, causing failure of the seam.

The QAC shall document the following for each destructive seam test:

- Location
- Seam number
- Welder I.D.
- Seamer
- Sample I.D.

3.5.2.5 Procedures for Destructive Test Failure

Procedures for destructive test failure are outlined in the specifications.

The GI and QAC shall document all actions taken in conjunction with destructive test failures; e.g., capping of failed seam area.

3.6 Defect And Repairs

All seams and non-seam areas of the geomembrane shall be examined by the GI and QAC for identification of defects, holes, blisters, un-dispersed raw materials and any sign of contamination by foreign matter.

3.6.1 Evaluation

Each suspect location both in seam and non-seam areas shall be nondestructively tested using the methods described in this section as appropriate. Each location that fails the nondestructive testing shall be marked by the GI and repaired. Work shall not proceed with any materials that will cover locations that have been repaired until non-destructive test results are recorded.

3.6.2 Repair Procedures

All portions of the geomembrane exhibiting a flaw or failing a destructive or nondestructive test shall be repaired in accordance with the project specifications. Several procedures exist for the repair of these areas. The final decision as to the appropriate repair procedure shall be agreed upon between the QAC, GI, and OWNER. The procedures available include:

1. Patching: Used to repair large holes, tears, and contamination by foreign matter.
2. Buffing and re-welding: Used to repair small sections of extruded seams.
3. Spot welding or seaming: Used to repair small tears, pinholes, or other minor localized flaws.
4. Capping: Used to repair areas of inadequate seams that have an exposed edge.

3.6.3 Verification of Repairs

Each major repair requiring a patch or cap shall be identified in the GI's repair log. Each repair shall use nondestructive test methods described in this section as appropriate. Repairs that pass the nondestructive test shall be taken as an indication of an adequate repair. Failed tests indicate that the repair shall be re-done and re-tested until passing test results are obtained. The QAC may choose to take a destructive test in an area of repair. The QAC shall document the location of each type of repair and the type of repair made.

3.7 Final Acceptance

The geomembrane must be observed for completion of liner construction activities. The final inspection shall be performed by the QAC, GI and OWNER. The QAC and GI shall document completion or incompletion. The GI shall repair or complete any testing that has been determined incomplete. The QAC and GI shall then re-inspect the repairs and observe testing to complete final inspection.

Geomembrane material shall be final inspected prior to being covered by overlying geosynthetic materials or soil layers.

3.8 Conformance With Project Specifications

The QAC shall document that the installation and necessary repairs were done in accordance with the project specifications.

4.0 Geotextile

4.1 General

This section addresses geotextiles that may be used as part of a synthetic drainage system in the final cover. Use of a studded drain liner would require installation of a non-woven geotextile to prevent clogging of the system from the overlying cover soils. A synthetic drainage system may not be applicable to each project; the construction drawings reflect the final cover profile to be installed.

4.2 Material Quality Control

The manufacturer shall provide a list of guaranteed minimum average roll value properties for the specified geotextile to be installed. Each roll of geotextile shall bear a label that identifies the properties. The QAC will examine results and report any nonconformance to OWNER. QC results will be reviewed and accepted or rejected by the QAC prior to deployment.

4.3 Observation and Documentation

4.3.1 Roll Inspection

Prior to placement, rolls shall be inspected for damage and defects by the QAC. During shipment and storage, geotextile shall be protected from ultraviolet light exposure, precipitation, mud, dirt, dust, puncture, cutting or any other damaging or deleterious conditions. Consistent with these objectives, geotextile rolls shall be shipped and stored in relatively opaque and watertight wrappings. The GC shall be responsible for proper on-site storage of geotextile materials and geotextiles shall be handled in such a manner as to ensure they are not damaged. In the presence of wind, the materials shall be weighted with sandbags. Care shall be taken to ensure that stones, mud, dirt and debris are not entrapped beneath the geotextile during placement and seaming operations that could cause damage.

4.3.2 Seaming

Geotextiles shall be sealed by overlapping 4 inches and sewing or by an alternate method as approved by the QAC and OWNER. Manufacturer recommended overlap lengths will be followed for slope applications. Sewing threads shall be a polymeric material with chemical resistance similar to the geotextile. The QAC shall observe and document that the panel overlap meets the project specifications and that there are no excessive folds or wrinkles in the geotextile.

4.3.3 Damage And Repairs

Any holes or tears in geotextiles shall be repaired by patching with the same geotextile materials. The patch shall be a minimum of 24 inches larger than the area to be repaired in all directions and shall be thermally spot-bonded (lystered) or stitched in accordance with the technical specifications. The QAC shall document that any holes or defects were repaired.

4.3.4 Conformance with Project Specifications

The QAC shall document that the installation and necessary repairs were done in accordance with the project specifications.

5.0 Granular Drainage Media

5.1 General

The granular drainage media consists of natural material used as a drainage layer in the cover system. Use of this section may not apply dependent on the final cover system selected for installation; see construction drawings for the final cover profile.

5.2 Material Quality Control

Samples of the granular drainage media will be tested in-place or during placement for grain size distribution and hydraulic conductivity. Frequencies are provided in Table 1 and acceptability criteria are listed in the technical specifications. Source testing requirements are identified in the technical specifications.

The QAC shall examine the results and report any nonconformance to the OWNER. QC results shall be reviewed and accepted or rejected by the QAC prior to installation.

5.3 Observation and Documentation

Observations of the construction work by QAC or OWNER include the following:

- Hauling of material to ensure no damage to underlying geosynthetics
- Spreading of granular drainage media material to ensure excess wrinkling of underlying geosynthetics does not occur.
- Placement of pipes to ensure proper bedding and coverage and protection of underlying geosynthetics.
- Documentation will include; laboratory test data, material information, placement methods and thicknesses.

5.4 Testing

CQA testing will be conducted on samples taken from the material during the course of construction. Sampling locations will be selected by QAC or OWNER according to the number of required tests. Locations of all tests will be documented for report purposes. Laboratory test methods and frequencies to develop data upon which acceptability evaluations can be based will be as provided in Table 1. Source testing requirements are identified in the technical specifications.

5.5 Damage and Repairs

Granular drainage media that does not meet the requirements of the CQA Plan or the Specifications will be removed and replaced with suitable material.

5.6 Survey

The minimum thickness of soil drainage media shall be as shown on the drawings and extending over the lining system. The thickness of granular drainage media shall be verified on a grid spacing as specified in Table 3 using consistent methods that shall not damage the liner. Grading tolerances are provided in Table 3. Settlement verification locations will be used to adjust subgrade elevations throughout granular drainage placement. The settlement verification locations will be determined by the ENGINEER prior to granular drainage media placement.

5.7 Conformance With Project Specifications

The QAC shall document that the granular drainage media installation was done in accordance with the project specifications.

6.0 Piping Systems

6.1 General

This section addresses the HDPE piping installed for the gas extraction system (if used) and stormwater management system piping.

6.2 Material Quality Control

The EC (or other piping contractor, if applicable) shall inspect all piping and fittings received at the site and shall verify that piping materials are:

1) In accordance with drawings and specifications (size, SDR ratio, material)
2) Free of material defects
3) Undamaged

EC shall be responsible for storing piping materials in a protected location where they will not be damaged.

The QAC shall examine the results and report any nonconformance to the OWNER. QC results shall be reviewed and accepted or rejected by the QAC prior to installation.

6.3 Observation And Documentation

6.3.1 Installation

EC shall install piping at locations and elevations as shown on drawings. All piping connections shall be made in accordance with manufacturer's recommendations and with the technical specifications. Installation of backfill around piping shall be done carefully to ensure damage to the piping does not occur. QAC will document piping types installed, methods of connection/fitting types, and backfilling procedures. Documentation of the piping will include information on the method used to join sections of the pipe.

6.4 Damage and Repairs

Damaged or defective portions of the piping, as determined by QAC, will be removed and replaced.

6.5 Survey

The piping will be surveyed to verify minimum required slope / grade. Pipe tolerances are provided in Table 3.

6.6 Conformance With Project Specifications

The QAC shall document that the piping installation was done in accordance with the project specifications.

7.0 Vegetative Soils

7.1 General

The vegetative layer will be topsoil capable of sustaining vegetative grasses over areas disturbed during construction.

7.2 Observation and Documentation

The QAC will observe and document the placement methods of the vegetative soils. The EC (or other contractor, if applicable) shall ensure conformance to the project requirements regarding topsoil quality and placement, fertilizer content and application, seed mixture, seeding operations, mulching, and reseeding/repair work to sustain vegetation.

The QAC shall examine the results and report any nonconformance to the OWNER. QC results shall be reviewed and accepted or rejected by the QAC prior to installation.

Topsoil thickness shall be documented to verify conformance with the Drawings and in accordance with the specifications and Table 3.

7.3 Damage and Repair

Seeded areas must be guaranteed by the EC to be alive and in satisfactory growth for a period of 1 year. If areas of non-growth or spotty growth are present, they will be reseeded.

TABLES

1. Soil Quality Assurance Testing Requirements
2. Geosynthetic Quality Assurance Testing Requirements
3. Grading Tolerances

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TABLE 1

Soils Quality Assurance Testing Requirements (In-place Testing Requirements[1])

Granular Drainage Layer			
Test	**Method**	**Number of Tests**	**Pass/Fail Criteria**
Grain Size	D6913	1/2,000 cubic yards Min. 1/source Min. 3 tests	<5% passing No. 200 Max. 3/8" (99% passing) Uniformity Coeff <6
USCS Classification	D2487	1/2,000 cubic yards Min. 1/source Min. 3 tests	-
Hydraulic Conductivity	D2434	1/5,000 cubic yards Min. 1/source Min. 3 tests	≥ 1 x 10^{-3} cm/sec at 90% standard proctor dry density

Rooting Zone & Topsoil			
Test	**Method**	**Number of Tests**	**Pass/Fail Criteria**
Visual Observation	--	--	Particle size and material limitations per the specifications.

[1]Source testing requirements for the final cover soil layers, as applicable, are identified in the technical specifications. Final cover construction projects may be phased and span multiple construction seasons dependent on waste fill rates, weather, and other site-specific considerations. Projects that span multiple seasons may be considered as the same project with separate "phases". In that case, soil material from the same borrow source may be used during subsequent phases as in the initial phase, without additional soil testing completed. Separate construction documentation reports may be developed and submitted for each phase of construction. The construction documentation report(s) for the subsequent phase(s) will contain the soil testing information from the initial phase, as applicable. Quality assurance testing (in-place testing) will be completed as tabulated above.

Stantec

TABLE 2

Geosynthetic Quality Assurance Testing Requirements

LLDPE Geomembrane Testing		
Test	**Reference**	**Frequency**
Material Properties	GRI GM 17 and Spec Section 02922	By manufacturer Every roll provided
Visual Inspection	--	Entire sheet
Trial Seam Welding	CQA Plan Section 3.4.3 and Spec Section 02922	Approximately every 4-hours (typically morning and afternoon); anytime equipment is turned off; for each seaming apparatus
Non-Destructive Seam Testing	CQA Plan Section 3.5.1 and Spec Section 02922	All seams/patches
Destructive Seam Strength Test	CQA Plan Section 3.5.2 and Spec Section 02922 GRI GM 19a ASTM D 6392 Pass Fail Criteria in Accordance with GRI GM 19a	1 test per 500 L.F. seam minimum

Geotextile		
Test	**Reference**	**Frequency**
Material Properties	Spec Section 02924	By manufacturer Every roll provided
Visual Inspection of Material and Seams	Spec Section 02924	Visual Inspection of Material and Seams

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TABLE 3

Grading Tolerances

Soil Layer/Surface	Measurement	Method	Pass/Fail Criteria[1]	Frequency
Top of Subgrade	Elevation	Survey	+ 0.2’	100’ Grid and Breaklines
Top of Granular Drainage Layer	Thickness	Survey or Hand Probe	12-inch minimum	100′ Grid and break lines
Top of Rooting Zone Layer	Thickness	Survey or Hand Probe	6-inch minimum	100’ Grid and Breaklines
Top of Final Cover	Elevation & Thickness	Survey	+0.2’ 6-inch minimum topsoil	100’ Grid and Breaklines
Piping	Elevation	Survey	Minimum required slope/grade per Drawings	Fittings, changes of direction, and every 50’ along piping

[1] Final cover grades may be lower than permit elevations; therefore, a maximum tolerance only is listed for soil layer elevations.

Attachment 1: Technical Specifications

SECTION 02201

GRANULAR DRAINAGE LAYER

PART 1 - GENERAL

1.01 SUMMARY

A. Work under this section includes descriptions and requirements for the installation of the granular drainage layer placed as part of the Final Cover System as shown on the drawings.

1.02 REFERENCES

A. American Society for Testing and Materials (ASTM):

1. ASTM D422 - Standard Method for Particle Size Analysis of Soils
2. ASTM D698 - Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lb/ft^3)
3. ASTM D1140 – Standard Test Methods for Determining the Amount of Material in Soils Finer than No. 200 (75-µm) Sieve by Washing
4. ASTM D2434 – Standard Test Method for Permeability of Granular Soils (Constant Head)
5. ASTM D2487 – Standard Practice for Classification of Soils for Engineering Purposes (Unified Soil Classification System)

1.03 SOIL MATERIAL QUALITY ASSURANCE

A. Granular drainage material may be available from OWNER designated on-site stockpile or imported to site by CONTRACTOR.

B. Source testing to be performed by OWNER or CONTRACTOR depending on source of material.

Property	Test Method	Frequency
Constant Head Permeability	ASTM D2434	1 test/2,000 cy, min. 1 test/source
Grain Size Analysis	ASTM D422/D1140	1 test/2,000 cy, min. 1 test/source
USCS Soil Classification	ASTM D2487	1 test/2,000 cy, min. 1 test/source
Standard Proctor	ASTM D698	1 test / source

PART 2 – PRODUCTS

2.01 Granular Drainage Layer: Durable, coarse rounded to subangular gravel exhibiting the following:

A. Grain Size: 99% passing 3/8-inch sieve and maximum 5% by weight which passes the #200 Sieve.

B. Minimum permeability: Minimum permeability of $1x10^{-3}$ cm/s for cover system at 90% of standard proctor density.
C. Uniformity Coefficient: Less than 6 (guideline, not requirement)

PART 3 - EXECUTION

3.01 FILL USAGE

A. Final Cover System construction: Directly over final cover geomembrane as shown on Drawings.

3.02 PREPARATION

A. CONTRACTOR to receive OWNER'S permission to begin installation of granular drainage layer.

B. CONTRACTOR shall be responsible for surface water control within construction limits and shall keep the construction and borrow areas well drained and minimize surface water ponding.

c. Subgrade elevation shall be documented by ENGINEER prior to placement of granular drainage layer material.

3.03 PLACEMENT

A. Placement of granular materials on geomembrane shall not proceed at ambient temperatures below 5°C (40°F).

B. Spread with one pass of low ground pressure tracked equipment or equivalent as approved by ENGINEER prior to placement. Do not allow rubber-tired vehicles on granular blanket after placement. Operation of hauling equipment will be allowed only on areas with a 3-foot minimum thickness on slopes. **Spread upslope only.**

C. Do not compact material on geosynthetics.

D. Protect buried pipes, geotextiles, geosynthetics, and similar installations.

E. CONTRACTOR shall place granular material by such method as to prevent wrinkling and possible damage to the LLDPE liner. Once the geosynthetic lining system has been accepted by the ENGINEER, it shall be the CONTRACTOR'S responsibility to ensure that the geosynthetics are not damaged. Should they become damaged, the CONTRACTOR shall at his own expense:

1. Immediately notify ENGINEER; and
2. Have the geosynthetic installer make any necessary repairs at the CONTRACTOR'S expense.

3.04 FIELD QUALITY CONTROL

A. Comply with approved Quality Assurance Manual. CONTRACTOR shall cooperate and assist ENGINEER with obtaining required documentation and testing.

B. Specified soil layers shall be graded to the minimum thicknesses as shown on drawings and specified herein.

C. Testing:

1. Granular drainage layer in-place testing will be performed by ENGINEER to monitor material parameters.
2. Tests to be performed and frequency of tests specified are in the Quality Assurance Manual.

D. ENGINEER shall perform documentation survey in accordance with the CQA manual. CONTRACTOR shall assist with determining settlement of surfaces due to construction loads for the ENGINEER to use in preparing the construction certification. Settlement will be determined on a spacing of approximately 2 per acre. Grid points used for settlement correction will be incorporated into the granular drainage layer thickness survey to be performed on an approximate 100-foot grid in accordance with the verification table. At the settlement correction survey locations, the thickness of the granular drainage material will also be surveyed. This survey will be done at the same time the top of granular drainage material survey is completed. CONTRACTOR shall manually excavate down to liner surface at these locations so that the liner surface may be surveyed at the same location and the settlement can be determined. CONTRACTOR is responsible for any damage to the underlying geosynthetics and replacement of granular drainage material during this process. ENGINEER must be present during excavation for settlement verification.

3.05 ADJUSTMENT AND CLEANING

A. Remove excess material not suitable for use to OWNER designated stockpile area. Grade to drain.

END OF SECTION

SECTION 02204

ROOTING ZONE

PART 1 - GENERAL

1.01 SUMMARY

A. This section includes the placement of the rooting zone soils.

1.02 REFERENCES

A. American Society for Testing and Materials (ASTM):

1. ASTM D422 - Standard Method for Particle Size Analysis of Soils.
2. ASTM D1140 - Standard Test Method for Amount of Material in Soils Finer than the No. 200 (75 um) Sieve.
3. ASTM D2487 - Standard Test Method for Classification of Soils for Engineering Purposes.

1.03 QUALITY ASSURANCE

A. Rooting zone to be obtained from OWNER designated on-site stockpile/borrow area. CONTRACTOR responsible to select suitable material from designated on-site source(s).

B. OWNER will perform quality control and quality assurance in accordance with the Construction Quality Assurance Manual.

PART 2 - PRODUCTS

2.01 SOIL MATERIALS

A. Rooting Zone:

1. Friable soil; Horizon B soils, suitable for establishment of rooting system of grass and plants
2. Free of stones, lumps, live plants and roots, sticks, and other undesirable material. The maximum particle size shall be no larger than three (3) inches.
3. Topsoil may be used for rooting zone soils.

PART 3 - EXECUTION

3.01 FILL USAGE

A. Rooting zone material: Directly on top of granular drainage layer for final cover system construction.

3.02 PREPARATION

A. Surface Water Control:

1. CONTRACTOR responsible for surface water control within construction limits.

2. Keep construction and borrow areas well drained and minimize surface water pooling.

3.03 PLACEMENT OF ROOTING ZONE

A. Construct to limits and thicknesses as shown on Drawings.

B. Spread with one pass using tracked equipment.

C. Spread uphill only.

D. Rubber-tired vehicles only allowed on areas with a 3-foot minimum thickness when being placed over geosynthetics.

3.04 FIELD QUALITY CONTROL

A. Comply with approved Quality Assurance Manual. Cooperate with quality control program.

B. Specified soil layers shall be graded to the minimum thicknesses as shown on drawings and specified herein. Thickness tolerance of the soil layers must be between -0.0 and +0.2 feet.

C. ENGINEER shall perform documentation survey in accordance with CQA manual. CONTRACTOR shall assist with determining settlement of surfaces due to construction loads for the ENGINEER to use in preparing the construction certification. Settlement will be determined at a frequency of approximately 2 locations per acre. Grid points used for settlement correction will be incorporated into the thickness survey to be performed on an approximate 100-foot grid in accordance with the verification table. At the settlement correction survey locations, the combined thickness of the rooting zone and topsoil material will be surveyed. This survey will be done at the same time the top of final cover survey is completed. CONTRACTOR shall manually excavate down to the top of the granular drainage layer at these locations so that the surface may be surveyed at the same location and the settlement can be determined. CONTRACTOR is responsible for any damage to the underlying geosynthetics and replacement of cover soils during this process. ENGINEER must be present during excavation for settlement verification. Topsoil thickness will be verified during excavation for settlement correction and per Section 02486 requirements.

D. Testing:

1. Tests performed and frequency of tests specified in the Quality Assurance Manual.
2. CONTRACTOR is responsible for all costs related to retests of materials not meeting specifications.

E. ENGINEER shall perform documentation survey in accordance with the CQA manual.

3.05 ADJUSTMENT AND CLEANING

A. Remove excess material not suitable for use to OWNER designated location on-site.

*** END OF SECTION ***

SECTION 02206

INTERMEDIATE COVER (BUFFER SOILS)

PART 1 - GENERAL

1.01 SUMMARY

A. This section includes the placement of the buffer soils.

1.02 QUALITY ASSURANCE

A. In accordance with the Construction Quality Assurance Manual for this project.

PART 2 - PRODUCTS

2.01 SOIL MATERIALS

A. Intermediate Cover/Buffer Soils:

1. Buffer soil material shall be in-place intermediate cover material supplemented as need to provide the minimum thickness shown on the Drawings. Material will be supplied by the OWNER and available from on-site stockpile/borrow areas. CONTRACTOR shall be responsible for selecting suitable buffer soil material to supplement in place soils as necessary.
2. Free from gravel, cinders, stone over 1/2 inch in any dimension and other undesirable material.

PART 3 - EXECUTION

3.01 FILL USAGE

A. Intermediate Cover/Buffer soils: Directly on top of the waste fill within the closure area.

3.02 PREPARATION

A. Surface Water Control:

1. CONTRACTOR responsible for surface water control within construction limits.
2. Keep construction and borrow areas well drained and minimize surface water pooling.

3.03 PLACEMENT OF BUFFER SOILS

A. Construct to limits and to the elevations as shown on Drawings.

B. Final surface must be firm and free of stones greater than ½ -inch diameter or any other material which would be deleterious to the overlying geomembrane liner.

C. Smooth drum surface to provide smooth surface for geomembrane installation. Remove and replace excessively soft or wet areas.

D. Final surface shall be smooth, uniform, and free from sudden changes in grade (such as vehicular ruts).

E. Before geomembrane installation begins, verify grade and accept subgrade per Section 02922.

3.04 FIELD QUALITY CONTROL

A. Comply with approved Quality Assurance Manual. Cooperate with quality control program.

B. Specified soil layers shall be graded to the minimum thicknesses as shown on drawings and specified herein. Thickness tolerance of the buffer soil layer must be between -0.0 and +0.2 feet.

C. Survey Requirements: ENGINEER shall perform documentation survey in accordance with the Quality Assurance Manual.

3.05 ADJUSTMENT AND CLEANING

A. Remove excess material not suitable for use to OWNER designated location on-site.

*** END OF SECTION ***

SECTION 02211

SITE PREPARATION

PART 1 - GENERAL

1.01 SUMMARY

A. Section includes the requirements for general site preparation, salvaged topsoil, and miscellaneous surface features.

1.02 DEFINITIONS

A. Structures and Surface Features: For purpose of this section, shall mean existing structures and surface features, including but not limited to buildings, pavements, curb and gutter, signs, posts, fences, trees, shrubs, and other landscaped features.

B. Salvaged Topsoil: Natural loam, sandy loam, silt loam, silty clay loam, or clay loam humus-bearing soils available from overlying portions of areas to be excavated for construction.

C. Unsuitable Material: Topsoil, peat, organic soils, and materials containing slag, cinders, foundry sand, debris, and rubble or soil with less than required bearing capacity as determined by ENGINEER.

D. Utilities: Existing landfill infrastructure including leachate piping, electric lines; conduits, telephone, and other communication lines; sewer pipe; cable television, other utilities, and appurtenances.

1.03 PROJECT/SITE CONDITIONS

A. Provide 72 hour notice, prior to beginning construction, to OWNER.

B. Several leachate lines, geosynthetics, landfill gas infrastructure, electrical utilities, existing surface water management features, and associated landfill features will be located in and adjacent to the project area. Locations of these pipes and utilities are shown on to the extent possible. CONTRACTOR should use caution around such infrastructure as due to landfill conditions, locations may not be exact.

1.04 COORDINATION

A. Coordinate work with others performing work at project site.

B. Call Gopher One to check for utilities prior to beginning Work.

PART 2 - PRODUCTS

(Not Used)

PART 3 - EXECUTION

3.01 PREPARATION

A. Provide protection and support during construction for existing utilities, structures, and surface features adjacent to construction area or easements and rights-of-way.

B. Remove obstructions such as mounds of dirt, stone or debris located within working limits.

C. Obstructions such as street signs, small culverts, and guard posts located within construction easements of rights-of-way may be removed if promptly replaced to original condition unless otherwise specified.

3.02 SALVAGED TOPSOIL

A. Excavate and temporarily stockpile salvaged topsoil where topsoil exists to restore areas disturbed by construction.

B. All material stockpile areas shall be stripped of topsoil prior to stockpiling.

C. Provide transportation of material and sites for stockpiles if adequate areas not available within the construction limits as shown on the Drawings.

3.03 RESTORATION

A. Restore existing utilities, surface feature, and structures to condition equal to or exceeding condition which existed prior to construction.

END OF SECTION

SECTION 02220

TRENCHING & EXCAVATION

PART 1 - GENERAL

1.01 SUMMARY

A. Work described in this section includes trenching and excavation for stormwater piping and related infrastructure installation.

1.02 REFERENCES

A. American Society for Testing and Materials (ASTM):

1. ASTM D422 - Standard Method for Particle Size Analysis of Soils.
2. ASTM D1140- Standard Test Method for Amount of Material in Soils Finer than the No. 200 (75 um) Sieve.
3. ASTM D698 - Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft^3)
4. ASTM D2487- Standard Test Method for Classification of Soils for Engineering Purposes.
5. ASTM D6938 – Standard Test Method for In-Place Density and Water Content of Soil and Soil-Aggregate by Nuclear Methods (Shallow Depth)

B. Minnesota Department of Transportation “Standard Specifications for Construction”, latest edition.

1.03 SUBMITTALS

A. Shoring, Bracing, and Sheeting Layout and Details: ENGINEER will review submitted material to ascertain effect on new construction. ENGINEER will not review shoring, bracing, and sheeting for structural integrity or effect on existing facilities.

B. Additional soil testing results as may be required.

1.04 QUALITY ASSURANCE

A. Sheeting, Shoring, and Bracing:

1. If determined necessary by CONTRACTOR, sheeting, shoring, and bracing shall be designed by a Professional Engineer registered in the state of Minnesota.
2. Sheeting, shoring, and bracing shall conform to safety requirements of federal, state, or local public agency having jurisdiction over such matters. Most stringent of these requirements shall apply.

1.05 DEFINITIONS

A. Influence Zone Under Foundations or Pavements: Area below foundation or pavement as bounded by 1 horizontal to 2 vertical slope extending outward from 1 ft beyond outer edges of foundation or pavement.

B. Influence Zone Around Piping or Electrical Ducts: Area below limits bounded by line 12 in. above pipe or duct and by 1 horizontal to 2 vertical slope extending outward from that line 1 ft beyond outer edge of pipe or duct.

C. Unsuitable Material: Topsoil, peat, organic soils, and materials containing slag, cinders, foundry sand, debris, and rubble or soil with less than required bearing capacity as determined by ENGINEER.

1.06 FIELD MEASUREMENTS

A. Verify control monuments and intended elevations for Work as shown on Drawings.

PART 2 - PRODUCTS

(NOT USED)

PART 3 - EXECUTION

3.01 EXAMINATION

A. Examine and verify acceptability and condition of surfaces to perform Work.

3.02 PREPARATION

A. Identify required lines, grades, levels, contours, and datum.

B. Protect benchmarks, structures, equipment, and partially completed Work.

C. Notify corporations, companies, individuals, or authorities owning above- or belowground conduits, wires, pipes, or other utilities running to property or encountered during excavating operations.

D. Cap or remove and relocate services in accordance with instructions by owners of services.

E. Protect, support, and maintain conduits, wires, pipes, and other remaining utilities in accordance with requirements of owners of said services.

F. Keep construction site free-draining.

G. Fill settled areas where excavations or trenches were backfilled and holes made by demolition, tree removal, and site preparation Work.

3.03 TRENCHING

A. Excavate to elevations and dimensions necessary to complete construction.

B. Place spoils pile upgradient of trench such that runoff from pile would drain to trench.

C. Comply with OSHA Health and Safety Standards.

D. Trenching Tolerances:

1. Excavate so pipes, ducts, and conduits can be laid straight at uniform grade, without sags or humps, between elevations shown on Drawings.
2. Maximum width of excavation on top of pipe shall be outside diameter of pipe plus 24 inches or as shown on the Drawings. When stringers and sheathing required, width of trench may be increased to allow for their use, provided provisions for this excess width of trench are met.
3. Where trench width for that portion of trench depth between trench bottom and outside top of pipe barrel, for any reason within CONTRACTOR'S control, exceeds specified limits, CONTRACTOR, at his expense, shall furnish pipe with strength adequate for actual trench width.

E. Do not advance excavation of trenches more than 150 feet ahead of completed pipe installation.

F. CONTRACTOR shall be aware that trenches may be wet.

G. Excess excavated waste shall be hauled to the active working face of the appropriate disposal area and disposed of in OWNER designated areas. Daily cover of such waste, if required, shall be coordinated with the OWNER. CONTRACTOR shall not perform waste excavation outside of normal landfill operating hours without prior approval from the OWNER.

3.04 COMMON EXCAVATION

A. Excavations shall conform to lines and grades as staked, and as shown on Drawings.

B. Excavations beyond those lines and grades without the ENGINEER's authorization will be considered unauthorized Work.

C. Method of excavation shall be consistent with soil types encountered and result in competent subgrade.

D. Remove stumps, roots, debris, large stones or boulders, and any other deleterious material from excavated materials to be used in embankments.

E. Do not excavate within influence zone of existing footings or foundations without prior approval of ENGINEER.

F. Upon completion of excavation, notify ENGINEER before proceeding with further Work.

3.05 ADJUSTMENT AND CLEANING

A. Stockpile excess excavated material suitable for backfill on site in OWNER designated location and grade to drain.

B. Haul excavated material not suitable for backfilling and unsuitable materials to OWNER designated location within the active working face.

END OF SECTION

SECTION 02271

RIPRAP

PART 1 - GENERAL

1.01 SUMMARY

A. Work described in the Section includes description and requirements for imported riprap material.

1.02 SUBMITTALS

A. Location of source of riprap material.

B. One gradation for each source and class of riprap.

1.03 QUALITY ASSURANCE

A. Testing of materials shall be provided by CONTRACTOR in accordance with this section.

B. Test results shall meet requirements for the materials and class of riprap defined on the Drawings in accordance with the latest edition of the Minnesota Department of Transportation “Standard Specification for Construction” Section as described in Part 2.02 below.

PART 2 - PRODUCTS

2.01 SOURCE OF MATERIAL

A. The CONTRACTOR is responsible for providing riprap material that conforms to the Technical Specifications.

2.02 MATERIALS

A. Classes of Riprap shall be as shown on Drawings and in accordance with Standard Specification Section 3601.
   a. Usage
      i. Class II Riprap at stormwater pipe inlets.
      ii. Class III Riprap at outlet to pond.

B. Riprap shall be hard, durable, angular in shape and resistant to weathering. Individual rock fragments shall be dense, sound and free from cracks, seams and other debris conducive to accelerated weathering.

C. Geotextile underlayment shall be non-woven polypropylene fabric meeting the requirements of Standard Specifications Section 3733 Type 4 geotextile for use with Class III riprap and Type 3 geotextile for use with Class II riprap.

D. Granular Filter shall be in accordance with Standard Specifications Section 3601.B; to be installed at the pond outlet location as shown on the Drawings.

PART 3 - EXECUTION

3.01 PREPARATION

A. Geotextile fabric, granular filter material (where applicable), and riprap shall be installed around surface water control inlet structures and at the outlet to the pond as indicated on Drawings.

B. Areas on which geotextile, granular filter material, and riprap are to be placed shall be graded and dressed as shown on the Drawings or as required by ENGINEER.

3.03 INSTALLATION

A. CONTRACTOR shall place geotextile and granular filter material (where applicable) under riprap, anchor geotextile as shown on the Drawings, and cover completely. No fabric shall be exposed along edges or under riprap. CONTRACTOR shall place granular filter material and riprap so geotextile is not damaged.

END OF SECTION

SECTION 02276

EROSION CONTROL

PART 1 - GENERAL

1.01 SUMMARY

A. Work includes the furnishing of the permanent and temporary erosion control as shown on the Drawings and the site specific Stormwater Pollution Prevention Plan (SWPPP).

B. Sediment control logs and heavy-duty silt fence shall be installed for erosion control where required.

C. Erosion control blanket shall be installed as detailed on the Drawings.

D. OWNER will obtain the required NPDES construction activity permit if required. CONTRACTOR is responsible to comply with permit requirements and perform maintenance as required as detailed in the site specific SWPPP.

1.02 REFERENCES

A. MNDOT Standard Specifications for Construction, latest edition.

1.03 SUBMITTALS

A. Manufacturer's certificates indicating specification conformance test results of furnished material.

PART 2 – PRODUCTS

2.01 SILT FENCE

A. Machine sliced (MS) silt fence shall conform to "Standard Specification" Section 3886.

2.02 EROSION CONTROL BLANKET

A. Category 20 in accordance with the “Standard Specification” Section 3885.

2.03 SEDIMENT CONTROL LOGS

A. Wood fiber in accordance with “Standard Specification” Section 3897.2.B. Anchors in accordance with 3897.2.I.

PART 3 – EXECUTION

3.01 USAGE

A. Silt fence and/or sediment control log where required for NPDES Permit compliance.

B. Erosion Control Blanket: Category 20 on the final cover sideslopes, in drainage berms, and other surface water drainage features as shown on Drawings.

C. Temporary erosion control measures to be installed prior to site disturbance.

3.02 SILT FENCE INSTALLATION

A. Silt fence shall be trenched in with a minimum of 6 inches of fabric buried.

B. Silt fence to be installed using the static slicing method or approved equivalent installation method, per Standard Specification Section 2573.3.B.

C. CONTRACTOR shall be responsible for maintenance and repair of silt fence until final acceptance of the project.

3.03 REMOVAL OF SILT FENCE

A. CONTRACTOR shall remove and dispose of silt fence after completion of project and the establishment of vegetation.

3.04 EROSION CONTROL BLANKET INSTALLATION

A. Place in accordance with Manufacturer's recommendations.

B. At a minimum, anchor upstream edges of all materials at least 4 inches into the soil to prevent underflow.

C. Shingle materials downslope.

D. Overlaps shall be as follows:
   1. End lap – 24 inches minimum.
   2. Edges – 4 inches minimum.

3.05 SEDIMENT CONTROL LOG

A. Place in accordance with Standard Specification Section 2573.3.F.

END OF SECTION

SECTION 02486

TURF RESTORATION

PART 1 - GENERAL

1.01 SUMMARY

A. This section contains requirements for topsoil, seeding, fertilizing, and mulching.

B. Seed all areas disturbed by construction activities at the site.

1.02 REFERENCES

A. Minnesota Department of Transportation Standard Specifications for Construction, latest edition. (Standard Specifications)

1.03 SUBMITTALS

A. Location of off-site source of materials.
B. Name, address, telephone number and contact person of independent soils laboratory.
C. Method of off-site source soils material sampling and analyses.
D. Off-site source material quality control analyses shall be submitted at least 14 days prior to installation.
E. Proposed haul road planned for transportation of all off-site materials to the project site.
F. Test Results:
   1. Suppliers analysis for standard products. Copy of source testing soils results, including fertilizer and lime requirement before seeding work begins.
G. Seed mix.

1.04 DELIVERY, STORAGE, AND HANDLING

A. Delivery:

   1. Deliver fertilizer to site in original, unopened containers bearing manufacturer's guaranteed chemical analysis, name, trade name, trademark, and conformance to state law.
   2. Deliver seed to site in unopened, original bags bearing supplier's name and address, type of seed contained, percentage of purity and germination, percentage of hard seed if any, and percentage of inert material.
   3. Fertilizer and seed delivered to site shall be stored in a waterproof location as directed by OWNER.
   4. Locate mulch on site where indicated by OWNER.

1.05. GUARANTEE

A. Guarantee seeded area for duration of one year after seeding to be alive and in satisfactory growth at end of guarantee period.

   1. For purpose of establishing acceptable standard, scattered bare spots, none larger than 1 square foot will be allowed up to maximum of 3 percent of seeded area.

2. Acceptance will be based upon meeting this standard one year after initial seeding or reseeding.

PART 2 - PRODUCTS

2.01 TOPSOIL

A. CONTRACTOR supplied topsoil consisting of friable, fertile, natural loam capable of sustaining vigorous vegetative growth shall be used. The application of fertilizer and/or lime shall be determined by the CONTRACTOR through testing of the topsoil material prior to construction. Topsoil and/or amended topsoil shall meet requirements of "Standard Specification" 3877.2.A. CONTRACTOR shall provide source testing of the material as follows:

Test	Frequency
Particle Size ASTM D422	1/source
Soil Classification ASTM D2487	1/source
Nutrient Content, Organic Content, pH*	1/source

*Topsoil testing per University of Minnesota Soil Testing Laboratory regular series for turf.

B. CONTRACTOR shall place topsoil at a thickness of minimum 6 inches.

C. OWNER will perform quality control/quality assurance in accordance with the Construction Quality Assurance Manual.

2.02 FERTILIZER

A. In accordance with Standard Specification 3881 at the ratio recommended by the soil testing lab after submittal of a topsoil sample.

2.03 GRASS SEED

A. General

1. Local nursery grown seed sources in the specified seed mix.
2. Weeds shall not exceed 0.25%.
3. Comply with current U.S. Department of Agriculture rules and regulations.
4. Seed mix shall be in accordance with Standard Specification 3876.2, mix 25-121 (without switchgrass) with a nurse crop depending on the sowing date as specified by MNDOT 2575.3.

5. Apply seed at recommended rate for specified mix.

2.04 WATER

A. CONTRACTOR shall be responsible for water.

2.05 MULCH

A. Type 1 or Type 5 per Standard Specifications 3882.

PART 3 – EXECUTION

3.01 INSPECTION

A. Do not begin ground preparation until boulders, debris, and similar materials have been removed, depressions and ruts filled, and area to be seeded is shaped, trimmed, and finished uniformly to grades and cross-sections shown on Drawings, or to match original grade.

3.02 SITE PREPARATION FOR SEEDING

A. Topsoil

1. Place topsoil directly on top of rooting zone material for final cover system construction. Construct to limits and thicknesses as shown on Drawings.
   a. Spread with one pass using tracked equipment.
   b. **Spread uphill only.**
   c. Rubber-tired vehicles only allowed on areas with a 3-foot minimum thickness when being placed within the final cover limits (over geosynthetics).
2. Scarify subgrade to depth of 3 inches for bonding of subsoil with topsoil.
3. No topsoil shall be placed or worked in frozen or muddy condition.
4. Prepare areas to be seeded to required depth of approximately 3 inches by disking, rototilling, harrowing or other approved means.
5. Remove and dispose of rock, trash, or other materials brought to surface from preparation activities.

3.03 TOPSOIL/FINISH GRADING

A. Topsoil/Finish grade is established final grade as shown on Drawings. Grades not otherwise indicated are uniform levels or slopes between points where elevations are given or between such points and existing finished grades. Finish grade shall be approved by the ENGINEER prior to seeding.

B. Grade, rake, and roll with roller weighing not more than 100 lbs./lf and not less than 25 lbs./lf.

C. Maximum allowable variation from correct elevation is 2 in. in 10 ft.

3.04 APPLYING FERTILIZER

A. Apply fertilizer uniformly over the designated area using mechanical spreading devices. Mix thoroughly with disk into upper 2 inches of soil. Apply in two passes at right angles to each other.

B. Apply at a rate recommended by the soil testing as defined in Section 2.02.A.

C. Apply fertilizer no more than 48 hours prior to seeding.

3.05 SEEDING

A. Do not seed on saturated or frozen soil.

B. Do not seed when wind velocity exceeds 6 mph.

C. Seed all areas disturbed by construction.

D. The grass seed shall be broadcasted according to methods in “MNDOT’s Seeding Manual”, latest edition. A rake or other implement shall be used to drag topsoil over the seed. Alternately, the grass seed may be drilled horizontally across the slope.

E. Do not seed if surface has been compacted by recent rain event.

3.06 MULCHING

A. Mulch seeded areas not designated to receive erosion control blanket within 24 hrs after seeding is complete.

B. Application rate shall be 2 tons per acre or no more than 1 inch in depth.

C. Mulch shall be spread uniformly in a continuous blanket. Mulch shall be started on the windward side of relatively flat area or on the upper part of a steep slope and continued uniformly until area is covered. The mulch shall not be bunched.

D. Do not mulch during periods of excessively high winds.

E. Immediately following the spreading of the mulch, the material shall be anchored securely into the soil a minimum of 3-inches by means of a mulch anchoring machine equipped with large coulter-type discs spaced on approximate 8-inch centers. All anchoring shall be at right angles to slope. Edges of the discs shall be dull to prevent cutting of the mulching and equipment operation shall be such as to embed the mulch to the required depth. In areas where equipment cannot be used, mulch shall be secured by shallow covering of earth or by embedding with approved hand methods, including straight-bladed spade with dull edge.

F. Mulch in accordance with Section 2575 of the Standard Specifications.

3.07 CLEANUP

A. Paved surface and other site areas shall be kept clean of seeding, fertilizing, and mulching materials.

B. Clean up shall occur at the end of each work day or as required by OWNER. Pavement shall be swept with a street sweeper as directed by ENGINEER throughout the project.

C. Restore existing utilities, surface features, and structures to condition equal to condition which existed prior to construction.

D. Replace to original condition or better, damaged vegetation or landscape work.

E. Complete project punch-list prepared by ENGINEER.

3.08 MAINTENANCE OF SEEDED AREA

A. Maintenance of seeded areas shall begin immediately following last seeding application. Continue until Work is accepted.

B. Maintain seeded area by watering, mowing, and replanting as necessary to produce uniform stand of grass until Work is accepted.

C. Rework/replace topsoil where original topsoil has eroded or washed away as directed by OWNER.

D. Remulch any areas where the original mulch has washed away as directed by the OWNER.

E. Implement erosion control measures as required to keep area free of rutted and eroded soils and protection fences and barriers as necessary.

3.09 RESEEDING AND REPAIR

A. Reseed areas that fail to show more than 75 plants/square feet and open areas or gaps larger than 6 inches in diameter.

B. Where plant density is less than 50 plants/square foot, retill and reseed areas in accordance with seeding and maintenance requirements.

3.10 ACCEPTANCE OF SEEDED AREAS

A. CONTRACTOR shall notify OWNER in writing 7 days prior to inspecting seeded area for acceptance.

B. CONTRACTOR and OWNER shall inspect seeded areas for contract compliance and acceptance of work. Upon completion of inspecting seeded areas, OWNER shall provide written acceptance or rejection to CONTRACTOR with further requirement for completing the seeding work. Seeding work remaining to be completed shall be reinspected by OWNER before final acceptance.

3.11 SURVEY QUALITY CONTROL

A. Topsoil shall be graded to the minimum thicknesses as shown on Drawings and specified herein. Thickness tolerance of topsoil shall be between -0.0 feet and +0.2 feet. Elevation tolerance shall be +/- 0.2 foot.

B. ENGINEER shall perform documentation survey in accordance with CQA manual. CONTRACTOR shall assist with determining settlement of surfaces due to construction loads for the ENGINEER to use in preparing the construction certification. Settlement will be determined at a frequency of approximately 2 locations per acre. Grid points used for settlement correction will be incorporated into the thickness survey to be performed on an approximate 100-foot grid in accordance with the verification table. At the settlement correction survey locations, the combined thickness of the rooting zone and topsoil material will be surveyed. This survey will be done at the same time the top of final cover survey is completed. CONTRACTOR shall manually excavate down to the top of the granular drainage layer at these locations so that the surface may be surveyed at the same location and the settlement can be determined. CONTRACTOR is responsible for any damage to the underlying geosynthetics and replacement of cover soils during this process. ENGINEER must be present during excavation for settlement verification.

C. Topsoil thickness will be verified during excavation for settlement correction detailed part 3.11.B above. Additionally, topsoil thickness will be verified on the approximate 100-foot grid points by either survey or hand verification methods (i.e. pothole, hand auger, etc.). Inverted grade stakes marked with the required thickness may also be used to visually verify topsoil thickness at the grid points.

END OF SECTION

SECTION 02623

PERFORATED AND NON-PERFORATED DRAIN PIPE

PART 1 - GENERAL

1.01 DESCRIPTION

A. Furnish and install perforated and non-perforated corrugated polyethylene pipe (CPEP) and appurtenances as shown on Drawings.

1.02 REFERENCES

A. American Association of State Highway and Transportation Officials (AASHTO).

1. AASHTO M252 - Corrugated Polyethylene Drainage Pipe.

B. American Society for Testing and Materials (ASTM)

1. ASTM F405 - Standard Specifications for Corrugated Polyethylene (PE) Pipe and Fittings.

1.03 SEQUENCING AND SCHEDULING

A. Include piping activities in the project schedule.

1.04 SUBMITTALS

A. The CONTRACTOR shall submit to the OWNER the manufacturer's literature that describes the physical characteristics of the pipe provided, the recommended installation procedures, and allowable pipe bend radius.

PART 2 - PRODUCTS

2.01 CORRUGATED POLYETHYLENE PIPE, DRAINAGE TUBING (CPEP), AND FITTINGS

A. CPEP and fittings shall meet the requirements of ASTM F405 or AASHTO M252. The pipe shall meet the dimensional requirements indicated on the Contract Drawings and be manufactured by Prinsco, ADS, Hancor, or other approved manufacturer.

B. CPEP used for surface water control (culverts or piping) shall be of double-wall construction with a smooth inner bore, and shall have watertight gasketed joints.

C. All CPEP used for surface water control (culverts) shall have flared end sections, both ends.

D. Perforated pipe shall be factory perforated with a minimum inlet area of 1 square inch/ft.

E. Fittings shall be from the same manufacturer as the pipe.

F. Drainage tubing wrap ("sock") shall be ADS Sock synthetic wrap or approved equivalent.

PART 3 - EXECUTION

3.01 CPEP AND FITTINGS

A. Install perforated and non-perforated CPEP of the size and in the locations and to the elevations and grades shown on the Drawings.

B. Do not install pipe with bends of smaller radius than the minimum recommended by the manufacturer.

C. Install marker posts at each drainage tubing outlet.

3.02 FILL PLACEMENT AROUND PIPES

A. CONTRACTOR shall mechanically tamp bedding material around the piping in lifts.

B. The CONTRACTOR shall notify OWNER before placing fill around pipes.

C. Do not use frozen fill material or place on frozen subgrade.

D. Pipe installed outside the boundaries of the geomembrane:

1. Install bedding and cover soils making sure pipe haunches are properly shaped.

3.03 FIELD QUALITY CONTROL

A. Pipe and pipe installation will be subject to rejection for any of the following reasons:

1. Failure to conform to the SPECIFICATIONS, particularly compaction under and around the pipe.
2. Fractures or cracks passing through pipe wall or socket.
3. Cracks which, in the opinion of OWNER or OWNER'S On-Site Representative, may impair strength, durability, or serviceability of pipe.
4. Defects indicating improper proportioning, mixing, or molding.
5. Damaged ends where such damage would prevent making a satisfactory joint.

B. Survey Requirements:

1. CONTRACTOR to provide survey information for all inverts and alignments of piping.

END OF SECTION

SECTION 02922

LINEAR LOW DENSITY POLYETHYLENE GEOMEMBRANE (LLDPE)

PART 1 - GENERAL

1.01 SUMMARY

A. Work includes manufacture, fabrication (if needed), supply, and installation of textured and smooth Linear Low Density Polyethylene (LLDPE) geomembrane liner. Textured geomembrane shall have a smooth edge for seaming.

1.02 DEFINITIONS/REFERENCES

A. American Society for Testing and Materials (ASTM) Standards specifically referenced in this Section:

A. American Society for Testing and Materials (ASTM) Standards specifically referenced in this Section:

1. ASTM D6693 Standard Test Method for Tensile Properties of Plastics.
2. ASTM D792 Standard Test Methods for Specific Gravity (Relative Density) and Density of Plastics by Displacement
3. ASTM D1004 Standard Test Method for Initial Tear Resistance of Plastic Film and Sheeting.
4. ASTM D1238 Standard Test Method for Flow Rates of Thermoplastics by Extrusion Plastometer.
5. ASTM D1505 Standard Test Method for Density of Plastics by the Density Gradient Technique.
6. ASTM D1603 Standard Test Method for Carbon Black in Olefin Plastics.
7. ASTM D3895 Test Method for Oxidative Induction Time of Polyolefins by Thermal Analysis.
8. ASTM D4218 Test Method for Determination of Carbon Black Content in Polyethylene Compounds by the Muffle-Furnace Technique.
9. ASTM D4437 Standard Practice for Determining the Integrity of Field Seams Used in Joining Flexible Polymeric Sheet Geomembranes.
10. ASTM D4833 Test Method for Index Puncture Resistance of Geotextiles, Geomembranes, and Related Products.
11. ASTM D5199 Test Method for Measuring Nominal Thickness of Geotextiles and Geomembranes.
12. ASTM D5323 Practice for Determination of 2% Secant Modulus for Polyethylene Geomembranes.
13. ASTM D5596 Test Method for Microscopic Evaluation of the Dispersion of Carbon Black in Polyolefin Geosynthetics.
14. ASTM D5617 Test Method for Multi-Axial Tension Test for Geosynthetics
15. ASTM D5641 Standard Practice fo Geomembrane Seam Evaluation by Vacuum Chamber.
16. ASTM D5721 Practice for Air-Oven Aging of Polyolefin Geomembranes.
17. ASTM D5885 Test Method for Oxidative Induction Time of Polyolefin Geosynthetics by High Pressure Differential Scanning Calorimetry.ASTM D5994 Test Method for Measuring the Core Thickness of Textured Geomembranes.

18 STM D6365 Standard Practice for the Nondestructive Testing of Geomembrane Seams using the Spark Test.
19 STM D6747 Standard Guide for Leak Location
20 ASTM D7002 Standard Practices for Bare Geomembranes (Leak Location)
21 ASTM D7007 Standard Practices for Geomembranes Covered with Water or Earth Materials (Leak Location)

B. Geosynthetic Research Institute (GRI) Standards:

1. GRI GM 6: Pressurized Air Channel Test for Dual Seamed Geomembranes
2. GRI GM 9: Cold Weather Seaming of Geomembranes
3. GM10: Specification for the Stress Crack Resistance of Geomembrane Sheet.
4. GM11: Accelerated Weathering of Geomembranes Using a Fluorescent UVA-Condensation Exposure Device.
5. GM12: Measurement of the Asperity Height of Textured Geomembranes Using a Depth Gage.
6. GM17: Test Properties, Testing Frequency and Recommended Warranty for LLDPE Smooth and Textured Geomemebranes.
7. GM 14: Test Frequencies for Destructive Seam Testing.

C. C. U.S. Environmental Protection Agency Technical Guidance Document “Quality Control Assurance and Quality Control for Waste Containment Facilities,” EPA/600/R-93/182, September 1993, 305 pgs.

1.03 SUBMITTALS

A. The following submittals shall be provided to and approved by OWNER or ENGINEER prior to delivery of geomembrane to the site or mobilization of the geomembrane CONTRACTOR’S crew or equipment:

1. INSTALLER shall supply information from the resin manufacturer regarding the resin type, properties as specified herein, and production dates of the resin used for this project. The resin type identification shall include the cell classification of the resin in accordance with the requirements of the latest ASTM Designation D3350.
2. INSTALLER shall submit from the geomembrane sheet manufacturer, test methods and results defining physical properties as specified herein, of the geomembrane to be used for this project. Test results at the frequency specified in the GRI standards of geomembrane furnished for this project shall be submitted, and test results shall be reported with corresponding roll identification numbers.
3. INSTALLER shall supply a statement of the geomembrane manufacturer's quality control procedures, identification of any resin admixtures, frequency of sampling, methods of material transportation and storage, and acceptance criteria for roll goods delivered to the site.
4. INSTALLER shall provide submittals describing the geomembrane sheet manufacturer's details of any factory seaming process proposed. Roll test results which may not be available prior to construction (i.e., environmental stress crack) shall be presented as preliminary prior to construction, with final test results submitted or affected rolls within the construction time frame.
5. INSTALLER shall submit from the extrudate weld rod manufacturer, verification that the weld rod was manufactured using the same resin as was used in the geomembrane sheets prior to using material.
6. INSTALLER shall submit a proposed panel and seam layout diagram specifying the type and location of all field and factory seams. The layout diagram shall be to scale and used as a construction Plan and shall include all necessary dimensions and details. The layout

diagram shall be compatible with the panel and seam layout requirements specified in this Section.

7. INSTALLER shall submit an installation schedule.
8. INSTALLER shall submit a list of personnel performing field supervision, and quality control, along with experience records and resumes.
9. INSTALLER shall submit a list of equipment types proposed to be used in panel layout, membrane seaming, and destructive and nondestructive testing.

B. The INSTALLER shall remit the following during geomembrane installation:

1. INSTALLER shall, at the end of each working day provide a detailed report of work completed that day, including:
   a) Panel Placement
   b) Trial Welds Results
   c) Subgrade Acceptance Form
   d) Seams
   e) Seam Testing (air and vacuum tests)
   f) Destructive Tests
   g) Repair Log

2. ENGINEER shall review with the INSTALLER and sign the above report at the end of each day. OWNER shall be provided with a copy of the report.

C. INSTALLER shall update their liner layout drawings on a daily basis. The drawings shall include all panel locations and numbering, seam locations and numbering, and test locations and numbering. The INSTALLER shall maintain a current liner layout drawing on the construction site at all times. At the request of ENGINEER, a copy of the current liner layout drawing will be submitted within 24 hours.

D. CONTRACTOR shall submit final as-built liner layout drawing(s) to OWNER within 14 calendar days of completion of the liner work. Drawings shall be submitted in paper and digital form.

E. Quality control certificates indicating resin type, properties as specified herein, and production dates shall be provided with each shipment of extrudate rods delivered to the site no later than the time of delivery.

F. Prior to the installation of any geomembrane, the CONTRACTOR shall submit CONTRACTOR'S certification in writing that the surface upon which the geomembrane is to be installed is acceptable (complete form contained at end of this Section).

G. Submit material delivery and installation schedule for incorporation into the Project schedule.

H. Required warranties: Five-year material warranty. One-year workmanship warranty.

1.04 EXPERIENCE

A. The geomembrane installation shall be performed under the direct supervision of a single field supervisor who must remain on-site throughout installation, including inspection of the surface upon which the geomembrane is to be installed, geomembrane handling and storage, panel layout and placement, seaming, seam testing, panel and seam repair, installation of appurtenances, anchorage and other geomembrane-related work. The field supervisor shall have a personal LLDPE or geomembrane installation record totaling at least 1 million square feet.

1.05 PRE-INSTALLATION MEETING

A. Representatives of the INSTALLER shall attend a meeting prior to installation of the geomembrane to discuss details of the proposed design, installation, and schedule.

1.06 MATERIAL DELIVERY

A. Geomembrane material may be delivered to the site at any time. CONTRACTOR is responsible for storage per manufacturer's recommendations and safekeeping of material onsite until material is installed.

PART 2 - PRODUCTS

2.01 MATERIALS

A. Raw Materials:

1. Textured LLDPE geomembrane and extrudate rods used for this project shall be manufactured of new, first quality resins containing no more than 2 percent clean recycled polymer by weight, with a minimum specific gravity of 0.915 and carbon black content of 2.0-3.0 percent, designed specifically for use in flexible membrane liner installations.
2. LLDPE resin used in manufacturing geomembranes used for this Project shall meet requirements set forth in the latest revision of the Geosynthetics Research Institute (GRI) for LLDPE (GRI GM 17).

B. Geomembrane Roll Goods:

1. LLDPE geomembrane sheets used for this project shall meet the requirements set forth in the latest revision of the Geosynthetics Research Institute (GRI) for LLDPE (GRI GM 17).
2. The geomembranes shall consist of unreinforced polyethylene containing at a maximum 3 percent by weight additives, fillers, or extenders.
3. The geomembranes shall be free of holes, blisters, striations, undispersed raw material, and contamination by foreign matter.
4. The geomembranes shall be supplied as a continuous sheet with no factory seams in rolls. Each roll shall be identified and labeled with the thickness of the geomembrane, length and width, manufacturer, lot number, and roll identification number. This identification number shall be used to identify roll location on the panel layout record drawing.

C. Extrudate: Resin used in the polyethylene extrudate shall be the same as that used to manufacture the geomembrane sheets. Extrudate rods are to be delivered in original sealed containers with the manufacturer's labeling. Extrudate rods shall be free of dirt, grease, moisture, other contaminants, and shall be free of damage.

D. Neoprene Foam (if applicable): Closed cell, weatherproof, black neoprene foam with adhesive backing suitable for long-term sun and liquid exposure. Dimensions shall be as specified on the DRAWINGS, if applicable.

E. Clamped Boots (if applicable): Boots required to seal the LLDPE geomembrane to the structures passing through it shall be made of the same materials as the geomembrane. The boots shall be fabricated so that all field assembly, welding, and seam testing can be accomplished using equipment and procedures regularly employed in the field for equipment and LLDPE geomembrane installation.

F. Banding Straps (if applicable): Type 302 stainless steel banding straps suitable for use on the pipe diameters shown on the DRAWINGS. Banding strap dimensions shall be as specified on the DRAWINGS. All surfaces of the banding straps shall be machined smooth to prevent tearing or puncturing of the LLDPE pipe boots. Outer lip of boot shall be sealed with silicone sealant as shown on Drawings.

2.02 EQUIPMENT

A. Extruding equipment shall be equipped with a temperature gauge at the barrel and nozzle.

B. Fusion equipment shall be equipped with a temperature gauge capable of continuous monitoring.

C. Provide digital or dial continuous temperature recording instruments, in satisfactory working condition, with each welding unit. Welding equipment shall not be operated without functioning temperature recording instruments for measuring geomembrane sheet temperature.

D. A coupon cutter and a calibrated tensiometer shall be provided for in-field seaming pre-qualification testing and destructive sample testing.

E. Store, transport, and operate all equipment to avoid damage to geomembranes.

F. Glass top of each vacuum box must be clear and free of scratches for easy reading of pressure gauge. The sealing gasket shall be intact and functioning to form close seals during testing.

G. ENGINEER reserves the right to order the CONTRACTOR to remove any equipment that in ENGINEER'S opinion is not satisfactory. The CONTRACTOR will remove the equipment promptly from the construction site and replace the unsatisfactory equipment with suitable equipment within 24 hours.

PART 3 - EXECUTION

3.01 SUBGRADE INSPECTION

A. CONTRACTOR shall certify in writing that the surface upon which the geomembrane is to be installed is acceptable (acceptance form contained at end of this Section).

B. CONTRACTOR shall provide daily written acceptance for the surface to be covered by the geomembrane in that day's operations. The surface shall be maintained in a manner during geomembrane installation to ensure subgrade suitability.

C. After subsurface has been accepted by CONTRACTOR, it shall be CONTRACTOR'S responsibility to indicate any change in subsurface conditions that may require repair work and perform required repair work. Damage to subsurface caused by work involved in installing geomembrane shall be repaired at CONTRACTOR'S expense. Geomembrane placement over damaged subsurface, as determined by ENGINEER or CONTRACTOR, is not acceptable. Nothing will waive CONTRACTOR'S contractual requirements with respect to warranty on installed system.

3.02 HANDLING, TRANSPORTATION, AND STORAGE

A. Geomembrane rolls shall be packaged and labeled prior to transporting to the site. Geomembrane rolls delivered to the site shall be wrapped in a relatively impermeable and opaque protective cover which may consist of a sacrificial wrap of geomembrane. The sacrificial wrap shall be removed prior to geomembrane installation.

B. Geomembrane transportation shall be in a manner that minimizes the possibility of material damage during shipment. When offloading geomembrane from the truck, straps and a spanbar shall be used. Direct contact with forklifts or front-end loaders to offload the material will not be allowed without written consent from ENGINEER.

C. On-site storage of the geomembrane rolls shall be in a safe manner, with rolls protected from grease, dirt, moisture, excessive heat, direct sunlight, vehicle traffic, and other possible sources of damage including theft and vandalism. The rolls will be placed in neat order and placed such that identification tags for each roll can be read. Storage areas shall be at the ENGINEER'S designated location.

D. Geomembrane and appurtenant materials delivered to the site shall be checked for proper labeling and visually inspected for transport or manufacturing damage. ENGINEER reserves the right to reject any unacceptable material at no cost to OWNER. Any roll that arrives on site without factory roll identification will not be used for the work and will be removed from the site promptly.

E. Only that quantity of geomembrane that is to be placed on a particular day shall be removed from the packaging. Geomembrane rolls shall be transported from the storage area to the construction area and deployed using wide lifting straps and properly sized forklifts, front end loaders, or other appropriate equipment.

F. Under no circumstances shall any heavy equipment be allowed directly on the geomembranes unless approved by ENGINEER.

G. Prior to placement, the geomembranes shall be visually inspected for compliance with this Section. Geomembrane material which, in the opinion of the ENGINEER is damaged or does not meet Specifications will be rejected by the ENGINEER. Minor damage may be repaired as specified in this Section. Damage to geomembranes caused by CONTRACTOR during handling shall be repaired or replaced at CONTRACTOR'S expense.

3.03 PANEL LAYOUT AND PLACEMENT

A. Panel and Seam Layout Diagram:

1. Prepare panel and seam layout diagram so that panel seams run parallel to the direction of maximum slope (i.e., down the slope).
2. Slope panels shall not be constructed from more than two pieces of geomembrane (i.e., not more than one cross-seam shall be permitted on any one slope panel).
3. Cross seams in slope panels, where allowed, shall be oriented at 45 degrees. Cross seams shall be located on at least the bottom half of the slope, wherever possible.
4. Cross seams in adjacent panels shall be staggered.
5. Assign identification number to each seam for reference to test results and record Drawings.

B. PANEL PLACEMENT:

1. Panel size and placement shall be in general accordance with the panel layout diagram submitted to ENGINEER as defined in this Specification.
2. Geomembrane shall be anchored with sand bags or other approved methods to prevent uplift and damage by wind.

3. A panel identification number shall be assigned to each panel for reference to test results and Record Drawings. The panel identification number and geomembrane roll number shall be written on each panel with a grease pencil, immediately following deployment of the panel.
4. Smoking during placement of panels is prohibited. Wearing damaging shoes or engaging in any behavior which may damage the geomembrane is prohibited.
5. Eating, drinking, disposal of food wraps, drinking bottles and cans on top of geomembrane is not allowed.
6. Place panels with appropriate slack incorporated into geomembrane to accommodate expansion and contraction without jeopardizing the integrity of the geomembrane.
7. Vehicle traffic over geosynthetics as a means of panel deployment is expressly prohibited without the consent of the ENGINEER.

C. ENGINEER and CONTRACTOR will visually inspect in-place panels prior to seaming. Any damaged panels shall be repaired, and if requested by ENGINEER, replaced at no additional cost to OWNER. Repairs shall be performed as specified in this Section. All damages and repairs shall be recorded on the Record Drawings.

3.04 SEAMING

A. Seaming Methods: All seams shall be joined using a heat extrusion or hot fusion (split wedge) weld process in accordance with the geomembrane manufacturer's recommendations. The CONTRACTOR shall maintain in working order at the site at least one spare seaming apparatus for each type of welder used. The hot fusion weld process will be used whenever possible. The use of extrusion welded seams shall be limited to repairs and any areas or seam configuration inaccessible to fusion welding equipment.

B. Factory and field seams shall meet the minimum specifications set forth by the latest revision of the GRI GM 19.

C. Seam Configuration and Preparation:

1. Overlap panels to be seamed at least 4 inches but not more than 6 inches. The loose end of the upper panel shall extend no more than 3 inches from the weld. All seams shall be made in a rainlap manner with the loose end of the upper panel downgradient of potential water flow.
2. Cross seams on slopes, where allowed, shall be made at a 45 degree angle to the edge of the panel.
3. The contact area between panels shall be clean and free of moisture, dust, dirt, debris, and foreign material. A protective layer of filter fabric or a sacrificial geomembrane strip shall be used directly beneath each seam overlap to achieve proper support and a clean work surface, if necessary.
4. Where extrusion welding is used, the contact surfaces between panels shall be ground to remove oxidation prior to welding. Grinding shall not result in grooving of the liner nor reduction of the liner thickness by more than 10 percent. The grinding motion shall be made perpendicular to the seam. Grinding in a direction parallel to the seam shall not be permitted. All ground areas shall be covered completely with extrudate.
5. Seams shall be aligned to minimize the number and size of wrinkles.

D. Test Seam:

1. A prequalification test seam sample shall be prepared with each piece of seaming equipment/seamer approximately every four hours at the beginning of each seaming period (usually morning and afternoon), unless otherwise directed by ENGINEER. Each sample shall be prepared by the operator of the equipment for that seaming period and

shall be at least 6 feet long (in the direction of the seam) by at least 1 foot wide and may be performed on scrap pieces of geomembrane.

2. Ten 1-inch wide specimens (coupons) from each test seam sample shall be prepared for on-site field testing for shear and peel strength. Coupons shall be prepared using a sheet cutter so that consistent, uniform 1-inch wide coupons are obtained. Samples should be distributed evenly over the 6 feet length.
3. The CONTRACTOR will make these test seams in the presence of ENGINEER.
4. The extension rates for these tests will not exceed 2-inches per minute unless permission from the ENGINEER is given.
5. Five coupons shall be tested in shear and five in peel. All coupons shall exhibit the required strength at yield and failure mechanism FTB as set forth in Paragraph 3.05B. Seam separation equal to or greater than 10% of the track width shall be considered a failing test. If any of the coupons fail, the reason for the failure shall be identified and corrected prior to preparing another test seam. The new test seam shall be prepared reflecting adjustments made to the seamer/seaming equipment and a new set of coupons shall be cut and tested.
6. Seaming equipment shall not be used until satisfactory prequalification test seams have been prepared, witnessed by ENGINEER.
7. The test results on all prequalification test seams will be reported to ENGINEER.

E. Climatic Conditions for Seaming:

1. Seaming shall be performed only when panel temperatures are between 32°F and 170°F, unless otherwise approved by ENGINEER. If seaming is permitted to be performed at panel temperatures below 32°F, the panel contact surface shall be preheated and CONTRACTOR shall certify in writing that the low-temperature seaming procedures will not cause any short-term or long-term damage to the geomembrane or the welded seam. CONTRACTOR shall demonstrate to ENGINEER that field seams comply with project specifications using pre-qualification test seams. CONTRACTOR shall submit to ENGINEER, for approval, detailed procedures for seaming at low temperatures, including the following:
    a. Preheating of the geomembrane
    b. Provision of a tent or other device if necessary to prevent heat losses during seaming and rapid heat losses subsequent to seaming.
    c. Number of additional test welds to determine appropriate seaming parameters.
2. Seaming during rainy weather or when dew is present on panels shall not be allowed.
3. CONTRACTOR shall provide any special lighting required for seaming during low-light or dark hours.
4. CONTRACTOR shall leave slack in the geomembrane as necessary to account for thermal expansion or contraction of geomembrane. Stress on panels due to thermal expansion and contraction shall be minimized by performing field seaming operations during the coolest parts of the day or night, if necessary. Special scheduling or extended hours of operation require approval by OWNER.

F. All welding shall provide a tight, leak proof, homogeneous bond between panels. All seams shall extend to ends of panels.

G. Welding equipment shall be continuously monitored to control the temperature of extrudate and wedge. If recording equipment allows for a hard copy of the monitoring, a copy of the monitoring labeled with the weld identification number will be submitted to ENGINEER.

3.05 PIPE PENETRATION SEALING SYSTEM

A. Penetration sealing systems shall be constructed from the base geomembrane material, flat stock, prefabricated boots and accessories, as applicable as shown on the Drawings.

B. All penetration sealing systems must be tested. Where field non destructive testing cannot be performed, field spark testing shall be performed using standard holiday leak detectors in accordance with ASTM 6365. Spark testing should be performed in areas where both air pressure testing and vacuum testing are not possible.

3.06 NONDESTRUCTIVE TESTING OF PRODUCTION SEAMS

A. All field seams shall be non-destructively tested by the CONTRACTOR over the full seam length before the seams are covered. Each seam shall be numbered or otherwise designated. The location, date, test unit, name of test, and outcome of all non-destructive testing shall be recorded and submitted to the ENGINEER.

B. Testing shall be done as the seaming work progresses, not at the completion of all field seaming. All defects found during testing shall be numbered and marked immediately after detection. All defects found shall be repaired, retested and remarked to indicated acceptable completion of the repair.

C. Non-destructive tests shall be performed by experienced technicians familiar with the specified test methods.

D. Visual Inspection: A visual inspection of all seams shall be performed. This inspection shall look for obvious flaws in seaming patches, penetration sealing, material defects, or other problems. Deviations from acceptable workmanship standards shall be noted and corrected.

E. Pressure Testing (Double-Fusion Welds): Where a double-fusion weld seaming system is employed, the continuity of the seam shall be tested with air pressure in accordance with the following procedure. The flow channel must not be obstructed by foreign objects or geomembrane material throughout the length of seam being tested. The vacuum test described in Paragraph 3.07F must be employed for testing of all seams that do not have a continuous flow channel.

1. A test device consisting of an inflation needle and pressure gauge mounted on a "T" fitting shall be used for air pressure testing. Insert the needle into the flow channel and seal the end of the channel around the needle. Connect a pump (such as a small bicycle pump) to the test device.
2. Ascertain that the flow channel is continuous by leaving the other end of the channel open and pumping air through the channel. If air does not pass through the channel the test length must be shortened until a continuous length of flow channel is found.
3. Seal and clamp both ends of the flow channel to assure an airtight seal. Inflate the flow channel to 25 to 30 psig. Allow one minute for the seam to stabilize.
4. Re-inflate as needed to achieve 25 to 30 psig on the seam and test for a period of five minutes.
5. At the end of the test period, if the pressure has not dropped more than 3 psi, the test shall be considered a pass and the following procedure will be implemented;
    a. Remove the test device and clamps.
    b. Make any repairs, if necessary, to the area where the flow channel was clamped or inflated.
    c. Record the test results, mark the seam as a pass, the date tested, and proceed to the next seam.
6. If the pressure drops below the 3 psi allowance, the test shall be considered a failure and the following procedure shall be implemented to identify the failure:
    a. Check to determine if there is excessive seepage around the inflation needle.
    b. Check both ends of the seam to ensure the flow channel is completely sealed off.

c. Walk the length of the seam; look and listen for air leaks.
d. If either of these procedures fail to identify the leak, trim the seam overlap and vacuum test the seam to locate the leak.
e. Once the leak is identified, make the necessary repairs and retest the seam.

7. Seam to be approved before testing by ENGINEER; test to be performed in presence of ENGINEER personnel.

F. Vacuum Testing: Vacuum testing shall be used to test the continuity of extrusion welded and mechanical seams. A clear topped vacuum box, supplied by CONTRACTOR, shall be placed over the seam to be tested after application of a soapy solution. Upon evacuation, bubbles will be evident through the viewing window if the seam lacks integrity. The following procedure shall be followed:

1. Wet seam to be tested with a soapy solution mixed at a ratio of 1 ounce soap to 1 gallon water. No antifreeze solution is allowed to be added to the water.
2. Place vacuum box over seam to be tested, evacuate box to a vacuum equal to 3 to 5 inches water column, and tug up to ensure a leak tight seal has been developed.
3. Examine the seam for a minimum of 10 seconds to detect soap bubbles.
4. If the bubbles are not evident, move to next test location. Adjacent test sections are to overlap by at least 1 inch.
5. If bubbles are present, mark area clearly for repair.
6. If the vacuum testing indicates leakage, the area shall be spot patched; or if major leaks are detected, the entire seam shall be reworked.
7. Seam to be approved before testing by ENGINEER; test to be done in presence of ENGINEER personnel.

3.07 DESTRUCTIVE TESTING OF PRODUCTION SEAMS

A. The purpose of destructive testing is to verify that the seaming process has produced seams of acceptable mechanical integrity. One seam sample shall be taken at random for each 500 feet of seam. Sample locations shall be designated by ENGINEER. Each sample shall be shown on the panel layout drawing. All holes in the installed geomembrane resulting from obtaining samples shall be repaired immediately. The sample ID number shall be marked on the patch. All repairs shall be 100 percent vacuum tested or spark tested for continuity.

B. Maximum frequency of test locations shall be agreed upon by the INSTALLER and ENGINEER prior to commencement of installation. Additional test locations, not to exceed agreed upon maximum frequency, shall be determined during seaming at ENGINEER'S discretion. Selection of such locations may be prompted by suspicion of excess crystallinity, contamination, offset welds or other potential cause of imperfect welding.

C. INSTALLER shall not be informed in advance of locations where seam samples will be taken.

D. Cut samples as seaming progresses in order to obtain documentation test results prior to completion of liner installation. Number each sample and identify sample number and location on panel layout drawing.

E. Samples shall be 0.4 m (16 in.) wide by 2.1 m (44 in.) long with seam centered lengthwise. Cut one 25 mm (1 in.) wide strip from each end of sample and test in field, by hand or tensiometer, for peel and shear respectively. The tested sample shall not fail through the seam. If tensiometer is not available and if 25 mm (1.0 in.) wide specimen is

too difficult to test by hand, 10 mm (0.5 in.) wide specimen is acceptable. Cut remaining sample into 3 parts and distribute as follows.

1. One portion to INSTALLER for field documentation testing, 0.40 m by 0.38 m (16 in. by 15 in.).
2. One portion to INSTALLER independent laboratory testing, 0.40 m by 0.38 m (16 in. by 15 in.) if required.
3. One portion to ENGINEER for archive storage, 0.40 m by 0.30 m (16 in. by 12 in.).

F. For field testing, the CONTRACTOR shall cut 10 identical 1-inch wide replicated specimens from his sample. The CONTRACTOR shall test five specimens for seam shear strength and five for peel strength. Peel tests shall be performed on both inside and outside weld tracks. To be acceptable 4 out of 5 specimens must pass the test criteria with less than 10% separation. The CONTRACTOR shall submit field documentation test results to the ENGINEER as soon as they become available, but no later than 2 working days after the sample was taken. Field seams shall meet the minimum specifications of GRI GM 19.

Note: All seams must exhibit a film tear bond (FTB).

G. All testing equipment required for these quality control tests shall be provided by CONTRACTOR. Any seams failing the quality control tests shall be repaired at CONTRACTOR'S expense until passing test results are obtained. At all times, care shall be exercised to avoid damaging the geomembrane.

H. ENGINEER shall be present for all field documentation testing of seam strength.

I. INSTALLER shall submit results of test it performs as a result of its quality control assurance program to ENGINEER.

3.08 PROCEDURES FOR DESTRUCTIVE TEST FAILURE

A. The following procedures shall apply when sample fails field or lab destructive test.

1. Obtain additional destructive test samples at locations approximately 10 feet on either side of the failed test location.
2. Perform destructive tests.
3. If test passes, the seam shall be considered adequate.
4. If tests fail, all seams represented by the original destructive test shall be repaired with a cap-strip extrusion welded to all sides of the capped area. All cap-strip seams shall be non-destructively tested until adequacy of the seams is achieved. Cap strip seams exceeding 150 feet in length shall be destructively tested.

B. In any case, acceptable seams shall be bounded by 2 passed test locations (i.e., above procedure shall be followed in both directions from original failed location), and one sample for destructive testing shall be taken within reconstructed area.

C. If sample fails laboratory destructive test (whether conducted by independent laboratory or by INSTALLER'S laboratory), above procedures shall be followed considering laboratory tests exclusively. Since final seam must be bounded by 2 passed test locations, it may be necessary to take one or more new samples for laboratory testing in addition to one required in reconstructed seam area.

3.09 DEFECTS AND REPAIRS

A. Identification: Broom or wash geomembrane if amount of dust or mud inhibits inspection.

B. Evaluation: Non-destructively test each suspect location in seam and non-seam areas. Repair each location failing nondestructive testing.

C. Repair Procedures:

1. Repair defective seams by reconstruction.
2. Repair tears or pinholes by seaming or patching.
3. Repair blisters, larger holes, undispersed raw materials, and contamination by foreign matter with patches.
4. Surfaces of geomembrane to be patched shall be abraded no more than 1 hour prior to repair.
5. Seams used in repairing patches shall be approved extrusion welded seams and may be subjected to same destructive test procedures as outlined for other seams.
6. Patches shall be made of same geomembrane, extend minimum of 150 mm (6 in.) beyond edge of defects, and applied using approved extrusion welding methods only. Report areas of repair to ENGINEER immediately.

D. SEAM RECONSTRUCTION PROCEDURES:

1. Seam reconstruction for extrusion welding process shall be achieved by installing a cap strip over the defective weld a minimum of 6 inches either side of the weld and extrusion welding.
2. Seam reconstruction for fusion process shall be achieved by cutting out existing seam and welding in replacement strip by welding a cap strip over the defective seam length.

E. Verification of Repairs: Test each repair non-destructively. Repairs passing nondestructive test shall be taken as indication of adequate repair. Failed tests indicate repair shall be redone and retested until passing test results.

3.10 GEOMEMBRANE ACCEPTANCE

A. INSTALLER shall retain ownership and responsibility for geomembrane until acceptance by ENGINEER. Geomembrane liner will be accepted by ENGINEER when:

1. Written certification letter, including "as-built" drawings, is received by ENGINEER.
2. Installation of the geomembrane is complete.
3. All required documentation of installation is submitted to ENGINEER, including inspector's final report.
4. Verification of adequacy of field seams and repairs, including associated testing, is complete and all paperwork accepted and approved by ENGINEER.
5. The five-year material and one-year workmanship warranties are received.

3.11 CLEANUP

A. The INSTALLER shall place ALL material scraps in ENGINEER designated area at the end of each working day. No scraps of materials will be allowed to be left on top of liner.

B. Once liner installation is complete the CONTRACTOR shall:

1. Remove all sand bags from site; or
2. Remove all sand bags and place in ENGINEER designated area; or
3. If sand in sand bags is acceptable as cover soil material the INSTALLER may

empty each bag and remove and dispose of the empty bags. This will only be allowed if the material meets the criteria for the rooting zone layer. The INSTALLER must receive permission from ENGINEER prior to emptying the sand bags onto the liner.

END OF SECTION

Attachment 1 to Section 02922

Certificate of Acceptance of
Geomembrane Subgrade Surface by INSTALLER

DESCRIPTION OF AREA TO BE CERTIFIED:_____
_____
LOCATION:_____
PROJECT:_____
ADDRESS:_____

The undersigned, _____ certifies that he is a representative of _____ _____, duly authorized to execute this certificate, that he visually inspected the subgrade surface described above on _____ and found the surface to be acceptable for installation of the geomembrane.

This certification is based on observations of the surface of the subgrade only. No sub terrain inspections or tests have been performed and_____ (company) makes no representations or warranties regarding conditions which may exist below the surface of the subgrade.

Date: _____ Signature: _____
Name:_____ Title:_____

CERTIFICATE RECEIVED BY CONTRACTOR CERTIFICATE RECEIVED BY ENGINEER

Date:_____ Date:_____
Contractor:_____ Company:_____
Name:_____ Name: _____
Signature_____ Signature_____
Title_____ Title:_____

SECTION 15064

HIGH DENSITY POLYETHYLENE PIPE

PART 1 - GENERAL

1.01 SUMMARY

A. Work under this section includes HDPE piping for stormwater management system construction.

B. Extent of pipe and fittings required by this section indicated on Drawings.

1.02 REFERENCES

A. American Water Works Association (AWWA).

B. American Society for Testing and Materials (ASTM):

1. ASTM D638 – Standard Test Method for Tensile Properties of Plastics.
2. ASTM D790 – Standard Test Method for Flexural Properties of Unreinforced and Reinforced Plastics and Electrical Insulating Materials
3. ASTM D1238 – Standard Test Method for Melt Flow Rates of Thermoplastics by Extrusion Plastometer.
4. ASTM D1248 – Standard Specification for Polyethelene Plastics and Extrusion Materials for Wire and Cable
5. ASTM D1505 – Standard Test Method for Density of Plastics by the Density-Gradient Technique.
6. ASTM D1693 – Standard Test Method for Environmental Stress Cracking of Ethylene Plastics.
7. ASTM D2837 – Standard Test Method for Obtaining Hydrostatic Design Basis for Thermoplastic Pipe Materials or Pressure Design Basis for Thermoplastic Pipe Products
8. ASTM D3350 - Standard Specification for Polyethylene Plastics Pipe and Fittings Material.
9. ASTM D2122 - Standard Test Method of Determining Dimensions of Thermoplastic Pipe and Fittings.
10. ASTM D3035 – Standard Specification for Polyethylene (PE) Plastic Pipe (DR-PR) Based on Controlled Outside Diameter.
11. ASTM D3261 - Standard Specification for Butt Heat Fusion Polyethylene (PE) Plastic Fittings for Polyethylene (PE) Plastic Pipe and Tubing.
12. ASTM F714 – Standard Specification for Polyethylene (PE) Plastic Pipe (SDR-PR) Based on Outside Diameter
13. ASTM F1473 – Standard Test Method for Notch Tensile Test to Measure the Resistance to Slow Crack Growth of Polyethylene Pipes and Resins

1.03 SUBMITTALS

A. Manufacturer's certificates indicating conformance test results of furnished material to Specifications.

B. Provide information where applicable as follows:

1. Manufacturer's name.
2. Nominal pipe size.
3. High density polyethylene (HDPE) classification, ASTM D3350.

4. Use for each type and size of pipe.
5. Extrusion date.
6. Lot number.

C. Stock density, melt flow, flexural modulus tensile strength, coloration, resin type and cell classification where applicable.

D. Provide instructions on special handling during transportation and storage.

E. Aforementioned submittals provided to OWNER a minimum of 30 days prior to beginning work on Project.

1.04 PRODUCT DELIVERY, STORAGE, AND HANDLING

A. Handle and protect product to ensure product is not damaged.

B. Elevate material above grade.

C. Store and handle in such a manner as to prevent soil from entering or becoming lodged in the pipe.

D. Provide protection for flanges and fittings by storing inside or packaging with impermeable opaque material.

PART 2 - PRODUCTS

PART 2 - PRODUCTS

A. Dimensions as shown on Drawings. Physical properties in conformance with cell classification requirements.

B. Pipe

1. High performance, high molecular weight, high density polyethylene pipe.
2. Material designation PPI-PE 4710; minimum cell classification value 445574C.
3. Marking: Intervals of 5 feet or less.
   a. Manufacturer's name or trademark.
   b. Nominal pipe size.
   c. HDPE cell classification, ASTM D3350.
   d. Legend: Industrial pipe SDR as indicated on Drawings.
   e. ASTM F714.
   f. Extrusion date, period of manufacture or lot number.
5. Perforations shall be pre-drilled and deburred prior to delivery to the Site, according to pattern indicated in the Drawings. Do not drill perforations within 1-ft of the ends of the pipe.

C. Fittings

1. Molded from polyethylene compound having cell classification equal or exceeding compound used in pipe to insure compatibility of resins.
2. Be of same manufacture as pipe.
3. Fusion weld joints.
4. Markings:
   a. Manufacturer's name or trademark.
   b. Nominal size.
   c. Material designation "HDPE".

d. ASTM D3261.

D. Fittings

1. Molded from polyethylene compound having cell classification equal or exceeding compound used in pipe to insure compatibility of resins.
2. Be of same manufacturer as pipe.
3. Fusion weld joints.
4. Markings:
   a. Manufacturer's name or trademark.
   b. Nominal size.
   c. Material designation "HDPE".
   d. ASTM D3261.

PART 3 - EXECUTION

3.01 EXECUTION

A. Examine and verify acceptability of surface to receive product.

3.02 HDPE PIPE INSTALLATION

A. Location, lines, and grades as shown on Drawings.

B. Welded joints.

1. Weld in accordance with manufacturer's recommendations for butt fusion methods.
2. Butt fusion equipment used in joining procedures capable of meeting conditions recommended by manufacturer, including, but not limited to: temperature required, alignment, and fusion pressures.

C. Electrofusion or butt fusion welding methods are allowable for piping installation. Electrofusion couplers to be approved by OWNER or ENGINEER.

D. No defective pipe installed. Defective pipe removed from site and replaced at CONTRACTOR'S expense.

E. Install granular bedding in accordance with Section 02208.

3.04 EXCAVATION AND PREPARATION OF SUBGRADE

A. Excavate and prepare subgrade as necessary for installation and as shown on Drawings.

B. CONTRACTOR to take care to avoid damage to underlying geosynthetics during stormwater piping installation; damage to underlying geomembrane shall be repaired at CONTRACTOR’s expense. Damages shall be repaired and documented in accordance with Section 02920.

3.04 BACKFILL

A. Backfill with required pipe bedding and place cover material as shown on Drawings.

3.05 FIELD QUALITY CONTROL

A. Pipe may be rejected for failure to conform to specification, or:

1. Fractures or cracks passing through pipe wall, except single crack not exceeding 2 inches in length at either end of pipe which could be cut off and discarded. Pipes within one shipment will be rejected if defects exist in more than 5 percent of shipment or delivery.
2. Cracks sufficient to impair strength, durability or serviceability of pipe.
2. Defects indicating improper proportioning, mixing, and molding.
3. Damaged ends, where damage would prevent making satisfactory joint.
5. Noticeable variations from true alignment and grade sufficient cause for rejection of Work.

B. Acceptance of fittings, stubs or other specially fabricated pipe sections based on visual inspection at site and documentation that they conform to these specifications.

C. Survey pipe and fitting locations per CQA plan.

END OF SECTION

Appendix I Environmental Review Pre-Screening Form

MINNESOTA POLLUTION CONTROL AGENCY
520 Lafayette Road North
St. Paul, MN 55155-4194

Environmental Review pre-screening form

Environmental Review Program

Doc Type: Environmental Review Checklist

Instructions: The following questions are designed to help you and the Minnesota Pollution Control Agency (MPCA) staff determine if your project requires environmental review before proceeding with the permitting process. If you need help with this form or have questions about environmental review, please contact MPCA staff at 651-296-6300 or via email at env.review.pca@state.mn.us.

Submittal: To avoid unnecessary and costly delays in your project, complete and submit this form with your permit application.

Important note: Under Environmental Quality Board (EQB) Rules, a project may not begin construction and no final government decisions may be made to grant a permit, approve a project, or begin a project until the environmental review process is complete.

Part A: Permitting information

Name of project: Dem-Con Pilgrim Landfill

City: Mankato County: Blue Earth

Contact name: Mark A. Pahl Contact phone number: 952-445-5755

Email address: markpahl@dem-con.com

1. List all MPCA permit(s) that may be needed for this project:

   Solid Waste Permit, General Industrial Stormwater Permit

2. Is this permit application for reissuance ***only**** of an existing permit? ☐ Yes ☒ No

   If this project involves any physical alterations, construction projects or operational changes to the facility or process you must answer **No.*

3. Provide a project description:

   The current Landfill operates as an unlined Class I unlined C&D Landfill. The facility is proposing to modify its design and operations to function as a Class III lined C&D Landfill and accept industrial waste which is co-disposed with C&D materials in the future lined DD 002 disposal area in accordance with the facility's ISWMP.

Part B: Environmental Review

	Yes	No
1. Are you required to prepare, are you preparing, or have you completed an Environmental Assessment Worksheet (EAW), Environmental Impact Statement (EIS), Alternative Urban Areawide Review (AUAR), or Federal Environmental Assessment (EA) for any responsible governmental unit (RGU) other than the MPCA (e.g., city, township, county, state or federal agency) as part of this project?	☐	☒

If yes, please identify the following:

RGU: _____

Type of Environmental Review document (EAW, EA, EIS, AUAR): _____

Other (specify): _____

If you answered "Yes" to either of the questions, you are finished. Please submit this form to the MPCA along with the permit application.

If you answered "No" to both of the above questions, please complete the remainder of the form, both part C and D. When completed, please submit this form to the MPCA along with the permit application.

Part C: The MPCA Environmental Review mandatory thresholds
(Minn. R. 4410.4300 and 4410.4400)

	Answer each question to determine if your project meets or exceeds the mandatory thresholds for environmental review. **Does your project consist of:**	**Yes**	**No**
Subp. 2	**Construction *or* expansion of a nuclear fuel or nuclear waste processing facility?**	☐	☒
Subp. 3	**Construction of an electric power generating plant and associated facilities designed for or capable of operating at a capacity of 25 megawatts or more but less than 50 megawatts and for which an air permit from the MPCA is required?**	☐	☒
Subp. 4	**Construction of a new *or* expansion of an existing petroleum refinery?** If yes, complete Q1 and Q2.	☐	☒
	Q1: Are you constructing a new petroleum refinery?	☐	☐
	Q2: Are you expanding an existing petroleum refinery that increases its capacity by 10,000 or more barrels per day?	☐	☐
Subp.5A	**Construction of a facility for the conversion of coal, peat, or other biomass sources to a gaseous, liquid, or solid fuel (this includes anaerobic digesters)?** If yes, complete Q1.	☐	☒
	Q1: Are you constructing a facility for the conversion of coal, peat, or biomass sources to gaseous, liquid, or solid fuels if that facility has the capacity to utilize 25,000 dry tons or more per year of input?	☐	☐
Subp. 5B	**Construction of a facility for the production of alcohol fuels?** If yes, complete Q2 - Q4.	☐	☒
	Q2: Are you constructing a new fuel conversion facility for the production of alcohol fuels that would have the capacity to produce 5,000,000 or more gallons per year of alcohol?	☐	☐
	Q3: Are you constructing or expanding an alcohol fuel production facility located in the seven-county metro area that would have or would increase its capacity by 50,000,000 or more gallons per year?	☐	☐
	Q4: Are you constructing or expanding an alcohol fuel production facility located outside the seven-county metro area that produces more than 125,000,000 gallons per year?	☐	☐
Subp.8A	**Construction or expansion of a coal transfer facility?** If yes, complete Q1 and Q2.	☐	☒
	Q1: Are you constructing a facility designed for or capable of transferring 300 tons or more of coal per hour or with an annual throughput of 500,000 tons of coal from one mode of transportation to a similar or different mode of transportation?	☐	☐
	Q2: Are you expanding an existing facility designed for or capable of transferring 300 tons or more of coal per hour or with an annual throughput of 500,000 tons of coal from one mode of transportation to a similar or different mode of transportation?	☐	☐
Subp. 8B	**Construction or expansion of a hazardous materials transfer facility?** If yes, complete Q3 and Q4.	☐	☒
	Q3: Are you constructing a new facility for the bulk transfer of hazardous materials with the capacity of 10,000 or more gallons per transfer and is the facility is located in a shoreland area, delineated flood plain, a state or federally designated wild and scenic rivers district, Minnesota River Project Riverbend area, or the Mississippi headwaters area?	☐	☐
	Q4: Are you expanding an existing facility, by 50 percent or more, for the bulk transfer of hazardous materials with the capacity of 10,000 or more gallons per transfer and is the facility is located in a shoreland area, delineated flood plain, a state or federally designated wild and scenic rivers district, Minnesota River Project Riverbend area, or the Mississippi headwaters area?	☐	☐
Subp. 10A	**Construction or expansion of a storage facility for coal?** If yes, complete Q1.	☐	☒
	Q1: Are you constructing or expanding a facility designed for or capable of storing more than 7,500 tons of coal or with an annual throughput of more than 125,000 tons of coal?	☐	☐
Subp. 10B	**Construction of a facility for the storage of hazardous materials?** If yes, complete Q2.	☐	☒
	Q2: Are you constructing a new major facility, as defined in Minn. R. 7151.1200 that results in a designed storage capacity of 1,000,000 gallons or more of hazardous materials?	☐	☐
Supb. 10C **Subp. 10D**	**Expansion of a facility for the storage of hazardous materials?** If yes, complete Q3 and Q4.	☐	☒
	Q3: Are you expanding an existing major facility, as defined in Minn. R. 7151.1200, with a designed storage capacity of 1,000,000 gallons or more of hazardous materials and the expansion adds a net increase of 1,000,000 gallons or more of a hazardous material?	☐	☐
	Q4: Are you expanding a facility that has less than 1,000,000 gallons in total designed storage capacity of hazardous materials when the net increase in designed storage capacity results in 1,000,000 gallons or more of hazardous materials?		

Answer each question to determine if your project meets or exceeds the mandatory thresholds for environmental review. **Does your project consist of:**		**Yes**	**No**
Subp. 10H	**Construction or expansion of a facility that will store silica sand?** If yes, complete Q4.	☐	☒
	Q4: Are you constructing a facility designed for or capable of storing on a single site 7,500 tons or more of silica sand or has an annual throughput of more than 200,000 tons of silica sand?	☐	☐
Subp. 13	**Construction or expansion of a paper or pulp processing facility?** If yes, complete Q1 and Q2.	☐	☒
	Q1: Are you expanding an existing paper or pulp processing facility that will increase its production capacity by 50 percent or more?	☐	☐
	Q2: Are you constructing a new paper or pulp processing facility?	☐	☐
Subp. 15	**Construction or modification of a stationary source of air emissions resulting in an increase in air emissions or greenhouse gases?** If yes, complete Q1 and Q2.	☐	☒
	Q1: Are you constructing or modifying a stationary emission source that will emit 250 tons per year or more of a single air pollutant after the installation of air pollution control equipment?	☐	☐
	Q2: Are you constructing or modifying a stationary source facility that generates a combined 100,000 tons or more per year of greenhouse gas emissions, expressed as carbon dioxide equivalents, after the installation of air pollution control equipment?	☐	☐
Subp. 16	**Construction or expansion of a hazardous waste disposal facility?** If yes, complete Q1 - Q5.	☐	☒
	Q1: Are you constructing or expanding a hazardous waste disposal facility?	☐	☐
	Q2: Are you constructing a new facility for hazardous waste storage or treatment that is generating or receiving 1,000 kilograms or more per month of hazardous waste or one kilogram or more per month of acute hazardous waste?	☐	☐
	Q3: Are you expanding an existing facility for hazardous waste storage or treatment that increases its capacity by 10 percent or more?	☐	☐
	Q4: Are you constructing or expanding a facility that sells hazardous waste storage services to generators other than the owner and operator of the facility or a facility at which a generator's own hazardous wastes will be stored for a time period in excess of 90 days and the facility is located in a water-related land use management district, or in an area characterized by soluble bedrock?	☐	☐
	Q5: Are you constructing or expanding a hazardous waste disposal, storage or treatment facility in a water-related land use management district or in an area characterized by soluble bedrock?	☐	☐
Subp. 17	**Construction or expansion of a mixed municipal solid waste disposal, transfer, energy recovery, or compost facility?** If yes, complete Q1 – Q9.	☐	☒
	Q1: Are you constructing a mixed municipal solid waste land disposal facility for up to 100,000 cubic yards of waste fill per year?	☐	☐
	Q2: Are you constructing a mixed municipal solid waste land disposal facility for 100,000 cubic yards or more of waste fill per year?	☐	☐
	Q3: Are you expanding by 25 percent or more of previously permitted capacity of a mixed municipal solid waste land disposal facility for up to 100,000 cubic yards of waste fill per year?	☐	☐
	Q4: Are you constructing or expanding a mixed municipal solid waste land disposal facility in a water-related land use management district or in an area characterized by soluble bedrock?	☐	☐
	Q5: Are you constructing or expanding a mixed municipal solid waste transfer station for 300,000 or more cubic yards per year?	☐	☐
	Q6: Are you constructing or expanding a mixed municipal solid waste energy recovery facility or incinerator, or the utilization of an existing facility for the combustion of mixed municipal solid waste or refuse-derived fuel, with a capacity of 30 or more tons per day of input?	☐	☐
	Q7: Are you constructing or expanding a mixed municipal solid waste compost facility or a refused-derived fuel production facility with a permitted capacity of 50 or more tons per day of input?	☐	☐
	Q8: Are you expanding a mixed municipal solid waste land disposal facility for 100,000 cubic yards or more of waste fill per year by at least 10 percent but less than 25 percent?	☐	☐
	Q9: Are you constructing or expanding a mixed municipal solid waste energy recovery facility ash landfill receiving ash from an incinerator that burns refuse-derived fuel or mixed municipal solid waste?	☐	☐
Subp. 18A **Subp. 18B**	**Expansion, modification, or replacement of a municipal sewage collection system?** If yes, complete Q1 and Q2.	☐	☒
	Q1: If you are discharging to a wastewater treatment facility with a capacity of less than 20,000,000 gallons per day, are you expanding, modifying, or replacing a municipal sewage collection system that will result in an increase in design average daily flow of 1,000,000 gallons per day or more?	☐	☐

Answer each question to determine if your project meets or exceeds the mandatory thresholds for environmental review. Does your project consist of:		Yes	No
	Q2: If you are discharging to a wastewater treatment facility with a capacity **greater than 20,000,000 gallons per day**, are you expanding, modifying, or replacing a municipal sewage collection system that will result in an increase in design average daily flow of 2,000,000 gallons per day or more?	☐	☐
Subp. 18C	**Expansion or reconstruction of an existing municipal or domestic wastewater treatment facility?** If yes, complete Q3.	☐	☒
	Q3: Are you expanding or reconstructing an existing municipal or domestic wastewater treatment facility that will result in an increase in capacity by 50 percent or more and by at least 200,000 gallons per day of its average wet weather design flow capacity?	☐	☐
Subp. 18D	**Construction of a new municipal or domestic wastewater treatment facility?** If yes, complete Q4.	☐	☒
	Q4: Are you constructing a new municipal or domestic wastewater treatment facility with an average wet weather design flow capacity of 200,000 gallons per day or more?	☐	☐
Subp. 18E	**Expansion or modification of an existing industrial process wastewater treatment facility?** If yes, complete Q5.	☐	☒
	Q5: Are you expanding or modifying an existing industrial process wastewater treatment facility that increases the facilities design flow capacity by 50 percent or more and by at least 200,000 gallons per day or more?	☐	☐
Subp. 18F	**Construction of a new industrial process wastewater treatment facility?** If yes, complete Q6.	☐	☒
	Q6: Are you constructing a new industrial process wastewater treatment facility with a design flow capacity of 200,000 gallons per day or more, or 5,000,000 gallons per month or more, or 20,000,000 gallons per year or more?	☐	☐
Subp. 25	**Incineration of wastes containing Polychlorinated Biphenyls (PCBs)?**	☐	☒
Subp. 29	**Construction or expansion of an animal feedlot facility?** If yes, complete Q1 and Q2.	☐	☒
	Q1: Are you constructing an animal feedlot facility with a capacity of 1,000 animal units or more?	☐	☐
	Q2: Are you expanding an animal feedlot by 1,000 animal units or more? **If "Yes" to Q1 or Q2, proceed to Part D. If "No", proceed to Q3.**	☐	☐
	Q3: Are you constructing or expanding an animal feedlot facility by more than 500 animal units? **If "No" to Q3, proceed to Part D. If "Yes", proceed to Q4.**	☐	☐
	Q4: Is the existing or proposed facility located wholly or partially in any of the following sensitive locations:		
	Shoreland or delineated floodplain?	☐	☐
	A state or federally designated wild and scenic river district?	☐	☐
	The Minnesota River Project Riverbend Area?	☐	☐
	The Mississippi Headwaters Area?	☐	☐
	A drinking water supply management area?	☐	☐
	Within 1000 feet of a sinkhole, cave, resurgent spring, disappearing spring, Karst window, blind valley or dry valley?	☐	☐

Part D: Phased or connected actions (Minn. R. 4410.1000)

Answer each question to determine if your project could be a phased or connected action. Multiple projects and multiple stages of a single project must be considered in total when determining the need for an EAW or EIS.		Yes	No
A.	Has a previous phase of this project been conducted in the last three years?	☐	☒
B.	Are you planning an expansion or another phase of this project within the next three years?	☐	☒
C.	Do you have other existing facilities or proposed projects that may affect the same geographic area as this project?	☐	☒
	If yes, what is the linear distance between the existing facilities or proposed project(s) and this project?:		
D.	Is this project a prerequisite for another project, whether by you or another entity?	☐	☒
E.	Is this project part of a larger project?	☐	☒

Stantec

Stantec is a global leader in sustainable engineering, architecture, and environmental consulting. The diverse perspectives of our partners and interested parties drive us to think beyond what's previously been done on critical issues like climate change, digital transformation, and future-proofing our cities and infrastructure. We innovate at the intersection of community, creativity, and client relationships to advance communities everywhere, so that together we can redefine what's possible.

Stantec Consulting Services Inc.
1 Carlson Parkway, Suite 100
Plymouth, MN 55447
stantec.com

VI. Local acknowledgment

This section is primarily meant to notify the county and local authorities of the applicant's intent so that all county and local ordinances and plans can be met. It is intended to validate that counties and local authorities were properly notified of this permit application for construction and operation. Signature by the county or local authority is not meant to imply approval.

A. County acknowledgment/permission (to be completed by County Solid Waste Administrator or County Zoning Administrator)

Print name: John Considine Title: Property and Zoning Land Supervisor

Email: john.considine@blueearthcountymn.gov Phone: (507) 304-4339

Organization: Blue Earth County

Address: Blue Earth County Government Center, 10 South 5th Street, P.O. Box 3566

City: Mankato State: MN Zip: 56002

B. Local acknowledgment/permission (to be completed by local building or zoning office)

Print name: Victoria Potts Title: Lime Township Planning and Zoning

Email: vpotts@mankatomn.gov Phone: (507) 387-8621

Organization: Lime Township

Address: PO Box 4444

City: Mankato State: MN Zip: 56002

In lieu of completion of this part of the application, the applicant may submit documentation that the applicant has sent appropriate notification to the county and local authorities. Documentation must consist of copies of letters sent to the county and local authorities via certified mail, return receipt requested and copies of the signed return receipt.

C. Local approvals

Have all local licenses/approvals been acquired? ☒ Yes ☐ No

If yes, please list all approvals, include issuances and expiration dates (include a copy of each approval)

Blue Earth County License - expires December 31, 2026

Lime Township CUP - issued May 18, 2004, does not expire

If no, please explain:

D. Solid waste transfer facilities and source-separated organic material (SSOM) compost facilities

The applicant for a transfer facility or SSOM compost facility must attach copies of all required municipal licenses/approvals, unless the applicant is a municipality. The MPCA will not process an application without these approvals. See Minn. R. 7001.3400, item C, or 7001.3375 item L for more details. If no municipal approvals are required the owner or operator must sign the statement below stating that no municipal approvals are required.

I certify, no municipal approvals are required:

Print name: _____ Title: _____

Signature: _____ Date (mm/dd/yyyy): _____

E. Land disposal facilities

The MPCA may not issue a permit for a new disposal area or an expansion of an existing disposal area prior to local units of government granting approval. All local approval will need to be obtained prior to issuance of the MPCA solid waste permit for disposal activities. See Minn. Stat. § 116.07, subd. 4j, item d(1) for more details.

MINNESOTA POLLUTION CONTROL AGENCY
520 Lafayette Road North
St. Paul, MN 55155-4194

Permit application change of ownership/operator/landowner

Solid Waste Permit Program

Doc Type: Permit Application

MPCA Use Only	
AI number:	
Activity ID:	

Print or type application: Before submitting, make a photocopy for your records. The Minnesota Pollution Control Agency (MPCA) will review the application for completeness and provide an official response to the permittees within 30 business days of receipt of the application.

Permit application assembly: To expedite the processing and review of your application, **put this form at the beginning** of your submittal package. Attach additional sheets as necessary. For more information, please contact the MPCA at: In Metro Area: 651-296-6300 or Outside Metro Area: 800-657-3864.

Completeness instructions: Without properly completed forms, an application cannot be processed and will be determined to be incomplete. All sections of this form must be completed. If portions do not apply to this facility, please indicate so with "n/a".

The completed form is to be returned to: **Solid Waste Permit Document Coordinator**
Minnesota Pollution Control Agency
520 Lafayette Road North
St. Paul, MN 55155-4194

Submittal: You must submit one (1) paper copy ***and*** one (1) electronic copy (i.e., disc or thumb drive) of your application.

Application is for (check appropriately): ☒ Change in Permitted Activity Owner
☒ Change in Permitted Landowner
☒ Change in Permitted Operator

Facility information (Minn. R. 7001.0050, item D)

Facility name: Dem-Con Pilgrim Landfill

Street address: 57032 231st Ln

City/Township: Mankato State: MN Zip code: 56001

Email: Phone:

MPCA Region (check one): ☐ Brainerd ☐ Detroit Lakes ☐ Duluth ☐ Marshall ☐ Metro ☒ Rochester

Current solid waste permit number: PBR **or** SW 254

I. Submittal information

A. Have you included copy of the binding written agreement between the permittee and the proposed transferee? (Minn. R. 7001.0190, subp. 2)

☒ Yes
☐ No

B. Does the written agreement include a specific date for transfer of permit responsibilities and allocation of liabilities? (Minn. R. 7001.0190, subp. 2)

☐ Yes Please include the date (mm/dd/yyyy):

☒ No Please explain:

The agreement is contingent on receipt of solid waste and any other applicable permits

C. Was a revised permit application submitted 90 days prior to the change in ownership or control (7001.0190, subp. 2(A))

☒ Yes Please include the date (mm/dd/yyyy): 4/24/2026

☐ No Please explain:

II. Current permittee information (Minn. R. 7001.0190, subp. 2)

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete.

I further certify that the construction and operation of the above described facility will be in accordance with the plans, specifications, reports and related communications accepted by the MPCA and on file in its office; and in accordance with conditions imposed in the permit issued by the MPCA.

I certify that the facility is consistent with local solid waste management plans. I am aware an MPCA permit must be obtained before construction or operation of the facility may begin and all local permits, licenses or other government approval must be obtained before an MPCA permit can be issued.

I am aware that there are significant penalties for submitting false information, including the possibility of fines and imprisonment.

Landowner [Minn. R. 7001.0060, item E]

Print name: Chad Phillips Title:

Email: chad.phillips@minnpm.com Phone: 507-380-7875

Organization: OMG Midwest d/b/a Minnesota Paving and Materials

Address: 1905 3rd Ave

City: Mankato State: MN Zip: 56003

Signature: Chad Phillips Date (mm/dd/yyyy): 04/20/2026

Activity Owner (Applicant) [Minn. R. 7001.0050, item A]

Print name: same as landowner Title:

Email: Phone:

Organization:

Address:

City: State: Zip:

Signature: Date (mm/dd/yyyy):

Operator* [Minn. R. 7001.0050, item B]

Print name: same as landowner Certification No:

Title: Expiration date:

Email: Phone:

Organization:

Address:

City: State: Zip:

Signature: Date (mm/dd/yyyy):

III. New Owner/Operator information (Minn. R. 7001.0190, subp. 2)

New landowner [Minn. R. 7001.0060, item E]

Print name: Mark Pahl | Title: Partner
Email: markpahl@dem-con.com | Phone: 951-224-7101
Organization: Dem-Con Companies
Address: 13020 Dem-Con Drive
City: Shakopee | State: MN | Zip: 55379
Signature: | Date (mm/dd/yyyy): 4-24-26

New activity owner [Minn. R. 7001.0050, item A]

Print name: same as new landowner | Title:
Email: | Phone:
Organization:
Address:
City: | State: | Zip:
Signature: | Date (mm/dd/yyyy):

New operator* [Minn. R. 7001.0050, item B]

Print name: Erik Klehr | Certification No: 67333916
Title: Landfill Manager | Expiration date:
Email: erikklehr@dem-con.com | Phone: 952-356-2401
Organization: Dem-Con Companies
Address: 13020 Dem-Con Drive
City: Shakopee | State: MN | Zip: 55379
Signature: | Date (mm/dd/yyyy): 4-24-26

**Provide the same information for other certified operators.*

IV. Local acknowledgment

This section is primarily meant to notify the county and local authorities of the applicant's intent so that all county and local ordinances and plans can be met. It is intended to validate that counties and local authorities were properly notified of this permit application for construction and operation. Signature by the county or local authority is not meant to imply approval.

A. County acknowledgment/permission (to be completed by County Solid Waste Administrator or County Zoning Administrator)

Print name: John Considine | Title: Property and Zoning Land Supervisor
Email: john.considine@blueearthcountymn.gov | Phone: 507-304-4339
Organization: Blue Earth County
Address: Blue Earth County Government Center, 10 South 5th Street, P.O. Box 3566
City: Mankato | State: MN | Zip: 56002

B. Local acknowledgment/permission (to be completed by local building or zoning office)

Print name: Victoria Potts | Title: Lime Township Planning and Zoning
Email: vpotts@mankatomn.gov | Phone: 507-387-8621
Organization: Lime Township
Address: PO Box 4444
City: Mankato | State: MN | Zip: 56002

In lieu of completion of this part of the application, the applicant may submit documentation that the applicant has sent appropriate notification to the county and local authorities. Documentation must consist of copies of letters sent to the county and local authorities via certified mail, return receipt requested and copies of the signed return receipt.

Minnesota Pollution Control Agency
520 Lafayette Road North
St. Paul, MN 55155-4194

Solid Waste Facility Application Checklist

Solid Waste Permit Program

Doc Type: Permit Application

Purpose: This checklist has been developed as a guide for permit application preparers and reviewers in order to assist with the submittal of a substantially complete permit application. Thoroughly review all applicable rules, statutes and guidance documents for further details and requirements. Minnesota Rules can be found at: https://www.revisor.mn.gov/rules/. All guidance documents can be found on the Minnesota Pollution Control Agency (MPCA) Solid Waste Publications webpage at: http://www.pca.state.mn.us/lupg880.

Many items listed below must be discussed in depth within the permit application submittal package. Be sure to include the most recently updated information, drawings and plans. Previously submitted documents **cannot** be referenced; all necessary documents must be included in this package. The permit application submittals should discuss all applicable MPCA Guidance Documents; include justification if the facility does not follow the guidance provided.

Instructions for permit application preparers: The following checklist must be completed and included with a permit application for all solid waste facilities. In the table below, indicate in the far left column the name and page number(s) of the document where the specified rule requirement is addressed. If the rule requirement does not apply, please indicate with "n/a" for not applicable. **The permit application will be determined to be incomplete if there are any blank spaces in this column**.

Document and page number	Minn. R. citation	MPCA use only		
		Completeness review		Comments
		Admin	Technical	
form w-sw3-33 and Section 1	7001.0050, item A Name, address, and telephone number of the owner of the facility for which the application is submitted and identification of the status of the owner as a federal, state, public, private, or other entity			
form w-sw3-33 and Section 1	7001.0050, item B If the operator of the facility for which the application is submitted is different from the owner, the name, address, and telephone number of the operator and identification of the status of the operator as a federal, state, public, private, or other entity			
form w-sw3-33 and Section 1	7001.0050, item C Name, address, and telephone number of the person who prepared the application			
Section 1.1.5	7001.0050, item D Description including the location of the business, plant, system, facility, or activity for which the permit is sought			
Section 2	7001.0050, item E General description of the materials handled, processed, stored, or disposed of by the applicant; and a statement of the nature and quantity of the materials proposed to be stored, processed, discharged, emitted, or disposed of during the period of the required permit, and proposed methods for control of these materials			

Document and page number	Minn. R. citation	MPCA use only		
		Completeness review		Comments
		Admin	Technical	
N/A	7001.0060, item A For a corporation, the permit application must be signed by a principal executive officer of at least the level of vice-president or the duly authorized representative or agent of the executive officer if the representative or agent is responsible for the overall operation of the facility that is the subject of the permit application			
form w-sw3-33	7001.0060, item B For a partnership or sole proprietorship, the permit application must be signed by a general partner or the proprietor, respectively			
N/A	7001.0060, item C For a municipality, state, federal, or other public agency, the permit application must be signed by either a principal executive officer or ranking elected official			
form w-sw3-33	7001.0060, item D If the operator of the facility for which the application is submitted is different from the owner, the permit application must be signed by both the owner according to items A through C above			
form w-sw3-33	7001.0060, item E For solid waste management facilities, the permit application must be signed by the facility owner and landowner under items A to C if the landowner is different from the owner of the facility for which the application is submitted			
form w-sw3-33	7001.0060, item F For a firm preparing the necessary reports and plans for a solid waste management facility permit application, the permit application must be signed by an engineer registered in Minnesota			
form w-sw3-33	7001.0070 A person who signs a permit application shall make the following certification: “I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information. The information is, to the best of my knowledge and belief, true, accurate, and complete.”			

Document and page number	Minn. R. citation	MPCA use only		
		Completeness review		Comments
		Admin	Technical	
form w-sw3-33	7001.3150 A person who signs a permit application or any portion of it, or any report required by a permit to be submitted to the commissioner or agency must make the certification required by part 7001.0070 and shall make the following additional certification: "I am aware that there are significant penalties for submitting false information, including the possibility of fines and imprisonment." An engineer registered in Minnesota must certify all technical documents, such as design drawings and specifications, engineering reports, and hydrogeologic studies, required to be submitted as part of a permit application or by a permit condition. The hydrogeologic report and all related groundwater and surface water monitoring reports must be signed by a person knowledgeable in the field of hydrogeology. This person must certify the quality of work performed and must have been responsible for the gathering and interpretation of the hydrogeologic data and the preparation of the reports.			
Section 1.1.5	7001.3300, item A General description of the facility			
Appendix A	7001.3300, item B Industrial solid waste management plan in accordance with 7035.2535			
Section 3.3	7001.3300, item C Description of security procedures and equipment			
Section 3.4	7001.3300, item D Inspection schedule			
Section 3.5	7001.3300, item E Contingency action plan			
Section 3.6.1	7001.3300, item F(1) Description of procedures, structures or equipment to prevent operational hazards			
Section 3.6.2	7001.3300, item F(2) Description of procedures, structures or equipment to prevent run-off, run-on			
Section 3.6.3	7001.3300, item F(3) Description of procedures, structures or equipment to prevent ground and surface water contamination			
Section 3.6.4	7001.3300, item F(4) Description of procedures, structures or equipment to mitigate effects of equipment failure			
Section 3.6.5	7001.3300, item G Description of precautions to prevent ignition or explosions and emergency response plan			

Document and page number	Minn. R. citation	MPCA use only		
		Completeness review		Comments
		Admin	Technical	
Section 3.7	7001.3300, item H Traffic patterns and control			
Section 3.8	7001.3300, item I Storage descriptions			
Section 4	7001.3300, item J Closure and Postclosure Plan			
Section 4.3	7001.3300, item K Closure cost estimates and evidence of financial assurance			
Section 4.4	7001.3300, item L Postclosure cost estimates and evidence of financial assurance			
Section 3.5.1, Section 3.5.7	7001.3300, item M Corrective action cost estimates and evidence of financial assurance			
Section 5.1, Figure 1, Appendix B	7001.3300, item N(1 to 18) Topographic and development map			
Section 5	7001.3300, item O Geologic and location information			
Section 6	7001.3300, item P(1 to 9) Operations and maintenance manual			
Section 7, Appendix H	7001.3300, item Q Construction QA/QC plan			
Section 10.5	7001.3300, item R Household hazardous waste management plan			
Appendix B	7001.3300, item S Full size copies of all engineering plan sheets			
Appendix B	7001.3300, item S Reduced copies of all engineering plan sheets (11” x 17”)			
Appendix F	7001.3300, item S Address labels for all adjacent properties owners and interested parties			
Appendix F	7001.3300, item S Plan sheet with adjacent land owner information			
N/A	7001.3300, item S Discussion of all previously granted variances			
Section 1.1.6, Variance Application Checklist	7001.3300, item S Variance application according to Minn. R. 7000.7000 for all new requests			
Section 1.1.6, Section 10	7001.3300, item S Description of how and why the facility does or does not operate according to all applicable MPCA Guidance Documents			
available upon request	7001.3300, item S Inspection Form			

Minnesota Pollution Control Agency
520 Lafayette Road North
St. Paul, MN 55155-4194

Demolition Debris Landfill Application Checklist

Solid Waste Permit Program

Doc Type: Permit Application

Purpose: This checklist has been developed as a guide for permit application preparers and reviewers in order to assist with the submittal of a substantially complete permit application. Thoroughly review all applicable rules, statutes and guidance documents for further details and requirements. Minnesota Rules can be found at: https://www.revisor.mn.gov/rules/. All guidance documents can be found on the Minnesota Pollution Control Agency (MPCA) Solid Waste Publications webpage at: http://www.pca.state.mn.us/lupg880.

Many items listed below must be discussed in depth within the permit application submittal package. Be sure to include the most recently updated information, drawings and plans. Previously submitted documents **cannot** be referenced; all necessary documents must be included in this package. The permit application submittals should discuss all applicable MPCA Guidance Documents; include justification if the facility does not follow the guidance provided.

Instructions for permit application preparers: The following checklist must be completed and included with a permit application for all demolition debris landfill disposal facilities. In the table below, indicate in the far left column the name and page number(s) of the document where the specified rule requirement is addressed. If the rule requirement does not apply, please indicate with "n/a" for not applicable. **The permit application will be determined to be incomplete if there are any blank spaces in this column**.

Document and page number	Minn. R. citation	MPCA use only		
		Completeness review		Comments
		Admin	Technical	
Section 2.2	7001.3425, item A Site capacity calculation and operating life			
see report	7001.3425, item B Detailed plans and engineering report			
Section 9.2	7001.3425, item C Particulate and fugitive dust control methods			
Section 9.3	7001.3425, item D Phase development plan			
Section 9.4, Appendix B	7001.3425, item E Cross-section plan			
previous applications/ n/a	7001.3425, item F Soils evaluation			
previous applications/ n/a	7001.3425, item G 7035.2815, subp. 3(A to D) Hydrogeological evaluation (extent to be determined by Commissioner)			
previous applications/ n/a	7035.2815, subp. 3(E) Phase I hydrogeologic evaluation			
previous applications/ n/a	7035.2815, subp. 3(F) Phase II hydrogeologic evaluation			
previous applications/ n/a	7035.2815, subp. 3(G) Phase II hydrogeologic evaluation report			
previous applications/ n/a	7035.2815, subp. 3(H) Phase III hydrogeologic evaluation			
previous	7035.2815, subp. 3(I)(1)			

applications/ n/a	Phase IV hydrogeologic evaluation work plan			

Document and page number	Minn. R. citation	MPCA use only		
		Completeness review		Comments
		Admin	Technical	
Section 3.5.2.4, Section 9.6, SAP (to be completed within 60 days of permit issuance)	7035.2815, subp. 4 Groundwater performance standards			
Sdection 9.5	7001.3425, item H Noise and access control methods			
Section 6.1	7001.3425, item I Equipment list			
Section 9.6	7001.3425, item J Groundwater monitoring system description			
Section 9.7	7001.3425, item K Listing of required permits			
Section 10.1	7035.2535, subp. 1 Unacceptable wastes			
Section 10.2	7035.2535, subp. 3 Security			
Section 10.3	7035.2535, subp. 4 General inspection requirement			
Section 3.2, Section 10.4 and Appendix A	7035.2535, subp. 5 Industrial solid waste management plan (ISWMP)			
Section 10.5	7035.2535, subp. 6 Household hazardous waste management plan			
Section 3.5	7035.2615 Contingency action plan			
Section 5	7035.2825, subp. 7 Location standards			
Appendix H	7035.2825, subp. 8(A) Site preparation specifications			
Appendix B	7035.2825, subp. 8(B) Phase development plans			
Section 4.1.8	7035.2825, subp. 8(C) Surface water drainage control system			
Section 4.1.7	7035.2825, subp. 8(D) Slopes and drainageways			
Section 4.1.7 and Appendix B	7035.2825, subp. 8(E) Final contours			
Section 6	7035.2825, subp. 9 Operation and maintenance plan			
previous applications/ n/a	7035.2825, subp. 10 Hydrogeologic evaluation			

Section 4.1.5	7035.2825, subp. 11 Cover system design			
Section 9.6	7035.2825, subp. 12 Water quality monitoring			
Section 4.5	7035.2825, subp. 13 Financial assurance (if required)			
Section 4	7035.2825, subp. 14 Closure and postclosure plan			

Minnesota Pollution Control Agency
520 Lafayette Road North
St. Paul, MN 55155-4194

Industrial Waste Landfill Application Checklist

Solid Waste Permit Program

Doc Type: Permit Application

Purpose: This checklist has been developed as a guide for permit application preparers and reviewers in order to assist with the submittal of a substantially complete permit application. Thoroughly review all applicable rules, statutes and guidance documents for further details and requirements. Minnesota Rules can be found at: https://www.revisor.mn.gov/rules/. All guidance documents can be found on the Minnesota Pollution Control Agency (MPCA) Solid Waste Publications webpage at: http://www.pca.state.mn.us/lupg880.

Many items listed below must be discussed in depth within the permit application submittal package. Be sure to include the most recently updated information, drawings and plans. Previously submitted documents **cannot** be referenced; all necessary documents must be included in this package. The permit application submittals should discuss all applicable MPCA Guidance Documents; include justification if the facility does not follow the guidance provided.

Instructions for permit application preparers: The following checklist must be completed and included with a permit application for all industrial waste land disposal facilities. In the table below, indicate in the far left column the name and page number(s) of the document where the specified rule requirement is addressed. If the rule requirement does not apply, please indicate with "n/a" for not applicable. **The permit application will be determined to be incomplete if there are any blank spaces in this column**.

Document and page number	Minn. R. citation	MPCA use only		
		Completeness review		Comments
		Admin	Technical	
1.1.6	7035.1700, items B and F Minimum separation distances			
Appendix A	7035.1700, item D Daily and intermediate cover			
Section 4.1.8, Section 10.10	7035.1700, item E Surface water drainage system			
Section 6.3	7035.1700, item H Access roads			
Section 6.1	7035.1700, items J and K Equipment			
Section 3.5.5, Section 3.6.5	7035.1700, item L Communication facilities			
Section 3.2, Appendix A	7035.1700, item O Screening			
Section 9.5	7035.1700, item Q Access control			
Section 9.6	7035.1700, item S Water monitoring program			
Section 1.1.5, Section 3.6.3, Appendix B	7035.1700, item T Leachate collection system			
n/a	7035.1700, item U Gas management system			
Section 4.1.7, Appendix B	7035.1700, item Y Final contours			
Section 4.1.5, Appendix B	7035.1700, item Y Cover system design			
see forms	7035.1800, item A A completed permit application form			

Document and page number	Minn. R. citation	MPCA use only		
		Completeness review		Comments
		Admin	Technical	
Section 1.1, Section 3.1	7035.1800, item B(1) General information			
previous applications/ n/a	7035.1800, item B(2) 7035.2815, subp. 3(A to D) Hydrogeological evaluation			
previous applications/ n/a	7035.2815, subp. 3(E) Phase I hydrogeologic evaluation			
previous applications/ n/a	7035.2815, subp. 3(F) Phase II hydrogeologic evaluation			
previous applications/ n/a	7035.2815, subp. 3(G) Phase II hydrogeologic evaluation report			
previous applications/ n/a	7035.2815, subp. 3(H) Phase III hydrogeologic evaluation			
previous applications/ n/a	7035.2815, subp. 3(I)(1) Phase IV hydrogeologic evaluation work plan			
Section 9.6	7035.2815, subp. 4 Groundwater performance standards			
Section 6	7035.1800, item B(3) Operating procedures			
Section 6.1	7035.1800, item B(4) Listing of equipment to be used			
Appendix B	7035.1800, item C(1) Existing conditions plan			
Appendix B	7035.1800, item C(2) Development plan			
Appendix B	7035.1800, item C(3) Engineering plans and drawings - cross section plan			
Section 3.1	7035.1800, item C(4) Ultimate land use plan			
Section 4.5	7035.2665 to 7035.2805 Financial Assurance (if Required)			

Minnesota Pollution Control Agency
520 Lafayette Road North
St. Paul, MN 55155-4194

Solid Waste Compost Facility Application Checklist

Solid Waste Permit Program

Mixed Municipal Solid Waste (MSW)

Doc Type: Permit Application

Purpose: This checklist has been developed as a guide for permit application preparers and reviewers in order to assist with the submittal of a substantially complete permit application. Thoroughly review all applicable rules, statutes and guidance documents for further details and requirements. Minnesota Rules can be found at: https://www.revisor.mn.gov/rules/. All guidance documents can be found on the Minnesota Pollution Control Agency (MPCA) Solid Waste Publications webpage at: http://www.pca.state.mn.us/lupg880.

Many items listed below must be discussed in depth within the permit application submittal package. Be sure to include the most recently updated information, drawings and plans. Previously submitted documents **cannot** be referenced; all necessary documents must be included in this package. The permit application submittals should discuss all applicable MPCA Guidance Documents; include justification if the facility does not follow the guidance provided.

Instructions for permit application preparers: The following checklist must be completed and included with a permit application for all solid waste compost facilities. In the table below, indicate in the far left column the name and page number(s) of the document where the specified rule requirement is addressed. If the rule requirement does not apply, please indicate with "n/a" for not applicable. **The permit application will be determined to be incomplete if there are any blank spaces in this column**.

Document and page number	Minn. R. citation	MPCA use only		
		Completeness review		Comments
		Admin	Technical	
Section 8	7001.3375, item A Description of area for each stage of the composting process			
Section 8	7001.3375, item B Description of design and features of the facility, including run-off, run-on, and leachate control systems			
Section 8	7001.3375, item C Description of material(s) to be composted			
Section 8	7001.3375, item D Description of the residue's composition			
Section 8	7001.3375, item E Description of residue disposal method			
Section 8	7001.3375, item F Design of odor control system			
n/a	7001.3375, item G Design and performance specifications			
n/a	7001.3375, item H Description of composting method, including retention time, temperature, number of turns and air flow design			
Section 6	7001.3375, item I Operating plan and waste analysis plan			
Section 8	7001.3375, item J Description of the proposed uses for the compost			
Section 8	7035.2836, subp. 4(A) Site preparations specifications			

Document and page number	Minn. R. citation	MPCA use only		
		Completeness review		Comments
		Admin	Technical	
Section 8, Section 9.5	7035.2836, subp. 4(B) Facility access plan			
Section 8	7035.2836, subp. 4(C) Surface water management			
n/a	7035.2836, subp. 4(D) The composting, curing, and storage area liners			
n/a	7035.2836, subp. 4(E) Leachate collection and treatment system			
Section 8	7035.2836, subp. 4(F) Residual management			
Section 8	7035.2836, subp. 4(G) Odor control design			
	7035.2836, subp. 5(A) Secured access			
	7035.2836, subp. 5(B) Personnel training program			
Section 8	7035.2836, subp. 5(C) Designated delivery area			
Section 8	7035.2836, subp. 5(D) Recyclable materials management			
Section 8	7035.2836, subp. 5(E) Residuals management			
n/a	7035.2836, subp. 5(F) Leachate management			
Section 8	7035.2836, subp. 5(G) Odor control			
n/a	7035.2836, subp. 5(H) Wind control			
n/a	7035.2836, subp. 5(I) PFRP method			
n/a	7035.2836, subp. 5(J)(1) Testing plan for compost maturity			
n/a	7035.2836, subp. 5(J)(2) Metals analysis			
n/a	7035.2836, subp. 5(J)(3) Percent inert material analysis			
n/a	7035.2836, subp. 5(J)(4) Testing plan for pH, moisture content, particle size, NPK ratio, and soluble salt content			
n/a	7035.2836, subp. 5(J)(5)(a) Training and experience of person collecting samples			
n/a	7035.2836, subp. 5(J)(5)(b) Equipment used to collect, process and store samples			
n/a	7035.2836, subp. 5(J)(5)(c) Equipment cleaning procedures			

Document and page number	Minn. R. citation	MPCA use only		
		Completeness review		Comments
		Admin	Technical	
n/a	7035.2836, subp. 5(J)(5)(d) Sample collection locations			
n/a	7035.2836, subp. 5(J)(5)(e) Grab sample procedures			
n/a	7035.2836, subp. 5(J)(5)(f) Composite sample procedures			
n/a	7035.2836, subp. 5(J)(5)(g) Chain-of-custody and storage procedures			
n/a	7035.2836, subp. 5(J)(5)(h) Sampling QA/QC			
n/a	7035.2836, subp. 6 Compost classification and description of how results will determine distribution			
n/a	7035.2836, subp. 7(A) Registration with MN Department of Agriculture			
Section 8	7035.2836, subp. 7(B) Allowable end uses			
Section 8	7035.2836, subp. 7(C) Compost distribution			

Page Number	Minn. R. citation	Requirement	MPCA use only	
			Completeness Review	Technical Review
N/A		plant, system, or facility has not been in operation for this period, then the financial statements and analysis must be based on the most complete data available);		
N/A	7000.7000, sub. 2.F.	*if seeking a variance on grounds that compliance is not technologically feasible*: a report from a registered professional engineer, or other person acceptable to the agency, stating fully the reasons why compliance is not technologically feasible;		
Section 1.1.6	7000.7000, sub. 2.G.	other additional data or information that is required by any applicable agency rule or standard;		
Section 2.1	7000.7000, sub. 2.H(1)	a general description of the materials handled or processed by the applicant that are pertinent to the subject application;		
Section 2.1	7000.7000, sub. 2.H(1)	a statement of the nature and quantity of the materials being discharged, emitted, or disposed of, and that can reasonably be expected to be discharged, emitted, or disposed of during the period of the proposed variance,		
Section 2.3	7000.7000, sub. 2.H(1)	proposed methods for the control of the materials listed above;		
N/A	7000.7000, sub. 2.H(2)	a comprehensive proposed plan indicating the steps to be taken by the applicant during the period of the variance, even if the applicant is seeking a permanent variance, to reduce emission levels or discharges to the lowest limits practical;		
Section 1.1.6	7000.7000, sub. 2.H(3)	a concise statement of the effect upon the air, water, and land resources of the state and upon the public and other persons affected, including those residing in the area where the variance will take effect, which will result from board or commissioner approval of the requested variance;		
Section 1.1.6	7000.7000, sub. 2.H(4)	a statement of the alternatives to the proposed operation under the variance which have been considered by the applicant;		
Section 1.1.6	7000.7000, sub. 2.H(5)	a concise statement of the effect on the establishment, maintenance, operation, and expansion of business, commerce, trade, traffic, and other economic factors that may result from approval and from denial of the requested variance.		

Page Number	Minn. R. citation	Requirement	MPCA use only	
			Completeness Review	Technical Review
see report	7000.7000, sub. 2.H.	any other relevant data or information that the commissioner deems essential to a determination on the application.		

INDUSTRIAL SOLID WASTE MANAGEMENT PLAN

Dem-Con Pilgrim Landfill (SW-254)
Mankato, Minnesota

Dem-Con Companies
13020 Dem-Con Drive
Shakopee, Minnesota 55379

April 22, 2026

Version 1

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Appendix F Liner Equivalency Calculations
Appendix G Method 1030, Ignitability of Solids
Appendix H The Lethality Characteristic, MPCA Guidance Document
Appendix I Managing Sealants and Coatings Containing PCBs
Appendix J Guidelines-Disposal Methods for Water Filter Backwash Solids
Appendix K Treated Seeds, MPCA Guidance Document

1.0 INTRODUCTION

The "Industrial Solid Waste Management Plan" (ISWMP) for the Dem-Con Pilgrim Landfill (SW-254) was prepared to provide the specific details and procedures for the management of industrial wastes at the facility. The ISWMP was developed according to Minnesota Solid Waste Rules Part 7035.2535, subpart 5. The ISWMP discusses specific industrial waste types that will or will not be accepted at the facility, and procedures to evaluate new waste types for acceptance. It is therefore expected that the plan be revised from time to time in accordance with changes in waste stream characteristics and the evolution of the industrial waste market.

Background

Dem-Con Pilgrim Landfill, LLC (Dem-Con) operates a demolition landfill located in Township 109 North, Range 26 West, Sections 30 and 31 in Lime Township of Blue Earth, Minnesota. The initial portion of the landfill is unlined. The permit was modified in 2026 to include a lined Class III demolition landfill area, as defined in the "Demolition Landfill Guidance (MPCA, 2005), and, as stated on page 3 of that document, can accept construction, demolition (C&D) and non-hazardous industrial wastes.

Amendments to the Industrial Solid Waste Management Plan

The ISWMP may be amended at any time during the life of the facility. An amended ISWMP will be submitted whenever changes in operation or design affect the ISWMP procedures. The MPCA must review and approve the amended ISWMP prior to implementation.

2.0 ACCEPTABLE AND UNACCEPTABLE WASTES

Acceptable Wastes

Dem-Con is permitted for landfilling in two areas. The eastern, unlined area (DD 001) is permitted as a Class I demolition landfill, and the western, lined area (DD 002) is permitted as a Class III demolition landfill by the MPCA. The following sections list types of wastes that are acceptable in each area.

2.1.1 Unlined Areas

Waste types accepted in the unlined area are limited to the following demolition debris types:

- Bituminous concrete (includes asphalt pavement and blacktop)
- Concrete (including rerod)
- Stone
- Uncontaminated soil
- Masonry (bricks, stucco and plaster)
- Untreated wood (including painted, stained and/or varnished dimensional lumber, pallets, tree stumps, grubbing, root balls, particle board, plywood, fencing and dock materials)
- Siding (Includes vinyl, masonite, untreated wood, aluminum and steel.)
- Wall coverings
- Electrical wiring and components
- Roofing materials
- Duct work
- Wall board, sheet rock
- Built-in cabinetry
- Plumbing fixtures
- Affixed carpet and padding
- Ceramic items
- Conduit and pipes
- Glass (limited to window and door glass from buildings and structures)
- Insulation (Includes fiberglass, mineral wool, cellulose, polystyrene and newspaper.)
- Plastic building parts
- Sheathing
- Molded fiberglass

- Rubber
- Drain tile
- Recognizable portions of burned structures
- Metal
- Ceiling tile
- Wood and vinyl flooring
- Asbestos-containing materials (pursuant to Appendix A of this ISWMP)

2.1.2 Lined Areas

In the lined areas, Dem-Con can accept:

- All wastes accepted in the unlined areas (no further evaluation needed);
- Packaging from construction materials and activities (no further evaluation needed);
- Empty containers from construction and demolition activities (no further evaluation needed);
- Empty containers managed in accordance with MPCA "Managing Empty Containers" document (no further evaluation needed);
- Emergency Disaster Debris
- Depackaging waste
- Treated lumber (no further evaluation needed);
- Railroad ties (no further evaluation needed);
- Contaminated soils (evaluate as per Table 1);
- Dredged Materials (evaluate as per Appendix B);
- Foundry sands (evaluate as per Table 1);
- Sandblasting sands (evaluate as per Table 1);
- Grinding sludges (evaluate as per Table 1);
- Car wash sand sediment (no further evaluation needed);
- Non-hazardous mercury contaminated soils and construction/demolition debris free of elemental mercury (evaluate as per Appendix B and Table 1, respectively);
- Wastes containing PCB's less than 50 ppm
- Demolition debris with PCB containing caulking wastes in excess of 50 ppm that are adhered to structure;
- Demolition debris with lead paint that is adhered to the structure;
- Ash from burnt structures (evaluate as per Table 1);

- Non-PCB ballasts (no further evaluation needed);
- Naturally Occurring Radioactive Material (NORM) with radium-226 not exceeding 30 Pico curries;
- Carpet – abated (no further evaluation needed);
- Street sweepings (no further evaluation needed);
- Absorbents (evaluate as per Table 1);
- Waste traps from garages (evaluate as per Table 1);
- Sanitary & Storm Sewer Grit (evaluate as per Table 1);
- Wastewater treatment residues (evaluate as per Table 1 and MPCA Guidance Document "Guidelines-Disposal Methods for Water Filter Backwash Solids");
- Autoclaved medical waste;
- Residue from single sort recycling, tire recycling, auto recycling, and other recycling operations;
- Other wastes from manufacturing and industrial processes that do not exceed the maximum concentrations of the toxicity characteristics for a given waste using the regulatory levels included in 40 CFR part 261 (see Section 2.3 and Table 1);
- Shredded demolition debris that can be identified and or verified from generator as acceptable materials;
- Fiberglass structures (boat hulls, hot tubs, etc.)
- Treated seeds, managed in accordance with Appendix K
- "Demo-like" materials from manufacturers of building materials and structural components of buildings (including cabinets, doors, prefabricated walls, countertops, carpet, shingles, etc.), including, but not limited to, wood, wood products, tree stumps, asbestos, glass, concrete, metal, brick, clay, porcelain fixtures, block, tile, rock, insulation, shingles, sheet rock, styrofoam, plastic pipe, conduit, fiberboard, plaster and dirt;
- Residuals from yardwaste compost screening operations; and
- Other waste types specifically listed in this ISWMP.

2.2 Unacceptable Wastes

MPCA rules prohibit certain wastes from disposal in C&D landfills, including:

- Municipal Solid Waste (MSW)
- Hazardous wastes;
- Sewage that does not meet Class B pathogen reduction listed in part 7041.1300 subpart 3 such as, sewage sludge, septic tank pumping, sewage sludge compost;
- Wastes containing free liquids;

- Raw animal manure;
- Infectious wastes;
- Used oil;
- Radioactive wastes;
- Animal carcasses, parts, renderings and slaughterhouse wastes;
- Appliances (for disposal);
- Hot ashes or wastes that could spontaneously combust or ignite other wastes due to high temperatures;
- Batteries;
- Recyclable cardboard;
- Explosives;
- Fluorescent tubes and ballasts containing PCB's;
- Food waste;
- Mattresses;
- High-intensity discharge lamps;
- Live coal tar (including applicators, containers, and tubes);
- Household hazardous waste;
- Machinery or engine parts;
- Medical waste (non-autoclaved);
- Wastes containing elemental or free mercury (thermostats, switches);
- MSW incinerator ash;
- PCB containing wastes greater than the regulatory limit of 50 ppm;
- Tires (for disposal);
- Unrecognizable waste, unless processed at an MPCA permitted solid waste facility prior to delivery;
- Vehicles; and
- Yard waste (for disposal).

2.3 Mandatory Waste Types

Minnesota Rules part 7035.2535, subpart 5, item B requires that the following 12 specific waste types be addressed in an ISWMP:

Waste Type	Accepted/Not Accepted		Disposal Method
	Unlined Area	Lined Area	
Empty pesticide containers	Not accepted	Accepted	Codisposal
Asbestos	Category 1 & 2 non-friable only	Accepted (all forms)	See Appendix A
Waste containing (PCBs) at a concentration less than 50 ppm	Not accepted	Accepted	See Table 1
Spilled non-hazardous materials	Not accepted	Accepted	See Table 1
Rendering and slaughterhouse wastes	Not accepted	Not Accepted	
Wastes that could spontaneously combust or that could ignite other wastes because of high temperatures	Not accepted	Not accepted	
Foundry wastes	Not accepted	Accepted	See Table 1
Ash from incinerators, resource recovery facilities and power plants	Not accepted	Accepted	See Table 1 (coal ash only accepted in cells with a Subtitle D -equivalent liner)
Paint residues, paint filters and paint dust	Not accepted	Accepted	See Table 1
Sludges, including ink sludges, lime sludge, wood sludge and paper sludge	Not accepted	Accepted	See Table 1
Fiberglass, urethane, polyurethane, and epoxy resin waste	Accepted	Accepted	See Table 1
Spend activated carbon filters	Not accepted	Accepted	See Table 1

2.4 Exempted Waste Types

Minnesota Rules part 7035.2535, subpart 5, item D exempts the following from evaluation in the ISWMP (although whether or not the waste type is accepted must be noted):

Waste Type	Accepted/Not Accepted		Notes
	Unlined Area	Lined Area	
Paper and cardboard wastes from manufacturing processes or packaging	Not accepted	Accepted	
Food and beverage packaging and handling materials	Not accepted	Accepted	Includes packaging, wrapping and food handling (i.e. tissue wrap, etc.) materials not containing organic food waste

Food not containing free liquids	Not accepted	Not accepted	
Aluminum, iron, steel, glass, wood, and hardened, cured plastic waste	Accepted	Accepted	
Dewatered sewage sludge that has been treated by a process to significantly reduce pathogens pursuant to Minnesota Rules	Not accepted	Accepted	Needs to meet the class B pathogen reduction listed in part 7041.1300 subpart 3
Compost including sewage sludge compost produced in accordance with Minnesota Rules, part 7035.2836	Not accepted	Accepted*	*Only Class II compost. Limited, if any, markets exist for Class II compost
Grit and bar screenings from a wastewater treatment plant	Not accepted	Accepted	
Ash from boilers and incinerators using wood or biomass as a fuel source	Not accepted	Accepted	See Table 1

2.5 Waste That Requires a Subtitle D Liner

- Coal Ash and Auto Shredder Residue both require a Subtitle D liner for management in Minnesota. Dem-Con's liner and cap design meet the requirements of subtitle D. A copy of the liner equivalency calculations by Carlson McCain that demonstrate that the liner and cap design exceeds the Subtitle D standard are included in Appendix F.

2.6 Hazardous Wastes

The following discussion is provided to assist facility managers in understanding what is and is not a hazardous waste. The definitions were originally specified in the Resource Conservation and Recovery Act (RCRA), as administered by the United States Environmental Protection Agency (USEPA). These definitions are incorporated into Minnesota state statutes and discussed in detail in rules promulgated by the Minnesota Pollution Control Agency (MPCA), as cited below.

A substance is a hazardous waste if:

- The waste exhibits any of the characteristics of hazardous waste in Minnesota Rules, part 7045.0131 (ignitability, it is an oxidizer, corrosivity, reactivity, lethality or toxicity);
- The waste is nonspecific source (F), specific source (K), commercial chemical product (P,U), listed in Minnesota Rules, part 7045.0135; or
- The waste is a polychlorinated biphenyl waste (PCB waste) at a concentration of 50 ppm or greater as described in Minnesota Rules, part 7045.0135 subpart 5.

The characteristics of a hazardous waste are:

- Ignitability: According to MN Rule 7045.0131 Subp 2, a liquid exhibits the characteristic of ignitability if it is an aqueous solution containing less than 24 percent alcohol by volume, and has a flash point less than 60 degrees Celsius (140 degrees Fahrenheit). The flash point test determines the lowest temperature at which a chemical ignites when exposed to flame. A non-liquid waste exhibits the characteristic of ignitability if it is capable, under standard temperature and pressure, of causing fire through friction, absorption of moisture, or spontaneous chemical changes and, when ignited, burns so vigorously and persistently that it creates a hazard. Test method 1030 from SW-846 is the most appropriate test for a non-liquid waste for which the ignitability characteristic is suspected.
- Corrosivity: A waste exhibits the characteristic of corrosivity if a representative sample of the waste is aqueous and has a pH less than or equal to 2.0 or greater than or equal to 12.5. The pH is a measurement that determines the acidity or alkalinity of a sample.
- Oxidizers: Any waste defined in the Code of Federal Regulations (CFR), Title 49, Section 173.115 as an oxidizer or any waste that readily supplies oxygen to a reaction in the absence of air.
- Reactivity: A waste is reactive if it is normally unstable; reacts violently with water; forms an explosive or toxic mixture with water; can easily be detonated or exploded; or contains quantities of cyanide gas or sulfide that could be released into the air at toxic levels when exposed to a pH range of 2.0 to 12.5;.
- Lethality: Lethality is a hazardous waste characteristic specific to Minnesota, and considers the toxicological, or poisonous, effects of the waste. In accordance with MN Rule 7045.0131, Subp 6, Lethality shall be determined by applying knowledge of materials and processes used, including reasonably available information on the lethality of the components of the waste. A waste is hazardous for the lethality characteristic when a representative sample exhibits any of the following:

  -an oral LD50 (rat) less than 500 mg/kg

  -a dermal LD50 (rabbit) less than 1000 mg/kg

  -an inhalation LC50 (rat) less than 2000 mg/m^3

  -an inhalation LC50 (rat) less than 1000 ppm for gasses and vapors

- Toxicity: The Toxicity Characteristic Leaching Procedure (TCLP) is a laboratory test where the concentrations of various constituents such as heavy metals, pesticides, and organic solvents are measured in an acid solution that has passed through a sample of the waste material. If the concentration of any constituents exceeds the maximum concentrations listed in MN Rule 7045.0131, Subp 8, the waste is hazardous.

There are exemptions to the hazardous waste classification for specific wastes, as listed in Minnesota Rules, part 7045.0120. Regulated hazardous waste must be disposed of at a permitted hazardous waste

disposal facility. Any material contaminated by a hazardous waste and is deemed to be a hazardous waste by the MPCA will not be managed by Dem-Con.

Dem-Con does not accept hazardous wastes, including household hazardous wastes and hazardous wastes from conditionally exempt generators. Anyone bringing in hazardous wastes for disposal will be directed to the Blue Earth County Household Hazardous Waste Facility, 651 Summit Ave, Mankato, Minnesota, or to contact their county solid waste officer.

3.0 WASTE EVALUATION PROCEDURES

3.1 Notification

Regular customers of the landfill receive notification of the types of materials that are and are not acceptable and any changes in policy. They are also informed of the policies for ensuring that only acceptable waste are hauled to and disposed of at the site.

New customers are notified of Dem-Con's policies and procedures as the new account is opened and/or via postings in the gatehouse or on the company website. Any changes to the original policy will be presented to the generator in the form of a notification letter as appropriate.

3.2 Evaluation of New Industrial Wastes

Dem-Con will evaluate each new waste type considered for disposal on a case-by-case basis. Procedures for evaluating certain specific waste types are included in Table 1 and the appendices. When a request for acceptance for a new waste type is received, Dem-Con will determine the acceptability using the following procedures, as necessary:

- Determine if the waste is construction, demolition or "demo-like" waste that can be accepted without further chemical evaluation. Acceptance of these wastes will be based on physical characteristics such as moisture, odor, dust and other potential nuisance conditions to ensure we are in compliance with our approved MPCA permit for the Facility.

- Request that a waste profile sheet be completed if applicable (See example in Appendix D)
- Determine if the waste is listed as an accepted exempt waste (Section 2.4) that can be accepted without further evaluation. Acceptance of these wastes will be based on physical characteristics such as moisture, odor, dust and other potential nuisance conditions to ensure we are in compliance with our approved MPCA permit for the Facility.
- Determine if the waste is addressed in the Table 1 as an acceptable type. Follow the evaluation procedures listed as appropriate.
- If the waste is a new waste type not covered in the above three categories, request information on the chemical makeup of the waste from the generator. Material Safety Data Sheets (MSDS's) and other product data should be obtained from the generator whenever possible. If waste contains any of the chemical parameters listed in Table 2, chemical analysis should be requested, which can be limited to the specific parameters in the waste. The TCLP test is the most definitive test and should be conducted if there is no data available or if the available data is from a different method and cannot be interpreted as being below the acceptance limits in Table 2. If the results of the chemical analysis are below the acceptance limits, the waste can be accepted for disposal pending a review of the physical characteristics.
- Concurrently with the request for chemical information, request information on the physical characteristics of the waste. Information on quantity, delivery method and frequency, physical state (dry, powder, solid, etc.), odor, flammability of the waste, and on the process that

produces it, should be considered. Determine if the waste can be safely managed and if special management procedures are needed.

- The final determination on acceptability of the waste will be based on comparisons with the acceptance limits (Table 2) and any potential concerns with the physical characteristics.

The need for laboratory testing will be determined on a case-by-case basis. Only the tests needed to accurately characterize the waste will be requested. Unknown waste or waste generated from an unknown process will be required to have complete TCLP analysis.

After it is determined that the waste is acceptable, the following additional steps must be completed:

- Develop procedures for managing the waste including inspection, handling, disposal, and any other conditions of acceptance.
- If the ISWMP needs to be modified, a revision will be prepared and submitted to the MPCA.
- Maintain generator file and waste acceptance records at the facility.

3.3 Review of Laboratory Data

The parameters listed Table 2 are ones for which there is a hazardous waste limit set by the USEPA. The TCLP test is the laboratory method used to determine if a material is hazardous or not, as it uses a leaching procedure to simulate landfill conditions. However, in most cases, the laboratory data provided by generators for solid materials will be for the total concentrations of parameters in the materials (reported in milligrams per kilogram, or mg/kg, or micrograms per kilogram, or ug/kg). The total concentrations will always be higher than the TCLP concentrations (reported as milligrams per liter, or mg/l).

As an initial comparison of total concentrations versus TCLP concentrations, divide the total concentration by 20. This "Rule of 20" is based on the fact that the weight of the fluid used for the leaching process in the TCLP test is 20 times the weight of the sample. Therefore, the theoretical maximum concentration in the fluid at the completion of the leaching process is 1/20 of the total concentration in the sample, assuming 100 percent of the parameters being tested leaches during the test. If the result of dividing the total concentrations by 20 is less than the acceptance limits, the waste is acceptable.

In practice, the ratio of the total concentration to the TCLP concentration is more than 20, since less than 100 percent leaches from the sample. If the result of dividing the total concentration by 20 is greater than the acceptance limit, the waste may still be acceptable. Request a TCLP test for the parameters in question, which will give a definitive result.

3.4 Evaluation of Wastes as Alternative Daily Cover

Some waste types, including contaminated soil, some foundry sands, C&D fines etc., are suitable for use as Alternative Daily Cover (ADC). ADC replaces native soil as daily/intermittent/intermediate cover. The waste must first be determined to be acceptable at the landfill. Then, the waste can be

evaluated for use as ADC if it can fulfill the function of native soil as a cover material, in that it must have the following characteristics:

- Be “soil-like”
- Able to control vectors, odors, and fire
- Is not subject to undue erosion or dust creation
- Does not pose a physical hazard to vehicles or workers.
- Must not be odorous
- Must not contain chemical parameters that exceed the ADC limits in Table 2

ADC will be placed in a 6-inch layer over active working areas, and cannot be used on external side slopes. See Table 1 and Appendix B for information on evaluation and management of materials as ADC. The action limits for ADC are different than the action limits for disposal. See Table 2 for the ADC action limits

3.5 Emergency Disaster Response Material Acceptance

In the event of a natural disaster such as but not limited to; tornado, high winds, flooding, fire, earthquake or act of terrorism Dem-Con Pilgrim Landfill may accept material per Dem-Con’s ISWMP.

4.0 MANAGEMENT OF INDUSTRIAL WASTES

Information on general procedures to manage industrial wastes is provided below. Additional information for certain specific wastes is included in Table 1. As new waste types are approved for acceptance, corresponding entries will be added.

4.1 General Inspection Procedure

Waste management is an important aspect of the operating procedures at Dem-Con Pilgrim Landfill. When a new account is established, customers are required to accept Dem-Con's policy of inspecting their loads for unacceptable wastes and to work with generators to eliminate those wastes from the loads. Various measures, such as providing generators with lists of acceptable and unacceptable wastes, providing two boxes at a site, one for acceptable and one for unacceptable wastes, are suggested for use by the haulers in complying with the Dem-Con acceptance policy. Haulers must walk around their loads and inspect them for unacceptable items after they have tipped. Dem-Con requires that haulers remove the entire load from the fill area if too many unacceptable items are found. This encourages haulers to work with generators to produce clean, acceptable waste streams. The site operators then inspect the load as they work the material into the current tipping area. Unacceptable items are removed when identified by the operator. Operators are trained and certified by the MPCA in waste identification and management procedures.

When unacceptable items are found in the waste after the hauler has left, they will be removed and stored in roll-off boxes prior to removal. The items will typically be removed to a recycler or appropriate disposal facility.

4.2 Disposal Procedure

All loads are checked in at the landfill gatehouse. In some cases, loads of industrial waste will be tracked using a Waste Manifest Form (see example Appendix C), which must be presented at check-in. The date, time, customer name and type and quantity of waste are documented. Dem-Con does not assume acceptance of materials until the load is inspected, spread and compacted, and additional material is placed over the top.

In general, industrial waste loads are disposed of in the same area and manner as demolition debris accepted at the landfill. This minimizes the size of the working face and allows for efficient inspection and compaction.

Tables

TABLE 1
INDUSTRIAL WASTE TESTING AND MANAGEMENT PROCEDURES
Dem-Con Pilgrim Landfill (SW-254)

Waste Type	General Parameters	TCLP Parameters				Notes	Disposal Method
		Metals	VOCs	SVOCs	Herbicides/ Pesticides		
Absorbents	Paint filter, flash point		X			Determine specific parameters on case by case basis	Codisposal
Asbestos						See Appendix A	See Appendix A
Ash - coal (power plants, boilers)		X				(In future cells w/MSW-equivalent liner only)	
- Wood/biomass		See notes				Ash from wood/biomass fueled power plants/boilers accepted with no testing. If mixed with coal or other fuels, review on a case-by-case basis.	Codisposal
Ash from fires		X				Add other parameters based on building contents. Ash from intentional fires (fire department training, etc.), new building construction sites, tree and pallet burning require no testing.	Codisposal
Contaminated Soils						See Appendix B (see Section 3.4 regarding use as ADC)	Codisposal/Alternative Cover
Mercury Contaminated C&D Debris		X				Evaluate as per the MPCA Program Management Decision Memo dated May 8, 2007 (Appendix E)	Codisposal
Dredged Materials	Copper, Arsenic, PAHs (carcinogenic and non-carcinogenic)					See Dredged Materials Section in Appendix B (see Section 3.4 regarding use as ADC)	Codisposal/Alternative Cover
Epoxy, Fiberglass and Urethane Resins		X	X			Review MSDS's for additional parameters to test	Codisposal
Foundry Wastes		X				Review process for additional parameters to test. Review for use as ADC (see Section 3.4).	Codisposal/Alternative Cover
Refractory Materials		X					Codisposal
Glass - Windshield and Specialty		Pb				Add Cr analysis for mirrored glass	Codisposal
Old Dumps	Molybdenum, iron, boron	X					Codisposal
Off-Spec Products							
- Adhesives		X	X	X			
- Wood treatment		X	X	X	X		
Paint Residue, Filters, Dust	Flashpoint	X	X			Review MSDS's for additional parameters to test	Codisposal
Wastewater Treatment Residues	PCBs, RCRA Metals, E-Coli/Fecal Coliform	X				Must be treated by process to reduce pathogens or not contain pathogens as listed in Mn Rule	Codisposal
Sandblasting Waste		X				If from inner wall of tank, add parameters based on contents	Codisposal
Shredder Fluff	PCBs	X				Evaluate per MPCA P.M.D.	Codisposal
Sludges - Paper Mill	Paint filter	X					Codisposal
- Ink	Paint filter, flash point	X	X				Codisposal
- Metal finishing	Reactive cyanide, Reactive sulfur, pH, flash point	X	X				Codisposal
Spent Carbon Filters		X	X			Determine specific parameters based on use of filters	Codisposal
Spilled Non-Hazardous Materials / Other Wastes	*	*	*	*	*	* Review MSDS and other information to determine sampling requirements	Codisposal
Storm Sewer Grit	PCBs, RCRA Metals	X				PCB's based on site specific conditions	Codisposal
Waste Traps from Garages	Metals, TPH, VOC, PCBs	X	X	X		Determine specific parameters on case by case basis	Codisposal

UPDATED APRIL 2026

TABLE 2 - ACCEPTANCE LIMITS

Dem-Con Pilgrim Landfill (SW-254)

Parameter	CAS No.	RCRA No.	Acceptance Limits for Disposal		Acceptance Limits for ADC
			TCLP (mg/l)	Total (mg/kg)(1)	Total (mg/kg)(3)
TCLP Metals					
Arsenic	7440-38-2	D004	5	100	9
Barium	7440-39-3	D005	100	2000	41000
Cadmium	7440-43-9	D006	1	20	23
Chromium	7440-47-3	D007	5*	100*	200
Lead	7439-92-1	D008	5	100	460
Mercury	7439-97-6	D009	0.2**	4**	3.1
Selenium	7782-49-2	D010	1	20	1200
Silver	7440-22-4	D011	5	100	1200
TCLP VOCs					
Benzene	71-43-2	D018	0.5	10	42
Carbon tetrachloride	56-23-5	D019	0.5	10	230
Chlorobenzene	108-90-7	D021	100	2000	700
Chloroform	67-66-3	D022	6	120	31
1,4-Dichlorobenzene	106-46-7	D027	7.5	150	200
1,2-Dichloroethane	107-06-2	D028	0.5	10	72
1,1-Dichloroethylene	75-35-4	D029	0.7	14	1200
Methyl ethyl ketone	78-93-3	D035	200	4000	28000
Tetrachloroethylene	127-18-4	D039	0.7	14	170
Trichloroethylene	79-01-6	D040	0.5	10	20
Vinyl chloride	75-01-4	D043	0.2	4	56
TCLP SVOCs					
o-Cresol *(2-methylphenol)*	95-48-7	D023	200	4000	8700
m-Cresol *(3-methylphenol)*	108-39-4	D024	200	4000	8700
p-Cresol *(4-methylphenol)*	106-44-5	D025	200	4000	3500
Cresol(2)		D026	200	4000	3500
2,4-Dinitrotoluene	121-14-2	D030	0.13	2.6	78
Hexachlorobenzene	118-74-1	D032	0.13	2.6	3.2
Hexachlorobutadiene	87-68-3	D033	0.5	10	17
Hexachloroethane	67-72-1	D034	3	60	150
Nitrobenzene	98-95-3	D036	2	40	380
Pentachlorophenol	87-86-5	D037	100	2000	46
Pyridine	110-86-1	D038	5	100	n/a
2,4,5-Trichlorophenol	95-95-4	D041	400	8000	18000
2,4,6-Trichlorophenol	88-06-2	D042	2	40	180
TCLP Pesticides/Herbicides					
Chlordane	57-74-9	D020	0.03	0.6	100
2,4-D	94-75-7	D016	10	200	n/a
Endrin	72-20-8	D012	0.02	0.4	54
Heptachlor (and its epoxide)	76-44-8	D031	0.008	0.16	4.2
Lindane	58-89-9	D013	0.4	8	0.17
Methoxychlor	72-43-5	D014	10	200	n/a
Toxaphene	8001-35-2	D015	0.5	10	16
2,4,5-TP (Silvex)	93-72-1	D017	1	20	n/a
Other Parameters					
PCBs			50 ppm		0 ppm
TPH (DRO, GRO, Oily Wastes)			no limit***		5,000 ppm
Flammability of a Solid (SW -846 & Test Method 1030)					

Notes: 1. Total concentration (mg/kg) is 20 times the mg/l value and is a guidance value. **UPDATED APRIL 2026**

If the guidance value is exceeded, run the TCLP test. The TCLP result takes precedent.

2. If o, m, and p-cresol cannot be separated, total cresol is used.

3. With the exception of arsenic, ADC acceptance is based on the Industrial SRVs as provided by the MPCA. Because natural arsenic concentrations are above the SRV, the background threshold value (BTV) is used.

**4. Wastes containing chromium which is exclusively or nearly exclusively trivalent chromium and do not generate hexavalent chromium are not D007 hazardous wastes if managed in non-oxidizing environments.*

*** 5. The acceptance limit for mercury contaminated soils and C&D debris is 10 ppm (or >10 ppm with written pre-approval from the MPCA) as per the MPCA Program Management Decision Memo dated May 8, 2007.*

**** 6. There is no limit on TPH, DRO, or GRO as long as materials meet all other criteria of the ISWMP such as free liquids, odor, etc.*

Appendix A

Asbestos-Containing Materials Guidance

ASBESTOS-CONTAINING MATERIALS GUIDANCE FOR LANDFILL DISPOSAL

Background

Asbestos is a mineral mined out of the ground for use in various products. The use in products has dropped significantly since the early 1970's when it was banned from further use in certain products. The bans were issued because long term exposure to airborne asbestos can result in respiratory diseases. Many of these products are now being removed as they wear out, or age.

From a landfill operator's standpoint, the primary hazard related to asbestos is possible inhalation, since asbestos is linked to lung diseases. Management of ACM is regulated by the United States Environmental Protection Agency (USEPA) under the code of federal regulations (CFR). Specifically, Title 40, section 61 (cited as 40 CFR 61), is a portion of the National Emission Standards for Hazardous Air Pollutants (NESHAP) that deals specifically with asbestos. There are requirements for all manner of asbestos related uses and management, including demolition and renovation (40 CFR 61.145), disposal procedures by generators (40 CFR 61.150), and requirements for landfill (40 CFR 61.154).

ACM is any material that contains at least 1% asbestos and any filters or packaging used during asbestos abatement. ACM comes in two forms; friable and non-friable. Friable ACM is any material that, when dry, can be crumbled or pulverized by hand pressure. Non-friable ACM cannot be crumbled or pulverized by hand pressure.

The NESHAP regulation divides non-friable ACM into two categories. Category 1 includes packings, gaskets, resilient floor covering and asphalt roofing products with at least 1% asbestos. Category 2 includes any non-friable ACM excluded from Category 1. Category 1 and 2 non-friable ACM is not subject to the NESHAP requirements, unless it has become friable. Dem-Con will accept only Category 1 and 2 non-friable ACM in the unlined areas. The lined areas of the landfill can accept Category 1 and 2 non-friable ACM as well as friable ACM..

For the remainder of this section, the requirements discussed refer to regulated ACM, which includes all friable materials and non-friable materials that may become friable. Information specific to category 1 and 2 non-friable materials is included in parentheses as necessary.

Manifesting and Documentation

EPA regulations require that, if a facility which is being demolished or renovated that has a minimum of 260 linear feet of ACM on pipes, 160 square feet of ACM on facility components, or 35 cubic feet of ACM from facility components which could not previously be measured, notification must be made to the regional program administrator of the demolition or renovation activity. If this notification is required, all shipments of ACM to the landfill must have a waste shipment record, or manifest. Dem-Con requires that all shipments have a manifest regardless of the quantity involved. See Appendix C for an example of a manifest form available for use by haulers.

Dem-Con will maintain shipping records for a period of 2 years in accordance with NESHAP regulations. Dem-Con will maintain until closure a record of fill locations and elevations, as well as volume of ACM

disposed. Documenting ACM disposal locations is important to ensure that the ACM is not disturbed during any future excavations. If separate cells are used, the horizontal and vertical location of ACM will be defined by the most recent airspace survey preceding ACM placement and the first airspace survey after ACM placement.

Documentation of the locations of ACM disposal will be submitted with the closure report for the facility. The documentation will also be submitted to the Blue Earth County Recorder as required as part of the final closure process.

Disposal Requirements

The following procedures must be followed for proper delivery and inspection of regulated ACM loads:

- Advance notification of the delivery of ACM loads is required.
- The regulated ACM must be sealed in leak-tight containers, or wrapping (≥ 6 mil) plastic bags or wrapping).
- A manifest must accompany every load, and the volume reported must be accurate to within 10% of the volume of the load. The generator (or authorized agent) and hauler must sign the manifest. (For Category 1 & 2 non-friable ACM, provide 1 manifest per day per job.)
- The manifest must be signed after verification of the load. The appropriate copy must be mailed to the Generator within 30 days. The manifest must be retained by the landfill for a minimum of two (2) years.
- The material must be shipped in such a manner (e.g., open top box, compactor box with inspection ports, drums) that will allow verification of proper packaging, labeling, and volume.
- A loading sign must be used during loading and unloading, worded as follows:

Danger
Asbestos Dust Hazard
Cancer and Lung Disease Hazard
Authorized Personnel Only

- If any unacceptable waste is observed, it will be the sole responsibility of the hauler to remove said waste. If the rejected waste is regulated asbestos, the rejection will be noted on the manifest and a copy sent to the MPCA. The hauler will immediately contact a certified asbestos abatement contractor to properly contain and remove ACM if necessary. Dem-Con must notify the MPCA within 48 hours of a hauler tipping unacceptable regulated ACM at the landfill. All rejected loads will be recorded by Dem-Con on a load rejection report, including the date, volume, hauler, ticket number and reason for rejection.
- The hauler is responsible for handling and unloading of all non-friable ACM. The ACM must be handled in a manner that will prevent visible emissions from the waste material. The hauler is responsible for training their personnel so they are properly informed of the health and safety issues associated with ACM.
- The location, depth, area and volume of ACM disposed of in the landfill must be recorded.
- Asbestos must be covered with six (6) inches of compacted, non-asbestos containing material or soil as soon as practical, but no later than the end of the working day. The ACM will be covered prior to compaction to prevent the release of asbestos fibers as well as to protect the waste so that

non-friable ACM does not become subject forces that will crumble or pulverize it, converting it to a friable state.
- No ACM will be placed within 5 feet of the base, side slope or final grade to ensure long-term protection.

A separate cell may be established at a location apart from the active working face. ACM will be dumped as described above. A minimum of six (6) inches of non-asbestos containing material or soil will be placed over the ACM as soon as practical, but no later than the end of the working day. The location designated for ACM disposal will move as landfilling progresses over the site.

Emergency Procedures

Emergency situations include, but are not limited to, the disturbance of previously buried ACM and discovery of unacceptable or undocumented ACM at the landfill. In the event of an emergency situation, a certified asbestos abatement contractor will be immediately notified. At a minimum, the area will be secured to keep landfill personnel and haulers away until the abatement contractor arrives. Under no circumstances will Dem-Con personnel handle or package any ACM.

Dem-Con personnel are trained in the facility's ACM management procedures. The procedures will be reviewed on a routine basis during regular site safety meetings.

In the event it becomes necessary to disturb buried ACM, the following procedures will be followed:

- Written notification, including a project description and schedule of proposed activity, will be submitted in writing to the MPCA a minimum of 45 days in advance. The advance notice period may be waived if the MPCA agrees that an emergency condition exists at the landfill.
- A certified asbestos abatement contractor will be on-site throughout the project to observe work and ensure that all proper regulations are followed.

Appendix B

Contaminated Soils

CONTAMINATED SOILS

Background

Soils contaminated with a variety of chemicals are acceptable in the lined area of the landfill. For the purposes of evaluation for acceptance, contaminated soils can be divided into two categories; petroleum contaminated soils and soils contaminated with other chemicals.

Evaluation of Laboratory Data

The analysis conducted on soils is typically for total concentrations, reporting in mg/kg or ug/kg. To evaluate if soil is acceptable, convert the results to mg/kg (if necessary), and see if the results are less than 20 times higher than the acceptance limits. If so, the soil is acceptable. If some parameters are more than 20 times the acceptance limits, request a TCLP test. Typically, the ratio of the total concentration to TCLP concentration is greater than 20, so the soil still may be acceptable pending the TCLP results. When applicable, if multiple samples of the totals analysis exceed the rule of 20, TCLP should be done for the highest 30% of the total samples that exceed this rule of 20 for any contaminant. There should be a minimum of 3 TCLP samples done for each project that has multiple exceedances of the rule of 20.

Analytical Requirements - Petroleum Contaminated Soils

These are soils from sites with contamination from various petroleum products at levels that are too high to be used as fill or to remain on-site. The testing required is based on the type of product present in the soil. It is important to determine the source of the contamination and the history of operations at the location as part of the evaluation process. The testing requirements for each source of contaminated soil should be evaluated on a case-by-case basis, as follows:

Analytical Requirements – Petroleum Contaminated Soil

PRODUCT	TEST REQUIRED
Regular Gasoline or Aviation Gasoline	VOCs, GRO, lead
Unleaded Gasoline	VOCs, GRO
Unused Product (Fuel Oil, Motor Oil, Diesel Fuel, Kerosene, Jet Fuels, Mineral Oil/Spirits, Crude Oil, Stoddard Solvents)	VOCs, DRO, PAH*
Used Oil	VOCs, DRO, RCRA metals, PCBs, PAHs
Hydraulic Fluids	VOCs, DRO, PAH*, PCB**
Unknown	Case by case
All Products	Flashpoint*, paint filter liquids test*

Notes:

** Optional based on-site conditions or soil moisture condition*

***For hydraulic fluid used in elevators, subject to high heat prior to the 1980s*

Analytical Requirements – Other Contaminated Soils

These are soils from sites with contamination from products or substances other than petroleum. The testing required is typically based on the past use of the site. It is important to determine the source of the contamination and the history of operations at the location as part of the evaluation process. The testing requirements for each source of contaminated soil should be evaluated on a case-by-case basis, as follows:

Analytical Requirements – Other Contaminated Soil

SOURCE	TESTS REQUIRED
Plating shops	RCRA metals, pH
PCB sources (transformers, etc.)	RCRA metals, total PCBs
Pesticides	TCLP pesticides
Used batteries	Lead
Unknown	Case-by-case

Testing Frequency

The number of tests recommended based on the estimated volume of soil is shown below.

Frequency of Testing

VOLUME (CY)	NUMBER OF TESTS
0 – 500	1
500 – 1,000	2
1,000 - 2,000	3
2,000 – 4,000	4
Each additional 2,000	1 additional

Use of Contaminated Soils as Alternative Daily Cover

Soil can often be used as alternative daily cover (ADC), depending on the physical characteristics and contaminant concentrations. A specific set of action limits is used to determine if soils or other suitable materials can be used as ADC, as shown on Table 2. Soil must meet the ADC actions limits and have the appropriate characteristics discussed in Section 3.4.

Soil accepted as ADC will be placed in a 6-inch layer over exposed waste and cannot be placed on external sideslopes.

Analytical and Sampling Requirements for Dredged Materials

Dredged materials include material that is excavated at or below the Ordinary High-Water Level of water basins, watercourses, public waters, or public waters wetlands, as defined by Minn. Stat. 103G.005. The testing and sampling of these soils will be performed in accordance with the Minnesota Pollution Control Agency Managing of Dredged Materials (MPCA Dredged Materials) document dated June 2009 and as amended from time to time.

Dredged materials removed from municipal or urban stormwater systems will follow the sampling requirements detailed in the Modified Characterization and Permit Approach for Urban Stormwater Ponds section of the MPCA Dredged Materials document. This section requires a minimum baseline sampling for Copper, Arsenic, and Polycyclic Aromatic Hydrocarbons (PAHs), both carcinogenic and non-carcinogenic. However, because the land use within the drainage area of a stormwater pond can be unique, additional sampling may be required based on the risk assessment approach provided in Chapter 3 of the MPCA Dredged Materials document.

The dredged materials may be used as ADC if they meet the ADC action limits listed in Table 2 and have the appropriate characteristics discussed in Section 3.4 of the ISWMP. Soil accepted as ADC will be placed in a 6-inch layer over exposed waste and cannot be placed on external side slopes. All dredged material, whether accepted as ADC or not, must pass the paint filter free liquids test.

Disposal and Sampling Requirements for Non-hazardous Mercury Contaminated Soils

Mercury contaminated soils will be acceptable in the lined area of the Dem-Con Pilgrim landfill in accordance with the May 8, 2007 MPCA Program Management Decision Memo regarding the disposal of mercury-contaminated soils and renovation/demolition debris in Minnesota landfills (Appendix E). These soils will be tested for mercury as well as other constituents as determined by a case specific evaluation of the project. The analytical results for the soils will be compared with the waste acceptance limits listed in Table 2. The waste acceptance limits and disposal practices for mercury contaminated soil in the lined landfill shall be in accordance with the following parameters:

- Waste with total levels of 0-4 ppm. No special handling requirements.
- Waste with total levels of 4-10 ppm, if immediately covered with six (6) inches of soil upon acceptance.
- Waste at total levels >10 ppm may be acceptable with written pre-approval from the MPCA, on a case-by-base basis, depending on volume and concentration. Additional requirements include:
    - Transporting vehicles must be lined and the waste covered with polyethylene sheeting;
    - The waste must be immediately covered with six (6) inches of soil upon acceptance.

Only non-hazardous mercury-contaminated soils and construction/demolition debris that meet the above parameters and are free of elemental or free mercury will be accepted at the Dem-Con Pilgrim landfill.

Appendix C

Special Waste Manifest Form

DEM-CON

WASTE MANIFEST FORM
MPCA PERMIT SW-254

Manifest #:

GENERATION

Work Site Name: Work Site Address: City, State, Zip: Contact Name: Contact Phone #:	Waste Disposal Site **Dem-Con Landfill - Pilgrim** **57032 231st Lane** **Mankato, MN 56001** **952-445-5755**
Contractor Name: Street Address: City, State, Zip: Contact Name: Contact Phone #:	Responsible Agency **MPCA** **520 Lafayette Road North** **St. Paul, MN 55155** **(651) 296-6300**
BILL TO #: **PROFILE #:**	Additional Generator Information:

Description of Materials:	Total Quantity: ☐ CY ☐ TON	Special Handling/Additional Info:

Generator/Contractor Certification: I hereby declare that the contents of this consignment are fully and accurately described above by proper shipping name and are classified, packed, marked and labeled, and are in all respects in proper condition for transport by highway according to applicable international and national government regulations. I further certify that the contents of this consignment do not contain hazardous waste as defined in 40 CFR Part 261 or MN Rule Chapter 7045.

Signature:	Date:
Printed Name:	Title:

TRANSPORTATION

TRANSPORTER INFORMATION

NAME ON TRUCK:	**TRUCK NUMBER:**

TRANSPORTER 1 (Acknowledgement of receipt of materials)

Company Name:	Company Address:	Company Phone #:
Driver's Name (Printed):	Signature:	Date:

TRANSPORTER 2 (Acknowledgement of receipt of materials)

Company Name:	Company Address:	Company Phone #:
Driver's Name (Printed):	Signature:	Date:

FACILITY

FOR DEM-CON ONLY

Discrepancy Indication Space:

Waste Disposal Site Owner or Operator: Certification of materials covered by this manifest except as noted in "Discrepancy Indication Space"

Print Name:	Signature:	Date:

COMPLETE TWO COPIES FOR EACH LOAD

DEM-CON: ONE COPY | TRANSPORTER: ONE COPY

Appendix D

Waste Profile Sheet

DEM-CON COMPANIES

DEM-CON PILGRIM LANDFILL
WASTE PROFILE SHEET

CUSTOMER JOB #:

DEM-CON PROFILE #:

Generator Information		Customer/Hauler Information ☐ Same as Generator	
1. Generator Name		8. Customer Name	
2. Site Address		9. Customer Address	
3. City, State, Zip		10. City, State, Zip	
4. Contact Name		11. Contact Name	
5. Telephone		12. Telephone	
6. Fax		13. Fax	
7. Email		14. Email	

Waste Stream Information

1. Waste Name:
2. Description of facility/site history:
3. Describe the process and source of the generated waste:
4. Typical Color(s):
5. Strong Odor: ☐ Yes ☐ No If yes, describe:
6. Physical State at 70°F: ☐ Solid ☐ Liquid ☐ Powder ☐ Semi-Solid or Sludge ☐ Other:
7. Waste Composition: ☐ Homogeneous/Uniform ☐ Non-Homogeneous or Layered
8. Water Reactive? ☐ Yes ☐ No If yes, describe:
9. pH Range: ☐ ≤ 2 ☐ 2.1 - 12.4 ☐ ≥ 12.5 ☐ N/A (solid) ☐ Actual:
10. Liquid Flash Point: ☐ < 140°F ☐ ≥ 140°F ☐ N/A (solid) ☐ Actual:
11. Flammable Solid: ☐ Yes ☐ No

12. Waste Composition and Constituents (List all known or attach document):	%	ppm

Waste Stream Properties (Answer ALL questions)

13. Is this waste a stream that contains any D, F, K, U or P listed as hazardous waste; either in pure form, as a mixture or treatment residue?	☐Yes ☐ No	20. Does this waste stream contain PCB material? If yes, concentration: ppm	☐Yes ☐ No
14. Is this waste explosive?	☐Yes ☐ No	21. Does this waste contain radioactive material?	☐Yes ☐ No
15. Is this waste sewer sludge?	☐Yes ☐ No	22. Does this waste contain absorbents?	☐Yes ☐ No
16. Is this waste demolition & /or construction debris?	☐Yes ☐ No	23. Does this waste stream contain fuming acids?	☐Yes ☐ No
17. Is this putrescible waste?	☐Yes ☐ No	24. Does this waste contain oxidizers?	☐Yes ☐ No
18. Is this waste lethal (by Minn. Rules 7045.0131 Subp. 6)?	☐Yes ☐ No	25. Does this waste contain asbestos?	☐Yes ☐ No
19. Does this waste contain untreated, regulated, medical or infectious waste?	☐Yes ☐ No		

26. Sample Information (check ALL that apply):
☐ Sample submitted with profile ☐ Laboratory analysis submitted ☐ Material Safety Data Sheet Submitted ☐ Other:

Waste Volume and Shipping Information

Check One: ☐ One Time Event ☐ Ongoing Waste Generation
Estimate Annual Quantity _____ ☐ Tons ☐ Cubic Yards ☐ Other:
Shipping Frequency _____ Units Per ☐ Month ☐ Quarter ☐ Year ☐ One Time ☐ Other:
Method of Shipment ☐ Roll-off ☐ End Dump ☐ Other:
DOT Hazardous Material? ☐ Yes ☐ No

Certification of Non-Hazardous Waste & Approval Conditions

I hereby certify that the information submitted in this profile and all attached documents contain true and accurate description of the waste material and that the waste is nonhazardous as defined in Title 42, United States Code Section 6903 and Minnesota Statute Section 116.06, Subdivision 11. Furthermore, I certify the following: that analytical data attached pertaining to the profiled waste was derived from testing a representative sample in accordance with 40 CFR 261.20 (c) or equivalent rules; that I am an agent signing on behalf of the Generator and have been delegated this authority by the generator; that any changes that occur in the character of the waste (i.e. changes in the process or new analytical) will be identified by myself or the Generator and disclosed to Dem-Con Companies prior to shipment of the waste to Dem-Con Companies. I understand that any changes in the character of the waste that are not reported to Dem-Con Companies in writing prior to shipment of the waste will invalidate this approval. I, on behalf of the generator, hereby agree to fully indemnify Dem-Con Companies for any damages and/or costs incurred as a result of any misrepresentations or falsifications made herein.

Signature | Printed Name | Title | Date

FOR DEM-CON USE ONLY

Approval Decision: ☐ Approved ☐ Not Approved
Management Method: ☐ Landfill ☐ Recycling Processing ☐ Off-Site Transfer ☐ Other:
Management Facility Precautions, Special Handling Procedures or Limitations:
☐ Shall not contain free liquid ☐ Approval Number must accompany each shipment
☐ Shipment must be scheduled into disposal facility ☐ Waste Manifest must accompany each load

Dem-Con Authorization Name/Title | Signature | Date

Appendix E

MPCA Program Management Decision Memo

Disposal of Mercury-Contaminated Soils and Renovation/Demolition Debris in Minnesota Landfills

Minnesota Pollution Control Agency

PROGRAM MANAGEMENT DECISION MEMO

ISSUE: Disposal of mercury-contaminated soils and renovation/demolition debris in Minnesota landfills

EFFECTIVE DATE: 5/8/2007

REPLACES: Program Management Decision Memo "Disposal of Mercury-contaminated Soils in Minnesota Landfills," effective March 1, 2004

DECISION

Non-hazardous mercury-contaminated soils and construction/demolition debris free of elemental mercury from products subject to regulation under Minn. Stat. 115A. 932 can be accepted in lined Minnesota landfills as part of an approved industrial solid waste management plan (ISWMP) within the following parameters:

- Waste with total levels of 0-4 ppm. No special handling requirements.

- Waste with total levels of 4-10 ppm, if immediately covered with six (6) inches of soil upon acceptance.

- Waste at total levels >10 ppm may be acceptable with written pre-approval from the MPCA, on a case-by-case basis, depending on volume and concentration. Transporting vehicles must be lined, and the waste covered, with polyethylene sheeting. The waste must be immediately covered with six (6) inches of soil upon acceptance. This approval will be considered on a case-by-case basis. In order to determine mercury emission levels during waste acceptance, the MPCA may monitor emissions before, during, and after waste acceptance at a landfill. In addition, the MPCA will examine landfill-gas monitoring data to ascertain whether increased amounts of mercury are being vented. Based on the results, it is possible that waste at total levels >10 ppm may not be allowed at landfills with active gas extraction.

This decision provides for disposal in appropriate Minnesota landfills of soils and construction/demolition debris contaminated by mercury at concentrations which are non-hazardous. This decision does not apply to wastes other than soils and construction/demolition debris. For example industrial wastes such as ash are not subject to this policy. This policy does not apply to materials which have Standing Beneficial Use Determinations, or those that have received a Case Specific Beneficial Use Determination. This allowance does **not** include elemental mercury or materials contaminated with free mercury, which must be managed as hazardous waste.

BACKGROUND

The recent history of changing policies governing mercury disposal has led to confusion among regulators, local units of government, waste generators, consultants, and landfill operators. As a result, the MPCA is adopting one policy for mercury-contaminated soils and construction/demolition debris. In addition, past policies were extremely conservative, which often led to the transportation of waste out of state, for disposal in similarly, or even less-protective, disposal environments. This policy includes special waste handling procedures to reduce potential emissions, based upon the mercury levels in the waste.

Disposal of wastes contaminated by mercury must be approved of within a landfill's ISWMP. In evaluating requests for approval, solid waste staff should consider a range of potential risk factors, including, but not limited to, releases due to methylation of mercury, vaporization during disposal and through gas vents, and leaching into ground water. Written request by the landfill, and approval by the MPCA, must be received prior to acceptance of waste covered by this policy.

In some circumstances, it may be possible to segregate wastes contaminated at high levels from those that are not, reducing the amount of material which must be disposed of out of state. All such determinations should be made in consultation with MPCA staff.

A formal letter outlining this final policy, including the website link, will be immediately sent to landfills and County Solid Waste Administrators. MPCA remediation, solid waste, and hazardous waste program staff will implement this policy change when advising outside parties of appropriate disposal options for mercury-contaminated waste.

RELEVANT STATUTES AND RULES

- Minn. Stat. § 115A.932: Prohibition of disposal of mercury or mercury-containing devices in Minnesota landfills;
- Minn. Rules, chapter 7045.0120, subpart 1, article F: Exempts disposal of coal ash from governance by hazardous waste rules; and
- Minn. Rules, chapter 7001.3300: industrial solid waste management plans.

RATIONALE

The following is a summary of historical policies governing mercury-contaminated waste:

Minnesota Statutes, section 115A.932 restricts disposal of mercury, in some forms and from certain sources, in Minnesota landfills. At the same time, some of the sites being redeveloped around the state contain mercury contaminated soils or materials within

structures may be contaminated from past improper disposal practices. In some cases, these soils or materials may need to be removed from the site, depending upon the levels of contamination and the planned land and site uses. In addition, routinely generated industrial wastes such as foundry sand, wastewater sludge, and slag can contain residual mercury.

How should such materials be disposed of, and under what circumstances should the MPCA require that such material be shipped out of state for disposal? There are also ethical and environmental issues regarding whether it makes sense to ship Minnesota's mercury contaminated waste to another state, if it might be managed safely here.

MPCA staff often had interpreted Minnesota Statutes, section 115A.932 to mean that essentially no mercury could be disposed of in Minnesota landfills, regardless of its nature or source, and that the mercury contaminated material must be disposed of in accordance with Minnesota Rules, chapter 7045.

It appears, however, that Minnesota Statutes, section 115A.932 had been interpreted too broadly, to prohibit disposal of materials it was not intended to prohibit. At the time the statute was developed, the Legislature was concerned about potential mercury contamination from mercury-containing devices, mercury-containing compounds, or bulk mercury, being intentionally placed in solid waste for disposal. It can be argued that the legislature did not intend for the statute to apply, for example, to soils contaminated by historical use of coal ash as fill material.

This broad reading of the law has led to confusing and conflicting requirements for disposal practices. On the one hand, the MPCA sent a memo to landfill operators (June 1, 2000) stating that materials which "passed" a TCLP test may be disposed of in a landfill, and that this level for mercury (0.2 ppm in the TCLP leachate) is used in industrial solid waste management plans as a cut-off for acceptance of mercury-containing materials. Again, the concern was mainly over acceptance of bulk mercury or mercury-containing devices and debris.

A leaching test is simply a method for determining whether a concentration of a contaminant in soils or other materials are high enough that the contaminant can leach out of the material at concentrations that exceed thresholds established by the United States Environmental Protection Agency (EPA). Therefore, the test helps determine whether the material should be evaluated and handled as a hazardous waste.

On the other hand, an MPCA remediation program had begun using a concentration of 0.7 ppm in soil (rather than in leachate) as the criterion for determining whether to ship the soil out of state for disposal in a hazardous waste landfill. At that time, this level corresponded to the MPCA's risk-based "soil reference value" (SRV) for residential land use. It may be argued, however, that using the 0.7 ppm concentration as the cut-off level for sending such soil out of state for disposal did not necessarily make sense. SRVs represent conservative screening levels up to which contamination might safely remain in place under certain exposure conditions. Establishment of final cleanup levels may

involve reducing on-site concentrations, altering exposure conditions, or some combination of the two. The 0.7 ppm level had been developed solely to be used as a risk screening level for mercury contamination in soils in a setting to be redeveloped for residential use. So, it was possible to build a house or a child's play area on soils containing mercury at concentrations up to 0.7 ppm.

The MPCA's "Risk-based Guidance" documents from which this level was drawn also suggested that soils with mercury contamination of up to 2 ppm might remain in place under commercial or industrial land-use scenarios. Therefore, using 0.7 ppm as the criterion for determining whether to ship soils from some sites out of state (not allowing them to be placed in landfills) could result in the paradox of allowing soils at other sites contaminated at concentrations of up to at least 2 ppm to remain in place beneath new developments. It stands to reason, then, from a risk standpoint, that soils contaminated at concentrations at least somewhat higher than 0.7 ppm might safely be placed in lined landfills, where even long-term exposures would be quite limited.

In order to recommend a disposal cut-off level for concentrations of mercury in soils, in March of 2004, a Program Management Decision Memo was issued which allowed soils contaminated with mercury at concentrations of up to 4 ppm to be disposed of in municipal solid waste landfills (and possibly some other types), because 4 ppm was a pragmatic benchmark that should protect human health from an air emission pathway, and yet did not unduly restrict management of soils contaminated by ash and other waste often encountered at cleanup sites.

This approach represented a reasonable compromise among the current range of disposal practices involving mercury contaminated soils. For example, the MPCA currently allows coal ash (commonly a source of mercury in soils from redevelopment sites) to be spread as a portion of the daily cover on municipal solid waste (MSW) landfills. In addition, there are landfills in Minnesota operated by utility companies specifically for disposal of coal ash. Indeed, Minnesota already approves application of soils with mercury concentrations significantly higher than those recommended in this policy (17 ppm) to agricultural lands as a soil amendment. Moreover, disposing of contaminated soil in an appropriate landfill is essentially moving an old, unmanaged release to be managed in safer, more controlled conditions, rather than creating a new release of mercury. This decision applied to mercury-contaminated soils only.

In late 2005, a request for a reevaluation of MPCA policy was received. The request was made after two large projects involving renovations of buildings that were contaminated from past, improper disposal of mercury and/or mercury-containing devices were undertaken. The request stated that using the Residential SRV as a disposal standard was too stringent, and caused an economic hardship due to increased costs from transporting debris out of Minnesota. The MPCA's reevaluation of the policy suggested that using the Residential SRV for mercury disposal was indeed too stringent a standard when applied to controlled disposal of waste in a lined landfill. The MPCA examined the totals data from one of the above projects and the vast majority of the waste fell below 1.5 ppm, which is the current Industrial SRV. That appeared to be a reasonable threshold. As a result, the MPCA decided that it would allow disposal of mercury-contaminated

renovation/demolition debris in a lined landfill at levels up to 1.5 ppm. This was communicated to landfills and County Solid Waste Administrators in a letter dated July 14, 2006.

In September of 2006, the MPCA was approached regarding disposal of large amounts of mercury-contaminated soil that were being generated as a result of remediation of a salvage yard. A large amount of the soil exceeded the 4 ppm threshold allowance, so was therefore being disposed of out of state. The MPCA learned it was being disposed of in a biopile in Wisconsin, which is a less protective environment than a lined landfill. Additional data provided showed completed and pending soil remediation projects totaling over 85,000 cubic yards of contaminated soil that exceeded 4 ppm, that would be disposed of outside of Minnesota.

The MPCA concludes that with special handling at landfills, based on totals levels, mercury-contaminated wastes can be safely accepted within Minnesota. The Minnesota Department of Health was consulted regarding this policy, and found it to be reasonable.

APPROVAL

I have reviewed this management decision and I concur.

Signed: Tim Scherkenbach
Date: 5/8/07

Tim Scherkenbach
Assistant Commissioner

Signed: James L. Warner
Date: 5/8/07

James L. Warner, P.E.
Director, Industrial Division

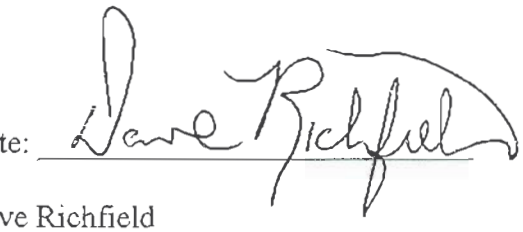
Signed: Lisa J. Thorvig
Date: 5/8/07

Lisa Thorvig
Director, Municipal Division

Signed: Gary Pulford
Date: 5/8/07

Gary Pulford
Manager
Policy, Local Government Assistance and Solid Waste Section

Signed: _____

Date: 

Dave Richfield
Supervisor, Land Policy Unit
Policy, Local Government Assistance and Solid Waste Section

Mercury-catalyzed Polyurethane Flooring and Mercury-contaminated Demolition Debris and Soil

Disposal in Minnesota

Mercury is an element that can cause harmful environmental and health effects when disposed of improperly. Because of previous practices, mercury contamination can be found in some soils and demolition debris in Minnesota. In one particular application, mercury was used as a catalyst in some types of synthetic flexible flooring between the 1960s and early 2000s. This flooring, called mercury-catalyzed polyurethane flooring (MCPF), is most commonly found in athletic facilities.

Normally, mercury and mercury-contaminated wastes are prohibited from land disposal in Minnesota under regulations of the Minnesota Pollution Control Agency (MPCA). However, the MPCA will allow some such wastes to be disposed in Minnesota landfills under the conditions discussed in this fact sheet.

Do I have MCPF in my building?

MCPF was most commonly used as a poured-in-place, rubber-like flooring and could be tinted to any color. It was made by many manufacturers under multiple brand names. The only way to determine whether a particular flooring contains mercury is to test a representative (full-thickness) sample using a reputable testing laboratory. The Minnesota Department of Health (MDH) administers a voluntary laboratory certification program. Although you are not required to use a certified laboratory, the MDH or MPCA can help you locate one if you choose.

Must I remove MCPF if I find it?

While Minnesota laws do not require you to remove MCPF, it may continue to release harmful gaseous mercury into a building's air for decades after installation. MDH has published indoor air quality guidance for mercury at http://www.health.state.mn.us/.

Mercury vapor from MCPF can penetrate and contaminate other materials, such as plastic and wood. Attempting to cover or seal MCPF instead of removing it may create more contamination and cost.

Ensure that anyone who may be exposed to the flooring or debris during removal (including employees, contractors, and students) is properly protected from exposure to mercury.

How must I dispose of suspected MCPF and related debris?

Before disposing of suspected MCPF and related debris, test representative samples of the flooring and any other debris for both total and leachable mercury content. The type of disposal allowed for the waste will depend on both of these values and is shown in Table 1 on the following page. Total mercury should be determined in parts per million (ppm) and leachable mercury in milligrams per Liter (mg/L).

Regardless of whether the waste is disposed of in a solid or hazardous waste landfill, ensure that the landfill is permitted to accept the waste and that you have performed any pre-treatment required by the receiving landfill. Additionally, transport the waste in a totally enclosed manner, such as in a truck bed lined and covered with plastic sheeting.

In addition to MCPF and related debris, soils contaminated by naturally-occurring mercury or historical practices, such as the use of coal combustion residuals as fill, may also be disposed according to Table 1.

Table 1: Allowed management of MCPF, related debris, and soils in Minnesota

Total mercury content	Non-hazardous waste (< 0.2 mg/L leachable mercury)	Hazardous waste (≥ 0.2 mg/L leachable mercury)
≤ 4 ppm total mercury	Minnesota solid waste landfill or out-of-state solid waste landfill ▪ No special handling required	Out-of-state hazardous waste landfill or treatment facility
4 < 10 ppm total mercury	Minnesota solid waste landfill or out-of-state solid waste landfill ▪ If in Minnesota, immediate coverage with 6 inches of soil	
10 - 1000 ppm total mercury*	Minnesota solid waste landfill or out-of-state solid waste landfill ▪ If in Minnesota, immediate coverage with 6 inches of soil and landfill maintains location & quantity records ***MCPF only:*** No MPCA preapproval needed ***All other related debris & soil:*** Must be preapproved by MPCA	Out-of-state hazardous waste landfill or treatment facility ▪ Land Disposal Restriction (LDR) may apply
> 1000 ppm total mercury	Out-of-state solid waste landfill	

More information

Guidance and requirements in this fact sheet were compiled from Minnesota Statutes, Chapters 115A and 116, and Minnesota Rules, Chapters 7035 and 7045, and incorporate regulatory interpretation decisions made by the MPCA on September 3, 2013. To review Minnesota Statutes and Rules, visit the Office of the Revisor of Statutes at https://www.revisor.mn.gov/pubs.

The MPCA's Small Business Environmental Assistance Program (SBEAP) can provide free, confidential compliance assistance. The Minnesota Technical Assistance Program (MnTAP) can help reduce your waste generation. Report all hazardous waste incidents to the Minnesota Duty Officer.

Metro County Hazardous Waste Offices

Anoka 763-422-7093
Carver 952-361-1800
Dakota 952-891-7557
Hennepin 612-348-3777
Ramsey 651-266-1199
Scott 952-496-8475
Washington 651-430-6655
Websites ..... http://www.co.[county].mn.us

Minnesota Technical Assistance Program

Toll free 1-800-247-0015
Metro 612-624-1300
Website ..... http://www.mntap.umn.edu

Small Business Environmental Assistance

Toll free 1-800-657-3938
Metro 651-282-6143
Website ..... http://www.pca.state.mn.us/sbeap/

Minnesota Pollution Control Agency

Toll free (all offices) 1-800-657-3864
Brainerd 218-828-2492
Detroit Lakes 218-847-1519
Duluth 218-723-4660
Mankato 507-389-5977
Marshall 507-537-7146
Rochester 507-285-7343
St. Paul 651-296-6300
Willmar 320-214-3786
Website ..... http://www.pca.state.mn.us

Minnesota Duty Officer

Toll free 1-800-422-0798
Metro 651-649-5451
Website ..... https://dps.mn.gov/divisions/bca/

Minnesota Department of Health

Toll free 1-888-345-0823
Metro 651-201-5000
Website ..... http://www.health.state.mn.us/

Appendix F

Liner Equivalency Calculations

Date: 5/23/12
By: Dan Riggs
Client: Dem-Con

LINER EQUIVALENCY CALCULATIONS – Confining Pressure

Objective:
Determine the amount of waste needed to achieve a hydraulic conductivity of 3 x 10^{-9} cm/sec on the geosynthetic clay liner, which occurs at 10 psi confining pressure.

Basis:
Vertical pressure on the liner can be expressed as:

$$(\gamma_{sand,sat} * d_{sand,sat}) + (\gamma_{sand} * d_{sand}) + (\gamma_{waste} * d_{waste}) = \sigma_{GCL}$$

or

$$d_{waste} = \frac{\sigma_{GCL} - (\gamma_{sand,sat} * d_{sand,sat}) + (\gamma_{sand} * d_{sand})}{\gamma_{waste}}$$

Where: γ = unit weight of material
d = depth of material
σ = pressure on material

Assumptions

1.) Leachate = 1 ft (depth permitted on liner)
2.) Thickness of sand = 2 ft
3.) Unit weight of sand above leachate, γ_{sand} = 1.5 tons/cu. yd = 111.11 pcf
4.) Unit weight of leachate = unit weight of water = 62.4 pcf
5.) Unit weight of sand below leachate, $\gamma_{sand,sat}$ = 111.11 pcf – 62.4 pcf = 48.71 pcf
6.) Unit weight of waste = 1.3 tons/cu. yd = 96.3 pcf

Depth of waste needed:

$$d_{\text{waste}} = \frac{10 \text{ psi} * 144 \frac{\text{psf}}{\text{psi}} - (48.71 \text{ pcf} * 1\ ft) - (111.11\ pcf * 1\ ft)}{96.3\ pcf}$$

$$\boldsymbol{d_{\text{waste}} = 13.3\ ft}$$

Results: 13.3 ft of waste will be needed above the 2 ft of sand to confine the GCL at 10 psi

Signature: _____

Daniel J. Riggs, PE

License No. 49559

Date: 5/23/12
By: Dan Riggs
Client: Dem-Con

LINER EQUIVALENCY CALCULATIONS – Leachate Flux

Objective:
Demonstrate that a single-layer geosynthetic clay liner (GCL) performs equally well or better than a 2-foot compacted clay liner at restricting exfiltration from the landfill.

Basis:
Estimate leachate flux through each liner material based on the following equations

$$Q = Ki$$

and

$$i = \frac{h + d}{d}$$

Where: Q = leachate flux through liner ($L^3/L^2/T$)
K = vertical hydraulic conductivity ($L^3/L^2/T$)
i = hydraulic gradient (L/L)
h = leachate head on liner (L)
d = saturated liner depth (L)

Assumptions

1) K for compacted clay = 1 x 10^{-7} cm/sec (maximum allowed by MN Rules)
2) K for GCL = 3 x 10^{-9} cm/sec (maximum value from manufacturer's specification, see attached Confining Pressure calculations and attached GCL specifications)
3) h = 1 ft (leachate permitted on liner)
4) d for compacted clay liner = 2 ft (fully saturated)
5) d for GCL = 0.25 in, or 0.0208 ft (fully saturated)

Leachate flux through GCL

$$Q_{GCL} = \left(3 \times 10^{-9} \frac{cm}{sec}\right)\left(\frac{1ft + 0.0208ft}{0.0208ft}\right)$$

$$Q_{GCL} = 1.47 \times 10^{-7} \frac{cm}{sec}$$

Leachate flux through compacted clay liner

$$Q_{Clay} = \left(1 \times 10^{-7} \frac{cm}{sec}\right)\left(\frac{1ft + 2ft}{2ft}\right)$$

$$Q_{Clay} = 1.50 \times 10^{-7} \frac{cm}{sec}$$

$\boldsymbol{Q_{GCL} < Q_{Clay}}$ ∴ **GCL results in less leachate flux through the liner than compacted clay.**

Signature: _____

Daniel J. Riggs, PE

License No. 49559

Appendix G

Method 1030

METHOD 1030

IGNITABILITY OF SOLIDS

SW-846 is not intended to be an analytical training manual. Therefore, method procedures are written based on the assumption that they will be performed by analysts who are formally trained in at least the basic principles of chemical analysis and in the use of the subject technology.

In addition, SW-846 methods, with the exception of required method use for the analysis of method-defined parameters, are intended to be guidance methods which contain general information on how to perform an analytical procedure or technique, which a laboratory can use as a basic starting point for generating its own detailed standard operating procedure (SOP), either for its own general use or for a specific project application. Performance data included in this method are for guidance purposes only and must not be used as absolute quality control (QC) acceptance criteria for purposes of laboratory QC or accreditation.

1.0 SCOPE AND APPLICATION

1.1 This method is suitable for the determination of the ignitability of solids and is appropriate for pastes, granular materials, solids that can be cut into strips, and powdery substances. Also, if it is impractical to perform this test because of the physical form of the sample, generator knowledge should be used to determine the ignitability hazard posed by the material. The test method described here is based on the test procedure adopted by the Department of Transportation (DOT) from the United Nations regulations for the international transportation of dangerous goods (see Appendix E to Part 173 of 49 CFR).

1.2 This method is not required by the Federal regulations to determine if a waste passes or fails the characteristic of ignitability according to the RCRA regulatory definition at 40 CFR 261.21. To clarify, the test results of this method cannot be used to directly classify a waste as a D001 hazardous waste, nor can the results be used by themselves to definitively classify a waste as non-hazardous. No specific test for ignitable solids is required by the RCRA regulations, and only a waste meeting the narrative regulatory definition at 40 CFR 261.21(a)(2) is an ignitable hazardous waste because it is an ignitable solid. In addition, the test in this method for a liquid may be helpful in determining whether a liquid waste has hazardous properties; however, a liquid waste is only a D001 hazardous waste if it is an oxidizer, as defined at 40 CFR 261.21(a)(4), or based on its flash point, as defined at 40 CFR 261.21(a)(1). This test method was developed to specifically illustrate the ignitability properties of materials, including wastes, and its results provide relevant and useful information that may be applied to knowledge of a waste in determining whether a waste meets the 40 CFR 261.21 criteria.

1.3 Prior to employing this method, analysts should consult the disclaimer statement at the front of the manual and the information in Chapter Two for 1) guidance on the intended flexibility in the choice of methods, apparatus, materials, reagents, and supplies; and 2) the responsibilities of the analyst for demonstrating that the techniques employed are appropriate for the analytes of interest, in the matrix of interest, and at the levels of concern.

In addition, analysts and data users are advised that, except where explicitly specified in a regulation, the use of SW-846 methods is *not* mandatory in response to Federal testing requirements. The information contained in this method is provided by the Environmental Protection Agency (EPA) as guidance to be used by the analyst and the regulated community in

making judgments necessary to generate results that meet the data quality objectives (DQOs) for the intended application.

1.4 This method is restricted to use by, or under supervision of, appropriately experienced and trained personnel. Each analyst must demonstrate the ability to generate acceptable results with this method.

2.0 SUMMARY OF METHOD

In a preliminary test, the test material is formed into an unbroken strip or powder train, 250 mm in length. An ignition source is applied to one end of the test material to determine whether combustion will propagate along 200 mm of the strip within a specified time period. Materials that propagate burning along a 200-mm strip within the specified time period are then subjected to a burning rate test. Materials that do not ignite or propagate combustion as described above do not require further testing. In the burning rate test, the burning time is measured over a distance of 100 mm and the rate of burning is determined. The test method described here is based on the test procedure adopted by the Department of Transportation from the United Nations regulations for the international transportation of dangerous goods and is contained in Appendix E to Part 173 of 49 CFR.

3.0 DEFINITIONS

Refer to Chapter One and the manufacturer's instructions for definitions that may be relevant to this procedure.

4.0 INTERFERENCES

4.1 In laboratory tests, the burning rate of duplicate runs is usually repeatable to within 10%. However, large differences in burning rates may occur if experimental conditions are not held constant. Variation in airflow rates, particle size, and moisture content of the test material will affect test results. Therefore, at least triplicate determinations of the burning rate should be conducted.

4.2 Particle size of test material can affect not only the burning rate, but also the ignition of the material. Therefore, the particle size of the test material should be the same for each test run. The particle size of the test material should be reported in a simple descriptive format (e.g., fine powder, sand, coarse granular).

4.3 Temperature of some test material (such as sulfur powder) affects the burning rate. For reproducible results, all tests should be performed at approximately the same initial temperature (ambient room or laboratory temperature).

4.4 All tests must be carried out inside a fume hood with the test apparatus situated perpendicular (90°) to the direction of airflow. Airflow parallel (0°) to the test apparatus results in non-reproducible burning rates.

4.5 The rate of airflow through the fume hood affects the burning rate. An airflow rate that is too high distorts the flame and retards its horizontal propagation. The optimum airflow rate appears to be in the range of 0.7-1 meters per second.

4.6 Materials that are moisture sensitive (i.e., readily absorb moisture from air) should be tested as quickly as possible after removal from the sample container. All materials should be tested as received by the laboratory.

5.0 SAFETY

5.1 This method does not address all safety issues associated with its use. The laboratory is responsible for maintaining a safe work environment and a current awareness file of OSHA regulations regarding the safe handling of the chemicals specified in this method. A reference file of material safety data sheets (MSDSs) should be available to all personnel involved in these analyses.

5.2 Prior to starting the preliminary screening test, all sample materials must be tested to determine if that material is explosive or extremely flammable (see WARNING below). Use a very small portion of material (1 g or less) for this test.

WARNING: If the sample material is explosive or extremely flammable, do not conduct this test.

5.3 This method could involve the combustion of highly flammable materials and the generation of toxic fumes. All tests must be conducted in a suitable fume hood fitted with a pull-down sash to prevent the escape of toxic fumes into working areas. The analyst should wear appropriate protective clothing, including a laboratory jacket or apron, safety glasses, and protective gloves. The laboratory should have appropriate firefighting equipment (such as a Class A fire extinguisher) readily available to extinguish small fires.

6.0 EQUIPMENT AND SUPPLIES

The mention of trade names or commercial products in this manual is for illustrative purposes only, and does not constitute an EPA endorsement or exclusive recommendation for use. The products and instrument settings cited in SW-846 methods represent those products and settings used during method development or subsequently evaluated by the Agency. Glassware, reagents, supplies, equipment, and settings other than those listed in this manual may be employed provided that method performance appropriate for the intended application has been demonstrated and documented.

This section does not list common laboratory glassware (e.g., beakers and flasks) that might be used.

6.1 Low-heat conducting, non-combustible, impervious ceramic tile or equivalent material, an approximate dimension of 25 cm x 25 cm x 2.5 cm (the tile must be at least 25 cm in length to support a 250-mm test sample).

6.2 High temperature marker or equivalent marking device for marking ceramic plates.

6.3 Powder train mold (see Figure 1) for molding powdered and granular materials for the burn rate test. The material of construction can be aluminum, brass, stainless steel, or plastic. The mold is 250 mm in length and has a triangular cross-section, with a width of 20 mm, and a depth of 10 mm as measured from the bottom of the triangular opening to where the sides meet. On both sides of the mold, in the longitudinal direction, two sheets are mounted as lateral limitations which extend 2 mm beyond the upper edge of the triangular cross-section.

This device can be fabricated by most machine shops. The complete burn rate apparatus is available from: Associated Design and Manufacturing Co., Lorton, Virginia, 22079.

6.4 A Bunsen (propane gas and air) burner with a minimum diameter of 5 mm capable of attaining a temperature of at least 1,000 °C.

6.5 Stop watch.

6.6 Thermocouple to measure the temperature of the gas flame.

6.7 Thermometer to measure initial temperature of material (i.e., room temperature).

6.8 Anemometer to measure airflow in the fume hood.

7.0 REAGENTS AND STANDARDS

No special reagents or standards are required to conduct this test.

8.0 SAMPLE COLLECTION, PRESERVATION, AND STORAGE

8.1 Samples should be tested on an as-received basis unless requested otherwise. No sample preservation is required, but sample containers should be completely filled and tightly sealed to preserve sample integrity.

8.2 Samples should be tested as soon as possible after removal from the sample container (i.e., samples should not be allowed to dry or absorb moisture for excessive periods or to lose volatiles). Samples that are chilled or cooled upon receipt to the laboratory should be allowed to equilibrate to the ambient laboratory temperature in the sample container.

9.0 QUALITY CONTROL

9.1 Refer to Chapter One for additional guidance on quality assurance (QA) and quality control (QC) protocols. When inconsistencies exist between QC guidelines, method specific QC criteria take precedence over both technique specific criteria and Chapter One criteria; technique specific QC criteria take precedence over Chapter One criteria. Any effort involving the collection of analytical data should include development of a structured and systematic planning document, such as a Quality Assurance Project Plan (QAPP) or a Sampling and Analysis Plan (SAP), which translates project objectives and specifications into directions for those implementing the project and assessing the results.

Each laboratory should maintain a formal quality assurance program. The laboratory should also maintain records to document the quality of the data generated. Development of in-house QC limits for each method is encouraged. Use of instrument specific QC limits is encouraged, provided such limits will generate data appropriate for use in the intended application. All data sheets and quality control data should be maintained for reference or inspection.

9.2 All tests must be performed on a clean ceramic plate at room temperature.

9.3 All replicate runs must be at the same initial temperature (ambient laboratory temperature).

9.4 All replicate tests must be run at approximately the same airflow through the fume hood.

9.5 Only materials of the same particle size distribution should be used for all replicate tests.

9.6 The burn rate test must be conducted in triplicate if the preliminary screening test is positive. Any burn rate for non-metallic samples that exceeds 2.2 mm/sec (or a burn time of less than 45 seconds for 100 mm) is considered to have a positive result. For metals, a burn rate of more than 0.17 mm/sec (or burn time of less than 10 minutes for 100 mm) is considered to have a positive result.

10.0 CALIBRATION AND STANDARDIZATION

There are no calibration or standardization steps directly associated with this procedure. See the equipment manufacturer's instructions for the calibration of certain equipment used in this method (e.g., the thermocouple).

11.0 PROCEDURE

WARNING: Prior to starting the preliminary screening test, all sample materials must be tested to determine if that material is explosive or extremely flammable. Use a very small portion of material (1 g or less). If the sample material is explosive or extremely flammable, do not conduct this test.

11.1 Preliminary screening test

11.1.1 The preliminary screening test for ignitability is conducted on all waste materials. On a clean, impervious ceramic tile (Sec. 6.1), clearly mark a 250 mm long test path. Make another mark at exactly 200 mm from the start of the sample path.

11.1.2 Prepare the test material in its "as received" form by forming an unbroken strip or powder train of sample 250 mm long by 20 mm wide by 10 mm high on the ceramic tile. Use the mold to form the material as described in Sec. 11.2.3.1, if appropriate.

11.1.3 Place the ceramic tile with the loaded sample in a fume hood about 20 cm (~8 inches) from the front of the hood and in an area of laminar airflow. Position the sample perpendicular to the airflow (See Figure 2). The airflow across the perpendicular axis of the sample should be sufficient to prevent fumes from escaping into the laboratory and should not be varied during the test. The air velocity should be approximately 0.7 meters/second. Measure the air velocity with an anemometer.

11.1.4 Light the Bunsen burner and adjust the height of the flame (6.5 to 7.5 cm) by adjusting the propane gas and air flows. Measure the temperature of the flame (tip of the flame) by a thermocouple. The temperature of the flame must be at least 1000 °C.

11.1.5 Apply the tip of the flame to one end of the sample strip. The test period will depend on the sample matrix (whether non-metallic or metallic) as described below in Sec. 11.1.5.1 and 11.1.5.2.

11.1.5.1 If the waste is non-metallic, hold the flame tip on the sample strip until the sample ignites or for a maximum of 2 minutes. If combustion occurs, begin timing with a stop watch and note whether the combustion propagates up to the 200 mm mark within the 2 minute test period.

11.1.5.2 If the waste is a metal or metal alloy powder, hold the flame tip on the sample strip until the sample ignites or for a maximum of 5 minutes. If combustion occurs, begin timing with a stop watch and note whether the combustion propagates up to the 200-mm mark within the 20 minute test period.

11.1.6 If the waste does not ignite and propagate combustion either by burning with open flame or by smoldering along the 200-mm sample strip within the 2 minute test period (or 20 minute test period for metal powders), the waste is not considered flammable and no further testing is required. If the waste propagates burning of 200 mm of the test strip within the 2 minute test period (20 minute test period for metals), the material must be evaluated by the burning rate test (proceed to Sec. 11.2).

11.2 Burning rate test

11.2.1 The preparation of the test sample for the burning rate test will depend on the physical characteristics of the waste. Wastes that exist in a powdered or granular state are molded in a powder train mold as shown in Figure 1. Pasty materials are formed into a rope that is 250 mm in length with a cross-section of 1 cm^2. All tests for the burn rate test are performed on clean, ambient temperature, ceramic plates.

11.2.2 On a clean, impervious ceramic tile (Sec. 6.2), clearly mark a 250-mm long test path. Make two additional timing marks at 80 mm and 180 mm from the start of the sample path. The distance between the two marks (100 mm) will be used to calculate the rate of burn in Sec. 12.0.

11.2.3 Sample preparation based on physical characteristics

11.2.3.1 Powder or granular material -- Tighten the side plates on the mold. Place the mold on the base plate. Pour the material to fill the triangular cross section of the mold loosely. Drop the unit from a height of 2 cm onto a solid surface three times to settle the powder. Remove the side supports. Lift the mold off the base plate. Place a clean ceramic test plate with the appropriate timing marks (Sec. 11.2.2) face down on top of the mold. Invert the setup and remove the mold.

11.2.3.2 Pasty wastes - Spread the waste on a marked ceramic tile (Sec. 11.2.2) in the form of a rope 250 mm in length with a cross-section of 1 cm^2.

11.2.4 Place the ceramic tile with the loaded sample prepared in Sec. 11.2.3 in a fume hood about 20 cm (~8 in) from the front of the hood and in an area of laminar airflow. Position the sample perpendicular to the airflow (See Figure 2). The airflow across the perpendicular axis of the sample should be sufficient to prevent fumes from escaping into the laboratory and should not be varied during the test. The air velocity should be

approximately in the range of 0.7-1 meters/second. Measure the air velocity with an anemometer.

11.2.5 Light the Bunsen burner and adjust the height of the flame (6.5 to 7.5 cm) by adjusting the propane gas and air flows. Measure the temperature of the flame (tip of the flame) by a thermocouple. The temperature of the flame must be at least 1000 °C.

11.2.6 Apply the tip of the flame to one end of the sample strip to ignite the test strip as described in Sec. 11.1.5.1 or 11.1.5.2 (based on whether the sample is non-metallic or metallic).

11.2.7 When the test strip or powder train has burned up to the 80-mm time marker, begin timing the rate of combustion with a stop watch. Stop the timer when the burned strip reaches the 180-mm time marker. Record the amount of time (in sec) required to burn the 100-mm test strip.

12.0 DATA ANALYSIS AND CALCULATIONS

Calculate the rate of burning by dividing the length of the burn test strip (100 mm) by the total time (sec). Results of the burn rate test should be reported in mm/sec. Wastes that have a rate of burning of more than 2.2 mm/sec (or burn time of less than 45 sec for 100 mm) are considered to have a positive result for ignitability according to DOT regulations. For metals, this time is 10 minutes or less for 100 mm (or a burn rate of more than 0.17 mm/sec). The following format may be used to document the data.

Test Material Information

Source of material (e.g., company, operation or process):
Description of material (e.g., powder or paste, metallic or non-metallic):
Particle size (e.g., fine powder, granular, sand, etc.):
Preliminary burning time (sec):

Test Conditions

Date of Test:
Temperature of test material (°C):
Air velocity through fume hood (m/s):

Ignitability Test Data				
Test Number	Time (sec) Elapsed Between Application of Flame and Start of Ignition	Burning Time over 100 mm (sec)	Burning Rate (mm/sec)	Comments
1				
2				
3				

13.0 METHOD PERFORMANCE

13.1 Performance data and related information are provided in SW-846 methods only as examples and guidance. The data does not represent required performance criteria for users of the methods. Instead, performance criteria should be developed on a project-specific basis, and the laboratory should establish in-house QC performance criteria for the application of this method. Performance data must not be used as absolute QC acceptance criteria for laboratory QC or accreditation.

13.2 An independent laboratory validation was conducted on the robustness of the burn rate test procedure. The materials selected for this evaluation included:

1. A 50/50 mixture of metallic silicon and lead dioxide (PbO_2)
2. Excelsior
3. Dextrin (yellow powder)
4. Sulfur (fine yellow powder)
5. Aluminum metal (coarse)
6. Magnesium metal (coarse)
7. Polyethylene high density (granular)
8. Polyethylene low density (fluffy white powder)
9. Scott fertilizer (32-3-10:N-P-K)
10. JP-4 contaminated soil (approximately 5000 ppm)

Of these materials, the 50/50 mixture of metallic silicon and lead dioxide (PbO_2), elemental sulfur, and excelsior gave a positive ignitability result under the conditions of the test. The remaining materials gave negative (nonflammable) results under the conditions of the test. Several test variables including: ignition source, ambient temperature, and apparatus orientation, were studied using these materials. Partial results of this study are summarized in Table 1. These data are provided for guidance purposes only.

13.3 In another evaluation of the DOT burn rate test, potentially ignitable finishing wastes from the furniture industry were collected and tested for burning rates. Each waste was tested in triplicate to establish a mean value for the burning rate. The results for the flammable wastes are summarized in Table 2. These data are provided for guidance purposes only.

13.4 In order to evaluate the ruggedness of the DOT burn rate test, select ignitable finishing wastes were split and tested by a state laboratory and an independent contract laboratory. The results of this comparison are summarized in Table 3. These data are provided for guidance purposes only.

14.0 POLLUTION PREVENTION

14.1 Pollution prevention encompasses any technique that reduces or eliminates the quantity and/or toxicity of waste at the point of generation. Numerous opportunities for pollution prevention exist in laboratory operations. The EPA has established a preferred hierarchy of environmental management techniques that places pollution prevention as the management option of first choice. Whenever feasible, laboratory personnel should use pollution prevention techniques to address their waste generation. When wastes cannot be feasibly reduced at the source, the Agency recommends recycling as the next best option.

14.2 For information about pollution prevention that may be applicable to laboratories and research institutions consult *Less is Better: Laboratory Chemical Management for Waste Reduction*, a free publication available from the American Chemical Society (ACS), Committee on Chemical Safety, http://portal.acs.org/portal/fileFetch/C/WPCP_012290/pdf/WPCP_012290.pdf.

15.0 WASTE MANAGEMENT

The Environmental Protection Agency requires that laboratory waste management practices be conducted consistent with all applicable rules and regulations. Laboratories are urged to protect air, water, and land by minimizing and controlling all releases from hoods and bench operations, complying with the letter and spirit of any sewer discharge permits and regulations, and by complying with all solid and hazardous waste regulations, particularly the hazardous waste identification rules and land disposal restrictions. For further information on laboratory waste management, consult *The Waste Management Manual for Laboratory Personnel* available from the American Chemical Society at the address listed in Sec. 14.2.

16.0 REFERENCES

1. "Test Methods for Readily Combustible Solids. Burning Rate Test." (14.2.2.5). Recommendations on the Transport of Dangerous Goods, Fifth Revised Edition, United Nations, New York, 1988.

2. 49 CFR, Appendix E to Part 173 (12-31-91 Edition), pp. 597-598.

3. "Flammability (solids). Method A.10," Official Journal of the European Communities, No. L251/63, September 19, 1984.

4. Foster Wheeler Enviresponse, Inc., Edison NJ., "Validation of Ignitability Method For Solids," submitted to the Office of Solid Waste, US EPA, February 1994.

5. Internal Report (AMFA Report), North Carolina Department of Environmental Health and Natural Resources (Bill Hamner).

17.0 TABLES, DIAGRAMS, FLOW CHARTS, AND VALIDATION DATA

The following pages contain the tables and figures referenced by this method. A flow diagram of the procedure is included after the figures.

TABLE 1

TEST VARIABLES FOR IGNITABILITY

Material Tested	Test Number	Variable combination[1]	Burn Time over 100 mm (sec)	Burn Rate (mm/sec)
50% Metallic Silicon and 50% Lead IV Oxide	1	ABC	0.84	119
	2	Abc	0.50	200
	3	aBc	0.69	145
	4	abC	0.65	154
Excelsior (wood shavings)	1	ABC	13.45	7.43
	2	Abc	9.14	10.9
	3	aBc	13.37	7.47
	4	abC	13.59	7.36

[1]Key:

A - Flame ignition
a - Hot wire ignition source
B - Ambient temperature of 20 ° C
b - Ambient temperature of 100 ° C
C - Orientation of test apparatus of 90 ° to air flow
c - Orientation of test apparatus of 0 ° to air flow

These data are provided for guidance purposes only.

TABLE 2

EXAMPLE BURNING RATES FOR IGNITABLE WASTES

Sample No.	Description of Waste	Burn Time over 100 mm (sec)	Burn Rate (mm/sec)
A2	Segregated Lacquer Dust	4.7	21.3
J2	Segregated Lacquer Dust	4.6	21.7
U	Segregated Lacquer Dust	8.6	11.6
K	Consolidated Lacquer Dust	6.0	16.7
H	Catalyzed Lacquer Dust	6.7	14.9
F	Water Based Lacquer Dust	19.4	5.15
P	Booth Coat-Stain Overspray	12.5	8.0
O	Pallet Covered Cardboard	11.1	9.0
Q	Pallet Covered Cardboard	12.3	8.13

These data are provided for guidance purposes only.

TABLE 3

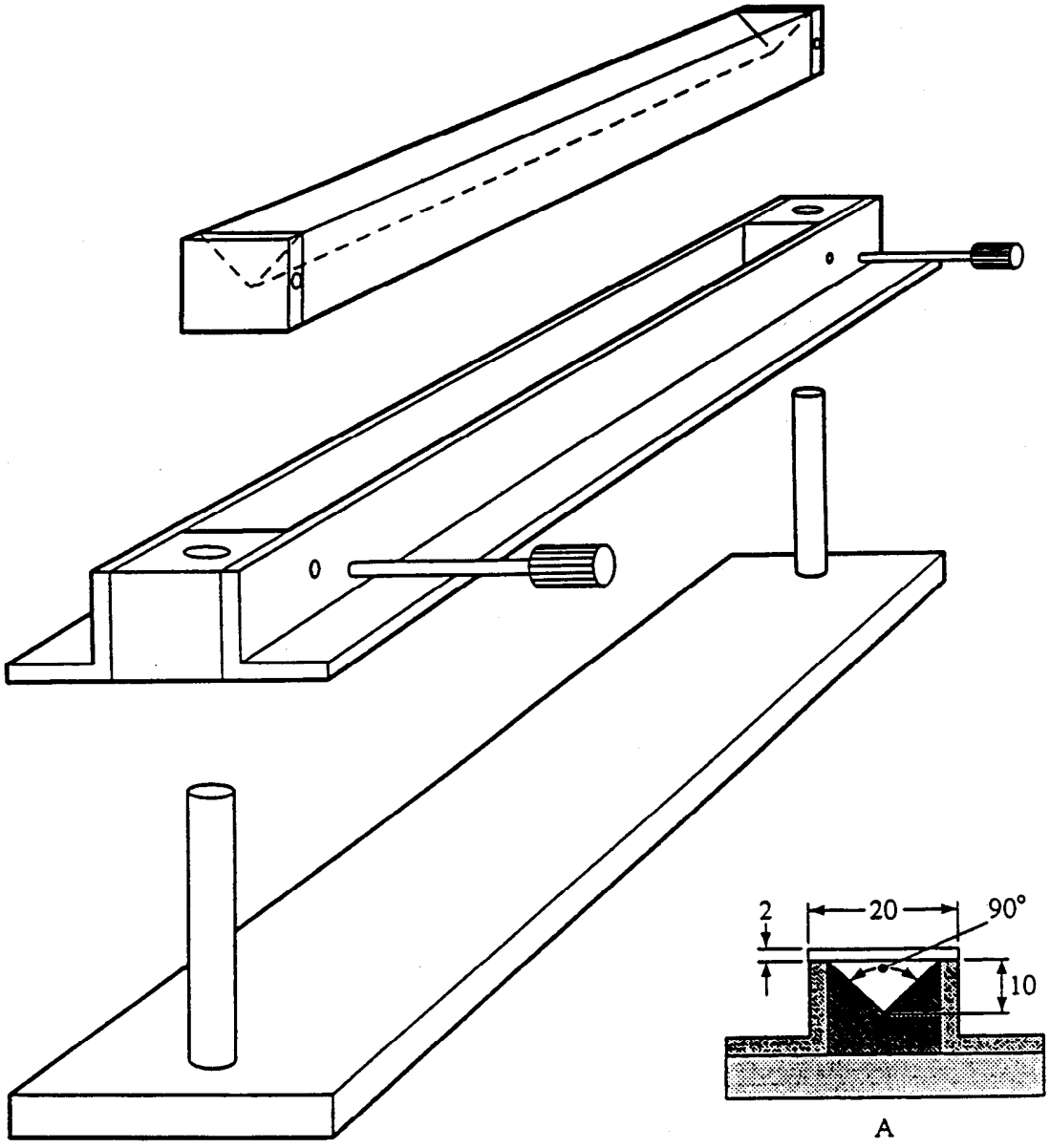
EXAMPLE COMPARISON OF BURN RATES

Sample No.	Description of Waste	Mean Burn Time Over 100 mm (Seconds)	
		State Laboratory	Contract Laboratory
A1	Segregated Lacquer Dust	4.7	5
J1	Segregated Lacquer Dust	4.6	4.3
12	Booth Coat-Glaze Overspray	0[1]	0[1]

[1] Waste was found to be nonflammable under conditions of the test.
These data are provided for guidance purposes only.

FIGURE 1

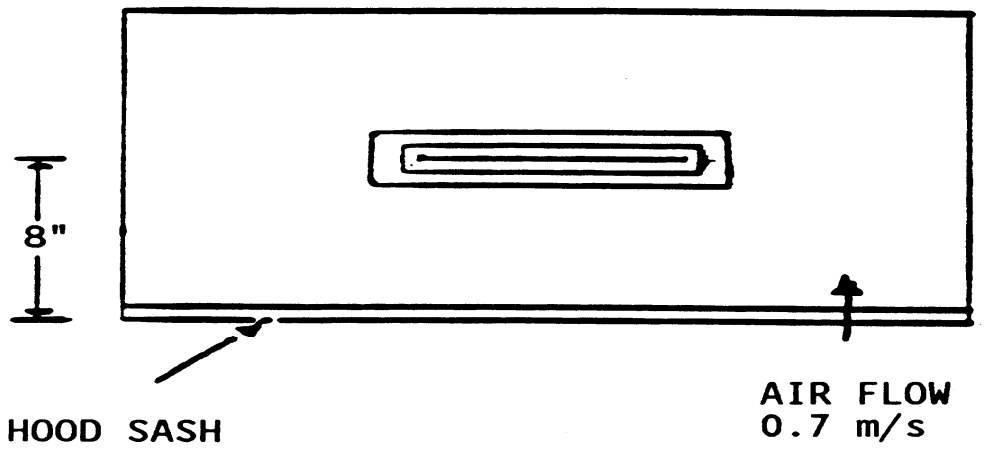
POWDER TRAIN MOLD



(A) Cross-section of 250 mm long mould

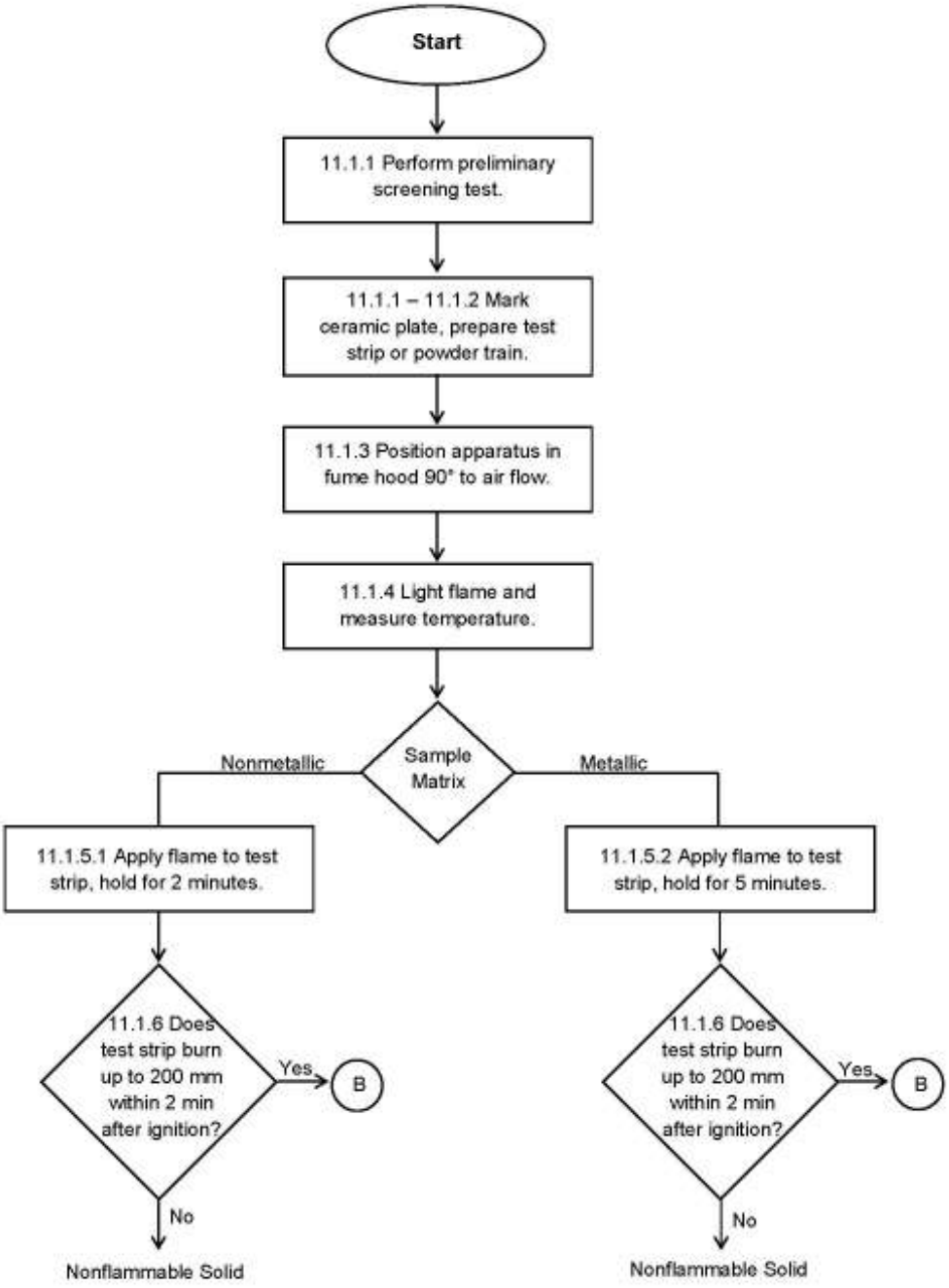
FIGURE 2

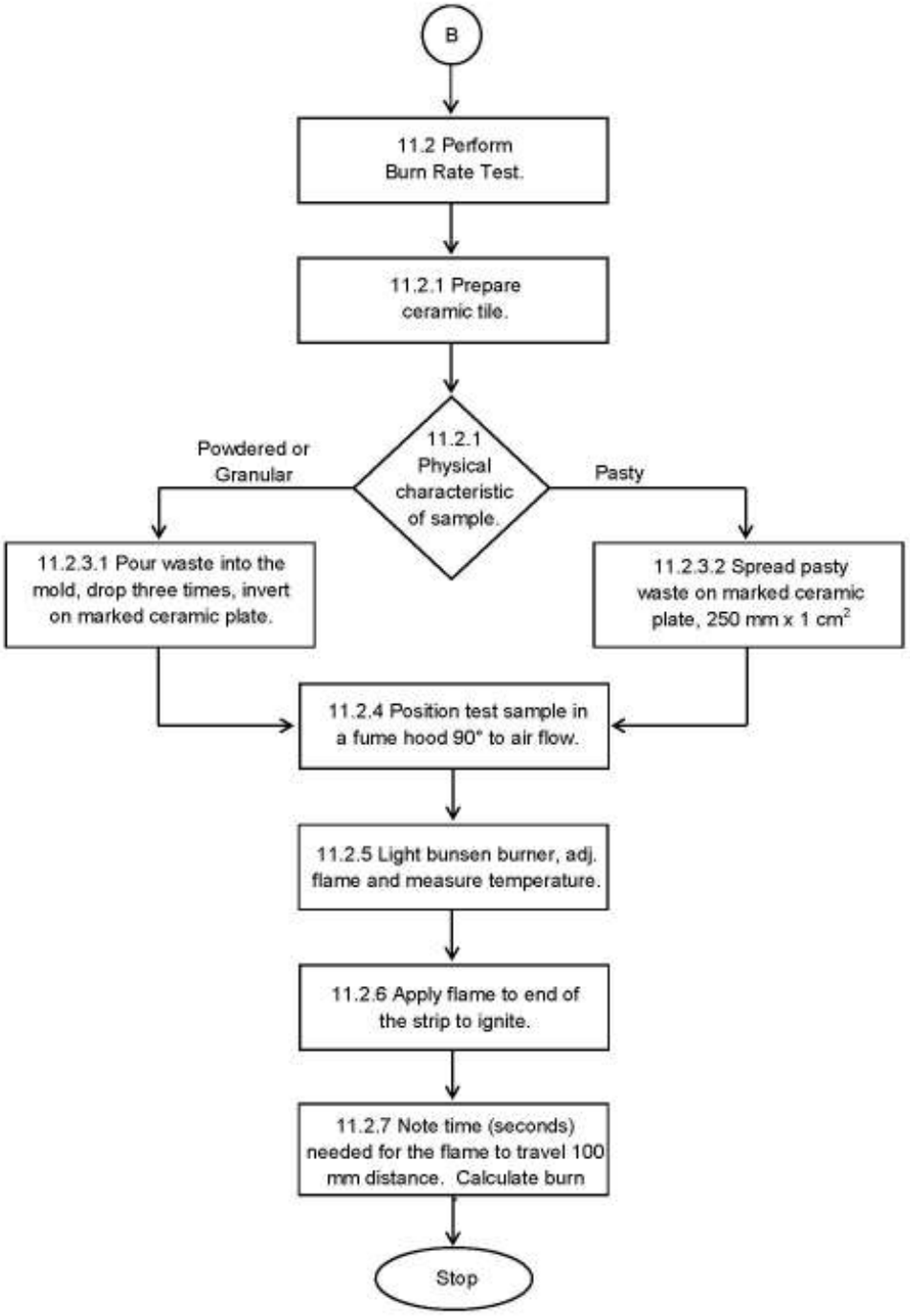
TEST APPARATUS POSITION IN FUME HOOD



SAMPLE 90° TO AIR FLOW

IGNITABILITY OF SOLIDS




B
11.2 Perform Burn Rate Test.
11.2.1 Prepare ceramic tile.
11.2.1 Physical characteristic of sample.
Powdered or Granular
Pasty
11.2.3.1 Pour waste into the mold, drop three times, invert on marked ceramic plate.
11.2.3.2 Spread pasty waste on marked ceramic plate, 250 mm x 1 cm2
11.2.4 Position test sample in a fume hood 90° to air flow.
11.2.5 Light bunsen burner, adj. flame and measure temperature.
11.2.6 Apply flame to end of the strip to ignite.
11.2.7 Note time (seconds) needed for the flame to travel 100 mm distance. Calculate burn
Stop

Appendix A:

Summary of Revisions to Method 1030 (From Revision 0 December 1996)

1. Improved overall method formatting for consistency with new SW-846 methods style guidance. The format was updated to Microsoft Word .docx.

2. Minor editorial and technical revisions were made throughout to improve method clarity.

3. The flowcharts on pages 14 and 15 were updated to improve visual clarity and edited for content.

4. The revision number was changed to 1 and the date published was changed to July 2014.

5. This appendix was added showing changes from the previous revision.

6. Items regarding regulatory use of this method in Sec. 1.1 and 1.2 were updated to reflect current guidance.

Appendix H

MPCA Guidance Document – The Lethality Characteristic

The Lethality Characteristic

A Minnesota-specific hazardous-waste characteristic

Waste/Hazardous Waste #2.05 • May 2009

Minnesota Pollution Control Agency

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Lethality, a hazardous waste characteristic specific to Minnesota, considers the toxicological, or poisonous, effect of a waste. Minnesota waste generators must ensure that wastes are evaluated for the Lethality characteristic as well as for the federal characteristics of Ignitability, Oxidizers, Corrosivity, Reactivity, and Toxicity. While the more familiar characteristic of Toxicity also contains the root 'toxic,' that characteristic refers to the presence and concentration of specific toxic contaminants as determined by the Toxicity Characteristic Leaching Procedure (TCLP). The Lethality characteristic is concerned with the overall toxicological effect of the waste as determined by biological testing. In this document, wastes displaying the Lethality characteristic are termed 'Lethal.'

Seek ways to reduce the total amount of waste you generate and the toxicity of the products you use to reduce the amount of potentially lethal hazardous wastes you generate. For free assistance, contact the Minnesota Technical Assistance Program (MnTAP). Contact information on page 4.

For more information on the federal characteristics, see MPCA hazardous waste fact sheet #2.04, *Characteristic Wastes*, available at www.pca.state.mn.us/publications/w-hw2-04.pdf

Lethality thresholds

The toxicological effect of a material is often measured in terms of the median lethal dose (LD_{50}), which is the amount of a material which will kill half of a test population of a specific animal, presented as a ratio with the body weight of the animal. Median lethal dose information is determined for a specific exposure method and test animal. The Lethality characteristic considers the oral, dermal, and inhalation exposure methods. The median lethal dose for the inhalation exposure is commonly referred to as the median lethal concentration (LC50).

Under Minnesota Rules, a waste is hazardous for the Lethality characteristic when a representative sample of the waste exhibits any of the following:

- an oral LD_{50} (rat) less than 500 milligrams per kilogram (mg/kg)
- a dermal LD_{50} (rabbit) less than 1000mg/kg
- an inhalation LC50 (rat) less than 2000 milligrams per cubic meter (mg/m3) for dusts and mists
- an inhalation LC50 (rat) less than 1000 parts per million (ppm) for gases and vapors

Evaluating for lethality

To help you evaluate waste for the Lethality characteristic, the Minnesota Pollution Control Agency (MPCA) has compiled a list of attributes that indicate a waste may be Lethal. See Table 1.

You may consider a waste does *not* meet the Lethality characteristic when you can document that the product from which the waste is generated does not display any of the Table 1 attributes. Maintain documentation at the generation site.

If a product *does* display any of the attributes, the waste *may* be Lethal; you must evaluate it further. Manage waste that

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651-296-6300 • 800-657-3864 • TTY 651-282-5332 or 800-657-3864 • Available in alternative formats

displays any of the attributes as a Lethality characteristic hazardous waste unless and until you evaluate further under Minn. R. 7045.0131, Subp. 6 and demonstrate that the waste does not display the Lethality characteristic.

Instead of performing a full evaluation, you may choose to assume a waste is lethal and manage it as fully regulated hazardous waste

Table 1: Attributes of potential lethality

- A **drug*** regulated by the Minnesota Board of Pharmacy
- A **pesticide** regulated by the Minnesota Department of Agriculture
- A **poisonous material** regulated for transport by the U.S. Department of Transportation
- A material bearing any of the descriptive or signal terms "**Poison**", "**Poisonous**", "**Toxic**", "**Lethal**", **"Fatal"** or **"Deadly"** on the product shipping container, product label, or in product documentation
- A material bearing the '**skull and crossbones**' graphic on the product shipping container, product label, or in product documentation



- A material bearing a U.S. Department of Transportation "**Hazard Class 6.1**" label or placard on the product shipping container, product label, or in product documentation



- A material bearing a National Fire Rating (NFR), Hazardous Materials Identification System (HMIS), or Hazardous Material Identification/Information Guide (HMIG) rating **Health Division ≥3** or **Special Hazard Division "POI"** (NFR only) label on the product shipping container, product label, or in product documentation



- A material bearing **LD_{50} data** on a Material Safety Data Sheet (MSDS) which you have, or which you are required by OSHA regulations to have, which states that the LD_{50} of any of the ingredients is less than the lethality thresholds on page 1 of this fact sheet
- A material having **specific information known to you** that the waste may reasonably be Lethal, including but not limited to information that your processes may alter a product or other material which does not exhibit any of the above attributes in such a way that the waste generated may reasonably be Lethal
- A material having **specific information published by the MPCA** in Table 2 of this fact sheet that the waste may reasonably be Lethal

Wastes which display no attributes may be considered non-Lethal.
Wastes which display one or more attributes may be Lethal and must be evaluated further.

*A 'drug' as specified in Table 1 above is considered by the MPCA to be a 'pharmaceutical' eligible for further evaluation for lethality under an approved Petition for the "*Alternate Method to Evaluate Pharmaceutical Waste for the Lethality Characteristic*" if you have such an approved Petition. For more information on the Alternate Method, see MPCA hazardous waste fact sheet #4.45b, *Alternate Method to Evaluate Pharmaceutical Waste for the Lethality Characteristic*, available at www.pca.state.mn.us/publications/w-hw4-45b.pdf

Further evaluation for lethality

Further evaluation of a waste for the Lethality characteristic may include calculating the estimated LD_{50} of the waste or applying specific and documented knowledge of materials and processes used in the generation of the waste. If you evaluate the waste further and can demonstrate that it does not meet the Lethality characteristic as identified in Minn. R. 7045.0131, Subp. 6, you may manage the waste as non-Lethality characteristic without further action on your part.

Note: A waste that is not hazardous due to the Lethality characteristic may be hazardous for other reasons. Always perform a complete evaluation.

Calculating the estimated LD_{50} of a waste

To calculate the estimated LD_{50} of a waste, you must have the appropriate LD_{50} data for all of the waste components that reasonably may produce a toxic effect. The LD_{50} data you use must be for the correct exposure method and test animal. You may exclude ingredients that reasonably will not produce a harmful toxicological effect. If your reference material gives a range for the % concentration of an ingredient, you must use the maximum range value in your calculation.

Note: Ingredients identified as 'inert' on product labels, such as propellants, solvents, and carriers, may *not* be assumed to produce no harmful toxicological effect. Many product labels identify these ingredients as 'inert' only because they do not perform the main function of the product. However, many of these 'inert' ingredients, such as petroleum-based solvents, may have significant harmful toxicological effects and must be included in your LD_{50} calculation.

To calculate the estimated LD_{50} of the waste, use the following formula:

$$\frac{1}{T_W} = \frac{1}{100} \text{ X } \left(\frac{C_A}{T_A} + \frac{C_B}{T_B} + \frac{C_C}{T_C} \right)$$

$T_W = LD_{50}$ of the waste

$T_{A,B,...Z} = LD_{50}$ of ingredient A, B, ...Z in the waste

$C_{A,B,...Z}$ = % concentration of ingredient A, B, ...Z in the waste

Note: The total % concentrations of ingredients A, B, ...Z you use in your calculation may be less than 100% if the remainder of the waste will not produce a harmful toxicological effect.

Applying specific knowledge to determine the lethality of a waste

As an alternative to calculating the estimated LD_{50} of a waste, you may apply specific and documented knowledge of the materials and processes used in generating the waste. If the waste is an unaltered discarded product, you must determine whether the product would reasonably meet the Lethality characteristic when disposed of. Certifications or informed statements by a product manufacturer that a waste is "non-toxic" or "practically non-toxic" to humans or mammals may constitute knowledge that the waste is reasonably non-Lethal.

If you are able to locate some toxicological information but are unable to calculate the estimated LD_{50} of the waste, you may still be able to use the available data to evaluate the waste for the Lethality characteristic. As an example, if the only LD_{50} data you are able to locate is for an exposure method other than the one you are considering, or if the test animal is different than the required animal for the exposure method you are considering, you may apply accepted principles of biochemistry, toxicology, and physiology to the LD_{50} data you do have to determine whether the waste would reasonably be Lethal.

Note: You may not use information that a product is certified for a specific use by a governmental agency, such as the U.S. Food and Drug Administration (FDA), U.S. Environmental Protection Agency (EPA) or other similar Federal or state agency, as evidence that the product is non-Lethal when disposed of unless the certified use by its nature and lack of limitation shows that the product would reasonably be non-Lethal. As an example, you may not use approval for limited medical use of a pharmaceutical by the FDA as evidence that the waste pharmaceutical is non-Lethal; however, the approval for unlimited food use of an additive would reasonably indicate the additive waste is non-Lethal.

When sufficient information and knowledge are not available to determine lethality

When, after exercising due diligence, you are unable to locate sufficient information and knowledge to determine whether a waste displays the Lethality characteristic, you may either simply manage the waste as a Lethal hazardous waste or notify the MPCA in writing. The MPCA may require specific additional evaluation to reasonably determine whether the waste may be managed as non-Lethal.

Specific published lethality information

Table 2 lists specific lethality information currently known to the MPCA for wastes which may not exhibit any of the other attributes from Table 1, with the approximate lethality threshold concentrations for the oral exposure method for each waste. This table does not list all known or potentially Lethal wastes, only those which the MPCA believes may otherwise not be identified and of which it has specific knowledge.

Table 2: Specific known lethality information

Waste name	CAS registry number	Approximate lethality threshold concentration
Beryllium	7440-41-7	2%
Formaldehyde	50-00-0	20%
Glutaraldehyde	111-30-8	27%
Perfluorobutanesulfonate (PFBS)	29420-49-3	86%
Perfluorodecanoic acid (PFDA)	335-76-2	11%
Perfluorooctanesulfonate (PFOS)	1763-23-1	50%
Perfluorooctanesulfonylamide (FOSA or PFOSA)	754-91-6	34%
Perfluorooctanoic acid (PFOA)	3825-26-1	50%

More information

The MPCA, in cooperation with metropolitan county hazardous waste staff, Minnesota Technical Assistance Program (MnTAP) staff and other partners have developed guidance materials about the hazardous waste regulations available on MPCA's Web site at www.pca.state.mn.us/waste/pubs/business.html

The MPCA and your metropolitan county hazardous waste offices have staff that can help you. Contact your metropolitan county or the MPCA office nearest your facility at the numbers below. MnTAP staff can provide information and resources to help you reduce waste.

Metro County Hazardous Waste Offices

Anoka County..... 763-422-7093
Carver County 952-361-1800
Dakota County..... 952-891-7557
Hennepin County..... 612-348-3777
Ramsey County..... 651-266-1199
Scott County 952-496-8475
Washington County 651-430-6655
Web sites..…..... www.co.[county].mn.us

Minnesota Pollution Control Agency

Toll free (all offices) 1-800-657-3864
Brainerd.....218-828-2492
Detroit Lakes.....218-847-1519
Duluth..... 218-723-4660
Mankato..... 507-389-5977
Marshall..... 507-537-7146
Rochester.....507-285-7343
St. Paul 651-296-6300
Willmar 320-214-3786
Web site..... www.pca.state.mn.us

Minnesota Technical Assistance Program

Toll-free..... 1-800-247-0015
Minneapolis.....612-624-1300
Web site ..... www.mntap.umn.edu

Appendix I

MPCA Guidance Document – Managing Sealants and Coatings Containing PCBs

Managing Sealants and Coatings Containing PCBs

Guidance for building owners and contractors

What are PCBs?

Polychlorinated biphenyls (PCBs) are a class of 209 toxic man-made chemicals that persist in the environment and bioaccumulate in animals and humans. They were used extensively in many industrial products from the 1950's through 1978. During this period, PCBs were added to some sealants and coatings such as paint and caulking to make them more flexible and last longer. Exposure to PCBs can cause a range of human health effects and environmental impacts. For more information on other potentially PCB-containing materials and how to test for PCBs, visit the Minnesota Pollution Control Agency (MPCA) at http://www.pca.state.mn.us/publications/w-hw4-48a.pdf to view hazardous waste fact sheet #w-hw4-48a, Identifying, Using, and Managing PCBs.

Where are sealants and coatings that may contain PCBs located?

PCBs were used as plasticizers in many industrial paints and are most commonly found in areas that required waterproof or high-impact coatings. Caulking commonly surrounds doors and windows and often was used in masonry work; it also may have been used in repairs throughout a structure. You will not be able to determine whether building materials contain PCBs by their appearance, brand, or manufacturer. Deliberate use of PCBs ended in 1978; you may assume structures or portions of structures built after 1979 do not have sealants or coatings deliberately containing PCBs.

When are sealants and coatings that may contain PCBs regulated?

Sealants and coatings that may contain PCBs are not regulated by the MPCA when they are in good condition and will remain in place in part of a structure that will not be demolished or renovated. The U.S. Environmental Protection Agency (EPA), however, has raised concerns regarding indoor airborne exposure to building materials containing PCBs. For more information on PCB exposure and indoor air quality, see EPA Publication #EPA-747-F-09-005, *Preventing Exposure to PCBs in Caulking Material*, available from the EPA website at http://www.epa.gov.

Sealants and coatings that may contain PCBs become regulated by the MPCA as wastes when they are disposed of, either with a structure, such as during a full or partial building demolition, or after they are separated from the structure, such as during an abatement project. Different requirements apply to wastes in these two categories that potentially contain PCBs.

Demolition debris that may contain PCBs

The MPCA will allow, without testing, disposal of demolition debris that may contain PCBs in sealants and coatings, including mastics, sealers, waxes, and manufactured rubber and plastic components in any solid waste landfill permitted by the MPCA or another state, including a demolition, municipal solid waste, and industrial solid waste landfill. Demolition debris contaminated by these wastes may also be disposed in a permitted landfill. However, landfill operators may refuse any waste regardless of MPCA allowances.

If the structure you will demolish or renovate is located in one of the Metropolitan Counties – Anoka, Carver, Dakota, Hennepin, Ramsey, Scott, or Washington – contact your county to determine the county requirements applicable to debris from the structure.

Note: Before demolishing all or part of a structure, in addition to removing other problem materials, you must also remove all separable components that may contain PCBs, including fluorescent and high-intensity discharge (HID) lighting ballasts, motor start capacitors, and electrical transmission or distribution equipment, such as transformers. Manage these wastes as PCB hazardous wastes unless you document they do not contain PCBs at or above 50 parts per million (ppm).

For more information on problem materials that must be removed before demolishing all or part of a structure, visit the MPCA at http://www.pca.state.mn.us/publications/w-sw4-20.pdf to view MPCA solid waste fact checklist #w-sw4-20, Pre-Renovation/Demolition Environmental Checklist.

For guidance on managing lighting ballasts and capacitors once you have removed them, see MPCA hazardous waste fact sheet #w-hw4-48f, Managing PCBs in Ballasts and Small Capacitors at http://www.pca.state.mn.us/publications/w-hw4-48f.pdf.

You may reuse uncontaminated recognizable concrete and masonry demolition debris as a substitute for conventional aggregate without MPCA review. Reuse of any debris potentially contaminated with PCBs, including painted or oil-stained debris, must be approved on a case-by-case basis by the MPCA.

Abatement waste and other separate wastes that may contain PCBs

Sealants or coating wastes from abatement work that may contain PCBs must be managed as a PCB hazardous waste in Minnesota unless you can document they contain less than 50 ppm PCBs. Abatement wastes include removed caulk materials, paint chips, and sandblasting debris. For information on storing and disposing of PCB hazardous waste generated in Minnesota, see MPCA hazardous waste fact sheets #w-hw4-48c, Storing PCBs, at http://www.pca.state.mn.us/publications/w-hw4-48c.pdf and #w-hw4-48d, Manifest and Dispose of PCBs, at http://www.pca.state.mn.us/publications/w-hw4-48d.pdf.

Report all PCB hazardous wastes you generate to the MPCA or your metropolitan county.

For more information on other requirements for performing sandblasting or other air-based blasting in Minnesota, see MPCA hazardous waste fact sheet #w-hw4-39a, Sandblasting and Other Air-based Blasting, at http://www.pca.state.mn.us/publications/w-hw4-39a.pdf. For more information on other requirements for performing hydroblasting or other water-based blasting in Minnesota, see MPCA hazardous waste fact sheet #w-hw4-39b, Powerwashing and Other Water-based Blasting, at http://www.pca.state.mn.us/publications/w-hw4-39b.pdf.

Structures to be burned for live burn firefighter training

In Minnesota no structure may be burned except for live burn firefighter training. Do not burn any structure for firefighter training until you have collected at least one composite representative sample from each building material in the structure that may contain PCBs and have documented that they do not contain PCBs at 50 ppm or more.

Note: Live burn firefighter training in Minnesota must be conducted according to the *Live Fire Burn Training Procedures* manual prepared by the Minnesota State Colleges and University System and under a burn permit properly obtained from the Minnesota Department of Natural Resources (DNR). You may obtain a copy of the current manual from the DNR at http://www.dnr.state.mn.us/.

More information

Guidance and requirements in this fact sheet were compiled from the Code of Federal Regulations, Chapter 40, Part 761, and Minnesota Rules, Chapters 7035 & 7045, and incorporates regulatory interpretation decisions made by the MPCA on February 28, 2013. Visit the U.S. Government Printing Office at http://www.gpo.gov/fdsys/ to review the Code of Federal Regulations directly. Visit the Office of the Revisor of Statutes at https://www.revisor.mn.gov/pubs to review the Minnesota Rules.

The MPCA and your Metropolitan County have staff available to answer waste management questions. For more information, contact your nearest MPCA regional staff.

Metro County Hazardous Waste Offices

Anoka 763-422-7093
Carver 952-361-1800
Dakota 952-891-7557
Hennepin 612-348-3777
Ramsey 651-266-1199
Scott.....952-496-8475
Washington.....651-430-6655
Websites ..... http://www.co.[county].mn.us

Minnesota Pollution Control Agency

Toll free (all offices).....1-800-657-3864
Brainerd.....218-828-2492
Detroit Lakes 218-847-1519
Duluth 218-723-4660
Mankato 507-389-5977
Marshall 507-537-7146
Rochester 507-285-7343
St. Paul 651-296-6300
Willmar 320-214-3786
Website ..... http://www.pca.state.mn.us

Appendix J

MPCA Guidance Document – Guidelines-Disposal Methods for Water Filter Backwash Soilids

Guidelines-Disposal Methods for Water Filter Backwash Solids

Water Quality/Wastewater Permits #2.02 • May 2007

Minnesota Pollution Control Agency

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Steps for Land Application .... page 2-4
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WFB:
Water Filter Backwash consists of both a liquid supernatant that contains dissolved and suspended solids, and a more solid sludge that has precipitated out of solution.

WFBS:
Water Filter Backwash Solids. These are the solids present following the backwash of water treatment media. This is considered a solid waste.

This fact sheet is intended to provide guidance for the proper disposal of water treatment backwash by-product.

Background

Water filter backwash (WFB) is generated when potable water treatment plants treat their well water to reduce suspended and dissolved solids.

Sand filter systems pump well water into the top of a tank that is pressurized or gravity fed down through a porous (usually sand-rock) media. Periodically the filter media is backwashed to remove the entrained solids.

Water filter backwash is conveyed to wastewater treatment facilities (WWTF) or is slurried to smaller settling tanks or ponds. To reduce wastewater treatment costs some municipalities' route the supernatant to settling facilities and the sludge to a WWTF, or the other way around. WFB routed to a settling facility need to be periodically cleaned out. The frequency will depend on the size of the tank or pond; and the volume and concentration of solids in the effluent.

Options for managing WFB include slurrying the material to a WWTF, landfilling, using as non-residential construction fill, or land application. Before deciding to dispose of WFB at a WWTF, you should contact the WWTF to fully discuss this option including: (1) available capacity of the WWTF; and (2) potential need to submit a sanitary sewer extension (SSE) permit application.

As described in Minn. R. 7035.0300 subp. 100 water filter backwash solids (WFBS) are considered a solid waste. If the material is either landfilled or land applied, it must be tested and handled in accordance with this guidance document.

Options for WFB/WFBS disposal:

1. **Wastewater Treatment Facility**
2. **Landfill**
3. **Construction Fill**
4. **Land Application**

Steps for landfilling WFBS

1. The WFBS must pass the paint filter test (i.e. is a solid) to be accepted in a landfill.
2. Test and compare the material for the analytes and standards listed in the landfill's industrial solid waste management plan.
3. For unlined landfills radium 226 (Ra) concentrations cannot exceed 5 piC/g. For lined landfills Ra concentrations cannot exceed 30 piC/g. If radium in the WFBS exceeds 30 piC/g options for its disposal must be arranged with the Minnesota Department of Health's Radiation Section.
4. If the test results are in alignment with the landfill's industrial solid waste management plan, the WFBS may be taken to a MPCA permitted landfill.

Minnesota Pollution Control Agency • 520 Lafayette Rd. N., St. Paul, MN 55155-4194 • www.pca.state.mn.us
651-296-6300 • 800-657-3864 • TTY 651-282-5332 or 800-657-3864 • Available in alternative formats

Steps for using WFBS as construction fill

1. Test the material for the analytes listed in Table 1.
2. Using the analytical results, and formulas provided, determine whether the cumulative land applications limits listed in Table 1 are met.

If the results are below the limits in Table 1, the material may be used as fill for non-residential projects.

Steps for land applying WFB

1. Test the material for the analytes listed in Table 1.
2. Using the analytical results, and formulas provided, determine whether the cumulative land applications limits listed in Table 1 are met.
3. Determine the suitability of your site for land application using Tables 2-4.
4. Send in written notification to the county solid waste officer, and either the township clerk or city mayor, which ever is applicable, to provide local officials an opportunity to comment on the proposed application site.
5. Land apply the WFB in accordance with these guidelines.
6. Keep adequate records for future use.

Testing water filter backwash

Each time the WFB is to be land applied, a representative sample of the WFB must be collected in a way that provides a sample of the material which is actually land applied. For WFB this requires that an adequate number of subsamples be collected and composited into a single sample. The sample is then sent to a certified laboratory for testing. In addition to the parameters listed in Table 1, any chemical additives present in the WFB must also be analyzed. The results of these tests will be used to calculate the acceptable application rates for the by-product.

Table 1
Analytic parameters and cumulative limits for WFB

Parameter (Totals in mg/kg)	Cumulative Limits for land application
Radium 226	4.5 (milliCi/acre)
Arsenic	37 lb/acre
Barium	No Limit Established
Cadmium	No Limit Established
Copper	No Limit Established
Lead	No Limit Established
Manganese	No Limit Established
Mercury	No Limit Established
Molybdenum	No Limit Established
Nickel	No Limit Established
Selenium	No Limit Established
Zinc	No Limit Established
% percent solids	No Limit Established

If you have questions about what to test for, please contact the MPCA. If you have questions about sampling procedures, please contact your lab.

Formulas used to determine cumulative limits:

Maximum Application Rates Based on Radium and Arsenic:

Max. application = 37 lb/acre ÷ (arsenic conc. x 0.002)
Based on arsenic (mg/kg)

Max. application = 4.5 milliCi/ac ÷ (radium 226 conc. x 0.0009)
Based on radium 226 (pCi/g)

*** The maximum allowable WTB application is the lesser of the two results above minus any amount applied to the site from previous applications.**

Actual Arsenic Loading rate (lbs/acre) = Arsenic Concentration (mg/kg) x Actual application rate of solids (dry tons/acre) x 0.002

Actual Ra-226 Loading rate (milliCi/acre) = Ra-226 Concentration (pCi/g) x Actual application rate of solids (dry tons/acre) x 0.0009

Solids Applied (dry tons/acre) = gal/acre x % total solids ÷ 240 Applied (as a decimal fraction)

Solids Applied (dry tons/acre) = Wet tons/acre x % total solids Applied (as a decimal fraction)

Site suitability criteria

All criteria in this section, including slope restrictions, site suitability criteria, and separation distances as provided in the following tables must be met for a site to be suitable for land application.

Table 2
Slope restrictions for application sites

Slope (percent)	Injection or Immediate Incorporation
0-12	Allowed
>12	Not Allowed

Table 3
Soil Suitability Criteria

Characteristic	Minimum Requirement [1]
Soil texture at the zone of by-product application	fine sand, loamy sand, sandy loam, loam, silt, silt loam, sandy clay loam, clay loam, sandy clay, silty clay loam, silty clay, or clay
Depth to bedrock	3 feet
Depth to seasonal high water table[2]	3 feet

[1] This information can be determined by obtaining information from soil surveys published by the Natural Resources Conservation Service or by characterization of the site by a state of Minnesota licensed soil scientist or other qualified individual.

Site Selection and Use

It is recommended that a Type IV certified operator determine the suitability of each site for application and be responsible for properly land spreading the WFB. The site selection process should also include the following steps:

1. Determine that the soils located on the site meet all site suitability criteria;
2. If the site has received WTB in the past, determine the amount of pollutant that can be applied to the site. This is done by subtracting the cumulative amount of pollutant applied to the site from previous application from the cumulative pollutant limit in Table 1.

Provide written notification to the county solid waste officer, and either the township clerk or city mayor (depending on the location of the site). Notifications must include a description of the WFB, and how the WFB will be land applied including any staging or storage that will occur prior to land application.

Miscellaneous management practices/restrictions

1. WFB must be incorporated or injected within 48 hours;
2. Application of WFB is not allowed on areas of a site ponded with water or liquid;
3. No runoff of the WFB from the application site is allowed;
4. No significant surface ponding of liquid WFB is allowed after 6 hours of the application;
5. All WFB which are land applied must be uniformly distributed over the area of the site used during application; and
6. Wind-blown WFB is not allowed.

Record keeping requirements

1. A map which identifies the exact site location and year of application;
2. Testing results and application rates;
3. The crop of vegetation grown on the site;
4. Daily hauling records which indicate quantities transferred to storage or land applied with the storage or site location identified;
5. The cumulative quantity of pollutant applied to the site from all applications of WTB;
6. A cumulative total of the quantity of material applied on each site for the cropping year;
7. A copy of written information provided to each end user of the WFB, this includes any test results;
8. A copy of notification letters submitted to each city, county, and township.

Table 4
Minimum separation distances from land application sites

Feature	Incorporated or Injected With 48 Hours	
Private drinking water supply wells	200 ft.	
Public drinking water supply Wells	1000 ft.	
Lakes, rivers, streams, ditches, wetlands, intermittent streams, or tile inlets connected to these surface water features[1]	slope 0%-6% slope 6%-12%	50 ft. 100 ft
Grassed Water Ways[2]	33 ft.	

[1] Intermittent stream means a drainage channel with definable banks that provides for runoff flow to any of the surface waters listed in the above table during snow melt or rainfall events.
[2] Grassed waterways are natural or constructed and seeded to grass as protection against erosion. Separation distances are from the centerline of grassed waterways. For a grassed waterway which is wider than the separation distances required, application is allowed to the edge of the grass strip.

Annual report

An annual report is only required for those facilities with a surface or subsurface discharge permitted by the MPCA.

A report of all water filter backwash solids disposal activities for the past cropping year must be submitted by December 31 of each year on the Annual Report Form. An electronic version of this form is available at the following address: http://www.pca.state.mn.us. The annual report must include the following information:

1. Method of disposal;
2. Total quantity disposed; and
3. Location of disposal; and
4. Analytical results.
5. Cumulative amount of arsenic and Radium-226 pollutant applied to the application site.

For assistance you may contact

For further assistance, contact the MPCA Customer Assistance Center at 651-297-2274, or 800-646-6247.

Terms/Definitions

Cropping Year means a year beginning on September 1 of the year prior to the growing season and ending August 31 the year the crop is harvested. For example, the 1994 cropping year began September 1, 1993 and ended August 31, 1994.

End User means the person that has accepted the IBP for their use as a soil amendment.

Immediately Incorporated means incorporated into the soil with tillage within 48 hours after surface application of an IBP.

Industrial By-product (IBP) has the same meaning as "solid waste" given in Minnesota Rules part 703 5.0300.

Type IV Certified Operator or Inspector means a person certified according to Minnesota Rules chapter 7048 for land application.

Wetlands generally include swamps, marshes, bogs, and similar areas. Wetlands must have the following attributes: (1) a predominance of hydric soils; (2) inundated or saturated by surface water or groundwater at a frequency and duration sufficient to support a prevalence of hydrophytic vegetation typically adapted for life in a saturated soil condition; and (3) under normal circumstances support a prevalence of such vegetation.

Appendix K

Treated Seed Disposal

TREATED SEED DISPOSAL

Background

Treated seeds are seeds, including grain, forage, oil-plant, and vegetable seeds, that have been treated with pesticides or fungicides. Treated seeds can usually be identified by their distinctive color. Federal law requires that a distinctive color be applied to seeds that are treated and sold. Treated seeds that will not be used by planting are considered industrial solid wastes in Minnesota.

Disposal requirements

The MPCA considers waste treated seed and packaging to be an industrial solid waste with no need for further hazardous waste evaluation by the generator, landfill, or WTE incineration facility. In accordance with Minnesota Rules and MPCA Guidance Documents, operators will manage these wastes with the following considerations:

- Gas generation. Waste treated seed may present a fermentation and methane gas generation risk. Landfill operators must determine on a project-by-project basis what prospective volume of waste treated seed and potential resulting gas generation the landfill can safely accept on a per-load or per-day basis.
- Stability and settlement. Landfill operators must determine when thin-spreading of waste treated seed over the active disposal area or incorporation into other received waste may be needed to maintain slope stability and minimize localized settlement.
- Daily cover. To prevent wildlife foraging and exposure, waste treated seed of any volume must be immediately covered.

Treated seeds

Treated seeds are seeds, including grain, forage, oil-plant, and vegetable seeds, that have been treated with pesticides or fungicides. Treated seeds can usually be identified by their distinctive color. Federal law requires that a distinctive color be applied to seeds that are treated and sold.

Treated seeds that will be used by planting

Treated seed that will be used must be planted according to the label directions on the treated seed packaging. Depending on the label directions, planting may be allowed for crop production, wildlife habitat, or erosion or weather protection. There may also be restrictions on planting rate and depth.

Treated seeds that will not be used by planting

While the Minnesota Department of Agriculture (MDA) and the U.S. Environmental Protection Agency (EPA) regulate the pesticides and fungicides that are used to treat seeds, treated seeds themselves are exempt from these requirements. Instead, management of treated seeds that will not be used by planting is regulated by the Minnesota Pollution Control Agency (MPCA).

Treated seeds that will not be used by planting are considered industrial solid wastes in Minnesota. Because of the risk of concentrating the chemicals they are treated with, waste treated seeds in Minnesota may not be:

- Buried for disposal, except in a permitted solid waste landfill, even if burial is stated as a disposal option on the treated seed label, except that farmers in Minnesota may bury treated seeds from their own farm on the farm property. Spreading and incorporation into soil, except by a farmer of their own treated seeds on their own farm, is considered being buried for disposal and is not allowed.
- Composted.
- Burned, except in a permitted Waste-To-Energy (WTE) incineration facility. Waste treated seed may not be burned openly, in corn or wood stoves, or in residential or commercial boilers, including by farmers.
- Used for ethanol, biodiesel, or other fermentation or oil processing, unless specifically approved by the MPCA. Though some treated seed labels still list ethanol production as a management option if no measurable residues of pesticides remain in resulting by-products used in agronomic practice, the MPCA is not aware of any currently available use that does not raise this risk.

Packaging and equipment

Disposable packaging from treated seed, such as bags, is also considered a regulated solid waste in Minnesota, and may not be buried or burned except in permitted facilities. Farmers who do not need to dispose of any treated seeds may dispose of treated seed bags with their normal solid waste, but may not burn any plastic.

Reusable packaging, such as totes and cartons, may be reused with or without rinsing for the same product. When washing equipment, such as seed treatment equipment, planting equipment, or reusable packaging, the MPCA recommends using only the minimum amount of rinsewater necessary.

Rinsewater may be discharged to a publicly owned treatment works, commonly known as a sewage treatment plant, after notifying the works operator and following any conditions or restrictions they apply. Rinsewater may also be applied at label rates to a crop for which the active ingredients in the seed treatment are registered. Rinsewater may not be allowed to discharge to uncropped ground, surface water, or septic systems.

Arranging for proper disposal

Manufacturers, distributors, retailers, farmers, and any other person generating waste treated seed and packaging, called the waste *generators*, are responsible for arranging for proper disposal of their waste. The MPCA considers waste treated seed and packaging to be an industrial solid waste with no need for further hazardous waste evaluation by the generator, landfill, or WTE incineration facility.

You may find a list of Minnesota landfills in MPCA fact sheet #w-sw6-04, Minnesota landfills accepting mixed municipal solid waste, at: https://www.pca.state.mn.us/sites/default/files/w-sw6-04.pdf.

You may find a list of permitted Minnesota WTE incineration facilities on the website of the Minnesota Resource Recovery Association (MRRA), at: http://mnresourcerecovery.com/.

Many of these landfills and WTE facilities may accept industrial solid waste treated seed, however **generators must contact the landfill or WTE facility first to ensure that they will agree to accept waste treated seeds and can safely manage this waste stream**.

Management in landfills

If not already explicitly included, treated seeds must be addressed in a revision to a landfill's Industrial Solid Waste Management Plan. The revised plan must be reviewed and approved by the MPCA before a landfill may receive this waste stream. Revisions for treated seeds must include:

- Gas generation. Waste treated seed may present a fermentation and methane gas generation risk. Landfill operators must determine what prospective volume of waste treated seed and potential resulting gas generation the landfill can safely accept on a per-load or per-day basis.
- Stability and settlement. Landfill operators must determine when thin-spreading of waste treated seed over the active disposal area or incorporation into other received waste may be needed to maintain slope stability and minimize localized settlement.
- Daily cover. To prevent wildlife foraging and exposure, waste treated seed of any volume must be immediately covered.

Some landfills may also be required to additionally obtain county approval to receive waste treated seed, depending on location.

More information

Guidance and requirements in this fact sheet were compiled from Minnesota Rules, Chapters 7035 and 7045, and incorporate regulatory interpretation decisions made by the MPCA on January 12, 2022. To review Minnesota Rules, visit the Office of the Revisor of Statutes at: https://www.revisor.mn.gov/pubs.

The MPCA's Small Business Environmental Assistance Program can offer free, confidential compliance assistance. For information about waste minimization, contact the Minnesota Technical Assistance Program.

Immediately report all spills that may damage the environment to the Minnesota Duty Officer.

Minnesota Pollution Control Agency

Toll free (all offices) 1-800-657-3864
All offices 651-296-6300
..... https://www.pca.state.mn.us/

Small Business Environmental Assistance Program

Toll free 1-800-657-3938
Metro 651-282-6143
..... https://www.pca.state.mn.us/sbeap/

Minnesota Technical Assistance Program

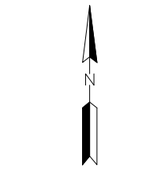
Toll free 1-800-247-0015
Metro 612-624-1300
..... http://www.mntap.umn.edu

Minnesota Duty Officer

Toll free 1-800-422-0798
Metro 651-649-5451

Plot Date & Time: 17 August 2026 3:04 PM





0 150 300
GRAPHIC SCALE IN FEET

PROPERTY BOUNDARY
PHASE BOUNDARY
EXISTING MAJOR CONTOUR
EXISTING MINOR CONTOUR
MW-1 MONITORING WELL
B-1 BORING
P-5 TEST PIT

REV	REVISION DESCRIPTION	DWN	APP	REV DATE
1	REVISED PER CLIENT COMMENTS	JJT	EDK	07/29/26
0	ISSUED FOR CUP	JJT	EDK	07/17/26

SEAL

I HEREBY CERTIFY THAT THIS PLAN, SPECIFICATION, OR REPORT WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA.

PRINT NAME ETHAN KETELSEN

SIGNATURE

DATE 07-17-2026 LICENSE # 56630

PRIME CONSULTANT

Stantec

PROJECT TITLE
CUP FIGURES

DEM-CON PILGRIM LANDFILL, LLC.

MANKATO, MINNESOTA

SHEET TITLE
SITE MAP FOR MONITORING WELLS AND BORINGS

DWN BY	CHK'D	APP'D	DWG DATE
JJT	BWS	EDK	JULY 2026

SCALE AS SHOWN

PROJECT NO. 227708930

SHEET NO. FIGURE 12

REV NO. 1

I:\227708930\drafting\cad\Figures\Figure 12_Site Map.dwg

Lime Township Planning Commission **4. 2.**

Meeting Date: 08/27/2026

Title

CYL-0009-26

Request of Xcel Energy, on behalf of property owner, Gerald Rausch, for a Conditional Use Permit to replace a deteriorating power pole and equipment on site. The subject property is described as the SW ¼ SW ¼ of section 27, Township 109, Range 26, excepting therefrom: A tract of land slightly in excess of 4 acres situate in the Southwest Quarter of the Southwest Quarter of Section 27-109-26 described as follows: Commencing at the Northwest corner of said Southwest Quarter of the Southwest Quarter and running thence South a distance of 400 feet; thence at right angles East a distance of 450 feet; thence at right angles North a distance of 400 feet; and thence West at right angles a distance of 450 feet to the point of the beginning. Included herein is a permanent right for easement for second parties to use the existing cartway and adjoining the above described tract on the North which cartway runs in a Easterly and Westerly direction; and the cost of maintenance of said cartway shall be borne by the users thereof, 23351 583rd Avenue, Lime Township, Blue Earth County (PID R400427300001).
The anticipated date of Lime Township Board action is September 8, 2026 at 7:30 p.m. at the Mankato Regional Airport.

Applicant

The applicant, Xcel Energy, on behalf of the property owners, Gerald Rausch.

Request

Request of Xcel Energy, on behalf of property owner, Gerald Rausch, for a Conditional Use Permit to replace a deteriorating power pole and equipment on site.

Location

The subject property is described as the SW ¼ SW ¼ of section 27, Township 109, Range 26, excepting therefrom: A tract of land slightly in excess of 4 acres situate in the Southwest Quarter of the Southwest Quarter of Section 27-109-26 described as follows: Commencing at the Northwest corner of said Southwest Quarter of the Southwest Quarter and running thence South a distance of 400 feet; thence at right angles East a distance of 450 feet; thence at right angles North a distance of 400 feet; and thence West at right angles a distance of 450 feet to the point of the beginning. Included herein is a permanent right for easement for second parties to use the existing cartway and adjoining the above described tract on the North which cartway runs in a Easterly and Westerly direction; and the cost of maintenance of said cartway shall be borne by the users thereof, 23351 583rd Avenue, Lime Township, Blue Earth County (PID R400427300001).

Existing Land Use

The land consists of a parcel located Northeast of State Highway 22 and is currently being used for residential purposes.

Zoning

The property is located in Lime Township and is zoned Agriculture.

Environmentally Sensitive Areas

There are no known environmentally sensitive areas within the parcel.

City Code

The Lime Township Ordinance can be found at this link: Lime Township Ordinances
The Mankato Regional Airport Zoning Ordinance can be found at this link: Mankato Regional Airport Zoning Ordinance

Review

The applicant, Xcel Energy is requesting, on behalf of property owner, Gerald Rausch, for a Conditional Use Permit to replace a deteriorating power pole and equipment on site. The property encompasses approximately 4.13 acres and is located within Airport Flight Zone C. Xcel Energy applied for the required FAA form given the airport zoning and was not required to submit notice according to the obstruction evaluation/airport airspace analysis.

The parcel is situated within the Agriculture Zoning District, which requires a Conditional Use Permit for essential services. The Lime Township Zoning Ordinance states: "The following uses may be permitted within the Agriculture District as a Conditional Use: Essential services" (Article 4, Section 2, Part B, Subpart 3). An essential service is described in the Lime Township Code as "communication towers, poles, wires, mains, drains, sewers, pipes, conduits, cables, fire alarm boxes, police call boxes, and accessories including Accessory Structures" (Article 2 Rules and Definitions, Section 5 Definitions). Given the definition and CUP requirement the applicant is requesting to replace the deteriorating poles on the requested parcel.

The applicant shall submit documentation illustrating compliance of a Subsurface Treatment System (SSTS) on the site. A recommended condition requires the applicant to coordinate with Blue Earth County to obtain approval for the septic system location. Coordination with the County will also be required for the compliance of a well prior to applying for land development permit.

Site access will remain unchanged, continuing from 583rd Avenue, as identified in the submitted plans. Any modifications to access will require additional review and approval by the Township Board and Blue Earth County.

Landscaping on the parcel will remain the same, left in a natural state and in a well-kept condition.

Noise levels will remain the same on the property and shall conform to Minnesota Rules Chapter 7030.

Odors on the property will remain the same.

There will be no changes to exterior lighting on the property.

The proposal will not impact nearby properties with vibrations, smoke and particular matter, toxic or Noxious matter and/or dust.

Prior to any construction of the power pole replacement, the applicant must obtain a land development permit.

Findings

Staff respectfully submits the following findings:

1. The establishment, maintenance, or operation of the conditional use allowing the replacement of utility pole will not be detrimental or endanger the public health, safety, comfort or general welfare.
2. The Conditional Use will not be injurious to the use and enjoyment of other property in the immediate vicinity for the purpose already permitted, nor substantially diminish and impair property values within the neighborhood given that the pole replacement would provide steady electricity to the surrounding area.
3. The establishment of the conditional use permit will not impede the normal and orderly development and improvement of surrounding property for uses permitted in the district.
4. Adequate utilities, access roads, drainage and necessary facilities have been or will be provided.
5. Adequate measures have been or will be taken to provide ingress or egress so designated as to minimize traffic congestion in the public streets.
6. The use of the property shall, in all respects other than conditional use, conforms to the applicable regulations of the district in which it is located, because the current use is permitted in the agricultural district and will not change based on the proposal.
7. The proposed use does not create a potential pollution hazard.
8. The establishment of the conditional use will not impede the normal and orderly development and improvement of surrounding vacant property for predominant uses in the area because the use will remain the same.
9. Adequate measures have been or will be taken to prevent or control offensive odor, fumes, dust, noise, and vibration so that none of these will constitute a nuisance, and to control lighted signs and other exterior lights in such a manner that no disturbance to neighboring properties will result. Given that the request is a one time replacement of deteriorating poles on the property.
10. The Conditional Use conforms to the joint resolution for orderly annexation.
11. Site-specific conditions and such other conditions are established as required for the protection of the public's health, safety, morals, and general welfare.

Recommendation

Staff recommends approval of the conditional use permit to replace the deteriorating power pole and equipment on site with the following conditions:

1. A land development permit shall be obtained prior to the commencement of construction for the deteriorated pole and equipment on site.
2. The applicant shall seek written approval from Blue Earth County on the septic and well compliance prior to applying for a land use development permit.

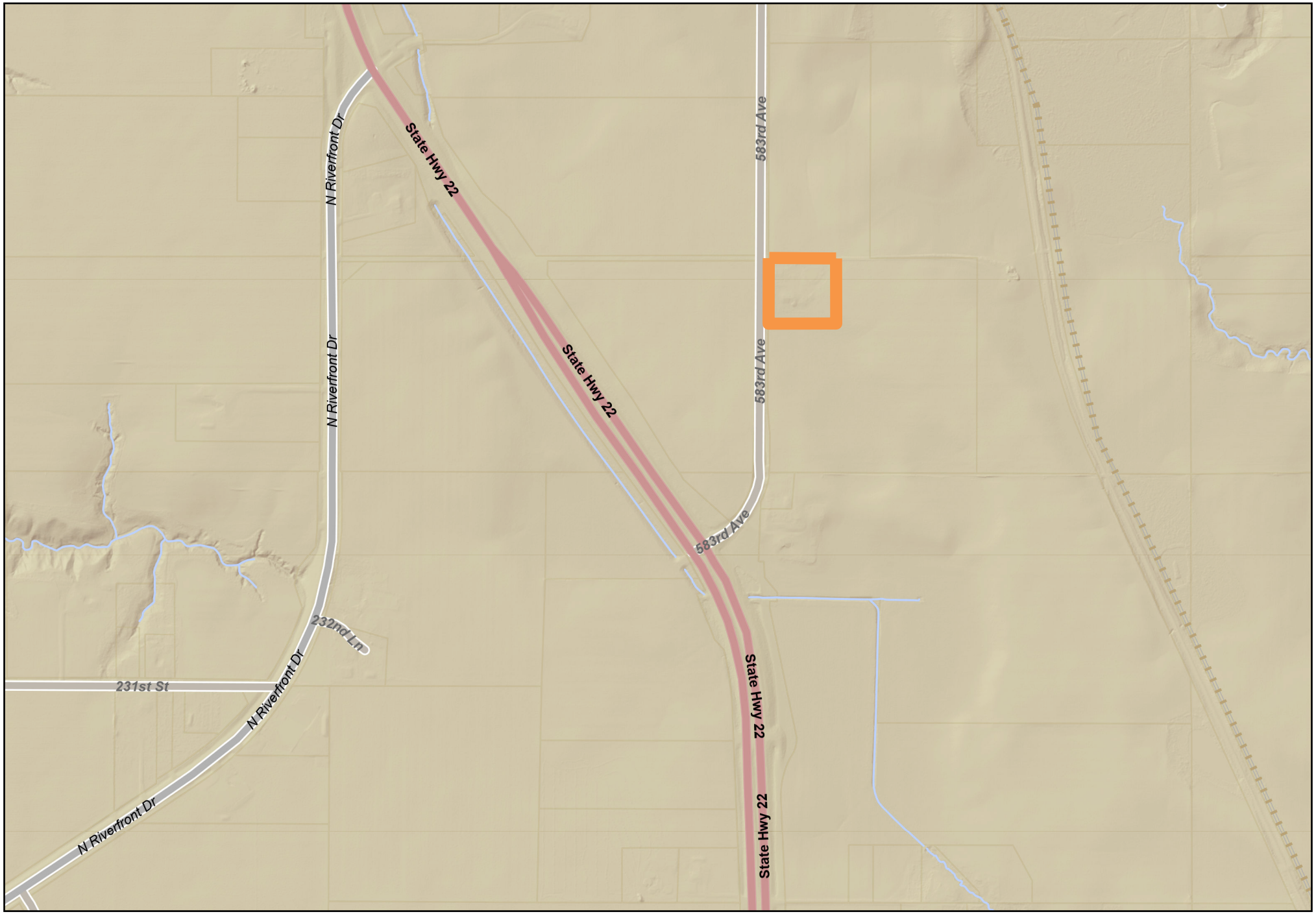
Attachments

General Location Map

Aerial Map

Site Plan

General Location Map



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Produced by: City of Mankato GIS
Published: August 12, 2026

Aerial Map



N W E S

0 0.2 0.5 0.9 mi

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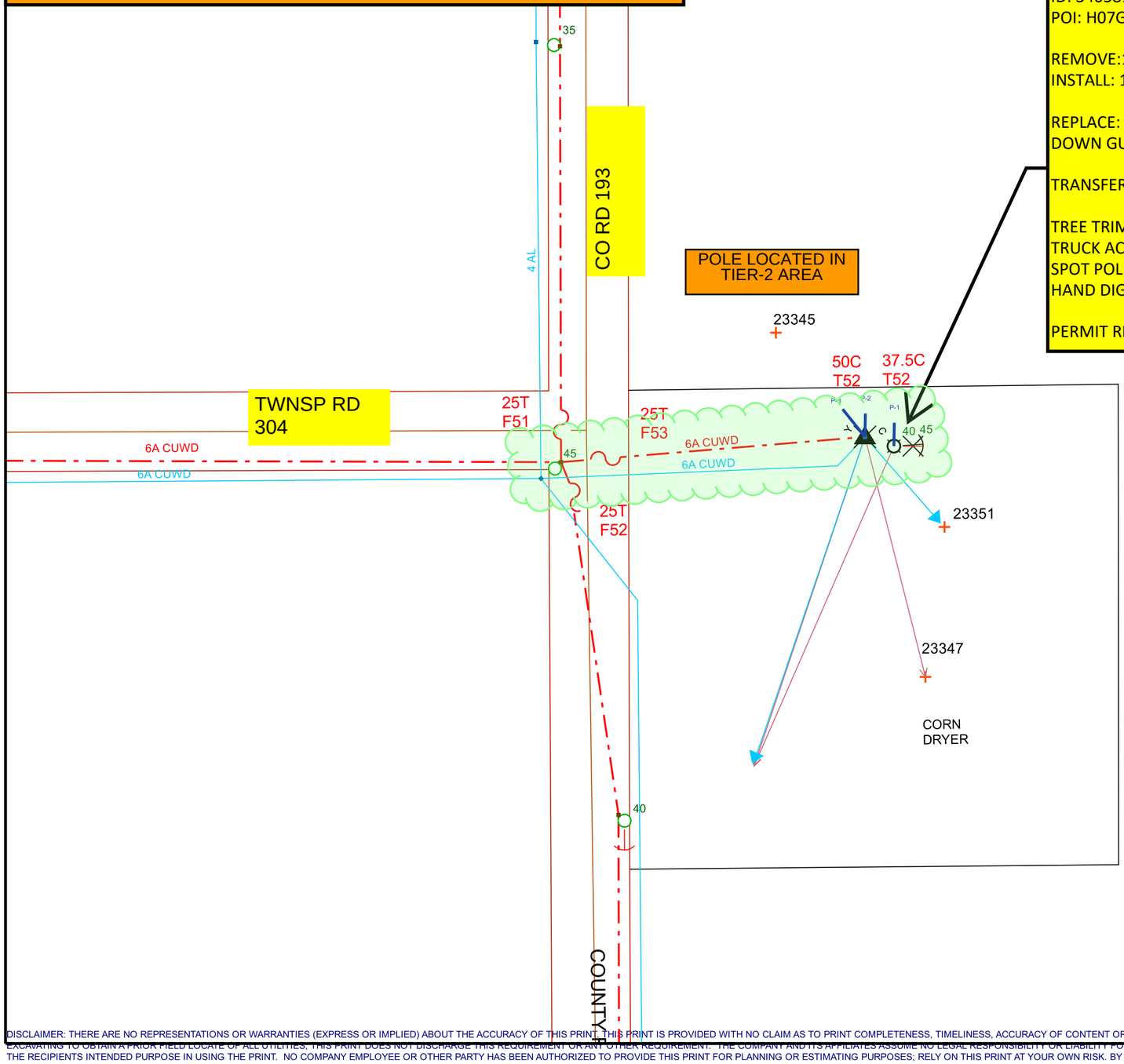
Produced by: City of Mankato GIS
Published: August 12, 2026

Mankato — Leading the way...

P-1 SN# 15722891
ADDRESS: 23351 583rd Ave, Mankato, MN 56001
COORDINATES: 44.21412 -93.948486
FEEDER: SMT072/C/7.97KV
WO#: 115457883



ID: 34058189
POI: H07G15T52

REMOVE:1Ø 37.5 KVA XMFR (E-20)
INSTALL: 1Ø 50 KVA XMFR (E-20)

REPLACE: POLE W/ A 45'/2 POLE 1Ø DE (C-11/C-209WF2) & DOWN GUY (B-1)

TRANSFER: CONDUCTORS, OH SVC'S

TREE TRIM: YES
TRUCK ACCESS: YES
SPOT POLE: NO
HAND DIG: NO

PERMIT REQ'D: LIME TWP



CONNER THOMAS
conner.thomas@xcelenergy.com
406-425-3348

Work Order Information		
Service Request #	:	000015722891
Design Number	:	000001238545
Designer/Planner ID	:	326089
Designer/Planner Name	:	CONNER THOMAS
Designer/Planner Ph #	:	406-425-3348
Manager Approval	:	

Joint Utility	
E:	G:
T:	C:

Design Location	
Division	: MANKATO
County	: BLUE EARTH
City	: MANKATO
Address	:
T: 109N R: 26W S: 27	
Map # : H07G15	Permit :

Electric	
Feeder:	Voltage:
Phase:	Bkup Dev ID:

Gas			
System	:	Pressure	:
Size	:	Material	:
Dead End	:		

Work Order # :

Date: 12/16/2025
Sketch: # Of # Sketch Data
Scale: 1" equals 100'



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RFO _____
FOREMAN _____ DATE _____
TEAM LEADER _____

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Lime Township Planning Commission **4. 3.**

Meeting Date: 08/27/2026

Title

CYL-0010-26

Request of Xcel Energy, on behalf of the property owner, Vetter Stone, for a Conditional Use Permit to replace a couple of deteriorating power poles and equipment on site. The subject property is described as That part of the Northeast quarter of the Southwest quarter (NE1/4 of the SW 1/4) of Section Twenty (20),Township One Hundred Nine (109) North, Range Twenty-Six (26) West, lying west of the Railroad right-of-way, 23894 3rd Avenue, Lime Township, Blue Earth County (PID R40042032600).

The anticipated date of Lime Township Board action is September 8, 2026 at 7:30 p.m. at the Mankato Regional Airport.

Applicant

The applicant, Xcel Energy, on behalf of the property owners, Vetter Stone.

Request

Request of Xcel Energy, on behalf of property owner, Vetter, for a Conditional Use Permit to replace a deteriorating power poles and equipment on site.

Location

The subject property is described as That part of the Northeast quarter of the Southwest quarter (NE1/4 of the SW 1/4) of Section Twenty (20), Township One Hundred Nine (109) North, Range Twenty-Six (26) West, lying west of the Railroad right-of-way, 23894 3rd Avenue, Lime Township, Blue Earth County (PID R40042032600).

Existing Land Use

The land consists of a parcel located off of 3rd Avenue and west of the Railroad tracks and is currently being used for business purposes.

Zoning

The property is located in Lime Township and is zoned Rural Conservation.

Environmentally Sensitive Areas

There are ravines located throughout the parcel and a flood zone is located on the Northwest side of the parcel.

City Code

The Lime Township Ordinance can be found at this link: Lime Township Ordinances

Review

The applicant, Xcel Energy is requesting, on behalf of property owner, Vetter Stone, for a Conditional Use Permit to replace deteriorating power poles and equipment on site. The first pole is located centrally on the East side of the parcel off of 574th Avenue and the 2nd pole that is proposed to get replaced is located on the most Northeast corner of the property. Both of the powerline poles are located in areas identified as ravines, which is prohibited in Lime Township to build a structure in. However, the following poles are considered legal nonconformities, given the time of placement and use. According to the Lime Township, "legal non-conformities may be continued or restored in accordance with this Section" (Article 1, Section 8, Part A, subpart 2). Thus allowing for the two poles to be replaced and restored in the same location as previously approved.

The parcel is situated within the Rural Conservation District, which requires a Conditional Use Permit for essential services. The Lime Township Zoning Ordinance states: "The following uses may be permitted in the RC, Rural Conservation, and RC-R, Rural Conservation Residential Districts, as a Conditional Use: Essential public utilities and service structures, not including storage yards" (Article 4, Section 3, Part C, Subpart 1). An essential service is described in the Lime Township Code as "communication towers, poles, wires, mains, drains, sewers, pipes, conduits, cables, fire alarm boxes, police call boxes, and accessories including Accessory Structures" (Article 2 Rules and Definitions, Section 5 Definitions). Given the definition and CUP requirement the applicant is requesting to replace the deteriorating poles on the requested parcel.

The applicant shall submit documentation illustrating compliance of a Subsurface Treatment System (SSTS) on the site. A recommended condition requires the applicant to coordinate with Blue Earth County to obtain approval for the septic system location. Coordination with the County will also be required for the compliance of a well prior to applying for land development permit.

Site access will remain unchanged, continuing from 3rd Avenue, as identified in the submitted plans. Any modifications to access will require additional review and approval by the Township Board and Blue Earth County.

Landscaping on the parcel will remain the same, left in a natural state and in a well-kept condition.

Noise levels will remain the same on the property and shall conform to Minnesota Rules Chapter 7030.

Odors on the property will remain the same.

There will be no changes to exterior lighting on the property.

The proposal will not impact nearby properties with vibrations, smoke and particular matter, toxic or Noxious matter and/or dust.

Prior to any construction of the power pole replacement, the applicant must obtain a land development permit.

Findings

Staff respectfully submits the following findings:

1. The establishment, maintenance, or operation of the conditional use allowing the replacement of utility pole will not be detrimental or endanger the public health, safety, comfort or general welfare.
2. The Conditional Use will not be injurious to the use and enjoyment of other property in the immediate vicinity for the purpose already permitted, nor substantially diminish and impair property values within the neighborhood given that the pole replacement would provide steady electricity to the surrounding area.
3. The establishment of the conditional use permit will not impede the normal and orderly development and improvement of surrounding property for uses permitted in the district.
4. Adequate utilities, access roads, drainage and necessary facilities have been or will be provided.
5. Adequate measures have been or will be taken to provide ingress or egress so designated as to minimize traffic congestion in the public streets.
6. The use of the property shall, in all respects other than conditional use, conforms to the applicable

regulations of the district in which it is located, because the current use is permitted in the Rural Conservation district and will not change based on the proposal.
7. The proposed use does not create a potential pollution hazard.
8. The establishment of the conditional use will not impede the normal and orderly development and improvement of surrounding vacant property for predominant uses in the area because the use will remain the same.
9. Adequate measures have been or will be taken to prevent or control offensive odor, fumes, dust, noise, and vibration so that none of these will constitute a nuisance, and to control lighted signs and other exterior lights in such a manner that no disturbance to neighboring properties will result. Given that the request is a one time replacement of deteriorating poles on the property.
10. The Conditional Use conforms to the joint resolution for orderly annexation.
11. Site-specific conditions and such other conditions are established as required for the protection of the public's health, safety, morals, and general welfare.

Recommendation

Staff recommends approval of the conditional use permit to replace the deteriorating power pole and equipment on site with the following conditions:

1. A land development permit shall be obtained prior to the commencement of construction for the deteriorated pole and equipment on site.
2. The applicant shall seek written approval from Blue Earth County on the septic and well compliance prior to applying for a land use development permit.

Attachments

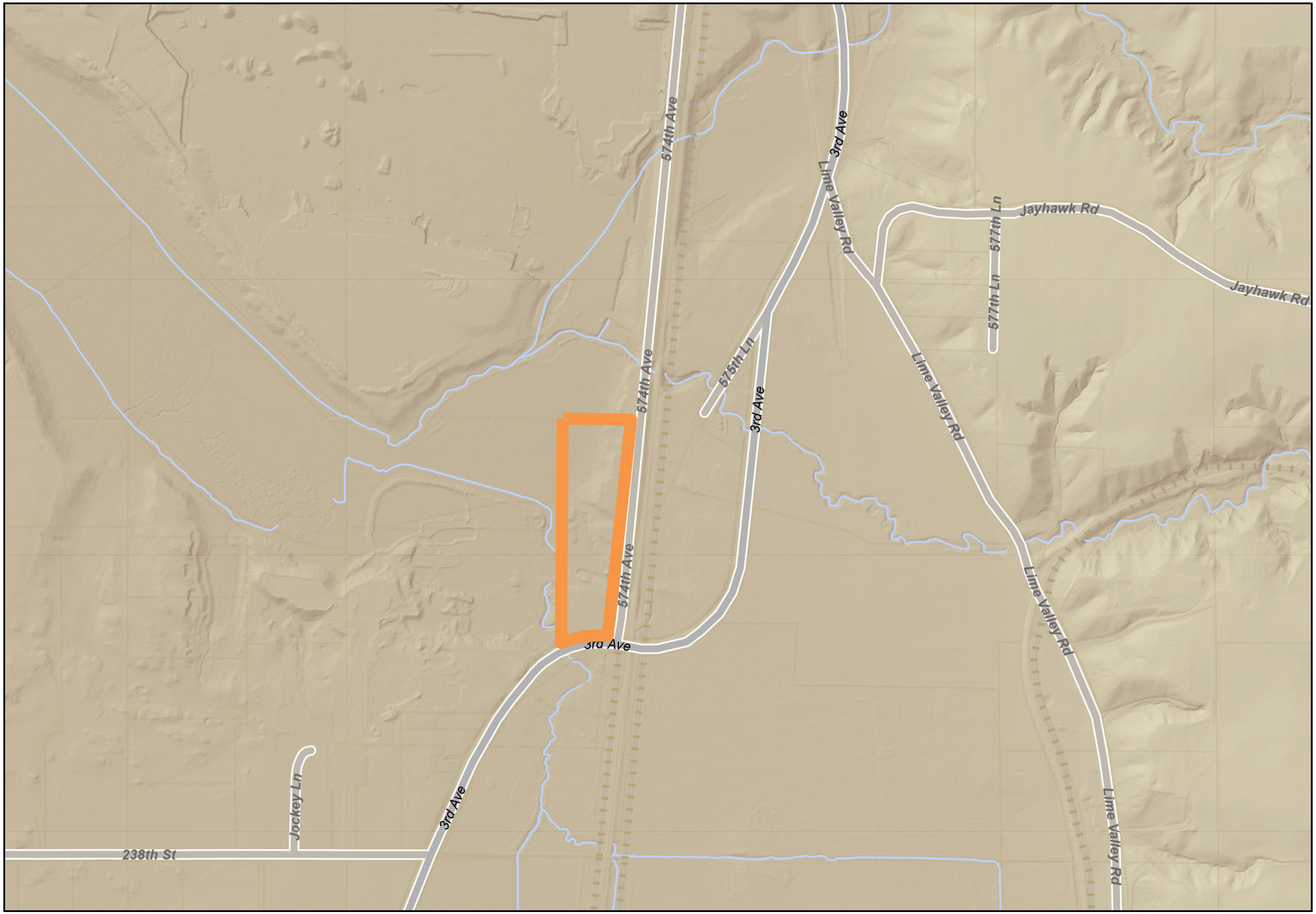
General Location Map

Aerial Map

Site Plan 1

Site Plan 2

General Location Map



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Produced by: City of Mankato GIS
Published: August 12, 2026

Mankato
Leading the way...

Aerial Map



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Produced by: City of Mankato GIS
Published: August 12, 2026

City of Mankato
Leading the way...

P1 SN# 15722975
ADDRESS: 24034 575th Ln, Mankato, MN 56001
COORDINATES: 44.23233 -93.982734
FEEDER: SMT082/BAC/13.8kV
WO#: 115430652

ID: 34057400
POI: H07C11F51

INSTALL: DG (B-1)

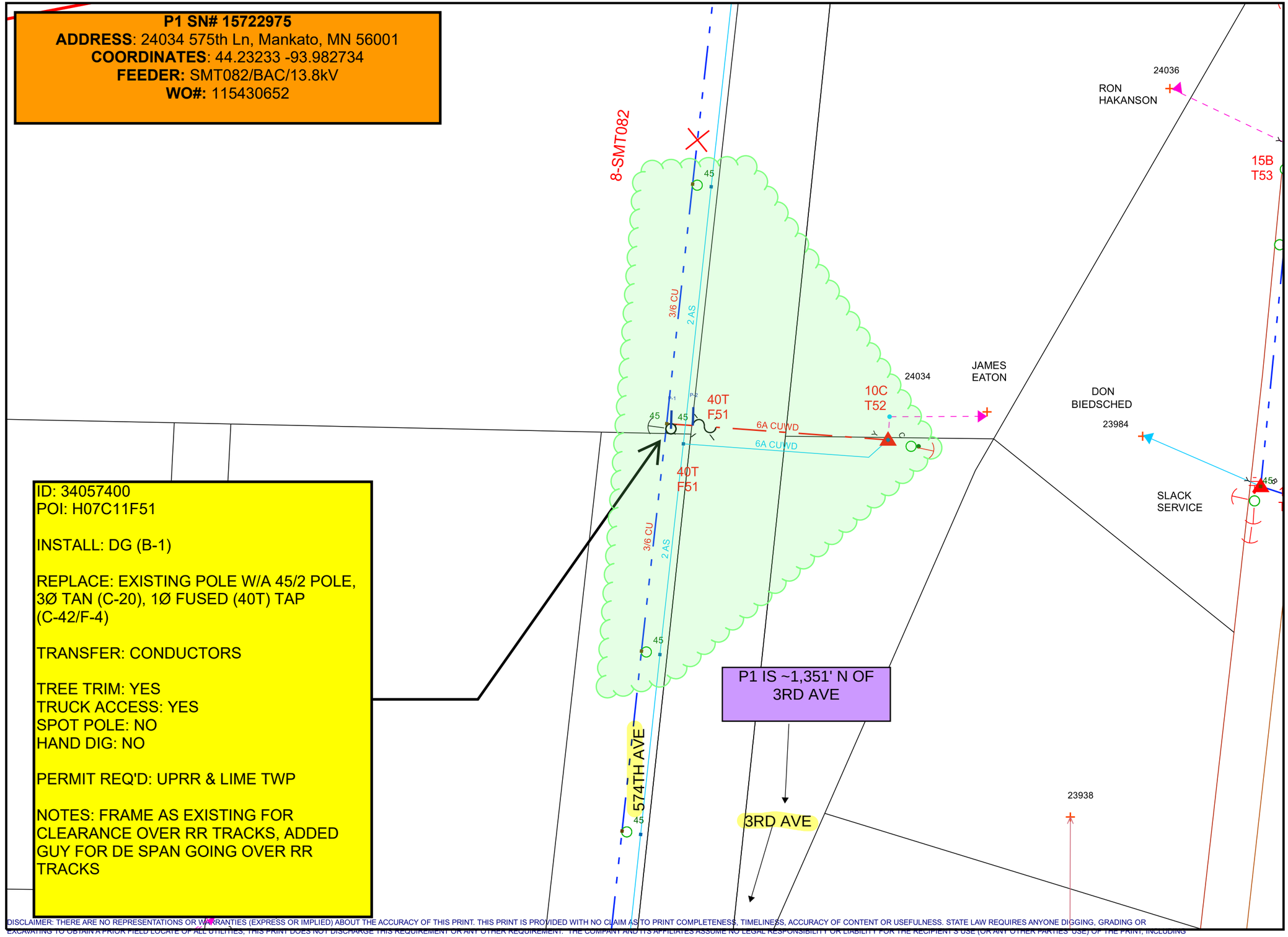
REPLACE: EXISTING POLE W/A 45/2 POLE, 3Ø TAN (C-20), 1Ø FUSED (40T) TAP (C-42/F-4)

TRANSFER: CONDUCTORS

TREE TRIM: YES
TRUCK ACCESS: YES
SPOT POLE: NO
HAND DIG: NO

PERMIT REQ'D: UPRR & LIME TWP

NOTES: FRAME AS EXISTING FOR CLEARANCE OVER RR TRACKS, ADDED GUY FOR DE SPAN GOING OVER RR TRACKS





MATTHEW MEARS
Mathew.Mears@xcelenergy.com
816-414-1149

Work Order Information		
Service Request #	:	000015722975
Design Number	:	000001244785
Designer/Planner ID	:	319010
Designer/Planner Name	:	
Designer/Planner Ph #	:	(000) 000-0000
Manager Approval	:	

Joint Utility	
E:	G:
T:	C:

Design Location		
Division	:	Mankato
County	:	Blue Earth
City	:	LIME TWP
Address	:	
T: 109N	R: 26W	S: 20
Map # : H07C11	Permit	:

Electric	
Feeder:	Voltage:
Phase:	Bkup Dev ID:

Gas			
System	:	Pressure	:
Size	:	Material	:
Dead End	:		

Work Order # :

Date: 01/15/2026
Sketch: # Of # Sketch Data
Scale: 1" equals 100'

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☐ CHANGES MADE AS INDICATED (ALL URD MUST HAVE ACTUAL MEASUREMENTS FROM THE FIELD SITE)

RFO _____
FOREMAN _____ DATE _____
TEAM LEADER _____

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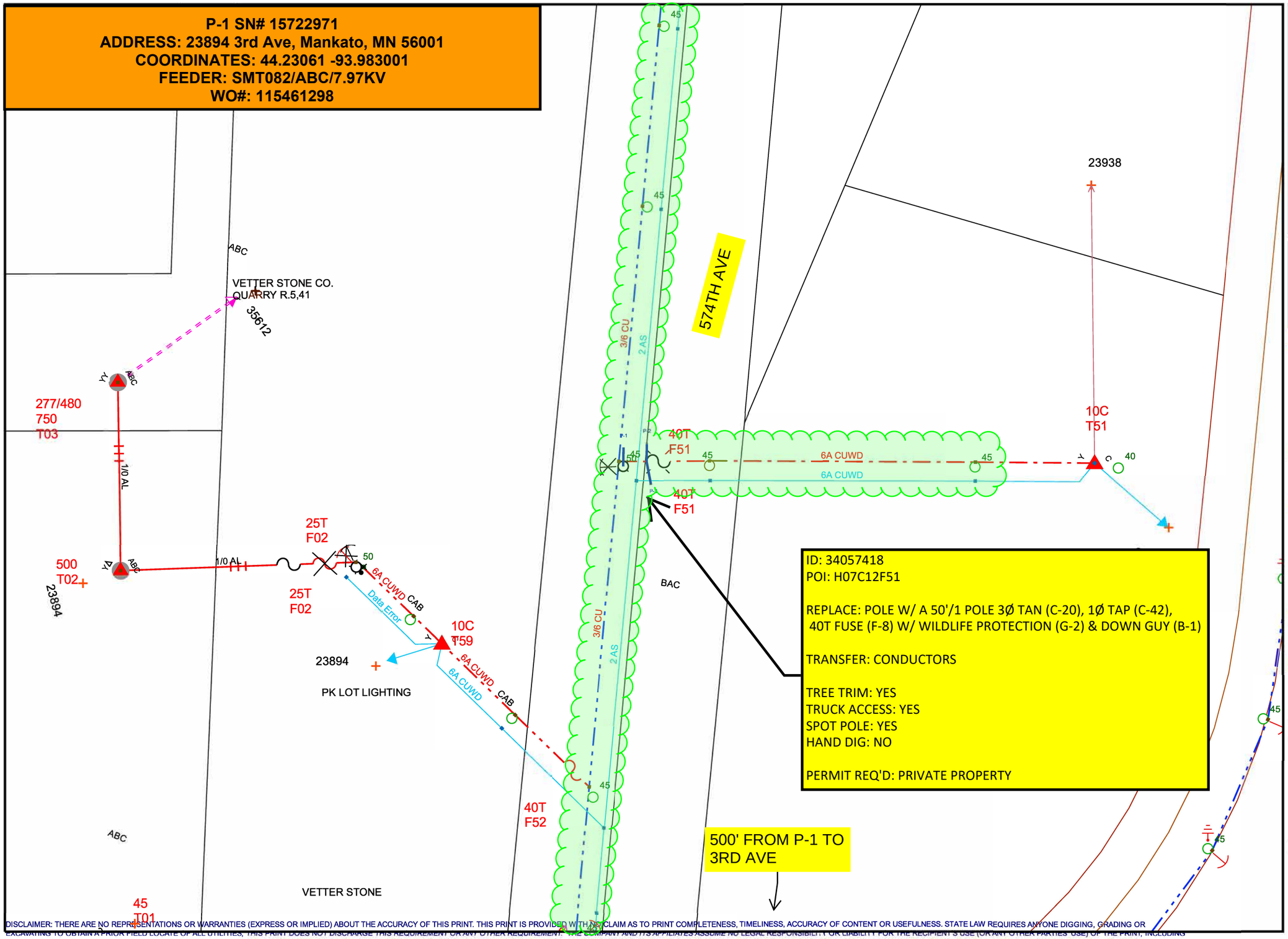
P-1 SN# 15722971
ADDRESS: 23894 3rd Ave, Mankato, MN 56001
COORDINATES: 44.23061 -93.983001
FEEDER: SMT082/ABC/7.97KV
WO#: 115461298





CONNER THOMAS
conner.thomas@xcelenergy.com
406-425-3348

Work Order Information		
Service Request #	:	000015722971
Design Number	:	000001238986
Designer/Planner ID	:	326089
Designer/Planner Name	:	CONNER THOMAS
Designer/Planner Ph #	:	406-425-3348
Manager Approval	:	

Joint Utility	
E:	G:
T:	C:

Design Location	
Division	: Mankato
County	: Blue Earth
City	: Mankato
Address	:
T: 109N R: 26W S: 20	
Map # : H07C11	Permit :

Electric	
Feeder:	Voltage:
Phase:	Bkup Dev ID:

Gas			
System	:	Pressure	:
Size	:	Material	:
Dead End	:		
Work Order #	:		

Date: 11/18/2025
Sketch: # Of # Sketch Data
Scale: 1" equals 100'

N W E S

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RFO
FOREMAN DATE
TEAM LEADER

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Lime Township Planning Commission **4. 4.**

Meeting Date: 08/27/2026

Title

CYL-0011-26

Request of Xcel Energy, on behalf of the property owner, OMG Midwest Inc, for a Conditional Use Permit to replace a deteriorating power pole and equipment on site. The subject property is described as Tract 1, Registered Land Survey 178, 57032 231st Lane, Lime Township, Blue Earth County (PID R400431200039).
The anticipated date of Lime Township Board action is September 8, 2026 at 7:30 p.m. at the Mankato Regional Airport.

Applicant

The applicant, Xcel Energy, on behalf of the property owners, OMG Midwest Inc

Request

Request of Xcel Energy, on behalf of property owner, OMG Midwest Inc, for a Conditional Use Permit to replace a deteriorating power pole and equipment on site.

Location

The subject property is described as Tract 1, Registered Land Survey 178, Lime Township, Blue Earth County (PID R400431200039).

Existing Land Use

The land consists of a parcel located West of 3rd Avenue and northwest of 231st Lane. The property is currently being used as a landfill.

Zoning

The property is located in Lime Township and is zoned Industrial.

Environmentally Sensitive Areas

There is a ravine located along the East side of the property.

City Code

The Lime Township Ordinance can be found at this link: Lime Township Ordinances

Review

The applicant, Xcel Energy is requesting, on behalf of the property owner, OMG Midwest Inc, for a Conditional Use Permit to replace a deteriorating power pole and equipment on site. The parcel encompasses 16.44 acres and is currently being utilized for landfill operations and contains an office for employees working onsite. The purposed replacement pole is located on the property line on the west side of the parcel.

The parcel is situated within the Industry Zoning District, which requires a Conditional Use Permit for Electrical products. The Lime Township Zoning Ordinance states: "The following uses may be permitted in the Industry District as a Conditional Use: Electrical products, manufacture and assembly" (Article 4, Section 8, Part C, Subpart 4). An essential service is described in the Lime Township Code as "communication towers, poles, wires, mains, drains, sewers, pipes, conduits, cables, fire alarm boxes, police call boxes, and accessories including Accessory Structures" (Article 2 Rules and Definitions, Section 5 Definitions). Given the definition and CUP requirement the applicant is requesting to replace the deteriorating poles on the requested parcel.

The applicant shall submit documentation illustrating compliance of a Subsurface Treatment System (SSTS) on the site. A recommended condition requires the applicant to coordinate with Blue Earth County to obtain approval for the septic system location. Coordination with the County will also be required for the compliance of a well prior to applying for land development permit.

Site access will remain unchanged, continuing from 231st Lane, as identified in the submitted plans. Any modifications to access will require additional review and approval by the Township Board and Blue Earth County.

Landscaping on the parcel will remain the same, left in a natural state and in a well-kept condition.

Noise levels will remain the same on the property and shall conform to Minnesota Rules Chapter 7030.
Odors on the property will remain the same.

There will be no changes to exterior lighting on the property.

The proposal will not impact nearby properties with vibrations, smoke and particular matter, toxic or Noxious matter and/or dust.

Prior to any construction of the power pole replacement, the applicant must obtain a land development permit.

Findings

Staff respectfully submits the following findings:

1. The establishment, maintenance, or operation of the conditional use allowing the replacement of utility pole will not be detrimental or endanger the public health, safety, comfort or general welfare.
2. The Conditional Use will not be injurious to the use and enjoyment of other property in the immediate vicinity for the purpose already permitted, nor substantially diminish and impair property values within the neighborhood given that the pole replacement would provide steady electricity to the surrounding area.
3. The establishment of the conditional use permit will not impede the normal and orderly development and improvement of surrounding property for uses permitted in the district.
4. Adequate utilities, access roads, drainage and necessary facilities have been or will be provided.
5. Adequate measures have been or will be taken to provide ingress or egress so designated as to minimize traffic congestion in the public streets.
6. The use of the property shall, in all respects other than conditional use, conforms to the applicable regulations of the district in which it is located, because the current use is has been previously approved in the Industry district and will not change based on the proposal.
7. The proposed use does not create a potential pollution hazard.
8. The establishment of the conditional use will not impede the normal and orderly development and improvement of surrounding vacant property for predominant uses in the area because the use will remain the same.

9. Adequate measures have been or will be taken to prevent or control offensive odor, fumes, dust, noise, and vibration so that none of these will constitute a nuisance, and to control lighted signs and other exterior lights in such a manner that no disturbance to neighboring properties will result. Given that the request is a one time replacement of deteriorating poles on the property.
10. The Conditional Use conforms to the joint resolution for orderly annexation.
11. Site-specific conditions and such other conditions are established as required for the protection of the public's health, safety, morals, and general welfare.

Recommendation

Staff recommends approval of the conditional use permit to replace the deteriorating power pole and equipment on site with the following conditions:

1. A land development permit shall be obtained prior to the commencement of construction for the deteriorated pole and equipment on site.
2. The applicant shall seek written approval from Blue Earth County on the septic and well compliance prior to applying for a land use development permit.

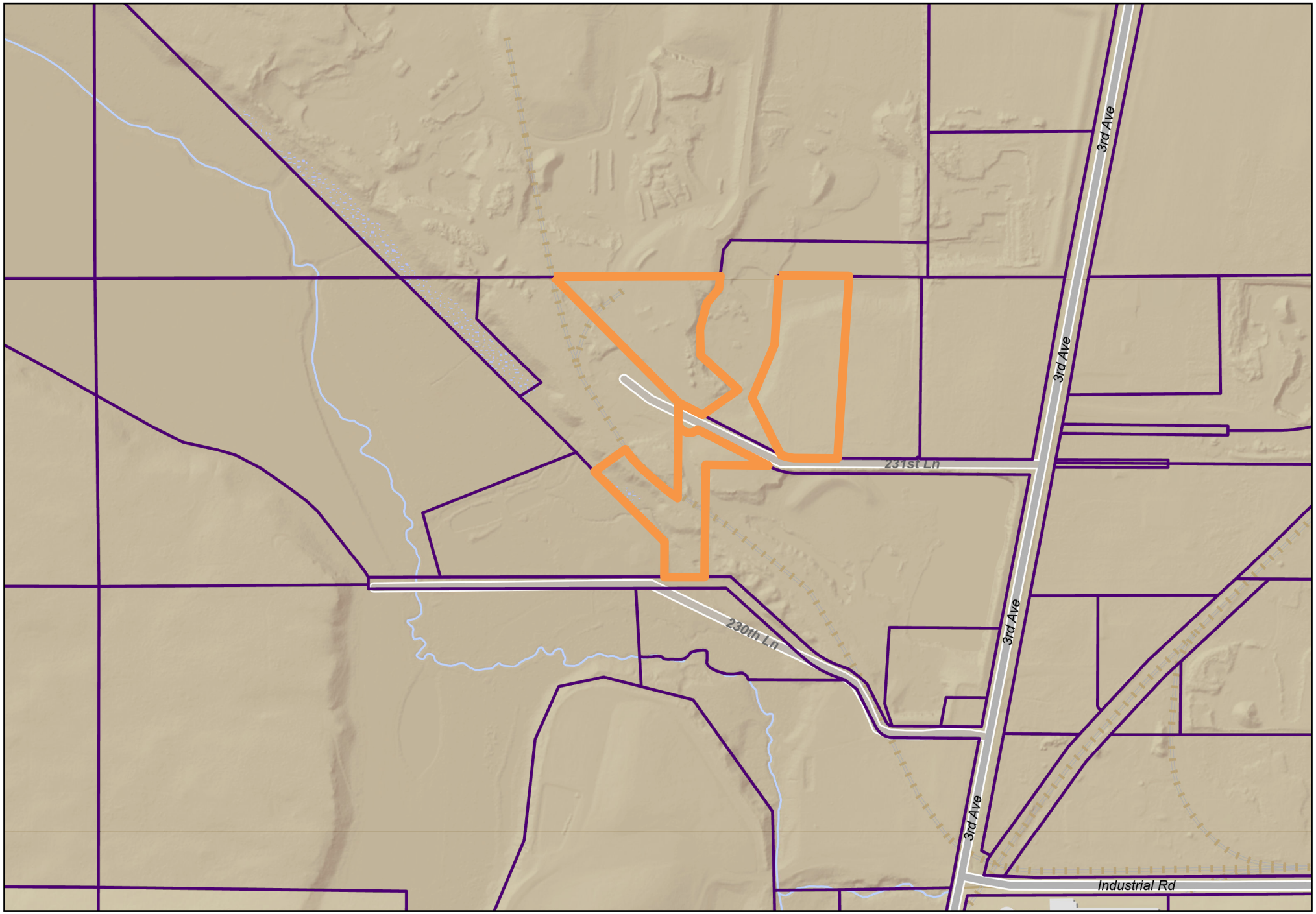
Attachments

General Location Map

Aerial Map

Site Plan

General Location Map



N
W E
S

0 0.2 0.3 0.6 mi

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Produced by: City of Mankato GIS
Published: August 13, 2026

City of Mankato
Leading the way...

Aerial Map



N
W E
S

0 0.2 0.4 0.8 mi

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Produced by: City of Mankato GIS
Published: August 13, 2026

City of Mankato — Leading the way...

P1 SN# 15722922
ADDRESS: 57032 231st Ln, Mankato, MN 56001
COORDINATES: 44.20987 -94.000831
FEEDER: SMT082/ABC/13.8kV
WO#: 115427251

P1 IS 1900 ' NW OF 3RD AVE AND 231ST LN INTERSECTION

ID: 34118479

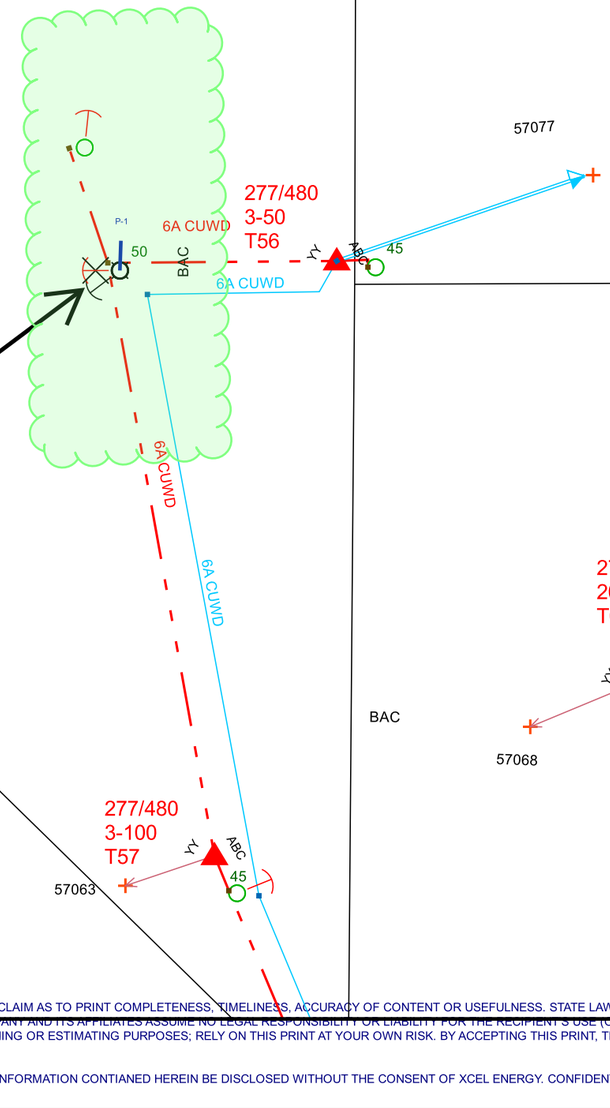
REPLACE: EXISTING POLE W/ A 50/2 POLE, 3Ø TAN (C-20), 3Ø NON-FUSED DE TAP (C-39), SEC HRDW (D-15), DG (B-2).

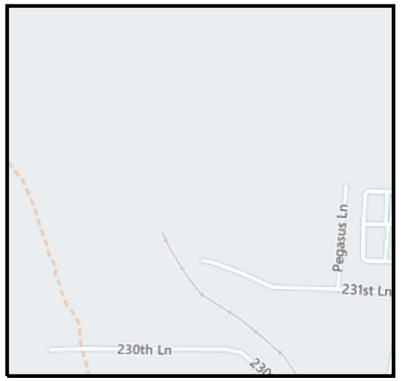
TRANSFER:
CONDUCTORS

TREE TRIM: YES
TRUCK ACCESS: YES
SPOT POLE: YES
HAND DIG: NO

PERMIT REQ'D: LIME TWP

NOTES:
- FIELD VERIFY SEC, EXTRA MAT'L GIVEN.





JENO SANTOLI
Jeno.Santoli@xcelenergy.com
816-414-1169

Work Order Information		
Service Request #	:	000015722922
Design Number	:	000001244642
Designer/Planner ID	:	319010
Designer/Planner Name	:	
Designer/Planner Ph #	:	(000) 000-0000
Manager Approval	:	_____

Joint Utility	
E:	G:
T:	C:

Design Location		
Division	:	Mankato
County	:	Blue Earth
City	:	LIME TWP
Address	:	
T: 109N	R: 26W	S: 30
Map # : 0	Permit	:

Electric	
Feeder:	Voltage:
Phase:	Bkup Dev ID:

Gas			
System	:	Pressure	:
Size	:	Material	:
Dead End	:		
Work Order #	:		

Date: 01/15/2026
Sketch: # Of # Sketch Data
Scale: 1" equals 100'

Xcel Energy®

CONSTRUCTION USE ONLY
- ☐ NO CHANGES (BUILT AS DESIGNED)
- ☐ CHANGES MADE AS INDICATED (ALL URD MUST HAVE ACTUAL MEASUREMENTS FROM THE FIELD SITE)

RFO _____
FOREMAN _____ DATE _____
TEAM LEADER _____

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Lime Township Planning Commission **4. 5.**

Meeting Date: 08/27/2026

Title

CYL-0012-26

Request of Kyle Kaldor, on behalf of the property, Joe Holtmeier, for an amendment to the previously approved Conditional Use Permit's Reclamation plan. The applicant is requesting for an Interim Use permit for the proposed use of an outdoor recreation and campground development. Additionally, there are three variance requests: one, to reduce the front yard fencing setback of 65 feet to 35 feet off of 230th lane, second, to reduce the front yard fencing setback of 130 feet to 45 feet off of 3rd avenue, and third, to increase the allowable height of an accessory structure in the Rural Conservation District of 35 feet to 100 feet given that the applicant is requesting to place a historic Quarry Derrick Crane. The subject property is described as Beginning at the center of the Big Sioux and Mendota Road where it crosses the North line of the SE ¼ of Section 30, Township 109 North, Range 26 West, thence running West on said line 14 rods, thence South 12 rods, thence East to the center of said road, thence Northerly along the center of said road to the point of the beginning, Lime Township, Blue Earth County (PID R40043040002), and That part of the Southeast Quarter of Section 30 lying west of the center line of County Highway No. 5, all in Township 109 North Range 26 West, Blue Earth County, Minnesota all more particularly described as: Commencing at the Northeast Corner of Section 30; (the east line of the Southeast Quarter of Section 30 to have an assumed bearing of South 00 degrees 31 minutes 34 seconds East) thence East a distance of 500.55 feet to a point on the center line of County Highway No. 5; thence South 22 degrees 20 minutes 00 seconds West, along said highway center line, 2581.5 feet; thence South 13 degrees 04 minutes 00 seconds West, a distance of 740.45 feet to the point of beginning; thence South 88 degrees 50 minutes 00 seconds West, 265.04 feet to an Iron pipe monument; thence South 11 degrees 20 minutes 00 seconds West, 85.00 feet to an Iron pipe monument; thence North 78 degrees 40 minutes 00 seconds West, 150.09 feet; thence South 88 degrees 50 minutes 00 seconds West, 584.34 feet; thence North 00 degrees 20 minutes 19 seconds West, 527.08 feet to a point on the north line of the Southeast Quarter of Section 30; thence easterly along said north line, 892.67 feet to a point distant 231.00 feet westerly of the Intersection of said North line with the center line of County Highway No. 5; thence southerly at right angles to said north line, 198.00 feet; thence easterly along a line parallel with the North line of the Southeast Quarter of Section 30 a distance of 184 feet to a point on the center line of County Highway No. 5; thence South 13 degrees 04 minutes 00 seconds West, along said highway center line, 270 feet to the point of beginning, according to the United States Government Survey thereof and situate in Blue Earth County, Minnesota. Commencing at the Northeast corner of Section 30, Township 109 North, Range 26 West, thence East a distance of 500.55 feet to a point on the public road, thence South 22°20' West along the public road a distance of 2581.5 feet, thence South 13°04' West a distance of 740.45 feet to the place of beginning, thence South 13°04' West a distance of 41.59 feet to a point in the center of the public road, thence South 10°50' West a distance of 298.10 feet, thence North 78°40' West a distance of 410.09 feet, thence North 11°20' East a distance of 196.99 feet, thence South 78°40' East a distance of 150.09 feet, thence North 11°20' East a distance of 85.00 feet, thence North 88°50' East a distance of 265.04 feet to the point of beginning. Commencing at the Northeast Corner of Section 30; (the east line of the Southeast Quarter of Section 30 to have an assumed bearing of South 00 degrees 31 minutes 34 seconds East) thence East a distance of 500.55 feet to a point on the center line of County Highway No. 5; thence South 22 degrees 20 minutes 00 seconds West, along said highway center line, 2581.5 feet; thence South 13 degrees 04 minutes 00 seconds West, a distance of 740.45 feet; thence South 88 degrees 50 minutes 00 seconds West, 265.04 feet; thence South 11 degrees 20 minutes 00 seconds West, a distance of 281.99 feet to the point of beginning; thence North 11 degrees 20 minutes 00 seconds East, back along the previously described course and its northeasterly extension, a distance of 396.42 feet; thence North 88 degrees 50 minutes 00 seconds East, a distance of 264.25 feet to a point on the center line of County Highway No. 5 and there terminating, Lime Township, Blue Earth County (PID R400430400018), and The North 74.53* feet of the East 94.39 feet of the North Half of the Southwest Quarter of Section 30,

and that part of the Southeast Quarter of Section 30 lying west of the centerline of County Highway No. 5, all in Township 109 North Range 26 West, Blue Earth County Minnesota all more particularly described as: Commencing at the Northeast Corner of Section 30; (the east line of the Southeast Quarter of Section 30 to have an assumed bearing of South 00 degrees 31 minutes 34 seconds East) thence East a distance of 500.55 feet to a point on the centerline of County Highway No. 5; thence South 22 degrees 20 minutes 00 seconds West, along said highway centerline, 2581.5 feet; thence South 13 degrees 04 minutes 00 seconds West, a distance of 740.45 feet to the point of beginning; thence South 88 degrees 50 minutes 00 seconds West, 265.04 feet to an iron pipe monument; thence South 11 degrees 20 minutes 00 seconds West, 85.00 feet to an iron pipe monument; thence North 78 degrees 40 minutes 00 seconds West, 150.09 feet; thence South 11 degrees 20 minutes 00 seconds West, 462.54 feet; thence South 78 degrees 40 minutes 00 seconds East, 160.09 feet to an iron pipe monument; thence South 11 degrees 20 minutes 00 seconds West, 348.48 feet to an iron pipe monument; thence South 87 degrees 40 minutes 00 seconds East, 250.00 feet to a point on the centerline of County Highway No. 5; thence South 11 degrees 20 minutes 00 seconds West along said highway centerline 602.18 feet to the point of intersection with the north line of the South 629.60 feet of the Southeast Quarter of Section 30; thence North 89 degrees 13 minutes 29 seconds West, along said North line, 757.63 feet to the point of intersection with the East line of the West 957.00 feet of the Southeast Quarter of Section 30; thence North 00 degrees 03 minutes 46 seconds East, along said East line, 747.80 feet to the point of intersection with a line drawn at right angles to the West line of the Southeast Quarter of Section 30 at a point distant 1365.50 feet north of the South Quarter Corner of Section 30 as measured along the West line of the Southeast Quarter of Section 30***, thence North 89 degrees 56 minutes 14 seconds West, along said line, 705.38 feet to the point of intersection with the East line of the West 251.62 feet of the Southeast Quarter of Section 30; thence North 00 degrees 03 minutes 46 seconds East along said East line, 1144.45 feet to a point on the South line of the North 74.58 feet of the Southeast Quarter of Section 30; thence westerly along said South line, 251.62 feet to a point on the West line of the Southwest Quarter of Section 30 a distance of 94.39 feet; thence North 00 degrees 03 minutes 46 seconds East, along a line parallel with the East line of the Southwest Quarter of Section 30 a distance of 74.58 feet to a point on the North line of the Southwest Quarter of Section 30; thence southerly along said North line, 94.39 feet to the Northwest Corner of the Southeast Quarter of Section 30; thence continuing easterly along the North line of the Southeast Quarter of Section 30 a distance of 1894.5 feet to a point distant 231.00 feet westerly of the intersection of said North line with the centerline of County Highway No. 5; thence southerly at right angles to said north line, 199.00**** feet; thence easterly along a line parallel with the north line of the Southeast Quarter of Section 30 a distance of 184 feet to a point on the centerline of County Highway No. 5; thence South 13 degrees 04 minutes 00 seconds West, along said Highway centerline, 270 feet to the point of beginning, according to the United States Government Survey thereof and situate in Blue Earth County, Minnesota. EXCEPTING the following: That part of the Southeast Quarter of Section 30 lying west of the centerline of County Highway No. 5, all in Township 109 North Range 26 West, Blue Earth County, Minnesota all more particularly described as: Commencing at the Northeast Corner of Section 30; (the east line of the Southeast Quarter of Section 30 to have an assumed bearing of South 00 degrees 31 minutes 34 seconds East) thence East a distance of 500.55 feet to a point on the center line of County Highway No. 5; thence South 22 degrees 20 minutes 00 seconds West, along said highway center line, 2581.5 feet; thence South 13 degrees 04 minutes 00 seconds West, a distance of 740.45 feet to the point of beginning; thence South 88 degrees 50 minutes 00 seconds West, 265.04 feet to an Iron pipe monument; thence South 11 degrees 20 minutes 00 seconds West, 85.00 feet to an Iron pipe monument; thence North 78 degrees 40 minutes 00 seconds West, 150.09 feet; thence South 88 degrees 50 minutes 00 seconds West, 584.34 feet; thence North 00 degrees 20 minutes 19 seconds West, 527.08 feet to a point on the north line of the Southeast Quarter of Section 30; thence easterly along said north line, 892.67 feet to a point distant 231.00 feet westerly of the Intersection of said North line with the center line of County Highway No. 5; thence southerly at right angles to said north line, 198.00 feet; thence easterly along a line parallel with the North line of the Southeast Quarter of Section 30 a distance of 184 feet to a point on the center line of County Highway No. 5; thence South 13 degrees 04 minutes 00 seconds West, along said highway center line, 270 feet to the point of beginning, according to the United States Government Survey thereof and situate in Blue Earth County, Minnesota, Lime Township, Blue Earth County (PID R400430400014), and Commencing at the Northeast corner of Section 30, Township 109 North, Range 26 West, thence East a distance of 500.55 feet to a point on the public road, thence South 22 degrees-20 minutes West along the public road a distance of 2581.5 feet, thence South 13 degrees-04**

minutes West a distance of 782.04 feet to a point in the center of the public road, thence South 10 degrees-50 minutes West along the center of the public road a distance of 298.10 feet to the place of beginning; thence continuing South 11 degrees-20 minutes West along the center of the public road a distance of 265.55 feet; thence North 78 degrees-40 minutes West a distance of 410.09 feet, thence North 11 degrees-20 minutes East a distance of 265.55 feet, thence South 78 degrees-40 minutes East a distance of 410.09 feet to the point of beginning. Said tract of land lying in the East one-half of the Southeast Quarter of Section 30, Township 109 North, Range 26 West, Blue Earth County, Minnesota, Lime Township, Blue Earth County (PID R400430400004), and All that part of the Southeast Quarter (SE1/4) of Section Thirty (30), Township One Hundred Nine (109) North, Range Twenty-six (26) West, Blue Earth County, Minnesota described as follows: Commencing at the Southeast Corner of said Section Thirty (30), thence due West (assumed bearing) along the South line of Section Thirty (30), 1047.00 feet to the point of intersection of the South line with the center Line of Highway No. 5, said point being the point of beginning; thence continuing due West along South line of Section Thirty (30), 633.40 feet; thence North 0 degrees 46.5 minutes West 629.60 feet; thence due East, and parallel to the South line of Section Thirty (30), 757.63 feet, to a point on the center line of Highway 5; thence South 10 degrees 25 minutes West along the Highway center line 640.07 feet to the point of beginning, according to the United States Government Survey thereof and situate in Blue Earth County, Minnesota, Lime Township, Blue Earth County (PID R400430400006), and Tract A, Registered Land Survey No. 172, Blue Earth County, Minnesota (PID R400431200033), and Beginning at the northwest corner of the SW1/4 NE1/4 of Sec. 31-109-26 West; thence north on the north and south 1/4 line of said Sec. 495 feet; thence north 89°54 minutes east 1434.16 feet to the center of the highway between Mankato and St. Peter (now known as Blue Earth County Aid Road No. 123); thence southwesterly 1177.10 feet down the center line of said highway to the north line of the S1/2 of said SW1/4 of the NE1/4; thence on said north line south 89°54 minutes west 461 feet; thence northwesterly 63°27 minutes to the right 251 feet; thence South 89°54 minutes west 116 feet; thence north 44°38 minutes west 290 feet; thence North 50°16 minutes west 288.5 feet; thence north 63°57 minutes west 100 feet to the point of beginning, except all existing highways and cartways. EXCEPT a strip of land 1 rod in width adjacent to the South line of Pilgrim's Rest Cemetery and extending the length of said Cemetery, allocated in the NE1/4 Sec. 31-109-26 West, more particularly described as follows: Commencing at an iron pipe at the intersection of the West line of the Mendota and Big Sioux Road, also known as the Mankato St. Peter Highway, and the North line of Sec. 31-109-26 West, said iron being approximately 1087 feet West of the northeast corner of said Section 31; thence running West a distance of 585 feet, thence South 3°45' West a distance of 792 feet to the place of beginning; thence continuing along the same line a distance of 16.5 feet, thence East and parallel to the North line of said Section 31 a distance of 485.2 feet to the West line of the Mendota and Big Sioux Road, thence North 10°38' East along the West line of said Mendota and Big Sioux Road a distance of 16.8 feet, thence West and parallel to the North line of said Section 31, a distance of 488.3 feet to the place of beginning. EXCEPT Tracts A & B, Registered Land Survey No. 36. And an easement in and to a roadway over the following described property: A road 20 feet in width 10 feet on either side of a line described as follows: Commencing at the intersection of the centerline of County Highway No. 5 and the North line of a tract of land described as follows: "The North 70 acres of the South 110 acres, West of County Highway No. 5, in the Northeast quarter of Section 31, Township 109 North, Range 26 West"; thence West along said North line approximately 1100 feet; thence Northwesterly approximately 340 feet to a point on the West line of a tract of land described as follows: "The West 16.92 acres of the North 24 acres of the Northwest Quarter of the Northeast Quarter of Section 31, Township 109 North, Range 26 west"; said point being approximately 100 feet North of the Southwest corner of said last described tract; thence continuing Westerly across the Northeast quarter of the Northwest quarter of said Section 31, approximately 100 feet to a point of termination, said terminal point being located as follows: commencing at a point on the North line of Section 31, Township 109 North, Range 26 West, 2179.8 feet East of the Northwest corner of said Section 31; thence South 184.6 feet; thence South 44 degrees 26 minutes East 520.5 feet; thence south 0 degrees 30 minutes West, 147.3 feet to said point of termination. In the event that should a survey of the above described roadway as it now exists show the above description to be inaccurate the vendor agrees at the request of the vendee to execute and deliver a Quit Claim Deed transferring to said vendee the road area in accordance with such survey. The covenants of warranty in this instrument shall be deemed not to apply to the last above described tract, said tract being the roadway conveyed hereby, Lime Township, Blue Earth County (PID R400431200005), and Lots A & B, Registered Land Survey No. 36, according to the plat thereof on file and of record in the office of the Register of Deeds

of Blue Earth County, Minnesota (PID R400431200007 and R400431200006).
The anticipated date of Lime Township Board action is September 8, 2026 at 7:30 p.m. at the Mankato Regional Airport.

Applicant

The applicant, Kyle Kaldor with Rockwell, on behalf of the property owners, Joe Holtmeier with Camp Quarry.

Request

Request of Kyle Kaldor with Rockwell, on behalf of property owner, Joe Holtmeier with Camp Quarry, for an amendment to the previously approved Conditional Use Permit's Reclamation plan. The applicant is requesting for an Interim Use permit for the proposed use of an outdoor recreation and campground development. Additionally, there are three variance requests: one, to reduce the front yard fencing setback of 65 feet to 35 feet off of 230th lane, second, to reduce the front yard fencing setback of 130 feet to 45 feet off of 3rd avenue, and third, to increase the allowable height of an accessory structure in the Rural Conservation District of 35 feet to 100 feet given that the applicant is requesting to place a historic Quarry Derrick Crane.

Location

The subject property is described as Beginning at the center of the Big Sioux and Mendota Road where it crosses the North line of the SE ¼ of Section 30, Township 109 North, Range 26 West, thence running West on said line 14 rods, thence South 12 rods, thence East to the center of said road, thence Northerly along the center of said road to the point of the beginning, Lime Township, Blue Earth County (PID R40043040002), and That part of the Southeast Quarter of Section 30 lying west of the center line of County Highway No. 5, all in Township 109 North Range 26 West, Blue Earth County, Minnesota all more particularly described as: Commencing at the Northeast Corner of Section 30; (the east line of the Southeast Quarter of Section 30 to have an assumed bearing of South 00 degrees 31 minutes 34 seconds East) thence East a distance of 500.55 feet to a point on the center line of County Highway No. 5; thence South 22 degrees 20 minutes 00 seconds West, along said highway center line, 2581.5 feet; thence South 13 degrees 04 minutes 00 seconds West, a distance of 740.45 feet to the point of beginning; thence South 88 degrees 50 minutes 00 seconds West, 265.04 feet to an Iron pipe monument; thence South 11 degrees 20 minutes 00 seconds West, 85.00 feet to an Iron pipe monument; thence North 78 degrees 40 minutes 00 seconds West, 150.09 feet; thence South 88 degrees 50 minutes 00 seconds West, 584.34 feet; thence North 00 degrees 20 minutes 19 seconds West, 527.08 feet to a point on the north line of the Southeast Quarter of Section 30; thence easterly along said north line, 892.67 feet to a point distant 231.00 feet westerly of the Intersection of said North line with the center line of County Highway No. 5; thence southerly at right angles to said north line, 198.00 feet; thence easterly along a line parallel with the North line of the Southeast Quarter of Section 30 a distance of 184 feet to a point on the center line of County Highway No. 5; thence South 13 degrees 04 minutes 00 seconds West, along said highway center line, 270 feet to the point of beginning, according to the United States Government Survey thereof and situate in Blue Earth County, Minnesota. Commencing at the Northeast corner of Section 30, Township 109 North, Range 26 West, thence East a distance of 500.55 feet to a point on the public road, thence South 22°20' West along the public road a distance of 2581.5 feet, thence South 13°04' West a distance of 740.45 feet to the place of beginning, thence South 13°04' West a distance of 41.59 feet to a point in the center of the public road, thence South 10°50' West a distance of 298.10 feet, thence North 78°40' West a distance of 410.09 feet, thence North 11°20' East a distance of 196.99 feet, thence South 78°40' East a distance of 150.09 feet, thence North 11°20' East a distance of 85.00 feet, thence North 88°50' East a distance of 265.04 feet to the point of beginning. Commencing at the Northeast Corner of Section 30; (the east line of the Southeast Quarter of Section 30 to have an assumed bearing of South 00 degrees 31 minutes 34 seconds East) thence East a distance of 500.55 feet to a point on the center line of County Highway No. 5; thence South 22 degrees 20 minutes 00 seconds West, along said highway center line, 2581.5 feet; thence South 13 degrees 04 minutes 00 seconds West, a distance of 740.45 feet; thence South 88 degrees 50 minutes 00 seconds West, 265.04 feet; thence South 11 degrees 20 minutes 00 seconds West, a distance of 281.99 feet to the point of beginning; thence North 11 degrees 20 minutes 00 seconds East, back along the previously described course and its

northeasterly extension, a distance of 396.42 feet; thence North 88 degrees 50 minutes 00 seconds East, a distance of 264.25 feet to a point on the center line of County Highway No. 5 and there terminating, Lime Township, Blue Earth County (PID R400430400018), and The North 74.53* feet of the East 94.39 feet of the North Half of the Southwest Quarter of Section 30, and that part of the Southeast Quarter of Section 30 lying west of the centerline of County Highway No. 5, all in Township 109 North Range 26 West, Blue Earth County Minnesota all more particularly described as: Commencing at the Northeast Corner of Section 30; (the east line of the Southeast Quarter of Section 30 to have an assumed bearing of South 00 degrees 31 minutes 34 seconds East) thence East a distance of 500.55 feet to a point on the centerline of County Highway No. 5; thence South 22 degrees 20 minutes 00 seconds West, along said highway centerline, 2581.5 feet; thence South 13 degrees 04 minutes 00 seconds West, a distance of 740.45 feet to the point of beginning; thence South 88 degrees 50 minutes 00 seconds West, 265.04 feet to an iron pipe monument; thence South 11 degrees 20 minutes 00 seconds West, 85.00 feet to an iron pipe monument; thence North 78 degrees 40 minutes 00 seconds West, 150.09 feet; thence South 11 degrees 20 minutes 00 seconds West, 462.54 feet; thence South 78 degrees 40 minutes 00 seconds East, 160.09 feet to an iron pipe monument; thence South 11 degrees 20 minutes 00 seconds West, 348.48 feet to an iron pipe monument; thence South 87** degrees 40 minutes 00 seconds East, 250.00 feet to a point on the centerline of County Highway No. 5; thence South 11 degrees 20 minutes 00 seconds West along said highway centerline 602.18 feet to the point of intersection with the north line of the South 629.60 feet of the Southeast Quarter of Section 30; thence North 89 degrees 13 minutes 29 seconds West, along said North line, 757.63 feet to the point of intersection with the East line of the West 957.00 feet of the Southeast Quarter of Section 30; thence North 00 degrees 03 minutes 46 seconds East, along said East line, 747.80 feet to the point of intersection with a line drawn at right angles to the West line of the Southeast Quarter of Section 30 at a point distant 1365.50 feet north of the South Quarter Corner of Section 30 as measured along the West line of the Southeast Quarter of Section 30***, thence North 89 degrees 56 minutes 14 seconds West, along said line, 705.38 feet to the point of intersection with the East line of the West 251.62 feet of the Southeast Quarter of Section 30; thence North 00 degrees 03 minutes 46 seconds East along said East line, 1144.45 feet to a point on the South line of the North 74.58 feet of the Southeast Quarter of Section 30; thence westerly along said South line, 251.62 feet to a point on the West line of the Southwest Quarter of Section 30 a distance of 94.39 feet; thence North 00 degrees 03 minutes 46 seconds East, along a line parallel with the East line of the Southwest Quarter of Section 30 a distance of 74.58 feet to a point on the North line of the Southwest Quarter of Section 30; thence southerly along said North line, 94.39 feet to the Northwest Corner of the Southeast Quarter of Section 30; thence continuing easterly along the North line of the Southeast Quarter of Section 30 a distance of 1894.5 feet to a point distant 231.00 feet westerly of the intersection of said North line with the centerline of County Highway No. 5; thence southerly at right angles to said north line, 199.00**** feet; thence easterly along a line parallel with the north line of the Southeast Quarter of Section 30 a distance of 184 feet to a point on the centerline of County Highway No. 5; thence South 13 degrees 04 minutes 00 seconds West, along said Highway centerline, 270 feet to the point of beginning, according to the United States Government Survey thereof and situate in Blue Earth County, Minnesota. EXCEPTING the following: That part of the Southeast Quarter of Section 30 lying west of the centerline of County Highway No. 5, all in Township 109 North Range 26 West, Blue Earth County, Minnesota all more particularly described as: Commencing at the Northeast Corner of Section 30; (the east line of the Southeast Quarter of Section 30 to have an assumed bearing of South 00 degrees 31 minutes 34 seconds East) thence East a distance of 500.55 feet to a point on the center line of County Highway No. 5; thence South 22 degrees 20 minutes 00 seconds We st, along said highway center line, 2581.5 feet; thence South 13 degrees 04 minutes 00 seconds West, a distance of 740.45 feet to the point of beginning; thence South 88 degrees 50 minutes 00 seconds West, 265.04 feet to an Iron pipe monument; thence South 11 degrees 20 minutes 00 seconds West, 85.00 feet to an Iron pipe monument; thence North 78 degrees 40 minutes 00 seconds West, 150.09 feet; thence South 88 degrees 50 minutes 00 seconds West, 584.34 feet; thence North 00 degrees 20 minutes 19 seconds West, 527.08 feet to a point on the north line of the Southeast Quarter of Section 30; thence easterly along said north line, 892.67 feet to a point distant 231.00 feet westerly of the Intersection of said North line with the center line of County Highway No. 5; thence southerly at right angles to said north line, 198.00 feet; thence easterly along a line parallel with the North line of the Southeast Quarter of Section 30 a distance of 184 feet to a point on the center line of County Highway No. 5; thence South 13 degrees 04 minutes 00 seconds West, along said highway center line, 270 feet to the point of beginning, according to the United States Government Survey thereof and situate in Blue Earth County, Minnesota, Lime Township, Blue Earth County (PID R400430400014), and Commencing at the Northeast corner of Section 30, Township 109 North, Range 26 West, thence East a distance of 500.55 feet to a point on the public road, thence South 22 degrees-20 minutes West along the public road a distance of 2581.5 feet, thence South 13 degrees-04

minutes West a distance of 782.04 feet to a point in the center of the public road, thence South 10 degrees-50 minutes West along the center of the public road a distance of 298.10 feet to the place of beginning; thence continuing South 11 degrees-20 minutes West along the center of the public road a distance of 265.55 feet; thence North 78 degrees-40 minutes West a distance of 410.09 feet, thence North 11 degrees-20 minutes East a distance of 265.55 feet, thence South 78 degrees-40 minutes East a distance of 410.09 feet to the point of beginning. Said tract of land lying in the East one-half of the Southeast Quarter of Section 30, Township 109 North, Range 26 West, Blue Earth County, Minnesota, Lime Township, Blue Earth County (PID R400430400004), and All that part of the Southeast Quarter (SE1/4) of Section Thirty (30), Township One Hundred Nine (109) North, Range Twenty-six (26) West, Blue Earth County, Minnesota described as follows: Commencing at the Southeast Corner of said Section Thirty (30), thence due West (assumed bearing) along the South line of Section Thirty (30), 1047.00 feet to the point of intersection of the South line with the center Line of Highway No. 5, said point being the point of beginning; thence continuing due West along South line of Section Thirty (30), 633.40 feet; thence North 0 degrees 46.5 minutes West 629.60 feet; thence due East, and parallel to the South line of Section Thirty (30), 757.63 feet, to a point on the center line of Highway 5; thence South 10 degrees 25 minutes West along the Highway center line 640.07 feet to the point of beginning, according to the United States Government Survey thereof and situate in Blue Earth County, Minnesota, Lime Township, Blue Earth County (PID R400430400006), and Tract A, Registered Land Survey No. 172, Blue Earth County, Minnesota (PID R400431200033), and Beginning at the northwest corner of the SW1/4 NE1/4 of Sec. 31-109-26 West; thence north on the north and south 1/4 line of said Sec. 495 feet; thence north 89°54 minutes east 1434.16 feet to the center of the highway between Mankato and St. Peter (now known as Blue Earth County Aid Road No. 123); thence southwesterly 1177.10 feet down the center line of said highway to the north line of the S1/2 of said SW1/4 of the NE1/4; thence on said north line south 89°54 minutes west 461 feet; thence northwesterly 63°27 minutes to the right 251 feet; thence South 89°54 minutes west 116 feet; thence north 44°38 minutes west 290 feet; thence North 50°16 minutes west 288.5 feet; thence north 63°57 minutes west 100 feet to the point of beginning, except all existing highways and cartways. EXCEPT a strip of land 1 rod in width adjacent to the South line of Pilgrim's Rest Cemetery and extending the length of said Cemetery, allocated in the NE1/4 Sec. 31-109-26 West, more particularly described as follows: Commencing at an iron pipe at the intersection of the West line of the Mendota and Big Sioux Road, also known as the Mankato St. Peter Highway, and the North line of Sec. 31-109-26 West, said iron being approximately 1087 feet West of the northeast corner of said Section 31; thence running West a distance of 585 feet, thence South 3°45' West a distance of 792 feet to the place of beginning; thence continuing along the same line a distance of 16.5 feet, thence East and parallel to the North line of said Section 31 a distance of 485.2 feet to the West line of the Mendota and Big Sioux Road, thence North 10°38' East along the West line of said Mendota and Big Sioux Road a distance of 16.8 feet, thence West and parallel to the North line of said Section 31, a distance of 488.3 feet to the place of beginning. EXCEPT Tracts A & B, Registered Land Survey No. 36. And an easement in and to a roadway over the following described property: A road 20 feet in width 10 feet on either side of a line described as follows: Commencing at the intersection of the centerline of County Highway No. 5 and the North line of a tract of land described as follows: "The North 70 acres of the South 110 acres, West of County Highway No. 5, in the Northeast quarter of Section 31, Township 109 North, Range 26 West"; thence West along said North line approximately 1100 feet; thence Northwesterly approximately 340 feet to a point on the West line of a tract of land described as follows: "The West 16.92 acres of the North 24 acres of the Northwest Quarter of the Northeast Quarter of Section 31, Township 109 North, Range 26 west"; said point being approximately 100 feet North of the Southwest corner of said last described tract; thence continuing Westerly across the Northeast quarter of the Northwest quarter of said Section 31, approximately 100 feet to a point of termination, said terminal point being located as follows: commencing at a point on the North line of Section 31, Township 109 North, Range 26 West, 2179.8 feet East of the Northwest corner of said Section 31; thence South 184.6 feet; thence South 44 degrees 26 minutes East 520.5 feet; thence south 0 degrees 30 minutes West, 147.3 feet to said point of termination. In the event that should a survey of the above described roadway as it now exists show the above description to be inaccurate the vendor agrees at the request of the vendee to execute and deliver a Quit Claim Deed transferring to said vendee the road area in accordance with such survey. The covenants of warranty in this instrument shall be deemed not to apply to the last above described tract, said tract being the roadway conveyed hereby, Lime Township, Blue Earth County (PID R400431200005), and Lots A & B, Registered Land Survey No. 36, according to the plat thereof on file and of record in the office of the Register of Deeds of Blue Earth County, Minnesota (PID R400431200007 and R400431200006).

Existing Land Use

The land consists of a parcels located West of 3rd Avenue and south of Deerhaven Drive, but North of 230th Lane.

Zoning

The southern portion of the property is zoned Industrial and the northern parcels are zoned in the rural conservation district within Lime Township.

Environmentally Sensitive Areas

There are ravines located throughout the proposed parcels and on the southwest border of the parcel ending in 0005 is slightly located in the shoreland district.

City Code

The Lime Township Ordinance can be found at this link: Lime Township Ordinances

Review

Conditional Use Permit- Amendment/ Interim Use Permit- Rockwell RV Park

Request of Kyle Kaldor with Rockwell, on behalf of property owner, Joe Holtmeier with Camp Quarry, for an amendment to the previously approved Conditional Use Permit's Reclamation plan. The applicant is requesting for an Interim Use permit for the proposed use of an outdoor recreation and campground development. The parcels where the current mining operations are occurring are located in the Rural Conservation District and Industry District. Both of which allow for mining operations to occur with either a conditional use permit or Interim Use permit. The total acreage for the proposal is approximately 105 acres and is currently being used for mining activities. The applicant is requesting to take the approved 2014 Conditional Use Permit and amend the reclamation plan and standards that were previously approved. Instead of a back filling all areas and planting native vegetation in the area the applicant is proposing to place mountain bike trails, parking areas, camping sites, and utilizing the water body for recreation purposes.

What was previously known as the Stoffel Quarry is located North of 231st Lane and was approved to have one body of water with a 3:1 slope perimeter. The applicant is requesting to have two separate bodies of water, given that the body of water is owned by two separate entities. The owner of the land has already placed a "permanent engineered dike" to split the two bodies of water and is proposing to utilize the Eastern portion of the water body for a cable wake park lake. An additional body of water has been established due to recent mining activities and instead of reclaiming the area to a conservation-like area the applicant is requesting to keep the body of water for a future aqua park. Near the additional body of water and the McClure Quarry the applicant is proposing to keep the limestone walls and quarry landforms as part of the natural landscape.

West of 3rd Avenue and South of 231st Lane, the McClure Quarry was meant to be two separate bodies of water with 3:1 slopes and open space. The proposed reclamation plan for this area is to continue to have two separate bodies of water while utilizing the open space for campground facilities, mountain bike trials, and water recreation with some proponents of natural landscaping throughout the parcel.

Additionally, the area defined as Pilgrims Rest Cemetery in the original reclamation plan was to be planted according to the cemetery boards approval. The applicant received approval from the cemetery board, to instead place camping sites throughout the previously reclaimed area.

The applicant has stated that quarry landforms will remain throughout the proposed amended reclaimed land. Some of which include: Dimensional stone highwalls, blasted aggregate highwalls, quarry benches, natural exposed limestone outcrops, manufactured limestone retaining walls, quarry floors, and natural changes in elevation. A condition has been enclosed herein for a practicing engineer, licensed in the state of Minnesota, to review the proposed slopes, quarry landforms, and site plans for approval. Their recommendation and approval

shall be forwarded to the Lime Township Board prior to the commencement of construction and post construction.

Site access will remain unchanged, continuing from 3rd Avenue and 231st Lane, as identified in the submitted plans. Any modifications to access will require additional review and approval by the Township Board and Blue Earth County.

Structure Height
All structures located in the Rural Conservation District shall not exceed 35 feet in height, this includes accessory structures as well. A structure is defined by Lime Township Zoning Ordinance as "anything constructed, placed, or erected that requires permanent location on the ground or is attached to something having permanent location on the ground including but not limited to fences, signs, and sheds" (Article 2, Section 5, Structure). The applicant is proposing to place a historic Quarry Derrick Crane that is 100 feet in height and is therefore requesting a variance for the commemorative piece. Additional information surrounding this request is listed below and will be further elaborated on. All other structures located in the Rural Conservation district shall comply with the height requirement and any newly added structures shall require a land development permit prior to the commencement of construction.

Fencing
The applicant has submitted a Fencing plan that describes their plans for fencing and securing the area while also enclosing a illustration of the proposed fencing they will be using. According to the Lime Township Zoning Ordinance, the entire recreation area must be fenced wherever possible with a minimum 6-foot-high fence. The applicant has submitted a site plan with a rendering of a wildlife fence with a height of 42 inches, however in the areas surrounding campgrounds, leisure activities, large group gatherings, or recreational use will require at minimum a 6-foot-high fence. A condition has been enclosed herein requiring the applicant to comply with the 6-foot height requirement of the fencing. Additionally, the applicant shall submit the 6-foot fencing plans to Minnesota Department of Natural resources for review to assure wildlife safety and access is approved. The approval letter shall be forwarded to the Lime Township Board prior to the commencement of a Land Development Permit.

The fencing that abuts residential properties must be setback at least 50 feet from the residential property line. In the Fencing plan submitted by the applicant, it is stated that the required 50 feet setback from the northern property boundary where the proposed Recreation Park meets residential parcels will be met.

The fencing setback from a Lime Township Road requires 65 feet measuring from the center of the line. According to the site plans submitted by the applicant, they will meet the requirement on the northern portion of the site but are requesting a variance along 230th Lane to a 35 feet setback instead. Additional information surrounding this request is listed below and will be further elaborated on.

Fencing abutting a state, federal or county highway requires a 130 feet setback measuring from the center of the road to the structure. The applicant's site is located west of 3rd Ave or County State Aid Highway 5, requiring the applicant to meet the 130 feet setback. However, the applicant is requesting a variance to reduce the 130 feet setback to 45 feet instead. Additional information surrounding this request is listed below and will be further elaborated on.

Any fencing adjoining a daycare facility is required to be of a solid type barrier to not allow children to climb through or over fencing and may be on the property line with written permission from the property owner. The applicant has indicated in the enclosed fencing plan that the wildlife friendly fencing will conclude outside of the daycare property lines, and a solid fence would begin in the areas surrounding the daycare facility. The applicant shall meet the required 10 feet setback from the property line of the daycare unless they are able to obtain written approval from the facility. A condition has been listed below to have the applicant place the solid fence style around the daycare facility meeting the 10 feet setback requirement unless they are able to obtain written approval from the owner. The letter of approval shall be submitted to the Lime Township Board prior to the commencement of construction.

The fencing plan illustrates that the applicant will meet the required 10 feet setback from property lines that are from non-residential properties.

Leisure Activities Setbacks
The Lime Township Zoning Ordinance requires applicants to meet a 100 feet setback from residential property lines to all leisure activities. A leisure activity is defined by Lime Township Zoning Ordinance as "human powered non-motorized sports such as badminton, volleyball, archery, horseshoes, slacklining/ninja line, baseball cage, ropes course, rock skipping, rock climbing, swimming canoeing, rope swinging, ladder toss, bocce ball, corn hole, tag, playground, shuffle board, pickleball, basketball, tetherball, croquet, disk golf, large Jenga, mini golf, golf driving range, paintball, dog park, ping pong, gaga ball, triple shoot, zipline, sledding, snow tubing, ice fishing, ice climbing, and hockey/ice skating or some other use which the Township Board deems is substantially similar to the above activities" (Article 5, Section 16, Part C, Leisure Activities). A condition has been enclosed herein requiring the applicant to meet the 100 feet leisure activity setback.

Recreation uses such as hiking and biking trails must be setback at least 10 feet from the interior of the fence in order to allow fencing maintenance, safety of use inside the fence. The applicant has submitted site plans that conform to the 10 feet requirement.

Campground Setbacks
Camp site setbacks shall be a minimum of 200 feet from residential property or 250 feet from a permanent residence, whichever is greater. The applicant has site plans that verify both setback requirements are being met from the residential properties and residence.

Additionally, the campsite must be setback at least 10 feet from the interior side of fence adjoining non-residentially zoned areas to allow for maintenance of the boundary. Site plans submitted appear to meet this requirement and a condition has been listed herein to ensure the campsites conform to the 10 feet setback from the interior side of the proposed fence.

Screening
The applicant proposes to utilize the current berms, trees, shrubs, natural vegetation and fencing as a screening barrier to residential lots. A viewshed analysis and cross section site plans were submitted to reflect how the use of existing and additional planting of trees, shrubs, and vegetation will provide a screening barrier to the surrounding neighborhood and residential lots abutting the proposed recreation park. In the enclosed "North Property- N/S Section 01" found on Site Section L510, the applicant illustrates the height, location, width, and species that are proposed to meet the screening requirement. A condition listed herein shall require the applicant to submit a maintenance plan by a landscape architect or arborist for review and the plan shall be submitted prior to the application of a land development permit.

In the viewshed analysis, it is seen that vegetative buffers are proposed to assist with visual impacts and the setbacks along with the screening will act as a sound barrier to mitigate the noise coming from the trials and proposed recreation activities occurring on site. The hours of operation and noise levels shall conform to Minnesota Rules Chapter 7030 and a condition has been listed herein for the operation and noise levels to adhere to such requirement.

Special Flood Insurance
Lime Township Zoning Ordinance states, "no campground and recreation area operations, campground spaces, structural amenities, fencing, or screening shall be allowed within any location identified as a Special Flood Hazard Area on the current Flood Insurance Rate Map" (Article 5, Section 16, Part F, Subpart 6). A condition has been enclosed requiring the applicant to submit a Flood Insurance Rate Map and to verify that the campgrounds, recreation area operations, structures, fencing, nor the screening are located in the special flood hazard area. The applicant shall coordinate with Blue Earth County to verify such requirement is being met.

Height
A condition has been enclosed herein requiring the applicant to ensure and verify recreation amenity structures are two feet below offsite adjacent residential viewsheds from the highest level of adjoining structures.

Impervious Surface
No more than 50 percent of the zoning lot site plan shall be occupied by impervious man-made structures. All the parcels enclosed in the applicant meet the following requirement.

Existing Berms and Vegetation
The applicant will be utilizing the natural vegetation, berms, and landforms created by mining activities throughout the properties.

Campground Performance Standards
In the submitted narrative, the applicant addresses utilities and infrastructure for the proposed recreational park. It is stated that "sanitary wastewater generated by the development will be collected through centralized wastewater system and conveyed to a storage facility located on the southern portion of the property. Wastewater will be transported to an approved treatment facility for processing and disposal" (Section 9.3 Wastewater Collection and Disposal). A condition has been listed herein requiring all sewage and wastewater to be discharged into an approved municipal sewage treatment or a subsurface sewage treatment system that meets the requirements of Minnesota Rules Chapter 7080 and Blue Earth County Code.

Toilet facilities must be provided within 400 feet of any campsite in accordance with Minnesota Rules Chapter 4630.0900. The applicant has submitted site plans illustrating a 400-foot diameter to the surrounding campsites. As seen in the site plans, some of the campsites do not meet the 400-foot requirement, thus requiring the applicant to reconfigure the site to bring it into conformance with Minnesota Rules Chapter 4630.0900.

An additional standard of Minnesota Rules Chapter 4630.0900 requires all campgrounds provide toilet and shower facilities that house recreation campground vehicles which are not equipped with toilet and bathing facilities. The applicant will meet this requirement given that there will be toilet and shower facilities throughout the campground areas.

As previously discussed, each campsite for recreational vehicles will have a centralized wastewater system that will be collected on the southern portion of the property. Final disposal method of sewage from the centralized wastewater system shall be approved and conform to standards listed by the MPCA and Department of Health.

The applicant is proposing to utilize groundwater wells on-site to provide potable water. They are proposing to utilize an existing well and anticipate one or more supplemental wells to provide additional capacity to the campground sites. The applicant shall submit documentation illustrating compliance of a Subsurface Treatment System (SSTS) on the site. A recommended condition requires the applicant to coordinate with Blue Earth County to obtain approval for the septic system location. Coordination with the County will also be required for the compliance of a well prior to applying for land development permit. Additionally, the applicant shall confirm with the Lime Township Board, that their drinking water sites meet Minnesota Rules Chapter 4630.0600 that requires drinking water from the water supply must be available within 400 feet of every campsite.

All plumbing installed shall be in accordance with Minnesota Plumbing Code, Minnesota Rules Chapter 4715. All recreational campground vehicles and their attachments shall be separated from each other or other structures by at least ten feet as required by Minnesota Rules Chapter 4630.0600. Site plans submitted by the applicant illustrate conformance to the 10 feet requirement.

The minimum camp site size is 2,000 square feet per Minnesota Rules Chapter 4630.0600 and the site plans submitted by the applicant verify that this requirement is being met. Given that each campsite will have a 12' x 85" RV Port, a parking spot for a vehicle measuring 12'x30' and the picnic area measuring over 12'x55' for a total of 2,040 square feet, the 2,000 square feet requirement is being met. The applicant will be required to meet the same square footage requirement for all tent camp sites as well. Tent sites shall be limited to two tents, and each tent shall not exceed more than 5 occupants as required by Lime Township Zoning Ordinance, Article 5, Section 16, Part G, subpart 26. Stakes or anchors for the ground may be permitted for ten campers, however, campers shall not be digging trenches or making any other excavations in the recreation or campground areas.

The storage, collection, and disposal of refuse and garbage in the campground shall be conducted in accordance with Chapter 16 (solid waste management) of the Blue Earth County Code. Enclosed in the narrative, the applicant states that solid waste will be managed though centralized collection areas and strategically located throughout the property.

Additionally, the applicant submitted a statement that they "plan to follow Minnesota Department of Health requirements for recreational camping areas" and will use "fly tight, watertight and rodent proof containers for every four sites" and the garbage will be collected for disposal not less than twice a week. A condition has been included herein required the final disposal of refuse to be collected at a waste management facility permitted by the state and licensed by Blue Earth County or as otherwise agreed to by the Lime Township Board. The applicant shall contain an adequate number of fly tight, watertight and rodent proof containers and the garbage nor refuse may not be burned, incinerated or buried on site.

The interior streets will be made of aggregate surfaces while the primary entrance roadway will be paved. Dust mitigation will consist of low posted speed limits, routine road maintenance, and application of additional aggregate as needed. All recreational vehicles entering the park shall have a current state issued license.

Signage identifying each camp site with non-duplicated numbers or letters shall be posted prior to the opening of the park and the applicant shall submit a map with the proposed signage to the Lime Township Board prior to applying for a land development permit. All signage being proposed shall meet the standards within the Lime Township Zoning Ordinance and Blue Earth County Code. Prior to the commencement of signage construction, the applicant shall submit a land development permit.

The applicant has indicated that signage and fencing will be located around the perimeter of the proposed site to communicate to users where the boundary ends and begins.

A Hydraulic Report was submitted by the applicant describing the existing drainage patterns and the proposed stormwater management. Given the use of the site is currently for mining operations the land has been sloped to cause water to drain into the central mine pit with the southern portion of the site draining to a separate smaller pit location. Groundwater from the site currently flows to the west side of the property towards the Minnesota River with a portion of the water flowing into a calcareous fen located west of the site.

According to the submitted Hydraulic Report, the applicant is stating that stormwater management on the site is proposed to meet State and Local requirements and the conditions align with the Environmental Assessment worksheet. The applicant is proposing to place 14 stormwater basins to intercept and infiltrate runoff to the upstream mine pits. Additionally, a series of swales will also be constructed to direct the majority of runoff towards the basins. The 2026 EAW identified runoff volume as a concern to the site, with an emphasis on the groundwater connection associated with the mine pits on site. A volume control table illustrates with the proposed basins and changes to the site water drainage will improve over the next 100 years by 40% than leaving the site in its current condition. On April 22, 2026, Blue Earth County provided the Township with comments "where correction or clarification is necessary or recommended". The applicant shall coordinate with Blue Earth County on the comments provided to the township to ensure compliance with State and County regulations. Final copy of the approval shall be forwarded to the Lime Township Board prior to the issuance of a Land development permit.
According to the Lime Township Zoning Ordinance, "all campgrounds shall have a property manager, which shall be onsite or within two (2) miles of the boundary of the parcel" (Article 5, Section 16, Part G, subpart 18). In the submitted Campground & Recreation Area Operational Plan, the applicant describes how they will meet the requirement of having an on-site manager that will either live on the grounds or within the two-mile boundary. The applicant also describes that contact information for the property manager will be posted at the park's entrance, main lodge, check-in facility, campground bulletin boards, and on the park's website. A permanent single-family dwelling for a caretaker has not been proposed at this time, however, in the future if the applicant requests to build a permanent structure they will need to apply for a land development permit and the request will need to meet all density and applicable Lime Township Zoning District requirements.

Parking for the campground must be off-street and meet the standards of Lime Township Zoning Ordinance

Article 5 and Blue Earth County Section 24-310.

Operation of the campground is seasonal and will be open seven (7) months out of the year excluding the months of December, January, and February. Opening and closing dates may vary on annual basis depending on the weather conditions and operational planning. Thus, conforming with the Lime Township Zoning Ordinance. A condition has been included herein to require the applicant when closing the facility for the season an annual inspection shall be conducted with the Lime Township Board to confirm no storage of tents, tent trailers, boats, boat trailers or recreational vehicles or campground vehicles remain on site outside of the 7 months of operation.

Campers and guests shall not cause, create, or make any noise which disturbs the peace and quiet and tranquility of the campground area. The hours of operation and noise levels shall conform to Minnesota Rules Chapter 7030, and a condition has been listed herein for the operation and noise levels to adhere to such requirement. Signage identifying the hours of 10:00 pm to 8:00 am shall be for outdoor solitude at each campground to ensure all camp attendees comply with Minnesota Rule Chapter 7030 and the Lime Township Zoning Ordinance. No person shall remain within any recreation or Campground area within the hours of 10:00pm-8:00am, except those registered as campers.

Lime Township Zoning ordinance states that "No person shall kindle, build, maintain or use a fire except in places provided for such purposes" (Article 5, Section 16, Part G, Subpart 27). The applicant has proposed the placement of fire rings on campsites that will be available to the campers however it is the responsibility of the property manager and owner to ensure that campfires do not exceed three feet in diameter and that the fire remains enclosed by provided fire rings. Firewood onsite shall comply with State and County ordinances.

Areas that will be utilized for swimming purposes shall be tested for E.coli, Coliform, arsenic, nitrates, or toxic algae blooms and the levels shall comply with Minnesota Department of Health Regulations. Prior to the opening of the season, the applicant shall perform such tests and submit the results with MDH approval to the Lime Township Board on an annual basis.

Recreation including Campground Areas- General Performance Standards and Conduct
Noise levels on each campsite, including but not limited to radios, television, and other devices that create sound shall not be heard beyond the border of a camper's individual campsite during quiet hours. It shall be unlawful to operate any loudspeaker, amplifier, or other device without first securing a permit. The Property Manager and/or Owner shall be responsible for the compliance of such ordinance. Violations may result in a revocation of Interim Use Permit.
Any large group gathering of 200 or more persons are prohibited, except as provided via Interim Use Permit or written approval by the Lime Township Board.

The applicant is not currently proposing any food services on site, however in the future if the applicant wishes to provide food services on site, they shall have the food catered, or pre-packaged, and have written approval by the Lime Township Board.

All campers and users of the proposed facility shall comply with standards listed within the Lime Township Zoning Ordinance, Article 5, Section 16, Part H, subpart 1 through 30. Any violators shall be held accountable with the Property Manager and/or Owner of the Site. A condition has been included herein requiring the applicant to post the conduct requirements at the park's entrance, main lodge, check-in facility, campground bulletin boards, and on the park's website.

Variance #1- Front yard setback 230th Lane
The applicant is requesting to reduce the front yard setback of 65 feet to 35 feet off of 230th lane for the purpose of constructing the required 6-foot-high fence surrounding entire recreation areas. The fencing type will remain the same, a Minnesota Department of Natural Resources approved style to allow for wildlife to safely access the site.

In order to grant a variance, the Board shall make affirmative findings in five categories. Those categories are: the conformance to code Article 3 General Administration, Section 6 Variances, Part D Standards for granting a variance in Lime Township Zoning Ordinance, the use of property is in a reasonable manner, the circumstances are unique to the property that is not caused by the property owner, the request does not alter the essential character or the zoning district, and that the use is in harmony with Lime Township Ordinances and Comprehensive Plan.

The proposed variance does conform to the standards for granting a variance found in Article 3 General Administration, Section 6 Variances, Part D Standards for granting a variance in Lime Township Zoning Ordinance. Given that the applicant is trying to satisfy the screening and safety requirement by utilizing a fence, the proposed use is in harmony with the general purposes and intent of the ordinance.

The proposed use is consistent with the comprehensive plan since the request would be promoting "the preservation of natural resources, prime farmland and environmentally sensitive areas" by not disturbing a ravine and heavily wooded area (Lime Township Comprehensive Plan, Guiding Principles, Part 2). On the Southwest side of 230th Lane there is an area identified as a ravine and the if the applicant were to place the fence in the required setback, the applicant would be disturbing the ravine and the heavily wooded area. However, if granted, the applicant would avoid the environmental impacts to the area and would be providing a wildlife friendly fence to continue access for animals in the area.

The property owner proposes to use the property in a reasonable manner, since the applicant is making an effort to comply with the fencing ordinances enclosed in Section 16 of the Lime Township Zoning Ordinance. A condition has been included herein that the applicant will need to obtain a land development permit prior to the commencement of construction of the fence.

There are unique circumstances to the property that are not caused by the property owner given that the site contains ravines and wooded areas for wildlife. The applicant is requesting to mitigate impacts to the environmentally sensitive areas on site by placing the fence in less sloped and wooded areas.

The request does not alter the essential character of the Lime Township and the Industry district since the predominant use in the surrounding area is Industrial.

Variance #2- Front yard Setback 3rd Avenue

The applicant is requesting to reduce the front yard fencing setback of 130 feet to 45 feet off of 3rd avenue, for the purpose of constructing the required 6-foot-high fence surrounding the entire recreation areas. The fencing type will remain the same, a Minnesota Department of Natural Resources approved styled fence to allow for wildlife to safely access the site.

In order to grant a variance, the Board shall make affirmative findings in five categories. Those categories are: the conformance to code Article 3 General Administration, Section 6 Variances, Part D Standards for granting a variance in Lime Township Zoning Ordinance, the use of property is in a reasonable manner, the circumstances are unique to the property that is not caused by the property owner, the request does not alter the essential character or the zoning district, and that the use is in harmony with Lime Township Ordinances and Comprehensive Plan.

The proposed variance does conform to the standards for granting a variance found in Article 3 General Administration, Section 6 Variances, Part D Standards for granting a variance in Lime Township Zoning Ordinance. On the Southern portion of the site, parcel ending in 0005 there is a ravine located along the 3rd Avenue and a water body abutting the ravine. If the fence were to meet the required 130 feet setback the fence would be located in the body of water, thus not fulfilling the safety requirement for the general welfare. Therefore, the proposed use is in harmony with the general purposes and intent of the ordinance. The proposed use is consistent with the comprehensive plan since the request would be promoting "the preservation of natural resources, prime farmland and environmentally sensitive areas" by not disturbing a ravine and by Protecting "the health, safety and welfare of the Township" (Lime Township Comprehensive Plan, Guiding Principles, Part 2). Given the proximity of the high-volume road, the applicant is making an effort to provide a safety buffer for those

utilizing the site while still providing wildlife access to the site.

The property owner proposes to use the property in a reasonable manner, since the applicant is making an effort to comply with the fencing ordinances enclosed in Section 16 of the Lime Township Zoning Ordinance. A condition has been included herein that the applicant will need to obtain a land development permit prior to the commencement of construction of the fence.

There are unique circumstances to the property that are not caused by the property owner given that the site contains a ravine. The applicant is requesting to mitigate impacts to the environmentally sensitive area on site by placing the fence in less sloped area.

The request does not alter the essential character of the Lime Township and the Rural Conservation district since fences are used throughout the zoning district and the proposed wildlife-friendly fence will maintain the rural character of the area.

Variance #3- Height in Rural Conservation District

The applicant is requesting to increase the allowable height of an accessory structure in the Rural Conservation District of 35 feet to 100 feet to allow for the installation and preservation of a historic Quarry Derrick Crane within the Rural Conservation District.

In order to grant a variance, the Board shall make affirmative findings in five categories. Those categories are: the conformance to code Article 3 General Administration, Section 6 Variances, Part D Standards for granting a variance in Lime Township Zoning Ordinance, the use of property is in a reasonable manner, the circumstances are unique to the property that is not caused by the property owner, the request does not alter the essential character or the zoning district, and that the use is in harmony with Lime Township Ordinances and Comprehensive Plan.

The proposed variance does conform to the standards for granting a variance found in Article 3 General Administration, Section 6 Variances, Part D Standards for granting a variance in Lime Township Zoning Ordinance, since the decorative item would not change the use of the property and the proposed structure is intended to preserve and display a historic quarry crane that is associated with the historical quarry activities that took place on site. The proposed use is in harmony with the general purposes and intent of the ordinance given that the request is intended to preserve an existing historic resource.

The proposed use is consistent with the comprehensive plan since the request would “Provide for a compatible land use pattern that limits existing and potential conflicts and respects private property rights” (Lime Township Comprehensive Plan, Guiding Principles, Part 4). The proposed 100-foot height is associated with the installation and preservation of a historic quarry crane and does not authorize a general increase in the allowable height of accessory structures. A condition has been included herein requesting the applicant to submit a viewshed analysis from 3rd Avenue and from the two residential homes within the general vicinity to illustrate the impact to the residents prior to the placement of the crane.

The property owner and applicant propose to use the property in a reasonable manner, given that the request is to preserve the historic Derrick quarry crane that is associated with the property’s history and character.

The property is a historic quarry site with unique characteristics that distinguish the property from any other property in the nearby vicinity given the past use.

The request does not alter the essential character of the Lime Township and the Rural Conservation district since the proposed structure will not introduce a new land use that is inconsistent with the zoning district. The approval is specific to the historical Quarry Derrick Crane and shall not be constructed as establishing a general 100-foot height allowance for accessory structures within the Rural Conservation district.

Findings

Findings

CUP amendment/ IUP Proposal

Staff respectfully submits the following findings:

1. The establishment, maintenance, or operation of the conditional use allowing for the amendment of the conditional use permit and the Interim Use permit for a proposed outdoor recreation and campground development will not be detrimental or endanger the public health, safety, comfort or general welfare.
2. The Conditional Use/Interim Use will not be injurious to the use and enjoyment of other property in the immediate vicinity, nor substantially diminish and impair property values within the neighborhood given that the recreation and campground development shall conform to noise standards and shall be out of view to the surrounding residential properties.
3. The establishment of the conditional use/interim use permit will not impede the normal and orderly development and improvement of surrounding property for use permitted in the district. Since mining and mining activities are allowed conditional and interim use within the rural conservation and industry zoning districts.
4. Adequate utilities, access roads, drainage and necessary facilities have been or will be provided given that the applicant will be coordinating with Blue Earth County to ensure compliance.
5. Adequate measures have been or will be taken to provide ingress or egress so designated as to minimize traffic congestion in the public streets. Access will remain the same off of 3rd Avenue and 231st Lane.
6. The use of the property shall, in all respects other than conditional use, conform to the applicable regulations of the district in which it is located, because the current use has been previously approved in the Residential Conservation district and reclamation plan is an allowable use a previously approved mine.
7. The proposed use does not create a potential pollution hazard. Since the applicant is proposing to update stormwater and groundwater drainage on site to improve the current conditions.
8. The establishment of the conditional use/interim use will not impede the normal and orderly development and improvement of surrounding vacant property for predominant uses in the area.
9. Adequate measures have been or will be taken to prevent or control offensive odor, fumes, dust, noise, and vibration so that none of these will constitute a nuisance, and to control lighted signs and other exterior lights in such a manner that no disturbance to neighboring properties will result. Since the applicant will take best management practices to control dust and light pollution throughout the campsites and recreational areas.
10. The Conditional Use/Interim use conforms to the joint resolution for orderly annexation.
11. Site-specific conditions and such other conditions are established as required for the protection of the public's health, safety, morals, and general welfare.

Variance #1

Staff respectfully submits the following findings:

1. The proposed variance conforms to the standards for granting a variance found in Article 3 General Administration, Section 6 Variances, Part D Lime Township Zoning Ordinance. Given that the applicant is trying to satisfy the screening and safety requirement by utilizing a fence, the proposed use is in harmony with the general purposes and intent of the ordinance.
2. The proposed variance is consistent with the comprehensive plan, as amended from time to time.
3. The applicant or owner establishes that there are practical difficulties in complying with this ordinance, since the parcel contains environmentally sensitive areas like a ravine and wooded areas.
4. The property owner will use the property in a reasonable manner permitted by the Lime Township Zoning Ordinance, since the use of a fence is allowed within the Industry district and the applicant is trying to comply with the fencing ordinances.
5. The plight of the property owner is due to circumstances unique to the property and was not created by any persons presently or formerly having an interest in the parcel of land.
6. The request does not alter the essential character of the locality within the Industry zoning district.

Variance #2

Staff respectfully submits the following findings:

1. The proposed variance conforms to the standards for granting a variance found in Article 3 General Administration, Section 6 Variances, Part D Lime Township Zoning Ordinance. Given that the applicant is

trying to satisfy the screening and safety requirement by utilizing a fence, the proposed use is in harmony with the general purposes and intent of the ordinance.
2. The proposed variance is consistent with the comprehensive plan, as amended form time to time.
3. The applicant or owner establishes that there are practical difficulties in complying with this ordinance, since the parcel contains a ravine.
4. The property owner will use the property in a reasonable manner permitted by the Lime Township Zoning Ordinance, since the applicant is making an effort to comply with the fencing ordinances enclosed in Section 16 of the Lime Township Zoning Ordinance.
5. The plight of the property owner is due to circumstances unique to the property and was not created by any persons presently or formerly having an interest in the parcel of land.
6. The request does not alter the essential character of the locality within the Rural Conservation zoning district.

Variance #3
Staff respectfully submits the following findings:

1. The proposed variance conforms to the standards for granting a variance found in Article 3 General Administration, Section 6 Variances, Part D Lime Township Zoning Ordinance since the decorative item would not change the use of the property.
2. The proposed variance is consistent with the comprehensive plan, as amended form time to time.
3. The applicant or owner establishes that there are practical difficulties in complying with this ordinance, since there is a strict application of a 35-foot height requirement preventing the reasonable preservation and display of a historical Derrick quarry crane.
4. The property owner will use the property in a reasonable manner permitted by the Lime Township Zoning Ordinance, since the use will not be impacted by the approval of the variance.
5. The plight of the property owner is due to circumstances unique to the property and was not created by any persons presently or formerly having an interest in the parcel of land.
6. The request does not alter the essential character of the locality within the Rural Conservation zoning district since the installation of the crane will not introduce a new land use that would be inconsistent with the zoning district.

Recommendation

CUP amendment/ IUP Proposal

Staff recommends approval for an amendment to the previously approved Conditional Use Permit's reclamation plan and for the approval of the proposed Interim Use Permit to allow for an outdoor recreation and campground development with the following conditions :

1. A practicing engineer, licensed in the state of Minnesota, shall review the proposed slopes, quarry landforms, and site plans for approval. Their recommendation and approval shall be forwarded to the Lime Township Board prior to the commencement of construction and post construction.
2. Any modifications to access will require additional review and approval by the Township Board and Blue Earth County.
3. All structures located in the Rural Conservation district shall comply with the height requirement and any newly added structures shall require a land development permit prior to the commencement of construction.
4. The applicant shall comply with the 6 foot height requirement of the fencing throughout the property as stated in Lime Township Zoning Ordinance, Article 5, Section 16.
5. A solid fence style around the daycare facility shall be installed meeting the 10 feet setback requirement unless written approval from the owner has been collected. The letter of approval shall be submitted to the Lime Township Board prior to the commencement of construction.
6. The applicant shall meet the 100 feet leisure activity setback.
7. All campsites shall conform to Lime Township Zoning Ordinance requiring a 10 feet setback from the interior side of the proposed fence.
8. A maintenance plan by a landscape architect or arborist shall be submitted prior to the application of a land development permit.
9. The hours of operation and noise levels shall conform to Minnesota Rules Chapter 7030.
10. A Flood Insurance Rate Map shall be submitted prior to the application of a land development permit to verify that the campgrounds, recreation area operations, structures, fencing, nor the screening are located in the special flood

hazard area. The applicant shall coordinate with Blue Earth County to verify such requirement is being met.

11. The applicant shall verify recreation amenity structures are two feet below offsite adjacent residential viewsheds from the highest level of adjoining structures prior to the commencement of construction activities.
12. All sewage and wastewater shall be discharged into an approved municipal sewage treatment or a subsurface sewage treatment system that meets the requirements of Minnesota Rules Chapter 7080 and Blue Earth County Code.
13. A 400 foot bathroom and shower facilities requirement by Minnesota Rules Chapter 4630.0900 shall be met and reflected on site plans prior to the issuance of a land development permit.
14. Final disposal method of sewage from the centralized wastewater system shall be approved and conform to standards listed by the MPCA and Department of Health.
15. The applicant shall submit documentation illustrating compliance of a Subsurface Treatment System (SSTS) on the site. A recommended condition requires the applicant to coordinate with Blue Earth County to obtain approval for the septic system location. Coordination with the County will also be required for the compliance of a well prior to applying for land development permit.
16. The applicant shall confirm with the Lime Township Board, that their drinking water sites meet Minnesota Rules Chapter 4630.0600 that requires drinking water
17. Applicant shall confirm the water supplied to campers meets the 400 feet radius of every campsite.
18. All plumbing installed shall be in accordance with Minnesota Plumbing Code, Minnesota Rules Chapter 4715.
19. The final disposal of refuse shall be collected at a waste management facility permitted by the state and licensed by Blue Earth County or as otherwise agreed to by the Lime Township Board.
20. The applicant shall contain an adequate number of fly tight, watertight and rodent proof containers and the garbage nor refuse may be burned, incinerated or buried on site.
21. All recreational vehicles entering the park shall have a current state issued license.
22. Signage identifying each camp site with non-duplicated numbers or letters shall be posted prior to the opening of the park and the applicant shall submit a map with the proposed signage to the Lime Township Board prior to applying for a land development permit.
23. All signage being proposed shall meet the standards within the Lime Township Zoning Ordinance and Blue Earth County Code. Prior to the commencement of signage construction, the applicant shall submit and obtain a land development permit.
24. The applicant shall coordinate with Blue Earth County on the comments provided to the Lime Township Board from the April 22, 2026, letter to ensure compliance with State and County standards are being met. A final copy of the approval shall be forwarded to the Lime Township Board prior to the application of a Land development permit.
25. In the future if the applicant requests to build a permanent structure they will need to apply for a land development permit and the request will need to meet all density and applicable Lime Township Zoning District requirements.
26. When closing the facility for the season an annual inspection shall be conducted with the Lime Township Board to confirm no storage of tents, tent trailers, boats, boat trailers or recreational vehicles or campground vehicles remain on site outside of the 7 months of operation.
27. Signage identifying the hours of 10:00 pm to 8:00 am shall be for outdoor solitude at each campground to ensure all camp attendees comply with Minnesota Rule Chapter 7030 and the Lime Township Zoning Ordinance. No person shall remain within any recreation or Campground area within the hours of 10:00pm-8:00am, except those registered as campers.
28. Firewood being used onsite shall comply with State and County ordinances.
29. Prior to the opening of the recreation season, the applicant shall perform E.coli, Coliform, arsenic, nitrates, or toxic algae blooms tests and submit the results to Minnesota Department of Health for final approval. The results shall be forwarded to the Lime Township Board on an annual basis.
30. In the future if the applicant wishes to provide food services on site, they shall have the food catered, or pre-packaged, and have written approval by the Lime Township Board.
31. The applicant shall post the conduct requirements found in Lime Township Zoning Ordinance, Article 5, Section 16, Part H, subpart 1 through 30 at the park's entrance, main lodge, check-in facility, campground bulletin boards, and on the park's website.

Variance #1

Staff recommends approval of the variance to reduce the required front yard setback of 65 feet to 35 feet off of 230th lane for the purpose of constructing the required 6-foot-high fence surrounding entire recreation area with the following condition:

1. The applicant will need to obtain a land development permit prior to the commencement of construction of the fence.

Variance #2
Staff recommends approval of the variance to reduce the required front yard fencing setback of 130 feet to 45 feet off of 3rd avenue, for the purpose of constructing the required 6-foot-high fence surrounding entire recreation area with the following condition:

1. The applicant will need to obtain a land development permit prior to the commencement of construction of the fence.

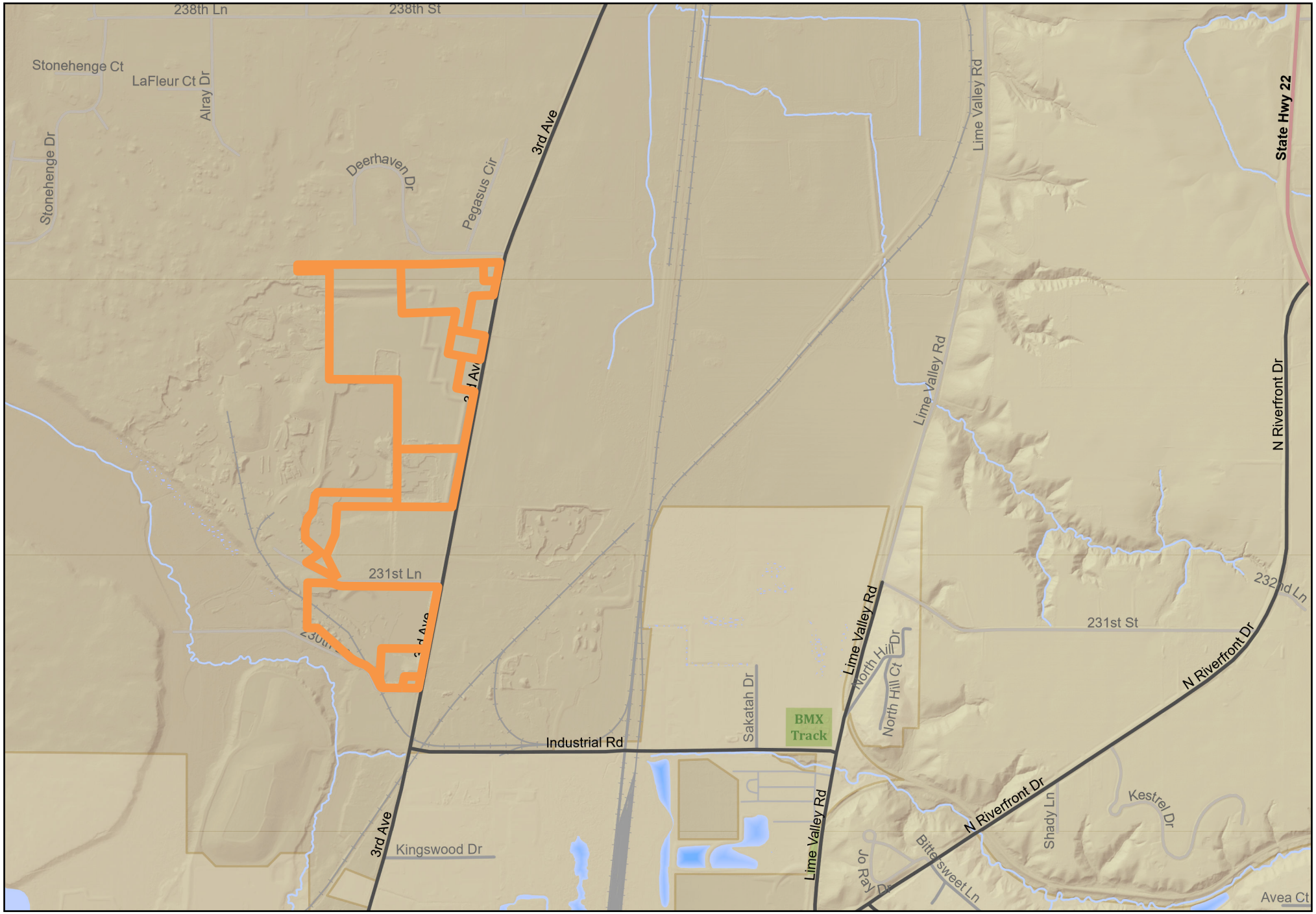
Variance #3
Staff recommends approval of the variance to increase the allowable height of an accessory structure in the Rural Conservation District of 35 feet to 100 feet to allow for the installation and preservation of a historic Quarry Derrick Crane within the Rural Conservation District with the following condition:

1. The applicant to submit a viewshed analysis from 3rd Avenue and from the two residential homes within the general vicinity to illustrate the impact to the residents prior to the placement of the crane.

Attachments

General Location Map
Aerial Map
Site Plans
Building and Floor Plans
Project Narrative
Landscape Plan and Viewshed Analysis
Noise Screening
Drainage Plan
EAW Documents
EAW responses
Lighting Plan
Cable Park Plans
Emergency Vehicle Movements
Safety and Local Enforcement Emails

General Location Map



N W E S

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Produced by: City of Mankato GIS
Published: August 13, 2026

City of Mankato — Leading the way...

Aerial Map



N W E S

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Published: August 13, 2026

Mankato — Leading the way...

CAMPQUARY LLC

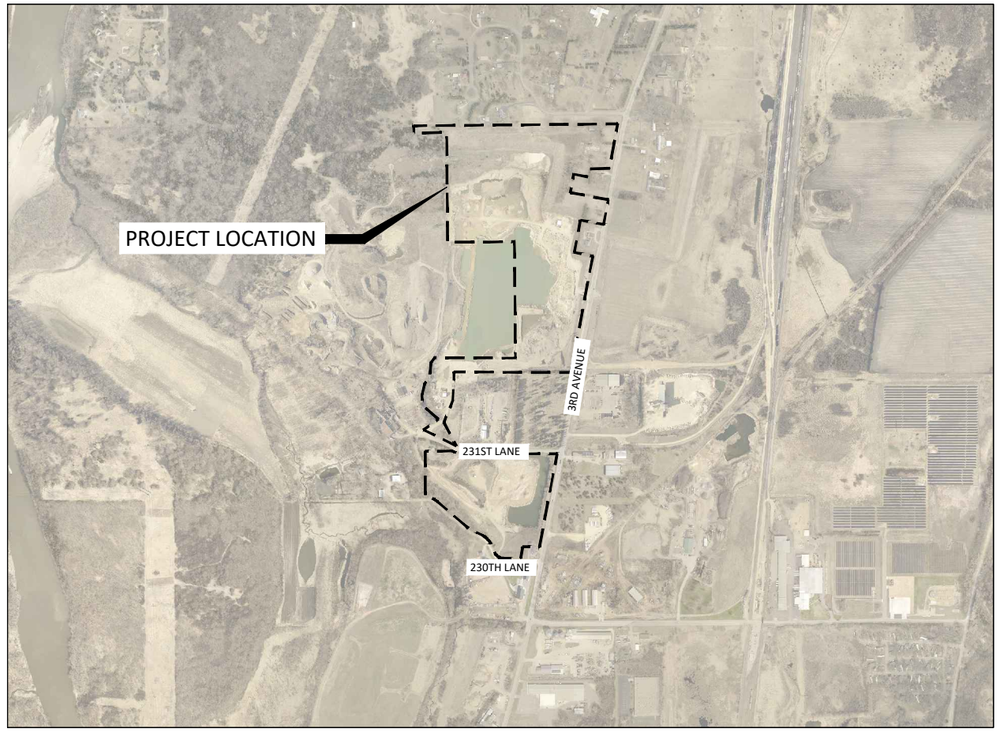
CONSTRUCTION PLANS FOR

ROCKWELL RV & ADVENTURE PARK

SITE GRADING, UTILITY CONSTRUCTION, PAVEMENT CONSTRUCTION

JULY 2026

MAP OF
LIME TOWNSHIP
BLUE EARTH COUNTY, MN



0 800 1600
1600
SCALE FEET

	SHEET TITLE
GENERAL	
G0.01	TITLE SHEET
G0.02	LEGEND
G1.01 - G1.02	PROJECT OVERVIEW
CIVIL	
C0.01 - C0.06	EXISTING CONDITIONS, REMOVALS PLAN
C1.01 - C1.03	CONSTRUCTION DETAILS
C2.01 - C2.24	STORMWATER POLLUTION PREVENTION PLAN
C3.01 - C3.18	GRADING PLAN
C4.01 - C4.08	SANITARY MAINLINE PLAN & PROFILE
C4.09 - C4.25	UTILITY PLAN
C5.01 - C5.03	SITE PLAN OVERVIEW
C6.01 - C6.18	ENLARGED SITE PLAN
C7.01 - C7.02	TRAILHEAD GRADING & SITE PLAN

THIS PLAN SET CONTAINS 103 SHEETS.

NOTE: EXISTING UTILITY INFORMATION SHOWN ON THIS PLAN HAS BEEN PROVIDED BY THE UTILITY OWNER. THE CONTRACTOR SHALL FIELD VERIFY EXACT LOCATIONS PRIOR TO COMMENCING CONSTRUCTION AS REQUIRED BY STATE LAW. NOTIFY GOPHER STATE ONE CALL, 1-800-252-1166 OR 651-454-0002.

THE SUBSURFACE UTILITY INFORMATION IN THIS PLAN IS UTILITY QUALITY LEVEL "D". THIS UTILITY QUALITY LEVEL WAS DETERMINED ACCORDING TO THE GUIDELINES OF CI/ASCE 38-22, ENTITLED "STANDARD GUIDELINES FOR INVESTIGATING AND DOCUMENTING EXISTING UTILITIES."

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H:\CAMPQUAR_PR\24X137080000\CAD\C3D\137080G001.dwg 7/27/2026 5:58:53 PM Plotted by: Caleb Ward

BM=829.85
MONITORING WELL SITE
BENCHMARK NORTH OF
STOFFELL QUARRY MAIN
ENTRANCE OFF 3RD AVE

PROJECT DATUM: BLUE EARTH COUNTY
HORIZONTAL: HARN 1996
VERTICAL: NAVD 1988

RECORD DRAWING INFORMATION
OBSERVER:

I HEREBY CERTIFY THAT THIS PLAN, SPECIFICATION, OR REPORT WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA.

NOT FOR CONSTRUCTION

ALEC W. PIETZ, P.E.
LIC. NO. 59617 DATE XX/XX/XXXX

BOLTON & MENK
1960 PREMIER DRIVE
MANKATO, MN 56001
Phone: (507) 625-4171
Email: Mankato@bolton-menk.com
www.bolton-menk.com

DESIGNED	NO.	ISSUED FOR	DATE
AWP			
DRAWN			
AWP			
CHECKED			
AWP			
CLIENT PROJ. NO.			
24X.137080			

CAMPQUARRY LLC
ROCKWELL RV & ADVENTURE PARK
TITLE SHEET

SHEET
G0.01

EXISTING TOPOGRAPHIC SYMBOLS

- ACCESS GRATE
- AIR CONDITION UNIT
- ANTENNA
- AUTO SPRINKLER CONNECTION
- BARRICADE PERMANENT
- BASKETBALL POST
- BENCH
- BIRD FEEDER
- BOLLARD
- BUSH
- CATCH BASIN RECTANGULAR CASTING
- CATCH BASIN CIRCULAR CASTING
- CURB STOP
- CLEAN OUT
- CULVERT END
- DRINKING FOUNTAIN
- DOWN SPOUT
- ELECTRIC CAR CHARGE STATION
- FILL PIPE
- FIRE HYDRANT
- FLAG POLE
- FLARED END / APRON
- FUEL PUMP
- GRILL
- GUY WIRE ANCHOR
- HANDHOLE
- HANDICAP SPACE
- IRRIGATION SPRINKLER HEAD
- IRRIGATION VALVE BOX
- LIFT STATION CONTROL PANEL
- LIFT STATION
- LIGHT POLE
- MAILBOX
- MANHOLE-COMMUNICATION
- MANHOLE-ELECTRIC
- MANHOLE-GAS
- MANHOLE-HEAT
- MANHOLE-RECLAIMED WATER
- MANHOLE-SANITARY SEWER
- MANHOLE-STORM SEWER
- MANHOLE-UTILITY
- MANHOLE-WATER
- METER
- DRIVE-THRU MICROPHONE
- PARKING METER
- PAVEMENT MARKING
- PEDESTAL-COMMUNICATION
- PEDESTAL-ELECTRIC
- PEDESTRIAN PUSH BUTTON
- PICNIC TABLE
- POLE-UTILITY
- POST
- RAILROAD SIGNAL POLE
- REGULATION STATION GAS
- SATELLITE DISH
- SIGN TRAFFIC
- SIGNAL CONTROL CABINET
- SOIL BORING
- SIREN
- TELEPHONE BOOTH
- TILE INLET
- TILE OUTLET
- TILE RISER
- TRANSFORMER-ELECTRIC
- TREE-CONIFEROUS
- TREE-DEAD
- TREE-DECIDUOUS
- TREE STUMP
- TRAFFIC ARM BARRIER
- TRAFFIC SIGNAL
- TRASH CAN
- UTILITY MARKER
- VALVE
- VALVE POST INDICATOR
- VALVE VAULT
- VAULT
- VENT PIPE
- WATER SPIGOT
- WELL
- WETLAND DELINEATED MARKER
- WETLAND
- WET WELL
- YARD HYDRANT

PROPOSED TOPOGRAPHIC SYMBOLS

- CLEANOUT
- MANHOLE
- LIFT STATION
- STORM SEWER CIRCULAR CASTING
- STORM SEWER RECTANGULAR CASTING
- STORM SEWER FLARED END / APRON
- STORM SEWER OUTLET STRUCTURE
- STORM SEWER OVERFLOW STRUCTURE
- CURB BOX
- FIRE HYDRANT
- WATER VALVE
- WATER REDUCER
- WATER BEND
- WATER TEE
- WATER CROSS
- WATER SLEEVE
- WATER CAP / PLUG
- RIP RAP
- DRAINAGE FLOW
- TRAFFIC SIGNS

SURVEY SYMBOLS

- BENCHMARK LOCATION
- CONTROL POINT
- MONUMENT FOUND
- CAST IRON MONUMENT
- STONE MONUMENT

EXISTING TOPOGRAPHIC LINES

- RETAINING WALL
- FENCE
- FENCE-DECORATIVE
- GUARD RAIL
- TREE LINE
- BUSH LINE

SURVEY LINES

- CONTROLLED ACCESS
- BOUNDARY
- CENTERLINE
- EXISTING EASEMENT LINE
- PROPOSED EASEMENT LINE
- EXISTING LOT LINE
- PROPOSED LOT LINE
- EXISTING RIGHT-OF-WAY
- PROPOSED RIGHT-OF-WAY
- SETBACK LINE
- SECTION LINE
- QUARTER LINE
- SIXTEENTH LINE
- TEMPORARY EASEMENT

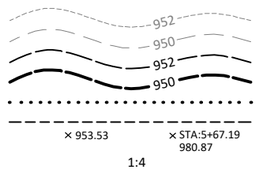
EXISTING UTILITY LINES

- FORCEMAIN
- SANITARY SEWER
- SANITARY SERVICE
- STORM SEWER
- STORM SEWER DRAIN TILE
- WATERMAIN
- WATER SERVICE
- RECLAIMED WATER

PROPOSED UTILITY LINES

- FORCEMAIN
- SANITARY SEWER
- SANITARY SERVICE
- STORM SEWER
- STORM SEWER DRAIN TILE
- WATERMAIN
- WATER SERVICE
- PIPE CASING
- TRENCHLESS PIPE (PLAN VIEW)
- TRENCHLESS PIPE (PROFILE VIEW)

GRADING INFORMATION



- EXISTING CONTOUR MINOR
- EXISTING CONTOUR MAJOR
- PROPOSED CONTOUR MINOR
- PROPOSED CONTOUR MAJOR
- PROPOSED GRADING LIMITS / SLOPE LIMITS
- PROJECT LIMITS
- PROPOSED SPOT ELEVATION
- RISE:RUN (SLOPE)

HATCH PATTERNS

- BITUMINOUS
- GRAVEL
- CONCRETE

EXISTING PRIVATE UTILITY LINES

NOTE:
EXISTING UTILITY INFORMATION SHOWN ON THIS PLAN HAS BEEN PROVIDED BY THE UTILITY OWNER. THE CONTRACTOR SHALL FIELD VERIFY EXACT LOCATIONS PRIOR TO COMMENCING CONSTRUCTION AS REQUIRED BY STATE LAW. NOTIFY GOPHER STATE ONE CALL, 1-800-252-1166 OR 651-454-0002.

THE SUBSURFACE UTILITY INFORMATION IN THIS PLAN IS UTILITY QUALITY LEVEL D UNLESS OTHERWISE NOTED. THIS UTILITY LEVEL WAS DETERMINED ACCORDING TO THE GUIDELINES OF CI/ASCE 38-22, ENTITLED "STANDARD GUIDELINE FOR INVESTIGATING AND DOCUMENTING EXISTING UTILITIES".

- UNDERGROUND FIBER OPTIC
- UNDERGROUND ELECTRIC
- UNDERGROUND GAS
- UNDERGROUND COMMUNICATION
- OVERHEAD ELECTRIC
- OVERHEAD COMMUNICATION
- OVERHEAD UTILITY

UTILITIES IDENTIFIED WITH A QUALITY LEVEL :

LINE TYPES FOLLOW THE FORMAT: UTILITY TYPE - QUALITY LEVEL
EXAMPLE: G-A G-A UNDERGROUND GAS, QUALITY LEVEL A
UTILITY QUALITY LEVEL (A,B,C,D) DEFINITIONS CAN BE FOUND IN CI/ASCE 38-22.

UTILITY QUALITY LEVELS:

QUALITY LEVEL D: PROVIDES THE MOST BASIC LEVEL OF INFORMATION. IT INVOLVES COLLECTING DATA FROM EXISTING UTILITY RECORDS. RECORDS MAY INCLUDE AS-BUILT DRAWINGS, DISTRIBUTION AND SERVICES MAPS, EXISTING GEOGRAPHIC INFORMATION SYSTEM DATABASES, CONSTRUCTION PLANS, ETC.

QUALITY LEVEL C: INVOLVES SURVEYING VISIBLE SUBSURFACE UTILITY STRUCTURES SUCH AS MANHOLES, HAND-HOLES, UTILITY VALVES AND METERS, FIRE HYDRANTS, PEDESTALS AND UTILITY MARKERS, AND THEN CORRELATING THE INFORMATION WITH EXISTING UTILITY RECORDS TO CREATE COMPOSITE DRAWINGS. INCLUDES QUALITY LEVEL D ACTIVITIES.

QUALITY LEVEL B: INVOLVES DESIGNATING THE HORIZONTAL POSITION OF SUBSURFACE UTILITIES THROUGH SURFACE DETECTION METHODS AND COLLECTING THE INFORMATION THROUGH A SURVEY METHOD. INCLUDES QUALITY LEVEL C AND D TASKS.

QUALITY LEVEL A: PROVIDES THE HIGHEST LEVEL OF ACCURACY. IT INVOLVES LOCATING OR POTHOLING UTILITIES AS WELL AS ACTIVITIES IN QUALITY LEVELS B, C, AND D. THE LOCATED FACILITY INFORMATION IS SURVEYED AND MAPPED AND THE DATA PROVIDES PRECISE PLAN AND PROFILE INFORMATION.

ABBREVIATIONS

A	ALGEBRAIC DIFFERENCE	GRAV	GRAVEL	RSC	RIGID STEEL CONDUIT
ADJ	ADJUST	GU	GUTTER	RT	RIGHT
ALT	ALTERNATE	GV	GATE VALVE	SAN	SANITARY SEWER
B-B	BACK TO BACK	HDPE	HIGH DENSITY POLYETHYLENE	SCH	SCHEDULE
BIT	BITUMINOUS	HH	HANDHOLE	SERV	SERVICE
BLDG	BUILDING	HP	HIGH POINT	SHLD	SHOULDER
BMP	BEST MANAGEMENT PRACTICE	HWL	HIGH WATER LEVEL	STA	STATION
BR	BEGIN RADIUS	HYD	HYDRANT	STD	STANDARD
BV	BUTTERFLY VALVE	I	INVERT	STM	STORM SEWER
CB	CATCH BASIN	K	CURVE COEFFICIENT	TC	TOP OF CURB
C&G	CURB AND GUTTER	L	LENGTH	TE	TEMPORARY EASEMENT
CIP	CAST IRON PIPE	LO	LOWEST OPENING	TEMP	TEMPORARY
CIPP	CURED-IN-PLACE PIPE	LP	LOW POINT	TNH	TOP NUT HYDRANT
CL	CENTER LINE	LT	LEFT	TP	TOP OF PIPE
CL.	CLASS	MAX	MAXIMUM	TYP	TYPICAL
CLVT	CULVERT	MH	MANHOLE	VCP	VITRIFIED CLAY PIPE
CMP	CORRUGATED METAL PIPE	MIN	MINIMUM	VERT	VERTICAL
C.O.	CHANGE ORDER	MR	MID RADIUS	VPC	VERTICAL POINT OF CURVE
COMM	COMMUNICATION	NIC	NOT IN CONTRACT	VPI	VERTICAL POINT OF INTERSECTION
CON	CONCRETE	NMC	NON-METALLIC CONDUIT	VPT	VERTICAL POINT OF TANGENT
CSP	CORRUGATED STEEL PIPE	NTS	NOT TO SCALE	WM	WATERMAIN
DIA	DIAMETER	NWL	NORMAL WATER LEVEL		
DIP	DUCTILE IRON PIPE	OHW	ORDINARY HIGH WATER LEVEL		
DWY	DRIVEWAY	PC	POINT OF CURVE	AC	ACRES
E	EXTERNAL CURVE DISTANCE	PCC	POINT OF COMPOUND CURVE	CF	CUBIC FEET
ELEC	ELECTRIC	PE	PERMANENT EASEMENT	CV	COMPACTED VOLUME
ELEV	ELEVATION	PED	PEDESTRIAN, PEDESTAL	CY	CUBIC YARD
EOF	EMERGENCY OVERFLOW	PERF	PERFORATED PIPE	EA	EACH
ER	END RADIUS	PERM	PERMANENT	EV	EXCAVATED VOLUME
ESMT	EASEMENT	PI	POINT OF INTERSECTION	LB	POUND
EX	EXISTING	PL	PROPERTY LINE	LF	LINEAR FEET
FES	FLARED END SECTION	PRC	POINT OF REVERSE CURVE	LS	LUMP SUM
F-F	FACE TO FACE	PT	POINT OF TANGENT	LV	LOOSE VOLUME
FF	FINISHED FLOOR	PVC	POLYVINYL CHLORIDE PIPE	SF	SQUARE FEET
F&I	FURNISH AND INSTALL	PVMT	PAVEMENT	SV	STOCKPILE VOLUME
FM	FORCEMAIN	R	RADIUS	SY	SQUARE YARD
FO	FIBER OPTIC	R/W	RIGHT-OF-WAY		
F.O.	FIELD ORDER	RCP	REINFORCED CONCRETE PIPE		
GRAN	GRANULAR	RET	RETAINING		

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ALEC W. PIETZ, P.E.
LIC. NO. 59617 DATE XX/XX/XXXX

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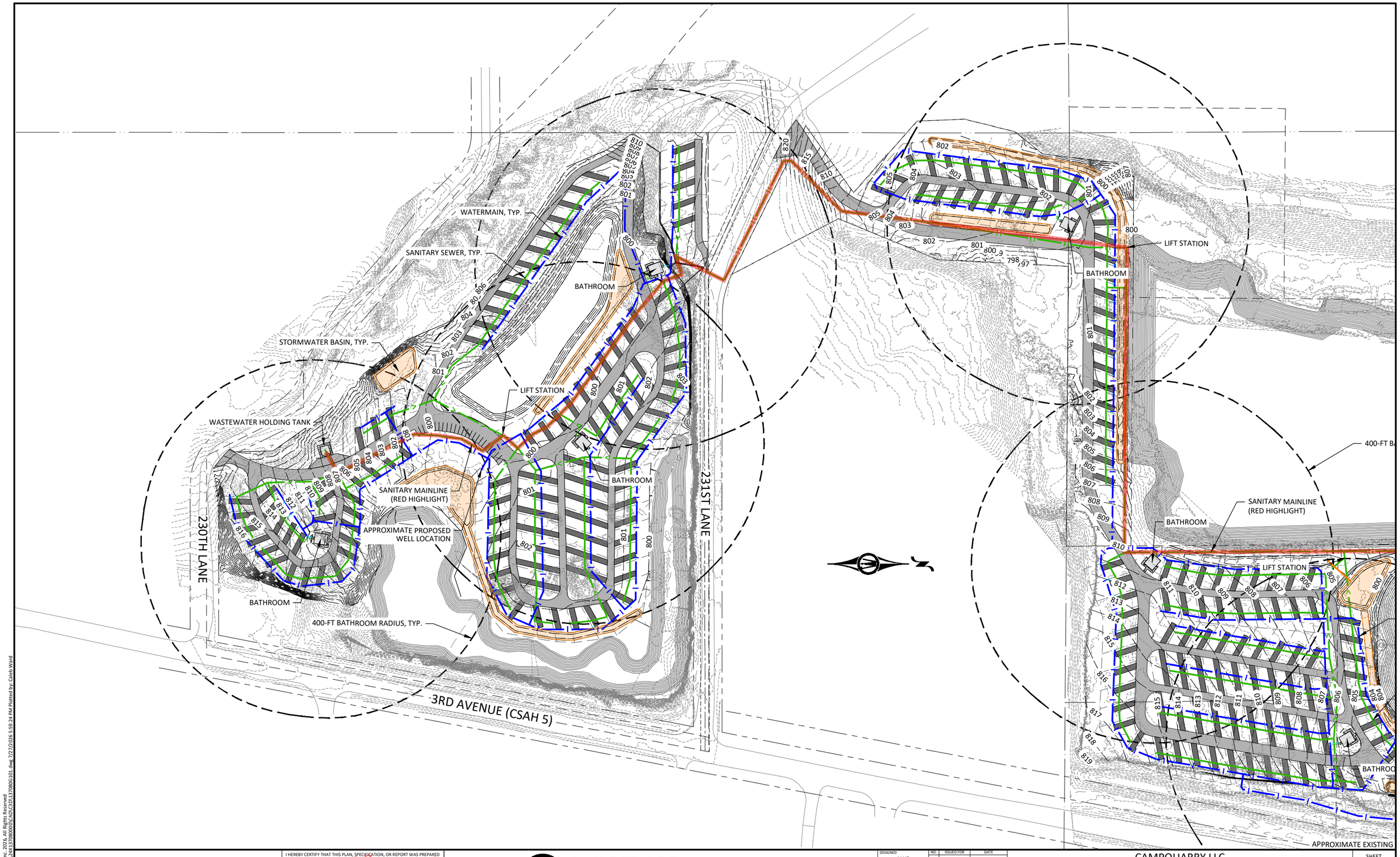

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HORZ. SCALE: 0, 100, 200 FEET

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ROCKWELL RV & ADVENTURE PARK

PROJECT OVERVIEW

SHEET G1.01

LIFT STATION
BATHROOM
400-FT BATHROOM RADIUS, TYP.
SANITARY MAINLINE (RED HIGHLIGHT)
WATERMAIN, TYP.
STORMWATER BASIN, TYP.
SANITARY SEWER, TYP.
ENTRANCE LODGE
PARKING LOT & STAGING AREA
FFE=831.0
APPROXIMATE EXISTING WELL LOCATION
3RD AVENUE (CSAH 5)

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PROJECT OVERVIEW

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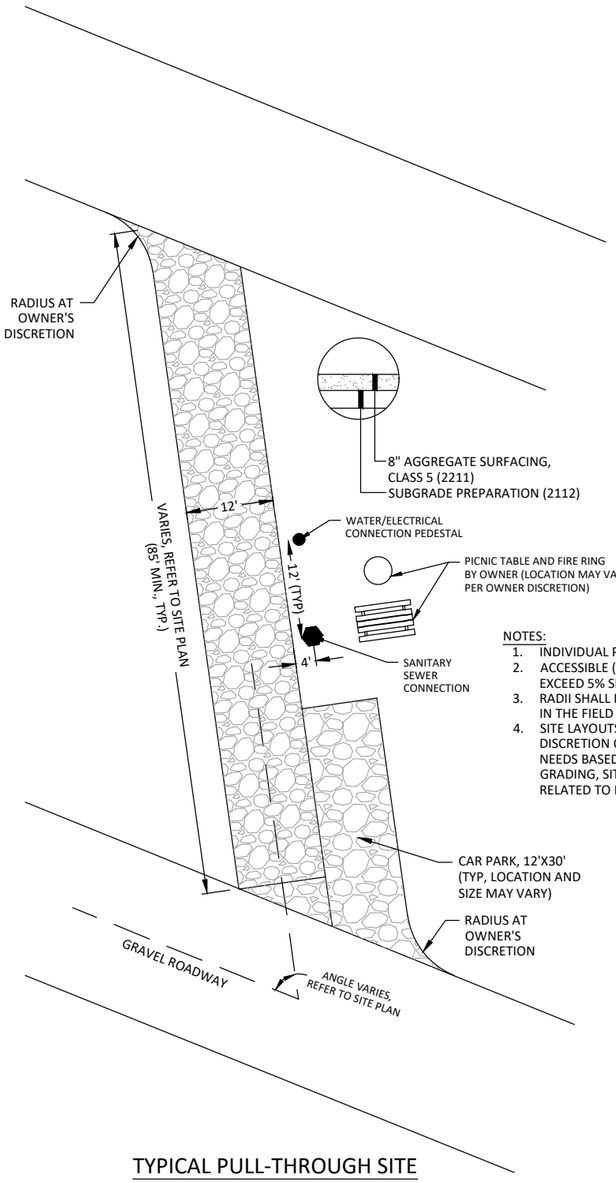


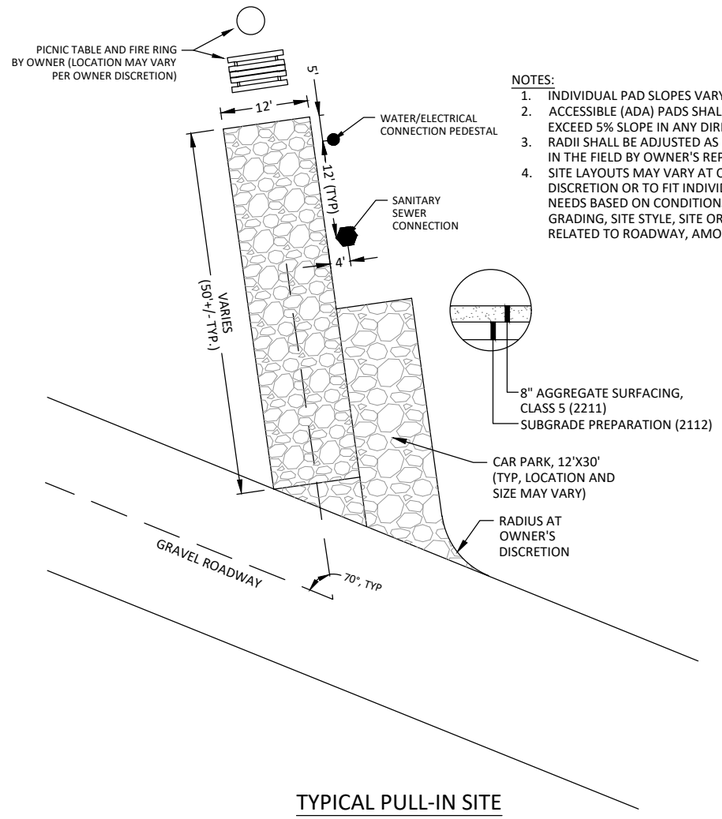
NOTES:

1. INDIVIDUAL PAD SLOPES VARY BY SITE
2. ACCESSIBLE (ADA) PADS SHALL NOT EXCEED 5% SLOPE IN ANY DIRECTION
3. RADII SHALL BE ADJUSTED AS NECESSARY IN THE FIELD BY OWNER'S REPRESENTATIVE
4. SITE LAYOUTS MAY VARY AT OWNER'S DISCRETION OR TO FIT INDIVIDUAL SITE NEEDS BASED ON CONDITIONS SUCH AS GRADING, SITE STYLE, SITE ORIENTATION RELATED TO ROADWAY, AMONG OTHERS

TYPICAL PULL-THROUGH SITE

NOT TO SCALE

NOTE: MINUTE DETAILS OF SITES MAY VARY AT OWNER'S DISCRETION. SITE ORIENTATION WILL ALSO VARY BASED ON DIRECTION OF TRAVEL AND LAYOUT AS SHOWN ON THE PLANS.



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TYPICAL PULL-IN SITE

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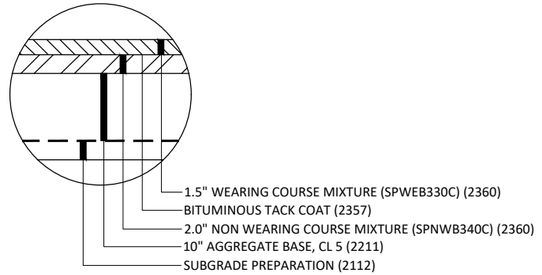

BITUMINOUS ROADWAY SECTION

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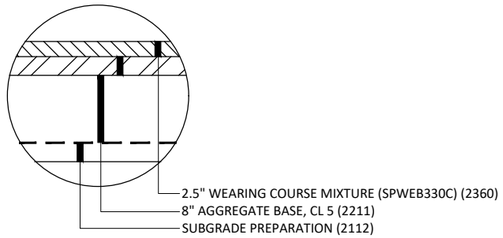

BITUMINOUS TRAIL SECTION

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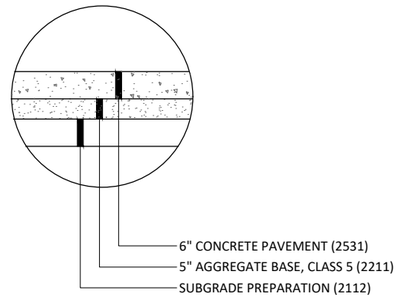

6" CONCRETE PAVEMENT/SIDEWALK SECTION

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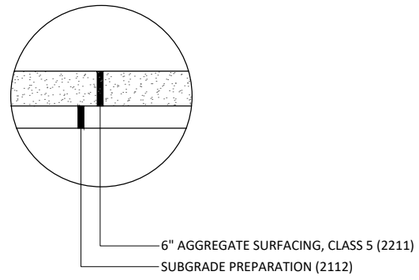

6" AGGREGATE SURFACING SECTION

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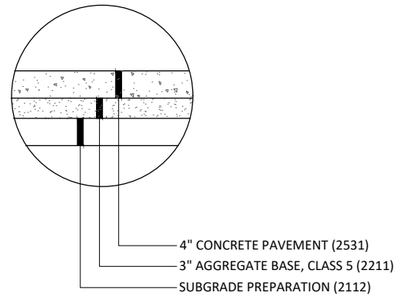

4" CONCRETE WALK SECTION

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CONSTRUCTION DETAILS

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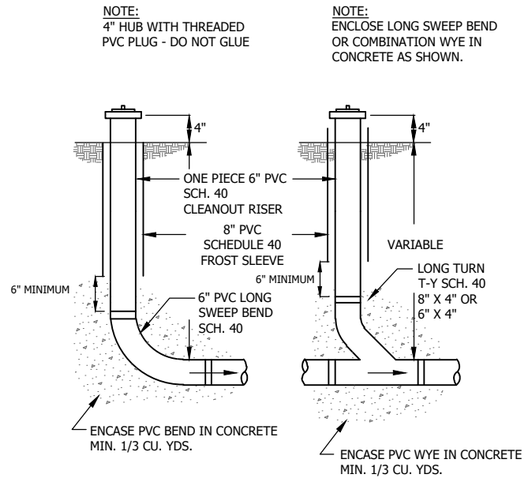

PVC SERVICE LINE CLEANOUTS

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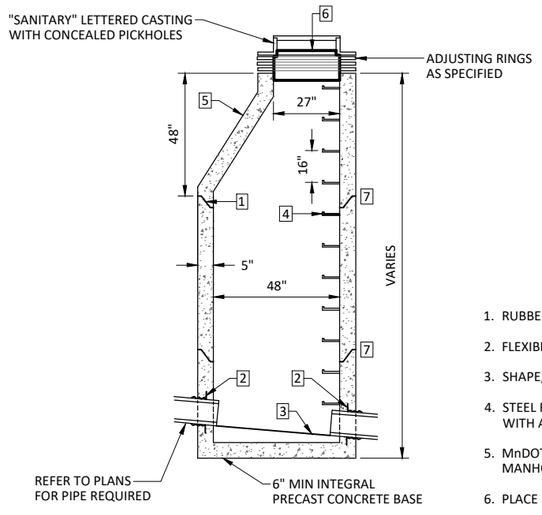
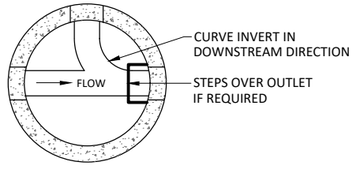


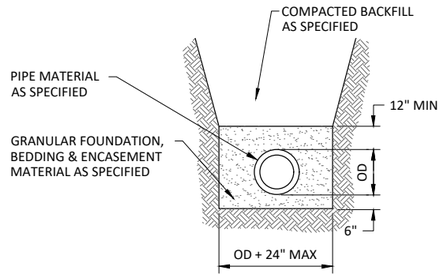


PLAN VIEW

1. RUBBER GASKET (TYPICAL)
2. FLEXIBLE WATERTIGHT SEAL TO BE APPROVED BY ENGINEER
3. SHAPE, DEPTH AND SLOPE OF INVERT TO BE APPROVED BY ENGINEER
4. STEEL REINFORCED PLASTIC STEPS SHALL BE A POLYPROPYLENE PLASTIC REINFORCED WITH A NO. 2 DEFORMED STEEL ROD GRADE 60
5. MnDOT TYPE "B" ECCENTRIC PRECAST CONCRETE CONE SECTION TYPICAL FOR ALL MANHOLES
6. PLACE INTERIOR CHIMNEY SEAL (WHEN SPECIFIED)
7. 8" WIDE, ¼" THICK BITUMINOUS MASTIC WRAP FULL CIRCUMFERENCE (WHEN SPECIFIED)

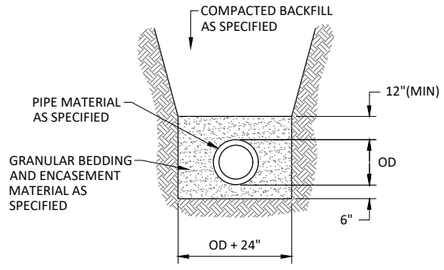
SANITARY MANHOLE

NOT TO SCALE



NON-RIGID STORM SEWER TRENCH

NOT TO SCALE



NON-RIGID SANITARY SEWER TRENCH

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NOT FOR CONSTRUCTION

ALEC W. PIETZ, P.E.

LIC. NO. 59617 DATE XX/XX/XXXX

BOLTON & MENK

1960 PREMIER DRIVE
MANKATO, MN 56001
Phone: (507) 625-4171
Email: Mankato@bolton-menk.com
www.bolton-menk.com

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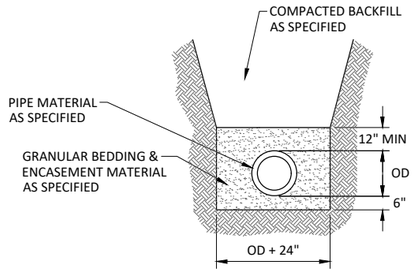
CHECKED AWP			
CLIENT PROJ. NO. 24X.137080			

CAMPQUARRY LLC

ROCKWELL RV & ADVENTURE PARK

CONSTRUCTION DETAILS

SHEET C1.02



HDPE WATERMAIN TRENCH

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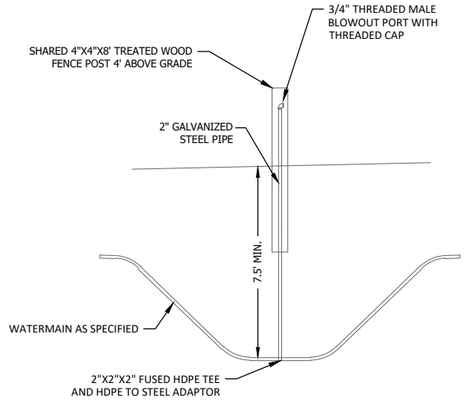

BLOWOUT STATION

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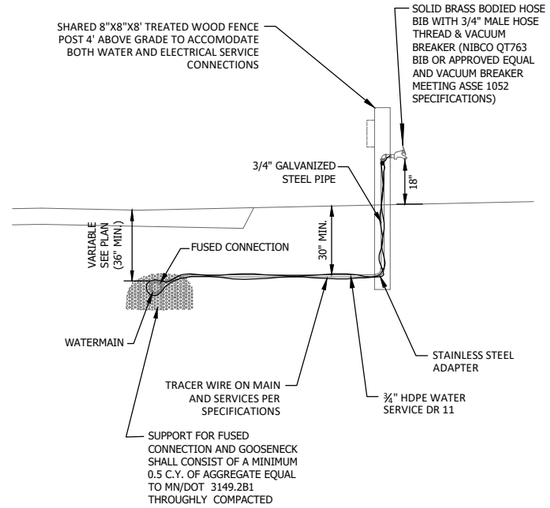
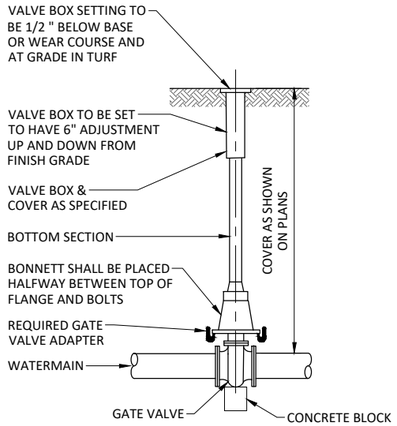


WATER SERVICE AND 3/4" GALVANIZED SERVICE WITH APPURTENANCES

NOT TO SCALE

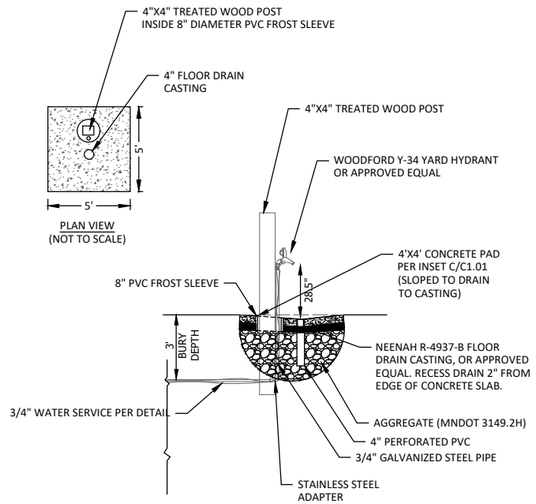
NOTES:

1. VALVE BOX SHALL BE CENTERED ON OPERATING NUTS, STRAIGHT, FREE FROM DEBRIS, AND ALL SECTIONS UNBROKEN
2. VALVES IN EASEMENTS SHALL HAVE CHANNEL POST WITNESS MARKERS WITH REFLECTIVE "GV" SIGN
3. DEEP VALVES SHALL HAVE NUT EXTENSIONS INSTALLED TO ELEVATION TO ACCOMMODATE STANDARD 10' KEY; BOTTOM NUT SHALL BE BOLTED TO VALVE NUT AND ONLY ONE SECTION
4. COMPACTION WITH MECHANICAL TAMPER AROUND VALVE BOX SHALL BE PLACED AND COMPACTED WITH 2' LIFTS TO ACHIEVE 95% COMPACTION
5. GATE VALVES LOCATED WITHIN THE CONCRETE SIDEWALK SHALL INCLUDE A METAL SEPARATOR BETWEEN THE VALVE BOX AND THE CONCRETE



GATE VALVE BOX INSTALLATION

NOT TO SCALE



WATER SPIGOT AND DRAIN

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CAMPQUARRY LLC

ROCKWELL RV & ADVENTURE PARK

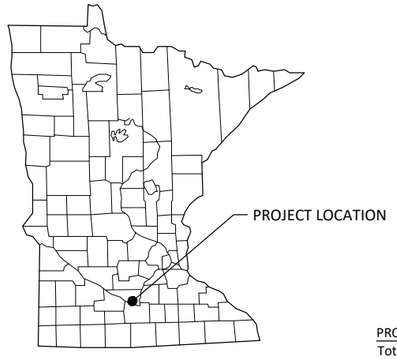
CONSTRUCTION DETAILS

SHEET C1.03

STORMWATER POLLUTION PREVENTION PLAN (SWPPP)

ROCKWELL RV & ADVENTURE PARK

LIME TOWNSHIP
BLUE EARTH COUNTY, MINNESOTA



LEGEND

- 1-MILE BOUNDARY
- PROJECT BOUNDARY
- OR — IMPAIRED, SPECIAL OR PROTECTED WATERS
- NATIONAL WETLANDS INVENTORY

RESPONSIBLE PARTIES:
The Contractor and Owner will be joint applicants under the MPCA's General Stormwater Permit for Construction Activity as required by the National Pollutant Discharge Elimination System (NPDES) Phase II program.

The Contractor shall provide one or more trained Construction SWPPP Manager(s) knowledgeable and experienced in the application of erosion prevention and sediment control BMPs that will oversee the implementation of the SWPPP, and the installation, inspection and maintenance of the erosion prevention and sediment control BMPs.

A Construction SWPPP Manager must be available for an on-site inspection within 72 hours upon request by the MPCA.

	COMPANY	CONTACT PERSON	PHONE
OWNER:	CampQuarry LLC	Kyle Kaldor	701-430-1312
SWPPP DESIGNER:	Bolton & Menk, Inc.	Caleb Ward	507-613-8795
CONTRACTOR:	TBD	TBD	TBD
CONSTRUCTION SWPPP MANAGER:	TBD	TBD	TBD
PARTY RESPONSIBLE FOR LONG TERM O&M:	CampQuarry LLC	Kyle Kaldor	701-430-1312

The SWPPP Designer, Construction SWPPP Manager, and BMP Installer must have appropriate training. Documentation showing training commensurate with the job duties and responsibilities is required to be included in the SWPPP prior to any work beginning on the site. Training documentation for the SWPPP Designer is included on the Narrative sheet. The Contractor shall attach training documentation to this SWPPP for the Construction SWPPP Manager and BMP Installer prior to the start of construction. This information shall be kept up to date until the project NOT is filed.

ADDITIONAL COMPENSATION
Payment for all work associated with Erosion and Sediment Control shall be as described in the Project Manual. Unless otherwise authorized by the Owner no additional payment shall be made for any work required to administer and maintain the site erosion and sediment control in compliance with the Minnesota Pollution Control Agency (MPCA) - General Stormwater Permit for Construction Activity (MN R100001) including but not limited to inspection, maintenance, and removal of BMPs or addition of BMPs to accommodate Contractor phasing.

DOCUMENT RETENTION
Permittees must make the SWPPP, including all inspection reports, maintenance records, training records and other information required by this permit, available to federal, state, and local officials within three (3) days upon request for the duration of the permit and for three (3) years following the NOT.

GENERAL STORMWATER DISCHARGE REQUIREMENTS
All requirements listed in Section 5.1 of the Permit for the design of the permanent stormwater management system and discharge have been included in the preparation of this SWPPP. These include but are not limited to:

1. The expected amount, frequency, intensity, and duration of precipitation.
2. The nature of stormwater runoff and run-on at the site
3. Peak flow rates and stormwater volumes to minimize erosion at outlets and downstream channel and stream bank erosion.
4. The range of soil particle sizes expected to be present on the site.

Permanent stormwater treatment systems for this project have been designed in accordance with the guidance in the MN Stormwater Manual in place at the time of bidding. Copies of the design information and calculations are part of this SWPPP and will be provided in digital format upon written request to the Engineer.

PROJECT AREAS:

Total Project Size (disturbed area) =	100.0	ACRES
Existing area of impervious surface =	0.0	ACRES
Post construction area of impervious surface =	32.0	ACRES
Total new impervious surface area created =	32.0	ACRES

Planned Construction Start Date:	Spring 2027
Estimated Construction Completion Date:	Fall 2028

PERMANENT STORMWATER MANAGEMENT SYSTEM:
Type of storm water management used if more than 1 acre of new impervious surface is created:

	Wet Sedimentation Basin
X	Infiltration/Filtration
	Regional Pond
	Permanent Stormwater Management Not Required

PROJECT LOCATION:

COUNTY	TOWNSHIP	RANGE	SECTION	LATITUDE	LONGITUDE
BLUE EARTH	T109N	R26W	30,31	44.2136° N	93.9958° W

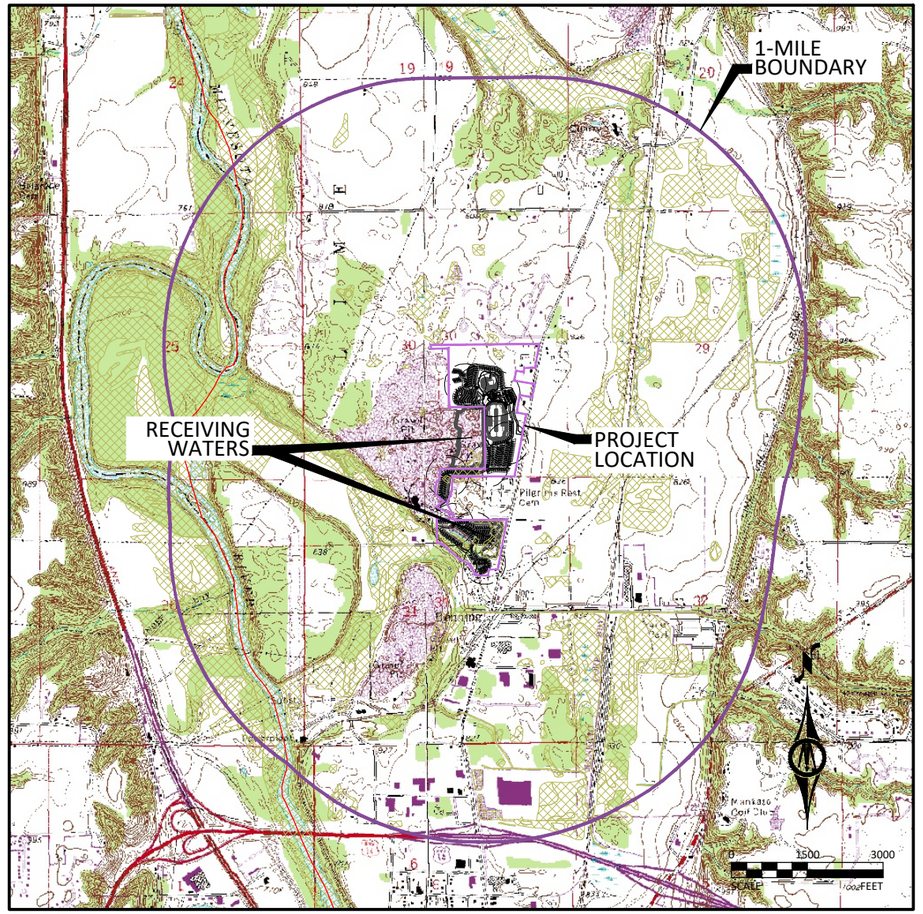
BMP SUMMARY	QUANTITY	UNIT
STABILIZED CONSTRUCTION EXIT	4	EACH
STORM DRAIN INLET PROTECTION	6	EACH
PERIMETER CONTROL	18,000	LIN FEET
TURF ESTABLISHMENT; DESIGNATION BY LANDSCAPE ARCHITECTURE	40.0	ACRE
NOTE: QUANTITIES LISTED ACCOUNT FOR ONE INSTALLATION. ADDITIONAL INSTALLATIONS DUE TO MAINTENANCE OR PHASING SHALL BE CONSIDERED INCIDENTAL.		

DESCRIPTION OF CONSTRUCTION ACTIVITIES AND STORMWATER MANAGEMENT:
Construction activities include: Site grading, camp site utilities, structural improvements, temporary erosion and sediment control, and permanent stabilization.

Stormwater currently discharges in various directions including to existing on-site basins currently serving the quarry operations and portions of the site. After construction is complete stormwater will generally discharge similar to existing conditions but grading will more intentionally direct stormwater constructed stormwater basins, which will act as permanent stormwater management.

While existing impervious surfaces do exist on site, the design considers these as incidental to the quarry operation so all proposed impervious with this plan is considered new. A comprehensive stormwater report was prepared to support these plans.

A copy of the SWPPP must remain on site at all times.



RECEIVING WATERS:
Receiving waters, including surface water, wetlands, Public Waters, and stormwater ponds, within 1-mile of the project boundary are identified on the USGS 7.5 min quad map above. Receiving waters that are impaired, the impairment, and WLA are listed as follows. All specific BMPs relative to construction activities listed in the permit for special, prohibited, restricted, or impaired have been incorporated into this plan. All specific BMPs listed in approved TMDLs and those BMPs listed for construction related waste load allocations have also been incorporated.

NAME OF WATER BODY	TYPE (ditch, pond, wetland, lake, etc.)	Special, Prohibited, Restricted Water [1]	Flows to Impaired Water Within 1-Mile [2]	USEPA Approved Construction Related TMDL [3]
Onsite Basins, Fully Infiltrate	Pond	N/A	No	N/A

[1] Special, prohibited, and restricted waters are listed in Section 23 of the MN Construction Stormwater General Permit (MNR100001).
[2] Identified as impaired under section 303 (d) of the federal Clean Water Act for phosphorus, turbidity, TSS, dissolved oxygen, and/or aquatic biota.
[3] Construction Related TMDLs include those related to: phosphorus, turbidity, TSS, dissolved oxygen, and/or aquatic biota.

IMPLEMENTATION SCHEDULE AND PHASING: The Contractor is required to provide an updated schedule and site management plan meeting the minimum requirements of Section 1717 of the Minnesota Standard Specifications for Construction.

1) Submit SWPPP Updates to Engineer. Submittal shall include any requested changes to the SWPPP, including but not limited to: Trained Personnel, Locations for Stockpiles, Concrete Washout, Sanitation Facilities, Types and Locations of Erosion & Sediment Control. Failure to submit updates shall be considered acceptance of the SWPPP as designed with no changes.
2) Install perimeter sediment control, inlet protection, and construction exit.
3) Complete site and utility improvements.
4) Add additional temporary BMPs as necessary during construction based on inspection reports.
5) Repeat steps 2-4 as necessary.
6) Ensure final stabilization measures are complete.
7) Provide digital copy of all Field SWPPP Documentation including Inspection Reports and SWPPP Revisions to the Owner.
8) Submit Notice of Termination (NOT) to MPCA. NOTE: The NOT must be submitted to MPCA before Final Stabilization is considered complete.

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ALEC W. PIETZ, P.E.
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CAMPQUARRY LLC
ROCKWELL RV & ADVENTURE PARK
STORMWATER POLLUTION PREVENTION PLAN
PROJECT INFORMATION & LOCATION MAP

SHEET C2.01

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Information contained in this SWPPP narrative sheet summarizes requirements of the GENERAL PERMIT AUTHORIZATION TO DISCHARGE STORMWATER ASSOCIATED WITH CONSTRUCTION ACTIVITY UNDER THE NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM/STATE DISPOSAL SYSTEM PROGRAM - Permit No: MN RI0000I (Permit) as they apply to this project. All provisions of the Permit including those not specifically cited herein shall apply to this project. The Contractor is responsible to be familiar with and comply with all conditions of the permit. The full text of the Permit is available at: https://www.pca.state.mn.us/sites/default/files/wq-strm2-80a.pdf

SWPPP AMENDMENTS AND SUBMITTALS

Contractor must prepare and submit to the Engineer a SWPPP amendment as necessary to include additional Best Management Practices (BMPs) to correct problems identified or address the following situations.

1. Contact information and training documentation for Construction SWPPP Manager and BMP Installer,
2. There is a change in construction method of phasing, operation, maintenance, weather or seasonal conditions not anticipated during the design of the SWPPP including but not limited to:
   a. Types and/or Locations of BMPs
   b. Material Storage and Spill Response
   c. Fueling Plans
   d. Locations for Stockpiles, Concrete Washout, and Sanitation Facilities and
   e. Project Phasing
3. It is determined that the SWPPP is not achieving objectives of minimizing pollutants in stormwater discharges associated with construction activity, or
4. The SWPPP is not consistent with the terms and conditions of the permit.

The Contractor may implement SWPPP amendments immediately and is not required to wait for Engineer review of the submittal. The responsibility for completeness of SWPPP amendments and compliance with the Permit lies with the Contractor. Review, comment, or lack of comment by the Engineer on a SWPPP amendment shall not absolve the responsibilities of the Contractor in any way.

If a change order is issued for a design change the SWPPP amendment will be prepared by the Engineer and included in the change order.

In addition to SWPPP amendments, the Contractor shall submit to the Engineer Weekly Erosion and Sediment Control Schedule meeting the requirements of MnDOT 1717.

The Contractor shall keep copies of all SWPPP amendments, Weekly Erosion and Sediment Control Schedules, inspection logs, and maintenance logs with the field copy of the SWPPP. A PDF copy of these documents will be provided along with a copy of the final Field Copy of the SWPPP to the Engineer along with the signed Notice of Termination when final stabilization is complete.

EROSION PREVENTION PRACTICES

Stormwater conveyance channels shall be routed around unstabilized areas. Erosion controls and velocity dissipation devices shall be used at outlets within and along the length of any constructed conveyance channel.

The normal wetted perimeter of all ditches or swales, including storm water management pond slopes, that drain waters from the site must be stabilized within 200' of any property edge or discharge point, including storm sewer inlets, within 24 hours of connection.

Temporary or permanent ditches or swales used as sediment containment during construction do not need to be stabilized during temporary period of use and shall be stabilized within 24 hours after no longer used as sediment containment.

Mulch, hydromulch, tackifier, or similar practice shall not be used in any portion of the wetted perimeter of a temporary or permanent drainage ditch or swale section with a continuous slope of greater than 2 percent.

Energy dissipation shall be installed at all temporary or permanent pipe outlets within 24 hours of connection to a surface water or permanent stormwater treatment system.

The Contractor shall phase construction and use construction methods to the extent practical to minimize exposed soils. The project phasing shall be documented in the Weekly Erosion and Sediment Control Schedule.

SEDIMENT CONTROL PRACTICES

Down gradient BMPs including perimeter BMPs must be in place before up gradient land- disturbing activities begin and shall remain in place until final stabilization.

All BMPs that have been adjusted or removed to accommodate short-term activities shall be re-installed or replaced the earlier of the end of the work day or before the next precipitation event even if the activity is not complete.

Inlet BMPs may be removed for specific safety concerns. The BMPs shall be replaced as soon as the safety concern is resolved. The removal shall be documented in the SWPPP as a SWPPP amendment.

Temporary stockpiles must have sediment control BMPs. The Contractor shall prepare and submit to the Engineer a SWPPP amendment showing the location of temporary stockpiles and the BMPs for each stockpile. The SWPPP amendment must meet the minimum requirements of Section 9 of the Permit.

Soil compaction shall be minimized and topsoil shall be preserved, unless infeasible or if construction activities dictate soil compaction or topsoil stripping.

The use of polymers, flocculants, or other sedimentation treatment chemicals are not proposed as part of this SWPPP as designed by the Engineer. If methods or phasing of construction require the use of any of these chemicals, the Contractor shall prepare and submit to the Engineer a SWPPP amendment that meets the minimum requirements of Section 9 of the Permit.

TEMPORARY SEDIMENTATION BASINS

A temporary sedimentation basin has not been included in this SWPPP as designed by the Engineer. If a basin is later determined to be desirable or necessary the Contractor shall prepare and submit to the Engineer a SWPPP amendment. Temporary sedimentation basins shall meet or exceed the minimum requirements of Section 14 of the Permit and shall include a basin draining plan meeting or exceeding the minimum requirements of Section 10 of the Permit. Where the site discharges to Special and/or Impaired Waters the SWPPP amendment shall also meet or exceed the minimum requirements of Section 23 of the permit.

DEWATERING

A dewatering plan has not been included in this SWPPP as designed by the Engineer. If dewatering is required for this project, the Contractor shall prepare and submit to the Engineer a SWPPP amendment. All dewatering shall meet or exceed the minimum requirements of Section 10 of the Permit.

POLLUTION PREVENTION

Products and materials that have the potential to leach pollutants that are stored on the site must be stored in a manner designed to minimize contact with stormwater. Materials that are not a source of potential contamination to stormwater or that are designed for exposure to stormwater are not required to be covered.

Hazardous materials including but not limited to pesticides, fertilizer, petroleum products, curing compounds and toxic waste must be properly stored and protected from stormwater exposure as recommended by the manufacturer in an access restricted area.

Solid waste must be stored, collected and disposed of in compliance with Minnesota Administrative Rules Chapter 7035.

Portable toilets must be positioned so that they are secure and will not be tipped or knocked over. Sanitary waste must be disposed of properly in accordance with Minn. R. CH 7041.

Exterior vehicle or equipment washing on the project site shall be limited to a defined area of the site. No engine degreasing is allowed on site. A sign must be installed adjacent to each washout facility that requires site personnel to utilize the proper facilities for disposal of concrete and other washout wastes.

The Contractor shall prepare and submit a SWPPP amendment detailing the location and BMPs proposed for storage of materials, solid waste, portable toilets, and exterior vehicle or equipment washing on the site. The SWPPP amendment shall include a spill prevention and response plan that is appropriate for the materials proposed to be on the site. The SWPPP amendment shall meet or exceed the minimum requirements of Section 12 of the Permit.

INSPECTION & MAINTENANCE

A trained person shall routinely inspect the entire construction site at the time interval indicated on this sheet of the SWPPP during active construction and within 24-hours after a rainfall event greater than 0.5 inches in 24 hours. Following an inspection that occurs within 24-hours after a rainfall event, the next inspection must be conducted at the time interval indicated in the Receiving Waters Table found on the SITE PLAN AND INFORMATION SHEET of the SWPPP.

All inspections and maintenance conducted during construction must be recorded on the day it is completed and must be retained with the SWPPP. Inspection report forms are available in the Project Specifications. Inspection report forms other than those provided shall be approved by the engineer.

The Contractor may request a change in inspection schedule for the following conditions:

a. Inspections of areas with permanent cover to be reduced to once per month,
b. Inspections of areas that have permanent cover and have had no construction activity for 12 months to be suspended until construction resumes,
c. Inspections of areas where construction is suspended due to frozen ground conditions, inspections to be suspended until the earlier of within 24 hours of runoff occurring, or upon resuming construction.

No change in inspection schedule shall occur until authorized by the Engineer.

Inspections must include:

1. All erosion prevention and sediment control BMPs and Pollution Prevention Management Measures to ensure integrity and effectiveness.
2. Surface waters, including drainage ditches and conveyance systems for evidence of erosion and sediment deposition.
3. Construction site vehicle exit locations, streets and curb and gutter systems within and adjacent to the project for sedimentation from erosion or tracked sediment from vehicles.
4. Infiltration areas to ensure that no sediment from ongoing construction activity is reaching the infiltration area and that equipment is not being driven across the infiltration area.

All non-functioning BMPs and those BMPs where sediment reaches one-half (1/2) of the depth of the BMP, or in the case of sediment basins one-half (1/2) of the storage volume, must be repaired, replaced, or supplemented by the end of the next business day after discovery, or as soon as field conditions allow.

Permittees must repair, replace or supplement all nonfunctional BMPs with functional BMPs by the end of the next business day after discovery, or as soon as field conditions allow.

Any sediment that escapes the site must be removed and the area stabilized within 7 calendar days of discovery unless precluded by legal, regulatory, or physical access in which case the work shall be completed within 7 calendar days of authorization. Paved surfaces such as streets shall have any escaped or tracked sediment removed by the end of the day that it is discovered. Sediment release, other than paved surfaces that can be cleaned up with street sweeping shall be reported immediately upon discovery to the Engineer.

PUBLIC WATER RESTRICTIONS:

For public waters that have been promulgated "work in water restrictions" during fish spawning time frames, all exposed soil areas that are within 200 feet of the water's edge, and drain to these waters must complete stabilization within 24-hours during the time period. MN DNR permits are not valid for work in waters that are designated as infested waters unless accompanied by an Infested Waters Permit or written notification has been obtained from MN DNR stating that such permit is not required. There is no exception for pre-existing permits. If a MN DNR Permit has been issued for the project and the water is later designated as infested, the Contractor shall halt all work covered by the MN DNR Permit until an Infested Waters Permit is obtained or that written notification is obtained stating that such permit is not required.

FINAL STABILIZATION

Final Stabilization is not complete until all the following requirements have been met:

1. Substantial Completion has been reached and no ground disturbing activities are anticipated.
2. Permanent cover has been installed with an established minimum uniform perennial vegetation density of 70 percent of its expected final growth. Vegetation is not required in areas where no vegetation is proposed by this project such as impervious surfaces or the base of a sand filter.
3. Accumulated sediment has been removed from all permanent stormwater treatment systems as necessary to ensure the system is operating as designed.
4. All sediment has been removed from conveyance systems
5. All temporary synthetic erosion prevention and sediment control BMPs have been removed. BMPs designated on the SWPPP to remain to decompose on-site may remain.
6. For residential construction only, permit coverage terminates on individual lots if the structures are finished and temporary erosion prevention and downgradient perimeter control is complete, the residence sells to the homeowner, and the permittee distributes the MPCA's "Homeowner Fact Sheet" to the homeowner.
7. For agricultural land only (e.g., pipelines across cropland), the disturbed land must be returned to its preconstruction agricultural use prior to submitting the NOT.

SITE STABILIZATION COMPLETION:

Stabilization of exposed soils shall begin immediately and shall be completed after the construction activity has temporarily or permanently ceased no later than:	14 calendar days

SITE INSPECTION INTERVAL:

A trained person shall routinely inspect the entire construction site during active construction at an interval of no more than:	7 calendar days

SPECIAL ENVIRONMENTAL CONSIDERATIONS AND PERMITS:

1)	Was an environmental review required for this project or any part of a common plan of development or sale that includes all or any portion of this project?	NO
2)	Does any portion of the site have the potential to affect threatened or endangered species or their critical habitat?	NO
3)	Does any portion of this site discharge to a Calcareous fen.	NO
4)	Will any portion of the site potentially affect properties listed on the National Register of Historic Places or a known or discovered archeological site?	NO
5)	Have any Karst features have been identified in the project vicinity?	NO
6)	Is compliance with temporary or permanent stormwater management design requirements infeasible for this project?	NO
7)	Has the MN DNR promulgated "work in water restrictions" for any Public Water this site disharges to during fish spawning?	NO

SWPPP DESIGNER TRAINING DOCUMENTATION:

UNIVERSITY OF MINNESOTA

Caleb Ward

Design of Construction SWPPP (May 31 2028)

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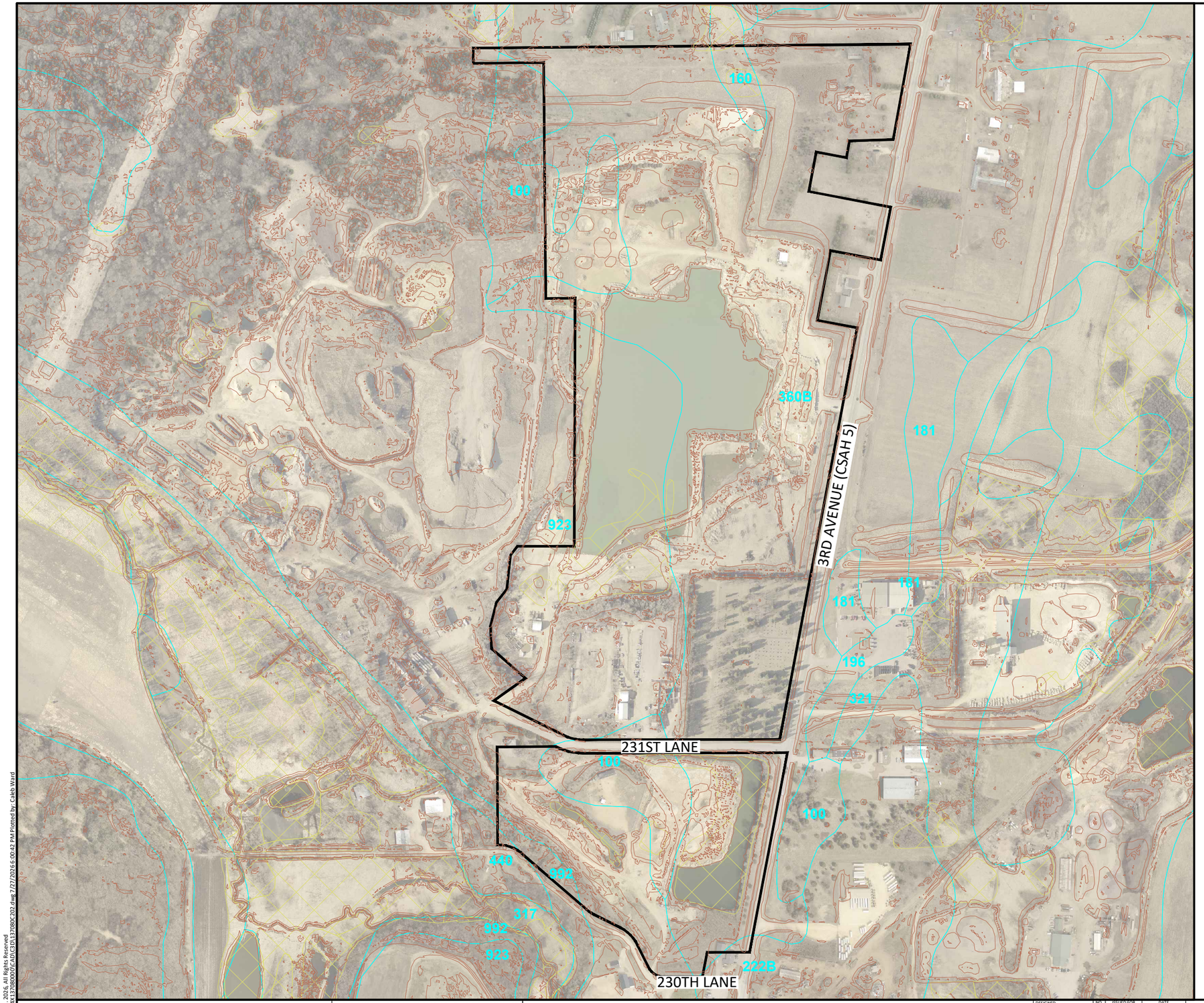
CAMPQUARRY LLC
ROCKWELL RV & ADVENTURE PARK
STORMWATER POLLUTION PREVENTION PLAN
NARRATIVE

SHEET C2.02



LEGEND

- PROJECT BOUNDARY
- SOIL TYPE
- NATIONAL WETLANDS INVENTORY
- STEEP SLOPES (>33.3%)

0 250 500
SCALE FEET

SOIL TYPE SUMMARY

Map Unit Symbol	Soil Name	Hyd. Soil Group	Erodibility
100	Copaston loam, 1 to 4 percent slopes	D	NHEL
160	Fieldon loam, 0 to 2 percent slopes	B/D	NHEL
222B	Lasa fine sand, 2 to 9 percent sloes	A	NHEL
360B	Lasa loamy fine sand, rock substratum, 1 to 6 percent slopes	A	NHEL
440	Copaston loam, very shallow, 1 to 4 percent slopes	D	NHEL
923	Copaston-Rock outcrop comples, 1 to 4 percent slopes	D	NHEL
992	Rock outcrop-Copaston comples, very steep	D	NHEL

NHEL - Not Highly Erodible Land
PHEL - Potentially Highly Erodible Land
HEL - Highly Erodible Land

LOCATION OF SWPPP REQUIREMENTS IN PROJECT PLAN

DESCRIPTION	SHEET NO.
SITE MAP	C2.01
NARRATIVE & NOTES	C2.01 - C2.02
SOILS	C2.03
EROSION & SEDIMENT CONTROL DETAILS	C2.04 - C2.05
DIRECTION OF FLOW	C2.06
FINAL STABILIZATION	C2.06 - C2.24

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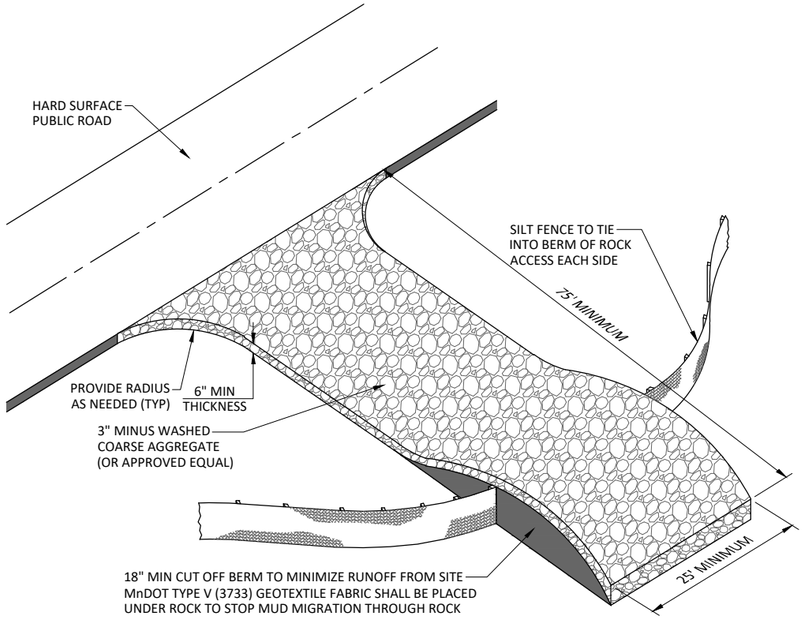
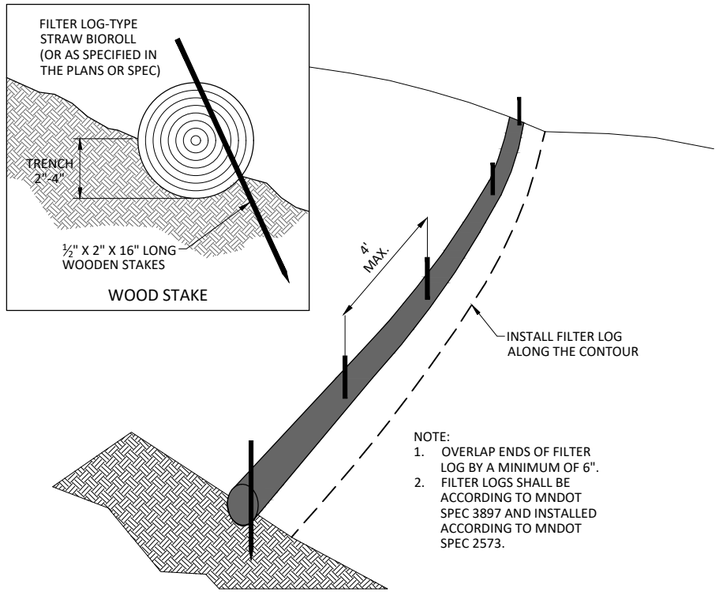
CAMPQUARRY LLC
ROCKWELL RV & ADVENTURE PARK
STORMWATER POLLUTION PREVENTION PLAN
SITE & SOILS MAP

SHEET C2.03



ROCK CONSTRUCTION ENTRANCE

NOT TO SCALE



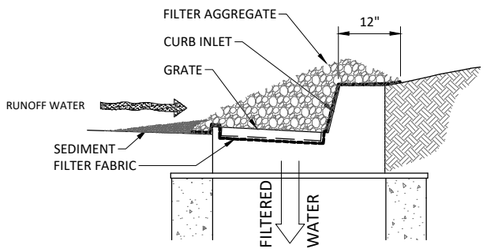
NOTE:
1. OVERLAP ENDS OF FILTER LOG BY A MINIMUM OF 6".
2. FILTER LOGS SHALL BE ACCORDING TO MNDOT SPEC 3897 AND INSTALLED ACCORDING TO MNDOT SPEC 2573.

PERIMETER PROTECTION-FILTER LOG

NOT TO SCALE

NOTES:

1. FILTER AGGREGATE TO BE 1 TO 2 INCH CLEAN ROCK
2. FILTER FABRIC SHALL MEET MnDOT SPECIFICATION 3733 GEOTEXTILE FABRIC TYPE II



INLET PROTECTION
FILTER AGGREGATE

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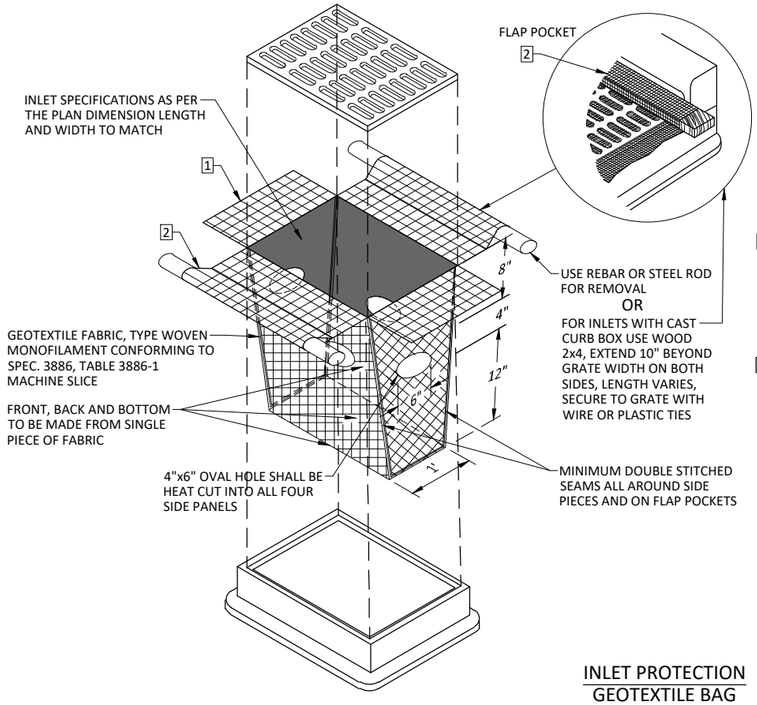

NOTES:

1 INLET PROTECTION DEVICES SHALL BE MAINTAINED OR REPLACED AT THE DIRECTION OF THE ENGINEER. MANUFACTURED ALTERNATIVES APPROVED AND LISTED ON THE DEPARTMENTS EROSION CONTROL PRODUCT ACCEPTABILITY LIST MAY BE SUBSTITUTED. WHEN REMOVING OR MAINTAINING INLET PROTECTION, CARE SHALL BE TAKEN SO THAT THE SEDIMENT TRAPPED ON THE GEOTEXTILE FABRIC DOES NOT FALL IN THE INLET. ANY MATERIAL FALLING INTO THE INLET SHALL BE REMOVED IMMEDIATELY.

2 FINISHED SIZE, INCLUDING POCKETS WHERE REQUIRED, SHALL EXTEND A MINIMUM OF 10" AROUND THE PERIMETER TO FACILITATE MAINTENANCE OR REMOVAL.

FLAP POCKETS SHALL BE LARGE ENOUGH TO ACCEPT WOOD 2x4.

INSTALLATION NOTES:
DO NOT INSTALL PROTECTION IN INLETS SHALLOWER THAN 30", MEASURED FROM THE BOTTOM OF THE INLET TO THE TOP OF THE GRATE.

TRIM EXCESS FABRIC IN THE FLOW LINE TO WITHIN 3" OF THE GRATE.

THE INSTALLED BAG SHALL HAVE A MINIMUM SIDE CLEARANCE, BETWEEN THE INLET AND THE BAG, MEASURED AT THE BOTTOM OF THE OVERFLOW HOLES, OF 3". WHERE NECESSARY THE CONTRACTOR SHALL CLINCH THE BAG, USING PLASTIC ZIP TIES, TO ACHIEVE THE 3" CLEARANCE. THE TIES SHALL BE PLACED AT A MAXIMUM OF 4" FROM THE BOTTOM OF THE BAG.

INLET PROTECTION
GEOTEXTILE BAG

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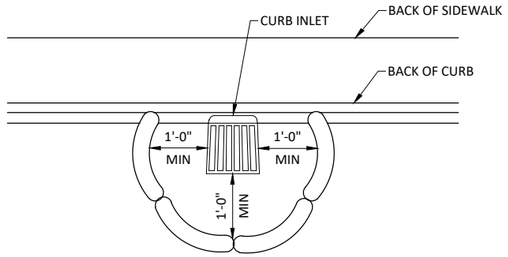
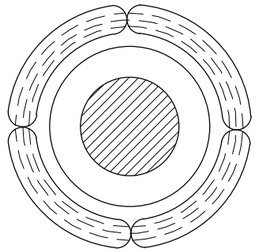


NOTE:
THIS INLET PROTECTION IS USED DURING ROUGH GRADING ONLY, USE BEFORE ROAD IS OPEN TO TRAFFIC OR IS PAVED

PAYMENT SHALL INCLUDE ALL MATERIALS, FILLING OF LOG, PLACEMENT, MAINTENANCE & REMOVAL;
80% OF BID PRICE SHALL BE PAID UPON PROPER PLACEMENT WITH THE FINAL 20% PAID UPON REMOVAL

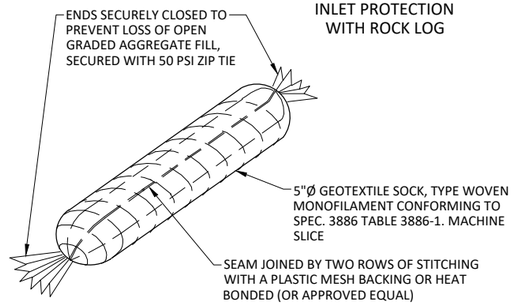


INLET PROTECTION
WITH ROCK LOG

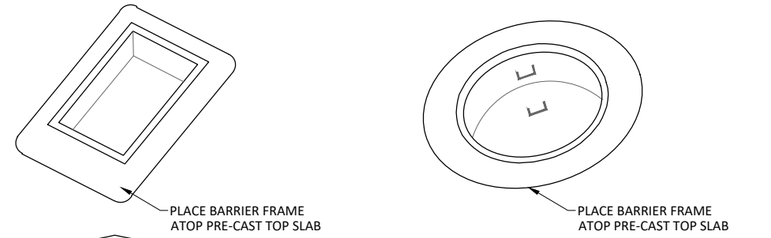
FILL ROCK LOG WITH 45 LBS. OF OPEN GRADED AGGREGATE CONSISTING OF SOUND, DURABLE PARTICLES OF CRUSHED QUARRY ROCK OR GRAVEL CONFORMING TO THE FOLLOWING GRADATION.

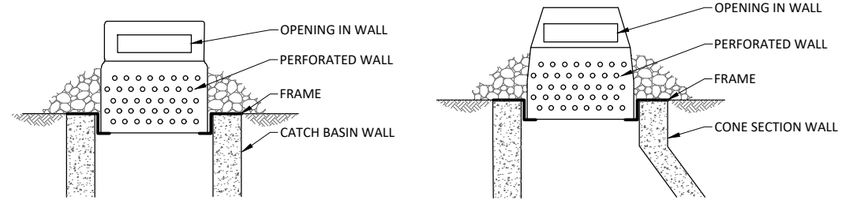
GRADATION	
SIEVE SIZE	PERCENT PASSING
1 1/2"	100
1"	95-100
3/4"	65-95
3/8"	30-65
NO 4	10-35
NO 10	3-20
NO 40	0-8
NO 200	0-3

NOTE:
CRUSHED CONCRETE OR BITUMINOUS SHALL NOT BE USED FOR OPEN GRADED AGGREGATE.



INLET PROTECTION
ROCK BAG
NOT TO SCALE





INLET PROTECTION
PERFORATED WALL
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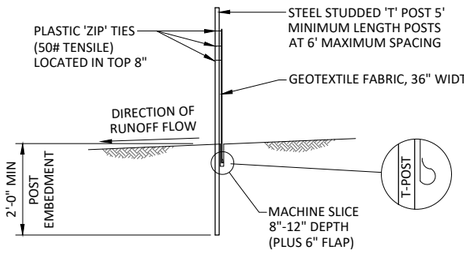

SILT FENCE - MACHINE SLICED
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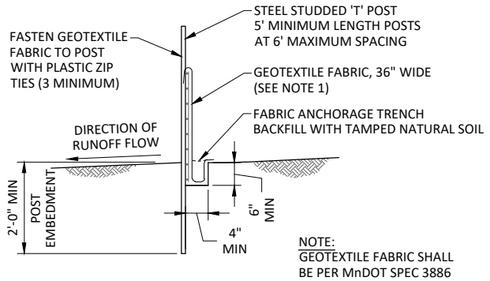

NOTE:
GEOTEXTILE FABRIC SHALL BE PER MnDOT SPEC 3886

SILT FENCE - HEAVY DUTY
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ROCKWELL RV & ADVENTURE PARK
STORMWATER POLLUTION PREVENTION PLAN
BEST MANAGEMENT PRACTICE DETAILS

SHEET
C2.05



NOTES:

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2. ALL STORM SEWER INLETS SHALL HAVE INLET PROTECTION IN PLACE AS NEEDED UNTIL DISTURBED TURF IS STABILIZED.
3. ALL PERIMETER CONTROL IS TO BE REMOVED UPON ESTABLISHED TURF RESTORATION.
4. CONTRACTOR TO COORDINATE THE REMOVAL AND REPLACEMENT OF TEMPORARY ROCK CONSTRUCTION EXITS DURING CONSTRUCTION.

EROSION CONTROL LEGEND

- EXISTING/PROPOSED DRAINAGE FLOW
- PERIMETER CONTROL
- STORM DRAIN INLET PROTECTION
- TURF EXTABLISHMENT; DESIGNATION BY LANDSCAPE ARCHITECTURE
- STABILIZED CONSTRUCTION EXIT

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SOUTH CAMPGROUND

SHEET C2.06

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EROSION CONTROL LEGEND

- EXISTING/PROPOSED DRAINAGE FLOW
- PERIMETER CONTROL
- STORM DRAIN INLET PROTECTION
- TURF EXTABLISHMENT; DESIGNATION BY LANDSCAPE ARCHITECTURE
- STABILIZED CONSTRUCTION EXIT

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EROSION CONTROL LEGEND

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- PERIMETER CONTROL
- STORM DRAIN INLET PROTECTION
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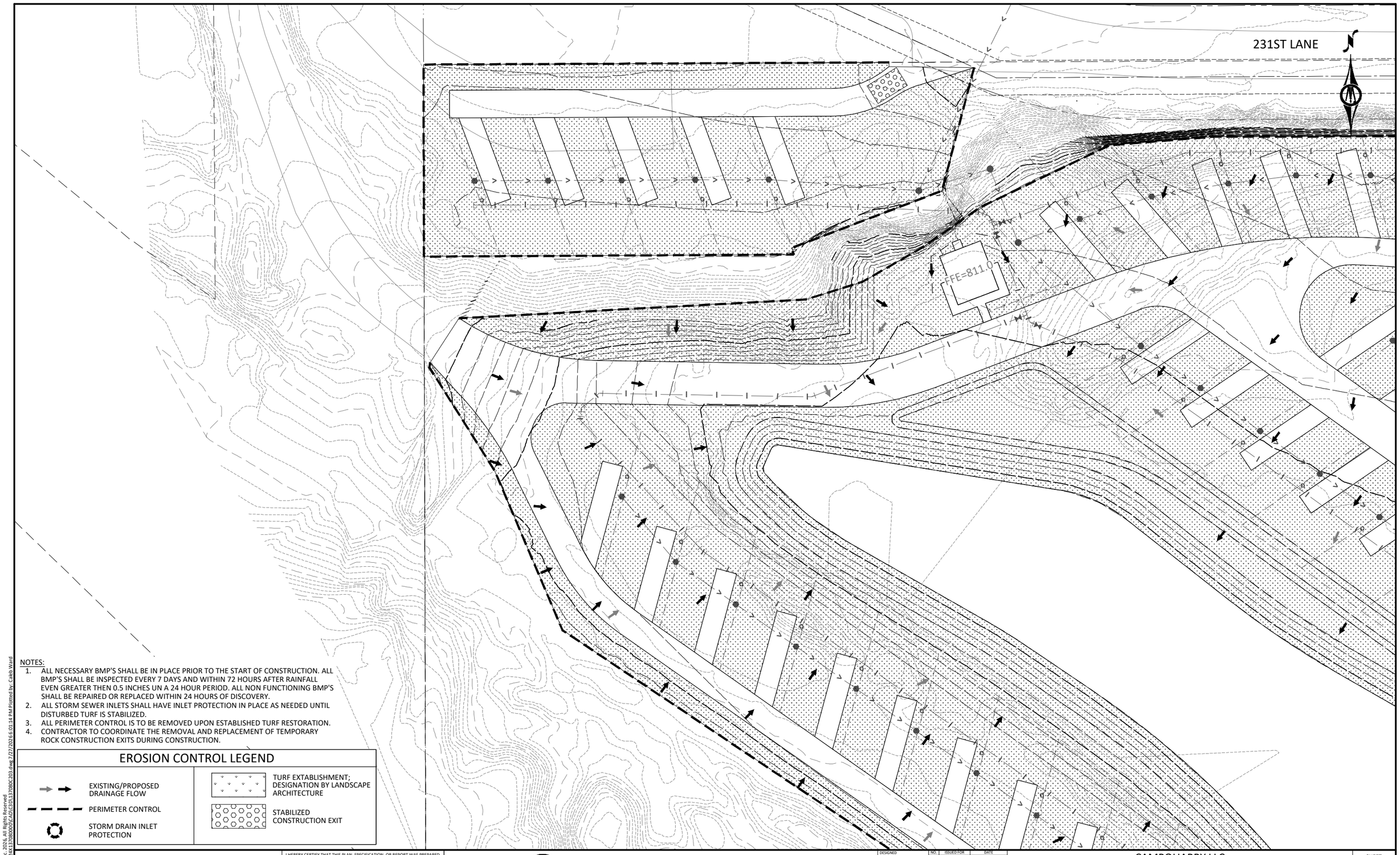

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EROSION CONTROL LEGEND

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- PERIMETER CONTROL
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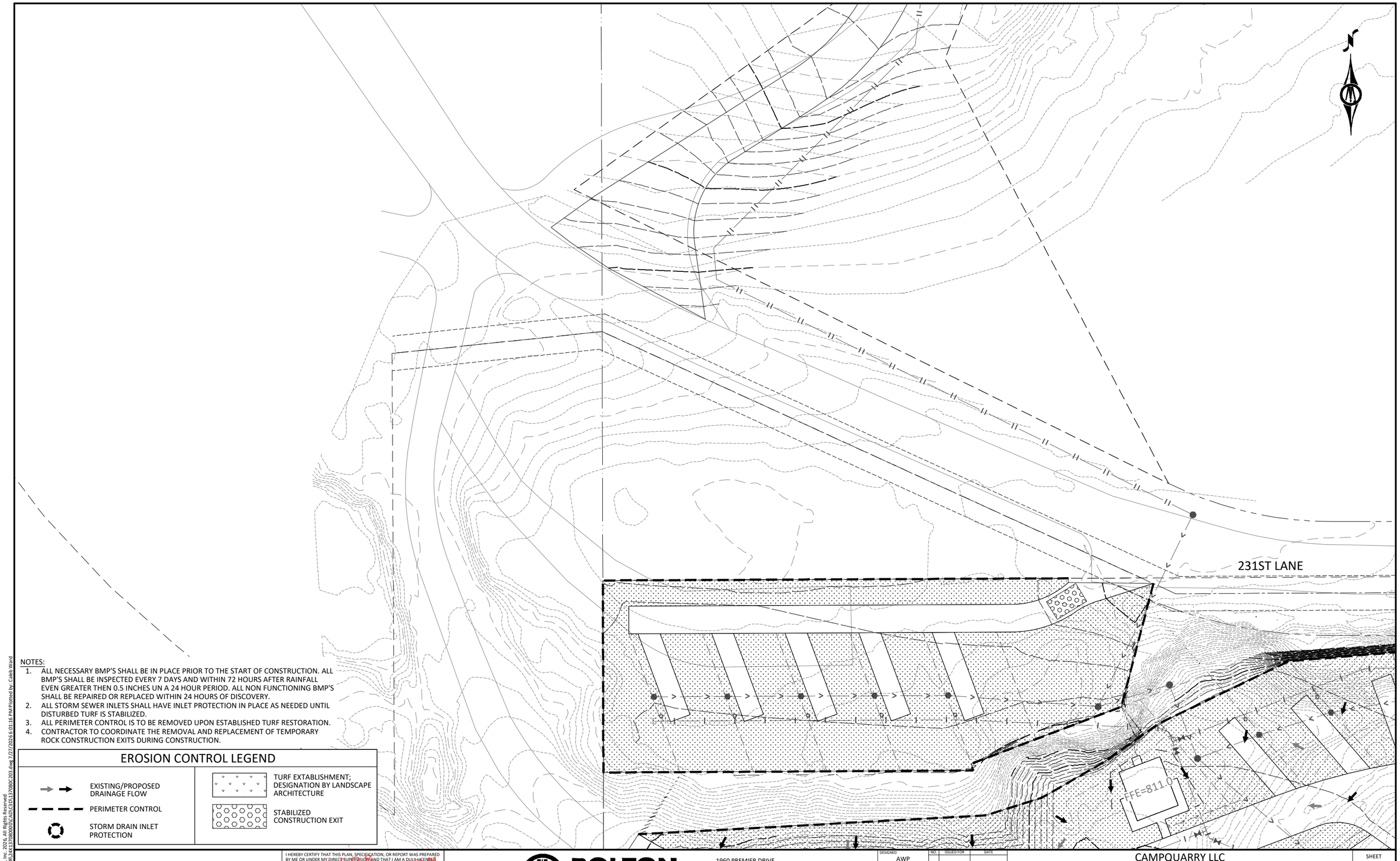

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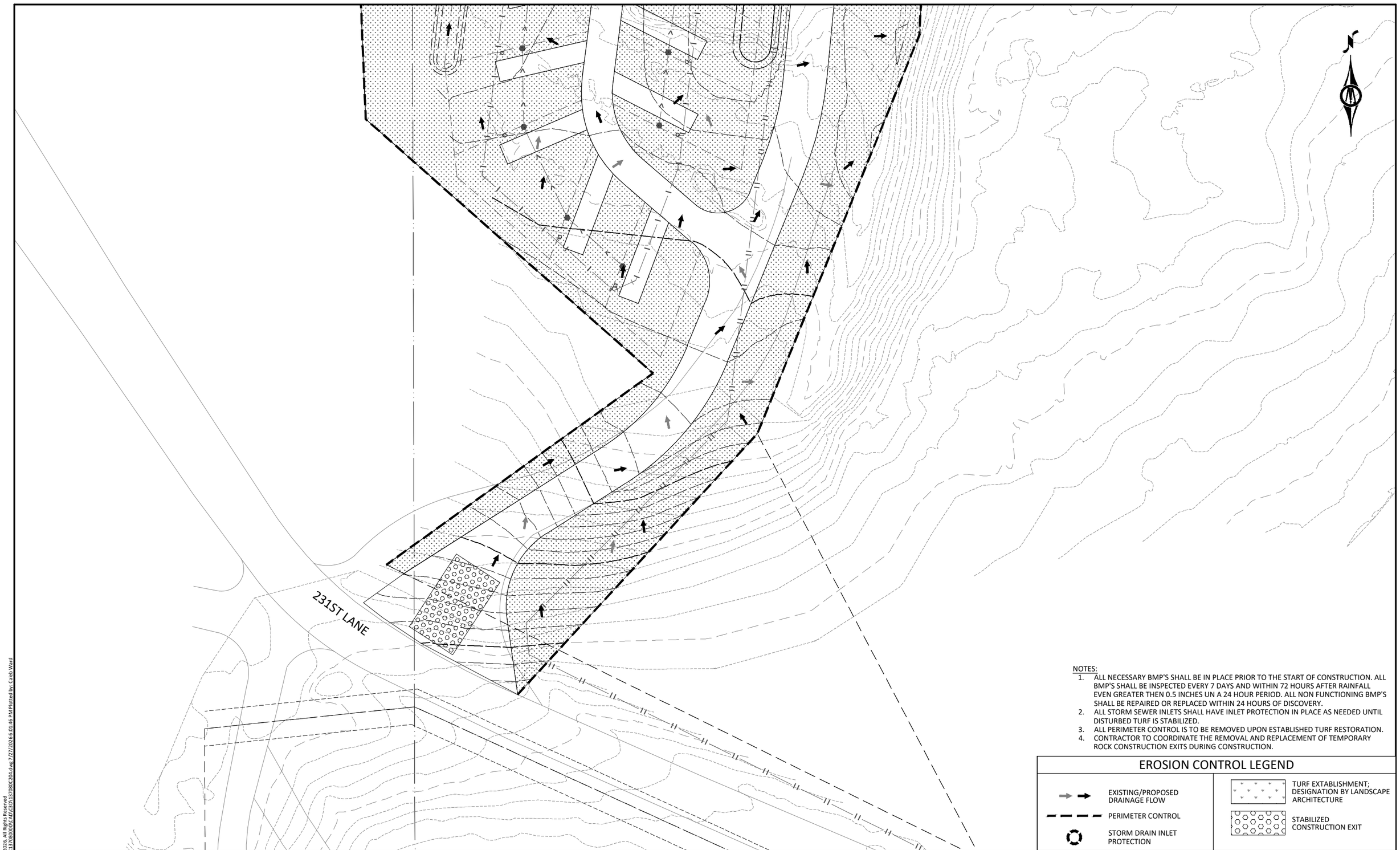

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EROSION CONTROL LEGEND

- EXISTING/PROPOSED DRAINAGE FLOW
- PERIMETER CONTROL
- STORM DRAIN INLET PROTECTION
- TURF EXTABLISHMENT; DESIGNATION BY LANDSCAPE ARCHITECTURE
- STABILIZED CONSTRUCTION EXIT

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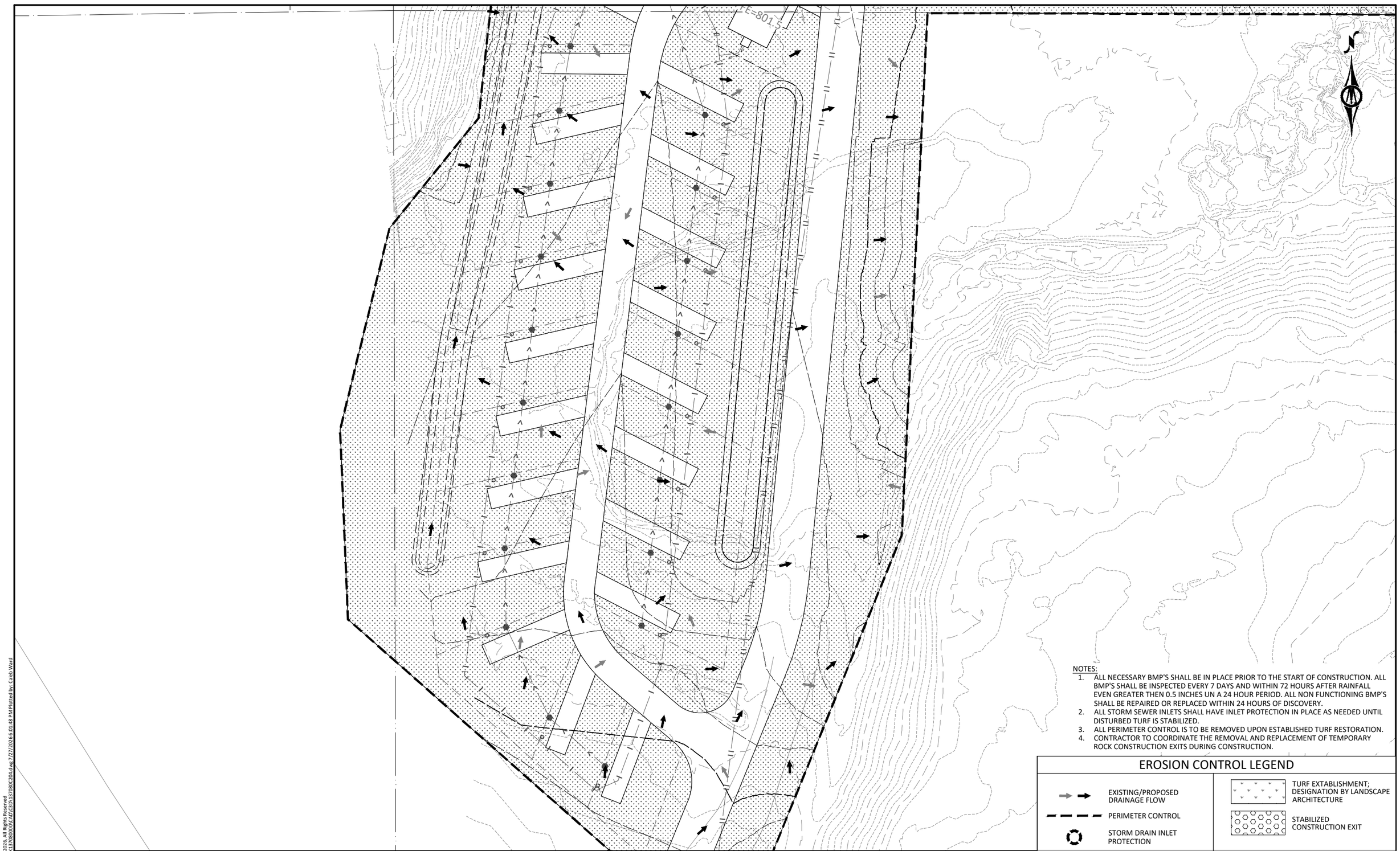

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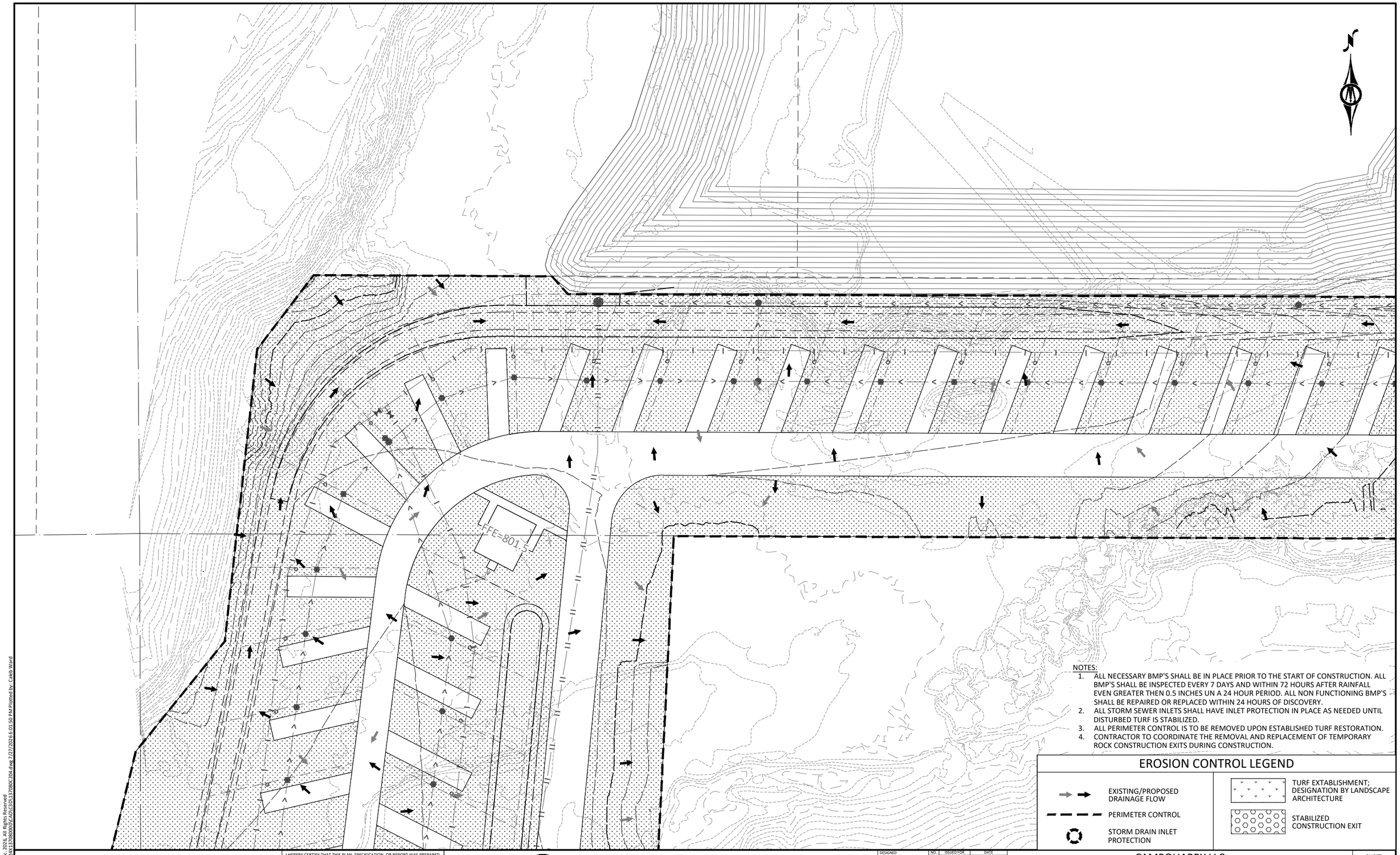

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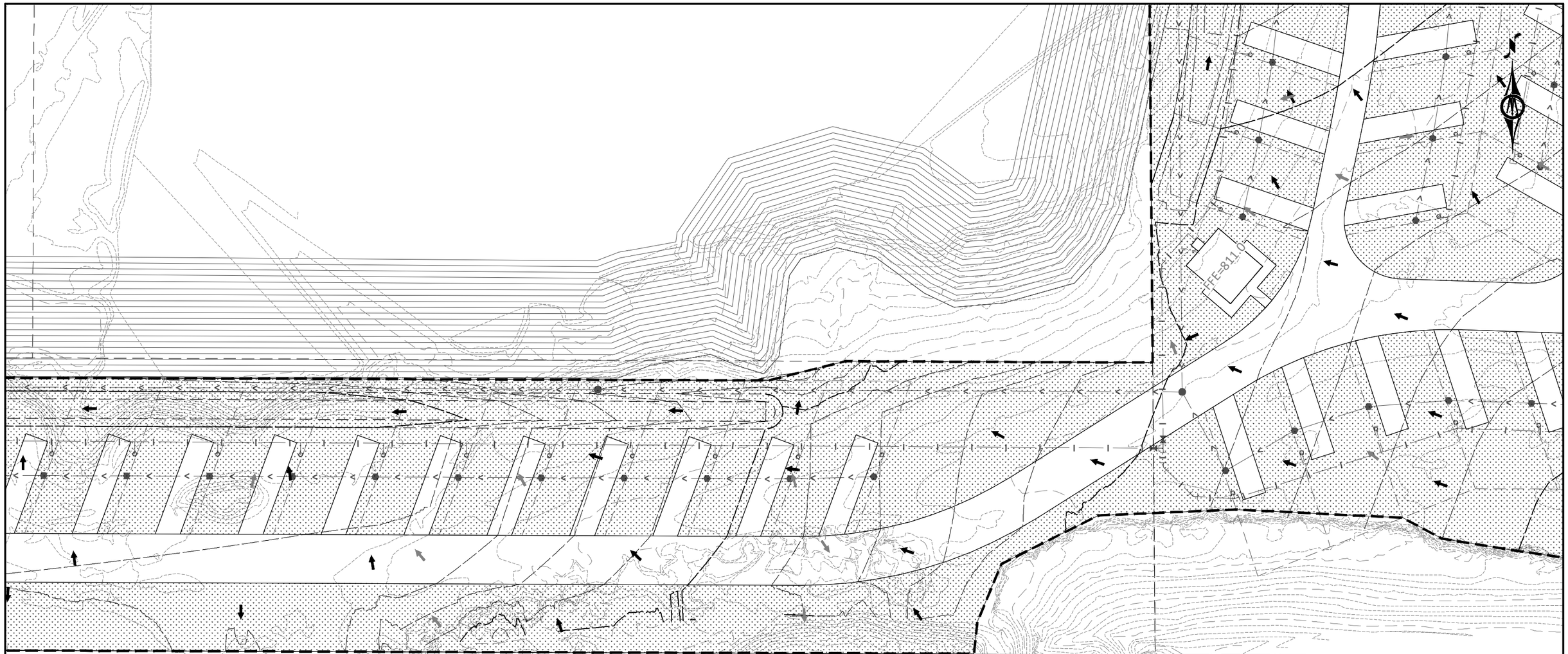

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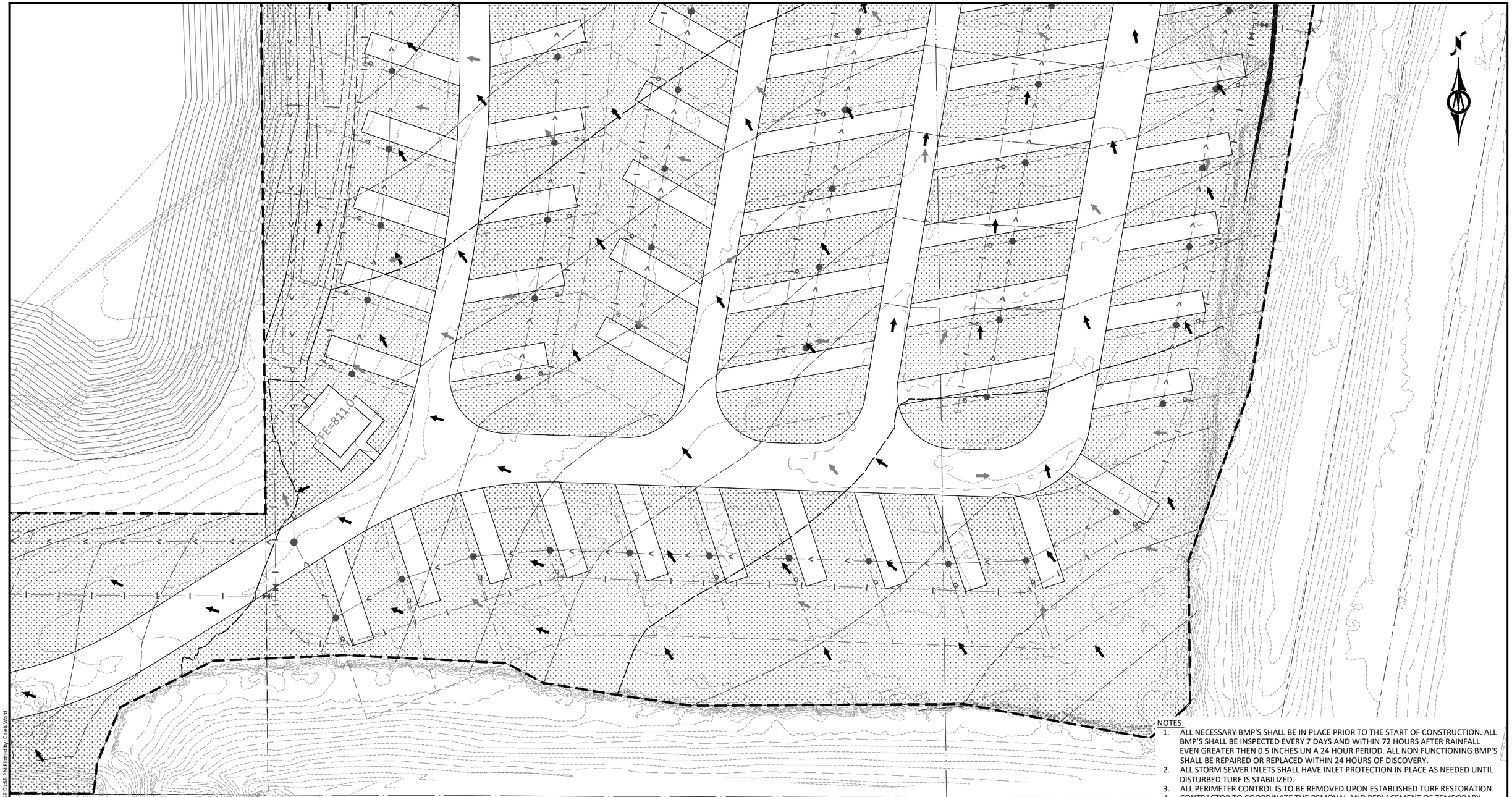

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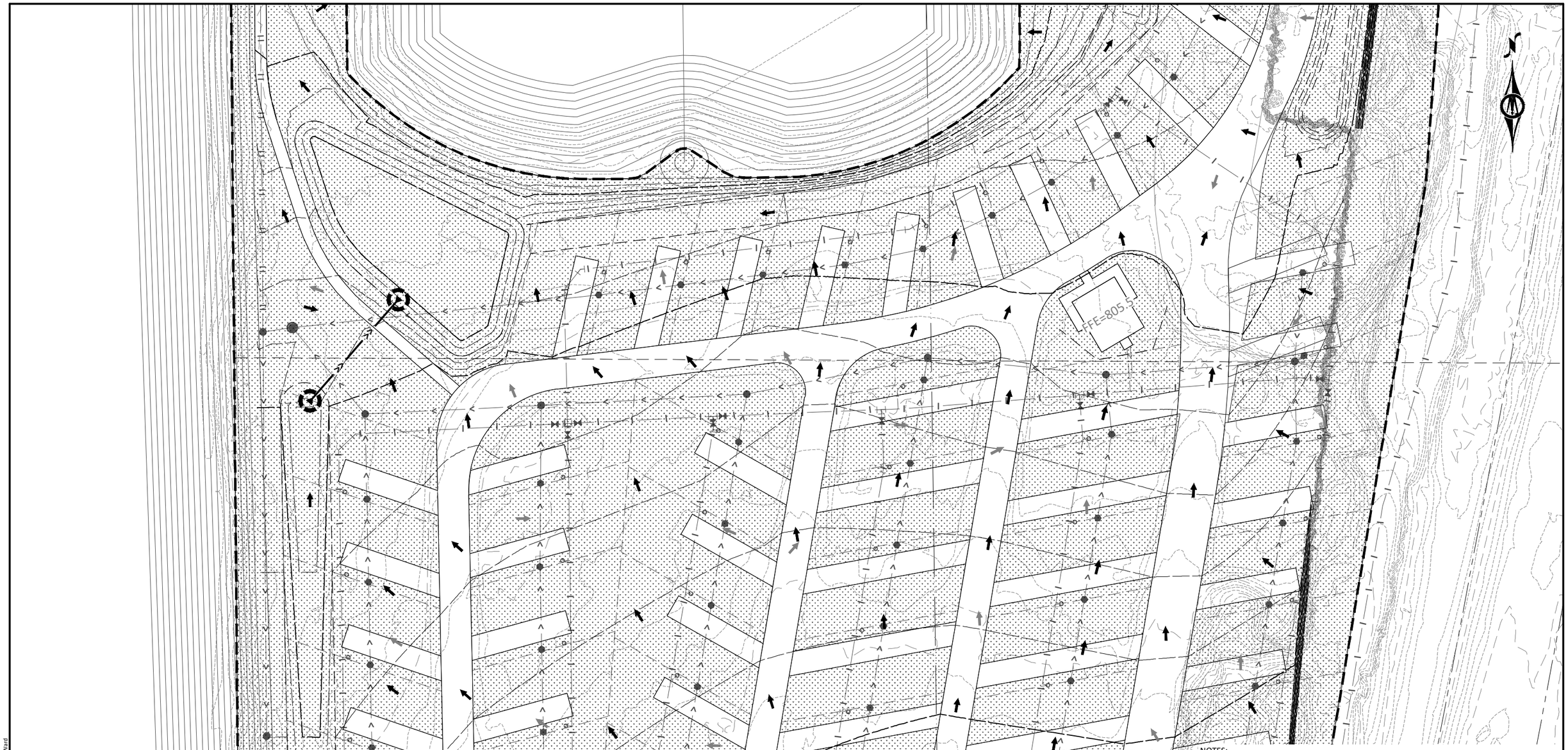

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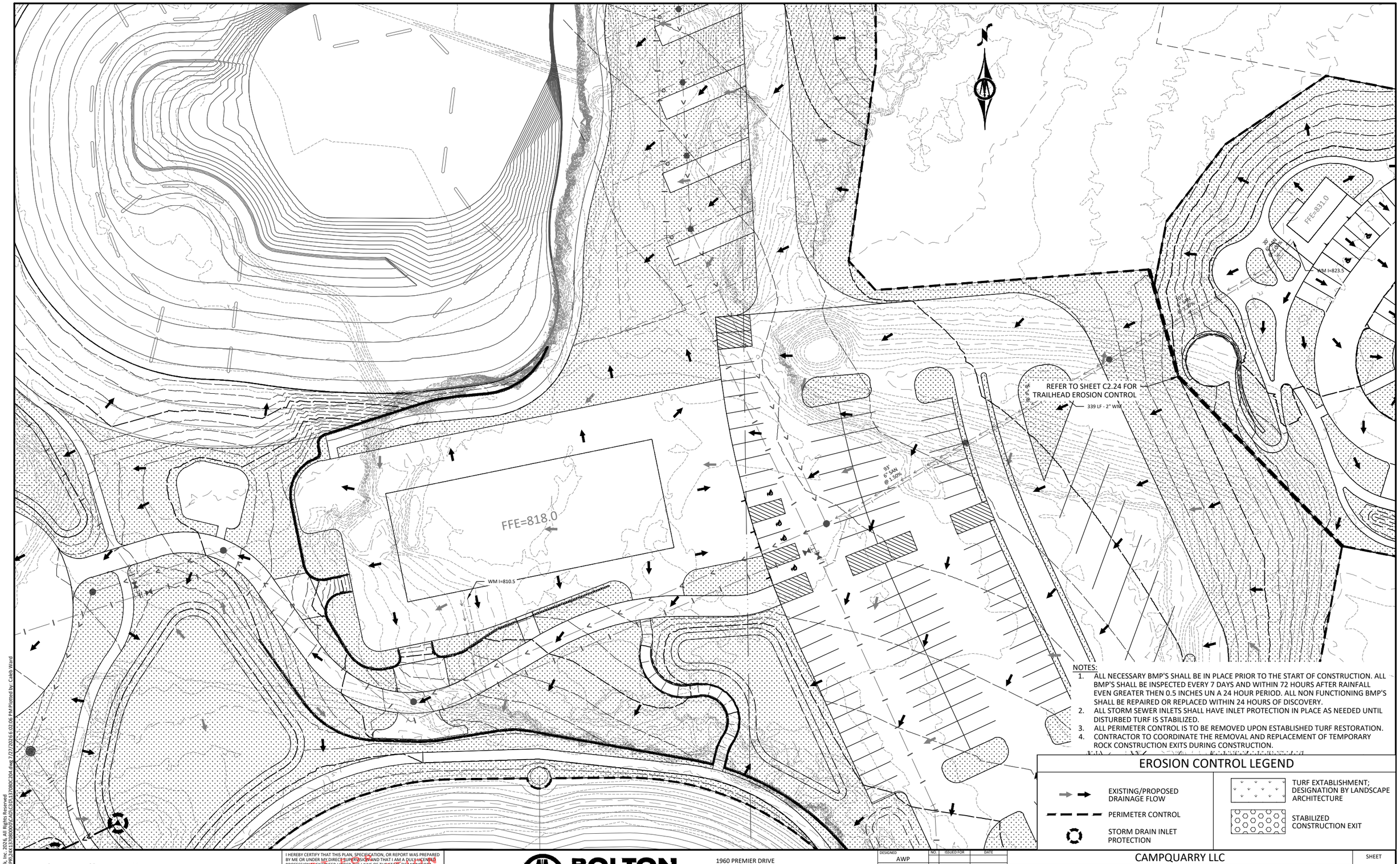

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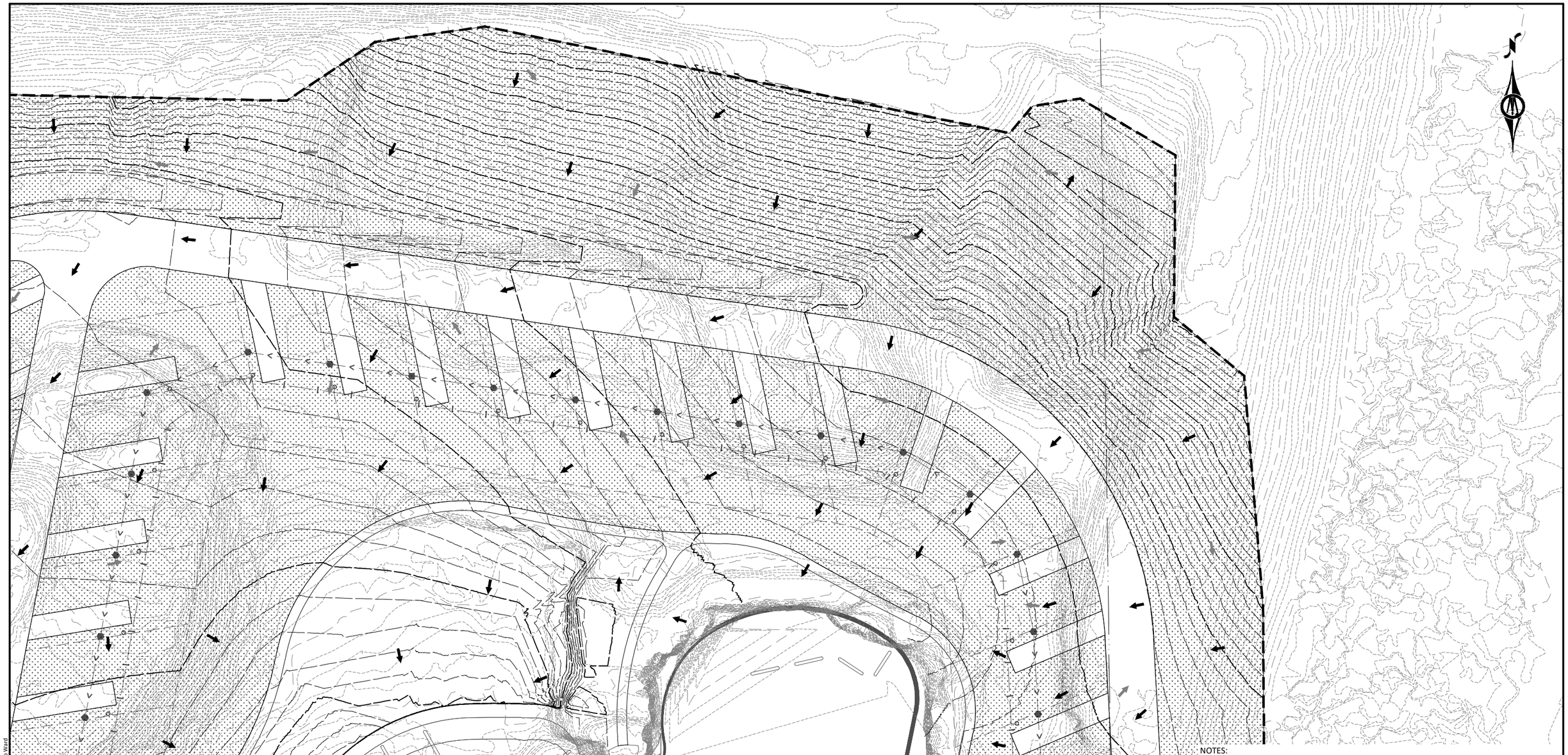

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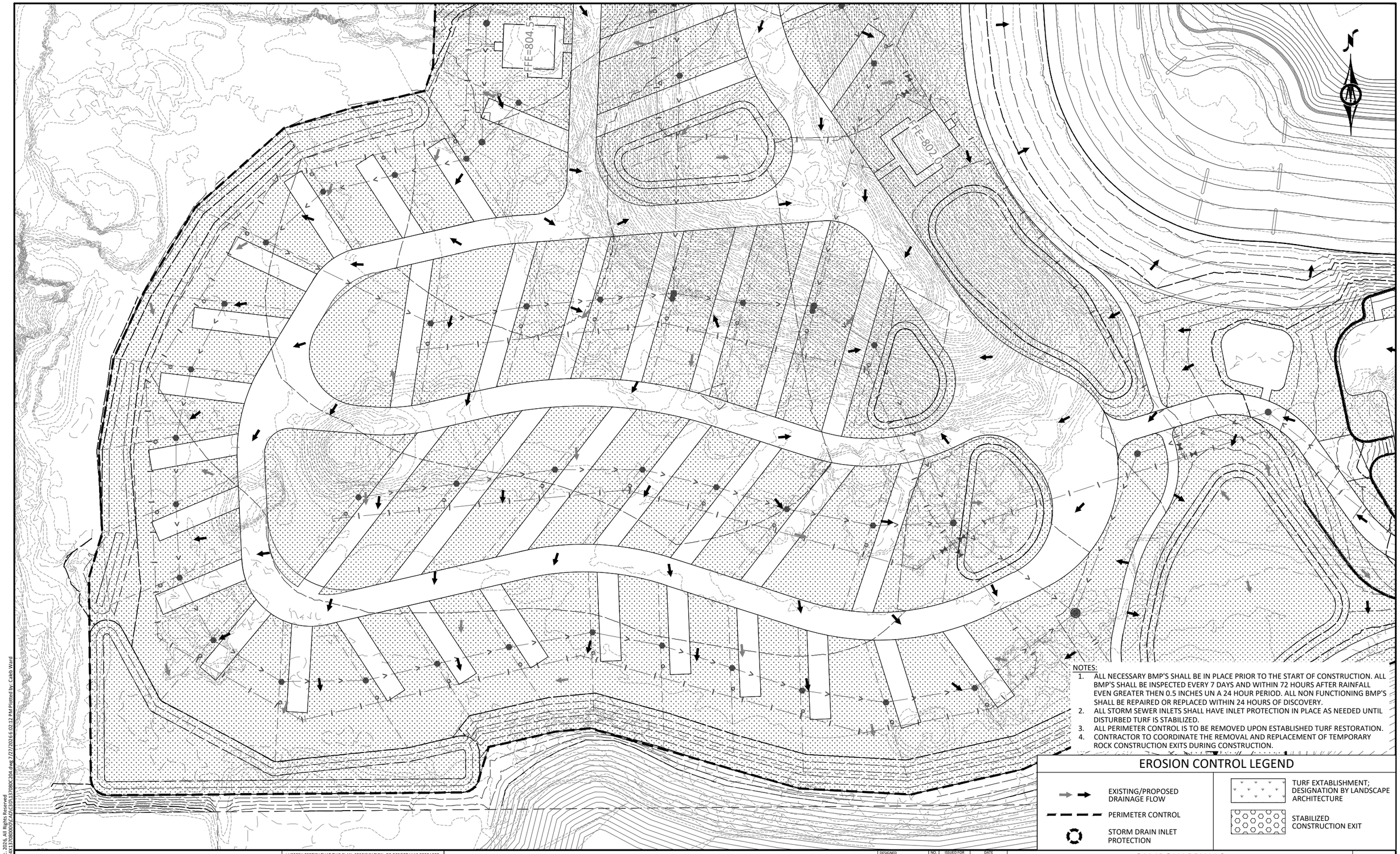

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HORZ. SCALE 0 25 50 FEET

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CAMPQUARRY LLC
ROCKWELL RV & ADVENTURE PARK
STORMWATER POLLUTION PREVENTION PLAN
NORTH CAMPGROUND

SHEET C2.22

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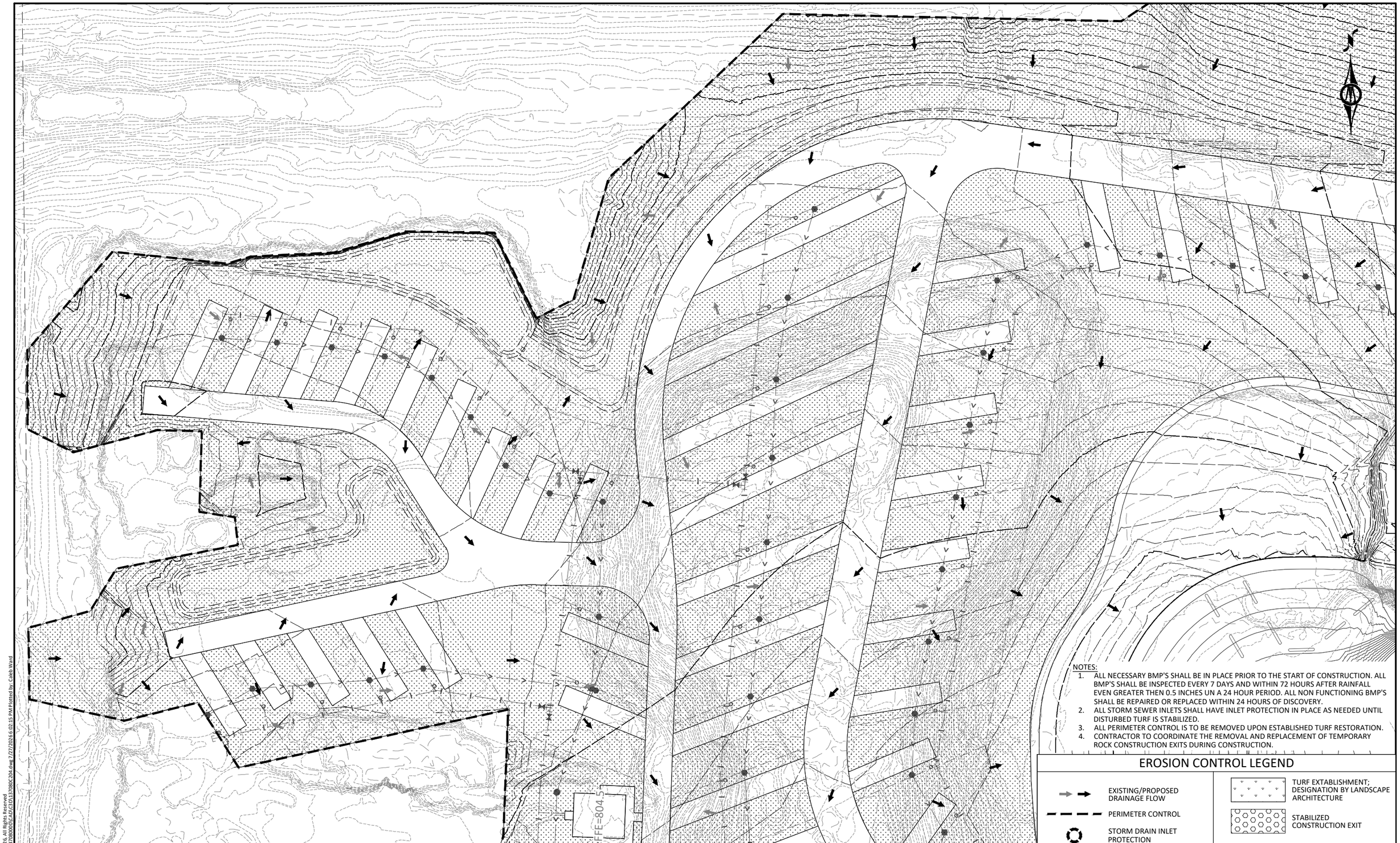

NOTES:

1. ALL NECESSARY BMP'S SHALL BE IN PLACE PRIOR TO THE START OF CONSTRUCTION. ALL BMP'S SHALL BE INSPECTED EVERY 7 DAYS AND WITHIN 72 HOURS AFTER RAINFALL EVEN GREATER THEN 0.5 INCHES UN A 24 HOUR PERIOD. ALL NON FUNCTIONING BMP'S SHALL BE REPAIRED OR REPLACED WITHIN 24 HOURS OF DISCOVERY.
2. ALL STORM SEWER INLETS SHALL HAVE INLET PROTECTION IN PLACE AS NEEDED UNTIL DISTURBED TURF IS STABILIZED.
3. ALL PERIMETER CONTROL IS TO BE REMOVED UPON ESTABLISHED TURF RESTORATION.
4. CONTRACTOR TO COORDINATE THE REMOVAL AND REPLACEMENT OF TEMPORARY ROCK CONSTRUCTION EXITS DURING CONSTRUCTION.

EROSION CONTROL LEGEND

- EXISTING/PROPOSED DRAINAGE FLOW
- PERIMETER CONTROL
- STORM DRAIN INLET PROTECTION
- TURF EXTABLISHMENT; DESIGNATION BY LANDSCAPE ARCHITECTURE
- STABILIZED CONSTRUCTION EXIT

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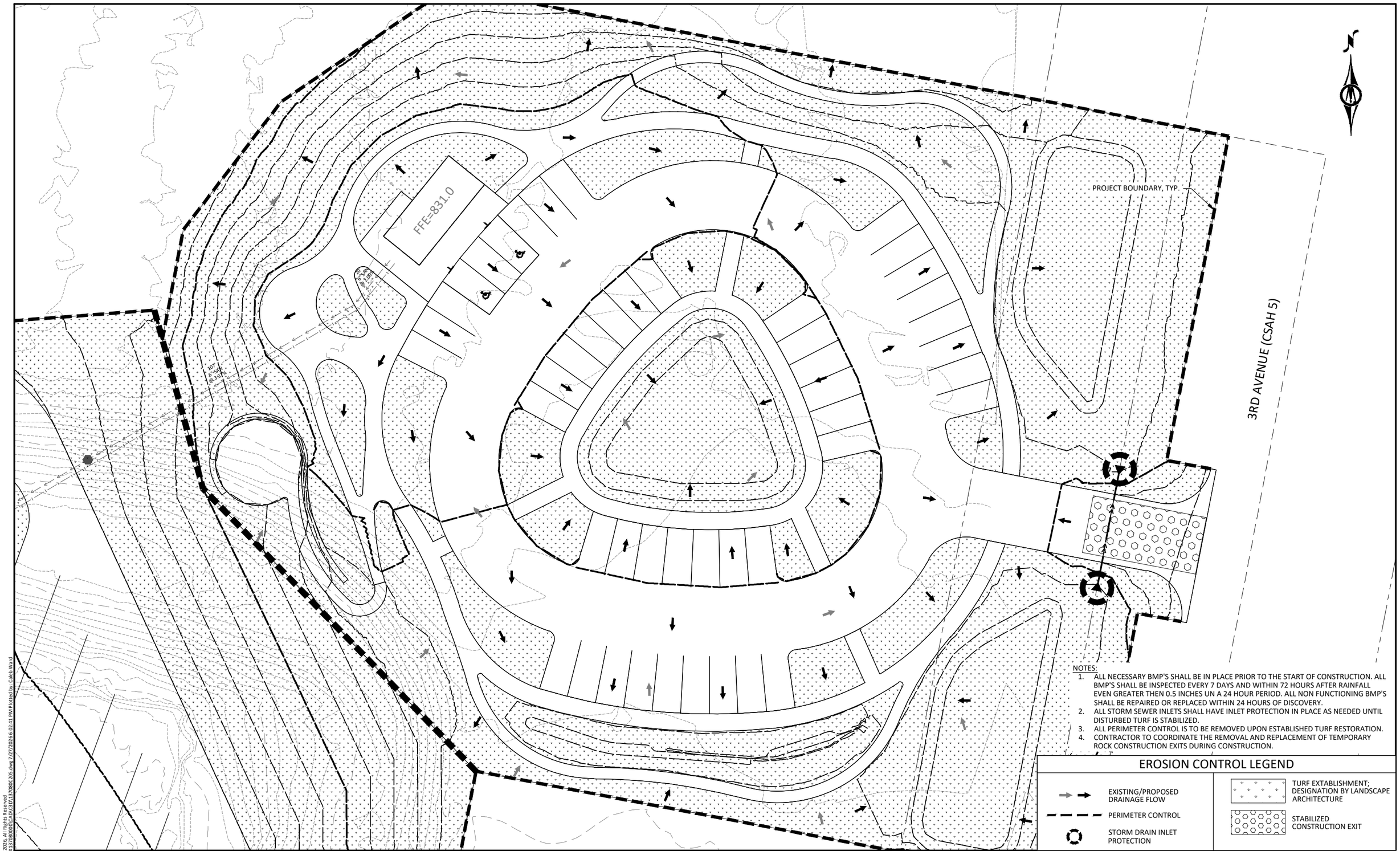
STORMWATER POLLUTION PREVENTION PLAN
NORTH CAMPGROUND

SHEET C2.23



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EROSION CONTROL LEGEND

- EXISTING/PROPOSED DRAINAGE FLOW
- PERIMETER CONTROL
- STORM DRAIN INLET PROTECTION
- TURF EXTABLISHMENT; DESIGNATION BY LANDSCAPE ARCHITECTURE
- STABILIZED CONSTRUCTION EXIT

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HORZ. SCALE 0 15 30 FEET

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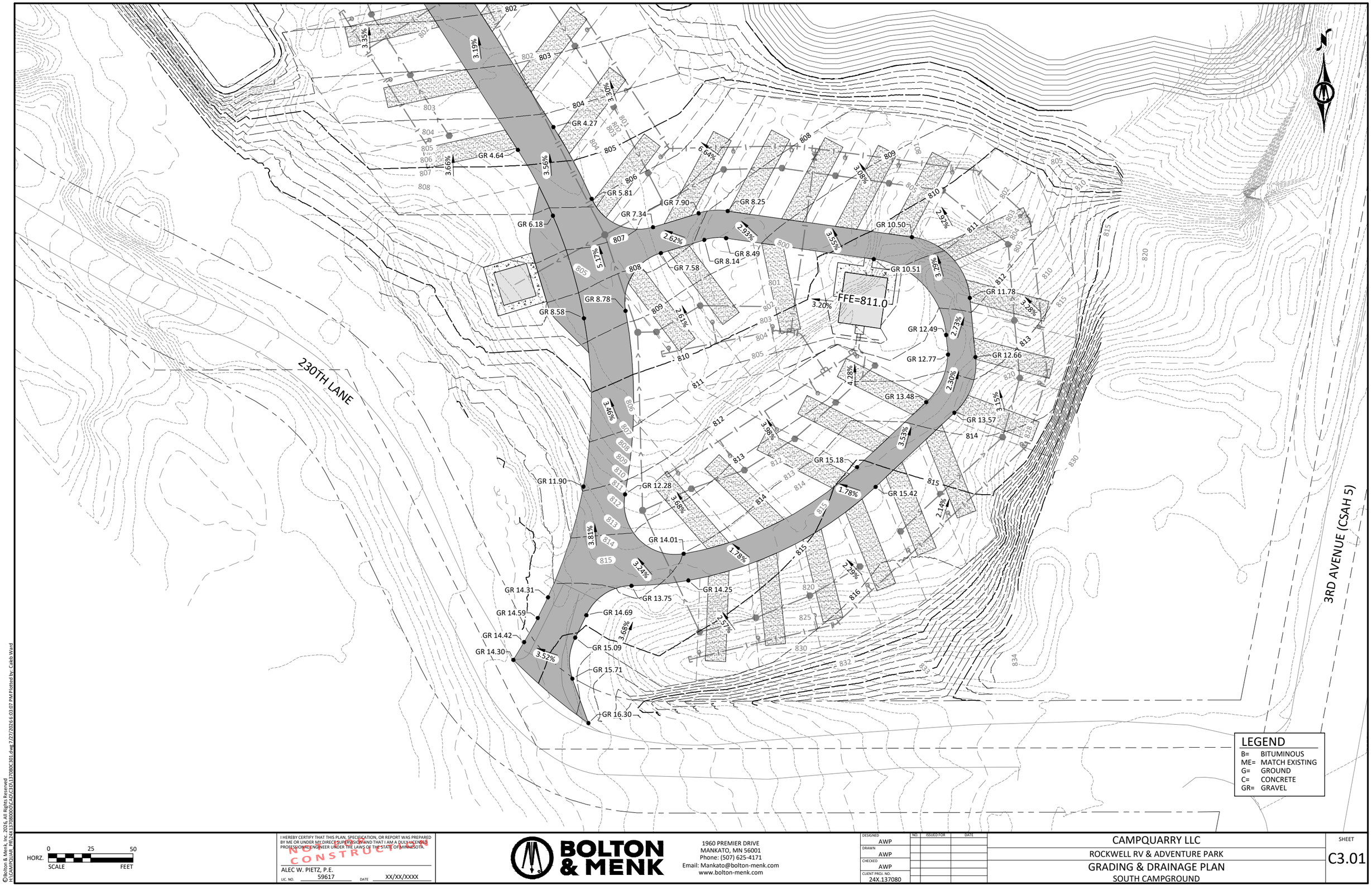
STORMWATER POLLUTION PREVENTION PLAN
TRAILHEAD

SHEET C2.24



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SOUTH CAMPGROUND

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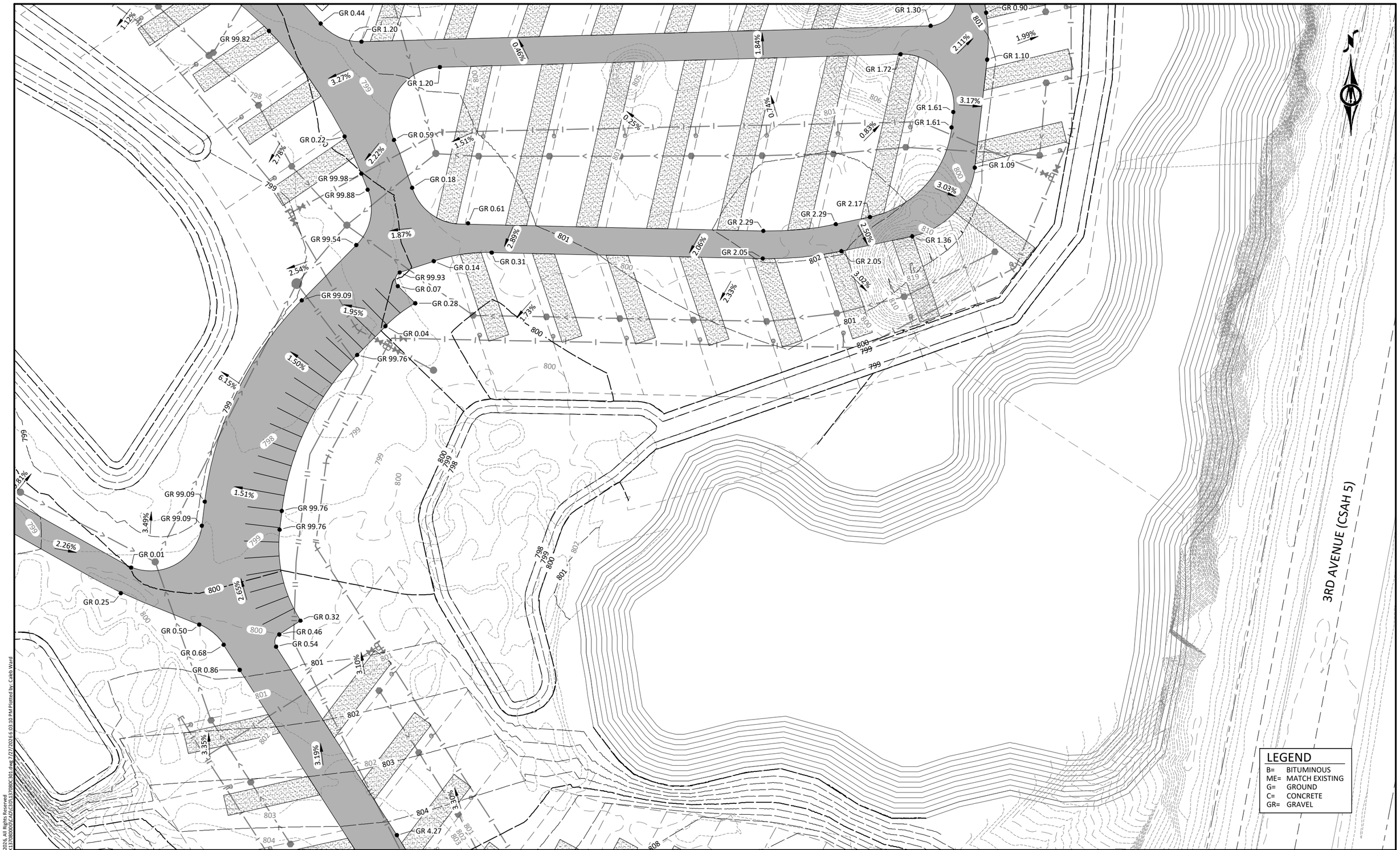
C3.01



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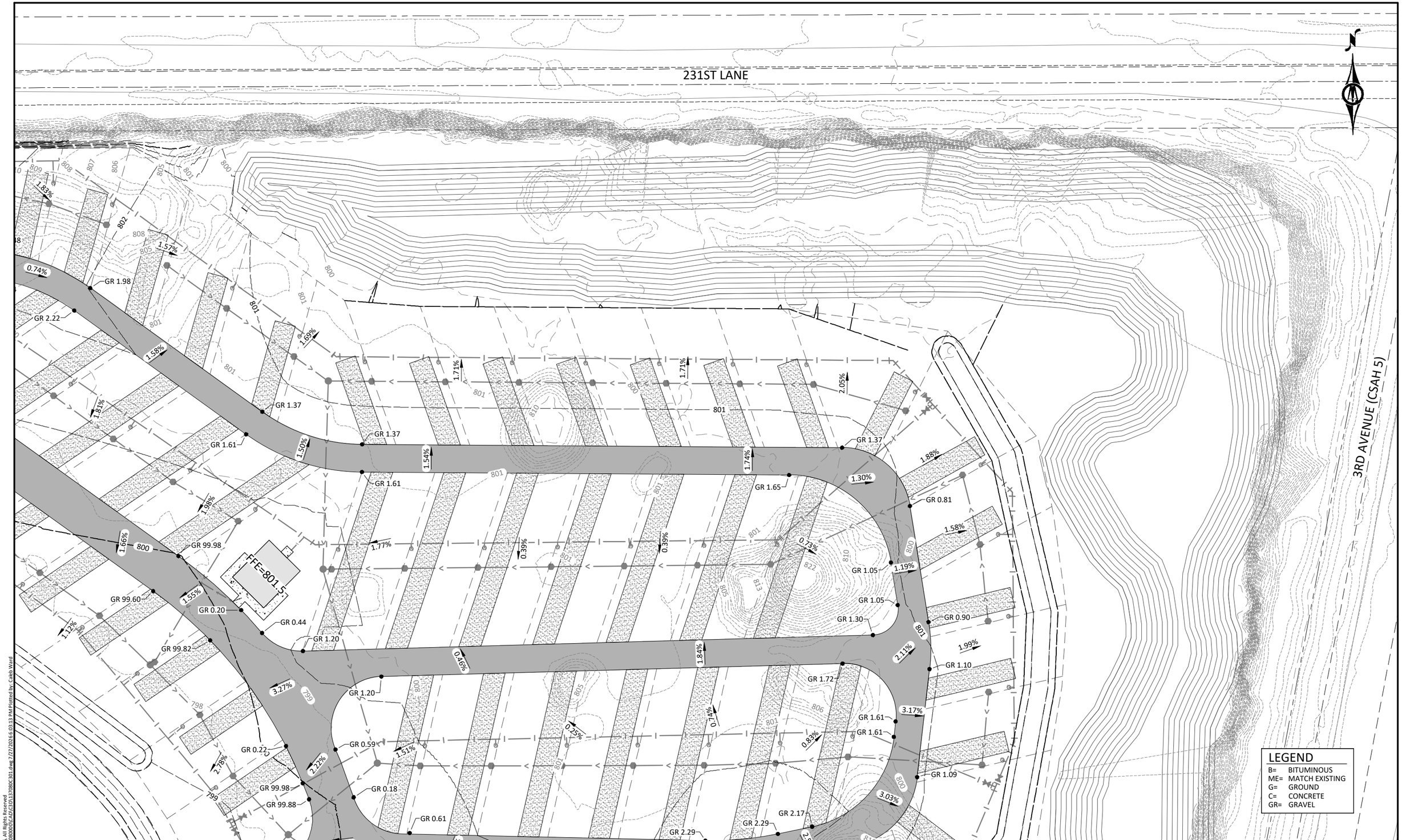
SHEET C3.02



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HORZ. 0 25 50
SCALE FEET

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SHEET C3.03



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SOUTH CAMPGROUND

SHEET
C3.04

231ST LANE

ME 29.02 · ME 30.00 · ME 29.25 · ME 29.09 · GR 29.60 · GR 30.60 · GR 28.51 · GR 29.89 · GR 29.45 · ME 27.68 · GR 27.74 · GR 27.50 · GR 28.27 · 6.66% · 1.54% · 1.37% · 3.99% · 3.01% · 1.51% · 1.97% · 1.63% · 1.03% · FFE=811.0 · GR 2.37 · GR 0.78 · GR 2.13 · GR 0.61 · GR 0.90 · GR 0.40 · GR 99.71 · GR 99.34 · GR 1.28 · GR 10.80 · GR 11.00 · GR 9.07 · GR 3.00 · GR 0.37 · GR 4.56 · GR 99.99 · 8.81% · 4.29% · 1.50% · 1.83% · 1.80% · 1.88% · 1.49% · 1.12% · 1.77% · 1.61% · 2.67% · 1.66% · GR 5.15 · GR 4.60 · GR 4.50 · GR 4.74 · 1.75% · 2.27% · GR 4.00 · GR 4.25 · GR 4.24 · 1.52% · 1.27% · 0.76% · 2.47%

LEGEND

B=	BITUMINOUS
ME=	MATCH EXISTING
G=	GROUND
C=	CONCRETE
GR=	GRAVEL

HORZ. 0 25 50 SCALE FEET

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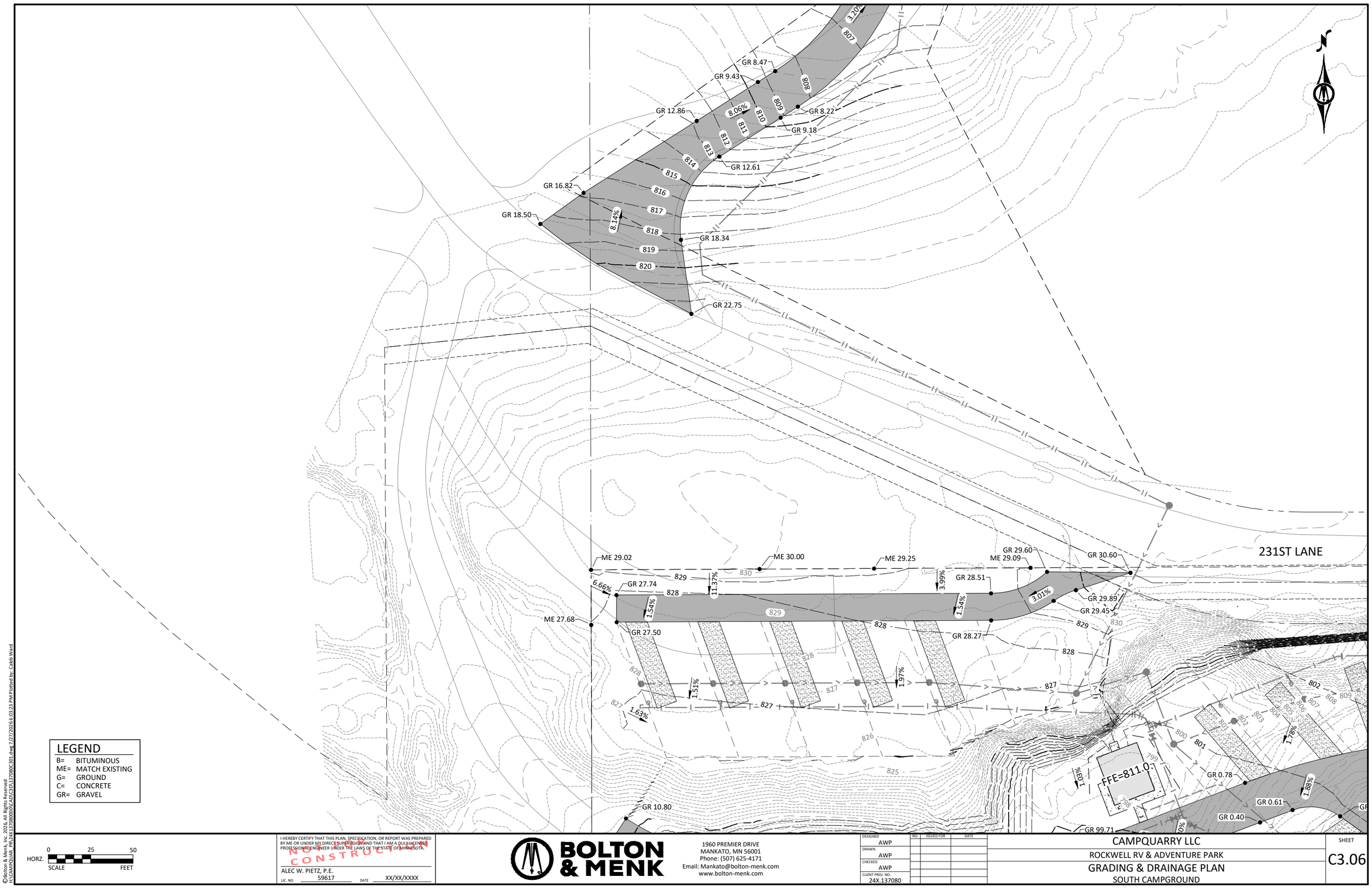

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HORZ. 0 25 50
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GRADING & DRAINAGE PLAN
NORTH CAMPGROUND

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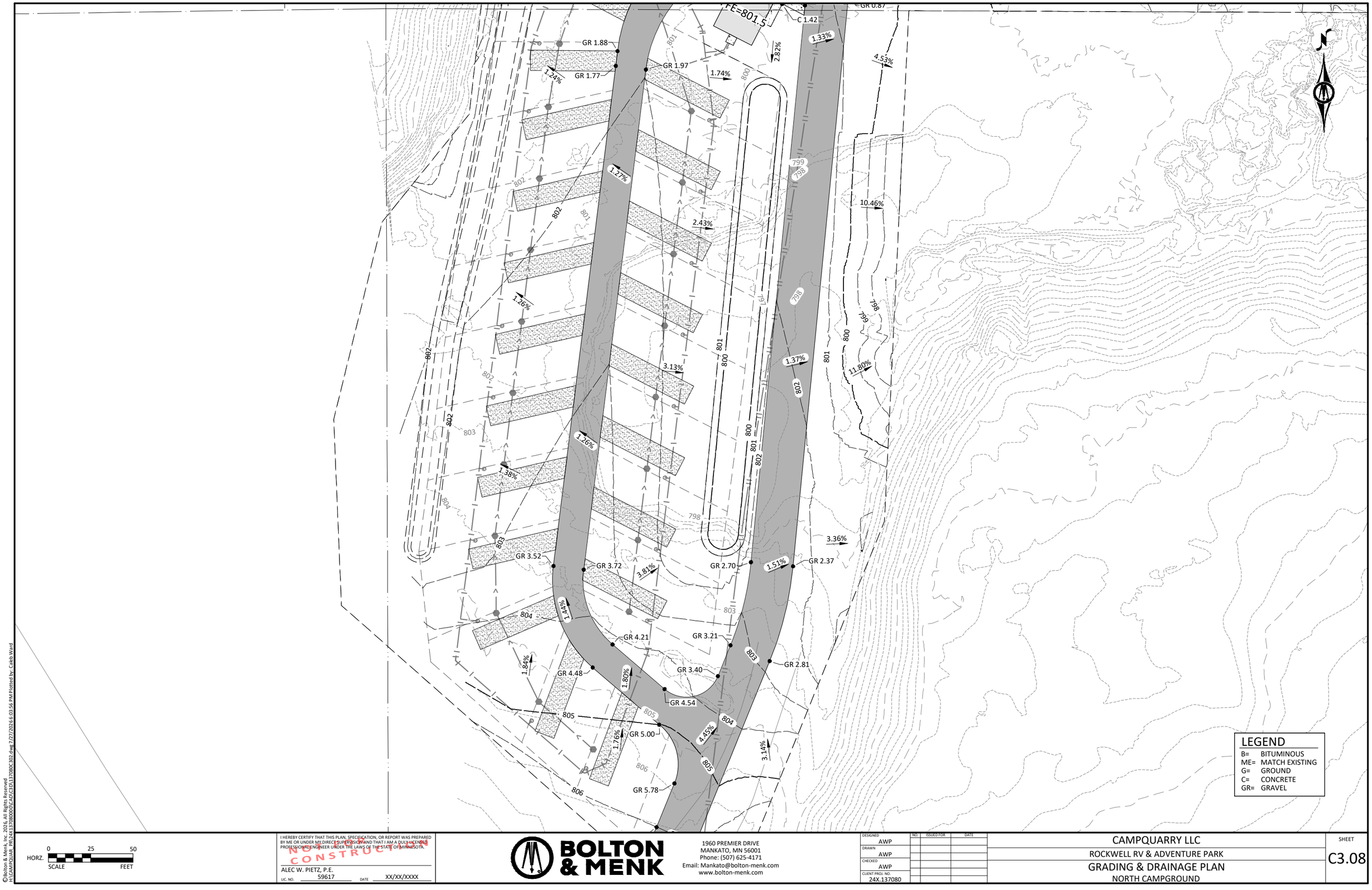

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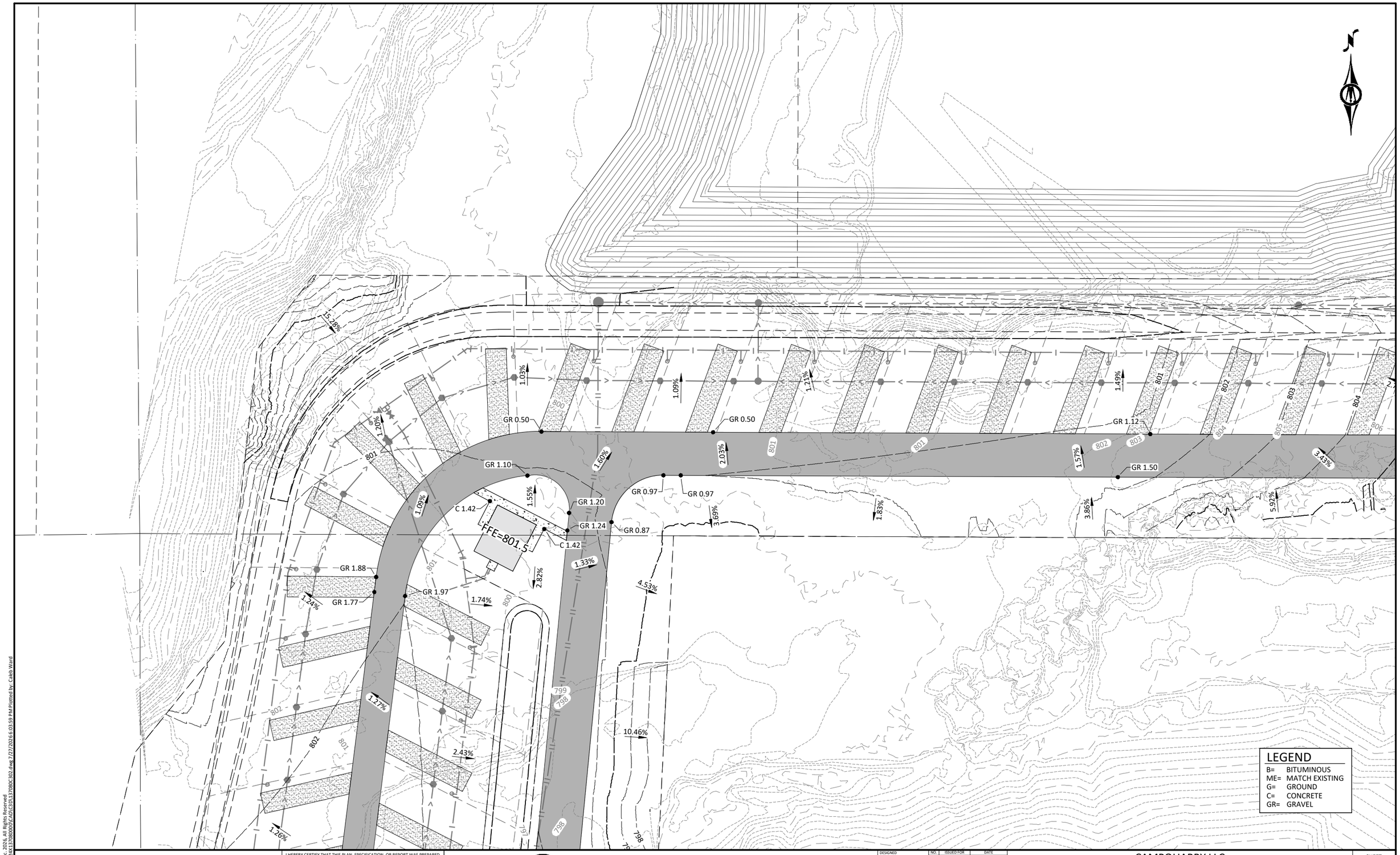

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NORTH CAMPGROUND

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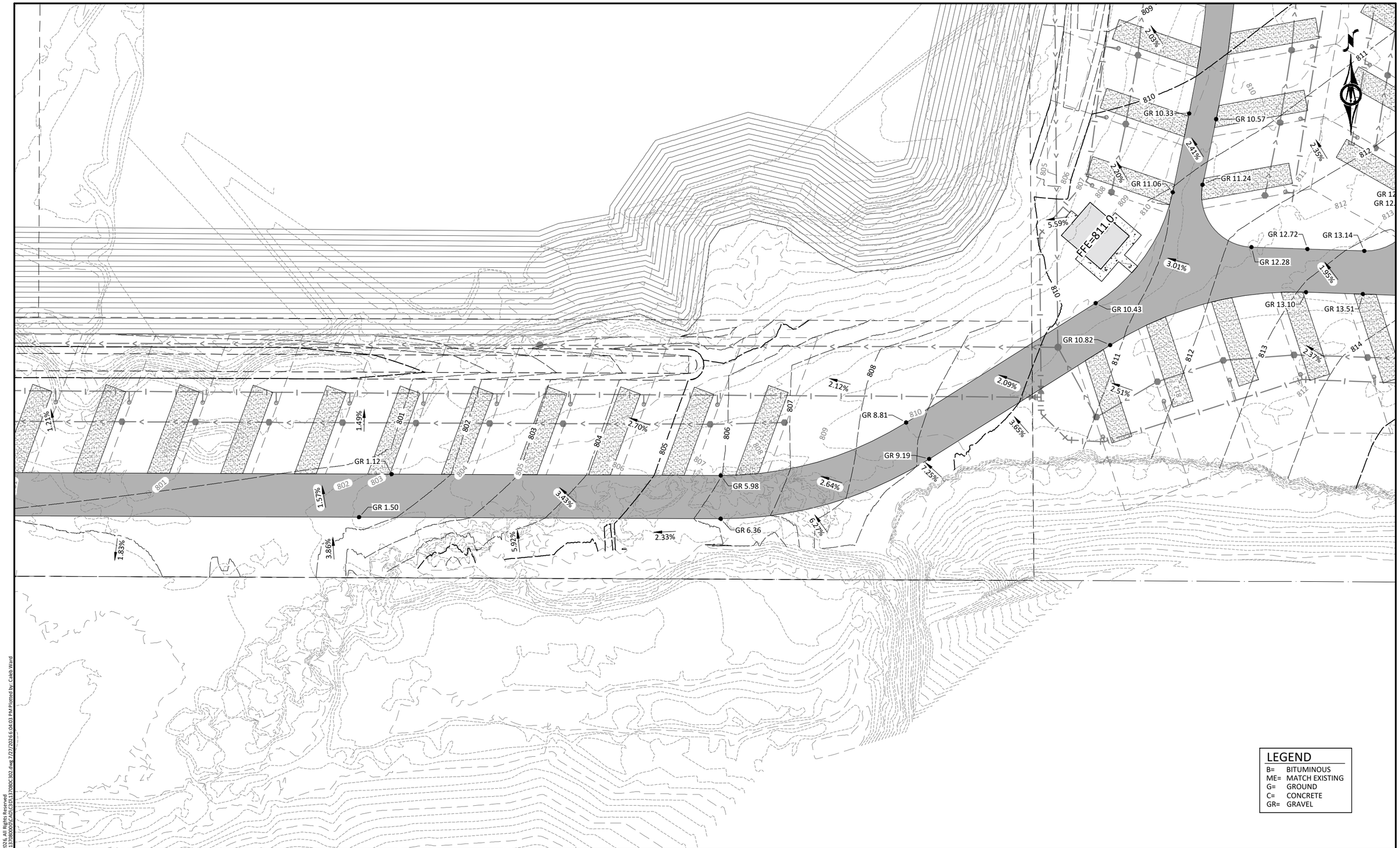

HORZ. SCALE 0 25 50 FEET

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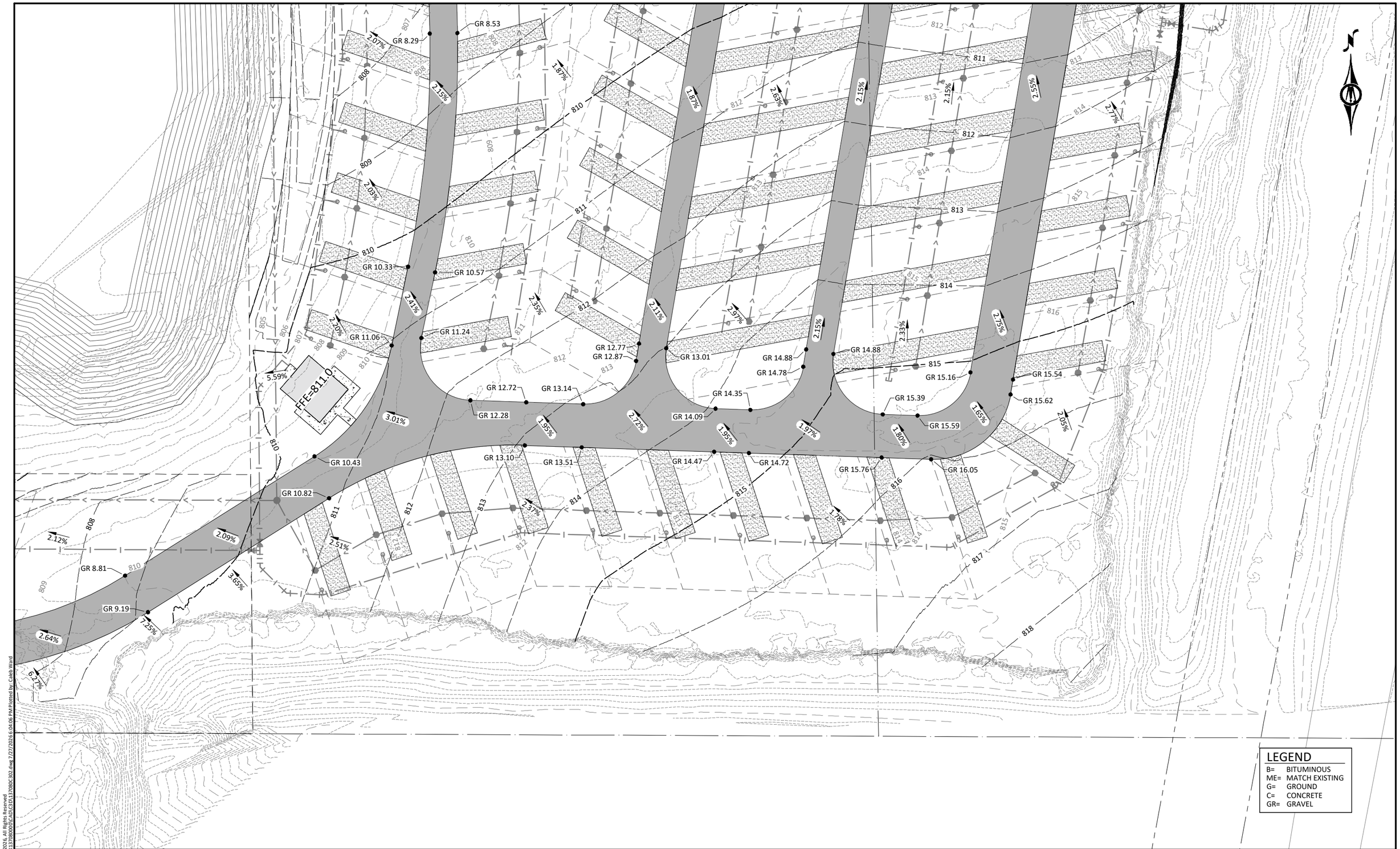

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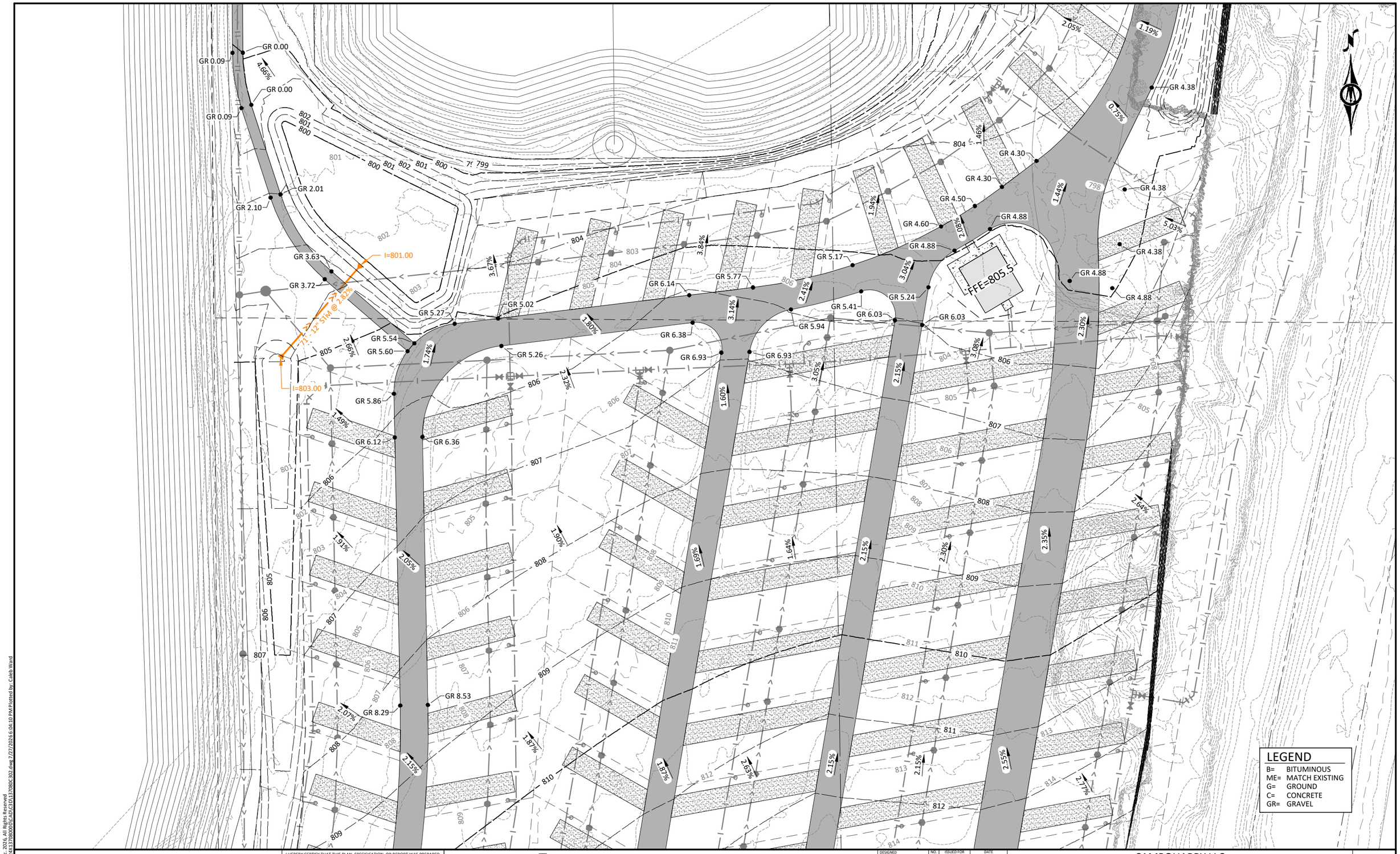

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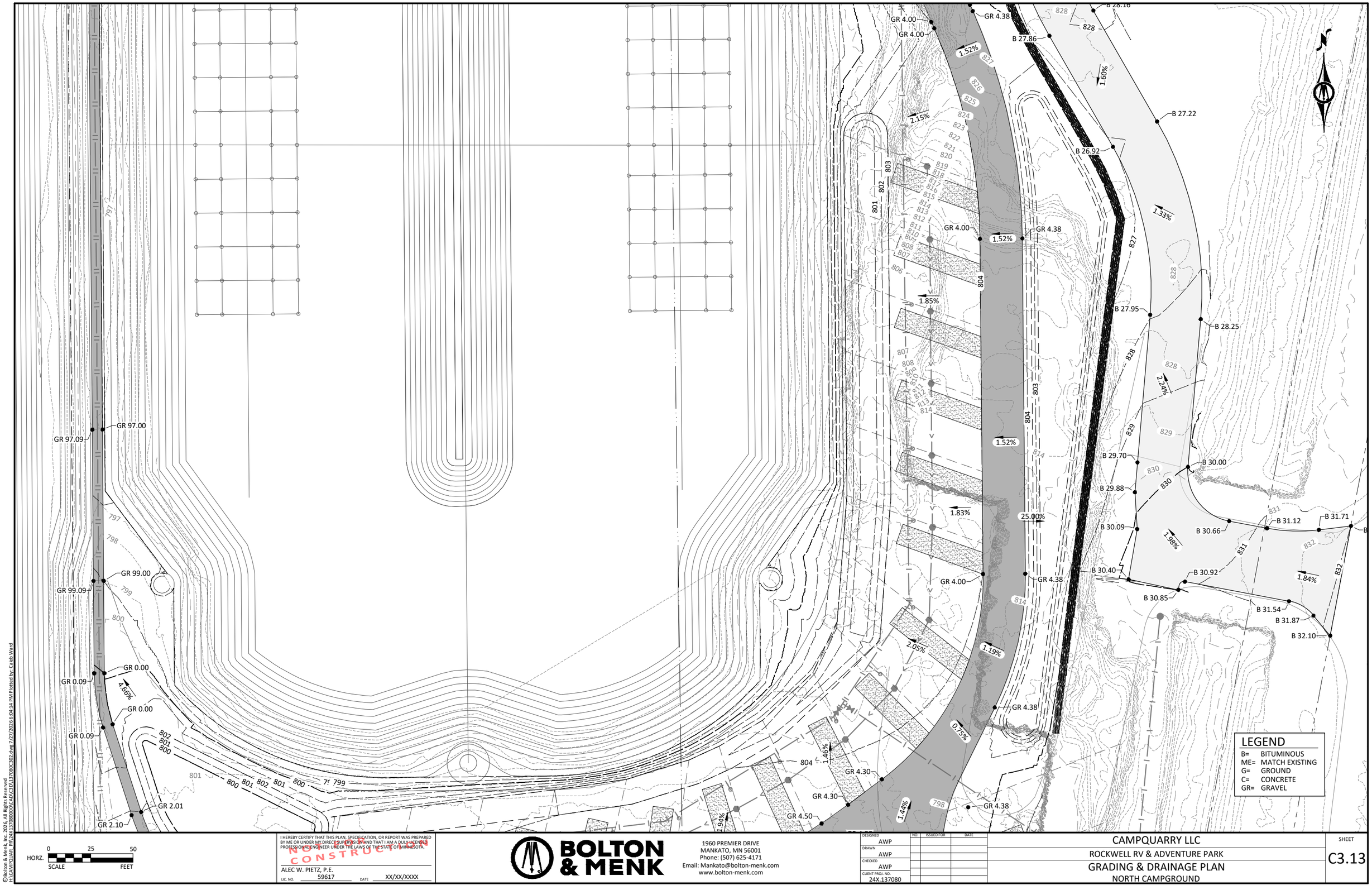

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ROCKWELL RV & ADVENTURE PARK
GRADING & DRAINAGE PLAN
NORTH CAMPGROUND

SHEET
C3.13



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ALEC W. PIETZ, P.E.
LIC. NO. 59617 DATE XX/XX/XXXX

BOLTON & MENK

1960 PREMIER DRIVE
MANKATO, MN 56001
Phone: (507) 625-4171
Email: Mankato@bolton-menk.com
www.bolton-menk.com

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CHECKED	AWP
CLIENT PROJ. NO.	24X.137080

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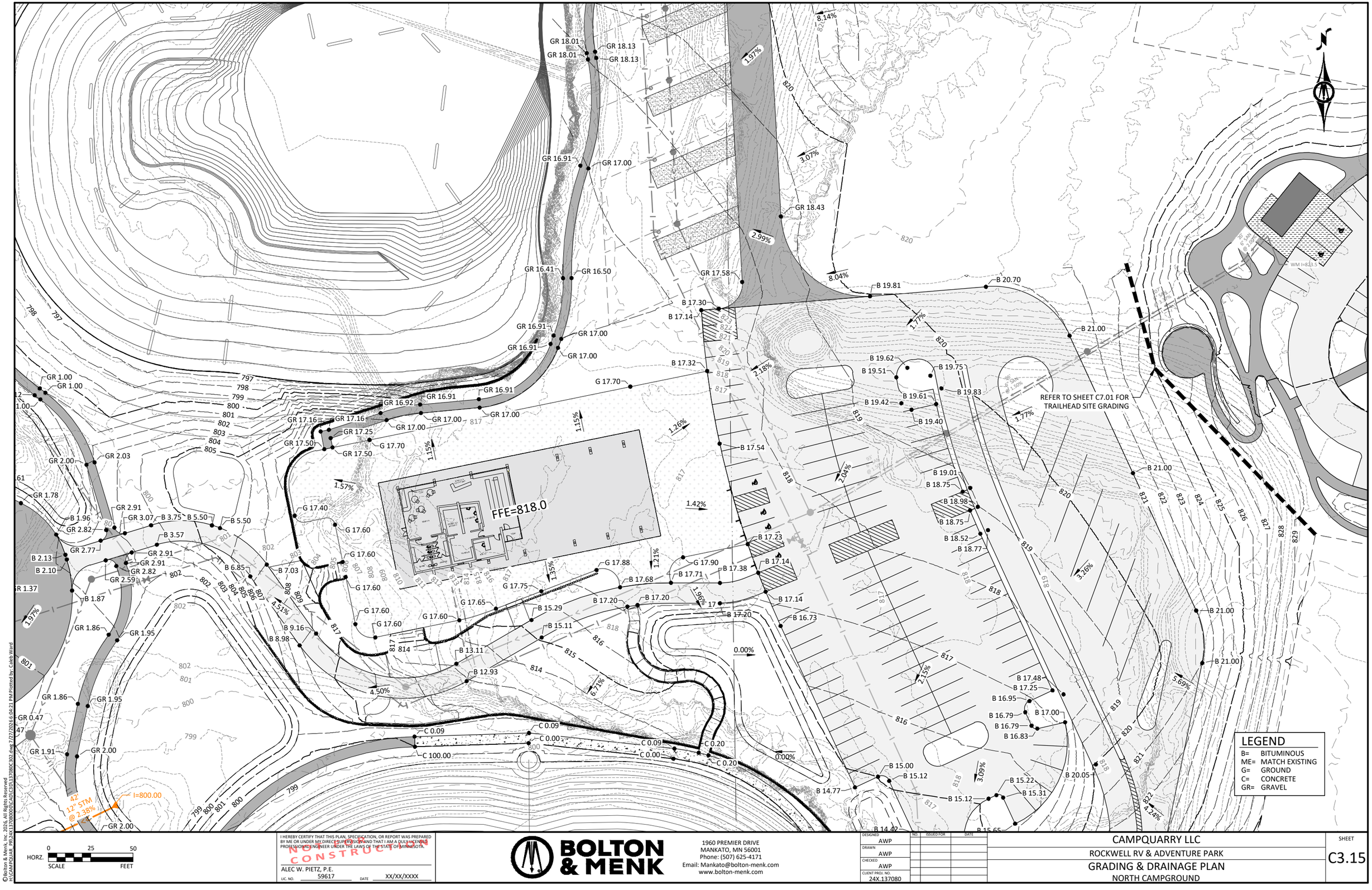

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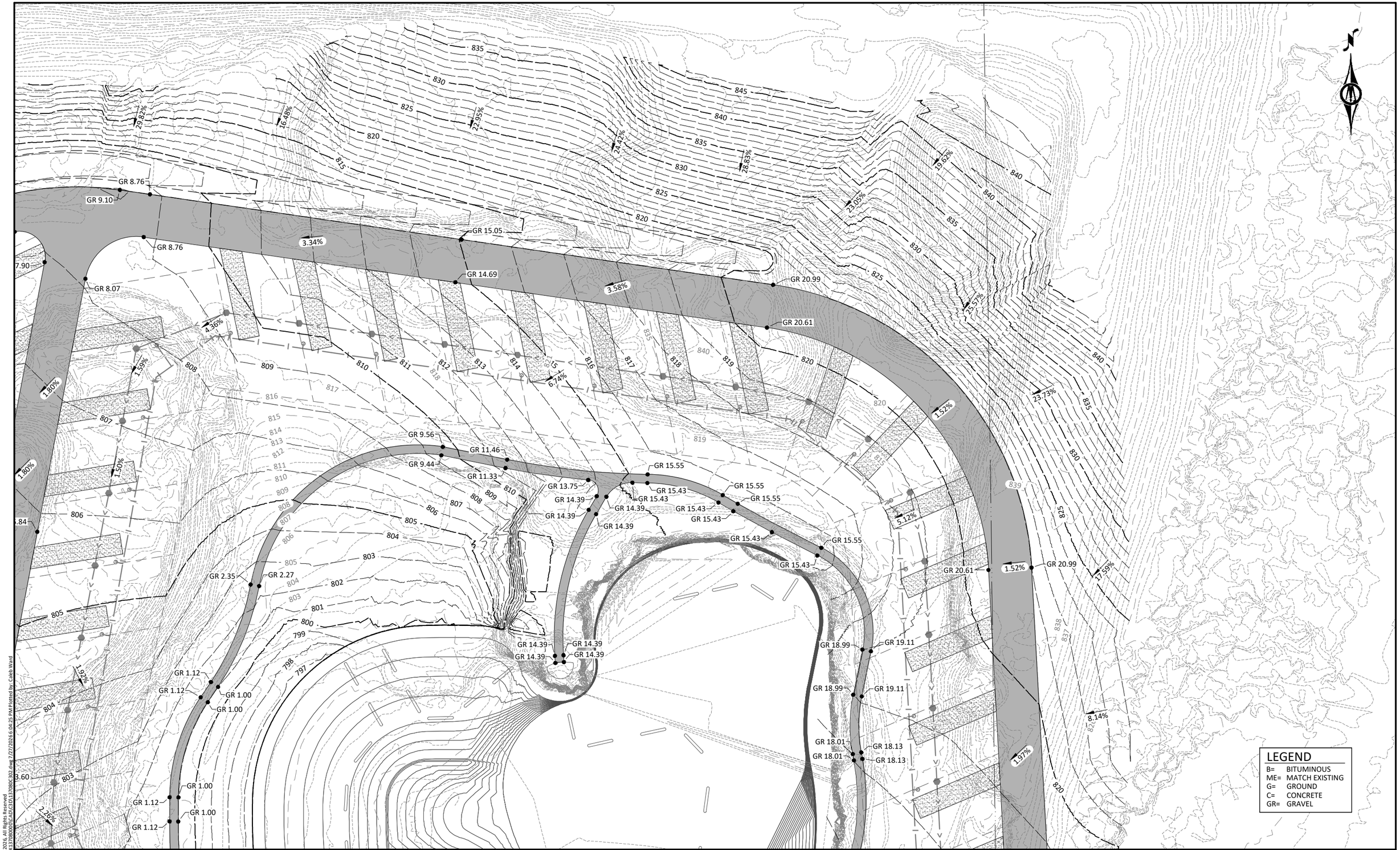

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HORZ. SCALE 0 25 50 FEET

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HORZ. SCALE 0 25 50 FEET

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SHEET C3.17

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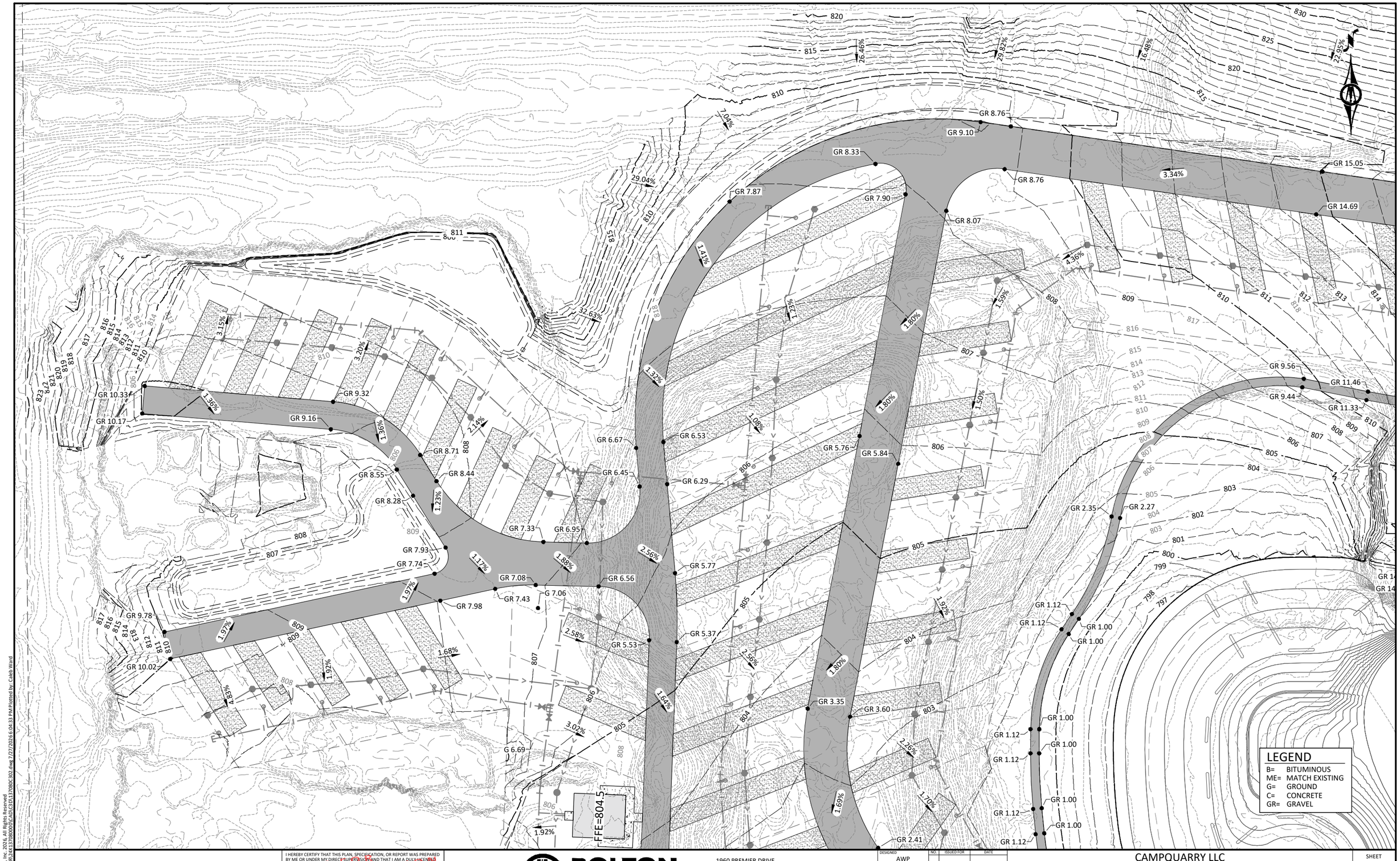

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HORZ. SCALE 0 25 50 FEET

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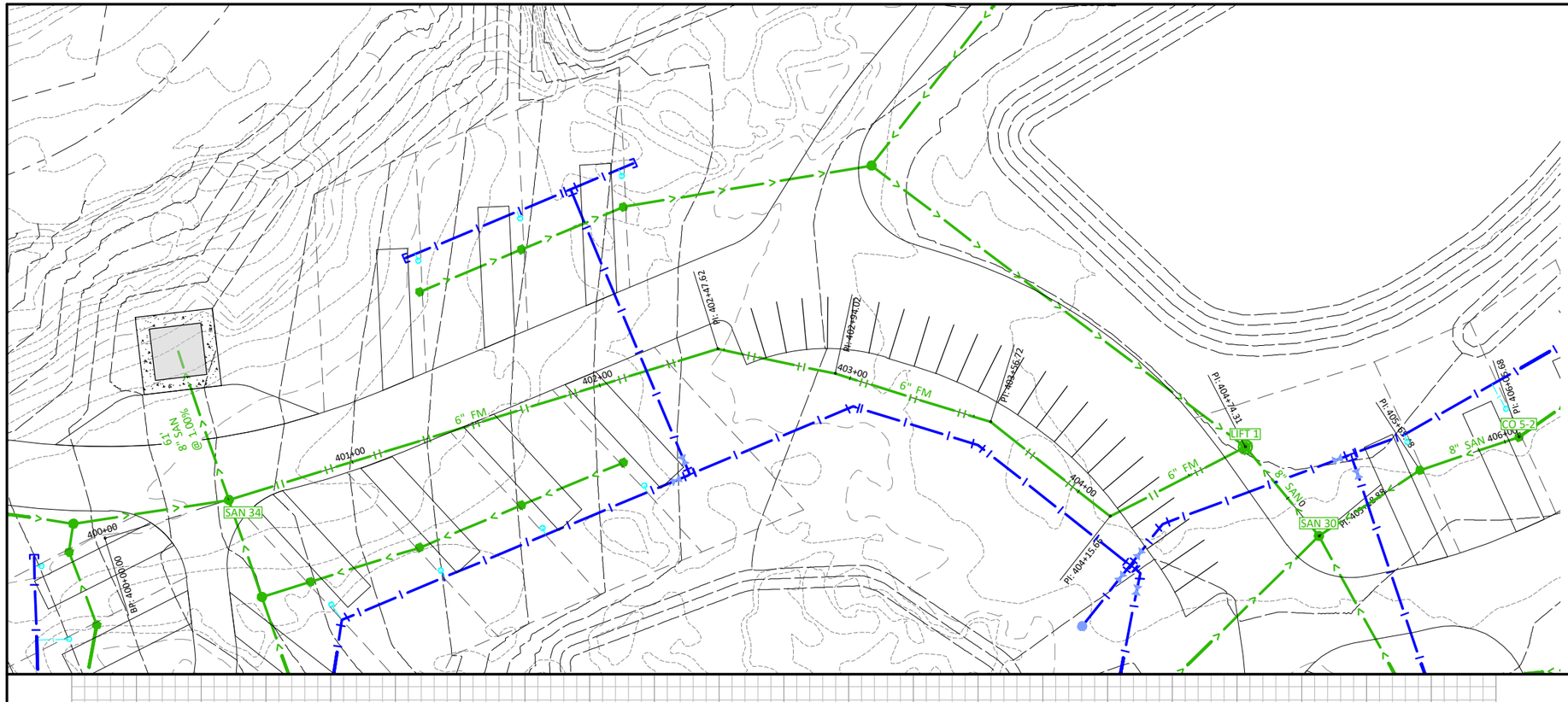
GRADING & DRAINAGE PLAN
NORTH CAMPGROUND

SHEET C3.18



WATERMAIN NOTE:
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PIPE MATERIAL NOTES:

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- ALL STORM SEWER PIPE SHALL BE:
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HORZ. SCALE 0 25 50 FEET
VERT. SCALE 0 5 10 FEET

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STA - 400+00 TO 404+00

SHEET C4.01

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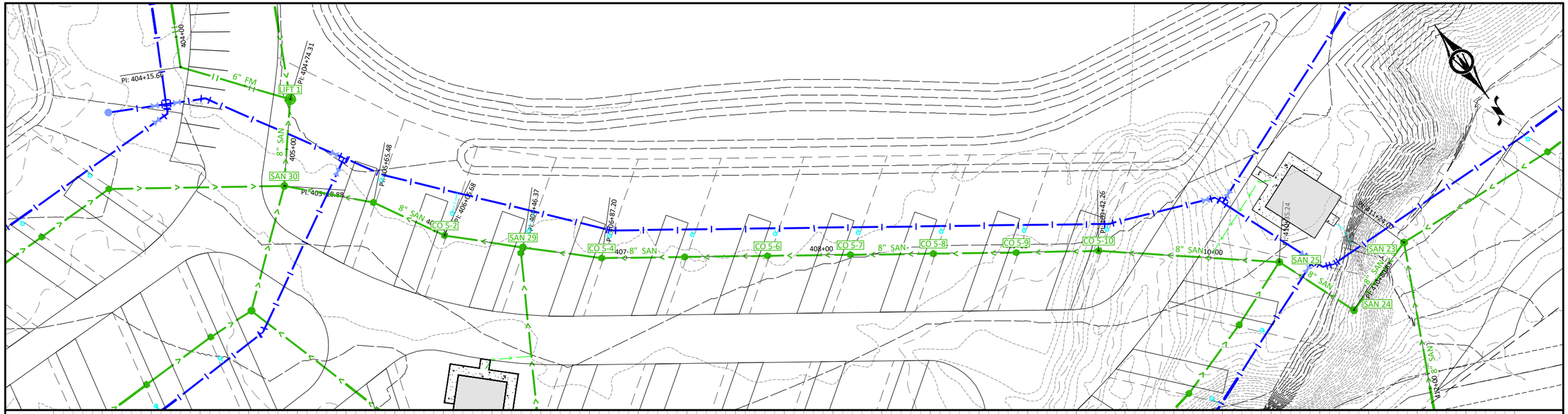

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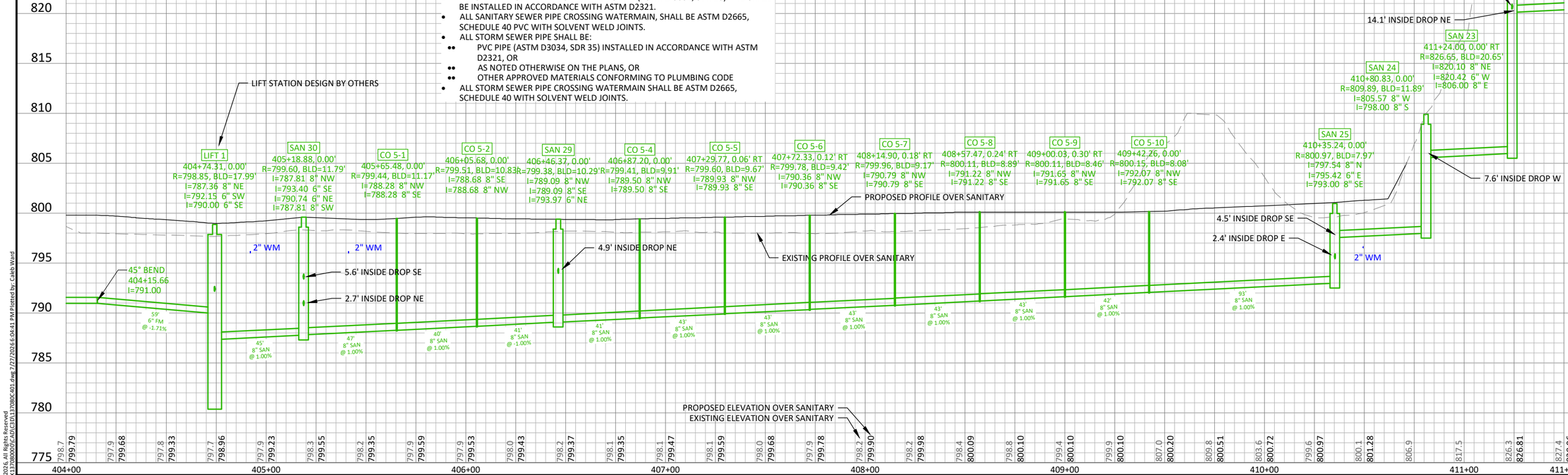

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HORZ. 0 25 50 SCALE FEET
VERT. 0 5 10 SCALE FEET

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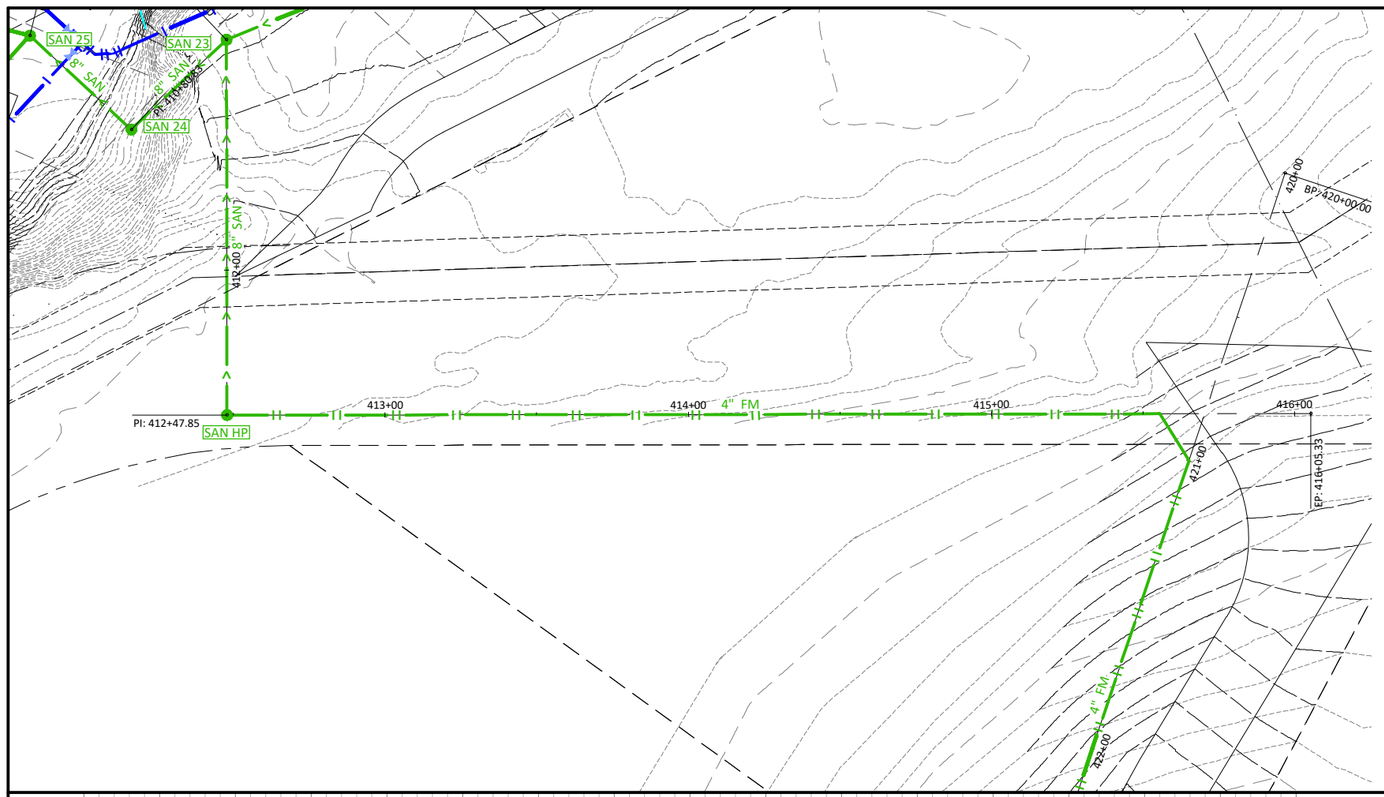
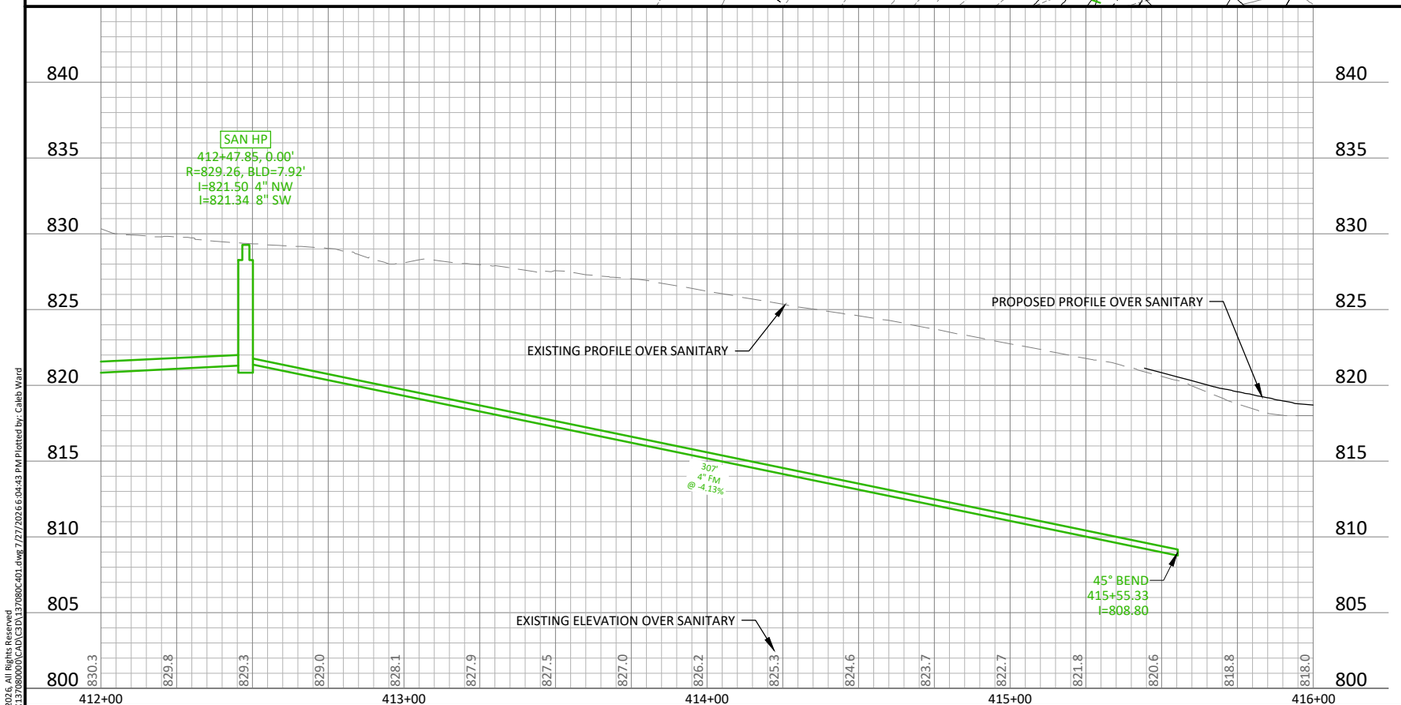
STA - 404+00 TO 411+50

SHEET C4.02





NOTE: REFER TO SHEET C4.04 FOR CONTINUED SANITARY FORCEMAIN PROFILE

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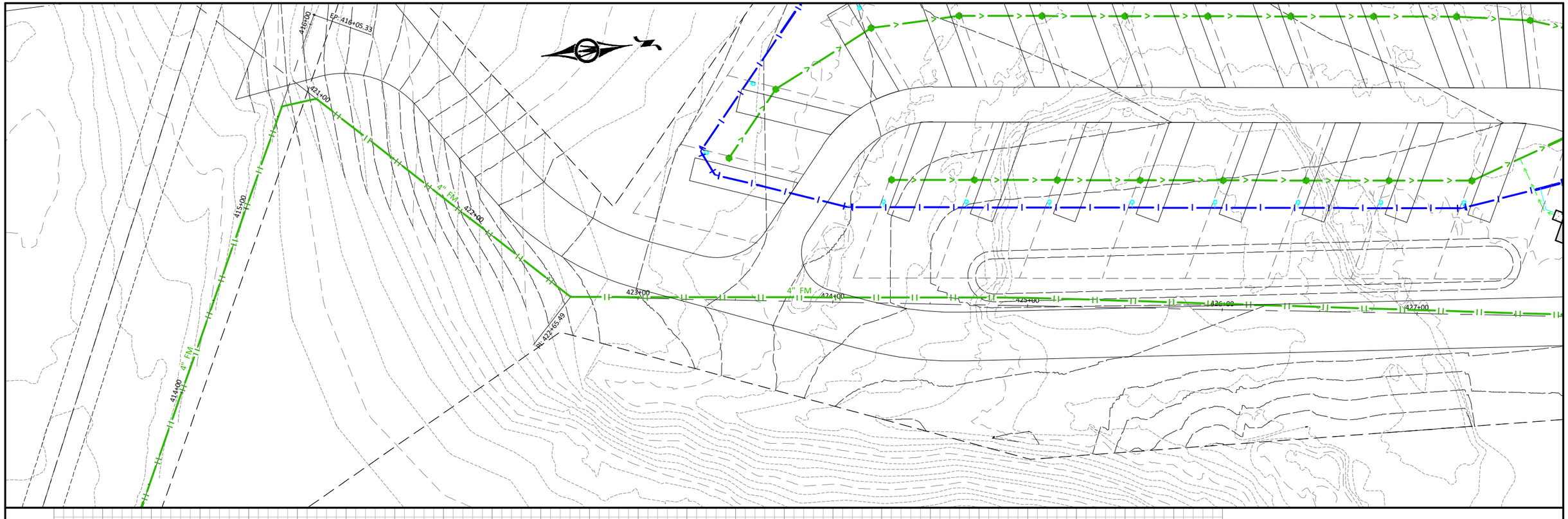
STA - 411+50 TO 415+50

SHEET C4.03



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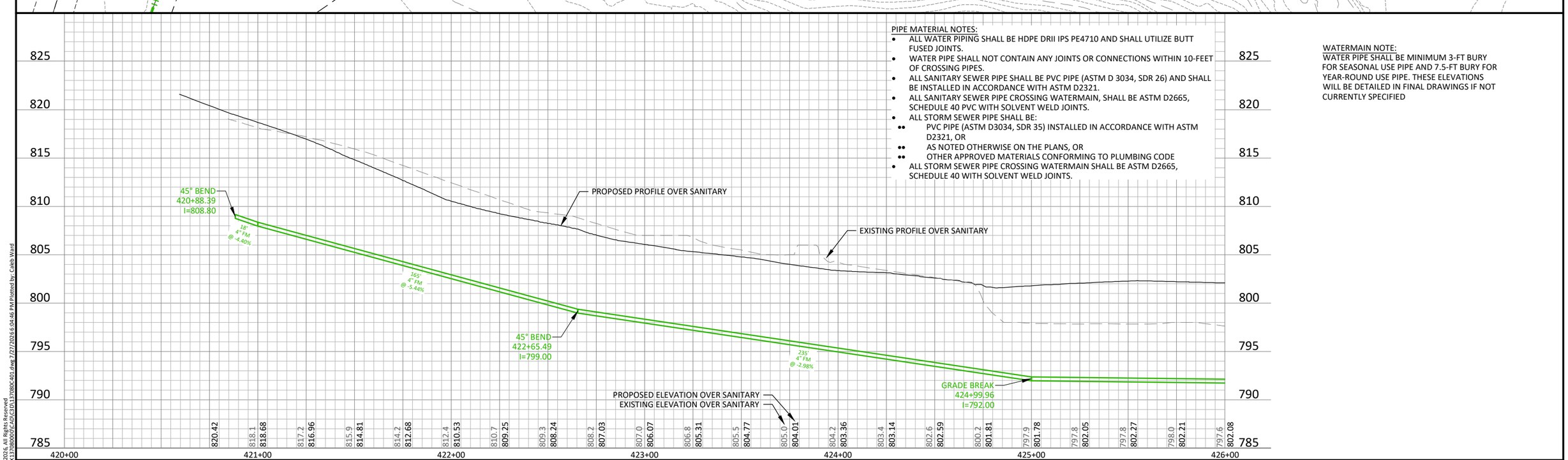

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SHEET
C4.04

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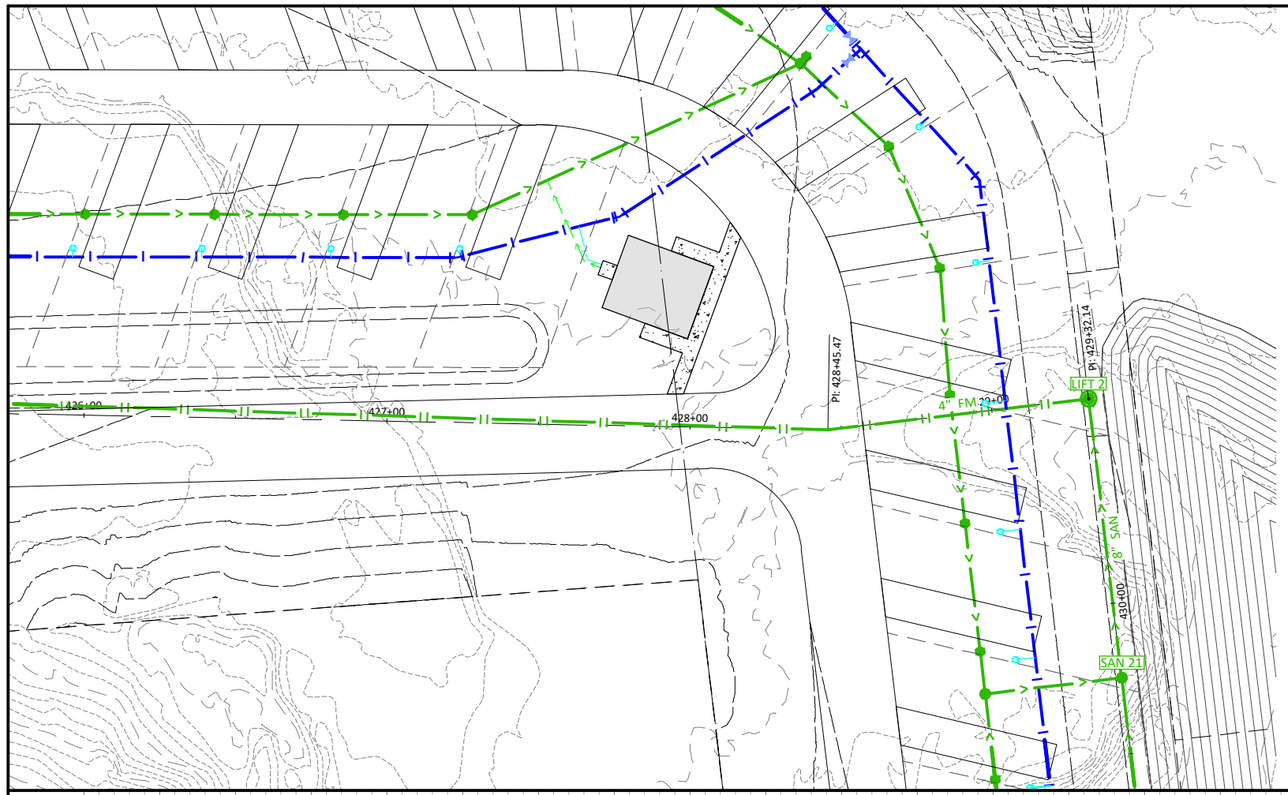

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STA - 426+00 TO 430+00

SHEET C4.05

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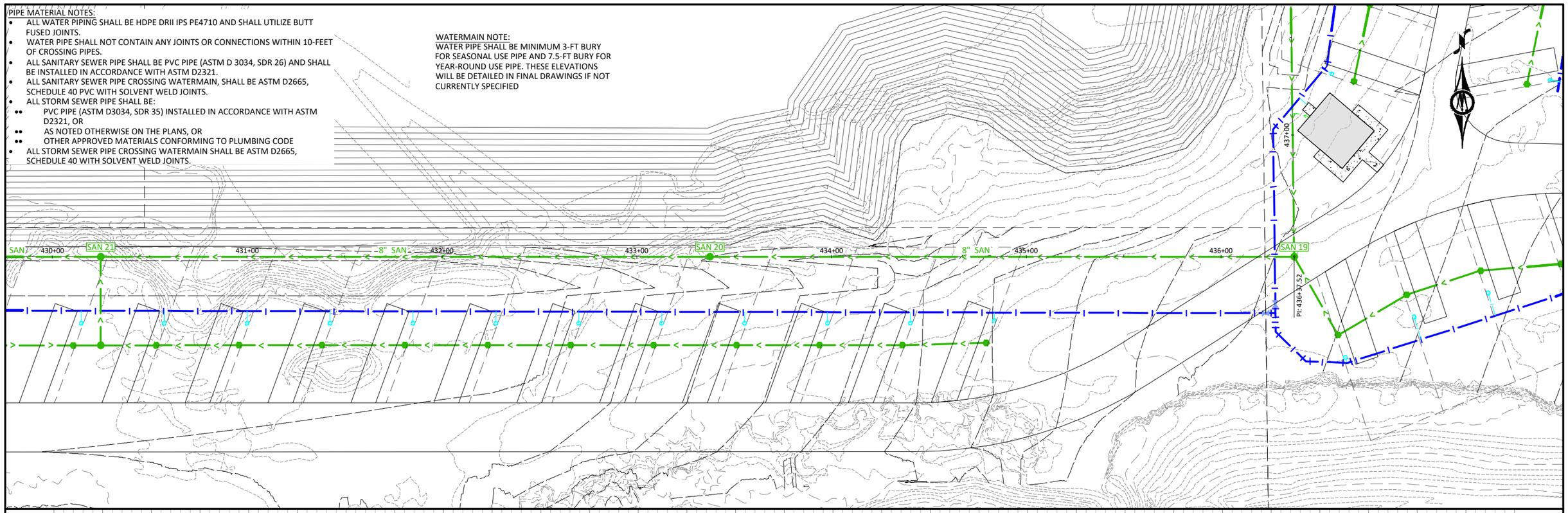

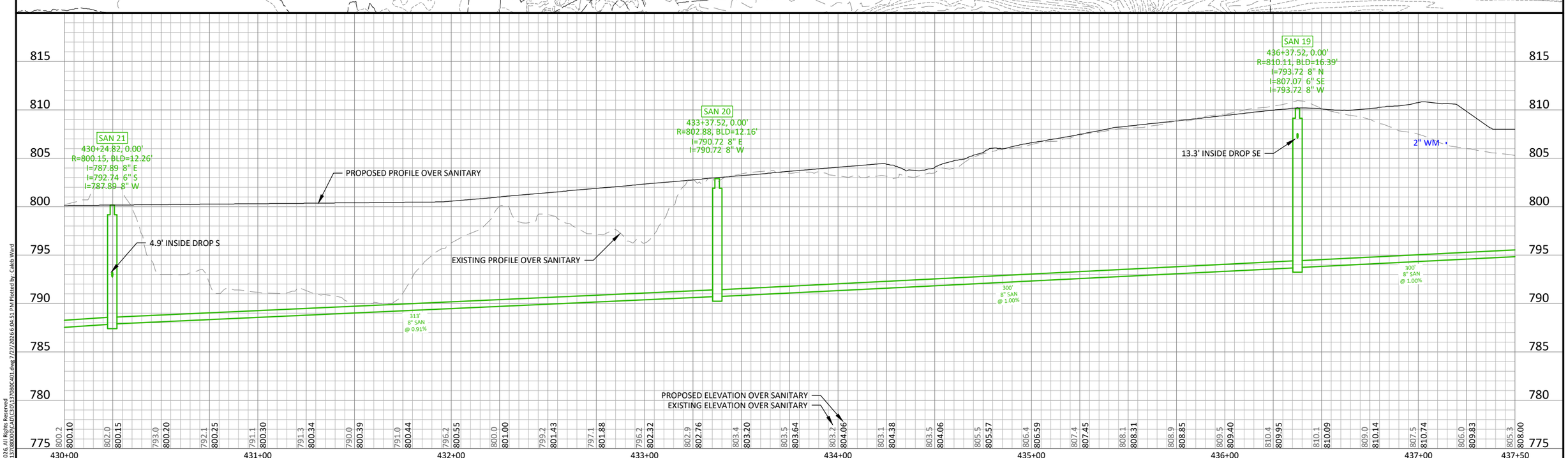

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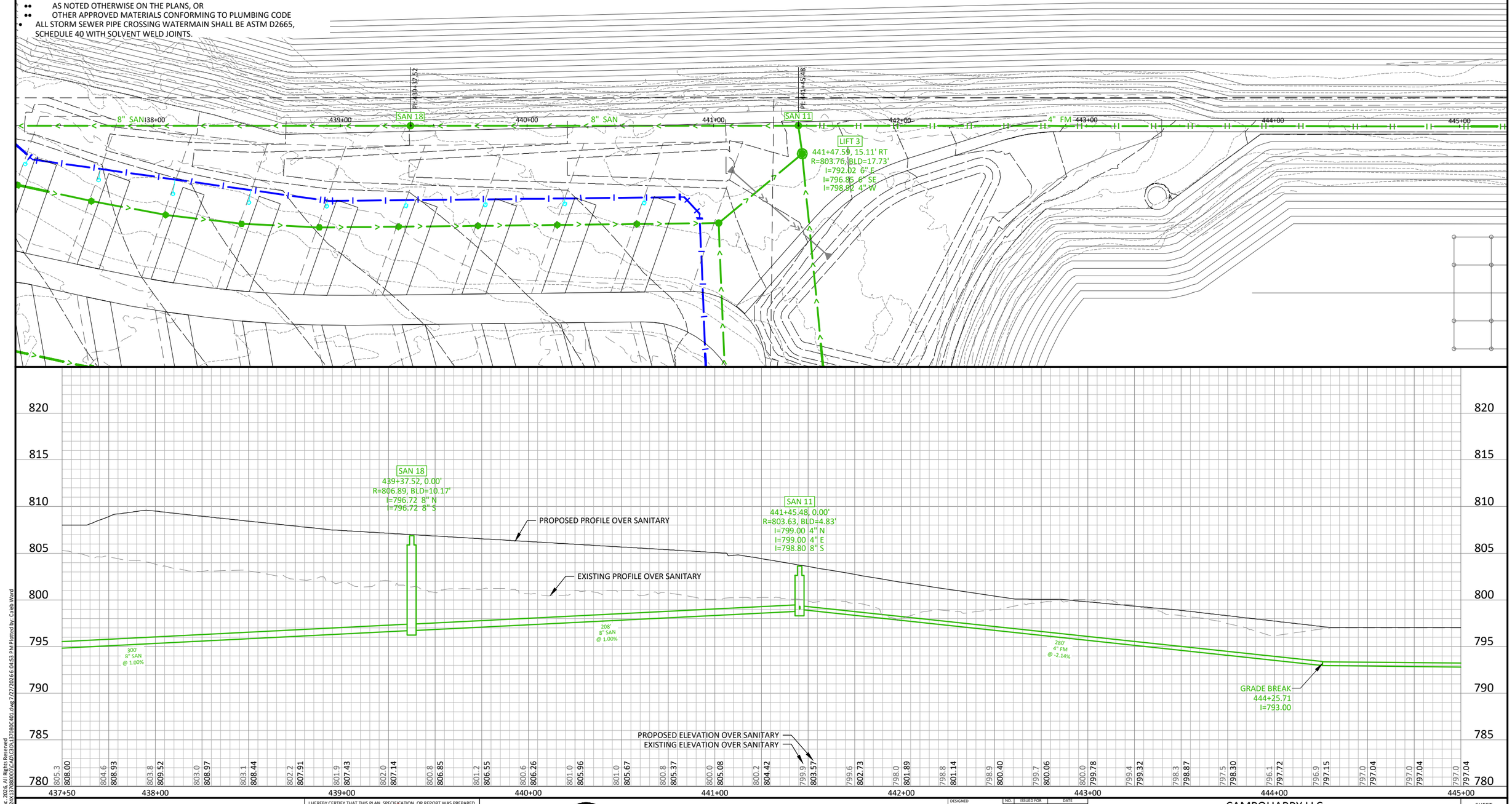
- ALL STORM SEWER PIPE CROSSING WATERMAIN SHALL BE ASTM D2665, SCHEDULE 40 WITH SOLVENT WELD JOINTS.

WATERMAIN NOTE:
WATER PIPE SHALL BE MINIMUM 3-FT BURY FOR SEASONAL USE PIPE AND 7.5-FT BURY FOR YEAR-ROUND USE PIPE. THESE ELEVATIONS WILL BE DETAILED IN FINAL DRAWINGS IF NOT CURRENTLY SPECIFIED



HORZ. 0 25 50 SCALE FEET

VERT. 0 5 10 SCALE FEET

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ROCKWELL RV & ADVENTURE PARK
SANITARY MAINLINE PLAN & PROFILE
STA - 437+50 TO 445+00

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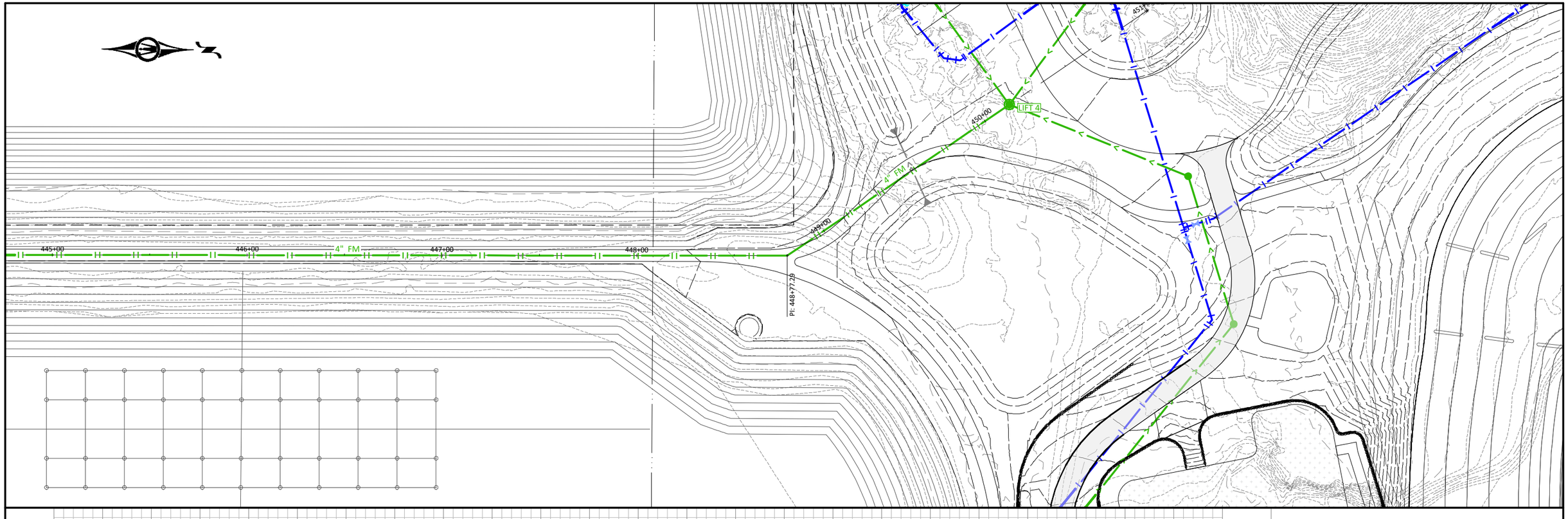

PIPE MATERIAL NOTES:

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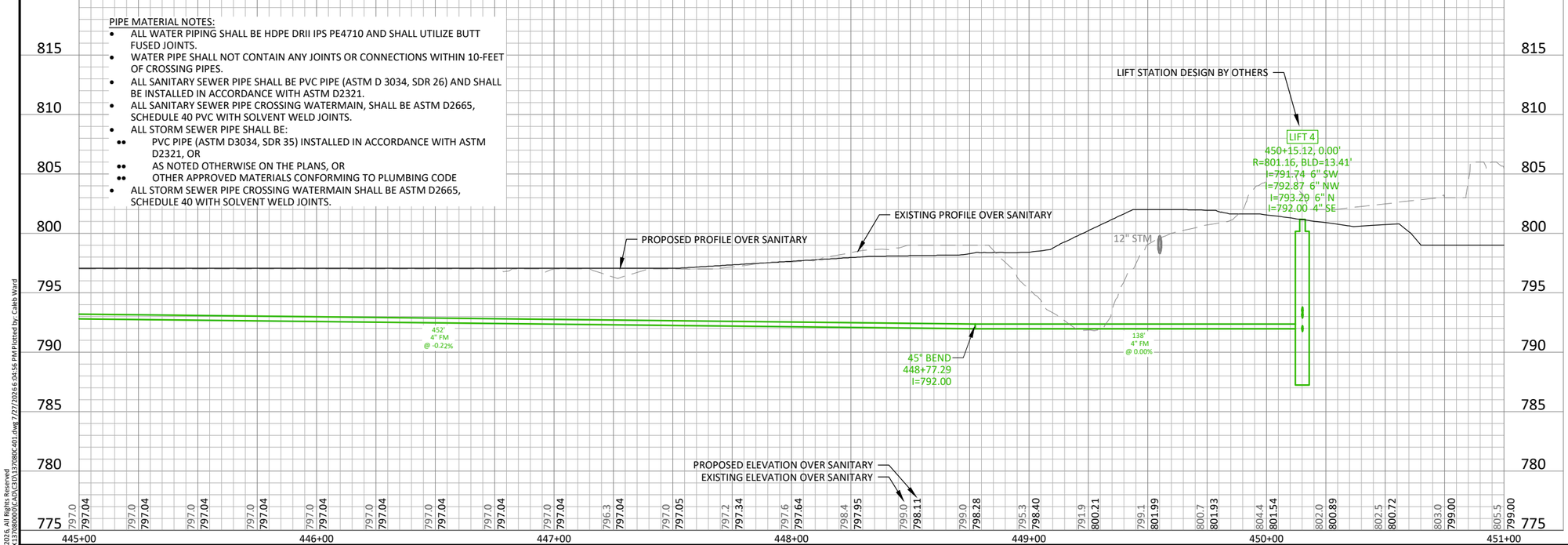

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SANITARY MAINLINE PLAN & PROFILE
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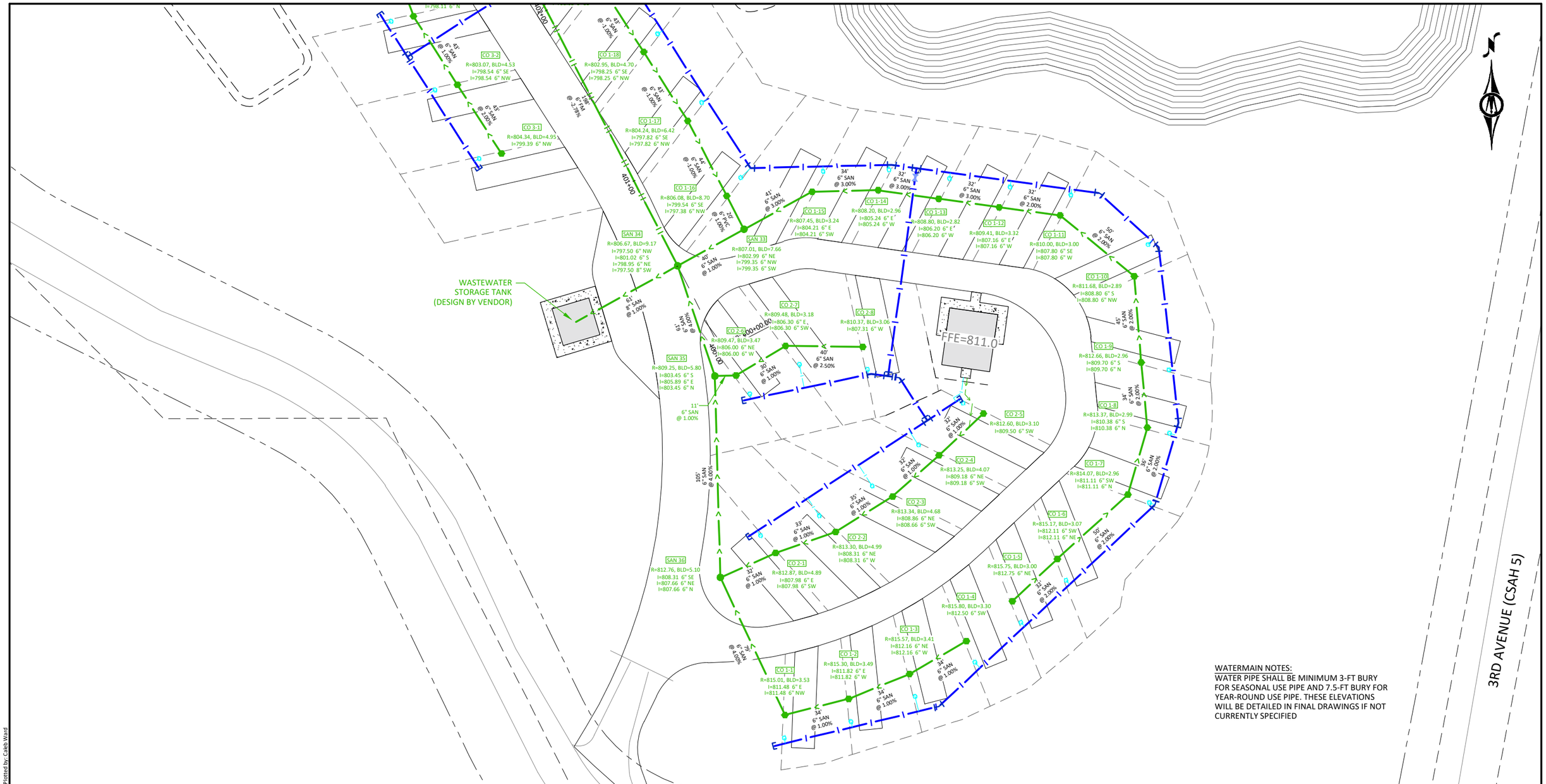

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APPROXIMATE PROPOSED WELL LOCATION (DESIGN BY OTHERS)

3RD AVENUE (CSAH 5)

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231ST LANE

3RD AVENUE (CSAH 5)

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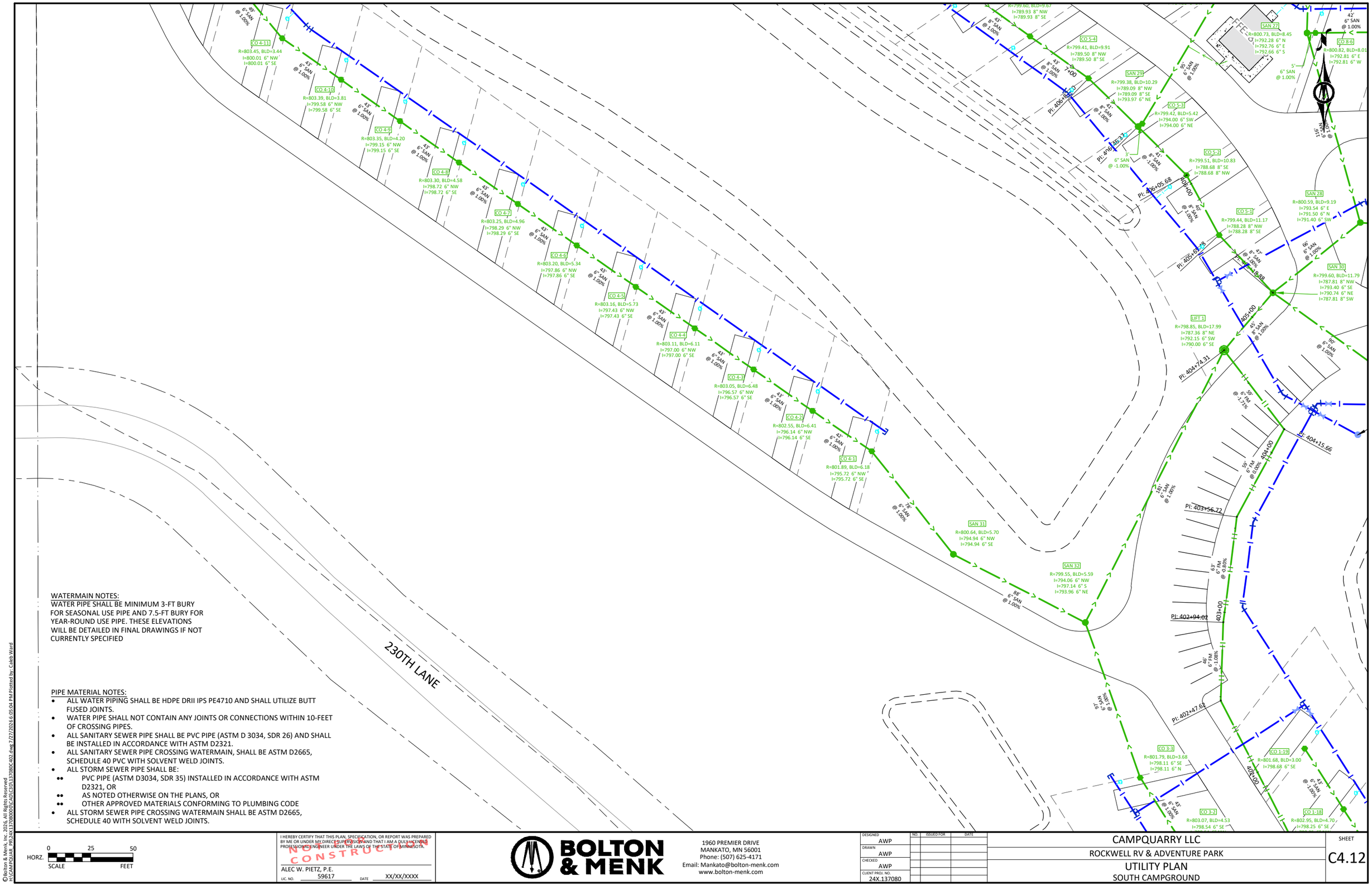

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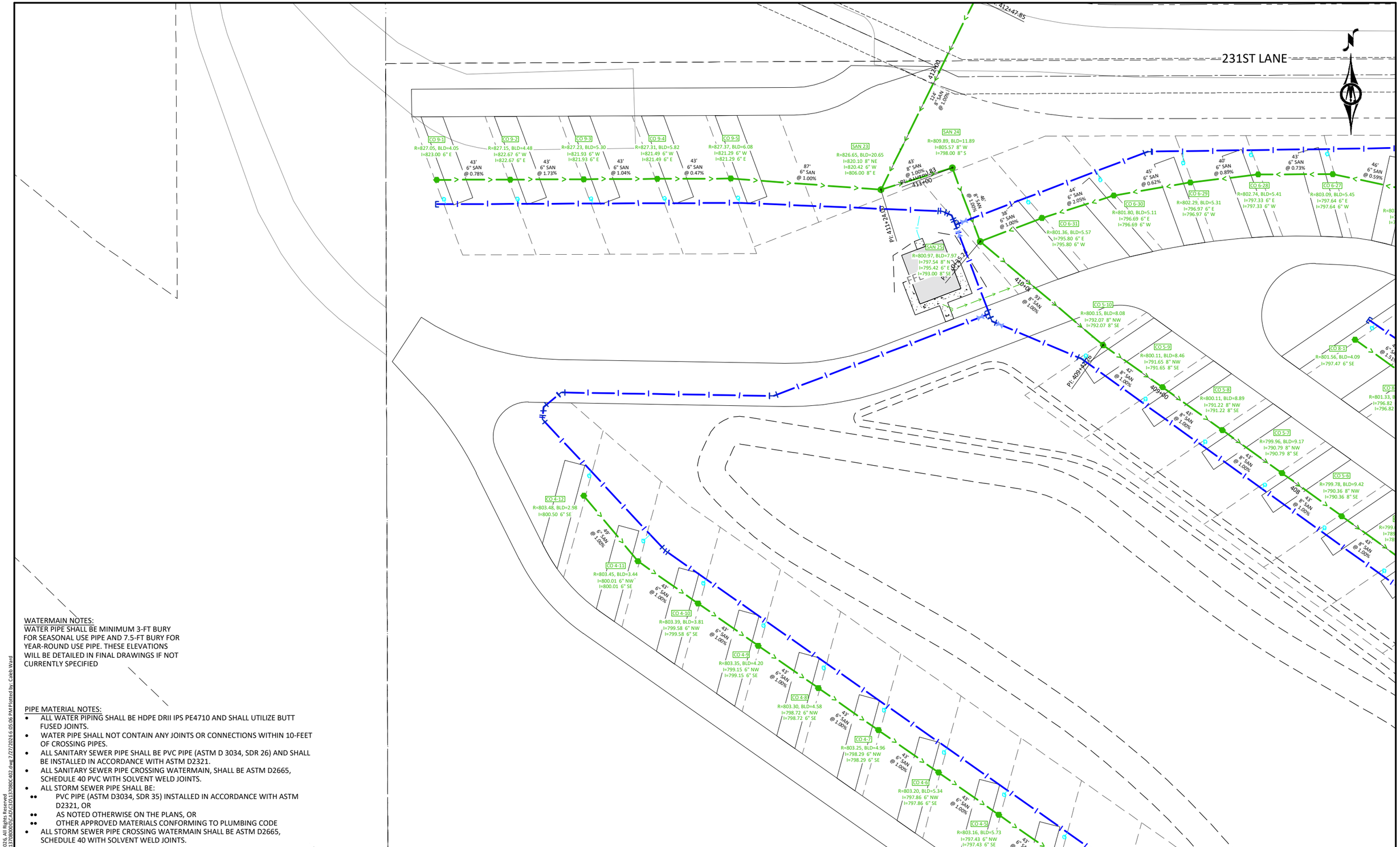

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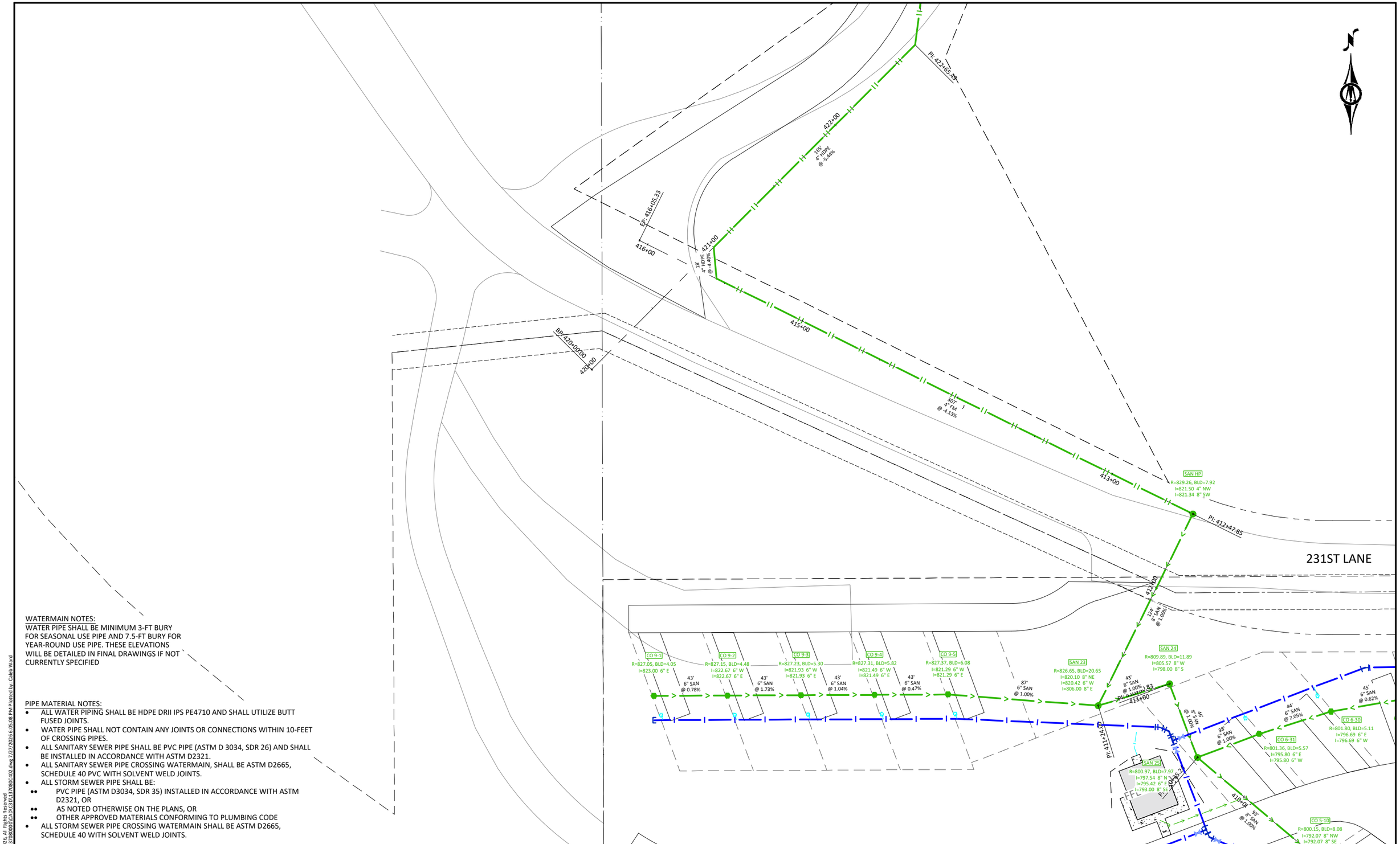

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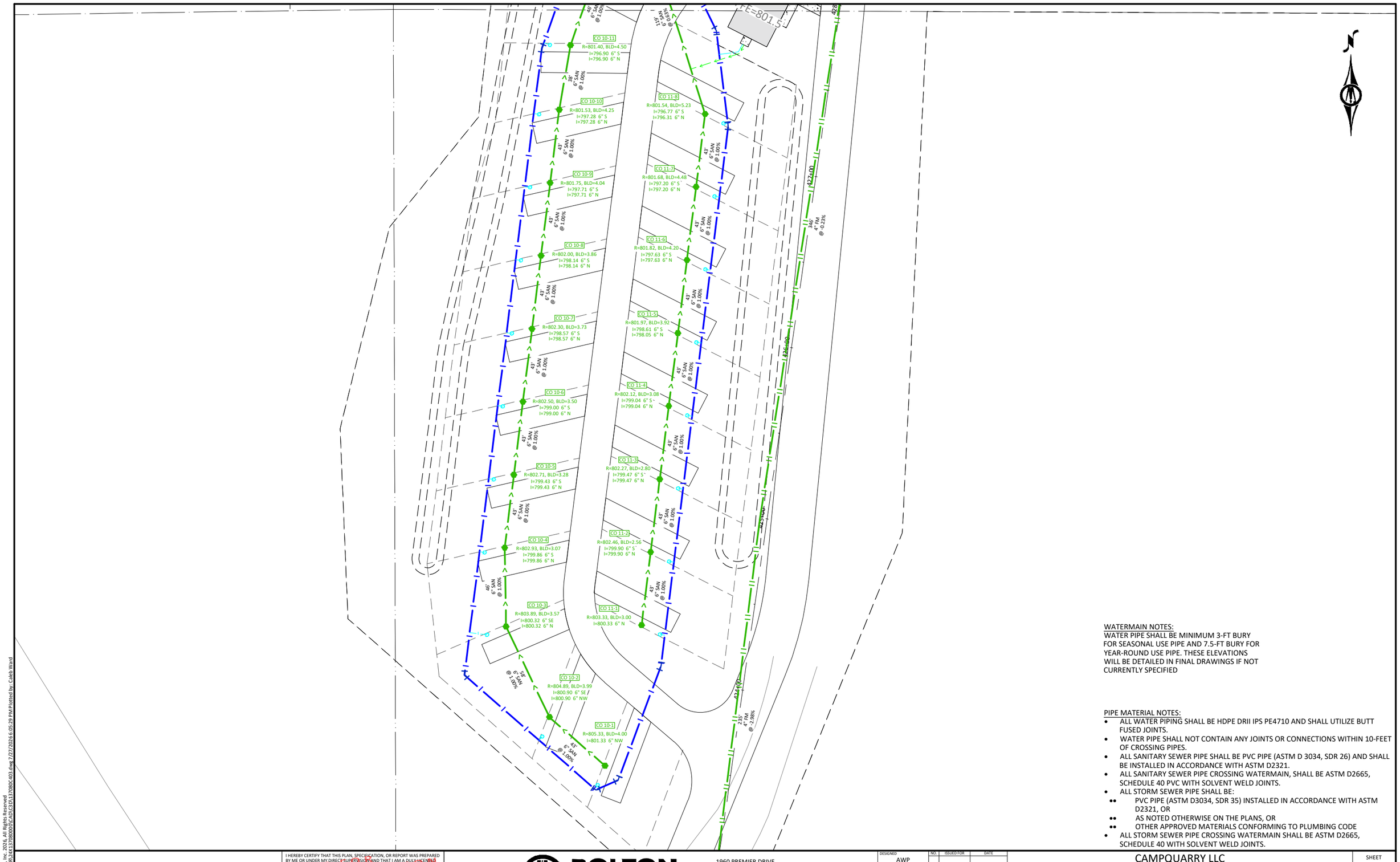

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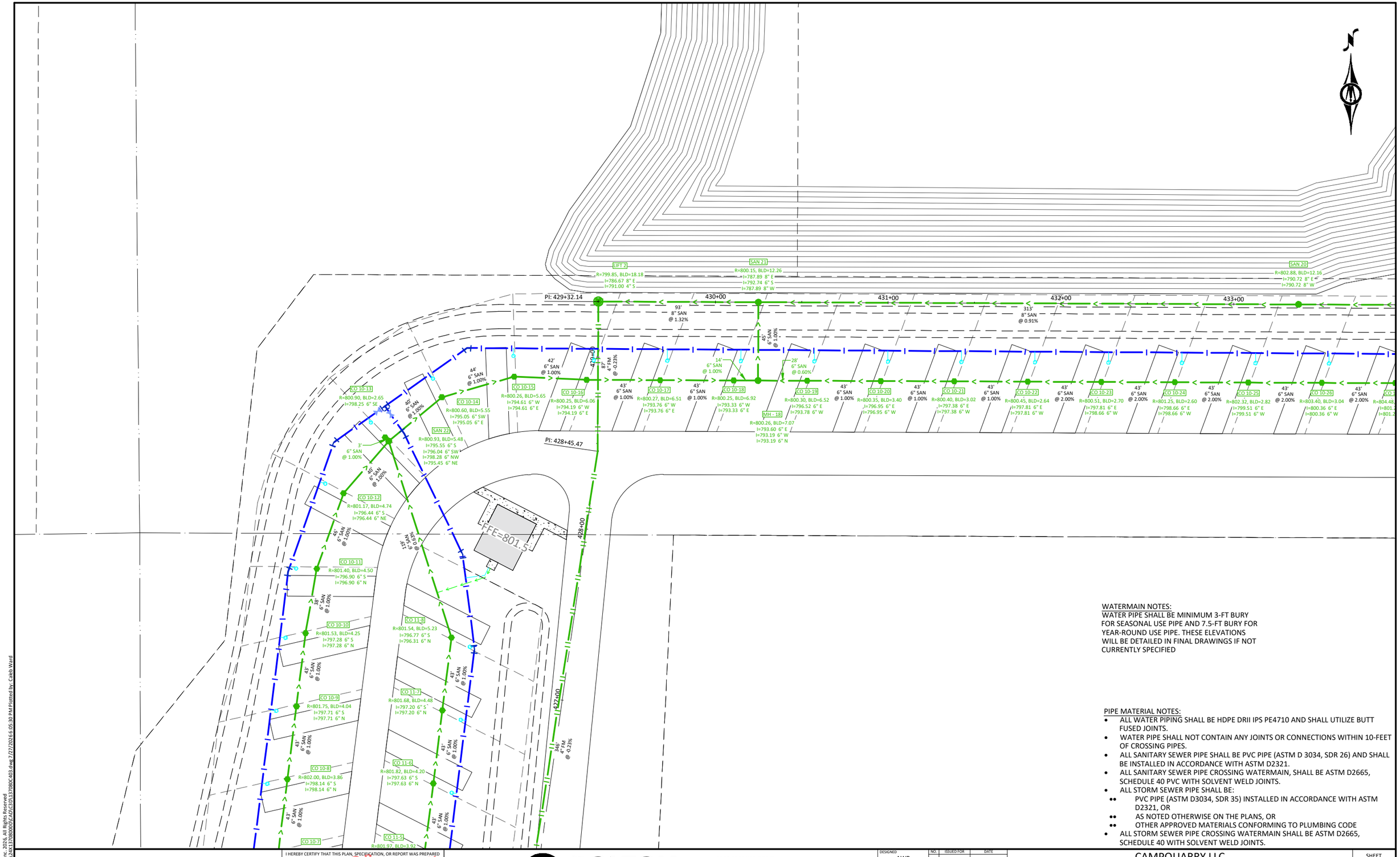

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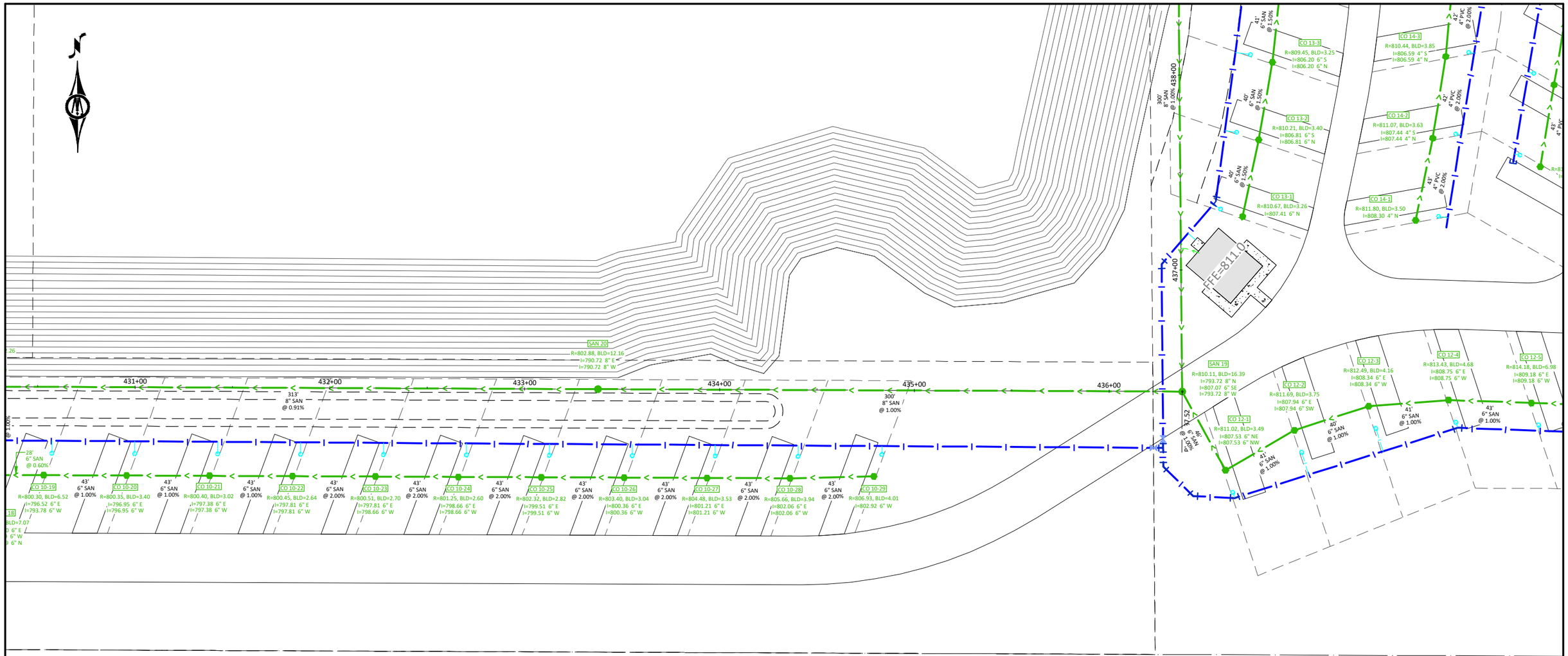

WATERMAIN NOTES:
WATER PIPE SHALL BE MINIMUM 3-FT BURY FOR SEASONAL USE PIPE AND 7.5-FT BURY FOR YEAR-ROUND USE PIPE. THESE ELEVATIONS WILL BE DETAILED IN FINAL DRAWINGS IF NOT CURRENTLY SPECIFIED

PIPE MATERIAL NOTES:

- ALL WATER PIPING SHALL BE HDPE DRII IPS PE4710 AND SHALL UTILIZE BUTT FUSED JOINTS.
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- ALL SANITARY SEWER PIPE SHALL BE PVC PIPE (ASTM D 3034, SDR 26) AND SHALL BE INSTALLED IN ACCORDANCE WITH ASTM D2321.
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- ALL STORM SEWER PIPE SHALL BE:
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ROCKWELL RV & ADVENTURE PARK
UTILITY PLAN
NORTH CAMPGROUND

SHEET C4.17



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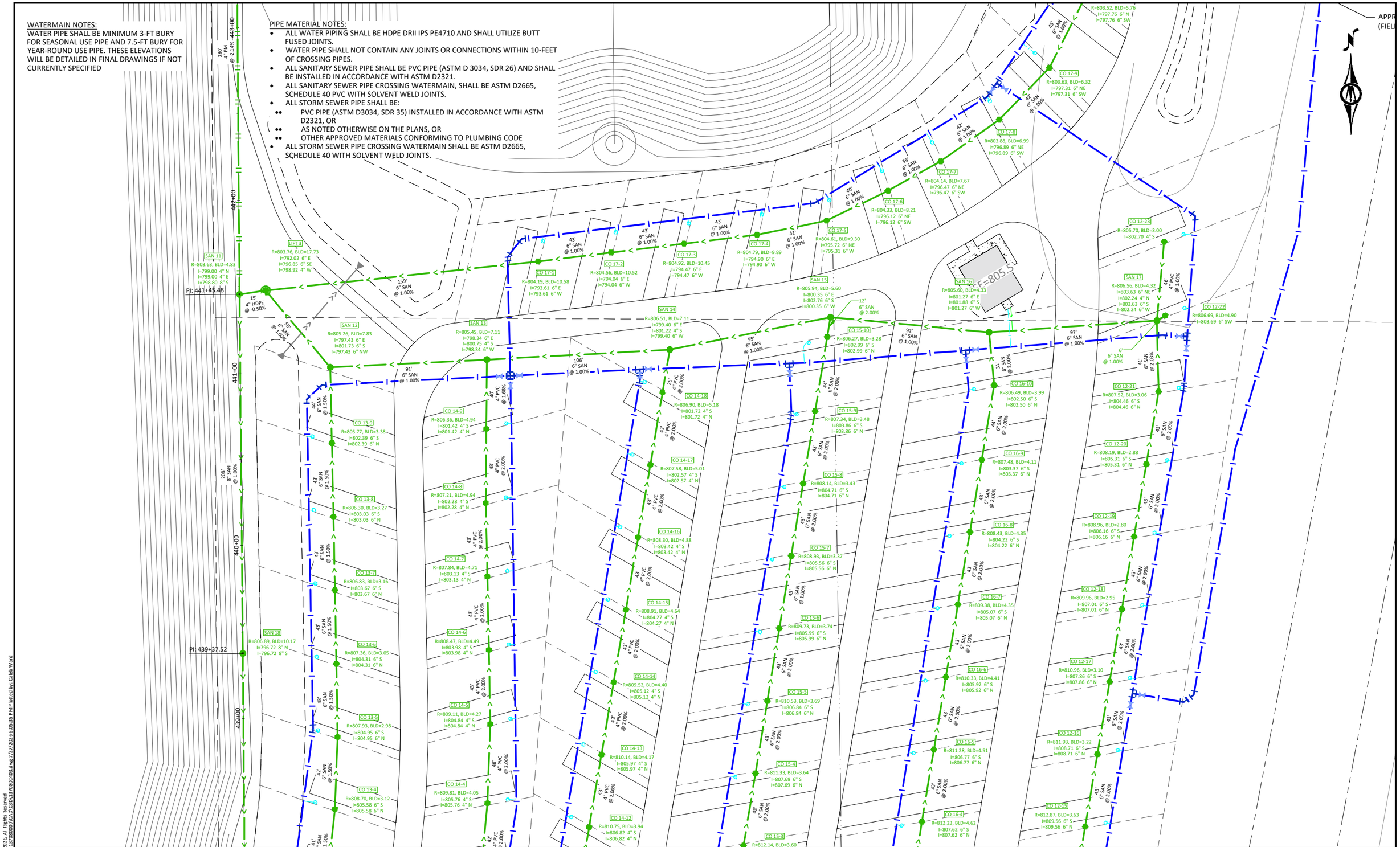

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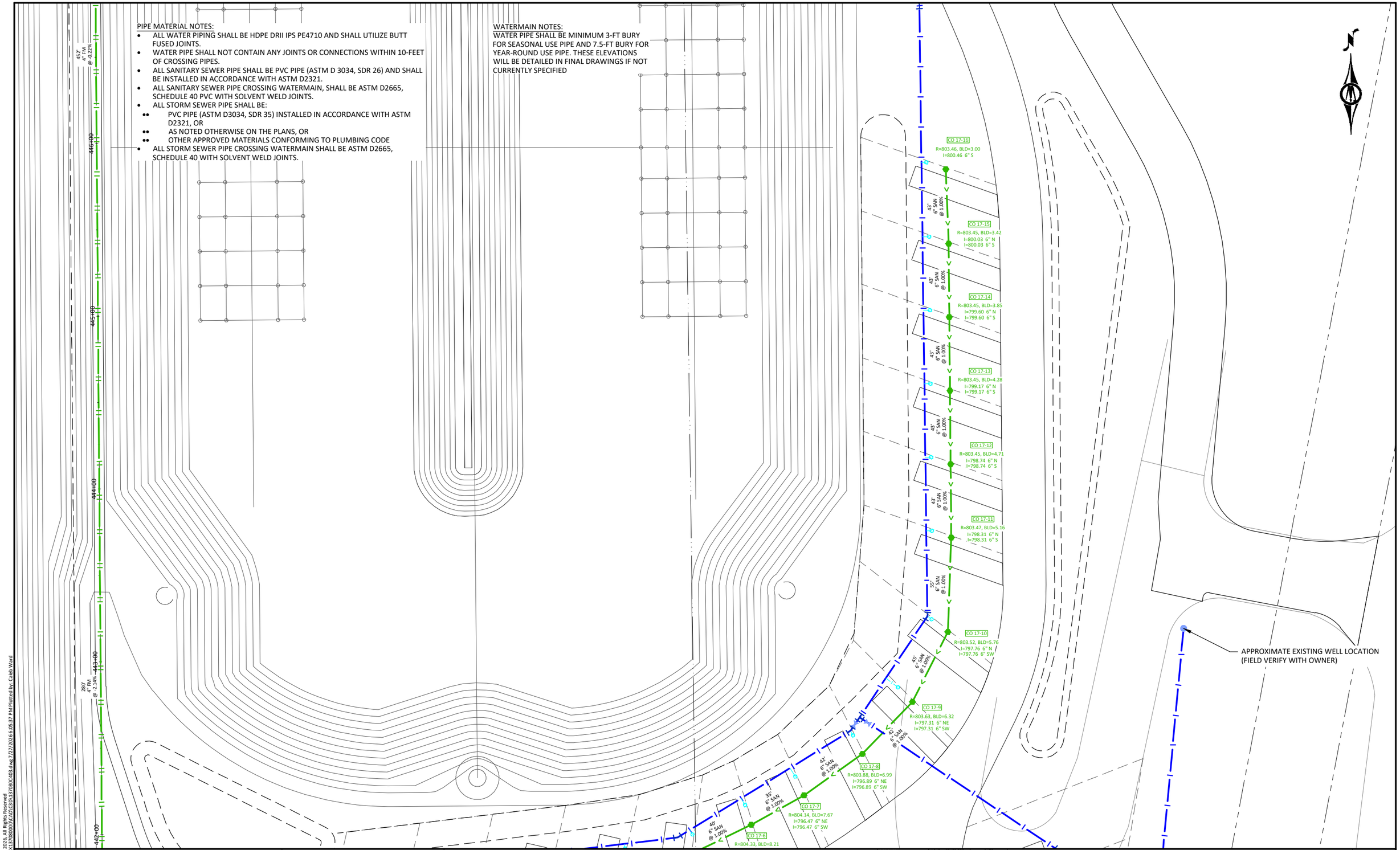

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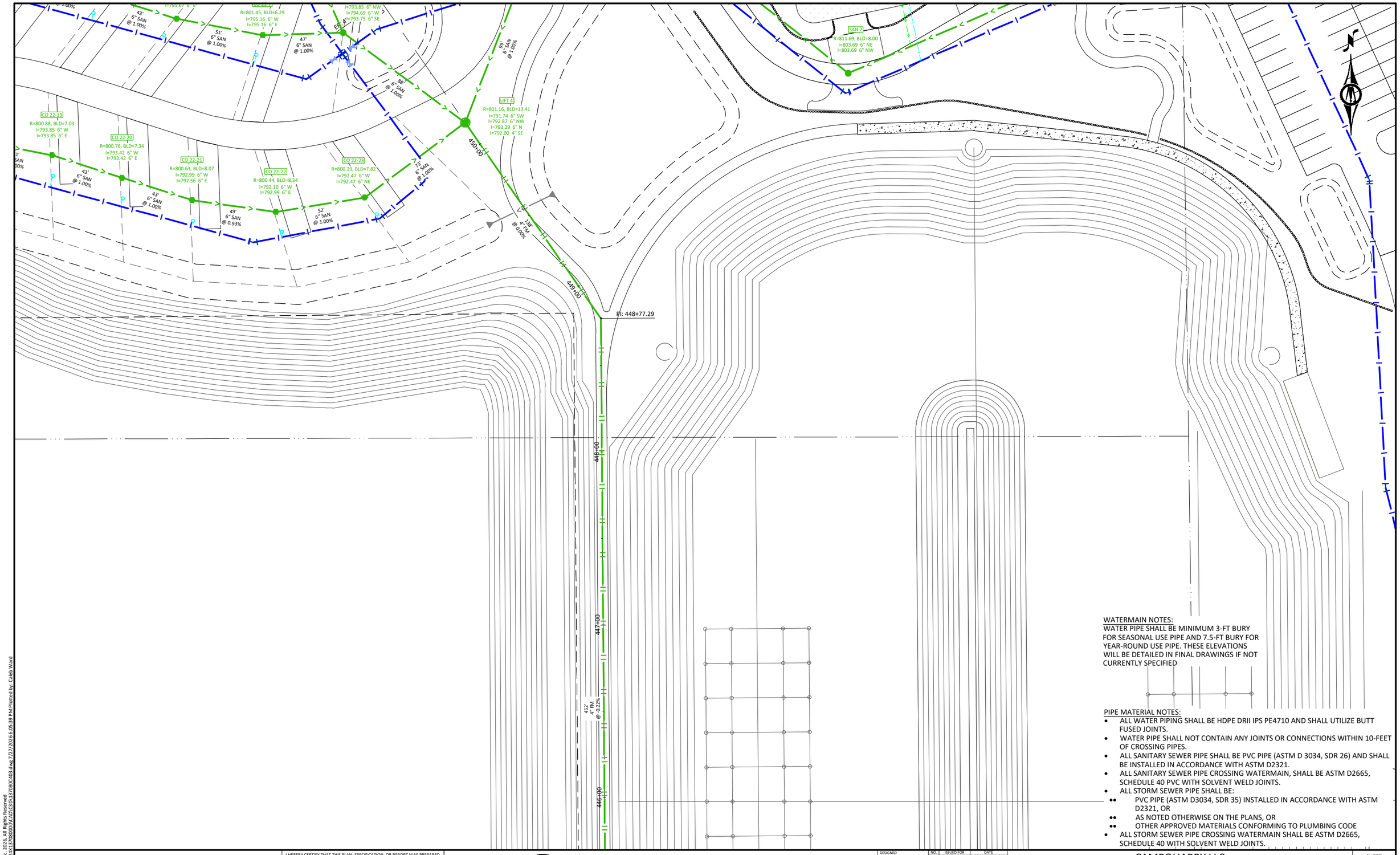

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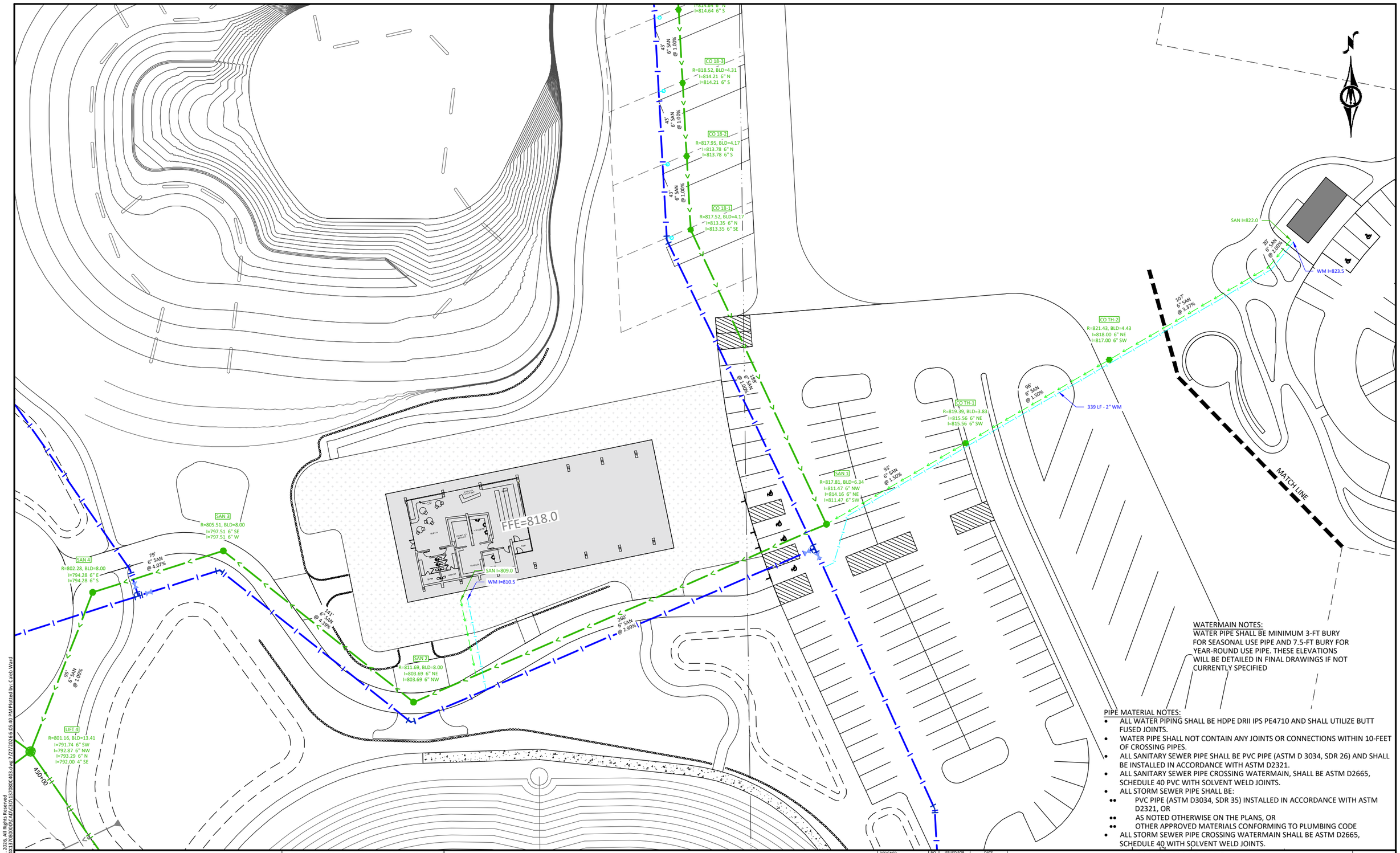

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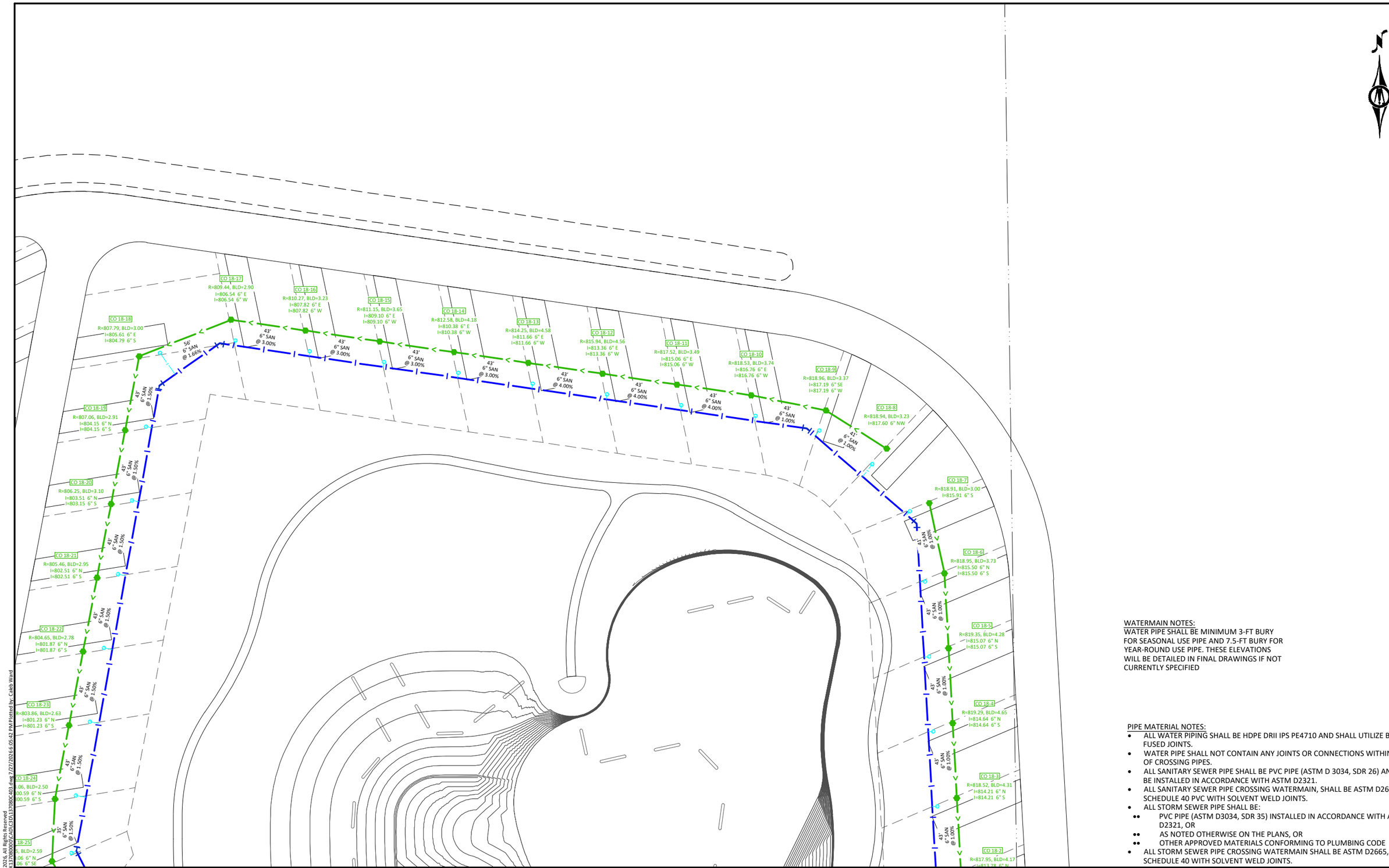

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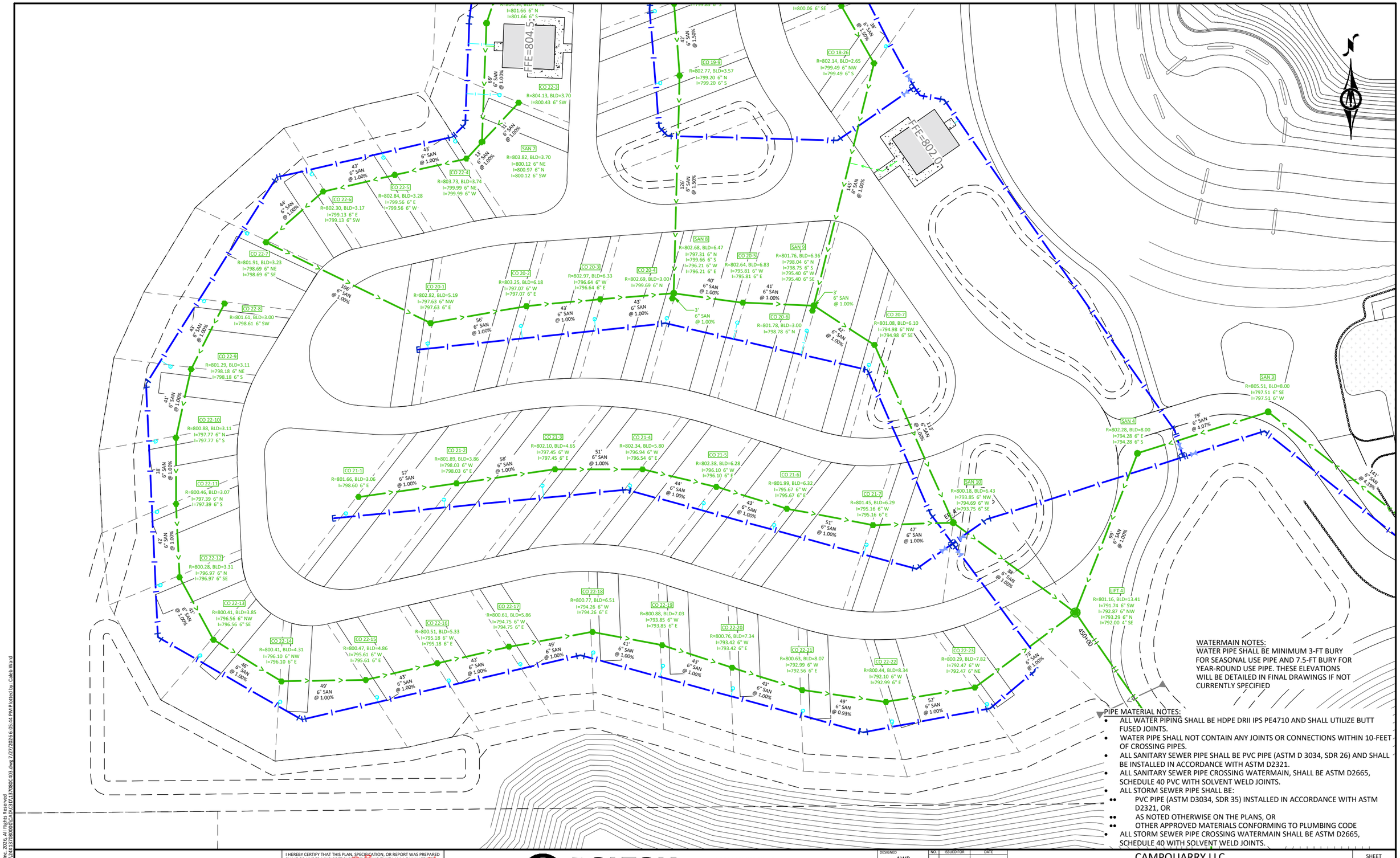

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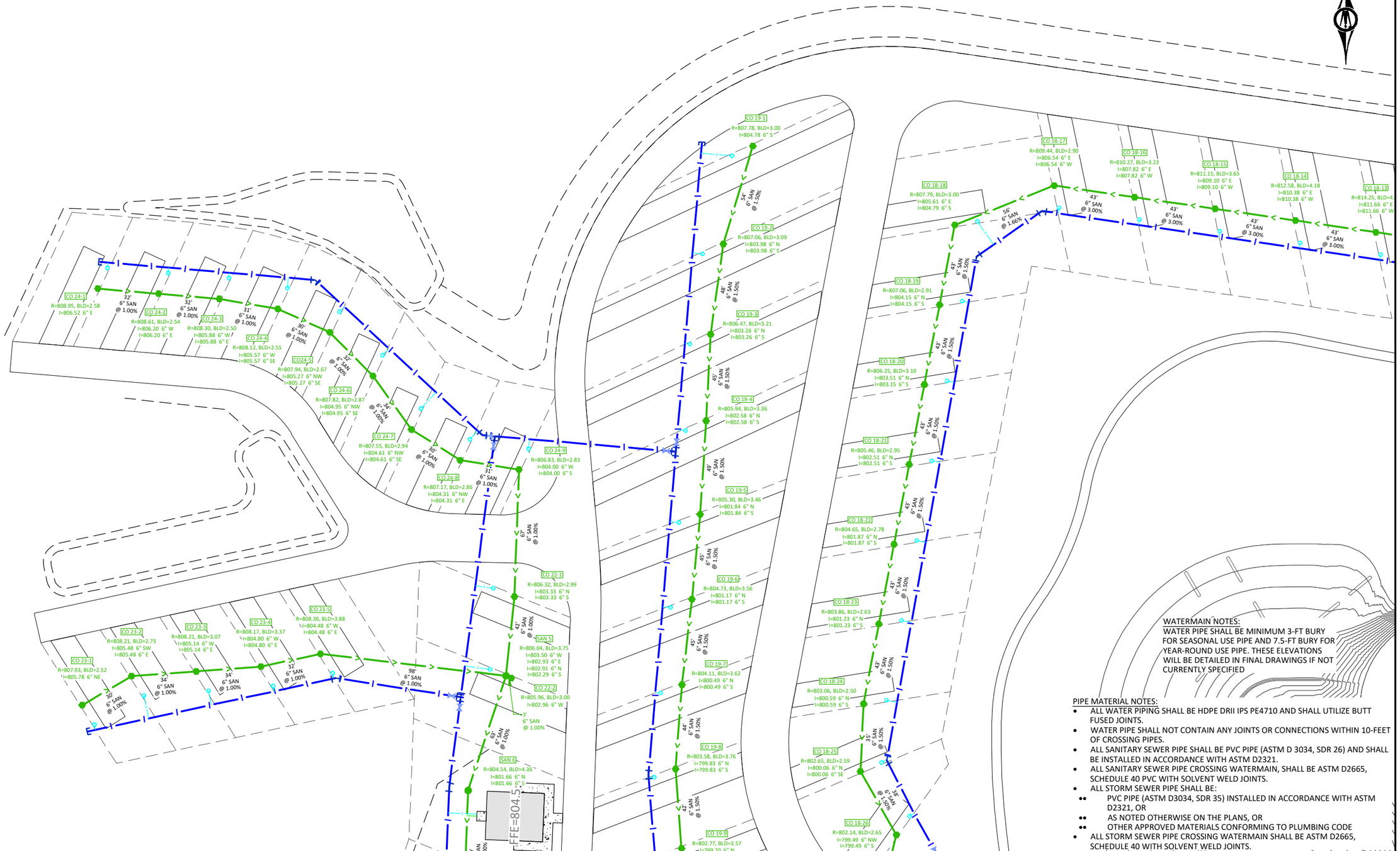

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SHEET C4.25

SITE #	AREA (SF)	SITE #	AREA (SF)	SITE #	AREA (SF)	SITE #	AREA (SF)	SITE #	AREA (SF)
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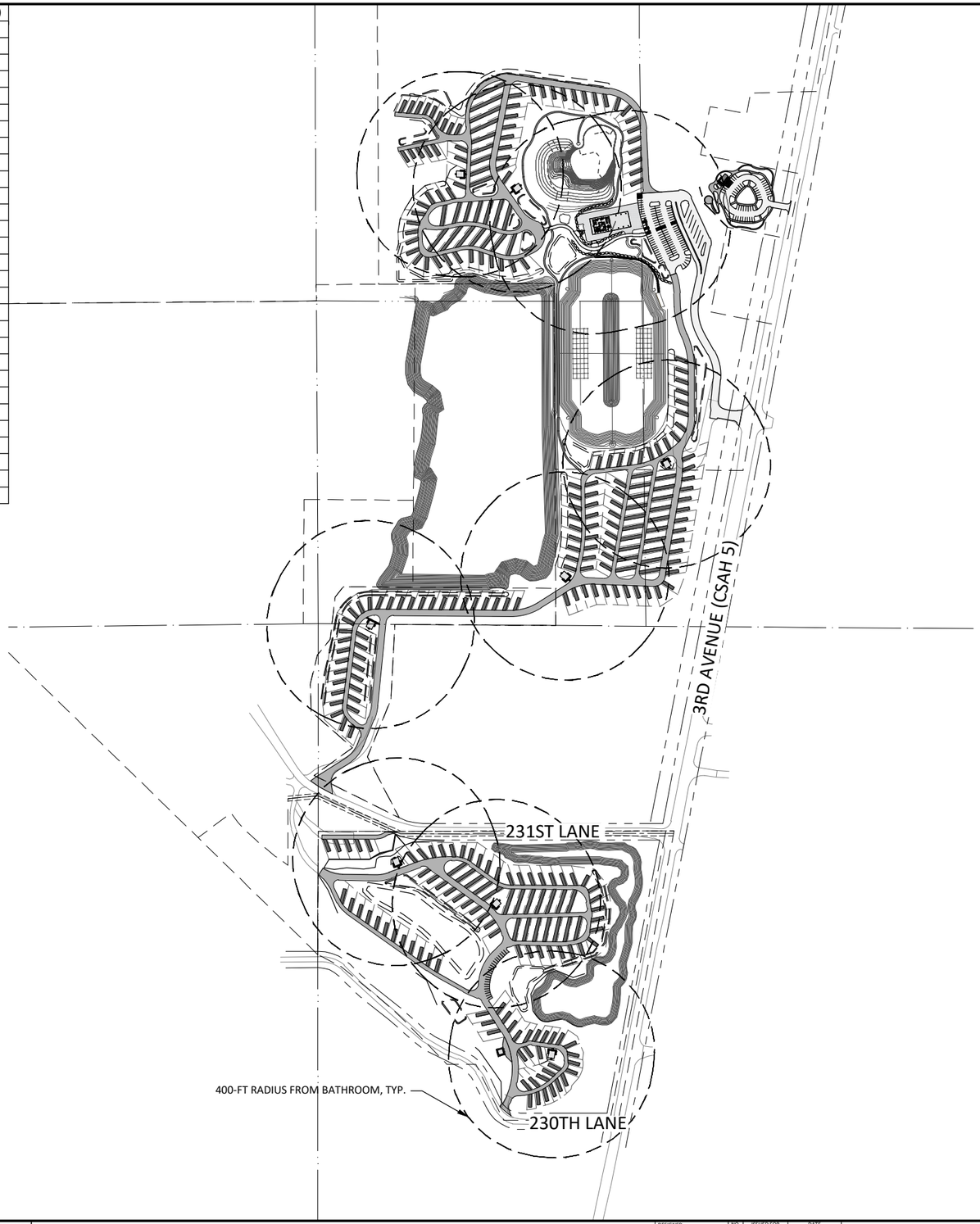
1-18	3403	7-7	3907	12-17	3405	18-3	3402	23-3	2235
1-19	3407	8-1	3725	12-18	3405	18-4	3402	23-4	2235
2-1	2684	8-2	3404	12-19	3405	18-5	3402	23-5	2235
2-2	3024	8-3	3405	12-20	3405	18-6	3402	24-1	2235
2-3	2954	8-4	3405	12-21	3405	18-7	3229	24-2	2235
2-4	2761	8-5	3531	12-22	3405	18-8	2929	24-3	2212
2-5	2130	8-6	4331	12-23	3433	18-9	3084	24-4	2122
2-6	2494	8-7	4268	13-1	3119	18-10	3313	24-5	2134
2-7	3028	8-8	4206	13-2	3241	18-11	3406	24-6	2326
2-8	2365	8-9	4143	13-3	3282	18-12	3406	24-7	2401
3-1	3397	8-10	4081	13-4	3343	18-13	3406	24-8	2318
3-2	3405	8-11	4018	13-5	3387	18-14	3405	24-9	2219
3-3	3405	8-12	6175	13-6	3405	18-15	3405		
4-1	3303	9-1	3405	13-7	3405	18-16	3405		
4-2	3421	9-2	3400	13-8	3405	18-17	3405		
4-3	3419	9-3	3400	13-9	3405	18-18	3415		
4-4	3417	9-4	3403	14-1	2623	18-19	3835		
4-5	3414	9-5	2932	14-2	2581	18-20	3405		
4-6	3412	10-1	2624	14-3	2579	18-21	3405		
4-7	3410	10-2	2646	14-4	2871	18-22	3405		
4-8	3408	10-3	3903	14-5	2888	18-23	3405		
4-9	3406	10-4	3613	14-6	3049	18-24	3405		
4-10	3423	10-5	3405	14-7	3240	18-25	2767		
4-11	3556	10-6	3405	14-8	3430	18-26	2917		
4-12	3759	10-7	3405	14-9	3574	19-1	5350		
5-1	4964	10-8	3405	14-10	2605	19-2	5699		
5-2	3266	10-9	3405	14-11	2654	19-3	5271		
5-3	3330	10-10	3242	14-12	2683	19-4	5012		
5-4	3411	10-11	2727	14-13	2833	19-5	3996		
5-5	3408	10-12	3665	14-14	2993	19-6	3660		
5-6	3400	10-13	3345	14-15	3154	19-7	3373		
5-7	3403	10-14	3335	14-16	3314	19-8	3434		
5-8	3403	10-15	3618	14-17	3474	19-9	4031		
5-9	3400	10-16	3678	14-18	3635	20-1	4855		
5-10	3403	10-17	3405	15-1	3220	20-2	4505		
6-1	3379	10-18	3405	15-2	3405	20-3	3419		
6-2	3409	10-19	3405	15-3	3405	20-4	3529		
6-3	3414	10-20	3405	15-4	3405	20-5	3903		
6-4	3421	10-21	3405	15-5	3405	20-6	4487		
6-5	3346	10-22	3405	15-6	3405	20-7	4430		
6-6	3169	10-23	3405	15-7	3405	21-1	4870		
6-7	3126	10-24	3405	15-8	3405	21-2	4829		
6-8	6885	10-25	3405	15-9	3405	21-3	4078		
6-9	3252	10-26	3405	15-10	3405	21-4	3528		
6-10	3235	10-27	3405	16-1	3378	21-5	3407		
6-11	3648	10-28	3405	16-2	3405	21-6	4378		
6-12	3409	10-29	3389	16-3	3405	21-7	4305		
6-13	4286	11-1	3400	16-4	3405	22-1	3392		
6-14	4577	11-2	3405	16-5	3405	22-2	3405		
6-15	3405	11-3	3405	16-6	3405	22-3	4050		
6-16	3405	11-4	3405	16-7	3405	22-4	3418		
6-17	3405	11-5	3405	16-8	3405	22-5	3349		
6-18	3405	11-6	3405	16-9	3405	22-6	3573		
6-19	3405	11-7	3405	16-10	3405	22-7	3495		
6-20	3471	11-8	3346	17-1	2980	22-8	3403		



SITE NOTE:
CAMP SITES ARE GENERALLY DISPLAYED ON THIS PLAN. THE OWNER WILL FIELD FIT LAYOUTS SIMILAR TO EXAMPLES PROVIDED IN THE DETAILS (C1 SECTION) TO BEST SUIT THE SITE.

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HORZ. 0 250 500
SCALE FEET

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NOT FOR CONSTRUCTION

ALEC W. PIETZ, P.E.
LIC. NO. 59617 DATE XX/XX/XXXX

BOLTON & MENK
1960 PREMIER DRIVE
MANKATO, MN 56001
Phone: (507) 625-4171
Email: Mankato@bolton-menk.com
www.bolton-menk.com

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AWP			
DRAWN			
AWP			
CHECKED			
AWP			
CLIENT PROJ. NO.			
24X.137080			

CAMPQUARRY LLC
ROCKWELL RV & ADVENTURE PARK
SITE PLAN OVERVIEW

SHEET
C5.01

SITE NOTE:
CAMP SITES ARE GENERALLY DISPLAYED ON THIS PLAN. THE OWNER WILL FIELD FIT LAYOUTS SIMILAR TO EXAMPLES PROVIDED IN THE DETAILS (C1 SECTION) TO BEST SUIT THE SITE.

BATHROOM
STORMWATER BASIN, TYP.
WASTEWATER HOLDING TANK
BATHROOM
230TH LANE
231ST LANE
BATHROOM
400-FT BATHROOM RADIUS, TYP.
BATHROOM
BATHROOM
3RD AVENUE (CSAH 5)

HORZ. 0 100 200
SCALE FEET

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ROCKWELL RV & ADVENTURE PARK
SITE PLAN OVERVIEW

SHEET
C5.02

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SITE NOTE:
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BATHROOM

BATHROOM

400-FT RADIUS FROM BATHROOM, TYP.

BATHROOM

BATHROOM

ENTRANCE LODGE

STORMWATER BASIN, TYP.

PARKING LOT & STAGING AREA

BATHROOM

FFE=831.0

3RD AVENUE (CSAH 5)

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HORZ. SCALE 0 100 200 FEET

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CAMPQUARRY LLC
ROCKWELL RV & ADVENTURE PARK
SITE PLAN OVERVIEW

SHEET C5.03

SITE 3-3
SITE 3-2
SITE 3-1
SITE 1-18
SITE 1-17
SPEED LIMIT 5
SITE 1-16
SITE 1-15
SITE 1-14
SITE 1-13
SITE 1-12
SITE 1-11
SITE 1-10
SITE 1-9
SITE 1-8
SITE 1-7
SITE 1-6
SITE 1-5
SITE 1-4
SITE 1-3
SITE 1-2
SITE 1-1
SITE 2-8
SITE 2-7
SITE 2-6
SITE 2-5
SITE 2-4
SITE 2-3
SITE 2-2
SITE 2-1
102.5'
16.19'
25'
FFE=811.0
BATHROOM
WASTEWATER STORAGE TANK
(DESIGN BY VENDOR)
230TH LANE
3RD AVENUE (CSAH 5)

NOTE:
ARROWS SHOWN ARE TRAFFIC DIRECTION REFERENCE ONLY, NOT STRIPING

FENCING NOTE:
REFER TO LANDSCAPE ARCHITECTURE PLANS FOR FENCING LOCATIONS AND DETAILS

SITE NOTE:
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LEGEND

- BITUMINOUS ROADWAY
- 6" AGGREGATE SURFACING
- 8" AGGREGATE SURFACING
- 6" CONCRETE PAVEMENT/SIDEWALK
- 4" CONCRETE WALK

HORZ. SCALE 0 25 50 FEET

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CAMPQUARRY LLC
ROCKWELL RV & ADVENTURE PARK
SITE PLAN
SOUTH CAMPGROUND

SHEET C6.01

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SITE 5-4
SITE 5-3
SITE 5-2
SITE 5-1
SITE 7-1
SITE 7-2
SITE 7-3
SITE 6-4
SITE 7-5
SITE 7-6
SITE 7-7
SITE 6-10
SITE 6-9
SITE 6-8
SITE 6-1
SITE 6-2
SITE 6-3
SITE 6-4
SITE 6-5
SITE 6-6
SITE 6-7
SITE 1-19
SITE 1-18
SITE 1-17
SITE 3-3
SITE 3-2

SPEED LIMIT 5

16'
92.55'
25'
52' VARIES
20'

APPROXIMATE PROPOSED WELL LOCATION (DESIGN BY OTHERS)

PARKING AREA ~23 STALLS

N

NOTE:
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LEGEND

- BITUMINOUS ROADWAY
- 6" AGGREGATE SURFACING
- 8" AGGREGATE SURFACING
- 6" CONCRETE PAVEMENT/SIDEWALK
- 4" CONCRETE WALK

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HORZ. SCALE 0 25 50 FEET

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CAMPQUARRY LLC
ROCKWELL RV & ADVENTURE PARK
SITE PLAN
SOUTH CAMPGROUND

SHEET C6.02

231ST LANE

N

SITE 6-26
SITE 6-25
SITE 6-24
SITE 6-23
SITE 6-22
SITE 6-21
SITE 6-20
SITE 6-19
SITE 6-18
SITE 6-17
SITE 6-16
SITE 6-15
SITE 6-14
SITE 6-13
SITE 6-12
SITE 6-11
SITE 6-10
SITE 6-9
SITE 6-8
SITE 8-2
SITE 8-3
SITE 8-4
SITE 8-5
SITE 8-6
SITE 8-7
SITE 8-8
SITE 8-9
SITE 8-10
SITE 8-11
SITE 8-12
SITE 5-5
SITE 5-4
SITE 5-3
SITE 5-2
SITE 5-1
SITE 7-1
SITE 7-2
SITE 7-3
SITE 6-4
SITE 7-5
SITE 7-6
SITE 7-7

80'
16'
102.22'
16'
92.35'
16'
25'

BATHROOM
FFE=801.5

SPEED LIMIT 5
SPEED LIMIT 5

NOTE:
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FENCING NOTE:
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SITE NOTE:
CAMP SITES ARE GENERALLY DISPLAYED ON THIS PLAN. THE OWNER WILL FIELD FIT LAYOUTS SIMILAR TO EXAMPLES PROVIDED IN THE DETAILS (C1 SECTION) TO BEST SUIT THE SITE.

LEGEND

- BITUMINOUS ROADWAY
- 6" AGGREGATE SURFACING
- 8" AGGREGATE SURFACING
- 6" CONCRETE PAVEMENT/SIDEWALK
- 4" CONCRETE WALK

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HORZ. 0 25 50
SCALE FEET

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CAMPQUARRY LLC
ROCKWELL RV & ADVENTURE PARK
SITE PLAN
SOUTH CAMPGROUND

SHEET
C6.03



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LEGEND

- BITUMINOUS ROADWAY
- 6" AGGREGATE SURFACING
- 8" AGGREGATE SURFACING
- 6" CONCRETE PAVEMENT/SIDEWALK
- 4" CONCRETE WALK

HORZ. 0 25 50
SCALE FEET

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SITE PLAN
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SHEET C6.04

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231ST LANE

N

16'

25'

SITE 9-1
SITE 9-2
SITE 9-3
SITE 9-4
SITE 9-5
52' VARIES

BATHROOM
FFE=811.0

SITE 6-31
SITE 6-30
SITE 6-29
SITE 6-28
SITE 6-27

SPEED LIMIT 5

SITE 5-10
SITE 5-9
SITE 5-8
SITE 5-7

SITE 4-12
SITE 4-11
SITE 4-10
SITE 4-9
SITE 4-8
SITE 4-7
SITE 4-6
SITE 4-5

NOTE:
ARROWS SHOWN ARE TRAFFIC DIRECTION REFERENCE ONLY, NOT STRIPING

FENCING NOTE:
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SITE NOTE:
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LEGEND

- BITUMINOUS ROADWAY
- 6" AGGREGATE SURFACING
- 8" AGGREGATE SURFACING
- 6" CONCRETE PAVEMENT/SIDEWALK
- 4" CONCRETE WALK

HORZ. 0 25 50
SCALE FEET

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SOUTH CAMPGROUND

SHEET
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N

231ST LANE

16'

52' - VARIES

SITE 9-1

SITE 9-2

SITE 9-3

SITE 9-4

SITE 9-5

SITE 6-30

SITE 6-31

SITE

BATHROOM

FFE=811.0

SPEED LIMIT 5

NOTE:
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- 6" AGGREGATE SURFACING
- 8" AGGREGATE SURFACING
- 6" CONCRETE PAVEMENT/SIDEWALK
- 4" CONCRETE WALK

HORZ. 0 25 50
SCALE FEET

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SITE PLAN
SOUTH CAMPGROUND

SHEET
C6.06



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HORZ. 0 25 50
SCALE FEET

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CAMPQUARRY LLC
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SITE PLAN
NORTH CAMPGROUND

SHEET
C6.07



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HORZ. SCALE 0 25 50 FEET

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NOT FOR CONSTRUCTION

ALEC W. PIETZ, P.E.
LIC. NO. 59617 DATE XX/XX/XXXX

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Phone: (507) 625-4171
Email: Mankato@bolton-menk.com
www.bolton-menk.com

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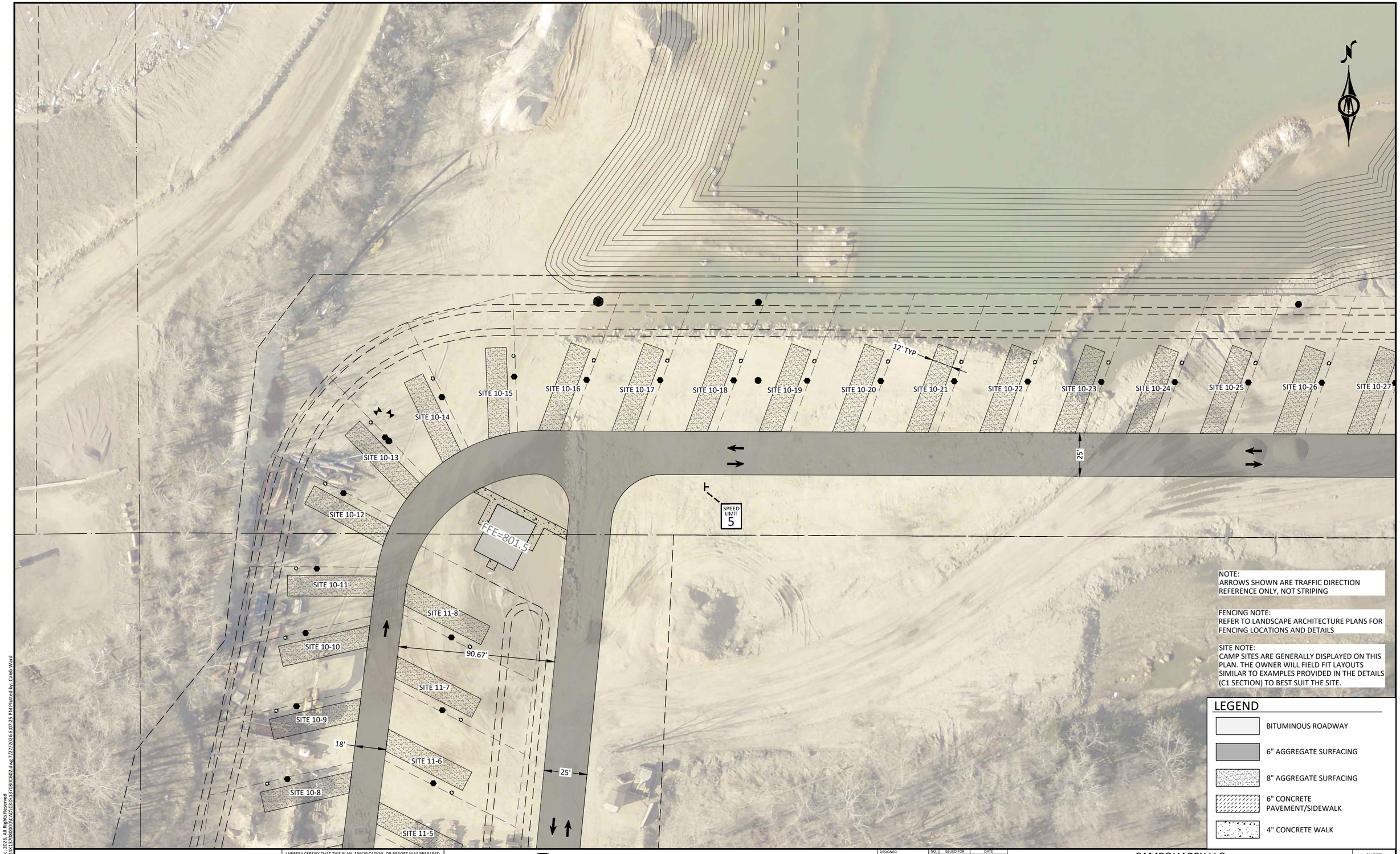
CLIENT PROJ. NO.			
24X.137080			

CAMPQUARRY LLC
ROCKWELL RV & ADVENTURE PARK
SITE PLAN
NORTH CAMPGROUND

SHEET C6.08



NOTE:
ARROWS SHOWN ARE TRAFFIC DIRECTION REFERENCE ONLY, NOT STRIPING

FENCING NOTE:
REFER TO LANDSCAPE ARCHITECTURE PLANS FOR FENCING LOCATIONS AND DETAILS

SITE NOTE:
CAMP SITES ARE GENERALLY DISPLAYED ON THIS PLAN. THE OWNER WILL FIELD FIT LAYOUTS SIMILAR TO EXAMPLES PROVIDED IN THE DETAILS (C1 SECTION) TO BEST SUIT THE SITE.

LEGEND

- BITUMINOUS ROADWAY
- 6" AGGREGATE SURFACING
- 8" AGGREGATE SURFACING
- 6" CONCRETE PAVEMENT/SIDEWALK
- 4" CONCRETE WALK

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HORZ. SCALE 0 25 50 FEET

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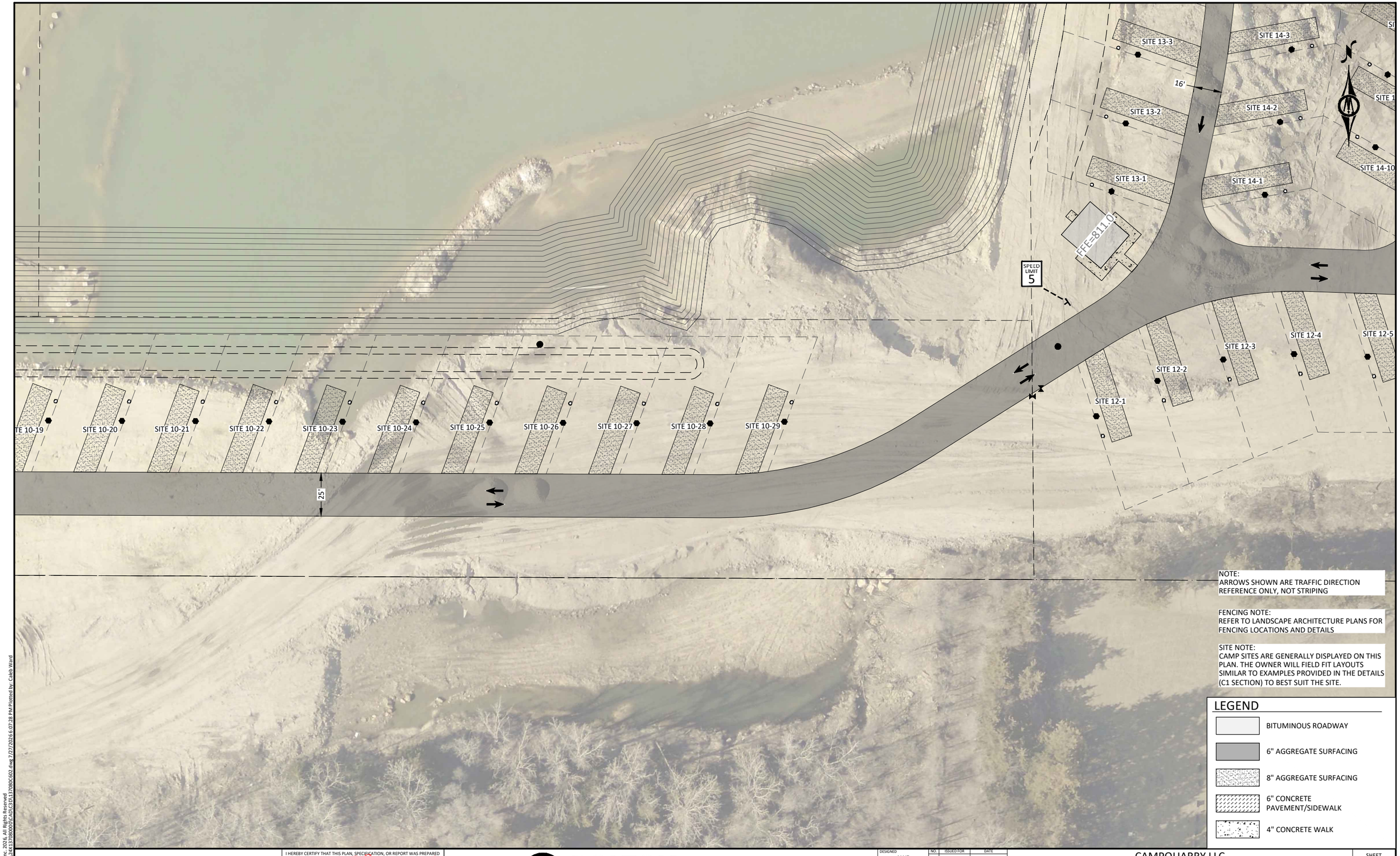
ROCKWELL RV & ADVENTURE PARK
SITE PLAN
NORTH CAMPGROUND

SHEET C6.09



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- 4" CONCRETE WALK

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HORZ. SCALE 0 25 50 FEET

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ROCKWELL RV & ADVENTURE PARK
SITE PLAN
NORTH CAMPGROUND

SHEET C6.10



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HORZ. 0 25 50
SCALE FEET

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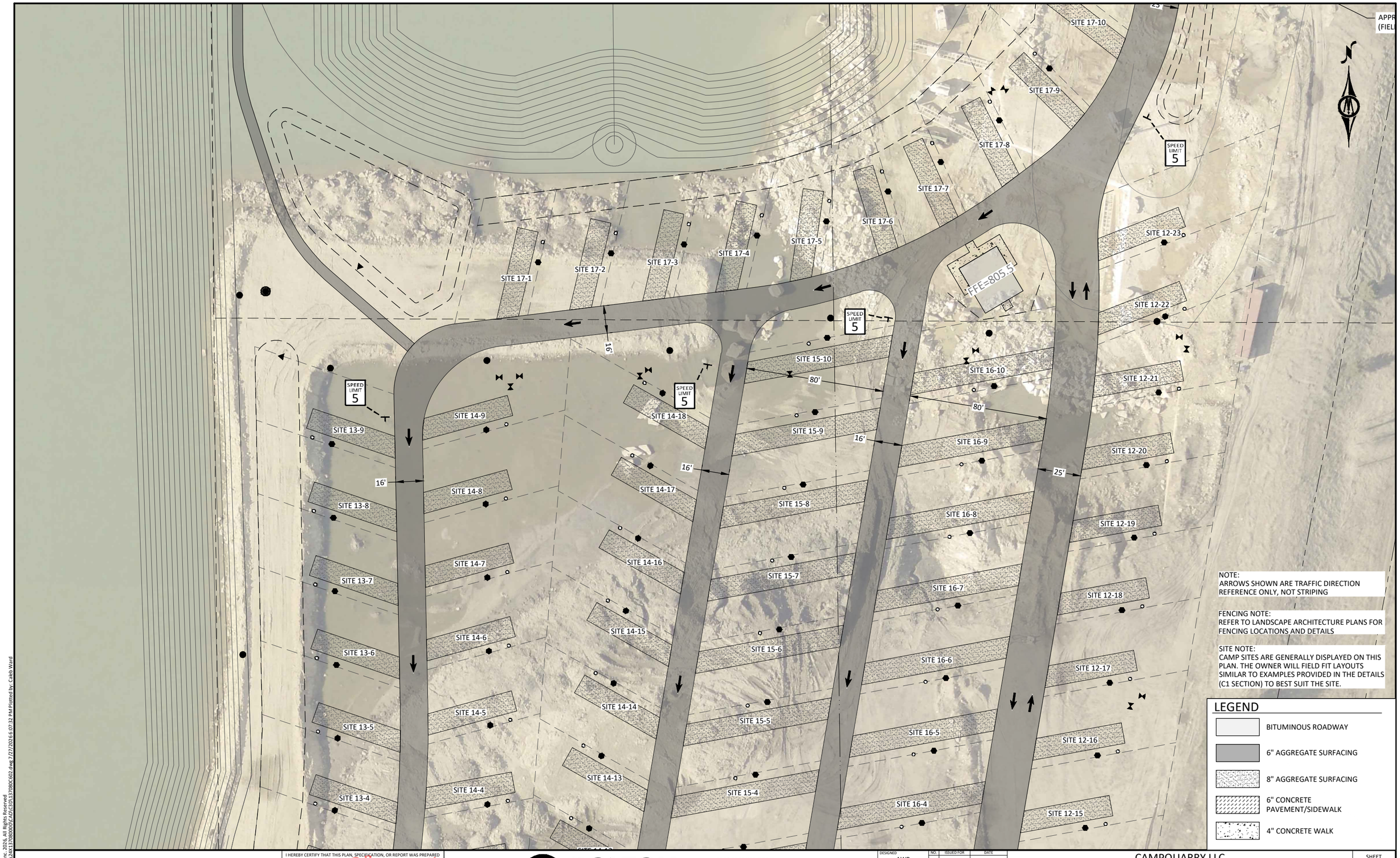
CAMPQUARRY LLC
ROCKWELL RV & ADVENTURE PARK
SITE PLAN
NORTH CAMPGROUND

SHEET
C6.11



NOTE:
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LEGEND

- BITUMINOUS ROADWAY
- 6" AGGREGATE SURFACING
- 8" AGGREGATE SURFACING
- 6" CONCRETE PAVEMENT/SIDEWALK
- 4" CONCRETE WALK

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HORZ. SCALE 0 25 50 FEET

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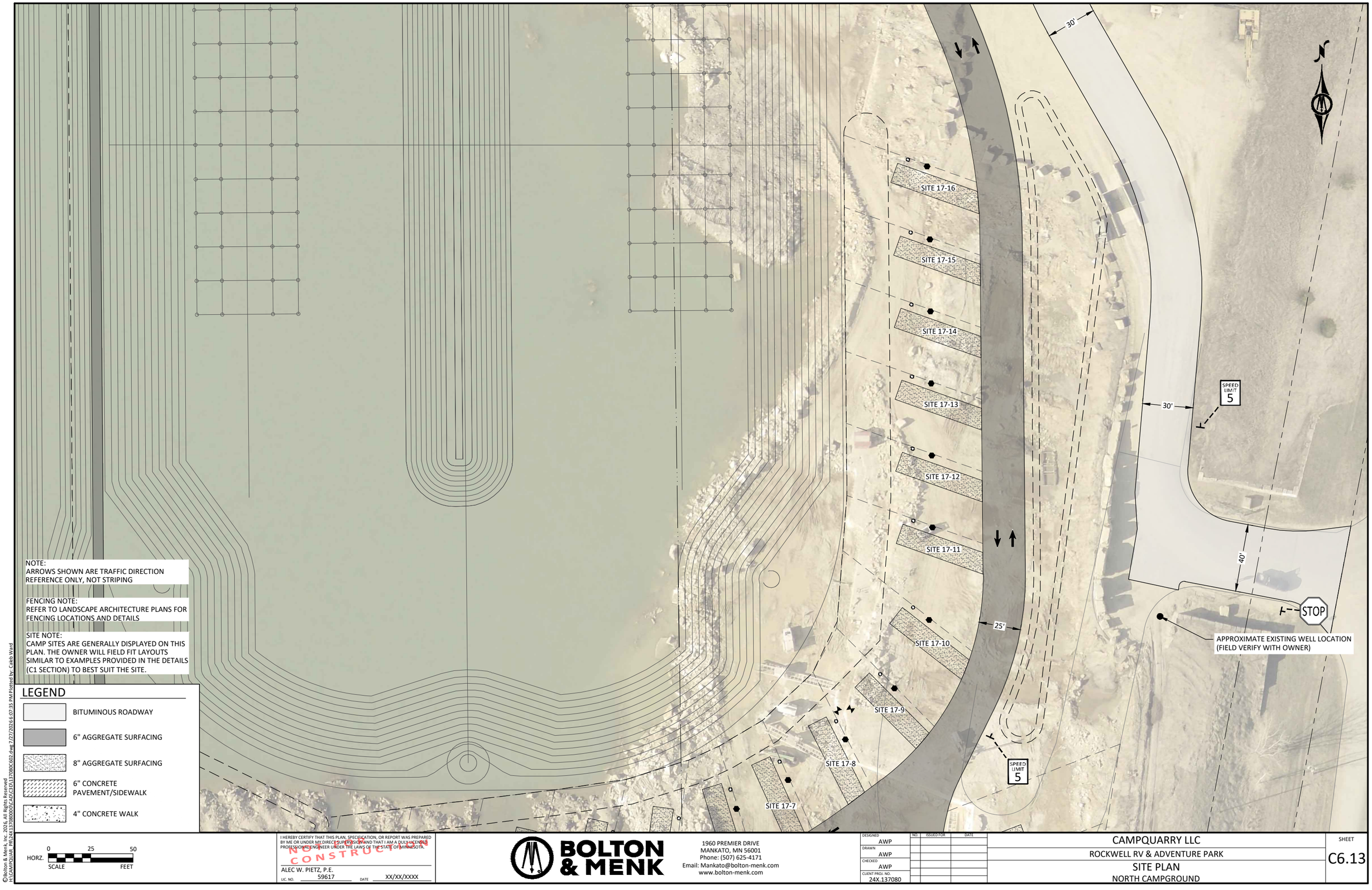
CAMPQUARRY LLC
ROCKWELL RV & ADVENTURE PARK
SITE PLAN
NORTH CAMPGROUND

SHEET C6.12



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- 6" AGGREGATE SURFACING
- 8" AGGREGATE SURFACING
- 6" CONCRETE PAVEMENT/SIDEWALK
- 4" CONCRETE WALK

HORZ. SCALE: 0 25 50 FEET

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ROCKWELL RV & ADVENTURE PARK
SITE PLAN
NORTH CAMPGROUND

SHEET C6.13

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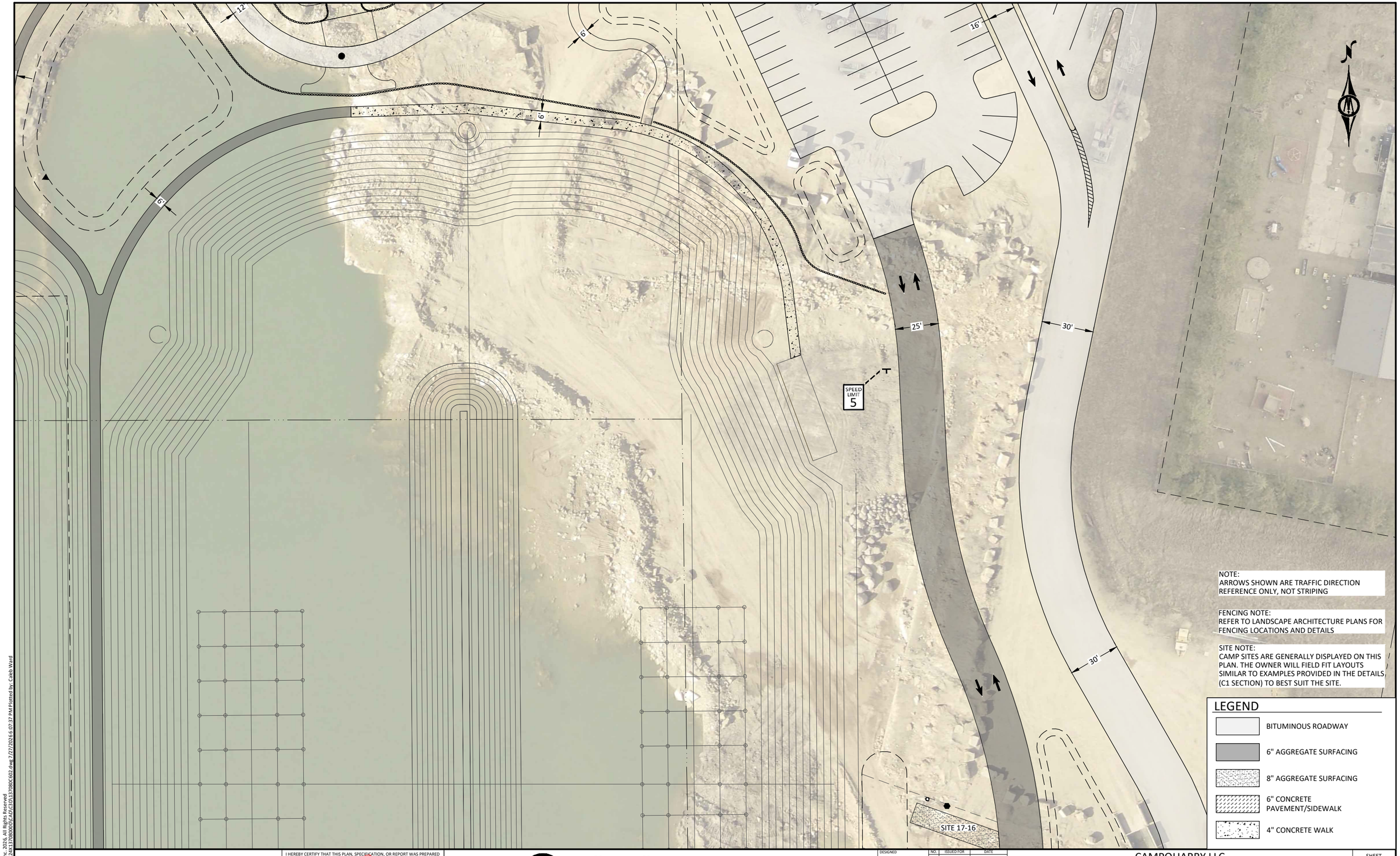

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HORZ. SCALE 0 25 50 FEET

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CAMPQUARRY LLC
ROCKWELL RV & ADVENTURE PARK
SITE PLAN
NORTH CAMPGROUND

SHEET C6.14

SITE 18-4

SITE 18-3

SITE 18-2

SITE 18-1

25'

5'

SPEED LIMIT 5

NATURAL FEATURES AND/OR LANDSCAPING BY LANDSCAPE ARCHITECTURE

PARKING LOT ~96 STALLS

9'X20' STALL ,TYP.

FFE=818.0

12'

6'

20'

16'

STAGING AREA ~7 STALLS

REFER TO SHEET C7.02 FOR TRAILHEAD SITE PLAN

MATCH LINE

55'

3'

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HORZ. SCALE 0 25 50 FEET

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ROCKWELL RV & ADVENTURE PARK
SITE PLAN
NORTH CAMPGROUND

SHEET C6.15

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HORZ. SCALE 0 25 50 FEET

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CAMPQUARRY LLC
ROCKWELL RV & ADVENTURE PARK
SITE PLAN
NORTH CAMPGROUND

SHEET C6.16



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HORZ. 0 25 50
SCALE FEET

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CAMPQUARRY LLC
ROCKWELL RV & ADVENTURE PARK
SITE PLAN
NORTH CAMPGROUND

SHEET
C6.17

SPEED LIMIT 5

SPEED LIMIT 5

SPEED LIMIT 5

SPEED LIMIT 5

SPEED LIMIT 5

SITE 24-1
SITE 24-2
SITE 24-3
SITE 24-4
SITE 24-5
SITE 24-6
SITE 24-7
SITE 24-8
SITE 24-9

SITE 23-1
SITE 23-2
SITE 23-3
SITE 23-4
SITE 23-5

SITE 22-1
SITE 22-2
SITE 22-3

SITE 19-1
SITE 19-2
SITE 19-3
SITE 19-4
SITE 19-5
SITE 19-6
SITE 19-7
SITE 19-8
SITE 19-9

SITE 18-17
SITE 18-16
SITE 18-15
SITE 18-14
SITE 18-18
SITE 18-19
SITE 18-20
SITE 18-21
SITE 18-22
SITE 18-23
SITE 18-24
SITE 18-25
SITE 18-26

16'
16'
25'
25'
25'
5'
5'

FFE=804.5

FFE=802.0

NOTE:
ARROWS SHOWN ARE TRAFFIC DIRECTION REFERENCE ONLY, NOT STRIPING

FENCING NOTE:
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SITE NOTE:
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LEGEND

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- 6" AGGREGATE SURFACING
- 8" AGGREGATE SURFACING
- 6" CONCRETE PAVEMENT/SIDEWALK
- 4" CONCRETE WALK

HORZ. SCALE 0 25 50 FEET

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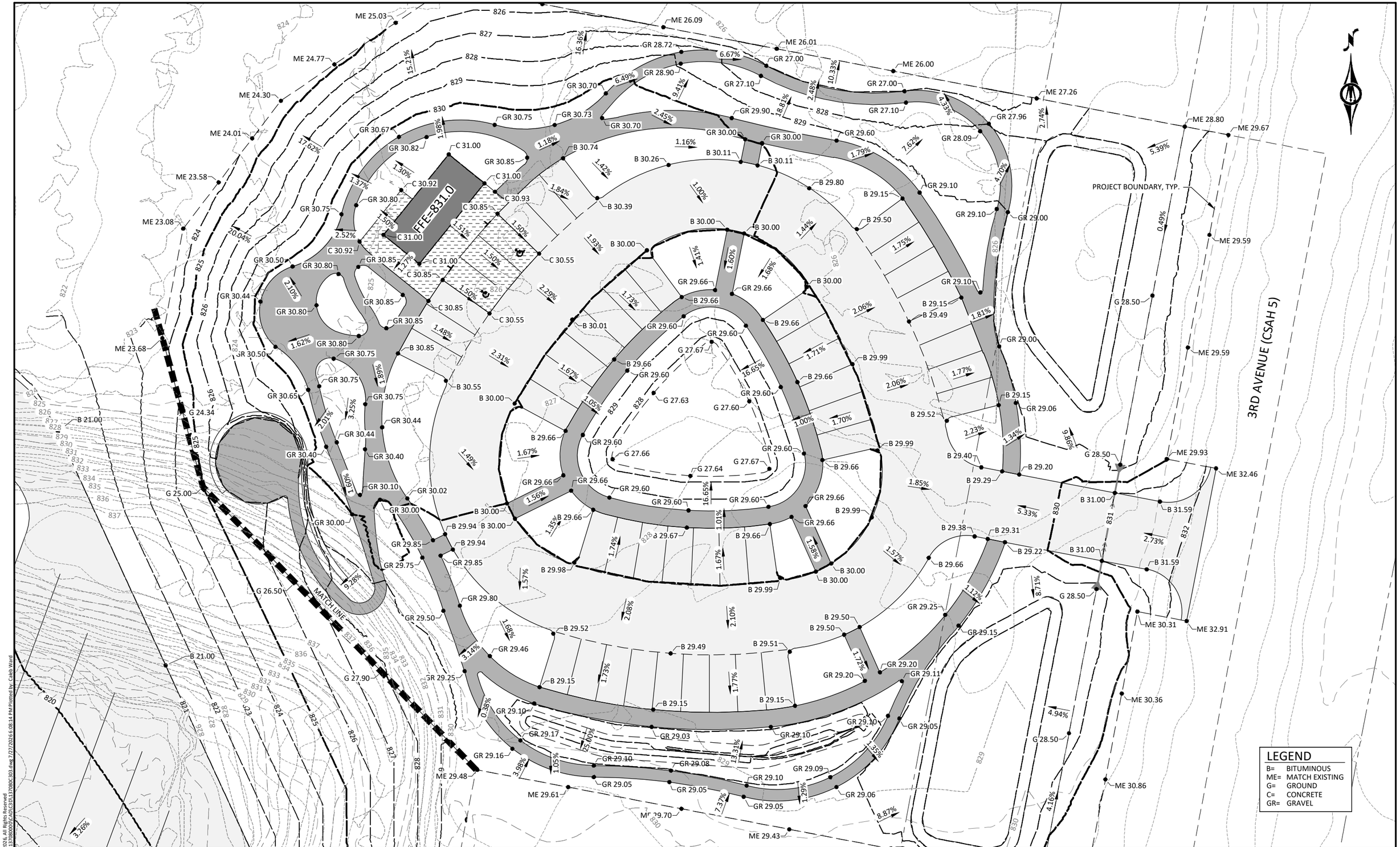
CAMPQUARRY LLC
ROCKWELL RV & ADVENTURE PARK
SITE PLAN
NORTH CAMPGROUND

SHEET
C6.18



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HORZ. SCALE 0 15 30 FEET

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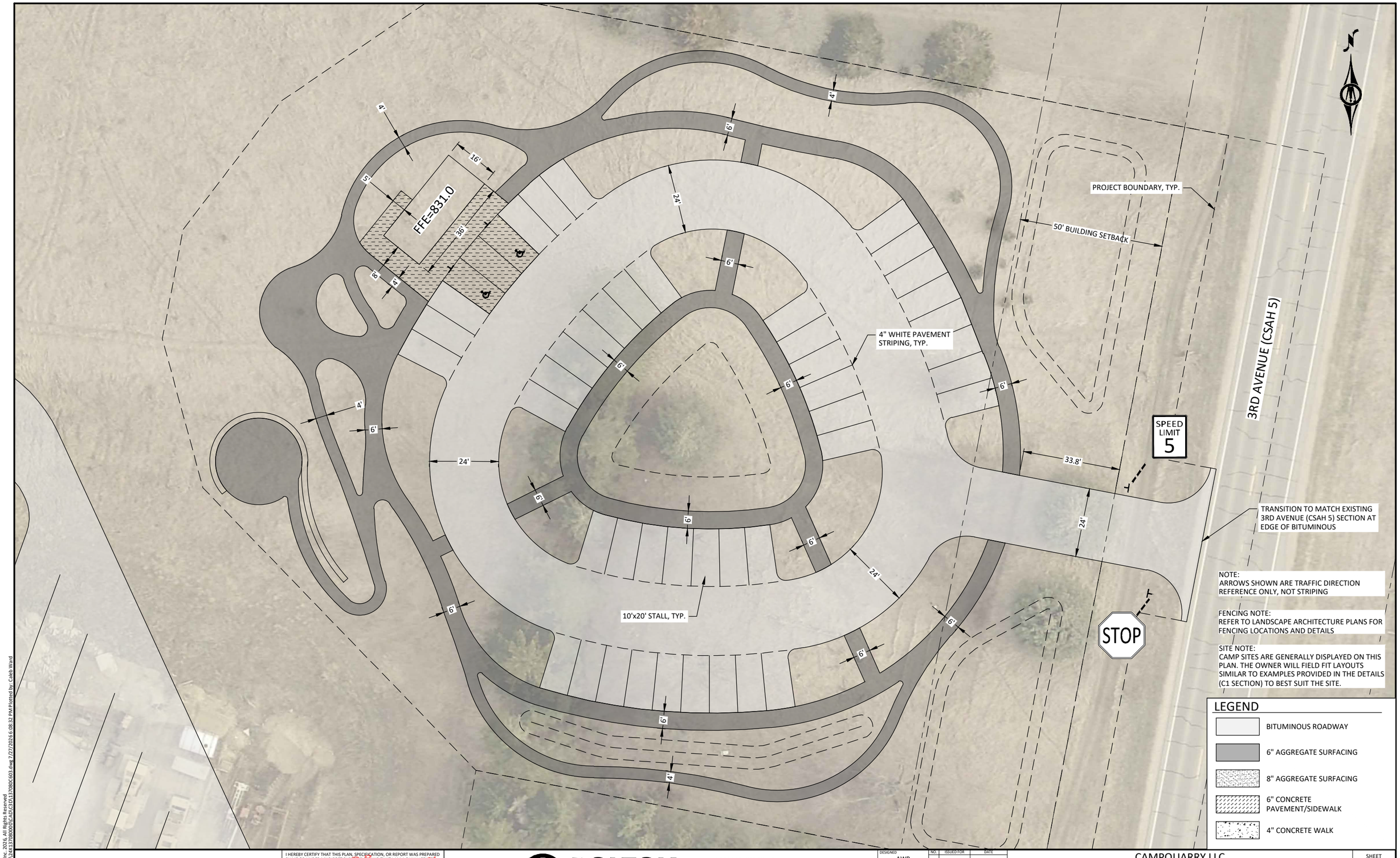
TRAILHEAD
GRADING PLAN

SHEET C7.01



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HORZ. SCALE 0 15 30 FEET

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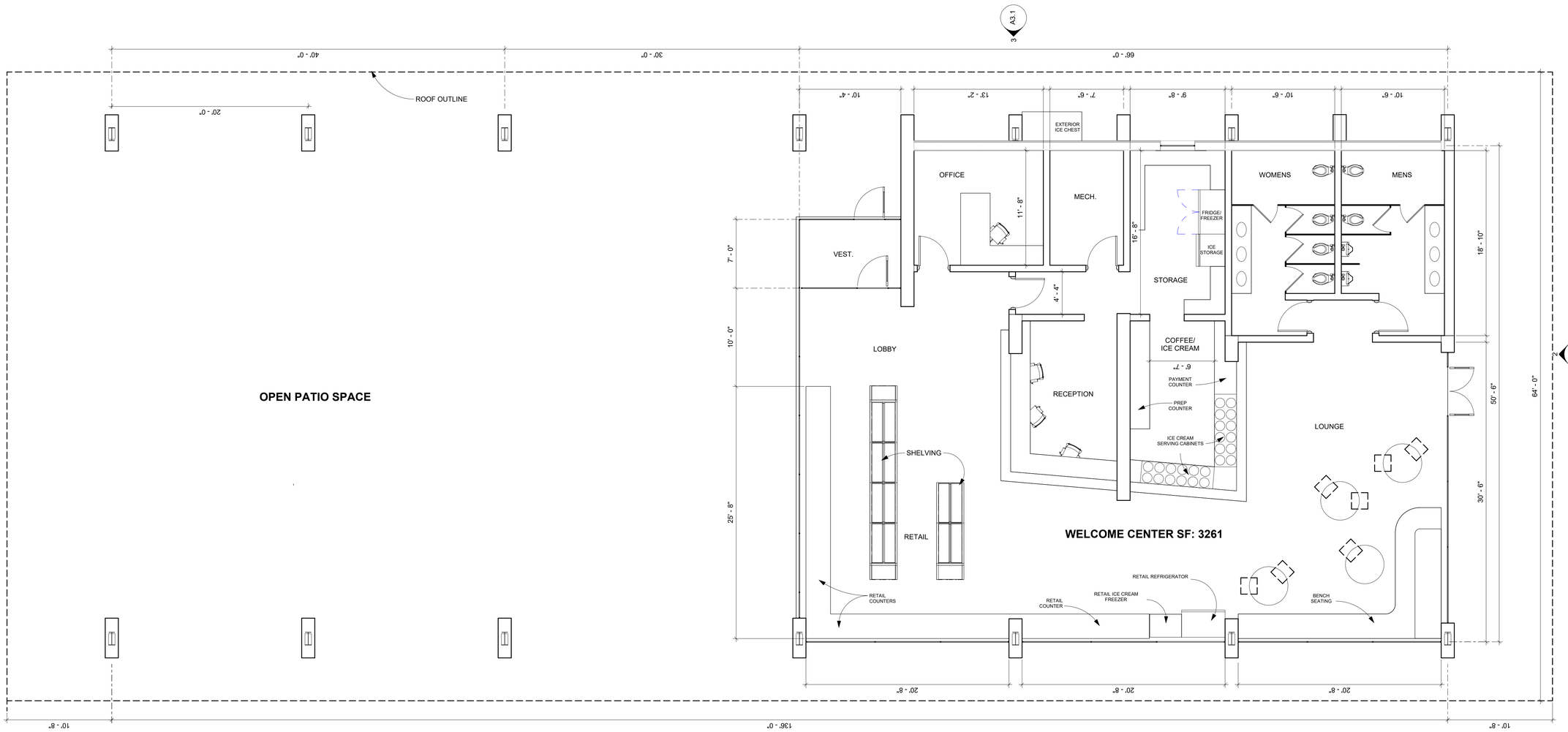
CAMPQUARRY LLC
ROCKWELL RV & ADVENTURE PARK
TRAILHEAD
SITE PLAN

SHEET C7.02

GENERAL NOTES

1. XXX
2. XXX
3. XXX
4. XXX



ARCHITECT OF RECORD

oha
ARCHITECTURE + DESIGN
OHARCHITECTS.COM

330 Stadium Road, Suite 202, Mankato, MN 56001
T: 507.385.1158

CONSULTANT

PRELIMINARY NOT FOR CONSTRUCTION

ROCKWELL ADVENTURE PARK ENTRANCE LODGE

PROJECT LOCATION

REVISIONS XX

PROJECT #	25-052MK
DATE	07/27/2026
DRAWN BY	DHL
CHECKED BY	DGH

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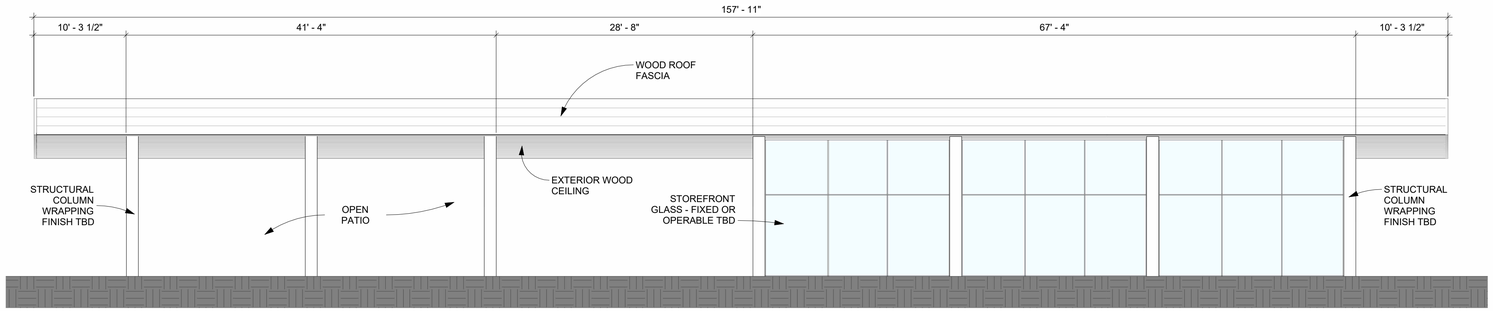
SHEET TITLE

FLOOR PLAN

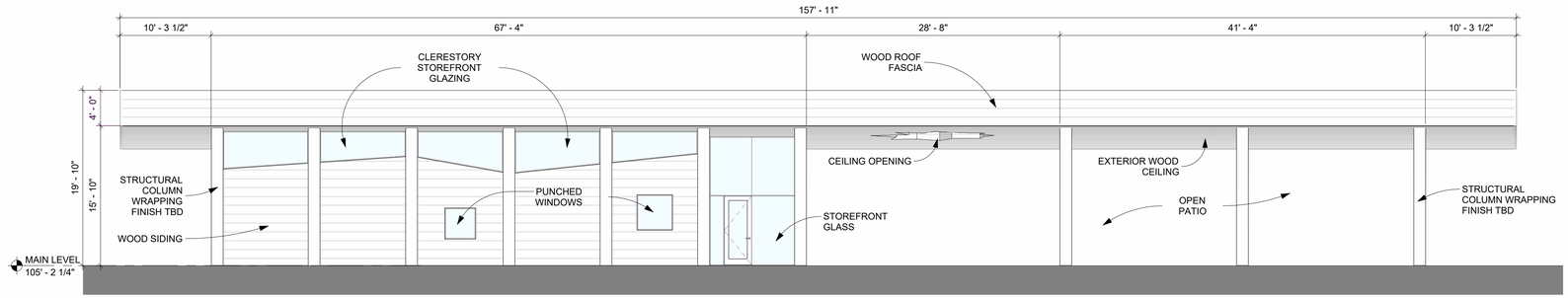
SHEET

A1.1

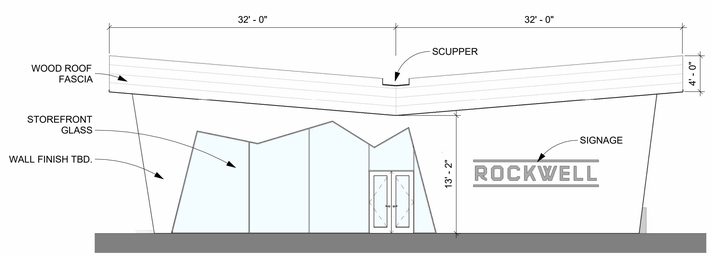
7/27/2026 1:01:18 PM



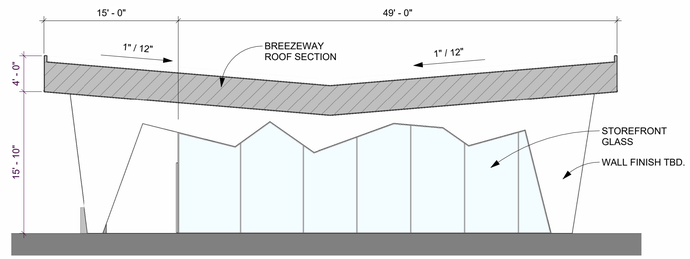
1 A3.1 NW BUILDING ELEVATION
SCALE: 1/8" = 1'-0"



3 A3.1 SE BUIDLING ELEVATION
SCALE: 1/8" = 1'-0"



2 A3.1 SW BUILDING ELEVATION
SCALE: 1/8" = 1'-0"



4 A3.1 NE BUILDING ELEVATION
SCALE: 1/8" = 1'-0"

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T: 507.385.1158

CONSULTANT

PRELIMINARY NOT FOR CONSTRUCTION

ROCKWELL ADVENTURE PARK ENTRANCE LODGE

PROJECT LOCATION

REVISIONS XX

PROJECT #	25-052MK
DATE	07/27/2026
DRAWN BY	DHL
CHECKED BY	DGH

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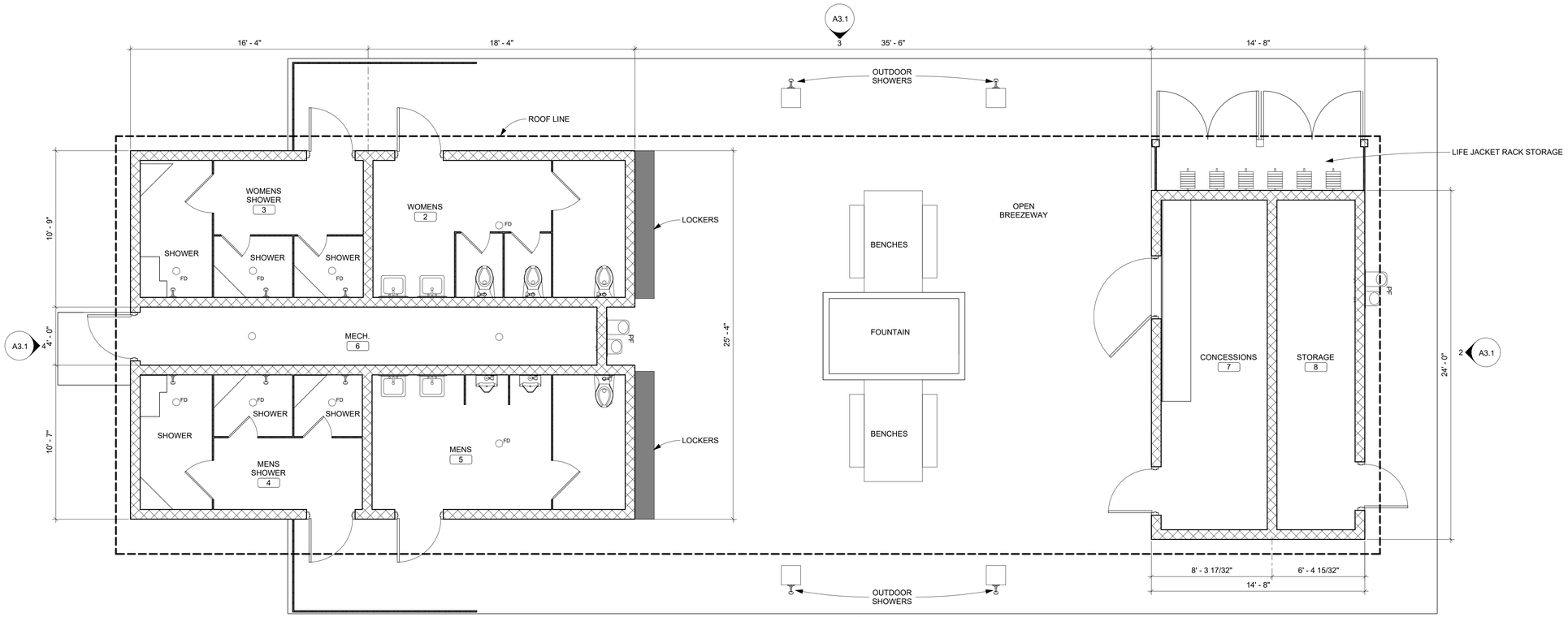
SHEET TITLE

EXTERIOR ELEVATIONS

SHEET

A3.1



1 A1.1 FLOOR PLAN - AQUA PARK BUILDING
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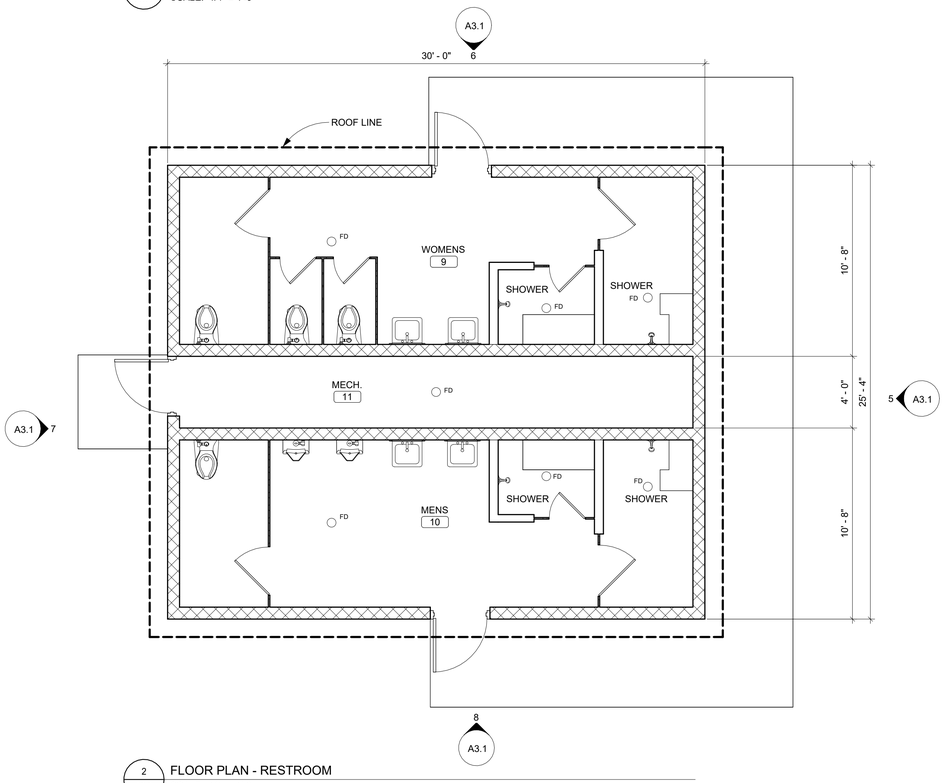

2 A1.1 FLOOR PLAN - RESTROOM
SCALE: 1/4" = 1'-0"

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CONSULTANT

PRELIMINARY NOT FOR CONSTRUCTION

ROCKWELL ADVENTURE PARK AQUA PARK AQUA PARK AND RESTROOMS

MANKATO, MN

REVISIONS XX

PROJECT #	26-XXXXX
DATE	7/28/2026
DRAWN BY	DHL
CHECKED BY	DGH

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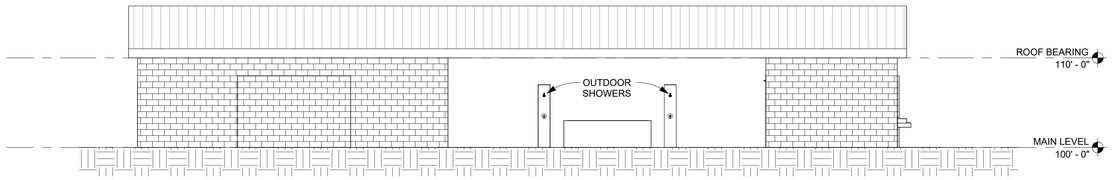
SHEET TITLE

FLOOR PLAN - AQUA PARK BUILDING AND RESTROOMS

SHEET

A1.1

NORTH



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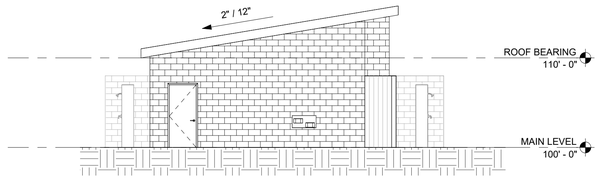

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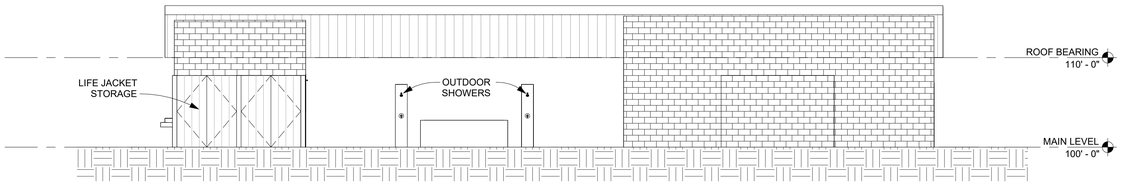

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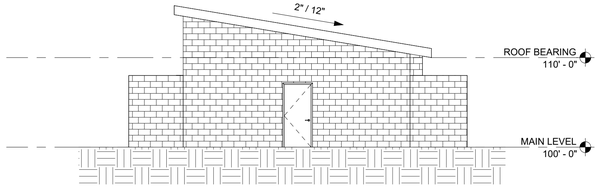

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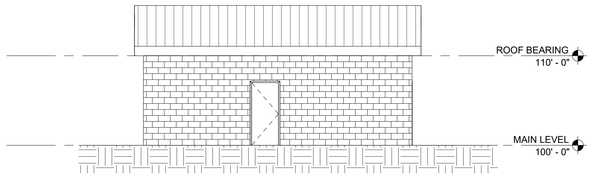

6 A3.1 RESTROOM SOUTH ELEVATION
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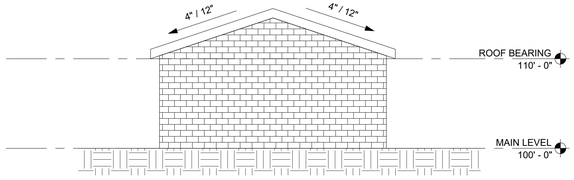

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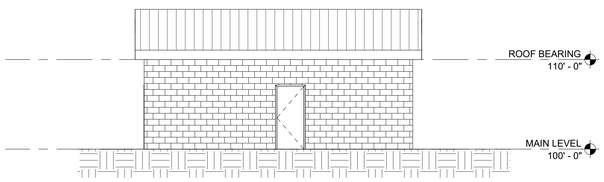

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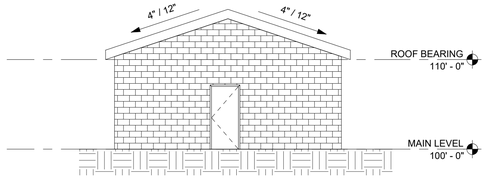
SCALE: 1/8" = 1'-0"



7 A3.1 RESTROOM WEST ELEVATION
SCALE: 1/8" = 1'-0"

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CONSULTANT

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ROCKWELL ADVENTURE PARK AQUA PARK
AQUA PARK AND RESTROOMS

MANKATO, MN

REVISIONS XX

PROJECT #	26-XXXXX
DATE	7/28/2026
DRAWN BY	Author
CHECKED BY	Checker

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SHEET TITLE

EXTERIOR ELEVATIONS

SHEET

A3.1

NORTH

Application Document

Rockwell RV & Adventure Park

Name, Address, and Phone number of the owner of the land:

- Campquarry LLC (Joe Holtmeier & Kyle Kaldor)
- 3301 3rd Ave, Mankato, MN 56001
- Joe – 507-327-5775, Kyle – 701-430-1312

Operator Contact information (Same as above)

Complete Legal Description of property:

County: Blue Earth County

City/Township: Lime Township

PLS Location (¼, ¼, Section, Township, Range):

- NW¼ of the SE¼ of Section 30 Township 109 North, Range 26 West
- NE¼ of the SE¼ of Section 30 Township 109 North, Range 26 West
- SW¼ of the SE¼ of Section 30 Township 109 North, Range 26 West
- SE¼ of the SE¼ of Section 30 Township 109 North, Range 26 West
- NW¼ of the NE¼ of Section 31 Township 109 North, Range 26 West
- SW¼ of the NE¼ of Section 31 Township 109 North, Range 26 West
- NE¼ of the NW¼ of Section 31 Township 109 North, Range 26 West
- SE¼ of the SW¼ of Section 30 Township 109 North, Range 26 West
- NE¼ of the SW¼ of Section 30 Township 109 North, Range 26 West

GPS Coordinates: 44.213089, -93.993096

Tax Parcel Numbers: R40.04.30.400.002, R40.04.30.400.004, R40.04.30.400.006, R40.04.30.400.018, R40.04.30.400.014, R40.04.31.200.005, R40.04.31.200.006, R40.04.31.200.007, R40.04.31.200.033.

Legal Description of Parcels:

LEGAL DESCRIPTION

The following were provided in Stewart Title Guaranty Company Commitment Number 01040-23597e, Revision Number 1, effective date of March 19, 2021, at 8:00 a.m., Schedule A.

TRACT K:

PIN R40.04.30.400.014

The North 74.53* feet of the East 94.39 feet of the North Half of the Southwest Quarter of Section 30, and that part of the Southeast Quarter of Section 30 lying west of the centerline of County Highway No. 5, all in Township 109 North Range 26 West, Blue Earth County Minnesota all more particularly described as:

Commencing at the Northeast Corner of Section 30; (the east line of the Southeast Quarter of Section 30 to have an assumed bearing of South 00 degrees 31 minutes 34 seconds East) thence East a distance of 500.55 feet to a point on the centerline of County Highway No. 5; thence South 22 degrees 20 minutes 00 seconds West, along said highway centerline, 2581.5 feet; thence South 13 degrees 04 minutes 00 seconds West, a distance of 740.45 feet to the point of beginning; thence South 88 degrees 50 minutes 00 seconds West, 265.04 feet to an iron pipe monument; thence South 11 degrees 20 minutes 00 seconds West, 85.00 feet to an iron pipe monument; thence North 78 degrees 40 minutes 00 seconds West, 150.09 feet; thence South 11 degrees 20 minutes 00 seconds West, 462.54 feet; thence South 78 degrees 40 minutes 00 seconds East, 160.09 feet to an iron pipe monument; thence South 11 degrees 20 minutes 00 seconds West, 348.48 feet to an iron pipe monument; thence South 87** degrees 40 minutes 00 seconds East, 250.00 feet to a point on the centerline of County Highway No. 5; thence South 11 degrees 20 minutes 00 seconds West along said highway centerline 602.18 feet to the point of intersection with the north line of the South 629.60 feet of the Southeast Quarter of Section 30; thence North 89 degrees 13 minutes 29 seconds West, along said North line, 757.63 feet to the point of intersection with the East line of the West 957.00 feet of the Southeast Quarter of Section 30; thence North 00 degrees 03 minutes 46 seconds East, along said East line, 747.80 feet to the point of intersection with a line drawn at right angles to the West line of the Southeast Quarter of Section 30 at a point distant 1365.50 feet north of the South Quarter Corner of Section 30 as measured along the West line of the Southeast Quarter of Section 30***, thence North 89 degrees 56 minutes 14 seconds West, along said line, 705.38 feet to the point of intersection with the East line of the West 251.62 feet of the Southeast Quarter of Section 30; thence North 00 degrees 03 minutes 46 seconds East along said East line, 1144.45 feet to a point on the South line of the North 74.58 feet of the Southeast Quarter of Section 30; thence westerly along said South line, 251.62 feet to a point on the West line of the Southeast Quarter of Section 30; thence continuing westerly along the South line of the North 74.58 feet of the Southwest Quarter of Section 30 a distance of 94.39 feet; thence North 00 degrees 03 minutes 46 seconds East, along a line parallel with the East line of the Southwest Quarter of Section 30 a distance of 74.58 feet to a point on the North line of the Southwest Quarter of Section 30; thence Easterly along said North line, 94.39 feet to the Northwest Corner of the Southeast Quarter of Section 30; thence continuing easterly along the North line of the Southeast Quarter of Section 30 a distance of 1894.5 feet to a point distant 231.00 feet westerly of the intersection of said North line with the centerline of County Highway No. 5; thence southerly at right angles to said north line, 199.00**** feet; thence easterly along a line parallel with the north line of the Southeast Quarter of Section 30 a distance of 184 feet to a point on the centerline of County Highway No. 5; thence South 13 degrees 04 minutes 00 seconds West, along said Highway centerline, 270 feet to the point of beginning, according to the United States Government Survey thereof and situate in Blue Earth County, Minnesota.

EXCEPTING the following:

That part of the Southeast Quarter of Section 30 lying west of the centerline of County Highway No. 5, all in Township 109 North Range 26 West, Blue Earth County, Minnesota all more particularly described as:

Commencing at the Northeast Corner of Section 30; (the east line of the Southeast Quarter of Section 30 to have an assumed bearing of South 00 degrees 31 minutes 34 seconds East) thence East a distance of 500.55 feet to a point on the center line of County Highway No. 5; thence South 22 degrees 20 minutes 00 seconds West, along said highway center line, 2581.5 feet; thence South 13 degrees 04 minutes 00 seconds West, a distance of 740.45 feet to the point of beginning; thence South 88 degrees 50 minutes 00 seconds West, 265.04 feet to an Iron pipe monument; thence South 11 degrees 20 minutes 00 seconds West, 85.00 feet to an Iron pipe monument; thence North 78 degrees 40 minutes 00 seconds West, 150.09 feet; thence South 88 degrees 50 minutes 00 seconds West, 584.34 feet; thence North 00 degrees 20 minutes 19 seconds West, 527.08 feet to a point on the north line of the Southeast Quarter of Section 30; thence easterly along said north line, 892.67 feet to a point distant 231.00 feet westerly of the Intersection of said North line with the center line of County Highway No. 5; thence southerly at right angles to said north line, 198.00 feet; thence easterly along a line parallel with the North line of the Southeast Quarter of Section 30 a distance of 184 feet to a point on the center line of County Highway No. 5; thence South 13 degrees 04 minutes 00 seconds West, along said highway center line, 270 feet to the point of beginning, according to the United States Government Survey thereof and situate in Blue Earth County, Minnesota.

TRACT T:

PIN R40.04.30.400.004

Commencing at the Northeast corner of Section 30, Township 109 North, Range 26 West, thence East a distance of 500.55 feet to a point on the public road, thence South 22 degrees-20 minutes West along the public road a distance of 2581.5 feet,thence South 13 degrees-04 minutes West a distance of 782.04 feet to a point in the center of the public road, thence South 10 degrees-50 minutes West along the center of the public road a distance of 298.10 feet to the place of beginning, thence continuing South 11 degrees-20 minutes West along the center of the public road a distance of 265.55 feet; thence North 78 degrees-40 minutes West a distance of 410.09 feet, thence North 11degrees-20 minutes East a distance of 265.55 feet, thence South 78 degrees-40 minutes East a distance of 410.09 feet to the point of beginning. Said tract of land lying in the East one-half of the Southeast Quarter of Section 30, Township 109 North, Range 26 West, Blue Earth County, Minnesota.

Abstract Property

TRACT W:

PIN R40.04.31.200.033

Tract A, Registered Land Survey No. 172, Blue Earth County, Minnesota.

Registered Land -Certificate of Title No. 33905.

Tract AA:

PIN R40.04.30.400.002

Beginning at the center of the Big Sioux and Mendota Road where it crosses the North line of the SE1/4 of Section 30, Township 109 North, Range 26 West, thence running West on said line 14 rods, thence South 12 rods, thence East to the center of said road, thence Northerly along the center of said road to the point of beginning.

Abstract property

Tract CC:

PINs R40.04.31.200.007 and R40.04.31.200.006

Lots A & B, Registered Land Survey No. 36, according to the plat thereof on file and of record in the office of the Register of Deeds of Blue Earth County, Minnesota.

Registered Land -Certificate of Title No. 33729.

Tract DD:

PIN R40.04.31.200.005

Beginning at the northwest corner of the SW1/4 NE1/4 of Sec. 31-109-26 West; thence north on the north and south 1/4 line of said Sec. 495 feet; thence north 89°54 minutes east 1434.16 feet to the center of the highway between Mankato and St. Peter (now known as Blue Earth County Aid Road No. 123); thence southwesterly 1177.10 feet down the center line of said highway to the north line of the S1/2 of said SW1/4 of the NE1/4; thence on said north line south 89°54 minutes west 461 feet; thence northwesterly 63°27 minutes to the right 251 feet; thence South 89°54 minutes west 116 feet; thence north 44°38 minutes west 290 feet; thence North 50°16 minutes west 288.5 feet; thence north 63°57 minutes west 100 feet to the point of beginning, except all existing highways and cartways. EXCEPT a strip of land 1 rod in width adjacent to the South line of Pilgrim's Rest Cemetery and extending the length of said Cemetery, allocated in the NE1/4 Sec. 31-109-26 West, more particularly described as follows: Commencing at an iron pipe at the intersection of the West line of the Mendota and Big Sioux Road, also known as the Mankato St. Peter Highway, and the North line of Sec. 31-109-26 West, said iron being approximately 1087 feet West of the northeast corner of said Section31; thence running West a distance of 585 feet, thence South 3°45' West a distance of 792 feet to the place of beginning; thence continuing along the same line a distance of 16.5 feet, thence East and parallel to the North line of said Section 31 a distance of 485.2 feet to the West line of the Mendota and Big Sioux Road, thence North 10°38' East along the West line of said Mendota and Big Sioux Road a distance of 16.8 feet, thence West and parallel to the North line of said Section 31, a distance of 488.3 feet to the place of beginning.

EXCEPT Tracts A & B, Registered Land Survey No. 36.

And an easement in and to a roadway over the following described property:

A road 20 feet in width 10 feet on either side of a line described as follows: Commencing at the intersection of the centerline of County Highway No. 5 and the North line of a tract of land described as follows: "The North 70 acres of the South 110 acres, West of County Highway No. 5, in the Northeast quarter of Section 31, Township 109North, Range 26 West"; thence West along said North line approximately 1100 feet; thence Northwesterly approximately 340 feet to a point on the West line of a tract of land described as follows: "The West 16.92 acres of the North 24 acres of the Northwest Quarter of the Northeast Quarter of Section 31, Township 109 North, Range 26 west"; said point being approximately 100 feet North of the Southwest corner of said last described tract; thence continuing Westerly across the Northeast quarter of the Northwest quarter of said Section 31, approximately 100 feet to a point of termination, said terminal point being located as follows: commencing at a point on the North line of Section 31, Township 109 North, Range26 West, 2179.8 feet East of the Northwest corner of said Section 31; thence South 184.6 feet; thence South 44 degrees 26 minutes East 520.5 feet; thence south 0 degrees 30 minutes West, 147.3 feet to said point of termination.

In the event that should a survey of the above described roadway as it now exists show the above description to be inaccurate the vendor agrees at the request of the vendee to execute and deliver a Quit Claim Deed transferring to said vendee the road area in accordance with such survey. The covenants of warranty in this instrument shall be deemed not to apply to the last above described tract, said tract being the roadway conveyed hereby.

Registered Land -Certificate of Title No. 33866.

Tract L – PID R40.04.30.400.018

DESCRIPTION

All that part of the following two descriptions:

(Description 1)

That part of the Southeast Quarter of Section 30 lying west of the center line of County Highway No. 5, all in Township 109 North Range 26 West, Blue Earth County, Minnesota all more particularly described as:

Commencing at the Northeast Corner of Section 30; (the east line of the Southeast Quarter of Section 30 to have an assumed bearing of South 00 degrees 31 minutes 34 seconds East) thence East a distance of 500.55 feet to a point on the center line of County Highway No. 5; thence South 22 degrees 20 minutes 00 seconds West, along said highway center line, 2581.5 feet; thence South 13 degrees 04 minutes 00 seconds West, a distance of 740.45 feet to the point of beginning; thence South 88 degrees 50 minutes 00 seconds West, 265.04 feet to an Iron pipe monument; thence South 11 degrees 20 minutes 00 seconds West, 85.00 feet to an Iron pipe monument; thence North 78 degrees 40 minutes 00 seconds West, 150.09 feet; thence South 88 degrees 50 minutes 00 seconds West, 584.34 feet; thence North 00 degrees 20 minutes 19 seconds West, 527.08 feet to a point on the north line of the Southeast Quarter of Section 30; thence easterly along said north line, 892.67 feet to a point distant 231.00 feet westerly of the Intersection of said North line with the center line of County Highway No. 5; thence southerly at right angles to said north line, 198.00 feet; thence easterly along a line parallel with the North line of the Southeast Quarter of Section 30 a distance of 184 feet to a point on the center line of County Highway No. 5; thence South 13 degrees 04 minutes 00 seconds West, along said highway center line, 270 feet to the point of beginning, according to the United States Government Survey thereof and situate in Blue Earth County, Minnesota.

(Description 2)

Commencing at the Northeast corner of Section 30, Township 109 North, Range 26 West, thence East a distance of 500.55 feet to a point on the public road, thence South 22°20' West along the public road a distance of 2581.5 feet, thence South 13°04' West a distance of 740.45 feet to the place of beginning, thence South 13°04' West a distance of 41.59 feet to a point in the center of the public road, thence South 10°50' West a distance of 298.10 feet, thence North 78°40' West a distance of 410.09 feet, thence North 11°20' East a distance of 196.99 feet, thence South 78°40' East a distance of 150.09 feet, thence North 11°20' East a distance of 85.00 feet, thence North 88°50' East a distance of 265.04 feet to the point of beginning.

DESCRIPTION (con't)

Which lies westerly and northerly of the following described line:

Commencing at the Northeast Corner of Section 30; (the east line of the Southeast Quarter of Section 30 to have an assumed bearing of South 00 degrees 31 minutes 34 seconds East) thence East a distance of 500.55 feet to a point on the center line of County Highway No. 5; thence South 22 degrees 20 minutes 00 seconds West, along said highway center line, 2581.5 feet; thence South 13 degrees 04 minutes 00 seconds West, a distance of 740.45 feet; thence South 88 degrees 50 minutes 00 seconds West, 265.04 feet; thence South 11 degrees 20 minutes 00 seconds West, a distance of 281.99 feet to the point of beginning; thence North 11 degrees 20 minutes 00 seconds East, back along the previously described course and its northeasterly extension, a distance of 396.42 feet; thence North 88 degrees 50 minutes 00 seconds East, a distance of 264.25 feet to a point on the center line of County Highway No. 5 and there terminating.

PID R40.04.30.400.006 – Emmanuel Lutheran 10 acres

Property Legal Description

All that part of the Southeast Quarter (SE1/4) of Section Thirty (30), Township One Hundred Nine (109) North, Range Twenty-six (26) West, Blue Eath County, Minnesota described as follows:

Commencing at the Southeast Corner of said Section Thirty (30), thence due West (assumed bearing) along the South line of Section Thirty (30), 1047.00 feet to the point of interesection of the South line with the center Line of Highway No. 5, said point being the point of beginning; thence continuing due West along South line of Section Thirty (30), 633.40 feet; thence North 0 degrees 46.5 minutes West 629.60 feet; thence due East, and parallel to the South line of Section Thirty (30), 757.63 feet, to a point on the center line of Highway 5; thence South 10 degrees 25 minutes West along the Highway center line 640.07 feet to the point of beginning, according to the United States Government Survey thereof and situate in Blue Earth County, Minnesota.

Rockwell RV & Adventure Park
IUP Application

Prepared for: Lime Township

Index

1. Executive Summary / Project Overview
2. Project Vision and Intent
3. Existing Site Conditions
4. Proposed Recreational Amenities and Supporting Facilities
5. Events, Gatherings, and Organized Activities
6. Operational Plan
7. Traffic, Access, and Parking
8. Environmental Stewardship, Water Resources, and Site Reclamation
9. Utilities and Infrastructure
10. Compatibility with Surrounding Area
11. Economic and Community Benefits
12. Consistency with Ordinance and Comprehensive Plan
13. Requested Approvals and Flexibility
14. Conclusion

1. Executive Summary / Project Overview

Rockwell RV & Adventure Park is a proposed outdoor recreation and campground development located on approximately 105 acres north of Mankato in Lime Township, Minnesota. This application requests approval of an Interim Use Permit (IUP) for the proposed recreational development, along with revocation of the existing Mining Conditional Use Permit (CUP) for the parcels included within the IUP boundary to facilitate the planned transition from mining to campground and outdoor recreation use. Parcels not included within this application will remain subject to the existing Mining CUP and may continue to operate in accordance with its terms.

The project represents the next phase in the property's evolution by transitioning previously mined lands into a thoughtfully planned outdoor recreation destination that combines camping, adventure recreation, hospitality, and publicly accessible recreational amenities within a reclaimed quarry landscape.

Rather than developing agricultural or previously undisturbed land, the project adapts an existing industrial property whose quarry lakes, limestone highwalls, and varied topography create a unique setting for outdoor recreation. Development is concentrated within previously disturbed areas, allowing the project to utilize existing landforms while preserving natural buffers, protecting environmental resources, and minimizing impacts on surrounding properties.

The proposed development includes approximately 300 RV and camping sites, a regional mountain bike trail system, cable wakeboarding park, aqua park, climbing and bouldering features, guest services lodge, food and beverage amenities, gathering spaces, and supporting infrastructure. Together, these amenities create an integrated recreational destination designed to serve visitors of all ages while promoting outdoor recreation, tourism, and healthy lifestyles.

A significant component of the project is the Rockwell Mountain Bike Trail System, which is planned in partnership with Mankato Area Mountain Bikers (MAMB). The trail system will remain publicly accessible independent of campground operations and will provide a long-term community recreational asset supported through nonprofit stewardship, volunteer involvement, and organized programming.

The project has been designed to work with the site's existing quarry topography, which naturally screens many activity areas from surrounding properties while reducing visual and noise impacts. Operational plans, environmental protections, traffic improvements, stormwater management, and buffering measures have been incorporated into the overall

design to ensure compatibility with adjacent land uses and compliance with applicable Township regulations.

Through the adaptive reuse of a historically disturbed quarry, Rockwell RV & Adventure Park will expand outdoor recreation opportunities, support regional tourism, strengthen the local economy, and create a long-term recreational and environmental asset for Lime Township and the Greater Mankato region.

---

2. Project Vision and Intent

Rockwell RV & Adventure Park has been planned as an integrated outdoor recreation destination that transforms a historically mined limestone quarry into a long-term recreational asset for Lime Township and the Greater Mankato region. Rather than reshaping the site to fit a predetermined concept, the development has been designed around the property's existing quarry landscape, utilizing its lakes, limestone highwalls, topography, and reclaimed areas to create a unique recreational experience.

A primary planning objective has been to concentrate development within previously disturbed portions of the property while preserving existing natural buffers, minimizing additional land disturbance, and protecting environmentally sensitive resources. The layout intentionally utilizes the site's recessed quarry areas and existing berms to reduce visual and noise impacts on adjacent properties and maintain compatibility with the surrounding rural landscape.

The project has also been designed to integrate multiple recreational and hospitality uses into a cohesive destination where camping, mountain biking, water recreation, climbing, lodging, food service, and gathering spaces complement one another while sharing infrastructure and guest amenities. This integrated approach encourages longer visitor stays, supports regional tourism, and creates operational efficiencies.

Long-term stewardship is a guiding principle of the project. Recreational facilities, natural resources, and supporting infrastructure are intended to be managed in a manner that promotes public safety, environmental responsibility, and high-quality visitor experiences. The partnership with Mankato Area Mountain Bikers (MAMB) further supports these objectives by providing long-term stewardship, volunteer involvement, and community programming for the publicly accessible trail system.

The overall vision is to create a thoughtfully planned recreational destination that enhances the long-term value of a historically disturbed property while providing lasting recreational, environmental, and economic benefits for the surrounding community.

3. Existing Site Conditions

The proposed development is located on approximately 105 acres of active and historically operated limestone quarry property in Lime Township, Minnesota. The site has been utilized for aggregate production and dimensional stone mining for many decades and contains multiple quarry areas in various stages of active mining and reclamation.

3.1 Site Topography and Quarry Conditions

The property is characterized by significant elevation changes created through historic quarry operations. Existing features include limestone highwalls, quarry benches, reclaimed slopes, internal haul roads, stockpile areas, and open excavation areas. Elevation across the site varies by approximately 50 feet, with many of the quarry areas situated 15 to 30 feet below the surrounding grade.

3.2 Water Features and Hydrology

The site contains five groundwater-fed quarry lakes created through historic mining operations, along with one small natural wetland located in the northern portion of the property. The quarry lakes do not have defined surface inflows or outflows and are hydrologically connected to the regional groundwater system characteristic of the area's karst geology.

3.3 Vegetation and Land Cover

Much of the property consists of previously disturbed land associated with historic quarry activities. Existing land cover includes exposed limestone, reclaimed grasslands, volunteer vegetation, mature trees along portions of the property boundary, and areas of natural regeneration within inactive portions of the quarry.

3.4 Existing Infrastructure

Existing site improvements include quarry access roads, internal haul roads, stockpile areas, processing areas, and an on-site water well. Electrical infrastructure is limited, and no municipal sanitary sewer service currently exists within the development area.

3.5 Surrounding Land Uses

The property is bordered by rural residential development to the north and northeast, industrial and mining-related properties to the east, south, and west, and agricultural land in portions of the surrounding area. Primary access is provided from 3rd Avenue, with additional roadway frontage along 230th Lane.

3.6 Existing Opportunities and Constraints

The site's existing quarry landscape presents both opportunities and design constraints. Historic mining has created a property with unique geological features, varied topography, and existing disturbed areas that influence future site planning. Steep slopes, quarry lakes, existing berms, and natural vegetation require careful integration into the project design while providing the framework for the property's long-term transition from industrial use to outdoor recreation.

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4. Proposed Recreational Amenities and Supporting Facilities

The proposed development includes a coordinated mix of outdoor recreation, hospitality, and supporting infrastructure designed to function as a single integrated recreational destination. Development may occur in phases as infrastructure and recreational amenities are completed, allowing portions of the project to become operational while subsequent phases continue to be constructed in accordance with approved plans and permits. The primary components of the project are described below.

4.1 RV Campground

The campground will serve as the primary hospitality component of the development and is planned to include approximately 300 RV campsites, along with a limited number of tent camping opportunities. Campsites will include a variety of configurations, including premium waterfront, pull-through, back-in, and standard sites. Supporting amenities include bathhouses, internal roadways, gathering areas, playgrounds, recreational areas, and utility infrastructure necessary to support campground operations.

4.2 Lodge and Guest Services

A central lodge will serve as the primary guest services hub for the development. Planned amenities include guest check-in, camp store, retail space, food and beverage service, indoor and outdoor seating, equipment rental, and gathering spaces overlooking the primary recreational amenities. Designated areas for food trucks and other complementary food service providers are also planned.

4.3 Cable Wake Park

The cable wake park will provide wakeboarding and other tow-assisted water sports utilizing a full-size overhead cable system. Supporting facilities include rental operations, staging and starting areas, spectator viewing, instructional programming, and associated operational infrastructure. Operations will include guest orientation, safety instruction,

trained operational staff, designated operating procedures, rescue equipment, and emergency response protocols appropriate for tow-assisted water recreation.

4.4 Aqua Park and Water Recreation

The aqua park will provide a variety of water-based recreational opportunities utilizing one of the existing quarry lakes. Planned amenities include designated swimming areas, inflatable aqua park attractions, junior play features, deep-water solo climbing, cliff jumping, kayak and paddleboard rentals, floating cabanas, concessions, locker facilities, and related guest amenities.

Water recreation activities will be supported by trained operational staff, designated swimming areas, posted safety rules, emergency response equipment, and operational procedures designed to promote guest safety while providing a high-quality recreational experience.

4.5 Climbing Features

The project includes both natural and constructed climbing opportunities integrated into the existing quarry landscape. Planned facilities include climbing walls, bouldering areas, deep-water solo climbing, instructional programming, and related recreational features.

4.6 Rockwell Mountain Bike Trails

The Rockwell Mountain Bike Trails will provide approximately six miles of publicly accessible, purpose-built trails designed for riders of all skill levels. Facilities include beginner skills areas, progression features, jump lines, advanced trails, trailhead parking, wayfinding signage, and supporting infrastructure. The trail system will be developed and maintained in partnership with Mankato Area Mountain Bikers (MAMB). Trail construction will incorporate existing quarry features, including limestone highwalls, benches, and rock formations. In select locations, limited rock excavation may be necessary to integrate trail alignments into the existing quarry landscape while maintaining appropriate safety and design standards.

The trail system will be regularly inspected and maintained to address trail conditions, erosion, vegetation management, signage, and rider safety. Temporary trail closures may occur due to weather, maintenance activities, or other safety considerations in accordance with the Operational Plan.

4.7 Events and Recreational Programming

The project may host recreational events, instructional programs, youth camps, nonprofit activities, private group functions, corporate retreats, weddings, community gatherings,

and other activities that are customary and incidental to the operation of an outdoor recreation destination. Such activities will be managed in accordance with the Operational Plan and applicable permit conditions.

4.8 Supporting Infrastructure

Supporting improvements include maintenance facilities, equipment storage, utility infrastructure, internal roadways, parking areas, pedestrian connections, signage, landscaping, stormwater management facilities, and other infrastructure necessary to support the long-term operation of the development. Wayfinding signage, regulatory signage, interpretive information, and emergency location markers will be installed throughout the property to assist visitors with navigation, safety, and orientation. Approximately 160 parking spaces are planned for the main parking lot of the campground and adventure park, with 23 additional spaces in the southern portion of the campground, along with approximately 60 dedicated spaces serving the public mountain bike trail system.

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5. Events, Gatherings, and Organized Activities

As part of its operation as an outdoor recreation and hospitality destination, Rockwell RV & Adventure Park may host a variety of organized recreational activities, educational programs, community events, and private gatherings that are customary and incidental to the primary recreational uses of the property.

Anticipated activities include mountain bike races and group rides, wakeboarding competitions and instructional programs, climbing clinics, youth recreation camps, outdoor education programs, nonprofit fundraising events, corporate retreats, team-building activities, weddings, birthday celebrations, and other private or community gatherings. Recreational programming may occur as single-day events, multi-day programs, recurring seasonal activities, or instructional clinics.

Many organized activities will occur in partnership with organizations such as Mankato Area Mountain Bikers (MAMB), schools, youth organizations, nonprofits, and community groups. The Rockwell Mountain Bike Trails, in particular, are intended to serve as a regional venue for trail stewardship activities, group rides, races, skills instruction, and youth programming.

Events will generally occur within designated recreational areas, gathering spaces, waterfront amenities, trail facilities, and the lodge area. Existing quarry topography, natural

buffers, and the overall site layout help contain event activity within the property while minimizing impacts on surrounding land uses.

Parking for organized events will typically be accommodated within the site's permanent parking facilities. Temporary overflow parking, additional staffing, traffic management measures, or event-specific operational controls may be implemented for larger events when necessary.

The events described herein are intended to be accessory and incidental to the primary recreational use of the property. The project is not intended to function as a stand-alone concert venue, festival grounds, motorsports facility, or other large-scale entertainment destination unrelated to the park's recreational purpose.

Operational requirements for organized activities and special events are addressed in the Rockwell RV & Adventure Park Operational Plan.

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6. Operation Plan

- See separate Operation Plan document

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7. Traffic, Access, and Parking

The proposed development has been designed with separate access points for the RV & Adventure Park and the Rockwell Mountain Bike Trails to efficiently distribute traffic and minimize conflicts between campground guests and public trail users. Traffic impacts and recommended roadway improvements associated with the development are evaluated in the Traffic Impact Study document prepared as part of the EAW and included in the project application.

7.1 Primary Site Access

Primary access to the RV & Adventure Park will be provided through the existing Stoffel Quarry entrance from 3rd Avenue. This entrance will serve campground guests, day-use visitors, staff, deliveries, and operational traffic associated with the campground and recreational amenities.

A separate entrance, north of the main entrance, along 3rd Avenue will provide direct access to the Rockwell Mountain Bike Trails trailhead and parking area, allowing public access independent of campground operations. This parking area may remain available

during periods when campground operations are reduced or closed, subject to posted operating hours and trail conditions.

7.2 Internal Circulation

The internal roadway network is designed to provide safe and efficient access throughout the development while accommodating the site's unique topography. A combination of primary and secondary roadways will serve campground areas, recreational amenities, parking areas, and operational facilities. Pedestrian circulation throughout the development will be provided through a combination of dedicated pathways, recreational trails, and the campground's internal circulation roads. Within the campground, the internal road network is designed with a posted speed limit of 10 mph and is expected to experience relatively low traffic volumes, creating an environment where pedestrians can comfortably and safely share the roadway with slow-moving vehicles, consistent with typical campground operations. Dedicated pathways and trails provide additional connections between major activity areas, recreational amenities, and support facilities, encouraging walking and bicycling while reducing the need for vehicle travel within the site.

Internal campground roads will primarily consist of well-maintained aggregate surfaces designed for low-speed recreational traffic. The primary entrance roadway connecting the campground to the public road system will be paved to reduce tracking of aggregate and soil onto adjacent public roadways. Dust generation on unpaved roadways will be minimized through low posted speed limits, routine road maintenance, application of additional aggregate as needed, and other dust control measures when warranted by weather conditions or operational needs.

Limited on-site transportation, including rental golf carts, may be available for campground guests and will be managed in accordance with the Operational Plan.

7.3 Parking

The development is planned to provide approximately 160 parking spaces serving the campground, lodge, aqua park, cable wake park, climbing areas, and other recreational amenities at the main parking lot. An additional 23 parking spaces are planned in the southern portion of the campground. A separate trailhead parking area will provide approximately 60 spaces dedicated to the Rockwell Mountain Bike Trails. Parking areas may consist of a combination of paved and aggregate surfaces designed to meet the operational needs of the development. Operation of the mountain bike trailhead parking area, including permitted uses, hours of operation, and parking regulations, is governed by the Rockwell RV & Adventure Park Operational Plan.

Temporary overflow parking may be utilized during larger organized events in accordance with the Operational Plan.

All off-street parking areas associated with the proposed development will be designed in accordance with applicable Township requirements and accepted engineering standards. Unless otherwise approved by the Township, standard vehicle parking stalls will have minimum dimensions of 9 feet in width by 20 feet in length. Parking lot layouts will also include appropriate aisle widths, accessible parking spaces, pedestrian circulation, and traffic flow to provide safe and efficient access throughout the development. Final parking dimensions and layouts are shown on the civil engineering plans prepared by Bolton & Menk.

7.4 Emergency Access

Emergency access will be provided throughout the development by the internal roadway network. In addition to the primary entrances from 3rd Avenue, secondary emergency access is available via connections to 231st Lane and 230th Lane, providing additional access for emergency responders and evacuation if necessary. Roadways, parking areas, recreational facilities, and trail systems will be designed to maintain reasonable access for emergency responders throughout the property.

7.5 Controlled Access and Recreational Use

Rockwell RV & Adventure Park is intended to operate as a managed recreational facility rather than an open public park. Access to recreational amenities will be controlled through designated entry points, guest registration, operational staffing, fencing, signage, and established operating hours. Recreational facilities, including the cable wake park, aqua park, and associated water recreation areas, will generally be available only to registered campground guests, day-use patrons, organized programs, or participants who have obtained the appropriate admission or activity pass.

Recreational amenities will operate only during established hours under staff oversight. When facilities are closed, operational measures such as controlled access points, perimeter fencing, signage, and other management practices may be used to discourage unauthorized entry and recreational use. The Operational Plan establishes procedures for access control, guest management, facility supervision, and enforcement of park rules.

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8. Environmental Stewardship, Water Resources, and Site Reclamation

The proposed development represents the long-term transition of a historically mined limestone quarry into a managed outdoor recreation destination. Site planning has focused

on utilizing existing quarry features while protecting water resources, minimizing additional land disturbance, and supporting the orderly reclamation and long-term stewardship of the property. As recreational development progresses, portions of the property will continue transitioning from mining-related activities to their planned recreational uses in accordance with the approved reclamation plan.

8.1 Site Reclamation and Adaptive Reuse

The project is concentrated within areas that have already been disturbed by historic mining activities, including quarry pits, haul roads, stockpile areas, and reclaimed land. Rather than developing agricultural or previously undisturbed property, the project repurposes an existing industrial landscape for long-term recreational use.

As development proceeds, certain mining-related activities may continue on limited portions of the property to complete reclamation and facilitate construction of the approved recreational improvements. The general locations where continued aggregate crushing, stockpile processing, dimensional stone extraction, and limited rock excavation may occur are identified on the project plans. These activities are limited to the areas shown in the plan set and are intended solely to facilitate completion of reclamation and construction of the approved recreational improvements.

In addition, localized rock excavation, including cutting and/or drilling and blasting, may be required in two limited areas of the property. The first is within the existing dimensional stone mining area, following completion of commercial stone extraction, where additional rock removal may be necessary to achieve the final grades identified in the approved reclamation and recreational development plans. The second is along the existing highwall adjacent to 3rd Avenue within the McClure Quarry, where limited rock excavation may be required to construct a stepped or terraced mountain bike trail integrated into the quarry wall. Any such work will be limited to the extent necessary to construct the approved recreational improvements and will be completed in accordance with applicable permits, safety requirements, and regulatory approvals. No new mining areas are proposed as part of the recreational development.

Recreational construction and reclamation activities will be coordinated so that completed portions of the site are stabilized, revegetated where appropriate, and transitioned into long-term recreational use as development progresses. Existing quarry features, including limestone highwalls and quarry lakes, will be incorporated into the final site design while maintaining appropriate safety measures and environmental protections.

8.2 Water Resource Protection

The site's five groundwater-fed quarry lakes are central to both the recreational character and environmental management of the property. Protecting these water resources is a primary design objective. The existing quarry lakes are both a defining recreational feature of the development and an important natural resource. The project has been planned to protect and responsibly manage these groundwater-fed lakes through careful engineering, operational practices, and long-term environmental stewardship. Groundwater appropriations associated with the project will be completed in accordance with applicable Minnesota Department of Natural Resources (DNR) permits and requirements. Dewatering associated with quarry operations has ceased, and groundwater withdrawals for park operations will be managed to provide reliable water service while protecting groundwater resources and environmentally sensitive features identified during the environmental review process.

Stormwater management facilities are being designed to control runoff quantity and improve water quality through a combination of vegetated swales, infiltration practices, stormwater basins, and existing quarry drainage patterns. Detailed design information is provided within the project's Stormwater Pollution Prevention Plan (SWPPP) and supporting engineering documents.

Baseline water quality testing has demonstrated excellent recreational water quality. Routine monitoring of recreational water quality will continue throughout park operations to support public health, guide operational decisions, and verify the continued suitability of the lakes for recreational use. Recreational water features, including designated swimming areas and associated water-based amenities, will be designed, operated, and maintained in accordance with applicable Minnesota Department of Health requirements and other applicable regulatory standards. Operational procedures will support safe recreational use while protecting the long-term quality of the site's groundwater-fed quarry lakes.

8.3 Environmental Stewardship

Environmental stewardship extends beyond regulatory compliance and is incorporated into the long-term management of the property. Operational practices will emphasize erosion control, shoreline stabilization, native vegetation establishment, responsible stormwater management, routine water quality monitoring, and protection of environmentally sensitive resources.

The project also incorporates recommendations developed through environmental review, including measures to protect wetlands, groundwater resources, wildlife habitat, and other natural features identified during the planning and permitting process.

The proposed development is expected to improve the long-term environmental condition of the property by replacing active industrial operations with managed recreational uses. Compared to historical quarry operations, the completed development will substantially reduce areas of exposed soil, eliminate blasting and material processing within the development area, establish permanent vegetation and landscaping, and implement engineered stormwater management practices that improve erosion control and water quality protection. Routine inspection and maintenance of stormwater best management practices, shoreline stabilization measures, and recreational water quality monitoring will be incorporated into the long-term operation and stewardship of the property as described in the Rockwell RV & Adventure Park Operational Plan.

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9. Utilities and Infrastructure

Utility and infrastructure improvements for Rockwell RV & Adventure Park will be designed and constructed in accordance with applicable local, state, and federal regulations. Detailed engineering plans will be prepared as part of the permitting and construction process to support the campground, recreational amenities, guest services, and long-term operation of the development.

9.1 Stormwater Management

Stormwater management facilities are being designed to control runoff quantity and improve water quality while minimizing erosion and protecting downstream resources. The system will incorporate a combination of vegetated swales, infiltration practices, stormwater basins, and existing quarry drainage features. Detailed stormwater calculations and design information are provided in the project's engineering plans and Stormwater Pollution Prevention Plan (SWPPP). Stormwater management practices have been selected to reduce runoff velocities, improve water quality, encourage infiltration where practical, and minimize downstream impacts while working with the existing quarry topography.

9.2 Water Supply

Potable water will be provided by on-site groundwater wells. An existing well is anticipated to serve as the primary water source, with one or more supplemental wells planned to provide additional capacity, operational flexibility, and system redundancy as the project is developed in phases. Groundwater appropriations associated with the water supply system will be completed in accordance with applicable Minnesota Department of Natural Resources (DNR) permits and requirements. The water system will be designed in accordance with applicable health, engineering, and regulatory standards.

9.3 Wastewater Collection and Disposal

Sanitary wastewater generated by the development will be collected through a centralized wastewater system and conveyed to a storage facility located on the southern portion of the property. Wastewater will be transported to an approved treatment facility for processing and disposal. The centralized collection system eliminates the need for individual on-site septic systems throughout the development and provides operational flexibility while protecting groundwater resources. Final system design and permitting will be completed in coordination with the appropriate regulatory agencies.

9.4 Electrical Service

Electrical service will be provided by Xcel Energy. Distribution infrastructure will be installed throughout the development to serve campground sites, recreational facilities, guest services, maintenance buildings, lighting, and other operational needs.

9.5 Communications

Communications infrastructure, including internet and wireless services, will be installed to support guest services, operational management, security, and emergency communications.

9.6 Solid Waste Management

Solid waste will be managed through centralized collection areas and strategically located waste receptacles throughout the property. Waste handling practices will support campground operations, recreational activities, and special events while maintaining a clean and orderly site.

9.7 Fire Protection and Emergency Response

Fire protection and Emergency Response planning will be coordinated with local emergency service providers including Kasota Fire Dept., Blue Earth County Sheriff's Office, and Mankato Public Safety Dept. Emergency response will be supported through the internal roadway network, multiple emergency access points, and access to existing quarry water resources where appropriate. Emergency vehicle access has been incorporated into the overall site design.

Water-based recreational amenities will be supported by site-specific emergency response procedures developed in coordination with local emergency service providers. Staff assigned to water recreation areas will receive appropriate training for emergency response, incident recognition, guest evacuation, communications, and coordination with responding agencies. Emergency rescue equipment may include rescue boards, throw

bags, reaching poles, rescue tubes, automated external defibrillators (AEDs), first aid equipment, and other equipment appropriate for the recreational activities being provided. Watercraft or other specialized equipment may also be maintained on-site to facilitate rapid access to guests in the event of a water emergency. Emergency response procedures will be periodically reviewed and updated in coordination with local emergency service providers as operations evolve and new recreational amenities are introduced.

9.8 Lighting and Site Infrastructure

Site lighting will be designed to provide safe and efficient operation while minimizing impacts to adjacent properties and preserving the rural nighttime character of the area. Additional infrastructure improvements include internal roadways, parking areas, signage, utility distribution systems, maintenance facilities, and other improvements necessary to support long-term operation of the development.

Detailed engineering design, calculations, and construction plans for utility infrastructure are provided in the civil engineering plans prepared by Bolton & Menk.

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10. Compatibility with Surrounding Area

Rockwell RV & Adventure Park has been planned to be compatible with the surrounding rural character of Lime Township by utilizing the property's existing quarry topography, natural buffers, and thoughtful site design. The development transforms a historically mined industrial property into a managed recreational destination while minimizing impacts on neighboring properties through strategic placement of recreational amenities, operational controls, and environmental stewardship.

10.1 Relationship to Adjacent Land Uses

The property is bordered by a combination of rural residential, industrial, agricultural, and mining-related land uses. Residential properties are concentrated along the northern and northeastern boundaries, while the remaining property boundaries primarily adjoin industrial or agricultural uses. The existing quarry setting provides a transition between these land uses and the proposed recreational development.

10.2 Residential Compatibility

Protection of neighboring residences has been a primary consideration throughout the planning process. Higher activity areas have been located within the interior of the property and recessed quarry areas to maximize separation from nearby homes. Existing berms, mature vegetation, natural topography, wildlife-friendly perimeter fencing, existing and

proposed landscaping, and additional vegetative screening provide multiple layers of screening and buffering along residential property boundaries. The project also incorporates operational measures, including defined hours of operation, quiet hours, event management procedures, trailhead parking regulations, and a formal complaint response process, to further ensure compatibility with neighboring properties.

10.3 Visual Compatibility

Much of the development will be located below the elevation of surrounding properties within existing quarry areas. Existing limestone highwalls, berms, vegetation, and changes in grade substantially reduce visibility from adjacent properties and public roadways. Additional landscaping will further soften views where appropriate while preserving the site's unique quarry character.

10.4 Noise Compatibility

A separate acoustical study has been prepared to evaluate potential operational noise associated with the proposed development. Existing quarry topography, including highwalls and berms, provides natural sound attenuation between activity areas and neighboring properties.

Importantly, the proposed recreational use is expected to generate substantially less noise than the site's historical mining operations. Blasting, crushing, material processing, and continuous heavy equipment operations will cease within the developed portions of the property and be replaced by family-oriented recreational activities that occur primarily during daytime and early evening hours. Operational controls, including quiet hours, event management procedures, and complaint response protocols described in the Operational Plan, provide additional measures to maintain compatibility with surrounding properties.

10.5 Lighting Compatibility

Site lighting will be designed to provide safe operation while minimizing impacts on adjacent properties and preserving the rural nighttime character of Lime Township. Lighting fixtures will be fully shielded where appropriate and directed downward to reduce glare, light trespass, and unnecessary sky glow. Lighting levels will be limited to those necessary for safety and operational purposes, with many recreational areas operating primarily during daylight hours or utilizing lighting only when activities are occurring.

This approach supports responsible lighting practices while preserving nighttime visibility and the rural character of the surrounding area.

10.6 Overall Compatibility

The combination of existing quarry landforms, natural buffering, operational controls, environmental protection measures, and thoughtful site planning creates a development that is compatible with surrounding land uses and the rural character of Lime Township. By repurposing a historically disturbed quarry rather than developing previously undisturbed land, the project provides long-term recreational, environmental, and economic benefits while respecting neighboring properties and the surrounding community.

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11. Economic and Community Benefits

Rockwell RV & Adventure Park represents the adaptive reuse of a historically mined limestone quarry into a long-term recreational asset that will provide economic, recreational, environmental, and community benefits for Lime Township and the Greater Mankato region. Beyond creating a unique outdoor recreation destination, the project is expected to generate sustained private investment, expand tourism, increase public recreation opportunities, and support local businesses while preserving the property's long-term productive use.

11.1 Regional Tourism and Visitor Spending

The project is expected to attract visitors from throughout southern Minnesota and the surrounding region by offering a combination of camping, mountain biking, water recreation, climbing, and other outdoor activities that are not currently available within a single destination in southern Minnesota. By filling this gap in the regional recreation market, the project is expected to increase overnight stays and visitor spending at local restaurants, retail businesses, lodging establishments, fuel stations, grocery stores, and other businesses throughout the Greater Mankato area.

11.2 Employment and Local Investment

Construction of the project will generate work for local contractors, suppliers, and service providers. Upon completion, Rockwell RV & Adventure Park will create permanent and seasonal employment opportunities in hospitality, recreation, maintenance, guest services, food and beverage operations, and park management.

The project also represents a substantial private investment in Lime Township that will improve a historically disturbed property while contributing to the local tax base and encouraging additional investment in outdoor recreation and tourism-related businesses.

11.3 Recreation and Quality of Life

The project will significantly expand outdoor recreation opportunities for residents and visitors by providing camping, mountain biking, swimming, wakeboarding, climbing, hiking, and other family-oriented activities within a single destination.

A particularly significant community benefit is the Rockwell Mountain Bike Trails, which will remain publicly accessible independent of campground operations. The trail system will provide year-round recreational opportunities, weather permitting, and support healthy lifestyles, youth recreation, outdoor education, and community engagement.

The project also contributes to the region's ability to attract and retain residents and workforce by expanding access to high-quality outdoor recreation and enhancing the quality of life that is increasingly recognized as an important factor in economic competitiveness.

11.4 Community Partnerships and Regional Planning

The project has been developed through collaboration with a multidisciplinary team of engineers, architects, landscape architects, and specialty recreation designers along with help from local organizations, public agencies, and community partners to ensure the long-term success and sustainability of the development. A long-term partnership with Mankato Area Mountain Bikers (MAMB) will provide stewardship of the public trail system through volunteer maintenance, organized rides, youth programming, instructional clinics, fundraising events, and trail development.

Rockwell RV & Adventure Park also supports the goals of the ***Transform Tomorrow Together: Southern Minnesota 2040 Regional Comprehensive Plan***, which identifies investment in quality-of-life amenities, outdoor recreation, tourism, and talent attraction as important strategies for strengthening the region's economy and supporting long-term growth. Greater Mankato Growth has recognized the project as a featured regional initiative and has provided formal support for its development.

The project will also create opportunities for partnerships with schools, youth organizations, nonprofits, businesses, and community groups through outdoor education, recreational programming, volunteerism, and special events.

11.5 Long-Term Community Asset

Rockwell RV & Adventure Park represents the long-term transition of a historically mined industrial property into a recreational destination that will serve residents and visitors for generations. Rather than leaving the property as a reclaimed industrial site with limited public benefit, the proposed development creates a destination that expands recreation,

supports tourism, encourages healthy outdoor lifestyles, and provides lasting economic and environmental value for Lime Township and the surrounding region.

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12. Consistency with Ordinance and Comprehensive Plan

Rockwell RV & Adventure Park is consistent with the goals and policies of the Lime Township Comprehensive Plan and the Recreation and Campground Ordinance. The project represents the planned transition of a historically mined limestone quarry into a long-term recreational destination while protecting natural resources, maintaining compatibility with surrounding land uses, and supporting the Township's vision for responsible land stewardship.

12.1 Consistency with the Comprehensive Plan

The Comprehensive Plan encourages responsible land use, protection of natural resources, compatible development, and the productive reuse of land following mineral extraction. The proposed project directly supports these objectives by redeveloping a previously disturbed quarry rather than converting agricultural or other undeveloped land.

The project also advances regional goals by expanding outdoor recreation opportunities, supporting tourism, encouraging private investment, and improving quality of life through the creation of a unique recreational destination. The project demonstrates the successful long-term reclamation and productive reuse of a mined property, illustrating how former mineral extraction sites can transition into community assets that continue to benefit Lime Township long after mining activities have ceased.

12.2 Natural Resource Protection

The project incorporates comprehensive measures to protect water quality, groundwater resources, wetlands, wildlife habitat, and other environmentally sensitive features. Existing quarry lakes and reclaimed landforms are incorporated into the site design, while engineered stormwater management, vegetation establishment, and ongoing environmental stewardship will support the long-term health of the property.

12.3 Compatible Land Use

Compatibility with surrounding properties has been a guiding principle throughout the planning process. Recreational amenities are concentrated within the existing quarry where natural topography, berms, vegetation, and distance provide effective separation from neighboring properties. Additional buffering, operational controls, lighting standards,

noise mitigation, and site management practices further support compatibility with adjacent residential, agricultural, and industrial land uses.

12.4 Consistency with the Recreation and Campground Ordinance

The project is located within areas where recreational and campground uses are contemplated through the Interim Use Permit process for previously mined properties. The proposed development is consistent with the intent of these provisions by providing appropriate infrastructure, environmental protection measures, operational controls, public safety features, buffering, and long-term site management while adaptively reusing a reclaimed quarry.

12.5 Overall Consistency

Rockwell RV & Adventure Park fulfills the intent of both the Comprehensive Plan and the Recreation and Campground Ordinance by transforming a historically industrial property into a well-managed recreational destination that provides lasting recreational, environmental, and economic benefits. The project demonstrates thoughtful site planning, responsible environmental stewardship, and compatibility with surrounding land uses while creating a long-term community asset for Lime Township.

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13. Requested Approvals and Flexibility

The Applicant respectfully requests approval of the following items as part of the Rockwell RV & Adventure Park Interim Use Permit application:

13.1 Interim Use Permit

Approval of an Interim Use Permit for the development and operation of Rockwell RV & Adventure Park in accordance with the submitted site plans, operational documents, and supporting technical reports.

13.2 Revocation of Existing Mining Conditional Use Permit

As part of this application, the Applicant requests revocation of the existing Mining Conditional Use Permit (CUP) for those parcels included within this Interim Use Permit (IUP) application. Revocation of the Mining CUP for these parcels will allow the permitted land use to transition from mining to the proposed campground and outdoor recreation use in accordance with this application.

The requested revocation applies only to the parcels included within the proposed IUP boundary. Any remaining parcels not included within this application will continue to be

governed by the existing Mining Conditional Use Permit and may continue to operate in accordance with its terms and applicable Township approvals.

13.3 Variance Requests

Approval of the fencing variances identified within the separate **Fencing Plan** document.

13.4 Supporting Plans

Approval of the following supporting plans submitted as part of the application:

- Operational Plan
- Lighting Plan
- Landscaping Plan
- Fencing Plan
- Complaint Response Plan
- Stormwater Management Plan
- Traffic Impact Study
- Noise Screening Assessment
- Any other technical reports submitted in support of the application

13.5 Final Engineering

The Applicant recognizes that detailed engineering and construction drawings will continue to be refined following land use approval. Minor adjustments to grading, utility alignments, landscaping, infrastructure, parking layouts, and similar engineering details may occur during final design provided such revisions:

- remain consistent with the approved site plan,
- do not materially increase impacts on adjacent properties,
- comply with applicable regulations and permit conditions, and
- do not alter the overall character or intensity of the approved development.

Minor additions or modifications to recreational features, site furnishings, landscaping, and guest amenities that are customary and incidental to the approved recreational use may be incorporated during final design, provided they remain consistent with the approved site plan and do not materially increase the intensity or impacts of the development.

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14. Conclusion

Rockwell RV & Adventure Park represents the thoughtful transformation of a historically mined limestone quarry into a long-term recreational destination that will serve residents

and visitors throughout southern Minnesota. The project has been planned to utilize the property's existing quarry landscape while protecting natural resources, minimizing impacts on neighboring properties, and creating new opportunities for outdoor recreation, tourism, and economic development.

Throughout the planning process, emphasis has been placed on responsible site design, environmental stewardship, public safety, operational management, and compatibility with surrounding land uses. Existing quarry topography, maintained berms, natural vegetation, and carefully planned recreational areas work together to create a development that respects the rural character of Lime Township while providing a productive long-term reuse of a previously disturbed industrial property.

The project also creates lasting public benefits through the Rockwell Mountain Bike Trails, expanded outdoor recreation opportunities, regional tourism, private investment, and partnerships with organizations such as Mankato Area Mountain Bikers and Greater Mankato Growth. These partnerships, combined with the project's support of the Transform Tomorrow Together: Southern Minnesota 2040 Regional Comprehensive Plan, position Rockwell RV & Adventure Park as an investment in the region's future quality of life and economic vitality.

Rather than leaving the property as a reclaimed industrial site with limited public benefit, the proposed development establishes a destination that encourages healthy outdoor lifestyles, supports environmental stewardship, strengthens the regional economy, and creates a lasting community asset for Lime Township.

The Applicant respectfully requests approval of the Interim Use Permit and associated applications and looks forward to continuing to work collaboratively with Township staff, the Planning Commission, Township Board, neighboring property owners, and regulatory agencies throughout the final design, permitting, construction, and long-term operation of the project.

Rockwell RV & Adventure Park

Campground & Recreation Area Operational Plan

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1. Purpose

This Operational Plan establishes the management policies, procedures, and operational standards for Rockwell RV & Adventure Park. The purpose of this plan is to ensure that the campground and recreation areas operate safely, responsibly, and in full compliance with the Lime Township Zoning Ordinance and applicable Blue Earth County and State of Minnesota regulations.

This document outlines management structure, operational procedures, safety practices, environmental protections, and guest conduct expectations.

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2. Management and Staffing

Property Manager

Rockwell RV & Adventure Park shall maintain a designated Property Manager responsible for day-to-day oversight of the campground and recreation areas.

The Property Manager may temporarily modify operating hours, close individual amenities, restrict access to portions of the property, or suspend recreational activities due to weather, maintenance, public safety, special events, environmental conditions, or other operational considerations.

The Property Manager will maintain a process for receiving, documenting, investigating, and responding to concerns from neighboring property owners and the public. A complaint log will be maintained by the Property Manager and made available to the Township upon request. The Property Manager will investigate complaints in a timely manner and implement reasonable corrective actions when warranted.

The Property Manager will be located:

- Onsite, or
- Within two (2) miles of the property boundary.

Contact information for the Property Manager will be clearly posted at:

- The park entrance
- The main lodge / check-in facility
- Campground bulletin boards

- Park website or guest materials

On-Site Staff

During the operating season the park may utilize:

- Onsite staff
- Maintenance personnel
- Guest services staff
- Designated host campers

These personnel will assist with:

- Guest services
- Monitoring campground activity & security
- Addressing operational issues
- Safety and maintenance oversight

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3. Operating Season and Hours of Operation

The campground shall operate on a seasonal basis.

The campground may be open for seven (7) months per calendar year, excluding the months of December, January, and February.

Opening and closing dates will be determined annually based on weather conditions and operational planning.

Hours of Operation

Activity	**Hours**
Campground (Registered Campers)	24 hours during operating season
Mountain Bike Trails	30 min before Sunrise to 30 min after Sunset
Trailhead parking	30 min before Sunrise to 30 min after Sunset
Aqua Park	Posted operating hours, not outside of quiet hours
Cable Park	Posted operating hours, not outside of quiet hours
Climbing areas	Posted operating hours, not outside of quiet hours
Main Lodge	Posted operating hours

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4. Recreational Vehicle Storage

No recreational units may remain stored onsite outside of the approved seven-month operating season.

All seasonal campers must remove their recreational units prior to the park closing date each year unless otherwise authorized for maintenance or operational purposes.

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5. Campground Registration and Guest Access

All campground users must be registered guests.

Access to campground facilities and recreational amenities will be managed through designated entrances, guest registration procedures, activity admissions, posted operating hours, and staff oversight. While the Rockwell Mountain Bike Trail System is intended to remain publicly accessible during posted hours, access to the campground, cable wake park, aqua park, climbing areas, and other guest amenities will generally be limited to registered campers, day-use guests, organized groups, or other authorized participants.

Registered guests will receive:

- Site assignment
- Parking instructions
- Park rules
- Emergency contact information

No person shall remain within recreation areas between 10:00 PM and 8:00 AM, except registered campers in designated campground areas.

Visitors must comply with campground rules and may be required to depart the park during quiet hours.

The Property Manager may restrict or suspend access to individual recreational amenities due to capacity limitations, weather conditions, maintenance activities, public safety concerns, special events, or other operational considerations.

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6. Mountain Bike Trail Access and Parking

The mountain bike trail system is intended to provide public recreational access independent of the campground and other park amenities. Trail users are expected to utilize only designated trailheads, parking areas, and approved access routes.

The mountain bike trail and parking area shall generally be open from 30 minutes before sunrise to 30 minutes after sunset, unless otherwise posted, temporarily closed by the Property Manager, or authorized for approved events. The following activities are prohibited within the trailhead parking area:

- Overnight camping or sleeping in vehicles
- Campfires or open flames
- Consumption of alcoholic beverages outside designated areas
- Loud or amplified music
- Vehicle repairs or maintenance, except emergency repairs
- Littering or illegal dumping
- Operation of off-road motorized vehicles
- Unauthorized commercial activity
- Loitering after posted operating hours

Vehicles may only park in designated parking spaces. Parking for trailers, buses, or oversized vehicles may be restricted to designated areas.

The Property Manager may temporarily close the trail system or parking area due to weather conditions, trail maintenance, public safety concerns, special events, or emergency situations.

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7. Waste Management and Refuse Disposal

Waste Handling

The storage, collection, and disposal of refuse and garbage shall comply with **Chapter 16 (Solid Waste Management) of the Blue Earth County Code**.

Waste management practices shall prevent:

- Health hazards
- Rodent harborage
- Insect breeding areas
- Fire hazards
- Air pollution

Waste Containers

Adequate numbers of containers will be provided throughout the campground. Containers will be:

- Fly-tight
- Watertight
- Rodent-proof

Waste Collection

Garbage and refuse will be collected at least twice per week, and more frequently if necessary to prevent nuisance conditions.

Waste Disposal

Final disposal of waste shall occur at a state-permitted waste management facility licensed by Blue Earth County, unless otherwise approved by the Township.

Garbage and refuse shall not be burned, buried, or incinerated onsite.

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8. Property Boundaries

Campgrounds adjacent to private land shall clearly identify property boundaries through:

- Signage
- Fencing
- Natural barriers
- Landscaping or other appropriate means

These measures will help ensure guests remain within designated recreation areas.

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9. Recreational Vehicle Licensing

All recreational campground vehicles shall maintain a current state vehicle license in states where licensing is required.

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10. Quiet Hours and Noise Management

Campers and guests shall not create noise that disturbs the peace, quiet, and tranquility of the campground.

Quiet Hours

Quiet hours shall be observed between:

10:00 PM and 8:00 AM

Signage identifying quiet hours will be posted throughout the campground.

During quiet hours:

- Radios
- Televisions

- Music systems
- Other sound-producing devices

must not be audible beyond the boundary of an individual campsite.

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11. Amplified Sound

No loudspeaker, amplifier, or other sound-amplifying device may be operated unless:

- A permit has been issued by the Township, or
- The use is authorized within the Interim Use Permit for the property.

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12. Large Gatherings and Special Events

Large gatherings involving more than 200 persons may be conducted only if:

- Authorized under the Interim Use Permit, or
- Approved in writing by the Township Board.

Rockwell RV & Adventure Park may host organized recreational events, youth programs, races, instructional clinics, camping weekends, and other outdoor recreation activities. Events may include competitive events, instructional programs, fundraising events, community events, and other recreational activities consistent with the operation of the park.

Event organizers shall be responsible for complying with all applicable park rules regarding parking, traffic management, sanitation, noise, public safety, and emergency access. Additional staffing, temporary parking areas, or traffic control measures may be utilized when warranted by the size or nature of an event.

Special events will generally occur during normal operating hours unless otherwise authorized.

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13. Private Events and Facility Rentals

Rockwell RV & Adventure Park may host private events and facility rentals that are compatible with the recreational nature of the park. Examples of such events may include family reunions, company outings, weddings, graduation celebrations, nonprofit gatherings, youth group activities, school programs, corporate retreats, and other private recreational events. Private events may utilize meeting spaces, campground facilities, recreational amenities, or designated outdoor gathering areas.

Private events shall be managed by the Property Manager or designated staff and shall be conducted in a manner that does not interfere with the safe operation of the park or create unreasonable impacts on neighboring properties. Event organizers shall comply with all applicable park rules regarding parking, noise, sanitation, alcohol service, fire safety, and visitor conduct.

Private events utilizing multiple park amenities may require advance reservations, event agreements, proof of insurance where appropriate, or additional staffing to ensure safe operation.

Events involving amplified sound, temporary structures, unusually large attendance, or activities outside normal operating procedures shall comply with the requirements of the Interim Use Permit and any applicable Township approvals.

Rockwell RV & Adventure Park reserves the right to establish event-specific operating conditions, occupancy limits, parking plans, security measures, and hours of operation based on the size and nature of the event.

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14. Organized Recreational Activities

Rockwell RV & Adventure Park may conduct or host organized recreational activities including, but not limited to:

- Mountain bike races
- Youth mountain bike camps
- Skills clinics and instructional programs
- Wakeboarding lessons and competitions
- Climbing instruction and competitions
- Community rides
- Outdoor recreation demonstrations
- School, nonprofit, and corporate group outings

These activities shall be managed by park staff or authorized event organizers and conducted in accordance with applicable safety procedures and operational policies.

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15. Fire Safety

Fires are permitted only in designated locations such as fire pits or fire rings.

All fires must:

- Be attended at all times by a responsible person
- Be fully extinguished when no longer in use
- Not exceed three (3) feet in diameter
- Be enclosed by the fire ring provided within the campsite

Firewood used onsite must comply with applicable state and county regulations.

Visitors may not leave burning materials such as matches, cigarettes, or cigars unattended.

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16. Ground Disturbance

Visitors may not dig trenches or conduct excavations in campground or recreation areas.

The placement of tent stakes or anchors for tents is permitted.

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17. Water Use and Swimming

Visitors swim or wade at their own risk.

Access to designated water recreation facilities shall be limited to authorized participants during posted operating hours. Private boats, personal watercraft, and unauthorized paddlecraft shall not be permitted within designated recreation lakes unless specifically authorized by park management for operational, maintenance, or emergency purposes.

Water recreation areas may be temporarily closed due to weather, water quality concerns, maintenance activities, public safety considerations, or other operational needs. Guests shall comply with posted signage, staff instructions, and all designated restricted areas.

Swimming and wading shall only occur:

- In designated swimming areas
- During posted park hours, unless otherwise approved.

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18. Visitor Conduct

Visitors shall comply with posted signage, staff instructions, and temporary area closures established for safety, maintenance, environmental protection, or operational purposes. The following conduct is prohibited within campground and recreation areas:

- Threatening, abusive, insulting, or obscene language
- Indecent behavior
- Breach of peace
- Harassment of visitors
- Interference with visitor property

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19. Alcohol and Drug Use

Visitors may not:

- Be under the influence of intoxicating liquor in a disruptive or unsafe manner
- Possess or use illegal drugs within the campground or recreation areas.

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20. Littering and Environmental Protection

Visitors shall not:

- Deposit bottles, cans, broken glass, sewage, or waste outside designated receptacles
- Discharge substances into lakes, streams, ponds, or other bodies of water

Proper waste disposal facilities will be provided throughout the park.

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21. Pets

Pets are permitted only if:

- Restrained on a leash no longer than six (6) feet, or
- Confined within the visitors' campsite.

Pets may not be left unattended in vehicles.

Pet owners must pick up and properly dispose of pet waste.

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22. Wildlife Protection

Visitors may not:

- Kill, trap, hunt, or pursue wildlife
- Disturb wildlife within the park

Fishing may be permitted in designated areas in accordance with state regulations.

Visitors may not introduce insects, fish, wildlife, plants, or chemicals that could harm vegetation or wildlife.

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23. Weapons

The discharge of weapons within or into the recreation or campground area is prohibited, including:

- Firearms
- Archery equipment
- BB guns
- Slingshots

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24. Vehicles and Traffic

Motor vehicles may only be operated on:

- Designated roadways
- Parking areas
- Approved access routes

Drivers must possess a valid driver's license.

Vehicles may not:

- Exceed posted speed limits
- Produce excessive noise
- Emit dense smoke or fumes
- Operate in a manner that creates excessive dust or unsafe conditions.

Vehicles must park only in designated parking areas.

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25. Roadway Maintenance and Dust Control

Rockwell RV & Adventure Park will maintain internal roadways in a manner that promotes safe travel conditions while minimizing dust generation, erosion, and the tracking of aggregate or soil onto adjacent public roadways.

Internal campground roads will primarily consist of well-maintained aggregate surfaces designed for low-speed recreational traffic. A posted speed limit of 10 miles per hour throughout the campground will reduce dust generation while promoting pedestrian safety.

Routine roadway maintenance may include grading, placement of additional aggregate, drainage improvements, sweeping or removal of aggregate from paved surfaces, and other maintenance activities necessary to maintain roadway conditions. Dust suppression measures may be implemented during extended dry weather or when operational conditions warrant.

The primary entrance roadway connecting the campground to the public roadway system will be paved with asphalt to minimize the tracking of aggregate and soil onto adjacent public roads. The Property Manager may implement additional roadway maintenance or dust control measures as necessary to protect public safety and maintain the quality of the campground environment.

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26. Off-Road Vehicles

Non-licensed motorized vehicles such as:

- Dirt bikes
- Mini bikes
- Off-road vehicles

are prohibited within the campground and recreation areas except for maintenance purposes.

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27. Watercraft

Watercraft must be operated in accordance with all applicable state laws governing water and boating safety.

The use or launching of privately owned watercraft, including boats, canoes, kayaks, paddleboards, personal watercraft, or similar recreational equipment, is prohibited unless specifically authorized by the Property Manager. Watercraft owned or authorized by the park may be used for recreational programming, maintenance activities, safety operations, or emergency response.

The Property Manager may temporarily restrict or prohibit watercraft use due to weather conditions, maintenance activities, public safety concerns, special events, or other operational considerations.

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28. Restricted Roads

Motor vehicles may not operate on roads that are posted, gated, chained, or otherwise restricted from vehicular traffic.

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29. Fishing and Disposal of Remains

Fishing may be permitted in designated areas of the park in accordance with all applicable Minnesota fishing regulations and licensing requirements.

Fishing shall not be permitted:

- Within designated swimming or aqua park areas
- Within posted no-fishing zones
- In areas temporarily closed for safety or maintenance

Fish cleaning shall only occur at designated fish cleaning stations or approved locations provided by the park. Disposal of fish remains shall occur only in designated waste receptacles or disposal facilities. Disposal of fish remains in the lakes, shoreline, campsites, restroom facilities, or garbage containers not intended for fish waste is prohibited. Fish cleaning stations, if provided, shall be maintained in a sanitary condition and serviced regularly.

The Property Manager may temporarily restrict fishing activities to protect public safety, water quality, wildlife, or recreational operations.

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30. Emergency Response and Safety Procedures

Rockwell RV & Adventure Park will maintain emergency response procedures to ensure the safety of guests and staff. Staff will receive training appropriate to their assigned responsibilities, including emergency response procedures, guest safety, and operation of recreational facilities.

Emergency Contact Information

Emergency contact information will be clearly posted at:

- The park entrance
- Main lodge or check-in facility
- Campground bulletin boards
- Bathhouses and common facilities

Guests will be instructed to call **911** in the event of emergencies involving fire, medical issues, or public safety concerns.

Staff Response

Park staff will assist emergency responders by:

- Directing responders to the correct location
- Providing site maps if necessary
- Assisting with evacuation if required

Site maps, emergency location markers, internal communication systems, and emergency response equipment will be maintained to assist staff and emergency responders in locating and accessing incidents throughout the property. Staff may initiate temporary closure of recreational facilities when conditions present an unreasonable risk to guest safety.

Fire Safety

Fire extinguishers will be located in:

- The main lodge
- Maintenance facilities
- Other appropriate locations throughout the park.

Open fires will only be permitted in designated fire pits.

Evacuation Procedures

In the event of severe weather, wildfire risk, or other emergency conditions, park staff may direct visitors to evacuate designated areas of the campground.

Guests will be instructed to follow posted emergency procedures and staff directions.

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31. Water Safety

Water recreation areas will include clearly posted signage identifying:

- Designated swimming areas
- Swimming hours
- Safety warnings
- Swim-at-your-own-risk policies

Swimming will only be permitted in designated areas during approved hours.

Safety and rescue equipment, including rescue boards, rescue tubes, throw bags, reaching poles, first aid supplies, automated external defibrillators (AEDs), or other emergency response equipment may be maintained where appropriate based on the recreational

activity being provided. Watercraft or other specialized rescue equipment may also be utilized to facilitate rapid emergency response.

Guests will be responsible for supervising children and inexperienced swimmers.

Water recreation facilities will be operated and maintained in accordance with applicable Minnesota Department of Health requirements and other applicable regulatory standards.

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32. Maintenance and Inspection

Rockwell RV & Adventure Park will maintain the campground and recreation areas to ensure a safe and well-maintained environment.

Routine Inspections

Staff will conduct routine inspections of:

- Campground sites
- Roads and parking areas
- Recreation areas
- Waste collection areas
- Fire pits and safety features

Facility Maintenance

Regular maintenance will be performed on:

- Bathhouses
- Water systems
- Waste facilities
- Landscaping
- Trails and recreational infrastructure

Corrective Action

Any unsafe condition or damaged infrastructure identified during inspections will be repaired or corrected as promptly as possible.

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33. Enforcement of Rules

All visitors are required to comply with campground rules and operational policies.

The Property Manager or designated staff may:

- Issue warnings

- Require corrective action
- Remove visitors who fail to comply with park rules.

Violations of park rules may result in removal from the campground and possible prohibition from future use of the facility.

Fencing Plan

Rockwell RV & Adventure Park

The purpose of the proposed fencing plan is to establish clear project boundaries, support public safety, direct recreational access, and provide separation between recreational activities and adjacent properties while minimizing impacts to the existing natural landscape and wildlife movement corridors. The fencing plan has been developed to follow the ordinance language where possible and work in conjunction with the unique topography and historic quarry features of the property while balancing safety, environmental stewardship, and compatibility with surrounding land uses.

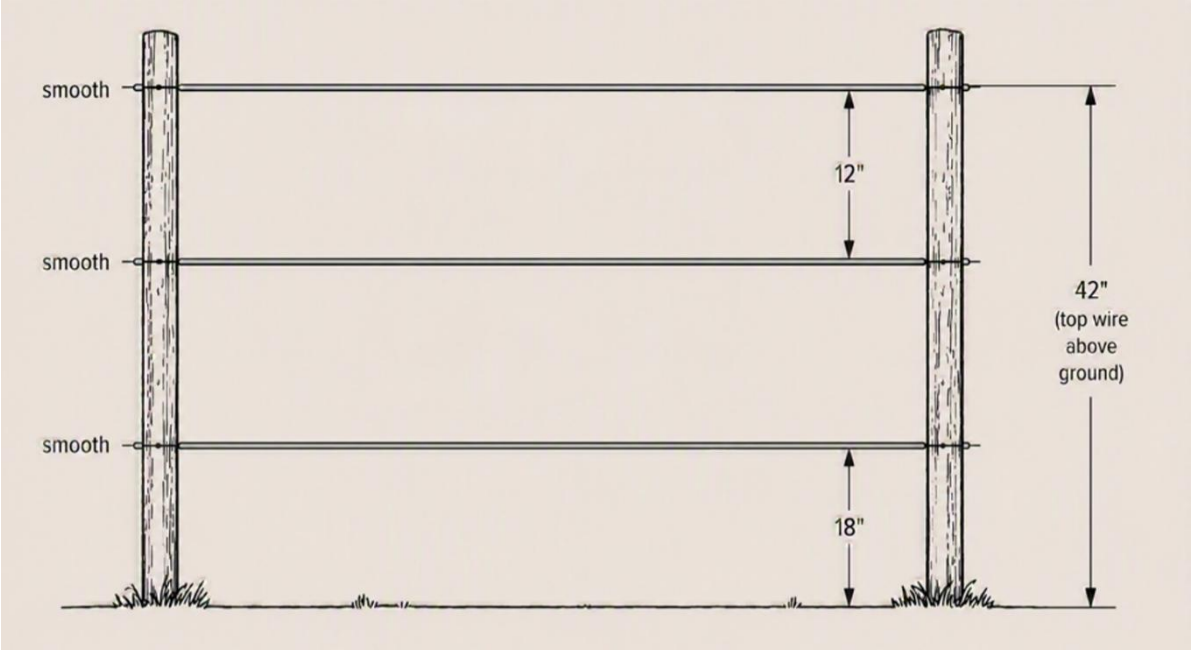
Proposed Fencing

The proposed fencing is intended to utilize a wildlife-permeable fencing design consistent with recommendations provided by the Minnesota Department of Natural Resources (MNDNR). This style of fencing is designed to provide property delineation and public safety while also allowing for continued wildlife movement throughout the area. The proposed fencing generally consists of a smooth-wire post-and-wire style fence with increased spacing between wires and additional ground clearance at the bottom of the fence to allow smaller wildlife like fawns to more safely pass beneath or over the fence. Unlike traditional woven-wire or tightly spaced fencing systems, wildlife-permeable fencing is specifically intended to reduce wildlife entanglement and minimize disruption to natural movement corridors. Similar wildlife-friendly fencing standards have been promoted by multiple wildlife agencies and conservation organizations for use in areas containing migratory wildlife habitat and open landscapes.

The MNDNR recommended fence consists of a top wire at a maximum height of 42 inches. The top two wires of a fence should be at least 12 inches apart to reduce entanglement. The bottom wire should be high enough for animals like fawns who prefer to crawl underneath the fence. The bottom wire should be 18 inches from the ground. Smooth wires on top and bottom should be used to prevent snagging and fence visibility markers will reduce wildlife collisions.

The Applicant proposes to utilize this wildlife-permeable fencing design as the primary fencing type throughout the project along both residential and non-residential property boundaries wherever practical. The use of this fencing style is intended to better align with the existing natural character of the property, reduce impacts to wildlife movement, and

support the ordinance goals related to wildlife safety and preservation of natural features while still providing a clearly defined project boundary and controlled recreation area.



<u>Fencing Variance Request #1</u>

Township Road – 230th Lane

The south end of the property is bordered by 230th Lane, a low-volume township roadway that serves only a single residential property and several vacant parcels. Along this section of the property is a narrow wooded corridor containing mature existing vegetation and historic limestone stockpiles remaining from the former quarry operations. The width of this corridor averages about 125 feet, with many existing trees located within approximately 10 feet of the roadway edge.

A Practical Difficulty exists in this area due to the unique physical characteristics of the property and the historic quarry landscape. Strict application of the fence setback requirements from the roadway centerline, combined with the required interior trail setbacks from the fence, would effectively eliminate the reasonable recreational use of this corridor for low-impact mountain bike trail development. Compliance with the ordinance as written would require unnecessary disturbance and clearing of existing mature vegetation and would limit the ability to incorporate the historic limestone stockpile features into the trail system.

The proposed variance request reduces the fencing from 65 feet from centerline of the township road to 35 feet in this limited area in order to preserve the existing wooded buffer, minimize grading and land disturbance, and maintain the historic quarry character of the site. The existing vegetation already provides effective visual screening and separation between the roadway and recreational activities. In addition, the proposed trail use in this area consists of low-profile, passive recreational mountain bike trails with minimal visual and noise impacts.

Variance Criteria Responses

1. In your opinion, is the variance in harmony with the purposes and intent of the ordinance?

Yes. The requested variance remains consistent with the purposes and intent of the ordinance by continuing to provide roadway separation, public safety, and buffering while minimizing unnecessary disturbance to the existing natural landscape. The proposed reduced setback allows preservation of mature vegetation, existing wooded screening, and historic quarry features while still maintaining a clearly defined recreational corridor adjacent to a very low-volume township roadway. The proposed mountain bike trail use within this area is low-impact in nature and does not create the type of intensive activity or safety concern that would necessitate the full ordinance setback.

2. In your opinion, is the variance consistent with the comprehensive plan?

Yes. The requested variance is consistent with the comprehensive plan goals related to environmental stewardship, preservation of natural features, adaptive reuse of historically disturbed land, and expansion of outdoor recreational opportunities. The variance supports retention of existing vegetation and minimizes land disturbance while allowing development of a low-impact recreational trail corridor that enhances public recreational access and tourism opportunities within the area.

3. In your opinion, does the proposal put property to use in a reasonable manner?

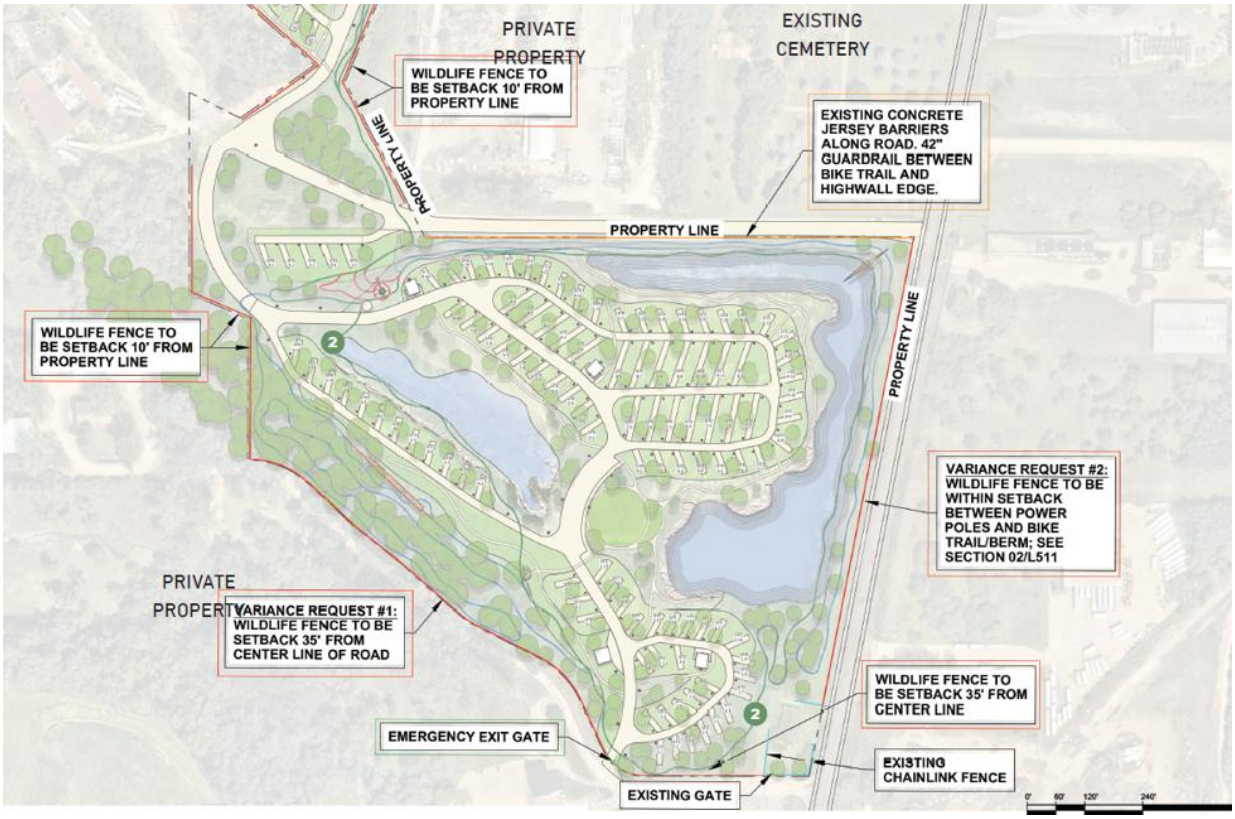
Yes. The variance allows the property to be utilized in a reasonable manner by preserving the ability to develop mountain bike trails within a narrow corridor that would otherwise become largely unusable under strict application of the ordinance setback requirements. The combination of roadway setbacks, fencing setbacks, and trail setbacks would effectively eliminate practical recreational use of this portion of the property despite the area being well suited for low-impact trail development. The proposed use is compatible with the surrounding rural area and maintains appropriate separation from the roadway.

4. In your opinion, are there circumstances unique to the property?

Yes. Unique circumstances exist due to the narrow wooded corridor along 230th Lane, the presence of mature existing vegetation close to the roadway, and the historic limestone stockpiles associated with the former quarry operations. These site characteristics create physical constraints that are unique to this property and make strict compliance with the ordinance setback impractical without causing unnecessary vegetation clearing, grading, and disturbance to historic quarry features.

5. In your opinion, will the variance maintain the essential character of the locality?

Yes. The requested variance will maintain the essential rural and natural character of the area by preserving existing wooded vegetation, minimizing disturbance, and avoiding the creation of an excessively wide cleared corridor adjacent to the roadway. The proposed mountain bike trail use is low-profile and low-impact, with minimal visual or noise impacts. Because 230th Lane is a very low-volume roadway serving limited residential properties, the reduced setback will not materially alter the character of the surrounding area.



<u>Fencing Variance Request #2</u>

3rd Avenue Corridor (McClure and Stoffel)

Along the portions of the McClure and Stoffel properties adjacent to 3rd Avenue, the Applicant is requesting a variance from the ordinance requirement establishing a minimum fence setback of 130 feet from the centerline of the roadway. Instead, a wildlife-friendly fence is proposed immediately outside the public road right-of-way, generally aligned just outside the existing utility pole corridor to retain access for the utility company's maintenance needs.

A practical difficulty exists because the existing quarry topography, including quarry highwalls and water features, is located within the required setback area. Strict application of the setback would place portions of the required fence within quarry water or otherwise create impractical construction and maintenance conditions. In addition, it would unnecessarily separate the roadway safety berm from the fence, creating an isolated strip of land that would be difficult to maintain while reducing the usable recreational area of the property.

Ryan Thilges, Blue Earth County Engineer, has indicated that the primary concern along this corridor is maintaining the roadway safety berm and preserving the public road right-of-way. The proposed fence alignment satisfies these objectives by locating the fence immediately outside the right-of-way while maintaining the existing berm adjacent to the roadway. The wildlife-friendly fence design will provide a clearly defined property boundary while allowing wildlife movement and minimizing impacts to the rural character of the corridor.

Variance Criteria Responses

1. In your opinion, is the variance in harmony with the purposes and intent of the ordinance?

Yes. The requested variance remains consistent with the purpose and intent of the ordinance by providing a continuous fence along the roadway to clearly define the property boundary and enhance public safety. While the fence will be located closer to the roadway than the prescribed setback, it will continue to achieve the ordinance's safety objectives while recognizing the unique physical constraints of the former quarry.

2. In your opinion, is the variance consistent with the Comprehensive Plan?

Yes. The requested variance supports the Comprehensive Plan by facilitating the adaptive reuse of a previously mined property while maintaining roadway safety, preserving existing infrastructure, minimizing unnecessary land disturbance, and utilizing a wildlife-friendly fence design compatible with the surrounding rural landscape.

3. In your opinion, does the proposal put property to use in a reasonable manner?

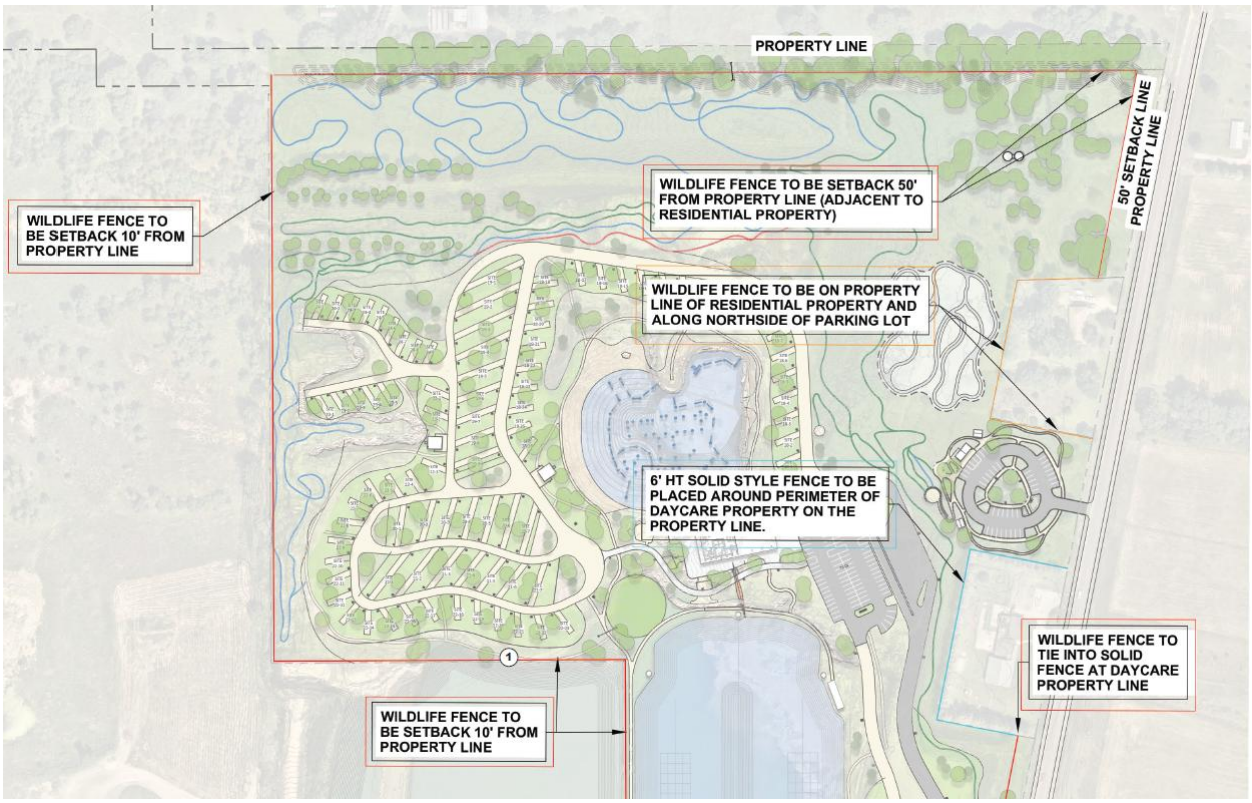
Yes. Locating the fence immediately outside the road right-of-way allows the property to be used in a practical and reasonable manner while maintaining the roadway safety berm and maximizing the efficient use of the reclaimed quarry property. Strict application of the 130-foot setback would create impractical maintenance conditions and unnecessarily reduce the usable recreational area without providing additional public safety benefits.

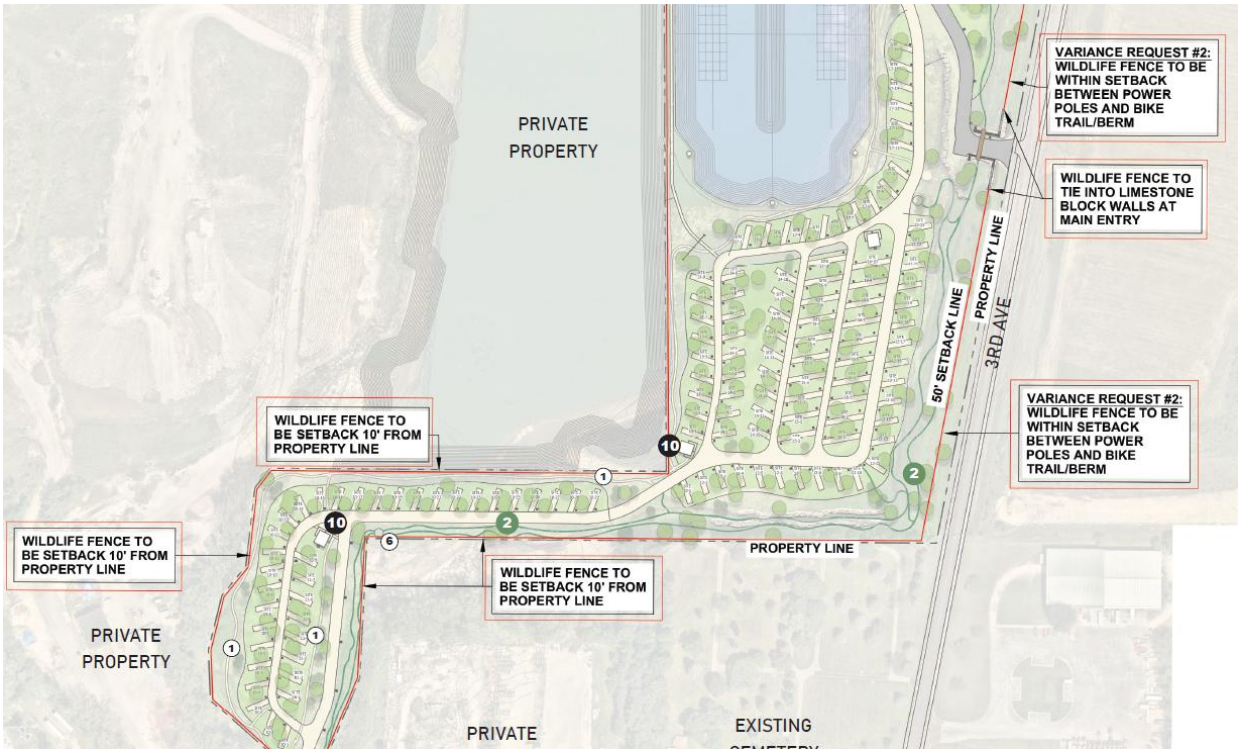
4. In your opinion, are there circumstances unique to the property?

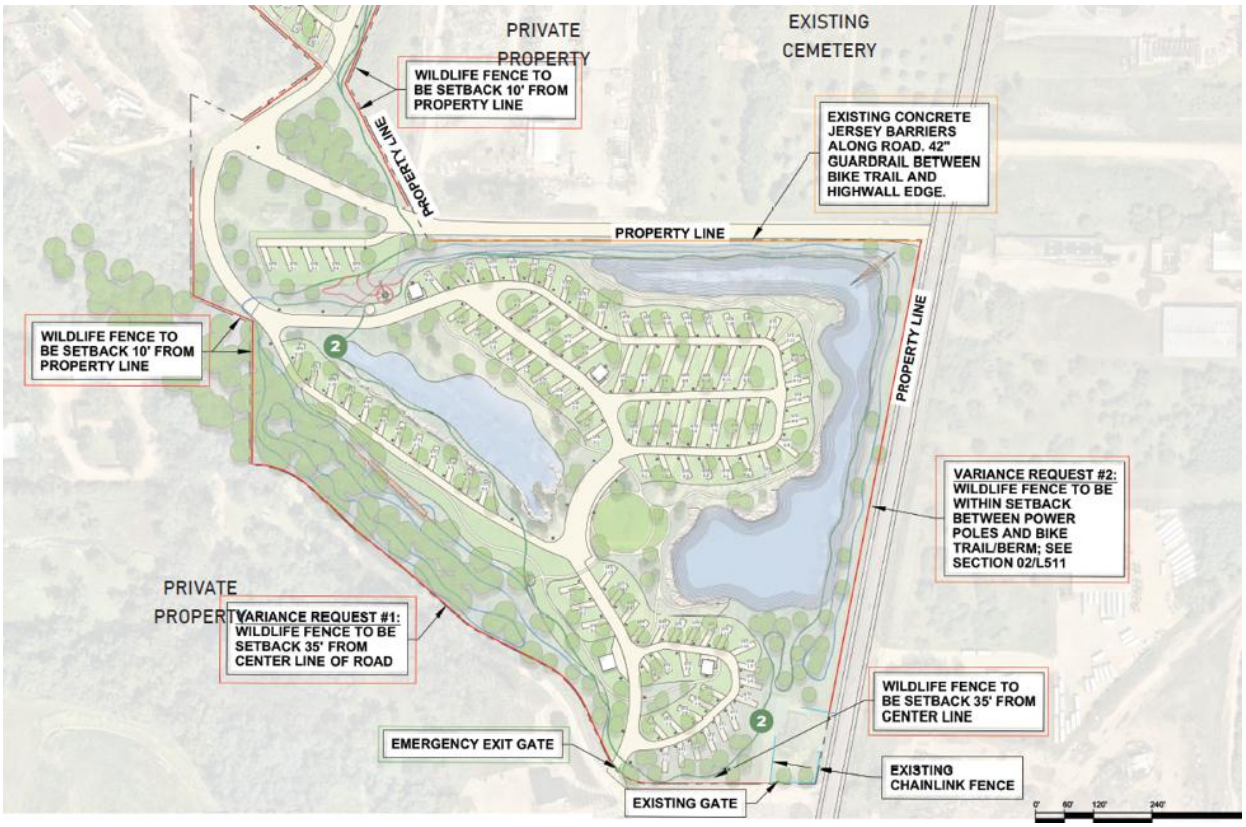
Yes. Unique circumstances exist due to the historic quarry highwalls, quarry water features, existing roadway alignment, roadside berm, and utility corridor. These physical conditions are unique to the property and make strict compliance with the prescribed fence setback impractical.

5. In your opinion, will the variance maintain the essential character of the locality?

Yes. The proposed wildlife-friendly fence will maintain the rural character of the area while providing a continuous property boundary adjacent to the roadway. By following the existing utility corridor and preserving the roadside berm, the fence will integrate with the existing landscape without adversely affecting neighboring properties or roadway operations.



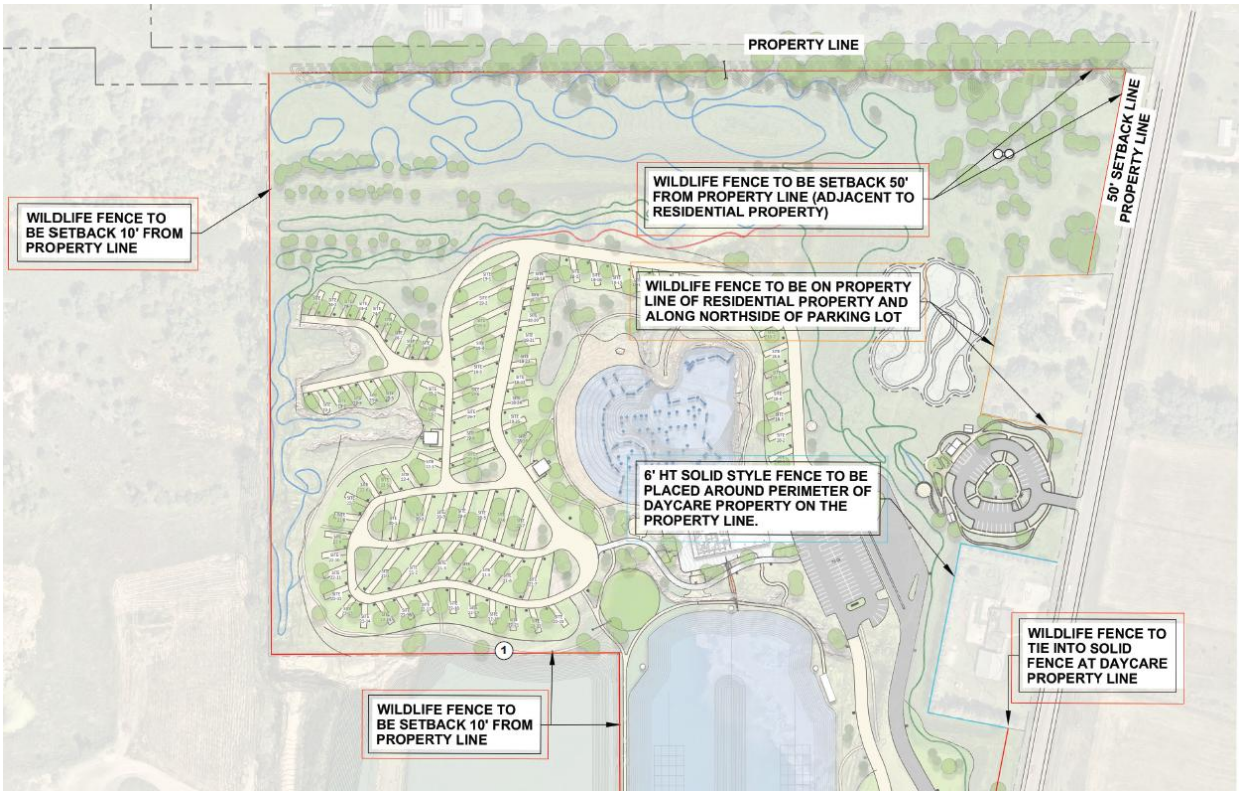

PRIVATE PROPERTY
VARIANCE REQUEST #2: WILDLIFE FENCE TO BE WITHIN SETBACK BETWEEN POWER POLES AND BIKE TRAIL/BERM
WILDLIFE FENCE TO TIE INTO LIMESTONE BLOCK WALLS AT MAIN ENTRY
PROPERTY LINE
50' SETBACK LINE
3RD AVE
WILDLIFE FENCE TO BE SETBACK 10' FROM PROPERTY LINE
VARIANCE REQUEST #2: WILDLIFE FENCE TO BE WITHIN SETBACK BETWEEN POWER POLES AND BIKE TRAIL/BERM
WILDLIFE FENCE TO BE SETBACK 10' FROM PROPERTY LINE
PROPERTY LINE
WILDLIFE FENCE TO BE SETBACK 10' FROM PROPERTY LINE
PRIVATE PROPERTY
PRIVATE
EXISTING


PRIVATE PROPERTY
EXISTING CEMETERY
WILDLIFE FENCE TO BE SETBACK 10' FROM PROPERTY LINE
PROPERTY LINE
EXISTING CONCRETE JERSEY BARRIERS ALONG ROAD. 42" GUARDRAIL BETWEEN BIKE TRAIL AND HIGHWALL EDGE.
PROPERTY LINE
WILDLIFE FENCE TO BE SETBACK 10' FROM PROPERTY LINE
VARIANCE REQUEST #2: WILDLIFE FENCE TO BE WITHIN SETBACK BETWEEN POWER POLES AND BIKE TRAIL/BERM; SEE SECTION 02/L511
PRIVATE PROPERTY
VARIANCE REQUEST #1: WILDLIFE FENCE TO BE SETBACK 35' FROM CENTER LINE OF ROAD
WILDLIFE FENCE TO BE SETBACK 35' FROM CENTER LINE
EMERGENCY EXIT GATE
EXISTING CHAINLINK FENCE
EXISTING GATE
0' 60' 120' 240'

North Residential Border

Along the northern property boundary adjacent to the existing residential neighborhood, the proposed fencing plan is intended to **comply** with the ordinance setback requirements by locating the fence approximately 50 feet from the residential property line. This section of fencing is intended to provide separation between the recreational uses within the project area and the adjacent residential properties while maintaining a vegetated, screened buffer corridor along the property boundary.

Consistent with the overall project fencing approach and recommendations provided by the Minnesota Department of Natural Resources (MNDNR), the Applicant proposes utilizing the previously described wildlife-permeable fencing design in place of a traditional six-foot fence. The proposed fencing will provide a clearly defined project boundary while also allowing for continued wildlife movement and reducing impacts to natural wildlife corridors. Existing vegetation within this setback area will be retained wherever practical along with new vegetation to provide visual screening and buffering between the project and the adjacent residential neighborhood.

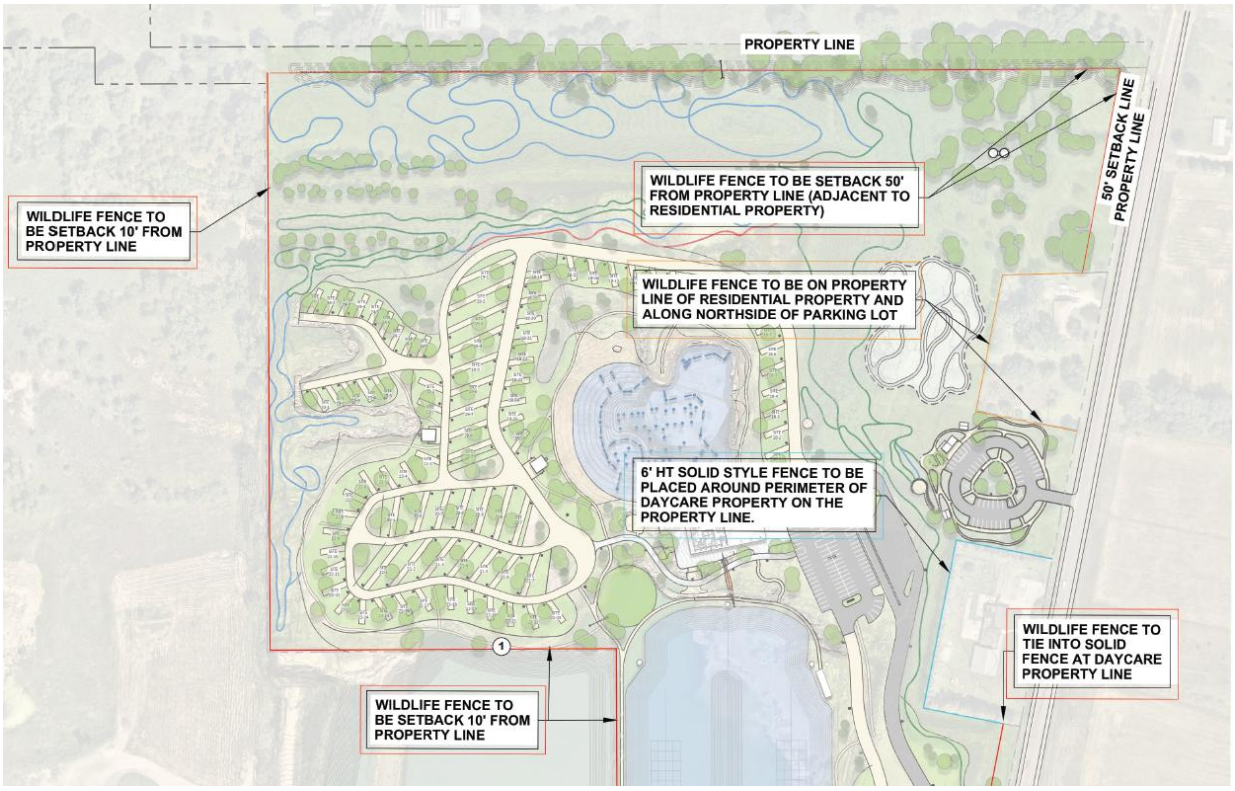


Non-Residential Property Boundaries

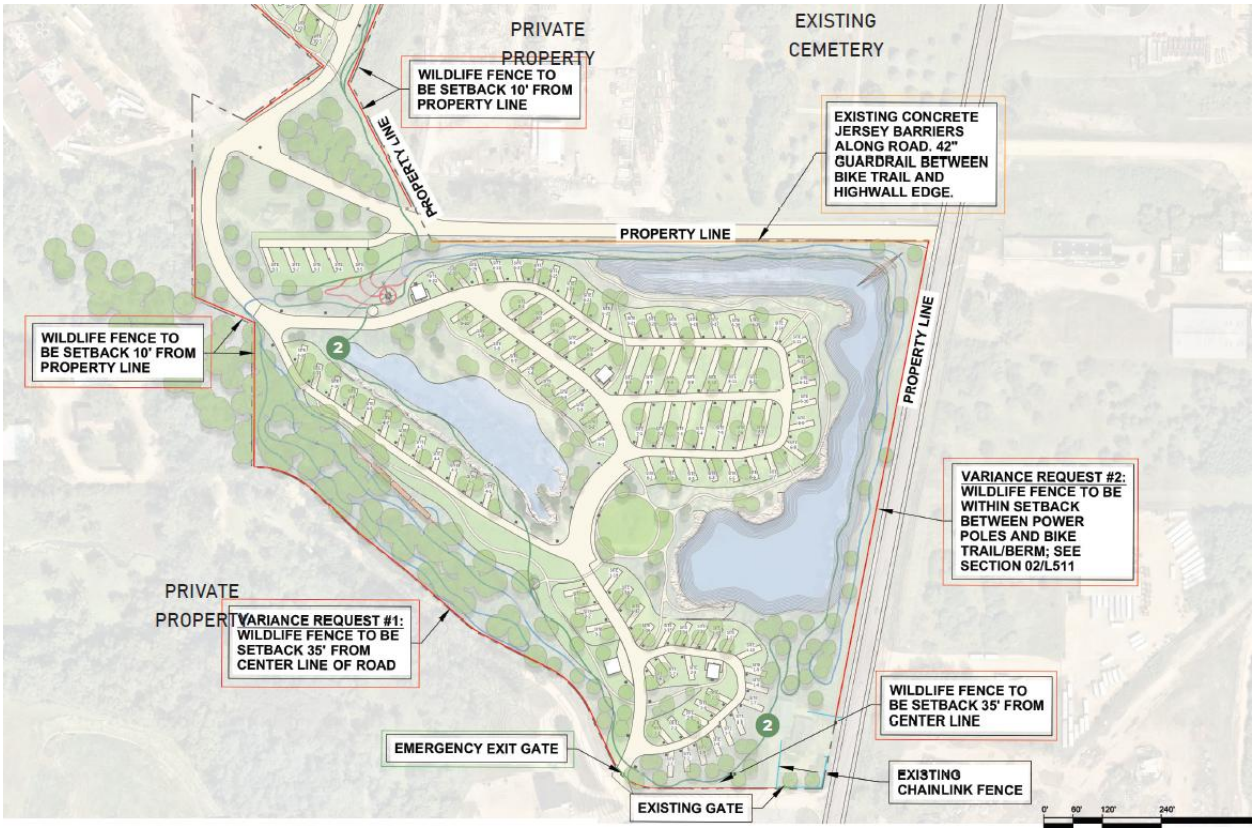
Along property boundaries adjoining non-residential land uses, perimeter fencing will be installed in accordance with the requirements of the Lime Township Zoning Ordinance. Fencing will generally be located a minimum of 10 feet inside the property line, consistent with the ordinance, while following existing topography and site conditions where practical.

Several adjoining non-residential properties already contain existing perimeter fencing, including the Pilgrim's Rest Cemetery property, the Storm Equipment property, and the property located southwest of 231st Lane. Where these existing fences are present, the proposed fencing will be coordinated to provide a continuous and clearly defined property boundary while avoiding unnecessary duplication where appropriate.

A wildlife-friendly fence design consisting of three smooth wires will be utilized along these boundaries to provide a clear property delineation while maintaining compatibility with adjacent rural land uses and allowing continued wildlife movement throughout the area.




PRIVATE PROPERTY
VARIANCE REQUEST #2: WILDLIFE FENCE TO BE WITHIN SETBACK BETWEEN POWER POLES AND BIKE TRAIL/BERM
WILDLIFE FENCE TO TIE INTO LIMESTONE BLOCK WALLS AT MAIN ENTRY
PROPERTY LINE
50' SETBACK LINE
3RD AVE
WILDLIFE FENCE TO BE SETBACK 10' FROM PROPERTY LINE
VARIANCE REQUEST #2: WILDLIFE FENCE TO BE WITHIN SETBACK BETWEEN POWER POLES AND BIKE TRAIL/BERM
WILDLIFE FENCE TO BE SETBACK 10' FROM PROPERTY LINE
PROPERTY LINE
WILDLIFE FENCE TO BE SETBACK 10' FROM PROPERTY LINE
PRIVATE PROPERTY
PRIVATE
EXISTING


PRIVATE PROPERTY
EXISTING CEMETERY
WILDLIFE FENCE TO BE SETBACK 10' FROM PROPERTY LINE
PROPERTY LINE
EXISTING CONCRETE JERSEY BARRIERS ALONG ROAD. 42" GUARDRAIL BETWEEN BIKE TRAIL AND HIGHWALL EDGE.
PROPERTY LINE
WILDLIFE FENCE TO BE SETBACK 10' FROM PROPERTY LINE
VARIANCE REQUEST #2: WILDLIFE FENCE TO BE WITHIN SETBACK BETWEEN POWER POLES AND BIKE TRAIL/BERM; SEE SECTION 02/L511
PRIVATE PROPERTY
VARIANCE REQUEST #1: WILDLIFE FENCE TO BE SETBACK 35' FROM CENTER LINE OF ROAD
WILDLIFE FENCE TO BE SETBACK 35' FROM CENTER LINE
EMERGENCY EXIT GATE
EXISTING CHAINLINK FENCE
EXISTING GATE
0' 60' 120' 240'

Variance Request #3

Historic Quarry Derrick Crane

Applicant: Rockwell RV & Adventure Park

Applicable Ordinance

Lime Township Zoning Ordinance – Structure Height

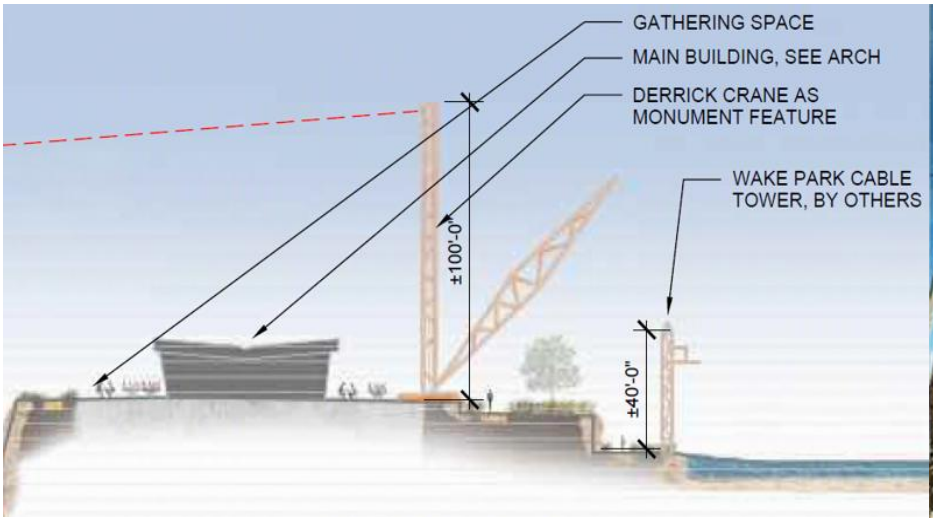
- **Industry District** structures shall have no height limitation.
- **Rural Conservation District:** Commercial structures shall not exceed thirty-five (35) feet in height.
- **Rural Conservation District:** Accessory structures shall not exceed thirty-five (35) feet in height.

Variance Requested

Rockwell RV & Adventure Park requests approval of a variance to allow the installation and preservation of an approximately 100-foot-tall Historic Quarry Derrick Crane within the Rural Conservation District portion of the property.

The derrick crane will serve as a permanent historic interpretive feature recognizing the property's limestone quarry heritage. The crane will be permanently secured in place and will not be used for lifting operations or any industrial purpose.

A second historic derrick crane is proposed within the Industry District near the northeast corner of McClure quarry, where no structure height limitation applies. Therefore, no variance is requested for that structure.





Variance Criteria

1. Is the variance request in harmony with the general purpose and intent of the Zoning Ordinance?

Yes. The requested variance is consistent with the intent of the zoning ordinance because it does not increase the intensity of development or introduce additional commercial building space within the Rural Conservation District. Instead, it allows for the preservation of an authentic piece of historic quarry equipment that reflects the property's long-standing industrial history and supports the adaptive reuse of the former quarry as a recreational destination.

The proposed derrick crane is intended as a permanent interpretive landmark and educational feature rather than an occupied structure or active industrial facility.

2. Is the owner proposing to use the property in a reasonable manner not permitted by the Zoning Ordinance?

Yes. The proposed recreational use of the property has been carefully planned as the adaptive reuse of a former limestone quarry. Preserving and displaying an authentic historic quarry derrick crane is a reasonable component of that reuse because it recognizes the property's history while providing visitors with an opportunity to better understand the site's mining heritage.

The requested variance is limited solely to the structure height necessary to preserve the crane in its authentic form.

3. Is the practical difficulty due to circumstances unique to this property and not created by the landowner?

Yes. The property is unique because it is a reclaimed limestone quarry with more than a century of mining history. The proposed derrick crane is directly associated with that history and is intended to preserve an important element of the site's industrial heritage.

The practical difficulty arises from the historic scale of authentic quarry equipment. Reducing the height of the structure would compromise its historic character and interpretive value. The request is based on the unique characteristics and history of the property rather than any action taken by the applicant.

4. Will granting the variance alter the essential character of the locality?

No. Although approximately 100 feet tall, the derrick crane is an open lattice framework rather than a large enclosed building. It will not create additional floor area, increase site

density, generate additional traffic, produce noise, or require additional lighting beyond what is already proposed for the recreational development.

The structure will serve as a visual reminder of the property's historic quarry operations and complements the site's transition from industrial use to recreation while preserving an important aspect of its identity.

5. Are there special circumstances or conditions affecting the land, building, or use that do not apply generally to other properties in the same vicinity?

Yes. Few properties within Lime Township possess the extensive limestone quarry history found on the subject property. The proposed derrick crane is uniquely tied to that history and represents an opportunity to preserve a significant artifact from the site's former mining operations.

These circumstances are unique to this property and distinguish it from other Rural Conservation properties within the Township. The variance request is therefore based on special conditions specific to the property's history and intended adaptive reuse.

Requested Action

Rockwell RV & Adventure Park respectfully requests approval of a variance permitting the installation and preservation of an approximately 100-foot-tall Historic Quarry Derrick Crane within the Rural Conservation District, as shown on the submitted site plans.

Potential Impacts to Adjacent Properties

Rockwell RV & Adventure Park

The proposed Rockwell RV & Adventure Park has been planned and designed to minimize potential impacts to adjacent properties while improving the overall condition and visual character of the site. The following provides a summary of potential impact areas and the measures in place to address them.

Traffic and Off-Site Transportation

Potential traffic impacts associated with the project have been evaluated through a separate Traffic Impact Study submitted as part of the EAW. That study assesses projected trip generation, roadway capacity, access, and safety considerations. Any recommended improvements or operational measures identified in the study will be implemented as part of the project to ensure that off-site transportation impacts are appropriately managed.

Noise

Noise associated with construction and ongoing recreational activities is being evaluated through a separate acoustical study. This study will assess anticipated sound levels, identify potential receptors, and recommend mitigation measures as necessary to ensure compliance with applicable standards and to minimize impacts to nearby properties.

It is also important to note that the proposed recreational use is expected to generate significantly less noise than the existing or historical mining operations on the site. Mining activities have historically involved heavy equipment operation, material processing, and occasional blasting, all of which generate substantial noise levels. In contrast, the proposed park will not include blasting or continuous heavy industrial equipment operations. Recreational activities typically produce intermittent and lower-intensity sound levels, which are generally more compatible with surrounding land uses.

As a result, the transition from a mining use to a recreational use is anticipated to reduce overall noise impacts to adjacent properties while maintaining compliance with applicable noise standards.

Dust

Dust generation is expected to be minimal due to the nature of the proposed development. The majority of the site will consist of vegetated areas, landscaped spaces, water features,

or stabilized surfaces such as paved or improved recreational areas. Exposed soil will be limited and primarily associated with temporary construction activities.

During construction, standard best management practices (BMPs) will be implemented as needed to control dust, such as temporary stabilization, watering of disturbed areas, and minimizing the duration of exposed soils. Following construction, permanent vegetation and site improvements will significantly reduce the potential for dust generation compared to existing or prior mining conditions.

Surface Water Runoff and Groundwater Protection

Potential impacts related to surface water runoff and groundwater contamination will be addressed through a comprehensive stormwater management plan prepared as part of the project. The plan will incorporate appropriate design measures and BMPs to manage runoff quantity and quality, promote infiltration where appropriate, and protect downstream resources.

The project represents a transition from a historically disturbed mining site to a managed and stabilized development and is expected to improve overall stormwater conditions through controlled drainage, vegetation establishment, and engineered treatment practices.

Aesthetics and Visual Character

The proposed development is expected to result in a significant improvement to the visual character of the property and surrounding area. The site is currently characterized by active or former mining activities, including exposed materials, limited vegetation, and industrial features.

The project will introduce a cohesive, well-maintained recreational environment that incorporates landscaping, naturalized areas, water features, and thoughtfully designed structures. These improvements will enhance the overall appearance of the site and provide a more visually appealing setting for both visitors and neighboring properties.

Summary

Overall, the proposed project is not anticipated to result in significant adverse impacts to adjacent properties. Key potential impact areas including traffic, noise, and stormwater are being addressed through permitting, dedicated technical design, and plans. In addition, the transition from a mining use to a managed recreational development is expected to reduce certain existing impacts while improving site conditions, aesthetics, and long-term environmental performance.

Amenity Descriptions

Rockwell RV & Adventure Park

Narrative Description of Proposed Recreational Amenities and Activities

The proposed Rockwell RV & Adventure Park is designed as a multi-use, outdoor recreation destination that integrates active recreation, nature-based experiences, and overnight accommodations within a reclaimed quarry landscape. At the center of the site will be a main office and check-in building, which will serve as the primary arrival point and operational hub for the park. This facility will provide guest services, orientation, ticketing, equipment rental, food and beverage offerings, and indoor/outdoor gathering spaces. It will also function as a visual and organizational anchor for the development, with direct connectivity to the surrounding recreational amenities, allowing visitors to efficiently access activities throughout the site. The project emphasizes sustainable land use, public access to outdoor recreation, and a diverse mix of amenities that serve a wide range of ages, abilities, and interests.

Mountain Biking

The project includes the development of the Rockwell Mountain Bike Trails, a purpose-built trail system designed for year-round public use. The trails will be managed and maintained by Mankato Area Mountain Bikers (MAMB), a local nonprofit organization. The trail network will feature a range of difficulty levels, from beginner-friendly flow trails to advanced technical terrain, accommodating riders of varying skill levels. Trails will be constructed using best management practices to minimize erosion, manage stormwater, and protect sensitive natural features while incorporating the unique quarry landscape. The system is intended to function both as a local recreational amenity and a regional destination, with potential for events, and youth programming, and partnerships with local biking organizations.

Camping and RV Accommodations

The campground component will offer a mix of RV sites and tent camping options, designed to support both short-term visitors and extended stays. Amenities will include utility hookups, bathhouse facilities, and convenient access to the park's recreational features. The campground is intended to create a basecamp experience, allowing guests to stay on-site and engage in multiple activities over the course of their visit. Site design will incorporate landscaping, circulation planning, and buffering to maintain a balance between activity areas and quiet enjoyment.

Aqua Park

The aqua park will be a central visual and recreational feature of the development, utilizing existing quarry water features. Planned elements include floating obstacle courses, swim areas, cliffs or high walls for visual interest, and integrated features such as waterfalls, islands, and access points. The aqua park is designed to provide a controlled, supervised environment for water-based recreation, with safety measures, and clearly designated activity zones. This amenity is intended to serve families and groups seeking a unique, immersive water experience.

Cable Wakeboarding Park

The cable park will provide wakeboarding and other tow-assisted water sports using an overhead cable system in place of motorized boats. This system reduces noise, fuel use, and shoreline disturbance while offering a consistent and accessible riding experience. The park will include beginner and advanced riding features, instructional programming, and equipment rental. The cable system allows for efficient operation and high user throughput, making it suitable for both casual users and organized events.

Climbing Wall and Bouldering

The project will incorporate both vertical, deep water solo climbing and bouldering opportunities, taking advantage of the quarry's natural rock features where appropriate, supplemented by constructed climbing walls as needed. These elements will provide a range of climbing experiences, from beginner routes to more advanced challenges. Safety methods, fall zones, and supervision protocols will be implemented in accordance with industry standards. The climbing amenities are intended to broaden the park's appeal and provide a land-based complement to the water and trail activities.

Overall Recreational Experience

Collectively, these amenities are designed to create a cohesive, multi-activity environment where visitors can engage in outdoor recreation throughout the day and across multiple days. The integration of land and water-based activities, along with on-site lodging, supports extended stays and repeat visitation. The project prioritizes safety, accessibility, environmental stewardship, and high-quality user experiences, positioning it as a regional destination for outdoor recreation and tourism.

Reclamation Plan Amendment Narrative

Rockwell RV & Adventure Park (Stoffel & McClure Quarry Sites)

1. Project Overview

Campquarry LLC (doing business as Rockwell RV & Adventure Park) is requesting approval of a Reclamation Plan Amendment to the existing Mining Conditional Use Permit for the Stoffel and McClure Quarry Sites in Lime Township.

The proposed Rockwell RV & Adventure Park Recreation Plan (Figures 3a & 3b) is submitted as the proposed amended reclamation plan for the mining operation. If approved, it will replace the previously approved reclamation plans (Figures 1 and 2) and establish the final post-mining condition and long-term land use of the property.

The Reclamation Plan Amendment is being submitted concurrently with an Interim Use Permit (IUP) application for the proposed recreational development. These applications are intended to be reviewed together because they establish the same final land use for the property. The Reclamation Plan Amendment defines the final reclaimed condition of the Stoffel and McClure Quarry Sites, while the Interim Use Permit provides the land use approvals necessary to implement that final reclamation plan.

Mining operations will cease prior to approval and implementation of the Interim Use Permit. Reclamation activities will continue in accordance with the amended reclamation plan until the final reclaimed condition is achieved.

2. Intention of Reclamation Plan Amendment

The purpose of this Reclamation Plan Amendment is to establish a revised final reclamation plan for the Stoffel and McClure Quarry Sites that reflects the intended post-mining land use of the property. The amended reclamation plan replaces the previously approved reclamation plans with the Recreation Plan (Figures 3a & 3b), which defines the final reclaimed condition of the property.

The original reclamation plans generally contemplated reclaiming the quarry to a conservation-oriented landscape consisting of reclaimed slopes, permanent water bodies, restored vegetation, and open space. The amended reclamation plan modifies the final reclaimed condition to establish recreation as the primary post-mining land use while continuing to satisfy the reclamation requirements of the existing Conditional Use Permit and the Lime Township Zoning Ordinance.

Some portions of the reclamation activities consistent with the proposed amended reclamation plan have already been completed or are currently underway in areas where mining operations have concluded. These activities include construction of the permanent engineered dike that separates the proposed cable wake park lake from the primary quarry lake, establishment of the future aqua park lake through recent mining and blasting activities, preservation of quarry landforms and limestone highwalls intended to remain as part of the final reclaimed landscape, and retention of selected historic quarry stockpiles within the McClure Quarry that will be incorporated into the future trail system. These improvements represent permanent components of the proposed final reclamation plan and are illustrated on Figures 3a & 3b.

Mining operations associated with the existing Conditional Use Permit will cease prior to approval and implementation of the proposed Interim Use Permit for recreational use. Following cessation of mining, reclamation activities will continue in accordance with the amended reclamation plan until the final reclaimed condition shown on Figures 3a & 3b is achieved. The amended reclamation plan establishes the final configuration of reclaimed landforms, water bodies, vegetation, circulation, utilities, and recreational improvements that will remain following completion of reclamation.

3. Existing Approved Reclamation Plan

The existing Mining Conditional Use Permit includes approved reclamation plans for both the Stoffel and McClure Quarry Sites that establish the anticipated final condition of the property following completion of mining activities. These plans are illustrated in Figures 1 and 2.

The approved reclamation plans were prepared to satisfy the reclamation requirements of the Conditional Use Permit and Lime Township Zoning Ordinance. The plans generally provide for reclamation through grading of disturbed areas, stabilization of quarry slopes, establishment of permanent water bodies, redistribution of stockpiled topsoil, revegetation, and restoration of the site for long-term open space and conservation-oriented land uses. Reclamation is required to occur concurrently with mining activities as areas become available and be completed in accordance with the approved reclamation sequencing plan and applicable permit conditions.

For the Stoffel Quarry Site, the approved reclamation plan anticipated a final condition consisting primarily of a single reclaimed water body surrounded by restored slopes, vegetated open space, and reclaimed land (Figure 1). The plan did not contemplate recreational infrastructure or modifications to create multiple water bodies or distinct recreational areas.

For the McClure Quarry Site, the approved reclamation plan similarly anticipated reclamation to a single permanent water body with surrounding restored quarry lands and open space (Figure 2). Existing quarry features, stockpile areas, and disturbed lands were generally intended to be reclaimed as part of the overall restoration of the mining operation.

The approved reclamation plans have served as the basis for reclamation activities to date. However, as mining operations have progressed and the long-term vision for the property has evolved, Camp Quarry LLC has determined that an amended reclamation plan can better utilize the reclaimed quarry landscape while continuing to satisfy the reclamation objectives established by the Conditional Use Permit. The following section summarizes the proposed modifications to the approved reclamation plans.

4. Description of Proposed Reclamation Plan Changes

The following sections describe the principal modifications to the previously approved reclamation plans (Figures 1 and 2) as reflected in the proposed amended Reclamation Plan (Figures 3a & 3b).

4.1 Final Land Use

The approved reclamation plans established a final reclaimed condition consisting primarily of restored open space, reclaimed water bodies, and conservation-oriented land uses following completion of mining activities.

The amended reclamation plan establishes recreation as the primary long-term post-mining land use while continuing to incorporate reclaimed open space, restored vegetation, and permanent water features. The final reclaimed condition integrates outdoor recreation with the existing quarry landscape, allowing reclaimed mining lands to be placed into productive long-term use while maintaining compliance with the reclamation objectives of the existing Conditional Use Permit.

The amended reclamation plan incorporates campground facilities, mountain bike trails, water recreation, supporting infrastructure, and managed open space into the final reclaimed condition of the property.

4.2 Water Body Configuration

The approved reclamation plans anticipated a single permanent water body within both the Stoffel and McClure Quarry Sites. The amended reclamation plan modifies the final reclaimed water body configuration to better support the proposed post-mining land use.

Stoffel Quarry

The original reclamation plan (Figure 1) illustrated a single reclaimed lake. The amended reclamation plan (Figures 3a & 3b) establishes three permanent water bodies.

The western quarry lake will remain as the largest water body within the quarry complex. A permanent engineered dike has been constructed to create a separate cable wake park lake while maintaining independent operation of the two water bodies. A third permanent lake has been established through recent mining and blasting activities and will serve as the future aqua park. These three permanent water bodies become integral components of the final reclaimed landscape.

McClure Quarry

The approved reclamation plan (Figure 2) anticipated a single reclaimed lake. The amended reclamation plan modifies the final reclaimed condition to establish two permanent water bodies within the McClure Quarry. These lakes will become permanent features of the reclaimed landscape while supporting the property's long-term recreational use.

4.3 Quarry Landforms and Slopes

The approved reclamation plan contemplated reclamation through grading and stabilization of disturbed mining areas. The amended reclamation plan retains many of the quarry's defining landforms as permanent components of the final reclaimed landscape.

These include:

- Dimensional stone highwalls
- Blasted aggregate highwalls
- Quarry benches
- Natural exposed limestone outcrops
- Manufactured Limestone retaining walls
- Quarry floors
- Natural changes in elevation

Where necessary, quarry slopes will be stabilized in accordance with engineering recommendations and applicable permit requirements. Other quarry faces will remain exposed where they can safely become permanent elements of the reclaimed landscape. This approach reduces unnecessary earthwork while preserving the geological character of the quarry.

Where modifications to existing quarry landforms are necessary to accommodate the approved post-mining land use, grading will utilize suitable on-site reclamation materials, including overburden, blasted rock, quarry fines, aggregate, topsoil, and other approved fill materials generated through mining operations or obtained from approved sources. Final grading will establish stable slopes, drainage patterns, and building areas while minimizing unnecessary disturbance of existing quarry features intended to remain as part of the final reclaimed landscape.

4.4 Berms and Buffer Areas

Mining operations established perimeter berms and setback areas to provide visual screening and buffering between quarry operations and adjacent properties.

The amended reclamation plan retains the northern perimeter berms adjacent to residential properties as permanent landscape features. These berms will continue to provide visual screening and separation between neighboring residential properties and the reclaimed recreational property.

Portions of the perimeter berm along 3rd Avenue will be modified where necessary to accommodate the proposed mountain bike trail system. Areas that were not mined because of required setbacks will remain largely undeveloped and will primarily accommodate mountain bike trails, natural open space, and restored vegetation.

4.5 Previously Disturbed Areas and Stockpiles

The amended reclamation plan places the majority of permanent improvements within areas previously disturbed through mining operations.

Former quarry floors, processing areas, and stockpile areas will be incorporated into the final reclaimed landscape and may accommodate campground facilities, circulation roads, parking areas, utilities, recreation areas, trails, and managed open space.

Select stockpile areas within the southern portion of the McClure Quarry will remain as permanent landscape features and will be incorporated into the future mountain bike trail system. These stockpile areas have been in place for years and are now overgrown with vegetation that will also remain. Where appropriate, reclaimed rock and aggregate materials from existing stockpiles may also be utilized during final grading, trail construction, retaining walls, shoreline stabilization, utility installation, and other site improvements associated with reclamation.

Locating permanent improvements within previously disturbed portions of the site minimizes additional disturbance of undisturbed land while placing reclaimed mining lands into productive long-term use.

4.6 Vegetation and Open Space

The amended reclamation plan continues to include restoration of vegetation throughout the property consistent with the reclamation requirements of the existing Conditional Use Permit.

Areas not occupied by recreational improvements or supporting infrastructure will be revegetated as reclamation progresses. Existing wooded areas, perimeter buffers, and natural vegetation will remain where practical to provide screening, wildlife habitat, and visual integration with surrounding land uses.

The amended reclamation plan maintains substantial areas of reclaimed open space throughout both quarry sites while integrating recreation into the restored landscape.

4.7 Circulation and Recreational Infrastructure

The amended reclamation plan incorporates permanent infrastructure necessary to support the approved post-mining land use.

Permanent improvements include:

- Campground roads
- Parking areas
- Campground facilities
- Mountain bike trails
- Pedestrian circulation
- Cable wake park facilities
- Aqua Park facilities
- Utilities
- Support buildings
- Associated site improvements

These improvements are integrated into the reclaimed landscape and utilize existing quarry landforms wherever practical.

4.8 Preservation of Quarry Character

A distinguishing feature of the amended reclamation plan is the intentional preservation of the site's quarry character. Rather than eliminating evidence of the property's mining history, the amended reclamation plan incorporates limestone highwalls, exposed bedrock, quarry benches, selected stockpiles, and reclaimed quarry landforms into the final site design. Limestone recovered from the site will continue to be utilized throughout the property for retaining walls, landscaping, trail features, shoreline stabilization, and other site improvements where appropriate. This approach preserves the geological and industrial identity of the Stoffel and McClure Quarry Sites while establishing a safe and functional final reclaimed landscape.

5. Final Reclaimed Site Condition and Implementation

The amended Reclamation Plan establishes the final reclaimed condition of the Stoffel and McClure Quarry Sites following completion of mining operations and reclamation activities. Upon completion, the property will consist of a permanently stabilized and reclaimed landscape that integrates recreational land uses with reclaimed quarry features, restored vegetation, permanent water bodies, and supporting infrastructure, as illustrated on Figures 3a & 3b.

The final reclaimed condition includes:

- Permanent reclaimed water bodies within the Stoffel and McClure Quarry Sites.

- Stabilized quarry slopes and engineered embankments, including the permanent dike separating the cable wake park lake from the primary quarry lake.
- Preserved limestone highwalls, quarry benches, exposed bedrock, and selected quarry stockpiles that remain as permanent components of the reclaimed landscape.
- Reclaimed open space, restored vegetation, and perimeter buffer areas.
- Internal circulation roads, parking areas, utilities, drainage infrastructure, and stormwater management facilities.
- Recreational improvements integrated into the reclaimed landscape, including mountain bike trails, campground facilities, water recreation areas, pedestrian circulation, and supporting buildings.

Reclamation will continue to be completed in accordance with the existing Mining Conditional Use Permit, applicable regulatory approvals, and accepted engineering practices. Mining operations will cease prior to implementation of the Interim Use Permit for recreational use; however, reclamation activities will continue until the final reclaimed condition illustrated on Figures 3a & 3b has been achieved.

Implementation of the amended Reclamation Plan will occur as individual portions of the site become available for final grading, stabilization, and development. Reclamation activities may include placement and redistribution of suitable reclamation materials, construction of engineered embankments, final grading, slope stabilization, shoreline stabilization, placement of topsoil, establishment of permanent vegetation, construction of drainage improvements, installation of utilities, and construction of permanent site improvements. Existing quarry landforms intended to remain as part of the final reclaimed condition will be preserved and incorporated into the overall site design where practical. Final grading and reclamation activities will be performed in accordance with the approved grading and engineering plans submitted with the application, applicable permit conditions, and accepted engineering practices to establish stable long-term landforms, positive drainage, and the approved post-mining land use.

Campquarry LLC will continue to utilize qualified engineering, geotechnical, and environmental professionals, as appropriate, to ensure that reclamation activities comply with applicable permit requirements and accepted engineering practices.

6. Site Integration and Drainage

The amended Reclamation Plan has been designed to integrate the final reclaimed landscape with the surrounding topography and adjacent land uses. Existing quarry landforms, reclaimed slopes, perimeter berms, and previously disturbed areas have been incorporated into the final site design where practical, minimizing additional earthwork while maintaining required buffering and long-term site stability. Existing northern perimeter berms will remain to provide screening adjacent to residential properties, while limited modifications to berms along 3rd Avenue will accommodate approved recreational improvements.

The permanent water bodies established by the amended Reclamation Plan will remain groundwater-fed features within the reclaimed quarry landscape. Final grading, drainage, shoreline stabilization, and erosion control measures will be incorporated into the final engineering design to maintain stable drainage patterns, protect adjacent properties, and support the long-term stability of the reclaimed landscape in accordance with applicable engineering standards and regulatory requirements.

7. Conclusion

The proposed Reclamation Plan Amendment establishes a revised final reclamation plan for the Stoffel and McClure Quarry Sites that reflects the property's intended post-mining land use while continuing to satisfy the reclamation requirements of the existing Mining Conditional Use Permit and the Lime Township Zoning Ordinance.

The amended Reclamation Plan replaces the previously approved reclamation plans with a comprehensive final reclamation plan that preserves significant quarry landforms, establishes permanent reclaimed water bodies, integrates recreational land uses into previously disturbed areas, and provides for long-term site stability, drainage, vegetation, and public safety. The proposed Recreation Plan (Figure 3) defines the intended final reclaimed condition of the property and serves as the amended Reclamation Plan for the existing Mining Conditional Use Permit.

The proposed Reclamation Plan Amendment is submitted concurrently with the Interim Use Permit application because both applications establish the same final post-mining land use for the property. Approval of the Reclamation Plan Amendment will allow ongoing reclamation activities to continue toward the final reclaimed condition illustrated in Figures 3a & 3b while providing a clear framework for the long-term management and use of the reclaimed property.

Campquarry LLC respectfully requests approval of the proposed Reclamation Plan Amendment.

Figure 1 – Approved Stoffel Quarry Reclamation Plan

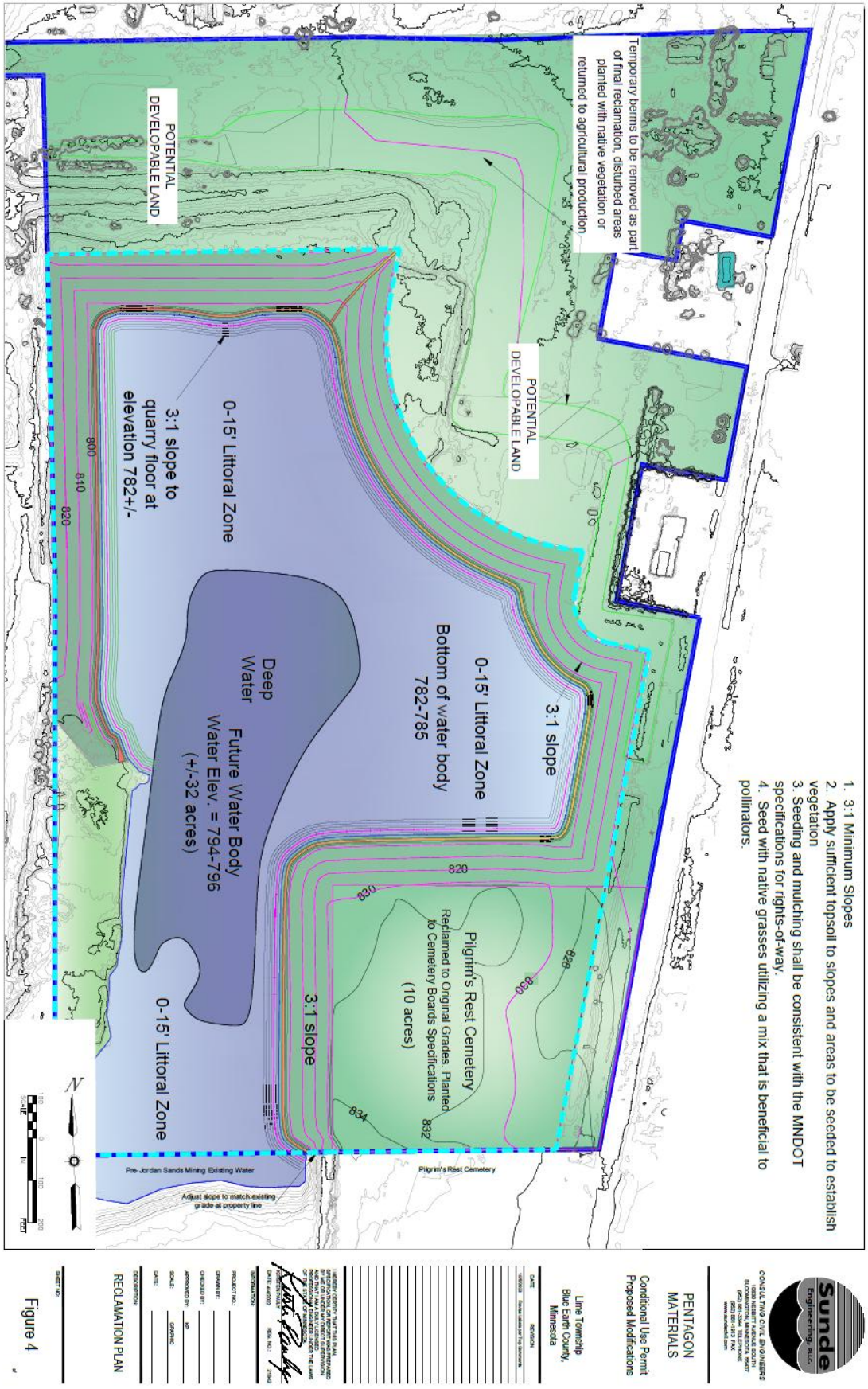


Figure 4

Figure 2 – Approved McClure Quarry Reclamation Plan



Figure 3a – Proposed Final Reclamation Plan/Rockwell RV & Adventure Park Recreation Plan

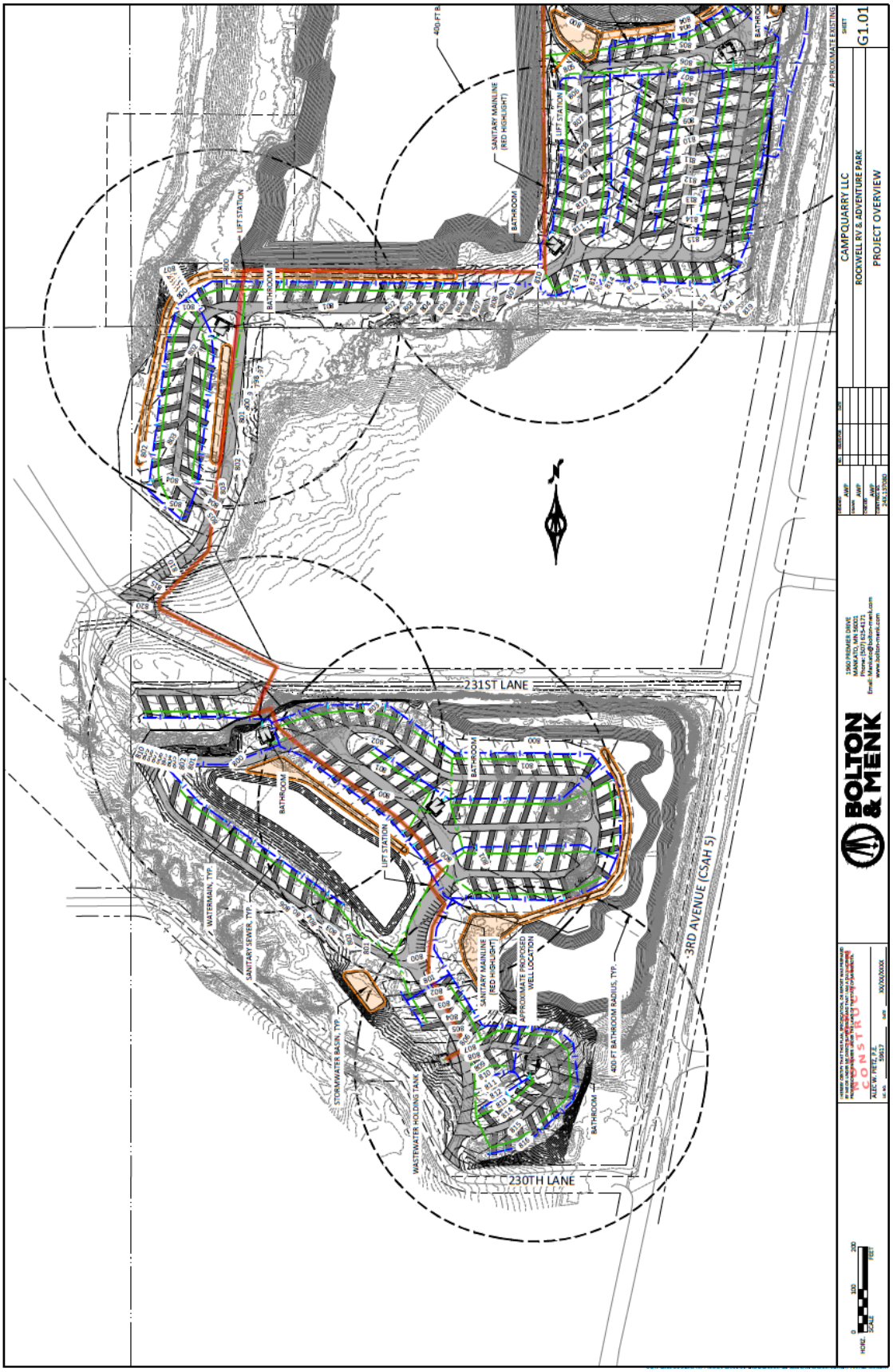


Figure 3b – Proposed Final Reclamation Plan/Rockwell RV & Adventure Park Recreation Plan



Figure 4. Current Mining and Reclamation Status as of July 2026.



Project Team and Professional Responsibilities

The development of Rockwell RV & Adventure Park has been supported by a multidisciplinary team of professionals with expertise in engineering, landscape architecture, recreation planning, architecture, environmental permitting, and specialized recreational facility design. Each consultant has defined responsibilities to ensure the project is designed and constructed in accordance with applicable regulations, industry standards, and the vision for the development.

Rockwell RV & Adventure Park Development Team

Joe Holtmeier – Owner / Developer

Responsible for overall project leadership, financing, construction oversight, mining and reclamation coordination, and long-term implementation of the development.

Kyle Kaldor – Project Manager

Responsible for overall project management, consultant coordination, permitting coordination, agency communication, operational planning, recreational programming, stakeholder engagement, and implementation of the project vision.

Bolton & Menk, Inc.

Civil Engineering, Environmental Permitting, and Infrastructure Design

Bolton & Menk serves as the project's lead civil engineering consultant and is responsible for:

- Overall civil engineering design
- Site grading and drainage
- Stormwater management
- Utility design
- Water and wastewater systems
- Traffic coordination
- Environmental permitting support
- EAW support
- Construction documentation
- Agency coordination

Confluence

Landscape Architecture and Site Planning

Confluence serves as the project's landscape architecture and master planning consultant and is responsible for:

- Overall site planning
- Master planning
- Recreational layout
- Landscape architecture
- Park design
- Guest experience
- Open space planning
- Planting concepts
- Amenity integration

Oleson & Hobbie Architects

Architecture

Oleson & Hobbie Architects provides architectural design services and is responsible for:

- Main lodge design
- Support buildings
- Bathhouses
- Architectural design
- Building code compliance
- Construction documents
- Coordination with engineering team

Pathfinder Trail Building

Mountain Bike Trail Design and Construction

Pathfinder Trail Building is responsible for the design and construction of the mountain bike trail system, including:

- Mountain bike trail design
- Trail layout
- Feature design
- Trail construction
- Sustainable trail practices
- Construction oversight
- Integration of trails with quarry features
- Long-term trail sustainability recommendations

EP Climbing

Deep-Water Solo Climbing and Bouldering Design

EP Climbing serves as the specialty climbing consultant and is responsible for the design and engineering of the climbing facilities, including:

- Deep-water solo climbing wall design
- Outdoor bouldering wall design
- Climbing feature engineering
- Construction drawings and technical specifications
- Coordination of climbing wall installation
- Compliance with applicable climbing industry standards

4Cable

Cable Wake Park Engineering and Design

4Cable serves as the specialty cable wake park consultant and is responsible for the engineering and technical design of the cable park, including:

- Cable wake park system engineering
- Cable system layout and configuration
- Mechanical equipment specifications
- Design drawings and technical specifications
- Coordination of cable system installation
- Integration of the cable park with the overall site design

Project Coordination

Rockwell RV & Adventure Park serves as the overall project coordinator, managing consultant coordination, permitting, construction sequencing, operational planning, stakeholder communication, and implementation of the project. The development team works collaboratively to ensure all project components are integrated into a cohesive recreational destination while meeting applicable engineering, environmental, architectural, and safety standards.

Complaint Process

Rockwell RV & Adventure Park

- Initially a complaint shall be filed with the operator.
- Complaints will be filed in the complaint log at this link:
  - Complaint Log - Rockwell.xlsx
- The operator shall research what has occurred and take the necessary corrective actions.
- The operator will provide a response within 2 business days to the Lime Township Board representative. This response will acknowledge the complaint and will communicate any new findings and/or communicate any necessary corrective actions taken.
- Operator contact information
  - Joe Holtmeier – 507-327-5775 – jholtmeier@holtmeierinc.com
  - Kyle Kaldor – 701-430-1312 – kyle@rockwelladventure.com

ROCKWELL RV & ADVENTURE PARK

23120 3RD AVE
MANKATO, MN 56001

SITE PLANS & LANDSCAPE PLANS



CONFLUENCE

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L503	SITE VISUAL INTENT IMAGERY
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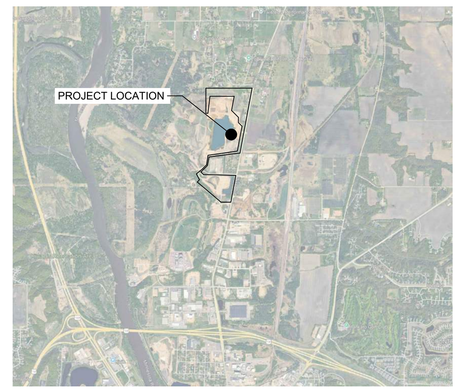
VICINITY MAP



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JAKE CORYELL

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NAME REGISTRATION # DATE

MY REGISTRATION DATE IS:

SHEETS COVERED BY THIS SEAL:

ISSUED FOR REVIEW

7/08/2026

811 Know what's below. Call before you dig.

COVER SHEET

CONFLUENCE PROJECT # 26129

G001

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GENERAL NOTES:

1. AN ON-SITE PRE-CONSTRUCTION MEETING SHALL BE CONDUCTED BY THE CONTRACTOR A MINIMUM OF 7 DAYS PRIOR TO INITIATING ANY EARTH DISTURBANCE (CORRIDOR AND/OR TREAD DEVELOPMENT). INCLUDE COUNTY STAFF AND PROJECT LANDSCAPE ARCHITECT.

2. AT LEAST 3 DAYS PRIOR TO STARTING EARTH DISTURBANCE ACTIVITIES, OR EXPANDING INTO AN AREA PREVIOUSLY UNMARKED FOR UTILITIES, THE GOPHER STATE ONE CALL SYSTEM INC. SHALL BE NOTIFIED AT 1-800-252-1166 FOR THE LOCATION OF EXISTING UNDERGROUND UTILITIES.

3. CONTRACTOR SHALL PROVIDE NOTIFICATION AT LEAST ONE WEEK PRIOR TO MOBILIZATION, AND A CONFIRMATION OF START DATE AT LEAST 48 HOURS IN ADVANCE OF MOBILIZATION.

4. ALL EARTH DISTURBANCE ACTIVITIES SHALL PROCEED IN ACCORDANCE WITH THE SEQUENCE PROVIDED ON THE PLAN DRAWINGS AND CONSTRUCTION NOTES.

5. TO BE CONFIRMED WITH TOWNSHIP BUT WORK TASKS CAN BE COMPLETED MONDAY THROUGH FRIDAY. OPERATIONS ARE RESTRICTED TO DAYTIME HOURS (7:00 AM TO 6:00 PM). IF SPECIAL CIRCUMSTANCES ARISE, THE CONTRACTOR MAY REQUEST TO WORK WEEKENDS. WORK MAY NOT OCCUR ON HOLIDAYS.

6. ALL CONSTRUCTION STAFF SHALL WEAR A SAFETY VEST OR HIGH VISIBILITY CLOTHING WHEN WORKING ON-SITE.

7. CONSTRUCTED TRAILS TO ADHERE TO EROSION AND SEDIMENTATION CONTROL MEASURES AS INDICATED IN NOTES AND PLANS.

4. STAGING/ STOCKPILE AREA TO BE DETERMINED WITH OWNER AND NECESSARY PARTIES.

5. CONTRACTOR IS RESPONSIBLE FOR SECURING CONSTRUCTION SITE THROUGH SUBSTANTIAL COMPLETION. FENCING AND SIGNAGE, IF NECESSARY, SHALL BE REPAIRED DAILY TO MINIMIZE TRESPASSING.

6. NO EQUIPMENT STORAGE IS ALLOWED OUTSIDE OF CONSTRUCTION LIMITS, WITHIN DRIP LINES OF EXISTING TREES, OR WITHIN THE PARKING LOT IN PARK AREAS.

7. CONTRACTOR SHALL WORK WITH OWNER TO ADJUST CONSTRUCTION LIMITS AS NECESSARY PRIOR TO CONSTRUCTION.

3. VERIFY REQUIRED PERMITS ARE ISSUED PRIOR TO USE OF ACCESS POINTS AND CONSTRUCTION START. CONTRACTOR IS RESPONSIBLE FOR ALL REQUIRED CONTACTS, PERMITTING, AND SIGNAGE ASSOCIATED WITH ALL PERMITS INCLUDING NECESSARY INSPECTIONS REVIEW.

4. AT PROJECT COMPLETION, CONTRACTOR SHALL WORK WITH OWNER TO SET UP A PUNCH LIST/ WALK THROUGH MEETING.

EROSION AND SEDIMENTATION POLLUTION CONTROL NOTES:

1. CONTRACTOR TO LIMIT DAILY OUTPUT TO THAT WHICH CAN BE CONSIDERED FINISHED WORK ACCORDING TO CONTRACT DOCUMENTS AND READY FOR INSPECTION.

2. A COPY OF THE APPROVED PLAN DRAWINGS AND NOTES MUST BE AVAILABLE AT THE PROJECT SITE AT ALL TIMES.

3. ALL EARTH DISTURBANCE ACTIVITIES SHALL PROCEED IN ACCORDANCE WITH THE SEQUENCE PROVIDED IN THE GENERAL AND TRAIL CONSTRUCTION NOTES AND ACCOMPANYING SPECIFICATIONS. DEVIATION FROM THAT SEQUENCE MUST BE APPROVED IN WRITING FROM WASHINGTON COUNTY PRIOR TO IMPLEMENTATION.

4. CLEARING, GRUBBING, AND TOPSOIL STRIPPING SHALL BE LIMITED TO THE TRAIL CORRIDOR.

5. POTENTIAL HAZARDS THAT MAY BE ENCOUNTERED ONSITE INCLUDE POISON IVY AND WILD PARSNIP. ADDITIONALLY THERE MAY BE BARBED WIRE, OLD FENCING, AND OTHER POTENTIALLY HAZARDOUS MATERIALS IN THE PROJECT AREA.

6. BORROW PIT DEVELOPMENT SHALL TAKE PLACE WITHIN 50' OF THE TRAIL CENTERLINE WITH ALL BORROW PITS AND ACCESS ROUTES STABILIZED AND NATURALIZED (SEE TRAIL CONSTRUCTION NOTES) FOLLOWING USE. BORROW PITS TO BE NO MORE THAN 2 CY IN SIZE.

7. IMMEDIATELY UPON DISCOVERING UNFORESEEN CIRCUMSTANCES POSING THE POTENTIAL FOR ACCELERATED EROSION AND/OR SEDIMENT POLLUTION, THE CONTRACTOR SHALL IMPLEMENT APPROPRIATE BMPS TO MINIMIZE THE POTENTIAL FOR EROSION AND SEDIMENT POLLUTION AND NOTIFY APPROPRIATE OFFICIALS.

8. ALL BUILDING MATERIALS AND WASTES MUST BE REMOVED FROM THE SITE AND RECYCLED OR DISPOSED OF IN ACCORDANCE WITH TOWNSHIP REGULATIONS. NO BUILDING MATERIALS, WASTES, OR UNUSED BUILDING MATERIALS SHALL BE BURNED, BURIED, DUMPED, OR DISCHARGED AT THE SITE.

9. TRAIL TREAD CONSTRUCTION DISTURBANCES SHALL BE PERMANENTLY STABILIZED ON A DAILY BASIS, AS PRESCRIBED IN THE CONSTRUCTION NOTES AND SPECIFICATIONS, TRAIL CORRIDOR CLEARING AND GRUBBING MAY TAKE PLACE WITHOUT ADDITIONAL STABILIZATION ACTIVITIES.

10. SEDIMENT TRACKED ONTO ANY PUBLIC ROADWAY OR PARKING AREA SHALL BE RETURNED TO THE CONSTRUCTION SITE BY THE END OF EACH WORK DAY AND DISPOSED IN THE MANNER PRESENTED FOR SPOILS STABILIZATION IN THE TRAIL CONSTRUCTION NOTES. IN NO CASE SHALL THE SEDIMENT BE WASHED, SHOVELED, OR SWEPT INTO ANY ROADSIDE DITCH, STORM SEWER, OR SURFACE WATER.

11. UPON COMPLETION OF ALL EARTH DISTURBANCE ACTIVITIES AND PERMANENT STABILIZATION OF ALL DISTURBED AREAS, PROPERTY OWNER AND CONTRACTOR SHALL SCHEDULE AND CONDUCT A FINAL INSPECTION.

12. FAILURE TO CORRECTLY INSTALL EROSION AND SEDIMENT CONTROL DEVICES, FAILURE TO PREVENT SEDIMENT-LADEN RUNOFF FROM LEAVING THE CONSTRUCTION SITE, OR FAILURE TO TAKE IMMEDIATE CORRECTIVE ACTION TO RESOLVE FAILURE OF SUCH DEVICES MAY RESULT IN ADMINISTRATIVE, CIVIL, AND/OR CRIMINAL PENALTIES.

1 L010 PLAN NOTES

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Revision Schedule

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ROCKWELL RV & ADVENTURE PARK

23120 3RD AVE
MANKATO, MN 56001

Project Number	26129
Issue	----
Date	2026-07-28

PLAN NOTES

L010

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VEGETATION REMOVALS AND RESTORATION

1. CONTRACTOR IS RESPONSIBLE FOR ONSITE REMOVALS AND DISPOSAL IN A LEGAL MANNER AT AN APPROPRIATE OFF-SITE LOCATION, UNLESS OTHERWISE NOTED BY COUNTY STAFF.

2. CONTRACTOR IS RESPONSIBLE FOR CLEARING AND GRUBBING AND REMOVALS OF ALL PLANT MATERIALS INCLUDING TREES, SHRUBS, GROUND COVERS, ETC. AND SHALL REMOVE ALL STUMPS PER SPECIFICATIONS AND DIRECTION OF COUNTY STAFF.

3. ANY TREE REMOVAL IS TO BE DONE SELECTIVELY AND NOT WITH MASS REMOVAL OPERATIONS WITH CARE TAKEN TO AVOID INJURY TO ADJACENT REMAINING VEGETATION. ANY DAMAGE TO TREES NOT APPROVED FOR REMOVAL SHALL BE REPLACED AT THE CONTRACTOR'S EXPENSE.

4. SEED SHALL BE BROADCAST OVER DISTURBED AREAS IMMEDIATELY AFTER FINISH GRADING IS COMPLETE.

5. SEED BED BELOW 3:1 SLOPE SHALL BE MULCHED WITH MNDOT TYPE 3 STRAW MULCH APPLIED AT 2 TONS PER ACRE.

6. MNDOT CATEGORY 25 TEMPORARY EROSION PREVENTION BLANKET TO BE USED ON ALL SLOPES GREATER THAN 3:1. ONLY NATURAL FIBERS SHALL BE USED IN THE NETTING AND FILL MATERIAL FOR TEMPORARY EROSION PREVENTION BLANKET.

7. THE FOLLOWING SEED MIXTURES SHALL BE USED FOLLOWING FINISH GRADING IN SECTIONS OF TRAIL DEPENDING ON TREE COVER AND SHADE:
   - 7.1. TREE CANOPY COVER GREATER THAN 30%: ANTICIPATED SELECTION: BWSR 36-211 WOODLAND EDGE SOUTH AND WEST MIXTURE OR APPROVED EQUAL. APPLY AT RATES RECOMMENDED.
   - 7.2. TREE CANOPY COVER LESS THAN 30%: ANTICIPATED SELECTION: BWSR 35-241 MESIC PRAIRIE GENERAL MIXTURE OR APPROVED EQUAL.

TRAIL CONSTRUCTION NOTES:

1. FINAL TRAIL ALIGNMENT IS INCLUDED IN DESIGN DRAWINGS. CONTRACTOR MUST ESTABLISH A ROLLING CONTOUR TRAIL THAT MEETS SPECIFICATIONS (SHEETS L2.0-L2.5) WITHIN 15' OF EITHER SIDE OF FLAGGING TO ESTABLISH A PERMANENT TRAIL CORRIDOR AND TREAD. TRAIL SHOULD NOT CROSS INTO DELINEATED WETLAND BOUNDARIES.

2. IDENTIFY SENSITIVE RESOURCES IN FIELD AND STAKE FLAG LIMITS OF FEATURE CONSTRUCTION FOR APPROVAL BY COUNTY STAFF. LIMITS TO CONSTRUCTION IMPACT IN THESE AREAS WILL BE THE WIDTH OF THE TRAIL CORRIDOR. CONSTRUCTION IMPACTS TO THESE AREAS MUST BE NATURALIZED BY
   - 2.1. RETURNING THE IMMEDIATE AREA TO THE PRE-CONSTRUCTION TOPOGRAPHY.
   - 2.2. RESTORING NATURAL HYDROLOGIC FLOW PATTERNS.
   - 2.3. REMOVING ALL CONSTRUCTION MATERIALS.

3. CONSTRUCTION OF TRAIL TREAD AND ATTENDANT FEATURES (I.E. PUNCHEON, WOODEN SKILLS FEATURES) WILL BE IN ACCORDANCE WITH THE GENERAL SPECIFICATIONS PRESENTED WITHIN THIS DOCUMENT AND FUNDAMENTALLY BASED ON SUSTAINABLE TRAIL DESIGN PRINCIPLES PROMULGATED BY CREDIBLE, RECOGNIZED PRINTED SOURCE MATERIAL, INCLUDING THE INTERNATIONAL MOUNTAIN BICYCLING ASSOCIATION'S HANDBOOKS, TRAIL SOLUTIONS AND MANAGING MOUNTAIN BIKING, AND THE USDA FOREST SERVICE'S TRAIL CONSTRUCTION AND MAINTENANCE NOTEBOOK.

4. TRAIL CORRIDOR WILL BE CLEARED TO A WIDTH IN ACCORDANCE WITH THE SPECIFICATIONS. STEMS LARGER THAN 6" DBH WILL NOT BE REMOVED UNTIL APPROVED BY COUNTY STAFF. ALL MATERIALS LONGER THAN 5' IN LENGTH WILL BE BUCKED TO LESS THAN 5' AND UTILIZED WITH NEARBY NATIVE MATERIALS TO STABILIZE EXCAVATED SPOILS. ALL VEGETATIVE MATERIALS WILL BE REMOVED FROM THE CORRIDOR. ANY STUMPS DEVELOPED IN THE CORRIDOR DEVELOPMENT WILL BE EXCAVATED AND REMOVED FROM THE CORRIDOR.

5. TRAIL TREAD DEVELOPMENT WILL CONSIST OF NATURAL SURFACED FULL BENCH TRAIL CONSTRUCTION, DEVOID OF FILL MATERIAL FOR USE IN THE TREAD SURFACE (BERMS AND ROLLER FEATURES EXCEPTED), AND MECHANICALLY COMPACTED FOLLOWING CONSTRUCTION. ACCEPTABLE PROTRUSION HEIGHT ABOVE THE TRAIL TREAD FOR NATURAL FEATURES SUCH AS ROCKS OR ROOTS WILL BE IN ACCORDANCE WITH THE SPECIFICATIONS OF THE PARTICULAR TRAIL TYPE (I.E. LEAST DIFFICULT, MORE DIFFICULT, MOST DIFFICULT) BEING CONSTRUCTED. TREAD WILL BE CONSTRUCTED WITH A 3-7% CROSS SLOPE, EXCEPT WHERE FEATURES ARE CONSTRUCTED FOR THE PURPOSE OF KEEPING RIDERS ON THE TRAIL (I.E. BERMS, INSLOPED CORNERS, AND CONSTRUCTED FEATURES WITH CROSS SLOPE OF 5-7%).

6. GRADE REVERSALS WILL BE LOCATED AT LESS THAN 50' INTERVALS AND SHOULD HAVE BROAD DRAINS (6-10') WITH CROSS SLOPES OF 10-15%. SUBSEQUENT REVERSALS IN GRADE SHOULD ALSO BE BROAD (10-25') AND COMPACTED WITH LEADING FACE AND TRANSITION FIELD-FIT TO MATCH THE DESIRED TRAIL EXPERIENCE (I.E. LOW AND ROLLING ON LEAST DIFFICULT TRAILS, ROLLABLE WITH THE ABILITY TO JUMP ON MORE DIFFICULT TRAILS, AND JUMP-OPTIMIZED ON MOST DIFFICULT TRAILS).

7. BACKSLOPES SHOULD BLEND WITH SURROUNDING HILLSLOPE GRADIENT AND FINISHED TO TREAD SPECIFICATIONS. IN THE CASE OF INSIDE TURNS, BACKSLOPE SHOULD BE OPTIMIZED FOR UTILITY AS A RIDING/TREAD SURFACE AND BLENDED WITH TRAIL TREAD TO PROVIDE SMOOTH TRANSITIONS.

8. EXCAVATED SPOIL PILES SHALL BE DISTRIBUTED SUCH THAT NO BERM IS PRESENT ON THE DOWNSLOPE EDGE OF THE TRAIL TREAD UNLESS IT IS CREATED FOR THE PURPOSE OF A TRAIL FEATURE, IN WHICH CASE IT WILL BE PRECEDED UPSLOPE BY A GRADE REVERSAL AND COMPACTED AS TRAIL TREAD.

9. DOWNSLOPE SPOIL WILL BE SUFFICIENTLY DISTRIBUTED DOWNSLOPE A.) WITH A DEPTH NOT GREATER THAN 4" AND B.) SHALL NOT BE DEPOSITED IN ACTIVE DRAINAGES (I.E. STREAM BED AND BANK STRUCTURE OR INCISED LINEAR FLOW PATTERN) OR LOCATIONS DEMONSTRATING CHARACTERISTICS OF STANDING WATER (I.E. PRESENCE OF STANDING WATER DURING CONSTRUCTION, DARKENED LEAVES OR WATER LINES ON TREES INDICATING STANDING WATER FOR SIGNIFICANT PORTIONS OF TIME). IN THESE CASES CANNOT BE ATTAINED, SPOIL MATERIALS WILL BE BUCKETED AND DISPERSED IN A NEARBY LOCATION THAT MEETS THESE CONDITIONS.

10. FOLLOWING SPOILS DISPERSAL, DOWNSLOPE AND BACKSLOPE AREAS WILL BE IMMEDIATELY COVERED WITH SPECIFIED NATIVE SEED AND EROSION CONTROL MATERIALS, CREATED DURING TRAIL CORRIDOR CLEARING ACTIVITIES.

11. ANY BORROW PITS DEVELOPED DURING THE COURSE OF CONSTRUCTION MUST BE CREATED WITHIN 50' OF THE TRAIL CENTERLINE AND SHALL BE NO MORE THAN 2 CUBIC YARDS IN SIZE. AFTER UTILIZING BORROW PIT AREAS, THEY ARE TO BE GRADED TO A NATURAL CONTOUR, WITH ROOTS TRIMMED, AND SOILS STABILIZED. THE ENTIRE PIT WILL BE "NATURALIZED" WITH NEARBY MATERIALS, PREFERABLY VEGETATIVE MATERIALS REMOVED DURING TRAIL CORRIDOR DEVELOPMENT.

12. TURNS IN THE TRAIL TREAD THAT RESULT IN CROSSING THE FALL-LINE OF THE HILLSLOPE WILL BE CONSTRUCTED ACCORDING TO THE TRAIL TREAD SPECIFICATIONS WITH THE ADDITION OF A GRADE REVERSAL UPSLOPE AND PRIOR TO THE TURN, ALL FILL AND/OR RETAINING WALLS NECESSARY TO STABILIZE THE TURN, DRAINAGE FEATURES NECESSARY TO REMOVE WATER FROM THE TURN AREA (I.E. INSLOPED DRAIN OR CROWNED TURN PLATFORM), AND A GRADE REVERSAL DOWNSLOPE/ FOLLOWING THE TURN. INSLOPED AND/OR SUPER-ELEVATED TURNS SHALL BE FIELD-FIT AND CONSTRUCTED, WHERE NECESSARY TO ASSIST RIDERS IN REMAINING IN THE CENTER OF THE TRAIL TREAD AND MAINTAINING MOMENTUM.

13. ALTERNATIVE RIDING LINES AND/OR TECHNICAL TRAIL FEATURES APPROACHES TO AND EXITS FROM FEATURES WILL BE FIELD-FIT TO MINIMIZE VEGETATION AND HYDROLOGIC IMPACTS. FALL ZONES FOR FEATURES HIGHER THAN 12" ABOVE THE SURROUNDING TOPOGRAPHY WILL BE CLEARED OF LOOSE, SHARP ROCKS OR OTHER MATERIALS THAT COULD FOCUS RIDER IMPACTS FOR A LATERAL DISTANCE OF 10' FROM THE FEATURE.

1 L011 PLAN NOTES

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MANKATO, MN 56001

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Issue	----
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PLAN NOTES

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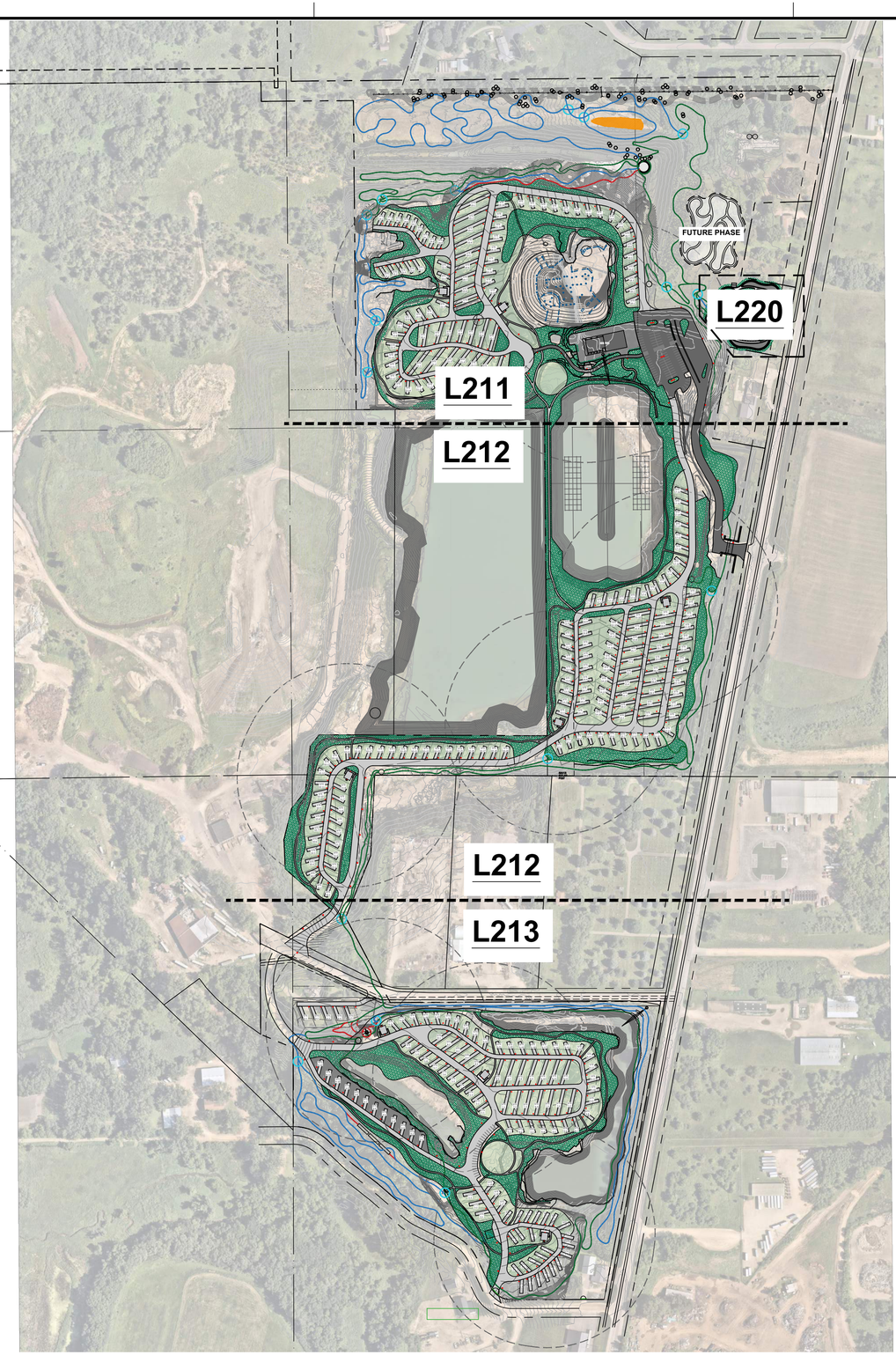

01 L210 OVERALL SITE PLAN REFERENCE

SCALE

0' 5' 10' 20'

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OVERALL SITE PLAN REFERENCE

L210

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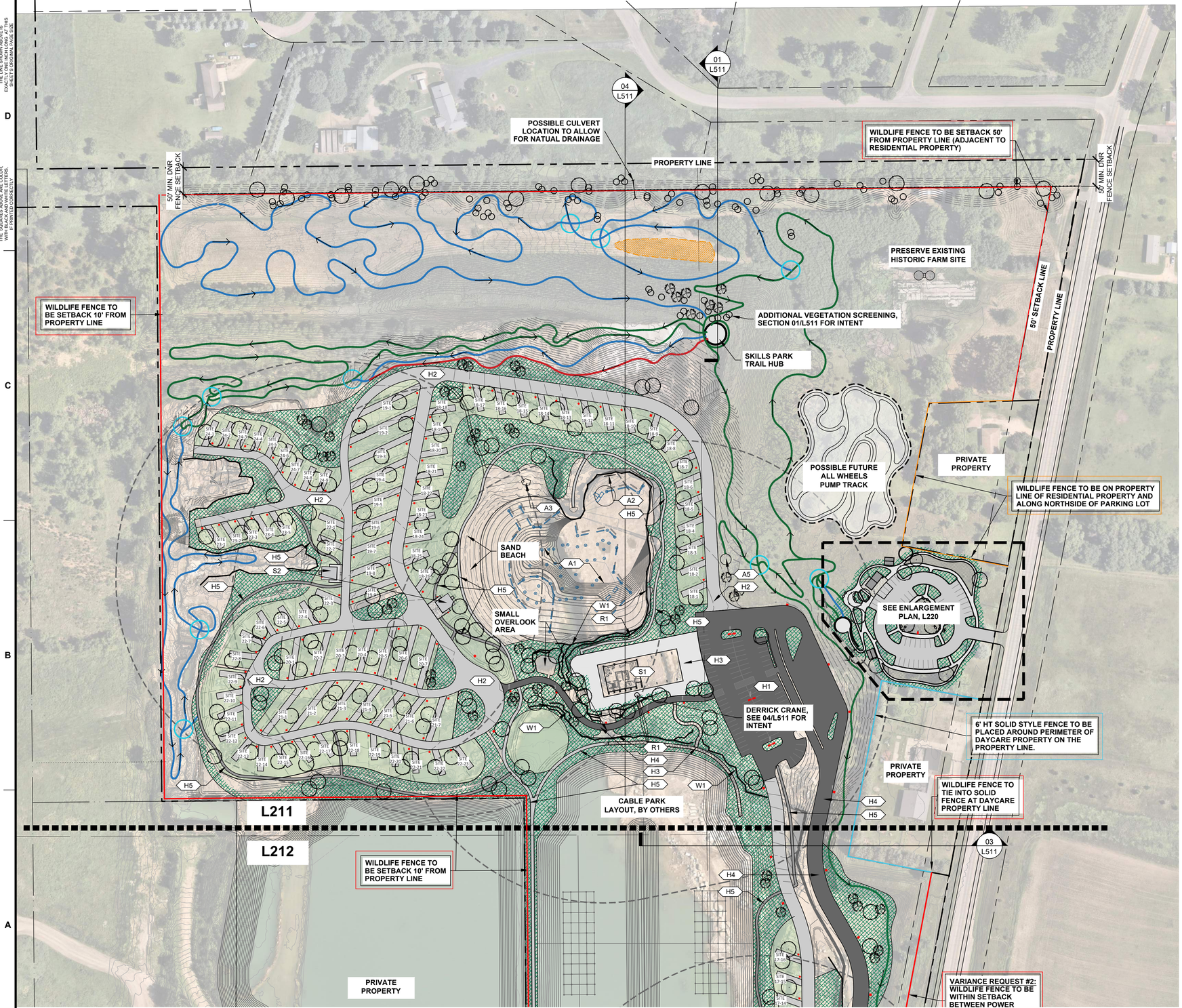

01 L211 SITE PLAN & LANDSCAPE PLAN

SCALE 0' 50' 100' 200'

TRAIL NETWORK LEGEND

- SINGLE TRACK (4'-6' WIDE) - BEGINNER
- SINGLE TRACK (4'-6' WIDE) - INTERMEDIATE
- SINGLE TRACK (4'-6' WIDE) - EXPERT/ADVANCED
- TRAIL JUNCTION SIGNAGE

TRAIL NOTE:

-SINGLE TRACK TRAILS ALIGNMENTS ARE SHOWN IN APPROXIMATE LOCATIONS. SINGLE TRACK TRAILS WILL BE FIELD FIT/ADJUSTED TO LIMIT DISTURBANCE AND BEST FIT EXISTING TOPOGRAPHY AND NATURAL FEATURES.

LANDSCAPE LEGEND

- LAWN / TURF (TEMP IRRIGATION UNTIL ESTABLISHED)
- NATIVE PLANTING (HYDROSEEDED W/TEMP IRRIGATION THROUGH ESTABLISHMENT
- PROTECTED WETLAND (DELINEATED BY OTHERS)
- ± 350-400 OVERSTORY TREE (FINAL PLACEMENT TBD; TEMP IRRIGATED)
- 80-100 EVERGREEN TREES (FINAL PLACEMENT TBD; TEMP IRRIGATED)

POSSIBLE TREE SPECIES
-OVERSTORY: SUGAR MAPLE, RED MAPLE, BUR OAK, RED OAK, ASPEN, HACKBERRY, RIVER BIRCH, HONEY LOCUST, IRONWOOD, AND ELM (DISEASE RESISTANT).
-EVERGREEN: WHITE PINE, BLACK HILLS SPRUCE, CONCOLOR FIR, RED PINE, AMERICAN LARCH, CEDAR

- NORTH BOUNDRAY VEGETATION SCREENING:
-OWNER TO COORDINATE W/ TOWNSHIP FOR SELECTION OF STAGHORN SUMAC & SUPPLEMENTAL NATIVE SPECIES

SITE PLAN NOTES:

- SEE CIVIL FOR FINAL GRADING AND UTILITY LAYOUTS
- SEE CIVIL FOR TYPICAL CAMPSITE LAYOUT.

SITE KEYNOTES:

PAVEMENT / HARDSCAPE

- H1 PARKING LOT / RV ENTRY LOT, SEE CIVIL
- H2 VEHICULAR CAMPGROUND CIRCULATION (GRAVEL), SEE CIVIL
- H3 CONCRETE, SEE CIVIL
- H4 BITUMINOUS, SEE CIVIL
- H5 CIRCULATION TRAILS, FINAL SURFACING TBD

STRUCTURES

- S1 MAIN BUILDING / RV CHECK IN, SEE ARCH
- S2 RESTROOM(S), SEE CIVIL

SITE WALLS

- W1 NATURAL TERRACING
- W2 BOULDER / STACKED TERRACING

SITE AMENITIES

- A1 AQUA PARK, BY OTHERS
- A2 CLIMBING FEATURE IN WATER, BY OTHERS
- A3 BOULDERING FEATURE(S), BY OTHERS
- A4 TRAIL HEAD FEATURE
- A5 MOUNTAIN BIKE PREMIERE FEATURE, BY OTHERS TBD

SITE FURNISHINGS (FURNISHED BY OWNER)

FLEX SEATING @ PLAZA, PRODUCT / LOCATION TBD
LITTER & RECYCLING RECEPTACLES, PRODUCT / LOCATION TBD
BIKE RACKS, PRODUCT / LOCATION TBD
POWER PEDESTAL FOR FOOD TRUCKS, PRODUCT / LOCATION TBD

RAILINGS

- R1 RAILING @ NATURAL TERRACE EDGE, FINAL PRODUCT TBD

ANTICIPATED LIGHTING LOCATIONS (SEE PHOTOMETRIC PLAN)

- PARKING LOT LIGHTING
- ROADWAY LIGHTING
- CAMPSITE LIGHTING
- BUILDING LIGHTING

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SITE PLAN & LANDSCAPE PLAN

L211

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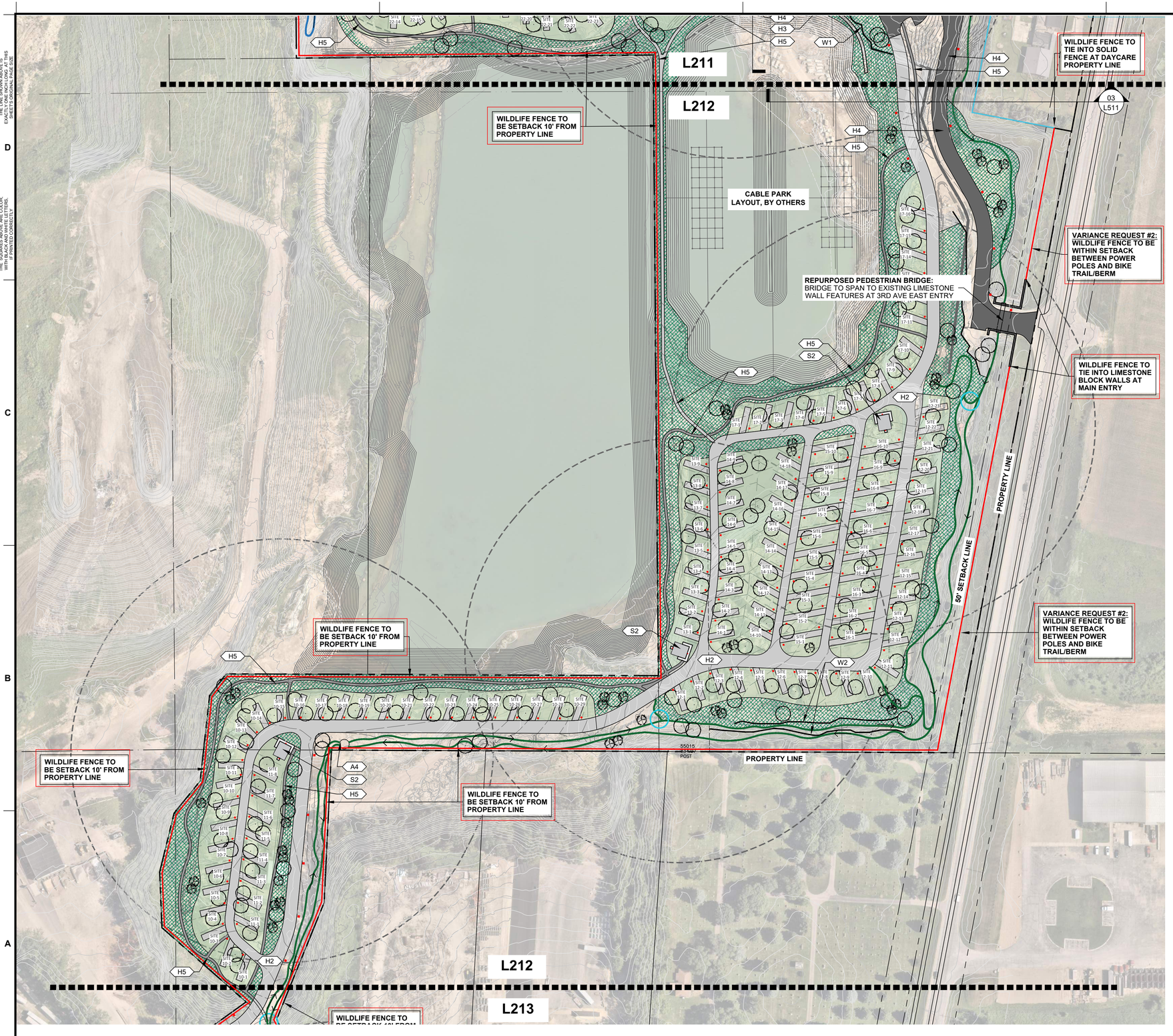

TRAIL NETWORK LEGEND

- SINGLE TRACK (4'-6' WIDE) - BEGINNER
- SINGLE TRACK (4'-6' WIDE) - INTERMEDIATE
- SINGLE TRACK (4'-6' WIDE) - EXPERT/ADVANCED
- TRAIL JUNCTION SIGNAGE

TRAIL NOTE:

-SINGLE TRACK TRAILS ALIGNMENTS ARE SHOWN IN APPROXIMATE LOCATIONS. SINGLE TRACK TRAILS WILL BE FIELD FIT/ADJUSTED TO LIMIT DISTURBANCE AND BEST FIT EXISTING TOPOGRAPHY AND NATURAL FEATURES.

LANDSCAPE LEGEND

- LAWN / TURF (TEMP IRRIGATION UNTIL ESTABLISHED)
- NATIVE PLANTING (HYDROSEEDED W/TEMP IRRIGATION THROUGH ESTABLISHMENT
- PROTECTED WETLAND (DELINEATED BY OTHERS)
- ± 350-400 OVERSTORY TREE (FINAL PLACEMENT TBD; TEMP IRRIGATED)
- 80-100 EVERGREEN TREES (FINAL PLACEMENT TBD; TEMP IRRIGATED)

POSSIBLE TREE SPECIES
-OVERSTORY: SUGAR MAPLE, RED MAPLE, BUR OAK, RED OAK, ASPEN, HACKBERRY, RIVER BIRCH, HONEY LOCUST, IRONWOOD, AND ELM (DISEASE RESISTANT).
-EVERGREEN: WHITE PINE, BLACK HILLS SPRUCE, CONCOLOR FIR, RED PINE, AMERICAN LARCH, CEDAR

- NORTH BOUNDRAY VEGETATION SCREENING:
  -OWNER TO COORDINATE W/ TOWNSHIP FOR SELECTION OF STAGHORN SUMAC & SUPPLEMENTAL NATIVE SPECIES

SITE PLAN NOTES:

- SEE CIVIL FOR FINAL GRADING AND UTILITY LAYOUTS
- SEE CIVIL FOR TYPICAL CAMPSITE LAYOUT.

SITE KEYNOTES:

PAVEMENT / HARDSCAPE

- H1 PARKING LOT / RV ENTRY LOT, SEE CIVIL
- H2 VEHICULAR CAMPGROUND CIRCULATION (GRAVEL), SEE CIVIL
- H3 CONCRETE, SEE CIVIL
- H4 BITUMINOUS, SEE CIVIL
- H5 CIRCULATION TRAILS, FINAL SURFACING TBD

STRUCTURES

- S1 MAIN BUILDING / RV CHECK IN, SEE ARCH
- S2 RESTROOM(S), SEE CIVIL

SITE WALLS

- W1 NATURAL TERRACING
- W2 BOULDER / STACKED TERRACING

SITE AMENITIES

- A1 AQUA PARK, BY OTHERS
- A2 CLIMBING FEATURE IN WATER, BY OTHERS
- A3 BOULDERING FEATURE(S), BY OTHERS
- A4 TRAIL HEAD FEATURE
- A5 MOUNTAIN BIKE PREMIERE FEATURE, BY OTHERS TBD

SITE FURNISHINGS (FURNISHED BY OWNER)

FLEX SEATING @ PLAZA, PRODUCT / LOCATION TBD
LITTER & RECYCLING RECEPTACLES, PRODUCT / LOCATION TBD
BIKE RACKS, PRODUCT / LOCATION TBD
POWER PEDESTAL FOR FOOD TRUCKS, PRODUCT / LOCATION TBD

RAILINGS

- R1 RAILING @ NATURAL TERRACE EDGE, FINAL PRODUCT TBD

ANTICIPATED LIGHTING LOCATIONS (SEE PHOTOMETRIC PLAN)

- PARKING LOT LIGHTING
- ROADWAY LIGHTING
- CAMPSITE LIGHTING
- BUILDING LIGHTING

01 L212 SITE PLAN & LANDSCAPE PLAN

SCALE 0' 50' 100' 200'

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Revision Schedule

No	Date	Description

ROCKWELL RV & ADVENTURE PARK

23120 3RD AVE
MANKATO, MN 56001

Project Number	26129
Issue	----
Date	2026-07-28

SITE PLAN & LANDSCAPE PLAN

L212

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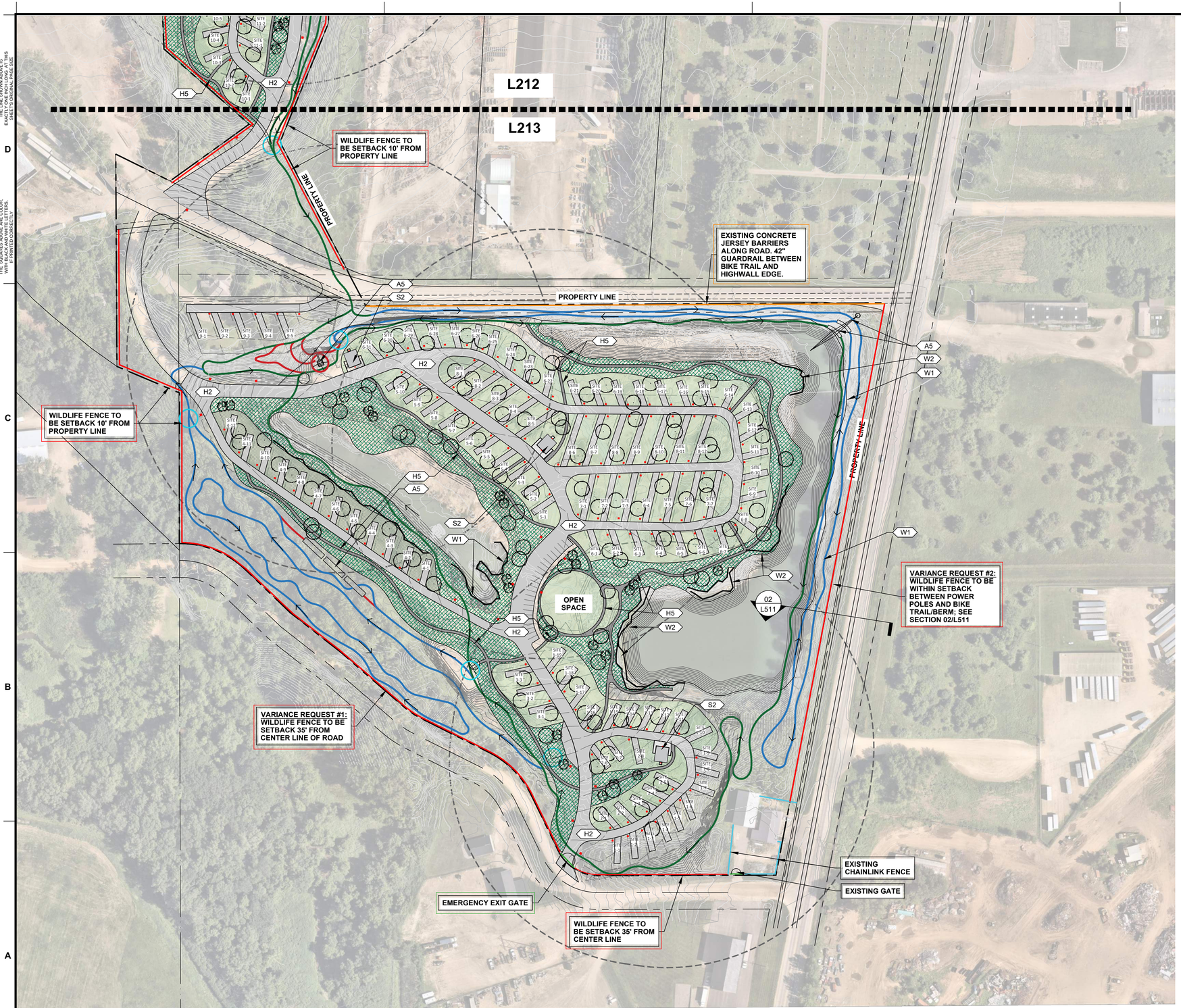

TRAIL NETWORK LEGEND

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- SEE CIVIL FOR TYPICAL CAMPSITE LAYOUT.

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RAILINGS
- R1 RAILING @ NATURAL TERRACE EDGE, FINAL PRODUCT TBD

ANTICIPATED LIGHTING LOCATIONS (SEE PHOTOMETRIC PLAN)
- PARKING LOT LIGHTING
- ROADWAY LIGHTING
- CAMPSITE LIGHTING
- BUILDING LIGHTING

01 L213 SITE PLAN & LANDSCAPE PLAN

SCALE 0' 50' 100' 200'

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ROCKWELL RV & ADVENTURE PARK
23120 3RD AVE
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Project Number	26129
Issue	----
Date	2026-07-28

SITE PLAN & LANDSCAPE PLAN

L213

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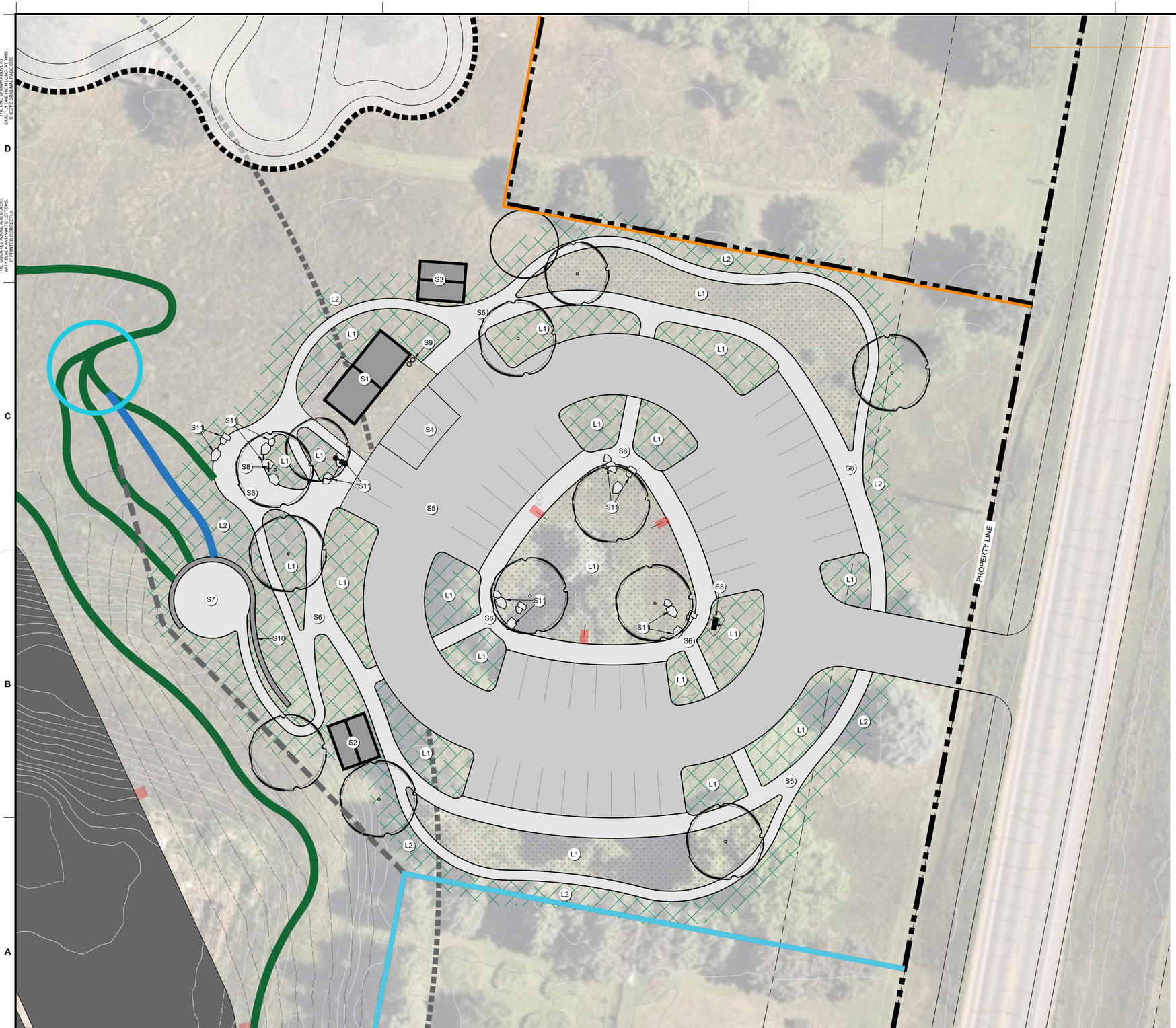

01 L220 SITE PLAN & LANDSCAPE PLAN ENLARGEMENT 1" = 20'

0' 10' 20' 40'

TRAIL NETWORK LEGEND

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KEYNOTES LEGEND

SITE & HARDSCAPE FEATURES

- S1 RESTROOM BUILDING W/ SHELTER (FINAL DESIGN TBD)
- S2 SHELTER
- S3 CHANGING STATION / PARTITION
- S4 CONCRETE / ADA HARDSCAPE SURFACE
- S5 GRAVEL AGGREGATE PARKING
- S6 GRAVEL CIRCULATION TRAILS
- S7 BEGINNER SKILL LEVEL TRAIL HUB START
- S8 SIGN FEATURE - BOULDER W/ METAL LETTERING
- S9 TRASH & RECYCLING RECEPTACLES
- S10 LIMESTONE WALLS W/ RECLAIMED BOULDERS
- S11 RECLAIMED BOULDERS
- SITE LIGHT, SEE L250 FOR INTENT

LANDSCAPE FEATURES

- L1 TURF SEED
- L2 NATIVE SEED
- OVERSTORY TREE (FINAL QTY'S AND PLACEMENT TBD)
- -POSSIBLE TREE SPECIES: SUGAR MAPLE, RED MAPLE, BUR OAK, RED OAK, ASPEN, HACKBERRY, RIVER BIRCH, HONEY LOCUST, IRONWOOD, AND ELM (DISEASE RESISTANT).



*IMAGE FOR DESIGN REFERENCE ONLY

03 L220 SHELTER INTENT N.T.S



*IMAGE FOR DESIGN REFERENCE ONLY

02 L220 RESTROOM & SHELTER INTENT N.T.S

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SITE PLAN & LANDSCAPE PLAN ENLARGEMENT

L220

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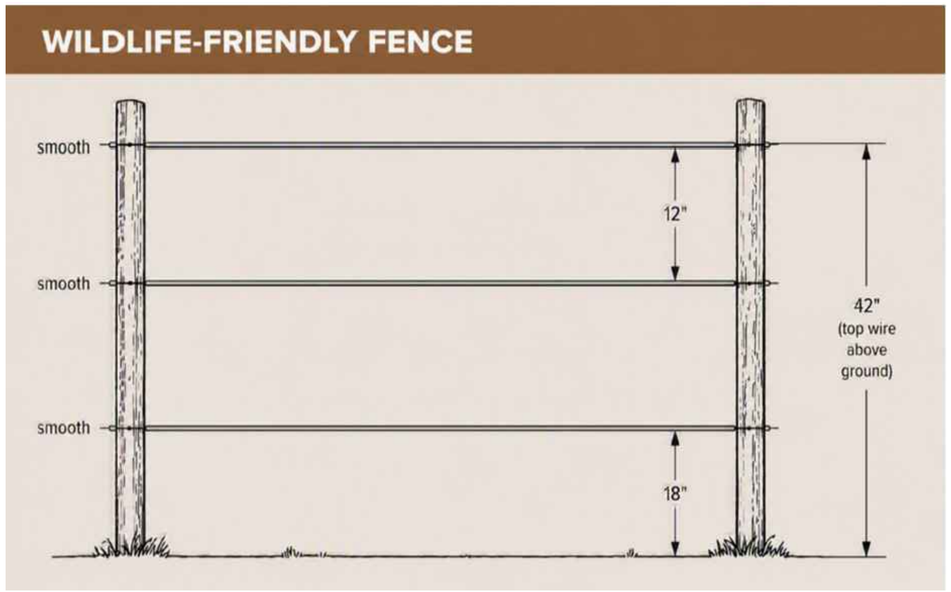
VISUAL INTENT: SOUTH GATE (EXIT ONLY)



VISUAL INTENT: WILDLIFE FENCE



VISUAL INTENT: SOLID FENCE

01
L501
SITE VISUAL INTENT IMAGERY - FENCE

1" = 20'

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SITE VISUAL INTENT IMAGERY - FENCE

L501

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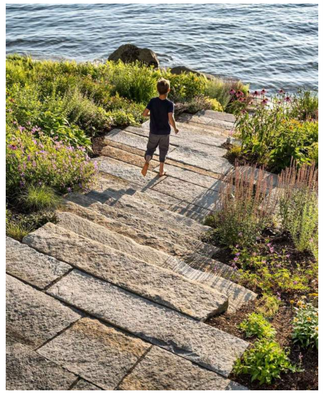
VISUAL INTENT: SWIMMING QUARRY





VISUAL INTENT: CAMPGROUND CHARACTER

VISUAL INTENT: POSSIBLE REUSE OF ON SITE LIMESTONE





VISUAL INTENT: POSSIBLE LANDSCAPE CHARACTER WITH TREES

VISUAL INTENT: POSSIBLE PLAZA CHARACTER NEAR MAIN BUILDING

VISUAL INTENT: POSSIBLE OPEN SPACE / FIRE ELEMENT

01
L502
SITE VISUAL INTENT IMAGERY - CHARACTER

1" = 20'

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SITE VISUAL INTENT IMAGERY - CHARACTER

L502

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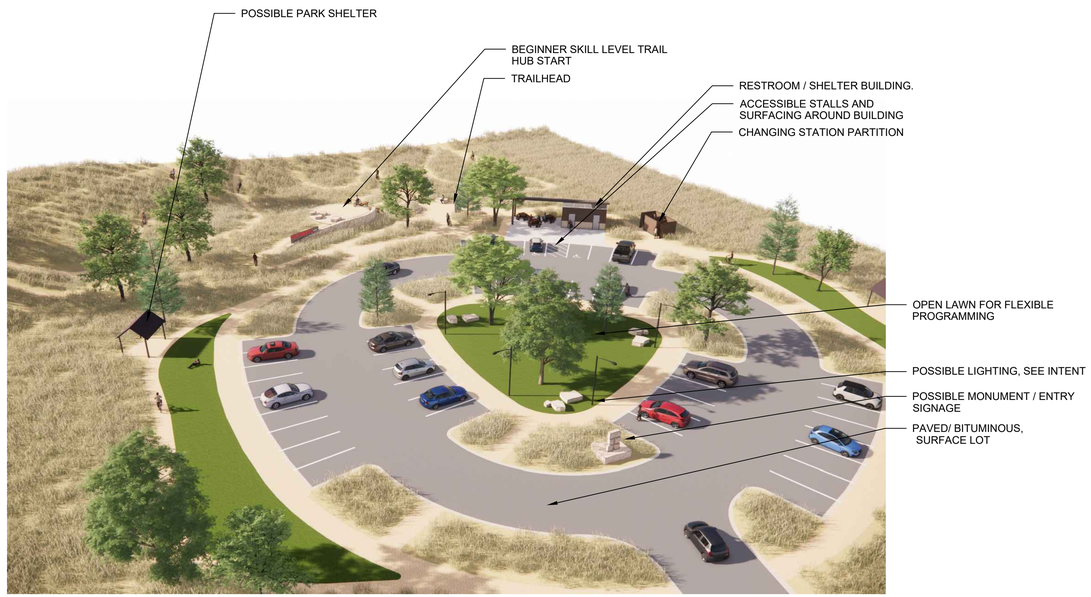
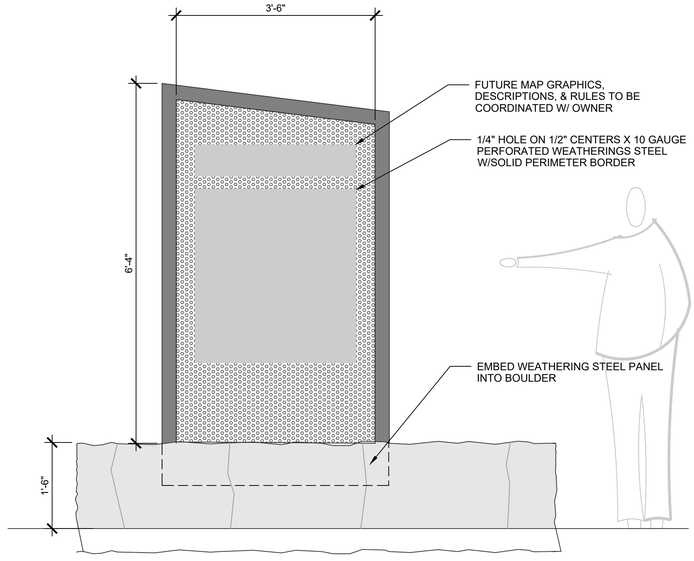


03 L510 MAIN ENTRY INTENT N.T.S



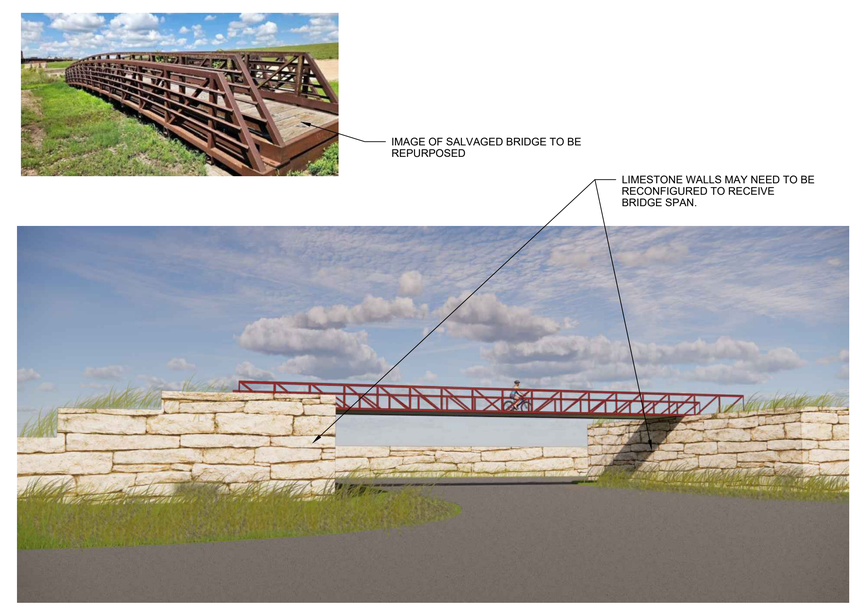
04 L510 SKILLS PARK TRAIL HUB N.T.S



01 L510 TRAILHEAD SIGNAGE INTENT, TYP SCALE: 3/4" = 1'-0"



VISUAL INTENT: FINAL LOCATIONS TBD



VISUAL INTENT: LOCATION AT MAIN EAST ENTRY

02 L510 REPURPOSED SALVAGED BRIDGE FEATURE SCALE: 3/4" = 1'-0"

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SITE VISUAL INTENT IMAGERY

L503

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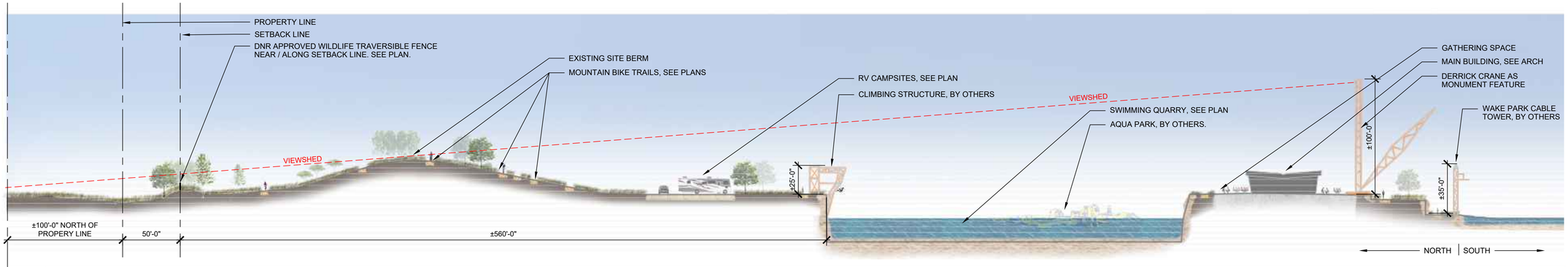
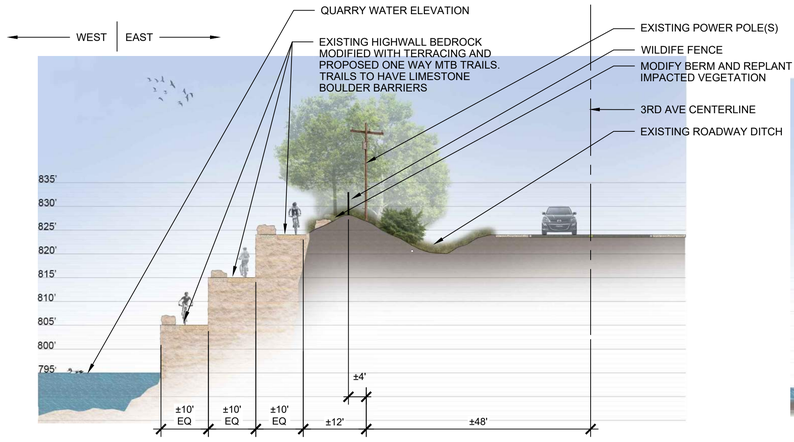


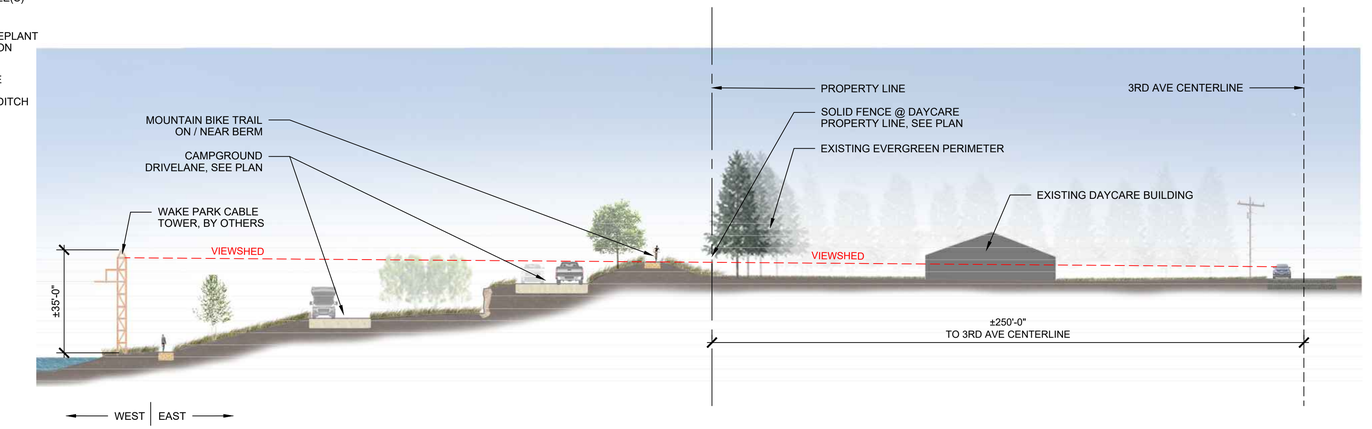
04 L511 NORTH PROPERTY - N/S SECTION 02

N.T.S



02 L511 SOUTH PROPERY - TERRACE TRAIL SECTION, TYP

N.T.S



03 L511 NORTH PROPERTY - E/W SECTION

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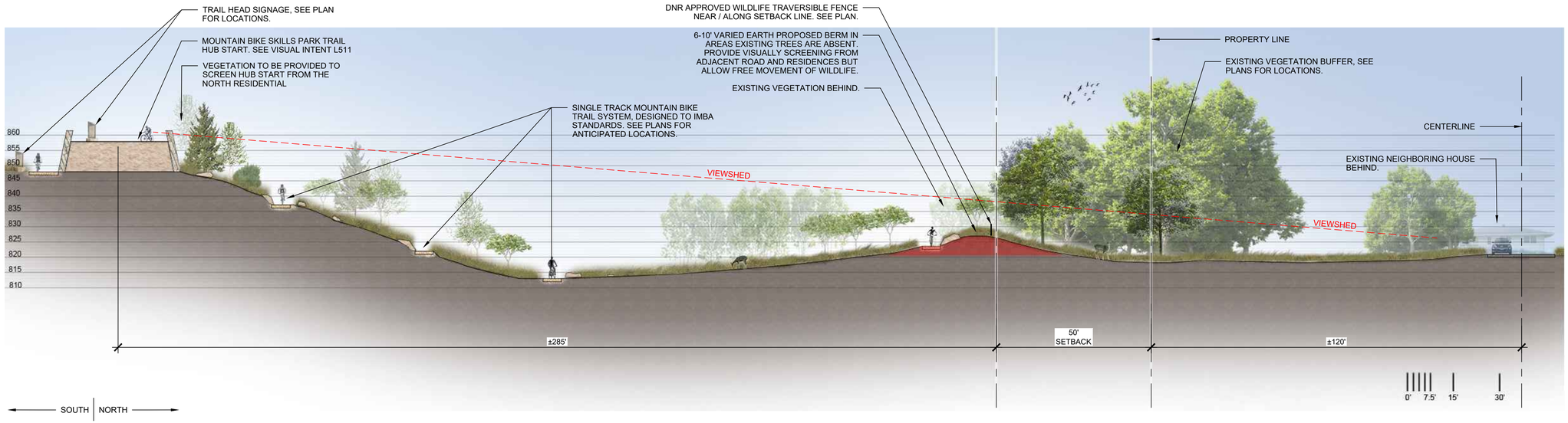

01 L511 NORTH PROPERTY - N/S SECTION 01

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SITE SECTIONS

L510

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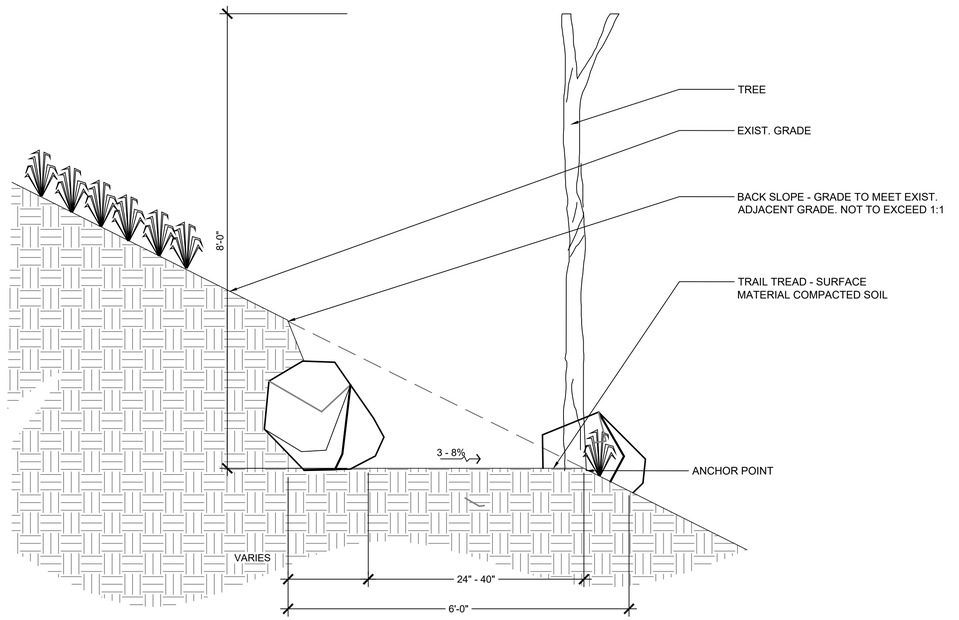
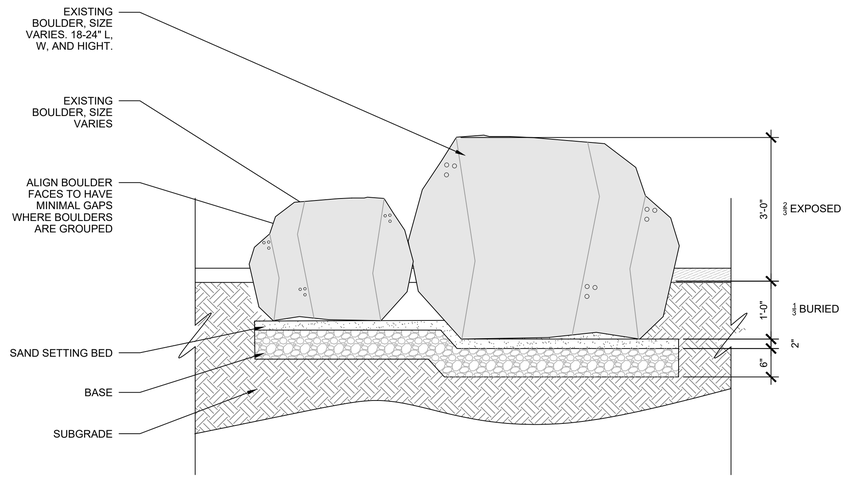
NOTES:
TYPICAL TRAIL TREAD ON SLOPE SIDE TRAILS SHALL BE CONSTRUCTED AS POSSIBLE.

1. CORRIDOR DIMENSIONS: 6' W X 8' H
2. TREAD WIDTH: 24" - 40"
3. TREAD MATERIAL: NATURAL SURFACE, MECHANICALLY COMPACTED
4. TREAD CROSS SLOPE: 3% - 8%

PROVIDE FULL DEPTH TEST SEGMENTS ON-SITE FOR ACCEPTANCE PRIOR TO TRAIL CONSTRUCTION. ADJUSTMENTS TO $\frac{3}{4}$" MINUS AGGREGATE DEPTH WILL BE FIELD DIRECTED BY PROJECT MANAGER TO OBTAIN DESIRED GRADATION AND DENSITY.



03 L512 TYPICAL SINGLETRACK TRAIL SECTION ON SLOPE
SCALE: 3/4" = 1'-0"

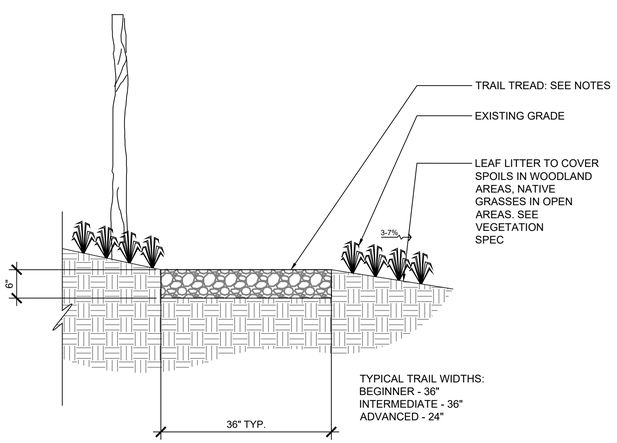


04 L512 FIELDSTONE BOULDER, TYP
SCALE: 3/4" = 1'-0"

NOTES:
THE TYPICAL TRAIL TREAD SHALL BE CONSTRUCTED AS FOLLOWS:

1. SCRAPE ORGANIC SOILS FROM SURFACE
2. ADD 2-3" DEPTH OF $\frac{3}{4}$" MINUS AGGREGATE/ RECLAIM MATERIAL TO AMEND UNDERLYING SOILS
3. TILL AGGREGATE MATERIAL TO A DEPTH OF 6"
4. COMPACT TO ACCEPTED STANDARDS PER TRAIL CONSTRUCTION NOTE 2 ON SHEET L5.0

PROVIDE FULL DEPTH TEST SEGMENTS ON-SITE FOR ACCEPTANCE PRIOR TO TRAIL CONSTRUCTION. ADJUSTMENTS TO $\frac{3}{4}$" MINUS AGGREGATE DEPTH WILL BE FIELD DIRECTED BY PROJECT MANAGER TO OBTAIN DESIRED GRADATION AND DENSITY.



01 L512 TYPICAL SINGLETRACK TRAIL CROSS SECTION
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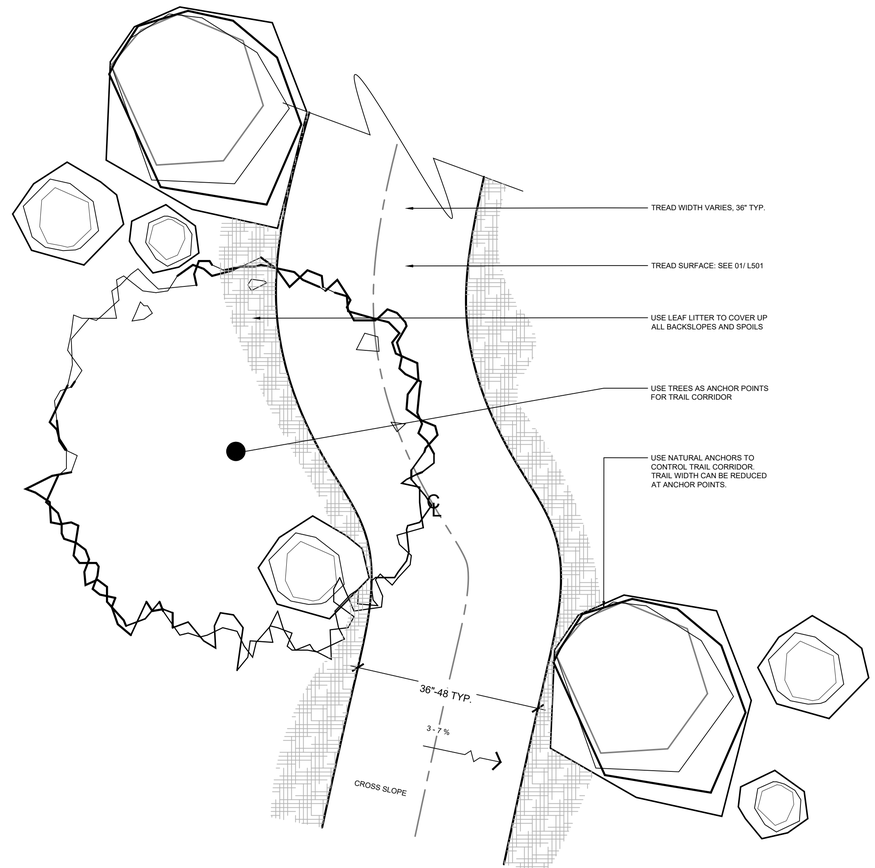

02 L512 TYPICAL SINGLE TRACK TRAIL CONSTRUCTION
N.T.S

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Minneapolis, MN 55401
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www.thinkconfluence.com

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PATHFINDER TRAIL BUILDERS
AFTON, MN
507.226.3799

CIVIL
BOLTON & MENK, INC
1960 PREMIER DR
MANKATO, MN 56001
507.625.4171

PRELIMINARY
NOT FOR CONSTRUCTION

Revision Schedule

No.	Date	Description

ROCKWELL RV & ADVENTURE PARK
23120 3RD AVE
MANKATO, MN 56001

Project Number	26129
Issue	----
Date	2026-07-28

SITE DETAILS

L511

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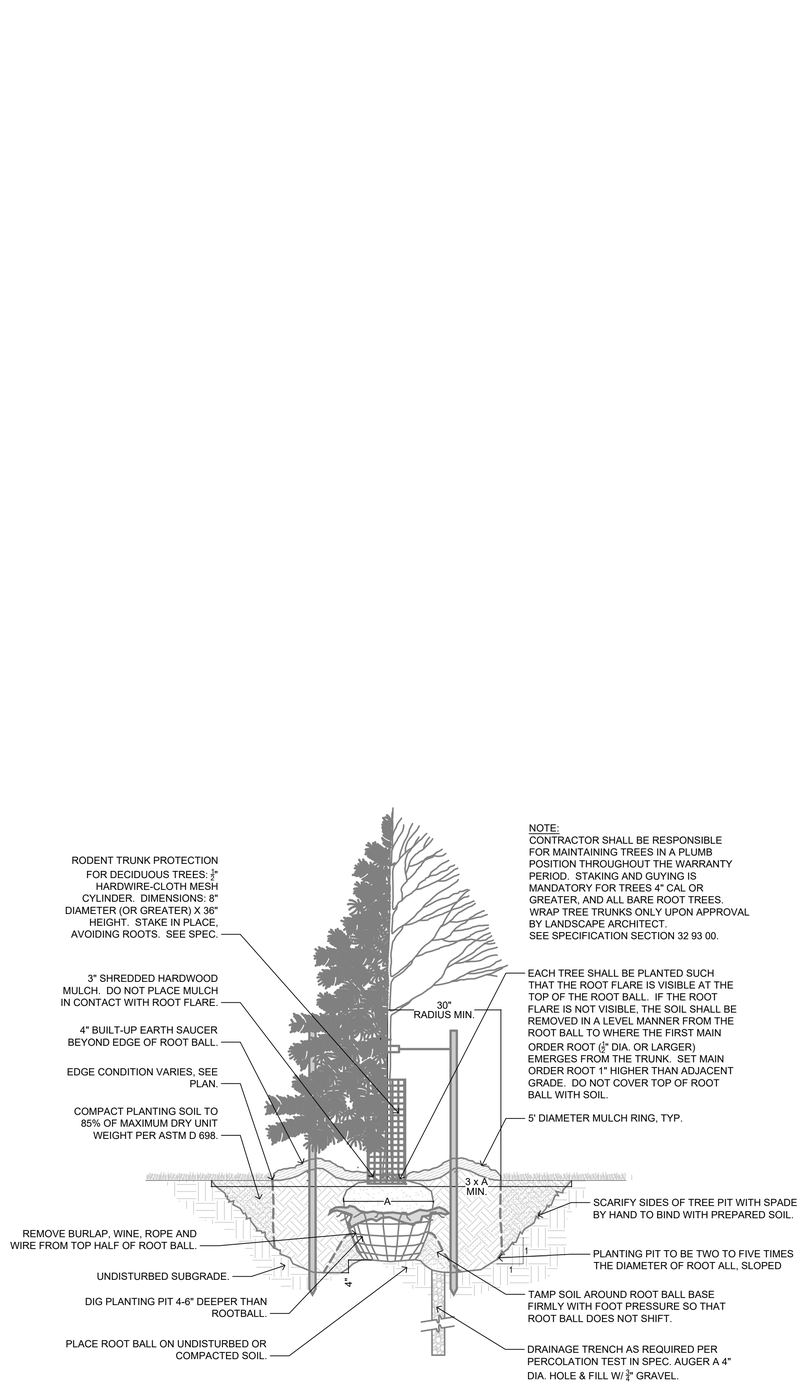
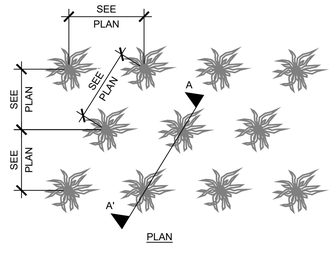


01 L501 TREE PLANTING DETAIL, TYP. N.T.S.



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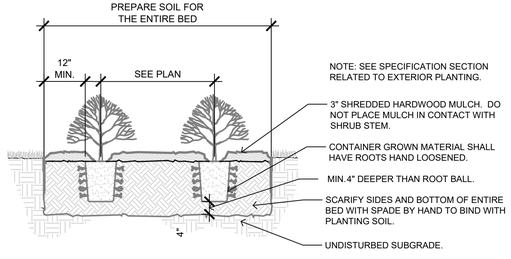
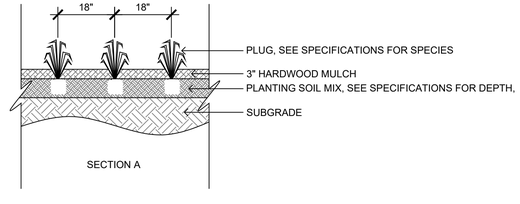


SECTION A'-A

02 L501 SHRUB PLANTING DETAIL, TYP. N.T.S.



SECTION A

03 L501 PERENNIAL AND NATIVE GRASS PLUG LAYOUT N.T.S

ROCKWELL RV & ADVENTURE PARK
23120 3RD AVE
MANKATO, MN 56001

Project Number	26129
Issue	----
Date	2026-07-28

PLANTING DETAILS

L512

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ROCKWELL
USA
TRD
MRK
RV AND ADVENTURE PARK
MANKATO, MN

PROPERTY LINE

WILDLIFE FENCE TO BE SETBACK 10' FROM PROPERTY LINE

WILDLIFE FENCE TO BE SETBACK 50' FROM PROPERTY LINE (ADJACENT TO RESIDENTIAL PROPERTY)

50' SETBACK LINE
PROPERTY LINE

WILDLIFE FENCE TO BE ON PROPERTY LINE OF RESIDENTIAL PROPERTY AND ALONG NORTHSIDE OF PARKING LOT

6' HT SOLID STYLE FENCE TO BE PLACED AROUND PERIMETER OF DAYCARE PROPERTY ON THE PROPERTY LINE.

WILDLIFE FENCE TO TIE INTO SOLID FENCE AT DAYCARE PROPERTY LINE

WILDLIFE FENCE TO BE SETBACK 10' FROM PROPERTY LINE

PRIVATE PROPERTY

VARIANCE REQUEST #2:
WILDLIFE FENCE TO BE WITHIN SETBACK BETWEEN POWER POLES AND BIKE TRAIL/BERM

WILDLIFE FENCE TO TIE INTO LIMESTONE BLOCK WALLS AT MAIN ENTRY

PROPERTY LINE
3RD AVE
50' SETBACK LINE

VARIANCE REQUEST #2:
WILDLIFE FENCE TO BE WITHIN SETBACK BETWEEN POWER POLES AND BIKE TRAIL/BERM

WILDLIFE FENCE TO BE SETBACK 10' FROM PROPERTY LINE

WILDLIFE FENCE TO BE SETBACK 10' FROM PROPERTY LINE

WILDLIFE FENCE TO BE SETBACK 10' FROM PROPERTY LINE

PRIVATE PROPERTY

PRIVATE PROPERTY

EXISTING CEMETERY

PROPERTY LINE

WILDLIFE FENCE TO BE SETBACK 10' FROM PROPERTY LINE

EXISTING CONCRETE JERSEY BARRIERS ALONG ROAD. 42" GUARDRAIL BETWEEN BIKE TRAIL AND HIGHWALL EDGE.

PROPERTY LINE

PROPERTY LINE

VARIANCE REQUEST #2:
WILDLIFE FENCE TO BE WITHIN SETBACK BETWEEN POWER POLES AND BIKE TRAIL/BERM; SEE SECTION 02/L511

PRIVATE PROPERTY

VARIANCE REQUEST #1:
WILDLIFE FENCE TO BE SETBACK 35' FROM CENTER LINE OF ROAD

WILDLIFE FENCE TO BE SETBACK 35' FROM CENTER LINE

EMERGENCY EXIT GATE

EXISTING CHAINLINK FENCE

EXISTING GATE

0' 60' 120' 240' 480'

NORTH

ROCKWELL QUARRY CONCEPT PERIMETER FENCE EXHIBIT

CONFLUENCE

SITE LEGEND:

BIKE TRAILS

1. ACCESS / CONVENIENCE BIKE OPTIMIZED TRAILS (TWO WAY)
2. BEGINNER TRAILS (ONE WAY)
3. INTERMEDIATE TRAILS (ONE WAY)
4. BIKE SKILLS LINES (BEGINNER; INTERMEDIATE; EXPERT)
5. TRAIL HUB @ BIKE SKILLS
6. TRAIL HEAD / TRAIL ENTRY POINTS

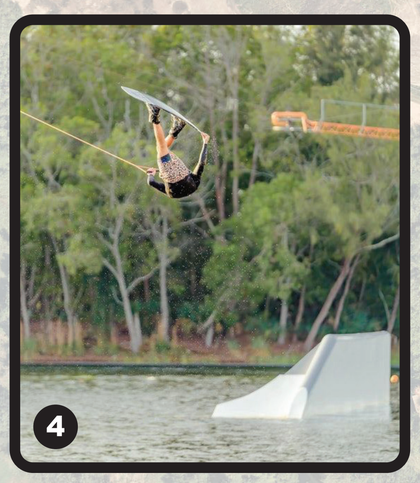
OTHER SITE AMENITIES / FEATURES

1. PUBLIC PARKING / ACCESS
2. USER PARKING
3. OPEN SPACE
4. WATER CABLE PARK
5. MODIFIED SHORELINE W/LIMESTONE TERRACING
6. GRAVEL / SAND BEACH
7. WATER ACCESS
8. CLIMBING WALL
9. BOULDERING WALLS

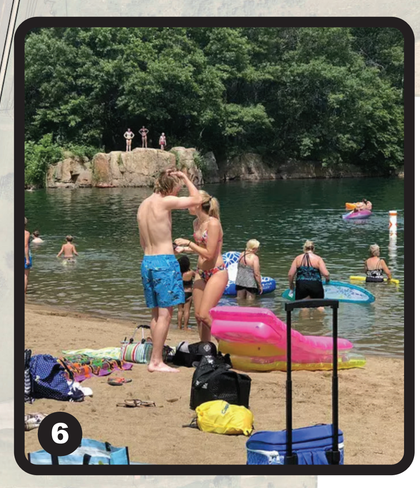
BUILDINGS

10. RESTROOM / PAVILION
11. MAIN BUILDING (W/RESTROOM)













FUTURE PUMP TRACK

AQUATIC PARK

PUBLIC ENTRY

WAKE BOARD CABLE PARK

MAIN ENTRY

PRIVATE PROPERTY

PRIVATE PROPERTY

PRIVATE PROPERTY

EXISTING CEMETERY

ROCKWELL USA TRD MRK RV AND ADVENTURE PARK MANKATO, MN

0' 60' 120' 240' 480'

NORTH

ROCKWELL QUARRY CONCEPT RENDERED SITE PLAN

CONFLUENCE

Noise Screening Assessment
Rockwell RV & Adventure Park

1. Executive Summary

This Noise Screening Assessment evaluates the potential for the proposed Rockwell RV & Adventure Park to comply with the applicable Minnesota Pollution Control Agency (MPCA) environmental noise standards at the nearest Noise Area Classification (NAC) 1 receiving properties, including the adjacent residential property and neighboring daycare.

A conservative screening assessment was performed by estimating the approximate source sound levels that could occur while maintaining the applicable daytime residential criterion of 60 dBA (L50) at the receiving properties. The assessment intentionally assumes unobstructed (free-field) sound propagation and does not account for attenuation associated with quarry topography, retained berms, buildings, vegetation, or other site-specific shielding features.

Based on this conservative screening assessment, the proposed Rockwell RV & Adventure Park is reasonably expected to operate below the applicable MPCA daytime noise standards during normal operations. Existing quarry topography, retained berms, thoughtful site layout, and planned operational practices are expected to provide additional reductions in off-site sound transmission beyond those assumed in this assessment.

---

2. Purpose

The purpose of this Noise Screening Assessment is to provide a preliminary evaluation of the potential environmental noise associated with the proposed Rockwell RV & Adventure Park in support of assessing the potential for the proposed recreational activities to comply with the applicable Minnesota Pollution Control Agency (MPCA) environmental noise standards at the nearest Noise Area Classification (NAC) 1 receiving properties.

Specifically, this assessment:

- Identifies the principal project-related noise sources.
- Identifies the nearest NAC 1 receiving properties.
- Evaluates the potential for project-generated noise to comply with applicable MPCA noise standards using conservative screening assumptions.
- Summarizes operational practices intended to minimize off-site noise.

This assessment is intended to support the Interim Use Permit application by providing an initial screening of potential noise impacts. It is not intended to replace a detailed acoustical propagation study should one later be requested by the permitting authority. Rather, it provides a conservative planning-level assessment intended to evaluate whether the proposed project is reasonably expected to comply with applicable MPCA noise standards under typical operating conditions.

---

3. MPCA Noise Standards and Screening Methodology

The State of Minnesota regulates environmental noise through the Minnesota Pollution Control Agency (MPCA) Noise Standards, Minnesota Rules Chapter 7030. These standards establish maximum allowable sound levels from the proposed property at the receiving property based on the land use classification of the receiver.

The nearest off-site Noise Area Classification (NAC) 1 receivers to the proposed Rockwell RV & Adventure Park are an existing residence north of the project and an adjacent daycare property to the east. Both are subject to the MPCA residential noise standards summarized in Table 3-1.

Table 3-1. MPCA Noise Standards – Noise Area Classification (NAC) 1

Time Period	L50 (dBA)	L10 (dBA)
Daytime (7:00 AM – 10:00 PM)	60	65
Nighttime (10:00 PM – 7:00 AM)	50	55

For the purposes of this screening assessment, the evaluation focuses on the applicable daytime residential criterion of 60 dBA (L50), as the principal recreational activities are proposed to occur during daytime operating hours.

A conservative screening methodology was used to evaluate whether the proposed recreational activities have the potential to exceed the applicable MPCA daytime residential noise standard. The screening assessment identifies the approximate sound level that would be required at each principal project noise source to produce 60 dBA (L50) at the nearest NAC 1 receiving property, assuming unobstructed (free-field) sound propagation. No attenuation associated with terrain, buildings, vegetation, atmospheric absorption, or other site-specific shielding features was included in the screening calculations.

As a result, the calculated source sound levels represent conservative screening thresholds that can be directly compared with the expected sound generated by the proposed recreational activities.

---

4. Existing Site Conditions

The proposed Rockwell RV & Adventure Park is located within a former limestone quarry in Lime Township, Blue Earth County, Minnesota. Mining operations were conducted on the property for many decades and included blasting, drilling, rock crushing, material processing, excavators, wheel loaders, haul trucks, and other heavy equipment commonly associated with limestone quarry operations.

The proposed redevelopment represents a transition from historic industrial land use to family-oriented outdoor recreation. The principal noise sources associated with the completed project will consist primarily of dispersed recreational activities rather than continuous industrial equipment.

To the Project Proposer's knowledge, no documented off-site noise complaints associated with the historic quarry operations have been identified during the period of active mining. While the proposed recreational uses differ substantially from historic mining activities, the site's long history of industrial operation provides useful context when considering the relative magnitude of anticipated project noise.

The nearest off-site Noise Area Classification (NAC) 1 receiving properties include:

- An existing single-family residence located immediately north of the project property.
- An adjacent daycare facility located on the east side of the project property near the northern project entrance.

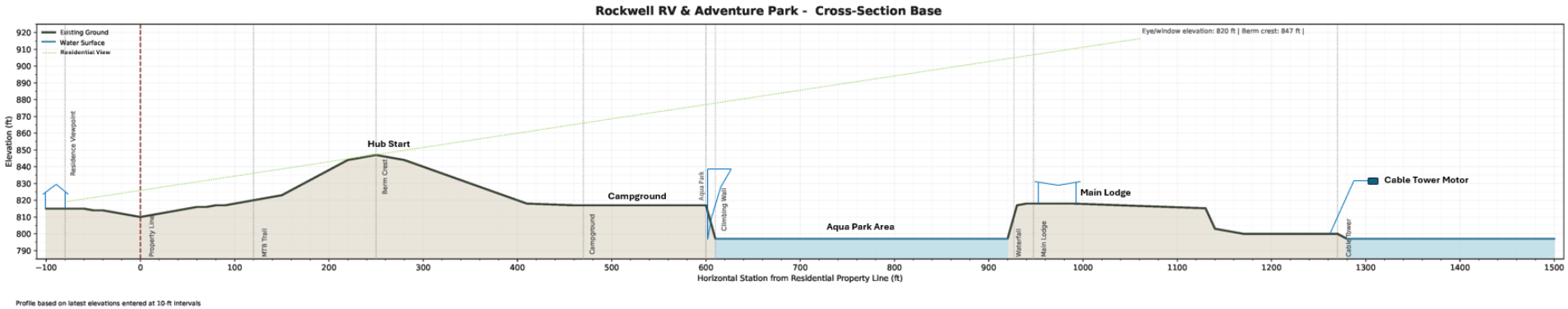
Table 4-1 summarizes the approximate separation distances between the principal project features and each NAC 1 receiving property. Because the closest receiving property varies depending on the project feature, the screening assessment presented in Section 6 evaluates each principal noise source using the nearest applicable NAC 1 receiver.

Table 4-1. Approximate Distance from Principal Project Features to Nearest NAC 1 Receiving Properties

Project Feature	Nearest Residence (ft)	Adjacent Daycare (ft)	Controlling Receiver
Hub Start	120	730	Residence
Campground	470	450	Daycare
Aqua Park	600	500	Daycare
Climbing Wall	610	640	Residence
Aqua Park Building	850	810	Daycare
Waterfall Feature	950	570	Daycare
Main Lodge	960	360	Daycare
Cable Wake Park	1,270	210	Daycare

Figure 4-1 illustrates the relationship between the existing residential property, retained quarry berms, and the proposed recreational facilities. The cross section demonstrates that the principal activity areas are located below the elevation of the surrounding terrain and that existing berms and quarry walls interrupt direct line-of-sight between project activities and adjacent residential properties. These physical site characteristics are discussed further in Section 7 as factors expected to reduce sound propagation beyond the conservative free-field assumptions used in the screening analysis.

Figure 4-1. Representative North–South Cross-Section



5. Principal Noise Source Categories

The proposed Rockwell RV & Adventure Park includes several distinct activity areas that generate different types and levels of sound during normal operations. The principal noise source categories evaluated in this screening assessment are described below.

5.1 Aqua Park

The Aqua Park is anticipated to be the most active recreational area during normal daytime operations. This category includes the floating Aqua Park attractions, deep-water climbing wall, Aqua Park support building, and decorative waterfall feature.

Typical sound sources include guest conversations, laughter, occasional cheering, lifeguard whistles used for safety purposes, participants entering the water, normal building activity, and the ambient sound generated by the waterfall. Background music may be provided near the Aqua Park building at a level intended to serve guests within the immediate activity area.

5.2 Mountain Bike Trail System

The Mountain Bike Trail System includes the Start Hub and the network of mountain bike trails distributed throughout the property.

Typical sound sources consist of riders gathering at the Start Hub, conversations, occasional rider instructions, bicycles traveling on the trail system, and intermittent cheering associated with organized rides or events. Once riders leave the Start Hub, activity becomes dispersed throughout the trail network, reducing the concentration of sound at any one location. No permanent amplified sound systems are proposed within the trail system. E-bikes are allowed, but bikes with internal combustion engines like motorcycles or dirt bikes are not permitted.

5.3 Campground

The campground consists of individual RV campsites distributed throughout the property and is characterized by dispersed, low-intensity recreational activity. Typical sound sources include conversations, children playing, vehicle arrivals and departures, campsite activities, and other routine campground use.

Because campground guests also represent a noise-sensitive recreational use, campground operations will be managed through established quiet hours and campground rules intended to minimize excessive noise during evening and nighttime

periods. These operational practices are expected to support a comfortable camping environment while also reducing the potential for off-site noise impacts.

5.4 Cable Wake Park

The Cable Wake Park consists of a continuously operating overhead cable system used to tow participants around the lake.

Primary sound sources include the electric drive motor and gearbox located at the drive tower, participant activity on the water, and routine guest conversations near the dock and staging area. The cable system operates using an electric motor with a variable frequency drive, resulting in smooth startup and operation without internal combustion engine noise. Background music may be provided near the Cable Park start dock at a level intended to serve guests within the immediate activity area.

5.5 Main Lodge

The Main Lodge serves as the primary guest arrival, registration, retail, and gathering area for the project.

Typical sound sources include guest arrivals, conversations, routine building activity, and vehicle movements within the adjacent parking areas. Outdoor amplified sound is not proposed as a regular component of Main Lodge operations. Background music may be provided near the Main Lodge at a level intended to serve guests within the immediate activity area.

---

6. Noise Screening Assessment

6.1 Screening Approach

A conservative screening assessment was performed to evaluate whether the proposed Rockwell RV & Adventure Park is reasonably expected to comply with the applicable Minnesota Pollution Control Agency (MPCA) daytime Noise Area Classification (NAC) 1 criterion of 60 dBA (L50) at the nearest residential and daycare receiving properties.

Because measured or manufacturer sound data are not available for many of the proposed recreational activities, this assessment uses a reverse-calculation approach. Rather than predicting future project noise, the assessment begins with the applicable receiver criterion and determines the approximate sound levels that could occur at representative source locations while maintaining compliance at the nearest receiving property.

For purposes of this screening assessment, each of the five principal source categories was evaluated using an equal contribution assumption. Under this assumption, each source category could contribute approximately 53 dBA at the nearest Noise Area Classification (NAC) 1 receiver while the combined sound level from all five sources would remain approximately 60 dBA (L50).

The five principal source categories include:

- Mountain Bike Trail System
- Campground
- Aqua Park
- Main Lodge
- Cable Wake Park

Reference sound levels were evaluated at 100 feet for the distributed recreational activity areas and 10 feet for the Cable Wake Park drive motor, which represents a localized mechanical source. The assessment assumes unobstructed (free-field) sound propagation and intentionally does not account for attenuation provided by quarry topography, retained berms, buildings, vegetation, atmospheric absorption, or other site-specific shielding features. Consequently, the calculated values represent conservative screening thresholds rather than predicted operating sound levels.

6.2 Reverse-Calculated Screening Thresholds

Using the applicable MPCA daytime criterion together with the approximate distance from each principal activity area to its nearest NAC 1 receiving property, conservative screening thresholds were calculated for each source category. These values represent the approximate sound level that could occur at the stated reference distance while contributing approximately 53 dBA at the controlling receiving property under free-field conditions.

Table 6-1. Reverse-Calculated Screening Thresholds

Source Category	Controlling Receiver	Distance to Receiver	Reference Distance	Screening Threshold
Mountain Bike Trail System	Residence	120 ft	100 ft	54.6 dBA
Campground	Daycare	450 ft	100 ft	66.1 dBA
Aqua Park	Daycare	500 ft	100 ft	67.0 dBA
Main Lodge	Daycare	360 ft	100 ft	64.1 dBA
Cable Wake Park	Daycare	210 ft	10 ft	79.4 dBA

These screening thresholds are intended only as planning-level reference values. They do not represent measured or predicted operating sound levels.

6.3 Comparison to Representative Sound Levels

To assist in interpreting the reverse-calculated screening thresholds, Table 6-3 compares the calculated reference-level thresholds with representative sound levels from the Minnesota Pollution Control Agency's *A Guide to Noise Control in Minnesota*. These comparisons are intended only to provide general context and should not be interpreted as direct measurements or predictions of actual project sound levels.

Table 6-3. Comparison to Representative Common Sound Levels

Calculated Threshold	Comparable Common Sound*	Discussion
60–65 dBA	Normal conversation at approximately 3 feet	Comparable to ordinary speech levels.
70 dBA	Vacuum cleaner at approximately 10 feet	Noticeably louder than conversation but common in everyday environments.
80 dBA	Food blender at approximately 3 feet	Represents relatively loud activity in close proximity to the source.
85–90 dBA	Gas lawn mower at approximately 3 feet	Comparable to common outdoor equipment when measured very near the source.

6.4 Interpretation of Screening Results

The reverse-calculated values shown in Table 6-1 identify the approximate sound level that each principal source category could generate at the stated reference distance while contributing approximately 53 dBA at the controlling receiving property. The reverse-calculated values identify the approximate screening threshold associated with each principal source category.

The screening thresholds are most applicable to sound that is sustained or frequently recurring during the MPCA hourly evaluation period. Many anticipated project sounds including conversations, occasional cheering, bicycle pass-byes, vehicle movements, and lifeguard whistles are intermittent and vary in both duration and location. These individual events would not independently determine compliance with the L50 criterion unless they occurred frequently enough to dominate the sound environment for more than 50 percent of the evaluation period.

The screening calculations intentionally exclude the additional attenuation expected from existing quarry topography, retained berms, buildings, vegetation, and other site-

specific shielding features. Accordingly, the calculated values represent conservative screening thresholds rather than anticipated field conditions.

Based on this screening assessment, the proposed recreational activities are reasonably expected to operate below the applicable MPCA daytime Noise Area Classification (NAC) 1 criterion during normal operations.

---

7. Site Characteristics Affecting Sound Propagation

The screening assessment presented in Section 6 intentionally assumes unobstructed free-field sound propagation and does not account for the existing physical characteristics of the project site that are expected to further reduce off-site sound transmission.

Several existing site features provide natural separation between the principal recreational activity areas and the nearest NAC 1 receiving properties.

7.1 Quarry Topography

The proposed Rockwell RV & Adventure Park is located within a former limestone quarry where many recreational activities occur below the elevation of the surrounding terrain. Existing quarry walls, retained rock faces, and earthen berms interrupt the direct path between project activity areas and the adjacent residential property and daycare, creating a natural barrier effect.

Barrier effects are generally more effective at attenuating higher-frequency sounds than lower-frequency sounds because higher-frequency sound waves are more readily interrupted by terrain and physical barriers. As a result, the quarry topography and berms are expected to provide meaningful additional attenuation for many sounds associated with recreational activities, including conversations, whistles, bicycle tire noise, and other higher-frequency components.

These topographic features were intentionally excluded from the screening calculations, making the assessment conservative.

7.2 Existing Berms

Substantial earthen berms remain along portions of the northern property boundary adjacent to the nearest residential property and daycare.

Similar to the quarry walls, these berms create an additional barrier effect by interrupting the direct line of sight between project activity areas and surrounding land

uses. This physical separation is expected to reduce off-site sound transmission beyond that predicted by the conservative screening calculations.

The barrier effect provided by the existing quarry topography and retained berms is particularly beneficial for the Mountain Bike Trail System, Aqua Park, Main Lodge, and Cable Wake Park, all of which are located below the elevation of the surrounding terrain for much of the project site.

7.3 Buildings and Site Layout

The overall site layout has been intentionally designed to maximize separation between the principal recreational activity areas and adjacent residential land uses.

Several of the higher-activity features, including the Aqua Park, Main Lodge, and Cable Wake Park, are located hundreds of feet from the nearest NAC 1 receivers. In addition, the proposed Main Lodge and Aqua Park support building are expected to provide localized shielding of activity areas immediately behind the structures.

The Mountain Bike Trail System has also been designed with noise and visual screening in mind. The primary trail corridor is setback from adjacent residential property lines. Existing and added wooded vegetation along the northern property boundary will provide additional visual and acoustical screening between trail users and neighboring properties.

7.4 Operational Controls

In addition to the site's physical characteristics, planned operational practices further reduce the potential for off-site noise impacts.

The proposed operating schedule has been intentionally developed to align with the Minnesota Pollution Control Agency (MPCA) daytime and nighttime evaluation periods. The park's normal operating hours are 8:00 a.m. to 10:00 p.m., which correspond to the MPCA's daytime period (7:00 a.m. to 10:00 p.m.) during which the 60 dBA (L50) residential noise criterion applies. Quiet hours are established from 10:00 p.m. to 8:00 a.m., overlapping the MPCA's nighttime period (10:00 p.m. to 7:00 a.m.), when the more restrictive nighttime noise standards apply.

Additional operational measures include:

- No routine outdoor public address systems.
- Limited background music confined primarily to designated guest gathering areas and oriented toward the interior of the site.
- Electric drive equipment for the Cable Wake Park, no engine noise associated with combustion-powered equipment.

- Quiet hours intended to minimize guest activity and noise generation during the MPCA nighttime evaluation period.

These operational practices are consistent with the assumptions used in the screening assessment and are expected to further reduce the potential for off-site noise impacts.

7.5 Overall Assessment

The cumulative screening assessment presented in Section 6 intentionally assumes unobstructed free-field sound propagation and therefore does not account for the additional sound attenuation expected from existing quarry topography, retained berms, buildings, vegetation, and other site-specific shielding features.

Collectively, these features create a barrier effect that interrupts direct sound propagation and is expected to further reduce sound transmission to the adjacent residential property and daycare beyond that predicted by the conservative screening analysis.

---

8. Conclusion

This Noise Screening Assessment evaluated the potential for the proposed Rockwell RV & Adventure Park to comply with the applicable Minnesota Pollution Control Agency (MPCA) daytime noise standard of 60 dBA (L50) at the nearest Noise Area Classification (NAC) 1 receiving properties.

Based on the conservative screening assessment presented herein, the proposed recreational activities are reasonably expected to operate below the identified screening thresholds, with combined project sound levels anticipated to remain below the applicable MPCA daytime NAC 1 criterion at both the adjacent residential property and the nearby daycare. Because the assessment intentionally excludes the additional attenuation expected from quarry topography, retained berms, buildings, vegetation, and other site-specific shielding features, actual off-site sound levels are expected to be equal to or lower than those indicated by this assessment.

The Project Proposer is committed to designing, operating, and maintaining the Rockwell RV & Adventure Park in a manner that complies with applicable Minnesota Pollution Control Agency (MPCA) noise standards while remaining compatible with adjacent land uses. Thoughtful site planning, operational policies, quiet-hour requirements, and ongoing management practices have been incorporated into the project to minimize off-site noise and will continue to support that commitment throughout the life of the project.

Hydraulic Report for

Rockwell RV & Adventure Park

Mankato, MN
July 2026

Submitted by:
Bolton & Menk, Inc.
1960 Premier Drive
Mankato, MN 56001
mankato@bolton-menk.com

BOLTON & MENK
Real People. Real Solutions.

Certification

Hydraulic Report

For

Rockwell RV Adventure Park

BMI Project Number

24X.137080

July 28, 2026

PROFESSIONAL ENGINEER

I hereby certify that this plan, specification, or report was prepared by me or under my direct supervision, and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.

Signature _____

Typed or Paul Strong

Date: _____ License Number: 60043

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VII. PROPOSED PROJECT CONDITIONS 7

Figures

Figure 1 – Existing Conditions Drainage Delineation

Figure 2 - Proposed Conditions Drainage Delineation

Figure 3 – Existing Conditions Land Use

Figure 4 - Proposed Conditions Land Use

Appendix

Appendix A: Environmental Assessment Worksheet

Appendix B: Construction Plans

Appendix C: PCSWMM Model Reports

I. INTRODUCTION

Bolton & Menk, Inc. developed hydraulic modeling analysis and construction plans for the Rockwell RV & Adventure Park site. The project is in Lime Township, Minnesota, adjacent to Mankato and near the intersection of CSAH 3 and 231st Lane. The site consists of a gravel pit that was in operation from the mid-2000's to the present, and runoff on site generally flows to onsite depressions or the borrow pits where it infiltrates. Groundwater flows to the west, towards an unnamed creek that discharges to the Minnesota River approximately 0.8 miles to the west of the site. A portion of the groundwater discharges to a calcareous fen to the west of the site. This area is hydraulically complex due to the high infiltration capacity of the soils on site, groundwater elevation, and remaining topography after mining activities.

The project's goals include converting the site into a recreational RV park and campground, with a series of trails, water activities, and other amenities along with revegetation. Maintaining high-water quality on site is a key component of the proposed design given the groundwater elevation and the intended recreational use. For water quality volume, a standard of 1.1-inches over the new and reconstructed impervious area was utilized for sizing. This meets the current City of Mankato standard, despite not being within City limits.

Drainage on site primarily flows to infiltration basins and swales prior to any further discharge to recreational bodies of water, and ultimately infiltration and groundwater flow. The majority of the site is bounded by roadways or berm that contain runoff to the site, effectively landlocking the basins. Under proposed conditions, runoff patterns will generally remain the same, with the aforementioned infiltration features being installed to treat runoff prior to discharge to recreational bodies.

II. PERMITTING

An Environmental Assessment Worksheet was completed for the site, with the record of decision being completed in April 2026. The EAW has been attached as Appendix A. The EAW detailed the various permits required for the site, and of particular note is the Minnesota Department of Natural Resources permitting associated with the calcareous fen identified to the west of the site.

As stated in the EAW, the project will incorporate stormwater Best Management Practices (BMPs) as outlined in the Minnesota Stormwater Manual. This will include infiltration basins, vegetated swales, and rain gardens, all designed to manage runoff volume, improve water quality, and enhance site resilience. BMPs have been placed in areas to avoid shallow or exposed bedrock and/or karst conditions, and amendment of the infiltration basins is planned to limit the infiltration rate to 8.3 inches/hour. The final stormwater management system will be sized to provide 1.1 inches of water quality volume over the proposed impervious which exceeds the requirements of the Minnesota Construction Stormwater Permit.

III. DATA SOURCES

A. Environmental Assessment Worksheet (EAW)
The EAW completed for the site in 2026 was reviewed for data and general performance criteria in relation to stormwater. The EAW is included in Appendix A.

B. Topographic Data

The basis for the model topographic data is the 2023 LiDAR data available from the Minnesota DNR along with a collection of field data and drone flight data. LiDAR was processed to generate 1 ft DEM and was utilized for floodplain modeling to capture the entire floodplain. All data is in the NAVD 88 datum.

C. Soils/Geology

Field observation logs and geological information collected during the mining operation/EAW process was reviewed. In general, soils on site consist of coarse sand and gravel which will require amendment to bring infiltration rates within the basins below 8.3 inches/hour. Soil amendment within the infiltration features is proposed to maintain an infiltration rate of between 0.8-8.3 inches per hour.

IV. HYDROLOGY

A. Land Cover

Land cover data was evaluated based on aerial photos from 2025 to reflect the latest site conditions. Land cover classifications and their associated runoff curve numbers are summarized in Table 1.

Table 1: Curve Number Summary

Land Use	Runoff Curve Number
Grass >75% Cover (HSG A)	39
Grass >75% Cover (HSG D)	80
Water	98
Impervious Surfaces	98
Bare Soils (Existing, HSG A)	77

Soils on site generally consist of coarse materials with high infiltration rates. Soil amendment within the infiltration features will be completed to limit infiltration rates to 4 inches per hour to allow for adequate treatment. Refer to Figures 3 & 4 for the existing and proposed land cover delineations.

B. Drainage Delineation

Site survey, proposed grading, and LiDAR data was reviewed to delineate drainage areas around the site and identify key outflow points. Three outlets were identified in the project area; direct offsite discharge (1L), discharge to the central mine basins (2L), and discharge to the southern mine basins (3L). Table 2 outlines the existing and proposed area routing.

Table 2: Drainage Area Routing Summary

Outlet Location	Existing Inflow Area (acres)	Proposed Inflow Area (acres)	Existing Impervious Area (acres)	Proposed Impervious Area (acres)
1L (Offsite)	7.90	0	0	0
2L (Central Basin)	91.10	99.00	13.81	20.16
3L (South Basin)	22.65	22.65	1.78	4.24

C. Rainfall Distribution/Rain On Grid

The rain-on-grid (ROG) approach applies rainfall directly onto a 2D computational mesh rather than routing runoff through lumped subcatchments. It integrates hydrology and hydraulics into a single process, and allows for detailed modeling of infiltration, depressional storage, and surface roughness. Overland flow is dynamically routed across the grid using sheet and shallow concentrated flow equations, eliminating the need for detailed subcatchment delineation and time-of-concentration assumption.

The analyzed rainfall events consisted of the 2-, 10-, and 100-year 24-hour events identified in the National Oceanographic and Atmospheric Administration Atlas 14 database. Rainfall depths for the three events are 2.86-, 4.26-, and 7.14-inches. The MSE 3 rainfall distribution was used to design the events.

v. HYDRAULICS

A. Two-Dimensional PCSWMM Modeling

Due to the complex drainage patterns and infiltration capacity of soils on the site, a two-dimensional model was completed to determine the appropriate sizing for stormwater BMPs. Cell size generally ranged from 5 feet to 20 feet, with areas of high detail along steep slopes and concentrated flow areas. Infiltration across the site was modeled using the curve number method and an assumed hydraulic

conductivity of 4 inches per hour for surface soils. Depressional storage was modeled for existing and proposed conditions using digital elevation models incorporated into the model.

VI. EXISTING PROJECT CONDITIONS

The existing site is an active gravel mining operation and is largely unvegetated. The mining area is ringed by a berm or vertical drops that contains the majority of runoff to the site. The majority of onsite drainage is to the central mine pit, with the southern portion of the site draining to a separate smaller pit location. Refer to Figure 1 for the existing drainage area map of the project area.

Groundwater from the site flows to the west, towards the Minnesota river, with a portion of the groundwater flow feeding into a calcareous fen located to the west of the site. The calcareous fen and general history of the site is discussed in detail in the attached EAW document.

VII. PROPOSED PROJECT CONDITIONS

Stormwater management on the site is proposed to meet state and local conditions in line with the Environmental Assessment Worksheet. 14 stormwater basins will be installed around the site to intercept and infiltrate runoff to the 1.1-inch standard upstream of the mine pits. A series of swales will also be constructed to direct the majority of runoff towards these basins prior to surface waters. The locations of these basins are shown on Figure 2 and in the attached construction plan set.

Water Quality Treatment: All new impervious will be subject to the treatment requirements. The state general permit requires instantaneous water quality volume equivalent to 1-inch over the new impervious be provided. To provide a higher level of treatment, a 1.1-inch standard was used for BMP sizing across the site. The required treatment volume calculations are detailed in Table 5.

Table 3: Water Quality Volume Requirements

Total Existing Impervious (ac)	23.41
Total Proposed Impervious (ac)	32.01
Exempt Linear Impervious (ac)	0
Net Impervious Requiring Treatment (ac)	32.01
Required Water Quality Volume (1.1-inch standard, cu ft)	127,815
WQV Volume – Basin 1P	4,628
WQV Volume – Basin 2P	33,395
WQV Volume – Basin 3P	6,062
WQV Volume – Basin 4P	3,814
WQV Volume – Basin 5P	12,576
WQV Volume – Basin 6P	11,738
WQV Volume – Basin 7P	15,440
WQV Volume – Basin 8P	22,200
WQV Volume – Basin 9P	20,949
WQV Volume – Basin 10P	3,356
WQV Volume – Basin 11P	4,419
WQV Volume – Basin 12P	5,657

WQV Volume – Basin 13P	6,975
WQV Volume – Basin 14P	2,651
Total Basin Volume Provided (cu ft)	153,860
% of Standard Achieved	**120%**

As shown in Table 3, the volume provided by the proposed infiltration BMPs is adequate to meet the site needs. Impervious routing is shown on Figure 2.

Rate Control: In order to safeguard the surface and groundwater quality, rate control is proposed to be met on site. PCSWMM modeling was completed for the site, with the existing and proposed runoff rates for the site at each outfall detailed below.

Table 4: Rate Control Summary

OUTLET ID	2-YEAR		10-YEAR		100-YEAR	
	Existing (cfs)	Proposed (cfs)	Existing (cfs)	Proposed (cfs)	Existing (cfs)	Proposed (cfs)
1L	2.84	2.57	4.8	4.81	12.47	8.8
2L	30.32	9.40	26.74	33.81	250.8	160.9
3L	4.35	3.99	12.80	11.06	40.61	38.86
SITE TOTAL	**37.51**	**15.96**	**44.34**	**49.68**	**303.88**	**208.56**

As shown in Table 4, the peak runoff rate from the site to the various outlets will 30 by 50% as a result of land cover changes and the proposed stormwater BMPs. Rate control is met for the overall site and to each outlet for all events.

Runoff Volume Summary

The EAW identified runoff volume as a concern for the site, with a particular emphasis on the groundwater connection associated with the mine pits on site. Table 5 summarizes the existing and proposed runoff volumes to the key outlet locations identified on site.

Table 5: Volume Control Summary

OUTLET ID	2-YEAR		10-YEAR		100-YEAR	
	Existing (acft)	Proposed (acft)	Existing (acft)	Proposed (acft)	Existing (acft)	Proposed (acft)
1L	0.137	0.117	0.205	0.203	0.536	0.408
2L	1.576	0.981	1.450	1.204	13.710	8.262
3L	0.198	0.242	0.754	0.886	1.408	1.55
SITE TOTAL	**1.911**	**1.34**	**2.409**	**2.293**	**15.654**	**10.22**

As shown in Table 5, the total runoff from the site to the various outlets will 10 by 40% as a result of land cover changes and the proposed stormwater BMPs. Volume control is met for the overall site and to each outlet for all events.

We are pleased to present this project for consideration. Please feel free to reach out if additional information is required or if clarification is needed. I can be contacted at paul.strong@bolton-menk.com or by phone at 651-247-8789.

Sincerely,

Bolton & Menk, Inc.

Paul Strong, PE
Water Resources Project Manager



Map Document: H:\CAMPQUAR_PR\24X\137080000\GIS\Pro\Landuse\Existing_Conditions.aprx | Username: paul.strong | Date Saved: 7/23/2026 2:30 PM

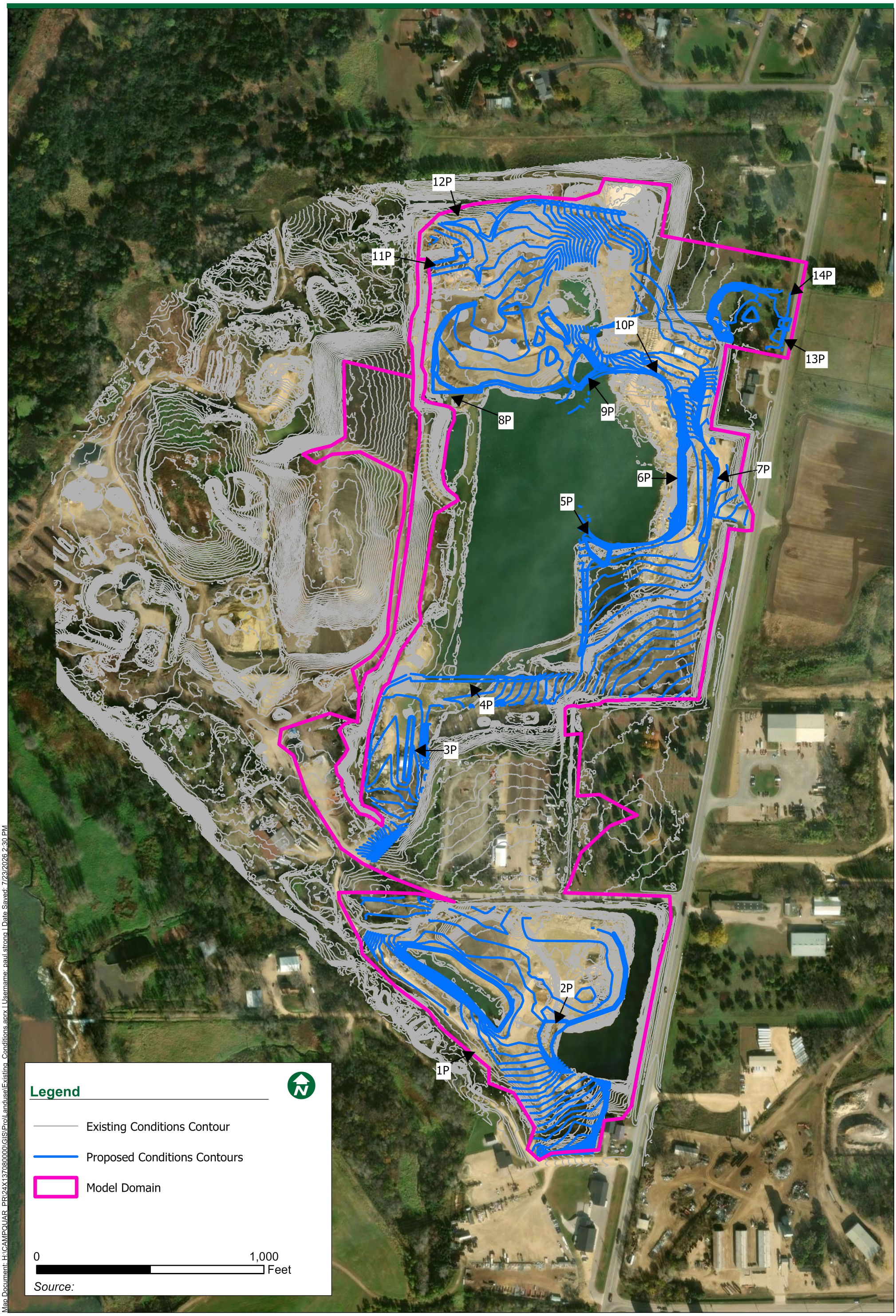
Camp Quarry Adventure Park

Camp Quarry, LLC

Proposed Conditions Drainage Areas

July 2026

BOLTON & MENK



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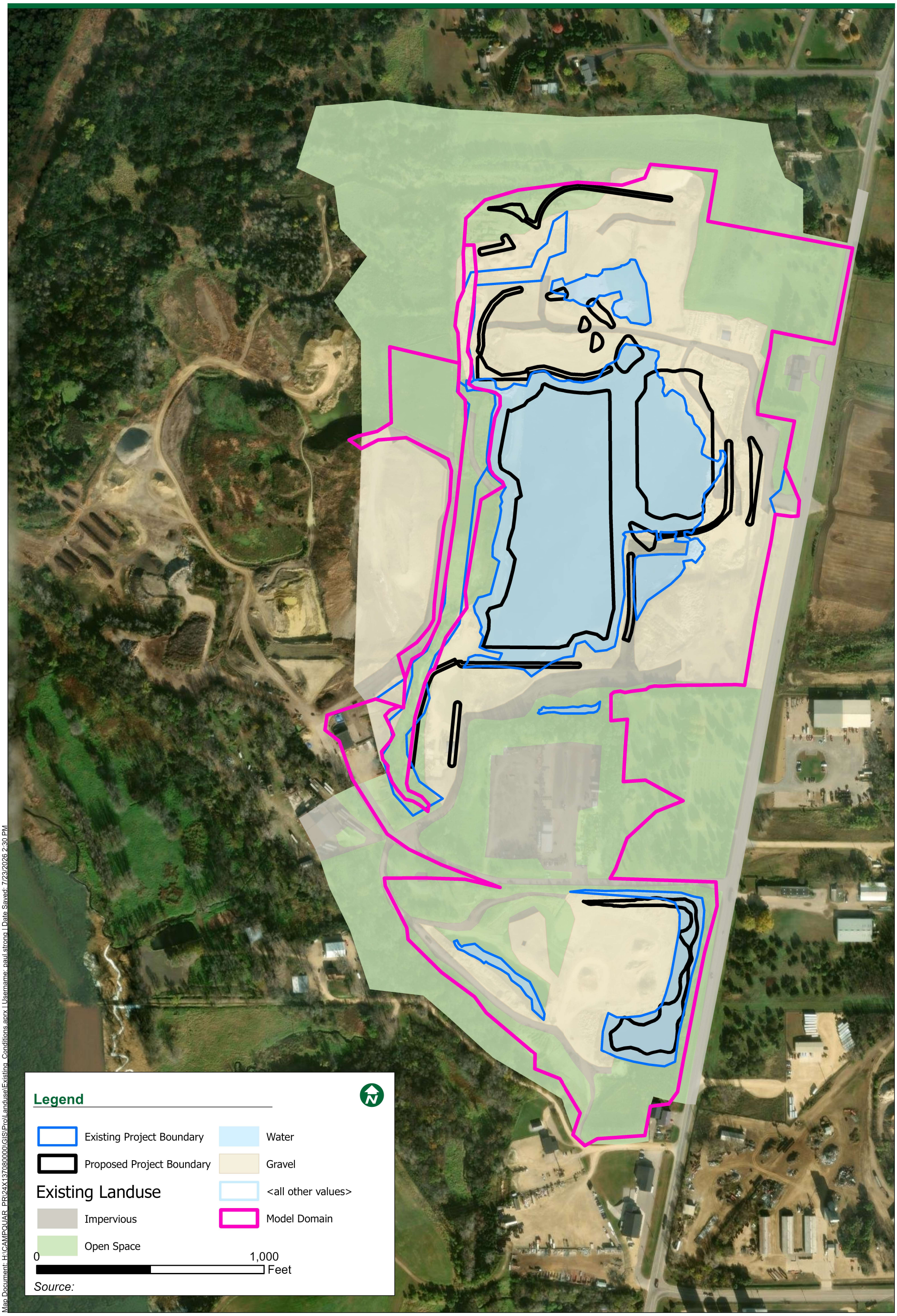

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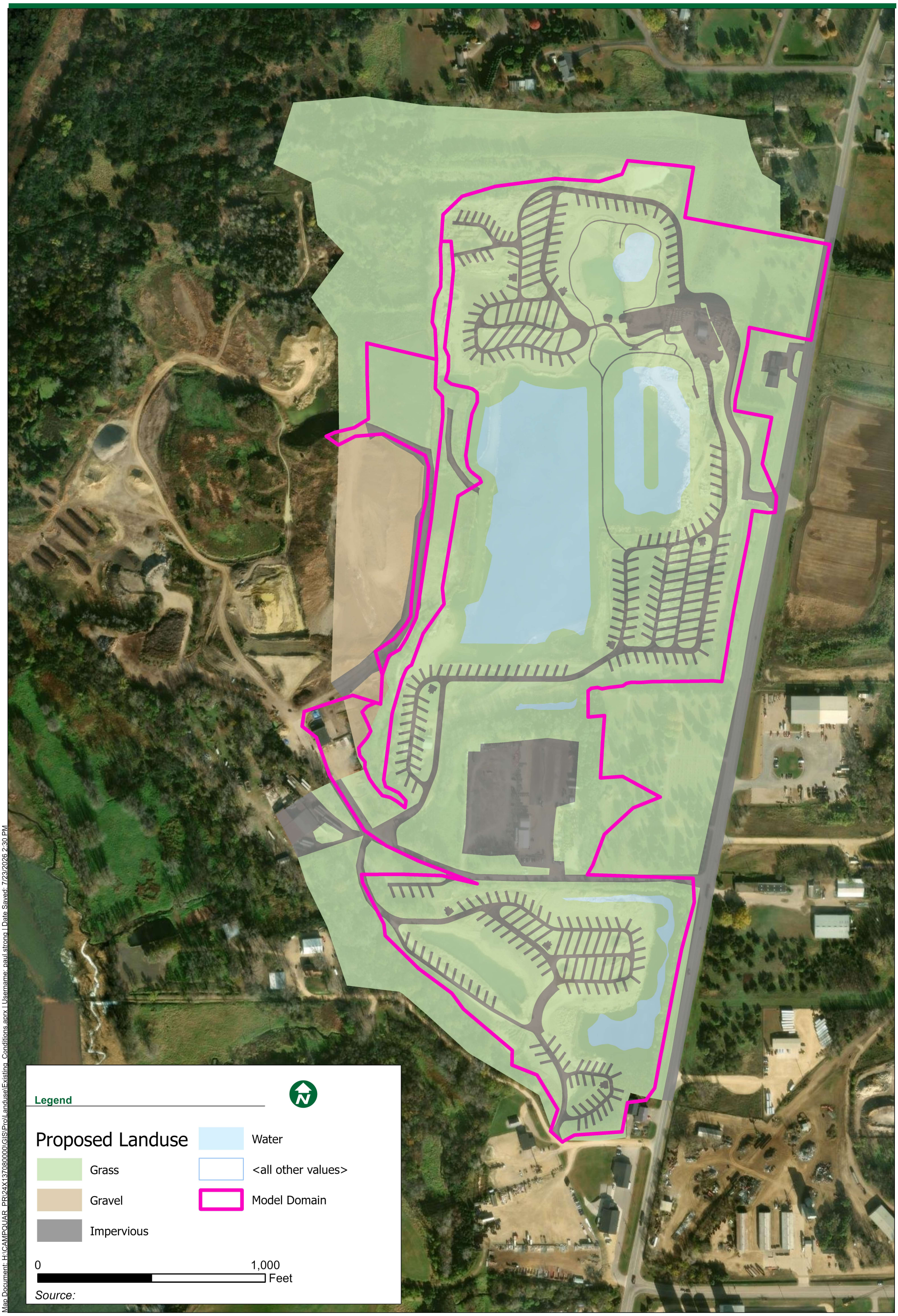
Camp Quarry Adventure Park

Camp Quarry, LLC

Proposed Conditions Land Use

July 2026

BOLTON & MENK



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Rockwell RV and Adventure Park

Environmental Assessment Worksheet

March 2, 2026

BOLTON & MENK

Real People. Real Solutions.

Submitted by:
Bolton & Menk, Inc.
1960 Premier Drive
Mankato, MN 56001
P: 507-625-4171

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1. Project Title

Rockwell RV and Adventure Park

2. Proposer

Organization: CampQuarry, LLC.

Contact Person: Joe Holtmeier

Title: Owner

Address: 3301 3rd Avenue

City, State, Zip: Mankato, MN, 56001

Phone: 507-327-5775

Email: jholtmeier@holtmeierinc.com

3. Responsible Governmental Unit (RGU)

Organization: Lime Township

Contact Person: Cody Hilgers

Title: Township Chair

Address: PO Box 4444

City, State, Zip: Mankato, MN 56002-4444

Phone: 507-995-2691

Email: limets.clerk@gmail.com

4. Reason for EAW Preparation

Required:	Discretionary
☐ EIS Scoping	☐ Citizen Petition
☒ Mandatory EAW MN Administrative Rules 4410.4300 Subp. 20. Campgrounds and RV parks.	☐ RGU discretion
	☐ Proposer initiated

5. Project Location

County: Blue Earth County

City/Township: Lime Township

PLS Location (¼, ¼, Section, Township, Range):

- NW¼ of the SE¼ of Section 30 Township 109 North, Range 26 West
- NE¼ of the SE¼ of Section 30 Township 109 North, Range 26 West
- SW¼ of the SE¼ of Section 30 Township 109 North, Range 26 West
- SE¼ of the SE¼ of Section 30 Township 109 North, Range 26 West
- NW¼ of the NE¼ of Section 31 Township 109 North, Range 26 West
- SW¼ of the NE¼ of Section 31 Township 109 North, Range 26 West
- NE¼ of the NW¼ of Section 31 Township 109 North, Range 26 West
- SE¼ of the SW¼ of Section 30 Township 109 North, Range 26 West
- NE¼ of the SW¼ of Section 30 Township 109 North, Range 26 West

Watershed (81 major watershed scale): Minnesota River - Mankato

GPS Coordinates: 44.213089, -93.993096

Tax Parcel Number: R40.04.30.400.002, R40.04.30.400.003, R40.04.30.400.004, R40.04.30.400.006, R40.04.30.400.013, R40.04.30.400.014, R40.04.31.200.005, R40.04.31.200.006, R40.04.31.200.007, R40.04.31.200.033, R40.04.31.200.034 (easement only).

At a minimum attach each of the following to the EAW:

- *County map showing the general location of the project;*
- *U.S. Geological Survey 7.5 minute, 1:24,000 scale map indicating project boundaries (photocopyacceptable); and*
- *Site plans showing all significant project and natural features. Pre-construction site plan and post-construction site plan.*
- *List of data sources, models, and other resources (from the Item-by-Item Guidance: Climate Adaptation and Resilience or other) used for information about current Minnesota climate trends and how climate change is anticipated to affect the general location of the project duringthe life of the project (as detailed below in item 7. Climate Adaptation and Resilience).*

6. Project Description

a) Provide the brief project summary to be published in the EQB Monitor, (approximately 50 words).

The Rockwell RV and Adventure Park will include campsites, a check-in office, multiple entrances, parking, bike trail facilities, restrooms, a maintenance building, and a service road. Additional amenities include a rental/snack shack, bike trails, an aquatic park, a water cable park, restrooms, and swimming areas.

b) Give a complete description of the proposed project and related new construction, including infrastructure needs. If the project is an expansion include a description of the existing facility. Emphasize: 1) construction, operation methods and features that will cause physical manipulation of the environment or will produce wastes, 2) modifications to existing equipment or industrial processes, 3) significant demolition, removal or remodeling of existing structures, and 4) timing and duration of construction activities.

The proposed Rockwell RV and Adventure Park (park) will be located in Sections 30 and 31, Township 109 North, Range 26 West, within Lime Township, Blue Earth County, Minnesota. The development spans approximately 112 acres and will feature a campground with up to 350 campsites of varying sizes. The project will occur on the west side of County State Highway (CSAH) 5/3rd Avenue, approximately one mile north of Trunk Highway 14.

The campground will include:

- Check-in office
- Main, north, and south entrances
  - The driveway access to the park from the south entrance is proposed to be restricted to limit use to emergency and service vehicles only.
- Surface parking areas
- Dedicated bike trail parking with shelter and restrooms
- A maintenance building
- A service road

In addition to the campground, the adventure park will offer:

- A rental/snack shack
- Multiple bike trail routes

- An aquatic park
- A water cable park
- Restrooms
- Swimming areas

The preliminary project concept shows 233 camping sites, 155 parking spots, and a potential 66 future camping sites. Site design and infrastructure will be able to accommodate 300 to 350 total campsites. All of the sites are proposed to have full utilities.

Utilities and Infrastructure

Sewage generated within the park will be managed using centrally located holding tanks. All collected sewage will be periodically pumped from this tank and transported to the City of Mankato for appropriate disposal. The tank will be constructed in accordance with MPCA storage tank requirements.

The site will utilize an existing drinking water well to supply potable water for guests and park operations. This well will be maintained and monitored to ensure safe, reliable access to drinking water in accordance with local health and safety standards. The existing well is anticipated to accommodate any proposed future potable water needs prior to municipal water infrastructure expansion.

In the future, the park intends to connect directly to the municipal sanitary sewer and drinking water systems once they become available. However, at present, there are no known plans or established timelines for the extension of public utilities to the park location.

All major grading activities necessary for the park will be conducted under the existing mining CUP as part of reclamation activities.

The total building footprint across the site will be approximately 15,000 square feet, including bathrooms.

Construction Timeline

Construction is scheduled to begin in 2026 and will continue throughout 2027, with anticipated completion by fall 2027. However, some final components may extend into spring 2028, if necessary.

Reclamation Activities

Reclamation activities, including grading to the final elevations necessary for the park, will be conducted under the current mining operation's permits and will proceed in phases aligned with ongoing mining operations. These activities will be completed in a timely manner to prevent erosion and sedimentation.

The original reclamation plan will be replaced by the concept plan for Rockwell RV and Adventure Park, which will serve as the new reclamation plan. Approval of this change will be incorporated into the overall project approval and permitting process, as confirmed by the Responsible Governmental Unit (RGU).

c) Project magnitude:

Table 1 Project Magnitude	
Description	**Number**
Total Project Acreage	112
Linear project length	n/a
Number and type of residential units	0
Residential building area (in square feet)	0
Commercial building area (in square feet)	0
Industrial building area (in square feet)	0
Institutional building area (in square feet)	0
Other uses – specify (in square feet)	15,000 (restrooms, shelters, snack/rental shack, check-in building, maintenance building.
Structure height(s)	39 – 46 feet above the water surface (cable park)

Design for the Cable Park has not been completed. Photos of Cable Park installations are provided for reference. The final design will be prepared and submitted for review as part of the permitting process for the park.



Exhibit 1: Cable Park Reference Photo



Exhibit 2: Cable Park Reference Photo

d) Explain the project purpose; if the project will be carried out by a governmental unit, explain the need for the project and identify its beneficiaries.

The purpose of the proposed Rockwell RV and Adventure Park is to develop a multi-use recreational facility that expands access to outdoor amenities within Lime Township, Blue Earth County, Minnesota. The project is privately proposed and is not being conducted by a governmental unit. Its primary objective is to provide a range of recreational opportunities for both local residents and regional visitors, including individuals and families who may not currently participate in other forms of organized recreation.

The project is designed to support passive and active outdoor use through the development of campsites, trail systems, aquatic features, and supporting infrastructure. By enhancing recreational access in the area, the project is expected to benefit a broad user base, including seasonal campers, day-use visitors, and community members seeking alternative outdoor experiences. The project also supports local and regional tourism and contributes to the long-term land use transition of a previously mined area through phased reclamation and redevelopment.

e) Are future stages of this development including development on any other property planned or likely to happen? Ξ Yes X No

If yes, briefly describe future stages, relationship to present project, timeline and plans forenvironmental review.

f) Is this project a subsequent stage of an earlier project? X YesΞ No

If yes, briefly describe the past development, timeline and any past environmental review.

Yes. This project represents a subsequent stage of a previously approved mining operation. The current work involves the grading of the mined area, which will occur under the existing mining

permits and in accordance with the park concept plan, which will replace the previously approved Reclamation Plan. Reclamation activities will begin under the existing mining permits. Final design plans for the park will be prepared and submitted for review as part of the permitting process for the park.

7. Climate Adaptation and Resilience

a) Describe the climate trends in the general location of the project (see guidance: Climate Adaptation and Resilience) and how climate change is anticipated to affect that location during the life of the project.

According to the Minnesota Department of Natural Resources, Climate Trends, "Minnesota's climate already is changing rapidly and will continue to do so for the foreseeable future. Temperatures are increasing, especially in winter, and larger, more frequent extreme precipitation events are occurring. Substantial warming during winter and at night, increased precipitation, and heavier downpours already have affected our natural resources and how we interact with and use them. The decades ahead will bring even warmer winters and nights, and even larger rainfalls, along with the likelihood of increased summer heat and the potential for longer dry spells."

Climate trends for Blue Earth County parallel the statewide overall trends for temperature and precipitation indicating Minnesota's climate is becoming warmer and wetter. **Exhibit 3** and **Exhibit 5** below, show the average annual temperatures and precipitation for Blue Earth County, Minnesota from 1895 to 2024. From 1895 to 2024, Blue Earth County experienced an average increase of 0.14 degrees Fahrenheit per decade and an average precipitation increase of 0.42 inches per decade.

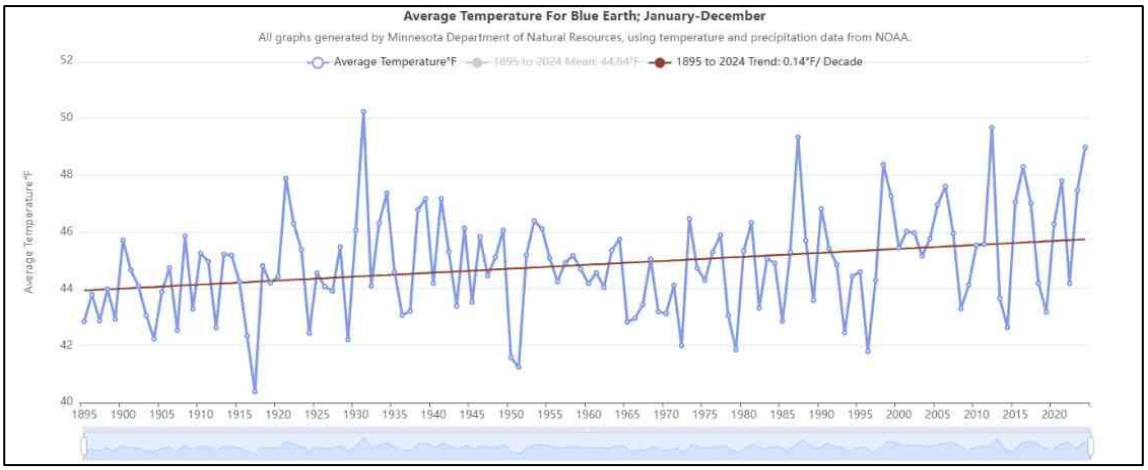


Exhibit 3. Average Temperature for Blue Earth County, January-December 1895-2024
Minnesota Climate Explorer. October 2025
Source: Minnesota Department of Natural Resources.
https://climate-explorer.MNDNR.state.mn.us/main/historical

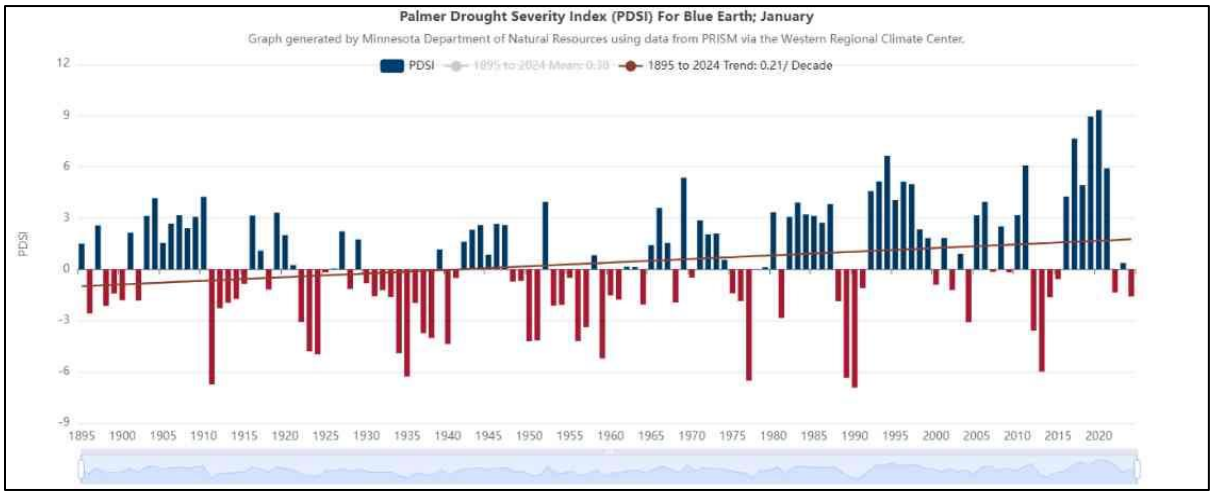


Exhibit 5. Historical PDSI Values for Blue Earth County, June 1895-2024
Minnesota Climate Explorer. October 2025
Source: Minnesota Department of Natural Resources.
https://arcgis.MNDNR.state.mn.us/ewr/climatetrends

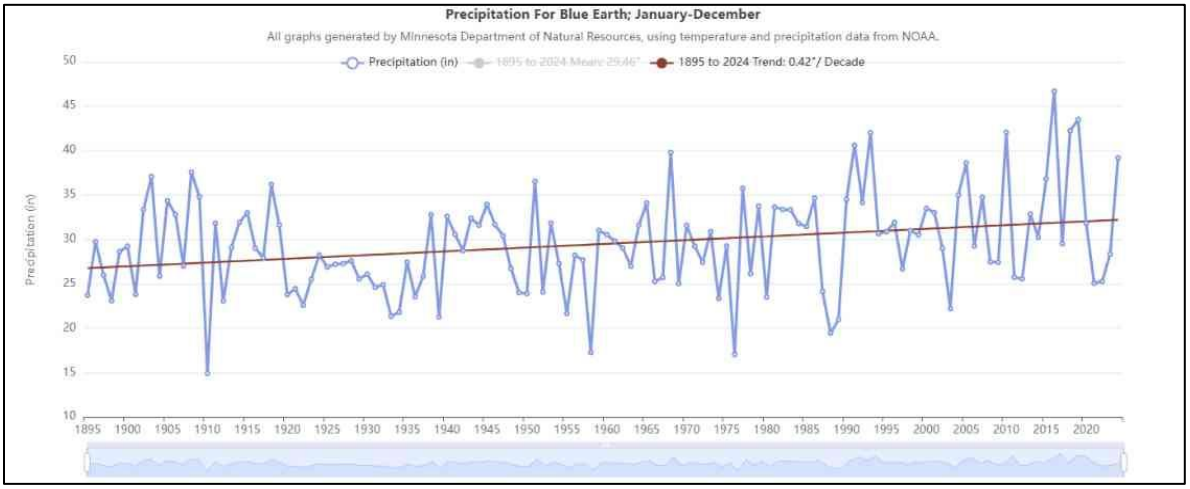


Exhibit 4. Precipitation for Blue Earth County, January-December 1895-2024
Minnesota Climate Explorer. October 2025
Source: Minnesota Department of Natural Resources.
https://climate-explorer.MNDNR.state.mn.us/main/historical

The Palmer Drought Severity Index (PDSI) utilizes temperature and precipitation data to estimate relative soil moisture conditions and serve as an indicator of long-term drought conditions. The index ranges from -5 to +5 indicating dry and wet conditions, respectively. PDSI values are reported on a monthly basis. **Exhibit 4** shows historic PDSI values for the month of June from 1895 to 2024 for Blue Earth County. The trend line from 1895 to 2024 indicates an increase of 0.21 per decade. Generally, the PSDI historical data indicates that the region is experiencing a wetter climate.

Projected climate trends indicate that temperatures within the County will continue to increase. Figure 4 illustrates projected temperatures for the County. Several climate models are shown in the projected temperature analysis. The model mean, shown in blue, illustrates the average of all models included in the analysis. **Exhibit 7** shows the modeled present condition, mid-century (2040-2059) at Representative concentration Pathway (RCP) 4.5, late-century (2080-2099) at RCP 4.5, and late-century (2080-2099) at RCP 8.5. RCP is a greenhouse gas concentration scenario used by the Intergovernmental Panel on Climate Change in the fifth assessment report. RCP 4.5 is an intermediate scenario in which missions decline after peaking around 2040 and RCP 8.5 represents a worst-case scenario in which emissions continue rising through the 21st century. Under the RCP 4.5 scenario, the annual temperature is anticipated to increase within the County from a modeled present mean of 45.39°F (1980-1999) to a mid-century (2040-2059) model mean of 48.77°F and a late-century (2080-2099) model mean of 51.21°F. Under the RCP 8.5 worst-case scenario, the County would experience a late-century (2080-2099) model mean temperature of 54.91°F. Projected climate trends indicate that temperatures within the County will continue to increase.

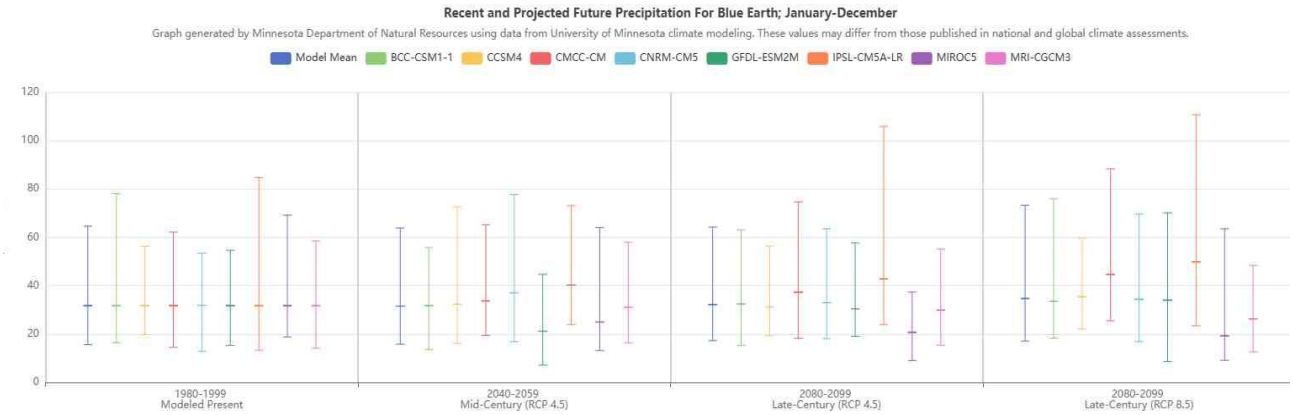


Exhibit 6. Projected precipitation in Blue Earth County, Minnesota Climate Explorer. May 2025. Source: Minnesota Department of Natural Resources.
*https://climate-explorer.MNDNR.state.mn.us/main/historica*l

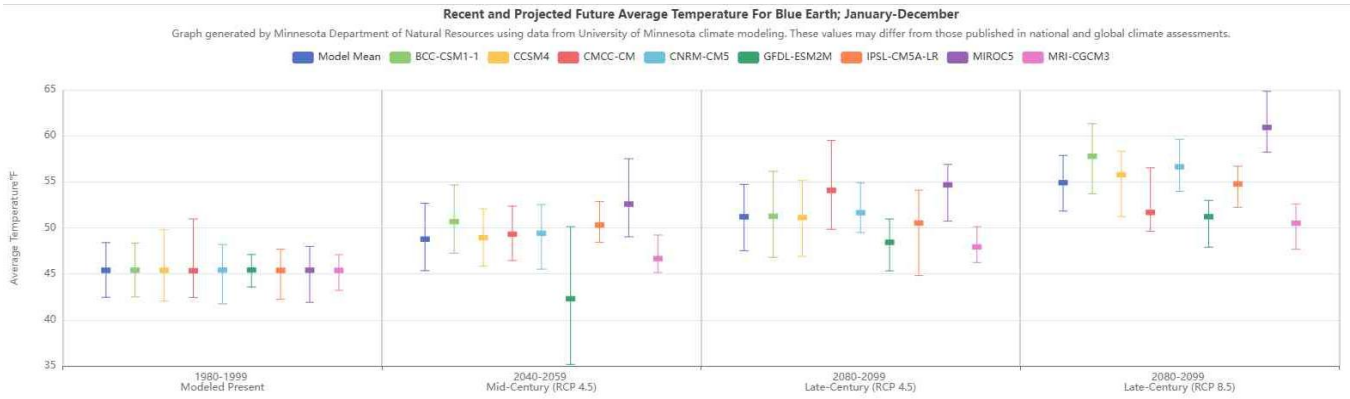


Exhibit 7. Projected temperatures in Blue Earth County, Minnesota Climate Explorer. May 2025. Source: Minnesota Department of Natural Resources. *https://climate-explorer.MNDNR.state.mn.us/main/historical*

Exhibit 6 presents projected average annual precipitation for Blue Earth County. Under the RCP 4.5 scenario, the annual precipitation is anticipated to increase within the County from a modeled present mean of 31.77 inches (1980-1999) to a mid-century (2040-2059) model mean of 31.56 inches and a late-century (2080-2099) model mean of 32.21 inches. Under the RCP 8.5 worst-case scenario, the County would experience a late-century (2080-2099) model mean precipitation of 34.67 inches.

According to the Federal Emergency Management Agency (FEMA) National Risk Index for Natural Hazards, which illustrates the U.S. communities most at risk for 18 types of natural hazards, overall, Blue Earth County, Minnesota is rated relatively low compared to the rest of the U.S. This rating is based on a relatively low expected annual loss rating, a relatively low social vulnerability rating, and a very high community resilience rating.

13 of 18 hazard types contribute to the expected annual loss for Blue Earth County, Minnesota. Three hazard types are rated relatively high risk (cold wave, landslide, strong wind); five hazard types are rated relatively moderate risk (drought, hail, ice storm, tornado, winter weather); three hazard types are rated relatively low risk (heat wave, lightning, riverine flooding); and two hazard types are rated very low risk (earthquake, wildfire).

The Social Vulnerability for each type of hazard is rated relatively low, which means social groups in Blue Earth County, Minnesota, have a relatively low susceptibility to the adverse impacts of natural hazards when compared to the rest of the U.S. The Community Resilience for each type of hazard is rated very high, which means communities in Blue Earth County have a very high ability to prepare for anticipated natural hazards, adapt to changing conditions, and withstand and recover rapidly from disruptions compared to the rest of the U.S. The expected loss each year due to natural hazards in Blue Earth County is relatively low. FEMA National Risk Index and supporting documents are located in **Appendix B**.

b) *For each Resource Category in the table below: Describe how the project's proposed activities and how the project's design will interact with those climate trends. Describe proposed adaptations to address the project effects identified.*

Table 2 Resource Categories

Resource Category	Climate Considerations	Climate Change Risks and Vulnerabilities	Adaptations
Project Design	The design and material choices in building architecture, along with site planning, can influence the surrounding environment. This includes altering climate zones, affecting temperature patterns, and increasing the likelihood of prolonged heat waves.	Climate change risks and vulnerabilities identified include: higher rainfall which may result in more localized flooding due to planned water features and impervious parking surfaces; impervious surfaces, absorb heat during the day and radiate it at night, which increases the urban heat island effect and amplifies the warming temperatures of climate change.	To support climate resilience and reduce the urban heat island effect, the project will promote increased vegetation throughout the site. This will be accomplished by planting trees and establishing green spaces within the development area where they have been cleared as part of the mining operation. A comprehensive landscape plan will be developed and submitted as part of the park permitting process. This plan will detail the vegetation selection and placement to ensure long-term sustainability and

Table 2 Resource Categories			
Resource Category	**Climate Considerations**	**Climate Change Risks and Vulnerabilities**	**Adaptations**
			alignment with local regulatory requirements.
Land Use	No critical facilities are proposed, including those essential for public health and safety, those storing hazardous materials, or those housing occupants with limited mobility.	Climate change risks and vulnerabilities identified include: higher rainfall, which may result in more localized flooding due to planned impervious surface and water features; and use of land by motorized homes, campers, and bikes.	The project will incorporate stormwater Best Management Practices (BMPs) as outlined in the Minnesota Stormwater Manual. These may include, but are not limited to, infiltration basins, vegetated swales, and rain gardens, all designed to manage runoff volume, improve water quality, and enhance site resilience. If karst conditions are identified near proposed stormwater BMPs, filtration basins will be incorporated to manage stormwater runoff. The final stormwater management system will be designed to meet or exceed the requirements of the Minnesota Construction Stormwater Permit for stormwater runoff volume reduction. The final location and design of all stormwater BMPs and drainage infrastructure will be detailed in the comprehensive site plan submitted for review during the permitting process.
Water Resources	Addressed in Item 12	Addressed in Item 12	Addressed in Item 12
Contamination/ Hazardous Materials/ Wastes	Current climate trends in Minnesota and anticipated climate changes in the project's vicinity may affect the environmental impact of generating, using, and storing hazardous waste and materials.	No hazardous waste is expected to be generated, used, or stored throughout the life of the project. Any waste generated during construction will be stored in marked containers in accordance with applicable laws and subsequently disposed of at licensed facilities.	Covered trash and recycling dumpsters will be provided for garbage and recyclables, which will be hauled away by a licensed waste hauler and properly disposed of at a licensed facility. Sanitary sewage will be collected in holding tanks and periodically trucked to the City of Mankato Municipal Wastewater Treatment Facility for proper disposal.
Fish, wildlife, plant communities, and sensitive ecological resources (rare	Addressed in Item 14	Addressed in Item 14	Addressed in Item 14

Table 2 Resource Categories			
Resource Category	**Climate Considerations**	**Climate Change Risks and Vulnerabilities**	**Adaptations**
features)			

8. Cover Types

Estimate the acreage of the site with each of the following cover types before and after development:

Table 3 Green Infrastructure Acreage		
Green Infrastructure	**Before (acreage)**	**After (acreage)**
Constructed infiltration systems (infiltration basins/infiltration trenches/ rainwater gardens/bioretention areas without underdrains/swales with impermeable check dams)	0	0*
Constructed tree trenches and tree boxes	0	0
Constructed wetlands	0	0
Constructed green roofs	0	0
Constructed permeable pavements	0	0
Other (describe)	0	0
TOTAL	0	0

* The infiltration basin value in Table 3 is shown as "0" because infiltration feasibility will be determined during final design. The project team will evaluate soil conditions, groundwater considerations, and any potential karst constraints before selecting the final BMP approach.

Table 4 Cover Types		
Cover Types	**Estimated Current Cover Types based on Available Aerial Imagery[1]**	**Estimated After (acres)**
Wetlands and shallow lakes (<2 meters deep)	14.8 Wetlands and 15.5 Shallow Lakes	30.33
Deep lakes (>2 meters deep)	0	0
Wooded/forest	5	3.59
Rivers/streams	0	0
Brush/Grassland	0	0
Cropland	0	0
Livestock rangeland/pastureland	0	0
Lawn/landscaping	0	58.29
Green infrastructure (TOTAL from Table 3)	0	0

[1] Updated Aerial imagery can be found in Appendix A.

Table 4 Cover Types		
Cover Types	**Estimated Current Cover Types based on Available Aerial Imagery[1]**	**Estimated After (acres)**
Impervious surface	5	19.79[2]
Pasture/Hay	0	0
Other (describe)	71.67 (Mining Operations, Barren Land)	
TOTAL	112.00	112.00

Table 5 Trees		
	Percent	**Number**
Percent tree canopy removed or number of mature trees removed during development	0	0
Number of new trees planted	0	0

9. Permits and approvals required

List all known local, state and federal permits, approvals, certifications and financial assistance for the project. Include modifications of any existing permits, governmental review of plans and all direct and indirect forms of public financial assistance including bond guarantees, Tax Increment Financing and infrastructure. All of these final decisions are prohibiteduntil all appropriate environmental review has been completed. See Minnesota Rules, Chapter 4410.3100

Cumulative potential effects may be considered and addressed in response to individual EAW Item 10-20, or the RGU can address all cumulative potential effects in response to EAW Item 22. If addressing cumulative effect under individual items, make sure to include information requested in EAW Item 21.

In Minnesota, an EAW is a brief, early-stage review that determines if a proposed project requires an Environmental Impact Statement (EIS).[3] Relying on preliminary design information, the EAW identifies possible significant environmental effects and outlines potential mitigation strategies without demanding final engineering details. The EAW serves to inform later project approvals and permits but does not itself grant approval. More specific technical and design requirements are addressed during the permitting phase. Table 6 lists the permits and approvals identified as part of this EAW that may apply to this project.

Table 6 Permits and Approvals				
Unit of Government	**Type of Application**	**Required Submittals**	**Typical Review Timeline**	**Public Comment Requirements**
Lime Township	Interim Use Permit	Application, design drawings, fee	5–8 weeks	Yes – Planning Commission hearing and Township Board approval
Blue Earth County Building Official	Building & Construction Permit	Building plans, code compliance documents	Few weeks	No – Administrative review

[2] This number includes buildings, parking areas, camp sites, bike trails, and internal site roads.

[3] https://www.revisor.mn.gov/rules/4410.1000/#rule.4410.1000.1

Table 6 Permits and Approvals				
Unit of Government	**Type of Application**	**Required Submittals**	**Typical Review Timeline**	**Public Comment Requirements**
Blue Earth County Highway Dept.	Road Access Permit	Driveway location sketch, culvert specs	~2 weeks	No – Administrative approval
Blue Earth County Highway Dept.	Work in Right-of-Way Permit	Work description, diagrams	Few days to 2 weeks	No – Administrative approval
Blue Earth County Engineer	Stormwater & Grading Plan Approval	Stormwater plan, grading plan, erosion control, Stormwater Pollution Prevention Plan	Few weeks	No – Technical review only
City of Mankato	Sanitary Waste Disposal Agreement	Negotiated contract	Variable	No
MPCA	Construction Stormwater Permit - NPDES/SDS Permits	Online application, SWPPP	7 days (30 days for large sites)	No
MPCA	Subsurface Sewage Treatment System	Online application	21 days	No
MNDNR	Water Appropriation Permit[4]	Application, water use plan, fee	1–3 months	No
MDH – Drinking Water	Drinking Water Plan Review[5]	Plans, specifications, fee	3–6 weeks	No
MDH – Food & Lodging	Food Establishment Permit	Plans, equipment specifications, menu, license application	Few weeks + inspection	No
MDH – Food & Lodging	Lodging Establishment Permit	Plans, license application, inspection	Few weeks	No

The project, as outlined in the concept plan, does not affect wetlands, encroach upon the Minnesota Biological Survey (MBS) site, or involve well sealing activities. Table 7 lists permits that could apply if changes to the final design result in these impacts.

Table 7 Permits and Approvals				
Unit of Government	**Type of Application**	**Required Submittals**	**Typical Review Timeline**	**Public Comment Requirements**
MPCA	Section 401 Certification	Joint application, Anti-Degradation form, plans	~150 days (max 1 year)	Yes – USACE public notice
MNDNR	Wetland Impact Permit	Joint application, delineation, mitigation plan	60–90 days (DNR); 1–2 months (WCA)	Minimal – Local Government Unit (LGU) meeting, no formal hearing
USFWS	ESA Section 7 Review	Biological Assessment, species impact memo	30–120 days	No – unless NEPA applies
USACE	Section 404 Permit	Wetland permit application, mitigation plan	3–18 months, depending on impact	Yes – 30-day comment for Individual Permits
SHPO/THPO	NHPA Section 106 Review	Cultural resource surveys, effect determinations	1–3 months	No – unless NEPA applies

[4] Change to use and volume of existing drinking water well.
[5] Required for drinking water treatment and distribution systems.

10. Land Use

a) Describe:

i. *Existing land use of the site as well as areas adjacent to and near the site, including parksand open space, cemeteries, trails, prime or unique farmlands.*

The existing land use of the site was a quarry owned and operated by Holtmeier Construction Inc. Camp Quarry LLC. now owns the property. The quarry is used to provide quality sand and gravel materials and limestone products. The quarry will not be operational upon the park construction start date. Adjacent property uses include rural conservation residential, rural conservation, industry, Pilgrim's Rest Cemetery and property owned by Mankato Area Mountain Bikers.

The project area contains no prime or unique farmlands because it is an active quarry and is not used for agricultural production.

ii. *Plans. Describe planned land use as identified in comprehensive plan (if available) and anyother applicable plan for land use, water, or resources management by a local, regional, state, or federal agency.*

Planned land use for the township includes recreational uses, as is outlined in the new Campground and Recreation Ordinance, in Section 16 of the Lime Township Ordinance[6]. The future land use designation for the project area is Industrial, which includes mining as an interim use with required reclamation, as shown on the Future Land Use Map in the Comprehensive Plan (Figure on page 6 of the Comprehensive Plan[7]). The project aligns with the guiding principles of the comprehensive plan. The original site reclamation plan, under the existing mining permit, includes site grading and preparation for future use. The new reclamation plan will be the concept plan for the RV and Adventure Park, attached in **Appendix A**.

iii. *Zoning, including special districts or overlays such as shoreland, floodplain, wild and scenicrivers, critical area, agricultural preserves, etc.*

The project area is currently zoned as Rural Conservation and Industrial in the zoning map and in the land use plan. The McClure Quarry, in the southern part of the project area, has an industrial land use. As outlined in Section 16 of the Lime Township Ordinance, a campground and recreation area is a permitted use. Rezoning is not required and an interim use permit is required. The project area is outside any special districts or overlay zones.

iv. *If any critical facilities (i.e. facilities necessary for public health and safety, those storing hazardous materials, or those with housing occupants who may be insufficiently mobile) are proposed in floodplain areas and other areas identified as at risk for localized flooding,describe the risk potential considering changing precipitation and event intensity.*

Not applicable.

b) Discuss the project's compatibility with nearby land uses, zoning, and plans listed in Item 9a above, concentrating on implications for environmental effects.

Existing land uses in the Lime Township Comprehensive plan include recreational. Although the future land use map does not specifically identify new recreational land uses, the proposed project is consistent with the comprehensive plan because it involves reclamation of an existing

[6] https://limetownshipmn.gov/ordinances-and-regulations/lime-township-zoning-ordinance/

[7] Lime Township Comprehensive Plan, https://limetownshipmn.gov/wp-content/uploads/2025/09/Lime-Township-Comprehensive-Plan.pdf

mining site, which is identified as an interim land use that must be restored for future development. The plan states that mineral extraction areas should be reclaimed in a manner that supports future use of the property and protects surrounding land uses. Converting the quarry into a managed RV park aligns with this guidance because it restores the mined area, supports an established pattern of recreational use within the township, and does not conflict with agricultural preservation or other long-term land use goals. Based on the plan language, no amendment to the comprehensive plan appears necessary for a reclamation project that transitions a mining area to a low intensity recreational use.

One of the guiding principles of the comprehensive plan is to "Allow for the extraction of mineral deposits in a manner that is sensitive to surrounding land uses, natural resources, and environmentally sensitive areas. Mitigation of impacts of mineral extraction on surrounding uses and reclamation of the property used for mineral extraction to a condition that can be utilized for future development should be considered in the review of permitting for mining interim use permits." This project would follow the condition set that land used for mineral extraction is being used for future development.

c) *Identify measures incorporated into the proposed project to mitigate any potential incompatibility as discussed in Item 10b above and any risk potential.*

Cross sections of the site are attached in **Appendix G**. The depressed elevation of the site compared to surrounding land uses will limit potential visual impacts.

Lime Township's new Recreation and Campground Ordinance imposes strict noise and lighting controls on recreational developments in addition to county and state rules. All such projects require an Interim Use/Conditional Use Permit with conditions to ensure compliance.

Recreational developments in Lime Township must adhere to state noise limits and local performance standards: loud activities are usually curtailed at night and kept within decibel limits, and lighting installations must be designed to confine light and glare on-site. These requirements are enforced through the township's permit process in cooperation with Blue Earth County, ensuring that new parks or campgrounds do not disturb neighbors or wildlife with excessive noise or unshielded lights. Compliance with Minnesota's environmental regulations (e.g., MPCA Noise Pollution Control rules) and any relevant county ordinances is explicitly required, making noise monitoring and light mitigation an integral part of project approval and ongoing operation.

11. Geology, soils and topography/land forms

a) *Geology - Describe the geology underlying the project area and identify and map any susceptible geologic features such as sinkholes, shallow limestone formations, unconfined/shallow aquifers, or karst conditions. Discuss any limitations of these features for the project and any effects the project could have on these features. Identify any project designs or mitigation measures to address effects to geologic features.*

Per the Lime Township comprehensive plan, the bedrock underlying the Township is generally sedimentary rock consisting primarily of sandstone, shale and carbonates. Shallow bedrock, specifically Jordan Sandstone, is found in substantial quantities in the western side of the Township near the Minnesota River valley. The type and quality of stone found in this unique geologic feature is desirable for building material and industrial uses.

The underlying geology of the project area is described in the C-26 Geologic Atlas of Blue Earth

County, Minnesota Part A[8]. The site contains exposed Cretaceous and Paleozoic bedrock at the surface, including saprolith that may have been reworked in a Cretaceous seaway. The surrounding area also includes surficial deposits of well sorted sand and gravelly sand with silt and clay that form broad, nearly level terraces shaped by the glacial River Warren during major discharge events from glacial Lake Agassiz. Bedrock and older indurated glacial sediments occur at or within roughly 10 feet of the ground surface in several locations. These conditions match the geology observed throughout the quarry area. Current mining operations involve removal of exposed limestone and associated rock materials through blasting, mechanical excavation, on site processing, and stockpiling within the quarry pit, consistent with ongoing extractive use of the site. It is anticipated that corporations will continue to be interested in mining those mineral resources in adjacent areas that are cost effective to mine.

The DNR and University of Minnesota maintain a database of karst features in southeastern Minnesota. As of the latest update (2025), the mapped sinkholes and springs cluster mainly in counties just east of Blue Earth. However, the DNR atlas also identifies karst conditions in Blue Earth, Nicollet, Le Sueur, Steele, and Rice Counties, as well as most of the southeastern corner of the state. The Natural Resources Atlas online mapping confirms a sparse occurrence of karst points in the Lime Township vicinity – likely only a few springs or small features are noted. This doesn't mean the area isn't karstic; rather, it means few features breach the surface dramatically enough to be catalogued. The final stormwater management design will evaluate potential risks related to subsurface materials and implement best management practices suitable for the area's soil and geologic conditions.

b) Soils and topography - Describe the soils on the site, giving NRCS (SCS) classifications and descriptions, including limitations of soils. Describe topography, any special site conditions relating to erosion potential, soil stability or other soils limitations, such as steep slopes, highly permeable soils. Provide estimated volume and acreage of soil excavation and/or grading. Discuss impacts from project activities (distinguish between construction and operational activities) related to soils and topography. Identify measures during and after project construction to address soil limitations including stabilization, soil corrections or other measures. Erosion/sedimentation control related to stormwater runoff should be addressed in response to Item 12.b.ii.

- *NOTE: For silica sand projects, the EAW must include a hydrogeologic investigation assessing the potential groundwater and surface water effects and geologic conditions that could create an increased risk of potentially significant effects on groundwater and surface water. Descriptions of water resources and potential effects from the project in EAW Item 12 must be consistent with thegeology, soils and topography/land forms and potential effects described in EAW Item 11.*

The soils in the United States are assigned to four groups (A, B, C, and D) and three dual classes (A/D, B/D, and C/D). The groups are defined as follows:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well-drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission. The majority of the soil in the project is in this group.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well-drained or well-drained soils that have a moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

[8] University of Minnesota, C-26 Geologic Atlas of Blue Earth County, Minnesota [Part A], accessed February 2026, https://conservancy.umn.edu/items/6a3b8562-eb23-440a-bfbe-bc028f93797f

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high-water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

If a soil is assigned to a dual hydrologic group (A/D, B/D, or C/D), the first letter is for drained areas and the second is for undrained areas. Only the soils that in their natural condition are in group D are assigned to dual classes.

A wind erodibility group (WEG) consists of soils that have similar properties affecting their susceptibility to wind erosion in cultivated areas. The soils assigned to group 1 are the most susceptible to wind erosion, and those assigned to group 8 are the least susceptible.

The project area is surrounded by steep slopes. According to the MnDNR MnTOPO Map[9], the elevation in the project area ranges from approximately 790 ft to 840 ft mean sea level (msl), with higher elevations surrounding the excavated areas of the mining site.

According to the Web Soil Survey[10], there is one major soil map unit (greater than 60 percent) within the project area: Lasa loamy fine sand, rock substratum, 1 to 6 percent slopes. This soil map unit constitutes approximately 78 acres (61.2 percent) of the project area. This soil is in hydrological group A, which has a low runoff potential. This soil group has a wind erodibility group (WEG) rating of 2, meaning that it is susceptible to wind erosion.

Other soils in the project area have WEG ratings of 1 (0.8 acres), 4L (1.6 acres), and 5 (45.3 acres).

Per the Lime Township comprehensive plan, the topsoil found throughout the Township consists of glacial till, a result of receding glacial ice and flowing water, characterized by a matrix of sand, silt, clay with scattered pebbles, cobbles, and some boulders. The topsoil ranges in thickness from one hundred (100) to three hundred (300) feet, except in areas near the Minnesota River, where the topsoil has been eroded away, exposing the underlying bedrock. Because construction and site reclamation activities will disturb more than one acre of land, the project will require coverage under the Minnesota NPDES Construction Stormwater Permit, along with preparation of a Stormwater Pollution Prevention Plan. These requirements will guide erosion prevention, sediment control, and management of disturbed soils throughout construction of the RV park and reclamation of the former quarry site.

Table 8 Soils

Map Unit Symbol	Map Unit Name	Hydrologic Group	Wind Erodibility Group (WEG)	Acres within Project Area	% of Project Area
100	Copaston loam, 1 to 4 percent slopes	D	5	12.2	9.5%
160	Fieldon loam, 0 to 2 percent slopes	B/D	4L	1.5	1.2%
222B	Lasa fine sand, 2 to 8 percent slopes	A	1	0.8	0.6%
317	Oshawa silt loam	C/D	4L	0.1	0.1%

[9] http://arcgis.MNDNR.state.mn.us/maps/mntopo/

[10] https://websoilsurvey.nrcs.usda.gov/app/WebSoilSurvey.aspx

Table 8 Soils					
Map Unit Symbol	**Map Unit Name**	**Hydrologic Group**	**Wind Erodibility Group (WEG)**	**Acres within Project Area**	**% of Project Area**
360B	Lasa loamy fine sand, rock substratum, 1 to 6 percent slopes	A	2	78.6	61.2%
440	Copaston loam, very shallow, 1 to 4 percent slopes	D	5	0.7	0.6%
923	Copaston-Rock outcrop complex, 1 to 4 percent slopes	D	5	32.4	25.2%
992	Rock outcrop-Copaston complex, very steep	-	-	2.2	1.7%

Grading for the proposed project is expected to occur across roughly 65-70 acres, with ultimate grading areas identified during final design. Much of this area would be reshaped to establish develop campsite pads and building foundations, improve drainage, prepare future lawn or restored landscape areas, and initiate trail corridors. Although the total disturbed area spans across the majority of the upland areas, only about 20 acres would ultimately transition to impervious surfaces, with the remainder stabilized as vegetated open space. Additionally, due to the site's quarry operations, the majority of the project area has been previously disturbed by grading and mining activities.

Construction-phase grading would temporarily expose soils to erosion, particularly on steeper slopes or in areas with highly permeable or easily compacted soils. Once grading is complete, these areas would be seeded, mulched, or planted to restore vegetation and reduce long-term erosion potential. Final site contours are expected to remain stable because restored lawn and landscape areas will provide continuous ground cover, and stormwater features will be designed to manage runoff from new impervious surfaces.

Operational impacts on soils and topography are anticipated to be minimal after stabilization, as the majority of disturbed acreage will return to vegetated conditions that protect soil structure and reduce sediment movement.

12. Water resources

a) Describe surface water and groundwater features on or near the site in a.i. and a.ii. below.

i. *Surface water - lakes, streams, wetlands, intermittent channels, and county/judicial ditches.Include any special designations such as public waters, shoreland classification and floodway/floodplain, trout stream/lake, wildlife lakes, migratory waterfowl feeding/resting lake, and outstanding resource value water. Include the presence of aquatic invasive speciesand the water quality impairments or special designations listed on the current MPCA 303d Impaired Waters List that are within 1 mile of the project. Include MNDNR Public Waters Inventory number(s), if any.*

A small portion of the southern project boundary intersects the FEMA mapped floodplain, including limited areas classified as Zone AE (flood zone) and Zone X (0.2% annual chance flood hazard) shown on the surface water resources figure as well as the FEMA figure. These areas occur along the outer edge of the property and within an easement and are not part of the construction limits for the RV park. All proposed development is located outside of the mapped floodplain and sits several feet above the identified base flood elevation shown on the figures in Appendix B. No

structures will be built in this area as it is not in the project footprint.

Public Waters Inventory features were reviewed for the project area and surrounding one mile radius. No PWI basins or watercourses occur within the project area. The southern project border is approximately 0.05 miles north of an unnamed stream. The western border of the project is located approximately 0.70 miles east of the Minnesota River. The nearest PWI features are located outside the study area and include PWI IDs 07040a, 52001ad, and 07043a, along with a mapped feature listed under kittle number M-055-072-002 that does not have a PWI ID. These features do not intersect the project boundary, and no work will occur within any designated Public Water.

The Minnesota River is located within one mile of the project area and is listed on the MPCA 303d Impaired Waters List. According to the MPCA, the Minnesota River includes impairments related to aquatic consumption, aquatic life, and aquatic recreation, which are common impairment categories for major river reaches that do not meet state water quality standards. Construction stormwater controls will follow the requirements for sites located near impaired waters.

An aquatic resource delineation was conducted on June 10, 2025, to assess the presence of wetlands within a 123-acre area, the wetland delineation study area. The Blue Earth County Technical Evaluation Panel met on June 30, 2025, to review the submitted report. The Notice of Decision (NOD) was issued on August 19, 2025 (LGU project # PL2025066), which approves the boundaries identified through the submitted report. One wetland was identified as a historic wetland, and four wetlands were designated as incidental. Per MN Rules 8420, incidental wetlands are those that were created in non-wetland areas and are not regulated under the MN Wetland Conservation Act (WCA).

Wetland 1 is a depression that holds water for portions of the year and is designated as a fresh (wet) meadow system. In total, 0.15 acres of wetlands regulated under the WCA and 14.68 acres of incidental wetlands were identified within the area of review. Site hydrology has a natural connection to an off-site historic wetland that is part of a larger fen complex. According to the Sunde Engineering groundwater assessment included in Appendix B, this connection is stable and does not cause noticeable or immediate changes in water levels on the site..

Table 9 Incidental Wetlands

Wetland ID	Area (AC)	Type
Incidental Wetland 1	10.09	Open Water
Incidental Wetland 2	2.91	Open Water
Incidental Wetland 3	0.68	Open Water
Incidental Wetland 4	0.93	Open Water

ii. *Groundwater – aquifers, springs, seeps. Include: 1) depth to groundwater; 2) if project is within a MDH wellhead protection area; 3) identification of any onsite and/or nearby wells,including unique numbers and well logs if available. If there are no wells known on site or nearby, explain the methodology used to determine this.*

According to the USDA NRCS Web Soil Survey, depth to groundwater ranges from 10 cm to over 200 cm. In addition to the general soil information from the USDA NRCS Web Soil Survey, regional hydrogeologic data were reviewed to provide a more accurate description of groundwater depth. According to the Minnesota Natural Resources Research Institute's Minnesota Natural Resource Atlas, the depth to the water table in the project area typically ranges from 0 to 20 feet, with

portions exceeding 40 feet along the southern part of the project area[11]. This regional information better reflects groundwater conditions in and around the former quarry, where shallow groundwater is expected due to exposed bedrock and past excavation. The project is not located within an MDH wellhead protection area. According to the Minnesota Department of Health Well Index, there are 43 wells in proximity to the site, and 22 within or immediately adjacent to the project area. Many of these wells are monitoring wells drilled as part of the previous quarry operations. A full list of wells and well logs are provided in **Appendix D**.

Table 10 Project Site Wells		
Well ID	**Well Owner**	**Well Depth (ft)**
620926	Dennis Horneman	100
112914	Ray Loeffler	127
439310	Ray Loeffler	127
652892	Coughlan Company	110
154677	Midwest Realty	277
802409	MW-11-JS	132
686895	MW	68
686896	MW	66
802410	MW-12-JS	81
802411	MW-13-JS	131
686897	MW	69
802408	MW-9-JS	66
716574*	Mankato Kasota Stone	230
802412	MW-14-JS	57
802413	MW-15-JS	112
686898	MW	89
761445	MW-8JS	30
802414	MW-16-JS	85
761444	MW-7JS	31
614146	Vernon Winkler	335
209383	Lundin	172
810975	Westman Investments, LLP	238

*Primary site water supply well

A review of the Minnesota Spring Inventory indicates that no mapped springs or seeps occur within the project area or the surrounding area.

b) Describe effects from project activities on water resources and measures to minimize or mitigate the effects in Item b.i. through Item b.iv. below.

i. *Wastewater - For each of the following, describe the sources, quantities and composition of all sanitary, municipal/domestic and industrial wastewater produced or treated at the site.*

1) *If the wastewater discharge is to a publicly owned treatment facility, identify any pretreatment measures and the ability of the facility to handle the added water andwaste loadings, including any effects on, or required expansion of, municipal wastewater infrastructure.*

The project is evaluating two wastewater management options: installing sanitary holding tanks

[11] Minnesota Natural Resources Atlas, https://mnatlas.org/gis-tool/?id=k_0279.

with wastewater hauled to the City of Mankato's wastewater treatment facility, or connecting to a sanitary force main if municipal sewer is extended to the area in the future. At this time, the project is expected to proceed with the holding-tank and hauling option, which can fully support wastewater needs for the 300 to 350 campsites. If a municipal force main becomes available, a connection could be made within existing road rights-of-way as part of a broader sewer extension intended to serve multiple properties in the surrounding area.

A preliminary concept plan showing the proposed holding tanks and project area infrastructure is available in **Appendix A**.

Both wastewater options are based on an estimated flow of approximately 19,820 gallons per day of typical RV and camper wastewater, which does not require on-site pretreatment. Coordination with the City of Mankato has occurred regarding acceptance of hauled wastewater and the possibility of a future sewer connection, although no agreement has been finalized.

The City's existing wastewater treatment facility has adequate capacity to accept the projected flows, and no expansion of municipal infrastructure is anticipated as a result of this project. Final wastewater system design will occur during detailed design and will comply with all applicable permitting requirements.

2) *If the wastewater discharge is to a subsurface sewage treatment systems (SSTS), describe the system used, the design flow, and suitability of site conditions for sucha system. If septic systems are part of the project, describe the availability of septage disposal options within the region to handle the ongoing amounts generated as a result of the project. Consider the effects of current Minnesota climate trends and anticipated changes in rainfall frequency, intensity and amount with this discussion.*

Not Applicable. The project as proposed does not include discharge of wastewater to an SSTS.

3) *If the wastewater discharge is to surface water, identify the wastewater treatment methods and identify discharge points and proposed effluent limitations to mitigateimpacts. Discuss any effects to surface or groundwater from wastewater discharges,taking into consideration how current Minnesota climate trends and anticipated climate change in the general location of the project may influence the effects.*

Not Applicable. The project as proposed does not include discharge of wastewater to a surface water.

ii. *Stormwater - Describe changes in surface hydrology resulting from change of land cover. Describe the routes and receiving water bodies for runoff from the project site (major downstream water bodies as well as the immediate receiving waters). Discuss environmental effects from stormwater discharges on receiving waters post construction including how the project will affect runoff volume, discharge rate and change in pollutants.Consider the effects of current Minnesota climate trends and anticipated changes in rainfall frequency, intensity and amount with this discussion. For projects requiring NPDES/SDS Construction Stormwater permit coverage, state the total number of acres that will be disturbed by the project and describe the stormwater pollution prevention plan (SWPPP), including specific best management practices to address soil erosion and sedimentation during and after project construction. Discuss permanent stormwater management plans, including methods of achieving volume reduction to restore or maintain the natural hydrology of the site using green infrastructure practices or other stormwater*

management practices. Identify any receiving waters that have construction-related water impairments orare classified as special as defined in the Construction Stormwater permit. Describe additional requirements for special and/or impaired waters.

The project is expected to have a neutral impact on groundwater resources as mining will no longer be taking place, and the site will be reclaimed as a campground. Dewatering operations ceased on July 1, 2023, and ponds have since filled with precipitation, runoff, and groundwater. Potable water is planned to be pumped using an existing well and treated on-site. Final design for treatment facilities will be reviewed as part of the MDH Plan Review process.

Dust and sediment control will be used during construction to minimize and avoid permanent impacts on surrounding vegetation and waterbodies. A construction stormwater pollution prevention plan (SWPPP) will be developed during project design and implemented during construction to protect water resources during construction. The project will require coverage under the NPDES Construction Stormwater Permit, and a Stormwater Pollution Prevention Plan will be prepared during final design to identify and implement the required best management practices. The plan will include permit-required erosion and sediment controls such as perimeter berms, silt fence, inlet protection, stabilized construction entrances, and rapid stabilization of disturbed soils. Final stormwater BMP selection, as outlined in the Minnesota Stormwater Manual, including potential infiltration basins, swales, or filtration practices, will be based on site soil conditions, groundwater depth, and any constraints identified during detailed design. The stormwater management approach will also include measures designed to reduce peak runoff rates to prevent downstream impacts and maintain stable flow conditions.

The project will likely continue to use the existing quarry pit as the primary stormwater management feature, which provides significant storage capacity and reduces the need for large, constructed basins. Although **Table 4** shows a moderate acreage of impervious surface (approximately 20 acres), much of this area will consist of campsite pads, buildings, roads and parking areas, and trails that currently drain internally to the pit, with the Minnesota River serving as the ultimate receiving body. The infiltration basin in **Table 3** remains marked as “0” with an asterisk because its feasibility will be determined during final design.

These commitments will be incorporated into the stormwater design to ensure the project meets all state construction stormwater requirements.

The Minnesota River is located within one mile of the project area and is listed on the MPCA 303d Impaired Waters List for aquatic consumption, aquatic life, and aquatic recreation. Construction near an impaired receiving water requires enhanced erosion and sediment controls under the Construction Stormwater Permit. The project will implement these enhanced measures, including strengthened perimeter controls, rapid stabilization of disturbed areas, and additional best management practices to prevent sediment from leaving the site. These requirements will be incorporated into the Stormwater Pollution Prevention Plan and followed throughout construction.

The final stormwater management system will be designed to meet or exceed the requirements of the Minnesota Construction Stormwater Permit for stormwater runoff volume reduction.

The stormwater system for the project will be designed to meet all requirements of the Minnesota Construction Stormwater Permit, which includes accounting for current climate trends and increased rainfall intensity. The final design will size stormwater best management practices to safely manage higher peak flows and larger storm events consistent with state guidance for future precipitation conditions. These considerations will be incorporated during detailed design to

ensure the system can manage more intense rainfall associated with changing climate patterns.

The final location and design of all stormwater BMPs and drainage infrastructure will be detailed in the comprehensive site plan submitted for review during the permitting process.

iii. *Water appropriation - Describe if the project proposes to appropriate surface or groundwater (including dewatering). Describe the source, quantity, duration, use and purpose of the water use and if a MNDNR water appropriation permit is required. Describe anywell abandonment. If connecting to an existing municipal water supply, identify the wells tobe used as a water source and any effects on, or required expansion of, municipal water infrastructure. Discuss environmental effects from water appropriation, including an assessment of the water resources available for appropriation. Discuss how the proposed water use is resilient in the event of changes in total precipitation, large precipitation events, drought, increased temperatures, variable surface water flows and elevations, and longer growing seasons. Identify any measures to avoid, minimize, or mitigate environmental effects from the water appropriation. Describe contingency plans should theappropriation volume increase beyond infrastructure capacity or water supply for the project diminish in quantity or quality, such as reuse of water, connections with another water source, or emergency connections.*

The project will continue to use Well 716574, which draws from the St. Lawrence Aquifer, to meet its operational water needs. No surface-water withdrawals or construction dewatering are proposed. The existing well is expected to provide adequate supply, though additional wells may be needed in the future if demand increases and connectivity to municipal water supply is not yet available. If any new wells are proposed in the future, they will require both MDH well construction permits and MNDNR water appropriation permits. No well abandonment is planned at this time.

Use of groundwater from the St. Lawrence Aquifer is not expected to affect nearby wetlands or the Lime 30 calcareous fen, as the project does not alter groundwater flow patterns or introduce new pumping demands beyond existing conditions. Because the aquifer is a deep, confined system, it is less sensitive to short-term climate variability such as heavy rainfall, drought, or reduced frozen-ground periods. The project's water needs are relatively stable and are not expected to increase significantly under projected climate trends.

To ensure long-term sustainability, the proposer will monitor water use, maintain efficient practices, and adjust operations if needed. If future conditions require additional supply or if water availability changes, contingency options include developing a secondary well, reusing non-potable water for limited site needs, or evaluating potential connections to an alternative water source.

iv. Surface Waters

a) *Wetlands - Describe any anticipated physical effects or alterations to wetland features such as draining, filling, permanent inundation, dredging and vegetative removal. Discuss direct and indirect environmental effects from physical modification of wetlands, including the anticipated effects that any proposed wetland alterations may have to the host watershed, taking into consideration how current Minnesota climate trends and anticipated climate change in the general location of the project may influence the effects. Identify measures to avoid (e.g., available alternatives that were considered), minimize, or mitigate environmental effects to*

wetlands. Discuss whether any required compensatory wetland mitigation for unavoidable wetland impacts will occur in the same minor or major watershed and identify those probable locations.

No dewatering is proposed with this project. The MNDNR, via verbal communication, has stated concerns that using aeration or chemicals in area surface waters will impact the fen. The proposed project does not include the installation of fountains or other features that would aerate surface waters. To ensure the safety and quality of water in designated swimming and cable park areas, regular water quality testing will be conducted. No chemical disinfectants or additives are planned for use during either the construction or operational phases of the project.

No wetland mitigation would be required for incidental wetlands that were identified. See **Appendix B** for the wetland delineation report.

Minnesota is experiencing warmer winters, more intense rainfall events, and greater precipitation variability, trends documented by the Minnesota State Climatology Office and the University of Minnesota Climate Adaptation Partnership. These changes are expected to continue, with climate models projecting increased heavy-rainfall frequency and reduced frozen-ground duration across the state[12].

While changing climate conditions may influence seasonal water levels in onsite and adjacent wetlands, available information indicates that these shifts are not expected to cause measurable or significant effects on the Lime 30 fen or other wetland areas. Most wetlands on the site have sufficient vegetative buffers and hydrologic separation to absorb short-term fluctuations, and the fen's groundwater-driven system provides additional stability against climate-related variability.

The project proposer has indicated that bike trails will be field-fit to avoid wetlands, or boardwalks or bridges would be used to avoid impacts to Wetland 1. If impacts to Wetland 1 are unavoidable, wetland impact permitting will be required. If impacts to Wetland 1 cannot be entirely avoided during final trail design, the project may qualify for de minimis wetland impacts under the Minnesota Wetland Conservation Act if the disturbance remains below applicable thresholds. If impacts exceed de minimis levels, the project will require wetland permitting and mitigation consistent with state and federal requirements, including potential review by the U.S. Army Corps of Engineers.

b) *Other surface waters- Describe any anticipated physical effects or alterations to surface water features (lakes, streams, ponds, intermittent channels, county/judicialditches) such as draining, filling, permanent inundation, dredging, diking, stream diversion, impoundment, aquatic plant removal and riparian alteration. Discuss direct and indirect environmental effects from physical modification of water features, taking into consideration how current Minnesota climate trends and anticipated climate change in the general location of the project may influence the effects. Identify measures to avoid, minimize, or mitigate environmental effects to surface water features, including in-water Best Management Practices that are proposed to avoid or minimize turbidity/sedimentation while physically altering thewater features. Discuss how the project will change the number or type of watercraft on any water body, including current and projected watercraft usage.*

The closest waterbody is the Minnesota River, located approximately 0.70 miles west of the

[12] Minnesota Climate Mapping and Analysis Tool (CliMAT), https://climate.umn.edu/MN-CliMAT.

project area. The Minnesota River is listed as impaired by the Minnesota Pollution Control Agency (MPCA). No work is proposed in the river itself or its banks. The ponds on the project site were created by past quarrying activities and have formed as groundwater, precipitation, and runoff filled the excavated areas after dewatering ended in 2023. These features meet the definition of incidental wetlands because they developed unintentionally as a result of mining and are not natural waterbodies. Although they appear as ponds, they are considered incidental wetlands for regulatory purposes . Dewatering operations ceased in July 2023, and ponds have since filled with precipitation, runoff, and groundwater. Dewatering is not likely, but if dewatering becomes necessary, a dewatering plan will be developed, and proper permits will be obtained before any pumping takes place.

Site hydrology has a natural connection to an off-site historic wetland that is part of a larger calcareous fen complex (Lime 30). According to a groundwater assessment (**Appendix B**), this connection is stable and does not cause noticeable or immediate changes in water levels on the Lime 30 calcareous fen.

Previous dewatering of the Stoffel Quarry Lake, conducted under state water appropriation permits to complete final reclamation grading, has been closely monitored through a network of groundwater wells. The quarry lake was lowered by approximately 14.5 feet during this dewatering process. Monitoring wells closest to the quarry showed the expected short-term lowering of groundwater levels during pumping, followed by recovery once pumping paused.

In contrast, monitoring wells located farther from the quarry and closest to the Lime 30 calcareous fen showed a small, steady decline in groundwater levels. This pattern matches typical winter conditions when frozen ground limits infiltration and groundwater levels naturally drop. Historical winter data from previous years show similar seasonal declines, indicating that the changes observed this year are consistent with normal seasonal patterns rather than the result of quarry dewatering.

Taken together, the monitoring data indicate that while the site is hydrologically connected to the larger fen system, this connection does not produce immediate or significant fluctuations in water levels. Temporary dewatering has caused localized drawdown near the quarry but has not measurably affected groundwater elevations near the calcareous fen or altered the stability of the hydrologic connection.

13. Contamination/Hazardous Materials/Wastes:

a) Pre-project site conditions - Describe existing contamination or potential environmental hazards on or in close proximity to the project site such as soil or ground water contamination, abandoned dumps, closed landfills, existing or abandoned storage tanks, and hazardous liquid or gas pipelines. Discuss any potential environmental effects from pre-project site conditions that would be caused or exacerbated by project construction and operation. Identify measures to avoid, minimize or mitigate adverse effects from existing contamination or potential environmental hazards. Include development of a Contingency Plan or Response Action Plan.

According to MPCA's What's In My Neighborhood database, there are 28 sites in proximity to the project location. Two of these sites are in the project area – Pilgrim's Demolition Landfill (aboveground tank and stormwater active) and Hubbard Milling Co Research Farm (not active). Hendley's Inc, Brielmaier Aggregates Inc, and an Unnamed Dump are close to but not in the project area. Documentation is attached in **Appendix D**.

In addition to the sites identified in the MPCA database, the project area includes an active

demolition landfill and active mining areas that may contain residual materials from past quarry operations. Construction activities will be planned to account for potential hazards such as old fuel tank remnants, blasting residue, and buried landfill contents. If suspect materials are encountered, including petroleum-stained soils, unexploded blasting residue, or demolition debris, they will be segregated, tested, and managed in accordance with MPCA solid waste and contaminated media requirements. A site-specific Contingency Plan will guide identification of unexpected materials, stop work procedures, and agency notifications. Coordination with the mining operator will ensure safe transition from active extraction to reclamation so that materials exposed during construction are managed properly and do not pose risks to workers or the environment.

b) *Project related generation/storage of solid wastes - Describe solid wastes generated/stored during construction and/or operation of the project. Indicate method of disposal. Discuss potential environmental effects from solid waste handling, storage and disposal. Identify measures to avoid, minimize or mitigate adverse effects from the generation/storage of solid waste including source reduction and recycling.*

Construction activities will produce typical solid wastes such as packaging materials, scrap building supplies, and general debris. These materials will be collected on-site in designated containers and regularly removed by a licensed waste hauler for disposal at a permitted landfill or recycling facility. Efforts will be made to separate recyclable materials, such as metals, cardboard, and plastics, to maximize diversion from landfill and support source reduction.

During project operation, the primary solid waste stream will consist of typical refuse generated by campers and park users, including food packaging, paper products, and other household waste. Solid waste will be stored in secure, animal-resistant containers located throughout the site and collected regularly by a licensed waste management provider for disposal or recycling. Recycling will be supported through the provision of dedicated bins and partnerships with local recycling providers.

Potential environmental effects from solid waste handling, storage, and disposal include risks of litter, odor, attraction of wildlife, and contamination of soil or water resources if not properly managed. To avoid, minimize, or mitigate these adverse effects, the project will implement several measures: (1) provision of clearly marked, animal-resistant waste and recycling containers throughout the site; (2) regular waste collection and site housekeeping to prevent accumulation; and (3) educational signage and outreach to encourage campers to minimize waste generation and participate in recycling programs. Source reduction will be promoted by encouraging the use of reusable items and minimizing single-use products where feasible.

c) *Project-related use/storage of hazardous materials - Describe chemicals/hazardous materials used/stored during construction and/or operation of the project including method of storage. Indicate the number, location and size of any new above or below ground tanks to store petroleum or other materials. Indicate the number, location, size and age of existing tanks on the property that the project will use. Discuss potential environmental effects from accidental spill or release of hazardous materials. Identify measures to avoid, minimize or mitigate adverse effects from the use/storage of chemicals/hazardous materials including source reduction and recycling. Include development of a spill prevention plan.*

During the construction and operation of the Rockwell RV & Adventure Park, the use and storage of hazardous materials will be limited and managed in accordance with applicable regulations and best practices. Typical chemicals and hazardous materials anticipated during construction include fuels, lubricants, hydraulic fluids, and solvents associated with construction equipment and site maintenance. These materials will be stored in approved containers and, if necessary, in temporary above-ground tanks located in designated, secure areas away from sensitive

environmental receptors. No new above-ground or below-ground petroleum storage tanks are proposed as part of the project, and there are no existing tanks on the property that will be used for project purposes.

A review of the MPCA tank and leak site search identified 71 tanks within one mile of the project site, with the closest tank located 0.1 miles away (**Appendix D**). There are no active leaks in the area. Underground petroleum storage tanks located more than 0.1 mile from the project limits were screened out as no-risk factors, consistent with attenuation science indicating that petroleum plumes in soil and groundwater rarely extend beyond a few hundred feet under typical conditions.[13] Under Minnesota Administrative Rule 4725.4450.1.B., petroleum tanks lacking protective safeguards must be at least 150 feet from drinking water wells, supporting the exclusion of more distant tanks from consideration.[14]

Although not anticipated, potential environmental effects from accidental spills or releases of hazardous materials include contamination of soil, groundwater, or surface water, as well as risks to human health and wildlife. To avoid, minimize, or mitigate these risks, the project will implement several measures: (1) hazardous materials will be stored in secure, labeled containers with secondary containment to prevent leaks or spills; (2) refueling and maintenance activities will be conducted in designated areas with spill response supplies readily available; (3) regular inspections and staff training will be conducted to ensure compliance with safety protocols; and (4) hazardous waste will be managed and disposed of in accordance with state and federal regulations, with recycling and source reduction promoted wherever feasible.

If needed, a spill prevention and response plan will be developed prior to construction and maintained throughout project operation. This plan will outline procedures for safe handling and storage of hazardous materials, emergency response actions in the event of a spill, and reporting requirements. By implementing these measures, the project will minimize the potential for adverse environmental effects associated with hazardous materials and ensure protection of human health and the environment.

Sewage will be collected in a holding tank until it can be trucked to the City of Mankato to be disposed of at the wastewater treatment facility. This waste will be typical of campers/motor homes. Per MPCA requirements, the project will use a "registered tank" and complete required annual maintenance and reporting.

d) Project related generation/storage of hazardous wastes - Describe hazardous wastes generated/stored during construction and/or operation of the project. Indicate method of disposal. Discuss potential environmental effects from hazardous waste handling, storage, and disposal. Identify measures to avoid, minimize or mitigate adverse effects from the generation/storage of hazardous waste including source reduction and recycling

During construction and operation of the Rockwell RV & Adventure Park, hazardous waste generation is expected to be minimal and will primarily be associated with routine maintenance and cleaning activities. Typical hazardous wastes during construction may include spent solvents, paint residues, adhesives, and small quantities of waste oils or lubricants from equipment servicing. These materials will be stored in clearly labeled, secure containers in designated areas and managed in accordance with applicable state and federal regulations. All hazardous wastes will be collected by licensed hazardous waste haulers and transported to approved treatment, storage, or disposal facilities. Documentation of waste generation, storage, and disposal will be maintained to ensure regulatory compliance and facilitate proper tracking.

[13] https://puc.sd.gov/commission/dockets/HydrocarbonPipeline/2014/HP14-001/rebuttal/transcanada/exhibit7.pdf)
[14] https://www.revisor.mn.gov/rules/4725.4450/#rule.4725.4450.1.B)

During project operations, hazardous waste generation will be limited, with the primary waste stream consisting of small quantities of cleaning chemicals, maintenance fluids, and other materials associated with facility upkeep. No large-scale hazardous waste storage is anticipated. All hazardous materials will be stored in accordance with manufacturer recommendations and regulatory requirements, with secondary containment provided to prevent accidental releases.

Sanitary sewage generated on-site will be collected in a centralized registered holding tank equipped with a pump system and trucked to the City of Mankato for disposal at the municipal wastewater treatment facility. This waste stream is typical of campers and motor homes and does not constitute hazardous waste under regulatory definitions. Communication has occurred with the City of Mankato to confirm acceptance of the wastewater, and the holding tank will be maintained with annual maintenance reports as required by the Minnesota Pollution Control Agency (MPCA).

Potential environmental effects from hazardous waste handling, storage, and disposal include risks of soil, groundwater, or surface water contamination, as well as impacts to human health and wildlife if not properly managed. To avoid, minimize, or mitigate these risks, the project will implement several measures: (1) hazardous wastes will be stored in secure, labeled containers with secondary containment; (2) regular inspections and staff training will be conducted to ensure compliance with safety protocols; and (3) hazardous waste will be managed and disposed of by licensed contractors in accordance with all applicable regulations.

14. Fish, wildlife, plant communities, and sensitive ecological resources (rare features)

a) Describe fish and wildlife resources as well as habitats and vegetation on or in near the site.

The project site will be a non-operational limestone quarry owned by Camp Quarry LLC. The land has been significantly disturbed due to past mining activities, resulting in a landscape that includes vegetated areas, quarry water bodies, roadways, remnants of a formal farmstead, and remnants of a former private gun range. Due to the historic mining use of the site, natural habitats have been largely altered or removed.

Vegetation on the site is limited and primarily consists of regrowth in disturbed areas. These vegetated patches may support some generalist wildlife species adapted to disturbed or edge habitats, but the site does not currently support high-quality or sensitive ecological communities.

The water bodies on the site, created through mining activities, are not natural aquatic ecosystems and are unlikely to support diverse fish populations. The nearest natural waterbody is a small unnamed stream located 0.05 miles south, and the Minnesota River located approximately 0.70 miles west of the project area.

Surrounding land uses include a mix of industrial, agricultural, residential, and community facilities such as a daycare center and a cemetery. These surrounding uses further limit the presence of sensitive wildlife species or habitats in the immediate vicinity of the project area.

In addition to the surrounding industrial, agricultural, residential, and community uses, a large tract of woodland lies between the project area and the Minnesota River. This wooded corridor provides more structured habitat than the disturbed quarry site and supports typical upland forest wildlife. Although this habitat is located off-site, its presence enhances overall ecological diversity in the broader landscape. The quarry's disturbed condition and lack of continuous vegetation limit direct use of the project area by forest-dependent species, but the woodland should be acknowledged as an adjacent habitat feature within the local ecological context.

b) *Describe rare features such as state-listed (endangered, threatened or special concern) species, native plant communities, Minnesota Biological Survey Sites of Biodiversity Significance, and other sensitive ecological resources on or within close proximity to the site. Provide the license agreement number (LA-) and/or correspondence number (MCE) from which the data were obtained and attach the Natural Heritage Review letter from the MNDNR. Indicate if any additional habitat or species survey work has been conducted within the site and describe the results.*

According to the Minnesota Department of Natural Resources (MNDNR) Conservation Explorer, the Lime 30, Final Minnesota Biological Survey (MBS) Site of Moderate significance is adjacent to the project area. Additionally, there is a MNDNR Native Plant Community, the Dry Bedrock Bluff Prairie (Southern), within the search area. The MNDNR Conservation Explorer also identified two calcareous fens, the Kasota 7 and Lime 30, within the search area (5-mile radius as determined by MN DNR). There is an important bird area, the Upper Minnesota River Valley IBA, within the search area. A USFWS Regulatory Species, the Rusty Patched Bumble Bee High Potential Zone, is located within the search area.

Automated reviews were completed on the MNDNR's Minnesota Conservation Explorer portal and the USFWS Information for Planning and Consultation (IPaC). Copies of the documents from those reviews are attached in **Appendix B**. The Conservation Explorer's MNDNR Natural Heritage Information System (NHIS) letter was received (MCE # 2025-00465) on August 14, 2025.

<u>Sensitive Ecological Resources</u>

The letter stated that a calcareous fen (Lime 30, Fen ID# 38219) has been documented within the vicinity of the proposed project area. Stream parsnip (*Berula erecta*), a state-listed threatened plant, has been documented within the fen. The WCA, authorized by Minnesota Statutes section 103G.223, states that calcareous fens may not be filled, drained, or otherwise degraded, wholly or partially, by any activity, except as provided for in a management plan approved by the commissioner of the Department of Natural Resources. Many of the unique characteristics of calcareous fens result from the upwelling of groundwater through calcareous substrates. Because of this dependence on groundwater hydrology, calcareous fens can be affected by nearby activities or even those several miles away. Calcareous fens may be impacted by activities within the fen, activities that affect surface water flows (e.g., stormwater flow, erosion), or activities that affect groundwater hydrology (e.g., groundwater pumping, contamination, discharge, or excavation). The MNDNR advises that if it is determined the project will impact the fen in any way, including indirect impacts through the alteration of hydrological conditions, a botanical survey is required. Final project design will avoid alterations of hydrological conditions.

To ensure compliance under WCA, coordination with the state's Calcareous Fen Coordinator, Keylor Andrews, occurred. Keylor informed the project team that the Lime 30 Fen is not expected to be impacted by the project, as long as all guidance steps are followed. Mr. Andrews indicated that there can be no use of fountains or any other mechanism that may add additional oxygen to the water. He also indicated that MNDNR does not want to see anything that would pull from the aquifer. Finally, the proposer cannot treat the water with any chemicals. Some RV parks with water features will treat the water to keep it clean, the proposer will not be allowed to do this. Coordination is found in **Appendix B**. If the proposer does not adhere to the MNDNR fen guidance, further consultation will be required.

The MNDNR also notes that the Minnesota Biological Survey (MBS) in Lime 30 is a Site of Moderate Biodiversity Significance. The MBS overlaps the northwest corner of the proposed project. Sites of Biodiversity Significance have varying levels of native biodiversity and are ranked based on the relative significance of this biodiversity at a statewide level. Sites ranked as

Moderate contain occurrences of rare species and/or moderately disturbed native plant communities, and/or landscapes that have a strong potential for recovery. This MBS Site contains Dry Bedrock Bluff Prairie (Southern) (UPs13c), a MNDNR Native Plant Community (NPC). This community is considered vulnerable to extirpation (S3) and rare in Minnesota.

The MNDNR recommends that the project be designed to avoid impacts to these ecologically significant areas. Actions to avoid or minimize disturbance include, but are not limited to, the following recommendations:

- As much as possible, operate within already-disturbed areas.
- Avoid the MBS Site and rare NPC.
- Retain a buffer between proposed activities and the MBS Site.
- Minimize vehicular disturbance in the MBS Site (allow only vehicles/equipment necessary for construction activities).
- Do not park equipment or stockpile supplies in the MBS Site.
- Do not place spoil in the MBS Site or other sensitive areas.
- If possible, conduct the work under frozen ground conditions.
- Use effective erosion prevention and sediment control measures.
- Inspect and clean equipment prior to operation and follow recommendations to prevent the spread of invasive species.
- Revegetate disturbed soil with native species suitable to the local habitat as soon after construction as possible.
- Use only weed-free mulches, topsoils, and seed mixes. Of particular concern are birdsfoot trefoil (*Lotus corniculatus*) and crown vetch (*Coronilla varia*), two invasive species that are sold commercially and are problematic in prairies and disturbed open areas.
- For trails:
    - Minimize width of trail.
    - Do not route trails through wet swales or depressions, or sensitive rock outcrop areas.
    - Bridge all stream and wetland crossings.
    - Trail maintenance plans should address erodible soils, especially in areas of steep topography.
    - Use signage to encourage visitors to stay on designated trails.

<u>State Rare, Threatened and Endangered Species</u>

MNDNR notes that Loggerhead shrikes (*Lanius ludovicianus*), a state-listed endangered bird, have been documented within the vicinity of the project site. Given the potential for this species to be found in the vicinity of the project, tree and shrub removal shall be avoided during the breeding season, April through July. If this mitigation measure cannot be followed, further coordination with the MNDNR is required.

MNDNR also notes that Stream parsnip (*Berula erecta*), a state-listed threatened plant, has been

documented within the nearby calcareous fen and suitable habitat may exist within the proposed project. Stream parsnip is found in calcareous and hydrologically active habitats at the margins of small spring-fed streams and pools and saturated sedge-derived peat; this includes rivulets in wet seepage meadows, calcareous fens, and spring-fed streams in forested ravines. Minnesota's Endangered Species Statute (Minnesota Statutes, section 84.0895) and associated Rules (Minnesota Rules, part 6212.1800 to 6212.2300 and 6134) prohibit the take of endangered or threatened plants or animals, including their parts or seeds, without a permit. If this mitigation measure cannot be followed, further coordination with the MNDNR is required.

Additionally, the Kentucky coffee tree (*Gymnocladus dioicus*), a state-listed species of special concern, has been documented in the vicinity of the proposed project. Kentucky coffee tree is found most often in mesic hardwood forests on terraces of the Minnesota River, well above the reach of normal flood events. The MNDNR recommends avoiding the removal of Kentucky coffee trees if they are found on the site.

The North American racer (*Coluber constrictor*), a state-listed species of special concern, has also been documented in the vicinity of the proposed project and may be encountered on site. These snakes occupy a variety of habitats in the deciduous forest region including forested hillsides, bluff prairies, grasslands, and open woods. Woodland margins and field edges are the preferred summer habitat. During winter months, North American racers hibernate in mammal burrows, caves, rock crevices, gravel banks, stone foundations, and old wells. North American racers have relatively large home ranges, making long-distance movements to and from their hibernacula each year. The North American racer emerges from hibernation in late April. Given the presence of these rare snakes, the MNDNR recommends that the use of wildlife-friendly erosion control mesh.

The Lark sparrow (*Chondestes grammacus*), a state-listed bird species of special concern, has also been documented in the vicinity of the project. This bird species is found in open, dry grassland areas with scattered trees and shrubs. They build their nest on the ground, in a shrub or a small tree. If feasible, avoid initial disturbance to grassland areas and tree/shrub removal from May 15 through August 15 to avoid disturbance of nesting birds.

Federal Rare, Threatened and Endangered Species

The MNDNR also notes that during the active season (approximately April-November) bats roost underneath bark, in cavities, or in crevices of both live and dead trees. Tree removal can negatively impact bats by destroying roosting habitat, especially during the pup-rearing season when females are forming maternity roosting colonies and the pups cannot yet fly. To minimize these impacts, the MNDNR recommends that tree removal be avoided from June 1 through August 15. If greater protection for bats is desired, avoid tree removal during the entire bat active season (April 1-November 15).

The MNDNR states that the area of interest overlaps with a USFWS Rusty Patched Bumble Bee High Potential Zone. The rusty patched bumble bee (*Bombus affinis*) is federally listed as endangered and is likely to be present in suitable habitat within High Potential Zones. From April through October, this species uses underground nests in upland grasslands, shrublands, and forest edges, and forages where nectar and pollen are available. From October through April, the species overwinters under tree litter in upland forests and woodlands. The rusty patched bumble bee may be impacted by a variety of land management activities, including, but not limited to, prescribed fire, tree-removal, haying, grazing, herbicide use, pesticide use, land-clearing, soil disturbance or compaction, or use of non-native bees. If applicable, the MNDNR recommends reseeding disturbed soils with native species of grasses and forbs using BWSR Seed Mixes or MnDOT Seed Mixes.

The USFWS Rusty Patched Bumble Bee Range Wide Determination Key was reviewed per guidance from the MNDNR. The key determined that the project may affect the Rusty Patched Bumble Bee (RPBB) and that further coordination with the USFWS is recommended. The project will proactively implement the MNDNR's recommendations to avoid activities most likely to impact the bee. Specifically, disturbed soils will be reseeded with native grasses and forbs using BWSR or MnDOT Seed Mixes, avoid land management activities including, but not limited to, prescribed fire, tree-removal, haying, grazing, herbicide use, pesticide use, land-clearing, soil disturbance or compaction, or use of non-native bees in the area identified as within High Potential Zones. By adopting these measures, the project aims to minimize potential impacts to the RPBB and support its conservation.

The project's location within a Rusty Patched Bumble Bee High Potential Zone and near habitat areas of other state-listed species necessitates careful planning to avoid adverse impacts both within the proposed project area and on adjacent properties. Measures such as:

- establishing and maintaining a buffer with the overlapping MBS site,
- avoiding tree removal during sensitive bat and bird breeding seasons,
- limiting soil disturbance near sensitive areas, and
- refraining from physical or chemical treatment of water features will be enforced to protect these species.

The USFWS online Minnesota-Wisconsin Endangered Species Determination Key was reviewed for this project. A finding of no effect on the Monarch Butterfly and Salamander Mussel was reached by the determination key. Although the Northern Long-eared Bat (NLEB) was not included in the determination keys, the MNDNR provided recommendations to avoid NLEB impacts.

The IPaC Species list identified that the Bald Eagle is likely to be found in the project region. The Minnesota Breeding Bird Atlas does not show any confirmed nests in block T109R26c that overlap the project area. The potential for impact to a Bald Eagle is highly improbable as the project area does not have trees of the size and type preferred by Bald Eagles, and there are nearby roadways with traffic and human activity at the project site, both of which the Bald Eagle is known to avoid. Several migratory birds were identified, but none are likely to be impacted by the project as proposed for the same reasons the site is likely to be avoided by Bald Eagles.

c) Discuss how the identified fish, wildlife, plant communities, rare features and ecosystems may be affected by the project including how current Minnesota climate trends and anticipated climate change in the general location of the project may influence the effects. Include a discussion on introduction and spread of invasive species from the project construction and operation. Separately discuss effects to known threatened and endangered species.

The species and rare features identified through MNDNR and USFWS reviews were evaluated for potential impacts based on the disturbed condition of the quarry and the proximity of sensitive habitats. No direct impacts are expected to the Lime 30 calcareous fen because the project does not alter groundwater or surface water conditions. Potential impacts to the overlapping MBS Site and its Dry Bedrock Bluff Prairie community could occur if construction enters undisturbed prairie or associated soils. State-listed wildlife and plant species documented in the broader vicinity, including loggerhead shrike, stream parsnip, Kentucky coffee tree, North American racer, lark sparrow, and bat species, may be affected if suitable habitat is disturbed or if vegetation removal coincides with sensitive breeding or roosting periods. The Rusty Patched Bumble Bee could be impacted if soil disturbance, vegetation clearing, or land-management practices reduce available

forage or nesting habitat. Because most habitat on the project site is highly disturbed from past mining, the risk of direct impacts is limited, but specific protective measures are required to ensure that sensitive species and rare communities are not affected.

The manufactured quarry water bodies on-site are unlikely to support substantial fish populations due to their artificial nature and limited ecological connectivity.

No direct work will occur in or near the Minnesota River or its banks, minimizing potential impacts. Wildlife currently using the site is likely limited to generalist species adapted to disturbed or edge habitats. Vegetation is primarily regrowth in disturbed areas, with limited ecological diversity. Restoration of the site into a campground may provide opportunities for habitat enhancement through native plantings and erosion control measures.

No known rare plant communities or sensitive ecosystems are present on the actual mining site due to its industrial history. Minnesota is experiencing warmer winters, increased precipitation, and more frequent extreme weather events. These trends may influence the success of vegetation restoration, increase the risk of erosion, and affect wildlife patterns.

The project will incorporate stormwater management and erosion control practices to mitigate these effects. Best management practices (BMPs) will be implemented to minimize the risk of invasive species during construction.

Based on the current site conditions and lack of natural habitat, the likelihood of threatened or endangered species being present on-site is low. If any listed species are identified in the area, appropriate mitigation measures will be developed in coordination with regulatory agencies to avoid or minimize impacts.

d) Identify measures that will be taken to avoid, minimize, or mitigate the adverse effects to fish, wildlife, plant communities, ecosystems, and sensitive ecological resources.

To avoid, minimize, or mitigate potential adverse effects to fish, wildlife, plant communities, ecosystems, and sensitive ecological resources, the project will implement a variety of best management practices and environmentally responsible strategies. These include implementing erosion and sediment control measures during construction and incorporating stormwater management features to protect water quality. Construction activities will be scheduled to avoid sensitive periods for local wildlife as identified by the MNDNR NHIS Letter, and any necessary wildlife protection measures will be coordinated with appropriate regulatory agencies. Additionally, the project will comply with all applicable environmental permits to ensure adherence to mitigation commitments and long-term ecological sustainability.

Mitigation measures required by MNDNR and USFWS guidance have been incorporated into the project design to avoid or minimize impacts to identified species and rare features. The project will maintain hydrologic conditions near the Lime 30 fen and follow all MNDNR fen protection restrictions, including prohibitions on aeration, chemical treatment of water, and groundwater withdrawal. A buffer will be maintained around the MBS Site, and no equipment access, stockpiling, or ground disturbance will occur within the Dry Bedrock Bluff Prairie community. Seasonal clearing restrictions will be followed, including avoiding tree and shrub removal from April through July for loggerhead shrike and from June through August for bats, with a broader April through November window applied where feasible. Disturbance in grassland or shrub areas will be avoided from May 15 through August 15 to protect lark sparrow nesting, and wildlife-friendly erosion control mesh will be used to reduce risk to North American racer. Stream parsnip and Kentucky coffee tree will be avoided if encountered, and any unavoidable disturbance will follow state endangered species requirements. To protect the Rusty Patched Bumble Bee, the project will use native seed mixes, minimize soil disturbance, and avoid herbicide, pesticide,

haying, grazing, and other land-management activities identified in the USFWS D-Key as potential impacts. These measures ensure compliance with agency guidance and reduce the potential for adverse effects on rare features and listed species.

Table 11 Rare Features and Species		
Rare Feature or Species	**Potential Project Impact**	**Required Protective Measures and Mitigation**
Calcareous fen (Lime 30)	Indirect hydrologic impacts if groundwater or surface water conditions change.	Follow all MNDNR fen guidance, including no aeration of water, no chemical treatment, and no groundwater withdrawal. Avoid any activity that alters hydrology. Coordinate with MNDNR if changes are proposed.
Dry Bedrock Bluff Prairie (MBS Site)	Disturbance to rare prairie vegetation and sensitive soils if construction expands into the MBS overlap.	Maintain required buffer. Avoid all construction activity, equipment access, spoil placement, and stockpiling in the MBS Site. Use erosion and sediment control, work in disturbed areas only, clean equipment to prevent invasive species spread, and revegetate with native species.
Loggerhead shrike (endangered)	Nest disturbance if shrubs or trees are removed during breeding season.	Avoid tree and shrub removal from April 1 through July 31 (per DNR recommendation). Coordinate with MNDNR if work must occur during this window.
Stream parsnip (threatened)	Disturbance to potential habitat in wet calcareous areas.	Avoid disturbance in hydrologically active wet areas. Comply with Minnesota endangered species statutes. Coordinate with MNDNR if disturbance cannot be avoided.
Kentucky coffee tree (special concern)	Removal of individual trees if present.	Identify and avoid removal of any Kentucky coffee trees.
North American racer (special concern)	Disturbance to movement corridors or hibernacula, especially in upland edges.	Use wildlife-friendly erosion control mesh. Minimize disturbance in suitable edge habitat. Avoid ground disturbance in potential hibernacula areas where feasible.
Lark sparrow (special concern)	Disturbance to ground nests in open grass or shrub habitat.	Avoid vegetation clearing in grassland or shrubby areas from May 15 through August 15.
Bats (multiple species)	Loss of roosting habitat if trees are removed during active season or maternity season.	Avoid tree removal from June 1 through August 15. For greater protection, avoid April 1 through November 15 if feasible (per MNDNR guidance).
Rusty Patched Bumble Bee (federally endangered)	Loss of forage or nesting habitat from soil disturbance, vegetation removal, or certain land management activities.	Follow USFWS D-Key recommendations. Minimize soil disturbance. Use only native seed mixes (BWSR or MnDOT). Avoid herbicide, pesticide, haying, grazing, soil compaction, or any ground-disturbing land management within High Potential Zone.
Bald Eagle	Low likelihood of impact due to lack of suitable nesting trees.	Maintain avoidance of large mature trees and comply with Bald and Golden Eagle Protection Act if any nests are discovered.

15. Historic Properties

Describe any historic structures, archeological sites, and/or traditional cultural properties on or in close proximity to the site. Include: 1) historic designations, 2) known artifact areas, and 3) architectural features. Attach letter received from the State Historic Preservation Office (SHPO). Discuss any anticipated effects to historic properties during project construction and operation. Identify measures that will be taken to avoid, minimize, or mitigate adverse effects to historic properties.

The project area and its immediate vicinity contain several historic properties, one archaeological site, and one historic district with recognized or potential historic significance (**Table 11**). A Phase I archaeological survey was conducted on July 22 – 25, 29 – 31, and August 5, 2025, which identified a multicomponent archaeological site (21BE0348) within the project area. This site was recommended as being potentially significant but requires Phase II archaeological survey to determine its eligibility for listing in the National Register of Historic Places (NRHP). In lieu of additional archaeological investigations, avoidance of the area was recommended.

A Phase I architecture-history reconnaissance survey and Phase II evaluation were conducted for the project on July 23 & 25, and August 5, 2025. Nine previously inventoried architecture-history properties and one historic district located within or immediately adjacent to the project area were revisited. Ultimately, six architecture-history properties were recommended as not individually eligible but contributing to the historic district, and two properties were recommended as individually eligible as well as contributing to the historic district. The historic district, as a whole, was also recommended as eligible, and its boundaries were defined to encompass all contributing elements.

Table 12 Archaeological & Architecture-History Resources Within/Proximate to Project Area

Inventory/Site No.	Name	NRHP Eligibility Recommendation
21BE0348	Mankato Holstein Farm Barn Site	Phase II archaeological survey needed to determine eligibility
BE-LIM-00001	Widell & Co. Office Building	Individually eligible under Criteria A & C; contributing to historic district (BE-LIM-00052)
BE-LIM-00002	Schaefer-Widell House	Not individually eligible but contributing to historic district (BE-LIM-00052)
BE-LIM-00003	Klondike Quarry Farmstead	Not individually eligible under Criteria A, B, or C; additional archaeological investigation needed to determine eligibility under Criterion D; contributing to historic district (BE-LIM-00052)
BE-LIM-00005	Carney Cement Co. Lime Kilns	Not individually eligible under Criteria A, B, or C; additional archaeological investigation needed to determine eligibility under Criterion D; contributing to historic district (BE-LIM-00052)
BE-LIM-00013	Mendota-Big Sioux River Military Road: Lime Section	Not individually eligible and not contributing to historic district (BE-LIM-00052)
BE-LIM-00047	McMullen-McClure Quarry Pit	Individually eligible under Criterion A; additional archaeological investigation needed to determine eligibility under Criterion D; contributing to historic district (BE-LIM-00052)

BE-LIM-00048	McMullen-McClure Quarry Stockpiles	Not individually eligible under Criteria A, B, or C; additional archaeological investigation needed to determine eligibility under Criterion D; contributing to historic district (BE-LIM-00052)
BE-LIM-00049	Klondike Quarry Railroad Spur	Not individually eligible but contributing to historic district (BE-LIM-00052)
BE-LIM-00051	James McClure Quarry Stockpile Structures	Not individually eligible under Criteria A, B, or C; additional archaeological investigation needed to determine eligibility under Criterion D; contributing to historic district (BE-LIM-00052)
BE-LIM-00052	Klondike and McClure Quarries Historic District	Eligible under Criterion A; additional archaeological investigation needed to determine eligibility under Criterion D

Based on the most recent surveys and evaluations (**Appendix C**), the proposed project is not anticipated to cause significant adverse effects to historic properties, provided that ground-disturbing activities are avoided within the boundaries of the Mankato Holstein Farm Barn Site (21BE0348) and that contributing elements of the Klondike and McClure Quarries Historic District are preserved.

Project activities in the southern portion of the site, where the historic district is located, are limited to RV camping spots and bike trails, which will be field fit to the existing landscape in order to reduce tree and brush removals and will avoid any existing stone structures or ruins. The installation of rail cars on the historic railroad spur as a feature of the bike trail is not expected to adversely affect the resource, provided no modifications are made to the spur itself, and may assist in interpreting the story of this historic property. The overall redevelopment from industrial mining to recreational use is consistent with the evolving character of the area and is not expected to diminish the integrity of the setting or feeling for the historic resources. Additionally, regular maintenance of the campground and outdoor facilities is anticipated to provide additional oversight for the historic district and its contributing elements that will discourage pilfering, graffiti, and other damage. In order to further discourage future adverse impacts, Bolton & Menk also recommend implementing additional measures to discourage future impacts by visitors. This could include, but not limited to, installing signage advising park users of the historical significance of these resources and promoting their continued preservation; stabilizing and preserving historic features within the park; promoting the history of the area and region within the park through events, activities, signage, displays, etc.

To avoid or minimize adverse effects, the following measures will be implemented during project construction:

- Avoidance: All ground-disturbing activities will be restricted to outside the boundaries of the Mankato Holstein Farm Barn Site (21BE0348) and the contributing elements of the Klondike and McClure Quarries Historic District.
- Design Sensitivity: New construction and trails will be designed to fit the existing landscape and avoid direct impacts to historic features.
- Monitoring: If any previously unidentified archaeological materials are encountered during construction, work will cease in the area, and a qualified archaeologist will be consulted.

16. Visual

Describe any scenic views or vistas on or near the project site. Describe any project related visual effects such as vapor plumes or glare from intense lights. Discuss the potential visual effects from the project. Identify any measures to avoid, minimize, or mitigate visual effects.

The project site, a former limestone quarry, is located in an area that includes a mix of industrial, agricultural, residential, and community land uses. Due to the site's previous use and surrounding development, there are no scenic views or natural vistas directly on the property. The broader region may offer views toward the Minnesota River valley, located approximately 0.70 miles west of the site. 3rd Avenue is part of the Minnesota River Valley National Scenic Byway.

The proposed redevelopment of the quarry into a campground is not expected to produce significant visual effects such as vapor plumes or intense glare. Lighting associated with the project will be typical of a campground. Landscaping and natural buffers will be incorporated where feasible to soften the visual impact of new structures and enhance the aesthetic quality of the site. Cross sections of the site are attached in **Appendix G**. The depressed elevation of the site compared to surrounding land uses will limit potential visual impacts. Overall, the project is expected to improve the visual character of the area by transforming a heavily disturbed industrial site into a more natural and recreational landscape.

17. Air

a) *Stationary source emissions - Describe the type, sources, quantities and compositions of any emissions from stationary sources such as boilers or exhaust stacks. Include any hazardous air pollutants, criteria pollutants. Discuss effects to air quality including any sensitive receptors, human health or applicable regulatory criteria. Include a discussion of any methods used assess the project's effect on air quality and the results of that assessment. Identify pollution control equipment and other measures that will be taken to avoid, minimize, or mitigate adverse effects from stationary source emissions.*

There are no stationary sources of emissions associated with this project. The proposed redevelopment of the former quarry into a campground does not include any boilers, exhaust stacks, or other equipment that would emit hazardous air pollutants or criteria pollutants. As such, no adverse effects to air quality, human health, or sensitive receptors are anticipated, and no air quality assessment or pollution control equipment is required.

b) *Vehicle emissions - Describe the effect of the project's traffic generation on air emissions. Discuss the project's vehicle-related emissions effect on air quality. Identify measures (e.g., traffic operational improvements, diesel idling minimization plan) that will be taken to minimize or mitigate vehicle-related emissions.*

Vehicle emissions associated with the project will primarily result from campground-related traffic. Please refer to Section 18 for a detailed discussion of vehicle emissions. While overall vehicle-related emissions are expected to be minimal, best management practices will be implemented to further reduce potential impacts. These include minimizing vehicle idling during construction and operation, maintaining equipment in good working condition to reduce exhaust emissions, and encouraging carpooling for campground visitors when feasible. These measures will help minimize air quality impacts and support environmentally responsible site operations.

c) *Dust and odors - Describe sources, characteristics, duration, quantities, and intensity of dust and odors generated during project construction and operation. (Fugitive dust may be discussed under item 17a). Discuss the effect of dust and odors in the vicinity of the project*

including nearby sensitive receptors and quality of life. Identify measures that will be taken to minimize or mitigate the effects of dust and odors.

The project construction will generate odors from vehicle exhaust and dust during construction. These will be mitigated by requiring that construction vehicles be in good working order, limiting work hours, and use of dust control such as water. The construction-related odor and dust impacts are temporary and will cease once the construction is complete. After construction ceases the site odors and dust will return to the existing condition.

18. Greenhouse Gas (GHG) Emissions/Carbon Footprint

a) *GHG Quantification: For all proposed projects, provide quantification and discussion of project GHG emissions. Include additional rows in the tables as necessary to provide project-specific emission sources. Describe the methods used to quantify emissions. If calculation methods are not readily available to quantify GHG emissions for a source, describe the process used to come to that conclusion and any GHG emission sources not included in the total calculation.*

The GHG emissions for the Project are calculated using the Greenhouse Gas Equivalencies Calculator - Calculations and References information from the US Environmental Protection Agency (EPA), the EPA Simplified Greenhouse Gas Emissions Calculator (SGEC) tool, and the EPA Waste Reduction Model (WARM) tool were also referenced. The methodologies for developing a carbon footprint are described in the Minnesota Environmental Quality Board's (EQB's) Revised EAW Guidance (June 2024). Table 9 shows the emission categories for project carbon footprint calculations, as provided in the EQB Guidance.

Global climate change results from the total accumulation of GHGs in the Earth's atmosphere, as well as other human-caused and natural factors. The GHG composition in the Earth's atmosphere is changing and causing the planet's climate to change. The proposed project's incremental contribution to global GHGs cannot be translated into effects on climate change globally or regionally.

In general, regional impacts from climate change may include the following effects: increased mean annual air temperature (summer and winter warming); increased surface water temperatures; later onset of winter and earlier onset of spring; precipitation may fall in fewer, but more intense, storms; species adapted to cold climates may shift out of the Great Lakes basin into Canada; and aspen and birch forests may be replaced by hardwood forests of oak and hickory. Moderate climate change may increase agricultural yields and food production, with some regional and annual variability.

Construction Emissions

Construction activities for this project are anticipated to include the use of large construction vehicles. These types of vehicles primarily rely on diesel as a fuel source, which results in the emission of Carbon Dioxide (CO_2) and, to a lesser extent, Methane (CH_4) and Nitrous Oxide (N_2O). Table 10 provides an estimate for the emissions generated by this equipment, assuming that activities will last for two construction seasons (approx. 240 working days) and utilize approximately 10 diesel-powered pieces of heavy equipment and 10 gasoline-powered passenger vehicles. The total emissions from these activities are considered one-time emissions; however, the industry standard for determining long-term impacts of construction-related GHG output is to annualize the total emissions over a project's lifetime, which is defined as a 30-year period.

GHG emissions from construction are associated with fuel combustion in mobile construction

equipment and on-road vehicles. The assumed construction schedule is two construction seasons (240 days). For on-road vehicles (commuting construction workers, dump trucks, and semi-trucks, emissions are calculated by estimating the number of vehicles, miles traveled, gallons of fuel used (using default mileage rates in the Simplified GHG Emissions Calculator from the FHWA[15], and emission factors from the U.S. EPA's Emission Factors Hub[16].

10 diesel vehicles are estimated to travel 60 miles per day at 7.4 miles per gallon (mpg) (SGEC, 2025). The average vehicle miles traveled (VMT) for single-unit 2-axle 6-tire or more combination trucks in 2022 was 23,183 miles per year, which equates to about 60 miles per day, additionally, these trucks run at 7.4 mpg (FHWA 2024). This equates to 19,459.5 gallons of diesel. According to the EPA's GHG Emission Factors Hub, 10,180 grams of CO2/gallon of diesel = 10.180 × 10-3 metric tons CO2/gallon of diesel (EPA, 2025). This equates to 198.1 Metric Tons of Carbon Dioxide Equivalent (MTCO2e) from the diesel trucks.

10 Passenger vehicles are estimated to travel 30 miles per day at 24.8 mpg (SGEC, 2025). The average VMT by light-duty vehicles in 2022 was 10,917 miles per year, which equates to about 30 miles per day. Additionally, these vehicles run at 24.8 mpg (FHWA 2024). This equates to 2,903.23 gallons of gas. According to EPA's GHG Emission Factors Hub, 8,887 grams of CO2/gallon of gasoline = 8.887 × 10-3 metric tons CO2/gallon of gasoline (EPA, 2025). This equates to 25.80 MTCO2e from the construction worker passenger vehicles.

The total construction vehicle emissions are 223.90 MTCO2e. Per EQB's Revised EAW Guidance, total construction emissions to construct the Project are divided by the lifetime of the project, estimated to be 30 years. Annualized over the project lifetime of 30 years, the total construction vehicle emissions are 7.46 MTCO2e annually.

Operational Emissions – Mobile Sources

130 Passenger vehicles are estimated to travel 30 miles per day at 24.8 mpg (SGEC, 2025). The average VMT by light-duty vehicles in 2022 was 10,952 miles per year, which equates to about 30 miles per day. Additionally, these vehicles run at 24.8 mpg (FHWA 2024). This equates to 33,653.23 gallons of gas. According to EPA's GHG Emission Factors Hub, 8,887 grams of CO2/gallon of gasoline = 8.887 × 10-3 metric tons CO2/gallon of gasoline (EPA, 2025). This equates to 299.08 MTCO2e from the operational passenger vehicles.

318 motor homes/campers are estimated to travel 60 miles per day at 7.9 mpg (SGEC, 2025). The average VMT by single-unit 2-axle 6-tire or more trucks in 2022 was 23,183 miles per year, which equates to about 60 miles per day. Additionally, these vehicles run at 7.9 mpg (FHWA 2024). This equates to 516,850.63 gallons of gas. According to EPA's GHG Emission Factors Hub, 8,887 grams of CO2/gallon of gasoline = 8.887 × 10-3 metric tons CO2/gallon of gasoline (EPA, 2025). This equates to 4,593.25 MTCO2e from the motor homes/campers.

Operational Emissions – Electricity, Camp Sites and Buildings, Cable Park

Approximately 298 camping sites will have an electricity hookup available. Sources including ShunAuto[17] and RV Talk[18] estimate that motor homes/campers use approximately 40 kWh per day when using air conditioning. The kWh totals were then inserted into the EPA SGEC tool to determine MTCO2e. With 298 campers and a 214-day operation season, this equates to 50958.90 MTCO2e per year from the motor home electricity.

[15] https://www.fhwa.dot.gov/policyinformation/statistics/2022/pdf/vm1.pdf
[16] https://www.epa.gov/climateleadership/ghg-emission-factors-hub, updated January 2025
[17] https://shunauto.com/article/how-much-electricity-does-a-camper-use-per-month
[18] https://www.rvtalk.net/rv-electricity-usage/

According to the Commercial Buildings Energy Consumption Survey (CBECS)[19] , other lodging (used for shower houses), have a median of around 12.0 kWh/sq ft/year. With 5,760 square feet and a 214-day operation season, this equates to 17.3 MTCO2e per year. Recreation buildings (used for the rental/snack shack) have a median of around 13.1 kWh/sq ft/year. With 1,600 square feet and a 214-day operation season, this equates to 5.3 MTCO2e per year. Other office buildings (used for the main building) have a median of around 13.2 kWh/sq ft/year. With 4,000 square feet and a 214-day operation season, this equates to 13.2 MTCO2e per year. Vehicle storage or maintenance (used for the maintenance building) have a median of around 7.2 kWh/sq ft/year. With 1,800 square feet and a 214-day operation season, this equates to 3.30 MTCO2e per year. In total this equates to 39.1 MTCO2e per year from the building's electricity.

The cable park will use 375 kWh per day and will be operated 214 days. The EPA Greenhouse Gas Equivalencies Calculator[20] was used to determine emissions per kWh. This equates to 31.62 MTCO2e per operational year from the cable park.

Operational Emissions – Waste, Camp Sites and Buildings

Waste management estimates were completed using estimated solid waste generation rates from CalRecycle[21], square footage of each source, and the US EPA WARM Model[22], Mixed Solid Waste (MSW) to get MTCO2e for each type. Residential homes are estimated to have 12.23 lbs. of waste per household per day. For this calculation, the large camp sites are estimated to have 2/3 the amount of waste as a household and the small sites are estimated to have 1/3 the amount of waste as a household. With 196 large sites and 122 small sites, this equates to 68.64 MTCO2e per year. The remaining buildings (other services in industry) were estimated to have 0.0312 lbs. of waste per square foot per day. With 13,160 square feet, this equates to 12.33 MTCO2e per operational year. In total, 80.97 MTCO2e per year from waste management.

Summary

A summary of GHG emissions is provided in Table 10. Emissions are presented in tons per year of carbon dioxide equivalent, which considers each GHG's global warming potential (GWP). Detailed emission calculations are provided in **Appendix E**.

The following tables are examples; other layouts are acceptable for providing GHG quantification results.

Table 13 GHG Type of Emissions

Category	Scope	Project Phase	Type of Emission
Direct Emissions	Scope 1 - Emissions	Operations	Combustion (Stationary, Area, Mobile Sources)
	Scope 1 - Emissions	Operations	Non-Combustion Process
	Scope 1 - Emissions	Construction	Combustion (Mobile Sources)
	Scope 1 - Emissions	Construction	Land-Use
Indirect Emissions	Scope 2	Operations	Off-site Electricity/Steam Production (Market-Based and Location-Based)
	Scope 3	Operations	Off-site Waste Management

[19] https://www.eia.gov/consumption/commercial/data/2012/c&e/cfm/pba4.php
[20] https://www.epa.gov/energy/greenhouse-gas-equivalencies-calculator-calculations-and-references
[21] https://www2.calrecycle.ca.gov/WasteCharacterization/General/Rates
[22] https://www.epa.gov/warm/versions-waste-reduction-model

Atmospheric Removal of GHGs	Scope 1 (Sinks)	Construction/Operations	Land -Use (CO2 removals to terrestrial storage)

Table 14 GHG Emissions

Scope	Emission Type	Emission Sub-type	Existing Conditions (MTCO2e)	Project-related Conditions (MTCO2e)	Total Emissions (MTCO2e)	Calculation method(s)
Scope 1	Combustion	Construction Mobile Equipment (annualized)	0	7.46	7.46	2 construction seasons, 120 days per season. 10 diesel vehicles, 60 miles per day, 7.4 mpg (EPA and FHWA, 2022), 10,180 grams of CO2/gallon of diesel = 10.180 × 10-3 metric tons CO2/gallon of diesel (EPA, 2025). 10 Passenger vehicles, 30 miles per day, 24.8 mpg (EPA and FHWA, 2022), 8,887 grams of CO2/gallon of gasoline = 8.887 × 10-3 metric tons CO2/gallon of gasoline (EPA, 2025). Annualized over the project lifetime of 30 years.
Scope 1	Motor Vehicle Emissions	Personal Vehicles and Motor Homes	0	4,892.33	4,892.33	130 vehicles, 30 miles per day, 24.8 mpg (EPA and FHWA, 2022). 8,887 grams of CO2/gallon of gasoline = 8.887 × 10-3 metric tons CO2/gallon of gasoline (EPA, 2025). 318 motor homes/campers, 60 miles per day at 7.9 mpg (SGEC, 2025). 8,887 grams of CO2/gallon of gasoline = 8.887 × 10-3 metric tons CO2/gallon of gasoline (EPA, 2025).
Scope 2	Off-Site Energy	Electricity Camp Site, Buildings, Cable Park	0	1,162.22	1,162.22	298 camp sites with 40 kWh/day (ShunAuto and RV Talk) for 214 days. U.S. Energy Information Administration. Table PBA4. Electricity consumption totals and conditional intensities by building activity subcategories, 2012. Per Square foot (kWh) for Other Lodging (used for shower houses), has a median of around 12.0 kWh/sq ft/year. Recreation buildings (used for the rental/snack shack) have a median of around 13.1 kWh/sq ft/year. Other office buildings (used for the main building) have a median of around 13.2 kWh/sq ft/year. Vehicle storage or maintenance (used for the maintenance building) has a median of around 7.2 kWh/sq ft/year. Shower Houses, 5760 sq. ft. Rental Snack Shack, 1600 sq. ft. Main Building, 4000 sq. ft. Maintenance Building, 1800 sq. ft. The kWh totals were then inserted into the EPA SGEC tool to determine MTCO2e.
Scope 2	Off-Site Energy	Waste (including housing	0	80.97	80.97	13,160 sq. ft. of buildings. 196 large camp sites. 122 small camp sites. Waste management estimates were completed

Table 14 GHG Emissions						
Scope	**Emission Type**	**Emission Sub-type**	**Existing Conditions (MTCO2e)**	**Project-related Conditions (MTCO2e)**	**Total Emissions (MTCO2e)**	**Calculation method(s)**
		units)				using estimated solid waste generation rates from CalRecycle, square footage of each source, and the US EPA WARM Model, Mixed Solid Waste (MSW) to get MTCO2e for each type. Other services were used for the buildings and were estimated to be 0.0312 lbs. of waste per square foot per day. Residential was used for the campsites. A household is estimated to have 12.23 lbs. of waste per day. A large campsite was estimated to be 2/3 of a household, and a small campsite was estimated to be 1/3 of a household.
TOTAL*					**6,142.98**	**MTCO2e**

b) GHG Assessment

i. *Describe any mitigation considered to reduce the project's GHG emissions.*

Over the project's assumed 30-year lifespan, there will be an estimated 6142.98 MTCO2e emitted without mitigations. This is equivalent to 1,433 gasoline-powered passenger vehicles being driven for one year, per the EPA Greenhouse Gas Equivalencies Calculator[23]. At least some of these emissions may be mitigated or offset by practices that can remove carbon from the atmosphere and sequester it.

Other mitigation measures can reduce indirect GHG emissions due to energy usage and other activities. These mitigation efforts may include planting native grasses to facilitate carbon uptake, establishing sustainability operations, such as encouraging the use of high-efficiency systems. Specific mitigation measures will be evaluated and identified during the final design process.

During construction, contract laborers will be encouraged to carpool and BMPs such as engine anti-idling will be implemented to minimize additional GHG output.

ii. *Describe and quantify reductions from selected mitigation, if proposed to reduce theproject's GHG emissions. Explain why the selected mitigation was preferred.*

No additional on-site mitigation is planned as part of the proposed project.

iii. *Quantify the proposed projects predicted net lifetime GHG emissions (total tons/#of years) and how those predicted emissions may affect achievement of the Minnesota Next Generation Energy Act goals and/or other more stringent state or local GHG reduction goals.*

As current MN Statutes require greenhouse gas (GHG) emissions control plans for large energy facilities, the state has implemented a climate action plan to address GHG emissions. Current goals are to reduce GHG emissions statewide to 30% below 2005 levels by 2025, and 80% below 2005 levels by 2050.

[23] https://www.epa.gov/energy/greenhouse-gas-equivalencies-calculator

Minnesota's Climate Action Framework has a priority action to establish a standard to achieve 100% carbon-free electricity and 55% renewable electricity by 2040. Minnesota's current, updated 2023, Climate Action Framework goals are to reduce greenhouse gas emissions 50% by 2030 from a 2005 baseline and achieve net-zero emissions by 2050[24]. The proposed project does not involve any large energy facilities but includes residential properties. BMPs will be utilized in the planning and construction phases of the project to remain in keeping with state and local GHG reduction goals. Again, over the project's assumed 30-year lifespan, there will be an estimated 6142.98 MTCO2e emitted annually without any mitigations.

19. Noise

Describe sources, characteristics, duration, quantities, and intensity of noise generated during project construction and operation. Discuss the effect of noise in the vicinity of the project, including 1) existing noise levels/sources in the area, 2) nearby sensitive receptors, 3) conformance to state noise standards, and 4) quality of life. Identify measures that will be taken to minimize or mitigate the effects of noise.

Noise will be generated during the reclamation and construction phases of the campground, primarily from heavy equipment and construction activities. These activities will be limited to regular working hours to minimize disruption and will be in compliance with Minnesota Rules 7030 and applicable MPCA Noise standards as referenced in the Lime Township Zoning Ordinance[25]. Once operational, noise associated with the campground will be typical of recreational use, including vehicle traffic, human activity, and occasional maintenance, and is not expected to exceed normal ambient levels for such settings. Existing noise sources in the area include nearby industrial operations and traffic. Sensitive receptors in the vicinity include a cemetery, a childcare center, residential areas, and agricultural properties. The project will comply with applicable Minnesota state noise standards, and noise levels are not anticipated to negatively affect human health or quality of life. The transformation of a non-operational quarry into a natural campground setting is expected to improve the overall character and livability of the area. To further minimize noise impacts, construction will follow best management practices.

20. Transportation

a) *Describe traffic-related aspects of project construction and operation. Include: 1) existing and proposed additional parking spaces, 2) estimated total average daily traffic generated, 3) estimated maximum peak hour traffic generated and time of occurrence, 4) indicate source of trip generation rates used in the estimates, and 5) availability of transit and/or other alternative transportation modes.*

The Rockwell RV & Adventure Park development will provide parking spaces at each of the RV spots. In addition to these locations, the site will offer parking spaces dedicated to bike trails and parking spaces for the aquatic/water cable park. Food service areas will be accommodated through food trucks during peak periods and permanent snack and beverage options. These parking provisions are designed to support the anticipated demand generated by the various amenities and activities planned for the site.

The estimated total average daily traffic generated by the proposed development is below the

[24] https://www.pca.state.mn.us/air-water-land-climate/climate-change-initiatives
[25] Lime Township Zoning Ordinance, https://limetownshipmn.gov/ordinances-and-regulations/lime-township-zoning-ordinance/.

Minnesota Department of Transportation (MnDOT) threshold of 2,500 daily trips, which is the criterion for requiring a full Traffic Impact Study. Based on conservative occupancy and trip generation assumptions, the daily traffic volume associated with the site will not exceed this threshold, ensuring that the existing roadway network can accommodate the additional demand without significant operational impacts.

During the weekday PM peak hour, the site is expected to generate approximately 227 vehicle trips, with 187 vehicles entering and 40 vehicles exiting the site. The peak hour is anticipated to occur on Thursday afternoons, as traffic counts indicated higher volumes on Thursdays compared to Fridays. This estimation is based on observed adjacent street traffic patterns and provides a conservative assessment of the maximum traffic impact during the busiest period.

Trip generation rates for the project were calculated using the Institute of Transportation Engineers' (ITE) Trip Generation Manual, 11th Edition, supplemented by engineering judgment. The calculations were based on the number of parking spaces and occupancy assumptions, as standard land use codes were not directly applicable to the unique mix of uses at the site. These methodologies were reviewed and discussed with Blue Earth County staff to ensure their appropriateness for the project context.

Public transit is not available to the site. The inclusion of bike trails within the development provides an alternative transportation mode for non-motorized access. This feature supports multimodal connectivity and offers visitors and residents an option beyond personal vehicles for accessing the park and its amenities.

b) Discuss the effect on traffic congestion on affected roads and describe any traffic improvements necessary. The analysis must discuss the project's impact on the regional transportation system. If the peak hour traffic generated exceeds 250 vehicles or the total daily trips exceeds 2,500, a traffic impact study must be prepared as part of the EAW. Use the format and procedures described in the Minnesota Department of Transportation's Access Management Manual, Chapter 5 (available at: http://www.dot.state.mn.us/accessmanagement/resources.html) or a similar local guidance

Based on the findings of the Rockwell RV & Adventure Park Traffic Impact Study, the effect of the proposed development on traffic congestion along affected roads is expected to be minimal. The analysis evaluated key intersections along CSAH 5 (3rd Avenue) and adjacent access points, considering both existing and projected opening day traffic volumes. All major street left-turn movements and minor-street approaches are anticipated to operate at Level of Service (LOS) B or better during the weekday PM peak hour under both current and future conditions, indicating efficient traffic flow and no significant congestion or queueing concerns. The regional transportation system, including the surrounding roadway network, is considered adequate to accommodate the additional trips generated by the project without substantial degradation in service levels.

To ensure safe and efficient operations, several traffic improvements are recommended in accordance with the Minnesota Department of Transportation's Access Management Manual, Chapter 5. At the main site access on 3rd Avenue, the existing northbound bypass lane should be converted to a dedicated northbound left-turn lane with at least 150 feet of storage to accommodate projected queues. The latest concept plan shows 1,100 feet of stacking between the gate and 3rd Avenue for check-in, which should be adequate for internal queuing. MN Statute 169.81 Subsection 3.c limits recreational vehicle length without a permit to 70 feet. If the internal queuing length is reduced during final design, it is recommended to add one RV parking stall for every 70 feet of reduction. The existing southbound right-turn lane and acceleration lane should be maintained to facilitate safe merging for RVs exiting the site. No additional turn lanes or

improvements are warranted at the 231st Lane intersection or the northern bike trail access, as traffic volumes do not justify such modifications.

Importantly, the projected peak hour traffic generated by the development (227 vehicles) and total daily trips are both below the MnDOT thresholds (250 peak hour trips and 2,500 daily trips) that require a full Traffic Impact Study as part of the Environmental Assessment Worksheet (EAW). The analysis and recommendations provided in the memorandum follow the format and procedures described in the MnDOT Access Management Manual, ensuring that the project's impact on the regional transportation system is thoroughly addressed and that necessary improvements are identified to maintain safe and efficient traffic operations.

c) Identify measures that will be taken to minimize or mitigate project-related transportation effects.

Measures to minimize or mitigate project-related transportation effects for the Rockwell RV & Adventure Park have been identified based on the traffic impact analysis. The primary mitigation strategies include converting the existing northbound bypass lane at the main site access to a dedicated northbound left-turn lane with at least 150 feet of storage, which will help accommodate anticipated vehicle queues and improve safety for vehicles entering the site. The internal check-in gate is recommended to be positioned as far back from 3rd Avenue as possible to allow for internal queueing and prevent vehicle stacking from encroaching onto the public roadway. Additionally, the existing southbound right-turn lane and acceleration lane should be maintained to facilitate safe and efficient egress for RVs merging onto 3rd Avenue. All campers will use the main entrance for check-in. No campers will be allowed to exit or enter on 231st off 3rd Avenue except in emergency conditions. No additional turn lanes or improvements are warranted at the 231st Lane intersection or the northern bike trail access, as projected traffic volumes do not justify such modifications. These measures are designed to ensure that the project does not adversely affect traffic operations or safety in the surrounding area, and that the existing roadway infrastructure remains sufficient to accommodate the anticipated demand.

The Draft Traffic Impact Study is in **Appendix F**.

21. Cumulative potential effects

(Preparers can leave this item blank if cumulative potential effects are addressed under the applicable EAW Items)

a) Describe the geographic scales and timeframes of the project related environmental effects that could combine with other environmental effects resulting in cumulative potential effects.

The cumulative potential environmental effects of the Rockwell RV and Adventure Park project are associated with its transformation from a former quarry into a recreational campground. The geographic scale of potential cumulative effects includes the immediate project area in Lime Township, Blue Earth County, and adjacent lands such as the Pilgrim's Rest Cemetery, MBS Site overlapping the northwest area of the site, calcareous fen (Lime 30, Fen ID# 38219), and surrounding residential and agricultural properties. The timeframe for these effects spans from the start of construction in 2026 through the operational life of the park, anticipated to extend for several decades.

b) Describe any reasonably foreseeable future projects (for which a basis of expectation has been laid) that may interact with environmental effects of the proposed project within the geographic scales and timeframes identified above.

Within this geographic and temporal scope, reasonably foreseeable future projects include continued reclamation activities under existing mining permits and potential infrastructure improvements related to the campground's operation. While there are no known or submitted plans for adjacent development, future mountain bike trails on property owned by the Mankato Area Mountain Bikers are possible northwest of the proposed project area. These activities may interact with environmental effects on the proposed project area, such as changes in land use, increased surfaces and altered stormwater runoff patterns. No proposals have been made for development of the property, and a timeline is not known. Trail connection from the park to the property owned by the Mankato Area Mountain Bikers has the potential to encroach on the MBS site that overlaps their property, which would require coordination with MNDNR.

The adjacent property owner would be responsible for maintaining the MNDNR-recommended buffer zone and following MNDNR construction and operational recommendations in the overlapping MBS site to minimize potential for impacts to these areas.

While there is not a significant concern based on groundwater monitoring data, following the MNDNR recommendations for water resources on the project site will minimize potential for impacts to the Lime 30 calcareous fen and the Minnesota River that may arise from hydrological changes or increased recreational use in the area.

c) Discuss the nature of the cumulative potential effects and summarize any other available information relevant to determining whether there is potential for significant environmental effects due to these cumulative effects.

The nature of cumulative potential effects includes increased runoff and erosion, potential impacts to rare plant communities and wildlife habitats, and changes in visual and noise characteristics of the area. However, mitigation measures such as stormwater best management practices (BMPs), erosion control, and coordination with regulatory agencies (MNDNR and USFWS) are advised to minimize potential future effects.

Following the MNDNR recommendations for avoiding impacts to the overlapping MBS, RPBB habitat, and calcareous fen described in section 14 of this EAW will minimize potential for impacts to these sensitive resources.

Available information, including the natural heritage information system reviews, agency coordination, and cultural resources assessment, indicates that while cumulative effects are possible, they are not expected to result in significant environmental impacts if mitigation strategies are properly implemented.

22. Other potential environmental effects

If the project may cause any additional environmental effects not addressed by items 1 to 19, describe the effects here, discuss how the environment will be affected, and identify measures that will be taken to minimize and mitigate these effects.

All anticipated potentially adverse environmental effects are addressed in the preceding EAW items.

RGU Certification

(The Environmental Quality Board will only accept SIGNED Environmental Assessment Worksheets for public notice in the EQB Monitor.)

I hereby certify that:

- The information contained in this document is accurate and complete to the best of myknowledge.
- The EAW describes the complete project; there are no other projects, stages or components other than those described in this document, which are related to the project as connected actions or phased actions, as defined at Minnesota Rules, parts 4410.0200, subparts 9c and 60,respectively.
- Copies of this EAW are being sent to the entire EQB distribution list.

Signature_____ Date _____

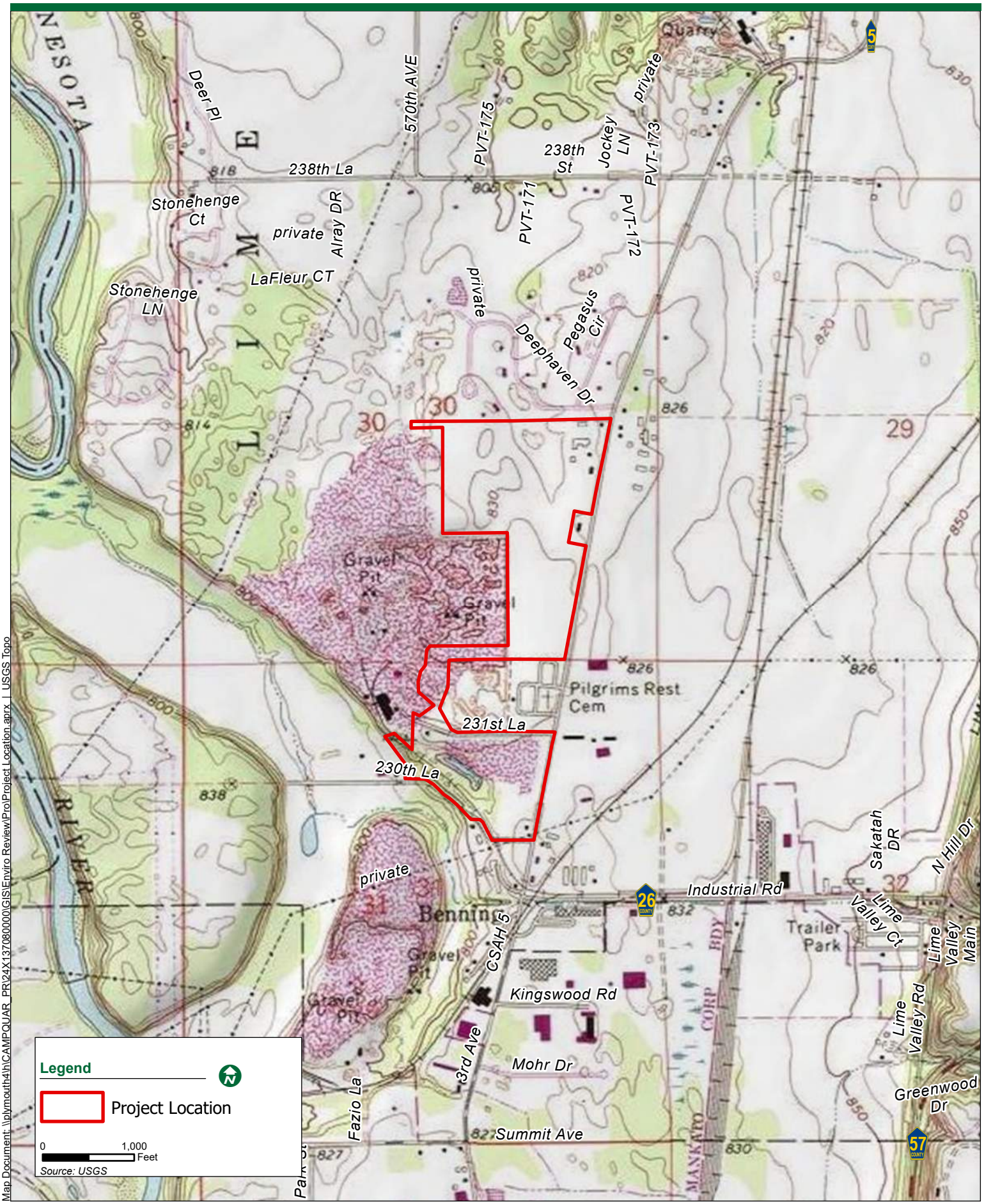
Title _____

Appendix A: Location and Concept

- Zoomed In Aerial Map
- USGS Topo Map
- Concept Plan
- Wastewater Holding Tanks Preliminary Plan
- Cover Type Map
- Future Land Use Map
- Zoning Map



Map Document: \\plymouth4\h\CAMPQUAR_PR\24X137080000\GIS\Enviro Review\Pro\Project Location.aprx



Map Document: \\plymouth4\h\CAMPQUAR_PR\24X137080000\GIS\Enviro Review\Pro\Project Location.aprx | USGS Topo

SITE LEGEND:

BIKE TRAILS

1. ACCESS / CONVENIENCE BIKE OPTIMIZED TRAILS (TWO WAY)
2. BEGINNER TRAILS (ONE WAY)
3. INTERMEDIATE TRAILS (ONE WAY)

OTHER SITE AMENITIES / FEATURES

1. PUBLIC PARKING / ACCESS
2. USER PARKING
3. WATER CABLE PARK
4. CABLE PARK STARTING FEATURE / VIEWING AREA
5. ISLAND FEATURE

BUILDINGS

6. RESTROOM / PAVILION
7. LAKESIDE PAVILION
8. WASTE WATER TANKS / LIFT STATION

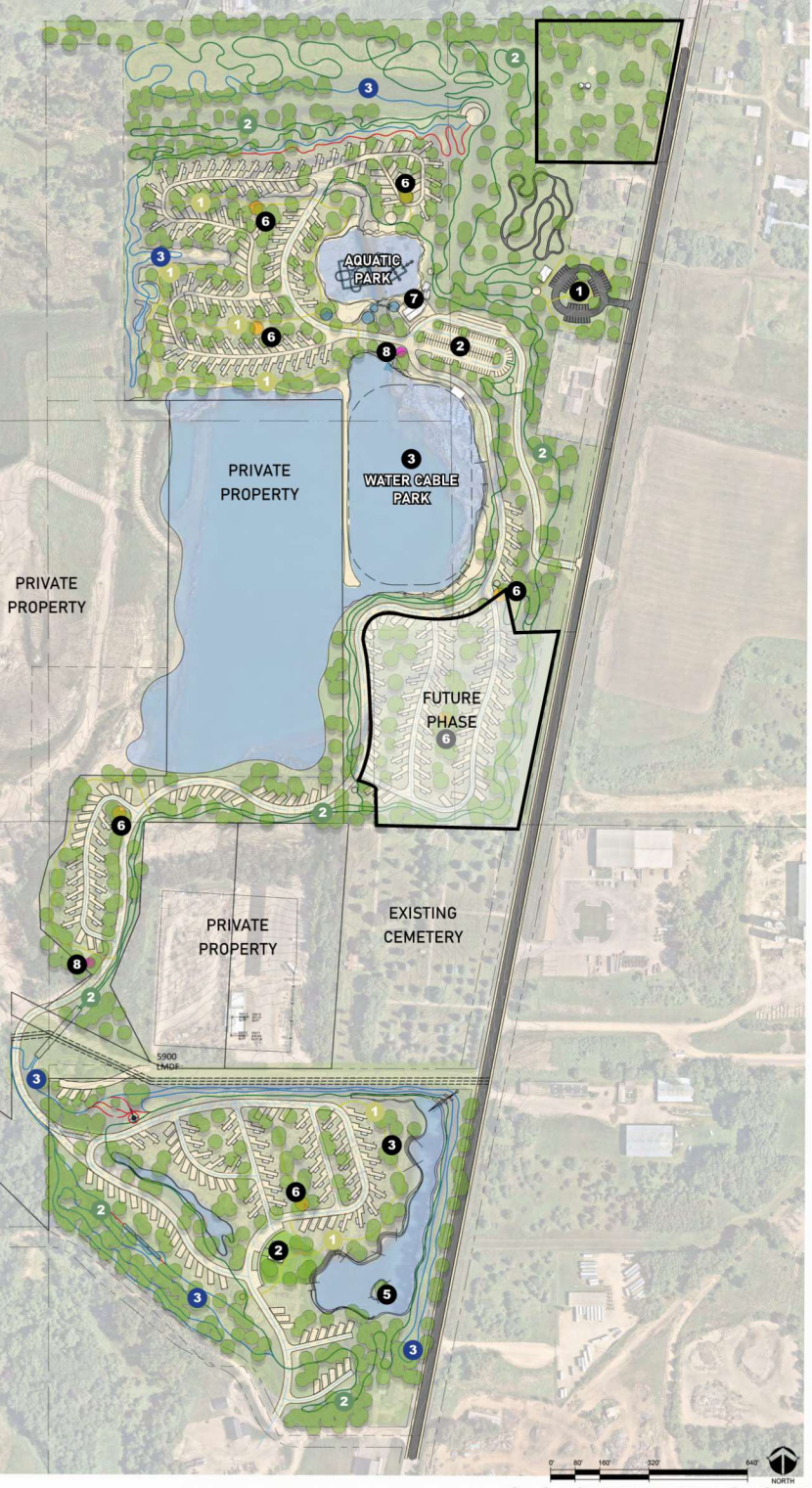
OTHER SITE NOTES:

POTABLE WATER WILL BE AT CAMPSITES OR WITHIN 400 FEET OF EVERY CAMPSITE IN ACCORDANCE WITH MINNESOTA RULES CHAPTER 4630.0600.

ALL TRAILS AND OPEN SPACES WILL BE FIELD-FIT TO REDUCE TREE AND BRUSH REMOVALS TO AVOID WETLANDS.

CHARACTER IMAGERY:





ROCKWELL CONCEPT

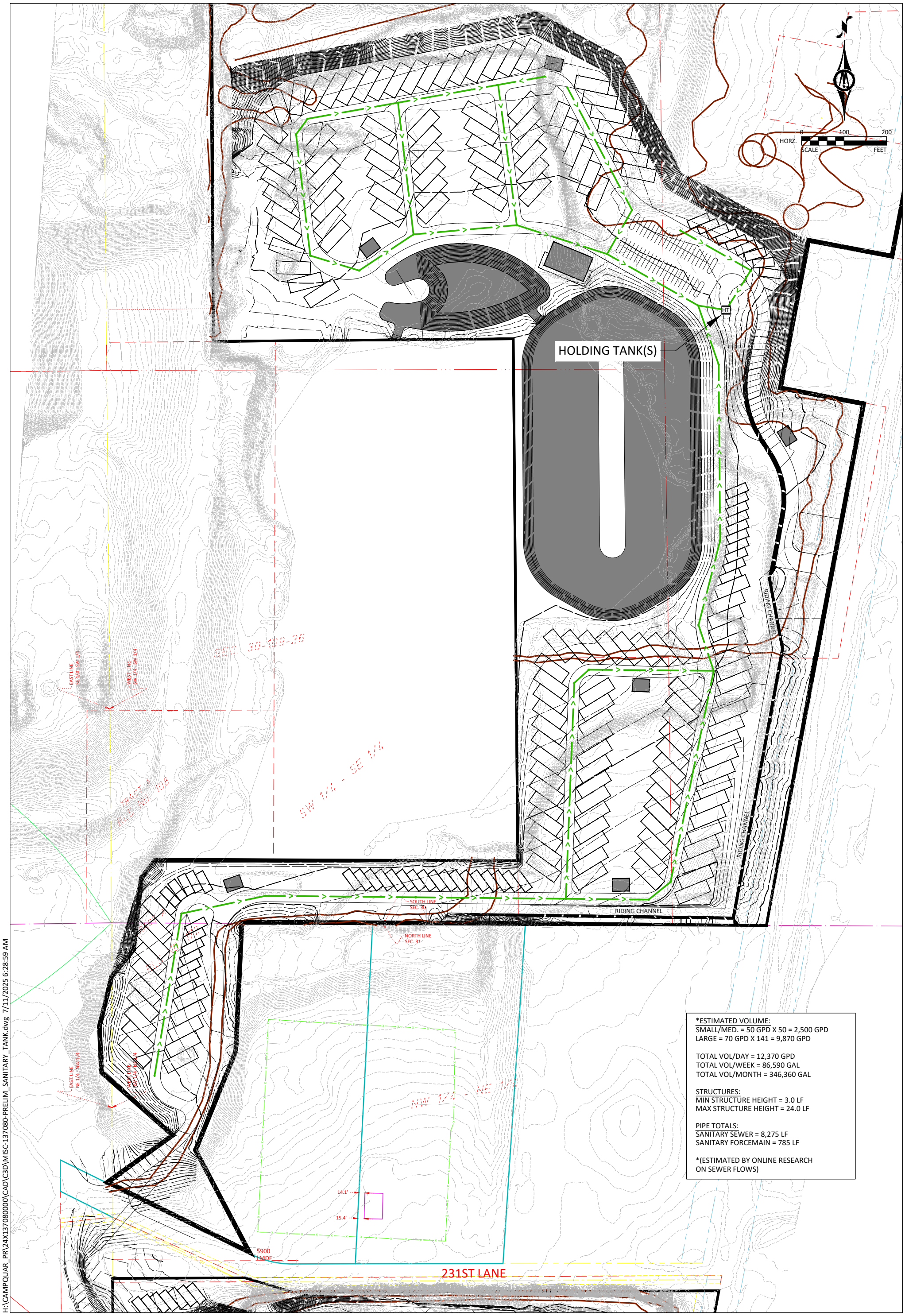
INTEGRATE THE SYSTEMS

CONFLUENCE

Camp Quarry
Lime Township, Minneosta

North Preliminary Sanitary Sewer - Holding Tank Option
July 2025

BOLTON & MENK



*ESTIMATED VOLUME:
SMALL/MED. = 50 GPD X 50 = 2,500 GPD
LARGE = 70 GPD X 141 = 9,870 GPD

TOTAL VOL/DAY = 12,370 GPD
TOTAL VOL/WEEK = 86,590 GAL
TOTAL VOL/MONTH = 346,360 GAL

STRUCTURES:
MIN STRUCTURE HEIGHT = 3.0 LF
MAX STRUCTURE HEIGHT = 24.0 LF

PIPE TOTALS:
SANITARY SEWER = 8,275 LF
SANITARY FORCEMAIN = 785 LF

*(ESTIMATED BY ONLINE RESEARCH ON SEWER FLOWS)

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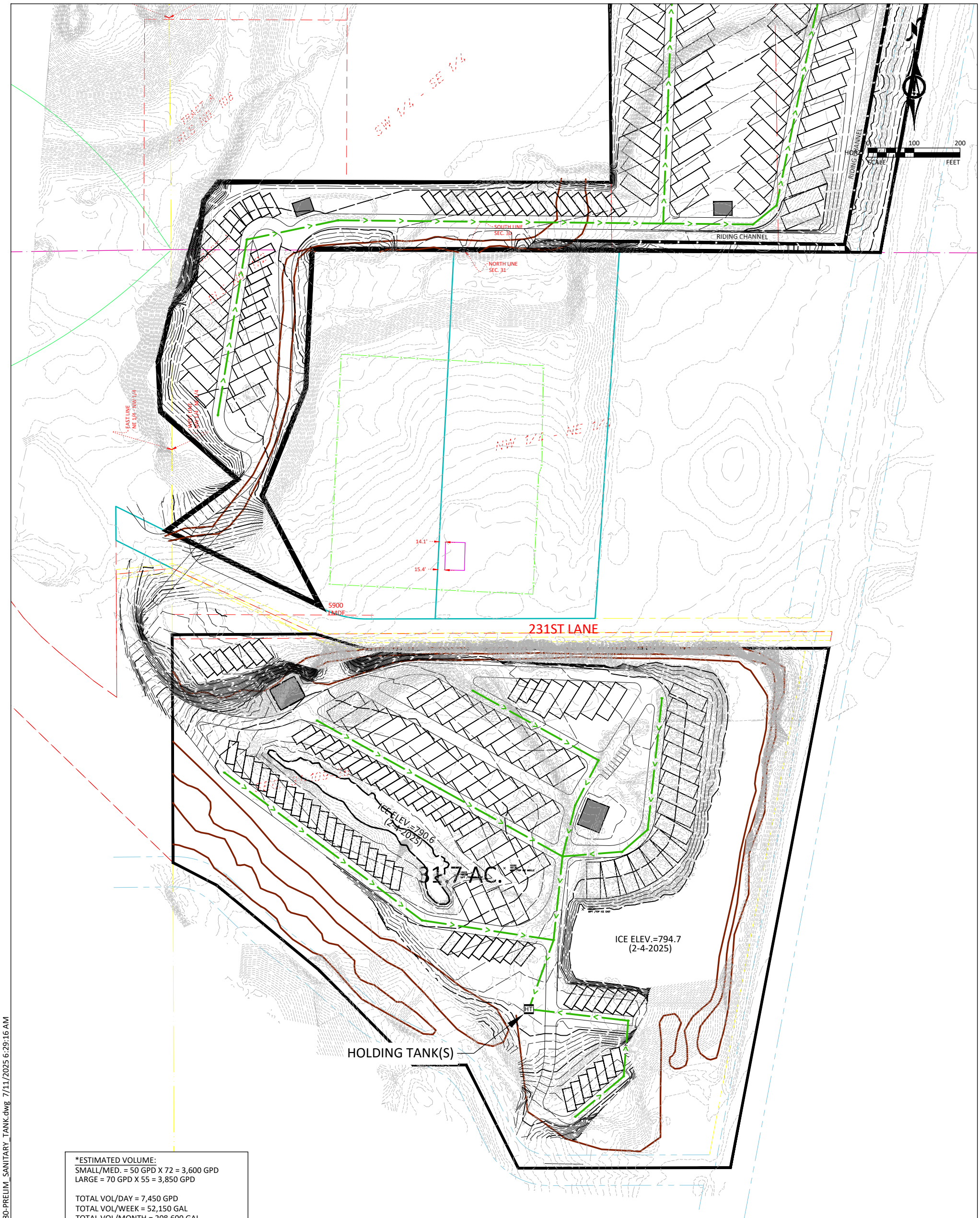
Camp Quarry
Lime Township, Minnesota

South Preliminary Sanitary Sewer - Holding Tank Option
July 2025

BOLTON & MENK



*ESTIMATED VOLUME:
SMALL/MED. = 50 GPD X 72 = 3,600 GPD
LARGE = 70 GPD X 55 = 3,850 GPD

TOTAL VOL/DAY = 7,450 GPD
TOTAL VOL/WEEK = 52,150 GAL
TOTAL VOL/MONTH = 208,600 GAL

STRUCTURES:
MIN STRUCTURE HEIGHT = 3.0 LF
MAX STRUCTURE HEIGHT = 18.5 LF

PIPE TOTALS:
SANITARY SEWER = 3,610 LF
SANITARY FORCEMAIN = 834 LF

*(ESTIMATED BY ONLINE RESEARCH ON SEWER FLOWS)

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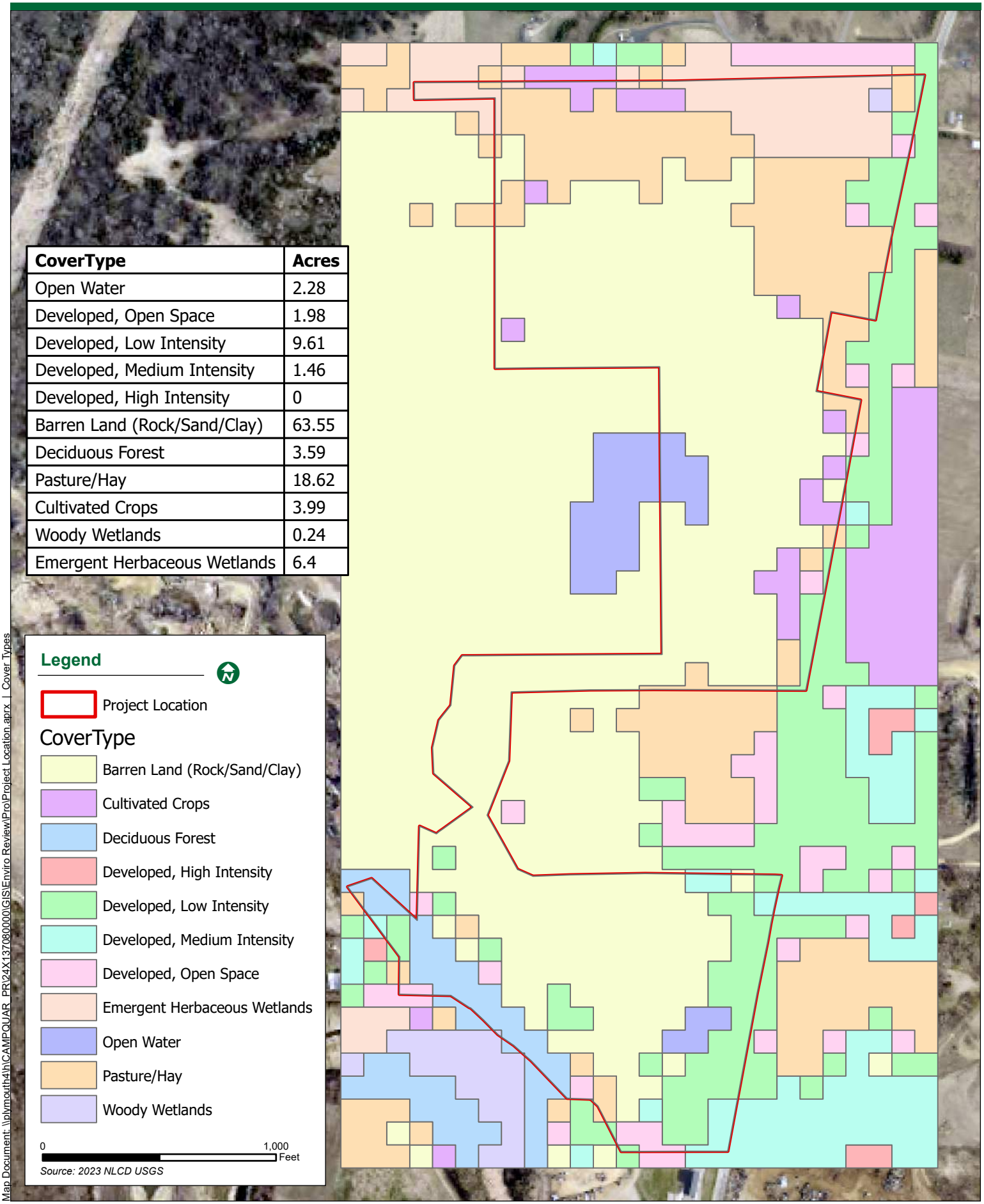
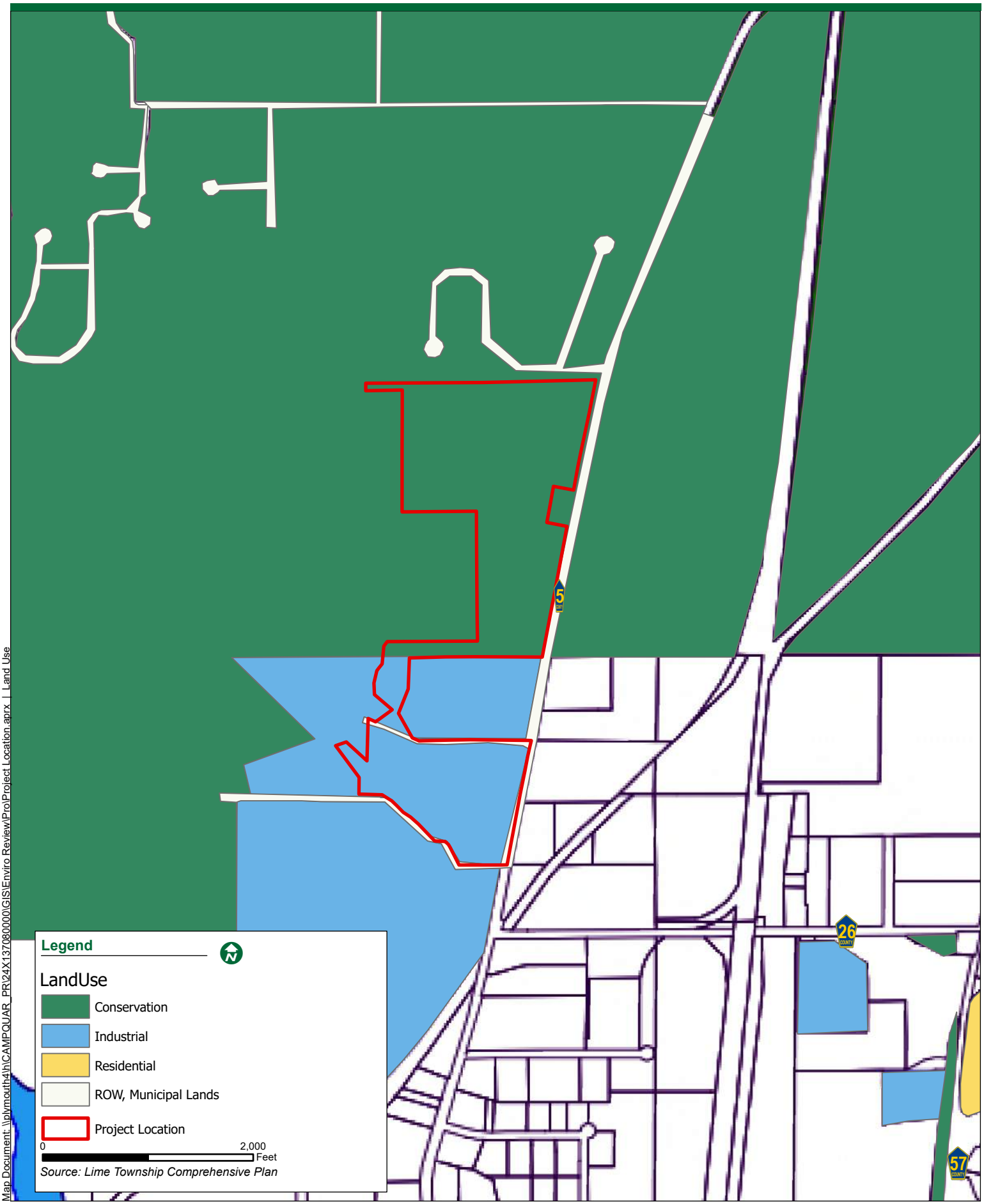
CoverType	Acres
Open Water	2.28
Developed, Open Space	1.98
Developed, Low Intensity	9.61
Developed, Medium Intensity	1.46
Developed, High Intensity	0
Barren Land (Rock/Sand/Clay)	63.55
Deciduous Forest	3.59
Pasture/Hay	18.62
Cultivated Crops	3.99
Woody Wetlands	0.24
Emergent Herbaceous Wetlands	6.4





Map Document: \\plymouth4\h\CAMPQUAR_PR\24X137080000\GIS\Enviro Review\Pro\Project Location.aprx | Land Use

Lime Township Zoning

N
W E
S

Mankato Regional Airport

Wita Lake

Sakatah Trail

Eagle Lake

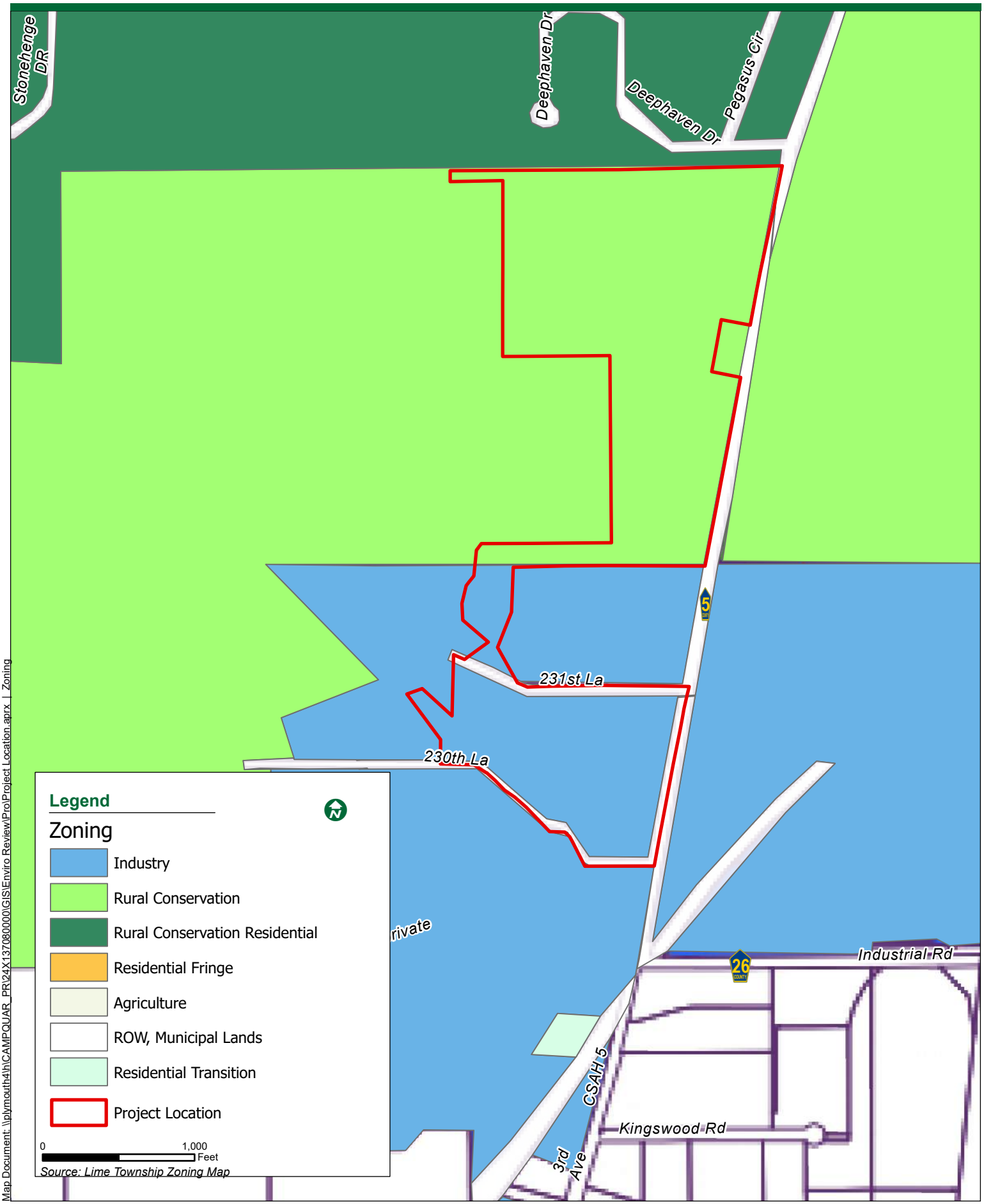
Legend

Zoning

- Public Water, Municipal Lands, Right of Way
- Agriculture
- Rural Conservation Residential
- Rural Conservation
- Rural Residential
- Residential Fringe
- Industry
- Commercial
- Residential Transition
- Parcels
- Water Bodies

Chris Talamantez
Planner
June 2022

0 0.25 0.5 1 Miles



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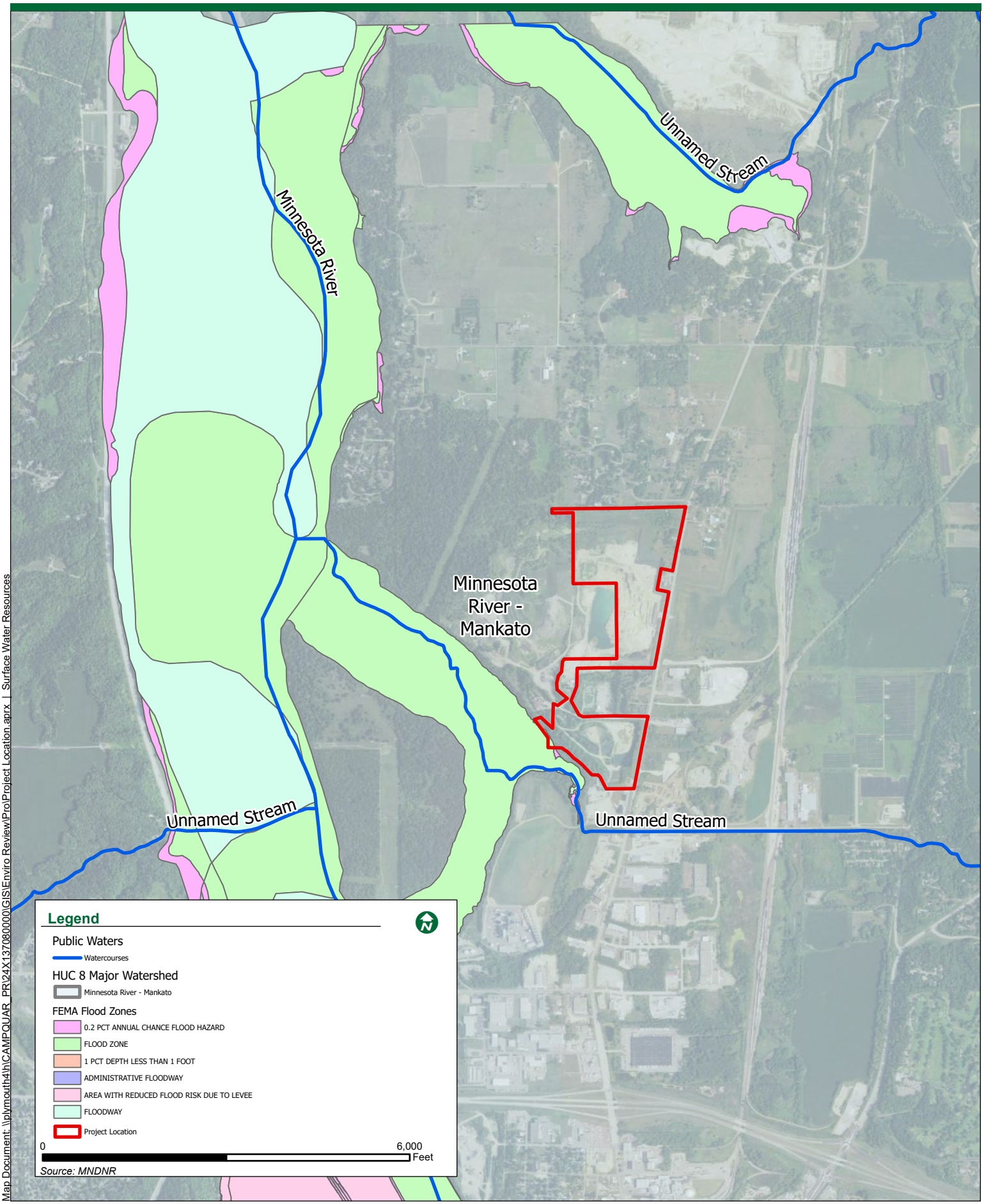
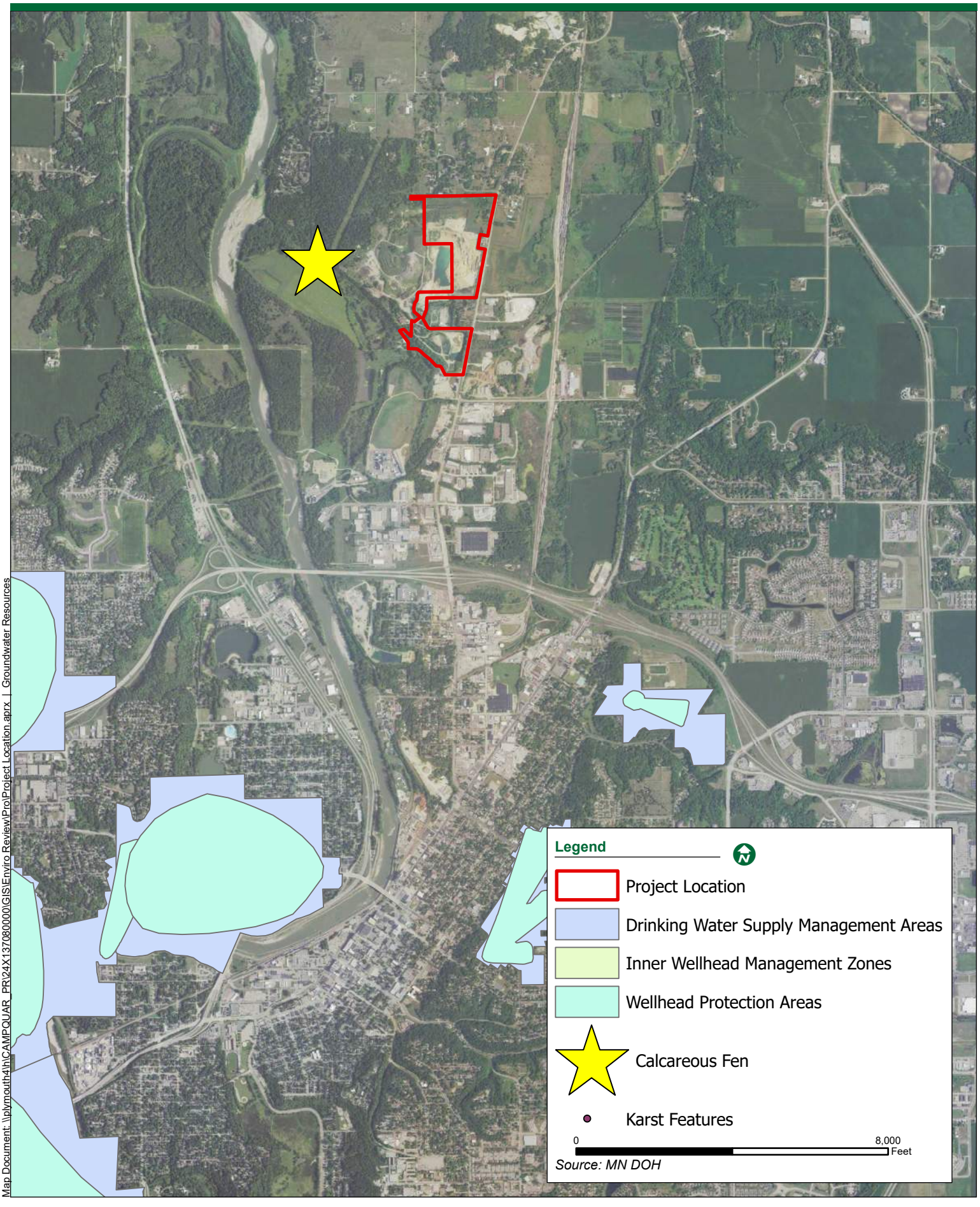
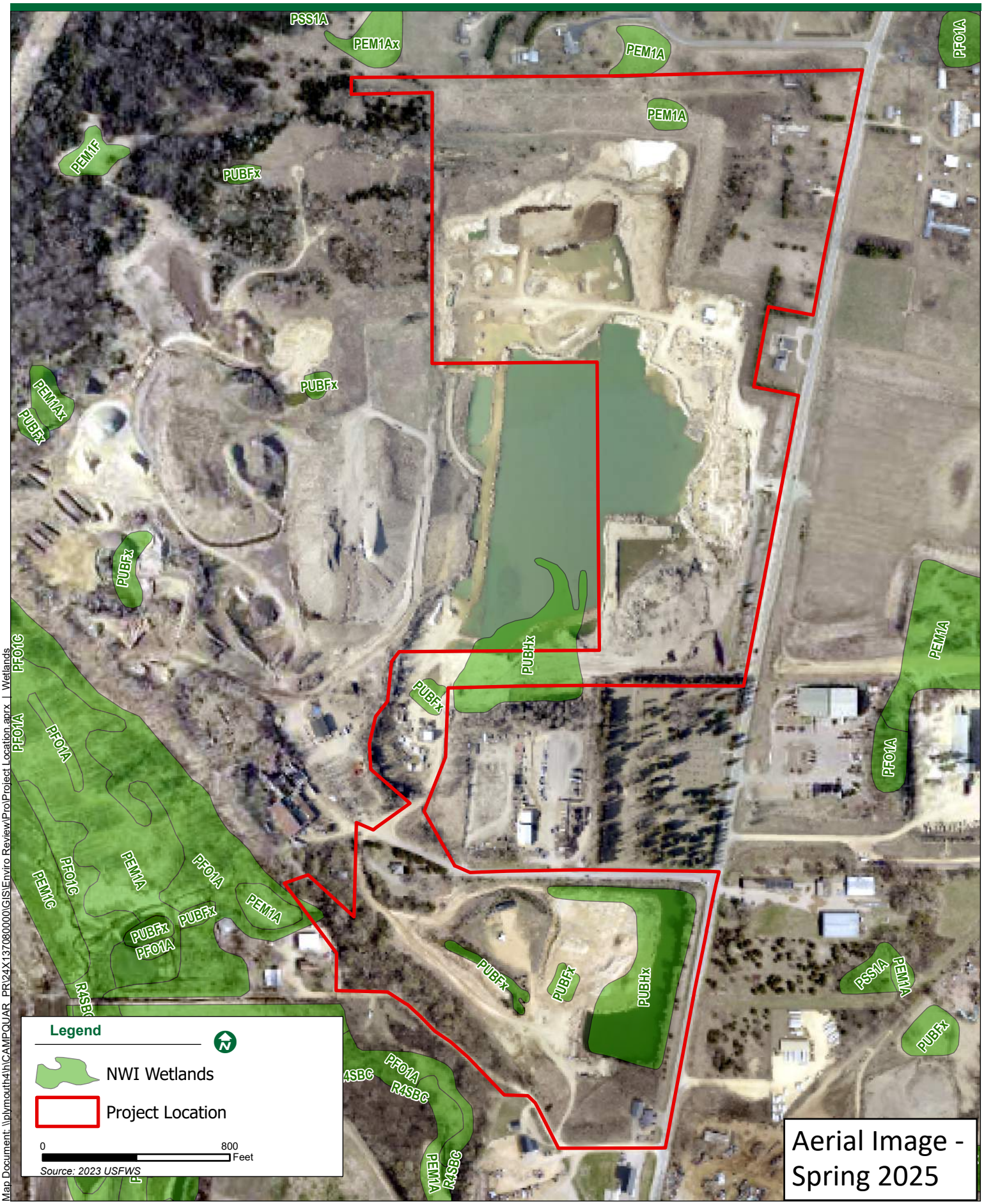
Appendix B: Natural Resources

- Aquatic Natural Resources
    - Surface Water Resources Map
    - Groundwater Resources Map
    - Wetlands
    - National Wetland Inventory Map
    - FEMA's National Flood Hazard Layer
    - NEPAssist Flood
    - MN Wetland Conservation Act Notice of Decision
    - Wetland Delineation Report
- Species
    - MNDNR Conservation Planning Report
    - MNDNR Natural Heritage Information System (NHIS) Letter
    - MNDNR Final Review
    - USFWS Information, Planning, and Conservation (IPaC) system Species List
    - USFWS IPaC Minnesota-Wisconsin Determination Key
    - USFWS IPaC Rusty Patched Bumble Bee Determination Key
    - Minnesota Breeding Bird Atlas for Block T106R14b
    - MNDNR Rare Natural Features
- Other
    - Soils Map
    - Sunde Engineering Groundwater Monitoring Memo


Minnesota River
Unnamed Stream
Minnesota River - Mankato
Unnamed Stream
Unnamed Stream
Legend
Public Waters
Watercourses
HUC 8 Major Watershed
Minnesota River - Mankato
FEMA Flood Zones
0.2 PCT ANNUAL CHANCE FLOOD HAZARD
FLOOD ZONE
1 PCT DEPTH LESS THAN 1 FOOT
ADMINISTRATIVE FLOODWAY
AREA WITH REDUCED FLOOD RISK DUE TO LEVEE
FLOODWAY
Project Location
0
6,000
Feet
Source: MNDNR



Map Document: \\plymouth4\h\CAMPQUAR_PR\24X137080000\GIS\Enviro Review\Pro\Project Location.aprx | Groundwater Resources



Map Document: \\plymouth4\h\CAMPQUAR_PR\24X137080000\GIS\Enviro Review\Pro\Project Location.aprx | Wetlands

U.S. Fish and Wildlife Service
National Wetlands Inventory

Camp Quarry NWI



May 7, 2025

Wetlands

- Estuarine and Marine Deepwater
- Estuarine and Marine Wetland
- Freshwater Emergent Wetland
- Freshwater Forested/Shrub Wetland
- Freshwater Pond
- Lake
- Other
- Riverine

This map is for general reference only. The US Fish and Wildlife Service is not responsible for the accuracy or currentness of the base data shown on this map. All wetlands related data should be used in accordance with the layer metadata found on the Wetlands Mapper web site.

Camp Quarry Adventure Park

Lime Township, Blue Earth County, MN

Figure 1: Incidental Wetland Review

June 2025

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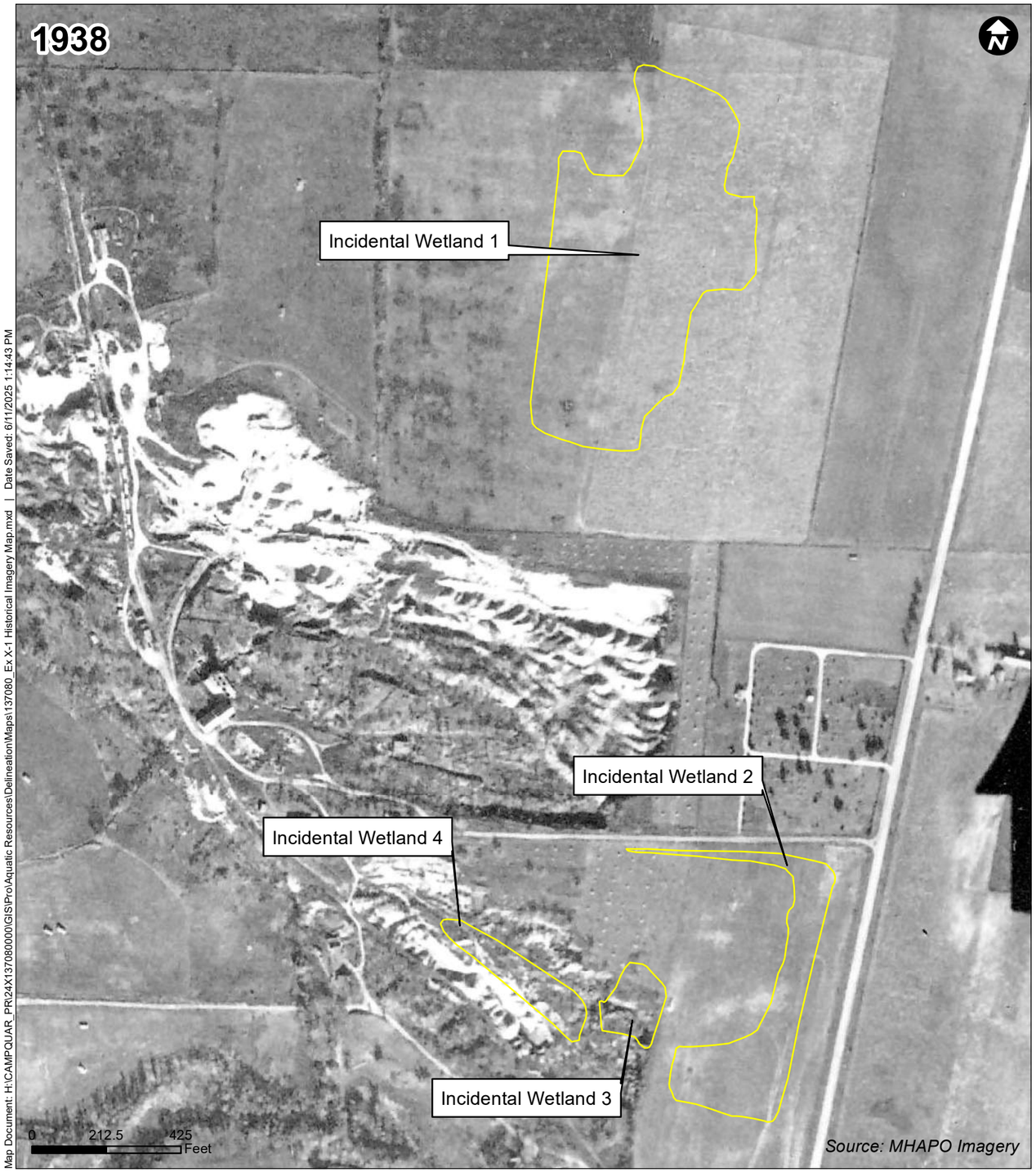
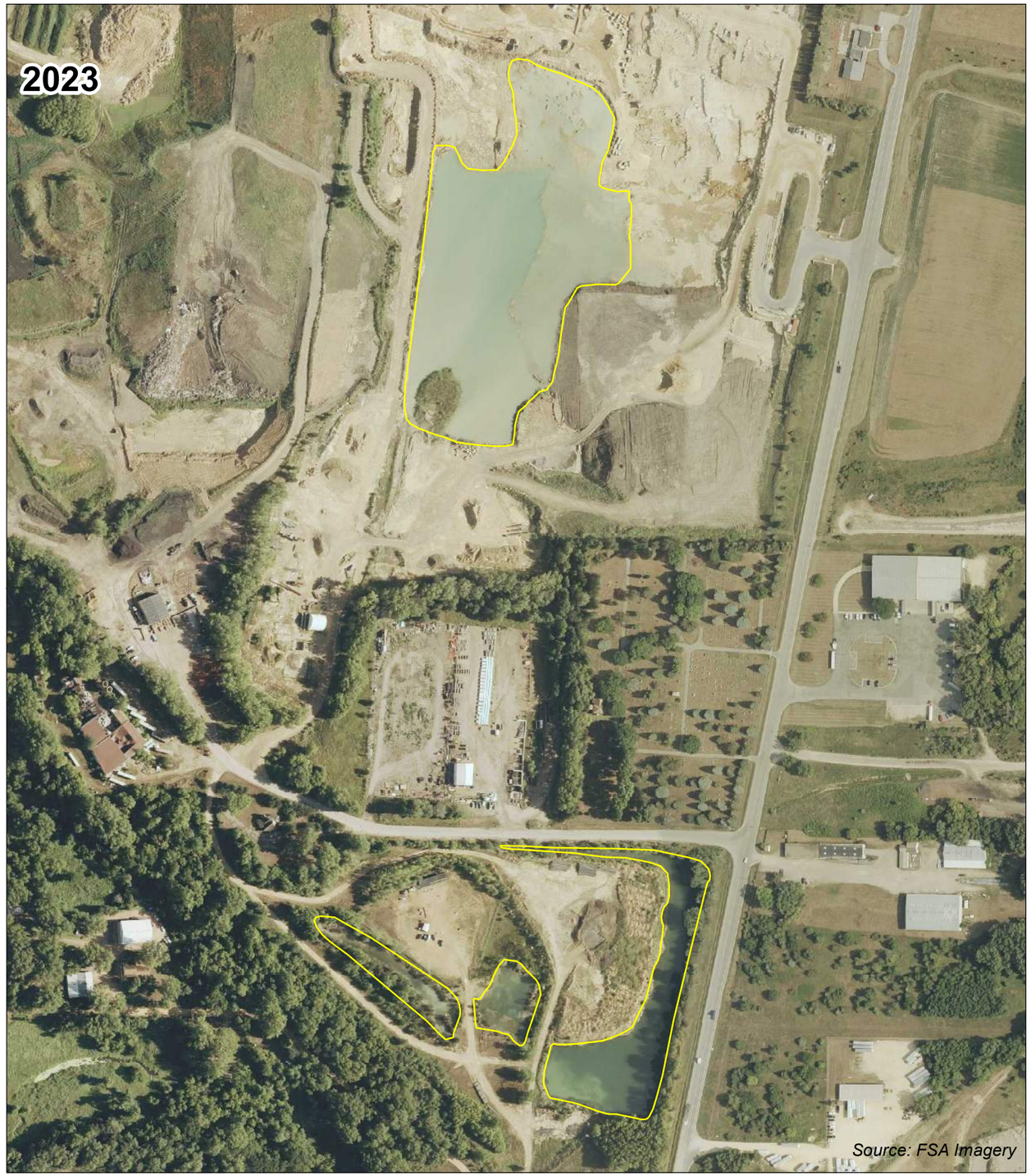
Real People. Real Solutions.





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Camp Quarry Adventure Park

Lime TWP, Blue Earth County, MN

Exhibit F-1: Wetland Delineation Map

June 2025

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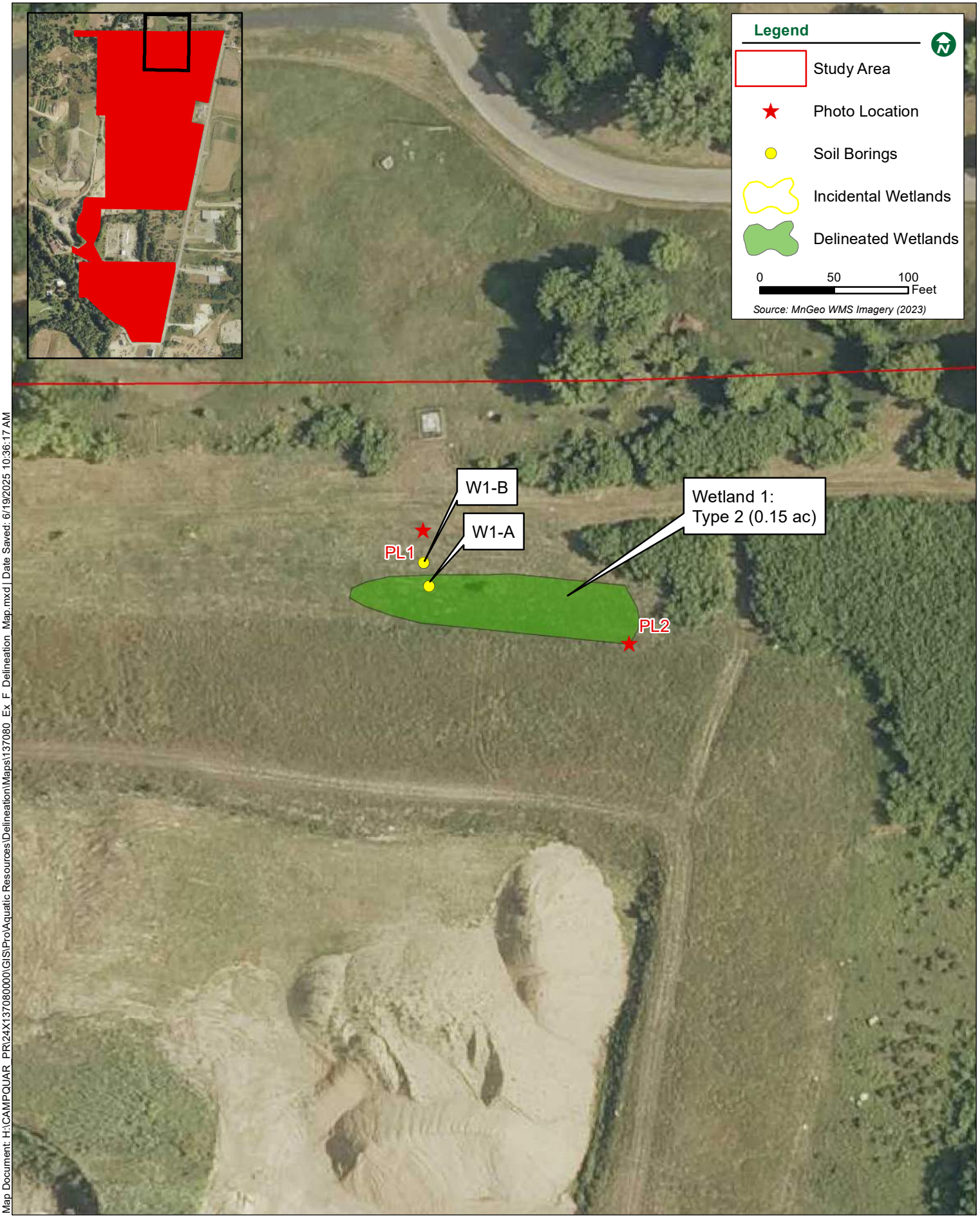
Real People. Real Solutions.



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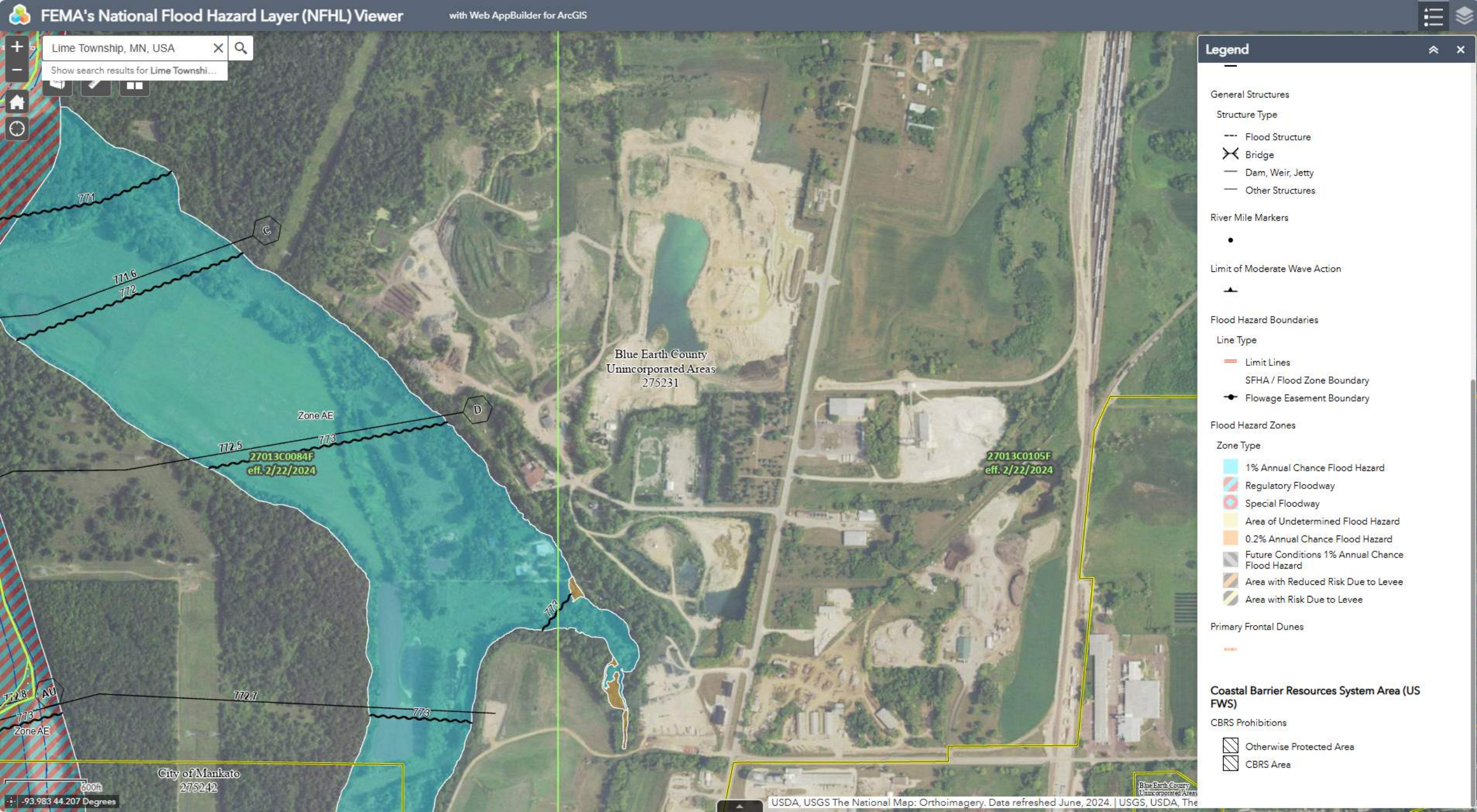
FEMA's National Flood Hazard Layer (NFHL) Viewer
with Web AppBuilder for ArcGIS
Lime Township, MN, USA
Show search results for Lime Townshi...
Legend
General Structures
Structure Type
Flood Structure
Bridge
Dam, Weir, Jetty
Other Structures
River Mile Markers
Limit of Moderate Wave Action
Flood Hazard Boundaries
Line Type
Limit Lines
SFHA / Flood Zone Boundary
Flowage Easement Boundary
Flood Hazard Zones
Zone Type
1% Annual Chance Flood Hazard
Regulatory Floodway
Special Floodway
Area of Undetermined Flood Hazard
0.2% Annual Chance Flood Hazard
Future Conditions 1% Annual Chance Flood Hazard
Area with Reduced Risk Due to Levee
Area with Risk Due to Levee
Primary Frontal Dunes
Coastal Barrier Resources System Area (US FWS)
CBRS Prohibitions
Otherwise Protected Area
CBRS Area
Blue Earth County
Unincorporated Areas
275231
City of Mankato
275242
27013C0084F
eff. 2/22/2024
27013C0105F
eff. 2/22/2024
Zone AE
771
771.6
772
772.5
773
772.7
772.8
AU
C
D
600ft
-93.983 44.207 Degrees
USDA, USGS The National Map: Orthoimagery. Data refreshed June, 2024. | USGS, USDA, The

Find address or place | Basemap | Imagery | Draw | Erase | Save Session | Tools | More Data



100 m

200 ft

EnviroMapper ®

44.209602, -93.994276

Vantor | EPA OEI | U.S. Esri, TomTom, Garmin, FAO, NOAA, USGS, (c) OpenStreetMap contributors, and the … Powered by Esri (http://www.esri.com/)

Camp Quarry Adventure Park

Lime Township, Blue Earth County, MN

MnDNR Rare Natural Features

May 2025

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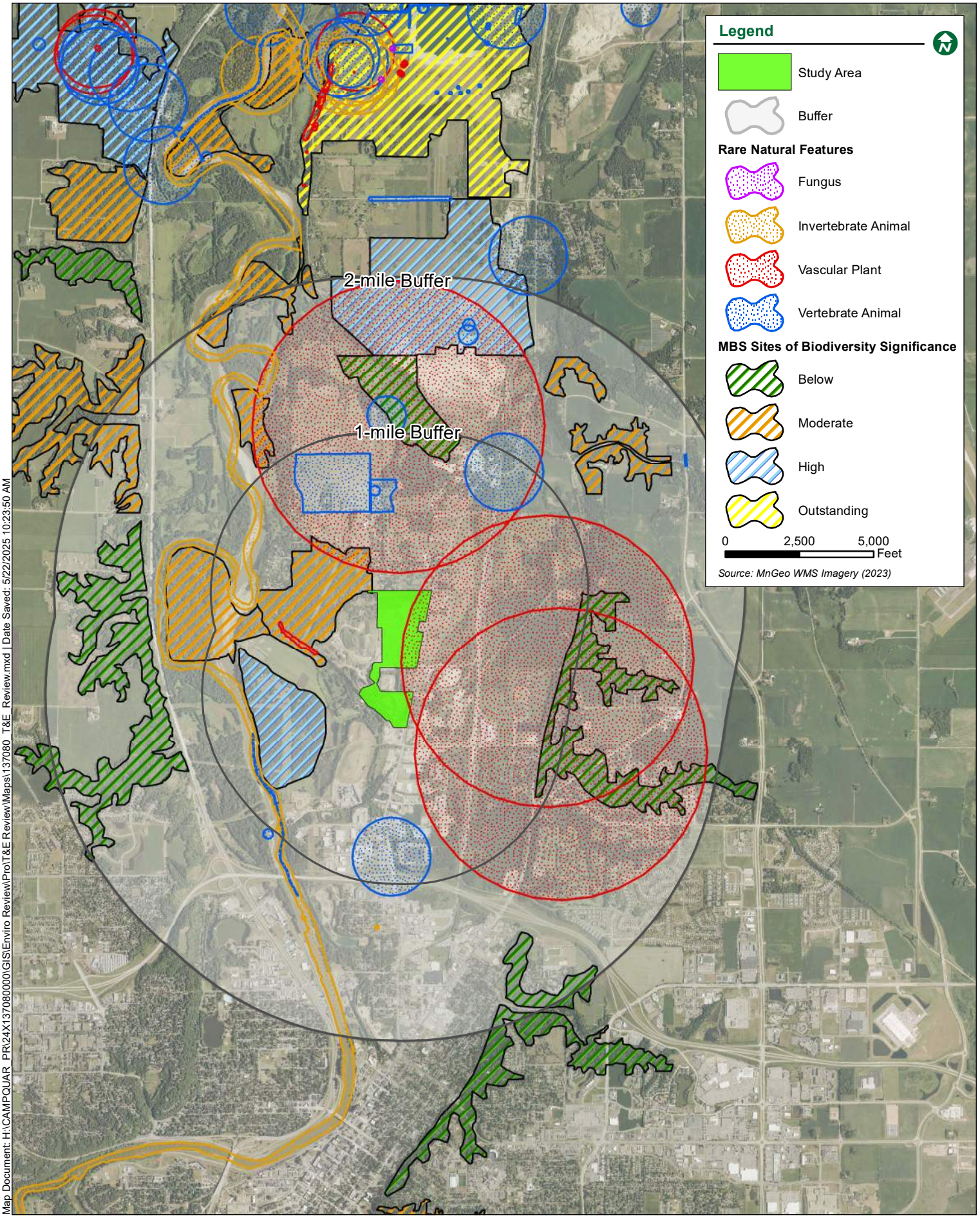

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18
94
1053
Legend
County Soils
Hydric Soils
Non-Hydric Soils
Water
Project Location
0
800
Feet
Source: USDA

BOARD OF WATER AND SOIL RESOURCES

Minnesota Wetland Conservation Act
Notice of Decision

Local Government Unit: Blue Earth County Property and Environmental Resources **County:** Blue Earth
Applicant Name: Dean Porter – CampQuarry LLC **Applicant Representative:** Addeline Theis Paradis – Bolton and Menk, Inc
Project Name: Camp Quarry Adventure Park Wetland Delineation **LGU Project No. (if any):** PL2025066
Date Complete Application Received by LGU: 6/26/2025
Date of LGU Decision: 8/19/2025
Date this Notice was sent: 8/19/2025

WCA Decision Type - check all that apply

☒ Wetland Boundary/Type ☐ Sequencing ☐ Replacement Plan ☐ Bank Plan (not credit purchase)
☐ Exemption ☐ No-Loss (8420.0415)
MN Rules 8420.0420 Part: ☐ A ☐ B ☐ C ☐ D ☐ E ☐ F ☐ G ☐ H
Subpart: ☐ 4 ☐ 5 ☐ 7 ☐ 9
MN Statutes 103G.2241
Subdivision: : ☐ 1 ☐ 2 ☐ 6 ☐ 9

Replacement Plan Impacts (replacement plan decisions only)

Total WCA Wetland Impact Area:
Wetland Replacement Type: ☐ Project Specific Credits - Number of Credits: ☐ Bank Credits – Number of Credits:
Bank Account Number(s):

Technical Evaluation Panel Findings and Recommendations (attach if any)

☒ Approve ☐ Approve w/Conditions ☐ Deny ☐ No TEP Recommendation

LGU Decision

☐ Approved with Conditions (specify below)[1] ☒ Approved[1] ☐ Denied
List Conditions:

Decision-Maker for this Application: ☒ Staff ☐ Governing Board/Council ☐ Other:

Decision is valid for: ☒ 5 years (default) ☐ Other (specify):

[1] *Wetland Replacement Plan appraval is not valid until BWSR confirms the withdrawal af any required wetland bank credits. For project-specific replacement a financial assurance per MN Rule 8420.0522, Subp. 9 and evidence that all required farms have been recorded an the title of the praperty on which the replacement wetland is located must be provided ta the LGU for the approval ta be valid.*

LGU Findings – Attach document(s) and/or insert narrative providing the basis for the LGU decision[1].

☐ Attachment(s) (specify):
☒ Summary: The Blue Earth County TEP meet on June 30th 2025 to review the submitted report. The TEP members met at the site. The TEP members evaluated the site for wetland characteristics that were identified in the submitted report. The TEP members observed the identified characteristic. Days before the site visit the area had been mowed which made it difficult in some areas to identify vegetation. The TEP walked the wetland boundary based off the GPS line. The Tep members agreed that the delineated wetland boundary was accurate,

Discussion was then had on other basins that were identified as incidental wetlands. The Incidental wetland areas are areas that have been part of the mining operations and are in areas where wetlands would not have occurred naturally. TEP members agreed with the incidental determinations for these basins.

[1] *Findings must consider any TEP recommendations.*

Attached Project Documents

☐ Site Location Map ☒ Project Plan(s)/Descriptions/Reports (specify): Camp Quarry Adventure Park Wetland Delineation Report

Appeals of LGU Decisions

If you wish to appeal this decision, you must provide a written request within 30 calendar days of the date you received the notice. All appeals must be submitted to the Board of Water and Soil Resources Executive Director along with a check payable to BWSR for $500 *unless* the LGU has adopted a local appeal process as identified below. The check must be sent by mail and the written request to appeal can be submitted by mail or e-mail. The appeal should include a copy of this notice, name and contact information of appellant(s) and their representatives (if applicable), a statement clarifying the intent to appeal and supporting information as to why the decision is in error. Send to:

Appeals & Regulatory Compliance Coordinator
Minnesota Board of Water & Soils Resources
520 Lafayette Road North
St. Paul, MN 55155
travis.germundson@state.mn.us

Does the LGU have a local appeal process applicable to this decision?

☒ Yes[1] ☐ No

[1]*If yes, all appeals must first be considered via the local appeals process.*

Local Appeals Submittal Requirements (LGU must describe how to appeal, submittal requirements, fees, etc. as applicable)

Appeal of an LGU staff decision. Send petition and $700.00 fee to:
Blue Earth County Property and Environmental Resources
PO BOX 3566
Mankato, MN 56002

Notice Distribution (include name)

Required on all notices:

☒ SWCD TEP Member: Jake Fritz	☒ BWSR TEP Member: Alyssa Core
☐ LGU TEP Member (if different than LGU contact):	
☒ DNR Representative: Erynn Jenzen	
☐ Watershed District or Watershed Mgmt. Org.:	
☒ Applicant: Dean Porter – CampQuarry LLC	☒ Agent/Consultant: Addeline Theis Paradis – Bolton and Menk, Inc

Optional or As Applicable:

☒ Corps of Engineers: USACE General Notification	
☐ BWSR Wetland Mitigation Coordinator (required for bank plan applications only):	
☐ Members of the Public (notice only):	☒ Other: Molly Westman – City of Mankato

Signature:	Date:
Dan Lyman	8/19/2025

This notice and accompanying application materials may be sent electronically or by mail. The LGU may opt to send a summary of the application to members of the public upon request per 8420.0255, Subp. 3.

Camp Quarry Adventure Park

Joint Application

CampQuarry LLC
June 19, 2025

Submitted by:
Bolton & Menk, Inc.
1960 Premier Drive
Mankato, MN 56001
P: (507) 625-4171
F: (507) 625-4177

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FIGURE 1: INCIDENTAL WETLAND REVIEW
WETLAND DELINEATION REPORT

PART ONE: Applicant Information

If applicant is an entity (company, government entity, partnership, etc.), an authorized contact person must be identified. If the applicant is using an agent (consultant, lawyer, or other third party) and has authorized them to act on their behalf, the agent's contact information must also be provided.

Applicant/Landowner Name:	Dean Porter | CampQuarry LLC
Mailing Address:	3301 3rd Avenue | Mankato, MN 56001
Phone:	
E-mail Address:	

Authorized Contact (do not complete if same as above):
Mailing Address:
Phone:
E-mail Address:

Agent Name:	Bolton & Menk, Inc. | Addeline Theis Paradis | Natural Resource Specialist
Mailing Address:	1960 Premier Drive | Mankato, MN | 56001
Phone:	507-380-4578
E-mail Address:	Addeline.theisparadis@bolton-menk.com

PART TWO: Site Location Information

County: Blue Earth **City/Township: Lime**
Parcel ID and/or Address: Refer to Exhibit A (Location Map)
Legal Description (Section, Township, Range): 30/31, 109N, 26W
Lat/Long (decimal degrees):
Attach a map showing the location of the site in relation to local streets, roads, highways.
Approximate size of site (acres) or if a linear project, length (feet): 122.66 acres

If you know that your proposal will require an individual Permit from the U.S. Army Corps of Engineers, you must provide the names and addresses of all property owners adjacent to the project site. This information may be provided by attaching a list to your application or by using block 25 of the Application for Department of the Army permit which can be obtained at:

http://www.mvp.usace.army.mil/Portals/57/docs/regulatory/RegulatoryDocs/engform_4345_2012oct.pdf

PART THREE: General Project/Site Information

If this application is related to a delineation approval, exemption determination, jurisdictional determination, or other correspondence submitted ***prior to*** this application then describe that here and provide the Corps of Engineers project number.

Describe the project that is being proposed, the project purpose and need, and schedule for implementation and completion. The project description must fully describe the nature and scope of the proposed activity including a description of all project elements that effect aquatic resources (wetland, lake, tributary, etc.) and must also include plans and cross section or profile drawings showing the location, character, and dimensions of all proposed activities and aquatic resource impacts.

PART FOUR: Aquatic Resource Impact[1] Summary

If your proposed project involves a direct or indirect impact to an aquatic resource (wetland, lake, tributary, etc.) identify each impact in the table below. Include all anticipated impacts, including those expected to be temporary. Attach an overhead view map, aerial photo, and/or drawing showing all of the aquatic resources in the project area and the location(s) of the proposed impacts. Label each aquatic resource on the map with a reference number or letter and identify the impacts in the following table.

Aquatic Resource ID (as noted on overhead view)	**Aquatic Resource Type** (wetland, lake, tributary etc.)	**Type of Impact** (fill, excavate, drain, or remove vegetation)	**Duration of Impact** Permanent (P) or Temporary (T)[1]	**Size of Impact**[2]	**Overall Size of Aquatic Resource** [3]	**Existing Plant Community Type(s)** in Impact Area[4]	**County, Major Watershed #, and Bank Service Area #** of Impact Area[5]

[1]If impacts are temporary; enter the duration of the impacts in days next to the "T". For example, a project with a temporary access fill that would be removed after 220 days would be entered "T (220)".
[2]Impacts less than 0.01 acre should be reported in square feet. Impacts 0.01 acre or greater should be reported as acres and rounded to the nearest 0.01 acre. Tributary impacts must be reported in linear feet of impact and an area of impact by indicating first the linear feet of impact along the flowline of the stream followed by the area impact in parentheses). For example, a project that impacts 50 feet of a stream that is 6 feet wide would be reported as 50 ft (300 square feet).
[3]This is generally only applicable if you are applying for a de minimis exemption under MN Rules 8420.0420 Subp. 8, otherwise enter "N/A".
[4]Use *Wetland Plants and Plant Community Types of Minnesota and Wisconsin* 3rd Ed. as modified in MN Rules 8420.0405 Subp. 2.
[5]Refer to Major Watershed and Bank Service Area maps in MN Rules 8420.0522 Subp. 7.

If any of the above identified impacts have already occurred, identify which impacts they are and the circumstances associated with each:

N/A

PART FIVE: Applicant Signature

☐ Check here if you are requesting a pre-application consultation with the Corps and LGU based on the information you have provided. Regulatory entities will not initiate a formal application review if this box is checked.

By signature below, I attest that the information in this application is complete and accurate. I further attest that I possess the authority to undertake the work described herein.

Signature: _____ Date:

I hereby authorize **Bolton & Menk, Inc** to act on my behalf as my agent in the processing of this application and to furnish, upon request, supplemental information in support of this application.

[1] The term "impact" as used in this joint application form is a generic term used for disclosure purposes to identify activities that may require approval from one or more regulatory agencies. For purposes of this form it is not meant to indicate whether or not those activities may require mitigation/replacement.

Attachment A

Request for Delineation Review, Wetland Type Determination, or Jurisdictional Determination

By submission of the enclosed wetland delineation report, I am requesting that the U.S. Army Corps of Engineers, St. Paul District (Corps) and/or the Wetland Conservation Act Local Government Unit (LGU) provide me with the following (check all that apply):

☒ **Wetland Type Confirmation**

☒ **Delineation Concurrence**. Concurrence with a delineation is a written notification from the Corps and a decision from the LGU concurring, not concurring, or commenting on the boundaries of the aquatic resources delineated on the property. Delineation concurrences are generally valid for five years unless site conditions change. Under this request alone, the Corps will not address the jurisdictional status of the aquatic resources on the property, only the boundaries of the resources within the review area (including wetlands, tributaries, lakes, etc.).

☐ **Preliminary Jurisdictional Determination**. A preliminary jurisdictional determination (PJD) is a non-binding written indication from the Corps that waters, including wetlands, identified on a parcel may be waters of the United States. For purposes of computation of impacts and compensatory mitigation requirements, a permit decision made on the basis of a PJD will treat all waters and wetlands in the review area as if they are jurisdictional waters of the U.S. PJDs are advisory in nature and may not be appealed.

☐ **Approved Jurisdictional Determination**. An approved jurisdictional determination (AJD) is an official Corps determination that jurisdictional waters of the United States are either present or absent on the property. AJDs can generally be relied upon by the affected party for five years. An AJD may be appealed through the Corps administrative appeal process.

In order for the Corps and LGU to process your request, the wetland delineation must be prepared in accordance with the 1987 Corps of Engineers Wetland Delineation Manual, any approved Regional Supplements to the 1987 Manual, and the *Guidelines for Submitting Wetland Delineations in Minnesota* (2013).
http://www.mvp.usace.army.mil/Missions/Regulatory/DelineationJDGuidance.aspx

Appendix

Camp Quarry Adventure Park

Lime Township, Blue Earth County, MN

Figure 1: Incidental Wetland Review

June 2025

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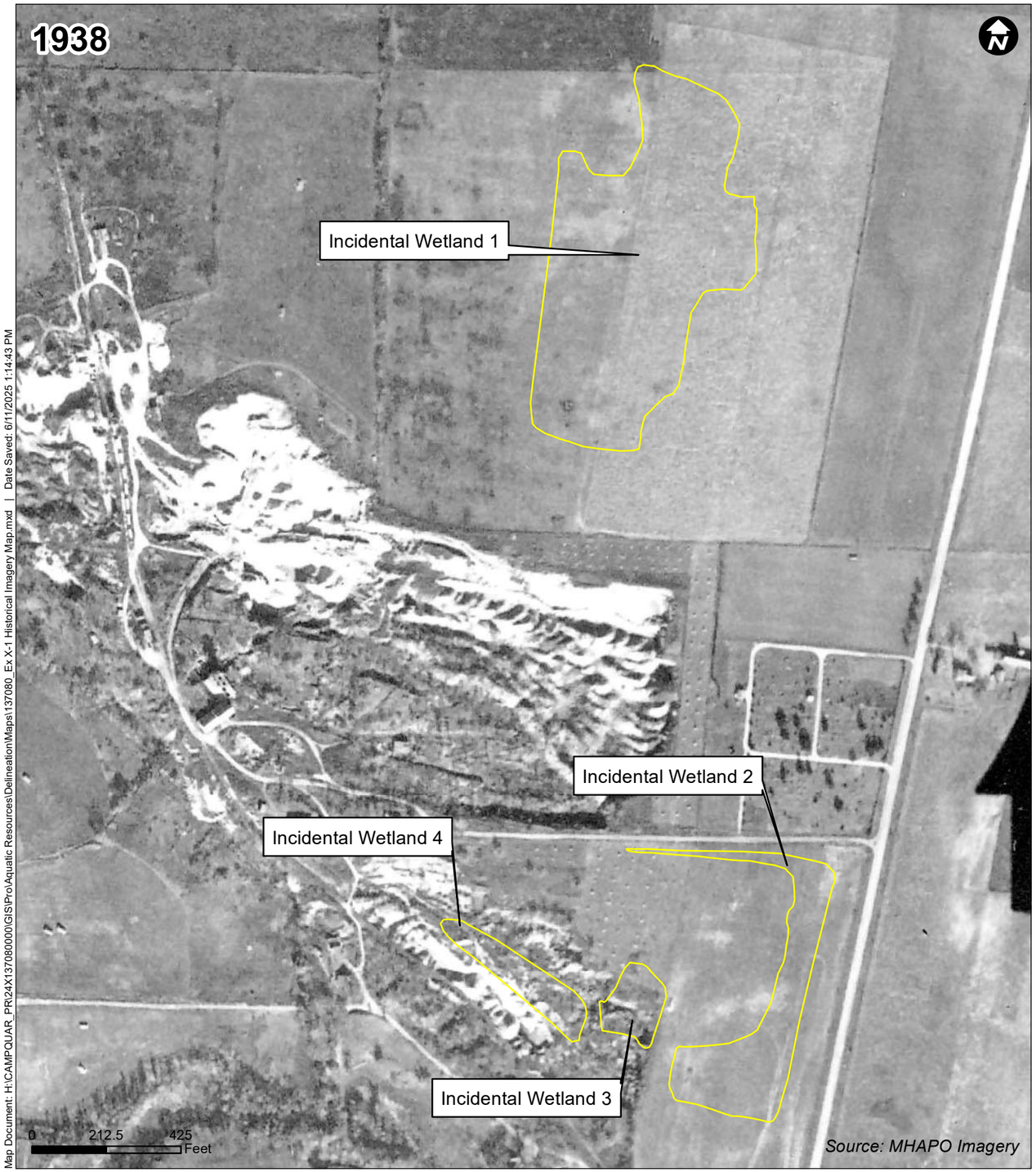

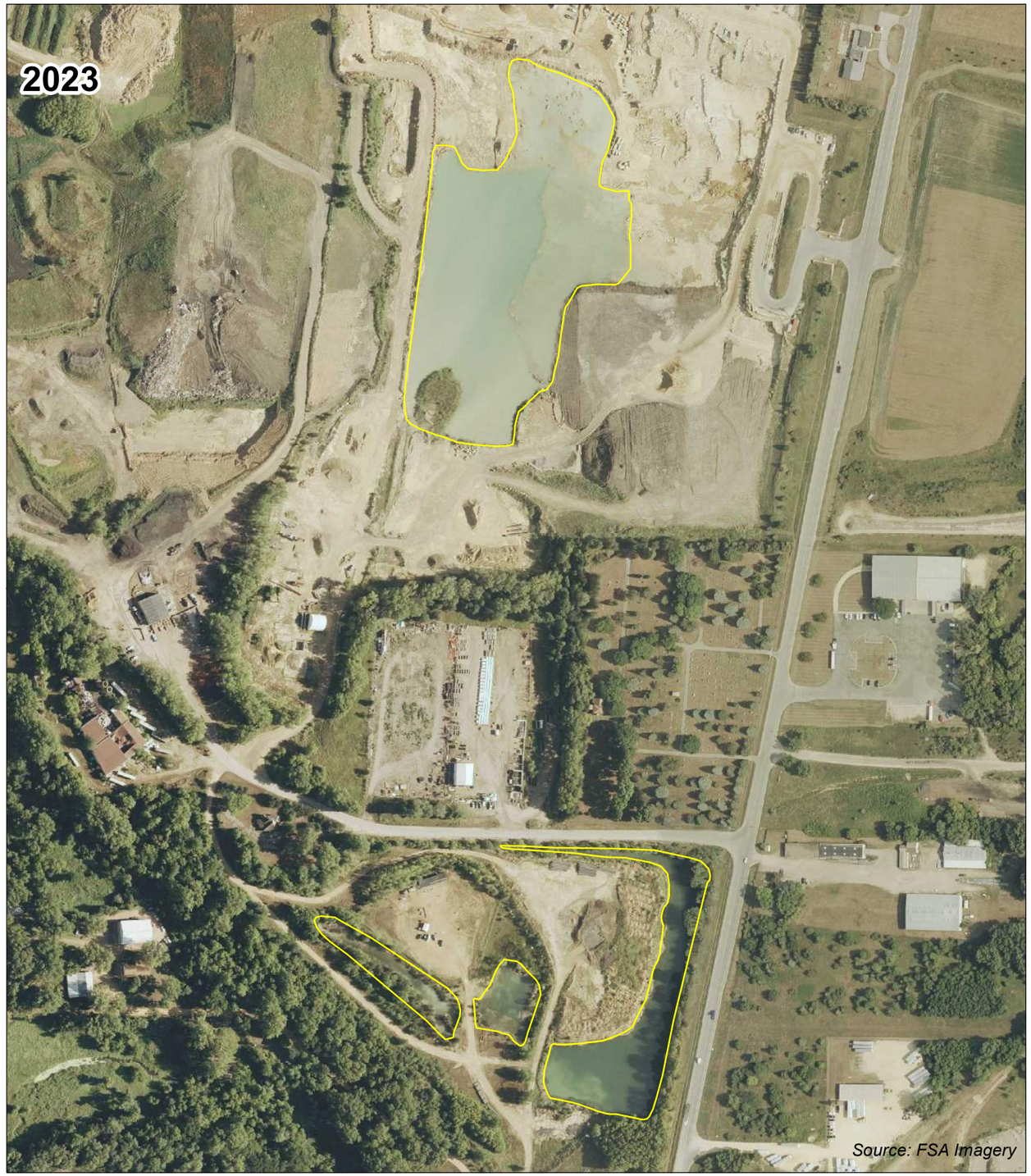

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Camp Quarry Adventure Park

Wetland Delineation

CampQuarry LLC
June 19, 2025

Submitted by:
Bolton & Menk, Inc.
1960 Premier Drive
Mankato, MN 56001
P: (507) 625-4171
F: (507) 625-4177

BOLTON & MENK
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ANTECEDENT PRECIPITATION CONDITIONS 2

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Exhibit A: Site Location Map
Exhibit B: 2-Foot LiDAR Contours Map
Exhibit C: National Wetlands Inventory Map
Exhibit D: Public Waters Inventory Map
Exhibit E: Blue Earth County Soil Survey Map
Exhibit F: Delineated Wetlands Map
Exhibit G: Delineation Data Sheets

I. INTRODUCTION

CampQuarry LLC is proposing site improvements to their property located off third Ave (Refer to Exhibit A: Location Map) located in Lime Township in Blue Earth County. This report details the findings of the field delineation that was completed on April 10, 2025.

The project is found in Section 30/31, in Township 109 North of Range 26 West.

II. WETLAND DELINEATION METHODOLOGY

The wetland boundaries were delineated and staked in the field in June 2025, using methods described in the "Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Midwest Region (Version 2.0)". Wetlands identified were classified using "Classification of Wetlands and Deepwater Habitats of the United States (Cowardin, et al., 1979)", "Wetlands of the United States (United States Fish and Wildlife Service Circular No. 39, 1971 edition)" and "Wetland Plants and Plant Communities of Minnesota and Wisconsin" (Eggers and Reed Third Edition). Subsequently, the three mandatory technical criteria for wetland determinations are as follows:

Hydrophytic Vegetation. A hydrophytic plant community is present when the dominant plant species present can endure prolonged inundation and/or soil saturation during the growing season. A plant's Wetland Indicator Status is determined using the 2016 National Wetland Plant List for Minnesota, published by the Army Corp of Engineers.

Hydric Soils. A hydric soil is defined as a soil that is formed under conditions of saturation, flooding or ponding long enough during the growing season (the portion of the year when there is above ground growth and development of vascular plants and/or soil temperature at 12 inches below the soil surface is above 41 degrees Fahrenheit or higher) to develop anaerobic conditions in the upper part.

Wetland Hydrology. An area has wetland hydrology if it experiences 14 or more consecutive days of flooding, ponding or a water table within 12 inches of the surface during the growing season at a minimum frequency of five out of ten years. This is determined by using both primary and secondary Wetland Hydrology indicators.

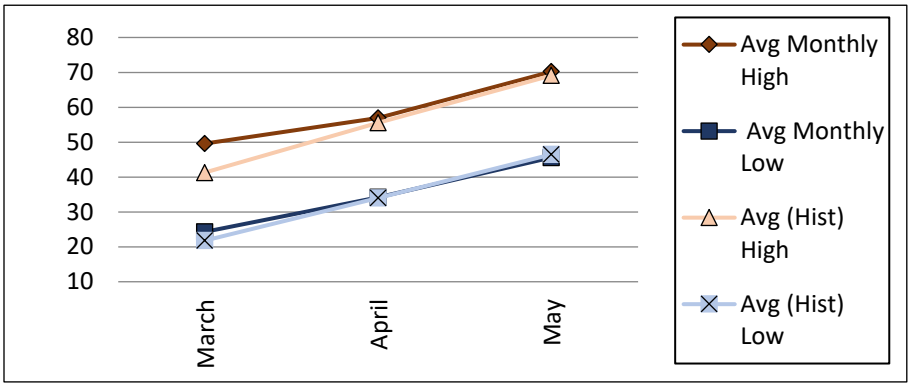
III. BACKGROUND INFORMATION

Prior to conducting a field investigation of this site, Exhibits A through E were used to complete a preliminary evaluation. The data gathered during the preliminary investigation was used as described below:
Exhibit A is a location map of the study area.
Exhibits B is an aerial photo with topographic information overlaid on it. This provides information regarding topography of the site, helping to identify areas that may have wetland characteristics.
Exhibit C is the National Wetlands Inventory of the site and surrounding properties. This information is used to complete a preliminary investigation of the wetlands that may or may not exist on the site.
Exhibit D is used to identify waters that are regulated by the DNR. This exhibit shows where there are DNR public waters relative to the site.
Exhibit E is the Blue Earth County Soil Survey and is used to identify hydric soils that may lie within the study area.
Delineation Exhibits F and G were prepared from the information gathered at the site.
Exhibit F is the site map showing the delineated aquatic resources.
Exhibit G includes the wetland delineation data sheets.

IV. CLIMATE DATA

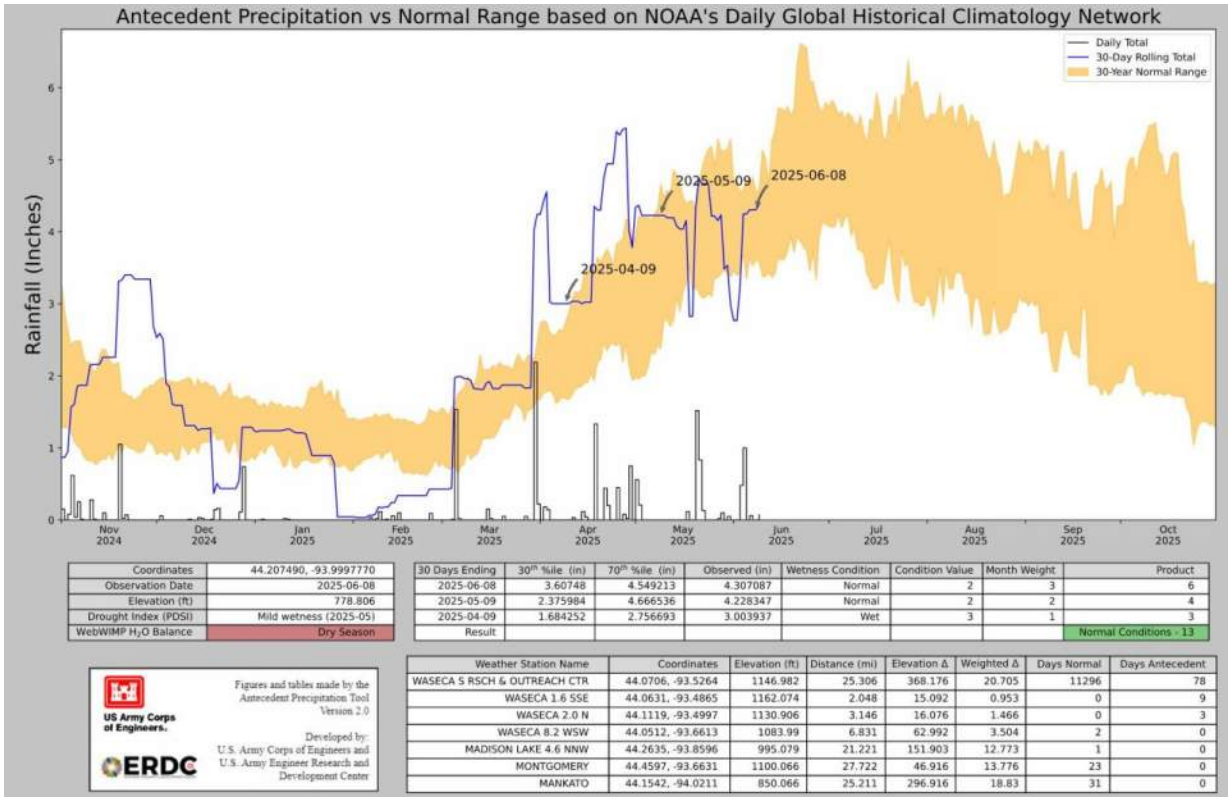
The monthly temperature table below shows the average high and low temperatures for the three months prior to the field delineation, along with the historical averages for these months. The monthly low and high temperatures have been within normal ranges for this period.

MONTHLY TEMPERATURE RANGE



Antecedent precipitation was evaluated using a combination of the NRCS Method and the Rolling Totals Method. The analysis found that precipitation was normal at time of site visit.

ANTECEDENT PRECIPITATION CONDITIONS



Coordinates	44.207490, -93.9997770
Observation Date	2025-06-08
Elevation (ft)	778.806
Drought Index (PDSI)	Mild wetness (2025-05)
WebWIMP H_2O Balance	Dry Season

30 Days Ending	30th %ile (in)	70th %ile (in)	Observed (in)	Wetness Condition	Condition Value	Month Weight	Product
2025-06-08	3.60748	4.549213	4.307087	Normal	2	3	6
2025-05-09	2.375984	4.666536	4.228347	Normal	2	2	4
2025-04-09	1.684252	2.756693	3.003937	Wet	3	1	3
Result							Normal Conditions - 13

Weather Station Name	Coordinates	Elevation (ft)	Distance (mi)	Elevation Δ	Weighted Δ	Days Normal	Days Antecedent
WASECA S RSCH & OUTREACH CTR	44.0706, -93.5264	1146.982	25.306	368.176	20.705	11296	78
WASECA 1.6 SSE	44.0631, -93.4865	1162.074	2.048	15.092	0.953	0	9
WASECA 2.0 N	44.1119, -93.4997	1130.906	3.146	16.076	1.466	0	3
WASECA 8.2 WSW	44.0512, -93.6613	1083.99	6.831	62.992	3.504	2	0
MADISON LAKE 4.6 NNW	44.2635, -93.8596	995.079	21.221	151.903	12.773	1	0
MONTGOMERY	44.4597, -93.6631	1100.066	27.722	46.916	13.776	23	0
MANKATO	44.1542, -94.0211	850.066	25.211	296.916	18.83	31	0

This climatic data was gathered using the Climatology Working Group Website, http://climate.umn.edu/ and the National Weather Service Forecast Office, http://w2.weather.gov/climate/. The information for the investigation was retrieved from the WETS Station in St Peter (ID 217405)

V. FINDINGS

On June 10, 2025 a field investigation was performed to evaluate and verify the existence and boundary of any aquatic resources located within the study area. Two wetland systems and one channel were found to exist within the study area. The following describes the aquatic resources identified, together with a brief description of wetland types and observations made during the field investigation.

Wetland 1 (W1-A & W1-B):
NWI Cowardin: PEM1A
PWI (Hydro) ID: None
Field Observation Circular 39: Type 2
Field Observation Eggers and Reed: Fresh (wet) Meadow
Soil Mapping Unit(s): 160-Fieldon loam

Wetland 1 consists of depression basin. The field investigation found that the site has met all three wetland indicators and this wetland complex should be considered a palustrine emergent persistent temporarily flooded (PEM1A) wetland. Two sample points were taken to determine the wetland boundary. The wetland boundary was largely drawn based on the changes in topography.

At the W1-A wetland pit location, the plant community was dominated by reed canary grass in the herb stratum. The W1-B upland pit location was dominated by Kentucky blue grass in the herb stratum. Both locations met hydrophytic vegetation. Soils in the W1-A wetland pit location met the hydric soil indicator A11-Depleted Below Dark Surface. Soils in the W1-B upland pit location did not meet any of the hydric soil indicators. The W1-A wetland location met two secondary indicators of D2-Geomorphic Position and D5-FAC-neutral Test. The W1-B upland pit did not meet any hydrology indicators. From these observations, the wetland boundary was established for this area.



Photo 1: View of the W1-A (blue flag) & W1-B (green flag) sample points looking into the wetland.



Photo 2: View of the wetland 1 fresh (wet) meadow. Looking west.



Photo 3: Incidental Wetland, looking north.

VI. CONCLUSION

The delineation was performed on June 10, 2025 The boundaries of the wetlands were staked in the field with three foot "Wetland Delineation" pin flags. The location of the pin flags were surveyed by Bolton & Menk, Inc. using a Juniper Geode Data Collector and tied to the Blue Earth County coordinate system. The delineated limits are believed to be the upper limits of where all three of the required wetland criteria were present.

Bolton & Menk, Inc., was asked to determine the boundaries of those jurisdictional wetlands that exist upon this property as defined by the Wetland Conservation Act.

Based upon all available information, the existing conditions that currently prevail, and the on-site investigation, evidence supports the presence of two wetland systems and one channel within the boundaries of the study area.

WETLAND SUMMARY

Id #	Wetland Type^	Size*
W1	Type 2 (Fresh (wet) Meadow)	0.15 ac
Total:		**0.15 ac**

**size measured within study area.*
^wetland type within study area

Sincerely,
BOLTON & MENK, INC.



Addeline Theis Paradis
Certified Wetland Delineator, No. 1434

APPENDIX

Camp Quarry Adventure Park

Lime TWP, Blue Earth County, MN

Exhibit A: Location Map

June 2025

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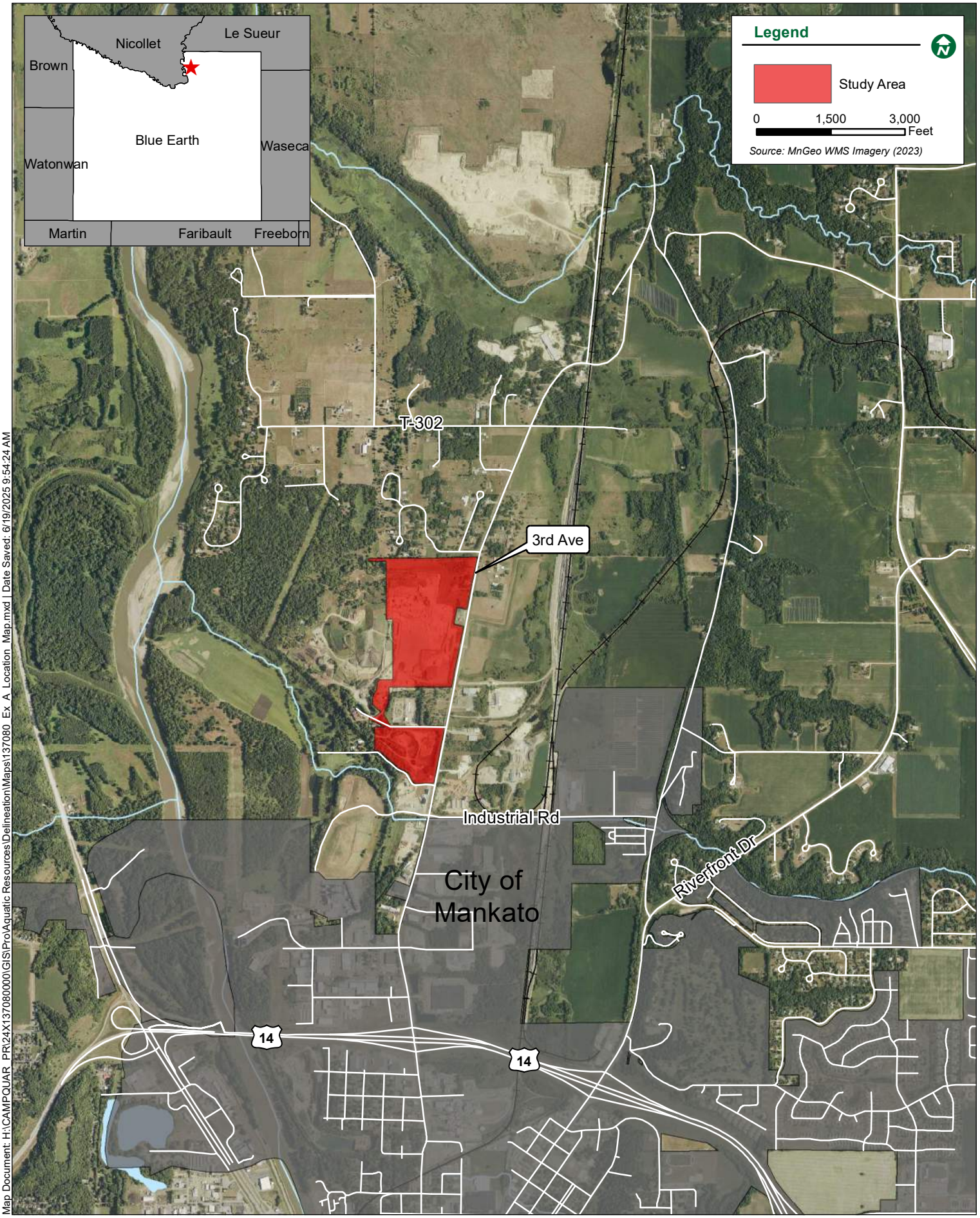

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Camp Quarry Adventure Park

Lime TWP, Blue Earth County, MN

Exhibit B-1: 2-Foot LiDAR Contours Map

June 2025

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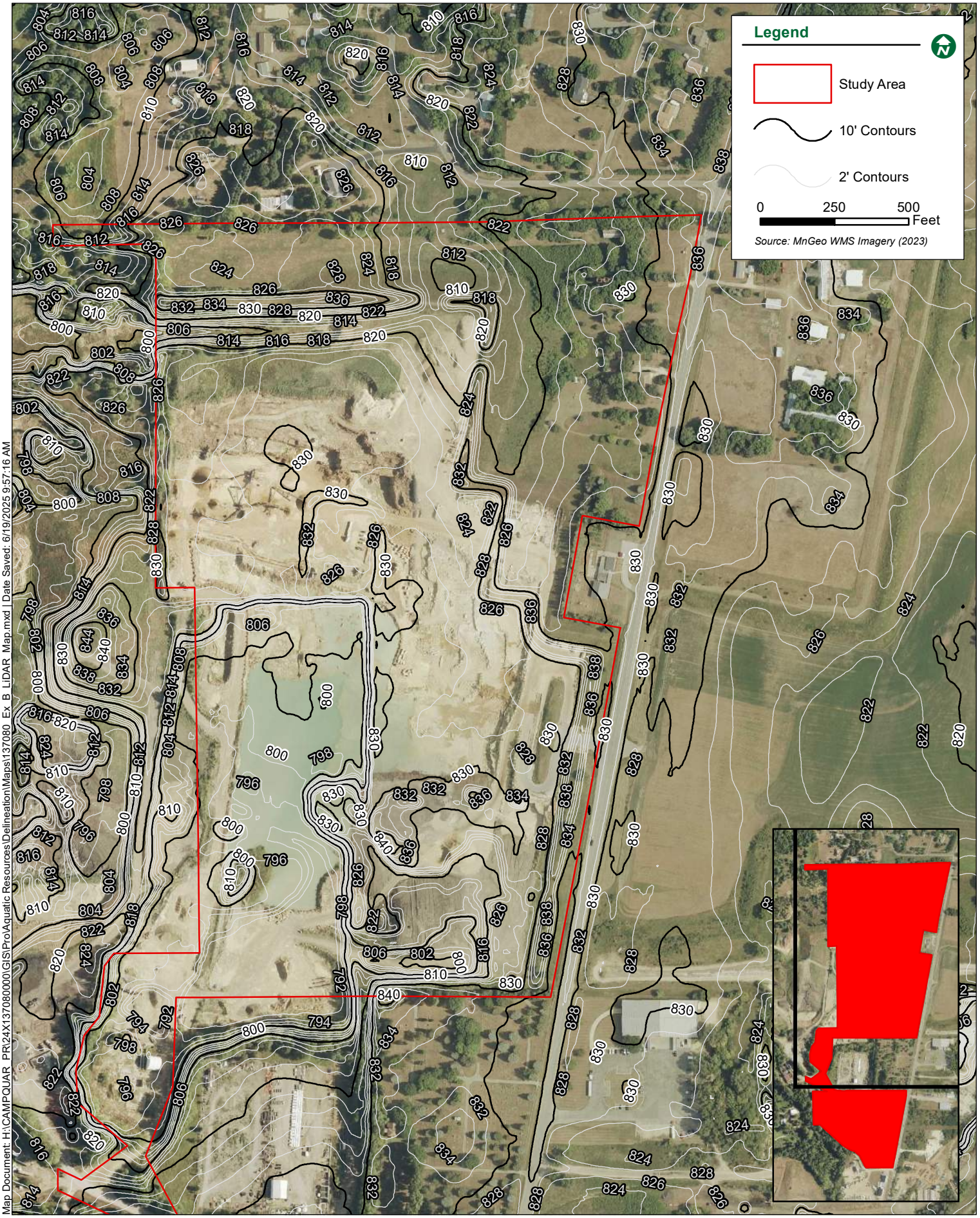

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Camp Quarry Adventure Park

Lime TWP, Blue Earth County, MN

Exhibit B-2: 2-Foot LiDAR Contours Map

June 2025

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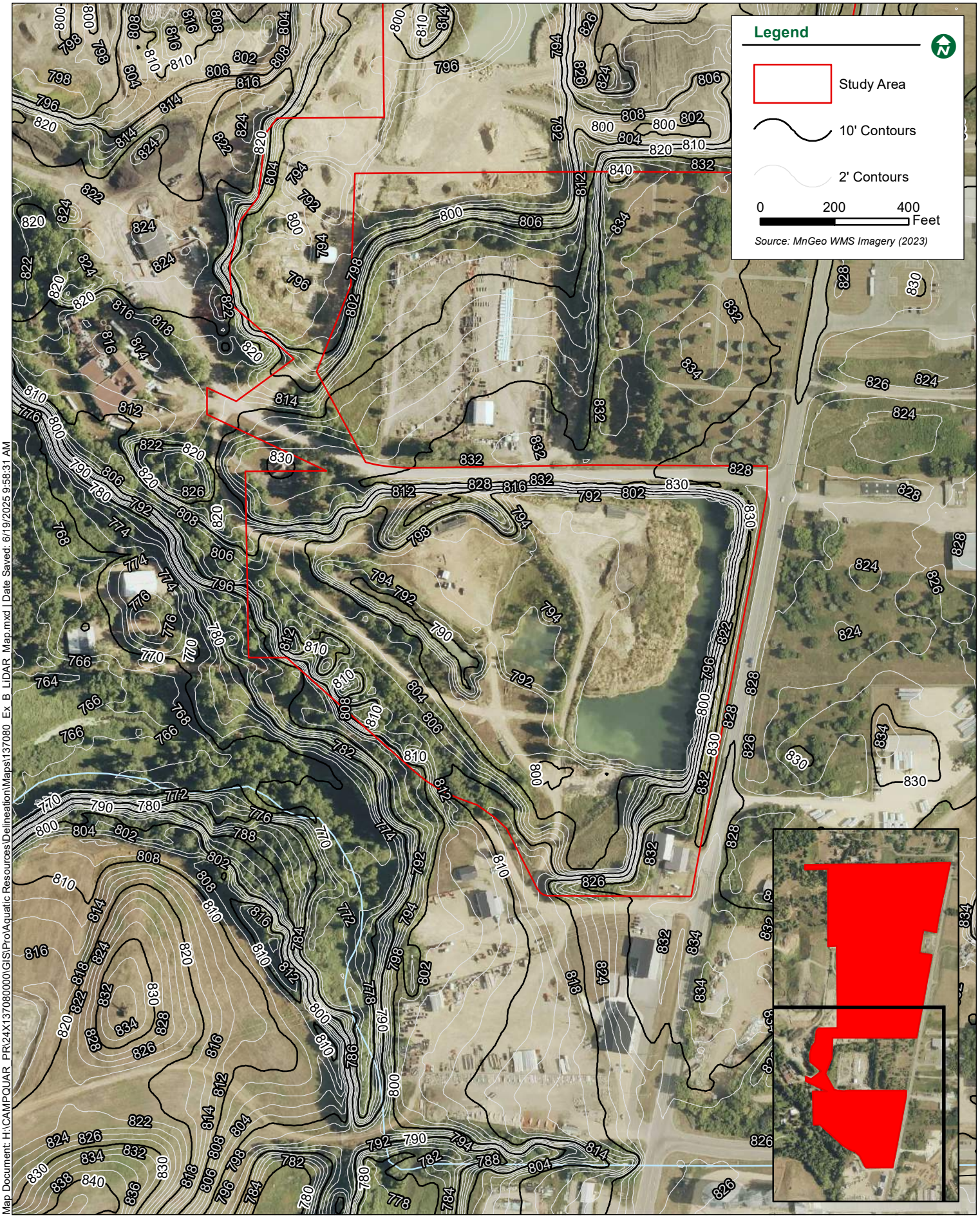

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Camp Quarry Adventure Park

Lime TWP, Blue Earth County, MN

Exhibit C: National Wetlands Inventory Map

June 2025

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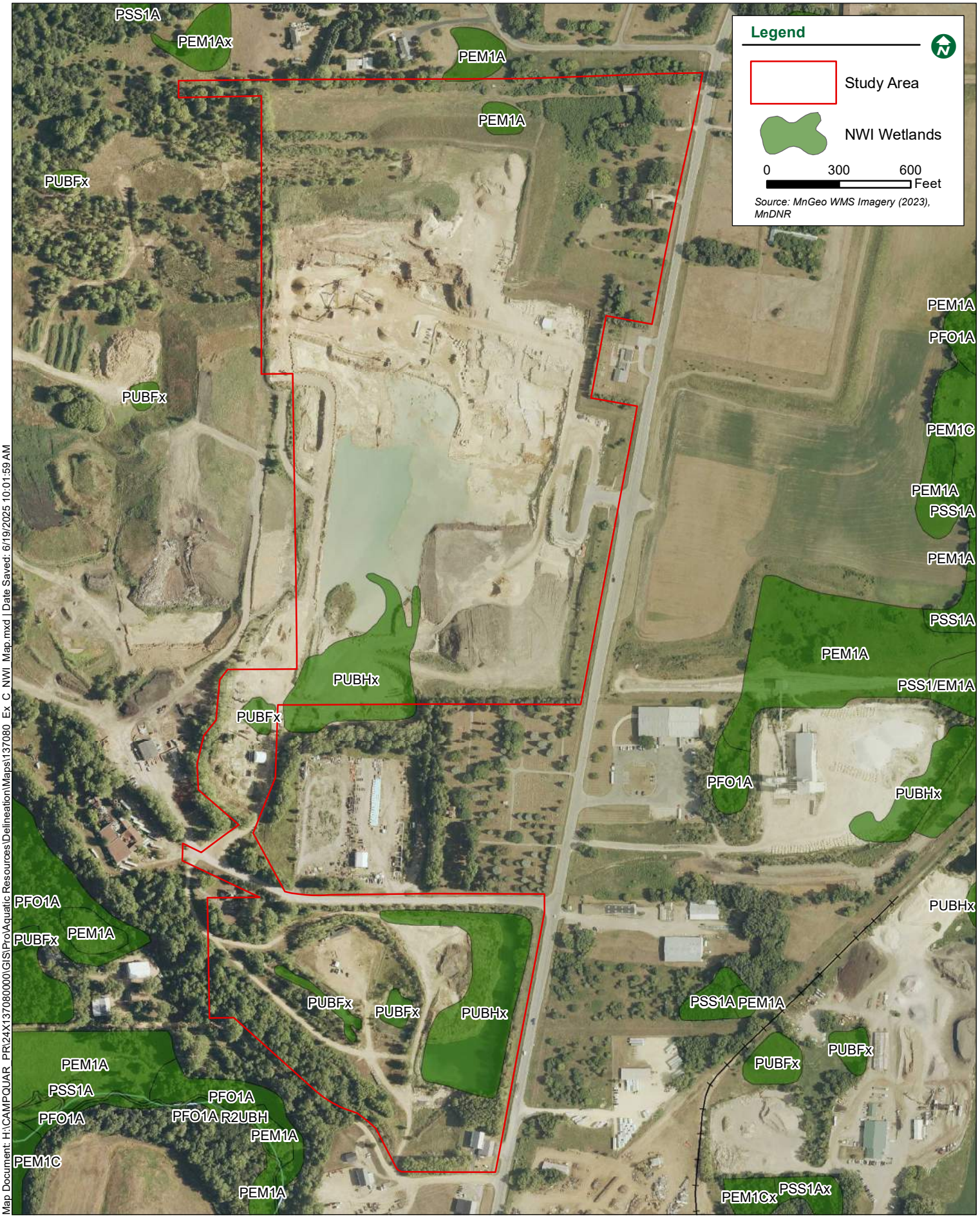

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Camp Quarry Adventure Park

Lime TWP, Blue Earth County, MN

Exhibit D: Public Waters Inventory Map

June 2025

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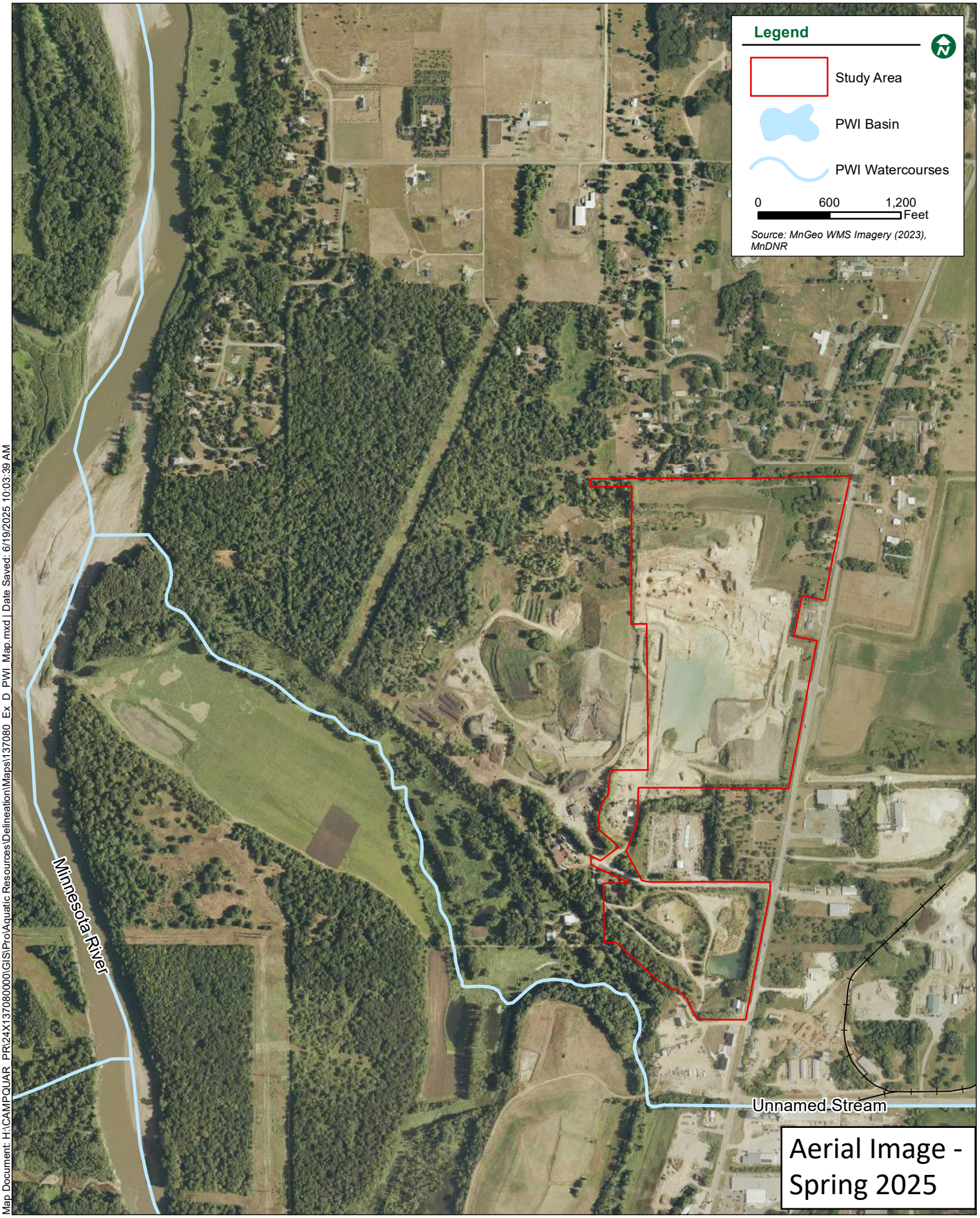

Map Document: H:\CAMPQUAR_PR\24X137080000\GIS\Pro\Aquatic Resources\Delineation\Maps\137080_Ex_D_PWI_Map.mxd | Date Saved: 6/19/2025 10:03:39 AM

Camp Quarry Adventure Park

Lime TWP, Blue Earth County, MN

Exhibit E: Blue Earth County Soil Survey Map

June 2025

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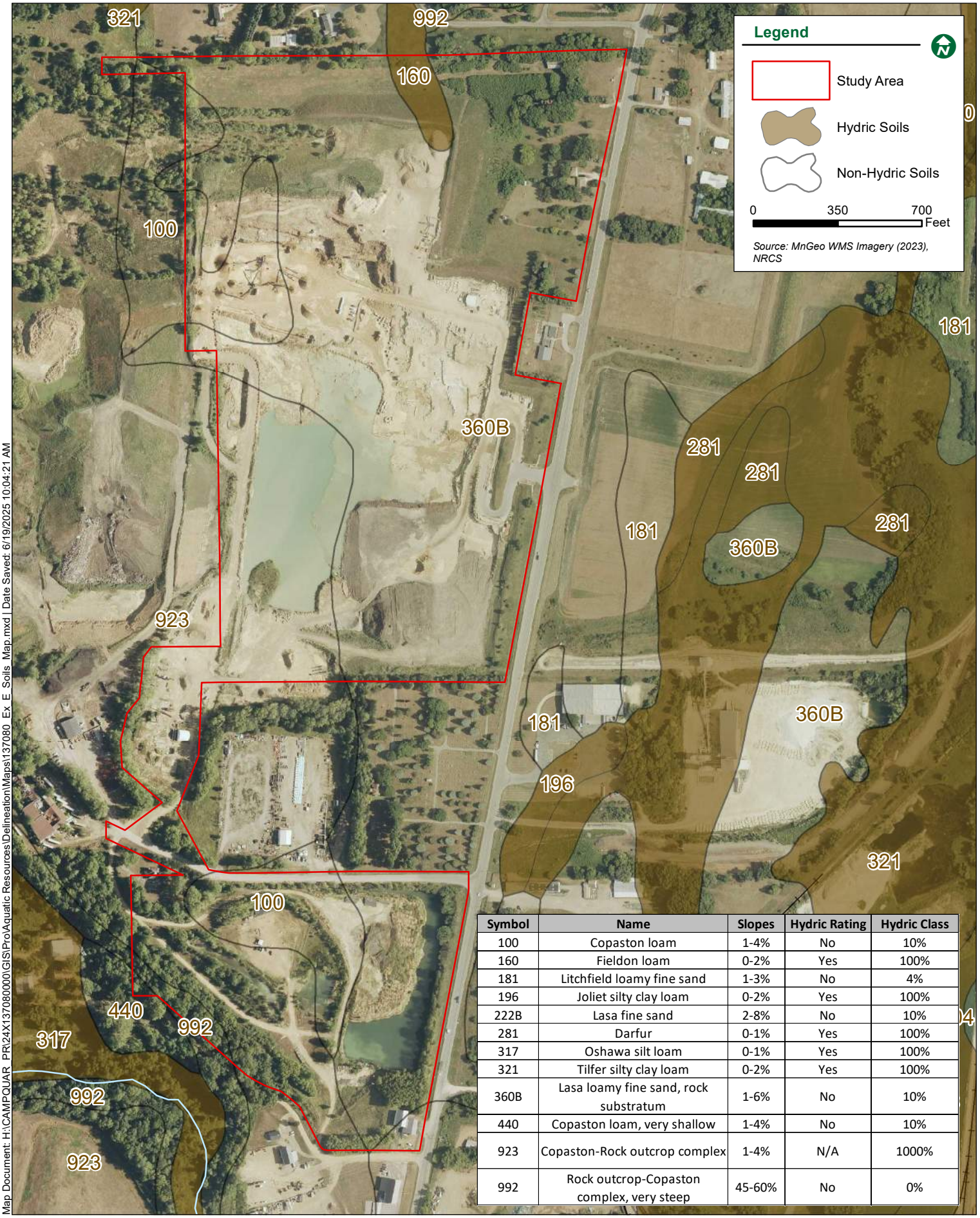

Symbol	Name	Slopes	Hydric Rating	Hydric Class
100	Copaston loam	1-4%	No	10%
160	Fieldon loam	0-2%	Yes	100%
181	Litchfield loamy fine sand	1-3%	No	4%
196	Joliet silty clay loam	0-2%	Yes	100%
222B	Lasa fine sand	2-8%	No	10%
281	Darfur	0-1%	Yes	100%
317	Oshawa silt loam	0-1%	Yes	100%
321	Tilfer silty clay loam	0-2%	Yes	100%
360B	Lasa loamy fine sand, rock substratum	1-6%	No	10%
440	Copaston loam, very shallow	1-4%	No	10%
923	Copaston-Rock outcrop complex	1-4%	N/A	1000%
992	Rock outcrop-Copaston complex, very steep	45-60%	No	0%

Map Document: H:\CAMPQUAR_PR\24X137080000\GIS\Pro\Aquatic Resources\Delineation\Maps\137080_Ex_E_Soils_Map.mxd | Date Saved: 6/19/2025 10:04:21 AM

Camp Quarry Adventure Park

Lime TWP, Blue Earth County, MN

Exhibit F-1: Wetland Delineation Map

June 2025

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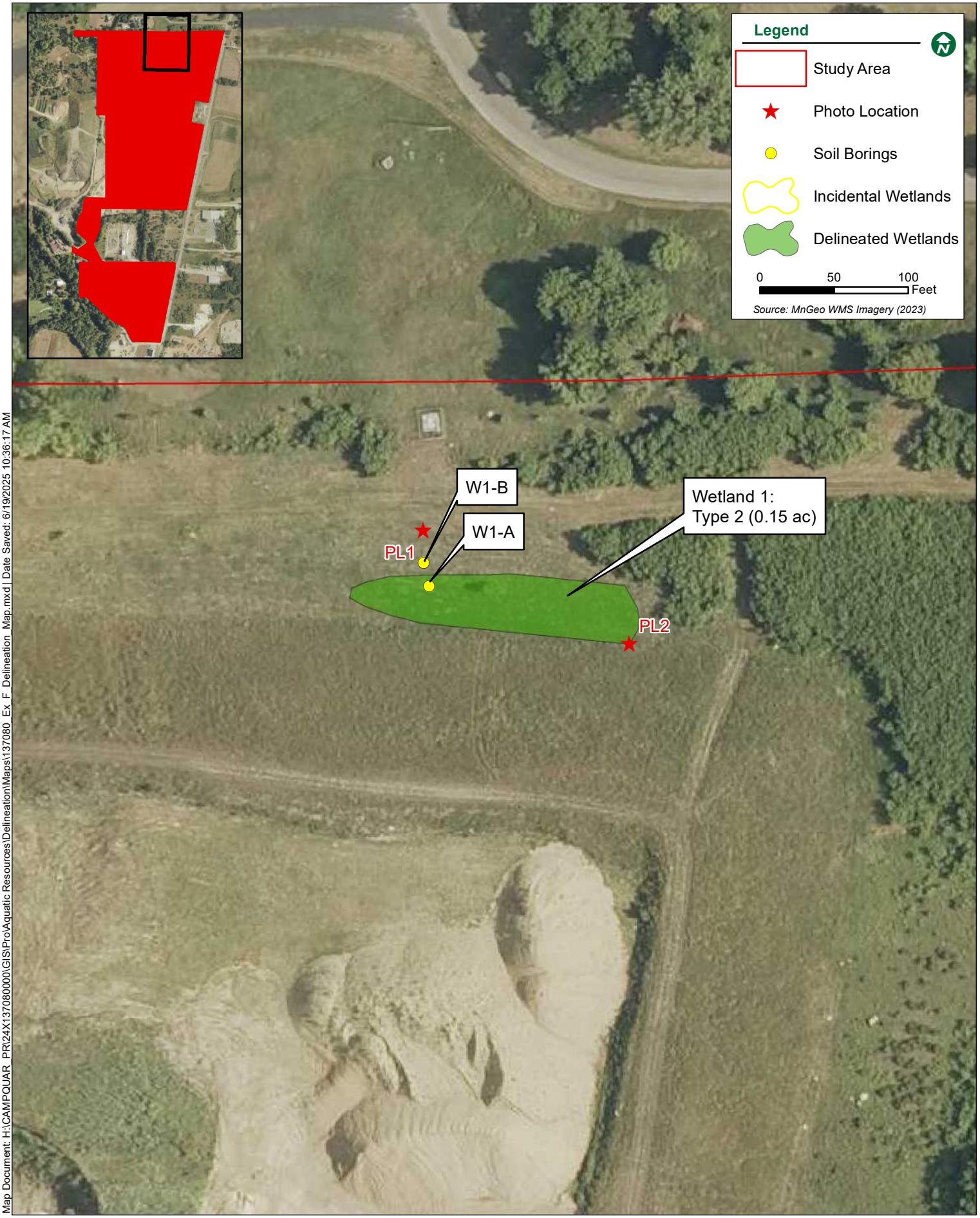

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Camp Quarry Adventure Park

Lime TWP, Blue Earth County, MN

Exhibit F-2: Wetland Delineation Map

June 2025

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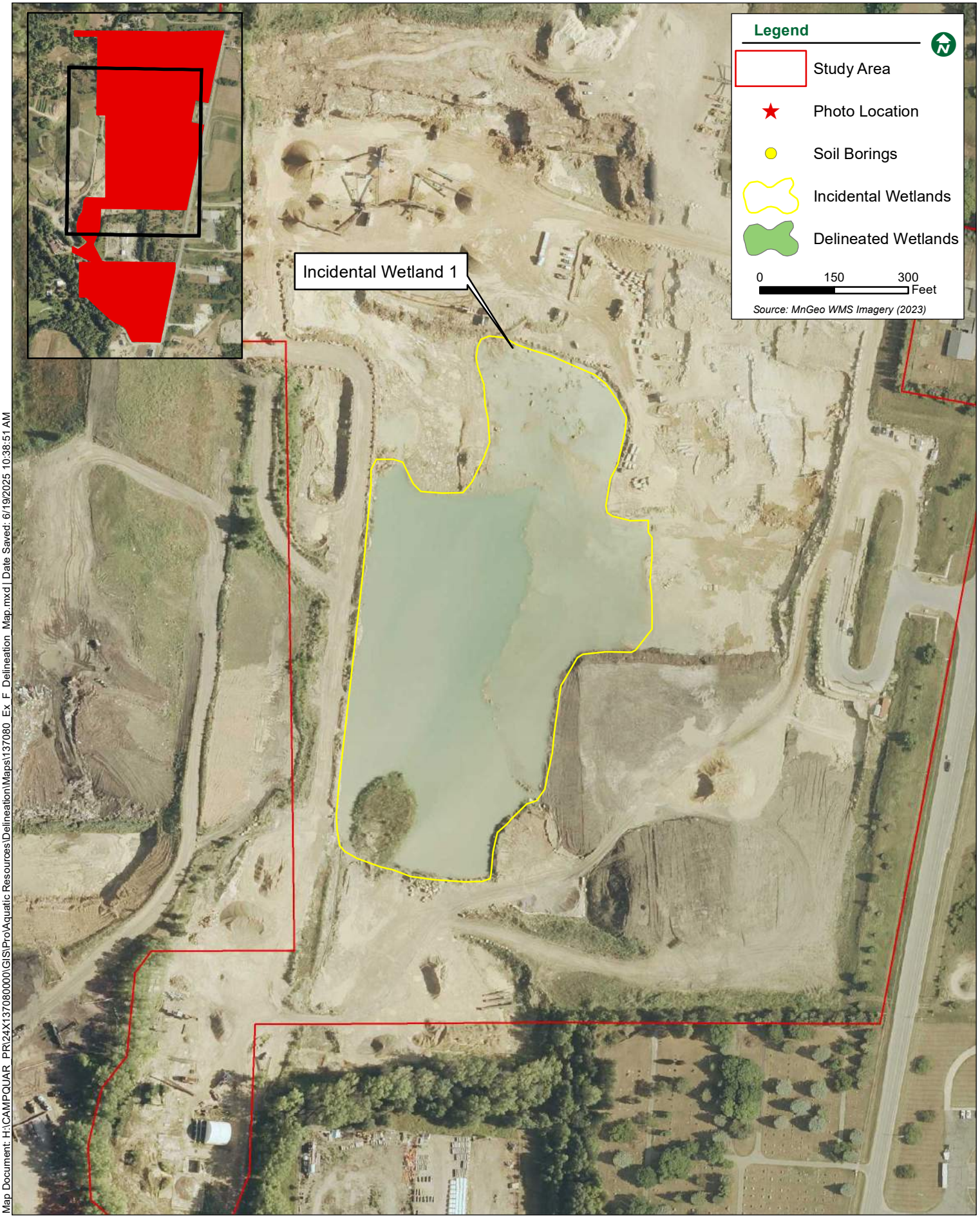

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Camp Quarry Adventure Park

Lime TWP, Blue Earth County, MN

Exhibit F-3: Wetland Delineation Map

June 2025

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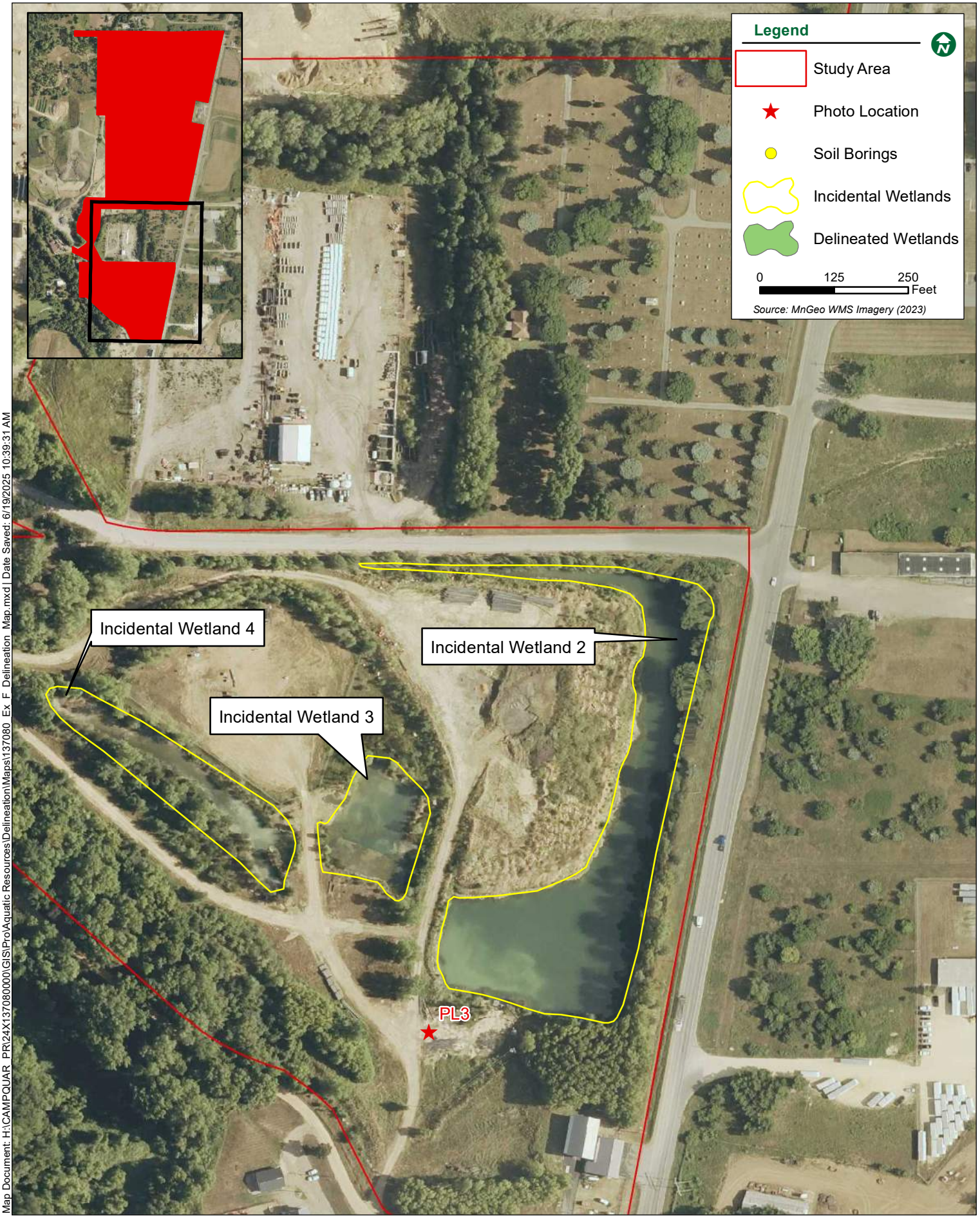

Map Document: H:\CAMPQUAR_PR\24X137080000\GIS\Pro\Aquatic Resources\Delineation\Maps\137080_Ex_F_Delineation_Map.mxd | Date Saved: 6/19/2025 10:39:31 AM

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EXHIBIT G:
WETLAND DETERMINATION DATA FORM
(Midwest Region)

Project/Site: **Camp Quarry Adventure Park** City/County: **Lime Township/Blue Earth County** Sampling Date: **6/10/2025**

Applicant/Owner: **CampQuarry LLC** State: **Minnesota** Sample Point: **W1-A**

Investigator(s): **Addeline Theis Paradis** Section, Township, Range: **S31 T109 R26**

Landforms (hillside, terrace, etc.): **Depression** Local Relief (concave, convex, none): **Concave**

Slope (%): **0-2** Latitude: Longitude: Datum:

Soil Map Unit Name: **160-Fieldon loam** NWI Classification: **PEM1A**

Are climatic/hydrologic conditions of the site typical for this time of year? **Yes** (If no, explain in remarks)

Are vegetation , soils , or hydrology significantly disturbed? Are normal circumstances present? **Yes**

Are vegetation , soils , or hydrology naturally problematic? (If needed, explain any answers in Remarks)

SUMMARY OF FINDINGS

Hydrophytic vegetation present?	**Yes**
Hydric soils present?	**Yes**
Wetland hydrology present?	**Yes**
Is the sampled area within a wetland?	**Yes**

Remarks: **No mowing is occuring in this area.**

VEGETATION - Use scientific names of plants

Tree Stratum (Plot size: 30 feet)	Absolute % Cover	Dominant Species	Indicator Status
1			
2			
3			
4			
5			
	=Total Cover		
Sapling/Shrub stratum (Plot size: 15 feet)			
1			
2			
3			
4			
5			
	20 =Total Cover		
Herb stratum: (Plot size: 5 feet)			
1 **Phalaris arundinacea**	**75**	**Yes**	**FACW**
2 **Solidago gigantea**	**22**	**No**	**FACW**
3 **Circium arvense**	**10**	**No**	**FACU**
4			
5			
6			
7			
8			
9			
10			
	107 =Total Cover		
Woody vine stratum: (Plot size: 15 feet)			
1			
2			
	=Total Cover		

Dominance Test Worksheet

Number of dominant species that are OBL, FACW, or FAC: **1** (A)

Total number of dominant species across all strata: **1** (B)

Percent of dominant species that are OBL, FACW or FAC: (A/B)

Prevalence Index Worksheet

Total % cover of:

OBL Species:	**0**	x 1 =	**0**
FACW Species:	**97**	x 2 =	**194**
FAC Species:	**0**	x 3 =	**0**
FACU species:	**20**	x 4 =	**40**
UPL Species:	**0**	x 5 =	**0**
Totals:	**117** (A)		**234** (B)

Prevalence Index (B/A): **2.00**

Hydrophytic Vegetation Indicators

- Rapid test for hydrophytic vegetation
- **X** Dominance test >50%
- **X** Prevalence index is ≤3.0*
- Morphological adaptations* (Provide supporting data in remarks)
- Problematic hydrophytic vegetation* (Explain in remarks)

*Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic

Hydrophytic vegetation present? **Yes**

Remarks:

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EXHIBIT G:
WETLAND DETERMINATION DATA FORM

(Midwest Region)

Sample Point: **W1-A**

SOILS

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type*	Loc**		
0-15	**10YR 2/1**	**100**					**Clay Loam**	
16 to 25	**10YR 4/2**	**90**	**7.5YR 4/6**	**10**	**C**	**M**	**Clay Loam**	

*Type: C = Concentration, D = Depletion, RM = Reduced Matrix, MS = Masked Sand Grains. **Location: PL = Pore Lining, M = Matrix

Hydric Soil Indicators:

- ___ Histisol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ 2 cm Muck (A10)
- **X** Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Material (S1)
- ___ 5 cm Mucky Peat or Peat (S3)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Material (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils*:

- ___ Coast Prairie Redox (A16)(**LRR K,L,R**)
- ___ Dark Surface (S7)(**LRR K, L**)
- ___ Iron-Manganese Masses (F12)(**LRR K, L, R**)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in remarks)

*Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soils Present? **Yes**

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ True Aquatic Plants (B14)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence or Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Gauge or Well Data (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Crack (B6)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- **X** Geomorphic Position (D2)
- **X** FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? **No** Depth (inches): _____

Water Table Present? **No** Depth (inches): _____

Saturation Present? **No** Depth (inches): _____

Indicators of Wetland Hydrology Present? **Yes**

Remarks:

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EXHIBIT G:
WETLAND DETERMINATION DATA FORM
(Midwest Region)

Project/Site: **Camp Quarry Adventure Park** City/County: **Lime Township/Blue Earth County** Sampling Date: **6/10/2025**

Applicant/Owner: **CampQuarry LLC** State: **Minnesota** Sample Point: **W1-B**

Investigator(s): **Addeline Theis Paradis** Section, Township, Range: **S31 T109 R26**

Landforms (hillside, terrace, etc.): **Footslope** Local Relief (concave, convex, none): **Linear**

Slope (%): **3-5** Latitude: Longitude: Datum:

Soil Map Unit Name: **160-Fieldon loam** NWI Classification: **None**

Are climatic/hydrologic conditions of the site typical for this time of year? **Yes** (If no, explain in remarks)

Are vegetation , soils , or hydrology significantly disturbed? Are normal circumstances present? **Yes**

Are vegetation , soils , or hydrology naturally problematic? (If needed, explain any answers in Remarks)

SUMMARY OF FINDINGS

Hydrophytic vegetation present?	**Yes**
Hydric soils present?	**No**
Wetland hydrology present?	**No**

Is the sampled area within a wetland? **No**

Remarks:

VEGETATION - Use scientific names of plants

Tree Stratum (Plot size: 30 feet)	Absolute % Cover	Dominant Species	Indicator Status
1			
2			
3			
4			
5			
	=Total Cover		
Sapling/Shrub stratum (Plot size: 15 feet)			
1			
2			
3			
4			
5			
	35 =Total Cover		
Herb stratum: (Plot size: 5 feet)			
1 **Poa pratensis**	**70**	**Yes**	**FAC**
2 **Bromus inermis**	**25**	**No**	**FACU**
3 **Carex molesta**	**12**	**No**	**FAC**
4 **Asclepias syriaca**	**7**	**No**	**FACU**
5			
6			
7			
8			
9			
10			
	114 =Total Cover		
Woody vine stratum: (Plot size: 15 feet)			
1			
2			
	=Total Cover		

Dominance Test Worksheet

Number of dominant species that are OBL, FACW, or FAC: **1** (A)

Total number of dominant species across all strata: **1** (B)

Percent of dominant species that are OBL, FACW or FAC: **100%** (A/B)

Prevalence Index Worksheet

Total % cover of:

OBL Species:	**0**	x 1 =	**0**
FACW Species:	**0**	x 2 =	**0**
FAC Species:	**82**	x 3 =	**246**
FACU species:	**32**	x 4 =	**128**
UPL Species:	**0**	x 5 =	**0**
Totals:	**114** (A)		**375** (B)

Prevalence Index (B/A): **3.29**

Hydrophytic Vegetation Indicators

- Rapid test for hydrophytic vegetation
- **X** Dominance test >50%
- **X** Prevalence index is ≤3.0*
- Morphological adaptations* (Provide supporting data in remarks)
- Problematic hydrophytic vegetation* (Explain in remarks)

*Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic

Hydrophytic vegetation present? **Yes**

Remarks:

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EXHIBIT G:
WETLAND DETERMINATION DATA FORM

(Midwest Region)

Sample Point: **W1-B**

SOILS

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type*	Loc**		
0 to17	**10YR 3/1**	**100**					**Silty Clay Loam**	

*Type: C = Concentration, D = Depletion, RM = Reduced Matrix, MS = Masked Sand Grains. **Location: PL = Pore Lining, M = Matrix

Hydric Soil Indicators:

- ___ Histisol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5)
- ___ 2 cm Muck (A10)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Material (S1)
- ___ 5 cm Mucky Peat or Peat (S3)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Material (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils*:

- ___ Coast Prairie Redox (A16)(**LRR K,L,R**)
- ___ Dark Surface (S7)(**LRR K, L**)
- ___ Iron-Manganese Masses (F12)(**LRR K, L, R**)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in remarks)

*Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soils Present? **No**

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9)
- ___ Aquatic Fauna (B13)
- ___ True Aquatic Plants (B14)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence or Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Gauge or Well Data (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Crack (B6)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Stunted or Stressed Plants (D1)
- ___ Geomorphic Position (D2)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? **No** Depth (inches): _____

Water Table Present? **No** Depth (inches): _____

Saturation Present? **No** Depth (inches): _____

Indicators of Wetland Hydrology Present? **No**

Remarks:

Conservation Planning Report: Camp Quarry Adventure Park, Lime Township, MN (24X.137080)

This document is intended for planning purposes only for the area of interest defined by the user. The report identifies ecologically significant areas documented within the defined area of interest plus any additional search distance indicated below. These ecologically significant areas can be viewed in the Explore Tab of the Minnesota Conservation Explorer. Please visit MN Geospatial Commons for downloadable GIS data.

This document does not meet the criteria for a Natural Heritage Review. If a Natural Heritage Review is needed, please define an Area of Interest in the Explore Tab and click on the Natural Heritage Review option.

This document does not include known occurrences of state-listed or federally listed species.

MBS Sites of Biodiversity Significance

Search distance = 330 feet

Minnesota Biological Survey (MBS) Sites of Biodiversity Significance are areas with varying levels of native biodiversity that may contain high quality native plant communities, rare plants, rare animals, and/or animal aggregations. A Biodiversity Significance Rank is assigned on the basis of the number of rare species, the quality of the native plant communities, size of the site, and context within the landscape. MBS Sites are ranked Outstanding, High, or Moderate. Areas ranked as Below were found to be disturbed and are retained in the layer as negative data. These areas do not meet the minimum biodiversity threshold for statewide significance but may have conservation value at the local level as habitat for native plants and animals, corridors for animal movements, buffers surrounding higher quality natural areas, or as areas with high potential for restoration of native habitat. The DNR recommends avoidance of MBS Sites of Biodiversity Significance ranked High or Outstanding.

Wetlands within MBS Sites of Outstanding or High Biodiversity Significance may be considered Rare Natural Communities under the Wetland Conservation Act. For technical guidance on Rare Natural Communities, please visit WCA Program Guidance and Information.

For more information please visit MBS Sites of Biodiversity Significance.

The following MBS Sites of Biodiversity Significance are within the search area:

MBS Site Name	Biodiversity Significance	Status
LIME 30	Moderate	final

DNR Native Plant Communities

Search distance = 330 feet

A native plant community is a group of native plants that interact with each other and with their environment in ways not greatly altered by modern human activity or by introduced organisms. These groups of native plant species form recognizable units, such as oak savannas, pine forests, or marshes, that tend to repeat over space and time. Native plant communities are classified and described by considering vegetation, hydrology, landforms, soils, and natural disturbance regimes.

DNR Native Plant Community types and subtypes are given a Conservation Status Rank that reflects the relative rarity and endangerment of the community type in Minnesota. Conservation Status Ranks range from S1 (critically imperiled) to S5 (secure, common, widespread, and abundant). Native plant communities with a Conservation Status Rank of S1 through S3 are considered rare in the state. The DNR recommends avoidance of rare native plant communities.

Wetland native plant communities with a conservation status rank of S1 through S3 may also be considered Rare Natural Communities under the Wetland Conservation Act. For technical guidance on Rare Natural Communities, please visit WCA Program Guidance and Information.

DNR Native Plant Communities may be given a Condition Rank that reflects the degree of ecological integrity of a specific occurrence of a native plant community. The Condition Rank is based on species composition, vegetation structure, ecological processes and functions, level of human disturbance, presence of exotic species, and other factors. Condition Ranks range from A-rank (excellent ecological integrity) to D-rank (poor ecological integrity. A Condition Rank of NR means Not Ranked and a Condition Rank of MULTI mean multiple ranks are present because the record is a native plant community complex.

For more information please visit Minnesota's Native Plant Communities.

The following DNR Native Plant Communities are within the search area:

MBS Site Name	NPC Code	Native Plant Community Classification	Conservation Status Rank	Number of Communities
LIME 30	UPs13c	Dry Bedrock Bluff Prairie (Southern)	S3	2

Calcareous Fens

Search distance = 5 miles

A calcareous fen is a rare and distinctive peat-accumulating wetland that is legally protected in Minnesota under the Wetland Conservation Act (*Minnesota Statutes*, section 103G.223). Many of the unique characteristics of calcareous fens result from the upwelling of groundwater through calcareous substrates. Because of this dependence on groundwater hydrology, calcareous fens can be affected by nearby activities or even those several miles away. For more information regarding calcareous fens, please see the Calcareous Fen Fact Sheet or review the List of Known Calcareous Fens.

The following Calcareous Fens are within the search area:

Fen Site Name	Fen ID	TRS
Kasota 7	34551	109N026W - 7
Lime 30	38219	109N027W - 25; 109N026W - 30

DNR Old Growth Stands

Search distance = 330 feet

Old-growth forests are natural forests that have developed over a long period of time, generally at least 120 years, without experiencing severe, stand-replacing disturbances such as fires, windstorms, or logging. Old-growth forests are a unique, nearly vanished piece of Minnesota's history and ecology; less than 4% of Minnesota's old-growth forests remain. The DNR recommends avoidance of all DNR Old Growth Stands. The following DNR Old Growth Stands have been documented within the search area.

SEARCH RESULTS: No features were found within the search area.

MN Prairie Conservation Plan

Search distance = 330 feet

The Minnesota Prairie Conservation Plan, a twenty-five year strategy for accelerating prairie conservation in the state, identifies Core Areas, Corridors, and Corridor Complexes as areas to focus conservation efforts. The Plan's strategies include protection, enhancement, and restoration of grassland and wetland habitat. To meet the Plan's goals, approaches within Core Areas will need to include restoration and approaches within Corridors will need to include conservation of grassland habitat which can provide stepping stones between larger Core Areas.

SEARCH RESULTS: No features were found within the search area.

Important Bird Areas

Search distance = 1 mile

Important Bird Areas, identified by Audubon Minnesota in partnership with the DNR, are part of an international conservation effort aimed at conserving globally important bird habitats. They are voluntary and non-regulatory, but the designation demonstrates the significant ecological value of the area.

The following Important Birds Areas are within the search area:

- Upper Minnesota River Valley IBA

Lakes of Biological Significance

Search distance = 330 feet

Lakes of Biological Significance are high quality lakes as determined by the aquatic plant, fish, bird, or amphibian communities present within the lake. To be included in this layer, a lake only needs to meet the criteria for one of these four community types. The lake is assigned a biological significance of Outstanding, High, or Moderate based on the community with the highest quality.

SEARCH RESULTS: No features were found within the search area.

USFWS Habitat Conservation Plans

A Habitat Conservation Plan (HCP) is a mechanism for compliance with the federal Endangered Species Act for a given set of activities and protected species. An HCP is required by the U.S. Fish and Wildlife Service (USFWS) as part of an application for an incidental take permit (ITP). The ITP allows the permit holder to proceed with activities covered in the HCP that could result in the unintentional take of federally listed species.

Lakes States Forest Management Bat Habitat Conservation Plan (Bat HCP): (search distance = 0; within area of interest only) This HCP was created to provide flexibility to the Minnesota Department of Natural Resources (DNR) to manage forests while addressing federal Endangered Species Act (ESA) regulations related to federally threatened and endangered bat species. The Bat HCP covers three bat species within Minnesota: northern long-eared bat, little brown bat, and tricolored bat. This report is intended to help non-federal, non-DNR landowners evaluate their potential eligibility for the Landowner Enrollment Program of the Bat HCP (For DNR-administered land, DNR staff should refer to the Bat HCP Implementation Policy).

Landowner Enrollment Program – DNR's incidental take permit may be extended through the Landowner Enrollment Program (LEP) to eligible non-federal landowners who conduct forest management activities. Landowners may be eligible to enroll in the LEP if they are a county land administrator, own more than 10,000 acres, or own land that overlaps a Bat HCP feature. The results below indicate if the defined area of interest overlaps a Bat HCP feature. For more information on how to enroll in the LEP, please visit the Landowner Enrollment Program (LEP).

SEARCH RESULTS: No Bat HCP features were found within the area of interest. Landowners are only eligible to apply for the Landowner Enrollment Program if they are a county land administrator or they own more than 10,000 acres.

USFWS Regulatory Layers

To ensure compliance with federal law, conduct a federal regulatory review using the U.S. Fish and Wildlife Service's (USFWS) online Information for Planning and Consultation (IPaC) tool. This report is not a substitution for a Section 7 review.

For informational purposes only, this tool currently checks the following USFWS Regulatory Layers:

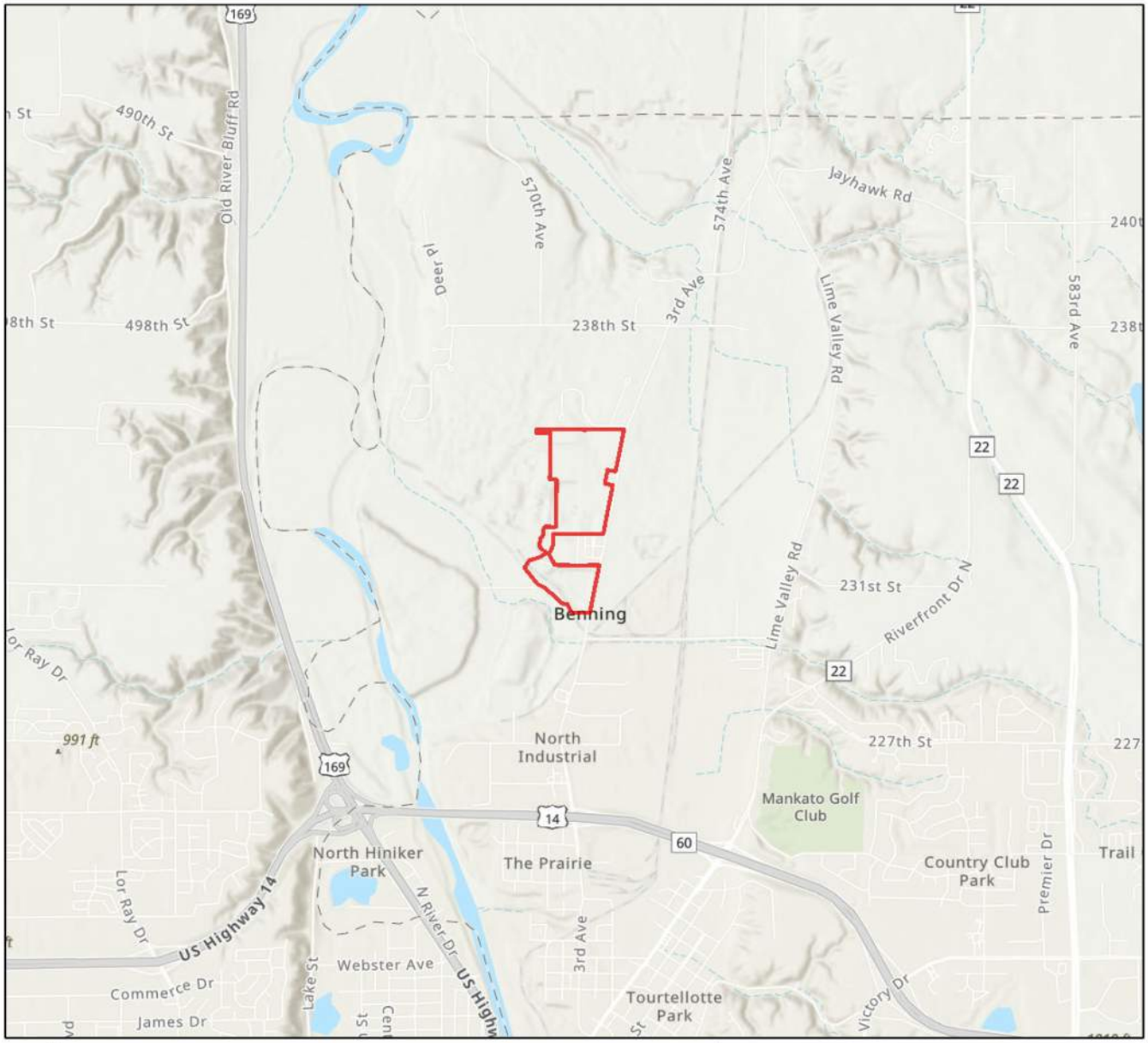
Rusty Patched Bumblebee High Potential Zones: (*search distance = 0; within area of interest only*) The rusty patched bumble bee (*Bombus affinis*), federally listed as endangered, is likely to be present in suitable habitat within the high potential zones. From April through October this species uses underground nests in upland grasslands, shrublands, and forest edges, and forages where nectar and pollen are available. From October through April the species overwinters under tree litter in upland forests and woodlands. The rusty patched bumble bee may be impacted by a variety of land management activities including, but not limited to, prescribed fire, tree-removal, haying, grazing, herbicide use, pesticide use, land-clearing, soil disturbance or compaction, or use of non-native bees. The USFWS RPBB guidance provides guidance on avoiding impacts to rusty patched bumble bee and a key for determining if actions are likely to affect the species; the determination key can be found in the appendix. Please visit the USFWS Rusty Patched Bumble Bee Map for the most current locations of High Potential Zones.

The following USFWS Regulatory Species are within the search area:

- Rusty Patched Bumble Bee High Potential Zone

mp Quarry Adventure Park, Lime Township, MN (24X.1370

Conservation Planning Map





0 0.3 0.6 1.2 1.8 2.4 Miles

Area of Interest



Size (acres): 128.46

County(s): Blue Earth

Esri, TomTom, Garmin, FAO, NOAA, USGS, EPA, USFWS
Esri, NASA, NGA, USGS, FEMA
Esri, TomTom, Garmin, SafeGraph, GeoTechnologies, Inc, METI/NASA, USGS,

DEPARTMENT OF NATURAL RESOURCES

Minnesota Department of Natural Resources
Division of Ecological & Water Resources
500 Lafayette Road, Box 25
St. Paul, MN 55155-4025

August 14, 2025

Heather Mullenbach
Bolton & Menk, Mankato Minnesota

RE: Natural Heritage Review of the proposed **Camp Quarry Adventure Park, Lime Township, MN (24X.137080)**, T109N R26W Sections 30-31; Blue Earth County

Dear Heather Mullenbach,

For all correspondence regarding the Natural Heritage Review of this project please include the project ID **MCE-2025-00465** in the email subject line.

As requested, the Minnesota Natural Heritage Information System has been reviewed to determine if the proposed project has the potential to impact any rare species or other significant natural features. Based on the project details provided with the request, the following rare features may be impacted by the proposed project:

Ecologically Significant Areas

- A calcareous fen (*Lime 30, Fen ID# 38219)* has been documented within the vicinity of the proposed project area. Stream parsnip (*Berula erecta*), a state-listed threatened plant, has been documented within the fen. A calcareous fen is a rare and distinctive peat-accumulating wetland that is legally protected in Minnesota. The Wetlands Conservation Act, authorized by Minnesota Statutes, section 103G.223, states that calcareous fens may not be filled, drained, or otherwise degraded, wholly or partially, by any activity, except as provided for in a management plan approved by the commissioner of the Department of Natural Resources. Many of the unique characteristics of calcareous fens result from the upwelling of groundwater through calcareous substrates. Because of this dependence on groundwater hydrology, calcareous fens can be affected by nearby activities or even those several miles away. For more information regarding calcareous fens, please see the Calcareous Fen Fact Sheet. To minimize stormwater impacts, please refer to the Minnesota Pollution Control Agency's General Principles for Erosion Prevention and Sediment Control in the Minnesota Stormwater Manual. Please note that calcareous fens are "Special Waters" and a buffer zone may be required.

  Calcareous fens may be impacted by activities within the fen, activities that affect surface water flows (e.g., stormwater flow, erosion), or activities that affect groundwater hydrology (e.g., groundwater pumping, contamination, or discharge). **To ensure compliance with WCA, please contact the Calcareous Fen Program Coordinator, Keylor Andrews** (Keylor.Andrews@state.mn.us).

If it is determined the project will impact the fen in any way, including indirect impacts through the alteration of hydrological conditions, a botanical survey is required. Surveys must be conducted by a qualified surveyor and follow the standards contained in the Rare Species Survey Process and Rare Plant Guidance. Visit the Natural Heritage Review page for a list of certified surveyors and more information on this process. Survey proposals should be submitted to Reports.NHIS@state.mn.us prior to initiating survey work. Project planning should take into account that any botanical survey needs to be conducted during the appropriate time of the year, which may be limited. Please consult Review.NHIS@state.mn.us if you have any questions regarding this process.

- The Minnesota Biological Survey (MBS) has identified **Lime 30** as a Site of *Moderate* Biodiversity Significance, which overlaps the northwest corner of the proposed project. Sites of Biodiversity Significance have varying levels of native biodiversity and are ranked based on the relative significance of this biodiversity at a statewide level. Sites ranked as *Moderate* contain occurrences of rare species and/or moderately disturbed native plant communities, and/or landscapes that have a strong potential for recovery. This MBS Site contains **Dry Bedrock Bluff Prairie (Southern)** (UPs13c), a DNR Native Plant Community (NPC), directly adjacent to the proposed project. This community is considered *vulnerable to extirpation (S3)* and rare in Minnesota.

  The DNR recommends that the project be designed to avoid impacts to these ecologically significant areas. Actions to avoid or minimize disturbance include, but are not limited to, the following recommendations:
  - As much as possible, operate within already-disturbed areas.
  - Avoid MBS Sites and rare NPCs (ranked S1, S2, or S3).
  - Retain a buffer between proposed activities and the MBS Site.
  - Minimize vehicular disturbance in the MBS Site (allow only vehicles/equipment necessary for construction activities).
  - Do not park equipment or stockpile supplies in the MBS Site.
  - Do not place spoil in the MBS Site or other sensitive areas.
  - If possible, conduct the work under frozen ground conditions.
  - Use effective erosion prevention and sediment control measures.
  - Inspect and clean equipment prior to operation and follow recommendations to prevent the spread of invasive species.
  - Revegetate disturbed soil with native species suitable to the local habitat as soon after construction as possible.
  - Use only weed-free mulches, topsoils, and seed mixes. Of particular concern are birdsfoot trefoil (*Lotus corniculatus*) and crown vetch (*Coronilla varia*), two invasive species that are sold commercially and are problematic in prairies and disturbed open areas.
  - For trails:
    - Minimize width of trail.
    - Do not route trails through wet swales or depressions, or sensitive rock outcrop areas.
    - Bridge all stream and wetland crossings.
    - Trail maintenance plans should address erodible soils, especially in areas of steep topography.

- Use signage to encourage visitors to stay on designated trails.
- Please reference the Guidelines for Managing and Restoring Natural Plant Communities along Trails and Waterways for additional information.

Ecologically Significant Areas can be viewed using the Explore page in Minnesota Conservation Explorer (MCE) or their GIS shapefiles can be downloaded from the MN Geospatial Commons. Reference the MBS Site Biodiversity Significance and Native Plant Community websites for information on interpreting the data. To receive a list of Ecologically Significant Areas in the vicinity of your project, create a Conservation Planning Report using the Explore page in MCE.

State-listed Species

- Loggerhead shrikes (*Lanius ludovicianus*), a state-listed endangered bird, have been documented in the vicinity of the project site. Loggerhead shrikes use grasslands that contain short grass and scattered perching sites such as hedgerows, shrubs, or small trees. They can be found in native prairie, pastures, shelterbelts, old fields or orchards, cemeteries, grassy roadsides, and farmyards. Minnesota's Endangered Species Statute (Minnesota Statutes, section 84.0895) and associated Rules (Minnesota Rules, part 6212.1800 to 6212.2300 and 6134) prohibit the take of endangered or threatened plants or animals, including their parts or seeds, without a permit. Given the potential for this species to be found in the vicinity of the project, **tree and shrub removal is required to be avoided during the breeding season, April through July.**

  Please contact Review.NHIS@state.mn.us **to confirm that the above avoidance measure will be implemented or to inform us that avoidance is not feasible.** If avoidance is not feasible, a qualified surveyor needs to conduct a survey for active nests before any trees or shrubs are removed. Requirements for surveys and lists of DNR certified surveyors can be found on the Natural Heritage Review website.

- Stream parsnip (*Berula erecta*), a state-listed threatened plant, has been documented within the nearby calcareous fen and suitable habitat may exist within the proposed project. Stream parsnip is found in calcareous and hydrologically active habitats at the margins of small spring-fed streams and pools and saturated sedge-derived peat; this includes rivulets in wet seepage meadows, calcareous fens, and spring-fed streams in forested ravines. Minnesota's Endangered Species Statute (Minnesota Statutes, section 84.0895) and associated Rules (Minnesota Rules, part 6212.1800 to 6212.2300 and 6134) prohibit the take of endangered or threatened plants or animals, including their parts or seeds, without a permit. **To demonstrate avoidance, a qualified surveyor will need to determine if suitable habitat exists within the activity impact area and, if so, conduct a survey prior to any project activities.**

  Surveys must be conducted by a qualified surveyor and follow the standards contained in the Rare Species Survey Process and Rare Plant Guidance. Visit the Natural Heritage Review page for a list of certified surveyors and more information on this process. Survey proposals should be submitted to Reports.NHIS@state.mn.us prior to initiating survey work. Project planning should take into account that any botanical survey needs to be conducted during the appropriate time of the year, which may be limited. Please consult Review.NHIS@state.mn.us if you have any questions regarding this process.

- Kentucky coffee tree (*Gymnocladus dioicus*), a state-listed species of special concern, has been documented in the vicinity of the proposed project. Kentucky coffee tree is found most often in mesic hardwood forests on terraces of the Minnesota River, well above the reach of normal flood events. **The DNR recommends avoiding the removal of Kentucky coffee trees.**

- North American racer (*Coluber constrictor*), a state-listed species of special concern, has been documented in the vicinity of the proposed project and may be encountered on site. These snakes occupy a variety of habitats in the deciduous forest region including forested hillsides, bluff prairies, grasslands, and open woods. Woodland margins and field edges are the preferred summer habitat. During winter months, North American racers hibernate in mammal burrows, caves, rock crevices, gravel banks, stone foundations, and old wells. North American racers have relatively large home ranges, making long-distance movements to and from their hibernacula each year. The North American racer emerges from hibernation in late April. Given the presence of these rare snakes, **the DNR recommends that the use of erosion control mesh, if any, be limited to wildlife-friendly materials.**

- Lark sparrow (*Chondestes grammacus*), a state-listed bird species of special concern, has been documented in the vicinity of the project. This bird species is found in open, dry grassland areas with scattered trees and shrubs. They build their nest on the ground, in a shrub or a small tree. **If feasible, avoid initial disturbance to grassland areas and tree/shrub removal from May 15 through August 15 to avoid disturbance of nesting birds.**

- The Natural Heritage Information System (NHIS) tracks bat roost trees and hibernacula plus some acoustic data, but this information is not exhaustive. Even if there are no bat records listed nearby, all of Minnesota's bats, including the federally endangered northern long-eared bat (*Myotis septentrionalis*), can be found throughout Minnesota. During the active season (approximately April-November) bats roost underneath bark, in cavities, or in crevices of both live and dead trees. Tree removal can negatively impact bats by destroying roosting habitat, especially during the pup rearing season when females are forming maternity roosting colonies and the pups cannot yet fly. To minimize these impacts, **the DNR recommends that tree removal be avoided from June 1 through August 15.** If greater protection for bats is desired, avoid tree removal during the entire bat active season (April 1-November 15).

- Please visit the DNR Rare Species Guide for more information on the habitat use of state-listed species and recommended measures to avoid or minimize impacts.

- Please report incidental sightings of state-listed species via the DNR Plant and Animal Observation Form.

Federally Protected Species

- The area of interest overlaps with a U.S Fish and Wildlife Service (USFWS) Rusty Patched Bumble Bee High Potential Zone. The rusty patched bumble bee *(Bombus affinis)* is federally listed as endangered and is likely to be present in suitable habitat within High Potential Zones. From April through October this species uses underground nests in upland grasslands, shrublands, and forest edges, and forages where nectar and pollen are available. From October through April the species overwinters under tree litter in upland forests and woodlands. The rusty patched bumble bee may be impacted by a variety of land management activities including, but not limited to, prescribed fire, tree-

removal, haying, grazing, herbicide use, pesticide use, land-clearing, soil disturbance or compaction, or use of non-native bees. If applicable, **the DNR recommends reseeding disturbed soils with native species of grasses and forbs using BWSR Seed Mixes or MnDOT Seed Mixes.**

To ensure compliance with federal law, please conduct a federal regulatory review using the U.S. Fish and Wildlife Service's online Information for Planning and Consultation (IPaC) tool. Please note that all projects, regardless of whether there is a federal nexus, are subject to federal take prohibitions. The IPaC review will determine if prohibited take is likely to occur and, if not, will generate an automated letter. The USFWS RPBB guidance provides guidance on avoiding impacts to rusty patched bumble bee and a key for determining if actions are likely to affect the species; the determination key can be found in the appendix.

Environmental Review and Permitting

- Please include a copy of this letter and the MCE-generated Final Project Report in any state or local license or permit application. Please note that measures to avoid or minimize disturbance to the above rare features may be included as restrictions or conditions in any required permits or licenses.
- The Environmental Assessment Worksheet (EAW) should address whether the proposed project has the potential to adversely affect the above rare features and, if so, it should identify specific measures that will be taken to avoid or minimize disturbance. Sufficient information should be provided so the DNR can determine whether a permit to take will be needed for any of the above protected species.

The Natural Heritage Information System (NHIS), a collection of databases that contains information about Minnesota's rare natural features, is maintained by the Division of Ecological and Water Resources, Department of Natural Resources. The NHIS is continually updated as new information becomes available and is the most complete source of data on Minnesota's native plant communities, rare species, and other rare features. However, the NHIS is not an exhaustive inventory and does not contain the locations of all rare features in the state. Therefore, ecologically significant features for which we have no records may exist within the project area. If additional information becomes available regarding rare features in the vicinity of the project, further review may be necessary.

For environmental review purposes, the results of this Natural Heritage Review are valid for one year; the results are only valid for the project location and project description provided with the request. **If project details change or the project has not occurred within one year, please resubmit the project for review within one year of initiating project activities.** Resubmit by selecting *Clone Project as Draft* on the project page in MCE.

The Natural Heritage Review does not constitute project approval by the Department of Natural Resources. Instead, it identifies issues regarding known occurrences of rare features and potential impacts to these rare features. Visit Natural Heritage Review for additional information regarding this process, survey guidance, and other related information. For information on the environmental review process or other natural resource concerns, please contact your DNR Regional Environmental Assessment Ecologist.

Thank you for consulting us on this matter and for your interest in preserving Minnesota's rare natural resources.

Sincerely,

Molly Barrett

Natural Heritage Review Specialist
molly.barrett@state.mn.us

Cc: Haley Byron, Regional Environmental Assessment Ecologist, South (Region 4)
Cc: Keylor Andrews, Calcareous Fen Program Coordinator

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Minnesota-Wisconsin Ecological Services Field Office
3815 American Blvd East
Bloomington, MN 55425-1659
Phone: (952) 858-0793

In Reply Refer To: 06/10/2025 15:23:34 UTC
Project Code: 2025-0098307
Project Name: Camp Quarry Adventure Park, Lime Township, MN (24X.137080)

Subject: List of threatened and endangered species that may occur in your proposed project location or may be affected by your proposed project

To Whom It May Concern:

This response has been generated by the Information, Planning, and Conservation (IPaC) system to provide information on natural resources that could be affected by your project. The U.S. Fish and Wildlife Service (Service) provides this response under the authority of the Endangered Species Act of 1973 (16 U.S.C. 1531-1543), the Bald and Golden Eagle Protection Act (16 U.S.C. 668-668d), the Migratory Bird Treaty Act (16 U.S.C. 703-712), and the Fish and Wildlife Coordination Act (16 U.S.C. 661 *et seq.*).

Threatened and Endangered Species
The enclosed species list identifies threatened, endangered, proposed and candidate species, as well as proposed and final designated critical habitat, that may occur within the boundary of your proposed project and may be affected by your proposed project. The species list fulfills the requirement for obtaining a Technical Assistance Letter from the U.S. Fish and Wildlife Service under section 7(c) of the Endangered Species Act (Act) of 1973, as amended (16 U.S.C. 1531 *et seq.*).

New information based on updated surveys, changes in the abundance and distribution of species, changed habitat conditions, or other factors could change this list. Note that under 50 CFR 402.12(e) of the regulations implementing section 7 of the Act, the accuracy of this species list should be verified after 90 days. The Service recommends that verification be completed by visiting the IPaC website at regular intervals during project planning and implementation for updates to species lists and information. An updated list may be requested through the IPaC system by completing the same process used to receive the enclosed list.

Consultation Technical Assistance
Please refer to refer to our Section 7 website for guidance and technical assistance, including step-by-step instructions for making effects determinations for each species that might be present and for specific guidance on the following types of projects: projects in developed areas, HUD, CDBG, EDA, USDA Rural Development projects, pipelines, buried utilities, telecommunications, and requests for a Conditional Letter of Map Revision (CLOMR) from FEMA.

We recommend running the project (if it qualifies) through our **Minnesota-Wisconsin Federal Endangered Species Determination Key (Minnesota-Wisconsin ("D-key"))**. A demonstration video showing how-to access and use the determination key is available. Please note that the Minnesota-Wisconsin D-key is the third option of 3 available d-keys. D-keys are tools to help Federal agencies and other project proponents determine if their proposed action has the potential to adversely affect federally listed species and designated critical habitat. The Minnesota-Wisconsin D-key includes a structured set of questions that assists a project proponent in determining whether a proposed project qualifies for a certain predetermined consultation outcome for all federally listed species found in Minnesota and Wisconsin (except for the northern long-eared bat- see below), which includes determinations of “no effect” or “may affect, not likely to adversely affect." In each case, the Service has compiled and analyzed the best available information on the species’ biology and the impacts of certain activities to support these determinations.

If your completed d-key output letter shows a "No Effect" (NE) determination for all listed species, print your IPaC output letter for your files to document your compliance with the Endangered Species Act.

For Federal projects with a “Not Likely to Adversely Affect” (NLAA) determination, our concurrence becomes valid if you do not hear otherwise from us after a 30-day review period, as indicated in your letter.

If your d-key output letter indicates additional coordination with the Minnesota-Wisconsin Ecological Services Field Office is necessary (i.e., you get a “May Affect” determination), you will be provided additional guidance on contacting the Service to continue ESA coordination outside of the key; ESA compliance cannot be concluded using the key for “May Affect” determinations unless otherwise indicated in your output letter.

Note: Once you obtain your official species list, you are not required to continue in IPaC with d-keys, although in most cases these tools should expedite your review. If you choose to make an effects determination on your own, you may do so. If the project is a Federal Action, you may want to review our section 7 step-by-step instructions before making your determinations.

Using the IPaC Official Species List to Make No Effect and May Affect Determinations for Listed Species

1. If IPaC returns a result of “There are no listed species found within the vicinity of the project,” then project proponents can conclude the proposed activities will have **no effect** on any federally listed species under Service jurisdiction. Concurrence from the Service is not required for **no effect** determinations. No further consultation or coordination is required. Attach this letter to the dated IPaC species list report for your records.
2. If IPaC returns one or more federally listed, proposed, or candidate species as potentially present in the action area of the proposed project – other than bats (see below) – then project proponents must determine if proposed activities will have **no effect** on or **may affect** those species. For assistance in determining if suitable habitat for listed, candidate, or proposed species occurs within your project area or if species may be affected by project activities, you can obtain Life History Information for Listed and Candidate Species on our office website. If no impacts will occur to a species on the IPaC species list (e.g., there is no habitat present in the project area), the appropriate determination is **no effect**. No further consultation or coordination is required. Attach this letter to the dated IPaC species list report for your records.

3. Should you determine that project activities **may affect** any federally listed, please contact our office for further coordination. Letters with requests for consultation or correspondence about your project should include the Consultation Tracking Number in the header. Electronic submission is preferred.

Northern Long-Eared Bats
Northern long-eared bats occur throughout Minnesota and Wisconsin and the information below may help in determining if your project may affect these species.

Suitable summer habitat for northern long-eared bats consists of a wide variety of forested/wooded habitats where they roost, forage, and travel and may also include some adjacent and interspersed non-forested habitats such as emergent wetlands and adjacent edges of agricultural fields, old fields and pastures. This includes forests and woodlots containing potential roosts (i.e., live trees and/or snags ≥3 inches dbh for northern long-eared bat that have exfoliating bark, cracks, crevices, and/or hollows), as well as linear features such as fencerows, riparian forests, and other wooded corridors. These wooded areas may be dense or loose aggregates of trees with variable amounts of canopy closure. Individual trees may be considered suitable habitat when they exhibit the characteristics of a potential roost tree and are located within 1,000 feet (305 meters) of forested/wooded habitat. Northern long-eared bats have also been observed roosting in human-made structures, such as buildings, barns, bridges, and bat houses; therefore, these structures should also be considered potential summer habitat and evaluated for use by bats. If your project will impact caves or mines or will involve clearing forest or woodland habitat containing suitable roosting habitat, northern long-eared bats could be affected. For bat activity dates, please review Appendix L in the Range-wide Indiana Bat and Northern Long-Eared Bat Survey Guidelines.

Examples of unsuitable habitat include:

- Individual trees that are greater than 1,000 feet from forested or wooded areas,
- Trees found in highly developed urban areas (e.g., street trees, downtown areas),
- A pure stand of less than 3-inch dbh trees that are not mixed with larger trees, and
- A monoculture stand of shrubby vegetation with no potential roost trees.

If IPaC returns a result that northern long-eared bats are potentially present in the action area of the proposed project, project proponents can conclude the proposed activities **may affect** this species **IF** one or more of the following activities are proposed:

- Clearing or disturbing suitable roosting habitat, as defined above, at any time of year,
- Any activity in or near the entrance to a cave or mine,
- Mining, deep excavation, or underground work within 0.25 miles of a cave or mine,
- Construction of one or more wind turbines, or
- Demolition or reconstruction of human-made structures that are known to be used by bats based on observations of roosting bats, bats emerging at dusk, or guano deposits or stains.

If none of the above activities are proposed, project proponents can conclude the proposed activities will have **no effect** on the northern long-eared bat. Concurrence from the Service is not required for **No Effect** determinations. No further consultation or coordination is required. Attach this letter to the dated IPaC

species list report for your records.

If any of the above activities are proposed, and the northern long-eared bat appears on the user's species list, the federal project user will be directed to either the northern long-eared bat and tricolored bat range-wide D-key or the Federal Highways Administration, Federal Railways Administration, and Federal Transit Administration Indiana bat/Northern long-eared bat D-key, depending on the type of project and federal agency involvement. Similar to the Minnesota-Wisconsin D-key, these d-keys helps to determine if prohibited take might occur and, if not, will generate an automated verification letter. Additional information about available tools can be found on the Service's northern long-eared bat website.

Whooping Crane
Whooping crane is designated as a non-essential experimental population in Wisconsin and consultation under Section 7(a)(2) of the Endangered Species Act is only required if project activities will occur within a National Wildlife Refuge or National Park. If project activities are proposed on lands outside of a National Wildlife Refuge or National Park, then you are not required to consult. For additional information on this designation and consultation requirements, please review "Establishment of a Nonessential Experimental Population of Whooping Cranes in the Eastern United States."

Other Trust Resources and Activities
Bald and Golden Eagles - Although the bald eagle has been removed from the endangered species list, this species and the golden eagle are protected by the Bald and Golden Eagle Act and the Migratory Bird Treaty Act. It is the responsibility of the project proponent to survey the area for any migratory bird nests. If there is an eagle nest on-site while work is on-going, eagles may be disturbed. We recommend avoiding and minimizing disturbance to eagles whenever practicable. If you cannot avoid eagle disturbance, you may seek a permit. A nest take permit is always required for removal, relocation, or obstruction of an eagle nest. For communication and wind energy projects, please refer to additional guidelines below.

Migratory Birds - The Migratory Bird Treaty Act (MBTA) prohibits the taking, killing, possession, transportation, and importation of migratory birds, their eggs, parts, and nests, except when specifically authorized by the Service. The Service has the responsibility under the MBTA to proactively prevent the mortality of migratory birds whenever possible and we encourage implementation of recommendations that minimize potential impacts to migratory birds. Such measures include clearing forested habitat outside the nesting season (generally March 1 to August 31) or conducting nest surveys prior to clearing to avoid injury to eggs or nestlings.

Communication Towers - Construction of new communications towers (including radio, television, cellular, and microwave) creates a potentially significant impact on migratory birds, especially some 350 species of night-migrating birds. However, the Service has developed voluntary guidelines for minimizing impacts.

Transmission Lines - Migratory birds, especially large species with long wingspans, heavy bodies, and poor maneuverability can also collide with power lines. In addition, mortality can occur when birds, particularly hawks, eagles, kites, falcons, and owls, attempt to perch on uninsulated or unguarded power poles. To minimize these risks, please refer to guidelines developed by the Avian Power Line Interaction Committee and the Service. Implementation of these measures is especially important along sections of lines adjacent to wetlands or other areas that support large numbers of raptors and migratory birds.

Wind Energy - To minimize impacts to migratory birds and bats, wind energy projects should follow the Service's Wind Energy Guidelines. In addition, please refer to the Service's Eagle Conservation Plan Guidance, which provides guidance for conserving bald and golden eagles in the course of siting, constructing, and operating wind energy facilities.

State Department of Natural Resources Coordination
While it is not required for your Federal section 7 consultation, please note that additional state endangered or threatened species may also have the potential to be impacted. **Please contact the Minnesota or Wisconsin Department of Natural Resources for information on state listed species that may be present in your proposed project area.**

Minnesota
Minnesota Department of Natural Resources - Endangered Resources Review Homepage
Email: Review.NHIS@state.mn.us

Wisconsin
Wisconsin Department of Natural Resources - Endangered Resources Review Homepage
Email: DNRERReview@wi.gov

We appreciate your concern for threatened and endangered species. Please feel free to contact our office with questions or for additional information.

Attachment(s):

- Official Species List
- USFWS National Wildlife Refuges and Fish Hatcheries
- Bald & Golden Eagles
- Migratory Birds
- Wetlands

OFFICIAL SPECIES LIST

This list is provided pursuant to Section 7 of the Endangered Species Act, and fulfills the requirement for Federal agencies to "request of the Secretary of the Interior information whether any species which is listed or proposed to be listed may be present in the area of a proposed action".

This species list is provided by:

Minnesota-Wisconsin Ecological Services Field Office
3815 American Blvd East
Bloomington, MN 55425-1659
(952) 858-0793

PROJECT SUMMARY

Project Code: 2025-0098307

Project Name: Camp Quarry Adventure Park, Lime Township, MN (24X.137080)

Project Type: Recreation - New Construction

Project Description: The proposed project, the Camp Quarry Adventure Park, is located in Sections 30 and 31, Township 109 North, Range 26 West, of Lime Township, Blue Earth County, MN. The project is the restoration of a former limestone mine site into a campground/adventure park. The park features a campground with approximately 318 campsites ranging in size. The campground will have a check-in office, main, north, and south entrances, surface parking, bike trail parking/shelter shelter/restrooms, a maintenance building, and a service road. Additional facilities that the adventure park will have include a rental/snack shack, several bike trail routes, an aquatic park, a water cable park, and swimming areas. There will be approximately 130 parking spaces for passenger vehicles and campers waiting to check in. There will be 196 Large Sites and 122 Small/Medium sites. Roughly 20-30 sites will be more primitive sites without water or electricity while the remaining sites will have water and electricity. Overall, there will be a total of about 15,000 sq.ft. of building space. Construction is scheduled to begin in summer/fall 2025 and will continue throughout 2026, with anticipated completion by fall 2026. However, some work may extend into spring 2027 if necessary to finalize all project components. The project area is approximately 130 acres. Construction activities include grading, fill, potential blasting, vegetation removal, construction of a cable park water feature, open cut utilities installation, building construction, and related activities. Construction waste will be collected and disposed of at a permitted facility.

Project Location:

The approximate location of the project can be viewed in Google Maps: https://www.google.com/maps/@44.211481,-93.99555137144812,14z



Counties: Blue Earth County, Minnesota

ENDANGERED SPECIES ACT SPECIES

There is a total of 5 threatened, endangered, or candidate species on this species list.

Species on this list should be considered in an effects analysis for your project and could include species that exist in another geographic area. For example, certain fish may appear on the species list because a project could affect downstream species.

IPaC does not display listed species or critical habitats under the sole jurisdiction of NOAA Fisheries[1], as USFWS does not have the authority to speak on behalf of NOAA and the Department of Commerce.

See the "Critical habitats" section below for those critical habitats that lie wholly or partially within your project area under this office's jurisdiction. Please contact the designated FWS office if you have questions.

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1. NOAA Fisheries, also known as the National Marine Fisheries Service (NMFS), is an office of the National Oceanic and Atmospheric Administration within the Department of Commerce.

MAMMALS

NAME	STATUS
Northern Long-eared Bat *Myotis septentrionalis* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/9045	Endangered

CLAMS

NAME	STATUS
Salamander Mussel *Simpsonaias ambigua* There is **proposed** critical habitat for this species. Your location does not overlap the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/6208	Proposed Endangered

INSECTS

NAME	STATUS
Monarch Butterfly *Danaus plexippus* There is **proposed** critical habitat for this species. Your location does not overlap the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/9743	Proposed Threatened
Rusty Patched Bumble Bee *Bombus affinis* There is **proposed** critical habitat for this species. Your location does not overlap the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/9383 General project design guidelines: https://ipac.ecosphere.fws.gov/project/AOI6TLY3AJGWTMPE7AJSO7RRJM/documents/generated/5967.pdf	Endangered
Western Regal Fritillary *Argynnis idalia occidentalis* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/12017	Proposed Threatened

CRITICAL HABITATS

THERE ARE NO CRITICAL HABITATS WITHIN YOUR PROJECT AREA UNDER THIS OFFICE'S JURISDICTION.

YOU ARE STILL REQUIRED TO DETERMINE IF YOUR PROJECT(S) MAY HAVE EFFECTS ON ALL ABOVE LISTED SPECIES.

USFWS NATIONAL WILDLIFE REFUGE LANDS AND FISH HATCHERIES

Any activity proposed on lands managed by the National Wildlife Refuge system must undergo a 'Compatibility Determination' conducted by the Refuge. Please contact the individual Refuges to discuss any questions or concerns.

THERE ARE NO REFUGE LANDS OR FISH HATCHERIES WITHIN YOUR PROJECT AREA.

BALD & GOLDEN EAGLES

Bald and Golden Eagles are protected under the Bald and Golden Eagle Protection Act [2] and the Migratory Bird Treaty Act (MBTA) [1]. Any person or organization who plans or conducts activities that may result in impacts to Bald or Golden Eagles, or their habitats, should follow appropriate regulations and consider implementing appropriate avoidance and minimization measures, as described in the various links on this page.

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1. The Bald and Golden Eagle Protection Act of 1940.
2. The Migratory Birds Treaty Act of 1918.
3. 50 C.F.R. Sec. 10.12 and 16 U.S.C. Sec. 668(a)

There are Bald Eagles and/or Golden Eagles in your project area.

Measures for Proactively Minimizing Eagle Impacts
For information on how to best avoid and minimize disturbance to nesting bald eagles, please review the National Bald Eagle Management Guidelines. You may employ the timing and activity-specific distance recommendations in this document when designing your project/ activity to avoid and minimize eagle impacts. For bald eagle information specific to Alaska, please refer to Bald Eagle Nesting and Sensitivity to Human Activity.

The FWS does not currently have guidelines for avoiding and minimizing disturbance to nesting Golden Eagles. For site-specific recommendations regarding nesting Golden Eagles, please consult with the appropriate Regional Migratory Bird Office or Ecological Services Field Office.

If disturbance or take of eagles cannot be avoided, an incidental take permit may be available to authorize any take that results from, but is not the purpose of, an otherwise lawful activity. For assistance making this determination for Bald Eagles, visit the Do I Need A Permit Tool. For assistance making this determination for golden eagles, please consult with the appropriate Regional Migratory Bird Office or Ecological Services Field Office.

Ensure Your Eagle List is Accurate and Complete
If your project area is in a poorly surveyed area in IPaC, your list may not be complete and you may need to rely on other resources to determine what species may be present (e.g. your local FWS field office, state surveys, your own surveys). Please review the Supplemental Information

on Migratory Birds and Eagles, to help you properly interpret the report for your specified location, including determining if there is sufficient data to ensure your list is accurate.

For guidance on when to schedule activities or implement avoidance and minimization measures to reduce impacts to bald or golden eagles on your list, see the "Probability of Presence Summary" below to see when these bald or golden eagles are most likely to be present and breeding in your project area.

NAME	BREEDING SEASON
Bald Eagle *Haliaeetus leucocephalus* This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities. https://ecos.fws.gov/ecp/species/1626	Breeds Dec 1 to Aug 31

PROBABILITY OF PRESENCE SUMMARY

The graphs below provide our best understanding of when birds of concern are most likely to be present in your project area. This information can be used to tailor and schedule your project activities to avoid or minimize impacts to birds. Please make sure you read "Supplemental Information on Migratory Birds and Eagles", specifically the FAQ section titled "Proper Interpretation and Use of Your Migratory Bird Report" before using or attempting to interpret this report.

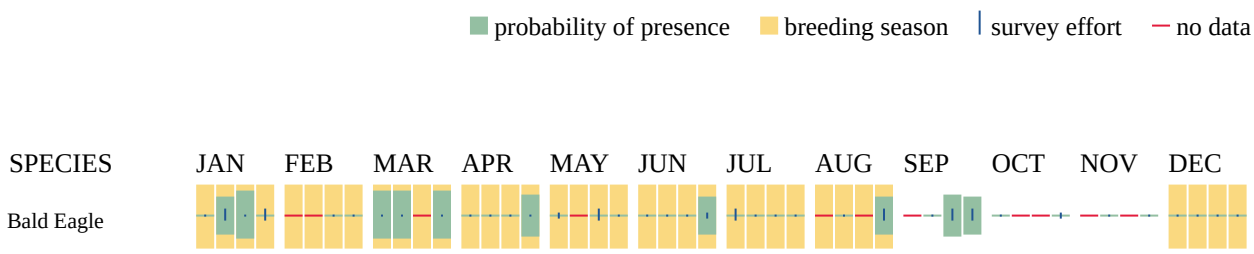
Probability of Presence (▪)

Green bars; the bird's relative probability of presence in the 10km grid cell(s) your project overlaps during that week of the year.

Breeding Season (▪)
Yellow bars; liberal estimate of the timeframe inside which the bird breeds across its entire range.

Survey Effort (|)
Vertical black lines; the number of surveys performed for that species in the 10km grid cell(s) your project area overlaps.

No Data (–)
A week is marked as having no data if there were no survey events for that week.



Non-BCC
Vulnerable

Additional information can be found using the following links:

- Eagle Management https://www.fws.gov/program/eagle-management
- Measures for avoiding and minimizing impacts to birds https://www.fws.gov/library/collections/avoiding-and-minimizing-incidental-take-migratory-birds
- Nationwide avoidance and minimization measures for birds https://www.fws.gov/sites/default/files/documents/nationwide-standard-conservation-measures.pdf
- Supplemental Information for Migratory Birds and Eagles in IPaC https://www.fws.gov/media/supplemental-information-migratory-birds-and-bald-and-golden-eagles-may-occur-project-action

MIGRATORY BIRDS

The Migratory Bird Treaty Act (MBTA) [1] prohibits the take (including killing, capturing, selling, trading, and transport) of protected migratory bird species without prior authorization by the Department of Interior U.S. Fish and Wildlife Service (Service). The incidental take of migratory birds is the injury or death of birds that results from, but is not the purpose, of an activity. The Service interprets the MBTA to prohibit incidental take.

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1. The Migratory Birds Treaty Act of 1918.
2. The Bald and Golden Eagle Protection Act of 1940.
3. 50 C.F.R. Sec. 10.12 and 16 U.S.C. Sec. 668(a)

For guidance on when to schedule activities or implement avoidance and minimization measures to reduce impacts to migratory birds on your list, see the "Probability of Presence Summary" below to see when these birds are most likely to be present and breeding in your project area.

NAME	BREEDING SEASON
Bald Eagle *Haliaeetus leucocephalus* This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities. https://ecos.fws.gov/ecp/species/1626	Breeds Dec 1 to Aug 31
Bobolink *Dolichonyx oryzivorus* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9454	Breeds May 20 to Jul 31

NAME	BREEDING SEASON
Chimney Swift *Chaetura pelagica* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9406	Breeds Mar 15 to Aug 25
Franklin's Gull *Leucophaeus pipixcan* This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/10567	Breeds May 1 to Jul 31
Grasshopper Sparrow *Ammodramus savannarum perpallidus* This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA https://ecos.fws.gov/ecp/species/8329	Breeds Jun 1 to Aug 20
Northern Harrier *Circus hudsonius* This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA https://ecos.fws.gov/ecp/species/8350	Breeds Apr 1 to Sep 15

PROBABILITY OF PRESENCE SUMMARY

The graphs below provide our best understanding of when birds of concern are most likely to be present in your project area. This information can be used to tailor and schedule your project activities to avoid or minimize impacts to birds. Please make sure you read "Supplemental Information on Migratory Birds and Eagles", specifically the FAQ section titled "Proper Interpretation and Use of Your Migratory Bird Report" before using or attempting to interpret this report.

Probability of Presence (■)

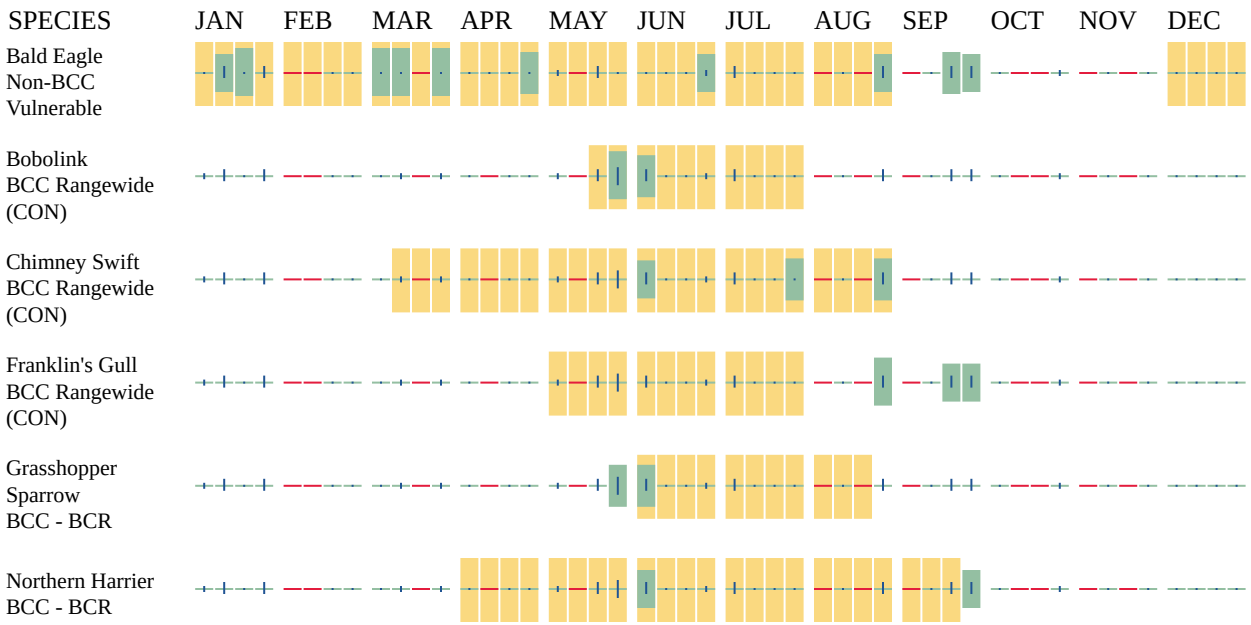
Green bars; the bird's relative probability of presence in the 10km grid cell(s) your project overlaps during that week of the year.

Breeding Season (■)
Yellow bars; liberal estimate of the timeframe inside which the bird breeds across its entire range.

Survey Effort (|)
Vertical black lines; the number of surveys performed for that species in the 10km grid cell(s) your project area overlaps.

No Data (–)
A week is marked as having no data if there were no survey events for that week.

■ probability of presence ■ breeding season | survey effort – no data



Additional information can be found using the following links:

- Eagle Management https://www.fws.gov/program/eagle-management
- Measures for avoiding and minimizing impacts to birds https://www.fws.gov/library/collections/avoiding-and-minimizing-incidental-take-migratory-birds
- Nationwide avoidance and minimization measures for birds
- Supplemental Information for Migratory Birds and Eagles in IPaC https://www.fws.gov/media/supplemental-information-migratory-birds-and-bald-and-golden-eagles-may-occur-project-action

WETLANDS

Impacts to NWI wetlands and other aquatic habitats may be subject to regulation under Section 404 of the Clean Water Act, or other State/Federal statutes.

For more information please contact the Regulatory Program of the local U.S. Army Corps of Engineers District.

Please note that the NWI data being shown may be out of date. We are currently working to update our NWI data set. We recommend you verify these results with a site visit to determine the actual extent of wetlands on site.

FRESHWATER POND

- PUBFx
- PUBHx

FRESHWATER FORESTED/SHRUB WETLAND

- PFO1A

FRESHWATER EMERGENT WETLAND

- PEM1A

IPAC USER CONTACT INFORMATION

Agency: Private Entity
Name: Heather Mullenbach
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City: Mankato
State: MN
Zip: 56001
Email heather.mullenbach@bolton-menk.com
Phone: 5079957387

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Minnesota-Wisconsin Ecological Services Field Office
3815 American Blvd East
Bloomington, MN 55425-1659
Phone: (952) 858-0793

In Reply Refer To: 08/15/2025 14:19:42 UTC
Project code: 2025-0098307
Project Name: Camp Quarry Adventure Park, Lime Township, MN (24X.137080)

Subject: Technical Assistance letter for 'Camp Quarry Adventure Park, Lime Township, MN (24X.137080)' for specified threatened and endangered species that may occur in your proposed project location consistent with the Minnesota-Wisconsin Endangered Species Determination Key (Minnesota-Wisconsin DKey).

Dear Heather Mullenbach:

The U.S. Fish and Wildlife Service (Service) received on **August 15, 2025** your effect determination(s) for the 'Camp Quarry Adventure Park, Lime Township, MN (24X.137080)' (Action) using the Minnesota-Wisconsin DKey within the Service's Information for Planning and Consultation (IPaC) system. The Service developed this system in accordance with the Endangered Species Act of 1973 (ESA) (87 Stat. 884, as amended; 16 U.S.C 1531 et seq.).

Based on your responses to the Service's Minnesota-Wisconsin DKey, you made the following effect determination(s) for the proposed Action:

Species	Listing Status	Determination
Monarch Butterfly (*Danaus plexippus*)	Proposed Threatened	No effect
Salamander Mussel (*Simpsonaias ambigua*)	Proposed Endangered	No effect

Determination Information

Thank you for informing the Service of your "No Effect" determination(s). No further coordination is necessary for the species you determined will not be affected by the Action.

Additional Information

Sufficient project details: Please provide sufficient project details on your project homepage in IPaC (Define Project, Project Description) to support your conclusions. Failure to disclose important aspects of your project that would influence the outcome of your effects determinations may negate your determinations and invalidate this letter. If you have site-specific information that leads you to believe a different determination is more appropriate for your

project than what the Dkey concludes, you can and should proceed based on the best available information.

Future project changes: The Service recommends that you contact the Minnesota-Wisconsin Ecological Services Field Office or re-evaluate the project in IPaC if: 1) the scope or location of the proposed Action is changed; 2) new information reveals that the action may affect federally listed species or federally designated critical habitat in a manner or to an extent not previously considered; 3) the Action is modified in a manner that causes effects to listed species or designated critical habitat; or 4) a new species is listed or critical habitat designated. If any of the above conditions occurs, additional consultation with the Service should take place before project changes are final or resources committed.

For projects that intersect with or are adjacent to Tribal lands: The Service has federal Trust responsibilities and a strong commitment to working with Tribal governments to help sustain fish and wildlife resources for future generations. Tribal governments should be provided with sufficient opportunity to express their perspectives and/or concerns for proposed projects. If your project intersects with Tribal lands or impacts culturally sensitive resources, please engage with the federally recognized Tribe to ensure they have an opportunity to provide input on this project.

Species-specific information

Bald and Golden Eagles: Bald eagles, golden eagles, and their nests are protected under the Bald and Golden Eagle Protection Act (54 Stat. 250, as amended, 16 U.S.C. 668a-d) (Eagle Act). The Eagle Act prohibits, except when authorized by an Eagle Act permit, the “taking” of bald and golden eagles and defines “take” as “pursue, shoot, shoot at, poison, wound, kill, capture, trap, collect, molest or disturb.” The Eagle Act’s implementing regulations define disturb as “… to agitate or bother a bald or golden eagle to a degree that causes, or is likely to cause, based on the best scientific information available, (1) injury to an eagle, (2) a decrease in its productivity, by substantially interfering with normal breeding, feeding, or sheltering behavior, or (3) nest abandonment, by substantially interfering with normal breeding, feeding, or sheltering behavior.”

Additional Species Requiring Review

In addition to the species described above, the following species or critical habitats may also occur in your project area and are not covered by this conclusion:

- Northern Long-eared Bat *Myotis septentrionalis* Endangered
- Rusty Patched Bumble Bee *Bombus affinis* Endangered
- Western Regal Fritillary *Argynnis idalia occidentalis* Proposed Threatened

Coordination with the Service is not complete if additional coordination is advised above for any species.

Action Description
You provided to IPaC the following name and description for the subject Action.

1. Name

Camp Quarry Adventure Park, Lime Township, MN (24X.137080)

2. Description

The following description was provided for the project 'Camp Quarry Adventure Park, Lime Township, MN (24X.137080)':

> The proposed project, the Camp Quarry Adventure Park, is located in Sections 30 and 31, Township 109 North, Range 26 West, of Lime Township, Blue Earth County, MN. The project is the restoration of a former limestone mine site into a campground/adventure park. The park features a campground with approximately 318 campsites ranging in size. The campground will have a check-in office, main, north, and south entrances, surface parking, bike trail parking/shelter shelter/ restrooms, a maintenance building, and a service road. Additional facilities that the adventure park will have include a rental/snack shack, several bike trail routes, an aquatic park, a water cable park, and swimming areas. There will be approximately 130 parking spaces for passenger vehicles and campers waiting to check in. There will be 196 Large Sites and 122 Small/Medium sites. Roughly 20-30 sites will be more primitive sites without water or electricity while the remaining sites will have water and electricity. Overall, there will be a total of about 15,000 sq.ft. of building space. Construction is scheduled to begin in summer/fall 2025 and will continue throughout 2026, with anticipated completion by fall 2026. However, some work may extend into spring 2027 if necessary to finalize all project components. The project area is approximately 130 acres. Construction activities include grading, fill, potential blasting, vegetation removal, construction of a cable park water feature, open cut utilities installation, building construction, and related activities. Construction waste will be collected and disposed of at a permitted facility.

The approximate location of the project can be viewed in Google Maps: https://www.google.com/maps/@44.211481,-93.99555137144812,14z


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QUALIFICATION INTERVIEW

1. This determination key is intended to assist the user in evaluating the effects of their actions on Federally listed species in Minnesota and Wisconsin. It does not cover other prohibited activities under the Endangered Species Act (e.g., for wildlife: import/export, Interstate or foreign commerce, possession of illegally taken wildlife, etc.; for plants: import/export, reduce to possession, malicious destruction on Federal lands, commercial sale, etc.) or other statutes. Additionally, this key DOES NOT cover wind development, purposeful take (e.g., for research or surveys), communication towers that have guy wires or are over 450 feet in height, aerial or other large-scale application of any chemical (such as insecticide or herbicide), and approval of long-term permits or plans (e.g., FERC licenses, HCP's).

   Click **YES** to acknowledge that you must consider other prohibitions of the ESA or other statutes outside of this determination key.

   Yes
2. Is the action being funded, authorized, or carried out by a Federal agency?

   No
3. Are you the Federal agency or designated non-federal representative?

   Yes
4. Does the proposed action involve **wind or solar energy**?

   No
5. Does the action involve purposeful take of a listed animal?

   No
6. Does the action involve a new communications tower?

   No
7. Does the activity involve aerial or other large-scale application of ANY chemical, including pesticides (insecticide, herbicide, fungicide, rodenticide, etc)?

   No
8. Will your action permanently affect local hydrology?

   No
9. Will your action temporarily affect local hydrology?

   No
10. Will your project have any direct impacts to a stream or river (e.g., Horizontal Directional Drilling (HDD), hydrostatic testing, stream/road crossings, new stormwater outfall discharge, dams, other in-stream work, etc.)?

    No

11. Does your project have the potential to impact the riparian zone or indirectly impact a stream/river (e.g., cut and fill; horizontal directional drilling; construction; vegetation removal; pesticide or fertilizer application; discharge; runoff of sediment or pollutants; increase in erosion, etc.)?

    Note: Consider all potential effects of the action, including those that may happen later in time and outside and downstream of the immediate area involved in the action.

    Endangered Species Act regulation defines "effects of the action" to include all consequences to listed species or critical habitat that are caused by the proposed action, including the consequences of other activities that are caused by the proposed action. A consequence is caused by the proposed action if it would not occur but for the proposed action and it is reasonably certain to occur. Effects of the action may occur later in time and may include consequences occurring outside the immediate area involved in the action. (50 CFR 402.02).

    No

12. Will your action disturb the ground or existing vegetation?

    Note: This includes any off-road vehicle access, soil compaction (enough to collapse a rodent burrow), digging, seismic survey, directional drilling, heavy equipment, grading, trenching, placement of fill, pesticide application (herbicide, fungicide), vegetation management (including removal or maintenance using equipment or prescribed fire), cultivation, development, etc.

    Yes

13. Will your action include spraying insecticides?

    Yes

14. Does your action area occur entirely within an already developed area?

    Note: Already developed areas are already paved, covered by existing structures, manicured lawns, industrial sites, or cultivated cropland, AND do not contain trees that could be roosting habitat. Be aware that listed species may occur in areas with natural, or semi-natural, vegetation immediately adjacent to existing utilities (e.g. roadways, railways) or within utility rights-of-way such as overhead transmission line corridors, and can utilize suitable trees, bridges, or culverts for roosting even in urban dominated landscapes (so these are not considered "already developed areas" for the purposes of this question). If unsure, select NO..

    Yes

15. Does the action have potential indirect effects to listed species or the habitats they depend on (e.g., water discharge into adjacent habitat or waterbody, changes in groundwater elevation, introduction of an exotic plant species)?

    No

16. [Semantic] Does the project intersect the Salamander mussel AOI?

    Automatically answered
    Yes

17. [Hidden Semantic] Does the action area intersect the monarch butterfly species list area?

    Automatically answered
    Yes

IPAC USER CONTACT INFORMATION

Agency: Private Entity
Name: Heather Mullenbach
Address: 1960 Premier Dr
City: Mankato
State: MN
Zip: 56001
Email heather.mullenbach@bolton-menk.com
Phone: 5079957387

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Minnesota-Wisconsin Ecological Services Field Office
3815 American Blvd East
Bloomington, MN 55425-1659
Phone: (952) 858-0793

In Reply Refer To: 08/15/2025 14:37:30 UTC
Project code: 2025-0098307
Project Name: Camp Quarry Adventure Park, Lime Township, MN (24X.137080)

Federal Nexus: no

Federal Action Agency (if applicable):

Subject: Technical Assistance letter for 'Camp Quarry Adventure Park, Lime Township, MN (24X.137080)' for rusty patched bumble bee that may occur in your proposed project location consistent with the Rusty Patched Bumble Bee Range Wide Determination Key (RPBB DKey).

Dear Heather Mullenbach:

This letter records your determination using the RPBB DKey within the Information for Planning and Consultation (IPaC) system provided to the U.S. Fish and Wildlife Service (USFWS) on **August 15, 2025**, for 'Camp Quarry Adventure Park, Lime Township, MN (24X.137080)' (here forward, Project). This project has been assigned Project Code ‘2025-0098307’ and all future correspondence should clearly reference this number. **Please carefully review this letter. Your Endangered Species Act (Act) requirements are not complete.**

Ensuring Accurate Determinations When Using IPaC Determination Keys

The USFWS developed the IPaC system and associated species’ determination keys in accordance with the Endangered Species Act of 1973 (ESA; 87 Stat. 884, as amended; 16 U.S.C. 1531 et seq.). All information submitted by the Project proponent into the IPaC must accurately represent the full scope and details of the Project. **Failure to accurately represent or implement the Project as detailed in IPaC or the RPBB DKey, invalidates this letter.**

Determination for the Rusty Patched Bumble Bee

Based on your answers and the assistance of the USFWS’ RPBB DKey, you made the following effect determination for the proposed Action:

Species	Listing Status	Determination
Rusty Patched Bumble Bee (*Bombus affinis*)	Endangered	May affect

Coordination with the USFWS is not complete. Further coordination with the USFWS is recommended for the rusty patched bumble bee. Please email the local USFWS Ecological Services Field Office and attach a copy of this letter, so we can discuss methods to avoid or minimize potential adverse impacts.

Other Species and Critical Habitat that May be Present in the Action Area

The IPaC-assisted determination key for the rusty patched bumble bee **does not** apply to the following ESA-protected species and/or critical habitat that also may occur in your Action area:

- Monarch Butterfly *Danaus plexippus* Proposed Threatened
- Northern Long-eared Bat *Myotis septentrionalis* Endangered
- Salamander Mussel *Simpsonaias ambigua* Proposed Endangered
- Western Regal Fritillary *Argynnis idalia occidentalis* Proposed Threatened

Coordination with the USFWS is advised for any species and/or critical habitat listed above.

You should coordinate with our Office to determine whether the Action may affect the species and/or critical habitat listed above and if further consultation is required. Note that reinitiation of consultation would be necessary if a new species is listed or critical habitat designated that may be affected by the identified action before it is complete.

If you have any questions regarding this letter or need further assistance, please contact the local Ecological Services Field Office and reference Project Code ‘2025-0098307’ associated with this Project. See the top of this letter for the Project Code.

Additional Information

Sufficient project details: Please provide sufficient project details on your project homepage in IPaC (Define Project, Project Description) to support your conclusions. Failure to disclose important aspects of your project that would influence the outcome of your effects determinations may negate your determinations and invalidate this letter. If you have site-specific information that leads you to believe a different determination is more appropriate for your project than what the Dkey concludes, you can and should proceed based on the best available information.

Future project changes: The Service recommends that you contact the local Ecological Services Field Office or re-evaluate the project in IPaC if: 1) the scope or location of the proposed Action is changed; 2) new information reveals that the action may affect rusty patched bumble bee in a manner or to an extent not previously considered; 3) the Action is modified in a manner that causes effects to rusty patched bumble bee; or 4) or critical habitat is designated. If any of the above conditions occur, additional consultation with the Service should take place before project changes are final or resources are committed.

Species-specific information

Bald and Golden Eagles: Bald eagles, golden eagles, and their nests are protected under the Bald and Golden Eagle Protection Act (54 Stat. 250, as amended, 16 U.S.C. 668a-d) (Eagle Act). The Eagle Act prohibits, except when authorized by an Eagle Act permit, the "taking" of bald and golden eagles and defines "take" as "pursue, shoot, shoot at, poison, wound, kill, capture, trap, collect, molest or disturb." The Eagle Act's implementing regulations define disturb as "… to agitate or bother a bald or golden eagle to a degree that causes, or is likely to cause, based on the best scientific information available, (1) injury to an eagle, (2) a decrease in its productivity, by substantially interfering with normal breeding, feeding, or sheltering behavior, or (3) nest abandonment, by substantially interfering with normal breeding, feeding, or sheltering behavior."

If you observe a bald eagle nest in the vicinity of your proposed project, you should follow the National Bald Eagle Management Guidelines (May 2007). For more information on eagles and conducting activities in the vicinity of an eagle nest, please visit our regional eagle website or contact the local Ecological Services Field Office. If the Action may affect bald or golden eagles, additional coordination with the Service under the Eagle Act may be required.

Action Description
You provided to IPaC the following name and description for the subject Action.

1. Name

Camp Quarry Adventure Park, Lime Township, MN (24X.137080)

2. Description

The following description was provided for the project 'Camp Quarry Adventure Park, Lime Township, MN (24X.137080)':

> The proposed project, the Camp Quarry Adventure Park, is located in Sections 30 and 31, Township 109 North, Range 26 West, of Lime Township, Blue Earth County, MN. The project is the restoration of a former limestone mine site into a campground/adventure park. The park features a campground with approximately 318 campsites ranging in size. The campground will have a check-in office, main, north, and south entrances, surface parking, bike trail parking/shelter shelter/ restrooms, a maintenance building, and a service road. Additional facilities that the adventure park will have include a rental/snack shack, several bike trail routes, an aquatic park, a water cable park, and swimming areas. There will be approximately 130 parking spaces for passenger vehicles and campers waiting to check in. There will be 196 Large Sites and 122 Small/Medium sites. Roughly 20-30 sites will be more primitive sites without water or electricity while the remaining sites will have water and electricity. Overall, there will be a total of about 15,000 sq.ft. of building space. Construction is scheduled to begin in summer/fall 2025 and will continue throughout 2026, with anticipated completion by fall 2026. However, some work may extend into spring 2027 if necessary to finalize all project components. The project area is approximately 130 acres. Construction activities include grading, fill, potential blasting, vegetation removal, construction of a cable park water feature, open cut utilities installation, building construction, and related activities. Construction waste will be collected and disposed of at a permitted facility.

The approximate location of the project can be viewed in Google Maps: https://www.google.com/maps/@44.211481,-93.99555137144812,14z


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QUALIFICATION INTERVIEW

1. Does the proposed action involve wind or solar energy?

   No

2. Is the action authorized, funded, or being carried out by a Federal agency?

   No

3. Does the action area overlap with a rusty patched bumble bee high potential zone?

   Automatically answered
   Yes

4. Does the action include - or is it reasonably certain to cause - intentional take of rusty patched bumble bee (rusty patched bumble bee) that is not covered under a scientific recovery permit under section 10(A)1(a) of the Endangered Species Act or under a cooperative agreement with a state agency?

   Note: This could include, for example, surveys or studies that include handling or capture of the species. Whether "Project Review" surveys using USFWS protocols were conducted as part of the action is addressed later in this key.

   No

5. Does the action include – or is it reasonably certain to result in – construction of one or more new roads or rail lines that will increase vehicle traffic in a rusty patched bumble bee HPZ?

   No

6. Does the action include – or is it reasonably certain to result in – the addition of travel lanes that are likely to increase vehicle traffic on one or more existing roads that will increase vehicle traffic in a rusty patched bumble bee HPZ?

   No

7. Is an increase in vehicular traffic in one or more HPZs a likely outcome of the federal action?

   No

8. Does the action include – or is it reasonably certain to cause – the use of commercial/ managed bees (e.g., the use of honeybees or managed bumble bees to pollinate crops).

   No

9. Is there habitat for nesting, foraging, and/or overwintering for the rusty patched bumble bee in the action area?

   Note: Please refer to the ESA Section 7(a)(2) Voluntary Implementation technical assistance for Rusty Patched Bumble Bee .

   Yes

10. Have “Project Review” surveys for rusty patched bumble bees already been conducted in the action area according to Service-approved protocols? If you don't know, answer 'no'.

    No

11. Does the action include collection of seed from native species?
    No
12. Does the action include, or will it cause the application of insecticides or fungicides?
    Yes

IPAC USER CONTACT INFORMATION

Agency: Private Entity
Name: Heather Mullenbach
Address: 1960 Premier Dr
City: Mankato
State: MN
Zip: 56001
Email heather.mullenbach@bolton-menk.com
Phone: 5079957387

Breeding evidence for block T109R26c

10 species were recorded in this block:

Pigeons and Doves	
Mourning Dove	possible
Flycatchers	
Eastern Kingbird	possible
Martins and Swallows	
Barn Swallow	possible
Thrushes	
American Robin	possible
Towhees and Sparrows	
Chipping Sparrow	possible
Grasshopper Sparrow	possible
Blackbirds and Orioles	
Bobolink	possible
Eastern Meadowlark	possible
Western Meadowlark	possible
Tanagers, Cardinals, and Grosbeaks	
Dickcissel	possible

Kirsten Pauly, PE/PG, *Principal*
Brian Mundstock, PE, *Principal*
Mike Kettler, PE, *Principal*

Sunde Engineering, PLLC.

Consulting Civil Engineers

February 13, 2026

Kyle Kaldor
Rockwell Adventure Park
3rd Ave
Mankato, MN 56001

Dear Mr. Kaldor,

As requested, the following is a review of how recent dewatering of the Stoffel Quarry lake has affected groundwater levels in the area near the quarry and near the Lime 30 Calcareous Fen (Fen). Water level monitoring of 16 monitoring wells is on-going as required by the temporary Water Appropriation Permits (WAP) #2025-2887 and #2025-2888. These temporary WAPs were issued to allow final Stoffel reclamation grading.

The Stoffel Quarry Lake was created from past quarry activity which involved long term dewatering that ceased in July 2023. Prior to the temporary dewatering the lake had fully recovered to pre-mining levels and was at an elevation of approximately 796.5 feet above mean sea level (msl). Dewatering of the Stoffel Quarry began December 2, 2025 at approximately 1pm has occurred intermittently since that time. The permit is approved to dewater to an elevation of 782 msl.

Water levels in two of the monitoring wells within the monitoring well network were reviewed. Both wells were equipped with data loggers to collect water level readings on an hourly basis. One well, MW-14-JS is located in Parcel D approximately 150 feet southwest of the edge of the water body that was dewatered where you would expect to see a response to pumping. The other well, MW-5-Pilgrim is located approximately 2,100 feet west of the edge of the water body and approximately 160 feet from the edge of the Fen. Figure 1 Well Locations, illustrates the locations of these two wells and the fen.

Manual water levels were taken on December 1, 2025, prior to the start of the dewatering operation. The water level in MW-14-JS was 793.08 msl and the groundwater elevation and the water level in MW-5 -Pilgrim was 772.97 msl on Dec 1, 2025. The attached graph illustrates the change in water levels of these two wells over the period of temporary dewatering. Days that the pump ran are indicated on the bottom of the graph.

The water level in the quarry lake was lowered approximately 14.5 feet. MW-14-JS showed a readily discernable pumping response with water levels declining a maximum of approximately 9.5 feet over the period of temporary dewatering, followed by a rise in water levels once pumping stopped after 1/15/26.

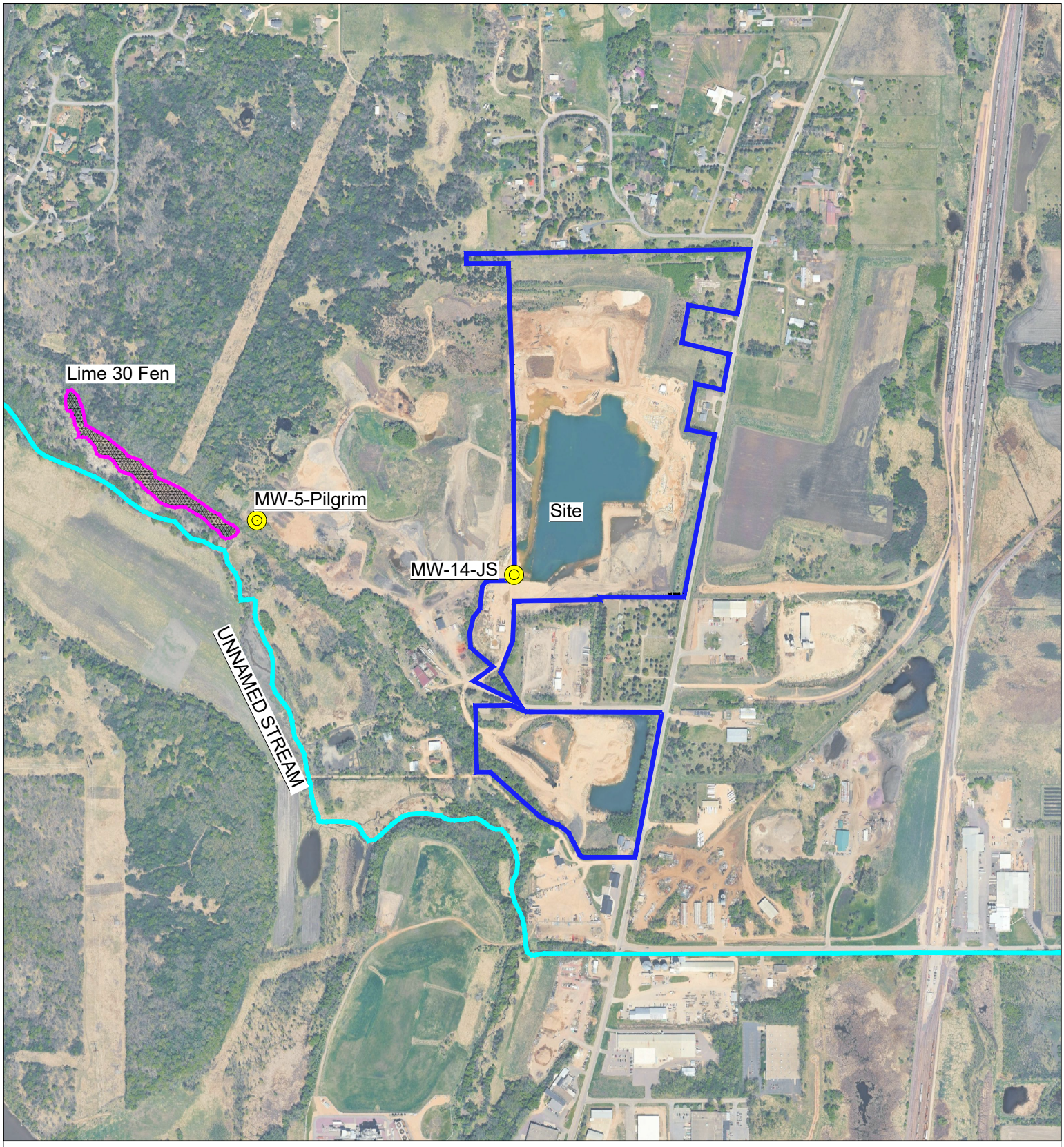
In contrast, water levels in MW-5-Pilgrim show a small and steady decline throughout the dewatering period with no obvious pumping signature. Water levels in MW-5-Pilgrim have declined approximately 0.9 feet since the start of the temporary dewatering. A decline in groundwater level is typical during the winter months when the ground is frozen and infiltration and recharge rates are near zero.

Previous MW-5-Pilgrim monitoring data was evaluated to further understand normal winter water level declines in this well. Three years of baseline monitoring data (2014-2015, 2015-2016, and 2016-2017) collected prior to the initial Jordan Sands dewatering of the Stoffel Quarry over the months of December through early February was reviewed. This timeframe is consistent with the temporary dewatering timeframe. Water levels declined by 0.75, 0.28, and 1.24 feet respectively, during the baseline monitoring. The 2025-2026 water level declined 0.90 feet, within the range of baseline declines, indicating the decline observed in MW-5-Pilgrim during the temporary dewatering may be independent of the dewatering activity. It is reasonable to conclude that recent pumping has shown little to no impact to the groundwater elevations near the fen.

Sincerely,



Tyler Dahm
Sunde Engineering, PLLC



Aerial imagery from Google Earth dated 5/5/2025

N

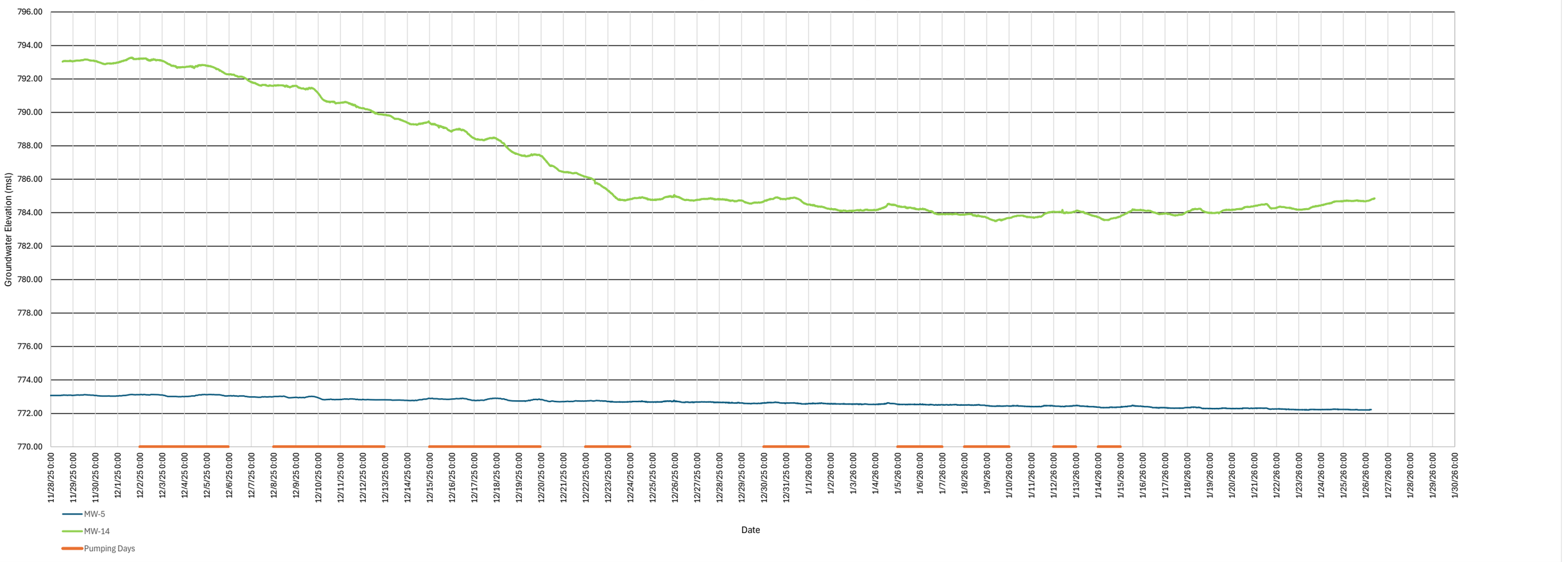
0 500 1000

SCALE IN FEET

Figure 1

Monitoring Well Locations

Sunde Engineering, PLLC.


MW-5-Pilgrim and MW-14-JS vs Pumping
Groundwater Elevation (msl)
796.00
794.00
792.00
790.00
788.00
786.00
784.00
782.00
780.00
778.00
776.00
774.00
772.00
770.00
11/28/25 0:00
11/29/25 0:00
11/30/25 0:00
12/1/25 0:00
12/2/25 0:00
12/3/25 0:00
12/4/25 0:00
12/5/25 0:00
12/6/25 0:00
12/7/25 0:00
12/8/25 0:00
12/9/25 0:00
12/10/25 0:00
12/11/25 0:00
12/12/25 0:00
12/13/25 0:00
12/14/25 0:00
12/15/25 0:00
12/16/25 0:00
12/17/25 0:00
12/18/25 0:00
12/19/25 0:00
12/20/25 0:00
12/21/25 0:00
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12/24/25 0:00
12/25/25 0:00
12/26/25 0:00
12/27/25 0:00
12/28/25 0:00
12/29/25 0:00
12/30/25 0:00
12/31/25 0:00
1/1/26 0:00
1/2/26 0:00
1/3/26 0:00
1/4/26 0:00
1/5/26 0:00
1/6/26 0:00
1/7/26 0:00
1/8/26 0:00
1/9/26 0:00
1/10/26 0:00
1/11/26 0:00
1/12/26 0:00
1/13/26 0:00
1/14/26 0:00
1/15/26 0:00
1/16/26 0:00
1/17/26 0:00
1/18/26 0:00
1/19/26 0:00
1/20/26 0:00
1/21/26 0:00
1/22/26 0:00
1/23/26 0:00
1/24/26 0:00
1/25/26 0:00
1/26/26 0:00
1/27/26 0:00
1/28/26 0:00
1/29/26 0:00
1/30/26 0:00
Date
MW-5
MW-14
Pumping Days

Appendix C: Cultural Resources

- SHPO Comment Letter
- Report Resubmittal Cover Letter
- Redacted Phase IA Cultural Resources Literature Review
- Phase I Architecture-History Reconnaissance Survey and Phase II Evaluations
-

Reports included in this Appendix are suitable for public distribution.

Pursuant to Section 304 of the National Historic Preservation Act (54 U.S.C. § 307103) and 36 CFR § 800.6(a)(5), information concerning the nature and location of archaeological resources is withheld from public disclosure to protect sensitive cultural and historical sites. Such information is considered confidential and is exempt from release under federal preservation regulations.

December 17, 2025

Ivy Faulkner, Sr. Cultural Resources Specialist
Bolton & Menk, Inc.
ivy.faulkner@bolton-menk.com

RE: Rockwell RV & Adventure Park
Lime Township, Blue Earth County
SHPO Number: 2026-0045

Dear Ivy Faulkner:

Thank you for contacting our office during the preparation of an Environmental Assessment Worksheet for the above-referenced project.

Project Description
As stated in your correspondence, CampQuarry, LLC is proposing construction of a new RV campground and outdoor recreational facility (Rockwell RV & Adventure Park) that will include 318 campsites, a check-in office, multiple entrances, parking, bike trail facilities, restrooms, a maintenance building, and a service road. Additional amenities will include a rental/snack shake, bike trails, an aquatic park, a water cable park, and swimming areas. The total project area is approximately 107.7 acres. We agree that the area of potential effects (APE) determination is generally appropriate to take into account the potential effects of the proposed project as we currently understand it.

Identification of Historic Properties
Architecture-History Properties
Based on the information provided, including the report, *Rockwell RV & Adventure Park, Lime Township, Blue Earth County, Minnesota, Phase I Architecture-History Reconnaissance Survey and Phase II Evaluations*, prepared by Jesse Kling, et al., of Bolton & Menk, Inc. (October 2025), and the inventory information uploaded to the Minnesota Statewide Historic Inventory Portal (MnSHIP), we agree with the consultant's recommendation that the following architecture-history resources are **individually eligible** for inclusion in the National Register of Historic Places (NRHP):

- **BE-LIM-00001—Widell & Co. Office Building**, 57032 231st Lane: This property is individually eligible for listing in the NRHP under Criteria A and C and contributes to the Klondike and McClure Quarries Historic District. Additional information is needed to assess this property's potential significance and individual eligibility under National Register Criterion B. The property is not individually eligible under Criterion D, nor does it contribute to the eligibility of the historic district under Criterion D.
- **BE-LIM-00047—McMullen-McClure Quarry Pit**, 57150 230th Lane: This property is individually eligible for listing in the NRHP under Criterion A and contributes to the Klondike and McClure Quarries Historic District.
- **BE-LIM-00052—Klondike and McClure Quarries Historic District**, NE 1/4 of Section 31: This property is individually eligible for listing in the NRHP under Criterion A. Additional information is needed to assess its potential significance and eligibility under Criterion D. The archaeological survey report did not address this property, and it should have done so.

We also agree with the consultant's recommendation that the following architecture-history resources are not individually eligible for inclusion in the National Register **but are contributing resources to the Klondike and McClure Quarries Historic District**:

- **BE-LIM-00002—Schaefer-Widell House**, 57063 231st Lane

- **BE-LIM-00003**—**Klondike Quarry Farmstead**, 57032 231st Lane: Additional information is needed to assess this property's potential significance and individual eligibility under Criterion D. The archaeological survey report did not address this property, and it should have done so if the property is within the footprint of proposed ground disturbance.
- **BE-LIM-00005**—**Carney Cement Co. Lime Kilns**, 57063 231st Lane
- **BE-LIM-00048**—**McMullen-McClure Quarry Stockpiles**, NE 1/4 of Section 31, North of 230th Lane: The property may contribute to the historic district's eligibility under Criterion D; however, additional information is needed to assess this property's potential significance and eligibility. The archaeological survey report did not address this property, and it should have done so.
- **BE-LIM-00049**—**Klondike Quarry Railroad Spur**, SW-NE to NE-NW of Section 31: The property may contribute to the district's eligibility under Criterion D; however, additional information is needed to assess this property's potential significance and eligibility. The archaeological survey report did not address this property, and it should have done so.
- **BE-LIM-00051**—**James McClure Quarry Stockpile Structures**, NE 1/4 of Section 31, North of 230th Lane: The property may contribute to the district's eligibility under Criterion D; however, additional information is needed to assess this property's potential significance and eligibility. The archaeological survey report did not address this property, and it should have done so.

We note that although the Mendota-Big Sioux River Military Road: Lime Section, Co. Hwy. 5 (BE-LIM-00013) abuts the project parcel, an updated inventory form was not prepared for this road, which was last inventoried in 1988. The architecture-history report indicates "previous alterations and modifications to the roadway (such as the resurfacing noted on the inventory form) make it unlikely that this property is eligible for [National Register] listing." However, Minnesota's *Historic and Architectural Survey Manual* (revised, August 2017) notes previous architecture-history survey documentation should be updated if the previous survey was 10 or more years ago or if the property has substantially changed since it was last surveyed. While full evaluation of either the 11-mile road segment or the entire 101-mile road might be above and beyond the scope of the current architecture-history investigation, we cannot agree Mendota-Big Sioux River Military Road is not eligible for inclusion in the NRHP without updated inventory information. In lieu of an evaluation, we recommend project design related to altering or creating access to the proposed facility consider how to minimize potential effects to the unevaluated road.

We do not agree with your recommendation that the prosed project will not adversely affect the historic properties. Although the ruins, stockpiles, and standing buildings may not be physically affected by the creation of the trails, campsites, and other amenities, there is the potential that these resources may suffer additional damage by park users (i.e. graffiti, moving/pilfering of stone and other items, climbing on features, etc.). We recommend that the project proponent consider ways to ensure that these resources are protected from further damage by park users.

Archaeological Resources

We have reviewed the additional material included with your November 24th submittal related to the archaeological survey. The report *Phase IA Cultural Resources Literature Review for Camp Quarry Adventure Park, Lime Township, Blue Earth County, Minnesota* prepared by Bolton & Menk in June 2025 has been returned to the archaeologist who submitted it in the Office of the State Archaeologist (OSA) Portal because it uses the phrase "pictographic imagery" which we believe should be edited to "aerial imagery." A pictograph is a symbol, not a photograph.

The report *Phase I Archaeological Survey for the Rockwell RV & Adventure Park, Lime Township, Blue Earth County, Minnesota* prepared by Bolton & Menk in October 2025 has been returned to the archaeologist who submitted it in the OSA Portal because we are requesting additional information about the evaluation of archaeological site **21BE0348**, the **Mankato Holstein Farm Barn Site.** Archaeological site 21BE0348 has been evaluated and determined eligible under Criteria A, B, C, and D. We do not agree. Please provide a detailed description of all the features identified within the site as well as a sketch map that labels the features. We note that detailed site mapping is a requirement of the *Historical Archaeology of Minnesota Farmsteads: Historic Context Study of Minnesota Farmsteads, 1820-1960* that was used to evaluate the site (Terrell 2006:B.13). We are not certain this historic context is appropriate for the site because a farmstead is defined therein as including at least one dwelling (Terrell 2006:B.5). Does this site include at least one dwelling? At this time, we

understand that there is a barn foundation, two clay brick silos, a cattle shute, a fence line, a windbreak, a root cellar, and possibly other foundations. In addition to detailed site mapping and information about the features, please provide additional documentation for the site's significance. We recommend reviewing National Register Bulletin 36 *Guidelines for Evaluating and Registering Archeological Properties*. Specifically, we request additional information regarding the significance of the site under Criterion A, which we believe can be addressed by providing more information about the features documented at the site. We are not convinced that the site is eligible under Criterion B for association with John Clement Marlow because we need more information about Marlow's significance at the local, state, and national levels. We do not believe that the site is significant under Criterion C because the structure is no longer extant. We are not convinced that the site is eligible under Criterion D because we do not agree that the requirements outlined by the historic context have been met, except for the association with the Development of Livestock Industries period. Please provide additional information about how the site has the potential to answer the research questions identified and the integrity of the site. We recommend reviewing National Register Bulletin 36 in relation to evaluating the site's integrity.

We also request additional information, in the archaeology report, regarding the above referenced above ground historic resources that need additional information to assess their potential significance and integrity under Criterion D. These resources include: the Klondike and McClure Quarries Historic District, the Klondike Quarry Farmstead, the McMullen-McClure Quarry Stockpiles, the Klondike Quarry Railroad Spur, and the James McClure Quarry Stockpile Structures.

Please revise the archaeological reports to address our comments above. After the reports are revised and resubmitted in the OSA Portal, please prepare a cover letter addressing the changes as well as our comments regarding the proposed project's potential effects on the historic properties identified. Send the cover letter via email to ENReviewSHPO@state.mn.us and reference SHPO Number 2026-0045. During the preparation of the EAW, please do not include non-public archaeological site location information in the public-facing document and do not include the archaeological reports as appendices.

Please note that this comment letter is intended to provide technical assistance during the preparation of an EAW. It does not address the requirements of Section 106 of the National Historic Preservation Act of 1966 and 36 CFR § 800. If this project is considered for federal financial assistance, or requires a federal permit or license, then review and consultation with our office will need to be initiated by the lead federal agency in order to define the federal undertaking, an appropriate area of potential effects (APE) for the federal undertaking, as well as the necessary historic property identification and evaluation efforts required for a federal review. Be advised that comments and recommendations provided by our office for this review may differ from findings and determinations made by the federal agency as part of review and consultation under Section 106.

We look forward to continuing consultation on this project. Please contact me at kelly.graggjohnson@state.mn.us if you have any general questions regarding our review of this project. Please contact Lucy Harrington, Environmental Review Archaeologist, at lucy.harrington@state.mn.us with questions regarding archaeology.

Sincerely,

Kelly Gragg-Johnson

Kelly Gragg-Johnson
Environmental Review Specialist

BOLTON & MENK
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Burnsville, MN 55337-1649

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February 27, 2026

Kelly Gragg-Johnson
Environmental Review Specialist
SHPO Number: 2026-0045

RE: Rockwell RV & Adventure Park, Lime Township, Blue Earth County, Minnesota

Bolton & Menk completed a Phase I archaeological survey and Phase I/II architecture-history investigation on behalf of CampQuarry, LLC in July and August 2025. In its review of the associated survey report dated December 17, 2025 (SHPO No. 2026-0045a), SHPO requested additional information related to the following points:

- Potential eligibility of contributing elements to the Klondike and McClure Quarries Historic District (BE-LIM-00052) under Criterion D. SHPO requested that this be addressed in the archaeological survey report.
- Updated inventory information and associated form for the Mendota-Big Sioux River Military Road: Lime Section (BE-LIM-00013).
- Discussion regarding methods for avoiding potential indirect impacts to historic properties by campground users.
- Information on extant features associated with the Mankato Holstein Farm Barn Site (21BE0348)
- Additional information related to the potential eligibility of the Mankato Holstein Farm Barn Site under each of the eligibility criteria.
- Revision of the phrase “pictographic imagery” in the Phase IA report to “aerial imagery.”

The Phase IA report titled “Phase IA Cultural Resources Literature Review for Camp Quarry Adventure Park, Lime Township, Blue Earth County, Minnesota” by Ivy Faulkner and Mattea Spaeth was revised and resubmitted via the OSA Portal in December 2025. The Phase I archaeological survey report titled “Phase I Archaeological Survey for the Rockwell RV & Adventure Park, Lime Township, Blue Earth County, Minnesota” by Ivy Faulkner and El Julius was updated and resubmitted via the OSA Portal in February 2026. The Phase I/II architecture-history report titled “Phase I Architecture-History Reconnaissance Survey and Phase II Evaluations for the Rockwell RV & Adventure Park, Lime Township, Blue Earth County, Minnesota” by Ivy Faulkner, Jesse Kling, Mattea Spaeth, and El Julius was updated and is attached to this email.

As described in the updated archaeological survey report, research to date suggests that the Mankato Holstein Farm Barn Site may have historical significance. However, additional archaeological investigation is needed to determine eligibility. In lieu of a Phase II archaeological survey, avoidance of the site area was recommended and incorporated into project plans. Additionally, although no archaeological components of the Klondike and McClure Quarries Historic District were encountered during the Phase I archaeological survey, more investigations are needed to determine whether significant archaeological deposits associated with the historic district may exist and the integrity of any such deposits. However, as current project plans are not anticipated to significantly impact any potential archaeological components of this district, no further archaeological work was conducted as a part of the current investigation.

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Similarly, the revised architecture-history report specifies that although eligible architecture-history properties, including the Klondike and McClure Quarries Historic District, were identified in the southern portion of the project area, proposed project activities in this area are restricted to the installation of RV camping spots and bike trails which will not adversely impact these resources. The redevelopment of the area from an industrial mining operation to a campground and outdoor recreational facility will have some effect upon the integrity of setting and feeling, but given the increasing shift from industrial quarrying to residential development of the surrounding parcels over the past several decades, this is not anticipated to have significant adverse impacts on any of the architecture-history resources evaluated as part of this investigation. Additionally, regular maintenance of the campground and outdoor facilities is anticipated to provide additional oversight for the historic district and its contributing elements that will discourage pilfering, graffiti, and other damage. In order to further discourage future adverse impacts, Bolton & Menk also recommends implementing additional measures to discourage future impacts by visitors. This could include, but is not limited to, installing signage advising park users of the historical significance of these resources and promoting their continued preservation; stabilizing and preserving historic features within the park; promoting the history of the area and region within the park through events, activities, signage, displays, etc.

Finally, the revised architecture-history report includes further discussion of the Mendota-Big Sioux River Military Road: Lime Section (BE-LIM-00013) which was recommended as not eligible for NRHP listing due to a significant loss of integrity as a result of roadway realignment and resurfacing between 1958 – 1964. An updated inventory form for this property has been submitted via MnSHIP.

Based on these findings, and presuming that the recommendations described in the revised reports are incorporated, Bolton & Menk recommends a finding of ***no adverse effect to historic properties*** and no further cultural resources investigations for the project as currently proposed.

Sincerely,

Bolton & Menk, Inc.



Ivy Faulkner, PhD
Sr. Cultural Resources Specialist

CC: Angie Smith, Environmental Planning Division Leader, Bolton & Menk
Teresa Burgess, Environmental Planning Sr. Project Engineer, Bolton & Menk
Jason Femrite, PE, Land Development Group Leader, Bolton & Menk

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Camp Quarry Adventure Park, Lime Township, Blue Earth County, Minnesota

Phase IA Cultural Resources Literature Review

Holtmeier Construction, Inc.
June 2025

THIS REPORT MAY CONTAIN SITE LOCATION INFORMATION NOT FOR PUBLIC DISTRUBTION

BOLTON & MENK
Real People. Real Solutions.

Submitted by:
Bolton & Menk, Inc.
12224 Nicollet Ave
Burnsville, MN 55337
P: (952) 890-0509

Phase IA Cultural Resources Literature Review for Camp Quarry Adventure Park, Lime Township, Blue Earth County, Minnesota

Prepared for Holtmeier Construction, Inc.

Authors

Ivy Faulkner, PhD

Mattea Spaeth

Prepared by:
Bolton & Menk, Inc.
12224 Nicollet Avenue
Burnsville, MN 55337

June 2025

ABSTRACT

The following report contains the results of a Phase IA cultural resources literature review conducted on behalf of Holtmeier Construction, Inc. for the proposed construction of a new RV and outdoor recreation park (Camp Quarry Adventure Park). The proposed Camp Quarry Adventure Park will include 318 campsites, a check-in office, multiple entrances, parking, bike trail facilities, restrooms, a maintenance building, and a service road. Additional amenities will include a rental/snack shack, bike trails, an aquatic park, a water cable park, and swimming areas. The proposed project is located on a reclaimed gravel pit in T109N, R26W, Sections 30 & 31 of Lime Township, Blue Earth County, Minnesota. The total project area is approximately 130 acres. The project area is within Minnesota State Historic Preservation Office (SHPO) Archaeological Region 2e (Prairie Lakes East).

The proposed project is located on private parcels and will be funded with private funds. However, the proposed project exceeds the threshold outlines in MN Rules 4410.4300, Subpar 20. Campgrounds and RV Parks and therefore requires the preparation of an Environmental Assessment Worksheet (EAW), which includes cultural resources review.

The Phase IA cultural resources literature review was conducted by the Bolton & Menk, Inc. cultural resources team in June 2025. The objectives of the literature review were to: 1) document the recommended Study Area for the proposed project, 2) summarize data/information of previously recorded cultural resources and cultural resource surveys within/near the Study Area, and 3) determine if further cultural resource investigation is recommended. This report meets the requirements outlined in the *State Archaeologist's Manual for Archaeological Projects in Minnesota* (Anfinson 2011).

Three previously recorded archaeological sites were identified within one mile of the proposed project area. Additionally, 16 previously inventoried historic resources were identified within 0.5 miles of the project area. Ten previously completed environmental planning documents and cultural resources investigations were reviewed which were conducted within approximately 1 mile of the project area. Six of these reports discussed portions of or the entirety of the current proposed project area.

Although historic documentation, including historic maps and aerial imagery, indicate a long history of stone quarrying across the majority of the Study Area, historic properties related to these activities appear to remain extant. Previous cultural resources investigations have recommended that several of the properties within the Study Area are potentially eligible for NRHP listing. In 2015, SHPO concurred with the recommendation of eligibility for three properties, which were also recommended as contributing elements of a historic district. Other previously identified and potentially eligible historic resources within or adjacent to the Study Area have not been evaluated since they were initially inventoried. As such, they require further assessment in order to determine their potential eligibility and the extent of potential impacts as a result of the proposed project. Finally, previously inventoried historic properties that were listed in or recommended as potentially eligible to the NRHP that have subsequently been demolished require assessment of their potential for eligibility as archaeological sites.

Therefore, based on an off-site review, Bolton & Menk recommends ***additional cultural resources investigations including both archaeological and architecture-history surveys***.

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Appendix

Appendix A: Preliminary Project Plans

INTRODUCTION

PROJECT DESCRIPTION

Holtmeier Construction, Inc. (Holtmeier) is proposing the construction of a new RV and outdoor recreation park (Camp Quarry Adventure Park) in Lime Township, Blue Earth County, Minnesota (**Figure 1**). The proposed Camp Quarry Adventure Park will include 318 campsites, a check-in office, multiple entrances, parking, bike trail facilities, restrooms, a maintenance building, and a service road. Additional amenities will include a rental/snack shack, bike trails, an aquatic park, a water cable park, and swimming areas. The total project area is approximately 130 acres. The proposed project is located on a reclaimed gravel pit in T109N, R26W, Sections 30 & 31 of Blue Earth County, Minnesota (**Figure 2**). This project area is within Minnesota State Historic Preservation Office (SHPO) Archaeological Region 2e (Prairie Lakes East).

The proposed project is located on private parcels and will be funded with private funds. However, the proposed project exceeds the threshold outlines in MN Rules 4410.4300, Subpar 20. Campgrounds and RV Parks and therefore requires the preparation of an Environmental Assessment Worksheet (EAW), which includes cultural resources review.

The Bolton & Menk, Inc. cultural resources team was contracted to perform a Phase IA Literature Review to summarize data/information of known cultural resources within/near the proposed project area documented through June 2025 and to make recommendations regarding whether additional cultural resources investigation is necessary. This report meets the requirements outlined in the *State Archaeologist's Manual for Archaeological Projects in Minnesota* (Anfinson 2011).

Information contained in this report relating to the nature and location of archaeological sites is considered private and confidential and not for public disclosure in accordance with Section 304 of the National Historic Preservation Act (54 USC § 307103), 36 CFR Part 800.6 (a)(5) of the Advisory Council on Historic Preservation's rules implementing Sections 106 of the NHPA.

RECOMMENDED STUDY AREA

Holtmeier is proposing to construct a new RV and outdoor recreation park (Camp Quarry Adventure Park). Proposed project activities include construction of a check-in office, maintenance building, retail/snack shack, three entrances with associated access or service roads, restroom facilities, bike trails, an aquatic park, a water cable park, swimming areas, approximately 130 parking spaces, 196 large campsites and 122 small/medium campsites, most with associated water and electricity hook-ups (20 – 30 campsites are anticipated to be more primitive sites without water or electricity). Sewage will be collected in a holding tank with a pump and trucked to the City of Mankato to be disposed of. Any large-scale drilling or grading will be done under the existing mining permit prior to the beginning of reclamation. Reclamation will proceed in phases aligned with mining operations and will be completed in a timely manner to prevent erosion and sedimentation. The final landscape will include a mix of upland areas and water bodies, balanced with available backfill materials. Backfill below the water table will consist of shot limestone and fine sands from the wet plant, used as interlocking hydraulic fill. Once backfilling reaches three feet above the water table, filter cake will be blended with fine sands and limestone to bring areas to final grade. Upland areas will be covered with topsoil, seeded, and mulched using native prairie seed mixes tailored to site conditions in order to promote diverse vegetation and wildlife habitation across the site.

Overall, the proposed project is anticipated to include a total of approximately 15,000 square feet of building space within a total project area of approximately 130 acres. The Study Area includes the entire 130-acre proposed project area as ground disturbing activities, including construction staging and

stockpiling, may occur anywhere within this project area. The majority of the Study Area is within a reclaimed quarry site, which will no longer be in operation upon the beginning of project construction.

Camp Quarry Adventure Park

Holtmeier Construction, Inc.

Figure 1 - Aerial Location

June 2025

BOLTON & MENK



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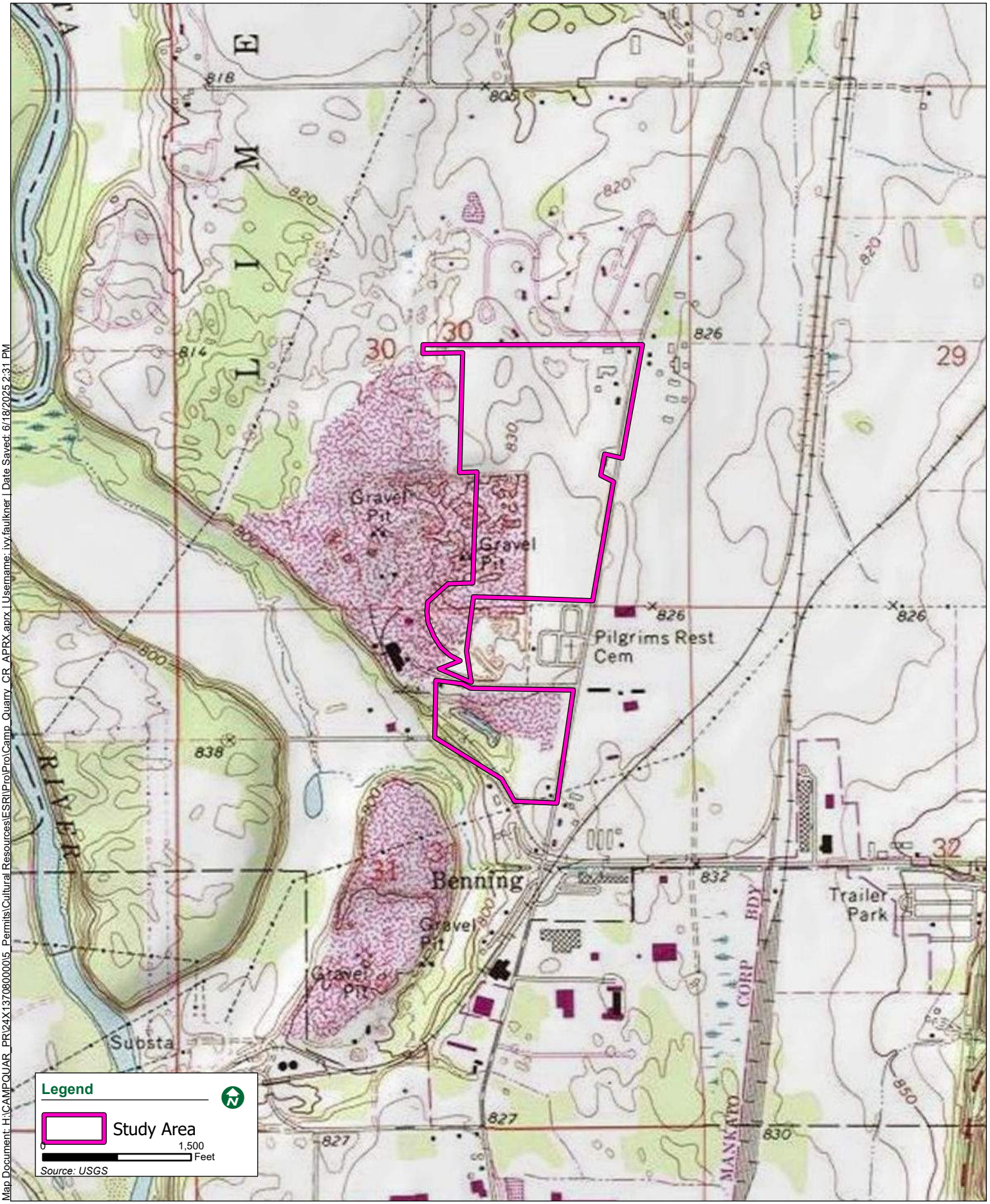

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METHODOLOGY/RESEARCH DESIGN

OBJECTIVES

Objectives for this Phase IA cultural resources literature review are as follows:

1. Document the recommended Study Area for the proposed project.
2. Summarize data/information regarding previously recorded cultural resources and cultural resource surveys within/near the Study Area.
3. Determine if further cultural resource investigation is recommended.

METHODS

Literature Search

Background research was completed to identify previously recorded archaeological sites and architecture-history resources documented through June 2025 within approximately 1 mile and 0.5 miles of the Study Area respectively. This research included reviewing cultural resources reports, site forms, maps, and other available information. The Office of the State Archaeologist (OSA) Portal and Minnesota's Statewide Historic Inventory Portal (MnSHIP) were utilized as repositories of information on previously recorded cultural resources in the state. Historic aerial imagery of the project area was reviewed in order to understand the past development of this area and how potential and existing archaeological site areas have been impacted through time. Data in state site files regarding previously completed cultural resources surveys within approximately 1 mile of the Study Area were reviewed on June 4, 2025, during in-person research at SHPO. Additional historic documentation, primarily newspaper articles relevant to the Study Area, were provided by the Blue Earth County Historical Society.

SETTING

The project is located in Blue Earth County and within Lime Township on the west side of County Road (CR) 5 (**Figures 1** & **2**). The majority of the Study Area is within a reclaimed sand, gravel, and limestone quarry site, which will no longer be in operation upon the beginning of project construction. However, there are also some vegetated areas, primarily at the northern and southern ends of the project area and some wetland areas, particularly in the southern half of the project area (**Figures 3** & **4**).

Figure 3: Project Setting – Northern End of Study Area



View south from northern end of Study Area (4/21/2025)

Figure 4: Project Setting – Southern End of Study Area



View north from southern end of Study Area (4/21/2025)

GEOLOGICAL & ENVIRONMENTAL CONTEXTS

The Study Area is within a Bar and Erosional Strath landform in a landscape of Catastrophic Flood, according to the MM4 Landform Layer (Hobbs 2019a). According to the Web Soil Survey, soils in the area are predominantly comprised of Lasa loamy fine sand (**Table 1**; Natural Resources Conservation Service [NRCS] 2019).

Table 1: Soil Types Within the Study Area

Soil Name*	Parent Material	Typical Soil Profile**	Percent of Study Area
Lasa loamy fine sand, rock substratum, 1 – 6% slopes	Sandy outwash	Ap, A (disturbed topsoil, topsoil) 0 – 22 inches: loamy fine sand Bw (weathered subsoil) 22 – 48 inches: loamy fine sand 2R (bedrock of separate parent material) 48 – 60 inches: unweathered bedrock	65.5%
Copaston-Rock outcrop complex, 1 – 4% slopes	Fine-loamy till over limestone bedrock	A (topsoil) 0 – 10 inches: loam Bw (weathered subsoil) 10 – 19 inches: sandy loam 2R (bedrock of separate parent material) 19 – 23 inches: unweathered bedrock	18.9%
Copaston loam, 1 – 4% slopes	Fine-loamy till over limestone bedrock	A (topsoil) 0 – 10 inches: loam Bw (weathered subsoil) 10 – 19 inches: sandy loam 2R (bedrock of separate parent material) 19 – 23 inches: unweathered bedrock	11.7%
Fieldon loam, 0 – 2% slopes	Coarse-loamy glaciofluvial deposits over sandy outwash	Ap (disturbed topsoil) 0 – 10 inches: loam A (topsoil) 10 – 16 inches: fine sandy loam Bg (gleyed subsoil) 16 – 32 inches: fine sandy loam 2Cg (gleyed substratum from separate parent material) 32 – 79 inches: stratified loamy fine sand to sandy loam to very fine sandy loam	1.4%
Rock outcrop-Copaston complex, very steep	Fine-loamy till over limestone bedrock	A (topsoil) 0 – 8 inches: loam Bw (weathered subsoil) 8 – 12 inches: sandy loam 2R (bedrock of separate parent material) 12 – 16 inches: unweathered bedrock	1.2%
Lasa fine sand, 2 – 8% slopes	Sandy outwash	Ap, A (disturbed topsoil, topsoil) 0 – 22 inches: fine sand Bw (weathered subsoil) 22 – 45 inches: fine sand C (unconsolidated substratum) 45 – 60 inches: fine sand	0.6%
Copaston loam, very shallow, 1 – 4% slopes	Fine-loamy till over limestone bedrock	A (topsoil) 0 – 8 inches: loam Bw (weathered subsoil) 8 – 12 inches: sandy loam 2R (bedrock of separate parent material) 12 – 16 inches: unweathered bedrock	0.6%

*Based on data provided by Web Soil Survey.
**Soil horizon descriptions derived from *Keys to Soil Taxonomy*, 13th Edition (NRCS 2022).

Bedrock within this portion of Blue Earth County is typically composed of dolostone, sandstone and shale of the Prairie du Chien group or dolostone and limestone of the Galena Group (Mossler 1995a; Retzler 2022a; Runkel and Mossler 2006). Bedrock is typically encountered between 1 – 100 feet below the ground surface (Steenberg 2012). Surficial geology is characterized by sand and gravelly sand with silt and clay (Jennings, Lusardi, and Gowan 2012).

The Study Area is in SHPO Region 2e - Prairie Lakes East, an archaeological resource region that includes all of Waseca, Freeborn, Steele, and Le Sueur Counties as well as portions of Scott, Dakota, Rice, Blue Earth, and Faribault Counties in southern Minnesota. SHPO Regions are based on features of the natural environment such as vegetation and hydrology that are believed to have been important contributors to regional cultural diversity in the precontact and contact periods (Gibbon et al. 2002). According to the MM4 Historic Vegetation Model that draws from digitized GLO map data, historic vegetation for the Study Area would have been dominated by prairieland with scarce trees (Hobbs 2019b). According to the MM4 Prehistoric Hydrography Model, the western half of the Study Area would have been within

the Minnesota River floodplain and a more extensive wetland area was located at the northern end of the Study Area (Hobbs et al. 2019). Late Holocene period subsistence resources would have included bison, white-tailed deer, occasional herds of elk, aquatic mammals, waterfowl, fish, and seasonally available edible plants such as water lilies, cattails, prairie turnip and ground plum (Gibbon et al. 2002).

CULTURAL CONTEXTS

PALEOINDIAN TRADITION

The Paleoindian Tradition in Minnesota occurred from approximately 13,000 to 9,000 years before present (BP, present defined as 1950 upon the development of radiocarbon dating methods). The Paleoindian Tradition in Minnesota is primarily known based upon the isolated finds of projectile points, primarily found by non-professional archaeologists during uncontrolled surface collection (Buhta et al. 2011). As Buhta et al. (2011) write, very little progress in our understanding of the Paleoindian occupation in Minnesota has taken place since documentation of the Brown's Valley burial (21TR0005) in the 1930s. This dearth of information is largely due to the fact that systematic sampling has failed to identify single-component Paleoindian assemblages of any size (Buhta et al. 2011).

The Paleoindian Tradition is broadly divided into two cultural groups, the earlier Llano (13,000 – 10,000 BP) and the later Plano (10,000 – 9,000 BP), which are based primarily on their point typology (Higginbottom 1996). Llano points are fluted, with Clovis being the earliest documented complex, found primarily in central and southeastern Minnesota, and Folsom being the most commonly occurring, particularly in western and southern Minnesota (Gibbon 2012). The Llano complexes were largely replaced around 10,000 BP by Plano points, which are unfluted (Forsberg 2003). Toolkits during the Paleoindian Tradition would have minimally included spear points, scrapers, drills, gravers, and hammerstones, but may have also included bone and wooden tools (Mississippi Valley Archaeology Center [MVAC] 2004a).

There are no excavated archaeological materials that can be definitively attributed to the makers of Clovis or Folsom projectile points in Minnesota, although parts of Minnesota would have been inhabitable throughout the Wisconsin Glaciation (Buhta et al. 2011). There have been several finds of woolly mammoth skeletal parts and teeth at Minnesota localities, but none has ever been indisputably associated with human activity (Johnson 1988). Similarly, although late Paleoindian points have been found throughout Minnesota, Plano sites in Minnesota are also rare and even fewer have been systematically excavated. Only two of these sites have associated radiocarbon dates: the Brown's Valley site (21TR0005) in Traverse County, which dates to around 9,000 BP, and the Bradbury Brook site (21ML0042) in Mille Lacs County, which dates to around 9,200 BP (Forsberg 2003).

With the Paleoindian Tradition in Minnesota defined almost entirely by isolated artifact find spots, this period in Minnesota is understood primarily through paleoecological reconstructions and by extending what is known about Paleoindian lifeways elsewhere in North America to the Upper Midwest (Buhta et al. 2011). Paleoindian subsistence appears to have been reliant upon a combination of large game hunting, including caribou, bison, deer, moose, mammoth, and fish and floral resources that returned to the previously glaciated regions shortly after the ice retreated (Buhta et al. 2011). Paleoindian settlement patterns are poorly understood, although it is hypothesized that the hunters and gatherers may have lived in small family groups, traveling to find the floral and faunal resources described above (Gibbon 2012; MVAC 2004b).

It should also be noted that there has been an increasing argument for an even earlier complex in the Paleoindian Tradition, typically referred to as Pre-Clovis, with dates between almost 20,000 – 13,000 BP. While some areas of Minnesota would have been ice free by around 15,000 BP and all but the northernmost areas would have been habitable by 13,750 BP, the presence of Pre-Clovis in Minnesota is still hotly debated (Buhta et al. 2011).

ARCHAIC TRADITION

The time span between the Paleoindian and Woodland Traditions (roughly 9,500 – 2,500 BP) encompasses several thousand years which have all been attributed to the Archaic. The Archaic Tradition is arguably the most poorly understood precontact period and was originally defined based on the lack of the distinct lithic materials from the preceding Paleoindian Tradition and the subsequent burial mounds and ceramics that characterize the Woodland Tradition (Buhta et al. 2017). However, as more information about this period has come to light, it has become increasingly clear that a) there was not a clear distinction between the Paleoindian and the Archaic Traditions, but rather a great deal of overlap in subsistence patterns and lithic material usage, and b) the Archaic is characterized by its own traditions, based on subsistence and settlement patterns, technological and cultural practices, and other factors that differed from the traditions before and after, and not just by a lack of distinctive cultural materials (Buhta et al. 2017; McElrath et al. 2009; McElrath and Emerson 2009).

The Archaic occurred during a time of pronounced post-glacial environmental changes, which included the extinction of the large Pleistocene mammals. In Minnesota, this period was marked by drastic climatic shifts and corresponding changes in vegetation and other resources for its occupants. During the Early Archaic, less fire-resistant forests dominated the landscape with primarily coniferous species in the north and deciduous species in the south. The Middle Archaic saw the expansion of drier conditions and prairie environments expanded to cover even the northernmost extents of Minnesota. The prairie and oak savannas reached their maximum during this period, concurrent and likely intensified by the catastrophic drainage of Lake Agassiz. Finally, during the Late Archaic, forests once again replaced prairies, although at this time the forests were characterized by more fire-resistant species (such as oaks and aspens). The re-expansion of forests in the Late Archaic began with mainly deciduous species before coniferous species returned and intensified, particularly across northern Minnesota, before eventually stabilizing into the three distinct biomes of prairie, deciduous forest, and coniferous forest familiar in Minnesota today (Buhta et al. 2017).

Environmental changes through the Archaic necessitated changing subsistence strategies. During the heavily forested periods, forest resources such as deer were heavily utilized. However, in the Middle Archaic, the spreading of grassland environments introduced bison and other prairie species. In addition to climate, fire may have been one of the primary controls on vegetation during the period. Given that humans use fire for hunting and other activities, it is possible that they had considerable influence over vegetation change (Clark et al. 2001; Grimm 1984; Nelson et al. 2006). By the Late Archaic, the stabilization of the climate and vegetation to modern conditions allowed for specialization based upon the use of specific resources, and the development of distinctive lifeways based on these adaptations (Gibbon 2012). Environmental changes and the resultant geographic shifts in biomes have caused changes in the territories between the different Archaic adaptations – and thus overlapping and commingled archaeological deposits.

Known technological changes to occur during the Archaic period include the development of ground stone and copper tools, as well as the early horticulture of plants such as squash. The Archaic also marks a technological shift from larger, hafted, bifacially worked, lanceolate artifacts to smaller lithic specimens, namely stemmed and notched points. This shift in lithic usage is thought to be indicative of the application of atlatl technology (Buhta et al. 2017). In aquatic settings throughout the Midwest, the use of seine weights, indicative of intensified fishing via cast nets, has also been observed (Struever and Holton 2000).

Other information regarding changes in subsistence, settlement patterns, demographics, social hierarchy, economic structure, political relationships, and religious practices are largely unknown. Most sites that are affiliated with the Archaic are multi-component and most of these sites have experienced considerable amounts of mixing due to rodent and agricultural activity. Some Archaic sites are deeply buried, with some even found below the present water table. Few datable and/or diagnostic artifacts

have been found within discrete Archaic horizons (Cummings et al. 2017). Only three single-component Archaic sites that have been excavated in Minnesota have associated radiocarbon dates, and only five sites with Archaic components include both diagnostic artifacts and radiocarbon dates (Buhta et al. 2017).

WOODLAND TRADITION

The Woodland Tradition in Minnesota spans from 1000 BC to AD 1750 (Arzigian 2008; Buhta et al. 2014; Gibbon 2012). The Woodland in Minnesota was once thought to represent the simultaneous adoption of ceramic technology, mound interment, and plant cultivation (Anfinson 1979; Buhta et al. 2014); however, the transition from Archaic to Woodland was more complicated, with societies selectively accepting these practices and technologies at different times (Theler and Boszhardt 2005). As with the transition from the Paleoindian to Archaic Traditions, the beginning of this period does not represent a sudden nor drastic change from the preceding period. Instead, the transition to the Woodland Tradition is characterized by an intensification of local resource bases and regionalization of peoples on the landscape. Still, the presence of pottery is generally used to identify Woodland and later contexts (Arzigian 2008).

Also during this period, the use of new resource bases (i.e. the cultivation of domesticated crops) led to greater sedentism (Gibbon 2012). Thus, while implements were similar to those of the preceding Archaic complexes, material culture types found in Woodland contexts shifted due to cultural change and regionalization as modes of resource exploitation specialized for local environments, a trend attributed at least in part to the continued stabilization of local environments. As a result of this regional specialization, there are a wider variety of forms in both projectile points and ceramics across the different complexes. Compared with the Archaic, stemmed points are rarer with side-and corner-notched points of several varieties supplanting them. Scrapers, knives, drills, awls, and punches of chipped stone persisted, and as well as ground-stone implements. Although ceramics varied in their composition and decoration by complex, some of the earliest examples in the state come from thick-walled and conical vessels and, over time, these generally become thinner and more globular. Shell tempering eventually would allow for a more water-tight, less permeable vessel (Arzigian 2008). Copper continued to be used for awls and ornaments, although the frequency of copper articles is lower than in the Archaic.

At the same time this regionalization was taking place on the landscape, contact with peoples from far-removed societies also occurred. This expanded interaction sphere is visible through the occurrence of exotic items such as galena, obsidian, and shark teeth, to name a few, along with changes in ceramic stylistic attributes.

During the Late (Terminal) Woodland, after AD 500 or so, the continued intensification of local resources through time led to even further regionalization. During the Terminal Woodland, population size increased, as did the size and number of habitation sites. Agricultural societies focused on maize horticulture and residing in associated palisaded villages in southern and western Minnesota (Plains Village cultures). The Effigy Mound complex in the Upper Mississippi River valley, and semi-sedentary villages focused on intensive wild rice harvesting in northern Minnesota (Psinomani Complex). Both deer and bison continued to be important resources, and many Woodland sites reflect season occupation as the inhabitants moved back and forth between the prairies and the woodlands (Arzigian 2008).

CONTACT PERIOD

The Contact Period is defined as the period of initial contact between Europeans and the tribes of Minnesota. While the territory now known as Minnesota was legally under the control of Spain from 1763 to 1800, French and British presence predated the United States' acquisition of the territory with the Louisiana Purchase in 1803. The French presence in Minnesota began with the exploration of the

Great Lakes in the early 1600s (Dobbs 1988). For this reason, there is some overlap between the Late Woodland and the early Contact Period (c. 1650).

The fur trade was the major catalyst for French interest and many early trading posts in northern Minnesota and along the Mississippi River were established by French fur traders. However, when the British defeated the French in the French and Indian War in 1760, French influence in Minnesota essentially ended while the presence of the British intensified. The founding of two major fur trade companies (Hudson's Bay and the North West Company) solidified British interest in Minnesota and British fur traders expanded the French trading post network through the interior of the state, primarily following the major river routes along the Minnesota, Red, and Mississippi Rivers (Dobbs 1988).

While officially the United States' political presence in Minnesota began in 1803 with the Louisiana Purchase, in practice it began following the establishment of the first permanent US military presence: the founding of Fort Snelling in 1819 (Dobbs 1988). Zebulon Pike claimed to have secured 100,000 acres from the Dakota in 1805 for the erection of a US fort, and the confluence of the Minnesota and Mississippi Rivers, the ancestral birthplace for the Dakota people, was selected for this purpose. The initial function of the fort was to secure the control of US interests in the fur trade and to quell hostilities between indigenous groups and the encroaching settlers moving westward (Cassady and DeCarlo 2018).

In addition to expanding and shifting European interests in Minnesota, the Contact Period was also a time of significant tribal movements. When the French first arrived in Minnesota, members of related Indigenous groups referred to by the Europeans as the "Sioux" (primarily the Dakota, Nakota, and Lakota) occupied most of the state. However, around the mid-1700s, Ojibwe tribes that had been established around the Great Lakes began moving south and west from the area of Lake Superior. As these groups continued to expand into Minnesota, periodic conflicts with the Dakota eventually culminated between 1736 – 1760 in outright warfare (Minnesota Historical Society [MNHS] n.d.). The US attempted to impose peace between the tribes by establishing a border between them with the Treaty of Prairie du Chien in 1825. However, the treaty did little to resolve matters between the Dakota and the Ojibwe and was later used by the US as justification for later land cessions from both groups (Milwaukee Public Museum 2022). Ultimately, the end to intertribal conflicts was the overwhelming challenges imposed upon Indigenous peoples by Euro-American settlers (MNHS n.d.).

HISTORIC/POST-CONTACT PERIOD

The start of the historic or post-contact Period in Minnesota is marked by the major land cessations that began in 1837 between the US, the Dakota and the Ojibwe (Anfinson 1994). By 1851, the Dakota had ceded all of their land in Minnesota in the Treaty of Traverse des Sioux. The Dakota were assured a swath of land, 10 miles wide, on either side of the Minnesota River following the cessations with the "Upper Sioux" (Sisseton and Wahpeton) settling above the river and the "Lower Sioux" (Mdewakanton and Wahpekute) settling below the river. However, in 1858, the same year that Minnesota was granted Statehood, an additional treaty allowed for Euro-American settlers to occupy the land on the north side of the Minnesota River (Lass 1998).

Annuities to the Lower Sioux Agency were delayed in 1862, and a portion of the starving, mistreated, and frustrated Dakota retaliated, leading to the start of the US-Dakota War. Following the war, only a small number of Dakota remained in Minnesota. For all intents and purposes, by 1863, due to the government abrogating all Dakota treaties, it was illegal to be Dakota in the state of Minnesota (Anfinson 1994). The Ojibwe, meanwhile, were eventually forced to retreat onto a series of reservations established from 1854 – 1867 as Euro-Americans, drawn by the ample farmland and dense forests for lumbering available in Minnesota, took control over the land (OSA n.d.).

HISTORIC BLUE EARTH COUNTY

The earliest European presence in Blue Earth County was likely Pierre Le Sueur, who arrived at the confluence of the Minnesota and Blue Earth rivers in 1683. Le Sueur assumed the blue-green clay he identified, which is the namesake of the County, contained copper. After returning to France with a sample of the clay, Le Sueur returned to the area in 1700 to establish Fort Le Huillier in an effort to extract copper from the clay soils. This venture was not profitable, and it was abandoned by 1702. The area was in French control until the Louisiana Purchase, after which it became part of the Minnesota Territory. The first Euro-American settlers arrived in 1852, establishing themselves at what would become the City of Mankato, one year before the Treaties of Traverse des Sioux and Mendota officially opened the area for Euro-American settlement (Blue Earth County 2022). Blue Earth County was officially established in 1853.

Euro-American presence in the area expanded rapidly after the Treaties of Traverse des Sioux and Mendota were signed, which caused friction between the Dakota and the Euro-American settlers. A bad growing season in 1861 lead to a "starving winter" for the Dakota furthering the building tension (Minnesota Historical Society [MNHS] 2012a). Due to the increased presence of Euro-Americans in the area there was greater competition for game. Additionally, their concerns with corrupt government agents failing to deliver treaty provisions continued to go unaddressed. The commonly cited start of the US-Dakota War of 1862 is in August of 1862 when a hunting party of young Dakota men killed five Euro-American settlers. Minnesota state troops were diverted from the Civil War effort and redirected to march against the Dakota (MNHS 2024).

The war continued until September 23rd when the Dakota were defeated. Many moved quickly to Dakota territory after the battle, but many fought to stay with their families that could not move as quickly. Those who stayed were taken into custody of the US military. Over the next three weeks 392 Dakota men were tried for their participation in the war; 303 were sentenced to death. The legal authority and procedures followed by the commission were heavily questioned at the time (MNHS 2012b). After the trials the convicted Dakota were marched to Mankato and the remaining Dakota were removed to the Fort Snelling Concentration Camp. While the camp was not a death camp it was a part of the genocidal policies used against Indigenous peoples throughout the US. Between 160 and 300 Dakota died during their forced stay at Fort Snelling (MNHS 2024). President Lincoln approved death sentences for 39 of the 303 convicted Dakota in Mankato. On December 26th 38 men were hanged, the largest mass execution in United States history (MNHS 2012b).

At this time, Ho-Chunk were relocated from their Long Prairie Reservation in the north to a new reservation in east-central Blue Earth County in 1855. The relocated Ho-Chunk, which had farmed their original land in Wisconsin, continued to farm at the new reservation with success, which caused nearby Euro-American settlers to become hostile in an effort to obtain the fertile agricultural land for themselves. Ho-Chunk did not take part in the US-Dakota War of 1862, but due to racism and the settler's desire for more fertile land, the settlers demanded the Ho-Chunk be removed along with Dakota populations after the war (Coates 2017; Reicher 2014). By 1863, the Ho-Chunk endured another forced relocation to barren land in Crow Creek, South Dakota, and again to Omaha, Nebraska two years later (Reicher 2014).

Euro-American settlement continued to expand in the late 19th century and into the 20th century. Railroad development quickly superseded river traffic and brought booming industries to the County, particularly milling and business firms. Agriculture was, and continues, to play an important role in the Blue Earth County economy (Blue Earth County 2022).

HISTORIC MANKATO AND THE QUARRY INDUSTRY

Following the arrival of the first Euro-American settlers to Mankato in 1852, development of the settlement progressed rapidly. The cutting and selling of local limestone, a pink to yellow to buff-colored

limestone commonly referred to as Kasota Stone found only in this region, for use in building construction by Mankato's settlers dates back to the beginning of the settlement and, in 1853, George Maxfield established the first formal stone quarry. In 1868, a second quarry was opened by Adam Jefferson, followed in swift succession by several other quarries in Kasota and Lime Township. In addition to serving as a desirable building material, stone from these quarries was integral to the expansion of the railroads across the state as it was utilized heavily for bridge and culvert construction (Pratt 2015).

By the 1880s, the Mankato-Kasota stone quarry industry was booming, and ten different quarries were in operation: J.R. Beatty, J.W. Babcock (Babcock and Wilcox Company in 1889), Frank Fowler, Adam Jefferson, Fred Widell, W.B. Craig, Fowler & Pay, Maxfield and Coughlan, Ring and Tobin, and Arthur McMullen (Pratt 2015; Douglas 2019). These quarries employed hundreds of local workers through the end of the nineteenth century and provided the stone for historically significant bridges and public buildings across Minnesota, including the State Capitol and the Stone Arch Bridge in Minneapolis (**Figure 5**; *Mankato Free Press* 21 January 1896, 22 January 1916; Bowles 1918; Pratt 2015). However, the development of steel and cement technology reduced the demand for stone (Free Press Printing 1903; Bowles 1918; Pratt 2015). By 1918, only six quarries remained in operation in the Mankato area: Mankato Limestone & Fuel Co., T.R. Coughlan Co., Fowler & Pay, James McClure, Widell & Co., and the Carney Bricklayer's Cement Co. (Bowles 1918). A brief resurgence in sales occurred between 1921 and 1930 when the use of local limestone became popular for architecture. Important historic buildings built of Kasota stone in this period include the Public Library in Rochester and the Harriet Island Pavillion in St. Paul. However, by 1967, only three producing stone quarries remained in the Mankato area and, by the early 2000s, only the Mankato-Kasota Stone Co. and the Vetter Stone Co. remained in business (Pratt 2015).

In addition to stone quarrying, an important secondary business related to the local limestone in Mankato and Lime Township was the production of lime. In fact, the name of the township derives from the lime-making business (Harren 2017; Douglas 2019). Despite the resurgence in the popularity of Kasota Stone in the 1920s and the continued presence of at least a few producing quarries into the present, the lime-making industry continued to steadily decline in the twentieth century and ended by 1939. As a mortar material, Portland cement, developed between 1900 and 1910, had replaced lime. The two largest lime-making operations, T.R. Coughlin Co. and Fowler & Pay, both deactivated their lime kilns by 1925, although they continued to quarry stone. Both companies attempted to revive the industry in the 1930s, but by 1939, production of lime had again ceased. Since this period the majority of the old lime kilns have been destroyed (Aptiz 1985).

Figure 5: Mankato Stone Quarry



View of cut stones in a stone quarry in Mankato, circa 1900 (Blue Earth County Historical Society 2025)

RESULTS

LITERATURE REVIEW

The OSA Portal was searched for archaeological sites and MnSHIP was searched for architecture-history resources recorded through June 2025, within 1 mile and 0.5 miles of the Study Area respectively. In-person research was conducted at SHPO on June 4, 2025, to identify previously completed cultural resources surveys within 1 mile of the Study Area.

Archaeological Sites Within 1 Mile of Study Area

There are three previously recorded archaeological sites within 1 mile of the Study Area (**Table 2; Figure 6**). None of these sites are within or in close proximity to the Study Area. Due to this distance, no impacts to these sites are anticipated as a result of the project as currently proposed.

Table 2: Previously Recorded Archaeological Sites Within 1 Mile of Study Area

Site No.	Site Name	Description/Cultural Affiliation*	Distance from Study Area	NRHP Eligibility**	Potential Effects
21BE0324	-	Lithic Scatter / Precontact	[redacted]	Unevaluated	None
21BE0325	-	Lithic Scatter / Precontact		Unevaluated	None
21BE0009	-	Burial Mound / Precontact		Unevaluated	None

*inferred cultural affiliation based upon site type.
**NRHP status provided by SHPO from their records on May 29, 2025.

Architecture-History Resources Within 0.5 Miles of Study Area

There are 16 previously recorded architecture-history resources within 0.5 miles of the Study Area (**Table 3; Figure 6**). Resources within or adjacent to the Study Area are discussed further below the table. Additionally, although it is outside the search radius of 0.5 miles, it should be noted that the Dakota and Ho-Chunk Forced Relocation Route (XX-CLS-00001) is recorded at approximately [redacted]

Table 3: Previously Inventoried Architecture-History Resources Within 0.5 Miles of Study Area

SHPO Inventory No.	Property Name	Location	Distance from Study Area	NRHP Eligibility*	Potential Effects
BE-LIM-00001	Widell House	57032 231st Ln	Within	Unevaluated	Yes
BE-LIM-00014	Mankato Holstein Farm Barn	23458 3rd Ave (razed)	Within	Unevaluated**	Yes
BE-LIM-00047	James McClure Quarry Pit	57150 230th Ln	Within	Eligible	Yes
BE-LIM-00048	James McClure Quarry Stockpiles	NE ¼ of Section 31, N of 230th Ln	Within	Eligible	Yes
BE-LIM-00049	James McClure Quarry Railroad Spur	SW-NE to NE-NW of Section 31	Within	Eligible	Yes
BE-LIM-00051	James McClure Quarry Stockpile Stone Structures	NE ¼ of Section 31, N of 230th Ln	Within	Unevaluated	Yes
BE-LIM-00003	Farmstead	57032 231st Ln	Adjacent	Unevaluated	Yes
BE-LIM-00013	Mendota-Big Sioux River Military Road: Lime Section	Co. Hwy. 5	Adjacent	Unevaluated	None
BE-LIM-00011	Shaubut House	23471 3rd Ave	130 feet east	Unevaluated	None
BE-LIM-00002	House	57063 231st Ln	145 feet west	Unevaluated	Yes
XX-RRD-CSP041	CM&StP Railway Company/ CMStP&P Railroad Company: Mankato-Farmington Branch	Downtown Mankato – Farmington	350 feet southeast	Not Eligible	None
BE-LIM-00005	Lime Kilns	57063 231st Ln	425 feet west	Unevaluated	Yes
XX-RRD-CGW018	WM&P Railroad Company/ CGW Railway Company	Mankato – Redwing	425 feet southeast	Not Eligible	None
XX-RRD-CGW019	WM&P Railroad Company/ CGW Railway Company, Faribault to Mankato	Mankato – Faribault	425 feet southeast	Not Eligible	None
XX-RRD-CNW006 / XX-RRD-CNW013	St. Paul & Sioux City Railroad Company/ Chicago St. Paul Minneapolis & Omaha Railway Company (Omaha)/ Chicago & North Western Railway Company/ Minnesota Valley Railroad Company mainline	St Paul – St James	0.15 miles east	Unevaluated	None
BE-MKC-00337	Mendota-Big Sioux River Road: Mankato Section	Section of 3rd Ave (CR 5) from N Riverfront Dr – N Industrial Rd	0.16 miles south	Unevaluated	None

*NRHP status as indicated on MnSHIP.
**Demolished in 2006 and removed from the National Register in 2007.

Widell House (BE-LIM-00001)

Minimal information related to the Widell House (BE-LIM-00001) is included in the original inventory form from 1979. However, the form does include a few photographs, indicates that at the time of survey the building was being utilized as offices by the Brielmaier Corporation, and states that the property is possibly eligible for NRHP listing with the other inventoried stone buildings located in the quarry area (Gimmestad 1979a). The structure is a one-story construction built of rough-cut local limestone with a hipped roof that, according to Blue Earth County property records, was originally constructed in 1901. Two additions were added to the main building in 1945: a wood frame extension to the rear of the building and a concrete block and wood extension from the western façade. Finally, two metal storage structures have been added to the property in 1979 and in 2000 (Blue Earth County 2025). The building is associated with Gustaf Widell who assumed ownership of the Widell & Co. Quarry following the death of his brother, Frederick, in the 1890s (*Mankato Free Press* 30 April 1890; Mankato City Directory 1902; Free Press Printing 1903; Geo. A. Ogle 1914). Although the property was inventoried as a house, subsequent survey has suggested that it may have actually been utilized as an office by Widell & Co. (Pratt 2015).

The Widell House is located in the northwest corner of the southern portion of the Study Area, south of 231st Lane. Although the property was revisited in 2015, it was not evaluated at this time (**Figure 7**; Pratt 2015). Therefore, it is unknown whether the property retains sufficient integrity to be eligible for NRHP listing and therefore to what extent changes to the viewshed may impact the property.

Mankato Holstein Farm Barn (BE-LIM-00014)

The Mankato Holstein Farm Barn (BE-LIM-00014) was originally inventoried in 1979 and listed in the National Register in 1980. At that time, the approximately 210-foot-long barn was described as having a brown clay tile exterior and a frame rainbow-arch roof with slightly flared eaves (**Figure 8**). The barn was oriented on an east-west axis with a ground level drive at the center of the east side and a banked ramp at the center of the north side for access to the loft. Two clay block silos were attached at the base to the main building by a small connecting unit on the west side of the ramp. A three-story section near the center of the south side of the building contained the living area for farm workers and a longer section at the west end of the building contained additional housing for calves. The interior of the barn had stanchion housing for 40 cows with bull pens at the east end and steel calf pens at the west end (Gimmestad 1980a).

The Mankato Holstein Farm Barn was originally constructed in 1917 by J.C. Marlow and W.W. Randall. Marlow first moved to the Mankato area from Wisconsin in 1908 where he established several herds of registered Holstein cattle. The most important of his herds, which won national competitions, were established in partnership with Randall in 1917 at the Mankato Holstein Farm. This herd would subsequently be dispersed to a number of major operations around the country in 1924. Marlow would then go on to establish cattle clubs, create the Marlow Milking Machine, and promote the advancement of dairy cattle breeding. The property was recommended for NRHP listing due to its significance as one of the largest agricultural buildings in the region, demonstrating the importance of dairying in Blue Earth County's history, and its association with J.C. Marlow, an important figure in the history of dairy farming in the region (Gimmestad 1980a). Although not specified in the inventory form, the period of significance for the property is presumed to be from its construction in 1917 through the dispersal of the Mankato Holstein Farm herd in 1924, although the form does note that the barn remained in use at the time it was inventoried. Additional documentation related to the Mankato Holstein Farm Barn includes the removal of the property from the National Register in 2007 after the barn was razed on May 12, 2006. Although the foundations of the barn and the two silos remained extant, the property no longer retained sufficient integrity for NRHP listing under the previously identified criteria (**Figure 9**; SHPO 2007).

The Mankato Holstein Farm Barn is located within the northeastern portion of the Study Area. Although the barn was razed in 2006 and the property was subsequently removed from NRHP listing, it is currently considered unevaluated according to SHPO records. This is because the property has not been evaluated for its archaeological potential and may therefore be eligible for NRHP listing under Criterion D for its potential to yield important information (National Park Service [NPS] 1995).

James McClure Quarry Pit (BE-LIM-00047)

The James McClure Quarry Pit (BE-LIM-00047) was identified during architecture-history investigations conducted by ARCH^3 in 2015 for the proposed expansion of the Jordan Sands, LLC mining operation. Based on a comparison with historic aerial imagery from 1938 and 1973, this investigation concluded that this main extraction pit appeared to remain relatively intact since it was closed sometime between 1919 and 1934. The James McClure Quarry Pit was recommended as eligible for NRHP listing due to its significance as an example of the Kasota Stone quarrying that was foundational to the development of Mankato and Blue Earth County. The James McClure Quarry Pit was additionally recommended as a contributing element of a potential historic district associated with the McClure quarrying operation (Pratt 2015). SHPO concurred with this recommendation in a letter dated July 8, 2015 (SHPO No. 2012-

2879). The James McClure Quarry Pit is located in the southern portion of the Study Area. Therefore, additional architecture-history investigation is recommended to determine appropriate boundaries for the historic district, the extent of project impacts, and an appropriate plan for mitigation of adverse effects.

James McClure Quarry Stockpiles (BE-LIM-00048)

The James McClure Quarry Stockpiles (BE-LIM-00048) were also identified during the architecture-history investigations conducted by ARCH^3 in 2015. These stockpiles are large mounds of quarry material, primarily waste material comprised of glacial till and fragmentary limestone, extracted from the McClure Quarry during historic mining operations (**Figure 10**). The James McClure Quarry Stockpiles were recommended as eligible for NRHP listing and as a contributing element of the potential James McClure Quarry Historic District (Pratt 2015). The James McClure Quarry Stockpiles are located southwest of the James McClure Quarry Pit in the southern portion of the Study Area. Therefore, additional architecture-history investigation is recommended to determine appropriate boundaries for the historic district, the extent of project impacts, and an appropriate plan for mitigation of adverse effects.

James McClure Quarry Railroad Spur (BE-LIM-00049)

The James McClure Quarry Railroad Spur (BE-LIM-00049) was also identified during the architecture-history investigations conducted by ARCH^3 in 2015. The railroad spur extends from just north of the junction of 230th Lane and an unpaved access road into the McClure Quarry area, proceeding northwest for approximately 0.3 miles to the abandoned Carney rockwool facility. Although largely obscured by tree cover in aerial imagery, the railroad spur remains extant (**Figure 11**). The James McClure Quarry Railroad Spur was recommended as eligible for NRHP listing and as a contributing element of the potential James McClure Quarry Historic District (Pratt 2015). The railroad spur crosses through the southern portion of the Study Area. Therefore, additional architecture-history investigation is recommended to determine appropriate boundaries for the historic district, the extent of project impacts, and an appropriate plan for mitigation of adverse effects.

James McClure Quarry Stockpile Stone Structures (BE-LIM-00051)

The James McClure Quarry Stockpile Stone Structures (BE-LIM-00051) are four rectangular stone structures of variable size that were also identified during the architecture-history investigations conducted by ARCH^3 in 2015. Three of these structures are composed of unmortared, irregular, randomly-coursed limestone while the fourth is composed of regular-coursed, rough-cut ashlar masonry with flush mortar joints (**Figure 12**). While the function of the three limestone structures could not be determined, the fourth resembled a lime kiln. These structures were located among the James McClure Quarry Stockpiles, situated in alignment with each other at approximately equal spacing. The function and historical association of these structures could not be determined. Therefore, they were recommended as not eligible and not contributing to the potential James McClure Quarry Historic District (Pratt 2015).

Farmstead (BE-LIM-00003)

This farmstead was originally inventoried in 1979 and is included in the group of stone buildings within the quarry area that is noted as being potentially NRHP eligible. The inventory form indicates that this property includes a house and a barn, gives an approximate location, and includes a few photographs, but provides no other information (Gimmestad 1979b). A 2015 survey found a reference to the stone barn in an undated article which states that it was used to stable horses for the nearby quarry. This survey further notes that the reddish color of the limestone of both the house and barn suggests that they may have been destroyed in a fire (Pratt 2015). If these structures are indeed associated with the nearby quarries, this may have been the fire that struck the Widell Company Quarry in 1910 (*Minneapolis Morning Tribune* 30 April 1910). Aerial and pictographic imagery indicate that this property

is located at the southern end of the parcel currently associated with the address 57032 231st Ln. However, no images or plans of the building are included in the property records. Based on pictographic imagery, both the house and barn have been abandoned and the structures partially collapsed since at least 2009 (**Figure 13;** Blue Earth County 2025).

This farmstead is located adjacent to the southwestern border of the Study Area. Although the property was revisited in 2015, it was not evaluated at this time (**Figure 14**; Pratt 2015). Therefore, it is unknown whether the property retains sufficient integrity to be eligible for NRHP listing and therefore to what extent changes to the viewshed may impact the property. Additionally, it is unknown whether any archaeological deposits associated with the farmstead may remain within the Study Area proximate to the structural ruins.

Mendota-Big Sioux River Military Road: Lime Section (BE-LIM-00013)

The Mendota-Big Sioux River Military Road: Lime Section (BE-LIM-00013) is an 11-mile segment of the approximately 101-mile mid- to late nineteenth century military route between Mendota and Mankato. The Lime Section of the route is the southernmost portion, traveling along County State Aid Highway (CSAH) 5 from the border of Blue Earth County and Le Sueur County to Riverfront Drive in northern Mankato. This section of the route is described as a paved, two-lane roadway with a shoulder that has been resurfaced since it was originally established (Hess 1988). Although this property is adjacent to the Study Area, previous alterations and modifications to the roadway (such as the resurfacing noted on the inventory form) make it unlikely that this property is eligible for NRHP listing. Therefore, no significant impacts to this property are anticipated as a result of the proposed project.

Shaubut House (BE-LIM-00011)

The Shaubut House (BE-LIM-00011) was originally inventoried in 1979, at which time the property was owned by the Hubbard Milling Company. Included with the inventory form are some correspondences with Jeanne Kress at the Blue Earth County Historical Society regarding the property and some newspaper references from an unknown source (potentially the Mankato Free Press) dated to 1937 and 1951. These references describe the stone residence as potentially the first stone house erected in Blue Earth County based upon an engraved stone above the main entry, which, depending upon the reference, either reads 1855 or 1856. The residence, built from local limestone, belonged to Henry Shaubut who moved to the area from Pennsylvania in 1854. Shaubut would become a successful businessman and banker, as well as an important figure in the development of early Mankato. Finally, the inventory form notes that the property is potentially eligible for NRHP listing (Gimmestad 1979c).

There appears to have been some initial confusion regarding the location of the Shaubut House as another early stone residence located at 816 N 2nd Street was also attributed to a Shaubut, but the correspondence indicates that this was likely the residence of Henry Shaubut's brother, John, who joined his brother in Mankato in 1856 (Gimmestad 1979c). Confusingly, a third structure, located near Main Street and Front Street, which was destroyed by a fire in 1901, is also described as the "Old Henry Shaubut House" (*Mankato Free Press* 5 April 1901). However, the article from 1951 included in the Shaubut House inventory form indicates that this structure was a brick store constructed by John Shaubut but also states that this building was still extant (Gimmestad 1979c). Additionally, another article from the Mankato Free Press in 1914 that describes the Shaubut House indicates that it was constructed by Alexander Campbell in 1855, then subsequently purchased by Henry Shaubut (*Mankato Free Press* 8 May 1914). Based on historic maps and aerial imagery, this property appears to have been immediately south of the current residence at 23499 3rd Ave within the parcel associated with 23471 3rd Ave but was razed between 1990 – 1992. Therefore, the Shaubut House is located approximately 130 feet east of the Study Area. As no above ground elements of this property remain extant, no significant impacts to this property are anticipated as a result of the proposed project.

House (BE-LIM-00002)

Very little information is included in the original inventory form from 1972 for this stone house besides its approximate location, a few photographs of the exterior, and a note that it is potentially eligible for NRHP listing with the other stone buildings located within the quarry area (Gimmestad 1979d). The building is located across an unpaved access drive from the Widell House (BE-LIM-00001) in a wooded portion of the parcel, south of the Lime Kilns (BE-LIM-00005). Although the property was inventoried as a house, subsequent survey found that this structure was likely the original office building for the Widell & Co. Quarry (Pratt 2015). According to Blue Earth County property records, the structure is a two-story building constructed of local limestone that was built around 1900. Pictographic imagery indicates that the roof has partially collapsed, and the structure has been abandoned since at least 2009 (**Figure 15**; Blue Earth County 2025).

This building is located approximately 145 feet west of the Study Area. Although the property was revisited in 2015, it was not evaluated at this time (**Figure 16**; Pratt 2015). Therefore, it is unknown whether the property retains sufficient integrity to be eligible for NRHP listing and therefore to what extent changes to the viewshed may impact the property.

Lime Kilns (BE-LIM-00005)

The Lime Kilns (BE-LIM-0005) were originally inventoried in 1979. The inventory form notes that four lime kilns were first constructed during World War I, but no lime was ever produced. The kilns were subsequently utilized by the Carney Company for the production of rockwool insulation beginning around 1938 – 1939 (Gimmestad 1979e). Two brick chimneys were added to two of the kilns to facilitate the rockwool manufacturing process. These chimneys appear to have been constructed in 1970 following a fire at the facility (*Mankato Free Press* 5 January 1970). The Carney Company shut down in the 1980s (Pratt 2015). Pictographic imagery of the property indicates that the majority of the structures appear to be in a state of partial collapse or disrepair, but the lime kilns appear to remain extant (**Figures 17** & **18**; Pratt 2015; Blue Earth County 2025).

The Lime Kilns are located approximately 425 feet west of the Study Area. The inventory form notes that the kilns may potentially be eligible for NRHP listing with the other stone structures within the quarry area (Gimmestad 1979e). Although the property was revisited in 2015, it was not evaluated at this time (**Figure 17**; Pratt 2015). Therefore, it is unknown whether the property retains sufficient integrity to be eligible for NRHP listing and therefore to what extent changes to the viewshed may impact the property.

CM&StP/CMStP&P: Mankato-Farmington Branch (XX-RRD-CSP041)

The Mankato – Farmington Branch of the Chicago Milwaukee & St. Paul Railway (CM&StP), later the Chicago Milwaukee St. Paul & Pacific Railroad (CMStP&P), is a railroad corridor that extends for approximately 70 miles from Mankato to the junction with the Iowa and Minnesota Division main line in Farmington. This branch line was constructed in 1902 – 1903 and abandoned in 1980. The entirety of the railroad corridor is no longer extant and has either been plowed over or incorporated into roadway rights-of-way in Blue Earth, Dakota, Le Sueur, and Rice Counties. As no visual expression of the corridor remains, the branch line was determined to be not eligible for NRHP listing (Schmidt 2021). The Mankato-Farmington Branch corridor (XX-RRD-CSP041) is located approximately 350 feet southeast of the Study Area. No significant impacts to this resource are anticipated as a result of the proposed project.

WM&P/CGW (XX-RRD-CGW018) & WM&P/CGW, Faribault to Mankato (XX-RRD-CGW019)

The Wisconsin Minnesota & Pacific Railroad Company (WM&P), later the Chicago Great Western Railway Company (CGW), railroad corridor (XX-RRD-CGW018) includes the current and former railroad right-of-way between Red Wing and Mankato. This corridor was constructed between 1882 – 1887. The majority of the corridor was subsequently abandoned between 1971 – 1982 but remains extant as

multi-use trails, except for a portion between Dundas and Faribault. However, since a substantial portion of the corridor has been eliminated, the railroad as a whole lacks sufficient integrity to be eligible for NRHP listing (Schmidt 2024a).

The segment of the WM&P railroad corridor between Faribault and Mankato (XX-RRD-CGW019) is approximately 45 miles in length with right-of-way that ranges between 45 – 150 feet in width. The majority of the railroad corridor has been converted to trail use although short portions, notably an approximately 1-mile segment between Eagle Lake and Mankato, are no longer extant. Finally, the Faribault to Mankato segment of the WM&P railroad corridor was found not to demonstrate significance under any of the requirements established in the Railroads MPDF and was therefore found to be not eligible for NRHP listing (Schmidt 2024b).

The WM&P railroad corridor (XX-RRD-CGW018 and XX-RRD-CGW-019) is located approximately 425 feet southeast of the Study Area. No significant impacts to this resource are anticipated as a result of the project as currently proposed.

Historical Cemeteries Within 1 Mile of Study Area

A review of the OSA Portal Historical Cemeteries Study Layer, created on behalf of the Minnesota Cemetery Project (Vermeer and Terrell 2011) shows one cemetery within 1 mile of the Study Area: the Pilgrims Rest Cemetery. This cemetery is located at 3000 3rd Ave, between the northern and southern portions of the Study Area (**Figure 6**). The oldest recorded memorial in the Pilgrims Rest Cemetery dates to 1857 and belongs to Jacob Hub. The cemetery remains in use today (FindaGrave.com 2000). Little additional information related to the history of the cemetery was identified. However, the cemetery is depicted on historic maps as early as 1874 (**Figure 20**; Andreas 1874). Aerial imagery, as well as a modern map of the cemetery burial plots, indicates that the cemetery has expanded to the north and west over time although the trees along the parcel boundary appear to have been planted beginning as early as 1938. Internal access drives within the cemetery were extended to the north beginning in the 1970s before reaching their current configuration by 1990 (**Figures 21 – 26**).

Previous Cultural Resource Investigations Near/Informative to the Study Area

A review of reports on file at SHPO identified seven previous cultural resources surveys within 1 mile of the Study Area (**Table 4**). Additionally, previous environmental documentation and associated cultural resources investigations performed by or in coordination with Bolton & Menk that were never submitted for agency review due to the abandonment of the proposed project were identified that involved the current Study Area. These previous survey reports were reviewed to develop a better understanding of the soils and cultural materials typically encountered in the area, as well as the historic and cultural contexts relevant to the Study Area. Surveys which include the current Study Area are described further below the table.

Table 4: Previously Completed Reports/Cultural Resources Surveys

Publication Year	Report Title	Author(s)	Distance from Study Area	Report No.*
1980	Historic Resources of Blue Earth County, Multiple Resource Area Nomination	D. Gimmestad	Includes	BE-80-1H
1989	Final Report for the Historic Trails Project	J. Hess	Adjacent	XX-89-4H
1996	Report on Cultural Resource Investigations Within Proposed UNIMIN Corporation Mining Site (Vetter Mine), Kasota, Le Sueur County, Minnesota	C. Harrison	0.14 miles east	LE-96-04
2004	Report on Cultural Resource Reconnaissance Survey Conducted for a Natural Gas Pipeline to Serve the Mankato Energy Center, Lime Township, Blue Earth County, Minnesota	C. Harrison	Adjacent to SE corner	BE-04-01
2006	Survey of Cultural Resources of Lime Township, Kasota Mining Operation	D. Maul	Overlaps	BE-06-01

2014	Jordan Sands, LLC, Industrial Sand Mining and Processing Facility, Lime Township, Blue Earth County, MN: Environmental Assessment Worksheet	Sunde Engineering	Includes	N/A
2014	Potential for Cultural Resources Impacts – Jordan Sands, LLC	D. Abere & A. Jenkins	Includes	N/A
2015	Jordan Sands Sand Mining & Processing Facility, Guaranteed B & I Loan Program, Class II Assessment, Mankato, MN	C. Seanoa	Includes	N/A
2015	Jordan Sands, LLC. Proposed Silica Sand Mining Operations Expansion, Vicinity of Mankato, Blue Earth County, Minnesota: Phase II Architecture History Investigation	D. Pratt	Includes	BE-15-05H
2016	Sakatah Singing Hills State Trail Slope Failure, Blue Earth County	J. Tworzyanski & M. Van Vleet	1.0 mile southeast	BE-16-08
2017	Phase I Archaeological Survey of Planned Jordan Sands Mining Expansion	A. Jenkins & A. Ollila	0.35 miles northeast	N/A

* Report numbers based on state database (i.e. MN SHPO, OSA, etc.) filing system. Reports without a number were located in-house at Bolton & Menk in association with previous projects that were abandoned and therefore never submitted for agency review.

1980: Historic Resources Survey of Blue Earth County

In 1979 – 1980, a survey of historic standing structures in Blue Earth County was conducted as part of the Minnesota SHPO's long-rage statewide survey of historic resources. The survey focused on standing structures which demonstrated various aspects of the county's history and were constructed prior to 1940. Ultimately, approximately 400 historic resources were inventoried, 22 of which were selected for nomination to the NRHP. Six of the 16 architecture-history resources located within 0.5 miles of the Study Area were initially inventoried as a part of this survey: the Widell House (BE-LIM-00001), the House (BE-LIM-00002), the Farmstead (BE-LIM-00003), the Lime Kilns (BE-LIM-00005), the Shaubut House (BE-LIM-00011), and the Mankato Holstein Farm Barn (BE-LIM-00014). The Mankato Holstein Farm Barn (BE-LIM-00014) was nominated and ultimately listed to the NRHP (Gimmestad 1980b). As this was a county-wide survey, it includes the entirety of the current Study Area.

1989: Historic Trails Project

In 1988 – 1989, Jeffrey A. Hess, Historical Consultants conducted a study of the Red River Trails and Military Roads in Minnesota on behalf of the Minnesota SHPO and the Minnesota Historical Society. The purpose of this study was to complete inventory forms for each historic route system, identify any of said routes that might be eligible for NRHP nomination, and to survey a sample of the routes in order to develop NRHP eligibility criteria. Ultimately, nine sites across eight counties were surveyed and inventoried. One of these sites, the Mendota-Big Sioux River Military Road, follows modern CR 5 in Lime Township and is adjacent to the Study Area. However, this section of the route was not field surveyed as part of this study and, therefore, no recommendations on the eligibility of this portion of the larger route were made (Hess 1989).

2004: Mankato Energy Center Natural Gas Pipeline Phase I Survey

In 2004, Archaeological Research Services conducted a Phase I survey on behalf of Mankato Energy Center for the proposed construction of a 3.7-mile natural gas pipeline in Lime Township. The proposed project corridor extended from the northern border of Sections 32 – 34 before turning southwest to CR 5 and then south along the western side of the roadway before finally continuing southwest along the abandoned railroad grade to the existing power plant. The segment of this corridor along the western side of CR 5 in Section 31 is adjacent to the southeastern corner of the current Study Area. The 2004 survey consisted of surface survey of the entire project corridor. No archaeological materials were identified, and the majority of the corridor was noted as having been extensively previously disturbed by industrial development as well as roadway and railroad construction (Harrison 2004).

2006: Kasota Mining Operation Phase I Survey

In 2006, Bolton & Menk conducted a Phase I cultural resources survey on behalf of Minnesota Kasota Stone's proposed expansion of their mining operation in Lime Township. This survey overlaps with the current Study Area in Section 30. The 2006 survey consisted of surface survey of the proposed project location. Limestone outcroppings were observed in several areas, but no archaeological materials were identified (Maul 2006).

2014 – 2017: Jordan Sands Mining Expansion

Jordan Sands, LLC proposed to repurpose and develop existing mining operations on four parcels (Parcels A, B, C, and D) in Lime Township and to construct a new industrial sand processing facility. Parcels C and D of this project correspond to the northern and southern portions of the current Study Area. Since a portion of the project exceeded the threshold of 40 acres identified in MN Rules 4410.4300 Subp. 12, the preparation of an Environmental Assessment Worksheet (EAW) was required. SHPO's initial review of the project did not recommend archaeological survey, but did identify the need for additional investigation of architecture-history properties should federal funding be secured and the project fall under Section 106 review (SHPO No. 2012-2879).

Following the involvement of the US Department of Agriculture - Rural Development (USDA Rural Development) as the funding source and lead federal agency, Sunde Engineering was contracted to prepare an updated EAW on behalf of Jordan Sands in 2014. In order to meet the needs of Section 106 consultation, the 2014 EAW referenced the previous cultural resources survey conducted in 1996 on Parcel D (Harrison 1996) as well as the 2006 Kasota Mining Operation survey (Maul 2006) which overlapped with a portion of Parcel A, both of which had negative results (Sunde Engineering 2014). The following architecture-history resources were identified as within the vicinity of the project area:

- Farmstead (BE-LIM-00004)
- Lime Kilns (BE-LIM-00005)
- Shaubut House (BE-LIM-00011)
- Mendota-Big Sioux River Military Road: Lime Section (BE-LIM-00013)
- Mankato Holstein Farm Barn (BE-LIM-00014).

However, field observations conducted by Bolton & Menk of the existing facilities indicated that visual impacts were limited to the existing quarries and, therefore, no potential impacts to these resources were identified (Abere and Jenkins 2014). Based upon these findings, the EAW determined that "there are no archaeological, historical or architectural resources that are present or will be impacted by the Project" (Sunde Engineering 2014:57).

In 2015, the USDA Rural Development prepared an Environmental Assessment (EA) for the proposed Jordan Sands project as part of the required documentation under the National Environmental Policy Act. By the time this document was prepared, project plans had been modified such that no mining or processing operations were proposed for Parcel B due to excessive noise impacts identified by the previous EAW. Additionally, ARCH^3, LLC was contracted to conduct a Phase II architecture-history investigation of Parcel C and portions of Parcels A and D, per the recommendation of SHPO in a letter dated January 9, 2015 (SHPO No. 2012-2879). This investigation identified the following previously inventoried architecture-history resources as within or immediately adjacent to the proposed project area: Widell House (BE-LIM-00001), House (BE-LIM-00002), Farmstead (BE-LIM-00003), and Lime Kilns (BE-LIM-00005). Additionally, the following four previously unrecorded historic properties were identified: James McClure Quarry Pit (BE-LIM-00047), James McClure Quarry Stockpiles (BE-LIM-00048), James McClure Quarry Railroad Spur (BE-LIM-00049), and James McClure Quarry Stockpile Stone Structures (BE-LIM-00051). **Table 5** summarizes the results of the survey in regard to each of these resources, as well as their location relative to the current Study Area.

Table 5: 2015 Architecture-History Survey Results

SHPO Inventory No.	Property Name	Location in Current Study Area	2015 NRHP Recommendation
BE-LIM-00001	Widell House	Northern portion	Not evaluated
BE-LIM-00002	House	Northern portion	Not evaluated
BE-LIM-00003	Farmstead	Northern portion	Potentially eligible, potentially contributing element of James McClure Quarry Historic District
BE-LIM-00005	Lime Kilns	Northern portion	Not evaluated
BE-LIM-00047	James McClure Quarry Pit	Southern portion	Recommended eligible, contributing element of James McClure Quarry Historic District
BE-LIM-00048	James McClure Quarry Stockpiles	Southern portion	Recommended eligible, contributing element of James McClure Quarry Historic District
BE-LIM-00049	James McClure Quarry Railroad Spur	Southern portion	Recommended eligible, contributing element of James McClure Quarry Historic District
BE-LIM-00051	James McClure Quarry Stockpile Stone Structures	Southern portion	Recommended not eligible, not contributing to James McClure Quarry Historic District

Ultimately, this study found that the northern portion of the current Study Area (former Parcel D) included the Widell & Co. Quarry while the southern portion of the current Study Area (former Parcel C) included the Arthur McMullen/James McClure Quarry. The northern portion, including the area of the Widell & Co. Quarry, is described as having experienced nearly continuous quarrying, resulting in "the complete removal of the original ground surface and the remains of the George Widell quarry" (Pratt 2015:20). The southern portion, including the area of the James McClure Quarry, however, appeared to have been inactive from around the 1930s until around the 1990s. At this time, quarrying resumed in the northeastern section of this area, which had previously been agricultural fields, while the southwestern section remained inactive, possibly due to the presence of a portion of railroad spur remaining in this area. As a result, the area of the James McClure Quarry was found to retain sufficient integrity to represent a potentially eligible historic district under Criterion A: Patterns of History in the areas of industry and extractive quarrying with a recommended period of significance from 1899 – 1930. This potential district would include the remains of the quarry (BE-LIM-00047), associated stockpiles (BE-LIM-00048), and the railroad spur (BE-LIM-00049) as historically significant contributing elements (**Figure 19**). The stone house and barn (BE-LIM-0003) is also recommended as a potentially contributing element, although why this structure is believed to be closely associated with the James McClure Quarry is not explained. Finally, the function and historical association of the stone structures in the stockpile area could not be determined so they were recommended as not eligible and not contributing. No boundaries for the potential James McClure Quarry Historic District were identified (Pratt 2015).

Due to the identification of potentially eligible historic properties, project plans were modified to eliminate all proposed activities besides water pumping to maintain the existing water level as required by the Minnesota Pollution Control Agency. Therefore, a determination of no adverse effect was recommended (Seanoa 2015). SHPO concurred with this determination as well as the recommendation that the James McClure Quarry Historic District is eligible for NRHP listing in a letter dated July 8, 2015 (SHPO No. 2012-2879).

Figure 6 - Previously Recorded Cultural Resources



Protect Site Locational Data

Archaeological site Location data are a protected data type. The client must ensure these data are not made available to the general public through in-person viewing or electronic access.

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Figure 7: Widell House, circa 2015



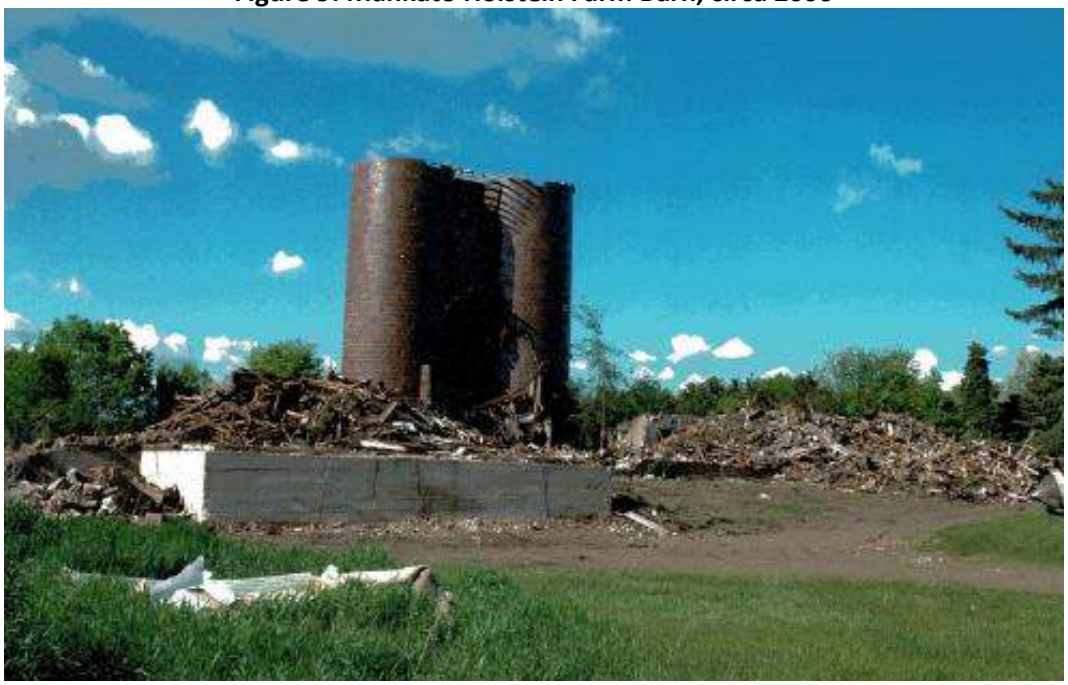
View southwest of Widell House (BE-LIM-00001) in 2015 (Pratt 2015)

Figure 8: Mankato Holstein Farm Barn, circa 1979



View northwest of Mankato Holstein Farm Barn (BE-LIM-00014) in 1979 (Gimmestad 1980)

Figure 9: Mankato Holstein Farm Barn, circa 2006



View of Mankato Holstein Farm Barn (BE-LIM-00014) following demolition in 2006 (SHPO 2007)

Figure 10: James McClure Quarry Stockpiles, circa 2015



View west of James McClure Quarry Stockpiles (BE-LIM-00048) in 2015 (Pratt 2015)

Figure 11: James McClure Quarry Railroad Spur, circa 2015



View northwest of James McClure Quarry Railroad Spur (BE-LIM-00049) in 2015 (Pratt 2015)

Figure 12: James McClure Quarry Stockpiles, circa 2015



View west of one of the James McClure Quarry Stockpile Stone Structures (BE-LIM-00051) in 2015 (Pratt 2015)

Figure 13: Farmstead, circa 2009



View east of ruins of Farmstead (BE-LIM-00003) in 2009 (Blue Earth County 2025)

Figure 14: Farmstead, circa 2015



View west of Farmstead (BE-LIM-00003) in 2015 (Pratt 2015)

Figure 15: House, circa 2009



View north of partially collapsed, abandoned House (BE-LIM-00002) in 2009 (Blue Earth County 2025)

Figure 16: House, circa 2015



View southwest of House (BE-LIM-00002) in 2015 (Pratt 2015)

Figure 17: Lime Kilns, circa 2015



View southwest of Lime Kilns (BE-LIM-00005) in 2015 (Pratt 2015)

Figure 18: Lime Kilns, circa 2025

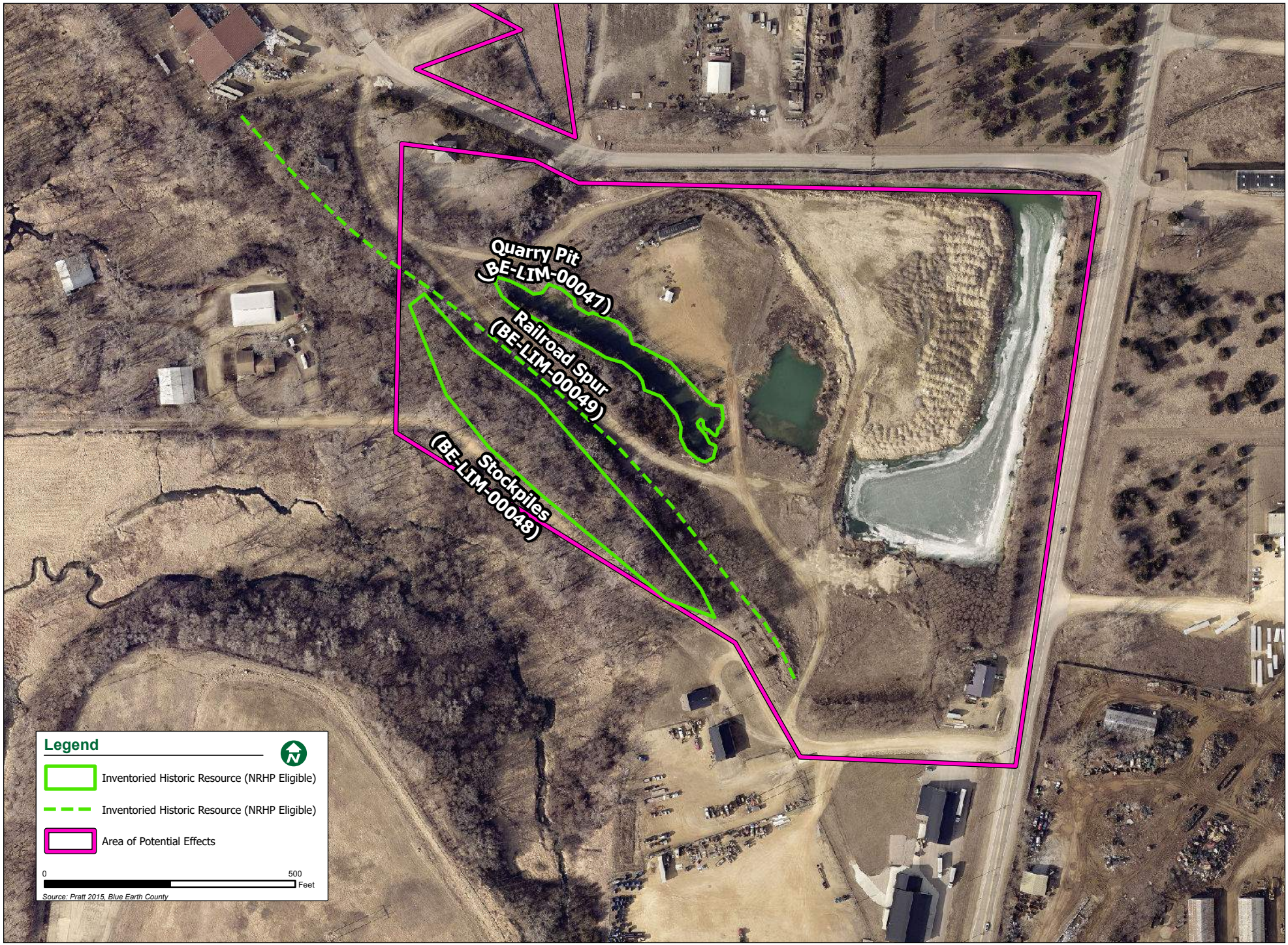


View west of Lime Kilns (BE-LIM-00005) in 2025 (Blue Earth County 2025)

Figure 19 - Potential James McClure Quarry Historic District Elements

June 2025

BOLTON & MENK



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HISTORIC LAND USE WITHIN THE STUDY AREA

A review of historic maps and aerial imagery demonstrates that land use within the Study Area has been primarily related to stone quarrying and agriculture. Quarrying activity appears to have gradually shifted over time as the targeted material became exhausted. Beginning initially in the southern portion of the Study Area, quarrying shifted north and west over the twentieth century before moving east across the northern portion of the Study Area in the 2010s. By 2015, quarrying had supplanted agriculture across almost the entirety of the Study Area.

Historic Map Review

Historic Trygg maps based on the Original Land Surveyors' plat maps and field notes from the mid- to late-1800s show the Study Area as prairie along an established route to Mankato with farmhouses depicted on either side of the route near the northern section boundary of Section 31 (Trygg 1964). A.T. Andreas' Illustrated Historical Atlas of the State of Minnesota from 1874 also depicts this route, as well as the railroad corridor to the east of the Study Area. The Shaubut House (BE-LIM-00011), the Pilgrims Rest Cemetery (unlabeled on the map), a schoolhouse, and a farmhouse attributed to D.R. Brooks are also indicated (**Figure 20**; Andreas 1874). Although Andreas does not depict quarries in his atlas, by 1914, a quarry accessed by a railroad spur off the CM&StP line is depicted along with several structures likely associated with quarry operations due to their proximity (**Figure 21**; Geo. A. Ogle 1914). Based on the location of the quarry icon on this map, it appears to be the Widell & Co. Quarry, however the railroad spur also bisects the parcel owned by James McClure who also operated a quarry in this period. The full extent of the quarries at this time is not indicated, however a reference from 1918, describes the Widell and McClure quarries as having been "excavated to a depth of 35 feet in a buff-colored dolomitic limestone" with the best material coming from a section known as the "bridge ledge" (**Figure 22**; Bowles 1918:155).

Aerial Imagery Review

A review of historic aerial imagery available from as early as 1938 demonstrates that land use within and around the Study Area in this period was primarily related to stone quarrying and agricultural (**Figure 23**). However, the extents of the quarry in 1938 appear substantially different than currently, with the bulk of quarrying activity located in the southern portion of the Study Area and to the west of this area. The northern portion of the Study Area at this time was predominantly agricultural fields with the associated farmstead located in the northeastern corner of the Study Area. By 1950, a new access drive was constructed from the southwest corner of the cemetery north into the Study Area, then proceeding diagonally to the northwest (**Figure 24**). Quarrying activities at this time appear to have been expanded northward but remained primarily to the west of the Study Area. Over the next two decades, the extents of the quarry continued to expand. By 1979, quarrying extended east into the northern portion of the Study Area as well as further north and west (**Figure 25**). This development within the Study Area matches the increased industrial development visible in the surrounding landscape at this time. Additionally, extension of the internal access drives within Pilgrims Rest Cemetery had also begun. Development of these drives in the cemetery would be completed by 1990. By this time, the quarry area in the southern portion of the Study Area has expanded east to CR 5. Additional industrial and commercial development has occurred in the surrounding landscape, but most of the northern portion of the Study Area was still agricultural (**Figure 26**). The shift of quarrying activities into the northern portion of the Study Area appears to have begun in 2004 immediately north of the cemetery. An access drive is visible along the eastern edge of this area that proceeds north and then west along the edges of the field before turning due west to join the larger quarrying area located to the west of the Study Area. Between 2004 and 2006, the segment of the quarry in the southern portion of the Study Area was extended to the south, encompassing much of this portion. Access drives are visible across this area and extending to other quarry sections in the south (**Figure 27**). Also in 2006, the Blue Earth County Sheriff's Office received a permit to operate a gun range in the southern portion of the Study Area (Seanoa

2015). Between 2011 and 2015, quarrying activities were extended across this agricultural field, encompassing the majority of the northern portion of the Study Area (**Figure 28**). The large quarry pond that is currently located within the northern portion of the Study Area appears to have been established between 2015 and 2020 in the southwestern section of this area where the earliest quarrying activities were concentrated.

Property Ownership

Utilizing available information from historic plat maps, property records, and other historic references, a brief summary of the ownership of the properties within the Study Area is provided below. In general, the Study Area contained three types of historic land use: an agricultural area encompassing the majority of the northern portion and two quarrying areas, one straddling the boundary between Sections 30 & 31 and the other entirely within the southern portion of the Study Area (**Table 6**).

Table 6: Historic Land Use Within the Study Area

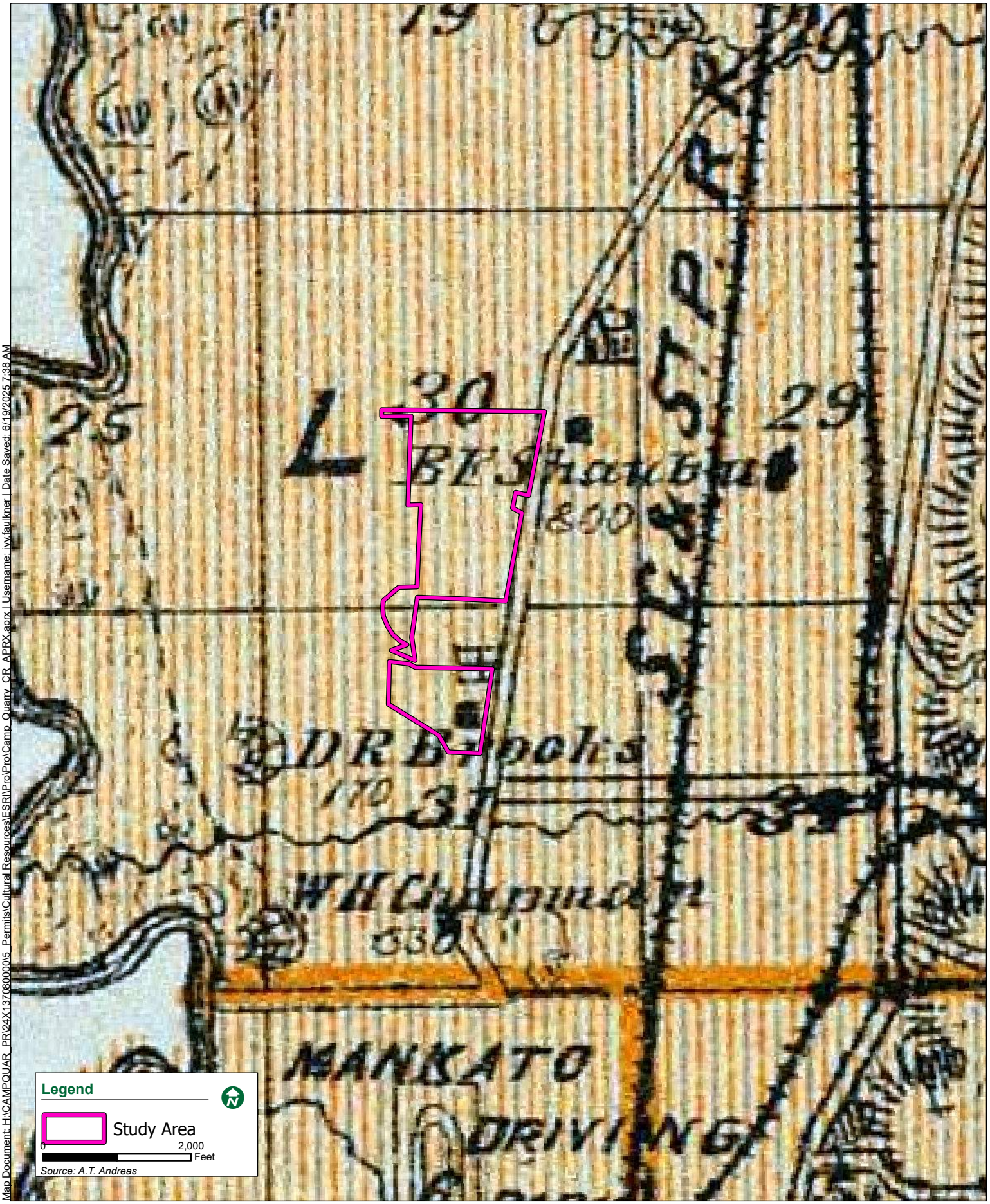
Parcel ID	Portion of Study Area	Historic Land Use
R40.04.30.300.006	Northern	Farm
R40.04.30.400.002	Northern	Farm
R40.04.30.400.003	Northern	Farm
R40.04.30.400.004	Northern	Farm
R40.04.30.400.006	Northern	Farm
R40.04.30.400.013	Northern	Farm
R40.04.30.400.014	Northern	Farm
R40.04.31.200.033	Northern	Quarry
R40.04.31.200.005	Southern	Quarry
R40.04.31.200.006	Southern	Quarry
R40.04.31.200.007	Southern	Quarry

The agricultural area in the northern portion of the Study Area appears to have remained a single large parcel through at least the early 1960s according to available plat maps (Swenson 1895; Geo. A. Ogle 1914; Webb Publishing 1929; W.W. Hixson 1938; Thomas O. Nelson 1955, 1962). The earliest plat map attributes ownership of this parcel to D.L. and R.H. Rose (Swenson 1895). R.H. Rose appears to have retained ownership through 1914 when the Riverside Stock Farm was located on the parcel (Geo. A. Ogle 1914). Then, in 1917, J.C. Marlow and W.W. Randall purchased the land to establish the Mankato Holstein Farms. Although the Mankato Holstein herd would be dispersed in 1924, subsequent plat maps continue to attribute the parcel to this business (Webb Publishing 1929; W.W. Hixson 1938). However, in 1955, the property has been acquired by Ray and Alfred Loeffler from W.G. Burton, who must have acquired the property at some point between 1924 and 1955 (Thomas O. Nelson; Nienaber 2006). In 1995, the Loeffler family sold approximately 60 acres of the property to Coughlin Quarries (Nienaber 2006). The remainder of the former agricultural property appears to have been acquired by OMG Midwest, Inc. by 2006 (Farm and Home 2006). Although this company continues to own one of the parcels that is partially within the northern portion of the Study Area, the other parcels appear to have been largely acquired by Coughlin Quarries beginning in 2008. In 2021, Coughlin Quarries filed a quitclaim deed transferring ownership of these parcels to Pentagon Acquisition LLC, who remains the listed owner of the majority of these parcels (Blue Earth County 2025). **Figure 29** is a rough timeline of the property ownership of the agricultural property in the northern portion of the Study Area.

The quarries at the southern end of the northern portion of the Study Area and in the southern portion of the Study Area were both opened during the boom in the Mankato quarrying industry in the 1880s. Although it is unclear precisely when the Arthur McMullen Quarry was opened, a reference to an earlier workers' strike involving this quarry indicates that it was prior to 1885 (Kolnick 1994). The Fred Widell, located in the southern portion of the Study Area, was opened slightly later in 1886. Gustaf Widell,

Fred's brother, served as the company foreman before eventually becoming a full partner in 1894. Following Fred's death in 1895, Gustaf assumed ownership of the quarry (Hughes 1901).

Just before the turn of the century, in 1899, James McClure purchased the McMullen Quarry. McClure would retain ownership of the quarry until the main extraction pit was closed, sometime around 1930. A few years later in 1904, due to financial difficulties, the Widell Quarry reorganized to become the Widell-Finley Company, but this venture went into receivership in 1906, forcing Widell to reform the company as the Widell Company (Pratt 2015). Then, in 1910, a large fire at the Widell Quarry destroyed the majority of the buildings and caused damage to much of the heavy equipment (*Minneapolis Morning Tribune* 30 April 1910). By 1920, the Widell Quarry was sold to the Carney Company (also known as the Carney Rockwool Company and the Carney Cement Company) and around 1930, the McClure Quarry was also acquired by Carney (Webb Publishing 1929; Pratt 2015). By 1935, both quarries are listed in an inventory of inactive and abandoned quarries in the Mankato-Kasota region (Thiel and Dutton 1935). Portions of these historic quarries would later be reopened beginning in the late 1930s and quarrying activities continue in this region to the present. **Figure 30** is a rough timeline of the property ownership of the quarrying areas.



Legend

Study Area

0 2,000 Feet

Source: A.T. Andreas

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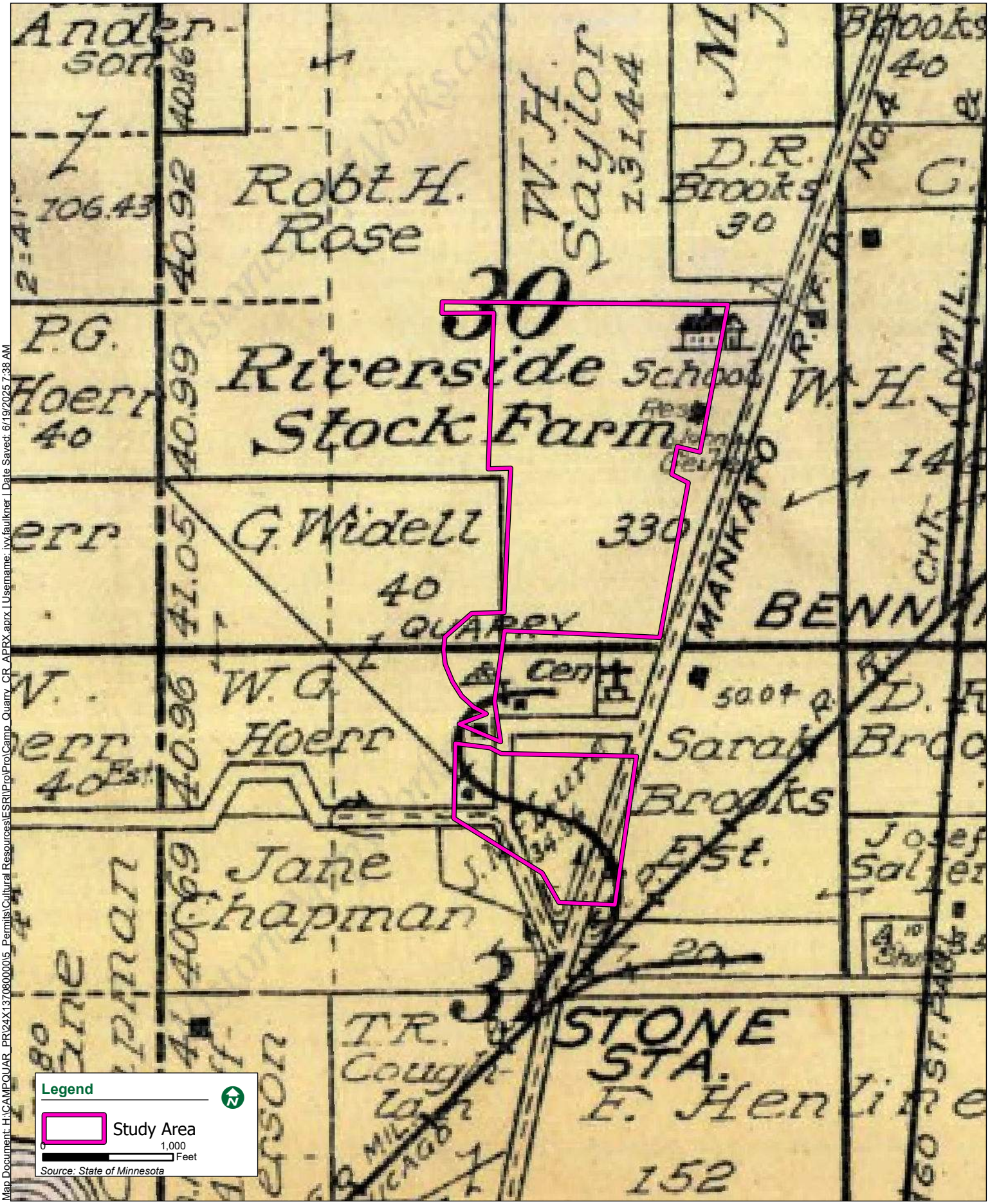

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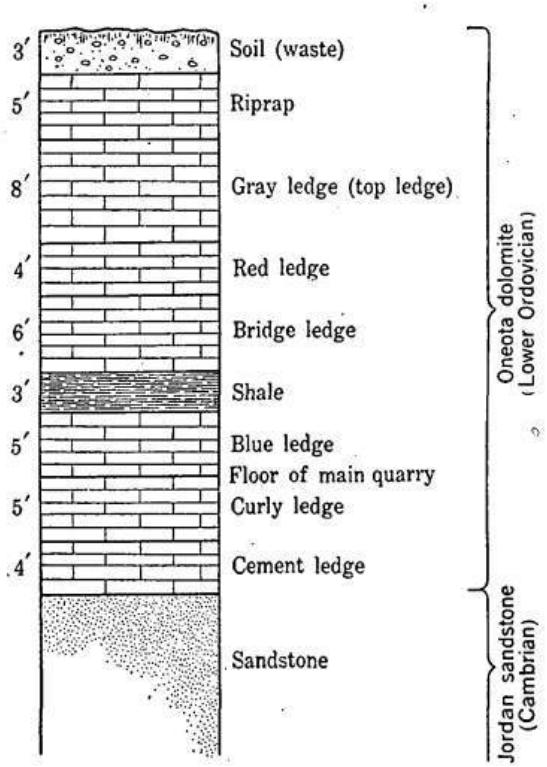
Figure 22: Widell Quarry Section



Vertical section of the Widell Construction Company Quarry (Bowles 1918:154)

Camp Quarry Adventure Park

Holtmeier Construction, Inc.

Figure 23 - 1938 Aerial Imagery

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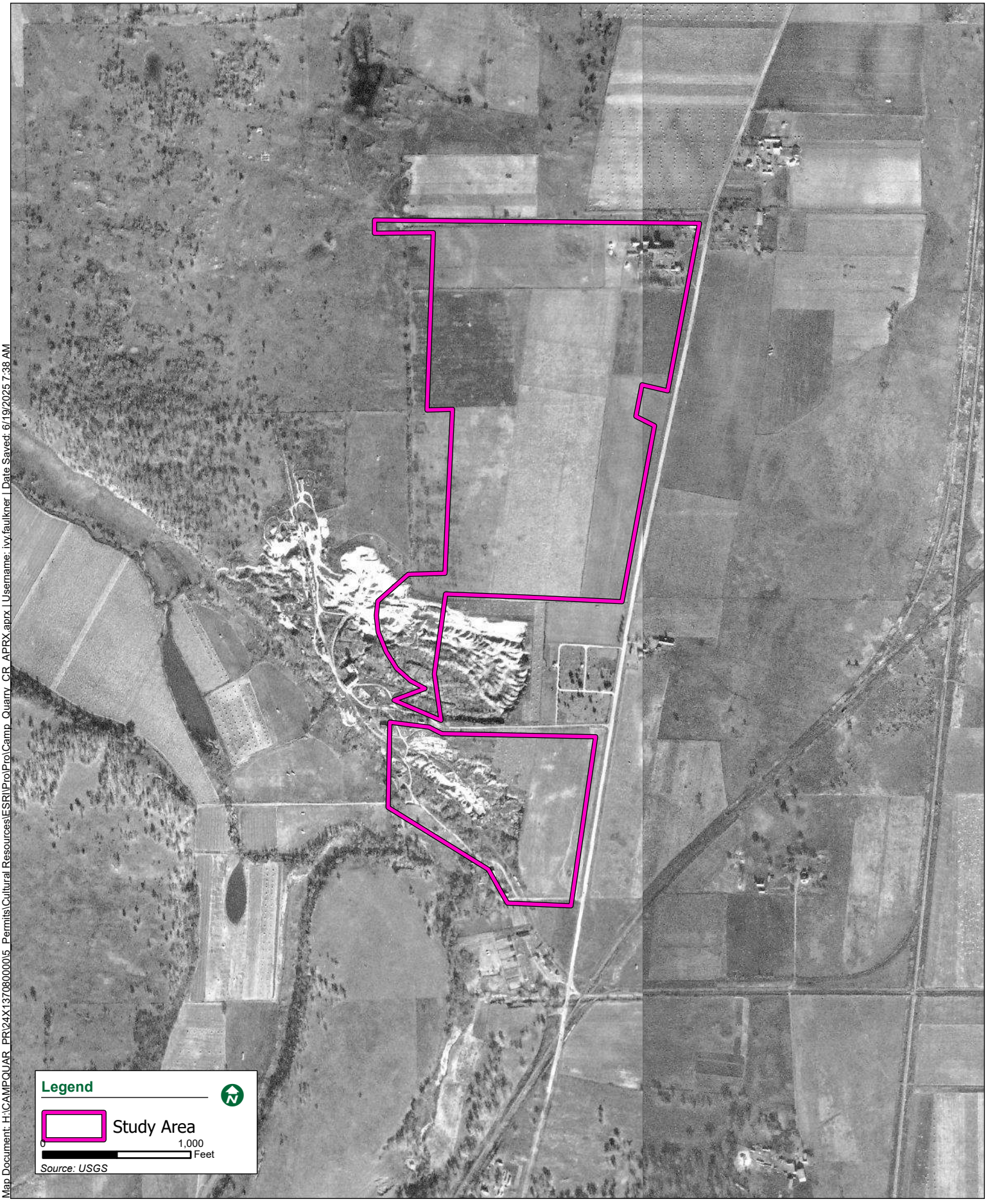

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Figure 24 - 1950 Aerial Imagery

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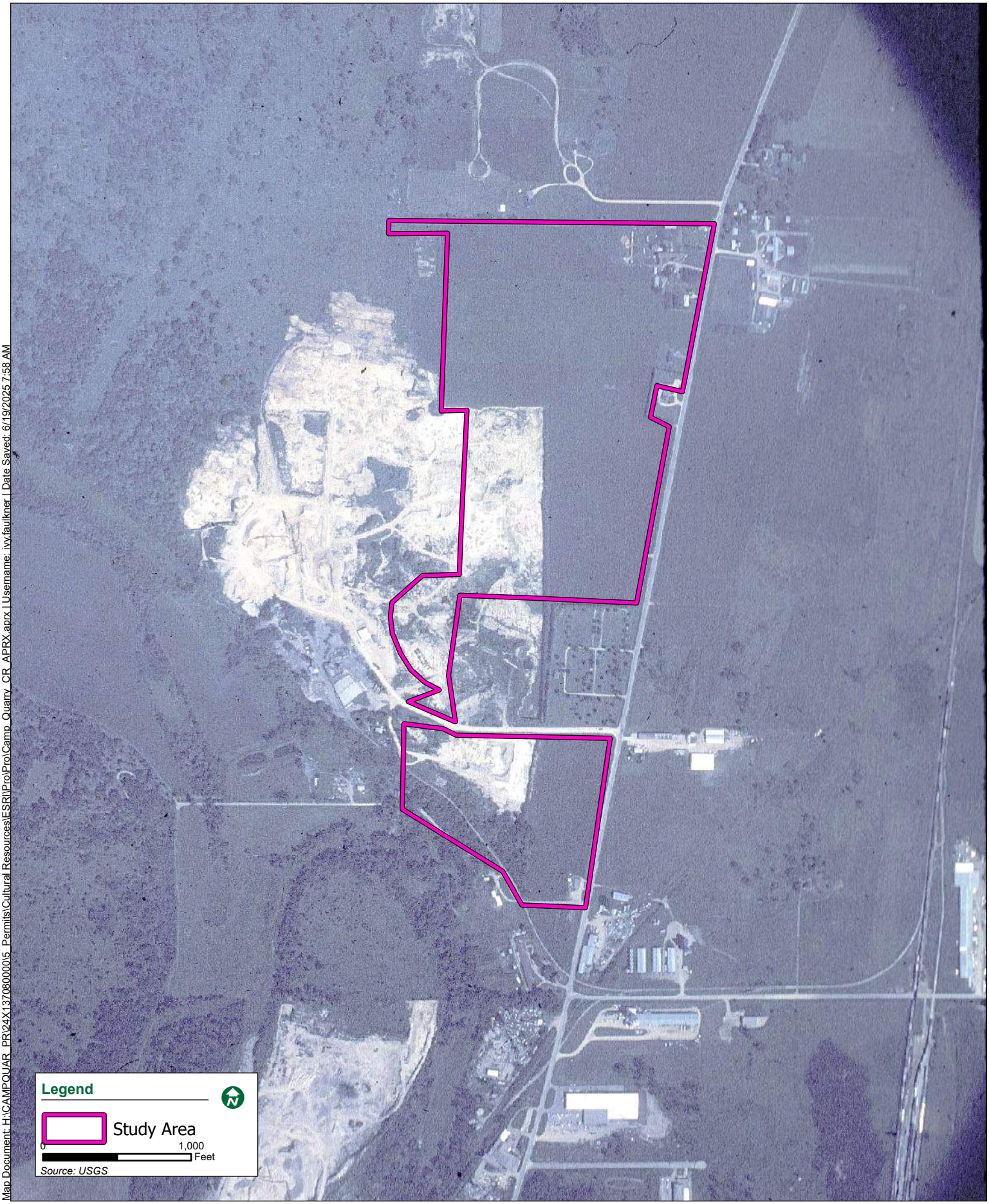

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Figure 26 - 1990 Aerial Imagery

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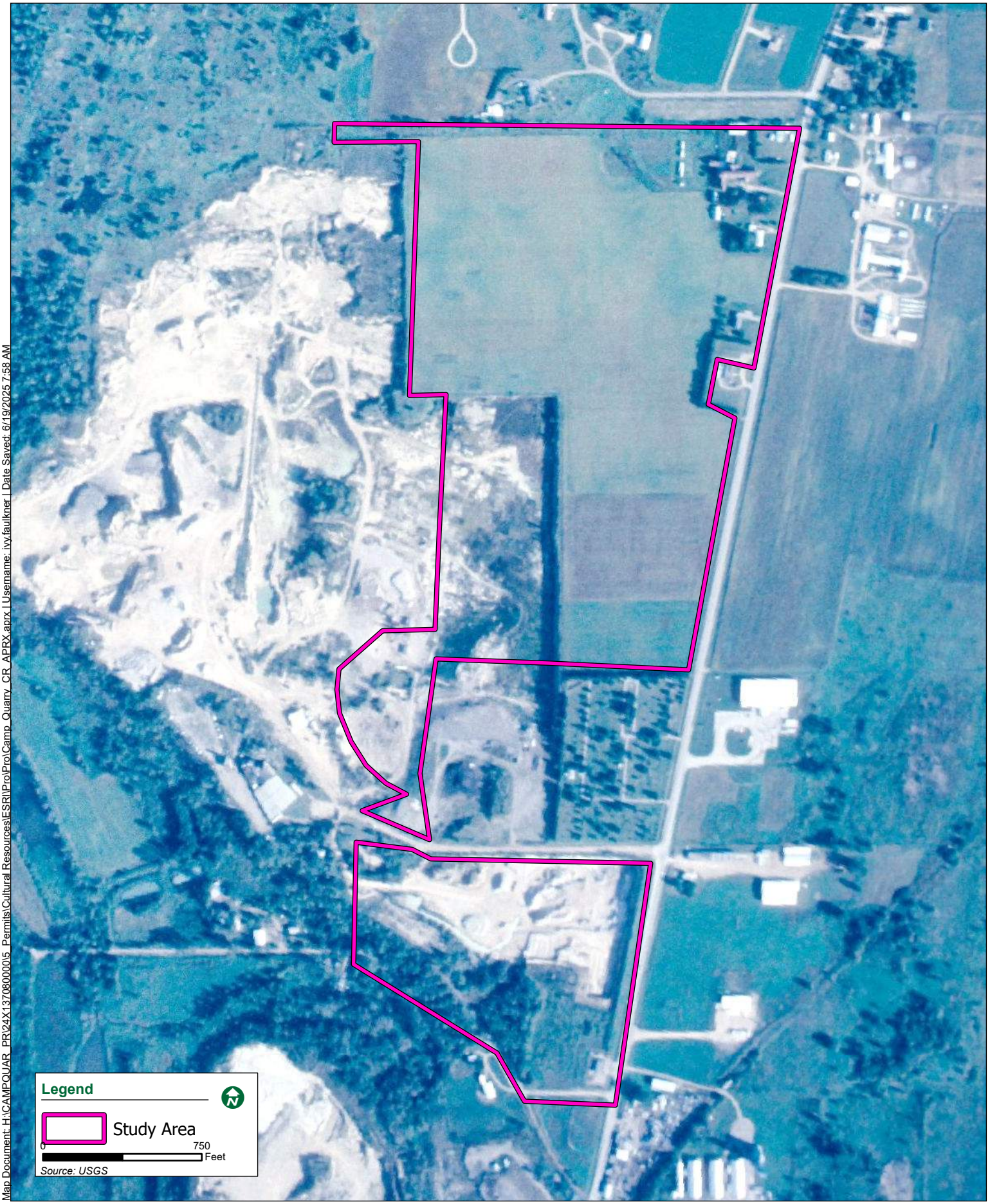

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Camp Quarry Adventure Park

Holtmeier Construction, Inc.

Figure 27 - 2006 Aerial Imagery

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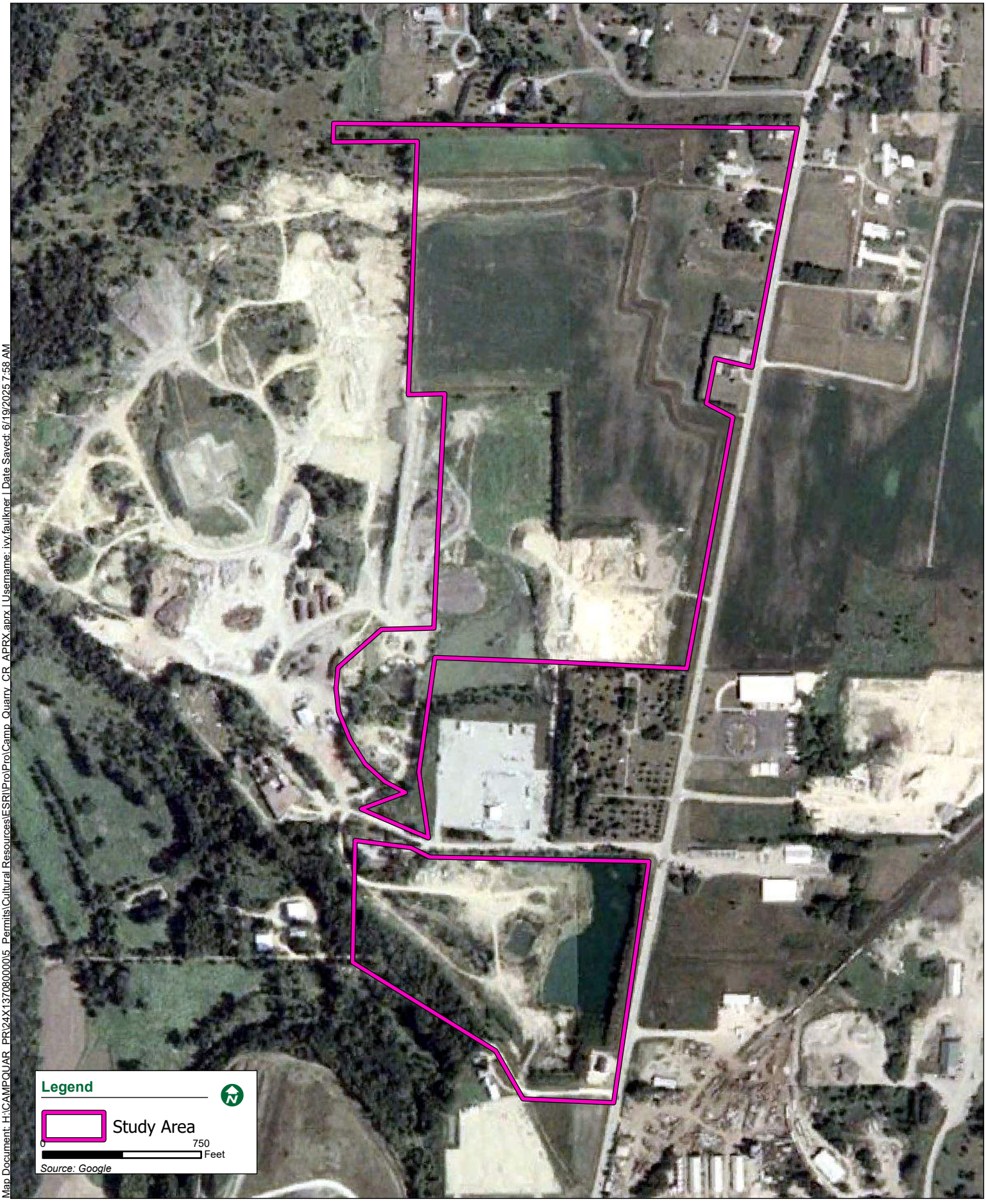

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Camp Quarry Adventure Park

Holtmeier Construction, Inc.

Figure 28 - 2015 Aerial Imagery

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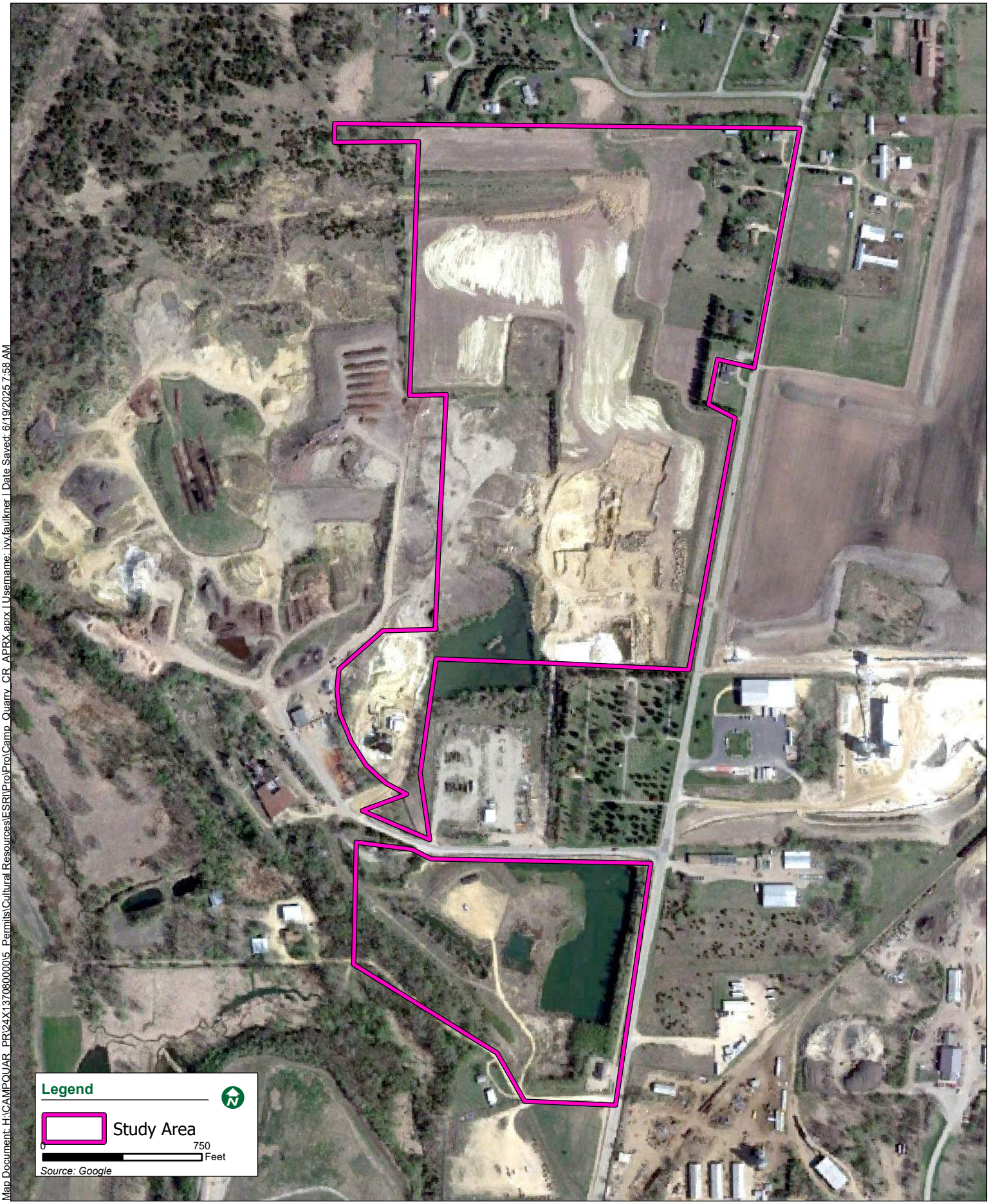

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Figure 29: Timeline of Ownership for Historic Farming Area

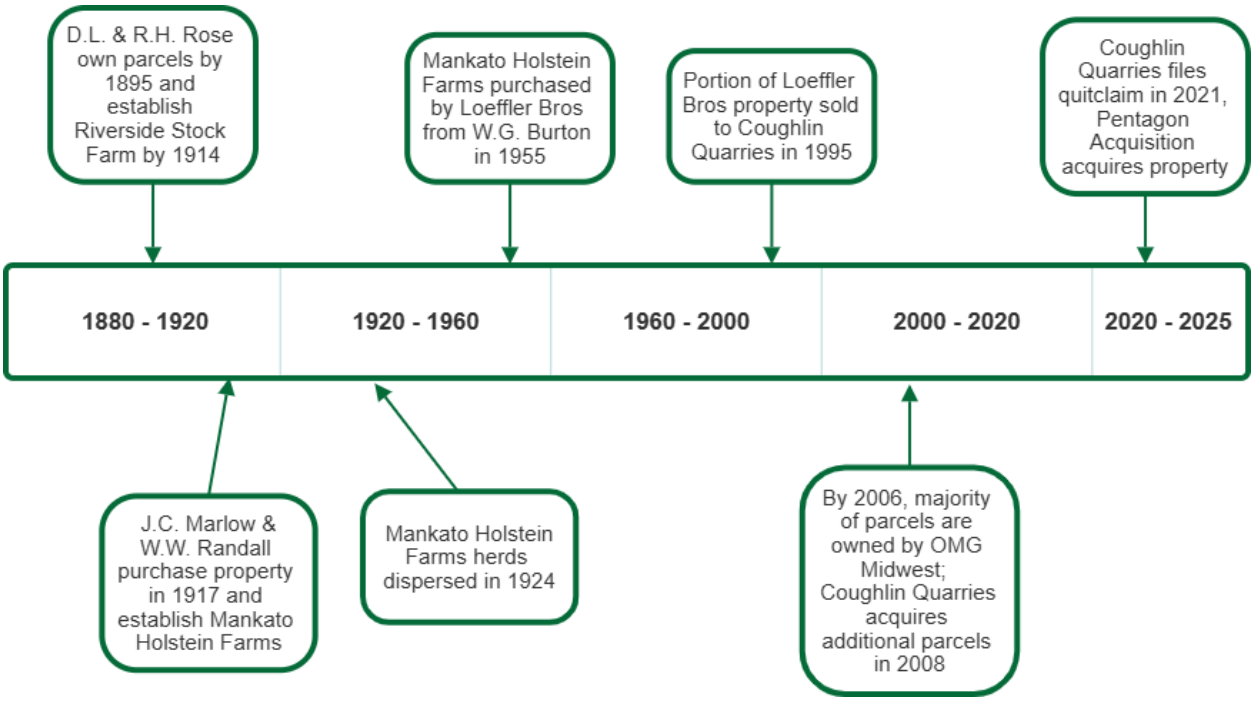
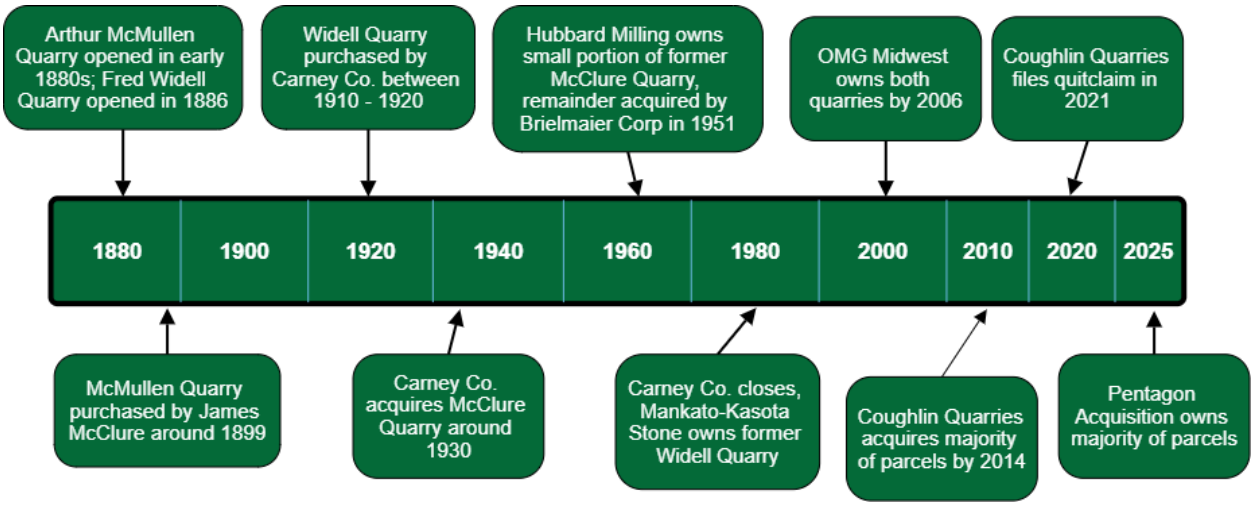


Figure 30: Timeline of Ownership for Historic Quarrying Areas



SUMMARY & RECOMMENDATIONS

A Phase IA cultural resources literature review was conducted by the Bolton & Menk, Inc. cultural resources team in June 2025 for the proposed Camp Quarry Adventure Park in Lime Township, Blue Earth County, Minnesota. Three previously recorded archaeological sites were identified within one mile of the proposed project area. Additionally, 16 previously inventoried historic resources were identified within 0.5 miles of the project area, as well as a recommendation for a potential historic district. Although historic documentation, including historic maps and aerial imagery, indicate a long history of stone quarrying across the majority of the Study Area, historic properties related to these activities appear to remain extant. Previous cultural resources investigations have recommended that several of the properties within the Study Area are potentially eligible for NRHP listing. In 2015, SHPO concurred with the recommendation of eligibility for three of these properties (BE-LIM-00047, BE-LIM-00048, and BE-LIM-00049), which were also recommended as contributing elements of a historic district. Other previously identified and potentially eligible historic resources within or adjacent to the Study Area have not been evaluated since they were initially inventoried. As such, they require further assessment in order to determine their potential eligibility and the extent of potential impacts as a result of the proposed project. Finally, previously inventoried historic properties that were listed in or recommended as potentially eligible to the NRHP that have subsequently been demolished require assessment of their potential for eligibility as archaeological sites. Therefore, Bolton & Menk recommends ***additional cultural resources investigations including both archaeological and architecture-history surveys***.

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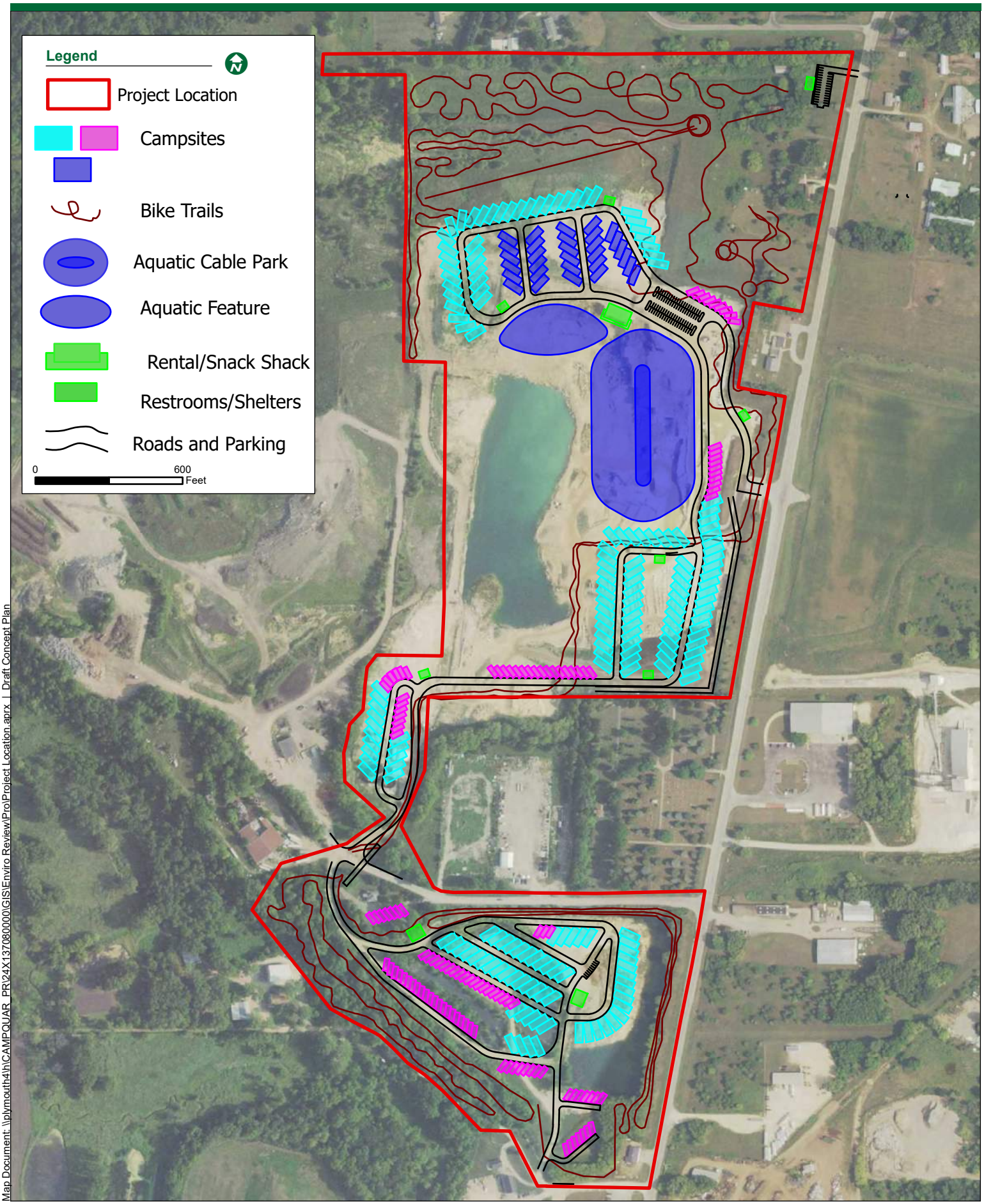
Appendix A: Preliminary Project Plans



Map Document: \\plymouth4\h\CAMPQUAR_PR\24X137080000\GIS\Enviro Review\Pro\Project Location.aprx | Draft Concept Plan

Rockwell RV & Adventure Park, Lime Township, Blue Earth County, Minnesota

Phase I Architecture-History Reconnaissance Survey and Phase II Evaluations

CampQuarry, LLC
February 2026

T109N, R26W, Sections 30 & 31

BOLTON & MENK
Real People. Real Solutions.

Submitted by:
Bolton & Menk, Inc.
12224 Nicollet Ave
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P: (952) 890-0509

Phase I Architecture-History Reconnaissance Survey and Phase II Evaluations for the Rockwell RV & Adventure Park, Lime Township, Blue Earth County, Minnesota

Prepared for CampQuarry, LLC

Principal Investigator

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February 2026

MANAGEMENT SUMMARY

The following report contains the results of a Phase I architecture-history reconnaissance survey and Phase II evaluations conducted on behalf of CampQuarry, LLC for the proposed construction of a new RV campground and outdoor recreational facility (Rockwell RV & Adventure Park). The proposed Rockwell RV and Adventure Park will include 318 campsites, a check-in office, multiple entrances, parking, bike trail facilities, restrooms, a maintenance building, and a service road. Additional amenities will include a rental/snack shack, bike trails, an aquatic park, a water cable park, and swimming areas (see **Appendix C**). The total project area is approximately 107.7 acres. The project is located in T109N, R26W, Sections 30 & 31 of Blue Earth County, Minnesota.

The proposed project is located on private parcels and will be funded with private funds. However, the proposed project exceeds the threshold outlines in MN Rules 4410.4300, Subpar 20. Campgrounds and RV Parks and therefore requires the preparation of an Environmental Assessment Worksheet (EAW), which includes cultural resources review. The Bolton & Menk, Inc. cultural resources team completed a Phase IA literature review for the proposed project in June 2025. This literature review recommended architecture-history investigation of previously identified and potentially eligible historic resources within or adjacent to the proposed project area.

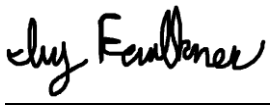
The Bolton & Menk, Inc. cultural resources team, led by Ivy Faulkner, PhD, conducted a Phase I architecture-history reconnaissance survey to identify architecture-history resources that may be eligible for listing on the National Register of Historic Places (NRHP) within the project area and to evaluate potential impacts to said resources on July 23 & 25, and August 5, 2025. An Area of Potential Effects (APE) was determined to account for both direct (caused at the time of project construction, including visual, auditory, and atmospheric impacts) effects and indirect (occurring later in time, but which can reasonably be foreseen) effects as a result of proposed project activities.

Architecture-history survey followed the guidelines set forth in the *Historic and Architectural Survey Manual* (Minnesota Historical Society [MNHS] 2017) and *The Secretary of the Interior's Standards and Guidelines for Archaeology and Historic Preservation* (National Park Service [NPS] 1995). As recommended by the previously completed Phase IA literature review, nine architecture-history resources were revisited and evaluated. Additionally, the previously identified potential historic district (BE-LIM-00052) was fully defined and evaluated. Ultimately, six properties within the APE were recommended as **not individually eligible but contributing to the historic district** and two properties were recommended as **individually eligible and contributing to the historic district.** The historic district, as a whole, was also recommended as **eligible** and its boundaries were defined to encompass all contributing elements.

As described in this report, although eligible architecture-history properties, including the Klondike and McClure Quarries Historic District, were identified in the southern portion of the project area, proposed project activities in this area are not anticipated to cause significant adverse impacts to these resources. Therefore, based on current project plans, Bolton & Menk recommends a finding of ***no adverse effects to historic properties and no further architecture-history investigations*** for the Rockwell RV & Adventure Park.

CERTIFICATION OF RESULTS

I certify that this investigation was conducted and documented according to the Secretary of the Interior's Standards and Guidelines and that the report is complete and accurate to the best of my knowledge.



Signature of Principal Investigator

February 27, 2026
Date

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Appendix A: Overview of Inventoried Structures
Appendix B: Historic Property Inventory Forms
Appendix C: Concept Designs

INTRODUCTION

PROJECT DESCRIPTION

CampQuarry, LLC is proposing to construct a new RV campground and outdoor recreational facility (Rockwell RV and Adventure Park) in Lime Township, Blue Earth County, Minnesota (**Figure 1**). The proposed Rockwell RV and Adventure Park will include 318 campsites, a check-in office, multiple entrances, parking, bike trail facilities, restrooms, a maintenance building, and a service road. Additional amenities will include a rental/snack shack, bike trails, an aquatic park, a water cable park, and swimming areas (see **Appendix C**). The total project area is approximately 107.7 acres. The project is located in T109N, R26W, Sections 30 & 31 of Blue Earth County, Minnesota.

The proposed project is located on private parcels and will be funded with private funds. However, the proposed project exceeds the threshold outlines in MN Rules 4410.4300, Subpar 20. Campgrounds and RV Parks and therefore requires the preparation of an Environmental Assessment Worksheet (EAW), which includes cultural resources review. The Bolton & Menk, Inc. cultural resources team completed a Phase IA literature review for the proposed project in June 2025 (Faulkner and Spaeth 2025). This literature review recommended architecture-history investigation of previously identified and potentially eligible historic resources within or adjacent to the proposed project area.

The Bolton & Menk, Inc. cultural resources team was contracted to perform a Phase I architecture-history survey to identify historic properties that may be eligible for listing on the National Register of Historic Places (NRHP) within the project area and evaluate potential impacts to said properties. Phase II architecture-history evaluations of eight properties located within the project area were then conducted in order to make recommendations on the eligibility of these properties. Additionally, the previously identified potential historic district (BE-LIM-00052) was defined and evaluated.

Architecture-history fieldwork was conducted on July 23 & 25, and August 5, 2025. Ivy Faulkner, PhD, served as Principal Investigator for the project. Jesse Kling served as Field Director. Faulkner meets the requirements of a professional historian as defined by Minnesota Statute 138.31, subd. 10 and the Secretary of the Interior Standards. Architecture-history survey followed the guidelines set forth in the *Historic and Architectural Survey Manual* (Minnesota Historical Society [MNHS] 2017) and *The Secretary of the Interior's Standards and Guidelines for Archaeology and Historic Preservation* (National Park Service [NPS] 1995).

AREA OF POTENTIAL EFFECTS

According to the regulations as codified in 36 CFR 800.16 of Section 106 of the NHPA, the APE is defined as "the geographic area or areas within which an undertaking may directly or indirectly cause alterations in the character or use of historic properties, if any such properties exist." Therefore, the APE must account for both direct (caused at the time of the project including visual, auditory, and atmospheric) and indirect (occurring later in time which can reasonably be foreseen) effects as a result of the proposed project activities. The APE is therefore defined primarily by the construction limits of the proposed project as the topography of the area and the existing vegetation severely restrict the extents of the viewshed. The exception to this is in the southwestern part of the APE where the height of an adjacent previously inventoried historic property (BE-LIM-00005) required that the APE be extended to encompass the location of this property. See **Figures 1** for an overview map of the APE. Parcels included within the APE are listed in **Table 1**.

Resources in the APE included residences, commercial, and industrial properties, primarily associated with historic limestone quarrying. **Appendix A** presents a map of the surveyed properties within the APE. Current concept designs for the proposed project as of the time of this report are included as **Appendix C**.

Table 1: Parcels Within the APE

Parcel ID	Within Construction Limits
R40.04.30.400.002	Yes
R40.04.30.400.003	Yes
R40.04.30.400.004	Yes
R40.04.30.400.006	Yes
R40.04.30.400.013	Yes
R40.04.30.400.014	Yes
R40.04.31.200.033	Yes
R40.04.31.200.005	Yes
R40.04.31.200.006	Yes
R40.04.31.200.007	Yes
R40.04.31.200.034	No
R40.04.31.100.002	No

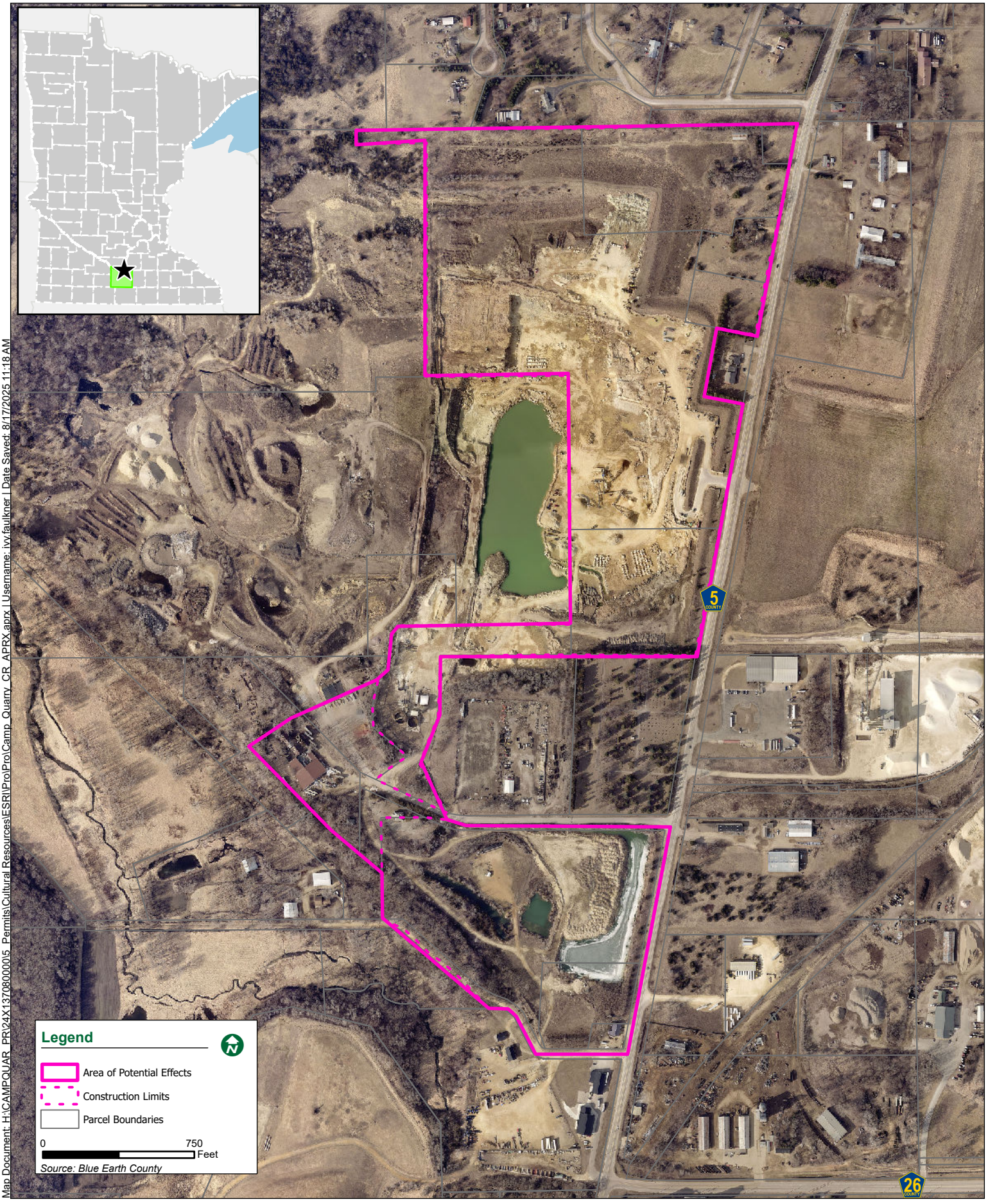
Rockwell RV & Adventure Park

CampQuarry, LLC

Figure 1 - Architecture-History Survey Aerial Location

August 2025

BOLTON & MENK



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METHODOLOGY/RESEARCH DESIGN

OBJECTIVES

The objectives of the Phase I architecture-history reconnaissance survey and Phase II evaluations were as follows:

1. to identify historic-age architecture-history resources located withing the APE,
2. to determine if those resources are eligible for listing in the National Register of Historic Places (NRHP), and
3. to evaluate potential impacts to said resources by the project as currently proposed.

SURVEY METHODOLOGY

Historic-age architecture-history resources were identified as those being at least 45 years of age, or older, at the time of survey. This age was selected so the survey will remain relevant in the event that the proposed project is delayed. New or updated Minnesota Architecture/History Property Inventory Forms were prepared for any surveyed historic resources and submitted to SHPO. Project fieldwork and documentation was completed according to the guidance set forth in the *Historic and Architectural Survey Manual* (Minnesota Historical Society [MNHS] 2017) and *The Secretary of the Interior's Standards and Guidelines for Archaeology and Historic Preservation* (National Park Service [NPS] 1995).

Historic-age resources were reviewed to assess significance and integrity within the context of important historical themes locally in Lime Township and Blue Earth County. Properties that appeared to possess significance were evaluated based on the National Register Criteria for Evaluation.

National Register eligibility is based, in part, on the four significance criteria outlined below:

- **Criterion A** – association with events or patterns that have made a significant contribution in our past;
- **Criterion B** – association with the lives of persons significant in our past;
- **Criterion C** – embodiment of the distinctive characteristics of a type, period, or method of construction; representation of the work of a master, possession of high artistic values; or representation of a significant and distinguishable entity whose components may lack individual distinction; and
- **Criterion D** – potential to yield information important to prehistory or history (NPS 1995)

Eligibility additionally requires that the property is able to convey its significance based on the following seven aspects of integrity: location, design, setting, materials, workmanship, feeling and association (NPS 1995).

Important historic themes within the APE included industrial quarrying and agriculture. The following SHPO statewide historic contexts provide frameworks for evaluating historic properties in relation to these themes:

- *Minnesota Military Roads, 1850-1875* (Hess 1989),
- *Minnesota's Nineteenth-Century Masonry Ruins* (Pizza 2013), and
- *Railroads in Minnesota, 1862-1956* (Schmidt and Pratt 2007).

LITERATURE REVIEW

PREVIOUSLY COMPLETED SURVEYS AND SOURCE MATERIALS

Primary and secondary sources were reviewed to gain an understanding of the historic context for properties within the APE. These sources provided information about the area's settlement and development patterns and historical information on the properties within the APE identified for further study.

Repositories consulted to obtain historical information included:

- Minnesota Historical Society
- Blue Earth County Historical Society
- SHPO / Minnesota's Statewide Historic Inventory Portal (MnSHIP)

Primary and secondary sources included:

- SHPO inventory forms and survey reports
- Plat maps, atlases, and aerial images
- County and city histories
- City directories
- Online resources
- Previously prepared contexts, community surveys, and nominations

A review of reports on file at SHPO, conducted on June 4, 2025, as well as Bolton & Menk's internal project-related documentation, identified eight previous cultural resources surveys within or informative to the APE (**Table 2**). These reports are summarized below the table.

Table 2: Previously Completed Reports/Cultural Resources Surveys

Publication Year	Report Title	Author(s)	Report *
1980	Historic Resources of Blue Earth County, Multiple Resource Area Nomination	D. Gimmestad	BE-80-01H
1989	Final Report for the Historic Trails Project	J. Hess	XX-89-04H
2004	Report on Cultural Resource Reconnaissance Survey Conducted for a Natural Gas Pipeline to Serve the Mankato Energy Center, Lime Township, Blue Earth County, Minnesota	C. Harrison	BE-04-01
2006	Survey of Cultural Resources of Lime Township, Kasota Mining Operation	D. Maul	BE-06-01
2014	Jordan Sands, LLC, Industrial Sand Mining and Processing Facility, Lime Township, Blue Earth County, MN: Environmental Assessment Worksheet	Sunde Engineering	N/A
2014	Potential for Cultural Resources Impacts – Jordan Sands, LLC	D. Abere & A. Jenkins	N/A
2015	Jordan Sands Sand Mining & Processing Facility, Guaranteed B & I Loan Program, Class II Assessment, Mankato, MN	C. Seanoa	N/A
2015	Jordan Sands, LLC Proposed Silica Sand Mining Operation Expansion, Vicinity of Mankato, Blue Earth County, Minnesota – Phase II Architecture History Investigation	Daniel R. Pratt	BE-15-05H

*Report numbers based on state database (i.e. MN SHPO) filing system.

1980: Historic Resources Survey of Blue Earth County

In 1979 – 1980, a survey of historic standing structures in Blue Earth County was conducted as part of the Minnesota SHPO's long-rage statewide survey of historic resources. The survey focused on standing structures which demonstrated various aspects of the county's history and were constructed prior to 1940. Ultimately, approximately 400 historic resources were inventoried, 22 of which were selected for

nomination to the NRHP. Six of the 16 architecture-history resources located within 0.5 miles of the APE were initially inventoried as a part of this survey: the Widell House (BE-LIM-00001), the House (BE-LIM-00002), the Farmstead (BE-LIM-00003), the Lime Kilns (BE-LIM-00005), the Shaubut House (BE-LIM-00011), and the Mankato Holstein Farm Barn (BE-LIM-00014). The Mankato Holstein Farm Barn (BE-LIM-00014) was nominated and ultimately listed to the NRHP (Gimmestad 1980b). As this was a county-wide survey, it includes the entirety of the current APE.

1989: Historic Trails Project

In 1988 – 1989, Jeffrey A. Hess, Historical Consultants conducted a study of the Red River Trails and Military Roads in Minnesota on behalf of the Minnesota SHPO and the Minnesota Historical Society. The purpose of this study was to complete inventory forms for each historic route system, identify any of said routes that might be eligible for NRHP nomination, and to survey a sample of the routes in order to develop NRHP eligibility criteria. Ultimately, nine sites across eight counties were surveyed and inventoried. One of these sites, the Mendota-Big Sioux River Military Road, follows modern CR 5 in Lime Township and is adjacent to the APE. However, this section of the route was not field surveyed as part of this study and, therefore, no recommendations on the eligibility of this portion of the larger route were made at this time (Hess 1989).

2004: Mankato Energy Center Natural Gas Pipeline Phase I Survey

In 2004, Archaeological Research Services conducted a Phase I survey on behalf of Mankato Energy Center for the proposed construction of a 3.7-mile natural gas pipeline in Lime Township. The proposed project corridor extended from the northern border of Sections 32 – 34 before turning southwest to CR 5 and then south along the western side of the roadway before finally continuing southwest along the abandoned railroad grade to the existing power plant. The segment of this corridor along the western side of CR 5 in Section 31 is adjacent to the southeastern corner of the current APE. The 2004 survey consisted of surface survey of the entire project corridor. No archaeological materials were identified, and the majority of the corridor was noted as having been extensively previously disturbed by industrial development as well as roadway and railroad construction (Harrison 2004).

2006: Kasota Mining Operation Phase I Survey

In 2006, Bolton & Menk conducted a Phase I cultural resources survey on behalf of Minnesota Kasota Stone's proposed expansion of their mining operation in Lime Township. This survey overlaps with the current APE in Section 30. The 2006 survey consisted of surface survey of the proposed project location. Limestone outcroppings were observed in several areas, but no archaeological materials were identified (Maul 2006).

2014 – 2017: Jordan Sands Mining Expansion

Jordan Sands, LLC proposed to repurpose and develop existing mining operations on four parcels (Parcels A, B, C, and D) in Lime Township and to construct a new industrial sand processing facility. Parcels C and D of this project correspond to the northern and southern portions of the current APE. Since a portion of the project exceeded the threshold of 40 acres identified in MN Rules 4410.4300 Subp. 12, the preparation of an Environmental Assessment Worksheet (EAW) was required. SHPO's initial review of the project did not recommend archaeological survey but did identify the need for additional investigation of architecture-history properties should federal funding be secured and the project fall under Section 106 review (SHPO No. 2012-2879).

Following the involvement of the US Department of Agriculture - Rural Development (USDA Rural Development) as the funding source and lead federal agency, Sunde Engineering was contracted to prepare an updated EAW on behalf of Jordan Sands in 2014. In order to meet the needs of Section 106 consultation, the 2014 EAW referenced the previous cultural resources survey conducted in 1996 on Parcel D (Harrison 1996) as well as the 2006 Kasota Mining Operation survey (Maul 2006) which

overlapped with a portion of Parcel A, both of which had negative results (Sunde Engineering 2014). The following architecture-history resources were identified as within the vicinity of the project area:

- Farmstead (BE-LIM-00004)
- Lime Kilns (BE-LIM-00005)
- Shaubut House (BE-LIM-00011)
- Mendota-Big Sioux River Military Road: Lime Section (BE-LIM-00013)
- Mankato Holstein Farm Barn (BE-LIM-00014).

However, field observations conducted by Bolton & Menk of the existing facilities indicated that visual impacts were limited to the existing quarries and, therefore, no potential impacts to these resources were identified (Abere and Jenkins 2014). Based upon these findings, the EAW determined that "there are no archaeological, historical or architectural resources that are present or will be impacted by the Project" (Sunde Engineering 2014:57).

In 2015, the USDA Rural Development prepared an Environmental Assessment (EA) for the proposed Jordan Sands project as part of the required documentation under the National Environmental Policy Act. By the time this document was prepared, project plans had been modified such that no mining or processing operations were proposed for Parcel B due to excessive noise impacts identified by the previous EAW. Additionally, ARCH^3, LLC was contracted to conduct a Phase II architecture-history investigation of Parcel C and portions of Parcels A and D, per the recommendation of SHPO in a letter dated January 9, 2015 (SHPO No. 2012-2879). This investigation identified the following previously inventoried architecture-history resources as within or immediately adjacent to the proposed project area: Widell House (BE-LIM-00001), House (BE-LIM-00002), Farmstead (BE-LIM-00003), and Lime Kilns (BE-LIM-00005). Additionally, the following four previously unrecorded historic properties were identified: James McClure Quarry Pit (BE-LIM-00047), James McClure Quarry Stockpiles (BE-LIM-00048), James McClure Quarry Railroad Spur (BE-LIM-00049), and James McClure Quarry Stockpile Stone Structures (BE-LIM-00051).

Ultimately, this study found that the northern portion of the current APE (former Parcel D) included the Widell & Co. Quarry while the southern portion of the current APE (former Parcel C) included the Arthur McMullen/James McClure Quarry. The northern portion, including the area of the Widell & Co. Quarry, is described as having experienced nearly continuous quarrying, resulting in "the complete removal of the original ground surface and the remains of the George Widell quarry" (Pratt 2015:20). The southern portion, including the area of the James McClure Quarry, however, appeared to have been inactive from around the 1930s until around the 1990s. At this time, quarrying resumed in the northeastern section of this area, which had previously been agricultural fields, while the southwestern section remained inactive, possibly due to the presence of a portion of railroad spur remaining in this area. As a result, the area of the James McClure Quarry was found to retain sufficient integrity to represent a potentially eligible historic district although no boundaries for the potential district were identified (Pratt 2015).

Due to the identification of potentially eligible historic properties, project plans were modified to eliminate all proposed activities besides water pumping to maintain the existing water level as required by the Minnesota Pollution Control Agency. Therefore, a determination of no adverse effect was recommended (Seanoa 2015). SHPO concurred with this determination as well as the recommendation that the James McClure Quarry Historic District is eligible for NRHP listing in a letter dated July 8, 2015 (SHPO No. 2012-2879).

PREVIOUSLY INVENTORIED ARCHITECTURE-HISTORY RESOURCES WITHIN/NEAR APE

Bolton & Menk, Inc. reviewed SHPO inventory files and identified 16 previously inventoried architecture-history properties documented through June 2025 that are located within 0.5 miles of the APE (**Table 3; Figure 2**). Thirteen of these resources are within or adjacent to the APE. These resources are described further below the table.

Table 3: Previously Inventoried Architecture-History Resources Within 0.5 Miles of APE

SHPO Inventory No.	Property Name	Location	Distance from APE	Previous Eligibility Determination*
BE-LIM-00001	Widell House (Widell & Co. Office Building)	57032 231st Lane	Within	Unevaluated
BE-LIM-00002	House (Schaefer-Widell House)	57063 231st Lane	Adjacent	Unevaluated
BE-LIM-00003	Farmstead (Klondike Quarry Farmstead)	57032 231st Lane	Adjacent	Unevaluated
BE-LIM-00005	Lime Kilns	57063 231st Lane	Adjacent	Unevaluated
BE-LIM-00011	Shaubut House	23471 3rd Ave	Adjacent	Unevaluated
BE-LIM-00013	Mendota-Big Sioux River Military Road: Lime Section	Co. Hwy. 5	Adjacent	Unevaluated
BE-LIM-00014	Mankato Holstein Farm Barn	23458 3rd Ave (razed)	Within	Delisted**
BE-LIM-00047	James McClure Quarry Pit	57150 230th Lane	Within	Eligible
BE-LIM-00048	James McClure Quarry Stockpiles	NE ¼ of Section 31, N of 230th Ln	Within	Eligible
BE-LIM-00049	James McClure Quarry Railroad Spur (Klondike Quarry Railroad Spur)	SW-NE to NE-NW of Section 31	Within	Eligible
BE-LIM-00051	James McClure Quarry Stockpile Structures	NE ¼ of Section 31, N of 230th Ln	Within	Unevaluated
BE-LIM-00052	James McClure Quarry Historic District	NE ¼ of Section 31	Within	Eligible
BE-MKC-00337	Mendota-Big Sioux River Road: Mankato Section	Section of 3rd Ave (CR 5) from N Riverfront Dr – N Industrial Rd	0.16 miles south	Unevaluated
XX-RRD-CGW018/ XX-RRD-CGW019	WM&P Railroad Company/ CGW Railway Company	Mankato – Redwing	Adjacent	Not Eligible
XX-RRD-CNW006/ XX-RRD-CNW013	St. Paul & Sioux City Railroad Company/ Chicago St. Paul Minneapolis & Omaha Railway Company (Omaha)/ Chicago & North Western Railway Company/ Minnesota Valley Railroad Company mainline	St. Paul – St. James	0.15 miles east	Unevaluated
XX-RRD-CSP041	CM&StP Railway Company/ CMStP&P Railroad Company: Mankato-Farmington Branch	Downtown Mankato – Farmington	Adjacent	Not Eligible

*NRHP status as indicated on MnSHIP.
**Demolished in 2006 and removed from the National Register in 2007.

Widell House (BE-LIM-00001)

Minimal information related to the Widell House (BE-LIM-00001) is included in the original inventory form from 1979. However, the form does include a few photographs, indicates that at the time of survey the building was being utilized as offices by the Brielmaier Corporation, and states that the property is possibly eligible for NRHP listing with the other inventoried stone buildings located in the quarry area (Gimmestad 1979a). The structure is a one-story construction built of rusticated local limestone ashlars with a hipped roof that, according to both historical documentation and Blue Earth County property records, was originally constructed in 1901 (*Mankato Free Press* 21 June 1901; Blue Earth County 2025). Two additions were added to the main building in 1945: a wood frame extension to the south of the building and a concrete block and wood extension from the western façade. Finally, two metal storage structures have been added to the property in 1979 and in 2000 (Blue Earth County 2025). The building is associated with Gustav Widell who assumed ownership of the Widell & Co. Quarry following the death of his brother, Frederick, in the 1890s (*Mankato Free Press* 30 April 1890; Mankato City Directory 1902; Free Press Printing 1903; Geo. A. Ogle 1914). Although the property was inventoried as a house, the building was originally built as an office by Widell & Co., and therefore a more appropriate historic name

for the property is the Widell & Co. Office Building (Pratt 2015). The Widell & Co. Office Building is located in the northwest corner of the southern portion of the APE, south of 231st Lane. Although the property was revisited in 2015, it was not evaluated at this time (**Figure 3**; Pratt 2015).

House (BE-LIM-00002)

Very little information is included in the original inventory form from 1979 for this stone house besides its approximate location, a few photographs of the exterior, and a note that it is potentially eligible for NRHP listing with the other stone buildings located within the quarry area (Gimmestad 1979b). The building is located across an unpaved access drive from the Widell & Co. Office Building (BE-LIM-00001) in a wooded portion of the parcel, south of the Lime Kilns (BE-LIM-00005). Although this property is understood to have served as the original office building for Widell & Co.'s Klondike Quarry, the house shows up on the earliest available plat map of Lime Township in 1879 as the house of farmer Frank M. Schaefer, a German immigrant (Pratt 2015; 1879 plat map). The house's simple Italianate design appears consistent with a circa 1870s construction date. According to Blue Earth County property records, the structure is a two-story building constructed of local limestone that was built by 1900. Pictographic imagery indicates that the roof has partially collapsed, and the structure has been abandoned since at least 2009 (**Figure 4**; Blue Earth County 2025). This building is located approximately 145 feet west of the APE. Although the property was revisited in 2015, it was not evaluated at this time (**Figure 5**; Pratt 2015).

Farmstead (BE-LIM-00003)

This farmstead was originally inventoried in 1979 and is included in the group of stone buildings within the quarry area that is noted as being potentially NRHP eligible. The inventory form indicates that this property includes a house and a barn, gives an approximate location, and includes a few photographs, but provides no other information (Gimmestad 1979c). A 2015 survey found a reference to the stone barn in an undated article which states that it was used to stable horses for the nearby quarry. This anecdote is supported by an 1899 newspaper profile of Gustav Widell's Klondike Quarry, which describes a new stone barn and teamster's house constructed for the quarry's workhorses (*Mankato Free Press* 5 May 1899). The 2015 survey further notes that the reddish color of the limestone of both the house and barn suggests that they may have been destroyed in a fire (Pratt 2015). Historic aerial imagery, as well as notes from the 1979 survey indicated that the house was inhabited in this period, suggest that this fire occurred in the early 1980s. Aerial and pictographic imagery indicate that this property is located at the southern end of the parcel currently associated with the address 57032 231st Ln. However, no images or plans of the building are included in the property records. Based on pictographic imagery, the house was in ruins by 1982, possibly following a fire (**Figure 6;** Blue Earth County 2025). This farmstead is located adjacent to the southwestern border of the APE. Although the property was revisited in 2015, it was not evaluated at this time (**Figure 7**; Pratt 2015).

Lime Kilns (BE-LIM-00005)

The Lime Kilns (BE-LIM-0005) were originally inventoried in 1979. The inventory form notes that four lime kilns were first constructed during World War I, but no lime was ever produced. The kilns were subsequently utilized by the Carney Company for the production of rockwool insulation beginning around 1938 – 1939 (Gimmestad 1979d). Two brick chimneys were added to two of the kilns to facilitate the rockwool manufacturing process. These chimneys were in place by 1945 and may be original to the rockwool production plant (*Mankato Free Press* 3 October 1945). Following a 1970 fire, the plant's warehouse, office, and laboratory were rebuilt in the existing sheet-metal warehouse structure (*Mankato Free Press* 14 March 1970). The Carney Company shut down in the 1980s (Pratt 2015). Survey of the property in July 2025 indicates that the 1939 and 1945 sections of the plant have been partially demolished and a majority of the 1970-era warehouse to be in a state of partial collapse or disrepair, but the lime kilns remain extant (**Figures 8** & **9**; Pratt 2015; Blue Earth County 2025). The Lime Kilns are

located approximately 425 feet west of the APE. The inventory form notes that the kilns may potentially be eligible for NRHP listing with the other stone structures within the quarry area (Gimmestad 1979d). Although the property was revisited in 2015, it was not evaluated at this time (**Figure 8**; Pratt 2015).

Shaubut House (BE-LIM-00011)

The Shaubut House (BE-LIM-00011) was originally inventoried in 1979, at which time the property was owned by the Hubbard Milling Company. Included with the inventory form are some correspondences with Jeanne Kress at the Blue Earth County Historical Society regarding the property and some newspaper references from an unknown source (potentially the Mankato Free Press) dated to 1937 and 1951. These references describe the stone residence as potentially the first stone house erected in Blue Earth County based upon an engraved stone above the main entry, which, depending upon the reference, either reads 1855 or 1856. The residence, built from local limestone, belonged to Henry Shaubut who moved to the area from Pennsylvania in 1854. Shaubut would become a successful businessman and banker, as well as an important figure in the development of early Mankato. Finally, the inventory form notes that the property is potentially eligible for NRHP listing (Gimmestad 1979e).

There appears to have been some initial confusion regarding the location of the Shaubut House as another early stone residence located at 816 N 2nd Street was also attributed to a Shaubut, but the correspondence indicates that this was likely the residence of Henry Shaubut's brother, John, who joined his brother in Mankato in 1856 (Gimmestad 1979e). Confusingly, a third structure, located near Main Street and Front Street, which was destroyed by a fire in 1901, is also described as the "Old Henry Shaubut House" (*Mankato Free Press* 5 April 1901). However, the article from 1951 included in the Shaubut House inventory form indicates that this structure was a brick store constructed by John Shaubut but also states that this building was still extant (Gimmestad 1979e). Additionally, another article from the Mankato Free Press in 1914 that describes the Shaubut House indicates that it was constructed by Alexander Campbell in 1855, then subsequently purchased by Henry Shaubut (*Mankato Free Press* 8 May 1914). Based on historic maps and aerial imagery, this property appears to have been immediately south of the current residence at 23499 3rd Ave within the parcel associated with 23471 3rd Ave but was razed between 1990 – 1992 (**Figure 10**). Therefore, the Shaubut House is located approximately 130 feet east of the APE. As no above ground elements of this property remain extant, no significant impacts to this property are anticipated as a result of the proposed project.

Mendota-Big Sioux River Military Road: Lime Section (BE-LIM-00013)

The Mendota-Big Sioux River Military Road: Lime Section (BE-LIM-00013) is an 11-mile segment of the approximately 101-mile mid- to late nineteenth century military route between Mendota and Mankato. The Lime Section of the route is the southernmost portion, traveling along County State Aid Highway (CSAH) 5 from the border of Blue Earth County and Le Sueur County to Riverfront Drive in northern Mankato. This section of the route is described as a paved, two-lane roadway with a shoulder that has been resurfaced since it was originally established (Hess 1988).

Mankato Holstein Farm Barn (BE-LIM-00014)

The Mankato Holstein Farm Barn (BE-LIM-00014) was originally inventoried in 1979 and listed in the National Register in 1980. At that time, the approximately 210-foot-long barn was described as having a brown clay tile exterior and a frame rainbow-arch roof with slightly flared eaves (**Figure 11**). The barn was oriented on an east-west axis with a ground level drive at the center of the east side and a banked ramp at the center of the north side for access to the loft. Two clay block silos were attached at the base to the main building by a small connecting unit on the west side of the ramp. A three-story section near the center of the south side of the building contained the living area for farm workers and a longer section at the west end of the building contained additional housing for calves. The interior of the barn had stanchion housing for 40 cows with bull pens at the east end and steel calf pens at the west end (Gimmestad 1980a).

The Mankato Holstein Farm Barn was originally constructed in 1917 by J.C. Marlow and W.W. Randall. Marlow first moved to the Mankato area from Wisconsin in 1908 where he established several herds of registered Holstein cattle. The most important of his herds, which won national competitions, were established in partnership with Randall in 1917 at the Mankato Holstein Farm. This herd would subsequently be dispersed to a number of major operations around the country in 1924. Marlow would then go on to establish cattle clubs, create the Marlow Milking Machine, and promote the advancement of dairy cattle breeding. The property was recommended for NRHP listing due to its significance as one of the largest agricultural buildings in the region, demonstrating the importance of dairying in Blue Earth County's history, and its association with J.C. Marlow, an important figure in the history of dairy farming in the region (Gimmestad 1980a). Although not specified in the inventory form, the period of significance for the property is presumed to be from its construction in 1917 through the dispersal of the Mankato Holstein Farm herd in 1924, although the form does note that the barn remained in use at the time it was inventoried. Additional documentation related to the Mankato Holstein Farm Barn includes the removal of the property from the National Register in 2007 after the barn was razed on May 12, 2006. Although the foundations of the barn and the two silos remained extant, the property no longer retained sufficient integrity for NRHP listing under the previously identified criteria (**Figure 12**; SHPO 2007).

James McClure Quarry Pit (BE-LIM-00047)

The James McClure Quarry Pit (BE-LIM-00047) was identified during architecture-history investigations conducted by ARCH^3 in 2015 for the proposed expansion of the Jordan Sands, LLC mining operation. Based on a comparison with historic aerial imagery from 1938 and 1973, this investigation concluded that this main extraction pit appeared to remain relatively intact since it was closed sometime between 1919 and 1934. The James McClure Quarry Pit was recommended as eligible for NRHP listing due to its significance as an example of the Kasota Stone quarrying that was foundational to the development of Mankato and Blue Earth County. The James McClure Quarry Pit was additionally recommended as a contributing element of a potential historic district associated with the McClure quarrying operation (Pratt 2015). SHPO concurred with this recommendation in a letter dated July 8, 2015 (SHPO No. 2012-2879).

James McClure Quarry Stockpiles (BE-LIM-00048)

The James McClure Quarry Stockpiles (BE-LIM-00048) were also identified during the architecture-history investigations conducted by ARCH^3 in 2015. These stockpiles are large mounds of quarry material, primarily waste material comprised of glacial till and fragmentary limestone, extracted from the McClure Quarry during historic mining operations (**Figure 13**). The James McClure Quarry Stockpiles were recommended as eligible for NRHP listing and as a contributing element of the potential James McClure Quarry Historic District (Pratt 2015).

James McClure Quarry Railroad Spur (BE-LIM-00049)

The James McClure Quarry Railroad Spur (BE-LIM-00049) was also identified during the architecture-history investigations conducted by ARCH^3 in 2015. Though the railroad spur was inventoried for its association with the adjacent James McClure Quarry, it predates the McClure Quarry and was constructed in 1898 to provide the Chicago Milwaukee St. Paul & Omaha and Minneapolis & St. Louis Railroads with access to Widell & Co.'s newly opened Klondike Quarry (*Mankato Free Press* 15 April 1898, 5 May 1899). The railroad spur extends from just north of the junction of 230th Lane and an unpaved access road into the McClure Quarry area, proceeding northwest for approximately 0.3 miles to the abandoned Carney rockwool facility. Although largely obscured by tree cover in aerial imagery, the railroad spur remains extant (**Figure 14**). The James McClure Quarry Railroad Spur was recommended as eligible for NRHP listing and as a contributing element of the potential James McClure Quarry Historic District (Pratt 2015).

James McClure Quarry Stockpile Stone Structures (BE-LIM-00051)

The James McClure Quarry Stockpile Stone Structures (BE-LIM-00051) are four rectangular stone structures of variable size that were also identified during the architecture-history investigations conducted by ARCH^3 in 2015. Three of these structures are composed of unmortared, irregular, randomly-coursed limestone while the fourth is composed of regular-coursed, rough-cut ashlar masonry with flush mortar joints (**Figure 15**). While the function of the three limestone structures could not be determined, Pratt (2015) suggested that the fourth resembled a lime kiln. These structures were located among the James McClure Quarry Stockpiles, situated in alignment with each other at approximately equal spacing. The function and historical association of these structures could not be determined. Therefore, they were recommended as not eligible and not contributing to the potential James McClure Quarry Historic District (Pratt 2015).

James McClure Quarry Historic District (BE-LIM-00052)

The James McClure Quarry Historic District (BE-LIM-00052) was also identified during the architecture-history investigations conducted by ARCH^3 in 2015. The 2015 survey found that the James McClure Quarry and associated properties retained sufficient integrity to represent a potentially eligible historic district under Criterion A: Patterns of History in the areas of industry and extractive quarrying with a recommended period of significance from 1899 – 1930. The district is comprised of the remains of the quarry (BE-LIM-00047), associated stockpiles (BE-LIM-00048), and the railroad spur (BE-LIM-00049) as historically significant contributing elements (**Figure 16**). The stone house and barn (BE-LIM-0003) is also recommended as a potentially contributing element, although why this structure is believed to be closely associated with the James McClure Quarry is not explained. Finally, the function and historical association of the stone structures in the stockpile area could not be determined so they were recommended as not eligible and not contributing. No boundaries for the potential James McClure Quarry Historic District were identified (Pratt 2015).

WM&P/CGW (XX-RRD-CGW018) & WM&P/CGW, Faribault to Mankato (XX-RRD-CGW019)

The Wisconsin Minnesota & Pacific Railroad Company (WM&P), later the Chicago Great Western Railway Company (CGW), railroad corridor (XX-RRD-CGW018) includes the current and former railroad right-of-way between Red Wing and Mankato. This corridor was constructed between 1882 – 1887. The majority of the corridor was subsequently abandoned between 1971 – 1982 but remains extant as multi-use trails, except for a portion between Dundas and Faribault. However, since a substantial portion of the corridor has been eliminated, the railroad as a whole lacks sufficient integrity to be eligible for NRHP listing (Schmidt 2024a).

The segment of the WM&P railroad corridor between Faribault and Mankato (XX-RRD-CGW019) is approximately 45 miles in length with right-of-way that ranges between 45 – 150 feet in width. The majority of the railroad corridor has been converted to trail use although short portions, notably an approximately 1-mile segment between Eagle Lake and Mankato, are no longer extant. Finally, the Faribault to Mankato segment of the WM&P railroad corridor was found not to demonstrate significance under any of the requirements established in the Railroads MPDF and was therefore found to be not eligible for NRHP listing (Schmidt 2024b).

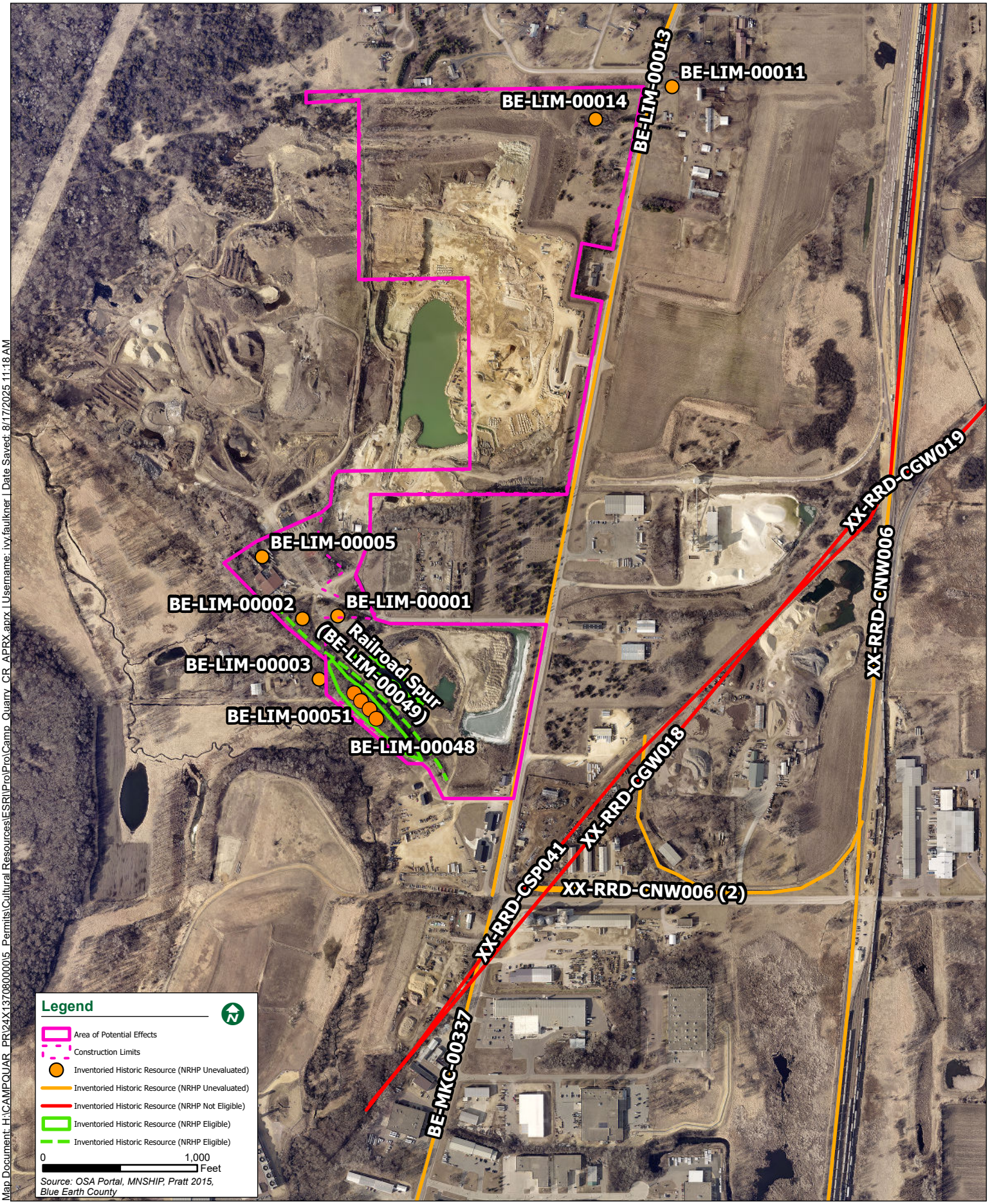
The WM&P railroad corridor (XX-RRD-CGW018 and XX-RRD-CGW-019) is located approximately 425 feet southeast of the APE. No significant impacts to this resource are anticipated as a result of the project as currently proposed.

CM&StP/CMStP&P: Mankato-Farmington Branch (XX-RRD-CSP041)

The Mankato – Farmington Branch of the Chicago Milwaukee & St. Paul Railway (CM&StP), later the Chicago Milwaukee St. Paul & Pacific Railroad (CMStP&P), is a railroad corridor that extends for approximately 70 miles from Mankato to the junction with the Iowa and Minnesota Division main line in

Farmington. This branch line was constructed in 1902 – 1903 and abandoned in 1980. The entirety of the railroad corridor is no longer extant and has either been plowed over or incorporated into roadway rights-of-way in Blue Earth, Dakota, Le Sueur, and Rice Counties. As no visual expression of the corridor remains, the branch line was determined to be not eligible for NRHP listing (Schmidt 2021). The Mankato-Farmington Branch corridor (XX-RRD-CSP041) is located approximately 350 feet southeast of the APE. No significant impacts to this resource are anticipated as a result of the proposed project.

Figure 8 - Previously Recorded Architecture-History Resources



Map Document: H:\CAMPQUAR_PR\24X13708000005_Permits\Cultural Resources\ESRI\Pro\Pro\Camp_Quarry_CR_APRX.aprx | Username: ivy.faulkner | Date Saved: 8/17/2025 11:18 AM

Figure 3: Widell House, circa 2015



View southwest of Widell House (BE-LIM-00001) in 2015 (Pratt 2015)

Figure 4: House, circa 2009



View north of partially collapsed, abandoned House (BE-LIM-00002) in 2009 (Blue Earth County 2025)

Figure 5: House, circa 2015



View southwest of House (BE-LIM-00002) in 2015 (Pratt 2015)

Figure 6: Farmstead, circa 2009



View east of ruins of Farmstead (BE-LIM-00003) in 2009 (Blue Earth County 2025)

Figure 7: Farmstead, circa 2015



View west of Farmstead (BE-LIM-00003) in 2015 (Pratt 2015)

Figure 8: Lime Kilns, circa 2015



View southwest of Lime Kilns (BE-LIM-00005) in 2015 (Pratt 2015)

Figure 9: Lime Kilns, circa 2025



View west of Lime Kilns (BE-LIM-00005) in 2025 (Blue Earth County 2025)

Figure 10- 1990 and 1992 Historic Aerial Imagery

August 2025

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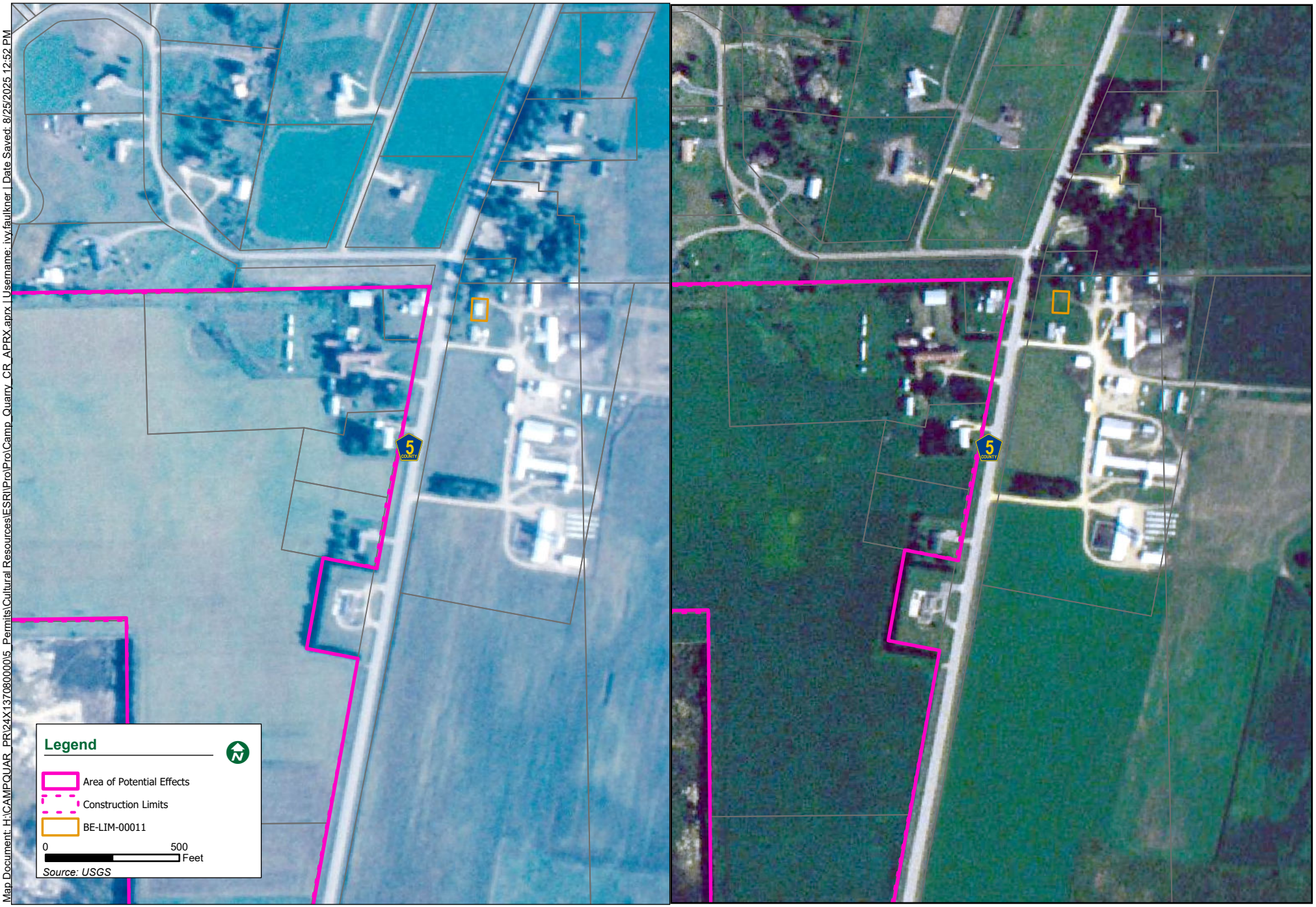

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Figure 11: Mankato Holstein Farm Barn, circa 1979



View northwest of Mankato Holstein Farm Barn (BE-LIM-00014) in 1979 (Gimmestad 1980)

Figure 12: Mankato Holstein Farm Barn, circa 2006



View of Mankato Holstein Farm Barn (BE-LIM-00014) following demolition in 2006 (SHPO 2007)

Figure 13: James McClure Quarry Stockpiles, circa 2015



View west of James McClure Quarry Stockpiles (BE-LIM-00048) in 2015 (Pratt 2015)

Figure 14: James McClure Quarry Railroad Spur, circa 2015



View northwest of James McClure Quarry Railroad Spur (BE-LIM-00049) in 2015 (Pratt 2015)

Figure 15: James McClure Quarry Stockpiles, circa 2015

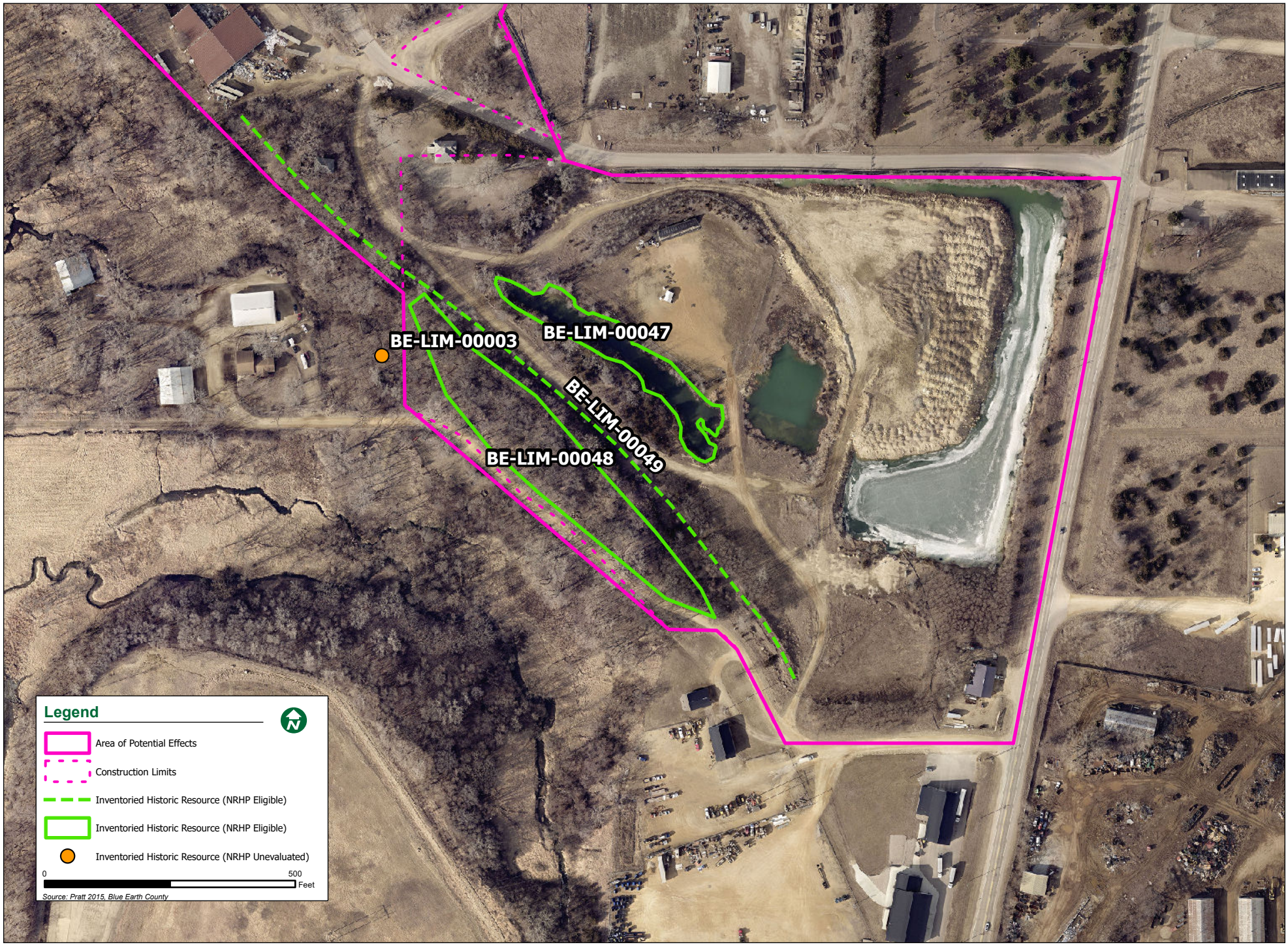


View west of one of the James McClure Quarry Stockpile Stone Structures (BE-LIM-00051) in 2015 (Pratt 2015)

Figure 16 - Potential James McClure Quarry Historic District Elements

August 2025

BOLTON & MENK



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HISTORIC CONTEXTS

The historic contexts that follow include a brief overview of Blue Earth County and the Mankato area. These contexts provide a framework for the development of the area and the potential significance of architecture-history properties located therein. **Figure 17** provides a general timeline of the events described below as they are related to the quarries located within the APE.

PRECONTACT BLUE EARTH COUNTY

Prior to the arrival of Europeans in what is now Blue Earth County in the late seventeenth – early eighteenth centuries, the area was occupied for thousands of years by native peoples. Due to the county's location along several major river routes, particularly the confluence of the Minnesota and Blue Earth Rivers, as well as the availability of quality lithic materials for the production of stone tools, this area would have been an important resource procurement area, as well as a culturally significant one. Isolated finds of Paleoindian projectile points are relatively common in this region, indicating the presence of native peoples around 10,000 years ago. Subsequent Archaic (7000 – 1000 BC) and Woodland (1000 BC – AD 1750) period sites are common and many of these locations demonstrate multi-component usage over long periods of time (Gibbon et al. 2002). When Europeans arrived in the area of Blue Earth County, the region was primarily occupied by Dakota people, particularly the Sisseton tribe (Westerman and White 2012).

HISTORIC BLUE EARTH COUNTY

The earliest European presence in Blue Earth County was likely Pierre Le Sueur, who arrived at the confluence of the Minnesota and Blue Earth rivers in 1683. Le Sueur assumed the blue-green clay he identified, which is the namesake of the County, contained copper. After returning to France with a sample of the clay, Le Sueur returned to the area in 1700 to establish Fort Le Huillier in an effort to extract copper from the clay soils. This venture was not profitable, and it was abandoned by 1702. The area was in French control until the Louisiana Purchase, after which it became part of the Minnesota Territory. The first Euro-American settlers arrived in 1852, establishing themselves at what would become the City of Mankato, one year before the Treaties of Traverse des Sioux and Mendota officially opened the area for Euro-American settlement (Blue Earth County 2022). Blue Earth County was officially established in 1853.

Euro-American presence in the area expanded rapidly after the Treaties of Traverse des Sioux and Mendota were signed, which caused friction between the Dakota and the Euro-American settlers. A bad growing season in 1861 lead to a "starving winter" for the Dakota furthering the building tension (Minnesota Historical Society [MNHS] 2012a). Due to the increased presence of Euro-Americans in the area there was greater competition for game. Additionally, their concerns with corrupt government agents failing to deliver treaty provisions continued to go unaddressed. The commonly cited start of the US-Dakota War of 1862 is in August of 1862 when a hunting party of young Dakota men killed five Euro-American settlers. Minnesota state troops were diverted from the Civil War effort and redirected to march against the Dakota (MNHS 2024).

The war continued until September 23rd when the Dakota were defeated. Many moved quickly to Dakota territory after the battle, but many fought to stay with their families that could not move as quickly. Those who stayed were taken into custody of the US military. Over the next three weeks 392 Dakota men were tried for their participation in the war; 303 were sentenced to death. The legal authority and procedures followed by the commission were heavily questioned at the time (MNHS 2012b). After the trials the convicted Dakota were marched to Mankato and the remaining Dakota were removed to the Fort Snelling Concentration Camp. While the camp was not a death camp it was a part of the genocidal policies used against Indigenous peoples throughout the US. Between 160 and 300 Dakota

died during their forced stay at Fort Snelling (MNHS 2024). President Lincoln approved death sentences for 39 of the 303 convicted Dakota in Mankato. On December 26th 38 men were hanged, the largest mass execution in United States history (MNHS 2012b).

At this time, Ho-Chunk were relocated from their Long Prairie Reservation in the north to a new reservation in east-central Blue Earth County in 1855. The relocated Ho-Chunk, which had farmed their original land in Wisconsin, continued to farm at the new reservation with success, which caused nearby Euro-American settlers to become hostile in an effort to obtain the fertile agricultural land for themselves. Ho-Chunk did not take part in the US-Dakota War of 1862, but due to racism and the settler's desire for more fertile land, the settlers demanded the Ho-Chunk be removed along with Dakota populations after the war (Coates 2017; Reicher 2014). By 1863, the Ho-Chunk endured another forced relocation to barren land in Crow Creek, South Dakota, and again to Omaha, Nebraska two years later (Reicher 2014).

Euro-American settlement continued to expand in the late 19th century and into the 20th century. Railroad development quickly superseded river traffic and brought booming industries to the County, particularly milling and business firms. Agriculture was, and continues, to play an important role in the Blue Earth County economy (Blue Earth County 2022).

QUARRYING IN MINNESOTA

While quarrying operations can be found across Minnesota, the resources extracted in these different areas varied by the region. Copper was mined in northeastern Minnesota near Lake Superior, small quantities of gold were recovered in the Vermilion Lake district near the Canadian border, and iron ores were a particularly significant resource extracted along two large belts stretching from northeast to southwest from the northeastern corner of the state known as the Mesabi and Vermilion Iron Ranges. However, in addition to these resources, Minnesota also possesses substantial quantities of various types of building stone such as granite, gneiss, quartzite, sandstone, and limestone, particularly in the southern portion of the state (Upham 1898).

Quarrying for limestone has been an important industry in Minnesota since the earliest period of Euro-American settlement. Limestone quarried from the bluffs in St. Paul was utilized in the construction of Fort Snelling in 1820 – 1821 and in the construction of General Sibley's residence in 1836, the first stone residence built in Minnesota (Upham 1898). Other important areas for limestone quarrying were identified and quarries were opened in Stillwater in 1847, in Mankato in 1853, in Winona in 1854, in Frontenac and Florence in 1855, in Mantorville in 1856, in Red Wing and Kasota in 1865, and near Stockton in 1876. The Mankato quarries, in particular, supplied a large quantity of the limestone utilized for railroad bridge masonry throughout Minnesota and into South Dakota. This same limestone could also be used to make the lime used to produce hydraulic cement, another important building material in the late nineteenth century.

THE MANKATO-AREA STONE INDUSTRY AND LIME TOWNSHIP

Following the arrival of the first Euro-American settlers to Mankato in 1852, development of the settlement progressed rapidly. The cutting and selling of local limestone, a pink to yellow to buff-colored limestone commonly referred to as Kasota or Mankato stone found only in this region, for use in building construction by Mankato's settlers dates back to the beginning of the settlement and, in 1853, George Maxfield established the first formal stone quarry. While Mankato and Kasota are the placenames most associated with the Minnesota Valley's limestone industry, in the second half of the nineteenth century significant quarry operations were also established in Lime, the township situated directly between the two. Among the earliest areas within Blue Earth County to be settled by Euro-Americans, Lime Township was organized in 1858 following a brief period as part of LeSueur County's Kasota Township. The township was transversed by the early Mendota-Big Sioux River Military Road (BE-LIM-00013) that led from the mouth of the Minnesota River at Mendota to the river's bend at Mankato

along the route of today's 3rd Avenue. In 1868, a Mankato-area second quarry was opened by Adam Jefferson, followed in swift succession by several other quarries in Kasota and Lime Township. In addition to serving as a desirable building material, stone from these quarries was integral to the expansion of the railroads across the state as it was utilized heavily for bridge and culvert construction (Pratt 2015).

By the 1880s, the Mankato-Kasota stone quarry industry was booming, and ten different quarries were in operation: J.R. Beatty, J.W. Babcock (Babcock and Wilcox Company in 1889), Frank Fowler, Adam Jefferson, Fred Widell, W.B. Craig, Fowler & Pay, Maxfield and Coughlan, Ring and Tobin, and Arthur McMullen (Pratt 2015; Douglas 2019). These quarries employed hundreds of local workers through the end of the nineteenth century and provided the stone for historically significant bridges and public buildings across Minnesota, including the State Capitol and the Stone Arch Bridge in Minneapolis (*Mankato Free Press* 21 January 1896, 22 January 1916; Bowles 1918; Pratt 2015). However, the development of steel and cement technology reduced the demand for stone (Free Press Printing 1903; Bowles 1918; Pratt 2015). By 1918, only six quarries, including the two located within the APE, remained in operation in the Mankato area: Mankato Limestone & Fuel Co., T.R. Coughlan Co., Fowler & Pay, James McClure, Widell & Co., and the Carney Bricklayer's Cement Co. (**Figure 18**; Bowles 1918). A brief resurgence in sales occurred between 1921 and 1930 when the use of local limestone became popular for architecture. Important historic buildings built of Kasota stone in this period include the Public Library in Rochester and the Harriet Island Pavillion in St. Paul. However, by 1967, only three producing stone quarries remained in the Mankato area and, by the early 2000s, only the Mankato-Kasota Stone Co. and the Vetter Stone Co. remained in business (Pratt 2015).

In addition to stone quarrying, an important secondary business related to the local limestone in Mankato and Lime Township was the production of lime. In fact, the name of the township derives from the lime-making business (Harren 2017; Douglas 2019). Despite the resurgence in the popularity of Kasota Stone in the 1920s and the continued presence of at least a few producing quarries into the present, the lime-making industry continued to steadily decline in the twentieth century and ended by 1939. As a mortar material, Portland cement, developed between 1900 and 1910, had replaced lime. The two largest lime-making operations, T.R. Coughlin Co. and Fowler & Pay, both deactivated their lime kilns by 1925, although they continued to quarry stone. Both companies attempted to revive the industry in the 1930s, but by 1939, production of lime had again ceased. Since this period the majority of the old lime kilns have been destroyed (Aptiz 1985).

THE ARTHUR MCMULLEN QUARRY AND FRED WIDELL

In 1885, Minneapolis builder Arthur McMullen (1854-1926) established a limestone quarry within the western portion of Lime Township between the Mendota-Big Sioux River Road and the Minnesota River, upon the farmland of early Lime settler D. R. Brooks (*Saint Paul Daily Globe* 8 January 1885). McMullen was born in Canada in 1854 but moved as a young man with his family to Minneapolis when he was a child (US Census Bureau 1860). As a young man, McMullen established himself as a contractor in the Twin Cities, founding McMullen & Co. (*Saint Paul Daily Globe* 8 January 1885). McMullen appointed Swedish immigrant Fred Widell, previously the Omaha Road's superintendent of bridge construction and a foreman for the railroad's Lime Township quarry at Bradley Crossing, as the new quarry's superintendent (*Mankato Free Press* 16 March 1894). Widell told the *Mankato Free Press* in early March that "they will construct a side track from the Omaha road into the quarry at once, and they have erected a large boarding house and a blacksmith shop on the grounds," and "that the ledge proves much more valuable than was at first anticipated. Ston[e]s can be got from 8 inches to three feet in thickness and that of the best quality" (*Mankato Free Press* 6 March 1885). While it does not appear that an Omaha Road sidetrack to the McMullen Quarry was constructed at this time, the opening of the Wisconsin Minnesota & Pacific Railroad's Cannon Valley Division two years later would provide direct rail access to the quarry from its diagonal right of way immediately to the southeast (Central Publishing

1895; Schmidt and Pratt 2007). By 1887, a Charles Lardner took over operation of the quarry for McMullen, likely due to Widell starting his own quarrying operation nearby (*The Irish Standard* 22 March 1890). Also in 1887, Arthur McMullen received a major contract from the city of Minneapolis to construct a new bridge over the Mississippi River at 20th Avenue North (today Broadway Avenue) using stone from his Lime quarry, and the following year the McMullen Quarry supplied stone for the construction of Mankato's Blue Earth County Courthouse (*Saint Paul Daily Globe* 22 January 1887; Mankato *Free Press* 30 November 1888). Although it is unclear at what point between 1890 and 1900 the McMullen Quarry ceased operations, in 1900 it was sold to James McClure after having been "shut down for years" (*Minneapolis Journal* 9 May 1900). Sometime around the turn of the century, McMullen relocated to Fairfield, Connecticut, where he lived until his death in 1926 (*Evening Express* 18 August 1926).

Around 1886, Fred Widell departed his position with the McMullen Quarry to pursue his own quarrying business—first leasing two quarries in the area and finally coming to purchase his own quarry in the south of Lime, later referred to as the "Northwestern Quarry," which he would run with business partner John Peterson (*Mankato Free Press* 16 March 1894). By 1888, Widell and Peterson would join Arthur McMullen in providing stone for the County Courthouse, and the following year the quarry was hired to supply the stone for a St. Paul & Duluth Railroad bridge—despite that project's proximity to the established Kettle River Quarry in Sandstone (*Mankato Free Press* 30 November 1888; *Mankato Free Press* 1 March 1889). That same year, with active contracts for both railroad and grain elevator construction Widell's success was such to allow him to buy out Peterson's share of the company (*Mankato Free Press* 30 August 1889). Fred Widell's 1891 profile by Swedish-American newspaper *The North* highlighted not only his self-made accomplishment but also his innovative embrace of cost-saving technology such as steam-powered derricks that enabled him to lower his prices beyond competitors (*The North* 28 January 1891). By 1892, Widell had a total of 300 workers in his employ, distributed between his Northwestern Quarry and various projects in the region (*Mankato Free Press* 3 June 1892). In late 1893, Widell reorganized his business through a new partnership with his brother Gustav as Widell & Co. (*Mankato Free Press* 17 November 1893).

GUSTAV WIDELL AND THE KLONDIKE QUARRY

Fred Widell died following a brief, serious illness in March 1894, and his brother Gustav bought out his estate's share of Widell & Co. by that November (*Mankato Free Press* 16 March 1894; *Mankato Free Press* 30 November 1894). Gustav quickly proved himself to be a shrewd leader of his late brother's quarry business, and Widell & Co. expanded its portfolio of large railroad and infrastructure projects over the next three years, including for the Chicago & North Western, Minneapolis & St. Louis, Chicago Milwaukee & St. Paul, Omaha Road, and the lower dam at St. Anthony Falls in Minneapolis (*Mankato Free Press* 10 April 1894, 30 November 1894, 24 April 1896, 7 May 1897, 15 October 1897). To support his growing array of contracts, Widell operated a total of four quarries by 1896—including three in the Mankato area and one in Morton near St. Cloud (*Mankato Free Press* 24 April 1896). In addition to the original Northwestern Quarry, Widell also controlled two quarries in the Germania Park neighborhood of Mankato proper at this time.

In 1898, Widell purchased a hundred acres to quarry immediately north of the McMullen Quarry on land that since the 1870s had been occupied by the farm of Frank M. Schaefer (Central Publishing 1895; *Mankato Free* Press 15 April 1898, 5 May 1899). That same year, at the height of the Klondike Gold Rush, Widell launched a Mankato-Alaskan Mining and Milling Company side business to pursue gold mining in the Yukon Territory's Klondike Valley (*Mankato Free Press* 22 April 1898). Perhaps in reference to this venture, Widell named his new, "lower" (downriver) Lime quarry the "Klondike Quarry." Consisting of one hundred acres, in its first year the Klondike quarry already boasted 200 workers—equal to Widell's total employment between its four quarries just two years before—as well as rail connections to the nearby Omaha Road and M&StL's Cannon Valley Division. Though Widell would

operate the quarry from the old Schaefer farmhouse on the property, he reported to the *Mankato Free Press* that he "expects to soon erect a fine new office building" (*Mankato Free Press* 5 May 1899). An illustration of the quarry from a 1901 advertisement shows the house with its existing rear extension at the center of the quarry's hive of activity (Widell & Co. 1901).

In 1901, Widell realized his vision for a new office building at the Klondike quarry. Upon its opening that June, the *Free Press* published that "the new office building is picturesquely situated overlooking the quarry on three sides, is built entirely of range stone quarried a few rods from where it stands, and was built by stone masons in the employ of Mr. Widell" (*Mankato Free Press* 21 June 1901). The office building was arranged with a main, public-facing office in its front room, a stenographer's office and vault in the middle room, and Widell's private office in the rear room. So that Widell could personally observe the activities of the quarry from his office, the northwest corner of the building was equipped with a diagonally facing observatory. The building's interiors were clad with red-oak finishes, and Widell's personal office was specially equipped with a rubble-masonry fireplace designed by Widell himself with the words "1901, G. Widell" engraved within the mantel. The *Free Press* extolled that "Mr. Widell will have an office building which will easily equal any in the state" (*Mankato Free Press* 21 June 1901).

Long having served as an alderman for the City of Mankato, Gustav Widell's reputation as both a leading businessman and public figure for the city grew quickly in the early 1900s. As the stone industry ascended in prominence within the state's economy, Widell was appointed to the staff of Minnesota Governor Samuel Rinnah Van Sant by 1902 with the title of "Colonel" (*Mankato Free Press* 30 June 1902). That summer, Col. Widell was elected president of the board of the Mankato Public Library, and after a promotion to General by Gov. Van Sant to General by 1903 Widell became recognized by state Republican leaders as a rising star in the Republican Party and a worthy GOP candidate for secretary of state for 1904 (*Mankato Free Press* 8 August 1902, 13 November 1903). Though Widell would decline to run for the seat, the General would lead the state party's delegation to the 1904 Republican National Convention for the endorsement of then-president Theodore Roosevelt (*Mankato Free Press* 22 January 1904, 18 March 1904).

Amid his growing business and reputation, Gen. Gustav Widell pursued an ambitious new venture in late 1904 to transform Widell & Co. from merely a stone supplier to a full-service bridge engineering and construction firm. Partnering with Chicago's W. H. Finley, a specialist in bridge engineering, the new Widell-Finley Company would remain based in Mankato and intended to quadruple the business of the preceding Widell & Co. (*Mankato Free Press* 23 December 1904). By spring 1905 Widell-Finley was awarded two major contracts by the federal government to oversee massive irrigation engineering projects: one for an irrigation canal in Belle Fourche, South Dakota; and a second for a forty-mile canal near Fort Beauford, Montana (*Mankato Free Press* 28 April 1905, 26 May 1905). That winter, the company also added the design and construction of a major railroad bridge in Sheboygan, Wisconsin to its portfolio (*Mankato Free Press* 15 December 1905).

The three large projects were more than the fledgling Widell-Finley Company could bear, and amid massive cost overruns and engineering challenges at Belle Fourche, the company was forced into bankruptcy by February 1906 (*Mankato Free Press* 16 February 1906). With Widell allegedly considering departing Mankato for Wisconsin following his high-profile business failure, Mankato's business community sought to set up a means for the General to remain in charge of his local quarries (*Mankato Free Press* 2 March 1906). Within weeks, the city's businessmen set up a new company for Widell to lead with State Senator (later Governor) A. O. Eberhart as a business partner. The new company would be loaned adequate funds for it to return to work and would lease the Klondike Quarry until it regained the means to purchase back the land (*Minneapolis Journal* 21 March 1906). Already by April, the Klondike Quarry resumed production as the new Widell Company and was fulfilling contracts for the Chicago & North Western Railway (*Mankato Free Press* 27 April 1906).

In 1910, a fire struck the Klondike quarry facilities, destroying its crusher plant building, screen house, bins, sheds, and trestle. The *Mankato Free Press* reported that the office building "caught fire several times, but was saved by the work of the [work]men. It was a close call, and the men worked hard" (*Mankato Free Press* 6 May 1910). The facilities were reconstructed and repaired promptly, and the quarry and plant returned to production by the end of the month (*Mankato Free Press* 20 May 1910).

THE JAMES MCCLURE QUARRY

In 1900, James McClure (1841-1916) purchased the dormant Arthur McMullen Quarry with the intent of exerting greater control over his access to limestone within his various building efforts (*Mankato Free Press* 11 May 1900). McClure was born in Ireland but immigrated to the US in 1867, where he established himself as a general contractor based out of St. Paul (US Census Bureau 1910). By the time McClure purchased the former McMullen Quarry, he was listed as a railroad, bridge, masonry, and specialty contractor (R.L. Polk & Co. 1904). Few references to McClure following his purchase of the quarry could be located. At some point in the early twentieth century, he founded a contracting company with his son, Jon McClure, called McClure and Son (*Star Tribune* 6 June 1916). Then, in 1913, McClure was sued by Mrs. Carl Leo, the widow of Carl Leo, who was killed while working at the McClure Quarry (*Mankato Free Press* 24 October 1913). The case never made it to trial as Mrs. Carl Leo died in 1915 from a sudden illness (*Mankato Free Press* 15 January 1915). A year later, in 1916, McClure himself died at the age of 74 in his St. Paul home due to heart complications (*Star Tribune* 6 June 1916). After his father's death, John McClure took over the family business and changed the name to McClure Contracting Co. John McClure continued to run McClure Contracting Co. until 1919 (R.L. Polk & Co. 1916).

THE CARNEY CEMENT COMPANY AND SUCCESSORS

By 1920, Widell sold the entire Klondike Quarry property, including the Widell & Co. Office Building, to the Carney Cement Company. Originally founded as the Standard Cement Company and active as a Mankato producer of cement mortar since the 1880s, in 1920 Carney Cement planned to expand the Klondike Quarry's existing crusher plant (rebuilt in 1910) into a major cement plant (*Mankato Free Press* 13 June 1913, 15 October 1920). Though the plant was designed to be "absolutely fire proof," its crusher house and machinery were entirely destroyed in a fire during the plant's construction in 1921 (*Mankato Free Press* 15 October 1920; *Mankato Free Press* 25 March 1921). In April 1923, the plant remained unfinished, with a small section of its lime kilns approaching completion but with the crusher house still apparently on the cusp of reconstruction (*Mankato Free Press* 20 April 1923). With Carney Cement continuing to operate its original West Mankato plant, it is uncertain whether the Klondike cement plant was completed, and the lime kilns appear to retain their unfinished 1923 form as of 2025. However, the Carney Cement Company appears to have continued quarrying operations on the property in supply of the West Mankato plant (*Mankato Free Press* 25 August 1939).

In 1939, the Carney Cement Co.—now renamed the Carney Rockwool Co.--established a new "rockwool" insulation plant at the site of the unfinished cement plant on its Klondike Quarry property (*Mankato Free Press* 25 August 1939). Rather than utilizing the limestone deposits that the quarry had been previously dedicated to, the manufacture of rockwool instead used the layer of shale beneath the "bridge stone" limestone ledge that had previously been treated as waste stone. At its new Lime Township plant, the Carney Rockwool Co. would melt down the shale and steam-blow the molten rock into thin fibers, forming a wool-like "bat" material that could be sold as a durable, fireproof insulation material (*Mankato Free Press* 26 October 1939; Carney 1945). The Carney Rockwool plant constructed in 1939 would consist of a two-story, concrete-block and steel-sided factory flanking the earlier lime kilns and cement plant, the latter of which would be adapted as a warehouse (**Figure 19**; *Mankato Free Press* 25 August 1939). In 1945, the plant added a rock crusher to the quarry in order to resume the processing of limestone for agriculture, railroad ballast, and aggregate (**Figure 20**; *Mankato Free Press* 3 October 1945). The plant's warehouse was destroyed in a 1970 fire and was replaced with the existing

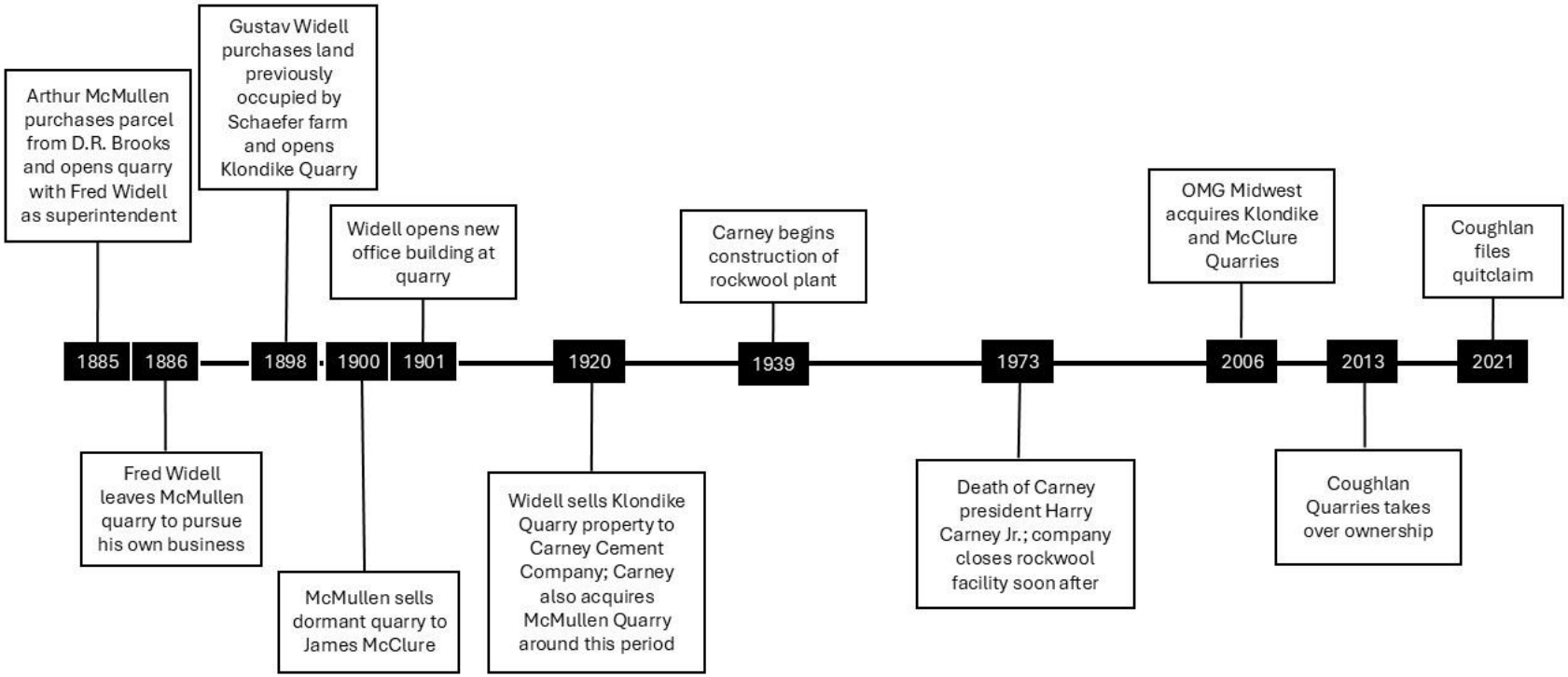
utilitarian metal warehouse that same year (**Figure 21**; *Mankato Free Press* 14 March 1970). The Carney Rockwool plant would continue to produce insulation until its closure in the 1980s (*Mankato* Business 25 March 1977; Pratt 2015).

RECENT HISTORY OF THE QUARRIES SINCE 1980

In the 1980s, the quarries were acquired by Mankato Kasota Stone Inc., a historic Mankato limestone quarrying company operated by the Coughlan family. The former Klondike Quarry continued to operate until Mankato Kasota Stone Inc. and the quarry closed in 2013 (Twin Cities Business 2013). However, that same year the quarry was reopened by Jordan Sands, another Coughlan family business (Krohn 2021). Instead of extracting limestone, Jordan Sands mined the silica sand located under the limestone layers, the sand was used in natural gas and oil fracking.

The company took out a 22-million-dollar loan from Stearns Bank in 2016. In 2020, Jordan Sands defaulted on this loan and was forced to shut down the company. In an attempt to repay some of the loan, the quarry property was listed for sale. However, much of the limestone had already been extracted and what remained was not suitable for use in road construction. An 8-million-dollar offer was approved in 2021, and the property was sold to Holtmeier Construction, Kasota Stone Fabricators, and Pentagon Materials (Krohn 2021). Today, the majority of the quarries are owned by Rockwell Outdoor Adventure Park.

Figure 17: Klondike and McClure Quarries Timeline



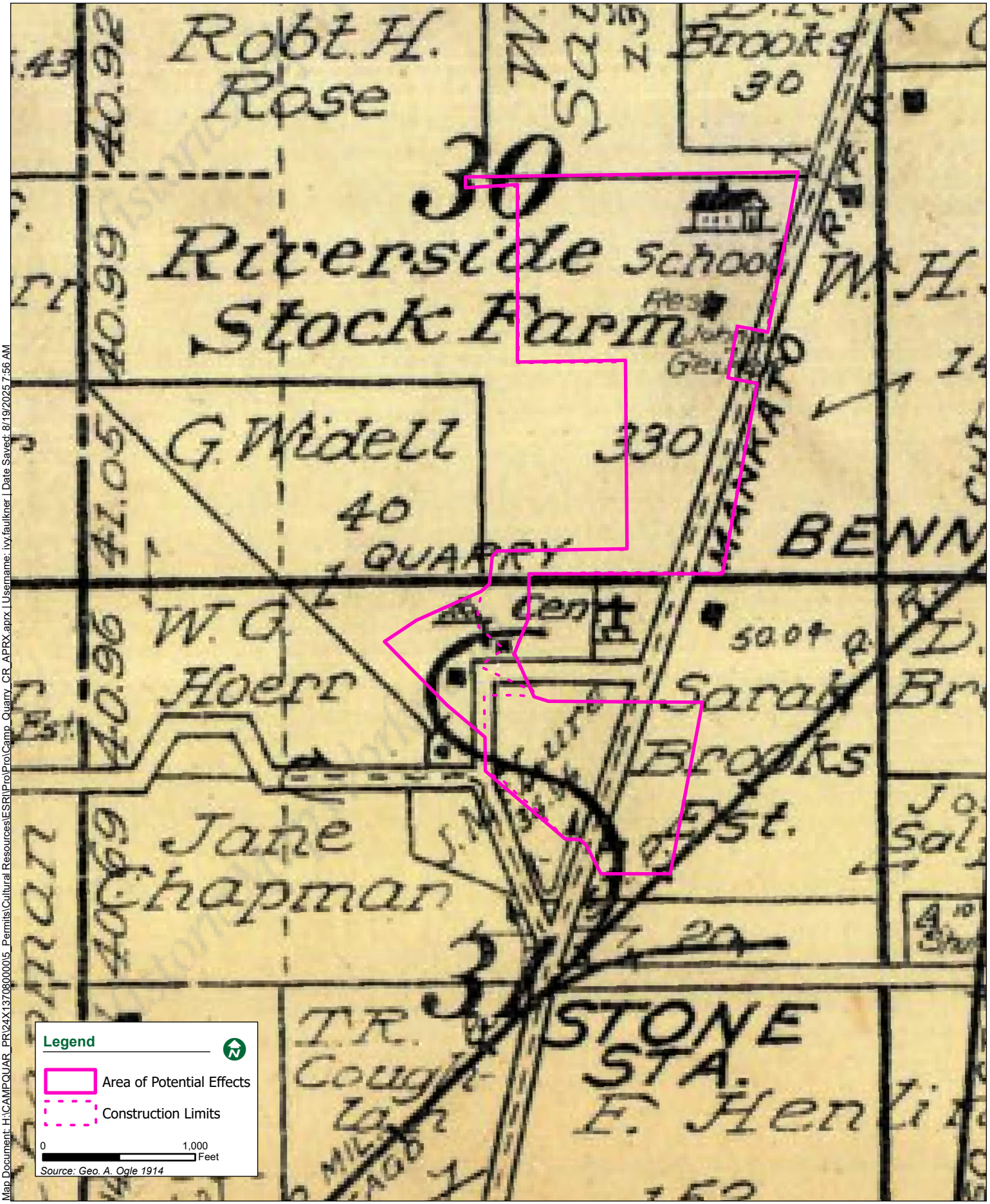


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Figure 19- 1938 Historic Aerial Imagery

September 2025

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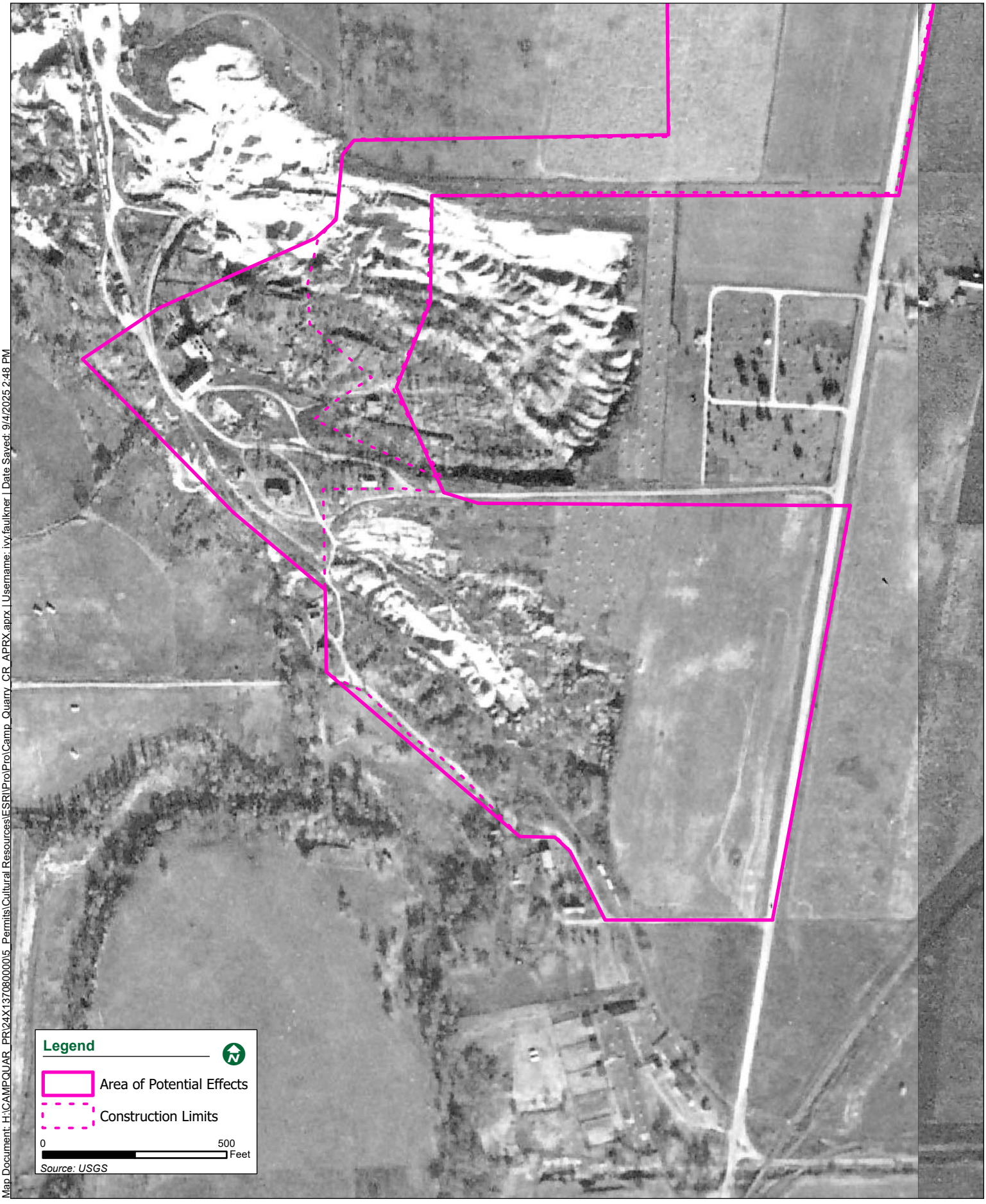

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Figure X- 1950 Historic Aerial Imagery

August 2025

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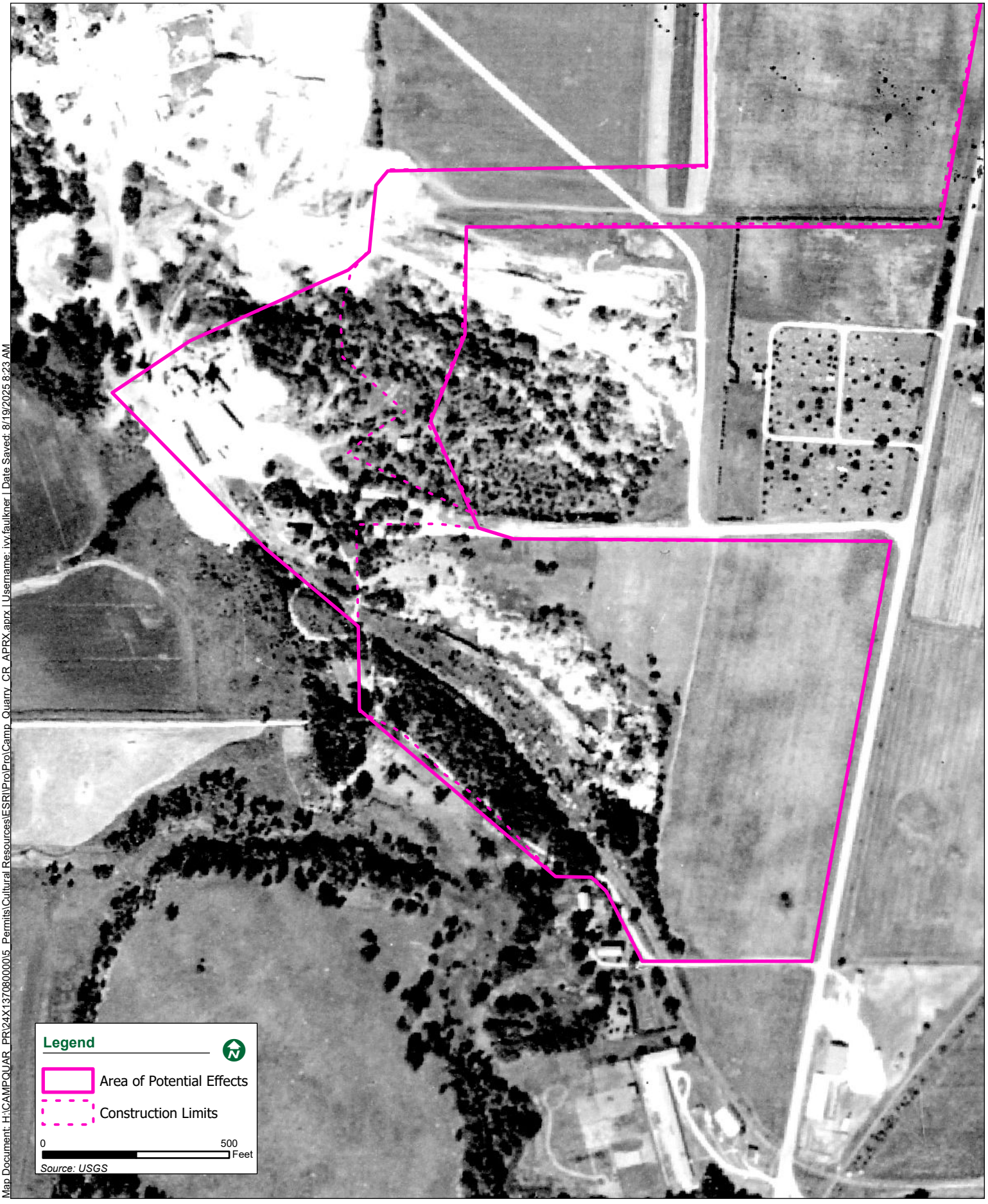

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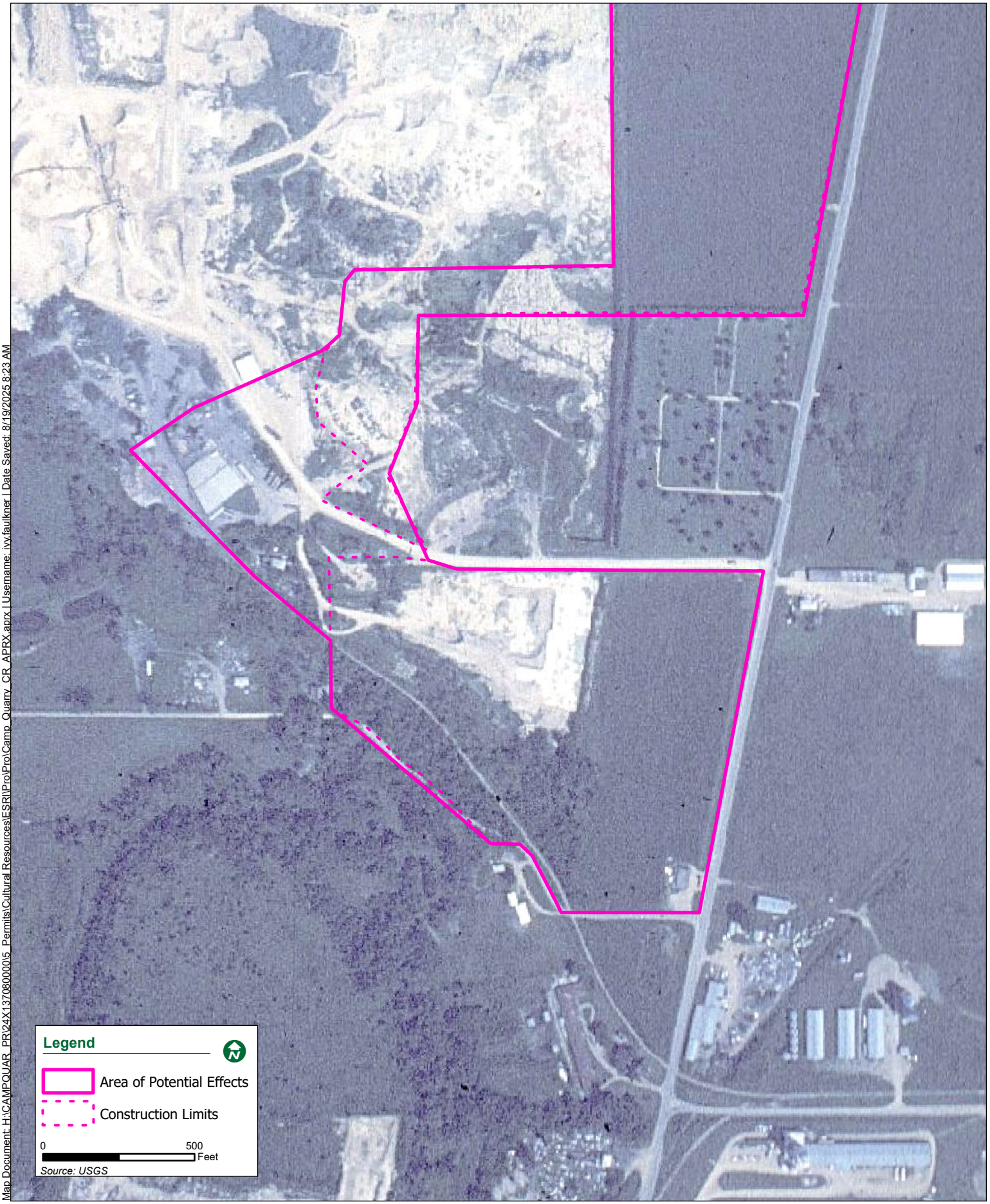

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RESULTS

SUMMARY OF ARCHITECTURE-HISTORY RESOURCES IN APE

Bolton & Menk, Inc. cultural resources staff, led by Ivy Faulkner and Jesse Kling, conducted the architecture-history survey on July 23 & 25, and August 5, 2025. Although the project area has been the subject of previous cultural resources survey, it has been more than 10 years since that survey took place. As a result, new properties have reached historic age and need to be evaluated. Additionally, properties that were previously inventoried were revisited to determine if substantial changes have occurred since the time of the original survey and to confirm any previous eligibility determinations.

PHASE I SURVEY & PHASE II EVALUATION RESULTS

As recommended in the previously completed Phase IA literature review, completed by Bolton & Menk (Faulkner and Spaeth 2025), eight previously inventoried architecture-history properties and one potential historic district located within or adjacent to the APE were revisited (**Table 4**). All revisited properties were subsequently evaluated for NRHP eligibility. Additionally, the potential historic district comprised of several previously inventoried historic properties was fully documented and defined. Archaeological components of this historic district is discussed in a separate archaeological report prepared by Bolton & Menk (Faulkner and Julius 2026). New or updated Minnesota Architecture/History Property Inventory Forms were prepared and submitted to SHPO via MnSHIP for all surveyed properties, which include detailed descriptions and photographs. Property locations are identified on the map included in **Appendix A**. Each property is discussed further below the table. Drafts of individual inventory forms are included as **Appendix B**.

Table 4: Architecture-History Survey Results

SHPO Inventory No.	Property Name	Updated Property Name	Parcel ID	Date Constructed	NRHP Recommendation
BE-LIM-00001	Widell House	Widell & Co. Office Building	R400431200034	1901	Individually Eligible / Contributing
BE-LIM-00002	House	Schaefer-Widell House	R400431100002	c. 1875	Contributing
BE-LIM-00003	Farmstead	Klondike Quarry Farmstead	R400431200034	1899	Contributing
BE-LIM-00005	Lime Kilns	Carney Cement Co. Lime Kilns	R400431100002	1923	Contributing
BE-LIM-00013	Mendota-Big Sioux River Military Road: Lime Section	-	N/A	c. 1850s	Not Eligible
BE-LIM-00047	James McClure Quarry Pit	McMullen-McClure Quarry Pit	R400431200005	1885, 1900	Individually Eligible/ Contributing
BE-LIM-00048	James McClure Quarry Stockpiles	McMullen-McClure Quarry Stockpiles	R400431200005	1885, 1900	Contributing
BE-LIM-00049	James McClure Quarry Railroad Spur	Klondike Quarry Railroad Spur	R400431200005	1898	Contributing
BE-LIM-00051	James McClure Quarry Stockpile Structures	–	R400431200005	c. 1900-1925	Contributing
BE-LIM-00052	James McClure Quarry Historic District	Klondike and McClure Quarries Historic District	R400431100002, R400431200005, & R400431200034	c. 1875-1925	Eligible

Widell & Co. Office Building (BE-LIM-00001)

Narrative Description

The Widell & Co. Office Building is a one-story Queen Anne industrial office building located on 231st Lane in the township of Lime, Blue Earth County, Minnesota. The building faces east toward 3rd Avenue, the north-south county highway that runs one quarter mile to the east and is accessed by a poured concrete driveway that wraps around its south side. The historic portion of the building is clad in locally quarried Kasota limestone coursed, rusticated ashlar masonry, and is topped by a hipped cedar-shake roof. Its front façade is composed of three narrow bays centered upon a large picture window with a decorative leaded transom. The picture window is flanked to its south by the historic main entrance, now infilled with plywood, and to its north by a tall, narrow window currently infilled with a replacement fixed undivided window that is currently broken. The three openings are each capped by rusticated limestone-ashlar lintels set proud of the surrounding masonry walls, and the window openings rise from rusticated limestone sills that are also proud of the surrounding masonry. At the roof, the front elevation features a pedimented gable-on-hip dormer with a glazed entablature consisting of two fixed four-pane wood windows separated by an unfinished wood mullion. The pediment is infilled with alternating fish-scale and diamond cedar shakes. The building rests upon a projecting rusticated limestone watercourse that tops a limestone-block foundation.

The building's north side elevation continues the detailing of the front façade, including three more high, narrow window openings that repeat the expression of the front façade's north window. The northwest corner, however, features a distinctive chamfered projecting ell with window openings on its three sides. The ell is capped by a pedimented gable-on-hip with identical detailing to the front-façade dormer. The building's rear elevation is dominated by a painted concrete-block shed addition with a rear entry on its north side, while the south elevation is consumed by a non-historic, faux-log addition that extends the historic building's cedar-shingle hipped roof massing. The south addition includes a steel-panel side door accessed by a concrete stoop and awning windows, several of which are missing glazing.

Statement of Significance

As a surviving early twentieth-century industrial office building associated with the Mankato area's significant limestone quarrying industry, as well as the headquarters of one of area's most prolific quarry companies, the Widell & Co. Office Building is recommended **eligible** to the National Register of Historic Places under Criterion A in the area of Industry. Although the property is closely associated with Gustav Widell, an important figure in Minnesota's early quarry industry, the significance of the property is primarily expressed through its relationship to the broader quarry industry rather than to Widell as an individual. Therefore, the building is recommended as **not eligible** under Criterion B. Though the building has two non-historic additions dating to 1945, the spare Queen Anne architecture of its historic section continues to be highly legible and representative of the distinctive architectural qualities of the Mankato limestone quarried on the site and used in its construction, and is therefore recommended **eligible** for National Register listing under Criterion C.

The Widell & Co. Office Building conveys its significance through its high level of integrity in location, design, setting, materials, workmanship, feeling, and association. Furthermore, the building is recommended as a **contributing** property to the Klondike and McClure Quarries Historic District (BE-LIM-00052).

Property Photos


Widell & Co. Office Building (BE-LIM-00001), view southwest (7/23/2025)


Widell & Co. Office Building (BE-LIM-00001), view northeast (7/23/2025)


Widell & Co. Office Building (BE-LIM-00001), view northwest (7/23/2025)


Widell & Co. Office Building (BE-LIM-00001), view southeast (7/23/2025)

Schaefer-Widell House (BE-LIM-00002)

Narrative Description

The Schaefer-Widell House is a two-story, Italianate former house and office constructed of Kasota Limestone located southwest of 231st Lane in the township of Lime, Blue Earth County, Minnesota. The house is perched atop a limestone rubble embankment above an unpaved drive to its east that leads from 231st Lane to the former McClure Quarry to the southeast. The front (east) and south elevations are currently concealed within thick overgrowth, while the north and west elevations are exposed by means of a recent (as of July 2025) clearing. The building has a rectangular form consisting of a hip-roofed original front section and a currently un-roofed rear extension that matches the original house in its masonry and fenestration patterns. The front, east-facing elevation is three bays wide, with the main entrance located in the northern bay. The entry's doorway is currently exposed to the elements without a door in place and is topped by a historic wood transom opening that is missing its glazing. The doorway is flanked by two tall window openings to its south that occupy the southern two bays; both are missing their glazed infill but retain their historic wood framing, brick molds, and projecting limestone-block lintels and sills. The second story features three window openings that match the spacing of the first-story openings below; each are likewise missing glazing but retain their historic framing, brick molds, and lintels and sills, which each match the detailing of those at the first-floor window openings. The house's hipped roof is clad in asphalt shingles, and projects over the walls with wide, wood-clad eaves and a thick wood fascia. The house sits on a limestone ashlar foundation.

The north elevation of the house's original section is dominated by an uninterrupted solid limestone masonry wall that spans both stories. Whereas the front elevation is dressed with regular course ashlar masonry, the side elevations implement broken rangework masonry. The rear (west) end of the original

house section features a single bay of window openings at the first and second stories, and the former rear corner of the original house is made legible by its use of larger, more regular ashlars as are used on the front façade. Each of the side and rear window openings, including those on the extension, feature segmental-arched rubble-limestone lintels, along with simple, rectangularly profiled wood brickmolds; none retain window infill. The north elevation of the extension includes a single wrought-iron S-brace near its intersection with the original house section. The west elevation has only one window opening, which is centered at the second story; the opening is missing its lintel and brick molds, with the top of courses of the extension's west and south elevations having collapsed. The south elevation of the original house features two bays of windows, arranged symmetrically toward its corners.

Statement of Significance

Despite being the oldest building within the potential Klondike and McClure Quarries Historic District and the only building on the site to predate the existence of the commercial quarrying operations, the Schaefer-Widell House is recommended as **not individually eligible** for listing on the National Register of Historic Places. Detailed historical documentation could not be located on the property's use as the Schaefer Farmhouse or as a house and office for Widell & Co. Additionally, the absence of its historic farm buildings or landscape detracts from its integrity of setting and association to its early agricultural history although the house does retain a fair level of integrity in these two aspects relative to its subsequent history associated with the Klondike Quarry. Therefore, the house is recommended as **not individually eligible** for the National Register under Criterion A in either the areas of Agriculture or Industry. The house is likewise not associated with a figure of historical importance. Although it briefly served as the temporary office of Gustav Widell, it has a weaker association with Widell than the nearby Widell & Co. Office Building (BE-LIM-00001), and is thus recommended **not eligible** under Criterion B. Furthermore, the house's Italianate design and limestone construction have both been compromised by its current ruined state, and therefore is likewise recommended **not eligible** under Criterion C.

Considered as part of the Klondike and McClure Quarries Historic District, however, the Schaefer-Widell House demonstrates eligibility as a contributing property under National Register Criterion A in the area of Industry. Its association with the related properties in the potential district and the house's early construction using the site's local limestone anticipates the property's later use as a major commercial limestone quarry. The house's adapted use as an administrative center for the Klondike Quarry likewise enforces its historical association with the significant quarrying efforts at Widell & Co.'s Klondike Quarry. Therefore, the Schaefer-Widell House is recommended as **not individually eligible**, but as a **contributing** property to the Klondike and McClure Quarries Historic District (BE-LIM-00052).

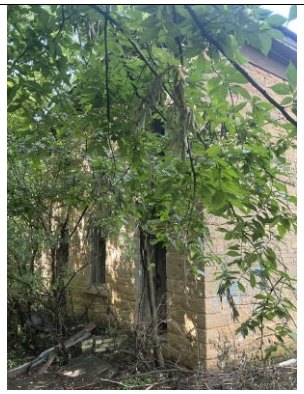
Property Photos



Schaefer-Widell House (BE-LIM-00002), view northeast (8/5/2025)



Schaefer-Widell House (BE-LIM-00002), view southeast (7/23/2025)



Schaefer-Widell House (BE-LIM-00002), view southwest (7/23/2025)



Schaefer-Widell House (BE-LIM-00002), view north (8/5/2025)



Schaefer-Widell House (BE-LIM-00002), east door (8/5/2025)



Schaefer-Widell House (BE-LIM-00002), view south (7/23/2025)



Schaefer-Widell House (BE-LIM-00002), north door (8/5/2025)



Schaefer-Widell House (BE-LIM-00002), view south (7/23/2025)

Klondike Quarry Farmstead (BE-LIM-00003)

Narrative Description

The Klondike Quarry Farmstead is a ruined farmhouse and barn facing the north side of 230th Lane in the township of Lime, Blue Earth County, Minnesota. The farmstead is situated upon an elevated terrace raised above the road to the south and wetland to the west behind limestone rubble retaining walls. Both the farmhouse and barn only have their limestone outer walls surviving, and the ruins are surrounded by wooded overgrowth. The east perimeter of the farmstead site is lined by a limestone rubble retaining wall that braces the slope and former McClure Quarry Stockpiles (BE-LIM-00048) to the east. The farmhouse is oriented parallel to 230th Lane, while the barn is oriented at a slight northeast-southwest angle.

The farmhouse ruin faces east toward the former McClure Quarry Stockpiles and the rest of the former Klondike Quarry property. The house's walls are constructed of rusticated, coursed Kasota limestone

masonry, with window openings featuring single-unit lintels and sills. The front (east) façade features the house's former entrance, whose opening is now collapsed, and a large picture window opening to the south. A broad limestone masonry pier separates the entry bay from the picture window opening. The south elevation facing the road is marked by a projecting bay window at its east end, whose three window openings are divided by narrow limestone piers. An additional window opening is located at the west end, separated from the bay window by a broad undivided limestone pier. The rear, west elevation consists of two bays with a projecting north bay, with only the north bay featuring a window opening. The projecting north bay's south-facing wall features a rear door opening. The house's north side elevation is three window bays wide, with the central bay only occupied by a small, transom-level window opening. Several of the window openings throughout the house are missing their lintels and topping masonry courses. The house rests on a limestone rubble foundation.

North of the farmhouse ruin, the stone barn ruin faces the north side of the farmhouse to its south. The barn uses similar but more roughly coursed limestone masonry as compared to the farmhouse. The barn has a side-gabled configuration with four bays on its south façade, including a doorway (missing its lintel and topping masonry courses) at the second bay from east. Each of the three south-facing window openings are small and irregularly sized; the east and west windows each feature single-unit lintels while the window at the second bay from west is missing the above masonry. The barn's west-side elevation features a prominent, steeply sloped gable with a large window opening centered within. A small opening, partially infilled with wood boards, is located below, at ground level. The west elevation's masonry exhibits roughly detailed repointing that is not present on the barn's other elevations. The north and east elevations are less intact than the south and west elevations, with the northeast corner having fully collapsed.

Statement of Significance

As a secondary, supporting property associated with Widell & Co.'s Klondike Quarry, the Klondike Quarry Farmstead is recommended **not individually eligible** for listing on the National Register of Historic Places. As the home for the quarry's workhorses and teamster, as well as the base for the quarry's supporting agricultural activity, the farmstead is not individually representative of the quarry's historical significance under Criterion A. The farmstead is likewise not associated with a figure of historical importance, and while constructed at the behest of Gustav Widell it has a weaker direct historical association with Widell than the nearby Widell & Co. Office Building (BE-LIM-00001), and **is** thus recommended **not eligible** under Criterion B. Furthermore, the farmhouse and barn's original design and limestone construction have both been compromised by their current ruined state, and therefore are **not individually eligible** under Criterion C.

Considered as part of the Klondike and McClure Quarries Historic District, however, the Klondike Quarry Farmstead does demonstrate eligibility as a contributing property under National Register Criterion A in the area of Industry. As associated with the related properties in the potential district, the farmstead's construction using the site's local limestone directly associates it with the Klondike Quarry. The farmstead's supportive use for the Klondike Quarry's workhorse boarding enforces its historical association with the significant quarrying efforts at Widell & Co.'s Klondike Quarry, an aspect that is reinforced by its masonry construction out of the quarry's own limestone. Therefore, the Klondike Quarry Farmstead is recommended as **not individually eligible**, but as a **contributing** property to the Klondike and McClure Quarries Historic District (BE-LIM-00052).

Property Photos



Klondike Quarry Farmstead (BE-LIM-00003), view southeast of farmhouse (8/5/2025)



Klondike Quarry Farmstead (BE-LIM-00003), view west of farmhouse (8/5/2025)



Klondike Quarry Farmstead, (BE-LIM-00003), detail of barn interior (7/23/2025)



Klondike Quarry Farmstead (BE-LIM-00003), view north of barn (7/23/2025)

Carney Cement Co. Lime Kilns (BE-LIM-00005)

Narrative Description

BE-LIM-00005 is a lime kiln structure located near the west end of 231st Lane in the township of Lime, Blue Earth County, Minnesota. The structure is situated near the terminus of a former railroad spur that accessed the factory and quarries formerly at this site. The former factory, which is currently in ruins and in a state of partial demolition, is adjacent to the kiln structure on its southwest. The clearing northeast of the structure is today used for industrial trailer storage.

Constructed of massive, coursed limestone ashlar masonry, the structure features eight kilns between its northeast and southwest sides that are framed within poured concrete arches. Each kiln is paired on its interior with a kiln on the opposite side of the structure, forming a total of four continuous kiln bays. The kiln interiors are tapered toward the centerline of the structure, where they intersect at shared flues that rise through the structure's roof. The structure rests on a foundation of larger limestone ashlars and is topped with a thick reinforced-concrete coping and flat roof. Steel I-beams project from the spandrels between each bay. The two bays of kilns at the northwest end of the structure are each topped with large, cylindrical brick silos with concrete copings. A steel chute leading from the former factory site directly to the west connects to the structure's north corner, and a thin steel railing lines this end of the roof. Several of the kiln openings are infilled fully or partially with concrete block, and a high, poured-concrete curb lines the base of the northeast side of the structure. Both the northeast elevation, northwest elevation, and roof are heavily overgrown with vegetation including vines and trees.

Statement of Significance

On their own, the Carney Cement Co. Lime Kilns are not representative of the long history of the Carney Company's ownership of the Klondike Quarry property, and as such the kilns are recommended **not individually eligible** for listing on the National Register of Historic Places. Though the kilns were originally constructed as part of a planned cement plant, the absence of associated structures associated with cement production at the site deprives them of integrity of in the areas of Setting or

Association for its early agricultural history. Furthermore, despite the kilns' subsequent adaptation in 1939 as part of the Carney Rockwool factory, the site's poor level of integrity reflecting this era of its history likewise undermines the Carney Cement Co. Lime Kilns' individual eligibility under Criterion A. The kilns are likewise not associated with a figure of historical importance, and are thus recommended **not eligible** under Criterion B. Furthermore, the house's Italianate design and limestone construction have both been compromised by its current ruined state, and therefore is likewise **not individually eligible** under Criterion C.

Considered as part of the Klondike and McClure Quarries Historic District, however, the Carney Cement Co. Lime Kilns demonstrate eligibility as a contributing property under National Register Criterion A in the area of Industry. As associated with the related properties in the potential district, the kilns' construction marks the quarry's transition by the 1920s away from supplying cut limestone and toward supplying concrete, and later, rockwool insulation production in an era when the demand for building stone was declining in favor of concrete. Therefore, the Carney Cement Co. Lime Kilns are recommended as **not individually eligible**, but as a **contributing** property to the Klondike and McClure Quarries Historic District (BE-LIM-00052).

Property Photos



Carney Cement Co. Lime Kilns (BE-LIM-00005), view northeast (7/23/2025)



Carney Cement Co. Lime Kilns (BE-LIM-00005), view south (7/23/2025)



Carney Cement Co. Lime Kilns (BE-LIM-00005), view west (7/23/2025)



Carney Cement Co. Lime Kilns (BE-LIM-00005), view southeast (7/23/2025)

Mendota-Big Sioux River Military Road: Lime Section (BE-LIM-00013)

Narrative Description

The Mendota-Big Sioux River Military Road: Lime Section (BE-LIM-00013) is a portion of the 101-mile historic military road between Mendota and Mankato. This section forms the southern end of the route and begins in Le Sueur County at the junction with MN-99 proceeding south and west along County State Aid Highway (CSAH) 21 into Kasota. At the border with Blue Earth County, the roadway turns south and proceeds along CSAH 5 to the junction with Riverfront Drive in Mankato. This section of the route is described in the original inventory form from 1988 as 11 miles of paved, two-lane roadway with a shoulder that has been resurfaced since it was originally established (Hess 1988).

Current mapping of the Lime Section segment of the route indicates that it is actually a 12-mile segment. A review of historical aerial imagery shows that between 1958 and 1964, the alignment of the northern portion of the Lime Section was shifted and the roadway was paved. The route remains a primarily two-lane bituminous-surfaced roadway with narrow shoulders that passes through rural areas of southern Minnesota. However, the roadway widens to four lanes near the intersection with Industrial Road and continues south to its terminus in Mankato.

Statement of Significance

According to the Minnesota Military Roads, 1850 – 1875 Multiple Property Documentation Form (MPDF), military routes are significant regionally under Criterion A in both the area of Transportation and the area of Politics and Government since "the military roads built by the Corps of Topographical Engineers represent a major phase in the development of Minnesota's transportation infrastructure [and] the federally funded road program also became an important issue in territorial politics" (Hess 1989:F2). However, the Lime Section of the Mendota-Big Sioux River Road does not retain sufficient integrity to demonstrate this significance since the current roadway is no longer unpaved, has had portions of the original route eliminated or realigned, and includes modern intrusions in the form of recent roads and buildings, particularly within the City of Mankato. Therefore, the Mendota-Big Sioux River Road: Lime Section (BE-LIM-00013) is recommended as **not eligible** for inclusion in the National Register. Additionally, as the period of significance for military roads, 1850s – 1870s, predates the Klondike and McClure Quarries, the roadway is recommended as **not contributing** to the Klondike and McClure Quarries Historic District (BE-LIM-00052) and is therefore not included within the district boundaries as defined below.

Property Photos



Lime Section (BE-LIM-00013), view southwest from intersection with MN-99 (Google Streetview July 2024)



Lime Section (BE-LIM-00013), view west from intersection with Golf Course Road (Google Streetview June 2023)



Lime Section (BE-LIM-00013), view south from intersection with Deerhaven Drive (Google Streetview August 2025)



Lime Section (BE-LIM-00013), view northwest from intersection with Riverfront Drive (Google Streetview July 2024)

McMullen-McClure Quarry Pit (BE-LIM-00047)

Narrative Description

The McMullen-McClure Quarry Pit is an open-air quarry pit located halfway between 230th and 231st Lanes in the township of Lime, Blue Earth County, Minnesota. The quarry is long and slender in shape and spans in a southeast-to-northwest orientation, parallel to the former Klondike Quarry Rail Spur (BE-LIM-00049) and James McClure Quarry Stockpiles (BE-LIM-00048) to the southwest. A larger, more recent quarry is located directly to the east, which today is operated as a composting facility and gravel pit. The McClure Quarry is surrounded on three sides by unpaved industrial roadways accessing these facilities. The southwest edge of the quarry is currently lined by a recently deposited series of rock tailings. With a slightly arced, irregular oxbow shape, the quarry pit has sharply delineated, vertically cut limestone rock walls on its southwest edge, and a less discernible, rubble-strewn northeast edge. The quarry is fully filled with water, with approximately six feet of exposed rock wall on the southwest edge and an average of one foot of earth and rock tailings along its northeast edge.

Statement of Significance

As the sole extant limestone quarry in the Mankato area that largely retains its historic early-twentieth-century form, the McMullen-McClure Quarry Pit is recommended **eligible** for the National Register of Historic Places under Criterion A in the area of Industry. Though the quarry pit is directly associated with Arthur McMullen and James McClure, the quarry is less significant for its association with these individuals given that they were based in Minneapolis and St. Paul respectively and only managed the quarry from afar; thus, the quarry pit is recommended **not eligible** under Criterion B. The quarry pit also does not reflect significance in the areas of its design or engineering, and is therefore recommended **not eligible** for National Register listing under Criterion C.

Although, the quarry pit's integrity of setting has been somewhat compromised by more recent quarrying activities adjacent to the east, as well as recently placed rock debris piles that now line the quarry pit to the west, it continues to convey its significance through a high level of integrity of location, design, materials, workmanship, feeling, and association. The site is also recommended as a **contributing property** to the Klondike and McClure Quarries Historic District (BE-LIM-00052).

Property Photos



McMullen-McClure Quarry Pit (BE-LIM-00047), view northwest (7/25/2025)



McMullen-McClure Quarry Pit (BE-LIM-00047), view west of southern end of quarry (7/25/2025)

McMullen-McClure Quarry Stockpiles (BE-LIM-00048)

Narrative Description

The McMullen-McClure Quarry Stockpiles are a contiguous series of high rock tailing stockpiles deposited along a slope lining the northeast side of 230th Lane in the township of Lime, Blue Earth County, Minnesota. The stockpiles are fully forested and consist of a combination of rock and earth debris. Because the stockpiles are located on a strip of land that slopes downward from the Klondike Quarry Rail Spur (BE-LIM-00049) to the northeast to 230th Lane to the southwest, they are most prominent along 230th Lane. Four ruined small stone structures (BE-LIM-00051) are scattered near the east-central area of the stockpiles.

Statement of Significance

As a secondary, supporting property associated with the McMullen-McClure Quarry, the McMullen-McClure Quarry Stockpiles are recommended **not individually eligible** for listing on the National Register of Historic Places. As a deposit for the waste materials resulting from production at the quarry, the stockpiles are not individually representative of the quarry's historical significance under Criterion A. While formed in association with the McMullen-McClure Quarry Pit (BE-LIM-00048), the stockpiles have a weaker direct historical association with either Arthur McMullen or James McClure than the nearby Quarry Pit, and are thus recommended **not eligible** under Criterion B. Furthermore, because the stockpiles are themselves unremarkable in form, they are **not individually eligible u**nder Criterion C.

Considered as part of the Klondike and McClure Quarries Historic District, however, the McMullen-McClure Quarry Stockpiles demonstrate eligibility as a contributing property under National Register Criterion A in the area of Industry. As associated with the related properties in the potential district, the stockpiles are an extant industrial landscape feature formed as a result of the historical quarrying process. Therefore, the McMullen-McClure Quarry Stockpiles are recommended as **not individually eligible**, but as a **contributing** property to the Klondike and McClure Quarries Historic District (BE-LIM-00052).

Property Photos



James McClure Quarry Stockpiles (BE-LIM-00048), view east (7/23/2025)



James McClure Quarry Stockpiles (BE-LIM-00048), view east (8/5/2025)

Minneapolis & St. Louis Railway Company/Chicago St. Paul Minneapolis & Omaha Railway Company/Chicago & North Western Railway Company: Klondike Quarry Spur (BE-LIM-00049)

Narrative Description

The Klondike Quarry Spur is a former railroad spur segment running northwest from the former Chicago, St. Paul, Minneapolis and Omaha Railroad (Omaha Road) mainline in the township of Lime, Blue Earth County, Minnesota. The existing rail segment survives from a point northwest of its former crossing of 230th Lane to the rear of BE-LIM-00002. Most of the rail segment is flanked to its southwest by the former McMullen-McClure Quarry Stockpiles (BE-LIM-00048) and to its northeast by the former McMullen-McClure Quarry Pit (BE-LIM-00047). The length of the segment retains its historic rails, ties, and riprap, all heavily overgrown with vegetation. Near the southeast end of the surviving segment, the tracks are lined by a series of limestone boulders that appear placed to define the right of way's northeast boundary. The northwest end of the segment terminates in a non-historic buffer stop constructed with sheet metal that blocks off the former right of way leading to the former Klondike Quarry and lime kilns (BE-LIM-00005) to the northwest.

Statement of Significance

As a secondary, supporting property associated with the Klondike Quarry, the Klondike Quarry Spur is recommended **not individually eligible** for listing on the National Register of Historic Places. As an abandoned, incomplete railroad spur, the Klondike Quarry Spur is not individually representative of the Klondike Quarry's historical significance under Criterion A. While planned and constructed by Gustav Widell in the service of his Klondike Quarry, the spur has a weaker direct historical association with Widell than the nearby Widell & Co. Office Building, and is thus recommended **not eligible** under Criterion B. Furthermore, because the spur is itself unremarkable in its design and engineering it is **not individually eligible** under Criterion C.

Considered as part of the Klondike and McClure Quarries Historic District, however, the Klondike Quarry Spur does demonstrate eligibility as a contributing property under National Register Criterion A in the area of Industry. As associated with the related properties in the potential district, the spur is an extant feature of quarry infrastructure that directly facilitated the transportation of limestone from the Klondike Quarry. Therefore, the Klondike Quarry Spur is recommended as **not individually eligible**, but as a **contributing** property to the Klondike and McClure Quarries Historic District (BE-LIM-00052).

Property Photos



Klondike Quarry Spur (BE-LIM-00049), view northwest (8/5/2025)



Klondike Quarry Spur (BE-LIM-00049), detail view of rail line (7/25/2025)

James McClure Quarry Stockpile Structures (BE-LIM-00051)

Narrative Description

The James McClure Quarry Stockpile Structures are a series of four small limestone masonry ruins constructed upon the James McClure Quarry Stockpiles (BE-LIM-00048) in the township of Lime, Blue Earth County, Minnesota. One of the structures (Structure 1) is distinguished by its use of regular course limestone masonry, while the other three structures (Structures 2-4) are built of dry rubble masonry. Structure 1 is oriented parallel to the former Klondike Quarry Rail Spur (BE-LIM-00049) and has a single door opening within its perimeter walls that faces northwest towards the former railroad spur. Structures 2-4, meanwhile, are each situated at the peaks of the stockpiles.

Statement of Significance

As secondary, supporting features associated with the McMullen-McClure Quarry, the James McClure Quarry Stockpile Structures are recommended **not individually eligible** for listing on the National Register of Historic Places. As the ruins of small stone structures of unknown purpose that were constructed atop the McMullen-McClure Quarry Stockpiles (BE-LIM-00048), the stockpile structures are not individually representative of the quarry's historical significance under Criterion A. While seemingly constructed in association with the McMullen-McClure Quarry Pit (BE-LIM-00047), the stockpile structures have a weaker direct historical association with either Arthur McMullen or James McClure than the nearby Quarry Pit, and are thus recommended **not eligible** under Criterion B. Furthermore, because the historic design and construction of the stockpile structures cannot be determined, they are **not individually eligible** under Criterion C.

Considered as part of the Klondike and McClure Quarries Historic District, however, the McMullen-McClure Quarry Stockpiles do demonstrate eligibility as a contributing property under National Register Criterion A in the area of Industry. As associated with the related properties in the potential district, the stockpiles are an extant industrial feature that appear to relate to historical activity at the McMullen-McClure Quarry Stockpiles, the McMullen-McClure Quarry Pit, and possibly the adjacent Klondike Spur (BE-LIM-00049). Therefore, the McMullen-McClure Quarry Stockpiles are recommended as **not individually eligible**, but as a **contributing** property to the Klondike and McClure Quarries Historic District (BE-LIM-00052).

Property Photos



James McClure Quarry Stockpile Structures (BE-LIM-00051), Structure 1, view south (7/23/2025)



James McClure Quarry Stockpile Structures (BE-LIM-00051), Structure 3, view southwest (8/5/2025)



James McClure Quarry Stockpile Structures (BE-LIM-00051), Structure 2, view north (8/5/2025)



James McClure Quarry Stockpile Structures (BE-LIM-00051), Structure 4, view southwest (8/5/2025)

Klondike and McClure Quarries Historic District (BE-LIM-00052)

Narrative Description

The potential James McClure Quarry Historic District was identified following a Phase 2 architectural history investigation in the vicinity of the proposed Jordan Sands silica sand mining expansion (BE-LIM-00048) in the township of Lime, Blue Earth County, Minnesota. The proposed historic district encompasses historic properties associated with the James McClure Quarry, which was active at the site between 1900 and the 1920s. The district is 63 acres in area and is trapezoidal in shape, bounded by 3rd Street to the east, an east-west line south of 230th Lane to the south, a north-south line west of the Klondike Quarry Farmstead (BE-LIM-00003) to the west, and an east-west line north of 231st Lane to the north. Historic properties associated with the adjacent Klondike Quarry to the north are also included within these district boundaries, but these properties are non-contributing.

The Klondike and McClure Quarries Historic District encompass the extant resources associated with the historic Klondike-Carney and McMullen-McClure Quarries within Lime Township, Blue Earth County, Minnesota. Though the historic Klondike and Carney quarry pits were located just north of 231st Lane, these areas are excluded from the district due to their loss of integrity from subsequent quarrying and industrial use.

Statement of Significance

According to the 2015 report, the James McClure Quarry Historic District would include three contributing historic properties: the James McClure (McMullen-McClure) Quarry Pit (BE-LIM-00047), the James McClure (McMullen-McClure) Quarry Stockpiles (BE-LIM-00048), and a Railroad Spur (Klondike Quarry Spur; BE-LIM-00049). However, additional research has now identified that the properties associated with the adjacent Klondike Quarry to the north, including the Widell & Co. Office Building (BE-LIM-00001), the Schaefer-Widell House (BE-LIM-00002), the Klondike Quarry Farmstead (BE-LIM-00003), and the Carney Cement Co. Lime Kilns (BE-LIM-00005) not only share the historical context of the James McClure Quarry Historic District but add to the narrative by representing other aspects of the industry's history in Lime Township, ranging from land use prior to quarrying (the Schaefer-Widell House) to quarry administration (the Widell & Co. Office Building) and operation (the Klondike Quarry Farmstead) to the quarries' transition toward supplying a growing concrete industry in the 1920s (the Carney Cement Co. Lime Kilns). Furthermore, the Railroad Spur identified as contributing to the James McClure Quarry Historic District was primarily planned and constructed to serve the Klondike Quarry, and the stone house and barn ruins at BE-LIM-00003 identified as possibly contributing to this historic district were built for the Klondike Quarry.

The Klondike and McClure Quarries Historic District represent a significant cluster of historic properties associated with the nationally renowned limestone quarrying industry of greater Mankato, Minnesota. While quarries procuring "Mankato" or "Kasota" limestone—the distinctive yellow- or pink-hued limestone only found in the Minnesota River Valley—historically lined the east bank of the Minnesota River between the cities of Mankato and Kasota, few of the existing quarries retain either historic integrity or historic structures associated with the quarrying industry. In addition to retaining the McMullen-McClure Quarry Pit (BE-LIM-00047), the Klondike and McClure Quarries Historic District include two additional resources associated with the McMullen-McClure Quarry: the McMullen-McClure Quarry Stockpiles (BE-LIM-00048) and the James McClure Quarry Stockpile Structures (BE-LIM-00051). While the historic Klondike Quarry pit is no longer extant in its historic form and is not included in this district, the Klondike Quarry retains five important associated resources that are included here: the Widell & Co. Office Building (BE-LIM-00001), the Schaefer-Widell House (BE-LIM-00002), the Klondike Quarry Farmstead (BE-LIM-00003), the Carney Cement Co. Lime Kilns (BE-LIM-00005), and the Klondike Quarry Spur (BE-LIM-00049).

Each of the resources included within the district were previously surveyed and inventoried in 2015 ahead of a planned expansion of sand mining in the vicinity, and as a result of this investigation a potential James McClure Quarry Historic District (BE-LIM-00052) was proposed. The newly proposed Klondike and McClure Quarries Historic District encompass all inventoried properties in the James McClure Quarry Historic District with an additional four resources related to the Klondike Quarry to the north. Together, the adjacent Klondike and McClure Quarries reflect the history of the greater Mankato stone industry's most prolific and influential period. The district's period of significance begins with the establishment of the Arthur McMullen Quarry in 1885—both the predecessor to the James McClure Quarry and the introduction of Fred Widell to quarry leadership in the city. Following the substantial growth of the Mankato quarries' stone contracts, fueled by both the city's increasing connectivity with the region's railroad networks and the continuing boom in railroad construction throughout the Upper Midwest, the turn of the twentieth century saw the opening of Widell & Co.'s Klondike Quarry in 1898 and the James McClure Quarry in 1900. A majority of the resources included within the historic district date from this boom period—including the Klondike Quarry Spur (1898), the Klondike Quarry Farmstead (1899), the James McClure Quarry Pit and Stockpiles (1900), and Widell & Co. Office Building (1901)—date from these years. After this heyday period faded by the mid-1910s—marked by the Widell-Finley Company's bankruptcy in 1905—the district's quarries continued steady production for the following decade. The Carney Cement Company's purchase of the Klondike Quarry by 1920 signaled a shift in focus from the quarries supplying limestone block to supplying crushed stone for aggregate and cement

production; the construction of the historic district's last contributing structure, the Carney Cement Co. Lime Kilns (1923), represents this transition.

While Carney Cement does not seem to have completed its ambitious Klondike Quarry cement plant, the company would continue quarry operations at the site to support its growing West Mankato cement plant through the 1920s and 1930s and additionally purchased the James McClure Quarry by 1929. In 1939, Carney Cement renamed itself the Carney Rockwool Company and reoriented its Klondike quarrying focus to the site's shale deposits, which it would blow into "rockwool" insulation at its new plant constructed at the yet-unused limekilns. Rockwool production would continue in the district until the Carney plant's closure in the 1980s, after which the quarries would continue to expand with a focus on gravel and sand extraction.

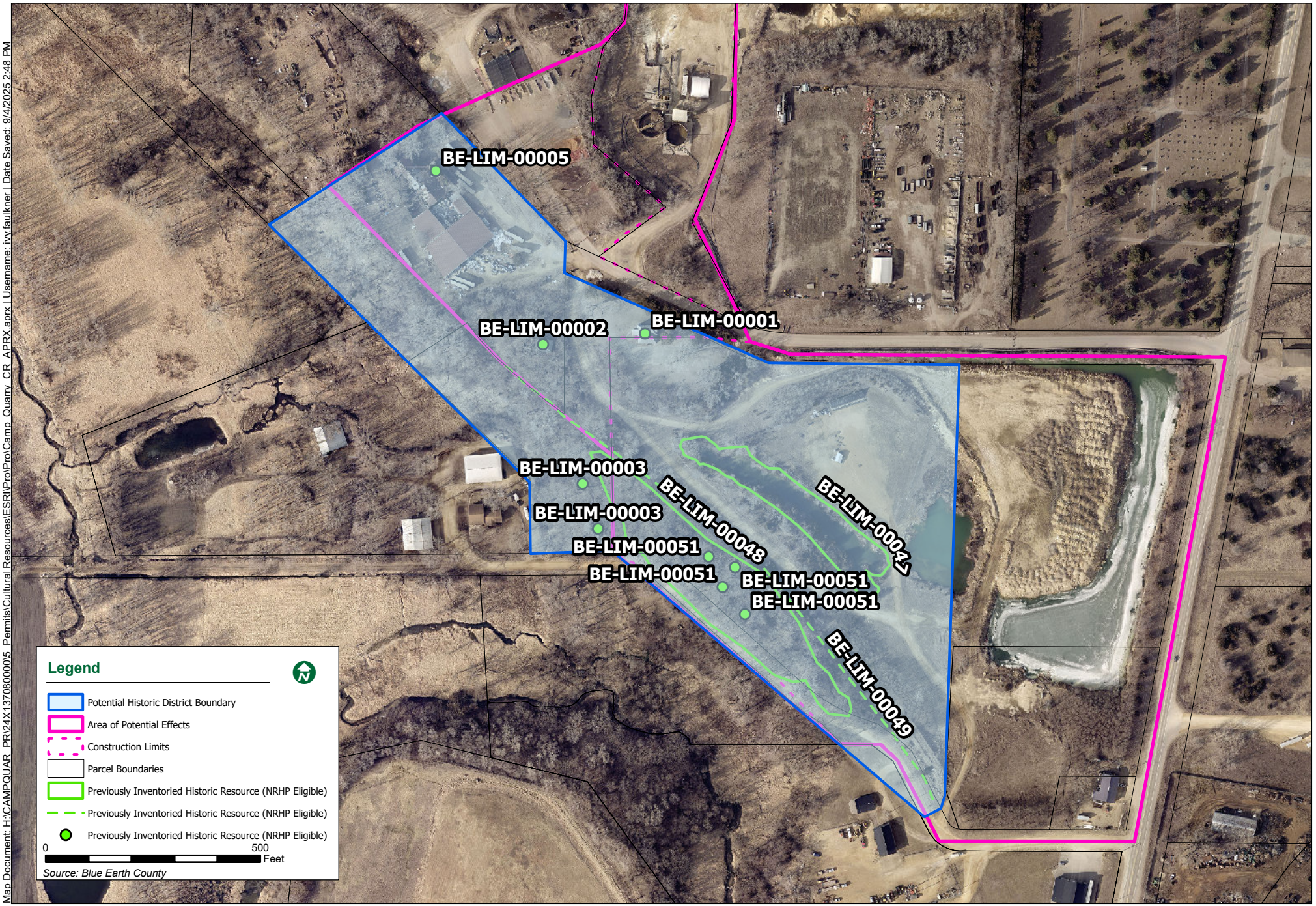
The Klondike and McClure Quarries Historic District is recommended **eligible** under National Register Criterion A in the area of Industry, for its statewide importance in Minnesota's limestone quarrying industry. As two of the leading suppliers of "Mankato" limestone, the Klondike and McMullen-McClure Quarries made themselves the source of stone for bridge, building, and railroad construction throughout the Upper Midwest between the 1880s and 1910s. The district and its contributing resources demonstrate the transformation of the Mankato limestone industry—which remains active to this day—from a local-focused industry to the dominant regional force it would be by the turn of the twentieth century. Amid a waning of demand for building stone in the second half of the 1900s and the 1910s, the Klondike and McClure Quarries would be repositioned as sources of lime and aggregate for concrete production by the 1920s, a shift that was especially marked by their purchases by the Carney Cement Co. between the late 1910s and late 1920s.

Overall, the Klondike and McClure Quarries Historic District is recommended **not eligible** under Criterion B. Though significant figures in the Mankato quarrying industry—most notable Gustav Widell—have strong associations with individual resources within the district (e.g. the Widell & Co. Office Building), the overall district is not united by an association with a single significant historical figure. Though individual resources within the Klondike and McClure Quarries Historic District—including the Widell Co. Office Building (BE-LIM-00001) and the Carney Cement Co. Lime Kilns (BE-LIM-00005) may convey significance under Criterion C, the overall district does not achieve its National Register eligibility for its design or construction. Therefore, the district is recommended as **not eligible** under Criterion C. The potential eligibility of this historic district and its contributing elements as an industrial landscape under Criterion D is discussed in the separate archaeological report prepared by Bolton & Menk (Faulkner and Julius 2026).

The district's recommended period of significance begins in 1885, the date of the McMullen Quarry's opening, and 1925, following the construction of the Carney Cement Co. Lime Kilns and the approximate date of sale of the James McClure Quarry to the Carney Cement Co. This period spans the duration of Gustav Widell and James McClure's ownership of their respective quarries, as well as the subsequent pivot of the quarries away from cut stone production by the 1920s. The Klondike and McClure Quarries Historic District retain all aspects of historical integrity, including location, design, setting, materials, workmanship, feeling, and association.

The proposed boundaries for the Klondike and McClure Quarries Historic District, as depicted in **Figure 22**, begin at a point on the south side of 231st Lane approximately 550 feet west of 3rd Avenue. From this point, the district's north boundary traces the south side of 231st Lane to the terminus of the road's public right-of-way. The boundary then follows the property line of 57063 231st Lane counterclockwise until reaching the west property line of 57032 231st Lane, which it follows southeast and south to the north edge of 230th Lane. From this point, the boundary traces the north side of 231st Lane to the road's northwest corner with the drive leading to the former McClure Quarry property at 57150 230th Lane. The boundary then turns north to meet the starting point on 231st Lane.

Figure 22 - Klondike and McClure Quarries Historic District



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SUMMARY & RECOMMENDATIONS

Bolton & Menk, Inc. cultural resources staff conducted a Phase I reconnaissance survey and Phase II evaluations of architecture-history resources on behalf of CampQuarry, LLC, on July 23 & 25, and August 5, 2025, for the proposed Rockwell RV and Adventure Park. The objective of the Phase I survey and Phase II evaluations, which included literature review and field survey, was to identify historic-age properties within the project area that are or may be eligible for listing in the National Register of Historic Places. Nine previously inventoried architecture-history properties and one potential historic district located within or adjacent to the APE were revisited. All revisited properties were subsequently evaluated for NRHP eligibility. Additionally, the proposed potential historic district comprised of several previously inventoried historic properties was fully documented and defined. Ultimately, six properties within the APE were recommended as **not individually eligible but contributing to the historic district** and two properties were recommended as **individually eligible as well as contributing to the historic district.** The historic district, as a whole, was also recommended as **eligible** and its boundaries were defined to encompass all contributing elements.

Although eligible architecture-history properties, including the Klondike and McClure Quarries Historic District, were identified in the southern portion of the project area, proposed project activities in this area are restricted to the installation of RV camping spots and bike trails. The redevelopment of the area from an industrial mining operation to a campground and outdoor recreational facility will have some effect upon the integrity of setting and feeling, but given the increasing shift from industrial quarrying to residential development of the surrounding parcels over the past several decades, this is not anticipated to have significant adverse impacts on any of the architecture-history resources evaluated as part of this investigation. Additionally, regular maintenance of the campground and outdoor facilities is anticipated to provide additional oversight for the historic district and its contributing elements that will discourage pilfering, graffiti, and other damage. In order to further discourage future adverse impacts, Bolton & Menk also recommends implementing additional measures to discourage future impacts by visitors. This could include, but not limited to, installing signage advising park users of the historical significance of these resources and promoting their continued preservation; stabilizing and preserving historic features within the park; promoting the history of the area and region within the park through events, activities, signage, displays, etc.

Bike trails are proposed to be field-fit to the existing landscape in order to reduce tree and brush removals and will avoid any existing stone structures or ruins and minimize impacts (see **Appendix C**). Additionally, retaining this vegetation and steep slopes will provide screening and discourage inadvertent impacts by camp users to the historic resources. The potential installation of rail cars on the historic railroad spur as a feature of the bike trail may assist in interpreting the story of this historic property, provided no modifications to the railroad spur are needed to install this feature. At the time of this reporting, concept designs for the bike trails at this location involve the installation of wooden ramps over the railroad spur and across the top of the added rail cars, which will assist in preserving the features underneath.

Therefore, based on current project plans, Bolton & Menk recommends a finding of ***no adverse effects to historic properties and no further architecture-history investigations*** for the Rockwell RV & Adventure Park.

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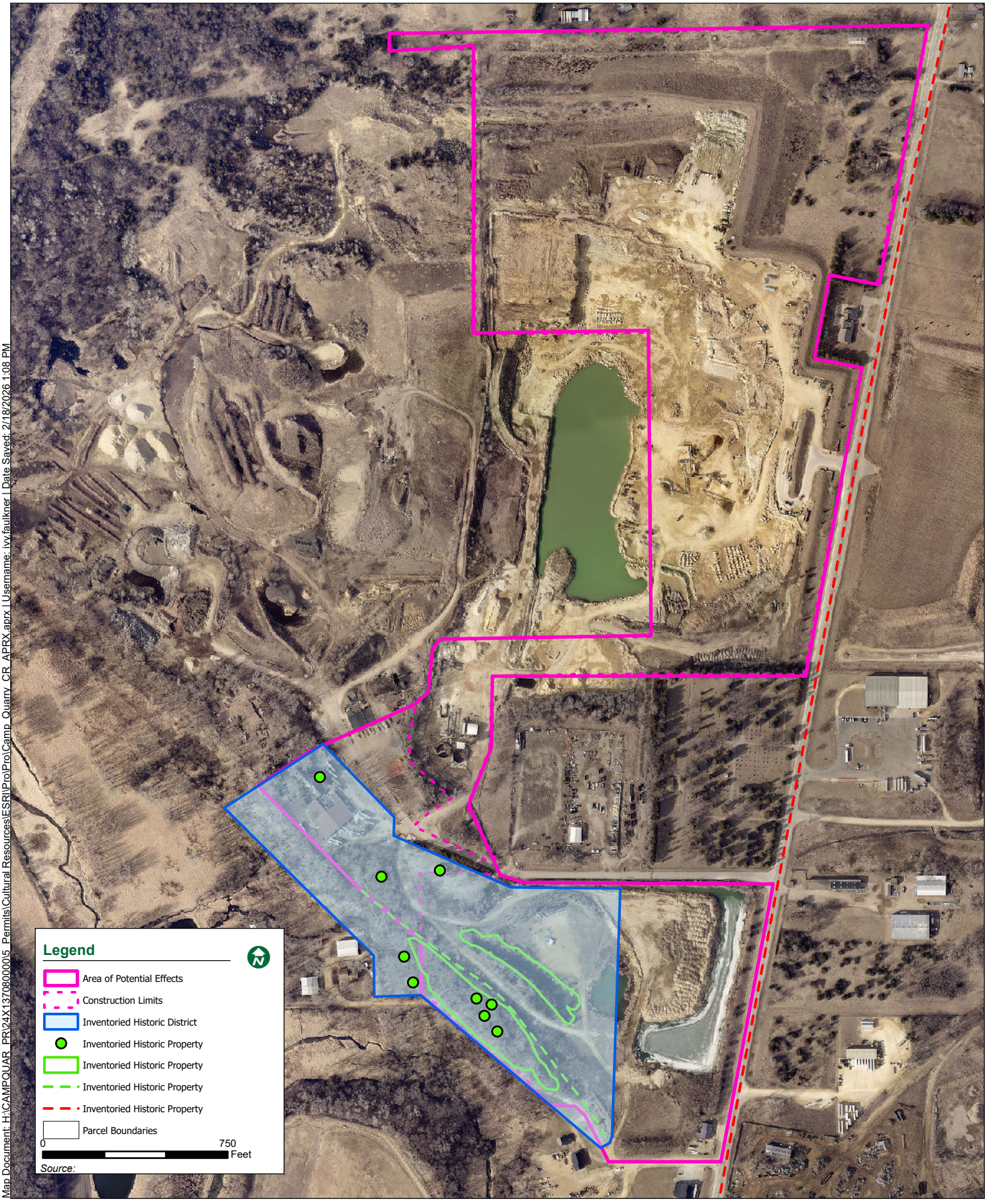
Appendix A: Overview of Inventoried Structures



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Appendix B: Historic Property Inventory Forms

Associated MN Multiple Property Form (Name and Inventory No): Klondike and McClure Quarries Historic District (BE-LIM-00052)

Narrative Description

The Widell & Co. Office Building is a one-story Queen Anne industrial office building located on 231st Lane in the township of Lime, Blue Earth County, Minnesota. The building faces east toward 3rd Avenue, the north-south county highway that runs one quarter mile to the east and is accessed by a poured concrete driveway that wraps around its south side. The historic portion of the building is clad in locally quarried Kasota limestone coursed, rusticated ashlar masonry, and is topped by a hipped cedar-shake roof. Its front façade is composed of three narrow bays centered upon a large picture window with a decorative leaded transom. The picture window is flanked to its south by the historic main entrance, now infilled with plywood, and to its north by a tall, narrow window currently infilled with a replacement fixed undivided window that is currently broken. The three openings are each capped by rusticated limestone-ashlar lintels set proud of the surrounding masonry walls, and the window openings rise from rusticated limestone sills that are also proud of the surrounding masonry. At the roof, the front elevation features a pedimented gable-on-hip dormer with a glazed entablature consisting of two fixed four-pane wood windows separated by an unfinished wood mullion. The pediment is infilled with alternating fish-scale and diamond cedar shakes. The building rests upon a projecting rusticated limestone watercourse that tops a limestone-block foundation.

The building's north side elevation continues the detailing of the front façade, including three more high, narrow window openings that repeat the expression of the front façade's north window. The northwest corner, however, features a distinctive chamfered projecting ell with window openings on its three sides. The ell is capped by a pedimented gable-on-hip with identical detailing to the front-façade dormer. The building's rear elevation is dominated by a painted concrete-block shed addition with a rear entry on its north side, while the south elevation is consumed by a non-historic, faux-log addition that extends the historic building's cedar-shingle hipped roof massing. The south addition includes a steel-panel side door accessed by a concrete stoop and awning windows, several of which are missing glazing.

Statement of Significance

Property History

In 1898, Gustav Widell established a new "lower" quarry north of his company's original "upper quarry," which he named the "Klondike" quarry after the recently discovered gold deposits in the Canadian Yukon. Consisting of one hundred acres, in its first year the Klondike quarry already boasted 200 workers and rail connections to the nearby Omaha and Minneapolis & St. Louis Roads. Though Widell would operate the quarry from the existing Italianate stone house and office on the property, he reported to the *Mankato Free Press* that he "expects to soon erect a fine new office building" (*Mankato Free Press* 5 May 1899).

By 1901, Widell realized his vision for a new office building at the Klondike quarry. Upon its opening that June, the *Free Press* published that "the new office building is picturesquely situated overlooking the quarry on three sides, is built entirely of range stone quarried a few rods from where it stands, and was built by stone masons in the employ of Mr. Widell" (*Mankato Free Press* 21 June 1901). The office building was arranged with a main, public-facing office in its front room, a stenographer's office and vault in the middle room, and Widell's private office in the rear room. So that Widell could personally observe the activities of the quarry from his office, the northwest corner of the building was equipped with a diagonally facing observatory. The building's interiors were clad with red-oak finishes, and Widell's personal office was specially equipped with a rubble-masonry fireplace designed by Widell himself with the words "1901, G. Widell" engraved within the mantel. The *Free*

Press extolled that "Mr. Widell will have an office building which will easily equal any in the state" (*Mankato Free Press* 21 June 1901).

In 1910, a fire struck the Klondike quarry facilities, destroying its crusher plant building, screen house, bins, sheds, and trestle. The *Mankato Free Press* reported that the office building "caught fire several times, but was saved by the work of the [work]men. It was a close call, and the men worked hard" (*Mankato Free Press* 6 May 1910). The facilities were reconstructed and repaired promptly, and the quarry and plant returned to production by the end of the month (*Mankato Free Press* 20 May 1910). By 1920, Widell sold the entire Klondike Quarry property, including the Widell & Co. Office Building, to the Carney Cement Co. Carney Cement would expand the quarry's existing plant into a major cement plant (*Mankato Free Press* 15 October 1920). Though the plant was designed to be "absolutely fire proof," its crusher house and machinery were destroyed in a fire during the plant's construction in 1921 (*Mankato Free Press* 15 October 1920; *Mankato Free Press* 25 March 1921). In April 1923, the plant remained unfinished, with a small section of its lime kilns approaching completion but with the crusher house not yet rebuilt (*Mankato Free Press* 20 April 1923).

Eligibility and Conclusion

As a surviving early twentieth-century industrial office building associated with the Mankato area's significant limestone quarrying industry, as well as the headquarters of one of area's most prolific quarry companies, the Widell & Co. Office Building is recommended **eligible** to the National Register of Historic Places under Criterion A in the area of Industry. Additionally, based on its close association with Gustav Widell, a pivotal historical figure in Minnesota's quarry industry and in the construction of infrastructure throughout the broader region, the building may also be **eligible** under Criterion B. Though the building has two non-historic additions dating to 1945, the spare Queen Anne architecture of its historic section continues to be highly legible and representative of the distinctive architectural qualities of the Mankato limestone quarried on the site and used in its construction, and is therefore recommended **eligible** for National Register listing under Criterion C. However, the property is not shown to be likely to yield information important in prehistory or history and is therefore recommended **not eligible** under Criterion D.

The Widell & Co. Office Building conveys its significance through its high level of integrity in location, design, setting, materials, workmanship, feeling, and association. Furthermore, the building is recommended as a **contributing** property to the potential Klondike and McClure Quarries Historic District (BE-LIM-00052).

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Maps



Associated MN Multiple Property Form (Name and Inventory No): Klondike and McClure Quarries Historic District (BE-LIM-00052)

Photographs



Widell & Co. Office Building (BE-LIM-00001), view southwest (7/23/2025)



Widell & Co. Office Building (BE-LIM-00001), view northeast (7/23/2025)



Widell & Co. Office Building (BE-LIM-00001), view northwest (7/23/2025)



Widell & Co. Office Building (BE-LIM-00001), view southeast (7/23/2025)

Associated MN Multiple Property Form (Name and Inventory No): Klondike and McClure Quarries Historic District (BE-LIM-00052)

Narrative Description

The Schaefer-Widell House is a two-story, Italianate former house and office constructed of Kasota Limestone located southwest of 231st Lane in the township of Lime, Blue Earth County, Minnesota. The house is perched atop a limestone rubble embankment above an unpaved drive to its east that leads from 231st Lane to the former McClure Quarry to the southeast. The front (east) and south elevations are currently concealed within thick overgrowth, while the north and west elevations are exposed by means of a recent (as of July 2025) clearing. The building has a rectangular form consisting of a hip-roofed original front section and a currently un-roofed rear extension that matches the original house in its masonry and fenestration patterns. The front, east-facing elevation is three bays wide, with the main entrance located in the northern bay. The entry's doorway is currently exposed to the elements without a door in place and is topped by a historic wood transom opening that is missing its glazing. The doorway is flanked by two tall window openings to its south that occupy the southern two bays; both are missing their glazed infill but retain their historic wood framing, brick molds, and projecting limestone-block lintels and sills. The second story features three window openings that match the spacing of the first-story openings below; each are likewise missing glazing but retain their historic framing, brick molds, and lintels and sills, which each match the detailing of those at the first-floor window openings. The house's hipped roof is clad in asphalt shingles, and projects over the walls with wide, wood-clad eaves and a thick wood fascia. The house sits on a limestone ashlar foundation.

The north elevation of the house's original section is dominated by an uninterrupted solid limestone masonry wall that spans both stories. Whereas the front elevation is dressed with regular course ashlar masonry, the side elevations implement broken rangework masonry. The rear (west) end of the original house section features a single bay of window openings at the first and second stories, and the former rear corner of the original house is made legible by its use of larger, more regular ashlars as are used on the front façade. Each of the side and rear window openings, including those on the extension, feature segmental-arched rubble-limestone lintels, along with simple, rectangularly profiled wood brickmolds; none retain window infill. The north elevation of the extension includes a single wrought-iron S-brace near its intersection with the original house section. The west elevation has only one window opening, which is centered at the second story; the opening is missing its lintel and brick molds, with the top of courses of the extension's west and south elevations having collapsed. The south elevation of the original house features two bays of windows, arranged symmetrically toward its corners.

Statement of Significance

Property History

Though early documentation of the Schaefer-Widell house is sparse, the house first appears on the earliest available plat map of Lime Township in 1879 as the home of Frank M. Schaefer, a German immigrant farmer. Because the house's location on the 1879 map is at the precise site of the existing house and its Italianate architecture appears consistent with a pre-1880 initial construction date, the house is likely to be the same house Schaefer inhabited in the 1870s. Schaefer first appears as a resident of Lime under the 1875 State Census, at which time he was living with his wife Mary Barbara, a Moravian immigrant, and infant daughter Rosina

(Minnesota Census 1875). By 1880, the Schaefer family also had a son, William M., who was joined by 1885 by siblings Frank, Jr. and Theresa (US Census Bureau 1880; Minnesota Census 1885). Frank M. Schaefer was still recorded as the house's property owner in the 1895 plat map of the township (Central Publishing 1895).

By 1898, the Schaefer farm fell under the control of Widell & Co. to be operated as a limestone quarry (*Mankato Free Press* 15 April 1898). Gustav Widell, the new quarry's proprietor, used the old Schaefer farmhouse as a residence for the quarry's general foreman, his father John G. Widell, as well as a temporary office before a permanent office building would be constructed (*Mankato Free Press* 5 May 1899). An illustration of the quarry from a 1901 advertisement shows the house with its existing rear extension at the center of the quarry's hive of activity; two non-extant outbuildings are also shown to the house's west. The Schaefer-Widell house is striking in the illustration for being dramatically sited upon an elevated terrace that overlooks both the quarry to the north and the railroad spur to the south; a long driveway ascends the south side of the terrace to reach the house (Widell & Co. 1901). In 1910, the quarry's crusher plant, screen house, bins, sheds, and trestle were all destroyed in a fire, but the Schaefer-Widell house was evidently spared (*Mankato Free* Press 6 May 1910). By 1920, the house was sold to the Carney Cement Co. along with the rest of Widell's Klondike Quarry property (*Mankato Free Press* 15 October 1920).

Eligibility and Conclusion

Despite being the oldest building within the potential Klondike and McClure Quarries Historic District and the only building on the site to predate the existence of the commercial quarrying operations, the Schaefer-Widell House is recommended as **not individually eligible** for listing on the National Register of Historic Places. Detailed historical documentation could not be located on the property's use as the Schaefer Farmhouse or as a house and office for Widell & Co. Additionally, the absence of its historic farm buildings or landscape detracts from its integrity of setting and association to its early agricultural history although the house does retain a fair level of integrity in these two aspects relative to its subsequent history associated with the Klondike Quarry. Therefore, the house is recommended as **not individually eligible** for the National Register under Criterion A in either the areas of Agriculture or Industry. The house is likewise not associated with a figure of historical importance. Although it briefly served as the temporary office of Gustav Widell, it has a weaker association with Widell than the nearby Widell & Co. Office Building (BE-LIM-00001), and is thus recommended **not eligible** under Criterion B. Furthermore, the house's Italianate design and limestone construction have both been compromised by its current ruined state, and therefore is likewise recommended **not eligible** under Criterion C.

Considered as part of the potential Klondike and McClure Quarries Historic District, however, the Schaefer-Widell House demonstrates **eligibility as a contributing property** under National Register Criteria A and D. Its association with the related properties in the potential district and the house's early construction using the site's local limestone anticipates the property's later use as a major commercial limestone quarry. The house's adapted use as an administrative center for the Klondike Quarry likewise enforces its historical association with the significant quarrying efforts at Widell & Co.'s Klondike Quarry. Finally, the high level of historical integrity present on the site has potential to yield information regarding the historical use of the house both as a farmhouse and as a quarry residence and office. Therefore, the Schaefer-Widell House is recommended as **not**

individually eligible, but as a **contributing** property to the potential Klondike and McClure Quarries Historic District (BE-LIM-00052).

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Associated MN Multiple Property Form (Name and Inventory No): Klondike and McClure Quarries Historic District (BE-LIM-00052)

Maps



Photographs



John Widell House (BE-LIM-00002), view northeast (8/5/2025)



John Widell House (BE-LIM-00002), view southeast (7/23/2025)



John Widell House (BE-LIM-00002), view southwest (7/23/2025)



John Widell House (BE-LIM-00002), view north (8/5/2025)



John Widell House (BE-LIM-00002), view south (7/23/2025)



John Widell House (BE-LIM-00002), view south (7/23/2025)



John Widell House (BE-LIM-00002), detail of northern door (8/5/2025)



John Widell House (BE-LIM-00002), detail of western door (8/5/2025)

Minnesota Individual Property Inventory Form – Continuation Sheet

Historic Name: Klondike Quarry Farmstead

Inventory No.: BE-LIM-00003

Associated MN Multiple Property Form (Name and Inventory No): Klondike and McClure Quarries Historic District (BE-LIM-00052)

Narrative Description

The Klondike Quarry Farmstead is a ruined farmhouse and barn facing the north side of 230th Lane in the township of Lime, Blue Earth County, Minnesota. The farmstead is situated upon an elevated terrace raised above the road to the south and wetland to the west behind limestone rubble retaining walls. Both the farmhouse and barn only have their limestone outer walls surviving, and the ruins are surrounded by wooded overgrowth. The east perimeter of the farmstead site is lined by a limestone rubble retaining wall that braces the slope and former McClure Quarry Stockpiles (BE-LIM-00048) to the east. The farmhouse is oriented parallel to 230th Lane, while the barn is oriented at a slight northeast-southwest angle.

The farmhouse ruin faces east toward the former McClure Quarry Stockpiles and the rest of the former Klondike Quarry property. The house's walls are constructed of rusticated, coursed Kasota limestone masonry, with window openings featuring single-unit lintels and sills. The front (east) façade features the house's former entrance, whose opening is now collapsed, and a large picture window opening to the south. A broad limestone masonry pier separates the entry bay from the picture window opening. The south elevation facing the road is marked by a projecting bay window at its east end, whose three window openings are divided by narrow limestone piers. An additional window opening is located at the west end, separated from the bay window by a broad undivided limestone pier. The rear, west elevation consists of two bays with a projecting north bay, with only the north bay featuring a window opening. The projecting north bay's south-facing wall features a rear door opening. The house's north side elevation is three window bays wide, with the central bay only occupied by a small, transom-level window opening. Several of the window openings throughout the house are missing their lintels and topping masonry courses. The house rests on a limestone rubble foundation.

North of the farmhouse ruin, the stone barn ruin faces the north side of the farmhouse to its south. The barn uses similar but more roughly coursed limestone masonry as compared to the farmhouse. The barn has a side-gabled configuration with four bays on its south façade, including a doorway (missing its lintel and topping masonry courses) at the second bay from east. Each of the three south-facing window openings are small and irregularly sized; the east and west windows each feature single-unit lintels while the window at the second bay from west is missing the above masonry. The barn's west-side elevation features a prominent, steeply sloped gable with a large window opening centered within. A small opening, partially infilled with wood boards, is located below, at ground level. The west elevation's masonry exhibits roughly detailed repointing that is not present on the barn's other elevations. The north and east elevations are less intact than the south and west elevations, with the northeast corner having fully collapsed.

Statement of Significance

Property History

In 1898, Gustav Widell established a new "lower" quarry north of his company's original "upper quarry," which he named the "Klondike" quarry after the recently discovered gold deposits in the Canadian Yukon. Consisting of one hundred acres, in its first year the Klondike quarry already boasted 200 workers and rail connections to the nearby Omaha and Minneapolis & St. Louis Roads. By the spring of 1899, Widell constructed a modern barn for

the quarry's workhorses. The *Mankato Free Press* extolled that "the barn is a model of its kind, being nearly all stone and iron. The walls and floor are of stone, the oats room is cemented and has sheet iron sides to keep out the mice, and there is every convenience of harness room" (*Mankato Free Press* 5 May 1899). In addition to the barn, the *Free Press* noted that "Widell is building a house of ruble [sic] for his teamster, and is grading up the house and the barn, with a foundation of strippings, to be covered with black dirt" (*Mankato Free Press* 5 May 1899).

Together, the Klondike Quarry's barn and teamster's house constituted a farmstead that not only provided the quarry with necessary horsepower but also serviced Widell's concurrent diversification into agriculture. From the time of the Klondike Quarry's establishment in 1898, the majority of the property was farmed with cash crops as it awaited being "opened up" (*Mankato Fre Press* 5 May 1899). By the time of the September 1899 harvest, the farm was reported by the *Mankato Free Press* to have produced "a yield of 22 bushels of wheat to the acre" (*Mankato Free Press* 15 September 1899). The property's use for wheat growing would be lasting: the first available aerial image of the property, taken in 1938 during a period of inactivity at the quarries, shows the fields east and west of the Klondike Quarry dotted with bundles of wheat (US Department of Agriculture 1938).

The Klondike Farmstead continues to be represented upon the property of "G. Widell" on the 1914 George A. Ogle map of Lime Township (Geo. A. Ogle. 1914). By 1920, the farmstead was shown with the rest of the Klondike Quarry property under the ownership of the Carney Cement Company, though by 1938 the farmstead had been carved out from the Carney Cement property to be joined to the property of James McClure (Allison 1920; W.W. Hixson 1938). In 1955 and 1962, the farmstead appears under the ownership of the Carney Rock Wool Co. (Thomas O. Nelson 1955, 1962).

By the time of the farmstead's initial survey for the State Historic Preservation Office in 1979, the stone barn was already in ruins, though with its outer walls and gables still largely intact. The farmhouse, however, was still fully extant and in use, and featured a Queen Anne design with a large, steep side-gabled shingle roof extending over a recessed front porch, supported by a corner turned porch support (Gimmestad 1979). Aerial imagery indicates that the house was in ruins by 1982, possibly following a fire as evidenced by the red staining present on the existing ruin's interior stonework.

Eligibility and Conclusion

As a secondary, supporting property associated with Widell & Co.'s Klondike Quarry, the Klondike Quarry Farmstead is recommended **not individually eligible** for listing on the National Register of Historic Places. As the home for the quarry's workhorses and teamster, as well as the base for the quarry's supporting agricultural activity, the farmstead is not individually representative of the quarry's historical significance under Criterion A. The farmstead is likewise not associated with a figure of historical importance, and while constructed at the behest of Gustav Widell it has a weaker direct historical association with Widell than the nearby Widell & Co. Office Building (BE-LIM-00001), and **is** thus recommended **not eligible** under Criterion B. Furthermore, the farmhouse and barn's original design and limestone construction have both been compromised by their current ruined state, and therefore are **not individually eligible** under Criterion C. The long-abandoned and largely

untouched status of the site may render it as a source of important information, therefore making it **potentially eligible** under Criterion D, but without individual eligibility under Criteria A, B, and C, this alone would not deem the site eligible for National Register listing.

Considered as part of the potential Klondike and McClure Quarries Historic District, however, the Klondike Quarry Farmstead does demonstrate **eligibility as a contributing property** under National Register Criteria A and D. As associated with the related properties in the potential district, the farmstead's construction using the site's local limestone directly associates it with the Klondike Quarry. The farmstead's supportive use for the Klondike Quarry's workhorse boarding enforces its historical association with the significant quarrying efforts at Widell & Co.'s Klondike Quarry, an aspect that is reinforced by its masonry construction out of the quarry's own limestone. Finally, the largely undisturbed state of the site has potential to yield information regarding the historical use of farmstead as part of the operations of the Klondike Quarry. Therefore, the Klondike Quarry Farmstead is recommended as **not individually eligible**, but as a **contributing** property to the potential Klondike and McClure Quarries Historic District (BE-LIM-00052).

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Maps



Photographs



Klondike Quarry Farmstead (BE-LIM-00003), view southeast of farmhouse (8/5/2025)



Klondike Quarry Farmstead (BE-LIM-00003), view west of farmhouse (8/5/2025)



Klondike Quarry Farmstead (BE-LIM-00003), view north of barn (7/23/2025)



Klondike Quarry Farmstead (BE-LIM-00003), detail of barn interior (7/23/2025)

Associated MN Multiple Property Form (Name and Inventory No): Klondike and McClure Quarries Historic District (BE-LIM-00052)

Narrative Description

BE-LIM-00005 is a lime kiln structure located near the west end of 231st Lane in the township of Lime, Blue Earth County, Minnesota. The structure is situated near the terminus of a former railroad spur that accessed the factory and quarries formerly at this site. The former factory, which is currently in ruins and in a state of partial demolition, is adjacent to the kiln structure on its southwest. The clearing northeast of the structure is today used for industrial trailer storage.

Constructed of massive, coursed limestone ashlar masonry, the structure features eight kilns between its northeast and southwest sides that are framed within poured concrete arches. Each kiln is paired on its interior with a kiln on the opposite side of the structure, forming a total of four continuous kiln bays. The kiln interiors are tapered toward the centerline of the structure, where they intersect at shared flues that rise through the structure's roof. The structure rests on a foundation of larger limestone ashlars and is topped with a thick reinforced-concrete coping and flat roof. Steel I-beams project from the spandrels between each bay. The two bays of kilns at the northwest end of the structure are each topped with large, cylindrical brick silos with concrete copings. A steel chute leading from the former factory site directly to the west connects to the structure's north corner, and a thin steel railing lines this end of the roof. Several of the kiln openings are infilled fully or partially with concrete block, and a high, poured-concrete curb lines the base of the northeast side of the structure. Both the northeast elevation, northwest elevation, and roof are heavily overgrown with vegetation including vines and trees.

Statement of Significance

Property History

By 1920, Widell sold the entire Klondike Quarry property, including the Widell & Co. Office Building, to the Carney Cement Company. Originally founded as the Standard Cement Company and active as a Mankato producer of cement mortar since the 1880s, in 1920 Carney Cement planned to expand the Klondike Quarry's existing crusher plant into a major cement plant (*Mankato Free Press* 13 June 1913, 15 October 1920). Though the plant was designed to be "absolutely fire proof," its crusher house and machinery were entirely destroyed in a fire during the plant's construction in 1921 (*Mankato Free Press* 15 October 1920; *Mankato Free Press* 25 March 1921). In April 1923, the plant remained unfinished, with a small section of its lime kilns approaching completion but with the crusher house still apparently on the cusp of reconstruction (*Mankato Free Press* 20 April 1923). With Carney Cement continuing to operate its original West Mankato plant, it is uncertain whether the Klondike cement plant was completed; however, the company appears to have continued quarrying operations on the property in supply of the West Mankato plant (*Mankato Free Press* 25 August 1939).

In 1939, the Carney Cement Co.—now renamed the Carney Rockwool Co.--established a new "rockwool" insulation plant at the site of the unfinished cement plant on its Klondike Quarry property (*Mankato Free Press* 25 August 1939). Rather than utilizing the limestone deposits that the quarry had been previously dedicated to, the manufacture of rockwool instead used the layer of shale beneath the "bridge stone" limestone ledge that had previously been treated as waste stone. At its new Lime Township plant, the Carney Rockwool Co. would

melt down the shale and steam-blow the molten rock into thin fibers, forming a wool-like "bat" material that could be sold as a durable, fireproof insulation material (*Mankato Free Press* 26 October 1939). The Carney Rockwool plant constructed in 1939 would consist of a two-story, concrete-block and steel-sided factory flanking the earlier lime kilns and cement plant, the latter of which would be adapted as a warehouse (*Mankato Free Press* 25 August 1939). In 1945, the plant added a rock crusher to the quarry in order to resume the processing of limestone for agriculture, railroad ballast, and aggregate (*Mankato Free Press* 3 October 1945). The plant's warehouse was destroyed in a 1970 fire and was replaced with the existing utilitarian metal warehouse that same year (*Mankato Free Press* 14 March 1970). The Carney Rockwool plant would continue to produce insulation until its closure in the 1980s (*Mankato Business* 25 March 1977; Pratt 2015).

Eligibility and Conclusion

On their own, the Carney Cement Co. Lime Kilns are not representative of the long history of the Carney Company's ownership of the Klondike Quarry property, and as such the kilns are recommended **not individually eligible** for listing on the National Register of Historic Places. Though the kilns were originally constructed as part of a planned cement plant, the absence of associated structures associated with cement production at the site deprives them of integrity of in the areas of Setting or Association for its early agricultural history. Furthermore, despite the kilns' subsequent adaptation in 1939 as part of the Carney Rockwool factory, the site's poor level of integrity reflecting this era of its history likewise undermines the Carney Cement Co. Lime Kilns' individual eligibility under Criterion A. The kilns are likewise not associated with a figure of historical importance, and are thus recommended **not eligible** under Criterion B. Furthermore, the house's Italianate design and limestone construction have both been compromised by its current ruined state, and therefore is likewise **not individually eligible** under Criterion C. Finally, the high level of ground disturbance present at the site makes it unlikely to yield information regarding historical industrial use, and therefore **not eligible** under Criterion D.

Considered as part of the potential Klondike and McClure Quarries Historic District, however, the Carney Cement Co. Lime Kilns demonstrate **eligibility as a contributing property** under National Register Criteria A and D. As associated with the related properties in the potential district, the kilns' construction marks the quarry's transition by the 1920s away from supplying cut limestone and toward supplying concrete, and later, rockwool insulation production in an era when the demand for building stone was declining in favor of concrete. Therefore, the Carney Cement Co. Lime Kilns are recommended as **not individually eligible**, but as a **contributing** property to the potential Klondike and McClure Quarries Historic District (BE-LIM-00052).

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Associated MN Multiple Property Form (Name and Inventory No): Klondike and McClure Quarries Historic District (BE-LIM-00052)

Maps



Photographs



Lime Kilns (BE-LIM-00005), view northeast (7/23/2025)



Lime Kilns (BE-LIM-00005), view south (7/23/2025)



Lime Kilns (BE-LIM-00005), view west (7/23/2025)



Lime Kilns (BE-LIM-00005), view southeast (7/23/2025)

Narrative Description

The Mendota-Big Sioux River Military Road: Lime Section (BE-LIM-00013) is a portion of the 101-mile historic military road between Mendota and Mankato. This section forms the southern end of the route and begins in Le Sueur County at the junction with MN-99 proceeding south and west along County State Aid Highway (CSAH) 21 into Kasota. At the border with Blue Earth County, the roadway turns south and proceeds along CSAH 5 to the junction with Riverfront Drive in Mankato. This section of the route is described as 11 miles of paved, two-lane roadway with a shoulder that has been resurfaced since it was originally established (Hess 1988).

Current mapping of the Lime Section segment of the route indicates that it is actually a 12-mile segment. The route remains a primarily two-lane bituminous-surfaced roadway with narrow shoulders that passes through rural areas of southern Minnesota. However, the roadway widens to four lanes near the intersection with Industrial Road and continuing south to its terminus in Mankato.

Statement of Significance

Property History

Construction of the Mendota-Big Sioux River Road began in the 1850s following the Minnesota Road Act of 1850. The route was intended to cover approximately 280 miles, but escalating costs and legislative obstacles resulted in only 96 miles of the route being constructed by 1858 when Minnesota became a state. At this time, military roads came under the jurisdiction of the local townships who lacked the resources to maintain the roads much less continue any construction. Additionally, the 1860s – 1870s witnessed a shift in transportation efforts to railroads, which, by the end of the 1870s, largely replacing many of the former military routes as the primary method for travel and trade through the region (Hess 1989).

Hess (1988) notes that several segments of the original route had been abandoned, in particular a half-mile section within the City of Kasota. A review of historical aerial imagery shows that realignment of the roadway, particular in the northern portion of the segment, occurred between 1958 and 1964. This also appears to have been the period in which the roadway was resurfaced with bituminous pavement.

Eligibility and Conclusion

To evaluate the Lime Section of the Mendota-Big Sioux River Road, the 1989 *Minnesota Military Roads, 1850-1875* Multiple Property Documentation Form (Military Roads MPDF) by Jeffrey A. Hess and the 2016 *Minnesota Trunk Highways (1921-1954): Historic Context and National Register Evaluation and Integrity Considerations* (Trunk Highway Context) by Mead & Hunt were used. Although the Lime Section of the historic military road currently functions primarily as a County State Aid Highway rather than a Trunk Highway, this context still provides relevant guidance for evaluating this type of transportation route in Minnesota.

According to the Trunk Highway Context, roadways are typically not eligible under Criterion B as the "works of road engineers, designers, and artisans are typically recognized under Criterion C, not Criterion B" (Mead & Hunt 2016:68). Additionally, as the construction methods utilized for these routes are well understood and documented, Criterion D is typically not applicable. Therefore, roadways can be eligible under the following Criteria:

- Criterion A: significance is under three broad themes- (1) Transportation: if a road provided a new connection within the state or provided access to something that was previously inaccessible overland, a roadway significantly improved during the Trunk Highway System development, or was a significant

example of a Minnesota Highway Department initiative; (2) Entertainment/Recreation, Agriculture, and Industry: the first roadway to provide access to a recreational area, agricultural market, or provided access to industrial locations; or (3) Politics and Government: as an important example of federal-relief construction (for example during the Great Depression).

- Criterion C, a roadway can be eligible under three broad themes, (1) Engineering: representing an important variation or evolution in the design of a roadway, or the implementation of a standardized design or construction practice; (2) Landscape Architecture: representing high artistic value through the addition of associated features like retaining walls, overlooks, waysides, etc.; (3) Work of a Master: "In rare cases, a Trunk Highway designed by a noted engineer or landscape architect recognized in their respective field that demonstrates an important phase, principle, or aesthetic of their work" (Mead & Hunt 2016:68).

According to the Military Roads MPDF, these roadways may be significant on a regional level under Criterion A in both the area of Transportation and the area of Politics and Government since "the military roads built by the Corps of Topographical Engineers represent a major phase in the development of Minnesota's transportation infrastructure [and] the federally funded road program also became an important issue in territorial politics" (Hess 1989:F2). The period of significance for military roads under Criterion A in the area of Politics and Government "ended in 1857, when federal funding ceased in anticipation of Minnesota's achieving statehood the next year" while the period of significance in the area of Transportation continued "until the 1870s, when they were replaced by railroads" (Hess 1989:F2).

The Military Roads MPDF further identifies the following criteria for evaluating the integrity of historic military road segments:

- Route – must closely conform to the original route of the military road,
- Physical Appearance – should be unpaved, relatively clear and passable, measuring approximately 18 – 33-feet in width,
- Sense of Function or Destination – should be long enough to evoke a sense of destination,
- Setting - should generally be in a rural area with no modern intrusions such as recent roads or buildings,
- Other Associational Qualities – may possess some other quality which associates the segment with the historic road, such as a place name (Hess 1989).

Based on the guidelines outlined above, the Lime Section of the Mendota-Big Sioux River Road, although significant under Criterion A as a segment of a historic military route, does not retain sufficient integrity to demonstrate this significance. The current roadway is no longer unpaved, has had portions of the original route eliminated or realigned, and includes modern intrusions in the form of recent roads and buildings, particularly within the City of Mankato. Therefore, the Mendota-Big Sioux River Road: Lime Section (BE-LIM-00013) is recommended as ***not eligible*** for inclusion in the National Register.

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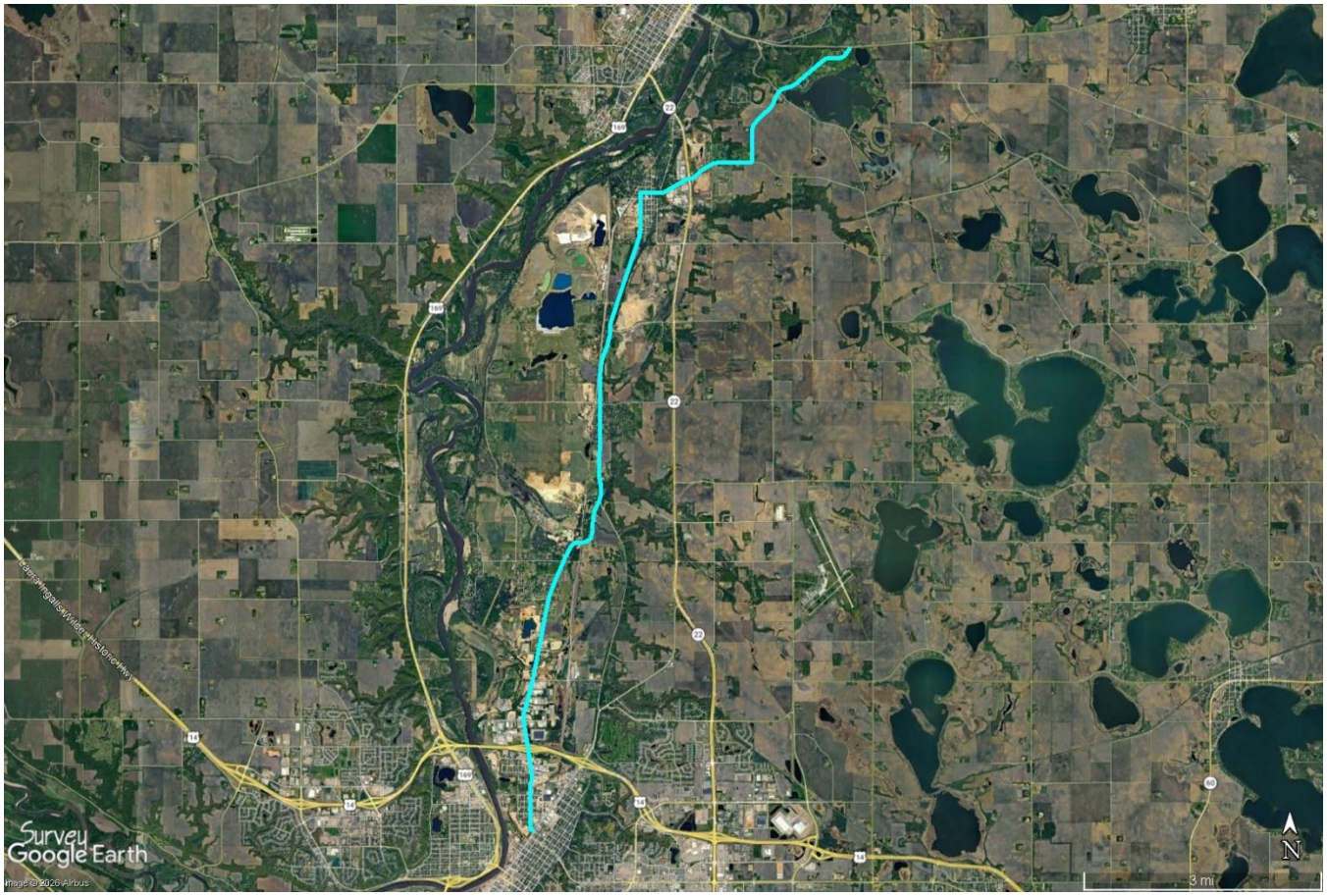
Maps

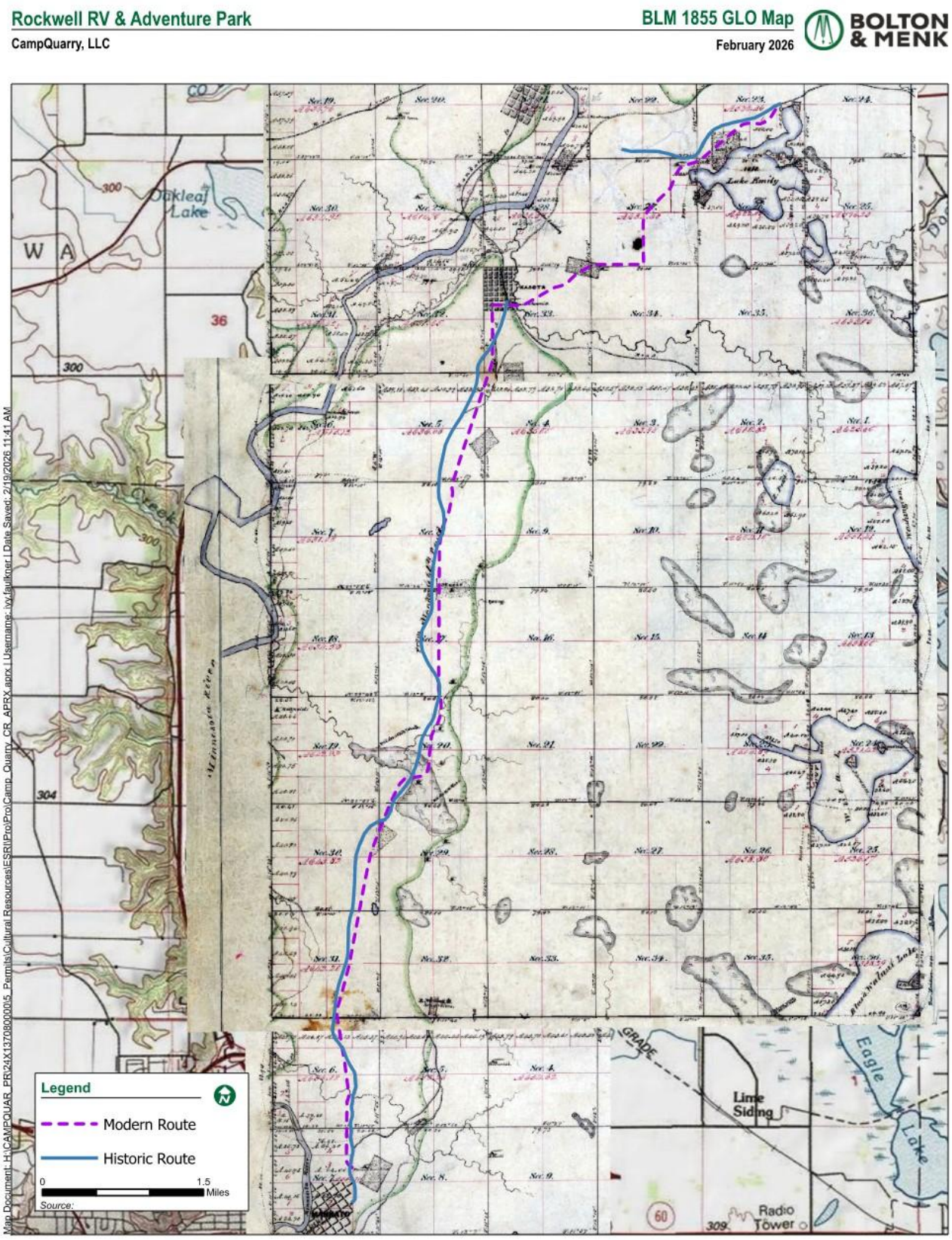


Minnesota Individual Property Inventory Form – Continuation Sheet

Historic Name: Mendota-Big Sioux River Road: Lime Section

Inventory No.: BE-LIM-00013

Associated MN Multiple Property Form (Name and Inventory No):



Photographs



Lime Section (BE-LIM-00013), view southwest from intersection with MN-99 (Google Streetview July 2024)



Lime Section (BE-LIM-00013), view west from intersection with Golf Course Road (Google Streetview June 2023)



Lime Section (BE-LIM-00013), view east from intersection with N Ridgely Street in Kasota (Google Streetview August 2025)



Lime Section (BE-LIM-00013), view north from intersection with 468th Street (Google Streetview August 2025)



Lime Section (BE-LIM-00013), view south from intersection with Deerhaven Drive (Google Streetview August 2025)



Lime Section (BE-LIM-00013), view north from intersection with Industrial Road (Google Streetview August 2025)

Associated MN Multiple Property Form (Name and Inventory No):



Lime Section (BE-LIM-00013), view northwest from intersection with Riverfront Drive (Google Streetview July 2024)

Associated MN Multiple Property Form (Name and Inventory No): Klondike and McClure Quarries Historic District (BE-LIM-00052)

Narrative Description

The McMullen-McClure Quarry Pit is an open-air quarry pit located halfway between 230th and 231st Lanes in the township of Lime, Blue Earth County, Minnesota. The quarry is long and slender in shape and spans in a southeast-to-northwest orientation, parallel to the former Klondike Quarry Rail Spur (BE-LIM-00049) and James McClure Quarry Stockpiles (BE-LIM-00048) to the southwest. A larger, more recent quarry is located directly to the east, which today is operated as a composting facility and gravel pit. The McClure Quarry is surrounded on three sides by unpaved industrial roadways accessing these facilities. The southwest edge of the quarry is currently lined by a recently deposited series of rock tailings. With a slightly arced, irregular oxbow shape, the quarry pit has sharply delineated, vertically cut limestone rock walls on its southwest edge, and a less discernible, rubble-strewn northeast edge. The quarry is fully filled with water, with approximately six feet of exposed rock wall on the southwest edge and an average of one foot of earth and rock tailings along its northeast edge.

Statement of Significance

Property History

In 1885, Minneapolis builder Arthur McMullen (1854-1926) established a limestone quarry within the western portion of Lime Township between the Mendota-Big Sioux River Road and the Minnesota River, upon the farmland of early Lime settler D. R. Brooks (*Saint Paul Daily Globe* 8 January 1885). McMullen was born in Canada in 1854 but moved as a young man with his family to Minneapolis when he was a child (US Census Bureau 1860). As a young man, McMullen established himself as a contractor in the Twin Cities, founding McMullen & Co. (*Saint Paul Daily Globe* 8 January 1885). McMullen appointed Swedish immigrant Fred Widell, previously the Omaha Road's superintendent of bridge construction and a foreman for the railroad's Lime Township quarry at Bradley Crossing, as the new quarry's superintendent (*Mankato Free Press* 16 March 1894). Widell told the *Mankato Free Press* in early March that "they will construct a side track from the Omaha road into the quarry at once, and they have erected a large boarding house and a blacksmith shop on the grounds," and "that the ledge proves much more valuable than was at first anticipated. Ston[e]s can be got from 8 inches to three feet in thickness and that of the best quality" (*Mankato Free Press* 6 March 1885). While it does not appear that an Omaha Road sidetrack to the McMullen Quarry was constructed at this time, the opening of the Wisconsin Minnesota & Pacific Railroad's Cannon Valley Division two years later would provide direct rail access to the quarry from its diagonal right of way immediately to the southeast (Central Publishing 1895; Schmidt and Pratt 2007). By 1887, a Charles Lardner took over operation of the quarry for McMullen, likely due to Widell starting his own quarrying operation nearby (*The Irish Standard* 22 March 1890). Also in 1887, Arthur McMullen received a major contract from the city of Minneapolis to construct a new bridge over the Mississippi River at 20th Avenue North (today Broadway Avenue) using stone from his Lime quarry, and the following year the McMullen Quarry supplied stone for the construction of Mankato's Blue Earth County Courthouse (*Saint Paul Daily Globe* 22 January 1887; Mankato *Free Press* 30 November 1888). Although it is unclear at what point between 1890 and 1900 the McMullen Quarry ceased operations, in 1900 it was sold to James McClure after

having been "shut down for years" (*Minneapolis Journal* 9 May 1900). Sometime around the turn of the century, McMullen relocated to Fairfield, Connecticut, where he lived until his death in 1926 (*Evening Express* 18 August 1926).

In 1900, James McClure (1841-1916) purchased the dormant Arthur McMullen Quarry with the intent of exerting greater control over his access to limestone within his various building efforts (*Mankato Free Press* 11 May 1900). McClure was born in Ireland but immigrated to the US in 1867, where he established himself as a general contractor based out of St. Paul (US Census Bureau 1910). By the time McClure purchased the former McMullen Quarry, he was listed as a railroad, bridge, masonry, and specialty contractor (R.L. Polk & Co. 1904). Few references to McClure following his purchase of the quarry could be located. At some point in the early twentieth century, he founded a contracting company with his son, Jon McClure, called McClure and Son (*Star Tribune* 6 June 1916). Then, in 1913, McClure was sued by Mrs. Carl Leo, the widow of Carl Leo, who was killed while working at the McClure Quarry (*Mankato Free Press* 24 October 1913). The case never made it to trial as Mrs. Carl Leo died in 1915 from a sudden illness (*Mankato Free Press* 15 January 1915). A year later, in 1916, McClure himself died at the age of 74 in his St. Paul home due to heart complications (*Star Tribune* 6 June 1916). After his father's death, John McClure took over the family business and changed the name to McClure Contracting Co. John McClure continued to run McClure Contracting Co. until 1919 (R.L. Polk & Co. 1916). The quarry appears to have remained largely dormant since this period, although property ownership has changed hands several times.

Eligibility and Conclusion

As the sole extant limestone quarry in the Mankato area that largely retains its historic early-twentieth-century form, the McMullen-McClure Quarry Pit is recommended **eligible** for the National Register of Historic Places under Criterion A in the area of Industry. Though the quarry pit is directly associated with Arthur McMullen and James McClure, the quarry is less significant for its association with these individuals given that they were based in Minneapolis and St. Paul respectively and only managed the quarry from afar; thus, the quarry pit is recommended **not eligible** under Criterion B. The quarry pit also does not reflect significance in the areas of its design or engineering, and is therefore recommended **not eligible** for National Register listing under Criterion C. Because of the high level of ground disturbance at and around the quarry pit, the property is not shown to be likely to yield information important in prehistory or history and is therefore recommended **not eligible** under Criterion D for Information Potential.

Although, the quarry pit's integrity of setting has been somewhat compromised by more recent quarrying activities adjacent to the east, as well as recently placed rock debris piles that now line the quarry pit to the west, it continues to convey its significance through a high level of integrity of location, design, materials, workmanship, feeling, and association. The site is also recommended as a **contributing property** to the potential Klondike and McClure Quarries Historic District (BE-LIM-00052).

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Maps



Photographs



McMullen-McClure Quarry Pit (BE-LIM-00047), view northwest (7/25/2025)



McMullen-McClure Quarry Pit (BE-LIM-00047), view west of southern end of quarry (7/25/2025)

Minnesota Individual Property Inventory Form – Continuation Sheet

Historic Name: McMullen-McClure Quarry Stockpiles

Inventory No.: BE-LIM-00048

Associated MN Multiple Property Form (Name and Inventory No): Klondike and McClure Quarries Historic District (BE-LIM-00052)

Narrative Description

The McMullen-McClure Quarry Stockpiles are a contiguous series of high rock tailing stockpiles deposited along a slope lining the northeast side of 230th Lane in the township of Lime, Blue Earth County, Minnesota. The stockpiles are fully forested and consist of a combination of rock and earth debris. Because the stockpiles are located on a strip of land that slopes downward from the Klondike Quarry Rail Spur (BE-LIM-00049) to the northeast to 230th Lane to the southwest, they are most prominent along 230th Lane. Four ruined small stone structures (BE-LIM-00051) are scattered near the east-central area of the stockpiles.

Statement of Significance

Property History

In 1885, Minneapolis builder Arthur McMullen (1854-1926) established a limestone quarry within the western portion of Lime Township between the Mendota-Big Sioux River Road and the Minnesota River, upon the farmland of early Lime settler D. R. Brooks (*Saint Paul Daily Globe* 8 January 1885). McMullen was born in Canada in 1854 but moved as a young man with his family to Minneapolis when he was a child (US Census Bureau 1860). As a young man, McMullen established himself as a contractor in the Twin Cities, founding McMullen & Co. (*Saint Paul Daily Globe* 8 January 1885). McMullen appointed Swedish immigrant Fred Widell, previously the Omaha Road's superintendent of bridge construction and a foreman for the railroad's Lime Township quarry at Bradley Crossing, as the new quarry's superintendent (*Mankato Free Press* 16 March 1894). Widell told the *Mankato Free Press* in early March that "they will construct a side track from the Omaha road into the quarry at once, and they have erected a large boarding house and a blacksmith shop on the grounds," and "that the ledge proves much more valuable than was at first anticipated. Ston[e]s can be got from 8 inches to three feet in thickness and that of the best quality" (*Mankato Free Press* 6 March 1885). While it does not appear that an Omaha Road sidetrack to the McMullen Quarry was constructed at this time, the opening of the Wisconsin Minnesota & Pacific Railroad's Cannon Valley Division two years later would provide direct rail access to the quarry from its diagonal right of way immediately to the southeast (Central Publishing 1895; Schmidt and Pratt 2007). By 1887, a Charles Lardner took over operation of the quarry for McMullen, likely due to Widell starting his own quarrying operation nearby (*The Irish Standard* 22 March 1890). Also in 1887, Arthur McMullen received a major contract from the city of Minneapolis to construct a new bridge over the Mississippi River at 20th Avenue North (today Broadway Avenue) using stone from his Lime quarry, and the following year the McMullen Quarry supplied stone for the construction of Mankato's Blue Earth County Courthouse (*Saint Paul Daily Globe* 22 January 1887; Mankato *Free Press* 30 November 1888). Although it is unclear at what point between 1890 and 1900 the McMullen Quarry ceased operations, in 1900 it was sold to James McClure after having been "shut down for years" (*Minneapolis Journal* 9 May 1900). Sometime around the turn of the century, McMullen relocated to Fairfield, Connecticut, where he lived until his death in 1926 (*Evening Express* 18 August 1926).

In 1900, James McClure (1841-1916) purchased the dormant Arthur McMullen Quarry with the intent of exerting greater control over his access to limestone within his various building efforts (*Mankato Free Press* 11 May 1900). McClure was born in Ireland but immigrated to the US in 1867, where he established himself as a general contractor based out of St. Paul (US Census Bureau 1910). By the time McClure purchased the former McMullen Quarry, he was listed as a railroad, bridge, masonry, and specialty contractor (R.L. Polk & Co. 1904). Few references to McClure following his purchase of the quarry could be located. At some point in the early twentieth century, he founded a contracting company with his son, Jon McClure, called McClure and Son (*Star Tribune* 6 June 1916). Then, in 1913, McClure was sued by Mrs. Carl Leo, the widow of Carl Leo, who was killed while working at the McClure Quarry (*Mankato Free Press* 24 October 1913). The case never made it to trial as Mrs. Carl Leo died in 1915 from a sudden illness (*Mankato Free Press* 15 January 1915). A year later, in 1916, McClure himself died at the age of 74 in his St. Paul home due to heart complications (*Star Tribune* 6 June 1916). After his father's death, John McClure took over the family business and changed the name to McClure Contracting Co. John McClure continued to run McClure Contracting Co. until 1919 (R.L. Polk & Co. 1916).

The McMullen-McClure Quarry Stockpiles appear to be the deposits of discarded rock that was removed during the course of quarrying activity at the McMullen-McClure Quarry. Based on the stockpiles' mound-like forms, their stones appear to have been deposited from above, likely using a derrick system. In their existing form the stockpiles are most reflective of quarrying activity in the James McClure era of ownership, with any McMullen-era activity likely to be reflected by non-visible substrata.

Eligibility and Conclusion

As a secondary, supporting property associated with the McMullen-McClure Quarry, the McMullen-McClure Quarry Stockpiles are recommended **not individually eligible** for listing on the National Register of Historic Places. As a deposit for the waste materials resulting from production at the quarry, the stockpiles are not individually representative of the quarry's historical significance under Criterion A. While formed in association with the McMullen-McClure Quarry Pit (BE-LIM-00048), the stockpiles have a weaker direct historical association with either Arthur McMullen or James McClure than the nearby Quarry Pit, and are thus recommended **not eligible** under Criterion B. Furthermore, because the stockpiles are themselves unremarkable in form, they are **not individually eligible u**nder Criterion C. The long-abandoned and largely untouched status of the site may render it as a source of potential information and therefore **potentially eligible** under Criterion D, but without individual eligibility under Criteria A, B, and C, this alone would not deem the site eligible for National Register listing.

Considered as part of the potential Klondike and McClure Quarries Historic District, however, the McMullen-McClure Quarry Stockpiles demonstrate **eligibility as a contributing property** under National Register Criteria A and D. As associated with the related properties in the potential district, the stockpiles are an extant industrial landscape feature formed as a result of the historical quarrying process. Finally, the largely undisturbed state of the site has potential to yield information regarding the historical activity at the stockpiles as part of the operations of the James McClure Quarry. Therefore, the McMullen-McClure Quarry Stockpiles are

recommended as **not individually eligible**, but as a **contributing** property to the potential Klondike and McClure Quarries Historic District (BE-LIM-00052).

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Maps



Photographs



James McClure Quarry Stockpiles (BE-LIM-00048), view east (7/23/2025)



James McClure Quarry Stockpiles (BE-LIM-00048), view east (8/5/2025)

Narrative Description

The Klondike Quarry Spur is a former railroad spur segment running northwest from the former Chicago, St. Paul, Minneapolis and Omaha Railroad (Omaha Road) mainline in the township of Lime, Blue Earth County, Minnesota. The existing rail segment survives from a point northwest of its former crossing of 230th Lane to the rear of BE-LIM-00002. Most of the rail segment is flanked to its southwest by the former James McClure Quarry Stockpiles (BE-LIM-00048) and to its northeast by the former James McClure Quarry (BE-LIM-00047). The length of the segment retains its historic rails, ties, and riprap, all heavily overgrown with vegetation. Near the southeast end of the surviving segment, the tracks are lined by a series of limestone boulders that appear placed to define the right of way's northeast boundary. The northwest end of the segment terminates in a non-historic buffer stop constructed with sheet metal that blocks off the former right of way leading to the former Klondike Quarry and lime kilns (BE-LIM-00005) to the northwest.

Statement of Significance

Railroads in Lime Township

The first railroad to be constructed through the township of Lime was the Minnesota Valley Railroad in 1868, which spanned the township from north to south in a nearly straight line parallel to the old Mendota-Big Sioux River Road (BE-LIM-00013), today's 3rd Avenue (Hess 1988; Schmidt and Pratt 2007). From its origin at Mendota at the confluence of the Minnesota and Mississippi Rivers (Bdote), the Minnesota Valley Railroad reorganized as the St. Paul and Sioux City Railroad (StP&SC) in 1869 when it received extensions to St. Paul and St. James at its northeast and southwest respective termini. In 1881, the newly formed Chicago St. Paul Minneapolis and Omaha Railway (Omaha Road) absorbed the StP&SC, and the following year partnered with the Chicago and North Western Railroad (C&NW) as a joint system connecting Chicago, the Twin Cities, and Omaha (Schmidt and Pratt 2007).

Within Lime Township, the Minnesota Valley Railroad's opening was followed by the 1871 completion of the Winona and St. Peter Railroad (subsidiary of the C&NW) to the east, the Wisconsin Minnesota and Pacific Railroad (WM&P)'s Cannon Valley Division from Red Wing in 1887, and finally by the Chicago Milwaukee and St. Paul Railway (CM&StP)'s Mankato-Farmington Branch (XX-RRD-CSP041) in 1903 that provided the CM&StP with its own competitor route to the Omaha Road's Minnesota Valley Railroad (Schmidt 2021; Schmidt and Pratt 2007). Though the Mankato-Farmington Branch took an inland route that skipped the Minnesota River towns of St. Peter, Le Sueur, and Shakopee in favor of the vegetable-growing and -canning interior of Le Sueur County, within Lime the branch ran alongside the Omaha Road to Benning (Lime's junction between the Omaha Road, CM&StP, and WM&P), from which point it shared the Cannon Valley Division's right of way into Mankato (Geo. A. Ogle 1914; Schmidt and Pratt 2007). Following its foreclosure amid the Panic of 1893, the WM&P was bought by the Chicago Rock Island & Pacific (CRI&P), which in turn was absorbed by the Chicago Great Western Railway (CGW) in 1901 (Schmidt and Pratt 2007).

At the beginning of the twentieth century, Lime Township was served by each of the four railroads that converged at Mankato's regional rail hub, connecting to the Twin Cities by means of the Omaha Road and CM&StP, the Dakotas via the CM&StP, Omaha via the Omaha Road, and to Chicago and smaller cities throughout the Upper Midwest by all four (Schmidt and Pratt 2007). Within the township, the Omaha Road, CM&StP, and CGW each stopped at the junction at Benning, while the CM&StP made two additional stops at Stone Station (near today's intersection of 3rd Avenue and Industrial Road) and Bradley Station (near today's intersection of 3rd Avenue and 574th Avenue). Stone Station served Lime's burgeoning McClure and Klondike quarries (Geo. A. Ogle 1914).

Property History

When Fred Widell first started quarrying operations at the former farm of D. R. Brooks in Lime Township in 1885, the *Mankato Free Press* reported that the quarry's Minneapolis backers would be building "a side track from the Omaha road into the quarry at once" (*Mankato Free Press* 6 March 1885). Though it is unclear if this early sidetrack was constructed, the 1887 completion of the Cannon Valley Division directly past the original Widell quarry provided the quarry with access to both the Chicago and North Western (C&NW) and Minneapolis and St. Louis (M&StL) railways, as Widell would soon advertise (*Mankato Free Press* 26 September 1890). Already by 1887, Mankato quarries had exported a total of 7,721 carloads of limestone by rail (*Mankato Free Press* 30 December 1887). Many of Fred Widell's largest stone contracts were for the very railroads that passed nearby, including the Omaha Road and the C&NW (*Mankato Free Press* 25 October 1889, 11 November 1890). By 1889, Widell's reputation for supplying railroad construction was strong enough to grant him the business of the more distant St. Paul & Duluth Railroad, even as that railroad passed through the prolific Kettle River Sandstone Quarry (PN-SSC-00008, NR-designated 1991) (*Mankato Free Press* 1 March 1889; Koop 1990). Widell added the Chicago Milwaukee and St. Paul Railroad (CM&StP) to his quarry's portfolio of large clients in 1893, and later that year he appointed his brother Gustav, a Mankato alderman, as a partner in the business, which they thereby renamed Widell & Co. (*Mankato Free Press* 17 February 1893, 17 November 1893). Following Fred Widell's sudden death in 1894, Gustav (Gus) Widell bought out his late brother's share of Widell & Co. and inherited full responsibility over the company's sizeable C&NW and M&StL contracts throughout Minnesota, South Dakota, and Iowa—including its charge over all stone supply within a 150-mile radius for Mankato's four railroads (*Mankato Free Press* 1 March 1889, 19 October 1894, 30 November 1894). Gus Widell's management of the company was highly successful, and already by 1896 Widell & Co. operated a total of four quarries--three in Mankato and one in Morton—and had 200 workers in its hire (*Mankato Free Press* 24 April 1896). That year, Widell was hired by the Omaha Road to construct the rail-spur right of way through his quarries in Mankato proper (*Mankato Free Press* 12 June 1896).

In 1898, Gustav Widell established a fourth quarry in the Mankato area, this time four miles north of the city within the township of Lime (*Mankato Free Press* 15 April 1898). That same year, at the height of the Klondike Gold Rush, Widell launched a Mankato-Alaskan Mining and Milling Company side business to pursue gold mining in the Yukon Territory's Klondike Valley (*Mankato Free Press* 22 April 1898). Perhaps in reference to this venture,

Widell named his new, "lower" Lime quarry the "Klondike Quarry." Consisting of one hundred acres, in its first year the Klondike quarry already boasted 200 workers—equal to Widell's total employment between its four quarries just two years before—as well as rail connections to the nearby Omaha Road and M&StL's Cannon Valley Division (*Mankato Free Press* 15 April 1898, 5 May 1899). During a visit by the *Mankato Free Press* to the new Klondike Quarry in 1899, the newspaper described the scene of the rail spur leading into the quarry:

> The tracks were filled with empty flat cars, running over the hill as far as the eye could see, the track following the curvature of the ground. Notwithstanding all these "empties," Mr. Widell said that his chief difficulty is to get enough cars. Every car that was on the tracks was to be loaded and sent out by tonight. From both quarries, an average of fifty car loads of stone must be sent out each day, which will give some idea of the magnitude of the contracts on hand and of the work being accomplished in the quarries. To aid in getting the stone to the railroad tracks, three dummy tracks have been constructed in the Klondike quarry, one passing under an arched roadway. [*Mankato Free Press* 5 May 1899]

Eligibility and Conclusion

As a secondary, supporting property associated with the Klondike Quarry, the Klondike Quarry Spur is recommended **not individually eligible** for listing on the National Register of Historic Places. As an abandoned, incomplete railroad spur, the Klondike Quarry Spur is not individually representative of the Klondike Quarry's historical significance under Criterion A. While planned and constructed by Gustav Widell in the service of his Klondike Quarry, the spur has a weaker direct historical association with Widell than the nearby Widell & Co. Office Building, and is thus recommended **not eligible** under Criterion B. Furthermore, because the spur is itself unremarkable in its design and engineering it is **not individually eligible** under Criterion C. The long-abandoned and largely untouched status of the site may render it as a source of potential information and therefore **potentially eligible** under Criterion D, but without individual eligibility under Criteria A, B, and C, this alone would not deem the site eligible for National Register listing.

Considered as part of the potential Klondike and McClure Quarries Historic District, however, the Klondike Quarry Spur does demonstrate **eligibility as a contributing property** under National Register Criteria A and D. As associated with the related properties in the potential district, the spur is an extant feature of quarry infrastructure that directly facilitated the transportation of limestone from the Klondike Quarry. Finally, the largely undisturbed state of the site has potential to yield information regarding the historical activity along the spur as part of the operations of the Klondike Quarry. Therefore, the Klondike Quarry Spur is recommended as **not individually eligible**, but as a **contributing** property to the potential Klondike and McClure Quarries Historic District (BE-LIM-00052).

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Maps



Photographs



Klondike Quarry Spur (BE-LIM-00049), view northwest (8/5/2025)



Klondike Quarry Spur (BE-LIM-00049), detail view of rail line (7/25/2025)

Associated MN Multiple Property Form (Name and Inventory No): Klondike and McClure Quarries Historic District (BE-LIM-00052)

Narrative Description

The James McClure Quarry Stockpile Structures are a series of four small limestone masonry ruins constructed upon the James McClure Quarry Stockpiles (BE-LIM-00048) in the township of Lime, Blue Earth County, Minnesota. One of the structures (Structure 1) is distinguished by its use of regular course limestone masonry, while the other three structures (Structures 2-4) are built of dry rubble masonry. Structure 1 is oriented parallel to the former Klondike Quarry Rail Spur (BE-LIM-00049) and has a single door opening within its perimeter walls that faces northwest towards the former railroad spur. Structures 2-4, meanwhile, are each situated at the peaks of the stockpiles.

Statement of Significance

Property History

In 1885, Minneapolis builder Arthur McMullen (1854-1926) established a limestone quarry within the western portion of Lime Township between the Mendota-Big Sioux River Road and the Minnesota River, upon the farmland of early Lime settler D. R. Brooks (*Saint Paul Daily Globe* 8 January 1885). McMullen was born in Canada in 1854 but moved as a young man with his family to Minneapolis when he was a child (US Census Bureau 1860). As a young man, McMullen established himself as a contractor in the Twin Cities, founding McMullen & Co. (*Saint Paul Daily Globe* 8 January 1885). McMullen appointed Swedish immigrant Fred Widell, previously the Omaha Road's superintendent of bridge construction and a foreman for the railroad's Lime Township quarry at Bradley Crossing, as the new quarry's superintendent (*Mankato Free Press* 16 March 1894). Widell told the *Mankato Free Press* in early March that "they will construct a side track from the Omaha road into the quarry at once, and they have erected a large boarding house and a blacksmith shop on the grounds," and "that the ledge proves much more valuable than was at first anticipated. Ston[e]s can be got from 8 inches to three feet in thickness and that of the best quality" (*Mankato Free Press* 6 March 1885). While it does not appear that an Omaha Road sidetrack to the McMullen Quarry was constructed at this time, the opening of the Wisconsin Minnesota & Pacific Railroad's Cannon Valley Division two years later would provide direct rail access to the quarry from its diagonal right of way immediately to the southeast (Central Publishing 1895; Schmidt and Pratt 2007). By 1887, a Charles Lardner took over operation of the quarry for McMullen, likely due to Widell starting his own quarrying operation nearby (*The Irish Standard* 22 March 1890). Also in 1887, Arthur McMullen received a major contract from the city of Minneapolis to construct a new bridge over the Mississippi River at 20th Avenue North (today Broadway Avenue) using stone from his Lime quarry, and the following year the McMullen Quarry supplied stone for the construction of Mankato's Blue Earth County Courthouse (*Saint Paul Daily Globe* 22 January 1887; Mankato *Free Press* 30 November 1888). Although it is unclear at what point between 1890 and 1900 the McMullen Quarry ceased operations, in 1900 it was sold to James McClure after having been "shut down for years" (*Minneapolis Journal* 9 May 1900). Sometime around the turn of the century, McMullen relocated to Fairfield, Connecticut, where he lived until his death in 1926 (*Evening Express* 18 August 1926).

In 1900, James McClure (1841-1916) purchased the dormant Arthur McMullen Quarry with the intent of exerting greater control over his access to limestone within his various building efforts (*Mankato Free Press* 11 May 1900). McClure was born in Ireland but immigrated to the US in 1867, where he established himself as a general contractor based out of St. Paul (US Census Bureau 1910). By the time McClure purchased the former McMullen Quarry, he was listed as a railroad, bridge, masonry, and specialty contractor (R.L. Polk & Co. 1904). Few references to McClure following his purchase of the quarry could be located. At some point in the early twentieth century, he founded a contracting company with his son, Jon McClure, called McClure and Son (*Star Tribune* 6 June 1916). Then, in 1913, McClure was sued by Mrs. Carl Leo, the widow of Carl Leo, who was killed while working at the McClure Quarry (*Mankato Free Press* 24 October 1913). The case never made it to trial as Mrs. Carl Leo died in 1915 from a sudden illness (*Mankato Free Press* 15 January 1915). A year later, in 1916, McClure himself died at the age of 74 in his St. Paul home due to heart complications (*Star Tribune* 6 June 1916). After his father's death, John McClure took over the family business and changed the name to McClure Contracting Co. John McClure continued to run McClure Contracting Co. until 1919 (R.L. Polk & Co. 1916). The quarry appears to have remained largely dormant since this period, although property ownership has changed hands several times.

Eligibility and Conclusion

As secondary, supporting features associated with the McMullen-McClure Quarry, the James McClure Quarry Stockpile Structures are recommended **not individually eligible** for listing on the National Register of Historic Places. As the ruins of small stone structures of unknown purpose that were constructed atop the McMullen-McClure Quarry Stockpiles (BE-LIM-00048), the stockpile structures are not individually representative of the quarry's historical significance under Criterion A. While seemingly constructed in association with the McMullen-McClure Quarry Pit (BE-LIM-00047), the stockpile structures have a weaker direct historical association with either Arthur McMullen or James McClure than the nearby Quarry Pit, and are thus recommended **not eligible** under Criterion B. Furthermore, because the historic design and construction of the stockpile structures cannot be determined, they are **not individually eligible** under Criterion C. The long-abandoned and largely untouched status of the site may render it as a source of potential information and therefore **potentially eligible** under Criterion D, but without individual eligibility under Criteria A, B, and C, this alone would not deem the site eligible for National Register listing.

Considered as part of the potential Klondike and McClure Quarries Historic District, however, the McMullen-McClure Quarry Stockpiles do demonstrate **eligibility as a contributing property** under National Register Criteria A and D. As associated with the related properties in the potential district, the stockpiles are an extant industrial feature that appear to relate to historical activity at the McMullen-McClure Quarry Stockpiles, the McMullen-McClure Quarry Pit, and possibly the adjacent Klondike Spur (BE-LIM-00049). Finally, the largely undisturbed state of the site has potential to yield information regarding the historical activity at the stockpiles as part of the operations of the James McClure Quarry. Therefore, the McMullen-McClure Quarry Stockpiles are recommended as **not individually eligible**, but as a **contributing** property to the potential Klondike and McClure Quarries Historic District (BE-LIM-00052).

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Maps



Photographs



James McClure Quarry Stockpile Structures (BE-LIM-00051), Structure 1, view south (7/23/2025)



James McClure Quarry Stockpile Structures (BE-LIM-00051), Structure 3, view southwest (8/5/2025)



James McClure Quarry Stockpile Structures (BE-LIM-00051), Structure 2, view north (8/5/2025)



James McClure Quarry Stockpile Structures (BE-LIM-00051), Structure 4, view southwest (8/5/2025)

Narrative Description

The potential James McClure Quarry Historic District was identified following a Phase 2 architectural history investigation in the vicinity of the proposed Jordan Sands silica sand mining expansion (BE-LIM-00048) in the township of Lime, Blue Earth County, Minnesota. The proposed historic district encompasses historic properties associated with the James McClure Quarry, which was active at the site between 1900 and the 1920s. The district is 63 acres in area and is trapezoidal in shape, bounded by 3rd Street to the east, an east-west line south of 230th Lane to the south, a north-south line west of the Klondike Quarry Farmstead (BE-LIM-00003) to the west, and an east-west line north of 231st Lane to the north. Historic properties associated with the adjacent Klondike Quarry to the north are also included within these district boundaries, but these properties are non-contributing.

The Klondike and McClure Quarries Historic District encompasses the extant resources associated with the historic Klondike-Carney and McMullen-McClure Quarries within Lime Township, Blue Earth County, Minnesota. The district is situated about 500 feet west of 3rd Street, bounded by 230th Lane to the south and 231st Lane to the north. The western boundary is defined by the historic western property line of Widell & Co.'s Klondike Quarry property, while the eastern boundary is at the approximate limit of the non-historic quarry located immediately to the east. Though the historic Klondike and Carney quarry pits were located just north of 231st Lane, these areas are excluded from the district due to their loss of integrity from subsequent quarrying and industrial use.

Statement of Significance

Property History

In 1885, Minneapolis builder Arthur McMullen (1854-1926) established a limestone quarry within the western portion of Lime Township between the Mendota-Big Sioux River Road and the Minnesota River, upon the farmland of early Lime settler D. R. Brooks (*Saint Paul Daily Globe* 8 January 1885). McMullen was born in Canada in 1854 but moved as a young man with his family to Minneapolis when he was a child (US Census Bureau 1860). As a young man, McMullen established himself as a contractor in the Twin Cities, founding McMullen & Co. (*Saint Paul Daily Globe* 8 January 1885). McMullen appointed Swedish immigrant Fred Widell, previously the Omaha Road's superintendent of bridge construction and a foreman for the railroad's Lime Township quarry at Bradley Crossing, as the new quarry's superintendent (*Mankato Free Press* 16 March 1894). Widell told the *Mankato Free Press* in early March that "they will construct a side track from the Omaha road into the quarry at once, and they have erected a large boarding house and a blacksmith shop on the grounds," and "that the ledge proves much more valuable than was at first anticipated. Ston[e]s can be got from 8 inches to three feet in thickness and that of the best quality" (*Mankato Free Press* 6 March 1885). While it does not appear that an Omaha Road sidetrack to the McMullen Quarry was constructed at this time, the opening of the Wisconsin Minnesota & Pacific Railroad's Cannon Valley Division two years later would provide direct rail access to the quarry from its diagonal right of way immediately to the southeast (Central Publishing 1895; Schmidt and Pratt 2007). By 1887, a Charles Lardner took over operation of the quarry for McMullen, likely due to Widell starting his own quarrying operation nearby (*The Irish Standard* 22 March 1890). Also in 1887, Arthur McMullen received a major contract from the city of Minneapolis to construct a new bridge over the Mississippi River at 20th Avenue North (today Broadway Avenue) using stone from his Lime quarry, and the following year the McMullen Quarry supplied stone for the construction of Mankato's Blue Earth County Courthouse (*Saint Paul Daily Globe* 22 January 1887; Mankato *Free Press* 30 November 1888). Although it is unclear at what point between 1890 and 1900 the McMullen Quarry ceased operations, in 1900 it was sold to James McClure after

having been "shut down for years" (*Minneapolis Journal* 9 May 1900). Sometime around the turn of the century, McMullen relocated to Fairfield, Connecticut, where he lived until his death in 1926 (*Evening Express* 18 August 1926).

Around 1886, Fred Widell departed his position with the McMullen Quarry to pursue his own quarrying business—first leasing two quarries in the area and finally coming to purchase his own quarry in the south of Lime, later referred to as the "Northwestern Quarry," which he would run with business partner John Peterson (*Mankato Free Press* 16 March 1894). By 1888, Widell and Peterson would join Arthur McMullen in providing stone for the County Courthouse, and the following year the quarry was hired to supply the stone for a St. Paul & Duluth Railroad bridge—despite that project's proximity to the established Kettle River Quarry in Sandstone (*Mankato Free Press* 30 November 1888; *Mankato Free Press* 1 March 1889). That same year, with active contracts for both railroad and grain elevator construction Widell's success was such to allow him to buy out Peterson's share of the company (*Mankato Free Press* 30 August 1889). Fred Widell's 1891 profile by Swedish-American newspaper *The North* highlighted not only his self-made accomplishment but also his innovative embrace of cost-saving technology such as steam-powered derricks that enabled him to lower his prices beyond competitors (*The North* 28 January 1891). By 1892, Widell had a total of 300 workers in his employ, distributed between his Northwestern Quarry and various projects in the region (*Mankato Free Press* 3 June 1892). In late 1893, Widell reorganized his business through a new partnership with his brother Gustav as Widell & Co. (*Mankato Free Press* 17 November 1893).

Fred Widell died following a brief, serious illness in March 1894, and his brother Gustav bought out his estate's share of Widell & Co. by that November (*Mankato Free Press* 16 March 1894; *Mankato Free Press* 30 November 1894). Gustav quickly proved himself to be a shrewd leader of his late brother's quarry business, and Widell & Co. expanded its portfolio of large railroad and infrastructure projects over the next three years, including for the Chicago & North Western, Minneapolis & St. Louis, Chicago Milwaukee & St. Paul, Omaha Road, and the lower dam at St. Anthony Falls in Minneapolis (*Mankato Free Press* 10 April 1894, 30 November 1894, 24 April 1896, 7 May 1897, 15 October 1897). To support his growing array of contracts, Widell operated a total of four quarries by 1896—including three in the Mankato area and one in Morton near St. Cloud (*Mankato Free Press* 24 April 1896). In addition to the original Northwestern Quarry, Widell also controlled two quarries in the Germania Park neighborhood of Mankato proper at this time.

In 1898, Widell purchased a hundred acres to quarry immediately north of the McMullen Quarry on land that since the 1870s had been occupied by the farm of Frank M. Schaefer (Central Publishing 1895; *Mankato Free* Press 15 April 1898, 5 May 1899). That same year, at the height of the Klondike Gold Rush, Widell launched a Mankato-Alaskan Mining and Milling Company side business to pursue gold mining in the Yukon Territory's Klondike Valley (*Mankato Free Press* 22 April 1898). Perhaps in reference to this venture, Widell named his new, "lower" (downriver) Lime quarry the "Klondike Quarry." Consisting of one hundred acres, in its first year the Klondike quarry already boasted 200 workers—equal to Widell's total employment between its four quarries just two years before—as well as rail connections to the nearby Omaha Road and M&StL's Cannon Valley Division. Though Widell would operate the quarry from the old Schaefer farmhouse on the property, he reported to the *Mankato Free Press* that he "expects to soon erect a fine new office building" (*Mankato Free Press* 5 May 1899). An illustration of the quarry from a 1901 advertisement shows the house with its existing rear extension at the center of the quarry's hive of activity (Widell & Co. 1901).

In 1901, Widell realized his vision for a new office building at the Klondike quarry. Upon its opening that June, the *Free Press* published that "the new office building is picturesquely situated overlooking the quarry on three sides, is built entirely of range stone quarried a few rods from where it stands, and was built by stone masons in

the employ of Mr. Widell" (*Mankato Free Press* 21 June 1901). The office building was arranged with a main, public-facing office in its front room, a stenographer's office and vault in the middle room, and Widell's private office in the rear room. So that Widell could personally observe the activities of the quarry from his office, the northwest corner of the building was equipped with a diagonally facing observatory. The building's interiors were clad with red-oak finishes, and Widell's personal office was specially equipped with a rubble-masonry fireplace designed by Widell himself with the words "1901, G. Widell" engraved within the mantel. The *Free Press* extolled that "Mr. Widell will have an office building which will easily equal any in the state" (*Mankato Free Press* 21 June 1901).

Long having served as an alderman for the City of Mankato, Gustav Widell's reputation as both a leading businessman and public figure for the city grew quickly in the early 1900s. As the stone industry ascended in prominence within the state's economy, Widell was appointed to the staff of Minnesota Governor Samuel Rinnah Van Sant by 1902 with the title of "Colonel" (*Mankato Free Press* 30 June 1902). That summer, Col. Widell was elected president of the board of the Mankato Public Library, and after a promotion to General by Gov. Van Sant to General by 1903 Widell became recognized by state Republican leaders as a rising star in the Republican Party and a worthy GOP candidate for secretary of state for 1904 (*Mankato Free Press* 8 August 1902, 13 November 1903). Though Widell would decline to run for the seat, the General would lead the state party's delegation to the 1904 Republican National Convention for the endorsement of then-president Theodore Roosevelt (*Mankato Free Press* 22 January 1904, 18 March 1904).

Amid his growing business and reputation, Gen. Gustav Widell pursued an ambitious new venture in late 1904 to transform Widell & Co. from merely a stone supplier to a full-service bridge engineering and construction firm. Partnering with Chicago's W. H. Finley, a specialist in bridge engineering, the new Widell-Finley Company would remain based in Mankato and intended to quadruple the business of the preceding Widell & Co. (*Mankato Free Press* 23 December 1904). By spring 1905 Widell-Finley was awarded two major contracts by the federal government to oversee massive irrigation engineering projects: one for an irrigation canal in Belle Fourche, South Dakota; and a second for a forty-mile canal near Fort Beauford, Montana (*Mankato Free Press* 28 April 1905, 26 May 1905). That winter, the company also added the design and construction of a major railroad bridge in Sheboygan, Wisconsin to its portfolio (*Mankato Free Press* 15 December 1905).

The three large projects were more than the fledgling Widell-Finley Company could bear, and amid massive cost overruns and engineering challenges at Belle Fourche, the company was forced into bankruptcy by February 1906 (*Mankato Free Press* 16 February 1906). With Widell allegedly considering departing Mankato for Wisconsin following his high-profile business failure, Mankato's business community sought to set up a means for the General to remain in charge of his local quarries (*Mankato Free Press* 2 March 1906). Within weeks, the city's businessmen set up a new company for Widell to lead with State Senator (later Governor) A. O. Eberhart as a business partner. The new company would be loaned adequate funds for it to return to work and would lease the Klondike Quarry until it regained the means to purchase back the land (*Minneapolis Journal* 21 March 1906). Already by April, the Klondike Quarry resumed production as the new Widell Company and was fulfilling contracts for the Chicago & North Western Railway (*Mankato Free Press* 27 April 1906).

In 1910, a fire struck the Klondike quarry facilities, destroying its crusher plant building, screen house, bins, sheds, and trestle. The *Mankato Free Press* reported that the office building "caught fire several times, but was saved by the work of the [work]men. It was a close call, and the men worked hard" (*Mankato Free Press* 6 May 1910). The facilities were reconstructed and repaired promptly, and the quarry and plant returned to production by the end of the month (*Mankato Free Press* 20 May 1910).

In 1900, James McClure (1841-1916) purchased the dormant Arthur McMullen Quarry with the intent of exerting greater control over his access to limestone within his various building efforts (*Mankato Free Press* 11 May 1900). McClure was born in Ireland but immigrated to the US in 1867, where he established himself as a general contractor based out of St. Paul (US Census Bureau 1910). By the time McClure purchased the former McMullen Quarry, he was listed as a railroad, bridge, masonry, and specialty contractor (R.L. Polk & Co. 1904). Few references to McClure following his purchase of the quarry could be located. At some point in the early twentieth century, he founded a contracting company with his son, Jon McClure, called McClure and Son (*Star Tribune* 6 June 1916). Then, in 1913, McClure was sued by Mrs. Carl Leo, the widow of Carl Leo, who was killed while working at the McClure Quarry (*Mankato Free Press* 24 October 1913). The case never made it to trial as Mrs. Carl Leo died in 1915 from a sudden illness (*Mankato Free Press* 15 January 1915). A year later, in 1916, McClure himself died at the age of 74 in his St. Paul home due to heart complications (*Star Tribune* 6 June 1916). After his father's death, John McClure took over the family business and changed the name to McClure Contracting Co. John McClure continued to run McClure Contracting Co. until 1919 (R.L. Polk & Co. 1916).

By 1920, Widell sold the entire Klondike Quarry property, including the Widell & Co. Office Building, to the Carney Cement Company. Originally founded as the Standard Cement Company and active as a Mankato producer of cement mortar since the 1880s, in 1920 Carney Cement planned to expand the Klondike Quarry's existing crusher plant (rebuilt in 1910) into a major cement plant (*Mankato Free Press* 13 June 1913, 15 October 1920). Though the plant was designed to be "absolutely fire proof," its crusher house and machinery were entirely destroyed in a fire during the plant's construction in 1921 (*Mankato Free Press* 15 October 1920; *Mankato Free Press* 25 March 1921). In April 1923, the plant remained unfinished, with a small section of its lime kilns approaching completion but with the crusher house still apparently on the cusp of reconstruction (*Mankato Free Press* 20 April 1923). With Carney Cement continuing to operate its original West Mankato plant, it is uncertain whether the Klondike cement plant was completed, and the lime kilns appear to retain their unfinished 1923 form as of 2025. However, the Carney Cement Company appears to have continued quarrying operations on the property in supply of the West Mankato plant (*Mankato Free Press* 25 August 1939).

In 1939, the Carney Cement Co.—now renamed the Carney Rockwool Co.--established a new "rockwool" insulation plant at the site of the unfinished cement plant on its Klondike Quarry property (*Mankato Free Press* 25 August 1939). Rather than utilizing the limestone deposits that the quarry had been previously dedicated to, the manufacture of rockwool instead used the layer of shale beneath the "bridge stone" limestone ledge that had previously been treated as waste stone. At its new Lime Township plant, the Carney Rockwool Co. would melt down the shale and steam-blow the molten rock into thin fibers, forming a wool-like "bat" material that could be sold as a durable, fireproof insulation material (*Mankato Free Press* 26 October 1939; Carney 1945). The Carney Rockwool plant constructed in 1939 would consist of a two-story, concrete-block and steel-sided factory flanking the earlier lime kilns and cement plant, the latter of which would be adapted as a warehouse (*Mankato Free Press* 25 August 1939). In 1945, the plant added a rock crusher to the quarry in order to resume the processing of limestone for agriculture, railroad ballast, and aggregate (*Mankato Free Press* 3 October 1945). The plant's warehouse was destroyed in a 1970 fire and was replaced with the existing utilitarian metal warehouse that same year (*Mankato Free Press* 14 March 1970). The Carney Rockwool plant would continue to produce insulation until its closure in the 1980s (*Mankato* Business 25 March 1977; Pratt 2015).

In the 1980s, the quarries were acquired by Mankato Kasota Stone Inc., a historic Mankato limestone quarrying company operated by the Coughlan family. The former Klondike Quarry continued to operate until Mankato Kasota Stone Inc. and the quarry closed in 2013 (Twin Cities Business 2013). However, that same year the quarry was reopened by Jordan Sands, another Coughlan family business (Krohn 2021). Instead of extracting limestone,

Jordan Sands mined the silica sand located under the limestone layers, the sand was used in natural gas and oil fracking.

The company took out a 22-million-dollar loan from Stearns Bank in 2016. In 2020, Jordan Sands defaulted on this loan and was forced to shut down the company. In an attempt to repay some of the loan, the quarry property was listed for sale. However, much of the limestone had already been extracted and what remained was not suitable for use in road construction. An 8-million-dollar offer was approved in 2021, and the property was sold to Holtmeier Construction, Kasota Stone Fabricators, and Pentagon Materials (Krohn 2021). Today, the majority of the quarries are owned by Rockwell Outdoor Adventure Park.

Eligibility and Conclusion

According to the 2015 report, the James McClure Quarry Historic District would include three contributing historic properties: the James McClure (McMullen-McClure) Quarry Pit (BE-LIM-00047), the James McClure (McMullen-McClure) Quarry Stockpiles (BE-LIM-00048), and a Railroad Spur (Klondike Quarry Spur; BE-LIM-00049). However, additional research has now identified that the properties associated with the adjacent Klondike Quarry to the north, including the Widell & Co. Office Building (BE-LIM-00001), the Schaefer-Widell House (BE-LIM-00002), the Klondike Quarry Farmstead (BE-LIM-00003), and the Carney Cement Co. Lime Kilns (BE-LIM-00005) not only share the historical context of the James McClure Quarry Historic District but add to the narrative by representing other aspects of the industry's history in Lime Township, ranging from land use prior to quarrying (the Schaefer-Widell House) to quarry administration (the Widell & Co. Office Building) and operation (the Klondike Quarry Farmstead) to the quarries' transition toward supplying a growing concrete industry in the 1920s (the Carney Cement Co. Lime Kilns). Furthermore, the Railroad Spur identified as contributing to the James McClure Quarry Historic District was primarily planned and constructed to serve the Klondike Quarry, and the stone house and barn ruins at BE-LIM-00003 identified as possibly contributing to this historic district were built for the Klondike Quarry.

The Klondike and McClure Quarries Historic District represents a significant cluster of historic properties associated with the nationally renowned limestone quarrying industry of greater Mankato, Minnesota. While quarries procuring "Mankato" or "Kasota" limestone—the distinctive yellow- or pink-hued limestone only found in the Minnesota River Valley—historically lined the east bank of the Minnesota River between the cities of Mankato and Kasota, few of the existing quarries retain either historic integrity or historic structures associated with the quarrying industry. In addition to retaining the McMullen-McClure Quarry Pit (BE-LIM-00047), the Klondike and McClure Quarries Historic District includes two additional resources associated with the McMullen-McClure Quarry: the McMullen-McClure Quarry Stockpiles (BE-LIM-00048) and the James McClure Quarry Stockpile Structures (BE-LIM-00051). While the historic Klondike Quarry pit is no longer extant in its historic form and is not included in this district, the Klondike Quarry retains five important associated resources that are included here: the Widell & Co. Office Building (BE-LIM-00001), the Schaefer-Widell House (BE-LIM-00002), the Klondike Quarry Farmstead (BE-LIM-00003), the Carney Cement Co. Lime Kilns (BE-LIM-00005), and the Klondike Quarry Spur (BE-LIM-00049).

Each of the resources included within the district were previously surveyed and inventoried in 2015 ahead of a planned expansion of sand mining in the vicinity, and as a result of this investigation a potential James McClure Quarry Historic District (BE-LIM-00052) was proposed. The newly proposed Klondike and McClure Quarries Historic District encompasses all inventoried properties in the James McClure Quarry Historic District with the additional four resources relating to the Klondike Quarry to the north.

Together, the adjacent Klondike and McClure Quarries reflect the history of the greater Mankato stone industry's most prolific and influential period. The district's period of significance begins with the establishment

of the Arthur McMullen Quarry in 1885—both the predecessor to the James McClure Quarry and the introduction of Fred Widell to quarry leadership in the city. Following the substantial growth of the Mankato quarries' stone contracts, fueled by both the city's increasing connectivity with the region's railroad networks and the continuing boom in railroad construction throughout the Upper Midwest, the turn of the twentieth century saw the opening of Widell & Co.'s Klondike Quarry in 1898 and the James McClure Quarry in 1900. A majority of the resources included within the historic district date from this boom period—including the Klondike Quarry Spur (1898), the Klondike Quarry Farmstead (1899), the James McClure Quarry Pit and Stockpiles (1900), and Widell & Co. Office Building (1901)—date from these years. After this heyday period faded by the mid-1910s—marked by the Widell-Finley Company's bankruptcy in 1905—the district's quarries continued steady production for the following decade. The Carney Cement Company's purchase of the Klondike Quarry by 1920 signaled a shift in focus from the quarries supplying limestone block to supplying crushed stone for aggregate and cement production; the construction of the historic district's last contributing structure, the Carney Cement Co. Lime Kilns (1923), represents this transition.

While Carney Cement does not seem to have completed its ambitious Klondike Quarry cement plant, the company would continue quarry operations at the site to support its growing West Mankato cement plant through the 1920s and 1930s, and additionally purchased the James McClure Quarry by 1929. In 1939, Carney Cement renamed itself the Carney Rockwool Company and reoriented its Klondike quarrying focus to the site's shale deposits, which it would blow into "rockwool" insulation at its new plant constructed at the yet-unused limekilns. Rockwool production would continue in the district until the Carney plant's closure in the 1980s, after which the quarries would continue to expand with a focus on gravel and sand extraction.

The district's recommended period of significance begins in 1885, the date of the McMullen Quarry's opening, and 1925, following the construction of the Carney Cement Co. Lime Kilns and the approximate date of sale of the James McClure Quarry to the Carney Cement Co. This period spans the duration of Gustav Widell and James McClure's ownership of their respective quarries, as well as the subsequent pivot of the quarries away from cut stone production by the 1920s.

The Klondike and McClure Quarries Historic District is **eligible** under National Register Criterion A in the area of Industry, for its statewide importance in Minnesota's limestone quarrying industry. As two of the leading suppliers of "Mankato" limestone, the Klondike and McMullen-McClure Quarries made themselves the source of stone for bridge, building, and railroad construction throughout the Upper Midwest between the 1880s and 1910s. The district and its contributing resources demonstrate the transformation of the Mankato limestone industry—which remains active to this day—from a local-focused industry to the dominant regional force it would be by the turn of the twentieth century. Amid a waning of demand for building stone in the second half of the 1900s and the 1910s, the Klondike and McClure Quarries would be repositioned as sources of lime and aggregate for concrete production by the 1920s—a shift that was especially marked by their purchases by the Carney Cement Co. between the late 1910s and late 1920s.

Overall, the Klondike and McClure Quarries Historic District is recommended **not eligible** under Criterion B. Though significant figures in the Mankato quarrying industry—most notable Gustav Widell—have strong associations with individual resources within the district (e.g. the Widell & Co. Office Building), the overall district is not united by an association with a single significant historical figure.

Though individual resources within the Klondike and McClure Quarries Historic District—including the Widell Co. Office Building (BE-LIM-00001) and the Carney Cement Co. Lime Kilns (BE-LIM-00005) may convey significance under Criterion C, the overall district does not achieve its National Register eligibility for its design or construction. Therefore, the district is recommended as **not eligible** under Criterion C.

As an industrial landscape with a high level of historic integrity and substantial undisturbed areas dating to the district's period of significance, the Klondike and McClure Quarries Historic District is also **potentially eligible** for National Register listing under Criterion D for Information Potential.

The Klondike and McClure Quarries Historic District retains all aspects of historical integrity, including location, design, setting, materials, workmanship, feeling, and association.

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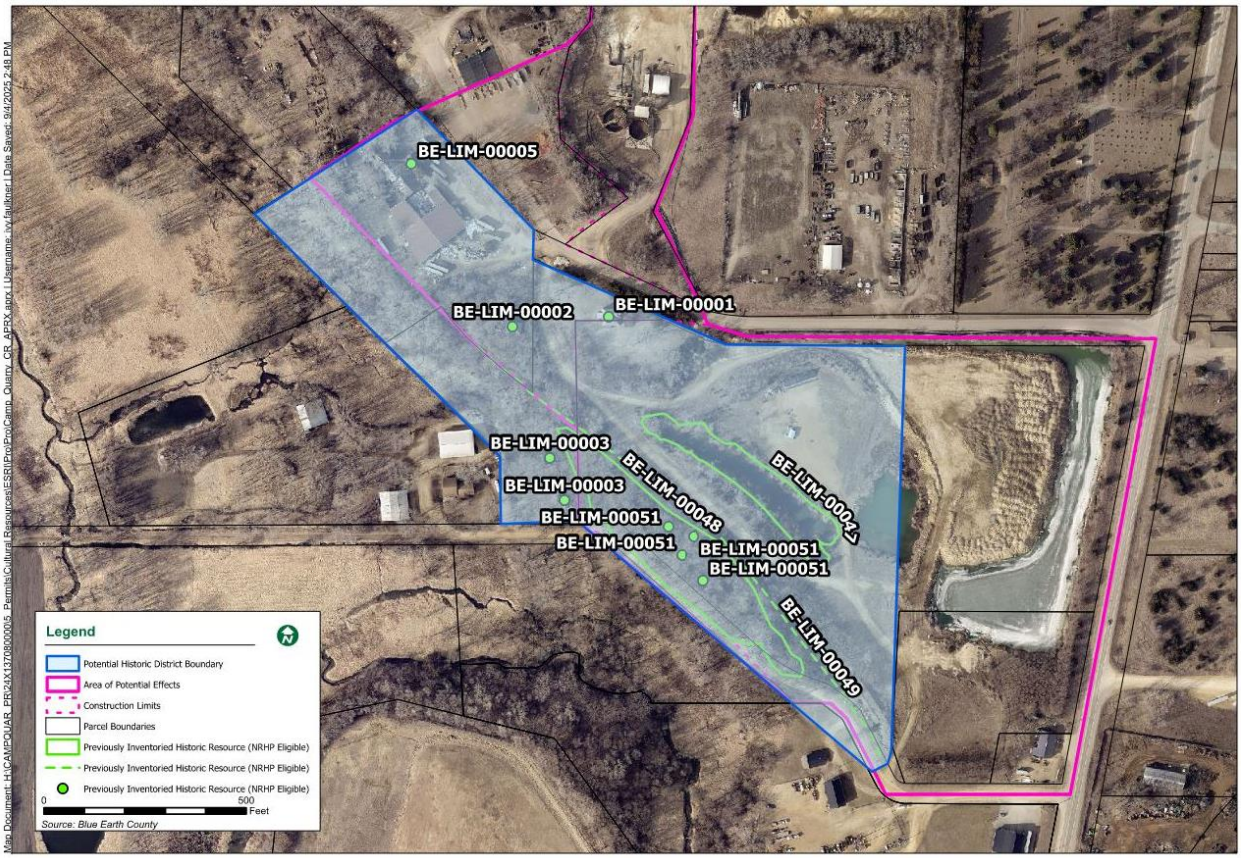
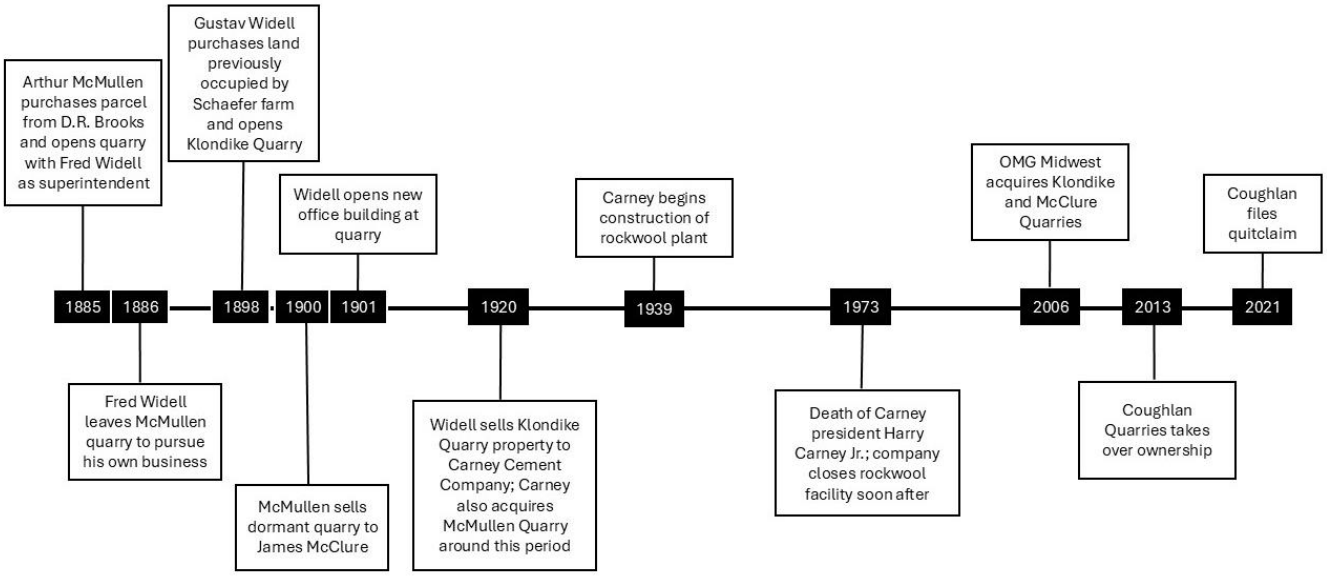
Maps



Timeline



Photographs



Widell & Co. Office Building (BE-LIM-00001), view southwest (7/23/2025)



Widell & Co. Office Building (BE-LIM-00001), view northeast (7/23/2025)



Widell & Co. Office Building (BE-LIM-00001), view northwest (7/23/2025)



Widell & Co. Office Building (BE-LIM-00001), view southeast (7/23/2025)



Schaefer-Widell House (BE-LIM-00002), view northeast (8/5/2025)



Schaefer-Widell House (BE-LIM-00002), view southeast (7/23/2025)



Klondike Quarry Farmstead (BE-LIM-00003), view southeast of farmhouse (8/5/2025)



Klondike Quarry Farmstead (BE-LIM-00003), view west of farmhouse (8/5/2025)



Klondike Quarry Farmstead, (BE-LIM-00003), detail of barn interior (7/23/2025)



Klondike Quarry Farmstead (BE-LIM-00003), view north of barn (7/23/2025)



Carney Cement Co. Lime Kilns (BE-LIM-00005), view northeast (7/23/2025)



Carney Cement Co. Lime Kilns (BE-LIM-00005), view south (7/23/2025)



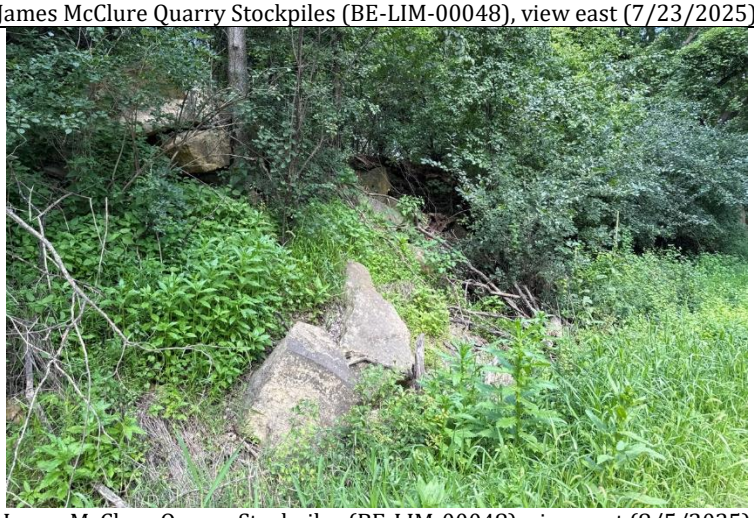
McMullen-McClure Quarry Pit (BE-LIM-00047), view northwest (7/25/2025)



McMullen-McClure Quarry Pit (BE-LIM-00047), view west of southern end of quarry (7/25/2025)



James McClure Quarry Stockpiles (BE-LIM-00048), view east (7/23/2025)



James McClure Quarry Stockpiles (BE-LIM-00048), view east (8/5/2025)



Klondike Quarry Spur (BE-LIM-00049), view northwest (8/5/2025)



Klondike Quarry Spur (BE-LIM-00049), detail view of rail line (7/25/2025)



James McClure Quarry Stockpile Structures (BE-LIM-00051), Structure 1, view south (7/23/2025)



James McClure Quarry Stockpile Structures (BE-LIM-00051), Structure 3, view southwest (8/5/2025)



James McClure Quarry Stockpile Structures (BE-LIM-00051), Structure 2, view north (8/5/2025)



James McClure Quarry Stockpile Structures (BE-LIM-00051), Structure 4, view southwest (8/5/2025)

Appendix C: Concept Designs

SITE LEGEND:

BIKE TRAILS

1. ACCESS / CONVENIENCE BIKE OPTIMIZED TRAILS (TWO WAY)
2. BEGINNER TRAILS (ONE WAY)
3. INTERMEDIATE TRAILS (ONE WAY)

OTHER SITE AMENITIES / FEATURES

1. PUBLIC PARKING / ACCESS
2. USER PARKING
3. WATER CABLE PARK
4. CABLE PARK STARTING FEATURE / VIEWING AREA
5. ISLAND FEATURE

BUILDINGS

6. RESTROOM / PAVILION
7. LAKESIDE PAVILION
8. WASTE WATER TANKS / LIFT STATION

OTHER SITE NOTES:

POTABLE WATER WILL BE AT CAMPSITES OR WITHIN 400 FEET OF EVERY CAMPSITE IN ACCORDANCE WITH MINNESOTA RULES CHAPTER 4630.0600.

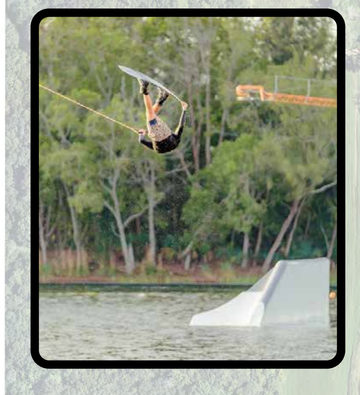
ALL TRAILS AND OPEN SPACES WILL BE FIELD-FIT TO REDUCE TREE AND BRUSH REMOVALS TO AVOID WETLANDS.

CHARACTER IMAGERY:







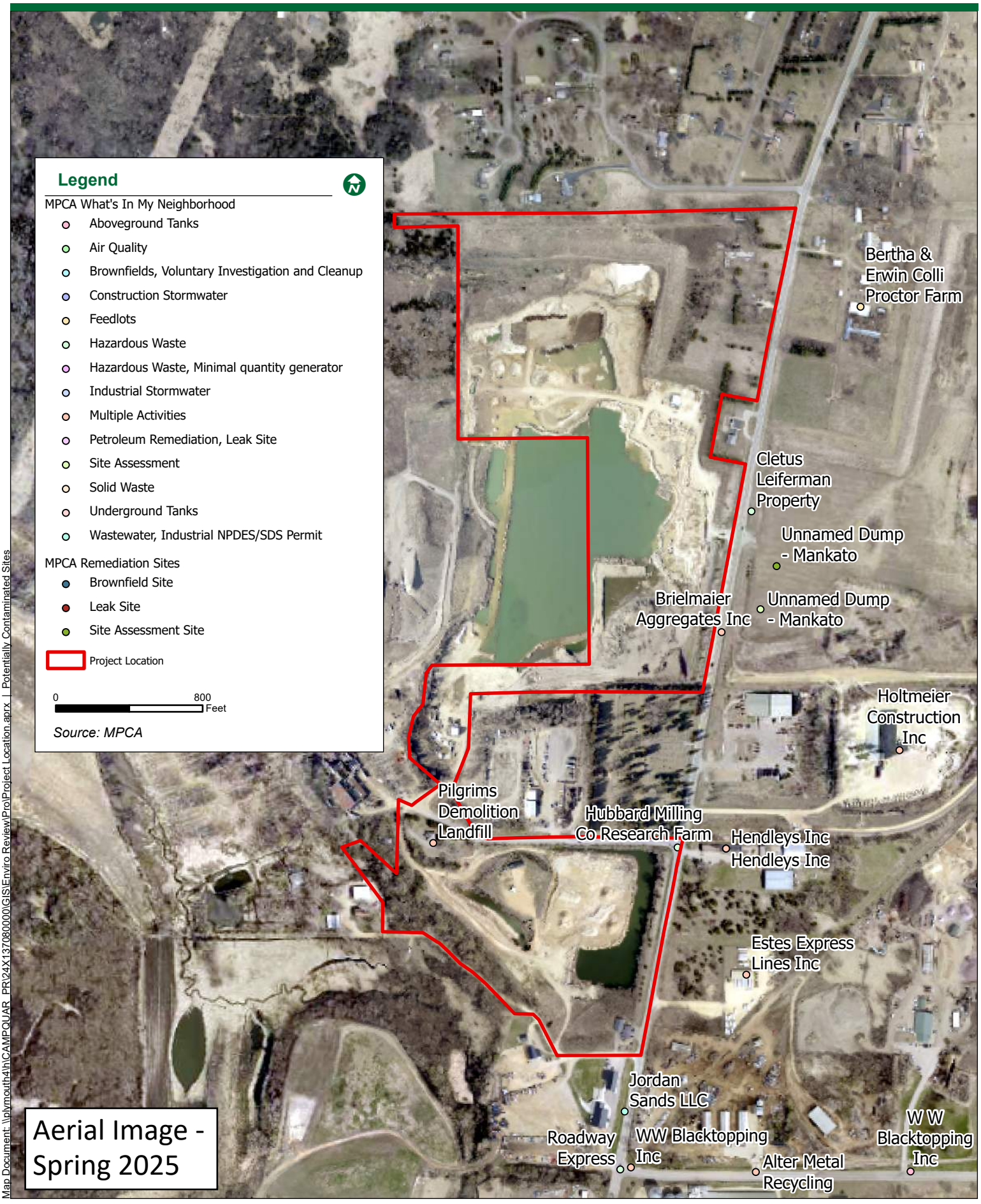

ROCKWELL CONCEPT

INTEGRATE THE SYSTEMS

CONFLUENCE

Appendix D: Contamination and Hazards

- Potentially Contaminated MPCA Sites
- MPCA Active Tank
- MPCA Active Leaks
- Wells Table
- Well and Boring Logs



Map Document: \\plymouth4h\CAMPQUAR_PR\24X137080000\GIS\Enviro Review\Pro\Project Location.aprx | Potentially Contaminated Sites


EPA NEPAssist
Version 2025.2.001
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Boundaries
Non-attainment Areas
Ozone 8-hr (1997 standard)
Nonattainment (NAAQS revoked)
Maintenance (NAAQS revoked)
Ozone 8-hr (2008 standard)
Nonattainment
Maintenance
Ozone 8-hr (2015 Standard)
Nonattainment
Maintenance
Lead (2008 standard)
Nonattainment
Maintenance
SO2 1-hr (2010 standard)
Nonattainment
Maintenance
PM2.5 24hr (2006 standard)
Nonattainment
Maintenance
PM2.5 Annual (1997 standard)
Nonattainment
Maintenance (NAAQS revoked)
PM2.5 Annual (2012 standard)
Nonattainment
Maintenance
PM10 (1987 standard)
Nonattainment
Maintenance
CO (1971 Standard)
Nonattainment
Maintenance
Ozone 1-hr (1979 standard-revoked)
Nonattainment (NAAQS revoked)
Maintenance (NAAQS revoked)
NO2 (1971 Standard)
Maintenance
Water
Transportation
Places
Critical Habitat
NWI Wetlands
FEMA Flood
Land Cover
updated study area for enviro review
3rd Ave
Chicago and North Western Railroad
Pegasus Ln
231st Ln
230th Ln
Chicago Rock Island and Pacific Railroad
Benning
200 m
600 ft
EnviroMapper
44.216100, -94.001981
Maxar | EPA OEI | U.S. EPA Office of Air and Radiation (OAR) - Office of Air Quality Planning and Standards (OAQPS) | EPA OEI, OFA | NONE | Sources: Esri, TomTom, Garmin, FAO, NOAA, USGS, (c) OpenStreetMap contributors, and the GIS User Community
Powered by Esri

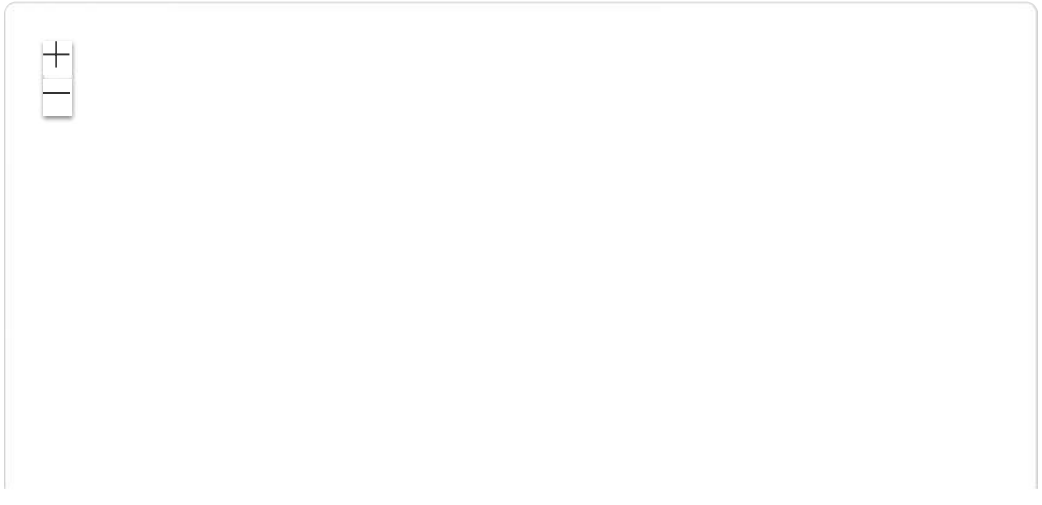
MINNESOTA POLLUTION CONTROL AGENCY

Data

What's in My Neighborhood

Brielmaier Aggregates Inc

Location:	County Road 5 Mankato, MN 56002 Blue Earth County
Watershed:	Minnesota River - Mankato (07020007)
Latitude:	44.21157222
Longitude:	-93.99298889
Coordinate collection method:	Address Matching Primary Name
Currently active?	**No**
Industry classification:	Crushed and Broken Limestone Mining and Quarrying Construction Sand and Gravel Mining Ready-Mix Concrete Manufacturing
Institutional controls:	No





Search with a map

Activity overview | MPCA contacts | Alternate names | Owners | Documents (0)

Air Quality

Air Quality - 01300057

Status: Inactive

If a facility generates air pollutants during operation of its business, it may need an air quality permit, which helps to minimize these pollutants by establishing limits, operating requirements and monitoring.

More Detail ▼

Hazardous Waste

Hazardous Waste - DELETE MND008801219

Status: Inactive

More Detail ▼

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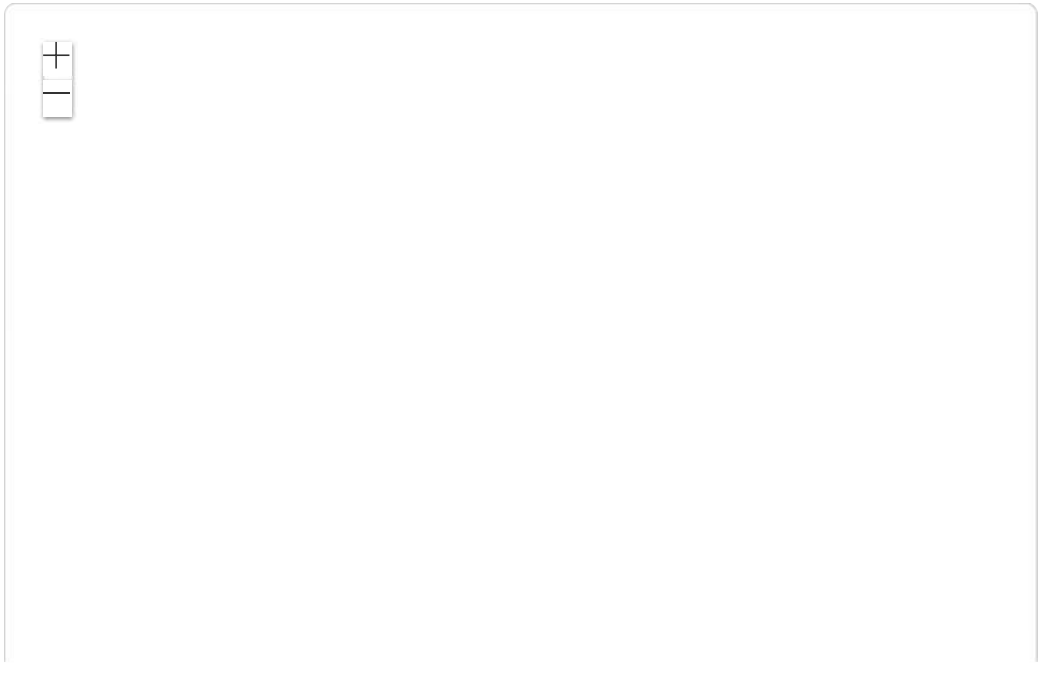
MINNESOTA POLLUTION CONTROL AGENCY

Data

What's in My Neighborhood

Hendleys Inc

Location:	3501 3rd Ave Mankato, MN 56001 Blue Earth County
Watershed:	Minnesota River - Mankato (07020007)
Latitude:	44.2083401
Longitude:	-93.99290954
Coordinate collection method:	Digitized - MPCA internal map
Currently active?	**No**
Institutional controls:	No





Investigation and Cleanup

Petroleum Remediation - LS0006106 - Leak Site

Status: Inactive

Leak sites are locations where a release of petroleum products has occurred from a tank system. Leak sites can occur from aboveground or underground tank systems as well as from spills at tank facilities.

More Detail ▼



Tanks

Underground Tanks - TS0012840

Status: Inactive

An underground storage tank site has at least one tank of a certain size on the premises. A tank site may have multiple tanks and these tanks may contain food products, petroleum products or other substances.

More Detail ▼

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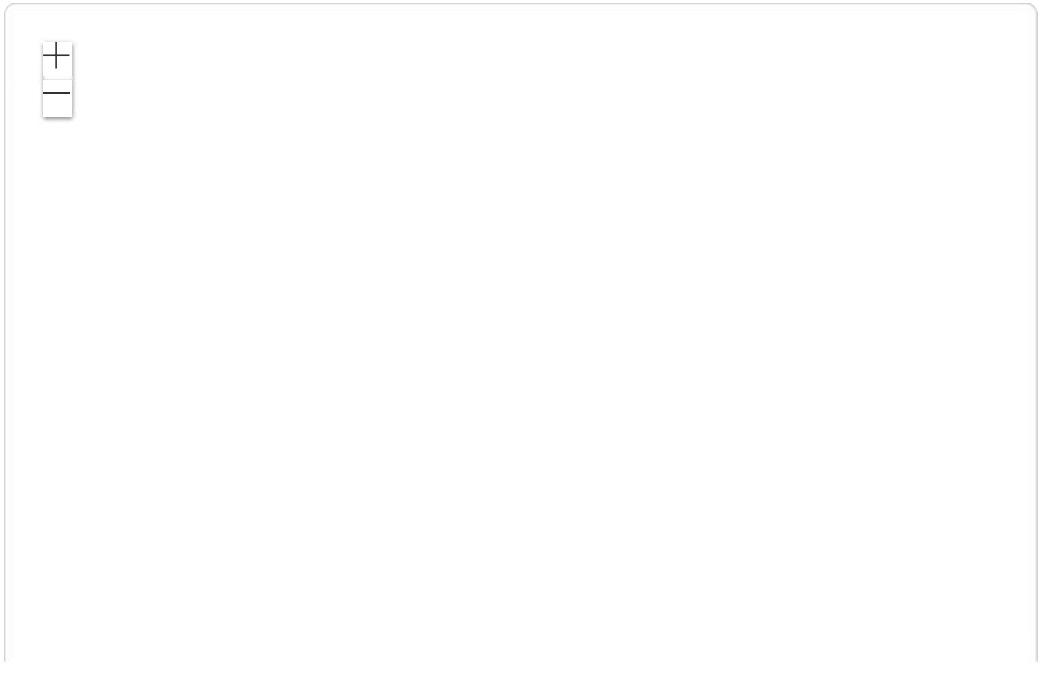
What's in My Neighborhood

Hubbard Milling Co Research Farm

Location:	23471 3rd Ave Mankato, MN 56001-7528 Blue Earth County
Watershed:	Minnesota River - Mankato (07020007)
Latitude:	44.2083591
Longitude:	-93.9939165
Coordinate collection method:	Address Matching House Number
Currently active?	**No**
Institutional controls:	No





Hazardous Waste

Hazardous Waste - MN0000054460

Status: Inactive

More Detail ▼

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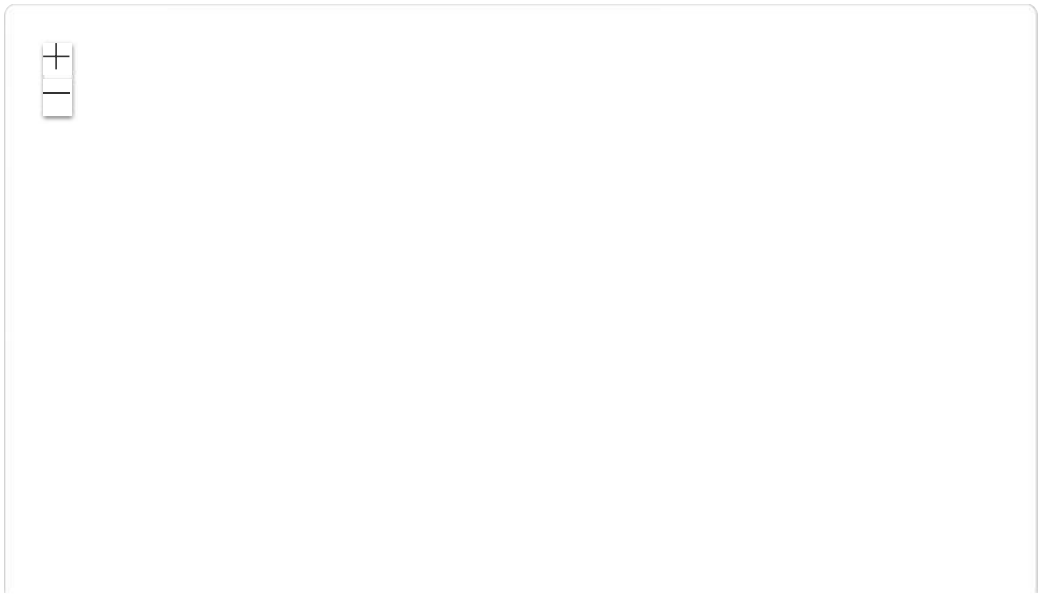
Data

What's in My Neighborhood

Pilgrims Demolition Landfill

Location:	3600 3rd Ave Mankato, MN 56001-2732 Blue Earth County
Watershed:	Minnesota River - Mankato (07020007)
Latitude:	44.20843739
Longitude:	-93.99899285
Coordinate collection method:	Address Matching House Number
Currently active?	Yes
Industry classification:	Hazardous Waste Treatment and Disposal
Institutional controls:	No





Search with a map

Activity overview | MPCA contacts | Alternate names | Owners | Documents (3)

Solid Waste

Solid Waste - SW-611 - Closed Landfill privately managed, Permitted Solid Waste Facility

Status: Inactive

More Detail ▼

Solid Waste - SW-254 - Permitted Solid Waste Facility

Status: Active

Open, permitted landfills are those that still accept waste. They accept household garbage, industrial waste and-or debris from construction or demolition. They are required to bury garbage in a controlled way to reduce impacts on the environment.

More Detail ▼

Stormwater

Industrial Stormwater - MNR053BWS

Status: Active

At industrial sites, stormwater may come into contact with harmful pollutants such as toxic metals, oil, grease and de-icing

salts. Industrial stormwater permits are designed to limit the contaminants that reach surface and groundwater.

More Detail ▼

Industrial Stormwater - MNR0534D3
Status: Inactive

At industrial sites, stormwater may come into contact with harmful pollutants such as toxic metals, oil, grease and de-icing salts. Industrial stormwater permits are designed to limit the contaminants that reach surface and groundwater.

More Detail ▼



Tanks

Aboveground Tanks - TS0130518
Status: Active

An aboveground storage tank site has at least one tank of a certain size on the premises. A tank site may have multiple tanks and these tanks may contain food products, petroleum products or other substances.

More Detail ▼

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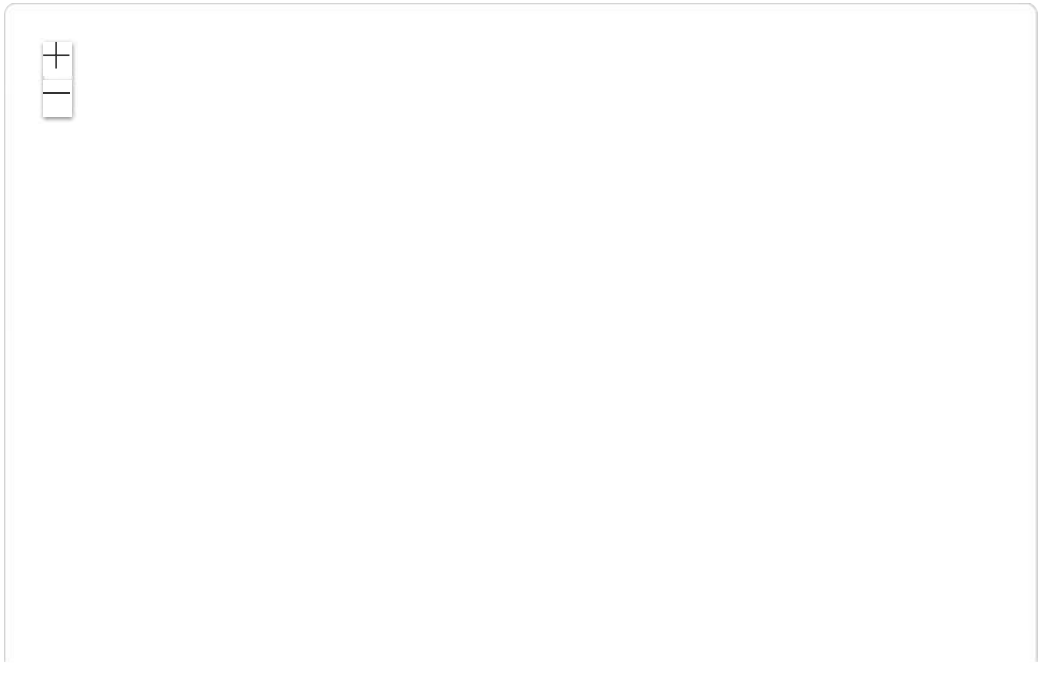
Data

What's in My Neighborhood

Unnamed Dump - Mankato

Location:	See location description Mankato, MN 56001 Blue Earth County
Watershed:	Minnesota River - Mankato (07020007)
Latitude:	44.21191232
Longitude:	-93.9921777
Coordinate collection method:	Digitized-DRG
Currently active?	Yes
Institutional controls:	No



Search with a map

Activity overview | MPCA contacts | Alternate names | Owners | Documents (0)



Investigation and Cleanup

Site Assessment - SA0007219

Status: Inactive

State Assessment sites are places the MPCA has investigated due to suspected contamination. They are assessed to determine if they pose a risk to human health or the environment. If so, they are referred to a cleanup program.

More Detail ▼

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MINNESOTA POLLUTION CONTROL AGENCY

Owatonna Concrete Products-Mankato

Site ID	TS0000562
Location	3301 3rd Ave Mankato, MN 56001 Blue Earth County
Tank Count	2 tanks are (or were) located at this site.



lat/long: 44.20213587,-93.99421443

Tank number	Install date	Registration date	Tank capacity	Tank status	Stored product	Above or underground
001	06/01/1975	12/09/1985	10000	Removed	Fuel Oil	Underground
1002	Unknown	Unknown	500	Active	Diesel Fuel	Aboveground

For further information on aboveground or underground storage tank systems, please visit MPCA's storage tank program page or publications page.

MINNESOTA POLLUTION CONTROL AGENCY

B H Chesley Co

Site ID	TS0000560
Location	2200 4th Ave Mankato, MN 56001 Blue Earth County
Tank Count	2 tanks are (or were) located at this site.



lat/long: 44.18926485,-93.9972965

Tank number	Install date	Registration date	Tank capacity	Tank status	Stored product	Above or underground
012	07/01/1979	11/08/1985	1000	Removed	Motor Oil	Underground
013	07/01/1979	11/08/1985	1000	Removed	Used or waste oil	Underground

For further information on aboveground or underground storage tank systems, please visit MPCA's storage tank program page or publications page.

MINNESOTA POLLUTION CONTROL AGENCY

ADM - Mankato - AST

Site ID	TS0000555
Location	2019 3rd Ave Mankato, MN 56001-2804 Blue Earth County
Tank Count	104 tanks are (or were) located at this site.



lat/long: 44.1869,-93.9935

Tank number	Install date	Registration date	Tank capacity	Tank status	Stored product	Above or underground
001	08/28/1984	03/25/1986	20000	Removed	Chemical other or unspecified	Underground
1	01/01/1992	12/17/1992	200000	Active	Fuel Oil #1	Aboveground
10	01/01/1972	05/21/1990	103667	Closed	Chemical Other Or Unspecified	Aboveground
100	01/01/1997	05/04/2011	580	Active	Diesel Fuel	Aboveground
101	01/01/1997	05/04/2011	1152	Active	Used Oil	Aboveground
102	01/01/1999	05/04/2011	564	Active	Diesel Fuel	Aboveground
103	01/01/1999	05/04/2011	564	Active	Used Oil	Aboveground
104	01/01/1996	05/04/2011	564	Active	Diesel Fuel	Aboveground

Tank number	Install date	Registration date	Tank capacity	Tank status	Stored product	Above or underground
105	01/01/1996	05/04/2011	564	Active	Gasoline Blends (E1-E49)	Aboveground
106	Unknown	Unknown	20000	Pending	Chemical Other Or Unspecified	Aboveground
107	Unknown	Unknown	20000	Pending	Chemical Other Or Unspecified	Aboveground
108	Unknown	Unknown	20000	Pending	Chemical Other Or Unspecified	Aboveground
11	01/01/1972	12/17/1992	499683	Removed	Vegetable and Plant Oils	Aboveground
12	01/01/1972	12/17/1992	499683	Removed	Vegetable and Plant Oils	Aboveground
13	01/01/1972	12/17/1992	499683	Removed	Vegetable and Plant Oils	Aboveground
14	01/01/1972	12/17/1992	499683	Removed	Vegetable and Plant Oils	Aboveground
15	01/01/1975	05/21/1990	20000	Removed	Chemical Other Or Unspecified	Aboveground
16	01/01/1975	05/21/1990	20000	Removed	Chemical Other Or Unspecified	Aboveground
17	01/01/1975	05/21/1990	10000	Active	Chemical Other Or Unspecified	Aboveground

Tank number	Install date	Registration date	Tank capacity	Tank status	Stored product	Above or underground
18	01/01/1975	05/21/1990	10000	Active	Chemical Other Or Unspecified	Aboveground
19	06/01/1996	05/09/2011	12255	Active	Chemical Other Or Unspecified	Aboveground
2	01/01/1974	12/17/1992	190961	Active	Soybean Oil	Aboveground
20	01/01/1996	05/04/2011	5250	Active	Other	Aboveground
20A	12/16/2005	04/18/2019	6715	Active	Hexane	Aboveground
21	01/01/1984	05/04/2011	5250	Active	Other	Aboveground
21B	12/16/2005	04/18/2019	6715	Active	Hexane	Aboveground
22	08/01/1994	11/27/1996	18000	Active	Other	Aboveground
23	01/01/1975	05/21/1990	9200	Active	Other	Aboveground
24	01/01/1975	05/21/1990	9200	Active	Other	Aboveground
25	Unknown	Unknown	3475	Active	Other	Aboveground
26	01/01/1991	11/27/1996	1400	Active	Chemical Other Or Unspecified	Aboveground
27	10/01/1996	11/27/1996	1100	Active	Other	Aboveground
28	10/01/1996	11/27/1996	1200	Active	Other	Aboveground
29	10/01/1996	11/27/1996	1300	Active	Other	Aboveground
3	01/01/1972	12/17/1992	518242	Active	Food	Aboveground
30	10/01/1996	11/27/1996	1400	Active	Other	Aboveground
31	10/01/1996	11/27/1996	50000	Active	Food	Aboveground
32	10/01/1996	11/27/1996	50000	Active	Food	Aboveground
33	10/01/1996	11/27/1996	50000	Active	Food	Aboveground

Tank number	Install date	Registration date	Tank capacity	Tank status	Stored product	Above or underground
34	10/01/1996	11/27/1996	50000	Active	Food	Aboveground
35	10/01/1996	11/27/1996	50000	Active	Food	Aboveground
36	10/01/1996	11/27/1996	50000	Active	Food	Aboveground
37	10/01/1996	11/27/1996	50000	Active	Food	Aboveground
38	10/01/1996	11/27/1996	50000	Active	Food	Aboveground
39	10/01/1996	11/27/1996	50000	Active	Food	Aboveground
4	01/01/1985	12/17/1992	10500	Active	Chemical Acidic	Aboveground
40	10/01/1996	11/27/1996	50000	Active	Food	Aboveground
41	10/01/1996	11/27/1996	50000	Active	Food	Aboveground
42	10/01/1996	11/27/1996	50000	Active	Food	Aboveground
43	10/01/1996	11/27/1996	50000	Active	Food	Aboveground
44	10/01/1996	11/27/1996	50000	Active	Food	Aboveground
45	10/01/1996	11/27/1996	50000	Active	Food	Aboveground
46	10/01/1996	11/27/1996	50000	Active	Food	Aboveground
47	10/01/1996	11/27/1996	50000	Active	Food	Aboveground
48	10/01/1996	11/27/1996	50000	Active	Food	Aboveground
49	10/01/1996	11/27/1996	50000	Active	Food	Aboveground
5	01/01/1978	12/17/1992	4102944	Active	Food	Aboveground
50	10/01/1996	11/27/1996	50000	Active	Food	Aboveground
51	10/01/1996	11/27/1996	50000	Active	Food	Aboveground
52	10/01/1996	11/27/1996	50000	Active	Food	Aboveground
53	10/01/1996	11/27/1996	50000	Active	Food	Aboveground
54	10/01/1996	11/27/1996	50000	Active	Food	Aboveground

Tank number	Install date	Registration date	Tank capacity	Tank status	Stored product	Above or underground
55	10/01/1996	11/27/1996	50000	Active	Food	Aboveground
56	10/01/1996	11/27/1996	50000	Active	Food	Aboveground
57	10/01/1996	11/27/1996	50000	Active	Food	Aboveground
58	10/01/1996	11/27/1996	50000	Active	Food	Aboveground
59	10/01/1996	11/27/1996	50000	Active	Food	Aboveground
6	01/01/1979	05/21/1990	1800576	Active	Food	Aboveground
60	10/01/1996	11/27/1996	50000	Active	Food	Aboveground
61	10/01/1996	11/27/1996	50000	Active	Food	Aboveground
62	10/01/1996	11/27/1996	50000	Active	Food	Aboveground
63	10/01/1996	11/27/1996	50000	Active	Food	Aboveground
64	10/01/1996	11/27/1996	50000	Active	Food	Aboveground
65	10/01/1996	11/27/1996	50000	Active	Food	Aboveground
66	10/01/1996	11/27/1996	50000	Active	Food	Aboveground
68	10/01/1996	11/27/1996	240000	Active	Food	Aboveground
69	10/01/1996	11/27/1996	240000	Active	Food	Aboveground
7	01/01/1985	12/17/1992	10600	Active	Chemical Caustic	Aboveground
70	10/01/1996	11/27/1996	240000	Active	Food	Aboveground
71	10/01/1996	11/27/1996	50000	Active	Food	Aboveground
72	10/01/1996	11/27/1996	50000	Active	Food	Aboveground
73	10/01/1996	11/27/1996	9900	Active	Chemical Other Or Unspecified	Aboveground
74	10/01/1996	11/27/1996	8570	Active	Other	Aboveground
75	10/01/1996	11/27/1996	25400	Active	Food	Aboveground

Tank number	Install date	Registration date	Tank capacity	Tank status	Stored product	Above or underground
76	10/01/1996	11/27/1996	29000	Active	Chemical Other Or Unspecified	Aboveground
77	10/01/1996	11/27/1996	29000	Active	Chemical Other Or Unspecified	Aboveground
78	10/01/1996	11/27/1996	2600	Active	Chemical Other Or Unspecified	Aboveground
79	10/01/1996	11/27/1996	14000	Active	Food	Aboveground
8	01/01/1985	12/17/1992	3200	Active	Chemical Caustic	Aboveground
80	10/01/1996	11/27/1996	14000	Active	Food	Aboveground
81	10/01/1996	11/27/1996	7350	Active	Food	Aboveground
82	10/01/1996	11/27/1996	7350	Active	Food	Aboveground
83	10/01/1996	11/27/1996	15250	Active	Food	Aboveground
84	10/01/1996	11/27/1996	15250	Active	Food	Aboveground
85	10/01/1996	11/27/1996	3000	Active	Food	Aboveground
86	10/01/1996	11/27/1996	12000	Active	Food	Aboveground
87	10/01/1996	11/27/1996	12000	Active	Food	Aboveground
88	10/01/1996	11/27/1996	51700	Active	Food	Aboveground
89	10/01/1996	11/27/1996	51700	Active	Food	Aboveground
9	01/01/1985	12/17/1992	3300	Active	Other	Aboveground
96	09/01/2005	09/08/2005	50000	Active	Other	Aboveground
97	09/01/2005	09/08/2005	50000	Active	Other	Aboveground
98	09/01/2005	09/08/2005	50000	Active	Other	Aboveground
99	01/01/1997	05/04/2011	580	Active	Diesel Fuel	Aboveground

For further information on aboveground or underground storage tank systems, please visit MPCA's storage tank program page or publications page.

MINNESOTA POLLUTION CONTROL AGENCY

United Parcel Service

Site ID	TS0000567
Location	202 Lundin Rd Mankato, MN 56001 Blue Earth County
Tank Count	1 tanks are (or were) located at this site.



lat/long: 44.193517,-93.9983458

Tank number	Install date	Registration date	Tank capacity	Tank status	Stored product	Above or underground
001	08/01/1971	04/15/1986	4000	Removed	Gasoline	Underground

For further information on aboveground or underground storage tank systems, please visit MPCA's storage tank program page or publications page.

MINNESOTA POLLUTION CONTROL AGENCY

MTU Onsite Energy-Lundin

Site ID	TS0000585
Location	304 Lundin Blvd Mankato, MN 56001-2706 Blue Earth County
Tank Count	9 tanks are (or were) located at this site.



lat/long: 44.1939247,-94.00054818

Tank number	Install date	Registration date	Tank capacity	Tank status	Stored product	Above or underground
001	04/01/1979	05/07/1986	1000	Removed	Gasoline	Underground
002	07/01/1984	07/01/1984	250	Removed	Used or waste oil	Underground
1001	01/15/2008	09/16/2008	525	Active	Motor Oil	Aboveground
1002	01/15/2008	09/16/2008	1750	Active	Antifreeze	Aboveground
1003	01/15/2008	09/16/2008	525	Active	Motor Oil	Aboveground
1004	04/30/2008	09/16/2008	525	Removed	Antifreeze	Aboveground
1005	05/31/2008	09/18/2008	225	Active	Used Oil	Aboveground
1006	01/15/2008	09/16/2008	970	Active	Diesel Fuel	Aboveground
1007	06/12/2012	06/14/2012	200	Active	Diesel Fuel	Aboveground

For further information on aboveground or underground storage tank systems, please visit MPCA's storage tank program page or publications page.

MINNESOTA POLLUTION CONTROL AGENCY

Hendleys Inc

Site ID	TS0012840
Location	3501 3rd Ave Mankato, MN 56001 Blue Earth County
Tank Count	4 tanks are (or were) located at this site.



lat/long: 44.2083401,-93.99290954

Tank number	Install date	Registration date	Tank capacity	Tank status	Stored product	Above or underground
001	Unknown	Unknown	2500	Removed	Gasoline	Underground
003	Unknown	Unknown	2500	Removed	Gasoline	Underground
02A	06/01/1978	03/23/1989	3000	Removed	Gasoline	Underground
02B	06/01/1978	03/23/1989	3000	Removed	Gasoline	Underground

For further information on aboveground or underground storage tank systems, please visit MPCA's storage tank program page or publications page.

MINNESOTA POLLUTION CONTROL AGENCY

Shell on 3rd Avenue

Site ID	TS0013519
Location	2424 3rd Ave Mankato, MN 56001 Blue Earth County
Tank Count	5 tanks are (or were) located at this site.



lat/long: 44.19298128,-93.99744542

Tank number	Install date	Registration date	Tank capacity	Tank status	Stored product	Above or underground
001	08/09/1989	12/10/1989	10000	Active	Gasoline	Underground
002	08/09/1989	12/10/1989	10000	Active	Gasoline	Underground
003	08/09/1989	12/10/1989	10000	Active	Gasoline	Underground
004	08/09/1989	12/10/1989	10000	Active	Diesel	Underground
005	08/09/1989	12/10/1989	10000	Active	Diesel	Underground

For further information on aboveground or underground storage tank systems, please visit MPCA's storage tank program page or publications page.

MINNESOTA POLLUTION CONTROL AGENCY

Tow Distributing Corportation

Site ID	TS0019058
Location	3100 3rd Ave N Mankato, MN 56001 Blue Earth County
Tank Count	4 tanks are (or were) located at this site.



lat/long: 44.1995519,-93.9972365

Tank number	Install date	Registration date	Tank capacity	Tank status	Stored product	Above or underground
001	02/06/1984	02/07/1995	2000	Removed	Diesel	Underground
002	02/06/1984	02/07/1995	2000	Removed	Diesel	Underground
003	02/06/1984	02/07/1995	4000	Removed	Gasoline	Underground
004	02/06/1984	02/07/1995	12000	Removed	Gasoline	Underground

For further information on aboveground or underground storage tank systems, please visit MPCA's storage tank program page or publications page.

MINNESOTA POLLUTION CONTROL AGENCY

Catco Parts & Service Inc

Site ID	TS0017016
Location	2626 3rd Ave N Mankato, MN 56001 Blue Earth County
Tank Count	6 tanks are (or were) located at this site.



lat/long: 44.1937049,-93.997011

Tank number	Install date	Registration date	Tank capacity	Tank status	Stored product	Above or underground
001	01/01/1974	07/29/1992	500	Removed	Used or waste oil	Underground
1001	01/01/1990	10/16/1990	265	Active	Used Oil	Aboveground
101A	06/30/1988	10/16/1990	120	Temporarily Closed	Other	Aboveground
101B	06/30/1988	10/16/1990	120	Temporarily Closed	Other	Aboveground
101C	06/30/1988	10/16/1990	120	Temporarily Closed	Other	Aboveground
102A	06/30/1988	10/16/1990	265	Temporarily Closed	Used Oil	Aboveground

For further information on aboveground or underground storage tank systems, please visit MPCA's storage tank program page or publications page.

MINNESOTA POLLUTION CONTROL AGENCY

Crystal Valley Coop

Site ID	TS0050660
Location	3rd Ave & County Road 5 Mankato, MN 56001 Blue Earth County
Tank Count	8 tanks are (or were) located at this site.



lat/long: 44.1967299,-93.99748179

Tank number	Install date	Registration date	Tank capacity	Tank status	Stored product	Above or underground
1001	01/01/1983	05/14/1990	16587	Removed	Diesel Fuel	Aboveground
1002	01/01/1983	05/14/1990	16587	Removed	Diesel Fuel	Aboveground
1003	01/01/1983	05/14/1990	14928	Removed	Diesel Fuel	Aboveground
1004	01/01/1983	05/14/1990	12381	Removed	Fuel Oil #1	Aboveground
1005	01/01/1983	05/14/1990	16587	Removed	Fuel Oil #1	Aboveground
1006	01/01/1983	05/14/1990	16587	Removed	Gasoline Blends (E1-E49)	Aboveground
1007	01/01/1983	05/14/1990	21326	Removed	Gasoline Blends	Aboveground

Tank number	Install date	Registration date	Tank capacity	Tank status	Stored product	Above or underground
					(E1-E49)	
1009	01/01/1988	05/14/1990	15639	Removed	Kerosene	Aboveground

For further information on aboveground or underground storage tank systems, please visit MPCA's storage tank program page or publications page.

MINNESOTA POLLUTION CONTROL AGENCY

Lime Valley Asphalt Inc

Site ID	TS0051400
Location	3600 3rd Ave Mankato, MN 56001 Blue Earth County
Tank Count	6 tanks are (or were) located at this site.



lat/long: 44.2013043,-93.996011

Tank number	Install date	Registration date	Tank capacity	Tank status	Stored product	Above or underground
1	04/01/1985	09/17/1990	11000	Removed	Asphalt and Asphaltic Blends	Aboveground
1002	04/01/1985	09/17/1990	11000	Removed	Asphalt and Asphaltic Blends	Aboveground
1003	04/01/1985	09/17/1990	11000	Removed	Asphalt and Asphaltic Blends	Aboveground
1004	04/01/1985	09/17/1990	11000	Removed	Asphalt and Asphaltic Blends	Aboveground

Tank number	Install date	Registration date	Tank capacity	Tank status	Stored product	Above or underground
1005	04/01/1985	09/17/1990	11000	Removed	Asphalt and Asphaltic Blends	Aboveground
1006	04/01/1985	09/17/1990	11000	Removed	Fuel Oil #1	Aboveground

For further information on aboveground or underground storage tank systems, please visit MPCA's storage tank program page or publications page.

MINNESOTA POLLUTION CONTROL AGENCY

Xcel Energy-Wilmarth/Key City

Site ID	TS0051505
Location	1020 Summit Ave Mankato, MN 56001 Blue Earth County
Tank Count	5 tanks are (or were) located at this site.



lat/long: 44.1964256,-94.0064323

Tank number	Install date	Registration date	Tank capacity	Tank status	Stored product	Above or underground
140	01/01/1970	11/09/2017	1000000	Closed	Other	Aboveground
141	01/01/1970	06/05/1990	510417	Closed	Fuel Oil #1	Aboveground
352	10/25/1993	03/01/2000	600	Active	Diesel Fuel	Aboveground
353	11/01/1993	03/01/2000	600	Active	Diesel Fuel	Aboveground
9A	01/01/1969	07/08/2013	2000	Active	Lubricating Oils	Aboveground

For further information on aboveground or underground storage tank systems, please visit MPCA's storage tank program page or publications page.

MINNESOTA POLLUTION CONTROL AGENCY

Condux International

Site ID	TS0051705
Location	145 Kingswood Dr Mankato, MN 56001-3159 Blue Earth County
Tank Count	1 tanks are (or were) located at this site.



lat/long: 44.19974,-93.992537

Tank number	Install date	Registration date	Tank capacity	Tank status	Stored product	Above or underground
1001	01/01/1985	08/06/1990	250	Removed	Diesel Fuel	Aboveground

For further information on aboveground or underground storage tank systems, please visit MPCA's storage tank program page or publications page.

MINNESOTA POLLUTION CONTROL AGENCY

Phenix Manufacturing

Site ID	TS0055510
Location	241 Mohr Dr Mankato, MN 56001-3038 Blue Earth County
Tank Count	5 tanks are (or were) located at this site.



lat/long: 44.1974,-93.9903

Tank number	Install date	Registration date	Tank capacity	Tank status	Stored product	Above or underground
1001	05/01/1998	02/24/1998	11000	Closed	Other	Aboveground
1002	05/01/1998	02/24/1998	11000	Closed	Other	Aboveground
1003	05/01/1998	02/24/1998	11000	Closed	Other	Aboveground
1004	05/01/1998	02/24/1998	11000	Closed	Other	Aboveground
1005	05/01/1998	02/24/1998	11000	Closed	Other	Aboveground

For further information on aboveground or underground storage tank systems, please visit MPCA's storage tank program page or publications page.

MINNESOTA POLLUTION CONTROL AGENCY

W W Blacktopping Inc

Site ID	TS0122811
Location	700 N Industrial Rd Mankato, MN 56001 Blue Earth County
Tank Count	13 tanks are (or were) located at this site.



lat/long: 44.2035084,-93.9891004

Tank number	Install date	Registration date	Tank capacity	Tank status	Stored product	Above or underground
1001	Unknown	11/12/2002	500	Abandoned	Other	Aboveground
1002	Unknown	11/12/2002	250	Active	Used Oil	Aboveground
1003	Unknown	11/12/2002	250	Abandoned	Other	Aboveground
1004	Unknown	11/12/2002	500	Active	Gasoline Blends (E1-E49)	Aboveground
1005	Unknown	11/12/2002	1000	Active	Diesel Fuel	Aboveground
1006	Unknown	11/12/2002	1000	Active	Diesel Fuel	Aboveground
1007	01/01/1999	11/12/2002	1000	Active	Diesel Fuel	Aboveground
1008	01/01/1999	11/12/2002	200	Active	Kerosene	Aboveground

Tank number	Install date	Registration date	Tank capacity	Tank status	Stored product	Above or underground
1009	01/01/1999	11/12/2002	200	Active	Petroleum Other	Aboveground
1010	01/01/1999	11/12/2002	200	Active	Petroleum Other	Aboveground
1011	Unknown	Unknown	200	Active	Motor Oil	Aboveground
1012	11/10/2009	11/11/2009	12000	Active	Diesel Fuel	Aboveground
1013	11/10/2009	11/11/2009	2000	Active	Diesel Fuel	Aboveground

For further information on aboveground or underground storage tank systems, please visit MPCA's storage tank program page or publications page.

MINNESOTA POLLUTION CONTROL AGENCY

Gopher State Scrap & Metal Inc

Site ID	TS0122893
Location	3401 3rd Ave Mankato, MN 56001 Blue Earth County
Tank Count	1 tanks are (or were) located at this site.



lat/long: 44.199234,-93.9965239

Tank number	Install date	Registration date	Tank capacity	Tank status	Stored product	Above or underground
1001	Unknown	Unknown				Aboveground

For further information on aboveground or underground storage tank systems, please visit MPCA's storage tank program page or publications page.

MINNESOTA POLLUTION CONTROL AGENCY

Jones Metal Inc

Site ID	TS0123601
Location	3201 3rd Ave Mankato, MN 56001-2725 Blue Earth County
Tank Count	2 tanks are (or were) located at this site.



lat/long: 44.20150762,-93.99435176

Tank number	Install date	Registration date	Tank capacity	Tank status	Stored product	Above or underground
1001	06/30/1995	05/07/2004	1625	Removed	Diesel Fuel	Aboveground
1002	06/30/1995	05/07/2004	135	Removed	Used Oil	Aboveground

For further information on aboveground or underground storage tank systems, please visit MPCA's storage tank program page or publications page.

MINNESOTA POLLUTION CONTROL AGENCY

Mankato Energy Center Power Plant-Plant

Site ID	TS0124248
Location	1 Fazio Ln Mankato, MN 56001-2743 Blue Earth County
Tank Count	7 tanks are (or were) located at this site.



lat/long: 44.19925247,-94.00230034

Tank number	Install date	Registration date	Tank capacity	Tank status	Stored product	Above or underground
1-00-ANS-TK-0801	04/02/2019	07/23/2019	45095	Active	Other	Aboveground
1001	11/01/2005	08/08/2006	8820	Active	Other	Aboveground
1002	11/01/2005	08/08/2006	350000	Active	Fuel Oil #2	Aboveground
1003	11/01/2005	08/08/2006	14700	Closed	Chemical Other Or Unspecified	Aboveground
1004	02/07/2013	03/01/2013	6200	Active	Sulfuric Acid	Aboveground
1005	11/01/2005	07/23/2019	8000	Active	Other	Aboveground
1006	11/01/2005	07/23/2019	2100	Active	Other	Aboveground

For further information on aboveground or underground storage tank systems, please visit MPCA's storage tank program page or publications page.

MINNESOTA POLLUTION CONTROL AGENCY

Alter Metal Recycling

Site ID	TS0124439
Location	804 Industrial Rd Mankato, MN 56001-3009 Blue Earth County
Tank Count	3 tanks are (or were) located at this site.



lat/long: 44.203508,-93.992314

Tank number	Install date	Registration date	Tank capacity	Tank status	Stored product	Above or underground
1001	Unknown	09/21/2006	750	Removed	Gasoline Blends (E1-E49)	Aboveground
1002	Unknown	Unknown	500	Active	Petroleum Other	Aboveground
PAST4	08/12/2008	08/18/2008	1000	Active	Diesel Fuel	Aboveground

For further information on aboveground or underground storage tank systems, please visit MPCA's storage tank program page or publications page.

MINNESOTA POLLUTION CONTROL AGENCY

Farmers Coop of Hanska Mankato

Site ID	TS0125780
Location	3301 3rd Ave Mankato, MN 56001 Blue Earth County
Tank Count	1 tanks are (or were) located at this site.



lat/long: 44.20286766,-93.99398591

Tank number	Install date	Registration date	Tank capacity	Tank status	Stored product	Above or underground
001	04/28/2012	08/30/2012	10000	Active	Diesel	Underground

For further information on aboveground or underground storage tank systems, please visit MPCA's storage tank program page or publications page.

MINNESOTA POLLUTION CONTROL AGENCY

WRMC - Mankato

Site ID	TS0125973
Location	161 Summit Ave Mankato, MN 56001 Blue Earth County
Tank Count	36 tanks are (or were) located at this site.



lat/long: 44.197531,-93.9916798

Tank number	Install date	Registration date	Tank capacity	Tank status	Stored product	Above or underground
1001	07/01/2013	07/19/2013	4200	Removed	Diesel Fuel	Aboveground
1002	07/01/2013	07/19/2013	1500	Removed	Other	Aboveground
1003	07/01/2013	07/19/2013	1500	Removed	Other	Aboveground
1004	07/01/2013	07/19/2013	750	Removed	Other	Aboveground
1005	07/01/2013	07/19/2013	750	Removed	Other	Aboveground
1006	07/01/2013	07/19/2013	750	Removed	Other	Aboveground
1007	09/01/2013	07/10/2014	900	Removed	Other	Aboveground
1008	09/01/2013	07/10/2014	850	Active	Chemical Other Or Unspecified	Aboveground
1009	09/01/2013	07/10/2014	850	Active	Chemical Other Or Unspecified	Aboveground

Tank number	Install date	Registration date	Tank capacity	Tank status	Stored product	Above or underground
1010	09/01/2013	07/10/2014	850	Active	Chemical Other Or Unspecified	Aboveground
1011	09/01/2014	07/10/2014	850	Active	Chemical Other Or Unspecified	Aboveground
1012	09/01/2013	07/10/2014	850	Active	Chemical Other Or Unspecified	Aboveground
1013	09/01/2013	07/10/2014	850	Active	Chemical Other Or Unspecified	Aboveground
1014	09/01/2013	07/10/2014	2000	Active	Chemical Other Or Unspecified	Aboveground
1015	05/30/2018	06/26/2018	1000	Active	Chemical Other Or Unspecified	Aboveground
1016	05/31/2018	06/26/2018	1000	Active	Chemical Other Or Unspecified	Aboveground
1017	06/01/2018	06/26/2018	1000	Active	Chemical Other Or Unspecified	Aboveground
1020	07/01/2015	08/22/2023	1000	Active	Other	Aboveground
1021	07/02/2015	08/22/2023	1000	Active	Other	Aboveground
1022	07/03/2015	06/26/2018	850	Active	Other	Aboveground
1023	07/04/2015	08/22/2023	1000	Active	Other	Aboveground
1050	05/01/2020	08/22/2023	850	Active	Other	Aboveground
1051	05/01/2020	08/22/2023	850	Active	Other	Aboveground
1052	05/01/2020	08/22/2023	850	Active	Other	Aboveground

Tank number	Install date	Registration date	Tank capacity	Tank status	Stored product	Above or underground
500	04/15/2014	07/10/2014	1000	Removed	Other	Aboveground
501	04/15/2013	07/10/2014	1000	Removed	Other	Aboveground
502	04/15/2013	07/10/2014	1000	Removed	Other	Aboveground
503	Unknown	07/10/2014	500	Removed	Other	Aboveground
504	04/15/2013	07/10/2014	500	Removed	Other	Aboveground
710	05/23/2019	05/28/2019	10000	Active	Diesel Fuel	Aboveground
CEM 624	05/30/2018	06/26/2018	600	Active	Chemical Other Or Unspecified	Aboveground
CEM 625	05/31/2018	06/26/2018	600	Active	Chemical Other Or Unspecified	Aboveground
CEM 626	06/01/2018	06/26/2018	600	Active	Chemical Other Or Unspecified	Aboveground
CEM 627	06/02/2018	06/26/2018	600	Active	Chemical Other Or Unspecified	Aboveground
CEM 628	06/03/2018	06/26/2018	600	Active	Chemical Other Or Unspecified	Aboveground
CEM 629	06/04/2018	06/26/2018	3000	Active	Diesel Fuel	Aboveground

For further information on aboveground or underground storage tank systems, please visit MPCA's storage tank program page or publications page.

Well Inventory

Unique Number	Well Name	Address	City	County	Township	Range	Section	Depth(ft)	Elevation(ft)	Casing Depth(ft)	Casing Diameter
802410	MW-12-JS	3RD AV	MANKATO	Blue Earth	109	26	30	81	827.1	71	2
539419	HENDLEY'S INC. TB-6	RR 5	MANKATO	Blue Earth	109	26	31	25	825	8	6
802413	MW-15-JS	3RD AV	MANKATO	Blue Earth	109	26	30	112	799.71	102	2
802414	MW-16-JS	3RD AV	MANKATO	Blue Earth	109	26	31	85	803.33	75	2
342744	K-7A-11	null	null	Blue Earth	109	26	30	105	830	null	null
780502	MW-7	3600 3RD AV	MANKATO	Blue Earth	109	26	30	17	799.6	5	2
589755	MW-4	null	null	Blue Earth	109	26	31	45	778	32.4	2
761445	MW-8JS	null	null	Blue Earth	109	26	31	30	803.61	20	2
530510	HENDLEY'S TB-2	5 CR	MANKATO	Blue Earth	109	26	31	29	831	10	6
186201	BUSCH, BILL	null	MANKATO	Blue Earth	109	26	30	135	830	85	5
652892	COUGHLAN COMPANY	73458 3RD AV	MANKATO	Blue Earth	109	26	30	110	830	91	5
686896	MW	null	null	Blue Earth	109	26	30	66	815	62	2
530511	HENDLEY'S INC TB-3	5 CR	MANKATO	Blue Earth	109	26	31	31	827	7.5	6
802411	MW-13-JS	3RD AV	MANKATO	Blue Earth	109	26	30	131	826.92	121	2
802412	MW-14-JS	3RD AV	MANKATO	Blue Earth	109	26	30	57	799.85	47	2
342741	K-1-11	null	null	Blue Earth	109	26	30	110	824	null	null
112914	LOEFFLER, RAY	null	MANKATO	Blue Earth	109	26	30	127	830	86	5
511439	MILLER, JEROME	null	null	Blue Earth	109	26	31	210	832	115	5
686898	MW	null	null	Blue Earth	109	26	30	89	829.03	84	2
439310	LOEFFLER, AL	RR 5 BOX 19	MANKATO	Blue Earth	109	26	30	127	828	91	5
342742	K-2-11	null	null	Blue Earth	109	26	30	101	830	null	null
160363	WINKLER, VERNON	RR 5	MANKATO	Blue Earth	109	26	31	270	764.35	83	6
539420	HENDLEY'S INC. TB-4	RR 5 BOX 14	MANKATO	Blue Earth	109	26	31	50	827	45	2
668827	SOUTHERN MN CONST. MW-2	3RD AV	MANKATO	Blue Earth	109	26	30	16	796	5	2
668826	SOUTHERN MN CONST. MW-1	3RD AV	MANKATO	Blue Earth	109	26	30	20	797	9	2
802409	MW-11-JS	3RD AV	MANKATO	Blue Earth	109	26	30	132	823.71	122	2
190629	KRISTICE INC.	null	MANKATO	Blue Earth	109	26	31	210	828	117	5
686895	MW	null	null	Blue Earth	109	26	30	68	828	64	2
186124	WINKLER, VERNON	RR 5	MANKATO	Blue Earth	109	26	31	160	778	96	5
154677	MIDWEST REALTY	2 STONEHEDGE	MANKATO	Blue Earth	109	26	30	277	815	84	5
620926	HORNEMANN, DENNIS	RR 5 BOX 22	MANKATO	Blue Earth	109	26	30	100	832	91	5
342743	K-3-11	null	null	Blue Earth	109	26	30	78	805	null	null
802408	MW-9-JS	3RD AV	MANKATO	Blue Earth	109	26	30	66	799.74	56	2
614146	WINKLER, VERNON	57076 230TH LA	MANKATO	Blue Earth	109	26	31	335	775.1	115	6
761444	MW-7JS	null	null	Blue Earth	109	26	31	31	804.98	21	2
686897	MW	null	null	Blue Earth	109	26	30	69	829.48	64	2
530512	HENDLEY'S, INC. TB-1	5 CR	MANKATO	Blue Earth	109	26	31	27	828	8	6
539418	HENDLEY'S INC. TB-5	RR 5	MANKATO	Blue Earth	109	26	31	25	828	8	6
716574	MANKATO KASOTA STONE	null	null	Blue Earth	109	26	30	230	831	145	5
761446	MW-5JS	null	null	Blue Earth	109	26	31	30	826.43	20	2
796052	MW 8B	57075 230TH LA	MANKATO	Blue Earth	109	26	31	30	null	25	2
796051	MW 8	57076 230TH LA	MANKATO	Blue Earth	109	26	31	11	null	null	2
818514	SANDS, JORDAN	57068 231ST LA	MANKATO	Blue Earth	109	26	31	75	null	52	5

Minnesota Unique Well Number

802410

County Blue Earth
Quad Mankato
Quad ID 55B

MINNESOTA DEPARTMENT OF HEALTH

WELL AND BORING REPORT

Minnesota Statutes Chapter 1031

Entry Date 03/27/2015
Update Date 01/12/2018
Received Date 02/02/2015

Well Name	Township	Range	Dir	Section	Subsection
MW-12-JS	109	26	W	30	DBCBDD

Elevation 827.1 **Elev. Method** Surveyed

Address

Well 3RD AV MANKATO MN 56001
Contact 1710 ROE CREST DR NORTH MANKATO MN 55003

Stratigraphy Information

Geological Material	From	To (ft.)	Color	Hardness
TOP SOIL	0	1	BLACK	SOFT
LIMESTONE	1	9	YELLOW	M.HARD
LIMESTONE	9	38	YELLOW	HARD
SANDSTONE	38	81	WHITE	SOFT

Remarks

Well Depth 81 ft. **Depth Completed** 81 ft. **Date Well Completed** 10/28/2014

Drill Method Non-specified Rotary **Drill Fluid** Water

Use monitor well **Status** Active

Well Hydrofractured? Yes ☐ No ☒ **From** **To**

Casing Type Single casing **Joint** Threaded
Drive Shoe? Yes ☐ No ☒ **Above/Below**

Casing Diameter	Weight	Hole Diameter
2 in. To 71 ft.	lbs./ft.	6.2 in. To 81 ft.

Open Hole From ft. To ft.

Screen? ☒ **Type** stainless **Make** JOHNSON

Diameter	Slot/Gauze	Length	Set
2 in.	10	10 ft.	71 ft. 81 ft.

Static Water Level
35 ft. land surface Measure 10/28/2014

Pumping Level (below land surface)

Wellhead Completion
Pitless adapter manufacturer Model
☒ Casing Protection ☒ 12 in. above grade
☐ At-grade (Environmental Wells and Borings ONLY)

Grouting Information Well Grouted? ☒ Yes ☐ No ☐ Not Specified

Material	Amount	From	To
neat cement	25 Sacks	ft.	71 ft.

Nearest Known Source of Contamination
500 feet West Direction Septic tank/drain field Type
Well disinfected upon completion? ☐ Yes ☐ No

Pump ☒ Not Installed Date Installed
Manufacturer's name
Model Number HP Volt
Length of drop pipe ft Capacity g.p. Typ

Abandoned
Does property have any not in use and not sealed well(s)? ☐ Yes ☒ No

Variance
Was a variance granted from the MDH for this well? ☐ Yes ☒ No

Miscellaneous
First Bedrock Prairie Du Chien Group Aquifer Jordan
Last Strat Jordan Sandstone Depth to Bedrock 1 ft
Located by Minnesota Geological Survey
Locate Method Digitization (Screen) - Map (1:12,000) (>15 meters)
System UTM - NAD83, Zone 15, Meters X 420253 Y 4896257
Unique Number Verification Info/GPS from data Input Date 01/12/2018

Angled Drill Hole

Well Contractor
Jadd Seppmann and Sons, 1790 SEPPMANN, T.
Licensee Business Lic. or Reg. No. Name of Driller

Minnesota Unique Well Number

539419

County Blue Earth
Quad Mankato
Quad ID 55B

MINNESOTA DEPARTMENT OF HEALTH

WELL AND BORING REPORT

Minnesota Statutes Chapter 1031

Entry Date 06/17/1997
Update Date 05/06/2005
Received Date

Well Name	Township	Range	Dir	Section	Subsection
HENDLEY'S INC.	109	26	W	31	AACCCA

Elevation 825 ft. **Elev. Method** 7.5 minute topographic map (+/- 5 feet)

Address

Contact RR 5 BOX 14 MANKATO
Well RR 5 MANKATO MN

Stratigraphy Information

Geological Material	From	To (ft.)	Color	Hardness
SILTY SAND	0	4	BROWN	
SAND, SOME SILT	4	5	BROWN	
DOLOMITE	5	10	BROWN	HARD
DOLO	10	25	VARIED	HARD

Remarks

USE IS REMEDIAL.
WELL SEALED 03-11-1997 BY 07478

Well Depth 25 ft. **Depth Completed** 25 ft. **Date Well Completed** 03/04/1994

Drill Method Vibracore/rotasonic **Drill Fluid**

Use other (specify in remarks) **Status** Sealed

Well Hydrofractured? Yes ☐ No ☐ **From** **To**

Casing Type Single casing **Joint**
Drive Shoe? Yes ☒ No ☐ **Above/Below**

Casing Diameter	Weight	Hole Diameter
6 in. To 8 ft.	lbs./ft.	4.5 in. To 25 ft.

Open Hole From 8 ft. To 25 ft.

Screen? ☐ **Type** **Make**

Static Water Level

Pumping Level (below land surface)

Wellhead Completion

Pitless adapter manufacturer Model

☒ Casing Protection ☐ 12 in. above grade
☐ At-grade (Environmental Wells and Borings ONLY)

Grouting Information Well Grouted? ☐ Yes ☒ No ☐ Not Specified

Nearest Known Source of Contamination

feet Direction Type

Well disinfected upon completion? ☐ Yes ☐ No

Pump ☒ Not Installed Date Installed

Manufacturer's name

Model Number HP Volt

Length of drop pipe ft Capacity g.p. Typ

Abandoned

Does property have any not in use and not sealed well(s)? ☐ Yes ☒ No

Variance

Was a variance granted from the MDH for this well? ☐ Yes ☐ No

Miscellaneous

First Bedrock Prairie Du Chien/Oneota Aquifer Oneota Fm
Last Strat Prairie Du Chien/Oneota Depth to Bedrock 5 ft
Located by Minnesota Geological Survey
Locate Method Digitization (Screen) - Map (1:24,000) (15 meters or
System UTM - NAD83, Zone 15, Meters X 420600 Y 4895387
Unique Number Verification Other, note in Input Date 10/21/2002

Angled Drill Hole

Well Contractor

Boart Longyear Drilling 49588 JOHNSON, S.
Licensee Business Lic. or Reg. No. Name of Driller

Minnesota Unique Well Number

802413

County Blue Earth
Quad Mankato
Quad ID 55B

MINNESOTA DEPARTMENT OF HEALTH

WELL AND BORING REPORT

Minnesota Statutes Chapter 1031

Entry Date 03/27/2015
Update Date 01/12/2018
Received Date 02/02/2015

Well Name	Township	Range	Dir	Section	Subsection
MW-15-JS	109	26	W	30	DCCBDC

Elevation 799.71 **Elev. Method** Surveyed

Address

Well 3RD AV MANKATO MN 56001
Contact 1710 ROE CREST DR NORTH MANKATO MN 55003

Stratigraphy Information

Geological Material	From	To (ft.)	Color	Hardness
LIMESTONE	0	15	YEL/GRY	HARD
SHALE	15	17	GREEN	SOFT
SANDSTONE	17	63	WHITE	SOFT
SANDSTONE	63	112	PINK	MEDIUM

Remarks

Well Depth 112 ft. **Depth Completed** 112 ft. **Date Well Completed** 10/28/2014

Drill Method Non-specified Rotary **Drill Fluid** Water

Use monitor well **Status** Active

Well Hydrofractured? Yes ☐ No ☒ **From** **To**

Casing Type Single casing **Joint** Threaded
Drive Shoe? Yes ☐ No ☒ **Above/Below**

Casing Diameter	Weight	Hole Diameter
2 in. To 102 ft.	lbs./ft.	6.2 in. To 112 ft.

Open Hole From ft. To ft.

Screen? ☒ **Type** stainless **Make** JOHNSON

Diameter	Slot/Gauze	Length	Set
2 in.	10	10 ft.	102 ft. 112 ft.

Static Water Level
32 ft. land surface Measure 10/28/2014

Pumping Level (below land surface)

Wellhead Completion
Pitless adapter manufacturer Model
☒ Casing Protection ☒ 12 in. above grade
☐ At-grade (Environmental Wells and Borings ONLY)

Grouting Information Well Grouted? ☒ Yes ☐ No ☐ Not Specified

Material	Amount	From	To
neat cement	40 Sacks	ft.	102 ft.

Nearest Known Source of Contamination
feet Direction Type
Well disinfected upon completion? ☐ Yes ☐ No

Pump ☒ Not Installed Date Installed
Manufacturer's name
Model Number HP Volt
Length of drop pipe ft Capacity g.p. Typ

Abandoned
Does property have any not in use and not sealed well(s)? ☐ Yes ☒ No

Variance
Was a variance granted from the MDH for this well? ☐ Yes ☒ No

Miscellaneous
First Bedrock Prairie Du Chien Group Aquifer Jordan
Last Strat Jordan Sandstone Depth to Bedrock 0 ft
Located by Minnesota Geological Survey
Locate Method Digitization (Screen) - Map (1:12,000) (>15 meters)
System UTM - NAD83, Zone 15, Meters X 420233 Y 4895853
Unique Number Verification Info/GPS from data Input Date 01/12/2018

Angled Drill Hole

Well Contractor
Jadd Seppmann and Sons, 1790 SEPPMANN, T.
Licensee Business Lic. or Reg. No. Name of Driller

Minnesota Unique Well Number

802414

County Blue Earth
Quad Mankato
Quad ID 55B

MINNESOTA DEPARTMENT OF HEALTH

WELL AND BORING REPORT

Minnesota Statutes Chapter 1031

Entry Date 03/27/2015
Update Date 01/12/2018
Received Date 02/02/2015

Well Name	Township	Range	Dir	Section	Subsection
MW-16-JS	109	26	W	31	ABCCBB

Elevation 803.33 **Elev. Method** LiDAR 1m DEM (MNDNR)

Address

Well 3RD AV MANKATO MN 56001
Contact 1710 ROE CREST DR NORTH MANKATO MN 56003

Stratigraphy Information

Geological Material	From	To (ft.)	Color	Hardness
LIMESTONE/FILL	0	10	BROWN	SOFT
LIMESTONE	10	20	PINK	HARD
SANDSTONE	20	81	WHITE	SOFT
DOLOMITE	81	85	PINK	HARD

Remarks

Well Depth 85 ft. **Depth Completed** 85 ft. **Date Well Completed** 10/28/2014

Drill Method Non-specified Rotary **Drill Fluid** Bentonite

Use monitor well **Status** Active

Well Hydrofractured? Yes ☐ No ☒ **From** **To**

Casing Type Single casing **Joint** Threaded
Drive Shoe? Yes ☐ No ☒ **Above/Below**

Casing Diameter	Weight	Hole Diameter
2 in. To 75 ft.	lbs./ft.	6.2 in. To 85 ft.

Open Hole From ft. To ft.

Screen? ☒ **Type** stainless **Make** JOHNSON

Diameter	Slot/Gauze	Length	Set
2 in.	10	10 ft.	75 ft. 85 ft.

Static Water Level
15 ft. land surface Measure 10/28/2014

Pumping Level (below land surface)

Wellhead Completion
Pitless adapter manufacturer Model
☒ Casing Protection ☒ 12 in. above grade
☐ At-grade (Environmental Wells and Borings ONLY)

Grouting Information Well Grouted? ☒ Yes ☐ No ☐ Not Specified

Material	Amount	From	To
neat cement	20 Sacks	ft.	72 ft.

Nearest Known Source of Contamination
300 feet Southwes Direction Body of water Type
Well disinfected upon completion? ☐ Yes ☐ No

Pump ☒ Not Installed Date Installed
Manufacturer's name
Model Number HP Volt
Length of drop pipe ft Capacity g.p. Typ

Abandoned
Does property have any not in use and not sealed well(s)? ☐ Yes ☒ No

Variance
Was a variance granted from the MDH for this well? ☐ Yes ☒ No

Miscellaneous
First Bedrock Prairie Du Chien Group Aquifer Jordan
Last Strat Jordan Sandstone Depth to Bedrock 10 ft
Located by Minnesota Geological Survey
Locate Method Digitization (Screen) - Map (1:12,000) (>15 meters)
System UTM - NAD83, Zone 15, Meters X 420186 Y 4895429
Unique Number Verification Info/GPS from data Input Date 01/12/2018

Angled Drill Hole

Well Contractor
Jadd Seppmann and Sons, 1790 SEPPMANN, T.
Licensee Business Lic. or Reg. No. Name of Driller

Minnesota Unique Well Number

342744

County Blue Earth
Quad Mankato
Quad ID 55B

MINNESOTA DEPARTMENT OF HEALTH

WELL AND BORING REPORT

Minnesota Statutes Chapter 1031

Entry Date 03/22/2022
Update Date 03/22/2022
Received Date

Well Name	Township	Range	Dir	Section	Subsection
K-7A-11	109	26	W	30	DDBDDA

Elevation 830 ft. **Elev. Method** LiDAR 1m DEM (MNDNR)

Address

Contact 818 WILLOW ST N MANKATO MN 56002

Stratigraphy Information

Geological Material	From	To (ft.)	Color	Hardness
SAND	0	14	BROWN	
LIMESTONE	14	55	PUR/PNK	HARD
SANDSTONE	55	105	GRY/BRN	M.HARD

Remarks

Well Depth 105 ft. **Depth Completed** 105 ft. **Date Well Completed** 03/29/2011

Drill Method **Drill Fluid**

Use environ. bore hole **Status** Sealed

Well Hydrofractured? **Yes** ☐ **No** ☐ **From** **To**

Casing Type **Joint**
Drive Shoe? **Yes** ☐ **No** ☐ **Above/Below**

Open Hole From ft. To ft.

Screen? ☐ **Type** **Make**

Static Water Level
7.3 ft. land surface Measure 03/29/2011

Pumping Level (below land surface)

Wellhead Completion
Pitless adapter manufacturer Model
☐ Casing Protection ☐ 12 in. above grade
☐ At-grade (Environmental Wells and Borings ONLY)

Grouting Information Well Grouted? ☒ Yes ☐ No ☐ Not Specified

Material	Amount		From		To	
neat cement	3	Sacks	12	ft.	105	ft.
bentonite	1.5	Sacks		ft.	12	ft.

Nearest Known Source of Contamination
feet Direction Type
Well disinfected upon completion? ☐ Yes ☐ No

Pump ☒ Not Installed Date Installed
Manufacturer's name
Model Number HP Volt
Length of drop pipe ft Capacity g.p. Typ

Abandoned
Does property have any not in use and not sealed well(s)? ☐ Yes ☐ No

Variance
Was a variance granted from the MDH for this well? ☐ Yes ☒ No

Miscellaneous
First Bedrock Prairie Du Chien Group Aquifer
Last Strat Jordan Sandstone Depth to Bedrock 13.6 ft
Located by Minnesota Geological Survey
Locate Method Digitization (Screen) - Map (1:24,000) (15 meters or
System UTM - NAD83, Zone 15, Meters X 420755 Y 4895984
Unique Number Verification Info/GPS from data Input Date 03/22/2022

Angled Drill Hole

Well Contractor
Subsurface Exploration 2974 CARLSON, J.
Licensee Business Lic. or Reg. No. Name of Driller

Minnesota Unique Well Number

780502

County Blue Earth
Quad Mankato
Quad ID 56A

MINNESOTA DEPARTMENT OF HEALTH

WELL AND BORING REPORT

Minnesota Statutes Chapter 1031

Entry Date
Update Date 10/14/2022
Received Date 03/14/2011

Well Name	Township	Range	Dir	Section	Subsection
MW-7	109	26	W	30	CDABAD

Elevation 799.6 **Elev. Method** Surveyed

Address

Well 3600 3RD AV MANKATO MN 56001
Contact PO BOX 3069 MANKATO MN 56002

Stratigraphy Information

Geological Material	From	To (ft.)	Color	Hardness
WEATHERED	0	7		
SANDSTONE	7	17		

Remarks

MW-7.
WELLHEAD COMPLETION: CASING PROTECTION= 6" PROTOP.

Well Depth	Depth Completed	Date Well Completed
17 ft.	15 ft.	08/12/2010

Drill Method Auger (non-specified) **Drill Fluid**

Use monitor well **Status** Active

Well Hydrofractured? Yes ☐ No ☒ **From** **To**

Casing Type Single casing **Joint**
Drive Shoe? Yes ☐ No ☐ **Above/Below**

Casing Diameter	Weight	Hole Diameter
2 in. To 5 ft.	lbs./ft.	8 in. To 15 ft.

Open Hole From ft. To ft.

Screen? ☒ **Type** stainless **Make** JOHNSON

Diameter	Slot/Gauze	Length	Set
2 in.	10	10 ft.	5 ft. 15 ft.

Static Water Level
6 ft. land surface Measure 08/12/2010

Pumping Level (below land surface)

Wellhead Completion
Pitless adapter manufacturer Model
☒ Casing Protection ☐ 12 in. above grade
☐ At-grade (Environmental Wells and Borings ONLY)

Grouting Information Well Grouted? ☒ Yes ☐ No ☐ Not Specified

Material	Amount	From	To
neat cement	0.5 Sacks	0 ft.	4 ft.

Nearest Known Source of Contamination
feet Direction Type
Well disinfected upon completion? ☐ Yes ☒ No

Pump ☒ Not Installed Date Installed
Manufacturer's name
Model Number HP Volt
Length of drop pipe ft Capacity g.p. Typ

Abandoned
Does property have any not in use and not sealed well(s)? ☐ Yes ☒ No

Variance
Was a variance granted from the MDH for this well? ☐ Yes ☒ No

Miscellaneous
First Bedrock Aquifer
Last Strat Depth to Bedrock ft
Located by Minnesota Geological Survey
Locate Method Digitization (Screen) - Map (1:24,000) (15 meters or
System UTM - NAD83, Zone 15, Meters X 420050 Y 4896109
Unique Number Verification Info/GPS from data Input Date 10/14/2022

Angled Drill Hole

Well Contractor
Aqua Plus, Inc. 1467 CANTY, B.
Licensee Business Lic. or Reg. No. Name of Driller

Minnesota Unique Well Number

589755

County Blue Earth
Quad Mankato
Quad ID 56A

MINNESOTA DEPARTMENT OF HEALTH

WELL AND BORING REPORT

Minnesota Statutes Chapter 1031

Entry Date 04/22/2003
Update Date 05/16/2017
Received Date

Well Name	Township	Range	Dir	Section	Subsection
MW-4	109	26	W	31	BDACBC

Elevation 778 ft. **Elev. Method** 7.5 minute topographic map (+/- 5 feet)

Address

Stratigraphy Information

Geological Material	From	To (ft.)	Color	Hardness
FILL	0	7	BRN/BLK	
SAND W/SILT	7	10	BROWN	
SILTY SAND & SAND	10	45	BROWN	

Remarks

Well Depth 45 ft. **Depth Completed** 42.4 ft. **Date Well Completed** 04/10/1997

Drill Method Multiple methods used **Drill Fluid**

Use monitor well **Status** Unknow

Well Hydrofractured? Yes ☐ No ☐ **From** **To**

Casing Type Single casing **Joint** Threaded
Drive Shoe? Yes ☒ No ☐ **Above/Below**

Casing Diameter	Weight	Hole Diameter
2 in. To 32.4 ft.	lbs./ft.	8 in. To 45 ft.

Open Hole From ft. To ft.

Screen? ☒ **Type** stainless **Make** COOK

Diameter	Slot/Gauze	Length	Set	
2 in.	20	10 ft.	32 ft.	42.4 ft.

Static Water Level
33 ft. land surface Measure 04/10/1997

Pumping Level (below land surface)

Wellhead Completion
Pitless adapter manufacturer Model
☒ Casing Protection ☒ 12 in. above grade
☐ At-grade (Environmental Wells and Borings ONLY)

Grouting Information Well Grouted? ☒ Yes ☐ No ☐ Not Specified

Material	Amount	From	To
neat cement		4 ft.	30.4 ft.
bentonite		30.4 ft.	31.4 ft.
concrete		ft.	4 ft.

Nearest Known Source of Contamination
feet Direction Type
Well disinfected upon completion? ☐ Yes ☐ No

Pump ☒ Not Installed Date Installed
Manufacturer's name
Model Number HP Volt
Length of drop pipe ft Capacity g.p. Typ

Abandoned
Does property have any not in use and not sealed well(s)? ☐ Yes ☐ No

Variance
Was a variance granted from the MDH for this well? ☐ Yes ☒ No

Miscellaneous
First Bedrock Aquifer Quat. Water
Last Strat sand+silt-brown Depth to Bedrock ft
Located by Minnesota Geological Survey
Locate Method Digitization (Screen) - Map (1:24,000) (15 meters or
System UTM - NAD83, Zone 15, Meters X 419978 Y 4895221
Unique Number Verification Tag on well Input Date 10/16/2002

Angled Drill Hole

Well Contractor

Licensee Business	Lic. or Reg. No.	Name of Driller
American Engineering	M0156	BABCOCK

Minnesota Unique Well Number

761445

County Blue Earth
Quad Mankato
Quad ID 55B

MINNESOTA DEPARTMENT OF HEALTH

WELL AND BORING REPORT

Minnesota Statutes Chapter 1031

Entry Date 03/06/2014
Update Date 01/12/2018
Received Date 01/09/2014

Well Name	Township	Range	Dir	Section	Subsection
MW-8JS	109	26	W	31	ABCCBB

Elevation 803.61 **Elev. Method** Surveyed

Address

Contact 1710 ROE CREST DR NORTH MANKATO MN 56003

Stratigraphy Information

Geological Material	From	To (ft.)	Color	Hardness
SILTY SAND	0	4	ORANGE	MEDIUM
WEATHERED	4	6	ORN/WHT	
LIMESTONE	6	30		HARD

Remarks

W-8J MA-12-6554D BECKY MCCARTY.

Well Depth 30 ft. **Depth Completed** 30 ft. **Date Well Completed** 06/10/2013

Drill Method Multiple methods used **Drill Fluid**

Use monitor well **Status** Active

Well Hydrofractured? Yes ☐ No ☒ **From** **To**

Casing Type Single casing **Joint** Threaded

Drive Shoe? Yes ☐ No ☒ **Above/Below**

Casing Diameter	Weight	Hole Diameter
2 in. To 20 ft.	3.75 lbs./ft.	10 in. To 4 ft.
		6 in. To 30 ft.

Open Hole From ft. To ft.

Screen? ☒ **Type** plastic **Make** JOHNSON

Diameter	Slot/Gauze	Length	Set	
2 in.	10	10 ft.	20 ft.	30 ft.

Static Water Level

16.7 ft. land surface Measure 06/10/2013

Pumping Level (below land surface)

Wellhead Completion

Pitless adapter manufacturer Model

☒ Casing Protection ☒ 12 in. above grade

☐ At-grade (Environmental Wells and Borings ONLY)

Grouting Information Well Grouted? ☒ Yes ☐ No ☐ Not Specified

Material	Amount		From	To
neat cement	4	Sacks	4 ft.	17 ft.
concrete	4	Sacks	ft.	4 ft.

Nearest Known Source of Contamination

feet Direction Type

Well disinfected upon completion? ☐ Yes ☒ No

Pump ☒ Not Installed Date Installed

Manufacturer's name

Model Number HP Volt

Length of drop pipe ft Capacity g.p. Typ

Abandoned

Does property have any not in use and not sealed well(s)? ☐ Yes ☒ No

Variance

Was a variance granted from the MDH for this well? ☐ Yes ☒ No

Miscellaneous

First Bedrock Prairie Du Chien Group Aquifer Prairie Du Chien

Last Strat Prairie Du Chien Group Depth to Bedrock 4 ft

Located by Minnesota Geological Survey

Locate Method Digitization (Screen) - Map (1:12,000) (>15 meters)

System UTM - NAD83, Zone 15, Meters X 420184 Y 4895428

Unique Number Verification Info/GPS from data Input Date 01/12/2018

Angled Drill Hole

Well Contractor

Braun Intertec Corp. 1323 CHERMAK, J.

Licensee Business Lic. or Reg. No. Name of Driller

Minnesota Unique Well Number

530510

County Blue Earth
Quad Mankato
Quad ID 55B

MINNESOTA DEPARTMENT OF HEALTH

WELL AND BORING REPORT

Minnesota Statutes Chapter 1031

Entry Date 06/17/1997
Update Date 03/10/2014
Received Date

Well Name	Township	Range	Dir	Section	Subsection
HENDLEY'S TB-	109	26	W	31	ABADDD

Elevation 831 ft. **Elev. Method** 7.5 minute topographic map (+/- 5 feet)

Address

Contact 421 2ND N MANKATO MN 56001
Well 5 CR MANKATO MN 56001

Stratigraphy Information

Geological Material	From	To (ft.)	Color	Hardness
SILTY SAND	0	2	BLACK	
SAND, SOME SILT	2	5	BROWN	
CLAY, SOME SAND	5	6	BROWN	
SAND, SOME FINE	6	7	RED/BRN	
CLAY, SOME GRAVEL,	7	8	WHITE	
DOLOMITE, SOME	8	14	BROWN	HARD
DOLOMITE	14	25	VARIED	HARD
DOLOMITE, VUGS	25	29	VARIED	HARD

Remarks

H-117806 - SEPPMANN WELL DRILLING
WELL SEALED 03-11-1997 BY 07478

Well Depth 29 ft. **Depth Completed** 29 ft. **Date Well Completed** 06/01/1993

Drill Method Vibracore/rotasonic **Drill Fluid**

Use abandoned **Status** Sealed

Well Hydrofractured? Yes ☐ No ☐ **From** **To**

Casing Type Single casing **Joint**
Drive Shoe? Yes ☒ No ☐ **Above/Below**

Casing Diameter	Weight	Hole Diameter
6 in. To 10 ft.	lbs./ft.	6.5 in. To 29 ft.

Open Hole From 9 ft. To 29 ft.

Screen? ☐ **Type** **Make**

Static Water Level

Pumping Level (below land surface)

Wellhead Completion

Pitless adapter manufacturer Model

☐ Casing Protection ☐ 12 in. above grade
☒ At-grade (Environmental Wells and Borings ONLY)

Grouting Information Well Grouted? ☐ Yes ☒ No ☐ Not Specified

Nearest Known Source of Contamination

feet Direction Type

Well disinfected upon completion? ☐ Yes ☐ No

Pump ☒ Not Installed Date Installed

Manufacturer's name

Model Number HP Volt

Length of drop pipe ft Capacity g.p. Typ

Abandoned

Does property have any not in use and not sealed well(s)? ☐ Yes ☒ No

Variance

Was a variance granted from the MDH for this well? ☐ Yes ☐ No

Miscellaneous

First Bedrock Prairie Du Chien/Oneota Aquifer Oneota Fm
Last Strat Prairie Du Chien/Oneota Depth to Bedrock 8 ft
Located by Minnesota Geological Survey
Locate Method Digitization (Screen) - Map (1:24,000) (15 meters or
System UTM - NAD83, Zone 15, Meters X 420542 Y 4895561
Unique Number Verification Other, note in Input Date 10/21/2002

Angled Drill Hole

Well Contractor

Licensee Business	Lic. or Reg. No.	Name of Driller
Boart Longyear Drilling	49588	ANDERSON, J.

Minnesota Unique Well Number

186201

County Blue Earth
Quad Mankato
Quad ID 55B

MINNESOTA DEPARTMENT OF HEALTH

WELL AND BORING REPORT

Minnesota Statutes Chapter 1031

Entry Date 06/17/1997
Update Date 05/22/2014
Received Date

Well Name	Township	Range	Dir	Section	Subsection
BUSCH, BILL	109	26	W	30	ACDCDB

Elevation 830 ft. **Elev. Method** 7.5 minute topographic map (+/- 5 feet)

Address

C/W MANKATO MN

Stratigraphy Information

Geological Material	From	To (ft.)	Color	Hardness
DRIFT	0	35		
LIME ROCK	35	66		
SAND ROCK	66	85		
LIME AND SAND ROCK	85	135		

Remarks

Well Depth 135 ft. **Depth Completed** 135 ft. **Date Well Completed** 00/00/1989

Drill Method Non-specified Rotary **Drill Fluid**

Use domestic **Status** Active

Well Hydrofractured? Yes ☐ No ☐ **From** **To**

Casing Type Single casing **Joint** Threaded

Drive Shoe? Yes ☐ No ☐ **Above/Below** 0 ft.

Casing Diameter	Weight	Hole Diameter
5 in. To 85 ft.	lbs./ft.	5 in. To 0 ft.

Open Hole From 85 ft. To 135 ft.

Screen? ☐ **Type** **Make**

Static Water Level

52 ft. land surface Measure 00/00/1989

Pumping Level (below land surface)

Wellhead Completion

Pitless adapter manufacturer Model

☐ Casing Protection ☐ 12 in. above grade

☐ At-grade (Environmental Wells and Borings ONLY)

Grouting Information Well Grouted? ☒ Yes ☐ No ☐ Not Specified

Material	Amount	From	To
neat cement	0	0 ft.	85 ft.

Nearest Known Source of Contamination

62 feet Northeas Direction Septic tank/drain field Type

Well disinfected upon completion? ☐ Yes ☐ No

Pump ☐ Not Installed Date Installed 00/00/1989

Manufacturer's name RED JACKET

Model Number HP 0.5 Volt 220

Length of drop pipe 80 ft Capacity 10 g.p. Typ Submersible

Abandoned

Does property have any not in use and not sealed well(s)? ☐ Yes ☐ No

Variance

Was a variance granted from the MDH for this well? ☐ Yes ☐ No

Miscellaneous

First Bedrock Prairie Du Chien Group Aquifer Jordan

Last Strat Jordan Sandstone Depth to Bedrock 35 ft

Located by Minnesota Geological Survey

Locate Method Digitization (Screen) - Map (1:24,000) (15 meters or

System UTM - NAD83, Zone 15, Meters X 420420 Y 4896583

Unique Number Verification Information from Input Date 06/02/2000

Angled Drill Hole

Well Contractor

Baer Well Co. 07251 BAER, J.

Licensee Business Lic. or Reg. No. Name of Driller

Minnesota Unique Well Number

652892

County Blue Earth
Quad Mankato
Quad ID 55B

MINNESOTA DEPARTMENT OF HEALTH

WELL AND BORING REPORT

Minnesota Statutes Chapter 1031

Entry Date 10/01/2002
Update Date 03/10/2014
Received Date 08/28/2002

Well Name	Township	Range	Dir	Section	Subsection
COUGHLAN	109	26	W	30	DABDAA

Elevation 830 ft. **Elev. Method** CALC FROM 2-FOOT COUNTY DEM

Address

Well 73458 3RD AV MANKATO MN 56001
Contact P.O. BOX 1358 MANKATO MN 56001

Stratigraphy Information

Geological Material	From	To (ft.)	Color	Hardness
SAND	0	11	BROWN	SOFT
LIMESTONE	11	57	YELLOW	HARD
SANDSTONE FIRM	57	110	WHITE	

Remarks

BE-02-28 - JADD SEPPMANN & SONS

Well Depth 110 ft. **Depth Completed** 110 ft. **Date Well Completed** 06/25/2002

Drill Method Non-specified Rotary **Drill Fluid** Bentonite

Use domestic **Status** Active

Well Hydrofractured? Yes ☐ No ☒ **From** **To**

Casing Type Single casing **Joint** Threaded
Drive Shoe? Yes ☒ No ☐ **Above/Below**

Casing Diameter	Weight	Hole Diameter
5 in. To 91 ft.	15 lbs./ft.	10 in. To 91 ft.
		5 in. To 110 ft.

Open Hole From 91 ft. To 110 ft.

Screen? ☐ **Type** **Make**

Static Water Level

50 ft. land surface Measure 06/25/2002

Pumping Level (below land surface)

60 ft. 2 hrs. Pumping at 50 g.p.m.

Wellhead Completion

Pitless adapter manufacturer Model

☐ Casing Protection ☒ 12 in. above grade
☐ At-grade (Environmental Wells and Borings ONLY)

Grouting Information Well Grouted? ☒ Yes ☐ No ☐ Not Specified

Material	Amount	From	To
neat cement	35 Sacks	0 ft.	91 ft.

Nearest Known Source of Contamination

60 feet West Direction Septic tank/drain field Type

Well disinfected upon completion? ☒ Yes ☐ No

Pump ☐ Not Installed Date Installed 06/25/2002

Manufacturer's name AERMOTOR
Model Number HP 0.5 Volt
Length of drop pipe ft Capacity g.p. Typ Submersible

Abandoned

Does property have any not in use and not sealed well(s)? ☐ Yes ☒ No

Variance

Was a variance granted from the MDH for this well? ☐ Yes ☒ No

Miscellaneous

First Bedrock Prairie Du Chien Group Aquifer Jordan
Last Strat Jordan Sandstone Depth to Bedrock 11 ft
Located by Blue Earth Cty.
Locate Method GPS SA Off (averaged) (15 meters)
System UTM - NAD83, Zone 15, Meters X 420764 Y 4896440
Unique Number Verification Input Date 08/12/2008

Angled Drill Hole

Well Contractor

Seppmann Well Drilling | 07441 | SEPPMANN, T.
Licensee Business | Lic. or Reg. No. | Name of Driller

Minnesota Unique Well Number

686896

County Blue Earth
Quad Mankato
Quad ID 55B

MINNESOTA DEPARTMENT OF HEALTH

WELL AND BORING REPORT

Minnesota Statutes Chapter 1031

Entry Date 01/04/2005
Update Date 11/19/2013
Received Date 03/23/2004

Well Name	Township	Range	Dir	Section	Subsection
MW	109	26	W	30	DBADBB

Elevation 815 ft. **Elev. Method** Calc from DEM (USGS 7.5 min or equiv.)

Address

Contact P O BOX 1358 MANKATO MN 56002

Stratigraphy Information

Geological Material	From	To (ft.)	Color	Hardness
SAND & CLAY	0	12	BROWN	SOFT
LIMESTONE	12	40	YELLOW	HARD
SANDSTONE	40	66	WHITE	SOFT

Remarks

DRILLER: JADD SEPPPMANN & SONS #07441

Well Depth	Depth Completed	Date Well Completed
66 ft.	66 ft.	03/04/2004

Drill Method Non-specified Rotary **Drill Fluid** Bentonite

Use monitor well **Status** Active

Well Hydrofractured? Yes ☐ No ☒ **From** **To**

Casing Type Single casing **Joint** Threaded

Drive Shoe? Yes ☐ No ☒ **Above/Below**

Casing Diameter	Weight	Hole Diameter
2 in. To 62 ft.	lbs./ft.	6.2 in. To 66 ft.

Open Hole From ft. To ft.

Screen? ☒ **Type** stainless **Make** JOHNSON

Diameter	Slot/Gauze	Length	Set
2 in.	10	4 ft.	58 ft. 62 ft.

Static Water Level

Pumping Level (below land surface)

62 ft. 1 hrs. Pumping at 5 g.p.m.

Wellhead Completion

Pitless adapter manufacturer Model

☒ Casing Protection ☒ 12 in. above grade

☐ At-grade (Environmental Wells and Borings ONLY)

Grouting Information Well Grouted? ☒ Yes ☐ No ☐ Not Specified

Material	Amount	From	To
neat cement	14 Sacks	ft.	60 ft.
neat cement	3 Sacks	ft.	15 ft.

Nearest Known Source of Contamination

feet Direction Type

Well disinfected upon completion? ☐ Yes ☐ No

Pump ☒ Not Installed Date Installed

Manufacturer's name

Model Number HP Volt

Length of drop pipe ft Capacity g.p. Typ

Abandoned

Does property have any not in use and not sealed well(s)? ☐ Yes ☒ No

Variance

Was a variance granted from the MDH for this well? ☐ Yes ☒ No

Miscellaneous

First Bedrock Aquifer

Last Strat Depth to Bedrock ft

Located by Minnesota Department of Health

Locate Method Digitization (Screen) - Map (1:24,000) (15 meters or

System UTM - NAD83, Zone 15, Meters X 420482 Y 4896453

Unique Number Verification Information from Input Date 07/20/2012

Angled Drill Hole

Well Contractor

Licensee Business	Lic. or Reg. No.	Name of Driller
Seppmann Well Drilling	07441	SEPPMANN, T.

Minnesota Unique Well Number

530511

County Blue Earth
Quad Madison
Quad ID 55A

MINNESOTA DEPARTMENT OF HEALTH

WELL AND BORING REPORT

Minnesota Statutes Chapter 1031

Entry Date 06/17/1997
Update Date 12/26/2013
Received Date

Well Name	Township	Range	Dir	Section	Subsection
HENDLEY'S INC	109	26	W	31	AACBDB

Elevation 827 ft. **Elev. Method** 7.5 minute topographic map (+/- 5 feet)

Address

Well 5 CR MANKATO MN 56001
Contact RR 5 BOX 14 MANKATO MN 56001

Stratigraphy Information

Geological Material	From	To (ft.)	Color	Hardness
SAND, SOME SILT	0	2	BLACK	
SANDY CLAY	2	5	BROWN	
SAND, SOME CLAY &	5	6	BRN/WHT	
DOLOMITE	6	15	BROWN	HARD
DOLOMITE	15	17	GRY/PUR	HARD
DOLOMITE, SLI.	17	25	BRN/PNK	HARD
DOLOMITE,	25	29	BRN/GRY	HARD
DOLOMITE, W/ WHITE	29	31	GRY/BRN	HARD

Remarks

USE IS REMEDIAL.
WELL SEALED 03-11-1997 BY 07478

Well Depth 31 ft. **Depth Completed** 31 ft. **Date Well Completed** 06/02/1993

Drill Method Multiple methods used **Drill Fluid**

Use other (specify in remarks) **Status** Sealed

Well Hydrofractured? Yes ☐ No ☐ **From** **To**

Casing Type Single casing **Joint**
Drive Shoe? Yes ☒ No ☐ **Above/Below**

Casing Diameter	Weight	Hole Diameter
6 in. To 7.5 ft.	lbs./ft.	4.5 in. To 31 ft.

Open Hole From 8 ft. To 31 ft.

Screen? ☐ **Type** **Make**

Static Water Level

Pumping Level (below land surface)

Wellhead Completion

Pitless adapter manufacturer Model

☒ Casing Protection ☐ 12 in. above grade
☐ At-grade (Environmental Wells and Borings ONLY)

Grouting Information Well Grouted? ☐ Yes ☒ No ☐ Not Specified

Nearest Known Source of Contamination

feet Direction Type

Well disinfected upon completion? ☒ Yes ☐ No

Pump ☒ Not Installed Date Installed

Manufacturer's name

Model Number HP Volt

Length of drop pipe ft Capacity g.p. Typ

Abandoned

Does property have any not in use and not sealed well(s)? ☐ Yes ☒ No

Variance

Was a variance granted from the MDH for this well? ☐ Yes ☐ No

Miscellaneous

First Bedrock Prairie Du Chien/Oneota Aquifer Oneota Fm
Last Strat Prairie Du Chien/Oneota Depth to Bedrock 6 ft
Located by Minnesota Geological Survey
Locate Method Digitization (Screen) - Map (1:24,000) (15 meters or
System UTM - NAD83, Zone 15, Meters X 420612 Y 4895471
Unique Number Verification Other, note in Input Date 10/21/2002

Angled Drill Hole

Well Contractor

Boart Longyear Drilling	49588	ANDERSON, J.
Licensee Business	Lic. or Reg. No.	Name of Driller

Minnesota Unique Well Number

802411

County Blue Earth
Quad Mankato
Quad ID 55B

MINNESOTA DEPARTMENT OF HEALTH

WELL AND BORING REPORT

Minnesota Statutes Chapter 1031

Entry Date 03/27/2015
Update Date 01/12/2018
Received Date 02/02/2015

Well Name	Township	Range	Dir	Section	Subsection
MW-13-JS	109	26	W	30	DBCBDD

Elevation 826.92 **Elev. Method** Surveyed

Address

Well 3RD AV MANKATO MN 56001
Contact 1710 ROE CREST DR NORTH MANKATO MN 56003

Stratigraphy Information

Geological Material	From	To (ft.)	Color	Hardness
TOP SOIL & ROCK	0	1	BLACK	SOFT
LIMESTONE	1	36	YELLOW	HARD
LIMESTONE & SHALE	36	39	GREEN	SOFT
SANDSTONE	39	75	WHITE	SOFT
SANDSTONE	75	83	PINK	MEDIUM
SANDSTONE & SHALE	83	89	VARIED	SOFT
SANDSTONE LAYERS	89	102		MED-HRD
SANDSTONE	102	126	PINK	SOFT
SHALE	126	131	GREEN	SOFT

Remarks

Well Depth 131 ft. **Depth Completed** 131 ft. **Date Well Completed** 10/28/2014

Drill Method Non-specified Rotary **Drill Fluid** Water

Use monitor well **Status** Active

Well Hydrofractured? Yes ☐ No ☒ From To

Casing Type Single casing **Joint** Threaded
Drive Shoe? Yes ☐ No ☒ **Above/Below**

Casing Diameter	Weight	Hole Diameter
2 in. To 121 ft.	lbs./ft.	6.2 in. To 131 ft.

Open Hole From ft. To ft.

Screen? ☒ **Type** stainless **Make** JOHNSON

Diameter	Slot/Gauze	Length	Set	
2 in.	10	10 ft.	121 ft.	131 ft.

Static Water Level
35 ft. land surface Measure 10/28/2014

Pumping Level (below land surface)

Wellhead Completion
Pitless adapter manufacturer Model
☒ Casing Protection ☒ 12 in. above grade
☐ At-grade (Environmental Wells and Borings ONLY)

Grouting Information Well Grouted? ☒ Yes ☐ No ☐ Not Specified

Material	Amount	From	To
neat cement	30 Sacks	ft.	121 ft.

Nearest Known Source of Contamination
feet Direction Type
Well disinfected upon completion? ☐ Yes ☐ No

Pump ☒ Not Installed Date Installed
Manufacturer's name
Model Number HP Volt
Length of drop pipe ft Capacity g.p. Typ

Abandoned
Does property have any not in use and not sealed well(s)? ☐ Yes ☒ No

Variance
Was a variance granted from the MDH for this well? ☐ Yes ☒ No

Miscellaneous
First Bedrock Prairie Du Chien Group Aquifer Jordan-St.
Last Strat St.Lawrence Formation Depth to Bedrock 1 ft
Located by Minnesota Geological Survey
Locate Method Digitization (Screen) - Map (1:12,000) (>15 meters)
System UTM - NAD83, Zone 15, Meters X 420254 Y 4896255
Unique Number Verification Info/GPS from data Input Date 01/12/2018

Angled Drill Hole

Well Contractor
Jadd Seppmann and Sons, 1790 SEPPMANN, T.
Licensee Business Lic. or Reg. No. Name of Driller

Minnesota Unique Well Number

802412

County Blue Earth
Quad Mankato
Quad ID 55B

MINNESOTA DEPARTMENT OF HEALTH

WELL AND BORING REPORT

Minnesota Statutes Chapter 1031

Entry Date 03/27/2015
Update Date 01/12/2018
Received Date 02/02/2015

Well Name	Township	Range	Dir	Section	Subsection
MW-14-JS	109	26	W	30	DCCBDC

Elevation 799.85 **Elev. Method** Surveyed

Address

Well 3RD AV MANKATO MN 56001
Contact 1710 ROE CREST DR NORTH MANKATO MN 556003

Stratigraphy Information

Geological Material	From	To (ft.)	Color	Hardness
LIMESTONE	0	15	YEL/GRY	HARD
SHALE	15	17	GREEN	SOFT
SANDSTONE	17	57	WHITE	SOFT

Remarks

Well Depth 57 ft. **Depth Completed** 57 ft. **Date Well Completed** 10/28/2014

Drill Method Non-specified Rotary **Drill Fluid** Water

Use monitor well **Status** Active

Well Hydrofractured? Yes ☐ No ☒ **From** **To**

Casing Type Single casing **Joint** Threaded
Drive Shoe? Yes ☐ No ☒ **Above/Below**

Casing Diameter	Weight	Hole Diameter
2 in. To 47 ft.	lbs./ft.	6.2 in. To 57 ft.

Open Hole From ft. To ft.

Screen? ☒ **Type** stainless **Make** JOHNSON

Diameter	Slot/Gauze	Length	Set
2 in.	10	10 ft.	47 ft. 57 ft.

Static Water Level

Pumping Level (below land surface)

Wellhead Completion

Pitless adapter manufacturer Model

☒ Casing Protection ☒ 12 in. above grade
☐ At-grade (Environmental Wells and Borings ONLY)

Grouting Information Well Grouted? ☒ Yes ☐ No ☐ Not Specified

Material	Amount	From	To
neat cement	15 Sacks	ft.	47 ft.

Nearest Known Source of Contamination

32 feet Direction Type

Well disinfected upon completion? ☐ Yes ☐ No

Pump ☒ Not Installed Date Installed

Manufacturer's name
Model Number HP Volt
Length of drop pipe ft Capacity g.p. Typ

Abandoned

Does property have any not in use and not sealed well(s)? ☐ Yes ☒ No

Variance

Was a variance granted from the MDH for this well? ☐ Yes ☒ No

Miscellaneous

First Bedrock Prairie Du Chien Group Aquifer Jordan
Last Strat Jordan Sandstone Depth to Bedrock 0 ft
Located by Minnesota Geological Survey
Locate Method Digitization (Screen) - Map (1:12,000) (>15 meters)
System UTM - NAD83, Zone 15, Meters X 420232 Y 4895850
Unique Number Verification Info/GPS from data Input Date 01/12/2018

Angled Drill Hole

Well Contractor

Jadd Seppmann and Sons, 1790 SEPPMANN, T.
Licensee Business Lic. or Reg. No. Name of Driller

Minnesota Unique Well Number

342741

County Blue Earth
Quad Mankato
Quad ID 55B

MINNESOTA DEPARTMENT OF HEALTH

WELL AND BORING REPORT

Minnesota Statutes Chapter 1031

Entry Date 03/22/2022
Update Date 03/22/2022
Received Date

Well Name	Township	Range	Dir	Section	Subsection
K-1-11	109	26	W	30	DBBDDB

Elevation 824 ft. **Elev. Method** LiDAR 1m DEM (MNDNR)

Address

Contact 818 WILLOW ST N MANKATO MN 56002

Stratigraphy Information

Geological Material	From	To (ft.)	Color	Hardness
TOPSOIL	0	4	BLACK	
SAND	4	22	BROWN	
LIMESTONE	22	40	GRAY	HARD
SANDSTONE	40	110	GRY/BRN	M.HARD

Remarks

Well Depth	Depth Completed	Date Well Completed
110 ft.	110 ft.	03/23/2011

Drill Method **Drill Fluid**

Use environ. bore hole **Status** Sealed

Well Hydrofractured? **Yes** ☐ **No** ☐ **From** **To**

Casing Type **Joint**
Drive Shoe? **Yes** ☐ **No** ☐ **Above/Below**

Open Hole From ft. To ft.

Screen? ☐ **Type** **Make**

Static Water Level
19 ft. land surface Measure 03/23/2011

Pumping Level (below land surface)

Wellhead Completion
Pitless adapter manufacturer Model
☐ Casing Protection ☐ 12 in. above grade
☐ At-grade (Environmental Wells and Borings ONLY)

Grouting Information Well Grouted? ☒ Yes ☐ No ☐ Not Specified

Material	Amount		From		To	
neat cement	3	Sacks	16	ft.	110	ft.
bentonite	2	Sacks		ft.	16	ft.

Nearest Known Source of Contamination
feet Direction Type
Well disinfected upon completion? ☐ Yes ☐ No

Pump ☒ Not Installed Date Installed
Manufacturer's name
Model Number HP Volt
Length of drop pipe ft Capacity g.p. Typ

Abandoned
Does property have any not in use and not sealed well(s)? ☐ Yes ☐ No

Variance
Was a variance granted from the MDH for this well? ☐ Yes ☒ No

Miscellaneous
First Bedrock Prairie Du Chien Group Aquifer
Last Strat Jordan Sandstone Depth to Bedrock 22.3 ft
Located by Minnesota Geological Survey
Locate Method Digitization (Screen) - Map (1:24,000) (15 meters or
System UTM - NAD83, Zone 15, Meters X 420321 Y 4896393
Unique Number Verification Info/GPS from data Input Date 03/22/2022

Angled Drill Hole

Well Contractor
Subsurface Exploration 2974 CARLSON, J.
Licensee Business Lic. or Reg. No. Name of Driller

Minnesota Unique Well Number

112914

County Blue Earth
Quad Mankato
Quad ID 55B

MINNESOTA DEPARTMENT OF HEALTH

WELL AND BORING REPORT

Minnesota Statutes Chapter 1031

Entry Date 06/17/1997
Update Date 03/11/2005
Received Date

Well Name	Township	Range	Dir	Section	Subsection
LOEFFLER, RAY	109	26	W	30	DAABBB

Elevation 830 ft. **Elev. Method** 7.5 minute topographic map (+/- 5 feet)

Address

C/W MANKATO MN 56001

Stratigraphy Information

Geological Material	From	To (ft.)	Color	Hardness
SAND	0	7		
LIMESTONE	7	46	YELLOW	
SAND	46	86		SOFT
SANDSTONE	86	127	WHITE	

Remarks

Well Depth 127 ft. **Depth Completed** 127 ft. **Date Well Completed** 06/25/1976

Drill Method Non-specified Rotary **Drill Fluid**

Use domestic **Status** Active

Well Hydrofractured? Yes ☐ No ☐ **From** **To**

Casing Type Single casing **Joint**
Drive Shoe? Yes ☐ No ☐ **Above/Below**

Casing Diameter	Weight	Hole Diameter
5 in. To 86 ft.	lbs./ft.	5 in. To 127 ft.

Open Hole From 86 ft. To 127 ft.

Screen? ☐ **Type** **Make**

Static Water Level

Pumping Level (below land surface)

Wellhead Completion

Pitless adapter manufacturer Model

☐ Casing Protection ☐ 12 in. above grade
☐ At-grade (Environmental Wells and Borings ONLY)

Grouting Information Well Grouted? ☒ Yes ☐ No ☐ Not Specified

Nearest Known Source of Contamination

feet Direction Type

Well disinfected upon completion? ☐ Yes ☐ No

Pump ☐ Not Installed Date Installed

Manufacturer's name

Model Number HP Volt

Length of drop pipe ft Capacity g.p. Typ

Abandoned

Does property have any not in use and not sealed well(s)? ☐ Yes ☐ No

Variance

Was a variance granted from the MDH for this well? ☐ Yes ☐ No

Miscellaneous

First Bedrock Prairie Du Chien Group Aquifer Jordan
Last Strat Jordan Sandstone Depth to Bedrock 7 ft
Located by Minnesota Geological Survey
Locate Method Digitized - scale 1:24,000 or larger (Digitizing Table)
System UTM - NAD83, Zone 15, Meters X 420768 Y 4896520
Unique Number Verification Information from Input Date 01/01/1990

Angled Drill Hole

Well Contractor

Seppmann Well Co. 07160
Licensee Business Lic. or Reg. No. Name of Driller

Minnesota Unique Well Number

511439

County Blue Earth
Quad Mankato
Quad ID 55B

MINNESOTA DEPARTMENT OF HEALTH

WELL AND BORING REPORT

Minnesota Statutes Chapter 1031

Entry Date 06/17/1997
Update Date 08/18/2014
Received Date

Well Name	Township	Range	Dir	Section	Subsection
MILLER,	109	26	W	31	ADBACA

Elevation 832 ft. **Elev. Method** 7.5 minute topographic map (+/- 5 feet)

Address

Contact 7414 245TH ST ST CLOUD MN

Stratigraphy Information

Geological Material	From	To (ft.)	Color	Hardness
SANDY DIRT	0	12	BLACK	SOFT
ROCK & BOULDER	12	14	RED	HARD
LIMESTONE	14	58	BROWN	HARD
SANDROCK	58	105	WHITE	SOFT
FRANCONIAN	105	210	PINK	HARD

Remarks

JUNCTION INDUSTRIAL RD. & CO. 5 - 1/4 MILE NORTH

Well Depth 210 ft. **Depth Completed** 210 ft. **Date Well Completed** 07/24/1989

Drill Method Non-specified Rotary **Drill Fluid** Bentonite

Use industrial **Status** Active

Well Hydrofractured? Yes ☐ No ☐ **From** **To**

Casing Type Single casing **Joint** Threaded

Drive Shoe? Yes ☒ No ☐ **Above/Below** 2 ft.

Casing Diameter	Weight	Hole Diameter
5 in. To 115 ft.	15 lbs./ft.	10 in. To 115 ft.

Open Hole From 115 ft. To 210 ft.

Screen? ☐ **Type** **Make**

Static Water Level

60 ft. land surface Measure 07/24/1989

Pumping Level (below land surface)

ft. hrs. Pumping at 15 g.p.m.

Wellhead Completion

Pitless adapter manufacturer MONITOR Model

☐ Casing Protection ☐ 12 in. above grade

☐ At-grade (Environmental Wells and Borings ONLY)

Grouting Information Well Grouted? ☒ Yes ☐ No ☐ Not Specified

Material	Amount	From	To
neat cement		10 ft.	115 ft.

Nearest Known Source of Contamination

65 feet North Direction Septic tank/drain field Type

Well disinfected upon completion? ☒ Yes ☐ No

Pump ☐ Not Installed Date Installed 08/21/1989

Manufacturer's name AERMOTOR

Model Number A12B50 HP 0.5 Volt 230

Length of drop pipe 100 ft Capacity 12 g.p. Typ Submersible

Abandoned

Does property have any not in use and not sealed well(s)? ☐ Yes ☒ No

Variance

Was a variance granted from the MDH for this well? ☐ Yes ☐ No

Miscellaneous

First Bedrock Prairie Du Chien/Oneota Aquifer St.Lawrence-

Last Strat St.Lawrence-Tunnel City Depth to Bedrock 14 ft

Located by Minnesota Geological Survey

Locate Method Digitization (Screen) - Map (1:24,000) (15 meters or

System UTM - NAD83, Zone 15, Meters X 420689 Y 4895275

Unique Number Verification Other, note in Input Date 10/10/2002

Angled Drill Hole

Well Contractor

Searles Well Co. 08258 VOLK, J.

Licensee Business Lic. or Reg. No. Name of Driller

Minnesota Unique Well Number

686898

County Blue Earth
Quad Mankato
Quad ID 55B

MINNESOTA DEPARTMENT OF HEALTH
WELL AND BORING REPORT
Minnesota Statutes Chapter 1031

Entry Date
Update Date 01/24/2018
Received Date 03/23/2004

Well Name	Township	Range	Dir	Section	Subsection
MW	109	26	W	30	DDCCDD

Elevation 829.03 **Elev. Method** Surveyed

Address

Contact P.O. BOX 1358 MANKATO MN 56002

Stratigraphy Information

Geological Material	From	To (ft.)	Color	Hardness
SAND & CLAY	0	3	YELLOW	SOFT
LIMESTONE	3	54	YELLOW	HARD
SANDSTONE &	54	70	WHITE	SOFT
SANDSTONE	70	89	WHITE	SOFT

Remarks

Well Depth	Depth Completed	Date Well Completed
89 ft.	89 ft.	03/04/2004

Drill Method Non-specified Rotary **Drill Fluid** Bentonite

Use monitor well **Status** Active

Well Hydrofractured? Yes ☐ No ☒ **From** **To**

Casing Type Single casing **Joint** Threaded
Drive Shoe? Yes ☐ No ☒ **Above/Below**

Casing Diameter	Weight	Hole Diameter
2 in. To 84 ft.	lbs./ft.	6.2 in. To 89 ft.

Open Hole From ft. To ft.

Screen? ☒ **Type** stainless **Make** JOHNSON

Diameter	Slot/Gauze	Length	Set
2 in.	10	4 ft.	84 ft. 89 ft.

Static Water Level

Pumping Level (below land surface)

89 ft. 1 hrs. Pumping at 5 g.p.m.

Wellhead Completion

Pitless adapter manufacturer Model

☒ Casing Protection ☒ 12 in. above grade
☐ At-grade (Environmental Wells and Borings ONLY)

Grouting Information Well Grouted? ☒ Yes ☐ No ☐ Not Specified

Material	Amount	From	To
neat cement	15 Sacks	ft.	80 ft.
neat cement	1 Sacks	ft.	5 ft.

Nearest Known Source of Contamination

feet Direction Type

Well disinfected upon completion? ☐ Yes ☐ No

Pump ☐ Not Installed Date Installed

Manufacturer's name

Model Number HP Volt

Length of drop pipe ft Capacity g.p. Typ

Abandoned

Does property have any not in use and not sealed well(s)? ☐ Yes ☒ No

Variance

Was a variance granted from the MDH for this well? ☐ Yes ☒ No

Miscellaneous

First Bedrock Prairie Du Chien Group Aquifer Jordan
Last Strat Jordan Sandstone Depth to Bedrock 3 ft
Located by Minnesota Geological Survey
Locate Method Digitization (Screen) - Map (1:24,000) (15 meters or
System UTM - NAD83, Zone 15, Meters X 420636 Y 4895765
Unique Number Verification Info/GPS from data Input Date 07/20/2012

Angled Drill Hole

Well Contractor

Seppmann Well Drilling	07441	SEPPMANN, T.
Licensee Business	Lic. or Reg. No.	Name of Driller

Minnesota Well Index Report | **686898** | Printed on 05/22/2025 HE-01205-15

Minnesota Unique Well Number

439310

County Blue Earth
Quad Mankato
Quad ID 55B

MINNESOTA DEPARTMENT OF HEALTH

WELL AND BORING REPORT

Minnesota Statutes Chapter 1031

Entry Date 06/17/1997
Update Date 02/14/2014
Received Date

Well Name	Township	Range	Dir	Section	Subsection
LOEFFLER, AL	109	26	W	30	DABDDC

Elevation 828 ft. **Elev. Method** 7.5 minute topographic map (+/- 5 feet)

Address

C/W RR 5 BOX 19 MANKATO MN

Stratigraphy Information

Geological Material	From	To (ft.)	Color	Hardness
TOP SOIL	0	7		
LIMESTONE	7	50		
SAND	50	86		
SANDSTONE	86	110		
SHALE	110	112		
SANDSTONE	112	127		

Remarks

Well Depth 127 ft. **Depth Completed** 127 ft. **Date Well Completed** 04/22/1991

Drill Method Non-specified Rotary **Drill Fluid** Bentonite

Use domestic **Status** Active

Well Hydrofractured? Yes ☐ No ☐ **From** **To**

Casing Type Single casing **Joint** Threaded
Drive Shoe? Yes ☒ No ☐ **Above/Below** 0 ft.

Casing Diameter	Weight	Hole Diameter
5 in. To 91 ft.	lbs./ft.	11 in. To 91 ft.

Open Hole From 91 ft. To 127 ft.

Screen? ☐ **Type** **Make**

Static Water Level
35 ft. land surface Measure 04/22/1991

Pumping Level (below land surface)

Wellhead Completion
Pitless adapter manufacturer Model
☐ Casing Protection ☐ 12 in. above grade
☐ At-grade (Environmental Wells and Borings ONLY)

Grouting Information Well Grouted? ☒ Yes ☐ No ☐ Not Specified

Nearest Known Source of Contamination
feet Direction Type
Well disinfected upon completion? ☐ Yes ☐ No

Pump ☐ Not Installed Date Installed 04/22/1991
Manufacturer's name
Model Number HP 0.5 Volt 230
Length of drop pipe 60 ft Capacity 15 g.p. Typ Submersible

Abandoned
Does property have any not in use and not sealed well(s)? ☐ Yes ☐ No

Variance
Was a variance granted from the MDH for this well? ☐ Yes ☐ No

Miscellaneous
First Bedrock Prairie Du Chien Group Aquifer Jordan
Last Strat Jordan Sandstone Depth to Bedrock 7 ft
Located by Minnesota Geological Survey
Locate Method Digitization (Screen) - Map (1:24,000) (15 meters or
System UTM - NAD83, Zone 15, Meters X 420730 Y 4896372
Unique Number Verification Information from Input Date 06/02/2000

Angled Drill Hole

Well Contractor
Seppmann Well Co. 07160 SEPPMANN, J.
Licensee Business Lic. or Reg. No. Name of Driller

Minnesota Unique Well Number

342742

County Blue Earth
Quad Mankato
Quad ID 55B

MINNESOTA DEPARTMENT OF HEALTH

WELL AND BORING REPORT

Minnesota Statutes Chapter 1031

Entry Date 03/22/2022
Update Date 03/22/2022
Received Date

Well Name	Township	Range	Dir	Section	Subsection
K-2-11	109	26	W	30	DBDDCC

Elevation 830 ft. **Elev. Method** LiDAR 1m DEM (MNDNR)

Address

Contact 818 WILLOW ST N MANKATO MN 56002

Stratigraphy Information

Geological Material	From	To (ft.)	Color	Hardness
TOPSOIL	0	3	BLACK	
LIMESTONE	3	48	GRAY	HARD
SANDSTONE	48	101	GRY/BRN	M.HARD

Remarks

Well Depth	Depth Completed	Date Well Completed
101 ft.	101 ft.	03/24/2011

Drill Method **Drill Fluid**

Use environ. bore hole **Status** Sealed

Well Hydrofractured? **Yes** ☐ **No** ☐ **From** **To**

Casing Type **Joint**
Drive Shoe? **Yes** ☐ **No** ☐ **Above/Below**

Open Hole From ft. To ft.

Screen? ☐ **Type** **Make**

Static Water Level

Pumping Level (below land surface)

Wellhead Completion

Pitless adapter manufacturer Model

☐ Casing Protection ☐ 12 in. above grade
☐ At-grade (Environmental Wells and Borings ONLY)

Grouting Information Well Grouted? ☒ Yes ☐ No ☐ Not Specified

Material	Amount		From	To
neat cement	3	Sacks	3 ft.	101 ft.
bentonite	0.5	Sacks	ft.	3 ft.

Nearest Known Source of Contamination

feet Direction Type

Well disinfected upon completion? ☐ Yes ☐ No

Pump ☒ Not Installed Date Installed

Manufacturer's name

Model Number HP Volt

Length of drop pipe ft Capacity g.p. Typ

Abandoned

Does property have any not in use and not sealed well(s)? ☐ Yes ☐ No

Variance

Was a variance granted from the MDH for this well? ☐ Yes ☒ No

Miscellaneous

First Bedrock Prairie Du Chien Group Aquifer
Last Strat Jordan Sandstone Depth to Bedrock 2.7 ft
Located by Minnesota Geological Survey
Locate Method Digitization (Screen) - Map (1:24,000) (15 meters or
System UTM - NAD83, Zone 15, Meters X 420486 Y 4896162
Unique Number Verification Info/GPS from data Input Date 03/22/2022

Angled Drill Hole

Well Contractor

Subsurface Exploration 2974 CARLSON, J.
Licensee Business Lic. or Reg. No. Name of Driller

Minnesota Unique Well Number

160363

County Blue Earth
Quad Mankato
Quad ID 56A

MINNESOTA DEPARTMENT OF HEALTH

WELL AND BORING REPORT

Minnesota Statutes Chapter 1031

Entry Date 06/17/1997
Update Date 01/03/2019
Received Date

Well Name	Township	Range	Dir	Section	Subsection
WINKLER,	109	26	W	31	BACDAA

Elevation 764.35 **Elev. Method** Surveyed

Address

C/W RR 5 MANKATO MN 56001

Stratigraphy Information

Geological Material	From	To (ft.)	Color	Hardness
PEAT GROUND	0	20	BROWN	SOFT
CLAY	20	50	BLACK	SOFT
FINE SAND	50	75		SOFT
ROCK	75	270	GREEN	HARD

Remarks

WELL FLOWS. WELL FOR A BAIT SHOP.

Well Depth	Depth Completed	Date Well Completed
270 ft.	270 ft.	03/24/1981

Drill Method Non-specified Rotary **Drill Fluid**

Use domestic **Status** Active

Well Hydrofractured? Yes ☐ No ☐ **From** **To**

Casing Type Single casing **Joint** Threaded
Drive Shoe? Yes ☒ No ☐ **Above/Below** 3 ft.

Casing Diameter	Weight	Hole Diameter
6 in. To 83 ft.	lbs./ft.	10 in. To 83 ft.
		6 in. To 270 ft.

Open Hole From 83 ft. To 270 ft.

Screen? ☐ **Type** **Make**

Static Water Level

0 ft. land surface Measure 03/24/1981

Pumping Level (below land surface)

0 ft. hrs. Pumping at 150 g.p.m.

Wellhead Completion

Pitless adapter manufacturer Model

☐ Casing Protection ☒ 12 in. above grade
☐ At-grade (Environmental Wells and Borings ONLY)

Grouting Information Well Grouted? ☒ Yes ☐ No ☐ Not Specified

Material	Amount	From	To
	2.5 Cubic yards	0 ft.	83 ft.

Nearest Known Source of Contamination

100 feet Southeas Direction Septic tank/drain field Type

Well disinfected upon completion? ☐ Yes ☐ No

Pump ☒ Not Installed Date Installed

Manufacturer's name

Model Number HP 0 Volt

Length of drop pipe ft Capacity g.p. Typ

Abandoned

Does property have any not in use and not sealed well(s)? ☐ Yes ☐ No

Variance

Was a variance granted from the MDH for this well? ☐ Yes ☐ No

Miscellaneous

First Bedrock St.Lawrence Formation Aquifer multiple
Last Strat St.Lawrence-Tunnel City Depth to Bedrock 75 ft
Located by Minnesota Geological Survey
Locate Method Digitization (Screen) - Map (1:24,000) (15 meters or
System UTM - NAD83, Zone 15, Meters X 419956 Y 4895428
Unique Number Verification Other, note in Input Date 01/01/1990

Angled Drill Hole

Well Contractor

St. Peter Well Drilling 08072 VOLK, J.
Licensee Business Lic. or Reg. No. Name of Driller

Minnesota Unique Well Number

539420

County Blue Earth
Quad Mankato
Quad ID 55B

MINNESOTA DEPARTMENT OF HEALTH

WELL AND BORING REPORT

Minnesota Statutes Chapter 1031

Entry Date 06/17/1997
Update Date 02/14/2014
Received Date

Well Name	Township	Range	Dir	Section	Subsection
HENDLEY'S INC.	109	26	W	31	AACBDB

Elevation 827 ft. **Elev. Method** 7.5 minute topographic map (+/- 5 feet)

Address

C/W RR 5 BOX 14 MANKATO MN

Stratigraphy Information

Geological Material	From	To (ft.)	Color	Hardness
SILT	0	1	BLACK	
SAND, SOME SILT	1	8	BROWN	
DOLOMITE	8	13	BROWN	HARD
DOLOMITE	13	14	BRN/GRY	HARD
DOLOMITE, VUGGY	14	25	VARIED	HARD
DOLOMITE	25	30	VARIED	HARD

Remarks

BLUE EARTH PERMIT #BE-94-6
USE IS REMEDIAL.
WELL SEALED 03-11-1997 BY 07478

Well Depth 50 ft. **Depth Completed** 50 ft. **Date Well Completed** 03/02/1994

Drill Method Vibracore/rotasonic **Drill Fluid**

Use other (specify in remarks) **Status** Sealed

Well Hydrofractured? Yes ☐ No ☐ **From** **To**

Casing Type Step down **Joint** Welded
Drive Shoe? Yes ☒ No ☐ **Above/Below**

Casing Diameter	Weight	Hole Diameter
6 in. To 9 ft.	lbs./ft.	6.5 in. To 50 ft.
2 in. To 45 ft.	lbs./ft.	

Open Hole From ft. To ft.

Screen? ☒ **Type** stainless **Make** JOHNSON

Diameter	Slot/Gauze	Length	Set	
2 in.	10	5 ft.	45 ft.	50 ft.

Static Water Level

31 ft. land surface Measure 03/04/1994

Pumping Level (below land surface)

Wellhead Completion

Pitless adapter manufacturer Model

☒ Casing Protection ☒ 12 in. above grade
☐ At-grade (Environmental Wells and Borings ONLY)

Grouting Information Well Grouted? ☒ Yes ☐ No ☐ Not Specified

Material	Amount		From	To
neat cement	0.3	Cubic yards	0 ft.	38 ft.

Nearest Known Source of Contamination

0 feet Direction Volatile organic compounds Type

Well disinfected upon completion? ☐ Yes ☐ No

Pump ☒ Not Installed Date Installed

Manufacturer's name

Model Number HP Volt

Length of drop pipe ft Capacity g.p. Typ

Abandoned

Does property have any not in use and not sealed well(s)? ☐ Yes ☒ No

Variance

Was a variance granted from the MDH for this well? ☐ Yes ☐ No

Miscellaneous

First Bedrock Prairie Du Chien/Oneota Aquifer Oneota Fm
Last Strat Prairie Du Chien/Oneota Depth to Bedrock 8 ft
Located by Minnesota Geological Survey
Locate Method Digitization (Screen) - Map (1:24,000) (15 meters or
System UTM - NAD83, Zone 15, Meters X 420618 Y 4895471
Unique Number Verification Other, note in Input Date 10/21/2002

Angled Drill Hole

Well Contractor

Boart Longyear Drilling	49588	JOHNSON, S.
Licensee Business	Lic. or Reg. No.	Name of Driller

Minnesota Unique Well Number

668827

County Blue Earth
Quad Mankato
Quad ID 55B

MINNESOTA DEPARTMENT OF HEALTH

WELL AND BORING REPORT

Minnesota Statutes Chapter 1031

Entry Date 07/29/2002
Update Date 04/15/2019
Received Date

Well Name	Township	Range	Dir	Section	Subsection
SOUTHERN MN	109	26	W	30	DCBDCB

Elevation 796 ft. **Elev. Method** Surveyed

Address

Contact 1905 3RD AV MANKATO MN 56002-3069
Well 3RD AV MANKATO MN 56002

Stratigraphy Information

Geological Material	From	To (ft.)	Color	Hardness
LIMESTONE/SHALE	0	5	YEL/BRN	HARD
SANDSTONE	5	16	WHITE	SOFT

Remarks

DRILLING FLUID: TRUE BORE.
SEALED 05-01-2018 BY 1790

Well Depth	Depth Completed	Date Well Completed
16 ft.	15 ft.	05/23/2002

Drill Method Non-specified Rotary **Drill Fluid** Other

Use monitor well **Status** Sealed

Well Hydrofractured? Yes ☐ No ☒ **From** **To**

Casing Type Step down **Joint**
Drive Shoe? Yes ☐ No ☐ **Above/Below**

Casing Diameter	Weight	Hole Diameter
2 in. To 5 ft.	lbs./ft.	8 in. To 4 ft.
6 in. To 4 ft.	lbs./ft.	6 in. To 16 ft.

Open Hole From ft. To ft.

Screen? ☒ **Type** stainless **Make** JOHNSON

Diameter	Slot/Gauze	Length	Set	
2 in.	10	10 ft.	5.2 ft.	15.2 ft.

Static Water Level

7 ft. land surface Measure 05/23/2002

Pumping Level (below land surface)

Wellhead Completion

Pitless adapter manufacturer Model

☒ Casing Protection ☐ 12 in. above grade
☐ At-grade (Environmental Wells and Borings ONLY)

Grouting Information Well Grouted? ☒ Yes ☐ No ☐ Not Specified

Material	Amount		From	To
	2		0 ft.	4 ft.
neat cement	2	Sacks	0 ft.	4 ft.

Nearest Known Source of Contamination

feet Direction Type

Well disinfected upon completion? ☐ Yes ☒ No

Pump ☒ Not Installed Date Installed

Manufacturer's name

Model Number HP Volt

Length of drop pipe ft Capacity g.p. Typ

Abandoned

Does property have any not in use and not sealed well(s)? ☐ Yes ☒ No

Variance

Was a variance granted from the MDH for this well? ☐ Yes ☒ No

Miscellaneous

First Bedrock Prairie Du Chien/Oneota Aquifer Jordan
Last Strat Jordan Sandstone Depth to Bedrock 0 ft
Located by Minnesota Geological Survey
Locate Method Digitization (Screen) - Map (1:24,000) (15 meters or
System UTM - NAD83, Zone 15, Meters X 420258 Y 4895991
Unique Number Verification Information from Input Date 10/16/2002

Angled Drill Hole

Well Contractor

W.J. Canty, Inc. 71677 CANTY, B.
Licensee Business Lic. or Reg. No. Name of Driller

Minnesota Unique Well Number

668826

County Blue Earth
Quad Mankato
Quad ID 56A

MINNESOTA DEPARTMENT OF HEALTH

WELL AND BORING REPORT

Minnesota Statutes Chapter 1031

Entry Date 07/29/2002
Update Date 12/19/2011
Received Date

Well Name	Township	Range	Dir	Section	Subsection
SOUTHERN MN	109	26	W	30	CAADCC

Elevation 797 ft. **Elev. Method** Surveyed

Address

Contact 1905 3RD AV MANKATO MN 56002-3069
Well 3RD AV MANKATO MN 56002

Stratigraphy Information

Geological Material	From	To (ft.)	Color	Hardness
LIMESTONE/SHALE	0	8	YEL/BRN	HARD
SANDSTONE	8	14	WHITE	HARD
SANDSTONE	14	20	WHITE	SOFT

Remarks

DRILLING FLUID: TRUE BORE.

Well Depth 20 ft. **Depth Completed** 19 ft. **Date Well Completed** 05/23/2002

Drill Method Non-specified Rotary **Drill Fluid** Other

Use monitor well **Status** Active

Well Hydrofractured? Yes ☐ No ☒ **From** **To**

Casing Type Step down **Joint** Unknown
Drive Shoe? Yes ☐ No ☐ **Above/Below**

Casing Diameter	Weight	Hole Diameter
2 in. To 9 ft.	lbs./ft.	8 in. To 8 ft.
6 in. To 8 ft.	lbs./ft.	6 in. To 20 ft.

Open Hole From ft. To ft.

Screen? ☒ **Type** stainless **Make** JOHNSON

Diameter	Slot/Gauze	Length	Set
2 in.	10	10 ft.	9 ft. 19 ft.

Static Water Level

9 ft. land surface Measure 05/29/2002

Pumping Level (below land surface)

Wellhead Completion

Pitless adapter manufacturer Model

☒ Casing Protection ☐ 12 in. above grade
☐ At-grade (Environmental Wells and Borings ONLY)

Grouting Information Well Grouted? ☒ Yes ☐ No ☐ Not Specified

Material	Amount	From	To
	2 Sacks	0 ft.	8 ft.
neat cement	3 Sacks	0 ft.	7 ft.

Nearest Known Source of Contamination

feet Direction Type

Well disinfected upon completion? ☐ Yes ☒ No

Pump ☒ Not Installed Date Installed

Manufacturer's name

Model Number HP Volt

Length of drop pipe ft Capacity g.p. Typ

Abandoned

Does property have any not in use and not sealed well(s)? ☐ Yes ☒ No

Variance

Was a variance granted from the MDH for this well? ☐ Yes ☒ No

Miscellaneous

First Bedrock Prairie Du Chien/Oneota Aquifer Jordan
Last Strat Jordan Sandstone Depth to Bedrock 0 ft
Located by Minnesota Geological Survey
Locate Method Digitization (Screen) - Map (1:24,000) (15 meters or
System UTM - NAD83, Zone 15, Meters X 420075 Y 4896379
Unique Number Verification Information from Input Date 10/16/2002

Angled Drill Hole

Well Contractor

W.J. Canty, Inc. 71677 CANTY, B.
Licensee Business Lic. or Reg. No. Name of Driller

Minnesota Unique Well Number

802409

County Blue Earth
Quad Mankato
Quad ID 55B

MINNESOTA DEPARTMENT OF HEALTH

WELL AND BORING REPORT

Minnesota Statutes Chapter 1031

Entry Date 03/27/2015
Update Date 01/12/2018
Received Date 02/02/2015

Well Name	Township	Range	Dir	Section	Subsection
MW-11-JS	109	26	W	30	DBBBDA

Elevation 823.71 **Elev. Method** Surveyed

Address

Well 3RD AV MANKATO MN 56001
Contact 1710 ROE CREST DR NORTH MANKATO MN 56003

Stratigraphy Information

Geological Material	From	To (ft.)	Color	Hardness
TOP SOIL	0	2	BLACK	SOFT
SANDY CLAY	2	19	BROWN	SOFT
BOULDERS	19	21	BLK/RED	HARD
LIMESTONE	21	39	BROWN	HARD
SANDSTONE	39	84	WHITE	SOFT
SANDSTONE	84	101	PINK	M.HARD
SANDSTONE	101	128	WHITE	SOFT
ROCK/SHALE	128	132	GREEN	HARD

Remarks

Well Depth 132 ft. **Depth Completed** 132 ft. **Date Well Completed** 10/28/2014

Drill Method Non-specified Rotary **Drill Fluid** Water

Use monitor well **Status** Active

Well Hydrofractured? Yes ☐ No ☒ **From** **To**

Casing Type Single casing **Joint** Threaded
Drive Shoe? Yes ☐ No ☒ **Above/Below**

Casing Diameter	Weight	Hole Diameter
2 in. To 122 ft.	lbs./ft.	6.2 in. To 132 ft.

Open Hole From ft. To ft.

Screen? ☒ **Type** stainless **Make** JOHNSON

Diameter	Slot/Gauze	Length	Set
2 in.	10	10 ft.	122 ft. 132 ft.

Static Water Level
35 ft. land surface Measure 10/28/2014

Pumping Level (below land surface)

Wellhead Completion
Pitless adapter manufacturer Model
☒ Casing Protection ☒ 12 in. above grade
☐ At-grade (Environmental Wells and Borings ONLY)

Grouting Information Well Grouted? ☒ Yes ☐ No ☐ Not Specified

Material	Amount	From	To
neat cement	40 Sacks	ft.	122 ft.

Nearest Known Source of Contamination
500 feet West Direction Septic tank/drain field Type
Well disinfected upon completion? ☐ Yes ☐ No

Pump ☒ Not Installed Date Installed
Manufacturer's name
Model Number HP Volt
Length of drop pipe ft Capacity g.p. Typ

Abandoned
Does property have any not in use and not sealed well(s)? ☐ Yes ☒ No

Variance
Was a variance granted from the MDH for this well? ☐ Yes ☒ No

Miscellaneous
First Bedrock Prairie Du Chien Group Aquifer Jordan-St.
Last Strat St.Lawrence Formation Depth to Bedrock 21 ft
Located by Minnesota Geological Survey
Locate Method Digitization (Screen) - Map (1:12,000) (>15 meters)
System UTM - NAD83, Zone 15, Meters X 420253 Y 4896497
Unique Number Verification Info/GPS from data Input Date 01/12/2018

Angled Drill Hole

Well Contractor
Jadd Seppmann and Sons, 1790 SEPPMANN, T.
Licensee Business Lic. or Reg. No. Name of Driller

Minnesota Unique Well Number

190629

County Blue Earth
Quad Mankato
Quad ID 55B

MINNESOTA DEPARTMENT OF HEALTH

WELL AND BORING REPORT

Minnesota Statutes Chapter 1031

Entry Date 06/17/1997
Update Date 02/14/2014
Received Date

Well Name	Township	Range	Dir	Section	Subsection
KRISTICE INC.	109	26	W	31	AABDBC

Elevation 828 ft. **Elev. Method** 7.5 minute topographic map (+/- 5 feet)

Address

C/W MANKATO MN 56001

Stratigraphy Information

Geological Material	From	To (ft.)	Color	Hardness
ROCK	0	56	YELLOW	HARD
SANDROCK	56	107	WHITE	
ROCK	107	210	PINK	HARD

Remarks

Well Depth	Depth Completed	Date Well Completed
210 ft.	210 ft.	07/24/1984

Drill Method Non-specified Rotary **Drill Fluid**

Use industrial **Status** Active

Well Hydrofractured? Yes ☐ No ☐ **From** **To**

Casing Type Single casing **Joint** Threaded
Drive Shoe? Yes ☐ No ☐ **Above/Below** 1 ft.

Casing Diameter	Weight	Hole Diameter
5 in. To 117 ft.	lbs./ft.	9 in. To 17 ft.

Open Hole From 117 ft. To 210 ft.

Screen? ☐ **Type** **Make**

Static Water Level
50 ft. land surface Measure 07/24/1984

Pumping Level (below land surface)
0 ft. hrs. Pumping at 35 g.p.m.

Wellhead Completion
Pitless adapter manufacturer WHITEWATER Model
☐ Casing Protection ☐ 12 in. above grade
☐ At-grade (Environmental Wells and Borings ONLY)

Grouting Information Well Grouted? ☒ Yes ☐ No ☐ Not Specified

Material	Amount	From	To
neat cement	2.5 Cubic yards	0 ft.	72 ft.

Nearest Known Source of Contamination
55 feet Northwes Direction Septic tank/drain field Type
Well disinfected upon completion? ☐ Yes ☐ No

Pump ☐ Not Installed Date Installed 08/14/1984
Manufacturer's name FLINT & WALLING
Model Number 4F19B10- HP 1 Volt 230
Length of drop pipe 80 ft Capacity 19 g.p. Typ Submersible

Abandoned
Does property have any not in use and not sealed well(s)? ☐ Yes ☐ No

Variance
Was a variance granted from the MDH for this well? ☐ Yes ☐ No

Miscellaneous
First Bedrock Prairie Du Chien Group Aquifer multiple
Last Strat Jordan-St.Lawrence Depth to Bedrock 0 ft
Located by Minnesota Geological Survey
Locate Method Digitized - scale 1:24,000 or larger (Digitizing Table)
System UTM - NAD83, Zone 15, Meters X 420668 Y 4895620
Unique Number Verification Information from Input Date 01/01/1990

Angled Drill Hole

Well Contractor

Licensee Business	Lic. or Reg. No.	Name of Driller
St. Peter Well Drilling	08072	SCHAEFER, J.

Minnesota Unique Well Number

686895

County Blue Earth
Quad Mankato
Quad ID 55B

MINNESOTA DEPARTMENT OF HEALTH

WELL AND BORING REPORT

Minnesota Statutes Chapter 1031

Entry Date
Update Date 11/19/2013
Received Date 03/23/2004

Well Name	Township	Range	Dir	Section	Subsection
MW	109	26	W	30	DBBDBB

Elevation 828 ft. **Elev. Method** Calc from DEM (USGS 7.5 min or equiv.)

Address

Contact P O BOX 1358 MANKATO MN 56002

Stratigraphy Information

Geological Material	From	To (ft.)	Color	Hardness
SANDY CLAY	0	15	YELLOW	SOFT
LIMESTONE	15	38	YELLOW	HARD
SANDSTONE	38	68	WHITE	SOFT

Remarks

WELL CONTRACTOR CERTIFICATION:
JADD SEPPAMNN & SONS #07441

Well Depth	Depth Completed	Date Well Completed
68 ft.	68 ft.	03/04/2004

Drill Method Non-specified Rotary **Drill Fluid** Bentonite

Use monitor well **Status** Active

Well Hydrofractured? Yes ☐ No ☒ **From** **To**

Casing Type Single casing **Joint** Threaded
Drive Shoe? Yes ☐ No ☒ **Above/Below**

Casing Diameter	Weight	Hole Diameter
2 in. To 64 ft.	lbs./ft.	6.2 in. To 68 ft.

Open Hole From ft. To ft.

Screen? ☒ **Type** stainless **Make** JOHNSON

Diameter	Slot/Gauze	Length	Set
2 in.	10	4 ft.	64 ft. 68 ft.

Static Water Level

Pumping Level (below land surface)

68 ft. 1 hrs. Pumping at 10 g.p.m.

Wellhead Completion

Pitless adapter manufacturer Model

☒ Casing Protection ☐ 12 in. above grade
☐ At-grade (Environmental Wells and Borings ONLY)

Grouting Information Well Grouted? ☒ Yes ☐ No ☐ Not Specified

Material	Amount	From	To
neat cement	10 Sacks	ft.	60 ft.
neat cement	1 Sacks	ft.	5 ft.

Nearest Known Source of Contamination

feet Direction Type

Well disinfected upon completion? ☐ Yes ☐ No

Pump ☒ Not Installed Date Installed

Manufacturer's name

Model Number HP Volt

Length of drop pipe ft Capacity g.p. Typ

Abandoned

Does property have any not in use and not sealed well(s)? ☐ Yes ☒ No

Variance

Was a variance granted from the MDH for this well? ☐ Yes ☒ No

Miscellaneous

First Bedrock Aquifer
Last Strat Depth to Bedrock ft
Located by Minnesota Department of Health
Locate Method Digitization (Screen) - Map (1:24,000) (15 meters or
System UTM - NAD83, Zone 15, Meters X 420280 Y 4896453
Unique Number Verification Information from Input Date 07/20/2012

Angled Drill Hole

Well Contractor

Seppmann Well Drilling	07441	SEPPMANN, T.
Licensee Business	Lic. or Reg. No.	Name of Driller

Minnesota Unique Well Number

186124

County Blue Earth
Quad Mankato
Quad ID 56A

MINNESOTA DEPARTMENT OF HEALTH

WELL AND BORING REPORT

Minnesota Statutes Chapter 1031

Entry Date 06/17/1997
Update Date 08/13/2019
Received Date

Well Name	Township	Range	Dir	Section	Subsection
WINKLER,	109	26	W	31	BADDCB

Elevation 778 ft. **Elev. Method** LiDAR 1m DEM (MNDNR)

Address

C/W RR 5 MANKATO MN

Stratigraphy Information

Geological Material	From	To (ft.)	Color	Hardness
FILL	0	10	BLACK	SOFT
ROCKS	10	50	RED	HARD
ROCK	50	60	PINK	HARD
SANDROCK	60	88	WHITE	SOFT
ROCK	88	160	GREEN	HARD

Remarks

WELL FLOWS.

WELL SEALED 9-11-2018 BY 1493.

WELL LOCATION FROM TIM GRANT @ BLUE EARTH COUNTY ENVIRONMENTAL HEALTH 1-3-2019.

Well Depth 160 ft. **Depth Completed** 160 ft. **Date Well Completed** 11/10/1982

Drill Method Non-specified Rotary **Drill Fluid**

Use domestic **Status** Sealed

Well Hydrofractured? Yes ☐ No ☐ **From** **To**

Casing Type Single casing **Joint** Threaded

Drive Shoe? Yes ☒ No ☐ **Above/Below** 1 ft.

Casing Diameter	Weight	Hole Diameter
5 in. To 96 ft.	lbs./ft.	9 in. To 96 ft.

Open Hole From 96 ft. To 160 ft.

Screen? ☐ **Type** **Make**

Static Water Level

-1 ft. land surface Measure 11/10/1982

Pumping Level (below land surface)

ft. hrs. Pumping at 100 g.p.m.

Wellhead Completion

Pitless adapter manufacturer Model

☐ Casing Protection ☒ 12 in. above grade

☐ At-grade (Environmental Wells and Borings ONLY)

Grouting Information Well Grouted? ☒ Yes ☐ No ☐ Not Specified

Material	Amount	From	To
neat cement	2 Cubic yards	10 ft.	50 ft.

Nearest Known Source of Contamination

60 feet South Direction Septic tank/drain field Type

Well disinfected upon completion? ☐ Yes ☐ No

Pump ☐ Not Installed Date Installed 10/11/1982

Manufacturer's name FLINT & WALLING

Model Number HP 0.5 Volt 110

Length of drop pipe 4 ft Capacity 8 g.p. Typ Jet

Abandoned

Does property have any not in use and not sealed well(s)? ☐ Yes ☐ No

Variance

Was a variance granted from the MDH for this well? ☐ Yes ☐ No

Miscellaneous

First Bedrock Jordan Sandstone Aquifer multiple

Last Strat St.Lawrence-Tunnel City Depth to Bedrock 50 ft

Located by Minnesota Geological Survey

Locate Method Digitization (Screen) - Map (1:24,000) (15 meters or

System UTM - NAD83, Zone 15, Meters X 420081 Y 4895397

Unique Number Verification Information from Input Date 01/01/1990

Angled Drill Hole

Well Contractor

St. Peter Well Drilling 08072 VOLK, J.

Licensee Business Lic. or Reg. No. Name of Driller

Minnesota Unique Well Number

154677

County Blue Earth
Quad Mankato
Quad ID 55B

MINNESOTA DEPARTMENT OF HEALTH

WELL AND BORING REPORT

Minnesota Statutes Chapter 1031

Entry Date 06/17/1997
Update Date 02/14/2014
Received Date

Well Name	Township	Range	Dir	Section	Subsection
MIDWEST	109	26	W	30	DBBBBB

Elevation 815 ft. **Elev. Method** Calc from DEM (USGS 7.5 min or equiv.)

Address

C/W 2 STONEHEDGE MANKATO MN 56001

Stratigraphy Information

Geological Material	From	To (ft.)	Color	Hardness
CLAY	0	18		
SAND	18	84		SOFT
SANDSTONE	84	95	PINK	
SANDSTONEW	95	277		

Remarks

Well Depth 277 ft. **Depth Completed** 277 ft. **Date Well Completed** 06/27/1979

Drill Method Non-specified Rotary **Drill Fluid**

Use domestic **Status** Active

Well Hydrofractured? Yes ☐ No ☐ **From** **To**

Casing Type Single casing **Joint** Threaded

Drive Shoe? Yes ☐ No ☐ **Above/Below**

Casing Diameter	Weight	Hole Diameter
5 in. To 84 ft.	lbs./ft.	5 in. To 277 ft.

Open Hole From 84 ft. To 277 ft.

Screen? ☐ **Type** **Make**

Static Water Level

24 ft. land surface Measure 06/27/1979

Pumping Level (below land surface)

Wellhead Completion

Pitless adapter manufacturer Model

☐ Casing Protection ☐ 12 in. above grade
☐ At-grade (Environmental Wells and Borings ONLY)

Grouting Information Well Grouted? ☒ Yes ☐ No ☐ Not Specified

Material	Amount	From	To
bentonite		ft.	ft.

Nearest Known Source of Contamination

feet Direction Type

Well disinfected upon completion? ☒ Yes ☐ No

Pump ☐ Not Installed Date Installed

Manufacturer's name

Model Number HP 1.5 Volt

Length of drop pipe ft Capacity g.p. Typ Submersible

Abandoned

Does property have any not in use and not sealed well(s)? ☐ Yes ☐ No

Variance

Was a variance granted from the MDH for this well? ☐ Yes ☐ No

Miscellaneous

First Bedrock Aquifer

Last Strat Depth to Bedrock 84 ft

Located by Minnesota Department of Health

Locate Method Digitization (Screen) - Map (1:24,000) (15 meters or

System UTM - NAD83, Zone 15, Meters X 420178 Y 4896554

Unique Number Verification Information from Input Date 07/20/2012

Angled Drill Hole

Well Contractor

Licensee Business	Lic. or Reg. No.	Name of Driller
Seppmann Well Co.	07160	SEPPMANN, J.

Minnesota Unique Well Number

620926

County Blue Earth
Quad Mankato
Quad ID 55B

MINNESOTA DEPARTMENT OF HEALTH

WELL AND BORING REPORT

Minnesota Statutes Chapter 1031

Entry Date 05/31/2000
Update Date 03/10/2014
Received Date

Well Name	Township	Range	Dir	Section	Subsection
HORNEMANN,	109	26	W	30	ADDCCD

Elevation 832 ft. **Elev. Method** 7.5 minute topographic map (+/- 5 feet)

Address

Well RR 5 BOX 22 MANKATO MN 56001
Contact 6105 KERRY CT MADISON LAKE MN 56063

Stratigraphy Information

Geological Material	From	To (ft.)	Color	Hardness
SAND	0	13	BROWN	SOFT
LIMESTONE	13	57	YELLOW	HARD
SANDSTONE FIRM	57	100	WHITE	

Remarks

BE-00-02 - JADD SEPPMANN & SONS

Well Depth	Depth Completed	Date Well Completed
100 ft.	100 ft.	01/18/2000

Drill Method Non-specified Rotary **Drill Fluid** Bentonite

Use domestic **Status** Active

Well Hydrofractured? Yes ☐ No ☒ **From** **To**

Casing Type Single casing **Joint** Unknown
Drive Shoe? Yes ☒ No ☐ **Above/Below**

Casing Diameter	Weight	Hole Diameter
5 in. To 91 ft.	15 lbs./ft.	10 in. To 91 ft.

Open Hole From 91 ft. To 100 ft.

Screen? ☐ **Type** **Make**

Static Water Level

40 ft. land surface Measure 01/18/2000

Pumping Level (below land surface)

ft. hrs. Pumping at 30 g.p.m.

Wellhead Completion

Pitless adapter manufacturer MONITOR Model
☐ Casing Protection ☐ 12 in. above grade
☐ At-grade (Environmental Wells and Borings ONLY)

Grouting Information Well Grouted? ☒ Yes ☐ No ☐ Not Specified

Material	Amount	From	To
neat cement	35 Sacks	0 ft.	91 ft.

Nearest Known Source of Contamination

50 feet North Direction Septic tank/drain field Type
Well disinfected upon completion? ☐ Yes ☐ No

Pump ☐ Not Installed Date Installed 01/19/2000
Manufacturer's name GOULDS
Model Number HP 0.5 Volt
Length of drop pipe 95 ft Capacity 7 g.p. Typ Submersible

Abandoned

Does property have any not in use and not sealed well(s)? ☐ Yes ☒ No

Variance

Was a variance granted from the MDH for this well? ☐ Yes ☒ No

Miscellaneous

First Bedrock Prairie Du Chien/Oneota Aquifer Jordan
Last Strat Jordan Sandstone Depth to Bedrock 13 ft
Located by Minnesota Geological Survey
Locate Method Digitization (Screen) - Map (1:24,000) (15 meters or
System UTM - NAD83, Zone 15, Meters X 420786 Y 4896559
Unique Number Verification Tag on well Input Date 10/16/2002

Angled Drill Hole

Well Contractor

Seppmann Well Drilling 07441 VOLK, J.
Licensee Business Lic. or Reg. No. Name of Driller

Minnesota Unique Well Number

342743

County Blue Earth
Quad Mankato
Quad ID 55B

MINNESOTA DEPARTMENT OF HEALTH

WELL AND BORING REPORT

Minnesota Statutes Chapter 1031

Entry Date 03/22/2022
Update Date 03/22/2022
Received Date

Well Name	Township	Range	Dir	Section	Subsection
K-3-11	109	26	W	30	DCDDCA

Elevation 805 ft. **Elev. Method** LiDAR 1m DEM (MNDNR)

Address

Contact 818 WILLOW ST N MANKATO MN 56002

Stratigraphy Information

Geological Material	From	To (ft.)	Color	Hardness
LIMESTONE	0	23	GRAY	HARD
SANDSTONE	23	78	GRY/BRN	M.HARD

Remarks

WELL DRILLED IN BOTTOM OF QUARY.

Well Depth	Depth Completed	Date Well Completed
78 ft.	78 ft.	03/25/2011

Drill Method **Drill Fluid**

Use environ. bore hole **Status** Sealed

Well Hydrofractured? **Yes** ☐ **No** ☐ **From** **To**

Casing Type **Joint**
Drive Shoe? **Yes** ☐ **No** ☐ **Above/Below**

Open Hole From ft. To ft.

Screen? ☐ **Type** **Make**

Static Water Level

6.7 ft. land surface Measure 03/25/2011

Pumping Level (below land surface)

Wellhead Completion

Pitless adapter manufacturer Model

☐ Casing Protection ☐ 12 in. above grade
☐ At-grade (Environmental Wells and Borings ONLY)

Grouting Information Well Grouted? ☒ Yes ☐ No ☐ Not Specified

Material	Amount		From	To
neat cement	3	Sacks	ft. 78	ft.

Nearest Known Source of Contamination

feet Direction Type

Well disinfected upon completion? ☐ Yes ☐ No

Pump ☒ Not Installed Date Installed

Manufacturer's name

Model Number HP Volt

Length of drop pipe ft Capacity g.p. Typ

Abandoned

Does property have any not in use and not sealed well(s)? ☐ Yes ☐ No

Variance

Was a variance granted from the MDH for this well? ☐ Yes ☒ No

Miscellaneous

First Bedrock Prairie Du Chien Group Aquifer
Last Strat Jordan Sandstone Depth to Bedrock 0 ft
Located by Minnesota Geological Survey
Locate Method Digitization (Screen) - Map (1:24,000) (15 meters or
System UTM - NAD83, Zone 15, Meters X 420497 Y 4895796
Unique Number Verification Info/GPS from data Input Date 03/22/2022

Angled Drill Hole

Well Contractor

Subsurface Exploration 2974 CARLSON, J.
Licensee Business Lic. or Reg. No. Name of Driller

Minnesota Unique Well Number

802408

County Blue Earth
Quad Mankato
Quad ID 55B

MINNESOTA DEPARTMENT OF HEALTH

WELL AND BORING REPORT

Minnesota Statutes Chapter 1031

Entry Date 03/27/2015
Update Date 01/12/2018
Received Date 02/02/2015

Well Name	Township	Range	Dir	Section	Subsection
MW-9-JS	109	26	W	30	DCBCAA

Elevation 799.74 **Elev. Method** Surveyed

Address

Well 3RD AV MANKATO MN 56001

Stratigraphy Information

Geological Material	From	To (ft.)	Color	Hardness
CLAY & LIMESTONE	0	7	BLK/GRY	SOFT
LIMESTONE	7	12	YELLOW	HARD
SHALE	12	15	GREEN	SOFT
SANDSTONE	15	61	WHITE	SOFT
SANDSTONE & SHALE	61	66	GRAY	HARD

Remarks

Well Depth	Depth Completed	Date Well Completed
66 ft.	66 ft.	00/00/2014

Drill Method Non-specified Rotary **Drill Fluid** Water

Use monitor well **Status** Active

Well Hydrofractured? Yes ☐ No ☒ **From** **To**

Casing Type Single casing **Joint** Threaded
Drive Shoe? Yes ☐ No ☒ **Above/Below**

Casing Diameter	Weight	Hole Diameter
2 in. To 56 ft.	lbs./ft.	6.2 in. To 66 ft.

Open Hole From ft. To ft.

Screen? ☒ **Type** stainless **Make** JOHNSON

Diameter	Slot/Gauze	Length	Set
2 in.	10	10 ft.	56 ft. 66 ft.

Static Water Level

11 ft. land surface Measure 00/00/2014

Pumping Level (below land surface)

Wellhead Completion

Pitless adapter manufacturer Model

☒ Casing Protection ☒ 12 in. above grade
☐ At-grade (Environmental Wells and Borings ONLY)

Grouting Information Well Grouted? ☒ Yes ☐ No ☐ Not Specified

Material	Amount	From	To
neat cement	15 Sacks	ft.	56 ft.

Nearest Known Source of Contamination

feet Direction Type

Well disinfected upon completion? ☐ Yes ☐ No

Pump ☒ Not Installed Date Installed

Manufacturer's name

Model Number HP Volt

Length of drop pipe ft Capacity g.p. Typ

Abandoned

Does property have any not in use and not sealed well(s)? ☐ Yes ☒ No

Variance

Was a variance granted from the MDH for this well? ☐ Yes ☒ No

Miscellaneous

First Bedrock Prairie Du Chien Group Aquifer Jordan
Last Strat Jordan Sandstone Depth to Bedrock 7 ft
Located by Minnesota Geological Survey
Locate Method Digitization (Screen) - Map (1:12,000) (>15 meters)
System UTM - NAD83, Zone 15, Meters X 420259 Y 4896050
Unique Number Verification Info/GPS from data Input Date 01/12/2018

Angled Drill Hole

Well Contractor

Jadd Seppmann and Sons, 1790 SEPPMANN, T.
Licensee Business Lic. or Reg. No. Name of Driller

Minnesota Unique Well Number

614146

County Blue Earth
Quad Mankato
Quad ID 56A

MINNESOTA DEPARTMENT OF HEALTH

WELL AND BORING REPORT

Minnesota Statutes Chapter 1031

Entry Date 11/05/1999
Update Date 01/26/2018
Received Date

Well Name	Township	Range	Dir	Section	Subsection
WINKLER,	109	26	W	31	BADDBB

Elevation 775.1 **Elev. Method** Surveyed

Address

Well 57076 230TH LA MANKATO MN
Contact RR 5 BOX 611 MANKATO MN 56001

Stratigraphy Information

Geological Material	From	To (ft.)	Color	Hardness
FILL	0	20		
SAND	20	40	BROWN	SOFT
LIMESTONE	40	56	YELLOW	HARD
SAND, FIRM	56	62		
ROCK	62	66	PINK	HARD
SAND, FIRM	66	80		
SHALE, FIRM	80	82	GREEN	
ROCK	82	280	GREEN	HARD
IRONTON	280	335	WHITE	HARD
EAU CLAIRE	335	335		

Remarks

Well Depth 335 ft. **Depth Completed** 335 ft. **Date Well Completed** 08/06/1998

Drill Method Non-specified Rotary **Drill Fluid** Bentonite

Use domestic **Status** Active

Well Hydrofractured? Yes ☐ No ☐ **From** **To**

Casing Type Step down **Joint** Welded
Drive Shoe? Yes ☒ No ☐ **Above/Below**

Casing Diameter	Weight	Hole Diameter
10 in. To 83 ft.	lbs./ft.	15 in. To 83 ft.
6 in. To 115 ft.	21 lbs./ft.	10 in. To 115 ft.

Open Hole From 115 ft. To 235 ft.

Screen? ☐ **Type** **Make**

Static Water Level
-1 ft. land surface Measure 08/06/1998

Pumping Level (below land surface)
ft. hrs. Pumping at 100 g.p.m.

Wellhead Completion
Pitless adapter manufacturer Model
☐ Casing Protection ☒ 12 in. above grade
☐ At-grade (Environmental Wells and Borings ONLY)

Grouting Information Well Grouted? ☒ Yes ☐ No ☐ Not Specified

Material	Amount	From	To
neat cement	32 Sacks	0 ft.	115 ft.
neat cement	48 Sacks	0 ft.	83 ft.

Nearest Known Source of Contamination
50 feet West Direction Septic tank/drain field Type
Well disinfected upon completion? ☒ Yes ☐ No

Pump ☒ Not Installed Date Installed
Manufacturer's name
Model Number HP Volt
Length of drop pipe ft Capacity g.p. Typ

Abandoned
Does property have any not in use and not sealed well(s)? ☐ Yes ☒ No

Variance
Was a variance granted from the MDH for this well? ☐ Yes ☒ No

Miscellaneous
First Bedrock Jordan Sandstone Aquifer Tunnel City-
Last Strat Wonewoc Sandstone Depth to Bedrock 56 ft
Located by Minnesota Geological Survey
Locate Method Digitization (Screen) - Map (1:24,000) (15 meters or
System UTM - NAD83, Zone 15, Meters X 420083 Y 4895429
Unique Number Verification Info/GPS from data Input Date 10/10/2002

Angled Drill Hole

Well Contractor
Searles Well Co. 08258 VOLK, J.
Licensee Business Lic. or Reg. No. Name of Driller

Minnesota Unique Well Number

761444

County Blue Earth
Quad Mankato
Quad ID 55B

MINNESOTA DEPARTMENT OF HEALTH
WELL AND BORING REPORT
Minnesota Statutes Chapter 1031

Entry Date 03/06/2014
Update Date 08/13/2020
Received Date 01/09/2014

Well Name	Township	Range	Dir	Section	Subsection
MW-7JS	109	26	W	31	ABCCDA

Elevation 804.98 **Elev. Method** Surveyed

Address

Contact 1710 ROE CREST DR NORTH MANKATO MN 56003

Stratigraphy Information

Geological Material	From	To (ft.)	Color	Hardness
CLAYEY SAND	0	20		MEDIUM
LIMESTONE	20	23		
CLAYEY SAND	23	26	GRAY	
SANDSTONE	26	31	WHT/ORN	

Remarks

MW-7JS MA-12-6554D BECKY MCCARTY.

Well Depth 31 ft. **Depth Completed** 31 ft. **Date Well Completed** 06/01/2013

Drill Method Multiple methods used **Drill Fluid**

Use monitor well **Status** Active

Well Hydrofractured? Yes ☐ No ☒ **From** **To**

Casing Type Single casing **Joint** Threaded

Drive Shoe? Yes ☐ No ☒ **Above/Below**

Casing Diameter	Weight	Hole Diameter
2 in. To 21 ft.	3.75 lbs./ft.	10 in. To 20 ft.
		6 in. To 31 ft.

Open Hole From ft. To ft.

Screen? ☒ **Type** plastic **Make** JOHNSON

Diameter	Slot/Gauze	Length	Set
2 in.	10	10 ft.	21 ft. 31 ft.

Static Water Level

17.0 ft. land surface Measure 06/01/2013

Pumping Level (below land surface)

Wellhead Completion

Pitless adapter manufacturer Model

☒ Casing Protection ☒ 12 in. above grade
☐ At-grade (Environmental Wells and Borings ONLY)

Grouting Information Well Grouted? ☒ Yes ☐ No ☐ Not Specified

Material	Amount		From	To
neat cement	4	Sacks	4 ft.	13 ft.
concrete	3	Sacks	ft.	4 ft.

Nearest Known Source of Contamination

feet Direction Type

Well disinfected upon completion? ☐ Yes ☒ No

Pump ☒ Not Installed Date Installed

Manufacturer's name

Model Number HP Volt

Length of drop pipe ft Capacity g.p. Typ

Abandoned

Does property have any not in use and not sealed well(s)? ☐ Yes ☒ No

Variance

Was a variance granted from the MDH for this well? ☐ Yes ☒ No

Miscellaneous

First Bedrock Prairie Du Chien Group Aquifer Prairie Du Chien-
Last Strat Jordan Sandstone Depth to Bedrock 20 ft
Located by Minnesota Geological Survey
Locate Method Digitization (Screen) - Map (1:12,000) (>15 meters)
System UTM - NAD83, Zone 15, Meters X 420244 Y 4895378
Unique Number Verification Info/GPS from data Input Date 01/12/2018

Angled Drill Hole

Well Contractor

Braun Intertec Corp. 1323 CHERMAK, J.
Licensee Business Lic. or Reg. No. Name of Driller

Minnesota Unique Well Number

686897

County Blue Earth
Quad Mankato
Quad ID 55B

MINNESOTA DEPARTMENT OF HEALTH
WELL AND BORING REPORT
Minnesota Statutes Chapter 1031

Entry Date
Update Date 01/24/2018
Received Date 03/23/2004

Well Name	Township	Range	Dir	Section	Subsection
MW	109	26	W	30	DDBABD

Elevation 829.48 **Elev. Method** Surveyed

Address

Contact P.O. BOX 1358 MANKATO MN 56002

Stratigraphy Information

Geological Material	From	To (ft.)	Color	Hardness
SAND	0	10	BROWN	SOFT
LIMESTONE	10	50	YELLOW	HARD
RUNNY SAND	50	59	WHITE	SOFT
SANDSTONE	59	69	WHITE	SOFT

Remarks

Well Depth	Depth Completed	Date Well Completed
69 ft.	69 ft.	03/04/2004

Drill Method Non-specified Rotary **Drill Fluid** Bentonite

Use monitor well **Status** Active

Well Hydrofractured? Yes ☐ No ☒ **From** **To**

Casing Type Single casing **Joint** Threaded
Drive Shoe? Yes ☐ No ☒ **Above/Below**

Casing Diameter	Weight	Hole Diameter
2 in. To 64 ft.	lbs./ft.	6.2 in. To 69 ft.

Open Hole From ft. To ft.

Screen? ☒ **Type** stainless **Make** JOHNSON

Diameter	Slot/Gauze	Length	Set
2 in.	10	4 ft.	64 ft. 69 ft.

Static Water Level

Pumping Level (below land surface)

69 ft. 1 hrs. Pumping at 5 g.p.m.

Wellhead Completion

Pitless adapter manufacturer Model

☒ Casing Protection ☒ 12 in. above grade
☐ At-grade (Environmental Wells and Borings ONLY)

Grouting Information Well Grouted? ☒ Yes ☐ No ☐ Not Specified

Material	Amount	From	To
neat cement	10 Sacks	ft.	50 ft.
neat cement	1 Sacks	ft.	5 ft.

Nearest Known Source of Contamination

feet Direction Type

Well disinfected upon completion? ☐ Yes ☐ No

Pump ☒ Not Installed Date Installed

Manufacturer's name

Model Number HP Volt

Length of drop pipe ft Capacity g.p. Typ

Abandoned

Does property have any not in use and not sealed well(s)? ☐ Yes ☒ No

Variance

Was a variance granted from the MDH for this well? ☐ Yes ☒ No

Miscellaneous

First Bedrock Prairie Du Chien Group Aquifer Jordan
Last Strat Jordan Sandstone Depth to Bedrock 10 ft
Located by Minnesota Geological Survey
Locate Method Digitization (Screen) - Map (1:24,000) (15 meters or
System UTM - NAD83, Zone 15, Meters X 420706 Y 4896110
Unique Number Verification Info/GPS from data Input Date 07/20/2012

Angled Drill Hole

Well Contractor

Licensee Business	Lic. or Reg. No.	Name of Driller
Seppmann Well Drilling	07441	SEPPMANN, T.

Minnesota Unique Well Number

530512

County Blue Earth
Quad Mankato
Quad ID 55B

MINNESOTA DEPARTMENT OF HEALTH

WELL AND BORING REPORT

Minnesota Statutes Chapter 1031

Entry Date 06/17/1997
Update Date 03/10/2014
Received Date

Well Name	Township	Range	Dir	Section	Subsection
HENDLEY'S,	109	26	W	31	AACBAC

Elevation 828 ft. **Elev. Method** 7.5 minute topographic map (+/- 5 feet)

Address

Well 5 CR MANKATO MN
Contact RR 5 BOX 14 MANKATO MN 56001

Stratigraphy Information

Geological Material	From	To (ft.)	Color	Hardness
SAND, TRACE GRAVEL	0	6	BROWN	
DOLOMITE	6	25	BRN/PNK	HARD
DOLOMITE	25	27	GRAY	HARD

Remarks

H117808 - SEPPMANN WELL DRILLING
WELL SEALED 03-11-1997 BY 07478

Well Depth 27 ft. **Depth Completed** 27 ft. **Date Well Completed** 06/01/1993

Drill Method Vibracore/rotasonic **Drill Fluid**

Use abandoned **Status** Sealed

Well Hydrofractured? Yes ☐ No ☐ **From** **To**

Casing Type Single casing **Joint**
Drive Shoe? Yes ☒ No ☐ **Above/Below**

Casing Diameter	Weight	Hole Diameter
6 in. To 8 ft.	lbs./ft.	4.5 in. To 27 ft.

Open Hole From 8 ft. To 27 ft.

Screen? ☐ **Type** **Make**

Static Water Level

Pumping Level (below land surface)

Wellhead Completion

Pitless adapter manufacturer Model

☒ Casing Protection ☒ 12 in. above grade
☐ At-grade (Environmental Wells and Borings ONLY)

Grouting Information Well Grouted? ☐ Yes ☒ No ☐ Not Specified

Nearest Known Source of Contamination

feet Direction Type

Well disinfected upon completion? ☐ Yes ☐ No

Pump ☒ Not Installed Date Installed

Manufacturer's name

Model Number HP Volt

Length of drop pipe ft Capacity g.p. Typ

Abandoned

Does property have any not in use and not sealed well(s)? ☐ Yes ☐ No

Variance

Was a variance granted from the MDH for this well? ☐ Yes ☐ No

Miscellaneous

First Bedrock Prairie Du Chien/Oneota Aquifer Oneota Fm
Last Strat Prairie Du Chien/Oneota Depth to Bedrock 6 ft
Located by Minnesota Geological Survey
Locate Method Digitization (Screen) - Map (1:24,000) (15 meters or
System UTM - NAD83, Zone 15, Meters X 420624 Y 4895512
Unique Number Verification Other, note in Input Date 10/21/2002

Angled Drill Hole

Well Contractor

Boart Longyear Drilling 49588 ANDERSON, J.
Licensee Business Lic. or Reg. No. Name of Driller

Minnesota Unique Well Number

539418

County Blue Earth
Quad Mankato
Quad ID 55B

MINNESOTA DEPARTMENT OF HEALTH

WELL AND BORING REPORT

Minnesota Statutes Chapter 1031

Entry Date 06/17/1997
Update Date 05/06/2005
Received Date

Well Name	Township	Range	Dir	Section	Subsection
HENDLEY'S INC.	109	26	W	31	AACBAB

Elevation 828 ft. **Elev. Method** 7.5 minute topographic map (+/- 5 feet)

Address

Contact 2020 RIVERFRONT DR S MANKATO
Well RR 5 MANKATO MN

Stratigraphy Information

Geological Material	From	To (ft.)	Color	Hardness
SILTY SAND	0	2	DK. BRN	
SAND, SOME SILT, TR	2	4	LT. BRN	
DOLOMITE	4	23	BRN/PNK	HARD
DOLOMITE	23	25	LT. GRY	HARD

Remarks

USE IS REMEDIAL.
WELL SEALED 03-11-1997 BY 07478

Well Depth 25 ft. **Depth Completed** 25 ft. **Date Well Completed** 03/03/1994

Drill Method Vibracore/rotasonic **Drill Fluid**

Use other (specify in remarks) **Status** Sealed

Well Hydrofractured? Yes ☐ No ☐ **From** **To**

Casing Type Single casing **Joint** Welded
Drive Shoe? Yes ☒ No ☐ **Above/Below**

Casing Diameter	Weight	Hole Diameter
6 in. To 8 ft.	lbs./ft.	4.5 in. To 25 ft.

Open Hole From 8 ft. To 25 ft.

Screen? ☐ **Type** **Make**

Static Water Level

Pumping Level (below land surface)

Wellhead Completion

Pitless adapter manufacturer Model

☐ Casing Protection ☐ 12 in. above grade
☐ At-grade (Environmental Wells and Borings ONLY)

Grouting Information Well Grouted? ☐ Yes ☒ No ☐ Not Specified

Nearest Known Source of Contamination

0 feet Direction Volatile organic compounds Type

Well disinfected upon completion? ☐ Yes ☐ No

Pump ☒ Not Installed Date Installed

Manufacturer's name

Model Number HP Volt

Length of drop pipe ft Capacity g.p. Typ

Abandoned

Does property have any not in use and not sealed well(s)? ☐ Yes ☒ No

Variance

Was a variance granted from the MDH for this well? ☐ Yes ☐ No

Miscellaneous

First Bedrock Prairie Du Chien/Oneota Aquifer Oneota Fm
Last Strat Prairie Du Chien/Oneota Depth to Bedrock 4 ft
Located by Minnesota Geological Survey
Locate Method Digitization (Screen) - Map (1:24,000) (15 meters or
System UTM - NAD83, Zone 15, Meters X 420628 Y 4895552
Unique Number Verification Other, note in Input Date 10/21/2002

Angled Drill Hole

Well Contractor

Licensee Business	Lic. or Reg. No.	Name of Driller
Boart Longyear Drilling	49588	JOHNSON, S.

Minnesota Unique Well Number

716574

County Blue Earth
Quad Mankato
Quad ID 55B

MINNESOTA DEPARTMENT OF HEALTH

WELL AND BORING REPORT

Minnesota Statutes Chapter 1031

Entry Date 11/29/2005
Update Date 08/18/2014
Received Date 06/18/2005

Well Name	Township	Range	Dir	Section	Subsection
MANKATO	109	26	W	30	DDCBAC

Elevation 831 ft. **Elev. Method** CALC FROM 2-FOOT COUNTY DEM

Address

Well MN

Stratigraphy Information

Geological Material	From	To (ft.)	Color	Hardness
LIMESTONE	0	55	YELLOW	HARD
SANDSTONE	55	100	WHITE	SOFT
SANDSTONE	100	110	PINK	HARD
ROCK & GRAY	110	115	RED/GRY	HARD
ROCK & SHALE	115	140	RED/BLU	HARD
SANDSTONE	140	230	GRAY	M.HARD

Remarks

Well Depth 230 ft. **Depth Completed** 230 ft. **Date Well Completed** 06/01/2005

Drill Method Non-specified Rotary **Drill Fluid** Bentonite

Use industrial **Status** Active

Well Hydrofractured? Yes ☐ No ☒ **From** **To**

Casing Type Single casing **Joint** Threaded

Drive Shoe? Yes ☐ No ☒ **Above/Below**

Casing Diameter	Weight	Hole Diameter
5 in. To 145 ft.	15 lbs./ft.	10 in. To 145 ft.
		5 in. To 230 ft.

Open Hole From 145 ft. To 230 ft.

Screen? ☐ **Type** **Make**

Static Water Level

46 ft. land surface Measure 06/01/2005

Pumping Level (below land surface)

120 ft. 1 hrs. Pumping at 80 g.p.m.

Wellhead Completion

Pitless adapter manufacturer Model

☐ Casing Protection ☒ 12 in. above grade
☐ At-grade (Environmental Wells and Borings ONLY)

Grouting Information Well Grouted? ☒ Yes ☐ No ☐ Not Specified

Material	Amount	From	To
neat cement	53 Sacks	ft.	145 ft.

Nearest Known Source of Contamination

feet Direction Type

Well disinfected upon completion? ☐ Yes ☐ No

Pump ☐ Not Installed Date Installed 06/01/2005

Manufacturer's name

Model Number HP 5 Volt

Length of drop pipe ft Capacity g.p. Typ Submersible

Abandoned

Does property have any not in use and not sealed well(s)? ☐ Yes ☒ No

Variance

Was a variance granted from the MDH for this well? ☐ Yes ☒ No

Miscellaneous

First Bedrock Prairie Du Chien Group Aquifer St.Lawrence-
Last Strat Tunnel CIty/Lone Rock Fm Depth to Bedrock 0 ft
Located by Minnesota Geological Survey
Locate Method Digitization (Screen) - Map (1:24,000) (15 meters or
System UTM - NAD83, Zone 15, Meters X 420640 Y 4895916
Unique Number Verification Information from Input Date 12/30/2009

Angled Drill Hole

Well Contractor

Seppmann Well Drilling	07441	SEPPMANN, T.
Licensee Business	Lic. or Reg. No.	Name of Driller

Minnesota Unique Well Number

761446

County Blue Earth
Quad Mankato
Quad ID 55B

MINNESOTA DEPARTMENT OF HEALTH

WELL AND BORING REPORT

Minnesota Statutes Chapter 1031

Entry Date 03/06/2014
Update Date 01/12/2018
Received Date 01/09/2014

Well Name	Township	Range	Dir	Section	Subsection
MW-5JS	109	26	W	31	AAACCA

Elevation 826.43 **Elev. Method** Surveyed

Address

Contact 3301 THIRD AV MANKATO MN 56001

Stratigraphy Information

Geological Material	From	To (ft.)	Color	Hardness
POORLY GRADED	0	3		MEDIUM
CLAYEY SAND	3	5	BROWN	MEDIUM
SILTY SAND	5	8		MEDIUM
LIMESTONE	8	30		

Remarks

MW-5JS MA-12-6554D BECKY MCCARTY.

Well Depth 30 ft. **Depth Completed** 30 ft. **Date Well Completed** 06/11/2013

Drill Method Multiple methods used **Drill Fluid**

Use monitor well **Status** Active

Well Hydrofractured? Yes ☐ No ☒ **From** **To**

Casing Type Single casing **Joint** Threaded

Drive Shoe? Yes ☐ No ☒ **Above/Below**

Casing Diameter	Weight	Hole Diameter
2 in. To 20 ft.	3.75 lbs./ft.	10 in. To 7.5 ft.
		6 in. To 30 ft.

Open Hole From ft. To ft.

Screen? ☒ **Type** plastic **Make** JOHNSON

Diameter	Slot/Gauze	Length	Set
2 in.	10	10 ft.	20 ft. 30 ft.

Static Water Level

9.75 ft. land surface Measure 06/11/2013

Pumping Level (below land surface)

Wellhead Completion

Pitless adapter manufacturer Model

☒ Casing Protection ☒ 12 in. above grade

☐ At-grade (Environmental Wells and Borings ONLY)

Grouting Information Well Grouted? ☒ Yes ☐ No ☐ Not Specified

Material	Amount	From	To
neat cement	4 Sacks	4 ft.	17 ft.
concrete	3.5 Sacks	ft.	4 ft.

Nearest Known Source of Contamination

feet Direction Type

Well disinfected upon completion? ☐ Yes ☒ No

Pump ☒ Not Installed Date Installed

Manufacturer's name

Model Number HP Volt

Length of drop pipe ft Capacity g.p. Typ

Abandoned

Does property have any not in use and not sealed well(s)? ☐ Yes ☒ No

Variance

Was a variance granted from the MDH for this well? ☐ Yes ☒ No

Miscellaneous

First Bedrock Prairie Du Chien Group Aquifer Prairie Du Chien

Last Strat Prairie Du Chien Group Depth to Bedrock 8 ft

Located by Minnesota Geological Survey

Locate Method Digitization (Screen) - Map (1:12,000) (>15 meters)

System UTM - NAD83, Zone 15, Meters X 420797 Y 4895585

Unique Number Verification Info/GPS from data Input Date 01/12/2018

Angled Drill Hole

Well Contractor

Braun Intertec Corp. 1323 CHERMAK, J.

Licensee Business Lic. or Reg. No. Name of Driller

Minnesota Unique Well Number

796052

County Blue Earth
Quad
Quad ID

MINNESOTA DEPARTMENT OF HEALTH
WELL AND BORING REPORT
Minnesota Statutes Chapter 1031

Entry Date 03/04/2014
Update Date 12/30/2019
Received Date 01/24/2014

Well Name	Township	Range	Dir	Section	Subsection
MW 8B	109	26	W	31	ACB

Elevation **Elev. Method**

Address

Well 57075 230TH LA MANKATO MN

Stratigraphy Information

Geological Material	From	To (ft.)	Color	Hardness
SAND W/GRAVEL	0	30	BROWN	

Remarks

MW 8B
SEALED 09-11-2019 BY 1790

Well Depth	Depth Completed	Date Well Completed
30 ft.	30 ft.	10/22/2013

Drill Method Auger (non-specified) **Drill Fluid** Water

Use monitor well **Status** Sealed

Well Hydrofractured? **Yes** ☐ **No** ☒ **From** **To**

Casing Type Single casing **Joint** Threaded
Drive Shoe? **Yes** ☐ **No** ☒ **Above/Below**

Casing Diameter	Weight	Hole Diameter
2 in. To 25 ft.	lbs./ft.	8 in. To 30 ft.

Open Hole From ft. To ft.

Screen? ☒ **Type** stainless **Make** JOHNSON

Diameter	Slot/Gauze	Length	Set
2 in.	10	5 ft.	25 ft. 30 ft.

Static Water Level

3 ft. land surface Measure 10/22/2013

Pumping Level (below land surface)

Wellhead Completion

Pitless adapter manufacturer Model

☒ Casing Protection ☐ 12 in. above grade
☐ At-grade (Environmental Wells and Borings ONLY)

Grouting Information Well Grouted? ☒ Yes ☐ No ☐ Not Specified

Material	Amount	From	To
bentonite	3 Sacks	ft.	23 ft.

Nearest Known Source of Contamination

feet Direction Type

Well disinfected upon completion? ☐ Yes ☒ No

Pump ☒ Not Installed Date Installed

Manufacturer's name

Model Number HP Volt

Length of drop pipe ft Capacity g.p. Typ

Abandoned

Does property have any not in use and not sealed well(s)? ☐ Yes ☐ No

Variance

Was a variance granted from the MDH for this well? ☐ Yes ☒ No

Miscellaneous

First Bedrock Aquifer

Last Strat Depth to Bedrock ft

Located by

Locate Method

System UTM - NAD83, Zone 15, Meters X Y

Unique Number Verification Input Date

Angled Drill Hole

Well Contractor

Aqua Plus, Inc.	1467	CANTY, W.
Licensee Business	Lic. or Reg. No.	Name of Driller

Minnesota Unique Well Number

796051

County Blue Earth
Quad
Quad ID

MINNESOTA DEPARTMENT OF HEALTH
WELL AND BORING REPORT
Minnesota Statutes Chapter 1031

Entry Date 03/04/2014
Update Date 12/30/2019
Received Date 01/24/2014

Well Name	Township	Range	Dir	Section	Subsection
MW 8	109	26	W	31	ACB

Elevation **Elev. Method**

Address
C/W 57076 230TH LA MANKATO MN 56001

Stratigraphy Information

Geological Material	From	To (ft.)	Color	Hardness
SAND W/GRAVEL	0	11	BROWN	

Remarks
MW 8
SEALED 09-11-2019 BY 1790

Well Depth 11 ft. **Depth Completed** 11 ft. **Date Well Completed** 10/22/2013
Drill Method Auger (non-specified) **Drill Fluid** Water

Use monitor well **Status** Sealed

Well Hydrofractured? Yes ☐ No ☒ **From** **To**

Casing Type Single casing **Joint** Threaded
Drive Shoe? Yes ☐ No ☒ **Above/Below**

Casing Diameter	Weight	Hole Diameter
2 in. To 0 ft.	lbs./ft.	8 in. To 11 ft.

Open Hole From ft. To ft.

Screen? ☒ **Type** stainless **Make** JOHNSON

Diameter	Slot/Gauze	Length	Set
2 in.	10	5 ft.	6 ft. 11 ft.

Static Water Level
3 ft. land surface Measure 10/22/2013

Pumping Level (below land surface)

Wellhead Completion
Pitless adapter manufacturer Model
☒ Casing Protection ☐ 12 in. above grade
☐ At-grade (Environmental Wells and Borings ONLY)

Grouting Information Well Grouted? ☒ Yes ☐ No ☐ Not Specified

Material	Amount	From	To
bentonite	1 Sacks	ft.	5 ft.

Nearest Known Source of Contamination
feet Direction Type
Well disinfected upon completion? ☐ Yes ☒ No

Pump ☒ Not Installed Date Installed
Manufacturer's name
Model Number HP Volt
Length of drop pipe ft Capacity g.p. Typ

Abandoned
Does property have any not in use and not sealed well(s)? ☐ Yes ☐ No

Variance
Was a variance granted from the MDH for this well? ☐ Yes ☒ No

Miscellaneous
First Bedrock Aquifer
Last Strat Depth to Bedrock ft
Located by
Locate Method
System UTM - NAD83, Zone 15, Meters X Y
Unique Number Verification Input Date

Angled Drill Hole

Well Contractor
Aqua Plus, Inc. 1467 CANTY, W.
Licensee Business Lic. or Reg. No. Name of Driller

Minnesota Unique Well Number

818514

County Blue Earth
Quad
Quad ID

MINNESOTA DEPARTMENT OF HEALTH

WELL AND BORING REPORT

Minnesota Statutes Chapter 1031

Entry Date
Update Date 05/10/2018
Received Date

Well Name	Township	Range	Dir	Section	Subsection
SANDS, JORDAN	109	26	W	31	ABB

Elevation **Elev. Method**

Address

Well 57068 231ST LA MANKATO MN 56001

Stratigraphy Information

Geological Material	From	To (ft.)	Color	Hardness
CLAY	0	4	BRN/BLK	SOFT
LIMESTONE	4	17	YELLOW	MEDIUM
SANDSTONE	17	36	WHT/YEL	SOFT
SANDSTONE	36	38	PINK	HARD
SANDSTONE	38	75	WHITE	SOFT
ROCK/ SANDSTONE	75	75	GRAY	HARD

Remarks

Well Depth 75 ft. **Depth Completed** 75 ft. **Date Well Completed** 10/17/2016

Drill Method Non-specified Rotary **Drill Fluid** Water

Use industrial /commercial **Status** Active

Well Hydrofractured? **Yes** ☐ **No** ☒ **From** **To**

Casing Type **Joint** Threaded
Drive Shoe? **Yes** ☒ **No** ☐ **Above/Below**

Casing Diameter	Weight	Hole Diameter
5 in. To 52 ft.	15 lbs./ft.	10 in. To 52 ft.
		5 in. To ft.

Open Hole From 52 ft. To ft.

Screen? ☐ **Type** **Make**

Static Water Level

8 ft. land surface Measure 10/17/2016

Pumping Level (below land surface)

20 ft. 1 hrs. Pumping at 20 g.p.m.

Wellhead Completion

Pitless adapter manufacturer Model

☐ Casing Protection ☒ 12 in. above grade
☐ At-grade (Environmental Wells and Borings ONLY)

Grouting Information Well Grouted? ☒ Yes ☐ No ☐ Not Specified

Material	Amount	From	To
cement-sand	19 Sacks	ft.	52 ft.

Nearest Known Source of Contamination

75 feet West Direction Other Type

Well disinfected upon completion? ☒ Yes ☐ No

Pump ☐ Not Installed Date Installed 10/17/2016

Manufacturer's name

Model Number HP 1 Volt 240

Length of drop pipe 40 ft Capacity 16 g.p. Typ Submersible

Abandoned

Does property have any not in use and not sealed well(s)? ☐ Yes ☒ No

Variance

Was a variance granted from the MDH for this well? ☐ Yes ☒ No

Miscellaneous

First Bedrock Aquifer

Last Strat Depth to Bedrock ft

Located by

Locate Method

System UTM - NAD83, Zone 15, Meters X Y

Unique Number Verification Input Date

Angled Drill Hole

Well Contractor

Jadd Seppmann and Sons, 1790 SEPPMANN
Licensee Business Lic. or Reg. No. Name of Driller

Appendix E: Climate and Greenhouse Gas Analysis

- FEMA National Risk Index
- Greenhouse Gas Calculation Spreadsheet

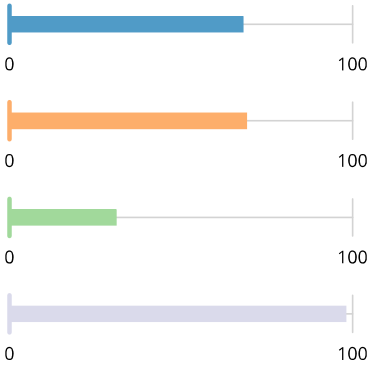
National Risk Index

May 02, 2025

Blue Earth County, Minnesota

Summary

Risk Index is **Relatively Low**	Score **68.1**
Expected Annual Loss is **Relatively Low**	Score **69.9**
Social Vulnerability is **Relatively Low**	Score **31.8**
Community Resilience is **Very High**	Score **98.8**

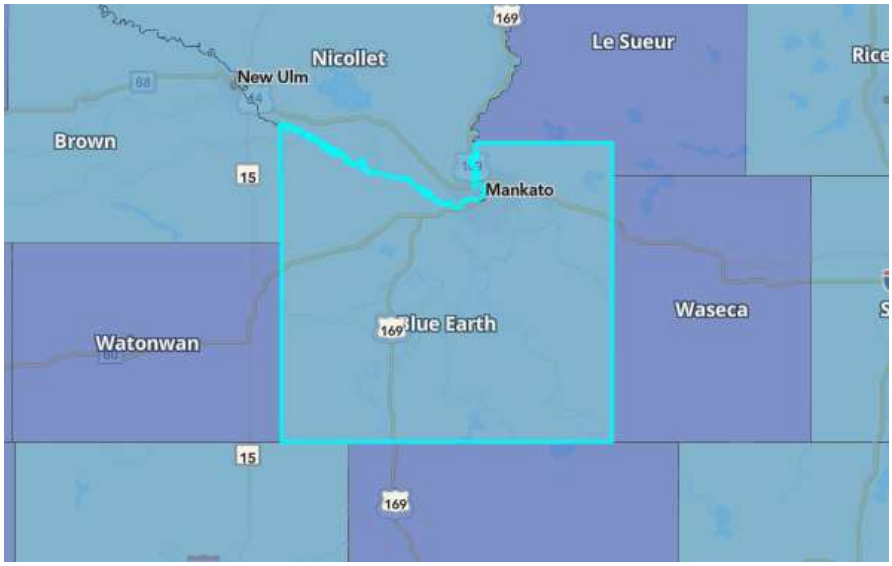


While reviewing this report, keep in mind that low risk is driven by lower loss due to natural hazards, lower social vulnerability, and higher community resilience.

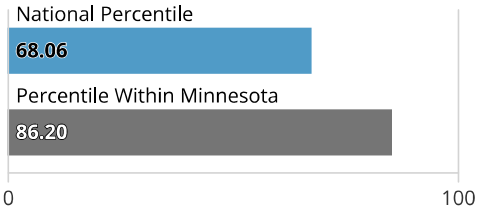
For more information about the National Risk Index, its data, and how to interpret the information it provides, please review the **About the National Risk Index** and **How to Take Action** sections at the end of this report. Or, visit the National Risk Index website at hazards.fema.gov/nri/learn-more to access supporting documentation and links.

Risk Index

The Risk Index rating is **Relatively Low** for **Blue Earth County, MN** when compared to the rest of the U.S.



Score	68.06



68% of U.S. counties have a lower Risk Index

86% of counties in Minnesota have a lower Risk Index

Risk Index Legend

Very High | Relatively High | Relatively Moderate | Relatively Low | Very Low

No Rating | Not Applicable | Insufficient Data

Hazard Type Risk Index

Hazard type Risk Index scores are calculated using data for only a single hazard type, and reflect a community's Expected Annual Loss value, community risk factors, and the adjustment factor used to calculate the risk value.

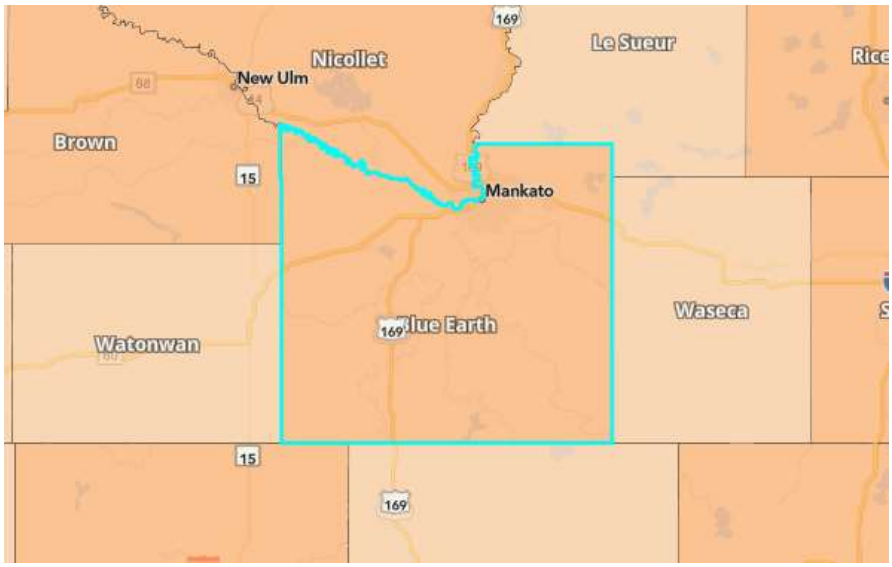
Hazard Type	Risk Index Rating	Risk Index Score	National Percentile
Avalanche	Not Applicable	--	
Coastal Flooding	Not Applicable	--	
Cold Wave	Relatively High	90.8	0 100
Drought	Relatively Moderate	93.8	0 100
Earthquake	Very Low	18.8	0 100
Hail	Relatively Moderate	81.8	0 100
Heat Wave	Relatively Low	65.3	0 100
Hurricane	Not Applicable	--	
Ice Storm	Relatively Moderate	66.7	0 100
Landslide	Relatively High	97	0 100
Lightning	Relatively Low	45.1	0 100
Riverine Flooding	Relatively Low	51.6	0 100
Strong Wind	Relatively High	97.1	0 100
Tornado	Relatively Moderate	78.3	0 100
Tsunami	Not Applicable	--	
Volcanic Activity	Not Applicable	--	
Wildfire	Very Low	37.9	0 100
Winter Weather	Relatively Moderate	81.2	0 100

Risk Factor Breakdown

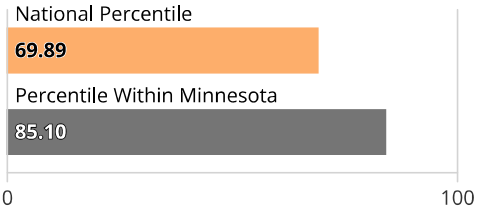
Hazard Type	EAL Value	Social Vulnerability	Community Resilience	CRF	Risk Value	Risk Index Score
Strong Wind	$3,565,300	Relatively Low	Very High	1.02	$3,745,182	97.1
Tornado	$3,307,463	Relatively Low	Very High	1.02	$3,477,459	78.3
Drought	$1,084,546	Relatively Low	Very High	1.02	$975,064	93.8
Cold Wave	$830,261	Relatively Low	Very High	1.02	$834,541	90.8
Hail	$593,013	Relatively Low	Very High	1.02	$563,015	81.8
Riverine Flooding	$551,946	Relatively Low	Very High	1.02	$502,883	51.6
Landslide	$441,430	Relatively Low	Very High	1.02	$442,925	97
Winter Weather	$215,545	Relatively Low	Very High	1.02	$225,190	81.2
Heat Wave	$210,985	Relatively Low	Very High	1.02	$217,345	65.3
Ice Storm	$139,617	Relatively Low	Very High	1.02	$147,733	66.7
Lightning	$85,566	Relatively Low	Very High	1.02	$90,368	45.1
Wildfire	$19,745	Relatively Low	Very High	1.02	$19,647	37.9
Earthquake	$11,666	Relatively Low	Very High	1.02	$12,318	18.8
Avalanche	--	Relatively Low	Very High	1.02	--	--
Coastal Flooding	--	Relatively Low	Very High	1.02	--	--
Hurricane	--	Relatively Low	Very High	1.02	--	--
Tsunami	--	Relatively Low	Very High	1.02	--	--
Volcanic Activity	--	Relatively Low	Very High	1.02	--	--

Expected Annual Loss

In **Blue Earth County, MN**, expected loss each year due to natural hazards is **Relatively Low** when compared to the rest of the U.S.



Score	69.89



70% of U.S. counties have a lower Expected Annual Loss

85% of counties in Minnesota have a lower Expected Annual Loss

Expected Annual Loss Legend

Very High | Relatively High | Relatively Moderate | Relatively Low | Very Low

No Expected Annual Losses | Not Applicable | Insufficient Data

Composite Expected Annual Loss	**$11,057,083.09**
Composite Expected Annual Loss Rate National Percentile	**33.1**

Building EAL	**$7,076,989.90**	Population EAL	**0.16** fatalities
Building EAL Rate	**$1 per $2.20K of building value**	Population EAL Rate	**1 per 440.45K people**
Agriculture EAL	**$2,160,931.29**	Population Equivalence EAL	**$1,819,161.90**
Agriculture EAL Rate	**$1 per $256.66 of agriculture value**		

Expected Annual Loss for Hazard Types

Expected Annual Loss scores for hazard types are calculated using data for only a single hazard type, and reflect a community's relative expected annual loss for only that hazard type.

13 of 18 hazard types contribute to the expected annual loss for **Blue Earth County, MN**.

Hazard Type	Expected Annual Loss Rating	EAL Value	Score
Strong Wind	Relatively High	$3,565,300	97.3
Tornado	Relatively Moderate	$3,307,463	81.1

Hazard Type	Expected Annual Loss Rating	EAL Value	Score
Drought	Relatively Moderate	$1,084,546	95.4
Cold Wave	Relatively High	$830,262	92.1
Hail	Relatively Moderate	$593,013	84.1
Riverine Flooding	Relatively Low	$551,946	57.1
Landslide	Relatively High	$441,430	97.3
Winter Weather	Relatively High	$215,545	83.3
Heat Wave	Relatively Low	$210,985	68.8
Ice Storm	Relatively Moderate	$139,617	68.4
Lightning	Relatively Low	$85,566	48.8
Wildfire	Very Low	$19,745	39.4
Earthquake	Very Low	$11,666	19.2
Avalanche	Not Applicable	--	--
Coastal Flooding	Not Applicable	--	--
Hurricane	Not Applicable	--	--
Tsunami	Not Applicable	--	--
Volcanic Activity	Not Applicable	--	--

Expected Annual Loss Values

Hazard Type	Total	Building Value	Population Equivalence	Population	Agriculture Value
Avalanche	--	--	--	--	--
Coastal Flooding	--	--	--	--	--
Cold Wave	$830,261	$192	$539,715	0.05	$290,354
Drought	$1,084,546	n/a	n/a	n/a	$1,084,546
Earthquake	$11,666	$9,472	$2,194	0.00	n/a
Hail	$593,013	$88,806	$65,259	0.01	$438,949
Heat Wave	$210,985	$20,541	$152,517	0.01	$37,927
Hurricane	--	--	--	--	--
Ice Storm	$139,617	$84,471	$55,146	0.00	n/a
Landslide	$441,430	$366,778	$74,651	0.01	n/a
Lightning	$85,566	$15,395	$70,171	0.01	n/a
Riverine Flooding	$551,946	$357,423	$40,565	0.00	$153,958

Hazard Type	Total	Building Value	Population Equivalence	Population	Agriculture Value
Strong Wind	$3,565,300	$3,276,864	$151,833	0.01	$136,603
Tornado	$3,307,463	$2,641,354	$652,366	0.06	$13,743
Tsunami	--	--	--	--	--
Volcanic Activity	--	--	--	--	--
Wildfire	$19,745	$16,934	$2,810	0.00	$1
Winter Weather	$215,545	$198,759	$11,936	0.00	$4,849

Exposure Values

Hazard Type	Total	Building Value	Population Equivalence	Population	Agriculture Value
Avalanche	--	--	--	--	--
Coastal Flooding	--	--	--	--	--
Cold Wave	$817,381,292,920	$15,579,871,642	$801,246,800,000	69,073.00	$554,621,278
Drought	$208,157,849	n/a	n/a	n/a	$208,157,849
Earthquake	$817,278,885,000	$15,579,685,000	$801,699,200,000	69,112.00	n/a
Hail	$817,381,292,920	$15,579,871,642	$801,246,800,000	69,073.00	$554,621,278
Heat Wave	$817,381,292,920	$15,579,871,642	$801,246,800,000	69,073.00	$554,621,278
Hurricane	--	--	--	--	--
Ice Storm	$816,826,671,642	$15,579,871,642	$801,246,800,000	69,073.00	n/a
Landslide	$307,945,619,154	$5,721,762,095	$302,223,857,059	26,053.78	n/a
Lightning	$816,826,671,642	$15,579,871,642	$801,246,800,000	69,073.00	n/a
Riverine Flooding	$3,626,872,393	$67,696,832	$3,550,527,199	306.08	$8,648,362
Strong Wind	$817,381,292,920	$15,579,871,642	$801,246,800,000	69,073.00	$554,621,278
Tornado	$817,381,292,920	$15,579,871,642	$801,246,800,000	69,073.00	$554,621,278
Tsunami	--	--	--	--	--
Volcanic Activity	--	--	--	--	--
Wildfire	$94,601,637,554	$1,722,953,531	$92,807,578,065	8,000.65	$71,105,958
Winter Weather	$817,381,292,920	$15,579,871,642	$801,246,800,000	69,073.00	$554,621,278

Annualized Frequency Values

Hazard Type	Annualized Frequency	Events on Record	Period of Record
Avalanche	--	--	--

Hazard Type	Annualized Frequency	Events on Record	Period of Record
Coastal Flooding	--	--	--
Cold Wave	2.2 events per year	36	2005-2021 (16 years)
Drought	14 events per year	322	2000-2021 (22 years)
Earthquake	0.010% chance per year	n/a	2021 dataset
Hail	5 events per year	169	1986-2021 (34 years)
Heat Wave	1.2 events per year	20	2005-2021 (16 years)
Hurricane	--	--	--
Ice Storm	0.3 events per year	22	1946-2014 (67 years)
Landslide	0 events per year	4	2010-2021 (12 years)
Lightning	39.8 events per year	876	1991-2012 (22 years)
Riverine Flooding	1.3 events per year	30	1996-2019 (24 years)
Strong Wind	4 events per year	138	1986-2021 (34 years)
Tornado	0.6 events per year	34	1950-2021 (72 years)
Tsunami	--	--	--
Volcanic Activity	--	--	--
Wildfire	0.002% chance per year	n/a	2021 dataset
Winter Weather	7.6 events per year	122	2005-2021 (16 years)

Historic Loss Ratios

Hazard Type	Overall Rating
Avalanche	--
Coastal Flooding	--
Cold Wave	Very Low
Drought	Relatively Low
Earthquake	Very Low
Hail	Relatively Low
Heat Wave	Very Low
Hurricane	--
Ice Storm	Relatively Low
Landslide	Relatively Low
Lightning	Very Low

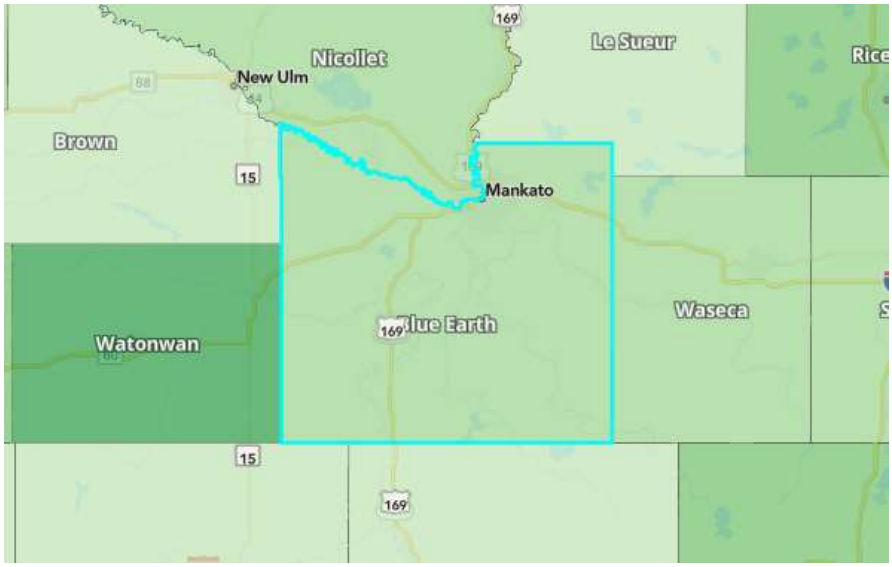
Hazard Type	Overall Rating
Riverine Flooding	Relatively Low
Strong Wind	Relatively Moderate
Tornado	Relatively Low
Tsunami	--
Volcanic Activity	--
Wildfire	Relatively Moderate
Winter Weather	Relatively Low

Expected Annual Loss Rate

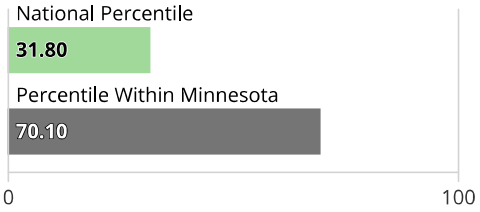
Hazard Type	Building EAL Rate (per building value)	Population EAL Rate (per population)	Agriculture EAL Rate (per agriculture value)
Avalanche	--	--	--
Coastal Flooding	--	--	--
Cold Wave	$1 per $81.09M	1 per 1.48M	$1 per $1.91K
Drought	--	--	$1 per $511.39
Earthquake	$1 per $1.64M	1 per 365.18M	--
Hail	$1 per $175.44K	1 per 12.28M	$1 per $1.26K
Heat Wave	$1 per $758.46K	1 per 5.25M	$1 per $14.62K
Hurricane	--	--	--
Ice Storm	$1 per $184.44K	1 per 14.53M	--
Landslide	$1 per $42.48K	1 per 10.73M	--
Lightning	$1 per $1.01M	1 per 11.42M	--
Riverine Flooding	$1 per $43.59K	1 per 19.75M	$1 per $3.60K
Strong Wind	$1 per $4.75K	1 per 5.28M	$1 per $4.06K
Tornado	$1 per $5.90K	1 per 1.23M	$1 per $40.36K
Tsunami	--	--	--
Volcanic Activity	--	--	--
Wildfire	$1 per $920.02K	1 per 285.19M	$1 per $432.09M
Winter Weather	$1 per $78.39K	1 per 67.13M	$1 per $114.37K

Social Vulnerability

Social groups in **Blue Earth County, MN** have a **Relatively Low** susceptibility to the adverse impacts of natural hazards when compared to the rest of the U.S.



Score **31.8**



32% of U.S. counties have a lower Social Vulnerability

70% of counties in Minnesota have a lower Social Vulnerability

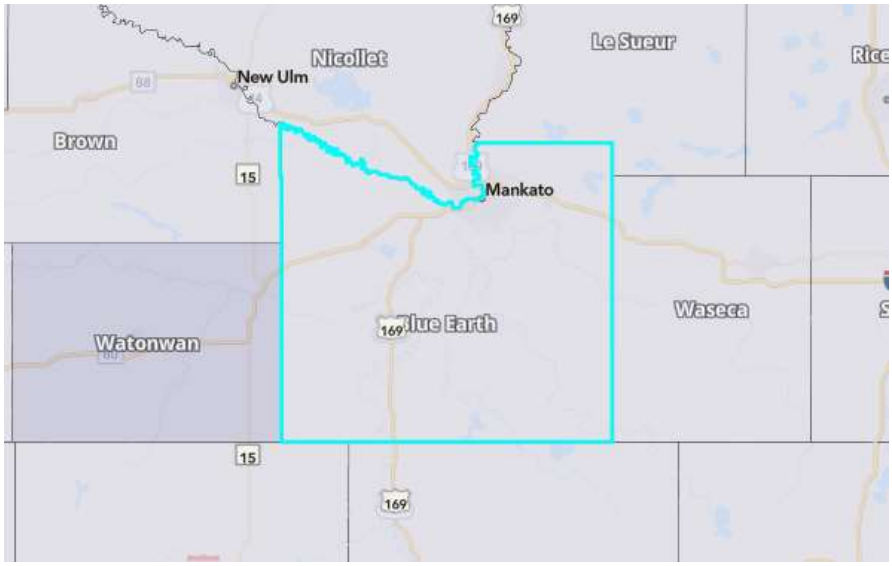
Social Vulnerability Legend

Very High | Relatively High | Relatively Moderate | Relatively Low | Very Low

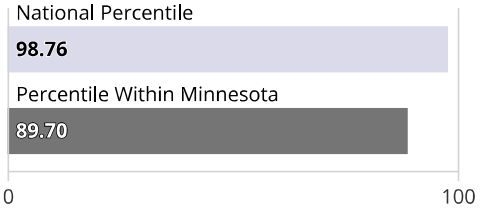
Data Unavailable

Community Resilience

Communities in **Blue Earth County, MN** have a **Very High** ability to prepare for anticipated natural hazards, adapt to changing conditions, and withstand and recover rapidly from disruptions when compared to the rest of the U.S.



Score	98.76



1% of U.S. counties have a higher Community Resilience

10% of counties in Minnesota have a higher Community Resilience

Community Resilience Legend

Very High | Relatively High | Relatively Moderate | Relatively Low | Very Low | Data Unavailable

About the National Risk Index

The National Risk Index is a dataset and online tool to help illustrate the United States communities most at risk for 18 natural hazards: Avalanche, Coastal Flooding, Cold Wave, Drought, Earthquake, Hail, Heat Wave, Hurricane, Ice Storm, Landslide, Lightning, Riverine Flooding, Strong Wind, Tornado, Tsunami, Volcanic Activity, Wildfire, and Winter Weather.

The National Risk Index leverages available source data for Expected Annual Loss due to these 18 hazard types, Social Vulnerability, and Community Resilience to develop a baseline relative risk measurement for each United States county and Census tract. These measurements are calculated using average past conditions, but they cannot be used to predict future outcomes for a community. The National Risk Index is intended to fill gaps in available data and analyses to better inform federal, state, local, tribal, and territorial decision makers as they develop risk reduction strategies.

Explore the National Risk Index Map at **hazards.fema.gov/nri/map**.

Visit the National Risk Index website at **hazards.fema.gov/nri/learn-more** to access supporting documentation and links.

Calculating the Risk Index

Risk Index values are calculated using an equation* that combines values for Expected Annual Loss (EAL) due to natural hazards, with the Community Risk Factor (CRF), which is a function of Social Vulnerability and Community Resilience:

$$\text{Risk Index} = \text{Expected Annual Loss} \times \text{Community Risk Factor}$$

$$\text{where Community Risk Factor} = f\left(\frac{\text{Social Vulnerability}}{\text{Community Resilience}}\right)$$

*County-level risk values are derived by summing the risk values of all Census tracts within that county.

Risk is presented as a composite value and score for all 18 hazard types, as well as individual values and scores for each hazard type.

For more information, visit **hazards.fema.gov/nri/determining-risk**.

Calculating Expected Annual Loss

Expected Annual Loss values are calculated using an equation* that combines values for exposure, annualized frequency, and historic loss ratios for 18 hazard types:

$$\text{Expected Annual Loss} = \text{Exposure} \times \text{Annualized Frequency} \times \text{Historic Loss Ratio}$$

*Excluding Avalanche, Drought, Earthquake, and Tornado, EAL values for each hazard are calculated at the Census block level and summed together to determine Census tract and county-level hazard type EAL values.

Expected Annual Loss is presented as a composite value and score for all 18 hazard types, as well as individual values and scores for each hazard type.

For more information, visit **hazards.fema.gov/nri/expected-annual-loss**.

Calculating Social Vulnerability

Social Vulnerability is measured using the Social Vulnerability Index (SVI) published by the Centers for Disease Control and Prevention (CDC).

For more information, visit **hazards.fema.gov/nri/social-vulnerability**.

Calculating Community Resilience

Community Resilience is measured at the County level using the Baseline Resilience Indicators for Communities (HVRI BRIC) published by the University of South Carolina's Hazards and Vulnerability Research Institute (HVRI).

For more information, visit **hazards.fema.gov/nri/community-resilience**.

Values, Scores, and Ratings

The National Risk Index provides three different types of results for Risk and each component used to derive Risk: EAL, Social Vulnerability, and Community Resilience:

Values. Values for Risk and EAL are in units of dollars, representing the community's average economic loss from natural hazards each year. For Social Vulnerability and Community Resilience, values are the index values for the community provided by the source data sets.

Scores. Scores represent the national percentile ranking of the community's component value compared to all other communities at the same level (county or Census tract).

Ratings. Ratings refer to the qualitative terms that describe the relative risk of an area within the same geographic level. These rating categories range from "Very Low" to "Very High". Ratings for Social Vulnerability and Community Resilience are based on quintiles of those components' scores, while Risk and EAL ratings are based on more advanced statistical calculations on values . As a result, there is no fixed range of scores or values that correspond to the rating categories.

How to Take Action

There are many ways to reduce natural hazard risk through mitigation. Communities with high National Risk Index scores can take action to reduce risk by decreasing Expected Annual Loss due to natural hazards, decreasing Social Vulnerability, and increasing Community Resilience.

For information about how to take action and reduce your risk, visit **hazards.fema.gov/nri/take-action**.

Disclaimer

The National Risk Index (the Risk Index or the Index) and its associated data are meant for planning purposes only. This tool was created for broad nationwide comparisons and is not a substitute for localized risk assessment analysis. Nationwide datasets used as inputs for the National Risk Index are, in many cases, not as accurate as available local data. Users with access to local data for each National Risk Index risk factor should consider substituting the Risk Index data with local data to recalculate a more accurate risk index. If you decide to download the National Risk Index data and substitute it with local data, you assume responsibility for the accuracy of the data and any resulting data index. Please visit the **Contact Us** page if you would like to discuss this process further.

The methodology used by the National Risk Index has been reviewed by subject matter experts in the fields of natural hazard risk research, risk analysis, mitigation planning, and emergency management. The processing methods used to create the National Risk Index have produced results similar to those from other natural hazard risk analyses conducted on a smaller scale. The breadth and combination of geographic information systems (GIS) and data processing techniques leveraged by the National Risk Index enable it to incorporate multiple hazard types and risk factors, manage its nationwide scope, and capture what might have been missed using other methods.

The National Risk Index does not consider the intricate economic and physical interdependencies that exist across geographic regions. Keep in mind that hazard impacts in surrounding counties or Census tracts can cause indirect losses in your community regardless of your community's risk profile.

Nationwide data available for some risk factors are rudimentary at this time. The risk profiles for the vast majority of hazard types are based on historical frequency and loss data. They represent risk and expected annual loss based on average past conditions, not future predictions. The National Risk Index will be continuously updated as new data become available and improved methodologies are identified.

For comprehensive details about how the Risk Index can help you and its limitations, see the **National Risk Index Technical Documentation**

Assumption of Risk

In view of the identified limitations of the National Risk Index associated data, by using the data, you acknowledge and agree that FEMA makes no representations or warranties about the accuracy, completeness, or fitness for any particular purpose of the data; that the data is provided "as is" without warranty of any kind; that you assume full responsibility for any consequences that may arise, including financial losses, legal disputes, or other adverse outcomes; and that you release FEMA and the federal government from any liability that may arise to the extent allowable by law.

Attribution, No Endorsement

Please attribute your use of the National Risk Index and its associated data to the Federal Emergency Management Agency.

However, you acknowledge and agree that nothing herein constitutes and endorsement of you or your work by FEMA or the federal government, and you shall not imply through use of the National Risk Index or its associated data or through providing attribution, that FEMA or the federal government endorses you.

Preferred citation for the National Risk Index:

Zuzak, C., E. Goodenough, C. Stanton, M. Mowrer, A. Sheehan, B. Roberts, P. McGuire, and J. Rozelle. 2023. National Risk Index Technical Documentation. Federal Emergency Management Agency, Washington, DC.

The National Risk Index Contact Us page is available at **hazards.fema.gov/nri/contact-us**.

Project Details		
Details		
Operation Season	214	days
Total Camping Sites	318	sites
Electric and Water Sites	298	sites
Primitive Sites	20	sites
Shower Houses	6	houses
Shower Houses Sq. Ft.	960	sq. ft
Total Shower Houses Sq. Ft.	5,760	sq. ft
Maintenance Building Sq. Ft.	1,800	sq. ft
Rental/Snack Shack Sq. Ft.	1,600	sq. ft
Pavillions	3	pavillions
Pavillions Sq. Ft.	600	sq. ft
Total Pavillions Sq. Ft.	1,800	sq. ft
Main Building/Check In Office	4,000	sq. ft
Parking Spots	130	parking spots
Cable Park	375	kWh/day
Construction		
Seasons	2	
Days of construction (120 per season)	240	
Hours of Construction (960 per season)	1920	hours
Diesel Vehicles	10	vehicles
Construction Crew	10	passenger vehicles
Project Lifetime	30	years

Total GHG Emissions		
Construction (annualized)	7.46	MTCO2e
Motor Homes Driven	4593.25	MTCO2e
Motor Homes Electricity	1091.50	MTCO2e
Motor Homes Waste	68.64	MTCO2e
Cable Park Electricity	31.62	MTCO2e
Building Waste	12.33	MTCO2e
Passenger Vehicles	299.08	MTCO2e
Shower Houses Electricity	17.30	MTCO2e
Rental Snack Shack Electricity	5.30	MTCO2e
Main Building Electricity	13.20	MTCO2e
Maintenance Building Electricity	3.30	MTCO2e
Total Annual Emissions	6142.98	MTCO2e

Construction Emissions			
Seasons of Construction	2	seasons	"The construction will be initiated in 2025 to complete the mass grading and to prepare the site for development. The duration of mass grading and installation of the roadways will take approximately 6 months. Individual lots are expected to be developed over a five-year period."
Days of construction (120 per season)	240	days	
Hours of Construction (960 per season)	1920	hours	
			Per EPA GHG Equivalencies Calculator
Large Diesel Vehicle Count	10	vehicles	10,180 grams of CO2/gallon of diesel = 10.180 × 10-3 metric tons CO2/gallon of diesel
Days Worked	240	days	0.01018
Miles Traveled daily (avg.)	60	miles	
	144000		
Total Miles	144000	miles	https://www.epa.gov/energy/greenhouse-gas-equivalencies-calculator-calculations-and-references
Avg. Miles per gallon per desiel vehicle (EPA GHG Calculator tool)	7.4	mpg	
Total Gallons	19459.45946	gallons	https://www.fhwa.dot.gov/policyinformation/statistics/2022/pdf/vm1.pdf
Emissions from Diesel Vehicles	198.0972973	MTCO2e	The average vehicle miles traveled (VMT) in 2022 was 23,183 miles per year (FHWA 2024). 23,183/365 = ~60
Passenger Work Vehicle Count	10	cars	
Days Worked	240	days	
Miles traveled to and from site daily (avg.)	30	miles	The average vehicle miles traveled (VMT) in 2022 was 10,917 miles per year (FHWA 2024). 10,917/365 = ~30
	72000		
Total Miles	72000	miles	Per EPA GHG Equivalencies Calculator
Avg. Miles per gallon passenger vehicles (EPA GHG Calculator tool)	24.8	mpg	8,887 grams of CO2/gallon of gasoline = 8.887 × 10-3 metric tons CO2/gallon of gasoline
Total Gallons	2,903.23	gallons	0.008887
Emissions from passenger vehicles	25.80	MTCO2e	https://www.epa.gov/energy/greenhouse-gas-equivalencies-calculator-calculations-and-references
			https://www.epa.gov/climateleadership/simplified-ghg-emissions-calculator
Annualized Construction Vehicles			
Total Vehicle Emissions	223.90	MTCO2e	The total emissions from these activities (passenger + work trucks) are considered one-time emissions, however the industry standard for determining long-term impacts of construction-related GHG output is to annualize the total emissions over a project's lifetime, which is defined as a 30-year period.
Project Lifetime (Years)	30	years	
Annualized MTCO2e/Years	7.46	MTCO2e	

Average mpg values from the U.S. Department of Transportation, Federal Highway Administration, Highway Statistics 2022 (Updated February 2024), Table VM-1.

Cable Park Electricity		
Cable Park	375	kWh/day
Operation Days	214	days
Total kWh	80250	kWh/operation season
Emissions per kWh	0.000394	MTCO2e per kWh
Total Emissions	31.6185	MTCO2e

0.000394 MTCO2e per kWh Greenhouse Gas Equivalencies Calculator - Calculations and References | US EPA

Motor Homes Driving		
Single unit 2-Axle 6-Tire or More Trucks	7.9	mpg
2022 FHWA	23,183	miles per year
	60	miles per day
	7.59	gallons per day
Max Motor Homes	318	Motor Homes
Total Gallons per day	2,415.19	gallons per day
Total Operational Days	214	Days
Total Gallons per operation season	516,850.63	Gallons
Emissions Per gallon Gasoline (EPA)	0.008887	MTCO2e per gallon
Total Emissions	4,593.25	MTCO2e per year of operation

vm1.pdf https://www.fhwa.dot.gov/policyinformation/statistics/2022/pdf/vm1.pdf

EPA SGEC Greenhouse Gas Equivalencies Calculator - Calculations and References | US EPA
https://www.epa.gov/energy/greenhouse-gas-equivalencies-calculator-calculations-and-references

https://www.epa.gov/energy/greenhouse-gas-equivalencies-calculator-calculations-and-references

Vehicle Use		
Total Vehicles	130	Vehicles
Miles Driven Averge Daily	30	miles
Avg. Miles per gallon passenger vehicles (EPA GHG Equivalencies + FHWA 2024)	24.8	mpg
Gallons/day per 1 car	1.21	gallons
Gallons/operational year per 1 car	258.87	gallons
Total Gallons/operationalyear for all x cars	33,653.23	gallons
Total Emissions/year	299.08	MTCO2e/operational year

Per EPA GHG Equivalencies Calculator - 8,887 grams of CO2/gallon of gasoline = 8.887 × 10-3 metric tons CO2/gallon of gasoline

0.008887 MTCO2e

https://www.epa.gov/energy/greenhouse-gas-equivalencies-calculator-calculations-and-references
https://www.epa.gov/climateleadership/simplified-ghg-emissions-calculator

The average vehicle miles traveled (VMT) in 2022 was 10,952 miles per year (FHWA 2024).
10,952/365 = ~30
https://www.epa.gov/energy/greenhouse-gas-equivalencies-calculator-calculations-and-references

Campsite Electricity		
Sites with Electricity	298	Sites
kWh per Motor Home/day	40	kWh
total kWh per day	11920	kWh/day
days operational	214	days
total kWh per operational season	2,550,880	kWh/operational year
MTCO2e per kWh (EPA)	EPA SGEC Calculator	MTCO2e/1 kWh
Total MTCO2e	1,091.50	MTCO2e/operational year

20 kWh per day no A/C
40 kWh per motor home per day electricity. With A/C on
https://www.rvtalk.net/rv-electricity-usage/
https://shunauto.com/article/how-much-electricity-does-a-camper-use-per-month
0.000394 MTCO2e per kWh
Greenhouse Gas Equivalencies Calculator - Calculations and References | US EPA

Building Electricity						
Category	Floor Space	kWh	total kWh	kWh for 214 days of operation	Multiplier for MT CO2e	Total MT CO2e
Shower Houses	5760	12.0 kWh per square (annual)	69120	40525.15	EPA GHG Calculator	17.3
Rental Snack Shack	1600	13.1 kWh per square foot (annual)	20960	12288.88	EPA GHG Calculator	5.3
Main Building	4000	13.2 kWh per square foor (annual)	52800	30956.71	EPA GHG Calculator	13.2
Maintenace Building	1,800	7.2 kWh per square foot (annual)	12960	7598.47	EPA GHG Calculator	3.30
						39.1

According to the Commercial Buildings Energy Consumption Survey (CBECS) -
Other Lodging (used for shower houses), have a median of around 12.0 kWh/sq ft/year. Recreation buildings (used for the rental/snack shack) have a median of around 13.1 kWh/sq ft/year. Other office buildings (used for the main building) have a median of around 13.2 kWh/sq ft/year. Vehicle storage or maintenance (used for the maintenance building) have a median of around 7.2 kWh/sq ft/year.

https://www.eia.gov/consumption/commercial/data/2012/c&e/cfm/pba4.php
Shower Houses = Other Lodging
Rental/Snack Shack = Recreation
Main Building = Other Office
Maintenance = Vehicle Storage or Maintenance
0.000394 MTCO2e per kWh - https://www.epa.gov/energy/greenhouse-gas-equivalencies-calculator-calculations-and-references

Motor Home Waste		
Large Sites	196	
Small/Med Sites	122	
Waste per Household per day	12.23	lbs/day
Waster per 1 large site (2/3 of household)	8.0718	lbs/day
Waste per 1 Small/Med Site (1/3 of household)	4.0359	lbs/day
Waste from Large Sites per day	1582.0728	lbs/day
Waste from Small/Med Sites per day	492.3798	lbs/day
Total Waste per day	2074.4526	lbs/day
Total Waste per operational year	443932.8564	lbs/operational year
Total Pounds to tons	221.9664282	tons/operational year
MTCO2e (per EPA Waste Reduction Model (WARM) calculator)	68.64	MTCO2e/year

Building Waste							
		Other services* lbs/day	total pounds/	metric tons/day	metric tons/ operation year	EPA WARM tool	Label
Shower Houses	5760	0.0312	179.712	0.081502041	17.44143673	5.39	MT CO2e
Rental Snack Shack	1600	0.0312	49.92	0.022639456	4.844843537	1.5	MT CO2e
Main Building	4000	0.0312	124.8	0.056598639	12.11210884	3.75	MT CO2e
Maintenace Building	1,800	0.0312	56.16	0.025469388	5.45044898	1.69	MT CO2e
Totals	13160	0.1248	410.592	0.186209524	39.8488381	12.33	MT CO2e

Total Waste	80.97
Camp Sites	68.64
Buildings	12.33

https://www2.calrecycle.ca.gov/WasteCharacterization/General/Rates

Residential homes are estimated to have **12.23** lbs. of waste per household per day. For this calculation, the large camp sites are estimated to have **2/3** the amount of waste as a household and the small sites are estimated to have **1/3** the amount of waste as a household. With 196 large sites and 122 small sites, this equates to 68.64 MTCO2e per year. The remaining buildings (other services in industry) was estimated to have **0.0312** lbs. of waste per square foot per day. With **13,160** square feet, this equates to 12.33 MTCO2e per operational year. In total, 80.97 MTCO2e per year from waste management.

Appendix F: Traffic Impact Study

- Rockwell RV & Adventure Park: Traffic Impact Study

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Plymouth, MN 55447

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Bolton-Menk.com

TRAFFIC MEMORANDUM

Date: 12/3/2025

To: Ryan Thilges, PE (Blue Earth County)

From: Anna Irby, PE

Subject: Rockwell RV & Adventure Park: Traffic Impact Study
Project No.: 24X.137080.000

I hereby certify that this plan, specification, or report was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the state of Minnesota.
Signature: _____
Name: Anna McDowell Irby
Date: 12/3/2025 License Number: 63412

This Traffic Impact Study (TIS) was prepared to document analyses that were performed to understand potential traffic impacts associated with the proposed Rockwell RV & Adventure Park.

Development Details

The site is located along CSAH 5 (3rd Avenue) in Blue Earth County (County), Minnesota. This analysis focuses on traffic impacts on the surrounding roadway network. The proposed development could consist of the following land uses and amenities:

- Approximately 125 small/med RV spots
- Approximately 200 large RV spots
- Bike trails and parking (approximately 46 parking spaces)
- Aquatic Park / Water Cable Park (approximately 125 parking spaces)

It should be noted that the most recent concept plan shows slightly lower projections; therefore, the analysis provides a conservative estimate. The main access, located at the exiting quarry access, will have an internal gate for all vehicles staying at the site to check in. The northern access will provide access to the bike trail, and the southern access will provide egress for RVs and access for maintenance vehicles. Refer to **Figure 1** for the site location map and **Figure 2** for a copy of the preliminary site plan.

Study Intersections

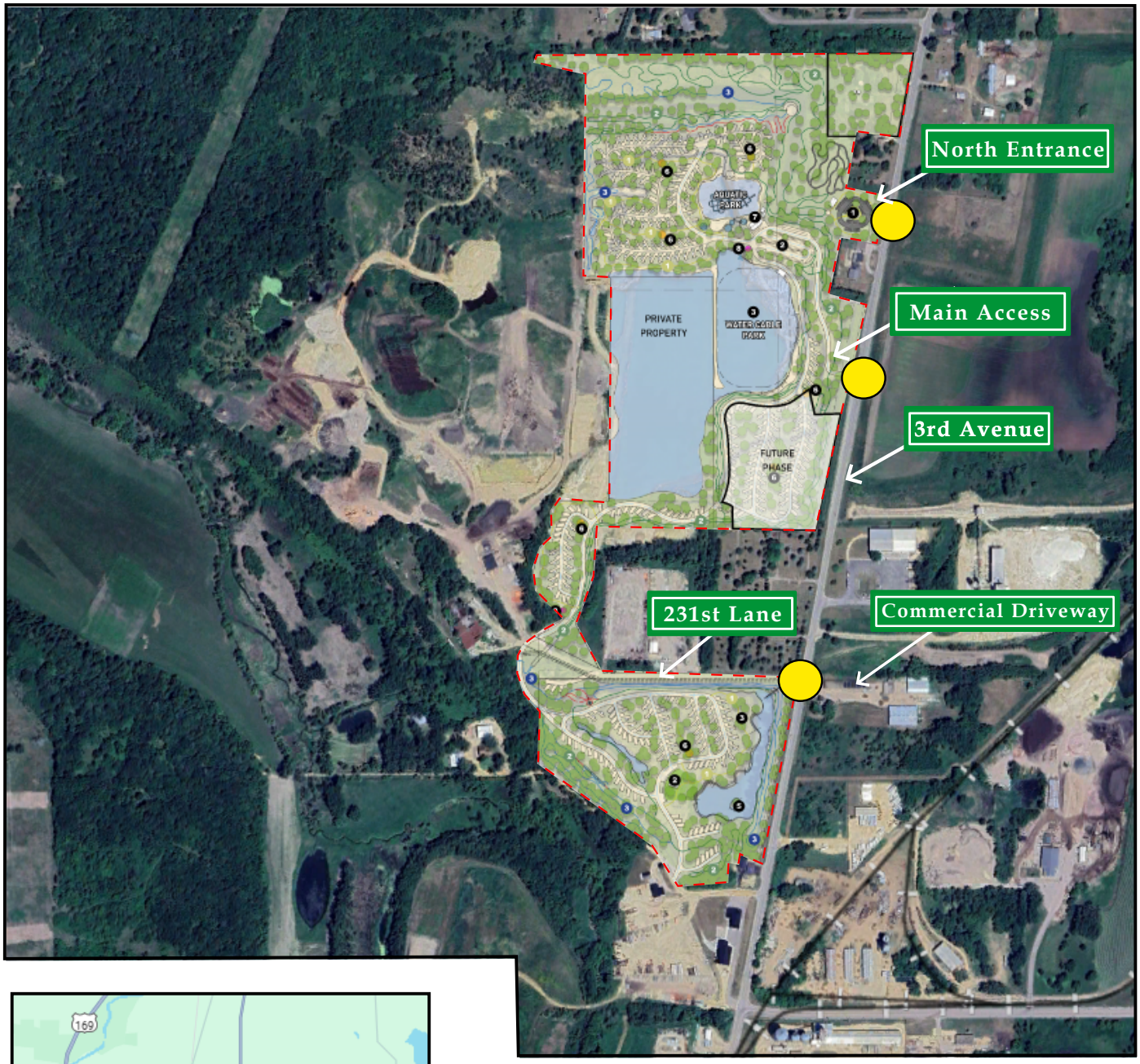
Traffic impacts from development-related traffic were evaluated at the following intersections:

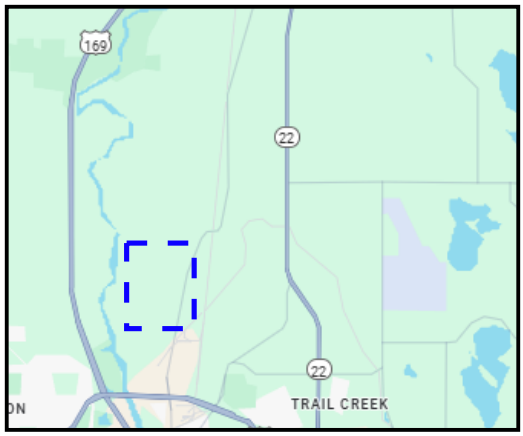
- 3rd Avenue and Proposed Northern Access (Bike Trail) – [stop control on Driveway]
- 3rd Avenue and Existing Quarry Access/Proposed Main Access – [stop control on Existing Quarry Access]
- 3rd Avenue and 231st Lane and Proposed Southern Access – [stop control on 231st Lane and Commercial Driveway]

The study area and project assumptions for the traffic study were determined through coordination with the Blue Earth County (County) staff.

All traffic will enter at the main access and RVs will proceed to the check-in office [*denoted with **circle 7** on the concept plan*] while aquatic park traffic can proceed to the parking lot [*denoted with **circle 2** on the concept plan*]. The most recent site plan indicates there will be multiple stalls for RVs to queue during check-in. Through coordination with the project team, this process will be a mixture of online and in-person check-in.

It is assumed that the majority of site traffic would enter the site during a concentrated afternoon peak on Thursday or Friday. Only one peak hour was analyzed based on the highest peak of the adjacent street traffic of the two days, which occurred on Thursday. Exiting site traffic will likely occur on Sundays but will be spread over multiple hours [not concentrated in a peak hour] and is not expected to be a traffic concern due to expected lower adjacent street volumes on a Sunday; therefore, check-out traffic was not analyzed.





LEGEND

- Proposed Site Location
- Study Area
- Study Intersection

N

BOLTON & MENK

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Rockwell RV & Adventure Park

Blue Earth County, MN

Site Location Map

Scale: Not to Scale

Figure 1

SITE LEGEND:

BIKE TRAILS

1. ACCESS / CONVENIENCE BIKE OPTIMIZED TRAILS (TWO WAY)
2. BEGINNER TRAILS (ONE WAY)
3. INTERMEDIATE TRAILS (ONE WAY)

OTHER SITE AMENITIES / FEATURES

1. PUBLIC PARKING / ACCESS
2. USER PARKING
3. WATER CABLE PARK
4. CABLE PARK STARTING FEATURE / VIEWING AREA
5. ISLAND FEATURE

BUILDINGS

6. RESTROOM / PAVILION
7. LAKESIDE PAVILION
8. WASTE WATER TANKS / LIFT STATION

OTHER SITE NOTES:

POTABLE WATER WILL BE AT CAMPSITES OR WITHIN 400 FEET OF EVERY CAMPSITE IN ACCORDANCE WITH MINNESOTA RULES CHAPTER 4630.0600.

ALL TRAILS AND OPEN SPACES WILL BE FIELD-FIT TO REDUCE TREE AND BRUSH REMOVALS TO AVOID WETLANDS.

CHARACTER IMAGERY:





ROCKWELL CONCEPT INTEGRATE THE SYSTEMS

CONFLUENCE

Crash Data

Crash data was obtained using the Minnesota Crash Mapping Analysis Tool (MnCMAT2) at the study intersections for the most recent five-year period (2020-2024) to determine existing safety issues at these intersections. A summary of the crash results is provided for the intersections in **Table 1** and **Table 2**. No crashes were reported at the intersection of 3rd Avenue and the Residential Driveway (northern intersection), so this intersection was removed from the summary tables. Refer to the **Appendix** for the crash analysis report.

MnDOT uses a comparison of the crash rate and the critical rate when determining whether there is a safety issue at an intersection. The crash rate is the number of crashes per million entering vehicles (MEV). The critical rate is a statistical comparison based on similar intersections statewide. An observed crash rate greater than the critical rate indicates that the intersection operates outside of the expected normal range. The critical index reports the magnitude of this difference and a critical index of less than one shows that the intersection is operating within the normal range. **Table 2** summarizes the crash severity and crash rates for each study intersection.

Table 1: Crash Rate Summary (2020-2024)

Study Intersections	Crash Rate				Fatal & Serious Injury Rate			
	Int. Rate	*Statewide Average*	*Critical Rate*	Crash Index	Int. Rate	*Statewide Average*	*Critical Rate*	Critical Index
CSAH 5 and Existing Quarry Access	**0.24**	***0.14***	***0.73***	**0.33**	**0.00**	***0.93***	***18.23***	**0.00**
CSAH 5 and 231st Lane	**0.48**	***0.14***	***0.73***	**0.65**	**23.81**	***0.93***	***18.85***	**1.26**

Table 1 shows that the observed fatal & injury rate at the intersection of 3rd Avenue and 231st Lane is above the normal range and exceeds the critical rate due to the fatal accident that occurred.

See **Table 2** for a summary of crash types for each intersection.

Table 2: Crash Type Summary (2020-2024)

Study Intersections	Type of Crash							Total Crashes
	Head On	Angle	Rear End	Left-Turn	Sideswipe	Run Off Road	Other (Animal)	
3rd Avenue and Existing Quarry Access	0	0	0	0	0	0	1 (PDO)	**1**
3rd Avenue and 231st Lane	0	0	0	1 (K)	0	0	1 (PDO)	**2**
Total Crashes	**0**	**0**	**0**	**0**	**0**	**0**	**2**	**3**

Table 2, above, outlines the type of crashes experienced at the study intersections. Two of the three crashes at the study intersections were the result of an animal collision (deer). The left-turn crash at the intersection of 3rd Avenue and 231st Lane was the result of the motorcyclist and a medium truck collision and resulted in a fatality. This crash occurred during the day with no adverse weather conditions.

Existing Traffic Volumes

Existing lane configurations (number of traffic lanes on each intersection approach), storage capacities, and other intersection and roadway information within the study area are shown in **Figure 3**. **Table 3** provides a summary of the existing roadway characteristics.

Table 3: Existing Roadway Inventory

Road Name	Typical Cross Section	Speed Limit	Functional Classification	2024 AADT
CSAH 5 (3rd Avenue)	2-lane undivided	50 mph	Major Collector	3,718
231st Lane	2-lane undivided	15 mph	Local	No Available Data

Existing peak hour traffic volumes were conducted in May 2025, during a weekday Thursday and Friday for 13-hours at all the existing study intersections while schools were in session. Based on the data collected, the Thursday PM peak hour was analyzed since it indicated higher traffic volumes along 3rd Avenue when compared to Friday. This provides a conservative approach that analyzes the peak hour of the adjacent street traffic on a Thursday with the peak hour for entering site traffic.

Refer to **Figure 4** for existing weekday PM peak hour traffic volumes (2025). A copy of the count data is in the **Appendix** of this report.

The existing weekday PM peak hour traffic volumes (2025) were analyzed to determine the current levels of service at the study intersections under existing roadway conditions. The results of the analysis are presented in the **Capacity Analysis** section of this report.

While not analyzed, it should be noted that 231st Lane is expected to contain significant heavy vehicle traffic during the Saturday AM peak hour due to the surrounding quarry and material/paving sites. It is not expected that this peak heavy vehicle traffic will overlap with the peak site trip traffic.

Opening Day Traffic Volumes

The proposed build year for the development is 2027. Based on the MnDOT Traffic Mapping Application, ADTs at various traffic count locations in the study area indicate a negative growth rate. Therefore, it is determined that no background growth rate be applied when analyzing opening day traffic conditions.

Proposed Development Traffic Volumes

As mentioned previously, the proposed development could consist of up to 325 RV spots, public bike trails with 46 parking spaces, and an aquatic park/water cable park with 125 parking spaces. It should be noted that the most recent concept plan shows slightly lower projections; therefore, the analysis provides a conservative estimate.

Average weekday PM peak hour trips for the proposed development were estimated using methodology contained within the Institute of Transportation Engineers' (ITE) *Trip Generation Manual*, 11th Edition and engineering judgement. Site trips were generated for the RV park, the proposed water features, and the bike trail parking lot. Various land use codes were reviewed for the RV park and bike trail but were determined to not be accurate for the site at hand; therefore, the trip generation was calculated based on parking spaces. **Table 4** provides a summary of the trip generation potential for the site.

Table 4: Trip Generation Summary

Land Use	Intensity	Weekday PM Peak Hour Trips (vph)	
		Enter	Exit
RV Camp Sites	325 spots	163	0
Aquatic Park – *analyzed with LUC 482 [Water Slide Park]*	125 parking spaces	7	28
Bike Trail	46 parking spaces	23	23
Total Trips		**193**	**51**

The RV Camp site trips were calculated based on the assumption that at 100% occupancy and all RV's were assumed to enter within a two-hour period. Therefore, the entering site trips were assumed to be 163 trips (325 spots/2). The bike trail site trips were calculated based on a 100% occupancy of the 46 parking spaces and all vehicles were assumed to enter within a two-hour period. It was assumed that all traffic would enter and exit during the same peak hour. These site trip assumptions provide a conservative approach since they combine the assumption of 100% occupancy and assume a concentrated 2-hour site trip window. In the field it is likely that both the RV Camp Site and the Bike Trail would not be 100% occupied at the same time and that the trips would be spread over the course of multiple hours or on various days. This methodology was discussed and reviewed by the County

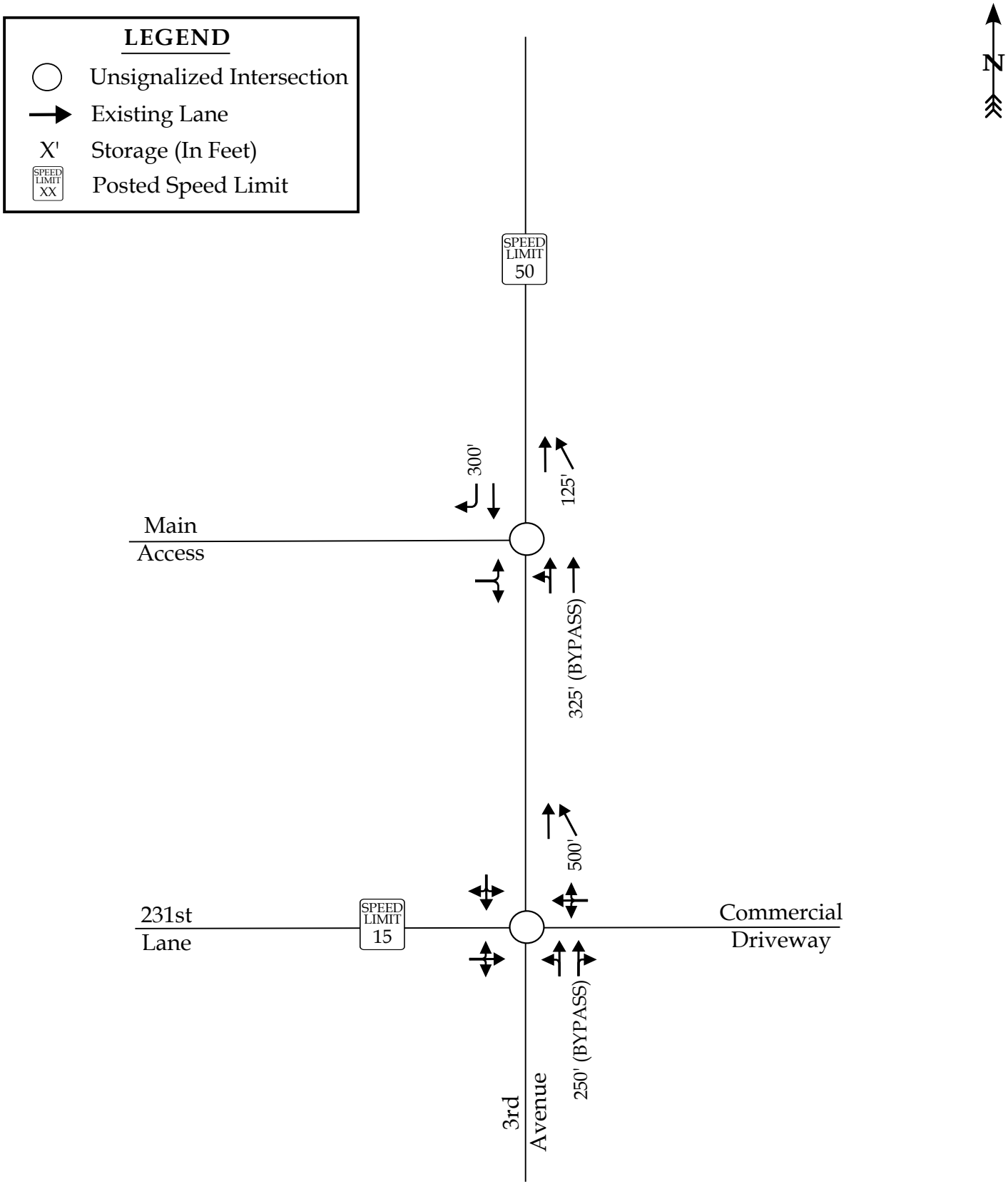
Of the daily traffic volume, it is anticipated that 244 trips (193 entering and 51 exiting) will occur during the weekday PM peak hour. It should be noted that the daily traffic is below the MnDOT threshold to require a TIS (2,500 daily trips or 250 peak hour trips).

Trip distribution percentages used in assigning site traffic for this development were estimated based on a combination of existing traffic patterns, population centers in the vicinity of the study area, and engineering judgment. It is estimated that the overall site trips will be regionally distributed as follows:

- 35% to/from the north via 3rd Avenue
- 65% to/from the south via 3rd Avenue

The site trip distribution percentages were applied to the trip generation in **Table 4** to determine the site trip assignment. Refer to **Figure 4** for the site trip assignment. To estimate traffic conditions with the site fully built out, the total site trips were added to the existing traffic volumes (2025) to determine the opening day traffic volumes (2027). Refer to **Figure 4** for an illustration of the opening day peak hour traffic volumes (2027) with the proposed site fully developed.

Study intersections were analyzed with the opening day traffic volumes (2027) using the same methodology previously discussed for existing (2025) traffic conditions. Intersections were analyzed with improvements necessary to accommodate future traffic volumes. The analysis results for each intersection are presented in the **Capacity Analysis** section of this report.



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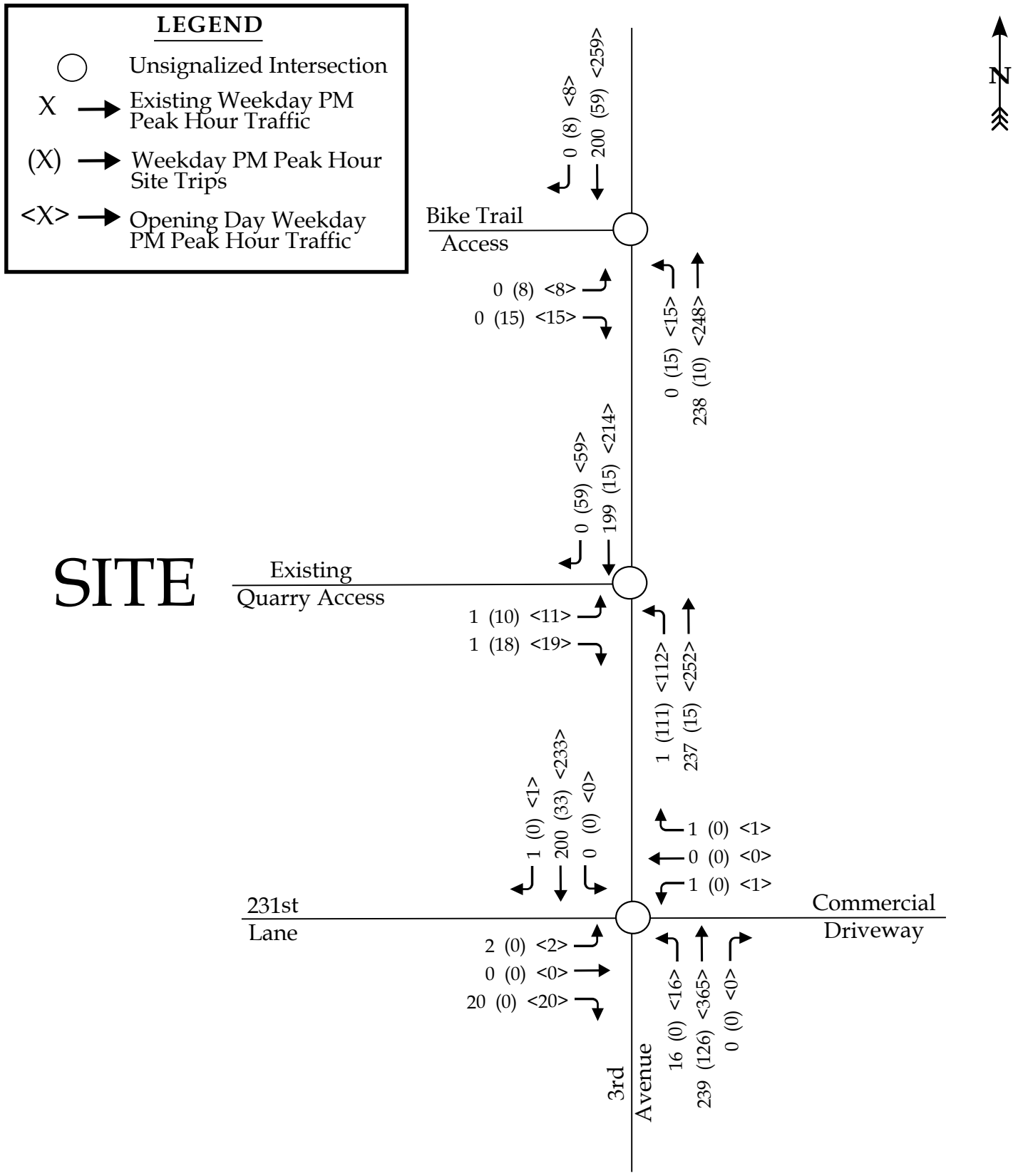
Blue Earth County, MN

Existing Lane Configurations

Scale: Not to Scale

Figure 3



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Existing, Site Trip, Opening Day - Weekday PM PHTV

Scale: Not to Scale

Figure 4

Capacity Analysis

Weekday PM peak hour intersection levels of service were estimated using the Synchro/SimTraffic 12 analysis software for all unsignalized intersections. Level of service (LOS) is a letter grade that describes the quality of traffic operations, with levels of service ranging from LOS A (minimal delays) to LOS F (breakdown of traffic flow with major delays).

Intersection level of service analysis identifies levels of service for specific turning movements, intersection approaches (averaging delays for each turning movement on an intersection approach), and the overall intersection (averaging delays for all movements at an intersection).

This analysis considered operations with approach-level or intersection-level LOS E (or worse) deficient, and in need of mitigation to improve traffic flow. This is a common design standard throughout Minnesota. Refer to the **Appendix** for the Synchro capacity analysis reports and SimTraffic queueing reports.

The following pages summarize the LOS and queueing results for the existing (2025) and the opening day (2027) traffic conditions.

Existing

Table 5, below, summarizes the existing peak hour traffic operations queueing results.

Table 5: Existing LOS PM Peak Hour Traffic Operations

		PM Peak Hour									
		Traffic Delay (sec/veh)				Traffic Queuing (feet)					
Intersection	Approach	Movement (Delay - LOS)			Approach (Delay - LOS)	Left Turn			Right Turn		
		L	T	R		Storage	Avg	Max	Storage	Avg	Max
3rd Avenue & Existing Quarry Access	EB	11 - B	-	11 - B	11 - B	-	25	50	-	25	50
	NB	8 - A	-	-	8 - A	325	25	25	-	-	-
	SB	-	-	-	-	-	-	-	-	-	-
3rd Avenue & 231st Lane	EB	10 - B	10 - B	10 - B	10 - B	-	25	75	-	25	75
	WB	12 - B	12 - B	12 - B	12 - B	-	-	-	-	-	-
	NB	8 - A	-	-	8 - A	250	25	25	-	-	-
	SB	0 - A	-	-	0 - A	-	-	-	-	-	-

All major-street left-turn movements and minor-street approaches are operating at LOS B or better for all study intersections under existing weekday PM peak hour traffic conditions. There are no existing queueing concerns.

Opening Day

Table 6, below, summarizes the existing peak hour traffic operations queueing results.

Table 6: Opening Day LOS PM Peak Hour Traffic Operations

Intersection	Approach	PM Peak Hour									
		Traffic Delay (sec/veh)				Traffic Queuing (feet)					
		Movement (Delay - LOS)			Approach (Delay - LOS)	Left Turn			Right Turn		
		L	T	R		Storage	Avg	Max	Storage	Avg	Max
3rd Avenue & Bike Trail Access	EB	11 - B	-	11 - B	11 - B	-	25	50	-	25	50
	NB	8 - A	-	-	8 - A	-	25	50	-	-	-
	SB	-	-	-	-	-	-	-	-	-	-
3rd Avenue & Main Access	EB	13 - B	-	13 - B	13 - B	-	25	75	-	25	75
	NB	10 - A	-	-	10 - A	325	50	150	-	-	-
	SB	-	-	-	-	-	-	-	300	25	25
3rd Avenue & 231st Lane	EB	11 - B	11 - B	11 - B	11 - B	-	25	50	-	25	50
	WB	14 - B	14 - B	14 - B	13 - B	-	25	25	-	25	25
	NB	8 - A	-	-	8 - A	250	25	25	-	-	-
	SB	8 - A	-	-	8 - A	-	-	-	-	-	-

All major-street left-turn movements and minor-street approaches are expected to operate at LOS B or better for all study intersections under opening day weekday PM peak hour traffic conditions. There are no expected queueing concerns.

As shown on the latest concept plan, there are expected to be stalls for RVs to queue in if check-in requires extra time. The latest concept plan shows 1,100 feet of stacking between the gate and 3rd Avenue for check-in, which should be adequate for internal queuing. MN Statute 169.81 Subsection 3.c limits recreational vehicle length without a permit to 70 feet. If the internal queuing length is reduced during final design, it is recommended to add one RV parking stall for every 70 feet of reduction.

Site Access Turn Lane Evaluation

Based on the MnDOT *Access Management Manual*, a left-turn lane is warranted for a two-lane highway with a posted speed of 45 MPH or greater and an AADT greater than 3,000 vehicles per day (vpd) if the cross-street volume or driveway ADT is greater than 1,200 vpd. A right-turn lane is warranted for a two-lane highway with a posted speed of 45 MPH or greater and an AADT greater than 1,500 vehicles per day (vpd) if the cross-street volume or driveway ADT is greater than 100 vpd.

A southbound right-turn is warranted at the main access and already exists. Additionally, due to the nature of the site consisting of RVs, it is recommended that the existing northbound bypass lane be converted to a northbound left-turn lane and the existing southbound acceleration lane remain to allow RVs exiting the site time to gain speed before merging into 3rd Avenue.

No turn lanes are warranted at the 231st Lane intersection or the northern (bike trail) access.

Summary of Traffic Impacts

The overall intersection LOS weekday PM peak hours is anticipated to be LOS B or better for all approaches at all study intersections under existing and opening day traffic conditions. There are no expected queueing issues.

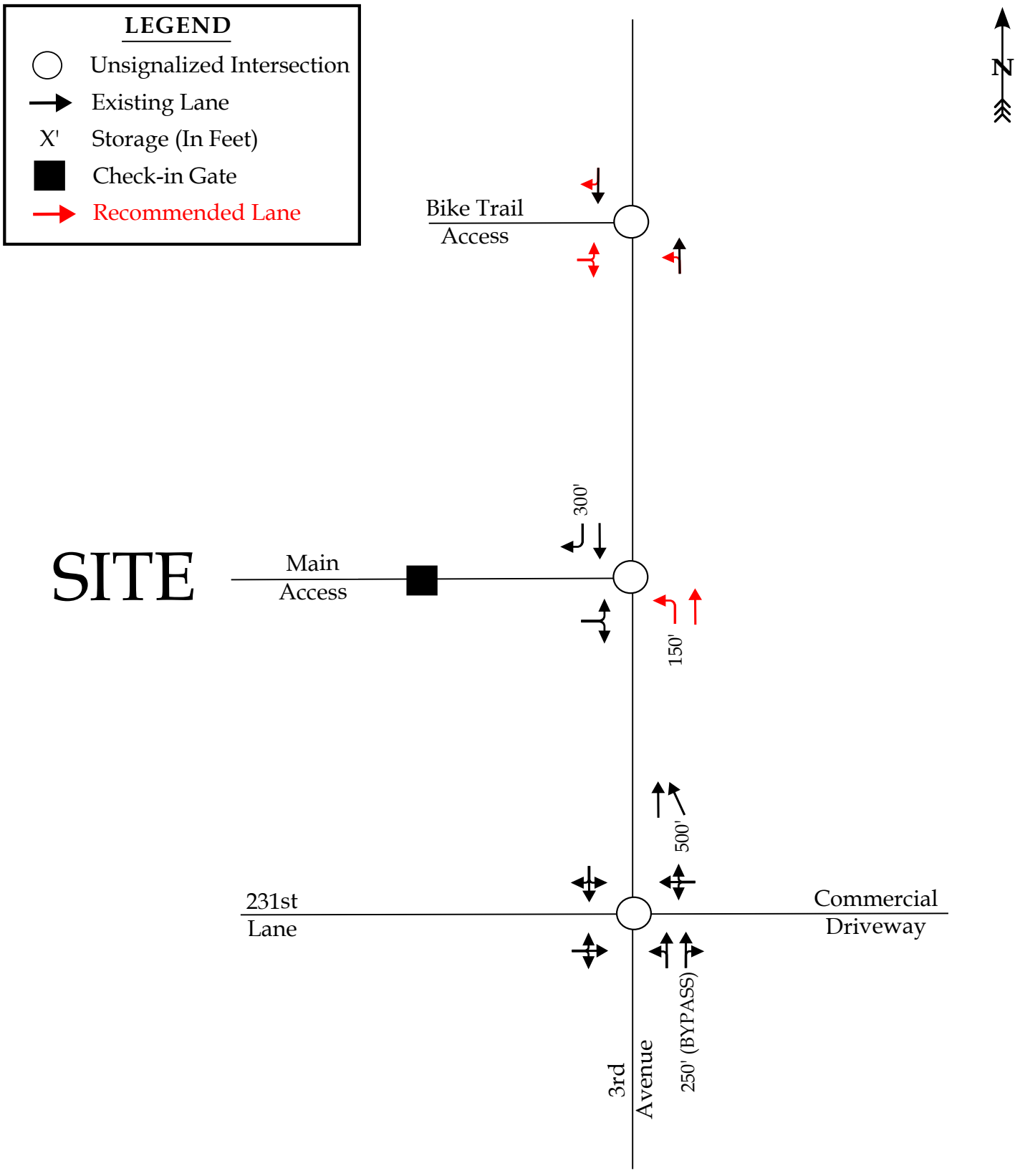
Conclusion and Recommendations

Traffic Operations and Safety

Based on operational analysis at the study intersections, the existing roadway system, existing intersection geometry, and existing intersection control, is sufficient to manage the additional trips generated by the proposed development. Refer to **Figure 5** for an illustration of the existing lane configurations and the recommended lane configuration for the proposed development access.

Based on a review of the turn lane criteria from the MnDOT's Access Management Manual, the following site access improvements are recommended:

- 3rd Avenue and Proposed Northern Access (Bike Trail)
  - No turn lanes warranted and no recommendations.
- 3rd Avenue and Proposed Main Access
  - Convert the existing northbound bypass lane to a dedicated northbound left-turn lane with at least 150 feet of storage [per maximum queues].
  - The existing southbound right-turn lane and acceleration lane on the south leg are recommended to remain.
  - The latest concept plan shows 1,100 feet of stacking between the gate and 3rd Avenue for check-in, which should be adequate for internal queuing. If the internal queuing length is reduced during final design, it is recommended to add one RV parking stall for every 70 feet of reduction.
- 3rd Avenue and 231st Lane/Commercial Driveway/Proposed Southern Access
  - No turn lanes warranted and no recommendations.



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Recommended Lane Configurations

Scale: Not to Scale

Figure 8

Appendix

Crash Detail Report - Short Form

CSAH 5 and 231st Lane

INCIDENT ID	ROUTE SYS	ROUTE NUM	MEASURE	ROUTE NAME	ROUTE ID	COUNTY	CITY
01089016	04-CSAH	0005	2.294	CSAH 5	0400006594520005-I	7-Blue Earth	NOT IN A CITY

INTERSECT WITH	# VEH	# KILL	DATE	TIME	DAY	LAT	LONG	UTM X	UTM Y	WORK ZONE TYPE
	1	0	03/19/23	21:00	Sun	44.208246	-93.993914	420593.6	4895482.0	NOT APPLICABLE

BASIC TYPE	CRASH SEVERITY	FIRST HARMFUL	LIGHT CONDITION	WEATHER PRIMARY
Single Vehicle Other	N - Prop Damage Only	Deer	Dark (Str Lights On)	Clear

	Unit 1	Unit 2	Unit 3	Unit 4
Unit Type	Motor Vehicle in Transport			
Vehicle Type	Passenger Car			
Direction of Travel	Southbound			
Maneuver	Moving Forward			
Age/Sex	60 M			
Physical Cond	Apparently Normal			
Contributing Factor 1	Unknown			

OFFICER SKETCH



NARRATIVE

ON 03/10/23,STEVEN SCHOLTZ WAS DRIVING SOUTHBOUND ON CO RD 5 AND A DEER ENTERED THE ROADWAY. HE STRUCK THE DEER AND HAD DAMAGE TO THE DRIVER SIDE HEADLIGHT ASSEMBLY AND BUMPER. THE VEHICLE WAS STILL DRIVABLE AND WAS DRIVEN FROM THE SCENE. HE SAID THE DEER WAS OFF THE ROADWAY AND HE DID NOT WANT THE DEER. STEVEN HAD NO INJURIES AND DID NOT NEED MEDICAL ATTENTION.

INCIDENT ID	ROUTE SYS	ROUTE NUM	MEASURE	ROUTE NAME	ROUTE ID	COUNTY	CITY
00805783	04-CSAH	0005	2.302	CSAH 5	0400006594520005-I	7-Blue Earth	NOT IN A CITY

INTERSECT WITH	# VEH	# KILL	DATE	TIME	DAY	LAT	LONG	UTM X	UTM Y	WORK ZONE TYPE
	2	1	03/31/20	15:15	Tue	44.208367	-93.993882	420596.3	4895495.4	NOT APPLICABLE

BASIC TYPE	CRASH SEVERITY	FIRST HARMFUL	LIGHT CONDITION	WEATHER PRIMARY
Left Turn	K - Fatal	Motor Vehicle In Transport	Daylight	Cloudy

	Unit 1	Unit 2	Unit 3	Unit 4
Unit Type	Motor Vehicle in Transport	Motor Vehicle in Transport		
Vehicle Type	Motorcycle	Medium / Heavy Trucks (More		
Direction of Travel	Southbound	Northbound		
Maneuver	Moving Forward	Turning Left		
Age/Sex	40 M	61 M		
Physical Cond	Apparently Normal	Apparently Normal		
Contributing Factor 1	No Clear Contributing Action	Failure to Yield Right-of-Way		

OFFICER SKETCH



NARRATIVE

UNIT 1 (MOTORCYCLE) WAS TRAVELLING SOUTHBOUND ON BLUE EARTH COUNTY RD 5 (A.K.A 3RD AVENUE). UNIT 2 (PICKUP WITH TRAILER) WAS TRAVELLING NORTHBOUND ON COUNTY RD 5. DRIVER OF UNIT 2 WAS ATTEMPTING TO TURN LEFT (WEST) ONTO 231ST LN. DRIVER OF UNIT 2 BEGAN TURNING WITHOUT SEEING UNIT 1 APPROACHING FROM THE NORTH. DRIVER OF UNIT 1 COLLIDED WITH THE PASSENGER SIDE OF UNIT 2 AND THE DRIVER OF UNIT 1 FELL OFF OF THE MOTORCYCLE. DRIVER OF UNIT 2 STOPPED ON 231ST LN AFTER THE COLLISION. STATUS OF DRIVER OF UNIT 1: -WAS WEARING A HELMET, GOGGLES, AND OTHER PROTECTIVE GEAR -VISUAL TRAUMA TO THE HEAD AND FACE WITH SIGNIFICANT BLOOD LOSS -WITNESSES REPORTED A STRUGGLE TO BREATH IMMEDIATELY AFTER CRASH -UNRESPONSIVE WHEN LAW ENFORCEMENT ARRIVED SHORTLY AFTER -CPR PERFORMED AND LIFE SAVING MEASURES ATTEMPTED BY MAYO CLINIC AMBULANCE -PRONOUNCED DECEASED

Crash Detail Report - Short Form

CSAH 5 and 231st Lane

Selection Filter:

WORK AREA: County('7') - FILTER: Year('2020','2021','2022','2023','2024')

Analyst:	Notes:
Ross Tillman	

Crash Detail Report - Short Form

INCIDENT ID	ROUTE SYS	ROUTE NUM	MEASURE	ROUTE NAME	ROUTE ID	COUNTY	CITY
00910597	04-CSAH	0005	2.595	CSAH 5	0400006594520005-I	7-Blue Earth	NOT IN A CITY

INTERSECT WITH	# VEH	# KILL	DATE	TIME	DAY	LAT	LONG	UTM X	UTM Y	WORK ZONE TYPE
	1	0	06/07/21	06:00	Mon	44.212525	-93.992751	420692.2	4895956.2	NOT APPLICABLE

BASIC TYPE	CRASH SEVERITY	FIRST HARMFUL	LIGHT CONDITION	WEATHER PRIMARY
Single Vehicle Other	N - Prop Damage Only	Deer	Sunrise	Clear

	Unit 1	Unit 2	Unit 3	Unit 4
Unit Type	Motor Vehicle in Transport			
Vehicle Type	Passenger Car			
Direction of Travel	Southbound			
Maneuver	Moving Forward			
Age/Sex	27 M			
Physical Cond	Apparently Normal			
Contributing Factor 1	No Clear Contributing Action			

OFFICER SKETCH



NARRATIVE

ALLAN RONO WAS TRAVELLING SOUTHBOUND ON 3RD AVENUE JUST NORTH OF THE INTERSECTION WITH 231ST LANE. ALLAN STATED A LARGE DEER RAN INTO THE ROADWAY AND CAUSED A COLLISION WITH THE VEHICLE HE WAS DRIVING, MINNESOTA LICENSE PLATE CAB357. ALLAN REPORTED NO INJURIES FROM THE COLLISION, AND MULTIPLE AIRBAGS DEPLOYED IN THE VEHICLE. THERE WAS SEVERE DAMAGE TO THE FRONT OF THE VEHICLE MAKING IT INOPERABLE. ALLAN PROVIDED ME WITH AN INSURANCE POLICY FOR THE VEHICLE, BUT SAID HE IS ONLY LISTED AS A DRIVER ON THE POLICY. THE POLICY IS THROUGH THE VEHICLE'S OWNER SARAH KERICH. SARAH WAS CALLED TO ADVISE HER OF THE INCIDENT, BUT DID NOT RESPOND TO MY MESSAGES. AFFORDABLE TOWING REMOVED THE VEHICLE FROM THE SHOULDER OF THE ROADWAY AND BROUGHT IT TO THEIR LOT IN MANKATO MINNESOTA.

Selection Filter:

WORK AREA: County('7') - FILTER: Year('2020','2021','2022','2023','2024'), Incident ID('910597')

Analyst: Ross Tillman

Notes:

Crash Detail Report - Short Form

Deerhaven Drive & 3rd Avenue

Selection Filter:

WORK AREA: County('7') - FILTER: Year('2020','2021','2022','2023','2024')

Analyst:

Ross Tillman

Notes:

3rd Ave & 231st Ln, Mankato, MN

0 0

Thursday, May 22, 2025

Time	Southbound 0						Westbound 0						Northbound 0						Eastbound 0						VEHICLE TOTAL
	U Turns	Left Turns	Straight Through	Right Turns	Crosswalk Crossings	*Vehicle Approach Total*	U Turns	Left Turns	Straight Through	Right Turns	Crosswalk Crossings	*Vehicle Approach Total*	U Turns	Left Turns	Straight Through	Right Turns	Crosswalk Crossings	*Vehicle Approach Total*	U Turns	Left Turns	Straight Through	Right Turns	Crosswalk Crossings	*Vehicle Approach Total*	
2:00 PM	0	0	39	1	0	*40*	0	0	0	0	0	*0*	0	3	27	0	0	*30*	0	0	0	2	0	*2*	**72**
2:15 PM	0	0	28	0	0	*28*	0	1	0	0	0	*1*	0	6	39	0	0	*45*	0	1	0	2	0	*3*	**77**
2:30 PM	0	0	23	0	0	*23*	0	0	0	0	0	*0*	0	2	36	1	0	*39*	0	0	0	8	0	*8*	**70**
2:45 PM	0	0	45	0	0	*45*	0	1	0	0	0	*1*	0	5	44	0	0	*49*	0	0	0	3	0	*3*	**98**
Hourly Total	0	0	135	1	0	*136*	0	2	0	0	0	*2*	0	16	146	1	0	*163*	0	1	0	15	0	*16*	**317**
3:00 PM	0	0	45	0	0	*45*	0	0	0	0	0	*0*	0	4	59	1	0	*64*	0	0	0	6	0	*6*	**115**
3:15 PM	0	0	43	0	0	*43*	0	0	0	0	0	*0*	0	3	48	0	0	*51*	0	0	0	2	0	*2*	**96**
3:30 PM	0	0	44	3	0	*47*	0	0	0	0	0	*0*	0	3	45	0	0	*48*	0	0	0	7	0	*7*	**102**
3:45 PM	0	0	40	0	0	*40*	0	0	0	0	0	*0*	0	10	47	0	0	*57*	0	1	0	6	0	*7*	**104**
Hourly Total	0	0	172	3	0	*175*	0	0	0	0	0	*0*	0	20	199	1	0	*220*	0	1	0	21	0	*22*	**417**
4:00 PM	0	0	67	1	0	*68*	0	1	0	0	0	*1*	0	6	55	0	0	*61*	0	1	0	8	0	*9*	**139**
4:15 PM	0	0	42	0	0	*42*	0	0	0	0	0	*0*	0	6	62	0	0	*68*	0	1	0	3	0	*4*	**114**
4:30 PM	0	0	41	0	0	*41*	0	0	0	1	0	*1*	0	4	61	0	0	*65*	0	0	0	4	0	*4*	**111**
4:45 PM	0	0	50	0	0	*50*	0	0	0	0	0	*0*	0	0	61	0	0	*61*	0	0	0	5	0	*5*	**116**
Hourly Total	0	0	200	1	0	*201*	0	1	0	1	0	*2*	0	16	239	0	0	*255*	0	2	0	20	0	*22*	**480**
5:00 PM	0	0	52	0	0	*52*	0	0	0	0	0	*0*	0	0	47	0	0	*47*	0	0	0	3	0	*3*	**102**
5:15 PM	0	0	45	0	0	*45*	0	0	0	0	0	*0*	0	0	68	0	0	*68*	0	0	0	0	0	*0*	**113**
5:30 PM	0	0	37	3	0	*40*	0	0	0	0	0	*0*	0	0	50	0	0	*50*	0	0	0	2	0	*2*	**92**
5:45 PM	0	0	30	0	0	*30*	0	0	0	0	0	*0*	0	0	51	0	0	*51*	0	0	0	0	0	*0*	**81**
Hourly Total	0	0	164	3	0	*167*	0	0	0	0	0	*0*	0	0	216	0	0	*216*	0	0	0	5	0	*5*	**388**
6:00 PM	0	0	41	0	0	*41*	0	0	0	0	0	*0*	0	0	33	0	0	*33*	0	0	0	2	0	*2*	**76**
6:15 PM	0	0	36	0	0	*36*	0	0	0	0	0	*0*	0	1	31	0	0	*32*	0	0	0	0	0	*0*	**68**
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Hourly Total	0	0	139	0	0	*139*	0	0	0	0	0	*0*	0	1	139	0	0	*140*	0	1	0	2	0	*3*	**282**
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7:15 PM	0	0	48	0	0	*48*	0	0	0	0	0	*0*	0	0	33	0	0	*33*	0	0	0	0	0	*0*	**81**
7:30 PM	0	0	47	0	0	*47*	0	0	0	0	0	*0*	0	0	26	0	0	*26*	0	0	0	0	0	*0*	**73**
7:45 PM	0	0	19	0	0	*19*	0	0	0	0	0	*0*	0	0	26	0	0	*26*	0	0	0	0	0	*0*	**45**
Hourly Total	0	0	146	0	0	*146*	0	0	0	0	0	*0*	0	0	105	0	0	*105*	0	0	0	0	0	*0*	**251**
DAILY TOTAL	**0**	**0**	**956**	**8**	**0**	***964***	**0**	**3**	**0**	**1**	**0**	***4***	**0**	**53**	**1044**	**2**	**0**	***1099***	**0**	**5**	**0**	**63**	**0**	***68***	**2135**
Cars	0	0	894	7	0	*901*	0	3	0	1	0	*4*	0	47	982	2	0	*1031*	0	4	0	57	0	*61*	**1997**
Heavy Vehicles	0	0	62	1	0	*63*	0	0	0	0	0	*0*	0	6	62	0	0	*68*	0	1	0	6	0	*7*	**138**
Heavy Vehicle %	0.00%	0.00%	6.49%	12.50%	0.00%	*6.54%*	0.00%	0.00%	0.00%	0.00%	0.00%	*0.00%*	0.00%	11.32%	5.94%	0.00%	0.00%	*6.19%*	0.00%	20.00%	0.00%	9.52%	0.00%	*10.29%*	**6.46%**

PM Peak Hour (14:00 - 24:00)

Time	Southbound						Westbound						Northbound						Eastbound						VEHICLE TOTAL
	U Turns	Left Turns	Straight Through	Right Turns	Crosswalk Crossings	*Vehicle Approach Total*	U Turns	Left Turns	Straight Through	Right Turns	Crosswalk Crossings	*Vehicle Approach Total*	U Turns	Left Turns	Straight Through	Right Turns	Crosswalk Crossings	*Vehicle Approach Total*	U Turns	Left Turns	Straight Through	Right Turns	Crosswalk Crossings	*Vehicle Approach Total*	
4:00 PM	0	0	67	1	0	*68*	0	1	0	0	0	*1*	0	6	55	0	0	*61*	0	1	0	8	0	*9*	**139**
4:15 PM	0	0	42	0	0	*42*	0	0	0	0	0	*0*	0	6	62	0	0	*68*	0	1	0	3	0	*4*	**114**
4:30 PM	0	0	41	0	0	*41*	0	0	0	1	0	*1*	0	4	61	0	0	*65*	0	0	0	4	0	*4*	**111**
4:45 PM	0	0	50	0	0	*50*	0	0	0	0	0	*0*	0	0	61	0	0	*61*	0	0	0	5	0	*5*	**116**
Peak Hour Total	0	0	200	1	0	*201*	0	1	0	1	0	*2*	0	16	239	0	0	*255*	0	2	0	20	0	*22*	**480**
Peak Hour Heavy Vehicles	0	0	14	0	0	*14*	0	0	0	0	0	*0*	0	2	16	0	0	*18*	0	0	0	1	0	*1*	**33**
Peak Hour Heavy Vehicles %	0.00%	0.00%	7.00%	0.00%	0.00%	6.97%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	12.50%	6.69%	0.00%	0.00%	7.06%	0.00%	0.00%	0.00%	5.00%	0.00%	4.55%	6.88%
PHF	0.000	0.000	0.746	0.250	0.000	*0.739*	0.000	0.250	0.000	0.250	0.000	*0.500*	0.000	0.667	0.964	0.000	0.000	*0.938*	0.000	0.500	0.000	0.625	0.000	*0.611*	**0.863**

3rd Ave & North Intersection, Mankato, MN

0 0

Thursday, May 22, 2025

Time	Southbound 0						Westbound 0						Northbound 0						Eastbound 0						VEHICLE TOTAL
	U Turns	Left Turns	Straight Through	Right Turns	Crosswalk Crossings	*Vehicle Approach Total*	U Turns	Left Turns	Straight Through	Right Turns	Crosswalk Crossings	*Vehicle Approach Total*	U Turns	Left Turns	Straight Through	Right Turns	Crosswalk Crossings	*Vehicle Approach Total*	U Turns	Left Turns	Straight Through	Right Turns	Crosswalk Crossings	*Vehicle Approach Total*	
2:00 PM	0	0	35	0	0	*35*	0	0	0	0	0	*0*	0	0	29	0	0	*29*	0	0	0	0	0	*0*	**64**
2:15 PM	0	0	22	0	0	*22*	0	0	0	0	0	*0*	0	0	32	0	0	*32*	0	0	0	0	0	*0*	**54**
2:30 PM	0	0	24	0	0	*24*	0	0	0	0	0	*0*	0	0	33	0	0	*33*	0	0	0	0	0	*0*	**57**
2:45 PM	0	0	36	0	0	*36*	0	0	0	0	0	*0*	0	0	43	0	0	*43*	0	0	0	0	0	*0*	**79**
Hourly Total	0	0	117	0	0	*117*	0	0	0	0	0	*0*	0	0	137	0	0	*137*	0	0	0	0	0	*0*	**254**
3:00 PM	0	0	44	0	0	*44*	0	0	0	0	0	*0*	0	0	59	0	0	*59*	0	0	0	0	0	*0*	**103**
3:15 PM	0	0	42	0	0	*42*	0	0	0	0	0	*0*	0	0	41	0	0	*41*	0	0	0	0	0	*0*	**83**
3:30 PM	0	0	42	0	0	*42*	0	0	0	0	0	*0*	0	0	43	1	0	*44*	0	0	0	0	0	*0*	**86**
3:45 PM	0	0	41	0	0	*41*	0	1	0	0	0	*1*	0	0	50	0	0	*50*	0	0	0	0	0	*0*	**92**
Hourly Total	0	0	169	0	0	*169*	0	1	0	0	0	*1*	0	0	193	1	0	*194*	0	0	0	0	0	*0*	**364**
4:00 PM	0	0	58	0	0	*58*	0	0	0	0	0	*0*	0	1	54	1	0	*56*	0	0	0	0	0	*0*	**114**
4:15 PM	0	0	41	0	0	*41*	0	0	0	0	0	*0*	0	0	60	1	0	*61*	0	0	0	0	0	*0*	**102**
4:30 PM	0	0	49	0	0	*49*	0	0	0	0	0	*0*	0	0	64	0	0	*64*	0	0	0	0	0	*0*	**113**
4:45 PM	0	0	52	0	0	*52*	0	1	0	0	0	*1*	0	0	56	0	0	*56*	0	0	0	0	0	*0*	**109**
Hourly Total	0	0	200	0	0	*200*	0	1	0	0	0	*1*	0	1	234	2	0	*237*	0	0	0	0	0	*0*	**438**
5:00 PM	0	0	47	0	0	*47*	0	0	0	1	0	*1*	0	0	50	0	0	*50*	0	1	0	1	0	*2*	**100**
5:15 PM	0	0	42	0	0	*42*	0	0	0	0	0	*0*	0	0	62	0	0	*62*	0	0	0	0	0	*0*	**104**
5:30 PM	0	0	32	0	0	*32*	0	0	0	0	0	*0*	0	0	52	0	0	*52*	0	0	0	1	0	*1*	**85**
5:45 PM	0	0	26	0	0	*26*	0	0	0	0	0	*0*	0	0	52	0	0	*52*	0	0	0	0	0	*0*	**78**
Hourly Total	0	0	147	0	0	*147*	0	0	0	1	0	*1*	0	0	216	0	0	*216*	0	1	0	2	0	*3*	**367**
6:00 PM	0	0	39	0	0	*39*	0	0	0	0	0	*0*	0	0	28	0	0	*28*	0	0	0	0	0	*0*	**67**
6:15 PM	0	0	29	0	0	*29*	0	0	0	0	0	*0*	0	0	27	0	0	*27*	0	0	0	0	0	*0*	**56**
6:30 PM	0	0	22	0	0	*22*	0	0	0	0	0	*0*	0	0	48	0	0	*48*	0	0	0	0	0	*0*	**70**
6:45 PM	0	0	34	0	0	*34*	0	1	0	0	0	*1*	0	0	33	0	0	*33*	0	0	0	0	0	*0*	**68**
Hourly Total	0	0	124	0	0	*124*	0	1	0	0	0	*1*	0	0	136	0	0	*136*	0	0	0	0	0	*0*	**261**
7:00 PM	0	0	33	0	0	*33*	0	0	0	0	0	*0*	0	0	20	0	0	*20*	0	0	0	0	0	*0*	**53**
7:15 PM	0	0	15	0	0	*15*	0	0	0	0	0	*0*	0	0	33	0	0	*33*	0	0	0	0	0	*0*	**48**
7:30 PM	0	0	47	0	0	*47*	0	0	0	0	0	*0*	0	0	25	0	0	*25*	0	0	0	0	0	*0*	**72**
7:45 PM	0	0	17	0	0	*17*	0	0	0	0	0	*0*	0	0	28	0	0	*28*	0	1	0	0	0	*1*	**46**
Hourly Total	0	0	112	0	0	*112*	0	0	0	0	0	*0*	0	0	106	0	0	*106*	0	1	0	0	0	*1*	**219**
DAILY TOTAL	**0**	**0**	**869**	**0**	**0**	***869***	**0**	**3**	**0**	**1**	**0**	***4***	**0**	**1**	**1022**	**3**	**0**	***1026***	**0**	**2**	**0**	**2**	**0**	***4***	**1903**
Cars	0	0	806	0	0	*806*	0	3	0	1	0	*4*	0	1	965	3	0	*969*	0	2	0	2	0	*4*	**1783**
Heavy Vehicles	0	0	63	0	0	*63*	0	0	0	0	0	*0*	0	0	57	0	0	*57*	0	0	0	0	0	*0*	**120**
Heavy Vehicle %	0.00%	0.00%	7.25%	0.00%	0.00%	*7.25%*	0.00%	0.00%	0.00%	0.00%	0.00%	*0.00%*	0.00%	0.00%	5.58%	0.00%	0.00%	*5.56%*	0.00%	0.00%	0.00%	0.00%	0.00%	*0.00%*	**6.31%**

PM Peak Hour (14:00 - 24:00)

Time	Southbound						Westbound						Northbound						Eastbound						VEHICLE TOTAL
	U Turns	Left Turns	Straight Through	Right Turns	Crosswalk Crossings	*Vehicle Approach Total*	U Turns	Left Turns	Straight Through	Right Turns	Crosswalk Crossings	*Vehicle Approach Total*	U Turns	Left Turns	Straight Through	Right Turns	Crosswalk Crossings	*Vehicle Approach Total*	U Turns	Left Turns	Straight Through	Right Turns	Crosswalk Crossings	*Vehicle Approach Total*	
4:00 PM	0	0	58	0	0	*58*	0	0	0	0	0	*0*	0	1	54	1	0	*56*	0	0	0	0	0	*0*	**114**
4:15 PM	0	0	41	0	0	*41*	0	0	0	0	0	*0*	0	0	60	1	0	*61*	0	0	0	0	0	*0*	**102**
4:30 PM	0	0	49	0	0	*49*	0	0	0	0	0	*0*	0	0	64	0	0	*64*	0	0	0	0	0	*0*	**113**
4:45 PM	0	0	52	0	0	*52*	0	1	0	0	0	*1*	0	0	56	0	0	*56*	0	0	0	0	0	*0*	**109**
Peak Hour Total	0	0	200	0	0	*200*	0	1	0	0	0	*1*	0	1	234	2	0	*237*	0	0	0	0	0	*0*	**438**
Peak Hour Heavy Vehicles	0	0	15	0	0	*15*	0	0	0	0	0	*0*	0	0	16	0	0	*16*	0	0	0	0	0	*0*	**31**
Peak Hour Heavy Vehicles %	0.00%	0.00%	7.50%	0.00%	0.00%	*7.50%*	0.00%	0.00%	0.00%	0.00%	0.00%	*0.00%*	0.00%	0.00%	6.84%	0.00%	0.00%	*6.75%*	0.00%	0.00%	0.00%	0.00%	0.00%	*0.00%*	7.08%
PHF	0.000	0.000	0.862	0.000	0.000	*0.862*	0.000	0.250	0.000	0.000	0.000	*0.250*	0.000	0.250	0.914	0.500	0.000	*0.926*	0.000	0.000	0.000	0.000	0.000	*0.000*	**0.961**

3rd Ave & Midblock, Mankato, MN
0 0
Thursday, May 22, 2025

Time	Southbound 0						Westbound 0						Northbound 0						Eastbound 0						VEHICLE TOTAL
	U Turns	Left Turns	Straight Through	Right Turns	Crosswalk Crossings	*Vehicle Approach Total*	U Turns	Left Turns	Straight Through	Right Turns	Crosswalk Crossings	*Vehicle Approach Total*	U Turns	Left Turns	Straight Through	Right Turns	Crosswalk Crossings	*Vehicle Approach Total*	U Turns	Left Turns	Straight Through	Right Turns	Crosswalk Crossings	*Vehicle Approach Total*	
2:00 PM	0	0	37	0	0	*37*	0	0	0	0	0	*0*	0	0	27	0	0	*27*	0	0	0	0	0	*0*	**64**
2:15 PM	0	0	23	0	0	*23*	0	0	0	0	0	*0*	0	1	35	0	0	*36*	0	0	0	0	0	*0*	**59**
2:30 PM	0	0	24	0	0	*24*	0	0	0	0	0	*0*	0	0	34	0	0	*34*	0	0	0	0	0	*0*	**58**
2:45 PM	0	0	36	0	0	*36*	0	0	0	0	0	*0*	0	0	39	0	0	*39*	0	0	0	1	0	*1*	**76**
Hourly Total	0	0	120	0	0	*120*	0	0	0	0	0	*0*	0	1	135	0	0	*136*	0	0	0	1	0	*1*	**257**
3:00 PM	0	0	44	0	0	*44*	0	0	0	0	0	*0*	0	0	60	0	0	*60*	0	0	0	0	0	*0*	**104**
3:15 PM	0	0	42	0	0	*42*	0	0	0	0	0	*0*	0	0	42	0	0	*42*	0	0	0	0	0	*0*	**84**
3:30 PM	0	0	44	0	0	*44*	0	0	0	0	0	*0*	1	0	45	0	0	*46*	0	0	0	0	0	*0*	**90**
3:45 PM	0	0	42	0	0	*42*	0	0	0	0	0	*0*	0	0	48	0	0	*48*	0	0	0	2	0	*2*	**92**
Hourly Total	0	0	172	0	0	*172*	0	0	0	0	0	*0*	1	0	195	0	0	*196*	0	0	0	2	0	*2*	**370**
4:00 PM	0	0	60	0	0	*60*	0	0	0	0	0	*0*	0	0	54	0	0	*54*	0	0	0	1	0	*1*	**115**
4:15 PM	0	0	40	0	0	*40*	0	0	0	0	0	*0*	0	0	58	0	0	*58*	0	0	0	0	0	*0*	**98**
4:30 PM	0	0	48	0	0	*48*	0	0	0	0	0	*0*	1	0	63	0	0	*64*	0	0	0	0	0	*0*	**112**
4:45 PM	0	0	51	0	0	*51*	0	0	0	0	0	*0*	0	0	62	0	0	*62*	0	1	0	0	0	*1*	**114**
Hourly Total	0	0	199	0	0	*199*	0	0	0	0	0	*0*	1	0	237	0	0	*238*	0	1	0	1	0	*2*	**439**
5:00 PM	0	0	49	0	0	*49*	0	0	0	0	0	*0*	0	0	44	0	0	*44*	0	0	0	1	0	*1*	**94**
5:15 PM	0	0	42	0	0	*42*	0	0	0	0	0	*0*	0	0	65	0	0	*65*	0	0	0	0	0	*0*	**107**
5:30 PM	0	0	35	0	0	*35*	0	0	0	0	0	*0*	0	0	50	0	0	*50*	0	0	0	0	0	*0*	**85**
5:45 PM	0	0	25	0	0	*25*	0	0	0	0	0	*0*	0	0	51	0	0	*51*	0	0	0	0	0	*0*	**76**
Hourly Total	0	0	151	0	0	*151*	0	0	0	0	0	*0*	0	0	210	0	0	*210*	0	0	0	1	0	*1*	**362**
6:00 PM	0	0	39	0	0	*39*	0	0	0	0	0	*0*	0	0	29	0	0	*29*	0	0	0	0	0	*0*	**68**
6:15 PM	0	0	30	0	0	*30*	0	0	0	0	0	*0*	0	0	30	0	0	*30*	0	0	0	0	0	*0*	**60**
6:30 PM	0	0	21	0	0	*21*	0	0	0	0	0	*0*	0	0	48	0	0	*48*	0	0	0	0	0	*0*	**69**
6:45 PM	0	0	35	0	0	*35*	0	0	0	0	0	*0*	0	0	31	0	0	*31*	0	0	0	0	0	*0*	**66**
Hourly Total	0	0	125	0	0	*125*	0	0	0	0	0	*0*	0	0	138	0	0	*138*	0	0	0	0	0	*0*	**263**
7:00 PM	0	0	34	0	0	*34*	0	0	0	0	0	*0*	0	0	21	0	0	*21*	0	0	0	0	0	*0*	**55**
7:15 PM	0	0	15	0	0	*15*	0	0	0	0	0	*0*	0	0	33	0	0	*33*	0	0	0	0	0	*0*	**48**
7:30 PM	0	0	46	0	0	*46*	0	0	0	0	0	*0*	0	0	26	0	0	*26*	0	0	0	0	0	*0*	**72**
7:45 PM	0	0	18	0	0	*18*	0	0	0	0	0	*0*	0	1	27	0	0	*28*	0	0	0	0	0	*0*	**46**
Hourly Total	0	0	113	0	0	*113*	0	0	0	0	0	*0*	0	1	107	0	0	*108*	0	0	0	0	0	*0*	**221**
DAILY TOTAL	**0**	**0**	**880**	**0**	**0**	***880***	**0**	**0**	**0**	**0**	**0**	***0***	**2**	**2**	**1022**	**0**	**0**	***1026***	**0**	**1**	**0**	**5**	**0**	***6***	**1912**
Cars	0	0	816	0	0	*816*	0	0	0	0	0	*0*	2	2	966	0	0	*970*	0	1	0	4	0	*5*	**1791**
Heavy Vehicles	0	0	64	0	0	*64*	0	0	0	0	0	*0*	0	0	56	0	0	*56*	0	0	0	1	0	*1*	**121**
Heavy Vehicle %	0.00%	0.00%	7.27%	0.00%	0.00%	*7.27%*	0.00%	0.00%	0.00%	0.00%	0.00%	*0.00%*	0.00%	0.00%	5.48%	0.00%	0.00%	*5.46%*	0.00%	0.00%	0.00%	20.00%	0.00%	*16.67%*	**6.33%**

PM Peak Hour (14:00 - 24:00)

Time	Southbound						Westbound						Northbound						Eastbound						VEHICLE TOTAL
	U Turns	Left Turns	Straight Through	Right Turns	Crosswalk Crossings	*Vehicle Approach Total*	U Turns	Left Turns	Straight Through	Right Turns	Crosswalk Crossings	*Vehicle Approach Total*	U Turns	Left Turns	Straight Through	Right Turns	Crosswalk Crossings	*Vehicle Approach Total*	U Turns	Left Turns	Straight Through	Right Turns	Crosswalk Crossings	*Vehicle Approach Total*	
4:00 PM	0	0	60	0	0	*60*	0	0	0	0	0	*0*	0	0	54	0	0	*54*	0	0	0	1	0	*1*	**115**
4:15 PM	0	0	40	0	0	*40*	0	0	0	0	0	*0*	0	0	58	0	0	*58*	0	0	0	0	0	*0*	**98**
4:30 PM	0	0	48	0	0	*48*	0	0	0	0	0	*0*	1	0	63	0	0	*64*	0	0	0	0	0	*0*	**112**
4:45 PM	0	0	51	0	0	*51*	0	0	0	0	0	*0*	0	0	62	0	0	*62*	0	1	0	0	0	*1*	**114**
Peak Hour Total	0	0	199	0	0	*199*	0	0	0	0	0	*0*	1	0	237	0	0	*238*	0	1	0	1	0	*2*	**439**
Peak Hour Heavy Vehicles	0	0	15	0	0	*15*	0	0	0	0	0	*0*	0	0	16	0	0	*16*	0	0	0	0	0	*0*	**31**
Peak Hour Heavy Vehicles %	0.00%	0.00%	7.54%	0.00%	0.00%	*7.54%*	0.00%	0.00%	0.00%	0.00%	0.00%	*0.00%*	0.00%	0.00%	6.75%	0.00%	0.00%	*6.72%*	0.00%	0.00%	0.00%	0.00%	0.00%	*0.00%*	7.06%
PHF	0.000	0.000	0.829	0.000	0.000	*0.829*	0.000	0.000	0.000	0.000	0.000	*0.000*	0.250	0.000	0.940	0.000	0.000	*0.930*	0.000	0.250	0.000	0.250	0.000	*0.500*	**0.954**

3rd Ave & 231st Ln, Mankato, MN

0 0

Friday, May 23, 2025

Time	Southbound 0						Westbound 0						Northbound 0						Eastbound 0						VEHICLE TOTAL
	U Turns	Left Turns	Straight Through	Right Turns	Crosswalk Crossings	*Vehicle Approach Total*	U Turns	Left Turns	Straight Through	Right Turns	Crosswalk Crossings	*Vehicle Approach Total*	U Turns	Left Turns	Straight Through	Right Turns	Crosswalk Crossings	*Vehicle Approach Total*	U Turns	Left Turns	Straight Through	Right Turns	Crosswalk Crossings	*Vehicle Approach Total*	
2:00 PM	0	0	35	3	0	*38*	0	2	0	0	0	*2*	0	10	37	2	0	*49*	0	0	0	8	0	*8*	**97**
2:15 PM	0	0	45	1	0	*46*	0	0	0	0	0	*0*	1	5	41	0	0	*47*	0	0	0	7	0	*7*	**100**
2:30 PM	0	0	26	0	0	*26*	0	1	0	0	0	*1*	0	11	45	0	0	*56*	0	1	0	10	0	*11*	**94**
2:45 PM	0	0	31	0	0	*31*	0	0	0	0	0	*0*	0	10	42	0	0	*52*	0	0	0	11	0	*11*	**94**
Hourly Total	0	0	137	4	0	*141*	0	3	0	0	0	*3*	1	36	165	2	0	*204*	0	1	0	36	0	*37*	**385**
3:00 PM	0	0	53	0	0	*53*	0	0	0	0	0	*0*	0	11	44	0	0	*55*	0	0	0	12	0	*12*	**120**
3:15 PM	0	0	47	0	0	*47*	0	0	0	0	0	*0*	0	6	48	0	0	*54*	0	1	0	10	0	*11*	**112**
3:30 PM	0	0	38	1	0	*39*	0	0	0	0	0	*0*	0	8	42	0	0	*50*	0	0	0	4	0	*4*	**93**
3:45 PM	0	0	35	0	0	*35*	0	1	0	0	0	*1*	0	8	56	0	0	*64*	0	1	0	8	0	*9*	**109**
Hourly Total	0	0	173	1	0	*174*	0	1	0	0	0	*1*	0	33	190	0	0	*223*	0	2	0	34	0	*36*	**434**
4:00 PM	0	0	35	0	0	*35*	0	0	0	0	0	*0*	0	2	49	0	0	*51*	0	0	0	7	0	*7*	**93**
4:15 PM	0	0	48	0	0	*48*	0	0	0	0	0	*0*	0	7	45	0	0	*52*	0	0	0	5	0	*5*	**105**
4:30 PM	0	0	36	0	0	*36*	0	0	0	0	0	*0*	0	6	43	0	0	*49*	0	1	0	10	0	*11*	**96**
4:45 PM	0	0	37	0	0	*37*	0	0	0	0	0	*0*	0	1	63	0	0	*64*	0	0	0	3	0	*3*	**104**
Hourly Total	0	0	156	0	0	*156*	0	0	0	0	0	*0*	0	16	200	0	0	*216*	0	1	0	25	0	*26*	**398**
5:00 PM	0	0	46	2	0	*48*	0	0	0	0	0	*0*	0	1	59	0	0	*60*	0	0	0	2	0	*2*	**110**
5:15 PM	0	0	37	0	0	*37*	0	0	0	0	0	*0*	0	0	39	0	0	*39*	0	0	0	0	0	*0*	**76**
5:30 PM	0	0	36	0	0	*36*	0	0	0	0	0	*0*	0	0	35	0	0	*35*	0	0	0	0	0	*0*	**71**
5:45 PM	0	0	30	0	0	*30*	0	0	0	0	0	*0*	0	0	57	0	0	*57*	0	0	0	0	0	*0*	**87**
Hourly Total	0	0	149	2	0	*151*	0	0	0	0	0	*0*	0	1	190	0	0	*191*	0	0	0	2	0	*2*	**344**
6:00 PM	0	0	32	0	0	*32*	0	0	0	0	1	*0*	0	0	36	0	0	*36*	0	0	0	0	0	*0*	**68**
6:15 PM	0	0	33	0	0	*33*	0	0	0	0	0	*0*	0	0	25	0	0	*25*	0	0	0	0	0	*0*	**58**
6:30 PM	0	0	25	1	0	*26*	0	0	0	0	0	*0*	0	0	32	0	0	*32*	0	0	0	0	0	*0*	**58**
6:45 PM	0	0	24	0	0	*24*	0	0	0	0	0	*0*	0	1	25	0	0	*26*	0	0	0	0	0	*0*	**50**
Hourly Total	0	0	114	1	0	*115*	0	0	0	0	1	*0*	0	1	118	0	0	*119*	0	0	0	0	0	*0*	**234**
7:00 PM	0	0	31	0	0	*31*	0	0	0	0	0	*0*	0	0	22	0	0	*22*	0	1	0	1	0	*2*	**55**
7:15 PM	0	0	19	0	0	*19*	0	0	0	0	0	*0*	0	0	19	0	0	*19*	0	0	0	0	0	*0*	**38**
7:30 PM	0	0	31	0	0	*31*	0	0	0	0	0	*0*	0	0	32	0	0	*32*	0	0	0	0	0	*0*	**63**
7:45 PM	0	0	6	0	0	*6*	0	0	0	0	0	*0*	0	0	21	0	0	*21*	0	0	0	0	0	*0*	**27**
Hourly Total	0	0	87	0	0	*87*	0	0	0	0	0	*0*	0	0	94	0	0	*94*	0	1	0	1	0	*2*	**183**

PM Peak Hour (14:00 - 24:00)

Time	Southbound						Westbound						Northbound						Eastbound						VEHICLE TOTAL
	U Turns	Left Turns	Straight Through	Right Turns	Crosswalk Crossings	*Vehicle Approach Total*	U Turns	Left Turns	Straight Through	Right Turns	Crosswalk Crossings	*Vehicle Approach Total*	U Turns	Left Turns	Straight Through	Right Turns	Crosswalk Crossings	*Vehicle Approach Total*	U Turns	Left Turns	Straight Through	Right Turns	Crosswalk Crossings	*Vehicle Approach Total*	
3:00 PM	0	0	53	0	0	*53*	0	0	0	0	0	*0*	0	11	44	0	0	*55*	0	0	0	12	0	*12*	**120**
3:15 PM	0	0	47	0	0	*47*	0	0	0	0	0	*0*	0	6	48	0	0	*54*	0	1	0	10	0	*11*	**112**
3:30 PM	0	0	38	1	0	*39*	0	0	0	0	0	*0*	0	8	42	0	0	*50*	0	0	0	4	0	*4*	**93**
3:45 PM	0	0	35	0	0	*35*	0	1	0	0	0	*1*	0	8	56	0	0	*64*	0	1	0	8	0	*9*	**109**
Peak Hour Total	0	0	173	1	0	*174*	0	1	0	0	0	*1*	0	33	190	0	0	*223*	0	2	0	34	0	*36*	**434**
Peak Hour Heavy Vehicles	0	0	17	0	0	*17*	0	0	0	0	0	*0*	0	3	15	0	0	*18*	0	0	0	5	0	*5*	**40**
Peak Hour Heavy Vehicles %	0.00%	0.00%	9.83%	0.00%	0.00%	9.77%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	9.09%	7.89%	0.00%	0.00%	8.07%	0.00%	0.00%	0.00%	14.71%	0.00%	13.89%	9.22%
PHF	0.000	0.000	0.816	0.250	0.000	*0.821*	0.000	0.250	0.000	0.000	0.000	*0.250*	0.000	0.750	0.848	0.000	0.000	*0.871*	0.000	0.500	0.000	0.708	0.000	*0.750*	**0.904**

3rd Ave & Midblock, Mankato, MN
0 0
Friday, May 23, 2025

Time	Southbound 0						Westbound 0						Northbound 0						Eastbound 0						VEHICLE TOTAL
	U Turns	Left Turns	Straight Through	Right Turns	Crosswalk Crossings	*Vehicle Approach Total*	U Turns	Left Turns	Straight Through	Right Turns	Crosswalk Crossings	*Vehicle Approach Total*	U Turns	Left Turns	Straight Through	Right Turns	Crosswalk Crossings	*Vehicle Approach Total*	U Turns	Left Turns	Straight Through	Right Turns	Crosswalk Crossings	*Vehicle Approach Total*	
2:00 PM	0	0	36	0	0	*36*	0	0	0	1	0	*1*	0	0	36	1	0	*37*	0	0	0	1	0	*1*	**75**
2:15 PM	0	0	39	0	0	*39*	0	0	0	0	0	*0*	0	0	38	0	0	*38*	0	0	0	0	0	*0*	**77**
2:30 PM	0	0	25	0	0	*25*	0	0	0	0	0	*0*	0	0	46	0	0	*46*	0	0	0	0	0	*0*	**71**
2:45 PM	0	0	27	0	0	*27*	0	0	0	0	0	*0*	0	0	40	0	0	*40*	0	0	0	0	0	*0*	**67**
Hourly Total	0	0	127	0	0	*127*	0	0	0	1	0	*1*	0	0	160	1	0	*161*	0	0	0	1	0	*1*	**290**
3:00 PM	0	0	55	0	0	*55*	0	0	0	0	0	*0*	0	0	42	0	0	*42*	0	1	0	0	0	*1*	**98**
3:15 PM	0	0	45	0	0	*45*	0	0	0	0	0	*0*	0	0	48	0	0	*48*	0	0	0	0	0	*0*	**93**
3:30 PM	0	0	35	0	0	*35*	0	0	0	0	0	*0*	0	0	40	0	0	*40*	0	0	0	0	0	*0*	**75**
3:45 PM	0	0	35	0	0	*35*	0	0	0	0	0	*0*	0	0	56	0	0	*56*	0	0	0	0	0	*0*	**91**
Hourly Total	0	0	170	0	0	*170*	0	0	0	0	0	*0*	0	0	186	0	0	*186*	0	1	0	0	0	*1*	**357**
4:00 PM	0	0	34	0	0	*34*	0	0	0	0	0	*0*	0	0	46	0	0	*46*	0	0	0	0	1	*0*	**80**
4:15 PM	0	0	44	0	0	*44*	0	0	0	0	0	*0*	0	0	41	0	0	*41*	0	0	0	0	0	*0*	**85**
4:30 PM	0	0	35	0	0	*35*	0	0	0	0	0	*0*	0	0	47	0	0	*47*	0	0	0	0	1	*0*	**82**
4:45 PM	0	0	35	1	0	*36*	0	0	0	0	0	*0*	0	1	57	0	0	*58*	0	0	0	1	0	*1*	**95**
Hourly Total	0	0	148	1	0	*149*	0	0	0	0	0	*0*	0	1	191	0	0	*192*	0	0	0	1	2	*1*	**342**
5:00 PM	0	0	44	0	0	*44*	0	0	0	0	0	*0*	0	0	54	0	0	*54*	0	0	0	1	0	*1*	**99**
5:15 PM	0	0	28	0	0	*28*	0	0	0	0	0	*0*	0	0	40	0	0	*40*	0	0	0	0	0	*0*	**68**
5:30 PM	0	0	31	0	0	*31*	0	0	0	0	0	*0*	0	0	33	0	0	*33*	0	0	0	0	0	*0*	**64**
5:45 PM	0	0	31	0	0	*31*	0	0	0	0	0	*0*	0	0	52	0	0	*52*	0	0	0	0	0	*0*	**83**
Hourly Total	0	0	134	0	0	*134*	0	0	0	0	0	*0*	0	0	179	0	0	*179*	0	0	0	1	0	*1*	**314**
6:00 PM	1	0	28	0	0	*29*	0	0	0	0	1	*0*	0	0	32	0	0	*32*	0	0	0	0	0	*0*	**61**
6:15 PM	0	0	27	0	0	*27*	0	0	0	0	0	*0*	0	0	26	0	0	*26*	0	0	0	0	0	*0*	**53**
6:30 PM	0	0	24	0	0	*24*	0	0	0	0	0	*0*	0	0	26	0	0	*26*	0	0	0	0	0	*0*	**50**
6:45 PM	0	0	19	0	0	*19*	0	0	0	0	0	*0*	0	0	24	0	0	*24*	0	0	0	0	0	*0*	**43**
Hourly Total	1	0	98	0	0	*99*	0	0	0	0	1	*0*	0	0	108	0	0	*108*	0	0	0	0	0	*0*	**207**
7:00 PM	0	0	30	0	0	*30*	0	0	0	0	0	*0*	0	0	22	0	0	*22*	0	0	0	0	0	*0*	**52**
7:15 PM	0	0	19	0	0	*19*	0	0	0	0	0	*0*	0	0	20	0	0	*20*	0	0	0	0	0	*0*	**39**
7:30 PM	0	0	31	0	0	*31*	0	0	0	0	0	*0*	0	0	32	0	0	*32*	0	0	0	0	0	*0*	**63**
7:45 PM	0	0	5	0	0	*5*	0	0	0	0	0	*0*	0	0	20	0	0	*20*	0	0	0	0	0	*0*	**25**
Hourly Total	0	0	85	0	0	*85*	0	0	0	0	0	*0*	0	0	94	0	0	*94*	0	0	0	0	0	*0*	**179**

PM Peak Hour (14:00 - 24:00)

Time	Southbound						Westbound						Northbound						Eastbound						VEHICLE TOTAL
	U Turns	Left Turns	Straight Through	Right Turns	Crosswalk Crossings	*Vehicle Approach Total*	U Turns	Left Turns	Straight Through	Right Turns	Crosswalk Crossings	*Vehicle Approach Total*	U Turns	Left Turns	Straight Through	Right Turns	Crosswalk Crossings	*Vehicle Approach Total*	U Turns	Left Turns	Straight Through	Right Turns	Crosswalk Crossings	*Vehicle Approach Total*	
4:15 PM	0	0	44	0	0	*44*	0	0	0	0	0	*0*	0	0	41	0	0	*41*	0	0	0	0	0	*0*	**85**
4:30 PM	0	0	35	0	0	*35*	0	0	0	0	0	*0*	0	0	47	0	0	*47*	0	0	0	0	1	*0*	**82**
4:45 PM	0	0	35	1	0	*36*	0	0	0	0	0	*0*	0	1	57	0	0	*58*	0	0	0	1	0	*1*	**95**
5:00 PM	0	0	44	0	0	*44*	0	0	0	0	0	*0*	0	0	54	0	0	*54*	0	0	0	1	0	*1*	**99**
Peak Hour Total	0	0	158	1	0	*159*	0	0	0	0	0	*0*	0	1	199	0	0	*200*	0	0	0	2	1	*2*	**361**
Peak Hour Heavy Vehicles	0	0	10	0	0	*10*	0	0	0	0	0	*0*	0	1	5	0	0	*6*	0	0	0	1	1	*1*	**17**
Peak Hour Heavy Vehicles %	0.00%	0.00%	6.33%	0.00%	0.00%	*6.29%*	0.00%	0.00%	0.00%	0.00%	0.00%	*0.00%*	0.00%	100.00%	2.51%	0.00%	0.00%	*3.00%*	0.00%	0.00%	0.00%	50.00%	100.00%	*50.00%*	4.71%
PHF	0.000	0.000	0.898	0.250	0.000	*0.903*	0.000	0.000	0.000	0.000	0.000	*0.000*	0.000	0.250	0.873	0.000	0.000	*0.862*	0.000	0.000	0.000	0.500	0.250	*0.500*	**0.912**

3rd Ave & North Intersection, Mankato, MN
0 0
Friday, May 23, 2025

Time	Southbound 0						Westbound 0						Northbound 0						Eastbound 0						VEHICLE TOTAL
	U Turns	Left Turns	Straight Through	Right Turns	Crosswalk Crossings	*Vehicle Approach Total*	U Turns	Left Turns	Straight Through	Right Turns	Crosswalk Crossings	*Vehicle Approach Total*	U Turns	Left Turns	Straight Through	Right Turns	Crosswalk Crossings	*Vehicle Approach Total*	U Turns	Left Turns	Straight Through	Right Turns	Crosswalk Crossings	*Vehicle Approach Total*	
2:00 PM	0	0	37	0	0	*37*	0	0	0	0	0	*0*	0	0	37	0	0	*37*	0	0	0	0	0	*0*	**74**
2:15 PM	0	0	38	0	0	*38*	0	0	0	0	0	*0*	0	0	37	0	0	*37*	0	0	0	0	0	*0*	**75**
2:30 PM	0	0	25	0	0	*25*	0	0	0	0	0	*0*	0	0	42	2	0	*44*	0	0	0	0	0	*0*	**69**
2:45 PM	0	0	31	0	0	*31*	0	0	0	0	0	*0*	0	0	41	0	0	*41*	0	0	0	0	0	*0*	**72**
Hourly Total	0	0	131	0	0	*131*	0	0	0	0	0	*0*	0	0	157	2	0	*159*	0	0	0	0	0	*0*	**290**
3:00 PM	0	0	51	0	0	*51*	0	0	0	0	0	*0*	0	0	43	0	0	*43*	0	0	0	0	0	*0*	**94**
3:15 PM	0	0	47	0	0	*47*	0	0	0	0	0	*0*	0	0	48	0	0	*48*	0	0	0	0	0	*0*	**95**
3:30 PM	0	0	32	0	0	*32*	0	0	0	0	0	*0*	0	0	40	0	0	*40*	0	0	0	0	0	*0*	**72**
3:45 PM	0	0	36	0	0	*36*	0	0	0	0	0	*0*	0	0	53	0	0	*53*	0	0	0	0	0	*0*	**89**
Hourly Total	0	0	166	0	0	*166*	0	0	0	0	0	*0*	0	0	184	0	0	*184*	0	0	0	0	0	*0*	**350**
4:00 PM	0	0	35	0	0	*35*	0	0	0	0	0	*0*	0	0	45	0	0	*45*	0	0	0	0	0	*0*	**80**
4:15 PM	0	0	41	0	0	*41*	0	0	0	0	0	*0*	0	0	44	0	0	*44*	0	0	0	0	0	*0*	**85**
4:30 PM	0	0	36	0	0	*36*	0	0	0	0	0	*0*	0	0	48	0	0	*48*	0	0	0	0	0	*0*	**84**
4:45 PM	0	0	37	0	0	*37*	0	0	0	0	0	*0*	0	0	55	0	0	*55*	0	0	0	0	0	*0*	**92**
Hourly Total	0	0	149	0	0	*149*	0	0	0	0	0	*0*	0	0	192	0	0	*192*	0	0	0	0	0	*0*	**341**
5:00 PM	0	1	42	0	0	*43*	0	0	0	0	0	*0*	1	1	52	0	0	*54*	0	0	0	0	0	*0*	**97**
5:15 PM	0	0	26	0	0	*26*	0	0	0	0	0	*0*	0	0	42	0	0	*42*	0	0	0	1	0	*1*	**69**
5:30 PM	0	1	31	0	0	*32*	0	0	0	0	0	*0*	0	0	33	0	0	*33*	0	0	0	0	0	*0*	**65**
5:45 PM	0	0	30	0	0	*30*	0	0	0	0	0	*0*	0	0	51	1	0	*52*	0	0	0	0	0	*0*	**82**
Hourly Total	0	2	129	0	0	*131*	0	0	0	0	0	*0*	1	1	178	1	0	*181*	0	0	0	1	0	*1*	**313**
6:00 PM	0	0	29	0	0	*29*	0	1	0	0	1	*1*	0	0	35	0	0	*35*	0	0	0	0	0	*0*	**65**
6:15 PM	0	0	27	0	0	*27*	0	0	0	0	0	*0*	0	0	25	1	0	*26*	0	1	0	0	0	*1*	**54**
6:30 PM	0	0	23	0	0	*23*	0	0	0	0	0	*0*	0	0	25	0	0	*25*	0	0	0	0	0	*0*	**48**
6:45 PM	0	0	21	0	0	*21*	0	0	0	0	0	*0*	0	0	25	0	0	*25*	0	0	0	0	0	*0*	**46**
Hourly Total	0	0	100	0	0	*100*	0	1	0	0	1	*1*	0	0	110	1	0	*111*	0	1	0	0	0	*1*	**213**
7:00 PM	0	0	28	0	0	*28*	0	0	0	0	0	*0*	0	1	21	0	0	*22*	0	0	0	0	0	*0*	**50**
7:15 PM	0	0	19	0	0	*19*	0	0	0	1	0	*1*	0	0	20	0	0	*20*	0	0	0	0	0	*0*	**40**
7:30 PM	0	0	31	0	0	*31*	0	0	0	0	0	*0*	0	0	31	0	0	*31*	0	0	0	0	0	*0*	**62**
7:45 PM	0	0	6	0	0	*6*	0	0	0	0	0	*0*	0	0	21	0	0	*21*	0	0	0	0	0	*0*	**27**
Hourly Total	0	0	84	0	0	*84*	0	0	0	1	0	*1*	0	1	93	0	0	*94*	0	0	0	0	0	*0*	**179**

Time	Southbound						Westbound						Northbound						Eastbound						VEHICLE TOTAL
	U Turns	Left Turns	Straight Through	Right Turns	Crosswalk Crossings	*Vehicle Approach Total*	U Turns	Left Turns	Straight Through	Right Turns	Crosswalk Crossings	*Vehicle Approach Total*	U Turns	Left Turns	Straight Through	Right Turns	Crosswalk Crossings	*Vehicle Approach Total*	U Turns	Left Turns	Straight Through	Right Turns	Crosswalk Crossings	*Vehicle Approach Total*	
4:15 PM	0	0	41	0	0	*41*	0	0	0	0	0	*0*	0	0	44	0	0	*44*	0	0	0	0	0	*0*	**85**
4:30 PM	0	0	36	0	0	*36*	0	0	0	0	0	*0*	0	0	48	0	0	*48*	0	0	0	0	0	*0*	**84**
4:45 PM	0	0	37	0	0	*37*	0	0	0	0	0	*0*	0	0	55	0	0	*55*	0	0	0	0	0	*0*	**92**
5:00 PM	0	1	42	0	0	*43*	0	0	0	0	0	*0*	1	1	52	0	0	*54*	0	0	0	0	0	*0*	**97**
Peak Hour Total	0	1	156	0	0	*157*	0	0	0	0	0	*0*	1	1	199	0	0	*201*	0	0	0	0	0	*0*	**358**
Peak Hour Heavy Vehicles	0	0	10	0	0	*10*	0	0	0	0	0	*0*	0	0	5	0	0	*5*	0	0	0	0	0	*0*	**15**
Peak Hour Heavy Vehicles %	0.00%	0.00%	6.41%	0.00%	0.00%	6.37%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	2.51%	0.00%	0.00%	2.49%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	4.19%
PHF	0.000	0.250	0.929	0.000	0.000	*0.913*	0.000	0.000	0.000	0.000	0.000	*0.000*	0.250	0.250	0.905	0.000	0.000	*0.914*	0.000	0.000	0.000	0.000	0.000	*0.000*	**0.923**

Intersection	
Int Delay, s/veh	0.2

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	1	1	1	237	199	0
Future Vol, veh/h	1	1	1	237	199	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	325	-	-	300
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	25	25	90	94	83	90
Heavy Vehicles, %	0	0	2	7	7	2
Mvmt Flow	4	4	1	252	240	0

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	494	240	240	0	-	0
Stage 1	240	-	-	-	-	-
Stage 2	254	-	-	-	-	-
Critical Hdwy	6.4	6.2	4.12	-	-	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	2.218	-	-	-
Pot Cap-1 Maneuver	538	804	1327	-	-	-
Stage 1	805	-	-	-	-	-
Stage 2	793	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	538	804	1327	-	-	-
Mov Cap-2 Maneuver	538	-	-	-	-	-
Stage 1	804	-	-	-	-	-
Stage 2	793	-	-	-	-	-

Approach	EB	NB	SB
HCM Ctrl Dly, s/v	10.66	0.03	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1327	-	644	-	-
HCM Lane V/C Ratio	0.001	-	0.012	-	-
HCM Ctrl Dly (s/v)	7.7	-	10.7	-	-
HCM Lane LOS	A	-	B	-	-
HCM 95th %tile Q(veh)	0	-	0	-	-

Intersection	
Int Delay, s/veh	1.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	2	0	20	1	0	1	16	239	0	0	200	1
Future Vol, veh/h	2	0	20	1	0	1	16	239	0	0	200	1
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	250	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	50	90	63	25	90	25	67	96	90	90	75	25
Heavy Vehicles, %	0	2	5	0	2	0	13	7	2	2	7	0
Mvmt Flow	4	0	32	4	0	4	24	249	0	0	267	4

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	565	565	269	563	567	249	271	0	0	249	0	0
Stage 1	269	269	-	297	297	-	-	-	-	-	-	-
Stage 2	297	297	-	267	271	-	-	-	-	-	-	-
Critical Hdwy	7.1	6.52	6.25	7.1	6.52	6.2	4.23	-	-	4.12	-	-
Critical Hdwy Stg 1	6.1	5.52	-	6.1	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.1	5.52	-	6.1	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4.018	3.345	3.5	4.018	3.3	2.317	-	-	2.218	-	-
Pot Cap-1 Maneuver	438	434	763	440	433	795	1232	-	-	1317	-	-
Stage 1	741	687	-	716	668	-	-	-	-	-	-	-
Stage 2	716	668	-	743	685	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	428	426	763	413	424	795	1232	-	-	1317	-	-
Mov Cap-2 Maneuver	428	426	-	413	424	-	-	-	-	-	-	-
Stage 1	741	687	-	702	655	-	-	-	-	-	-	-
Stage 2	699	655	-	712	685	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Ctrl Dly, s/v	10.41	11.72	0.7	0
HCM LOS	B	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1232	-	-	701	544	1317	-	-
HCM Lane V/C Ratio	0.019	-	-	0.051	0.015	-	-	-
HCM Ctrl Dly (s/v)	8	-	-	10.4	11.7	0	-	-
HCM Lane LOS	A	-	-	B	B	A	-	-
HCM 95th %tile Q(veh)	0.1	-	-	0.2	0	0	-	-

Intersection	
Int Delay, s/veh	0.7

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	8	15	15	248	259	8
Future Vol, veh/h	8	15	15	248	259	8
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	90	90	90	94	85	90
Heavy Vehicles, %	0	0	0	6	28	0
Mvmt Flow	9	17	17	264	305	9

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	606	309	314	0	-	0
Stage 1	309	-	-	-	-	-
Stage 2	297	-	-	-	-	-
Critical Hdwy	6.4	6.2	4.1	-	-	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	2.2	-	-	-
Pot Cap-1 Maneuver	463	736	1258	-	-	-
Stage 1	749	-	-	-	-	-
Stage 2	758	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	456	736	1258	-	-	-
Mov Cap-2 Maneuver	456	-	-	-	-	-
Stage 1	737	-	-	-	-	-
Stage 2	758	-	-	-	-	-

Approach	EB	NB	SB
HCM Ctrl Dly, s/v	11.2	0.47	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	107	-	606	-	-
HCM Lane V/C Ratio	0.013	-	0.042	-	-
HCM Ctrl Dly (s/v)	7.9	0	11.2	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0	-	0.1	-	-

Intersection	
Int Delay, s/veh	2.2

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	11	19	112	252	214	59
Future Vol, veh/h	11	19	112	252	214	59
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	325	-	-	300
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	84	87	90	94	83	90
Heavy Vehicles, %	0	0	95	6	7	97
Mvmt Flow	13	22	124	268	258	66

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	775	258	323	0	-	0
Stage 1	258	-	-	-	-	-
Stage 2	517	-	-	-	-	-
Critical Hdwy	6.4	6.2	5.05	-	-	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	3.055	-	-	-
Pot Cap-1 Maneuver	369	786	856	-	-	-
Stage 1	790	-	-	-	-	-
Stage 2	603	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	316	786	856	-	-	-
Mov Cap-2 Maneuver	316	-	-	-	-	-
Stage 1	675	-	-	-	-	-
Stage 2	603	-	-	-	-	-

Approach	EB	NB	SB
HCM Ctrl Dly, s/v	12.67	3.14	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	856	-	504	-	-
HCM Lane V/C Ratio	0.145	-	0.069	-	-
HCM Ctrl Dly (s/v)	9.9	-	12.7	-	-
HCM Lane LOS	A	-	B	-	-
HCM 95th %tile Q(veh)	0.5	-	0.2	-	-

Intersection	
Int Delay, s/veh	0.9

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	2	0	20	1	0	1	16	365	0	0	233	1
Future Vol, veh/h	2	0	20	1	0	1	16	365	0	0	233	1
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	250	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	50	90	63	25	90	25	67	94	90	90	77	25
Heavy Vehicles, %	0	2	5	0	2	0	13	34	2	2	6	0
Mvmt Flow	4	0	32	4	0	4	24	388	0	0	303	4

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	741	741	305	739	743	388	307	0	0	388	0	0
Stage 1	305	305	-	436	436	-	-	-	-	-	-	-
Stage 2	436	436	-	303	307	-	-	-	-	-	-	-
Critical Hdwy	7.1	6.52	6.25	7.1	6.52	6.2	4.23	-	-	4.12	-	-
Critical Hdwy Stg 1	6.1	5.52	-	6.1	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.1	5.52	-	6.1	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4.018	3.345	3.5	4.018	3.3	2.317	-	-	2.218	-	-
Pot Cap-1 Maneuver	335	344	728	336	343	664	1194	-	-	1170	-	-
Stage 1	709	663	-	603	580	-	-	-	-	-	-	-
Stage 2	603	580	-	711	661	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	326	337	728	315	337	664	1194	-	-	1170	-	-
Mov Cap-2 Maneuver	326	337	-	315	337	-	-	-	-	-	-	-
Stage 1	709	663	-	591	568	-	-	-	-	-	-	-
Stage 2	587	568	-	680	661	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Ctrl Dly, s/v	10.96	13.59	0.47	0
HCM LOS	B	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1194	-	-	640	427	1170	-	-
HCM Lane V/C Ratio	0.02	-	-	0.056	0.019	-	-	-
HCM Ctrl Dly (s/v)	8.1	-	-	11	13.6	0	-	-
HCM Lane LOS	A	-	-	B	B	A	-	-
HCM 95th %tile Q(veh)	0.1	-	-	0.2	0.1	0	-	-

Appendix G: Cross Sections

SITE LEGEND:

BIKE TRAILS

1. ACCESS / CONVENIENCE BIKE OPTIMIZED TRAILS (TWO WAY)
2. BEGINNER TRAILS (ONE WAY)
3. INTERMEDIATE TRAILS (ONE WAY)
4. EXPERT / DIFFICULT TRAILS (ONE WAY)
H. HUB START

OTHER SITE AMENITIES / FEATURES

1. BIKE TRAIL PUBLIC PARKING ACCESS
2. RV & ADVENTURE PARK USER PARKING
3. WATER CABLE PARK
4. CABLE PARK STARTING FEATURE / VIEWING AREA
5. ISLAND FEATURE

BUILDINGS

6. RESTROOM / SHOWER
7. MAIN BUILDING / CHECK-IN
8. WASTE WATER HOLDING TANKS / LIFT STATION
9. MAINTENANCE / SERVICE BUILDING

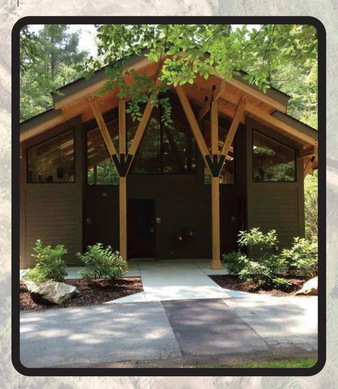
OTHER SITE NOTES:

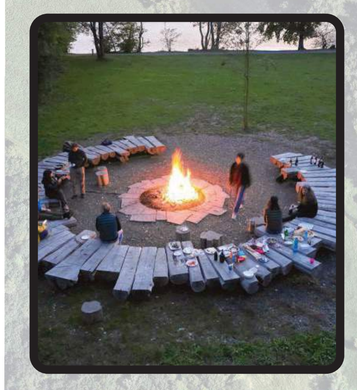
POTABLE WATER WILL BE AT CAMPSITES OR WITHIN 400 FEET OF EVERY CAMPSITE IN ACCORDANCE WITH MINNESOTA RULES CHAPTER 4630.0600.

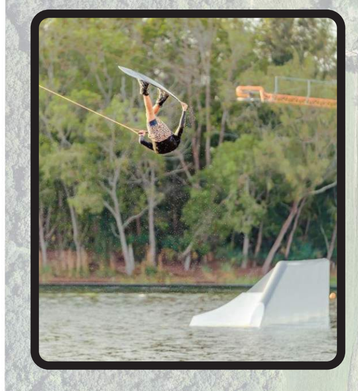
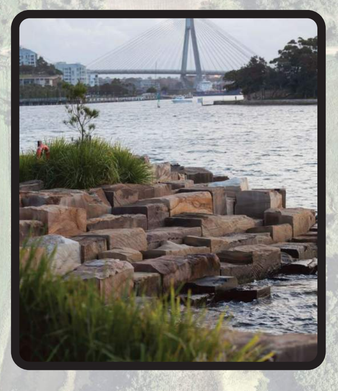
ALL TOILET FACILITIES SHALL NOT BE MORE THAN 400 FEET FROM THE FURTHEST SITE TO BE SERVED IN ACCORDANCE WITH MINNESOTA RULES CHAPTER 4630.0900.

TRAILS AND OPEN SPACES WILL BE FIELD-FIT TO REDUCE TREE AND BRUSH REMOVALS AND TO AVOID WETLANDS.

CHARACTER IMAGERY:

ROCKWELL USA TRD MRK RV AND ADVENTURE PARK MANKATO, MN

NORTH ALIGNMENT APPROXIMATE LOCATION

AQUATIC PARK

PRIVATE PROPERTY

WATER CABLE PARK

PRIVATE PROPERTY

MAIN ENTRY / EXIT TO PARK

MIDDLE ALIGNMENT APPROXIMATE LOCATION

PRIVATE PROPERTY

EXISTING CEMETERY

SOUTH ALIGNMENT APPROXIMATE LOCATION

GATED SERVICE ROAD / NOT FOR GUEST ENTRY / EXIT

0' 80' 160' 320' 640'

NORTH

ROCKWELL CONCEPT

INTEGRATE THE SYSTEMS

CONFLUENCE

Rockwell RV and Adventure Park

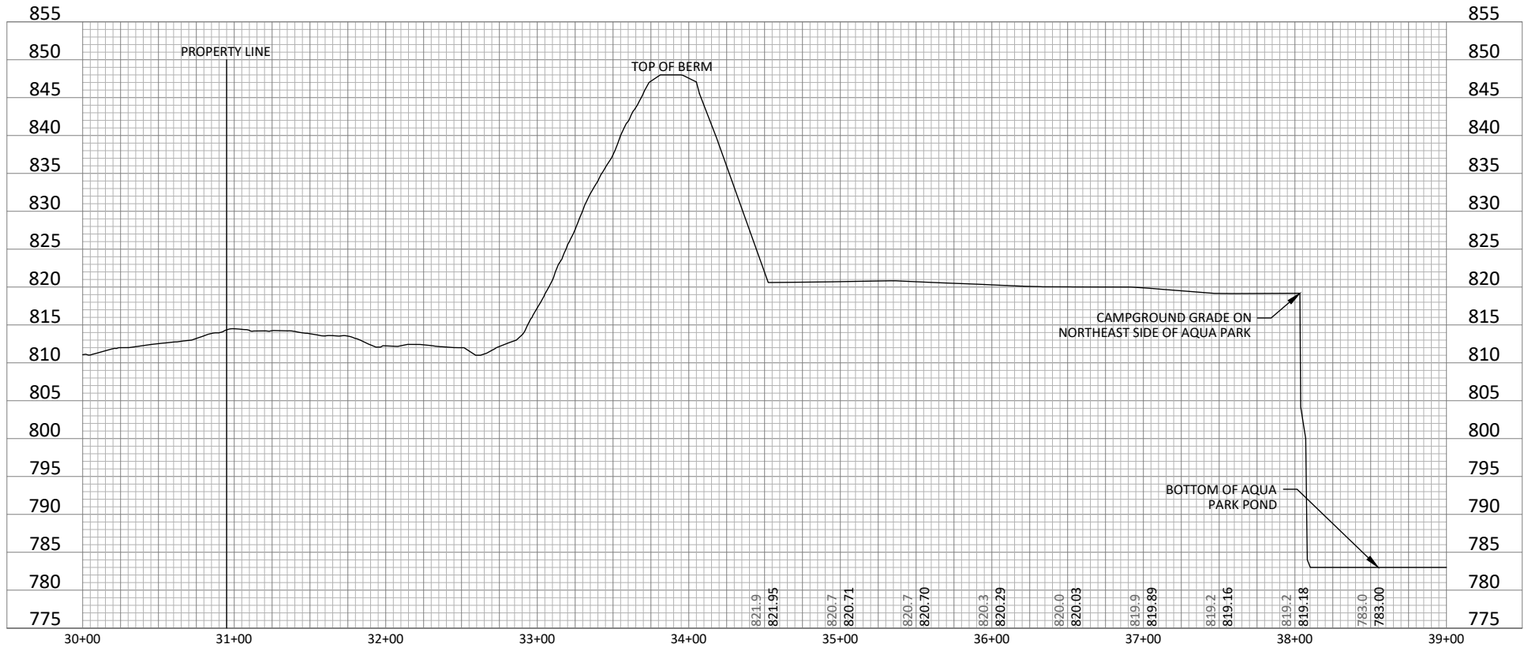
Blue Earth County, Minnesota

Select Quarry Cross Sections

November 2025

BOLTON & MENK

NORTH ALIGNMENT



HORZ. 0 50 100 SCALE FEET

VERT. 0 10 20 SCALE FEET

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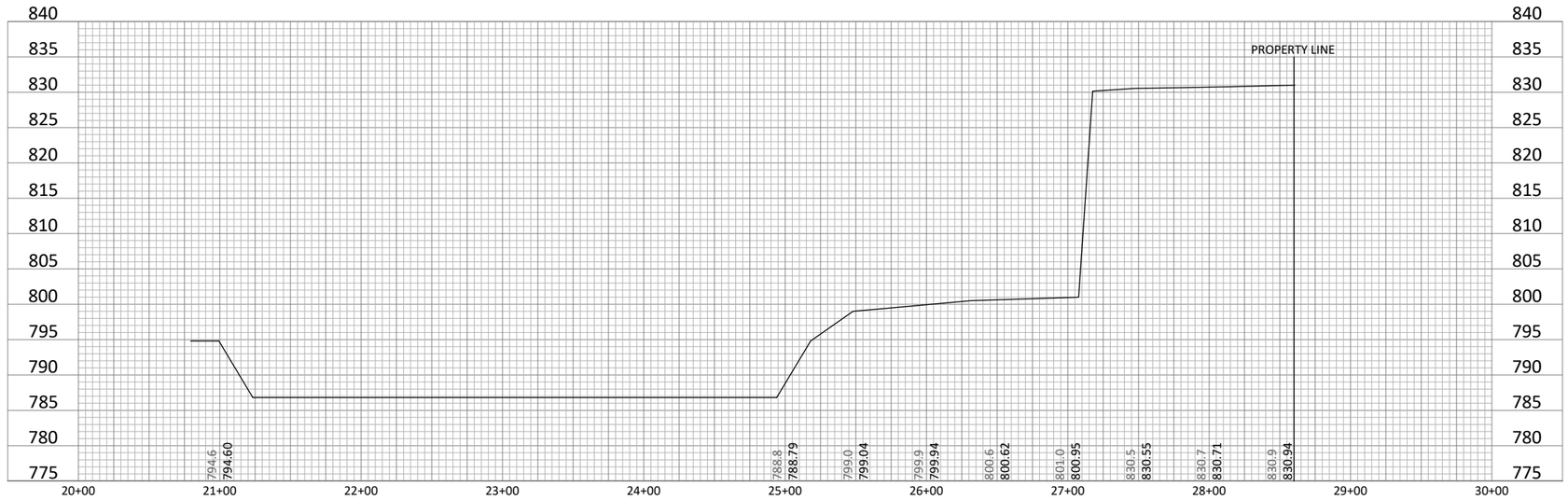
MIDDLE ALIGNMENT



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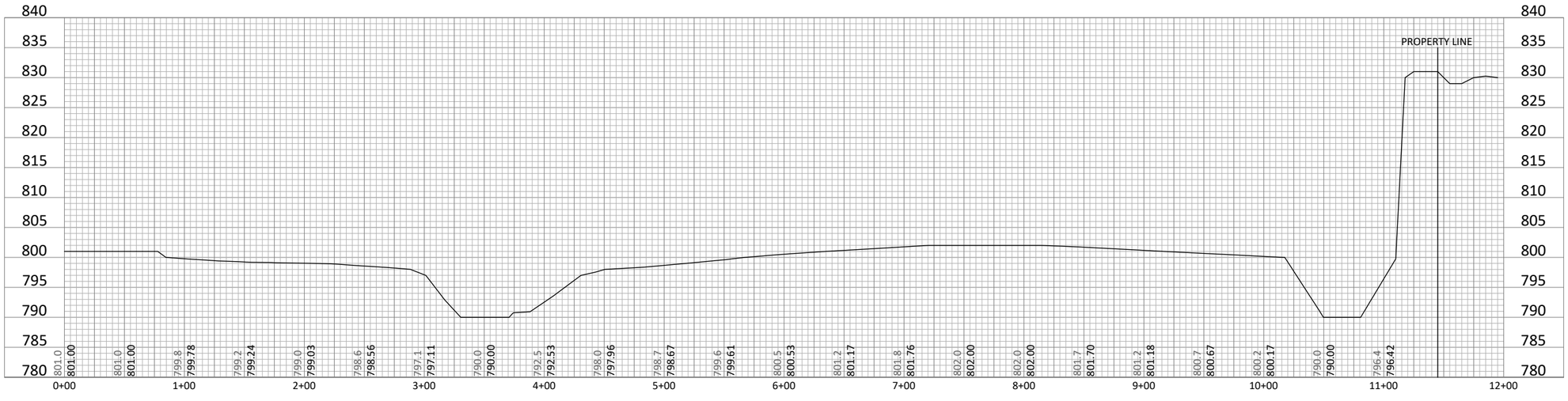
SOUTH ALIGNMENT



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Appendix H: Summary of Environmental Mitigations

Summary of Mitigation Measures and Design Requirements		
Section	**Mitigation Measure**	**Design Requirements**
Project Design	- Increase vegetation and green spaces to reduce urban heat island effect.	- Material choices and site planning to minimize climate impacts. - Develop comprehensive landscape plan
Land Use	- None: project is compatible with existing and planned land uses and zoning	- Adherence to local zoning and comprehensive plan. - Interim Use Permit required.
Water Resources - Wastewater	- Sewage collected in holding tanks, trucked to municipal facility. - Holding tanks built/maintained per MPCA requirements. - Annual maintenance and reporting. - Future connection to municipal sewer planned.	- Central holding tank for sewage. - Future municipal utility connection. - All plans and actions reviewed by RGU and agencies.
Water Resources – Stormwater	- Incorporate BMPs (infiltration basins, swales, rain gardens). - Develop and implement SWPPP for construction. - Meet/exceed Minnesota Construction Stormwater Permit requirements. - Dust and sediment control during construction.	- Central holding tank for sewage. - SWPPP required for construction. - Stormwater management system detailed in site plan. - All plans and actions reviewed by RGU and agencies.
Water Resources – Wetlands	- Avoid impacts to natural wetlands; use boardwalks/bridges for trails. - Wetland impact permitting if avoidance is not possible.	- Compliance with wetland delineation and permitting. - All plans and actions reviewed by RGU and agencies.
Water Resources – Surface Water	- No work in Minnesota River or its banks. - Dewatering ceased. - Regular water quality testing for aquatic features. - No chemical disinfectants/additives in water features. - No fountains in water features.	- Water quality testing protocols. - All plans and actions reviewed by RGU and agencies.
Water Resources – Groundwater	- Monitor groundwater levels to confirm no impacts or changes to Lime 30 hydrology.	- Use existing well for potable water. - Plan approval required for drinking water treatment and distribution system.
Water Resources – Floodplain/Hydrology	- Finalize stormwater plan during final design. - Design to limit and monitor for potential hydrologic changes leaving the site.	- No structures in FEMA Flood Hazard Zones. - Avoid hydrological changes impacting the nearby fen.
Contamination/Hazardous Materials/Wastes	- Store construction waste in marked containers; dispose of at licensed facilities. - Covered trash/recycling dumpsters; regular removal. - Spill prevention and response plan. - Hazardous materials stored with secondary containment. - Licensed haulers for hazardous waste. - Annual maintenance/reporting for sewage tanks.	- Secure, labeled containers for hazardous materials. - Refueling/maintenance in designated areas. - Compliance with MPCA and federal regulations.

Summary of Mitigation Measures and Design Requirements		
Section	**Mitigation Measure**	**Design Requirements**
Fish, Wildlife, Plant Communities, Sensitive Ecological Resources	- Avoid impacts to the calcareous fen. - Buffer zones to the MBS site are maintained. - Avoid tree/shrub removal during sensitive seasons. - Reseed disturbed soils with native species. - Wildlife-friendly erosion control mesh. - No fountains or chemical treatments in water features. - BMPs for invasive species prevention. - Coordination, if needed, with MNDNR and USFWS for rare species.	- Trails field-fit to avoid sensitive areas. - Construction scheduled to avoid sensitive wildlife periods. - Compliance with WCA and endangered species statutes. - Use signage to keep visitors on trails. - BMPs to prevent invasive species introduction. - Erosion/sediment control measures. - Maintain buffer zones. - Consider sensitive water bodies when doing stormwater design.
Historic Properties	- Avoid ground-disturbing activities in historic/archaeological sites. - Design sensitivity for new construction/trails. - Monitoring for unidentified archaeological materials.	- Restrict activities outside the boundaries of historic sites. - Preserve contributing elements of the historic district. - Consultation with SHPO as needed.
Visual	- Landscaping and natural buffers to soften visual impact. - Lighting designed to confine glare on-site. - Depressed site elevation limits visual impacts.	- Lighting installations per township and county standards.
Air	- No stationary emission sources. - Maintain equipment to reduce emissions. - Encourage carpooling.	- Minimize vehicle idling. - No boilers/exhaust stacks. - BMPs for vehicle emissions.
Greenhouse Gas Emissions/Carbon Footprint	- Plant native grasses for carbon uptake. - Encourage high-efficiency systems. - Carpooling and anti-idling during construction. - BMPs for energy use.	- BMPs in planning/construction phases. - Select native grasses. - Select high-efficiency systems. - Specify carpooling and anti-idling during construction.
Noise	- Limit construction to regular working hours. - Adhere to state noise standards. - BMPs for noise during construction.	- Compliance with township and state regulations. - Specify signage for quiet hours.
Transportation	- Convert the bypass lane to a dedicated left-turn lane. - Maintain right-turn and acceleration lanes. - Internal queuing to prevent stacking on public roads. - No campers allowed at the secondary entrance except in emergencies.	- Parking spaces at RV spots and amenities. - Traffic improvements to restripe for a dedicated left turn lane. - Include adequate internal queuing or add additional RV parking. - Signage and gates to limit use of the secondary entrance.

CAMPQUARY LLC

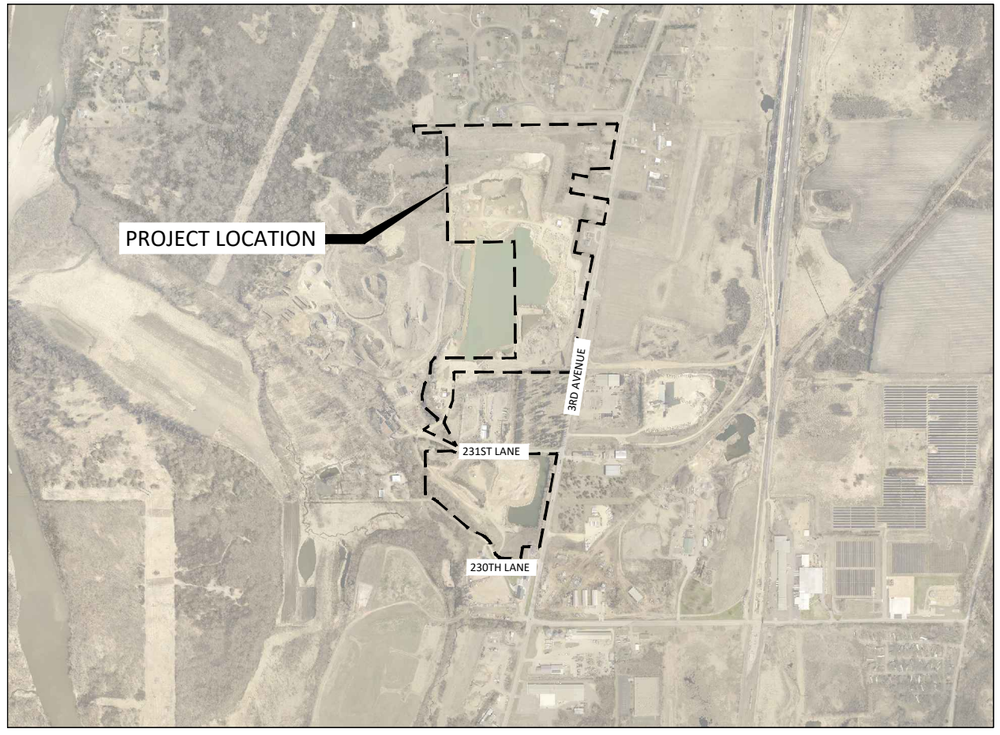
CONSTRUCTION PLANS FOR

ROCKWELL RV & ADVENTURE PARK

SITE GRADING, UTILITY CONSTRUCTION, PAVEMENT CONSTRUCTION

JULY 2026

MAP OF
LIME TOWNSHIP
BLUE EARTH COUNTY, MN



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SCALE FEET

	SHEET TITLE
GENERAL	
G0.01	TITLE SHEET
G0.02	LEGEND
G1.01 - G1.02	PROJECT OVERVIEW
CIVIL	
C0.01 - C0.06	EXISTING CONDITIONS, REMOVALS PLAN
C1.01 - C1.03	CONSTRUCTION DETAILS
C2.01 - C2.24	STORMWATER POLLUTION PREVENTION PLAN
C3.01 - C3.18	GRADING PLAN
C4.01 - C4.08	SANITARY MAINLINE PLAN & PROFILE
C4.09 - C4.25	UTILITY PLAN
C5.01 - C5.03	SITE PLAN OVERVIEW
C6.01 - C6.18	ENLARGED SITE PLAN
C7.01 - C7.02	TRAILHEAD GRADING & SITE PLAN

THIS PLAN SET CONTAINS 103 SHEETS.

NOTE: EXISTING UTILITY INFORMATION SHOWN ON THIS PLAN HAS BEEN PROVIDED BY THE UTILITY OWNER. THE CONTRACTOR SHALL FIELD VERIFY EXACT LOCATIONS PRIOR TO COMMENCING CONSTRUCTION AS REQUIRED BY STATE LAW. NOTIFY GOPHER STATE ONE CALL, 1-800-252-1166 OR 651-454-0002.

THE SUBSURFACE UTILITY INFORMATION IN THIS PLAN IS UTILITY QUALITY LEVEL "D". THIS UTILITY QUALITY LEVEL WAS DETERMINED ACCORDING TO THE GUIDELINES OF CI/ASCE 38-22, ENTITLED "STANDARD GUIDELINES FOR INVESTIGATING AND DOCUMENTING EXISTING UTILITIES."

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BM=829.85
MONITORING WELL SITE
BENCHMARK NORTH OF
STOFFELL QUARRY MAIN
ENTRANCE OFF 3RD AVE

PROJECT DATUM: BLUE EARTH COUNTY
HORIZONTAL: HARN 1996
VERTICAL: NAVD 1988

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CAMPQUARRY LLC
ROCKWELL RV & ADVENTURE PARK
TITLE SHEET

SHEET
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EXISTING TOPOGRAPHIC SYMBOLS

- ACCESS GRATE
- AIR CONDITION UNIT
- ANTENNA
- AUTO SPRINKLER CONNECTION
- BARRICADE PERMANENT
- BASKETBALL POST
- BENCH
- BIRD FEEDER
- BOLLARD
- BUSH
- CATCH BASIN RECTANGULAR CASTING
- CATCH BASIN CIRCULAR CASTING
- CURB STOP
- CLEAN OUT
- CULVERT END
- DRINKING FOUNTAIN
- DOWN SPOUT
- ELECTRIC CAR CHARGE STATION
- FILL PIPE
- FIRE HYDRANT
- FLAG POLE
- FLARED END / APRON
- FUEL PUMP
- GRILL
- GUY WIRE ANCHOR
- HANDHOLE
- HANDICAP SPACE
- IRRIGATION SPRINKLER HEAD
- IRRIGATION VALVE BOX
- LIFT STATION CONTROL PANEL
- LIFT STATION
- LIGHT POLE
- MAILBOX
- MANHOLE-COMMUNICATION
- MANHOLE-ELECTRIC
- MANHOLE-GAS
- MANHOLE-HEAT
- MANHOLE-RECLAIMED WATER
- MANHOLE-SANITARY SEWER
- MANHOLE-STORM SEWER
- MANHOLE-UTILITY
- MANHOLE-WATER
- METER
- DRIVE-THRU MICROPHONE
- PARKING METER
- PAVEMENT MARKING
- PEDESTAL-COMMUNICATION
- PEDESTAL-ELECTRIC
- PEDESTRIAN PUSH BUTTON
- PICNIC TABLE
- POLE-UTILITY
- POST
- RAILROAD SIGNAL POLE
- REGULATION STATION GAS
- SATELLITE DISH
- SIGN TRAFFIC
- SIGNAL CONTROL CABINET
- SOIL BORING
- SIREN
- TELEPHONE BOOTH
- TILE INLET
- TILE OUTLET
- TILE RISER
- TRANSFORMER-ELECTRIC
- TREE-CONIFEROUS
- TREE-DEAD
- TREE-DECIDUOUS
- TREE STUMP
- TRAFFIC ARM BARRIER
- TRAFFIC SIGNAL
- TRASH CAN
- UTILITY MARKER
- VALVE
- VALVE POST INDICATOR
- VALVE VAULT
- VAULT
- VENT PIPE
- WATER SPIGOT
- WELL
- WETLAND DELINEATED MARKER
- WETLAND
- WET WELL
- YARD HYDRANT

PROPOSED TOPOGRAPHIC SYMBOLS

- CLEANOUT
- MANHOLE
- LIFT STATION
- STORM SEWER CIRCULAR CASTING
- STORM SEWER RECTANGULAR CASTING
- STORM SEWER FLARED END / APRON
- STORM SEWER OUTLET STRUCTURE
- STORM SEWER OVERFLOW STRUCTURE
- CURB BOX
- FIRE HYDRANT
- WATER VALVE
- WATER REDUCER
- WATER BEND
- WATER TEE
- WATER CROSS
- WATER SLEEVE
- WATER CAP / PLUG
- RIP RAP
- DRAINAGE FLOW
- TRAFFIC SIGNS

SURVEY SYMBOLS

- BENCHMARK LOCATION
- CONTROL POINT
- MONUMENT FOUND
- CAST IRON MONUMENT
- STONE MONUMENT

EXISTING TOPOGRAPHIC LINES

- RETAINING WALL
- FENCE
- FENCE-DECORATIVE
- GUARD RAIL
- TREE LINE
- BUSH LINE

SURVEY LINES

- CONTROLLED ACCESS
- BOUNDARY
- CENTERLINE
- EXISTING EASEMENT LINE
- PROPOSED EASEMENT LINE
- EXISTING LOT LINE
- PROPOSED LOT LINE
- EXISTING RIGHT-OF-WAY
- PROPOSED RIGHT-OF-WAY
- SETBACK LINE
- SECTION LINE
- QUARTER LINE
- SIXTEENTH LINE
- TEMPORARY EASEMENT

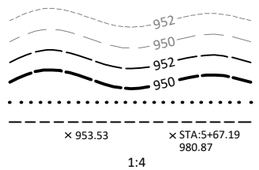
EXISTING UTILITY LINES

- FORCEMAIN
- SANITARY SEWER
- SANITARY SERVICE
- STORM SEWER
- STORM SEWER DRAIN TILE
- WATERMAIN
- WATER SERVICE
- RECLAIMED WATER

PROPOSED UTILITY LINES

- FORCEMAIN
- SANITARY SEWER
- SANITARY SERVICE
- STORM SEWER
- STORM SEWER DRAIN TILE
- WATERMAIN
- WATER SERVICE
- PIPE CASING
- TRENCHLESS PIPE (PLAN VIEW)
- TRENCHLESS PIPE (PROFILE VIEW)

GRADING INFORMATION



- EXISTING CONTOUR MINOR
- EXISTING CONTOUR MAJOR
- PROPOSED CONTOUR MINOR
- PROPOSED CONTOUR MAJOR
- PROPOSED GRADING LIMITS / SLOPE LIMITS
- PROJECT LIMITS
- PROPOSED SPOT ELEVATION
- RISE:RUN (SLOPE)

HATCH PATTERNS

- BITUMINOUS
- GRAVEL
- CONCRETE

EXISTING PRIVATE UTILITY LINES

NOTE:
EXISTING UTILITY INFORMATION SHOWN ON THIS PLAN HAS BEEN PROVIDED BY THE UTILITY OWNER. THE CONTRACTOR SHALL FIELD VERIFY EXACT LOCATIONS PRIOR TO COMMENCING CONSTRUCTION AS REQUIRED BY STATE LAW. NOTIFY GOPHER STATE ONE CALL, 1-800-252-1166 OR 651-454-0002.

THE SUBSURFACE UTILITY INFORMATION IN THIS PLAN IS UTILITY QUALITY LEVEL D UNLESS OTHERWISE NOTED. THIS UTILITY LEVEL WAS DETERMINED ACCORDING TO THE GUIDELINES OF CI/ASCE 38-22, ENTITLED "STANDARD GUIDELINE FOR INVESTIGATING AND DOCUMENTING EXISTING UTILITIES".

- UNDERGROUND FIBER OPTIC
- UNDERGROUND ELECTRIC
- UNDERGROUND GAS
- UNDERGROUND COMMUNICATION
- OVERHEAD ELECTRIC
- OVERHEAD COMMUNICATION
- OVERHEAD UTILITY

UTILITIES IDENTIFIED WITH A QUALITY LEVEL :

LINE TYPES FOLLOW THE FORMAT: UTILITY TYPE - QUALITY LEVEL
EXAMPLE: G-A G-A UNDERGROUND GAS, QUALITY LEVEL A
UTILITY QUALITY LEVEL (A,B,C,D) DEFINITIONS CAN BE FOUND IN CI/ASCE 38-22.

UTILITY QUALITY LEVELS:

QUALITY LEVEL D: PROVIDES THE MOST BASIC LEVEL OF INFORMATION. IT INVOLVES COLLECTING DATA FROM EXISTING UTILITY RECORDS. RECORDS MAY INCLUDE AS-BUILT DRAWINGS, DISTRIBUTION AND SERVICES MAPS, EXISTING GEOGRAPHIC INFORMATION SYSTEM DATABASES, CONSTRUCTION PLANS, ETC.

QUALITY LEVEL C: INVOLVES SURVEYING VISIBLE SUBSURFACE UTILITY STRUCTURES SUCH AS MANHOLES, HAND-HOLES, UTILITY VALVES AND METERS, FIRE HYDRANTS, PEDESTALS AND UTILITY MARKERS, AND THEN CORRELATING THE INFORMATION WITH EXISTING UTILITY RECORDS TO CREATE COMPOSITE DRAWINGS. INCLUDES QUALITY LEVEL D ACTIVITIES.

QUALITY LEVEL B: INVOLVES DESIGNATING THE HORIZONTAL POSITION OF SUBSURFACE UTILITIES THROUGH SURFACE DETECTION METHODS AND COLLECTING THE INFORMATION THROUGH A SURVEY METHOD. INCLUDES QUALITY LEVEL C AND D TASKS.

QUALITY LEVEL A: PROVIDES THE HIGHEST LEVEL OF ACCURACY. IT INVOLVES LOCATING OR POTHOLING UTILITIES AS WELL AS ACTIVITIES IN QUALITY LEVELS B, C, AND D. THE LOCATED FACILITY INFORMATION IS SURVEYED AND MAPPED AND THE DATA PROVIDES PRECISE PLAN AND PROFILE INFORMATION.

ABBREVIATIONS

A	ALGEBRAIC DIFFERENCE	GRAV	GRAVEL	RSC	RIGID STEEL CONDUIT
ADJ	ADJUST	GU	GUTTER	RT	RIGHT
ALT	ALTERNATE	GV	GATE VALVE	SAN	SANITARY SEWER
B-B	BACK TO BACK	HDPE	HIGH DENSITY POLYETHYLENE	SCH	SCHEDULE
BIT	BITUMINOUS	HH	HANDHOLE	SERV	SERVICE
BLDG	BUILDING	HP	HIGH POINT	SHLD	SHOULDER
BMP	BEST MANAGEMENT PRACTICE	HWL	HIGH WATER LEVEL	STA	STATION
BR	BEGIN RADIUS	HYD	HYDRANT	STD	STANDARD
BV	BUTTERFLY VALVE	I	INVERT	STM	STORM SEWER
CB	CATCH BASIN	K	CURVE COEFFICIENT	TC	TOP OF CURB
C&G	CURB AND GUTTER	L	LENGTH	TE	TEMPORARY EASEMENT
CIP	CAST IRON PIPE	LO	LOWEST OPENING	TEMP	TEMPORARY
CIPP	CURED-IN-PLACE PIPE	LP	LOW POINT	TNH	TOP NUT HYDRANT
CL	CENTER LINE	LT	LEFT	TP	TOP OF PIPE
CL.	CLASS	MAX	MAXIMUM	TYP	TYPICAL
CLVT	CULVERT	MH	MANHOLE	VCP	VITRIFIED CLAY PIPE
CMP	CORRUGATED METAL PIPE	MIN	MINIMUM	VERT	VERTICAL
C.O.	CHANGE ORDER	MR	MID RADIUS	VPC	VERTICAL POINT OF CURVE
COMM	COMMUNICATION	NIC	NOT IN CONTRACT	VPI	VERTICAL POINT OF INTERSECTION
CON	CONCRETE	NMC	NON-METALLIC CONDUIT	VPT	VERTICAL POINT OF TANGENT
CSP	CORRUGATED STEEL PIPE	NTS	NOT TO SCALE	WM	WATERMAIN
DIA	DIAMETER	NWL	NORMAL WATER LEVEL		
DIP	DUCTILE IRON PIPE	OHW	ORDINARY HIGH WATER LEVEL		
DWY	DRIVEWAY	PC	POINT OF CURVE	AC	ACRES
E	EXTERNAL CURVE DISTANCE	PCC	POINT OF COMPOUND CURVE	CF	CUBIC FEET
ELEC	ELECTRIC	PE	PERMANENT EASEMENT	CV	COMPACTED VOLUME
ELEV	ELEVATION	PED	PEDESTRIAN, PEDESTAL	CY	CUBIC YARD
EOF	EMERGENCY OVERFLOW	PERF	PERFORATED PIPE	EA	EACH
ER	END RADIUS	PERM	PERMANENT	EV	EXCAVATED VOLUME
ESMT	EASEMENT	PI	POINT OF INTERSECTION	LB	POUND
EX	EXISTING	PL	PROPERTY LINE	LF	LINEAR FEET
FES	FLARED END SECTION	PRC	POINT OF REVERSE CURVE	LS	LUMP SUM
F-F	FACE TO FACE	PT	POINT OF TANGENT	LV	LOOSE VOLUME
FF	FINISHED FLOOR	PVC	POLYVINYL CHLORIDE PIPE	SF	SQUARE FEET
F&I	FURNISH AND INSTALL	PVMT	PAVEMENT	SV	STOCKPILE VOLUME
FM	FORCEMAIN	R	RADIUS	SY	SQUARE YARD
FO	FIBER OPTIC	R/W	RIGHT-OF-WAY		
F.O.	FIELD ORDER	RCP	REINFORCED CONCRETE PIPE		
GRAN	GRANULAR	RET	RETAINING		

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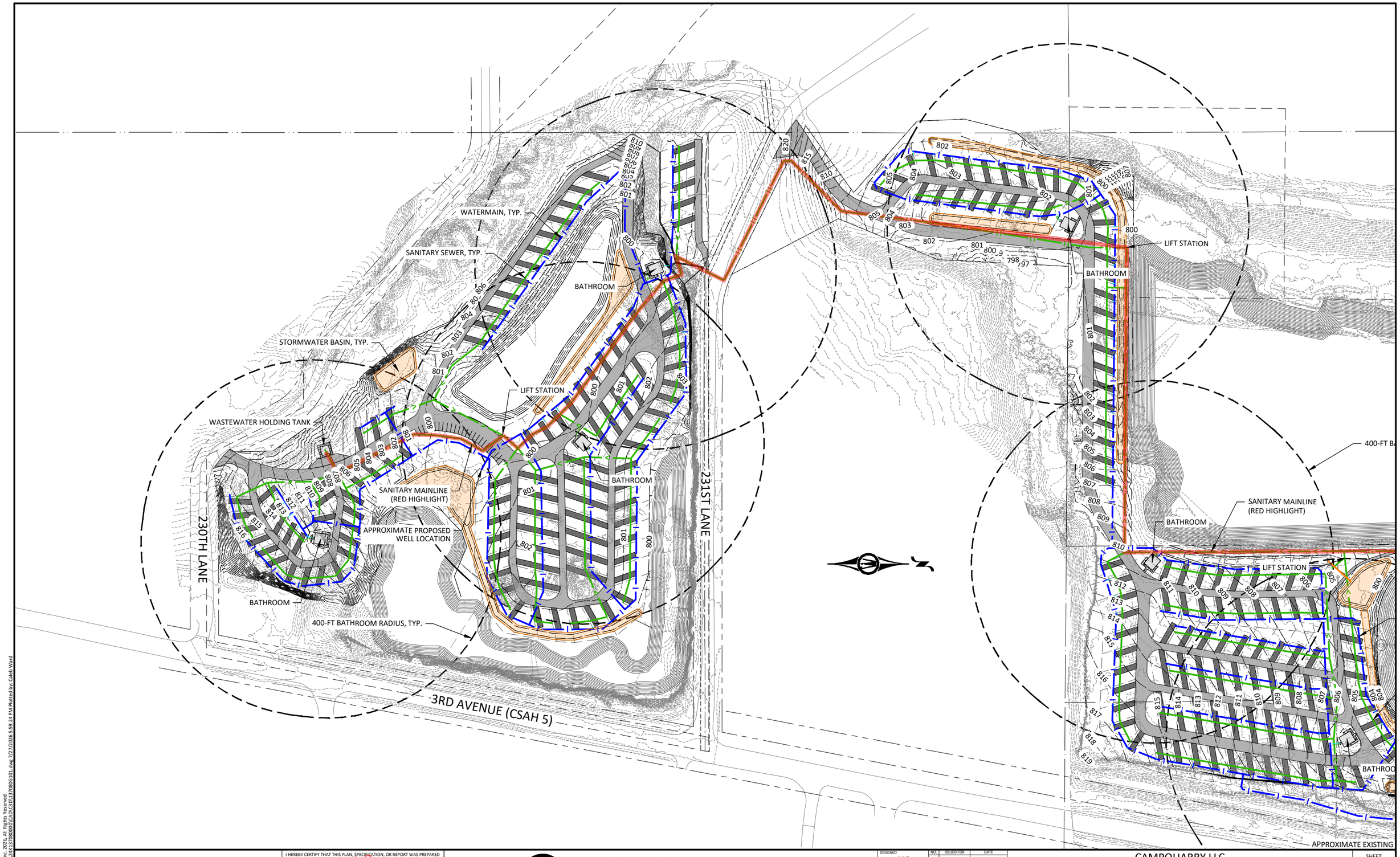

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ROCKWELL RV & ADVENTURE PARK

PROJECT OVERVIEW

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LIFT STATION
BATHROOM
400-FT BATHROOM RADIUS, TYP.
SANITARY MAINLINE (RED HIGHLIGHT)
WATERMAIN, TYP.
STORMWATER BASIN, TYP.
SANITARY SEWER, TYP.
ENTRANCE LODGE
PARKING LOT & STAGING AREA
FFE=831.0
APPROXIMATE EXISTING WELL LOCATION
3RD AVENUE (CSAH 5)

HORZ. SCALE 0 100 200 FEET

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PROJECT OVERVIEW

SHEET G1.02

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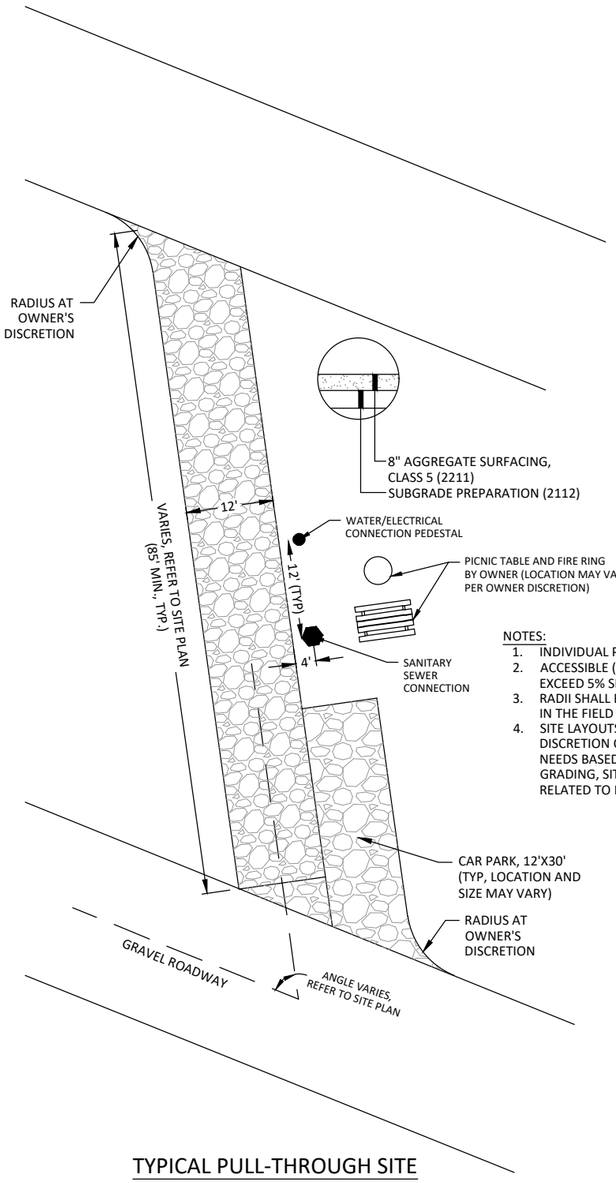


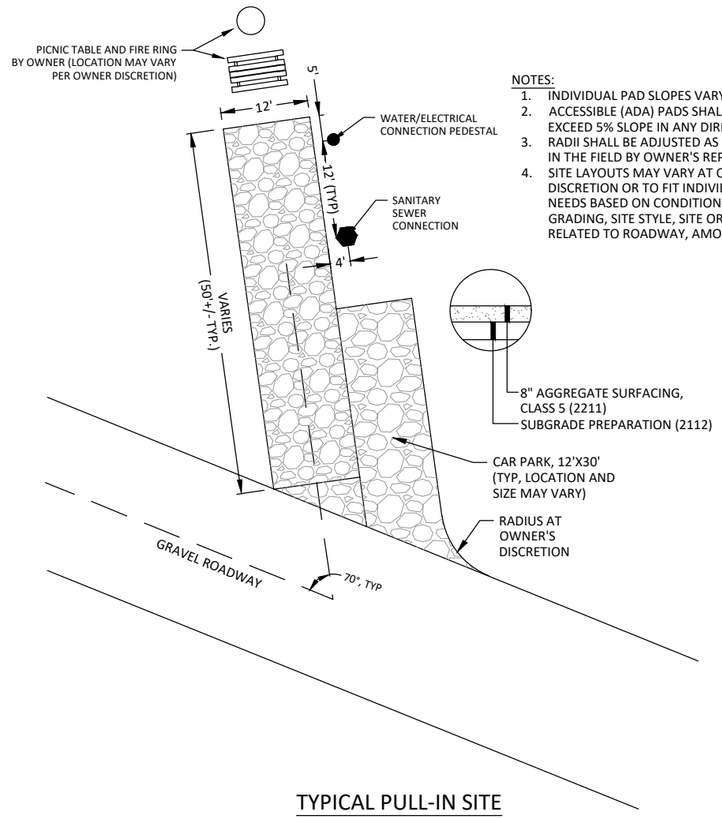
NOTES:

1. INDIVIDUAL PAD SLOPES VARY BY SITE
2. ACCESSIBLE (ADA) PADS SHALL NOT EXCEED 5% SLOPE IN ANY DIRECTION
3. RADII SHALL BE ADJUSTED AS NECESSARY IN THE FIELD BY OWNER'S REPRESENTATIVE
4. SITE LAYOUTS MAY VARY AT OWNER'S DISCRETION OR TO FIT INDIVIDUAL SITE NEEDS BASED ON CONDITIONS SUCH AS GRADING, SITE STYLE, SITE ORIENTATION RELATED TO ROADWAY, AMONG OTHERS

TYPICAL PULL-THROUGH SITE

NOT TO SCALE

NOTE: MINUTE DETAILS OF SITES MAY VARY AT OWNER'S DISCRETION. SITE ORIENTATION WILL ALSO VARY BASED ON DIRECTION OF TRAVEL AND LAYOUT AS SHOWN ON THE PLANS.



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TYPICAL PULL-IN SITE

NOT TO SCALE

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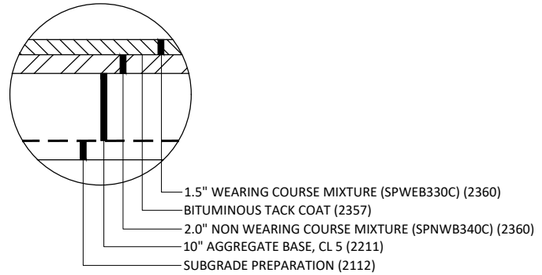

BITUMINOUS ROADWAY SECTION

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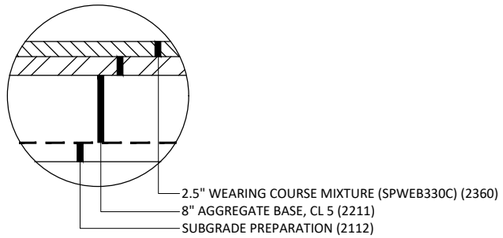

BITUMINOUS TRAIL SECTION

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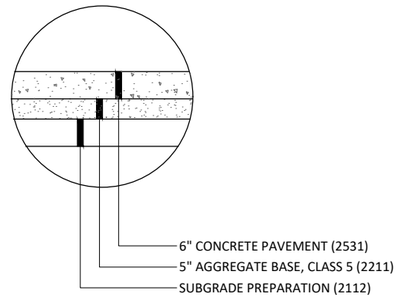

6" CONCRETE PAVEMENT/SIDEWALK SECTION

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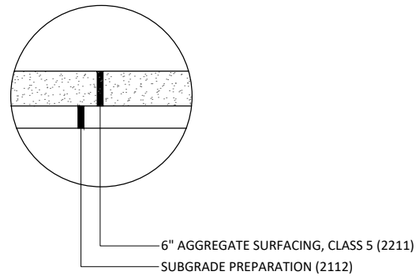

6" AGGREGATE SURFACING SECTION

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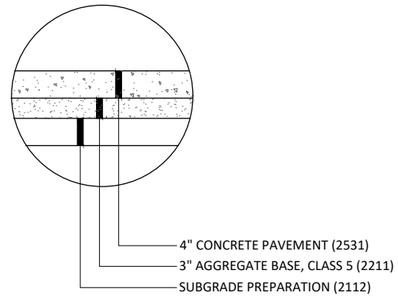

4" CONCRETE WALK SECTION

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NOT FOR CONSTRUCTION

ALEC W. PIETZ, P.E.
LIC. NO. 59617 DATE XX/XX/XXXX

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1960 PREMIER DRIVE
MANKATO, MN 56001
Phone: (507) 625-4171
Email: Mankato@bolton-menk.com
www.bolton-menk.com

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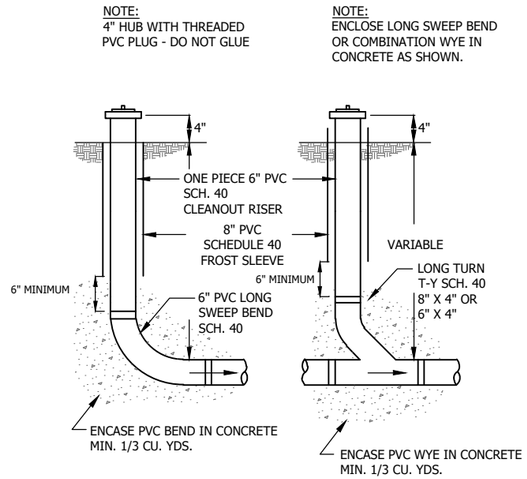
AWP			
CLIENT PROJ. NO.			
24X.137080			

CAMPQUARRY LLC
ROCKWELL RV & ADVENTURE PARK
CONSTRUCTION DETAILS

SHEET
C1.01



PVC SERVICE LINE CLEANOUTS

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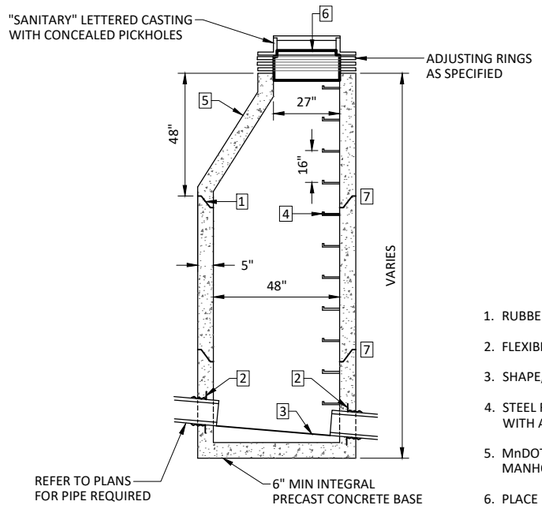
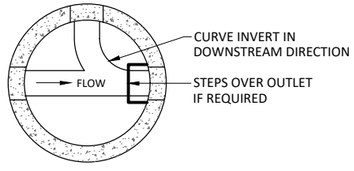


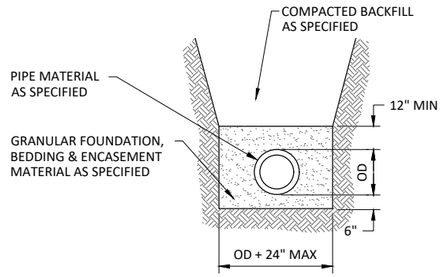


PLAN VIEW

1. RUBBER GASKET (TYPICAL)
2. FLEXIBLE WATERTIGHT SEAL TO BE APPROVED BY ENGINEER
3. SHAPE, DEPTH AND SLOPE OF INVERT TO BE APPROVED BY ENGINEER
4. STEEL REINFORCED PLASTIC STEPS SHALL BE A POLYPROPYLENE PLASTIC REINFORCED WITH A NO. 2 DEFORMED STEEL ROD GRADE 60
5. MnDOT TYPE "B" ECCENTRIC PRECAST CONCRETE CONE SECTION TYPICAL FOR ALL MANHOLES
6. PLACE INTERIOR CHIMNEY SEAL (WHEN SPECIFIED)
7. 8" WIDE, ¼" THICK BITUMINOUS MASTIC WRAP FULL CIRCUMFERENCE (WHEN SPECIFIED)

SANITARY MANHOLE

NOT TO SCALE



NON-RIGID STORM SEWER TRENCH

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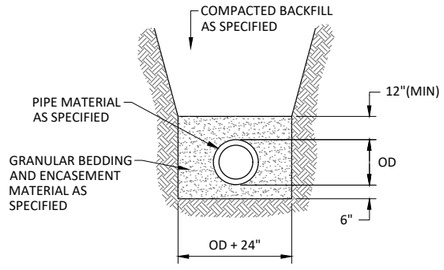

NON-RIGID SANITARY SEWER TRENCH

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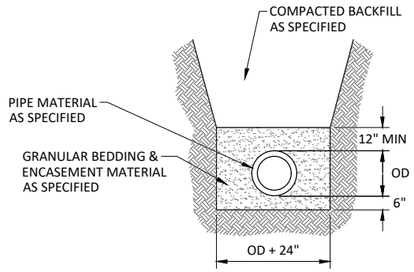
CAMPQUARRY LLC

ROCKWELL RV & ADVENTURE PARK

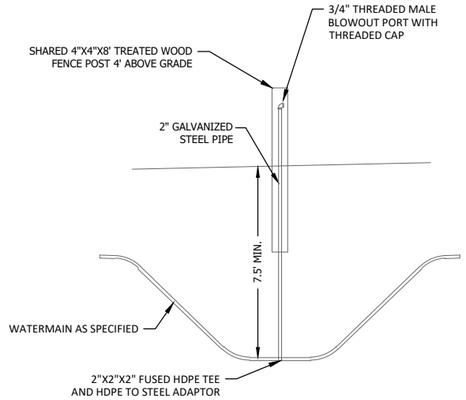
CONSTRUCTION DETAILS

SHEET C1.02



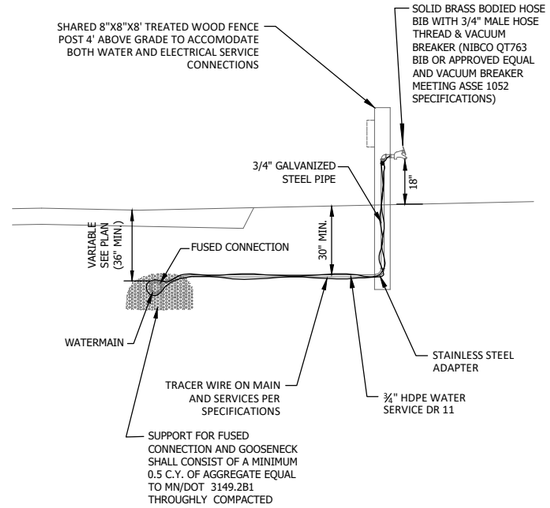
HDPE WATERMAIN TRENCH

NOT TO SCALE



BLOWOUT STATION

NOT TO SCALE

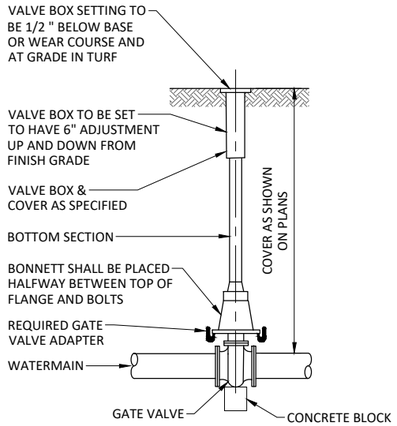


WATER SERVICE AND 3/4" GALVANIZED SERVICE WITH APPURTENANCES

NOT TO SCALE

NOTES:

1. VALVE BOX SHALL BE CENTERED ON OPERATING NUTS, STRAIGHT, FREE FROM DEBRIS, AND ALL SECTIONS UNBROKEN
2. VALVES IN EASEMENTS SHALL HAVE CHANNEL POST WITNESS MARKERS WITH REFLECTIVE "GV" SIGN
3. DEEP VALVES SHALL HAVE NUT EXTENSIONS INSTALLED TO ELEVATION TO ACCOMMODATE STANDARD 10' KEY; BOTTOM NUT SHALL BE BOLTED TO VALVE NUT AND ONLY ONE SECTION
4. COMPACTION WITH MECHANICAL TAMPER AROUND VALVE BOX SHALL BE PLACED AND COMPACTED WITH 2' LIFTS TO ACHIEVE 95% COMPACTION
5. GATE VALVES LOCATED WITHIN THE CONCRETE SIDEWALK SHALL INCLUDE A METAL SEPARATOR BETWEEN THE VALVE BOX AND THE CONCRETE



GATE VALVE BOX INSTALLATION

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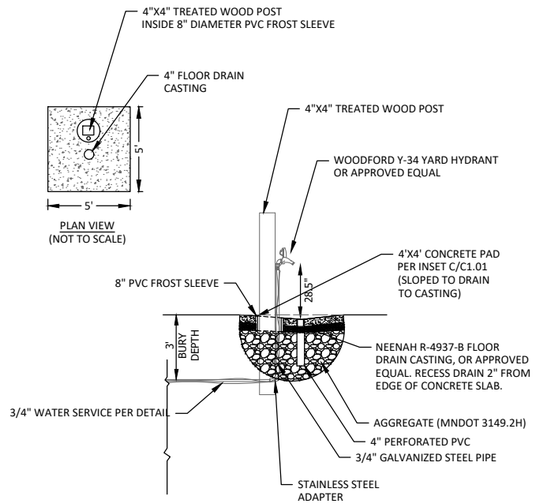

WATER SPIGOT AND DRAIN

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CAMPQUARRY LLC

ROCKWELL RV & ADVENTURE PARK

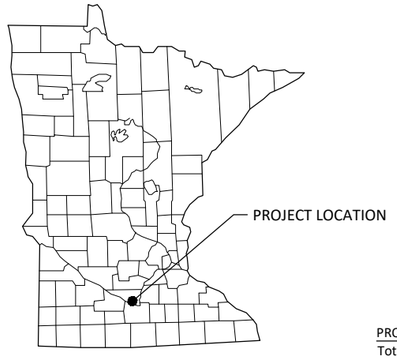
CONSTRUCTION DETAILS

SHEET C1.03

STORMWATER POLLUTION PREVENTION PLAN (SWPPP)

ROCKWELL RV & ADVENTURE PARK

LIME TOWNSHIP
BLUE EARTH COUNTY, MINNESOTA



LEGEND

- 1-MILE BOUNDARY
- PROJECT BOUNDARY
- OR — IMPAIRED, SPECIAL OR PROTECTED WATERS
- NATIONAL WETLANDS INVENTORY

RESPONSIBLE PARTIES:
The Contractor and Owner will be joint applicants under the MPCA's General Stormwater Permit for Construction Activity as required by the National Pollutant Discharge Elimination System (NPDES) Phase II program.

The Contractor shall provide one or more trained Construction SWPPP Manager(s) knowledgeable and experienced in the application of erosion prevention and sediment control BMPs that will oversee the implementation of the SWPPP, and the installation, inspection and maintenance of the erosion prevention and sediment control BMPs.

A Construction SWPPP Manager must be available for an on-site inspection within 72 hours upon request by the MPCA.

	COMPANY	CONTACT PERSON	PHONE
OWNER:	CampQuarry LLC	Kyle Kaldor	701-430-1312
SWPPP DESIGNER:	Bolton & Menk, Inc.	Caleb Ward	507-613-8795
CONTRACTOR:	TBD	TBD	TBD
CONSTRUCTION SWPPP MANAGER:	TBD	TBD	TBD
PARTY RESPONSIBLE FOR LONG TERM O&M:	CampQuarry LLC	Kyle Kaldor	701-430-1312

The SWPPP Designer, Construction SWPPP Manager, and BMP Installer must have appropriate training. Documentation showing training commensurate with the job duties and responsibilities is required to be included in the SWPPP prior to any work beginning on the site. Training documentation for the SWPPP Designer is included on the Narrative sheet. The Contractor shall attach training documentation to this SWPPP for the Construction SWPPP Manager and BMP Installer prior to the start of construction. This information shall be kept up to date until the project NOT is filed.

ADDITIONAL COMPENSATION
Payment for all work associated with Erosion and Sediment Control shall be as described in the Project Manual. Unless otherwise authorized by the Owner no additional payment shall be made for any work required to administer and maintain the site erosion and sediment control in compliance with the Minnesota Pollution Control Agency (MPCA) - General Stormwater Permit for Construction Activity (MN R100001) including but not limited to inspection, maintenance, and removal of BMPs or addition of BMPs to accommodate Contractor phasing.

DOCUMENT RETENTION
Permittees must make the SWPPP, including all inspection reports, maintenance records, training records and other information required by this permit, available to federal, state, and local officials within three (3) days upon request for the duration of the permit and for three (3) years following the NOT.

GENERAL STORMWATER DISCHARGE REQUIREMENTS
All requirements listed in Section 5.1 of the Permit for the design of the permanent stormwater management system and discharge have been included in the preparation of this SWPPP. These include but are not limited to:

1. The expected amount, frequency, intensity, and duration of precipitation.
2. The nature of stormwater runoff and run-on at the site
3. Peak flow rates and stormwater volumes to minimize erosion at outlets and downstream channel and stream bank erosion.
4. The range of soil particle sizes expected to be present on the site.

Permanent stormwater treatment systems for this project have been designed in accordance with the guidance in the MN Stormwater Manual in place at the time of bidding. Copies of the design information and calculations are part of this SWPPP and will be provided in digital format upon written request to the Engineer.

PROJECT AREAS:

Total Project Size (disturbed area) =	100.0	ACRES
Existing area of impervious surface =	0.0	ACRES
Post construction area of impervious surface =	32.0	ACRES
Total new impervious surface area created =	32.0	ACRES

Planned Construction Start Date:	Spring 2027
Estimated Construction Completion Date:	Fall 2028

PERMANENT STORMWATER MANAGEMENT SYSTEM:
Type of storm water management used if more than 1 acre of new impervious surface is created:

	Wet Sedimentation Basin
X	Infiltration/Filtration
	Regional Pond
	Permanent Stormwater Management Not Required

PROJECT LOCATION:

COUNTY	TOWNSHIP	RANGE	SECTION	LATITUDE	LONGITUDE
BLUE EARTH	T109N	R26W	30,31	44.2136° N	93.9958° W

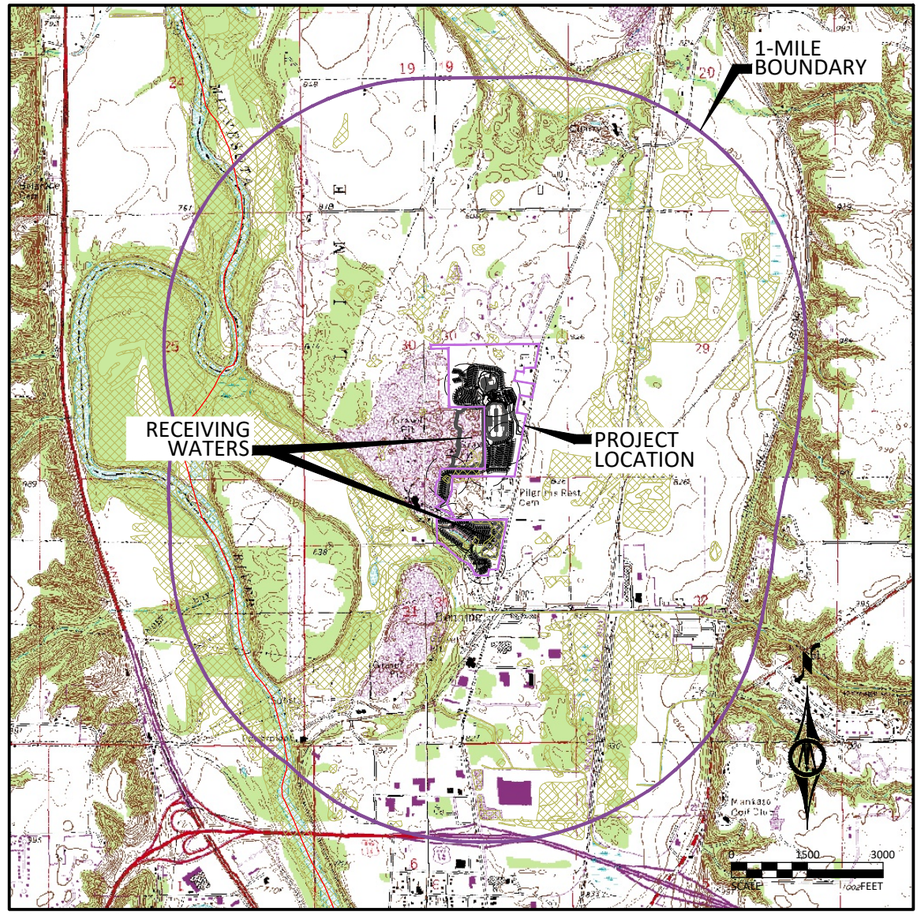
BMP SUMMARY	QUANTITY	UNIT
STABILIZED CONSTRUCTION EXIT	4	EACH
STORM DRAIN INLET PROTECTION	6	EACH
PERIMETER CONTROL	18,000	LIN FEET
TURF ESTABLISHMENT; DESIGNATION BY LANDSCAPE ARCHITECTURE	40.0	ACRE
NOTE: QUANTITIES LISTED ACCOUNT FOR ONE INSTALLATION. ADDITIONAL INSTALLATIONS DUE TO MAINTENANCE OR PHASING SHALL BE CONSIDERED INCIDENTAL.		

DESCRIPTION OF CONSTRUCTION ACTIVITIES AND STORMWATER MANAGEMENT:
Construction activities include: Site grading, camp site utilities, structural improvements, temporary erosion and sediment control, and permanent stabilization.

Stormwater currently discharges in various directions including to existing on-site basins currently serving the quarry operations and portions of the site. After construction is complete stormwater will generally discharge similar to existing conditions but grading will more intentionally direct stormwater constructed stormwater basins, which will act as permanent stormwater management.

While existing impervious surfaces do exist on site, the design considers these as incidental to the quarry operation so all proposed impervious with this plan is considered new. A comprehensive stormwater report was prepared to support these plans.

A copy of the SWPPP must remain on site at all times.



RECEIVING WATERS:
Receiving waters, including surface water, wetlands, Public Waters, and stormwater ponds, within 1-mile of the project boundary are identified on the USGS 7.5 min quad map above. Receiving waters that are impaired, the impairment, and WLA are listed as follows. All specific BMPs relative to construction activities listed in the permit for special, prohibited, restricted, or impaired have been incorporated into this plan. All specific BMPs listed in approved TMDLs and those BMPs listed for construction related waste load allocations have also been incorporated.

NAME OF WATER BODY	TYPE (ditch, pond, wetland, lake, etc.)	Special, Prohibited, Restricted Water [1]	Flows to Impaired Water Within 1-Mile [2]	USEPA Approved Construction Related TMDL [3]
Onsite Basins, Fully Infiltrate	Pond	N/A	No	N/A

[1] Special, prohibited, and restricted waters are listed in Section 23 of the MN Construction Stormwater General Permit (MNR100001).
[2] Identified as impaired under section 303 (d) of the federal Clean Water Act for phosphorus, turbidity, TSS, dissolved oxygen, and/or aquatic biota.
[3] Construction Related TMDLs include those related to: phosphorus, turbidity, TSS, dissolved oxygen, and/or aquatic biota.

IMPLEMENTATION SCHEDULE AND PHASING: The Contractor is required to provide an updated schedule and site management plan meeting the minimum requirements of Section 1717 of the Minnesota Standard Specifications for Construction.

1) Submit SWPPP Updates to Engineer. Submittal shall include any requested changes to the SWPPP, including but not limited to: Trained Personnel, Locations for Stockpiles, Concrete Washout, Sanitation Facilities, Types and Locations of Erosion & Sediment Control. Failure to submit updates shall be considered acceptance of the SWPPP as designed with no changes.
2) Install perimeter sediment control, inlet protection, and construction exit.
3) Complete site and utility improvements.
4) Add additional temporary BMPs as necessary during construction based on inspection reports.
5) Repeat steps 2-4 as necessary.
6) Ensure final stabilization measures are complete.
7) Provide digital copy of all Field SWPPP Documentation including Inspection Reports and SWPPP Revisions to the Owner.
8) Submit Notice of Termination (NOT) to MPCA. NOTE: The NOT must be submitted to MPCA before Final Stabilization is considered complete.

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CAMPQUARRY LLC
ROCKWELL RV & ADVENTURE PARK
STORMWATER POLLUTION PREVENTION PLAN
PROJECT INFORMATION & LOCATION MAP

SHEET C2.01

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Information contained in this SWPPP narrative sheet summarizes requirements of the GENERAL PERMIT AUTHORIZATION TO DISCHARGE STORMWATER ASSOCIATED WITH CONSTRUCTION ACTIVITY UNDER THE NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM/STATE DISPOSAL SYSTEM PROGRAM - Permit No: MN RI0000I (Permit) as they apply to this project. All provisions of the Permit including those not specifically cited herein shall apply to this project. The Contractor is responsible to be familiar with and comply with all conditions of the permit. The full text of the Permit is available at: https://www.pca.state.mn.us/sites/default/files/wq-strm2-80a.pdf

SWPPP AMENDMENTS AND SUBMITTALS

Contractor must prepare and submit to the Engineer a SWPPP amendment as necessary to include additional Best Management Practices (BMPs) to correct problems identified or address the following situations.

1. Contact information and training documentation for Construction SWPPP Manager and BMP Installer,
2. There is a change in construction method of phasing, operation, maintenance, weather or seasonal conditions not anticipated during the design of the SWPPP including but not limited to:
   a. Types and/or Locations of BMPs
   b. Material Storage and Spill Response
   c. Fueling Plans
   d. Locations for Stockpiles, Concrete Washout, and Sanitation Facilities and
   e. Project Phasing
3. It is determined that the SWPPP is not achieving objectives of minimizing pollutants in stormwater discharges associated with construction activity, or
4. The SWPPP is not consistent with the terms and conditions of the permit.

The Contractor may implement SWPPP amendments immediately and is not required to wait for Engineer review of the submittal. The responsibility for completeness of SWPPP amendments and compliance with the Permit lies with the Contractor. Review, comment, or lack of comment by the Engineer on a SWPPP amendment shall not absolve the responsibilities of the Contractor in any way.

If a change order is issued for a design change the SWPPP amendment will be prepared by the Engineer and included in the change order.

In addition to SWPPP amendments, the Contractor shall submit to the Engineer Weekly Erosion and Sediment Control Schedule meeting the requirements of MnDOT 1717.

The Contractor shall keep copies of all SWPPP amendments, Weekly Erosion and Sediment Control Schedules, inspection logs, and maintenance logs with the field copy of the SWPPP. A PDF copy of these documents will be provided along with a copy of the final Field Copy of the SWPPP to the Engineer along with the signed Notice of Termination when final stabilization is complete.

EROSION PREVENTION PRACTICES

Stormwater conveyance channels shall be routed around unstabilized areas. Erosion controls and velocity dissipation devices shall be used at outlets within and along the length of any constructed conveyance channel.

The normal wetted perimeter of all ditches or swales, including storm water management pond slopes, that drain waters from the site must be stabilized within 200' of any property edge or discharge point, including storm sewer inlets, within 24 hours of connection.

Temporary or permanent ditches or swales used as sediment containment during construction do not need to be stabilized during temporary period of use and shall be stabilized within 24 hours after no longer used as sediment containment.

Mulch, hydromulch, tackifier, or similar practice shall not be used in any portion of the wetted perimeter of a temporary or permanent drainage ditch or swale section with a continuous slope of greater than 2 percent.

Energy dissipation shall be installed at all temporary or permanent pipe outlets within 24 hours of connection to a surface water or permanent stormwater treatment system.

The Contractor shall phase construction and use construction methods to the extent practical to minimize exposed soils. The project phasing shall be documented in the Weekly Erosion and Sediment Control Schedule.

SEDIMENT CONTROL PRACTICES

Down gradient BMPs including perimeter BMPs must be in place before up gradient land- disturbing activities begin and shall remain in place until final stabilization.

All BMPs that have been adjusted or removed to accommodate short-term activities shall be re-installed or replaced the earlier of the end of the work day or before the next precipitation event even if the activity is not complete.

Inlet BMPs may be removed for specific safety concerns. The BMPs shall be replaced as soon as the safety concern is resolved. The removal shall be documented in the SWPPP as a SWPPP amendment.

Temporary stockpiles must have sediment control BMPs. The Contractor shall prepare and submit to the Engineer a SWPPP amendment showing the location of temporary stockpiles and the BMPs for each stockpile. The SWPPP amendment must meet the minimum requirements of Section 9 of the Permit.

Soil compaction shall be minimized and topsoil shall be preserved, unless infeasible or if construction activities dictate soil compaction or topsoil stripping.

The use of polymers, flocculants, or other sedimentation treatment chemicals are not proposed as part of this SWPPP as designed by the Engineer. If methods or phasing of construction require the use of any of these chemicals, the Contractor shall prepare and submit to the Engineer a SWPPP amendment that meets the minimum requirements of Section 9 of the Permit.

TEMPORARY SEDIMENTATION BASINS

A temporary sedimentation basin has not been included in this SWPPP as designed by the Engineer. If a basin is later determined to be desirable or necessary the Contractor shall prepare and submit to the Engineer a SWPPP amendment. Temporary sedimentation basins shall meet or exceed the minimum requirements of Section 14 of the Permit and shall include a basin draining plan meeting or exceeding the minimum requirements of Section 10 of the Permit. Where the site discharges to Special and/or Impaired Waters the SWPPP amendment shall also meet or exceed the minimum requirements of Section 23 of the permit.

DEWATERING

A dewatering plan has not been included in this SWPPP as designed by the Engineer. If dewatering is required for this project, the Contractor shall prepare and submit to the Engineer a SWPPP amendment. All dewatering shall meet or exceed the minimum requirements of Section 10 of the Permit.

POLLUTION PREVENTION

Products and materials that have the potential to leach pollutants that are stored on the site must be stored in a manner designed to minimize contact with stormwater. Materials that are not a source of potential contamination to stormwater or that are designed for exposure to stormwater are not required to be covered.

Hazardous materials including but not limited to pesticides, fertilizer, petroleum products, curing compounds and toxic waste must be properly stored and protected from stormwater exposure as recommended by the manufacturer in an access restricted area.

Solid waste must be stored, collected and disposed of in compliance with Minnesota Administrative Rules Chapter 7035.

Portable toilets must be positioned so that they are secure and will not be tipped or knocked over. Sanitary waste must be disposed of properly in accordance with Minn. R. CH 7041.

Exterior vehicle or equipment washing on the project site shall be limited to a defined area of the site. No engine degreasing is allowed on site. A sign must be installed adjacent to each washout facility that requires site personnel to utilize the proper facilities for disposal of concrete and other washout wastes.

The Contractor shall prepare and submit a SWPPP amendment detailing the location and BMPs proposed for storage of materials, solid waste, portable toilets, and exterior vehicle or equipment washing on the site. The SWPPP amendment shall include a spill prevention and response plan that is appropriate for the materials proposed to be on the site. The SWPPP amendment shall meet or exceed the minimum requirements of Section 12 of the Permit.

INSPECTION & MAINTENANCE

A trained person shall routinely inspect the entire construction site at the time interval indicated on this sheet of the SWPPP during active construction and within 24-hours after a rainfall event greater than 0.5 inches in 24 hours. Following an inspection that occurs within 24-hours after a rainfall event, the next inspection must be conducted at the time interval indicated in the Receiving Waters Table found on the SITE PLAN AND INFORMATION SHEET of the SWPPP.

All inspections and maintenance conducted during construction must be recorded on the day it is completed and must be retained with the SWPPP. Inspection report forms are available in the Project Specifications. Inspection report forms other than those provided shall be approved by the engineer.

The Contractor may request a change in inspection schedule for the following conditions:

a. Inspections of areas with permanent cover to be reduced to once per month,
b. Inspections of areas that have permanent cover and have had no construction activity for 12 months to be suspended until construction resumes,
c. Inspections of areas where construction is suspended due to frozen ground conditions, inspections to be suspended until the earlier of within 24 hours of runoff occurring, or upon resuming construction.

No change in inspection schedule shall occur until authorized by the Engineer.

Inspections must include:

1. All erosion prevention and sediment control BMPs and Pollution Prevention Management Measures to ensure integrity and effectiveness.
2. Surface waters, including drainage ditches and conveyance systems for evidence of erosion and sediment deposition.
3. Construction site vehicle exit locations, streets and curb and gutter systems within and adjacent to the project for sedimentation from erosion or tracked sediment from vehicles.
4. Infiltration areas to ensure that no sediment from ongoing construction activity is reaching the infiltration area and that equipment is not being driven across the infiltration area.

All non-functioning BMPs and those BMPs where sediment reaches one-half (1/2) of the depth of the BMP, or in the case of sediment basins one-half (1/2) of the storage volume, must be repaired, replaced, or supplemented by the end of the next business day after discovery, or as soon as field conditions allow.

Permittees must repair, replace or supplement all nonfunctional BMPs with functional BMPs by the end of the next business day after discovery, or as soon as field conditions allow.

Any sediment that escapes the site must be removed and the area stabilized within 7 calendar days of discovery unless precluded by legal, regulatory, or physical access in which case the work shall be completed within 7 calendar days of authorization. Paved surfaces such as streets shall have any escaped or tracked sediment removed by the end of the day that it is discovered. Sediment release, other than paved surfaces that can be cleaned up with street sweeping shall be reported immediately upon discovery to the Engineer.

PUBLIC WATER RESTRICTIONS:

For public waters that have been promulgated "work in water restrictions" during fish spawning time frames, all exposed soil areas that are within 200 feet of the water's edge, and drain to these waters must complete stabilization within 24-hours during the time period. MN DNR permits are not valid for work in waters that are designated as infested waters unless accompanied by an Infested Waters Permit or written notification has been obtained from MN DNR stating that such permit is not required. There is no exception for pre-existing permits. If a MN DNR Permit has been issued for the project and the water is later designated as infested, the Contractor shall halt all work covered by the MN DNR Permit until an Infested Waters Permit is obtained or that written notification is obtained stating that such permit is not required.

FINAL STABILIZATION

Final Stabilization is not complete until all the following requirements have been met:

1. Substantial Completion has been reached and no ground disturbing activities are anticipated.
2. Permanent cover has been installed with an established minimum uniform perennial vegetation density of 70 percent of its expected final growth. Vegetation is not required in areas where no vegetation is proposed by this project such as impervious surfaces or the base of a sand filter.
3. Accumulated sediment has been removed from all permanent stormwater treatment systems as necessary to ensure the system is operating as designed.
4. All sediment has been removed from conveyance systems
5. All temporary synthetic erosion prevention and sediment control BMPs have been removed. BMPs designated on the SWPPP to remain to decompose on-site may remain.
6. For residential construction only, permit coverage terminates on individual lots if the structures are finished and temporary erosion prevention and downgradient perimeter control is complete, the residence sells to the homeowner, and the permittee distributes the MPCA's "Homeowner Fact Sheet" to the homeowner.
7. For agricultural land only (e.g., pipelines across cropland), the disturbed land must be returned to its preconstruction agricultural use prior to submitting the NOT.

SITE STABILIZATION COMPLETION:

Stabilization of exposed soils shall begin immediately and shall be completed after the construction activity has temporarily or permanently ceased no later than:	14 calendar days

SITE INSPECTION INTERVAL:

A trained person shall routinely inspect the entire construction site during active construction at an interval of no more than:	7 calendar days

SPECIAL ENVIRONMENTAL CONSIDERATIONS AND PERMITS:

1)	Was an environmental review required for this project or any part of a common plan of development or sale that includes all or any portion of this project?	NO
2)	Does any portion of the site have the potential to affect threatened or endangered species or their critical habitat?	NO
3)	Does any portion of this site discharge to a Calcareous fen.	NO
4)	Will any portion of the site potentially affect properties listed on the National Register of Historic Places or a known or discovered archeological site?	NO
5)	Have any Karst features have been identified in the project vicinity?	NO
6)	Is compliance with temporary or permanent stormwater management design requirements infeasible for this project?	NO
7)	Has the MN DNR promulgated "work in water restrictions" for any Public Water this site disharges to during fish spawning?	NO

SWPPP DESIGNER TRAINING DOCUMENTATION:

UNIVERSITY OF MINNESOTA

Caleb Ward

Design of Construction SWPPP (May 31 2028)

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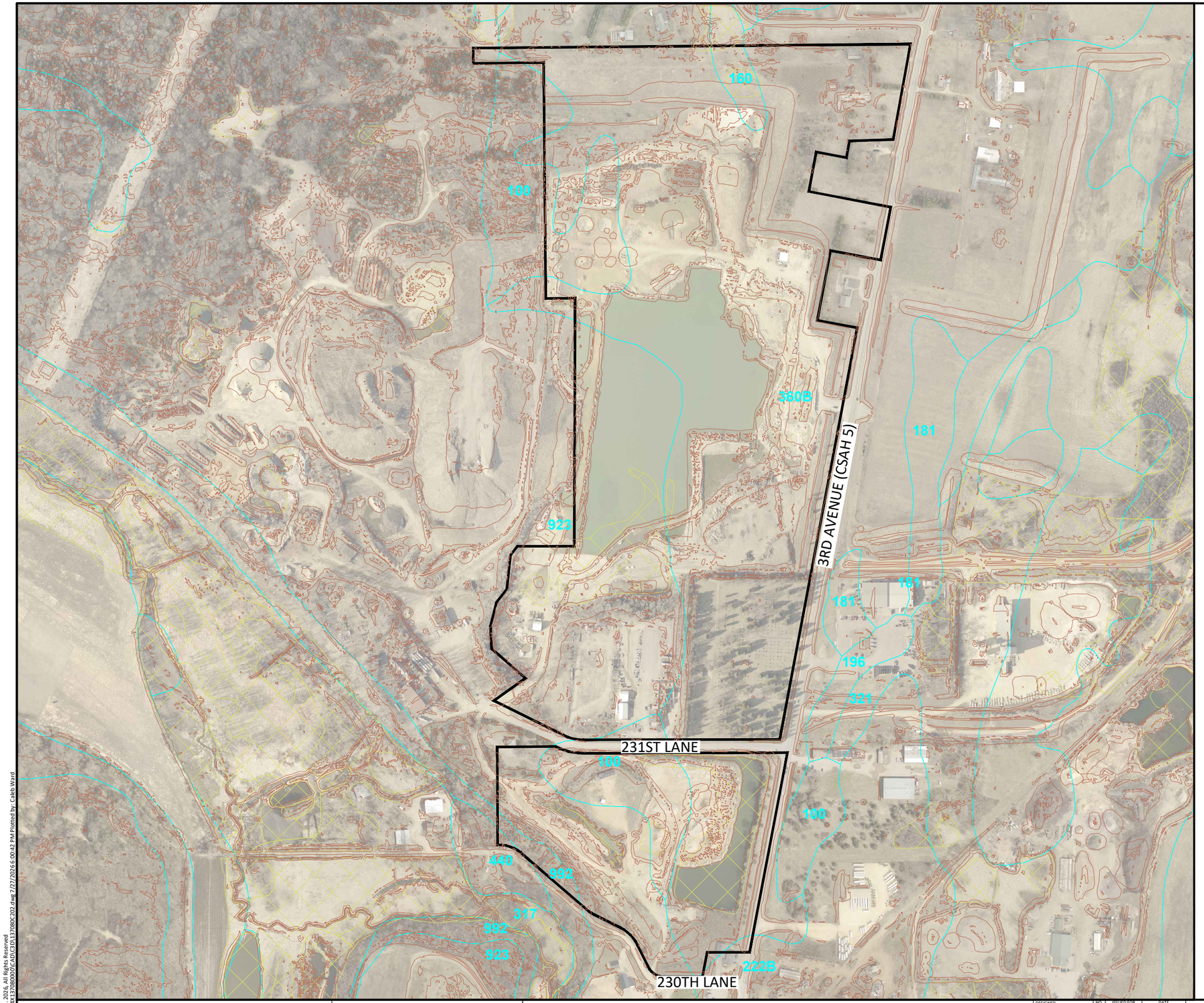
STORMWATER POLLUTION PREVENTION PLAN
NARRATIVE

SHEET C2.02



LEGEND

- PROJECT BOUNDARY
- SOIL TYPE
- NATIONAL WETLANDS INVENTORY
- STEEP SLOPES (>33.3%)

0 250 500
SCALE FEET

SOIL TYPE SUMMARY

Map Unit Symbol	Soil Name	Hyd. Soil Group	Erodibility
100	Copaston loam, 1 to 4 percent slopes	D	NHEL
160	Fieldon loam, 0 to 2 percent slopes	B/D	NHEL
222B	Lasa fine sand, 2 to 9 percent sloes	A	NHEL
360B	Lasa loamy fine sand, rock substratum, 1 to 6 percent slopes	A	NHEL
440	Copaston loam, very shallow, 1 to 4 percent slopes	D	NHEL
923	Copaston-Rock outcrop comples, 1 to 4 percent slopes	D	NHEL
992	Rock outcrop-Copaston comples, very steep	D	NHEL

NHEL - Not Highly Erodible Land
PHEL - Potentially Highly Erodible Land
HEL - Highly Erodible Land

LOCATION OF SWPPP REQUIREMENTS IN PROJECT PLAN

DESCRIPTION	SHEET NO.
SITE MAP	C2.01
NARRATIVE & NOTES	C2.01 - C2.02
SOILS	C2.03
EROSION & SEDIMENT CONTROL DETAILS	C2.04 - C2.05
DIRECTION OF FLOW	C2.06
FINAL STABILIZATION	C2.06 - C2.24

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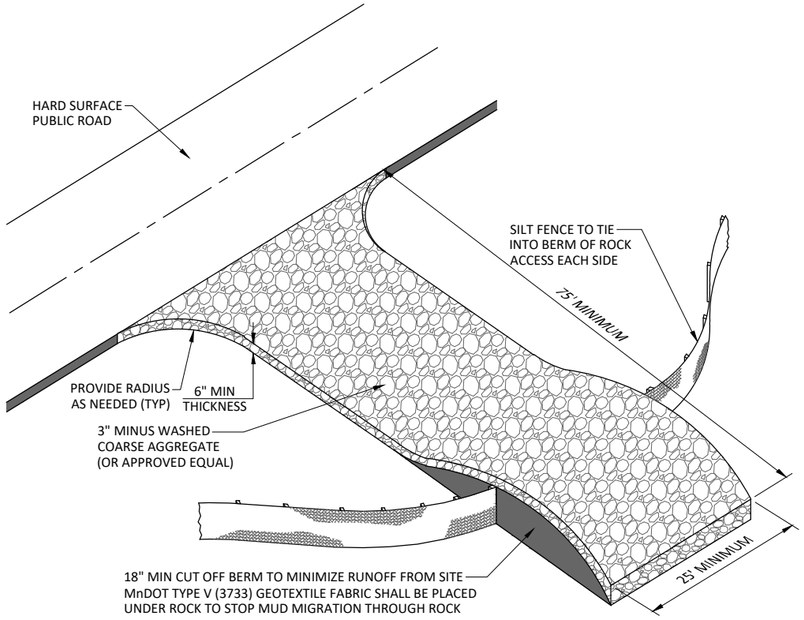
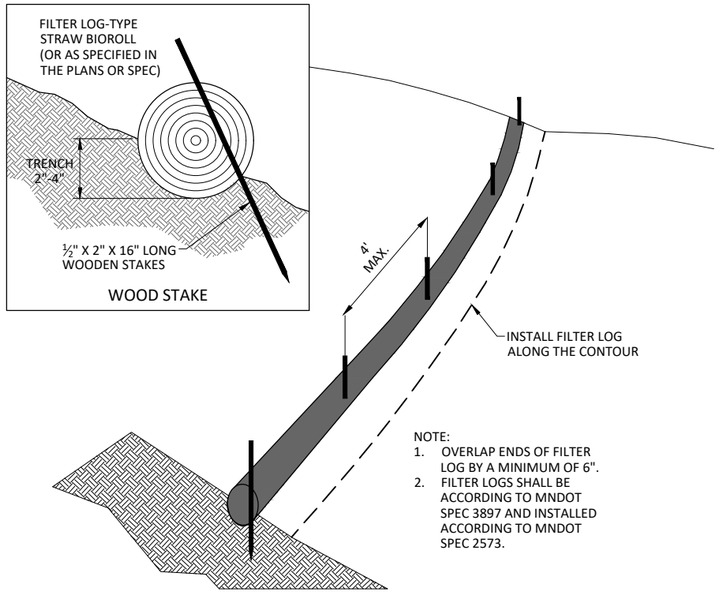
STORMWATER POLLUTION PREVENTION PLAN
SITE & SOILS MAP

SHEET C2.03



ROCK CONSTRUCTION ENTRANCE

NOT TO SCALE



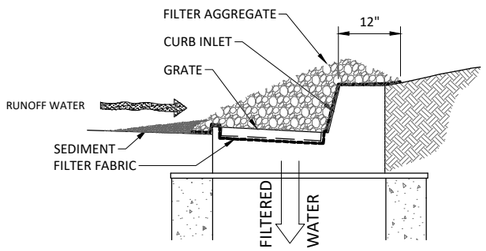
NOTE:
1. OVERLAP ENDS OF FILTER LOG BY A MINIMUM OF 6".
2. FILTER LOGS SHALL BE ACCORDING TO MNDOT SPEC 3897 AND INSTALLED ACCORDING TO MNDOT SPEC 2573.

PERIMETER PROTECTION-FILTER LOG

NOT TO SCALE

NOTES:

1. FILTER AGGREGATE TO BE 1 TO 2 INCH CLEAN ROCK
2. FILTER FABRIC SHALL MEET MnDOT SPECIFICATION 3733 GEOTEXTILE FABRIC TYPE II



INLET PROTECTION
FILTER AGGREGATE

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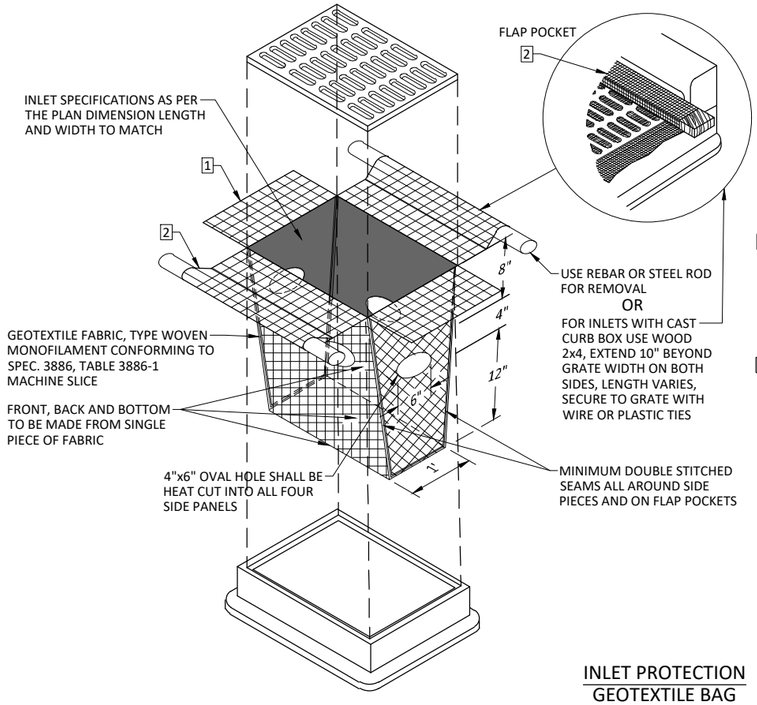

NOTES:

1 INLET PROTECTION DEVICES SHALL BE MAINTAINED OR REPLACED AT THE DIRECTION OF THE ENGINEER. MANUFACTURED ALTERNATIVES APPROVED AND LISTED ON THE DEPARTMENTS EROSION CONTROL PRODUCT ACCEPTABILITY LIST MAY BE SUBSTITUTED. WHEN REMOVING OR MAINTAINING INLET PROTECTION, CARE SHALL BE TAKEN SO THAT THE SEDIMENT TRAPPED ON THE GEOTEXTILE FABRIC DOES NOT FALL IN THE INLET. ANY MATERIAL FALLING INTO THE INLET SHALL BE REMOVED IMMEDIATELY.

2 FINISHED SIZE, INCLUDING POCKETS WHERE REQUIRED, SHALL EXTEND A MINIMUM OF 10" AROUND THE PERIMETER TO FACILITATE MAINTENANCE OR REMOVAL.

FLAP POCKETS SHALL BE LARGE ENOUGH TO ACCEPT WOOD 2x4.

INSTALLATION NOTES:
DO NOT INSTALL PROTECTION IN INLETS SHALLOWER THAN 30", MEASURED FROM THE BOTTOM OF THE INLET TO THE TOP OF THE GRATE.

TRIM EXCESS FABRIC IN THE FLOW LINE TO WITHIN 3" OF THE GRATE.

THE INSTALLED BAG SHALL HAVE A MINIMUM SIDE CLEARANCE, BETWEEN THE INLET AND THE BAG, MEASURED AT THE BOTTOM OF THE OVERFLOW HOLES, OF 3". WHERE NECESSARY THE CONTRACTOR SHALL CLINCH THE BAG, USING PLASTIC ZIP TIES, TO ACHIEVE THE 3" CLEARANCE. THE TIES SHALL BE PLACED AT A MAXIMUM OF 4" FROM THE BOTTOM OF THE BAG.

INLET PROTECTION
GEOTEXTILE BAG

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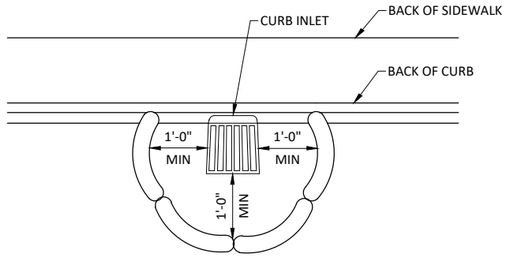
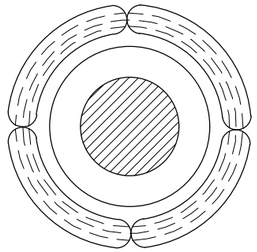


NOTE:
THIS INLET PROTECTION IS USED DURING ROUGH GRADING ONLY, USE BEFORE ROAD IS OPEN TO TRAFFIC OR IS PAVED

PAYMENT SHALL INCLUDE ALL MATERIALS, FILLING OF LOG, PLACEMENT, MAINTENANCE & REMOVAL;
80% OF BID PRICE SHALL BE PAID UPON PROPER PLACEMENT WITH THE FINAL 20% PAID UPON REMOVAL

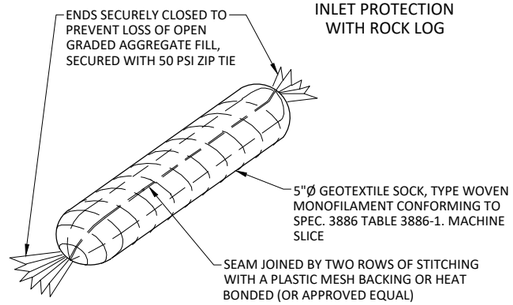


INLET PROTECTION
WITH ROCK LOG

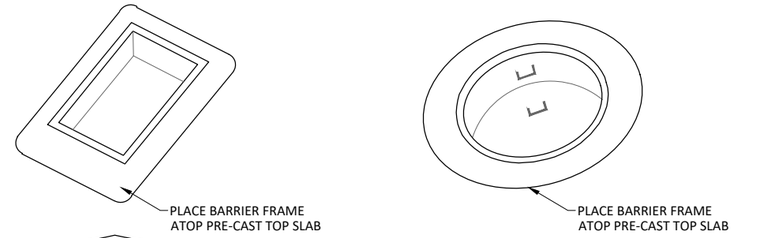
FILL ROCK LOG WITH 45 LBS. OF OPEN GRADED AGGREGATE CONSISTING OF SOUND, DURABLE PARTICLES OF CRUSHED QUARRY ROCK OR GRAVEL CONFORMING TO THE FOLLOWING GRADATION.

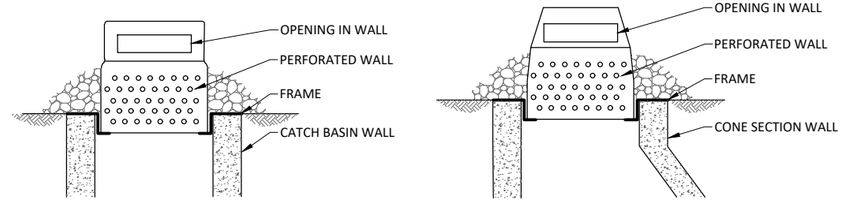
GRADATION	
SIEVE SIZE	PERCENT PASSING
1 1/2"	100
1"	95-100
3/4"	65-95
3/8"	30-65
NO 4	10-35
NO 10	3-20
NO 40	0-8
NO 200	0-3

NOTE:
CRUSHED CONCRETE OR BITUMINOUS SHALL NOT BE USED FOR OPEN GRADED AGGREGATE.

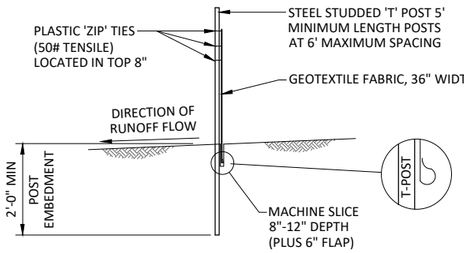


INLET PROTECTION
ROCK BAG
NOT TO SCALE





INLET PROTECTION
PERFORATED WALL
NOT TO SCALE



SILT FENCE - MACHINE SLICED
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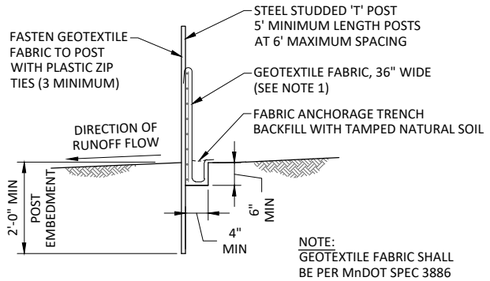

NOTE:
GEOTEXTILE FABRIC SHALL BE PER MnDOT SPEC 3886

SILT FENCE - HEAVY DUTY
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ROCKWELL RV & ADVENTURE PARK
STORMWATER POLLUTION PREVENTION PLAN
BEST MANAGEMENT PRACTICE DETAILS

SHEET
C2.05



NOTES:

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2. ALL STORM SEWER INLETS SHALL HAVE INLET PROTECTION IN PLACE AS NEEDED UNTIL DISTURBED TURF IS STABILIZED.
3. ALL PERIMETER CONTROL IS TO BE REMOVED UPON ESTABLISHED TURF RESTORATION.
4. CONTRACTOR TO COORDINATE THE REMOVAL AND REPLACEMENT OF TEMPORARY ROCK CONSTRUCTION EXITS DURING CONSTRUCTION.

EROSION CONTROL LEGEND

- EXISTING/PROPOSED DRAINAGE FLOW
- PERIMETER CONTROL
- STORM DRAIN INLET PROTECTION
- TURF EXTABLISHMENT; DESIGNATION BY LANDSCAPE ARCHITECTURE
- STABILIZED CONSTRUCTION EXIT

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STORMWATER POLLUTION PREVENTION PLAN
SOUTH CAMPGROUND

SHEET C2.06

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EROSION CONTROL LEGEND

- EXISTING/PROPOSED DRAINAGE FLOW
- PERIMETER CONTROL
- STORM DRAIN INLET PROTECTION
- TURF EXTABLISHMENT; DESIGNATION BY LANDSCAPE ARCHITECTURE
- STABILIZED CONSTRUCTION EXIT

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EROSION CONTROL LEGEND

- EXISTING/PROPOSED DRAINAGE FLOW
- PERIMETER CONTROL
- STORM DRAIN INLET PROTECTION
- TURF EXTABLISHMENT; DESIGNATION BY LANDSCAPE ARCHITECTURE
- STABILIZED CONSTRUCTION EXIT

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EROSION CONTROL LEGEND

- EXISTING/PROPOSED DRAINAGE FLOW
- PERIMETER CONTROL
- STORM DRAIN INLET PROTECTION
- TURF EXTABLISHMENT; DESIGNATION BY LANDSCAPE ARCHITECTURE
- STABILIZED CONSTRUCTION EXIT

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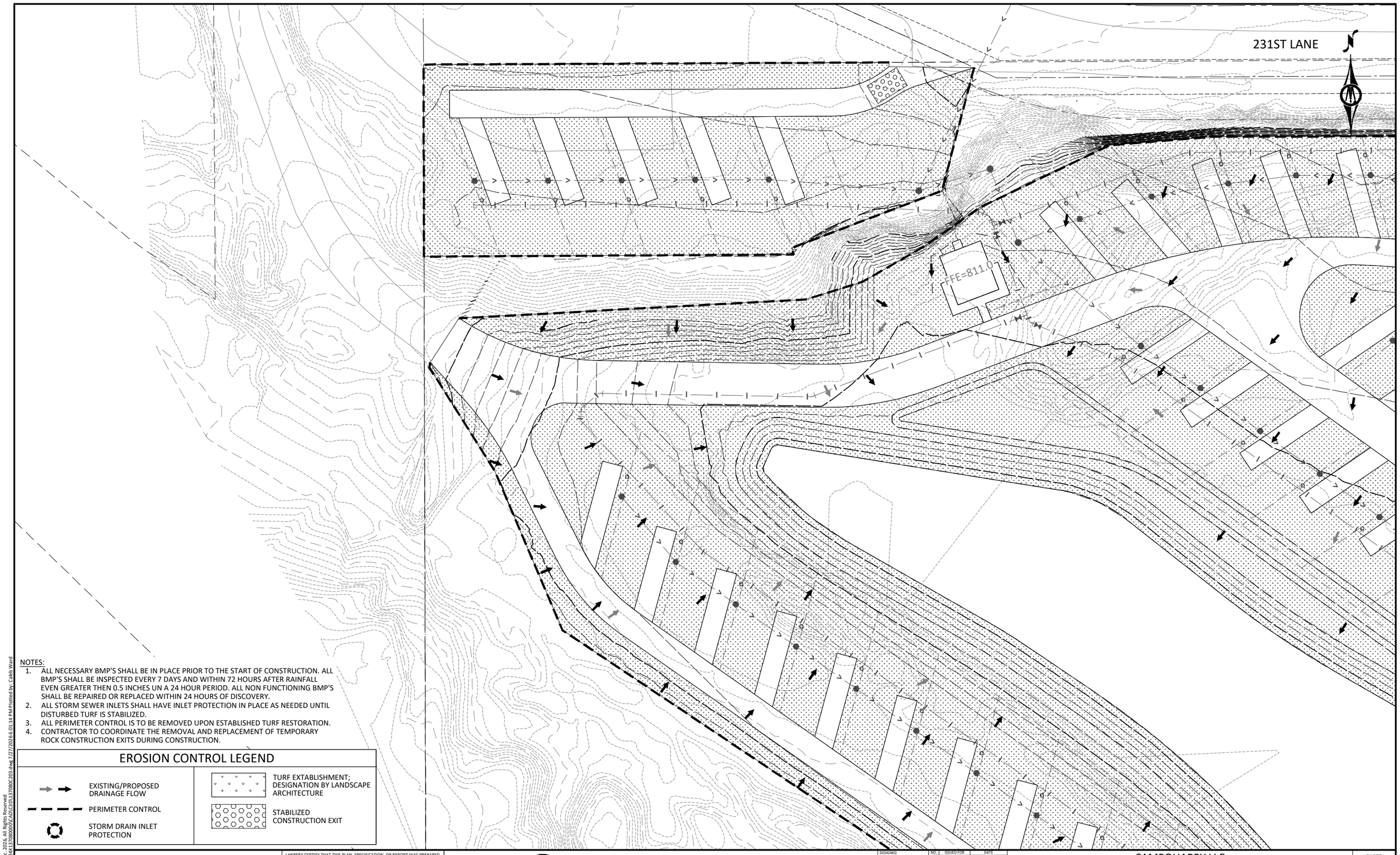

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EROSION CONTROL LEGEND

- EXISTING/PROPOSED DRAINAGE FLOW
- PERIMETER CONTROL
- STORM DRAIN INLET PROTECTION
- TURF EXTABLISHMENT; DESIGNATION BY LANDSCAPE ARCHITECTURE
- STABILIZED CONSTRUCTION EXIT

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STORMWATER POLLUTION PREVENTION PLAN
SOUTH CAMPGROUND

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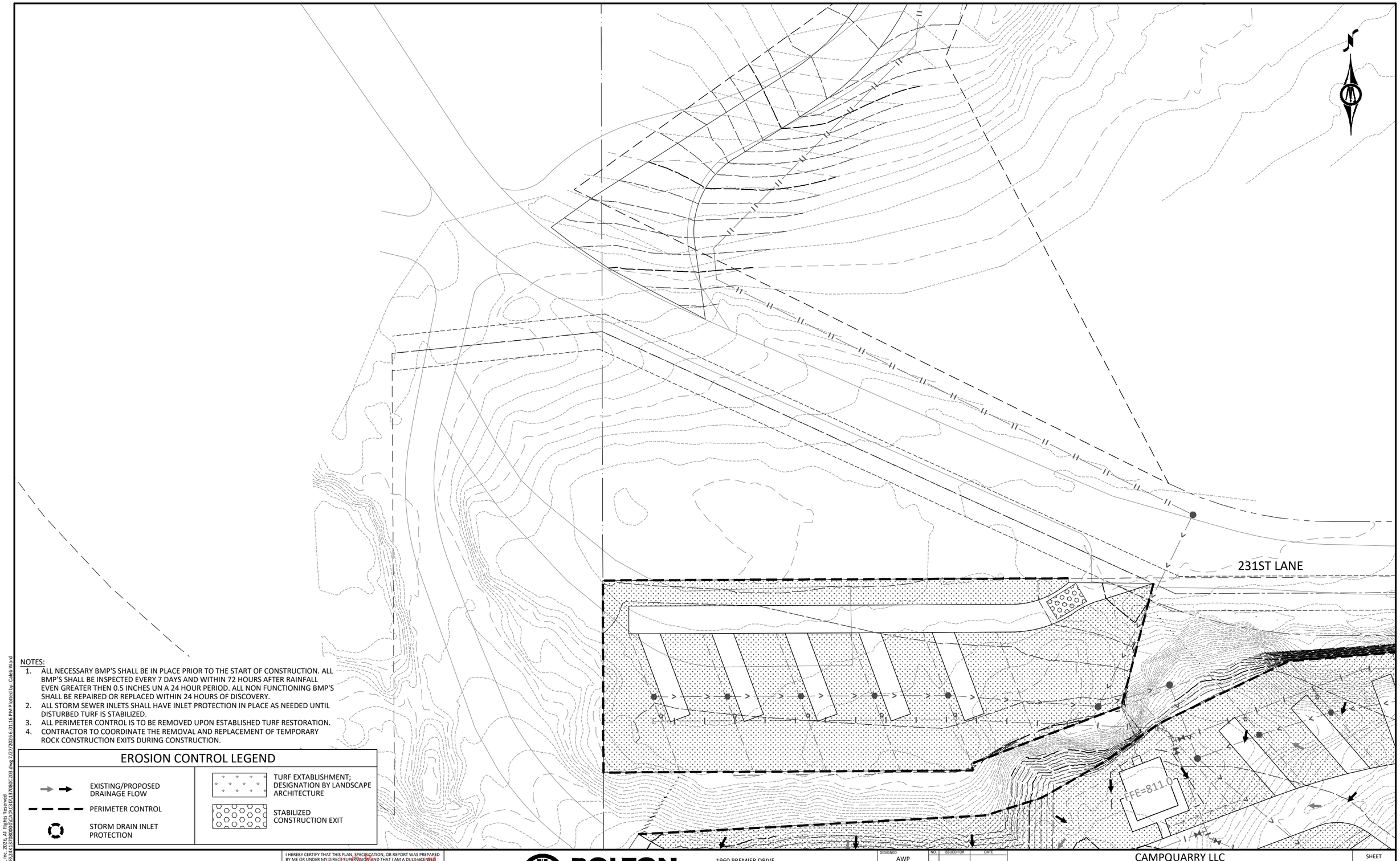

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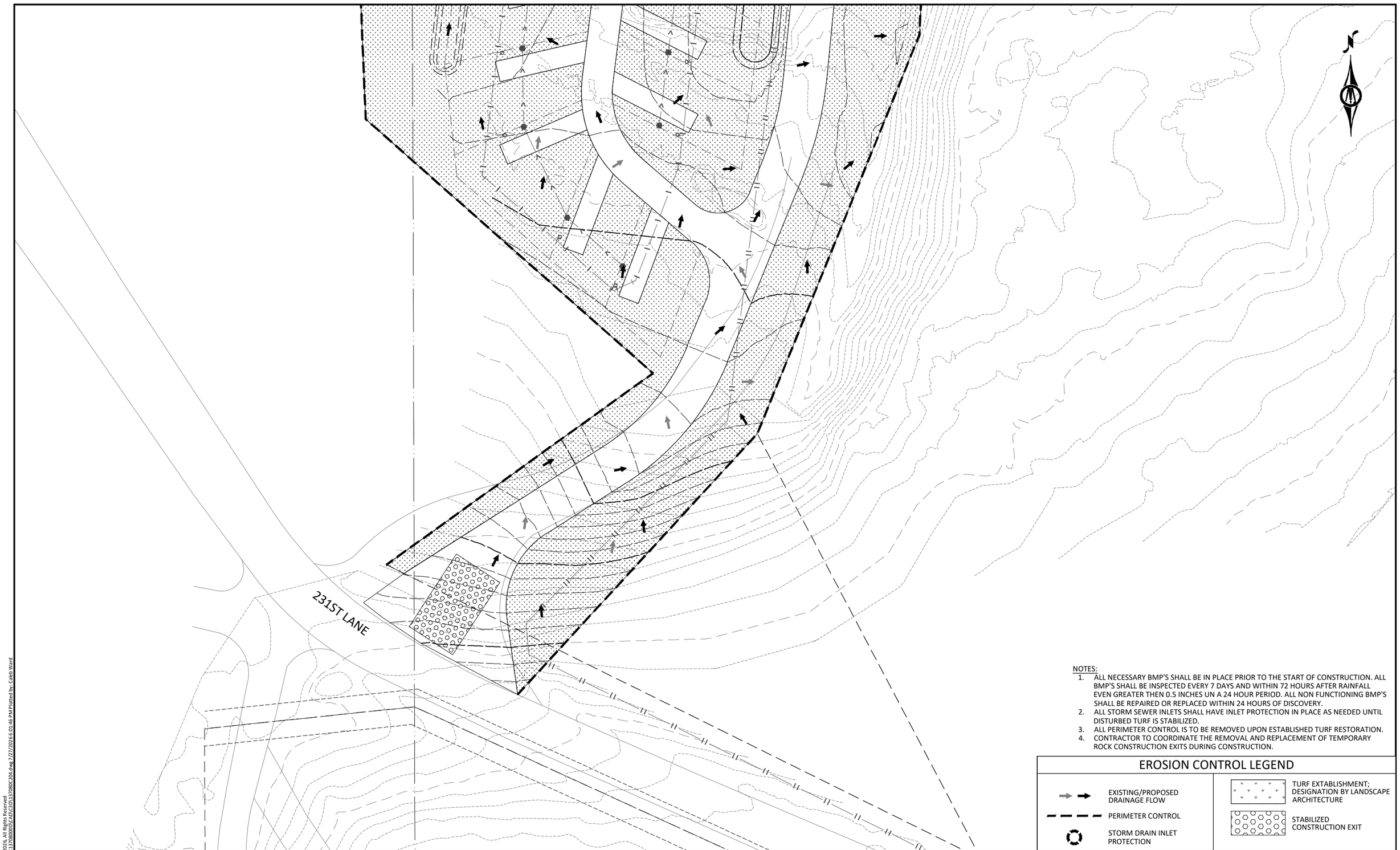

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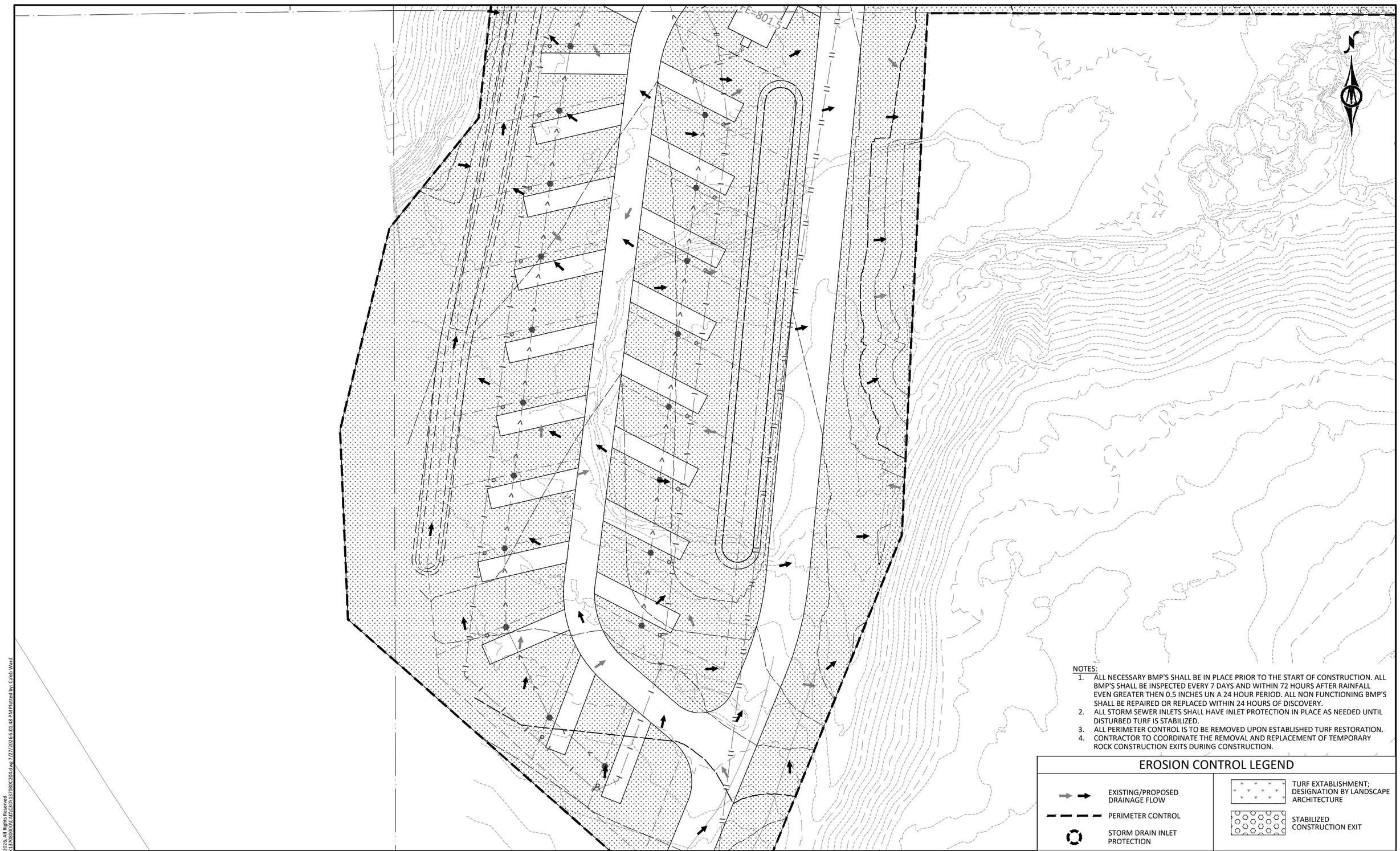

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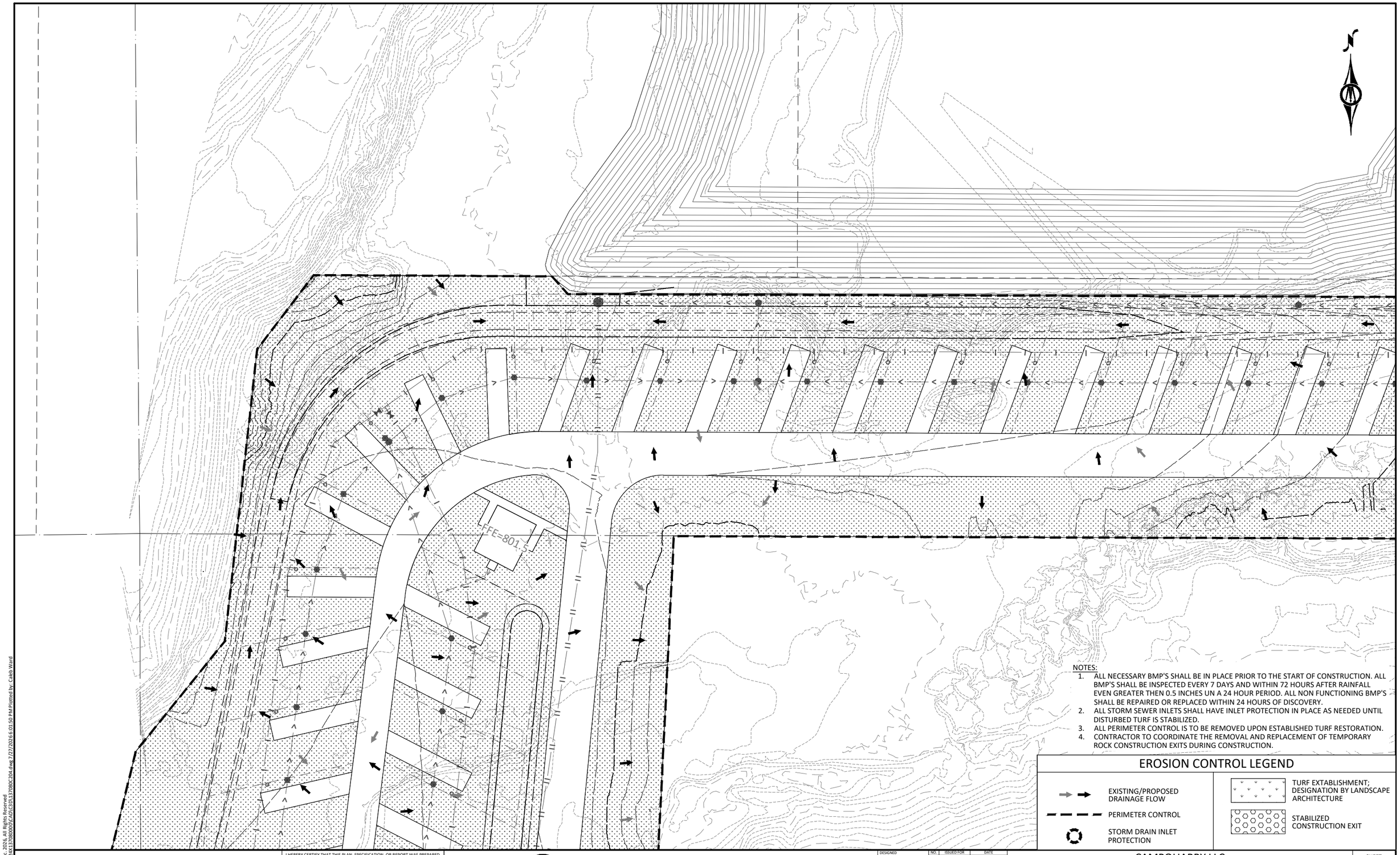

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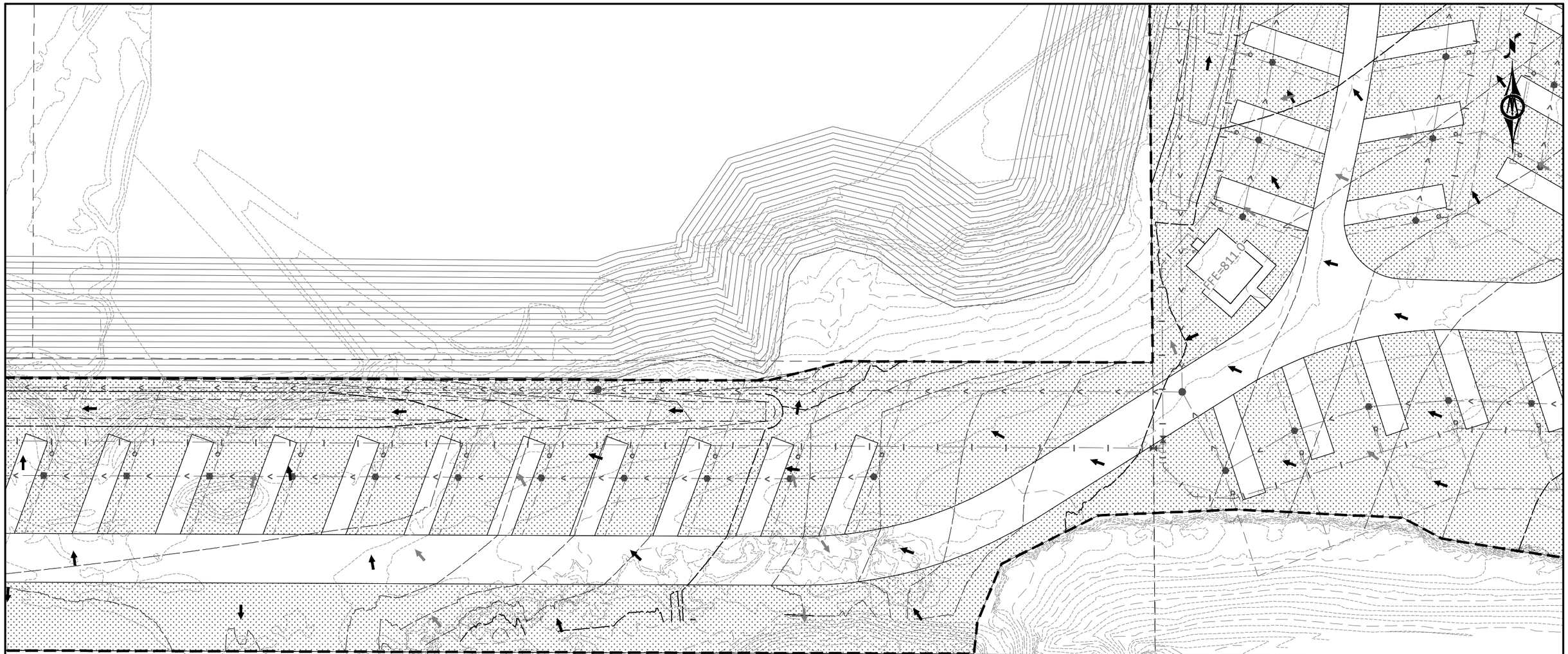

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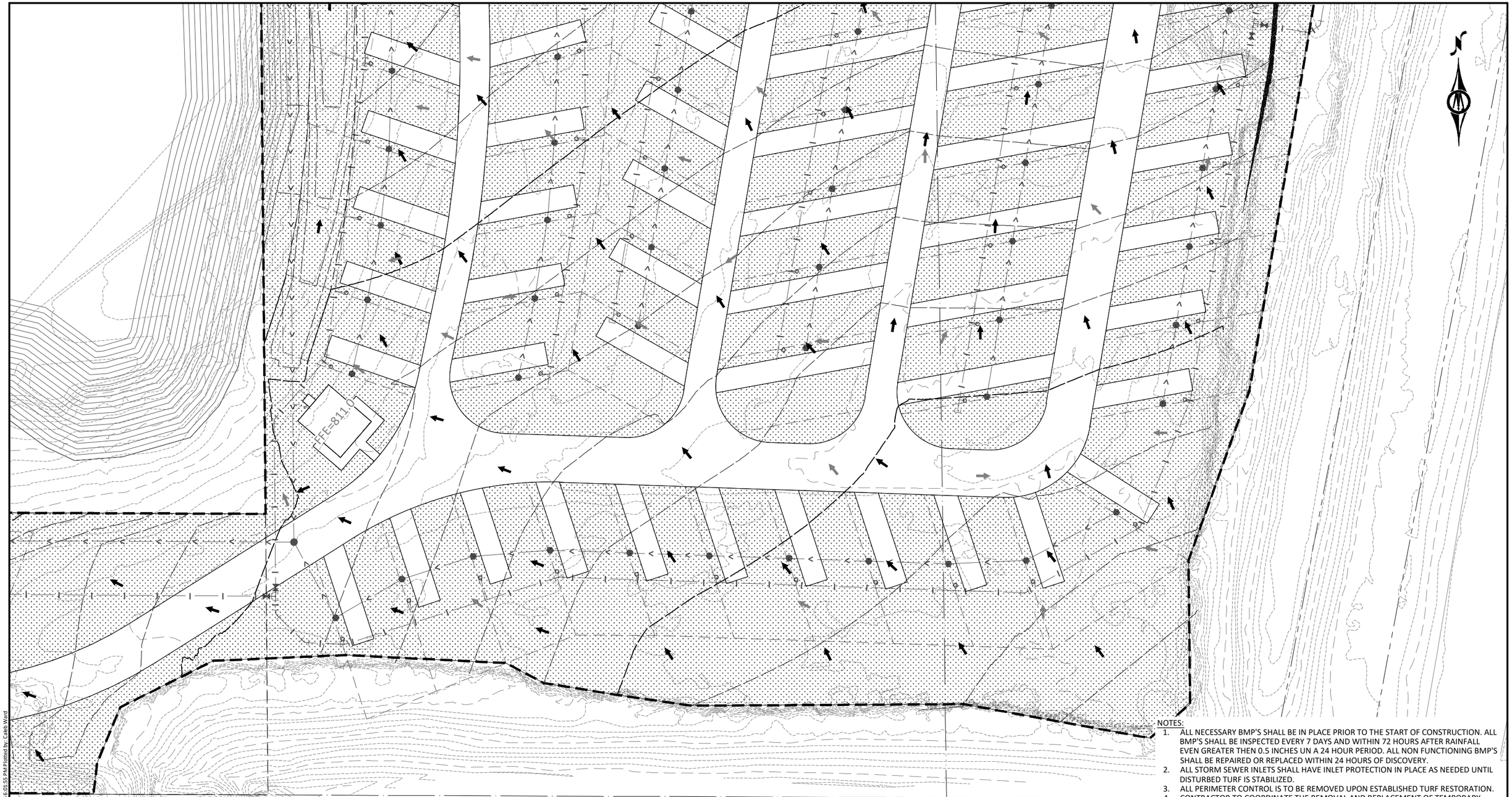

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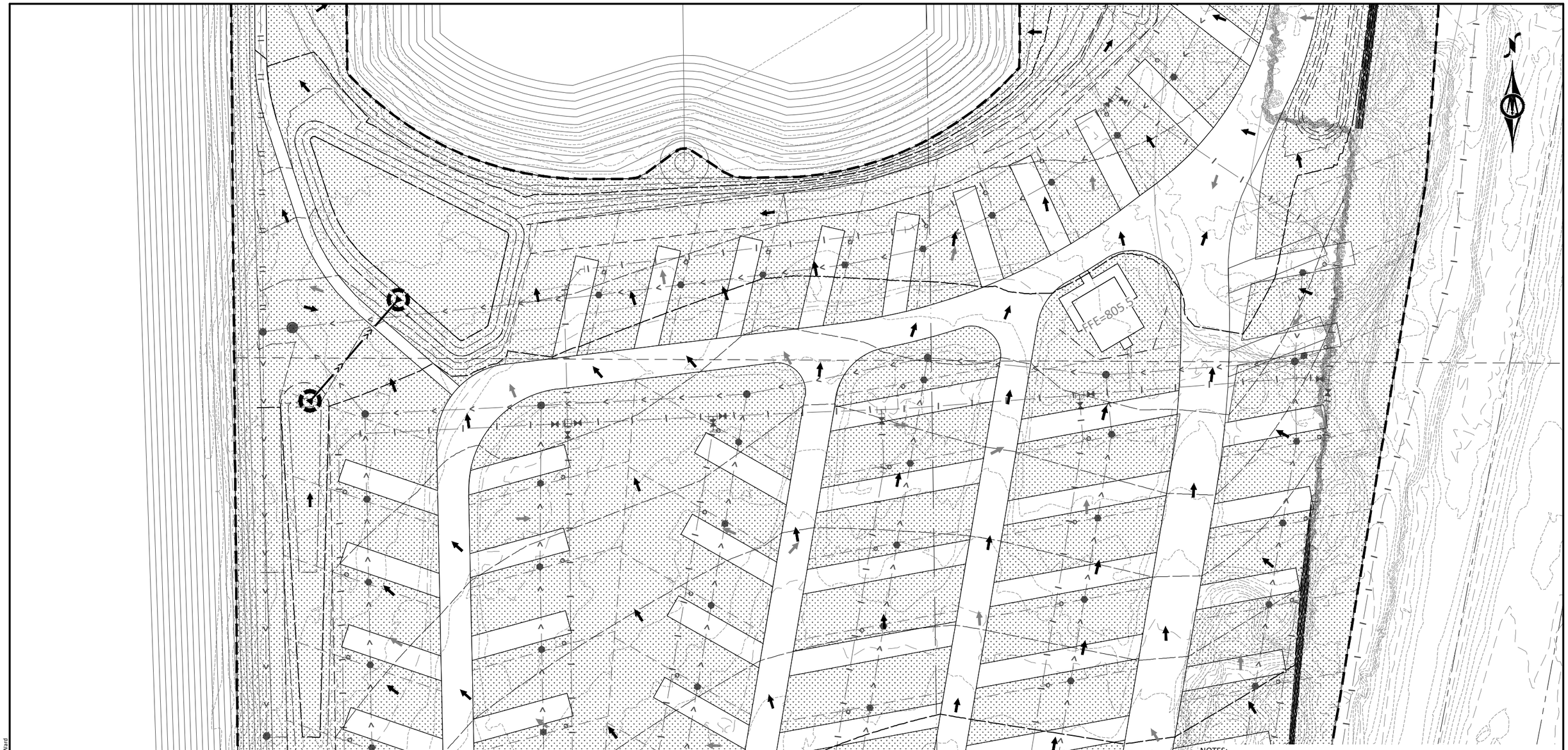

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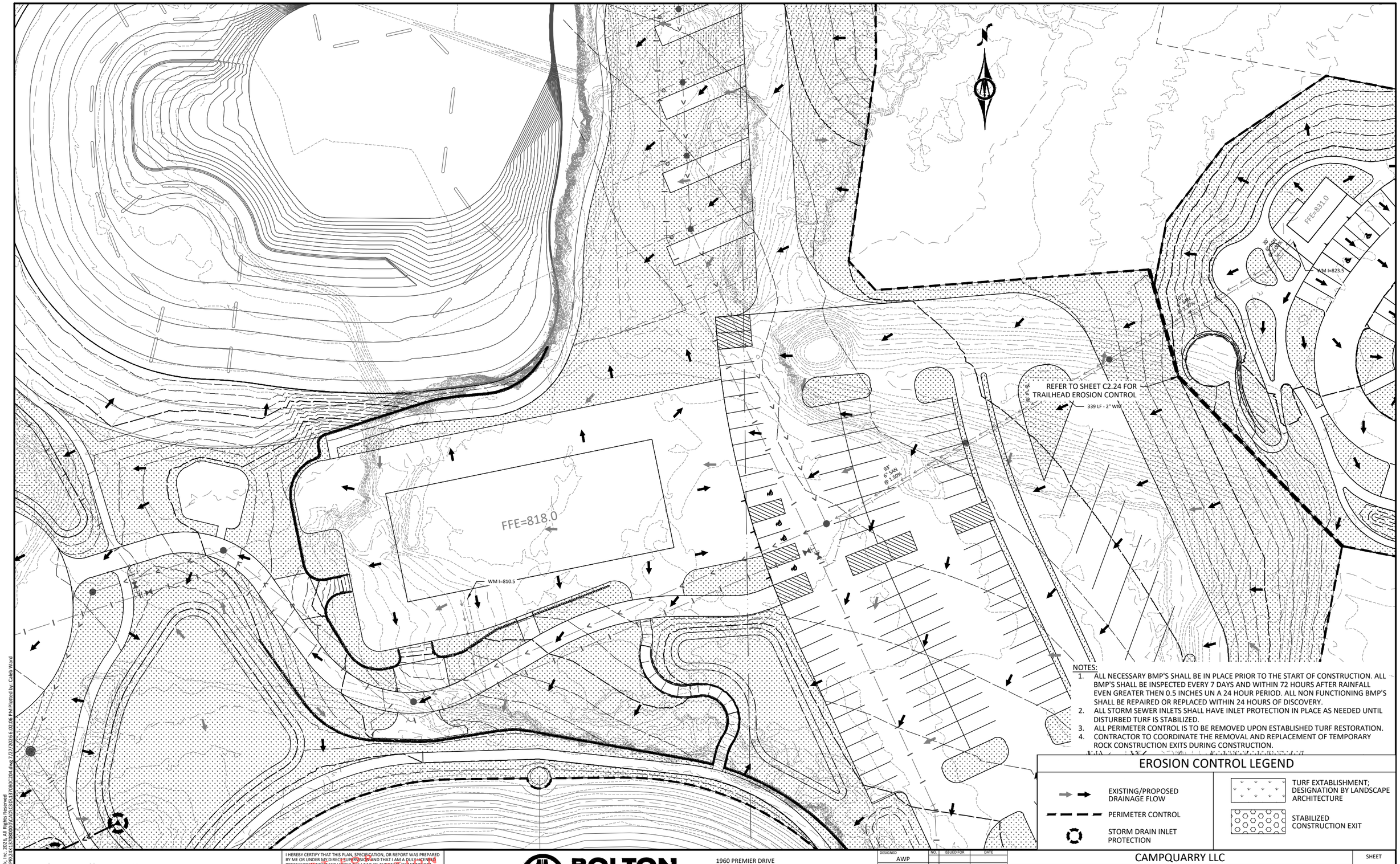

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CAMPQUARRY LLC
ROCKWELL RV & ADVENTURE PARK
STORMWATER POLLUTION PREVENTION PLAN
NORTH CAMPGROUND

SHEET C2.20

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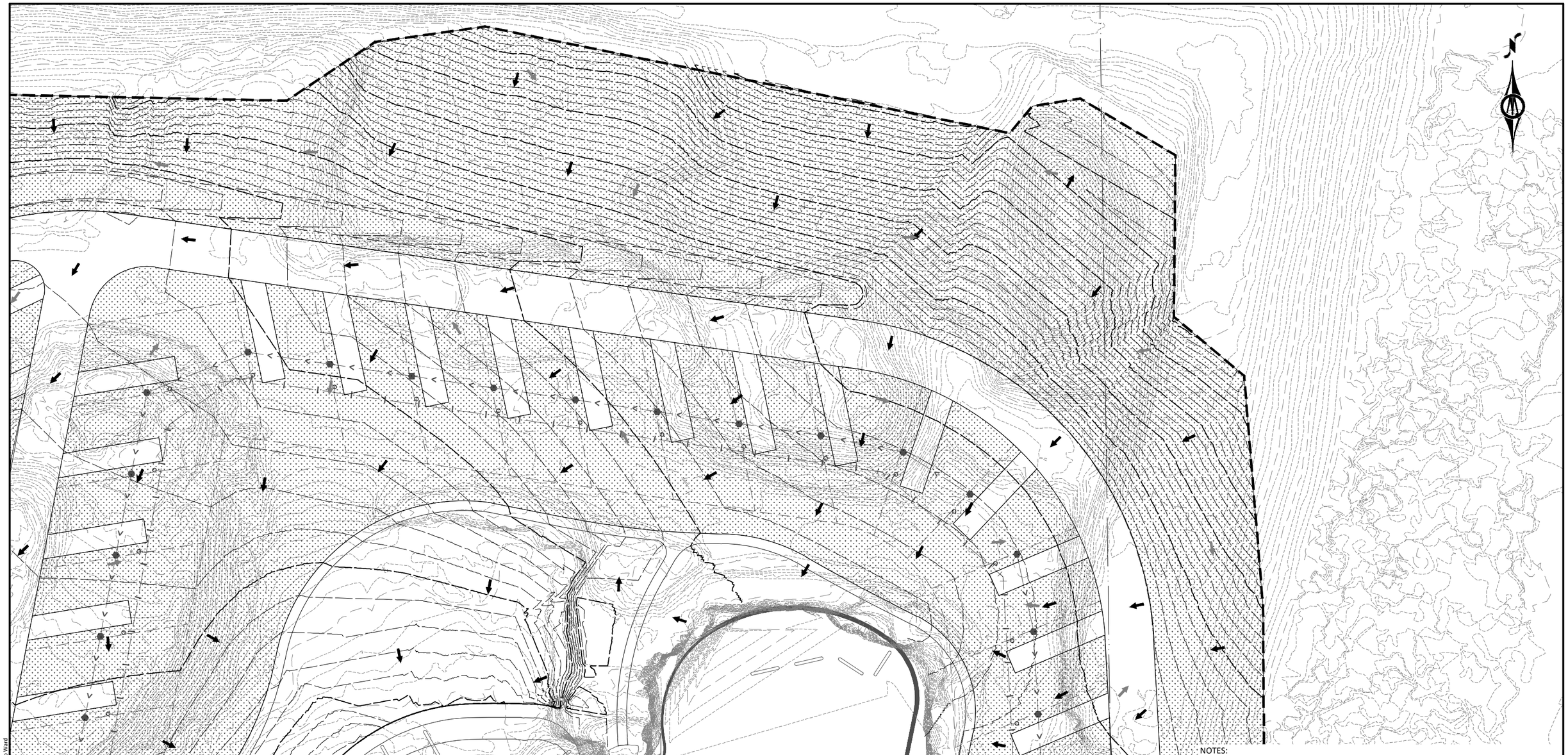

NOTES:

1. ALL NECESSARY BMP'S SHALL BE IN PLACE PRIOR TO THE START OF CONSTRUCTION. ALL BMP'S SHALL BE INSPECTED EVERY 7 DAYS AND WITHIN 72 HOURS AFTER RAINFALL EVEN GREATER THEN 0.5 INCHES UN A 24 HOUR PERIOD. ALL NON FUNCTIONING BMP'S SHALL BE REPAIRED OR REPLACED WITHIN 24 HOURS OF DISCOVERY.
2. ALL STORM SEWER INLETS SHALL HAVE INLET PROTECTION IN PLACE AS NEEDED UNTIL DISTURBED TURF IS STABILIZED.
3. ALL PERIMETER CONTROL IS TO BE REMOVED UPON ESTABLISHED TURF RESTORATION.
4. CONTRACTOR TO COORDINATE THE REMOVAL AND REPLACEMENT OF TEMPORARY ROCK CONSTRUCTION EXITS DURING CONSTRUCTION.

EROSION CONTROL LEGEND

- EXISTING/PROPOSED DRAINAGE FLOW
- PERIMETER CONTROL
- STORM DRAIN INLET PROTECTION
- TURF EXTABLISHMENT; DESIGNATION BY LANDSCAPE ARCHITECTURE
- STABILIZED CONSTRUCTION EXIT

HORZ. SCALE 0 25 50 FEET

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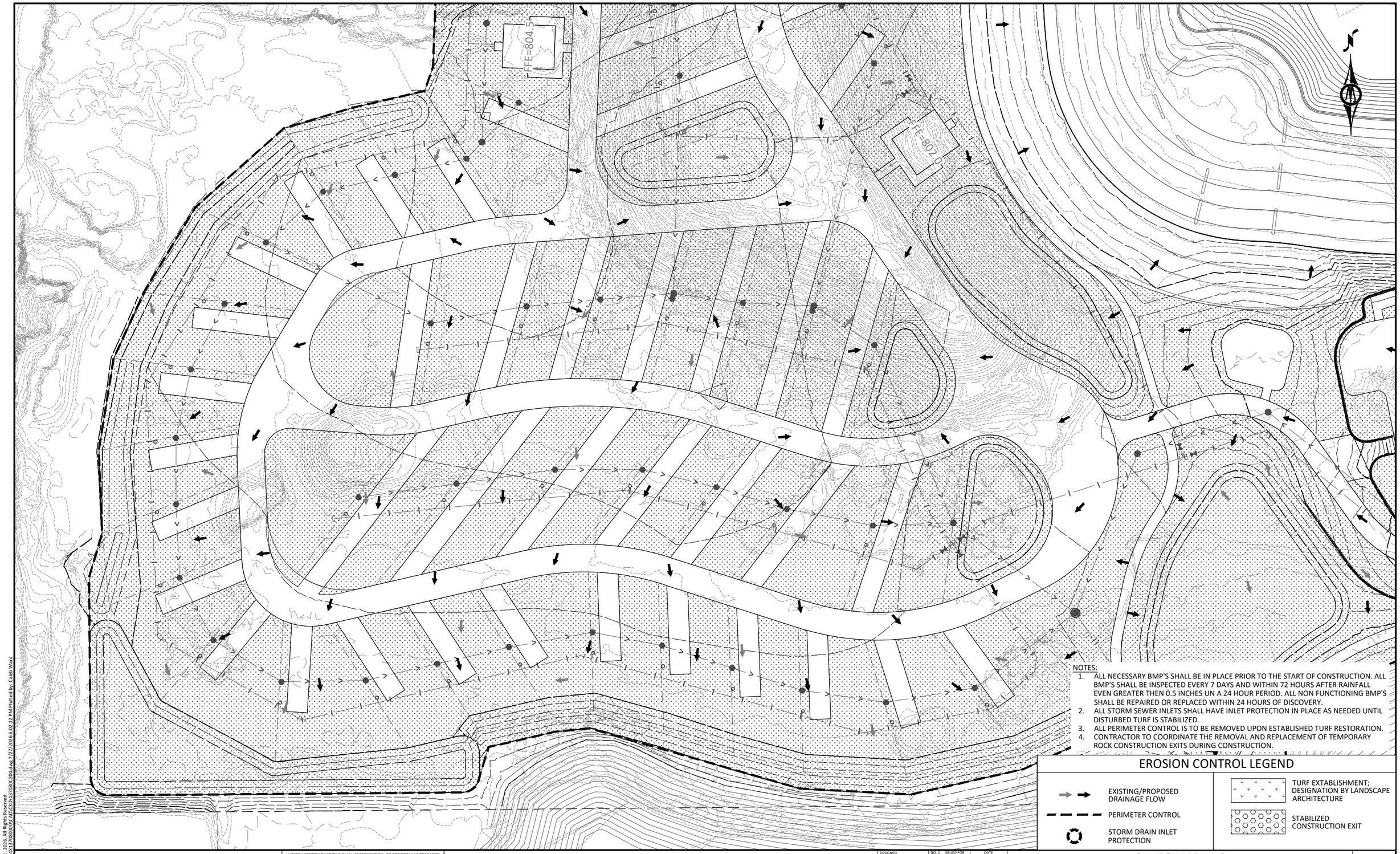

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EROSION CONTROL LEGEND

- EXISTING/PROPOSED DRAINAGE FLOW
- PERIMETER CONTROL
- STORM DRAIN INLET PROTECTION
- TURF EXTABLISHMENT; DESIGNATION BY LANDSCAPE ARCHITECTURE
- STABILIZED CONSTRUCTION EXIT

HORZ. SCALE 0 25 50 FEET

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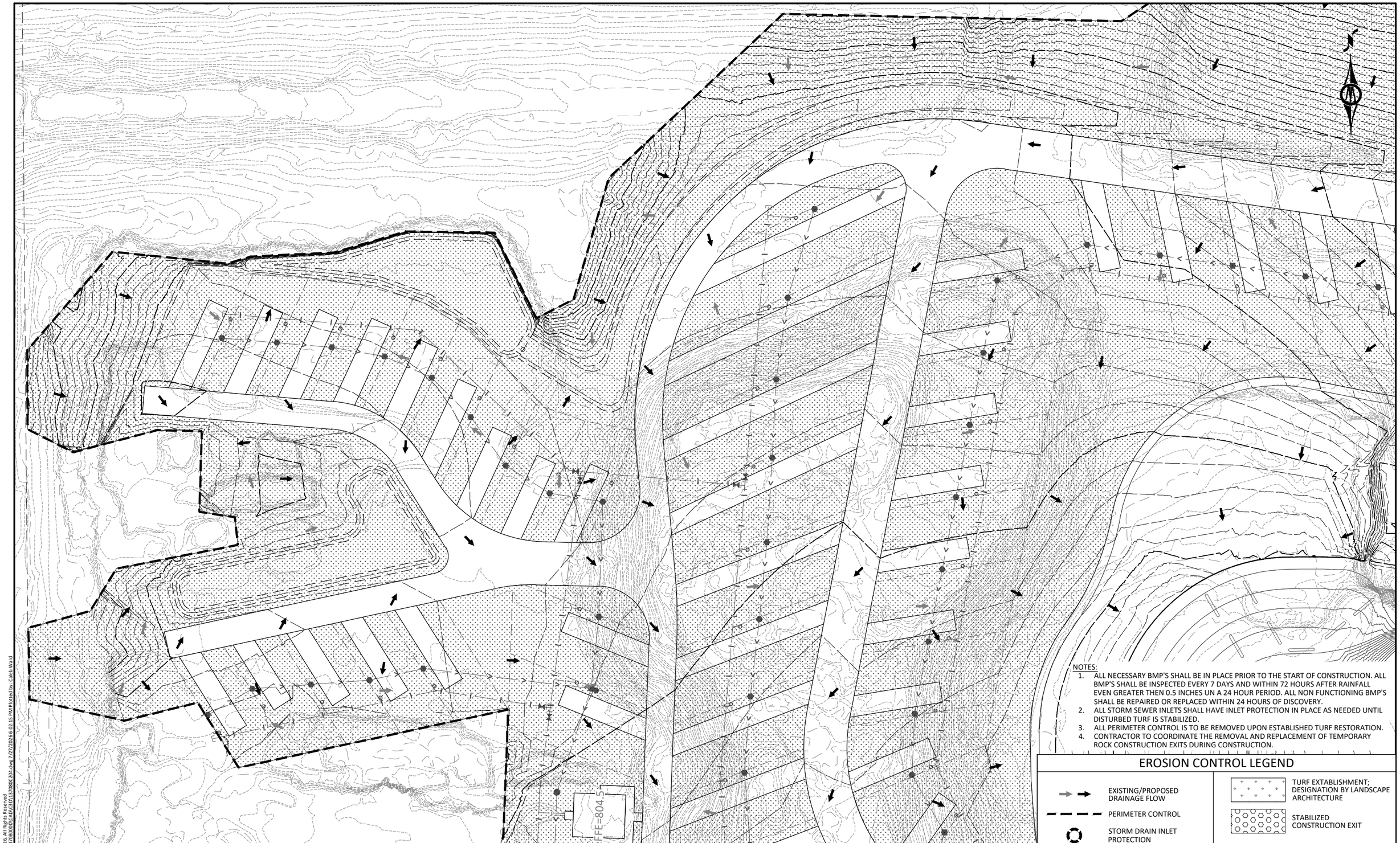

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EROSION CONTROL LEGEND

- EXISTING/PROPOSED DRAINAGE FLOW
- PERIMETER CONTROL
- STORM DRAIN INLET PROTECTION
- TURF EXTABLISHMENT; DESIGNATION BY LANDSCAPE ARCHITECTURE
- STABILIZED CONSTRUCTION EXIT

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HORZ. 0 25 50
SCALE FEET

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STORMWATER POLLUTION PREVENTION PLAN
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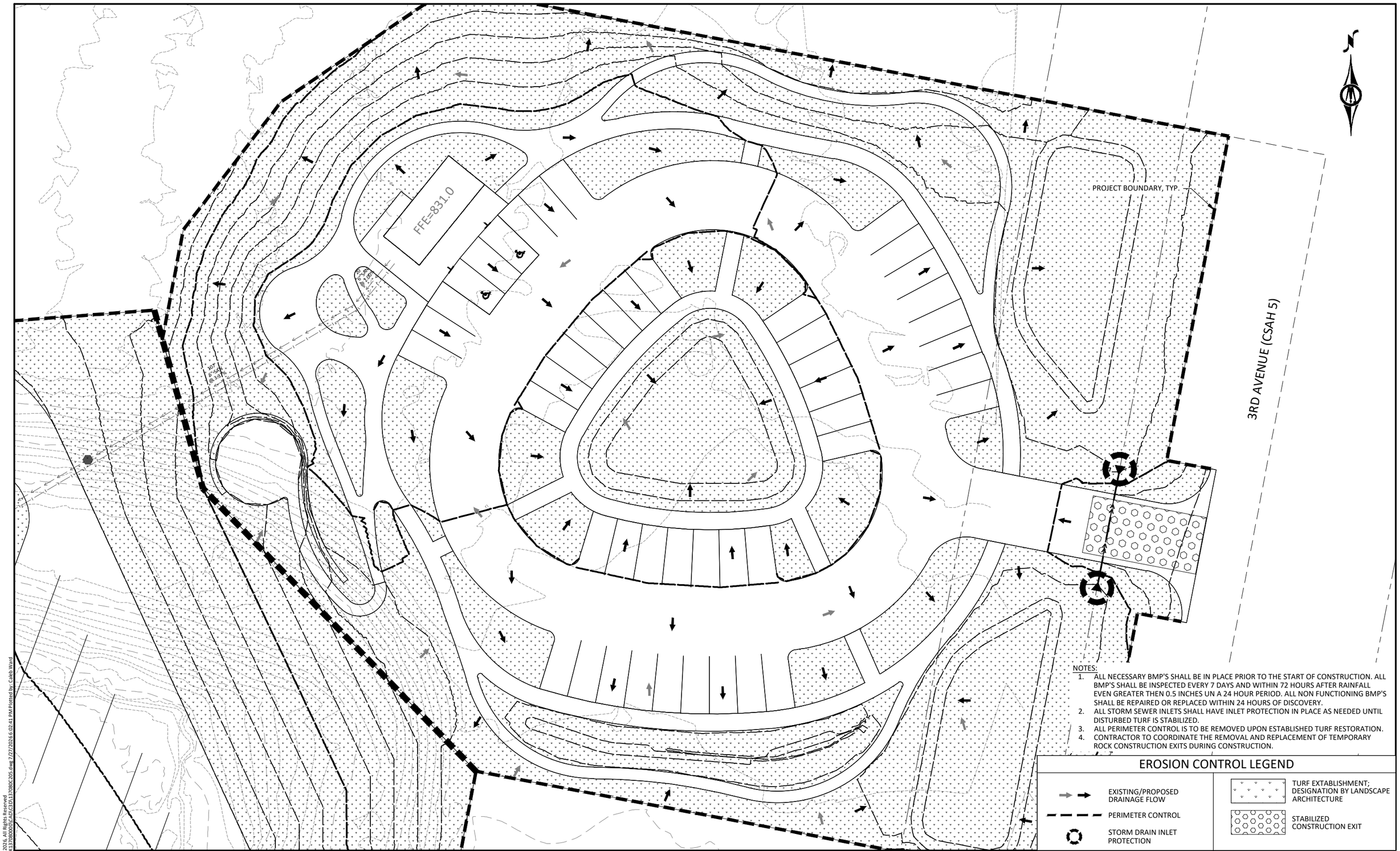
SHEET C2.23



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- PERIMETER CONTROL
- STORM DRAIN INLET PROTECTION
- TURF EXTABLISHMENT; DESIGNATION BY LANDSCAPE ARCHITECTURE
- STABILIZED CONSTRUCTION EXIT

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HORZ. SCALE 0 15 30 FEET

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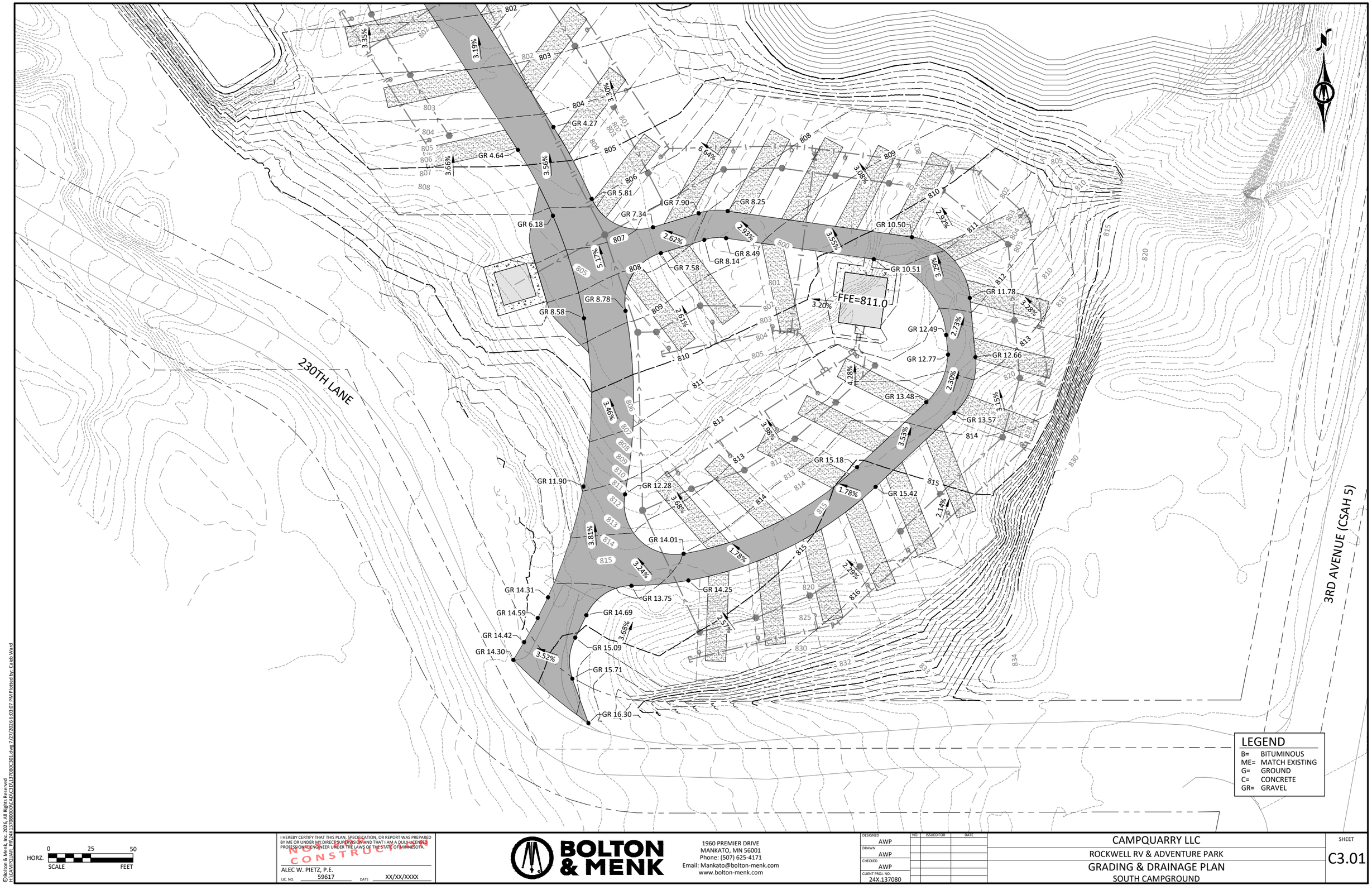
STORMWATER POLLUTION PREVENTION PLAN
TRAILHEAD

SHEET C2.24



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HORZ. SCALE 0 25 50 FEET

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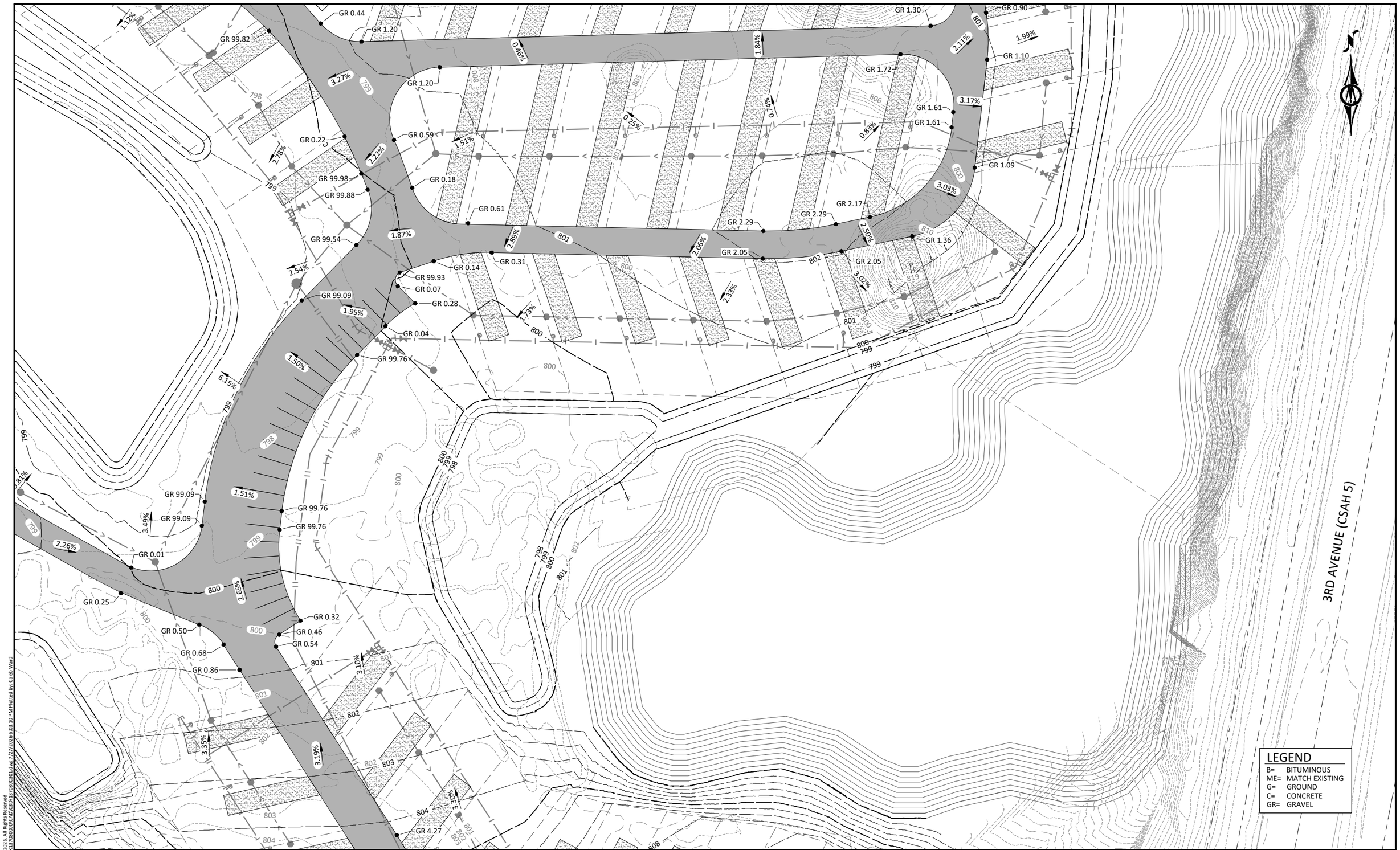
GRADING & DRAINAGE PLAN
SOUTH CAMPGROUND

SHEET
C3.01



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HORZ. SCALE 0 25 50 FEET

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GRADING & DRAINAGE PLAN
SOUTH CAMPGROUND

SHEET C3.02

231ST LANE

3RD AVENUE (CSAH 5)

FFE=801.5

GR 1.98
GR 2.22
GR 1.37
GR 1.61
GR 99.98
GR 99.60
GR 0.20
GR 0.44
GR 99.82
GR 1.20
GR 0.22
GR 0.59
GR 0.18
GR 99.88
GR 99.54
GR 0.61
GR 1.65
GR 1.05
GR 1.30
GR 1.72
GR 1.61
GR 2.17
GR 2.29
GR 0.81
GR 0.90
GR 1.10
GR 1.09

LEGEND

B=	BITUMINOUS
ME=	MATCH EXISTING
G=	GROUND
C=	CONCRETE
GR=	GRAVEL

HORZ. SCALE 0 25 50 FEET

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GRADING & DRAINAGE PLAN
SOUTH CAMPGROUND

SHEET C3.03

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ROCKWELL RV & ADVENTURE PARK
GRADING & DRAINAGE PLAN
SOUTH CAMPGROUND

SHEET
C3.04

231ST LANE

ME 29.02 · ME 30.00 · ME 29.25 · ME 29.09 · GR 29.60 · GR 30.60 · GR 28.51 · GR 29.89 · GR 29.45 · ME 27.68 · GR 27.74 · GR 27.50 · GR 28.27 · 6.66% · 1.54% · 1.37% · 3.99% · 3.01% · 1.51% · 1.97% · 1.63% · 1.03% · FFE=811.0 · GR 2.37 · GR 0.78 · GR 2.13 · GR 0.61 · GR 0.90 · GR 0.40 · GR 99.71 · GR 99.34 · GR 1.28 · GR 10.80 · GR 11.00 · GR 9.07 · GR 3.00 · GR 0.37 · GR 4.56 · GR 99.99 · 8.81% · 4.29% · 1.50% · 1.83% · 1.80% · 1.88% · 1.49% · 1.12% · 1.77% · 1.61% · 2.67% · 1.66% · GR 5.15 · GR 4.60 · GR 4.50 · GR 4.74 · 1.75% · 2.27% · GR 4.00 · GR 4.25 · GR 4.24 · 1.52% · 1.27% · 0.76% · 2.47%

LEGEND

B=	BITUMINOUS
ME=	MATCH EXISTING
G=	GROUND
C=	CONCRETE
GR=	GRAVEL

HORZ. 0 25 50 SCALE FEET

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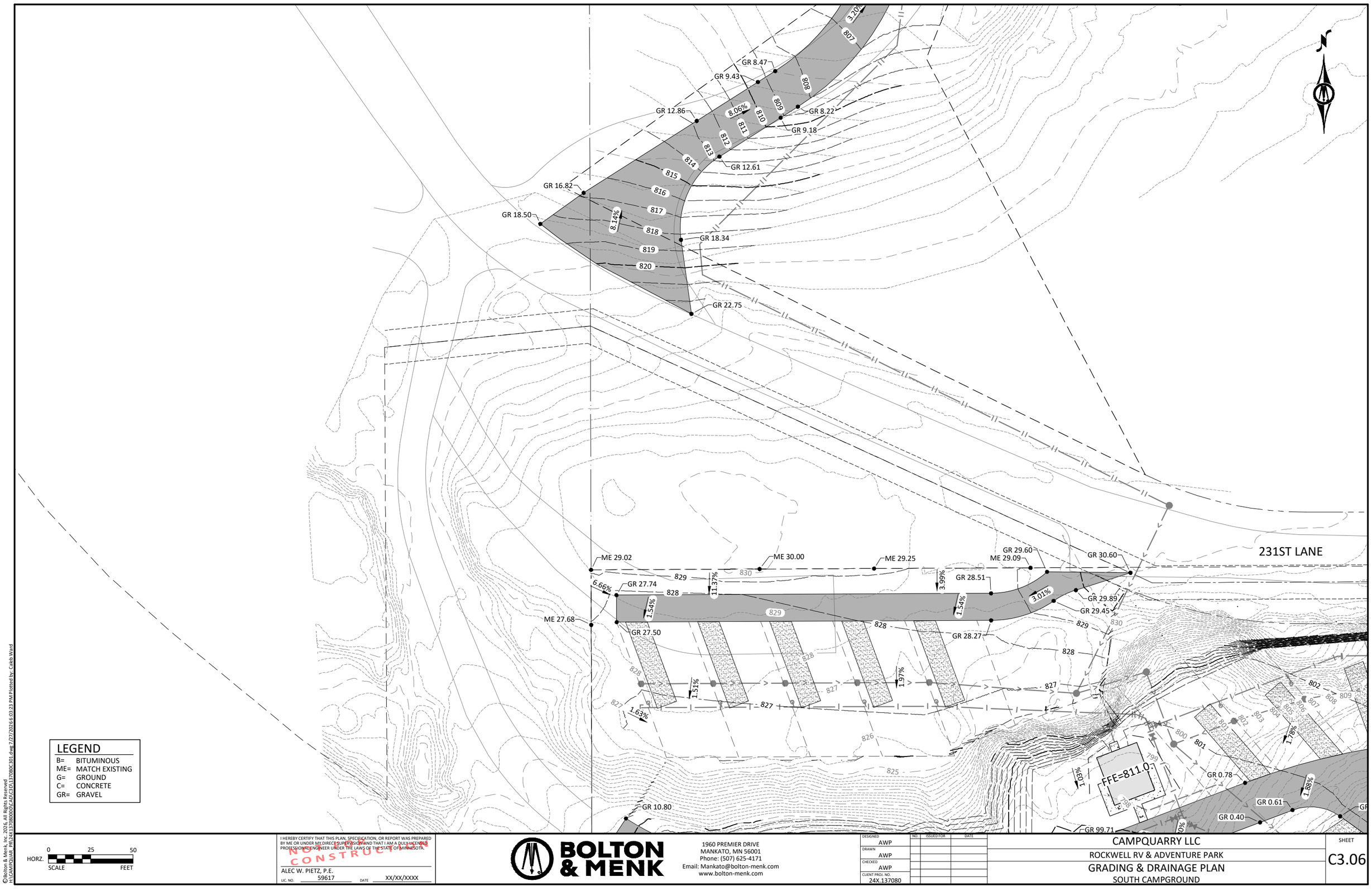

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HORZ. 0 25 50
SCALE FEET

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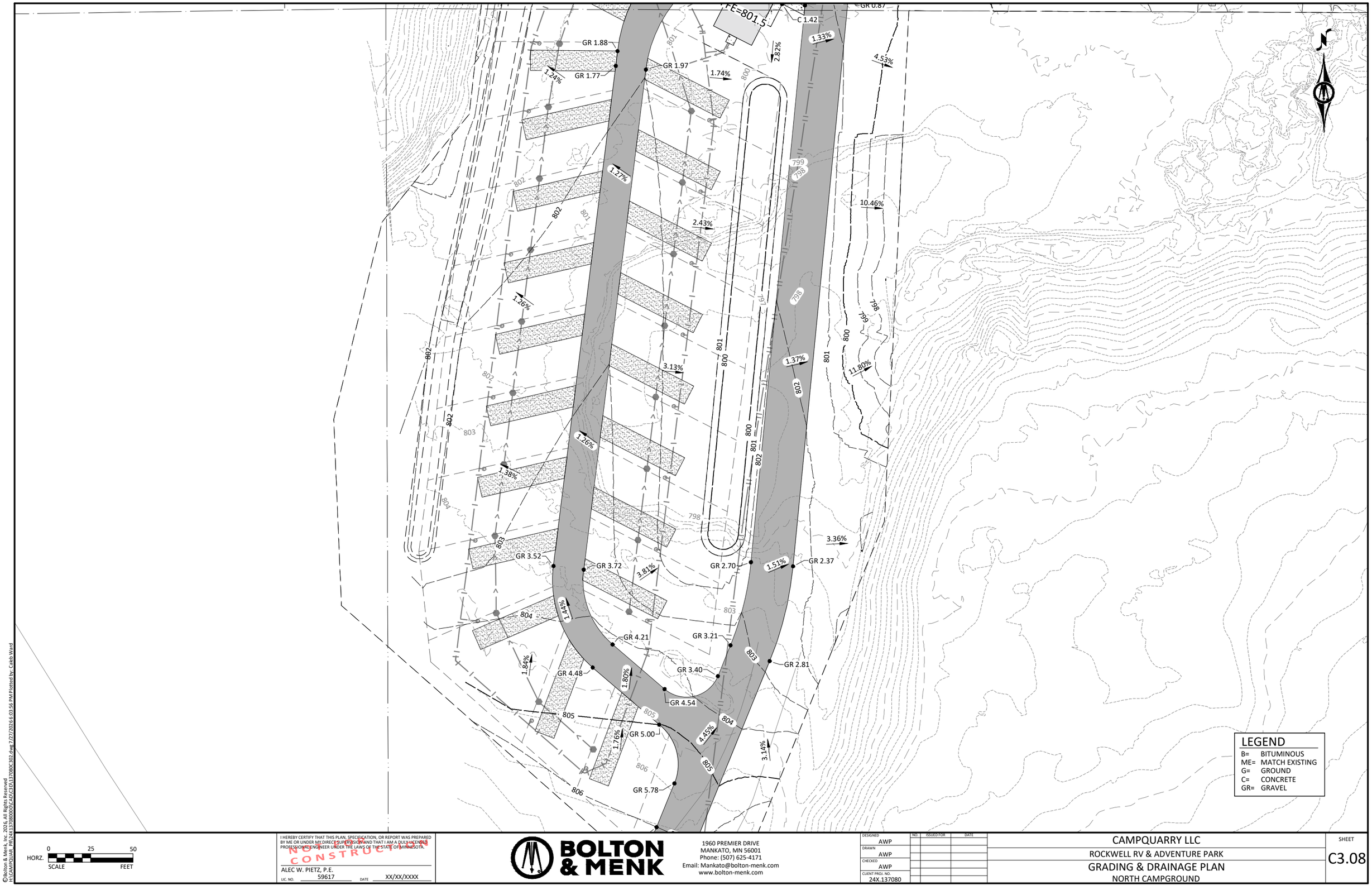
GRADING & DRAINAGE PLAN
NORTH CAMPGROUND

SHEET
C3.07



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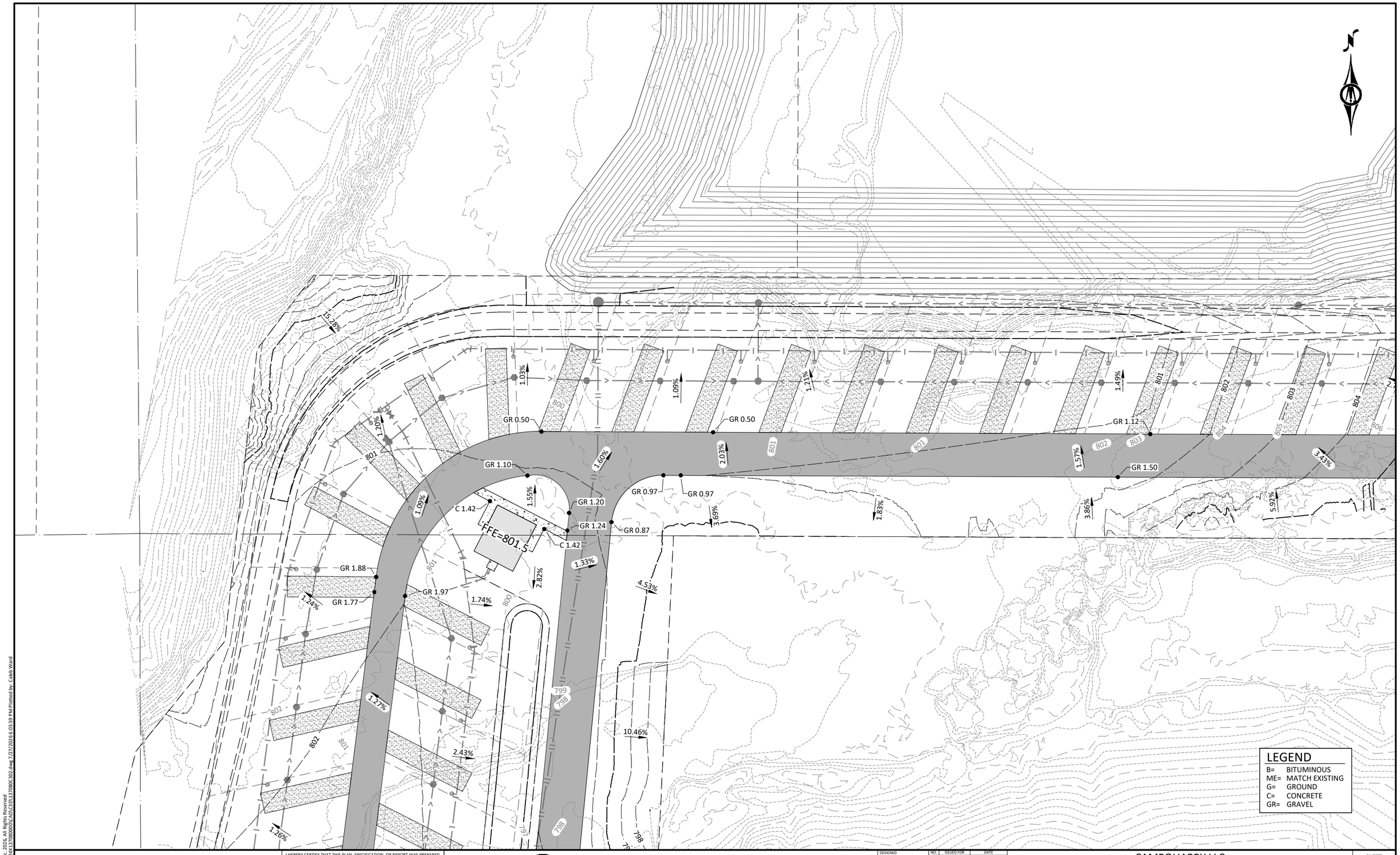

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HORZ. SCALE 0 25 50 FEET

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NORTH CAMPGROUND

SHEET
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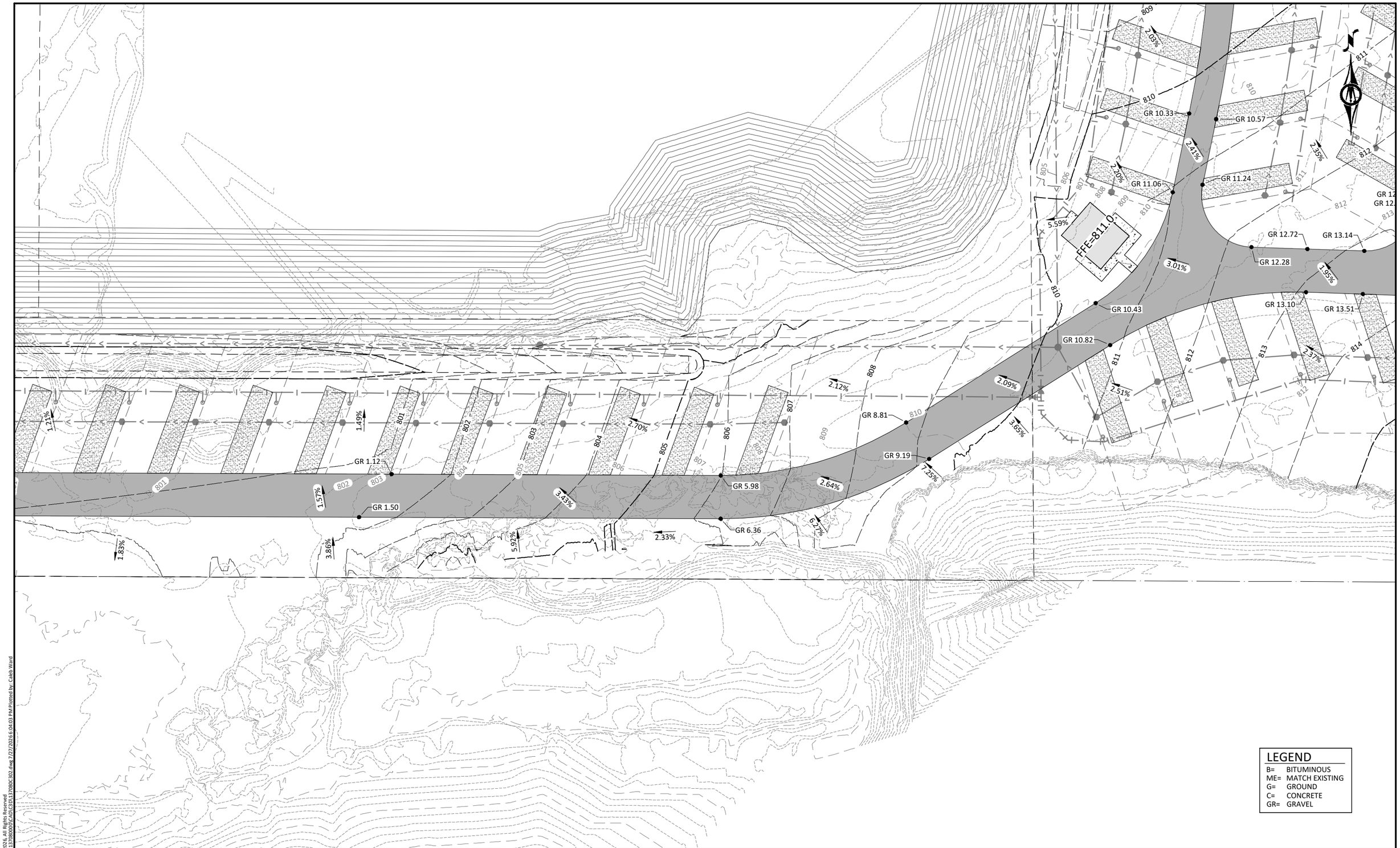

HORZ. SCALE 0 25 50 FEET

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SHEET C3.10

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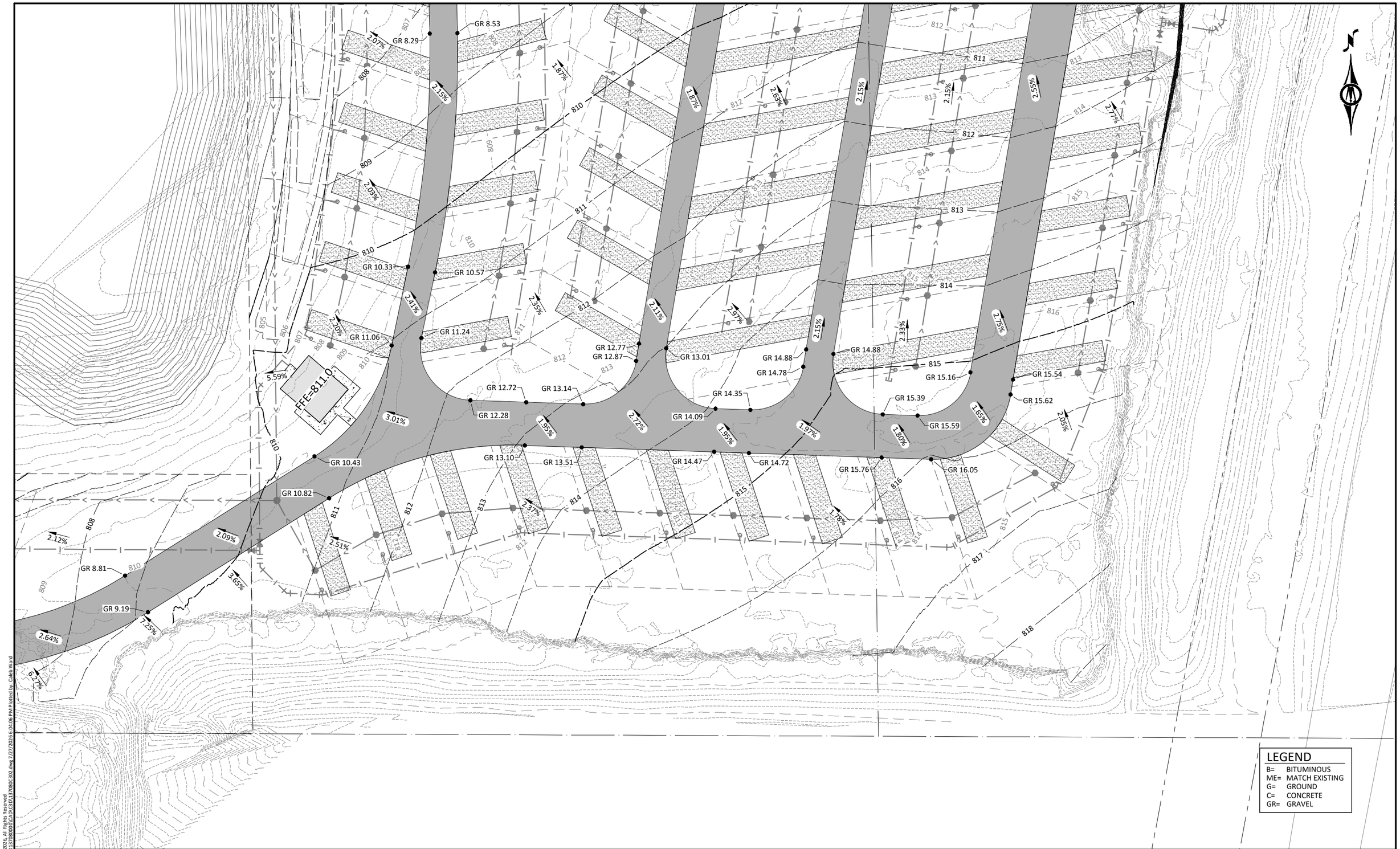

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HORZ. SCALE 0 25 50 FEET

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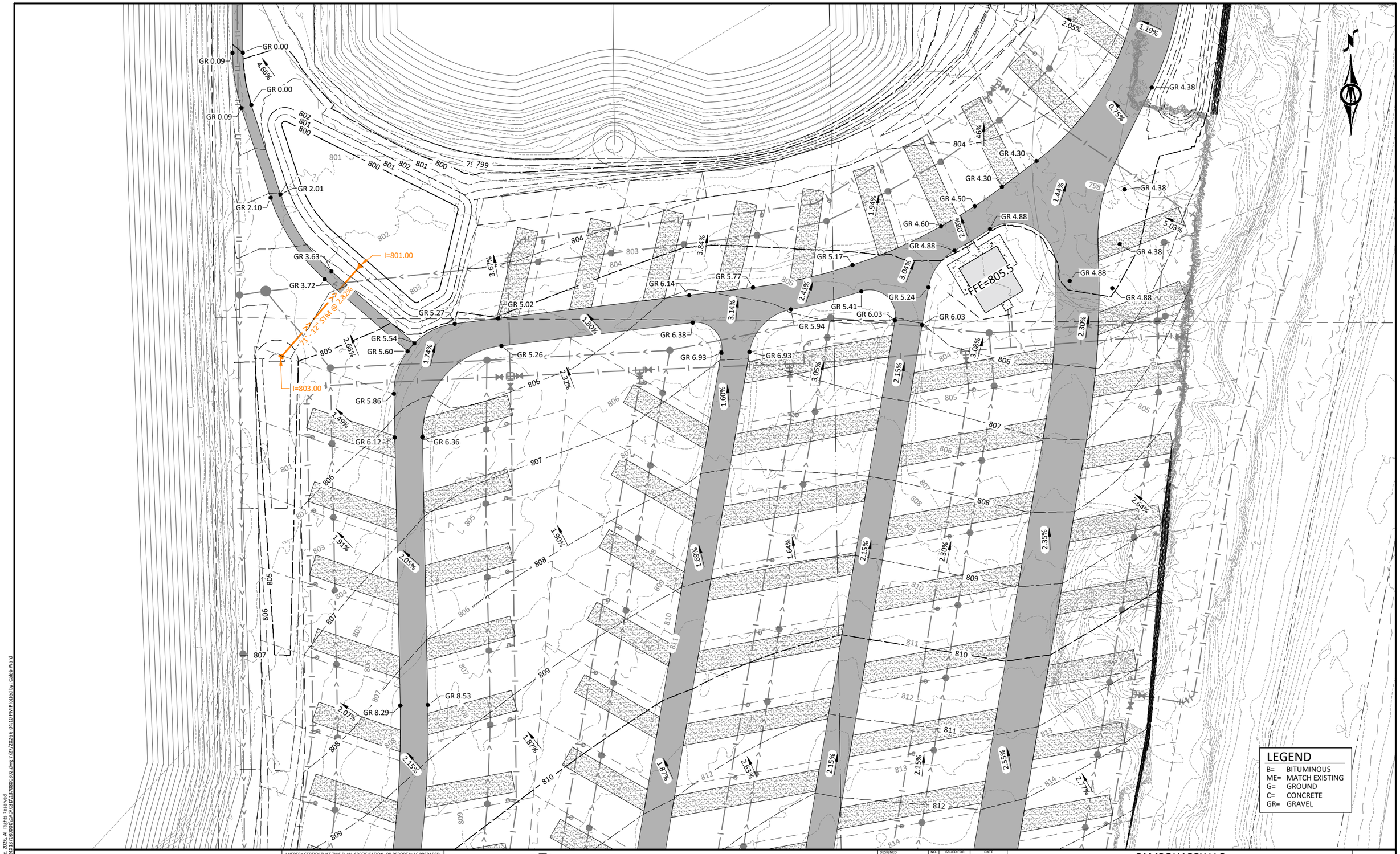

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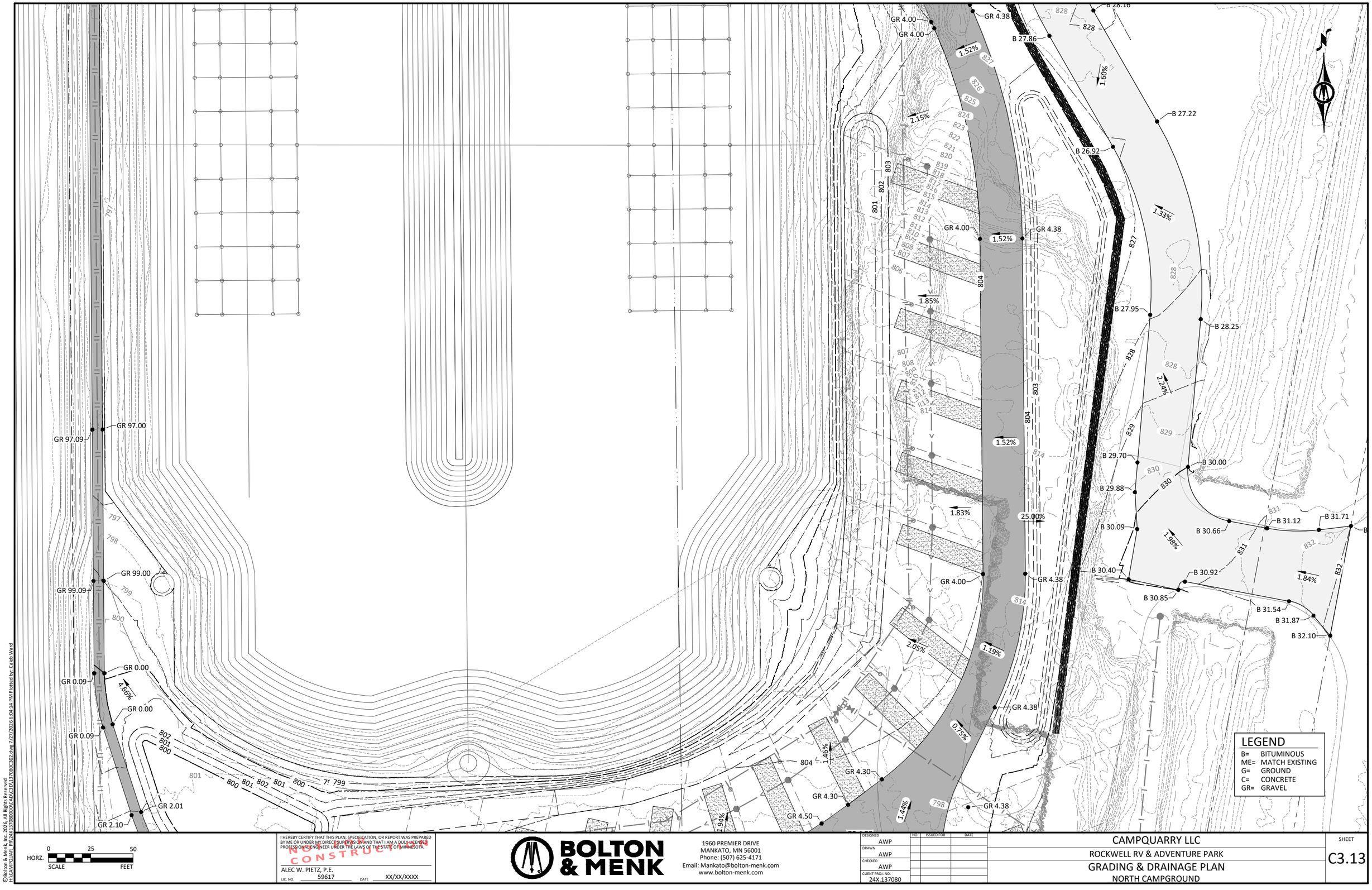

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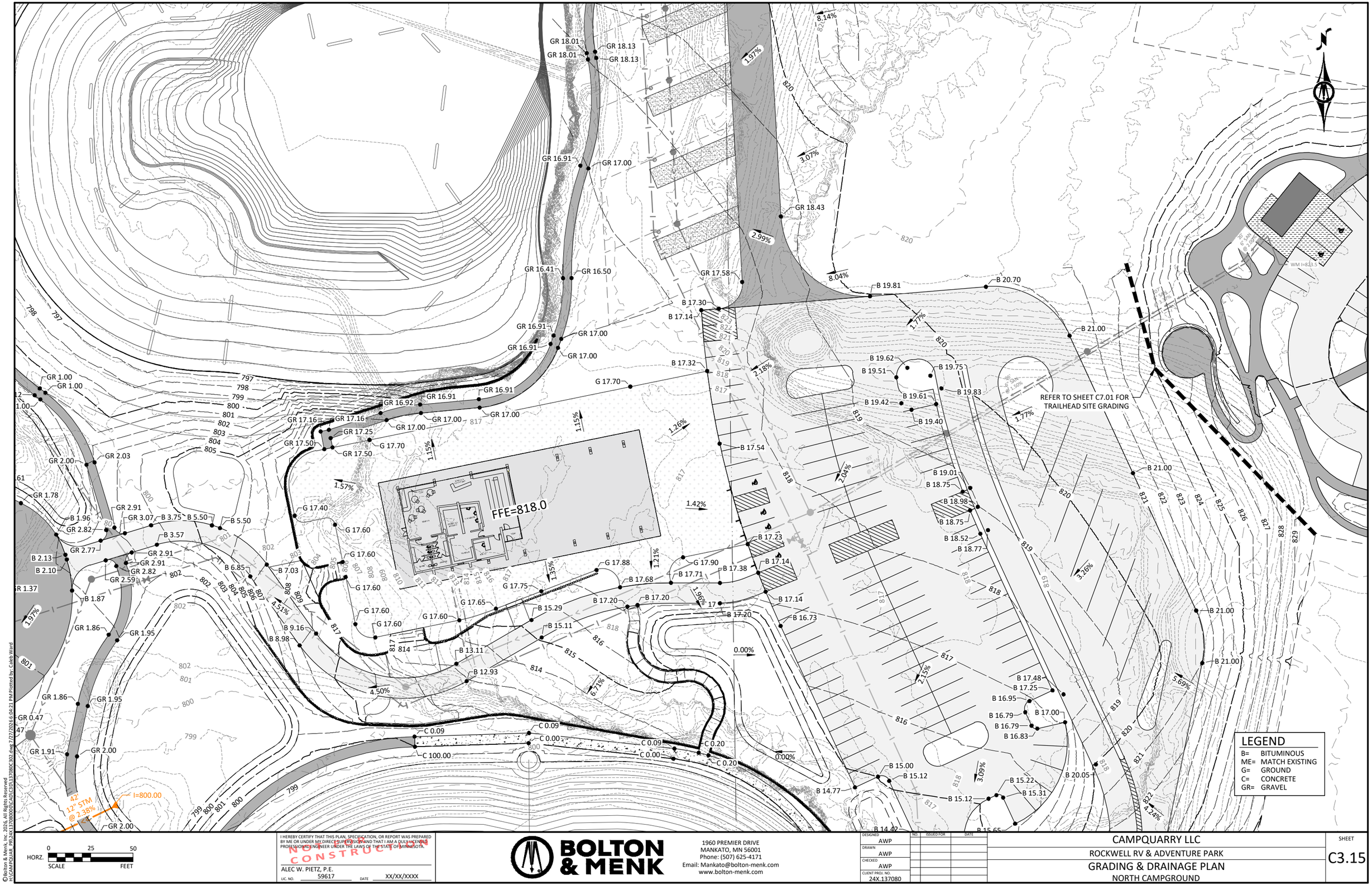
NORTH CAMPGROUND

SHEET
C3.14



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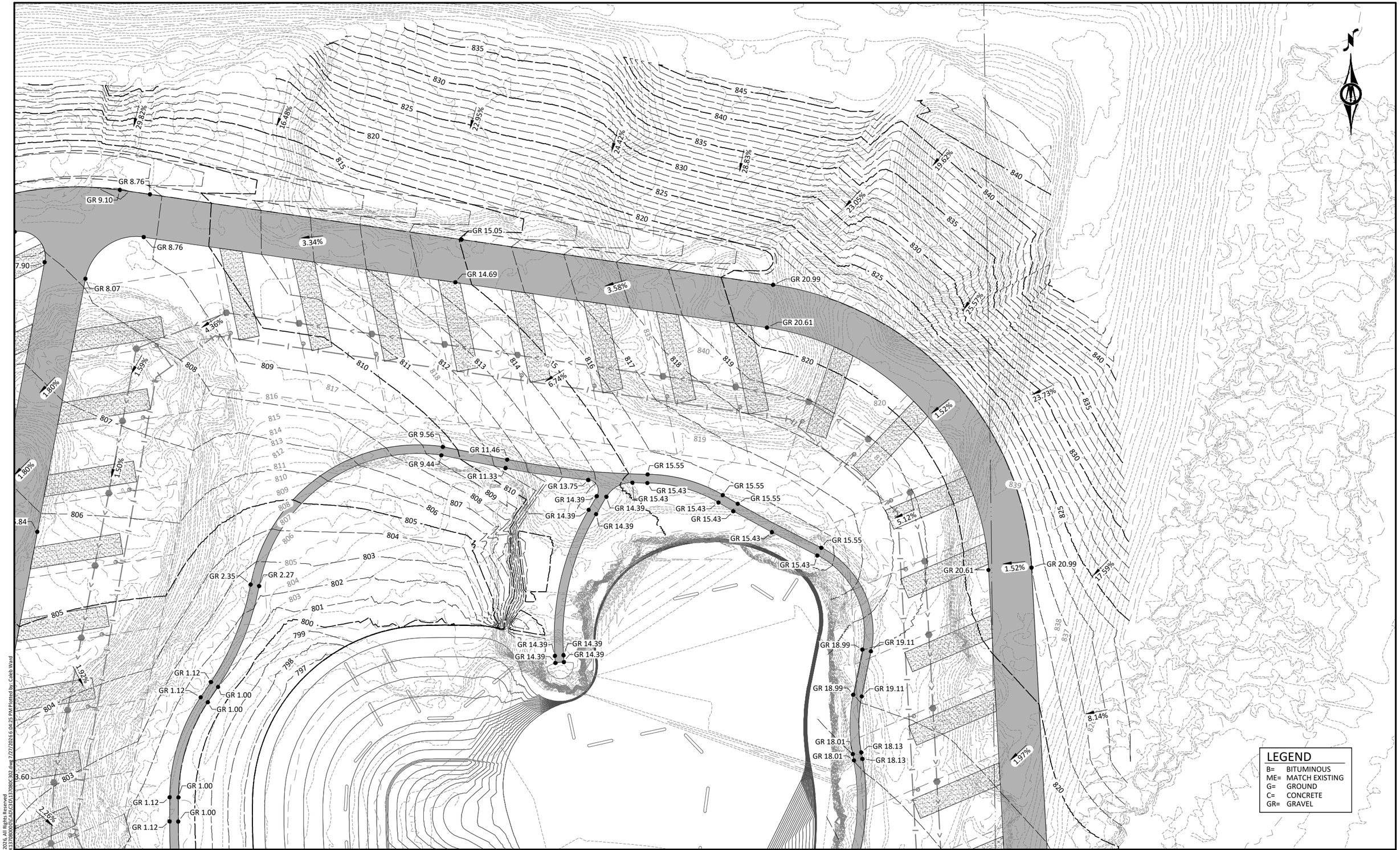

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HORZ. SCALE 0 25 50 FEET

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HORZ. 0 25 50
SCALE FEET

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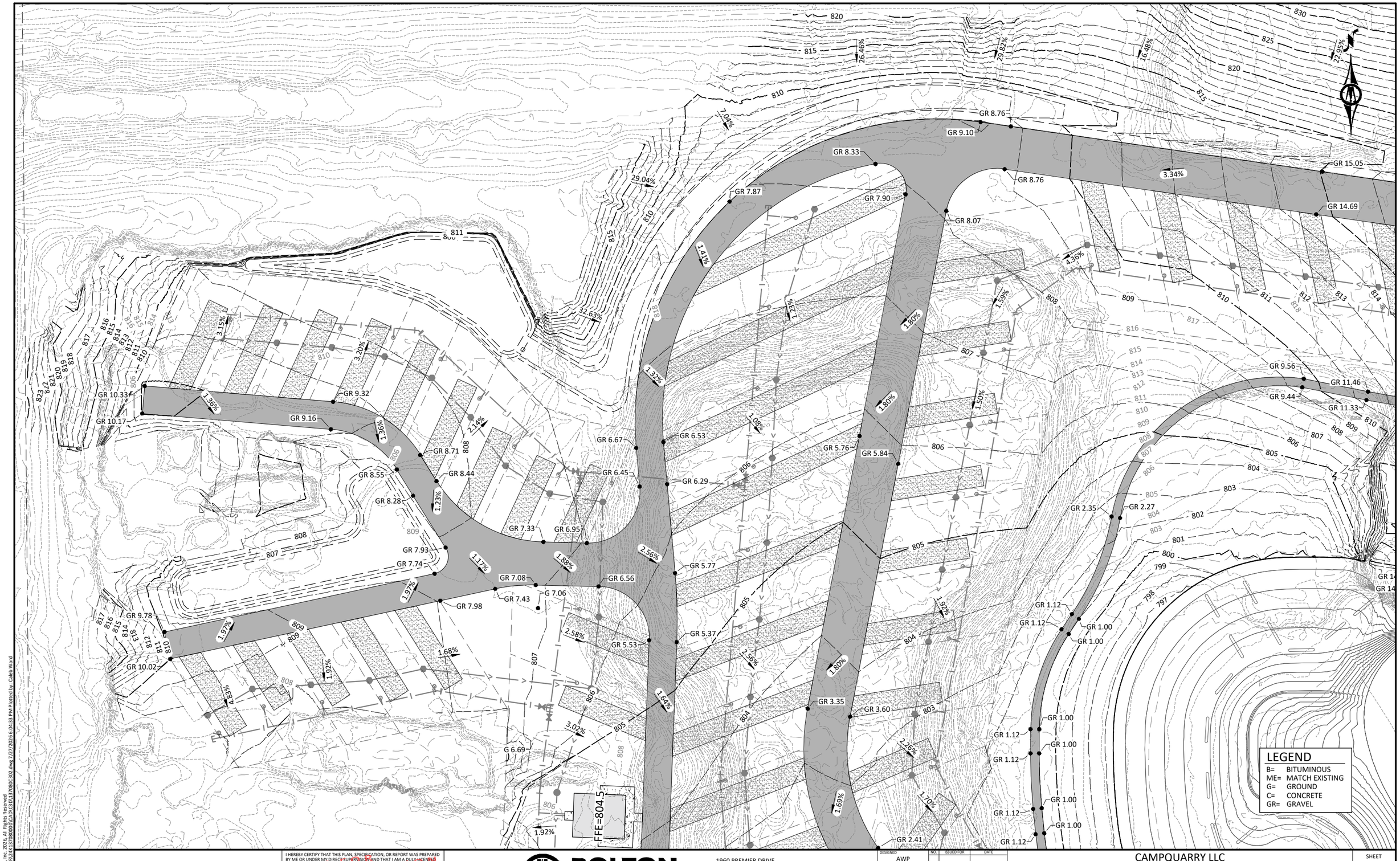

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HORZ. SCALE 0 25 50 FEET

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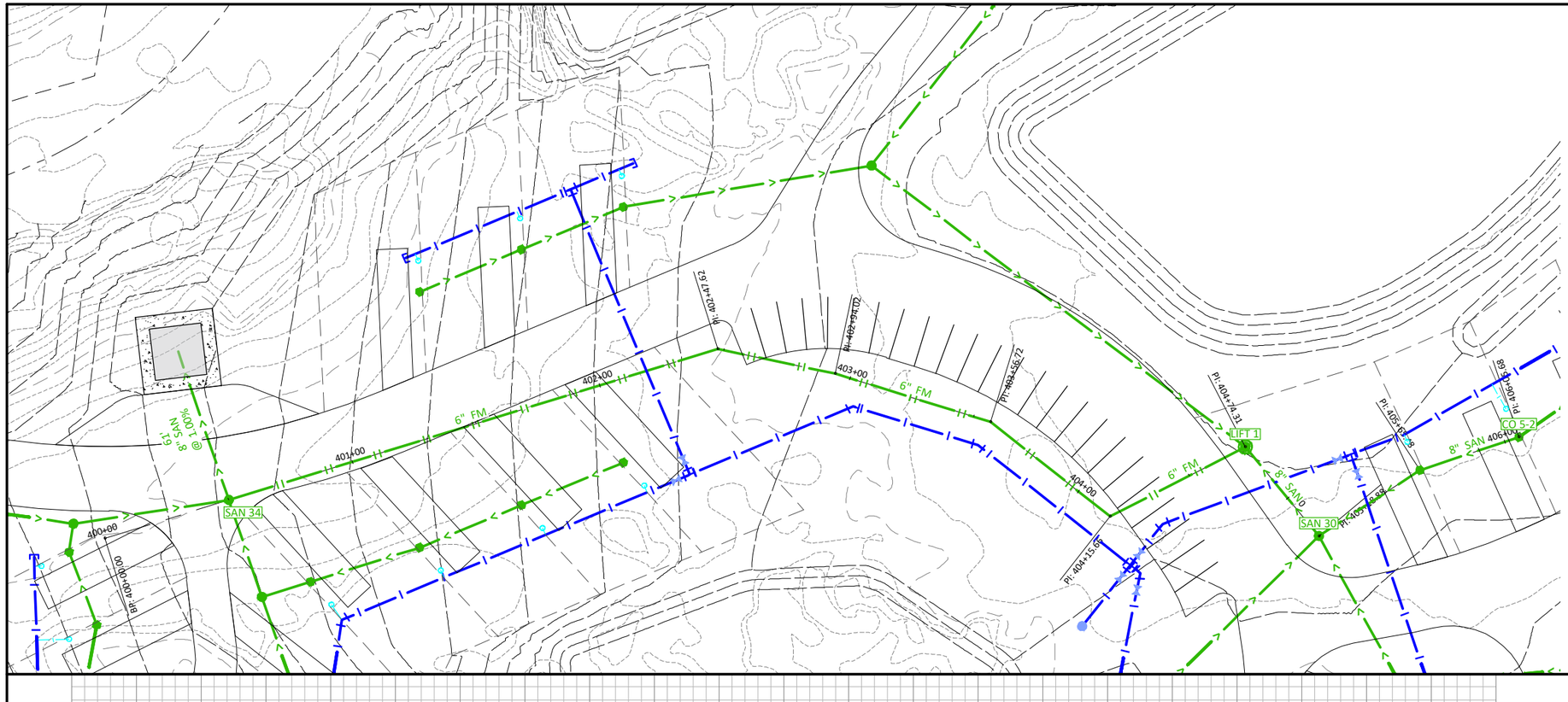
NORTH CAMPGROUND

SHEET C3.18



WATERMAIN NOTE:
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PIPE MATERIAL NOTES:

- ALL WATER PIPING SHALL BE HDPE DRII IPS PE4710 AND SHALL UTILIZE BUTT FUSED JOINTS.
- WATER PIPE SHALL NOT CONTAIN ANY JOINTS OR CONNECTIONS WITHIN 10-FEET OF CROSSING PIPES.
- ALL SANITARY SEWER PIPE SHALL BE PVC PIPE (ASTM D 3034, SDR 26) AND SHALL BE INSTALLED IN ACCORDANCE WITH ASTM D2321.
- ALL SANITARY SEWER PIPE CROSSING WATERMAIN, SHALL BE ASTM D2665, SCHEDULE 40 PVC WITH SOLVENT WELD JOINTS.
- ALL STORM SEWER PIPE SHALL BE:
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  - AS NOTED OTHERWISE ON THE PLANS, OR
  - OTHER APPROVED MATERIALS CONFORMING TO PLUMBING CODE
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HORZ. SCALE 0 25 50 FEET
VERT. SCALE 0 5 10 FEET

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STA - 400+00 TO 404+00

SHEET C4.01

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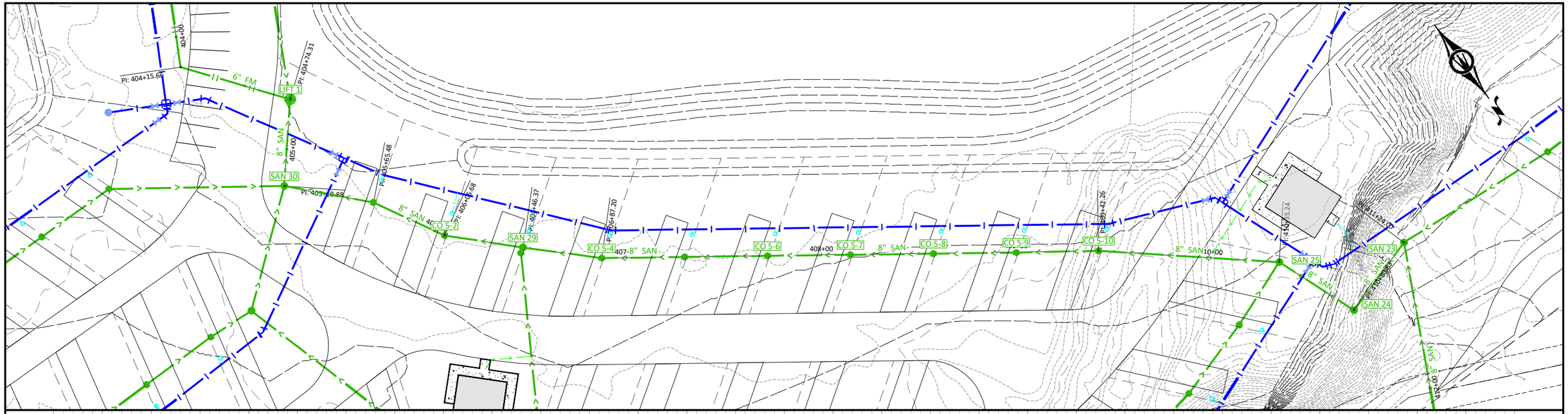

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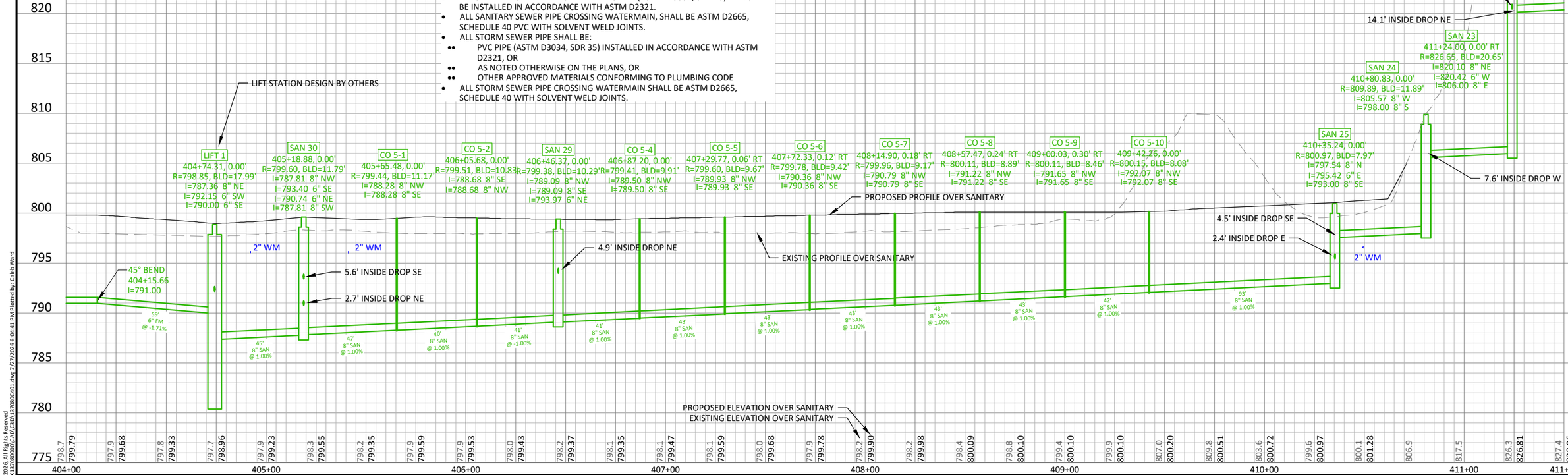

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HORZ. 0 25 50 SCALE FEET
VERT. 0 5 10 SCALE FEET

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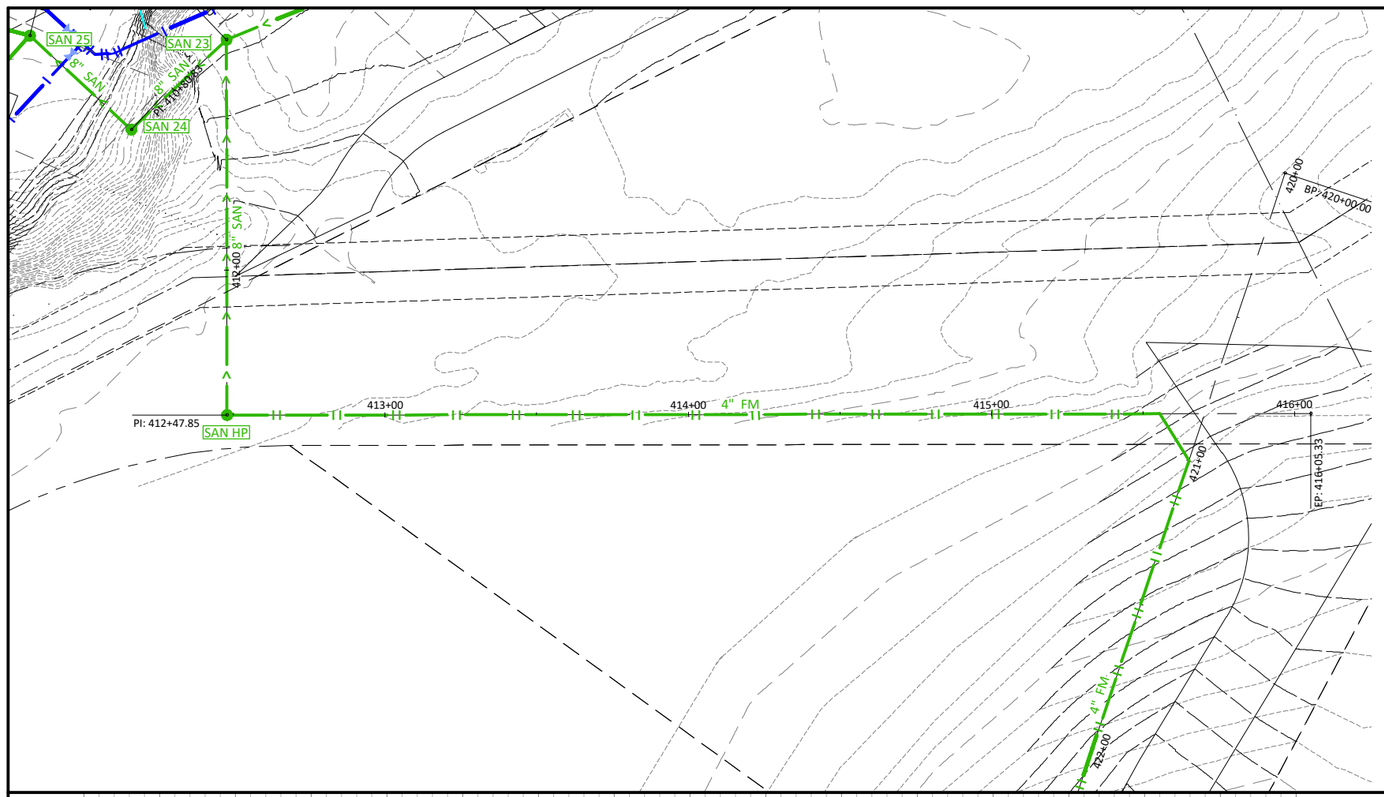

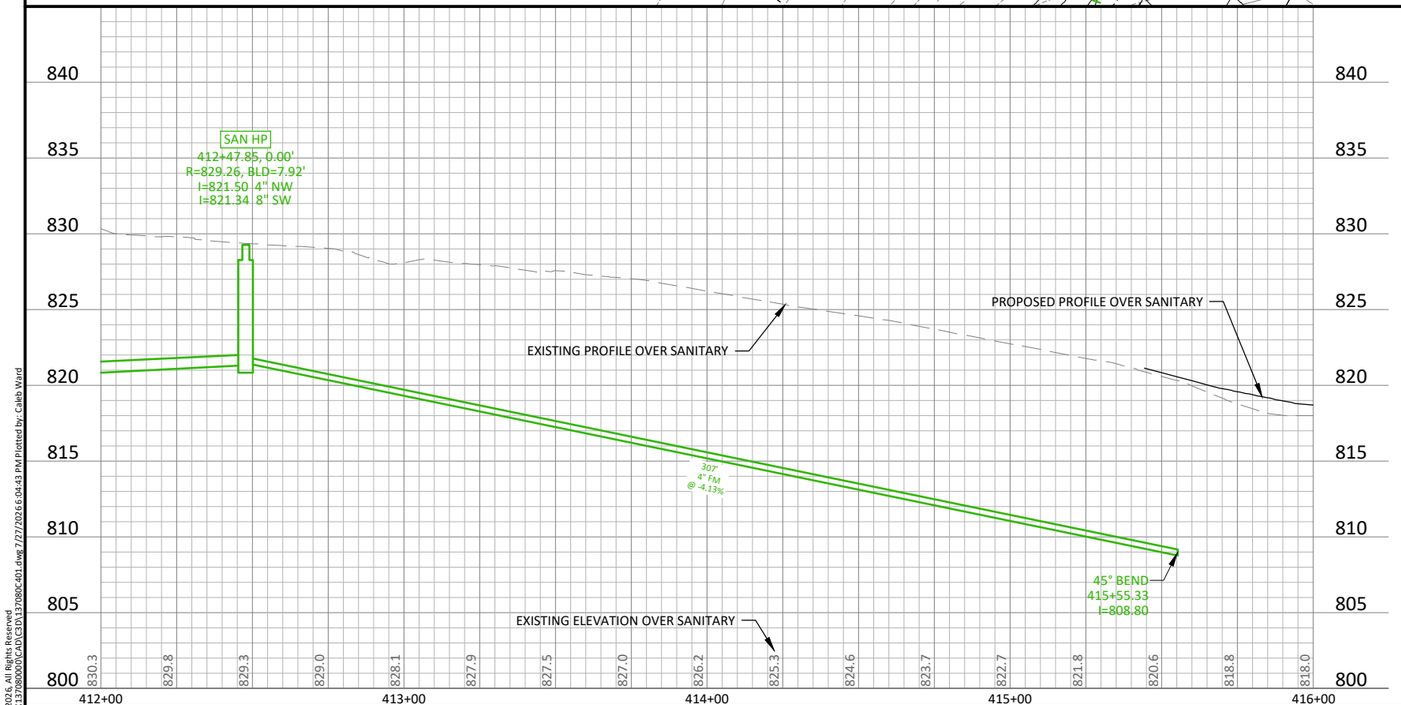

NOTE: REFER TO SHEET C4.04 FOR CONTINUED SANITARY FORCEMAIN PROFILE

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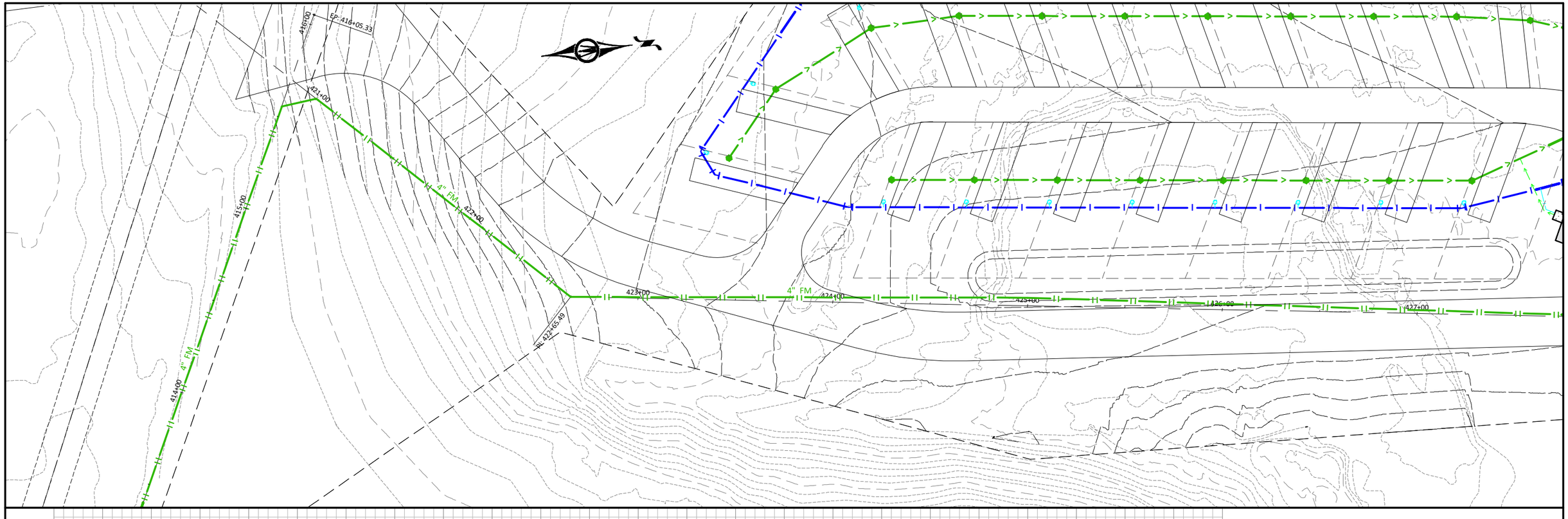

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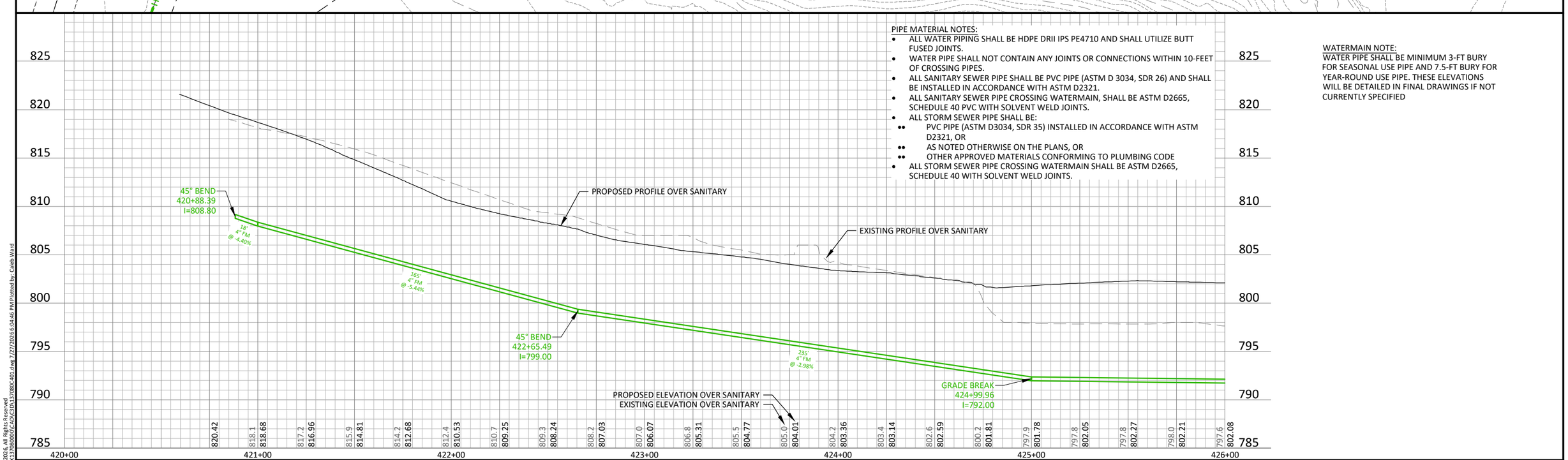

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VERT. 0 5 10 SCALE FEET

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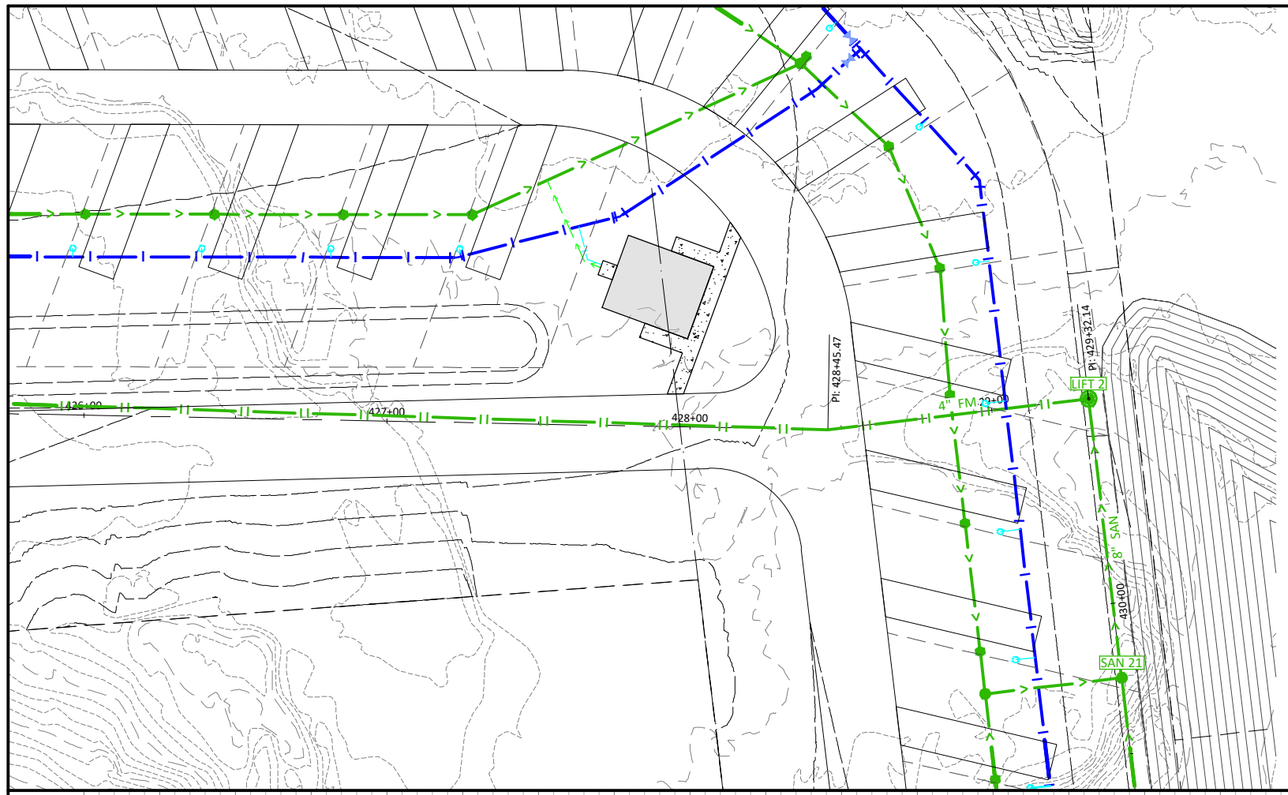

WATERMAIN NOTE:
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VERT. SCALE 0 5 10 FEET

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STA - 426+00 TO 430+00

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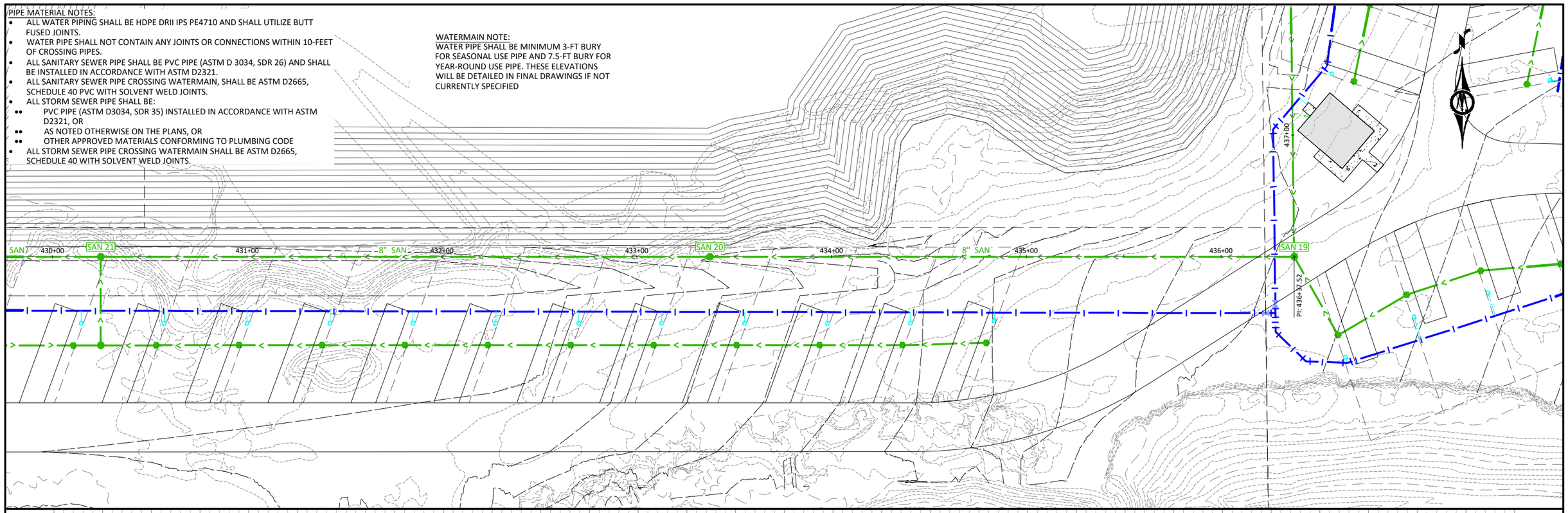

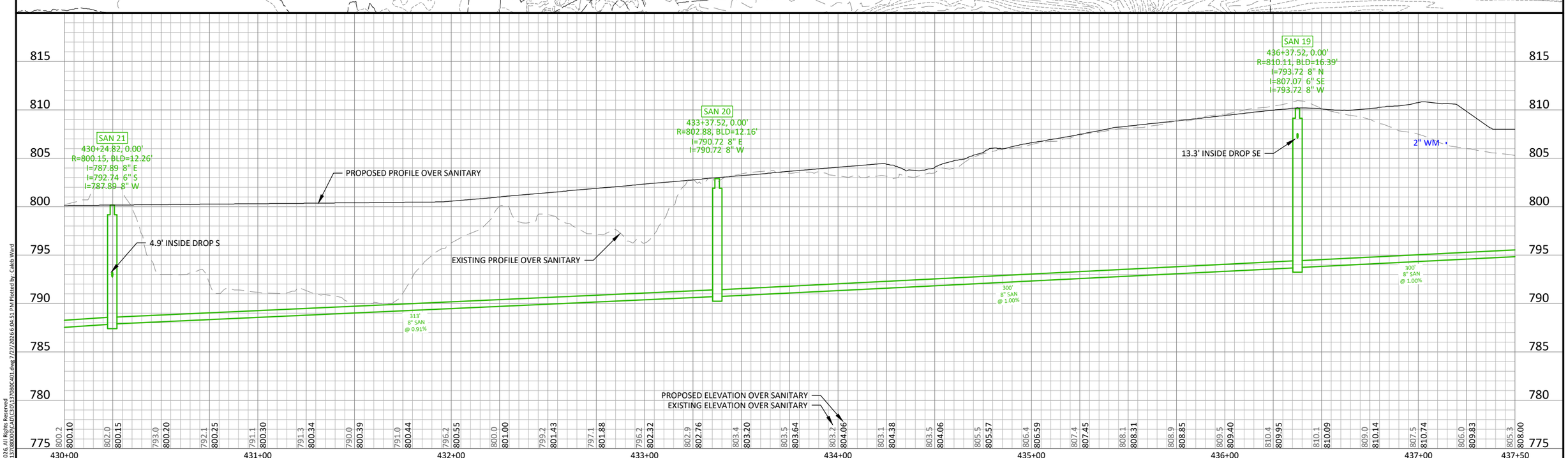

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SHEET C4.06

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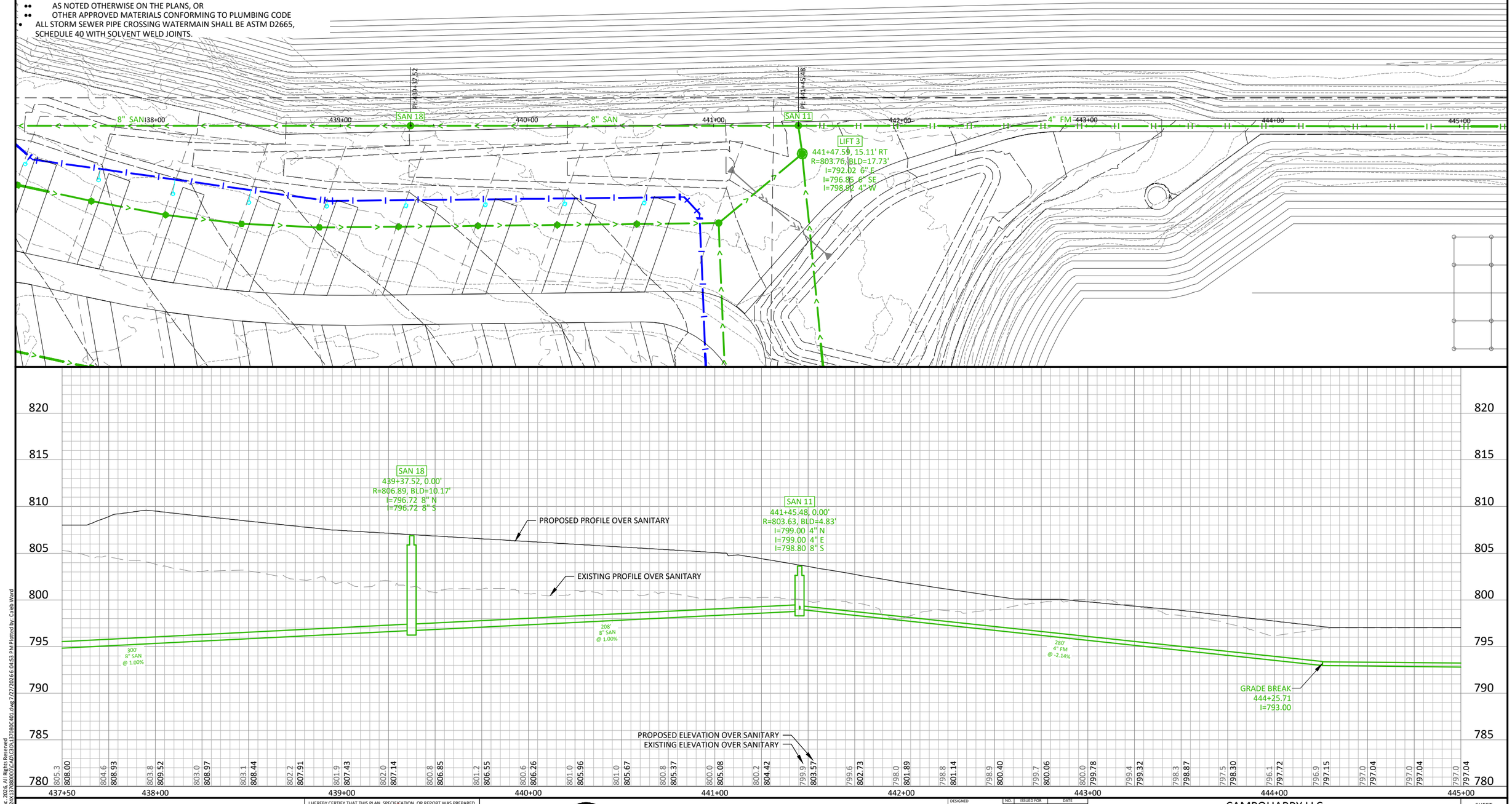

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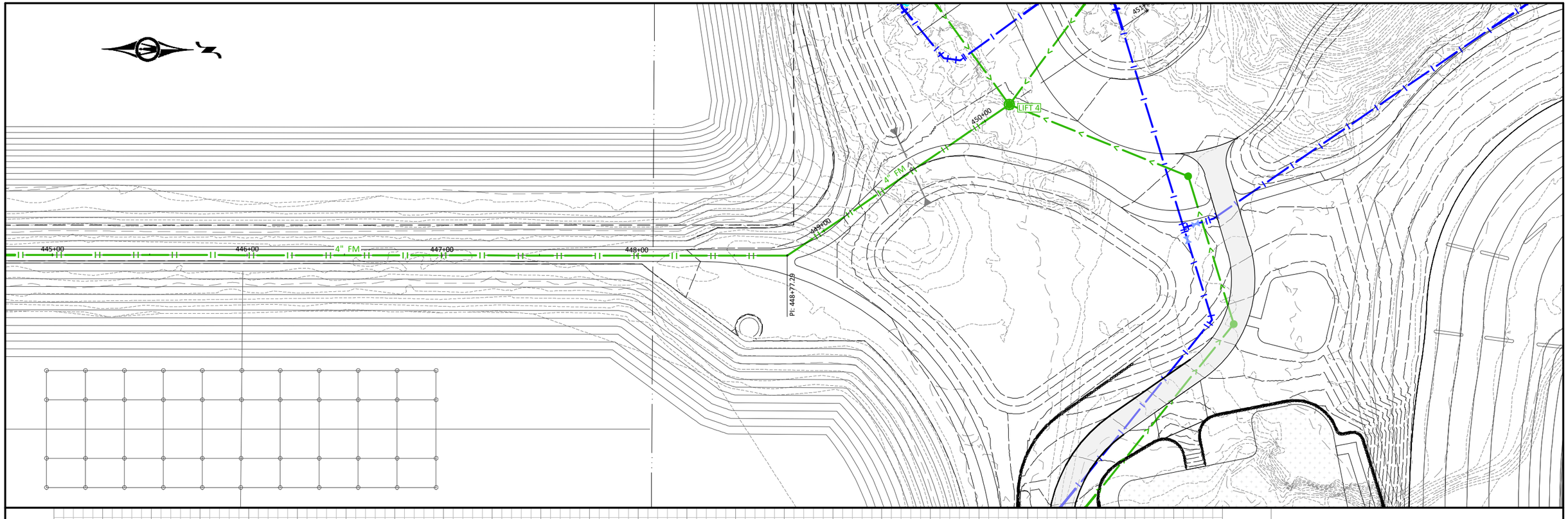

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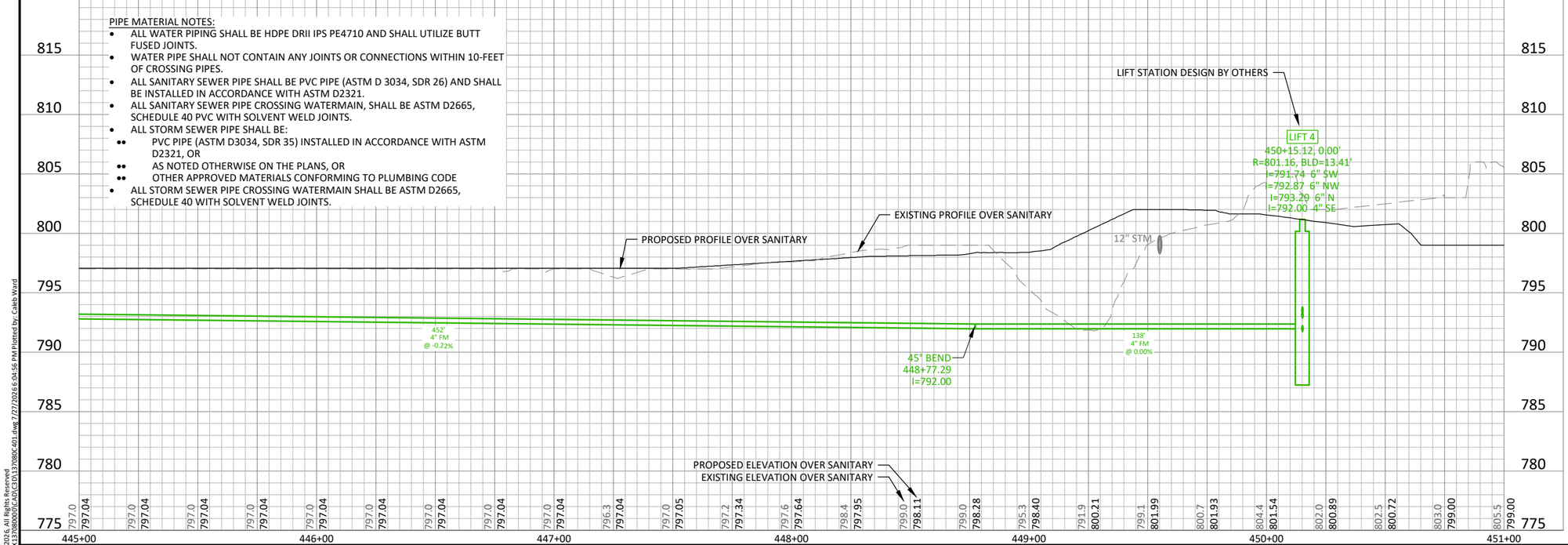

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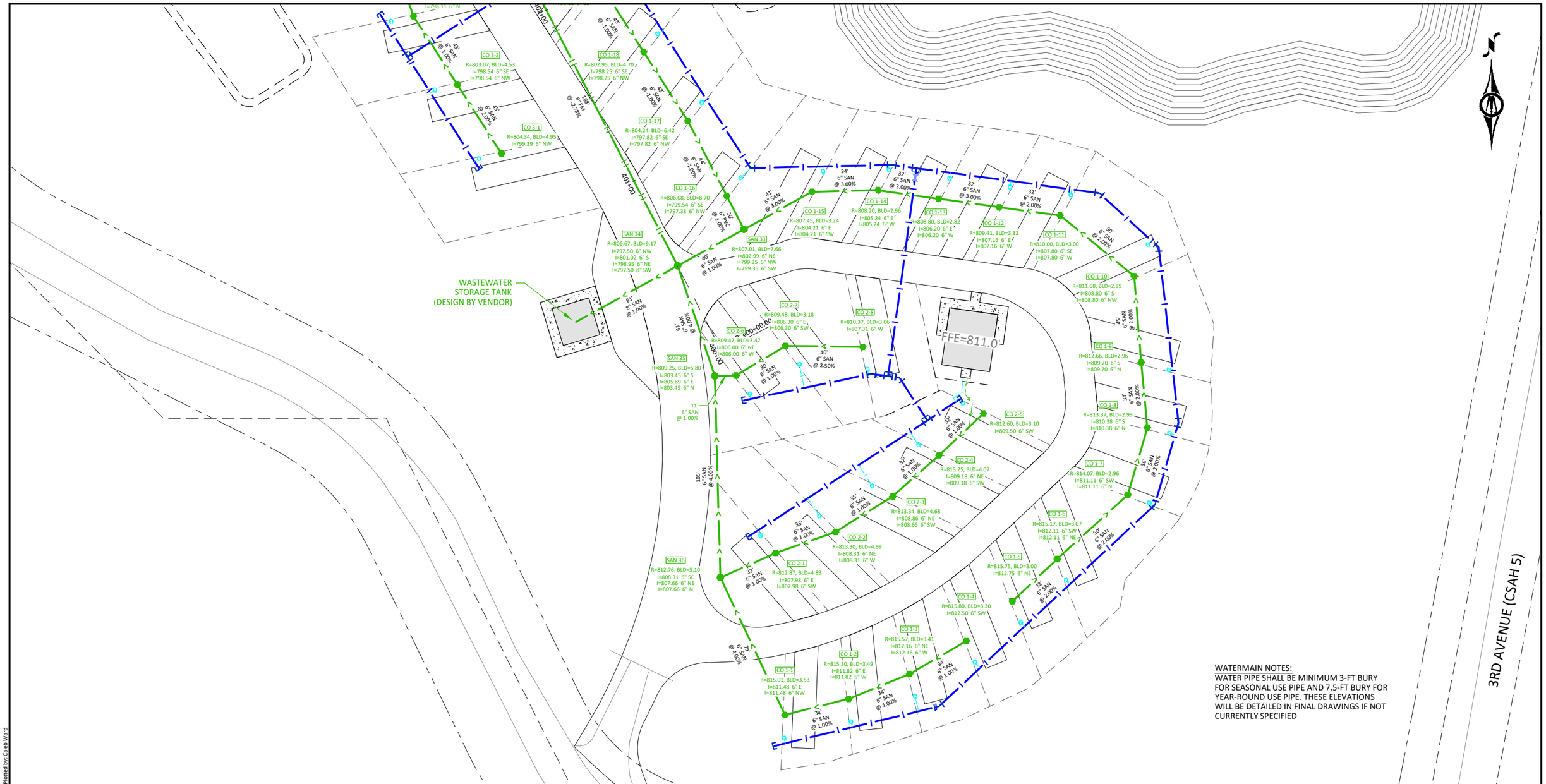

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HORZ. SCALE 0 25 50 FEET

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UTILITY PLAN
SOUTH CAMPGROUND

SHEET C4.09

APPROXIMATE PROPOSED WELL LOCATION (DESIGN BY OTHERS)

3RD AVENUE (CSAH 5)

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HORZ. SCALE 0 25 50 FEET

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SOUTH CAMPGROUND

SHEET C4.10

231ST LANE

3RD AVENUE (CSAH 5)

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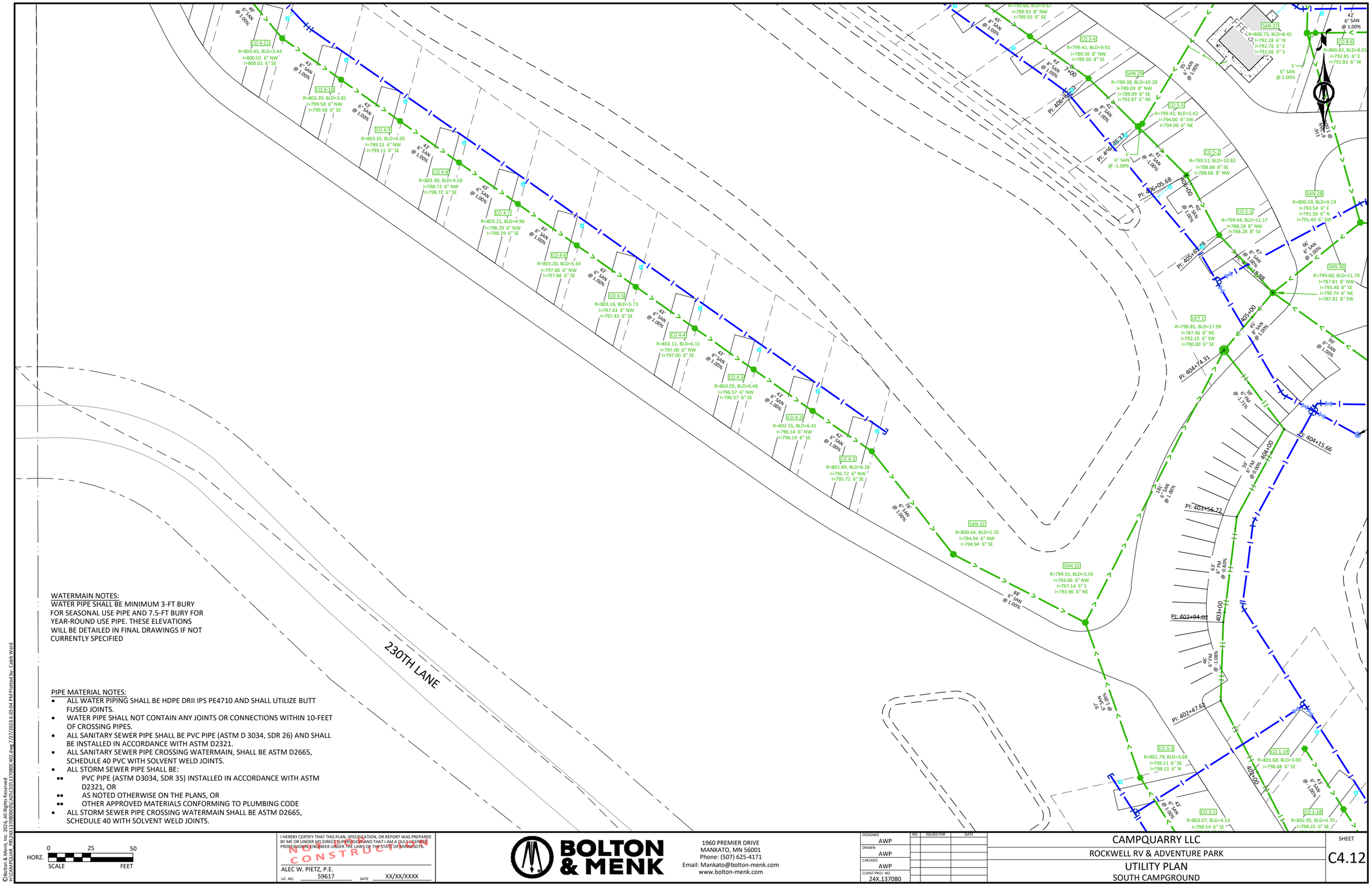

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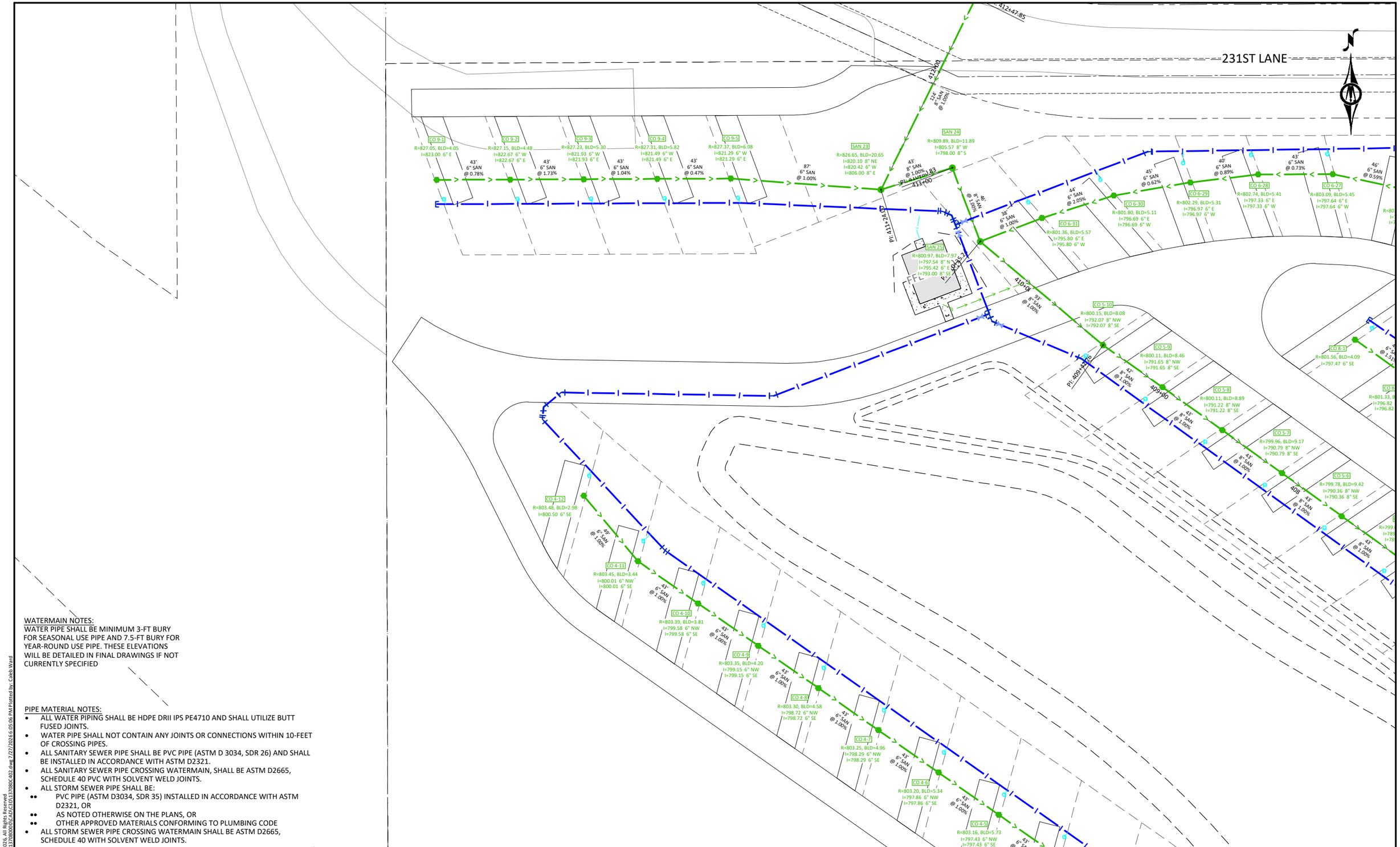

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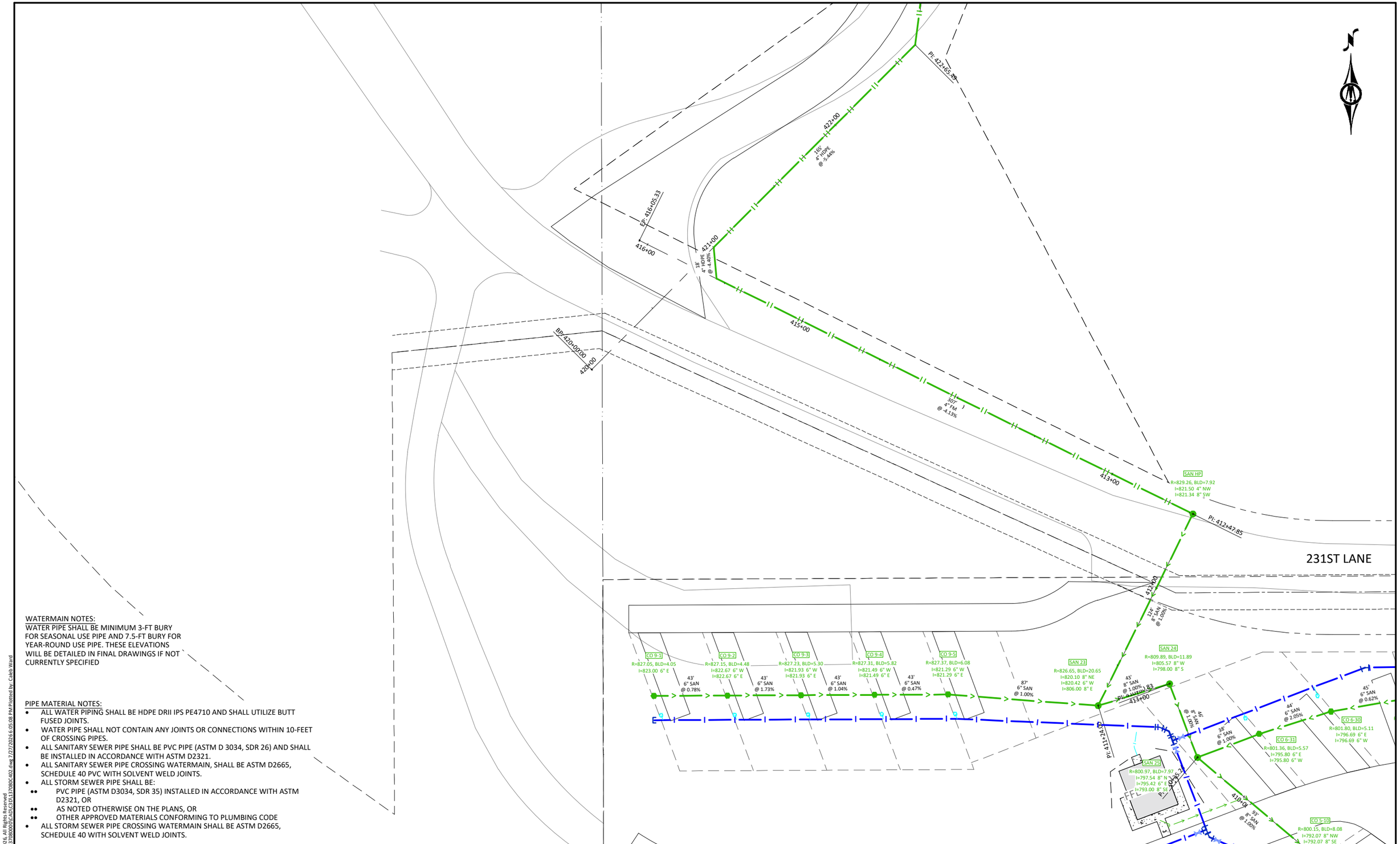

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- ALL STORM SEWER PIPE CROSSING WATERMAIN SHALL BE ASTM D2665, SCHEDULE 40 WITH SOLVENT WELD JOINTS.

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SOUTH CAMPGROUND

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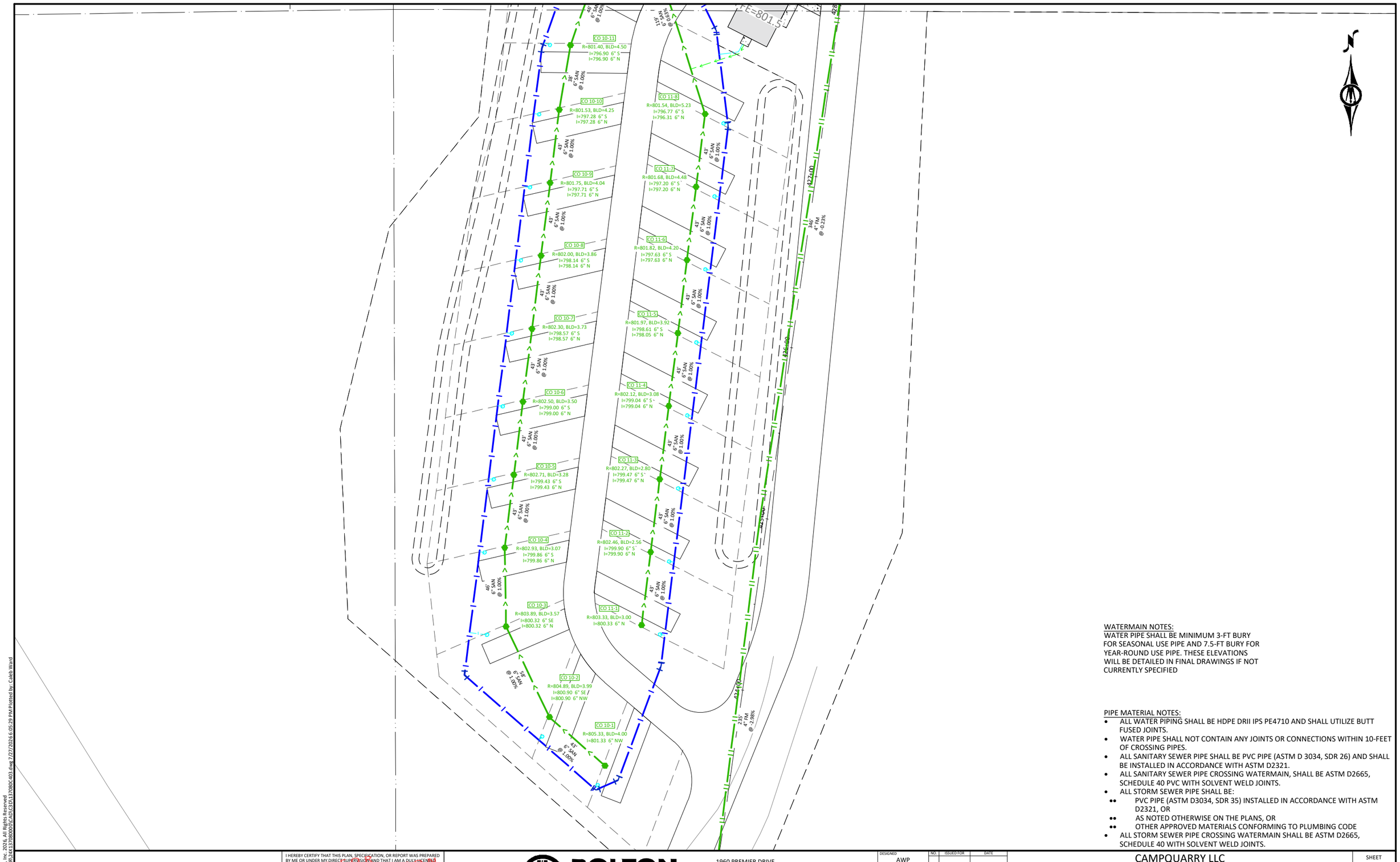

WATERMAIN NOTES:
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PIPE MATERIAL NOTES:

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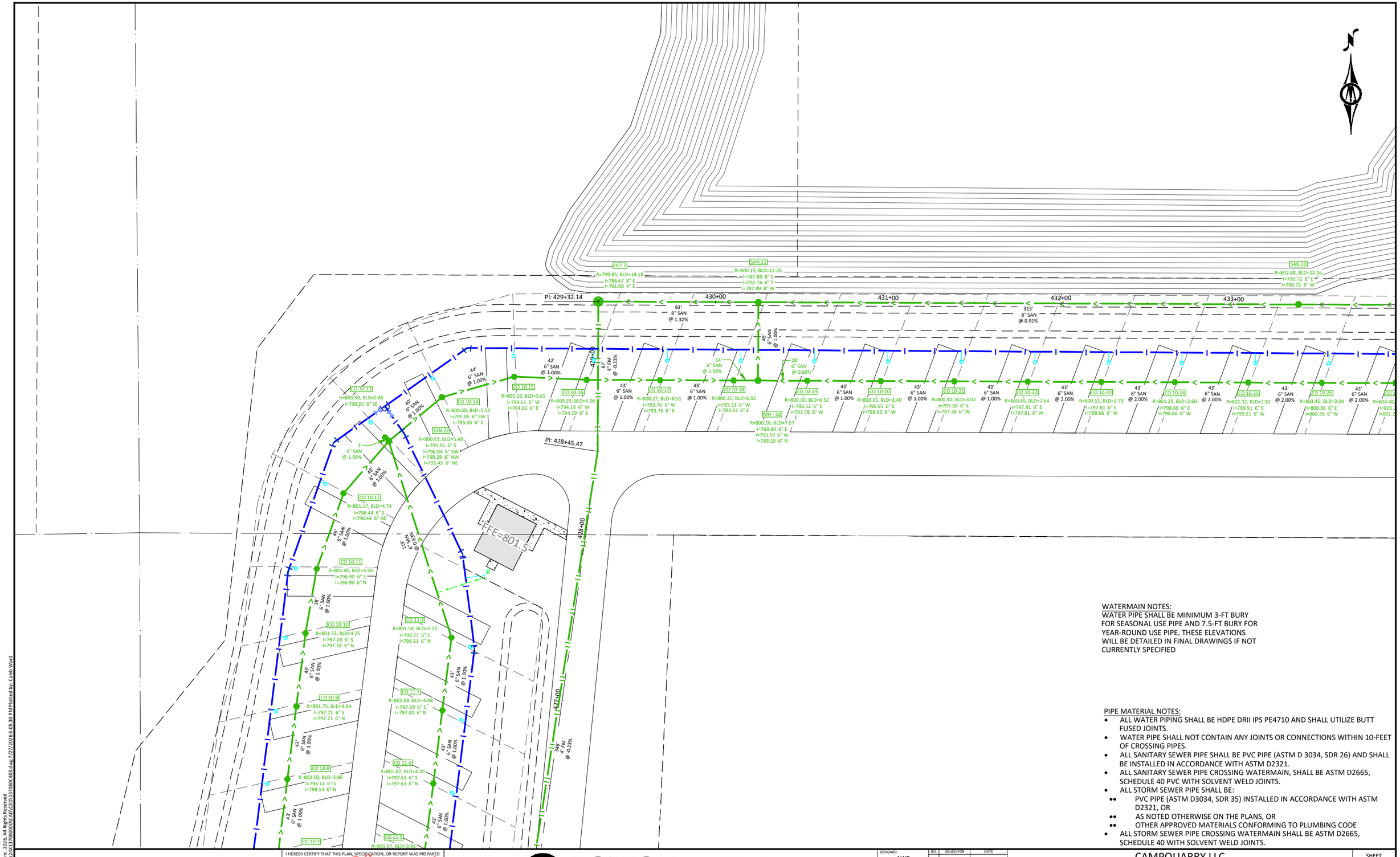

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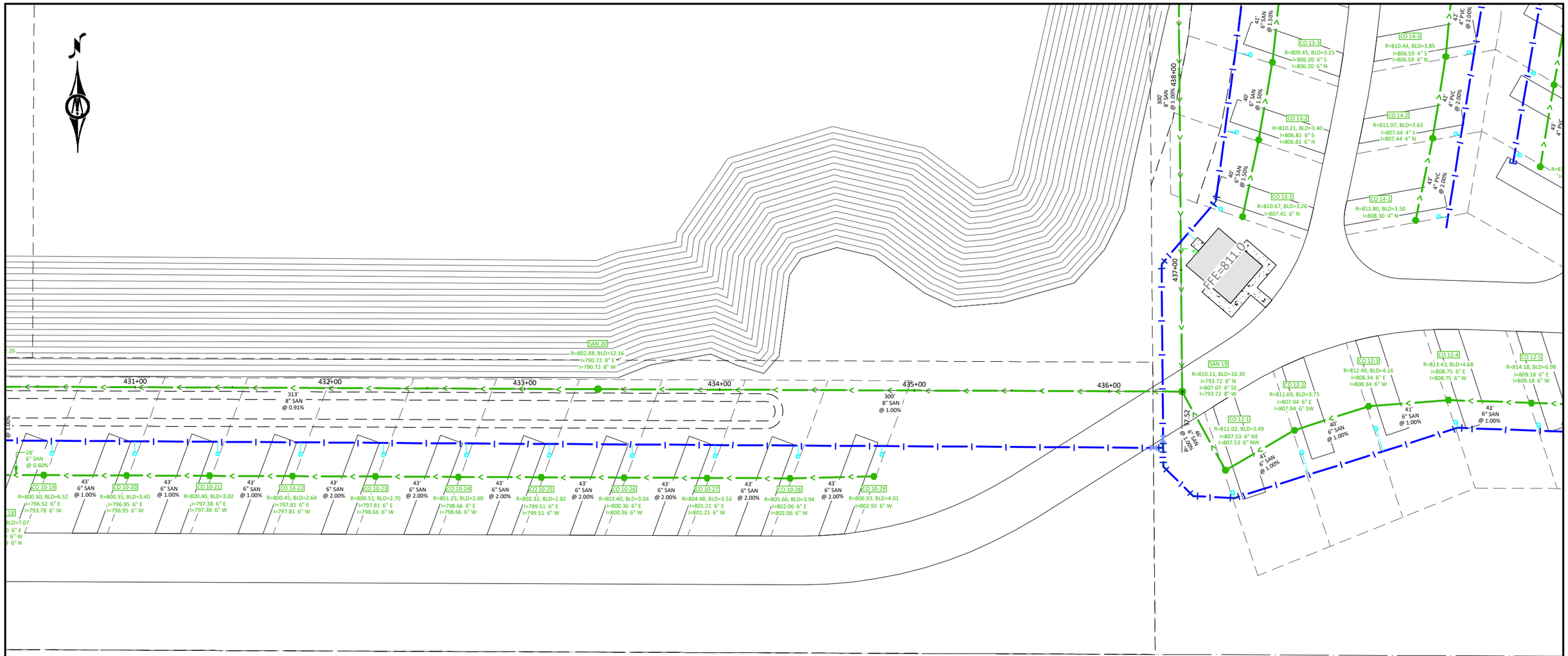

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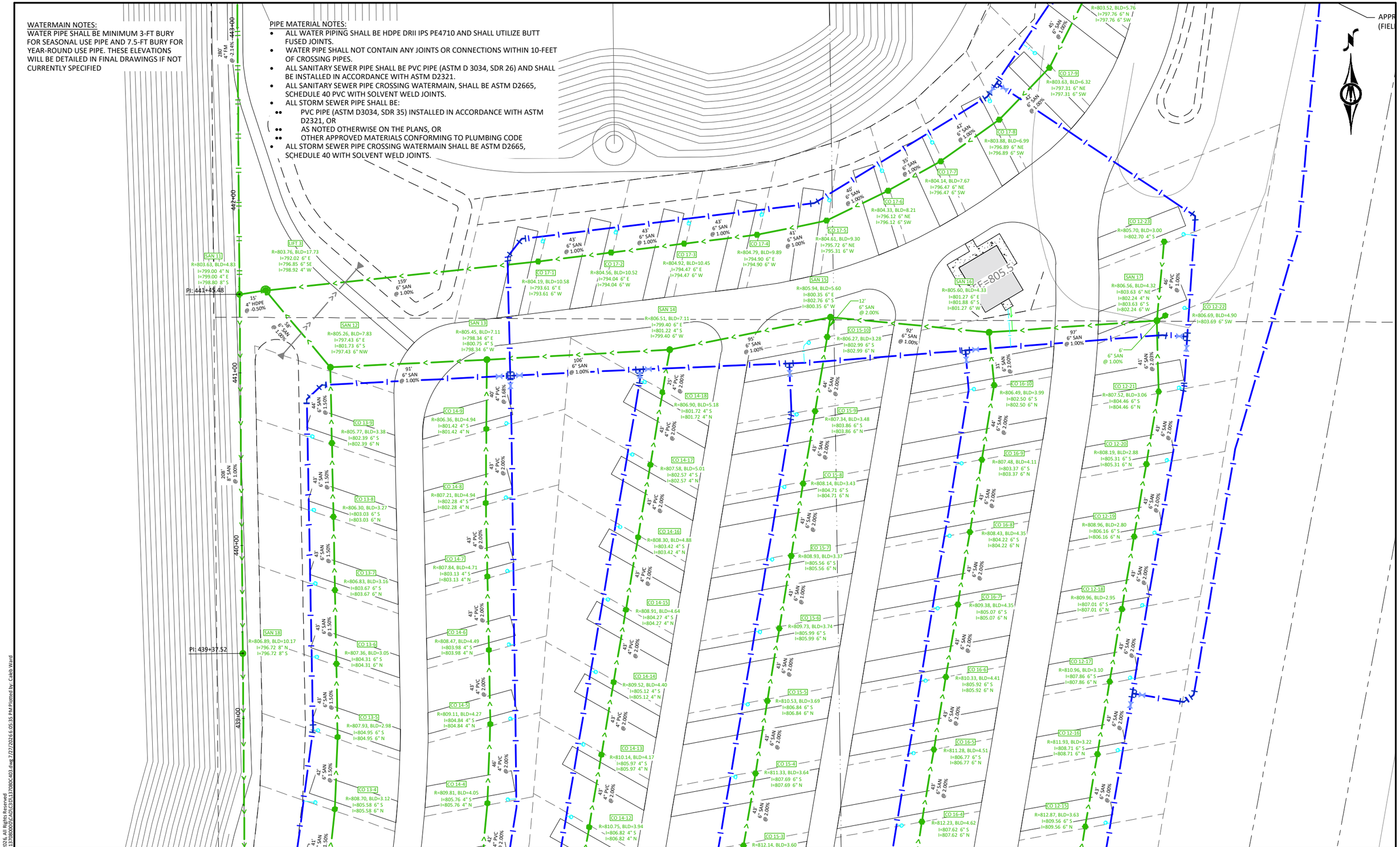

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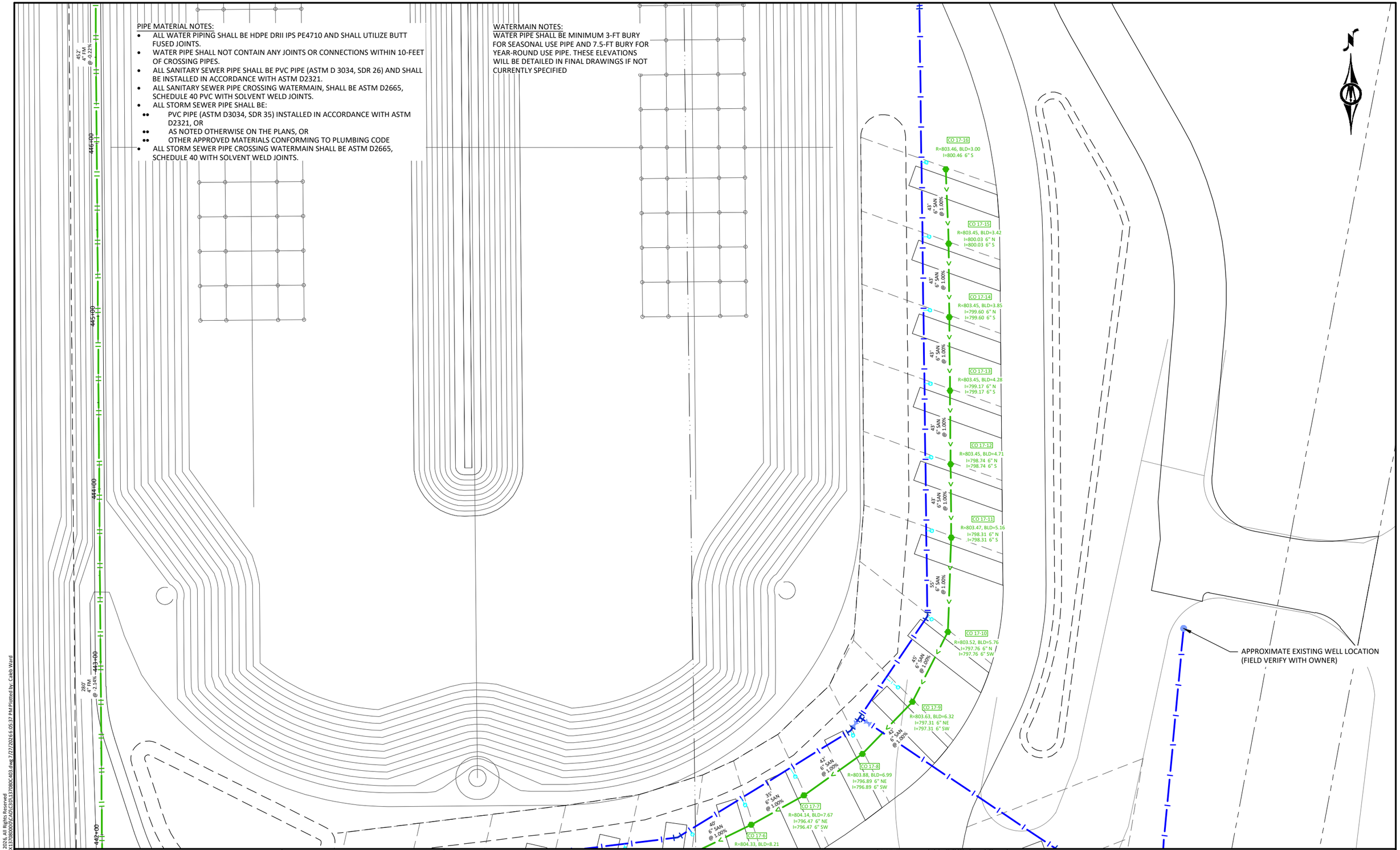

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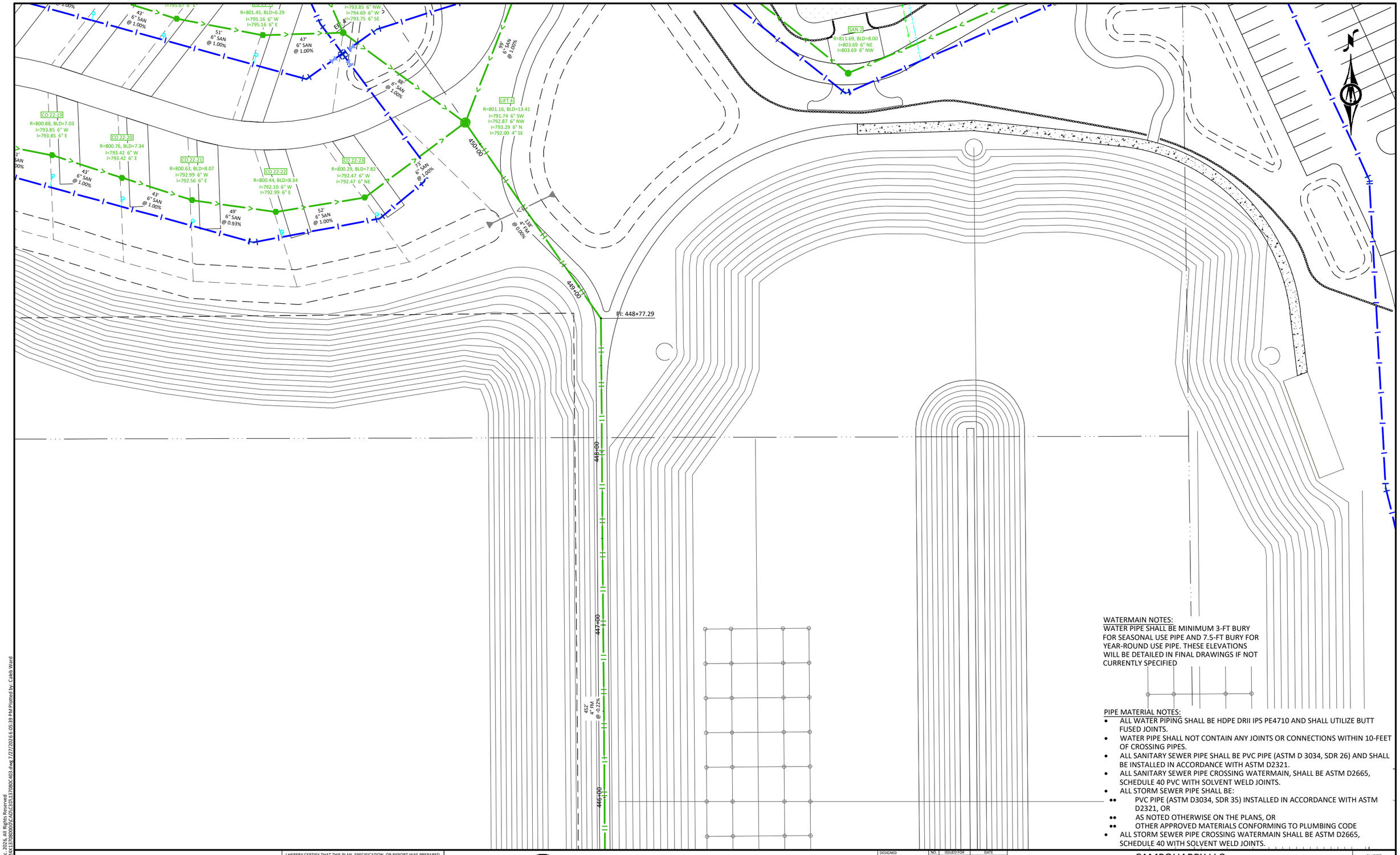

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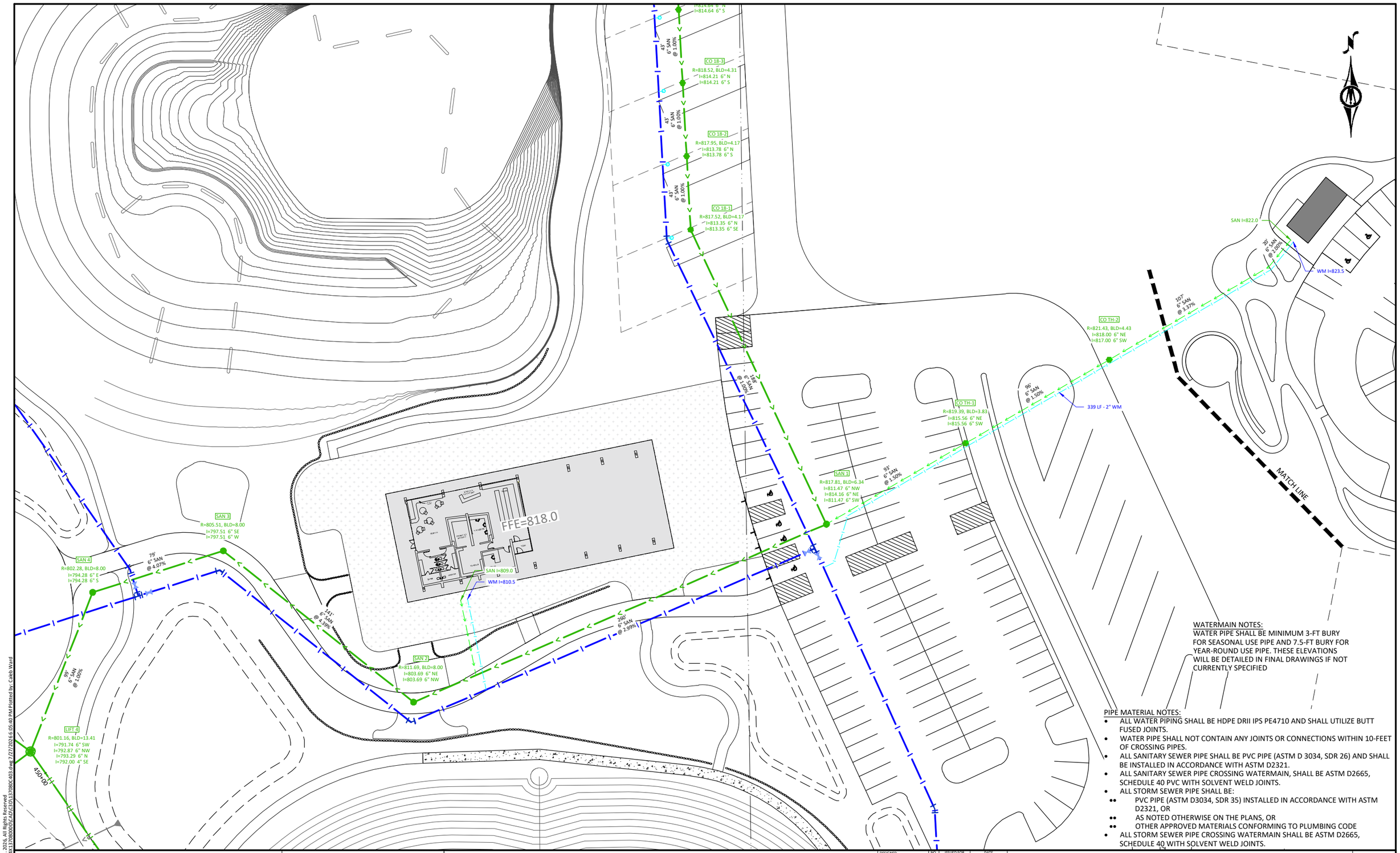

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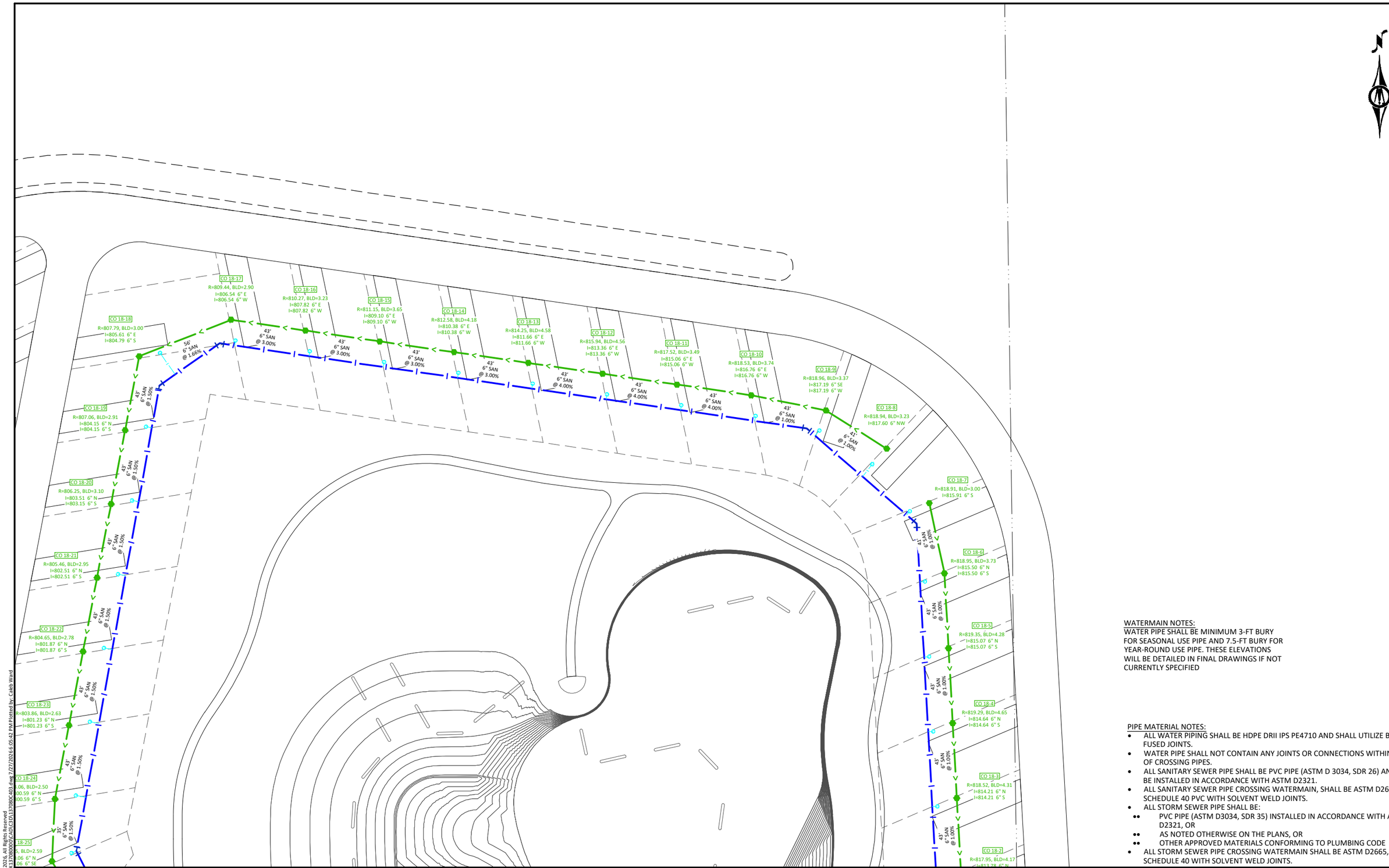

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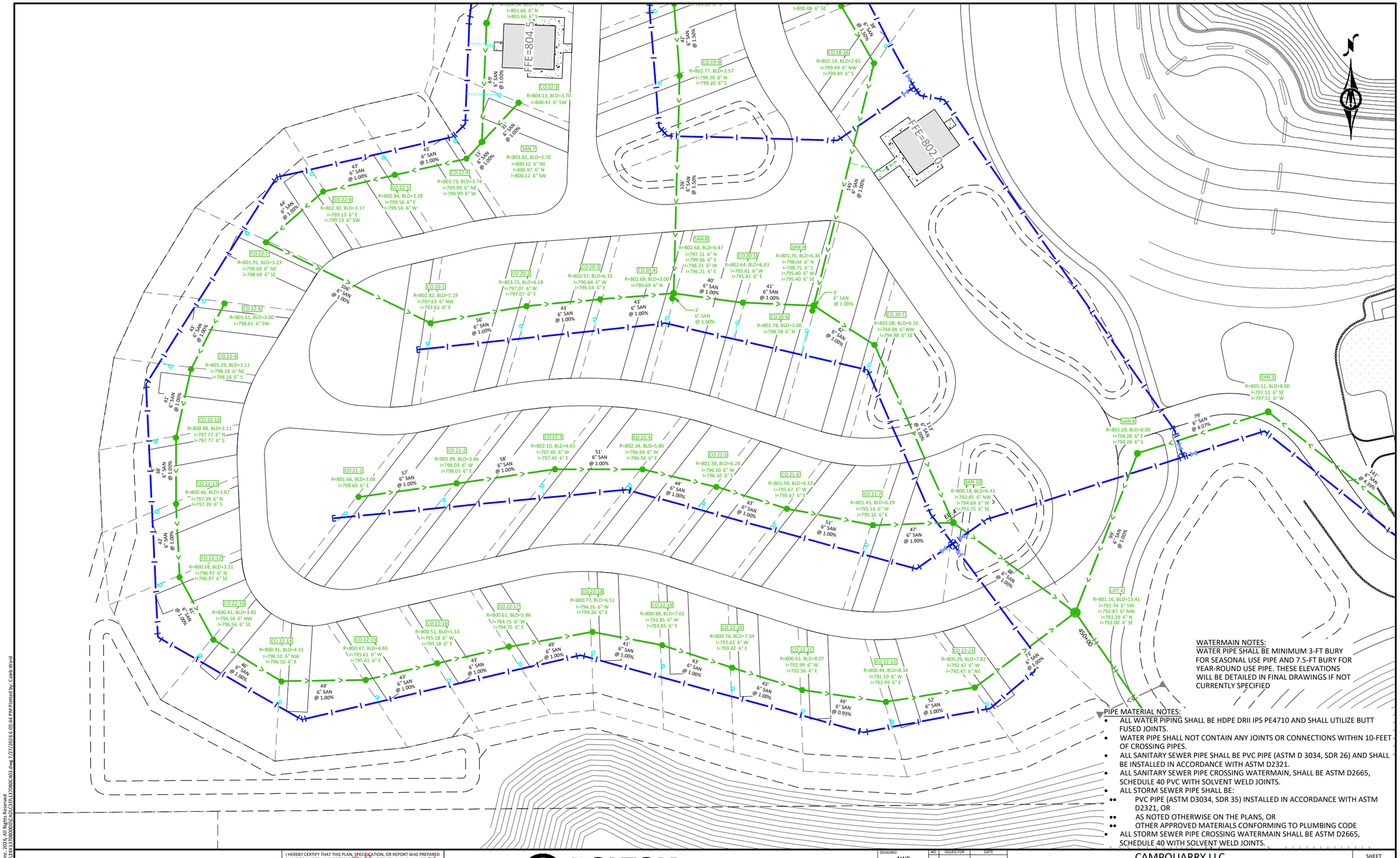

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- ALL SANITARY SEWER PIPE CROSSING WATERMAIN, SHALL BE ASTM D2665, SCHEDULE 40 PVC WITH SOLVENT WELD JOINTS.
- ALL STORM SEWER PIPE SHALL BE:
  - PVC PIPE (ASTM D3034, SDR 35) INSTALLED IN ACCORDANCE WITH ASTM D2321, OR
  - AS NOTED OTHERWISE ON THE PLANS, OR
  - OTHER APPROVED MATERIALS CONFORMING TO PLUMBING CODE
- ALL STORM SEWER PIPE CROSSING WATERMAIN SHALL BE ASTM D2665, SCHEDULE 40 WITH SOLVENT WELD JOINTS.

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NOT FOR CONSTRUCTION

ALEC W. PIETZ, P.E.
LIC. NO. 59617 DATE XX/XX/XXXX

BOLTON & MENK
1960 PREMIER DRIVE
MANKATO, MN 56001
Phone: (507) 625-4171
Email: Mankato@bolton-menk.com
www.bolton-menk.com

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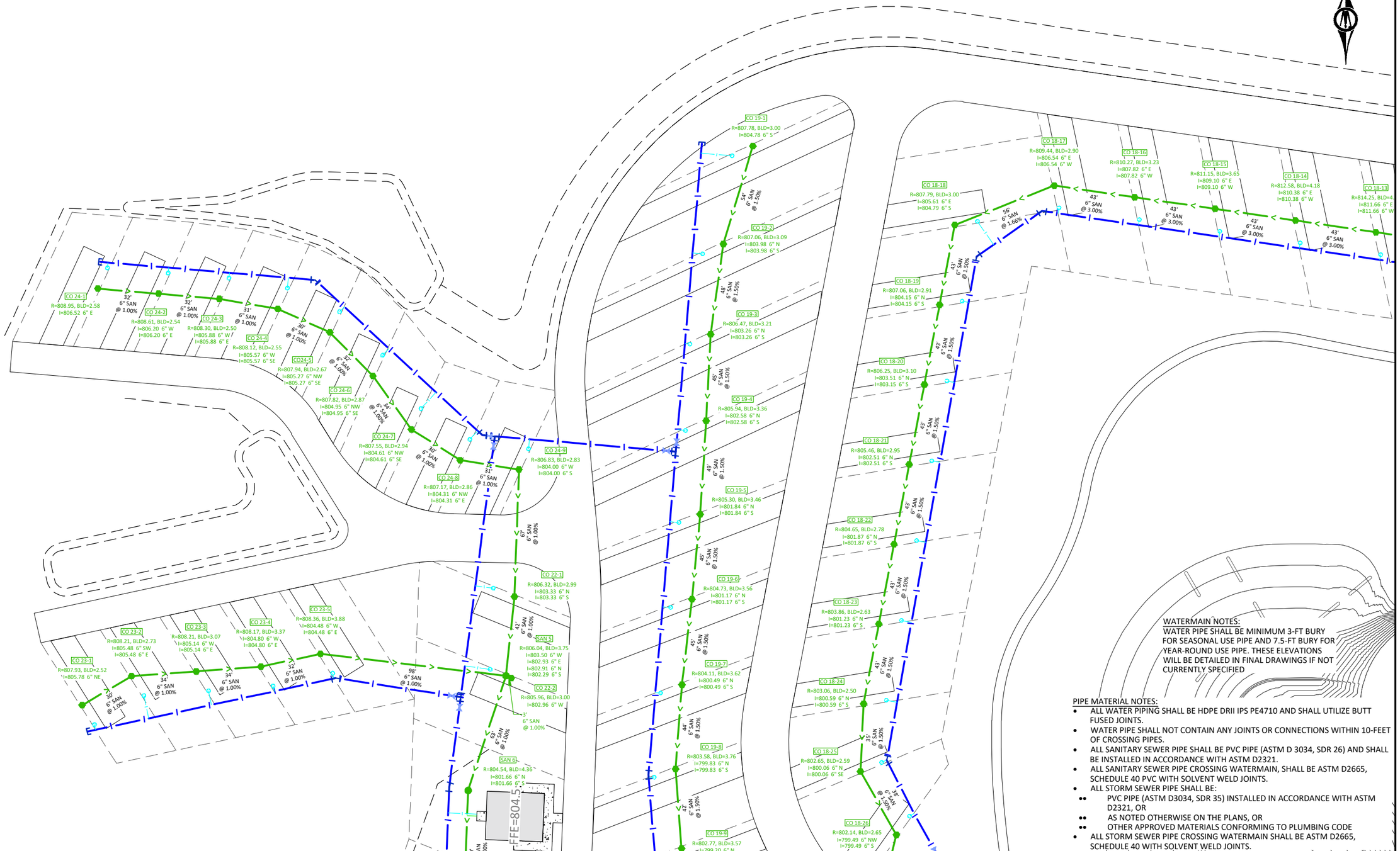
24X.137080			

CAMPQUARRY LLC
ROCKWELL RV & ADVENTURE PARK
UTILITY PLAN
NORTH CAMPGROUND

SHEET
C4.24



WATERMAIN NOTES:
WATER PIPE SHALL BE MINIMUM 3-FT BURY FOR SEASONAL USE PIPE AND 7.5-FT BURY FOR YEAR-ROUND USE PIPE. THESE ELEVATIONS WILL BE DETAILED IN FINAL DRAWINGS IF NOT CURRENTLY SPECIFIED

PIPE MATERIAL NOTES:

- ALL WATER PIPING SHALL BE HDPE DRII IPS PE4710 AND SHALL UTILIZE BUTT FUSED JOINTS.
- WATER PIPE SHALL NOT CONTAIN ANY JOINTS OR CONNECTIONS WITHIN 10-FEET OF CROSSING PIPES.
- ALL SANITARY SEWER PIPE SHALL BE PVC PIPE (ASTM D 3034, SDR 26) AND SHALL BE INSTALLED IN ACCORDANCE WITH ASTM D2321.
- ALL SANITARY SEWER PIPE CROSSING WATERMAIN, SHALL BE ASTM D2665, SCHEDULE 40 PVC WITH SOLVENT WELD JOINTS.
- ALL STORM SEWER PIPE SHALL BE:
  - PVC PIPE (ASTM D3034, SDR 35) INSTALLED IN ACCORDANCE WITH ASTM D2321, OR
  - AS NOTED OTHERWISE ON THE PLANS, OR
  - OTHER APPROVED MATERIALS CONFORMING TO PLUMBING CODE
- ALL STORM SEWER PIPE CROSSING WATERMAIN SHALL BE ASTM D2665, SCHEDULE 40 WITH SOLVENT WELD JOINTS.

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HORZ. SCALE 0 25 50 FEET

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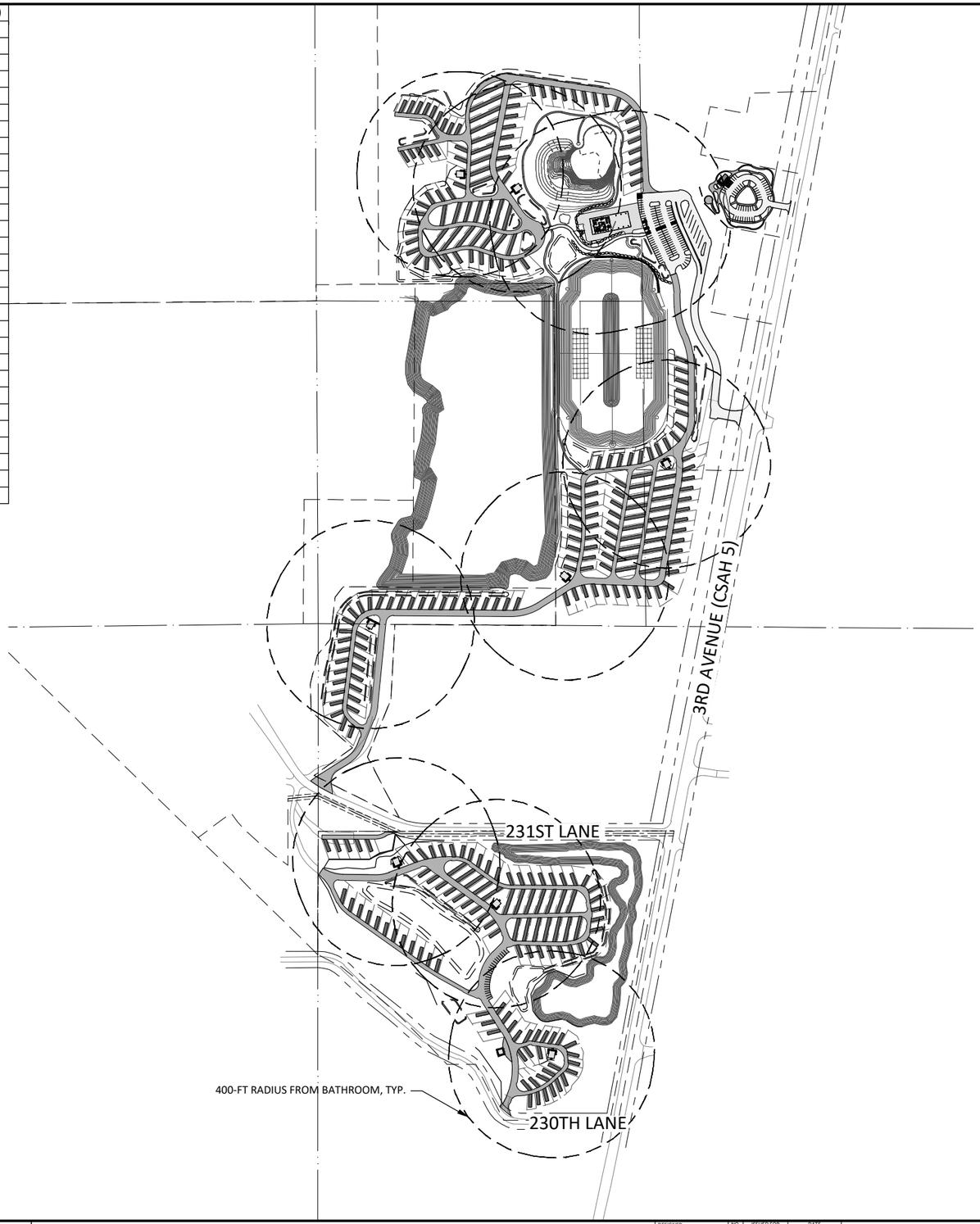
CAMPQUARRY LLC
ROCKWELL RV & ADVENTURE PARK
UTILITY PLAN
NORTH CAMPGROUND

SHEET C4.25

SITE #	AREA (SF)	SITE #	AREA (SF)	SITE #	AREA (SF)	SITE #	AREA (SF)	SITE #	AREA (SF)
1-1	2032	6-21	3679	11-8	3346	17-2	2980	22-9	3299
1-2	2049	6-22	3833	12-1	3674	17-3	2980	22-10	3111
1-3	2208	6-23	3405	12-2	3805	17-4	3003	22-11	3361
1-4	2137	6-24	3405	12-3	3619	17-5	2891	22-12	3370
1-5	2240	6-25	2632	12-4	3425	17-6	2539	22-13	3766
1-6	3267	6-26	2652	12-5	3405	17-7	2431	22-14	3931
1-7	2239	6-27	2482	12-6	3405	17-8	3011	22-15	3405
1-8	2009	6-28	2427	12-7	3405	17-9	3107	22-16	3405
1-9	2994	6-29	3052	12-8	3405	17-10	3845	22-17	3797
1-10	3502	6-30	3497	12-9	3405	17-11	4072	22-18	3345
1-11	2163	6-31	3409	12-10	4493	17-12	3405	22-19	3405
1-12	2235	7-1	4069	12-11	4940	17-13	3405	22-20	3368
1-13	2235	7-2	3814	12-12	3405	17-14	3405	22-21	3914
1-14	2246	7-3	3899	12-13	3405	17-15	3405	22-22	4167
1-15	3230	7-4	3984	12-14	3405	17-16	3386	22-23	4086
1-16	3695	7-5	4068	12-15	3405	18-1	3402	23-1	2235
1-17	3401	7-6	4124	12-16	3405	18-2	3402	23-2	2235
1-18	3403	7-7	3907	12-17	3405	18-3	3402	23-3	2235
1-19	3407	8-1	3725	12-18	3405	18-4	3402	23-4	2235
2-1	2684	8-2	3404	12-19	3405	18-5	3402	23-5	2235
2-2	3024	8-3	3405	12-20	3405	18-6	3402	24-1	2235
2-3	2954	8-4	3405	12-21	3405	18-7	3229	24-2	2235
2-4	2761	8-5	3531	12-22	3405	18-8	2929	24-3	2212
2-5	2130	8-6	4331	12-23	3433	18-9	3084	24-4	2122
2-6	2494	8-7	4268	13-1	3119	18-10	3313	24-5	2134
2-7	3028	8-8	4206	13-2	3241	18-11	3406	24-6	2326
2-8	2365	8-9	4143	13-3	3282	18-12	3406	24-7	2401
3-1	3397	8-10	4081	13-4	3343	18-13	3406	24-8	2318
3-2	3405	8-11	4018	13-5	3387	18-14	3405	24-9	2219
3-3	3405	8-12	6175	13-6	3405	18-15	3405		
4-1	3303	9-1	3405	13-7	3405	18-16	3405		
4-2	3421	9-2	3400	13-8	3405	18-17	3405		
4-3	3419	9-3	3400	13-9	3405	18-18	3415		
4-4	3417	9-4	3403	14-1	2623	18-19	3835		
4-5	3414	9-5	2932	14-2	2581	18-20	3405		
4-6	3412	10-1	2624	14-3	2579	18-21	3405		
4-7	3410	10-2	2646	14-4	2871	18-22	3405		
4-8	3408	10-3	3903	14-5	2888	18-23	3405		
4-9	3406	10-4	3613	14-6	3049	18-24	3405		
4-10	3423	10-5	3405	14-7	3240	18-25	2767		
4-11	3556	10-6	3405	14-8	3430	18-26	2917		
4-12	3759	10-7	3405	14-9	3574	19-1	5350		
5-1	4964	10-8	3405	14-10	2605	19-2	5699		
5-2	3266	10-9	3405	14-11	2654	19-3	5271		
5-3	3330	10-10	3242	14-12	2683	19-4	5012		
5-4	3411	10-11	2727	14-13	2833	19-5	3996		
5-5	3408	10-12	3665	14-14	2993	19-6	3660		
5-6	3400	10-13	3345	14-15	3154	19-7	3373		
5-7	3403	10-14	3335	14-16	3314	19-8	3434		
5-8	3403	10-15	3618	14-17	3474	19-9	4031		
5-9	3400	10-16	3678	14-18	3635	20-1	4855		
5-10	3403	10-17	3405	15-1	3220	20-2	4505		
6-1	3379	10-18	3405	15-2	3405	20-3	3419		
6-2	3409	10-19	3405	15-3	3405	20-4	3529		
6-3	3414	10-20	3405	15-4	3405	20-5	3903		
6-4	3421	10-21	3405	15-5	3405	20-6	4487		
6-5	3346	10-22	3405	15-6	3405	20-7	4430		
6-6	3169	10-23	3405	15-7	3405	21-1	4870		
6-7	3126	10-24	3405	15-8	3405	21-2	4829		
6-8	6885	10-25	3405	15-9	3405	21-3	4078		
6-9	3252	10-26	3405	15-10	3405	21-4	3528		
6-10	3235	10-27	3405	16-1	3378	21-5	3407		
6-11	3648	10-28	3405	16-2	3405	21-6	4378		
6-12	3409	10-29	3389	16-3	3405	21-7	4305		
6-13	4286	11-1	3400	16-4	3405	22-1	3392		
6-14	4577	11-2	3405	16-5	3405	22-2	3405		
6-15	3405	11-3	3405	16-6	3405	22-3	4050		
6-16	3405	11-4	3405	16-7	3405	22-4	3418		
6-17	3405	11-5	3405	16-8	3405	22-5	3349		
6-18	3405	11-6	3405	16-9	3405	22-6	3573		
6-19	3405	11-7	3405	16-10	3405	22-7	3495		
6-20	3471	11-8	3346	17-1	2980	22-8	3403		



SITE NOTE:
CAMP SITES ARE GENERALLY DISPLAYED ON THIS PLAN. THE OWNER WILL FIELD FIT LAYOUTS SIMILAR TO EXAMPLES PROVIDED IN THE DETAILS (C1 SECTION) TO BEST SUIT THE SITE.

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HORZ. 0 250 500
SCALE FEET

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ALEC W. PIETZ, P.E.
LIC. NO. 59617 DATE XX/XX/XXXX

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www.bolton-menk.com

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24X.137080			

CAMPQUARRY LLC
ROCKWELL RV & ADVENTURE PARK
SITE PLAN OVERVIEW

SHEET
C5.01

SITE NOTE:
CAMP SITES ARE GENERALLY DISPLAYED ON THIS PLAN. THE OWNER WILL FIELD FIT LAYOUTS SIMILAR TO EXAMPLES PROVIDED IN THE DETAILS (C1 SECTION) TO BEST SUIT THE SITE.

BATHROOM
STORMWATER BASIN, TYP.
WASTEWATER HOLDING TANK
BATHROOM
230TH LANE
231ST LANE
BATHROOM
400-FT BATHROOM RADIUS, TYP.
BATHROOM
BATHROOM
3RD AVENUE (CSAH 5)

HORZ. 0 100 200
SCALE FEET

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CAMPQUARRY LLC
ROCKWELL RV & ADVENTURE PARK
SITE PLAN OVERVIEW

SHEET
C5.02

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SITE NOTE:
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BATHROOM

BATHROOM

400-FT RADIUS FROM BATHROOM, TYP.

BATHROOM

BATHROOM

ENTRANCE LODGE

STORMWATER BASIN, TYP.

PARKING LOT & STAGING AREA

BATHROOM

FFE=831.0

3RD AVENUE (CSAH 5)

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HORZ. SCALE 0 100 200 FEET

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CAMPQUARRY LLC
ROCKWELL RV & ADVENTURE PARK
SITE PLAN OVERVIEW

SHEET C5.03

SITE 3-3
SITE 3-2
SITE 3-1
SITE 1-18
SITE 1-17
SPEED LIMIT 5
SITE 1-16
SITE 1-15
SITE 1-14
SITE 1-13
SITE 1-12
SITE 1-11
SITE 1-10
SITE 1-9
SITE 1-8
SITE 1-7
SITE 1-6
SITE 1-5
SITE 1-4
SITE 1-3
SITE 1-2
SITE 1-1
SITE 2-8
SITE 2-7
SITE 2-6
SITE 2-5
SITE 2-4
SITE 2-3
SITE 2-2
SITE 2-1
102.5'
16.19'
25'
FFE=811.0
BATHROOM
WASTEWATER STORAGE TANK
(DESIGN BY VENDOR)
230TH LANE
3RD AVENUE (CSAH 5)

NOTE:
ARROWS SHOWN ARE TRAFFIC DIRECTION REFERENCE ONLY, NOT STRIPING

FENCING NOTE:
REFER TO LANDSCAPE ARCHITECTURE PLANS FOR FENCING LOCATIONS AND DETAILS

SITE NOTE:
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LEGEND

- BITUMINOUS ROADWAY
- 6" AGGREGATE SURFACING
- 8" AGGREGATE SURFACING
- 6" CONCRETE PAVEMENT/SIDEWALK
- 4" CONCRETE WALK

HORZ. SCALE 0 25 50 FEET

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SITE PLAN
SOUTH CAMPGROUND

SHEET C6.01

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SITE 5-4
SITE 5-3
SITE 5-2
SITE 5-1
SITE 7-1
SITE 7-2
SITE 7-3
SITE 6-4
SITE 7-5
SITE 7-6
SITE 7-7
SITE 6-10
SITE 6-9
SITE 6-8
SITE 6-1
SITE 6-2
SITE 6-3
SITE 6-4
SITE 6-5
SITE 6-6
SITE 6-7
SITE 1-19
SITE 1-18
SITE 1-17
SITE 3-3
SITE 3-2

SPEED LIMIT 5

16'
92.55'
25'
52' VARIES
20'

APPROXIMATE PROPOSED WELL LOCATION (DESIGN BY OTHERS)

PARKING AREA ~23 STALLS

N

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LEGEND

- BITUMINOUS ROADWAY
- 6" AGGREGATE SURFACING
- 8" AGGREGATE SURFACING
- 6" CONCRETE PAVEMENT/SIDEWALK
- 4" CONCRETE WALK

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CAMPQUARRY LLC
ROCKWELL RV & ADVENTURE PARK
SITE PLAN
SOUTH CAMPGROUND

SHEET C6.02

231ST LANE

N

SITE 6-26
SITE 6-25
SITE 6-24
SITE 6-23
SITE 6-22
SITE 6-21
SITE 6-20
SITE 6-19
SITE 6-18
SITE 6-17
SITE 6-16
SITE 6-15
SITE 6-14
SITE 6-13
SITE 6-12
SITE 6-11
SITE 6-10
SITE 6-9
SITE 6-8
SITE 8-2
SITE 8-3
SITE 8-4
SITE 8-5
SITE 8-6
SITE 8-7
SITE 8-8
SITE 8-9
SITE 8-10
SITE 8-11
SITE 8-12
SITE 5-5
SITE 5-4
SITE 5-3
SITE 5-2
SITE 5-1
SITE 7-1
SITE 7-2
SITE 7-3
SITE 6-4
SITE 7-5
SITE 7-6
SITE 7-7

80'
16'
102.22'
16'
92.35'
16'
25'

BATHROOM
FFE=801.5

SPEED LIMIT 5
SPEED LIMIT 5

NOTE:
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LEGEND

- BITUMINOUS ROADWAY
- 6" AGGREGATE SURFACING
- 8" AGGREGATE SURFACING
- 6" CONCRETE PAVEMENT/SIDEWALK
- 4" CONCRETE WALK

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HORZ. 0 25 50
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CAMPQUARRY LLC
ROCKWELL RV & ADVENTURE PARK
SITE PLAN
SOUTH CAMPGROUND

SHEET
C6.03



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LEGEND

- BITUMINOUS ROADWAY
- 6" AGGREGATE SURFACING
- 8" AGGREGATE SURFACING
- 6" CONCRETE PAVEMENT/SIDEWALK
- 4" CONCRETE WALK

HORZ. 0 25 50
SCALE FEET

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NOT FOR CONSTRUCTION

ALEC W. PIETZ, P.E.
LIC. NO. 59617 DATE XX/XX/XXXX

BOLTON & MENK
1960 PREMIER DRIVE
MANKATO, MN 56001
Phone: (507) 625-4171
Email: Mankato@bolton-menk.com
www.bolton-menk.com

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DRAWN	AWP
CHECKED	AWP
CLIENT PROJ. NO.	24X.137080

NO.	ISSUED FOR	DATE

CAMPQUARRY LLC
ROCKWELL RV & ADVENTURE PARK
SITE PLAN
SOUTH CAMPGROUND

SHEET C6.04

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231ST LANE

N

16'

25'

SITE 9-1
SITE 9-2
SITE 9-3
SITE 9-4
SITE 9-5
52' VARIES

BATHROOM
FFE=811.0

SITE 6-31
SITE 6-30
SITE 6-29
SITE 6-28
SITE 6-27

SPEED LIMIT 5

SITE 5-10
SITE 5-9
SITE 5-8
SITE 5-7

SITE 4-12
SITE 4-11
SITE 4-10
SITE 4-9
SITE 4-8
SITE 4-7
SITE 4-6
SITE 4-5

NOTE:
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FENCING NOTE:
REFER TO LANDSCAPE ARCHITECTURE PLANS FOR FENCING LOCATIONS AND DETAILS

SITE NOTE:
CAMP SITES ARE GENERALLY DISPLAYED ON THIS PLAN. THE OWNER WILL FIELD FIT LAYOUTS SIMILAR TO EXAMPLES PROVIDED IN THE DETAILS (C1 SECTION) TO BEST SUIT THE SITE.

LEGEND

- BITUMINOUS ROADWAY
- 6" AGGREGATE SURFACING
- 8" AGGREGATE SURFACING
- 6" CONCRETE PAVEMENT/SIDEWALK
- 4" CONCRETE WALK

HORZ. 0 25 50
SCALE FEET

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SHEET
C6.05

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N

231ST LANE

16'

52' - VARIES

SITE 9-1

SITE 9-2

SITE 9-3

SITE 9-4

SITE 9-5

SITE 6-30

SITE 6-31

SITE

BATHROOM

FFE=811.0

SPEED LIMIT 5

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- 4" CONCRETE WALK

HORZ. 0 25 50
SCALE FEET

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SHEET
C6.06



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NORTH CAMPGROUND

SHEET
C6.07



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HORZ. SCALE 0 25 50 FEET

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CAMPQUARRY LLC
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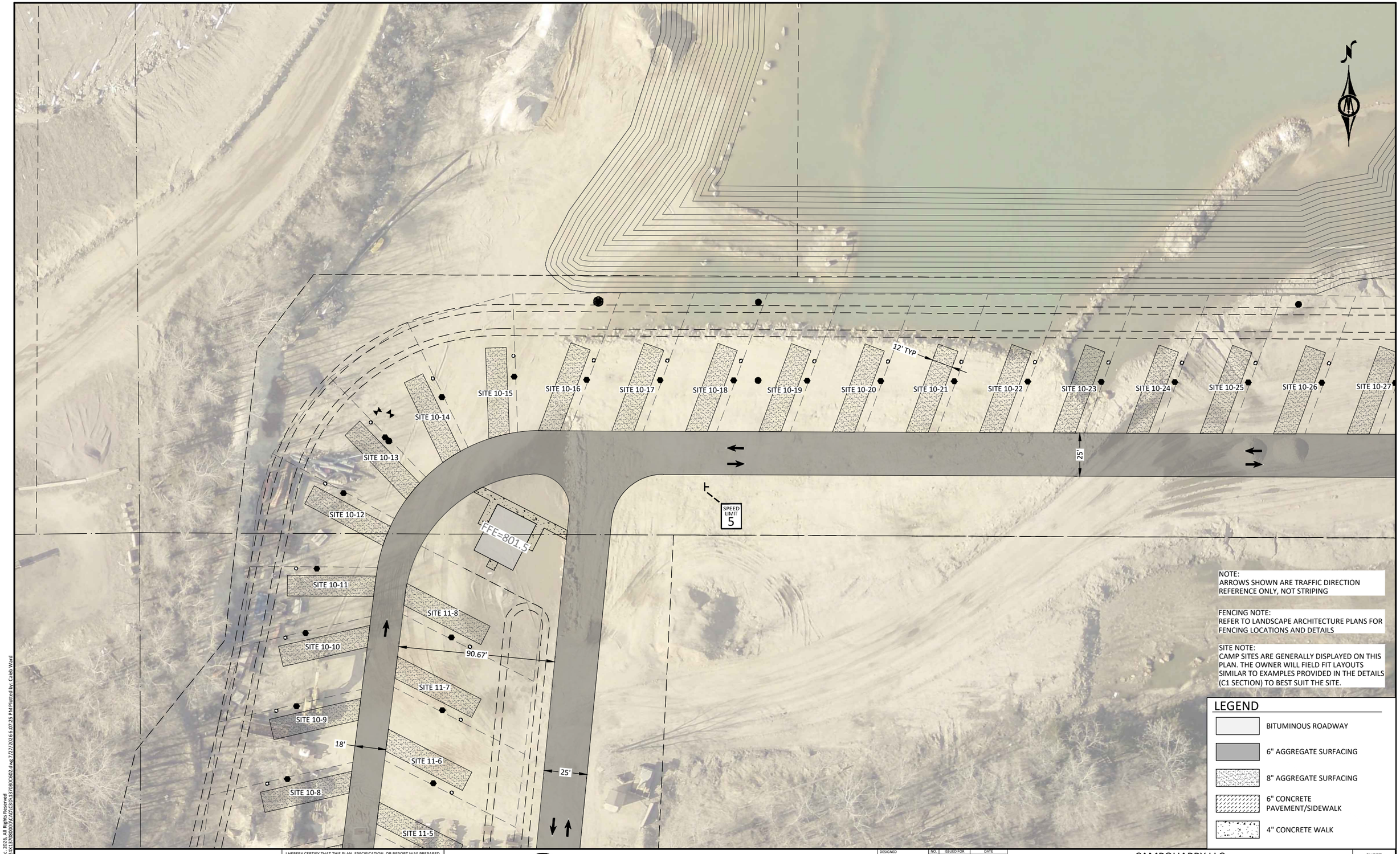
SITE PLAN
NORTH CAMPGROUND

SHEET C6.08



NOTE:
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FENCING NOTE:
REFER TO LANDSCAPE ARCHITECTURE PLANS FOR FENCING LOCATIONS AND DETAILS

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LEGEND

- BITUMINOUS ROADWAY
- 6" AGGREGATE SURFACING
- 8" AGGREGATE SURFACING
- 6" CONCRETE PAVEMENT/SIDEWALK
- 4" CONCRETE WALK

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HORZ. SCALE 0 25 50 FEET

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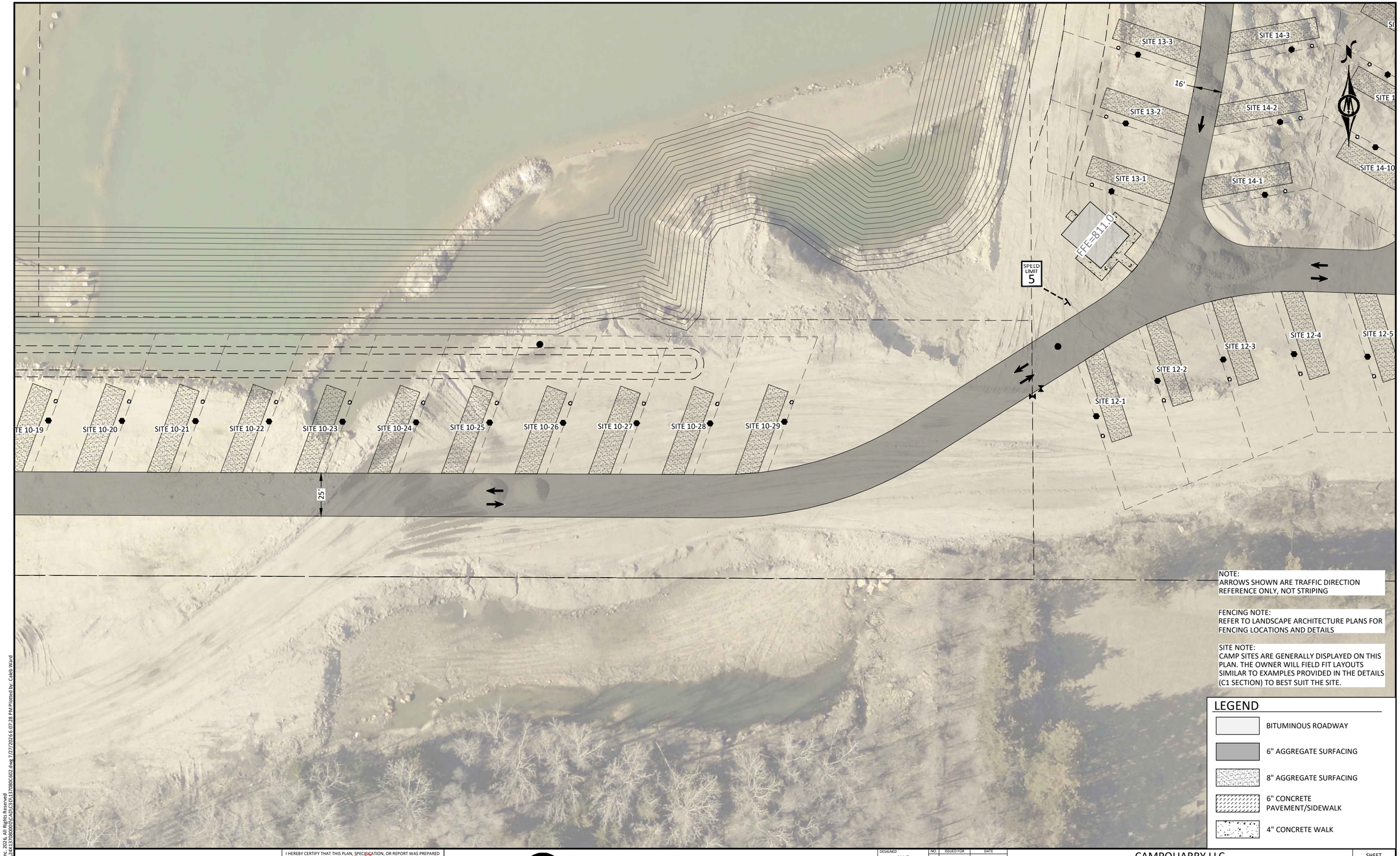
CAMPQUARRY LLC
ROCKWELL RV & ADVENTURE PARK
SITE PLAN
NORTH CAMPGROUND

SHEET C6.09



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- 4" CONCRETE WALK

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HORZ. SCALE 0 25 50 FEET

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SITE PLAN
NORTH CAMPGROUND

SHEET C6.10



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HORZ. 0 25 50
SCALE FEET

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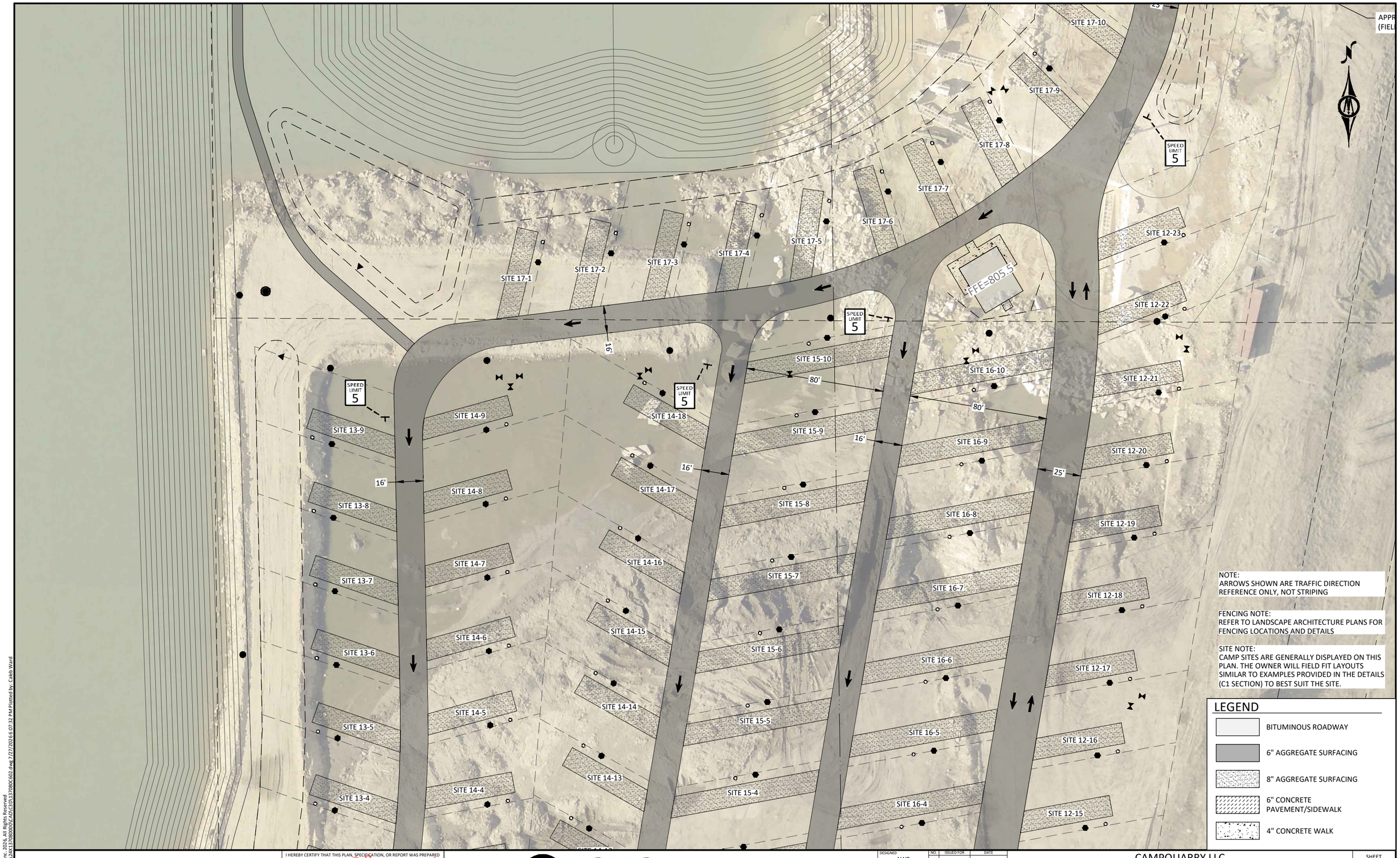
CAMPQUARRY LLC
ROCKWELL RV & ADVENTURE PARK
SITE PLAN
NORTH CAMPGROUND

SHEET
C6.11



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LEGEND

- BITUMINOUS ROADWAY
- 6" AGGREGATE SURFACING
- 8" AGGREGATE SURFACING
- 6" CONCRETE PAVEMENT/SIDEWALK
- 4" CONCRETE WALK

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HORZ. SCALE 0 25 50 FEET

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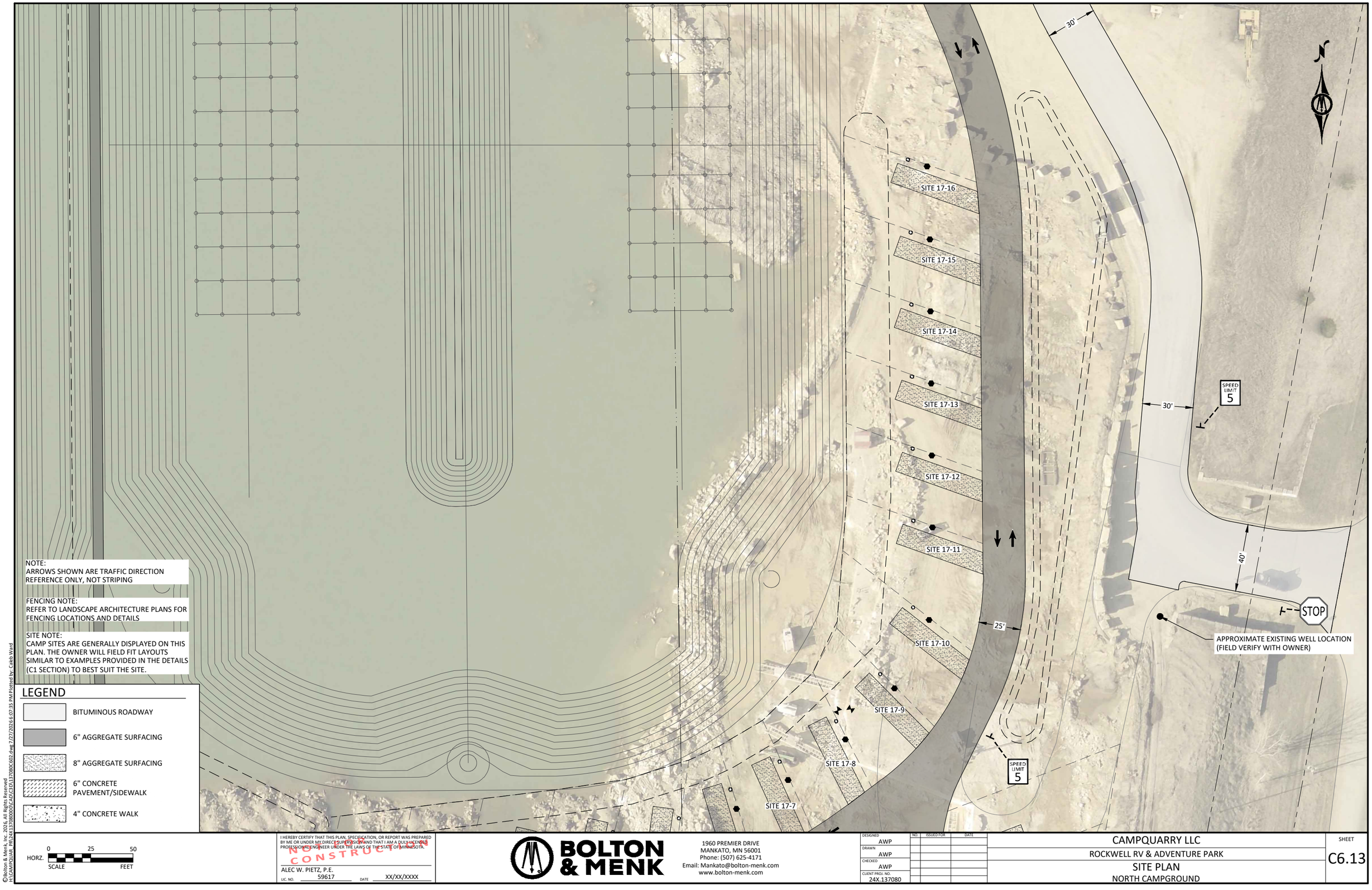
CAMPQUARRY LLC
ROCKWELL RV & ADVENTURE PARK
SITE PLAN
NORTH CAMPGROUND

SHEET C6.12



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- 4" CONCRETE WALK

HORZ. SCALE: 0 25 50 FEET

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SITE PLAN
NORTH CAMPGROUND

SHEET C6.13

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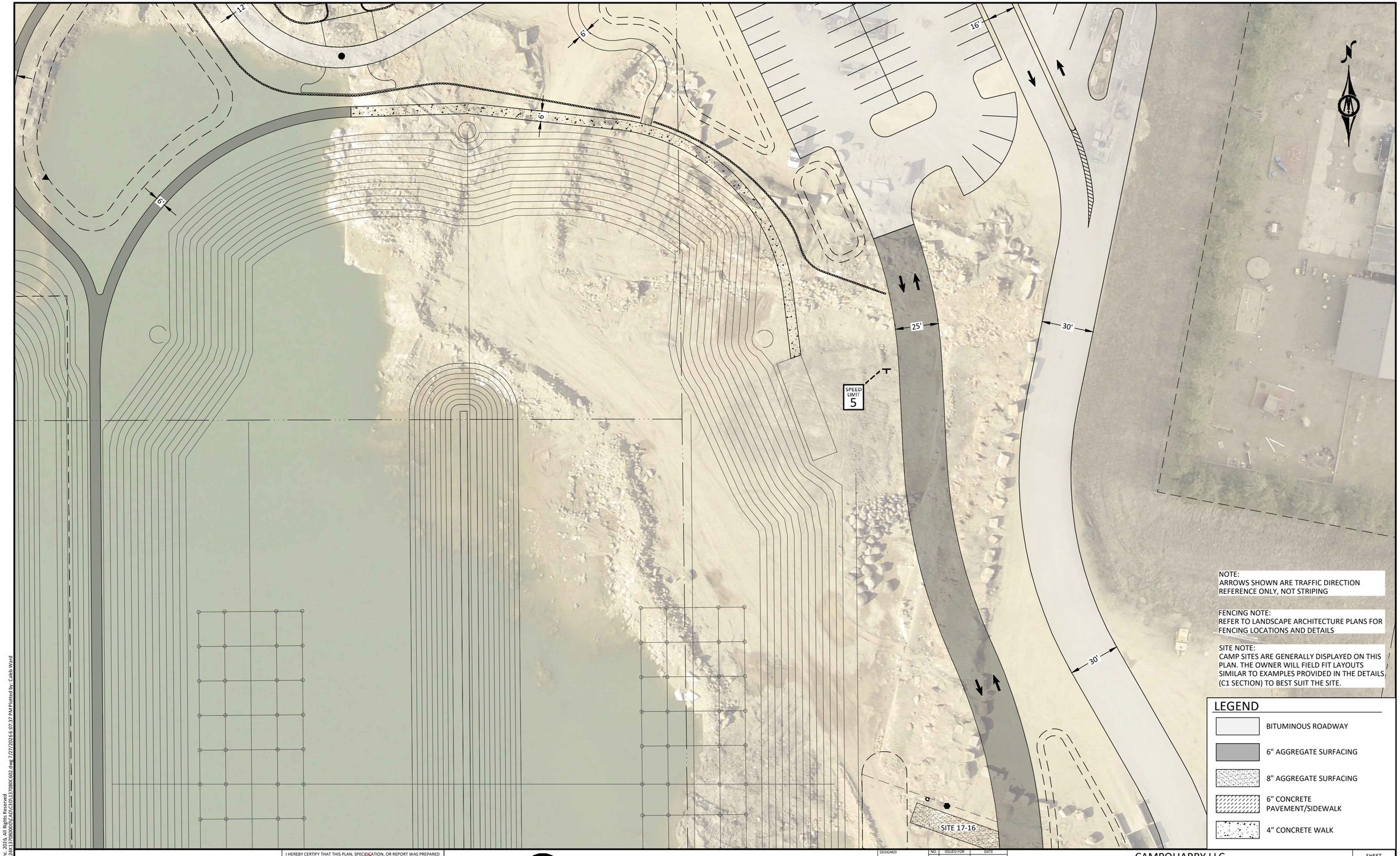

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HORZ. SCALE 0 25 50 FEET

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ROCKWELL RV & ADVENTURE PARK
SITE PLAN
NORTH CAMPGROUND

SHEET C6.14

SITE 18-4

SITE 18-3

SITE 18-2

SITE 18-1

25'

5'

SPEED LIMIT 5

NATURAL FEATURES AND/OR LANDSCAPING BY LANDSCAPE ARCHITECTURE

PARKING LOT ~96 STALLS

9'X20' STALL ,TYP.

FFE=818.0

12'

6'

20'

16'

STAGING AREA ~7 STALLS

REFER TO SHEET C7.02 FOR TRAILHEAD SITE PLAN

MATCH LINE

55'

3'

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SHEET C6.15

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HORZ. SCALE 0 25 50 FEET

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SITE PLAN
NORTH CAMPGROUND

SHEET
C6.17

SPEED LIMIT 5

SPEED LIMIT 5

SPEED LIMIT 5

SPEED LIMIT 5

SPEED LIMIT 5

SITE 24-1
SITE 24-2
SITE 24-3
SITE 24-4
SITE 24-5
SITE 24-6
SITE 24-7
SITE 24-8
SITE 24-9

SITE 23-1
SITE 23-2
SITE 23-3
SITE 23-4
SITE 23-5

SITE 22-1
SITE 22-2
SITE 22-3

SITE 19-1
SITE 19-2
SITE 19-3
SITE 19-4
SITE 19-5
SITE 19-6
SITE 19-7
SITE 19-8
SITE 19-9

SITE 18-17
SITE 18-16
SITE 18-15
SITE 18-14
SITE 18-18
SITE 18-19
SITE 18-20
SITE 18-21
SITE 18-22
SITE 18-23
SITE 18-24
SITE 18-25
SITE 18-26

16'
16'
25'
25'
25'
5'
5'

FFE=804.5

FFE=802.0

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HORZ. SCALE 0 25 50 FEET

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Email: Mankato@bolton-menk.com
www.bolton-menk.com

DESIGNED	NO.	ISSUED FOR	DATE
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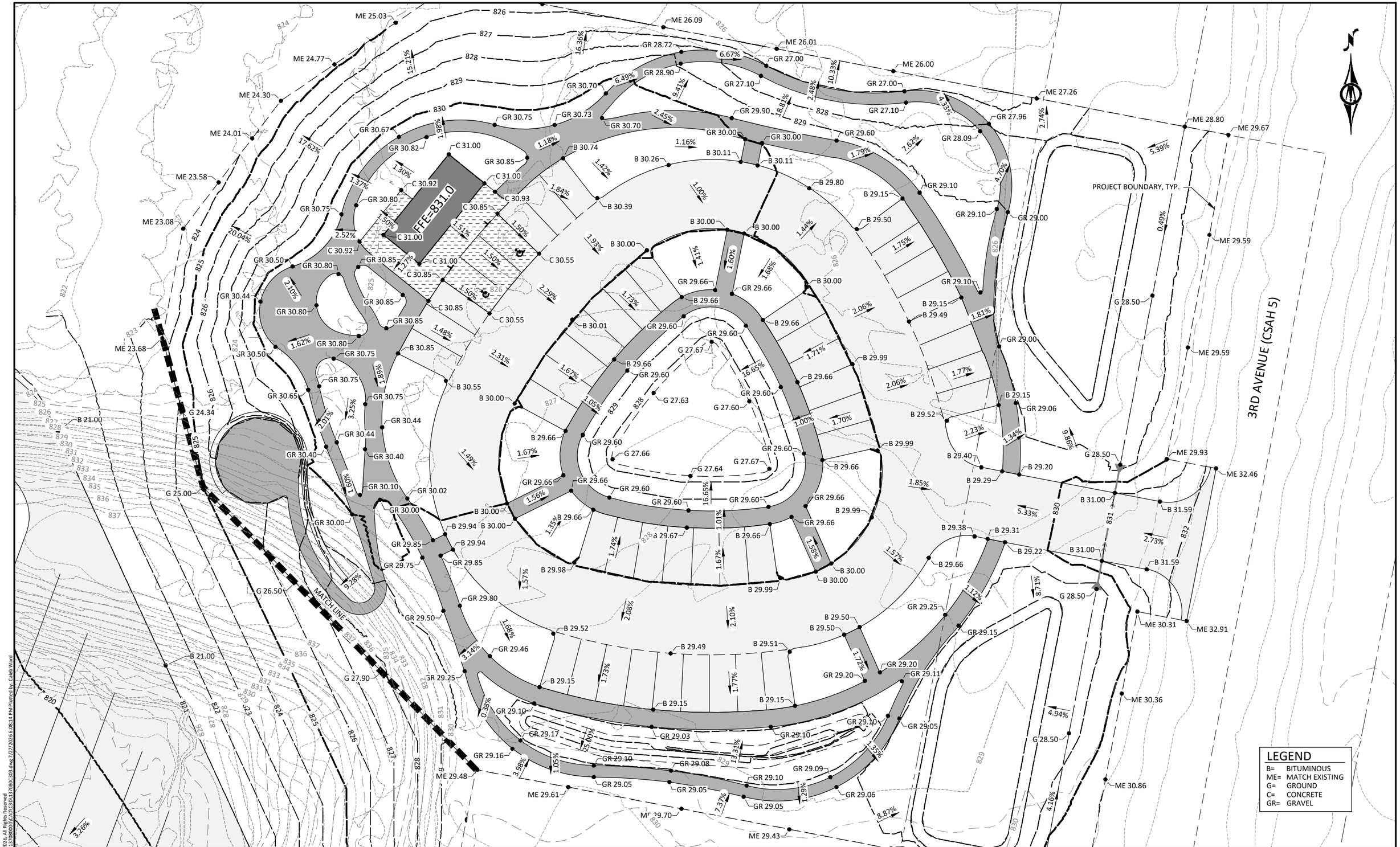
CLIENT PROJ. NO.			
24X.137080			

CAMPQUARRY LLC
ROCKWELL RV & ADVENTURE PARK
SITE PLAN
NORTH CAMPGROUND

SHEET
C6.18



© Bolton & Menk, Inc. 2026. All Rights Reserved
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I HEREBY CERTIFY THAT THIS PLAN, SPECIFICATION, OR REPORT WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA.

NOT FOR CONSTRUCTION

ALEC W. PIETZ, P.E.
LIC. NO. 59617 DATE XX/XX/XXXX

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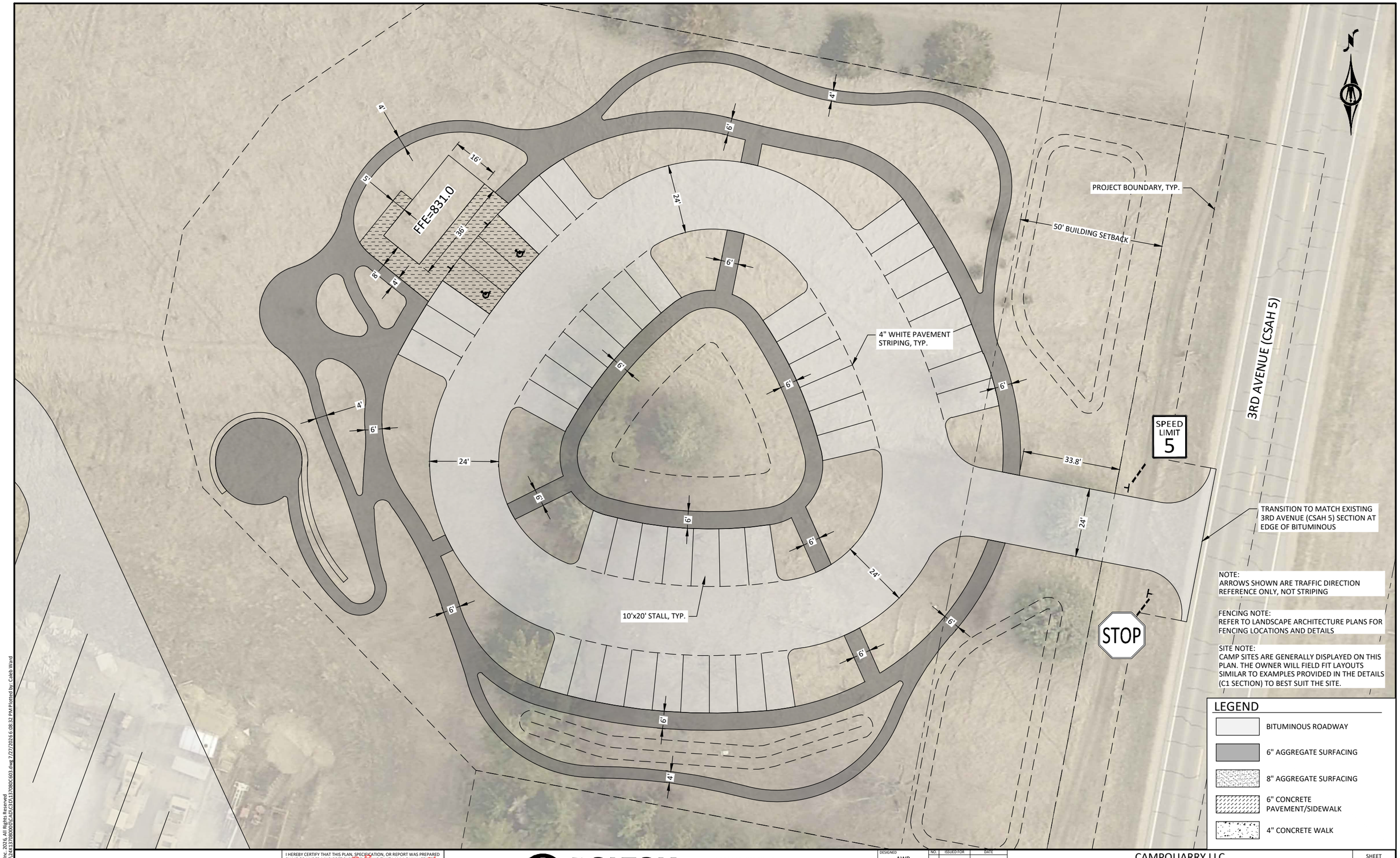
CHECKED	AWP
CLIENT PROJ. NO.	24X.137080

NO.	ISSUED FOR	DATE

CAMPQUARRY LLC
ROCKWELL RV & ADVENTURE PARK
TRAILHEAD
GRADING PLAN

SHEET C7.01



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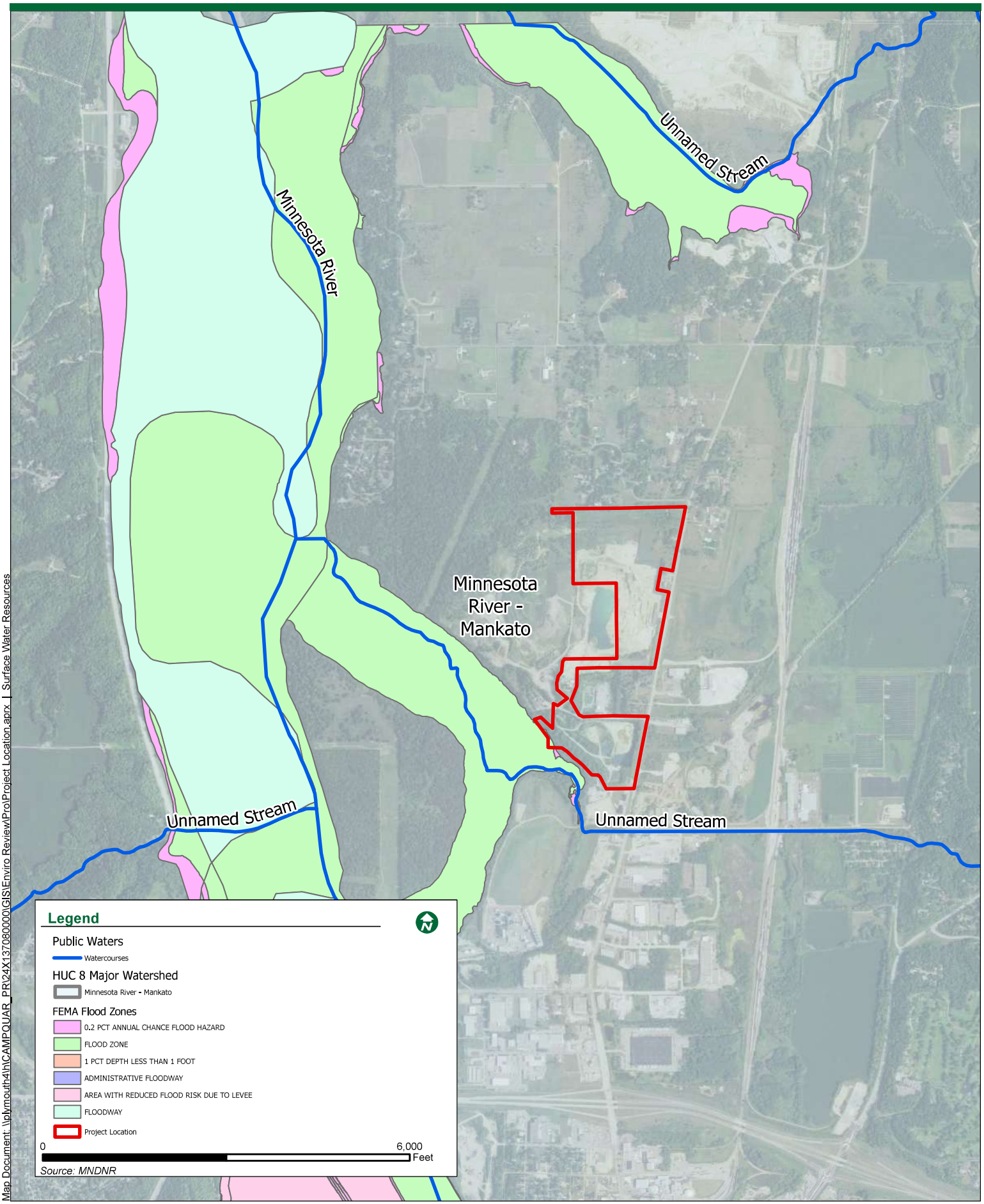
CAMPQUARRY LLC
ROCKWELL RV & ADVENTURE PARK
TRAILHEAD
SITE PLAN

SHEET C7.02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Watercourses
HUC 8 Major Watershed
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FEMA Flood Zones
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FLOOD ZONE
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ADMINISTRATIVE FLOODWAY
AREA WITH REDUCED FLOOD RISK DUE TO LEVEE
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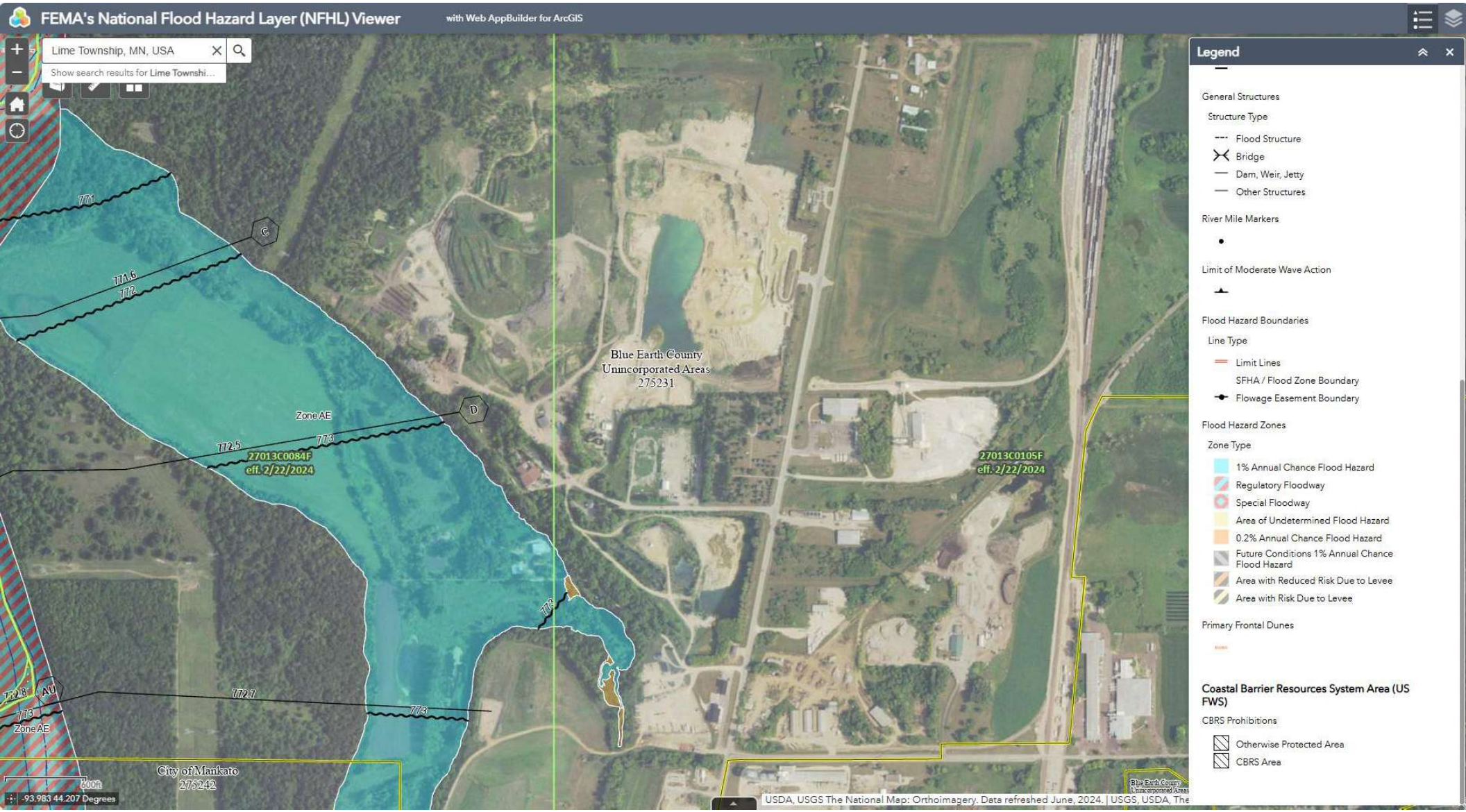
FEMA's National Flood Hazard Layer (NFHL) Viewer
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Legend
General Structures
Structure Type
Flood Structure
Bridge
Dam, Weir, Jetty
Other Structures
River Mile Markers
Limit of Moderate Wave Action
Flood Hazard Boundaries
Line Type
Limit Lines
SFHA / Flood Zone Boundary
Flowage Easement Boundary
Flood Hazard Zones
Zone Type
1% Annual Chance Flood Hazard
Regulatory Floodway
Special Floodway
Area of Undetermined Flood Hazard
0.2% Annual Chance Flood Hazard
Future Conditions 1% Annual Chance Flood Hazard
Area with Reduced Risk Due to Levee
Area with Risk Due to Levee
Primary Frontal Dunes
Coastal Barrier Resources System Area (US FWS)
CBRS Prohibitions
Otherwise Protected Area
CBRS Area



100 m

200 ft

44.209602, -93.994276

Minnesota's Climate Action Framework has a priority action to establish a standard to achieve 100% carbon-free electricity and 55% renewable electricity by 2040. Minnesota's current, updated 2023, Climate Action Framework goals are to reduce greenhouse gas emissions 50% by 2030 from a 2005 baseline and achieve net-zero emissions by 2050[24]. The proposed project does not involve any large energy facilities but includes residential properties. BMPs will be utilized in the planning and construction phases of the project to remain in keeping with state and local GHG reduction goals. Again, over the project's assumed 30-year lifespan, there will be an estimated 6142.98 MTCO2e emitted annually without any mitigations.

19. Noise

Describe sources, characteristics, duration, quantities, and intensity of noise generated during project construction and operation. Discuss the effect of noise in the vicinity of the project, including 1) existing noise levels/sources in the area, 2) nearby sensitive receptors, 3) conformance to state noise standards, and 4) quality of life. Identify measures that will be taken to minimize or mitigate the effects of noise.

Noise will be generated during the reclamation and construction phases of the campground, primarily from heavy equipment and construction activities. These activities will be limited to regular working hours to minimize disruption and will be in compliance with Minnesota Rules 7030 and applicable MPCA Noise standards as referenced in the Lime Township Zoning Ordinance[25]. Once operational, noise associated with the campground will be typical of recreational use, including vehicle traffic, human activity, and occasional maintenance, and is not expected to exceed normal ambient levels for such settings. Existing noise sources in the area include nearby industrial operations and traffic. Sensitive receptors in the vicinity include a cemetery, a childcare center, residential areas, and agricultural properties. The project will comply with applicable Minnesota state noise standards, and noise levels are not anticipated to negatively affect human health or quality of life. The transformation of a non-operational quarry into a natural campground setting is expected to improve the overall character and livability of the area. To further minimize noise impacts, construction will follow best management practices.

20. Transportation

a) *Describe traffic-related aspects of project construction and operation. Include: 1) existing and proposed additional parking spaces, 2) estimated total average daily traffic generated, 3) estimated maximum peak hour traffic generated and time of occurrence, 4) indicate source of trip generation rates used in the estimates, and 5) availability of transit and/or other alternative transportation modes.*

The Rockwell RV & Adventure Park development will provide parking spaces at each of the RV spots. In addition to these locations, the site will offer parking spaces dedicated to bike trails and parking spaces for the aquatic/water cable park. Food service areas will be accommodated through food trucks during peak periods and permanent snack and beverage options. These parking provisions are designed to support the anticipated demand generated by the various amenities and activities planned for the site.

The estimated total average daily traffic generated by the proposed development is below the

[24] https://www.pca.state.mn.us/air-water-land-climate/climate-change-initiatives
[25] Lime Township Zoning Ordinance, https://limetownshipmn.gov/ordinances-and-regulations/lime-township-zoning-ordinance/.

Minnesota Department of Transportation (MnDOT) threshold of 2,500 daily trips, which is the criterion for requiring a full Traffic Impact Study. Based on conservative occupancy and trip generation assumptions, the daily traffic volume associated with the site will not exceed this threshold, ensuring that the existing roadway network can accommodate the additional demand without significant operational impacts.

During the weekday PM peak hour, the site is expected to generate approximately 227 vehicle trips, with 187 vehicles entering and 40 vehicles exiting the site. The peak hour is anticipated to occur on Thursday afternoons, as traffic counts indicated higher volumes on Thursdays compared to Fridays. This estimation is based on observed adjacent street traffic patterns and provides a conservative assessment of the maximum traffic impact during the busiest period.

Trip generation rates for the project were calculated using the Institute of Transportation Engineers' (ITE) Trip Generation Manual, 11th Edition, supplemented by engineering judgment. The calculations were based on the number of parking spaces and occupancy assumptions, as standard land use codes were not directly applicable to the unique mix of uses at the site. These methodologies were reviewed and discussed with Blue Earth County staff to ensure their appropriateness for the project context.

Public transit is not available to the site. The inclusion of bike trails within the development provides an alternative transportation mode for non-motorized access. This feature supports multimodal connectivity and offers visitors and residents an option beyond personal vehicles for accessing the park and its amenities.

b) *Discuss the effect on traffic congestion on affected roads and describe any traffic improvements necessary. The analysis must discuss the project's impact on the regional transportation system. If the peak hour traffic generated exceeds 250 vehicles or the total daily trips exceeds 2,500, a traffic impact study must be prepared as part of the EAW. Use the format and procedures described in the Minnesota Department of Transportation's Access Management Manual, Chapter 5 (available at: http://www.dot.state.mn.us/accessmanagement/resources.html) or a similar local guidance*

Based on the findings of the Rockwell RV & Adventure Park Traffic Impact Study, the effect of the proposed development on traffic congestion along affected roads is expected to be minimal. The analysis evaluated key intersections along CSAH 5 (3rd Avenue) and adjacent access points, considering both existing and projected opening day traffic volumes. All major street left-turn movements and minor-street approaches are anticipated to operate at Level of Service (LOS) B or better during the weekday PM peak hour under both current and future conditions, indicating efficient traffic flow and no significant congestion or queueing concerns. The regional transportation system, including the surrounding roadway network, is considered adequate to accommodate the additional trips generated by the project without substantial degradation in service levels.

To ensure safe and efficient operations, several traffic improvements are recommended in accordance with the Minnesota Department of Transportation's Access Management Manual, Chapter 5. At the main site access on 3rd Avenue, the existing northbound bypass lane should be converted to a dedicated northbound left-turn lane with at least 150 feet of storage to accommodate projected queues. The latest concept plan shows 1,100 feet of stacking between the gate and 3rd Avenue for check-in, which should be adequate for internal queuing. MN Statute 169.81 Subsection 3.c limits recreational vehicle length without a permit to 70 feet. If the internal queuing length is reduced during final design, it is recommended to add one RV parking stall for every 70 feet of reduction. The existing southbound right-turn lane and acceleration lane should be maintained to facilitate safe merging for RVs exiting the site. No additional turn lanes or

improvements are warranted at the 231st Lane intersection or the northern bike trail access, as traffic volumes do not justify such modifications.

Importantly, the projected peak hour traffic generated by the development (227 vehicles) and total daily trips are both below the MnDOT thresholds (250 peak hour trips and 2,500 daily trips) that require a full Traffic Impact Study as part of the Environmental Assessment Worksheet (EAW). The analysis and recommendations provided in the memorandum follow the format and procedures described in the MnDOT Access Management Manual, ensuring that the project's impact on the regional transportation system is thoroughly addressed and that necessary improvements are identified to maintain safe and efficient traffic operations.

c) Identify measures that will be taken to minimize or mitigate project-related transportation effects.

Measures to minimize or mitigate project-related transportation effects for the Rockwell RV & Adventure Park have been identified based on the traffic impact analysis. The primary mitigation strategies include converting the existing northbound bypass lane at the main site access to a dedicated northbound left-turn lane with at least 150 feet of storage, which will help accommodate anticipated vehicle queues and improve safety for vehicles entering the site. The internal check-in gate is recommended to be positioned as far back from 3rd Avenue as possible to allow for internal queueing and prevent vehicle stacking from encroaching onto the public roadway. Additionally, the existing southbound right-turn lane and acceleration lane should be maintained to facilitate safe and efficient egress for RVs merging onto 3rd Avenue. All campers will use the main entrance for check-in. No campers will be allowed to exit or enter on 231st off 3rd Avenue except in emergency conditions. No additional turn lanes or improvements are warranted at the 231st Lane intersection or the northern bike trail access, as projected traffic volumes do not justify such modifications. These measures are designed to ensure that the project does not adversely affect traffic operations or safety in the surrounding area, and that the existing roadway infrastructure remains sufficient to accommodate the anticipated demand.

The Draft Traffic Impact Study is in **Appendix F**.

21. Cumulative potential effects

(Preparers can leave this item blank if cumulative potential effects are addressed under the applicable EAW Items)

a) Describe the geographic scales and timeframes of the project related environmental effects that could combine with other environmental effects resulting in cumulative potential effects.

The cumulative potential environmental effects of the Rockwell RV and Adventure Park project are associated with its transformation from a former quarry into a recreational campground. The geographic scale of potential cumulative effects includes the immediate project area in Lime Township, Blue Earth County, and adjacent lands such as the Pilgrim's Rest Cemetery, MBS Site overlapping the northwest area of the site, calcareous fen (Lime 30, Fen ID# 38219), and surrounding residential and agricultural properties. The timeframe for these effects spans from the start of construction in 2026 through the operational life of the park, anticipated to extend for several decades.

b) Describe any reasonably foreseeable future projects (for which a basis of expectation has been laid) that may interact with environmental effects of the proposed project within the geographic scales and timeframes identified above.

Appendix F: Traffic Impact Study

- Rockwell RV & Adventure Park: Traffic Impact Study

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Plymouth, MN 55447

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TRAFFIC MEMORANDUM

Date: 12/3/2025

To: Ryan Thilges, PE (Blue Earth County)

From: Anna Irby, PE

Subject: Rockwell RV & Adventure Park: Traffic Impact Study
Project No.: 24X.137080.000

I hereby certify that this plan, specification, or report was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the state of Minnesota.

Signature: _____

Name: Anna McDowell Irby

Date: 12/3/2025 License Number: 63412

This Traffic Impact Study (TIS) was prepared to document analyses that were performed to understand potential traffic impacts associated with the proposed Rockwell RV & Adventure Park.

Development Details

The site is located along CSAH 5 (3rd Avenue) in Blue Earth County (County), Minnesota. This analysis focuses on traffic impacts on the surrounding roadway network. The proposed development could consist of the following land uses and amenities:

- Approximately 125 small/med RV spots
- Approximately 200 large RV spots
- Bike trails and parking (approximately 46 parking spaces)
- Aquatic Park / Water Cable Park (approximately 125 parking spaces)

It should be noted that the most recent concept plan shows slightly lower projections; therefore, the analysis provides a conservative estimate. The main access, located at the exiting quarry access, will have an internal gate for all vehicles staying at the site to check in. The northern access will provide access to the bike trail, and the southern access will provide egress for RVs and access for maintenance vehicles. Refer to **Figure 1** for the site location map and **Figure 2** for a copy of the preliminary site plan.

Study Intersections

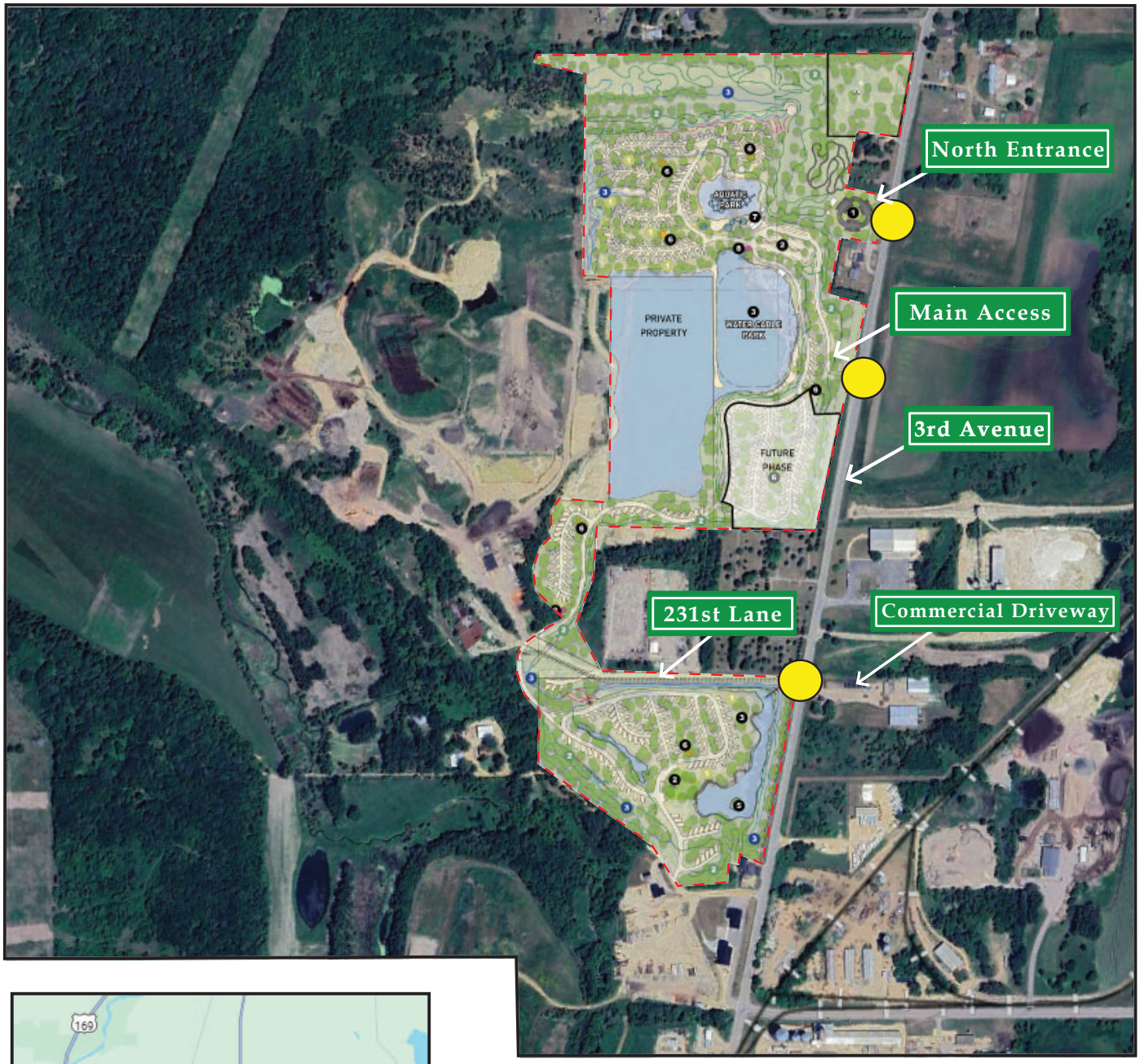
Traffic impacts from development-related traffic were evaluated at the following intersections:

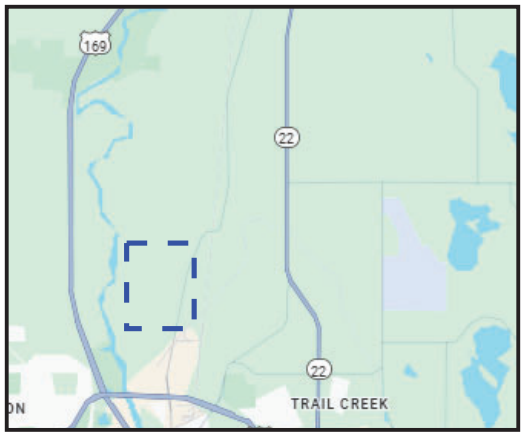
- 3rd Avenue and Proposed Northern Access (Bike Trail) – [stop control on Driveway]
- 3rd Avenue and Existing Quarry Access/Proposed Main Access – [stop control on Existing Quarry Access]
- 3rd Avenue and 231st Lane and Proposed Southern Access – [stop control on 231st Lane and Commercial Driveway]

The study area and project assumptions for the traffic study were determined through coordination with the Blue Earth County (County) staff.

All traffic will enter at the main access and RVs will proceed to the check-in office [*denoted with **circle 7** on the concept plan*] while aquatic park traffic can proceed to the parking lot [*denoted with **circle 2** on the concept plan*]. The most recent site plan indicates there will be multiple stalls for RVs to queue during check-in. Through coordination with the project team, this process will be a mixture of online and in-person check-in.

It is assumed that the majority of site traffic would enter the site during a concentrated afternoon peak on Thursday or Friday. Only one peak hour was analyzed based on the highest peak of the adjacent street traffic of the two days, which occurred on Thursday. Exiting site traffic will likely occur on Sundays but will be spread over multiple hours [not concentrated in a peak hour] and is not expected to be a traffic concern due to expected lower adjacent street volumes on a Sunday; therefore, check-out traffic was not analyzed.





LEGEND

- Proposed Site Location
- Study Area
- Study Intersection

N

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Blue Earth County, MN

Site Location Map

Scale: Not to Scale

Figure 1

SITE LEGEND:

BIKE TRAILS

1. ACCESS / CONVENIENCE BIKE OPTIMIZED TRAILS (TWO WAY)
2. BEGINNER TRAILS (ONE WAY)
3. INTERMEDIATE TRAILS (ONE WAY)

OTHER SITE AMENITIES / FEATURES

1. PUBLIC PARKING / ACCESS
2. USER PARKING
3. WATER CABLE PARK
4. CABLE PARK STARTING FEATURE / VIEWING AREA
5. ISLAND FEATURE

BUILDINGS

6. RESTROOM / PAVILION
7. LAKESIDE PAVILION
8. WASTE WATER TANKS / LIFT STATION

OTHER SITE NOTES:

POTABLE WATER WILL BE AT CAMPSITES OR WITHIN 400 FEET OF EVERY CAMPSITE IN ACCORDANCE WITH MINNESOTA RULES CHAPTER 4630.0600.

ALL TRAILS AND OPEN SPACES WILL BE FIELD-FIT TO REDUCE TREE AND BRUSH REMOVALS TO AVOID WETLANDS.

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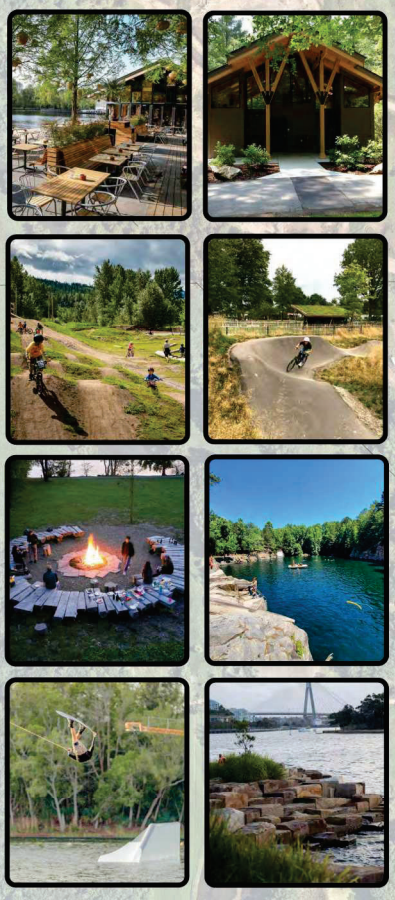


ROCKWELL CONCEPT

INTEGRATE THE SYSTEMS

CONFLUENCE

Crash Data

Crash data was obtained using the Minnesota Crash Mapping Analysis Tool (MnCMAT2) at the study intersections for the most recent five-year period (2020-2024) to determine existing safety issues at these intersections. A summary of the crash results is provided for the intersections in **Table 1** and **Table 2**. No crashes were reported at the intersection of 3rd Avenue and the Residential Driveway (northern intersection), so this intersection was removed from the summary tables. Refer to the **Appendix** for the crash analysis report.

MnDOT uses a comparison of the crash rate and the critical rate when determining whether there is a safety issue at an intersection. The crash rate is the number of crashes per million entering vehicles (MEV). The critical rate is a statistical comparison based on similar intersections statewide. An observed crash rate greater than the critical rate indicates that the intersection operates outside of the expected normal range. The critical index reports the magnitude of this difference and a critical index of less than one shows that the intersection is operating within the normal range. **Table 2** summarizes the crash severity and crash rates for each study intersection.

Table 1: Crash Rate Summary (2020-2024)

Study Intersections	Crash Rate				Fatal & Serious Injury Rate			
	Int. Rate	*Statewide Average*	*Critical Rate*	Crash Index	Int. Rate	*Statewide Average*	*Critical Rate*	Critical Index
CSAH 5 and Existing Quarry Access	**0.24**	***0.14***	***0.73***	**0.33**	**0.00**	***0.93***	***18.23***	**0.00**
CSAH 5 and 231st Lane	**0.48**	***0.14***	***0.73***	**0.65**	**23.81**	***0.93***	***18.85***	**1.26**

Table 1 shows that the observed fatal & injury rate at the intersection of 3rd Avenue and 231st Lane is above the normal range and exceeds the critical rate due to the fatal accident that occurred.

See **Table 2** for a summary of crash types for each intersection.

Table 2: Crash Type Summary (2020-2024)

Study Intersections	Type of Crash							Total Crashes
	Head On	Angle	Rear End	Left-Turn	Sideswipe	Run Off Road	Other (Animal)	
3rd Avenue and Existing Quarry Access	0	0	0	0	0	0	1 (PDO)	**1**
3rd Avenue and 231st Lane	0	0	0	1 (K)	0	0	1 (PDO)	**2**
Total Crashes	**0**	**0**	**0**	**0**	**0**	**0**	**2**	**3**

Table 2, above, outlines the type of crashes experienced at the study intersections. Two of the three crashes at the study intersections were the result of an animal collision (deer). The left-turn crash at the intersection of 3rd Avenue and 231st Lane was the result of the motorcyclist and a medium truck collision and resulted in a fatality. This crash occurred during the day with no adverse weather conditions.

Existing Traffic Volumes

Existing lane configurations (number of traffic lanes on each intersection approach), storage capacities, and other intersection and roadway information within the study area are shown in **Figure 3**. **Table 3** provides a summary of the existing roadway characteristics.

Table 3: Existing Roadway Inventory

Road Name	Typical Cross Section	Speed Limit	Functional Classification	2024 AADT
CSAH 5 (3rd Avenue)	2-lane undivided	50 mph	Major Collector	3,718
231st Lane	2-lane undivided	15 mph	Local	No Available Data

Existing peak hour traffic volumes were conducted in May 2025, during a weekday Thursday and Friday for 13-hours at all the existing study intersections while schools were in session. Based on the data collected, the Thursday PM peak hour was analyzed since it indicated higher traffic volumes along 3rd Avenue when compared to Friday. This provides a conservative approach that analyzes the peak hour of the adjacent street traffic on a Thursday with the peak hour for entering site traffic.

Refer to **Figure 4** for existing weekday PM peak hour traffic volumes (2025). A copy of the count data is in the **Appendix** of this report.

The existing weekday PM peak hour traffic volumes (2025) were analyzed to determine the current levels of service at the study intersections under existing roadway conditions. The results of the analysis are presented in the **Capacity Analysis** section of this report.

While not analyzed, it should be noted that 231st Lane is expected to contain significant heavy vehicle traffic during the Saturday AM peak hour due to the surrounding quarry and material/paving sites. It is not expected that this peak heavy vehicle traffic will overlap with the peak site trip traffic.

Opening Day Traffic Volumes

The proposed build year for the development is 2027. Based on the MnDOT Traffic Mapping Application, ADTs at various traffic count locations in the study area indicate a negative growth rate. Therefore, it is determined that no background growth rate be applied when analyzing opening day traffic conditions.

Proposed Development Traffic Volumes

As mentioned previously, the proposed development could consist of up to 325 RV spots, public bike trails with 46 parking spaces, and an aquatic park/water cable park with 125 parking spaces. It should be noted that the most recent concept plan shows slightly lower projections; therefore, the analysis provides a conservative estimate.

Average weekday PM peak hour trips for the proposed development were estimated using methodology contained within the Institute of Transportation Engineers' (ITE) *Trip Generation Manual*, 11th Edition and engineering judgement. Site trips were generated for the RV park, the proposed water features, and the bike trail parking lot. Various land use codes were reviewed for the RV park and bike trail but were determined to not be accurate for the site at hand; therefore, the trip generation was calculated based on parking spaces. **Table 4** provides a summary of the trip generation potential for the site.

Table 4: Trip Generation Summary

Land Use	Intensity	Weekday PM Peak Hour Trips (vph)	
		Enter	Exit
RV Camp Sites	325 spots	163	0
Aquatic Park – *analyzed with LUC 482 [Water Slide Park]*	125 parking spaces	7	28
Bike Trail	46 parking spaces	23	23
Total Trips		**193**	**51**

The RV Camp site trips were calculated based on the assumption that at 100% occupancy and all RV's were assumed to enter within a two-hour period. Therefore, the entering site trips were assumed to be 163 trips (325 spots/2). The bike trail site trips were calculated based on a 100% occupancy of the 46 parking spaces and all vehicles were assumed to enter within a two-hour period. It was assumed that all traffic would enter and exit during the same peak hour. These site trip assumptions provide a conservative approach since they combine the assumption of 100% occupancy and assume a concentrated 2-hour site trip window. In the field it is likely that both the RV Camp Site and the Bike Trail would not be 100% occupied at the same time and that the trips would be spread over the course of multiple hours or on various days. This methodology was discussed and reviewed by the County

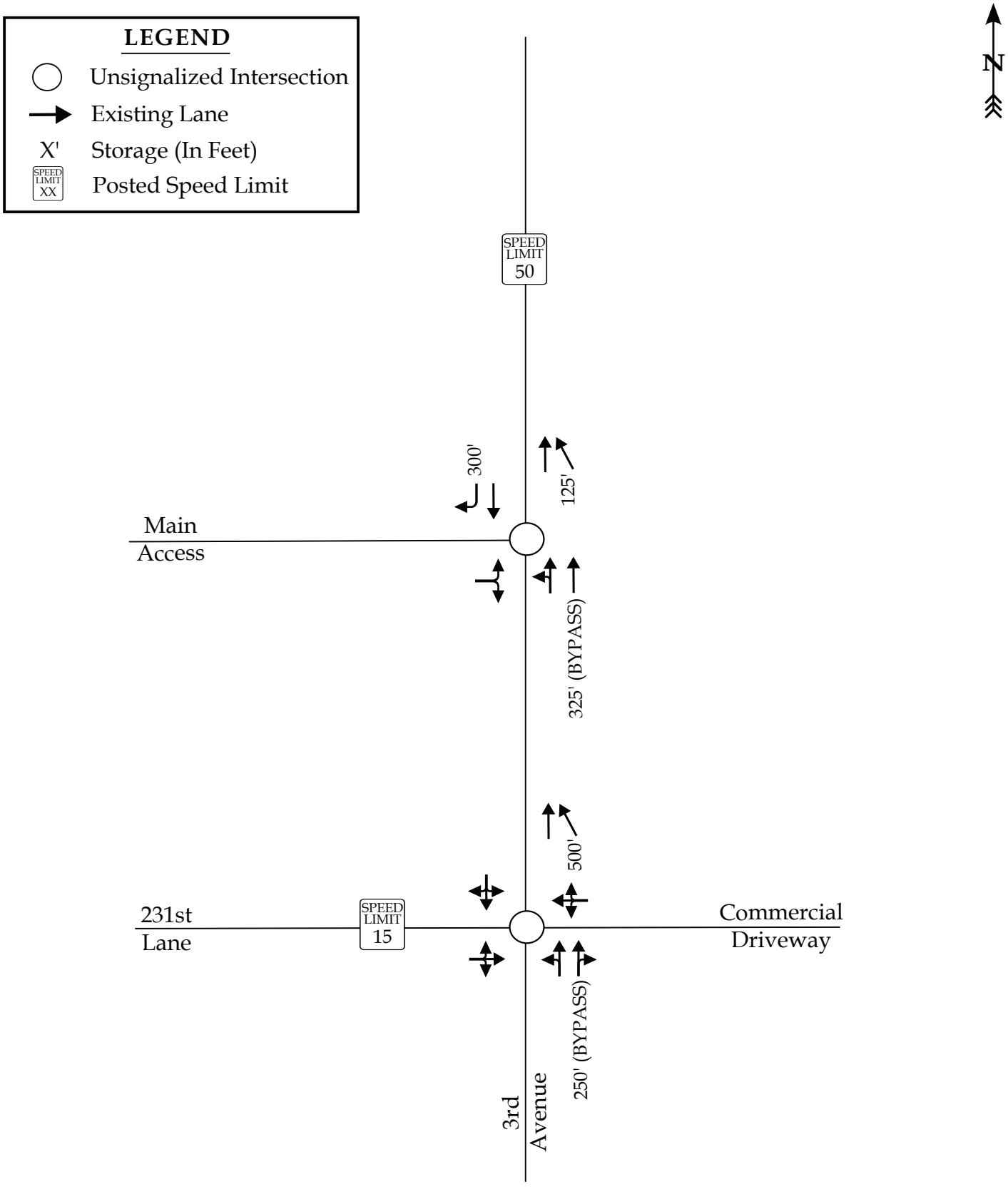
Of the daily traffic volume, it is anticipated that 244 trips (193 entering and 51 exiting) will occur during the weekday PM peak hour. It should be noted that the daily traffic is below the MnDOT threshold to require a TIS (2,500 daily trips or 250 peak hour trips).

Trip distribution percentages used in assigning site traffic for this development were estimated based on a combination of existing traffic patterns, population centers in the vicinity of the study area, and engineering judgment. It is estimated that the overall site trips will be regionally distributed as follows:

- 35% to/from the north via 3rd Avenue
- 65% to/from the south via 3rd Avenue

The site trip distribution percentages were applied to the trip generation in **Table 4** to determine the site trip assignment. Refer to **Figure 4** for the site trip assignment. To estimate traffic conditions with the site fully built out, the total site trips were added to the existing traffic volumes (2025) to determine the opening day traffic volumes (2027). Refer to **Figure 4** for an illustration of the opening day peak hour traffic volumes (2027) with the proposed site fully developed.

Study intersections were analyzed with the opening day traffic volumes (2027) using the same methodology previously discussed for existing (2025) traffic conditions. Intersections were analyzed with improvements necessary to accommodate future traffic volumes. The analysis results for each intersection are presented in the **Capacity Analysis** section of this report.



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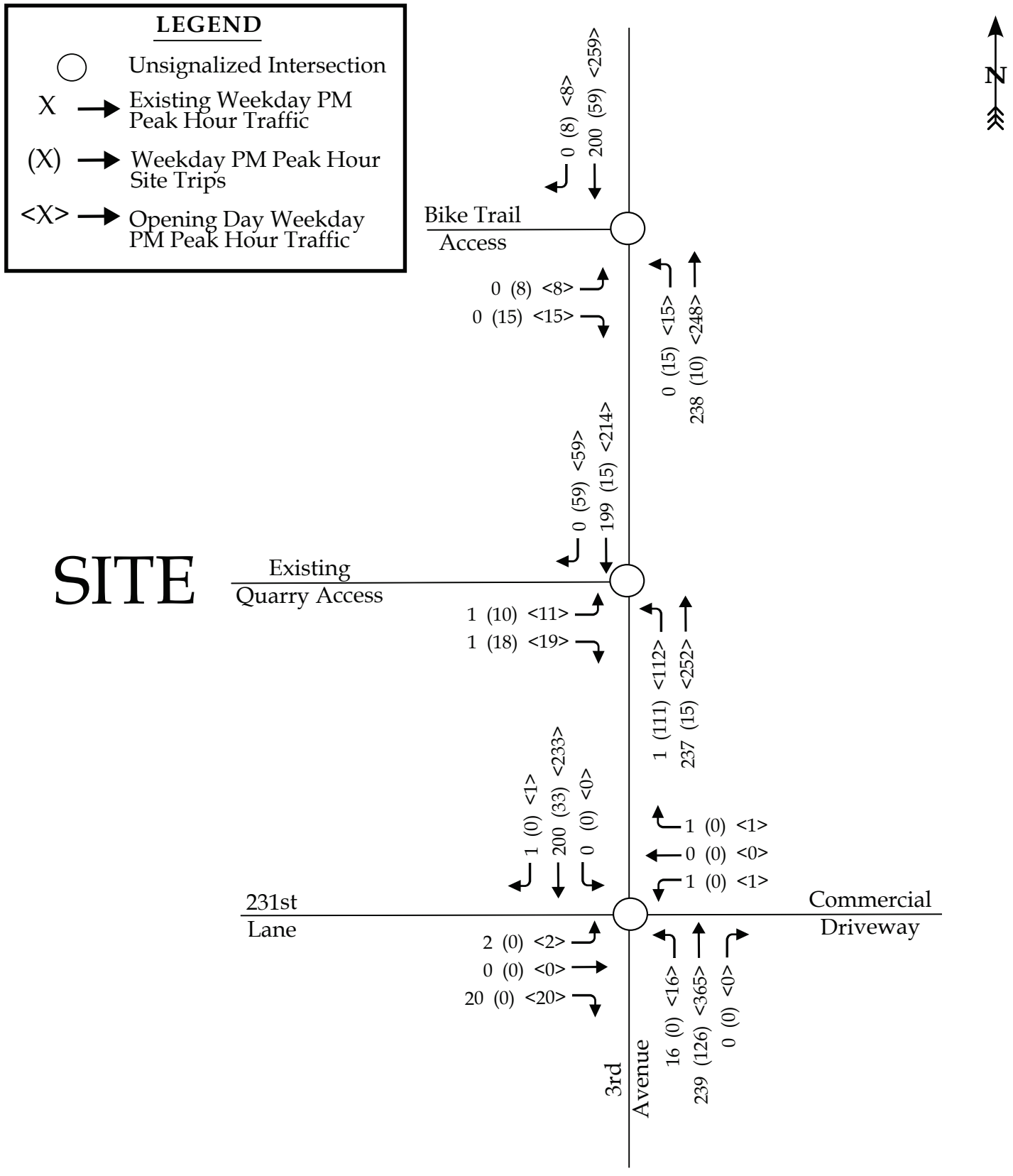
Existing Lane Configurations

Scale: Not to Scale

Figure 3



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Existing, Site Trip, Opening Day - Weekday PM PHTV

Scale: Not to Scale

Figure 4

Capacity Analysis

Weekday PM peak hour intersection levels of service were estimated using the Synchro/SimTraffic 12 analysis software for all unsignalized intersections. Level of service (LOS) is a letter grade that describes the quality of traffic operations, with levels of service ranging from LOS A (minimal delays) to LOS F (breakdown of traffic flow with major delays).

Intersection level of service analysis identifies levels of service for specific turning movements, intersection approaches (averaging delays for each turning movement on an intersection approach), and the overall intersection (averaging delays for all movements at an intersection).

This analysis considered operations with approach-level or intersection-level LOS E (or worse) deficient, and in need of mitigation to improve traffic flow. This is a common design standard throughout Minnesota. Refer to the **Appendix** for the Synchro capacity analysis reports and SimTraffic queueing reports.

The following pages summarize the LOS and queueing results for the existing (2025) and the opening day (2027) traffic conditions.

Existing

Table 5, below, summarizes the existing peak hour traffic operations queueing results.

Table 5: Existing LOS PM Peak Hour Traffic Operations

		PM Peak Hour									
		Traffic Delay (sec/veh)				Traffic Queuing (feet)					
Intersection	Approach	Movement (Delay - LOS)			Approach (Delay - LOS)	Left Turn			Right Turn		
		L	T	R		Storage	Avg	Max	Storage	Avg	Max
3rd Avenue & Existing Quarry Access	EB	11 - B	-	11 - B	11 - B	-	25	50	-	25	50
	NB	8 - A	-	-	8 - A	325	25	25	-	-	-
	SB	-	-	-	-	-	-	-	-	-	-
3rd Avenue & 231st Lane	EB	10 - B	10 - B	10 - B	10 - B	-	25	75	-	25	75
	WB	12 - B	12 - B	12 - B	12 - B	-	-	-	-	-	-
	NB	8 - A	-	-	8 - A	250	25	25	-	-	-
	SB	0 - A	-	-	0 - A	-	-	-	-	-	-

All major-street left-turn movements and minor-street approaches are operating at LOS B or better for all study intersections under existing weekday PM peak hour traffic conditions. There are no existing queueing concerns.

Opening Day

Table 6, below, summarizes the existing peak hour traffic operations queueing results.

Table 6: Opening Day LOS PM Peak Hour Traffic Operations

Intersection	Approach	PM Peak Hour									
		Traffic Delay (sec/veh)				Traffic Queuing (feet)					
		Movement (Delay - LOS)			Approach (Delay - LOS)	Left Turn			Right Turn		
		L	T	R		Storage	Avg	Max	Storage	Avg	Max
3rd Avenue & Bike Trail Access	EB	11 - B	-	11 - B	11 - B	-	25	50	-	25	50
	NB	8 - A	-	-	8 - A	-	25	50	-	-	-
	SB	-	-	-	-	-	-	-	-	-	-
3rd Avenue & Main Access	EB	13 - B	-	13 - B	13 - B	-	25	75	-	25	75
	NB	10 - A	-	-	10 - A	325	50	150	-	-	-
	SB	-	-	-	-	-	-	-	300	25	25
3rd Avenue & 231st Lane	EB	11 - B	11 - B	11 - B	11 - B	-	25	50	-	25	50
	WB	14 - B	14 - B	14 - B	13 - B	-	25	25	-	25	25
	NB	8 - A	-	-	8 - A	250	25	25	-	-	-
	SB	8 - A	-	-	8 - A	-	-	-	-	-	-

All major-street left-turn movements and minor-street approaches are expected to operate at LOS B or better for all study intersections under opening day weekday PM peak hour traffic conditions. There are no expected queueing concerns.

As shown on the latest concept plan, there are expected to be stalls for RVs to queue in if check-in requires extra time. The latest concept plan shows 1,100 feet of stacking between the gate and 3rd Avenue for check-in, which should be adequate for internal queuing. MN Statute 169.81 Subsection 3.c limits recreational vehicle length without a permit to 70 feet. If the internal queuing length is reduced during final design, it is recommended to add one RV parking stall for every 70 feet of reduction.

Site Access Turn Lane Evaluation

Based on the MnDOT *Access Management Manual*, a left-turn lane is warranted for a two-lane highway with a posted speed of 45 MPH or greater and an AADT greater than 3,000 vehicles per day (vpd) if the cross-street volume or driveway ADT is greater than 1,200 vpd. A right-turn lane is warranted for a two-lane highway with a posted speed of 45 MPH or greater and an AADT greater than 1,500 vehicles per day (vpd) if the cross-street volume or driveway ADT is greater than 100 vpd.

A southbound right-turn is warranted at the main access and already exists. Additionally, due to the nature of the site consisting of RVs, it is recommended that the existing northbound bypass lane be converted to a northbound left-turn lane and the existing southbound acceleration lane remain to allow RVs exiting the site time to gain speed before merging into 3rd Avenue.

No turn lanes are warranted at the 231st Lane intersection or the northern (bike trail) access.

Summary of Traffic Impacts

The overall intersection LOS weekday PM peak hours is anticipated to be LOS B or better for all approaches at all study intersections under existing and opening day traffic conditions. There are no expected queueing issues.

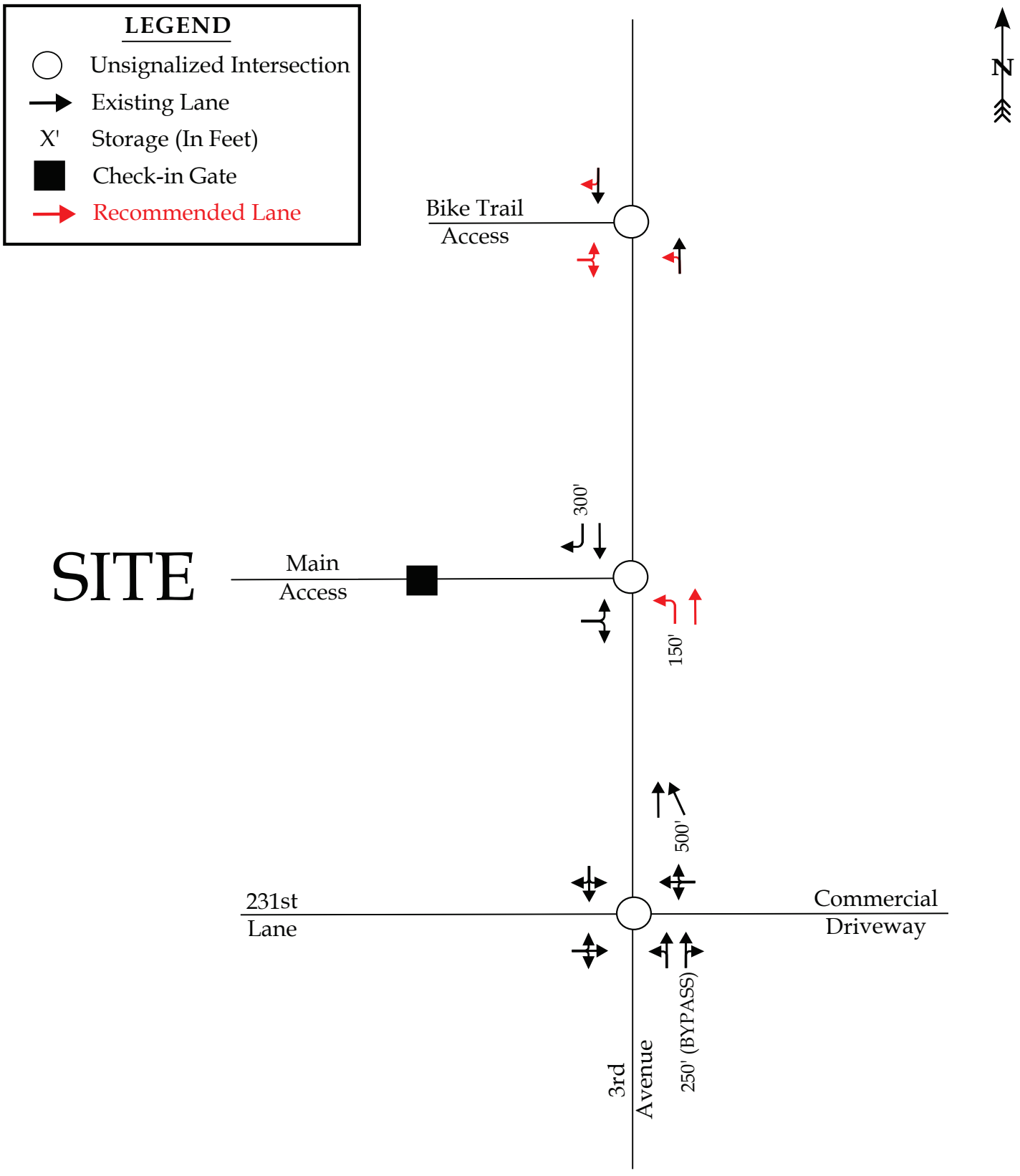
Conclusion and Recommendations

Traffic Operations and Safety

Based on operational analysis at the study intersections, the existing roadway system, existing intersection geometry, and existing intersection control, is sufficient to manage the additional trips generated by the proposed development. Refer to **Figure 5** for an illustration of the existing lane configurations and the recommended lane configuration for the proposed development access.

Based on a review of the turn lane criteria from the MnDOT's Access Management Manual, the following site access improvements are recommended:

- 3rd Avenue and Proposed Northern Access (Bike Trail)
  - No turn lanes warranted and no recommendations.
- 3rd Avenue and Proposed Main Access
  - Convert the existing northbound bypass lane to a dedicated northbound left-turn lane with at least 150 feet of storage [per maximum queues].
  - The existing southbound right-turn lane and acceleration lane on the south leg are recommended to remain.
  - The latest concept plan shows 1,100 feet of stacking between the gate and 3rd Avenue for check-in, which should be adequate for internal queuing. If the internal queuing length is reduced during final design, it is recommended to add one RV parking stall for every 70 feet of reduction.
- 3rd Avenue and 231st Lane/Commercial Driveway/Proposed Southern Access
  - No turn lanes warranted and no recommendations.



BOLTON & MENK
Real People. Real Solutions.

Rockwell RV & Adventure Park
Blue Earth County, MN

Recommended Lane Configurations

Scale: Not to Scale

Figure 8

Appendix

Crash Detail Report - Short Form

CSAH 5 and 231st Lane

INCIDENT ID	ROUTE SYS	ROUTE NUM	MEASURE	ROUTE NAME	ROUTE ID	COUNTY	CITY
01089016	04-CSAH	0005	2.294	CSAH 5	0400006594520005-I	7-Blue Earth	NOT IN A CITY

INTERSECT WITH	# VEH	# KILL	DATE	TIME	DAY	LAT	LONG	UTM X	UTM Y	WORK ZONE TYPE
	1	0	03/19/23	21:00	Sun	44.208246	-93.993914	420593.6	4895482.0	NOT APPLICABLE

BASIC TYPE	CRASH SEVERITY	FIRST HARMFUL	LIGHT CONDITION	WEATHER PRIMARY
Single Vehicle Other	N - Prop Damage Only	Deer	Dark (Str Lights On)	Clear

	Unit 1	Unit 2	Unit 3	Unit 4
Unit Type	Motor Vehicle in Transport			
Vehicle Type	Passenger Car			
Direction of Travel	Southbound			
Maneuver	Moving Forward			
Age/Sex	60 M			
Physical Cond	Apparently Normal			
Contributing Factor 1	Unknown			

OFFICER SKETCH



NARRATIVE

ON 03/10/23,STEVEN SCHOLTZ WAS DRIVING SOUTHBOUND ON CO RD 5 AND A DEER ENTERED THE ROADWAY. HE STRUCK THE DEER AND HAD DAMAGE TO THE DRIVER SIDE HEADLIGHT ASSEMBLY AND BUMPER. THE VEHICLE WAS STILL DRIVABLE AND WAS DRIVEN FROM THE SCENE. HE SAID THE DEER WAS OFF THE ROADWAY AND HE DID NOT WANT THE DEER. STEVEN HAD NO INJURIES AND DID NOT NEED MEDICAL ATTENTION.

INCIDENT ID	ROUTE SYS	ROUTE NUM	MEASURE	ROUTE NAME	ROUTE ID	COUNTY	CITY
00805783	04-CSAH	0005	2.302	CSAH 5	0400006594520005-I	7-Blue Earth	NOT IN A CITY

INTERSECT WITH	# VEH	# KILL	DATE	TIME	DAY	LAT	LONG	UTM X	UTM Y	WORK ZONE TYPE
	2	1	03/31/20	15:15	Tue	44.208367	-93.993882	420596.3	4895495.4	NOT APPLICABLE

BASIC TYPE	CRASH SEVERITY	FIRST HARMFUL	LIGHT CONDITION	WEATHER PRIMARY
Left Turn	K - Fatal	Motor Vehicle In Transport	Daylight	Cloudy

	Unit 1	Unit 2	Unit 3	Unit 4
Unit Type	Motor Vehicle in Transport	Motor Vehicle in Transport		
Vehicle Type	Motorcycle	Medium / Heavy Trucks (More		
Direction of Travel	Southbound	Northbound		
Maneuver	Moving Forward	Turning Left		
Age/Sex	40 M	61 M		
Physical Cond	Apparently Normal	Apparently Normal		
Contributing Factor 1	No Clear Contributing Action	Failure to Yield Right-of-Way		

OFFICER SKETCH



NARRATIVE

UNIT 1 (MOTORCYCLE) WAS TRAVELLING SOUTHBOUND ON BLUE EARTH COUNTY RD 5 (A.K.A 3RD AVENUE). UNIT 2 (PICKUP WITH TRAILER) WAS TRAVELLING NORTHBOUND ON COUNTY RD 5. DRIVER OF UNIT 2 WAS ATTEMPTING TO TURN LEFT (WEST) ONTO 231ST LN. DRIVER OF UNIT 2 BEGAN TURNING WITHOUT SEEING UNIT 1 APPROACHING FROM THE NORTH. DRIVER OF UNIT 1 COLLIDED WITH THE PASSENGER SIDE OF UNIT 2 AND THE DRIVER OF UNIT 1 FELL OFF OF THE MOTORCYCLE. DRIVER OF UNIT 2 STOPPED ON 231ST LN AFTER THE COLLISION. STATUS OF DRIVER OF UNIT 1: -WAS WEARING A HELMET, GOGGLES, AND OTHER PROTECTIVE GEAR -VISUAL TRAUMA TO THE HEAD AND FACE WITH SIGNIFICANT BLOOD LOSS -WITNESSES REPORTED A STRUGGLE TO BREATH IMMEDIATELY AFTER CRASH -UNRESPONSIVE WHEN LAW ENFORCEMENT ARRIVED SHORTLY AFTER -CPR PERFORMED AND LIFE SAVING MEASURES ATTEMPTED BY MAYO CLINIC AMBULANCE -PRONOUNCED DECEASED

Crash Detail Report - Short Form

CSAH 5 and 231st Lane

Selection Filter:

WORK AREA: County('7') - FILTER: Year('2020','2021','2022','2023','2024')

Analyst:

Ross Tillman

Notes:

Crash Detail Report - Short Form

INCIDENT ID	ROUTE SYS	ROUTE NUM	MEASURE	ROUTE NAME	ROUTE ID	COUNTY	CITY
00910597	04-CSAH	0005	2.595	CSAH 5	0400006594520005-I	7-Blue Earth	NOT IN A CITY

INTERSECT WITH	# VEH	# KILL	DATE	TIME	DAY	LAT	LONG	UTM X	UTM Y	WORK ZONE TYPE
	1	0	06/07/21	06:00	Mon	44.212525	-93.992751	420692.2	4895956.2	NOT APPLICABLE

BASIC TYPE	CRASH SEVERITY	FIRST HARMFUL	LIGHT CONDITION	WEATHER PRIMARY
Single Vehicle Other	N - Prop Damage Only	Deer	Sunrise	Clear

	Unit 1	Unit 2	Unit 3	Unit 4
Unit Type	Motor Vehicle in Transport			
Vehicle Type	Passenger Car			
Direction of Travel	Southbound			
Maneuver	Moving Forward			
Age/Sex	27 M			
Physical Cond	Apparently Normal			
Contributing Factor 1	No Clear Contributing Action			

OFFICER SKETCH



NARRATIVE

ALLAN RONO WAS TRAVELLING SOUTHBOUND ON 3RD AVENUE JUST NORTH OF THE INTERSECTION WITH 231ST LANE. ALLAN STATED A LARGE DEER RAN INTO THE ROADWAY AND CAUSED A COLLISION WITH THE VEHICLE HE WAS DRIVING, MINNESOTA LICENSE PLATE CAB357. ALLAN REPORTED NO INJURIES FROM THE COLLISION, AND MULTIPLE AIRBAGS DEPLOYED IN THE VEHICLE. THERE WAS SEVERE DAMAGE TO THE FRONT OF THE VEHICLE MAKING IT INOPERABLE. ALLAN PROVIDED ME WITH AN INSURANCE POLICY FOR THE VEHICLE, BUT SAID HE IS ONLY LISTED AS A DRIVER ON THE POLICY. THE POLICY IS THROUGH THE VEHICLE'S OWNER SARAH KERICH. SARAH WAS CALLED TO ADVISE HER OF THE INCIDENT, BUT DID NOT RESPOND TO MY MESSAGES. AFFORDABLE TOWING REMOVED THE VEHICLE FROM THE SHOULDER OF THE ROADWAY AND BROUGHT IT TO THEIR LOT IN MANKATO MINNESOTA.

Selection Filter:

WORK AREA: County('7') - FILTER: Year('2020','2021','2022','2023','2024'), Incident ID('910597')

Analyst: Ross Tillman

Notes:

Crash Detail Report - Short Form

Deerhaven Drive & 3rd Avenue

Selection Filter:

WORK AREA: County('7') - FILTER: Year('2020','2021','2022','2023','2024')

Analyst:

Ross Tillman

Notes:

3rd Ave & 231st Ln, Mankato, MN
0 0
Thursday, May 22, 2025

Time	Southbound 0						Westbound 0						Northbound 0						Eastbound 0						VEHICLE TOTAL
	U Turns	Left Turns	Straight Through	Right Turns	Crosswalk Crossings	*Vehicle Approach Total*	U Turns	Left Turns	Straight Through	Right Turns	Crosswalk Crossings	*Vehicle Approach Total*	U Turns	Left Turns	Straight Through	Right Turns	Crosswalk Crossings	*Vehicle Approach Total*	U Turns	Left Turns	Straight Through	Right Turns	Crosswalk Crossings	*Vehicle Approach Total*	
2:00 PM	0	0	39	1	0	*40*	0	0	0	0	0	*0*	0	3	27	0	0	*30*	0	0	0	2	0	*2*	**72**
2:15 PM	0	0	28	0	0	*28*	0	1	0	0	0	*1*	0	6	39	0	0	*45*	0	1	0	2	0	*3*	**77**
2:30 PM	0	0	23	0	0	*23*	0	0	0	0	0	*0*	0	2	36	1	0	*39*	0	0	0	8	0	*8*	**70**
2:45 PM	0	0	45	0	0	*45*	0	1	0	0	0	*1*	0	5	44	0	0	*49*	0	0	0	3	0	*3*	**98**
Hourly Total	0	0	135	1	0	*136*	0	2	0	0	0	*2*	0	16	146	1	0	*163*	0	1	0	15	0	*16*	**317**
3:00 PM	0	0	45	0	0	*45*	0	0	0	0	0	*0*	0	4	59	1	0	*64*	0	0	0	6	0	*6*	**115**
3:15 PM	0	0	43	0	0	*43*	0	0	0	0	0	*0*	0	3	48	0	0	*51*	0	0	0	2	0	*2*	**96**
3:30 PM	0	0	44	3	0	*47*	0	0	0	0	0	*0*	0	3	45	0	0	*48*	0	0	0	7	0	*7*	**102**
3:45 PM	0	0	40	0	0	*40*	0	0	0	0	0	*0*	0	10	47	0	0	*57*	0	1	0	6	0	*7*	**104**
Hourly Total	0	0	172	3	0	*175*	0	0	0	0	0	*0*	0	20	199	1	0	*220*	0	1	0	21	0	*22*	**417**
4:00 PM	0	0	67	1	0	*68*	0	1	0	0	0	*1*	0	6	55	0	0	*61*	0	1	0	8	0	*9*	**139**
4:15 PM	0	0	42	0	0	*42*	0	0	0	0	0	*0*	0	6	62	0	0	*68*	0	1	0	3	0	*4*	**114**
4:30 PM	0	0	41	0	0	*41*	0	0	0	1	0	*1*	0	4	61	0	0	*65*	0	0	0	4	0	*4*	**111**
4:45 PM	0	0	50	0	0	*50*	0	0	0	0	0	*0*	0	0	61	0	0	*61*	0	0	0	5	0	*5*	**116**
Hourly Total	0	0	200	1	0	*201*	0	1	0	1	0	*2*	0	16	239	0	0	*255*	0	2	0	20	0	*22*	**480**
5:00 PM	0	0	52	0	0	*52*	0	0	0	0	0	*0*	0	0	47	0	0	*47*	0	0	0	3	0	*3*	**102**
5:15 PM	0	0	45	0	0	*45*	0	0	0	0	0	*0*	0	0	68	0	0	*68*	0	0	0	0	0	*0*	**113**
5:30 PM	0	0	37	3	0	*40*	0	0	0	0	0	*0*	0	0	50	0	0	*50*	0	0	0	2	0	*2*	**92**
5:45 PM	0	0	30	0	0	*30*	0	0	0	0	0	*0*	0	0	51	0	0	*51*	0	0	0	0	0	*0*	**81**
Hourly Total	0	0	164	3	0	*167*	0	0	0	0	0	*0*	0	0	216	0	0	*216*	0	0	0	5	0	*5*	**388**
6:00 PM	0	0	41	0	0	*41*	0	0	0	0	0	*0*	0	0	33	0	0	*33*	0	0	0	2	0	*2*	**76**
6:15 PM	0	0	36	0	0	*36*	0	0	0	0	0	*0*	0	1	31	0	0	*32*	0	0	0	0	0	*0*	**68**
6:30 PM	0	0	23	0	0	*23*	0	0	0	0	0	*0*	0	0	44	0	0	*44*	0	1	0	0	0	*1*	**68**
6:45 PM	0	0	39	0	0	*39*	0	0	0	0	0	*0*	0	0	31	0	0	*31*	0	0	0	0	0	*0*	**70**
Hourly Total	0	0	139	0	0	*139*	0	0	0	0	0	*0*	0	1	139	0	0	*140*	0	1	0	2	0	*3*	**282**
7:00 PM	0	0	32	0	0	*32*	0	0	0	0	0	*0*	0	0	20	0	0	*20*	0	0	0	0	0	*0*	**52**
7:15 PM	0	0	48	0	0	*48*	0	0	0	0	0	*0*	0	0	33	0	0	*33*	0	0	0	0	0	*0*	**81**
7:30 PM	0	0	47	0	0	*47*	0	0	0	0	0	*0*	0	0	26	0	0	*26*	0	0	0	0	0	*0*	**73**
7:45 PM	0	0	19	0	0	*19*	0	0	0	0	0	*0*	0	0	26	0	0	*26*	0	0	0	0	0	*0*	**45**
Hourly Total	0	0	146	0	0	*146*	0	0	0	0	0	*0*	0	0	105	0	0	*105*	0	0	0	0	0	*0*	**251**
DAILY TOTAL	**0**	**0**	**956**	**8**	**0**	***964***	**0**	**3**	**0**	**1**	**0**	***4***	**0**	**53**	**1044**	**2**	**0**	***1099***	**0**	**5**	**0**	**63**	**0**	***68***	**2135**
Cars	0	0	894	7	0	*901*	0	3	0	1	0	*4*	0	47	982	2	0	*1031*	0	4	0	57	0	*61*	**1997**
Heavy Vehicles	0	0	62	1	0	*63*	0	0	0	0	0	*0*	0	6	62	0	0	*68*	0	1	0	6	0	*7*	**138**
Heavy Vehicle %	0.00%	0.00%	6.49%	12.50%	0.00%	*6.54%*	0.00%	0.00%	0.00%	0.00%	0.00%	*0.00%*	0.00%	11.32%	5.94%	0.00%	0.00%	*6.19%*	0.00%	20.00%	0.00%	9.52%	0.00%	*10.29%*	**6.46%**

PM Peak Hour (14:00 - 24:00)

Time	Southbound						Westbound						Northbound						Eastbound						VEHICLE TOTAL
	U Turns	Left Turns	Straight Through	Right Turns	Crosswalk Crossings	*Vehicle Approach Total*	U Turns	Left Turns	Straight Through	Right Turns	Crosswalk Crossings	*Vehicle Approach Total*	U Turns	Left Turns	Straight Through	Right Turns	Crosswalk Crossings	*Vehicle Approach Total*	U Turns	Left Turns	Straight Through	Right Turns	Crosswalk Crossings	*Vehicle Approach Total*	
4:00 PM	0	0	67	1	0	*68*	0	1	0	0	0	*1*	0	6	55	0	0	*61*	0	1	0	8	0	*9*	**139**
4:15 PM	0	0	42	0	0	*42*	0	0	0	0	0	*0*	0	6	62	0	0	*68*	0	1	0	3	0	*4*	**114**
4:30 PM	0	0	41	0	0	*41*	0	0	0	1	0	*1*	0	4	61	0	0	*65*	0	0	0	4	0	*4*	**111**
4:45 PM	0	0	50	0	0	*50*	0	0	0	0	0	*0*	0	0	61	0	0	*61*	0	0	0	5	0	*5*	**116**
Peak Hour Total	0	0	200	1	0	*201*	0	1	0	1	0	*2*	0	16	239	0	0	*255*	0	2	0	20	0	*22*	**480**
Peak Hour Heavy Vehicles	0	0	14	0	0	*14*	0	0	0	0	0	*0*	0	2	16	0	0	*18*	0	0	0	1	0	*1*	**33**
Peak Hour Heavy Vehicles %	0.00%	0.00%	7.00%	0.00%	0.00%	6.97%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	12.50%	6.69%	0.00%	0.00%	7.06%	0.00%	0.00%	0.00%	5.00%	0.00%	4.55%	6.88%
PHF	0.000	0.000	0.746	0.250	0.000	*0.739*	0.000	0.250	0.000	0.250	0.000	*0.500*	0.000	0.667	0.964	0.000	0.000	*0.938*	0.000	0.500	0.000	0.625	0.000	*0.611*	**0.863**

3rd Ave & North Intersection, Mankato, MN

0 0

Thursday, May 22, 2025

Time	Southbound 0						Westbound 0						Northbound 0						Eastbound 0						VEHICLE TOTAL
	U Turns	Left Turns	Straight Through	Right Turns	Crosswalk Crossings	*Vehicle Approach Total*	U Turns	Left Turns	Straight Through	Right Turns	Crosswalk Crossings	*Vehicle Approach Total*	U Turns	Left Turns	Straight Through	Right Turns	Crosswalk Crossings	*Vehicle Approach Total*	U Turns	Left Turns	Straight Through	Right Turns	Crosswalk Crossings	*Vehicle Approach Total*	
2:00 PM	0	0	35	0	0	*35*	0	0	0	0	0	*0*	0	0	29	0	0	*29*	0	0	0	0	0	*0*	**64**
2:15 PM	0	0	22	0	0	*22*	0	0	0	0	0	*0*	0	0	32	0	0	*32*	0	0	0	0	0	*0*	**54**
2:30 PM	0	0	24	0	0	*24*	0	0	0	0	0	*0*	0	0	33	0	0	*33*	0	0	0	0	0	*0*	**57**
2:45 PM	0	0	36	0	0	*36*	0	0	0	0	0	*0*	0	0	43	0	0	*43*	0	0	0	0	0	*0*	**79**
Hourly Total	0	0	117	0	0	*117*	0	0	0	0	0	*0*	0	0	137	0	0	*137*	0	0	0	0	0	*0*	**254**
3:00 PM	0	0	44	0	0	*44*	0	0	0	0	0	*0*	0	0	59	0	0	*59*	0	0	0	0	0	*0*	**103**
3:15 PM	0	0	42	0	0	*42*	0	0	0	0	0	*0*	0	0	41	0	0	*41*	0	0	0	0	0	*0*	**83**
3:30 PM	0	0	42	0	0	*42*	0	0	0	0	0	*0*	0	0	43	1	0	*44*	0	0	0	0	0	*0*	**86**
3:45 PM	0	0	41	0	0	*41*	0	1	0	0	0	*1*	0	0	50	0	0	*50*	0	0	0	0	0	*0*	**92**
Hourly Total	0	0	169	0	0	*169*	0	1	0	0	0	*1*	0	0	193	1	0	*194*	0	0	0	0	0	*0*	**364**
4:00 PM	0	0	58	0	0	*58*	0	0	0	0	0	*0*	0	1	54	1	0	*56*	0	0	0	0	0	*0*	**114**
4:15 PM	0	0	41	0	0	*41*	0	0	0	0	0	*0*	0	0	60	1	0	*61*	0	0	0	0	0	*0*	**102**
4:30 PM	0	0	49	0	0	*49*	0	0	0	0	0	*0*	0	0	64	0	0	*64*	0	0	0	0	0	*0*	**113**
4:45 PM	0	0	52	0	0	*52*	0	1	0	0	0	*1*	0	0	56	0	0	*56*	0	0	0	0	0	*0*	**109**
Hourly Total	0	0	200	0	0	*200*	0	1	0	0	0	*1*	0	1	234	2	0	*237*	0	0	0	0	0	*0*	**438**
5:00 PM	0	0	47	0	0	*47*	0	0	0	1	0	*1*	0	0	50	0	0	*50*	0	1	0	1	0	*2*	**100**
5:15 PM	0	0	42	0	0	*42*	0	0	0	0	0	*0*	0	0	62	0	0	*62*	0	0	0	0	0	*0*	**104**
5:30 PM	0	0	32	0	0	*32*	0	0	0	0	0	*0*	0	0	52	0	0	*52*	0	0	0	1	0	*1*	**85**
5:45 PM	0	0	26	0	0	*26*	0	0	0	0	0	*0*	0	0	52	0	0	*52*	0	0	0	0	0	*0*	**78**
Hourly Total	0	0	147	0	0	*147*	0	0	0	1	0	*1*	0	0	216	0	0	*216*	0	1	0	2	0	*3*	**367**
6:00 PM	0	0	39	0	0	*39*	0	0	0	0	0	*0*	0	0	28	0	0	*28*	0	0	0	0	0	*0*	**67**
6:15 PM	0	0	29	0	0	*29*	0	0	0	0	0	*0*	0	0	27	0	0	*27*	0	0	0	0	0	*0*	**56**
6:30 PM	0	0	22	0	0	*22*	0	0	0	0	0	*0*	0	0	48	0	0	*48*	0	0	0	0	0	*0*	**70**
6:45 PM	0	0	34	0	0	*34*	0	1	0	0	0	*1*	0	0	33	0	0	*33*	0	0	0	0	0	*0*	**68**
Hourly Total	0	0	124	0	0	*124*	0	1	0	0	0	*1*	0	0	136	0	0	*136*	0	0	0	0	0	*0*	**261**
7:00 PM	0	0	33	0	0	*33*	0	0	0	0	0	*0*	0	0	20	0	0	*20*	0	0	0	0	0	*0*	**53**
7:15 PM	0	0	15	0	0	*15*	0	0	0	0	0	*0*	0	0	33	0	0	*33*	0	0	0	0	0	*0*	**48**
7:30 PM	0	0	47	0	0	*47*	0	0	0	0	0	*0*	0	0	25	0	0	*25*	0	0	0	0	0	*0*	**72**
7:45 PM	0	0	17	0	0	*17*	0	0	0	0	0	*0*	0	0	28	0	0	*28*	0	1	0	0	0	*1*	**46**
Hourly Total	0	0	112	0	0	*112*	0	0	0	0	0	*0*	0	0	106	0	0	*106*	0	1	0	0	0	*1*	**219**
DAILY TOTAL	**0**	**0**	**869**	**0**	**0**	***869***	**0**	**3**	**0**	**1**	**0**	***4***	**0**	**1**	**1022**	**3**	**0**	***1026***	**0**	**2**	**0**	**2**	**0**	***4***	**1903**
Cars	0	0	806	0	0	*806*	0	3	0	1	0	*4*	0	1	965	3	0	*969*	0	2	0	2	0	*4*	**1783**
Heavy Vehicles	0	0	63	0	0	*63*	0	0	0	0	0	*0*	0	0	57	0	0	*57*	0	0	0	0	0	*0*	**120**
Heavy Vehicle %	0.00%	0.00%	7.25%	0.00%	0.00%	*7.25%*	0.00%	0.00%	0.00%	0.00%	0.00%	*0.00%*	0.00%	0.00%	5.58%	0.00%	0.00%	*5.56%*	0.00%	0.00%	0.00%	0.00%	0.00%	*0.00%*	**6.31%**

PM Peak Hour (14:00 - 24:00)

Time	Southbound						Westbound						Northbound						Eastbound						VEHICLE TOTAL
	U Turns	Left Turns	Straight Through	Right Turns	Crosswalk Crossings	*Vehicle Approach Total*	U Turns	Left Turns	Straight Through	Right Turns	Crosswalk Crossings	*Vehicle Approach Total*	U Turns	Left Turns	Straight Through	Right Turns	Crosswalk Crossings	*Vehicle Approach Total*	U Turns	Left Turns	Straight Through	Right Turns	Crosswalk Crossings	*Vehicle Approach Total*	
4:00 PM	0	0	58	0	0	*58*	0	0	0	0	0	*0*	0	1	54	1	0	*56*	0	0	0	0	0	*0*	**114**
4:15 PM	0	0	41	0	0	*41*	0	0	0	0	0	*0*	0	0	60	1	0	*61*	0	0	0	0	0	*0*	**102**
4:30 PM	0	0	49	0	0	*49*	0	0	0	0	0	*0*	0	0	64	0	0	*64*	0	0	0	0	0	*0*	**113**
4:45 PM	0	0	52	0	0	*52*	0	1	0	0	0	*1*	0	0	56	0	0	*56*	0	0	0	0	0	*0*	**109**
Peak Hour Total	0	0	200	0	0	*200*	0	1	0	0	0	*1*	0	1	234	2	0	*237*	0	0	0	0	0	*0*	**438**
Peak Hour Heavy Vehicles	0	0	15	0	0	*15*	0	0	0	0	0	*0*	0	0	16	0	0	*16*	0	0	0	0	0	*0*	**31**
Peak Hour Heavy Vehicles %	0.00%	0.00%	7.50%	0.00%	0.00%	7.50%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	6.84%	0.00%	0.00%	6.75%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	7.08%
PHF	0.000	0.000	0.862	0.000	0.000	*0.862*	0.000	0.250	0.000	0.000	0.000	*0.250*	0.000	0.250	0.914	0.500	0.000	*0.926*	0.000	0.000	0.000	0.000	0.000	*0.000*	**0.961**

3rd Ave & Midblock, Mankato, MN
0 0
Thursday, May 22, 2025

	Southbound 0						Westbound 0						Northbound 0						Eastbound 0						
Time	U Turns	Left Turns	Straight Through	Right Turns	Crosswalk Crossings	*Vehicle Approach Total*	U Turns	Left Turns	Straight Through	Right Turns	Crosswalk Crossings	*Vehicle Approach Total*	U Turns	Left Turns	Straight Through	Right Turns	Crosswalk Crossings	*Vehicle Approach Total*	U Turns	Left Turns	Straight Through	Right Turns	Crosswalk Crossings	*Vehicle Approach Total*	VEHICLE TOTAL
2:00 PM	0	0	37	0	0	*37*	0	0	0	0	0	*0*	0	0	27	0	0	*27*	0	0	0	0	0	*0*	**64**
2:15 PM	0	0	23	0	0	*23*	0	0	0	0	0	*0*	0	1	35	0	0	*36*	0	0	0	0	0	*0*	**59**
2:30 PM	0	0	24	0	0	*24*	0	0	0	0	0	*0*	0	0	34	0	0	*34*	0	0	0	0	0	*0*	**58**
2:45 PM	0	0	36	0	0	*36*	0	0	0	0	0	*0*	0	0	39	0	0	*39*	0	0	0	1	0	*1*	**76**
Hourly Total	0	0	120	0	0	*120*	0	0	0	0	0	*0*	0	1	135	0	0	*136*	0	0	0	1	0	*1*	**257**
3:00 PM	0	0	44	0	0	*44*	0	0	0	0	0	*0*	0	0	60	0	0	*60*	0	0	0	0	0	*0*	**104**
3:15 PM	0	0	42	0	0	*42*	0	0	0	0	0	*0*	0	0	42	0	0	*42*	0	0	0	0	0	*0*	**84**
3:30 PM	0	0	44	0	0	*44*	0	0	0	0	0	*0*	1	0	45	0	0	*46*	0	0	0	0	0	*0*	**90**
3:45 PM	0	0	42	0	0	*42*	0	0	0	0	0	*0*	0	0	48	0	0	*48*	0	0	0	2	0	*2*	**92**
Hourly Total	0	0	172	0	0	*172*	0	0	0	0	0	*0*	1	0	195	0	0	*196*	0	0	0	2	0	*2*	**370**
4:00 PM	0	0	60	0	0	*60*	0	0	0	0	0	*0*	0	0	54	0	0	*54*	0	0	0	1	0	*1*	**115**
4:15 PM	0	0	40	0	0	*40*	0	0	0	0	0	*0*	0	0	58	0	0	*58*	0	0	0	0	0	*0*	**98**
4:30 PM	0	0	48	0	0	*48*	0	0	0	0	0	*0*	1	0	63	0	0	*64*	0	0	0	0	0	*0*	**112**
4:45 PM	0	0	51	0	0	*51*	0	0	0	0	0	*0*	0	0	62	0	0	*62*	0	1	0	0	0	*1*	**114**
Hourly Total	0	0	199	0	0	*199*	0	0	0	0	0	*0*	1	0	237	0	0	*238*	0	1	0	1	0	*2*	**439**
5:00 PM	0	0	49	0	0	*49*	0	0	0	0	0	*0*	0	0	44	0	0	*44*	0	0	0	1	0	*1*	**94**
5:15 PM	0	0	42	0	0	*42*	0	0	0	0	0	*0*	0	0	65	0	0	*65*	0	0	0	0	0	*0*	**107**
5:30 PM	0	0	35	0	0	*35*	0	0	0	0	0	*0*	0	0	50	0	0	*50*	0	0	0	0	0	*0*	**85**
5:45 PM	0	0	25	0	0	*25*	0	0	0	0	0	*0*	0	0	51	0	0	*51*	0	0	0	0	0	*0*	**76**
Hourly Total	0	0	151	0	0	*151*	0	0	0	0	0	*0*	0	0	210	0	0	*210*	0	0	0	1	0	*1*	**362**
6:00 PM	0	0	39	0	0	*39*	0	0	0	0	0	*0*	0	0	29	0	0	*29*	0	0	0	0	0	*0*	**68**
6:15 PM	0	0	30	0	0	*30*	0	0	0	0	0	*0*	0	0	30	0	0	*30*	0	0	0	0	0	*0*	**60**
6:30 PM	0	0	21	0	0	*21*	0	0	0	0	0	*0*	0	0	48	0	0	*48*	0	0	0	0	0	*0*	**69**
6:45 PM	0	0	35	0	0	*35*	0	0	0	0	0	*0*	0	0	31	0	0	*31*	0	0	0	0	0	*0*	**66**
Hourly Total	0	0	125	0	0	*125*	0	0	0	0	0	*0*	0	0	138	0	0	*138*	0	0	0	0	0	*0*	**263**
7:00 PM	0	0	34	0	0	*34*	0	0	0	0	0	*0*	0	0	21	0	0	*21*	0	0	0	0	0	*0*	**55**
7:15 PM	0	0	15	0	0	*15*	0	0	0	0	0	*0*	0	0	33	0	0	*33*	0	0	0	0	0	*0*	**48**
7:30 PM	0	0	46	0	0	*46*	0	0	0	0	0	*0*	0	0	26	0	0	*26*	0	0	0	0	0	*0*	**72**
7:45 PM	0	0	18	0	0	*18*	0	0	0	0	0	*0*	0	1	27	0	0	*28*	0	0	0	0	0	*0*	**46**
Hourly Total	0	0	113	0	0	*113*	0	0	0	0	0	*0*	0	1	107	0	0	*108*	0	0	0	0	0	*0*	**221**
DAILY TOTAL	**0**	**0**	**880**	**0**	**0**	***880***	**0**	**0**	**0**	**0**	**0**	***0***	**2**	**2**	**1022**	**0**	**0**	***1026***	**0**	**1**	**0**	**5**	**0**	***6***	**1912**
Cars	0	0	816	0	0	*816*	0	0	0	0	0	*0*	2	2	966	0	0	*970*	0	1	0	4	0	*5*	**1791**
Heavy Vehicles	0	0	64	0	0	*64*	0	0	0	0	0	*0*	0	0	56	0	0	*56*	0	0	0	1	0	*1*	**121**
Heavy Vehicle %	0.00%	0.00%	7.27%	0.00%	0.00%	*7.27%*	0.00%	0.00%	0.00%	0.00%	0.00%	*0.00%*	0.00%	0.00%	5.48%	0.00%	0.00%	*5.46%*	0.00%	0.00%	0.00%	20.00%	0.00%	*16.67%*	**6.33%**

PM Peak Hour (14:00 - 24:00)

	Southbound						Westbound						Northbound						Eastbound						
Time	U Turns	Left Turns	Straight Through	Right Turns	Crosswalk Crossings	*Vehicle Approach Total*	U Turns	Left Turns	Straight Through	Right Turns	Crosswalk Crossings	*Vehicle Approach Total*	U Turns	Left Turns	Straight Through	Right Turns	Crosswalk Crossings	*Vehicle Approach Total*	U Turns	Left Turns	Straight Through	Right Turns	Crosswalk Crossings	*Vehicle Approach Total*	VEHICLE TOTAL
4:00 PM	0	0	60	0	0	*60*	0	0	0	0	0	*0*	0	0	54	0	0	*54*	0	0	0	1	0	*1*	**115**
4:15 PM	0	0	40	0	0	*40*	0	0	0	0	0	*0*	0	0	58	0	0	*58*	0	0	0	0	0	*0*	**98**
4:30 PM	0	0	48	0	0	*48*	0	0	0	0	0	*0*	1	0	63	0	0	*64*	0	0	0	0	0	*0*	**112**
4:45 PM	0	0	51	0	0	*51*	0	0	0	0	0	*0*	0	0	62	0	0	*62*	0	1	0	0	0	*1*	**114**
Peak Hour Total	0	0	199	0	0	*199*	0	0	0	0	0	*0*	1	0	237	0	0	*238*	0	1	0	1	0	*2*	**439**
Peak Hour Heavy Vehicles	0	0	15	0	0	*15*	0	0	0	0	0	*0*	0	0	16	0	0	*16*	0	0	0	0	0	*0*	**31**
Peak Hour Heavy Vehicles %	0.00%	0.00%	7.54%	0.00%	0.00%	*7.54%*	0.00%	0.00%	0.00%	0.00%	0.00%	*0.00%*	0.00%	0.00%	6.75%	0.00%	0.00%	*6.72%*	0.00%	0.00%	0.00%	0.00%	0.00%	*0.00%*	*7.06%*
PHF	0.000	0.000	0.829	0.000	0.000	*0.829*	0.000	0.000	0.000	0.000	0.000	*0.000*	0.250	0.000	0.940	0.000	0.000	*0.930*	0.000	0.250	0.000	0.250	0.000	*0.500*	**0.954**

3rd Ave & 231st Ln, Mankato, MN
0 0
Friday, May 23, 2025

Time	Southbound 0						Westbound 0						Northbound 0						Eastbound 0						VEHICLE TOTAL
	U Turns	Left Turns	Straight Through	Right Turns	Crosswalk Crossings	*Vehicle Approach Total*	U Turns	Left Turns	Straight Through	Right Turns	Crosswalk Crossings	*Vehicle Approach Total*	U Turns	Left Turns	Straight Through	Right Turns	Crosswalk Crossings	*Vehicle Approach Total*	U Turns	Left Turns	Straight Through	Right Turns	Crosswalk Crossings	*Vehicle Approach Total*	
2:00 PM	0	0	35	3	0	*38*	0	2	0	0	0	*2*	0	10	37	2	0	*49*	0	0	0	8	0	*8*	**97**
2:15 PM	0	0	45	1	0	*46*	0	0	0	0	0	*0*	1	5	41	0	0	*47*	0	0	0	7	0	*7*	**100**
2:30 PM	0	0	26	0	0	*26*	0	1	0	0	0	*1*	0	11	45	0	0	*56*	0	1	0	10	0	*11*	**94**
2:45 PM	0	0	31	0	0	*31*	0	0	0	0	0	*0*	0	10	42	0	0	*52*	0	0	0	11	0	*11*	**94**
Hourly Total	0	0	137	4	0	*141*	0	3	0	0	0	*3*	1	36	165	2	0	*204*	0	1	0	36	0	*37*	**385**
3:00 PM	0	0	53	0	0	*53*	0	0	0	0	0	*0*	0	11	44	0	0	*55*	0	0	0	12	0	*12*	**120**
3:15 PM	0	0	47	0	0	*47*	0	0	0	0	0	*0*	0	6	48	0	0	*54*	0	1	0	10	0	*11*	**112**
3:30 PM	0	0	38	1	0	*39*	0	0	0	0	0	*0*	0	8	42	0	0	*50*	0	0	0	4	0	*4*	**93**
3:45 PM	0	0	35	0	0	*35*	0	1	0	0	0	*1*	0	8	56	0	0	*64*	0	1	0	8	0	*9*	**109**
Hourly Total	0	0	173	1	0	*174*	0	1	0	0	0	*1*	0	33	190	0	0	*223*	0	2	0	34	0	*36*	**434**
4:00 PM	0	0	35	0	0	*35*	0	0	0	0	0	*0*	0	2	49	0	0	*51*	0	0	0	7	0	*7*	**93**
4:15 PM	0	0	48	0	0	*48*	0	0	0	0	0	*0*	0	7	45	0	0	*52*	0	0	0	5	0	*5*	**105**
4:30 PM	0	0	36	0	0	*36*	0	0	0	0	0	*0*	0	6	43	0	0	*49*	0	1	0	10	0	*11*	**96**
4:45 PM	0	0	37	0	0	*37*	0	0	0	0	0	*0*	0	1	63	0	0	*64*	0	0	0	3	0	*3*	**104**
Hourly Total	0	0	156	0	0	*156*	0	0	0	0	0	*0*	0	16	200	0	0	*216*	0	1	0	25	0	*26*	**398**
5:00 PM	0	0	46	2	0	*48*	0	0	0	0	0	*0*	0	1	59	0	0	*60*	0	0	0	2	0	*2*	**110**
5:15 PM	0	0	37	0	0	*37*	0	0	0	0	0	*0*	0	0	39	0	0	*39*	0	0	0	0	0	*0*	**76**
5:30 PM	0	0	36	0	0	*36*	0	0	0	0	0	*0*	0	0	35	0	0	*35*	0	0	0	0	0	*0*	**71**
5:45 PM	0	0	30	0	0	*30*	0	0	0	0	0	*0*	0	0	57	0	0	*57*	0	0	0	0	0	*0*	**87**
Hourly Total	0	0	149	2	0	*151*	0	0	0	0	0	*0*	0	1	190	0	0	*191*	0	0	0	2	0	*2*	**344**
6:00 PM	0	0	32	0	0	*32*	0	0	0	0	1	*0*	0	0	36	0	0	*36*	0	0	0	0	0	*0*	**68**
6:15 PM	0	0	33	0	0	*33*	0	0	0	0	0	*0*	0	0	25	0	0	*25*	0	0	0	0	0	*0*	**58**
6:30 PM	0	0	25	1	0	*26*	0	0	0	0	0	*0*	0	0	32	0	0	*32*	0	0	0	0	0	*0*	**58**
6:45 PM	0	0	24	0	0	*24*	0	0	0	0	0	*0*	0	1	25	0	0	*26*	0	0	0	0	0	*0*	**50**
Hourly Total	0	0	114	1	0	*115*	0	0	0	0	1	*0*	0	1	118	0	0	*119*	0	0	0	0	0	*0*	**234**
7:00 PM	0	0	31	0	0	*31*	0	0	0	0	0	*0*	0	0	22	0	0	*22*	0	1	0	1	0	*2*	**55**
7:15 PM	0	0	19	0	0	*19*	0	0	0	0	0	*0*	0	0	19	0	0	*19*	0	0	0	0	0	*0*	**38**
7:30 PM	0	0	31	0	0	*31*	0	0	0	0	0	*0*	0	0	32	0	0	*32*	0	0	0	0	0	*0*	**63**
7:45 PM	0	0	6	0	0	*6*	0	0	0	0	0	*0*	0	0	21	0	0	*21*	0	0	0	0	0	*0*	**27**
Hourly Total	0	0	87	0	0	*87*	0	0	0	0	0	*0*	0	0	94	0	0	*94*	0	1	0	1	0	*2*	**183**

PM Peak Hour (14:00 - 24:00)

Time	Southbound						Westbound						Northbound						Eastbound						VEHICLE TOTAL
	U Turns	Left Turns	Straight Through	Right Turns	Crosswalk Crossings	*Vehicle Approach Total*	U Turns	Left Turns	Straight Through	Right Turns	Crosswalk Crossings	*Vehicle Approach Total*	U Turns	Left Turns	Straight Through	Right Turns	Crosswalk Crossings	*Vehicle Approach Total*	U Turns	Left Turns	Straight Through	Right Turns	Crosswalk Crossings	*Vehicle Approach Total*	
3:00 PM	0	0	53	0	0	*53*	0	0	0	0	0	*0*	0	11	44	0	0	*55*	0	0	0	12	0	*12*	**120**
3:15 PM	0	0	47	0	0	*47*	0	0	0	0	0	*0*	0	6	48	0	0	*54*	0	1	0	10	0	*11*	**112**
3:30 PM	0	0	38	1	0	*39*	0	0	0	0	0	*0*	0	8	42	0	0	*50*	0	0	0	4	0	*4*	**93**
3:45 PM	0	0	35	0	0	*35*	0	1	0	0	0	*1*	0	8	56	0	0	*64*	0	1	0	8	0	*9*	**109**
Peak Hour Total	0	0	173	1	0	*174*	0	1	0	0	0	*1*	0	33	190	0	0	*223*	0	2	0	34	0	*36*	**434**
Peak Hour Heavy Vehicles	0	0	17	0	0	*17*	0	0	0	0	0	*0*	0	3	15	0	0	*18*	0	0	0	5	0	*5*	**40**
Peak Hour Heavy Vehicles %	0.00%	0.00%	9.83%	0.00%	0.00%	9.77%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	9.09%	7.89%	0.00%	0.00%	8.07%	0.00%	0.00%	0.00%	14.71%	0.00%	13.89%	9.22%
PHF	0.000	0.000	0.816	0.250	0.000	*0.821*	0.000	0.250	0.000	0.000	0.000	*0.250*	0.000	0.750	0.848	0.000	0.000	*0.871*	0.000	0.500	0.000	0.708	0.000	*0.750*	**0.904**

3rd Ave & Midblock, Mankato, MN
0 0
Friday, May 23, 2025

Time	Southbound 0						Westbound 0						Northbound 0						Eastbound 0						VEHICLE TOTAL
	U Turns	Left Turns	Straight Through	Right Turns	Crosswalk Crossings	*Vehicle Approach Total*	U Turns	Left Turns	Straight Through	Right Turns	Crosswalk Crossings	*Vehicle Approach Total*	U Turns	Left Turns	Straight Through	Right Turns	Crosswalk Crossings	*Vehicle Approach Total*	U Turns	Left Turns	Straight Through	Right Turns	Crosswalk Crossings	*Vehicle Approach Total*	
2:00 PM	0	0	36	0	0	*36*	0	0	0	1	0	*1*	0	0	36	1	0	*37*	0	0	0	1	0	*1*	**75**
2:15 PM	0	0	39	0	0	*39*	0	0	0	0	0	*0*	0	0	38	0	0	*38*	0	0	0	0	0	*0*	**77**
2:30 PM	0	0	25	0	0	*25*	0	0	0	0	0	*0*	0	0	46	0	0	*46*	0	0	0	0	0	*0*	**71**
2:45 PM	0	0	27	0	0	*27*	0	0	0	0	0	*0*	0	0	40	0	0	*40*	0	0	0	0	0	*0*	**67**
Hourly Total	0	0	127	0	0	*127*	0	0	0	1	0	*1*	0	0	160	1	0	*161*	0	0	0	1	0	*1*	**290**
3:00 PM	0	0	55	0	0	*55*	0	0	0	0	0	*0*	0	0	42	0	0	*42*	0	1	0	0	0	*1*	**98**
3:15 PM	0	0	45	0	0	*45*	0	0	0	0	0	*0*	0	0	48	0	0	*48*	0	0	0	0	0	*0*	**93**
3:30 PM	0	0	35	0	0	*35*	0	0	0	0	0	*0*	0	0	40	0	0	*40*	0	0	0	0	0	*0*	**75**
3:45 PM	0	0	35	0	0	*35*	0	0	0	0	0	*0*	0	0	56	0	0	*56*	0	0	0	0	0	*0*	**91**
Hourly Total	0	0	170	0	0	*170*	0	0	0	0	0	*0*	0	0	186	0	0	*186*	0	1	0	0	0	*1*	**357**
4:00 PM	0	0	34	0	0	*34*	0	0	0	0	0	*0*	0	0	46	0	0	*46*	0	0	0	0	1	*0*	**80**
4:15 PM	0	0	44	0	0	*44*	0	0	0	0	0	*0*	0	0	41	0	0	*41*	0	0	0	0	0	*0*	**85**
4:30 PM	0	0	35	0	0	*35*	0	0	0	0	0	*0*	0	0	47	0	0	*47*	0	0	0	0	1	*0*	**82**
4:45 PM	0	0	35	1	0	*36*	0	0	0	0	0	*0*	0	1	57	0	0	*58*	0	0	0	1	0	*1*	**95**
Hourly Total	0	0	148	1	0	*149*	0	0	0	0	0	*0*	0	1	191	0	0	*192*	0	0	0	1	2	*1*	**342**
5:00 PM	0	0	44	0	0	*44*	0	0	0	0	0	*0*	0	0	54	0	0	*54*	0	0	0	1	0	*1*	**99**
5:15 PM	0	0	28	0	0	*28*	0	0	0	0	0	*0*	0	0	40	0	0	*40*	0	0	0	0	0	*0*	**68**
5:30 PM	0	0	31	0	0	*31*	0	0	0	0	0	*0*	0	0	33	0	0	*33*	0	0	0	0	0	*0*	**64**
5:45 PM	0	0	31	0	0	*31*	0	0	0	0	0	*0*	0	0	52	0	0	*52*	0	0	0	0	0	*0*	**83**
Hourly Total	0	0	134	0	0	*134*	0	0	0	0	0	*0*	0	0	179	0	0	*179*	0	0	0	1	0	*1*	**314**
6:00 PM	1	0	28	0	0	*29*	0	0	0	0	1	*0*	0	0	32	0	0	*32*	0	0	0	0	0	*0*	**61**
6:15 PM	0	0	27	0	0	*27*	0	0	0	0	0	*0*	0	0	26	0	0	*26*	0	0	0	0	0	*0*	**53**
6:30 PM	0	0	24	0	0	*24*	0	0	0	0	0	*0*	0	0	26	0	0	*26*	0	0	0	0	0	*0*	**50**
6:45 PM	0	0	19	0	0	*19*	0	0	0	0	0	*0*	0	0	24	0	0	*24*	0	0	0	0	0	*0*	**43**
Hourly Total	1	0	98	0	0	*99*	0	0	0	0	1	*0*	0	0	108	0	0	*108*	0	0	0	0	0	*0*	**207**
7:00 PM	0	0	30	0	0	*30*	0	0	0	0	0	*0*	0	0	22	0	0	*22*	0	0	0	0	0	*0*	**52**
7:15 PM	0	0	19	0	0	*19*	0	0	0	0	0	*0*	0	0	20	0	0	*20*	0	0	0	0	0	*0*	**39**
7:30 PM	0	0	31	0	0	*31*	0	0	0	0	0	*0*	0	0	32	0	0	*32*	0	0	0	0	0	*0*	**63**
7:45 PM	0	0	5	0	0	*5*	0	0	0	0	0	*0*	0	0	20	0	0	*20*	0	0	0	0	0	*0*	**25**
Hourly Total	0	0	85	0	0	*85*	0	0	0	0	0	*0*	0	0	94	0	0	*94*	0	0	0	0	0	*0*	**179**

PM Peak Hour (14:00 - 24:00)

Time	Southbound						Westbound						Northbound						Eastbound						VEHICLE TOTAL
	U Turns	Left Turns	Straight Through	Right Turns	Crosswalk Crossings	*Vehicle Approach Total*	U Turns	Left Turns	Straight Through	Right Turns	Crosswalk Crossings	*Vehicle Approach Total*	U Turns	Left Turns	Straight Through	Right Turns	Crosswalk Crossings	*Vehicle Approach Total*	U Turns	Left Turns	Straight Through	Right Turns	Crosswalk Crossings	*Vehicle Approach Total*	
4:15 PM	0	0	44	0	0	*44*	0	0	0	0	0	*0*	0	0	41	0	0	*41*	0	0	0	0	0	*0*	**85**
4:30 PM	0	0	35	0	0	*35*	0	0	0	0	0	*0*	0	0	47	0	0	*47*	0	0	0	0	1	*0*	**82**
4:45 PM	0	0	35	1	0	*36*	0	0	0	0	0	*0*	0	1	57	0	0	*58*	0	0	0	1	0	*1*	**95**
5:00 PM	0	0	44	0	0	*44*	0	0	0	0	0	*0*	0	0	54	0	0	*54*	0	0	0	1	0	*1*	**99**
Peak Hour Total	0	0	158	1	0	*159*	0	0	0	0	0	*0*	0	1	199	0	0	*200*	0	0	0	2	1	*2*	**361**
Peak Hour Heavy Vehicles	0	0	10	0	0	*10*	0	0	0	0	0	*0*	0	1	5	0	0	*6*	0	0	0	1	1	*1*	**17**
Peak Hour Heavy Vehicles %	0.00%	0.00%	6.33%	0.00%	0.00%	*6.29%*	0.00%	0.00%	0.00%	0.00%	0.00%	*0.00%*	0.00%	100.00%	2.51%	0.00%	0.00%	*3.00%*	0.00%	0.00%	0.00%	50.00%	100.00%	*50.00%*	4.71%
PHF	0.000	0.000	0.898	0.250	0.000	*0.903*	0.000	0.000	0.000	0.000	0.000	*0.000*	0.000	0.250	0.873	0.000	0.000	*0.862*	0.000	0.000	0.000	0.500	0.250	*0.500*	**0.912**

3rd Ave & North Intersection, Mankato, MN
0 0
Friday, May 23, 2025

Time	Southbound 0						Westbound 0						Northbound 0						Eastbound 0						VEHICLE TOTAL
	U Turns	Left Turns	Straight Through	Right Turns	Crosswalk Crossings	*Vehicle Approach Total*	U Turns	Left Turns	Straight Through	Right Turns	Crosswalk Crossings	*Vehicle Approach Total*	U Turns	Left Turns	Straight Through	Right Turns	Crosswalk Crossings	*Vehicle Approach Total*	U Turns	Left Turns	Straight Through	Right Turns	Crosswalk Crossings	*Vehicle Approach Total*	
2:00 PM	0	0	37	0	0	*37*	0	0	0	0	0	*0*	0	0	37	0	0	*37*	0	0	0	0	0	*0*	**74**
2:15 PM	0	0	38	0	0	*38*	0	0	0	0	0	*0*	0	0	37	0	0	*37*	0	0	0	0	0	*0*	**75**
2:30 PM	0	0	25	0	0	*25*	0	0	0	0	0	*0*	0	0	42	2	0	*44*	0	0	0	0	0	*0*	**69**
2:45 PM	0	0	31	0	0	*31*	0	0	0	0	0	*0*	0	0	41	0	0	*41*	0	0	0	0	0	*0*	**72**
Hourly Total	0	0	131	0	0	*131*	0	0	0	0	0	*0*	0	0	157	2	0	*159*	0	0	0	0	0	*0*	**290**
3:00 PM	0	0	51	0	0	*51*	0	0	0	0	0	*0*	0	0	43	0	0	*43*	0	0	0	0	0	*0*	**94**
3:15 PM	0	0	47	0	0	*47*	0	0	0	0	0	*0*	0	0	48	0	0	*48*	0	0	0	0	0	*0*	**95**
3:30 PM	0	0	32	0	0	*32*	0	0	0	0	0	*0*	0	0	40	0	0	*40*	0	0	0	0	0	*0*	**72**
3:45 PM	0	0	36	0	0	*36*	0	0	0	0	0	*0*	0	0	53	0	0	*53*	0	0	0	0	0	*0*	**89**
Hourly Total	0	0	166	0	0	*166*	0	0	0	0	0	*0*	0	0	184	0	0	*184*	0	0	0	0	0	*0*	**350**
4:00 PM	0	0	35	0	0	*35*	0	0	0	0	0	*0*	0	0	45	0	0	*45*	0	0	0	0	0	*0*	**80**
4:15 PM	0	0	41	0	0	*41*	0	0	0	0	0	*0*	0	0	44	0	0	*44*	0	0	0	0	0	*0*	**85**
4:30 PM	0	0	36	0	0	*36*	0	0	0	0	0	*0*	0	0	48	0	0	*48*	0	0	0	0	0	*0*	**84**
4:45 PM	0	0	37	0	0	*37*	0	0	0	0	0	*0*	0	0	55	0	0	*55*	0	0	0	0	0	*0*	**92**
Hourly Total	0	0	149	0	0	*149*	0	0	0	0	0	*0*	0	0	192	0	0	*192*	0	0	0	0	0	*0*	**341**
5:00 PM	0	1	42	0	0	*43*	0	0	0	0	0	*0*	1	1	52	0	0	*54*	0	0	0	0	0	*0*	**97**
5:15 PM	0	0	26	0	0	*26*	0	0	0	0	0	*0*	0	0	42	0	0	*42*	0	0	0	1	0	*1*	**69**
5:30 PM	0	1	31	0	0	*32*	0	0	0	0	0	*0*	0	0	33	0	0	*33*	0	0	0	0	0	*0*	**65**
5:45 PM	0	0	30	0	0	*30*	0	0	0	0	0	*0*	0	0	51	1	0	*52*	0	0	0	0	0	*0*	**82**
Hourly Total	0	2	129	0	0	*131*	0	0	0	0	0	*0*	1	1	178	1	0	*181*	0	0	0	1	0	*1*	**313**
6:00 PM	0	0	29	0	0	*29*	0	1	0	0	1	*1*	0	0	35	0	0	*35*	0	0	0	0	0	*0*	**65**
6:15 PM	0	0	27	0	0	*27*	0	0	0	0	0	*0*	0	0	25	1	0	*26*	0	1	0	0	0	*1*	**54**
6:30 PM	0	0	23	0	0	*23*	0	0	0	0	0	*0*	0	0	25	0	0	*25*	0	0	0	0	0	*0*	**48**
6:45 PM	0	0	21	0	0	*21*	0	0	0	0	0	*0*	0	0	25	0	0	*25*	0	0	0	0	0	*0*	**46**
Hourly Total	0	0	100	0	0	*100*	0	1	0	0	1	*1*	0	0	110	1	0	*111*	0	1	0	0	0	*1*	**213**
7:00 PM	0	0	28	0	0	*28*	0	0	0	0	0	*0*	0	1	21	0	0	*22*	0	0	0	0	0	*0*	**50**
7:15 PM	0	0	19	0	0	*19*	0	0	0	1	0	*1*	0	0	20	0	0	*20*	0	0	0	0	0	*0*	**40**
7:30 PM	0	0	31	0	0	*31*	0	0	0	0	0	*0*	0	0	31	0	0	*31*	0	0	0	0	0	*0*	**62**
7:45 PM	0	0	6	0	0	*6*	0	0	0	0	0	*0*	0	0	21	0	0	*21*	0	0	0	0	0	*0*	**27**
Hourly Total	0	0	84	0	0	*84*	0	0	0	1	0	*1*	0	1	93	0	0	*94*	0	0	0	0	0	*0*	**179**

Time	Southbound						Westbound						Northbound						Eastbound						VEHICLE TOTAL
	U Turns	Left Turns	Straight Through	Right Turns	Crosswalk Crossings	*Vehicle Approach Total*	U Turns	Left Turns	Straight Through	Right Turns	Crosswalk Crossings	*Vehicle Approach Total*	U Turns	Left Turns	Straight Through	Right Turns	Crosswalk Crossings	*Vehicle Approach Total*	U Turns	Left Turns	Straight Through	Right Turns	Crosswalk Crossings	*Vehicle Approach Total*	
4:15 PM	0	0	41	0	0	*41*	0	0	0	0	0	*0*	0	0	44	0	0	*44*	0	0	0	0	0	*0*	**85**
4:30 PM	0	0	36	0	0	*36*	0	0	0	0	0	*0*	0	0	48	0	0	*48*	0	0	0	0	0	*0*	**84**
4:45 PM	0	0	37	0	0	*37*	0	0	0	0	0	*0*	0	0	55	0	0	*55*	0	0	0	0	0	*0*	**92**
5:00 PM	0	1	42	0	0	*43*	0	0	0	0	0	*0*	1	1	52	0	0	*54*	0	0	0	0	0	*0*	**97**
Peak Hour Total	0	1	156	0	0	*157*	0	0	0	0	0	*0*	1	1	199	0	0	*201*	0	0	0	0	0	*0*	**358**
Peak Hour Heavy Vehicles	0	0	10	0	0	*10*	0	0	0	0	0	*0*	0	0	5	0	0	*5*	0	0	0	0	0	*0*	**15**
Peak Hour Heavy Vehicles %	0.00%	0.00%	6.41%	0.00%	0.00%	6.37%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	2.51%	0.00%	0.00%	2.49%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	4.19%
PHF	0.000	0.250	0.929	0.000	0.000	*0.913*	0.000	0.000	0.000	0.000	0.000	*0.000*	0.250	0.250	0.905	0.000	0.000	*0.914*	0.000	0.000	0.000	0.000	0.000	*0.000*	**0.923**

Intersection	
Int Delay, s/veh	0.2

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	1	1	1	237	199	0
Future Vol, veh/h	1	1	1	237	199	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	325	-	-	300
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	25	25	90	94	83	90
Heavy Vehicles, %	0	0	2	7	7	2
Mvmt Flow	4	4	1	252	240	0

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	494	240	240	0	-	0
Stage 1	240	-	-	-	-	-
Stage 2	254	-	-	-	-	-
Critical Hdwy	6.4	6.2	4.12	-	-	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	2.218	-	-	-
Pot Cap-1 Maneuver	538	804	1327	-	-	-
Stage 1	805	-	-	-	-	-
Stage 2	793	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	538	804	1327	-	-	-
Mov Cap-2 Maneuver	538	-	-	-	-	-
Stage 1	804	-	-	-	-	-
Stage 2	793	-	-	-	-	-

Approach	EB	NB	SB
HCM Ctrl Dly, s/v	10.66	0.03	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	1327	-	644	-	-
HCM Lane V/C Ratio	0.001	-	0.012	-	-
HCM Ctrl Dly (s/v)	7.7	-	10.7	-	-
HCM Lane LOS	A	-	B	-	-
HCM 95th %tile Q(veh)	0	-	0	-	-

Intersection	
Int Delay, s/veh	1.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	2	0	20	1	0	1	16	239	0	0	200	1
Future Vol, veh/h	2	0	20	1	0	1	16	239	0	0	200	1
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	250	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	50	90	63	25	90	25	67	96	90	90	75	25
Heavy Vehicles, %	0	2	5	0	2	0	13	7	2	2	7	0
Mvmt Flow	4	0	32	4	0	4	24	249	0	0	267	4

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	565	565	269	563	567	249	271	0	0	249	0	0
Stage 1	269	269	-	297	297	-	-	-	-	-	-	-
Stage 2	297	297	-	267	271	-	-	-	-	-	-	-
Critical Hdwy	7.1	6.52	6.25	7.1	6.52	6.2	4.23	-	-	4.12	-	-
Critical Hdwy Stg 1	6.1	5.52	-	6.1	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.1	5.52	-	6.1	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4.018	3.345	3.5	4.018	3.3	2.317	-	-	2.218	-	-
Pot Cap-1 Maneuver	438	434	763	440	433	795	1232	-	-	1317	-	-
Stage 1	741	687	-	716	668	-	-	-	-	-	-	-
Stage 2	716	668	-	743	685	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	428	426	763	413	424	795	1232	-	-	1317	-	-
Mov Cap-2 Maneuver	428	426	-	413	424	-	-	-	-	-	-	-
Stage 1	741	687	-	702	655	-	-	-	-	-	-	-
Stage 2	699	655	-	712	685	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Ctrl Dly, s/v	10.41	11.72	0.7	0
HCM LOS	B	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1232	-	-	701	544	1317	-	-
HCM Lane V/C Ratio	0.019	-	-	0.051	0.015	-	-	-
HCM Ctrl Dly (s/v)	8	-	-	10.4	11.7	0	-	-
HCM Lane LOS	A	-	-	B	B	A	-	-
HCM 95th %tile Q(veh)	0.1	-	-	0.2	0	0	-	-

Intersection	
Int Delay, s/veh	0.7

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	8	15	15	248	259	8
Future Vol, veh/h	8	15	15	248	259	8
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	-	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	90	90	90	94	85	90
Heavy Vehicles, %	0	0	0	6	28	0
Mvmt Flow	9	17	17	264	305	9

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	606	309	314	0	-	0
Stage 1	309	-	-	-	-	-
Stage 2	297	-	-	-	-	-
Critical Hdwy	6.4	6.2	4.1	-	-	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	2.2	-	-	-
Pot Cap-1 Maneuver	463	736	1258	-	-	-
Stage 1	749	-	-	-	-	-
Stage 2	758	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	456	736	1258	-	-	-
Mov Cap-2 Maneuver	456	-	-	-	-	-
Stage 1	737	-	-	-	-	-
Stage 2	758	-	-	-	-	-

Approach	EB	NB	SB
HCM Ctrl Dly, s/v	11.2	0.47	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	107	-	606	-	-
HCM Lane V/C Ratio	0.013	-	0.042	-	-
HCM Ctrl Dly (s/v)	7.9	0	11.2	-	-
HCM Lane LOS	A	A	B	-	-
HCM 95th %tile Q(veh)	0	-	0.1	-	-

Intersection	
Int Delay, s/veh	2.2

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	11	19	112	252	214	59
Future Vol, veh/h	11	19	112	252	214	59
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	325	-	-	300
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	84	87	90	94	83	90
Heavy Vehicles, %	0	0	95	6	7	97
Mvmt Flow	13	22	124	268	258	66

Major/Minor	Minor2		Major1		Major2	
Conflicting Flow All	775	258	323	0	-	0
Stage 1	258	-	-	-	-	-
Stage 2	517	-	-	-	-	-
Critical Hdwy	6.4	6.2	5.05	-	-	-
Critical Hdwy Stg 1	5.4	-	-	-	-	-
Critical Hdwy Stg 2	5.4	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	3.055	-	-	-
Pot Cap-1 Maneuver	369	786	856	-	-	-
Stage 1	790	-	-	-	-	-
Stage 2	603	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	316	786	856	-	-	-
Mov Cap-2 Maneuver	316	-	-	-	-	-
Stage 1	675	-	-	-	-	-
Stage 2	603	-	-	-	-	-

Approach	EB	NB	SB
HCM Ctrl Dly, s/v	12.67	3.14	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	856	-	504	-	-
HCM Lane V/C Ratio	0.145	-	0.069	-	-
HCM Ctrl Dly (s/v)	9.9	-	12.7	-	-
HCM Lane LOS	A	-	B	-	-
HCM 95th %tile Q(veh)	0.5	-	0.2	-	-

Intersection	
Int Delay, s/veh	0.9

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	2	0	20	1	0	1	16	365	0	0	233	1
Future Vol, veh/h	2	0	20	1	0	1	16	365	0	0	233	1
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	250	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	50	90	63	25	90	25	67	94	90	90	77	25
Heavy Vehicles, %	0	2	5	0	2	0	13	34	2	2	6	0
Mvmt Flow	4	0	32	4	0	4	24	388	0	0	303	4

Major/Minor	Minor2			Minor1			Major1			Major2		
Conflicting Flow All	741	741	305	739	743	388	307	0	0	388	0	0
Stage 1	305	305	-	436	436	-	-	-	-	-	-	-
Stage 2	436	436	-	303	307	-	-	-	-	-	-	-
Critical Hdwy	7.1	6.52	6.25	7.1	6.52	6.2	4.23	-	-	4.12	-	-
Critical Hdwy Stg 1	6.1	5.52	-	6.1	5.52	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.1	5.52	-	6.1	5.52	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4.018	3.345	3.5	4.018	3.3	2.317	-	-	2.218	-	-
Pot Cap-1 Maneuver	335	344	728	336	343	664	1194	-	-	1170	-	-
Stage 1	709	663	-	603	580	-	-	-	-	-	-	-
Stage 2	603	580	-	711	661	-	-	-	-	-	-	-
Platoon blocked, %								-	-		-	-
Mov Cap-1 Maneuver	326	337	728	315	337	664	1194	-	-	1170	-	-
Mov Cap-2 Maneuver	326	337	-	315	337	-	-	-	-	-	-	-
Stage 1	709	663	-	591	568	-	-	-	-	-	-	-
Stage 2	587	568	-	680	661	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Ctrl Dly, s/v	10.96	13.59	0.47	0
HCM LOS	B	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1194	-	-	640	427	1170	-	-
HCM Lane V/C Ratio	0.02	-	-	0.056	0.019	-	-	-
HCM Ctrl Dly (s/v)	8.1	-	-	11	13.6	0	-	-
HCM Lane LOS	A	-	-	B	B	A	-	-
HCM 95th %tile Q(veh)	0.1	-	-	0.2	0.1	0	-	-



CSAH 5 (THIRD AVE)
Corridor Study

MANKATO/NORTH MANKATO
AREA PLANNING ORGANIZATION

SRF

3701 Wayzata Boulevard, Suite 100
Minneapolis, MN 55416
763.475.0010
www.srfconsulting.com

December 15, 2021

Charles Androsky
Transportation Planner
Mankato/North Mankato Area Planning Organization
10 Civic Center Plaza
Mankato, MN 56001

Subject: SRF Proposal for CSAH 5 (Third Ave) Corridor Study

1. CONTACT INFORMATION

SRF Consulting Group, Inc.
3701 Wayzata Boulevard, Suite 100
Minneapolis, MN 55416-3791
Sue Miller, PE | Project Manager
763.249.6778 | sgmiller@srfconsulting.com

Dear Mr. Androsky and Members of the Selection Committee:

CSAH 5 (Third Ave) is a key corridor as it provides regional connectivity between rural Blue Earth County and Mankato's urban core, in addition to the largest industrial and manufacturing area in the Mankato/North Mankato area, mining operations, and residential areas (both rural and urban). The goal of the CSAH 5 (Third Ave) Corridor Study is to establish a community and business-supported vision for the corridor which traverses several broad contexts (i.e., land use, roadway design, etc.). This vision will guide the development of a consensus-built implementation plan that successfully meets the needs of existing and future users of all ages, abilities, backgrounds, and income levels.

SRF understands that the corridor primarily serves numerous industrial, warehousing, manufacturing, and commercial businesses, as well as mining, agricultural, and residential properties. A thorough understanding of the specific user and the conflicts that exist between users will be critical to the success of the study. Moreover, meaningful engagement of businesses, residents, and other stakeholders will be at the forefront of each key step in this study using a variety of mediums to gain feedback and consensus amongst the different stakeholders on a long-term vision and conceptual designs. Highlights of our approach include:

- An innovative, implementable, and meaningful engagement process, regardless of the COVID-19 pandemic.
- A technical approach designed to quantify key issues and potential benefits regarding freight access and railroad crossings, traffic operations (with specific focus at key intersections and the US 14 interchange), safety for all users, and pedestrian and bicycle accommodations in key areas to build trust, understanding, and consensus with all involved parties, stakeholders, and the community.
- A proven ability to bring together multiple stakeholders and governmental jurisdictions to form consensus and broad support for solutions and projects.
- A strong technical team that is committed to delivering high-quality work products, continual collaboration with agency partners, and delivering this project on-time and within budget.

Our detailed knowledge of the Mankato area, from our recent completion of the MAPO Long Range Transportation Plan Update and continued work in the area via the Second Street Corridor Study, has allowed us to keep a pulse of the region and develop a detailed work plan that incorporates the resources and tools needed to efficiently analyze the transportation system and develop implementable solutions for our agency partners. This allows the SRF team to allocate our time towards building stakeholder understanding and consensus regarding corridor vision, issues, opportunities, and alternatives. We understand that the county, in their most recent Capital Improvement Plan, identified CSAH 5 (Third Ave) from Riverfront Drive to US 14 for major rehabilitation to improve the roadway and upgrade transportation infrastructure in 2024. Our Team commits to setting that work, and other future improvements, up for success.

The SRF team is excited to present our qualifications for consideration for this project. We look forward to the opportunity to collaborate with the MAPO, City of Mankato, and Blue Earth County on another successful study. If you have any questions regarding our submission, please do not hesitate to contact me at 763.249.6778 or sgmiller@srfconsulting.com.

Sincerely,



Sue Miller, PE
Project Manager

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Equal Employment Opportunity / Affirmative Action Employer

2. Project Understanding

The Mankato/North Mankato Area Planning Organization (MAPO) is requesting consultant services to conduct a corridor study for CSAH 5 (Third Ave) from Riverfront Drive to the Blue Earth County Line (approximately 4.8 miles). The CSAH 5 (Third Ave) corridor is a key linkage between central Mankato, US 14, rural areas north toward the City of Kasota, and the significant industrial and mining operations in between. It will be important for this study to propose a community and industry-supported corridor to ensure consensus-built alternatives are identified. A concise implementation plan will offer a clear vision toward improving CSAH 5 (Third Ave) so that it safely and efficiently moves people and goods, is accessible for those of all ages and abilities, and enhances the economic vitality for the 50+ businesses and nearly 4,400 jobs that exist within one-half mile of the study corridor.

The CSAH 5 corridor has three natural contextual divisions, which include:

1. **Riverfront Drive to US 14:** Industrial and residential mixed-use within an urban environment.
2. **US 14 to approximately 0.6 miles north of Industrial Road:** Industrial uses (i.e., manufacturing, warehousing, and mining) within a semi-rural environment.
3. **Approximately 0.6 miles north of Industrial Road to the Blue Earth County Line:** Agricultural, mining, and low-density residential uses within a rural environment.

Each context and specific corridor segment will require key considerations regarding the overall design and operations. The critical theme across all sections that will be prioritized throughout this process is freight access due to the high number of industrial businesses along, and within one mile of CSAH 5 (Third Ave) throughout the study area. Reliability of freight operations while accommodating other modes within one, or more, of the contexts will be key and could include vehicular traffic operations, wide shoulders for agricultural implements, and/or enhanced crossings or connections for pedestrians/bicyclists.

STUDY GOALS

The CSAH 5 (Third Ave) Corridor Study will accomplish the following goals over approximately 14 months (March 2022 through April 2023):

1. Organize a community and business-supported vision, goals and objectives, identified issues, and consensus-built alternatives for CSAH 5 (Third Ave) through meaningful outreach and engagement opportunities. Public engagement will occur throughout the study and constitute a significant focus for this effort. Due to the ongoing COVID-19 pandemic, a nimble and efficient engagement approach will remain a priority throughout this study.
2. Document detailed technical analysis that produces project alternatives that address existing and future needs regarding safety, traffic operations, intersection traffic control (most notably at the US 14 interchange), at-grade railroad crossings, multimodal connections, access management, and potential connections to the broader transportation network, including adjacent local roadways.
3. Produce a consensus-built and actionable corridor study that establishes a clear corridor vision, implementation plan, and recommended geometric improvements that prioritize freight movement while creating a safe and connected environment for those walking, bicycling, and driving.

To be successful in achieving these goals, we understand that the selected consultant team must have the following experience and skills:

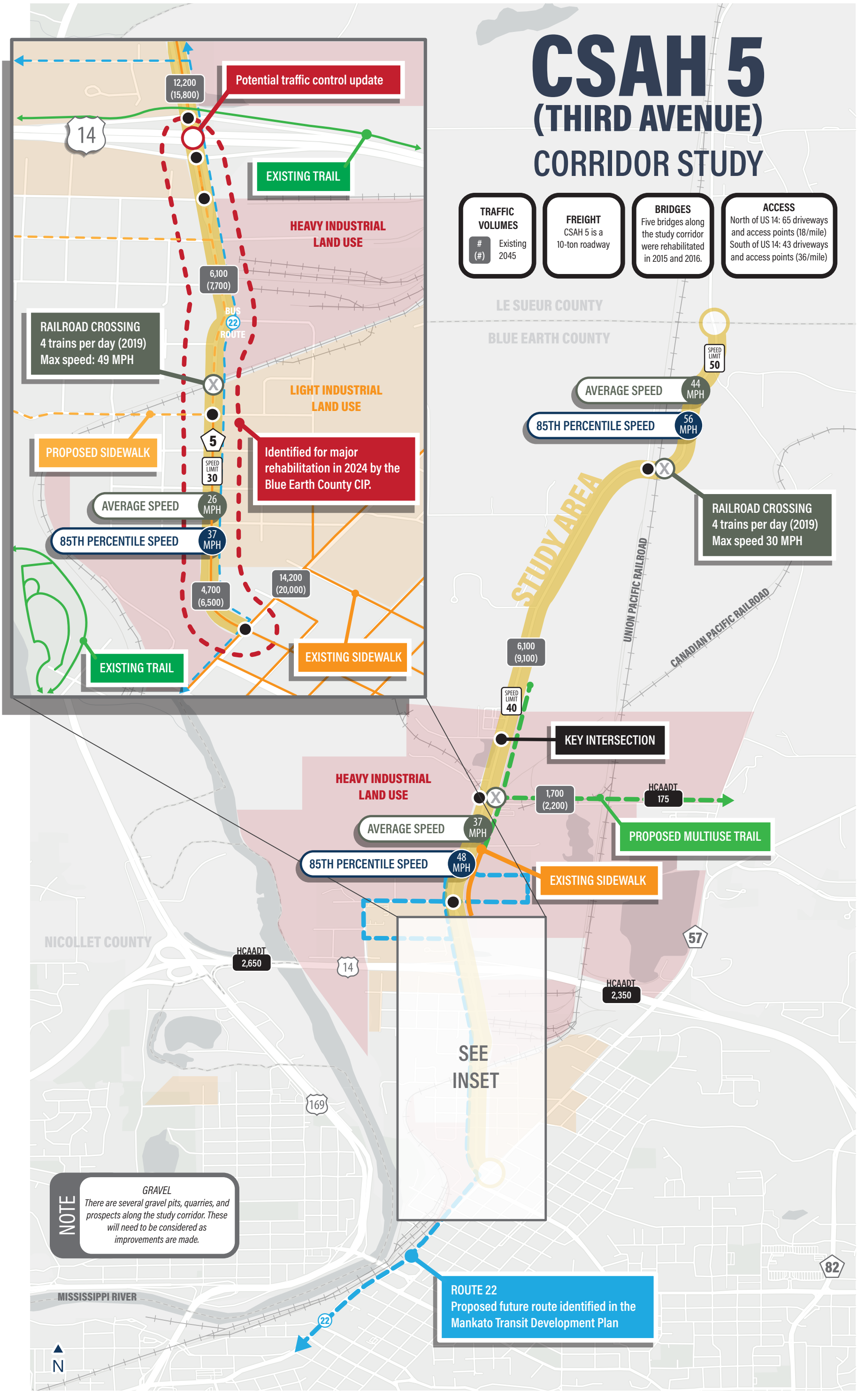
- Public and stakeholder engagement expertise
- Freight, vehicle, pedestrian, and bicycle infrastructure and safety expertise
- Rural roadway design and safety expertise
- Railroad grade crossing safety and design expertise
- Intersection control evaluation (including alternative intersection designs) expertise
- Traffic modeling and forecasting expertise
- Geometric design and cost estimating expertise
- Staff knowledge in environmental and cultural resources
- Experience coordinating with multiple agencies and other stakeholders
- In-depth knowledge of the area and surrounding community

STUDY CONTEXT

A context map organized for CSAH 5 (Third Ave) illustrates the SRF Team's understanding of key corridor elements (e.g., land use and local destinations), existing and future traffic volumes, posted speed limits and estimated 85th percentile speeds, traffic controls, and multimodal facilities (e.g., existing and future bikeways).



CONTEXT MAP


CSAH 5
(THIRD AVENUE)
CORRIDOR STUDY
TRAFFIC VOLUMES
(#) Existing 2045
FREIGHT
CSAH 5 is a 10-ton roadway
BRIDGES
Five bridges along the study corridor were rehabilitated in 2015 and 2016.
ACCESS
North of US 14: 65 driveways and access points (18/mile)
South of US 14: 43 driveways and access points (36/mile)
LE SUEUR COUNTY
BLUE EARTH COUNTY
NICOLLET COUNTY
STUDY AREA
UNION PACIFIC RAILROAD
CANADIAN PACIFIC RAILROAD
MISSISSIPPI RIVER
Potential traffic control update
EXISTING TRAIL
HEAVY INDUSTRIAL LAND USE
12,200 (15,800)
6,100 (7,700)
BUS 22 ROUTE
RAILROAD CROSSING
4 trains per day (2019)
Max speed: 49 MPH
LIGHT INDUSTRIAL LAND USE
PROPOSED SIDEWALK
SPEED LIMIT 30
AVERAGE SPEED 26 MPH
85TH PERCENTILE SPEED 37 MPH
Identified for major rehabilitation in 2024 by the Blue Earth County CIP.
4,700 (6,500)
14,200 (20,000)
EXISTING SIDEWALK
EXISTING TRAIL
SPEED LIMIT 50
AVERAGE SPEED 44 MPH
85TH PERCENTILE SPEED 56 MPH
RAILROAD CROSSING
4 trains per day (2019)
Max speed 30 MPH
6,100 (9,100)
SPEED LIMIT 40
KEY INTERSECTION
HEAVY INDUSTRIAL LAND USE
1,700 (2,200)
HCAADT 175
PROPOSED MULTIUSE TRAIL
AVERAGE SPEED 37 MPH
85TH PERCENTILE SPEED 48 MPH
EXISTING SIDEWALK
HCAADT 2,650
HCAADT 2,350
SEE INSET
NOTE
GRAVEL
There are several gravel pits, quarries, and prospects along the study corridor. These will need to be considered as improvements are made.
ROUTE 22
Proposed future route identified in the Mankato Transit Development Plan
N
14
169
5
57
82
22

PROJECT CHALLENGES

In preparation for this study, SRF spoke with staff from Blue Earth County to understand their perspectives. Through these discussions and our review of the RFP, we noted three key challenges, which need to be successfully addressed by the study. These challenges are summarized below with how our team will bring valued solutions.

1. UNDERSTANDING THE CORRIDOR'S USERS

Challenge: Understand the corridors various users, key destinations, and how CSAH 5 (Third Ave) can support safe and accessible connections to households, jobs, and other local destinations.

Context: CSAH 5 (Third Ave) serves as a local and regional north-south connector between Kasota and Mankato, running about one to two miles parallel of Trunk Highway (TH) 22. The 4.8-mile study corridor also travels through several different contexts including urban residential and industrial, as well as rural or semi-rural industrial, residential, and agricultural locations. As of 2019, nearly 4,400 jobs exist within one-half of a mile of CSAH 5, of which nearly 50 percent are in manufacturing and provide living wages for the community. Moreover, over 20 percent of those employed along the study corridor are traveling greater than 50 miles one-way to access their job, most from the north and east. This illustrates the need to understand the specific user (e.g., local versus regional) of the corridor, how CSAH 5 (Third Ave) operates within the broader transportation network to access housing and employment, and the issues or needs that may exist. Additionally, the potential design of the roadway will be informed by the various segmented contexts and specific needs that coincide with each of those. It will be important to understand the access and mobility relationship as it relates to the desired function of the corridor as it relates to each of those specific locational needs.

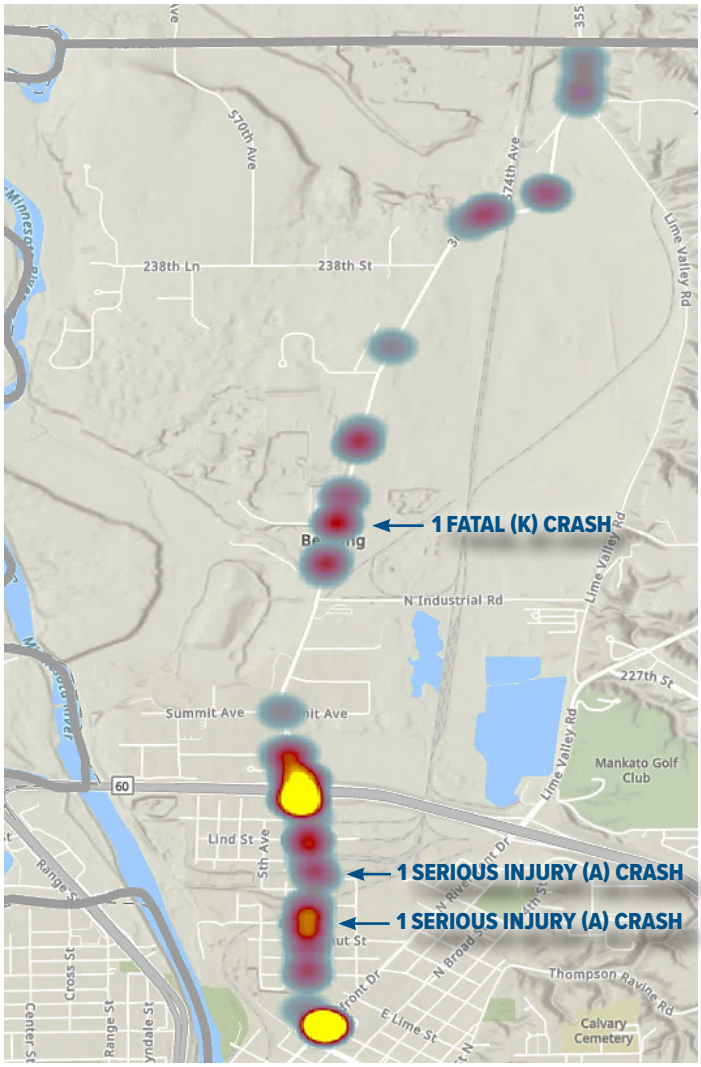
Our Value: SRF is well versed using StreetLight to understand a corridor's users and travelsheds. We utilized StreetLight for both TH 22 Corridor Study and the Second Street Corridor Study to understand the local regional travel patterns and data was categorized by heavy vehicles, cars, and bicycle/pedestrians. Using StreetLight's Origin-Destination analysis tools we can understand where those traveling along CSAH 5 (Third Ave) are accessing their home or work and understand key user demographic characteristics. Moreover, we can develop volumes and indexes to understand vehicle, freight, bicycle, and pedestrian origins/destinations or demand at key locations to ensure improvements are location specific by modal need or ensure tradeoffs are clearly defined if competing needs arise. We will also conduct robust stakeholder and public engagement at each key step of the planning process. This will include direct outreach to local businesses which SRF is well versed in conducting as demonstrated by our work contacting hundreds of businesses across MnDOT District 3 for a **Manufacturer's Perspectives Study.** Finally, some sections will require difficult trade-offs, such as the urban section south of US 14 where there are several competing needs, most notably the busiest at-grade railroad crossing in the area. SRF has a team of freight and railroad experts that will review the recent Quiet Zone Study and develop a balanced approach to ensure these needs are creatively addressed through transparent design and outreach processes.

2. TRANSPORTATION SYSTEM CONNECTIVITY, SAFETY, & OPERATIONS

Challenge: Understand the role of CSAH 5 (Third Ave) in the broader roadway network, most notably for local versus regional travel, business/mining access, and pedestrian/bicycle connections through neighborhoods and the city center.

Context: From a regional perspective, CSAH 5 (Third Ave) serves as a north-south connector between Kasota and Mankato parallel to TH 22, as well as provides a direct connection to US 14 and central Mankato. From a local perspective, the corridor provides access to nearby businesses, mining interests, agricultural operations, and residences. The 4.8-mile corridor varies greatly in traffic volumes, intersection density, and access, along with two at-grade railroad crossings (up to four daily trains at each as of 2019 per the FRA), which can significantly affect the safety and operations of CSAH 5 (Third Ave). The Minnesota River Valley and Sakatah Singing Hills State trails also connect at CSAH 5 (Third Ave) and provide regional pedestrian and bicycle connections. The City of Mankato envisions additional sidewalk and trail access along CSAH 5 (Third Ave) per their Complete Streets plan to enhance connectivity to those regional corridors while also facilitating local access to the surrounding neighborhood and businesses via key enhanced crossings along the corridor.

A high-level review of all crashes over the last five years was completed to identify potential "hot spots" along CSAH 5 (Third Ave). **A total of 73 crashes were recorded, of which three involved a bicyclist. One key area of concern is the interchange with US 14 where over 20 percent (16 crashes) of the entire study corridor's crashes occurred over the last five years.** This location will require closer review of existing operations and future opportunities (e.g., review of before and after metrics from the recent improvements made to a previously similarly designed interchange at US 14 and Riverfront Drive).



Source: MnDOT crash data 2016-2020.

Our Value: We completed the MAPO's Long Range Transportation Plan in the last year which provided our team a very thorough and recent understanding of the region's existing and projected traffic volumes, environmental constraints, and broader interactions of the roadway system (existing and future). That knowledge, coupled with numerous other local project experiences in the area completing corridor studies such as the ongoing Second Street Corridor Study, traffic analysis, and Intersection Control Evaluation (ICE) reports, we feel uniquely equipped to efficiently analyze and understand the local needs to develop geometric solutions, costs and benefits, and prioritized improvements. SRF will leverage our deep understanding of Big Data (i.e., StreetLight, Inrix, and Clearguide) to analyze existing travel patterns, volumes, and speeds along CSAH 5 and adjacent corridors as well. This will allow us to dial in on key locations to improve safety, operations, and access along CSAH 5 (Third Ave). Moreover, Inrix will provide an understanding of congestion and reliability specifically for freight so we can understand how freight and goods movement operates today. **Finally, we will leverage our safety expert, Renae Kuehl and other staff, who have significant safety experience supporting or managing safety plans for all counties in Minnesota and North Dakota, as well as all MnDOT Districts over the last ten years. SRF has honed a systematic approach and quantitatively driven risk-based analysis of safety along roadway segments and intersections. Renae and her team were a part of the Blue Earth County Roadway Safety Plan in 2012 illustrating their background and understanding of the County's needs. In that study, CSAH 5 was ranked fifth countywide for safety improvements.**



3. COMMUNITY & STAKEHOLDER ENGAGEMENT

Challenge: Organize meaningful outreach efforts that attract diverse perspectives and remain accessible during the COVID-19 pandemic.

Context: The CSAH 5 (Third Ave) study corridor has a variety of land uses (sometimes competing between residential and industrial) and multimodal transportation options. Involving each of these groups in a meaningful way will require thoughtful planning and focused strategies. Those living along the CSAH 5 (Third Ave) corridor are diverse and include a high percentage of nonwhite populations and households living in poverty. Engaging residents and obtaining meaningful input requires thoughtful planning, focused strategies, and accessible opportunities. It will be important to engage community members that are harder to reach due to internet access limitations, work schedule conflicts, language barriers, lack of transportation, and other potential barriers. These diverse perspectives can identify opportunities and equitable outcomes, as well as address environmental justice items which will be a top priority throughout the study. An estimated 50+ businesses, most manufacturing, warehousing, distribution, and other freight-dependent operations, are located within one-half mile of the study corridor. It will be critical to offer business owners and stakeholders numerous opportunities to engage with the study team through focus groups, direct calls or drop-in interactions, and online engagement to ensure they are abreast of the process and that a future CSAH 5 (Third Ave) corridor supports the success of their business.

- 18% Nonwhite (Black or African American and Hispanic or Latino)
- 8% Non-English or English Not Primary Language
- 18% live below the federal poverty threshold
- 51% are renters
- 15% of households do not own a vehicle

Source: *Minnesota Compass, data reviewed within a one-mile radius of the study corridor.*

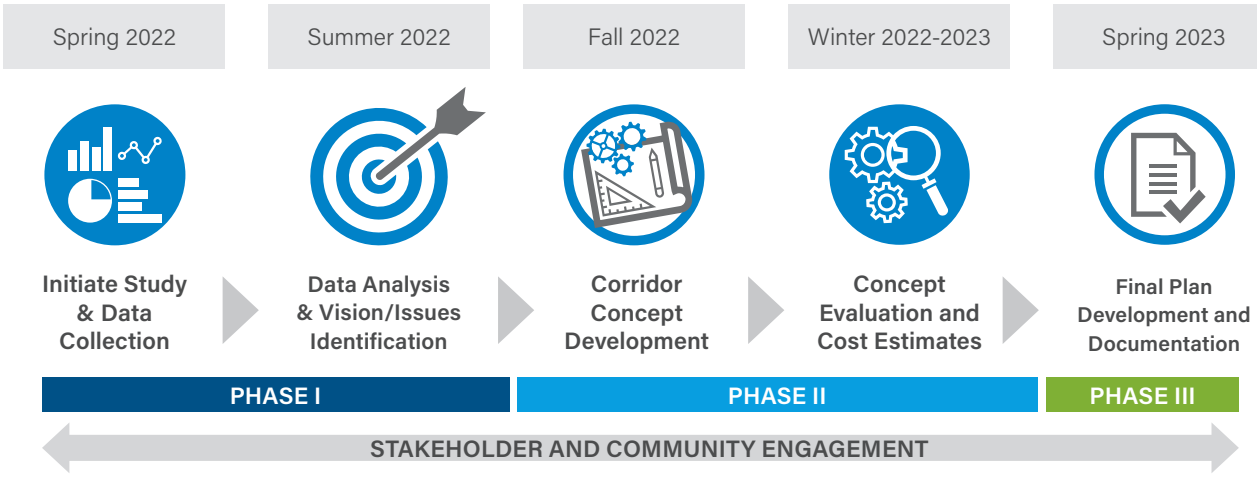
Our Value: Engagement during the pandemic has demonstrated the need for our outreach to go the extra mile. We are committed to engaging the community's diverse perspectives and having those perspectives inform the direction in the planning process. To help achieve equitable outcomes, as well as address environmental justice items, we will coordinate with key community organizations and popular destinations throughout the study process. We have experience organizing approaches that seek to include diverse communities, most notably through our ongoing effort with the TH 252 EIS project in Brooklyn Park, a highly diverse community adjacent to Minneapolis. We will also work closely with local businesses (e.g., ADM Mankato, TruValue Distribution Center, Kato Manufacturing, Minnesota Paving and Materials, etc.) and mining operations to guide the planning process as well. We have coordinated outreach to freight-dependent businesses managing the Manufacturers' Perspectives Study for MnDOT District 3, as well as facilitated focus groups for the **MnDOT District 3 Freight Plan.**

SRF has learned from our recent work with the Second Street Corridor Study and MAPO Long Range Transportation Plan Update that it is not a one-size-fits-all, but instead one needs to tailor the approach to maximize resources. Due to the ongoing COVID-19 pandemic, a nimble and efficient engagement approach is even more important for measurable success. Our comprehensive Public Involvement Plan will be carried throughout all phases of the study to create community-supported design, aiding implementation of the reconstruction project.

3. Study Approach & Methodology

Our approach is centered on building a collaborative effort where the SRF Team works closely with our study partners to coordinate planning efforts and identify solutions. The corridor improvements will balance regional transportation and freight needs with the local desires of the surrounding communities. At SRF, we take pride in being inclusive – we will ensure that the varied voices of the community are heard, listened to, and incorporated at key points in the process.

Through our work on several projects like this one, we have developed a process for completing the work on time, within budget, and in alignment with your expectations. The process diagram presented below outlines a three-phased approach to success. Phase I is a data driven set of activities to define the vision, goals, and issues. Phase II defines an appropriate range of solutions and tests these solutions with a variety of tools, cumulating with a preferred local corridor plan and implementation strategy. Phase III includes documentation and submission of a final report for review and approval by our agency partners. Integrated within this approach is comprehensive stakeholder and public engagement that will build understanding and consensus. Our approach has been developed based on the general work tasks described in the RFP but organized in a way that walks you through our process at a high-level.



4. Background & Corridor Study Experience

The SRF team has worked closely on several comparable studies in the MAPO area including the Mankato Second Street Corridor Study, Highway 22 Corridor Study, and the MAPO Long Range Transportation Plan Update, in addition to ICE reports across the area. We have built strong relationships through this experience across the MAPO's various local agencies. The SRF Team and key personnel have worked closely on several comparable projects highlighted on the following pages. Each of these studies encompass some or all of the characteristics associated with the CSAH 5 (Third Ave) Corridor Study. Detailed descriptions of key studies also provided.

SECOND STREET CORRIDOR STUDY | *Mankato, Minnesota*



Rather than undertaking a routine roadway reconstruction project the Mankato/North Mankato Area Planning Organization, along with its partner the City of Mankato, set out to complete a community-supported corridor study that considered multimodal, placemaking, and other opportunities to create an urban corridor that best serves the surrounding neighborhood and broader Mankato area. SRF is supporting those agencies by producing a consensus-built plan with robust engagement opportunities organized throughout the study process to engage a community with the highest share of people of color and lowest household incomes in the area along Second Street. The primary objective of the study was to complete a technical analysis of potential traffic control and lane configuration changes, and multimodal improvements along, and across the corridor as part of a roadway reconstruction project planned in 2024. SRF will produce several alternatives, a conceptual design, and cost estimates to improve nonmotorized access along, and across, Second Street as a key corridor in central Mankato. The study is ongoing and will be completed in June 2022.

Key Staff: Molly Stewart, Chris Brown, Dan McNeil, Julie Apolinario

Relevance:

- Multimodal-focused corridor study
- Data collection and review process for multimodal improvements
- Local familiarity.

HIGHWAY 22 CORRIDOR STUDY | *Kasota, Mankato, & Mapleton, Minnesota*



SRF worked with the Mankato/North Mankato Area Planning Organization (MAPO) and MnDOT to complete the Highway 22 Corridor Study. The purpose of the study was to evaluate existing and future transportation conditions along the corridor, with the intent of recommending improvements, if necessary – including: lane configurations, access management, safety improvements, intersection control options, alternative intersection designs, bicycle and pedestrian connectivity, local roadway and trail networks, and potential land use impacts and opportunities.

The study was guided with input from a technical advisory committee with representatives from the following organizations: MnDOT, MAPO, Blue Earth and Le Sueur Counties, Cities of Saint Peter, Kasota, Mankato and Mapleton, Lime and Mankato Townships, DNR, and Region Nine Development Commission.

The study also included a robust public engagement effort. SRF worked with agency and community stakeholders to understand the communities needs and issues with the Highway 22 corridor. A series of focus group meetings were held with community leaders, business owners, land owners, and residents to understand their needs and concerns along the Highway 22 corridor. Public open houses were also held at the beginning, middle and end of the study to present study information, recommendations and gather feedback.

Key deliverables highlighted in the final report included:

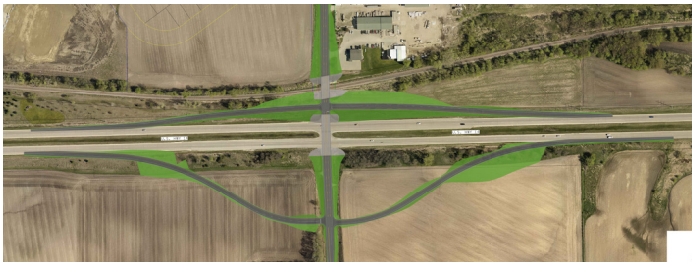
- Establishment of a vision and design parameters for each segment of the corridor
- Development of a purpose and need statement relative for each segment of the corridor
- Evaluation of a traffic safety and operations to understand vehicle and pedestrian safety along the corridor
- Evaluation of existing and future traffic operations including development of future traffic volumes and patterns
- Evaluation of the feasibility of pedestrian/bicycle improvements along the corridor
- Review of potential alignment options for the DNR State Minnesota River Trail between Saint Peter and Mankato

Key Staff: Molly Stewart

Relevance:

- Regional corridor with numerous contexts
- Multi-agency coordination
- Robust public engagement including focus group meetings, pop-up events and open house meetings
- Intersection control evaluation
- Long-term implementation plan for intersection improvements, access management, and multimodal network/crossing improvements.
- Local familiarity

US 14 CORRIDOR ANALYSIS & CONCEPT DESIGN | *Byron & Kasson, Minnesota*



SRF worked with Olmsted County, MnDOT District 6, the City of Byron, and other stakeholders to review the US Highway 14 corridor between Rochester (at County Road 104) and Kasson (at State Highway 57). We reviewed corridor operations, access, and safety to determine appropriate access modifications that will transition this segment of US Highway 14 to a full freeway facility. Our analysis included:

- Land use review
- Origin-destination study (Streetlight data analysis)
- Right of way impacts/needs
- Traffic operations
- Safety analysis
- Concept alternative development/evaluation
- Cost estimates
- Implementation plan framework
- Official mapping of potential projects

The project was guided by a Project Management Team and a Project Advisory Committee. Community and broader stakeholder engagement contributed significantly to study outcomes, with great ideas and collaboration. A series of pop-up meetings were facilitated to reach into the community for input and gather feedback from corridor users

At the end of the study, the Byron community can now plan their development and land use changes based on an understood access arrangements for US Highway 14 and provide Olmsted County and MnDOT with the information they need to plan for management of their transportation systems.

Key Staff: Sue Miller, Molly Stewart, Chris Brown, Dan McNeil

Relevance:

- Regional corridor adjacent to growing city with planned future development.
- Long-term implementation plan for access changes, innovative intersection design, interchange design
- Multimodal network/crossing improvements
- Robust public engagement including pop-up events and open houses
- Multi-agency coordination.

FIR AVENUE (CSAH 1) FEASIBILITY STUDY | *Fergus Falls, Minnesota*



SRF was hired by Otter Tail County and the City of Fergus Falls to complete the Fir Avenue Feasibility Study. The study was initiated as part of a jurisdictional transfer of roadways between Otter Tail County and the City of Fergus Falls. The purpose of the study was to determine the most appropriate intersection control alternative for key intersections along Otter Tail County State Aid Highway 1 (Fir Avenue) in Fergus Falls, Minnesota.

The study process included collecting traffic data, the analysis of existing and future traffic conditions, safety analysis, and the review of appropriate traffic control alternates (including signals and roundabouts) using technical evaluation criteria. The study also included a public open house to gather input on proposed intersection recommendations.

Key deliverables highlighted in the final study report included:

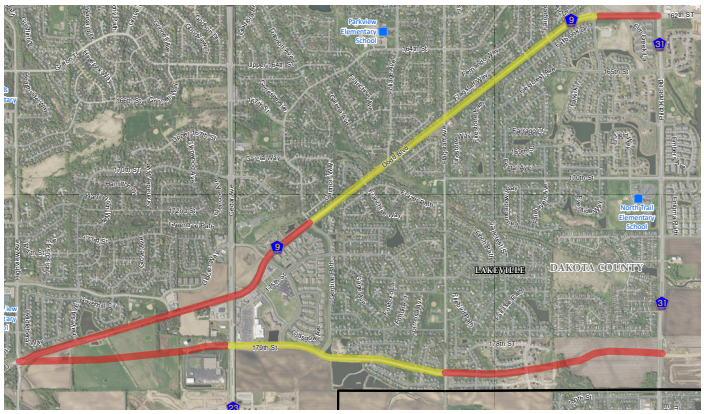
- Evaluation of traffic operations under no build and build scenarios to understand the appropriate intersection control type for each intersection.
- Development of various planning-level roundabout design alternatives for the three intersections which considered public input, County State Aid design standards, drainage considerations, safety and operations, future traffic and land use patterns, bicycle and pedestrian accommodations, environmental impacts and input from the Project Management Team (PMT).
- Evaluation of alternatives based on a comprehensive list of screening criteria (including social impacts, property impacts, environmental review impacts, safety, economic impacts and planning-level cost) to determine the most appropriate intersection alternative.

Key Staff: Molly Stewart

Relevance:

- Regional corridor with numerous contexts
- Multi-agency coordination
- Public engagement including an open house meeting
- Intersection control evaluation
- Long-term implementation plan for intersection improvements, access management, and multimodal network/crossing improvements.

COUNTY ROAD 9 & 179TH STREET CORRIDOR STUDY | *Lakeville, Minnesota*



Dakota County, in collaboration with the City of Lakeville, hired SRF to complete the County Road 9 & 179th Street Corridor Study. The study is the culmination of nearly two decades of planning by Dakota County and the City of Lakeville for an East-to-West roadway that would help accommodate an area wide system and travel network. The study includes a coordinate planning effort by Dakota County and the City of Lakeville to identify improvements on two roadway segments in the City of Lakeville – County Road 9 (Dodd Boulevard) and 179th Street. The project will provide users with a safer and more reliable roadway that can better serve the region in the future.

The study includes preliminary feasibility review and analysis of intersection and roadway improvements, preliminary engineering designs, surveying and cost estimates to better inform Dakota County and the City of Lakeville on how the two segments need to be upgraded to meet future traffic demands.

A key part of the success of the study is its robust and inclusive public engagement effort comprised of online surveys, newsletters, study website and public open houses. At the beginning of the study, a detailed Public Engagement Plan was developed to outline planned engagement, outreach and involvement strategies. The intent of public engagement for this project is to bring together project partners to inform, educate, and engage Lakeville area stakeholders, including landowners, businesses, other associated stakeholders, and the general public regarding the proposed work of the County Road 9 & 179th Street Corridor Study.

Key Staff: Molly Stewart

Relevance:

- Corridor feasibility including safety, environmental review, traffic operations, and access
- Conceptual design and cost estimating
- Multi-agency coordination
- Robust public engagement including pop-up events and open houses

MANKATO/NORTH MANKATO LONG RANGE TRANSPORTATION PLAN | *Minnesota*



In 2014, SRF was retained by the Mankato Area Planning Organization (MAPO) to develop their first Transportation Plan as a new MPO. The planning process addressed a number of critical issues, while reflecting local values and visions. The bi-county nature of this metro area, as well as its size, offered special challenges, including coordinating with MnDOT, two counties, four urban jurisdictions, five townships, and various special-purpose governments. In that respect, SRF developed an approach that brought together these jurisdictions in a meaningful and engaging manner. Our approach fostered a collaborative process with MAPO staff and its partners in developing a plan that achieved the following:

- Improves the multimodal transportation circulation of people and goods, using both motorized and non-motorized transportation modes and facilities
- Provides safe, efficient, accessible, cost effective, and aesthetically pleasing transportation systems
- Addresses system preservation needs and provides a fiscally constrained approach to new projects
- Complies with federal MAP-21 requirements and MnDOT initiatives

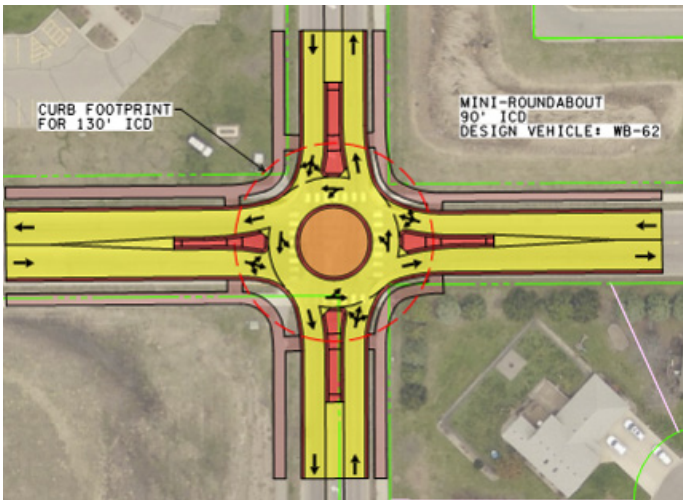
SRF completed an update of the original LRTP in 2020. The plan update complies with the current FAST ACT and provides the jurisdictional partners with an updated view of the multimodal infrastructure and project needs. It also provides a current understanding of fiscal constraint for the next 25 years.

Key Staff: Molly Stewart, Chris Brown, Dan McNiel

Relevance:

- Multi-agency coordination
- Short-, mid-, and long-term implementation plan for roadway and intersection improvements, access management, and multimodal network/crossing improvements.
- Robust public engagement including pop-up events and open house meetings
- Local familiarity

MAPO ICE STUDIES | *Mankato & North Mankato, Minnesota*



In 2016, 2017, 2018 and 2020 the Mankato/North Mankato Area Planning Organization (MAPO), in partnership with the cities of Mankato and North Mankato and Blue Earth County, retained SRF to complete studies to evaluate various traffic control alternatives at the following intersections:

- Lor Ray Drive at Howard Drive (2016)
- Balcerzak Drive at Pohl Road (2016)
- Stadium Road at Pohl Road (2016)
- Lookout Drive at Howard Drive (2017)
- Lor Ray Drive at Carlson Drive (2017)
- Stoltzman Road at Pleasant Street (2017)
- Hoffman Road at Victory Drive (2018)
- Lor Ray Drive at James Drive (2020)

The studies included collecting traffic data, analysis of existing conditions, and review of appropriate traffic control alternatives using technical evaluation criteria. The primary goals were to determine the optimal form of traffic control for each intersection to enhance both traffic operations and safety and consider other multimodal users such as pedestrians and bicyclists.

The project began with a scoping phase that included collecting traffic data, crash history, and site-specific information at each intersection. Twenty-year traffic forecast volumes were developed at each location based on historical growth data and future traffic volumes published in the MAPO 2045 Transportation Plan. Various concept alternatives were then developed and screened in an effort to identify any prospective alternatives to be further evaluated.

By thoroughly reviewing the study data, forecasts, and analysis, an informed recommendation as to a preferred traffic control alternative was made at each location. In 2016, roundabouts were identified as the preferred alternative for all three intersections. In 2017, a mini-roundabout was recommended at the Lor Ray Drive/Carlson Drive intersection. The other two 2017 intersections were recommended to remain as all-way stop control in the near term.

The final recommendation for the Hoffman Avenue/Victory Drive ICE was for an enhanced signal alternative that balanced increased safety and estimated costs. The final recommendation for the Lor Ray Drive/James Drive ICE was a mini-roundabout that balanced increased safety and operations.

Key Staff: Adrian Potter

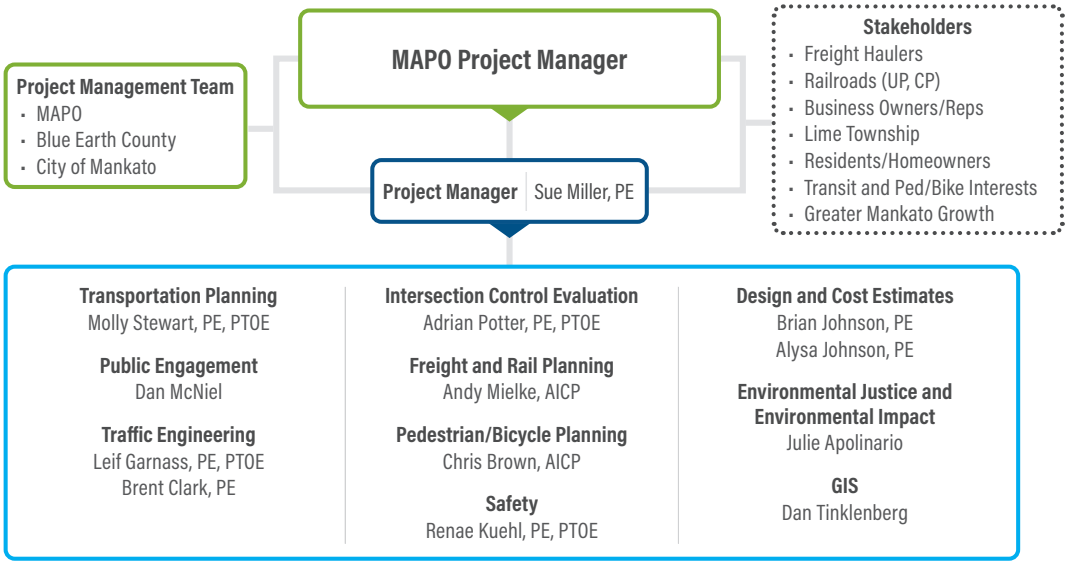
Relevance:

- Eight ICE studies in the last five years which included working closely with the MAPO and North Mankato
- One ICE report deal with Lookout Drive at Howard Drive which was completed in 2017
- Local familiarity

5. Key Personnel

SRF Consulting Group is a full-service transportation planning and design firm that is celebrating 60 years of excellence. SRF is a leader in project coordination, traffic analysis and modeling, preliminary engineering, community engagement, planning, and environmental documentation services; we have chosen an exceptionally experienced team to work with you. Our team's familiarity with the key agencies involved in the project and our collaborative relationship on other area projects will enable our team to efficiently develop the corridor study, while building consensus and understanding with community members and stakeholders.

As shown on the organization chart, our team includes numerous task leaders that can efficiently complete the plan objectives identified in the RFP. Our project manager, Sue Miller, PE will coordinate with each of the task leads throughout to ensure study milestones and deliverables are of the utmost quality, as well as on-time and within budget.





SUSAN MILLER, PE | PROJECT MANAGER

Sue joined SRF after nearly three decades of leading county and city public works teams. Her collaborative approach resulted in innovative, sustainable and sharable solutions. While with Freeborn County, Sue led the management and operation of more than 600 miles of county highways and 179 bridges.

Sue is an ideal choice to help the MAPO, Blue Earth County and City of Mankato deliver this study. Through her unwavering commitment, effective communication style, thorough documentation, and attention to detail, Sue has developed a consistent record of delivering complex multi-jurisdictional projects on-time and on-budget.

While at Freeborn County, Sue provided all federal aid project development and management for several significant county corridors including CSAH 22, CSAH 46, CSAH 46 with I-90, and CSAH 42 in addition to regional Highway Safety Improvement Projects (HSIP) on behalf of the counties in District 6.



MOLLY STEWART, PE, PTOE | TRANSPORTATION PLANNING

Molly brings more than 16 years of transportation planning and traffic engineering experience. Her experience includes working with state, county and municipal clients on a variety of projects including corridor studies, subarea studies, preservation plans, multimodal facility plans, freight studies, and funding applications. She has extensive experience working on the MAPO area having been the technical lead on the MAPO LRTP, the deputy project manager for the TH 22 Corridor Study, and is currently serving as the project manager for the Mankato Second Street Corridor Study. Molly has strong technical stills in traffic and transportation planning which allows her to create sound technical analysis and implementable results for her clients.



ANDY MIELKE, AICP | FREIGHT AND RAIL PLANNING

Andy has more than 20 years of experience working on a variety of transportation and freight planning projects for cities, counties and state Departments of Transportation. His work focuses on corridor studies and transportation plans, alternate route studies, **train whistle quiet zone studies**, transportation research, and policy plans. Andy's skills include technical analysis, quantitative and qualitative research, report writing, and transportation systems analysis. In addition, he experienced in working with the public and using a variety of presentation techniques. Andy currently serves on the National Cooperative Highway Research Program 25-50 Prioritization Method for Proposed Road-Rail Grade Separation Projects along Specific Rail Corridors Panel.



CHRIS BROWN, AICP | PEDESTRIAN/ BICYCLE PLANNING

Chris has six years of experience in transportation planning in both the private and public sectors. He has managed and supported long range transportation plans, corridor and safety studies, pedestrian/bicycle planning, Safe Routes to School studies, traffic operations analysis and development review, freight plans, university campus plans, and grant writing for state and federal funds. Chris applies his strengths in data analysis, public engagement, and technical writing to create meaningful and implementable results for his client partners. As a planner, Chris hopes to enhance mobility options,

accessibility, and safety through detailed data analysis, comprehensive community outreach and input, and using the latest tools or practices. Chris has a deep understanding of the MAPO area through is technical work on the MAPO LRTP update in 2020. Chris is also currently serving as the deputy project manger for the Mankato Second Street Corridor Study that is expected to wrap up in the summer of 2022.



LEIF GARNASS, PE, PTOE | TRAFFIC ENGINEERING

Over the past 16 years, Leif has managed complex traffic engineering and transportation engineering studies including large-scale subarea studies and multimodal arterial corridor studies. This experience includes developing traffic forecasts; identifying existing safety, access, and mobility issues; and developing concepts and facilitating technical discussions to achieve consensus. This experience provides a strong technical background that is critical to the success of multi-disciplinary projects – ensuring the appropriate tools and method are being applied to answer the questions being asked.

Leif is regularly involved in public and stakeholder engagement including public open houses, business and property owner meetings, and presentations to policy makers. He excels at taking detailed technical knowledge and simplifying the messages at key points to allow project stakeholders to make informed decisions.



ADRIAN POTTER, PE, PTOE | INTERSECTION CONTROL EVALUATION

Adrian has more than 22 years of experience in traffic and transportation engineering. His responsibilities include intersection control evaluations, signal justification reports, pavement marking and signing plan design, signal timing, traffic forecasting, work zone traffic control design, Intelligent Transportation Systems design, and preparation of plans and estimates for traffic signal systems. Adrian has led traffic engineering design efforts for state Departments of Transportation, cities, and counties on rural and urban roadways. Adrian has extensive local experience as he has completed numerous ICE reports over the past several years for the MAPO and its partner jurisdictions.



RENAE KUEHL, PE, PTOE | SAFETY

Renae has 21 years of experience in traffic engineering. Her experience covers a wide range of traffic engineering areas, providing a well-rounded understanding of traffic operations, impacts, and safety. She is proficient with many traffic engineering applications, including MnCMAT, CORSIM, Traffix, SYNCHRO, HCS, and SimTraffic. Renae has been heavily involved in the technical analysis for many safety related studies, including road safety plans, road safety audits, and safe routes to school studies. She also has experience with various special event traffic studies and transportation research. Renae is the recipient of the 2019 Engineering Star Award from Minnesota's Toward Zero Deaths program. Renae was the project manager for the Blue Earth County Road Safety Plan completed in 2012 and has been closely monitoring the update currently being completed.



BRIAN JOHNSON, PE | DESIGN & COST ESTIMATES

Brian has a broad range of highway and municipal engineering experience with a reputation for successfully managing and delivering complex multidisciplinary projects that include the planning, design and construction of interchanges, highways, roundabouts, public utilities, streetscaping, traffic signals, bridges, retaining walls, and stormwater management systems.

Brian has a thorough understanding of the Mankato/North Mankato area and is well versed in County State Aid design standards. His recent project work includes the CSAH 1 turnback design project and the CSAH 12 final design project for Blue Earth County and the CSAH 90/TH 22 roundabout final design project for MnDOT District 7.



DAN MCNIEL | PUBLIC ENGAGEMENT

Dan has five years of experience in public engagement and planning, including youth engagement, transportation planning and parks and recreation planning. He has significant experience facilitating community workshops, leading youth engagement activities, developing online engagement tools and designing long-range public participation processes. Dan is committed to developing meaningful, measurable and adaptable community engagement and is passionate about incorporating underrepresented perspectives into the planning process. In response to COVID-19, Dan has created digital public engagement strategies and designed online open houses. The online open houses are easy to navigate, informative and accessible for the general public.



BRENT CLARK, PE | TRAFFIC ENGINEERING

Brent has been with SRF's Traffic Studies group since 2015. He has been the technical traffic lead on a wide range of large-scale traffic impact, corridor, and multimodal studies. He uses a number of traffic analysis software programs including Synchro/SimTraffic, VISSIM, TRAFFIX, HCS, and IHSDM-HSM Predictive Method. Through his work, he has gained valuable experience in large-scale development impact studies (AUARs) and school and event traffic operations.



ALYSSA JOHNSON, PE | DESIGN & COST ESTIMATES

Alysa is a reliable and diligent member of SRF's Highway Department. Her work focuses on design-related tasks such as staging, traffic control, erosion control, alignments, profiles, and cross-sections. Her experience includes the development of preliminary design and final design plans for both municipal and highway projects as well as inspection responsibilities.



JULIE APOLINARIO | ENVIRONMENTAL JUSTICE & ENVIRONMENTAL IMPACT

Julie is a senior project manager with 35 years of natural resources management experience in the transportation, power, oil and gas, mining, and chemical industries. With her diverse background, Julie supports a wide range of environmental documentation efforts and manages multi-disciplinary teams to meet client regulatory requirements and construction schedules.



DAN TINKLENBERG | GIS

Dan has 20 years of experience in a wide variety of GIS applications, including data creation, manipulation, and analysis in the entire range of ArcGIS products. Additionally, he has experience with map publishing, web map services, dynamic segmentation, travel-time networks, model building, and numerous ArcGIS extensions.

6. Work Plan

TASK 1: PROJECT MANAGEMENT

The SRF Team is dedicated to providing quality products that fulfill the expectations of our clients. We will work with the MAPO project manager and members of the project management team (PMT) to ensure that the final project deliverables meet their expectations. SRF's project manager, Sue Miller, PE, will be the primary contact for the MAPO's project manager Sue has extensive experience working with counties to complete corridor and system evaluations throughout Minnesota. She will utilize her past experience as the Freeborn County Engineer to focus on the important issues and develop meaningful, consensus-driven solutions for the community. As project manager Sue will be responsible for coordination efforts with the MAPO Project Manager and PMT regarding schedule, study tasks and deliverables, and stakeholder meetings. Sue will work closely with the MAPO's project manager through biweekly check-in calls to coordinate efforts regarding tasks and meetings, review budgets and billings, monitor task milestones and the study schedule, and consult on monthly progress reports. Sue will also ensure that the budget guidelines, not to exceed $50,000 in 2022 and $30,000 in 2023, as specified in the RFP are adhered to. We will use several forms of communication, including telephone, email, virtual meetings (via Zoom), mail, and face-to-face meetings. Quality Assurance and Quality Control is an integral part of the project approach and Sue will ensure the final products meet stakeholder expectations. Additionally, all team members at SRF are responsible for preparing work products of the highest quality.

Deliverables: Regular coordination with MAPO project manager coordination of monthly invoicing, and ensuring all deliverables adhere to SRF's quality standards.

TASK 2: INITIATE STUDY

2.1 - PROJECT MANAGEMENT TEAM (PMT)

Study guidance and oversight will be provided by the study's Project Management Team (PMT) which will be comprised of stakeholders including representatives from the MAPO, Blue Earth County, and the City Mankato. The SRF Team will seek input from the PMT on all key deliverables, which will ultimately become elements of the draft and final study report. The SRF Team will coordinate distribution of these deliverables via email and coordinate written comments with the group.

Monthly PMT meetings for the duration of the study will be held virtually (via Zoom) to coordinate efforts regarding technical analysis, task milestones, and documentation or materials.

2.2 - BIWEEKLY CHECK-IN CALLS

SRF will coordinate biweekly 15-minute check-in meetings (via Zoom) with MAPO staff to discuss the study progress, upcoming deliverables/tasks, upcoming public and stakeholder meetings, and other study related items. The first biweekly check-in call will serve to establish early guidance on the study scope, approach, roles, objectives, and methodology. The draft Project Management Plan (PMP) that details the scope and schedule and will be discussed at this initial check-in meeting as well.

2.3 - PROJECT MANAGEMENT PLAN (PMP)

At the beginning of the study, the SRF Team will prepare a Project Management Plan (PMP) that details the scope and schedule for the study as specified in the RFP. The intent of this document will be to accurately detail our process to ensure that the final study is formally accepted by the MAPO Policy Board by April 2023 as specified in the RFP. The SRF Team will work closely with the MAPO staff to build consensus on the PMP.

2.4 - PURPOSE & NEED DOCUMENT

At the beginning of the study, SRF will work with the PMT to establish a study goals and objectives. These will inform the study process, define the issues to be solved, and guide the development of the alternatives.

Deliverables: Meeting agendas, talking points and meeting summaries, Project Management Plan (PMP) which details study scope, schedule, deliverables, and stakeholder and public engagement meetings, Purpose and Need Document.

TASK 3: DATA COLLECTION

A critical component in developing the CSAH 5 (Third Ave) Corridor Study will be to define the purpose and need of the corridor. To do that, background information will be collected and reviewed, and the SRF Team will identify needs, issues, constraints, and opportunities within the study area.

3.1 - TRAFFIC COUNTS

SRF will collect 24-hour video data traffic counts classified by motor vehicles, heavy trucks, pedestrians, and bicycles at the following locations:

- Riverfront Drive
- Pine Street
- Cleveland Street
- US 14 Eastbound ramp (ICE report)
- US 14 Westbound ramp (ICE report)
- Summit Avenue
- CSAH 26 (Industrial Road)
- 231st Street
- 574th Street
- Lime Valley Road

If video data collection is not obtainable, SRF will leverage their understanding of StreetLight to develop existing intersection turning movement counts (TMCs) and other relevant traffic data. Additionally, it will be important to couple either video data collection or StreetLight data with spot road tube counts to validate the data to ensure it is representative of existing traffic conditions. To ensure that traffic data is representative of existing traffic conditions, SRF will compare historic data and account for any seasonal fluctuations. Existing traffic counts will also be reviewed and validated by the PMT.

3.2 - TRAFFIC FORECASTS

Traffic forecasts are the foundation for decision-making in transportation projects. Recent unexpected changes in travel patterns due to COVID-19 have demonstrated the untapped potential of telework to reduce congestion. Further, increased on-line purchasing, transit options, micromobility services, and mobility as a service have presented consumers with more choices relative to how one travels and purchases/obtains goods, which all effect our transportation systems. These opportunities, along with emerging technologies (i.e., CAV), have led to uncertainty in future traffic forecasts for project-level decisions. SRF's team of industry-leading professionals will use current and historical trendlines, documented research results, and best practices to guide our approach to bracketing this uncertainty. We commonly use sensitivity testing to understand changes and whether these changes impact actual infrastructure decisions.

SRF completed the MAPO 2045 Long Range Transportation Plan Update in 2020. This plan utilized a detailed traffic forecasting model which will provide the basis for the development of 25-year traffic projections on all functionally classed roadways in the study area. These projections will be used as the starting point for the future traffic operational analysis. For this study, SRF will work with the MAPO, City of Mankato, and Blue Earth County to develop a historic growth rate for the CSAH 5 (Third Ave) corridor based on predicted future development and considering the recent travel pattern shifts due to COVID-19 and other factors as noted. The growth rate will be applied to the existing average annual daily traffic (AADT) and turning movement data to develop an augmented set of future forecast traffic volumes to be used for this analysis. Relevant planning and anticipated developments, as well as land use changes will also be considered when developing traffic forecasts. Draft traffic forecasts will be presented to the PMT for feedback. It will be important to receive concurrence from the stakeholders prior to moving forward.

3.3 - ELECTRONIC INVENTORY

We understand this task involves assembling, with the assistance of the MAPO and local staff, a wide range of data sets, documents, plans, and policies related to the CSAH 5 (Third Ave) corridor. Our team will compile this data and create an Electronic Inventory that will be updated regularly throughout the study. The information will also be summarized in an Existing Literature Summary Document which will include maps in a digital GIS format, if necessary. At a minimum, general data collection will include the items identified in detail in the RFP. For recently completed studies or plans, SRF will determine what updates, if any, are needed to capture current conditions.

A wide range of transportation data for pedestrian, bicyclist, transit, vehicular, and freight modes are required to understand how CSAH 5 (Third Ave) is used and key locations of focus for each mode. This will include reviewing readily available data from MnDOT or other local sources. Additional transportation data will include AADT volumes (existing and forecasted), heavy commercial average annual daily traffic (HCAADT), intersection turning movement counts, pedestrian and bicyclist counts, vehicle speeds, and crash history. This data will be summarized to identify trends and hotspots as they relate to the corridor study.

Deliverables: Traffic Count data, an Electronic Inventory, and Existing Literature Summary Document with maps and graphic tables displaying general corridor information (primarily secured from previous local work or data sources).

TASK 4: DATA ANALYSIS & STUDY DEVELOPMENT

Developing a solid understanding of the issues, constraints, and opportunities of the corridor is critical to successful execution of this study, requiring comprehensive data collection, thorough technical analysis, and in-depth discussions with stakeholders. This task will focus on collecting, assembling, and analyzing a large amount of pertinent data for the corridor to identify problems and issues to be addressed. The following is additional information on the analysis areas included in this task.

4.1 - EXISTING CONDITIONS

Demographics & Land Use

To understand how the corridor is expected to change, it is essential to identify past development trends and use predictive documents, such as the MAPO 2045 Long Range Transportation Plan, to gauge future trends. The SRF Team will coordinate with the PMT to summarize past and predicted trends in order to inform future conditions.

Pedestrians and Bicycles

SRF will review mapping of existing and planned on-street bikeways, trails, and parks or other destinations within, and adjacent to, the corridor study area. We will identify key crossings, ADA upgrades as identified by the MAPO's study, and multimodal connections to the existing and proposed pedestrian, bicycle, and transit networks. StreetLight will also be used to understand pedestrian and bicycle activity across the CSAH 5 (Third Ave) corridor. The large data set will provide a barometer as to the general use of intersection crossings along the corridor by those modes. The data set will provide a barometer of usage and could be used as another tool in the toolbox to prioritize improvements. This information will also be verified through the public engagement process.

Freight

As a key corridor for freight, with US 14 in between, special attention to freight needs in the study area will be considered. SRF will review freight needs or issues and ensure they are considered as a part of the concept alternative development process. StreetLight will be used to understand freight-specific origin/destination flows, key intersections by level of activity, and how freight is using/accessing CSAH 5 from the broader roadway network so we may focus on the areas of highest need. Moreover, we will leverage StreetLight to understand seasonal peaks in freight traffic, such as peak agricultural flows the correspond with truck traffic to ADM Mankato for example as pictured below on Google Streetview. SRF has extensive freight experience having recently developed the MnDOT District 3 Freight Plan where we studied different freight modes and networks across Central Minnesota, collaborating with businesses, and using a comprehensive quantitative evaluation matrix to identify future projects that improved freight safety and reliability. We also understand the two key at-grade railroad crossings that exist in the study area and will consider the recently completed Quite Zone Study to organize potential upgrades that improve the flow of the UP and CP railroads, as well as the vehicles and freight that travel along CSAH 5 (Third Ave) each day.



Safety

Corridor safety will be evaluated by a review of the number and severity of crashes occurring at all intersections and roadway segments. The average and critical crash rate will be calculated and compared to rates for similar intersections. Locations with higher-than-expected rates will be reviewed to determine if there are any physical constraints or design issues that may be leading to the higher rates. Through engagement with the focus groups and the public open house meetings, SRF will identify other safety concerns along the corridor including locations of near misses, sight line issues, and other potential safety concerns.

We will apply our experience with the Interactive Highway Safety Design Manual suite of tools for future conditions review. Using FHWA's Crash Prediction Model of the IHSDM that implements the HSM methodologies, we will develop a predictive safety model for the CSAH 5 (Third Ave) corridor. The focus of the future safety evaluation will be to identify locations of potential safety concern and understand how the existing roadway geometrics impact safety performance. SRF will use information from the base year and 2045 conditions with forecasts as inputs into the IHSDM safety model. Quantitative results of the crash prediction will help us identify safety needs along the corridor and incorporate safety into the evaluation.

Access

SRF will inventory the existing access conditions along the corridor and on all cross streets (within 150 feet of the intersection) and compare this spacing to the preferred city, county, MnDOT, and the MAPO access guidelines. We will record the type of access (e.g., full, three-quarters, restricted, etc.), location, size, and land use that is served. This process will include documenting the number of conflict points associated with each access, the type (residential, commercial, etc.) of such non-compliant access, the level of difficulty in modifying such access, and safety issues. We will also consider truck activity at key intersections from the traffic count data collection to understand the type of truck, frequency, and time of day usage. This data will be used to develop access management alternatives for the corridor.

Origin-Destination Assessment

Using StreetLight data, we will create an origin-destination matrix and graphical representations of existing travel patterns that use or cross the CSAH 5 (Third Ave) corridor. This data will allow us to answer some critical questions:

- Who is using the CSAH 5 (Third Ave) corridor (regional vs. local trips)?
- Do these patterns vary by time of day?
- Do these patterns vary by weekday vs weekend?
- Do these patterns vary by vehicle type (freight vs. passenger vehicles)?

SRF is a regional leader in using GPS O-D information to address questions that develop during complex projects. We have successfully used our innovative processing of O-D data on several projects over the past few years including the Mankato Second Street Corridor Study, TH 22 Corridor Study, and US 14 Corridor Analysis in Olmsted County.

Corridor Function and Connecting Roadways

A variety of information will be gathered and analyzed to assess the current and future connectivity of other roadways to CSAH 5 (Third Ave). This information includes travelshed, future traffic generation, roadway connectivity, traffic volumes, access spacing, travel speeds, and adjacent land uses. In addition, the SRF Team will develop network options and an assessment of a multi-directional network of collector and local roads to serve and integrate with the CSAH 5 (Third Ave) corridor and the larger planning area. The connecting roadways and intersections where detailed turning movement data is collected will be reviewed under future conditions as well to determine if significant changes are anticipated due to access modifications and travel pattern shifts within the area. If it is determined that substantive travel pattern shifts will negatively affect these intersections, appropriate system improvements or intersection geometric modifications will be recommended.

4.2 - TRAFFIC ANALYSIS

A modeling analysis will be conducted using the Synchro/SimTraffic software for the corridor for both existing and 2045 traffic conditions. This modeling analysis will assist in the determination of roadway capacity needs and issues (lane assignments, traffic control opportunities, etc.). This analysis will be conducted during the highest peak hours. Since there are unsignalized intersections in the study area, additional analysis may be required using Highway Capacity Manual methods to determine the operational characteristics of the overall corridor.

The Synchro/SimTraffic model will be rerun using the forecast traffic volumes. This analysis will identify future intersection and/or roadway segment capacity issues that should be considered during the development of alternatives. This will help set the stage for consideration of impacts on regional and county roadway systems that connect into the CSAH 5 (Third Ave) corridor and parallel local streets.

4.3 - CORRIDOR PURPOSE & NEED STATEMENT (ISSUES IDENTIFICATION SUMMARY)

Preparing a Purpose and Need Statement (PNS) is an essential step to defining the project and providing guidance for further analysis. Defining the scope and depth of the issues for a project provides a guide to stakeholders, officials, and the public in sorting out various alternatives and helping select a locally preferred alternative for detailed analysis in future environmental documentation. SRF will prepare a compelling and clearly articulated draft Purpose and Need Statement (PNS), supported by sound analysis for review/comment early in the study process. The Purpose and Need Statement will take into consideration the information gathered and the analysis completed and build on federal purpose and need guidelines, including:

- **Project history/status –** Discuss previous work and decisions made/improvements implemented relative to the study corridor.
- **Safety –** Document needs relative to addressing existing multimodal safety deficiencies.
- **Transportation, social and economic demands –** Discuss how corridor relates to local, state, and regional plans. This goes beyond transportation and includes land use, growth, and economic development.
- **System deficiencies and capacity needs –** Document needs relative to addressing existing needs related to capacity/operational issues, geometric deficiencies, and pavement quality.
- **System linkage and modal interrelationships –** Document needs relative to "connecting links" within the transportation study (including all modes).

It will be extremely important to build local consensus amongst the various stakeholder groups, business landowners, intermodal interests, each of which will likely view the project from a different perspective. The draft Purpose and Need Statement will be reviewed and discussed by the PMT and revised based on feedback. With feedback from the public and key interested groups, SRF will present the revised draft Purpose and Need Statement to the PMT for consideration and approval.

4.4 - ALTERNATIVES DEVELOPMENT

Corridor Vision & Goals

A key objective when completing a corridor study is to define a unified corridor vision that supports current and future land uses within the area as well as provides for user safety, mobility, and community connectivity. This generally begins by defining a common set of goals or outcomes,

based on technical analysis and stakeholder engagement, that must be achieved with the alternatives; these goals will help guide the process, alternative evaluations, and project decisions. The vision will be defined by a set of stated goals, a visual plan/map showing locations for key transportation facilities, and modifications along CSAH 5 (Third Ave).

Alternatives Development

Next, a range of alternatives that address existing and future traffic flow, safety, access management, intersection control, pedestrian and bicycle connectivity, lane configurations, freight mobility, and possible impacts to parallel streets will be developed. To do that, conceptual typical sections will be developed to address the corridor issues identified previously.

As part of this task, the SRF Team will develop up to four (4) corridor typical section alternatives to be evaluated further which includes a no build scenario as well. The typical sections will be prepared so that they graphically demonstrate how the corridor space will look and feel if implemented. Extra effort will be made to strike more of a balance between all transportation modes, while considering existing and future development plans.

4.5 - ALTERNATIVE EVALUATION

After typical section alternatives have been identified, the SRF Team will work with stakeholders to establish evaluation criteria that incorporate the purpose and need statement and earlier public input on issues and needs. Potential criteria could include the following:

- Multimodal (freight, pedestrians, and bicyclists) Operations/ Connectivity
- Railroad Grade Crossings
- Transit Compatibility
- Business Impacts
- Land Use Compatibility
- Adjacent corridors connectivity/compatibility
- Access Management
- Traffic Operations including intersection control
- Travel time reliability
- Safety/Crash Reductions
- Sustainability/Emissions
- Right-of-Way, Drainage and Utility Impacts
- Pavement Quality
- Landscaping/Streetscaping Opportunity
- Freight Compatibility
- Benefit-Cost
- Constructability and Maintenance

The SRF Team will compile evaluation results using our comprehensive evaluation methodology. Our evaluation system documents impact assessment criteria, tests and ranks the relative merits of each concept, compares concepts to each other and the no-build option, and documents the rationale for the locally preferred vision for the corridor. The results of the evaluation process will be presented in a matrix, which is organized so stakeholders can easily discern the relationship between study goals and the measurable criteria used to evaluate alternatives.

Our measurement of impacts will involve grading by magnitude of impact. For some criteria, quantifiable data will be available and included in the draft matrix, so the PMT can view results from the technical analyses. After PMT discussion, data will be generalized into a "good, fair, or poor" format or a similar scale for public review. While each alternative will have different trade-offs with respect to the evaluation criteria, the matrix will help stakeholders review the analyses and provide meaningful comments. Preliminary planning-level cost estimates for each alternative will also be included in the evaluation matrix. The preliminary planning-level cost estimates will be developed using generalized cost per mile data for similar improvements (including contingencies for drainage, landscaping, lighting, traffic control, etc.).

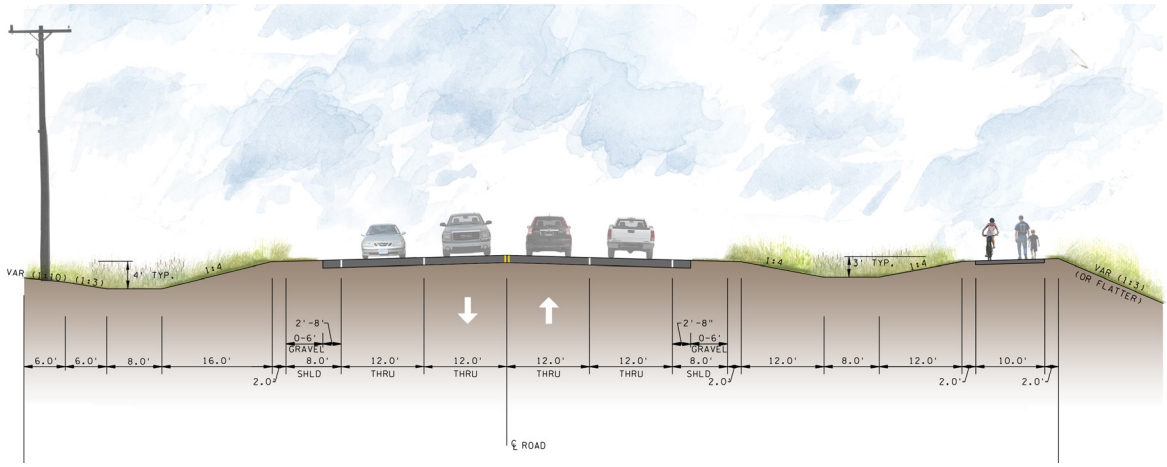
SRF will further summarize findings with an advantage/disadvantage chart, which helps the public quickly understand the relative benefits/ constraints of each alternative using color coding and format. The presentation of this analysis in simplified graphics will enable stakeholders to quickly digest the relative merits of each alternative, so that they can offer constructive comments, and identify their preferences.

The evaluation process and detailed results, the evaluation matrices, and the draft ranking of alternatives will be presented to the PMT for comment and refinement before presenting to resource agencies and the public for comments.

4.6 - RECOMMENDATIONS & BUDGET ESTIMATES

Based on the results of the alternatives evaluation, technical analysis, and public and stakeholder input, a locally preferred vision will be selected for the corridor. SRF will recommend specific strategies to the PMT to implement the proposed improvements included in the corridor vision for CSAH 5 (Third Ave). SRF will work with the PMT to identify lower-cost/high-benefit improvements and logical sequencing or staging of these improvements. To accomplish this, we will assist the PMT in identifying criteria that can be used to prioritize the improvements. As part of this staging analysis, possible criteria that could be used include:

- Immediacy of need (capacity, safety, and/or condition)
- Construction feasibility (what segments are less costly and more easily constructed)
- Ability to leverage other planned regional and/or local improvements
- Ability to leverage planned private improvements (adjacent development opportunities)
- Logical sequencing of segments to avoid the creation of downstream safety problems



SRF will also develop planning level-cost estimates for each phase of the implementation plan using generalized cost per mile data for similar improvements (including contingencies for drainage, landscaping, lighting, traffic control, etc.). Estimated right of way costs will also be determined using a generalized cost per acre. Long-term maintenance strategies will also be analyzed to ensure CSAH 5 is properly maintained, most notably for pavement preservation due to the wear and tear from heavy freight vehicles, to ensure Blue Earth County is well informed for future CIPs.

4.7 - INTERSECTION CONTROL EVALUATION (ICE) REPORTS

Using our extensive local experience and expertise, we will prepare ICE reports using the Minnesota Department of Transportation (MnDOT) ICE methodology for the intersections listed below. ICE reports will evaluate intersection operations and safety to determine the most appropriate long-term intersection control type for each intersection. Specifically, we will use the FHWA's CAP-X tool and ITE's Unsignalized Intersection Improvement Guide (UIIG) as tools to help understand the range of options given traffic data, safety history, and site characteristics. Potential intersection options for each intersection will be discussed with the MAPO and feedback will be obtained from the PMT if deemed necessary. ICE report locations:

- US 14 Eastbound ramp
- US 14 Westbound ramp

Deliverables: SRF will develop a series of technical memorandums summarizing the analysis completed as part of this task. This includes: Existing Conditions, Traffic Analysis, Issues Identification, Alternative Development and Evaluation, and Recommendations.

TASK 5: PUBLIC & AGENCY INPUT

The CSAH 5 (Third Ave) Corridor Study provides an opportunity for staff of the MAPO, Blue Earth County, and the City of Mankato, elected and appointed officials, and residents to come together and develop a vision for the corridor that supports the goals of the community (i.e., residents, businesses, and other stakeholders). **Our work plan that is detailed below outlines how we will inform and involve corridor residents and businesses, area stakeholders and the public throughout the study to achieve a community supported vision for the CSAH 5 (Third Ave) corridor.**

Engagement is most effective when it blends in-person interactions with online information sharing opportunities to provide convenient and accessible options for public participation. Our engagement approach will leverage interactive and visually appealing virtual engagement tools such as online input opportunities, virtual open house meetings, an actively managed website, and targeted social media advertising. Virtual engagement and outreach will be complimented with in-person focus group and open house meetings, pop-up events, mailers to targeted properties along the corridor, press releases and passive engagement notifications both along the corridor and at popular community locations. Our work on the Second Street Corridor Study has provided us firsthand expertise successfully collaborating with the City of Mankato's communications staff to leverage other outlets such as Every Voice Mankato and the City's quarterly newsletter.

Successful engagement must prioritize the user experience, now more than ever, to effectively reach a range of audiences, communicate study content in straightforward and visually appealing ways, and ensure equitable opportunities for residents to participate and provide input. All in-person engagement events will align with the MAPO Public Participation Plan and follow state and local social distancing guidelines. Study materials will include the option to request materials in alternative formats, including translation services of up to one (1) other language or public meeting accommodations. Virtual engagement tools will be user friendly and align with Web Accessibility Guidelines 2.0.

5.1 - PUBLIC INVOLVEMENT PLAN

The SRF Team has outlined our proposed public involvement plan in the sections below. Our approach outlines how we intend to inform and involve corridor residents and businesses, area stakeholders, and the public throughout the study. The MAPO's Public Participation Plan and Staff Guide (PPP) provides a key framework for the study's engagement process. As part of the study, a detailed Public Involvement Plan (PIP) will be developed. This document will identify audiences, engagement tools, outreach strategies, documentation and reporting, COVID-19 contingencies, and agency coordination efforts to help accomplish the study's final objective of achieving a community supported vision for the CSAH 5 (Third Ave) Corridor. In addition to community outreach and stakeholder engagement, the PIP will articulate a process for coordination with decision-making and advisory bodies, including the MAPO TAC and MAPO Policy Board, Blue Earth County, and City of Mankato, which will be integral to accomplishing the study objectives. At a minimum the PIP will include all items as noted in the RFP.

5.2 - ADVERTISING, SOCIAL MEDIA PROMOTION & STUDY WEBSITE

Our online engagement focuses on a social media strategy that will include sharing content by leveraging the channels (Facebook, Twitter, NextDoor, Social Pin Point) of partner agencies and organizations (e.g., Every Voice Mankato), as well as using these platforms for targeted promotion. Our team will utilize other platforms as to maintain an additional layer of communication with area stakeholders, including Wiki-mapping and Facebook. Our team will also use story Maps and online surveys, YouTube educational videos, targeted mailings to key stakeholders, traditional media outlets, and dynamic mapping platform integration/ArcGIS tools to disseminate information, educate stakeholders, and obtain input.

We will work with the PMT to develop a study webpage and brand/logo to regularly inform the public regarding activities, upcoming meetings, and links to additional relevant resources and study partners. By utilizing these additional resources, our team will disseminate information to the broader community through targeted communication to ensure each stakeholder group is reached. To kick off the study, the SRF Team proposes launching a social media campaign to introduce the study and funnel traffic to the study website. Detailed information to educate the public on the purpose of the study will be available on the study website. The study website will also provide an opportunity for the public to submit comments and questions. The SRF Team will work with the PMT to formulate response to comments and questions received.

SRF will work with the PMT to create a communication plan that articulates roles, responsibilities, primary contacts, and a detailed promotional timeline for all outreach strategies. It is understood that the City of Mankato has various contacts with local television, radio and other media outlets (e.g., Mankato Free Press) which SRF will plan to utilize, as needed, during the study.

5.3 - PROVISION OF MATERIALS

At points throughout the study, MAPO, Blue Earth County, City of Mankato, and other staff may deliver informational presentations and conduct outreach to stakeholders. At the PMT's discretion, agency staff may conduct these efforts without SRF staff present. During these occasions and at the PMT's request, SRF will supply agency staff with presentation and outreach materials. SRF will also gather all summary information and feedback received and integrate it into the study process and final documentation.

5.4 - FOCUSED DISCUSSIONS (FOCUS GROUPS (2)

These focus group meetings will be key in defining the vision and purpose and need for the corridor. There are many competing users that currently travel the CSAH 5 (Third Ave) corridor and understanding each will be key. We propose engaging the focus groups during the middle of the study to confirm the corridor issues and to present and discuss draft corridor alternatives. It will be important to gather input on the alternatives from the focus groups as they are key stakeholders that utilize the CSAH 5 (Third Ave) corridor. We will leverage Greater Mankato Growth to understand who to contact at these businesses, and strategize with them on the best ways to contact them and receive feedback. SRF experienced success collaborating with them during the TH 22 Corridor Study. We propose having the two focus groups schedule on the same day to maximize resources and schedule them mid-day between 11 a.m. and 1 p.m., each 45 minutes long.

We have identified the following businesses or residential areas for potential focus group meetings. This list is not exhaustive and illustrates a sampling of potential members as typically less than a quarter of those contacted will participate.

Urban

- AMCOR
- G&L Auto Supply
- Minnesota Paving and Materials
- Hubbard Feeds, Inc. /
- Truck Center Companies, Mankato
- Dittrich Welding and Fabrication
- True Value Distribution Center
- Western Specialized, Inc.
- Budweiser
- Jones Metal, Inc.
- Alter Metal Recycling
- Kato Manufacturing

Rural

- Pilgrim Demolition Landfill
- Vetter Stone
- Southern Minnesota Construction
- Residents along, or west, of CSAH 5

SRF believes that focus group meetings will be key to successfully confirming a vision for the corridor and receiving initial feedback on alternatives. Focus groups allow the opportunity to interact with targeted groups in an intimate way. In our experience the feedback received from focus group meetings is much more meaningful that a larger open house setting as attendees are more comfortable in the smaller setting and can freely share thoughts and ideas.

5.5 - OPEN HOUSE (1)

The SRF Team will host one (1) public open house meetings at the midpoint of the study to share study goals and objectives, existing corridor issues and purpose and need, preliminary alternatives and evaluation results, and input received during the focused discussions. The open house can be hosted virtually or in-person, if current COVID-19 guidelines are adhered to and will be based on PMT preference.

In-person: If the public open house meeting is hosted in person informational display boards will be developed along with a formal presentation. Comment cards and copies of any online materials will also be available at the open house meeting.

Virtual: If the public open house meeting is housed virtually the Zoom Webinar platform will be utilized, with options to call in our join the meeting via broadband. Meetings will include a presentation from the SRF Team and a facilitated Q & A to ensure opportunities for live interaction. Meetings will be recorded and made available on the study website after the event. Following guidance from MAPO's Public Participation Plan and Staff Guide, virtual open house meetings will ensure equitable opportunities to participate for those with limited English proficiency or no internet access.

The public open house meeting will be promoted via traditional media, a social media campaign, a virtual newsletter to the study contact list as well as a targeted mailer to the list of focus group attendees. In conjunction with this open house, SRF will develop and promote a community survey to gather input and promote public participation at this phase in the study process.

Additionally, we propose utilizing an interactive Wiki-mapping tool to provide the public opportunities to identify transportation issues and opportunities along the corridor.

Feedback received during the open house meeting will be reviewed and incorporated as needed into the study process and final documentation. Additionally, a comprehensive public comment log will be created and included in the final study document. SRF will work with the PMT to determine appropriate responses to all public comments received throughout the study process.

5.6 - PRESENTATIONS: MAPO

SRF will attend and deliver presentations at two (2) meetings with the MAPO TAC. It is understood that meetings are held on the third Thursday of each month or as needed and will be attended in-person. A summary of each meeting and the general presented topics are as follows:

- TAC Meeting #1: Introductions, Study Overview/Schedule, Data Summary and Existing Conditions, and Community Engagement Results (round 1), and Preliminary Concept Alternative Development.
- TAC Meeting #2: Concept Alternative Evaluation, Recommendations, and Community Engagement Results (round 2), and Draft Report with Comment.

At relevant and requested times during the study, SRF will attend and deliver a presentation at one (1) meeting with the MAPO Policy Board. It is understood that the meetings are held the first Thursday of each month or on an as-needed basis and will be attended in-person. The purpose of the presentation will be to provide an overview of the study process including all public and stakeholder engagement activities, share final study recommendations and present the final study documentation for acceptance.

5.7 - PRESENTATION: BLUE EARTH COUNTY BOARD WORK SESSION

SRF will attend and deliver in-person one (1) presentation at a Blue Earth County Board Work Session. The purpose of the presentation will be to provide an overview of the study progress including all public and stakeholder engagement activities, gather input on draft corridor alternatives. It will be important to consider input and feedback received during this work session when determining alternatives to carry forward.

5.8 - PRESENTATION: MANKATO CITY COUNCIL WORK SESSION

SRF will attend and deliver in-person one (1) presentation at a Mankato City Council Work Session The purpose of the presentation will be to provide an overview of the study progress including all public and stakeholder engagement activities, gather input on draft corridor alternatives. It will be important to consider input and feedback received during this work session when determining alternatives to carry forward.

5.9 - POP-UP ENGAGEMENT EVENT (1)

The MAPO Public Participation Plan acknowledges that pop-up engagement events help to reach an unbiased and proportionately representative audience. An in-person pop-up event is a great opportunity to interact with residents in an informal community setting. The event provides the opportunity to introduce the study, receive feedback on goals and opportunities, and gather feedback on preliminary corridor alternatives. SRF will host one (1) pop-up engagement event at popular community events, such as Songs on the Lawn, Night to Unite or another community event, to connect with residents, gather feedback, and promote participation in the CSAH 5 (Third Ave) Corridor Study. To maximize efficiencies, pop-up events will be scheduled at times that align with other study activities, such as focus group meetings or public open house meetings.

We experienced success of maximizing SRF and agency staff resources during a pop-up event for the Second Street Corridor Study where door knocking and businesses drop-ins were performed in tandem. We found benefit with this and would propose targeted business drop-ins along the corridor of those that did not participate in the focus group meeting. This could include two staff members driving to businesses along or near the corridor and handing out materials, as well as trying to connect with someone organically that day.

SRF will work with MAPO and the PMT to identify and prepare materials for additional pop-up events that could be attended by MAPO staff. The COVID-19 pandemic has demonstrated the need to go the extra mile to reach targeted audiences.

SRF will also prepare, if requested, passive engagement materials that could be posted at community locations along the CSAH 5 (Third Ave) corridor, the Mankato Intergovernmental Center, or nearby businesses.

5.10 - PUBLIC COMMENT LOG

Over the course of the study, input received will be maintained, responded to and complied within a comprehensive Public Comment Log that identifies public comments received and any resulting actions. Comments will be categorized and grouped by common theme as well as include the date received and a section on how/why the study was/was not updated to reflect the comment.

Deliverables: Public Involvement Plan (PIP), presentation materials, meeting materials, agendas and summaries, comprehensive public comment log

TASK 6: ENVIRONMENTAL JUSTICE & TITLE VI

SRF is a national leader in the areas of Title VI and Environmental Justice (EJ), specifically in the application of Title VI and EJ principles to multiple and varied modes of transportation. We have worked with transit agencies and MPOs to assess the potential adverse impacts to minority and low-income populations of transportation infrastructure changes and have reviewed their policies and practices to ensure compliance with all relevant requirements and guidelines. Conclusions from the population demographics analysis and community engagement will support identification of focus areas for issue confirmation to better understand corridor improvements that will not hinder vulnerable populations.

SRF will coordinate with MAPO's Title VI/EJ policies and PPP and will ensure that all federal, state and local EJ requirements are abided by.

6.1 - ENVIRONMENTAL JUSTICE (EJ) REPORT

SRF staff are experts at analyzing census data to gain useful insights into population demographics. These findings are often used to guide public participation activities in ways that will be more useful and meaningful to public participants, including minority and low-income populations, the young and the elderly, populations with limited access to vehicles and populations that speak a language other than English at home.

The MAPO has taken a strong lead in applying Environmental Justice principles by requiring the CSAH 5 (Third Ave) Corridor Study document to be translated into other languages as requested by the public. Through additional analysis of census data, we will be able to identify concentration of populations with limited English proficiency to better tailor our outreach approach to be inclusive of and inviting to all participants. Through our knowledge of EJ and Title VI guidelines, and our proposed public outreach efforts, MAPO can be assured that the final study document will meet all relevant EJ requirements.

6.2 - ENVIRONMENTAL IMPACT SUMMARY

Identification of environmental and cultural issues and constraints is a prerequisite to the concept development process. SRF will focus on understanding key "location defining" resources that require avoidance and minimization measures under state and federal environmental regulations, including:

- Wetlands, public waters, and other resources
- Parks, trails, and other recreational resources (including 4f/6f)
- Air, noise, and water quality impact
- Threatened and endangered species
- Previously surveyed historic and archaeological resources

Proactive consideration of these types of resources must be reviewed when evaluating various concepts. While an in-depth evaluation of social, economic, and environmental (SEE) resources is not part of this environmental screening, enough inventory and assessment work will be completed to determine which impacts may be potentially significant in examining alternative concepts to carry forward. SRF will assemble all relevant SEE information and display this data on the study's GIS base map. The base map will graphically depict the potential environmental issues and constraints as well as other critical factors that need to be considered in identifying concept alternatives. Additional information generated by agency and public input will also be added to the base map during the study process.

A preliminary review identified constraints for further review by the study, including:

- Karst bedrock is present under nearly all of the CSAH 5 study corridor area.
- CSAH 5 crosses three streams or tributaries within the study area, as well as travels directly adjacent to wetlands between US 14 and the county line.
- Potential sites along or adjacent to the study corridor with hazardous waste, stormwater, or other investigation and cleanup per the Minnesota Pollution Control Agency's data.

Deliverable: Technical memorandum summarizing the EJ Report and Environmental Impact Summary.

TASK 7: PROJECT COMPLETION/PLAN DELIVERY

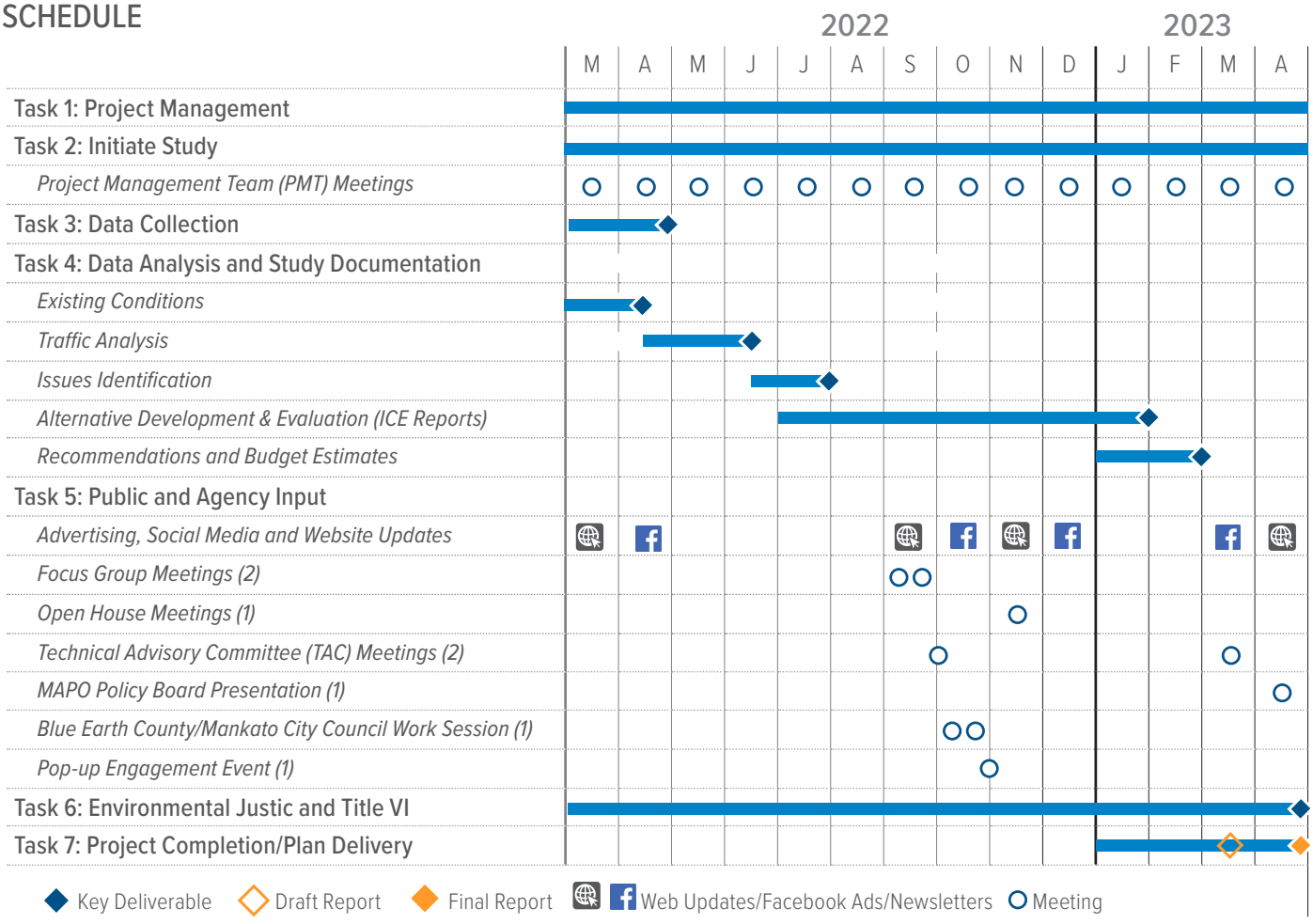
SRF will prepare a final document and stand alone executive summary document that details all study components as identified in the RFP.

All final materials for the CSAH 5 (Third Ave) Corridor study will be prepared, reviewed, revised, and finalized for distribution as specified below:

- A comprehensive record of steps performed, data collection, and analysis conducted.
- All materials will follow State and Federal requirements.
- Prepare draft study document and stand-alone executive summary for review by MAPO staff, the PMT, MAPO TAC, and MAPO Policy Board. The draft document will be emailed to these groups for review, and their comments reviewed with the MAPO staff and acceptable changes will be incorporated prior to proceeding through the review and adoption process.
- Prepare a revised draft study document of the study for use during public review.
- Print and provide three (3) hard copies of the Final Corridor Study document and stand-alone Executive Summary document. The final documents will be converted to the highest level of accessibility which includes readability by Adobe Acrobat's "Read Aloud" feature. If requested by the public, the Executive Summary document will also be translated into one (1) additional language.
- All electronic study materials
- Ensure that the final study is recommended for acceptance by the MAPO Technical Advisory Committee (TAC) no later than their March 2023 meeting.
- Ensure that the final study is formally accepted by the MAPO Policy Board no later than their April 2023 meeting.

Deliverables: The SRF Team will prepare the Draft and Final Study document, provide three (3) hard copies of the Final Corridor Study document and Executive Summary document, and one (1) electronic copy (on CD or USB drive) with electronic data sets and files. If requested, one (1) electronic copy of the Executive Summary document (on CD or USB drive) translated into an additional language.

SCHEDULE



7. Budget

SRF has developed a detailed scope of services, along with hourly fees, for each task herein, which is shown below. This includes all reimbursable expenses. We have included optional tasks and costs as detailed below.

TASK NO.	TASK DESCRIPTION	PRINCIPAL	SR. ASSOC.	ASSOCIATE	SR. PROF	PROF.	TECHNICAL	CLERICAL	TOTALS	EST. FEE
1.0	Project Management	16	0	0	0	0	0	0	16	$3,299.04
2.0	Initiate Study	24	0	26	0	0	0	0	50	$8,496.24
3.0	Data Collection	0	0	6	8	24	8	0	46	$5,039.52
4.0	Data Analysis and Study Development	12	2	18	22	174	0	0	228	$26,501.47
5.0	Public and Agency Input	32	0	49	0	72	26	4	183	$23,460.17
6.0	Environmental Justice and Title VI	0	8	0	0	22	0	0	30	$3,814.51
7.0	Project Completion/Plan Delivery	1	2	4	4	32	4	8	55	$6,009.83
	TOTAL ESTIMATED PERSON-HOURS	**85**	**12**	**103**	**34**	**324**	**38**	**12**	**608**	
	AVERAGE HOURLY PAYROLL RATE	$68.00	$61.00	$45.00	$41.00	$35.00	$28.00	$27.00		
	ESTIMATED LABOR	$5,780.00	$732.00	$4,635.00	$1,394.00	$11,340.00	$1,064.00	$324.00		$25,269.00
	ESTIMATED OVERHEAD COST								163.67%	$41,357.77
	ESTIMATED LABOR AND OVERHEAD									$66,626.77
	FIXED FEE								15.00%	$9,994.02
	SRF ESTIMATED DIRECT NON-SALARY EXPENSES									$3,378.50
	TOTAL ESTIMATED FEE									**$79,999.29**

SRF ESTIMATE OF DIRECT NON-SALARY EXPENSES:

MILEAGE:	Personal Vehicles	1600	Miles @	$0.560		$896.00
MEALS:		10	Meals @	$11.00		$110.00
	Color Copies	350	Copies @	$0.35		$122.50
	Final Report (3 copies)	3	Prints @	$50.00		$150.00
MISC PUBLIC ENGAGEMENT SUPPLIES						$100.00
24-HR TRAFFIC VIDEO COUNTS (10 LOCATIONS)		10	@	$200.00		$2,000.00
					SRF EXPENSES:	**$3,378.50**

8. References

Kaye Bieniek, PE

Olmsted County

2122 Campus Drive SE, Suite 200 Rochester, MN 55904-4744

Phone: 507.328.7047 Email: bieniek.kaye@co.olmsted.mn.us

Brian Gibson, PTP

St. Cloud APO Executive Director

1040 County Road 4 St. Cloud, MN 56303

Phone: 320.252.7568 Email: gibson@stcloudapo.org

Justin Femrite, PE

City of Elk River Public Works Director

Phone: 763.635.1051 Email: jfemrite@elkrivermn.gov

9. Forms, Certificates, Affidavits, Disclosures, & Documents

Appendix C: Required Affidavits and Certifications

Affidavit of Noncollusion
Conflict of Interest Checklist and Disclosure Form
Affirmative Action Certification
Immigration Status Certification
Certification of Restriction on Lobbying
Certificate of Liability Insurance

Non-Discrimination Assurances

Responders must provide confirmation they agree to comply with all applicable US DOT Standard Title VI/Non-Discrimination Assurances contained in DOT Order No. 1050.2A, and in particular Appendices A and E, which can be found at: edocs-public.dot.state.mn.us/edocs_public/DMResultSet/download?docId=11149035.

DESCRIPTION OF REQUIRED FORMS

Affidavit of Noncollusion

Responders must complete the "Affidavit of Noncollusion" found in this Appendix and include it with the response. The successful responder will be required to submit acceptable evidence of compliance with workers' compensation insurance coverage requirements prior to execution of the Contract. The successful responder will be required to submit pre-award audit information and comply with audit standards.

Organizational Conflicts of Interest

The responder warrants that, to the best of its knowledge and belief, and except as otherwise disclosed, there are no relevant facts or circumstances, which could give rise to organizational conflicts of interest. An organizational conflict of interest exists when, because of existing or planned activities or because of relationships with other persons, a vendor is unable or potentially unable to render impartial assistance or advice to MAPO, or the successful responder's objectivity in performing the Contract work is or might be otherwise impaired, or the successful responder has an unfair competitive advantage. The responder agrees that, if after award, an organizational conflict of interest is discovered, an immediate and full disclosure in writing must be made to MAPO, which must include a description of the action, which the successful responder has taken or proposes to take to avoid or mitigate such conflicts.

If an organization conflict of interest is determined to exist, MAPO may, at their discretion, cancel the Contract. In the event the responder was aware of an organizational conflict of interest prior to the award of the Contract and did not disclose the conflict to the contracting officer, MAPO may terminate the Contract for default. The provisions of this clause must be included in all subcontracts for work to be performed similar to the service provided by the prime contractor, and the terms "contract," "contractor," and "contracting officer" modified appropriately to preserve MAPO's rights. Responders must complete the "Conflict of Interest Checklist and Disclosure Form" and submit it along with the response, but not as a part of the response.

Affirmative Action Data

For all Contracts estimated to be in excess of $100,000, responders are required to complete the "Affirmative Action Certification" page and include it with the response.

Immigration Status Certification

By order of the Governor (Governor's Executive Order 08-01), vendors and subcontractors MUST certify compliance with the Immigration Reform and Control Act of 1986 (8 U.S.C. 1101 et seq.) and certify use of the *E-Verify* system established by the Department of Homeland Security. *E-Verify* program information can be found at http://www.dhs.gov/ximgtn/programs.

If any response to a solicitation is or could be in excess of $50,000, vendors and subcontractors must certify compliance with items 1 and 2 of the Immigration Status Certification by completing the required form and submitting it with their proposal.

In addition, prior to the delivery of the product or initiation of services, vendors must obtain this certification from all subcontractors who will participate in the performance of the contract. All subcontractor certifications must be kept on file with the contract vendor and made available to the state upon request.

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Restrictions on Lobbying
Contractors that apply or bid for an award of $100,000 or more must completed the required certification that is will not and has not used Federally appropriated funds to pay any person or organization for influencing an officer or employee of any agency, a member of Congress, officer or employee of Congress, or an employee of a member of Congress in connection with obtaining any Federal contract, grant, or any other award covered by 31 U.S.C. 1352. The Contractor must disclose any lobbying with non-Federal funds that takes place in connection with obtaining any Federal award. The offeror must submit the required form with their proposal.

Pursuant to Minnesota Statutes §10A.06, no person may act as or employ a lobbyist for compensation that is dependent upon the result or outcome of any legislation or administrative action.

Standard of Performance, Insurance and Indemnity
All services to be performed by Contractor hereunder shall be performed in a skilled, professional and non-negligent manner. Contractor shall obtain and maintain at his/her/its cost and expense:

a. **Comprehensive general liability insurance** that covers the consultant services performed by Contractor for MAPO with a combined single limit of liability of at least One Million Dollars ($1,000,000.00).
b. **Errors and omissions or equivalent insurance** that covers the contractor services performed by Contractor for MAPO with a combined single limit of liability of at least One Million Dollars ($1,000,000.00).
c. **Worker's compensation insurance** covering Contractor (if an individual) and all of Contractor's employees with coverages and limits of coverage required by law.

Contractor shall indemnify and hold harmless MAPO from and against all errors, omissions and/or negligent acts causing claims, damages, liabilities and damages arising out of the performance of his/her/its services hereunder.

Contractor certifies that Contractor is in compliance with all applicable worker's compensation laws, rules and regulations. Neither Contractor (if an individual) nor Contractor's employees and agents will be considered MAPO employees. Any claims that may arise under any worker's compensation laws on behalf of any employee of Contractor and any claims made by any third party as a consequence of any act or omission on the part of Contractor or any employee of Contractor are in no way MAPO's obligation or responsibility. By signing this Agreement, Contractor certifies that Contractor is in compliance with these laws and regulations.

Contractor shall deliver to MAPO, concurrent with the execution of this Agreement, one or more certificate(s) of insurance evidencing that Consultant has the insurance required by this Agreement in full force and effect. MAPO shall be named as additional insureds under such policy(ies). The insurer will provide at least thirty (30) days prior written notice to MAPO, without fail, of any cancellation, non-renewal, or modification of any the policy(ies) or coverage evidenced by said certificate(s) for any cause, except for nonpayment of premium. The insurer will provide at least ten (10) days prior written notice to MAPO, without fail, of any cancellation of any of the policy(ies) or coverage evidenced by said certificate(s) for nonpayment of premium. Contractor shall provide MAPO with appropriate endorsements to its policy(ies) reflecting the status of MAPO as an additional insured and requiring that the foregoing required notice of cancellation, material alteration or non-renewal be provided MAPO by the insurance company providing such insurance policy to Contractor.

The Contractor shall require any subcontractor permitted by MAPO under Section 3 hereof to perform work for Contractor on the Project to have in full force and effect the insurance coverage required of the Contractor under this Agreement before any subcontractor(s) begin(s) work on the Project. Contractor shall require any such subcontractor to provide to Contractor a Certificate of Insurance evidencing that such subcontractor has the insurance required by this Agreement in full force and effect. The Contractor and MAPO shall be named as additional insureds under such policies. The insurer will provide 30 day written notice to MAPO and Contractor, without fail, of any cancellation, non-renewal, or modification of the policy(ies) or coverage evidenced by said certificate(s) for any cause, except for nonpayment of premium. The insurer will provide at least ten (10) days prior written notice to MAPO, without fail, of any cancellation of any of the policy(ies) or coverage evidenced by said certificate(s) for nonpayment of premium. MAPO shall also be provided with appropriate endorsements to its policy(ies) reflecting the status of MAPO as an additional insured and requiring that the foregoing required notice of cancellation, material alteration or non-renewal be provided MAPO by the insurance company providing such insurance policy(ies).

AFFIDAVIT OF NONCOLLUSION

I swear (or affirm) under the penalty of perjury:

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1. That I am the Responder (if the Responder is an individual), a partner in the company (if the Responder is a partnership), or an officer or employee of the responding corporation having authority to sign on its behalf (if the Responder is a corporation);

2. That the attached proposal submitted in response to the CSAH 5 (Third Ave) Corridor Study Request for Proposals has been arrived at by the Responder independently and has been submitted without collusion with and without any agreement, understanding or planned common course of action with, any other Responder of materials, supplies, equipment or services described in the Request for Proposal, designed to limit fair and open competition;

3. That the contents of the proposal have not been communicated by the Responder or its employees or agents to any person not an employee or agent of the Responder and will not be communicated to any such persons prior to the official opening of the proposals; and

4. That I am fully informed regarding the accuracy of the statements made in this affidavit.

Responder's Firm Name: SRF Consulting Group

Authorized Signature: _____

Date: 12/14/2021

Subscribed and sworn to me this: 14th day of December 2021

Notary Public: Lauren Dabill

My commission expires: 1/31/2026

LAUREN BRIANNE DABILL
Notary Public
State of Minnesota
My Commission Expires
January 31, 2026

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CONFLICT OF INTEREST CHECKLIST AND DISCLOSURE FORM

Purpose of this Checklist. This checklist is provided to assist proposers in screening for potential organizational conflicts of interest. The checklist is for the internal use of proposers and does not need to be submitted, however, the Disclosure of Potential Conflict of Interest form should be submitted in a separate envelope along with your proposal.

Definition of "Proposer". As used herein, the word "Proposer" includes both the prime contractor and all proposed subcontractors.

Checklist is Not Exclusive. Please note that this checklist serves as a guide only, and that there may be additional potential conflict situations not covered by this checklist. If a proposer determines a potential conflict of interest exists that is not covered by this checklist, that potential conflict must still be disclosed.

Use of the Disclosure Form. A proposer must complete the attached disclosure form and submit it with their Proposal. If a proposer determines a potential conflict of interest exists, it must disclose the potential conflict to MAPO; however, such a disclosure will not necessarily disqualify a proposer from being awarded a Contract. To avoid any unfair "taint" of the selection process, the disclosure form should be provided separate from the bound proposal, and it will not be provided to selection committee members. MAPO personnel will review the disclosure and the appropriateness of the proposed mitigation measures to determine if the proposer may be awarded the contract notwithstanding the potential conflict. By statute, resolution of conflict of interest issues is ultimately at the sole discretion of MAPO.

Material Representation. The proposer is required to submit the attached disclosure form either declaring, to the best of its knowledge and belief, either that no potential conflict exists, or identifying potential conflicts and proposing remedial measures to ameliorate such conflict. The proposer must also update conflict information if such information changes after the submission of the proposal. Information provided on the form will constitute a material representation as to the award of this Contract. MAPO reserve the right to cancel or amend the resulting contract if the successful proposer failed to disclose a potential conflict, which it knew or should have known about, or if the proposer provided information on the disclosure form that is materially false or misleading.

Approach to Reviewing Potential Conflicts. MAPO recognizes that proposer's must maintain business relations with other public and private sector entities in order to continue as viable businesses. MAPO will take this reality into account as it evaluates the appropriateness of proposed measures to mitigate potential conflicts. It is not MAPO's intent to disqualify proposers based merely on the existence of a business relationship with another entity, but rather only when such relationship causes a conflict that potentially impairs the proposer's ability to provide objective advice to MAPO. MAPO would seek to disqualify proposers only in those cases where a potential conflict cannot be adequately mitigated. Nevertheless, MAPO must follow statutory guidance on Organizational Conflicts of Interest.

Statutory Guidance. Minnesota Statutes §16C.02, subd. 10 (a) places limits on state agencies ability to contract with entities having an "Organizational Conflict of Interest". For purposes of this checklist and disclosure requirement, the term "Vendor" includes "Proposer" as defined above. Pursuant to such statute, "Organizational Conflict of Interest" means that because of existing or planned activities or because of relationships with other persons: (1) the vendor is unable or potentially unable to render impartial assistance or advice to the state; (2) the vendor's objectivity in performing the contract work is or might otherwise be impaired; or (3) the vendor has an unfair advantage.

Additional Guidance for Professionals Licensed by the Minnesota Board of Engineering. The Minnesota Board of Engineering has established conflict of interest rules applicable to those professionals licensed by the Board (see Minnesota Rules part 1805.0300) Subpart 1 of the rule provides "A licensee shall avoid accepting a commission where duty to the client or the public would conflict with the personal interest of the licensee or the interest of another client. Prior to accepting such employment the licensee shall disclose to a prospective client such facts as may give rise to a conflict of interest".

An organizational conflict of interest may exist in any of the following cases:

- ❑ The proposer, or its principals, own real property in a location where there may be a positive or adverse impact on the value of such property based on the recommendations, designs, appraisals, or other deliverables required by this Contract.

- ❑ The proposer is providing services to another governmental or private entity and the proposer knows or has reason to believe, that entity's interests are, or may be, adverse to the state's interests with respect to the specific project covered by this contract. **Comment:** the mere existence of a business relationship with another entity would not ordinarily need to be disclosed. Rather, this focuses on the nature of services commissioned by the other entity. For example, it would not be appropriate to propose on an MAPO project if a local government has also retained the proposer for the purpose of

persuading MAPO to stop or alter the project plans.

- ❑ The Contract is for right-of-way acquisition services or related services (e.g. geotechnical exploration) and the proposer has an existing business relationship with a governmental or private entity that owns property to be acquired pursuant to the Contract.

- ❑ The proposer is providing real estate or design services to a private entity, including but not limited to developers, whom the proposer knows or has good reason to believe, own or are planning to purchase property affected by the project covered by this Contract, when the value or potential uses of such property may be affected by the proposer's performance of work pursuant to this Contract. "Property affected by the project" includes property that is in, adjacent to, or in reasonable proximity to current or potential right-of-way for the project. The value or potential uses of the private entity's property may be affected by the proposer's work pursuant to the Contract when such work involves providing recommendations for right-of-way acquisition, access control, and the design or location of frontage roads and interchanges. **Comment**: this provision does not presume proposers know or have a duty to inquire as to all of the business objectives of their clients. Rather, it seeks the disclosure of information regarding cases where the proposer has reason to believe that its performance of work under this contract may materially affect the value or viability of a project it is performing for the other entity.

- ❑ The proposer has a business arrangement with a current MAPO employee or immediate family member of such employee, including promised future employment of such person, or a subcontracting arrangement with such person, when such arrangement is contingent on the proposer being awarded this Contract. This item does not apply to pre-existing employment of current or former MAPO employees, or their immediate family members. Comment: this provision is not intended to supersede any MAPO policies applicable to its own employees accepting outside employment. This provision is intended to focus on identifying situations where promises of employment have been made contingent on the outcome of this particular procurement. It is intended to avoid a situation where a proposer may have unfair access to "inside" information.

- ❑ The proposer has, in previous work for the state, been given access to "data" relevant to this procurement or this project that is classified as "private" or "nonpublic" under the Minnesota Government Data Practices Act, and such data potentially provides the proposer with an unfair advantage in preparing a proposal for this project. **Comment**: this provision will not, for example, necessarily disqualify a proposer who performed some preliminary work from obtaining a final design Contract, especially when the results of such previous work are public data available to all other proposers. Rather, it attempts to avoid an "unfair advantage" when such information cannot be provided to other potential proposers. Definitions of "government data", "public data", "non-public data" and "private data" can be found in Minnesota Statutes Chapter 13.

- ❑ The proposer has, in previous work for the state, helped create the "ground rules" for this solicitation by performing work such as: writing this solicitation, or preparing evaluation criteria or evaluation guides for this solicitation.

- ❑ The proposer, or any of its principals, because of any current or planned business arrangement, investment interest, or ownership interest in any other business, may be unable to provide objective advice to the state.

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DISCLOSURE OF POTENTIAL CONFLICT OF INTEREST

Having had the opportunity to review the Organizational Conflict of Interest Checklist, the proposer hereby indicates that it has, to the best of its knowledge and belief:

SRF Consulting Group Determined that no potential organizational conflict of interest exists.

_____ Determined a potential organizational conflict of interest as follows:

Describe nature of potential conflict:

Describe measures proposed to mitigate the potential conflict:



Signature

12/14/2021

Date

If a potential conflict has been identified, please provide name and phone number for a contact person authorized to discuss this disclosure form with MAPO personnel.

Name

Phone

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AFFIRMATIVE ACTION CERTIFICATION

If your response to this solicitation is or could be in excess of $100,000.00, complete the information requested below to determine whether you are subject to the Minnesota Human Rights Act (Minnesota Statutes 363A.36) certification requirement, and to provide documentation of compliance if necessary. It is your sole responsibility to provide this information and—if required—to apply for Human Rights certification prior to the due date and time of the bid or proposal and to obtain Human Rights certification prior to the execution of the contract. The State of Minnesota is under no obligation to delay proceeding with a contract until a company receives Human Rights certification.

BOX A – For companies which have employed more than 40 full-time employees within Minnesota on any single working day during the previous 12 months. All other companies proceed to BOX B.
Your response will be rejected unless your business:

Has a current Certification of Compliance issued by the Minnesota Department of Human Rights (MDHR) -or- Has submitted an affirmative action plan to the MDHR, which the Department received prior to the date and time the responses are due.

Check one of the following statements if you have employed more than 40 full-time employees in Minnesota on any single working day during the previous 12 months:

☒ We have a current Certificate of Compliance issued by the MDHR. Proceed to Box C. Include a copy of you Certification with your response

☐ We do not have a current Certificate of Compliance; However, we submitted an Affirmative Action Plan to the MDHR for approval, which the Department received on _____(date). If the date is the same as the response due date, indicate the time your plan was received: _____(time). Proceed to Box C.

☐ We do not have a Certification of Compliance, nor has the MDHR received an Affirmative Action Plan from our company. We acknowledge that our response will be rejected. Proceed to Box C. Contact the MDHR for assistance. (See below for contact information)

Please note: Certificates of Compliance must be issued by the MDHR. Affirmative Action Plans must be approved by the Federal government, a county or a municipality must still be received, reviewed and approved by the MDHR before a Certification can be issued.

BOX B – For those companies not described in BOX A

Check below

❑ We have not employed more than 40 full-time employees on any single working day in Minnesota within the previous 12 months. **Proceed to BOX C.**

BOX C – For all companies

By signing this statement, you certify that the information provided is accurate and that you are authorized to sign on behalf of the responder. You also certify that you are in compliance with federal affirmative action requirements that may apply to your company. (These requirements are generally triggered only by participating as a prime or subcontractor on federal projects or contracts. Contractors are alerted to these requirements by the federal government.)

Name of Company: _ Date SRF Consulting Group 12/14/2021

Authorized Signature: _____ Telephone number: 763.475.0010

Printed Name: Todd Polum, PE Title: President

For assistance with this form, contact:

Minnesota Department of Human Rights, Compliance Services Section

Mail:	190 East 5th St., Suite 700 St. Paul, MN 55101	TC Metro:	(651) 296-5663	Toll Free:	800-657-3704
Web:	www.humanrights.state.mn.us	Fax:	(651) 296-9042	TTY:	(651) 296-1283

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DEPARTMENT OF HUMAN RIGHTS

WORKFORCE
CERTIFICATE OF COMPLIANCE

The Commissioner of the Minnesota Department of Human Rights by the signature below attests that **SRF CONSULTING GROUP, INC.** is hereby certified as a contractor under the Minnesota Human Rights Act, §363A.

Certificate start date: **8/9/2019**
Certificate expiration date: **8/8/2023**

Minnesota Department of Human Rights

FOR THE DEPARTMENT BY:

Rebecca Lucero, Commissioner

AN EQUAL OPPORTUNITY EMPLOYER
540 Fairview Ave N, Suite 201 • St. Paul, MN 55104 • Tel 651.539.1100
MN Relay 711 or 1.800.627.3529 • Toll Free 1.800.657.3704 • Fax 651.296.9042 • mn.gov/mdhr

Email: employerinfo@therightsplace.net

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IMMIGRATION STATUS CERTIFICATION

By order of the Governor (Governor's Executive Order 08-01), vendors and subcontractors MUST certify compliance with the Immigration Reform and Control Act of 1986 (8 U.S.C. 1101 et seq.) and certify use of the *E-Verify* system established by the Department of Homeland Security.

E-Verify program information can be found at http://www.dhs.gov/ximgtn/programs.

If any response to a solicitation is or could be in excess of $50,000.00, vendors and subcontractors must certify compliance with items 1 and 2 below. In addition, prior to the delivery of the product or initiation of services, vendors MUST obtain this certification from all subcontractors who will participate in the performance of the Contract. All subcontractor certifications must be kept on file with the Contract vendor and made available to the state upon request.

1. The company shown below is in compliance with the Immigration Reform and Control Act of 1986 in relation to all employees performing work in the United States and does not knowingly employ persons in violation of the United States immigration laws. The company shown below will obtain this certification from all subcontractors who will participate in the performance of this Contract and maintain subcontractor certifications for inspection by the state if such inspection is requested; and
2. By the date of the delivery of the product and/or performance of services, the company shown below will have implemented or will be in the process of implementing the *E-Verify* program for all newly hired employees in the United States who will perform work on behalf of the State of Minnesota.

I certify that the company shown below is in compliance with items 1 and 2 above and that I am authorized to sign on its behalf.

Name of Company: SRF Consulting Group Date: 12/14/2021

Authorized Signature: _____ Telephone Number: 763.475.0010

Printed Name: Todd Polum, PE Title: President

If the Contract vendor and/or the subcontractors are not in compliance with the Immigration Reform and Control Act, or knowingly employ persons in violation of the United States immigration laws, or have not begun or implemented the *E-Verify* program for all newly hired employees in support of the Contract, the state reserves the right to determine what action it may take. This action could include, but would not be limited to cancellation of the Contract, and/or suspending or debarring the Contract vendor from state purchasing.

For assistance with the *E-Verify* Program

Contact the National Customer Service Center (NCSC) at **1-800-375-5283** (TTY 1-800-767-1833).

For assistance with this form, contact:

Mail: 112 Administration Building, 50 Sherburne Avenue, St. Paul, Minnesota 55155
E-Mail: MMDHelp.Line@state.mn.us
Telephone: 651-296-2600
Persons with a hearing or speech disability may contact us by dialing 711 or 1-800-627-3529

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CERTIFICATION OF RESTRICTION ON LOBBYING

In accordance with Section 1352 of Title 31, United States Code, it is the policy of the bidder/company named below that:

1. No Federal or state appropriated funds have been paid or will be paid by or on behalf of the bidder/company, to any person for influencing or attempting to influence an officer or employee of any Federal or state agency, or a member of Congress or the state legislature in connection with the awarding of any Federal or state contract, the making of any Federal or state grant, the making of any Federal or state loan, extension, continuation, renewal, amendment, or modification of any Federal or state contract, grant, loan, or cooperative agreement.

2. If any funds other than Federal appropriated funds have been paid or will be paid to any person for influencing or attempting to influence an officer or employee of any Federal agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with this Federal contract, grant, loan or cooperative agreement, the undersigned shall complete and submit Standard Form-LLL, "Disclosure Form to Report Lobbying," in accordance with its instructions.

3. The bidder/company shall require that the language of this certification be included in the award documents for all subawards at all tiers (including subgrants and contracts and subcontracts under grants, subgrants, loans, and cooperative agreement), which exceeds $100,000, and that all such subrecipients shall certify and disclose accordingly.

4. This certification is a material representation of fact upon which reliance was placed when this transaction was made or entered into. Submission of this certification is a prerequisite for making or entering into this transaction imposed by Section 1352, Title 31, U.S. Code. Any person who fails to file the required certification shall be subject to a civil penalty of not less than $10,000 and not more than $100,000 for each failure.

Name of Bidder / Company Name SRF Consulting Group

Type or print name Todd Polum, PE

Signature of authorized representative  Date 12 / 14 / 21

President (Title of authorized official)

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CERTIFICATE OF LIABILITY INSURANCE

DATE (MM/DD/YYYY): 6/28/2021

THIS CERTIFICATE IS ISSUED AS A MATTER OF INFORMATION ONLY AND CONFERS NO RIGHTS UPON THE CERTIFICATE HOLDER. THIS CERTIFICATE DOES NOT AFFIRMATIVELY OR NEGATIVELY AMEND, EXTEND OR ALTER THE COVERAGE AFFORDED BY THE POLICIES BELOW. THIS CERTIFICATE OF INSURANCE DOES NOT CONSTITUTE A CONTRACT BETWEEN THE ISSUING INSURER(S), AUTHORIZED REPRESENTATIVE OR PRODUCER, AND THE CERTIFICATE HOLDER.

IMPORTANT: If the certificate holder is an ADDITIONAL INSURED, the policy(ies) must have ADDITIONAL INSURED provisions or be endorsed. If SUBROGATION IS WAIVED, subject to the terms and conditions of the policy, certain policies may require an endorsement. A statement on this certificate does not confer rights to the certificate holder in lieu of such endorsement(s).

PRODUCER
Marsh & McLennan Agency LLC
6160 Golden Hills Drive
Minneapolis MN 55416

CONTACT NAME: Jessica Rayman
PHONE (A/C, No, Ext): | **FAX (A/C, No):**
E-MAIL ADDRESS: Jessica.Rayman@marshmma.com

INSURER(S) AFFORDING COVERAGE	NAIC #
INSURER A : Continental Casualty Company	20443
INSURER B : Continental Insurance Company	35289
INSURER C : Valley Forge Insurance Compnay	20508
INSURER D :	
INSURER E :	
INSURER F :	

INSURED SRFCONSU
SRF Consulting Group, Inc.
3701 Wayzata Blvd.
Suite 100
Minneapolis MN 55416-3791

COVERAGES **CERTIFICATE NUMBER:** 98082257 **REVISION NUMBER:**

THIS IS TO CERTIFY THAT THE POLICIES OF INSURANCE LISTED BELOW HAVE BEEN ISSUED TO THE INSURED NAMED ABOVE FOR THE POLICY PERIOD INDICATED. NOTWITHSTANDING ANY REQUIREMENT, TERM OR CONDITION OF ANY CONTRACT OR OTHER DOCUMENT WITH RESPECT TO WHICH THIS CERTIFICATE MAY BE ISSUED OR MAY PERTAIN, THE INSURANCE AFFORDED BY THE POLICIES DESCRIBED HEREIN IS SUBJECT TO ALL THE TERMS, EXCLUSIONS AND CONDITIONS OF SUCH POLICIES. LIMITS SHOWN MAY HAVE BEEN REDUCED BY PAID CLAIMS.

INSR LTR	TYPE OF INSURANCE	ADDL INSD	SUBR WVD	POLICY NUMBER	POLICY EFF (MM/DD/YYYY)	POLICY EXP (MM/DD/YYYY)	LIMITS	
B	X **COMMERCIAL GENERAL LIABILITY** CLAIMS-MADE X OCCUR GEN'L AGGREGATE LIMIT APPLIES PER: POLICY PRO-JECT X LOC OTHER:			6018496289	6/30/2021	6/30/2022	EACH OCCURRENCE DAMAGE TO RENTED PREMISES (Ea occurrence) MED EXP (Any one person) PERSONAL & ADV INJURY GENERAL AGGREGATE PRODUCTS - COMP/OP AGG 	$ 1,000,000 $ 500,000 $ 15,000 $ 1,000,000 $ 2,000,000 $ 2,000,000 $
A	**AUTOMOBILE LIABILITY** X ANY AUTO OWNED AUTOS ONLY HIRED AUTOS ONLY SCHEDULED AUTOS NON-OWNED AUTOS ONLY			6018496292	6/30/2021	6/30/2022	COMBINED SINGLE LIMIT (Ea accident) BODILY INJURY (Per person) BODILY INJURY (Per accident) PROPERTY DAMAGE (Per accident) 	$ 1,000,000 $ $ $ $
B	X **UMBRELLA LIAB** X OCCUR **EXCESS LIAB** CLAIMS-MADE DED RETENTION $ None			6018496275	6/30/2021	6/30/2022	EACH OCCURRENCE AGGREGATE 	$ 10,000,000 $ 10,000,000 $
C	**WORKERS COMPENSATION AND EMPLOYERS' LIABILITY** ANYPROPRIETOR/PARTNER/EXECUTIVE OFFICER/MEMBER EXCLUDED? Y / N: N **(Mandatory in NH)** If yes, describe under DESCRIPTION OF OPERATIONS below	N / A		6042762355	6/30/2021	6/30/2022	X PER STATUTE OTH-ER E.L. EACH ACCIDENT E.L. DISEASE - EA EMPLOYEE E.L. DISEASE - POLICY LIMIT	 $ 1,000,000 $ 1,000,000 $ 1,000,000

DESCRIPTION OF OPERATIONS / LOCATIONS / VEHICLES (ACORD 101, Additional Remarks Schedule, may be attached if more space is required)

CERTIFICATE HOLDER

For Informational Purposes Only

CANCELLATION

SHOULD ANY OF THE ABOVE DESCRIBED POLICIES BE CANCELLED BEFORE THE EXPIRATION DATE THEREOF, NOTICE WILL BE DELIVERED IN ACCORDANCE WITH THE POLICY PROVISIONS.

AUTHORIZED REPRESENTATIVE

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Blue Earth County EAW Comment Response

1. Administrative Corrections and Regulatory Coordination

Agency Comments

Blue Earth County identified several administrative corrections and clarifications within the EAW, including:

- Removal of inactive parcel identification numbers.
- Clarification that Lime Township, rather than Blue Earth County, serves as the permitting authority for building permits.
- Clarification that Blue Earth County reviews grading, erosion control, and stormwater plans only where work affects County right-of-way.
- Addition of Blue Earth County as the delegated permitting authority for well construction and well sealing.
- Addition of the Minnesota Department of Labor and Industry as the plumbing permitting authority.
- Clarification of wetland permitting responsibilities between Blue Earth County and the Minnesota Department of Natural Resources.

Project Response

The Applicant appreciates Blue Earth County's review and recommendations. These comments primarily clarified regulatory jurisdiction and permitting responsibilities rather than identifying environmental concerns with the proposed project.

The project documentation has been updated to accurately reflect the appropriate permitting authorities and agency responsibilities. These revisions improve the accuracy of the project record and provide clearer guidance regarding agency oversight during final design, permitting, and construction.

How the Application Addresses These Comments

The Interim Use Permit application identifies the appropriate local and state agencies responsible for review of individual project components, including:

- Lime Township as the primary land use permitting authority.
- Blue Earth County as the delegated authority for well construction and well sealing.
- Minnesota Department of Labor and Industry for plumbing permits.
- Minnesota Pollution Control Agency for applicable wastewater and stormwater permitting.
- Minnesota Department of Natural Resources for water appropriation, groundwater protection, and calcareous fen review.

The application also recognizes that agency review continues beyond land use approval and that individual permits must be obtained prior to construction of regulated improvements.

Ongoing Coordination

The Applicant will continue coordinating with Blue Earth County throughout final engineering and construction permitting to ensure all applicable County requirements are satisfied. Coordination with other state agencies will likewise continue as individual permits are prepared and submitted.

2. Groundwater Protection and Stormwater Management

Agency Comments

Blue Earth County expressed concerns regarding the unique hydrogeologic characteristics of the former quarry, including the exposed Jordan Sandstone aquifer, shallow or exposed bedrock, and the site's high groundwater sensitivity. The County requested additional information describing how stormwater would be managed to prevent pollutants from entering groundwater and how permanent stormwater infrastructure would be designed given the site's geologic conditions. The County also recommended additional discussion regarding groundwater flow and the relationship between quarry water features and surrounding groundwater resources.

Project Response

The Applicant recognizes that groundwater protection is one of the most important environmental considerations for the project and has continued refining the project design following completion of the EAW. Since preparation of the EAW, the project has eliminated continuous dewatering activities, further reducing the potential for impacts to groundwater resources and allowing the former quarry lakes to function under natural groundwater conditions.

Permanent stormwater management will be designed during final engineering in accordance with applicable MPCA Construction Stormwater Permit requirements and will incorporate best management practices appropriate for the site's exposed bedrock and groundwater conditions. Rather than relying on direct discharge, stormwater will be managed through pretreatment practices such as vegetated swales, sediment forebays, and other treatment measures intended to reduce sediment and pollutants before runoff enters quarry water features.

The project also recognizes the unique groundwater sensitivity of the site. Final grading, drainage, and stormwater infrastructure will be designed to minimize the potential for

groundwater contamination while maintaining the natural hydrologic function of the reclaimed quarry.

How the Application Addresses These Comments

The Interim Use Permit application incorporates these commitments through:

- Preparation of a comprehensive Stormwater Pollution Prevention Plan (SWPPP) prior to construction.
- Final engineering of permanent stormwater infrastructure consistent with MPCA permit requirements.
- Use of water quality treatment best management practices prior to discharge to quarry water features.
- Continued coordination with Blue Earth County, the Minnesota Pollution Control Agency, and the Minnesota Department of Natural Resources during final design and permitting.

Ongoing Coordination

Because stormwater design will be finalized during the engineering phase, the Applicant will continue coordinating with the appropriate regulatory agencies to ensure that final grading, stormwater treatment, and drainage systems meet all applicable state and local requirements while protecting groundwater resources.

3. Water Supply, Water Appropriation, and Continued Agency Coordination

Agency Comments

Blue Earth County requested clarification regarding the project's anticipated water demand, well capacity, aquifer information, and future water supply planning. The County also noted corrections regarding well permitting authority and requested additional information regarding future water use. The DNR similarly identified the need for continued coordination regarding groundwater use, water appropriation, and protection of groundwater resources as final project plans are developed.

Project Response

Since completion of the EAW, the Applicant has continued refining the project's water supply system and evaluating anticipated operational demands. The current design proposes two independent well systems serving separate portions of the campground, significantly reducing demand on any individual well and improving overall system reliability.

Updated water demand modeling has been completed using revised campground layouts, bathhouse facilities, and lodge operations to verify that adequate water supplies can be provided during peak seasonal conditions. As final engineering progresses, the water system will continue to be refined to ensure adequate capacity while minimizing groundwater withdrawals.

The project also includes recreational water features and seasonal irrigation that will require water appropriation permits from the Minnesota Department of Natural Resources. Final pumping rates, operating schedules, and system design will be submitted to the DNR as part of the water appropriation permitting process. This review will ensure that groundwater withdrawals are compatible with long-term groundwater sustainability and protective of adjacent natural resources.

How the Application Addresses These Comments

The Interim Use Permit application incorporates these commitments through:

- Development of a dual-well water supply system to distribute demand across the project.
- Updated water demand analyses to verify adequate system capacity during peak operating conditions.
- Continued refinement of recreational water feature operations to minimize unnecessary groundwater withdrawals.
- Submission of final water appropriation information to the Minnesota Department of Natural Resources for review and approval prior to operation of regulated pumping systems.

Ongoing Coordination

The Applicant will continue coordinating with Blue Earth County regarding well construction and permitting requirements and with the Minnesota Department of Natural Resources regarding water appropriation permitting. Any new wells, pumping systems, or groundwater withdrawals requiring regulatory approval will be reviewed and permitted prior to construction and operation.

4. Lime 30 Calcareous Fen and Groundwater Resource Protection

Agency Comments

Blue Earth County noted that the Environmental Assessment Worksheet should more fully recognize the Lime 30 Calcareous Fen as a significant ecological resource and provide additional discussion regarding the groundwater connection between the reclaimed quarry

and the fen. The County also requested additional explanation describing how project design and operation will protect groundwater quality and associated natural resources.

Project Response

The Applicant acknowledges that protection of the Lime 30 Calcareous Fen and the associated groundwater system is one of the project's most important environmental considerations. As the project has advanced beyond the Environmental Assessment Worksheet, groundwater protection has become a primary design objective incorporated throughout the engineering and permitting process.

The Interim Use Permit application recognizes that the reclaimed quarry exists within a sensitive hydrogeologic setting and that groundwater quality and groundwater elevations are important considerations for both the project and adjacent natural resources. Accordingly, project planning has emphasized minimizing potential impacts to groundwater through careful site design, responsible stormwater management, and continued refinement of operational practices.

While Blue Earth County identified the importance of these groundwater resources, the Applicant also recognizes that evaluation of potential impacts to the Lime 30 Calcareous Fen falls under the regulatory authority of the Minnesota Department of Natural Resources. The project will continue coordinating with the DNR throughout final engineering and permitting to demonstrate that project design, groundwater use, and operational practices remain protective of the fen and associated groundwater resources.

How the Application Addresses These Comments

The Interim Use Permit application addresses these concerns by:

- Recognizing the ecological significance of the Lime 30 Calcareous Fen and the sensitivity of the site's groundwater resources.
- Incorporating groundwater protection as a primary design consideration throughout project planning.
- Committing to continued coordination with the Minnesota Department of Natural Resources during final engineering and permitting.
- Implementing project design and operational practices intended to protect groundwater quality and maintain compatibility with surrounding natural resources.

Ongoing Coordination

The Applicant will continue working with both Blue Earth County and the Minnesota Department of Natural Resources as final engineering is completed. Information developed through the DNR review process, including groundwater evaluations and permit

review where applicable, will be incorporated into the final project design prior to construction.

5. Summary of Agency Coordination

The Applicant appreciates the detailed review provided by Blue Earth County during the Environmental Assessment Worksheet process. The agency comments have resulted in additional clarification, continued refinement of the project design, and ongoing coordination with state and local regulatory agencies. The Applicant believes the project has been strengthened through this review process and remains committed to implementing the project in a manner that protects groundwater resources, sensitive ecological features, and the surrounding community.

MPCA EAW Comment Response

1. Noise Assessment and Compliance

Agency Comments

The MPCA noted that the Environmental Assessment Worksheet did not contain sufficient information to determine whether the proposed project would comply with Minnesota's state noise standards. The agency encouraged additional evaluation of potential impacts to nearby residential receptors, particularly during nighttime hours, and requested information demonstrating compliance with Minnesota Rules Chapter 7030.

Project Response

Since completion of the Environmental Assessment Worksheet, the Applicant has completed an acoustical analysis evaluating the proposed recreational uses, operational activities, and surrounding land uses. The study considered anticipated operational noise levels, hours of operation, site topography, existing quarry highwalls, and proposed mitigation measures to evaluate compliance with applicable Minnesota noise standards at surrounding residential properties.

The findings of the acoustical study have informed continued refinement of the project design and operating plan, including operational practices and site features intended to minimize off-site noise. The study has been incorporated into the Interim Use Permit application and demonstrates that the proposed project can operate in compliance with applicable state noise standards.

How the Application Addresses These Comments

The Interim Use Permit application addresses the MPCA's comments by:

- Including a comprehensive acoustical study prepared specifically for the proposed project.
- Evaluating potential noise impacts at nearby residential receptors.
- Demonstrating compliance with applicable Minnesota noise standards.
- Incorporating operational and site design measures intended to minimize off-site noise impacts.

2. Watershed Protection and Stormwater Management

Agency Comments

The MPCA emphasized the importance of preventing construction-related sediment and stormwater runoff from reaching Unnamed Creek and, ultimately, the Minnesota River. The agency encouraged implementation of enhanced erosion and sediment control measures

during construction and continued use of best management practices to protect downstream water quality. The MPCA also noted that the project ultimately drains to an impaired reach of the Minnesota River, making effective stormwater management an important component of the project.

Project Response

The Applicant recognizes the importance of protecting downstream water resources throughout both construction and long-term operation of the project. Stormwater management has continued to be refined through the engineering process and will be designed in accordance with applicable MPCA Construction Stormwater Permit requirements and accepted best management practices.

Temporary erosion and sediment control measures will be implemented during construction to minimize off-site sediment transport. Permanent stormwater management facilities will incorporate pretreatment and water quality best management practices appropriate for the reclaimed quarry setting, with the objective of reducing sediment and pollutant transport before runoff reaches downstream receiving waters.

How the Application Addresses These Comments

The Interim Use Permit application incorporates these commitments by:

- Implementing temporary erosion and sediment control measures during construction.
- Designing permanent stormwater management facilities consistent with applicable MPCA standards.
- Incorporating best management practices to protect downstream water quality.
- Continuing refinement of stormwater management through final engineering and permitting.

3. Continued MPCA Coordination

Agency Comments

The MPCA noted that its comments during the Environmental Assessment Worksheet process do not constitute approval of the project and reminded the Applicant that all required permits must be obtained and applicable permit conditions satisfied prior to construction and operation.

Project Response

The Applicant acknowledges the MPCA's continuing regulatory role and will obtain all applicable permits and approvals required for project construction and operation. Final

engineering, permitting, and project implementation will continue to be coordinated with the MPCA as necessary to ensure compliance with applicable environmental regulations.

Conclusion

The Applicant appreciates the MPCA's review and recommendations throughout the environmental review process. The agency's comments have been incorporated into continued refinement of the project's noise evaluation, stormwater management strategy, and environmental planning. As final engineering progresses, the Applicant remains committed to designing, constructing, and operating the project in a manner that protects neighboring properties, downstream water resources, and the surrounding environment while complying with applicable MPCA regulations.

Minnesota Department of Natural Resources EAW Comment Response

The Applicant appreciates the Minnesota Department of Natural Resources' review of the Environmental Assessment Worksheet and the constructive comments provided throughout the environmental review process. The comments have helped further refine the project and reinforce the importance of protecting the Lime 30 Calcareous Fen, associated groundwater resources, and other sensitive ecological features.

As the project advances beyond the Environmental Assessment Worksheet and into final engineering and permitting, the Applicant remains committed to continued coordination with the DNR. The following summarizes how the project has addressed the principal comments contained within the DNR review letter and how those considerations have been incorporated into the Interim Use Permit application and ongoing project development.

1. Continued Coordination and Regulatory Approval

Agency Comments

The DNR clarified that review of the Environmental Assessment Worksheet does not constitute approval of the project with respect to potential impacts to the Lime 30 Calcareous Fen and its supporting groundwater system. The Department noted that continued coordination is required and that a final project plan, including avoidance measures and supporting technical information, must be submitted and approved in writing prior to construction of activities regulated under Minnesota Statutes Section 103G.223.The DNR also identified several categories of information that will be evaluated during its review, including project design, construction methods, grading, groundwater use, hydrologic impacts, and proposed avoidance measures.

Project Response

The Applicant acknowledges the DNR's role in evaluating the project's potential effects on the groundwater system that supports the Lime 30 Calcareous Fen and recognizes that this review extends beyond the Environmental Assessment Worksheet and Interim Use Permit processes. The Applicant is committed to continued coordination with the DNR throughout final engineering and permitting and will submit the information necessary to support the Department's review of the final project plan.

The Applicant understands that final DNR approval is required for regulated activities affecting the Lime 30 Calcareous Fen and associated groundwater resources and will continue working collaboratively with DNR staff to ensure the project complies with

applicable statutory and permitting requirements before construction of those activities begins.

How the Application Addresses These Comments

The Interim Use Permit application incorporates this commitment by:

- Recognizing the DNR's continuing regulatory role in reviewing project impacts to the Lime 30 Calcareous Fen.
- Committing to submission of final engineering and supporting technical information as part of the applicable DNR review and permitting processes.
- Continuing coordination with DNR staff throughout final design to ensure project implementation remains consistent with applicable state requirements.

2. Protection of the Lime 30 Calcareous Fen Groundwater System

Agency Comments

The DNR emphasized that protection of the groundwater system supporting the Lime 30 Calcareous Fen is a primary consideration for the proposed project. The Department noted that additional information will be required during final project review to demonstrate that project construction, groundwater use, grading, hydrology, and operational activities will avoid adverse impacts to the fen and comply with Minnesota Statutes Section 103G.223.

Project Response

Although the Lime 30 Calcareous Fen is located off-site, the Applicant recognizes the ecological significance of the fen and the importance of protecting the groundwater system that supports it. Protection of groundwater resources has been one of the primary design objectives throughout project planning and refinement.

Since completion of the Environmental Assessment Worksheet, the project has continued to evolve through coordination with the Minnesota Department of Natural Resources and other reviewing agencies. Project planning has focused on minimizing potential impacts to groundwater resources through responsible site design, careful management of stormwater, and refinement of project infrastructure and operations. The Applicant has also eliminated the need for continuous quarry dewatering, allowing groundwater within the reclaimed quarry to remain under natural conditions and reducing the potential for changes to groundwater conditions that could affect surrounding groundwater-dependent resources.

The Applicant understands that demonstrating protection of the Lime 30 Calcareous Fen is an ongoing process that extends beyond the Interim Use Permit. Final engineering, groundwater evaluations, water appropriation review, and project-specific avoidance

measures will continue to be developed and submitted to the DNR as part of the Department's regulatory review.

How the Application Addresses These Comments

The Interim Use Permit application incorporates these commitments by:

- Recognizing the Lime 30 Calcareous Fen and associated groundwater system as environmentally sensitive resources requiring continued protection.
- Incorporating groundwater protection into the overall project design and operational planning.
- Eliminating continuous quarry dewatering from the proposed project design.
- Committing to continued coordination with the DNR as final engineering and permitting progress.
- Developing and implementing project-specific avoidance measures as part of the final DNR review process.

3. Environmental Design and Best Management Practices

Agency Comments

The DNR provided several recommendations intended to further minimize potential environmental impacts during project construction and long-term operation. These recommendations included coordination on native landscaping and seed mixes, consideration of a Kentucky Coffee Tree survey within wooded areas proposed for disturbance, use of wildlife-friendly lighting, avoidance of chloride-based dust suppressants, implementation of wildlife-friendly erosion control products, and adoption of best management practices to prevent the introduction and spread of invasive species.

Project Response

The Applicant appreciates the DNR's recommendations and recognizes that thoughtful environmental design extends beyond regulatory compliance. As final engineering and landscape plans are developed, the project will continue to incorporate environmentally responsible design practices where appropriate and practicable.

Landscape planning will emphasize the use of native vegetation compatible with the site's reclaimed quarry environment while balancing operational, recreational, and maintenance needs. Construction specifications will also incorporate best management practices for erosion and sediment control, invasive species prevention, and protection of adjacent natural resources. In addition, the Applicant will evaluate opportunities to incorporate the DNR's recommendations regarding lighting, vegetation, and other ecological enhancements during final design.

How the Application Addresses These Comments

The Interim Use Permit application reflects the following commitments:

- Continue coordination with the DNR regarding landscape design and native vegetation.
- Incorporate best management practices for erosion control, sediment management, and invasive species prevention during construction.
- Evaluate the DNR's recommendations regarding wildlife-friendly lighting, dust suppression, and vegetation management during final design.
- Continue refining construction specifications to minimize potential environmental impacts while maintaining safe and functional recreational facilities.

4. Conclusion

The Applicant appreciates the Minnesota Department of Natural Resources' thorough review of the Environmental Assessment Worksheet and the constructive recommendations provided throughout the environmental review process. The DNR's comments have contributed to continued refinement of the project and reinforce the importance of protecting groundwater resources, the Lime 30 Calcareous Fen groundwater system, and other environmentally sensitive features.

As the project advances through final engineering and permitting, the Applicant remains committed to continued coordination with the DNR and other regulatory agencies. Final project plans, supporting technical information, and applicable permit applications will be developed in consultation with the Department to ensure the project is implemented in a manner that protects natural resources while providing a high-quality recreational destination within the reclaimed quarry landscape.

The Applicant believes the proposed project demonstrates that recreation, environmental stewardship, and responsible reclamation can successfully coexist through thoughtful planning, sound engineering, and continued collaboration with regulatory agencies.

Minnesota State Historic Preservation Office (SHPO) Response

The Applicant appreciates the Minnesota State Historic Preservation Office's (SHPO) continued review of the Rockwell RV & Adventure Park project and the collaborative coordination that has occurred throughout the cultural resources investigations. The Applicant also appreciates SHPO's review of the Phase IA literature review, Phase I archaeological survey, and Phase I/II architectural history investigations completed for the project.

The following summarizes how SHPO's principal comments have been incorporated into the Interim Use Permit application and ongoing project planning.

1. Historic Resource Identification and Avoidance

Agency Comments

SHPO concurred with the findings of the cultural resource investigations and agreed that additional evaluation of the Mendota–Big Sioux River Military Road was not warranted. SHPO also agreed that the proposed project can avoid adverse effects to identified archaeological resources, including the Mankato Holstein Farm Barn Site (21BE0348), provided those resources continue to be avoided during project implementation.

Project Response

The Applicant appreciates SHPO's concurrence with the completed cultural resource investigations and remains committed to avoiding impacts to identified historic and archaeological resources throughout project construction and operation.

Project planning has intentionally incorporated the locations of known historic resources into the site design, allowing recreational facilities to coexist with significant cultural resources while avoiding direct disturbance of identified archaeological sites.

How the Application Addresses These Comments

The Interim Use Permit application reflects these commitments by:

- Incorporating the findings of the completed cultural resource investigations into the project design.
- Avoiding identified archaeological resources during project development.
- Continuing coordination with SHPO should project conditions or design changes affect previously identified historic resources.

2. Long-Term Historic Resource Stewardship

Agency Comments

SHPO agreed that several recommended stewardship measures would help minimize effects to historic resources, including regular maintenance, interpretive signage, stabilization of historic features, and promoting the history of the area through educational opportunities.

Project Response

The Applicant shares SHPO's goal of preserving and interpreting the historic character of the former quarry property. Rather than viewing these resources as constraints, the project seeks to incorporate them into the visitor experience through thoughtful interpretation, long-term stewardship, and ongoing maintenance.

As final site design progresses, opportunities for interpretive signage, historical education, and preservation of significant historic features will continue to be incorporated where appropriate. These efforts are intended to enhance visitors' understanding of the property's history while protecting the integrity of the remaining historic resources. Preservation and interpretation of the property's historic resources are intended to become an integral part of the visitor experience, allowing guests to better understand the site's agricultural and quarrying heritage while enjoying its modern recreational use.

How the Application Addresses These Comments

The Interim Use Permit application incorporates these commitments by:

- Preserving significant historic resources where feasible.
- Incorporating educational and interpretive opportunities highlighting the property's quarrying and agricultural history.
- Providing long-term maintenance and stewardship of preserved historic resources.
- Continuing to coordinate with SHPO as future preservation opportunities are identified.

3. Continued Coordination

Agency Comments

SHPO noted that its comments were provided as technical assistance during the EAW process and clarified that additional consultation could be required if future federal funding, permits, or licenses trigger review under Section 106 of the National Historic Preservation Act.

Project Response

The Applicant acknowledges SHPO's guidance regarding future coordination requirements and will continue to work with SHPO as appropriate if future project modifications or regulatory processes require additional cultural resource review.

Conclusion

The Applicant appreciates SHPO's continued review and constructive guidance throughout the cultural resources investigations. The completed archaeological and architectural history studies have helped shape the project in a manner that protects significant historic resources while allowing appropriate recreational reuse of the former quarry property. The Applicant remains committed to preserving the site's unique cultural heritage through thoughtful design, long-term stewardship, and continued coordination with SHPO as appropriate.



PLAN VIEW
Scale: 1 inch= 120 Ft.



TYPE XAA2 TYPE II MOUNT ON 10FT POLE (WITH 3FT DIRECT BUIRED)



TYPE XBB2 TYPE II MOUNT ON 16FT POLE (WITH 4FT DIRECT BURIED)



TYPE XWP - WALL PACK MOUNTED AT 10FT

Calculation Summary							
Label	CalcType	Units	Avg	Max	Min	Avg/Min	Max/Min
SITE GRUND	Illuminance	Fc	0.67	14.2	0.0	N.A.	N.A.

Luminaire Schedule

Symbol	Qty	Label	Arrangement	Description	LLF	Luminaire Lumens	Luminaire Watts
	128	XAA2	Single	STREETWORKS UTLD-PA1-50-827-U-T2U MOUNT ON VALMONT CMT TB13-B-50 POST TOP COLOR TBD 13FT POLE WITH 10FT MOUNT DIRECT BURIAL POLE	0.900	4929	54
	16	XBB2	Single	STREETWORKS UTLD-PA1-100-827-U-T2U MOUNT ON VALMONT CMT TB20-B-50 POST TOP-COLOR TBD 20FT POLE WITH 16FT MOUNT DIRECT BURIAL POLE	0.900	7603	96
	8	XWP	Single	RAB SLIM22-S-60 @30W3000K angle 0 MOUNT AT 10FT	0.900	4418	30.6

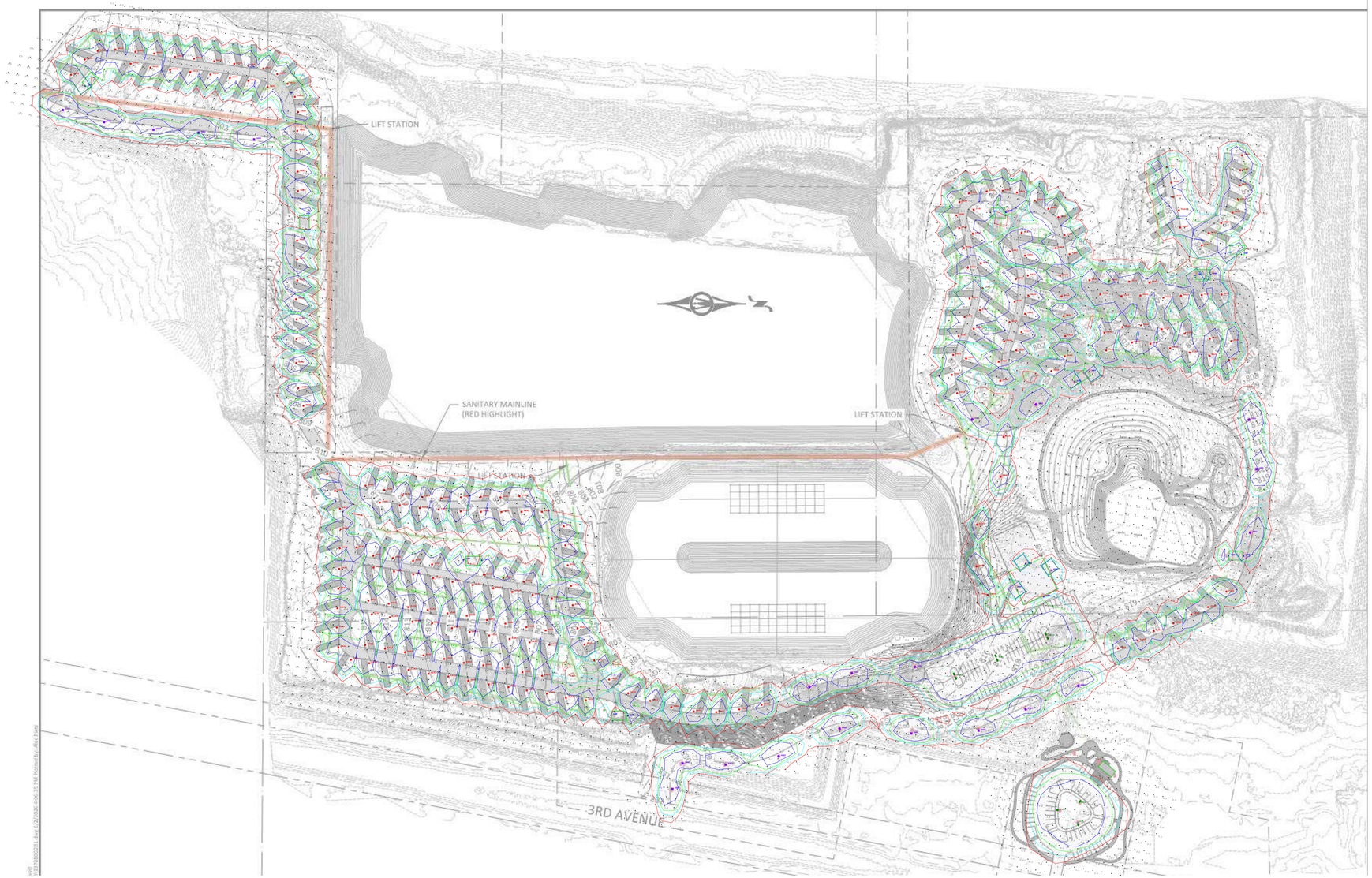
1. STANDARD REFLECTANCE OF 80/50/20 UNLESS NOTED OTHERWISE.
2. NOT A CONSTRUCTION DOCUMENT- FOR DESIGN PURPOSES ONLY.
3. STANDARD INDOOR CALC POINTS @ 30" AFF UNLESS NOTED OTHERWISE.
4. STANDARD OUTDOOR CALC POINTS @ GRADE UNLESS NOTED OTHERWISE.
5. EGRESS CALC POINTS @ 0'-0" AFF.
6. PHOTOMETRICS ARE ESTIMATED LIGHTING CALCULATIONS.
   VIKING ELECTRIC ASSUMES NO RESPONSIBILITY FOR INSTALLED LIGHT LEVELS DUE TO FIELD CONDITIONS.
7. VIKING ELECTRIC NOT RESPONSIBLE FOR FINAL REVIEW OF CODE REQUIREMENTS.

VIKING electric
A Sonepar Company

CUSTOMER: BLK ELECTRIC
CONTACT: DAN SCHULL
VE AM: MIKE SORENSON
DESIGNED BY: SANDY ANDERSON
Date:7/22/2026
Scale: AS NOTED

PHOTOMETRIC FLOOR PLAN

MANKATO RV PARK - SOUTH
MINNESOTA



PLAN VIEW
Scale: 1 inch= 120 Ft.



TYPE XAA2 TYPE II MOUNT ON 10FT POLE (WITH 3FT DIRECT BURIED)



TYPE XBB2 TYPE II MOUNT ON 16FT POLE (WITH 4FT DIRECT BURIED)



TYPE XCC MOUNT ON 25FT POLE (WITH 5FT DIRECT BURIED)



TYPE XWP - WALLPACK MOUNT AT 10FT

Calculation Summary							
Label	CalcType	Units	Avg	Max	Min	Avg/Min	Max/Min
SITE GRUND	Illuminance	Fc	0.76	18.6	0.0	N.A.	N.A.

Luminaire Schedule

Symbol	Qty	Label	Arrangement	Description	LLF	Luminaire Lumens	Luminaire Watts
	240	XAA2	Single	STREETWORKS UTLD-PA1-50-827-U-T2U MOUNT ON VALMONT CMT TB13-B-50 POST TOP COLOR TBD 13FT POLE WITH 10FT MOUNT DIRECT BURIAL POLE	0.900	4929	54
	22	XBB2	Single	STREETWORKS UTLD-PA1-100-827-U-T2U MOUNT ON VALMONT CMT TB20-B-50 POST TOP-COLOR TBD 20FT POLE WITH 16FT MOUNT DIRECT BURIAL POLE	0.900	7603	96
	3	XCC	Single	RAB A22-33T-150-120w-3000K SINGLE ARM MOUNT ON VALMONT CMT SB30-D-50 30FT POLE COLOR TBD WITH 25FT MOUNT DIRECT BURIAL POLE	0.900	17005	121
	3	XCC2	Back-Back	RAB A22-33T-150-120w-3000K 2@180 ARM MOUNT ON VALMONT CMT SB30-D-200 30FT POLE COLOR TBD WITH 25FT MOUNT DIRECT BURIAL POLE	0.900	17005	121
	22	XWP	Single	RAB SLIM22-S-60 @30W3000K angle 0 MOUNT AT 10FT	0.900	4418	30.6

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VIKING electric
A Sonepar Company

CUSTOMER: BLK ELECTRIC
CONTACT: DAN SCHULL
VE AM: MIKE SORENSON
DESIGNED BY: SANDY ANDERSON
Date:7/17/2026
Scale: AS NOTED

PHOTOMETRIC FLOOR PLAN

MANKATO RV PARK - NORTH
MINNESOTA

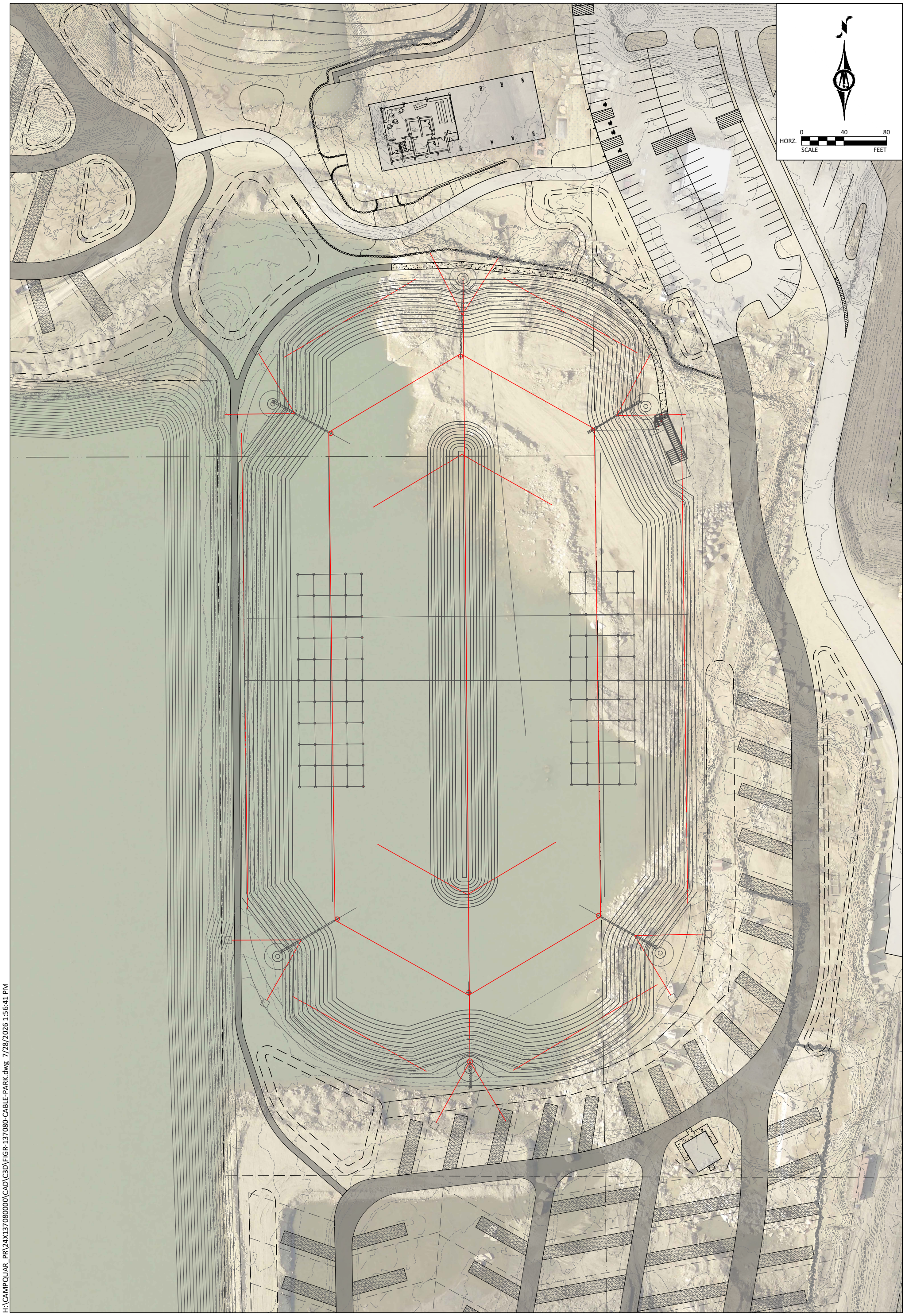
Rockwell RV & Adventure Park

Lime Township

Cable Park Figure

July 2026

BOLTON & MENK



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Rockwell RV & Adventure Park

Lime Township, Minnesota

Emergency Vehicle Movements

July 2026

BOLTON & MENK

GENERAL NOTES:
- A FIRE TRUCK MOVEMENT IS SHOWN FOR ALL VEHICLES
- MOVEMENTS THROUGH MAIN ROADWAYS ARE OMITTED AS KEY MOVEMENTS AT GENERALLY TIGHTER AREAS ARE SHOWN

N

0 60 120
HORZ. SCALE FEET

REVERSE OUT MOVEMENT REQUIRED

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Rockwell RV & Adventure Park

Lime Township, Minnesota

Emergency Vehicle Movements

July 2026

BOLTON & MENK

GENERAL NOTES:

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- MOVEMENTS THROUGH MAIN ROADWAYS ARE OMITTED AS KEY MOVEMENTS AT GENERALLY TIGHTER AREAS ARE SHOWN

HORZ. SCALE 0 60 120 FEET

REVERSE OUT MOVEMENT REQUIRED

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Rockwell RV & Adventure Park

Lime Township, Minnesota

Emergency Vehicle Movements

July 2026

BOLTON & MENK

GENERAL NOTES:
- A FIRE TRUCK MOVEMENT IS SHOWN FOR ALL VEHICLES
- MOVEMENTS THROUGH MAIN ROADWAYS ARE OMITTED AS KEY MOVEMENTS AT GENERALLY TIGHTER AREAS ARE SHOWN

HORZ. SCALE 0 60 120 FEET

3RD AVENUE

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Rockwell RV & Adventure Park

Lime Township, Minnesota

Emergency Vehicle Movements

July 2026

BOLTON & MENK

GENERAL NOTES:

- A FIRE TRUCK MOVEMENT IS SHOWN FOR ALL VEHICLES
- MOVEMENTS THROUGH MAIN ROADWAYS ARE OMITTED AS KEY MOVEMENTS AT GENERALLY TIGHTER AREAS ARE SHOWN

HORZ. SCALE 0 60 120 FEET

3RD AVENUE

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Rockwell RV & Adventure Park

Lime Township, Minnesota

Emergency Vehicle Movements

July 2026

BOLTON & MENK

GENERAL NOTES:
- A FIRE TRUCK MOVEMENT IS SHOWN FOR ALL VEHICLES
- MOVEMENTS THROUGH MAIN ROADWAYS ARE OMITTED AS KEY MOVEMENTS AT GENERALLY TIGHTER AREAS ARE SHOWN

N

0 60 120

HORZ. SCALE FEET

REVERSE OUT MOVEMENT REQUIRED

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July 3, 2026

CampQuarry, LLC
Kyle Kaldor
3301 Third Avenue
Mankato, Minnesota

Sent by E-mail only

RE: Pilgrims Rest Cemetery Lease

Hi Kyle:

This letter will confirm that Immanuel Evangelical Lutheran Church of Mankato, a Minnesota religious organization, has entered into a Lease with CampQuarry, LLC, a Minnesota limited liability company, for the rental of the ten (10) acres north of the existing Pilgrims Rest Cemetery for a minimum period of ten (10) years, through December 31, 2035. The initial rent payment has been made for the year 2026.

This Lease requires the placement of at least 55 camp sites on this parcel of land. This Lease may be renewed for subsequent ten (10) year periods. CampQuarry, LLC must provide proof of insurance each year and maintain a fence or barrier between this parcel and the existing Pilgrims Rest Cemetery.

I trust this will confirm that the Immanuel Evangelical Lutheran Church of Mankato is aware of this project and is cooperating with the basic idea of the project by renting this land to CampQuarry, LLC for the installation of camp sites on the Church's property.

Sincerely,

Karl O. Friedrichs
Vice President
Immanuel Evangelical Lutheran Church of Mankato
421 North Second Street
Mankato, Minnesota 56001

Outlook

Re: Rockwell RV & Adventure Park

From Bob Allen <boballen@arlingtonraceway.com>
Date Tue 7/28/2026 11:30 AM
To Kyle Kaldor <kyle@rockwelladventure.com>

Yes, I received the email. Kasota Fire appears to be the primary fire and rescue response agency. As you get closer to opening it may be best to have an onsite meeting to better understand your location as it relates to Kasota Fire Response planning.

Bob Allen
Kasota Fire
507-327-8416

On Mon, Jul 27, 2026 at 7:45 AM Kyle Kaldor <kyle@rockwelladventure.com> wrote:

> Hi Bob,
>
> Just wondering if you've had a chance to look at the last email I sent. We are submitting our permit application to the township tomorrow, so I'd like to get something from you by the end of the day today if possible. Just a quick response would be great if you could.
>
> Thanks,
> Kyle
>
> ---
>
> **From:** Kyle Kaldor <kyle@rockwelladventure.com>
> **Sent:** Wednesday, July 22, 2026 3:12 PM
> **To:** Bob Allen <boballen@arlingtonraceway.com>
> **Subject:** Re: Rockwell RV & Adventure Park
>
> Hi Bob,
>
> Thanks for the discussion this afternoon. As I mention, I've spoken to Jeff Bengtson at Mankato Public Safety and Jeff Wersal - Blue Earth County Sheriff and received letters acknowledging their responsibilities for emergency responses. If you could respond acknowledging the project and Kasota Fire Department's response actions for a call, that would be appreciated. If you would like to see the property closer to our expected open date of May/June 2027, please let me know.
>
> Thanks,
> Kyle Kaldor
>
> ---
>
> **From:** Kyle Kaldor <kyle@rockwelladventure.com>
> **Sent:** Monday, June 29, 2026 1:15 PM
> **To:** Bob Allen <boballen@arlingtonraceway.com>
> **Subject:** Re: Rockwell RV & Adventure Park

Outlook

RE: Commercial Recreation - Emergency Response

From Bengtson, Jeff <jbengtson@mankatomn.gov>
Date Fri 7/17/2026 11:17 AM
To Kyle Kaldor <kyle@rockwelladventure.com>
Cc Joe Holtmeier <jholtmeier@holtmeierinc.com>

Hi Kyle,
Thank you for the discussion today about the Rockwell project. To recap a few key points:

1. Kasota Fire Department is the primary responding department, but Mankato would certainly respond via mutual aid request from Kasota Fire under our Mutual Aid Agreement.
2. Your planned emergency vehicle access points appear sufficient.
3. We would recommend some equipment and ability for Rockwell staff to initiate a surface water rescue before first responders arrive. Maybe something like a life guard's surfboard would be appropriate. The Blue Earth County Sheriff's Office dive team would be the responding agency for an underwater rescue.
4. It would be helpful to identify campground zones (like North, Central, South) for responders to arrive more quickly.
5. It would be helpful for Mankato Fire (and other emergency response agencies) to tour the site closer to opening to review potential locations for technical rescue involving cliff areas. We would also welcome an opportunity to train on site.

Regards,
Jeff

Jeff Bengtson
Deputy Fire Chief/Assistant Director
Mankato Public Safety
710 S. Front Street
Mankato, MN 56001
507-387-8703
jbengtson@mankatomn.gov

Leading the way as a vibrant, diverse, regional community.
~Responsive ~Efficient ~Greater Good ~Innovative ~Open ~Neighborly

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Outlook

RE: (EXTERNAL)Rockwell RV & Adventure Park

From Jeff Wersal <Jeff.Wersal@blueearthcountymn.gov>
Date Thu 7/16/2026 7:52 AM
To Kyle Kaldor <kyle@rockwelladventure.com>; Paul Barta <Paul.Barta@blueearthcountymn.gov>

Kyle,

Thank you for the information on your project.

The Blue Earth County Sheriff's Office will be able to provide law enforcement services at the RV and Adventure Park. Please keep us informed on the status of the project. The Sheriff's Office has watercraft and a dive team and is responsible for water rescue operations in the county. We would like the opportunity to visit the site before it opens to the public to get a grasp on access points along the trails and to the bodies of water.

Jeff Wersal | Sheriff
Blue Earth County

From: Kyle Kaldor <kyle@rockwelladventure.com>
Sent: Wednesday, July 15, 2026 5:24 PM
To: Jeff Wersal <Jeff.Wersal@blueearthcountymn.gov>; Paul Barta <Paul.Barta@blueearthcountymn.gov>
Subject: (EXTERNAL)Rockwell RV & Adventure Park

CAUTION: This email originated from outside the BEC Network. Be aware that if the email contains links, use extreme caution before clicking. If the sender appears to be impersonating a coworker or department, report the email using the phishing alert button.

Hi Jeff and Paul,

We are working on a RV & Adventure Park just north of Mankato off 3rd Ave near the Pilgrims Rest Cemetery and Demolition Landfill. There will be a campground with about 300 campsites. We will have about 6 miles of mountain bike trails, mostly around the perimeter. There will be an Aqua Park, Cable Park, and Climbing walls.

I have attached a presentation that we used at a public open house meeting last week. In there you will see much more detail for the project.

I have also attached a letter from Jeff Bengston from Mankato Public Safety acknowledging their ability and willingness to respond if needed for technical rescue.

I'm wonderinf if you could provide a letter or email that we could include with our project application submittal acknowledging this project and that Blue Earth County Sheriff's Office would be able to provide law enforcement services. Please give me a call if you have any questions or want to talk about the project in any way.

Thanks,
Kyle Kaldor
Rockwell RV & Adventure Park
701-430-1312 (cell)

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