SITE PLAN AND TRAFFIC ADVISORY REVIEW COMMITTEE
Internal Staff Meeting
Minnesota Valley Room, First Floor, Intergovernmental Center
****

1. **SITE PLAN ITEMS**

1. CY16-26

Request of APX Construction, on behalf of 1531 Johnson, LLC., for a planned unit development for the installation of 3 new buildings, that contain a total of 84 residential units, in the R-2, one- and two-family dwelling zoning district. The subject properties are described as Lot 1, Block 2, Campus Cottages, and Outlot A, Campus Cottages subdivision (Blue Earth County PIDs R010920479029 and R010920479030).

2. CY17-26

Request of Bolton and Menk, on behalf of the owner, Tripoint Development, LLC., for a certificate of design compliance for the construction of two new structures in the Highway Gateway Overlay District. The subject properties are described as Lot 2 and Lot 3, Block 1, River Hills Mall Addition No. 3, (Blue Earth County PID's R010909426050 and R010909426049).

3. CY18-26

Request of Bolton and Menk, Inc., on behalf of the owner, M & J Property Holdings, LLC., for a planned unit development for a residential development containing 122 residential slab-on-grade dwellings. The subject properties are described as Lot 1, Block 2, and Lot 1, Block 3, Mesenbrink Subdivision (Blue Earth County PID R010915400007 and R010915400006).

4. CY19-26

Request of Brett Skilbred for an amended preliminary plat and final plat review of Quarry View Addition. The subject properties are described as Lots 1-6, Block 24, Germania Park Addition; Lots 1-8, Block 8 & Lots 1-2, Block 9, Columbia Park Addition; and the vacated portion of Lind Street.

5. CY20-26

Request of Southwest Minnesota Housing Partnership for a preliminary and final plat review of Good Counsel Hill subdivision, for a conditional use permit to accommodate more than one building on a single lot on a property zoned O-R, Office Residential, a planned unit development to establish and allow mixed uses within the subject development, and to amend the Institutional Overlay District to allow for an updated campus development plan to include the addition of parking and re-use of existing spaces located within the current structures on the existing campus. The subject property is described as Outlot B, School Sisters of Notre Dame Subdivision, according to the plat thereof on file at the County Recorder's Office, Blue Earth County, Minnesota (170 Good Counsel Drive, BE County PID's R010905379005, R010908201007).

6. *****FOR INFORMATION ONLY. Request of the Planning Agency to amend Chapter 10 of Mankato City Code related to parkland dedication ordinances.**

7. *****FOR INFORMATION ONLY. Request of the Planning Agency to review Chapter 10 of Mankato City Code related to temporary signage ordinances.**

2. **TRAFFIC ITEMS**

Meeting Date: 04/14/2026

Title

CY16-26

Request of APX Construction, on behalf of 1531 Johnson, LLC., for a planned unit development for the installation of 3 new buildings, that contain a total of 84 residential units, in the R-2, one- and two-family dwelling zoning district. The subject properties are described as Lot 1, Block 2, Campus Cottages, and Outlot A, Campus Cottages subdivision (Blue Earth County PIDs R010920479029 and R010920479030).

Applicant

The applicant is APX Construction Group, on behalf of 1531 Johnson, LLC.

Request

The applicant is seeking review for a planned unit development that would include the construction of three buildings for a multifamily development.

In addition to the PUD request, the applicant is seeking that the development not be subject to the 25% rental density ordinance.

Location

The subject properties are located on the Eastern side of Pohl Rd and are described as Lot 1, Block 2, Campus Cottages, and Outlot A, Campus Cottages subdivision.

Existing Land Use

The existing land use is identified as Medium Density Residential. The property is currently sitting vacant.

Zoning

The property is zoned R-2, One and Two Family Dwelling District.

Environmentally Sensitive Areas

There are identified wetlands onsite. The applicant will need to submit a No Loss Application.

Public Utilities

The property is not currently served by public utilities. The applicant will need to pay WAC and SAC fees for connections.

City Code

The City Code pertaining to the R-2, One and Two Family Dwelling District may be viewed at the following link.

https://library.municode.com/mn/mankato/codes/code_of_ordinances?nodeId=PTIICOOR_CH10LAUSDE_ARTIIREDI_DIV4OMIDWDI

Review

The applicant is seeking review for a planned unit development that would include the construction of three buildings for a multifamily development.

The subject properties are located on the eastern side of Pohl Road. A stormwater pond is proposed to accommodate onsite water treatment. The existing wetland areas located on the eastern side of the property are not proposed to be impacted.

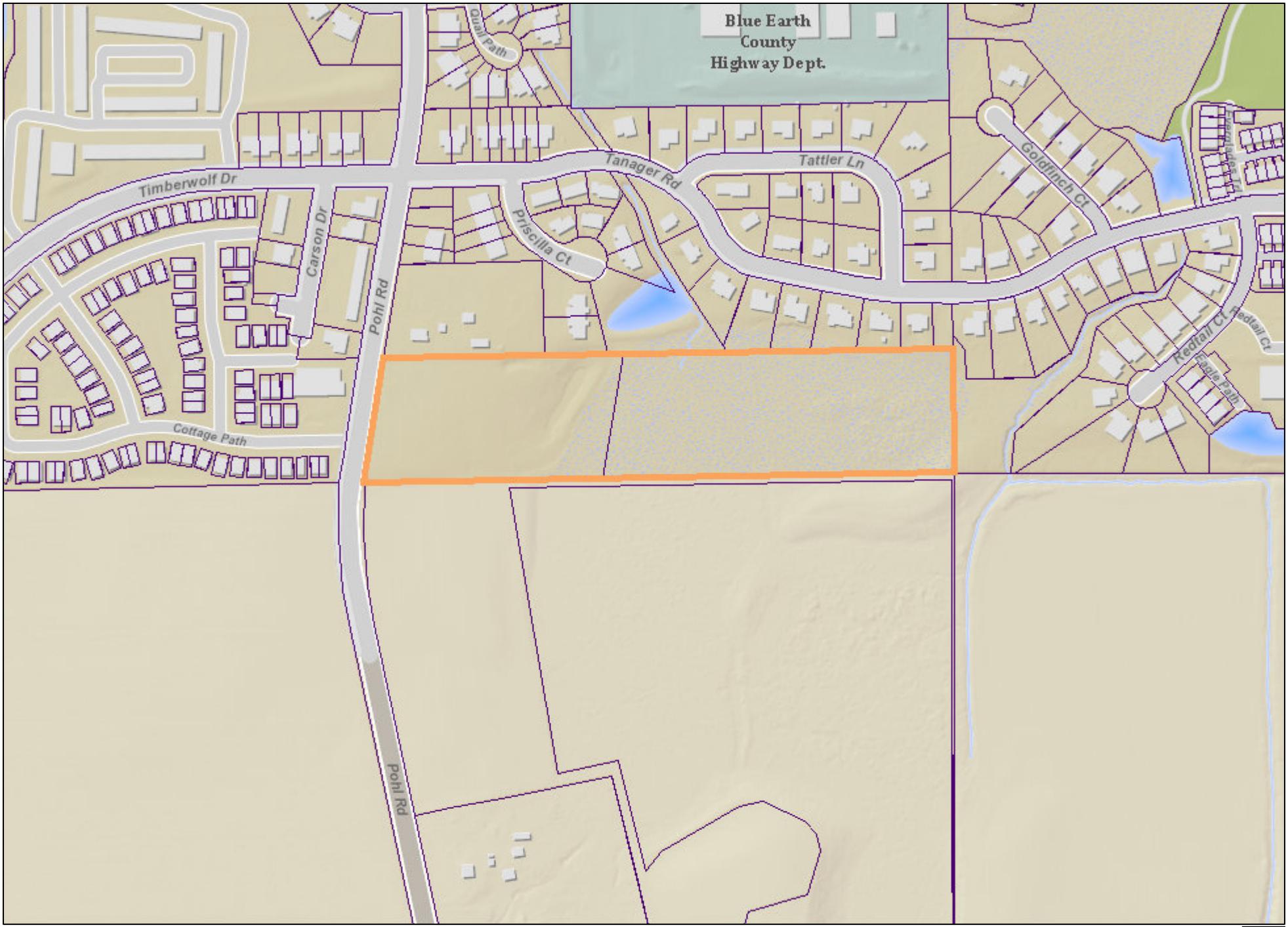
Floor plans show 84 units between the three buildings with a mix of unit configurations. Proposed finishes on the structures are shown to be a mix of siding configurations in earth-tone colorways. A dog run and patio amenity area are shown along Pohl Road.

Attachments

General Location Map
Aerial Plan
Site Plan
Civil Plans
Architectural Plans
Wetland No Loss Application

Stormwater Memo
Traffic Memo
Administrative Land Combination

General Location Map



Date: March 2026

Author:

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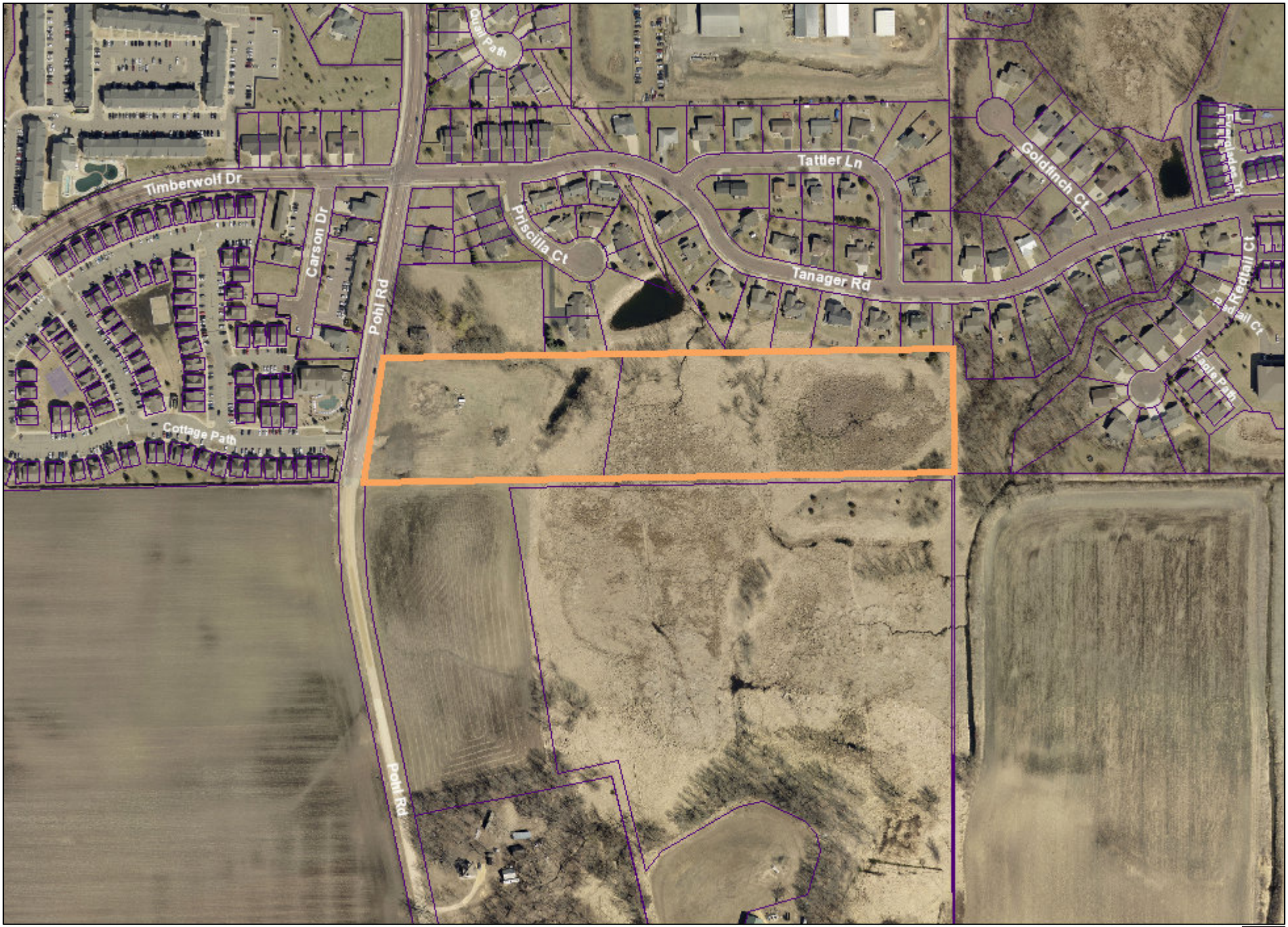
Aerial



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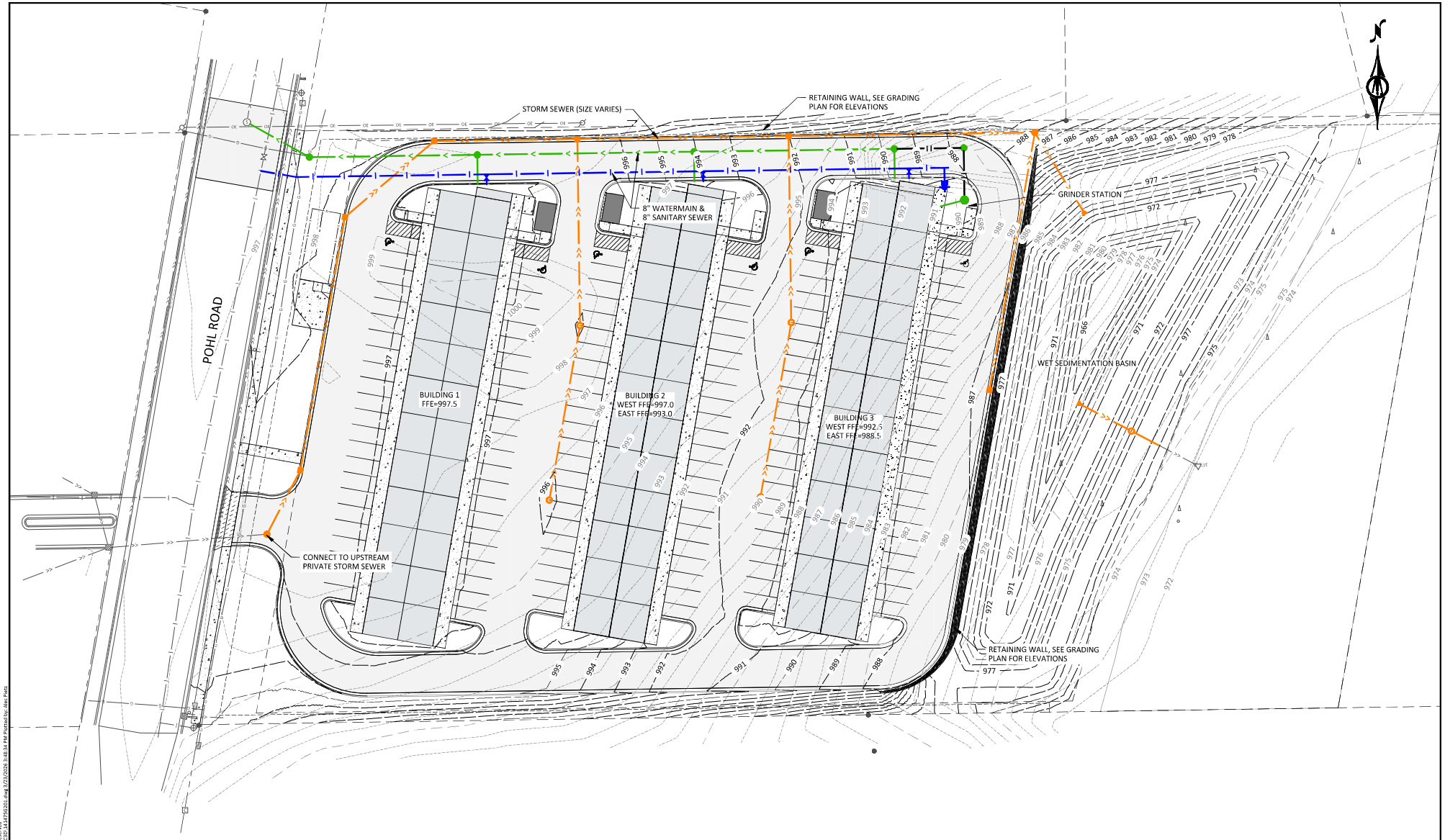

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SCALE FEET

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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
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CLIENT PROJ. NO.	25X.141475			

POHL TOWNHOMES LLC
POHL LOFTS
PROJECT OVERVIEW

SHEET G1.01

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POHL TOWNHOMES LLC

CONSTRUCTION PLANS FOR

POHL LOFTS

SITE GRADING, UTILITIES, STORMWATER MANAGEMENT, PAVEMENT CONSTRUCTION

MARCH 2026



MAP OF THE
CITY OF MANKATO
BLUE EARTH COUNTY, MN

0 400 800
SCALE FEET

SHEET NUMBER	SHEET TITLE
GENERAL	
G0.01	TITLE SHEET
G0.02	LEGEND
G1.01	PROJECT OVERVIEW
CIVIL	
C0.01	EXISTING CONDITIONS & REMOVAL PLAN
C1.01 - C1.04	CONSTRUCTION DETAILS
C2.01 - C2.06	STORMWATER POLLUTION PREVENTION PLAN
C3.01 - C3.04	GRADING PLAN
C4.01 - C4.03	UTILITY PLAN
C5.01	SITE PLAN
L1.01	PLANTING PLAN

THIS PLAN SET CONTAINS 23 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 UNLESS OTHERWISE NOTED. THIS UTILITY LEVEL WAS DETERMINED ACCORDING TO THE GUIDELINES OF CI/ASCE 38-22, ENTITLED "STANDARD GUIDELINES FOR THE COLLECTION AND DEPICTION OF EXISTING SUBSURFACE UTILITY DATA."

PROJECT DATUM: BLUE EARTH COUNTY
HORIZONTAL: 2011 COUNTY COORDINATES
VERTICAL: NAVD 1988

RECORD DRAWING INFORMATION
OBSERVER:
CONTRACTOR:
DATE:

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POHL TOWNHOMES LLC
POHL LOFTS
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
- 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 ON POLE
- LIGHT-GROUND
- MAILBOX
- MANHOLE-COMMUNICATION
- MANHOLE-ELECTRIC
- MANHOLE-GAS
- MANHOLE-HEAT
- MANHOLE-SANITARY SEWER
- MANHOLE-STORM SEWER
- MANHOLE-UTILITY
- MANHOLE-WATER
- METER
- ORDER MICROPHONE
- PARKING METER
- PAVEMENT MARKING
- PEDESTAL-COMMUNICATION
- PEDESTAL-ELECTRIC
- PEDESTRIAN PUSH BUTTON
- PICNIC TABLE
- POLE-UTILITY
- POLE-BRACE
- POST
- RAILROAD SIGNAL POLE
- REGULATION STATION GAS
- SATELLITE DISH
- SIGN NON TRAFFIC
- 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

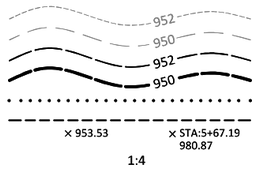
EXISTING UTILITY LINES

- FORCEMAIN
- SANITARY SEWER
- SANITARY SERVICE
- STORM SEWER
- STORM SEWER DRAIN TILE
- WATERMAIN
- WATER SERVICE

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

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- 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 38-02.

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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POHL TOWNHOMES LLC
POHL LOFTS
LEGEND

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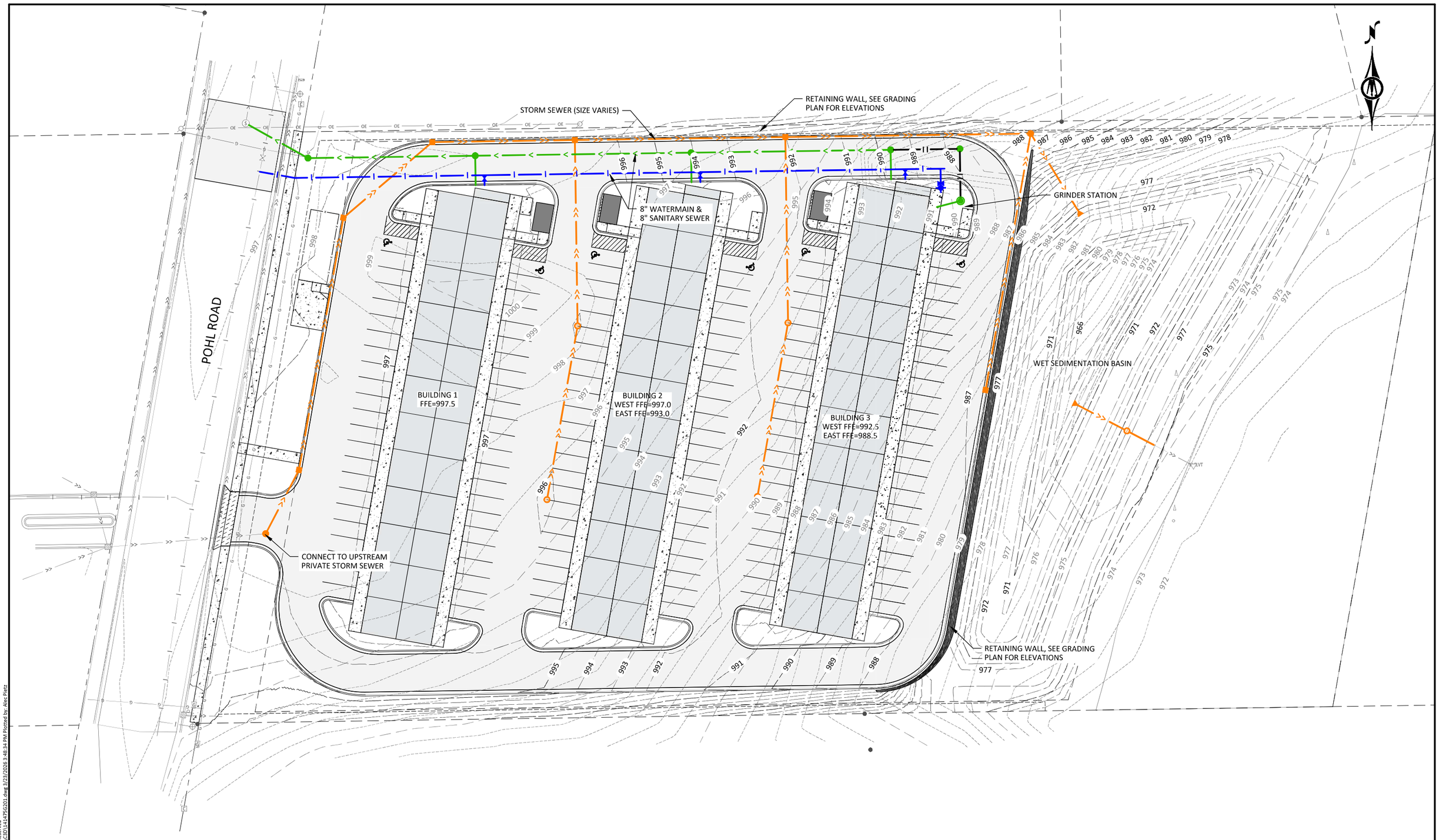

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POHL TOWNHOMES LLC
POHL LOFTS
PROJECT OVERVIEW

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REMOVE CONCRETE DRIVEWAY

REMOVE GRAVEL DRIVEWAY

REMOVE CURB & GUTTER AND PAVEMENT AS NECESSARY FOR UTILITY INSTALLATION. ALL REPLACEMENTS SHALL MATCH EXISTING. COORDINATE TRAFFIC CONTROL AND ROAD CLOSURE WITH THE CITY OF MANKATO.

REMOVE STORM MANHOLE

REMOVE & REPLACE UNDERDRAIN AS NECESSARY. MATCH EXISTING MATERIAL AND SIZE.

REMOVE STORM SEWER

POHL ROAD

EXISTING STORMWATER BASIN (INCIDENTAL WETLAND)

DELINEATED WETLAND & 16.5-FT BUFFER

REMOVE STORM MANHOLE & PIPE

REMOVE C&G FOR NEW DRIVEWAY. PATCH ADJACENT PAVEMENT AS NECESSARY.

RELOCATE ABOVE GROUND PRIVATE UTILITIES AS NECESSARY

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POHL TOWNHOMES LLC

POHL LOFTS

EXISTING CONDITIONS & REMOVAL PLAN

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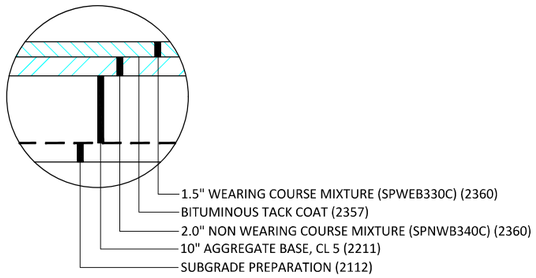
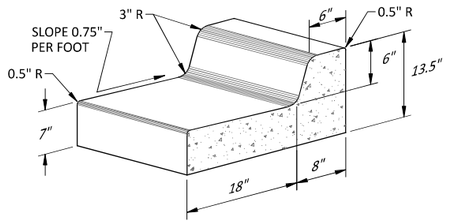
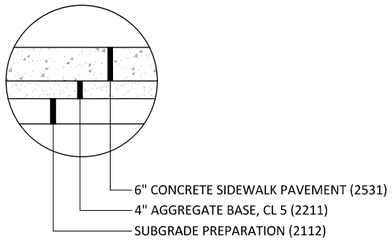


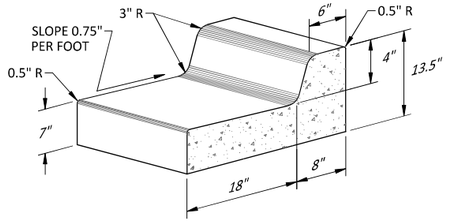
BITUMINOUS PAVEMENT SECTION
NOT TO SCALE



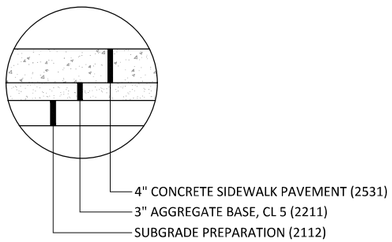
CONCRETE CURB & GUTTER
DESIGN B618
NOT TO SCALE



6" CONCRETE WALK
NOT TO SCALE



CONCRETE CURB & GUTTER
DESIGN B418
NOT TO SCALE



4" CONCRETE WALK
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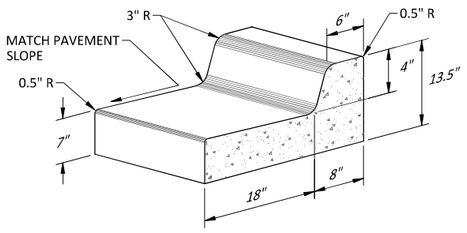
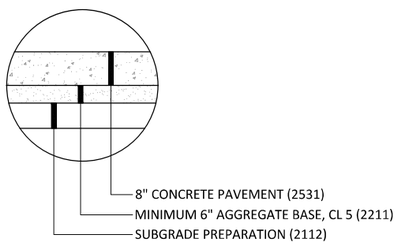
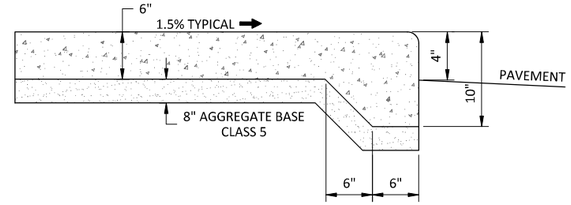


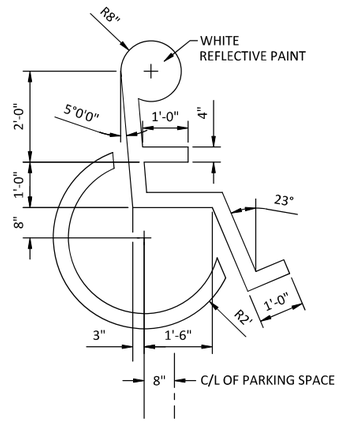
CONCRETE CURB & GUTTER
DESIGN B418, GUTTER OUT
NOT TO SCALE



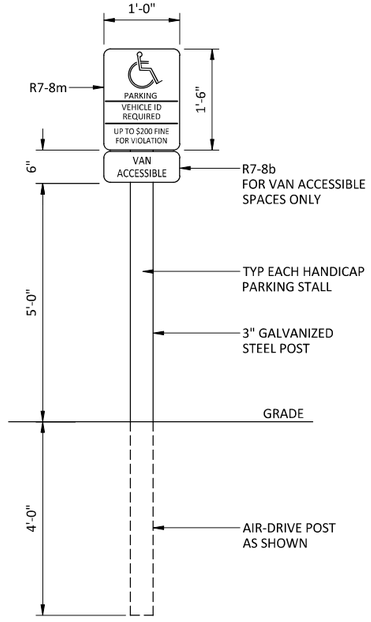
8" CONCRETE DRIVEWAY
NOT TO SCALE



THICKENED EDGE
CONCRETE SIDEWALK
NOT TO SCALE



INTERNATIONAL
ACCESSIBLE SYMBOL
NOT TO SCALE



ACCESSIBLE PARKING SIGN
NOT TO SCALE

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NOT FOR CONSTRUCTION

ALEC W. PIETZ, P.E.
LIC. NO. 59617 DATE XX/XX/XXXX

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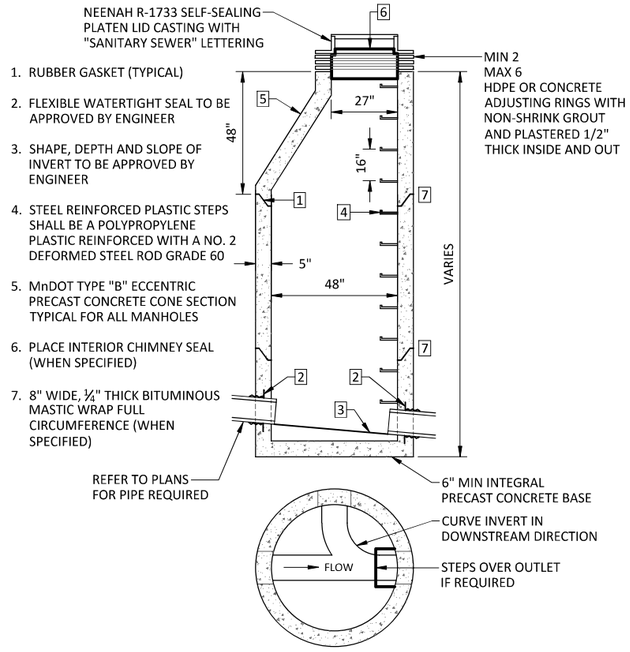
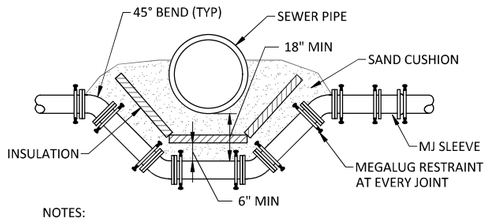
POHL TOWNHOMES LLC
POHL LOFTS
SURFACE CONSTRUCTION DETAILS

SHEET
C1.01

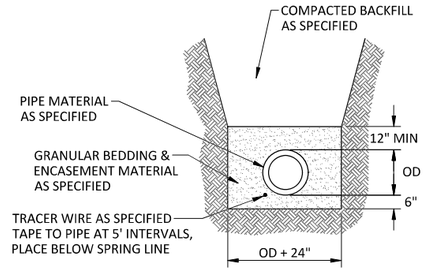


SANITARY MANHOLE (MNDOT DESIGN 4007C)
NOT TO SCALE



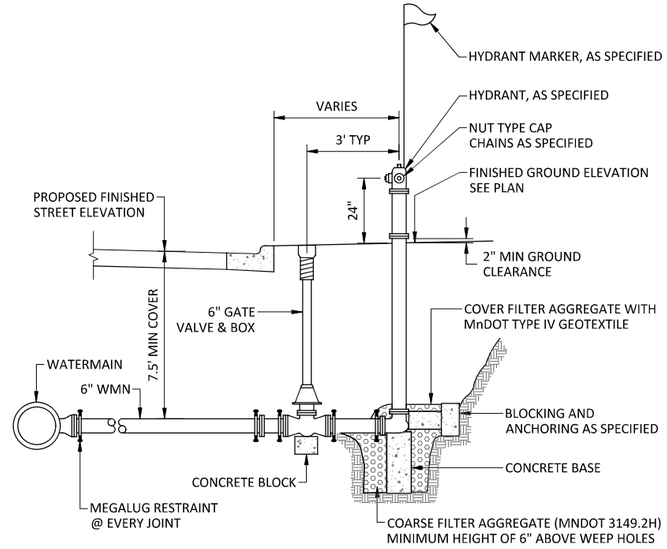
NOTES:
1. PROVIDE MEGALUG RESTRAINT AT JOINT ON BENDS AND AS SHOWN THIS DETAIL
2. COAT ALL ANCHORAGE AS PER SPECS
3. PROVIDE SAND CUSHION BETWEEN TOP OF WATERMAIN AND BOTTOM OF SEWER PIPE, MIN DIMENSIONS AS SHOWN THIS DETAIL (INCIDENTAL)
4. INSULATION TO BE 2" THICK POLYSTYRENE (IF NECESSARY, INCIDENTAL)

WATERMAIN OFFSET
NOT TO SCALE



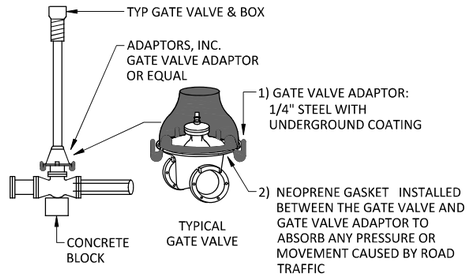
PVC WATERMAIN TRENCH
NOT TO SCALE

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

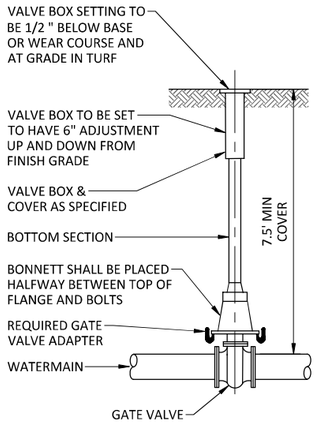


HYDRANTS LOCATED WHERE THE GROUNDWATER TABLE IS ABOVE THE DRAIN OUTLET SHALL HAVE THE OUTLET DRAIN PLUGGED AND SHALL BE EQUIPPED WITH A TAG STATING "PUMP AFTER USE"

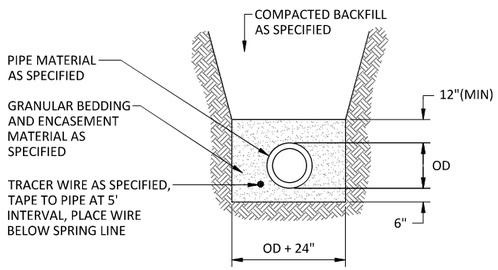
HYDRANT INSTALLATION, MEGALUGS
NOT TO SCALE



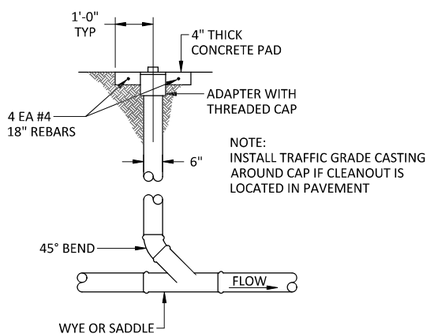
GATE VALVE ADAPTOR
NOT TO SCALE



GATE VALVE BOX INSTALLATION
NOT TO SCALE



NON-RIGID SANITARY SEWER TRENCH
NOT TO SCALE



SANITARY SEWER CLEANOUT
NOT TO SCALE

TRACER WIRE NOTE:
REFER TO THE MINNESOTA RURAL WATER ASSOCIATION (MRWA) TRACER WIRE SPECIFICATION GUIDE & DETAILS TO PROPERLY INSTALL TRACER WIRE WITH WATERMAIN AND SANITARY SEWER. THE GUIDE CAN BE FOUND AT: mrwa.com/tools.html - Tracer Wire Specification Guide & Details

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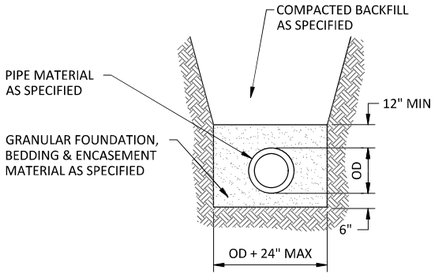
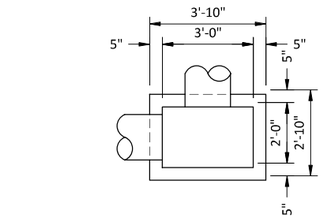
POHL TOWNHOMES LLC
POHL LOFTS
WATERMAIN & SANITARY SEWER DETAILS

SHEET C1.02

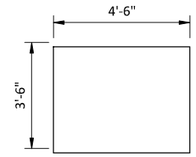


NON-RIGID STORM SEWER TRENCH

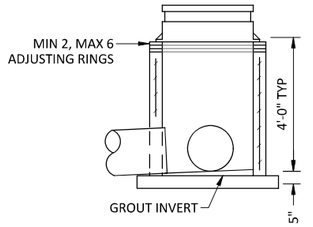
NOT TO SCALE



CATCH BASIN PLAN



BASE SLAB PLAN



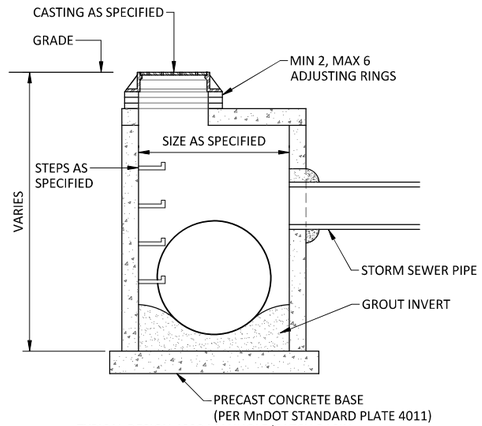
SECTION

NOTES:

1. CASTING PER CONSTRUCTION DOCUMENTS
2. PIPE CUT-OUTS PER CONSTRUCTION DOCUMENTS
3. ALTERNATE CAST-IN-PLACE BASE CAN BE USED
4. MIN REINFORCING SHALL BE WIRE FABRIC HAVING AN AREA OF NOT LESS THAN 0.12 SQ IN PER FOOT IN BOTH DIRECTIONS

CATCH BASIN STRUCTURE
DESIGN R-1 (2'x3')

NOT TO SCALE

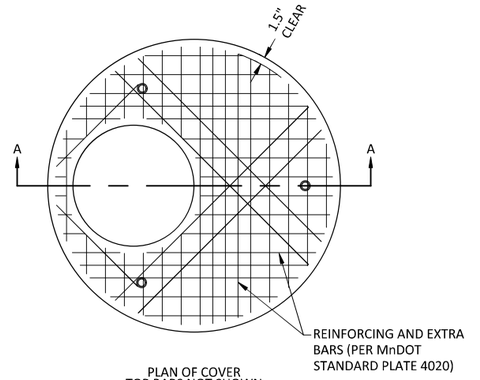


TYPICAL DESIGN 4020 MANHOLE/CATCH BASIN

NOTES:

1. AASHTO HS 25 LOADING MAX FILL HEIGHT 15'
2. THE # 4020 SHALL BE PERMANENTLY MARKED ON THE TOP COVER
3. EQUIVALENT STEEL AREAS IN WIRE MESH MAY BE USED
4. REINFORCEMENT PER SPEC 3301, GRADE 60 A SINGLE HOOP OF 8ga STEEL WIRE

DESIGNATION:
DESIGN DIAMETER - STANDARD PLATE #
DESIGN 48-4020

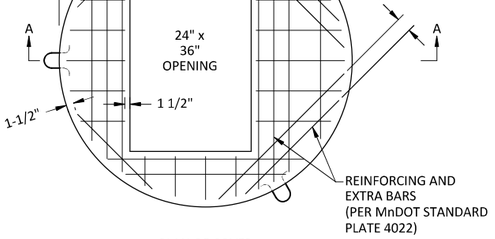


PLAN OF COVER
TOP BARS NOT SHOWN

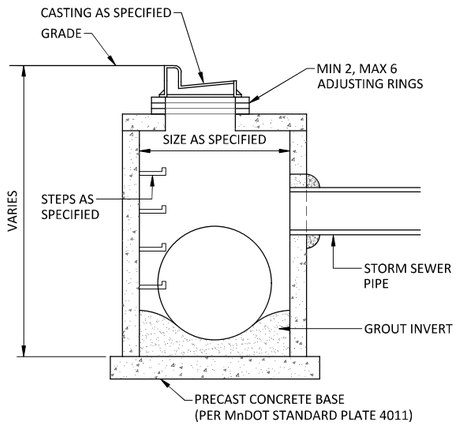
SECTION A-A

STORM SEWER STRUCTURE DESIGN 4020

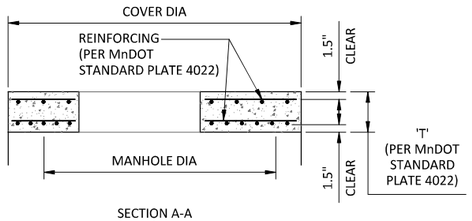
NOT TO SCALE



PLAN OF COVER
TOP BARS NOT SHOWN



TYPICAL DESIGN 4022 CATCH BASIN



SECTION A-A

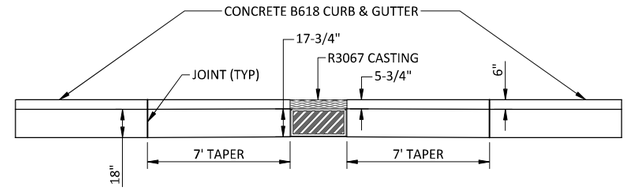
NOTES:

1. AASHTO HS 25 LOADING MAX FILL HEIGHT 15'
2. THE # 4022 SHALL BE PERMANENTLY MARKED ON THE TOP COVER
3. EQUIVALENT STEEL AREAS IN WIRE MESH MAY BE USED
4. REINFORCEMENT PER SPEC 3301, GRADE 60 A SINGLE HOOP OF 8ga STEEL WIRE

DESIGNATION:
DESIGN DIAMETER - STANDARD PLATE #
DESIGN 48-4020

STORM SEWER STRUCTURE DESIGN 4022

NOT TO SCALE



CATCHBASIN - CURB DETAIL FOR R-3067
IN "B" STYLE CURB

NOT TO SCALE

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POHL LOFTS
STORM SEWER DETAILS

SHEET
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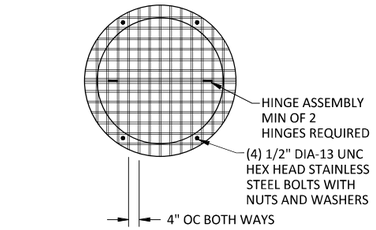
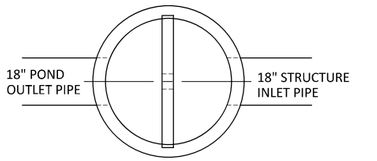
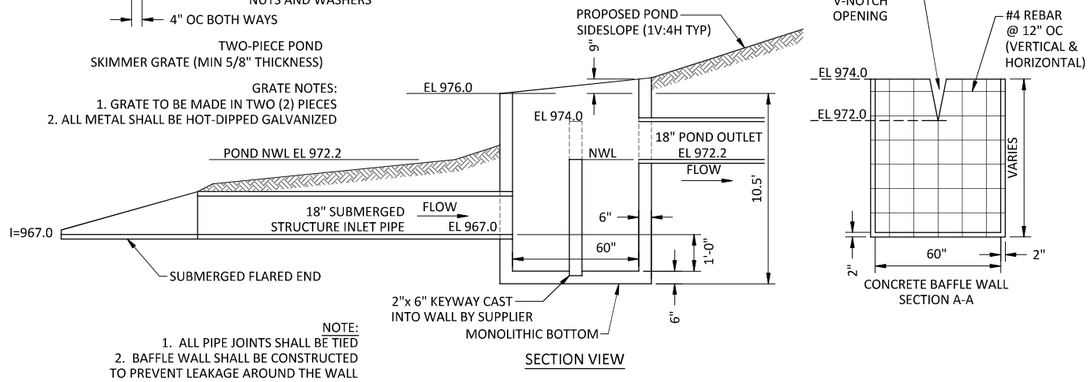


TWO-PIECE POND
SKIMMER GRATE (MIN 5/8" THICKNESS)

GRATE NOTES:
1. GRATE TO BE MADE IN TWO (2) PIECES
2. ALL METAL SHALL BE HOT-DIPPED GALVANIZED





SECTION VIEW

CONCRETE BAFFLE WALL
SECTION A-A

NOTE:
1. ALL PIPE JOINTS SHALL BE TIED
2. BAFFLE WALL SHALL BE CONSTRUCTED TO PREVENT LEAKAGE AROUND THE WALL

OUTFALL CONTROL STRUCTRE

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POHL LOFTS
STORM SEWER DETAILS

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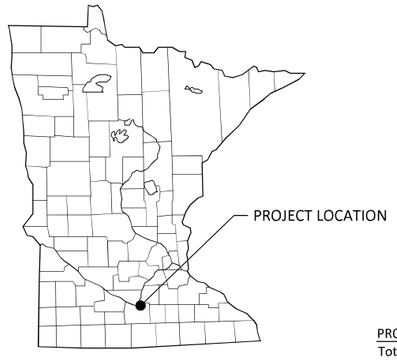
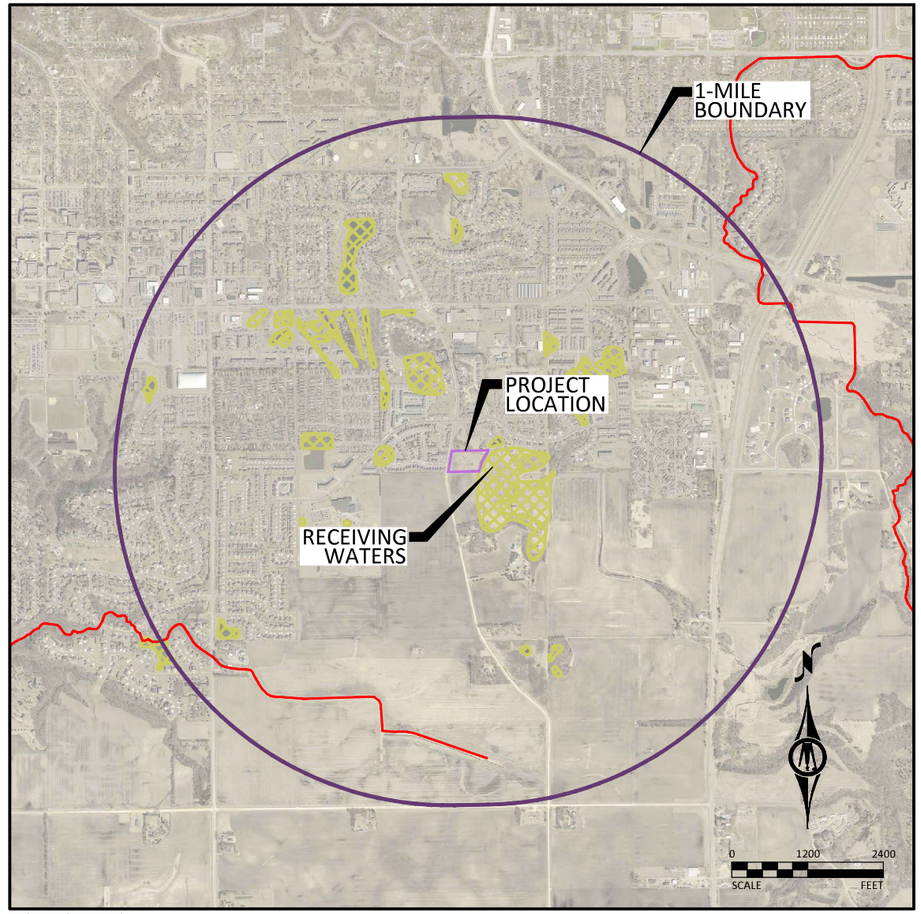
STORMWATER POLLUTION PREVENTION PLAN (SWPPP)

POHL TOWNHOMES LLC
POHL LOFTS
BLUE EARTH COUNTY, MINNESOTA



LEGEND

- 1-MILE BOUNDARY
- PROJECT BOUNDARY
- IMPAIRED 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:	Pohl Townhomes LLC	Ryan Evenson	507-387-6836
SWPPP DESIGNER:	Bolton & Menk, Inc.	Alec Pietz, P.E.	507-625-4171
CONTRACTOR:	TBD	TBD	TBD
CONSTRUCTION SWPPP MANAGER:	TBD	TBD	TBD
PARTY RESPONSIBLE FOR LONG TERM O&M:	Pohl Townhomes LLC	Ryan Evenson	507-387-6836

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) =	3.7	ACRES
Existing area of impervious surface =	0.0	ACRES
Post construction area of impervious surface =	2.7	ACRES
Total new impervious surface area created =	2.7	ACRES

Planned Construction Start Date:	Spring 2026
Estimated Construction Completion Date:	Summer 2027

PERMANENT STORMWATER MANAGEMENT SYSTEM:
Type of storm water management used if more than 1 acre of new impervious surface is created:

X	Wet Sedimentation Basin
	Infiltration/Filtration
	Regional Pond
	Permanent Stormwater Management Not Required

PROJECT LOCATION:

COUNTY	TOWNSHIP	RANGE	SECTION	LATITUDE	LONGITUDE
BLUE EARTH	T108N	R26W	20	44.1383° N	93.9741° W

BMP SUMMARY	QUANTITY	UNIT
STORM DRAIN INLET PROTECTION	12	EACH
STABILIZED CONSTRUCTION EXIT	1	EACH
PERIMETER CONTROL	2150	LIN FT
SEED MIX 25-151, FERTILIZER, & ROLLED EROS. PREV. CAT. 20	0.75	ACRE
SEED MIX 33-261, FERTILIZER, & ROLLED EROS. PREV. CAT. 20	0.25	ACRE
NOTE: QUANTITIES LISTED ACCOUNT FOR ONE INSTALLATION. ADDITIONAL INSTALLATIONS REQUIRED BY MAINTENANCE AND/OR PHASING SHALL BE CONSIDERED INCIDENTAL.		

DESCRIPTION OF CONSTRUCTION ACTIVITIES AND STORMWATER MANAGEMENT:
Construction activities include: Site grading, building construction, pavements, utility installation, stormwater management, and temporary and permanent stablization. Three residential buildings with a total of 84 units is proposed with this project.

A portion of stormwater is routed via private storm sewer from a parcel west of Pohl Road and to an existing onsite stormwater basin. The stormwater basin then discharges to the adjacent wetland. The development property generally drains south and east to adjacent property and the wetland.

After development, the existing drainage west of Pohl Road will continue to be routed through the site with new storm sewer that accommodates the existing and proposed development. The storm sewer will discharge to a newly constructed stormwater basin that replaces the existing one, bringing the existing development into current compliance and satisfying the requirements of the new development. The existing outfall pipe to the wetland will be connected to, and no disturbance to the wetland is proposed.

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]
Unnamed Wetland	Wetland	No	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) Remove existing surfaces as required.
4) Complete site and utility improvements.
5) Install additional inlet protection as needed.
6) Reestablish turf.
7) Repeat steps 2-6 as necessary throughout the project.
8) Add additional temporary BMPs as necessary during construction based on inspection reports.
9) Ensure final stabilization measures are complete.
10) Provide digital copy of all Field SWPPP Documentation including Inspection Reports and SWPPP Revisions to the Owner.
11) 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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NOT FOR CONSTRUCTION
ALEC W. PIETZ, P.E.
LIC. NO. 59617 DATE XX/XX/XXXX

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DESIGNED	NO.	ISSUED FOR	DATE
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DRAWN AWP			
CHECKED AWP			
CLIENT PROJ NO. 25X.141475			

POHL TOWNHOMES LLC
POHL LOFTS
STORMWATER POLLUTION PREVENTION PLAN
PROJECT INFORMATION & LOCATION MAP

SHEET C2.01

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

Alec W. Pietz

Design of Construction SWPPP (May 31 2027)

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ALEC W. PIETZ, P.E.
LIC. NO. 59617 DATE XX/XX/XXXX

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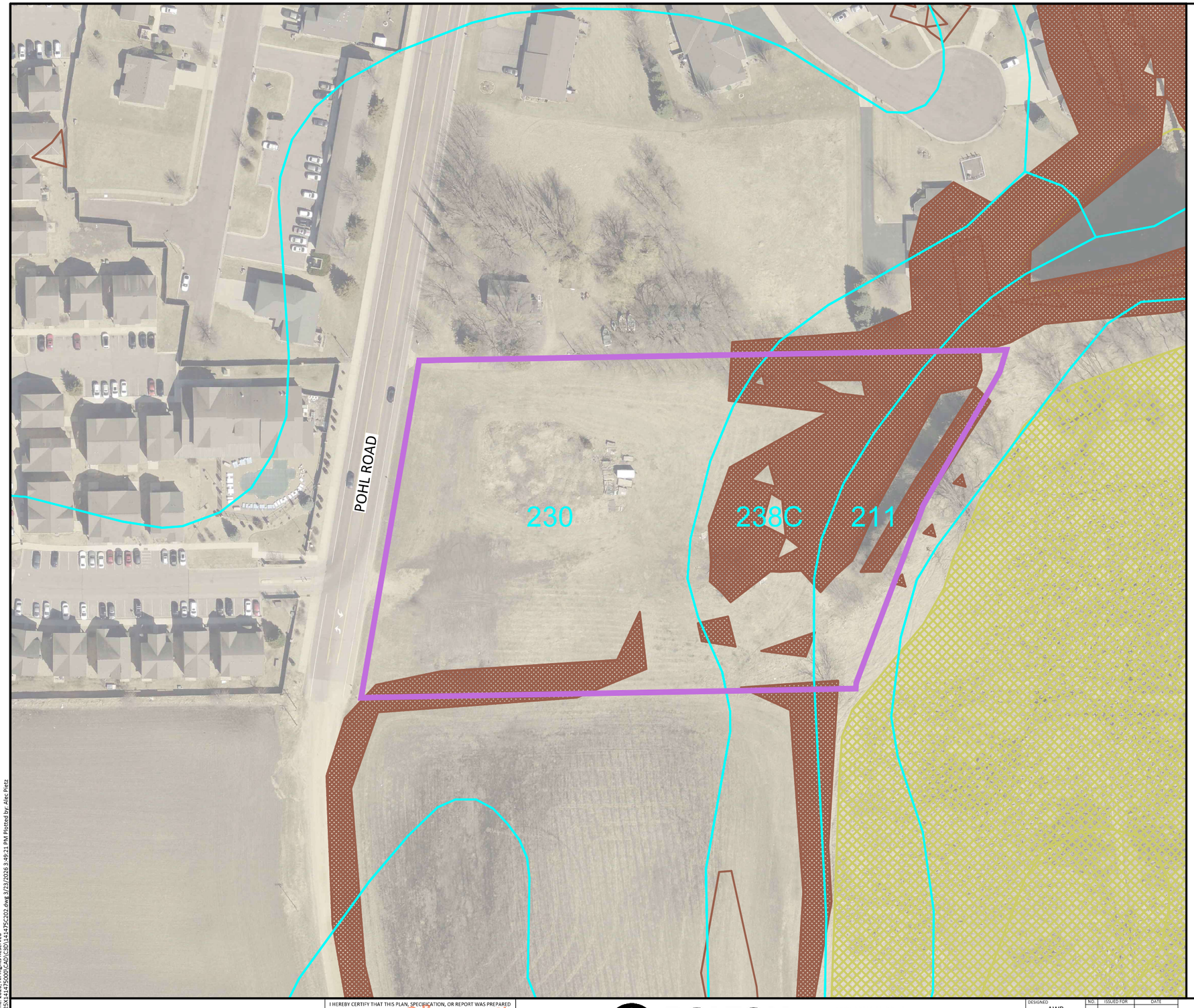
CLIENT PROJ. NO.	25X.141475

NO.	ISSUED FOR	DATE

POHL TOWNHOMES LLC
POHL LOFTS
STORMWATER POLLUTION PREVENTION PLAN
NARRATIVE

SHEET
C2.02



LEGEND

- PROJECT BOUNDARY
- SOIL TYPE
- STEEP SLOPES (>33.3%)
- NATIONAL WETLANDS INVENTORY

N

0 50 100
SCALE FEET

SOIL TYPE SUMMARY

Map Unit Symbol	Soil Name	Hyd. Soil Group	Erodibility
MUSYM	MUNAME	HYDGRP	MUHELCL
211	Lura Silty Clay	C/D	NHEL
230	Guckeen silty clay loam, 1 to 3 percent slopes	C/D	NHEL
238C	Kilkenny clay loam, 6 to 10 percent slopes, moderately eroded	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

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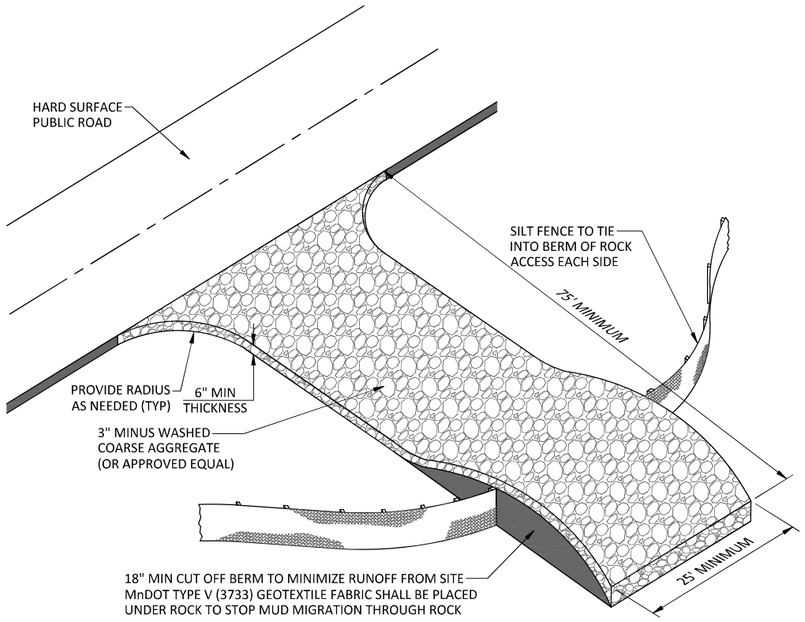
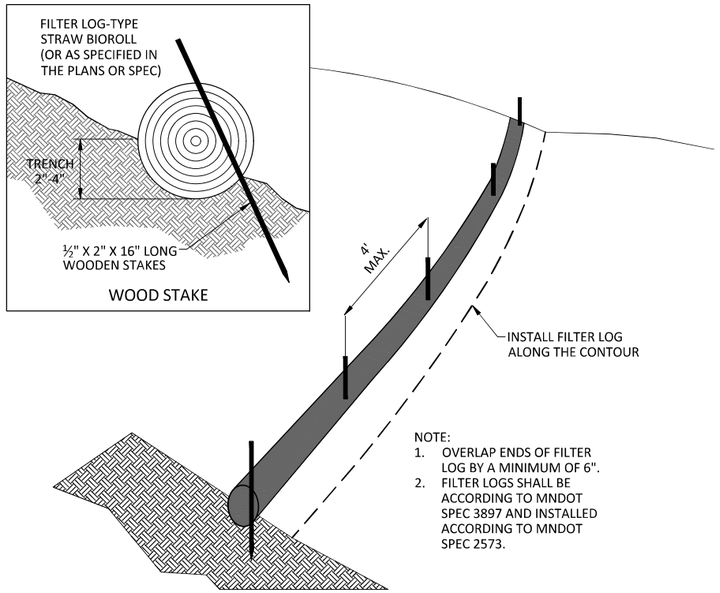
POHL TOWNHOMES LLC
POHL LOFTS
STORMWATER POLLUTION PREVENTION PLAN
SITE & SOILS MAP

SHEET C2.03



ROCK CONSTRUCTION ENTRANCE

NOT TO SCALE



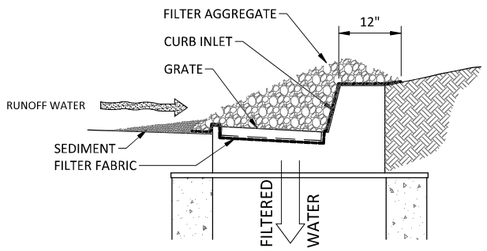
NOTE:
1. OVERLAP ENDS OF FILTER LOG BY A MINIMUM OF 6".
2. FILTER LOGS SHALL BE ACCORDING TO MNDOT SPEC 3897 AND INSTALLED ACCORDING TO MNDOT SPEC 2573.

PERIMETER PROTECTION-FILTER LOG

NOT TO SCALE

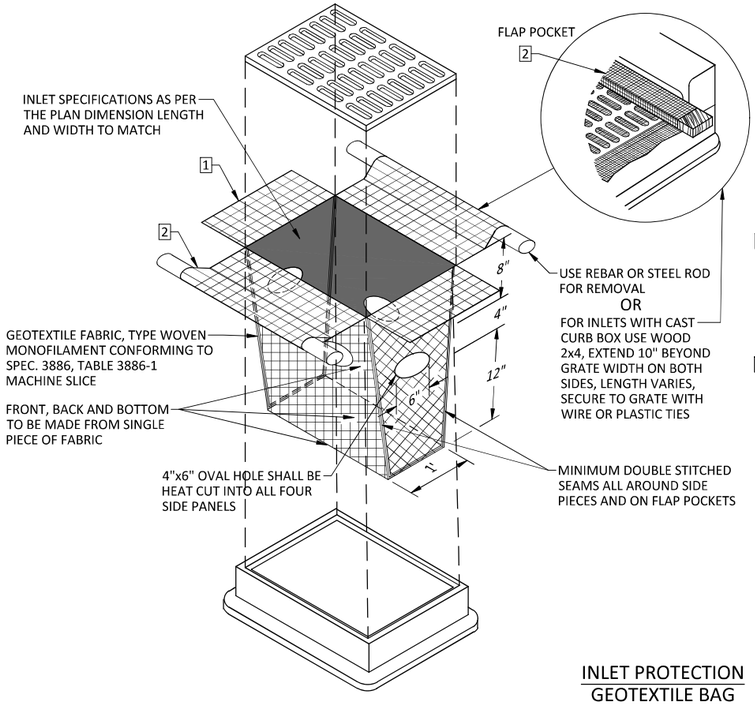
NOTES:

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

NOT TO SCALE



INLET PROTECTION GEOTEXTILE BAG

NOT TO SCALE

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.

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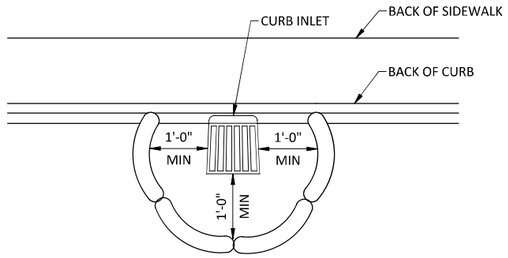
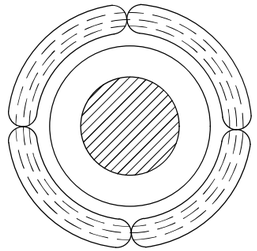
POHL TOWNHOMES LLC
POHL LOFTS
STORMWATER POLLUTION PREVENTION PLAN
BEST MANAGEMENT PRACTICE DETAILS

SHEET
C2.04



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

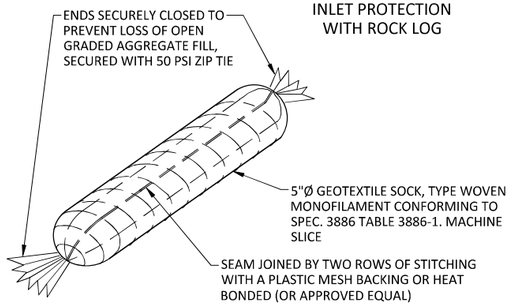


INLET PROTECTION
WITH ROCK LOG

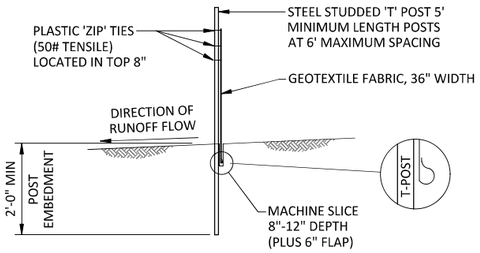
FILL ROCK LOG WITH 45 LBS. OF OPEN GRADED AGGREGATE CONSISTING OF SOUND, DURABLE PARTICLES OF CRUSHED QUARRY ROCK OR GRAVEL CONFORMING TO THE FOLLOWING GRADATION.

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

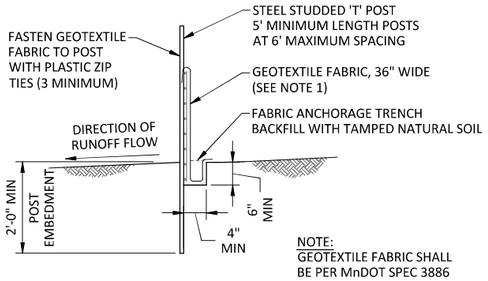
NOTE:
CRUSHED CONCRETE OR BITUMINOUS SHALL NOT BE USED FOR OPEN GRADED AGGREGATE.



INLET PROTECTION
ROCK BAG
NOT TO SCALE

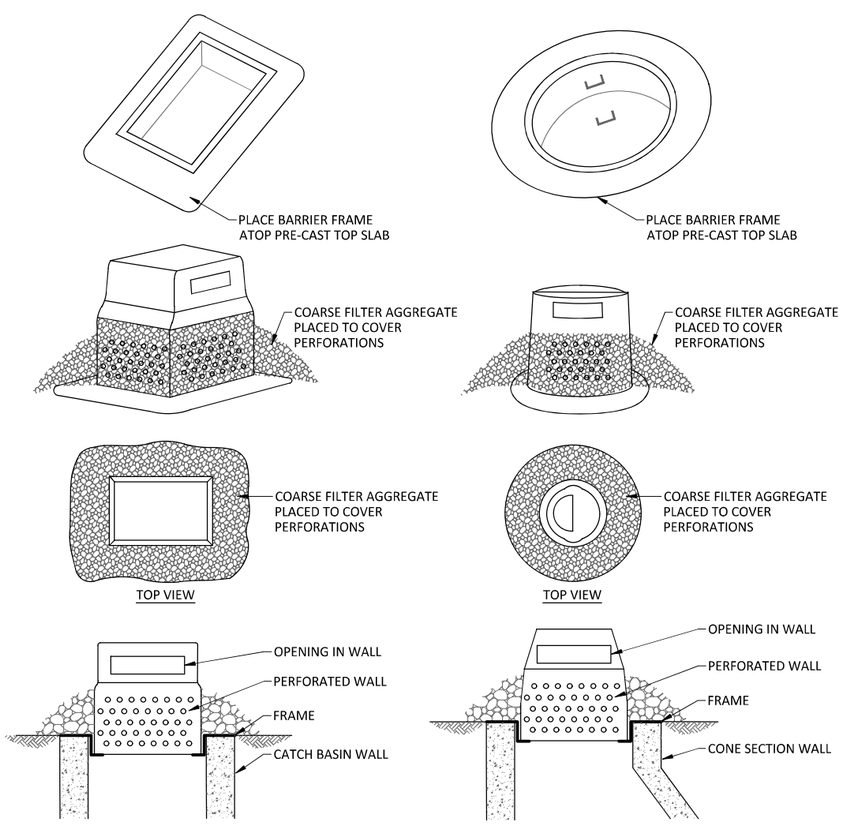


SILT FENCE - MACHINE SLICED
NOT TO SCALE



NOTE:
GEOTEXTILE FABRIC SHALL BE PER MnDOT SPEC 3886

SILT FENCE - HEAVY DUTY
NOT TO SCALE



INLET PROTECTION
PERFORATED WALL
NOT TO SCALE

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ALEC W. PIETZ, P.E.
LIC. NO. 59617 DATE XX/XX/XXXX

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POHL TOWNHOMES LLC
POHL LOFTS
STORMWATER POLLUTION PREVENTION PLAN
BEST MANAGEMENT PRACTICE DETAILS

SHEET
C2.05

POHL ROAD

BUILDING 1
FFE=997.5

BUILDING 2
WEST FFE=997.0
EAST FFE=993.0

BUILDING 3
WEST FFE=992.5
EAST FFE=988.5

15 CY CL III RIPRAP

REDUNDANT PERIMETER CONTROL ADJACENT TO WETLAND BUFFER

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 A RAINFALL EVENT GREATER THAN 0.5 INCHES IN 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
- STABILIZED CONSTRUCTION EXIT
- SEED MIX 25-151, FERTILIZER, & ROLLED EROS. PREV. CAT. 20
- SEED MIX 33-261, FERTILIZER, & ROLLED EROS. PREV. CAT. 20
- STORM DRAIN INLET PROTECTION

N

HORZ. SCALE 0 25 50 FEET

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POHL TOWNHOMES LLC
POHL LOFTS
STORMWATER POLLUTION PREVENTION PLAN
EROSION & SEDIMENT CONTROL PLAN

SHEET C2.06

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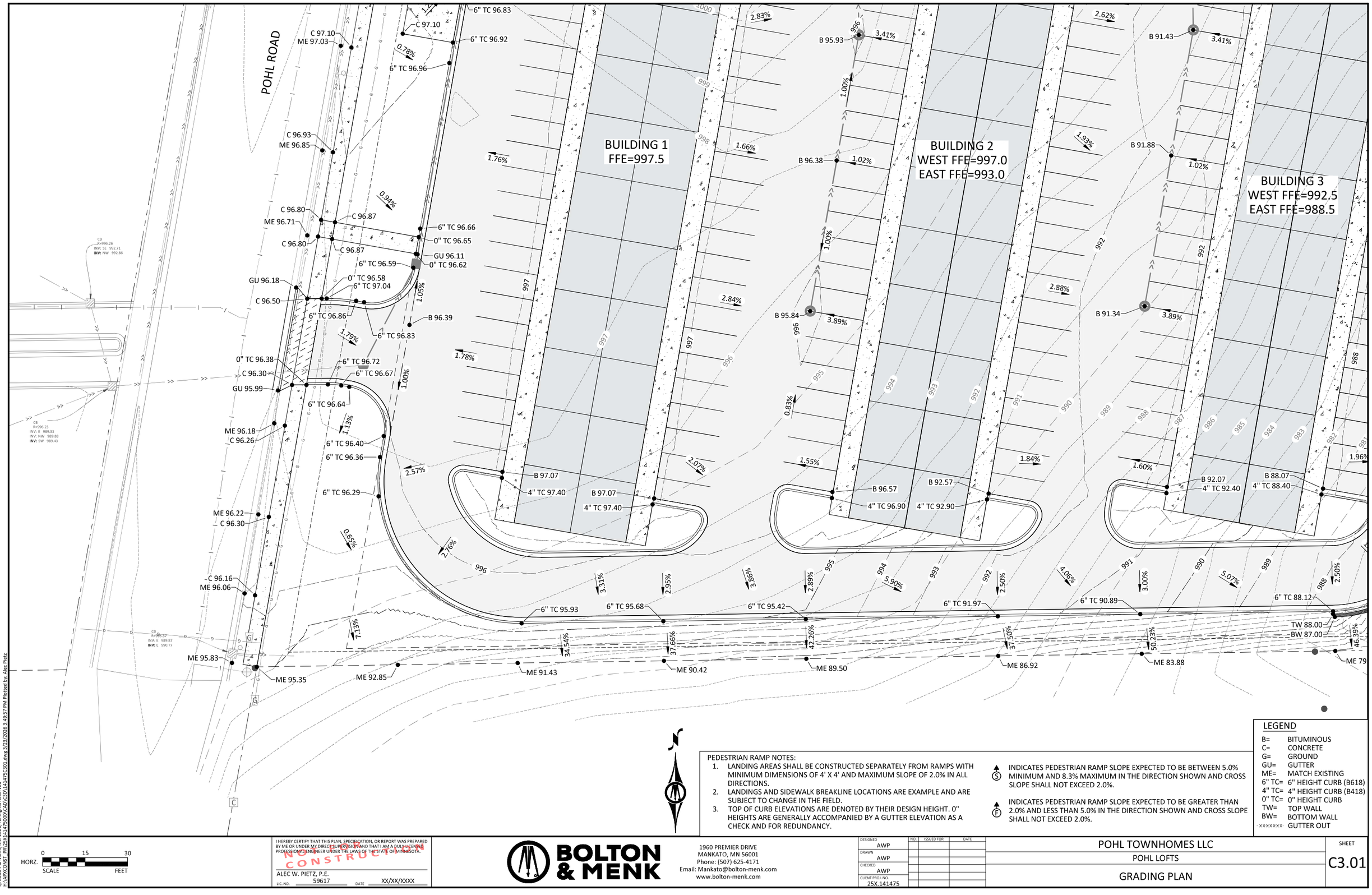

PEDESTRIAN RAMP NOTES:

1. LANDING AREAS SHALL BE CONSTRUCTED SEPARATELY FROM RAMPS WITH MINIMUM DIMENSIONS OF 4' X 4' AND MAXIMUM SLOPE OF 2.0% IN ALL DIRECTIONS.
2. LANDINGS AND SIDEWALK BREAKLINE LOCATIONS ARE EXAMPLE AND ARE SUBJECT TO CHANGE IN THE FIELD.
3. TOP OF CURB ELEVATIONS ARE DENOTED BY THEIR DESIGN HEIGHT. 0" HEIGHTS ARE GENERALLY ACCOMPANIED BY A GUTTER ELEVATION AS A CHECK AND FOR REDUNDANCY.

Ⓢ INDICATES PEDESTRIAN RAMP SLOPE EXPECTED TO BE BETWEEN 5.0% MINIMUM AND 8.3% MAXIMUM IN THE DIRECTION SHOWN AND CROSS SLOPE SHALL NOT EXCEED 2.0%.

Ⓕ INDICATES PEDESTRIAN RAMP SLOPE EXPECTED TO BE GREATER THAN 2.0% AND LESS THAN 5.0% IN THE DIRECTION SHOWN AND CROSS SLOPE SHALL NOT EXCEED 2.0%.

LEGEND

B=	BITUMINOUS
C=	CONCRETE
G=	GROUND
GU=	GUTTER
ME=	MATCH EXISTING
6" TC=	6" HEIGHT CURB (B618)
4" TC=	4" HEIGHT CURB (B418)
0" TC=	0" HEIGHT CURB
TW=	TOP WALL
BW=	BOTTOM WALL
XXXXXXX	GUTTER OUT

HORZ. 0 15 30 SCALE FEET

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POHL TOWNHOMES LLC

POHL LOFTS

GRADING PLAN

SHEET C3.01

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(F) INDICATES PEDESTRIAN RAMP SLOPE EXPECTED TO BE GREATER THAN 2.0% AND LESS THAN 5.0% IN THE DIRECTION SHOWN AND CROSS SLOPE SHALL NOT EXCEED 2.0%.

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0" TC=	0" HEIGHT CURB
TW=	TOP WALL
BW=	BOTTOM WALL
·xxxxxxx·	GUTTER OUT

HORZ. 0 15 30
SCALE FEET

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POHL TOWNHOMES LLC
POHL LOFTS
GRADING PLAN

SHEET C3.02

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4" TC=	4" HEIGHT CURB (B418)
0" TC=	0" HEIGHT CURB
TW=	TOP WALL
BW=	BOTTOM WALL
xxxxxxx	GUTTER OUT

5' GRADING INTO ADJOINING PROPERTY, EASEMENT TO BE OBTAINED

POHL ROAD

BUILDING 1
FFE=997.5

BUILDING 2
WEST FFE=997.0
EAST FFE=993.0

BUILDING 3
WEST FFE=992.5
EAST FFE=988.5

HORZ. SCALE 0 15 30 FEET

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POHL TOWNHOMES LLC
POHL LOFTS
GRADING PLAN

SHEET C3.03

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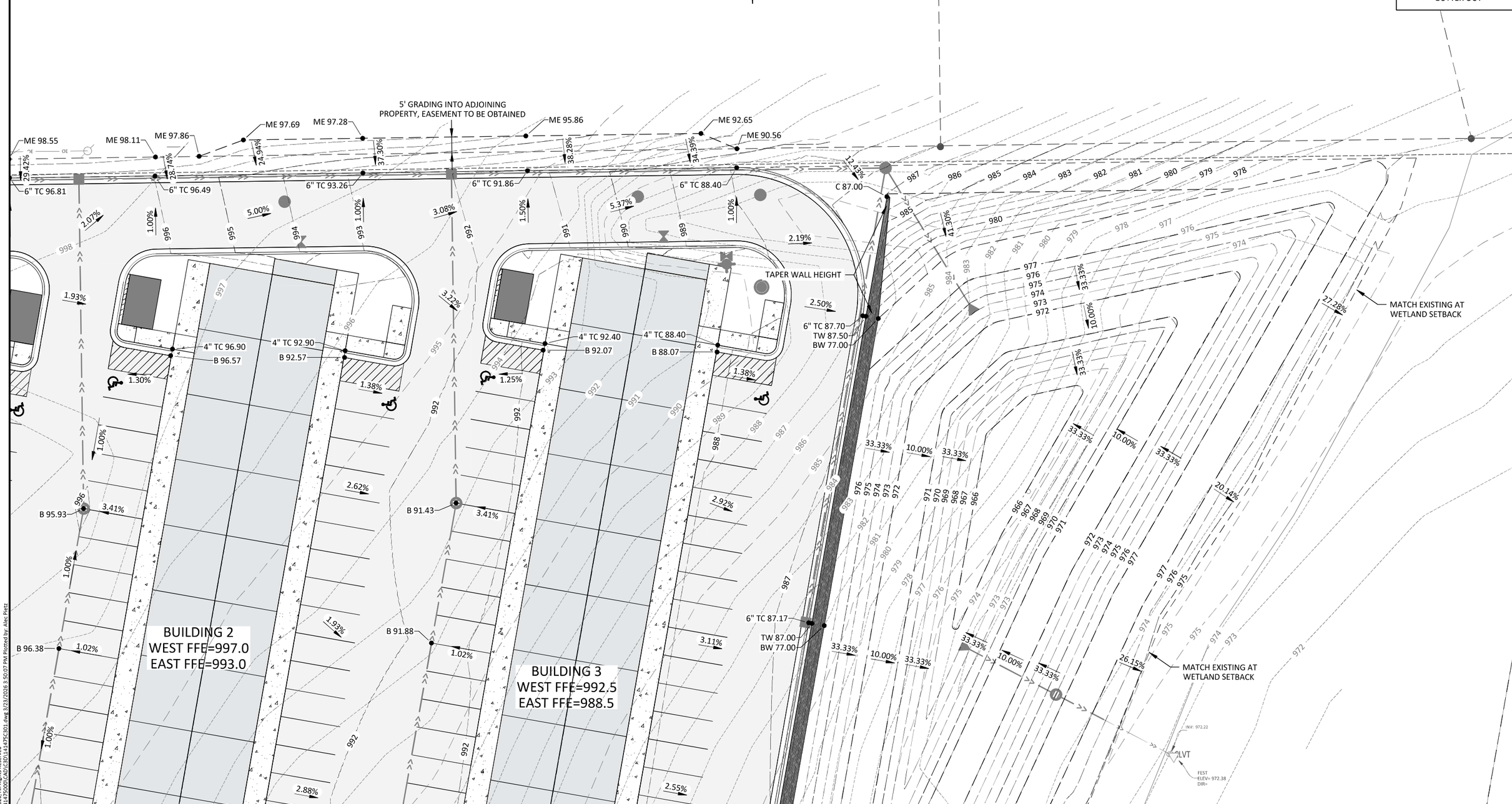
BW=	BOTTOM WALL
xxxxxxx	GUTTER OUT



HORZ. 0 15 30 SCALE FEET

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POHL TOWNHOMES LLC

POHL LOFTS

GRADING PLAN

SHEET C3.04

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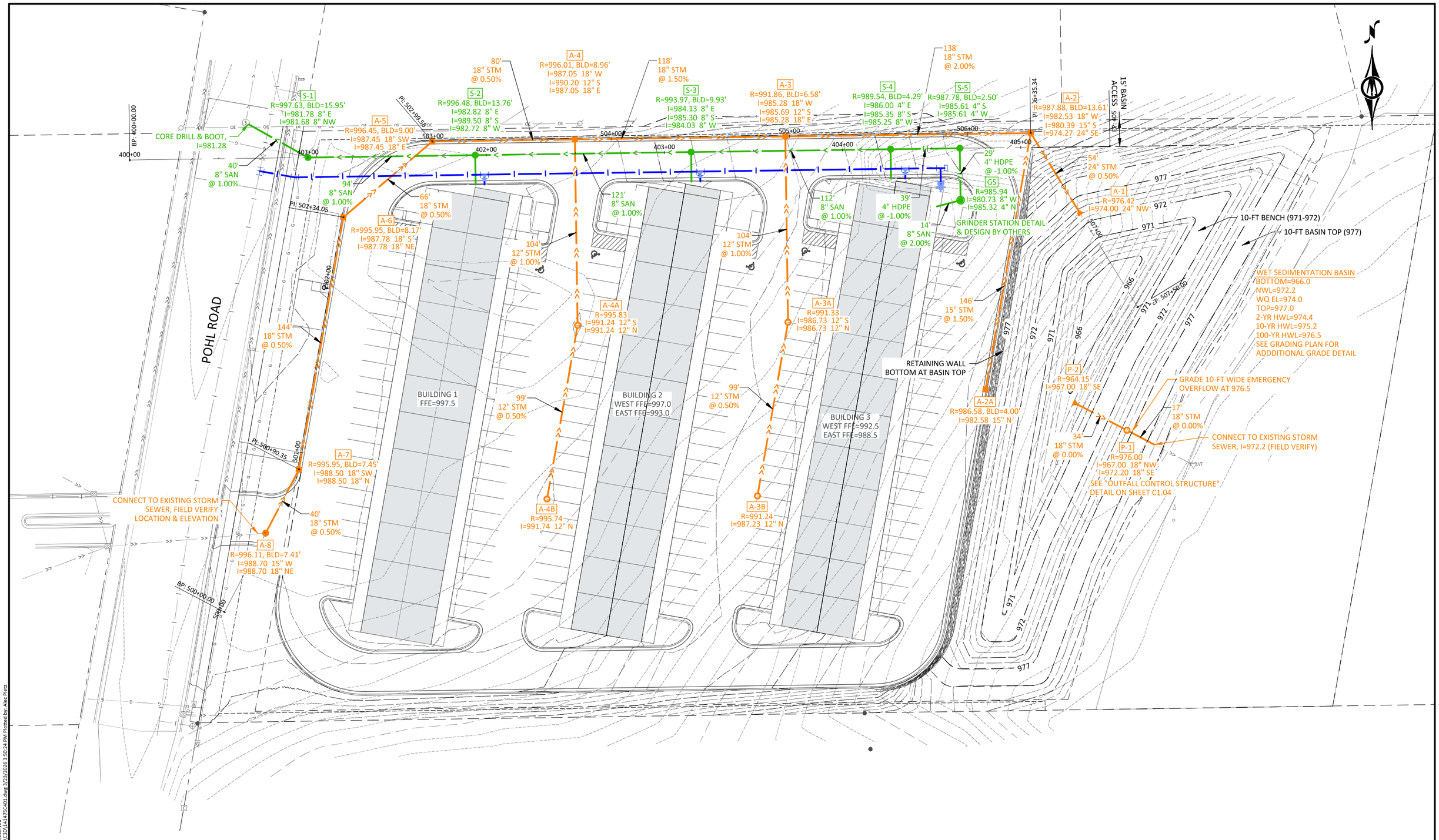

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HORZ. SCALE 0 25 50 FEET

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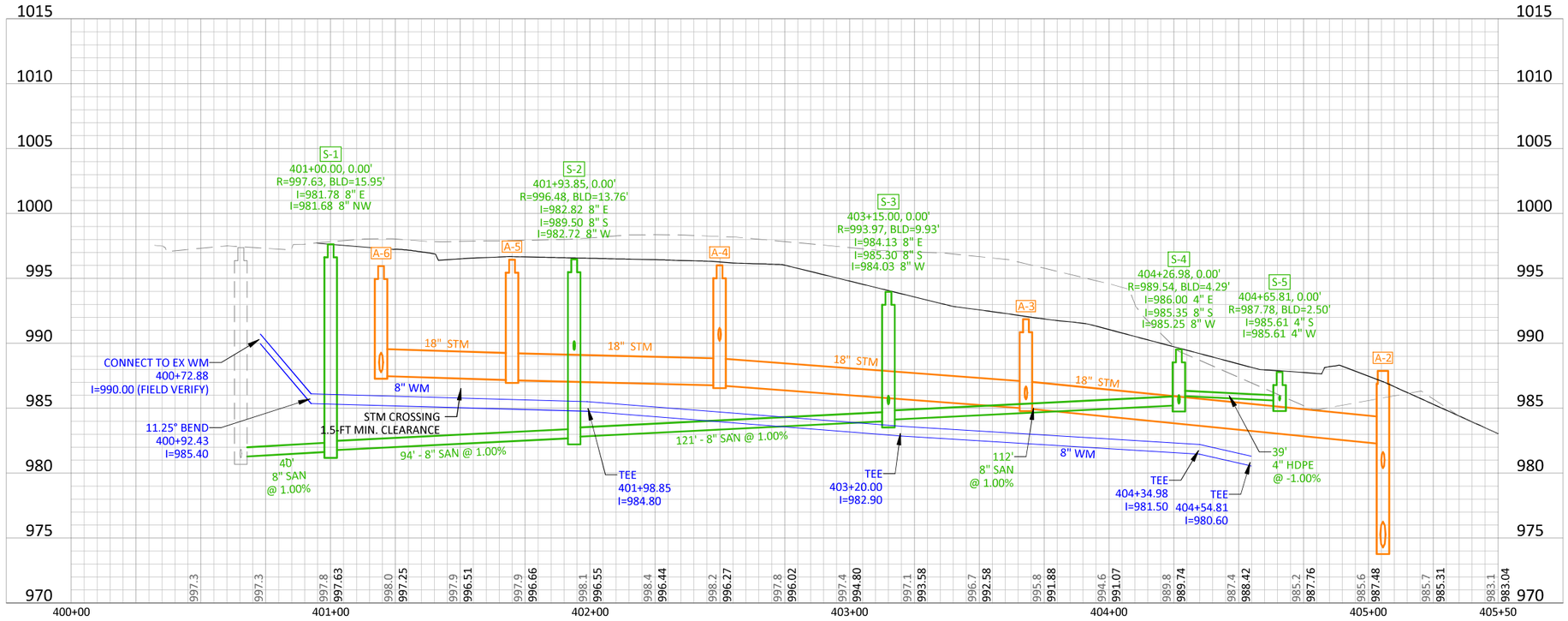
POHL TOWNHOMES LLC
POHL LOFTS
UTILITY PLAN
PLAN VIEW

SHEET C4.01



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HORZ. SCALE 0 25 50 FEET

VERT. SCALE 0 5 10 FEET

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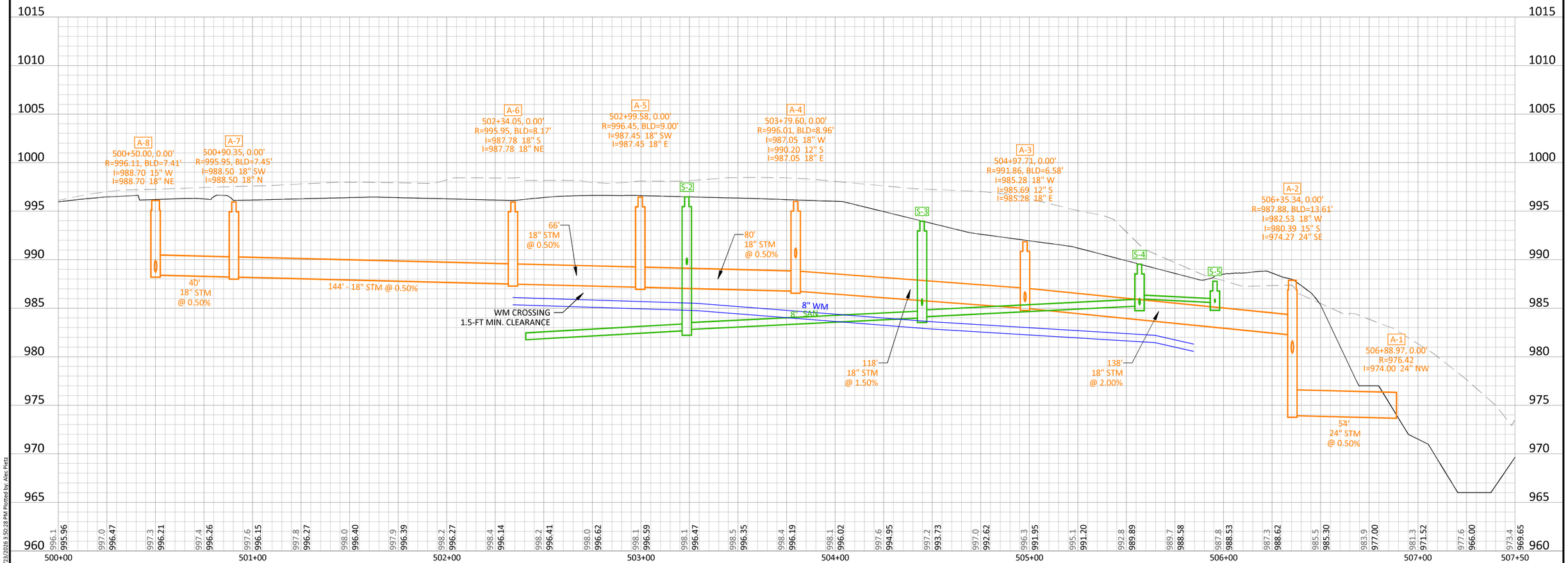
POHL TOWNHOMES LLC
POHL LOFTS
UTILITY PLAN
SANITARY SEWER & WATERMAIN PROFILE

SHEET C4.02



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HORZ. 0 25 50 SCALE FEET

VERT. 0 5 10 SCALE FEET

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POHL TOWNHOMES LLC
POHL LOFTS
UTILITY PLAN
MAINLINE STORM SEWER PROFILE

SHEET
C4.03

PROVIDE CLEAN SAWCUTS ON ALL MATCH POINTS

ROADWAY UTILITY PATCH

REMOVE & REPLACE C&G, PAVEMENT SECTION, AND DRAINTILE. MATCH EXISTING SECTIONS, GRADES, MATERIALS, ETC.

POHL ROAD

PUBLIC WALK 5-FT WIDE SIDEWALK & 3-4-FT BOULEVARD

8" CONCRETE DRIVEWAY

29'

30' SETBACK

80.7'

B618 C&G, TYP

6' SETBACK

BITUMINOUS PAVEMENT, TYP

10'X16' WASTE ENCLOSURE

BIKE RACK PAD

16'X40' DOG RUN

18'X26' PATIO AREA

23 EACH 9'X19' STALLS

46 EACH 9'X19' STALLS

46 EACH 9'X19' STALLS

23 EACH 9'X19' STALLS

21'

24'

20'

34'

36.6'

33.9'

24'

36.5'

BUILDING 1
FFE=997.5

BUILDING 2
WEST FFE=997.0
EAST FFE=993.0

BUILDING 3
WEST FFE=992.5
EAST FFE=988.5

7' WIDE, 4" THICKENED EDGE WALK, TYP

GRINDER STATION

BASIN BREAKLINE, TYP

16.5' WETLAND BUFFER

MINIMUM 42-INCH HEIGHT RAIL OR FENCE TO BE PROVIDED ALONG LENGTH OF RETAINING WALL (DETAIL TO BE DETERMINED)

RETAINING WALL, SEE GRADING PLAN FOR ELEVATIONS

42'

7-FT WIDE THICKENED EDGE WALK, TYP

6' SETBACK

PARKING SUMMARY
84 UNITS REQUIRING 1.5 STALLS/UNIT
126 STALLS REQUIRED
138 STALLS PROVIDED

DENSITY CALCULATIONS
COMBINED LOT SIZE - 11.67 ACRES
PROPOSED UNITS - 84 UNITS
DENSITY = 7.2 UNITS/ACRE
CODE MAXIMUM = 7.26 UNITS/ACRE (6,000 SF/UNIT)
BUILDING COVERAGE = 0.70 ACRES = 6%

HORZ. SCALE 0 25 50 FEET

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POHL TOWNHOMES LLC

POHL LOFTS

SITE PLAN

SHEET C5.01

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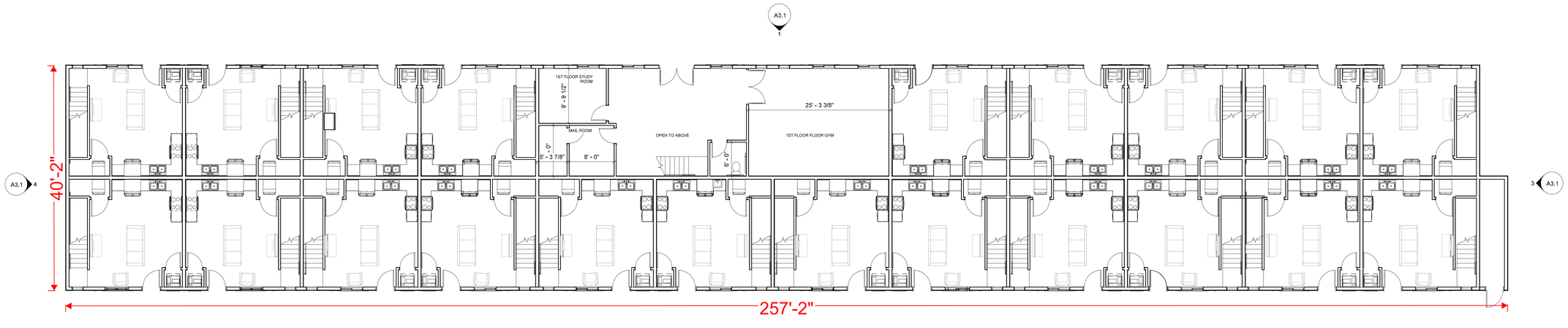
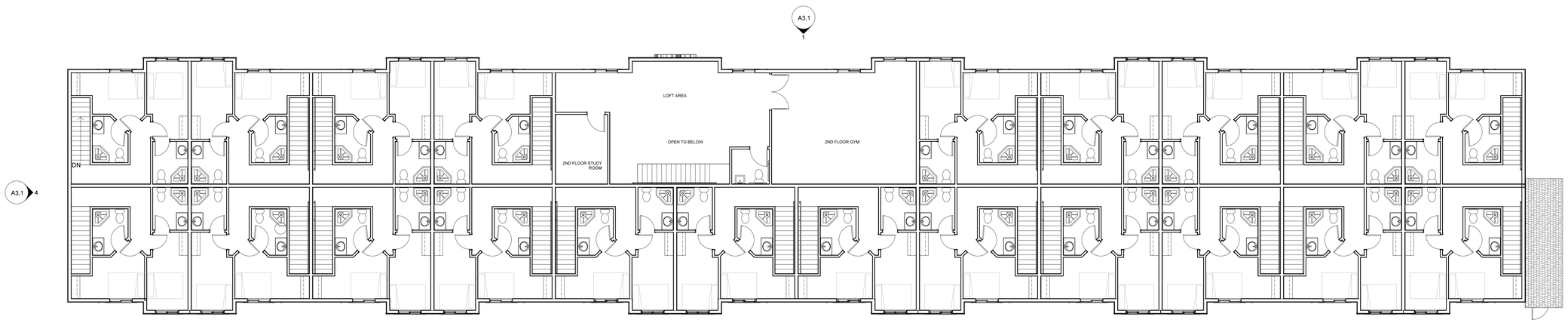


1 A1.1 FLOOR PLAN - MAIN LEVEL
SCALE: 1/8" = 1'-0"

2
A3.1



2 A1.1 FLOOR PLAN - SECOND LEVEL
SCALE: 1/8" = 1'-0"

2
A3.1

3/24/2026 1:45:38 PM

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ARCHITECT OF RECORD
oha
ARCHITECTURE + DESIGN
WWW.OHARCHITECTS.COM
330 Stadium Road, Suite 202, Mankato, MN 56001
T: 507.385.1158

CONSULTANT

POHL LOFTS

POHL ROAD, MANKATO, MN

REVISIONS XX

PROJECT #	26-013MK
DATE	03.18.2026
DRAWN BY	Author
CHECKED BY	Checker

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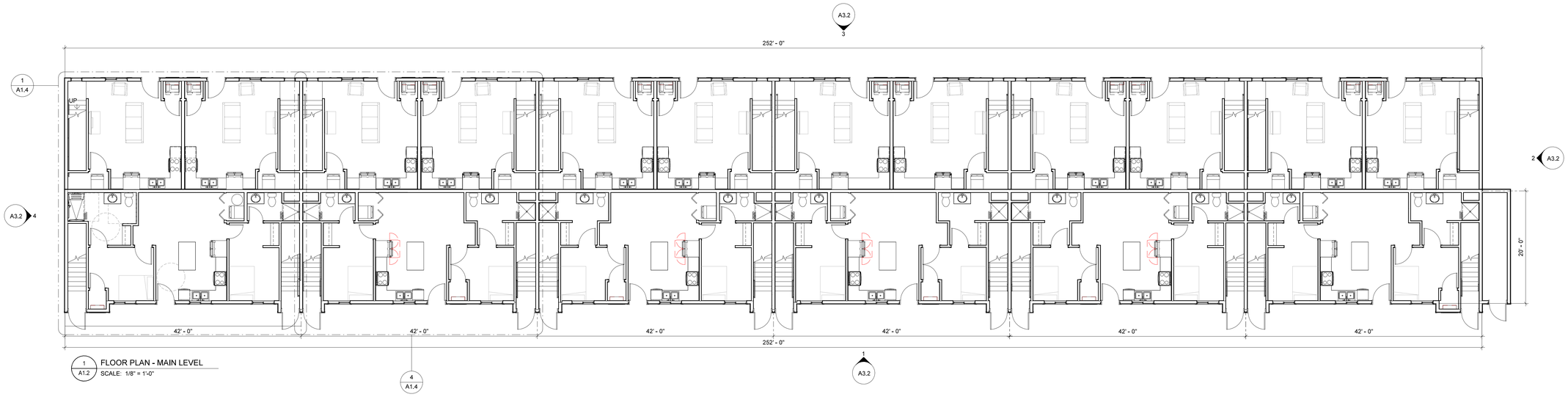
SHEET TITLE

BUILDING A FLOOR PLANS

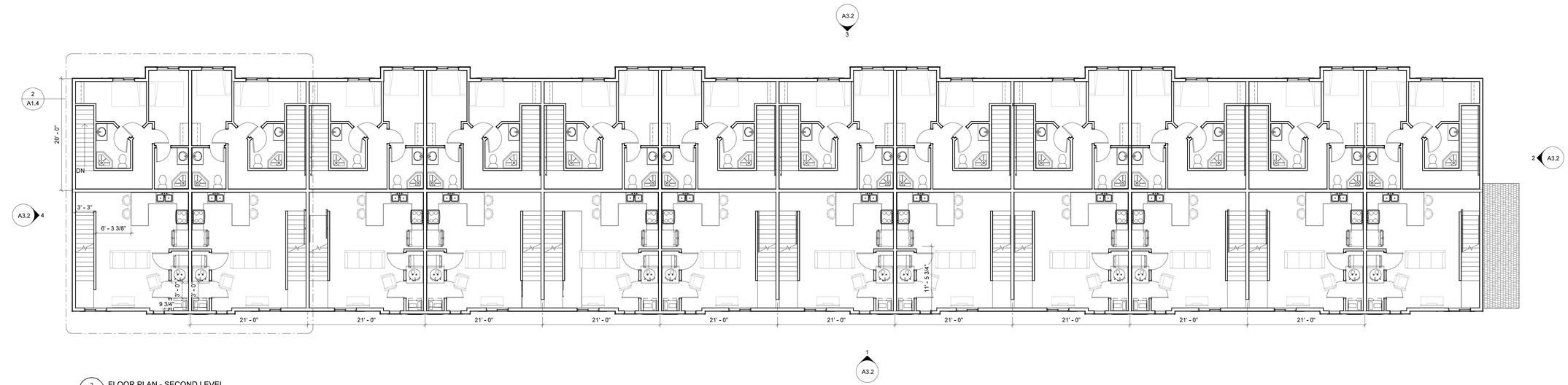
SHEET

A1.1

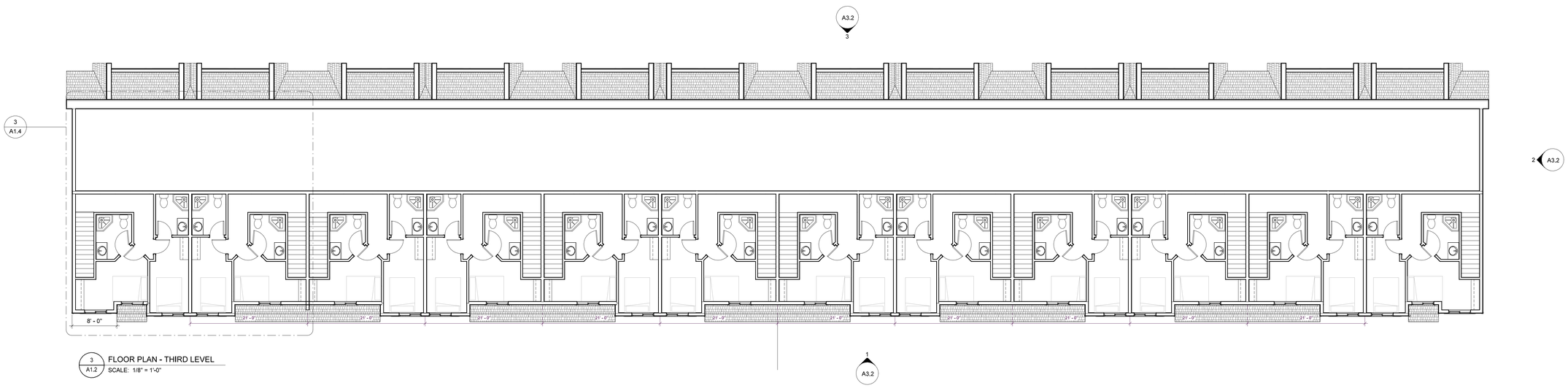
NORTH



1 A1.2 FLOOR PLAN - MAIN LEVEL
SCALE: 1/8" = 1'-0"



2 A1.2 FLOOR PLAN - SECOND LEVEL
SCALE: 1/8" = 1'-0"



3 A1.2 FLOOR PLAN - THIRD LEVEL
SCALE: 1/8" = 1'-0"

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CONSULTANT

POHL LOFTS

POHL ROAD, MANKATO, MN

REVISIONS XX

PROJECT #	26-013MK
DATE	03.18.2026
DRAWN BY	Author
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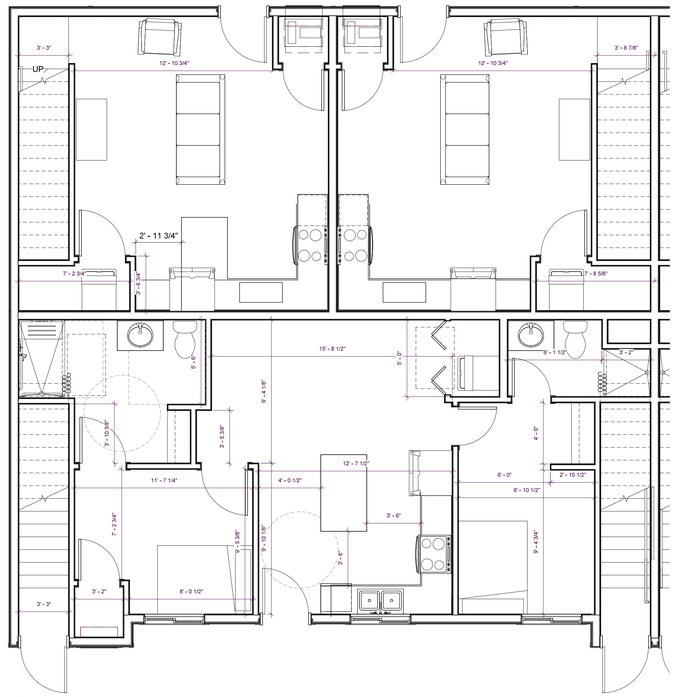
SHEET TITLE

BUILDING B & C FLOOR PLANS

SHEET

A1.2

NORTH



1 A1.4 GROUND LEVEL - TYPE A UNIT
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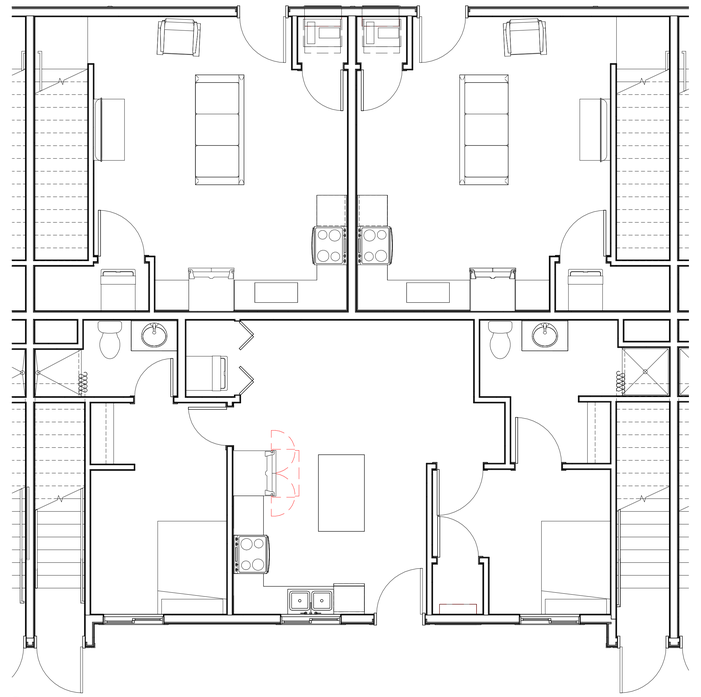

4 A1.4 GROUND LEVEL - TYPE B UNIT
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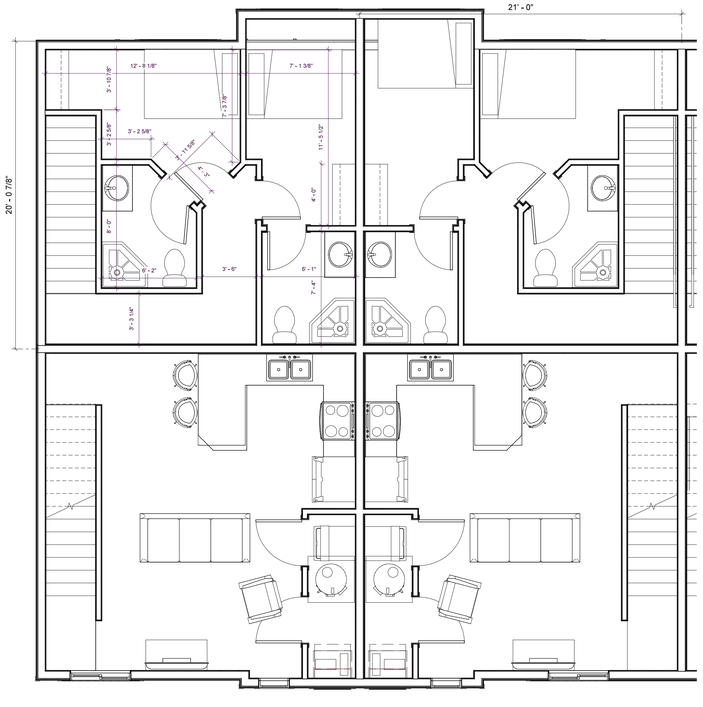

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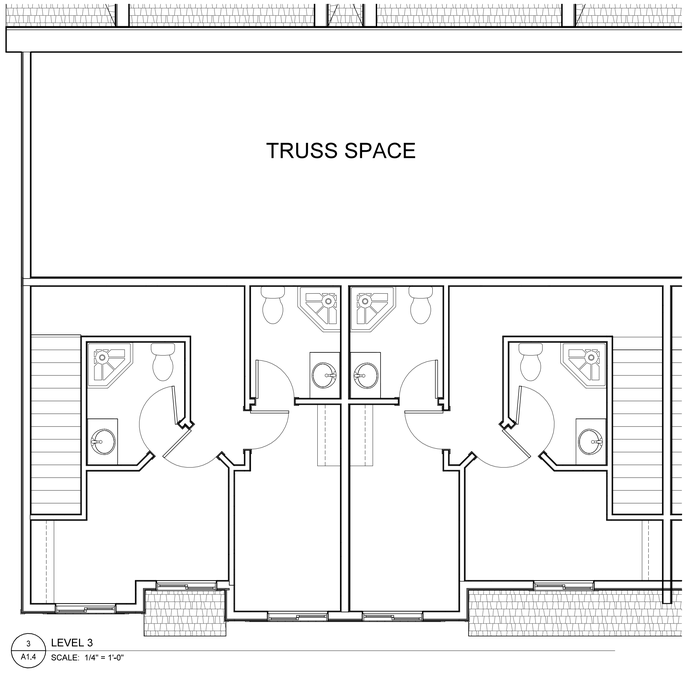

3 A1.4 LEVEL 3
SCALE: 1/4" = 1'-0"

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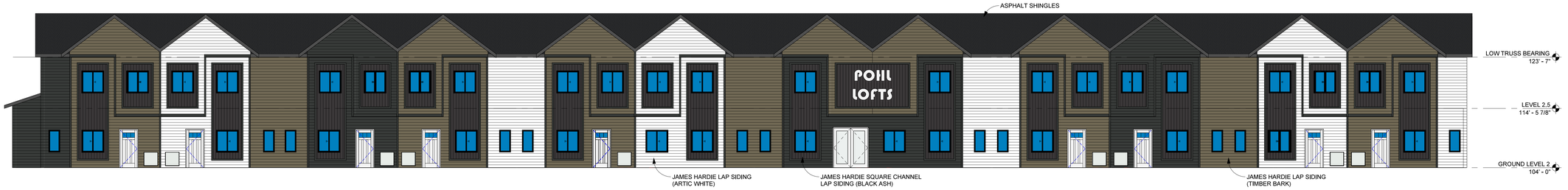
SHEET TITLE

UNIT PLANS

SHEET

A1.4

NORTH



1 / A3.1 BUILDING A NORTH ELEVATION
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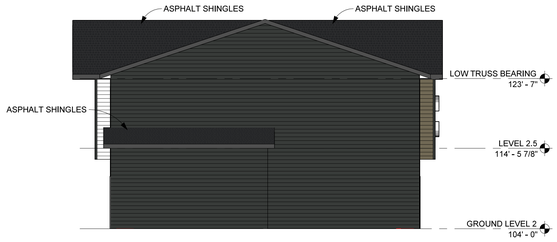
2 / A3.1 BUILDING A SOUTH ELEVATION
SCALE: 1/8" = 1'-0"



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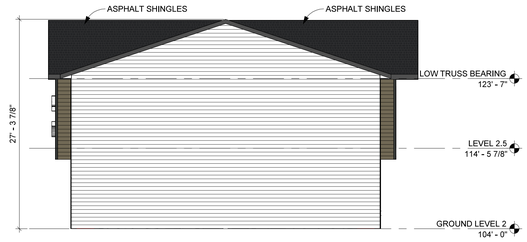

4 / A3.1 BUILDING A WEST ELEVATION
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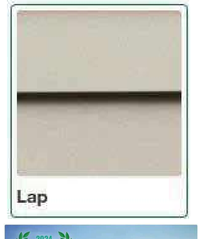
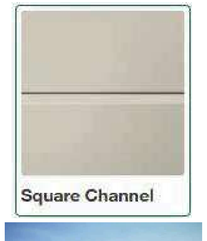
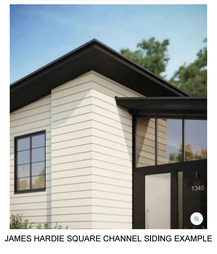
SIDING MATERIAL







JAMES HARDIE LAP SIDING EXAMPLE



JAMES HARDIE SQUARE CHANNEL SIDING EXAMPLE

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CONSULTANT

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 Architect under the laws of the state of Minnesota.

Dennis G. Hobbie, AIA

Dated: _____ Reg. No. 47091

POHL LOFTS

POHL ROAD, MANKATO, MN

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PROJECT # 26-013MK
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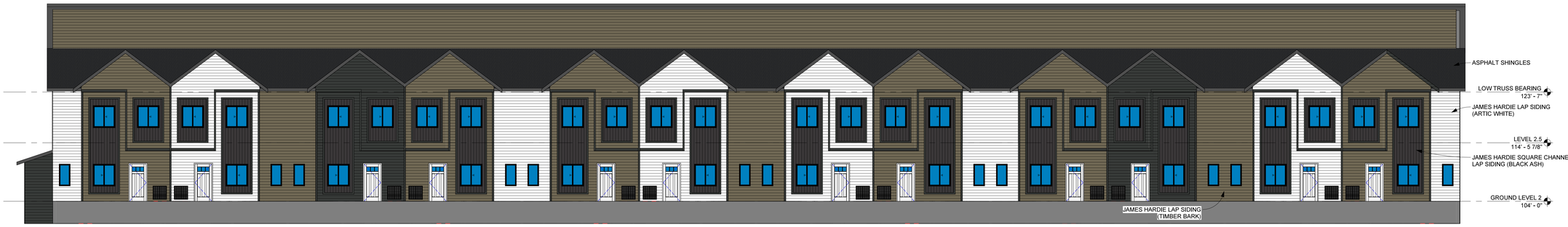
SHEET TITLE

BUILDING 'A' EXTERIOR ELEVATIONS

SHEET

A3.1

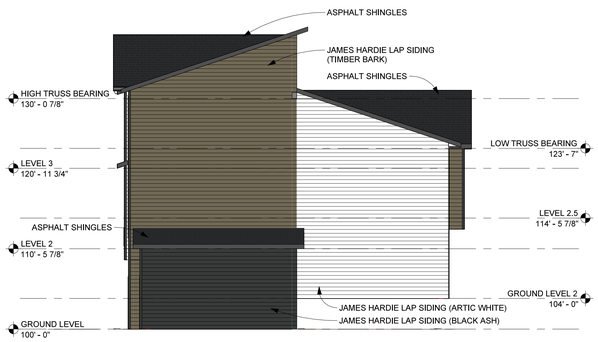
NORTH



3 A3.2 NORTH ELEVATION
SCALE: 1/8" = 1'-0"



1 A3.2 SOUTH ELEVATION
SCALE: 1/8" = 1'-0"



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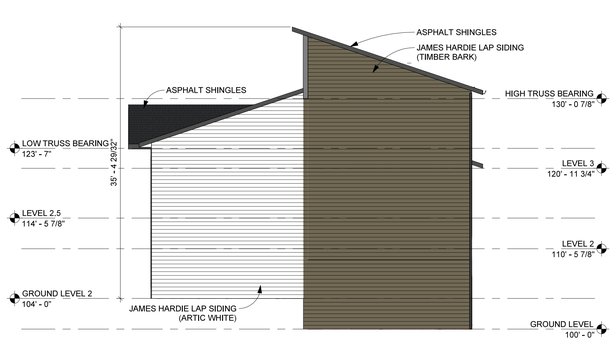

4 A3.2 WEST ELEVATION
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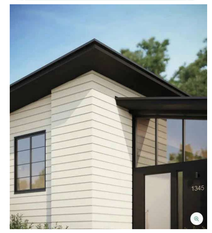
SIDING MATERIAL







JAMES HARDIE LAP SIDING EXAMPLE



JAMES HARDIE SQUARE CHANNEL SIDING EXAMPLE

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SHEET TITLE

BUILDING 'B' & 'C' EXTERIOR ELEVATIONS

SHEET

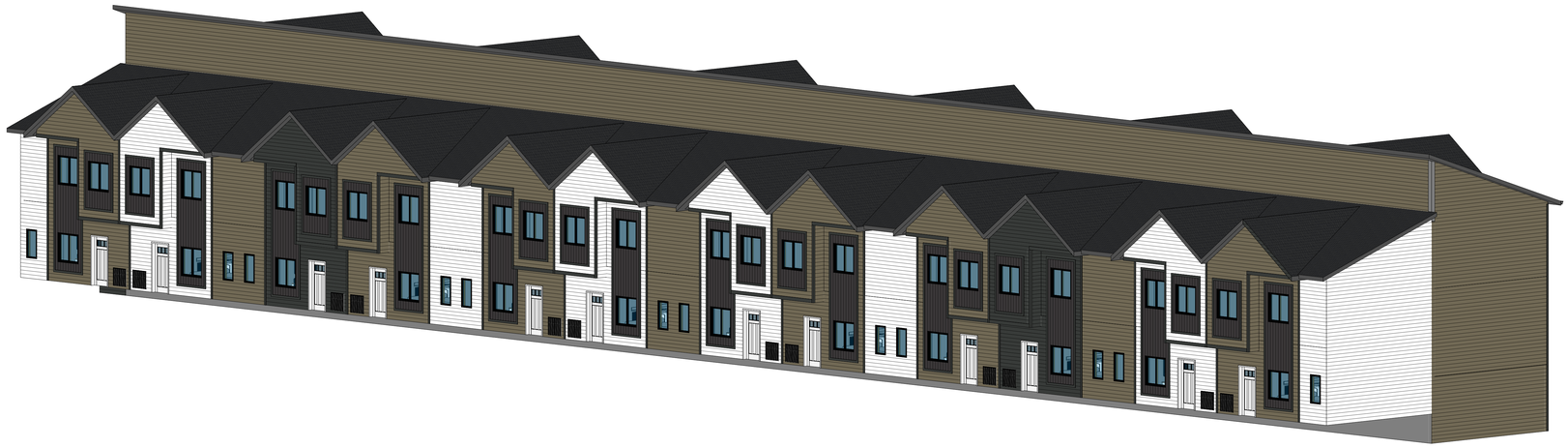
A3.2

NORTH

3/24/2026 1:45:57 PM



1 A3.3 BUILDING 'A' - NORTH & SOUTH VIEW
SCALE:



2 A3.3 BUILDING 'B' & 'C' NORTH VIEW
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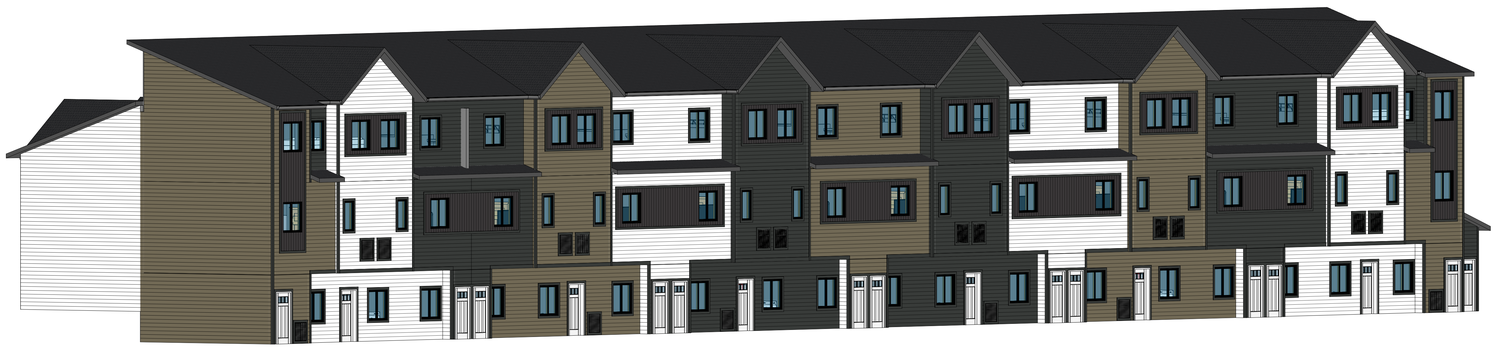

3 A3.3 BUILDING 'B' & 'C' SOUTH VIEW
SCALE:

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POHL ROAD, MANKATO, MN

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SHEET TITLE

EXTERIOR PERSPECTIVE VIEWS

SHEET

A3.3

NORTH

Pohl Townhouse

No Loss Application

APX Construction
March 23, 2026

Submitted by:
Bolton & Menk, Inc.
1960 Premier Drive
Mankato, MN 56001
P: (507) 625-4171
F: (507) 625-4177

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Table of Contents

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PART TWO: Site Location Information 1
PART THREE: General Project/Site Information 1
PART FOUR: Aquatic Resource Impact Summary 3
PART FIVE: Applicant Signature 3
Attachment B 4

Appendix

FIGURE 1 – LOCATION MAP
FIGURE 2 – PROPOSED PROJECT LAYOUT
FIGURE 3 – PROPOSED AQUATIC RESOURCE IMPACTS

PLAN SET

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:	Kyle Smith
Mailing Address:	1961 Premier Dr | Suite 318 | Mankato, MN 56001
Phone:	
E-mail Address:	Ksmith@thetailwindgroup.com

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:	K 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:** **City of Mankato**
Parcel ID and/or Address: **Refer to Figure 1: Location Map**
Legal Description (Section, Township, Range): **20, 108N, 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): **4.8 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.

A wetland delineation was conducted on November 11, 2025 to determine the boundaries of the aquatic resources present onsite. A TEP meeting was held November 19, 2025 to review the identified wetland boundary. The Notice of Decision (NOD) was issued on December 23, 2025. Through this review, incidental status was also reviewed for an aquatic resource present on site.

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.

APX Construction is designing and proposing to construct townhomes/apartment housing located off Pohl Road. Currently the plot is mostly pasture that is hayed with the eastern portion a large historic wetland. The project will use site grading to prepare the site for construction, construction of new impervious surfaces, stormwater pond, and construction of multiuse homes. Construction is proposed to begin early Summer of 2026.

Site grading will occur to create the site's new stormwater pond. Two retaining walls will be constructed to hold back soil and prevent erosion on slopes around the new impervious surfaces. While the western portion of the site is relatively flat, the east side of the property slopes down to the edge of a large historic wetland. A 16-foot buffer is planned from the grading limits to the historic wetland limit which aligns with city design code. The grading limits will fill in the incidental wetland that the delineation identified (0.20 acres) but this system is non-jurisdictional under WCA, due to the fact it was created after 1992 for the purpose of capturing and holding stormwater. For more information on the incidental status, please refer to the NOD for the Type & Boundary.

A new stormwater pond is being proposed onsite at the same location as the smaller one. The proposed stormwater pond will be larger as it will collect a larger amount of stormwater to reflect the needs of the proposed impervious surface.

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]
Incidental Wetland	Wetland	Fill	(P)	0.20	N/A	Type 2/3	Blue Earth, 32, 9

[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:

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: 3/23/2020

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 B

Supporting Information for Applications Involving Exemptions, No Loss Determinations, and Activities Not Requiring Mitigation

Complete this part ***if*** you maintain that the identified aquatic resource impacts in Part Four do not require wetland replacement/compensatory mitigation OR ***if*** you are seeking verification that the proposed water resource impacts are either exempt from replacement or are not under CWA/WCA jurisdiction.

Identify the specific exemption or no-loss provision for which you believe your project or site qualifies:

8420.0420 Subpart A – No-Loss Criteria

Provide a detailed explanation of how your project or site qualifies for the above. Be specific and provide and refer to attachments and exhibits that support your contention. Applicants should refer to rules (e.g. WCA rules), guidance documents (e.g. BWSR guidance, Corps guidance letters/public notices), and permit conditions (e.g. Corps General Permit conditions) to determine the necessary information to support the application. Applicants are strongly encouraged to contact the WCA LGU and Corps Project Manager prior to submitting an application if they are unsure of what type of information to provide:

8420.0420 Subpart A – No-Loss Criteria

There are no historical or jurisdictional wetland impacts associated with the permit and therefore the impacts of the incidental wetland that have been discussed in this application meets No-Loss criteria.

Appendix

Pohl Townhomes

APX Construction

Figure 1: Location Map

March 2026

BOLTON & MENK



Map Document: H:\APXCONST_PR\25X141475000\GIS\Natural_Resources\Pro\141475_NoLoss_Permitting.aprx | Figure 3: Proposed Aquatic Resource Impacts | Username: Addeline.Theis | Date Saved: 3/20/2026 1:08 PM



Map Document: H:\APXCONST_PR\25X\141475000\GIS\Natural_Resources\Pro\141475_NoLoss_Permitting.aprx | Figure 3: Proposed Aquatic Resource Impacts | Username: Addeline.Theis | Date Saved: 3/23/2026 2:20 PM



Map Document: H:\APXCONST_PR\25X141475000\GIS\Natural_Resources\Pro\141475_NoLoss_Permitting.aprx | Figure 3: Proposed Aquatic Resource Impacts | Username: Addeline.Theis | Date Saved: 3/24/2026 8:28 AM

PROVIDE CLEAN SAWCUTS ON ALL MATCH POINTS

ROADWAY UTILITY PATCH

REMOVE & REPLACE C&G, PAVEMENT SECTION, AND DRAINTILE. MATCH EXISTING SECTIONS, GRADES, MATERIALS, ETC.

POHL ROAD

PUBLIC WALK
5-FT WIDE SIDEWALK & 3-4-FT BOULEVARD

8" CONCRETE DRIVEWAY

B618 C&G, TYP

6' SETBACK

30' SETBACK

80.7'

34'

36.6'

33.9'

24'

36.5'

BITUMINOUS PAVEMENT, TYP

10'X16' WASTE ENCLOSURE

BIKE RACK PAD

16'X40' DOG RUN

18'X26' PATIO AREA

23 EACH 9'X19' STALLS

46 EACH 9'X19' STALLS

21'

24'

20'

BUILDING 1
FFE=997.5

BUILDING 2
WEST FFE=997.0
EAST FFE=993.0

BUILDING 3
WEST FFE=992.5
EAST FFE=988.5

7' WIDE, 4" THICKENED EDGE WALK, TYP

GRINDER STATION

BASIN BREAKLINE, TYP

16.5' WETLAND BUFFER

MINIMUM 42-INCH HEIGHT RAIL OR FENCE TO BE PROVIDED ALONG LENGTH OF RETAINING WALL (DETAIL TO BE DETERMINED)

RETAINING WALL, SEE GRADING PLAN FOR ELEVATIONS

29'

42'

7-FT WIDE THICKENED EDGE WALK, TYP

PARKING SUMMARY
84 UNITS REQUIRING 1.5 STALLS/UNIT
126 STALLS REQUIRED
138 STALLS PROVIDED

DENSITY CALCULATIONS
COMBINED LOT SIZE - 11.67 ACRES
PROPOSED UNITS - 84 UNITS
DENSITY = 7.2 UNITS/ACRE
CODE MAXIMUM = 7.26 UNITS/ACRE (6,000 SF/UNIT)
BUILDING COVERAGE = 0.70 ACRES = 6%

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H:\APXCONST_PR\25X\141475000\CAD\C3D\141475C601.dwg 3/23/2026 3:45:56 PM Plotted by: Alec Pietz

HORZ. SCALE 0 25 50 FEET

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. 25X.141475			

POHL TOWNHOMES LLC
POHL LOFTS
SITE PLAN

SHEET C5.01

BOLTON & MENK
Real People. Real Solutions.

1960 Premier Drive
Mankato, MN 56001-5900

Ph: (507) 625-4171
Fax: (507) 625-4177
Bolton-Menk.com

Stormwater Management Memorandum

Date: March 24, 2026

To: City of Mankato Public Works

From: Alec Pietz, P.E. – Project Manager

Subject: Pohl Townhomes LLC – Pohl Lofts
BMI Project No.: 25X.141475

I. Project Introduction

The following report provides a summary and analysis of the existing and proposed hydrology for Parcel I.D. R010920479029 in Mankato, Minnesota. The proposed project consists of three apartment buildings with a total of 84 units; necessary infrastructure, surface improvements, and stormwater management are also provided with this project. The SCS TR-20 hydrology method was utilized in Autodesk Storm and Sanitary Analysis (SSA) for the project. NOAA Atlas 14 rainfalls for Blue Earth County, Minnesota and MSE 3 distribution curves were used to develop rainfall events. Although additional storm events were used in the stormwater modeling, the 2-yr (2.87”), 10-yr (4.29”), and 100-yr (7.20”) events are reported for both peak flow rates and basin high-water levels.

II. Existing Site Hydrology

The current site generally consists of fairly grassed area with varying elevation difference from west to east in D soils. An existing wet sedimentation basin constructed as part of private drainage infrastructure for the College Town development (west of Pohl Road) also exists on site. As such, a portion of the existing development is routed through the property and is approximated as shown by the subbasin boundary and existing storm sewer in the *Existing Hydrology* figure. Three primary subbasins are identified for study with this project:

- College Town – which, as previously mentioned, routes through the project site
- Direct to Wetland – the portion of the project site that bypasses the existing basin and discharges to adjacent property or the wetland
- Direct to Existing Basin – additional drainage on the project site that directly flows to the existing basin.

It was found that the private storm sewer in College Town will overflow to Pohl Road and continue south.

The existing basin storage curve was developed based on the topographic survey and is the basis for existing condition modeling. The dead storage is not reported as it was not surveyed; this does not influence the modeling. A data sheet is provided as an attachment with this memo.

Modeling results for the design storms yield the following peak flows:

Existing Condition Peak Flow Rates (cfs)			
Location	**2-yr**	**10-yr**	**100-yr**
College Town EOF	1.08	7.33	18.47
Direct to Wetland / Adjacent Property	3.78	7.00	13.88
Wetland From Existing Basin	5.70	8.13	11.22
Total	**10.56**	**22.46**	**43.57**

Proposed peak flows to these areas must not exceed the existing peak flows.

III. Proposed Site Hydrology

The *Proposed Hydrology* figure illustrates the proposed improvements, drainage areas, storm sewer routing, and the proposed wet sedimentation basin. The proposed basin is designed to accommodate the College Town drainage area (and bringing it to current stormwater design standards) along with the proposed project. A summary sheet is provided showing the design information for the wet sedimentation basin. A total of 6.13 acres of impervious area is routed to the basin between the existing development and proposed project requiring 0.56 ac-ft of water quality volume to meet the City of Mankato's requirement of 1.1-inches over the impervious area. An outfall control structure with a v-notch weir was designed to limit flows within the water quality volume to meet MPCA maximum discharge rates. A detail is provided with the plans accompanying the project submittal. Typical conveyance pipes were sized to a minimum 2-year event.

Proposed peak flow rates for design storms were determined to be:

Proposed Condition Peak Flow Rates (cfs)			
Location	**2-yr**	**10-yr**	**100-yr**
College Town EOF	0.00	2.71	13.57
Direct to Wetland / Adjacent Property	0.92	1.82	3.77
Wetland From Proposed Basin	6.43	8.52	12.56
Total	**7.35**	**13.05**	**29.90**
Overall Existing Peak Rate	10.56	22.46	43.57

In review of the existing and proposed peak flow rates, the following is observed:

- The College Town EOF has reduced peak flow rates for all events due to the more efficient conveyance of stormwater through the site than existing conditions. This reduces the amount of surcharge onto Pohl Road.
- The sum of peak flows to the wetland and adjacent properties is less than the sum in existing conditions.

Please review the attached basin information, figures, & PUD submittal construction documents and feel free to contact Alec Pietz, P.E. at Alec.Pietz@bolton-menk.com or 507-766-3283 with any questions.

EXISTING WET SEDIMENTATION BASIN
POHL LOFTS - MANKATO, MN
BMI Project No. 25X.141475

Input Data

Existing Drainage Area:	5.87	Acres
Existing Impervious Area to Basin:	3.48	Acres

Basin Information

Dead Storage Not Determined

	Elev	Area (Square Feet)	Area (Acres)	Volume (Cu. Feet)	Volume (Acre-Feet)
Normal Water Level	972	6290	0.14	0	0.00
	973	8140	0.19	7215	0.17
	974	10105	0.23	16338	0.38
Overflow	975	14940	0.34	28860	0.66

Basin High Water Levels	
2-year	974.0
10-year	974.4
100-year	975.0

PROPOSED WET SEDIMENTATION BASIN
POHL LOFTS - MANKATO, MN
BMI Project No. 25X.141475

Input Data

Drainage Area:	7.88	Acres
Existing Impervious Area:	3.48	Acres
Proposed Impervious Area:	2.65	Acres
Total Impervious:	6.13	Acres

Dead Storage Volume Required

1800 cubic feet per drainage area or 1.1 inches of runoff from all new and fully reconstructed impervious surfaces.

Volume (1800 CF) :	14184	cubic feet =	0.33	acre-feet	
Volume (1.1") :	24477	cubic feet =	0.56	acre-feet	Controls

Water Quality Volume Required

(1.1 inches of runoff from impervious surfaces) (Total Site Impervious)

Volume :	24,477	cubic feet =	0.56	acre-feet

Pond Information

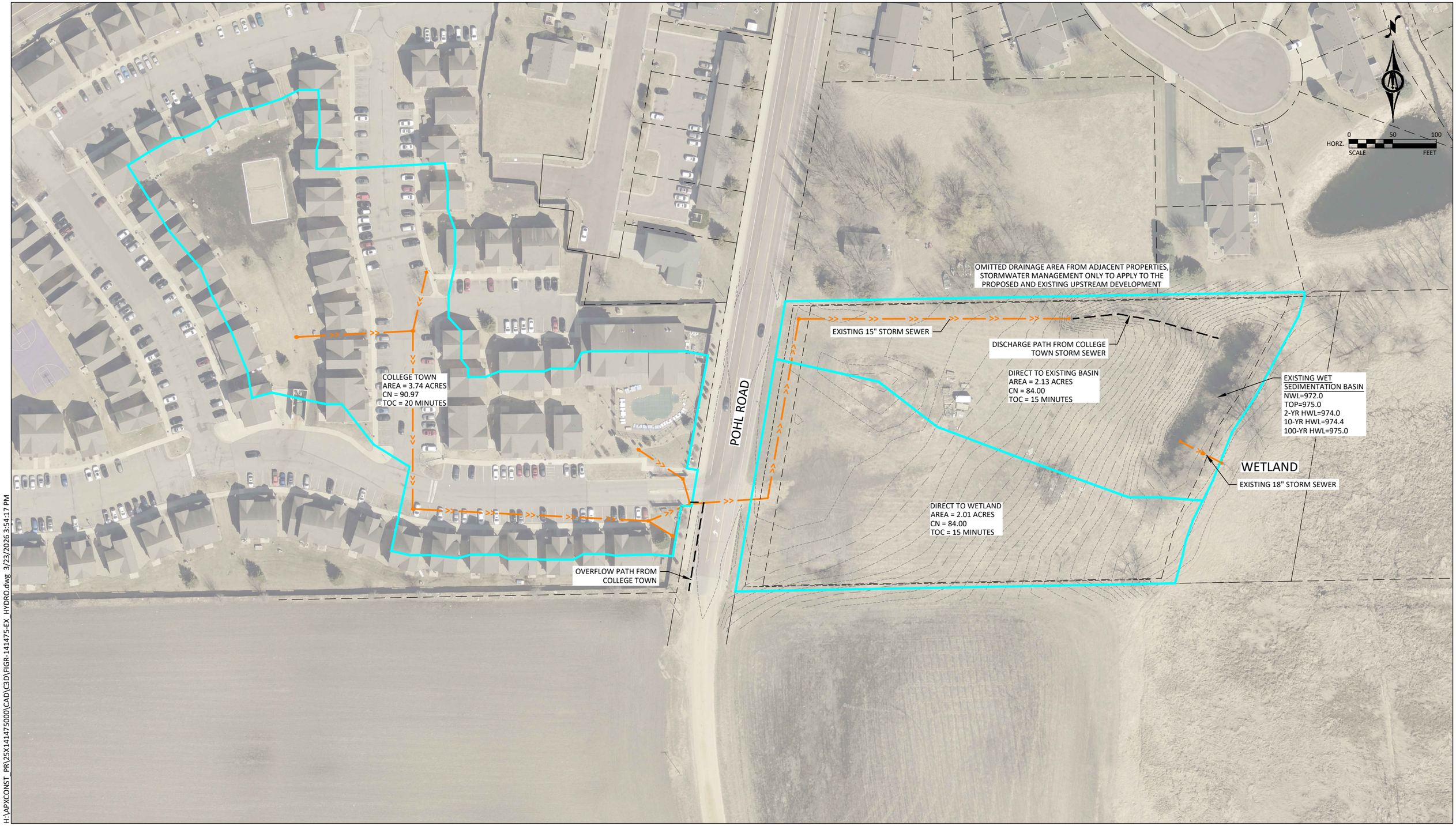
	Elev	Area (Square Feet)	Area (Acres)	Incr. Volume (Acre-Feet)	Total Volume (Acre-Feet)	
	Dead Storage Volume					
Pond Bottom:	966	1000	0.02	0.00	0.00	
	967	1710	0.04	0.03	0.03	
	968	2605	0.06	0.05	0.08	
	969	3685	0.08	0.07	0.15	
	970	4965	0.11	0.10	0.25	
Bench Bottom:	971	6480	0.15	0.13	0.38	
Maintained Water Surface:	972	12370	0.28	0.21	0.59	Meets Req'm
	Water Quality Volume					
Maintained Water Surface:	972	12370	0.28	0.00	0.00	
Water Quality Bump Elev:	974	16400	0.38	0.66	0.66	Meets Req'm
	Extended Retention					
Water Quality Bump Elev:	974	16400	0.38	0.66	0.66	
	975	18500	0.42	0.40	1.06	
	976	20500	0.47	0.45	1.51	
Pond Top:	977	23000	0.53	0.50	2.01	

Discharge Requirements

(5.66 cfs per acre of surface area of pond)

Surface Area of Pond at Water Quality Bump Elevation:	0.38	acres
Maximum Discharge Rate at Water Quality Bump Elevation:	2.13	cfs
Designed Discharge Rate at Water Quality Bump Elevation:	2.06	cfs

Basin High Water Levels	
2-year	974.4
10-year	975.2
100-year	976.5



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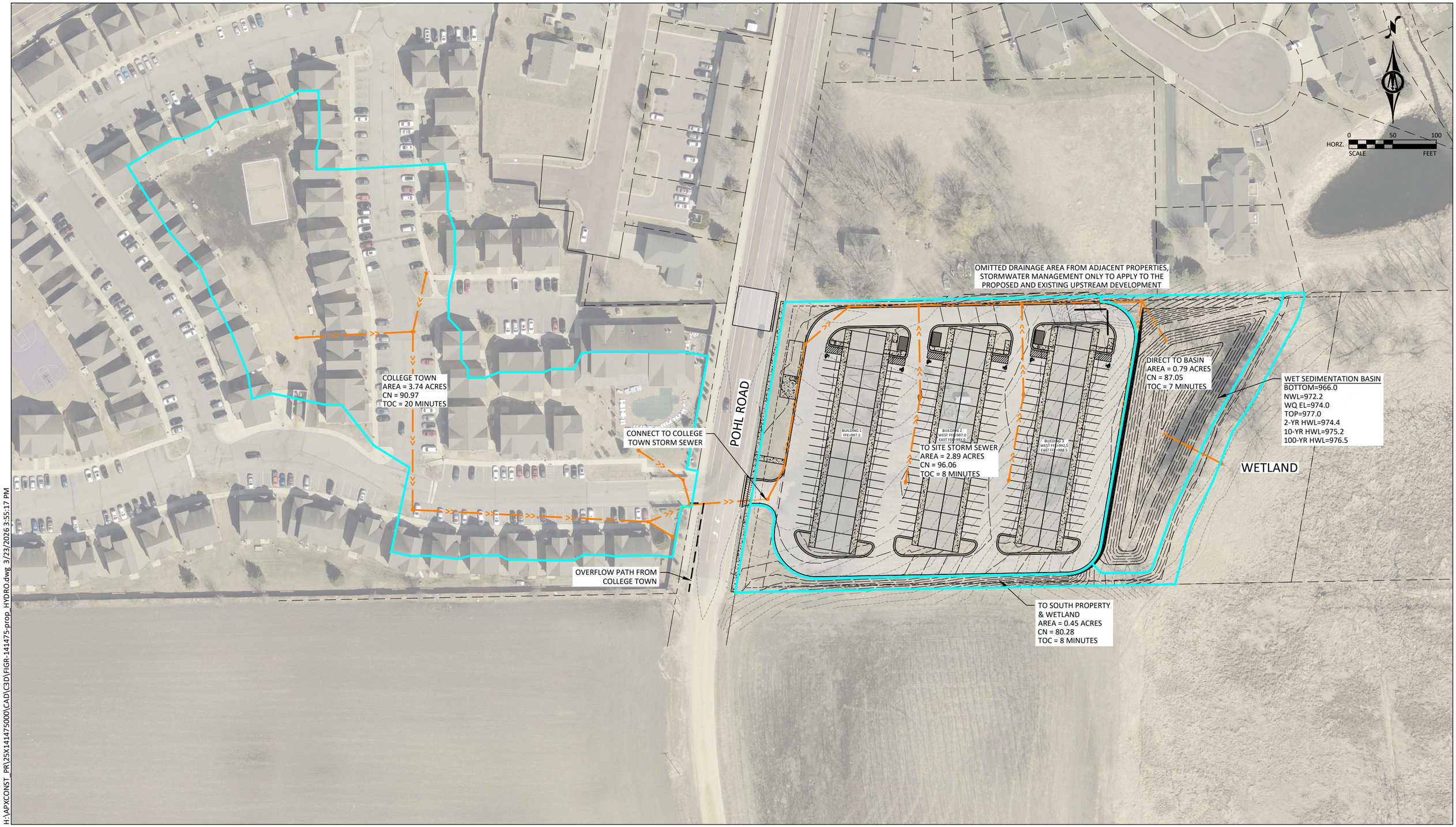

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BOLTON & MENK
Real People. Real Solutions.

1960 Premier Drive
Mankato, MN 56001

Phone: (507) 625-4171
Bolton-Menk.com

March 17, 2026

Cory Bienfang
City Engineer
City of Mankato
Desk: 507-387-8643

Reference: Pohl Apartments
Mankato. MN

Subject: Trip Generation Memorandum

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.

By: _____
Anna Irby, P.E.
License No. 63412

Date: March 17, 2026

This letter has been prepared to provide the trip generation potential and projected distribution for the proposed 84 apartment unit development east of Pohl Road in Mankato. MN. A site plan and site location map have been attached for reference.

Trip Generation

Average weekday daily, AM peak hour, and PM peak hour trips for the proposed development were estimated using methodology contained within the ITE *Trip Generation Manual*, 12th Edition.

Proposed Trip Generation Summary

Land Use (ITE Code)	Intensity	Daily Traffic (vpd)	Weekday AM Peak Hour Trips (vph)			Weekday PM Peak Hour Trips (vph)		
			Enter	Exit	Total	Enter	Exit	Total
Multifamily Housing [Low-Rise] (220)	84 Units	594	10	32	42	30	18	48

The proposed development is expected to generate approximately 594 weekday daily trips with 42 total trips occurring during the AM peak hour and 48 total trips occurring during the PM peak hour. These expected trip generation volumes are below the typical MnDOT (250 peak-hour vehicle trips or 2,500 daily vehicle trips) and Blue Earth County (100 peak hour vehicle trips) thresholds for consideration of a Traffic Impact Study.

Distribution

Based on the development in the area, it is expected that the vast majority of the trips (likely close to 100%) will travel to/from the north. South of the site is very rural and remains unpaved. Employment centers, schools, and retail development are located to the north.m Since there is already a two-way, left-turn lane adjacent to the proposed site driveway, no additional turn lanes are recommended at the site driveway.

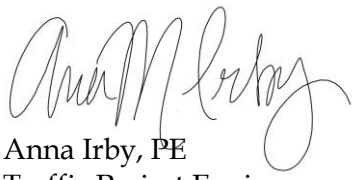
Conclusion

The trip generation potential for the proposed apartment development is below the typical MnDOT (250 peak-hour vehicle trips or 2,500 daily vehicle trips) and Blue Earth County (100 peak hour vehicle trips) thresholds for consideration of a Traffic Impact Study.

Additionally, since there is already a two-way, left-turn lane adjacent to the proposed site driveway and very few site trips are expected to travel to/from the south, no additional turn lanes are recommended at the site driveway.

If you have any questions or concerns, please do not hesitate to contact me.

Sincerely,
Bolton & Menk, Inc.

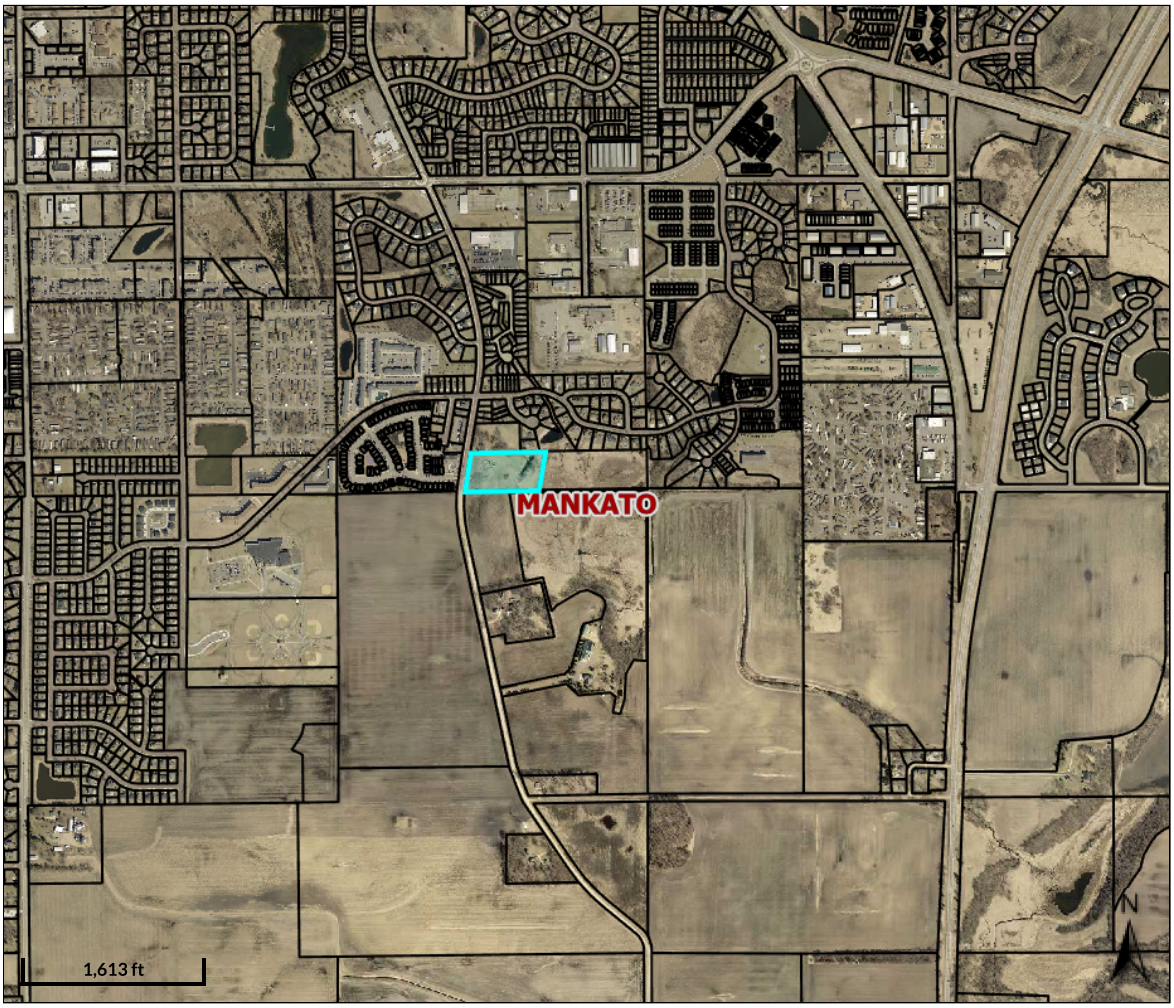


Anna Irby, PE
Traffic Project Engineer

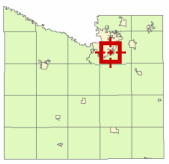
Attachments: Site Plan
Site Location Map

Bolton & Menk is an equal opportunity employer.

BLUE EARTH COUNTY



Overview



Legend

Cartography Urban

- Lot Dim Carto 100
- Lot Number Carto 100
- Parcel Acreage Carto 100
- Parcel Dim Carto 100
- Parcel Owner Hook 100
- Railroad Name Carto 100
- Road Name Carto 100
- Sub Blk Number Carto 100

Cartography Rural

- Lot Dim Carto 400
- Lot Number Carto 400
- Parcel Acreage Carto 400
- Parcel Dim Carto 400
- Parcel Owner Hook 400
- Road Name Carto 400
- Sub Blk Number Carto 400
- Water Name Carto 400

- **Tax Parcels**
- **Township Names**
- **MN-County**

Parcel ID	R010920479029	**Class**	201- 1A/1B/4BB RESIDENTIAL SINGLE UNIT	**Owner Address**	POHL TOWNHOMES LLC
Sec/Twp/Rng	20-108-26	**Acreage**	4.83		1531 MADISON AVE
Property Address					MANKATO, MN 56001
District	01077				
Brief Tax Description	CAMPUS COTTAGES LOT 1 BLK 2 04.830AC				
	(Note: Not to be used on legal documents)				

PROVIDE CLEAN SAWCUTS ON ALL MATCH POINTS

ROADWAY UTILITY PATCH

REMOVE & REPLACE C&G, PAVEMENT SECTION, AND DRAINTILE. MATCH EXISTING SECTIONS, GRADES, MATERIALS, ETC.

POHL ROAD

PUBLIC WALK
5-FT WIDE SIDEWALK & 3-4-FT BOULEVARD

8" CONCRETE DRIVEWAY

B618 C&G, TYP

6' SETBACK

30' SETBACK

80.7'

34'

36.6'

33.9'

24'

36.5'

BITUMINOUS PAVEMENT, TYP

10'X16' WASTE ENCLOSURE

BIKE RACK PAD

16'X40' DOG RUN

18'X26' PATIO AREA

23 EACH 9'X19' STALLS

46 EACH 9'X19' STALLS

21'

24'

20'

BUILDING 1
FFE=997.5

BUILDING 2
WEST FFE=997.0
EAST FFE=993.0

BUILDING 3
WEST FFE=992.5
EAST FFE=988.5

7' WIDE, 4" THICKENED EDGE WALK, TYP

GRINDER STATION

BASIN BREAKLINE, TYP

16.5' WETLAND BUFFER

MINIMUM 42-INCH HEIGHT RAIL OR FENCE TO BE PROVIDED ALONG LENGTH OF RETAINING WALL (DETAIL TO BE DETERMINED)

RETAINING WALL, SEE GRADING PLAN FOR ELEVATIONS

29'

42'

7-FT WIDE THICKENED EDGE WALK, TYP

PARKING SUMMARY
84 UNITS REQUIRING 1.5 STALLS/UNIT
126 STALLS REQUIRED
138 STALLS PROVIDED

DENSITY CALCULATIONS
COMBINED LOT SIZE - 11.67 ACRES
PROPOSED UNITS - 84 UNITS
DENSITY = 7.2 UNITS/ACRE
CODE MAXIMUM = 7.26 UNITS/ACRE (6,000 SF/UNIT)
BUILDING COVERAGE = 0.70 ACRES = 6%

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HORZ. SCALE 0 25 50 FEET

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

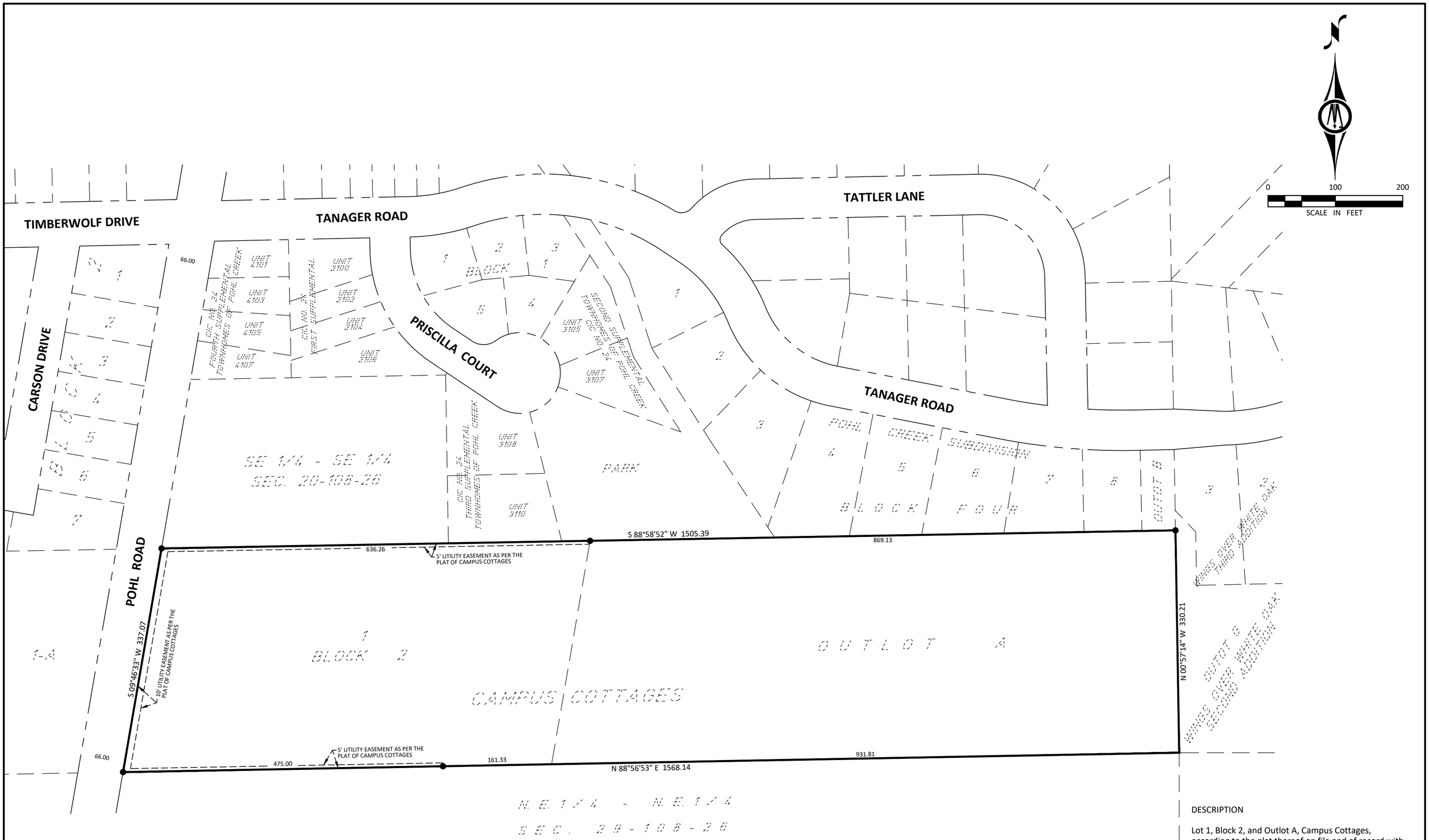
ALEC W. PIETZ, P.E.
LIC. NO. 59617 DATE XX/XX/XXXX

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. 25X.141475			

POHL TOWNHOMES LLC
POHL LOFTS
SITE PLAN

SHEET C5.01



DESCRIPTION

Lot 1, Block 2, and Outlot A, Campus Cottages, according to the plat thereof on file and of record with the Blue Earth County Recorder.

I hereby certify that this survey, plan, or report was prepared by me or under my direct supervision and that I am a duly Licensed Land Surveyor under the laws of the State of Minnesota.

Michael M. Eichers
License Number 46564

03/24/2026
Date

CITY ACKNOWLEDGMENT

This Lot Combine has been reviewed and approved pursuant to Section 11.14 of the Mankato City Code by the City Engineer and the Planning Director.

Signed this ___ day of _____ 2026.

_____
Mankato City Engineer

Signed this ___ day of _____ 2026.

_____
Mankato Planning Director

ADMINISTRATIVE LOT COMBINE
MANKATO, MINNESOTA

LOT 1, BLOCK 2, & OUTLOT A, CAMPUS COTTAGES

BOLTON & MENK
1960 Premier Drive
Mankato, MN 56001
Phone: (507) 625-4171

FOR: POHL TOWNHOMES, LLC

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Site Plan and Traffic Advisory Review Committee **1. 2.**

Meeting Date: 04/14/2026

Title

CY17-26

Request of Bolton and Menk, on behalf of the owner, Tripoint Development, LLC., for a certificate of design compliance for the construction of two new structures in the Highway Gateway Overlay District. The subject properties are described as Lot 2 and Lot 3, Block 1, River Hills Mall Addition No. 3, (Blue Earth County PID's R010909426050 and R010909426049).

Applicant

The applicant is Bolton and Menk, on behalf of the owner, Tripoint Development, LLC.

Request

The applicant is requesting a review for a certificate of design compliance for the construction of two new structures in the Highway Gateway Overlay District.

Location

The subject properties are located at 1830 and 1840 Adams St.

Existing Land Use

The existing properties are currently vacant.

Zoning

The property is zoned B-3, Highway Business District.

Environmentally Sensitive Areas

There are no known environmentally sensitive areas on the site.

Public Utilities

The applicant will need to connect to public utilities. Water Access Charges and Sewer Access Charges will apply. Costs will be determined by City Staff.

City Code

The City Code pertaining to the B-3, Highway Business District may be viewed at the following link.

https://library.municode.com/mn/mankato/codes/code_of_ordinances?nodeId=PTIICOOR_CH10LAUSDE_ARTVCODI_DIV8HIBUDI

The City Code pertaining to the Certificate of Design Compliance may be viewed at the following link.

https://library.municode.com/mn/mankato/codes/code_of_ordinances?nodeId=PTIICOOR_CH10LAUSDE_ARTVCODI_DIV9GTGAOVDI_SDVIGADERECEDECO

Review

The applicant is seeking a certificate of design compliance for the construction of two buildings in the highway gateway district.

The site is located to the west of the Adams Street entrance to River Hills Mall. The current addresses for the two parcels are 1830 and 1840 Adams St.

Plans show the first building to be approximately 95' X 40', with two tenant suites, and located on the easterly side of the property. A second building, to be approximately 90' X 50', with three tenant suites, is located on the northwesterly side of the lot. Tenants are not currently identified.

Exterior finishes for the buildings are shown to include thin stone veneer, metal panels, and aluminum storefronts. Colors are shown to be earth tones with wood accents. The two buildings are complimentary to each other but are not exact replicas.

Landscaping is shown around the site to provide the necessary screening and required tree plantings. A dumpster enclosure has been identified to serve both buildings.

Attachments

General Location Map
Aerial Plan
Site Plan
Administrative Land Combination
Civil Plans
Architectural Plans
Traffic Memo

General Location Map



Date: March 2026

Author:

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.

N

Aerial



Date: March 2026

Author:

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.

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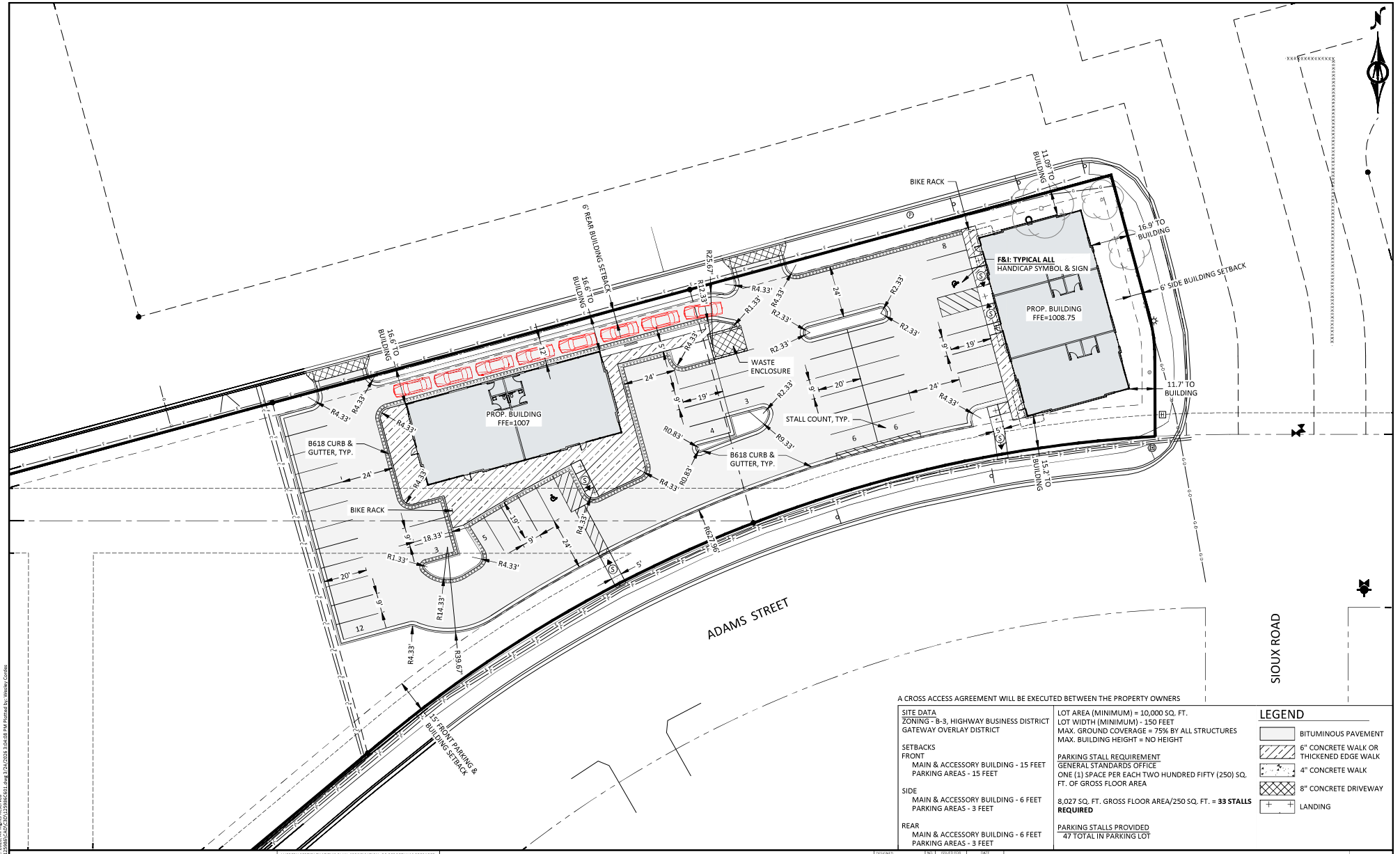

A CROSS ACCESS AGREEMENT WILL BE EXECUTED BETWEEN THE PROPERTY OWNERS

SITE DATA
ZONING - B-3, HIGHWAY BUSINESS DISTRICT
GATEWAY OVERLAY DISTRICT

SETBACKS
FRONT
MAIN & ACCESSORY BUILDING - 15 FEET
PARKING AREAS - 15 FEET

SIDE
MAIN & ACCESSORY BUILDING - 6 FEET
PARKING AREAS - 3 FEET

REAR
MAIN & ACCESSORY BUILDING - 6 FEET
PARKING AREAS - 3 FEET

LOT AREA (MINIMUM) = 10,000 SQ. FT.
LOT WIDTH (MINIMUM) - 150 FEET
MAX. GROUND COVERAGE = 75% BY ALL STRUCTURES
MAX. BUILDING HEIGHT = NO HEIGHT

PARKING STALL REQUIREMENT
GENERAL STANDARDS OFFICE
ONE (1) SPACE PER EACH TWO HUNDRED FIFTY (250) SQ. FT. OF GROSS FLOOR AREA

8,027 SQ. FT. GROSS FLOOR AREA/250 SQ. FT. = **33 STALLS REQUIRED**

PARKING STALLS PROVIDED
47 TOTAL IN PARKING LOT

LEGEND
- BITUMINOUS PAVEMENT
- 6" CONCRETE WALK OR THICKENED EDGE WALK
- 4" CONCRETE WALK
- 8" CONCRETE DRIVEWAY
- LANDING

HORZ. 0 20 40
SCALE FEET

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

WESLEY S. [illegible], P.E.
LIC. NO. 64053 DATE MM/DD/YYYY

BOLTON & MENK

1960 PREMIER DRIVE
MANKATO, MN 56001
Phone: (507) 625-4171
Email: Mankato@bolton-menk.com
www.bolton-menk.com

DESIGNED WSC	NO.	ISSUED FOR	DATE
DRAWN WSC			
CHECKED CJL			
CLIENT PROJ. NO. 0M3.125986			

TRIPOINT DEVELOPMENT LLC
TRIPOINT DEVELOPMENT - RIVER HILLS MALL
SITE PLAN

SHEET C6.01

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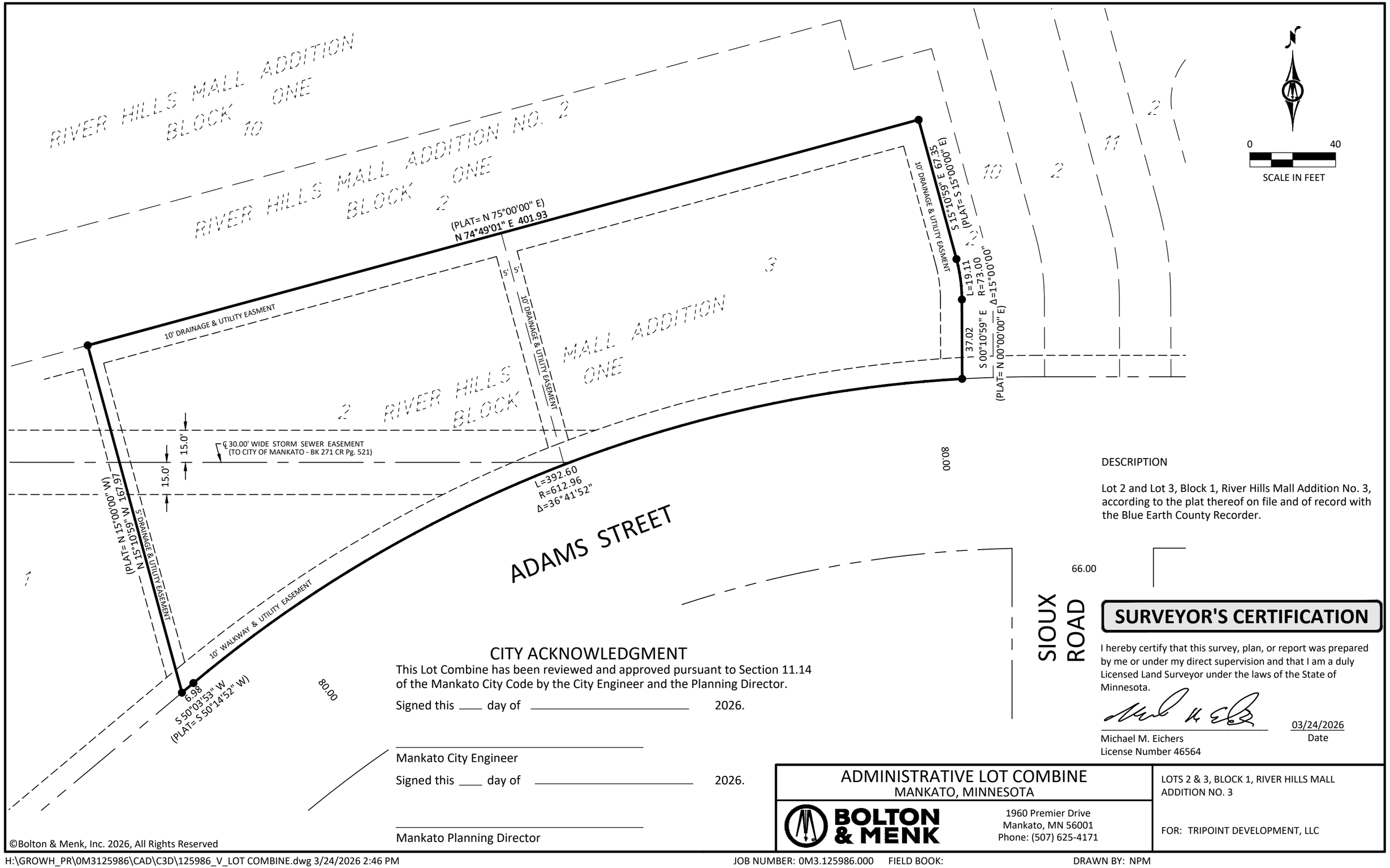

DESCRIPTION

Lot 2 and Lot 3, Block 1, River Hills Mall Addition No. 3, according to the plat thereof on file and of record with the Blue Earth County Recorder.

CITY ACKNOWLEDGMENT

This Lot Combine has been reviewed and approved pursuant to Section 11.14 of the Mankato City Code by the City Engineer and the Planning Director.

Signed this ____ day of _____ 2026.

_____
Mankato City Engineer

Signed this ____ day of _____ 2026.

_____
Mankato Planning Director

SURVEYOR'S CERTIFICATION

I hereby certify that this survey, plan, or report was prepared by me or under my direct supervision and that I am a duly Licensed Land Surveyor under the laws of the State of Minnesota.

Michael M. Eichers
License Number 46564

03/24/2026
Date

ADMINISTRATIVE LOT COMBINE
MANKATO, MINNESOTA

LOTS 2 & 3, BLOCK 1, RIVER HILLS MALL ADDITION NO. 3

FOR: TRIPOINT DEVELOPMENT, LLC

BOLTON & MENK
1960 Premier Drive
Mankato, MN 56001
Phone: (507) 625-4171

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TRIPOINT DEVELOPMENT LLC

CONSTRUCTION PLANS FOR

TRIPOINT DEVELOPMENT - RIVER HILLS MALL

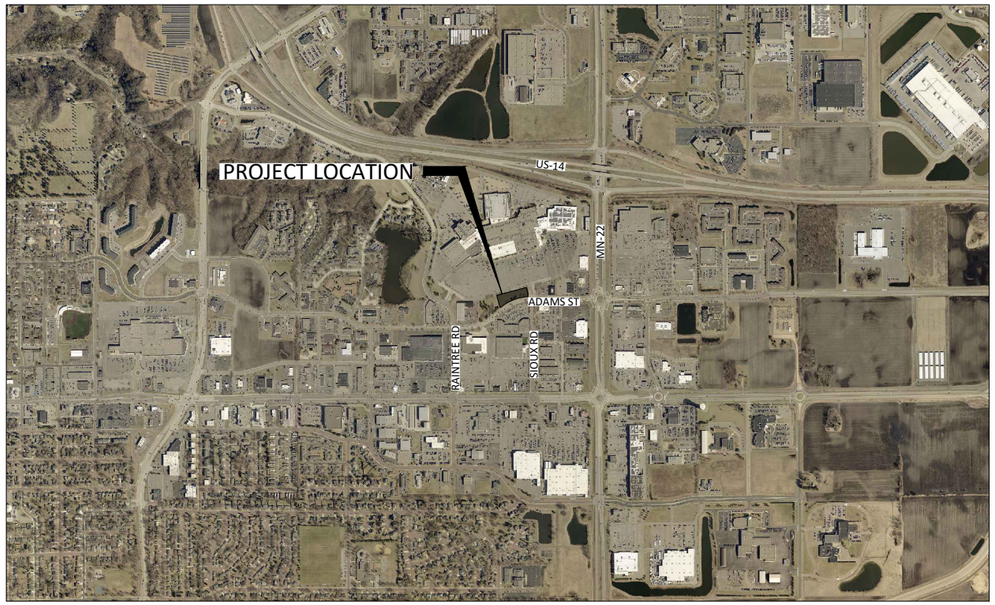
SITE GRADING, PAVEMENT AND SIDEWALK CONSTRUCTION
WATER MAIN, SANITARY SEWER AND STORM SEWER INSTALLATION

MARCH, 2026

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."

MAP OF THE
CITY OF MANKATO
BLUE EARTH COUNTY, MN



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SCALE FEET

SHEET NUMBER	SHEET TITLE
GENERAL	
G0.01	TITLE SHEET
G0.02	LEGEND
G2.01	PROJECT OVERVIEW
CIVIL	
C0.01	EXISTING CONDITIONS & REMOVAL PLAN
C1.01 - C1.10	CONSTRUCTION DETAILS
STORMWATER POLLUTION PREVENTION PLAN	
C2.01	PROJECT INFORMATION & LOCATION MAP
C2.02	NARRATIVE
C2.03	SITE & SOILS MAP
C2.04 - C2.05	BEST MANAGEMENT PRACTICE DETAILS
C2.06	EROSION & SEDIMENT CONTROL PLAN
GRADING PLAN	
C3.01	GRADING PLAN
SANITARY & WATER SERVICE PLAN	
C4.01	SANITARY & WATER SERVICE PLAN
STORM SEWER PLAN	
C5.01	STORM SEWER PLAN
SITE PLAN	
C6.01	SITE PLAN
LANDSCAPE	
L1.01	LANDSCAPE PLAN
L1.02	LANDSCAPE NOTES & DETAILS

THIS PLAN SET CONTAINS 26 SHEETS.

SPECIFICATIONS REFERENCE:
MNDOT STANDARD SPECIFICATIONS FOR CONSTRUCTION, CURRENT EDITION
CEAM STANDARD SPECIFICATIONS FOR CONSTRUCTION, CURRENT EDITION

⌖ BM=1007.87'
TOP NUT HYDRANT
NORTH SIDE OF ADAMS STREET,
MID-BLOCK BETWEEN SIOUX RD &
RAINTREE RD

PROJECT DATUM: BLUE EARTH COUNTY
HORIZONTAL: 2011 COUNTY COORDINATES
VERTICAL: NAVD 1988

RECORD DRAWING INFORMATION
OBSERVER:
CONTRACTOR:
DATE:

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

WESLEY S. CORDES, P.E.
LIC. NO. 64053 DATE MM/DD/YYYY

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
WSC			
DRAWN			
WSC			
CHECKED			
CJL			
CLIENT PROJ. NO.			
0M3.125986			

TRIPOINT DEVELOPMENT LLC
TRIPOINT DEVELOPMENT - RIVER HILLS MALL
TITLE SHEET

SHEET
G0.01

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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

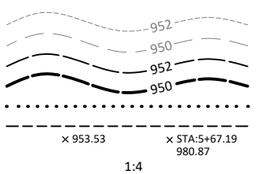
EXISTING UTILITY LINES

- 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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NOT FOR CONSTRUCTION

WESLEY S. CORDES, P.E.
LIC. NO. 64053 DATE MM/DD/YYYY

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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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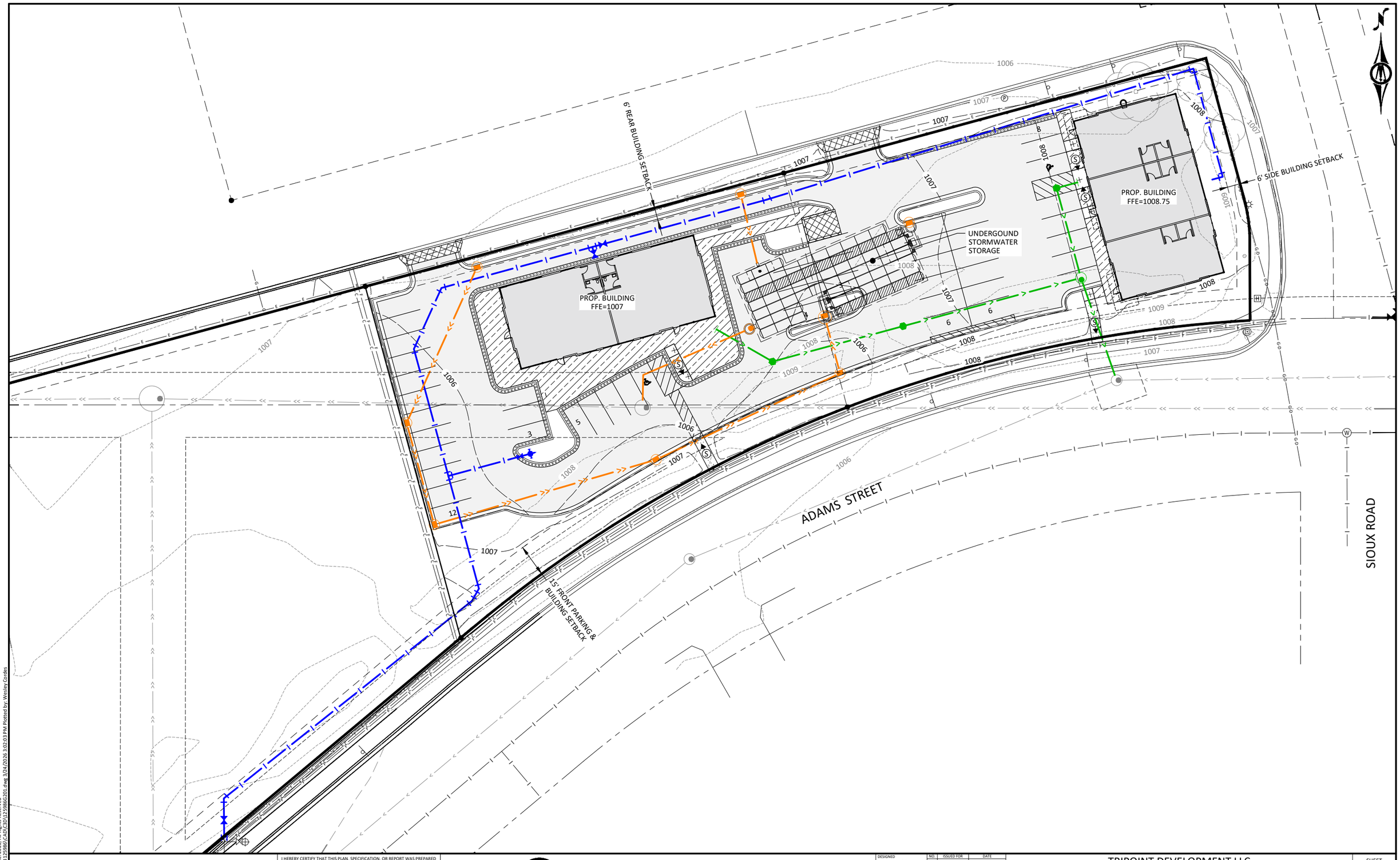
CHECKED	CJL		
CLIENT PROJ. NO.	0M3.125986		

TRIPOINT DEVELOPMENT LLC
TRIPOINT DEVELOPMENT - RIVER HILLS MALL
LEGEND

SHEET G0.02



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HORZ. SCALE 0 20 40 FEET

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TRIPOINT DEVELOPMENT LLC

TRIPOINT DEVELOPMENT - RIVER HILLS MALL

PROJECT OVERVIEW

SHEET G2.01

2' CONCRETE SAWCUT & PATCHBACK
REMOVE EX. CURB & GUTTER
REMOVE EX. TREE
CONCRETE
U POST
LANE ARROWS
HANDICAP CROSSING
STOP
3 PAIR XCEL ENERGY
CENTER POINT ENERGY
BITUMINOUS
MH STRM R=1006.74 INV: NE 992.54
SIOUX ROAD
CONCRETE
1006
1007
1008
1009
℄ 30.00' WIDE STORM SEWER EASEMENT (TO CITY OF MANKATO - BK 271 CR Pg. 521)
48" RCP STM
CONCRETE
RIVER HILLS MALL ENTRANCE 2
NO PARKING
24" PVC SAN
27" RCP STM
MH STRM R=1006.27 INV: NA
36" RCP STM
MH SSWR R=1006.40 INV: E 984.55 INV: SW 984.42
10" DI WM
STREET CUT FOR SANITARY SEWER SHALL BE FULL DEPTH. REPLACE EX. ROAD SECTION & CURB & GUTTER.
CLEAR & GRUB EX. BUSHES
MH STRM R=1007.58 INV: NW 993.68
ADAMS STREET
CONCRETE
24" PVC SAN
MH SSWR R=1005.76 INV: NE 984.19 INV: SW 984.16
54" RCP STM
BENCH MARK TOP NUT HYDRANT
& UTILITY EASEMENT

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TRIPOINT DEVELOPMENT LLC
TRIPOINT DEVELOPMENT - RIVER HILLS MALL
EXISTING CONDITIONS & REMOVAL PLAN

SHEET C0.01

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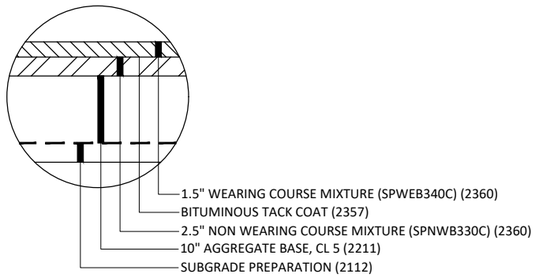
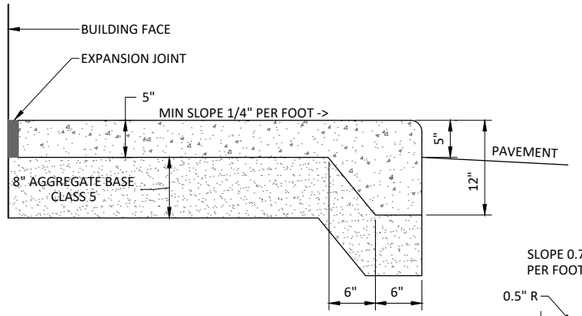
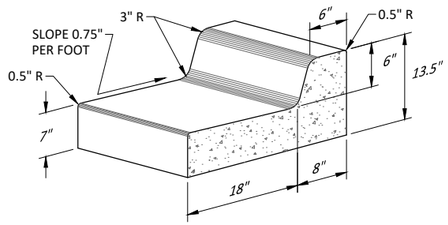


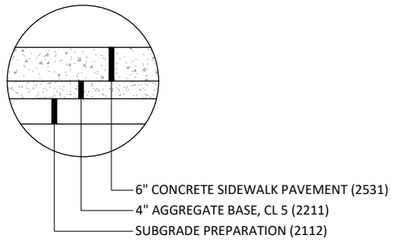
BITUMINOUS PAVEMENT SECTION
NOT TO SCALE



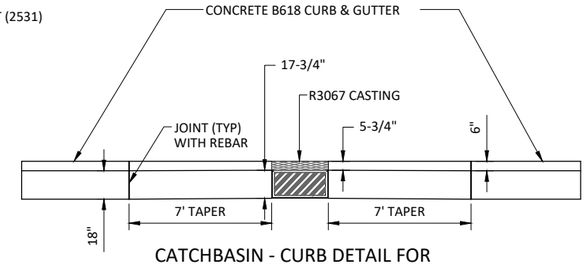
THICKENED EDGE
CONCRETE SIDEWALK
NOT TO SCALE



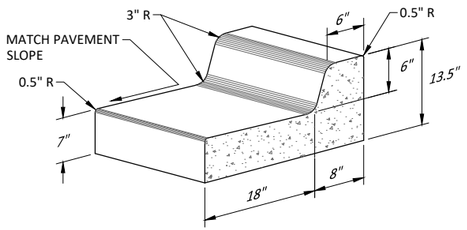
CONCRETE CURB & GUTTER
DESIGN B618
NOT TO SCALE



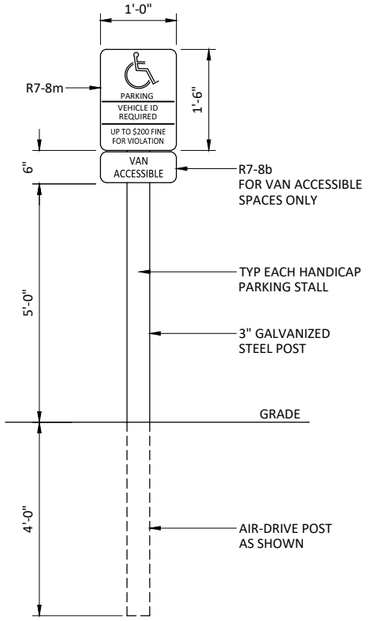
6" CONCRETE WALK
NOT TO SCALE



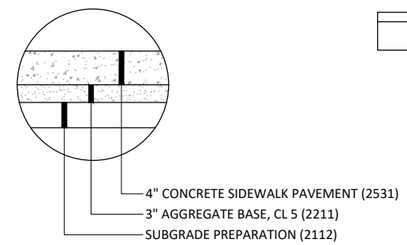
CATCHBASIN - CURB DETAIL FOR
R-3067 IN "B" STYLE CURB
NOT TO SCALE



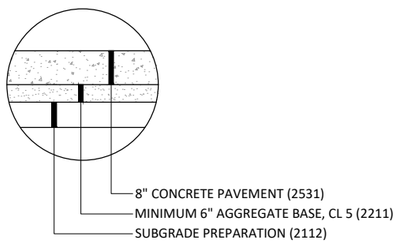
CONCRETE CURB & GUTTER
DESIGN B618, GUTTER OUT
NOT TO SCALE



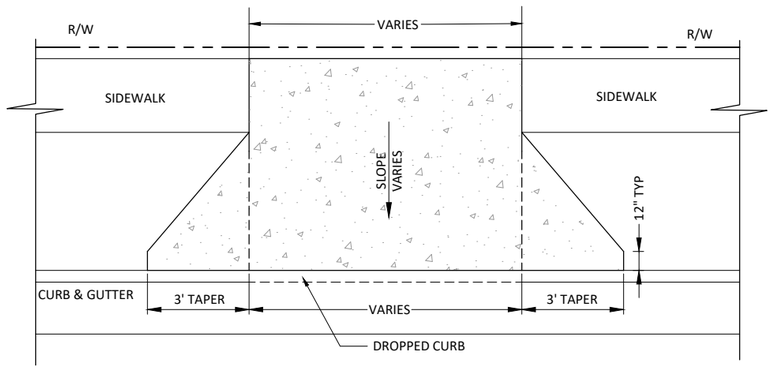
ACCESSIBLE PARKING SIGN
NOT TO SCALE



4" CONCRETE WALK
NOT TO SCALE



8" CONCRETE DRIVEWAY
NOT TO SCALE
NOTE: ALSO USE FOR WASTE ENCLOSURES



CONCRETE DRIVEWAY DETAIL
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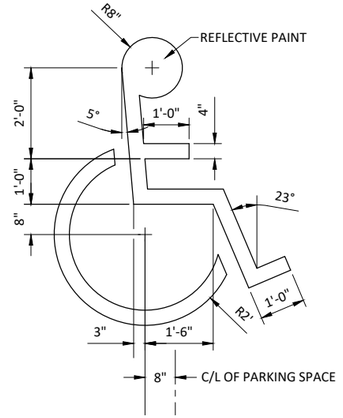

INTERNATIONAL
HANDICAP SYMBOL
NOT TO SCALE

PEDESTRIAN RAMP DETAILS:
SEE LATEST MNDOT STANDARD PLANS 5-297.250 FOR PROPER PEDESTRIAN RAMP DETAILS

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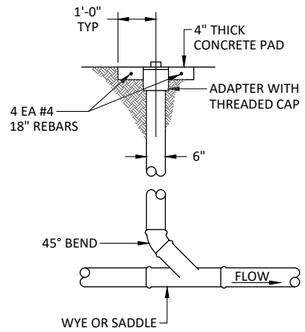
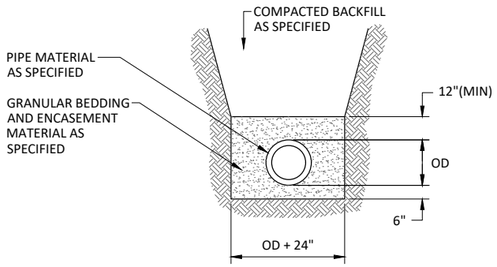
TRIPOINT DEVELOPMENT LLC
TRIPOINT DEVELOPMENT - RIVER HILLS MALL
CONSTRUCTION DETAILS
SURFACE DETAILS

SHEET
C1.01



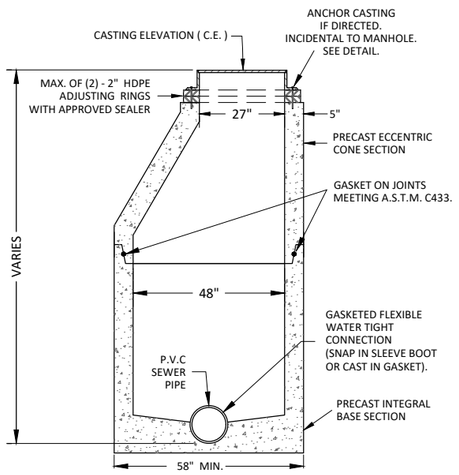
SANITARY SEWER CLEANOUT

NOT TO SCALE



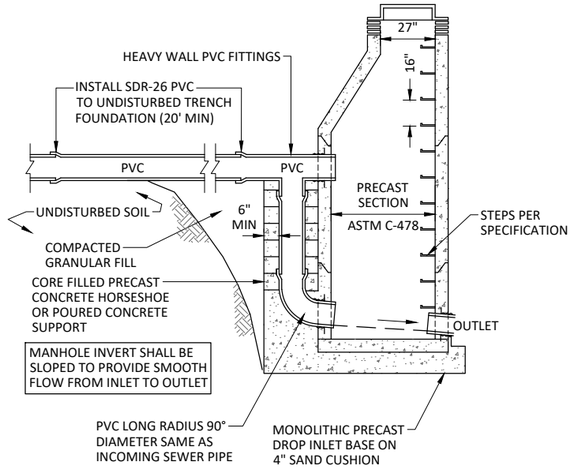
NON-RIGID SANITARY SEWER TRENCH

NOT TO SCALE



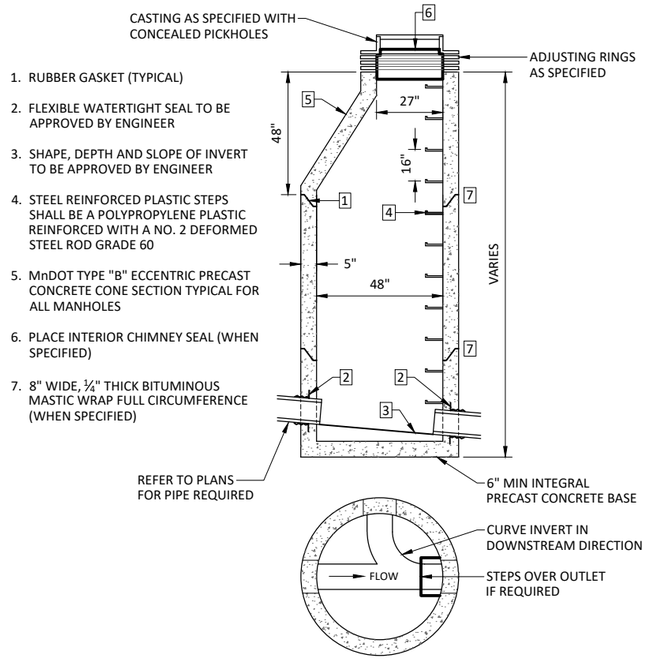
STANDARD 48" SANITARY MANHOLE

NOT TO SCALE



SANITARY MANHOLE
WITH OUTSIDE DROP

NOT TO SCALE

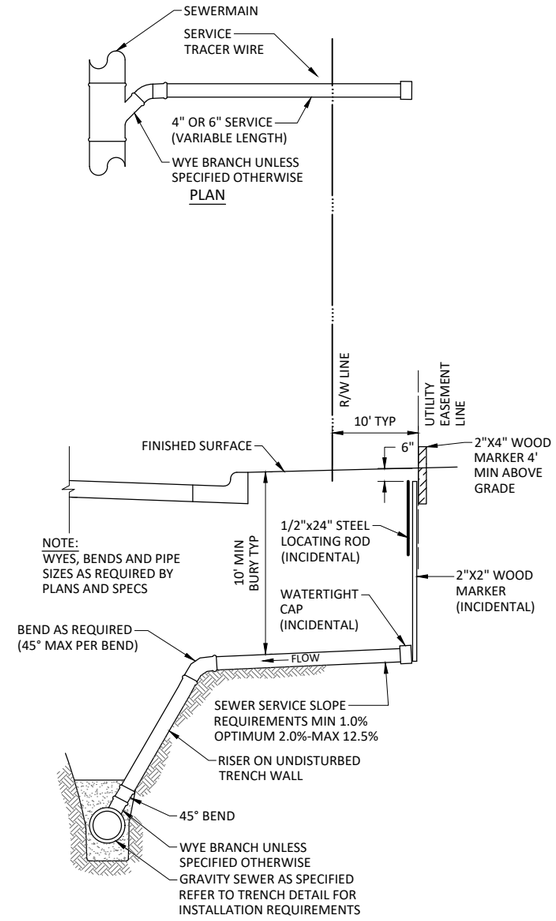


1. RUBBER GASKET (TYPICAL)
2. FLEXIBLE WATERTIGHT SEAL TO BE APPROVED BY ENGINEER
3. SHAPE, DEPTH AND SLOPE OF INVERT TO BE APPROVED BY ENGINEER
4. STEEL REINFORCED PLASTIC STEPS SHALL BE A POLYPROPYLENE PLASTIC REINFORCED WITH A NO. 2 DEFORMED STEEL ROD GRADE 60
5. MnDOT TYPE "B" ECCENTRIC PRECAST CONCRETE 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)

PLAN VIEW

SANITARY MANHOLE (DESIGN 4007C)

NOT TO SCALE



SANITARY SEWER SERVICE
NEW CONSTRUCTION

NOT TO SCALE

TRACER WIRE NOTE:
REFER TO THE MINNESOTA RURAL WATER ASSOCIATION (MRWA) TRACER WIRE SPECIFICATION GUIDE & DETAILS TO PROPERLY INSTALL TRACER WIRE WITH WATERMAIN AND SANITARY SEWER. THE GUIDE CAN BE FOUND AT: mrwa.com/tools.html - Tracer Wire Specification Guide & Details

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NOT FOR CONSTRUCTION

WESLEY S. CORDES, P.E.
LIC. NO. 64053 DATE MM/DD/YYYY

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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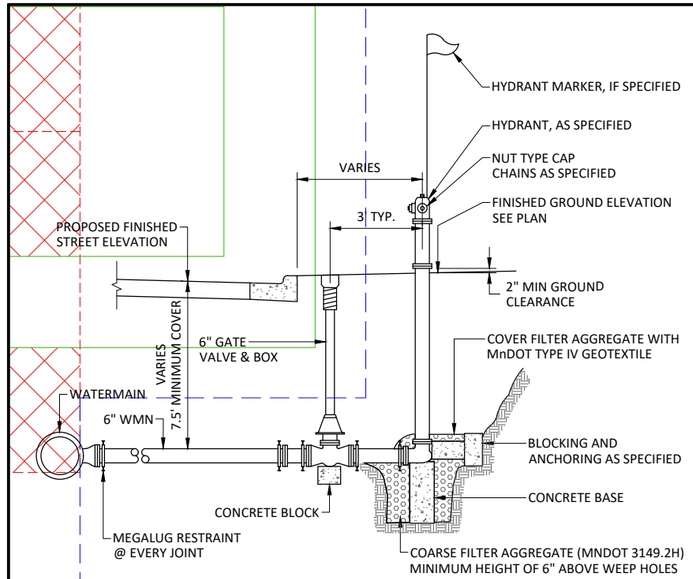
CLIENT PROJ. NO.			
0M3.125986			

TRIPOINT DEVELOPMENT LLC
TRIPOINT DEVELOPMENT - RIVER HILLS MALL
CONSTRUCTION DETAILS
SANITARY SEWER

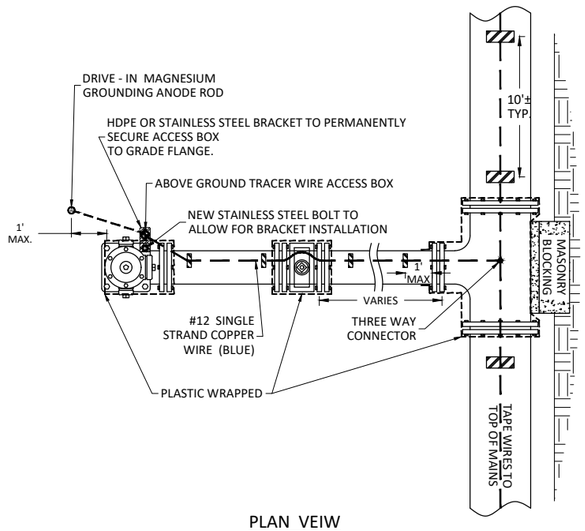
SHEET
C1.02



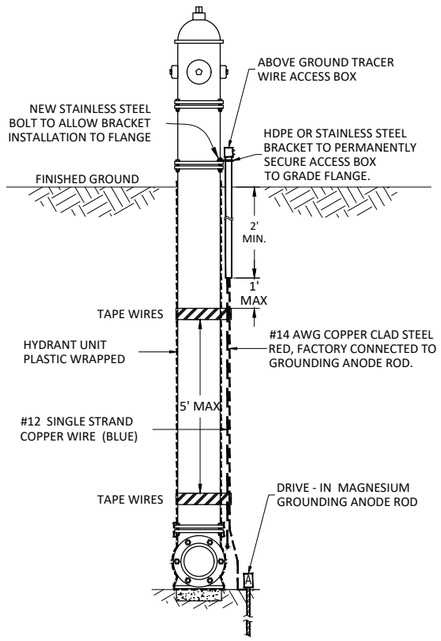
HYDRANTS LOCATED WHERE THE GROUNDWATER TABLE IS ABOVE THE DRAIN OUTLET SHALL HAVE THE OUTLET DRAIN PLUGGED AND SHALL BE EQUIPPED WITH A TAG STATING "PUMP AFTER USE"

HYDRANT INSTALLATION, MEGALUGS

NOT TO SCALE



PLAN VEIW



SECTION VEIW

TRACER WIRE HYDRANT DETAIL

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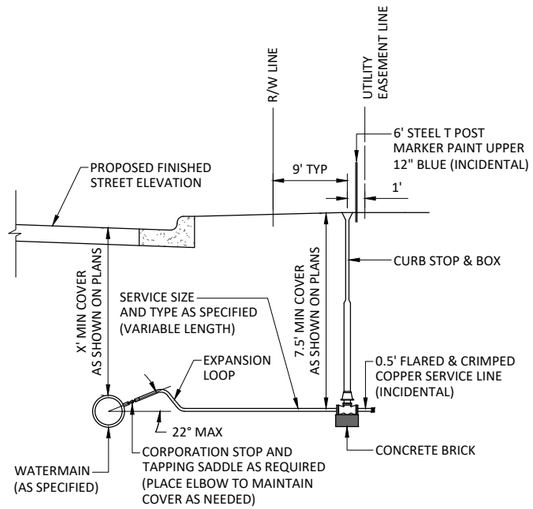
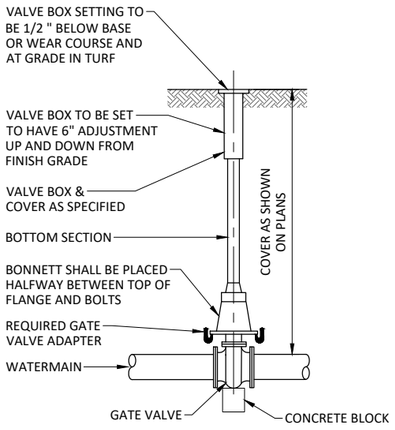


WATER SERVICE INSTALLATION
NEW CONSTRUCTION

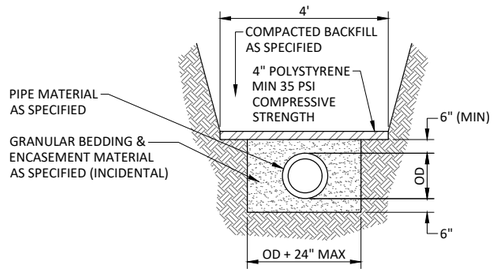
NOT TO SCALE

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



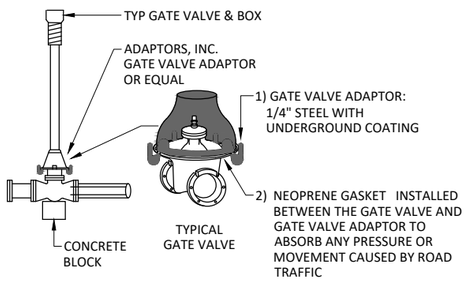
GATE VALVE BOX INSTALLATION

NOT TO SCALE



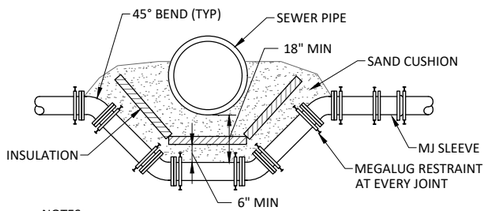
WATERMAIN INSULATION

NOT TO SCALE



GATE VALVE ADAPTOR

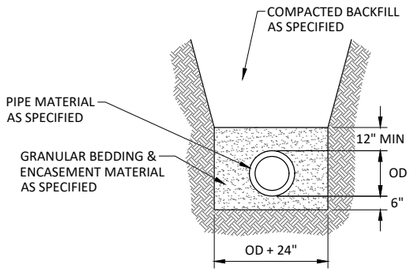
NOT TO SCALE



NOTES:
1. PROVIDE MEGALUG RESTRAINT AT JOINT ON BENDS AND AS SHOWN THIS DETAIL
2. COAT ALL ANCHORAGE AS PER SPECS
3. PROVIDE SAND CUSHION BETWEEN TOP OF WATERMAIN AND BOTTOM OF SEWER PIPE, MIN DIMENSIONS AS SHOWN THIS DETAIL (INCIDENTAL)
4. INSULATION TO BE 2" THICK POLYSTYRENE

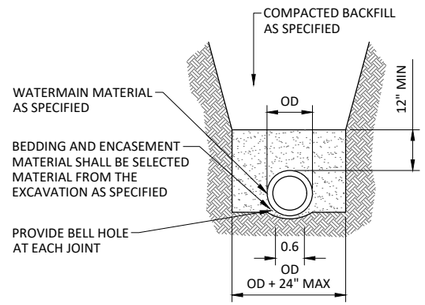
WATERMAIN OFFSET

NOT TO SCALE



PVC WATERMAIN TRENCH

NOT TO SCALE



DIP WATERMAIN TRENCH

NOT TO SCALE

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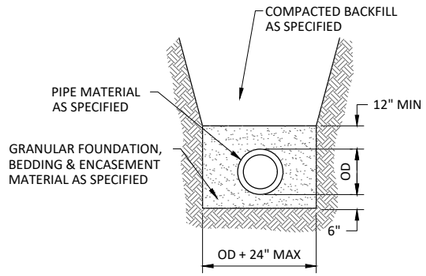
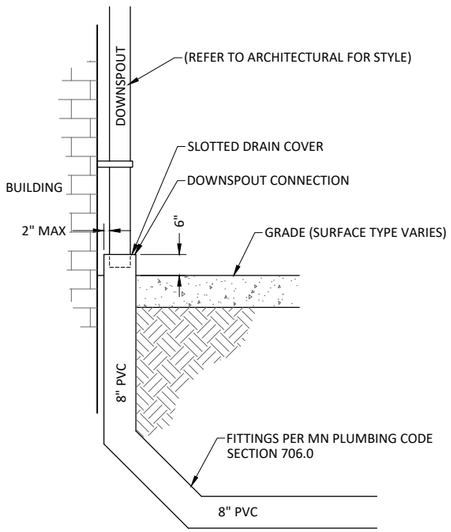
TRIPOINT DEVELOPMENT LLC
TRIPOINT DEVELOPMENT - RIVER HILLS MALL
CONSTRUCTION DETAILS
WATER MAIN

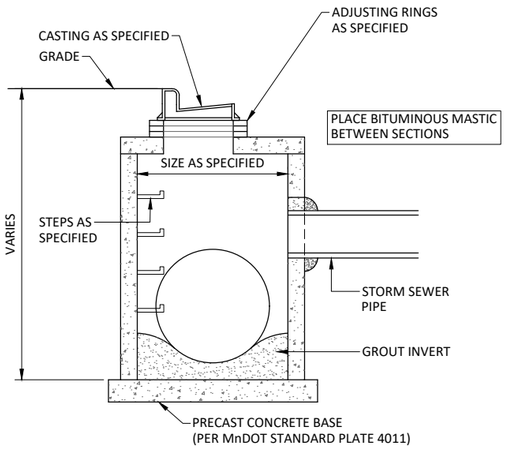
SHEET
C1.03



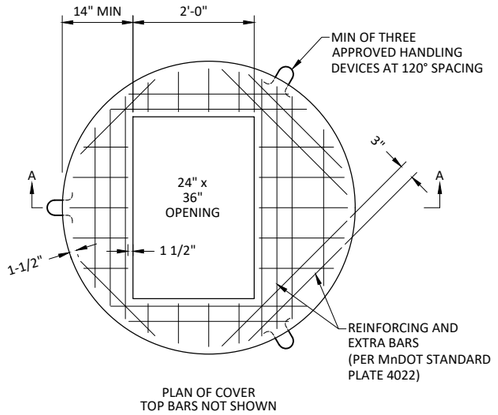
NON-RIGID STORM
SEWER TRENCH
NOT TO SCALE



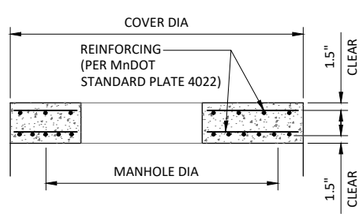
SUBSURFACE ROOF DRAIN CONNECTION
NOT TO SCALE



TYPICAL DESIGN 4022 CATCH BASIN



PLAN OF COVER
TOP BARS NOT SHOWN



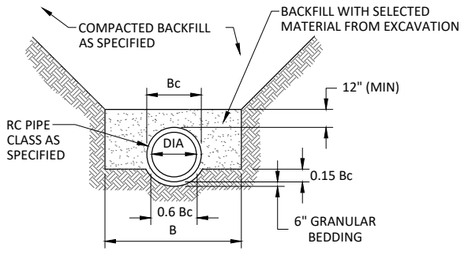
SECTION A-A

NOTES:

1. AASHTO HS 25 LOADING MAX FILL HEIGHT 15'
2. THE # 4022 SHALL BE PERMANENTLY MARKED ON THE TOP COVER
3. EQUIVALENT STEEL AREAS IN WIRE MESH MAY BE USED
4. REINFORCEMENT PER SPEC 3301, GRADE 60 A SINGLE HOOP OF 8ga STEEL WIRE

DESIGNATION:
DESIGN DIAMETER - STANDARD PLATE #
DESIGN 48-4020

STORM SEWER STRUCTURE DESIGN 4022
NOT TO SCALE



PIPE DIA	B
36" OR LESS	Bc + 24"
42" TO 54"	1.5 X Bc
60" OR OVER	Bc + 36"

RC PIPE
CLASS "B" BEDDING
NOT TO SCALE

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TRIPOINT DEVELOPMENT LLC
TRIPOINT DEVELOPMENT - RIVER HILLS MALL
CONSTRUCTION DETAILS
STORM SEWER

SHEET
C1.04

PROJECT INFORMATION	
ENGINEERED PRODUCT MANAGER	
ADS SALES REP	
PROJECT NO.	

Advanced Drainage Systems, Inc.

SiteAssist™
FOR STORMTECH
INSTALLATION INSTRUCTIONS
VISIT OUR WEBSITE

RIVER HILLS RETAIL (SC-800)

MANKATO, MN, USA

SC-800 STORMTECH CHAMBER SPECIFICATIONS

1. CHAMBERS SHALL BE STORMTECH SC-800.
2. CHAMBERS SHALL BE ARCH-SHAPED AND SHALL BE MANUFACTURED FROM VIRGIN, IMPACT-MODIFIED POLYPROPYLENE COPOLYMERS.
3. CHAMBERS SHALL MEET THE REQUIREMENTS OF ASTM F2418, "STANDARD SPECIFICATION FOR POLYPROPYLENE (PP) CORRUGATED WALL STORMWATER COLLECTION CHAMBERS".
4. CHAMBER ROWS SHALL PROVIDE CONTINUOUS, UNOBSTRUCTED INTERNAL SPACE WITH NO INTERNAL SUPPORTS THAT WOULD IMPEDE FLOW OR LIMIT ACCESS FOR INSPECTION.
5. THE STRUCTURAL DESIGN OF THE CHAMBERS, THE STRUCTURAL BACKFILL, AND THE INSTALLATION REQUIREMENTS SHALL ENSURE THAT THE LOAD FACTORS SPECIFIED IN THE AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS, SECTION 12.12, ARE MET FOR: 1) LONG-DURATION DEAD LOADS AND 2) SHORT-DURATION LIVE LOADS, BASED ON THE AASHTO DESIGN TRUCK WITH CONSIDERATION FOR IMPACT AND MULTIPLE VEHICLE PRESENCES.
6. CHAMBERS SHALL BE DESIGNED AND ALLOWABLE LOAD CONFIGURATIONS DETERMINED IN ACCORDANCE WITH ASTM F2787, "STANDARD PRACTICE FOR STRUCTURAL DESIGN OF THERMOPLASTIC CORRUGATED WALL STORMWATER COLLECTION CHAMBERS". LOAD CONFIGURATIONS SHALL INCLUDE: 1) INSTANTANEOUS (<1 MIN) AASHTO DESIGN TRUCK LIVE LOAD ON MINIMUM COVER 2) MAXIMUM PERMANENT (75-YR) COVER LOAD AND 3) ALLOWABLE COVER WITH PARKED (1-WEEK) AASHTO DESIGN TRUCK.
7. REQUIREMENTS FOR HANDLING AND INSTALLATION:
   - TO MAINTAIN THE WIDTH OF CHAMBERS DURING SHIPPING AND HANDLING, CHAMBERS SHALL HAVE INTEGRAL, INTERLOCKING STACKING LUGS.
   - TO ENSURE A SECURE JOINT DURING INSTALLATION AND BACKFILL, THE HEIGHT OF THE CHAMBER JOINT SHALL NOT BE LESS THAN 2".
   - TO ENSURE THE INTEGRITY OF THE ARCH SHAPE DURING INSTALLATION, a) THE ARCH STIFFNESS CONSTANT SHALL BE GREATER THAN OR EQUAL TO 700 LBS/FT/%. THE ASC IS DEFINED IN SECTION 6.2.8 OF ASTM F2418. AND b) TO RESIST CHAMBER DEFORMATION DURING INSTALLATION AT ELEVATED TEMPERATURES (ABOVE 73° F / 23° C), CHAMBERS SHALL BE PRODUCED FROM REFLECTIVE GOLD OR YELLOW COLORS.
8. ONLY CHAMBERS THAT ARE APPROVED BY THE SITE DESIGN ENGINEER WILL BE ALLOWED. UPON REQUEST BY THE SITE DESIGN ENGINEER OR OWNER, THE CHAMBER MANUFACTURER SHALL SUBMIT A STRUCTURAL EVALUATION FOR APPROVAL BEFORE DELIVERING CHAMBERS TO THE PROJECT SITE AS FOLLOWS:
   - THE STRUCTURAL EVALUATION SHALL BE SEALED BY A REGISTERED PROFESSIONAL ENGINEER.
   - THE STRUCTURAL EVALUATION SHALL DEMONSTRATE THAT THE SAFETY FACTORS ARE GREATER THAN OR EQUAL TO 1.95 FOR DEAD LOAD AND 1.75 FOR LIVE LOAD, THE MINIMUM REQUIRED BY ASTM F2787 AND BY SECTIONS 3 AND 12.12 OF THE AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS FOR THERMOPLASTIC PIPE.
   - THE TEST DERIVED CREEP MODULUS AS SPECIFIED IN ASTM F2418 SHALL BE USED FOR PERMANENT DEAD LOAD DESIGN EXCEPT THAT IT SHALL BE THE 75-YEAR MODULUS USED FOR DESIGN.
9. CHAMBERS AND END CAPS SHALL BE PRODUCED AT AN ISO 9001 CERTIFIED MANUFACTURING FACILITY.
10. MANIFOLD SIZE TO BE DETERMINED BY SITE DESIGN ENGINEER. SEE TECH NOTE #6.32 FOR MANIFOLD SIZING GUIDANCE. DUE TO THE ADAPTATION OF THIS CHAMBER SYSTEM TO SPECIFIC SITE AND DESIGN CONSTRAINTS, IT MAY BE NECESSARY TO CUT AND COUPLE ADDITIONAL PIPE TO STANDARD MANIFOLD COMPONENTS IN THE FIELD.
11. ADS DOES NOT DESIGN OR PROVIDE MEMBRANE LINER SYSTEMS. TO MINIMIZE THE LEAKAGE POTENTIAL OF LINER SYSTEMS, THE MEMBRANE LINER SYSTEM SHOULD BE DESIGNED BY A KNOWLEDGEABLE GEOTEXTILE PROFESSIONAL AND INSTALLED BY A QUALIFIED CONTRACTOR.

IMPORTANT - NOTES FOR THE BIDDING AND INSTALLATION OF THE SC-800 SYSTEM

1. STORMTECH SC-800 CHAMBERS SHALL NOT BE INSTALLED UNTIL THE MANUFACTURER'S REPRESENTATIVE HAS COMPLETED A PRE-CONSTRUCTION MEETING WITH THE INSTALLERS.
2. STORMTECH SC-800 CHAMBERS SHALL BE INSTALLED IN ACCORDANCE WITH THE "SC/DC STORMTECH CHAMBER INSTALLATION GUIDE".
3. CHAMBERS ARE NOT TO BE BACKFILLED WITH A DOZER OR AN EXCAVATOR SITUATED OVER THE CHAMBERS. STORMTECH RECOMMENDS 3 BACKFILL METHODS:
   - STONESHOOTER LOCATED OFF THE CHAMBER BED.
   - BACKFILL AS ROWS ARE BUILT USING AN EXCAVATOR ON THE FOUNDATION STONE OR SUBGRADE.
   - BACKFILL FROM OUTSIDE THE EXCAVATION USING A LONG BOOM HOE OR EXCAVATOR.
4. THE FOUNDATION STONE SHALL BE LEVELED AND COMPACTED PRIOR TO PLACING CHAMBERS.
5. JOINTS BETWEEN CHAMBERS SHALL BE PROPERLY SEATED PRIOR TO PLACING STONE.
6. MAINTAIN MINIMUM - 3" (75 mm) SPACING BETWEEN THE CHAMBER ROWS.
7. EMBEDMENT STONE SURROUNDING CHAMBERS MUST BE A CLEAN, CRUSHED, ANGULAR STONE OR RECYCLED CONCRETE; AASHTO M43 #3, 357, 4, 467, 5, 56, OR 57.
8. THE CONTRACTOR MUST REPORT ANY DISCREPANCIES WITH CHAMBER FOUNDATION MATERIALS BEARING CAPACITIES TO THE SITE DESIGN ENGINEER.
9. ADS RECOMMENDS THE USE OF "FLEXSTORM CATCH IT" INSERTS DURING CONSTRUCTION FOR ALL INLETS TO PROTECT THE SUBSURFACE STORMWATER MANAGEMENT SYSTEM FROM CONSTRUCTION SITE RUNOFF.

NOTES FOR CONSTRUCTION EQUIPMENT

1. STORMTECH SC-800 CHAMBERS SHALL BE INSTALLED IN ACCORDANCE WITH THE "SC/DC STORMTECH CHAMBER INSTALLATION GUIDE".
2. THE USE OF CONSTRUCTION EQUIPMENT OVER SC-800 CHAMBERS IS LIMITED:
   - NO EQUIPMENT IS ALLOWED ON BARE CHAMBERS.
   - NO RUBBER TIRED LOADERS, DUMP TRUCKS, OR EXCAVATORS ARE ALLOWED UNTIL PROPER FILL DEPTHS ARE REACHED IN ACCORDANCE WITH THE "SC/DC STORMTECH CHAMBER INSTALLATION GUIDE".
   - WEIGHT LIMITS FOR CONSTRUCTION EQUIPMENT CAN BE FOUND IN THE "SC/DC STORMTECH CHAMBER INSTALLATION GUIDE".
3. FULL 36" (900 mm) OF STABILIZED COVER MATERIALS OVER THE CHAMBERS IS REQUIRED FOR DUMP TRUCK TRAVEL OR DUMPING.

USE OF A DOZER TO PUSH EMBEDMENT STONE BETWEEN THE ROWS OF CHAMBERS MAY CAUSE DAMAGE TO THE CHAMBERS AND IS NOT AN ACCEPTABLE BACKFILL METHOD. ANY CHAMBERS DAMAGED BY THE "DUMP AND PUSH" METHOD ARE NOT COVERED UNDER THE STORMTECH STANDARD WARRANTY.

CONTACT ADS WITH ANY QUESTIONS ON INSTALLATION REQUIREMENTS OR WEIGHT LIMITS FOR CONSTRUCTION EQUIPMENT.

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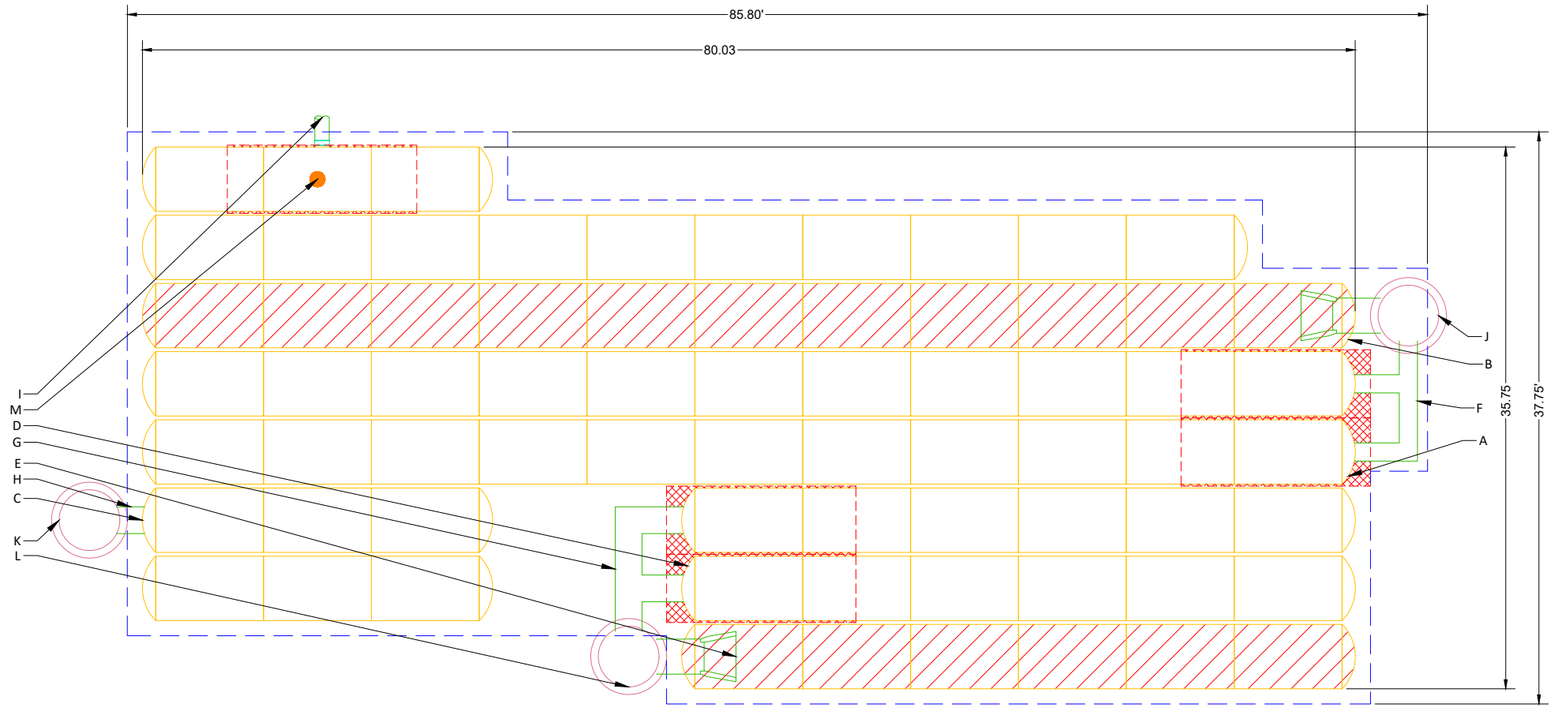
TRIPOINT DEVELOPMENT LLC
TRIPOINT DEVELOPMENT - RIVER HILLS MALL
CONSTRUCTION DETAILS
UNDERGROUND STORAGE

SHEET
C1.05

PROPOSED LAYOUT		PROPOSED ELEVATIONS	
70	STORMTECH SC-800 CHAMBERS	MAXIMUM ALLOWABLE GRADE (TOP OF PAVEMENT/UNPAVED):	1009.75
20	STORMTECH SC-800 END CAPS	MINIMUM ALLOWABLE GRADE (UNPAVED WITH TRAFFIC):	1003.50
12	STONE ABOVE (in)	MINIMUM ALLOWABLE GRADE (UNPAVED NO TRAFFIC):	1003.00
24	STONE BELOW (in)	MINIMUM ALLOWABLE GRADE (TOP OF RIGID CONCRETE PAVEMENT):	1003.00
40	STONE VOID	MINIMUM ALLOWABLE GRADE (BASE OF FLEXIBLE PAVEMENT):	1003.00
8375	INSTALLED SYSTEM VOLUME (CF) (PERIMETER STONE INCLUDED) (COVER STONE INCLUDED) (BASE STONE INCLUDED)	TOP OF STONE:	1002.75
		TOP OF SC-800 CHAMBER:	1001.75
		12" x 12" TOP MANIFOLD INVERT:	1000.20
		18" x 18" TOP MANIFOLD INVERT:	999.67
2699	SYSTEM AREA (SF)	10" INSERTA TEE INVERT:	999.33
247.1	SYSTEM PERIMETER (ft)	24" ISOLATOR ROW PLUS INVERT:	999.19
		18" BOTTOM CONNECTION INVERT:	999.17
		BOTTOM OF SC-800 CHAMBER:	999.00
		BOTTOM OF STONE:	997.00

*INVERT ABOVE BASE OF CHAMBER

PART TYPE	ITEM ON LAYOUT	DESCRIPTION	INVERT*	MAX FLOW
PRE-CORED END CAP	A	12" TOP PRE-CORED END CAP, PART#: SC800EPE12TPC / TYP OF ALL 12" TOP CONNECTIONS		
PREFABRICATED EZ END CAP	B	24" BOTTOM PREFABRICATED EZ END CAP, PART#: SC800ECEZ / TYP OF ALL 24" BOTTOM CONNECTIONS AND ISOLATOR PLUS ROWS		
PRE-CORED END CAP	C	18" BOTTOM PRE-CORED END CAP, PART#: SC800EPE18BPC / TYP OF ALL 18" BOTTOM CONNECTIONS		
PRE-CORED END CAP	D	18" TOP PRE-CORED END CAP, PART#: SC800EPE18TPC / TYP OF ALL 18" TOP CONNECTIONS		
FLAMP	E	INSTALL FLAMP ON 24" ACCESS PIPE / PART#: SC80024RAMP (TYP 2 PLACES)		
MANIFOLD	F	12" x 12" TOP MANIFOLD, ADS N-12	14.40"	
MANIFOLD	G	18" x 18" TOP MANIFOLD, ADS N-12	8.00"	
PIPE CONNECTION	H	18" BOTTOM CONNECTION	2.00"	
INSERTA TEE	I	10" DIAMETER	4.00"	
CONCRETE STRUCTURE	J	(DESIGN BY ENGINEER / PROVIDED BY OTHERS)		4.6 CFS IN
CONCRETE STRUCTURE	K	OCS (DESIGN BY ENGINEER / PROVIDED BY OTHERS)		4.0 CFS OUT
CONCRETE STRUCTURE	L	(DESIGN BY ENGINEER / PROVIDED BY OTHERS)		5.6 CFS IN
INSPECTION PORT	M	6" SEE DETAIL		



ISOLATOR ROW PLUS
(SEE DETAIL)

PLACE MINIMUM 12.50' OF ADSPLUS625 WOVEN GEOTEXTILE OVER BEDDING STONE AND UNDERNEATH CHAMBER FEET FOR SCOUR PROTECTION AT ALL CHAMBER INLET ROWS

BED LIMITS

NOTES

1. THE SITE DESIGN ENGINEER MUST REVIEW ELEVATIONS AND IF NECESSARY ADJUST GRADING TO ENSURE THE CHAMBER COVER REQUIREMENTS ARE MET.
2. **NOT FOR CONSTRUCTION**: THIS LAYOUT IS FOR DIMENSIONAL PURPOSES ONLY TO PROVE CONCEPT & THE REQUIRED STORAGE VOLUME CAN BE ACHIEVED ON SITE.

RIVER HILLS RETAIL (SC-800)
MANKATO, MN, USA
DATE: 03/24/2026
DRAWN: JH
CHECKED: N/A
PROJECT #:

DATE	DWN	CHK

StormTech® Chamber System

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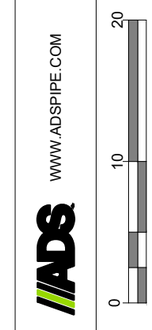

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SHEET
2 OF 6

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WESLEY S. CORDES, P.E.
LIC. NO. 64053 DATE MM/DD/YYYY

NOT FOR CONSTRUCTION

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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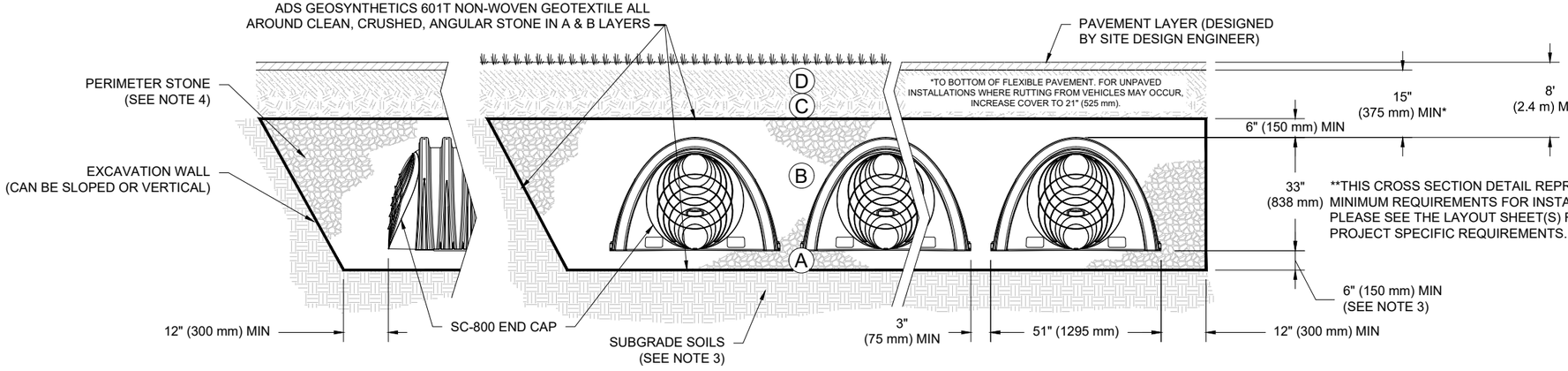
TRIPOINT DEVELOPMENT LLC
TRIPOINT DEVELOPMENT - RIVER HILLS MALL
CONSTRUCTION DETAILS
UNDERGROUND STORAGE

SHEET
C1.06

ACCEPTABLE FILL MATERIALS: STORMTECH SC-800 CHAMBER SYSTEMS

MATERIAL LOCATION		DESCRIPTION	AASHTO MATERIAL CLASSIFICATIONS	COMPACTION / DENSITY REQUIREMENT
D	**FINAL FILL:** FILL MATERIAL FOR LAYER 'D' STARTS FROM THE TOP OF THE 'C' LAYER TO THE BOTTOM OF FLEXIBLE PAVEMENT OR UNPAVED FINISHED GRADE ABOVE. NOTE THAT PAVEMENT SUBBASE MAY BE PART OF THE 'D' LAYER.	ANY SOIL/ROCK MATERIALS, NATIVE SOILS, OR PER ENGINEER'S PLANS. CHECK PLANS FOR PAVEMENT SUBGRADE REQUIREMENTS.	N/A	PREPARE PER SITE DESIGN ENGINEER'S PLANS. PAVED INSTALLATIONS MAY HAVE STRINGENT MATERIAL AND PREPARATION REQUIREMENTS.
C	**INITIAL FILL:** FILL MATERIAL FOR LAYER 'C' STARTS FROM THE TOP OF THE EMBEDMENT STONE ('B' LAYER) TO 15" (375 mm) ABOVE THE TOP OF THE CHAMBER. NOTE THAT PAVEMENT SUBBASE MAY BE A PART OF THE 'C' LAYER.	GRANULAR WELL-GRADED SOIL/AGGREGATE MIXTURES, <35% FINES OR PROCESSED AGGREGATE. MOST PAVEMENT SUBBASE MATERIALS CAN BE USED IN LIEU OF THIS LAYER.	AASHTO M145[1] A-1, A-2-4, A-3 OR AASHTO M43[1] 3, 357, 4, 467, 5, 56, 57, 6, 67, 68, 7, 78, 8, 89, 9, 10	BEGIN COMPACTIONS AFTER 12" (300 mm) OF MATERIAL OVER THE CHAMBERS IS REACHED. COMPACT ADDITIONAL LAYERS IN 6" (150 mm) MAX LIFTS TO A MIN. 95% PROCTOR DENSITY FOR WELL GRADED MATERIAL AND 95% RELATIVE DENSITY FOR PROCESSED AGGREGATE MATERIALS. ROLLER GROSS VEHICLE WEIGHT NOT TO EXCEED 12,000 lbs (53 kN). DYNAMIC FORCE NOT TO EXCEED 20,000 lbs (89 kN).
B	**EMBEDMENT STONE:** FILL SURROUNDING THE CHAMBERS FROM THE FOUNDATION STONE ('A' LAYER) TO THE 'C' LAYER ABOVE.	CLEAN, CRUSHED, ANGULAR STONE OR RECYCLED CONCRETE[5]	AASHTO M43[1] 3, 357, 4, 467, 5, 56, 57	NO COMPACTION REQUIRED.
A	**FOUNDATION STONE:** FILL BELOW CHAMBERS FROM THE SUBGRADE UP TO THE FOOT (BOTTOM) OF THE CHAMBER.	CLEAN, CRUSHED, ANGULAR STONE OR RECYCLED CONCRETE[5]	AASHTO M43[1] 3, 357, 4, 467, 5, 56, 57	PLATE COMPACT OR ROLL TO ACHIEVE A FLAT SURFACE.[2,3]

PLEASE NOTE:
1. THE LISTED AASHTO DESIGNATIONS ARE FOR GRADATIONS ONLY. THE STONE MUST ALSO BE CLEAN, CRUSHED, ANGULAR. FOR EXAMPLE, A SPECIFICATION FOR #4 STONE WOULD STATE: "CLEAN, CRUSHED, ANGULAR NO. 4 (AASHTO M43) STONE".
2. STORMTECH COMPACTION REQUIREMENTS ARE MET FOR 'A' LOCATION MATERIALS WHEN PLACED AND COMPACTED IN 6" (150 mm) (MAX) LIFTS USING TWO FULL COVERAGES WITH A VIBRATORY COMPACTOR.
3. WHERE INFILTRATION SURFACES MAY BE COMPROMISED BY COMPACTION, FOR STANDARD DESIGN LOAD CONDITIONS, A FLAT SURFACE MAY BE ACHIEVED BY RAKING OR DRAGGING WITHOUT COMPACTION EQUIPMENT. FOR SPECIAL LOAD DESIGNS, CONTACT STORMTECH FOR COMPACTION REQUIREMENTS.
4. ONCE LAYER 'C' IS PLACED, ANY SOIL/MATERIAL CAN BE PLACED IN LAYER 'D' UP TO THE FINISHED GRADE. MOST PAVEMENT SUBBASE SOILS CAN BE USED TO REPLACE THE MATERIAL REQUIREMENTS OF LAYER 'C' OR 'D' AT THE SITE DESIGN ENGINEER'S DISCRETION.
5. WHERE RECYCLED CONCRETE AGGREGATE IS USED IN LAYERS 'A' OR 'B' THE MATERIAL SHOULD ALSO MEET THE ACCEPTABILITY CRITERIA OUTLINED IN TECHNICAL NOTE 6.20 "RECYCLED CONCRETE STRUCTURAL BACKFILL".



NOTES:

1. CHAMBERS SHALL MEET THE REQUIREMENTS OF ASTM F2418, "STANDARD SPECIFICATION FOR POLYPROPYLENE (PP) CORRUGATED WALL STORMWATER COLLECTION CHAMBERS".
2. SC-800 CHAMBERS SHALL BE DESIGNED IN ACCORDANCE WITH ASTM F2787 "STANDARD PRACTICE FOR STRUCTURAL DESIGN OF THERMOPLASTIC CORRUGATED WALL STORMWATER COLLECTION CHAMBERS".
3. THE SITE DESIGN ENGINEER IS RESPONSIBLE FOR ASSESSING THE BEARING RESISTANCE (ALLOWABLE BEARING CAPACITY) OF THE SUBGRADE SOILS AND THE DEPTH OF FOUNDATION STONE WITH CONSIDERATION FOR THE RANGE OF EXPECTED SOIL MOISTURE CONDITIONS. REFERENCE STORMTECH DESIGN MANUAL FOR BEARING CAPACITY GUIDANCE.
4. PERIMETER STONE MUST BE EXTENDED HORIZONTALLY TO THE EXCAVATION WALL FOR BOTH VERTICAL AND SLOPED EXCAVATION WALLS.
5. REQUIREMENTS FOR HANDLING AND INSTALLATION:
   - TO MAINTAIN THE WIDTH OF CHAMBERS DURING SHIPPING AND HANDLING, CHAMBERS SHALL HAVE INTEGRAL, INTERLOCKING STACKING LUGS.
   - TO ENSURE A SECURE JOINT DURING INSTALLATION AND BACKFILL, THE HEIGHT OF THE CHAMBER JOINT SHALL NOT BE LESS THAN 2".
   - TO ENSURE THE INTEGRITY OF THE ARCH SHAPE DURING INSTALLATION, a) THE ARCH STIFFNESS CONSTANT AS DEFINED IN SECTION 6.2.8 OF ASTM F2418 SHALL BE GREATER THAN OR EQUAL TO 700 LBS/FT/%. AND b) TO RESIST CHAMBER DEFORMATION DURING INSTALLATION AT ELEVATED TEMPERATURES (ABOVE 73° F / 23° C), CHAMBERS SHALL BE PRODUCED FROM REFLECTIVE GOLD OR YELLOW COLORS.

RIVER HILLS RETAIL (SC-800)
MANKATO, MN, USA
DATE: 03/24/2026 | DRAWN: JH | CHECKED: N/A
PROJECT #:

DATE	DWN	CHK

StormTech® Chamber System

WWW.ADSPIPE.COM

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TRIPOINT DEVELOPMENT LLC
TRIPOINT DEVELOPMENT - RIVER HILLS MALL
CONSTRUCTION DETAILS
UNDERGROUND STORAGE

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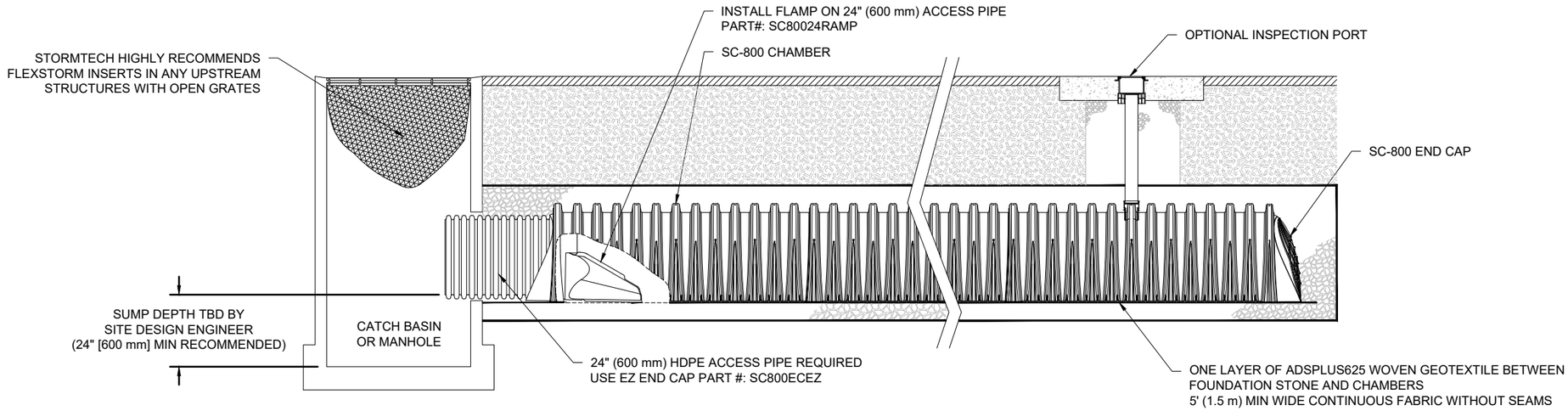


SC-800 ISOLATOR ROW PLUS DETAIL
NTS

INSPECTION & MAINTENANCE

STEP 1) INSPECT ISOLATOR ROW PLUS FOR SEDIMENT
- A. INSPECTION PORTS (IF PRESENT)
  - A.1. REMOVE/OPEN LID ON NYLOPLAST INLINE DRAIN
  - A.2. REMOVE AND CLEAN FLEXSTORM FILTER IF INSTALLED
  - A.3. USING A FLASHLIGHT AND STADIA ROD, MEASURE DEPTH OF SEDIMENT AND RECORD ON MAINTENANCE LOG
  - A.4. LOWER A CAMERA INTO ISOLATOR ROW PLUS FOR VISUAL INSPECTION OF SEDIMENT LEVELS (OPTIONAL)
  - A.5. IF SEDIMENT IS AT, OR ABOVE, 3" (80 mm) PROCEED TO STEP 2. IF NOT, PROCEED TO STEP 3.
- B. ALL ISOLATOR PLUS ROWS
  - B.1. REMOVE COVER FROM STRUCTURE AT UPSTREAM END OF ISOLATOR ROW PLUS
  - B.2. USING A FLASHLIGHT, INSPECT DOWN THE ISOLATOR ROW PLUS THROUGH OUTLET PIPE
    - i) MIRRORS ON POLES OR CAMERAS MAY BE USED TO AVOID A CONFINED SPACE ENTRY
    - ii) FOLLOW OSHA REGULATIONS FOR CONFINED SPACE ENTRY IF ENTERING MANHOLE
  - B.3. IF SEDIMENT IS AT, OR ABOVE, 3" (80 mm) PROCEED TO STEP 2. IF NOT, PROCEED TO STEP 3.

STEP 2) CLEAN OUT ISOLATOR ROW PLUS USING THE JETVAC PROCESS
- A. A FIXED CULVERT CLEANING NOZZLE WITH REAR FACING SPREAD OF 45" (1.1 m) OR MORE IS PREFERRED
- B. APPLY MULTIPLE PASSES OF JETVAC UNTIL BACKFLUSH WATER IS CLEAN
- C. VACUUM STRUCTURE SUMP AS REQUIRED

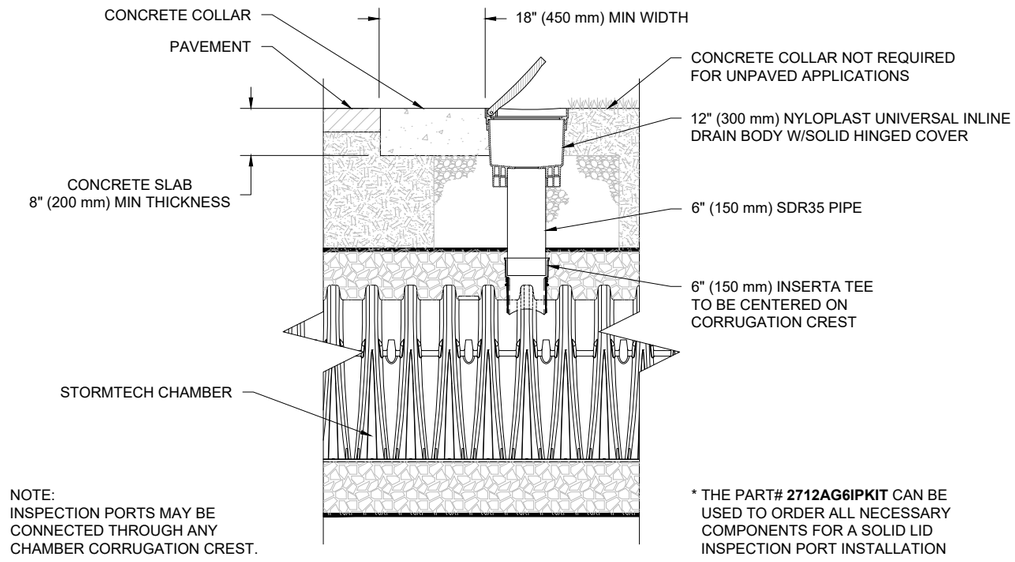
STEP 3) REPLACE ALL COVERS, GRATES, FILTERS, AND LIDS; RECORD OBSERVATIONS AND ACTIONS.

STEP 4) INSPECT AND CLEAN BASINS AND MANHOLES UPSTREAM OF THE STORMTECH SYSTEM.

NOTES

1. INSPECT EVERY 6 MONTHS DURING THE FIRST YEAR OF OPERATION. ADJUST THE INSPECTION INTERVAL BASED ON PREVIOUS OBSERVATIONS OF SEDIMENT ACCUMULATION AND HIGH WATER ELEVATIONS.

2. CONDUCT JETTING AND VACTORING ANNUALLY OR WHEN INSPECTION SHOWS THAT MAINTENANCE IS NECESSARY.



6" (150 mm) PVC INSPECTION PORT DETAIL
(SC SERIES CHAMBER)
NTS

RIVER HILLS RETAIL (SC-800)
MANKATO, MN, USA
DATE: 03/24/2026 | DRAWN: JH | PROJECT #: | CHECKED: N/A

DATE	DWN	CHK

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TRIPOINT DEVELOPMENT LLC
TRIPOINT DEVELOPMENT - RIVER HILLS MALL
CONSTRUCTION DETAILS
UNDERGROUND STORAGE

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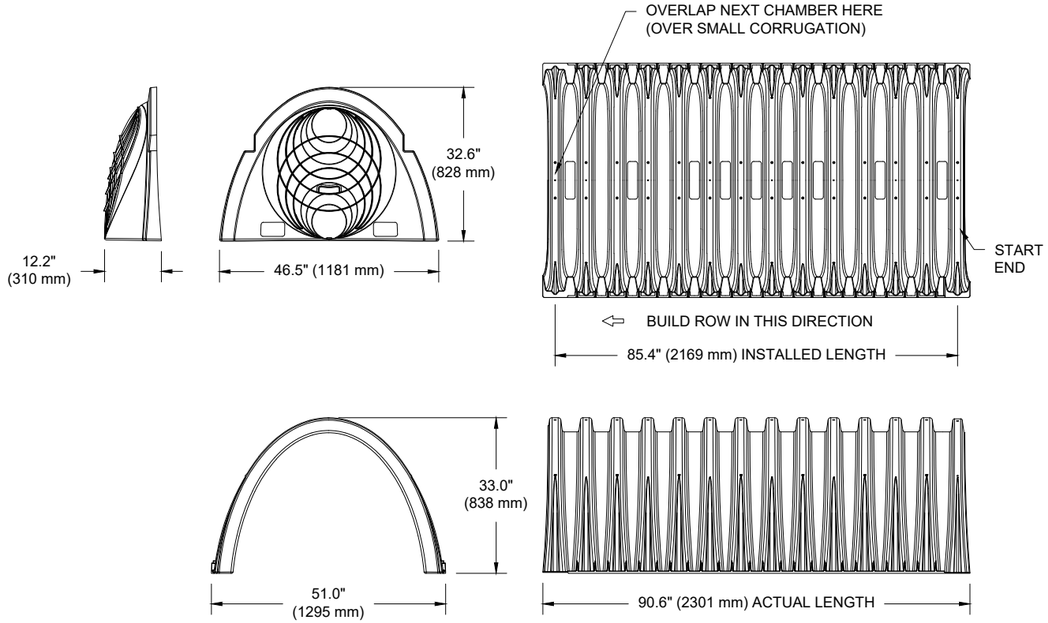
SC-800 TECHNICAL SPECIFICATION

NTS



NOMINAL CHAMBER SPECIFICATIONS

SIZE (W X H X INSTALLED LENGTH)	51.0" X 33.0" X 85.4"	(1295 mm X 838 mm X 2169 mm)
CHAMBER STORAGE	50.6 CUBIC FEET	(1.43 m³)
MINIMUM INSTALLED STORAGE*	78.4 CUBIC FEET	(2.22 m³)
WEIGHT	81.8 lbs.	(37.1 kg)

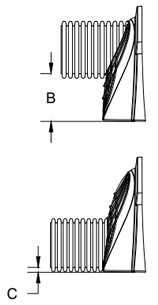
NOMINAL END CAP SPECIFICATIONS

SIZE (W X H X INSTALLED LENGTH)	46.5" X 32.6" X 10.5"	(1181 mm X 828 mm X 267 mm)
END CAP STORAGE	3.4 CUBIC FEET	(0.09 m³)
MINIMUM INSTALLED STORAGE**	14.7 CUBIC FEET	(0.42 m³)
WEIGHT	15.7 lbs.	(7.1 kg)

* ASSUMES 6" (150 mm) STONE ABOVE, BELOW, AND BETWEEN CHAMBERS, 3" (75 mm) BETWEEN CHAMBERS
**ASSUMES 6" (150 mm) STONE ABOVE AND BELOW END CAPS, 3" (150 mm) BETWEEN ROWS, 12" (300 mm) BEYOND END CAPS

PRE-CORED HOLES AT BOTTOM OF END CAP FOR PART NUMBERS ENDING WITH "BPC"
PRE-CORED HOLES AT TOP OF END CAP FOR PART NUMBERS ENDING WITH "TPC"

PART #	STUB	B	C
SC800EPE06TPC	6" (150 mm)	21.4" (544 mm)	---
SC800EPE06BPC		---	0.9" (23 mm)
SC800EPE08TPC	8" (200 mm)	19.2" (488 mm)	---
SC800EPE08BPC		---	1.0" (25 mm)
SC800EPE10TPC	10" (250 mm)	17.0" (432 mm)	---
SC800EPE10BPC		---	1.2" (30 mm)
SC800EPE12TPC	12" (300 mm)	14.4" (366 mm)	---
SC800EPE12BPC		---	1.6" (41 mm)
SC800EPE15TPC	15" (375 mm)	11.3" (287 mm)	---
SC800EPE15BPC		---	1.7" (43 mm)
SC800EPE18TPC	18" (450 mm)	8.0" (203 mm)	---
SC800EPE18BPC		---	2.0" (51 mm)
SC800EPE24BPC	24" (600 mm)	---	2.3" (58 mm)
SC800EPE	NONE	SOLID END CAP	



NOTE: ALL DIMENSIONS ARE NOMINAL

RIVER HILLS RETAIL (SC-800)
MANKATO, MN, USA
DATE: 03/24/2026 | DRAWN: JH | PROJECT #: | CHECKED: N/A

DATE	DWN	CHK

StormTech® Chamber System

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TRIPOINT DEVELOPMENT LLC
TRIPOINT DEVELOPMENT - RIVER HILLS MALL
CONSTRUCTION DETAILS
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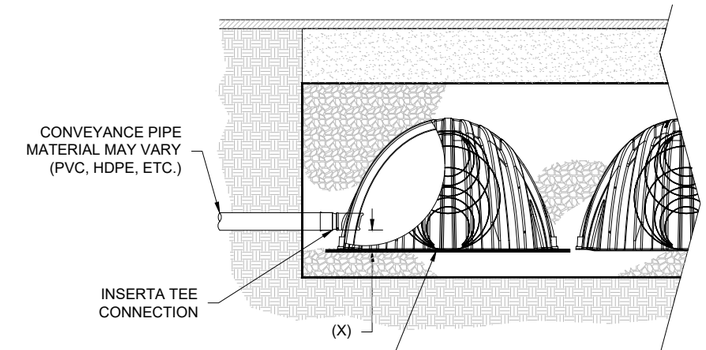
SHEET
C1.09

INSERTA TEE DETAIL

NTS



CHAMBER	MAX DIAMETER OF INSERTA TEE	HEIGHT FROM BASE OF CHAMBER (X)
SC-310	6" (150 mm)	4" (100 mm)
SC-800	10" (250 mm)	4" (100 mm)
DC-780	10" (250 mm)	4" (100 mm)
MC-3500	12" (300 mm)	6" (150 mm)
MC-4500	12" (300 mm)	8" (200 mm)
MC-7200	12" (300 mm)	8" (200 mm)
INSERTA TEE FITTINGS AVAILABLE FOR SDR 26, SDR 35, SCH 40 IPS GASKETED & SOLVENT WELD, N-12, HP STORM, C-900 OR DUCTILE IRON		

NOTES:

- PART NUMBERS WILL VARY BASED ON INLET PIPE MATERIALS. CONTACT STORMTECH FOR MORE INFORMATION.
- CONTACT ADS ENGINEERING SERVICES IF INSERTA TEE INLET MUST BE RAISED AS NOT ALL INVERTS ARE POSSIBLE.

RIVER HILLS RETAIL (SC-800)

MANKATO, MN, USA

DATE: 03/24/2026 | DRAWN: JH | CHECKED: N/A | PROJECT #:

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Inserta Tee®

Lateral Connection

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SHEET 6 OF 6

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TRIPOINT DEVELOPMENT LLC

TRIPOINT DEVELOPMENT - RIVER HILLS MALL

CONSTRUCTION DETAILS

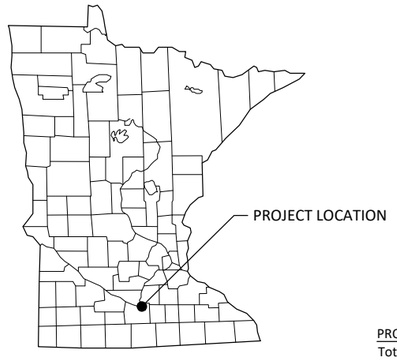
UNDERGROUND STORAGE

SHEET C1.10

STORMWATER POLLUTION PREVENTION PLAN (SWPPP)

TRIPOINT DEVELOPMENT - RIVER HILLS MALL

CITY OF MANKATO
BLUE EARTH COUNTY, MINNESOTA



LEGEND

- 1-MILE BOUNDARY
- PROJECT BOUNDARY
- 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:	TBD	TBD	TBD
SWPPP DESIGNER:	Bolton & Menk, Inc.	WESLEY S. CORDES, P.E.	507-978-4179
CONTRACTOR:	TBD	TBD	TBD
CONSTRUCTION SWPPP MANAGER:	TBD	TBD	TBD
PARTY RESPONSIBLE FOR LONG TERM O&M:	TBD	TBD	TBD

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) =	1.17	ACRES
Existing area of impervious surface =	0.0	ACRES
Post construction area of impervious surface =	0.88	ACRES
Total new impervious surface area created =	0.88	ACRES
Planned Construction Start Date:	TBD	
Estimated Construction Completion Date:	TBD	

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 (Underground)
	Regional Pond
	Permanent Stormwater Management Not Required

PROJECT LOCATION:

COUNTY	TOWNSHIP	RANGE	SECTION	LATITUDE	LONGITUDE
BLUE EARTH	T108N	R26W	9	44.1706° N	93.9533° W

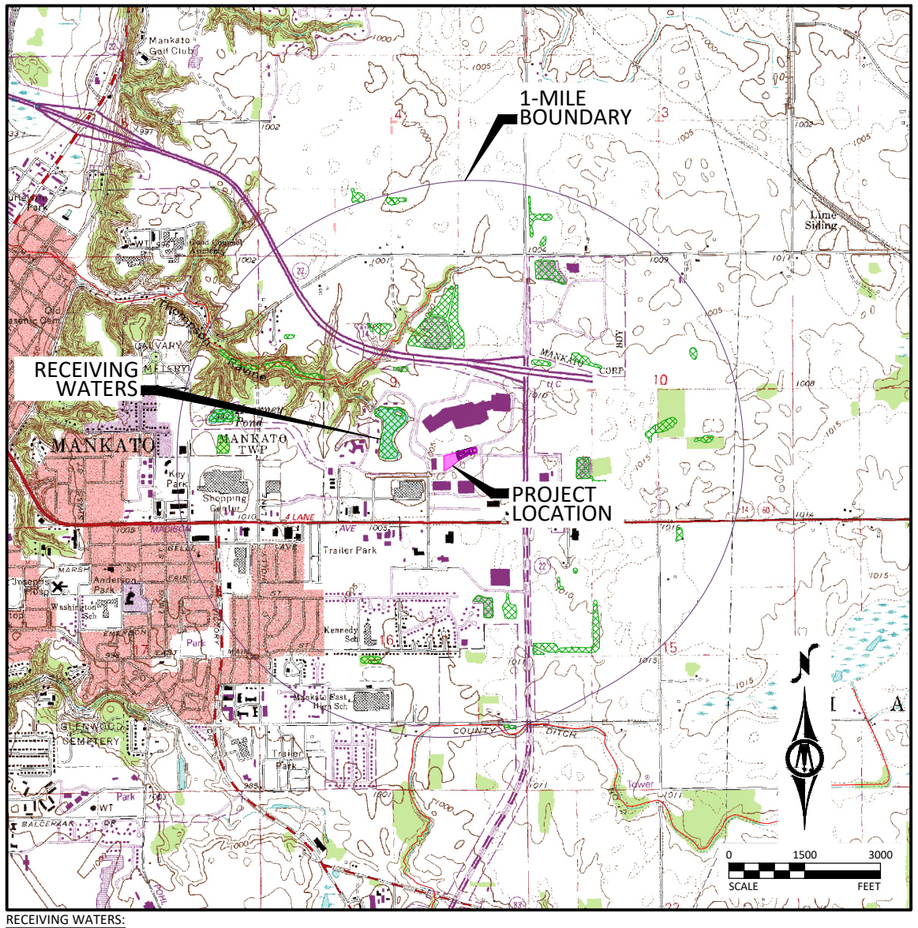
BMP SUMMARY	QUANTITY	UNIT
STABILIZED CONSTRUCTION EXIT	2	EACH
INLET PROTECTION	8	EACH
PERIMETER CONTROL	1045	LN FEET
TURF GRASS ESTABLISHMENT (W/FERTILIZER & MULCH OR BLANKET)	0.3	ACRE
NOTE: QUANTITIES LISTED ACCOUNT FOR ONE INSTALLATION. ADDITIONAL INSTALLATIONS MAY BE NECESSARY AS A RESULT OF SCHEDULING AND MAINTENANCE.		

DESCRIPTION OF CONSTRUCTION ACTIVITIES AND STORMWATER MANAGEMENT:
Construction activities include: Site grading, sanitary sewer and water main extensions, temporary erosion and sediment control, and permanent stabilization.

Stormwater currently ...

After construction is complete stormwater will ...

This project includes the following stormwater management BMPs ...



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]
UNDERGROUND DETENTION FACILITY	UNDERGROUND FACILITY	NO	NO	NO
LAKE DOROTHY	LAKE	NO	NO	NO

[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) Remove existing surfaces as required.
4) Complete site and utility improvements.
5) Install additional inlet protection as needed.
6) Reestablish turf.
7) Add additional temporary BMPs as necessary during construction based on inspection reports.
8) Ensure final stabilization measures are complete.
9) Provide digital copy of all Field SWPPP Documentation including Inspection Reports and SWPPP Revisions to the Owner.
10) 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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NOT FOR CONSTRUCTION

WESLEY S. CORDES, P.E.
LIC. NO. 64053 DATE MM/DD/YYYY

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CJL			
CLIENT PROJ. NO.			
0M3.125986			

TRIPOINT DEVELOPMENT LLC
TRIPOINT DEVELOPMENT - RIVER HILLS MALL
STORMWATER POLLUTION PREVENTION PLAN
PROJECT INFORMATION & LOCATION MAP

SHEET
C2.01

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

TYPE OF PERMIT	PERMITTING AGENCY	PERMIT STATUS AND CONDITIONS
Construction Stormwater NPDES	MPCA	PENDING SUBMITTAL

SWPPP DESIGNER TRAINING DOCUMENTATION:

UNIVERSITY OF MINNESOTA

Wesley Cordes

Design of Construction SWPPP (May 31 2028)

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WESLEY S. CORDES, P.E.
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DRAWN	WSC
CHECKED	CJL
CLIENT PROJ. NO.	0M3.125986

NO.	ISSUED FOR	DATE

TRIPOINT DEVELOPMENT LLC
TRIPOINT DEVELOPMENT - RIVER HILLS MALL
STORMWATER POLLUTION PREVENTION PLAN
NARRATIVE

SHEET
C2.02



LEGEND

PROJECT BOUNDARY

SOIL TYPE

N

0 100 200

SCALE FEET

SOIL TYPE SUMMARY

Map Unit Symbol	Soil Name	Hyd. Soil Group	Erodibility
109	CORDOVA CLAY LOAM, 0 TO 2 PERCENT SLOPES	C/D	NHEL
286	SHOREWOOD SILTY CLAY LOAM, 1 TO 6 PERCENT SLOPES	C/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 - C2.08
FINAL STABILIZATION	C2.06 - C2.08

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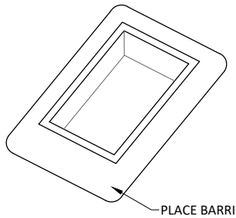
TRIPOINT DEVELOPMENT LLC

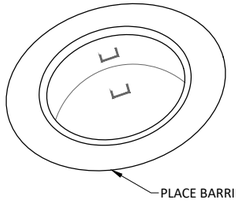
TRIPOINT DEVELOPMENT - RIVER HILLS MALL

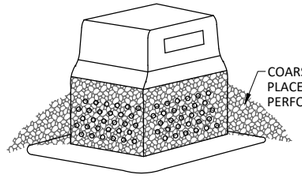
STORMWATER POLLUTION PREVENTION PLAN

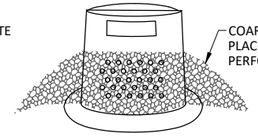
SITE & SOILS MAP

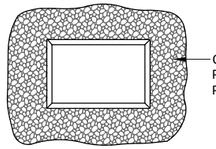
SHEET C2.03

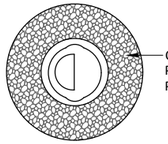






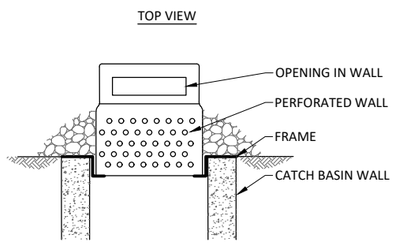


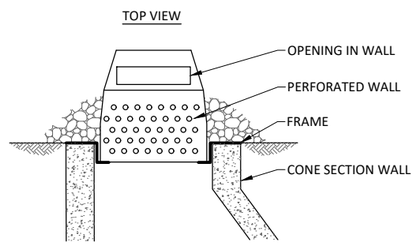




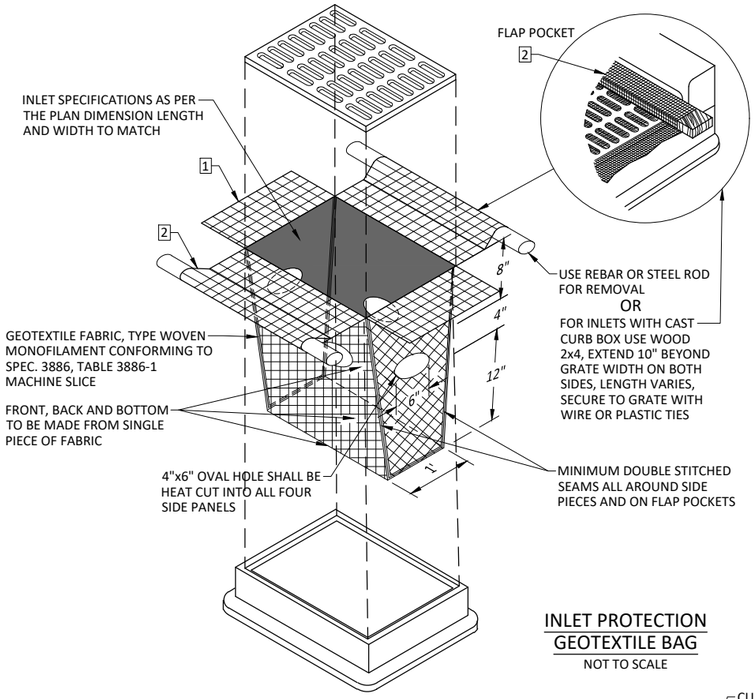
TOP VIEW

TOP VIEW





INLET PROTECTION
PERFORATED WALL
NOT TO SCALE



INLET PROTECTION
GEOTEXTILE BAG
NOT TO SCALE

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.

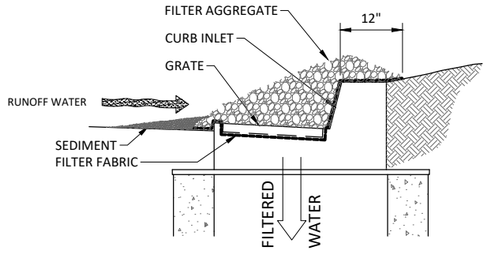
INSTALLATION NOTES:
DO NOT INSTALL PROTECTION IN INLETS SHALLOWER THAN 30", MEASURED FROM THE BOTTOM OF THE INLET TO THE TOP OF THE GRATE.

TRIM EXCESS FABRIC IN THE FLOW LINE TO WITHIN 3" OF THE GRATE.

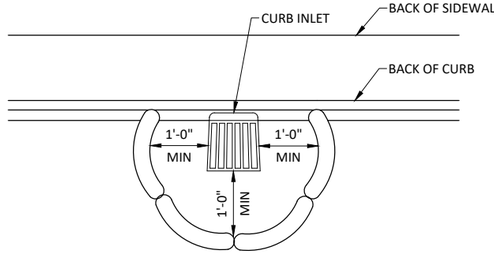
THE INSTALLED BAG SHALL HAVE A MINIMUM SIDE CLEARANCE, BETWEEN THE INLET AND THE BAG, MEASURED AT THE BOTTOM OF THE OVERFLOW HOLES, OF 3". WHERE NECESSARY THE CONTRACTOR SHALL CLINCH THE BAG, USING PLASTIC ZIP TIES, TO ACHIEVE THE 3" CLEARANCE. THE TIES SHALL BE PLACED AT A MAXIMUM OF 4" FROM THE BOTTOM OF THE BAG.

NOTES:

1. FILTER AGGREGATE TO BE 1 TO 2 INCH CLEAN ROCK
2. FILTER FABRIC SHALL MEET MnDOT SPECIFICATION 3733 GEOTEXTILE FABRIC TYPE 3

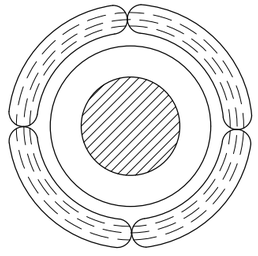


INLET PROTECTION
FILTER AGGREGATE
NOT TO SCALE



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

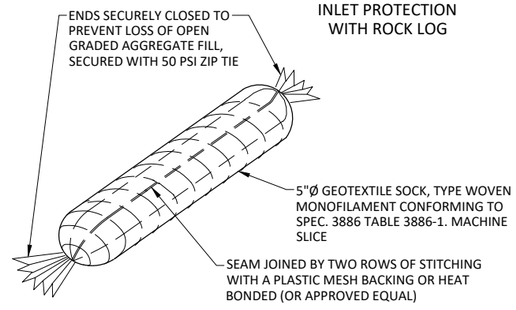


INLET PROTECTION
WITH ROCK LOG

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

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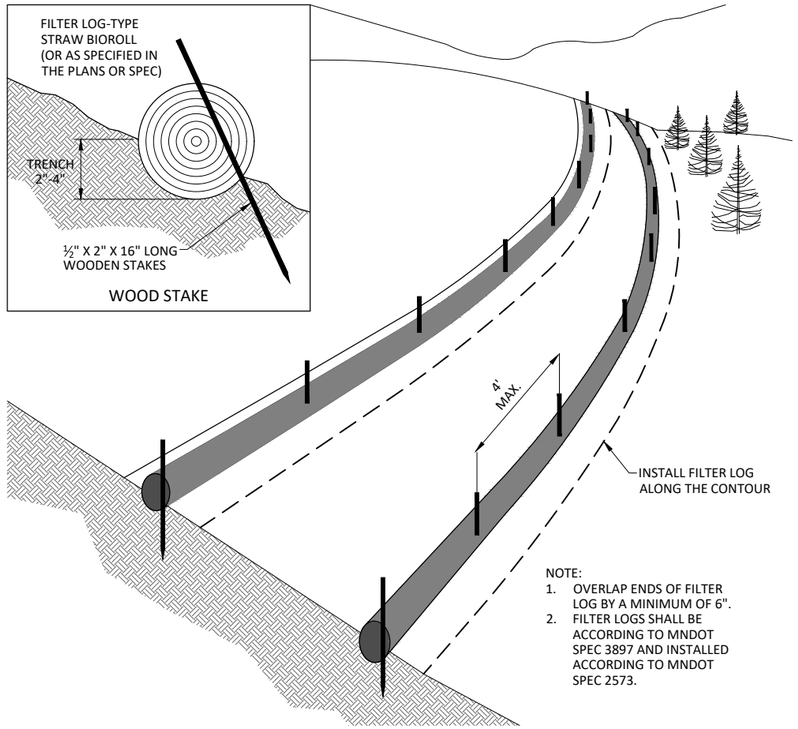
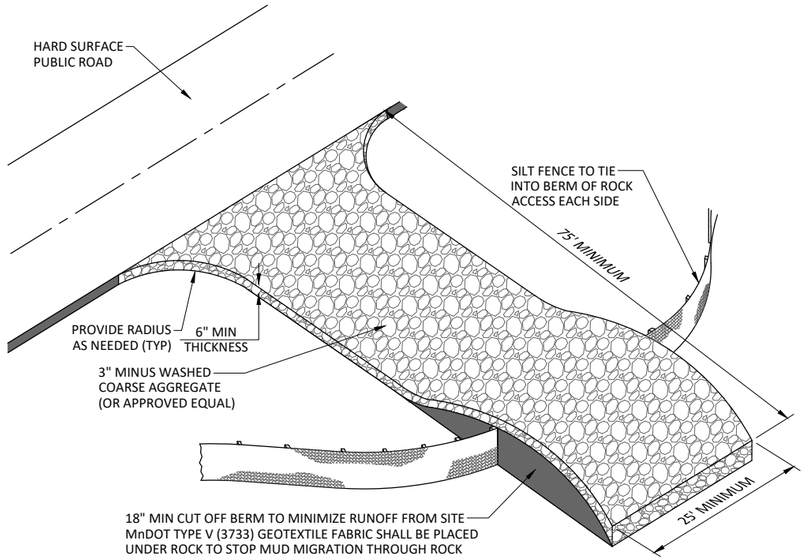
TRIPOINT DEVELOPMENT LLC
TRIPOINT DEVELOPMENT - RIVER HILLS MALL
STORMWATER POLLUTION PREVENTION PLAN
BEST MANAGEMENT PRACTICE DETAILS

SHEET
C2.04



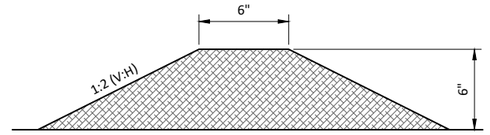
PERIMETER PROTECTION-FILTER LOG

NOT TO SCALE

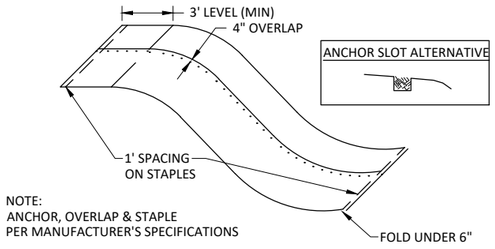


ROCK CONSTRUCTION ENTRANCE

NOT TO SCALE

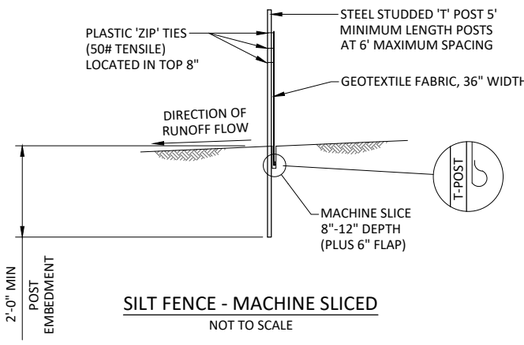


SECTION A-A



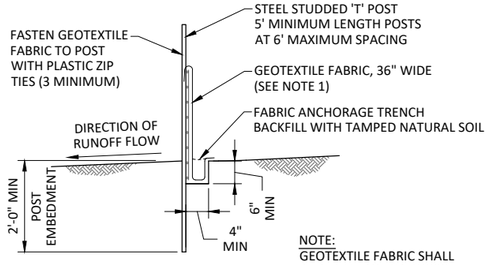
EROSION CONTROL
BLANKET INSTALLATION

NOT TO SCALE



SILT FENCE - MACHINE SLICED

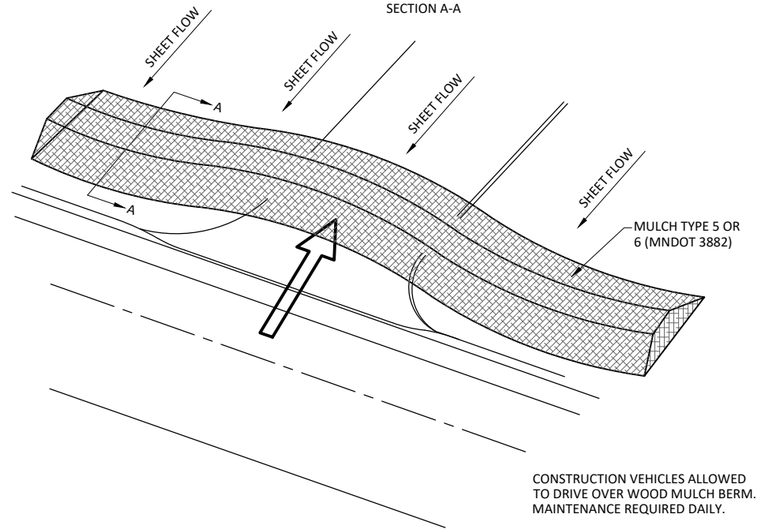
NOT TO SCALE



NOTE:
GEOTEXTILE FABRIC SHALL
BE PER MnDOT SPEC 3886

SILT FENCE - HEAVY DUTY

NOT TO SCALE



PERIMETER PROTECTION-WOOD MULCH BERM

NOT TO SCALE

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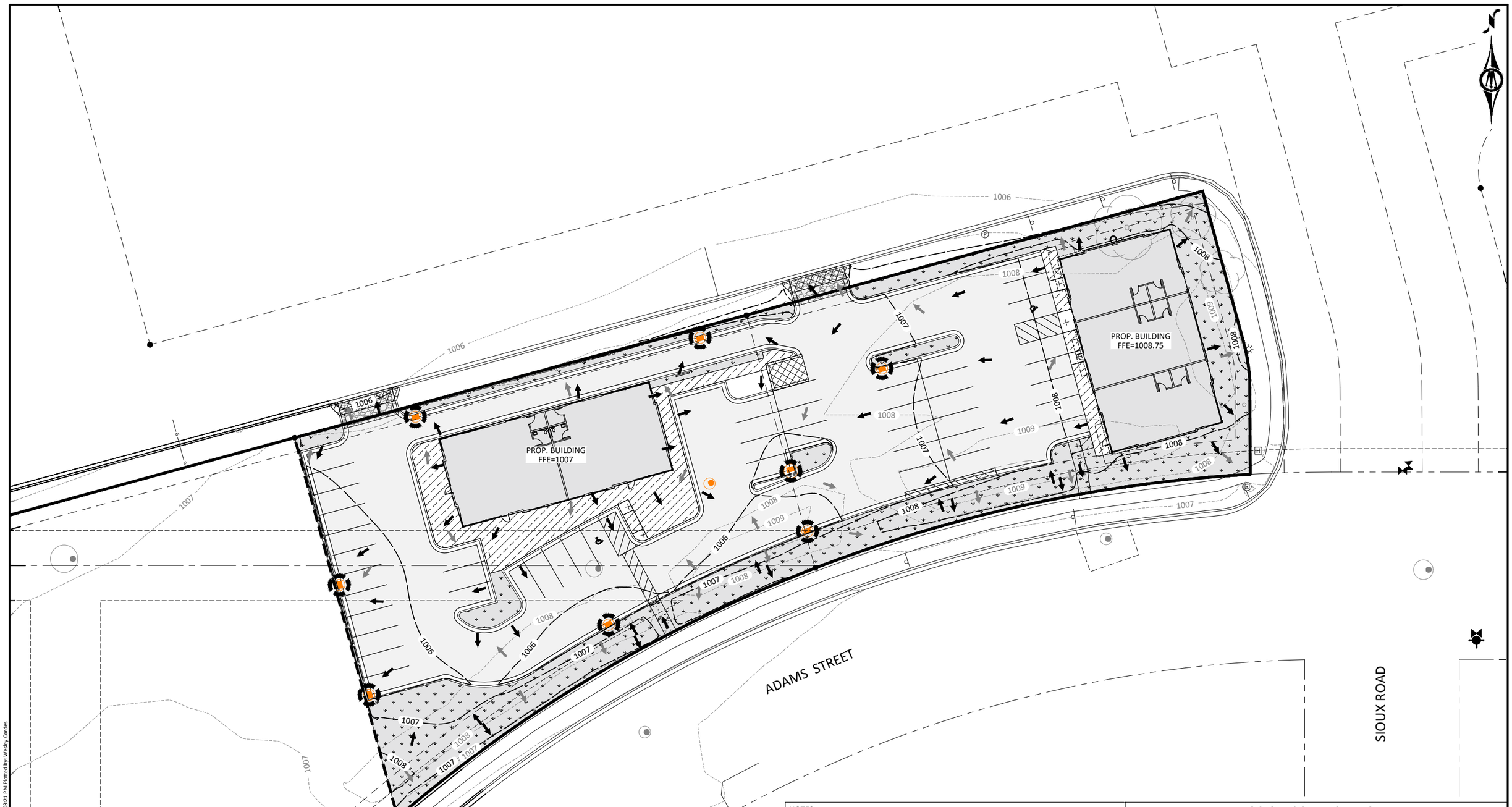
TRIPOINT DEVELOPMENT LLC

TRIPOINT DEVELOPMENT - RIVER HILLS MALL

STORMWATER POLLUTION PREVENTION PLAN

BEST MANAGEMENT PRACTICE DETAILS

SHEET C2.05



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 A RAINFALL EVENT GREATER THAN 0.5 INCHES IN 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
- STABILIZED CONSTRUCTION EXIT
- TURF GRASS MIX, FERTILIZER, AND MULCH (USE CAT 20 ROLLED EROSION PREVENTION ON AREAS OF CONCENTRATED FLOW OR SLOPES ABOVE 5H:1V)

HORZ. 0 20 40
SCALE FEET

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TRIPOINT DEVELOPMENT - RIVER HILLS MALL
STORMWATER POLLUTION PREVENTION PLAN
EROSION & SEDIMENT CONTROL PLAN

SHEET C2.06

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DRIVEWAS SHALL BE CONSTRUCTED IN ACCORDANCE WITH MN/DOT STANDARD PLAN 5-297-254

DRIVEWAS SHALL BE CONSTRUCTED IN ACCORDANCE WITH MN/DOT STANDARD PLAN 5-297-254

1.5% MAX SLOPES IN ALL DIRECTIONS

1.5% MAX SLOPES IN ALL DIRECTIONS

DECREASE HOLDDOWN TO 1008.25' ON BACK SIDE OF BUILDING

ADAMS STREET

LEGEND

B=	BITUMINOUS
C=	CONCRETE
G=	GROUND
6" TC=	6" HEIGHT CURB
0" TC=	0" HEIGHT CURB
GU=	GUTTER
HD=	HOLDDOWN
TW =	TOP OF WALL
BW =	BASE OF WALL
-x-x-x-x-x-	GUTTER OUT

PEDESTRIAN RAMP NOTES:

1. LANDING AREAS SHALL BE CONSTRUCTED SEPARATELY FROM RAMPS WITH MINIMUM DIMENSIONS OF 4' X 4' AND MAXIMUM SLOPE OF 2.0% IN ALL DIRECTIONS.
2. LANDINGS AND SIDEWALK BREAKLINE LOCATIONS ARE EXAMPLE AND ARE SUBJECT TO CHANGE IN THE FIELD.
3. TOP OF CURB ELEVATIONS ARE DENOTED BY THEIR DESIGN HEIGHT. 0" HEIGHTS ARE GENERALLY ACCOMPANIED BY A GUTTER ELEVATION AS A CHECK AND FOR REDUNDANCY.

▲ Ⓢ INDICATES PEDESTRIAN RAMP SLOPE EXPECTED TO BE BETWEEN 5.0% MINIMUM AND 8.3% MAXIMUM IN THE DIRECTION SHOWN AND CROSS SLOPE SHALL NOT EXCEED 2.0%.

▲ Ⓕ INDICATES PEDESTRIAN RAMP SLOPE EXPECTED TO BE GREATER THAN 2.0% AND LESS THAN 5.0% IN THE DIRECTION SHOWN AND CROSS SLOPE SHALL NOT EXCEED 2.0%.

HORZ. SCALE 0 15 30 FEET

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TRIPOINT DEVELOPMENT - RIVER HILLS MALL

GRADING PLAN

SHEET C3.01

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F&I:
1 EA 90° BEND

206 LF - 6" WM
(BEND TO BEND)

F&I:
2 EA 6" GV & BOX

F&I:
1 EA 8"X6" TEE

2 LF - 6" WM
(TEE TO BUILDING)

78 LF - 6" WM
(TEE TO BEND)

72 LF - 8" WM
(BEND TO TEE)

SAN CO-3
SANITARY CLEANOUT
R=1008.02
I=1000.55 6" E
I=1000.55 6" S

I=1000.75

I=1000.75

52 LF - 6" WM
(BEND TO BEND)

F&I:
1 EA 90° BEND

5 LF - 6" WM
(BEND TO BUILDING)

PROP. BUILDING
FFE=1008.75

10'
6" SAN
@ 2.00%

43'
6" SAN
@ 2.00%

A-1
OUTSIDE DROP
DESIGN 4007C
R-1733 "SANITARY
SEWER CASTING"
R=1008.02
I=999.69 6" N
I=994.20 6" W
I=985.65 8" S

90°

97'
6" SAN
@ 2.00%

85' - 6" SAN @ 2.00%

I=999

PROP. BUILDING
FFE=1007

SAN CO-2
SANITARY CLEANOUT
R=1006.37
I=995.91 6" W
I=995.91 6" E

F&I:
2 EA 45° BEND

31 LF - 8" WM
(BEND TO BEND)

I=999

30'
6" SAN
@ 2.00%

135°

62' - 6" SAN @ 2.00%

SAN CO-1
SANITARY CLEANOUT
R=1006.02
I=997.15 6" NW
I=997.15 6" E

GRADE BREAK
BOTTOM WM=999.22
TOP STM=997.68

PROTECT IN-PLACE
UNDERDRAINS IN ADAMS
STREET DURING UTILITY
CONSTRUCTION AND REPLACE
IF DAMAGED.

53'
8" SAN
@ 2.00%

28-042
R=1006.40
I=984.55 24" E
I=984.65 8" N
I=984.42 24" SW

61 LF - 8" WM
(TEE TO BEND)

F&I:
1 EA 8"X6" TEE

39 LF - 6" WM
(TEE TO HYDRANT)

ADAMS STREET

STREET CUT FOR SANITARY
SEWER SHALL BE FULL DEPTH.
REPLACE EX. ROAD SECTION &
CURB & GUTTER.

SIOUX ROAD

54 LF - 8" WM
(BEND TO TEE)

6 LF - 8" WM
(BEND TO BEND)

F&I: HYDRANT
1 EA 6" GV & BOX
-FG: 1006.8
-8.0' BURY

NOTE TO MANUFACTURER:
HYDRANT SHALL BE ROTATED TO FACE SOUTH

F&I:
1 EA 45° BEND
1 EA 22.5° BEND

146 LF - 8" WM
(BEND TO BEND)

F&I:
1 EA 45° BEND

F&I:
1 EA 8" TAPPING SLEEVE
(IF NECESSARY)

18 LF - 8" WM
(CONNECTION TO BEND)

F&I:
1 EA 8" GV & BOX

PIPE MATERIAL NOTES:

- ALL WATERMAIN SHALL BE AWWA C900 PVC PIPE INSTALLED IN ACCORDANCE WITH ASTM D2321. ALL WATERMAIN SHALL HAVE MINIMUM 7.5-FT BURY.
- WATER PIPE SHALL NOT CONTAIN ANY JOINTS OR CONNECTIONS WITHIN 10-FEET OF CROSSING PIPES.
- ALL WATER PIPE SHALL HAVE 10-FT MINIMUM SEPARATION FROM SEWERS AND 1.5-FT VERTICAL SEPARATION AT CROSSINGS.
- ALL SANITARY SEWER PIPE SHALL BE PVC PIPE (ASTM D3034, SDR 26 OR SDR 35 IF APPROVED BY THE AUTHORITY HAVING JURISDICTION) 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 CHANGES IN DIRECTION IN SANITARY AND STORM DRAINAGE PIPING MUST BE MADE BY APPROPRIATE USE OF WYES AND LONG SWEEP DRAINAGE FITTINGS.
- ALL STORM SEWER PIPE SHALL BE PVC PIPE (ASTM D3034, SDR 35) OR HDPE (ASTM F714 & ASTM F894) IF APPROVED BY THE AUTHORITY HAVING JURISDICTION INSTALLED IN ACCORDANCE WITH ASTM D2321.
- ALL STORM SEWER PIPE CROSSING WATERMAIN SHALL BE ASTM D2665, SCHEDULE 40 WITH SOLVENT WELD JOINTS.
- ALL BURIED IRON PIPE AND FITTINGS SHALL BE ENCASED IN POLYETHYLENE.

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HORZ. SCALE 0 20 40 FEET

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TRIPOINT DEVELOPMENT - RIVER HILLS MALL

SANITARY & WATER SERVICE PLAN

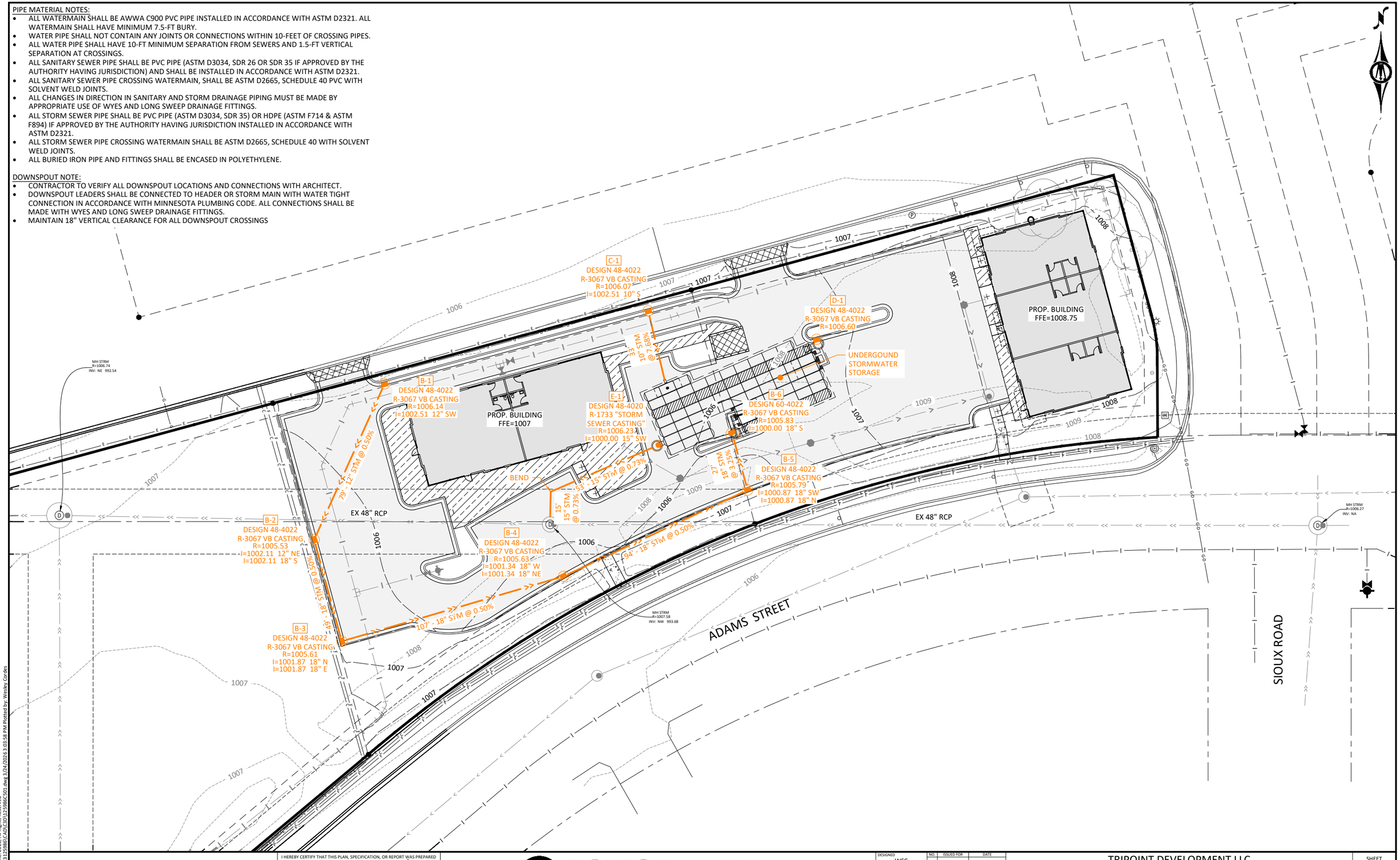
SHEET C4.01

PIPE MATERIAL NOTES:

- ALL WATERMAIN SHALL BE AWWA C900 PVC PIPE INSTALLED IN ACCORDANCE WITH ASTM D2321. ALL WATERMAIN SHALL HAVE MINIMUM 7.5-FT BURY.
- WATER PIPE SHALL NOT CONTAIN ANY JOINTS OR CONNECTIONS WITHIN 10-FEET OF CROSSING PIPES.
- ALL WATER PIPE SHALL HAVE 10-FT MINIMUM SEPARATION FROM SEWERS AND 1.5-FT VERTICAL SEPARATION AT CROSSINGS.
- ALL SANITARY SEWER PIPE SHALL BE PVC PIPE (ASTM D3034, SDR 26 OR SDR 35 IF APPROVED BY THE AUTHORITY HAVING JURISDICTION) 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 CHANGES IN DIRECTION IN SANITARY AND STORM DRAINAGE PIPING MUST BE MADE BY APPROPRIATE USE OF WYES AND LONG SWEEP DRAINAGE FITTINGS.
- ALL STORM SEWER PIPE SHALL BE PVC PIPE (ASTM D3034, SDR 35) OR HDPE (ASTM F714 & ASTM F894) IF APPROVED BY THE AUTHORITY HAVING JURISDICTION INSTALLED IN ACCORDANCE WITH ASTM D2321.
- ALL STORM SEWER PIPE CROSSING WATERMAIN SHALL BE ASTM D2665, SCHEDULE 40 WITH SOLVENT WELD JOINTS.
- ALL BURIED IRON PIPE AND FITTINGS SHALL BE ENCASED IN POLYETHYLENE.

DOWNSPOUT NOTE:

- CONTRACTOR TO VERIFY ALL DOWNSPOUT LOCATIONS AND CONNECTIONS WITH ARCHITECT.
- DOWNSPOUT LEADERS SHALL BE CONNECTED TO HEADER OR STORM MAIN WITH WATER TIGHT CONNECTION IN ACCORDANCE WITH MINNESOTA PLUMBING CODE. ALL CONNECTIONS SHALL BE MADE WITH WYES AND LONG SWEEP DRAINAGE FITTINGS.
- MAINTAIN 18" VERTICAL CLEARANCE FOR ALL DOWNSPOUT CROSSINGS



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TRIPOINT DEVELOPMENT - RIVER HILLS MALL

STORM SEWER PLAN

SHEET C5.01

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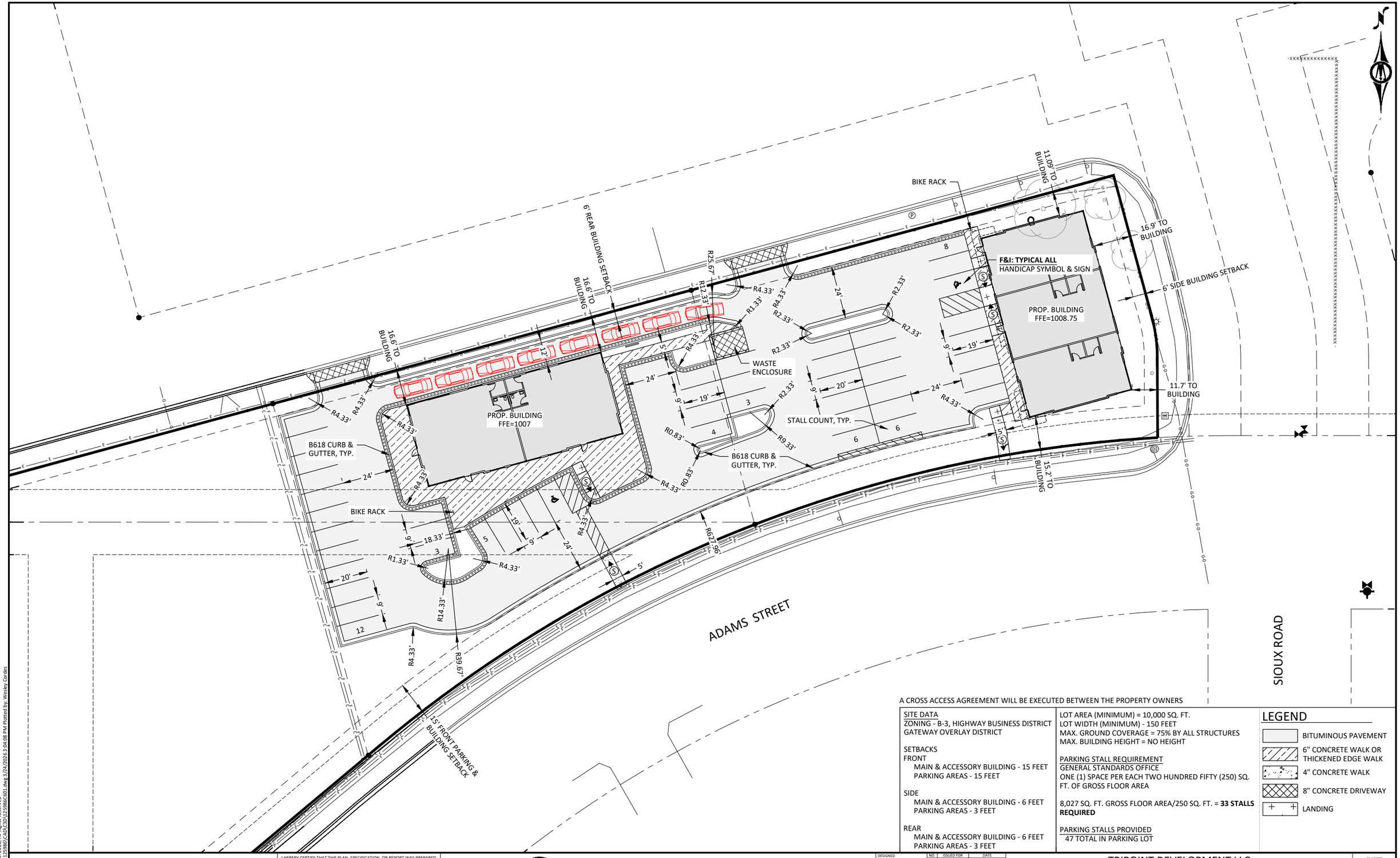

A CROSS ACCESS AGREEMENT WILL BE EXECUTED BETWEEN THE PROPERTY OWNERS

SITE DATA
ZONING - B-3, HIGHWAY BUSINESS DISTRICT
GATEWAY OVERLAY DISTRICT

SETBACKS
FRONT
MAIN & ACCESSORY BUILDING - 15 FEET
PARKING AREAS - 15 FEET

SIDE
MAIN & ACCESSORY BUILDING - 6 FEET
PARKING AREAS - 3 FEET

REAR
MAIN & ACCESSORY BUILDING - 6 FEET
PARKING AREAS - 3 FEET

LOT AREA (MINIMUM) = 10,000 SQ. FT.
LOT WIDTH (MINIMUM) - 150 FEET
MAX. GROUND COVERAGE = 75% BY ALL STRUCTURES
MAX. BUILDING HEIGHT = NO HEIGHT

PARKING STALL REQUIREMENT
GENERAL STANDARDS OFFICE
ONE (1) SPACE PER EACH TWO HUNDRED FIFTY (250) SQ. FT. OF GROSS FLOOR AREA

8,027 SQ. FT. GROSS FLOOR AREA/250 SQ. FT. = **33 STALLS REQUIRED**

PARKING STALLS PROVIDED
47 TOTAL IN PARKING LOT

LEGEND
- BITUMINOUS PAVEMENT
- 6" CONCRETE WALK OR THICKENED EDGE WALK
- 4" CONCRETE WALK
- 8" CONCRETE DRIVEWAY
- LANDING

HORZ. SCALE 0 20 40 FEET

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TRIPOINT DEVELOPMENT - RIVER HILLS MALL

SITE PLAN

SHEET C6.01

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PLANT SCHEDULE

CODE	QTY	BOTANICAL NAME	COMMON NAME	CALIPER	HEIGHT	CONTAINER	SPACING
CANOPY TREES							
AS	3	ACER X FREEMANII 'SIENNA'	SIENNA GLEN® MAPLE	2" CAL.	N.A.	B&B	PER PLAN
GI	2	GLEDITSIA TRIACANTHOS INERMIS 'SKYCOLE'	SKYLINE® HONEY LOCUST	2" CAL.	N.A.	B&B	PER PLAN
GD	2	GYMNOCLADUS DIOICUS 'ESPRESSO-JFS'	ESPRESSO™ KENTUCKY COFFEETREE	2" CAL.	N.A.	B&B	PER PLAN
EVERGREEN TREES							
JT	14	JUNIPERUS VIRGINIANA 'TAYLOR'	TAYLOR EASTERN REDCEDAR	N.A.	6 - 8` HT.	B&B	PER PLAN
CODE	**QTY**	**BOTANICAL NAME**	**COMMON NAME**	**SPREAD**	**HEIGHT**	**CONTAINER**	**SPACING**
DECIDUOUS SHRUBS							
DL	9	DIERVILLA LONICERA 'MICHIGAN SUNSET'	DWARF BUSH HONEYSUCKLE	N.A.	N.A.	#5 CONT.	PER PLAN
HB	9	HYDRANGEA PANICULATA 'ILVOBO'	BOBO® PANICLE HYDRANGEA	N.A.	N.A.	#5 CONT.	PER PLAN
SG	27	SPIRAEA JAPONICA 'GOLD MOUND'	GOLDMOUND SPIREA	N.A.	N.A.	#5 CONT.	PER PLAN
EVERGREEN SHRUBS							
TT	32	TAXUS X MEDIA 'TAUNTONII'	TAUNTON YEW	N.A.	N.A.	#5 CONT.	PER PLAN
PERENNIALS							
CK	14	CALAMAGROSTIS X ACUTIFLORA 'KARL FOERSTER'	KARL FOERSTER FEATHER REED GRASS	N.A.	N.A.	#1 CONT.	PER PLAN
EP	20	ECHINACEA X 'PAS702918'	POWWOW® WHITE CONEFLOWER	N.A.	N.A.	#1 CONT.	PER PLAN
SH	26	SPOROBOLUS HETEROLEPIS	PRAIRIE DROPSEED	N.A.	N.A.	#1 CONT.	PER PLAN

NOTE: THE INTENT OF THIS PLAN IS TO ILLUSTRATE MINIMUM CODE COMPLIANCE FOR PLANTINGS. PLANT SPECIES AND ARRANGEMENT MAY BE REVISED AS PART OF FINAL DESIGN.

LANDSCAPE SUMMARY

PERIMETER LANDSCAPE PROVIDED: SEE PLAN

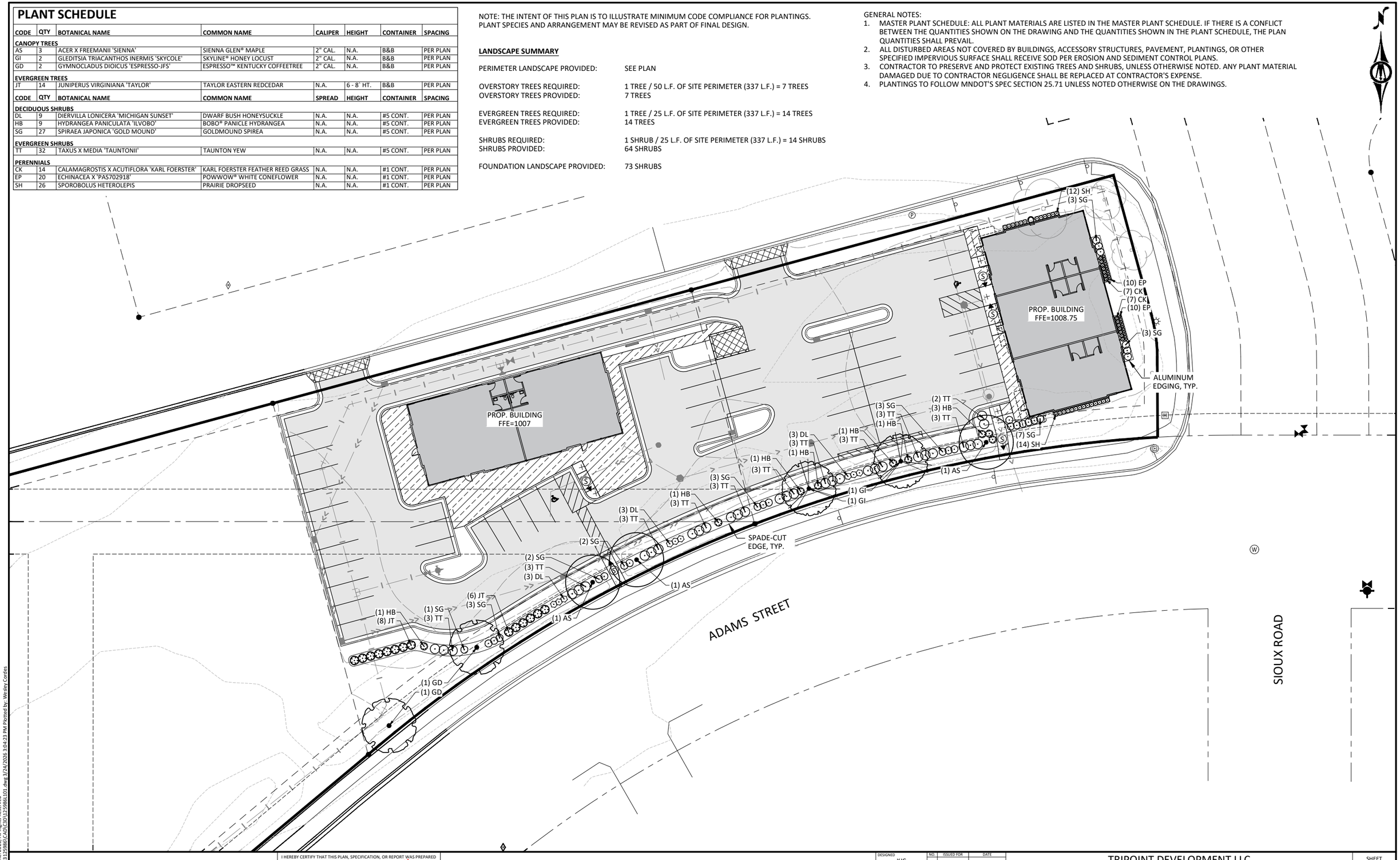
OVERSTORY TREES REQUIRED: 1 TREE / 50 L.F. OF SITE PERIMETER (337 L.F.) = 7 TREES
OVERSTORY TREES PROVIDED: 7 TREES

EVERGREEN TREES REQUIRED: 1 TREE / 25 L.F. OF SITE PERIMETER (337 L.F.) = 14 TREES
EVERGREEN TREES PROVIDED: 14 TREES

SHRUBS REQUIRED: 1 SHRUB / 25 L.F. OF SITE PERIMETER (337 L.F.) = 14 SHRUBS
SHRUBS PROVIDED: 64 SHRUBS

FOUNDATION LANDSCAPE PROVIDED: 73 SHRUBS

GENERAL NOTES:
1. MASTER PLANT SCHEDULE: ALL PLANT MATERIALS ARE LISTED IN THE MASTER PLANT SCHEDULE. IF THERE IS A CONFLICT BETWEEN THE QUANTITIES SHOWN ON THE DRAWING AND THE QUANTITIES SHOWN IN THE PLANT SCHEDULE, THE PLAN QUANTITIES SHALL PREVAIL.
2. ALL DISTURBED AREAS NOT COVERED BY BUILDINGS, ACCESSORY STRUCTURES, PAVEMENT, PLANTINGS, OR OTHER SPECIFIED IMPERVIOUS SURFACE SHALL RECEIVE SOD PER EROSION AND SEDIMENT CONTROL PLANS.
3. CONTRACTOR TO PRESERVE AND PROTECT EXISTING TREES AND SHRUBS, UNLESS OTHERWISE NOTED. ANY PLANT MATERIAL DAMAGED DUE TO CONTRACTOR NEGLIGENCE SHALL BE REPLACED AT CONTRACTOR'S EXPENSE.
4. PLANTINGS TO FOLLOW MNDOT'S SPEC SECTION 25.71 UNLESS NOTED OTHERWISE ON THE DRAWINGS.



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H:\GROWTH_PR\0M3125986\CAD\C3D\125986L101.dwg 3/24/2026 3:04:23 PM Plotted by: Wesley Cordes

HORZ. 0 20 40
SCALE FEET

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.

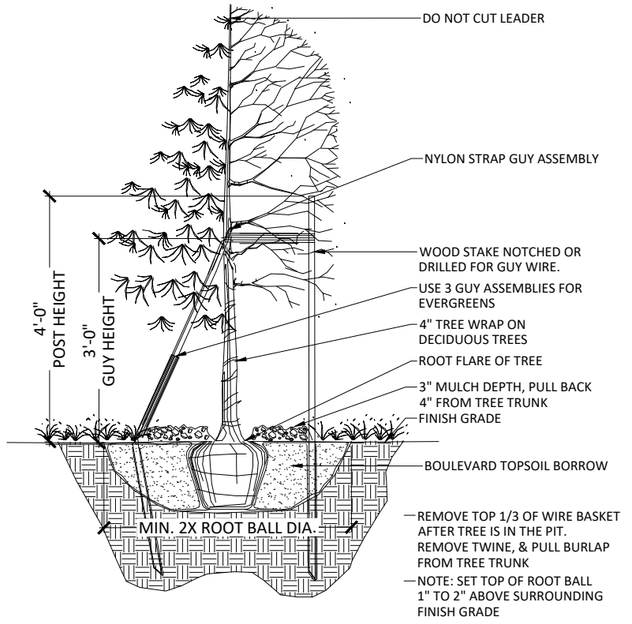
NOT FOR CONSTRUCTION

WESLEY S. [illegible], P.E.
LIC. NO. 64053 DATE MM/DD/YYYY

DESIGNED	NO.	ISSUED FOR	DATE
KJC			
DRAWN KJC			
CHECKED SJK			
CLIENT PROJ. NO. 0M3.125986			

TRIPOINT DEVELOPMENT LLC
TRIPOINT DEVELOPMENT - RIVER HILLS MALL
LANDSCAPE
LANDSCAPE PLAN

SHEET L1.01



1 TREE PLANTING
SCALE: N.T.S.

permaloc
WORLD'S BEST LANDSCAPE EDGING

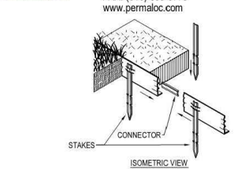
PERMALOC CORPORATION
13505 BARRY ST
HOLLAND, MI 49424
TOLL FREE: 1-800-356-9660
PHONE: (616) 399-9600
FAX: (616) 399-9770
www.permaloc.com

☑ SELECT DESIRED SIZE:

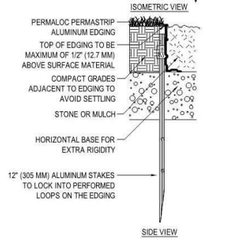
- ☐ 1/8" X 3 1/2" (3.2 MM X 89 MM), 0.06" (1.52 MM) THICK WITH 0.2" (5.08 MM) EXPOSED TOP LIP
- ☐ 3/16" X 3 1/2" (4.8 MM X 89 MM), 0.076" (1.93 MM) THICK WITH 0.2" (4.83 MM) EXPOSED TOP LIP
- ☐ 1/8" X 4" (3.2 MM X 101.6 MM), 0.06" (1.52 MM) THICK WITH 0.2" (5.08 MM) EXPOSED TOP LIP
- ☐ 3/16" X 4" (4.8 MM X 101.6 MM), 0.076" (1.93 MM) THICK WITH 0.2" (4.83 MM) EXPOSED TOP LIP
- ☐ 1/8" X 6" (3.2 MM X 152.4 MM), 0.06" (1.52 MM) THICK WITH 0.2" (5.08 MM) EXPOSED TOP LIP
- ☐ 3/16" X 6" (4.8 MM X 152.4 MM), 0.076" (1.93 MM) THICK WITH 0.2" (4.83 MM) EXPOSED TOP LIP

☑ SELECT DESIRED FINISH:

- ☐ MF - MILL FINISH-NATURAL ALUMINUM
- ☐ BL - BLACK DURAFLEX-ELECTROSTATICALLY APPLIED BAKED ON PAINT, MEETS AAMA 2603



ISOMETRIC VIEW



SIDE VIEW

NOTES:
1. INSTALL PER MANUFACTURER'S "INSTALLATION GUIDELINES".
2. 8'-0" (2.44 M) SECTIONS TO INCLUDE (3) 12" (305 MM) ALUMINUM STAKES.
3. 16'-0" (4.88 M) SECTIONS TO INCLUDE (8) 12" (305 MM) ALUMINUM STAKES.
4. CORNERS: NOTCH BASE ONLY AND FORM A CONTINUOUS CORNER.
5. PERMALOC PERMASTRIP AS MANUFACTURED BY PERMALOC CORPORATION.
6. DO NOT SCALE DRAWING.
7. THIS DRAWING IS INTENDED FOR USE BY ARCHITECTS, ENGINEERS, CONTRACTORS, CONSULTANTS AND DESIGN PROFESSIONALS FOR PLANNING PURPOSES ONLY. THIS DRAWING MAY NOT BE USED FOR CONSTRUCTION.
8. ALL INFORMATION CONTAINED HEREIN WAS CURRENT AT THE TIME OF DEVELOPMENT BUT MUST BE REVIEWED AND APPROVED BY THE PRODUCT MANUFACTURER TO BE CONSIDERED ACCURATE.
9. CONTRACTOR'S NOTE: FOR PRODUCT AND COMPANY INFORMATION VISIT www.CADdetails.com/info AND ENTER REFERENCE NUMBER 006-045.

PERMASTRIP™ ALUMINUM MAINTENANCE STRIP
PLANTING BED EDGING - STONE AND TURF CAD FILES PS-1

006-045 REVISION DATE 11/25/2014

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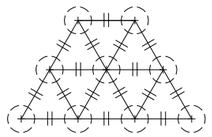
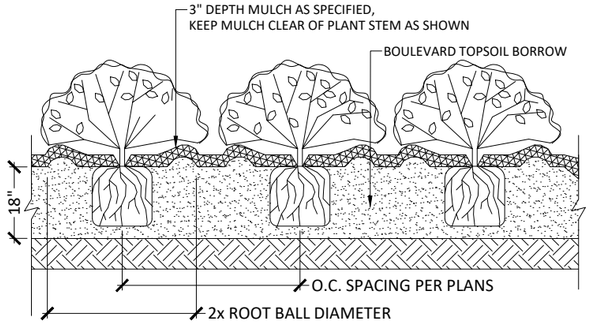
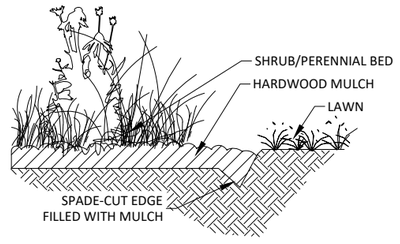


2 PERENNIAL PLANT SPACING
SCALE: N.T.S.

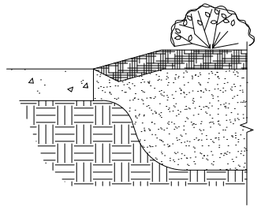


3 PERENNIAL / SHRUB PLANTING
SCALE: N.T.S.

NOTES:
SPADE-CUT EDGE TO BE INCIDENTAL TO PLANT MATERIAL AND SHALL BE USED WHERE ALL LANDSCAPE BEDS MEET ADJACENT SEEDED OR LAWN AREAS.



4 SECTION: SPADE-CUT EDGE
SCALE: N.T.S.



5 PLANTING EDGE AT HARDSCAPE SURFACE
SCALE: N.T.S.

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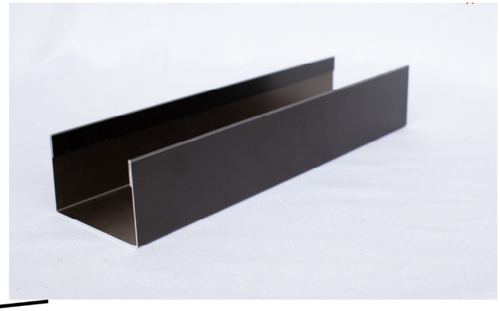
DESIGNED	NO.	ISSUED FOR	DATE
DRAWN			
CHECKED			
CLIENT PROJ. NO. 0M3.125986			

TRIPOINT DEVELOPMENT LLC
TRIPOINT DEVELOPMENT - RIVER HILLS MALL
LANDSCAPE
LANDSCAPE NOTES & DETAILS

SHEET
L1.02

EXTERIOR DESIGN



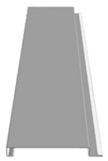


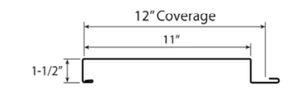
PREFINISHED STEEL
CAP AND SILL FLASHING
MATTE BLACK





THINSTONE VENEER
CHARCOAL GREY





PREFINISHED STEEL
PANELS WITH HIDDEN
FASTENERS
SNOWDRIFT WHITE



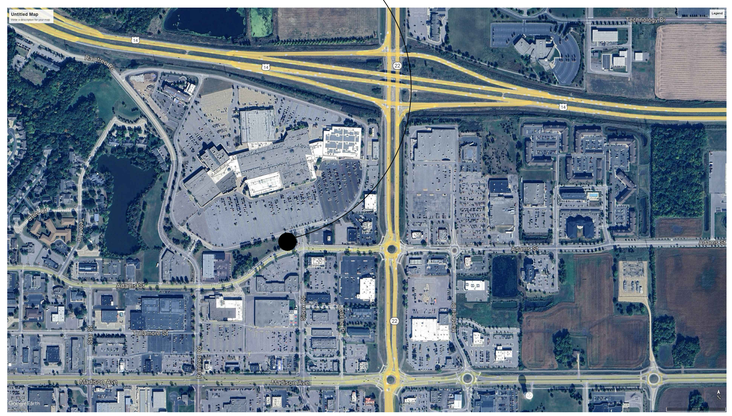
ALUMINUM STOREFRONT
FRAMING SYSTEM
CLEAR ALUMINUM



WOOD-LOOK STEEL
SHIPLAP SIDING
HICKORY

MATERIAL
BOARD

PROJECT LOCATION



Envelope Compliance Certificate

Project Information

Energy Code:	90.1 (2019) Standard
Project Title:	RHM Building One
Location:	Mankato, Minnesota
Climate Zone:	6a
Project Type:	New Construction
Vertical Glazing / Wall Area:	0.147
Performance Sim. Specs:	EnergyPlus 24.1.0 (EPW:)

Envelope Assemblies

Assembly	Gross Area or Perimeter	Cavity R-Value	Cont. R-Value	Proposed U-Factor	Budget U-Factor
Roof:Roof, Exterior Envelope, [Bldg. Use 1 - Retail]	4512	0.00	31.25	0.030	0.021
Floor:Floor, Horizontal with vertical 4 ft., Exterior Envelope, [Bldg. Use 1 - Retail] (c)	285	---	12.40	0.635	0.510
NORTH					
Ext Wall: Ext Wall - North, Exterior Envelope, [Bldg. Use 1 - Retail]	950	21.00	3.00	0.051	0.051
Window: Window (no shade), Perf. Specs.: Product ID Tubelite T14000, SHGC 0.30, VT 0.90, Exterior Envelope, [Bldg. Use 1 - Retail] (b)	59	---	---	0.250	0.340
Window: Window (below canopy), Perf. Specs.: Product ID Tubelite T14000, SHGC 0.30, PF 0.37, VT 0.90, Exterior Envelope, [Bldg. Use 1 - Retail] (b)	54	---	---	0.250	0.340
EAST					
Ext Wall: Ext Wall - East, Exterior Envelope, [Bldg. Use 1 - Retail]	1725	21.00	3.60	0.049	0.051
Window: Windows (corners), Perf. Specs.: Product ID Tubelite T14000, SHGC 0.30, PF 0.04, VT 0.90, Exterior Envelope, [Bldg. Use 1 - Retail] (b)	223	---	---	0.250	0.340
SOUTH					
Ext Wall: Ext Wall - South, Exterior Envelope, [Bldg. Use 1 - Retail]	950	21.00	3.00	0.051	0.051
Window: Window (below canopy), Perf. Specs.: Product ID Tubelite T14000, SHGC 0.30, PF 0.37, VT 0.90, Exterior Envelope, [Bldg. Use 1 - Retail] (b)	54	---	---	0.250	0.340
Window:Window (no shade), Perf. Specs.: Product ID Tubelite T14000, SHGC 0.30, VT 0.90, Exterior Envelope, [Bldg. Use 1 - Retail] (b)	59	---	---	0.250	0.340
WEST					
Ext Wall: Ext Wall - West, Exterior Envelope, [Bldg. Use 1 - Retail]	1725	21.00	3.60	0.049	0.051
Window: Windows (entrances), Perf. Specs.: Product ID Tubelite T14000, SHGC 0.30, PF 0.37, VT 0.90, Exterior Envelope, [Bldg. Use 1 - Retail] (b)	274	---	---	0.250	0.340
Door: Door, Perf. Specs.: Product ID Tubelite T14000, SHGC 0.30, PF 0.39, VT 0.90, Exterior Envelope, [Bldg. Use 1 - Retail] (b)	21	---	---	0.290	0.630
Door:Door 1, Perf. Specs.: Product ID Tubelite T14000, SHGC 0.30, PF 0.39, VT 0.90, Exterior Envelope, [Bldg. Use 1 - Retail] (b)	21	---	---	0.290	0.630
1 - Retail] (b)					
Door: Door, Perf. Specs.: Product ID Tubelite T14000, SHGC 0.30, PF 0.39, VT 0.90, Exterior Envelope, [Bldg. Use 1 - Retail] (b)	21	---	---	0.290	0.630
Door:Door 1, Perf. Specs.: Product ID Tubelite T14000, SHGC 0.30, PF 0.39, VT 0.90, Exterior Envelope, [Bldg. Use 1 - Retail] (b)	21	---	---	0.290	0.630
Door:Door 2, Perf. Specs.: Product ID Tubelite T14000, SHGC 0.30, PF 0.37, VT 0.90, Exterior Envelope, [Bldg. Use 1 - Retail] (b)	**21**	**---**	**---**	**0.290**	**0.630**

(a) Budget U-factors are used for software baseline calculations ONLY, and are not code requirements.
(b) Fenestration product performance must be certified in accordance with NFRC and requires supporting documentation.
(c) Slab-On-Grade proposed and budget U-factors shown in table are F-factors.

Envelope PASSES: Design 0.0% better than code

Envelope Compliance Statement

Compliance Statement: The proposed envelope design represented in this document is consistent with the building plans, specifications, and other calculations submitted with this permit application. The proposed envelope systems have been designed to meet the 90.1 (2019) Standard requirements in COMcheckWeb and to comply with any applicable mandatory requirements listed in the Inspection Checklist.

Matt Borowy - Designer — Matt Borowy — 9/23/2025

Name - Title **Signature** **Date**

RHM BUILDING - 1
MANKATO, MN 56001



GENERAL CONSTRUCTION NOTES

THE CONTRACTORS SHALL FAMILIARIZE THEMSELVES WITH THE PROJECT AND VERIFY ALL CONDITIONS AND DIMENSIONS. ANY DISCREPANCIES BETWEEN THESE DOCUMENTS AND ANY CODE, SHALL BE BROUGHT TO THE ATTENTION OF THE ARCHITECT IMMEDIATELY FOR CORRECTIONS.

THE CONTRACTOR SHALL VERIFY ALL EXACT ELEVATIONS, INVERTS, AND LOCATIONS OF UTILITIES.

ALL CONTRACTORS SHALL USE CAUTION TO LIMIT DAMAGE TO ANY EXISTING PLANTINGS, PROPERTY AND ADJOINING SURFACES.

THE DESIGN & CONSTRUCTION OF ACCESSIBLE BUILDING ELEMENTS WILL BE IN ACCORDANCE WITH THESE PLANS, MINNESOTA STATE BUILDING CODE CHAPTER 1341, INTERNATIONAL BUILDING CODE (I.B.C.) AND THE COUNCIL OF AMERICAN BUILDING OFFICIALS (CABO)/ AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI) A117.1-1992.

ALL NEW MATERIALS TO BE INSTALLED IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS AND SPECIFICATIONS.

WRITTEN DIMENSIONS SHALL TAKE PRECEDENCE OVER SCALED DIMENSIONS. CONTACT ARCHITECT FOR ADDITIONAL DIMENSIONS IF REQUIRED INSTEAD OF SCALING.

TRASH REMOVAL DURING CONSTRUCTION SHALL BE BY GENERAL CONTRACTOR AT GENERAL CONTRACTOR'S EXPENSE.

GENERAL CONTRACTOR TO OBTAIN ALL BUILDING PERMITS

IT IS THE CONTRACTOR'S RESPONSIBILITY TO PROVIDE AND MAINTAIN AN ALL WEATHER SURFACE ROADWAY FOR EMERGENCY VEHICLE PASSAGE FROM THE CITY STREET TO THE FRONT DOOR OF THE STRUCTURE.

SOME WALLS, WHETHER NOTED OR NOT, MAY NEED WIDER FRAMING TO ACCOMMODATE PLUMBING, CONDUIT, OR DUCTWORK. VERIFY AND COORDINATE WITH MECHANICAL OR ELECTRICAL CONTRACTOR.

ALL OUTSIDE CORNERS OF GYPSUM BOARD PARTITIONS SHALL HAVE A METAL CORNER BEAD.

TERMINATE ALL GYPSUM BOARD ABUTTING DISSIMILAR MATERIALS AND EDGES EXPOSED TO VIEW WITH NON-EXPOSED METAL CASING BEAD AND ISOLATED BY RODSTOCK AND SEALANT FULL LENGTH UNLESS NOTED OTHERWISE.

ALL DIMENSIONS AND LOCATIONS PERTAINING TO MECHANICAL OR ELECTRICAL SERVICES OR EQUIPMENT SHALL BE VERIFIED WITH RESPECTIVE TRADES.

CONTRACTOR SHALL VERIFY WITH THE RESPECTIVE TRADES FOR THE FOLLOWING:
A. CUTTING AND PATCHING TO MATCH WORK REQUIRED FOR MECHANICAL AND/OR ELECTRICAL CONSTRUCTION.
B. SIZE AND LOCATION OF PENETRATIONS FOR MECHANICAL AND/OR ELECTRICAL SERVICES OR EQUIPMENT.
C. SIZES AND LOCATIONS OF CONCRETE PADS FOR MECHANICAL AND/OR ELECTRICAL EQUIPMENT.
D. LOCATION FOR WOOD BLOCKING AS REQUIRED FOR MOUNTING MECHANICAL AND/OR ELECTRICAL EQUIPMENT.

CHANGES IN FLOOR MATERIALS OR FINISH SHALL OCCUR UNDER THE CENTER LINE OF THE DOOR OR AS NOTED.

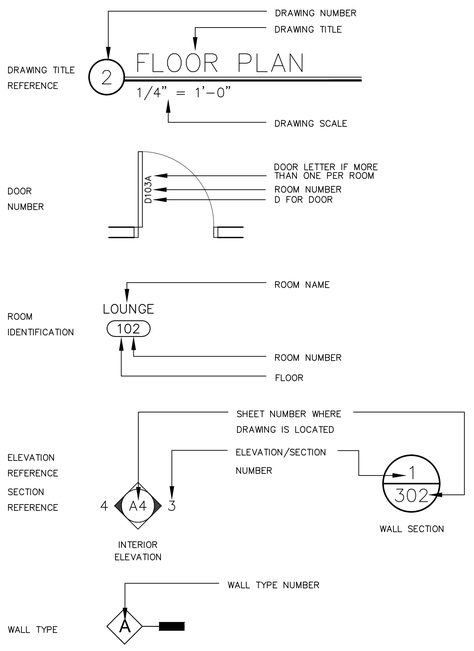
ALL FINISHES TO BE COORDINATED WITH OWNER PRIOR TO PURCHASING AND INSTALLING.

ENSURE ALL SEALANTS AND CAULKS ARE COMPATIBLE WITH ALL MATERIALS THEY COME IN CONTACT WITH.

GENERAL CONTRACTOR IS RESPONSIBLE FOR REMOVAL OF ALL DEBRIS LEFT AFTER CONSTRUCTION AND CLEAN THE SPACE FOR TURNOVER TO THE OWNER.

ALL FIRE STOPPING, CUTTING AND PATCHING WILL BE COMPLETED NY THE RESPECTED SUB-CONTRACTORS.

ARCHITECTURAL SYMBOLS



SHEET INDEX

T1.1 TITLE SHEET & CODE REVIEW

A1.1 FLOOR PLAN & ROOF PLAN

A2.1 BUILDING SECTION AND DETAILS
A2.2 BUILDING SECTION AND DETAILS

A3.1 EXTERIOR ELEVATIONS

A4.1 DOOR AND FRAME TYPES

A5.1 MONUMENT SIGN AND TRASH ENCLOSURE DETAILS

CIVIL DESIGN BY BOLTON & MENK

STRUCTURAL DESIGN BY IMEG ENGINEERING

RDS ARCHITECTS

Bright Pixel Design

PROJECT TITLE:

RIVER HILLS MALL
BUILDING ONE
MANKATO, MN 56001

RICHARD D. STORLIEN
REGISTERED PROFESSIONAL ARCHITECT
21258
STATE OF MINNESOTA

No.	SUBMISSIONS & REVISIONS	Date

TITLE SHEET

JOB. NO.: 25.22.1
DATE: 2-27-2026
DRAWN BY: MJB

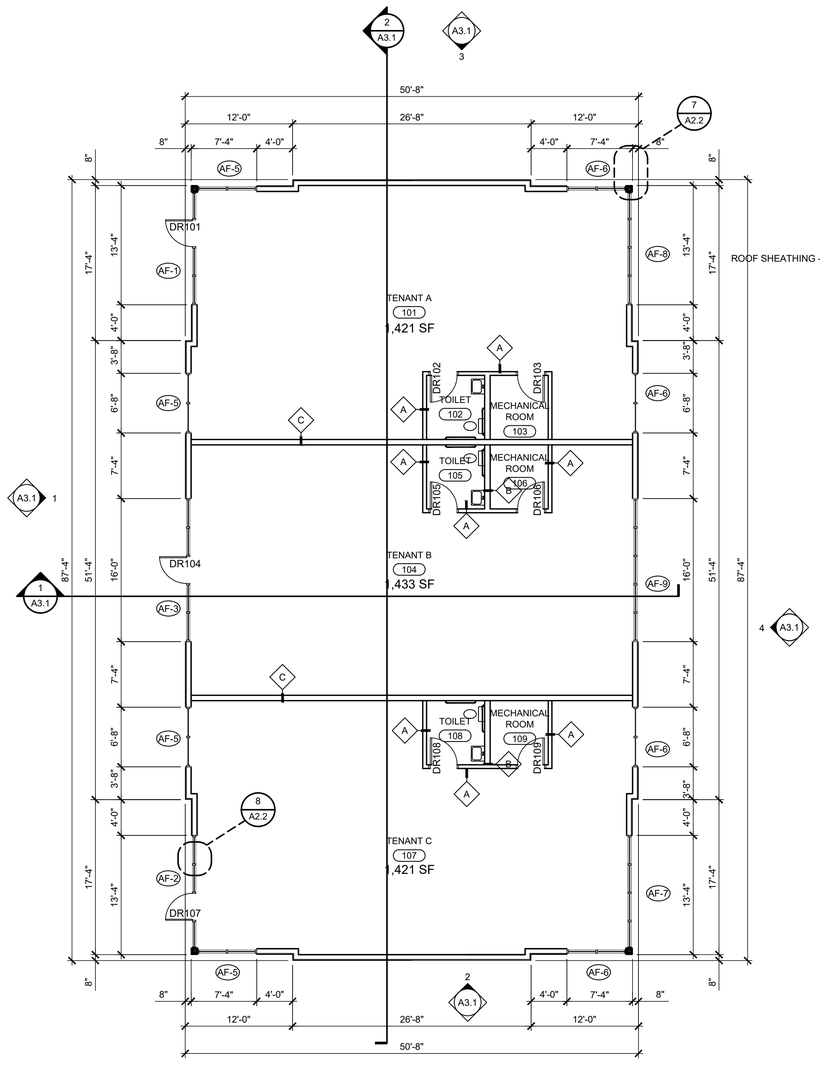
T1.1

WALL TYPES

A — 5/8" GYPSUM BOARD ON BOTH SIDES OF 2X4 WOOD STUDS @ 16" O.C. W/ BATT INSULATION - CONSTRUCT TO UNDERSIDE OF HARD CEILING — 4½"

B — 5/8" GYPSUM BOARD ON BOTH SIDES OF 2X6 WOOD STUDS @ 16" O.C. W/ BATT INSULATION. CONSTRUCT TO UNDERSIDE OF STRUCTURE — 6½"

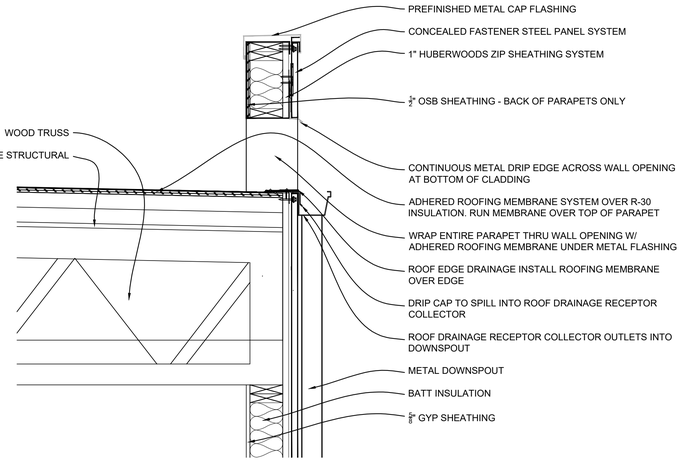
C — 5/8" GYPSUM BOARD ON BOTH SIDES OF 2X6 WOOD STUDS @ 16" O.C. W/ RESILIENT CHANNEL ONE SIDE & BATT INSULATION. CONSTRUCT TO UNDERSIDE OF STRUCTURE — 7¼"



1 FLOOR PLAN

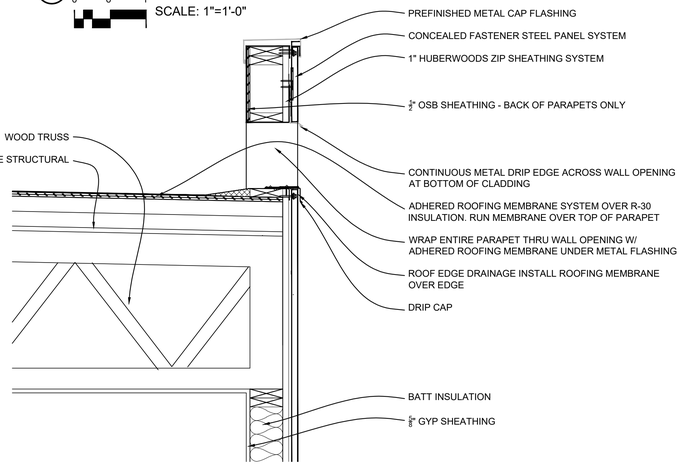
0 4' 8' SCALE: 1/8"=1'-0"

NORTH



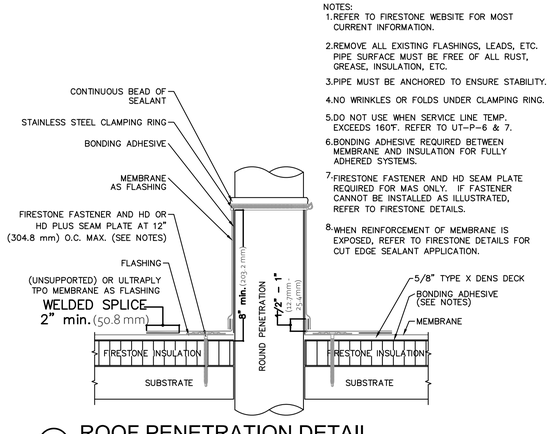
2 SCUPPER AND DOWNSPOUT DETAIL

0 6" 1' SCALE: 1"=1'-0"



3 OVERFLOW SCUPPER DETAIL

0 6" 1' SCALE: 1"=1'-0"



NOTES:
1. REFER TO FIRESTONE WEBSITE FOR MOST CURRENT INFORMATION.
2. REMOVE ALL EXISTING FLASHINGS, LEADS, ETC. PIPE SURFACE MUST BE FREE OF ALL RUST, GREASE, INSULATION, ETC.
3. PIPE MUST BE ANCHORED TO ENSURE STABILITY.
4. NO WRINKLES OR FOLDS UNDER CLAMPING RING.
5. DO NOT USE WHEN SERVICE LINE TEMP. EXCEEDS 160°F. REFER TO UT-P-6 & 7.
6. BONDING ADHESIVE REQUIRED BETWEEN MEMBRANE AND INSULATION FOR FULLY ADHERED SYSTEMS.
7. FIRESTONE FASTENER AND HD SEAM PLATE REQUIRED FOR MAS ONLY. IF FASTENER CANNOT BE INSTALLED AS ILLUSTRATED, REFER TO FIRESTONE DETAILS.
8. WHEN REINFORCEMENT OF MEMBRANE IS EXPOSED, REFER TO FIRESTONE DETAILS FOR CUT EDGE SEALANT APPLICATION.

4 ROOF PENETRATION DETAIL

0 6" 1' SCALE: 1"=1'-0"

BUILDING CODE REVIEW

BASED ON 2018 IBC
BASED ON 2020 MN BUILDING CODE

BUILDING TYPE VB
NO FIRE SPRINKLER SYSTEM INSTALLED
BUILDING IS 1 STORY WOOD FRAME CONSTRUCTION

BUILDING IS MULTI-TENANT BUILDING
NON-SEPARATED OCCUPANCY
TOTAL SQ. FTG. = 4543 SQ. FT.

ALLOWABLE BUILDING AREA CALCULATIONS
BASED ON MOST RESTRICTIVE OCC. (M) RETAIL
BASE ALLOWABLE SQ. FTG. = 9,000 SQ. FT.
ALLOWABLE 1 STORY
ACTUAL AREA = 4543 SQ. FT.

POTENTIAL OF 3 TENANT SPACE

EACH TENANT M (RETAIL) 1500 TOTAL SQ. FT. / 60 PER OCC. = 25 OCC.
EXITS REQUIRED (1) (1) PROVIDED

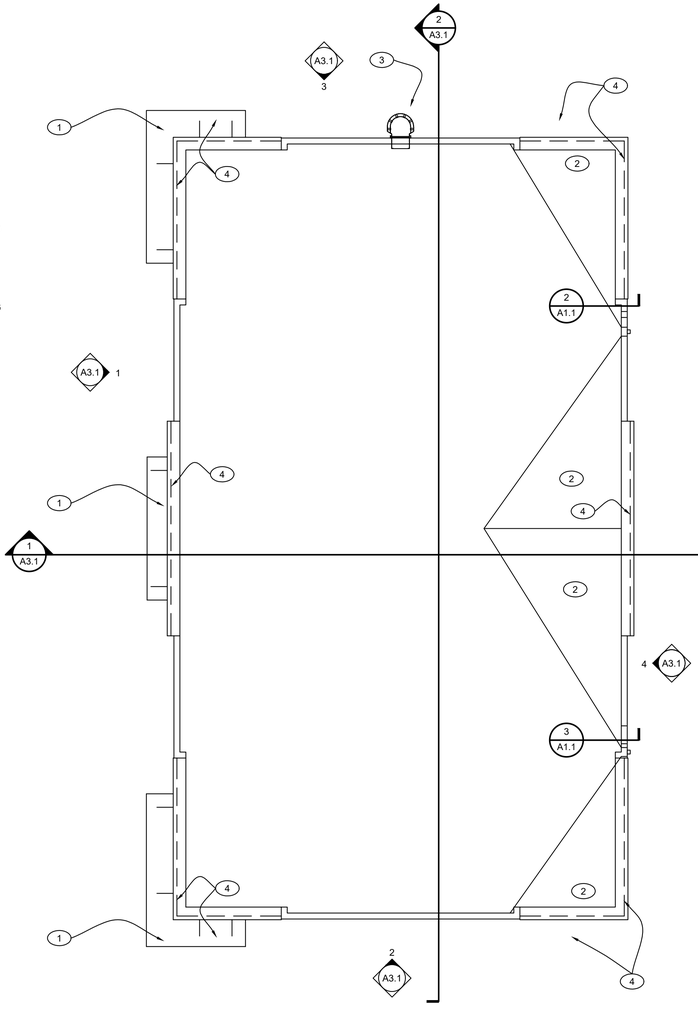
PLUMBING FIXTURE COUNT

OCCUPANT LOAD PER TENANT SPACE
M OCC. LOAD (RETAIL) = 25 OCC.

FIXTURES REQ'D BY CODE
M OCC. REQUIRES 1 TOILET/500 OCC.
TOILETS REQ'D (1)
M OCC. REQUIRES 1 SINK/750 OCC.
SINKS REQ'D (1)

TOTAL TOILETS REQUIRED (1) TOTAL SINKS REQ'D (1)
TOTAL TOILETS PROVIDED (1) TOTAL SINKS PROVIDED (1)

SINGLE GENDER NUETRAL RESTOOM ALLOWED DUE TO OCCUPANT LOAD OF 25 OR LESS



5 ROOF PLAN

0 4' 8' SCALE: 1/8"=1'-0"

NORTH

RDS ARCHITECTS

Bright Pixel Design

PROJECT TITLE:

RIVER HILLS MALL
BUILDING ONE
MANKATO, MN 56001

REGISTERED PROFESSIONAL ARCHITECT 21258 — RICHARD D. STORLIEN — STATE OF MINNESOTA

GENERAL NOTES:

CONTRACTORS TO FOLLOW MANUFACTURER'S INSTRUCTIONS AND INDUSTRY BEST PRACTICES FOR ALL PRODUCT INSTALLATIONS.

SHEET NOTES:

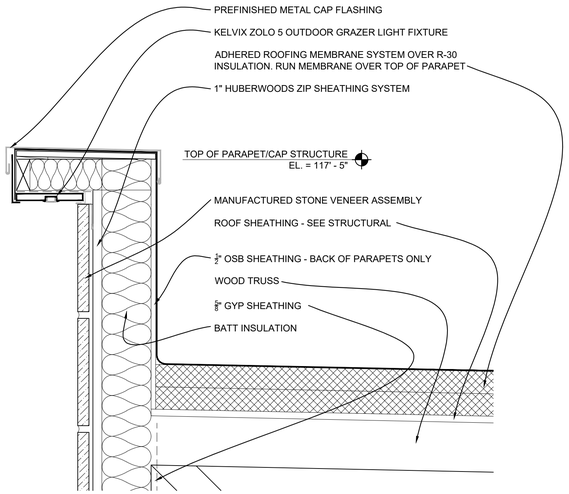
1. PREFABRICATED ALUMINUM SUNSHADE
2. WATER DIVERSION CRICKET CONSTRUCTED OF TAPERED RIGID INSULATION UNDER ADHERED ROOFING MEMBRANE
3. ROOF ACCESS LADDER SEE 1/A4.1
4. DASHED LINE DENOTES KELVIX ZOLO 5 OUTDOOR GRAZER LIGHT FIXTURE IN CAP

No.	SUBMISSIONS & REVISIONS	Date

FLOOR PLAN & ROOF PLAN

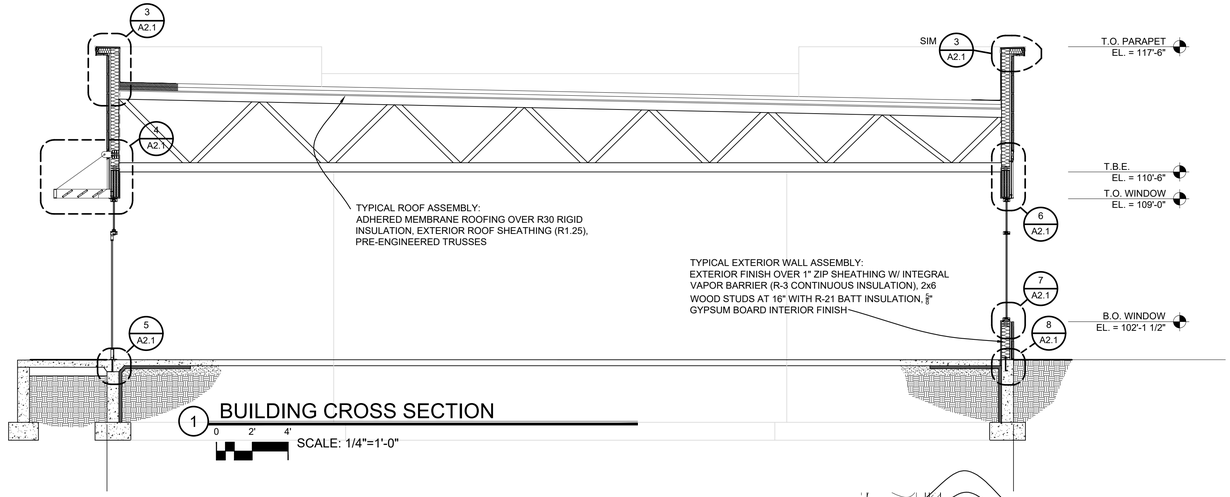
JOB. NO.: 25.22.1
DATE: 2-27-2026
DRAWN BY: MJB

A1.1



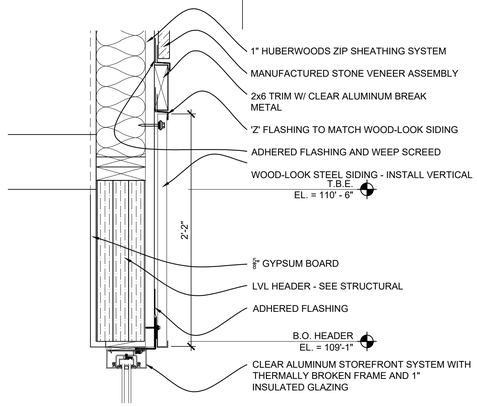
3 DETAIL

0 6" 1' SCALE: 1 1/2"=1'-0"



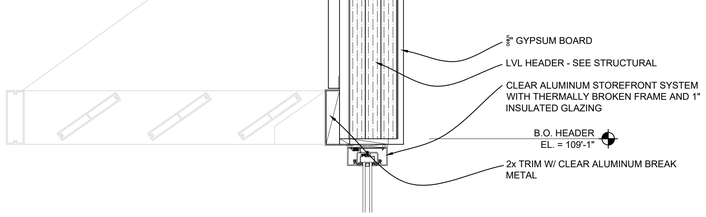
1 BUILDING CROSS SECTION

0 2' 4' SCALE: 1/4"=1'-0"



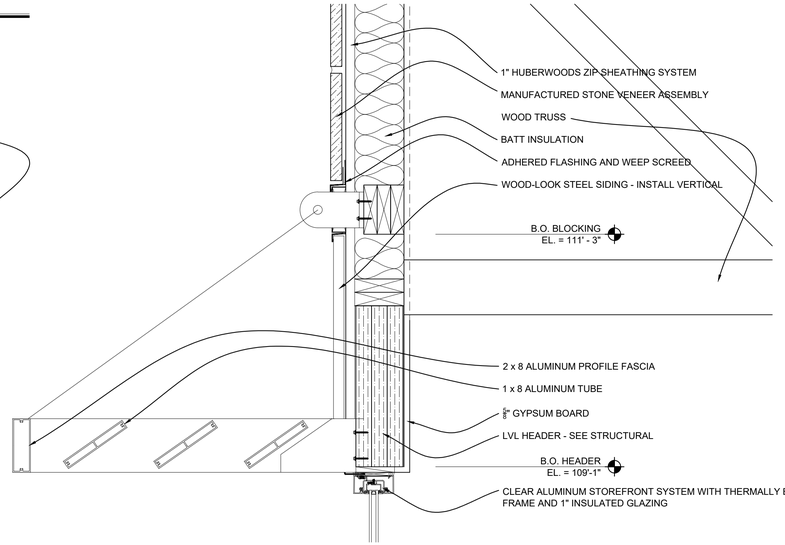
6 DETAIL

0 6" 1' SCALE: 1 1/2"=1'-0"



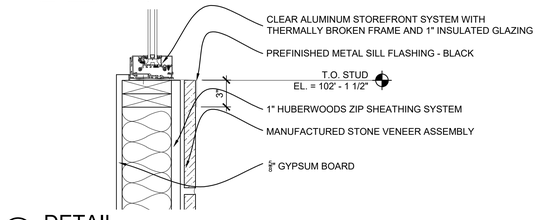
9 DETAIL

0 6" 1' SCALE: 1 1/2"=1'-0"



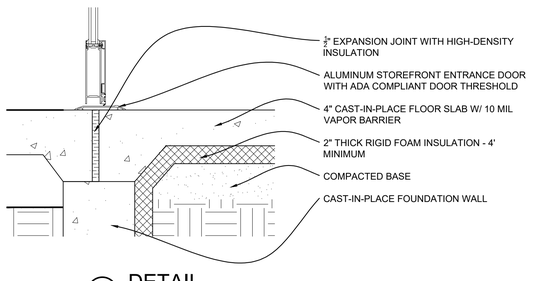
4 DETAIL

0 6" 1' SCALE: 1 1/2"=1'-0"



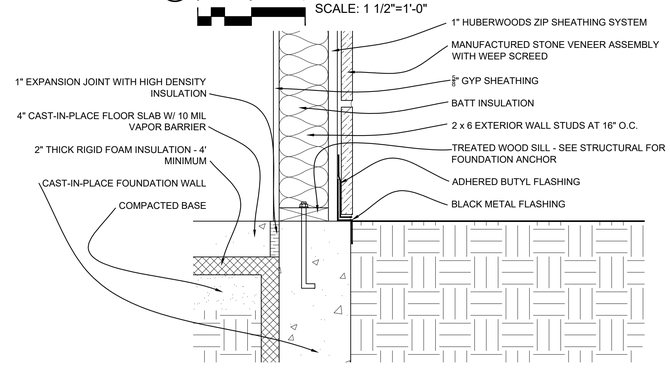
7 DETAIL

0 6" 1' SCALE: 1 1/2"=1'-0"



5 DETAIL

0 6" 1' SCALE: 1 1/2"=1'-0"



8 DETAIL

0 6" 1' SCALE: 1 1/2"=1'-0"

RDS ARCHITECTS

Bright Pixel Design

PROJECT TITLE:

RIVER HILLS MALL
BUILDING ONE
MANKATO, MN 56001

RICHARD D. STORLIEN REGISTERED PROFESSIONAL ARCHITECT 21258 STATE OF MINNESOTA

GENERAL NOTES:

CONTRACTORS TO FOLLOW MANUFACTURER'S INSTRUCTIONS AND INDUSTRY BEST PRACTICES FOR ALL PRODUCT INSTALLATIONS.

SHEET NOTES:

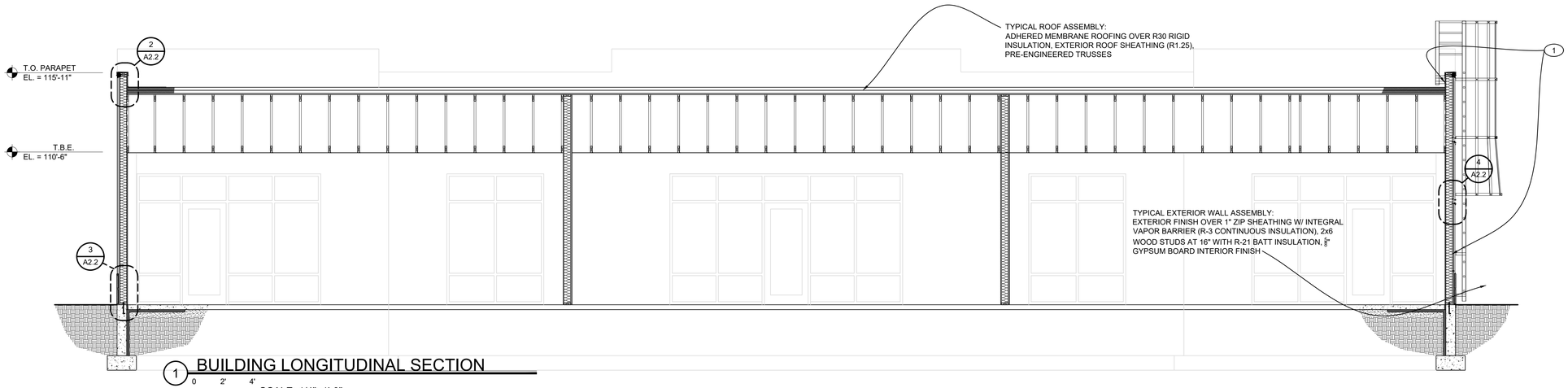
1 NOTE

No.	SUBMISSIONS & REVISIONS	Date

BUILDING SECTION

JOB. NO.: 25.22.1
DATE: 2-27-2026
DRAWN BY: MJB

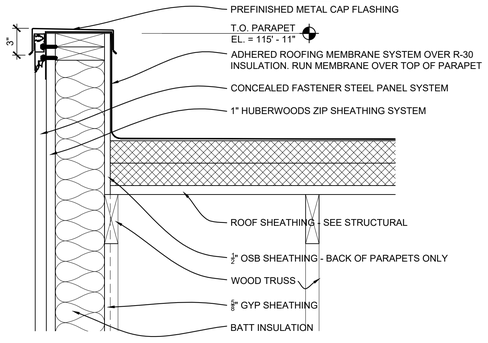
A2.1



1 BUILDING LONGITUDINAL SECTION

0 2' 4'

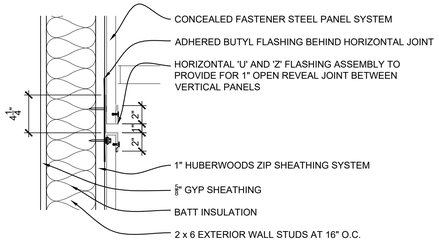
SCALE: 1/4"=1'-0"



2 DETAIL

0 6" 1'

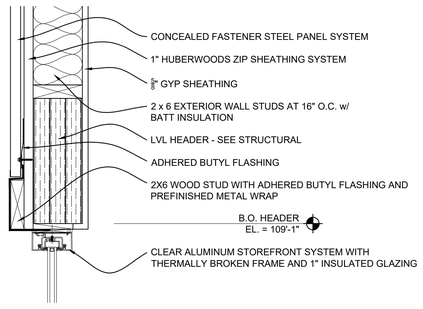
SCALE: 1 1/2"=1'-0"



4 DETAIL

0 6" 1'

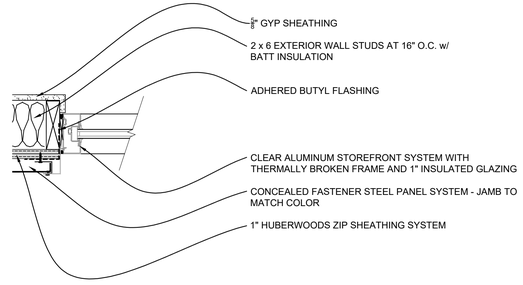
SCALE: 1 1/2"=1'-0"



6 DETAIL

0 6" 1'

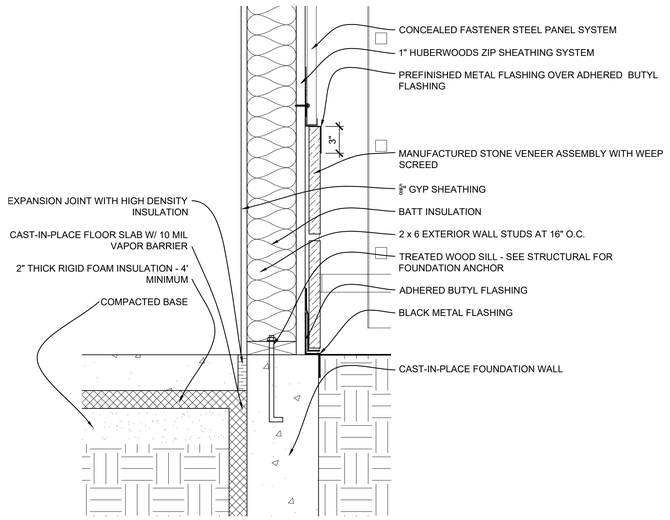
SCALE: 1 1/2"=1'-0"



8 DETAIL

0 6" 1'

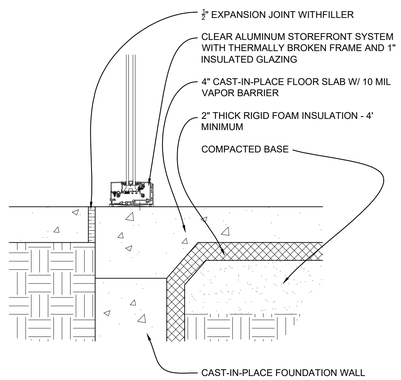
SCALE: 1 1/2"=1'-0"



3 DETAIL

0 6" 1'

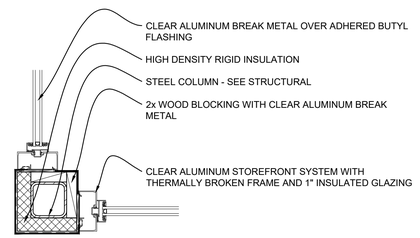
SCALE: 1 1/2"=1'-0"



5 DETAIL

0 6" 1'

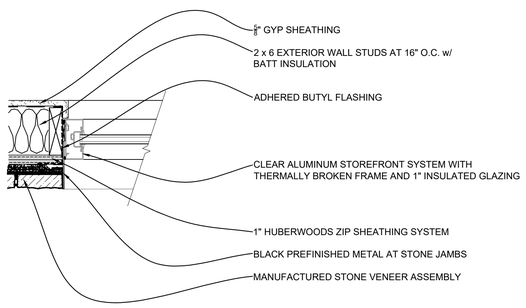
SCALE: 1 1/2"=1'-0"



7 DETAIL

0 6" 1'

SCALE: 1 1/2"=1'-0"



9 DETAIL

0 6" 1'

SCALE: 1 1/2"=1'-0"

RDS ARCHITECTS

Bright Pixel Design

PROJECT TITLE:

RIVER HILLS MALL
BUILDING ONE
MANKATO, MN 56001

RICHARD D. STORLIEN
REGISTERED PROFESSIONAL ARCHITECT
21258
STATE OF MINNESOTA

GENERAL NOTES:

CONTRACTORS TO FOLLOW MANUFACTURER'S INSTRUCTIONS AND INDUSTRY BEST PRACTICES FOR ALL PRODUCT INSTALLATIONS.

SHEET NOTES:

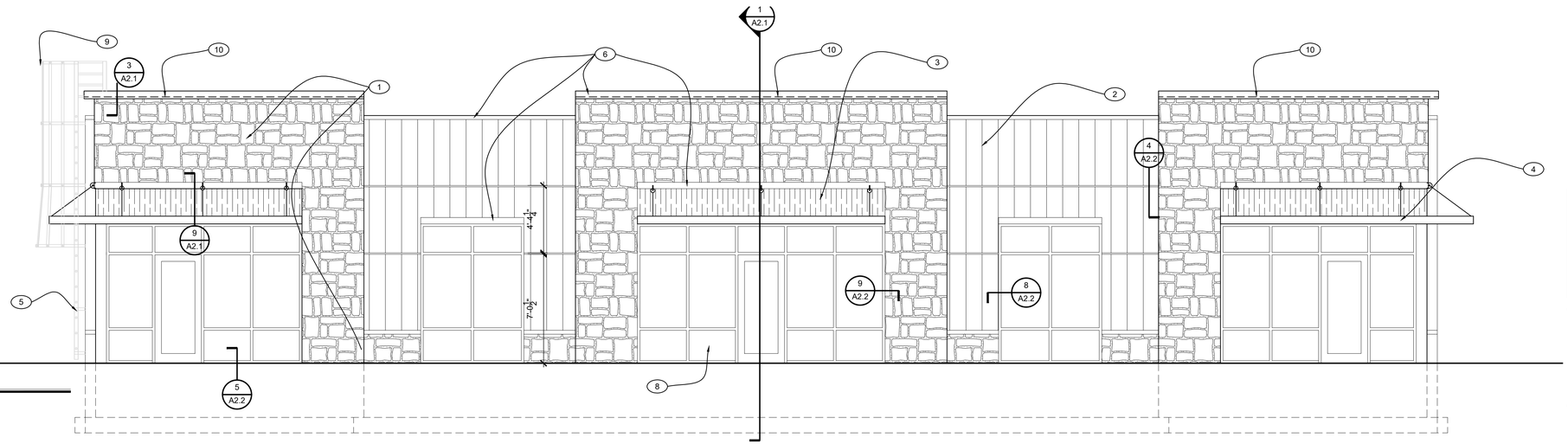
1. PROVIDE IN-WALL BLOCKING AS REQUIRED FOR LADDER INSTALLATION

No.	SUBMISSIONS & REVISIONS	Date

BUILDING SECTION AND DETAILS

JOB. NO.: 25.22.1
DATE: 2-27-2026
DRAWN BY: MJB

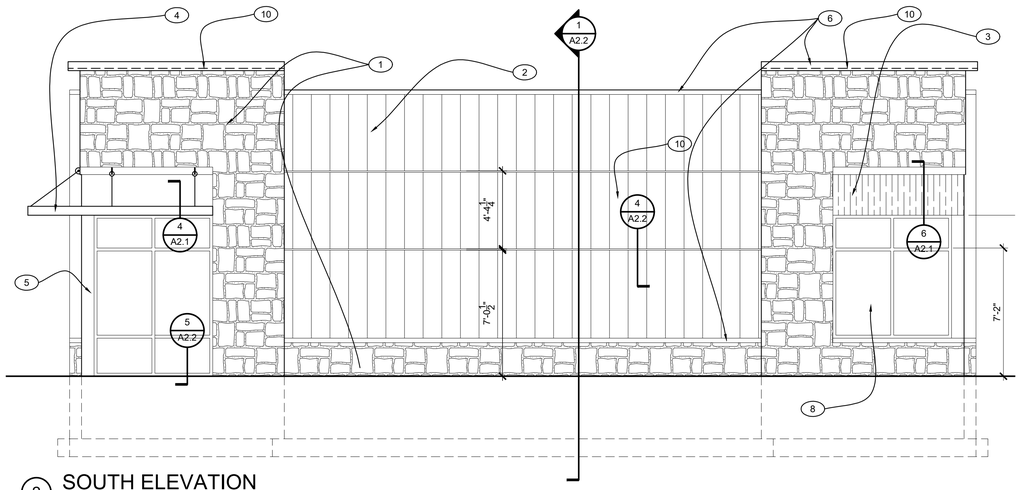
A2.2



1 WEST ELEVATION

0 2' 4'

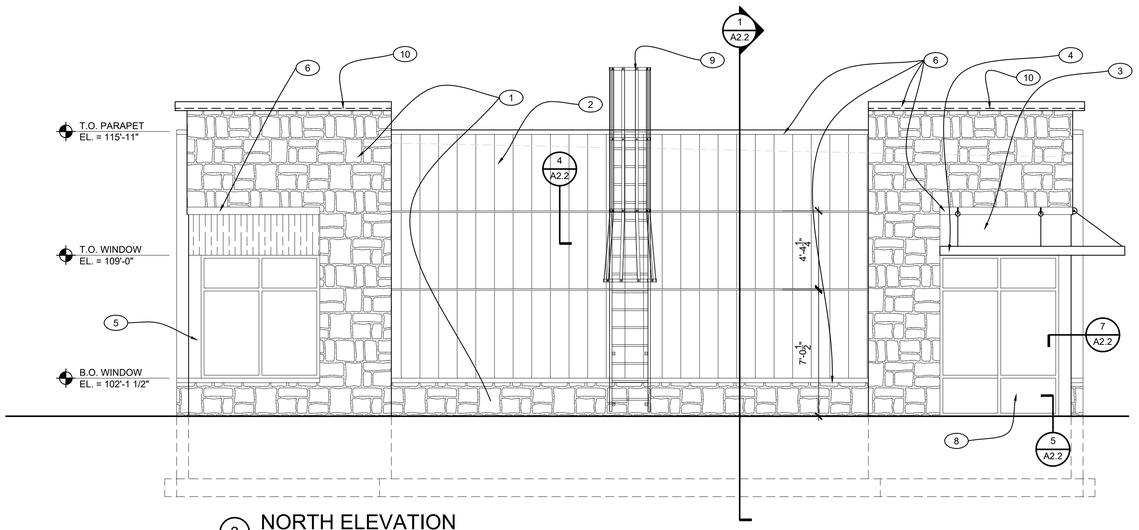
SCALE: 1/4"=1'-0"



2 SOUTH ELEVATION

0 2' 4'

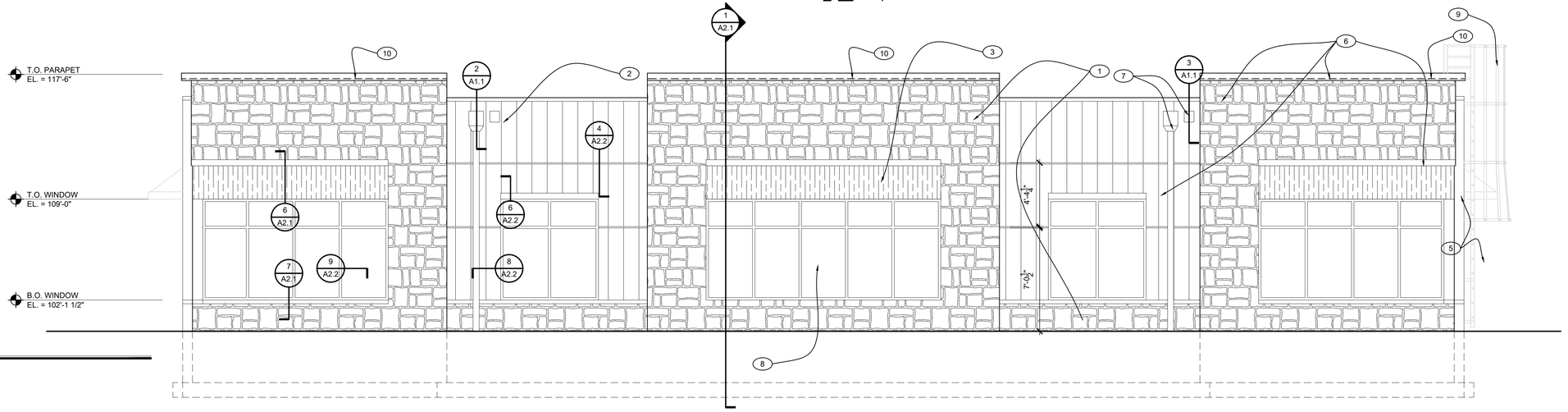
SCALE: 1/4"=1'-0"



3 NORTH ELEVATION

0 2' 4'

SCALE: 1/4"=1'-0"



4 EAST ELEVATION

0 2' 4'

SCALE: 1/4"=1'-0"

RDS ARCHITECTS

Bright Pixel Design

PROJECT TITLE:

RIVER HILLS MALL
BUILDING ONE
MANKATO, MN 56001

RICHARD D. STORLIEN
REGISTERED PROFESSIONAL ARCHITECT
21258
STATE OF MINNESOTA

GENERAL NOTES:

CONTRACTORS TO FOLLOW MANUFACTURER'S INSTRUCTIONS AND INDUSTRY BEST PRACTICES FOR ALL PRODUCT INSTALLATIONS.

SHEET NOTES:

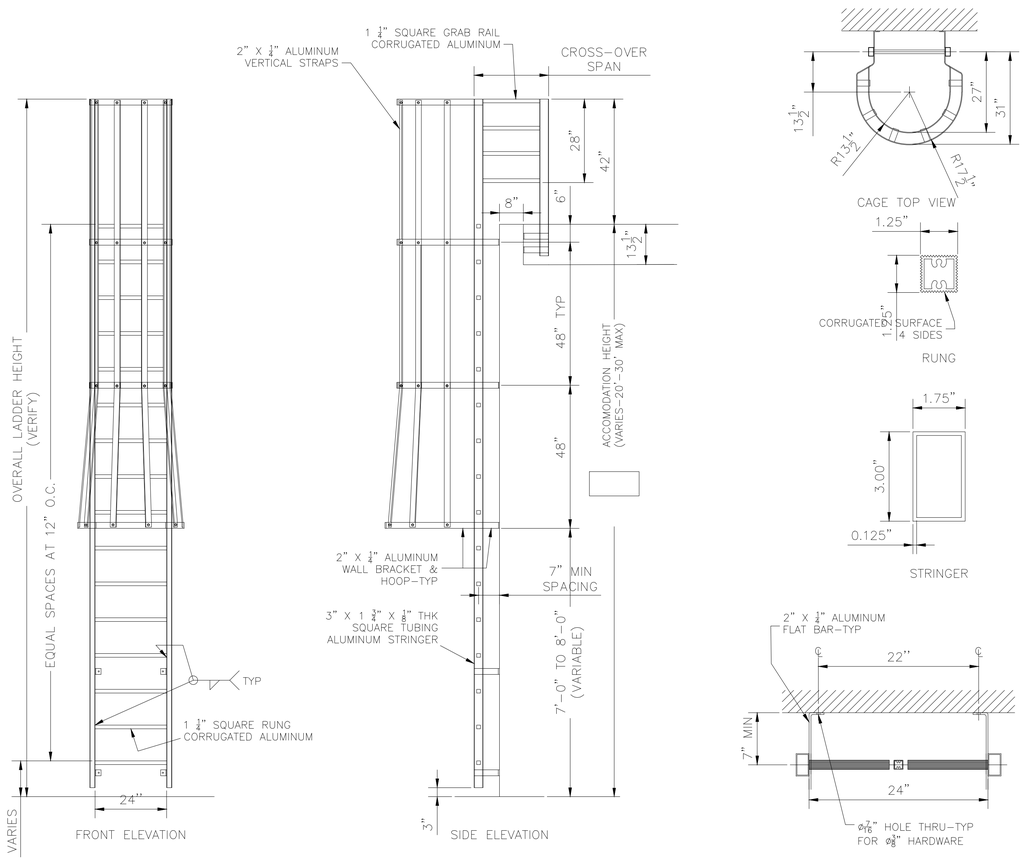
1. THINSTONE VENEER: CENTURION STONE DIMENSIONAL SLATE FLAT AND CORNER UNITS - CHARCOAL GREY
2. PREFINISHED STEEL SIDING: METAL SALES EM15-1211 CONCEALED FASTENER WALL PANELS WITH 1" OPEN EXPOSURE HORIZONTAL CHANNELS PER 4/A2.2 COLOR: SNOWDRIFT WHITE
3. WOOD-LOOK STEEL SIDING: EDCO SL6 PERSPECTIVES HICKORY - INSTALL VERTICAL
4. INDUSTRIAL LOUVERS, INC. PREFINISHED ALUMINUM SUNSHADE WITH ORNAMENTAL TIE-BACKS PER 4/A2.1 - CLEAR
5. CLEAR ALUMINUM BREAK METAL
6. PREFINISHED BLACK METAL WRAP FOR CAPS, SILLS AND TRIM WRAP
7. SCUPPER, OVERFLOW SCUPPER AND DOWNSPOUT: WHITE TO MATCH NOTE: 2
8. CLEAR ALUMINUM STOREFRONT SYSTEM: SEE SHEET A4.1
9. ROOF ACCESS LADDER SEE 1/A4.1
10. CORNICE/CAP WITH KELVIX ZOLO 5 OUTDOOR GRAZER LIGHT FIXTURE

No.	SUBMISSIONS & REVISIONS	Date

EXTERIOR ELEVATIONS

JOB. NO.: 25.22.1
DATE: 2-27-2026
DRAWN BY: MJB

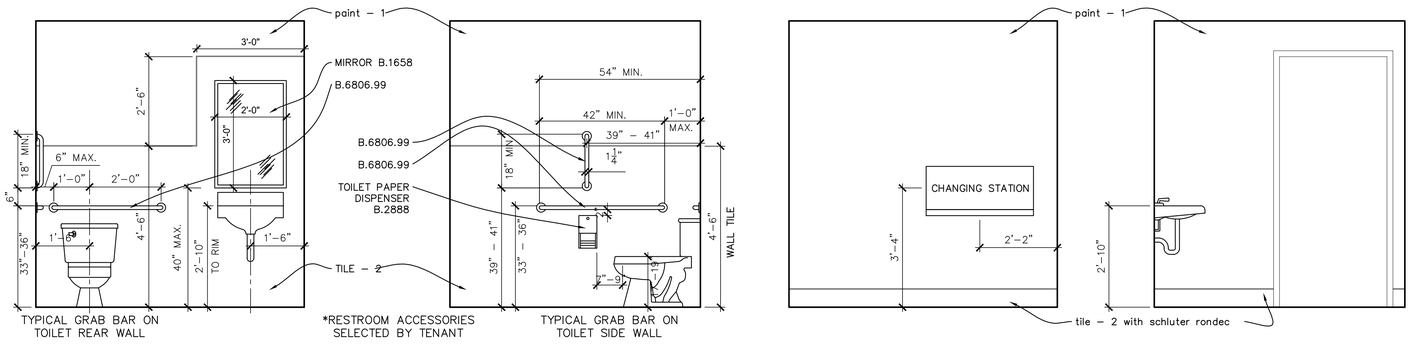
A3.1



1 ROOF ACCESS LADDER DETAILS

0 1' 2' SCALE: 1/2"=1'-0"

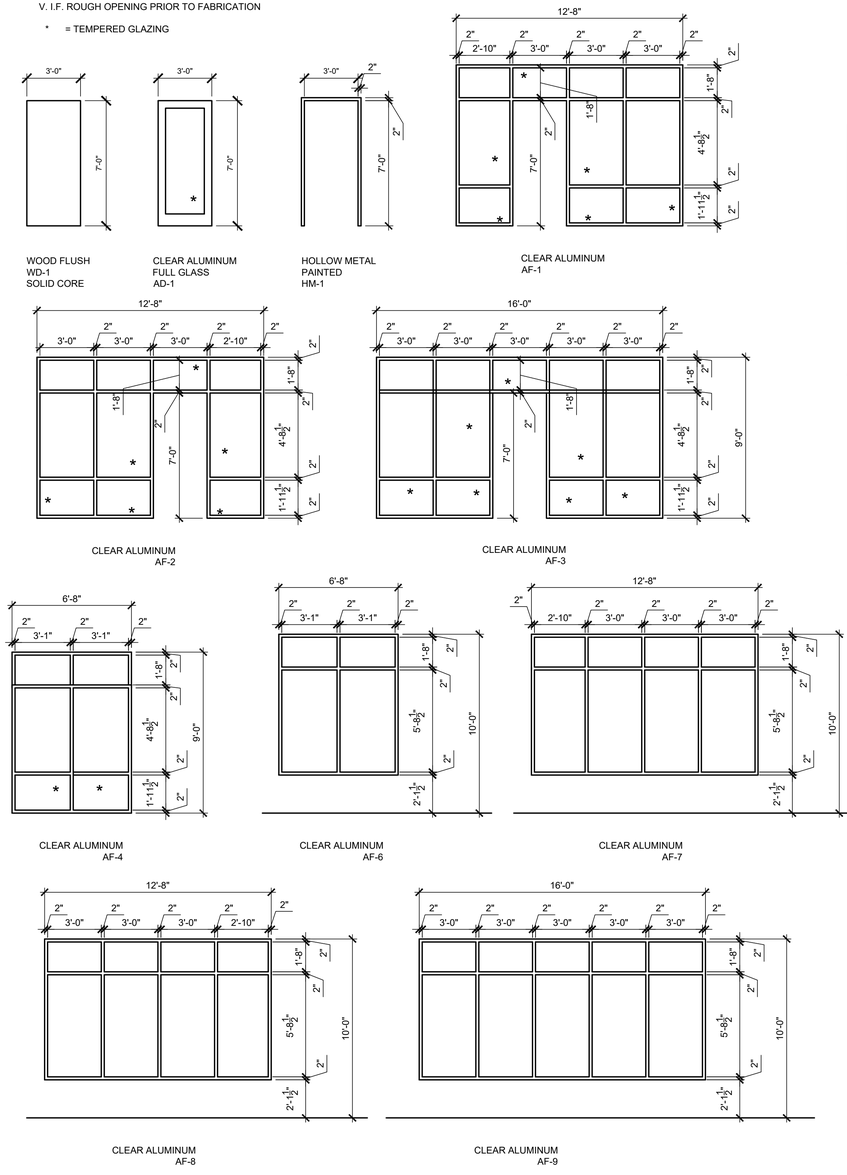
RESTROOM ELEVATIONS



DOOR & FRAME TYPES

V. I.F. ROUGH OPENING PRIOR TO FABRICATION

* = TEMPERED GLAZING



DOOR SCHEDULE

DESIGNATION		DOOR	FRAME	HDWR	MISC.
DOOR NUMBER	ROOM	DOOR TYPE	FRAME TYPE	GROUP	
101	TENANT A	AD-1	AF-1	STOREFRONT LOCKSET	CLOSER, EXTERIOR HARDWARE
102	TOILET	WD-1	HM-1	RESTROOM LOCKSET	-
103	MECHANICAL ROOM	WD-1	HM-1	STORAGE LOCKSET	-
104	TENANT B	AD-1	AF-3	STOREFRONT LOCKSET	CLOSER, EXTERIOR HARDWARE
105	TOILET	WD-1	HM-1	RESTROOM LOCKSET	-
106	MECHANICAL ROOM	WD-1	HM-1	STORAGE LOCKSET	-
107	TENANT C	AD-1	AF-2	STOREFRONT LOCKSET	CLOSER, EXTERIOR HARDWARE
108	TOILET	WD-1	HM-1	RESTROOM LOCKSET	-
109	MECHANICAL ROOM	WD-1	HM-1	STORAGE LOCKSET	-

NOTES:

1. VERIFY ALL HARDWARE WITH OWNER PRIOR TO PURCHASE AND INSTALLATION
2. FINISH: CLEAR ALUMINUM
3. ALL DOORS TO HAVE LEVER HANDLES UNLESS NOTED OTHERWISE

RDS ARCHITECTS

Bright Pixel Design

PROJECT TITLE:

RIVER HILLS MALL
BUILDING ONE
MANKATO, MN 56001

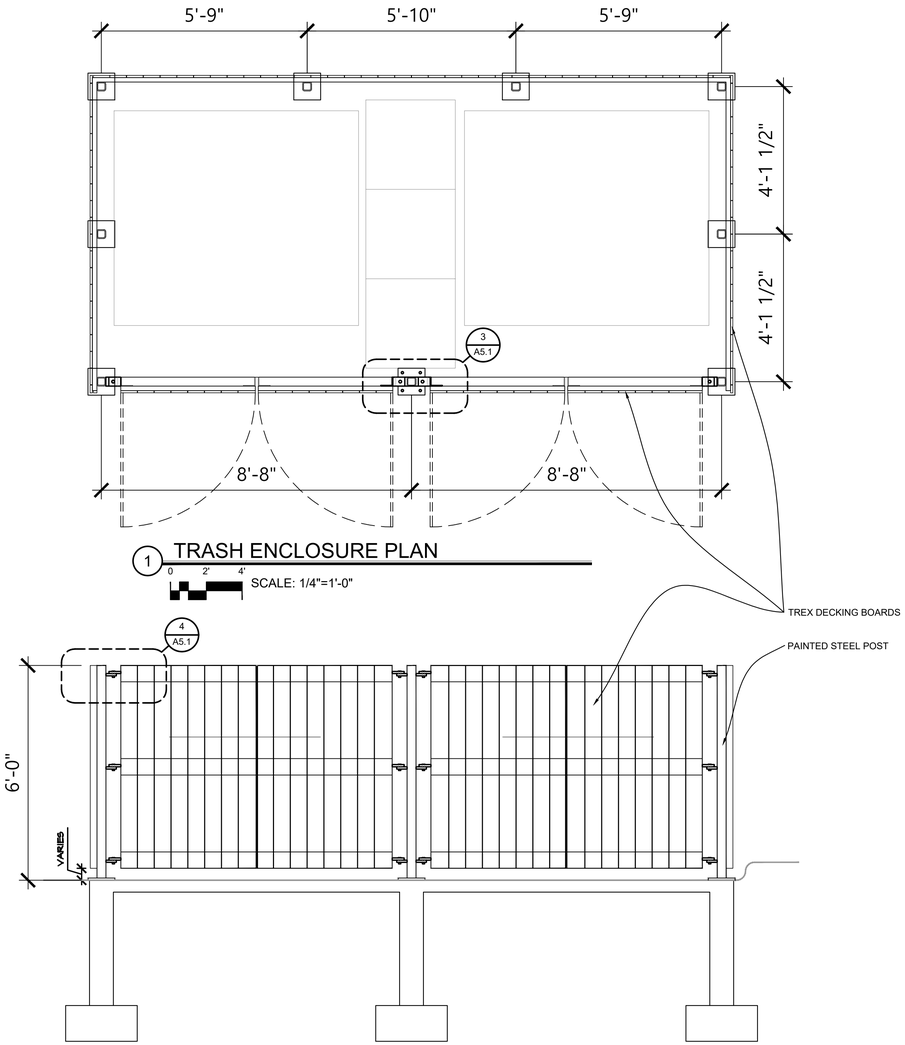
RICHARD D. STORLIEN REGISTERED PROFESSIONAL ARCHITECT 21258 STATE OF MINNESOTA

No.	SUBMISSIONS & REVISIONS	Date

DOOR & FRAME TYPES
DOOR SCHEDULE

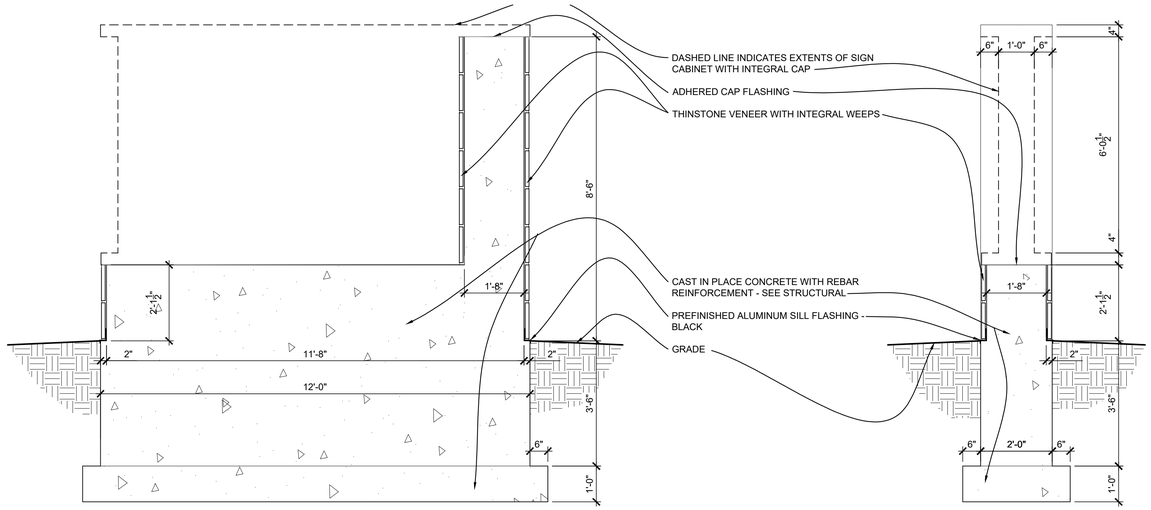
JOB. NO.: 25.22.1
DATE: 2-27-2026
DRAWN BY: MJB

A4.1



1 TRASH ENCLOSURE PLAN
0 2' 4'
SCALE: 1/4"=1'-0"

2 TRASH ENCLOSURE ELEVATION
0 2' 4'
SCALE: 1/4"=1'-0"

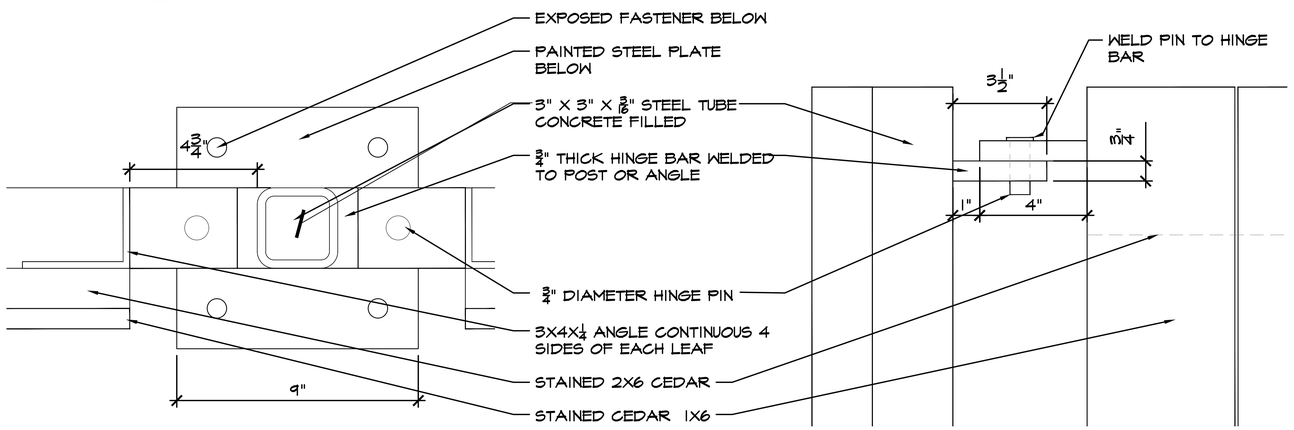


5 MONUMENT SIGN SECTION
0 1' 2'
SCALE: 1/2"=1'-0"

6 MONUMENT SIGN SECTION
0 1' 2'
SCALE: 1/2"=1'-0"

7 MONUMENT SIGN ELEVATION
0 1' 2'
SCALE: 1/2"=1'-0"

8 MONUMENT SIGN ELEVATION
0 1' 2'
SCALE: 1/2"=1'-0"



3 HINGE DETAIL
0 6" 1'
SCALE: 1"=1'-0"

4 HINGE DETAIL
0 6" 1'
SCALE: 1"=1'-0"

RDS ARCHITECTS

Bright Pixel Design

PROJECT TITLE:

RIVER HILLS MALL
BUILDING ONE
MANKATO, MN 56001

RICHARD D. STORLIEN
REGISTERED PROFESSIONAL ARCHITECT
21258
STATE OF MINNESOTA

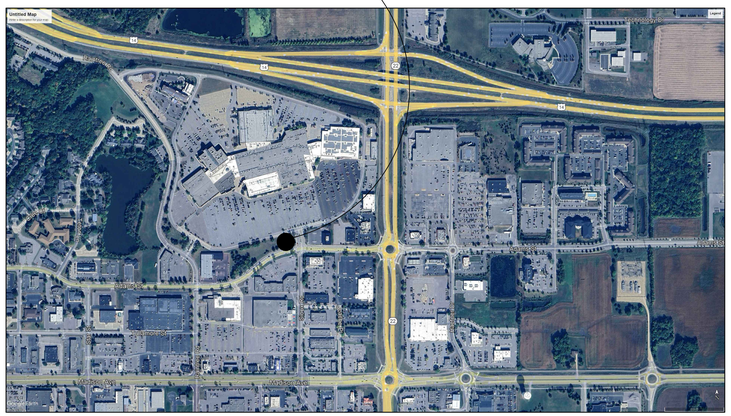
No.	SUBMISSIONS & REVISIONS	Date

MONUMENT SIGN & TRASH ENCLOSURE DETAILS

JOB. NO.: 25.22.1
DATE: 2-27-2026
DRAWN BY: MJB

A5.1

PROJECT LOCATION



RHM BUILDING - 2
MANKATO, MN 56001



RDS ARCHITECTS

Bright Pixel Design

PROJECT TITLE:

RIVER HILLS MALL
BUILDING TWO
MANKATO, MN 56001

Envelope Compliance Certificate

Project Information

Energy Code:	90.1 (2019) Standard
Project Title:	RHM-2
Location:	Mankato, Minnesota
Climate Zone:	6a
Project Type:	New Construction
Vertical Glazing / Wall Area:	0.319
Performance Sim. Specs:	EnergyPlus 24.1.0 (EPW:)

Building Area

Description	Floor Area
1-Retail (Retail) : Nonresidential	3718

Envelope Assemblies

Assembly	Gross Area or Perimeter	Cavity R-Value	Cont. R-Value	Proposed U-Factor	Budget U-Factor
Roof:Roof, Exterior Envelope, [Bldg. Use 1 - Retail]	3541	---	31.25	0.031	0.032
Floor:Floor, Vertical 4 ft., Exterior Envelope, [Bldg. Use 1 - Retail] (c)	269	---	12.40	0.751	0.688
NORTH					
Ext Wall: Ext Wall - North, Exterior Envelope, [Bldg. Use 1 - Retail]	1515	21.00	3.00	0.051	0.051
Window:Windows - North, Perf. Specs.: Product ID Tubelite T14000, SHGC 0.30, PF 0.04, VT 0.90, Exterior Envelope, [Bldg. Use 1 - Retail] (b)	355	---	---	0.250	0.340
EAST					
Ext Wall:Ext Wall - East, Exterior Envelope, [Bldg. Use 1 - Retail]	640	21.00	3.00	0.051	0.051
Window:Windows - East, Perf. Specs.: Product ID Tubelite T14000, SHGC 0.30, PF 0.17, VT 0.90, Exterior Envelope, [Bldg. Use 1 - Retail] (b)	74	---	---	0.250	0.340
SOUTH					
Ext Wall:Ext Wall - South, Exterior Envelope, [Bldg. Use 1 - Retail]	1515	21.00	3.00	0.051	0.051
Window:Windows - South, Perf. Specs.: Product ID Tubelite T14000, SHGC 0.30, PF 0.33, VT 0.90, Exterior Envelope, [Bldg. Use 1 - Retail] (b)	545	---	---	0.250	0.340
Door:Doors - South, Perf. Specs.: Product ID Tubelite T14000, SHGC 0.30, PF 0.33, VT 0.90, Exterior Envelope, [Bldg. Use 1 - Retail] (b)	42	---	---	0.290	0.630
WEST					
Ext Wall:Ext Wall - West, Exterior Envelope, [Bldg. Use 1 - Retail]	640	21.00	3.00	0.051	0.051
Window:Window - West, Perf. Specs.: Product ID Tubelite T14000, SHGC 0.30, PF 0.17, VT 0.90, Exterior Envelope, [Bldg. Use 1 - Retail] (b)	340	---	---	0.250	0.340
Door:Door - West, Perf. Specs.: Product ID Tubelite T14000, SHGC 0.30, PF 0.04, VT 0.90, Exterior Envelope, [Bldg. Use 1 - Retail] (b)	21	---	---	0.290	0.630

(a) Budget U-factors are used for software baseline calculations ONLY, and are not code requirements.
(b) Fenestration product performance must be certified in accordance with NFRC and requires supporting documentation.
(c) Slab-On-Grade proposed and budget U-factors shown in table are F-factors.

Envelope PASSES: Design 6% better than code

Envelope Compliance Statement

Compliance Statement: The proposed envelope design represented in this document is consistent with the building plans, specifications, and other calculations submitted with this permit application. The proposed envelope systems have been designed to meet the 90.1 (2019) Standard requirements in COMcheckWeb and to comply with any applicable mandatory requirements listed in the Inspection Checklist.

Matt J Borowy - Designer — 2-24-26

Name - Title **Signature** **Date**

GENERAL CONSTRUCTION NOTES

THE CONTRACTORS SHALL FAMILIARIZE THEMSELVES WITH THE PROJECT AND VERIFY ALL CONDITIONS AND DIMENSIONS. ANY DISCREPANCIES BETWEEN THESE DOCUMENTS AND ANY CODE, SHALL BE BROUGHT TO THE ATTENTION OF THE ARCHITECT IMMEDIATELY FOR CORRECTIONS.

THE CONTRACTOR SHALL VERIFY ALL EXACT ELEVATIONS, INVERTS, AND LOCATIONS OF UTILITIES.

ALL CONTRACTORS SHALL USE CAUTION TO LIMIT DAMAGE TO ANY EXISTING PLANTINGS, PROPERTY AND ADJOINING SURFACES.

THE DESIGN & CONSTRUCTION OF ACCESSIBLE BUILDING ELEMENTS WILL BE IN ACCORDANCE WITH THESE PLANS, MINNESOTA STATE BUILDING CODE CHAPTER 1341, INTERNATIONAL BUILDING CODE (I.B.C.) AND THE COUNCIL OF AMERICAN BUILDING OFFICIALS (CABO)/ AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI) A117.1-1992.

ALL NEW MATERIALS TO BE INSTALLED IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS AND SPECIFICATIONS.

WRITTEN DIMENSIONS SHALL TAKE PRECEDENCE OVER SCALED DIMENSIONS. CONTACT ARCHITECT FOR ADDITIONAL DIMENSIONS IF REQUIRED INSTEAD OF SCALING.

TRASH REMOVAL DURING CONSTRUCTION SHALL BE BY GENERAL CONTRACTOR AT GENERAL CONTRACTOR'S EXPENSE.

GENERAL CONTRACTOR TO OBTAIN ALL BUILDING PERMITS

IT IS THE CONTRACTOR'S RESPONSIBILITY TO PROVIDE AND MAINTAIN AN ALL WEATHER SURFACE ROADWAY FOR EMERGENCY VEHICLE PASSAGE FROM THE CITY STREET TO THE FRONT DOOR OF THE STRUCTURE.

SOME WALLS, WHETHER NOTED OR NOT, MAY NEED WIDER FRAMING TO ACCOMMODATE PLUMBING, CONDUIT, OR DUCTWORK. VERIFY AND COORDINATE WITH MECHANICAL OR ELECTRICAL CONTRACTOR.

ALL OUTSIDE CORNERS OF GYPSUM BOARD PARTITIONS SHALL HAVE A METAL CORNER BEAD.

TERMINATE ALL GYPSUM BOARD ABUTTING DISSIMILAR MATERIALS AND EDGES EXPOSED TO VIEW WITH NON-EXPOSED METAL CASING BEAD AND ISOLATED BY RODSTOCK AND SEALANT FULL LENGTH UNLESS NOTED OTHERWISE.

ALL DIMENSIONS AND LOCATIONS PERTAINING TO MECHANICAL OR ELECTRICAL SERVICES OR EQUIPMENT SHALL BE VERIFIED WITH RESPECTIVE TRADES.

CONTRACTOR SHALL VERIFY WITH THE RESPECTIVE TRADES FOR THE FOLLOWING:
A. CUTTING AND PATCHING TO MATCH WORK REQUIRED FOR MECHANICAL AND/OR ELECTRICAL CONSTRUCTION.
B. SIZE AND LOCATION OF PENETRATIONS FOR MECHANICAL AND/OR ELECTRICAL SERVICES OR EQUIPMENT.
C. SIZES AND LOCATIONS OF CONCRETE PADS FOR MECHANICAL AND/OR ELECTRICAL EQUIPMENT.
D. LOCATION FOR WOOD BLOCKING AS REQUIRED FOR MOUNTING MECHANICAL AND/OR ELECTRICAL EQUIPMENT.

CHANGES IN FLOOR MATERIALS OR FINISH SHALL OCCUR UNDER THE CENTER LINE OF THE DOOR OR AS NOTED.

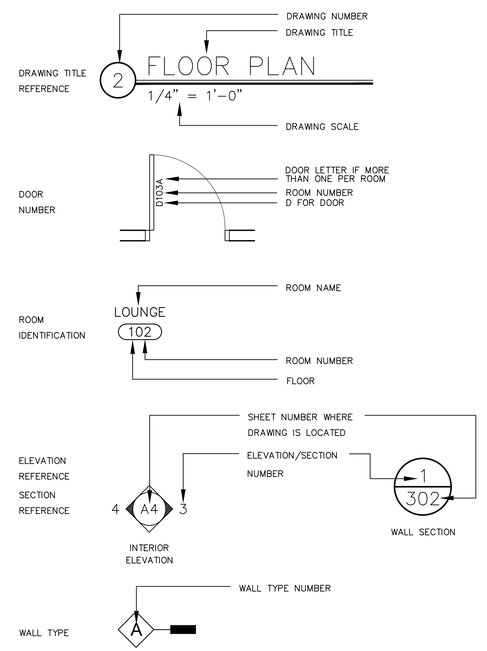
ALL FINISHES TO BE COORDINATED WITH OWNER PRIOR TO PURCHASING AND INSTALLING.

ENSURE ALL SEALANTS AND CAULKS ARE COMPATIBLE WITH ALL MATERIALS THEY COME IN CONTACT WITH.

GENERAL CONTRACTOR IS RESPONSIBLE FOR REMOVAL OF ALL DEBRIS LEFT AFTER CONSTRUCTION AND CLEAN THE SPACE FOR TURNOVER TO THE OWNER.

ALL FIRE STOPPING, CUTTING AND PATCHING WILL BE COMPLETED NY THE RESPECTED SUB-CONTRACTORS.

ARCHITECTURAL SYMBOLS



SHEET INDEX

T1.1 TITLE SHEET & CODE REVIEW

A1.1 FLOOR PLAN & ROOF PLAN

A2.1 BUILDING SECTION AND DETAILS

A2.2 BUILDING SECTION AND DETAILS

A3.1 EXTERIOR ELEVATIONS

A4.1 DOOR AND FRAME INFO AND LADDER DETAIL

CIVIL DESIGN BY BOLTON & MENK

STRUCTURAL DESIGN BY IMEG ENGINEERING

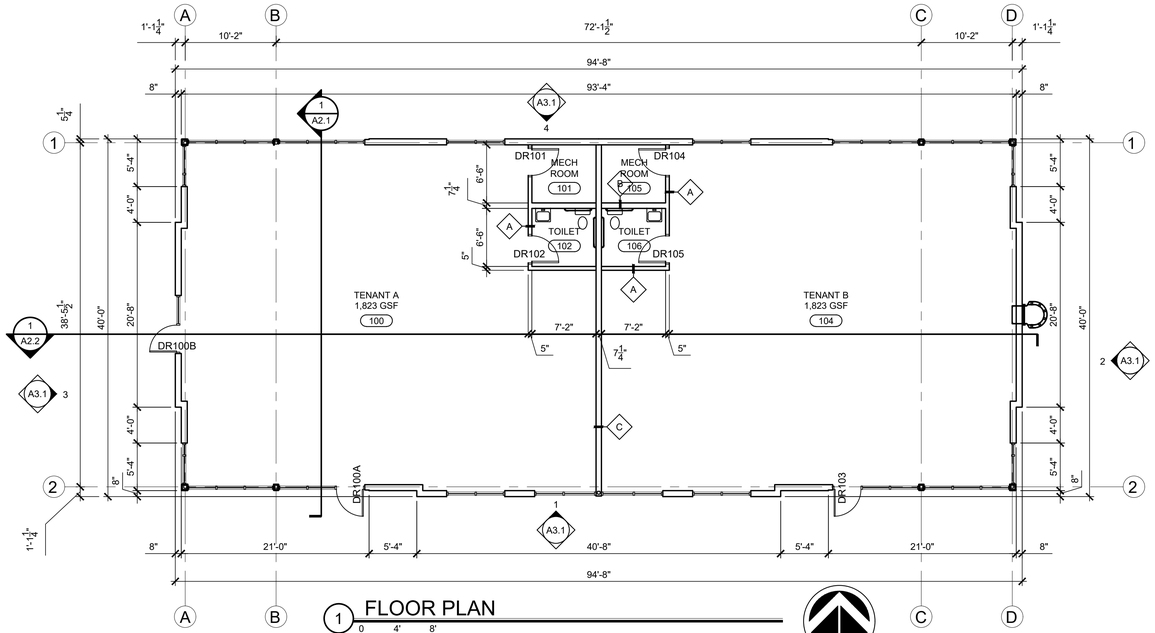
NOT FOR CONSTRUCTION

No.	SUBMISSIONS & REVISIONS	Date

TITLE SHEET

JOB. NO.: 26.22.1
DATE: 2-26-2026
DRAWN BY: MJB

T1.1



1 FLOOR PLAN

0 4' 8'

SCALE: 1/8"=1'-0"

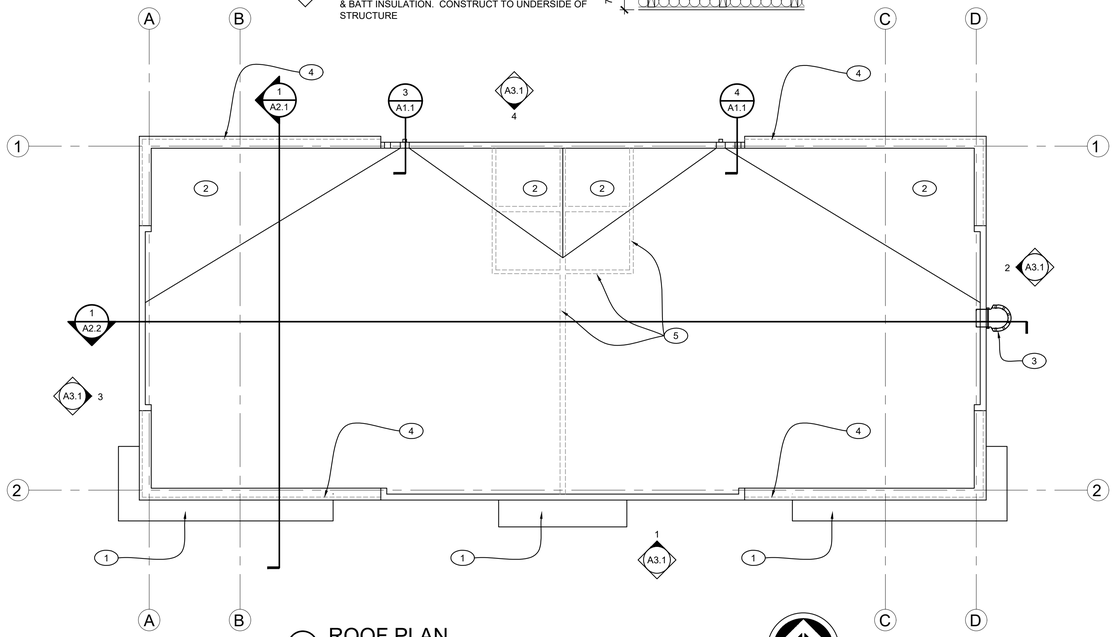
NORTH

WALL TYPES

A — 5/8" GYPSUM BOARD ON BOTH SIDES OF 2X4 WOOD STUDS @ 16" O.C. W/ BATT INSULATION - CONSTRUCT TO UNDERSIDE OF HARD CEILING

B — 5/8" GYPSUM BOARD ON BOTH SIDES OF 2X6 WOOD STUDS @ 16" O.C. W/ BATT INSULATION. CONSTRUCT TO UNDERSIDE OF STRUCTURE

C — 5/8" GYPSUM BOARD ON BOTH SIDES OF 2X6 WOOD STUDS @ 16" O.C. W/ RESILIENT CHANNEL ONE SIDE & BATT INSULATION. CONSTRUCT TO UNDERSIDE OF STRUCTURE

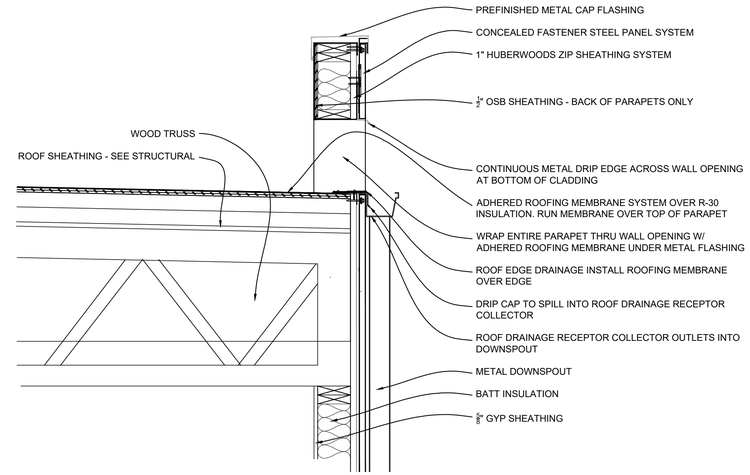


2 ROOF PLAN

0 4' 8'

SCALE: 1/8"=1'-0"

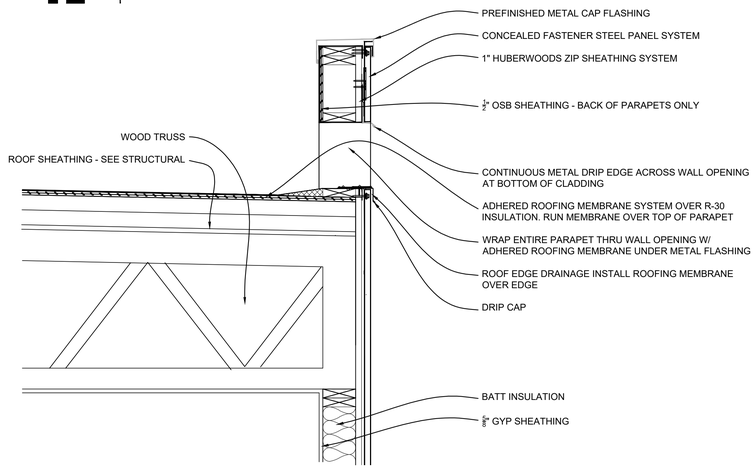
NORTH



3 SCUPPER AND DOWNSPOUT DETAIL

0 6" 1'

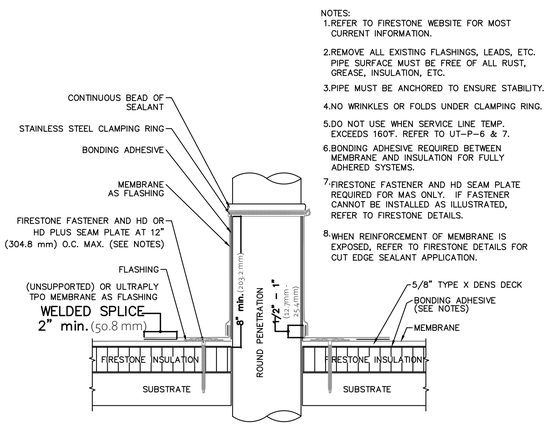
SCALE: 1"=1'-0"



4 OVERFLOW SCUPPER DETAIL

0 6" 1'

SCALE: 1"=1'-0"



NOTES:

1. REFER TO FIRESTONE WEBSITE FOR MOST CURRENT INFORMATION.
2. REMOVE ALL EXISTING FLASHINGS, LEADS, ETC. PIPE SURFACE MUST BE FREE OF ALL RUST, GREASE, INSULATION, ETC.
3. PIPE MUST BE ANCHORED TO ENSURE STABILITY.
4. NO WRINKLES OR FOLDS UNDER CLAMPING RING.
5. DO NOT USE WHEN SERVICE LINE TEMP. EXCEEDS 160°F. REFER TO UT-P-6 & 7.
6. BONDING ADHESIVE REQUIRED BETWEEN MEMBRANE AND INSULATION FOR FULLY ADHERED SYSTEMS.
7. FIRESTONE FASTENER AND HD SEAM PLATE REQUIRED FOR MAS ONLY. IF FASTENER CANNOT BE INSTALLED AS ILLUSTRATED, REFER TO FIRESTONE DETAILS.
8. WHEN REINFORCEMENT OF MEMBRANE IS EXPOSED, REFER TO FIRESTONE DETAILS FOR CUT EDGE SEALANT APPLICATION.

5 ROOF PENETRATION DETAIL

0 6" 1'

SCALE: 1"=1'-0"

BUILDING CODE REVIEW

BASED ON 2020 IBC
BASED ON 2020 MN BUILDING CODE

BUILDING TYPE VB
NO FIRE SPRINKLER SYSTEM INSTALLED
BUILDING IS 1 STORY WOOD FRAME CONSTRUCTION

BUILDING IS MULTI-TENANT BUILDING
NON-SEPARATED OCCUPANCY
TOTAL SQ. FTG. = 3714 SQ. FT.

ALLOWABLE BUILDING AREA CALCULATIONS
BASED ON MOST RESTRICTIVE OCC. (M) RETAIL
BASE ALLOWABLE SQ. FTG. = 9,000 SQ. FT.
ALLOWABLE 1 STORY
ACTUAL AREA = 3714 SQ. FT.

POTENTIAL OF 2 TENANT SPACES

TENANT #2 M (RETAIL) 1857 TOTAL SQ. FT. / 60 PER OCC. = 31 OCC.
EXITS REQUIRED (1) (1) PROVIDED

PLUMBING FIXTURE COUNT

OCCUPANT LOAD PER TENANT SPACE
M OCC. LOAD (RETAIL) = 31 OCC.

FIXTURES REQ'D BY CODE
M OCC. REQUIRES 1 TOILET/500 OCC.
TOILETS REQ'D (1)
M OCC. REQUIRES 1 SINK/750 OCC.
SINKS REQ'D (1)

TOTAL TOILETS REQUIRED (1) TOTAL SINKS REQ'D (1)
TOTAL TOILETS PROVIDED (1) TOTAL SINKS PROVIDED (1)

SINGLE GENDER NUETRAL RESTOOM ALLOWED DUE TO OCCUPANT LOAD OF 100 OR LESS

RDS ARCHITECTS

Bright Pixel Design

PROJECT TITLE:

RIVER HILLS MALL
BUILDING TWO
MANKATO, MN 56001

GENERAL NOTES:

CONTRACTORS TO FOLLOW MANUFACTURER'S INSTRUCTIONS AND INDUSTRY BEST PRACTICES FOR ALL PRODUCT INSTALLATIONS.

SHEET NOTES:

1. PREFABRICATED ALUMINUM SUNSHADE
2. WATER DIVERSION CRICKET CONSTRUCTED OF TAPERED RIGID INSULATION UNDER ADHERED ROOFING MEMBRANE
3. ROOF ACCESS LADDER SEE 1/A4.1
4. DASHED LINE DENOTES KELVIX ZOLO 5 OUTDOOR GRAZER LIGHT FIXTURE IN CAP
5. DASHED LINE DENOTES NON-STRUCTURAL WALLS BELOW

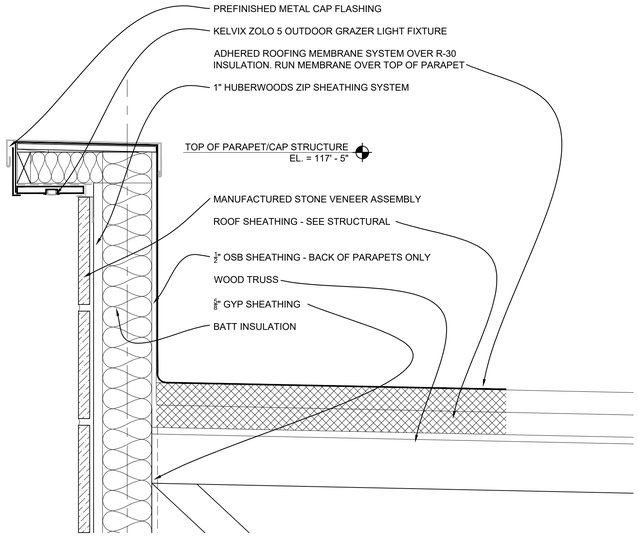
NOT FOR CONSTRUCTION

No.	SUBMISSIONS & REVISIONS	Date

FLOOR PLAN & ROOF PLAN

JOB. NO.: 26.22.1
DATE: 2-26-2026
DRAWN BY: MJB

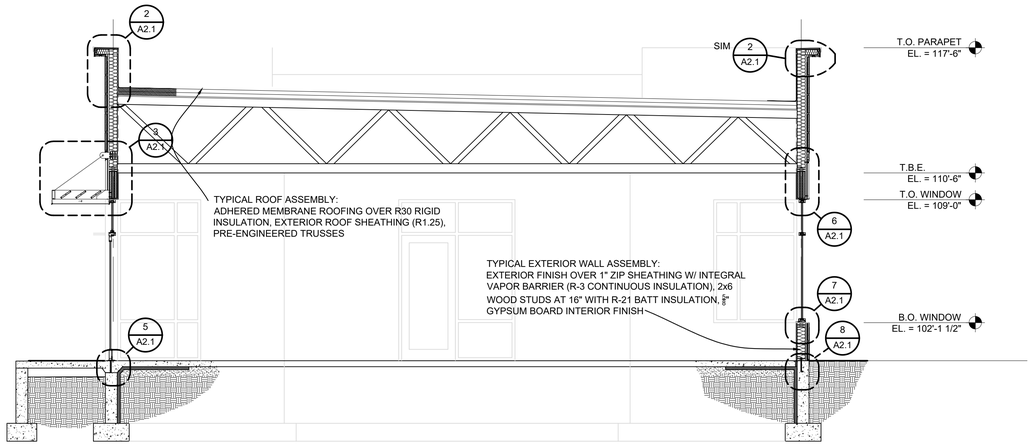
A1.1



2 DETAIL

0 6" 1'

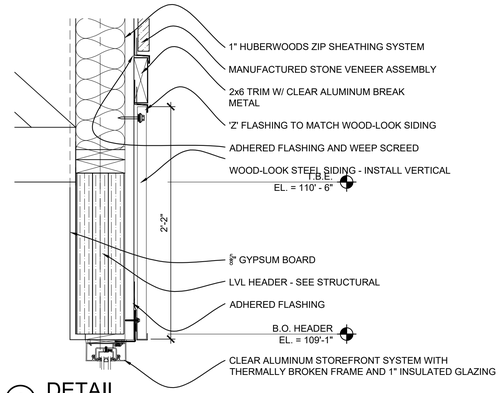
SCALE: 1 1/2"=1'-0"



1 BUILDING CROSS SECTION

0 2' 4'

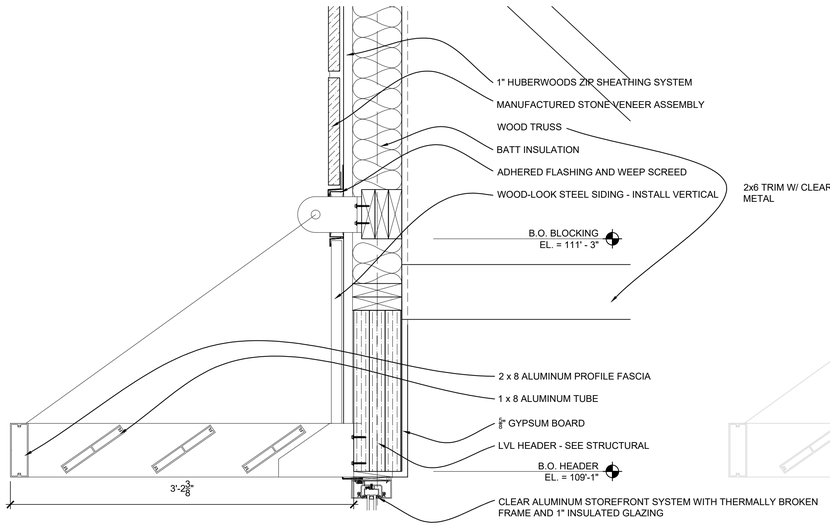
SCALE: 1/4"=1'-0"



6 DETAIL

0 6" 1'

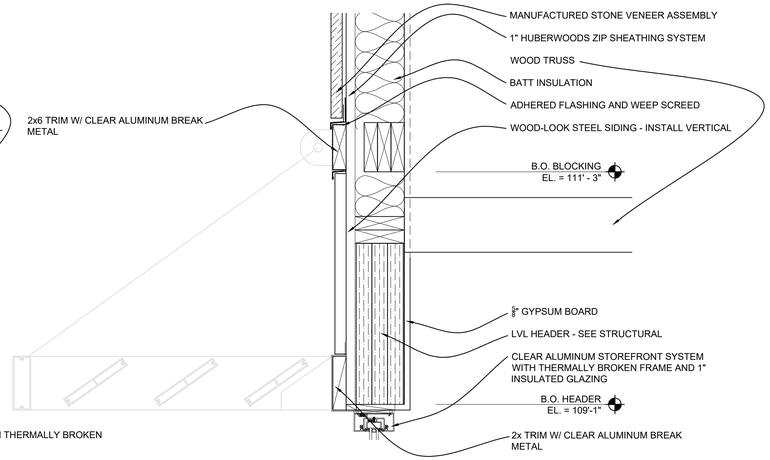
SCALE: 1 1/2"=1'-0"



3 DETAIL

0 6" 1'

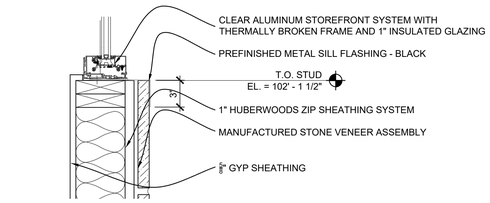
SCALE: 1 1/2"=1'-0"



4 DETAIL

0 6" 1'

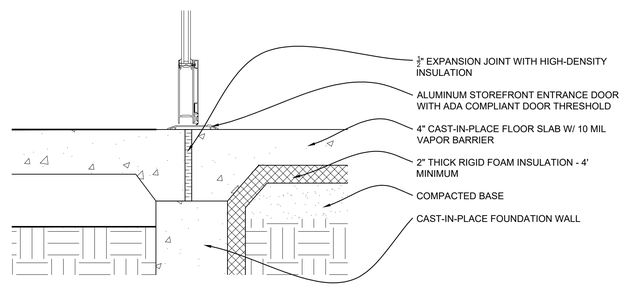
SCALE: 1 1/2"=1'-0"



7 DETAIL

0 6" 1'

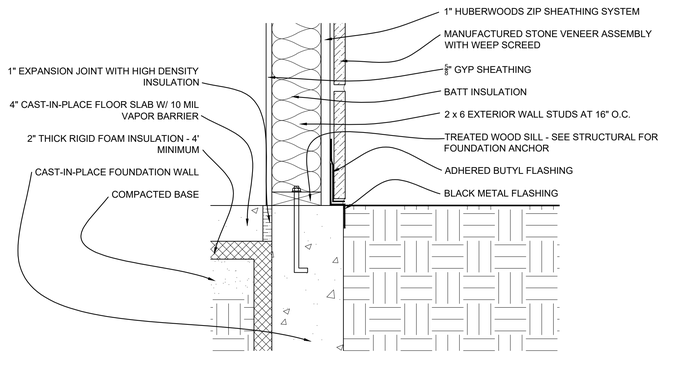
SCALE: 1 1/2"=1'-0"



5 DETAIL

0 6" 1'

SCALE: 1 1/2"=1'-0"



8 DETAIL

0 6" 1'

SCALE: 1 1/2"=1'-0"

RDS ARCHITECTS

Bright Pixel Design

PROJECT TITLE:

RIVER HILLS MALL
BUILDING TWO
MANKATO, MN 56001

GENERAL NOTES:

CONTRACTORS TO FOLLOW MANUFACTURER'S INSTRUCTIONS AND INDUSTRY BEST PRACTICES FOR ALL PRODUCT INSTALLATIONS.

SHEET NOTES:

(1) NOTE

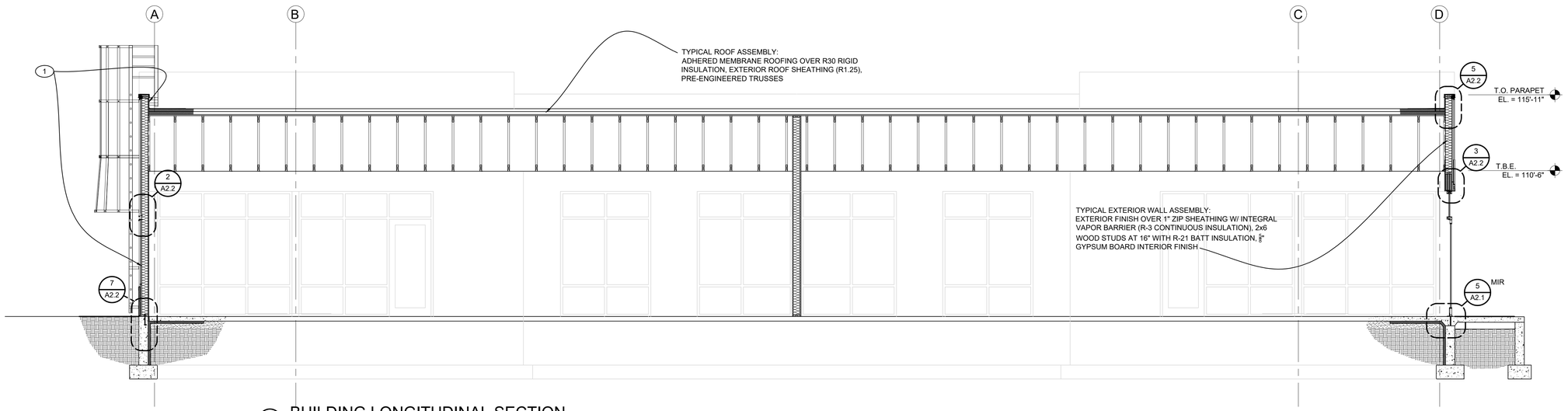
NOT FOR CONSTRUCTION

No.	SUBMISSIONS & REVISIONS	Date

BUILDING SECTION & DETAILS

JOB. NO.: 26.22.1
DATE: 2-26-2026
DRAWN BY: MJB

A2.1



1 BUILDING LONGITUDINAL SECTION

0 2' 4'

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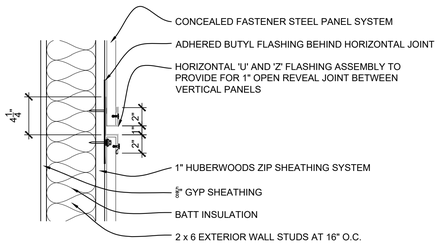
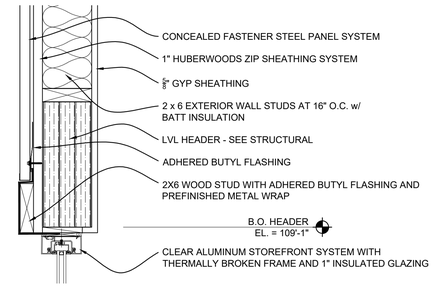


2 DETAIL

0 6" 1'

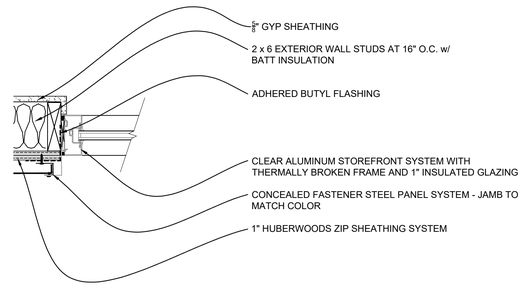
SCALE: 1 1/2"=1'-0"



3 DETAIL

0 6" 1'

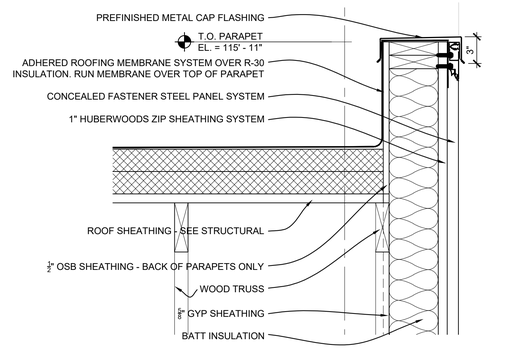
SCALE: 1 1/2"=1'-0"



4 DETAIL

0 6" 1'

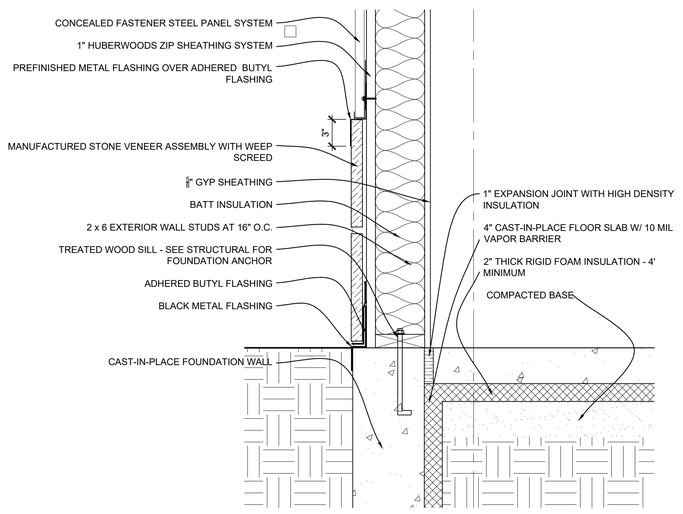
SCALE: 1 1/2"=1'-0"



5 DETAIL

0 6" 1'

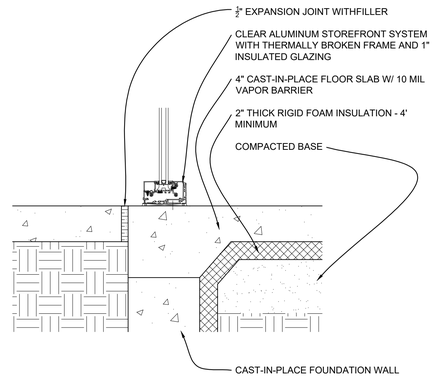
SCALE: 1 1/2"=1'-0"



7 DETAIL

0 6" 1'

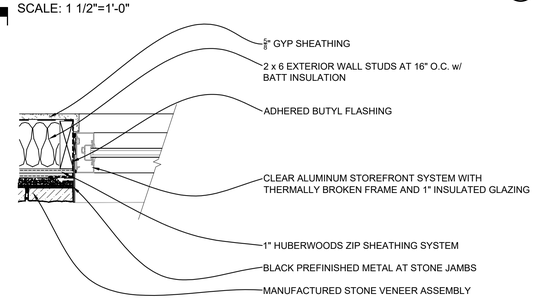
SCALE: 1 1/2"=1'-0"



8 DETAIL

0 6" 1'

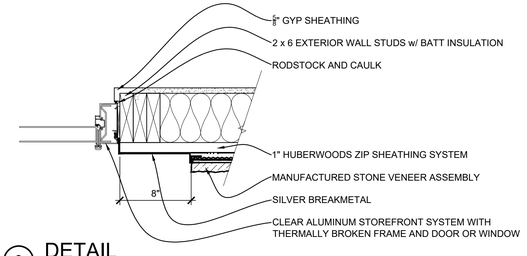
SCALE: 1 1/2"=1'-0"



6 DETAIL

0 6" 1'

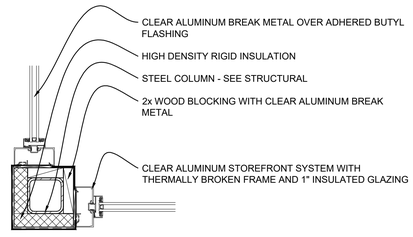
SCALE: 1 1/2"=1'-0"



9 DETAIL

0 6" 1'

SCALE: 1 1/2"=1'-0"



10 DETAIL

0 6" 1'

SCALE: 1 1/2"=1'-0"

RDS ARCHITECTS

Bright Pixel Design

PROJECT TITLE:

RIVER HILLS MALL
BUILDING TWO
MANKATO, MN 56001

GENERAL NOTES:

CONTRACTORS TO FOLLOW MANUFACTURER'S INSTRUCTIONS AND INDUSTRY BEST PRACTICES FOR ALL PRODUCT INSTALLATIONS.

SHEET NOTES:

1 PROVIDE IN-WALL BLOCKING AS REQUIRED FOR LADDER INSTALLATION

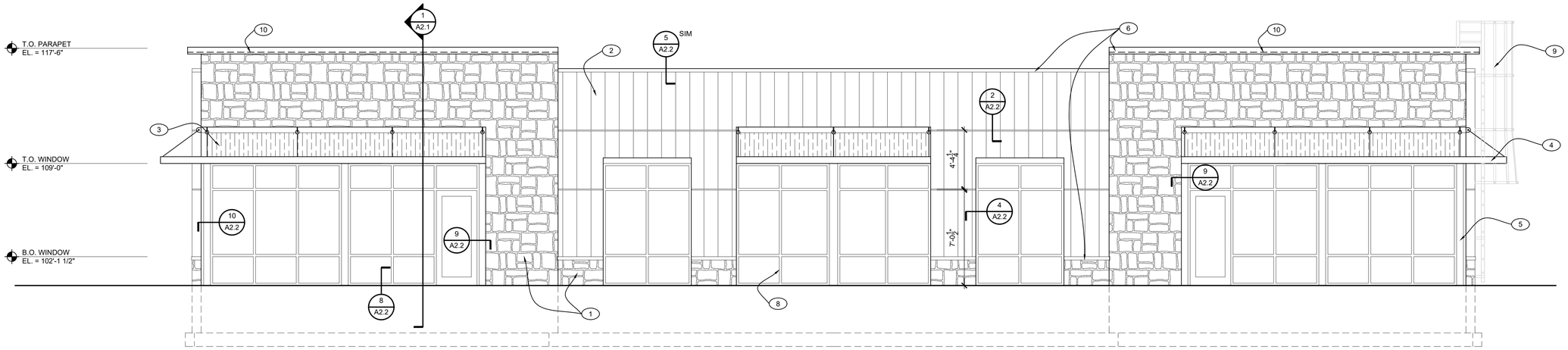
NOT FOR CONSTRUCTION

No.	SUBMISSIONS & REVISIONS	Date

BUILDING SECTION & DETAILS

JOB. NO.:	26.22.1
DATE:	2-26-2026
DRAWN BY:	MJB

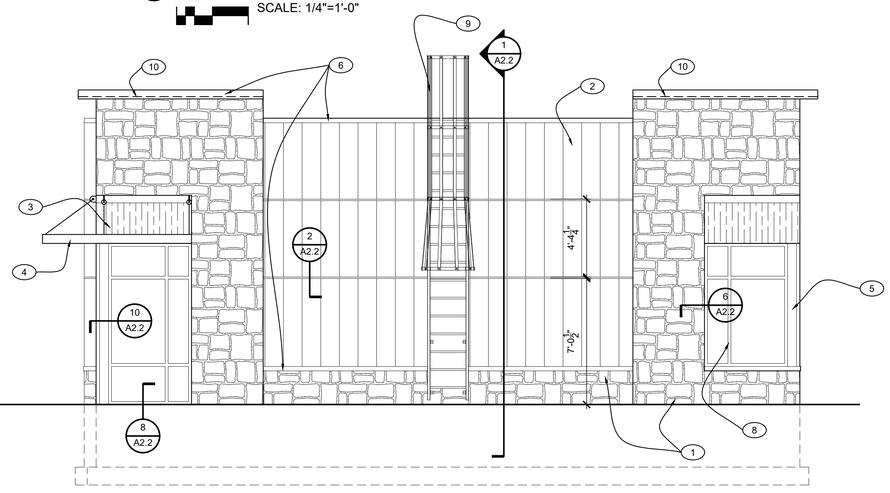
A2.2



1 SOUTH ELEVATION

0 2' 4'

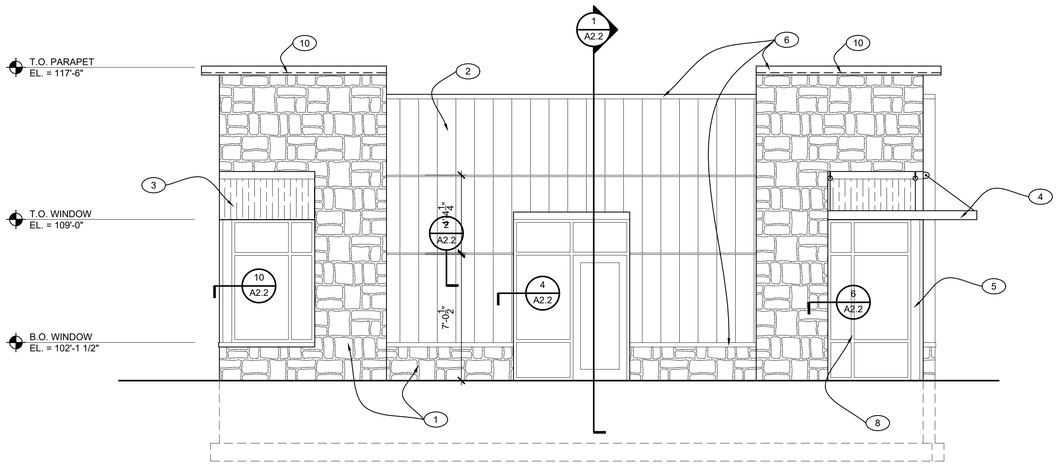
SCALE: 1/4"=1'-0"



2 EAST ELEVATION

0 2' 4'

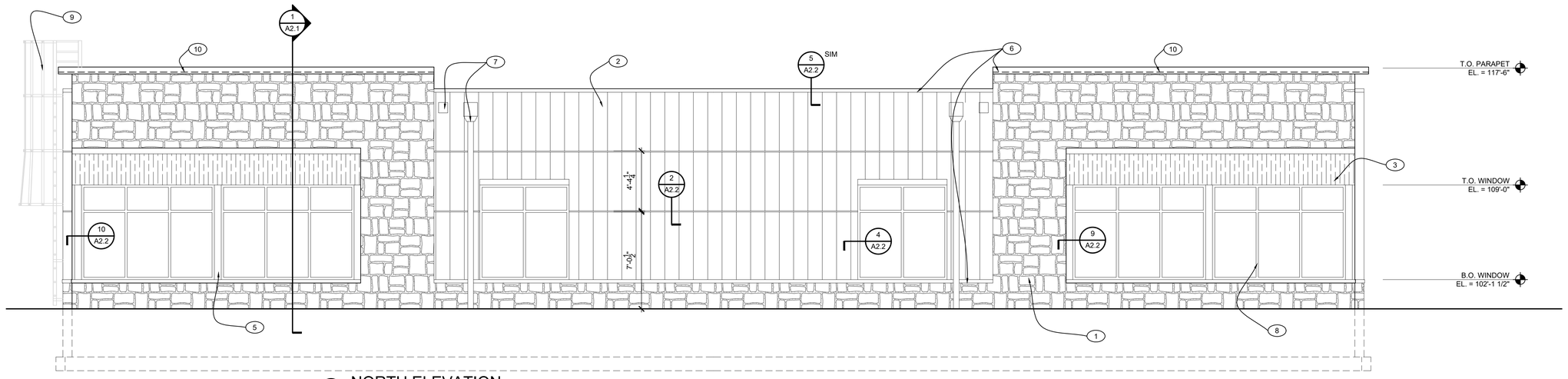
SCALE: 1/4"=1'-0"



3 WEST ELEVATION

0 2' 4'

SCALE: 1/4"=1'-0"



4 NORTH ELEVATION

0 2' 4'

SCALE: 1/4"=1'-0"

RDS ARCHITECTS

Bright Pixel Design

PROJECT TITLE:

RIVER HILLS MALL
BUILDING TWO
MANKATO, MN 56001

GENERAL NOTES:

CONTRACTORS TO FOLLOW MANUFACTURER'S INSTRUCTIONS AND INDUSTRY BEST PRACTICES FOR ALL PRODUCT INSTALLATIONS.

SHEET NOTES:

1. THINSTONE VENEER: CENTURION STONE DIMENSIONAL SLATE FLAT AND CORNER UNITS - CHARCOAL GREY
2. PREFINISHED STEEL SIDING: METAL SALES EM15-1211 CONCEALED FASTENER WALL PANELS WITH 1" OPEN EXPOSURE HORIZONTAL CHANNELS PER 2/A2.2 COLOR: SNOWDRIFT WHITE
3. WOOD-LOOK STEEL SIDING: EDCO SL6 PERSPECTIVES HICKORY - INSTALL VERTICAL
4. INDUSTRIAL LOUVERS, INC. PREFINISHED ALUMINUM SUNSHADE WITH ORNAMENTAL TIE-BACKS PER 4/A2.1 - CLEAR
5. CLEAR ALUMINUM BREAK METAL
6. PREFINISHED BLACK METAL WRAP FOR CAPS, SILLS AND TRIM WRAP
7. SCUPPER, OVERFLOW SCUPPER AND DOWNSPOUT: SNOWDRIFT WHITE
8. CLEAR ALUMINUM STOREFRONT SYSTEM: SEE SHEET A4.1
9. ROOF ACCESS LADDER: SEE 1/A4.1
10. CORNICE/CAP WITH LSI LVIX ZOLO 5 OUTDOOR GRAZER LIGHT FIXTURE

NOT FOR CONSTRUCTION

No.	SUBMISSIONS & REVISIONS	Date

EXTERIOR ELEVATIONS

JOB. NO.:	26.22.1
DATE:	2-26-2026
DRAWN BY:	MJB

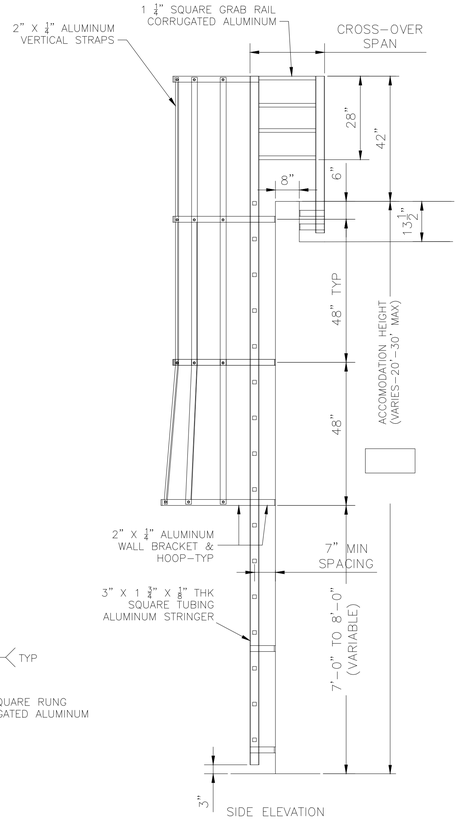
A3.1

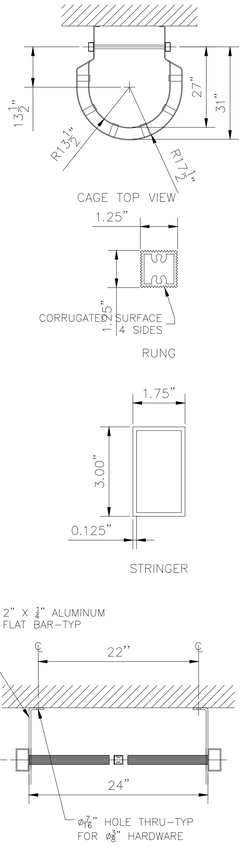
DOOR SCHEDULE

DESIGNATION		DOOR	FRAME	HDWR	MISC.
DOOR NUMBER	ROOM	DOOR TYPE	FRAME TYPE	GROUP	
100A	TENANT A	AD-1	AL-1a	STOREFRONT LOCKSET	CLOSER, GASKETS
100B	TENANT A	AD-1	AL-9	STOREFRONT LOCKSET	CLOSER, GASKETS, DRIP CAP
101	MECHANICAL ROOM	WD-1	HM-1	STOREROOM LOCKSET	-
102	TOILET ROOM	WD-1	HM-1	PRIVACY LOCKSET	CLOSER
103	TENANT B	AD-1	AL-1b	STOREFRONT LOCKSET	CLOSER, GASKETS
104	MECHANICAL ROOM	WD-1	HM-1	STOREROOM LOCKSET	-
105	TOILET ROOM	WD-1	HM-1	PRIVACY LOCKSET	CLOSER

NOTES:

1. VERIFY ALL HARDWARE WITH OWNER PRIOR TO PURCHASE AND INSTALLATION
2. FINISH: CLEAR ALUMINUM
3. ALL DOORS TO HAVE LEVER HANDLES UNLESS NOTED OTHERWISE





1 ROOF ACCESS LADDER DETAILS

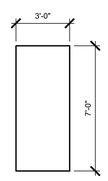
0 1' 2'

SCALE: 1/2"=1'-0"

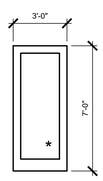
DOOR & FRAME TYPES

V. I.F. ROUGH OPENING PRIOR TO FABRICATION

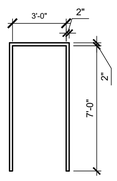
* = TEMPERED GLAZING



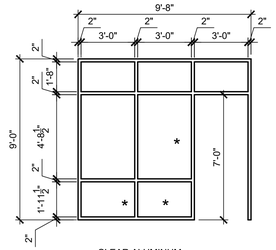
WOOD FLUSH
WD-1
SOLID CORE



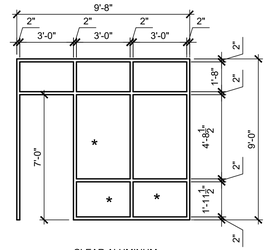
CLEAR ALUMINUM
FULL GLASS
AD-1



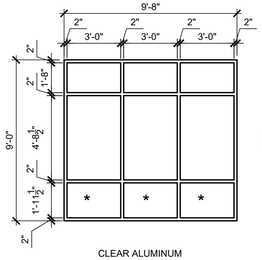
HOLLOW METAL
PAINTED
HM-1



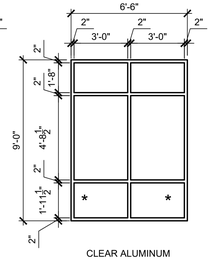
CLEAR ALUMINUM
AL-1a



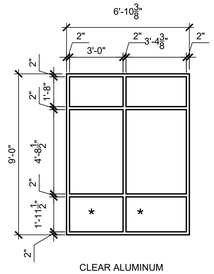
CLEAR ALUMINUM
AL-1b



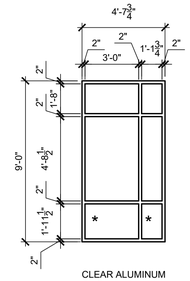
CLEAR ALUMINUM
AL-2



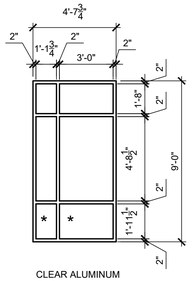
CLEAR ALUMINUM
AL-3



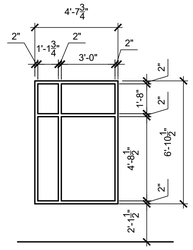
CLEAR ALUMINUM
AL-4



CLEAR ALUMINUM
AL-5a



CLEAR ALUMINUM
AL-5b



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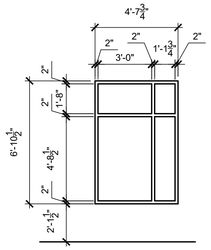
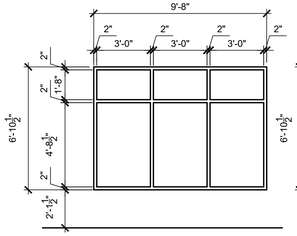
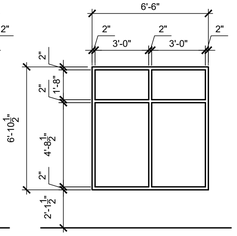
AL-6a



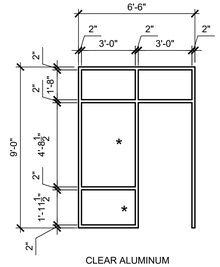
CLEAR ALUMINUM
AL-6b



CLEAR ALUMINUM
AL-7



CLEAR ALUMINUM
AL-8



CLEAR ALUMINUM
AL-9

RDS ARCHITECTS

Bright Pixel Design

PROJECT TITLE:

RIVER HILLS MALL
BUILDING TWO
MANKATO, MN 56001

NOT FOR CONSTRUCTION

No.	SUBMISSIONS & REVISIONS	Date

DOOR & FRAME INFO AND LADDER DETAILS

JOB. NO.: 26.22.1
DATE: 2-26-2026
DRAWN BY: MJB

A4.1

BOLTON & MENK
Real People. Real Solutions.

1960 Premier Drive
Mankato, MN 56001

Phone: (507) 625-4171
Bolton-Menk.com

March 23, 2026

Cory Bienfang
City Engineer
City of Mankato
Desk: 507-387-8643

Reference: Tripoint Development – River Hills Mall
Mankato. MN

Subject: Trip Generation Memorandum

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.

By: _____
Anna Irby, P.E.
License No. 63412

Date: March 23, 2026

This letter has been prepared to provide the trip generation potential for the commercial development located north of Adams Street in Mankato. MN. A copy of the preliminary site plan has been attached for your reference. The proposed development will be constructed in two phases. Phase 1 consists of two eastern buildings [total of 8,233 square feet (s.f.)] with access proposed to the River Hills Mall parking lot (Ring Road). Based on coordination with the City of Mankato (City), a trip generation memo for the first phase of the development was required. When the future Phase 2 development occurs, a Traffic Impact Study (TIS) will be required.

Trip Generation

Based on coordination with the project team, Phase 1 of the proposed commercial development is assumed to consist of the following land uses for each building:

- Building 1 [4,433 s.f.] – easternmost building
  - will consist of a mix of office and retail uses
- Building 2 [3,800 s.f.]
  - will consist of half food service [1,900 s.f.] and half office/retail [1,900 s.f.] uses

The following trip generation was calculated assuming the most conservative land use codes based on the proposed uses. Average weekday daily, AM peak hour, and PM peak hour trips for Phase 1 of the proposed development were estimated using methodology contained within the ITE *Trip Generation Manual*, 12th Edition.

Proposed Trip Generation Summary – Phase 1

Land Use (ITE Code)	Intensity	Daily Traffic (vpd)	Weekday AM Peak Hour Trips (vph)			Weekday PM Peak Hour Trips (vph)		
			Enter	Exit	Total	Enter	Exit	Total
Fast Casual Restaurant (930)	1,900 s.f.	429	2	1	3	14	13	27
Strip Retail Plaza [<40K] (822)	6,333 s.f.	497	14	11	25	28	28	56
Total		**926**	**16**	**12**	**28**	**42**	**41**	**83**

On a typical weekday, Phase 1 of the proposed development is expected to generate approximately 899 total daily trips with 28 total trips occurring during the AM peak hour and 83 total trips occurring during the PM peak hour. Although not included in the calculation, there is expected to be a reduction in trips when considering internal capture between the land uses within the proposed development and the existing River Hill Mall.

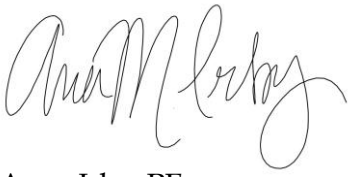
Conclusion

The trip generation potential for Phase 1 of the proposed development is below the typical MnDOT (250 peak-hour vehicle trips or 2,500 daily vehicle trips) and Blue Earth County (100 peak hour vehicle trips) thresholds for consideration of a Traffic Impact Study (TIS).

Based on the proposed trip generation for Phase 1, there is not expected to be a negative impact to the existing roadway facilities. As mentioned previously, a TIS will be required by the City when Phase 2 of the development occurs.

If you have any questions or concerns, please do not hesitate to contact me.

Sincerely,
Bolton & Menk, Inc.



Anna Irby, PE
Traffic Project Engineer

Attachments: Site Plan

Bolton & Menk is an equal opportunity employer.

STORM SEWER TO BE ROUTED TO UNDERGROUND DETENTION

STORM SEWER TO BE ROUTED TO UNDERGROUND DETENTION

PROP. BUILDING FFE=1007

PROP. BUILDING FFE=1009

FOOD SERVICE 3,650 SQFT

FOOD SERVICE 4,000 SQFT

ADS STORMTECH MC4500 BASIS FOR DESIGN FOOTPRINT

ADS STORMTECH MC4500 BASIS FOR DESIGN FOOTPRINT

ADAMS STREET

SIOUX ROAD

MH STRM
R=1006.74
INV: NE 992.54

MH STRM
R=1007.58
INV: NW 993.68

MH SSWR
R=1006.40
INV: E 984.55
INV: SW 984.42

MH STRM
R=1006.27
INV: NA

MH SSWR
R=1005.76
INV: NE 984.19
INV: SW 984.16

CB
R=1004.19
INV: S 999.49
INV: N 1000.79
INV: N 1000.79

MH STRM
R=1004.45
INV: NA

MH SSWR
R=1004.76
INV: NE 983.81
INV: SW 983.71
INV: S 984.26

MH SSWR
R=1003.89
INV: W 983.76
INV: NE 983.79

HORZ. SCALE 0 30 60 FEET

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

WESLEY S. CORDES, P.E.
LIC. NO. 64053 DATE MM/DD/YYYY

BOLTON & MENK
1960 PREMIER DRIVE
MANKATO, MN 56001
Phone: (507) 625-4171
Email: Mankato@bolton-menk.com
www.bolton-menk.com

DESIGNED	WSC
DRAWN	WSC
CHECKED	CJL
CLIENT PROJ. NO.	0M3.125986

NO.	ISSUED FOR	DATE

TRIPOINT DEVELOPMENT LLC

TRIPOINT DEVELOPMENT - RIVER HILLS MALL

PROJECT OVERVIEW - INDIVIDUAL CONNECTIONS

SHEET 1

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H:\GROWTH_PR\0M3\125986\CAD\C3D\FIGR-125986-UTILITY LAYOUTS & GRADING.dwg 3/5/2026 12:52:43 PM Plotted by: Wesley Cordes

Site Plan and Traffic Advisory Review Committee **1. 3.**

Meeting Date: 04/14/2026

Title

CY18-26

Request of Bolton and Menk, Inc., on behalf of the owner, M & J Property Holdings, LLC., for a planned unit development for a residential development containing 122 residential slab-on-grade dwellings. The subject properties are described as Lot 1, Block 2, and Lot 1, Block 3, Mesenbrink Subdivision (Blue Earth County PID R010915400007 and R010915400006).

Applicant

The applicant is Bolton and Menk, Inc., on behalf of the owner, M & J Property Holdings, LLC.

Request

The applicant, Bolton and Menk, Inc., on behalf of the owner, M & J Property Holdings, LLC., is requesting a planned unit development (PUD) to allow for a residential development containing 122 residential slab-on-grade dwellings.

Location

The subject properties are described as Lot 1, Block 2, and Lot 1, Block 3, Mesenbrink Subdivision (Blue Earth County PID R010915400007 and R010915400006).

Existing Land Use

The subject properties are currently utilized as agricultural fields, with the northern portion operating as an existing wetland.

Zoning

The subject properties are zoned R-2, One- and Two-Family Dwelling District.

Other Board or Commission

The subject properties have previously been reviewed across multiple approval processes as part of the larger Mesenbrink Subdivision development.

Environmentally Sensitive Areas

The northern portion of the subject area contains a public water, a wetland and, as a result, the property is subject to the City's shoreland ordinance. There are also wetlands located throughout the site in the currently farmed agricultural field.

Several wetlands have been delineated on the site and are reflected on the record Mesenbrink Subdivision plat. The large wet area on the northern side of the property is considered public water and is surrounded by wetlands. As mentioned, on August 12, 2024, the conditional use permit for wetland sequencing and replacement was approved by City Council. The public water wetland will remain, and the other wetlands on the site will purchase credits. All wetland banking credits, for the wetlands approved for replacement, shall be purchased prior to any work occurring in the subdivision.

The northern portion of the proposed development is located in the shoreland overlay district. See the Review section for greater detail.

Public Utilities

The subject properties are proposed to be served by public utilities via connections within Hoffman Rd.

Review

The applicant is seeking a planned unit development, PUD, for the construction of 122 residential slab-on-grade dwellings. The subject properties are described as Lot 1, Block 2, and Lot 1, Block 3, Mesenbrink Subdivision (Blue Earth County PID R010915400007 and R010915400006). The applicant has informally named this proposed development, "Aveyda Preserve".

Previous Approvals:

In early 2023, the City of Mankato received a development proposal, known as Mesenbrink Mixed-use Development Project, located on an approximately 105-acre parcel. The proposed project would construct a new mixed-use development consisting of retail space, apartment units and single-family residential units. The area was previously subject to an environmental review for this area as part of the Greater East Mankato Infill Service District AUAR, this approval has expired, and therefore the applicant conducted the Environmental Assessment Worksheet (EAW).

The EAW documented the purpose and need of the project along with the anticipated social, economic, and environmental effects. An original electronic copy of the EAW is available for review at the City's website at: https://www.mankatomn.gov/home/showpublisheddocument/12958/638107513590968202. The City Council adopted a resolution making a negative declaration on the need for an Environmental Impact Statement.

Following the EAW review, Mesenbrink Construction & Engineering, Inc. requested a Land Use Amendment to change the guided land use from Public/Semi-Public to Medium Density Residential to allow for a mixed-use development including single-family dwellings, apartment units, and commercial uses. At the time, the City's Land Use Plan showed the area to be guided as Public/Semi-Public. Mesenbrink submitted plans for the development and requested a change to the Land Use Plan and Map to Medium Density Residential to support their development request. The City Council approved the Land Use Plan amendment on July 24, 2023.

Succeeding approval of the LUPA, Mesenbrink applied for review of the Mesenbrink Subdivision Preliminary Plat. City Council approved the Preliminary Plat on April 8, 2024. In tandem with the Preliminary Plat approval, the subject property was annexed into the City of Mankato from Mankato Township. Mankato Township approved the Annexation on April 17, 2024, and the City Council approved the Annexation on May 13, 2024, and the subject property was officially annexed into the City on June 5, 2024.

Due to the presence of numerous wetlands within the subject property, Mesenbrink requested a conditional use permit to allow wetland sequencing and replacement. This request included approval for permanent impacts to 7.10 acres of wetland across 12 wetland basins on the subject property. This request was approved by City Council on August 12, 2024.

The most recent series of approvals included an Amendment to the previously approved Preliminary Plat to modify the proposed lot/block layout, review of the Final Plat of Mesenbrink Subdivision as three blocks and large areas of Public ROW, and Rezoning of the subject property from T-Transition to various commercial & residential zoning districts. These requests were approved by City Council on December 9. 2024. Note that, with this approval, it was defined that any proposed future development shall require a Planned Unit Development.

The development of the subject property necessitated the extension of Hoffman Road eastward. As part of the approval process, Mesenbrink was required to provide a subdivision agreement that depicted the construction of public improvements required to extend City roadway and utility infrastructure to serve the subject property.

Current Request:

The properties to be included in the new Planned Unit Development (PUD) are located in the Mesenbrink subdivision, and are platted lots identified as Lot 1, Block 2 and Lot 1, Block 3. The proposed Planned Unit

Development is located on 64.94 acres and consists entirely of property zoned R-2, One- and Two-Family Dwelling District. A portion of the subject property is also located within and subject to the Shoreland Overlay District. Specifically, this Shoreland area is the extent of the PUD that is located within 1,000 feet of the Ordinary High Water Level of the Public Water identified as "*Unnamed Lake 07007100*" by the Minnesota DNR. The applicant states that the proposed Planned Unit Development was prepared using the DNR's Residential PUD guidelines.

The proposed development area is located in the easterly extent of the City of Mankato and is positioned just east of CSAH No. 12 (589th Avenue) and occupies two areas immediately north and south of the new portion of Hoffman Road.

The PUD property is proposed to be developed with 88 single-family homes and 34 single-family attached homes, for a total of 122 slab-on-grade homes. The applicant has divided plans for the proposed Planned Unit Development (PUD) into two separate North & South PUD civil plan sets. The North PUD includes all the property north of Hoffman Road and features 34 slab-on-grade style single-family homes. The South PUD comprises all the property south of Hoffman Road and incorporates 54 slab-on-grade single-family homes as well as 34 slab-on-grade single-family attached homes.

The applicant shall provide a phasing plan depicting how the applicant intends the property to be developed.

Access to the development will be from the newly extended portion of Hoffman Road, with a proposed private drive, identified as "Meridian Trail", intersecting Hoffman Rd roughly north to south and proving access into both PUD areas. A second private access drive, shown as "Aveyda Bend Trail" is also proposed along the south side of Hoffman Rd, just to the east of the proposed Meridian Trail. All roadways within the development will remain private and be maintained by the Owner’s and/or Association.

The applicant is proposing to construct 122 single-family and single-family attached homes on a 64.94-acre PUD. This far exceeds the required 2.0-acre minimum area required in Mankato City Code Section 10-1912 for a planned unit development in the R-2 zoning district. The proposed PUD is divided into two parcels. Section 10-134 of the Mankato City Code sets the minimum lot area for one-family & one-family attached dwelling units at 6,000 Sq. Ft. The North PUD is approximately 43.19 acres (Est. 1,881,356 Sq. Ft.) in area and is proposed to contain 34 single-family homes. Based on the minimum lot requirement of the R-2, Zoning District, the South PUD parcel may have a maximum of 157 units. Based on the minimum lot requirement of the R-2, Zoning District, the North PUD parcel may technically have a maximum of 313 units. The South PUD is approximately 21.75 acres (Est. 947,430 Sq. Ft.) in area and is proposed to contain 88 single-family / single-family attached units. Based on the minimum lot requirement of the R-2, Zoning District, the South PUD parcel may technically have a maximum of 157 units. Note: Due to the presence of the Shoreland Overlay District, the areas of the proposed PUD that are within the Shoreland zone are subject to their own density requirements, requirements that are typically more restrictive. See the Shoreland review below.

Parking standards for the proposed development appear to achieve Mankato City Code requirements. Mankato City Code requires two off-street parking stalls be provided for each dwelling unit (minimum dimensions of 8' x 18' per stall). Plans appear to show designated garaged and driveway areas for each proposed single-family & attached single-family dwelling unit. As the subject property, composed of single-family attached & detached units, is located in the R-2, Zoning District, any future rental properties would be Limited Occupancy Rentals and thus also required to provide two off-street parking stalls per dwelling unit.

The applicant does not propose any pedestrian networks or connections within the development.

The applicant shall clarify how refuse and mail services are proposed to operate within the Planned Unit Development.

Mankato City Code criteria for a planned unit development states that common open space within a planned unit development must be used for amenity or recreational purposes. The uses authorized for the common open space must be approved to the scale and character of the planned unit development, and consider the planned unit

development's size, density, topography, and number and type of structures to be provided. The Code goes on to clarify that the common open space must be suitably improved for its intended use. Common open space containing natural features worthy of preservation may be left unimproved. The development plan must coordinate the improvement of the common open space and the construction of the permitted structures within the planned unit development. The applicant has not provided demonstrating any designated area for open space gathering within the South PUD. Note that the preserved open space within the North PUD, the wetland, shall not be utilized by any means as an amenity space. The applicant shall provide plans showing any proposed open space areas and any planned landscaping or amenities for residents.

The applicant has not provided a landscaping plan. As part of the PUD process, the Mankato City Code required that the applicant provide sketches of proposed landscaping and structures, including typical elevations.

As per the Mankato City Code for planned unit developments, all land shown on the approved development plan as common open space must be conveyed to trustees provided in the indenture establishing an association or similar organization for the maintenance of the planned unit development. Staff has recommended a condition which requires the documentation for the establishment of said association to be provided to the City at the time of building permit submittal for the development. Applicant shall clarify ownership intent for the PUD.

The applicant states that each home will be constructed as per the plans in this submittal, but notes that homes may be modified and customized to the owner's requests using the guidelines in the homeowner's association. The applicant has provided a plethora of exterior elevations and floor plans for potential slab-on-grade single-family home building types. These types include two single-story sunroom options, two single-story patio options, two single-story 3-stall garage options, a two-story king/queen suite option, a two-story bedroom/workout option, a two-story farmhouse option, a two-story Mediterranean, and various other single and two-story slab-on-grade home types. With more than ten home types of varying sizes & orientations, the proposed plans show a large variation between proposed slab-on-grade single-family dwelling styles, including units with one or two floors, single, double, and triple stall garages, units with patios or sunrooms, units with porches, and units with bonus rooms.

Proposed designs range from 4,101 Sq. Ft. multi-story high-style structures to simple angular 1,683 Sq. Ft. patio-style homes. Proposed dwellings also range from units providing two bedrooms & two bathrooms to larger units with up to five bedrooms and three & a half bathrooms.

The applicant has also provided an overall Materials Palette that depicts each proposed exterior finish. Proposed siding materials vary greatly and include Vinyl siding (Board & Batten, Shake, & Lap), Cement Board siding (Shingle, Panel, & Plank), SmartSide siding (Vertical, Shake, & Lap). Cedar Siding, Stucco / Synthetic Stucco, Brick, and Manufactured Stone. The applicant proposes two roofing material types, Dimensional Asphalt Shingles or Prefinished Standing Seam Metal. Two window types, Aluminum Clad Wood and Vinyl are shown. Proposed doors include fiberglass or steel entry doors and painted / wood-look overhead garage doors (Note that proposed patio doors are not shown). The applicant also proposed decorative brackets, shutters, and louvers as potential exterior accessories. It is the stated intention of the applicant that each home type may be modified and customized to the owner's requests.

The applicant has not provided exterior elevations or floor plans for the proposed attached single-family dwellings. The applicant shall provide updated plans for the attached single-family dwellings.

Public Benefit:
As part of the Planned Unit Development process, the applicant is asked to outline the Public Benefits provided to the surrounding neighborhood and the city as a whole provided by this PUD. The applicant states that the PUD will preserve and enhance site characteristics and open space by primarily continuing construction of single-family dwellings, as the existing homes adjacent to the Subject property are single-family dwellings. They state that the pattern of development will preserve natural vegetation and features by ensuring the areas adjacent to the "unnamed lake" remain in their natural state without any access. Additionally, the applicant expresses that the PUD will create a pleasing environment through the use of design, landscaping, and architectural features. In particular, the applicant states that the proposed North PUD will maintain large areas of natural open space and the South PUD will have designed open space for the residents to use for gathering. This open space will remain private and be

maintained by the owners and/or Association. Proposed plans show preservation of the public waters wetland within the North PUD, but no plans have been provided demonstrating any designated area for open space gathering within the South PUD. The applicant shall provide plans showing any proposed open space areas and any planned landscaping or amenities for residents. Lastly, the applicant/developer states that the proposed development will provide a variety of housing types by supplying market-rate housing for the area.

With the planned unit development, the applicant has requested flexibility from the 25% rental density ordinance for the proposed Planned Unit Development and is requesting that the entirety of the development not be subject to the City's rental density standard. Mankato City Code Section 7–57 states that "*not more than twenty-five (25) percent (rounded up) of the lots on any block shall be eligible to obtain a rental license or to be licensed as a rental property*". A planned unit development is intended to encourage the efficient use of land and resources, to promote greater efficiency in public and utility services and to encourage innovation in the planning and building of all types of development and, in exchange for providing public benefits, the Code allows flexibility. In this case, the proposed development provided the aforementioned analysis of their public benefits.

The applicant shall provide a detailed narrative describing how the proposed PUD provides public benefits, particularly how the proposed development provides amenity space to residents of the area.

Shoreland Overlay District:
As stated above, a significant portion of the Planned Unit Development falls within the Shoreland Overlay District as it is located within 1,000 feet of the Ordinary High Water Level (OHWL) of the Public Water identified as "*Unnamed Lake 07007100*" by the Minnesota DNR and designed in Section 10-1058 of the Mankato City Code. Because of this, the proposed residential Planned Unit Development is subject to the Chapter 10, Article VIII of the Mankato City Code, which guides development that is located within the bounds of the Shoreland Overlay District. By ensuring the proposed PUD meets the standards of the Shoreland Ordinance, the City of Mankato is administering its State delegated responsibility to preserve and enhance the quality of surface waters, conserve the economic and natural environmental values of shorelands, and provide for the wise use of waters and related land resources.

As previously discussed above, the applicant completed an EAW as part of previous approvals and it was determined that no EIS would be required for the proposed project.

It is the understanding of City Staff that the applicant coordinated with the Minnesota Department of Natural Resources to ensure the proposed residential Planned Unit Development preserves the Public Water and meets the Shoreland Standards. The proposed Planned Unit Development fully mirrors the proposed development reviewed as part of previous approvals, with one exception. The southern portion of the South PUD, the area outside of the Shoreland zone, was amended to include attached single-family unit rather than continue the originally proposed single-family detached units. This modification will not alter the proposed work within the Shoreland Overlay District and has been reviewed by the Minnesota DNR to verify that an updated EAW would not be required.

The applicant has provided a memo, including documented email communication with DNR staff stating that the adjustment from single-family homes to attached single-family structures with reduced building footprints – does not warrant preparation of a new Environmental Assessment Worksheet (EAW). Note that it is also stated that it is up to the Responsible Governmental Unit, the City of Mankato in this instance, to document that the existing EAW continues to adequately address the potential for significant environmental effects per Minn R 4410.1000 Subp. 5. Based on review of the proposed modification and the completed EAW, the City of Mankato shall determine if the proposed modification is considered a substantial change.

Previous approvals required that wetland signage be installed throughout the entire duration of the wetland setback. This wetland signage shall be in place prior to work beginning and no impacts shall occur to the public water / wetland.

Portions of the subject property that are within the Shoreland are divided into tiers that run parallel to the Ordinary High Water Level (also known as Ordinary High Water Mark or OHWM). The applicant completes this analysis and provides it to the DNR as part of a PUD Evaluation Sheet. The applicant has provided a copy of this form. As

the proposed development is along a "natural environment lake" and proposes to construct sewers, each density tier is set at 320-feet, which left the applicant with three tiers. The applicant then calculated area suitable for development by excluding areas not fit for development (16-acres of wetlands & 9.41-acres below the OHWL). They then utilized this information to determine the base density and plugged their existing data into the Residential PUD Analysis table. Tier 1, an 8.17-acre area, permits a maximum of 13 single-family residential units; The applicant proposes to construct 5 units within this tier. Tier 2, a 12.89-acre area, permits a maximum of 28 single-family residential units; The applicant proposes to construct exactly 28 units within this tier. Tier 3, a 12.75-acre area, permits a maximum of 41 single-family residential units; The applicant proposes to construct 27 units within this tier. As noted above, not all of the proposed Planned Unit Development is within the boundary of the Shoreland district. The southerly portion of the PUD, the 13.20-acre area proposed to contain a section of single-family attached homes, is stated by the applicant to allow a maximum of 95 single-family / single-family attached units. Density calculations for this area are included in the larger parcel calculations above. The applicant proposes to construct 27 single-family homes and 34 single-family attached units (shown on plans as 17 buildings) within the Non-Shoreland area of the PUD.

A maximum of 25% of the Shoreland Zone may be covered with impervious surfaces. The applicant has provided an exhibit showing that the subject development and future proposed adjacent development to the west proposes an impervious coverage of 20.4% within the Shoreland zone (512,253 Sq. Ft. of the total 2,510,427 Sq. Ft. area).

Attachments

General Location Map
Aerial
Development Plan
Dev Plan - North PUD
Dev Plan - South PUD
Shoreland PUD Plan
Impervious Coverage Plan
Single-Family Floor Plans & Elevations
Material Board
Narrative
Civil Plans - North PUD
Civil Plans - South PUD
PUD Density DNR Worksheet
EAW Update Memo
EAW Mesenbrink
Drainage Memo

General Location Map



Date: March 2026

Author:

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.

N

Aerial



Date: March 2026

Author:

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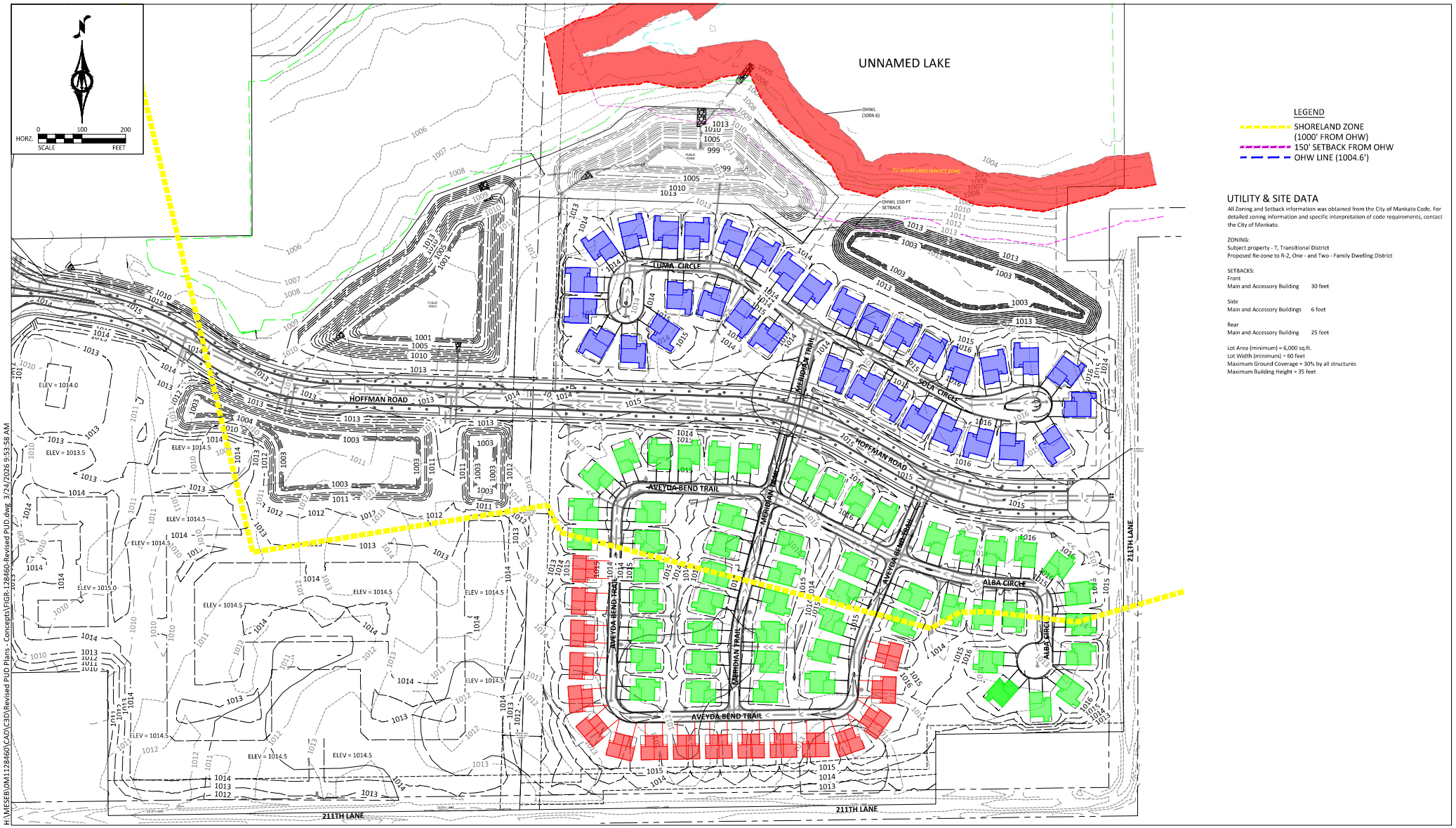
AVEYDA PRESERVE
Mankato, Minnesota

Development Plan
March, 2026

BOLTON & MENK



UTILITY & SITE DATA

All Zoning and Setback information was obtained from the City of Mankato Code. For detailed zoning information and specific interpretation of code requirements, contact the City of Mankato.

ZONING:
Subject property - T, Transitional District
Proposed Re-zone to R-2, One - and Two - Family Dwelling District

SETBACKS:
Front
Main and Accessory Building 30 feet

Side
Main and Accessory Buildings 6 feet

Rear
Main and Accessory Building 25 feet

Lot Area (minimum) = 6,000 sq.ft.
Lot Width (minimum) = 60 feet
Maximum Ground Coverage = 30% by all structures
Maximum Building Height = 35 feet

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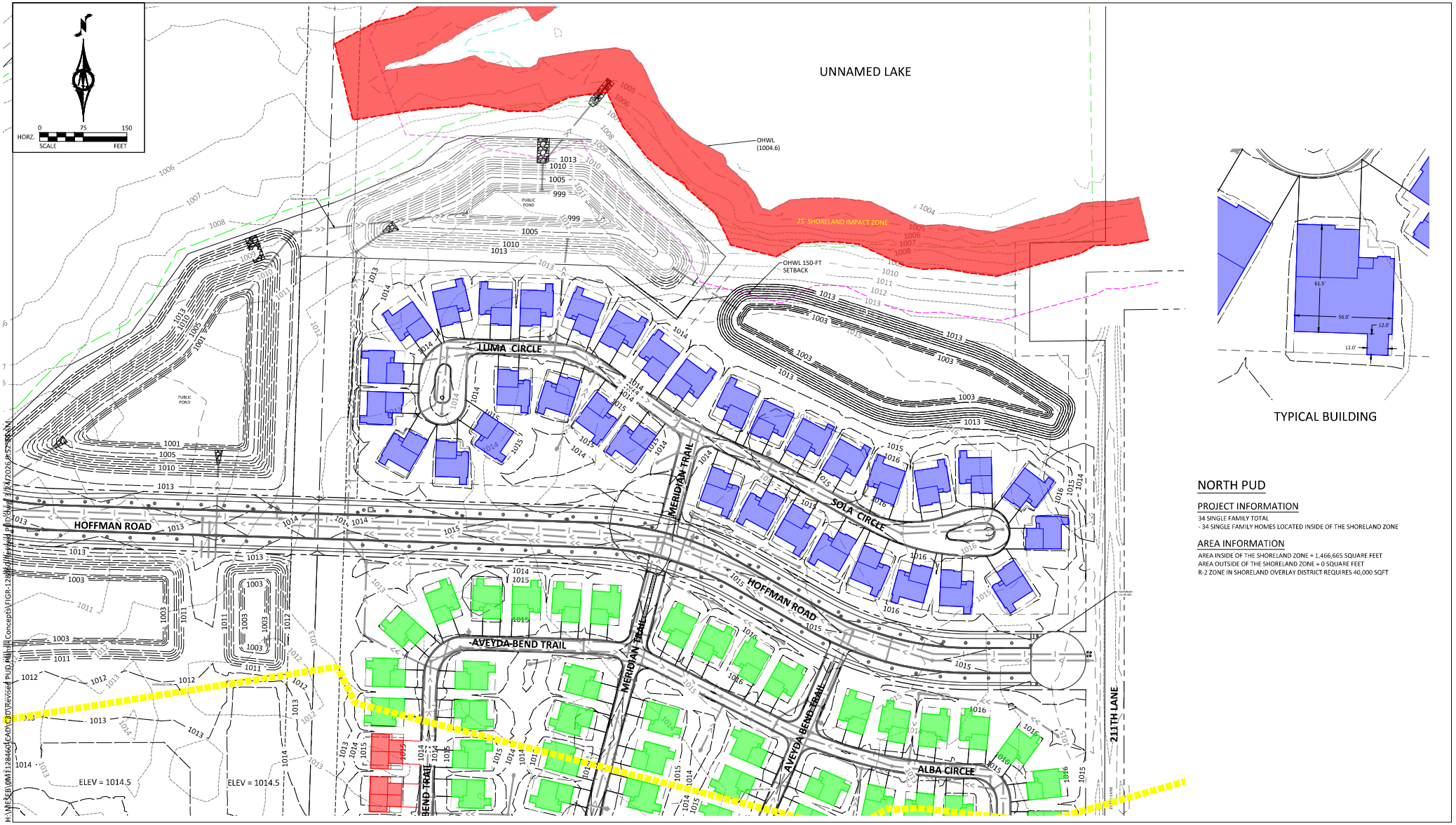
AVEYDA PRESERVE
Mankato, Minnesota

North PUD Area
March, 2026

BOLTON & MENK



NORTH PUD

PROJECT INFORMATION

34 SINGLE FAMILY TOTAL
- 34 SINGLE FAMILY HOMES LOCATED INSIDE OF THE SHORELAND ZONE

AREA INFORMATION

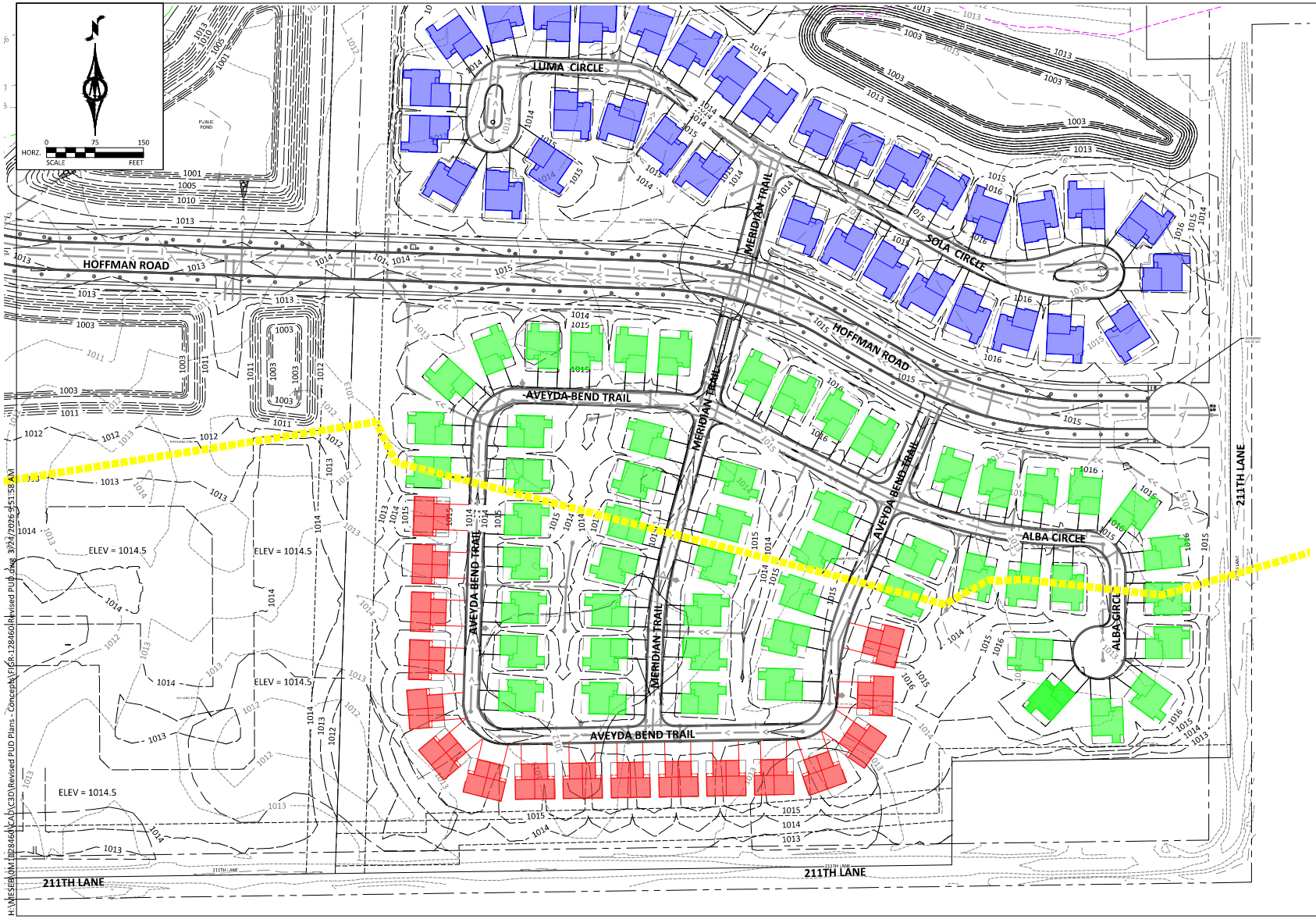
AREA INSIDE OF THE SHORELAND ZONE = 1,466,665 SQUARE FEET
AREA OUTSIDE OF THE SHORELAND ZONE = 0 SQUARE FEET
R-2 ZONE IN SHORELAND OVERLAY DISTRICT REQUIRES 40,000 SQFT

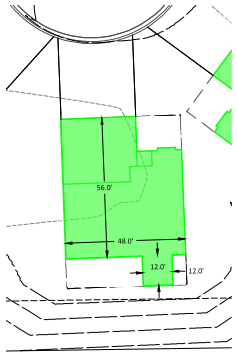
AVEYDA PRESERVE

Mankato, Minnesota

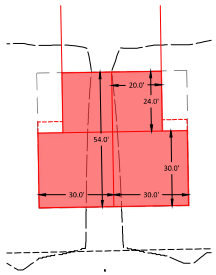
South PUD Area

March, 2026





TYPICAL SINGLE BUILDING



TYPICAL TWIN BUILDING

SOUTH PUD

PROJECT INFORMATION

88 SINGLE FAMILY AND SINGLE FAMILY ATTACHED HOMES TOTAL
- 33 SINGLE FAMILY HOMES LOCATED INSIDE OF THE SHORELAND ZONE
- 21 SINGLE FAMILY HOMES LOCATED OUTSIDE OF THE SHORELAND ZONE
- 34 SINGLE FAMILY ATTACHED HOMES LOCATED OUTSIDE OF THE SHORELAND ZONE

(16 ADDITIONAL UNITS PROPOSED)

AREA INFORMATION

AREA INSIDE OF THE SHORELAND ZONE = 372,348 SQUARE FEET
AREA OUTSIDE OF THE SHORELAND ZONE = 575,174 SQUARE FEET
R-2 ZONE REQUIRES 6,000 SQFT FOR SINGLE FAMILY HOMES
R-2 ZONE REQUIRES 8,000 SQFT FOR SINGLE FAMILY ATTACHED HOMES
575,174 / 6000 = 95 SINGLES FAMILY ALLOWED BY CODE
575,174 / 8000 = 71 SINGLE FAMILY ATTACHED ALLOWED BY CODE

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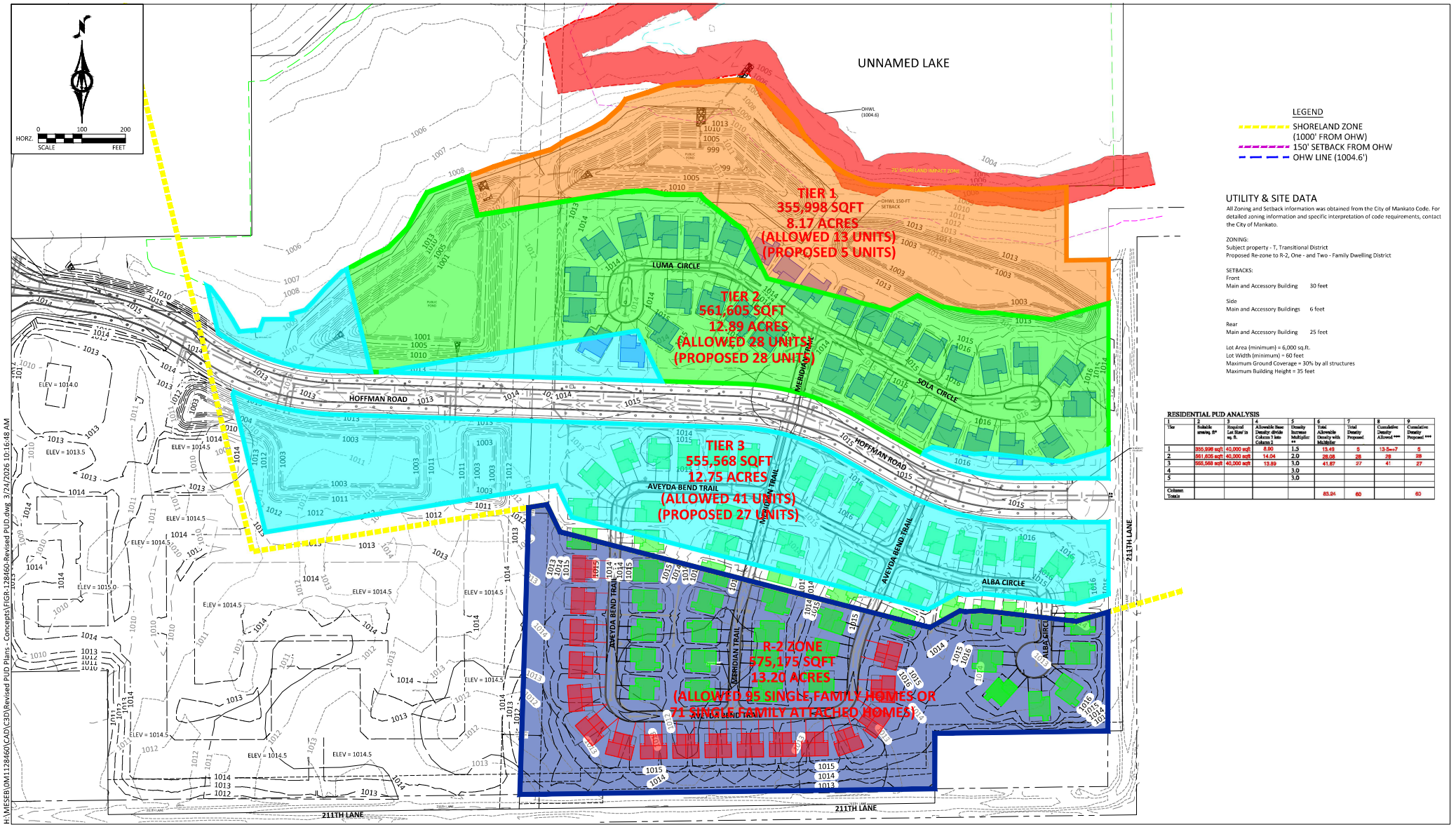
AVEYDA PRESERVE
Mankato, Minnesota

Development Plan
March, 2026

BOLTON & MENK



LEGEND
- SHORELAND ZONE (1000' FROM OHW)
- 150' SETBACK FROM OHW
- OHW LINE (1004.6')

UTILITY & SITE DATA

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Main and Accessory Building 25 feet

Lot Area (minimum) = 6,000 sq.ft.
Lot Width (minimum) = 60 feet
Maximum Ground Coverage = 30% by all structures
Maximum Building Height = 35 feet

RESIDENTIAL PUD ANALYSIS

1 Tier	2 Subdiv. zoning, ft²	3 Required Lot Size² in sq. ft.	4 Allowable Base Density: divide Column 2 into Column 3	5 Density Increase Multiplier **	6 Total Allowable Density with Multiplier	7 Total Density Proposed	8 Cumulative Density Allowed ***	9 Cumulative Density Proposed ***
1	355,998 sq/ft	40,000 sq/ft	8.90	1.5	13.49	5	13.5+=7	5
2	561,605 sq/ft	40,000 sq/ft	14.04	2.0	28.08	28	28	28
3	555,568 sq/ft	40,000 sq/ft	13.89	3.0	41.67	27	41	27
4				3.0				
5				3.0				
Column Totals					83.24	60		60

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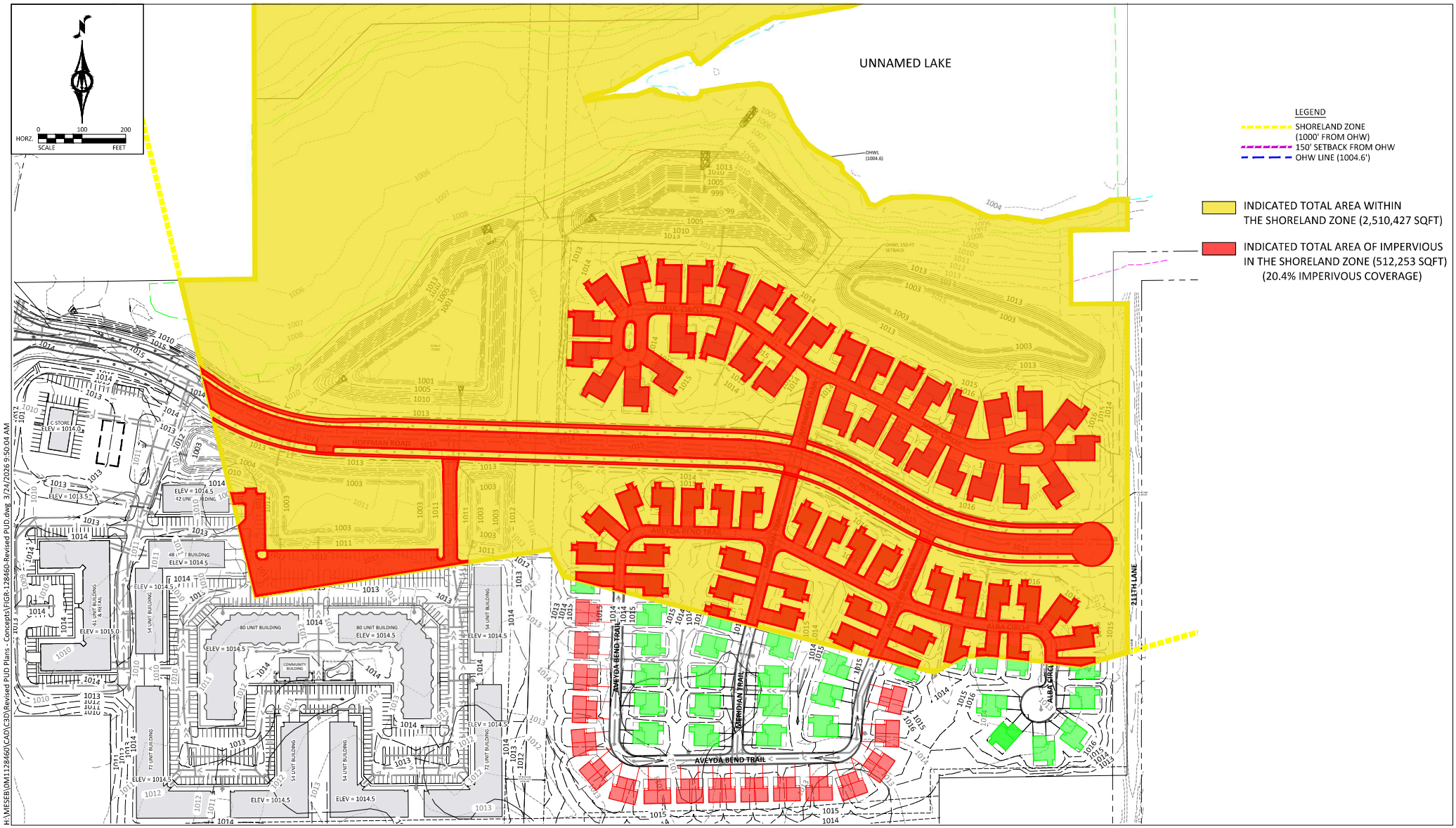
AVEYDA PRESERVE

Mankato, Minnesota

Impervious Coverage Plan

March, 2026

BOLTON & MENK



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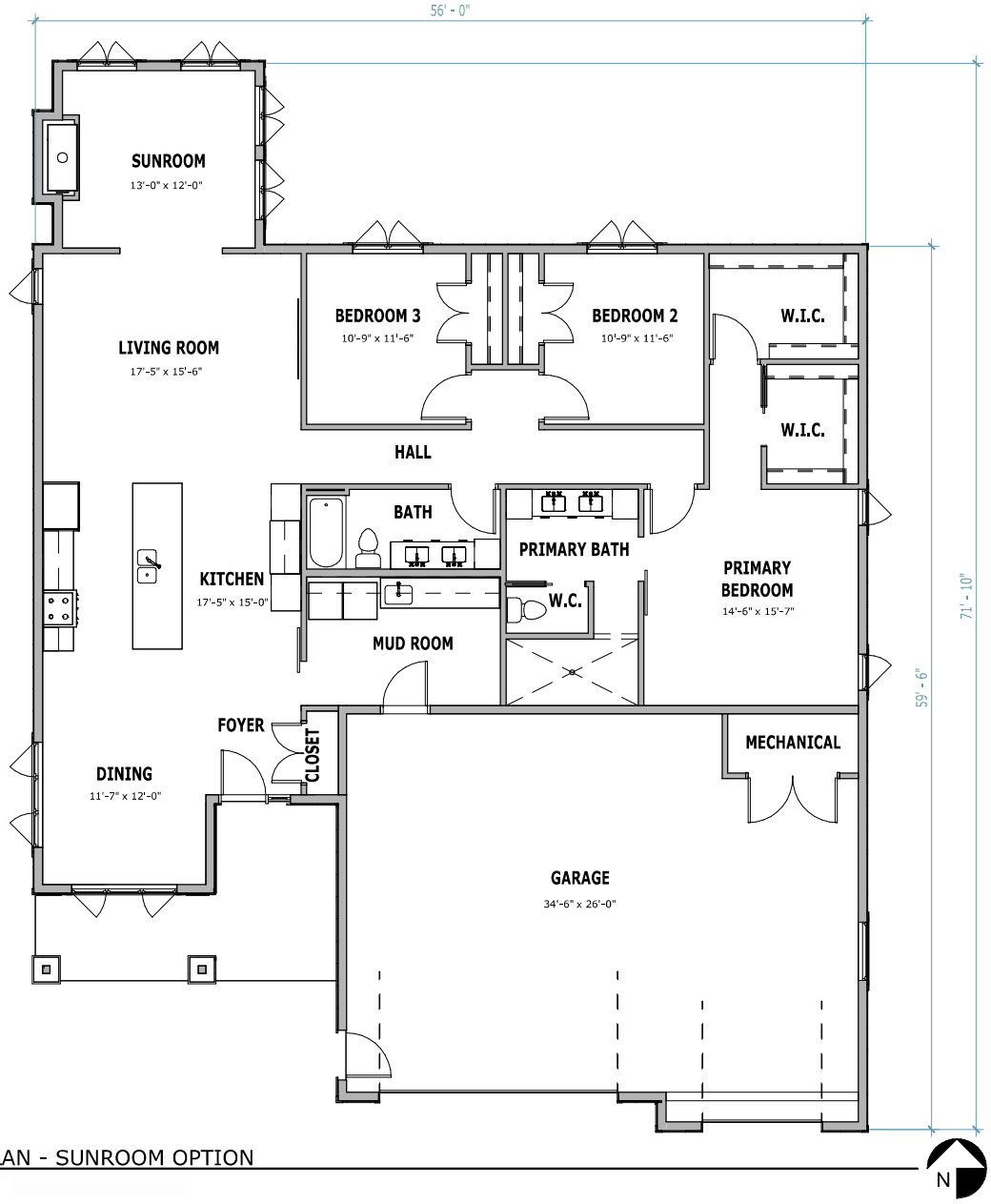
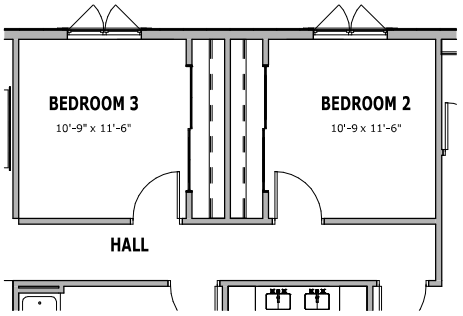
House Plan B1



1 FLOOR PLAN - SUNROOM OPTION
1/8" = 1'-0"



2 Large Closet Option
1/8" = 1'-0"

MESENBRINK CONSTRUCTION & ENGINEERING BUILDERS & DEVELOPERS

Mesenbrink Subdivision

TOTAL 2,140 S.F.

House Plan B1

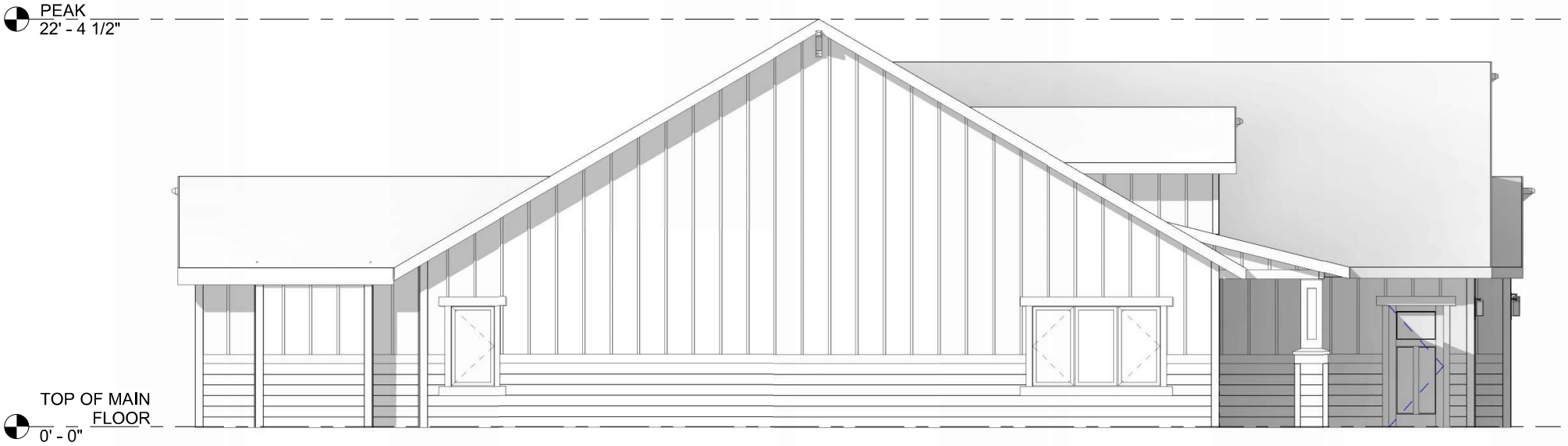


1 ELEVATION - SOUTH - SUNROOM OPTION
3/16" = 1'-0"

MESENBRINK CONSTRUCTION & ENGINEERING BUILDERS & DEVELOPERS

Mesenbrink Subdivision

House Plan B1

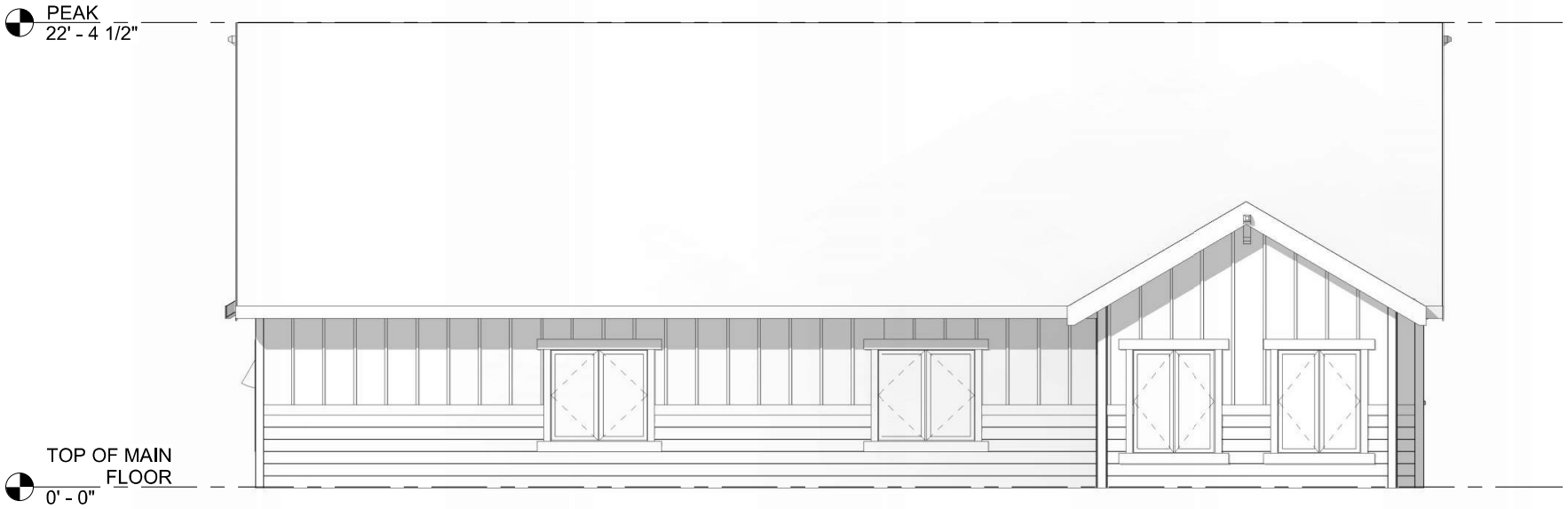


1 ELEVATION - WEST - SUNROOM OPTION
3/16" = 1'-0"

MESENBRINK CONSTRUCTION & ENGINEERING BUILDERS & DEVELOPERS

Mesenbrink Subdivision

House Plan B1

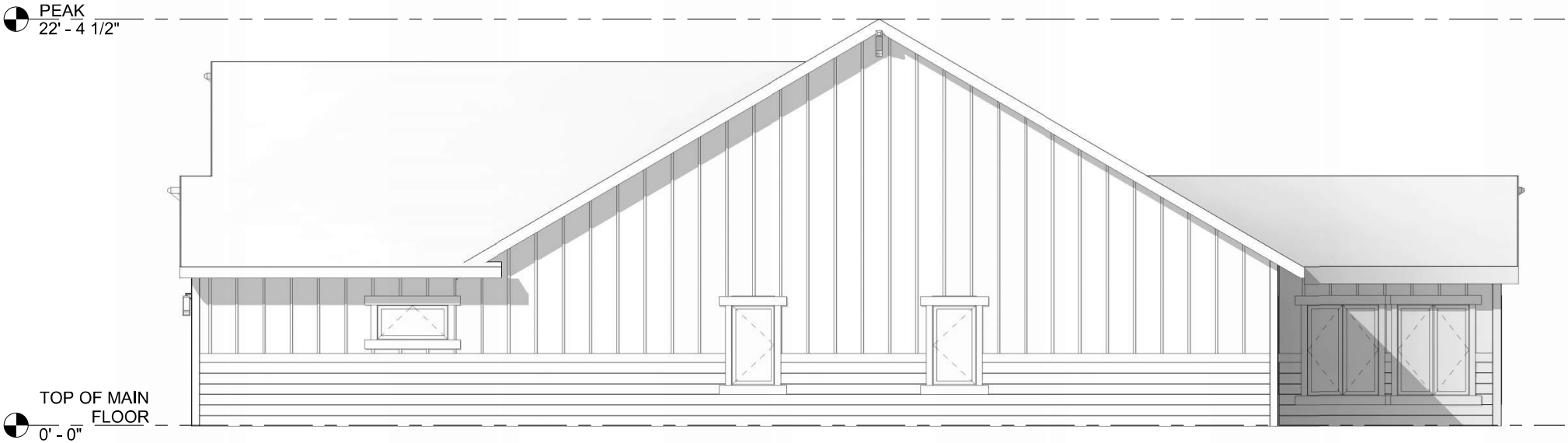


1 ELEVATION - NORTH - SUNROOM OPTION
3/16" = 1'-0"

MESENBRINK CONSTRUCTION & ENGINEERING BUILDERS & DEVELOPERS

Mesenbrink Subdivision

House Plan B1

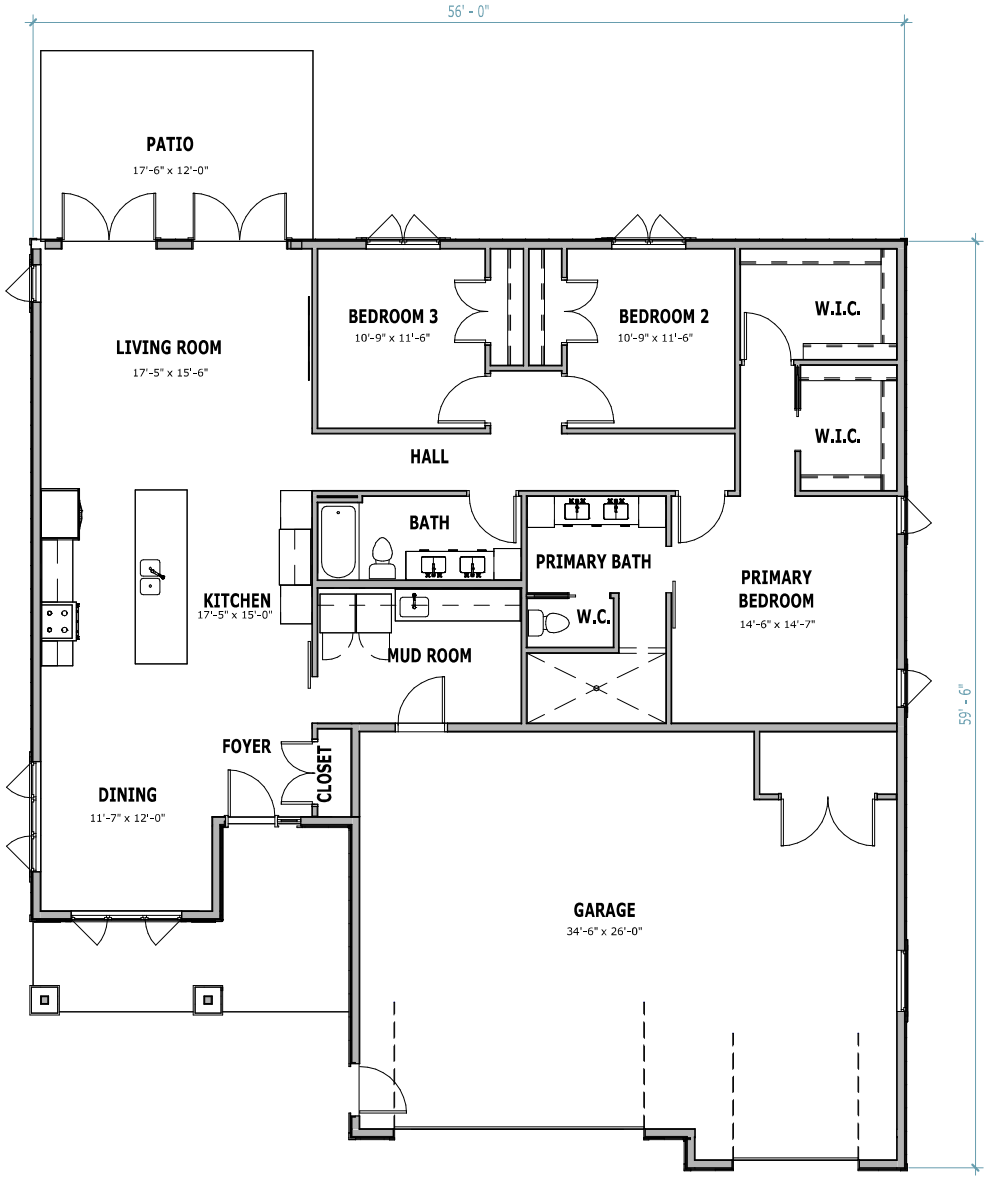


1 ELEVATION - EAST - SUNROOM OPTION
3/16" = 1'-0"

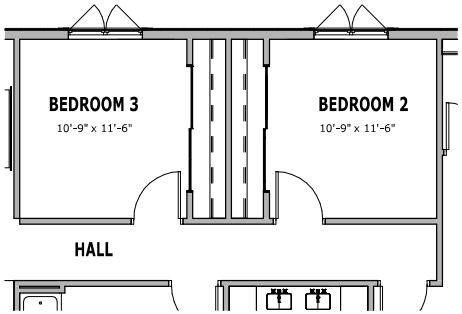
MESENBRINK CONSTRUCTION & ENGINEERING BUILDERS & DEVELOPERS

Mesenbrink Subdivision

House Plan B1a



1 FLOOR PLAN - PATIO OPTION
1/8" = 1'-0"



2 Large Closet Option
1/8" = 1'-0"

MESENBRINK CONSTRUCTION & ENGINEERING BUILDERS & DEVELOPERS

Mesenbrink Subdivision

TOTAL 1,960 S.F.

House Plan B1a



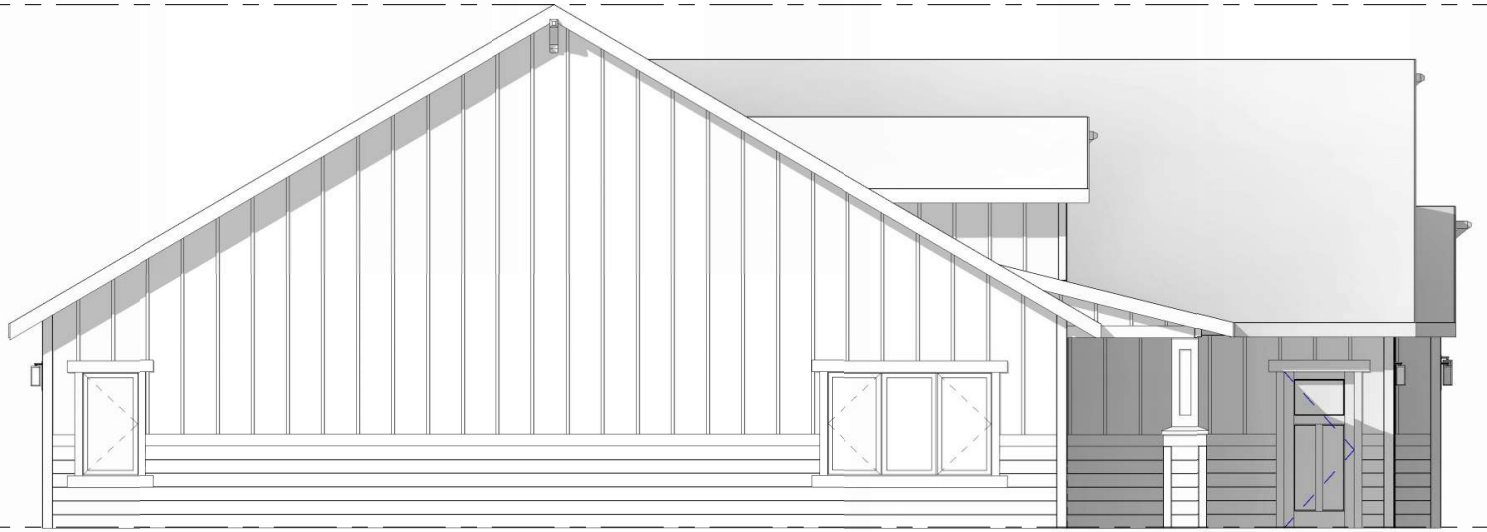
1 ELEVATION - SOUTH - PATIO OPTION
3/16" = 1'-0"

MESENBRINK CONSTRUCTION & ENGINEERING BUILDERS & DEVELOPERS

Mesenbrink Subdivision

House Plan B1a

PEAK
22' - 4 1/2"



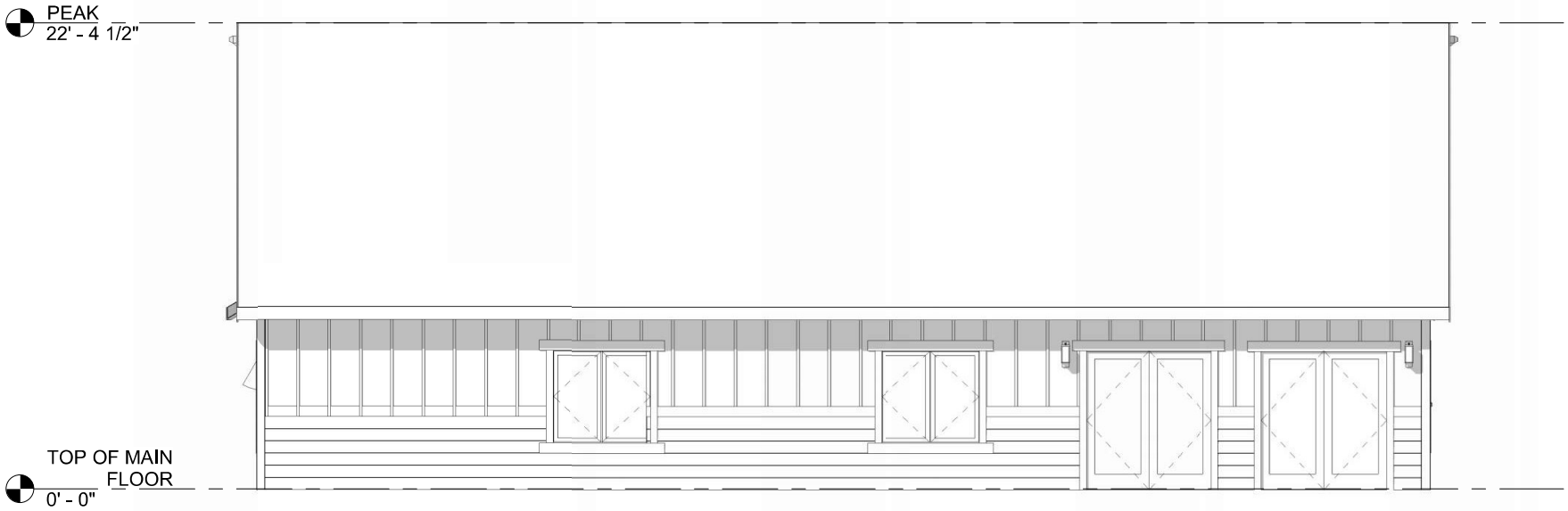
TOP OF MAIN FLOOR
0' - 0"

1 ELEVATION - WEST - PATIO OPTION
3/16" = 1'-0"

MESENBRINK CONSTRUCTION & ENGINEERING
BUILDERS & DEVELOPERS

Mesenbrink Subdivision

House Plan B1a



1 ELEVATION - NORTH - PATIO OPTION
3/16" = 1'-0"

MESENBRINK CONSTRUCTION & ENGINEERING BUILDERS & DEVELOPERS

Mesenbrink Subdivision

House Plan B1a

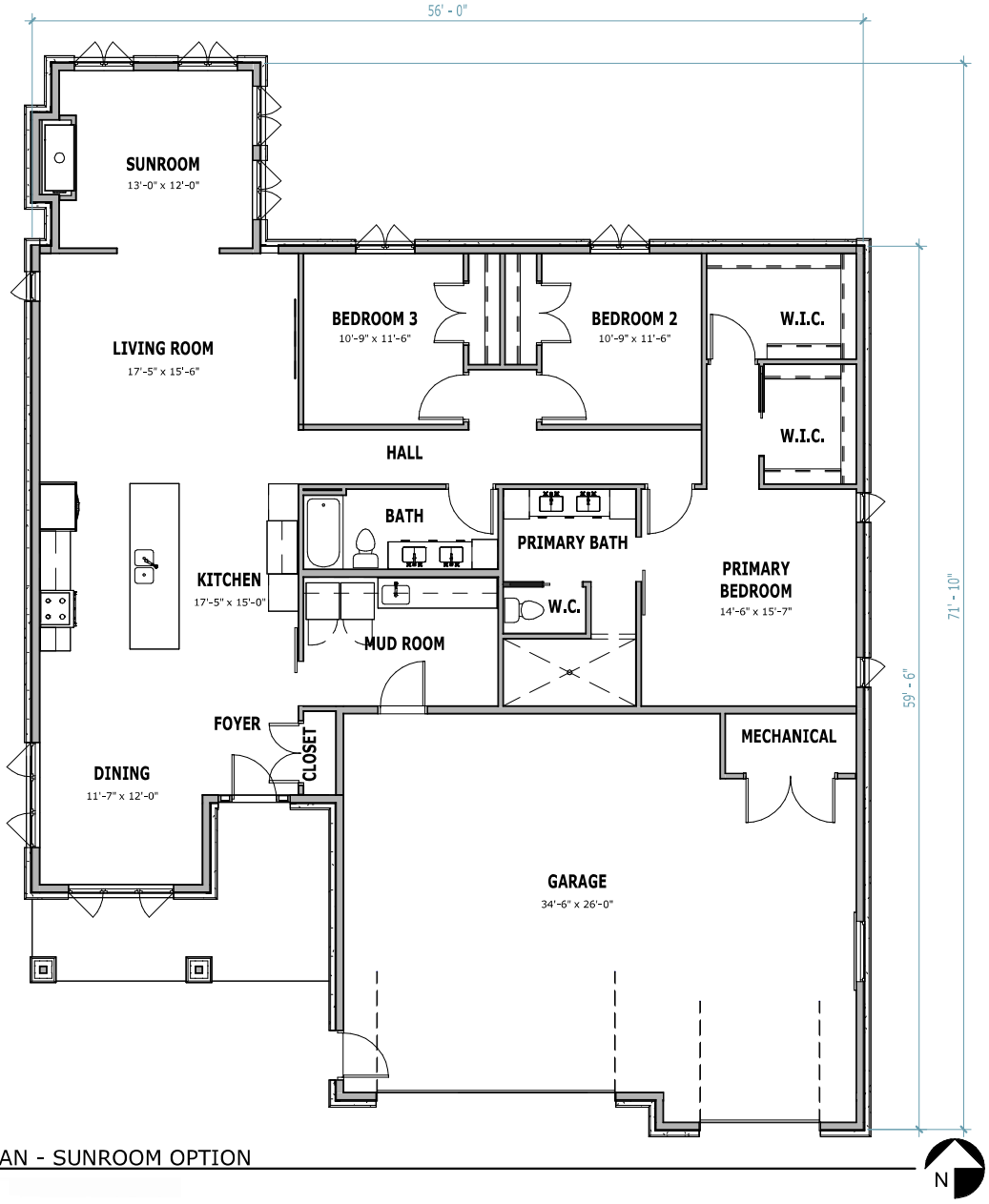


1 ELEVATION - EAST - PATIO OPTION
3/16" = 1'-0"

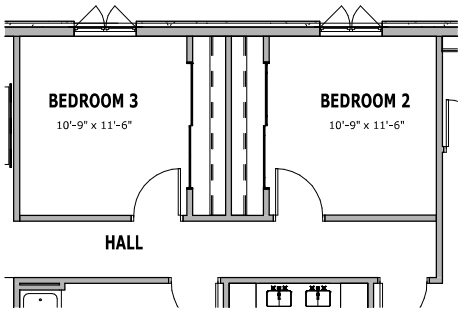
MESENBRINK CONSTRUCTION & ENGINEERING BUILDERS & DEVELOPERS

Mesenbrink Subdivision

House Plan B1a



1 FLOOR PLAN - SUNROOM OPTION
1/8" = 1'-0"



2 Large Closet Option
1/8" = 1'-0"

MESENBRINK CONSTRUCTION & ENGINEERING BUILDERS & DEVELOPERS

Mesenbrink Subdivision

TOTAL 2,140 S.F.

House Plan B1a

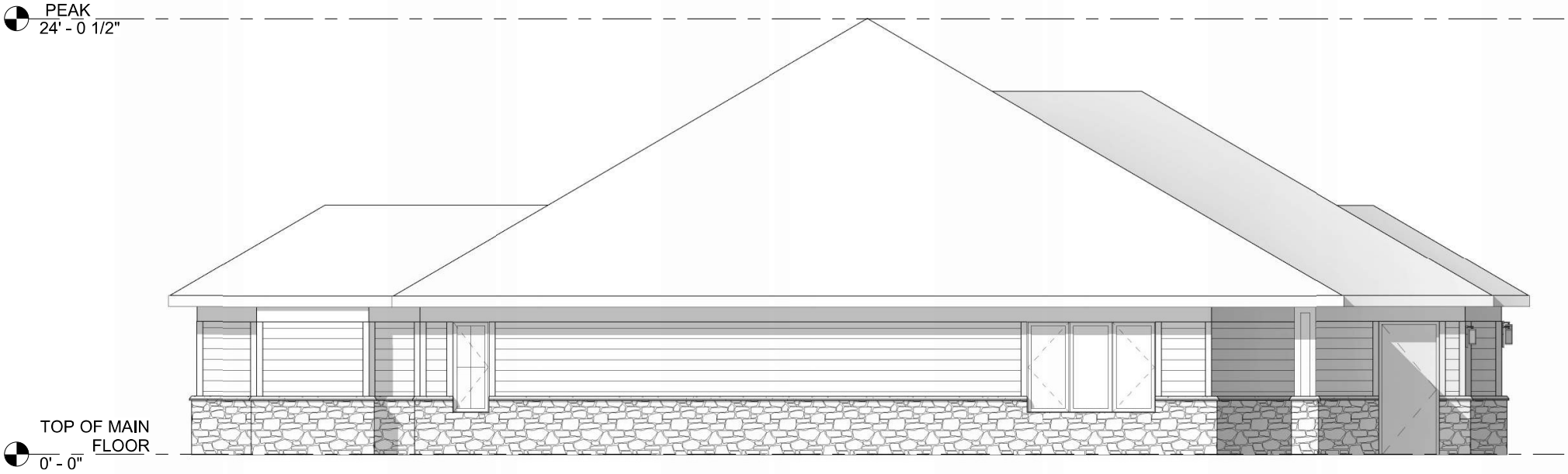


1 ELEVATION - SOUTH - SUNROOM OPTION
3/16" = 1'-0"

MESENBRINK CONSTRUCTION & ENGINEERING BUILDERS & DEVELOPERS

Mesenbrink Subdivision

House Plan B1a



1 ELEVATION - WEST - SUNROOM OPTION
3/16" = 1'-0"

MESENBRINK CONSTRUCTION & ENGINEERING BUILDERS & DEVELOPERS

Mesenbrink Subdivision

House Plan B1a

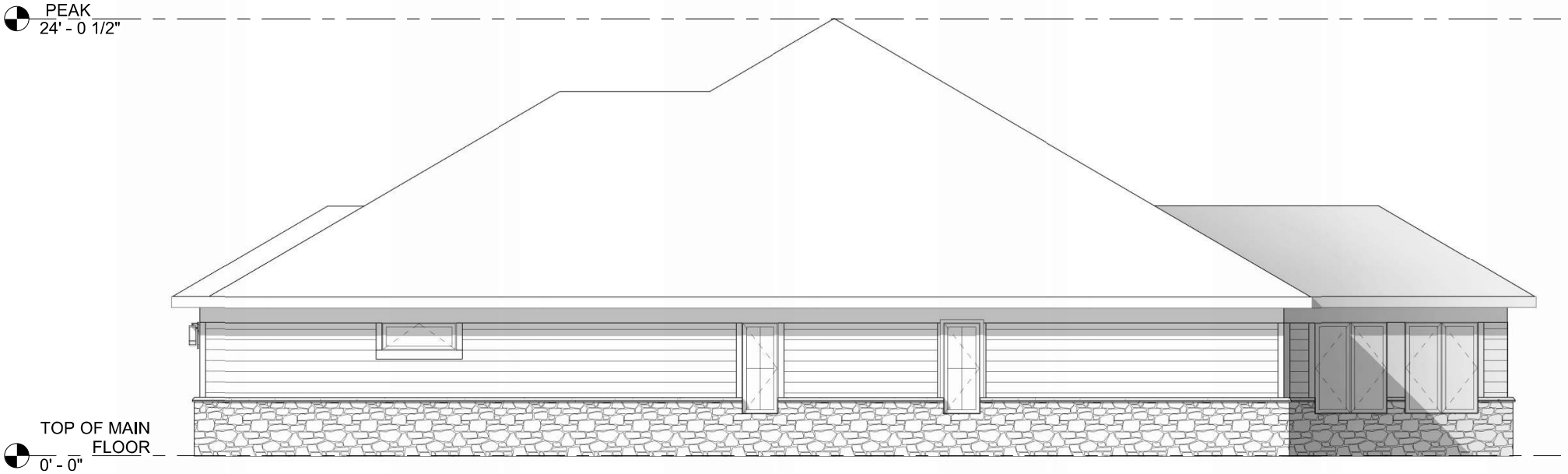


1 ELEVATION - NORTH - SUNROOM OPTION
3/16" = 1'-0"

MESENBRINK CONSTRUCTION & ENGINEERING BUILDERS & DEVELOPERS

Mesenbrink Subdivision

House Plan B1a

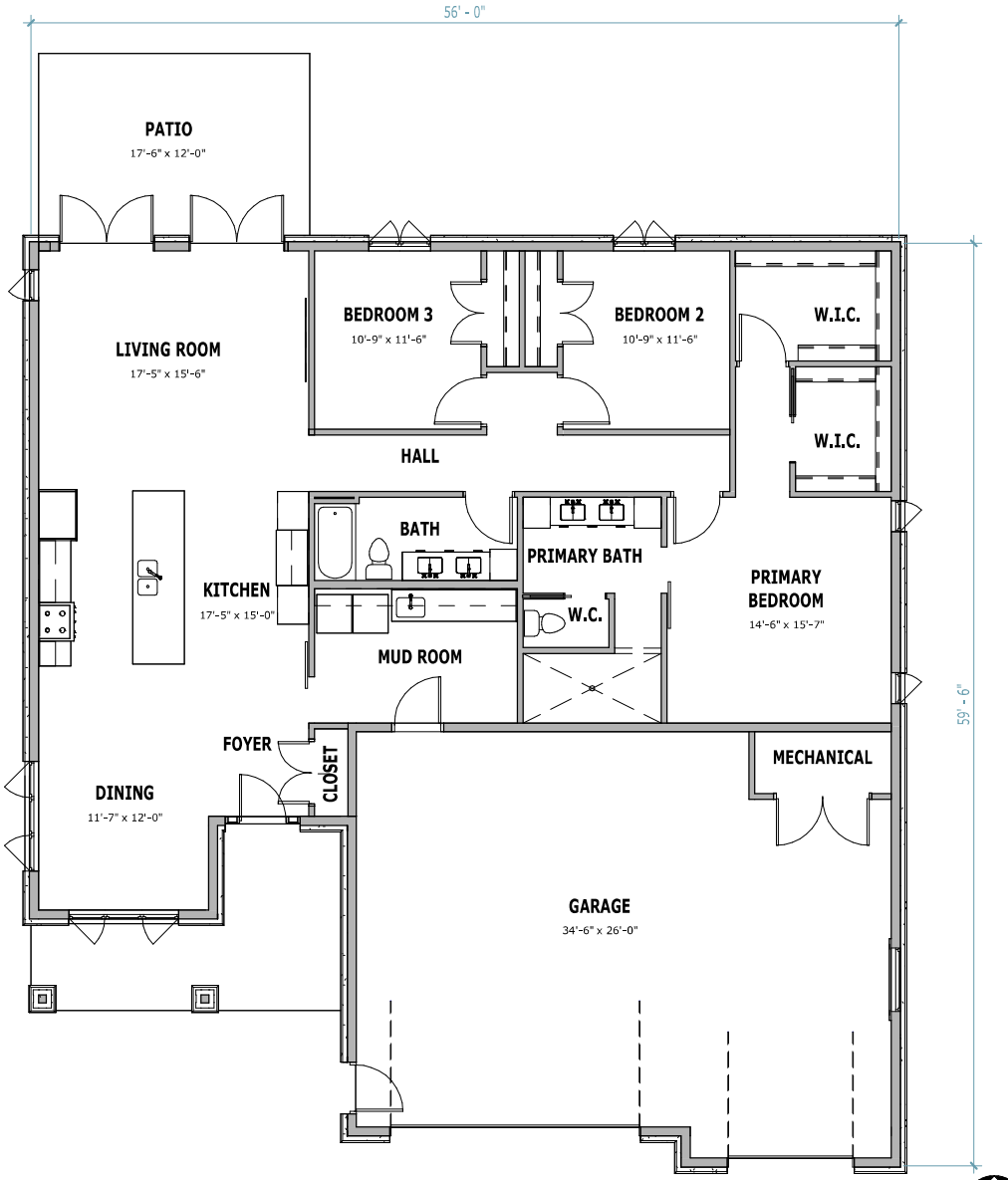


1 ELEVATION - EAST - SUNROOM OPTION
3/16" = 1'-0"

MESENBRINK CONSTRUCTION & ENGINEERING BUILDERS & DEVELOPERS

Mesenbrink Subdivision

House Plan B1a



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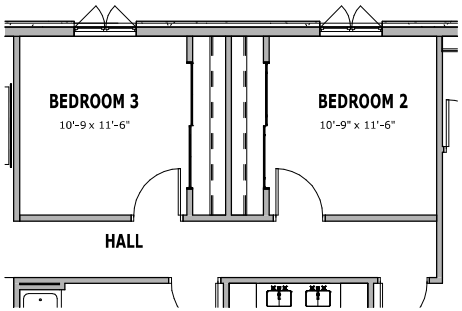


2 Large Closet Option
1/8" = 1'-0"

MESENBRINK CONSTRUCTION & ENGINEERING BUILDERS & DEVELOPERS

Mesenbrink Subdivision

TOTAL 1,960 S.F.

House Plan B1a



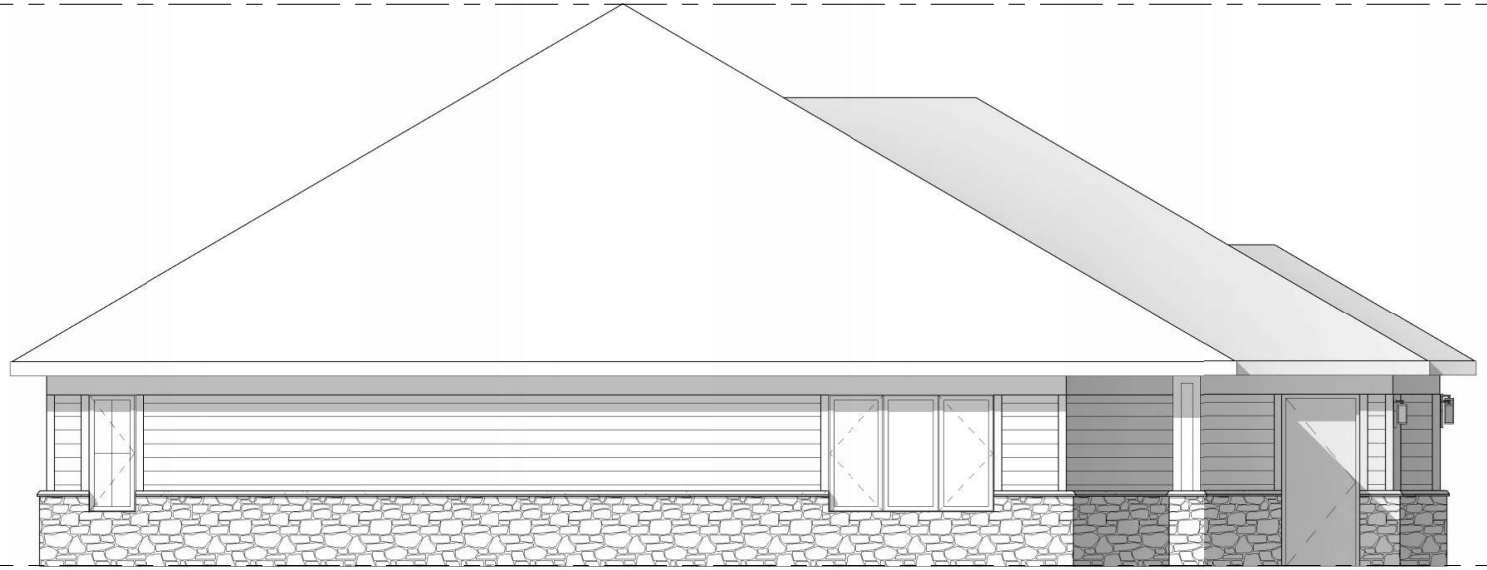
1 ELEVATION - SOUTH - PATIO OPTION
3/16" = 1'-0"

MESENBRINK CONSTRUCTION & ENGINEERING BUILDERS & DEVELOPERS

Mesenbrink Subdivision

House Plan B1a

PEAK
24' - 0 1/2"



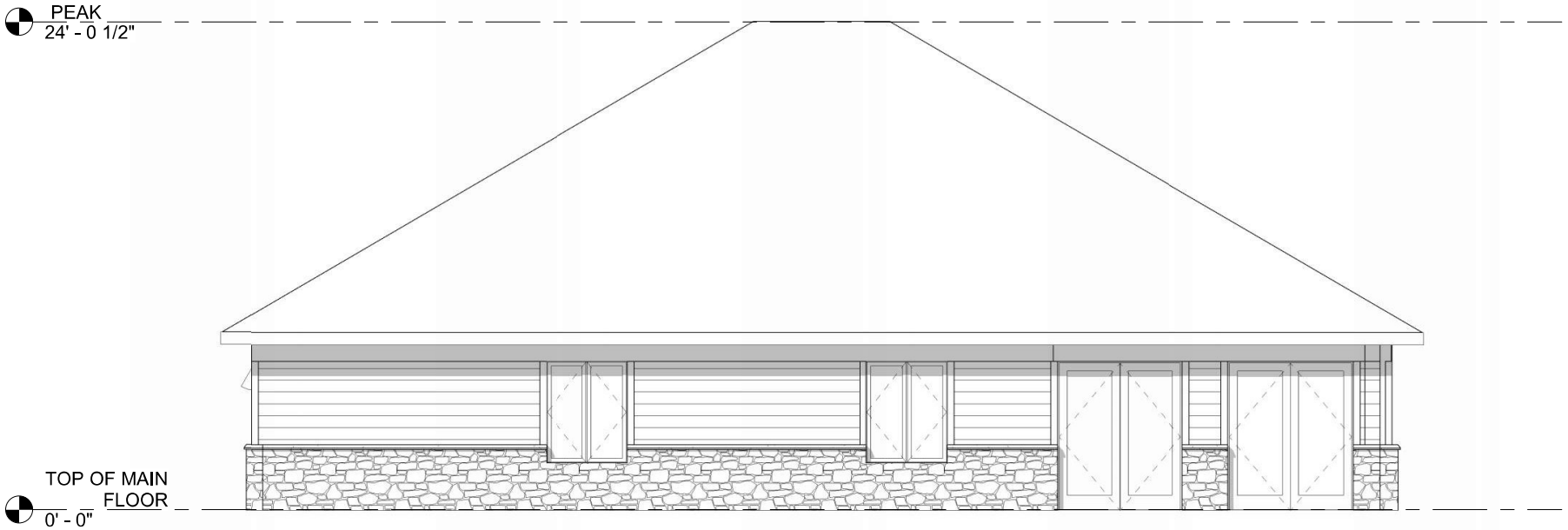
TOP OF MAIN FLOOR
0' - 0"

1 ELEVATION - WEST - PATIO OPTION
3/16" = 1'-0"

MESENBRINK CONSTRUCTION & ENGINEERING
BUILDERS & DEVELOPERS

Mesenbrink Subdivision

House Plan B1a

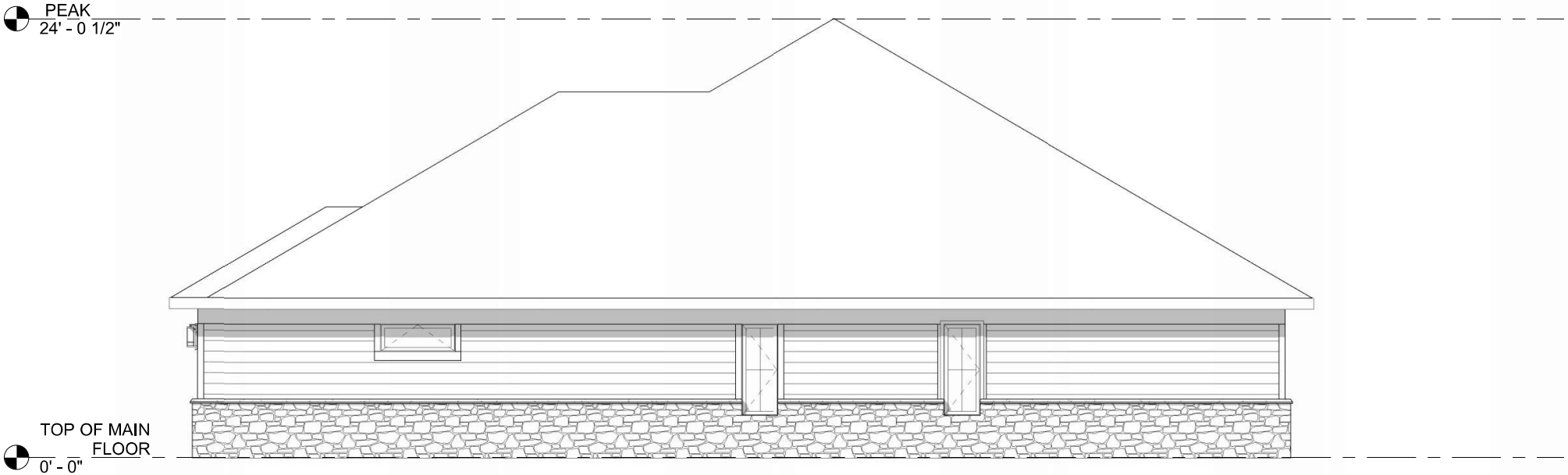


1 ELEVATION - NORTH - PATIO OPTION
3/16" = 1'-0"

MESENBRINK CONSTRUCTION & ENGINEERING BUILDERS & DEVELOPERS

Mesenbrink Subdivision

House Plan B1a

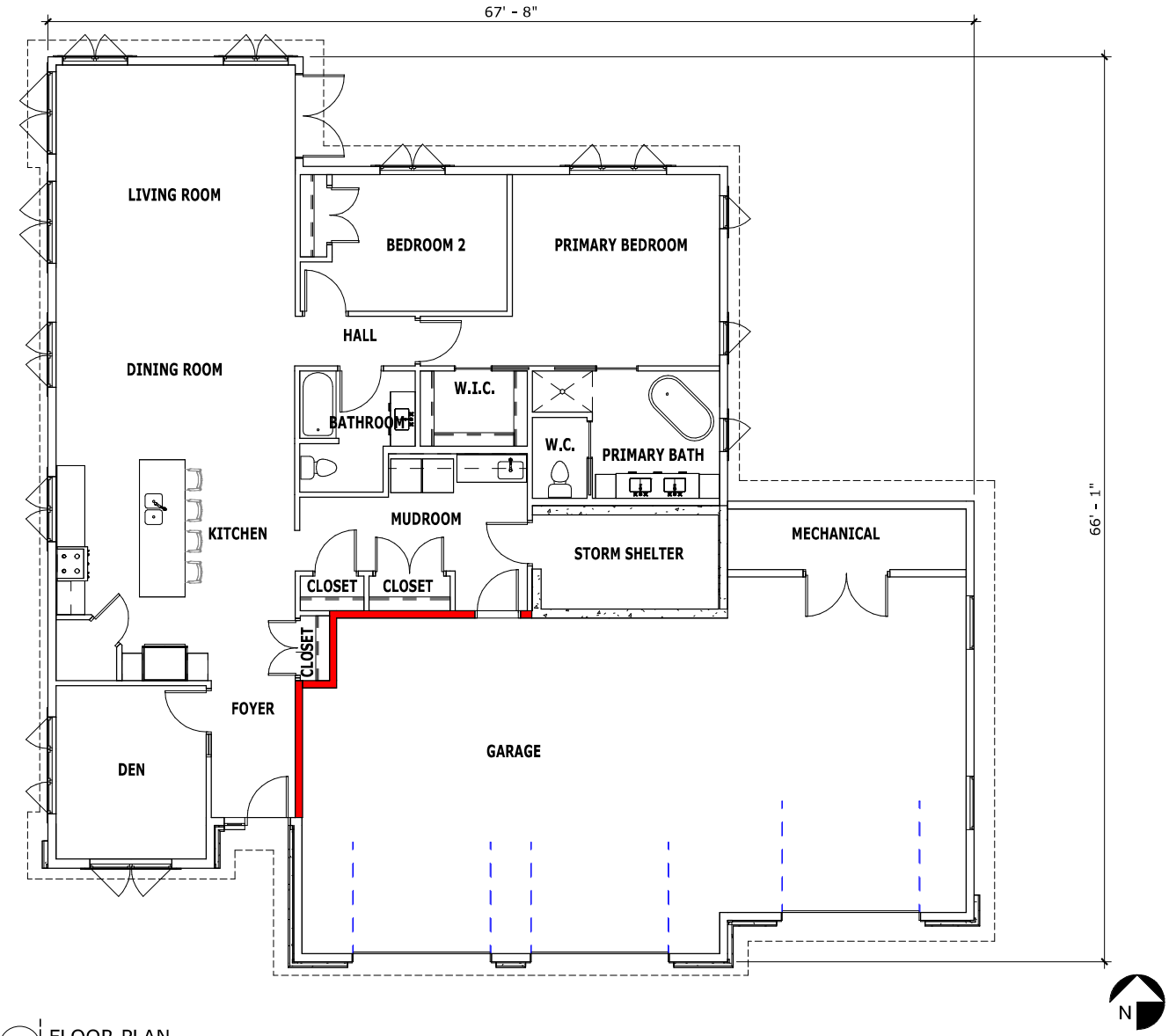


1 ELEVATION - NORTH - PATIO OPTION
3/16" = 1'-0"

MESENBRINK CONSTRUCTION & ENGINEERING BUILDERS & DEVELOPERS

Mesenbrink Subdivision

House Plan B2



1 FLOOR PLAN
1/8" = 1'-0"

TOTAL 2,088 SF

MESENBRINK CONSTRUCTION & ENGINEERING BUILDERS & DEVELOPERS

Mesenbrink Subdivision

House Plan B2



1 ELEVATION - SOUTH
3/16" = 1'-0"

MESENBRINK CONSTRUCTION & ENGINEERING BUILDERS & DEVELOPERS

Mesenbrink Subdivision

House Plan B2



1 ELEVATION - WEST
3/16" = 1'-0"

MESENBRINK CONSTRUCTION & ENGINEERING BUILDERS & DEVELOPERS

Mesenbrink Subdivision

House Plan B2

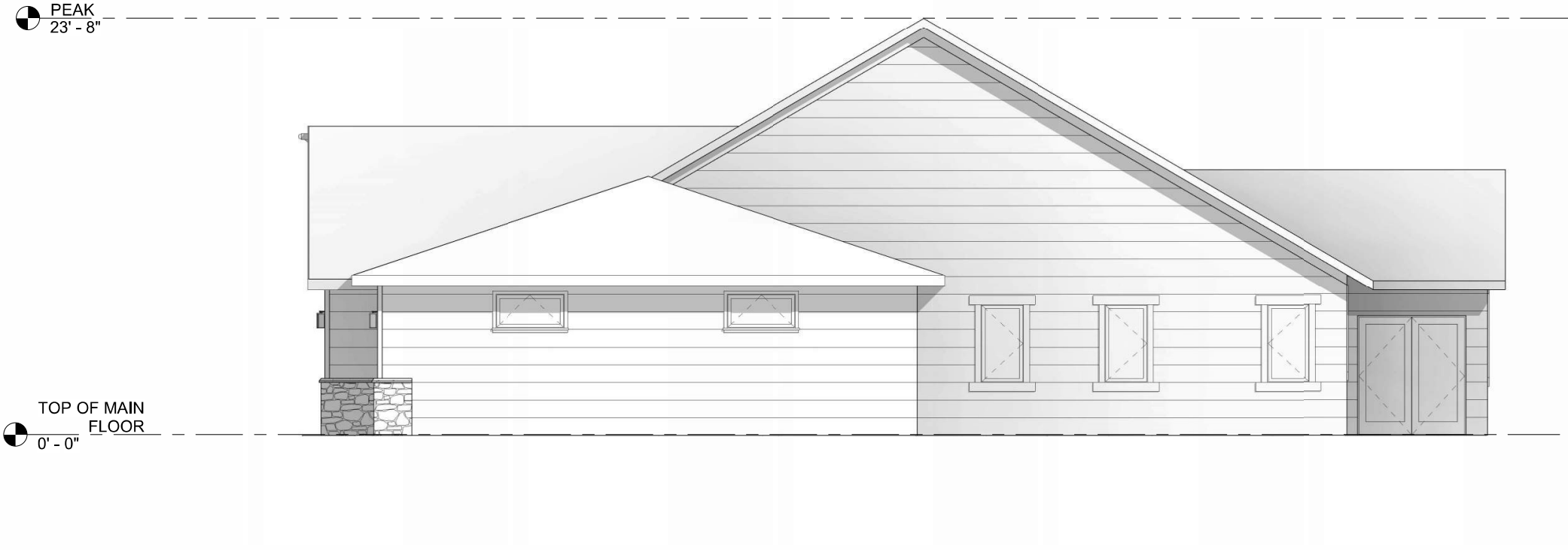


1 ELEVATION - NORTH
3/16" = 1'-0"

MESENBRINK CONSTRUCTION & ENGINEERING BUILDERS & DEVELOPERS

Mesenbrink Subdivision

House Plan B2

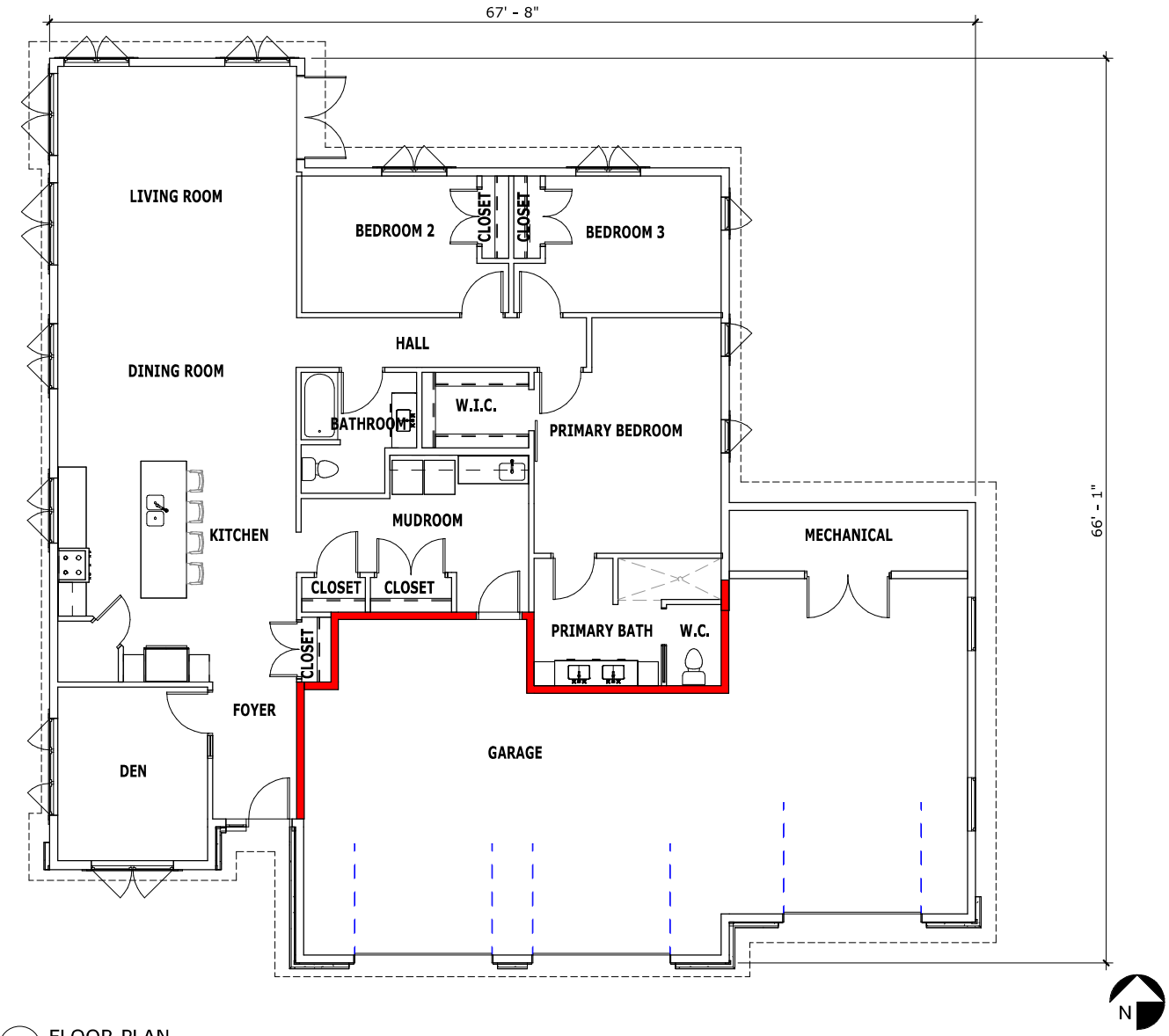


1 ELEVATION - EAST
3/16" = 1'-0"

MESENBRINK CONSTRUCTION & ENGINEERING BUILDERS & DEVELOPERS

Mesenbrink Subdivision

House Plan B2a



1 FLOOR PLAN
1/8" = 1'-0"

TOTAL 2,088 SF

MESENBRINK CONSTRUCTION & ENGINEERING BUILDERS & DEVELOPERS

Mesenbrink Subdivision

House Plan B2a



1 ELEVATION - SOUTH
3/16" = 1'-0"

MESENBRINK CONSTRUCTION & ENGINEERING BUILDERS & DEVELOPERS

Mesenbrink Subdivision

House Plan B2a

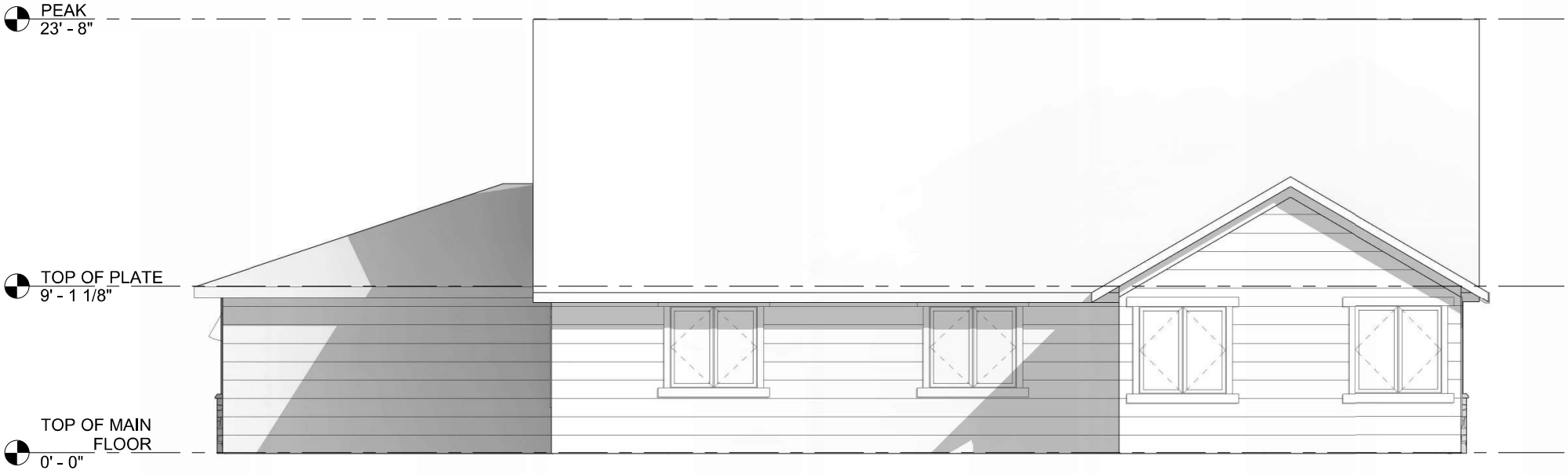


1 ELEVATION - WEST
3/16" = 1'-0"

MESENBRINK CONSTRUCTION & ENGINEERING BUILDERS & DEVELOPERS

Mesenbrink Subdivision

House Plan B2a



1 ELEVATION - NORTH
3/16" = 1'-0"

MESENBRINK CONSTRUCTION & ENGINEERING BUILDERS & DEVELOPERS

Mesenbrink Subdivision

House Plan B2a

PEAK
23' - 8"



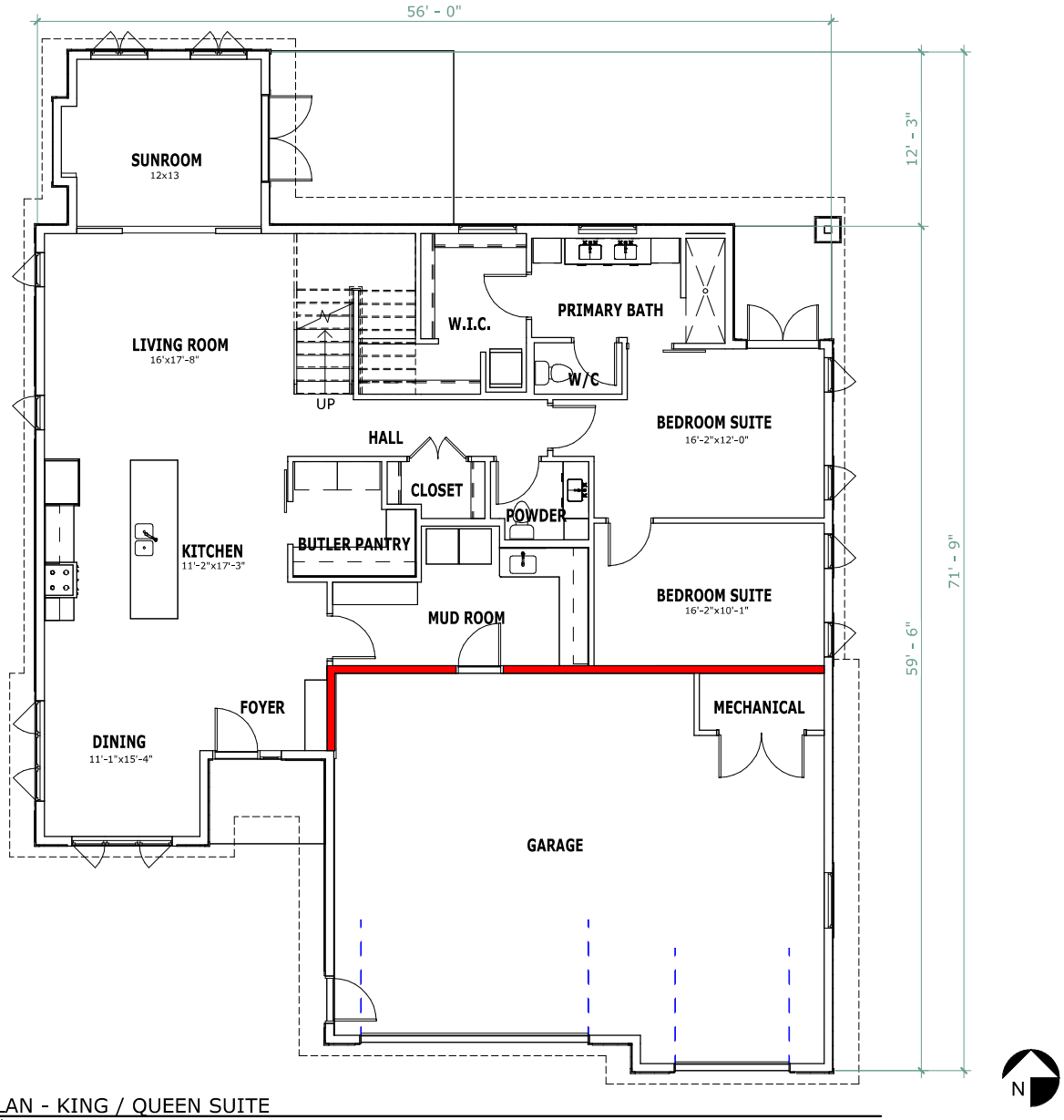
TOP OF MAIN FLOOR
0' - 0"

1 ELEVATION - EAST
3/16" = 1'-0"

MESENBRINK CONSTRUCTION & ENGINEERING
BUILDERS & DEVELOPERS

Mesenbrink Subdivision

House Plan B3



1 FLOOR PLAN - KING / QUEEN SUITE
1/8" = 1'-0"

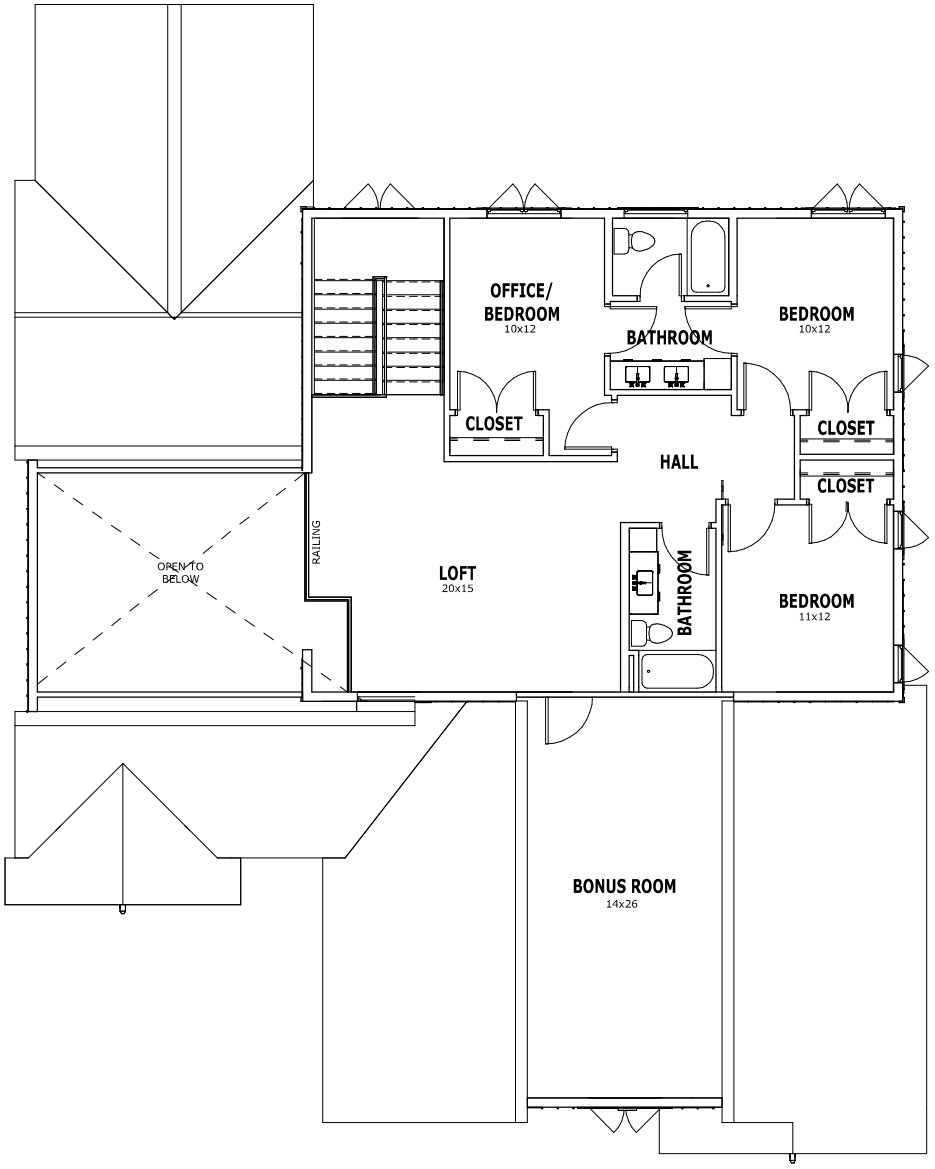
MESENBRINK CONSTRUCTION & ENGINEERING BUILDERS & DEVELOPERS

Mesenbrink Subdivision

MAIN:	2,157 SF
SECOND:	1,201 SF
BONUS:	380 SF

TOTAL 3,738 SF

House Plan B3



1 SECOND FLOOR PLAN
1/8" = 1'-0"

MESENBRINK CONSTRUCTION & ENGINEERING BUILDERS & DEVELOPERS

Mesenbrink Subdivision

MAIN:	2,157 SF
SECOND:	1,201 SF
BONUS:	380 SF

TOTAL 3,738 SF

House Plan B3

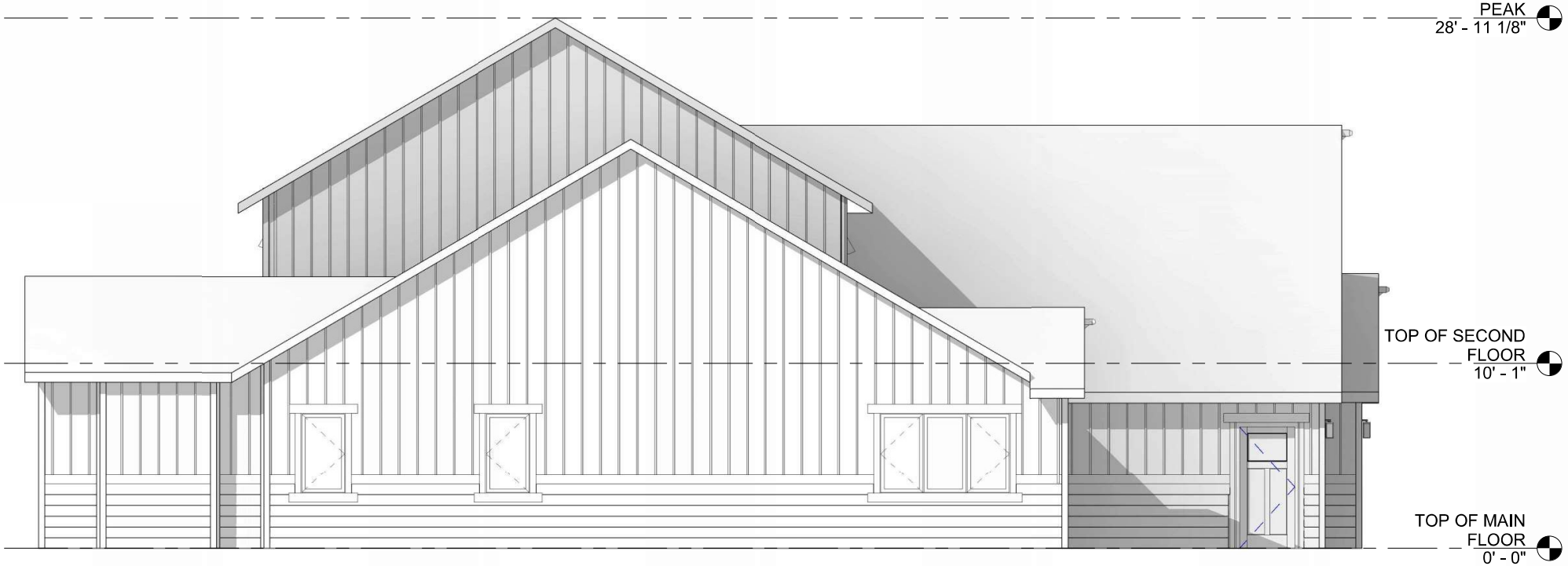


1 ELEVATION - SOUTH
3/16" = 1'-0"

MESENBRINK CONSTRUCTION & ENGINEERING BUILDERS & DEVELOPERS

Mesenbrink Subdivision

House Plan B3



1 ELEVATION - WEST
3/16" = 1'-0"

MESENBRINK CONSTRUCTION & ENGINEERING BUILDERS & DEVELOPERS

Mesenbrink Subdivision

House Plan B3



1 ELEVATION - NORTH
3/16" = 1'-0"

MESENBRINK CONSTRUCTION & ENGINEERING BUILDERS & DEVELOPERS

Mesenbrink Subdivision

House Plan B3

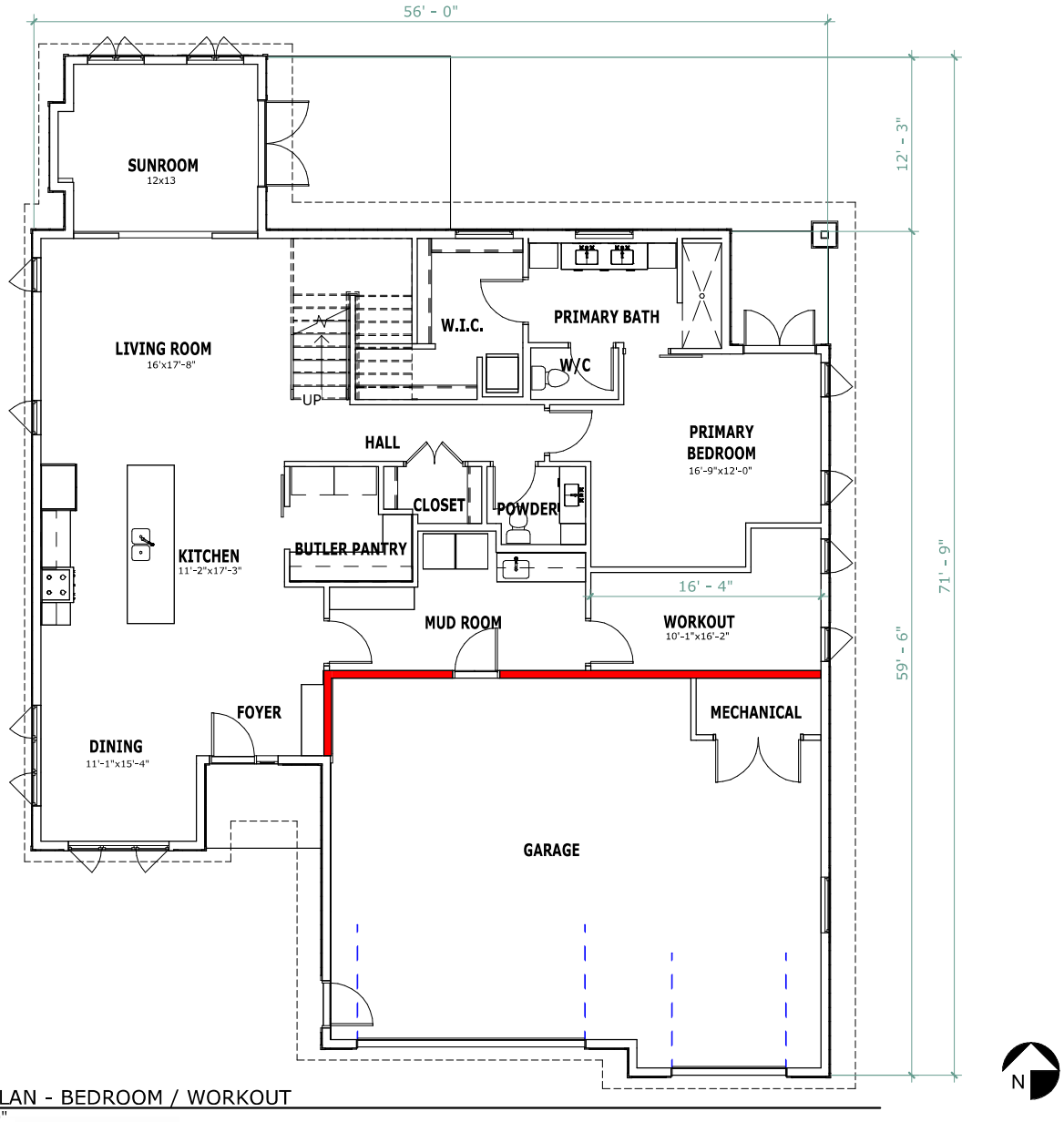


1 ELEVATION - EAST
3/16" = 1'-0"

MESENBRINK CONSTRUCTION & ENGINEERING BUILDERS & DEVELOPERS

Mesenbrink Subdivision

House Plan B3a



1 FLOOR PLAN - BEDROOM / WORKOUT
1/8" = 1'-0"

MESENBRINK CONSTRUCTION & ENGINEERING BUILDERS & DEVELOPERS

Mesenbrink Subdivision

MAIN:	2,157 SF
SECOND:	1,201 SF
BONUS:	380 SF

TOTAL 3,738 SF

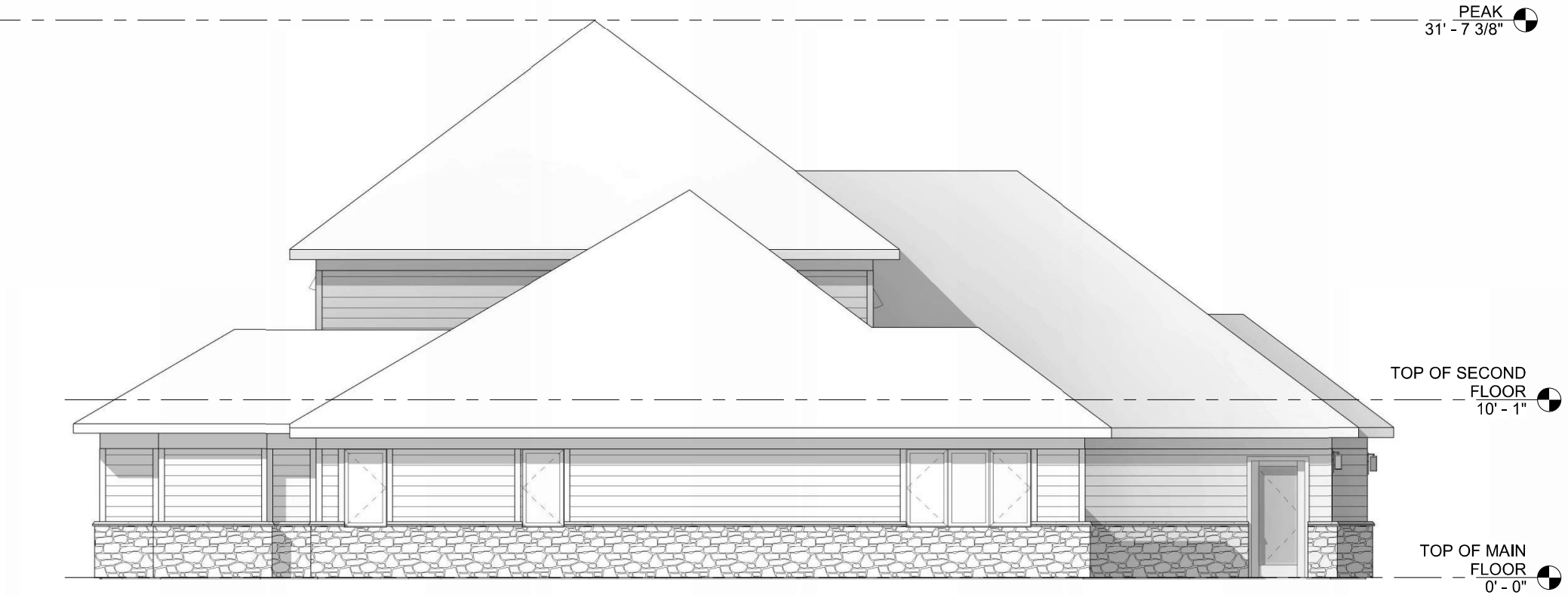


1 ELEVATION - SOUTH
3/16" = 1'-0"

MESENBRINK CONSTRUCTION & ENGINEERING BUILDERS & DEVELOPERS

Mesenbrink Subdivision

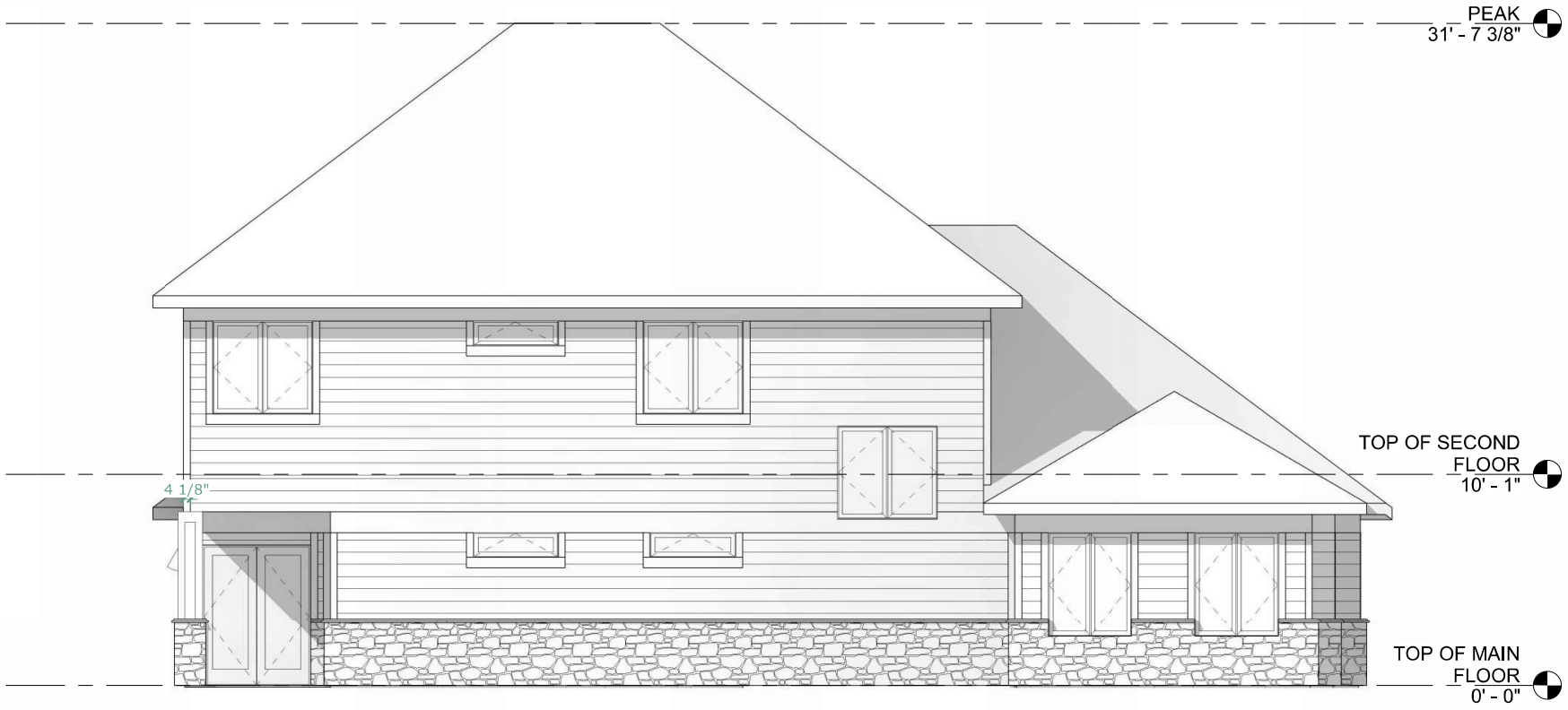
House Plan B3a



1 ELEVATION - WEST
3/16" = 1'-0"

MESENBRINK CONSTRUCTION & ENGINEERING BUILDERS & DEVELOPERS

Mesenbrink Subdivision



1 ELEVATION - NORTH
3/16" = 1'-0"

MESENBRINK CONSTRUCTION & ENGINEERING BUILDERS & DEVELOPERS

Mesenbrink Subdivision

House Plan B3a

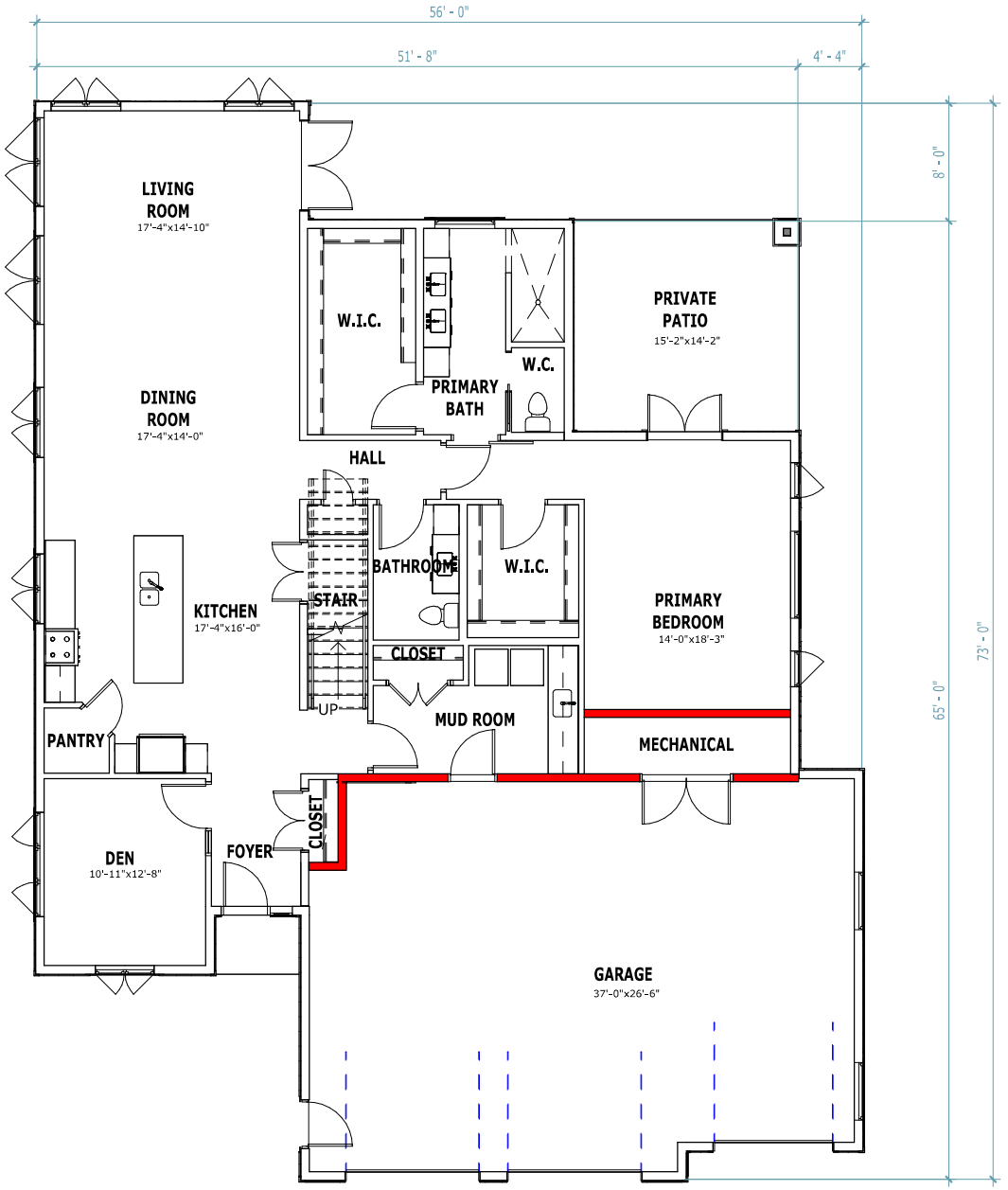


1 ELEVATION - EAST
3/16" = 1'-0"

MESENBRINK CONSTRUCTION & ENGINEERING BUILDERS & DEVELOPERS

Mesenbrink Subdivision

House Plan B4



1 MAIN FLOOR
1/8" = 1'-0"

N

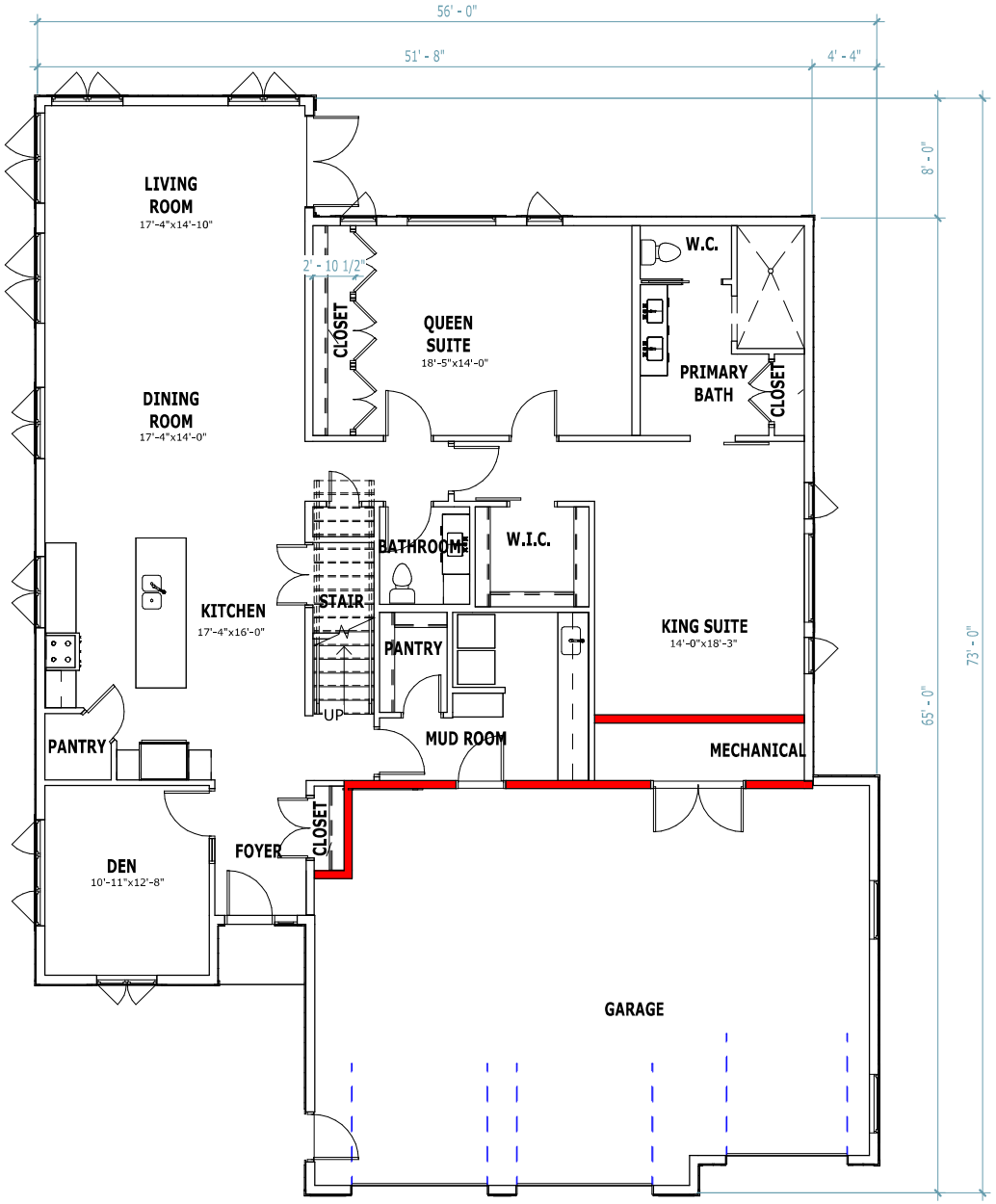
MAIN: 2,120 SF
SECOND: 1,281 SF
BONUS: 480 SF

TOTAL 3,881 SF

MESENBRINK CONSTRUCTION & ENGINEERING BUILDERS & DEVELOPERS

Mesenbrink Subdivision

House Plan B4



1 MAIN FLOOR - KING/QUEEN OPTION
1/8" = 1'-0"

N

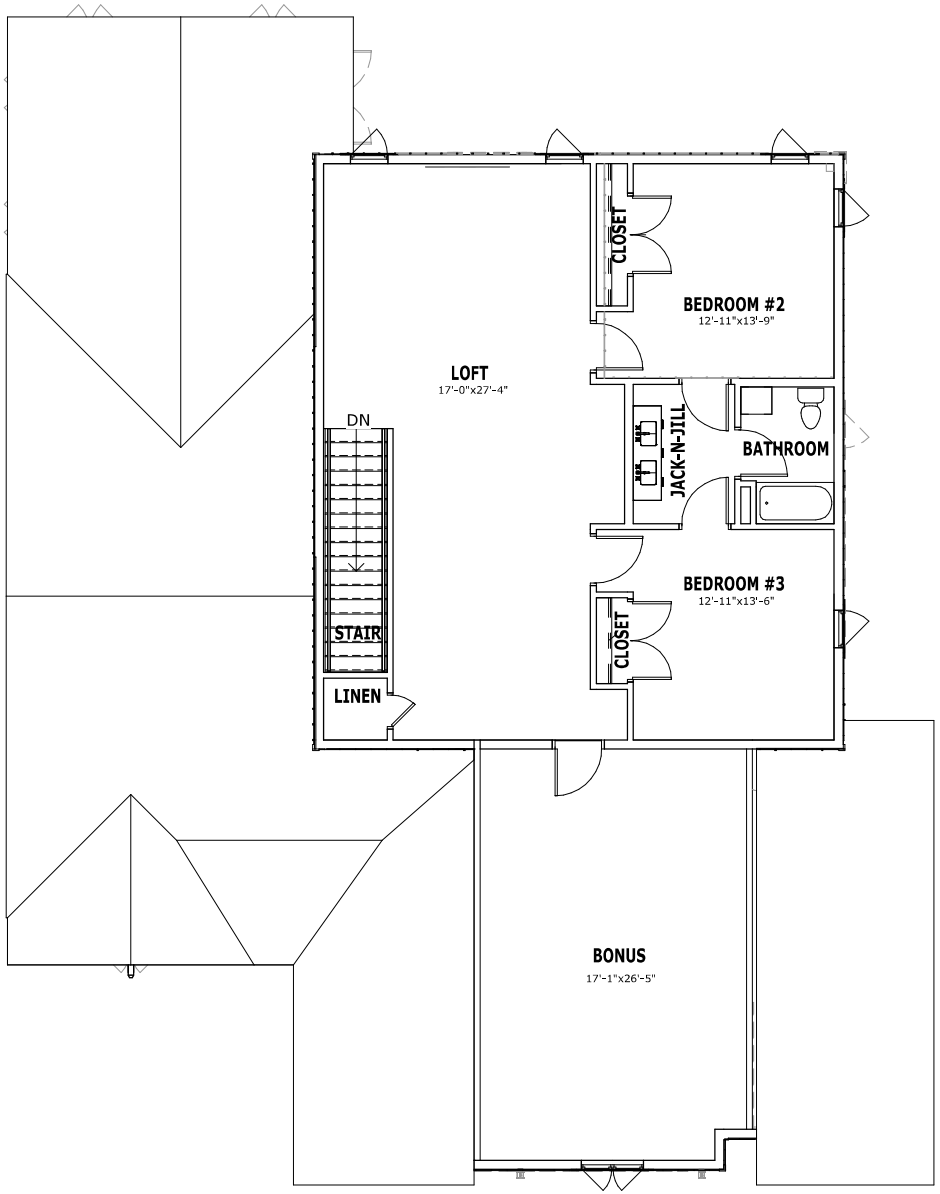
MESENBRINK CONSTRUCTION & ENGINEERING BUILDERS & DEVELOPERS

Mesenbrink Subdivision

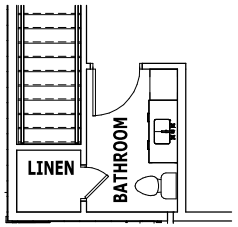
MAIN:	2,340 SF
SECOND:	1,281 SF
BONUS:	480 SF

TOTAL 4,101 SF

House Plan B4



1 SECOND FLOOR - FARMHOUSE
1/8" = 1'-0"



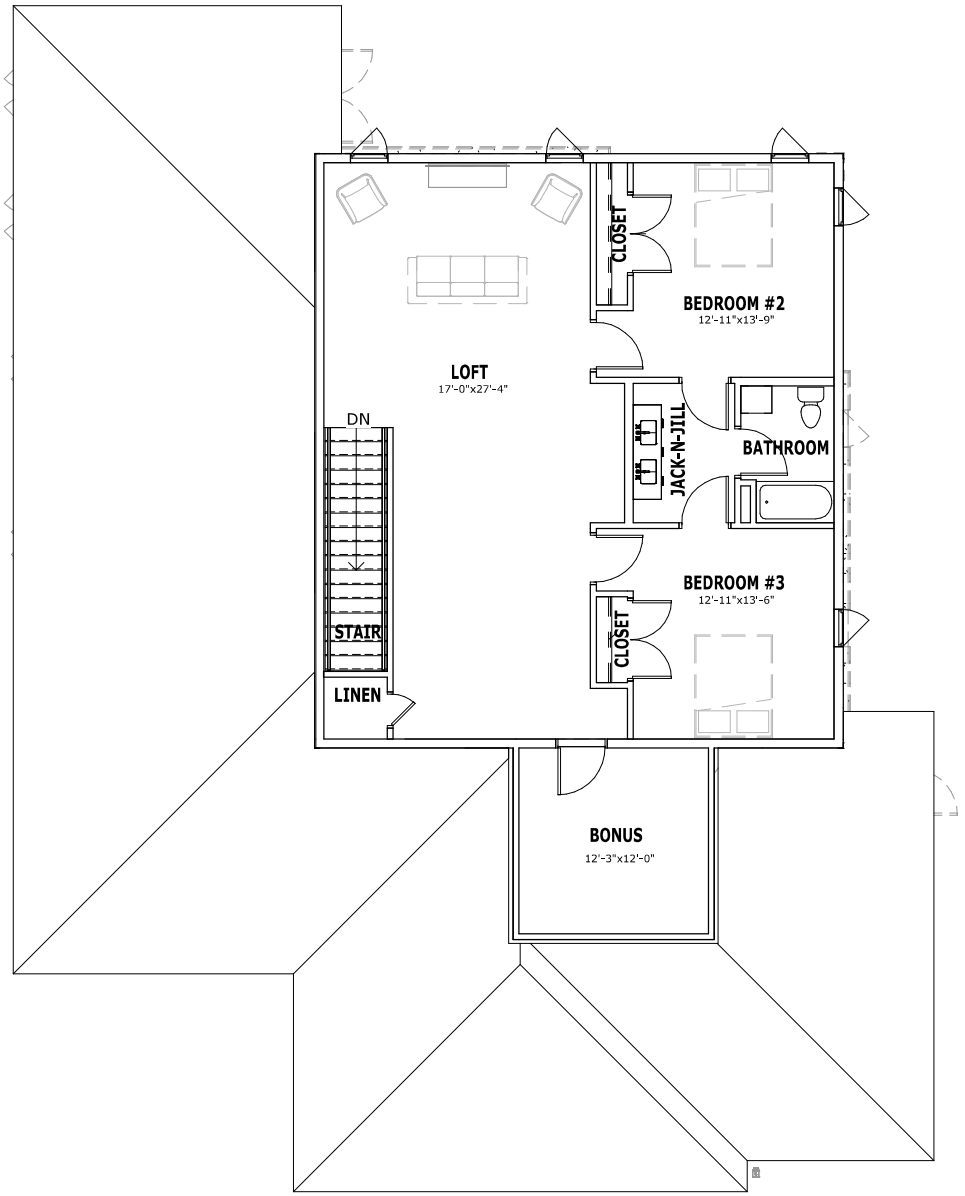
2 OPTIONAL BATHROOM ADDITION
1/8" = 1'-0"

MESENBRINK CONSTRUCTION & ENGINEERING BUILDERS & DEVELOPERS

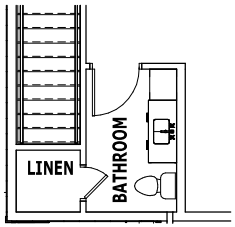
Mesenbrink Subdivision

N

House Plan B4



1 SECOND FLOOR - MEDITERRANEAN
1/8" = 1'-0"



2 OPTIONAL BATHROOM ADDITION
1/8" = 1'-0"

MESENBRINK CONSTRUCTION & ENGINEERING BUILDERS & DEVELOPERS

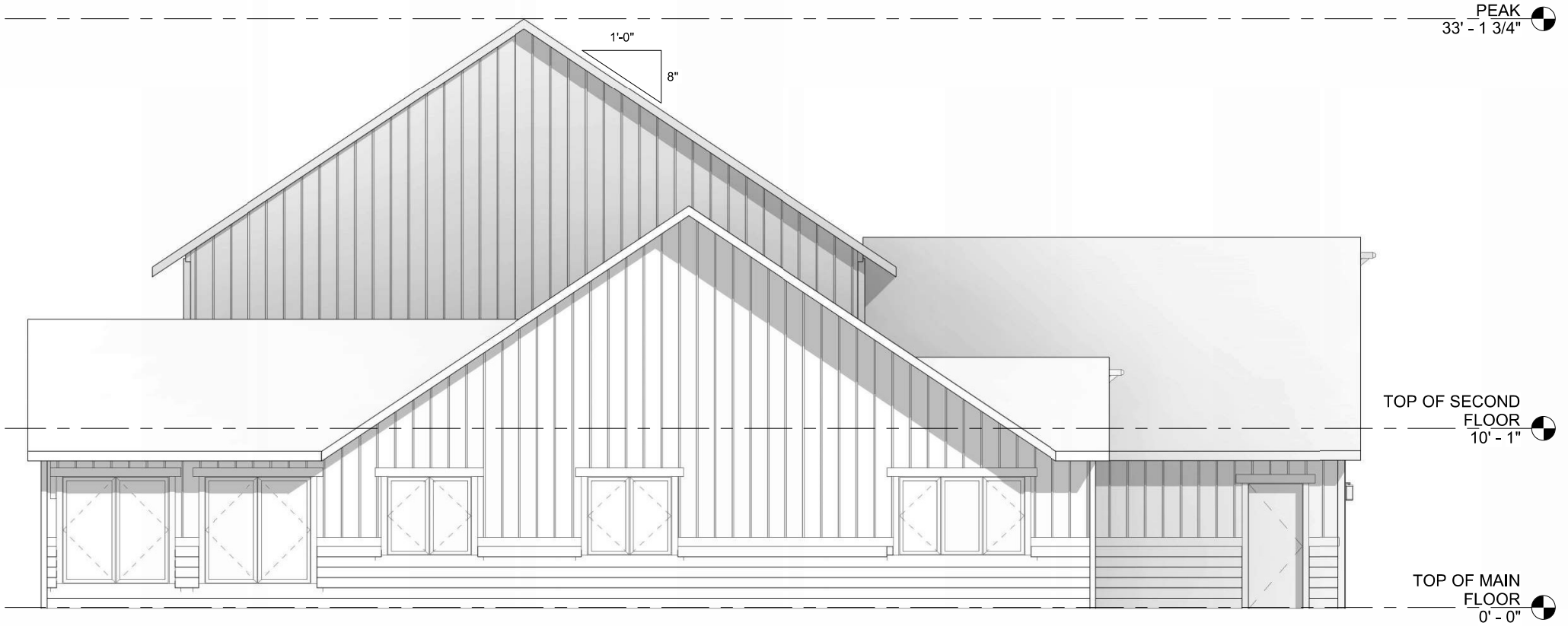
Mesenbrink Subdivision

N

MAIN:	SF
SECOND:	1,281 SF
BONUS:	160 SF

TOTAL SF

House Plan B4



1 ELEVATION - WEST
3/16" = 1'-0"

MESENBRINK CONSTRUCTION & ENGINEERING BUILDERS & DEVELOPERS

Mesenbrink Subdivision

House Plan B4



1 ELEVATION - NORTH
3/16" = 1'-0"

MESENBRINK CONSTRUCTION & ENGINEERING BUILDERS & DEVELOPERS

Mesenbrink Subdivision

House Plan B4

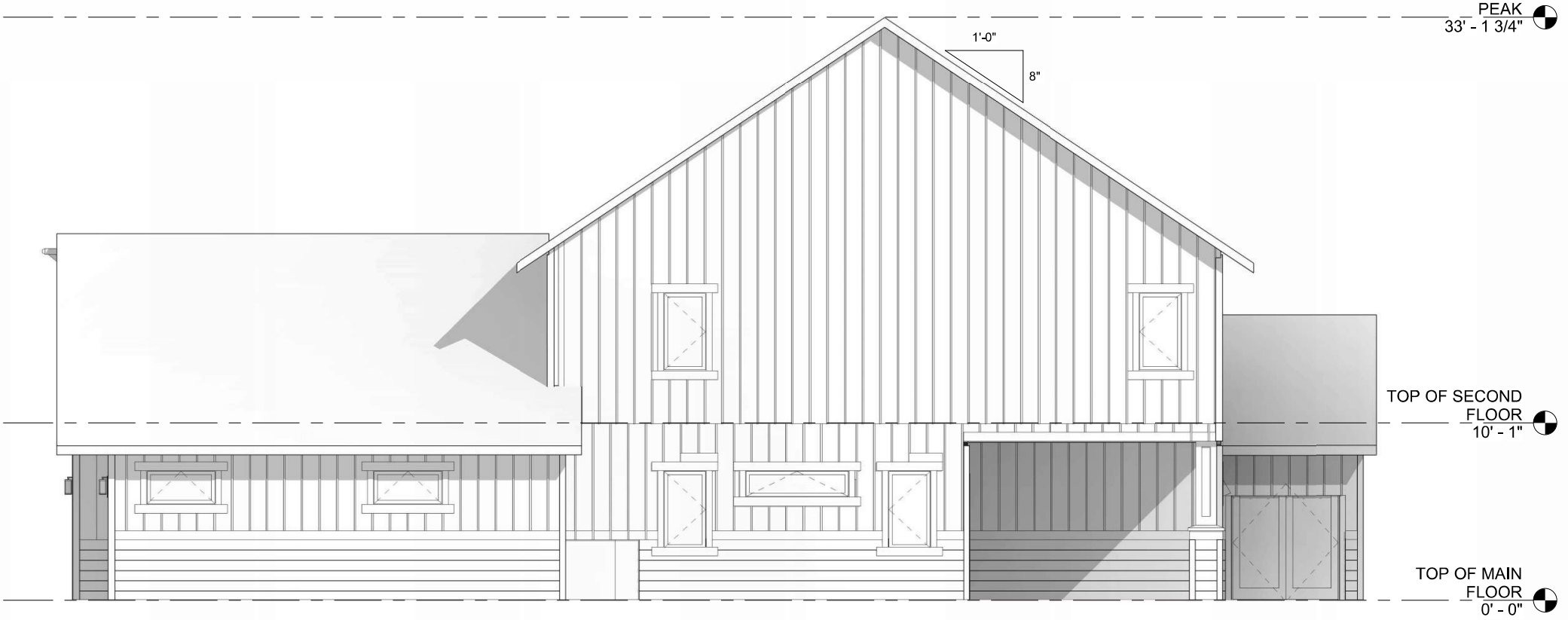


1 ELEVATION - NORTH - KING / QUEEN OPTION
3/16" = 1'-0"

MESENBRINK CONSTRUCTION & ENGINEERING BUILDERS & DEVELOPERS

Mesenbrink Subdivision

House Plan B4

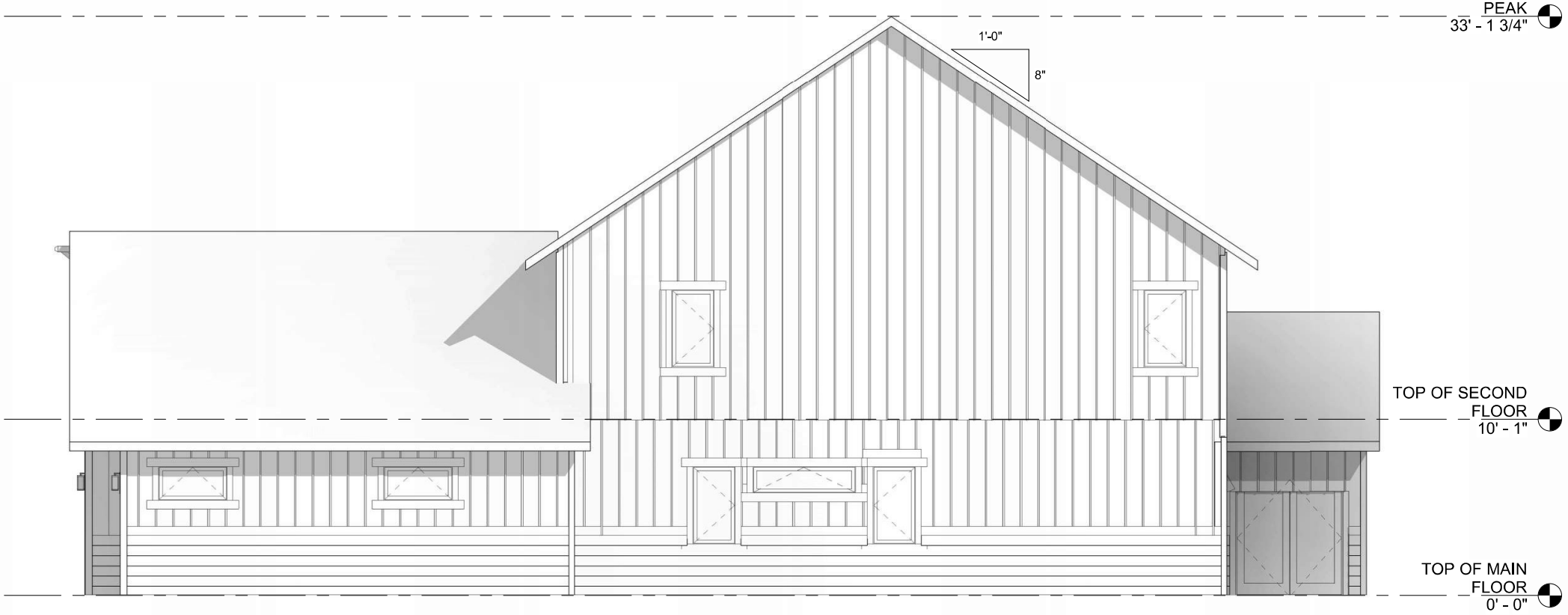


1 ELEVATION - EAST
3/16" = 1'-0"

MESENBRINK CONSTRUCTION & ENGINEERING BUILDERS & DEVELOPERS

Mesenbrink Subdivision

House Plan B4



1 ELEVATION - EAST - KING / QUEEN OPTION
3/16" = 1'-0"

MESENBRINK CONSTRUCTION & ENGINEERING BUILDERS & DEVELOPERS

Mesenbrink Subdivision

House Plan B4

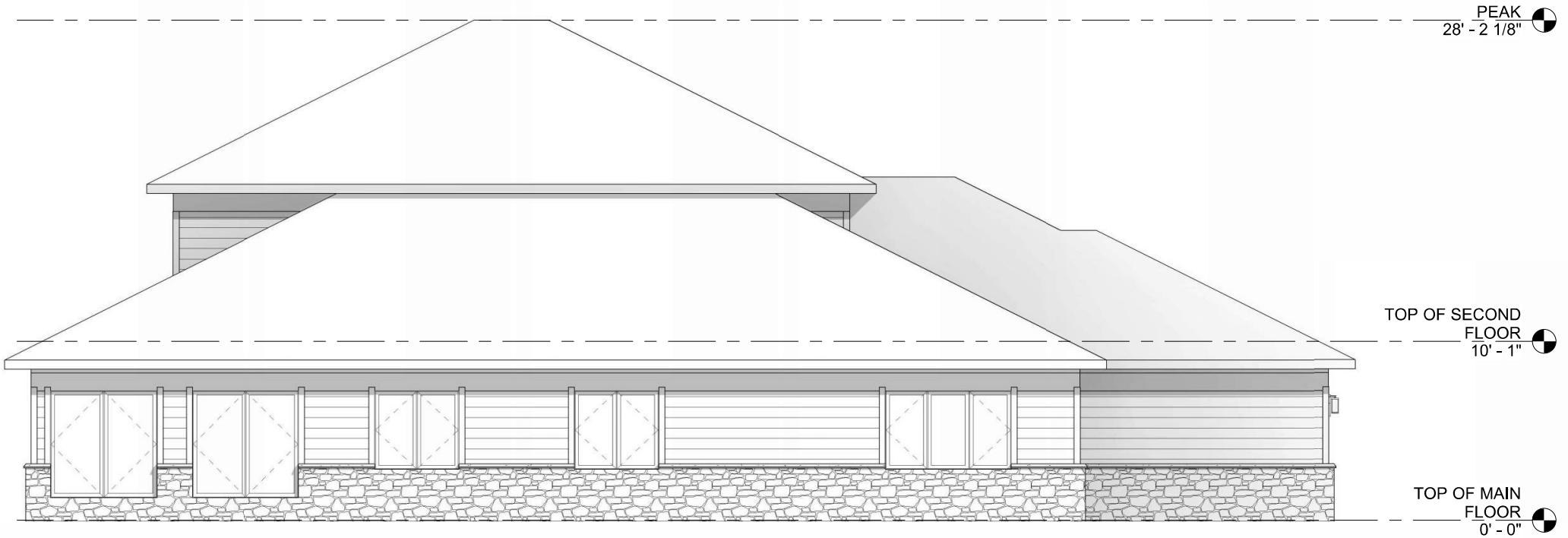


1 ELEVATION - SOUTH
3/16" = 1'-0"

MESENBRINK CONSTRUCTION & ENGINEERING BUILDERS & DEVELOPERS

Mesenbrink Subdivision

House Plan B4



1 ELEVATION - WEST
3/16" = 1'-0"

MESENBRINK CONSTRUCTION & ENGINEERING BUILDERS & DEVELOPERS

Mesenbrink Subdivision

House Plan B4

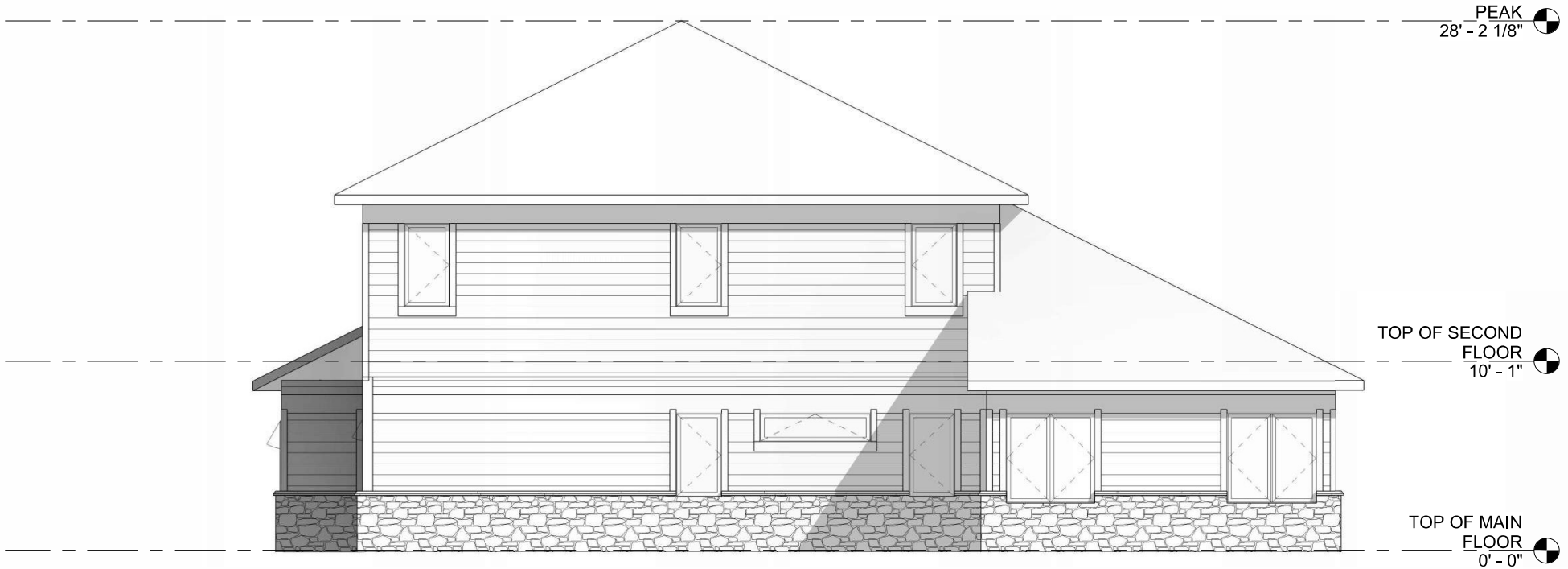


1 ELEVATION - NORTH
3/16" = 1'-0"

MESENBRINK CONSTRUCTION & ENGINEERING BUILDERS & DEVELOPERS

Mesenbrink Subdivision

House Plan B4



1 ELEVATION - NORTH - KING / QUEEN OPTION
3/16" = 1'-0"

MESENBRINK CONSTRUCTION & ENGINEERING BUILDERS & DEVELOPERS

Mesenbrink Subdivision

House Plan B4



1 ELEVATION - EAST
3/16" = 1'-0"

MESENBRINK CONSTRUCTION & ENGINEERING BUILDERS & DEVELOPERS

Mesenbrink Subdivision

House Plan B4

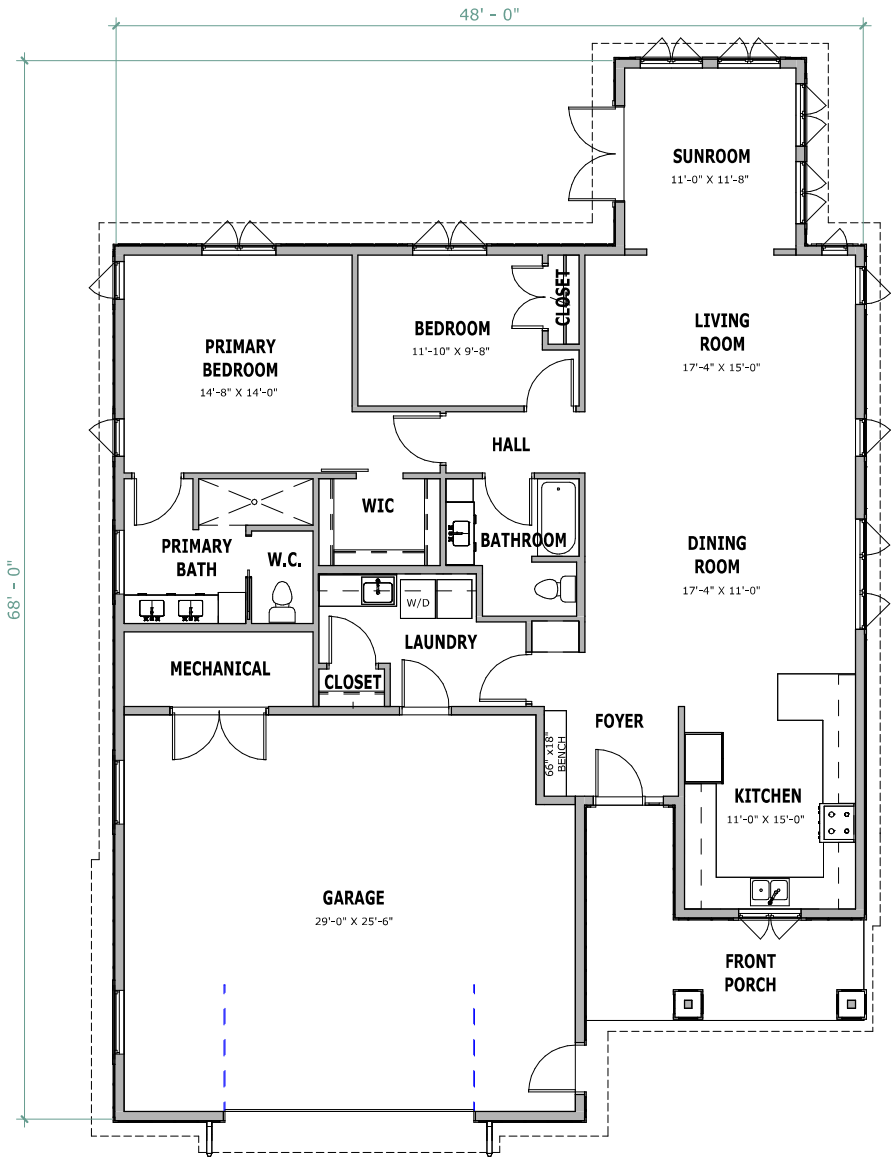


1 ELEVATION - EAST - KING / QUEEN OPTION
3/16" = 1'-0"

MESENBRINK CONSTRUCTION & ENGINEERING BUILDERS & DEVELOPERS

Mesenbrink Subdivision

House Plan G1



1 FLOOR PLAN - 01
1/8" = 1'-0"

TOTAL 1,792 SF

Mesenbrink Subdivision

House Plan G1

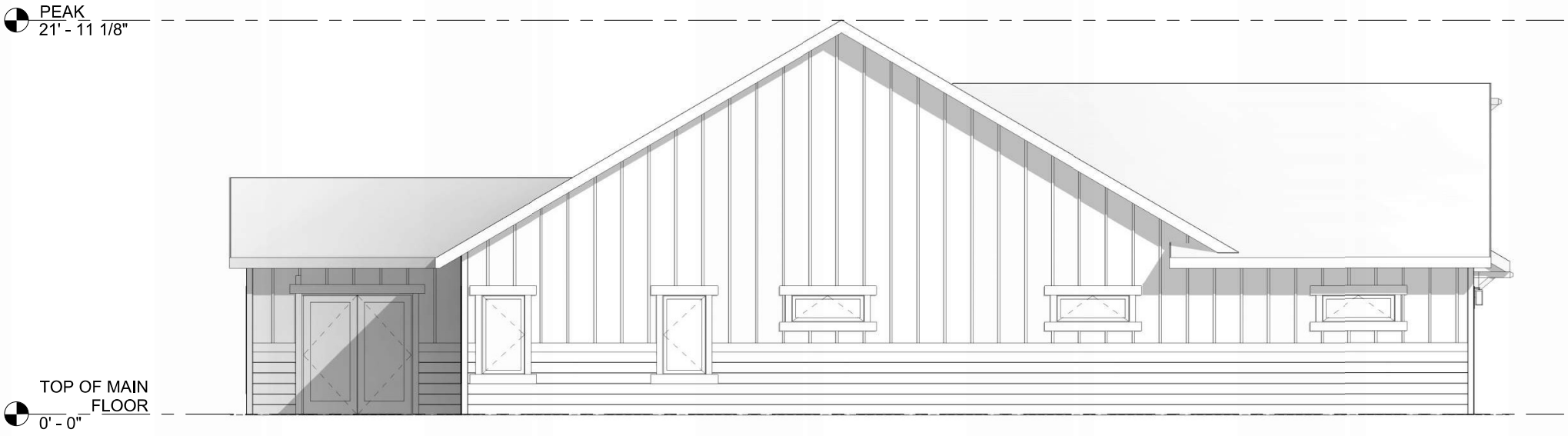


1 ELEVATION - SOUTH
3/16" = 1'-0"

MESENBRINK CONSTRUCTION & ENGINEERING BUILDERS & DEVELOPERS

Mesenbrink Subdivision

House Plan G1



1 ELEVATION - WEST
3/16" = 1'-0"

MESENBRINK CONSTRUCTION & ENGINEERING BUILDERS & DEVELOPERS

Mesenbrink Subdivision

House Plan G1



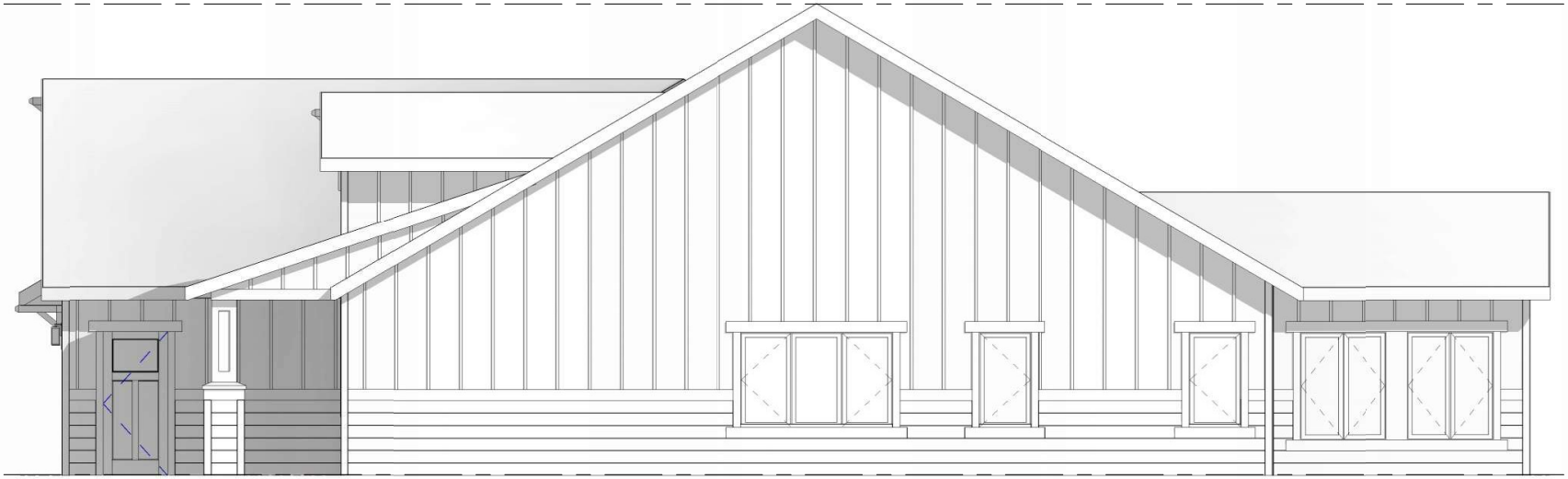
1 ELEVATION - NORTH
3/16" = 1'-0"

MESENBRINK CONSTRUCTION & ENGINEERING BUILDERS & DEVELOPERS

Mesenbrink Subdivision

House Plan G1

PEAK
21' - 11 1/8"



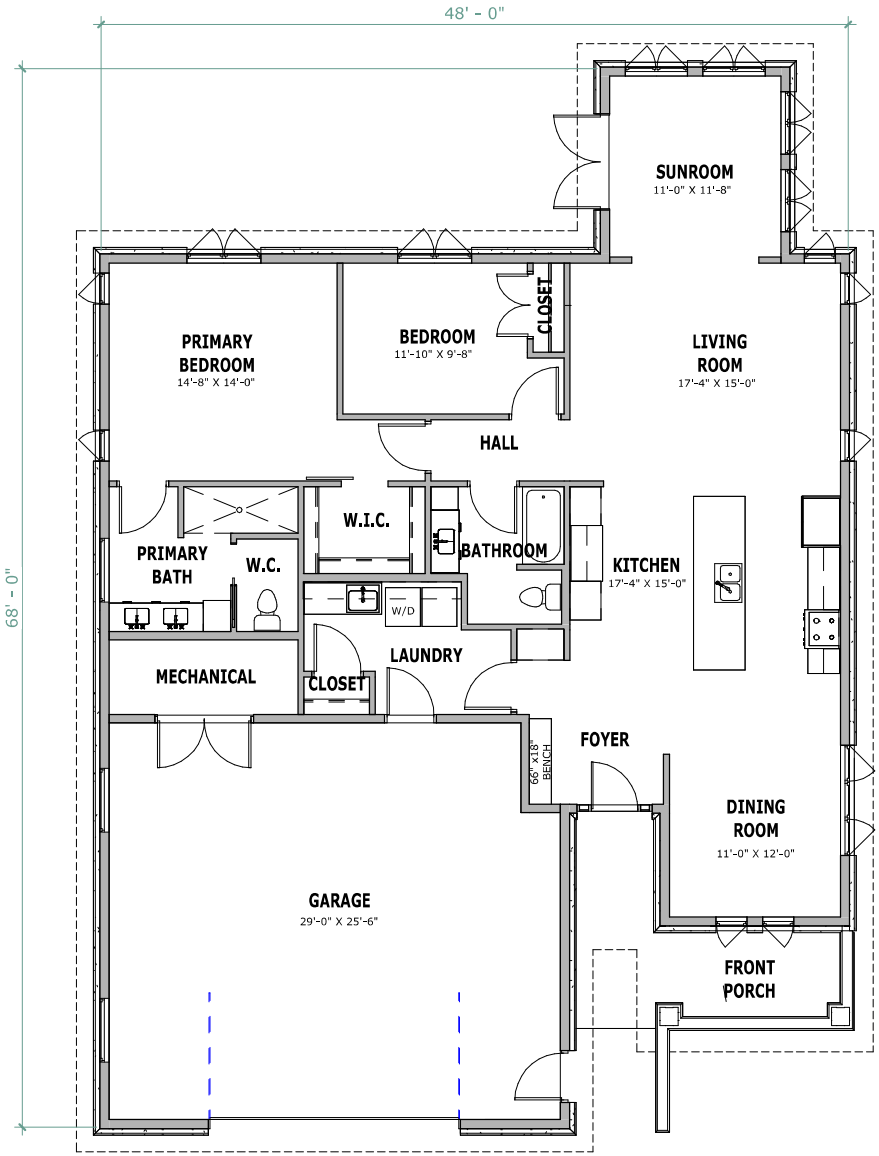
TOP OF MAIN FLOOR
0' - 0"

1 ELEVATION - EAST
3/16" = 1'-0"

MESENBRINK CONSTRUCTION & ENGINEERING
BUILDERS & DEVELOPERS

Mesenbrink Subdivision

House Plan G1a



1 FLOOR PLAN - 01
1/8" = 1'-0"

TOTAL 1,725 SF

MESENBRINK CONSTRUCTION & ENGINEERING BUILDERS & DEVELOPERS

Mesenbrink Subdivision

House Plan G1a

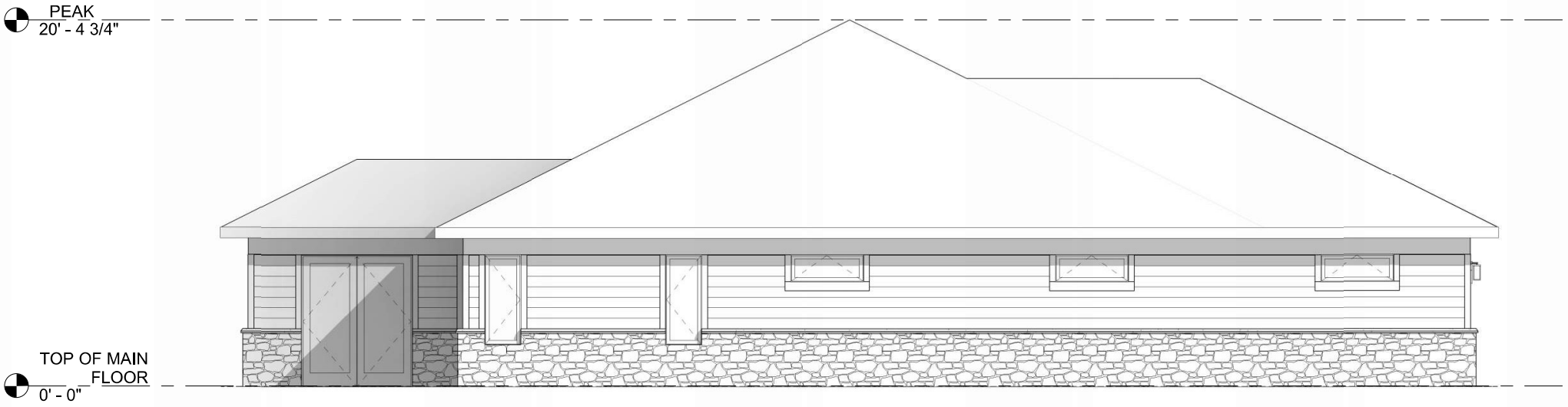


1 ELEVATION - SOUTH
3/16" = 1'-0"

MESENBRINK CONSTRUCTION & ENGINEERING BUILDERS & DEVELOPERS

Mesenbrink Subdivision

House Plan G1a



1 ELEVATION - WEST
3/16" = 1'-0"

MESENBRINK CONSTRUCTION & ENGINEERING BUILDERS & DEVELOPERS

Mesenbrink Subdivision

House Plan G1a

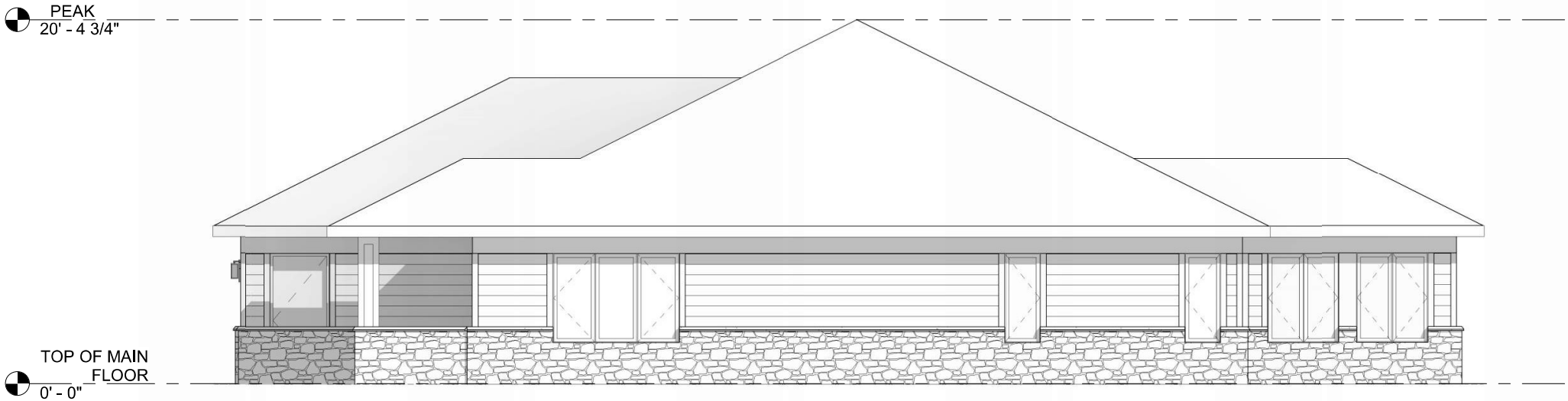


1 ELEVATION - NORTH
3/16" = 1'-0"

MESENBRINK CONSTRUCTION & ENGINEERING BUILDERS & DEVELOPERS

Mesenbrink Subdivision

House Plan G1a

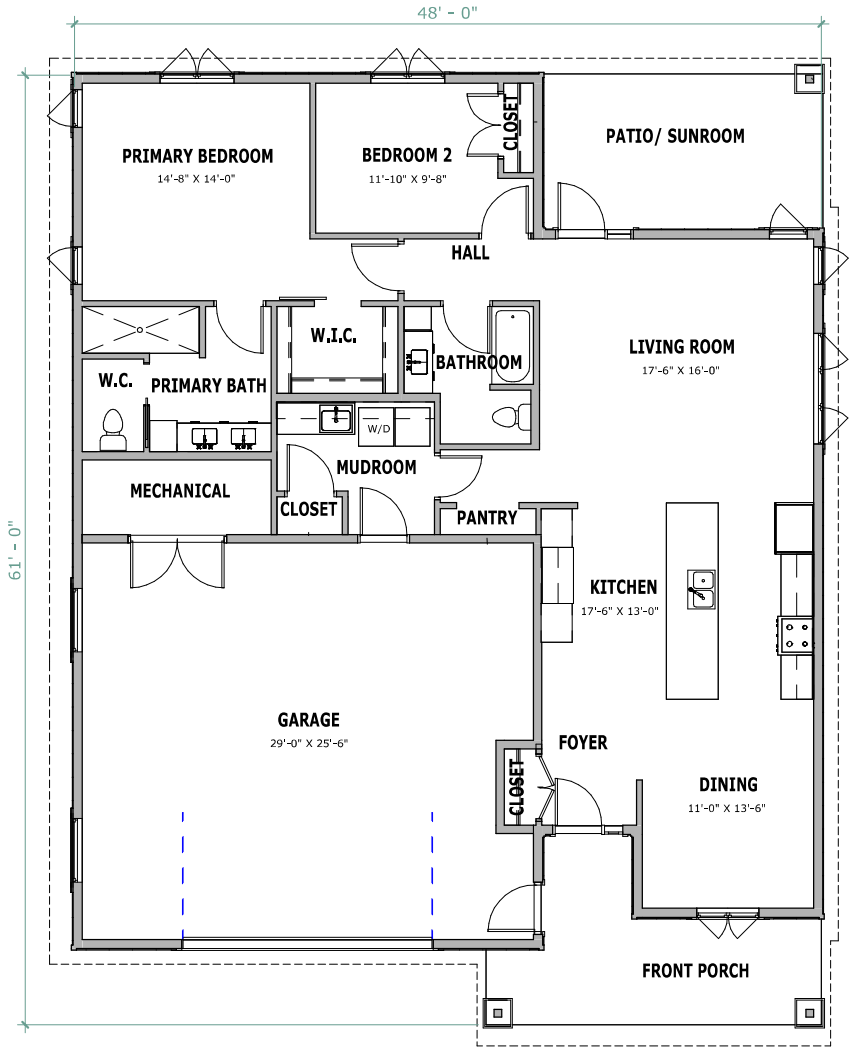


1 ELEVATION - EAST
3/16" = 1'-0"

MESENBRINK CONSTRUCTION & ENGINEERING BUILDERS & DEVELOPERS

Mesenbrink Subdivision

House Plan G2





1 FLOOR PLAN - 01
1/8" = 1'-0"

MESENBRINK CONSTRUCTION & ENGINEERING BUILDERS & DEVELOPERS

Mesenbrink Subdivision

TOTAL 1,683 S.F.

House Plan G2

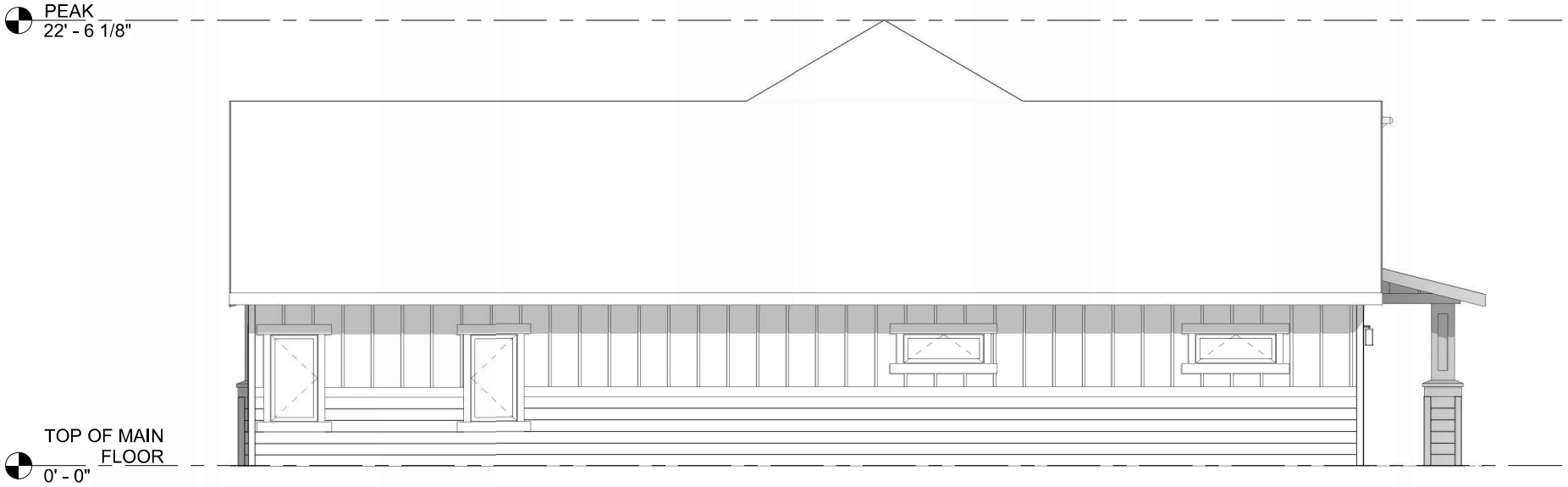


ELEVATION - SOUTH
3/16" = 1'-0"

MESENBRINK CONSTRUCTION & ENGINEERING BUILDERS & DEVELOPERS

Mesenbrink Subdivision

House Plan G2

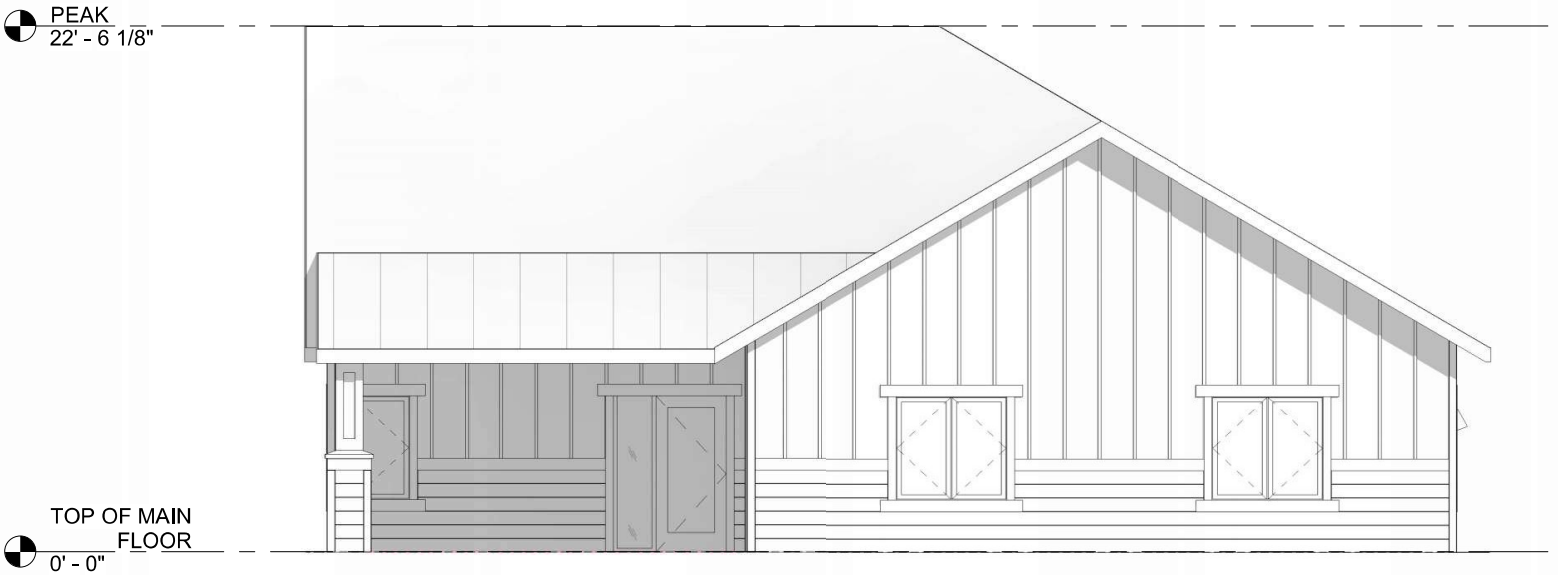


ELEVATION - WEST
3/16" = 1'-0"

MESENBRINK CONSTRUCTION & ENGINEERING BUILDERS & DEVELOPERS

Mesenbrink Subdivision

House Plan G2

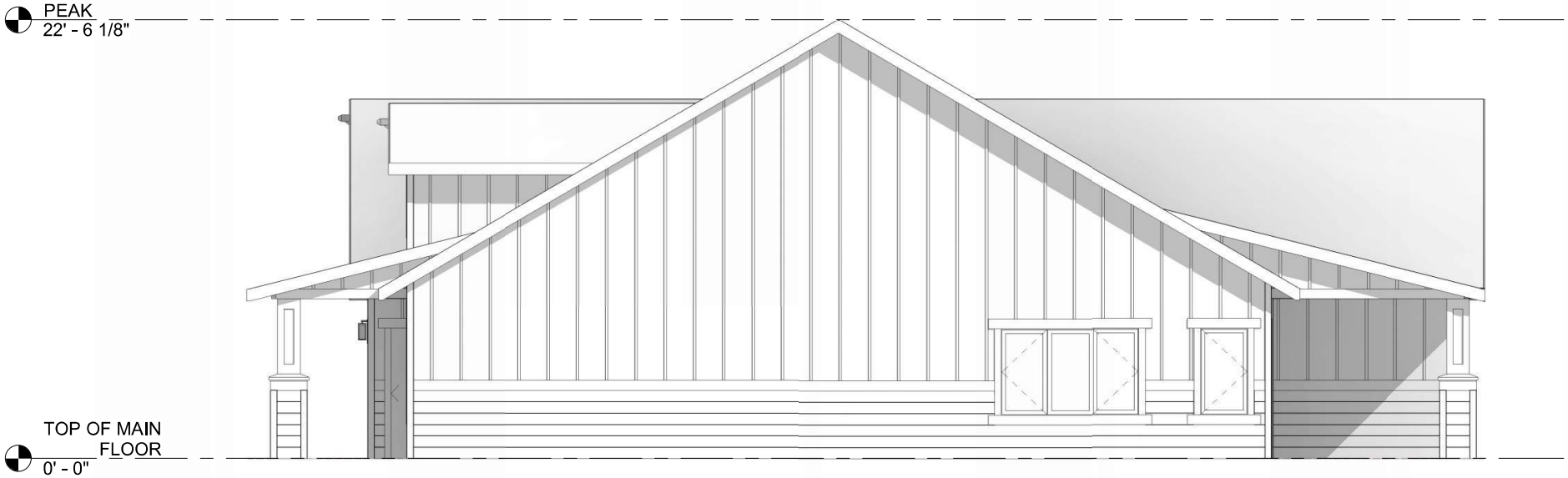


ELEVATION - NORTH
3/16" = 1'-0"

MESENBRINK CONSTRUCTION & ENGINEERING BUILDERS & DEVELOPERS

Mesenbrink Subdivision

House Plan G2

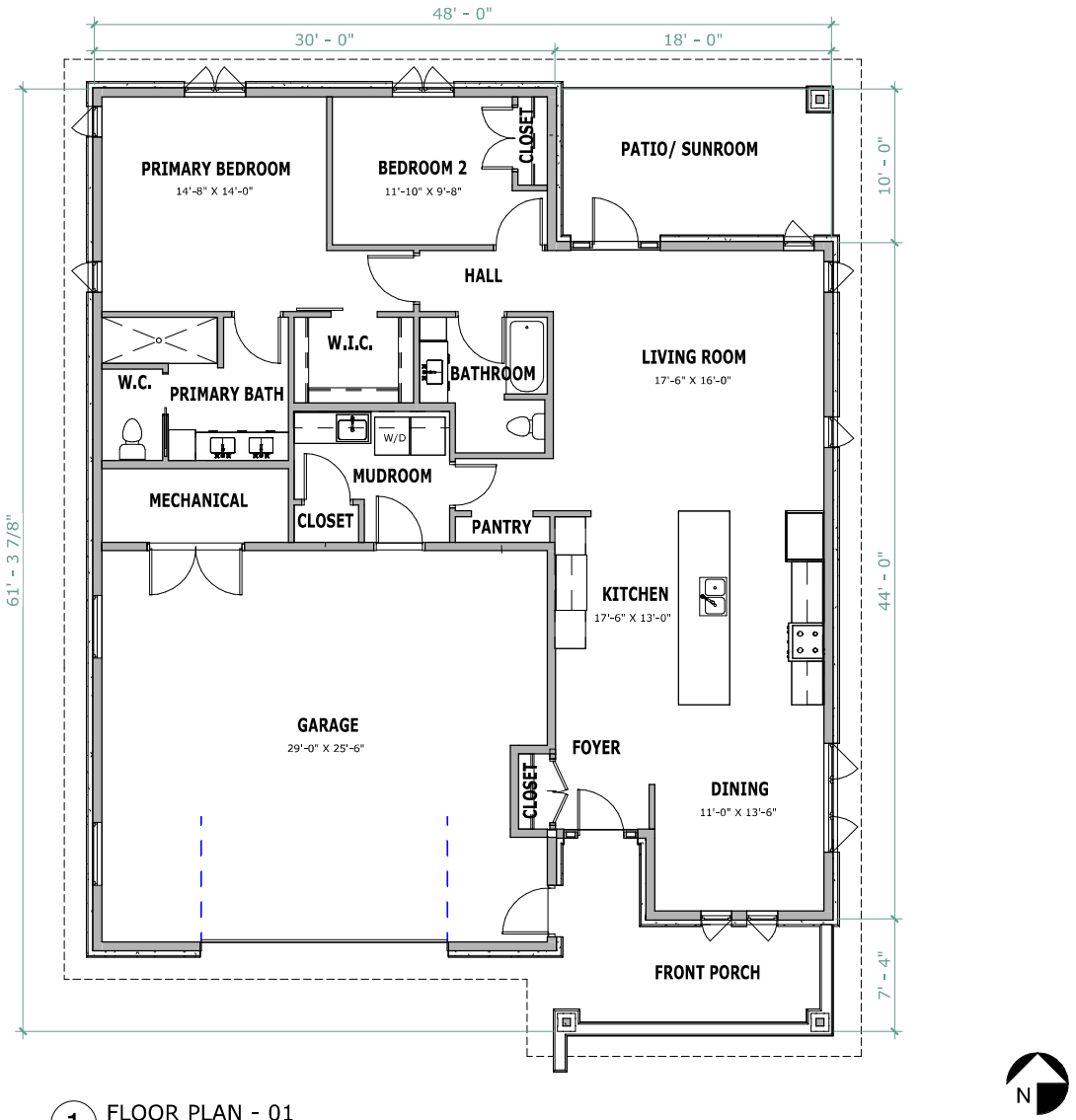


ELEVATION - EAST
3/16" = 1'-0"

MESENBRINK CONSTRUCTION & ENGINEERING BUILDERS & DEVELOPERS

Mesenbrink Subdivision

House Plan G2a



1 FLOOR PLAN - 01
1/8" = 1'-0"

MESENBRINK CONSTRUCTION & ENGINEERING BUILDERS & DEVELOPERS

Mesenbrink Subdivision

TOTAL 1,683 S.F.

House Plan G2a

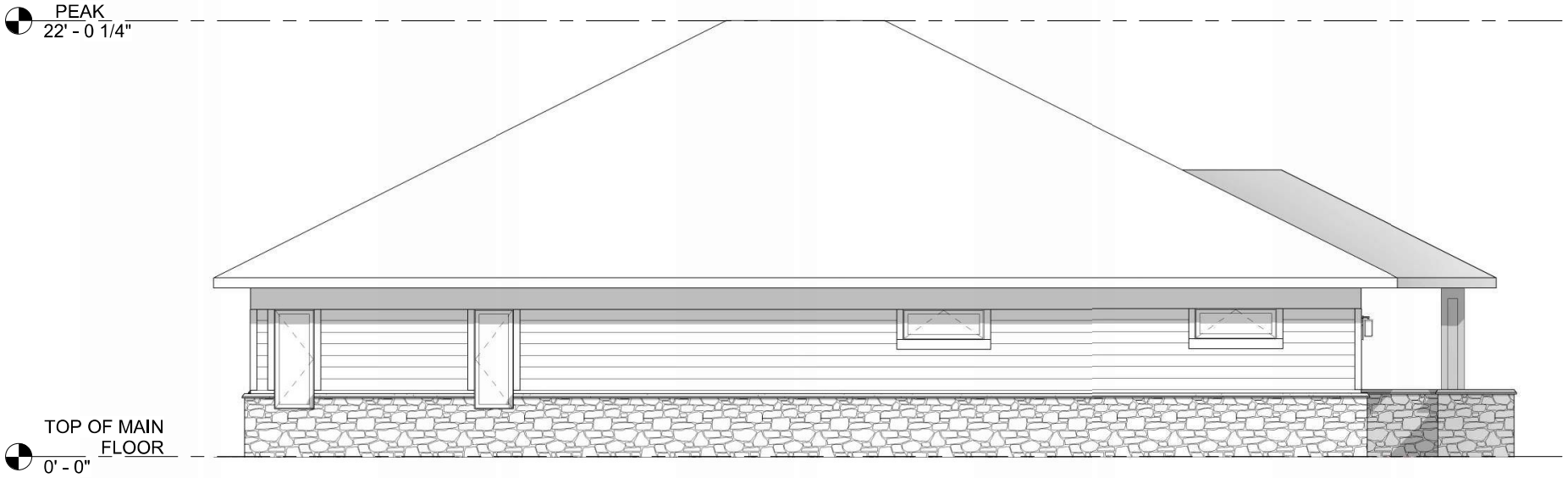


ELEVATION - SOUTH
3/16" = 1'-0"

MESENBRINK CONSTRUCTION & ENGINEERING
BUILDERS & DEVELOPERS

Mesenbrink Subdivision

House Plan G2a

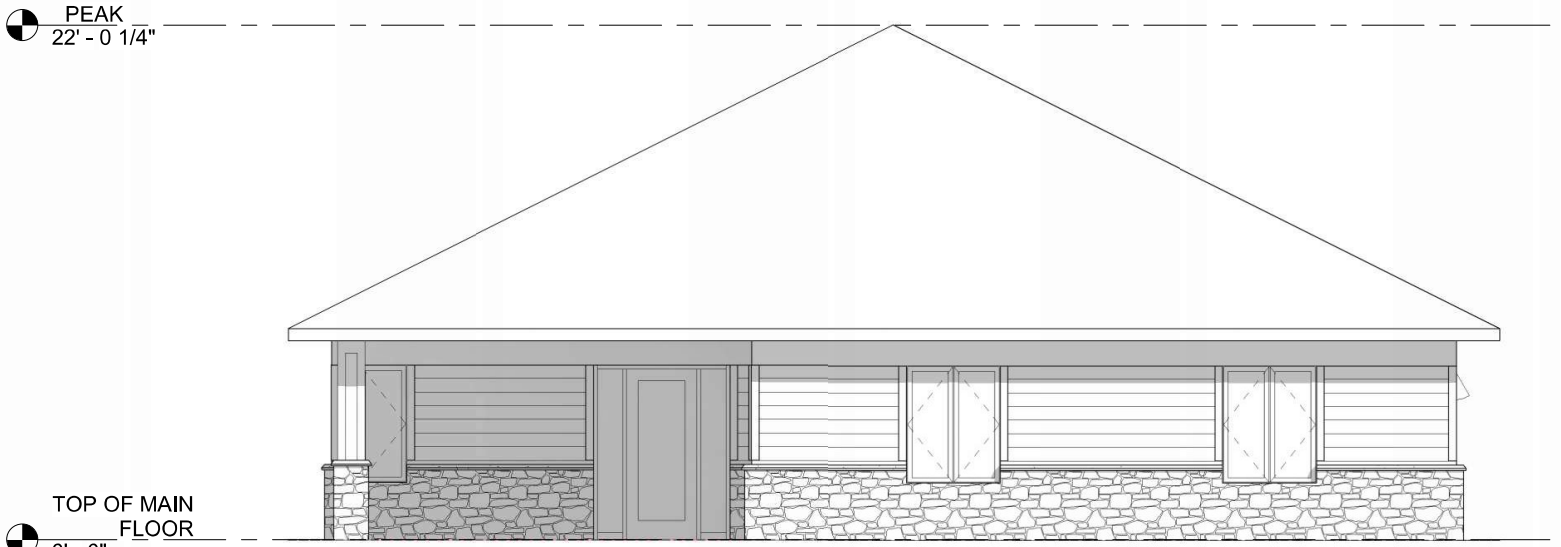


ELEVATION - WEST
3/16" = 1'-0"

MESENBRINK CONSTRUCTION & ENGINEERING BUILDERS & DEVELOPERS

Mesenbrink Subdivision

House Plan G2a

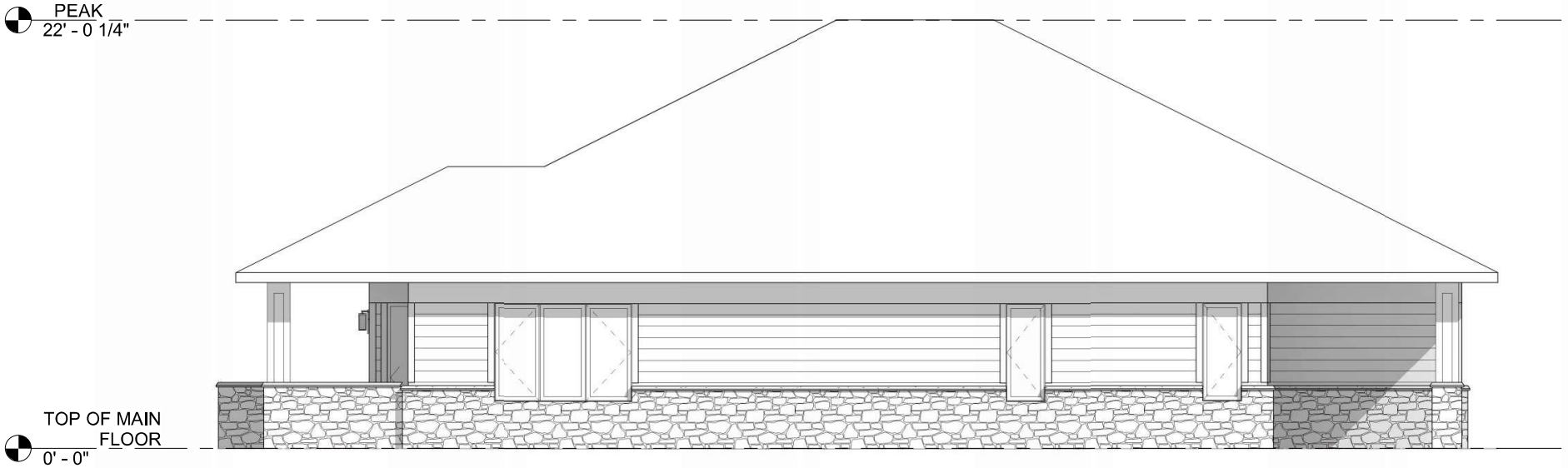


ELEVATION - NORTH
3/16" = 1'-0"

MESENBRINK CONSTRUCTION & ENGINEERING BUILDERS & DEVELOPERS

Mesenbrink Subdivision

House Plan G2a

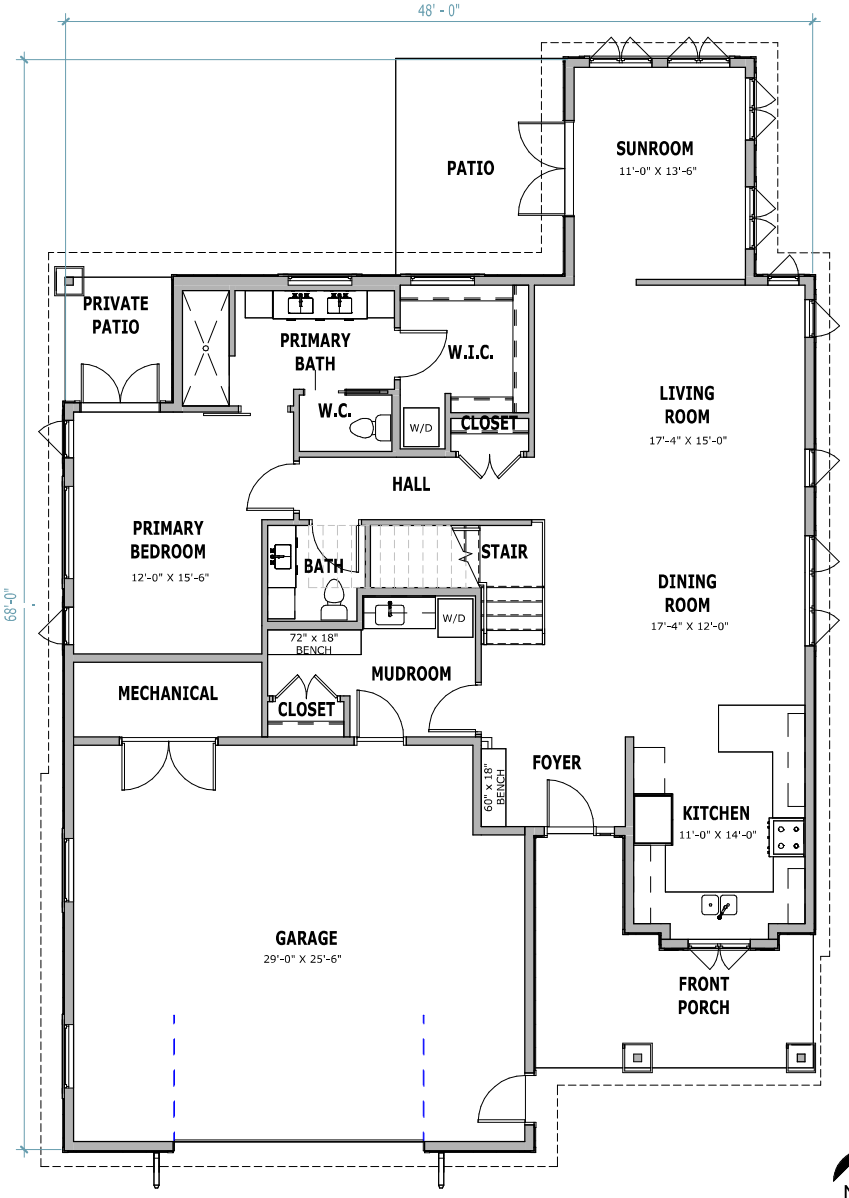


ELEVATION - EAST
3/16" = 1'-0"

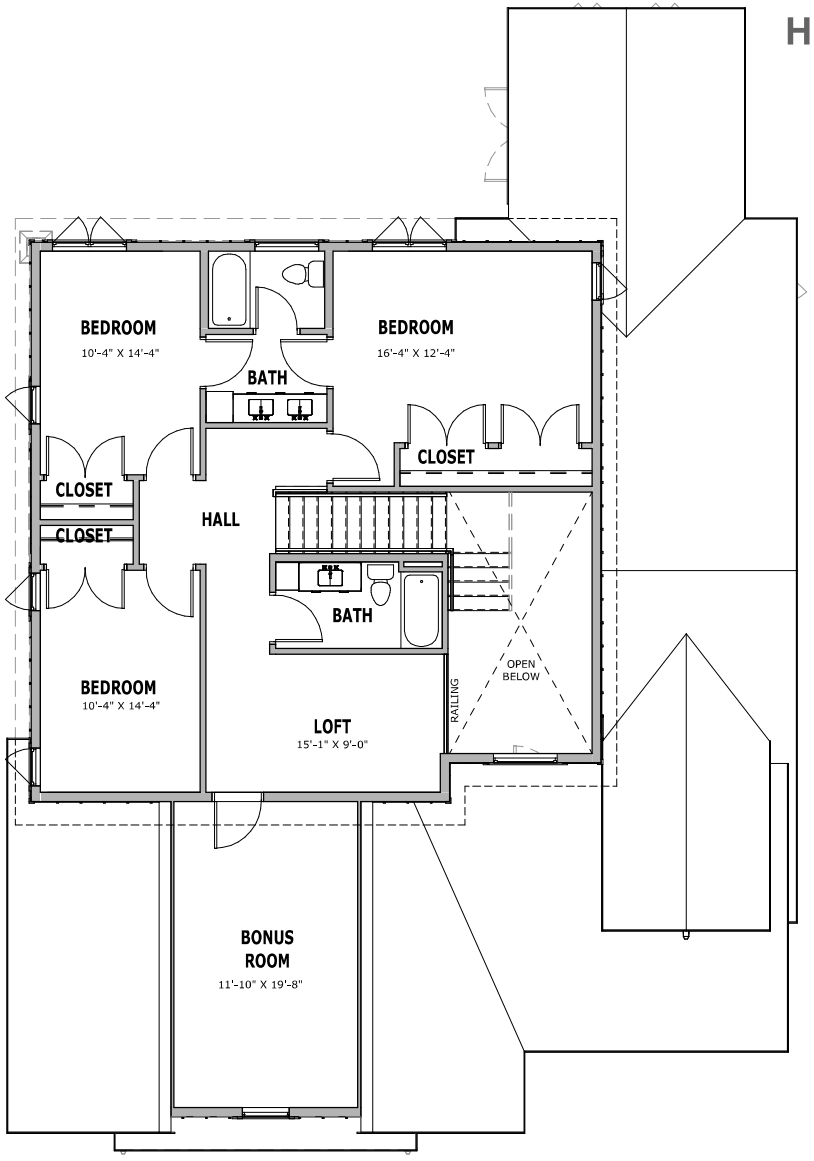
MESENBRINK CONSTRUCTION & ENGINEERING
BUILDERS & DEVELOPERS

Mesenbrink Subdivision

House Plan G3



1 MAIN FLOOR
1/8" = 1'-0"



2 SECOND FLOOR
1/8" = 1'-0"

N

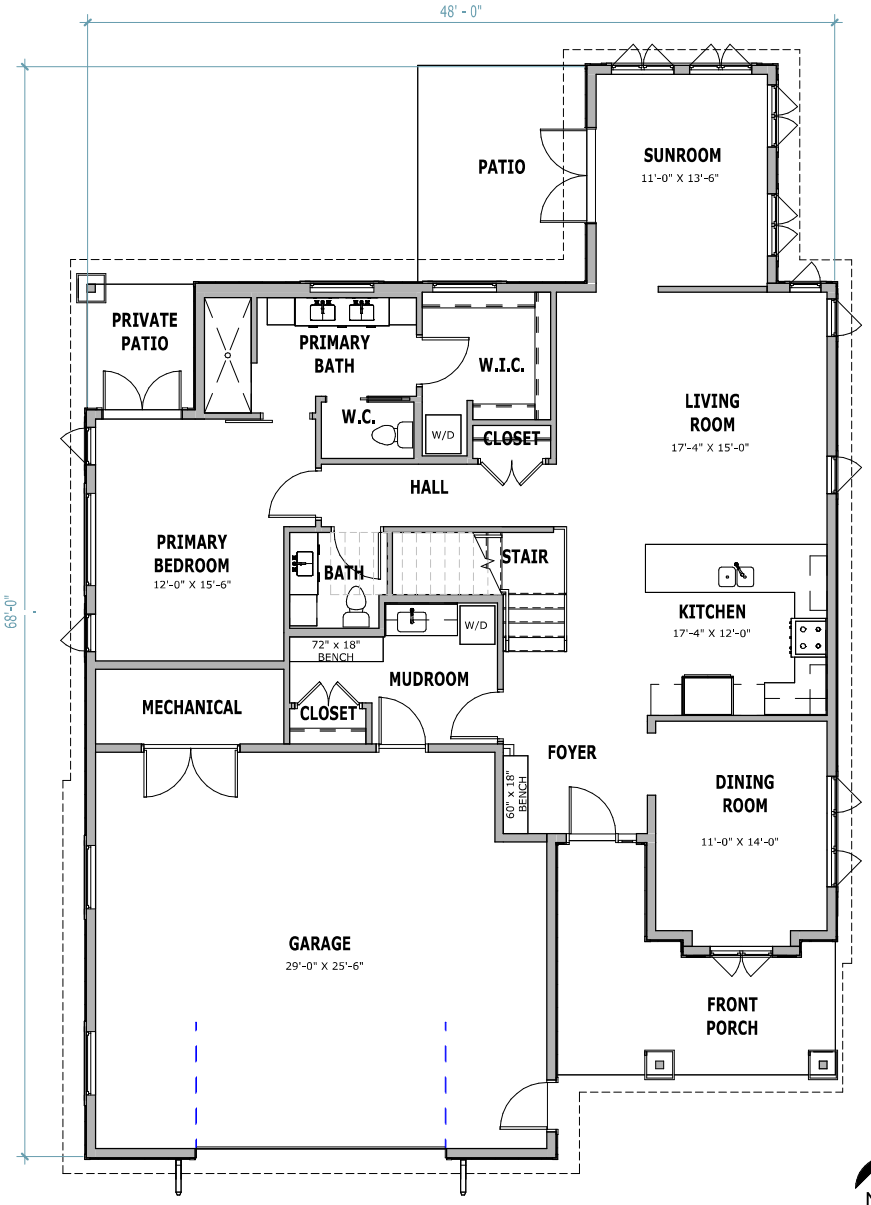
MAIN:	1,760 SF
SECOND:	1,022 SF
BONUS:	253 SF

MESENBRINK CONSTRUCTION & ENGINEERING BUILDERS & DEVELOPERS

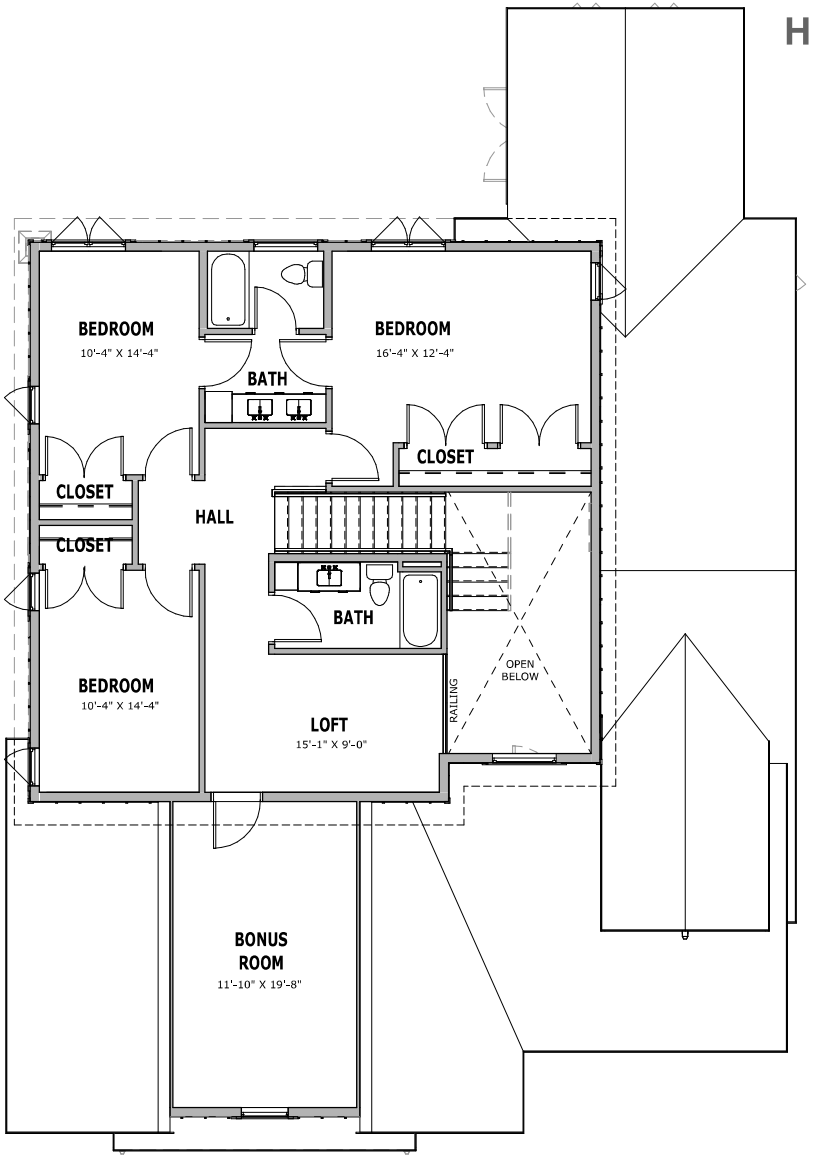
Mesenbrink Subdivision

TOTAL 3,035 SF

House Plan G3



1 MAIN FLOOR
1/8" = 1'-0"



N

2 SECOND FLOOR
1/8" = 1'-0"

MAIN:	1,760 SF
SECOND:	1,022 SF
BONUS:	253 SF

MESENBRINK CONSTRUCTION & ENGINEERING BUILDERS & DEVELOPERS

Mesenbrink Subdivision

TOTAL 3,035 SF

House Plan G3



ELEVATION - SOUTH - OPTION 1
3/16" = 1'-0"

MESENBRINK CONSTRUCTION & ENGINEERING BUILDERS & DEVELOPERS

Mesenbrink Subdivision

House Plan G3



ELEVATION - WEST - OPTION 1

3/16" = 1'-0"

MESENBRINK CONSTRUCTION & ENGINEERING BUILDERS & DEVELOPERS

Mesenbrink Subdivision

House Plan G3

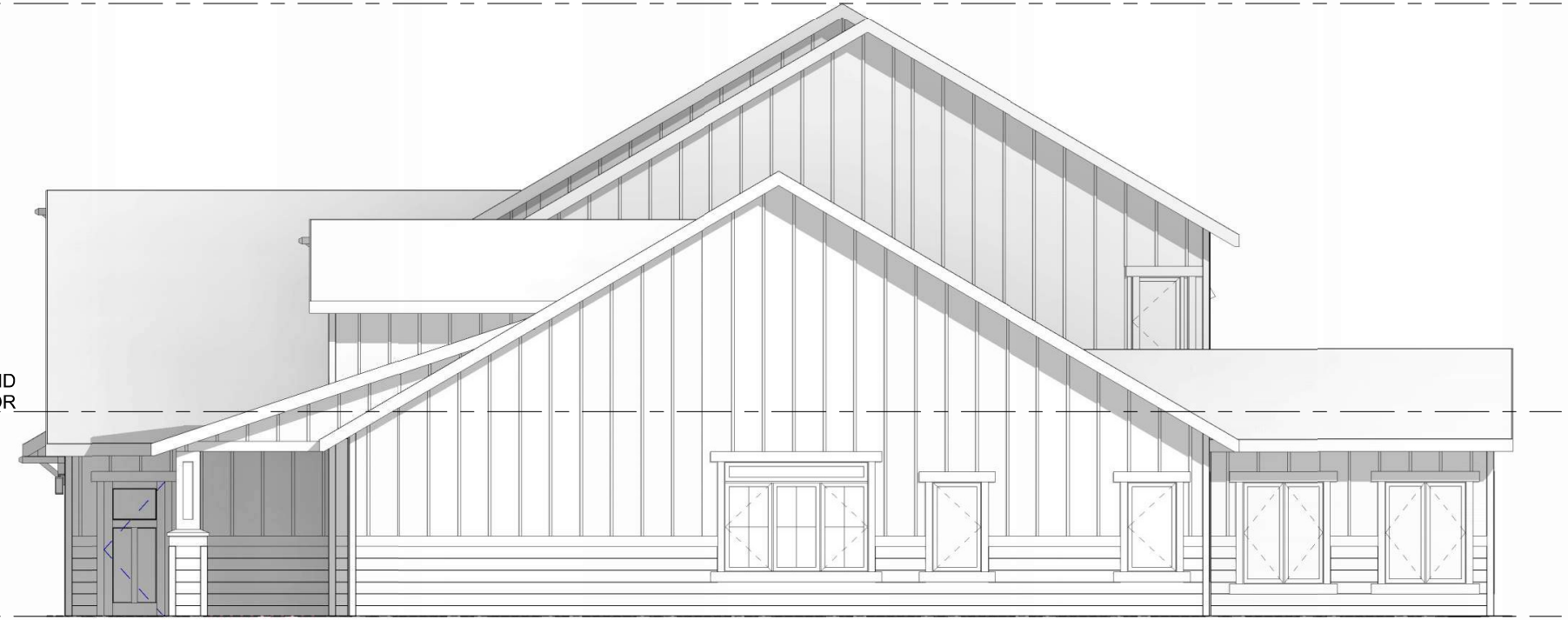


ELEVATION - NORTH - OPTION 1
3/16" = 1'-0"

MESENBRINK CONSTRUCTION & ENGINEERING BUILDERS & DEVELOPERS

Mesenbrink Subdivision

House Plan G3



ELEVATION - EAST - OPTION 1
3/16" = 1'-0"

MESENBRINK CONSTRUCTION & ENGINEERING BUILDERS & DEVELOPERS

Mesenbrink Subdivision

House Plan G3



ELEVATION - SOUTH - OPTION 2
3/16" = 1'-0"

MESENBRINK CONSTRUCTION & ENGINEERING BUILDERS & DEVELOPERS

Mesenbrink Subdivision

House Plan G3



ELEVATION - WEST - OPTION 2

3/16" = 1'-0"

MESENBRINK CONSTRUCTION & ENGINEERING BUILDERS & DEVELOPERS

Mesenbrink Subdivision

House Plan G3

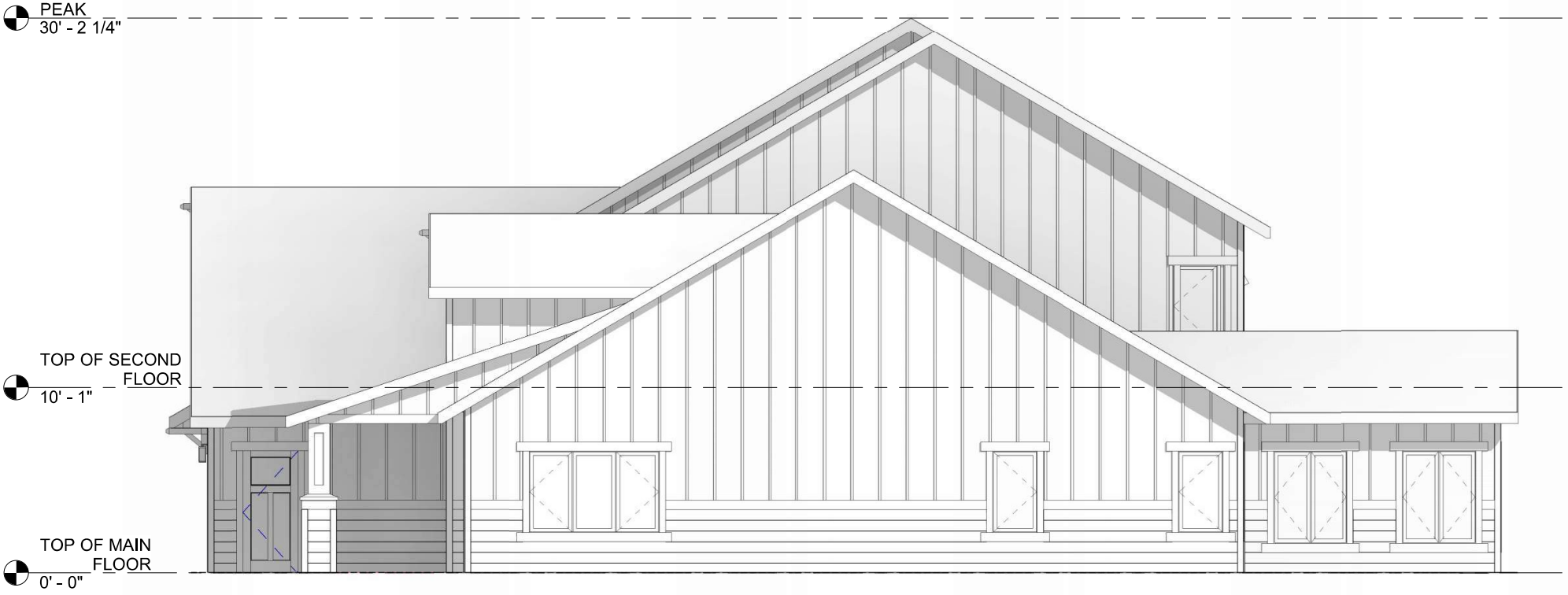


ELEVATION - NORTH - OPTION 2
3/16" = 1'-0"

MESENBRINK CONSTRUCTION & ENGINEERING
BUILDERS & DEVELOPERS

Mesenbrink Subdivision

House Plan G3

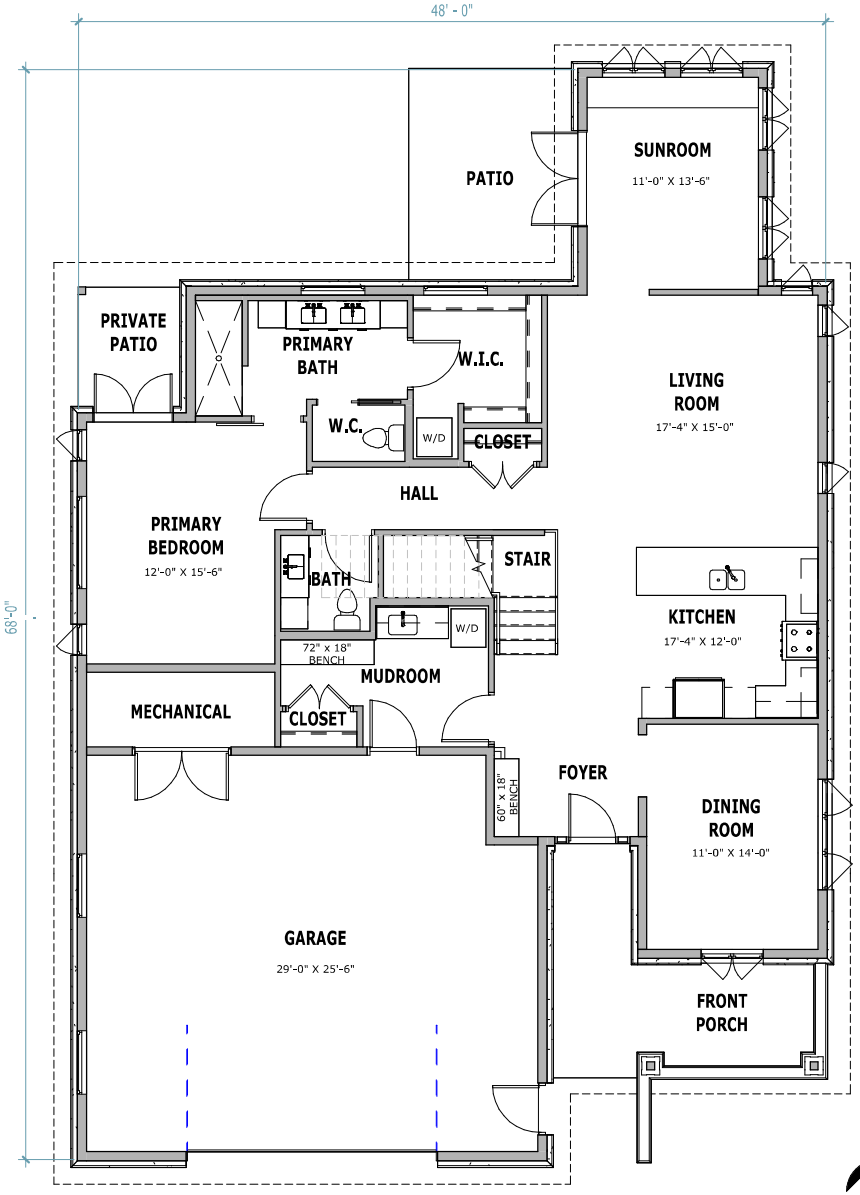


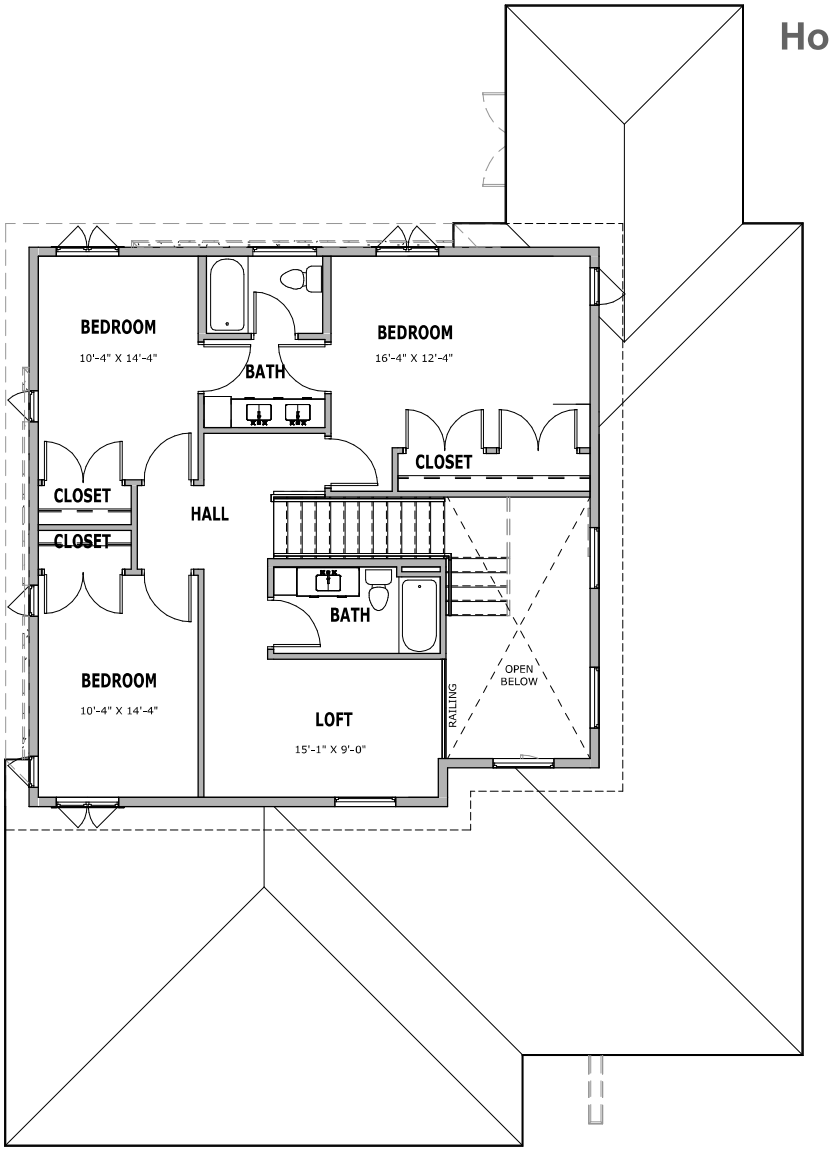
ELEVATION - EAST - OPTION 2
3/16" = 1'-0"

MESENBRINK CONSTRUCTION & ENGINEERING BUILDERS & DEVELOPERS

Mesenbrink Subdivision

House Plan G3a





N

1 MAIN FLOOR
1/8" = 1'-0"

2 SECOND FLOOR
1/8" = 1'-0"

MAIN:	1,760 SF
SECOND:	1,022 SF
BONUS:	253 SF

MESENBRINK CONSTRUCTION & ENGINEERING BUILDERS & DEVELOPERS

Mesenbrink Subdivision

TOTAL 3,035 SF

House Plan G3a



ELEVATION - SOUTH
3/16" = 1'-0"

MESENBRINK CONSTRUCTION & ENGINEERING BUILDERS & DEVELOPERS

Mesenbrink Subdivision

House Plan G3a

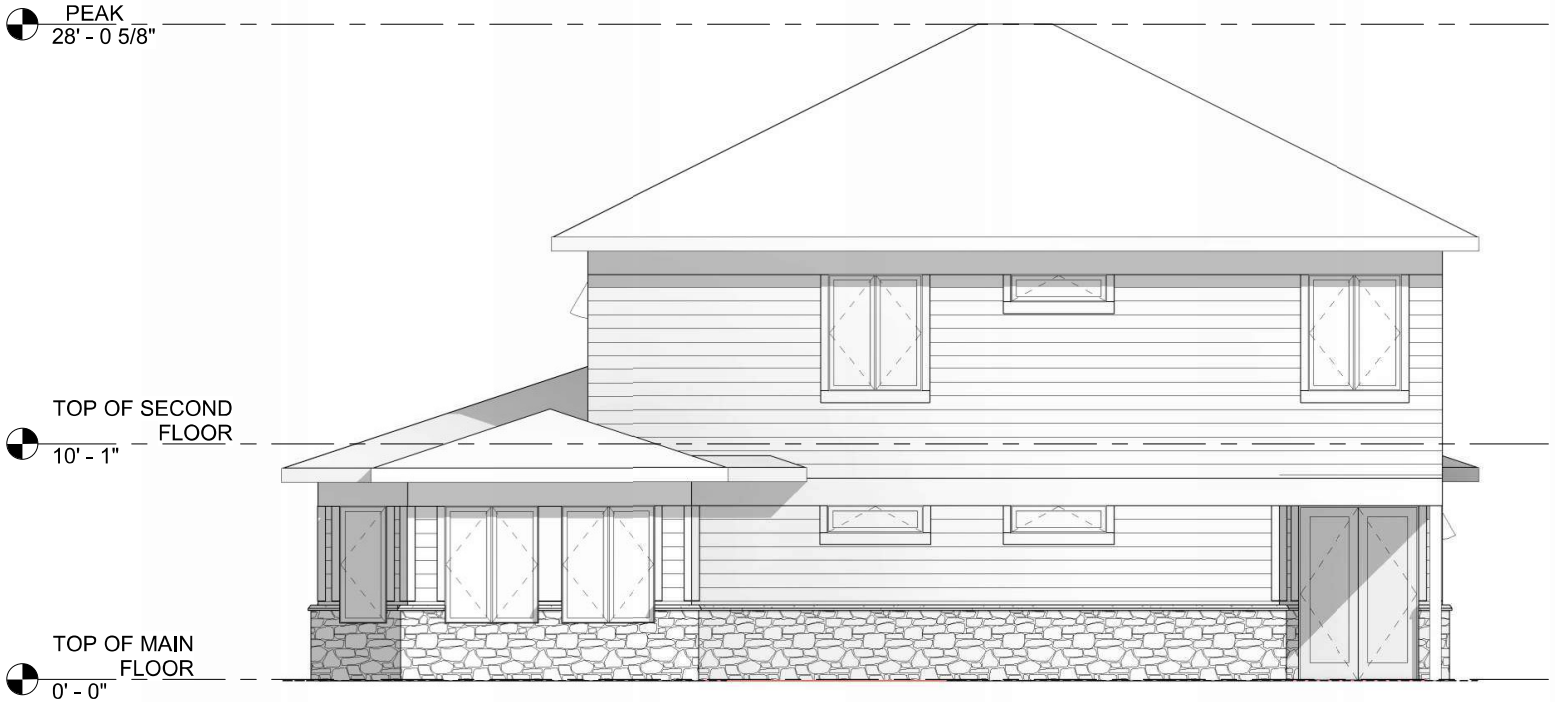


ELEVATION - WEST
3/16" = 1'-0"

MESENBRINK CONSTRUCTION & ENGINEERING BUILDERS & DEVELOPERS

Mesenbrink Subdivision

House Plan G3a

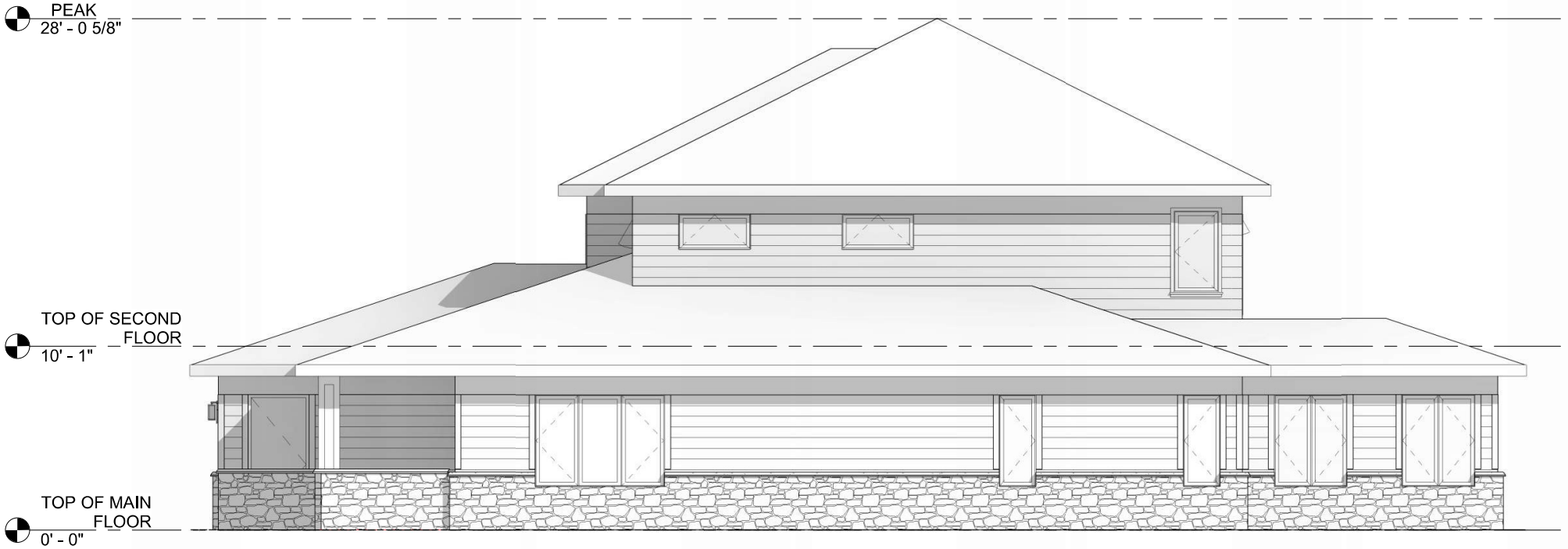


ELEVATION - NORTH
3/16" = 1'-0"

MESENBRINK CONSTRUCTION & ENGINEERING BUILDERS & DEVELOPERS

Mesenbrink Subdivision

House Plan G3a

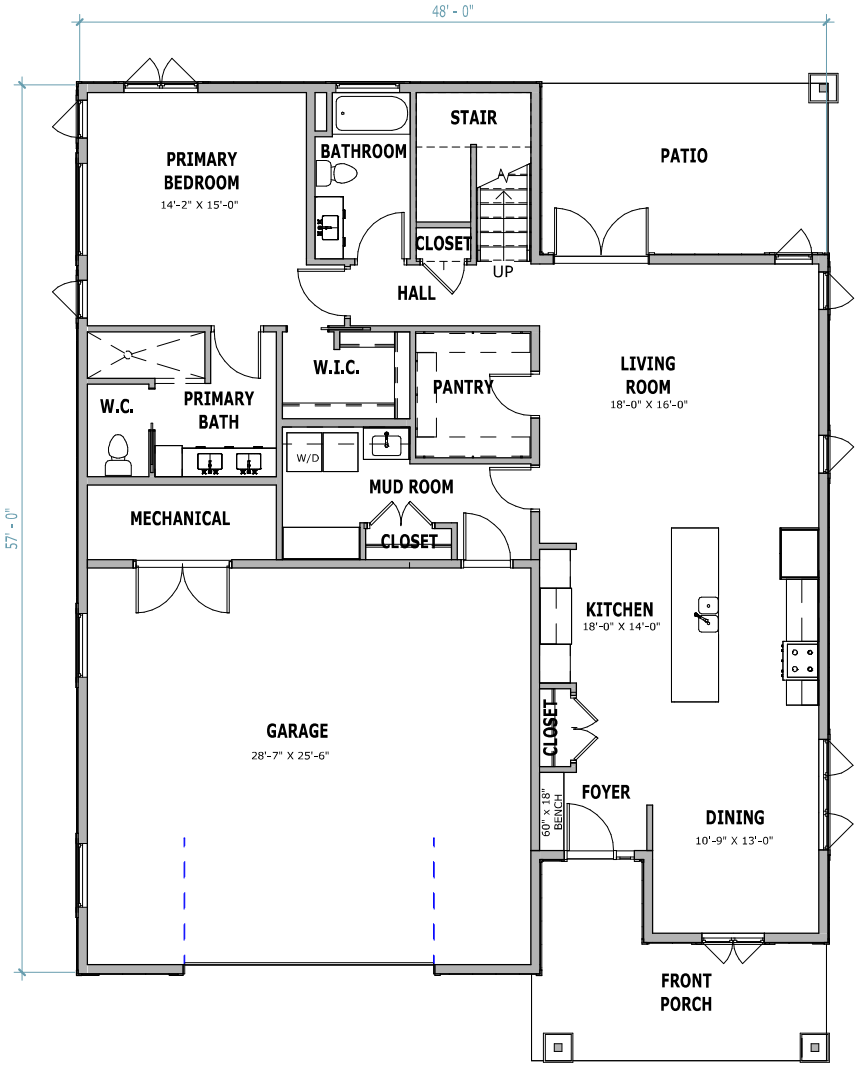


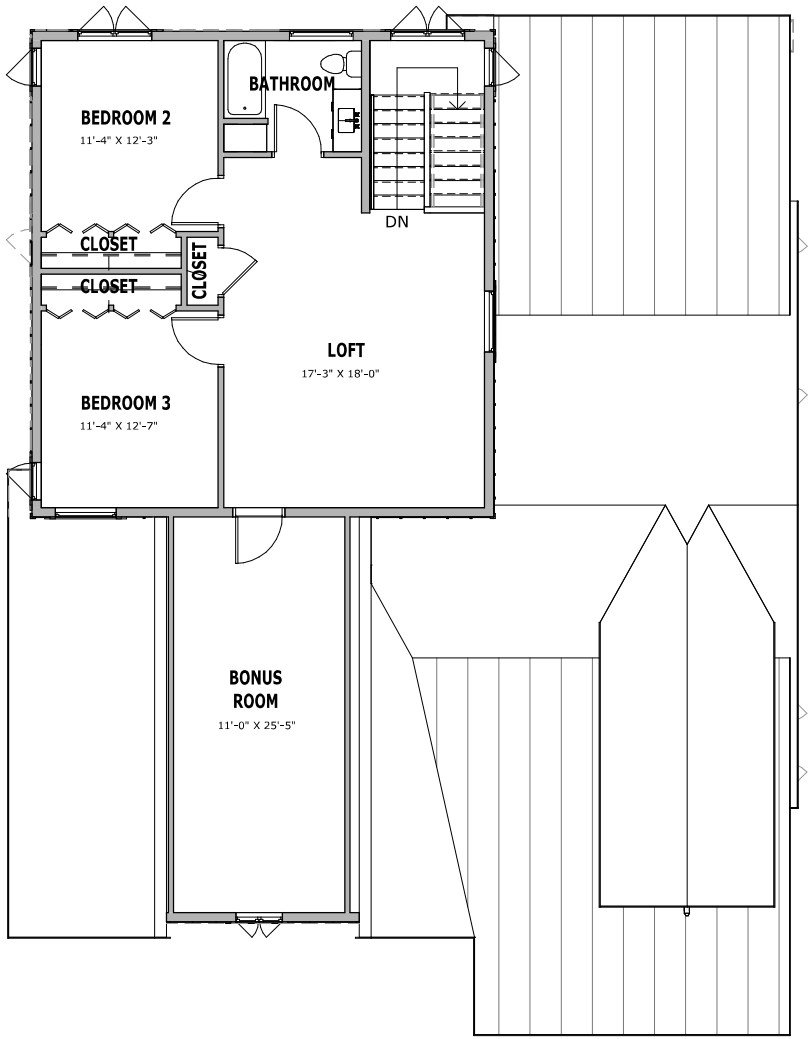
ELEVATION - EAST
3/16" = 1'-0"

MESENBRINK CONSTRUCTION & ENGINEERING BUILDERS & DEVELOPERS

Mesenbrink Subdivision

House Plan G4





N

1 MAIN FLOOR
1/8" = 1'-0"

2 SECOND FLOOR
1/8" = 1'-0"

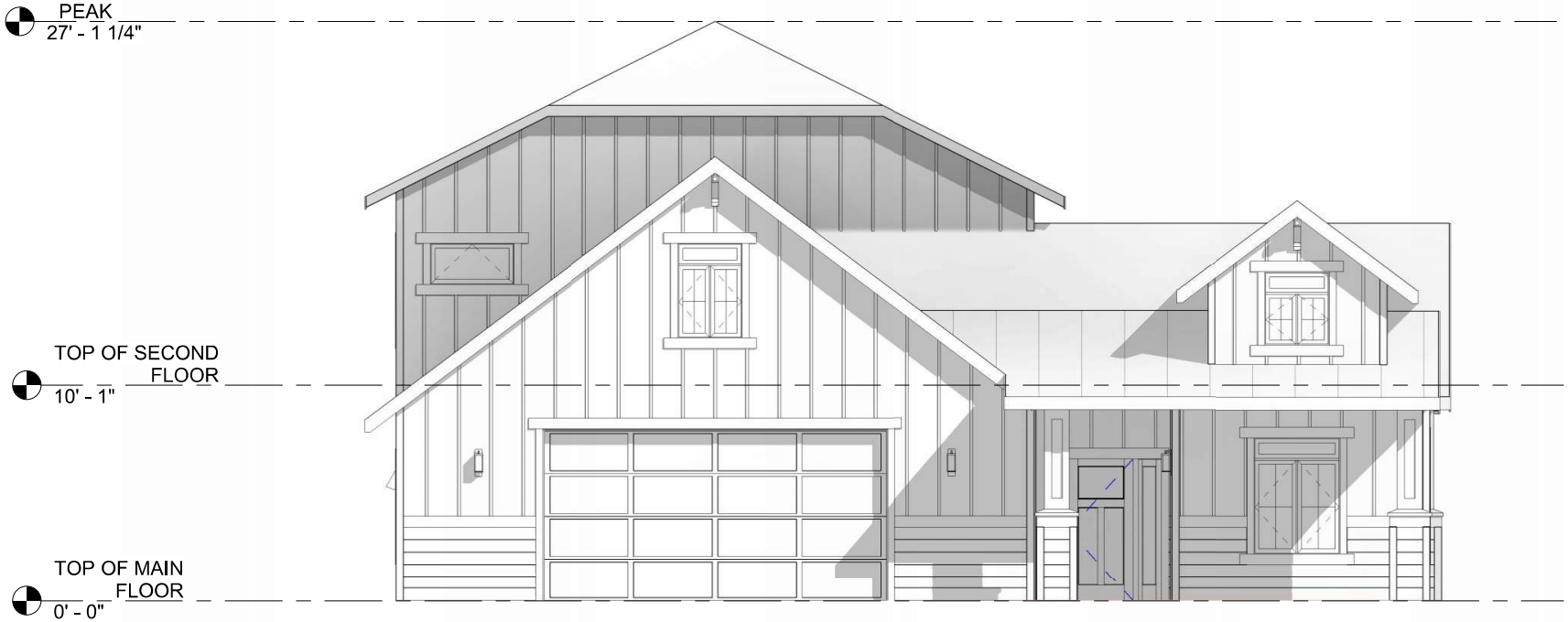
MAIN:	1,633 SF
SECOND:	915 SF
BONUS:	303 SF

MESENBRINK CONSTRUCTION & ENGINEERING BUILDERS & DEVELOPERS

Mesenbrink Subdivision

TOTAL 2,851 SF

House Plan G4

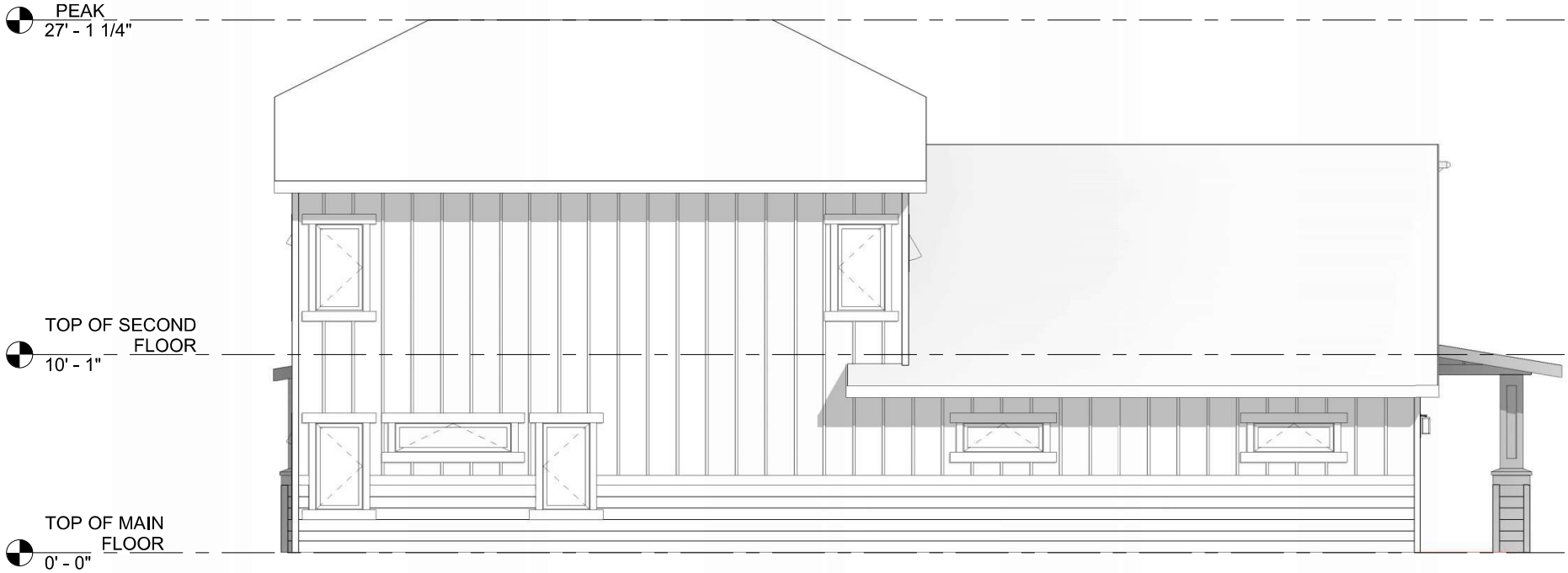


ELEVATION - SOUTH
3/16" = 1'-0"

MESENBRINK CONSTRUCTION & ENGINEERING BUILDERS & DEVELOPERS

Mesenbrink Subdivision

House Plan G4



ELEVATION - WEST
3/16" = 1'-0"

MESENBRINK CONSTRUCTION & ENGINEERING BUILDERS & DEVELOPERS

Mesenbrink Subdivision

House Plan G4

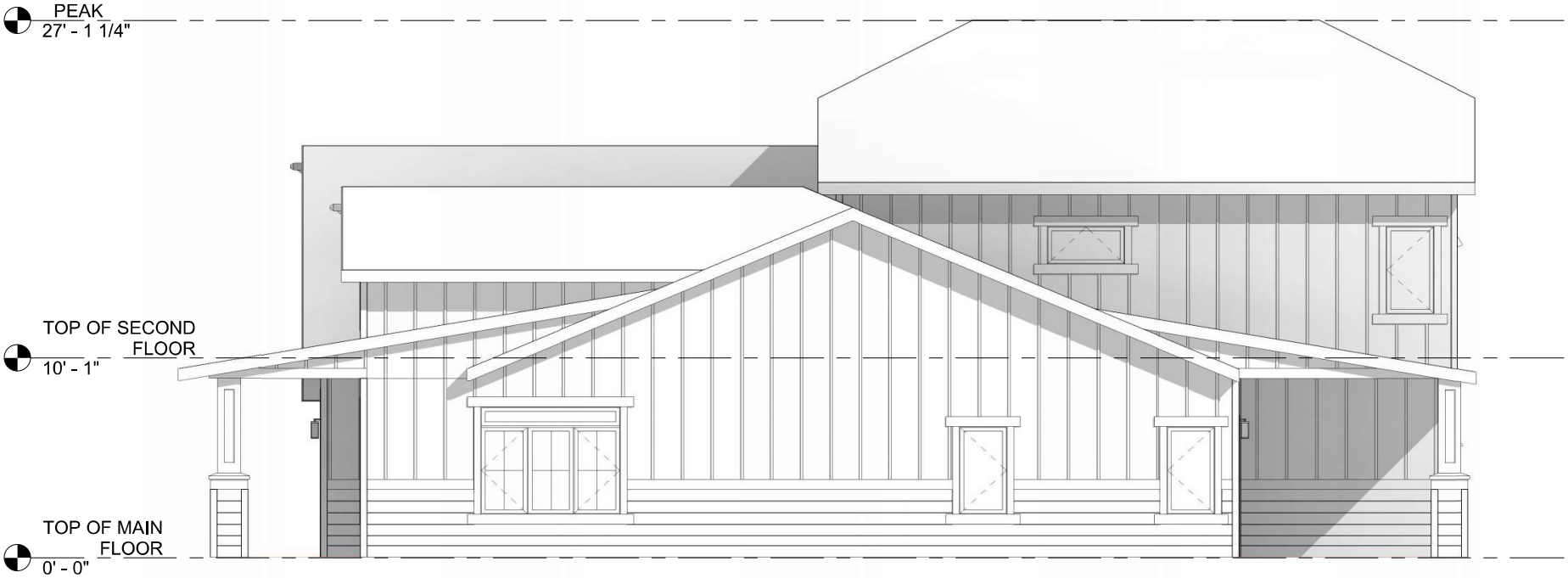


ELEVATION - NORTH
3/16" = 1'-0"

MESENBRINK CONSTRUCTION & ENGINEERING BUILDERS & DEVELOPERS

Mesenbrink Subdivision

House Plan G4

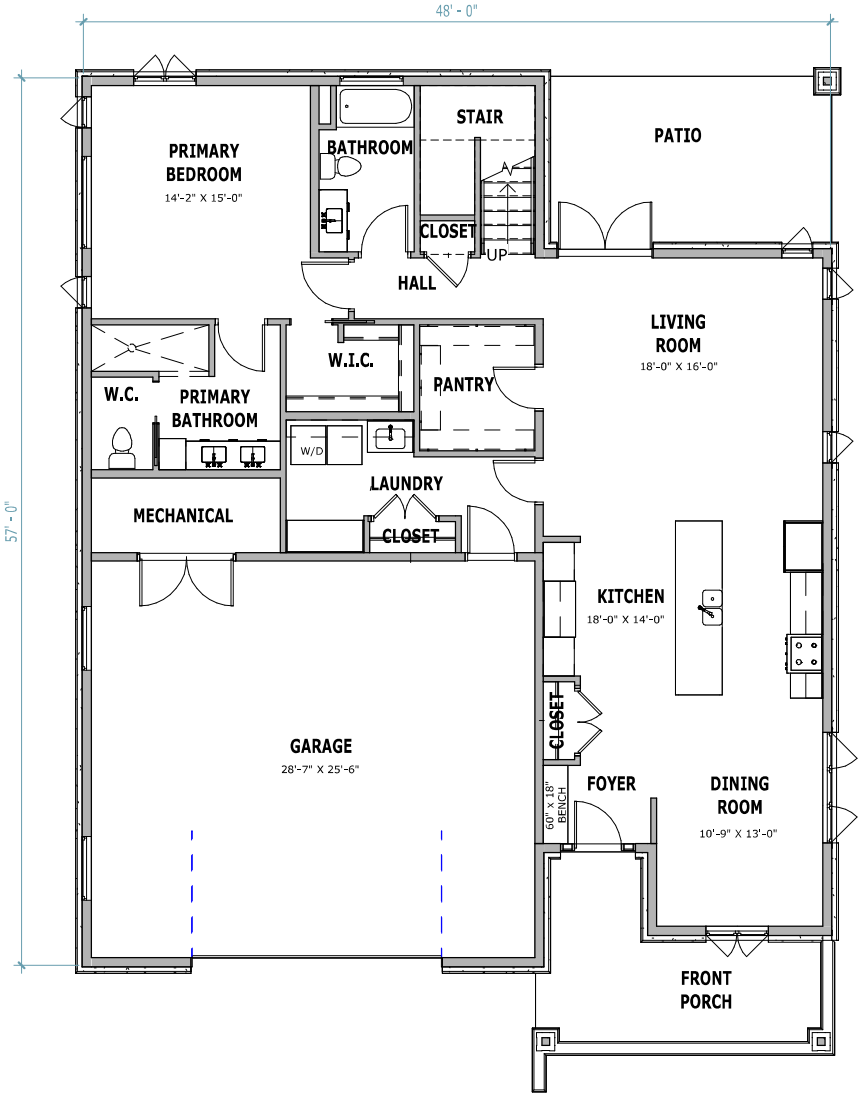


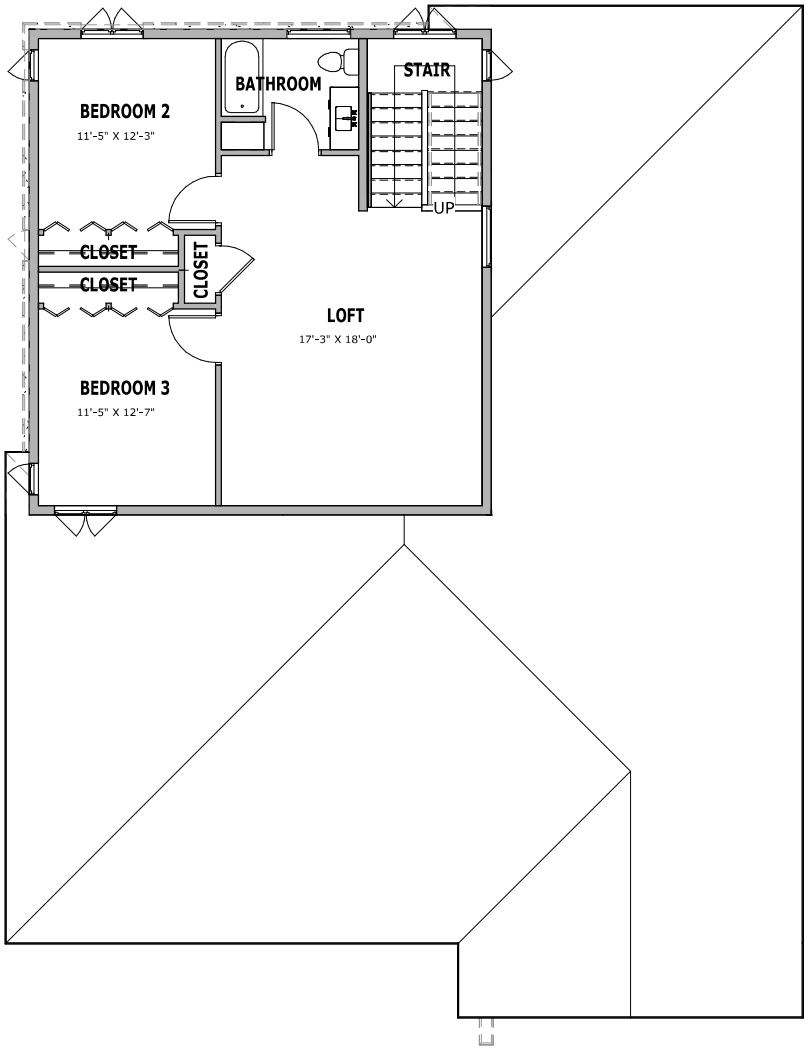
ELEVATION - EAST
3/16" = 1'-0"

MESENBRINK CONSTRUCTION & ENGINEERING BUILDERS & DEVELOPERS

Mesenbrink Subdivision

House Plan G4a





N

1 MAIN FLOOR
1/8" = 1'-0"

2 SECOND FLOOR
1/8" = 1'-0"

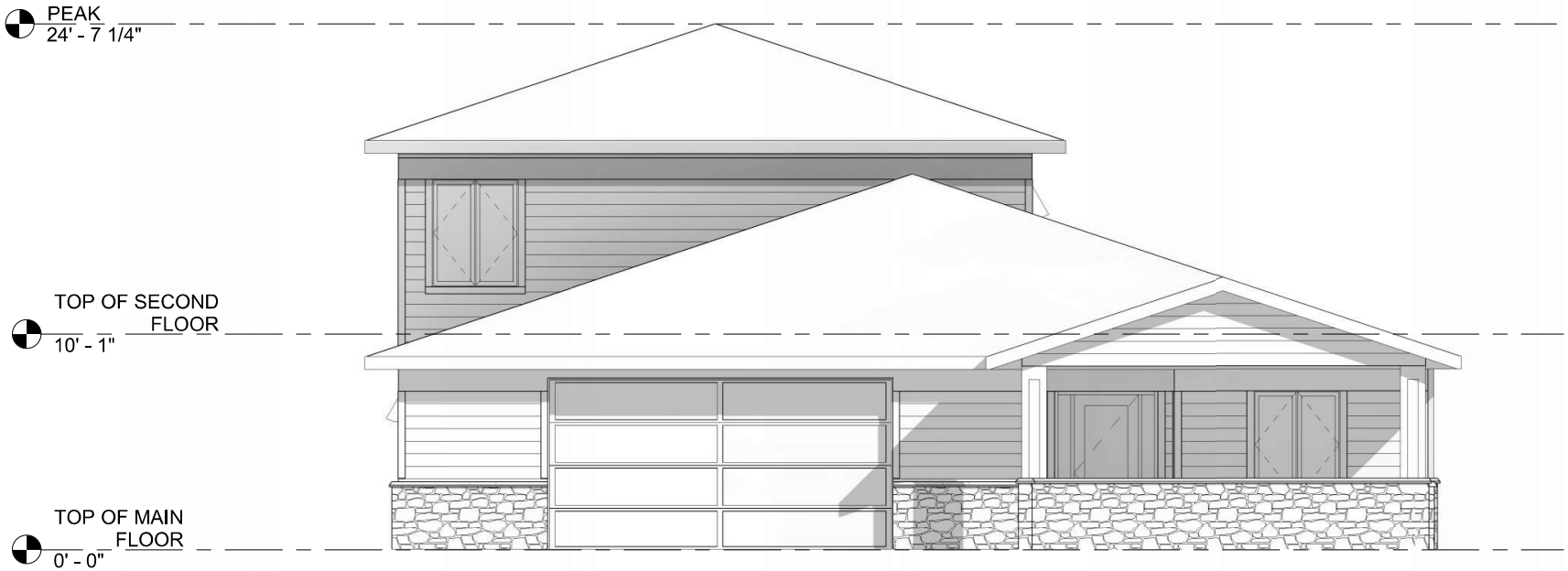
MAIN:	1,633 SF
SECOND:	915 SF
BONUS:	303 SF

MESENBRINK CONSTRUCTION & ENGINEERING BUILDERS & DEVELOPERS

Mesenbrink Subdivision

TOTAL 2,851 SF

House Plan G4a



ELEVATION - SOUTH
3/16" = 1'-0"

MESENBRINK CONSTRUCTION & ENGINEERING BUILDERS & DEVELOPERS

Mesenbrink Subdivision

House Plan G4a

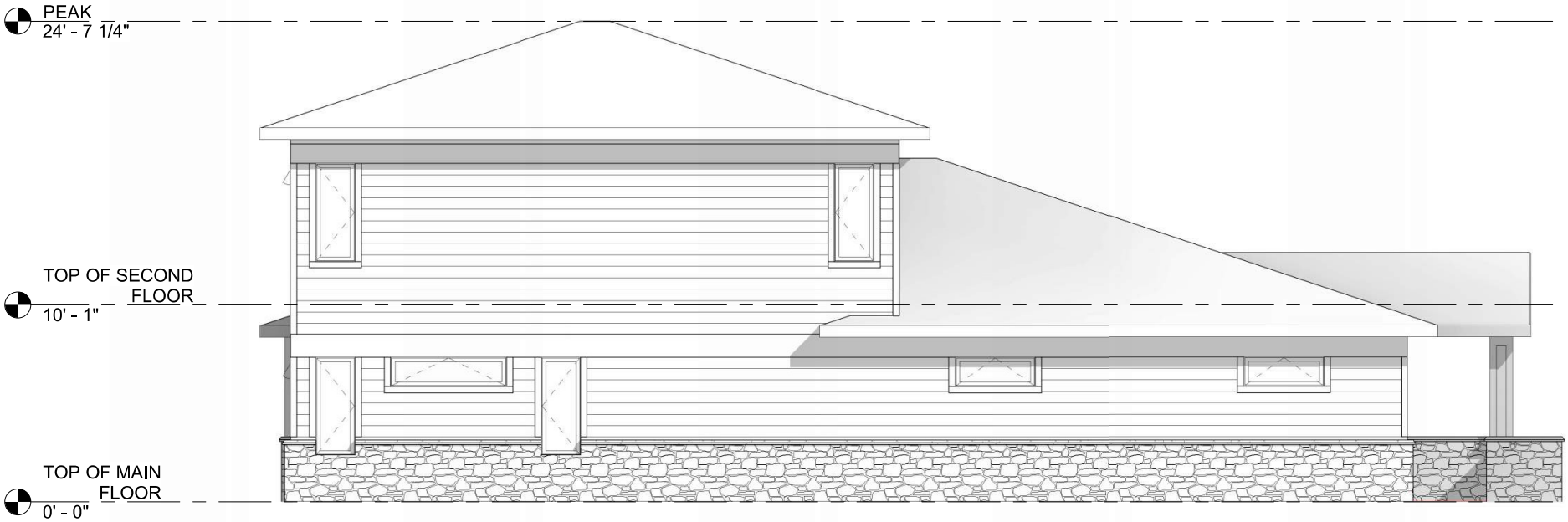


ELEVATION - NORTH
3/16" = 1'-0"

MESENBRINK CONSTRUCTION & ENGINEERING BUILDERS & DEVELOPERS

Mesenbrink Subdivision

House Plan G4a

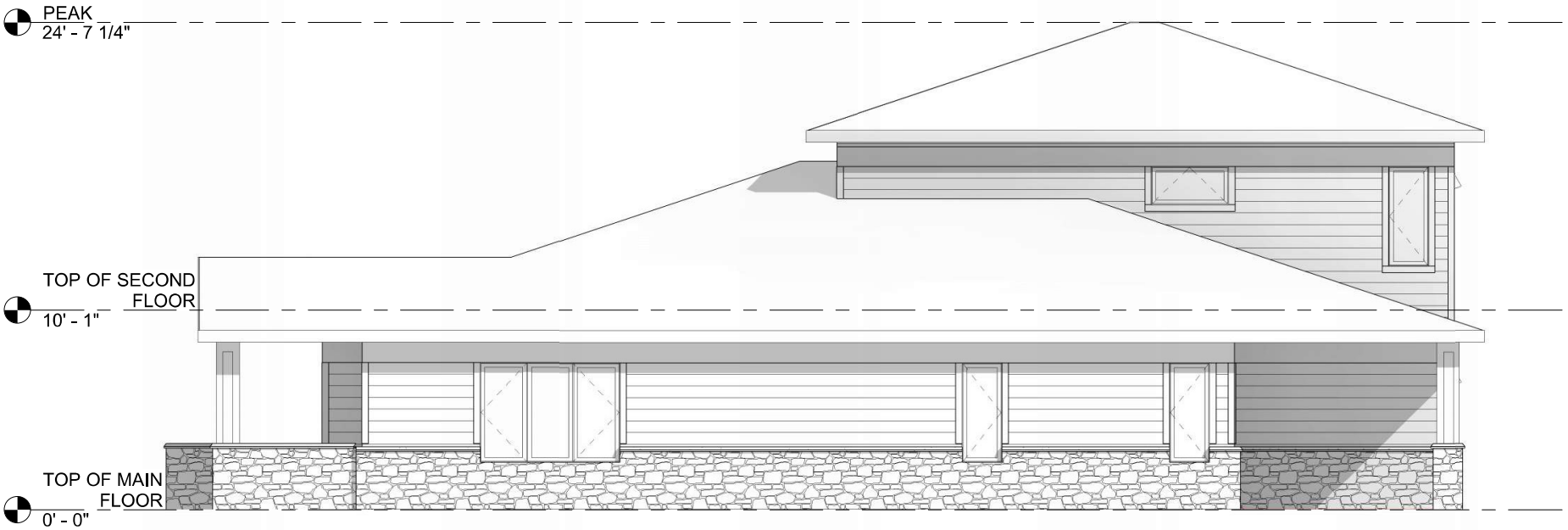


ELEVATION - WEST
3/16" = 1'-0"

MESENBRINK CONSTRUCTION & ENGINEERING BUILDERS & DEVELOPERS

Mesenbrink Subdivision

House Plan G4a



ELEVATION - EAST
3/16" = 1'-0"

MESENBRINK CONSTRUCTION & ENGINEERING BUILDERS & DEVELOPERS

Mesenbrink Subdivision

Mesenbrink Subdivision - Materials Palette

*For material reference *only*

Roofing Materials



Prefinished Standing Seam Material

Dimensional Asphalt Shingle

Siding Materials



Vinyl Siding



Cement Board Siding



SmartSide



Cedar Siding



Stucco/Synthetic Stucco



Brick



Manufactured Stone

Windows



Vinyl



Aluminum Clad Wood

Doors



Fiberglass



Steel



Painted / Wood Look (Overhead)

Accessories



Louvers



Shutters



Brackets

AVEYDA PRESERVE

PLANNED UNIT DEVELOPMENT PLAN

NARRATIVE

March 24, 2026

The Planned Unit Development (PUD) portion of the proposed new Lot 1, Block 2, and Lot 1, Block 3, Mesenbrink Subdivision. The proposed PUD will consist of 122 residential slab-on-grade homes.

The described PUD development property is in the easterly quadrant of the City of Mankato and is positioned just east of CSAH No. 12 (589 Avenue) and is north and south of the new Hoffman Road. The Planned Unit Development is located on 64.94 acres.

The property is already annexed into the City of Mankato and is zoned R-2 (One- and Two-Family Dwelling District). The subject property is also subject to the Shoreland Overlay District (the area of the PUD located within 1,000 feet from the Ordinary High Water of the Unnamed Lake 07007100). The development was prepared using the MNDNR Residential PUD guidelines.

The PUD property is proposed to be developed with 88 single family homes and 34 single family attached homes. Each home will be constructed as per the plans in this submittal. Homes can be modified and customized to the owner's requests using the guidelines in the homeowner's association. (see attached building floor plans).

Specifically, the Planned Unit Development Area includes:

North PUD consists of 34 Slab-on-grade Style Single Family homes.

South PUD consists of 54 Slab-on-grade Style Single Family homes and 34 Slab-on-grade Style Single Family Attached homes.

- **(122 total residential homes)**

The developer is sensitive to maintaining a high quality & aesthetically pleasing development and intends to maintain the property in the development with a high quality of standards to enhance the neighborhood and community of Mankato.

The Planned Unit Development will be accessed from Hoffman Road which is a dedicated public road to the City of Mankato. The private drives will remain private and be maintained by the Owner's and/or Association.

Open yard areas/landscaping within the PUD Plan area will be maintained privately and in compliance with City Code, by the Owner's and/or Association.

The developer would like to have this PUD ***not*** subject to the 25% Rental Density Ordinance.

Sec. 10.93. - Planned Unit Developments.

Subd. 1. Authority. The City Council may, in accordance with the procedures and standards set forth in this section, and other standards and regulations applicable to the district in which the subject property is located, approve by ordinance, planned unit developments for uses as listed within each zoning district.

Subd. 2. Purpose. A planned unit development is intended to encourage the efficient use of land and resources, to promote greater efficiency in public and utility services, and to encourage innovation in the planning and building of all types of development. A planned unit development may be approved by the City Council following a review and recommendation by the Planning Agency.

Subd. 3. Public Benefit. The public benefits to the surrounding neighborhood and the City as a whole that are intended to be derived from the approval of a planned unit development include, but are not limited to:

A. Preservation and enhancement of desirable site characteristics and open space.

The proposed development preserves the characteristics of the surrounding existing homes. Adjoining the property are single family homes located in the township (their anticipated land use is single family residential and parks/open space).

B. A pattern of development which preserves natural vegetation, topographic and geologic features.

The proposed project is planned on cultivated farm field and located south of the Unnamed Lake 07007100. Using the Shoreland Overlay District ordinance and the Shoreland Planned Unit Development section of code we will plan to leave part of the area closest to the Unnamed Lake in its natural state and provide a natural bluffer to the Lake. No access is planned to the Unnamed Lake.

C. Preservation and enhancement of historic and natural resources that significantly contribute to the character of the City.

The proposed project is located near other residential zoning districts and is in line with the character of the City and the approved Land Use Plan.

D. Use of design, landscape, or architectural features to create a pleasing environment or other special development features.

The proposed project will create a pleasing environment to the surrounding neighborhoods. The proposed North PUD will have natural open space and the South PUD will have designed open space

for the residents to use for gathering. This open space will remain private and be maintained by the Owner's and/or Association.

E. Provision of a variety or housing types in accordance with the City's housing goals.

The proposed development will provide market rate housing for the area.

F. Elimination of blighted structures or incompatible uses through redevelopment or rehabilitation.

The proposed development is being planned on un-developed property.

G. Business and commercial development to enhance the local economy and strengthen the tax base.

This item is not applicable.

H. The efficient use of land resulting in more economic networks of utilities, streets, schools, public grounds, buildings, and other facilities.

Mesenbrink Subdivision does extend Hoffman Road to service this property and future properties to the east.

MESENBRINK CONSTRUCTION

CONSTRUCTION PLANS FOR

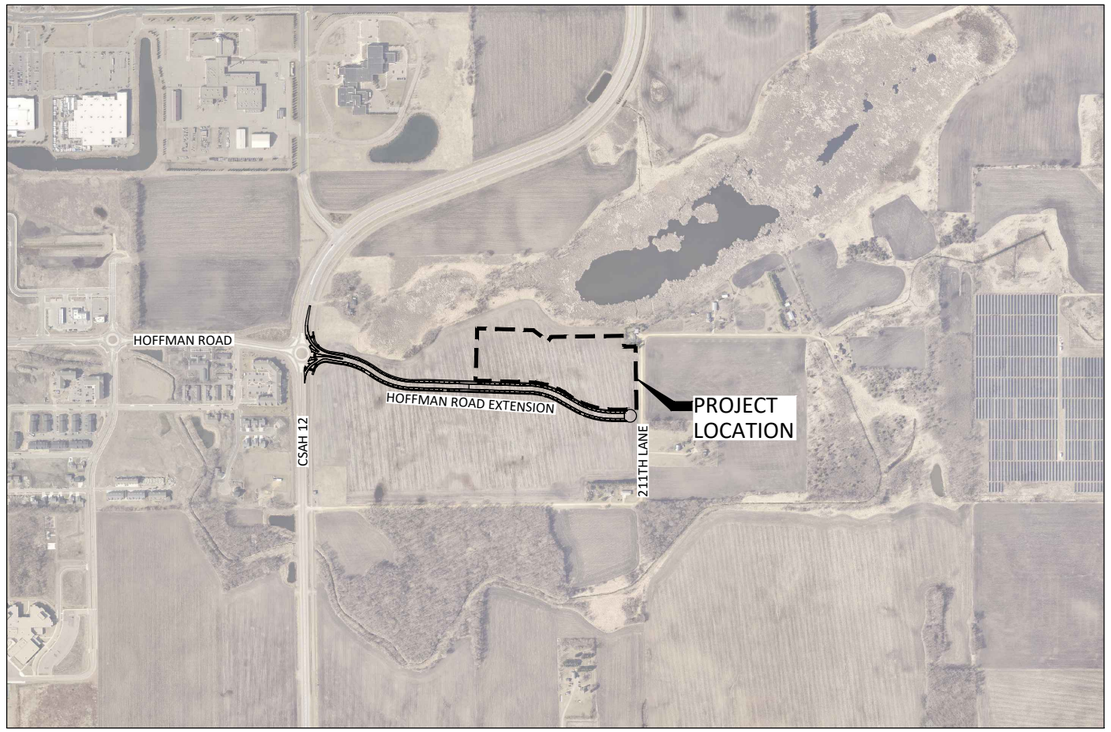
AVEYDA PRESERVE - NORTH PUD
MANKATO, MN

PAVEMENT AND SIDEWALK CONSTRUCTION, SITE GRADING
WATERMAIN, SANITARY SEWER, AND STORM SEWER INSTALLATION

MARCH 2026

MAP OF THE
CITY OF MANKATO
BLUE EARTH COUNTY, MN





SHEET NUMBER	SHEET TITLE
GENERAL	
G0.01 - G0.02	TITLE SHEET & LEGEND
G1.01	CONSTRUCTION DETAIL TABLES
G2.01	PROJECT OVERVIEW
CIVIL	
C0.01	EXISTING CONDITIONS
C1.01 - C1.04	CONSTRUCTION DETAILS
C2.01 - C2.08	STORMWATER POLLUTION PREVENTION PLAN
C3.01 - C3.02	GRADING PLAN
C4.01 - C4.03	SANITARY SEWER & WATERMAIN PLAN
C4.04 - C4.06	SERVICE PLAN & TABULATION (IN PROGRESS, NOT PROVIDED)
C5.01 - C5.04	STORM SEWER PLAN & PROFILE
C6.01 - C6.03	STREET PLAN & PROFILE
C6.04 - C6.06	INTERSECTION DETAILS

THIS PLAN SET CONTAINS 35 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 UNLESS OTHERWISE NOTED. THIS UTILITY LEVEL WAS DETERMINED ACCORDING TO THE GUIDELINES OF CI/ASCE 38-02, ENTITLED "STANDARD GUIDELINES FOR THE COLLECTION AND DEPICTION OF EXISTING SUBSURFACE UTILITY DATA."

BM=1012.33
TOP NUT HYDRANT
SE QUADRANT OF HOFFMAN / CSAH 12 ROUNDABOUT

PROJECT DATUM: BLUE EARTH COUNTY
HORIZONTAL: 2011 COUNTY COORDINATES
VERTICAL: NAVD 1988

RECORD DRAWING INFORMATION
OBSERVER:
CONTRACTOR:
DATE:

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H:\MESEB\0M1.128460\CAD\C3D\2 - North Single-Family PUD Plans\128460G001_N2.dwg 3/24/2026 7:26:43 AM

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, MINNESOTA 56001
Phone: (507) 625-4171
Email: Mankato@bolton-menk.com
www.bolton-menk.com

DESIGNED	AWP
DRAWN	AWP
CHECKED	NPM
CLIENT PROJ. NO.	0M1.128460

NO.	ISSUED FOR	DATE

MESENBRINK CONSTRUCTION
AVEYDA PRESERVE - NORTH PUD
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
- 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 ON POLE
- LIGHT-GROUND
- MAILBOX
- MANHOLE-COMMUNICATION
- MANHOLE-ELECTRIC
- MANHOLE-GAS
- MANHOLE-HEAT
- MANHOLE-SANITARY SEWER
- MANHOLE-STORM SEWER
- MANHOLE-UTILITY
- MANHOLE-WATER
- METER
- ORDER MICROPHONE
- PARKING METER
- PAVEMENT MARKING
- PEDESTAL-COMMUNICATION
- PEDESTAL-ELECTRIC
- PEDESTRIAN PUSH BUTTON
- PICNIC TABLE
- POLE-UTILITY
- POLE-BRACE
- POST
- RAILROAD SIGNAL POLE
- REGULATION STATION GAS
- SATELLITE DISH
- SIGN NON TRAFFIC
- 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

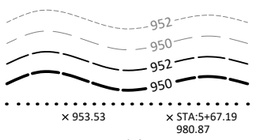
EXISTING UTILITY LINES

- FORCEMAIN
- SANITARY SEWER
- SANITARY SERVICE
- STORM SEWER
- STORM SEWER DRAIN TILE
- WATERMAIN
- WATER SERVICE

PROPOSED UTILITY LINES

- FORCEMAIN
- SANITARY SEWER
- SANITARY SERVICE
- STORM SEWER
- STORM SEWER DRAIN TILE
- WATERMAIN
- WATER SERVICE
- PIPE CASING

GRADING INFORMATION



- EXISTING CONTOUR MINOR
- EXISTING CONTOUR MAJOR
- PROPOSED CONTOUR MINOR
- PROPOSED CONTOUR MAJOR
- PROPOSED GRADING LIMITS / SLOPE LIMITS
- PROPOSED SPOT ELEVATION
- RISE:RUN (SLOPE)

HATCH PATTERNS

- BITUMINOUS
- CONCRETE
- GRAVEL

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 38-02, ENTITLED "STANDARD GUIDELINES FOR THE COLLECTION AND DEPICTION OF EXISTING SUBSURFACE UTILITY DATA"

- 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 38-02.

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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MESENBRINK CONSTRUCTION
AVEYDA PRESERVE - NORTH PUD
LEGEND

SHEET G0.02

STORM SEWER TABLE									
SERIES / ALIGNMENT	STRUCTURE NUMBER	STRUCTURE DESIGN	STATION	CASTING	RIM ELEV	LOW INVERT ELEV	DOWNSTREAM STRUCTURE	HEIGHT	NOTES
MAINLINE OUTFALL	A-1	18" APRON	522+54.1	N/A	N/A	1007.00	OUTFALL	N/A	OUTFALL TO PUBLIC BASIN
	A-2	48-4022	520+74.5	C-3	1013.11	1007.72	A-1	5.39 LF	
	A-3	48-4022	520+50.0	C-3	1013.11	1007.82	A-2	5.29 LF	
ROADWAY	A-4	48-4020	501+25.5	C-1	1013.66	1009.17	A-3	4.49 LF	
	A-4A	R-1	501+18.5	C-3	1013.18	1009.68	A-4	3.50 LF	
	A-4B	R-1	500+50.0	C-3	1013.05	1009.55	A-4	3.50 LF	
	A-5	48-4022	503+50.9	C-2	1013.60	1008.21	A-3	5.39 LF	
	A-5A	18" NYLOPLAST	N/A	C-4	1013.21	1010.21	A-5	3.00 LF	OR ALTERNATE STRUCTURE DESIGN
	A-6	48-4022	505+17.2	C-3	1013.18	1009.05	A-5	4.13 LF	
	A-6A	R-1	505+20.4	C-3	1013.22	1009.71	A-6	N/A	
	A-7	48-4020	505+34.3	C-1	1013.45	1009.13	A-6	4.32 LF	
	A-7A	48-4022	505+40.1	C-3	1013.17	1009.53	A-7	3.64 LF	
	A-7B	R-1	505+71.6	C-3	1013.19	1009.69	A-7A	3.50 LF	
	A-7C	18" NYLOPLAST	N/A	C-4	1013.54	1010.54	A-7A	3.00 LF	OR ALTERNATE STRUCTURE DESIGN
	A-8	R-1	506+94.5	C-3	1013.55	1009.93	A-7	3.62 LF	
	A-8A	R-1	506+95.1	C-3	1013.55	1010.05	A-8	3.50 LF	
SOUTH BACKYARDS	D-1	18" NYLOPLAST	517+79.2	C-4	1013.94	1010.98	D-2	2.96 LF	OR ALTERNATE STRUCTURE DESIGN
	D-2	18" NYLOPLAST	515+75.0	C-4	1013.37	1009.96	EXISTING	3.41 LF	OR ALTERNATE STRUCTURE DESIGN
NORTH BASIN	E-1	18" APRON	N/A	N/A	N/A	1007.00	OUTFALL	N/A	OUTFALL TO PUBLIC BASIN
	E-2	18" APRON	N/A	N/A	N/A	1007.00	E-1	N/A	

SANITARY SEWER TABLE						
STRUCTURE	STATION	RIM ELEV	LOW INVERT ELEV	DOWNSTREAM STRUCTURE	HEIGHT	NOTES
S-1	400+50.0	1013.98	1007.50	S-2	6.48 LF	
S-2	401+63.5	1013.54	1006.27	S-3	7.27 LF	
S-3	403+81.2	1013.51	1003.99	S-4	9.52 LF	
S-4	406+26.2	1013.76	1001.44	EXISTING	12.32 LF	
S-5	410+26.2	1015.20	1007.16	S-4	8.04 LF	
S-6	412+00.0	1016.10	1009.00	S-5	7.10 LF	

CASTING ASSEMBLY TABLE			
CASTING ID	CASTING DESIGNATION	CASTING TYPE	NUMBER REQ'D
C-1	NEENAH R-1733	PLATEN LID LETTERED "STORM SEWER" WITH TWO CONCEALED PICKHOLES	2
C-2	NEENAH R-3067-V	CURB INLET FRAME & CURB BOX WITH TYPE V-VANE GRATE	1
C-3	NEENAH R-3067-VB	CURB INLET FRAME & CURB BOX WITH TYPE BIDIRECTIONAL V-VANE GRATE	10
C-4	18" INLET FRAME AND GRATE	INLET FRAME AND GRATE COMPATIBLE WITH STRUCTURE MATERIAL	6
C-5	NEENAH R-1642	FRAME W / SELF-SEALING SOLID LID LETTERED "SANITARY SEWER" WITH TWO CONCEALED PICKHOLES	6

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MESENBRINK CONSTRUCTION
AVEYDA PRESERVE - NORTH PUD
CONSTRUCTION DETAIL TABLES

SHEET G1.01

PUBLIC POND (BY OTHERS)

12" TO 18" STORM SEWER

LUMA CIRCLE

ELECTIVE PRIVATE POND (NOT REQUIRED FOR PERMITTING)

8" WATERMAIN

8" SANITARY SEWER

MERIDIAN PATH

SOLA CIRCLE

HOFFMAN ROAD (BY OTHERS)

211TH LANE

UNIT 1 PAD EL=1015.2
UNIT 2 PAD EL=1015.2
UNIT 3 PAD EL=1015.2
UNIT 4 PAD EL=1015.2
UNIT 5 PAD EL=1015.2
UNIT 6 PAD EL=1015.2
UNIT 7 PAD EL=1015.1
UNIT 8 PAD EL=1015.0
UNIT 9 PAD EL=1014.7
UNIT 10 PAD EL=1014.7
UNIT 11 PAD EL=1015.0
UNIT 12 PAD EL=1015.0
UNIT 13 PAD EL=1014.8
UNIT 14 PAD EL=1014.7
UNIT 15 PAD EL=1014.9
UNIT 17 PAD EL=1014.9
UNIT 18 PAD EL=1015.3
UNIT 19 PAD EL=1015.7
UNIT 21 PAD EL=1015.7
UNIT 22 PAD EL=1016.1
UNIT 23 PAD EL=1016.5
UNIT 24 PAD EL=1016.8
UNIT 25 PAD EL=1017.1
UNIT 26 PAD EL=1017.1
UNIT 27 PAD EL=1017.2
UNIT 28 PAD EL=1017.0
UNIT 29 PAD EL=1016.7
UNIT 30 PAD EL=1016.3
UNIT 31 PAD EL=1015.9
UNIT 32 PAD EL=1015.6
UNIT 33 PAD EL=1015.4
UNIT 34 PAD EL=1015.2

HORZ. 0 50 100 SCALE FEET

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MESENBRINK CONSTRUCTION
AVEYDA PRESERVE - NORTH PUD
PROJECT OVERVIEW

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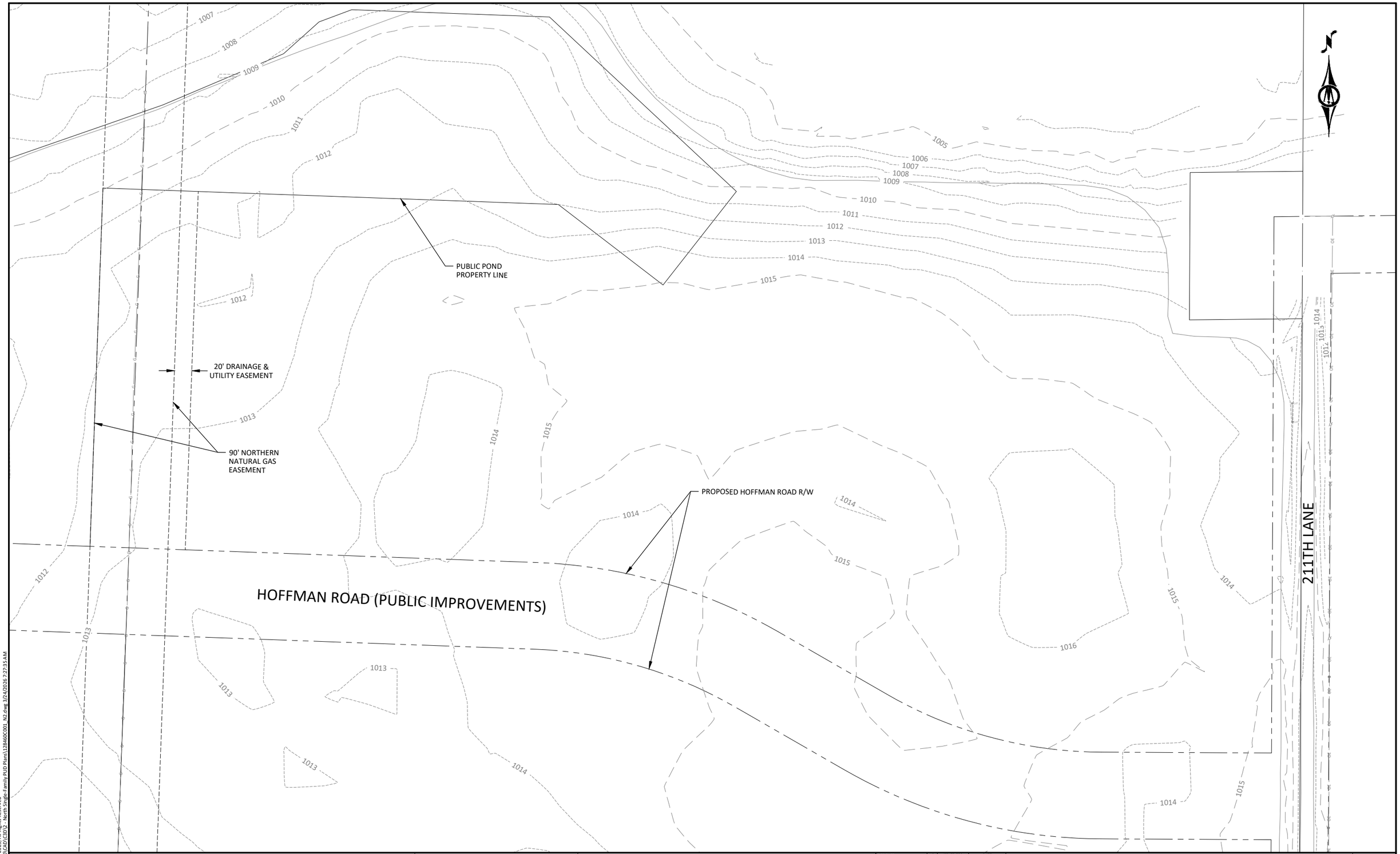

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MESENBRINK CONSTRUCTION
AVEYDA PRESERVE - NORTH PUD
EXISTING CONDITIONS

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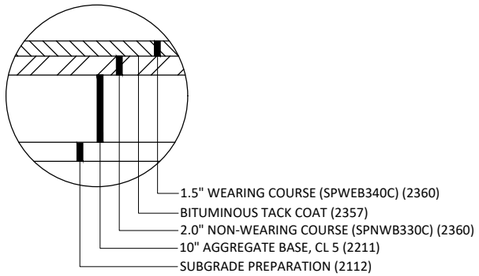
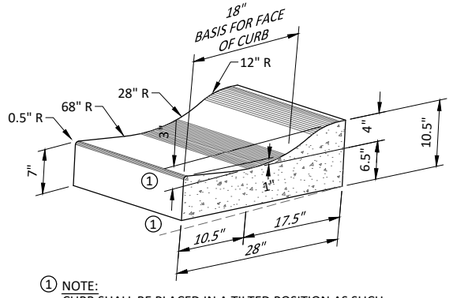


BITUMINOUS PAVEMENT SECTION

NOT TO SCALE

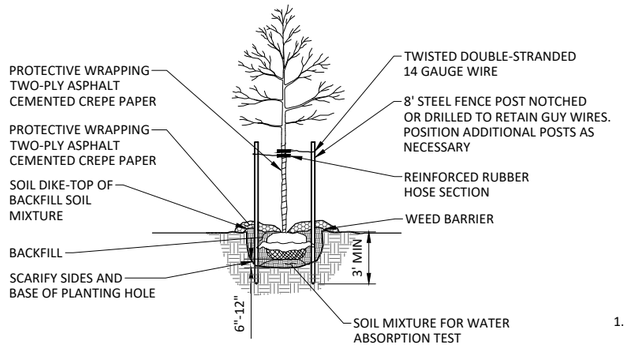


① NOTE:
CURB SHALL BE PLACED IN A TILTED POSITION AS SUCH TO PROVIDE A 3" DEPTH FROM THE TOP OF CURB TO THE FLOWLINE WHEN MEASURED ON A LEVEL PLANE.

MOUNTABLE
CONCRETE CURB & GUTTER

NOT TO SCALE

(MODIFIED S418 CURB & GUTTER)



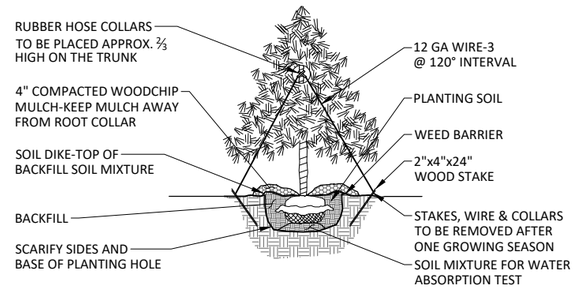
DECIDUOUS TREE PLANTING

NOT TO SCALE

BAG & BALL PLANTING NOTE:

1. REMOVE WRAPPING AND ALL TIES OR STRAPS. IF ROOT BALL IS WRAPPED IN BURLAP THE LOWER ½ PORTION OF THE FABRIC MAY BE LEFT AT THE BOTTOM OF THE HOLE. SYNTHETIC WRAP MUST BE REMOVED AND PROPERLY DISPOSED.
2. LOOSEN ROOTS TO ENSURE THEY ARE NOT GIRDLING THE ROOT BALL.
3. SALVAGE AND REUSE ALL SOIL THAT CAME WITH THE ROOT BALL.
4. IF ROOT BALL IS EXTREMELY DRY WATER IT PRIOR TO PLACING IT IN THE HOLE.
5. IF TREE IS CONTAINER GROWN, SALVAGE ALL SOIL AND MIX WITH SUPPLEMENTED SOIL FOR BACK FILL.

1. PROVIDE AND INSTALL HEALTHY PLANT MATERIALS THAT MEET ALL SPECIFICATIONS AND ARE OF THE SIZE, TYPE AND SPECIES NAMED ON THE PLANT SCHEDULE AND SHOWN ON THE PLANS.
2. DIG PLANT HOLE 1'-0" MINIMUM LARGER ON ALL SIDES THAN ROOT BALL.
3. PRIOR TO PLACING TREE, SCARIFY BOTTOM AND SIDES OF THE PLANTING HOLE.
4. TEST SOIL ABSORPTION.
5. FILL HOLE PARTIALLY WITH SUPPLEMENTED SOIL MIXTURE, ADD WATER AND ALLOW TO PUDDLE AND SETTLE PRIOR TO SETTING TREE.
6. AFTER PUDDLING HAS SETTLED, SET TREE AND BACK FILL WITH SUPPLEMENTED SOIL MIXTURE.
7. WATER THOROUGHLY AND ADD BACK FILL AS NEEDED AFTER MOISTURE IS ABSORBED.
8. BUILD SOIL DIKE AROUND PERIPHERY OF TREE TO HOLD WATER.
9. AFTER SETTLEMENT, MULCH WITH MINIMUM 4" LAYER SHREDDED BARK, WOOD CHIPS OR AS OTHERWISE SPECIFIED. DO NOT PLACE MULCH OVER THE ROOT COLLAR.
10. REMOVE DEAD OR DAMAGED BRANCHES RETAINING THE NATURAL FORM OF THE TREE.

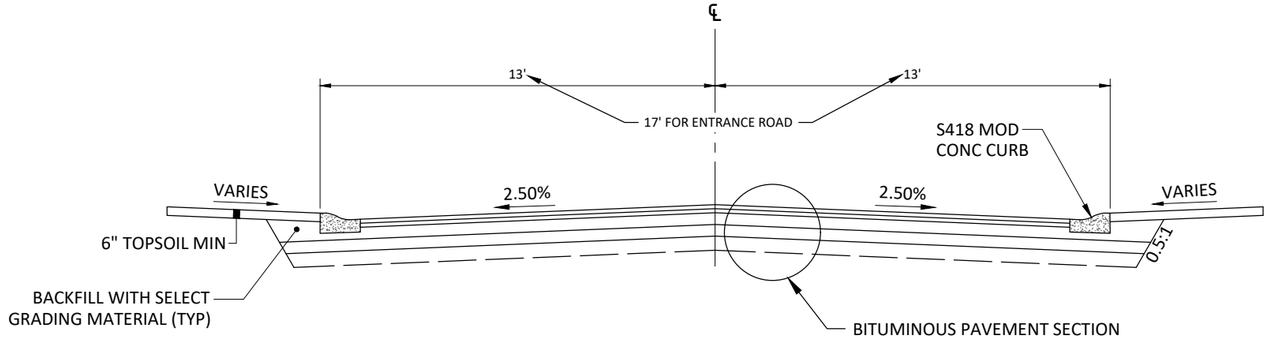


CONIFEROUS TREE PLANTING

NOT TO SCALE

TYPICAL SECTION

PRIVATE ROAD
NOT TO SCALE



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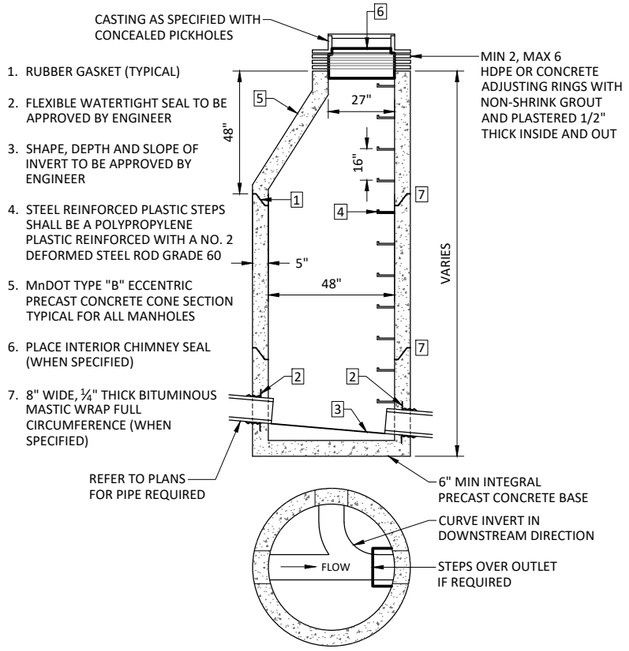
MESENBRINK CONSTRUCTION
AVEYDA PRESERVE - NORTH PUD
SURFACE CONSTRUCTION DETAILS

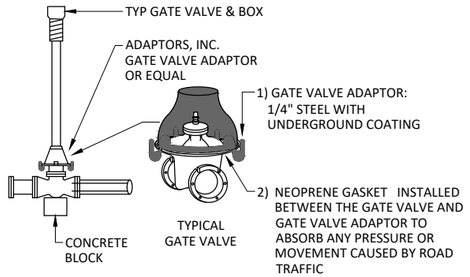
SHEET C1.01



PLAN VIEW

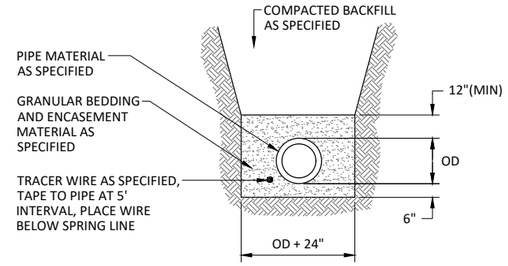
DESIGN 4007C SANITARY MANHOLE

NOT TO SCALE



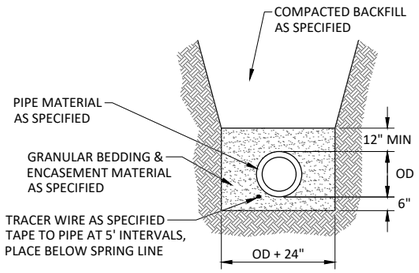
GATE VALVE ADAPTOR

NOT TO SCALE



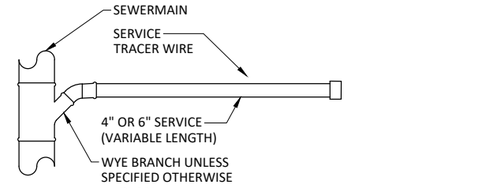
NON-RIGID SANITARY SEWER TRENCH

NOT TO SCALE

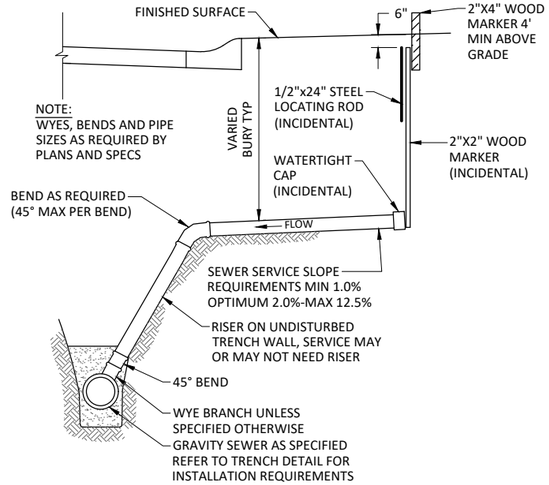


PVC WATERMAIN TRENCH

NOT TO SCALE



PLAN



PROFILE

SANITARY SEWER SERVICE NEW CONSTRUCTION

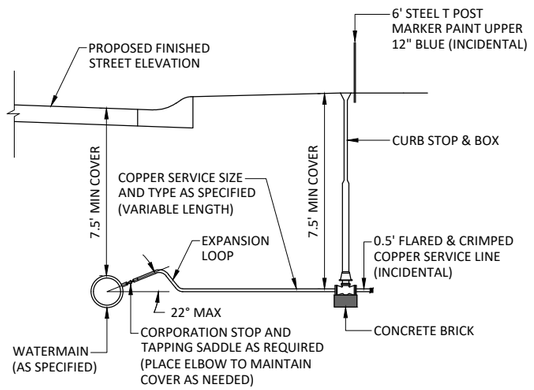
NOT TO SCALE

HYDRANTS LOCATED WHERE THE GROUNDWATER TABLE IS ABOVE THE DRAIN OUTLET SHALL HAVE THE OUTLET DRAIN PLUGGED AND SHALL BE EQUIPPED WITH A TAG STATING "PUMP AFTER USE"

HYDRANT INSTALLATION, MEGALUGS

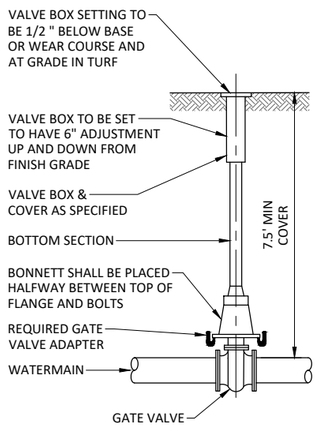
NOT TO SCALE

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



WATER SERVICE INSTALLATION NEW CONSTRUCTION

NOT TO SCALE



GATE VALVE BOX INSTALLATION

NOT TO SCALE

TRACER WIRE NOTE:
REFER TO THE MINNESOTA RURAL WATER ASSOCIATION (MRWA) TRACER WIRE SPECIFICATION GUIDE & DETAILS TO PROPERLY INSTALL TRACER WIRE WITH WATERMAIN AND SANITARY SEWER. THE GUIDE CAN BE FOUND AT: mrwa.com/tools.html - Tracer Wire Specification Guide & Details

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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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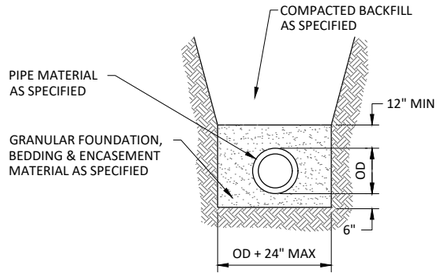
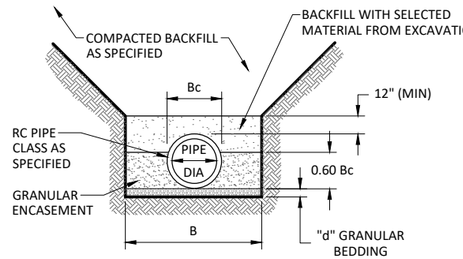
MESENBRINK CONSTRUCTION
AVEYDA PRESERVE - NORTH PUD
WATERMAIN & SANITARY SEWER DETAILS

SHEET C1.02



NON-RIGID STORM SEWER TRENCH

NOT TO SCALE

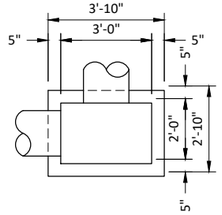


PIPE DIA	d	B
27" OR LESS	3"	Bc + 24"
30" TO 60"	4"	1.5 x Bc
66" OR OVER	6"	Bc + 36"

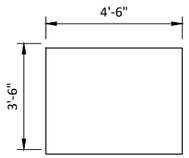
RC PIPE
CLASS "B" BEDDING-SQUARE TRENCH

NOT TO SCALE

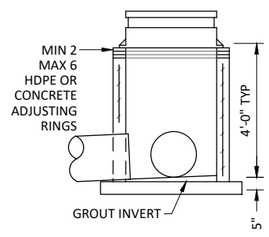
NOTE:
CONTRACTOR MAY SELECT STORM SEWER
CONFORMING TO PLUMBING CODE OR ALTERNATES
APPROVED BY THE AUTHORITY HAVING JURISDICTION



CATCH BASIN PLAN



BASE SLAB PLAN



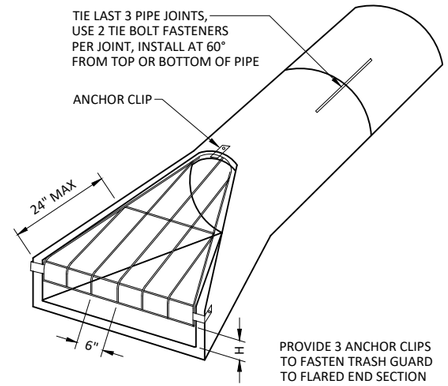
SECTION

NOTES:

1. CASTING PER CONSTRUCTION DOCUMENTS
2. PIPE CUT-OUTS PER CONSTRUCTION DOCUMENTS
3. ALTERNATE CAST-IN-PLACE BASE CAN BE USED
4. MIN REINFORCING SHALL BE WIRE FABRIC HAVING AN AREA OF NOT LESS THAN 0.12 SQ IN PER FOOT IN BOTH DIRECTIONS

CATCH BASIN STRUCTURE
DESIGN R-1 (2'x3')

NOT TO SCALE



ANCHOR BOTH SIDES

PROVIDE 3 ANCHOR CLIPS
TO FASTEN TRASH GUARD
TO FLARED END SECTION
HOT DIP GALVANIZE
AFTER FABRICATION

TRASH GUARD SIZES			
PIPE SIZE	BARS	"H"	BOLTS
12"-18"	3/4"Ø	4"	5/8"
21"-42"	1"Ø	6"	3/4"
42"-72"	1 1/4"Ø	12"	1"

RC APRON TRASH RACK
(STEEL BARS)

NOT TO SCALE

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CHECKED	NPM
CLIENT PROJ. NO.	0M1.128460

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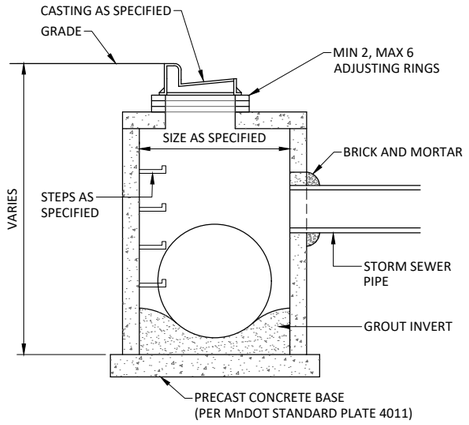
MESENBRINK CONSTRUCTION
AVEYDA PRESERVE - NORTH PUD
STORM SEWER DETAILS

SHEET
C1.03

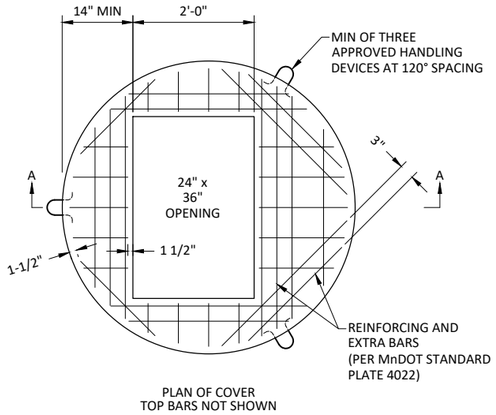


TYPICAL DESIGN 4022 CATCH BASIN

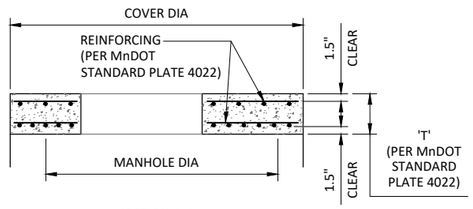
NOTES:

1. AASHTO HS 25 LOADING MAX FILL HEIGHT 15'
2. THE # 4022 SHALL BE PERMANENTLY MARKED ON THE TOP COVER
3. EQUIVALENT STEEL AREAS IN WIRE MESH MAY BE USED
4. REINFORCEMENT PER SPEC 3301, GRADE 60 A SINGLE HOOP OF 8ga STEEL WIRE

DESIGNATION:
DESIGN DIAMETER - STANDARD PLATE #
DESIGN 48-4020

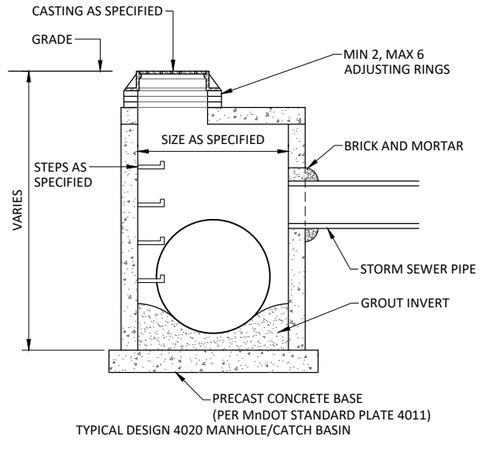


PLAN OF COVER
TOP BARS NOT SHOWN



SECTION A-A

STORM SEWER STRUCTURE
DESIGN 4022
NOT TO SCALE

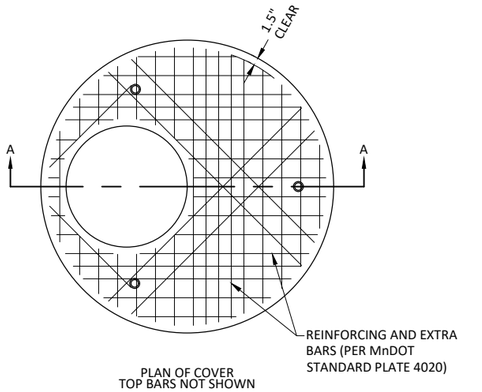


TYPICAL DESIGN 4020 MANHOLE/CATCH BASIN

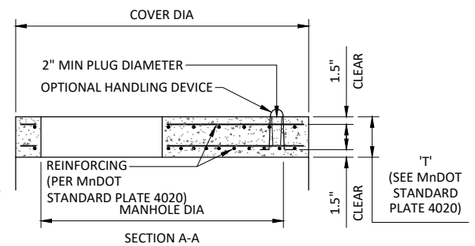
NOTES:

1. AASHTO HS 25 LOADING MAX FILL HEIGHT 15'
2. THE # 4020 SHALL BE PERMANENTLY MARKED ON THE TOP COVER
3. EQUIVALENT STEEL AREAS IN WIRE MESH MAY BE USED
4. REINFORCEMENT PER SPEC 3301, GRADE 60 A SINGLE HOOP OF 8ga STEEL WIRE

DESIGNATION:
DESIGN DIAMETER - STANDARD PLATE #
DESIGN 48-4020



PLAN OF COVER
TOP BARS NOT SHOWN



SECTION A-A

STORM SEWER STRUCTURE
DESIGN 4020
NOT TO SCALE

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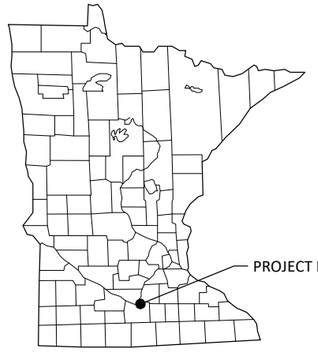
MESENBRINK CONSTRUCTION
AVEYDA PRESERVE - NORTH PUD
STORM SEWER DETAILS

SHEET
C1.04

STORMWATER POLLUTION PREVENTION PLAN (SWPPP)

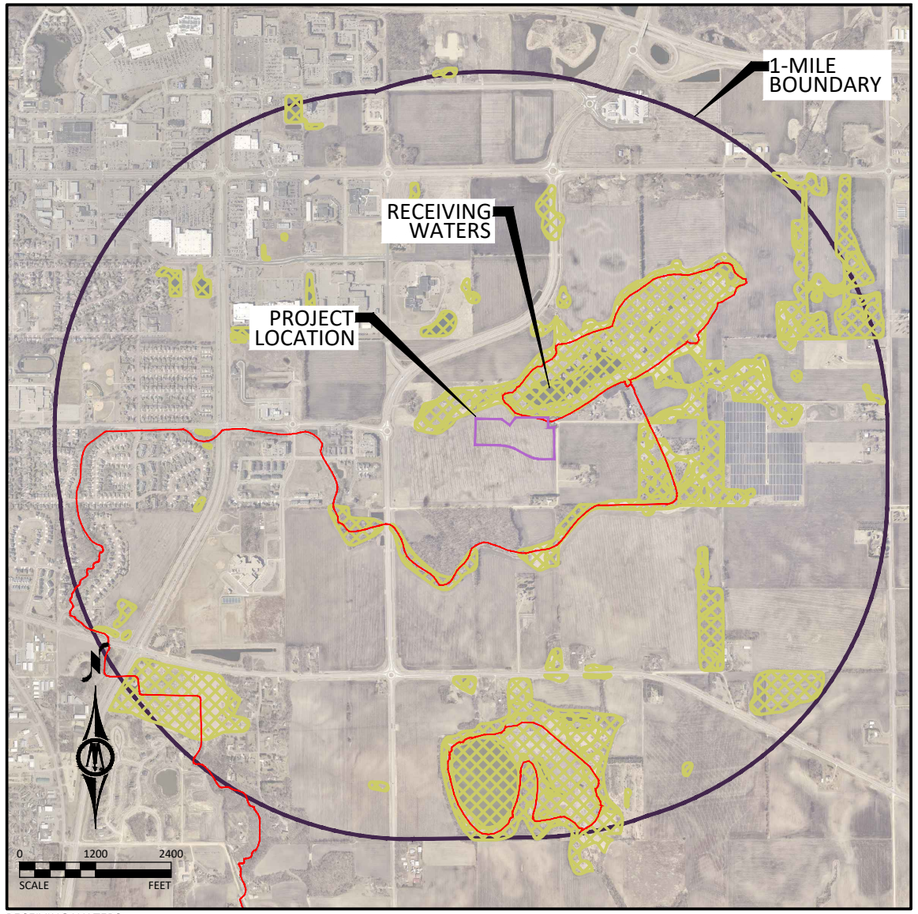
AVEYDA PRESERVE - NORTH PUD

CITY OF MANKATO
BLUE EARTH COUNTY, MINNESOTA



LEGEND

- 1-MILE BOUNDARY
- PROJECT BOUNDARY
- PROTECTED AND/OR IMPAIRED 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:	Mesenbrink Construction	John Mesenbrink	xxxxxx
SWPPP DESIGNER:	Bolton & Menk, Inc.	Alec W. Pietz, P.E.	507-625-4171
CONTRACTOR:	TBD	TBD	TBD
CONSTRUCTION SWPPP MANAGER:	TBD	TBD	TBD
PARTY RESPONSIBLE FOR LONG TERM O&M:	Mesenbrink Construction	John Mesenbrink	xxxxx

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.

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) =	16.6	ACRES
Existing area of impervious surface =	0.0	ACRES
Post construction area of impervious surface =	4.3	ACRES
Total new impervious surface area created =	4.3	ACRES

Planned Construction Start Date:	Summer 2026
Estimated Construction Completion Date:	Fall 2027

PERMANENT STORMWATER MANAGEMENT SYSTEM:
Type of storm water management used if more than 1 acre of new impervious surface is created:

	Wet Sedimentation Basin
	Infiltration/Filtration
X	Regional Pond
	Permanent Stormwater Management Not Required

Stormwater is routed to a regional pond sized for the project.
However, an elective basin is proposed for additional fill needs.

PROJECT LOCATION:

COUNTY	TOWNSHIP	RANGE	SECTION	LATITUDE	LONGITUDE
BLUE EARTH	T108N	R26W	15	44.1547° N	93.9340° W

BMP SUMMARY	QUANTITY	UNIT
STABILIZED CONSTRUCTION EXIT	1	EACH
STORM DRAIN INLET PROTECTION	15	EACH
SILT FENCE, TYPE MACHINE SLICED	4800	LIN FT
TURF ESTABLISHMENT (SEED MIX 25-151)	9.5	ACRE
SEED MIX 33-261, FERTILIZE, & ROLLED EROS. CAT 20	300	SQ YD
TURF ESTABLISHMENT (SEED MIX 34-262)	2.1	ACRE
RANDOM RIPRAP CLASS III/A	20	CU YD
NOTE: QUANTITIES LISTED ACCOUNT FOR ONE INSTALLATION. ADDITIONAL INSTALLATIONS MAY BE NECESSARY AS A RESULT OF SCHEDULING AND MAINTENANCE.		

DESCRIPTION OF CONSTRUCTION ACTIVITIES AND STORMWATER MANAGEMENT:
Construction activities include: Construction of private roadways and infrastructure in Mankato, Minnesota to provide service to low/medium density housing. Site improvements include pavements, storm sewer, watermain, sanitary sewer, water and sanitary services, and an elective wet sedimentation basin construction.

Currently, stormwater is conveyed by overland flow in various directions and local watersheds primarily to an existing unnamed lake to the north of the property.

After development, storm sewer and stormwater management systems will be installed to convey drainage of roadways and yards. Drainage will be routed to adjacent public storm sewer and public/private basins. The listed impervious area created with this project is based on the proposed roadway and anticipated unit impervious area.

A copy of the SWPPP must remain onsite at all times. Any modifications to the SWPPP shall be approved by the Engineer.

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]
Unnamed Lake	Lake	Yes	Yes	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) Remove existing surfaces as required.
4) Complete site and utility improvements.
5) Install additional inlet protection as needed.
6) Reestablish turf.
7) Repeat steps 2-6 as necessary throughout the project.
8) Add additional temporary BMPs as necessary during construction based on inspection reports.
9) Ensure final stabilization measures are complete.
10) Provide digital copy of all Field SWPPP Documentation including Inspection Reports and SWPPP Revisions to the Owner.
11) 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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MESENBRINK CONSTRUCTION
AVEYDA PRESERVE - NORTH PUD
STORMWATER POLLUTION PREVENTION PLAN
PROJECT INFORMATION & LOCATION MAP

SHEET C2.01

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:	7 calendar days

SITE INSPECTION INTERVAL:

A trained person shall routinely inspect the entire construction site during active construction at an interval of no less than:	3 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

Alec W. Pietz

Design of Construction SWPPP (May 31 2027)

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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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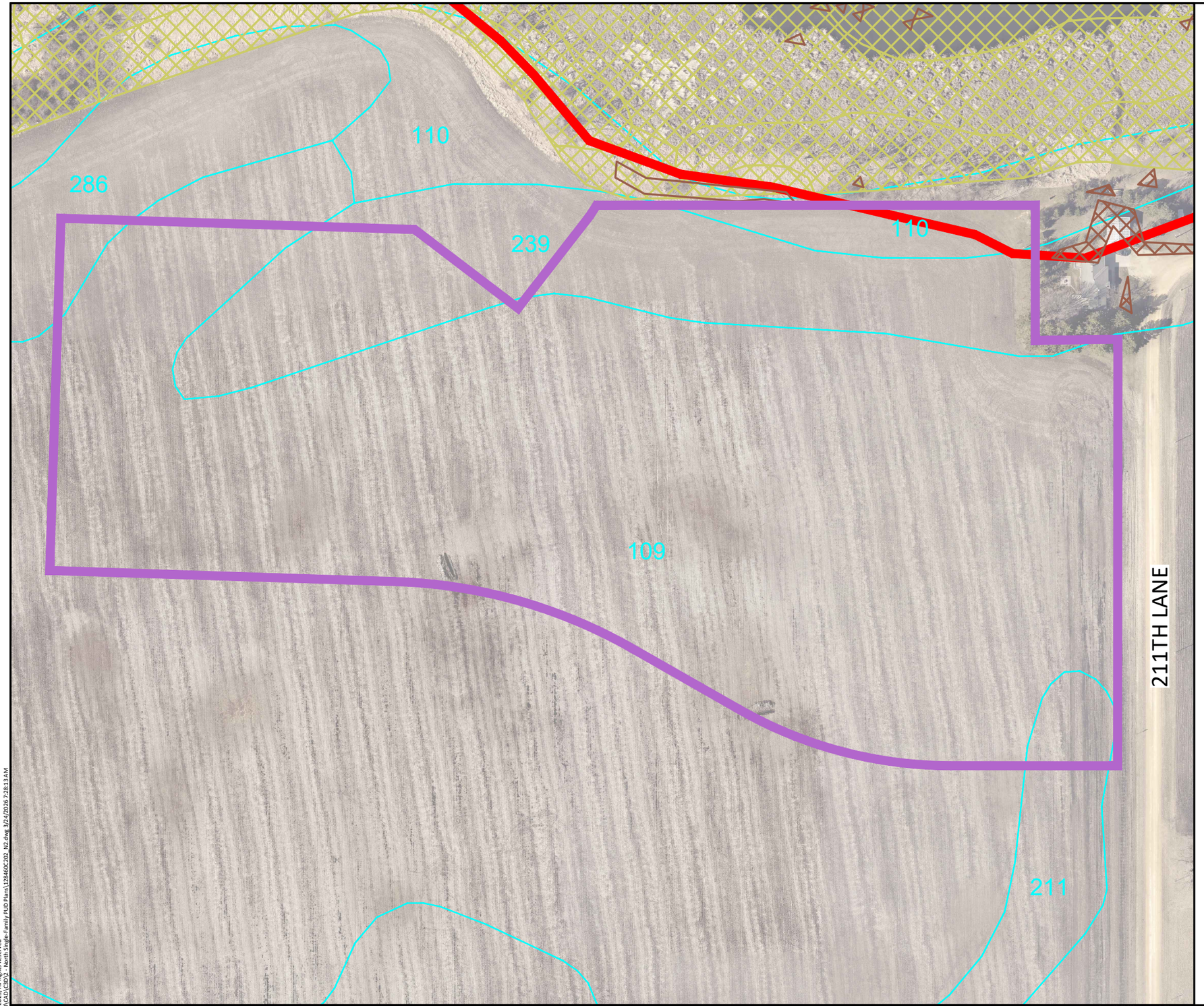
MESENBRINK CONSTRUCTION
AVEYDA PRESERVE - NORTH PUD
STORMWATER POLLUTION PREVENTION PLAN
NARRATIVE

SHEET C2.02



LEGEND

- PROJECT BOUNDARY
- SOIL TYPE
- STEEP SLOPES (>33.3%)
- NATIONAL WETLANDS INVENTORY
- RECEIVING WATERS

N

0 60 120
SCALE FEET

SOIL TYPE SUMMARY

Map Unit Symbol	Soil Name	Hyd. Soil Group	Erodibility
109	Cordova clay loam	C/D	NHEL
110	Marna silty clay loam	C/D	NHEL
211	Lura silty clay	C/D	NHEL
239	Le Sueur clay loam, 1 to 3 percent slopes	B/D	NHEL
286	Shorewood silty clay loam, 1 to 6 percent slopes	C/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 - C2.08
FINAL STABILIZATION	C2.06 - C2.08

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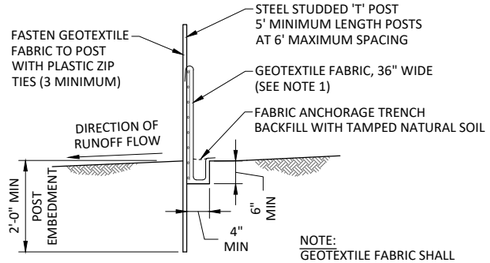
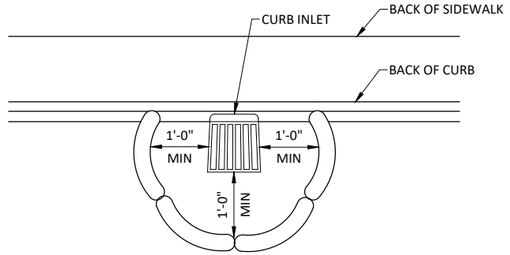
MESENBRINK CONSTRUCTION
AVEYDA PRESERVE - NORTH PUD
STORMWATER POLLUTION PREVENTION PLAN
SITE & SOILS MAP

SHEET C2.03



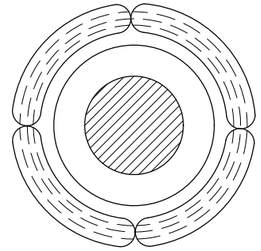
NOTE:
GEOTEXTILE FABRIC SHALL BE PER MnDOT SPEC 3886

SILT FENCE - HEAVY DUTY
NOT TO SCALE

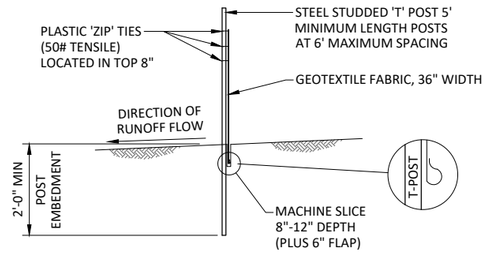


NOTE:
THIS INLET PROTECTION IS USED DURING ROUGH GRADING ONLY, USE BEFORE ROAD IS OPEN TO TRAFFIC OR IS PAVED

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

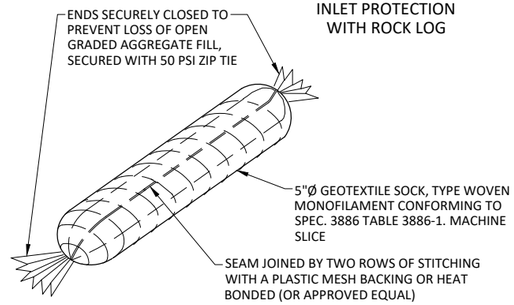


SILT FENCE - MACHINE SLICED
NOT TO SCALE

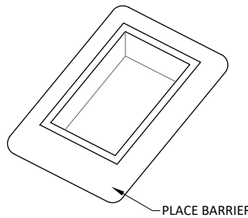
FILL ROCK LOG WITH 45 LBS. OF OPEN GRADED AGGREGATE CONSISTING OF SOUND, DURABLE PARTICLES OF CRUSHED QUARRY ROCK OR GRAVEL CONFORMING TO THE FOLLOWING GRADATION.

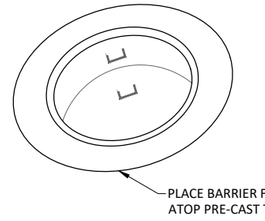
GRADATION	
SIEVE SIZE	PERCENT PASSING
1 1/2"	100
1"	95-100
3/4"	65-95
3/8"	30-65
NO 4	10-35
NO 10	3-20
NO 40	0-8
NO 200	0-3

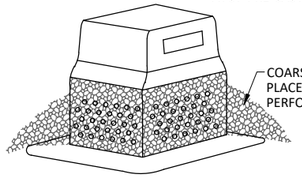
NOTE:
CRUSHED CONCRETE OR BITUMINOUS SHALL NOT BE USED FOR OPEN GRADED AGGREGATE.

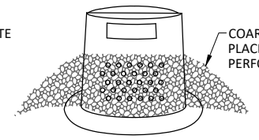


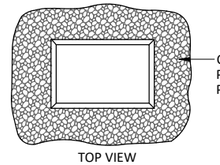
INLET PROTECTION ROCK BAG
NOT TO SCALE



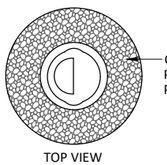




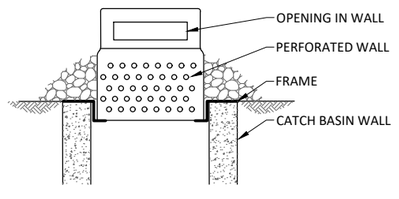


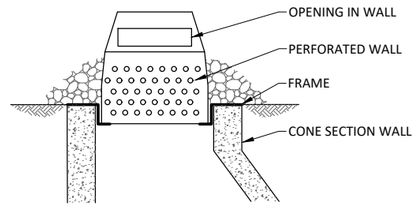


TOP VIEW

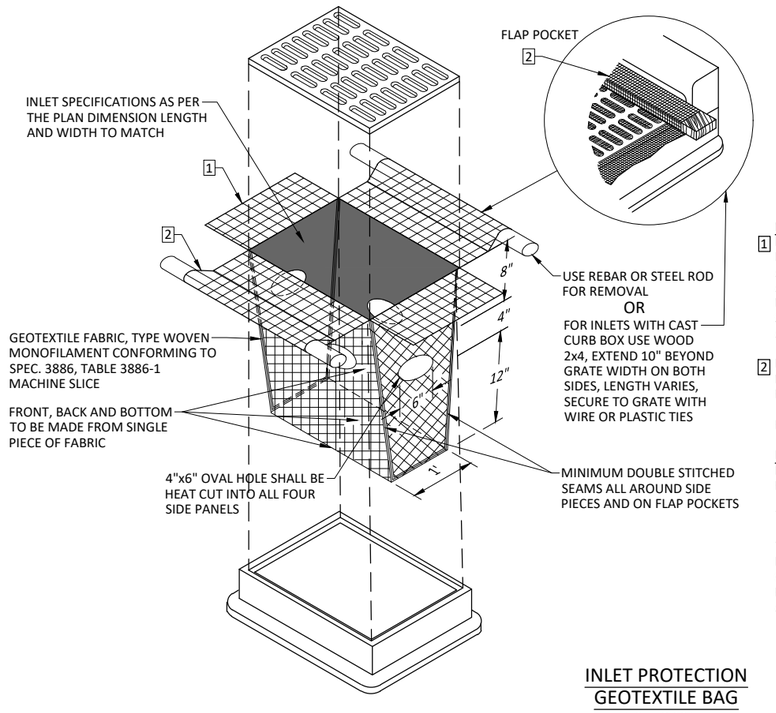


TOP VIEW





INLET PROTECTION PERFORATED WALL
NOT TO SCALE



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
NOT TO SCALE

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NOT FOR CONSTRUCTION

ALEC W. PIETZ, P.E.
LIC. NO. 59617 DATE XX/XX/XXXX

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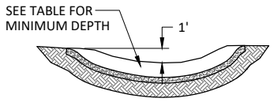
DESIGNED	AWP
DRAWN	AWP
CHECKED	NPM
CLIENT PROJ. NO.	0M1.128460

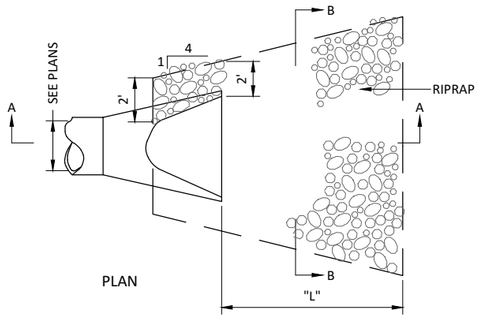
NO.	ISSUED FOR	DATE

MESENBRINK CONSTRUCTION
AVEYDA PRESERVE - NORTH PUD
STORMWATER POLLUTION PREVENTION PLAN
BEST MANAGEMENT PRACTICE DETAILS

SHEET C2.04

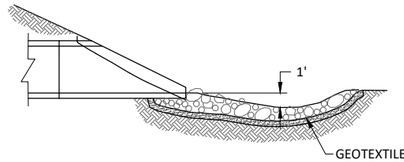


SECTION B-B



PLAN

		CLASS II d50=6"	CLASS III d50=9"	CLASS IV d50=12"
DIA OF ROUND PIPE (IN)	L (FT)	12" DEPTH RIPRAP (CU YD)	18" DEPTH RIPRAP (CU YD)	24" DEPTH RIPRAP (CU YD)
12	8	5	8	10
15	8	5	8	10
18	10	6	10	15
21	10	8	15	15
24	12	10	15	20
27	12	10	15	20
30	14	15	20	25
36	16	18	25	30
42	18	20	30	40
48	20	20	40	50

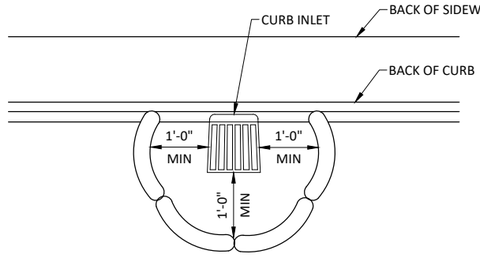


GEOTEXTILE FABRIC, PER SPEC 3733;
THE FABRIC SHOULD COVER THE AREA
OF THE RIPRAP AND EXTEND UNDER
THE CULVERT APRON THREE FEET

SECTION A-A

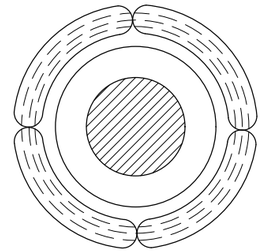
RIPRAP AT RCP CULVERT END

NOT TO SCALE



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

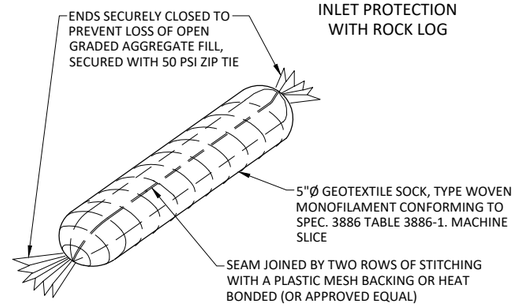


INLET PROTECTION
WITH ROCK LOG

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

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CHECKED NPM
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MESENBRINK CONSTRUCTION
AVEYDA PRESERVE - NORTH PUD
STORMWATER POLLUTION PREVENTION PLAN
BEST MANAGEMENT PRACTICE DETAILS

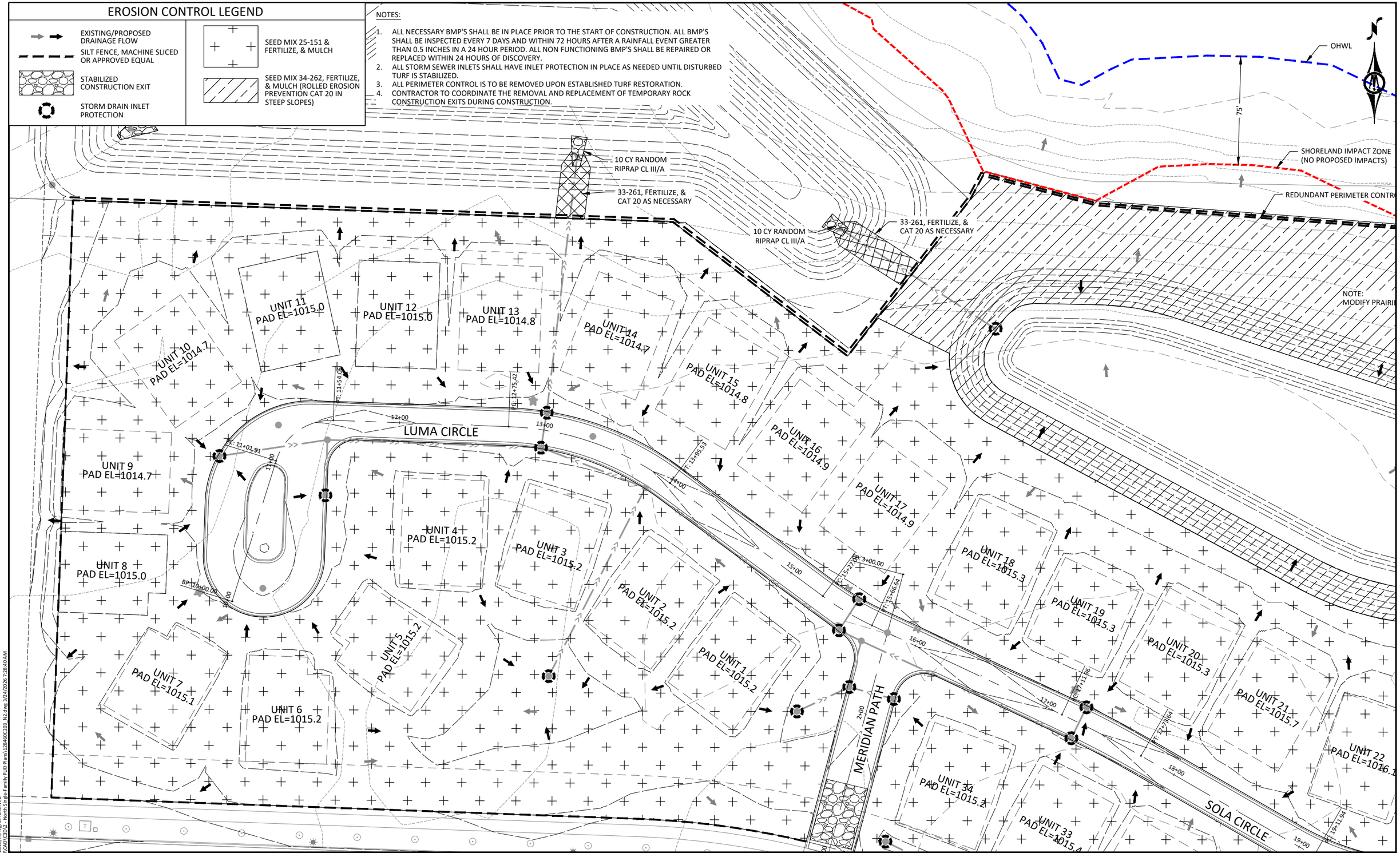
SHEET C2.05

EROSION CONTROL LEGEND

- EXISTING/PROPOSED DRAINAGE FLOW
- SILT FENCE, MACHINE SLICED OR APPROVED EQUAL
- STABILIZED CONSTRUCTION EXIT
- STORM DRAIN INLET PROTECTION
- SEED MIX 25-151 & FERTILIZE, & MULCH
- SEED MIX 34-262, FERTILIZE, & MULCH (ROLLED EROSION PREVENTION CAT 20 IN STEEP SLOPES)

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 A RAINFALL EVENT GREATER THAN 0.5 INCHES IN 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.



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HORZ. 0 25 50 SCALE FEET

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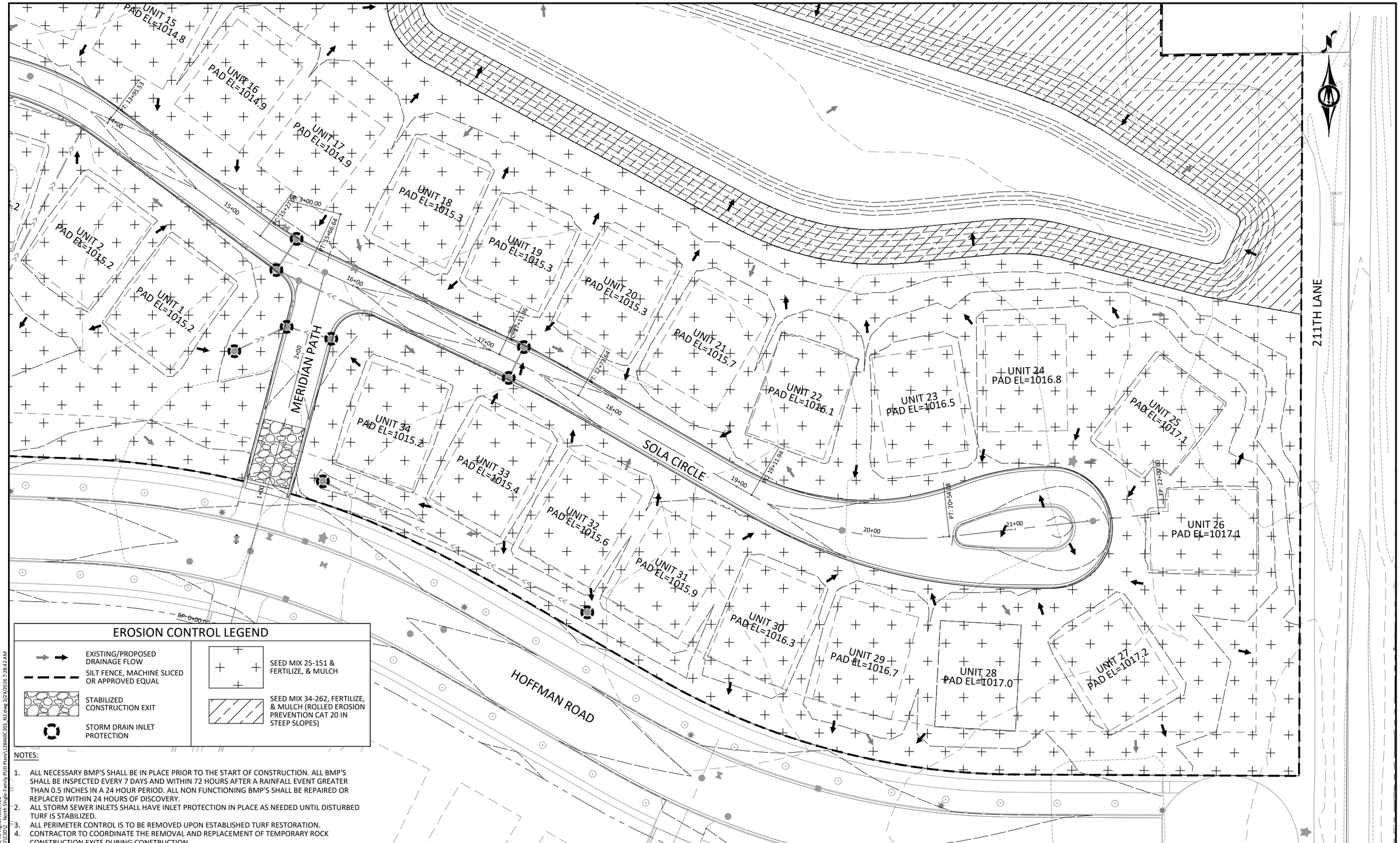
MESENBRINK CONSTRUCTION
AVEYDA PRESERVE - NORTH PUD
STORMWATER POLLUTION PREVENTION PLAN
EROSION & SEDIMENT CONTROL PLAN

SHEET C2.06



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HORZ. 0 30 60
SCALE FEET

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STORMWATER POLLUTION PREVENTION PLAN
EROSION & SEDIMENT CONTROL PLAN

SHEET C2.07

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OHWL

75'

SHORELAND IMPACT ZONE
(NO PROPOSED IMPACTS)

REDUNDANT PERIMETER CONTROL

10 CY RANDOM
RIPRAP CL III/A

33-261, FERTILIZE, &
CAT 20 AS NECESSARY

10 CY RANDOM
RIPRAP CL III/A

33-261, FERTILIZE, &
CAT 20 AS NECESSARY

NOTE:
MODIFY PRAIRIE MIX LIMITS AS NECESSARY

UNIT 14
PAD EL=1014.7

UNIT 15
PAD EL=1014.8

UNIT 16
PAD EL=1014.9

UNIT 18
PAD EL=1015.3

UNIT 19
PAD EL=1015.3

UNIT 20
PAD EL=1015.3

UNIT 21
PAD EL=1015.

13+00

13+95.53

14+00

16+00

17+00

211TH LANE

EROSION CONTROL LEGEND

- EXISTING/PROPOSED DRAINAGE FLOW
- SILT FENCE, MACHINE SLICED OR APPROVED EQUAL
- STABILIZED CONSTRUCTION EXIT
- STORM DRAIN INLET PROTECTION
- SEED MIX 25-151 & FERTILIZE, & MULCH
- SEED MIX 34-262, FERTILIZE, & MULCH (ROLLED EROSION PREVENTION CAT 20 IN STEEP SLOPES)

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HORZ. SCALE 0 30 60 FEET

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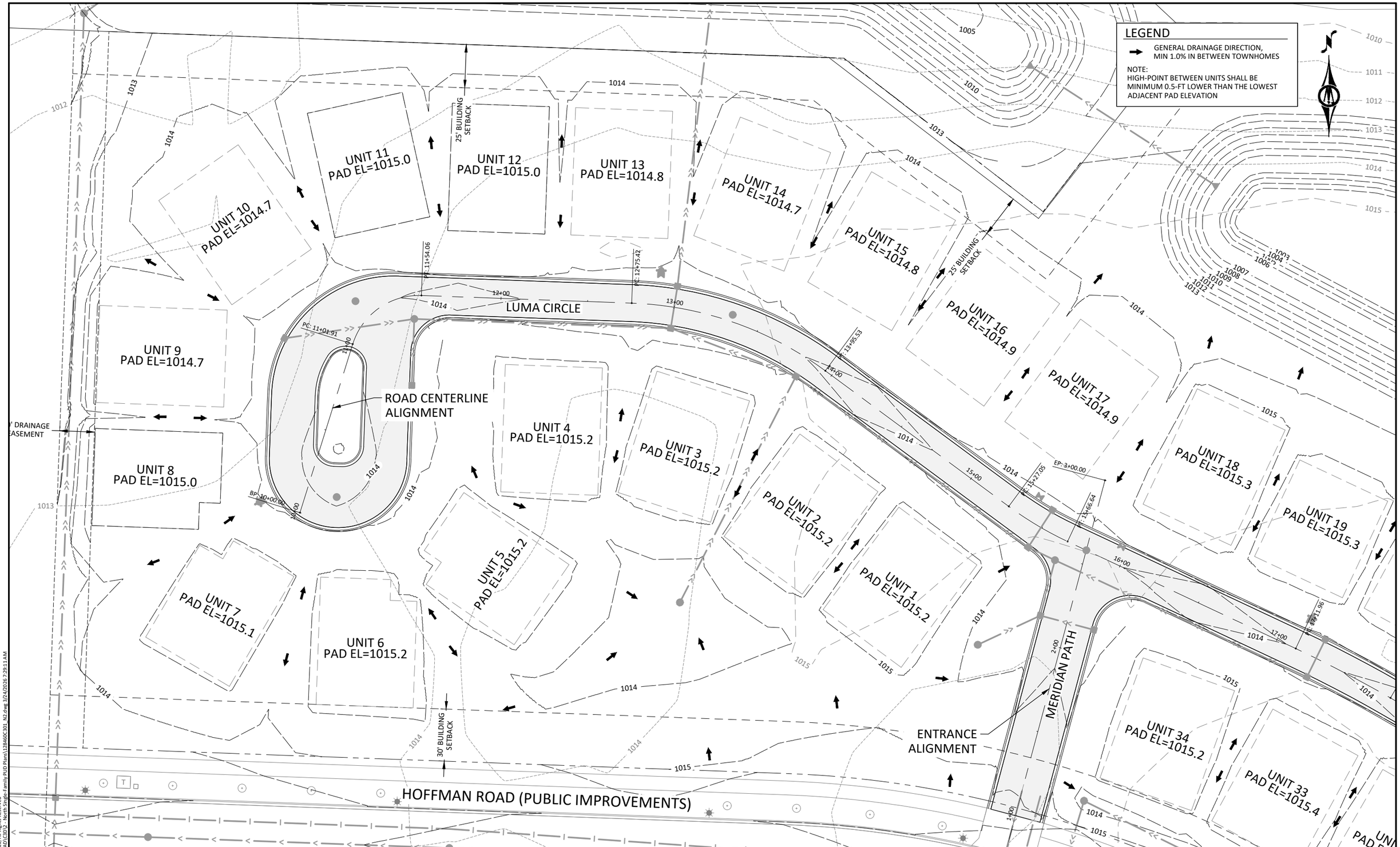
MESENBRINK CONSTRUCTION
AVEYDA PRESERVE - NORTH PUD
STORMWATER POLLUTION PREVENTION PLAN
EROSION & SEDIMENT CONTROL PLAN

SHEET C2.08



HORZ. 0 25 50 SCALE FEET

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MESENBRINK CONSTRUCTION
AVEYDA PRESERVE - NORTH PUD
GRADING PLAN

SHEET C3.01

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LEGEND

GENERAL DRAINAGE DIRECTION, MIN 1.0% IN BETWEEN TOWNHOMES

NOTE:
HIGH-POINT BETWEEN UNITS SHALL BE MINIMUM 0.5-FT LOWER THAN THE LOWEST ADJACENT PAD ELEVATION

UNIT 16 PAD EL=1014.9
UNIT 17 PAD EL=1014.9
UNIT 18 PAD EL=1015.3
UNIT 19 PAD EL=1015.3
UNIT 20 PAD EL=1015.3
UNIT 21 PAD EL=1015.7
UNIT 22 PAD EL=1016.1
UNIT 23 PAD EL=1016.5
UNIT 24 PAD EL=1016.8
UNIT 25 PAD EL=1017.1
UNIT 26 PAD EL=1017.1
UNIT 27 PAD EL=1017.2
UNIT 28 PAD EL=1017.0
UNIT 29 PAD EL=1016.7
UNIT 30 PAD EL=1016.3
UNIT 31 PAD EL=1015.9
UNIT 32 PAD EL=1015.6
UNIT 33 PAD EL=1015.4
UNIT 34 PAD EL=1015.2
UNIT 1 PAD EL=1015.2

MERIDIAN PATH
SOLA CIRCLE
HOFFMAN ROAD (PUBLIC IMPROVEMENTS)
ENTRANCE ALIGNMENT
ROAD CENTERLINE ALIGNMENT
30' BUILDING SETBACK

BP: 0+00.00
EP: 3+00.00
PC: 15+27.05
PT: 15+66.64
PC: 17+11.96
PT: 17+73.64
PC: 19+11.94
PT: 20+54.08
EP: 22+00.00

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HORZ. SCALE 0 25 50 FEET

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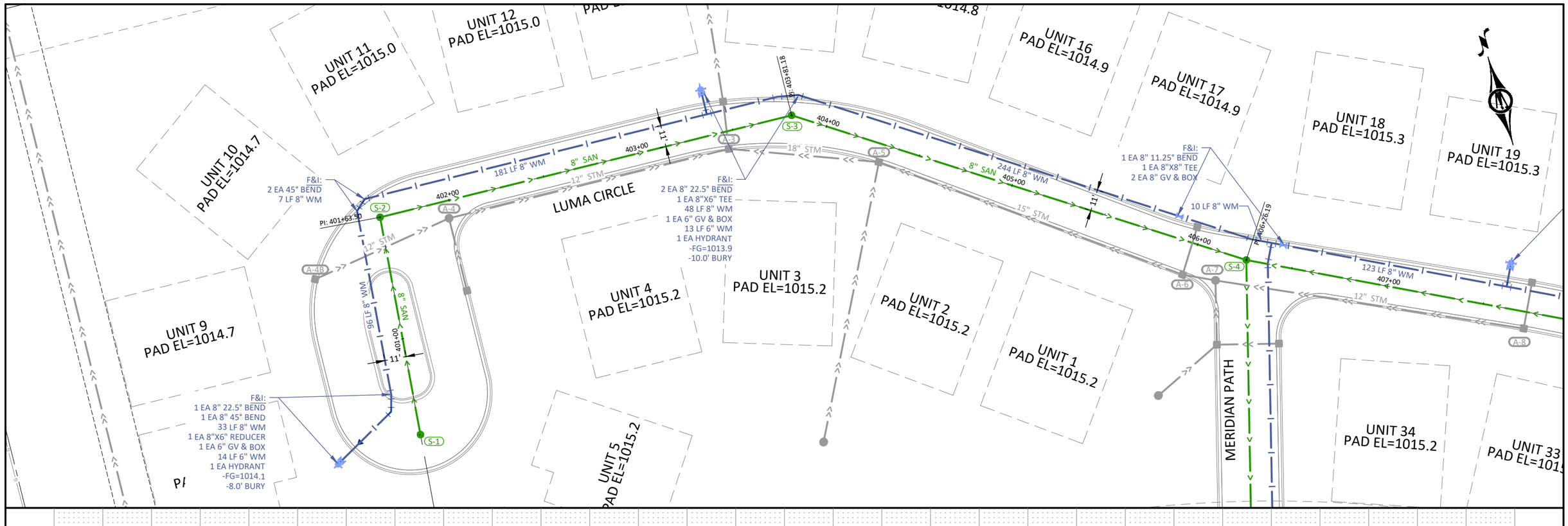
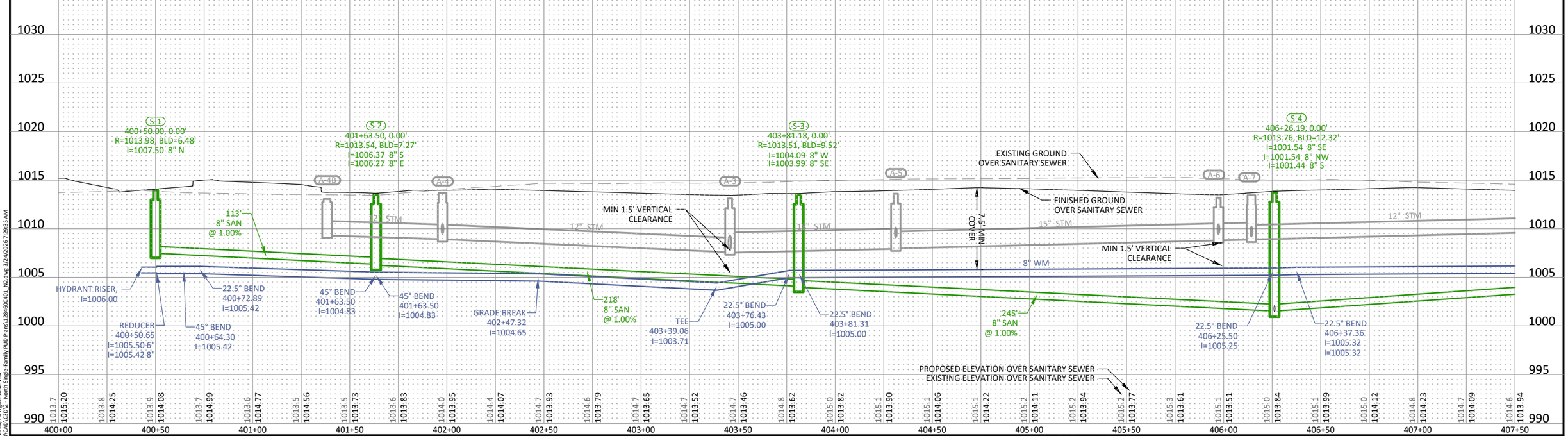
MESENBRINK CONSTRUCTION
AVEYDA PRESERVE - NORTH PUD
GRADING PLAN

SHEET C3.02





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MESENBRINK CONSTRUCTION
AVEYDA PRESERVE - NORTH PUD
SANITARY SEWER & WATERMAIN PLAN & PROFILE
LUMA CIRCLE - STA 400+00 TO 407+50

SHEET C4.01

UNIT 19
PAD EL=1015.3

UNIT 20
PAD EL=1015.3

UNIT 21
PAD EL=1015.7

UNIT 22
PAD EL=1016.1

UNIT 23
PAD EL=1016.5

UNIT 24
PAD EL=1016.8

UNIT 25
PAD EL=1017.1

UNIT 26
PAD EL=1017.1

UNIT 27
PAD EL=1017.2

UNIT 28
PAD EL=1017.0

UNIT 29

UNIT 30
PAD EL=1016.3

UNIT 31
PAD EL=1015.9

UNIT 32
PAD EL=1015.6

UNIT 33
PAD EL=1015.4

F&I:
1 EA 8"X6" TEE
1 EA 6" GV & BOX
12 LF 6" WM
1 EA HYDRANT
-FG=1014.4
-9.0' BURY

F&I:
1 EA 8" 22.5° BEND
1 EA 8" 45° BEND
26 LF 8" WM
1 EA 8"X6" REDUCER
1 EA 6" GV & BOX
10 LF 6" WM
1 EA HYDRANT
-FG=1016.6
-8.5' BURY

EP: 412+45.87

408+00
8" SAN
259 LF 8" WM
409+00
11'
SOLA CIRCLE
410+00
S-5
20 LF 8" WM
11'
411+00
127 LF 8" WM
8" SAN
412+00
S-6

A-8

F&I:
1 EA 22.5° BEND
1 EA 8" 11.25° BEND

PI: 410+26.19

SOLA CIRCLE

N

S-5
410+26.19, 0.00'
R=1015.20, BLD=8.04'
I=1007.26 8" E
I=1007.16 8" NW

S-6
412+00.00, 0.00'
R=1016.10, BLD=7.10'
I=1009.00 8" W

FINISHED GROUND
OVER SANITARY SEWER

EXISTING GROUND
OVER SANITARY SEWER

7.5' MIN
COVER

A-8

MIN 1.5' VERTICAL
CLEARANCE

8" WM

GRADE BREAK
408+50.00
I=1005.72

TEE
407+60.14
I=1005.47

400'
8" SAN
@ 1.41%

GRADE BREAK
409+00.00
I=1004.50

22.5° BEND
410+18.94
I=1006.15

11.25° BEND
410+44.87
I=1006.41

174'
8" SAN
@ 1.00%

8" WM

45° BEND
411+71.97
I=1008.02

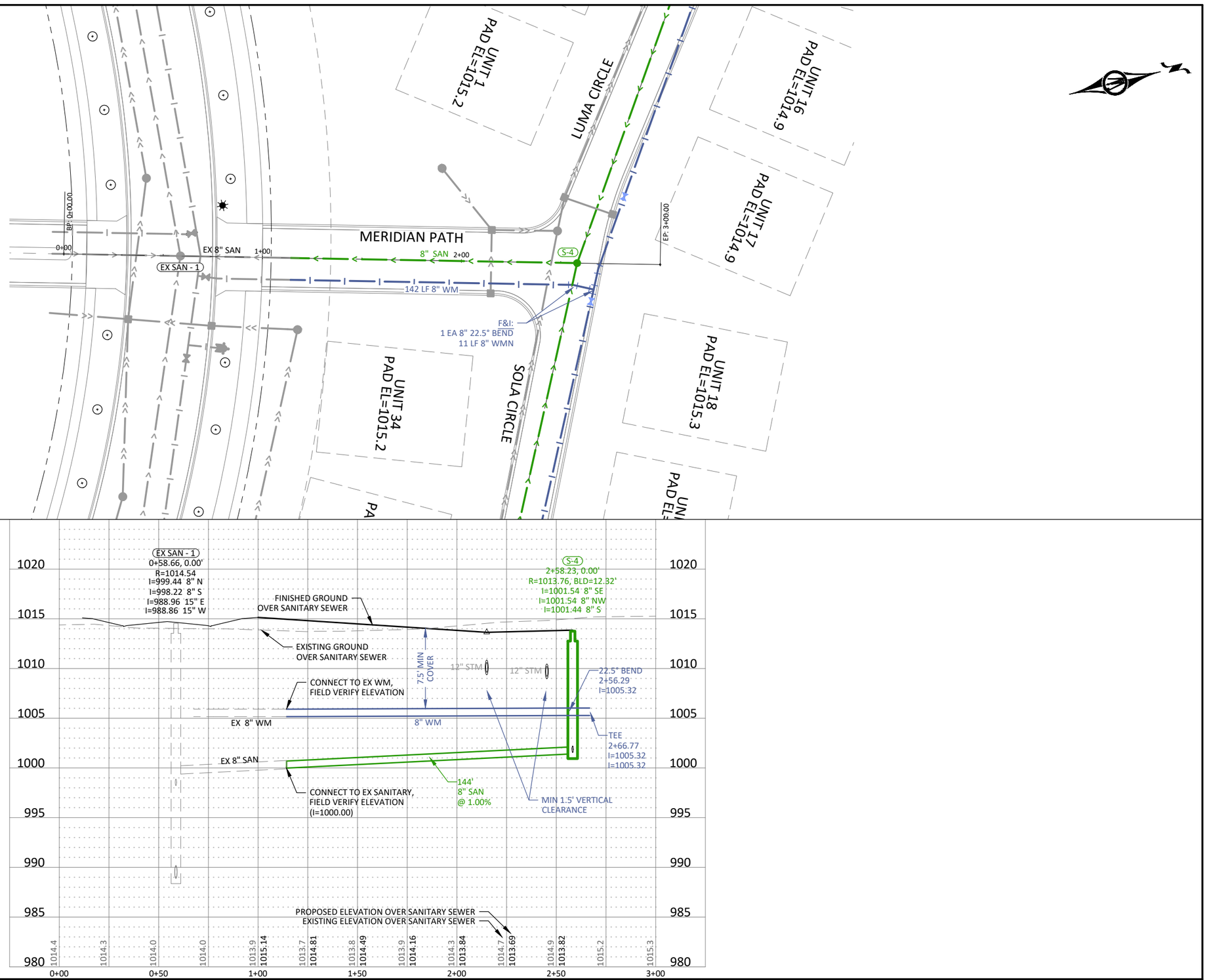
22.5° BEND
411+78.91
I=1008.02

HYDRANT RISER,
I=1008.10

REDUCER
411+84.42
I=1008.02 8"
I=1008.10 6"

PROPOSED ELEVATION OVER SANITARY SEWER
EXISTING ELEVATION OVER SANITARY SEWER

| | | |



HORZ. 0 25 50 SCALE FEET

VERT. 0 5 10 SCALE FEET

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MESENBRINK CONSTRUCTION

AVEYDA PRESERVE - NORTH PUD

SANITARY SEWER & WATERMAIN PLAN & PROFILE

MERIDIAN PATH - STA 0+00 TO 3+00

SHEET C4.03

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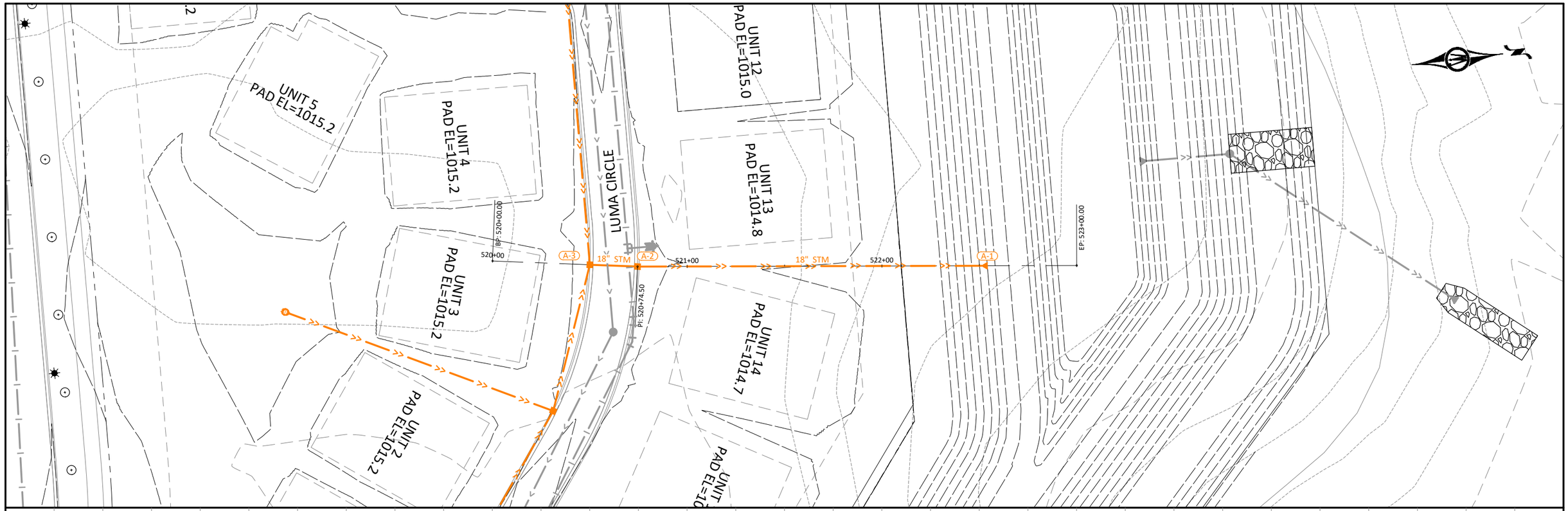

HORZ. 0 25 50 SCALE FEET

VERT. 0 5 10 SCALE FEET

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MESENBRINK CONSTRUCTION

AVEYDA PRESERVE - NORTH PUD

STORM SEWER PLAN & PROFILE

MAINLINE OUTFALL - STA 520+00 TO 523+00

SHEET C5.01

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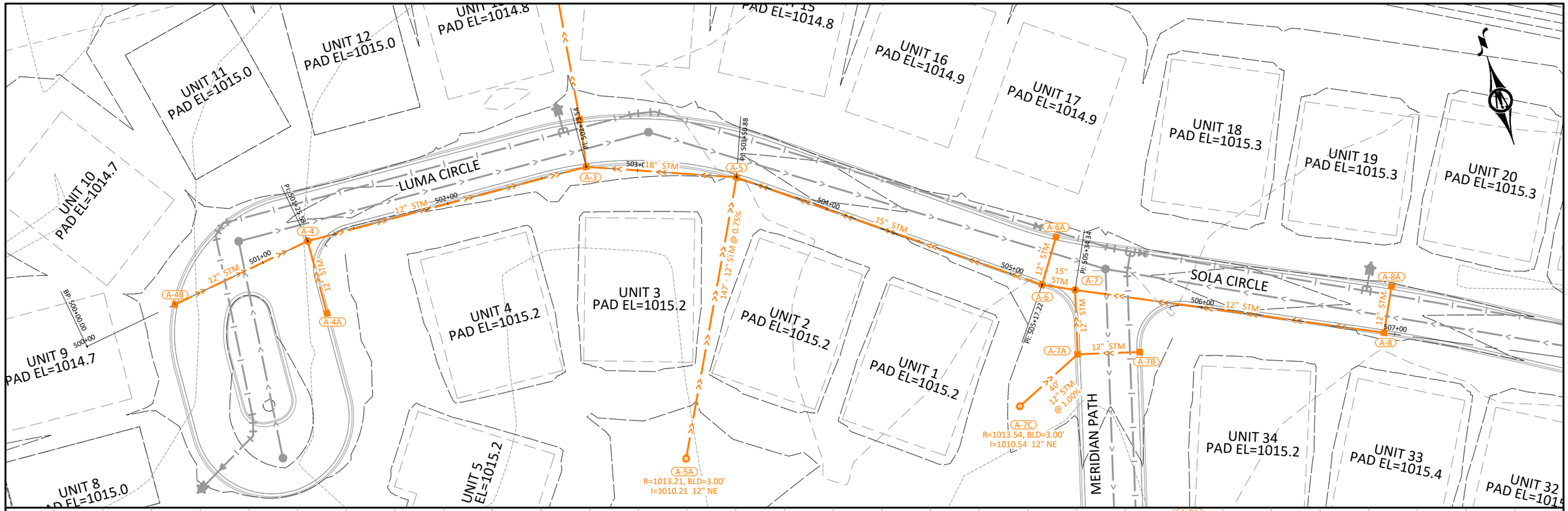

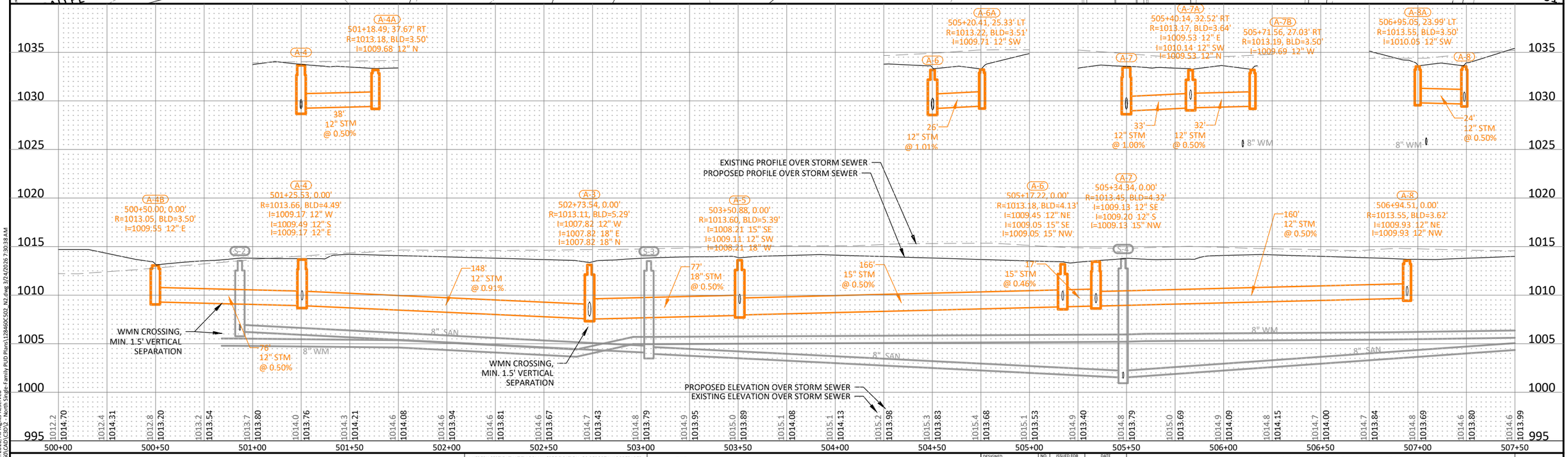

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VERT. SCALE 0 5 10 FEET

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MESENBRINK CONSTRUCTION
AVEYDA PRESERVE - NORTH PUD
STORM SEWER PLAN & PROFILE
ROADWAYS - STA 500+00 TO 507+50

SHEET C5.02

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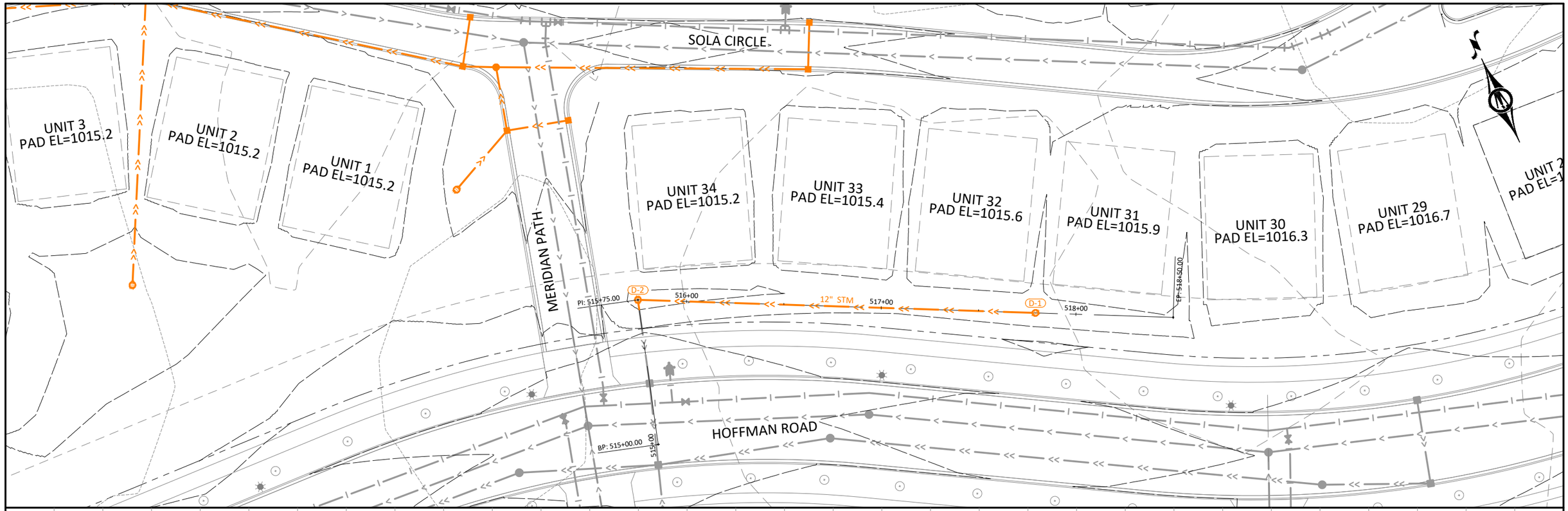

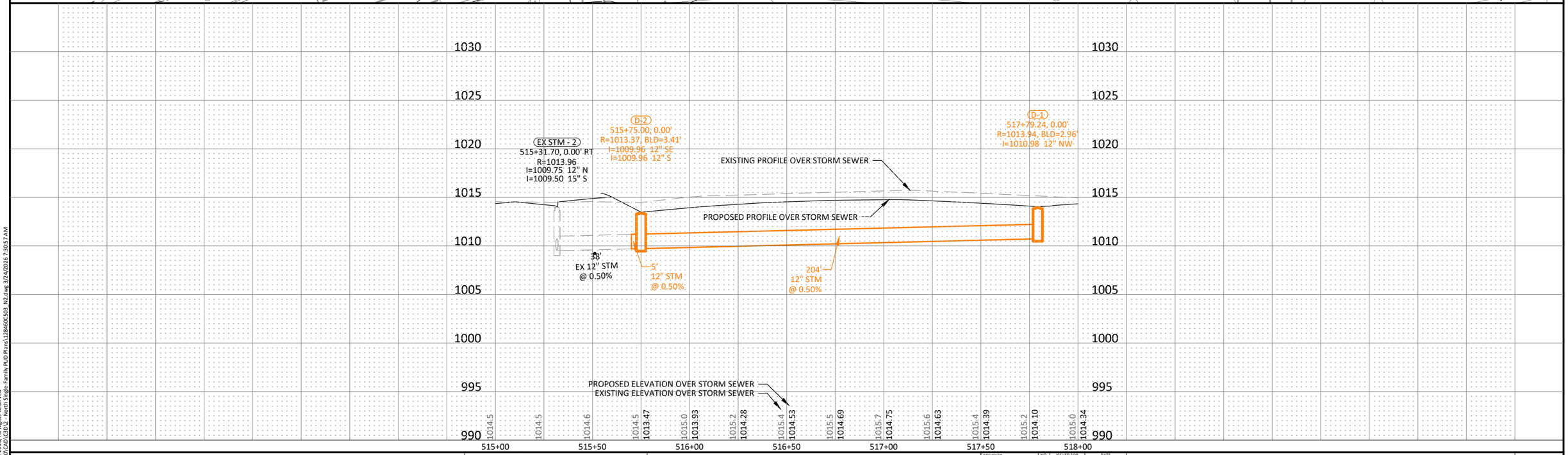

HORZ. SCALE 0 25 50 FEET

VERT. SCALE 0 5 10 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, MINNESOTA 56001
Phone: (507) 625-4171
Email: Mankato@bolton-menk.com
www.bolton-menk.com

DESIGNED	AWP
DRAWN	AWP
CHECKED	NPM
CLIENT PROJ. NO.	0M1.128460

NO.	ISSUED FOR	DATE

MESENBRINK CONSTRUCTION
AVEYDA PRESERVE - NORTH PUD
STORM SEWER PLAN & PROFILE
SOUTHERN BACKYARDS - STA 515+00 TO 518+00

SHEET C5.03

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E-1
R=1009.88
I=1007.00 18" SE

18" STM

E-2
R=1010.40
I=1007.00 18" NW

NOTE:
PROPOSED BASIN IS AN ELECTIVE FEATURE TO GENERATE NECESSARY FILL FOR THE SUBDIVISION. THE PUBLIC PONDS FROM THE "HOFFMAN ROAD EXTENSION" PLANS PROVIDE THE REQUIRED STORAGE REQUIREMENTS FOR THE DEVELOPMENT.

1009
1010
1011
1012
1013
1014
1015
1016

UNIT 15
=1014.8

UNIT 16
PAD EL=1014.9

UNIT 17
PAD EL=1014.9

UNIT 18
PAD EL=1015.3

UNIT 19
PAD EL=1015.3

UNIT 20
PAD EL=1015.3

UNIT 21
PAD EL=1015.7

UNIT 22
PAD EL=1016.1

UNIT 23
PAD EL=1016.5

UNIT 24
PAD EL=1016.8

UNIT 25
PAD EL=1017.1

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SCALE FEET

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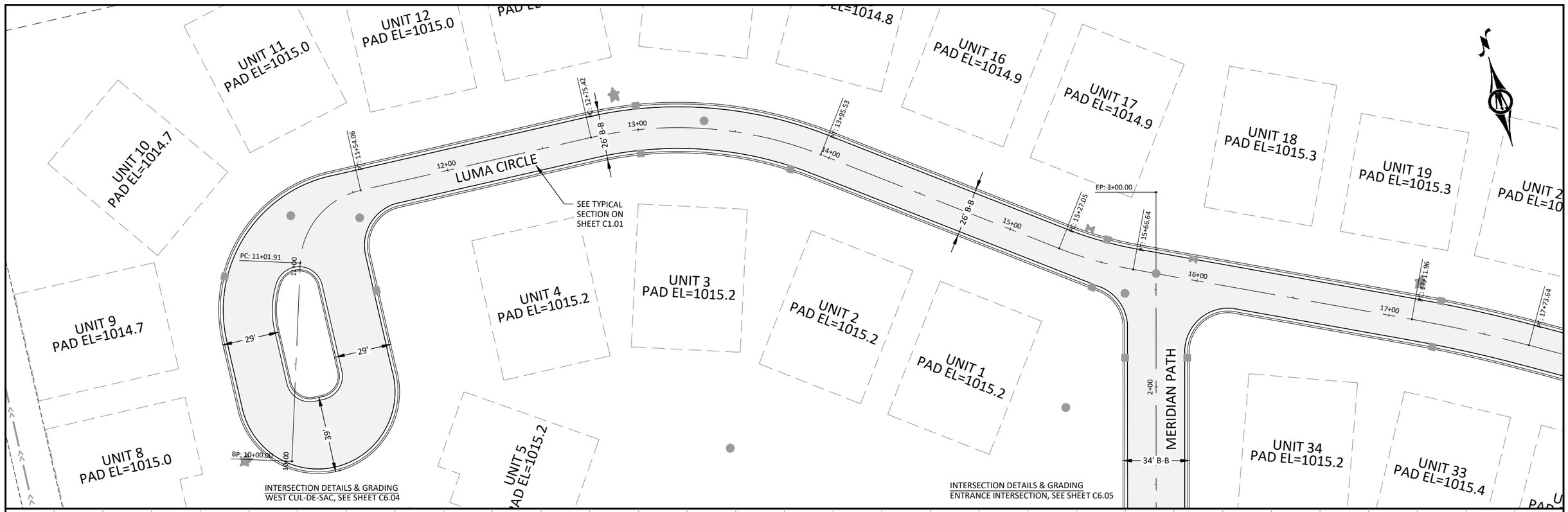
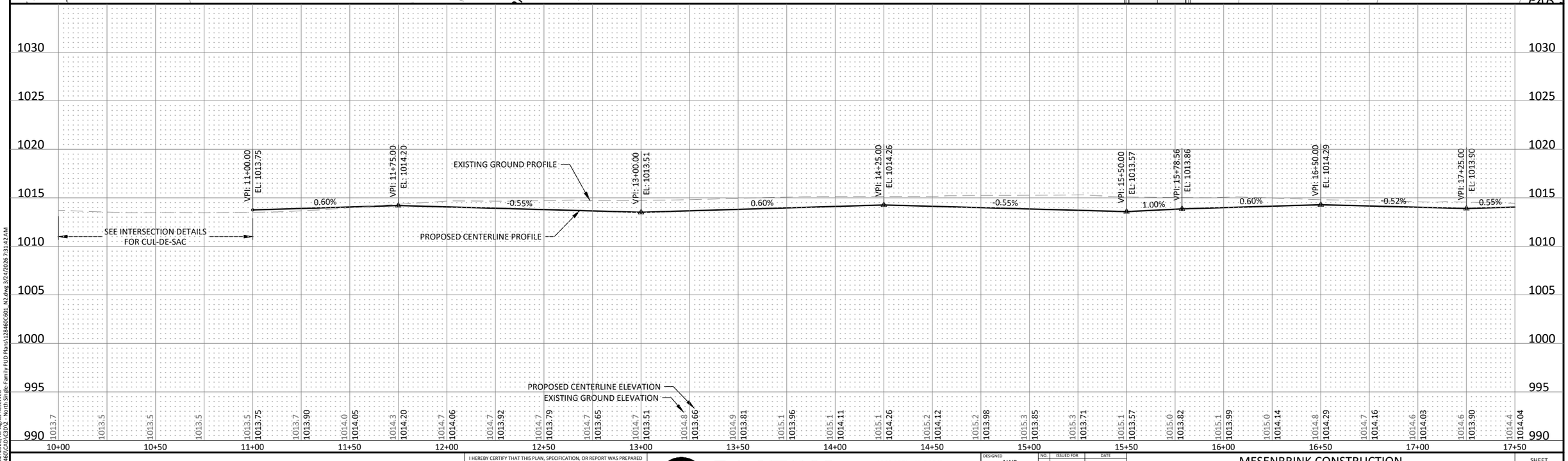
MESENBRINK CONSTRUCTION
AVEYDA PRESERVE - NORTH PUD
STORM SEWER PLAN & PROFILE
NORTHERN BACKYARDS & BASIN

SHEET
C5.04





HORZ. SCALE 0 25 50 FEET
VERT. SCALE 0 5 10 FEET

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NO.	ISSUED FOR	DATE

MESENBRINK CONSTRUCTION
AVEYDA PRESERVE - NORTH PUD
STREET PLAN & PROFILE
LUMA CIRCLE - STA 10+00 TO 17+50

SHEET C6.01

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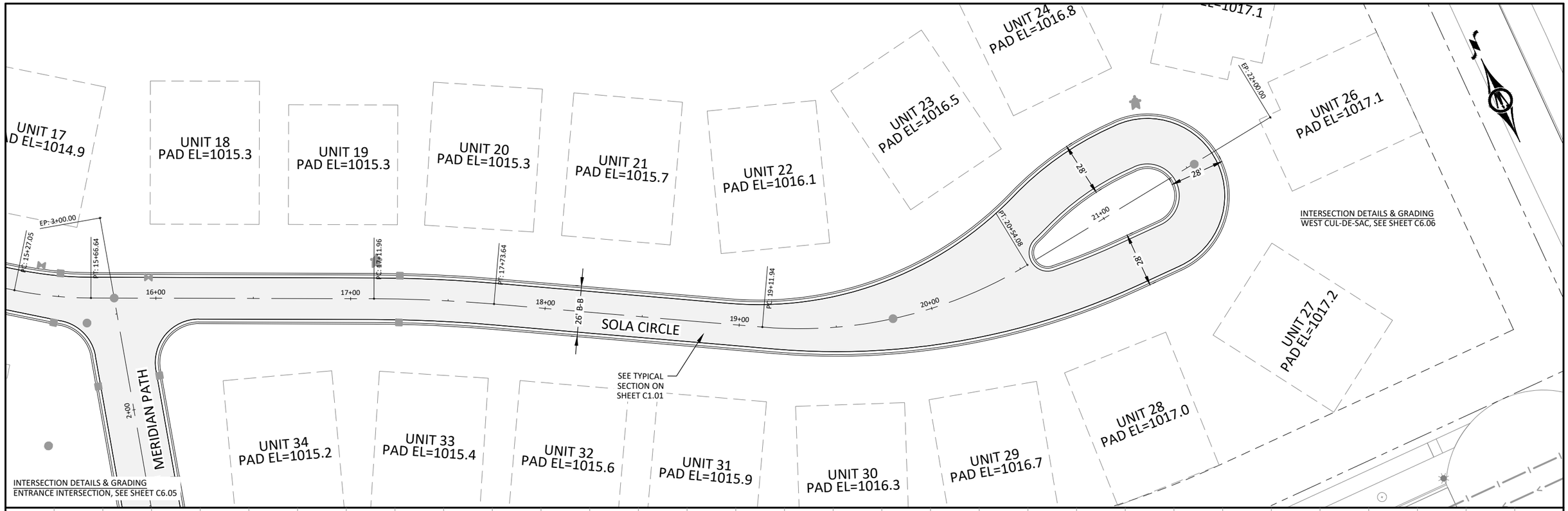

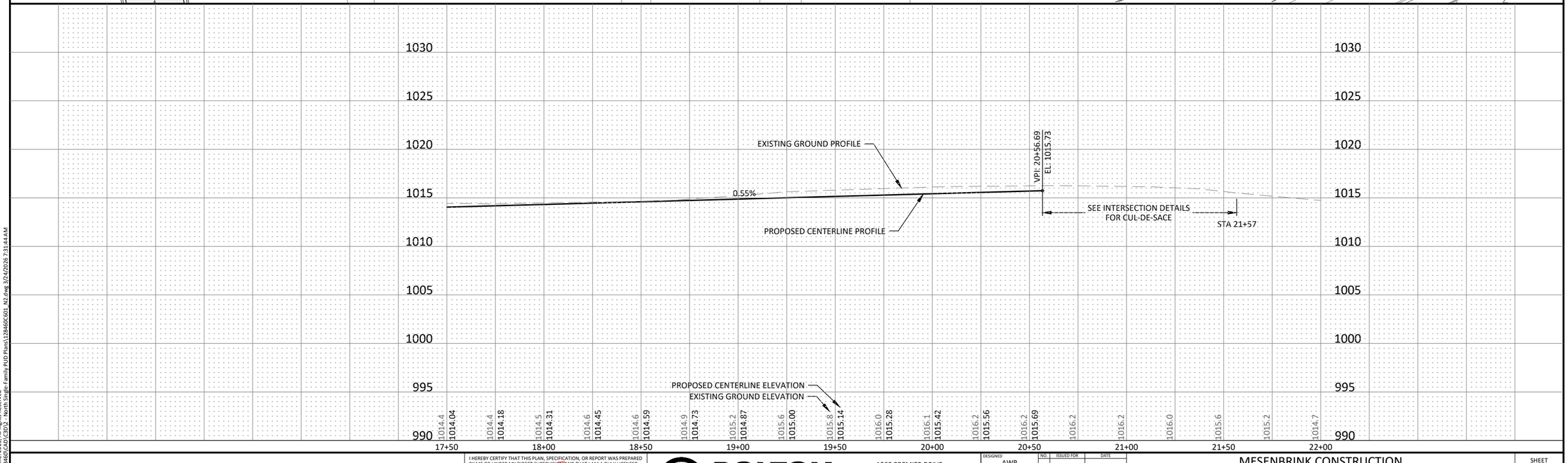

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VERT. SCALE 0 5 10 FEET

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MESENBRINK CONSTRUCTION

AVEYDA PRESERVE - NORTH PUD

STREET PLAN & PROFILE

SOLA CIRCLE - STA 17+50 TO 22+00

SHEET C6.02

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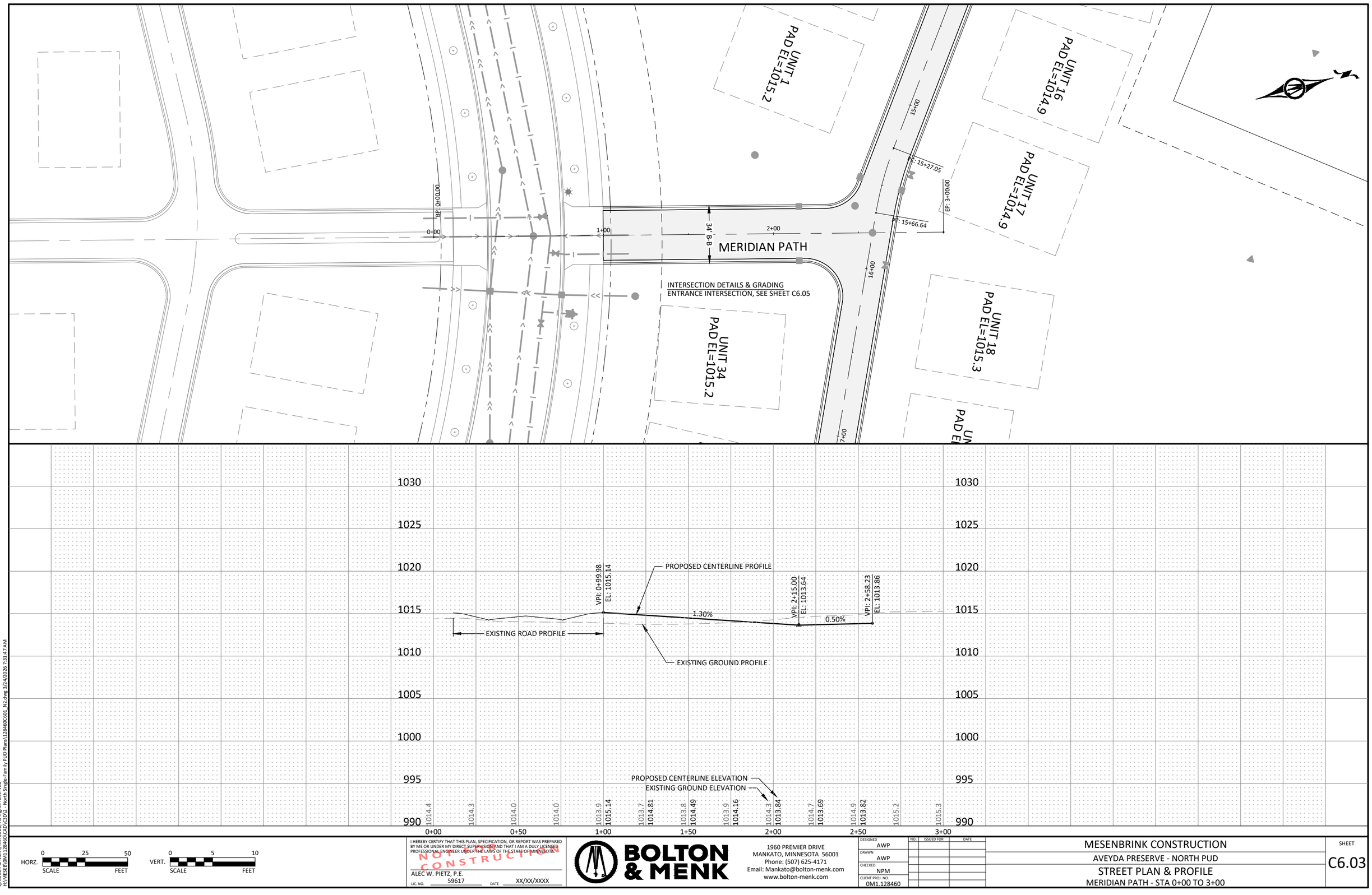

HORZ. 0 25 50 SCALE FEET

VERT. 0 5 10 SCALE FEET

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NO.	ISSUED FOR	DATE

MESENBRINK CONSTRUCTION

AVEYDA PRESERVE - NORTH PUD

STREET PLAN & PROFILE

MERIDIAN PATH - STA 0+00 TO 3+00

SHEET C6.03

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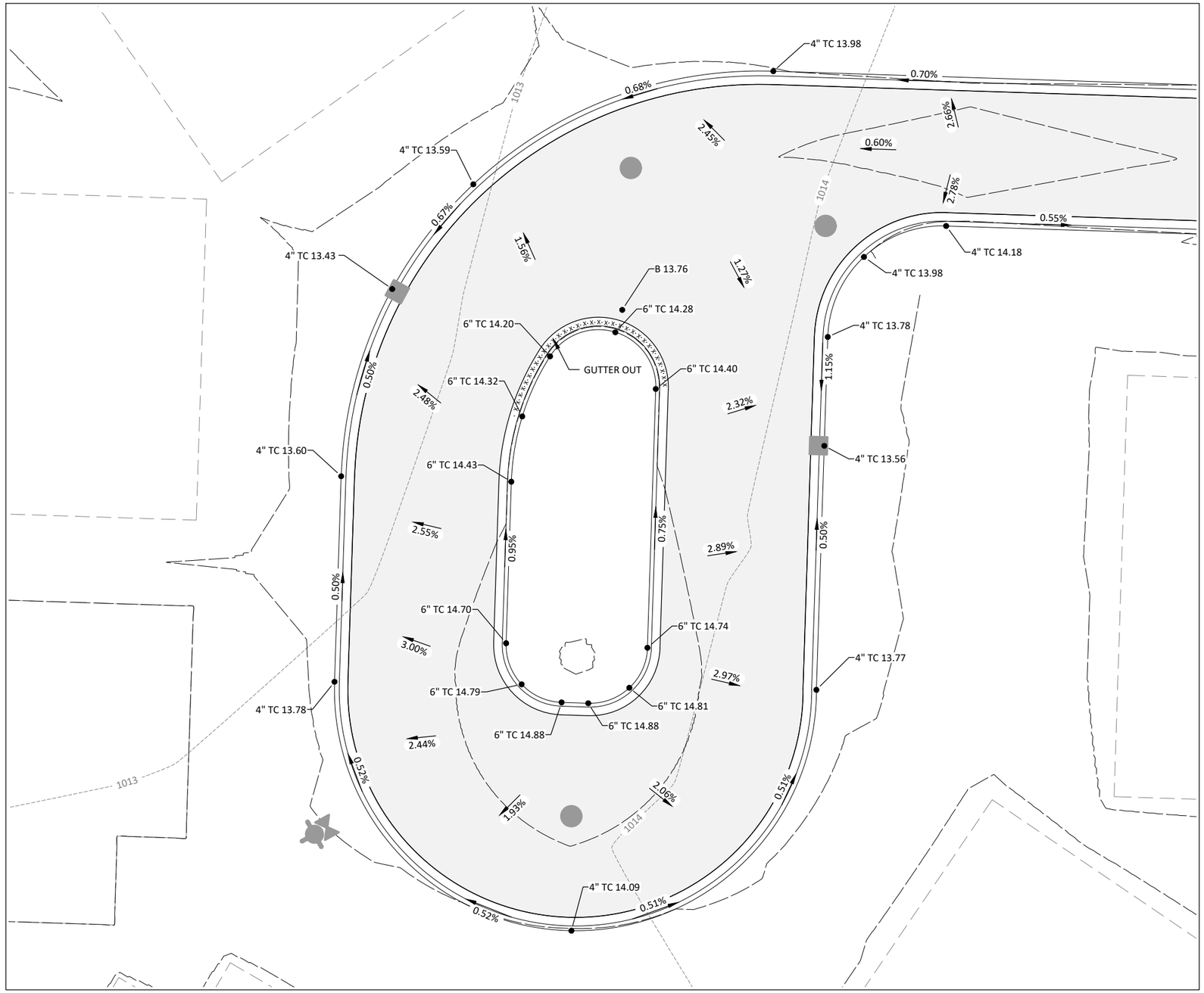

LUMA CIRCLE CUL-DE-SAC

LEGEND

6" TC=	6" HEIGHT CURB
4" TC=	4" HEIGHT CURB
B=	BITUMINOUS
ME=	MATCH EXISTING

HORZ. SCALE 0 10 20 FEET

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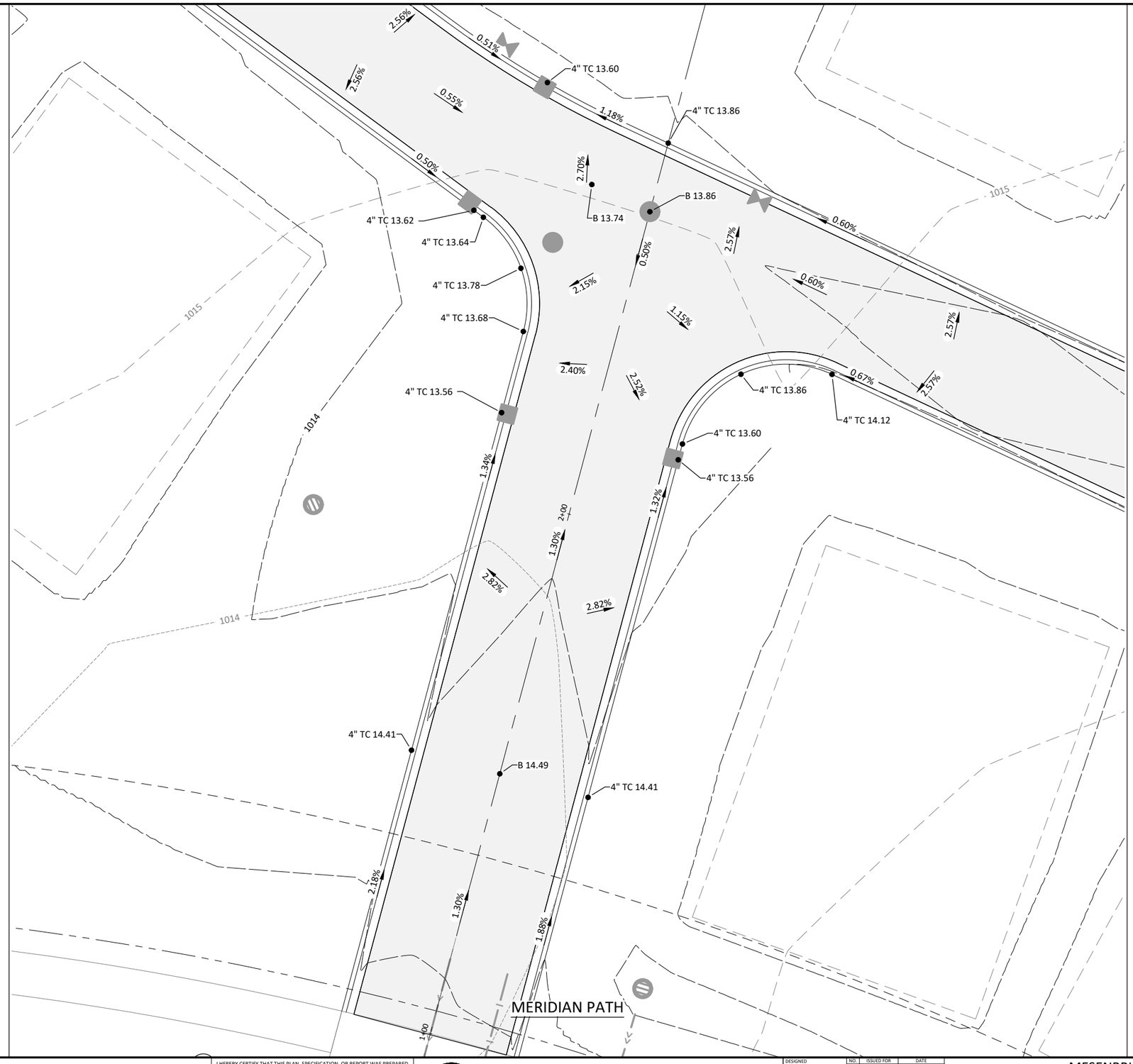
MESENBRINK CONSTRUCTION
AVEYDA PRESERVE - NORTH PUD
INTERSECTION DETAILS
WEST CUL-DE-SAC

SHEET C6.04



LEGEND

6" TC=	6" HEIGHT CURB
4" TC=	4" HEIGHT CURB
B=	BITUMINOUS
ME=	MATCH EXISTING

HORZ. 0 10 20
SCALE FEET

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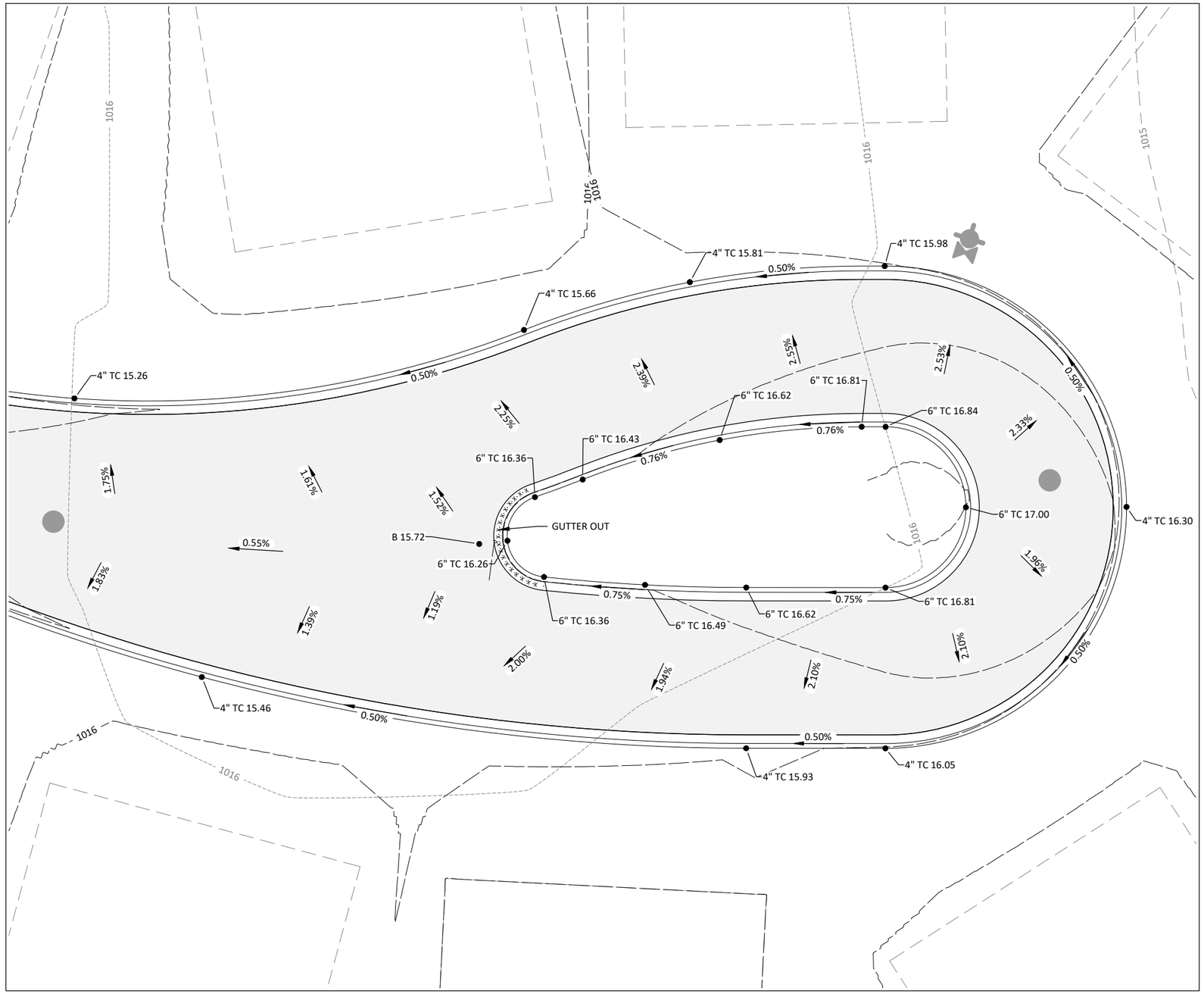
DRAWN	AWP			
CHECKED	NPM			
CLIENT PROJ. NO.	0M1.128460			

MESENBRINK CONSTRUCTION
AVEYDA PRESERVE - NORTH PUD
INTERSECTION DETAILS
ENTRANCE

SHEET
C6.05



SOLA CIRCLE CUL-DE-SAC

LEGEND

6" TC=	6" HEIGHT CURB
4" TC=	4" HEIGHT CURB
B=	BITUMINOUS
ME=	MATCH EXISTING

HORZ. SCALE 0 10 20 FEET

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NO.	ISSUED FOR	DATE

MESENBRINK CONSTRUCTION
AVEYDA PRESERVE - NORTH PUD
INTERSECTION DETAILS
EAST CUL-DE-SAC

SHEET C6.06

MESENBRINK CONSTRUCTION

CONSTRUCTION PLANS FOR

AVEYDA PRESERVE - SOUTH PUD
MANKATO, MN

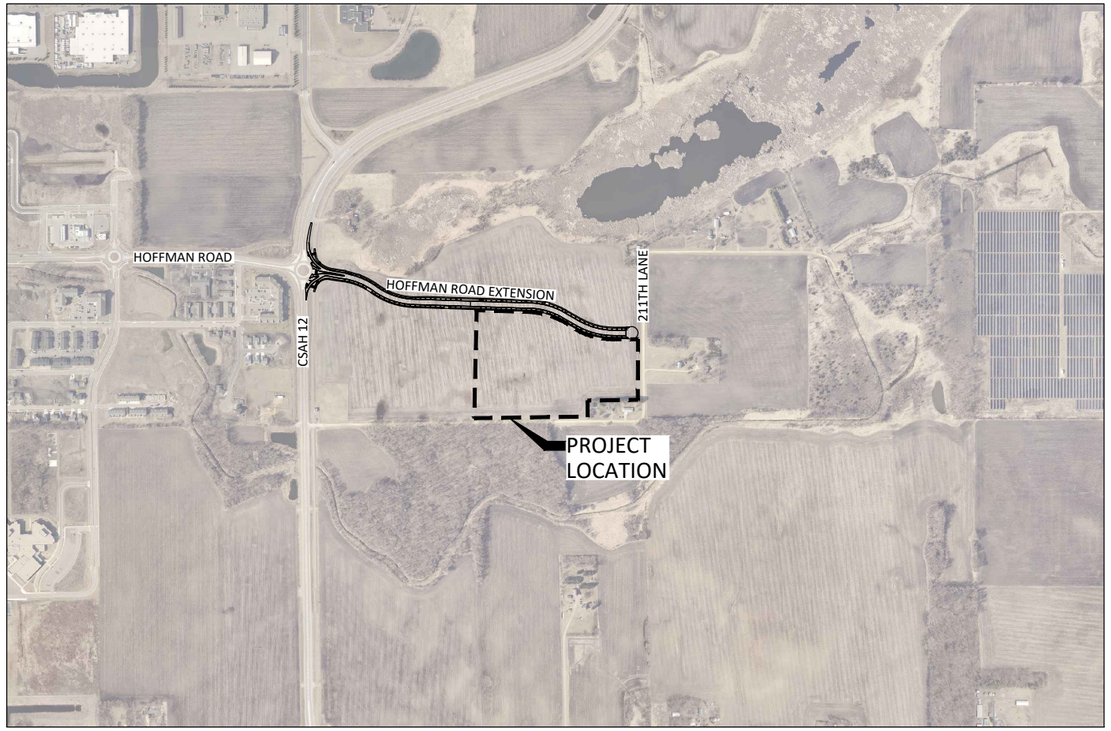
PAVEMENT AND SIDEWALK CONSTRUCTION, SITE GRADING
WATERMAIN, SANITARY SEWER, AND STORM SEWER INSTALLATION

MARCH 2026

MAP OF THE
CITY OF MANKATO
BLUE EARTH COUNTY, MN



0 600 1200
SCALE FEET



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 38-02, ENTITLED "STANDARD GUIDELINES FOR THE COLLECTION AND DEPICTION OF EXISTING SUBSURFACE UTILITY DATA."

SHEET NUMBER	SHEET TITLE
GENERAL	
G0.01 - G0.02	TITLE SHEET & LEGEND
G1.01	CONSTRUCTION DETAIL TABLES
G2.01	PROJECT OVERVIEW
CIVIL	
C0.01	EXISTING CONDITIONS
C1.01 - C1.04	CONSTRUCTION DETAILS
C2.01 - C2.09	STORMWATER POLLUTION PREVENTION PLAN
C3.01 - C3.04	GRADING PLAN
C4.01 - C4.07	SANITARY SEWER & WATERMAIN PLAN
C4.08 - C4.XX	SERVICE PLAN & TABULATION (IN PROGRESS, NOT PROVIDED)
C5.01 - C5.05	STORM SEWER PLAN & PROFILE
C6.01 - C6.07	STREET PLAN & PROFILE
C6.08 - C6.11	INTERSECTION DETAILS

THIS PLAN SET CONTAINS 38 SHEETS.

BM=1012.33
TOP NUT HYDRANT
SE QUADRANT OF HOFFMAN / CSAH 12 ROUNDABOUT

PROJECT DATUM: BLUE EARTH COUNTY
HORIZONTAL: 2011 COUNTY COORDINATES
VERTICAL: NAVD 1988

RECORD DRAWING INFORMATION
OBSERVER:
CONTRACTOR:
DATE:

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MESENBRINK CONSTRUCTION
AVEYDA PRESERVE - SOUTH PUD
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
- 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 ON POLE
- LIGHT-GROUND
- MAILBOX
- MANHOLE-COMMUNICATION
- MANHOLE-ELECTRIC
- MANHOLE-GAS
- MANHOLE-HEAT
- MANHOLE-SANITARY SEWER
- MANHOLE-STORM SEWER
- MANHOLE-UTILITY
- MANHOLE-WATER
- METER
- ORDER MICROPHONE
- PARKING METER
- PAVEMENT MARKING
- PEDESTAL-COMMUNICATION
- PEDESTAL-ELECTRIC
- PEDESTRIAN PUSH BUTTON
- PICNIC TABLE
- POLE-UTILITY
- POLE-BRACE
- POST
- RAILROAD SIGNAL POLE
- REGULATION STATION GAS
- SATELLITE DISH
- SIGN NON TRAFFIC
- 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

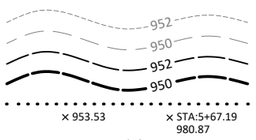
EXISTING UTILITY LINES

- FORCEMAIN
- SANITARY SEWER
- SANITARY SERVICE
- STORM SEWER
- STORM SEWER DRAIN TILE
- WATERMAIN
- WATER SERVICE

PROPOSED UTILITY LINES

- FORCEMAIN
- SANITARY SEWER
- SANITARY SERVICE
- STORM SEWER
- STORM SEWER DRAIN TILE
- WATERMAIN
- WATER SERVICE
- PIPE CASING

GRADING INFORMATION



- EXISTING CONTOUR MINOR
- EXISTING CONTOUR MAJOR
- PROPOSED CONTOUR MINOR
- PROPOSED CONTOUR MAJOR
- PROPOSED GRADING LIMITS / SLOPE LIMITS
- PROPOSED SPOT ELEVATION
- RISE:RUN (SLOPE)

HATCH PATTERNS

- BITUMINOUS
- CONCRETE
- GRAVEL

EXISTING PRIVATE UTILITY LINES

NOTE:
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- 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 38-02.

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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MESENBRINK CONSTRUCTION
AVEYDA PRESERVE - SOUTH PUD
LEGEND

SHEET G0.02

STORM SEWER TABLE

STRUCTURE NUMBER	STRUCTURE DESIGN	STATION	CASTING	RIM ELEV	LOW INVERT ELEV	DOWNSTREAM STRUCTURE	HEIGHT	NOTES
A-1	60-4020	516+80.1	C-1	1015.03	1007.92	EX STM - 2	7.11 LF	
A-1A	18" NYLOPLAST	N/A	C-4	1014.48	1010.77	A-1	3.71 LF	OR ALTERNATE STRUCTURE DESIGN
A-1B	18" NYLOPLAST	N/A	C-4	1014.48	1011.48	A-1A	3.00 LF	OR ALTERNATE STRUCTURE DESIGN
A-2	48-4022	515+83.0	C-3	1013.55	1008.21	A-1	5.34 LF	
A-2A	R-1	515+82.3	C-3	1013.63	1009.95	A-2	3.68 LF	
A-3	60-4020	515+32.9	C-1	1013.95	1008.36	A-2	5.59 LF	
A-3A	R-1	521+43.6	C-3	1013.03	1008.95	A-3	4.08 LF	
A-3B	R-1	521+43.6	C-3	1013.03	1009.53	A-3A	3.50 LF	
A-3C	18" NYLOPLAST	520+50.0	C-4	1012.42	1009.42	A-3A	3.00 LF	OR ALTERNATE STRUCTURE DESIGN
A-4	48-4022	515+02.8	C-3	1013.44	1008.48	A-3	4.96 LF	
A-4A	R-1	515+02.8	C-3	1013.48	1009.98	A-4	3.50 LF	
A-5	48-4022	513+03.3	C-2	1013.90	1009.28	A-4	4.62 LF	
A-6	48-4022	511+95.6	C-3	1013.34	1009.71	A-5	3.63 LF	
A-6A	R-1	51+95.6	C-3	1013.39	1010.39	A-6	3.00 LF	
A-6B	18" NYLOPLAST	N/A	C-4	1013.73	1010.21	A-6	3.52 LF	OR ALTERNATE STRUCTURE DESIGN
A-6C	18" NYLOPLAST	N/A	C-4	1013.22	1010.36	A-6B	2.86 LF	OR ALTERNATE STRUCTURE DESIGN
A-6D	18" NYLOPLAST	N/A	C-4	1013.77	1010.77	A-6B	3.00 LF	OR ALTERNATE STRUCTURE DESIGN
A-7	48-4020	510+50.0	C-1	1014.23	1010.30	A-6	3.93 LF	
A-7A	R-1	510+49.8	C-3	1013.97	1010.45	A-7	3.52 LF	
A-7B	R-1	510+25.8	C-3	1013.97	1010.57	A-7A	3.40 LF	
A-7C	R-1	510+45.8	C-3	1013.99	1010.55	A-7	3.44 LF	
A-7D	R-1	510+21.9	C-3	1013.99	1010.67	A-7C	3.32 LF	
A-8	48-4022	524+02.4	C-2	1014.50	1009.13	A-3	5.37 LF	
A-8A	18" NYLOPLAST	524+02.4	C-4	1013.01	1010.01	A-8	3.00 LF	OR ALTERNATE STRUCTURE DESIGN
A-9	48-4022	524+97.7	C-3	1013.99	1009.42	A-8	4.57 LF	
A-9A	R-1	524+97.7	C-3	1014.04	1009.66	A-9	4.38 LF	
A-9B	R-1	525+26.4	C-3	1013.88	1010.22	A-9A	3.66 LF	
A-9C	R-1	525+64.4	C-3	1013.88	1010.38	A-9B	3.50 LF	
A-10	48-4020	525+34.7	C-1	1014.25	1009.53	A-9	4.72 LF	
A-10A	R-1	525+34.7	C-3	1013.69	1009.92	A-10	3.77 LF	
A-10B	R-1	525+57.0	C-3	1013.69	1010.04	A-10A	3.65 LF	
A-11	48-4020	526+64.4	C-1	1014.82	1010.09	A-10	4.73 LF	
A-11A	18" NYLOPLAST	526+64.4	C-4	1013.44	1010.44	A-11	3.00 LF	OR ALTERNATE STRUCTURE DESIGN
A-12	48-4022	527+42.9	C-3	1014.09	1010.45	A-11	3.64 LF	
A-12A	R-1	527+42.9	C-3	1014.14	1010.61	A-12	3.53 LF	
A-12B	18" NYLOPLAST	N/A	C-4	1014.54	1010.95	A-12A	3.59 LF	
A-12C	18" NYLOPLAST	N/A	C-4	1014.80	1011.43	A-12B	3.37 LF	
A-12D	18" NYLOPLAST	N/A	C-4	1014.66	1011.72	A-12C	2.94 LF	
A-13	R-1	528+93.2	C-3	1014.14	1010.90	A-12	3.24 LF	
A-13A	R-1	529+10.8	C-3	1014.14	1011.14	A-13	3.00 LF	
B-1	18" NYLOPLAST	N/A	C-4	1013.29	1010.29	EX STM - 1	3.00 LF	OR ALTERNATE STRUCTURE DESIGN
B-2	48-4020	504+20.7	C-1	1013.90	1007.54	EX STM - 1	6.36 LF	
B-3	48-4022	503+03.2	C-3	1012.99	1008.13	B-2	4.86 LF	
B-3A	R-1	502+96.6	C-3	1013.03	1009.53	B-3	3.50 LF	
B-4	R-1	500+50.0	C-3	1013.41	1009.33	B-3	4.08 LF	
B-5	R-1	500+50.2	C-3	1013.41	1009.33	B-4	4.08 LF	
B-6	18" NYLOPLAST	N/A	C-4	1013.82	1009.85	B-5	3.97 LF	OR ALTERNATE STRUCTURE DESIGN
B-6A	18" NYLOPLAST	N/A	C-4	1013.14	1010.14	B-6	3.00 LF	OR ALTERNATE STRUCTURE DESIGN
B-6B	18" NYLOPLAST	N/A	C-4	1013.12	1010.12	B-6	3.00 LF	OR ALTERNATE STRUCTURE DESIGN

SANITARY SEWER TABLE

STRUCTURE	STATION	RIM ELEV	LOW INVERT ELEV	DOWNSTREAM STRUCTURE	HEIGHT	NOTES
S-1	405+66.2	1014.16	1000.28	EXISTING	13.88 LF	
S-2	402+66.2	1013.85	1003.87	S-1	9.98 LF	
S-3	400+50.0	1014.44	1006.13	S-2	8.31 LF	
S-3A	450+90.0	1015.11	1008.60	S-3	6.51 LF	
S-3B	455+58.6	1015.17	1008.55	S-3	6.62 LF	
S-4	421+33.4	1013.61	1003.28	S-1	10.33 LF	
S-5	445+41.0	1013.19	1003.94	S-4	9.25 LF	
S-6	443+00.0	1013.76	1006.45	S-5	7.31 LF	
S-7	440+84.0	1014.62	1008.71	S-6	5.91 LF	
S-8	413+76.1	1014.52	1003.56	EXISTING	10.96 LF	
S-8A	426+00.0	1014.85	1005.20	S-8	9.65 LF	
S-9	411+40.5	1014.49	1007.50	S-8	6.99 LF	
S-10	410+42.0	1015.16	1008.58	S-9	6.58 LF	
S-11	429+18.3	1014.43	1005.31	S-8	9.12 LF	
S-12	430+88.6	1014.60	1007.11	S-11	7.49 LF	
S-13	432+68.1	1015.56	1009.00	S-12	6.56 LF	

CASTING ASSEMBLY TABLE

CASTING ID	CASTING DESIGNATION	CASTING TYPE	NUMBER REQ'D
C-1	NEENAH R-1733	PLATEN LID LETTERED "STORM SEWER" WITH TWO CONCEALED PICKHOLES	6
C-2	NEENAH R-3067-V	CURB INLET FRAME & CURB BOX WITH TYPE V-VANE GRATE	2
C-3	NEENAH R-3067-VB	CURB INLET FRAME & CURB BOX WITH TYPE BIDIRECTIONAL V-VANE GRATE	26
C-4	18" INLET FRAME AND GRATE	INLET FRAME AND GRATE COMPATIBLE WITH STRUCTURE MATERIAL	15
C-5	NEENAH R-1642	FRAME W / SELF-SEALING SOLID LID LETTERED "SANITARY SEWER" WITH TWO CONCEALED PICKHOLES	16

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MESENBRINK CONSTRUCTION
AVEYDA PRESERVE - SOUTH PUD
CONSTRUCTION DETAIL TABLES

SHEET G1.01

UTILITY NOTES:

- 8" SANITARY SEWER
- 8" WATERMAIN
- 12"-18" STORM SEWER (PRIMARILY)

HOFFMAN ROAD (BY OTHERS)

AVEYDA BEND TRAIL

PRESERVE TRAIL

MERIDIAN PATH

ALBA CIRCLE

211TH LANE

UNIT 1 PAD EL=1017.0
UNIT 2 PAD EL=1017.0
UNIT 3 PAD EL=1017.3
UNIT 4 PAD EL=1017.1
UNIT 5 PAD EL=1017.0
UNIT 6 PAD EL=1017.0
UNIT 7 PAD EL=1017.0
UNIT 8 PAD EL=1017.0
UNIT 9 PAD EL=1017.0
UNIT 10 PAD EL=1016.7
UNIT 11 PAD EL=1016.5
UNIT 12 PAD EL=1016.5
UNIT 13 PAD EL=1016.5
UNIT 14 PAD EL=1016.8
UNIT 15 PAD EL=1016.8
UNIT 16 PAD EL=1016.8
UNIT 17 PAD EL=1016.8
UNIT 18 PAD EL=1016.5
UNIT 19 PAD EL=1016.5
UNIT 20 PAD EL=1016.7
UNIT 21 PAD EL=1016.5
UNIT 22 PAD EL=1016.1
UNIT 23 PAD EL=1016.4
UNIT 24 PAD EL=1016.4
UNIT 25 PAD EL=1016.1
UNIT 26 PAD EL=1015.8
UNIT 27 PAD EL=1015.6
UNIT 28 PAD EL=1015.6
UNIT 29 PAD EL=1015.6
UNIT 30 PAD EL=1015.8
UNIT 31 PAD EL=1015.8
UNIT 32 PAD EL=1015.5
UNIT 33 PAD EL=1015.5
UNIT 34 PAD EL=1015.6
UNIT 35 PAD EL=1015.3
UNIT 36 PAD EL=1015.3
UNIT 37 PAD EL=1015.1
UNIT 38 PAD EL=1015.0
UNIT 39 PAD EL=1015.5
UNIT 40 PAD EL=1015.3
UNIT 41 PAD EL=1015.8
UNIT 42 PAD EL=1016.0
UNIT 43 PAD EL=1016.0
UNIT 44 PAD EL=1015.8
UNIT 45 PAD EL=1015.5
UNIT 46 PAD EL=1015.5
UNIT 47 PAD EL=1015.5
UNIT 48 PAD EL=1015.9
UNIT 49 PAD EL=1015.9
UNIT 50 PAD EL=1015.9
UNIT 51 PAD EL=1015.9
UNIT 52 PAD EL=1016.1
UNIT 53 PAD EL=1016.5
UNIT 54 PAD EL=1016.0
UNIT 55 PAD EL=1015.9
UNIT 56 PAD EL=1015.9
UNIT 57 PAD EL=1016.0
UNIT 58 PAD EL=1016.0
UNIT 59 PAD EL=1015.9
UNIT 60 PAD EL=1015.6
UNIT 61 PAD EL=1016.0
UNIT 62 PAD EL=1016.3
UNIT 63 PAD EL=1016.0
UNIT 64 PAD EL=1015.8
UNIT 65 PAD EL=1015.8
UNIT 66 PAD EL=1016.0
UNIT 67 PAD EL=1016.8
UNIT 68 PAD EL=1016.6
UNIT 69 PAD EL=1016.5
UNIT 70 PAD EL=1016.3
UNIT 71 PAD EL=1016.0

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MESENBRINK CONSTRUCTION
AVEYDA PRESERVE - SOUTH PUD
PROJECT OVERVIEW

SHEET G2.01

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HOFFMAN ROAD

90' NORTHERN
NATURAL GAS
EASEMENT

PC: 18+46.3

PC: 21+13.51

PC: 22+59.26

PT: 25+43.75

13+00 14+00 15+00 16+00 17+00 18+00 19+00 20+00 21+00 22+00 23+00 24+00 25+00 26+00 27+00 28+00 29+00

1012 1013 1014 1015

GROUND BED RECTIFIER

GROUND BED RECTIFIER

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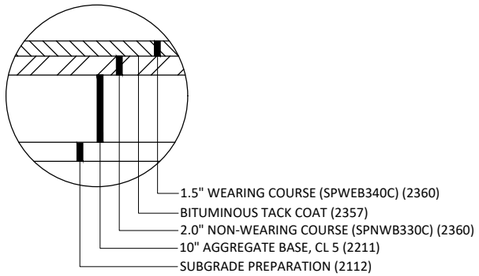
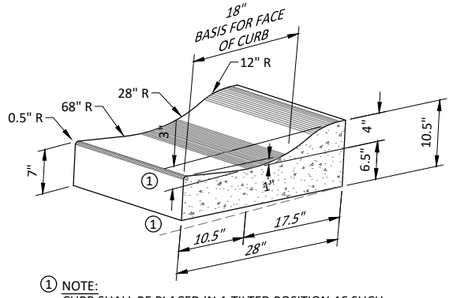
MESENBRINK CONSTRUCTION
AVEYDA PRESERVE - SOUTH PUD
EXISTING CONDITIONS
OVERVIEW

SHEET
C0.01



BITUMINOUS PAVEMENT SECTION

NOT TO SCALE

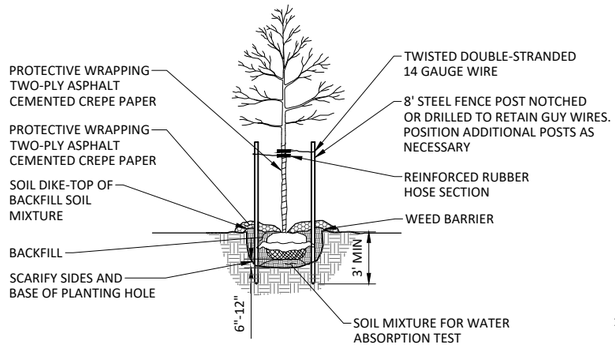


① NOTE:
CURB SHALL BE PLACED IN A TILTED POSITION AS SUCH TO PROVIDE A 3" DEPTH FROM THE TOP OF CURB TO THE FLOWLINE WHEN MEASURED ON A LEVEL PLANE.

MOUNTABLE
CONCRETE CURB & GUTTER

NOT TO SCALE

(MODIFIED S418 CURB & GUTTER)



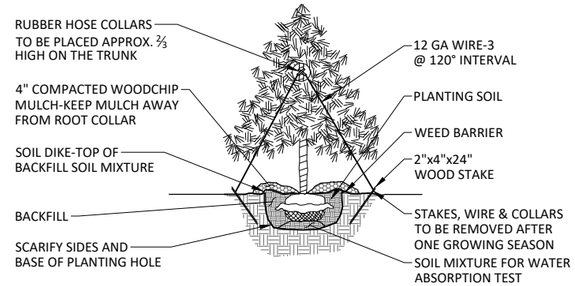
DECIDUOUS TREE PLANTING

NOT TO SCALE

BAG & BALL PLANTING NOTE:

1. REMOVE WRAPPING AND ALL TIES OR STRAPS. IF ROOT BALL IS WRAPPED IN BURLAP THE LOWER ½ PORTION OF THE FABRIC MAY BE LEFT AT THE BOTTOM OF THE HOLE. SYNTHETIC WRAP MUST BE REMOVED AND PROPERLY DISPOSED.
2. LOOSEN ROOTS TO ENSURE THEY ARE NOT GIRDLING THE ROOT BALL.
3. SALVAGE AND REUSE ALL SOIL THAT CAME WITH THE ROOT BALL.
4. IF ROOT BALL IS EXTREMELY DRY WATER IT PRIOR TO PLACING IT IN THE HOLE.
5. IF TREE IS CONTAINER GROWN, SALVAGE ALL SOIL AND MIX WITH SUPPLEMENTED SOIL FOR BACK FILL.

1. PROVIDE AND INSTALL HEALTHY PLANT MATERIALS THAT MEET ALL SPECIFICATIONS AND ARE OF THE SIZE, TYPE AND SPECIES NAMED ON THE PLANT SCHEDULE AND SHOWN ON THE PLANS.
2. DIG PLANT HOLE 1'-0" MINIMUM LARGER ON ALL SIDES THAN ROOT BALL.
3. PRIOR TO PLACING TREE, SCARIFY BOTTOM AND SIDES OF THE PLANTING HOLE.
4. TEST SOIL ABSORPTION.
5. FILL HOLE PARTIALLY WITH SUPPLEMENTED SOIL MIXTURE, ADD WATER AND ALLOW TO PUDDLE AND SETTLE PRIOR TO SETTING TREE.
6. AFTER PUDDLING HAS SETTLED, SET TREE AND BACK FILL WITH SUPPLEMENTED SOIL MIXTURE.
7. WATER THOROUGHLY AND ADD BACK FILL AS NEEDED AFTER MOISTURE IS ABSORBED.
8. BUILD SOIL DIKE AROUND PERIPHERY OF TREE TO HOLD WATER.
9. AFTER SETTLEMENT, MULCH WITH MINIMUM 4" LAYER SHREDDED BARK, WOOD CHIPS OR AS OTHERWISE SPECIFIED. DO NOT PLACE MULCH OVER THE ROOT COLLAR.
10. REMOVE DEAD OR DAMAGED BRANCHES RETAINING THE NATURAL FORM OF THE TREE.

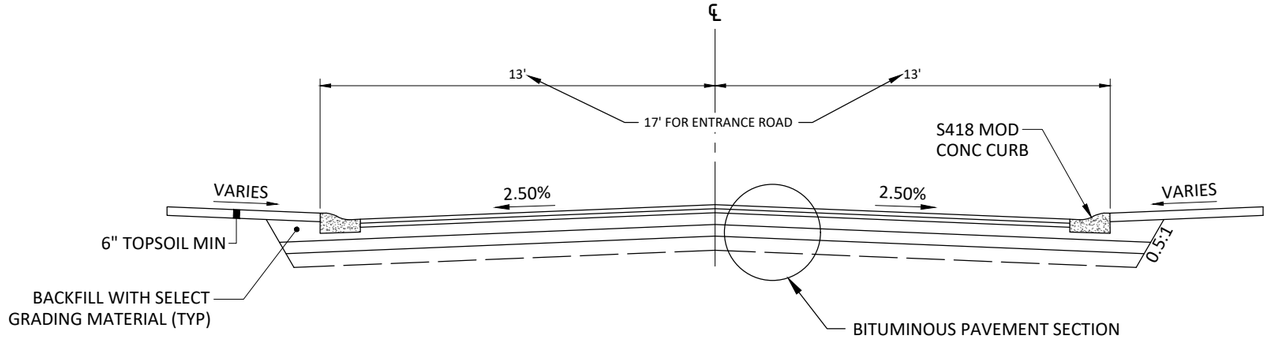


CONIFEROUS TREE PLANTING

NOT TO SCALE

TYPICAL SECTION

PRIVATE ROAD
NOT TO SCALE



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ALEC W. PIETZ, P.E.
LIC. NO. 59617 DATE XX/XX/XXXX

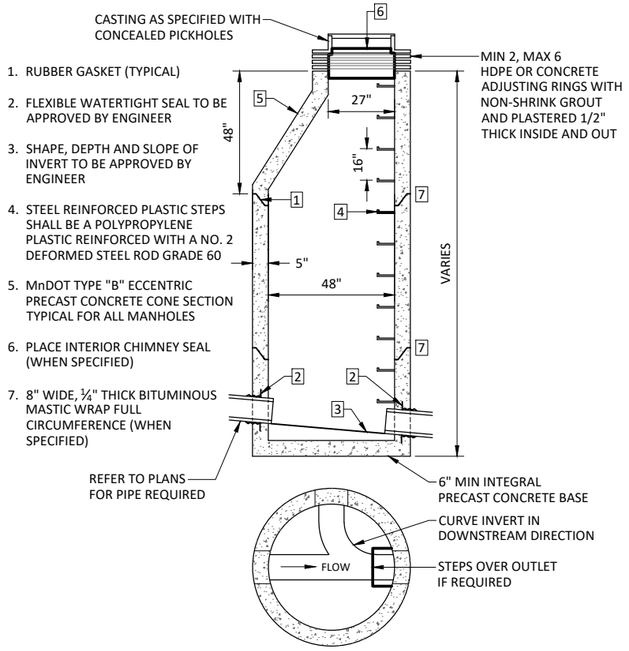
BOLTON & MENK
1960 PREMIER DRIVE
MANKATO, MINNESOTA 56001
Phone: (507) 625-4171
Email: Mankato@bolton-menk.com
www.bolton-menk.com

DESIGNED	AWP
DRAWN	AWP
CHECKED	NPM
CLIENT PROJ. NO.	0M1.128460

NO.	ISSUED FOR	DATE

MESENBRINK CONSTRUCTION
AVEYDA PRESERVE - SOUTH PUD
SURFACE CONSTRUCTION DETAILS

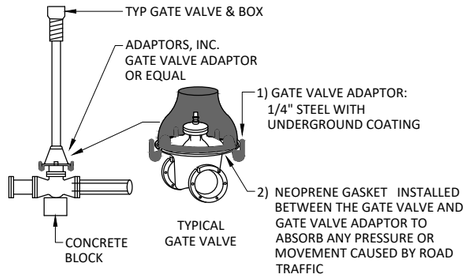
SHEET C1.01



PLAN VIEW

DESIGN 4007C SANITARY MANHOLE

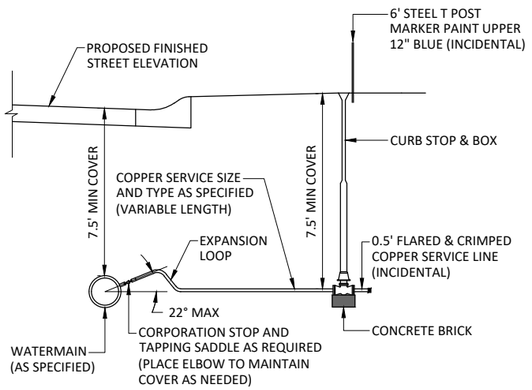
NOT TO SCALE



GATE VALVE ADAPTOR

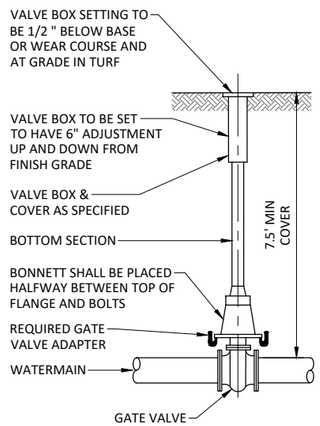
NOT TO SCALE

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



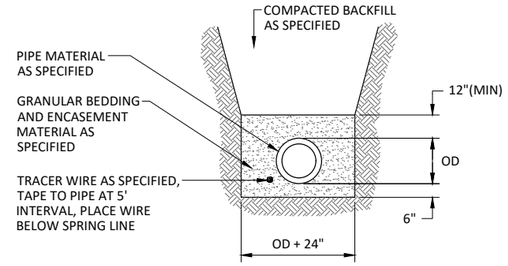
WATER SERVICE INSTALLATION
NEW CONSTRUCTION

NOT TO SCALE



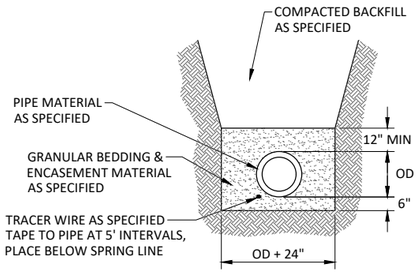
GATE VALVE BOX INSTALLATION

NOT TO SCALE



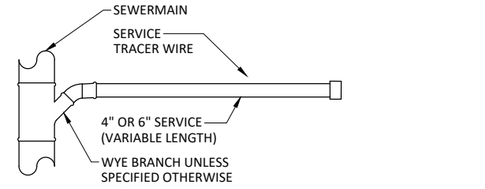
NON-RIGID SANITARY SEWER TRENCH

NOT TO SCALE

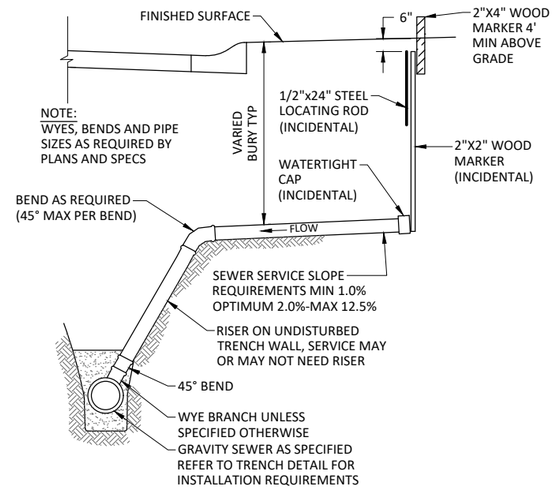


PVC WATERMAIN TRENCH

NOT TO SCALE



PLAN

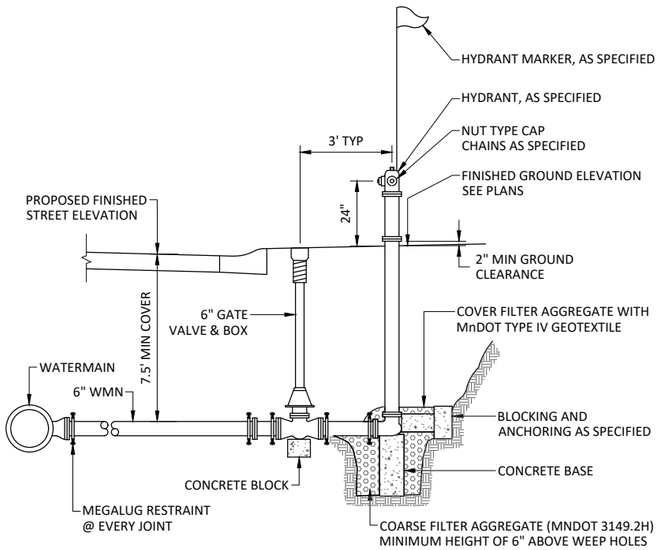


NOTE:
WYES, BENDS AND PIPE SIZES AS REQUIRED BY PLANS AND SPECS

PROFILE

SANITARY SEWER SERVICE
NEW CONSTRUCTION

NOT TO SCALE



HYDRANTS LOCATED WHERE THE GROUNDWATER TABLE IS ABOVE THE DRAIN OUTLET SHALL HAVE THE OUTLET DRAIN PLUGGED AND SHALL BE EQUIPPED WITH A TAG STATING "PUMP AFTER USE"

HYDRANT INSTALLATION, MEGALUGS

NOT TO SCALE

TRACER WIRE NOTE:
REFER TO THE MINNESOTA RURAL WATER ASSOCIATION (MRWA) TRACER WIRE SPECIFICATION GUIDE & DETAILS TO PROPERLY INSTALL TRACER WIRE WITH WATERMAIN AND SANITARY SEWER. THE GUIDE CAN BE FOUND AT: mrwa.com/tools.html - Tracer Wire Specification Guide & Details

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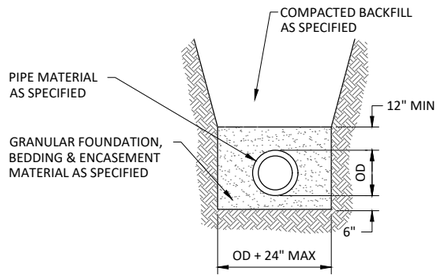
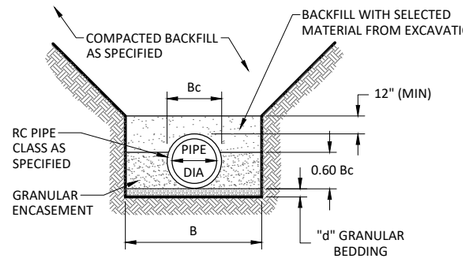
MESENBRINK CONSTRUCTION
AVEYDA PRESERVE - SOUTH PUD
WATERMAIN & SANITARY SEWER DETAILS

SHEET C1.02



NON-RIGID STORM SEWER TRENCH

NOT TO SCALE

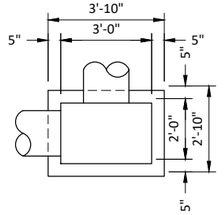


PIPE DIA	d	B
27" OR LESS	3"	Bc + 24"
30" TO 60"	4"	1.5 x Bc
66" OR OVER	6"	Bc + 36"

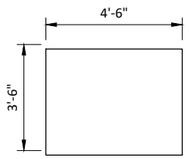
RC PIPE
CLASS "B" BEDDING-SQUARE TRENCH

NOT TO SCALE

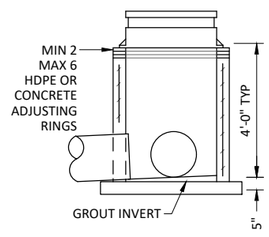
NOTE:
CONTRACTOR MAY SELECT STORM SEWER
CONFORMING TO PLUMBING CODE OR ALTERNATES
APPROVED BY THE AUTHORITY HAVING JURISDICTION



CATCH BASIN PLAN



BASE SLAB PLAN



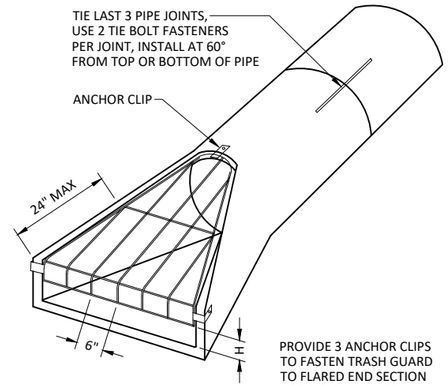
SECTION

NOTES:

1. CASTING PER CONSTRUCTION DOCUMENTS
2. PIPE CUT-OUTS PER CONSTRUCTION DOCUMENTS
3. ALTERNATE CAST-IN-PLACE BASE CAN BE USED
4. MIN REINFORCING SHALL BE WIRE FABRIC HAVING AN AREA OF NOT LESS THAN 0.12 SQ IN PER FOOT IN BOTH DIRECTIONS

CATCH BASIN STRUCTURE
DESIGN R-1 (2'x3')

NOT TO SCALE



ANCHOR BOTH SIDES

PROVIDE 3 ANCHOR CLIPS
TO FASTEN TRASH GUARD
TO FLARED END SECTION
HOT DIP GALVANIZE
AFTER FABRICATION

TRASH GUARD SIZES			
PIPE SIZE	BARS	"H"	BOLTS
12"-18"	3/4"Ø	4"	5/8"
21"-42"	1"Ø	6"	3/4"
42"-72"	1 1/4"Ø	12"	1"

RC APRON TRASH RACK
(STEEL BARS)

NOT TO SCALE

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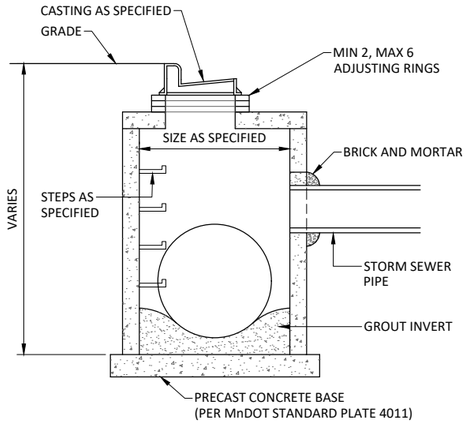
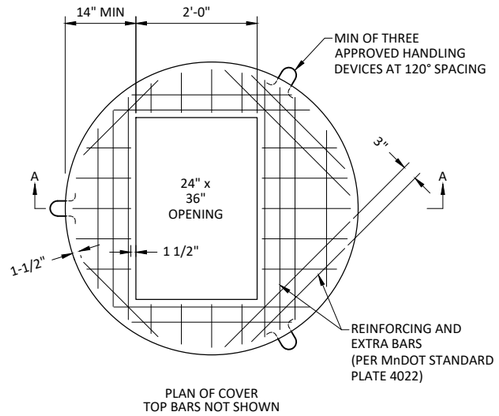
MESENBRINK CONSTRUCTION
AVEYDA PRESERVE - SOUTH PUD
STORM SEWER DETAILS

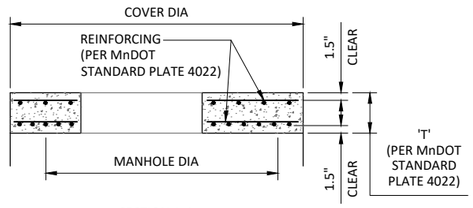
SHEET
C1.03



TYPICAL DESIGN 4022 CATCH BASIN



PLAN OF COVER
TOP BARS NOT SHOWN



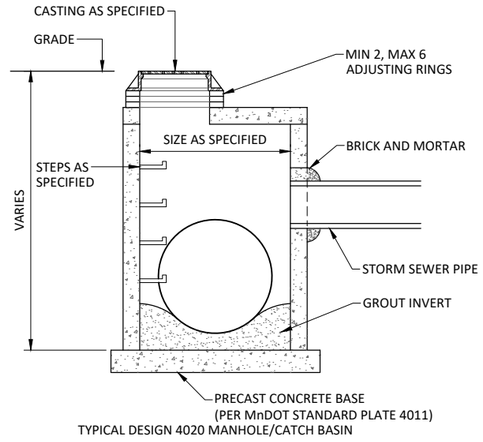
SECTION A-A

NOTES:

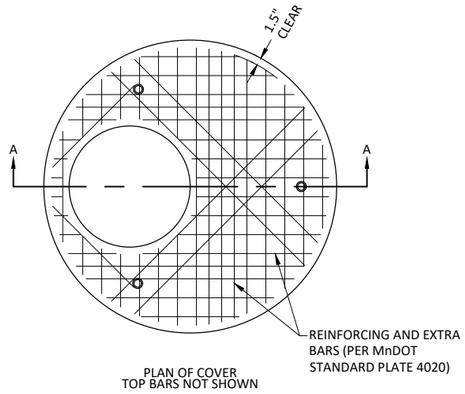
1. AASHTO HS 25 LOADING MAX FILL HEIGHT 15'
2. THE # 4022 SHALL BE PERMANENTLY MARKED ON THE TOP COVER
3. EQUIVALENT STEEL AREAS IN WIRE MESH MAY BE USED
4. REINFORCEMENT PER SPEC 3301, GRADE 60 A SINGLE HOOP OF 8ga STEEL WIRE

DESIGNATION:
DESIGN DIAMETER - STANDARD PLATE #
DESIGN 48-4020

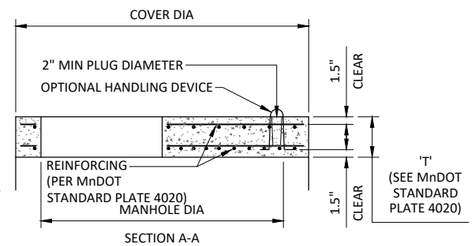
STORM SEWER STRUCTURE
DESIGN 4022
NOT TO SCALE



TYPICAL DESIGN 4020 MANHOLE/CATCH BASIN



PLAN OF COVER
TOP BARS NOT SHOWN



SECTION A-A

NOTES:

1. AASHTO HS 25 LOADING MAX FILL HEIGHT 15'
2. THE # 4020 SHALL BE PERMANENTLY MARKED ON THE TOP COVER
3. EQUIVALENT STEEL AREAS IN WIRE MESH MAY BE USED
4. REINFORCEMENT PER SPEC 3301, GRADE 60 A SINGLE HOOP OF 8ga STEEL WIRE

DESIGNATION:
DESIGN DIAMETER - STANDARD PLATE #
DESIGN 48-4020

STORM SEWER STRUCTURE
DESIGN 4020
NOT TO SCALE

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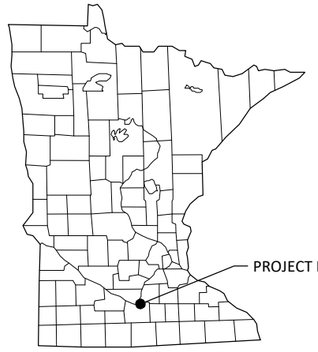
MESENBRINK CONSTRUCTION
AVEYDA PRESERVE - SOUTH PUD
STORM SEWER DETAILS

SHEET
C1.04

STORMWATER POLLUTION PREVENTION PLAN (SWPPP)

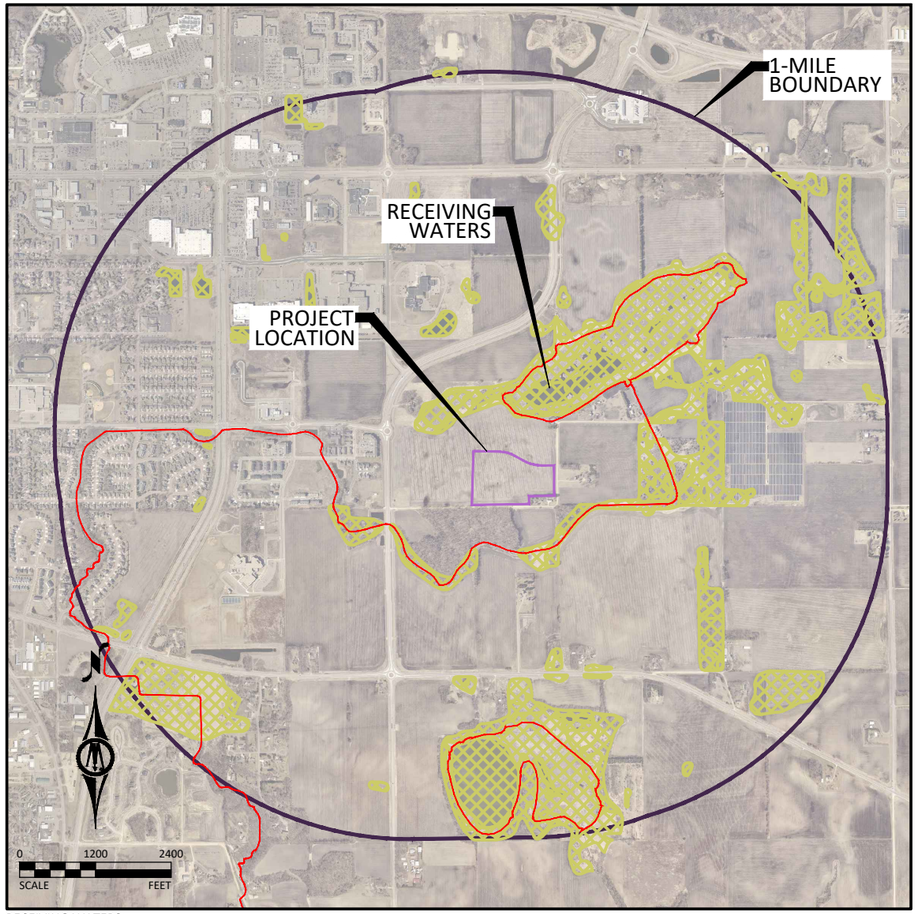
AVEYDA PRESERVE - SOUTH PUD

CITY OF MANKATO
BLUE EARTH COUNTY, MINNESOTA



LEGEND

- 1-MILE BOUNDARY
- PROJECT BOUNDARY
- PROTECTED AND/OR IMPAIRED 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:	Mesenbrink Construction	John Mesenbrink	xxxxxx
SWPPP DESIGNER:	Bolton & Menk, Inc.	Alec W. Pietz, P.E.	507-625-4171
CONTRACTOR:	TBD	TBD	TBD
CONSTRUCTION SWPPP MANAGER:	TBD	TBD	TBD
PARTY RESPONSIBLE FOR LONG TERM O&M:	Mesenbrink Construction	John Mesenbrink	xxxxx

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.

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) =	21.1	ACRES
Existing area of impervious surface =	0	ACRES
Post construction area of impervious surface =	9.1	ACRES
Total new impervious surface area created =	9.1	ACRES

Planned Construction Start Date:	TBD
Estimated Construction Completion Date:	TBD

PERMANENT STORMWATER MANAGEMENT SYSTEM:
Type of storm water management used if more than 1 acre of new impervious surface is created:

	Wet Sedimentation Basin
	Infiltration/Filtration
X	Regional Pond
	Permanent Stormwater Management Not Required

Stormwater is routed to public storm sewer with outfall to regional ponds.

PROJECT LOCATION:

COUNTY	TOWNSHIP	RANGE	SECTION	LATITUDE	LONGITUDE
BLUE EARTH	T108N	R26W	15	44.1547° N	93.9340° W

BMP SUMMARY	QUANTITY	UNIT
STABILIZED CONSTRUCTION EXIT	2	EACH
STORM DRAIN INLET PROTECTION	42	EACH
SILT FENCE, TYPE MACHINE SLICED	4050	LIN FT
SEED MIX 25-151, FERTILIZE, & MULCH	19.0	ACRE
NOTE: QUANTITIES LISTED ACCOUNT FOR ONE INSTALLATION. ADDITIONAL INSTALLATIONS MAY BE NECESSARY AS A RESULT OF SCHEDULING AND MAINTENANCE.		

DESCRIPTION OF CONSTRUCTION ACTIVITIES AND STORMWATER MANAGEMENT:
Construction activities include: Construction of private roadways and infrastructure in Mankato, Minnesota to provide service to low/medium density housing. Site improvements include pavements, storm sewer, watermain, sanitary sewer, water and sanitary services, and an elective wet sedimentation basin construction.

Currently, stormwater is conveyed by overland flow in various directions and local watersheds primarily to an existing unnamed lake to the north of the property.

After development, storm sewer and stormwater management systems will be installed to convey drainage of roadways and yards. Drainage will be routed to adjacent public storm sewer routing to regional ponds. The listed impervious area created with this project is based on the proposed roadway and anticipated unit impervious area.

A copy of the SWPPP must remain onsite at all times. Any modifications to the SWPPP shall be approved by the Engineer.

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]
Unnamed Lake	Lake	Yes	Yes	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) Remove existing surfaces as required.
4) Complete site and utility improvements.
5) Install additional inlet protection as needed.
6) Reestablish turf.
7) Repeat steps 2-6 as necessary throughout the project.
8) Add additional temporary BMPs as necessary during construction based on inspection reports.
9) Ensure final stabilization measures are complete.
10) Provide digital copy of all Field SWPPP Documentation including Inspection Reports and SWPPP Revisions to the Owner.
11) 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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MANKATO, MINNESOTA 56001
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CLIENT PROJ. NO. 0M1.128460			

MESENBRINK CONSTRUCTION
AVEYDA PRESERVE - SOUTH PUD
STORMWATER POLLUTION PREVENTION PLAN
PROJECT INFORMATION & LOCATION MAP

SHEET C2.01

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:	7 calendar days

SITE INSPECTION INTERVAL:

A trained person shall routinely inspect the entire construction site during active construction at an interval of no less than:	3 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

Alec W. Pietz

Design of Construction SWPPP (May 31 2027)

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NOT FOR CONSTRUCTION

ALEC W. PIETZ, P.E.
LIC. NO. 59617 DATE XX/XX/XXXX

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MESENBRINK CONSTRUCTION
AVEYDA PRESERVE - SOUTH PUD
STORMWATER POLLUTION PREVENTION PLAN
NARRATIVE

SHEET C2.02



LEGEND

- PROJECT BOUNDARY
- SOIL TYPE
- STEEP SLOPES (>33.3%)
- RECEIVING WATERS

N

0 60 120
SCALE FEET

SOIL TYPE SUMMARY

Map Unit Symbol	Soil Name	Hyd. Soil Group	Erodibility
109	Cordova clay loam	C/D	NHEL
110	Marna silty clay loam	C/D	NHEL
211	Lura silty clay	C/D	NHEL
287	Minnetonka silty clay loam	C/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 - C2.07
FINAL STABILIZATION	C2.06 - C2.07
STORM SEWER & STORMWATER MANAGEMENT	C5.01 - C5.10

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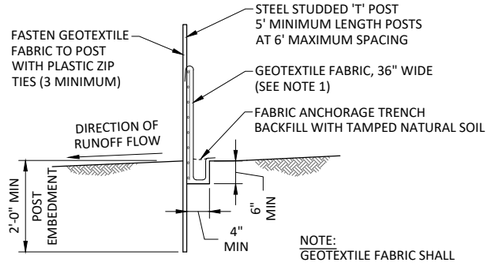
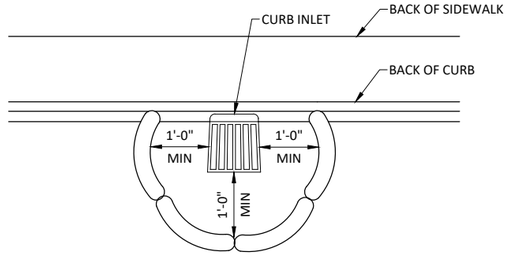
MESENBRINK CONSTRUCTION
AVEYDA PRESERVE - SOUTH PUD
STORMWATER POLLUTION PREVENTION PLAN
SITE & SOILS MAP

SHEET C2.03



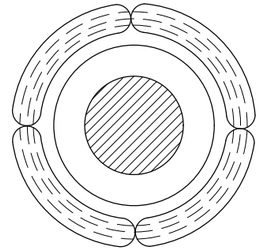
NOTE:
GEOTEXTILE FABRIC SHALL BE PER MnDOT SPEC 3886

SILT FENCE - HEAVY DUTY
NOT TO SCALE



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

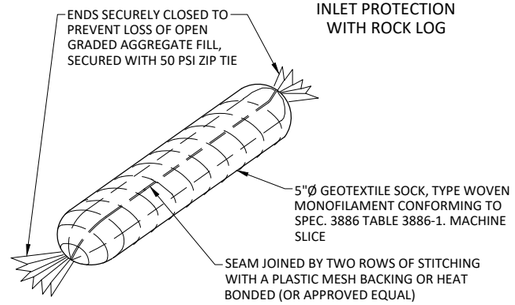


INLET PROTECTION WITH ROCK LOG

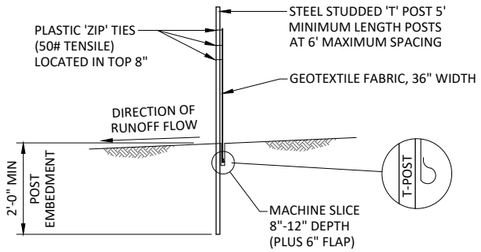
FILL ROCK LOG WITH 45 LBS. OF OPEN GRADED AGGREGATE CONSISTING OF SOUND, DURABLE PARTICLES OF CRUSHED QUARRY ROCK OR GRAVEL CONFORMING TO THE FOLLOWING GRADATION.

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

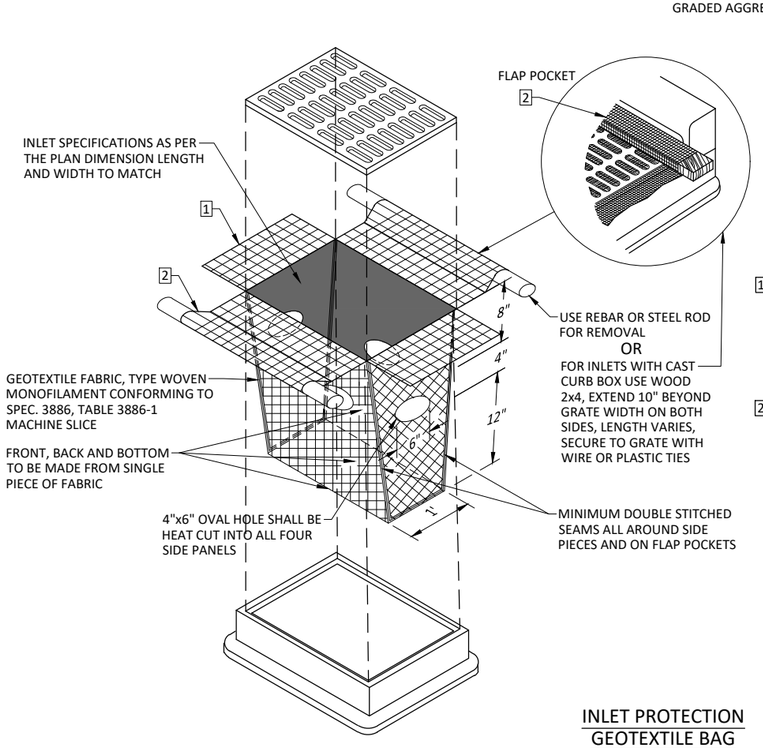
NOTE:
CRUSHED CONCRETE OR BITUMINOUS SHALL NOT BE USED FOR OPEN GRADED AGGREGATE.



INLET PROTECTION ROCK BAG
NOT TO SCALE



SILT FENCE - MACHINE SLICED
NOT TO SCALE



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.

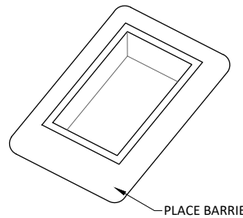
FLAP POCKETS SHALL BE LARGE ENOUGH TO ACCEPT WOOD 2x4.

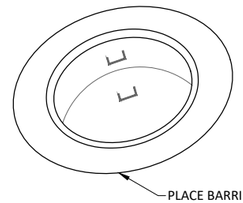
INSTALLATION NOTES:
DO NOT INSTALL PROTECTION IN INLETS SHALLOWER THAN 30", MEASURED FROM THE BOTTOM OF THE INLET TO THE TOP OF THE GRATE.

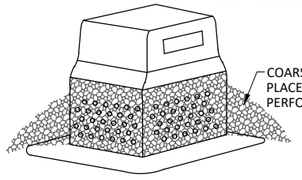
TRIM EXCESS FABRIC IN THE FLOW LINE TO WITHIN 3" OF THE GRATE.

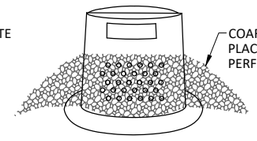
THE INSTALLED BAG SHALL HAVE A MINIMUM SIDE CLEARANCE, BETWEEN THE INLET AND THE BAG, MEASURED AT THE BOTTOM OF THE OVERFLOW HOLES, OF 3". WHERE NECESSARY THE CONTRACTOR SHALL CLINCH THE BAG, USING PLASTIC ZIP TIES, TO ACHIEVE THE 3" CLEARANCE. THE TIES SHALL BE PLACED AT A MAXIMUM OF 4" FROM THE BOTTOM OF THE BAG.

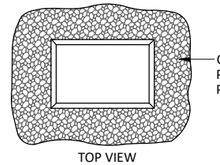
INLET PROTECTION GEOTEXTILE BAG
NOT TO SCALE



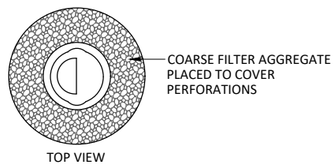








TOP VIEW



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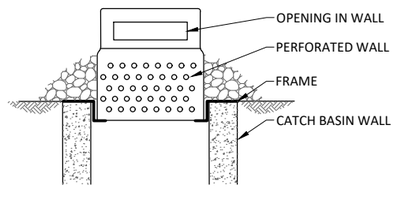

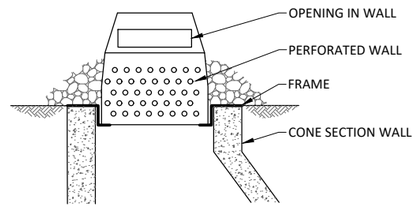

INLET PROTECTION PERFORATED WALL
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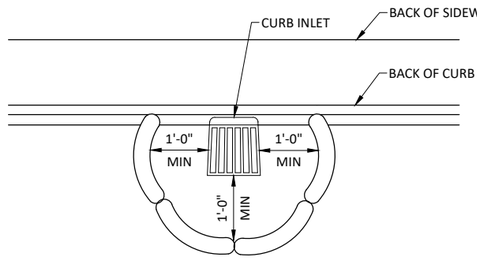
AVEYDA PRESERVE - SOUTH PUD
STORMWATER POLLUTION PREVENTION PLAN
BEST MANAGEMENT PRACTICE DETAILS

SHEET C2.04



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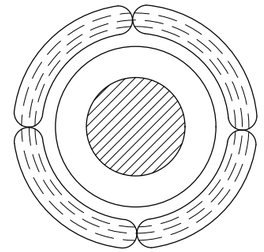
PAYMENT SHALL INCLUDE ALL MATERIALS, FILLING OF LOG, PLACEMENT, MAINTENANCE & REMOVAL;
80% OF BID PRICE SHALL BE PAID UPON PROPER PLACEMENT WITH THE FINAL 20% PAID UPON REMOVAL



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	
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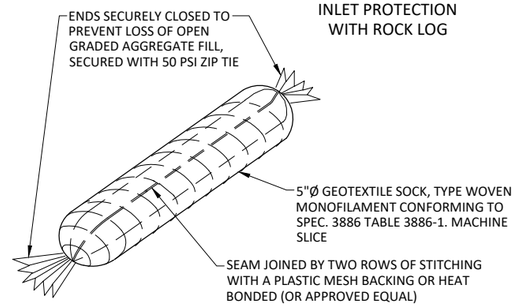
NO 40	0-8
NO 200	0-3

NOTE:
CRUSHED CONCRETE OR BITUMINOUS SHALL NOT BE USED FOR OPEN GRADED AGGREGATE.



INLET PROTECTION
ROCK BAG
NOT TO SCALE

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NOT FOR CONSTRUCTION

ALEC W. PIETZ, P.E.
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BOLTON & MENK
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Email: Mankato@bolton-menk.com
www.bolton-menk.com

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MESENBRINK CONSTRUCTION
AVEYDA PRESERVE - SOUTH PUD
STORMWATER POLLUTION PREVENTION PLAN
BEST MANAGEMENT PRACTICE DETAILS

SHEET
C2.05

EROSION CONTROL LEGEND

EXISTING/PROPOSED DRAINAGE FLOW	SEED MIX 25-151, FERTILIZE, & MULCH
SILT FENCE, MACHINE SLICED OR APPROVED EQUAL	STABILIZED CONSTRUCTION EXIT
STORM DRAIN INLET PROTECTION	

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 A RAINFALL EVENT GREATER THAN 0.5 INCHES IN 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.

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HORZ. 0 25 50
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MESENBRINK CONSTRUCTION
AVEYDA PRESERVE - SOUTH PUD
STORMWATER POLLUTION PREVENTION PLAN
EROSION & SEDIMENT CONTROL PLAN

SHEET C2.06

EROSION CONTROL LEGEND

- EXISTING/PROPOSED DRAINAGE FLOW
- SILT FENCE, MACHINE SLICED OR APPROVED EQUAL
- STORM DRAIN INLET PROTECTION
- SEED MIX 25-151, FERTILIZE, & MULCH
- STABILIZED CONSTRUCTION EXIT

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 A RAINFALL EVENT GREATER THAN 0.5 INCHES IN A 24 HOUR PERIOD. ALL NON FUNCTIONING BMP'S SHALL BE REPAIRED OR REPLACED WITHIN 24 HOURS OF DISCOVERY.
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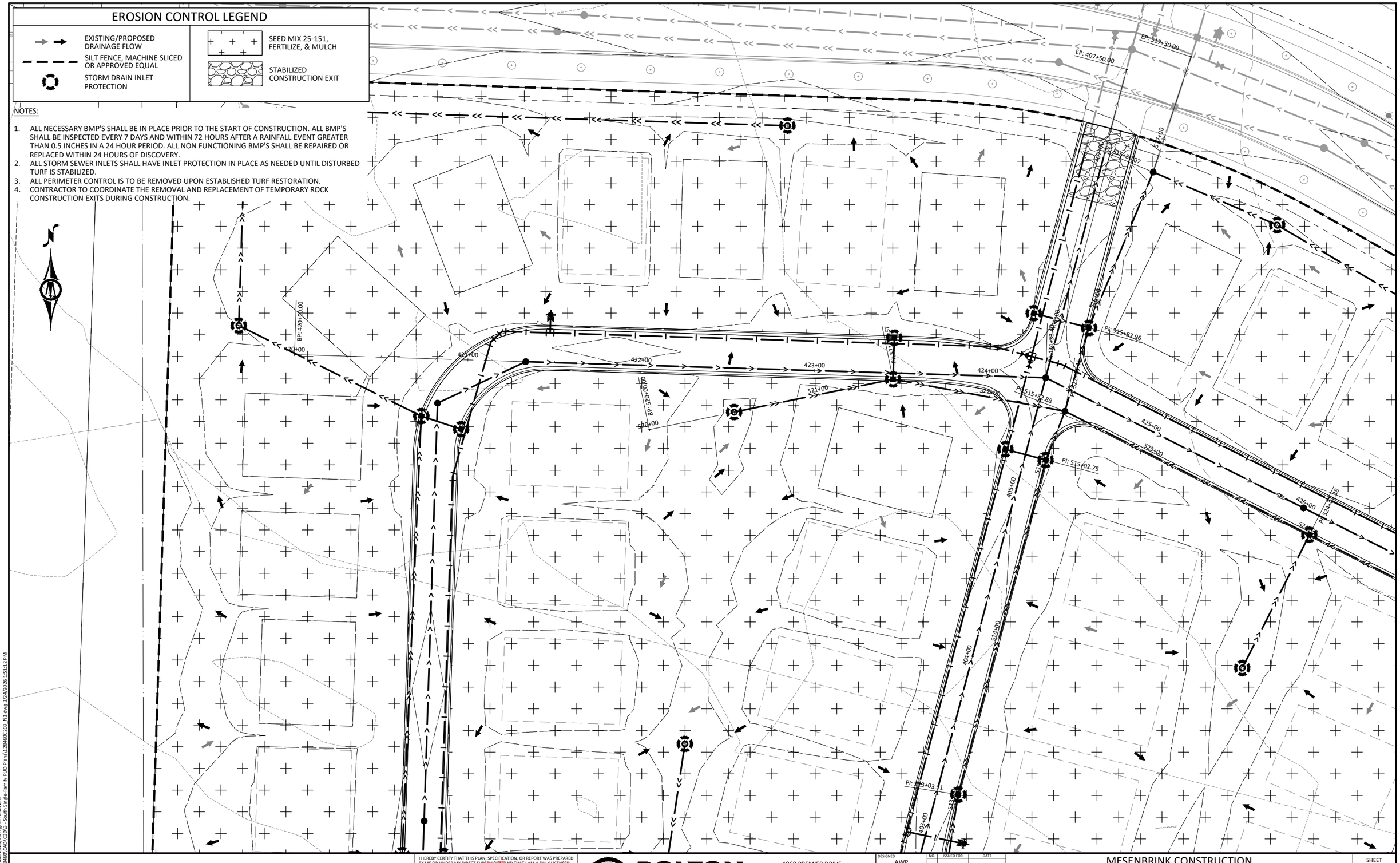
4. CONTRACTOR TO COORDINATE THE REMOVAL AND REPLACEMENT OF TEMPORARY ROCK CONSTRUCTION EXITS DURING CONSTRUCTION.



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SCALE FEET

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MESENBRINK CONSTRUCTION
AVEYDA PRESERVE - SOUTH PUD
STORMWATER POLLUTION PREVENTION PLAN
EROSION & SEDIMENT CONTROL PLAN

SHEET C2.07

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EROSION CONTROL LEGEND

- EXISTING/PROPOSED DRAINAGE FLOW
- SILT FENCE, MACHINE SLICED OR APPROVED EQUAL
- STORM DRAIN INLET PROTECTION
- SEED MIX 25-151, FERTILIZE, & MULCH
- STABILIZED CONSTRUCTION EXIT

NOTES:

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4. CONTRACTOR TO COORDINATE THE REMOVAL AND REPLACEMENT OF TEMPORARY ROCK CONSTRUCTION EXITS DURING CONSTRUCTION.

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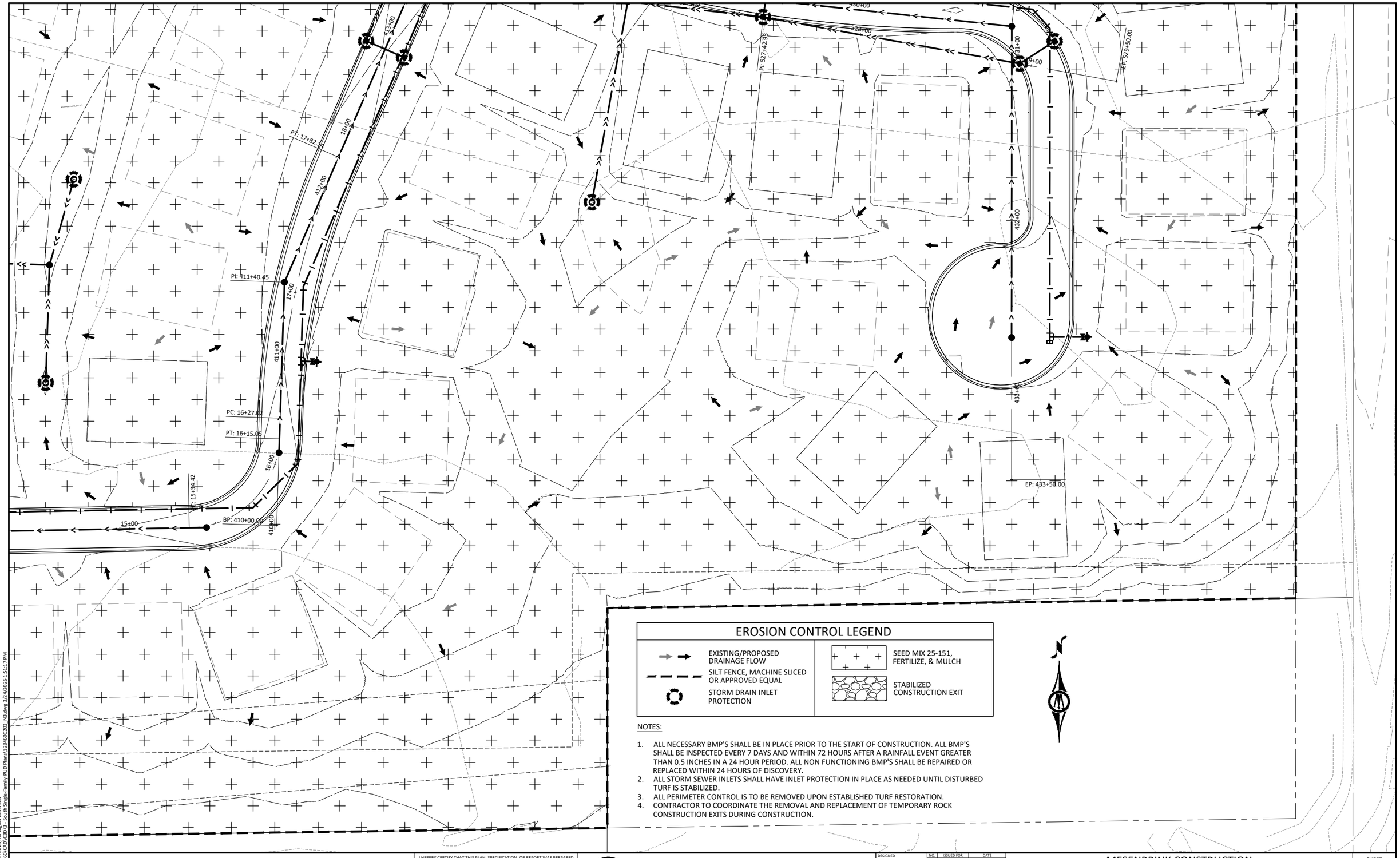
AVEYDA PRESERVE - SOUTH PUD
STORMWATER POLLUTION PREVENTION PLAN
EROSION & SEDIMENT CONTROL PLAN

SHEET C2.08



EROSION CONTROL LEGEND

- EXISTING/PROPOSED DRAINAGE FLOW
- SILT FENCE, MACHINE SLICED OR APPROVED EQUAL
- STORM DRAIN INLET PROTECTION
- SEED MIX 25-151, FERTILIZE, & MULCH
- STABILIZED CONSTRUCTION EXIT

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 A RAINFALL EVENT GREATER THAN 0.5 INCHES IN A 24 HOUR PERIOD. ALL NON FUNCTIONING BMP'S SHALL BE REPAIRED OR REPLACED WITHIN 24 HOURS OF DISCOVERY.
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4. CONTRACTOR TO COORDINATE THE REMOVAL AND REPLACEMENT OF TEMPORARY ROCK CONSTRUCTION EXITS DURING CONSTRUCTION.

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MESENBRINK CONSTRUCTION
AVEYDA PRESERVE - SOUTH PUD
STORMWATER POLLUTION PREVENTION PLAN
EROSION & SEDIMENT CONTROL PLAN

SHEET C2.09

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LEGEND

GENERAL DRAINAGE DIRECTION, MIN 1.0% IN BETWEEN TOWNHOMES

NOTE:
HIGH-POINT BETWEEN UNITS SHALL BE MINIMUM 0.5-FT LOWER THAN THE LOWEST ADJACENT PAD ELEVATION

UNIT 37 PAD EL=1015.1
UNIT 36 PAD EL=1015.3
UNIT 35 PAD EL=1015.3
UNIT 34 PAD EL=1015.6
UNIT 33 PAD EL=1015.5
UNIT 32 PAD EL=1015.5
UNIT 31 PAD EL=1015.8
UNIT 30 PAD EL=1015.8
UNIT 29 PAD EL=1015.6
UNIT 28 PAD EL=1015.6
UNIT 27 PAD EL=1015.6
UNIT 26 PAD EL=1015
UNIT 50 PAD EL=1015.9
UNIT 51 PAD EL=1015.9
UNIT 52 PAD EL=1016.1
UNIT 53 PAD EL=1016.5
UNIT 54 PAD EL=1016.0
UNIT 55 PAD EL=1015.9
UNIT 56 PAD EL=1015.9
UNIT 57 PAD EL=1016.0
UNIT 63 PAD EL=1016.0
UNIT 64 PAD EL=1015.8
UNIT 65 PAD EL=1015.8
UNIT 66 PAD EL=1016.0
UNIT 67 PAD EL=1016.8
UNIT 68 PAD EL=

PI: 31+00.00
PC: 2+53.04
PT: 3+68.32
BP: 0+00.00
EP: 4+00.00
33+00
32+00
31+00
30+00.00
30+00
3+00
2+00
1+00
0+20

1012
1013
1014

HORZ. SCALE 0 25 50 FEET

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MESENBRINK CONSTRUCTION
AVEYDA PRESERVE - SOUTH PUD
GRADING PLAN
SOUTH WEST QUADRANT

SHEET C3.01

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LEGEND

GENERAL DRAINAGE DIRECTION, MIN 1.0% IN BETWEEN TOWNHOMES

NOTE:
HIGH-POINT BETWEEN UNITS SHALL BE MINIMUM 0.5-FT LOWER THAN THE LOWEST ADJACENT PAD ELEVATION

UNIT 1 PAD EL=1017.0
UNIT 36 PAD EL=1015.3
UNIT 37 PAD EL=1015.1
UNIT 38 PAD EL=1015.0
UNIT 39 PAD EL=1015.5
UNIT 40 PAD EL=1015.3
UNIT 41 PAD EL=1015.8
UNIT 42 PAD EL=1016.0
UNIT 43 PAD EL=1016.0
UNIT 44 PAD EL=1015.8
UNIT 45 PAD EL=1015.5
UNIT 46 PAD EL=1015.5
UNIT 47 PAD EL=1015.5
UNIT 48 PAD EL=1015.9
UNIT 49 PAD EL=1015.9
UNIT 50 PAD EL=1015.9
UNIT 51 PAD EL=1015.9
UNIT 56 PAD EL=1015.9
UNIT 57 PAD EL=1016.0
UNIT 58 PAD EL=1016.0
UNIT 59 PAD EL=1015.9
UNIT 60 PAD EL=1015.6
UNIT 61 PAD EL=1016.0
UNIT 62 PAD EL=1016.3
UNIT 63 PAD EL=1016.0
UNIT 64 PAD EL=1015.8

PC: 35+11.94
PC: 38+23.76
PT: 3+68.32

HORZ. SCALE 0 25 50 FEET

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MESENBRINK CONSTRUCTION
AVEYDA PRESERVE - SOUTH PUD
GRADING PLAN
NORTH WEST QUADRANT

SHEET C3.02

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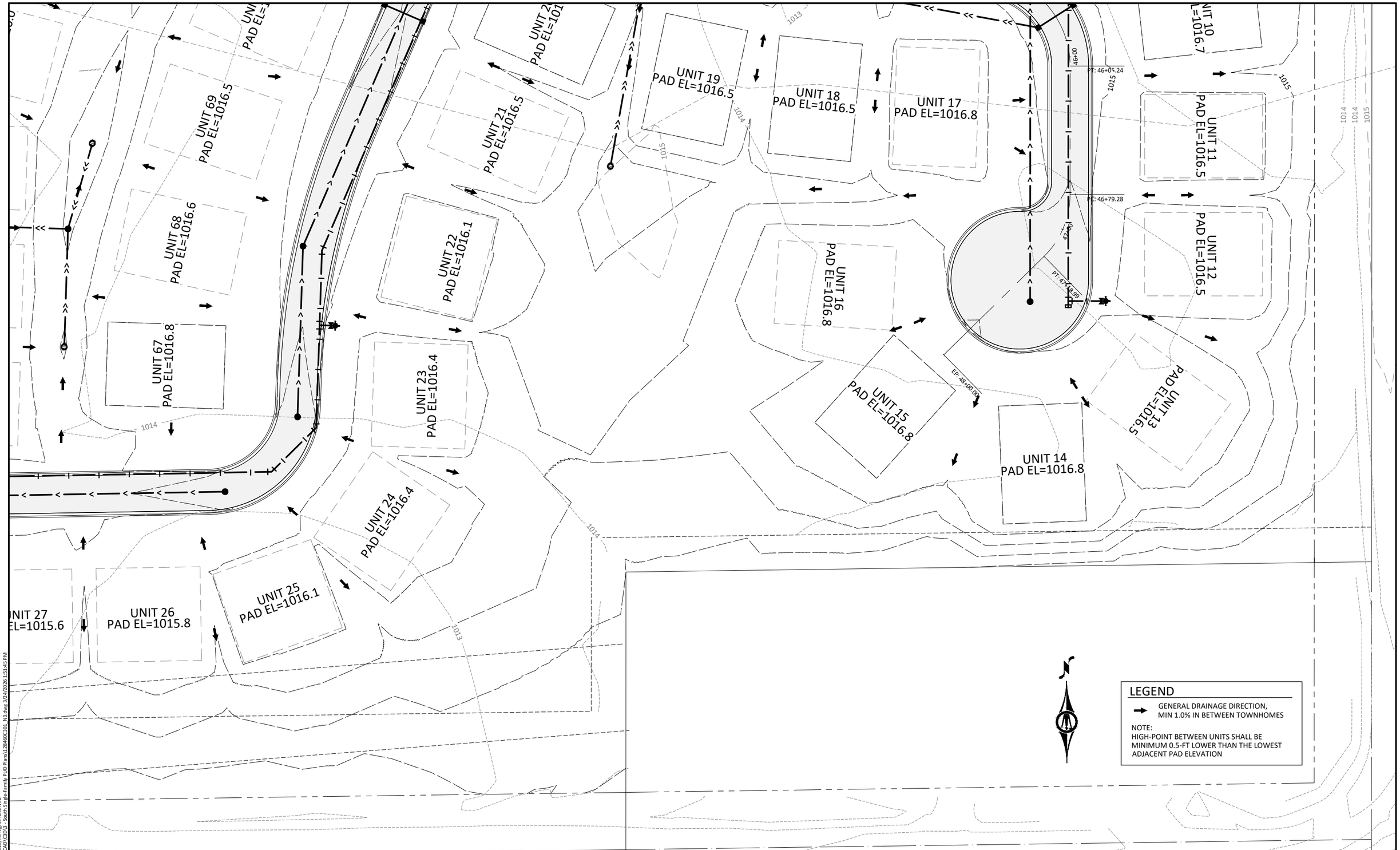

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MESENBRINK CONSTRUCTION
AVEYDA PRESERVE - SOUTH PUD
GRADING PLAN
SOUTH EAST QUADRANT

SHEET
C3.03

LEGEND

GENERAL DRAINAGE DIRECTION, MIN 1.0% IN BETWEEN TOWNHOMES

NOTE:
HIGH-POINT BETWEEN UNITS SHALL BE MINIMUM 0.5-FT LOWER THAN THE LOWEST ADJACENT PAD ELEVATION

UNIT 1 PAD EL=1017.0
UNIT 2 PAD EL=1017.0
UNIT 3 PAD EL=1017.3
UNIT 4 PAD EL=1017.1
UNIT 5 PAD EL=1017.0
UNIT 6 PAD EL=1017.0
UNIT 7 PAD EL=1017.0
UNIT 8 PAD EL=1017.0
UNIT 9 PAD EL=1017.0
UNIT 10 PAD EL=1016.7
UNIT 11 PAD EL=1016.5
UNIT 17 PAD EL=1016.8
UNIT 18 PAD EL=1016.5
UNIT 19 PAD EL=1016.5
UNIT 20 PAD EL=1016.7
UNIT 21 PAD EL=1016.5
UNIT 61 PAD EL=1016.0
UNIT 62 PAD EL=1016.3
UNIT 69 PAD EL=1016.5
UNIT 70 PAD EL=1016.3
UNIT 71 PAD EL=1016.0

39+34.23
40+00
41+00
41+70.01
42+00
43+00
44+00
45+00
PRC: 45+21.83
46+00
PT: 46+05.24

1015
1014
1013
1016

0 25 50
HORZ. SCALE FEET

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MESENBRINK CONSTRUCTION
AVEYDA PRESERVE - SOUTH PUD
GRADING PLAN
NORTH EAST QUADRANT

SHEET C3.04

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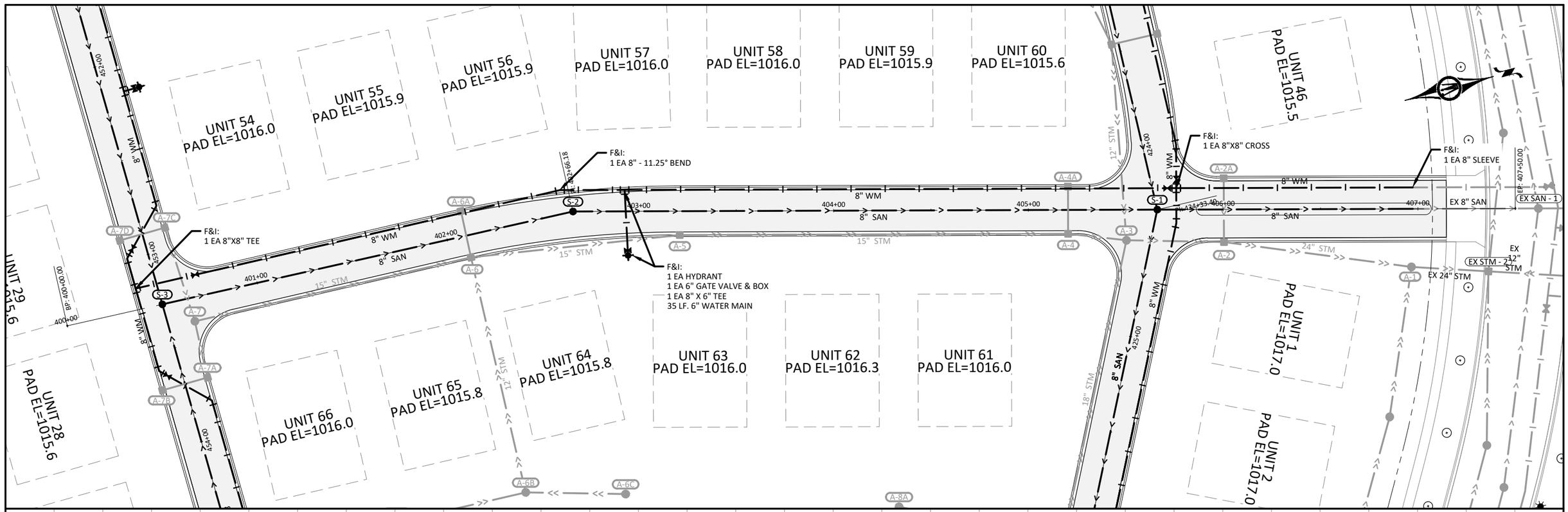

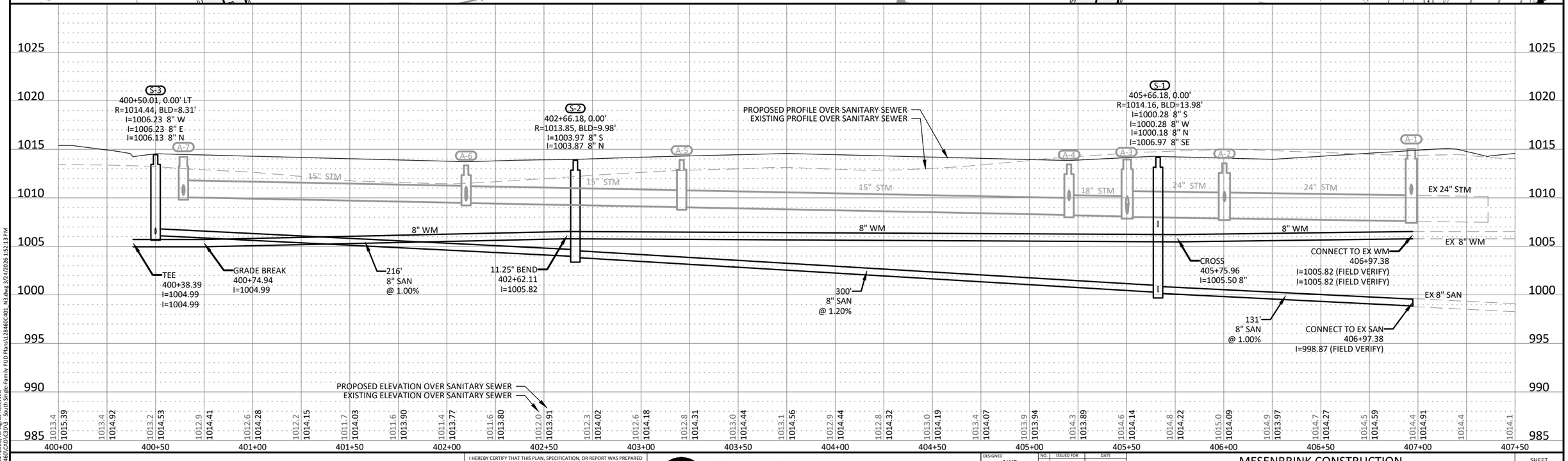

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VERT. SCALE 0 5 10 FEET

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MESENBRINK CONSTRUCTION
AVEYDA PRESERVE - SOUTH PUD
SANITARY SEWER & WATERMAIN PLAN & PROFILE
MERIDIAN PATH - STA 400+00 TO 407+50

SHEET C4.01

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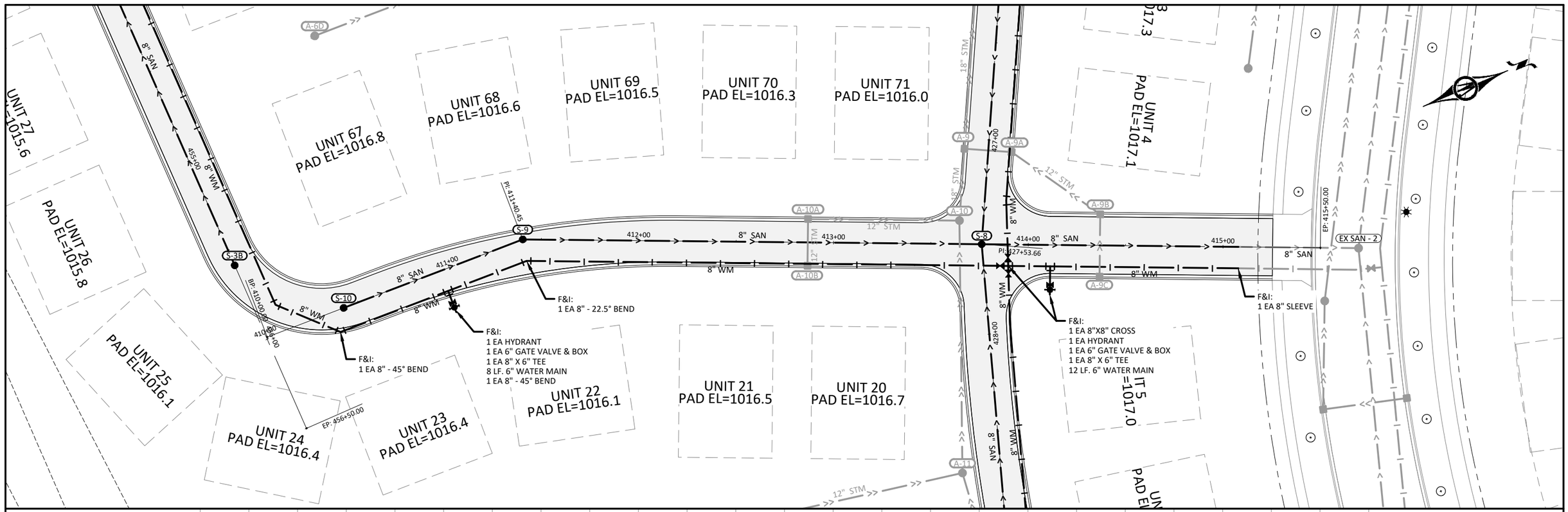

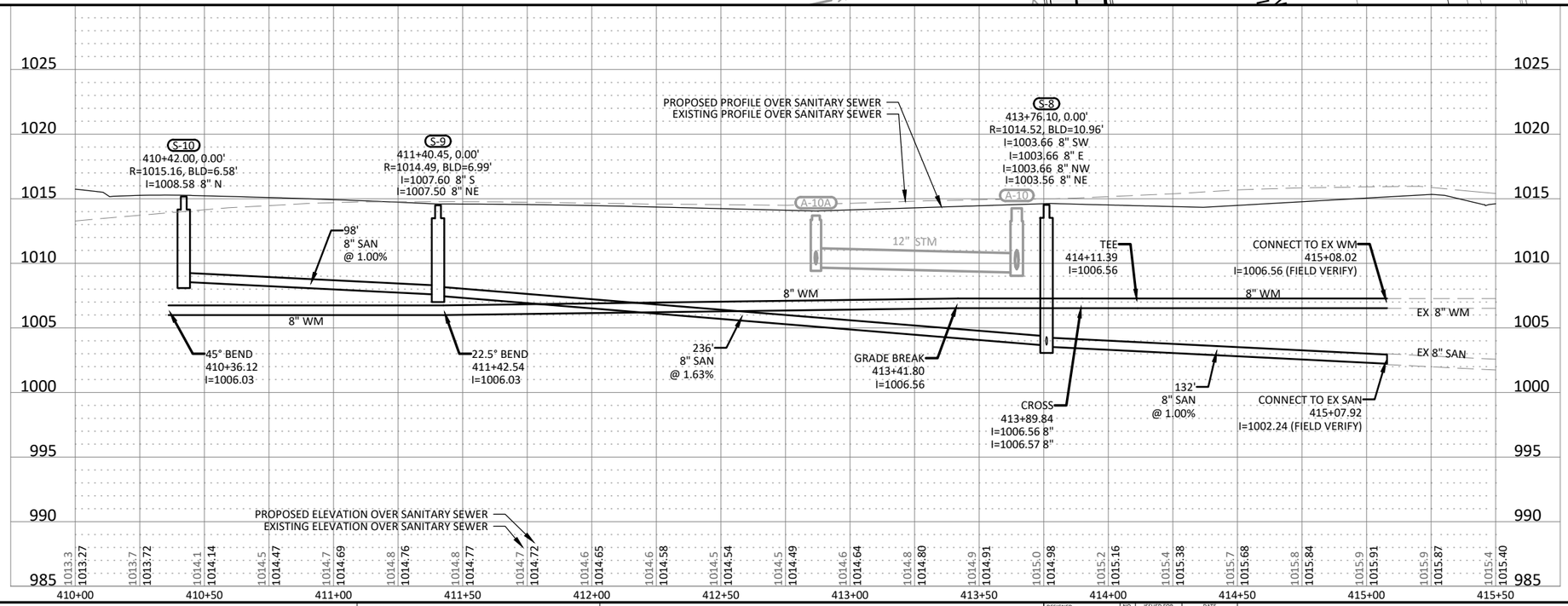

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VERT. SCALE 0 5 10 FEET

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MESENBRINK CONSTRUCTION
AVEYDA PRESERVE - SOUTH PUD
SANITARY SEWER & WATERMAIN PLAN & PROFILE
AVEDA BEND TRAIL - STA 410+00 TO 415+50

SHEET C4.02

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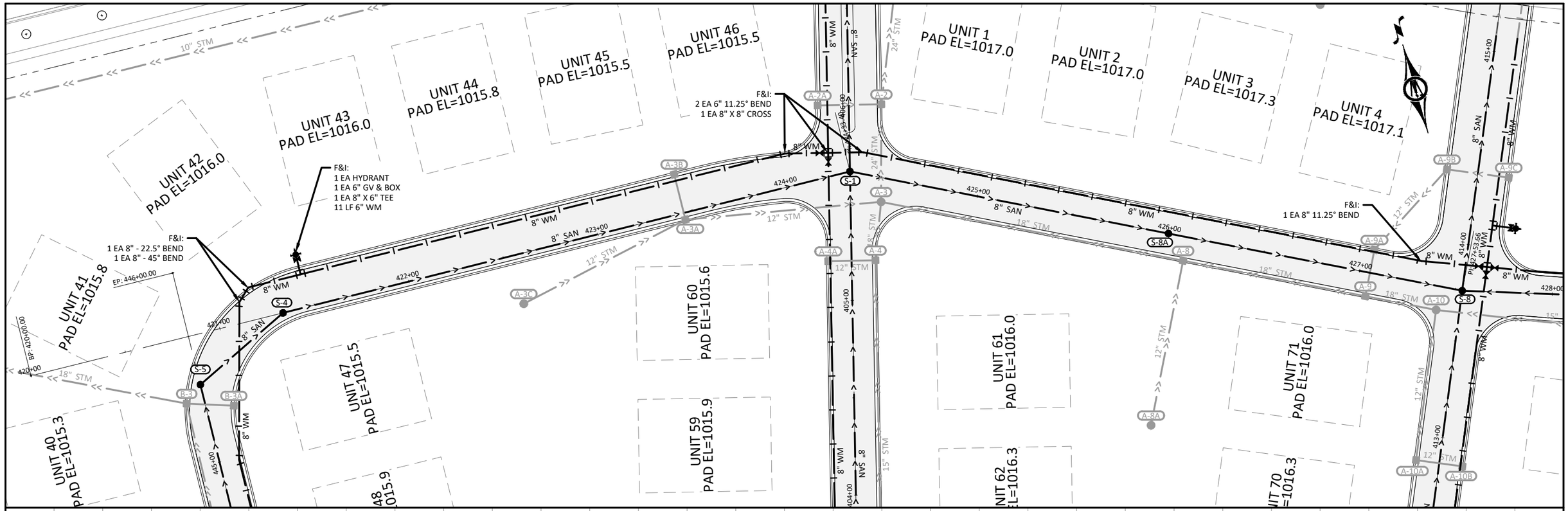

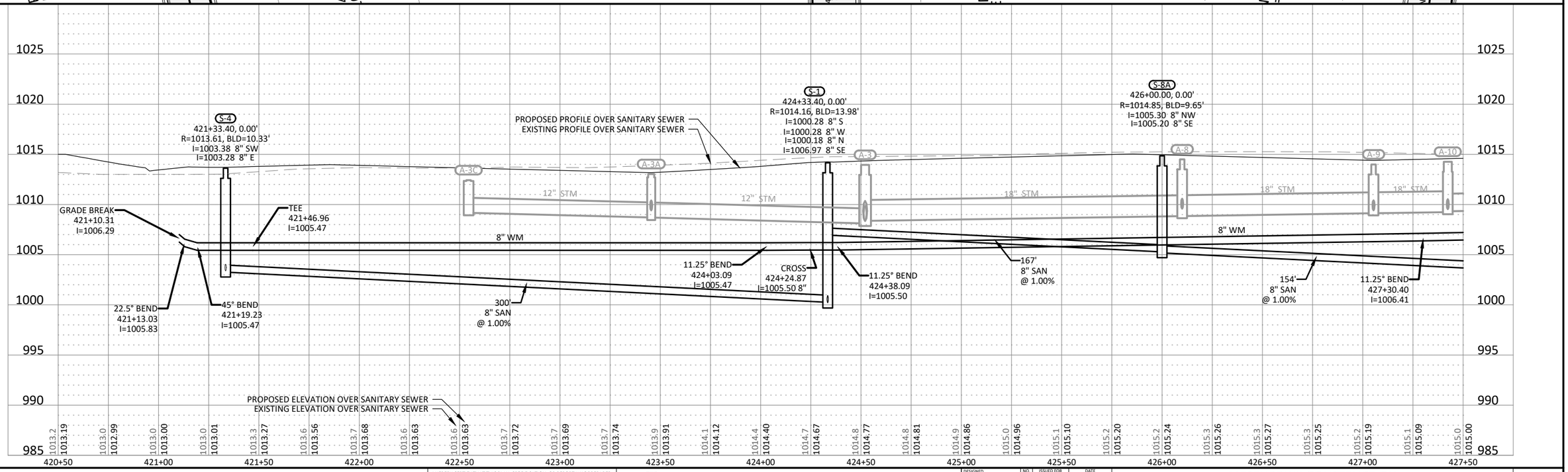

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VERT. SCALE 0 5 10 FEET

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MESENBRINK CONSTRUCTION
AVEYDA PRESERVE - SOUTH PUD
SANITARY SEWER & WATERMAIN PLAN & PROFILE
AVEYDA BEND TRAIL - STA 420+50 TO 427+50

SHEET C4.03

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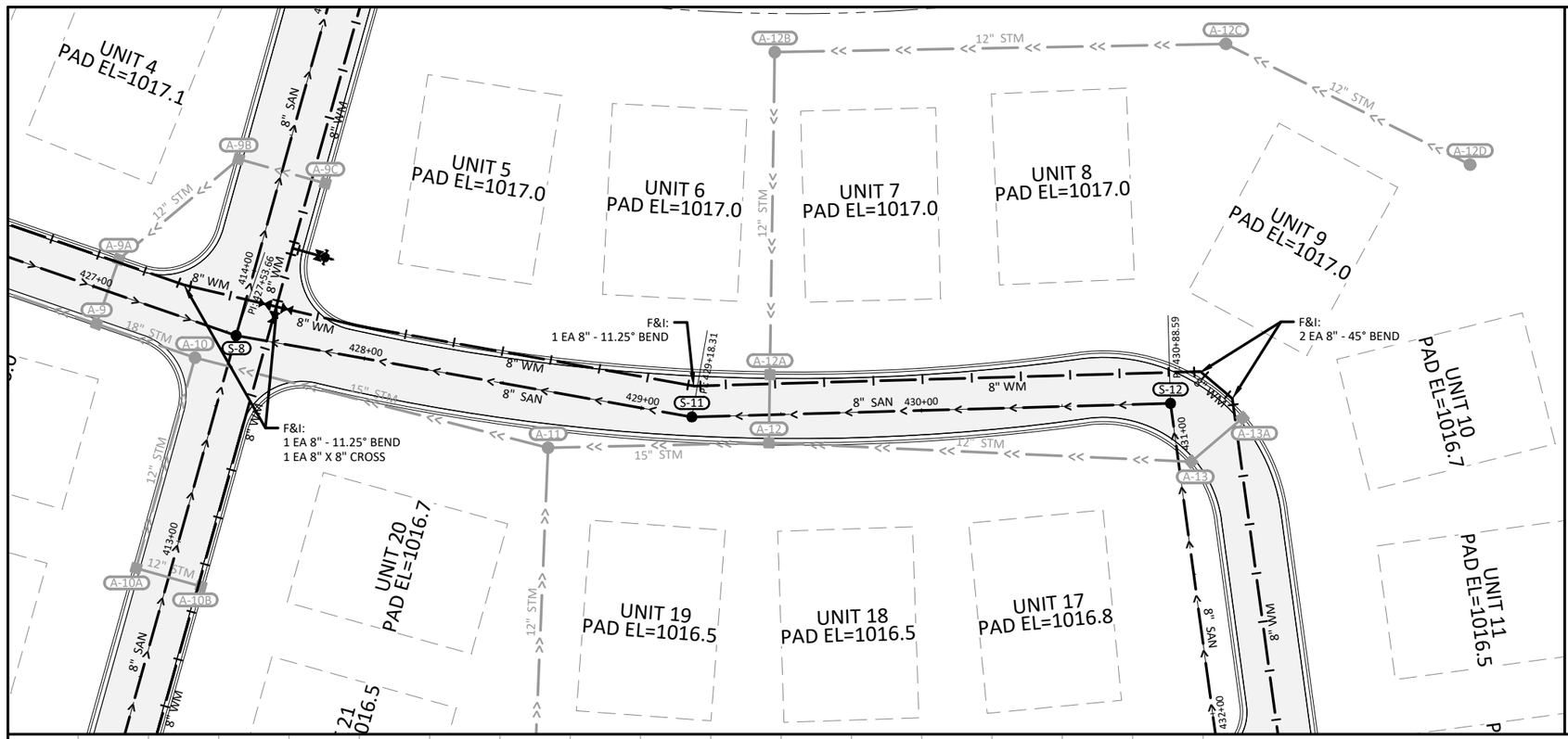

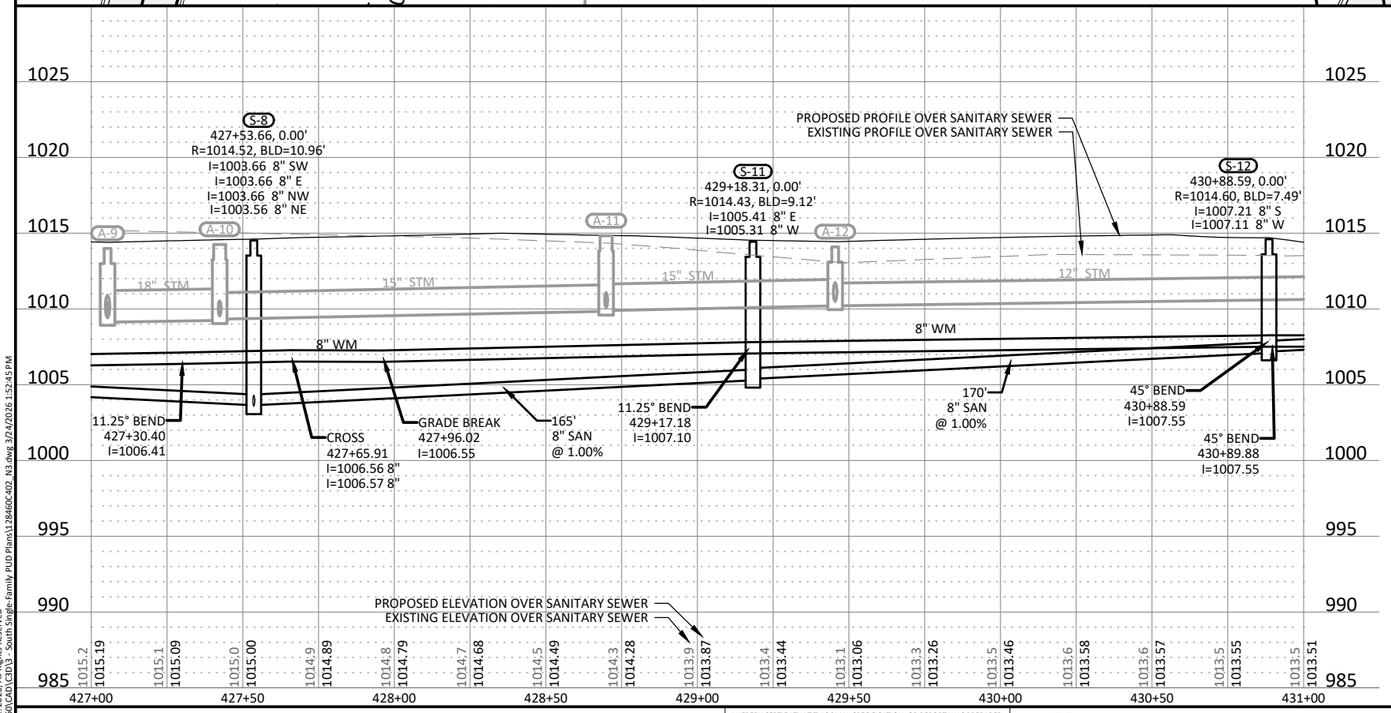

HORZ. SCALE 0 25 50 FEET
VERT. SCALE 0 5 10 FEET

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MESENBRINK CONSTRUCTION
AVEYDA PRESERVE - SOUTH PUD
SANITARY SEWER & WATERMAIN PLAN & PROFILE
ALBA CIRCLE - STA 427+00 TO 431+00

SHEET C4.04

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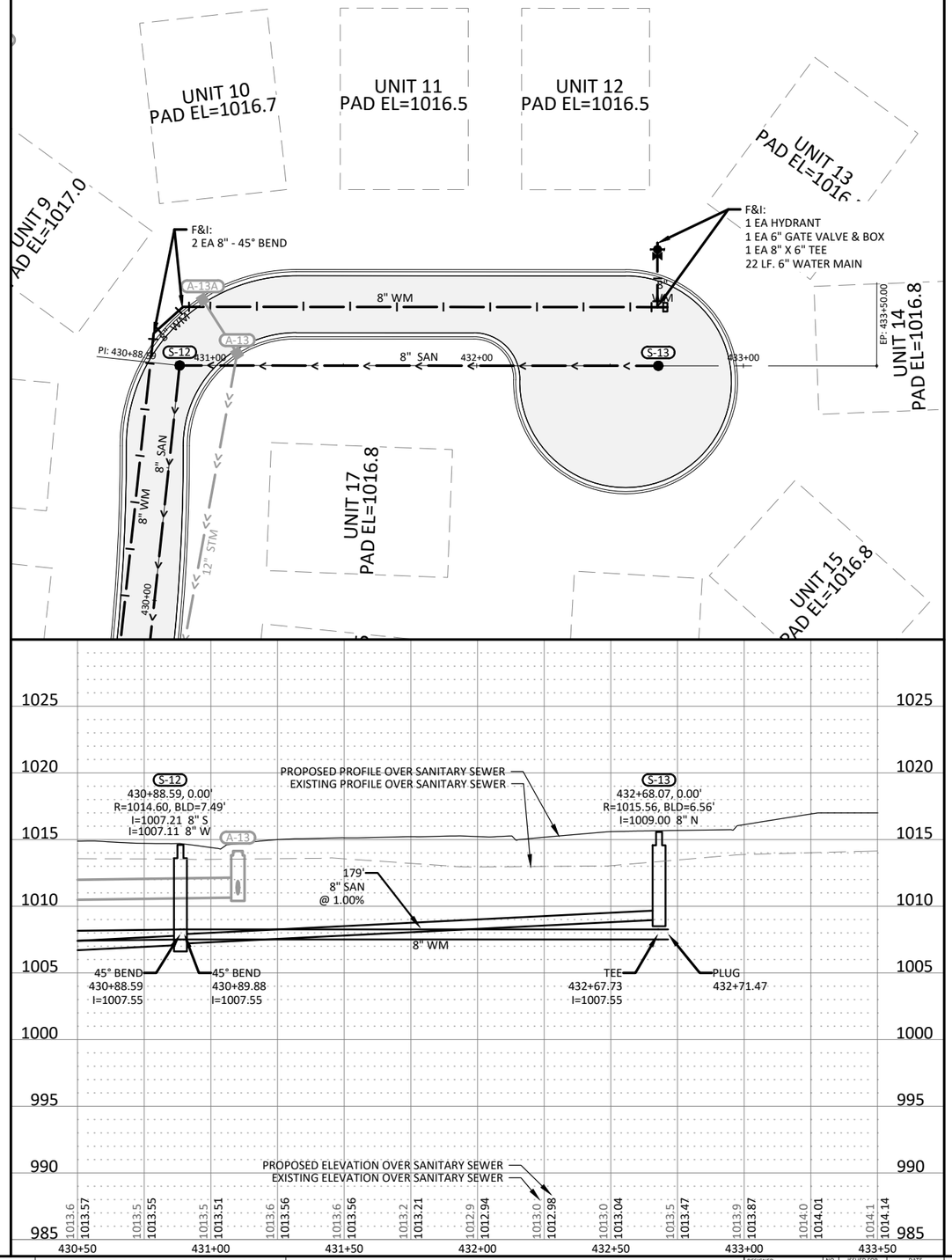

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ALBA CIRCLE - STA 430+50 TO 433+50

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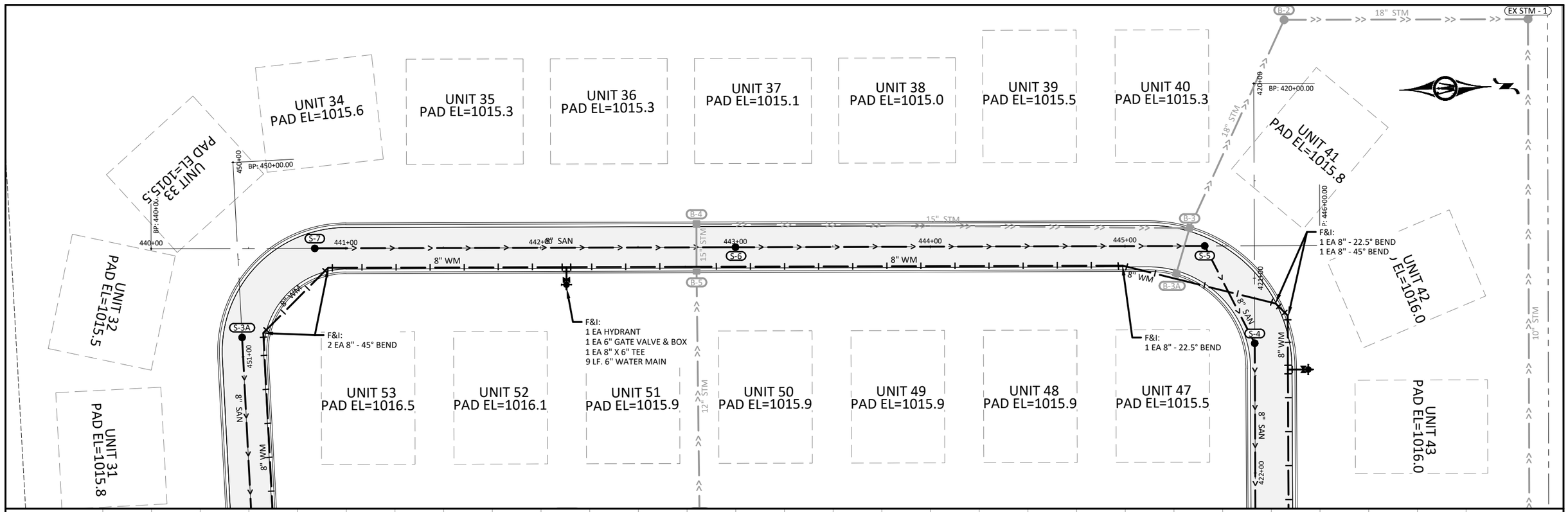

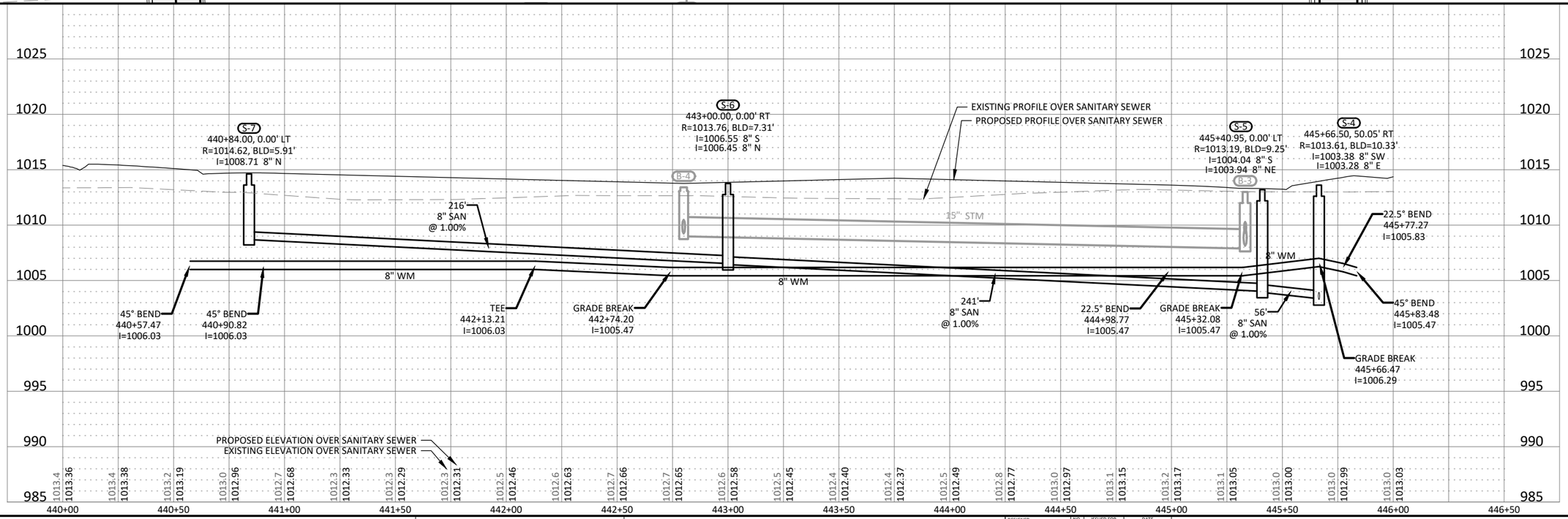

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MESENBRINK CONSTRUCTION
AVEYDA PRESERVE - SOUTH PUD
SANITARY SEWER & WATERMAIN PLAN & PROFILE
AVEYDA BEND TRAIL - STA 440+00 TO 446+50

SHEET C4.06

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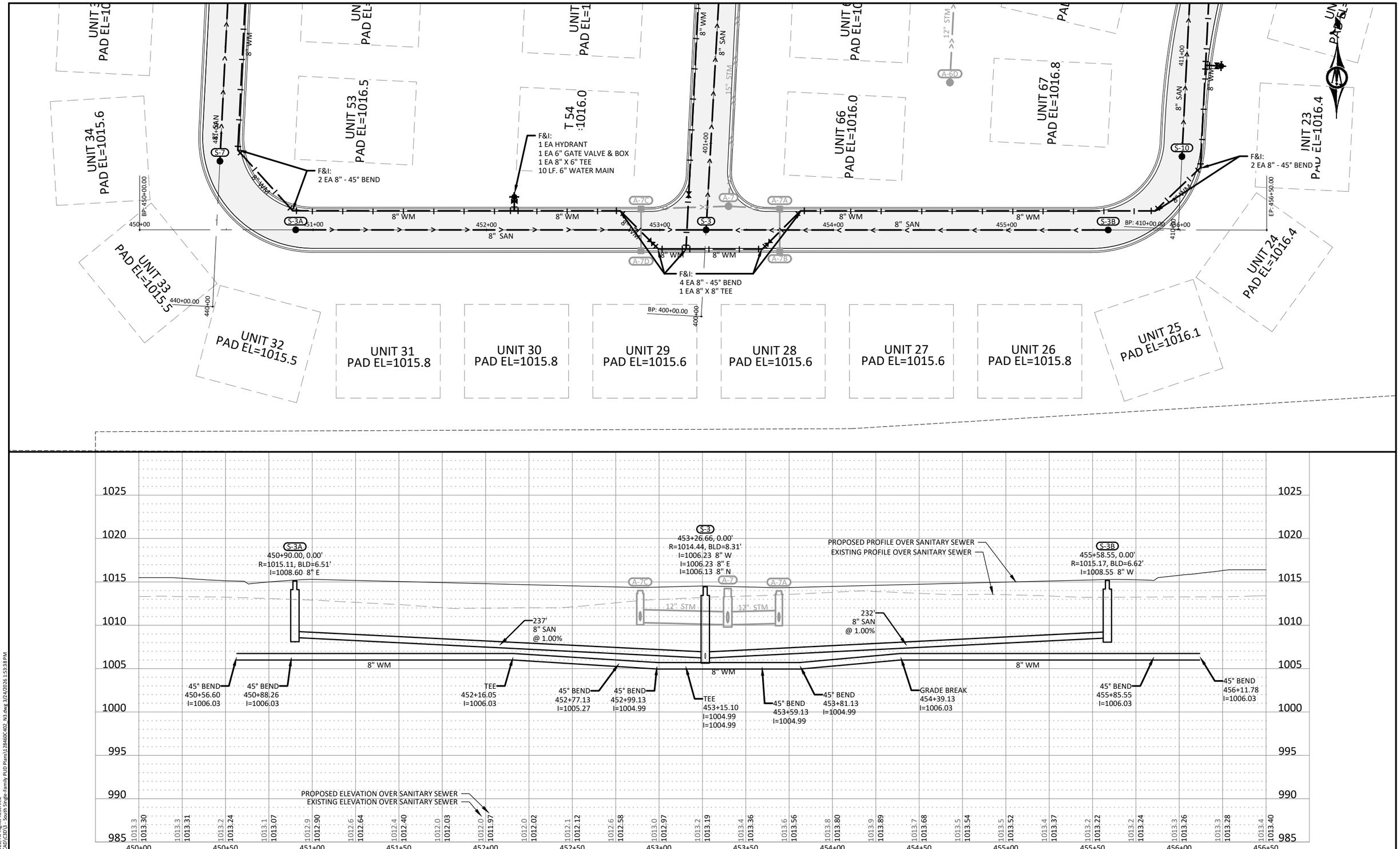

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MESENBRINK CONSTRUCTION

AVEYDA PRESERVE - SOUTH PUD

SANITARY SEWER & WATERMAIN PLAN & PROFILE

AVEYDA BEND TRAIL - STA 450+00 TO 456+50

SHEET C4.07

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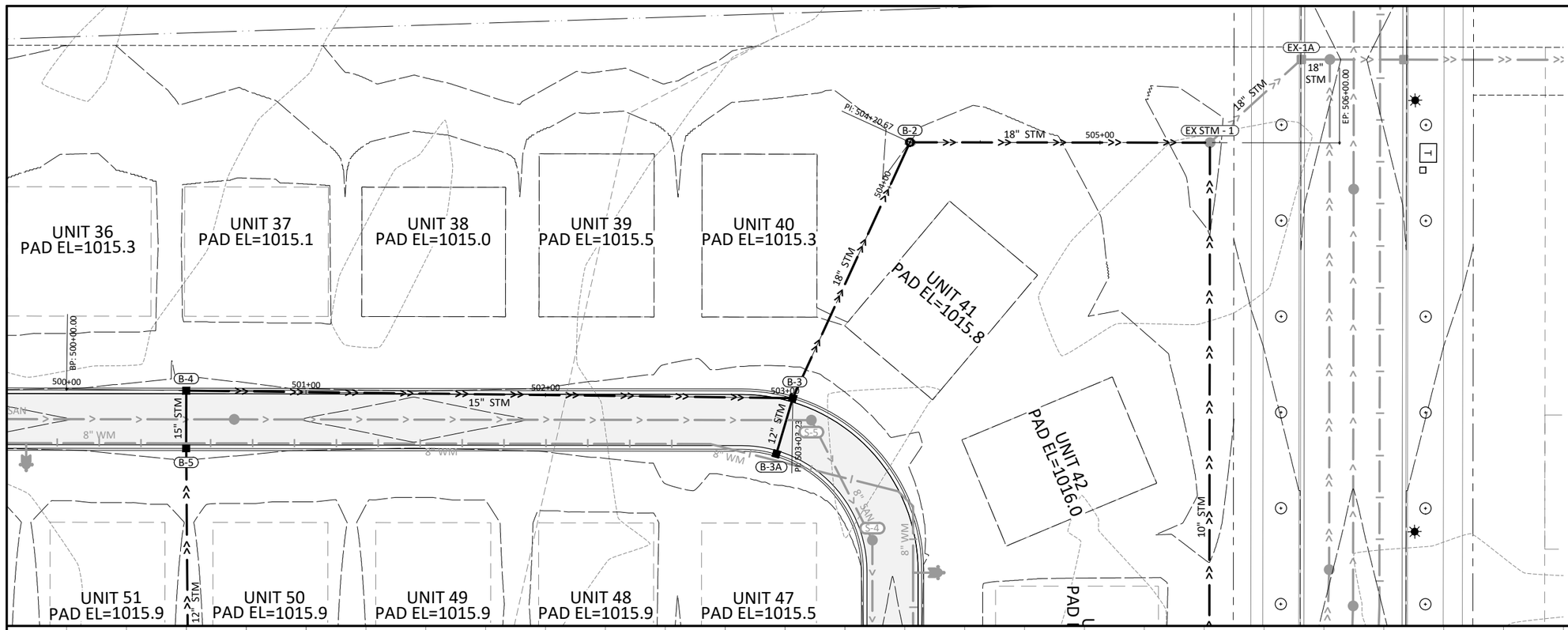

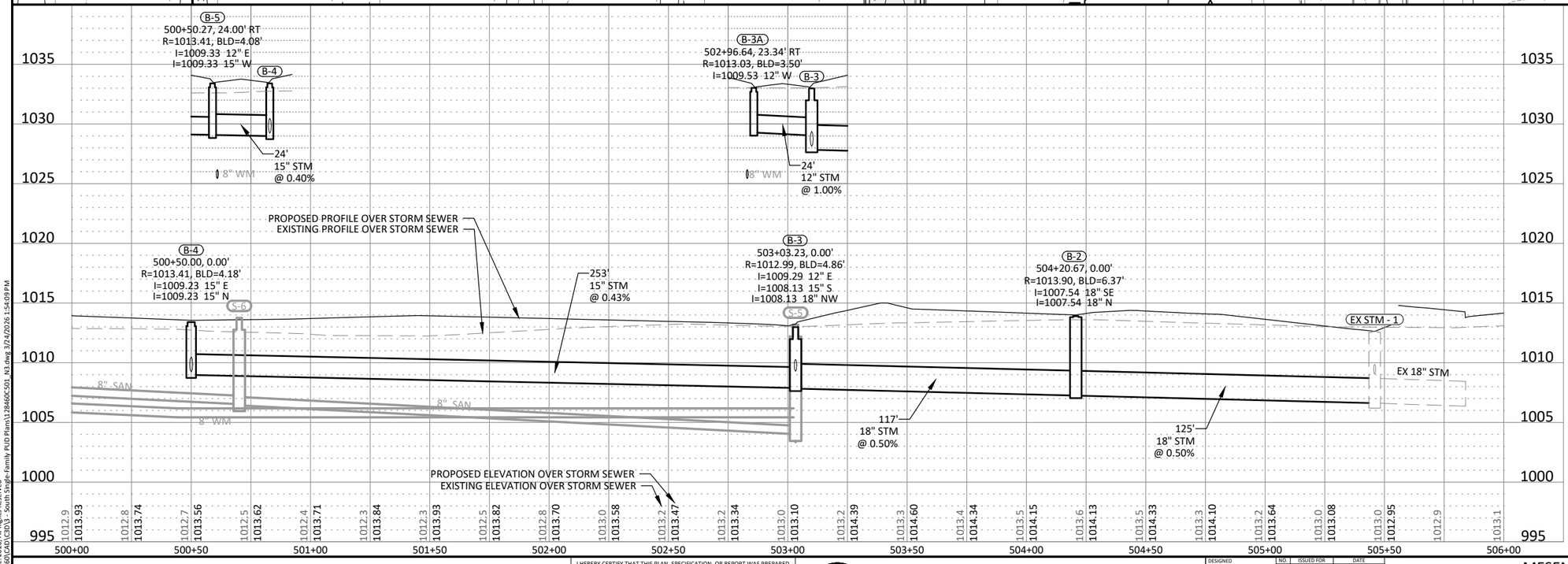

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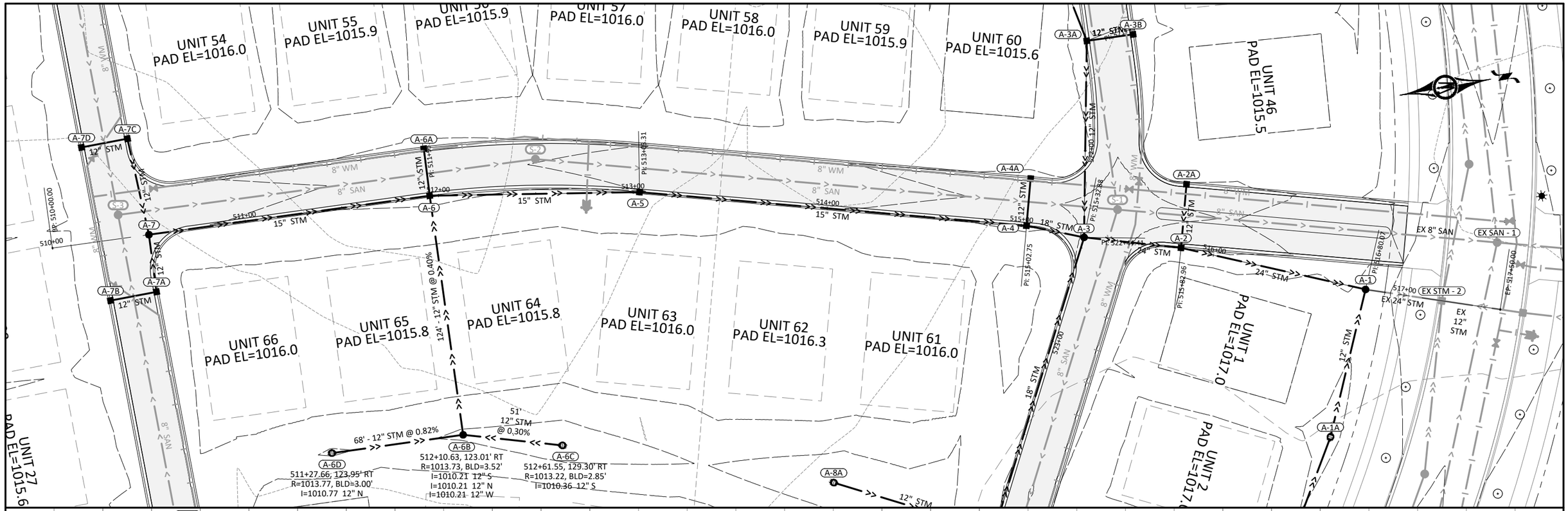
STORM SEWER PLAN & PROFILE
AVEYDA BEND TRAIL - STA 500+00 TO 506+00

SHEET C5.01



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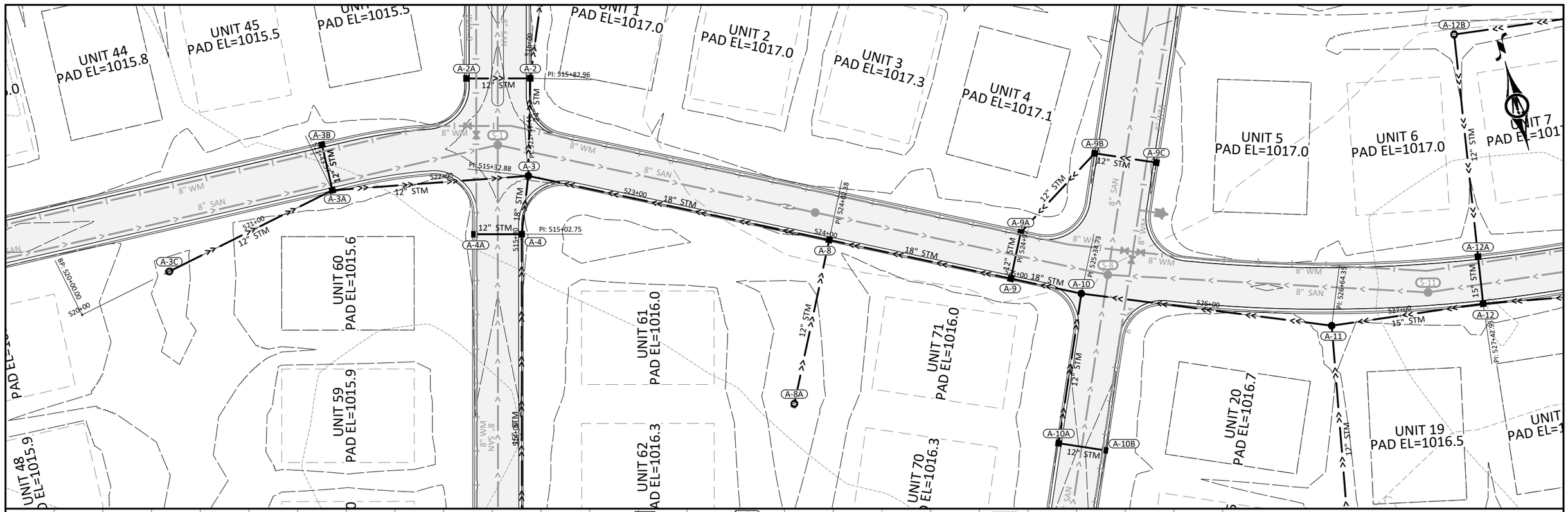
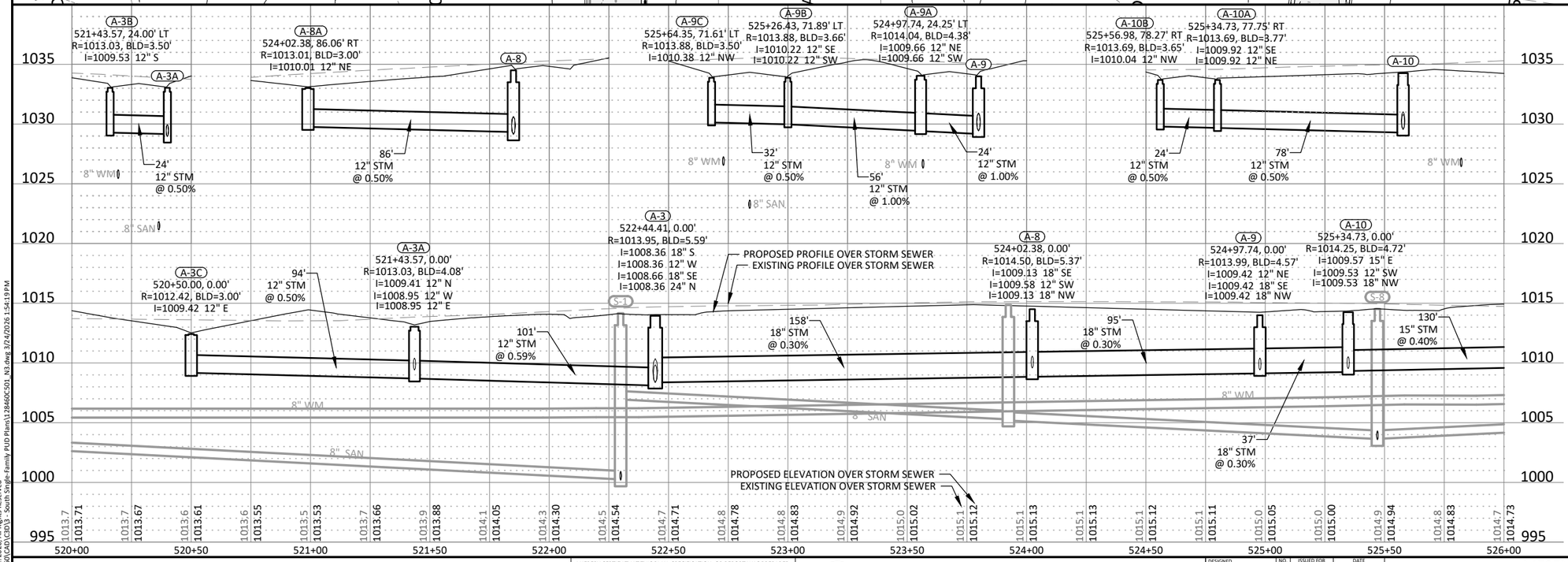
STORM SEWER PLAN & PROFILE
MERIDIAN PATH - STA 510+00 TO 517+50

SHEET C5.02





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MESENBRINK CONSTRUCTION
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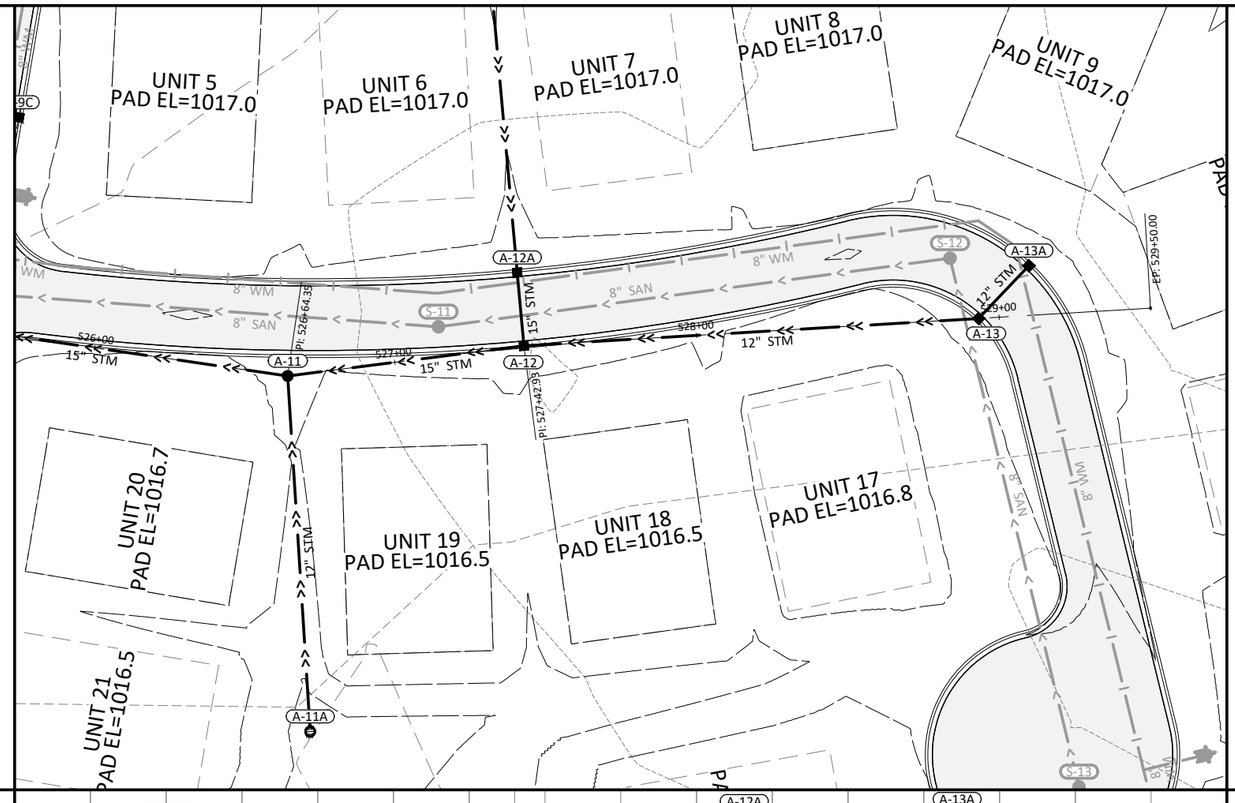
STORM SEWER PLAN & PROFILE
AVEYDA - PRESERVE - ALBA - STA 520+00 TO 526+00

SHEET C5.03



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MESENBRINK CONSTRUCTION
AVEYDA PRESERVE - SOUTH PUD
STORM SEWER PLAN & PROFILE
ALBA CIRCLE - STA 526+00 TO 529+50

SHEET C5.04

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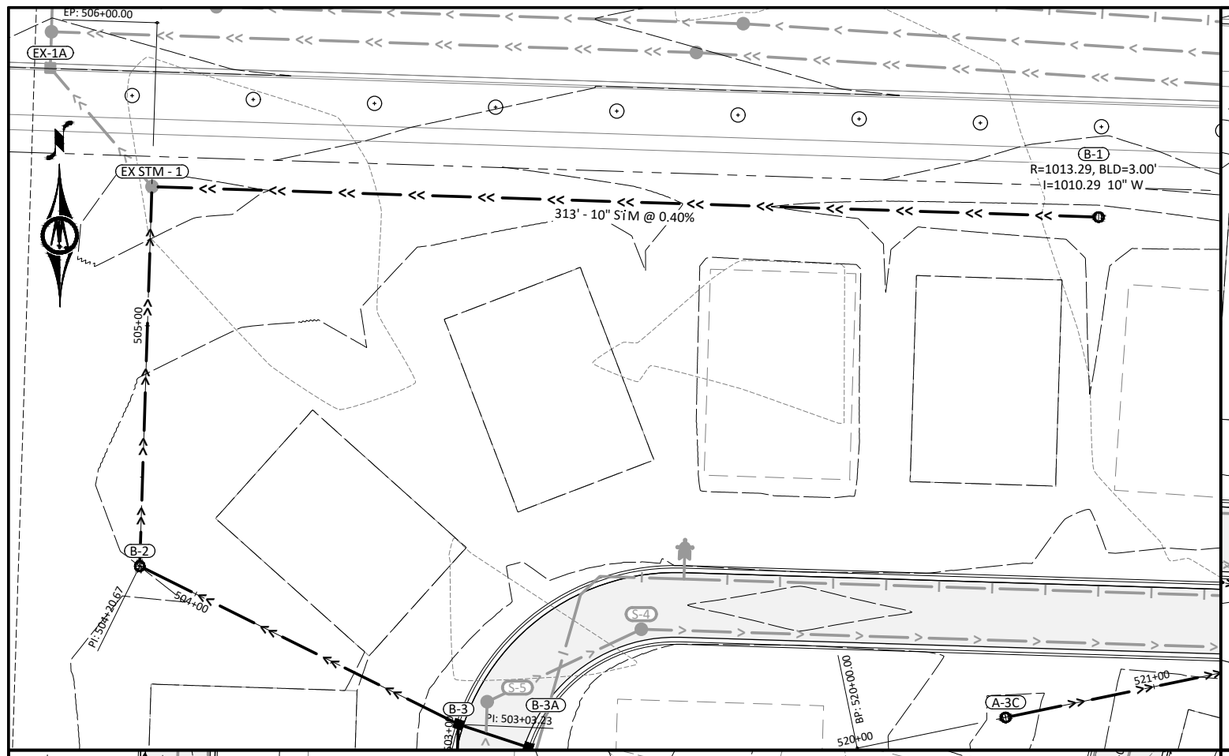

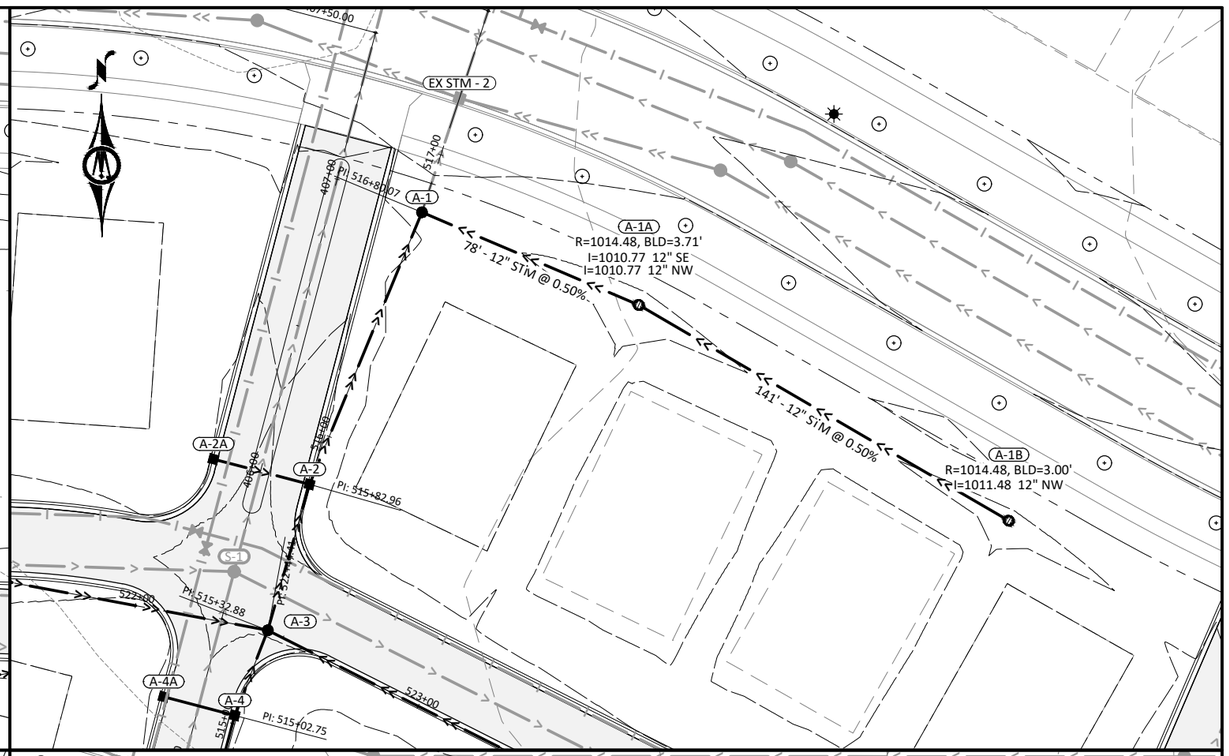

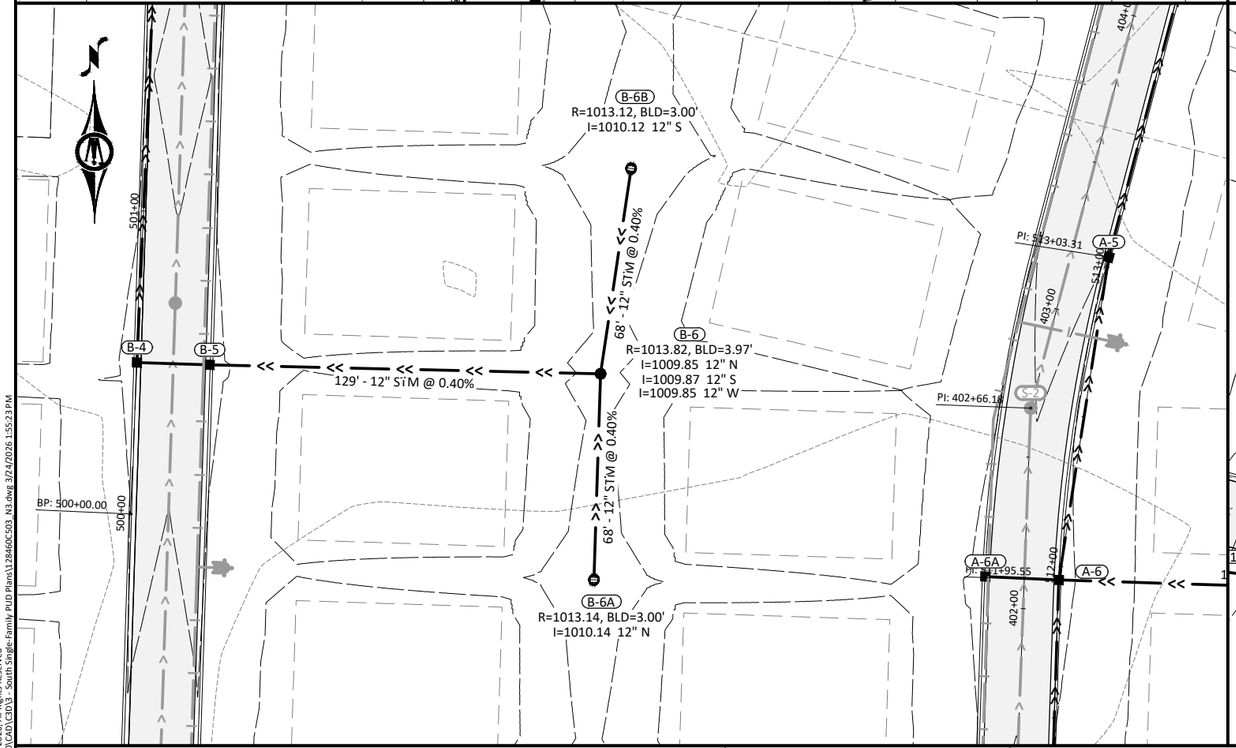

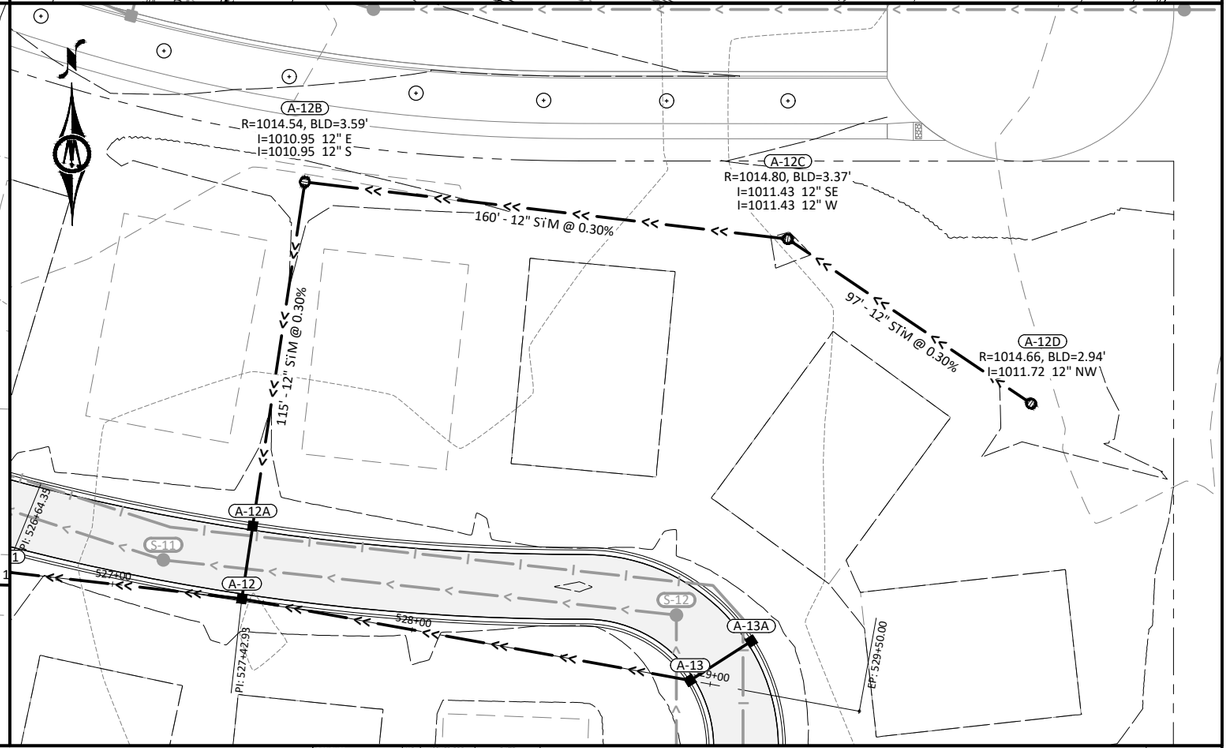

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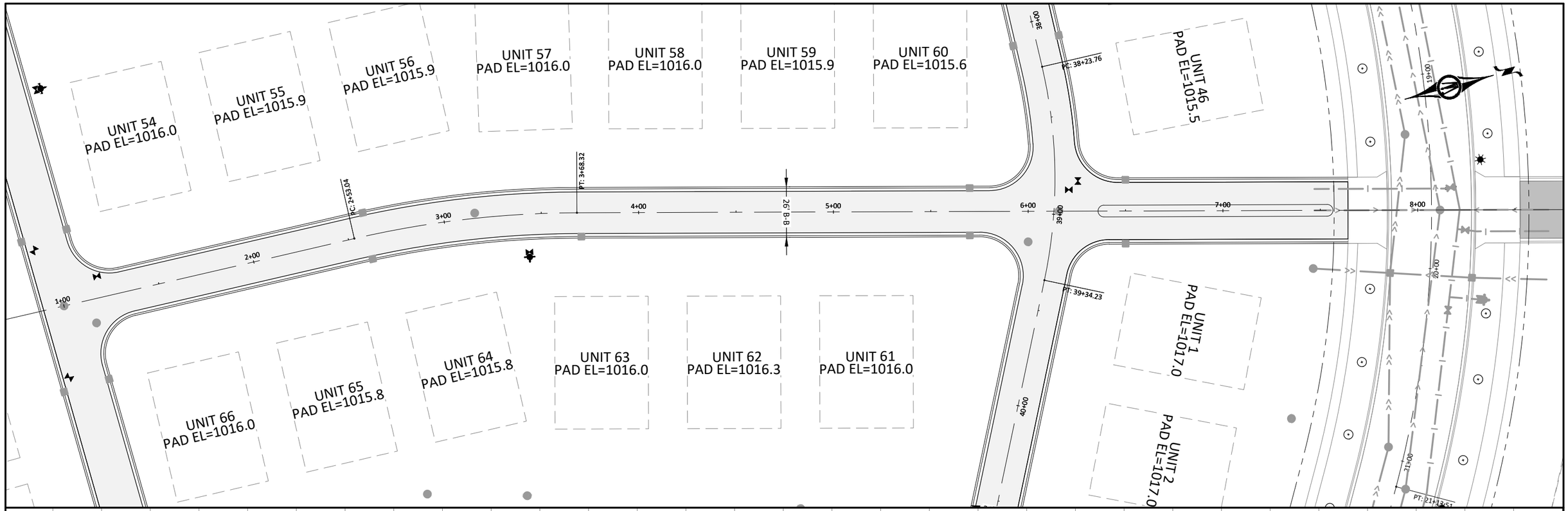
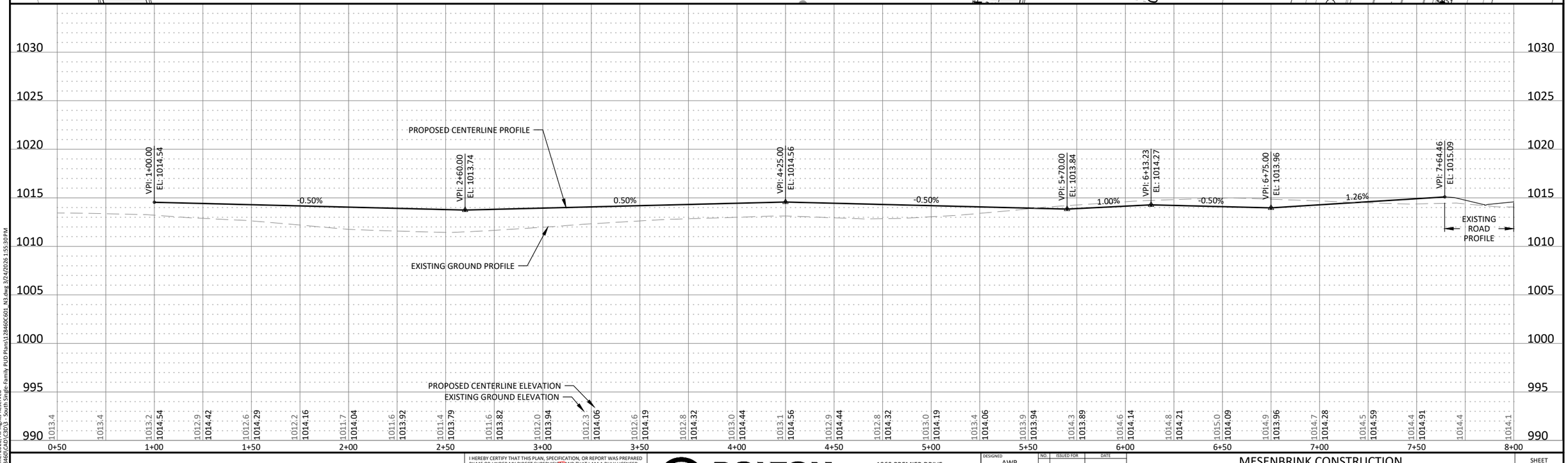
MESENBRINK CONSTRUCTION
AVEYDA PRESERVE - SOUTH PUD
STORM SEWER PLAN & PROFILE
REAR YARD DRAINS

SHEET C5.05





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MESENBRINK CONSTRUCTION

AVEYDA PRESERVE - SOUTH PUD

STREET PLAN & PROFILE

MERIDIAN PATH

SHEET C6.01

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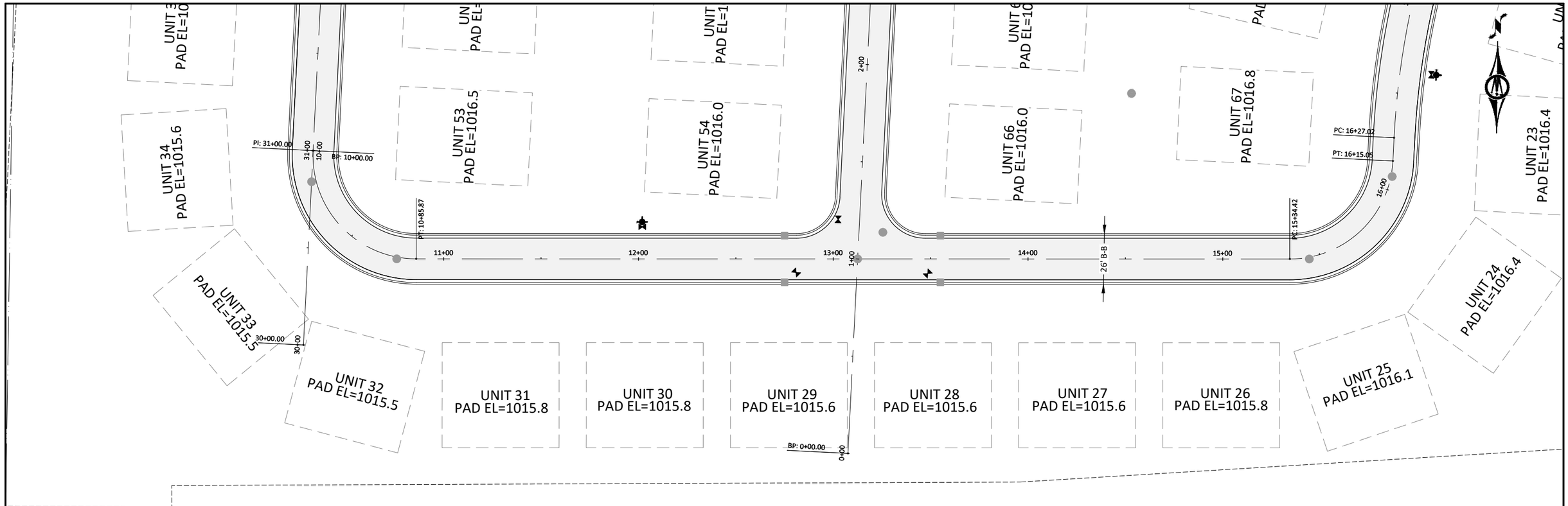

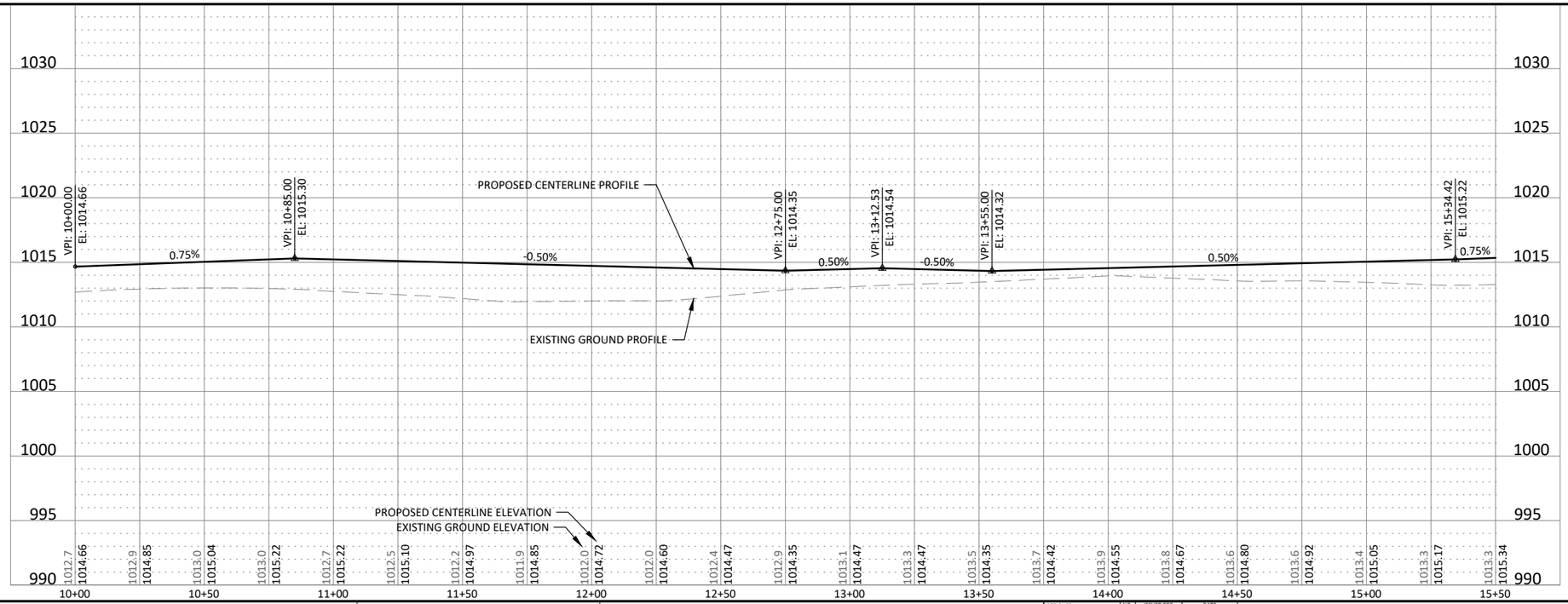

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STREET PLAN & PROFILE
AVEYDA BEND TRAIL

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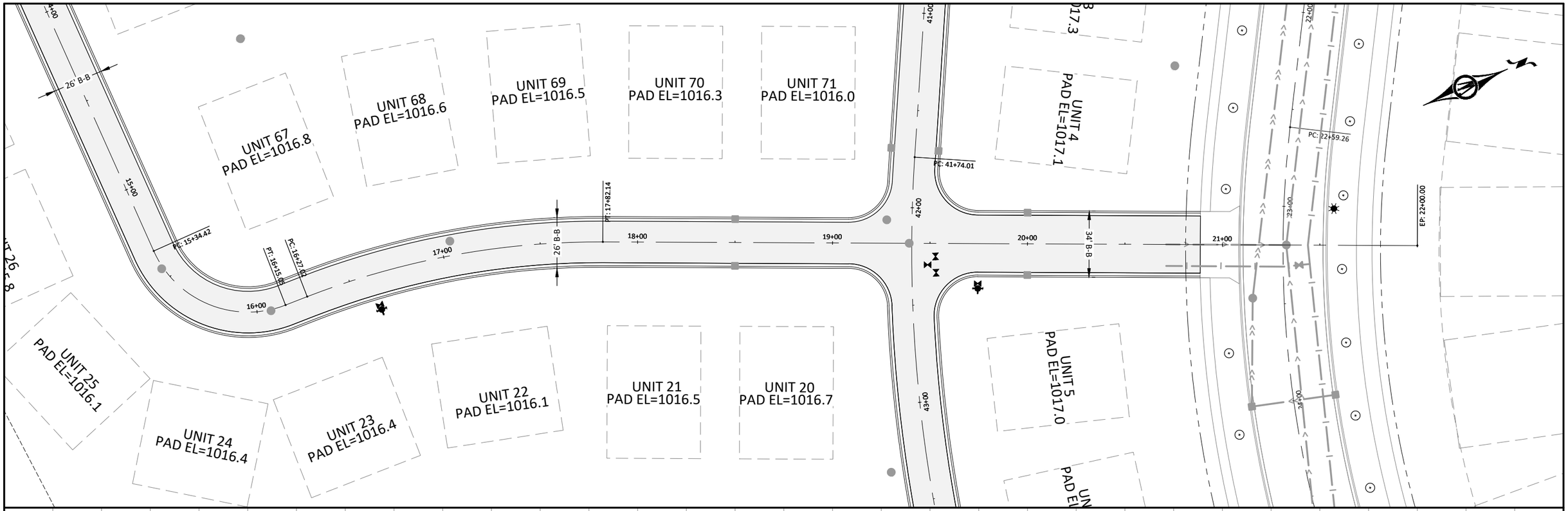

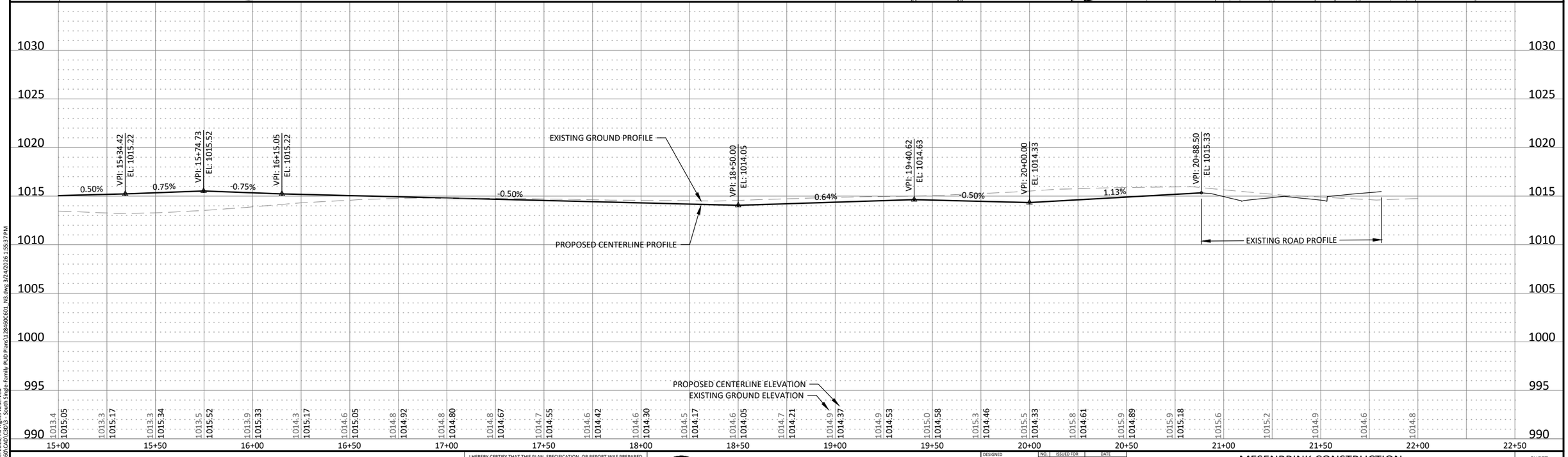

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STREET PLAN & PROFILE
AVEYDA BEND TRAIL

SHEET C6.03

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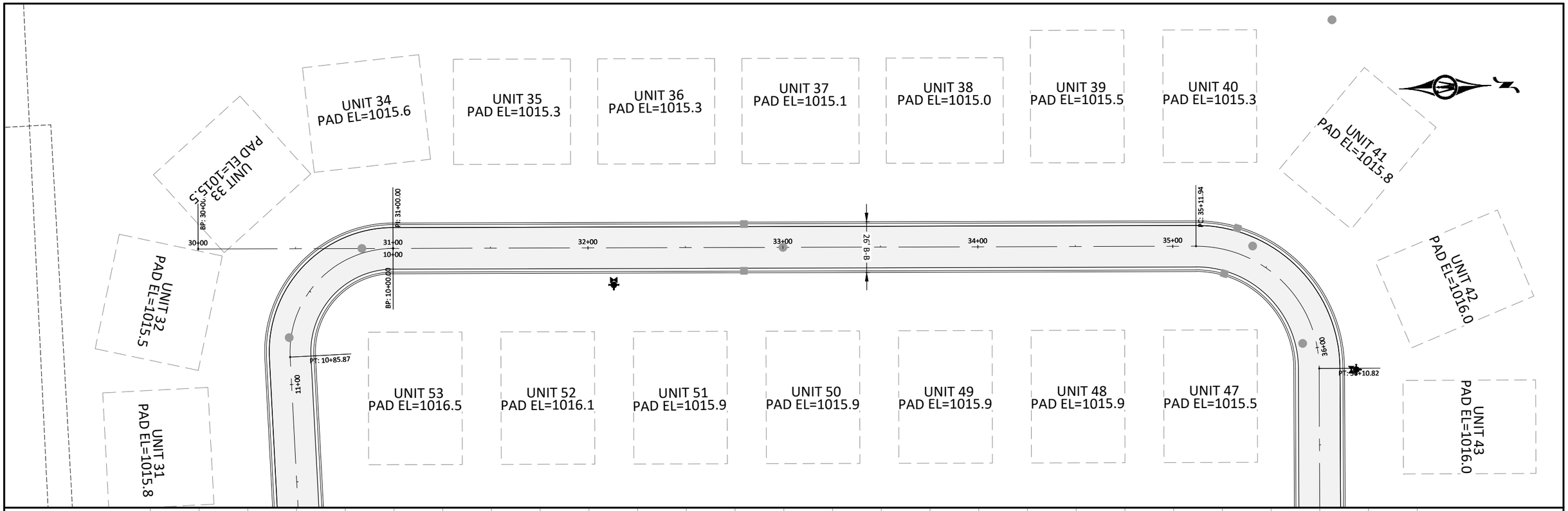

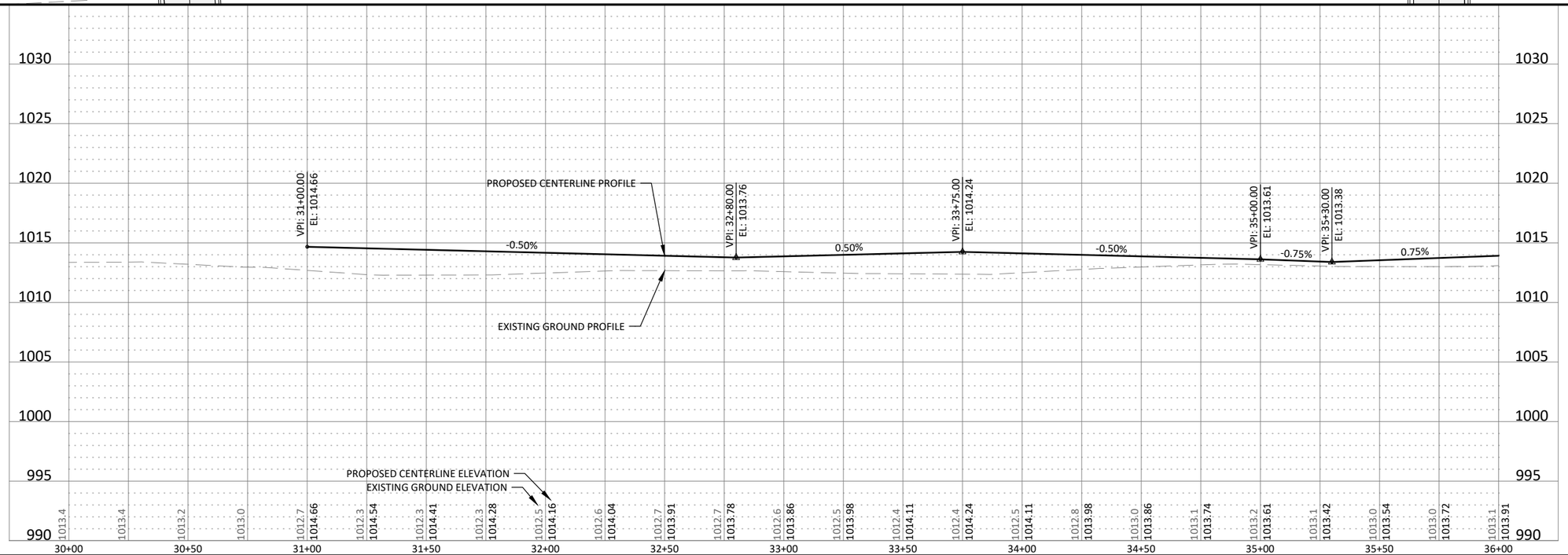

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Email: Mankato@bolton-menk.com
www.bolton-menk.com

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DRAWN	AWP
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CLIENT PROJ. NO.	0M1.128460

NO.	ISSUED FOR	DATE

MESENBRINK CONSTRUCTION
AVEYDA PRESERVE - SOUTH PUD
STREET PLAN & PROFILE
AVEYDA BEND TRAIL

SHEET C6.04

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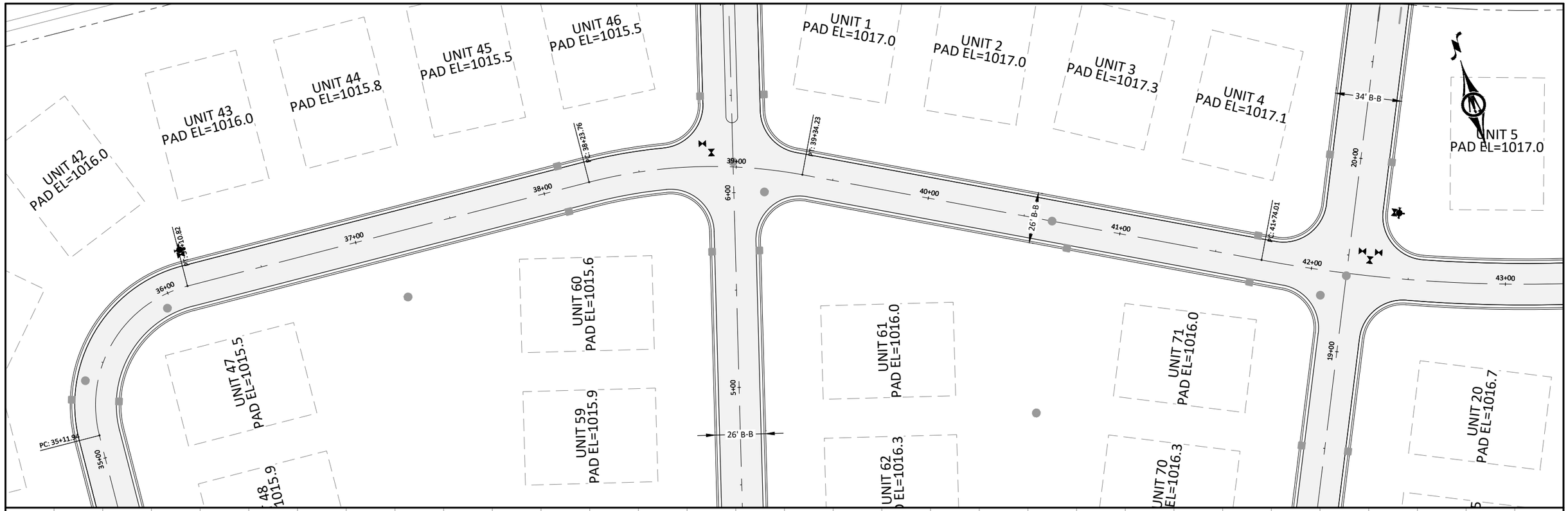

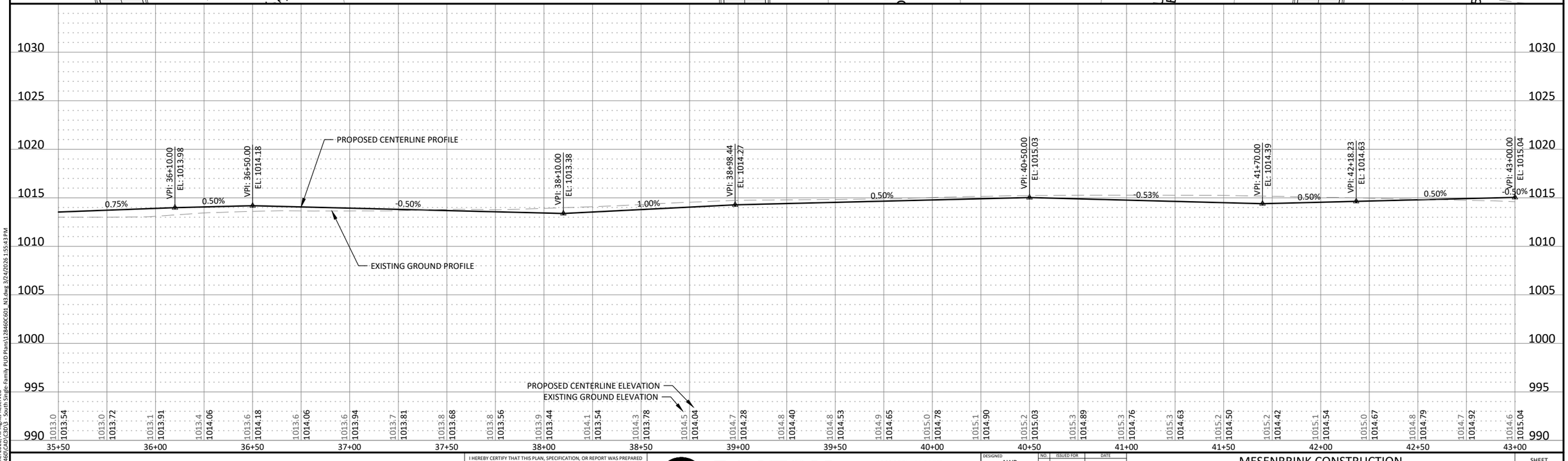

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VERT. SCALE 0 5 10 FEET

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AVEYDA BEND TRAIL & PRESERVE TRAIL

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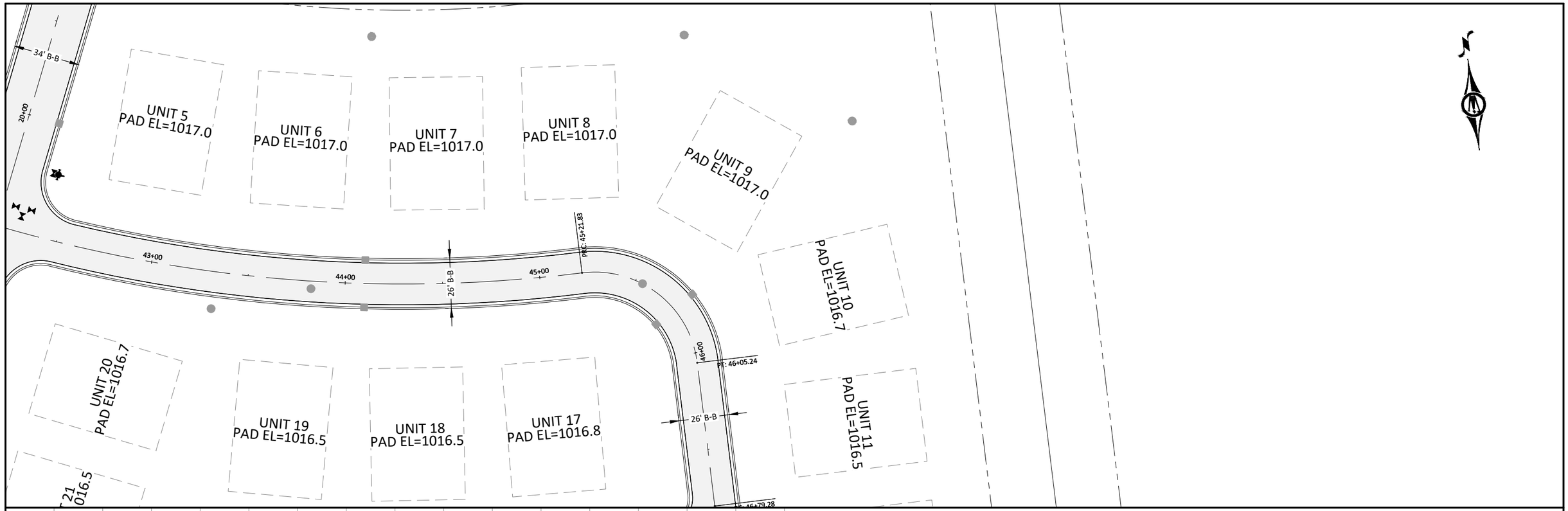

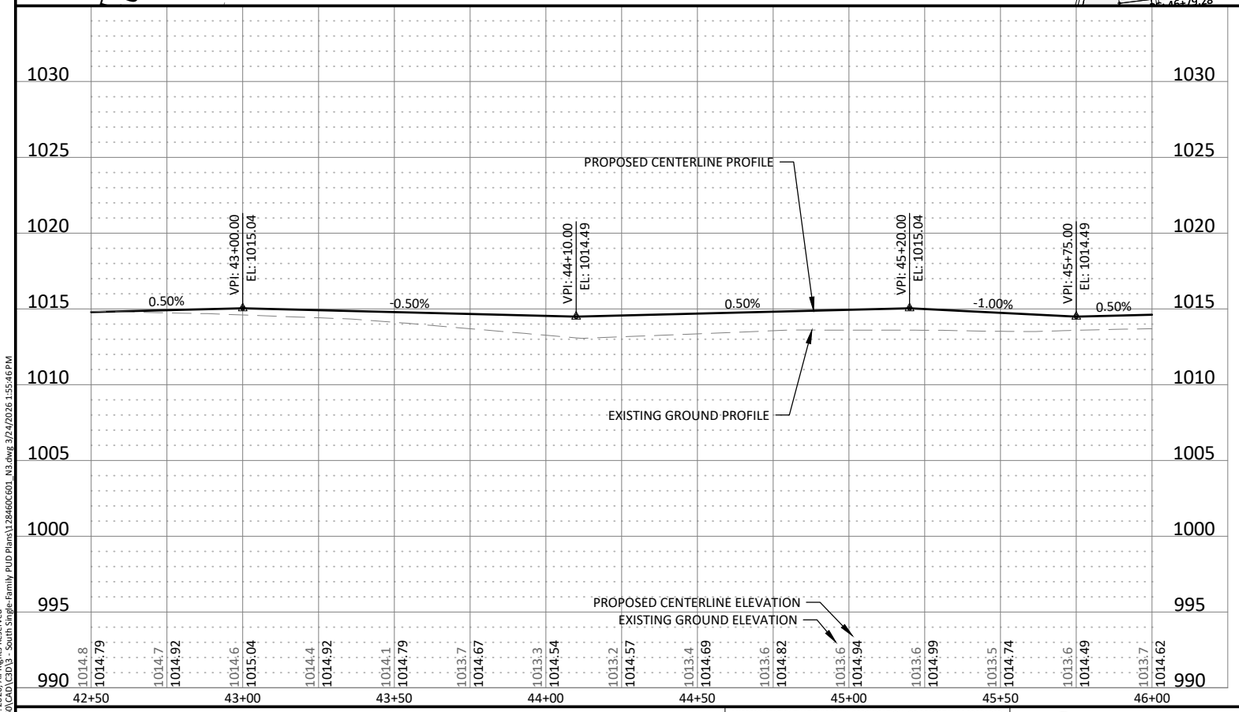

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ALBA CIRCLE

SHEET C6.06

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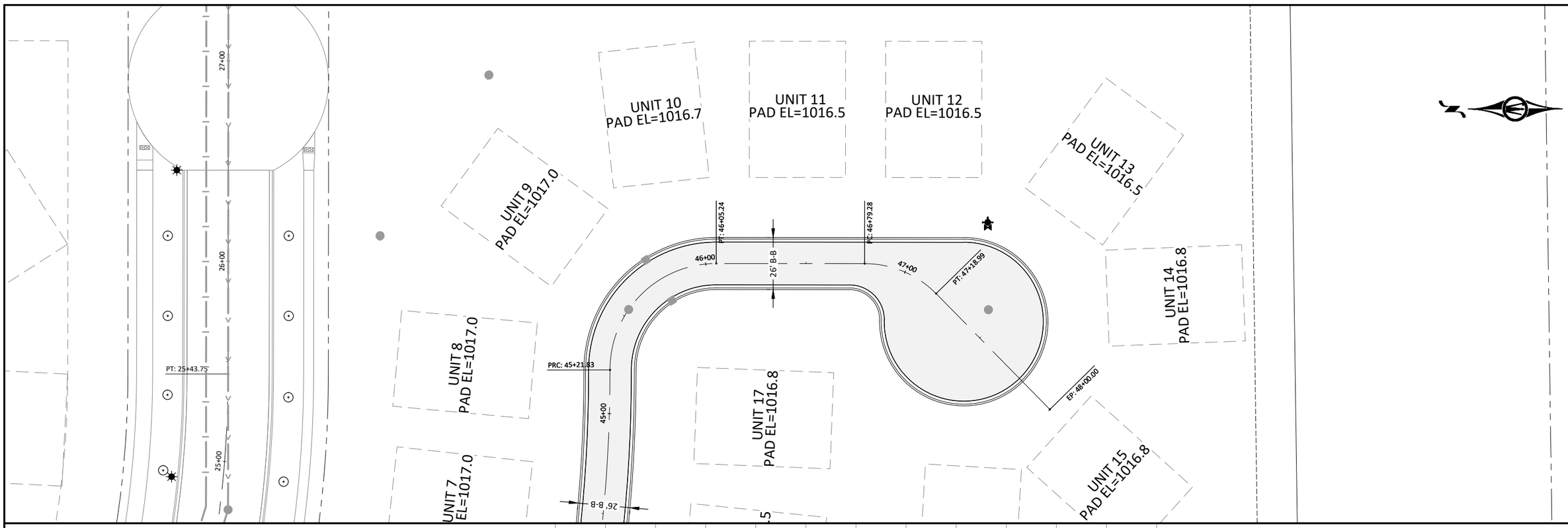

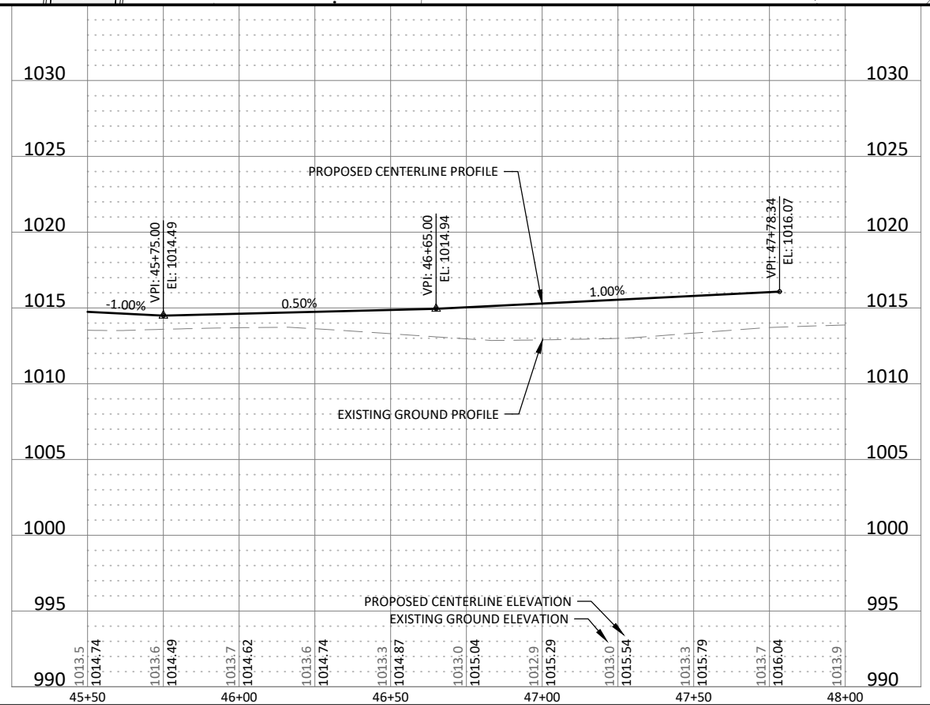

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STREET PLAN & PROFILE
ALBA CIRCLE

SHEET C6.07

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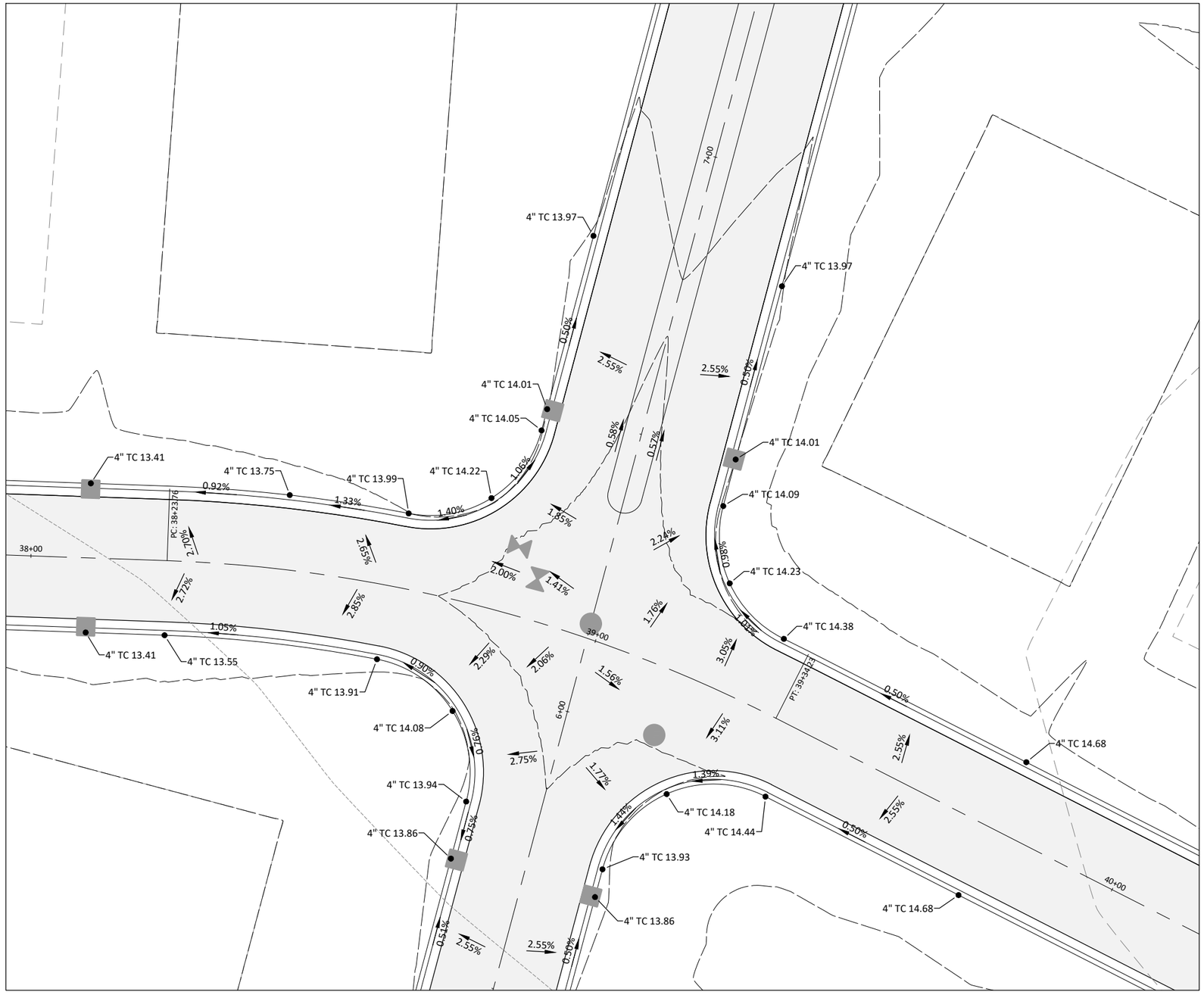

MERIDIAN PATH (NORTH)

LEGEND

6" TC=	6" HEIGHT CURB
4" TC=	4" HEIGHT CURB
B=	BITUMINOUS
ME=	MATCH EXISTING

HORZ. SCALE 0 10 20 FEET

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MESENBRINK CONSTRUCTION
AVEYDA PRESERVE - SOUTH PUD
INTERSECTION DETAILS
MERIDIAN PATH (NORTH)

SHEET C6.08

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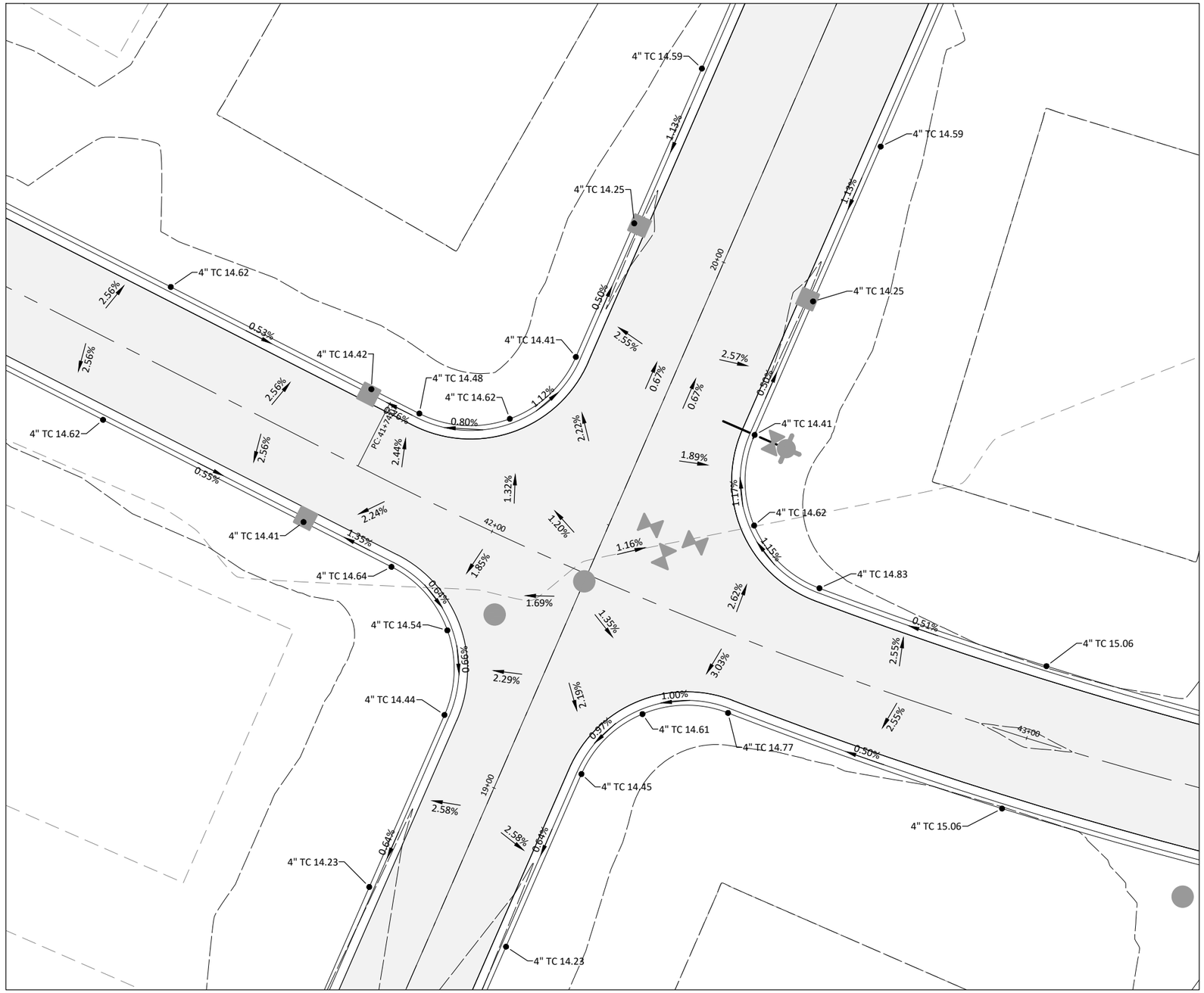

AVEYDA BEND TRAIL

LEGEND

6" TC=	6" HEIGHT CURB
4" TC=	4" HEIGHT CURB
B=	BITUMINOUS
ME=	MATCH EXISTING

HORZ. SCALE 0 10 20 FEET

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AVEYDA PRESERVE - SOUTH PUD
INTERSECTION DETAILS
AVEYDA BEND TRAIL

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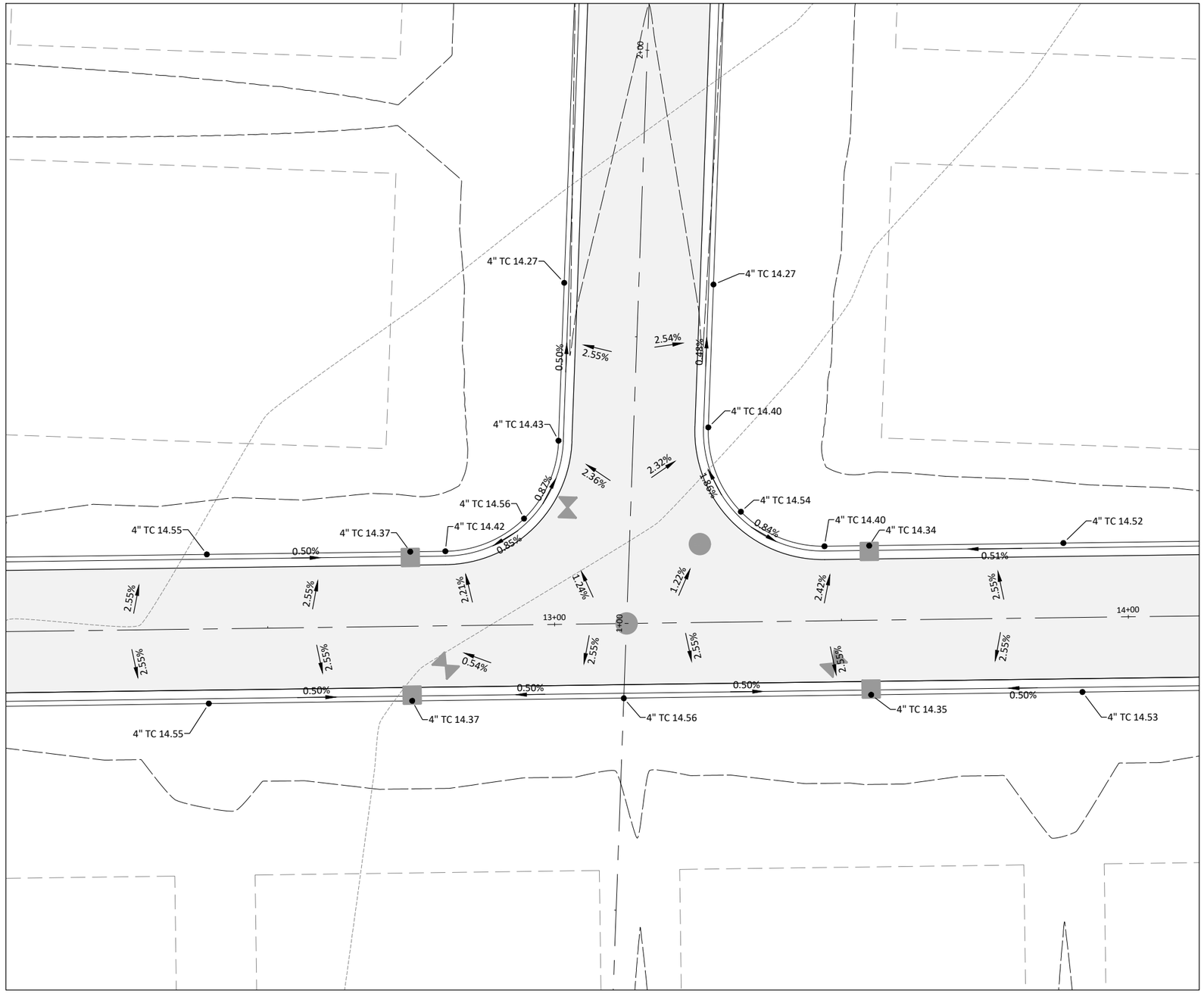

LEGEND

6" TC=	6" HEIGHT CURB
4" TC=	4" HEIGHT CURB
B=	BITUMINOUS
ME=	MATCH EXISTING

MERIDIAN PATH (SOUTH)

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MESENBRINK CONSTRUCTION
AVEYDA PRESERVE - SOUTH PUD
INTERSECTION DETAILS
MERIDIAN PATH (SOUTH)

SHEET
C6.10



LEGEND

6" TC=	6" HEIGHT CURB
4" TC=	4" HEIGHT CURB
B=	BITUMINOUS
ME=	MATCH EXISTING

ALBA CIRCLE

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MESENBRINK CONSTRUCTION
AVEYDA PRESERVE - SOUTH PUD
INTERSECTION DETAILS
ALBA CIRCLE

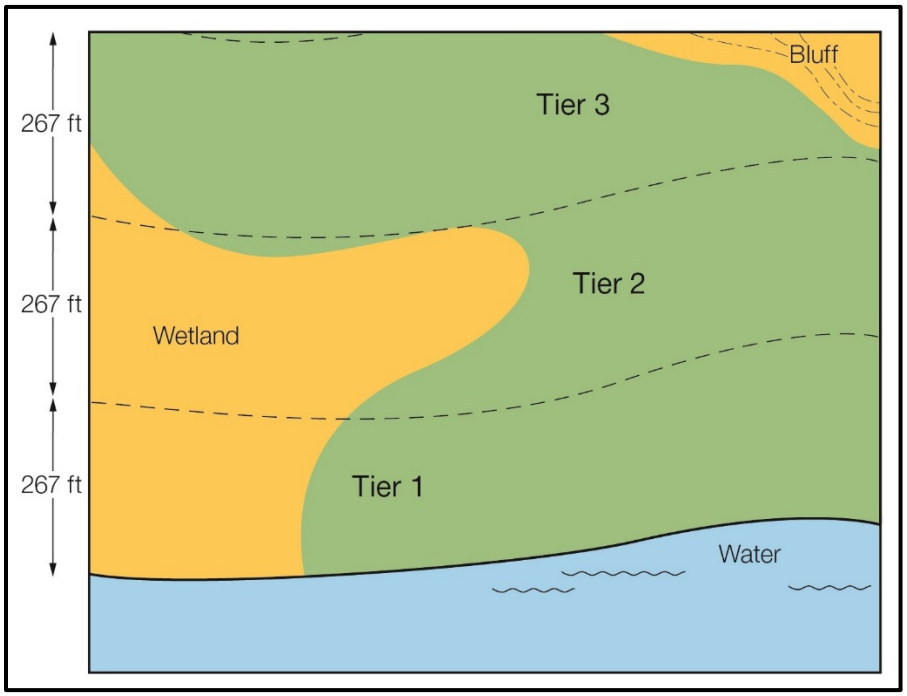
SHEET C6.11

Residential PUDs – Determining Allowed Density

PUDs in shoreland allow increased density in exchange for the preservation of open space on sensitive lands that are less suitable for development. The allowable density increases can be calculated using the steps identified in the example below for an 18 acre development on a Recreational Development lake.

Step 1 – Identify density analysis tiers

- Divide the portion of the parcel in shoreland into tiers by drawing one or more lines parallel to the Ordinary High Water Level (OHWL) at interval specified in the zoning ordinance for the relevant lake classification
- Determine total area in each tier. Only land areas above the OHWL may be considered



Step 2 – Calculate suitable area for development

Calculate the suitable area within each tier by excluding wetlands, bluffs, and land below the OHWL from the total area in each tier. Unsuitable area should be included in the area allocated to the 50% open space requirement.

Tier	Total Area	Unsuitable Area	Suitable Area	Minimum Lot Size for Lake Class (Sewered RD)	Base Density	Bonus Density Factor	Allowable Units per tier with Bonus Density	Adjusted Allowable Units per tier	Proposed Units	Units transferred to next tier
1	201,502	68,804	132,698							
2	319,288	152,046	167,242							
3	295,623	14,144	281,479							
Total	816,413	234,994	581,419				**0.0**		**0**	

Step 3 – Determine base density

Divide the suitable area within each tier by the minimum single residential lot area for the relevant water body classification (GD, RD, NE) to yield the base density, or number of dwelling units allowed. For Tier 1 use the riparian lot area, for all other tiers, use the non-riparian lot area.

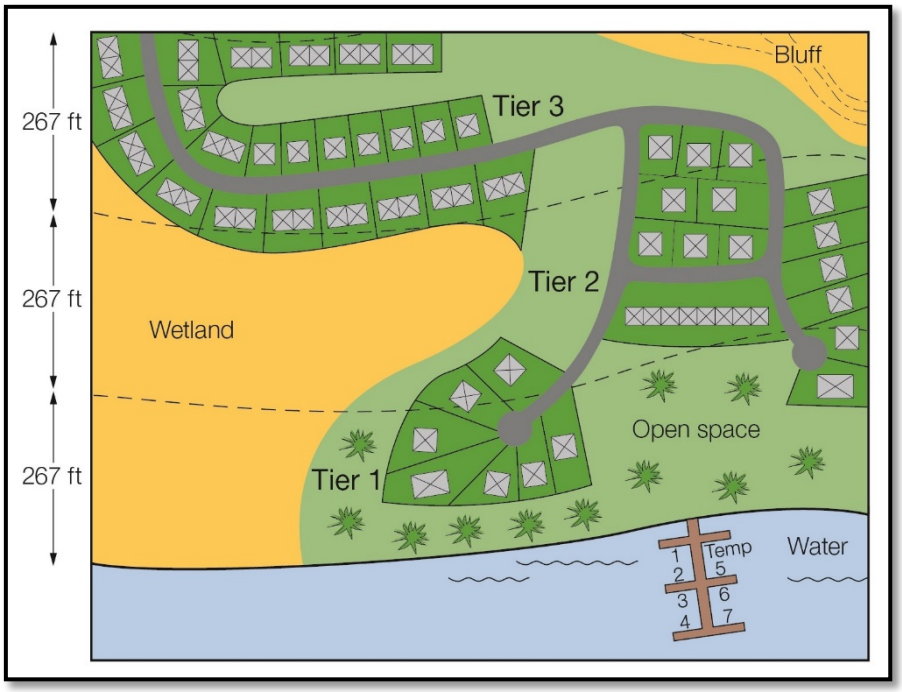
Tier	Total Area	Unsuitable Area	Suitable Area	Minimum Lot Size for Lake Class (Sewered RD)	Base Density	Bonus Density Factor	Allowable Units per tier with Bonus Density	Adjusted Allowable Units per tier	Proposed Units	Units transferred to next tier
1	201,502	68,804	132,698	20,000	6.6349					
2	319,288	152,046	167,242	15,000	11.14946667					
3	295,623	14,144	281,479	15,000	18.76526667					
Total	816,413	234,994	581,419				**0.0**		**0**	

Step 4 – Determine if the site can accommodate base density and any increased density

- If the site design can accommodate all the required design standards including the 50% open space, then bonus density may be considered by multiplying the base density by the bonus density factor to yield the allowable dwelling units.

Tier	Total Area	Unsuitable Area	Suitable Area	Minimum Lot Size for Lake Class (Sewered RD)	Base Density	Bonus Density Factor	Allowable Units per tier with Bonus Density	Adjusted Allowable Units per tier	Proposed Units	Units transferred to next tier
1	201,502	68,804	132,698	20,000	6.6349	1.5	10.0		7	3.0
2	319,288	152,046	167,242	15,000	11.14946667	2.0	22.3	25.3	18	7.3
3	295,623	14,144	281,479	15,000	18.76526667	3.0	56.3	63.5	44	
Total	816,413	234,994	581,419				**88.5**		**69**	

- To take advantage of bonus density, structure setbacks from the OHWL must be at least 50% greater than the minimum setback; or the impact on the waterbody is reduced an equivalent amount through vegetative management, topography, or additional acceptable means and the setback is at least 25% greater than the minimum setback.
- Allowable densities may be transferred from any tier to any other tier further from the waterbody, but must not be transferred to any tier closer to the waterbody
- Develop site plan and coordinate plan review with local government



PUD/CLUSTER EVALUATION SHEET

Aveyda Preserve (Mesenbrink Subdivision)
Prepared by Bolton & Menk 3-24-2026

Part 1. DNR In-house Information:

DNR Region and Area Number — Region____ Area_____

Checklist Preparer — _____ (Name)

Date Prepared — 3/24/2026

DNR PUD Approval Required?* — ___Yes ___No

Date of Field Inspection (DNR field inspection required when the PUD is subject to DNR approval) — _____

*In shoreland areas, DNR approval is required when the local unit of government has not yet adopted planned unit development (PUD) standards compliant with 1989 Minnesota Rules, Parts 6120.2500 - 6120.3900 for shoreland areas. DNR approval is required for all wild & scenic rivers planned cluster developments (PCD). This form does not apply to the Lower St. Croix Wild and Scenic Riverway Designation.

Part 2. General Project Information:

Project Name — Aveyda Preserve

Is this a Shoreland District PUD? — _x_ Yes ___No
Is this a Wild & Scenic River District PCD? — ___Yes _x_ No

Lake/Stream Involved (Include shoreland or wild & scenic rivers classification.) — Unnamed Basin #07-71W

_____ (Classification)

City &/or County Name — City of Mankato, MN

Blue Earth County

The Project Proposal is for:

New Development — Y
Resort Conversion — N
Redevelopment of existing site — N

Is the project one of the following:

A "residential" PUD? Residential planned unit development means a use where the nature of residency is nontransient and the major or primary focus of the development is not service- oriented. For example, residential apartments, manufactured home parks, townhouses, cooperatives, and full fee ownership residences would be considered as residential planned unit developments. X Yes ___No

A "commercial" PUD? Commercial planned unit developments are typically uses that provide transient, short-term lodging spaces, rooms, or parcels and their operations are essentially service-oriented. For example, hotel/motel accommodations, resorts, recreational vehicle and camping parks, and other primarily service- oriented activities are commercial planned unit developments. ___Yes X No

NOTE: An expansion to an existing commercial PUD involving 6 or less new dwelling units or sites since the date the community adopted land use regulations compliant with the revised shorelandPUD standards in Part 6120.3800 is permissible as a permitted use (under DNR's shoreland rules), provided the total project density does not exceedthe density calculated in the project density evaluation calculations which follows in Part 5.

A combined "residential and commercial" PUD? For the purposes of this checklist, this is a development with a mixture of uses and a combination of residential/ commercial dwelling units or sites. The total project acreage must be divided between the respective tables on page 6 for residential density analysis and page 8 for commercial density analysis. If a portion of the project area is set aside for a strictly commercial activity not involving dwelling unitsor dwelling sites (e.g., a proposed/existingmarina, restaurants, etc.), then a portion of the lot must be excluded from the density evaluation noted in the preceding sentence - this would be an area equal to creating a hypothetical lot for these facilities such that all dimensional, sewage treatment and water supply, and performance standards could be satisfied assuming this development was standing on its own. ___Yes X No

Conversion of a resort or other land use to a residential PUD? Resorts and other land uses may be converted to a residential PUD provided: 1) the proposed conversion has been initially evaluated in accordance with the criteria in Parts 5 and 6 which follow; and 2) remedial measures have been taken to correct project deficiencies as determined by the evaluation in Parts 5 and 6, all in accordance with Part 6120.3800, Subpart 5. (D) (See Attachment A, Part A). ___Yes X No

___Yes ___X No If this is a resort/other land conversion, have items 1 and 2 in the preceding paragraph been satisfied?

This checklist is designed so that an affirmative answer to the following questions will indicate that the PUD proposal meets applicable DNR shoreland/wild and scenic rivers rules. If a question is not applicable to a given PUD proposal, then an "N/A" should be entered into the "Yes" column (with an explanation, if necessary).

Part 3. Land Use District Compatibility:

Is the proposed land use permissible in the applicable zoning district? X Yes ___No

If this is a residential PUD in a Shoreland District, does the development have at least 5 dwelling units or sites? If not, the proposal does not qualify as a residential PUD. X Yes ___No

If this is a shoreland PUD, is the community requiring a Conditional Use application? X Yes ___No

Part 4. Project Development Information:

Have the following project development documents been provided:

Documents that explain how the PUD will be designed and will function, as approved by the DNR/local unit of government (specify which of the following have been provided): X Yes ___No

Y A master plan/drawing describing the project and the floor plan for all commercial structures to be occupied.

____ A property owners association agreement (for residential PUD's) with mandatory membership and all in accordance with the requirements of Part 6120.3800, subpart 5. (C) (See Attachment A, Part B); and

____ Deed restrictions, covenants, permanent easements or other instruments that: 1) properly address future vegetative and topographic alterations, construction of additional buildings, (uncontrolled) beaching of watercraft, and construction of commercial buildings in residential PUD'S; and 2) ensure the long-term preservation and maintenance of open space (in accordance with the criteria and analysis specified in Part 6. A. of this checklist).

A site plan and/or plat for the project showing locations of property boundaries, surface water features, existing and proposed structures and other facilities, land alterations, sewage treatment and water supply systems (where public systems will not be provided), and topographic contours at ten-foot intervals or less. When a PUD is a combined commercial and residential development, the site plan and/or plat must indicate and distinguish which buildings and portions of the project are residential, commercial or a combination of the two (see discussion on combined residential and commercial PUD's). X Yes ___No

The PUD applicant has satisfied all the necessary environmental assessment worksheet (EAW) or environmental impact statement (EIS) requirements. The DNR/local unit of government approval cannot occur until the environmental review process is complete. *If an EAW/EIS is required, do not answer this question "Yes" unless the required environmental review process is complete.* X Yes ___No

In accordance with A.-C. below, attach a map or drawing which shows:

- how the project has been divided into tiers, and
- those areas 'unsuitable" for inclusion in the density calculation.

A. In a shoreland district, divide the parcel into tiers by locating one or more lines approximately parallel to a line that identifies the ordinary high water level at the following intervals, proceeding landward:

SHORELAND TIER DIMENSIONS

	Unsewered (feet)	Sewered (feet)
General development lakes-first tier	200	200
General development lakes-second and additional tiers	267	200
Recreational development lakes	267	267
Natural environment lakes	400	320
All river classes*	300	300

B. In a wild and scenic river district, determine the tier depth dimensions for all tiers by dividing the minimum lot size by the minimum lot width requirement (NOTE: Certain urban reaches of wild and scenic rivers are managed by use of shoreland provisions which will require identifying tier depths as specified in A. above).

C. Calculate the "suitable area" for development within each tier, excluding all unsuitable areas such as wetlands bluffs, land below the ordinary high water level of public waters, controlled access lot type areas** , and the area set aside for commercial facilities not involving dwelling units or sites. This suitable area is then subjected to either the residential (subpart D below) or commercial (subpart E below) PUD density evaluation steps to arrive at an allowable number of dwelling units or sites. Include this suitable area figure in column 2 of the Residential PUD Table in subpart D or column 4 of the Commercial PUD Table in subpart E, as appropriate.

The total site acreage equals 67.04 Acres

Specify the total square feet/acreage of the site which is unsuitable due to:

Wetlands 16.00 Acres

Bluffs N/A

Land below the Ordinary High Water Level 9.41 Acres

Controlled Access Lot Area N/A

The area set aside for strictly commercial facilities N/A.

** *See the discussion in Part 6. C. (4) of this checklist if it is desired to provide over-water mooring spaces for nonriparian residential lot owners. To do this, additional riparian open space area will have to be provided consistent with the controlled access lot sizing calculations in the shoreland rules and as explained in Attachment A, Part C.*

D. For Residential PUD's, determine the allowable density by tier in accordance with Steps 1-3 below:

1. In a Shoreland District, divide the suitable area within each tier by the single residential lot size standard for lakes or, for rivers, the single residential lot width standard times the tier depth (unless the local unit of government has specified an alternative minimum lot size for rivers which shall then be used) to yield a base density of dwelling units or sites for each tier. Complete columns 2 and 3 in the Residential PUD Table on the following page;
2. In a wild and scenic river district, divide the suitable area within each tier by the single residential lot size. Complete columns 2 and 3 in the Residential PUD Table in subitem 3 which follows; and

3. Complete the remainder of the table on the following page to the degree necessary to determine final allowable project density.

RESIDENTIAL PUD ANALYSIS

1 Tier	2 Suitable area/sq. ft*	3 Required Lot Size/ in sq. ft.	4 Allowable Base Density: divide Column 3 into Column 2	5 Density Increase Multiplier **	6 Total Allowable Density with Multiplier	7 Total Density Proposed	8 Cumulative Density Allowed ***	9 Cumulative Density Proposed ***
1	355,998 sqft	40,000 sqft	8.90	1.5	13.49	5	13-5=+7	5
2	561,605 sqft	40,000 sqft	14.04	2.0	28.08	28	28	28
3	555,568 sqft	40,000 sqft	13.89	3.0	41.67	27	41	27
4				3.0				
5				3.0				
Column Totals					83.24	60		60

*Do not include as suitable area any wetlands, bluffs, land below the ordinary high water level, any land designated as controlled access lot area, or any land set aside for strictly commercial facilities.

**The total site acreage equals 67.04 ac and give the total square feet/acreage of the site which is unsuitable due to: Wetlands 16.0 ac.; Bluffs 0; Land below Ordinary High Water Level 9.41 ac.; Controlled access lot area 0: Land used strictly for Commercial Facilities N/A The density increase multiplier in this column can only be applied to the preceding column if the provisions of Subpart F. are satisfied.

***Use this column only if allowable density is being transferred from a given tier to another tier farther back from the waterbody. Please note that density may not be transferred from a tier farther back to a tier closer to the waterbody.

4. The proposed project density is consistent with the Residential PUD Analysis Table. X Yes ___No

E. For commercial PUD's determine the allowable density of dwelling units or sites by completing the Commercial PUD Analysis Table in item 2 on the next page. Complete the Commercial PUD table, if necessary, concurrently with the more detailed explanation in item 1 below:

1. Density/base dwelling unit or dwelling site calculation:

   a) Determine the average inside living area size (i.e., average unit floor area) of dwelling units or sites within each tier, including both existing and proposed units and sites. Computation of inside living area sizes need not include decks, patios, stoops, steps, garages, or porches and basements, unless they are habitable space. Fill in column 2 of the table on the next page.
   b) Select the appropriate floor area ratio from the table included as Attachment B to this checklist and complete column 3 of the table below.
   c) Multiply the suitable area within each tier (in column 4) by the floor area ratio (in column 3) to yield a total floor area for each tier allowed to be used for dwelling units or sites and put the answer in column 5 of the table.
   d) Divide the "total floor area" for each tier in column 5 by the average inside living area size in column 2 to yield a base number of dwelling units or sites for each tier, put the answer in column 6.
   e) Complete the remainder of the Commercial PUD Analysis Table, as appropriate.

2. COMMERCIAL PUD ANALYSIS

1	2	3	4	5	6	7	8	9	10	11
Tier	Average Unit Floor Area/ sq. ft.	Floor Area Ratio/ From Appendix B	Suitable Tier Area/ sq. ft.*	Total Floor Area Pier Tier* Column 3 multiplied by Column 4 **	Base Density/ Divide Column 5 by Column 2 ***	Density Increase Multiplier ****	Total Allowable Dwelling Units/Sites with Multiplier	Total Number of Units/Sites Proposed	Cumulative Number of Units/Sites Allowed ******	Cumulative Number of Units/Sites Proposed ******
1	N/A					1.5				
2						2.0				
3						3.0				
4						3.0				
5						3.0				
Column Totals										

* *Do not include as suitable area any wetlands, bluffs, land below the Ordinary High Water lever, any land designated as controlled access lots, or any land set aside for strictly commercial facilities.*
The Total Site Area equals: _____
Give the total square footage/acreage of the site, which is unsuitable due to:
Wetlands: _____; Bluffs:_____; Land below the OHW level:_____;
Controlled Access Lot area:_____; Land for strictly Commercial Facilities: _____.

** *This is the total floor area for each tier allowed to be used for dwelling units or sites.*

*** *This is the total number of dwelling units or sites allowable per tier without a density increase.*

**** *The density increase multiplier in this column can only be applied to the preceding column if the provisions of Subpart F, which follow, are satisfied.*

***** *Use this column only if allowable density is being transferred from a given tier farther back from the waterbody. Please note that density may not be transferred from a tier farther back to a tier closer to the waterbody.*

3. The proposed project density is consistent with the Commercial PUD Analysis Table. ___Yes ___No

F. **Density Increases:** Maximum density increases consistent with the density multiplier in the tables in subparts D and E above are permissible only when all of the design standards in Part 6 of this checklist are fully satisfied and one of the following provisions is satisfied: ___Yes ___No

The actual proposed structure setback(s) identified in Part 6. B. 5. c. of this checklist are equivalent to 150 percent of the minimum required structure structure setback; or ___Yes ___No

The actual proposed structure setback(s) identified in Part 6. B. 5. c. of this checklist are 125 percent of the required structure setback and the impact of reducing the structure setback from a 150 percent increase to a 125 percent increase is mitigated or reduced an equivalent amount through vegetative management, topography, or other methods acceptable to the local unit of government. ___Yes ___No

Part 6. Design and performance standards.

All PUD's must meet the following design and performance standards prior to final approval by the DNR/responsible local unit of government:

A. **Open Space Preservation and Management** X Yes ___No

1. At least 50 percent of the total project area is preserved as open space and the following additional standards are met:
   a) Dwelling units or sites, road rights-of-way, or land covered by road surfaces, parking areas, or structures, except water-oriented accessory structures or facilities, are developed areas and are not included in the computation of minimum open space.
   b) Open space does not include commercial facilities or uses (except open space may contain water-oriented accessory structures or facilities consistent with Part 6120.3300, Subpart 3, (H) (See Attachment A, Part D.) or recreational facilities for use by owners or occupants of the dwelling units or sites, or the public).
   c) Open space includes areas with physical characteristics unsuitable for development in their natural state, and areas containing significant historic sites or unplatted cemeteries.
   d) The appearance of open space areas, including topography, vegetation, and allowable uses, is preserved by use of restrictive deed covenants, permanent easements, public dedication and acceptance, or other equally effective and permanent means.
   e) All required open space areas are clearly identified or described in all final project drawings/plats and related project documents.

***NOTE**: Open space may include subsurface sewage treatment systems if the use of the space is restricted to avoid adverse impacts on the systems.*

2. The shore impact zone (SIZ), based on normal structure setbacks, is included as open space subject to the following:
   a) Determine SIZ depth by multiplying the normal minimum building setback of 150 feet by one-half to give a shore impact zone depth back from the ordinary high water level of 75 feet; and
   b) reserve the SIZ as open space as follows:
      - For new residential PUD'S, at least 70 percent of this SIZ area is preserved in its natural state.
      - For new commercial PUD'S, at least 50 percent of this SIZ area is preserved in its existing or natural state.
      - For existing developments/conversions, at least 50 percent of this SIZ area is preserved in its natural or existing state.

B. Centralization of Utilities and Structures X **Yes** ___**No**

1. The PUD is connected to a publicly-owned sewer or water supply system, if available.
2. If publicly-owned utility systems are not available, the on-site water supply and sewage treatment systems are centralized and will meet the applicable requirements of the State Department of Health or the Minnesota Pollution Control Agency, respectively.
3. The PUD applicant has either: 1) received any required State Minnesota Pollution Control Agency (MPCA) permit for the sewage treatment system; or 2) the applicant has received a written statement from the MPCA indicating that it is likely that there will be no anticipated problems in issuing a permit.
4. Sufficient lawn area free of limiting factors has been set aside for a replacement soil treatment system for each sewage treatment system that is constructed.

Property has been annexed into the City of Mankato and will be served by the City of Mankato utilities.

5. For residential PUD'S, all dwelling units or sites are clustered into one or more groups on suitable sites and are designed and located to meet or exceed the following standards for the relevant shoreland or wild and scenic river district classification:

	(1) Requirement of local ordinance	(2) Actual Proposal	(3) Percentage of that required by local ordinance
a) Minimum structure elevation above OHW*	_____	_____	NA_____
b) Maximum structure height	_____	_____	N/A_____
c) Minimum structure setback from the OHW	_____	_____	_____%**
d) Minimum structure setback from top of bluff, if applicable	_____	_____	_____%**

*Either state in number of feet or specify an elevation using a national geodetic vertical datum or assumed datum.

**Divide column 2 by column 1 and multiply by 100.

C. Placement of Shore Recreation Facilities

No shore recreation facilities are planned.

1. All swimming areas, docks and watercraft mooring areas and launching ramps are centralized in suitable locations.
2. The number of spaces provided for continuous over-water mooring, beaching or docking of watercraft does not exceed one for each first tier residential or commercial dwelling unit or site allowable in the applicable table in Part 5. D. or E. Commercial PUD'S can also include mooring sites authorized under a DNR protected water's permit for a commercial marina. Indicate the number of over-water spaces in this proposed development, and of this the number authorized under DNR permit for a commercial marina _____ _____.
3. Access to the lake or river for non-first tier property owners or for occupants of non-first tier commercial dwelling units or sites is provided only by a launching ramp. The launching ramp may include a small dock for the loading and unloading of equipment.
4. As an alternative to item 3 immediately above and for residential PUD'S only, nonriparian owners have been provided over-water mooring, beaching, or docking spaces in addition to those allowed for riparian first tier owners in item 2 immediately above. This is accomplished by providing additional "open space" in an amount (area) equal to the "controlled access lot" sizing requirements in the shoreland rules in Part 6120.3300, Subp. 2. E. (1) for the number of additional spaces proposed (complete the calculations in Attachment A, Part C). The additional open space also meets the following:

   a) A separate [controlled access] "lot of record" has not been created/subdivided, but: 1) the riparian area used for the controlled access lot sizing calculation has been clearly shown on the PUD drawings; and 2) the allowable project densities determined in Part 5. D. and E. have been redetermined to reflect the reduced riparian tier area now available for dwelling unit or dwelling site density calculations;
   b) This additional open space is treated consistent with the provisions of Part 6. A.1. a - e of this checklist; and
   c) If nonriparian dwelling units or sites are being provided with over-water mooring spaces, then indicate the total number of mooring spaces, and of this total the number

for: 1) residential/commercial first tier dwelling units or sites_____ ; 2) the number authorized under DNR permit for a commercial marina; and 3) the number of spaces for non first tier/nonriparian residential dwelling units or sites calculated on Attachment A, Part C of this checklist.

5. All launching ramps and on-water mooring structures/facilities for residential uses, within the meaning of Minnesota Rules, Parts 6115.0170, Subp. 20; 6115.0210; and 6115.0211, shall be exempt from a DNR permit if: 1) approved as part of a PUD consistent with Parts 6120.2500-6120.3900; and 2) designed and constructed in accordance with the criteria of the applicable DNR agency rule cited in this subpart.

D. Visibility. Structures, parking areas and other facilities will be treated to reduce visibility as viewed from the public water and adjacent shoreland. A specific plan/planning statement has been submitted by the applicant showing how this is to be accomplished by use of vegetation, topography, increased setbacks, color, or other means acceptable to the local unit of government/DNR, assuming summer, leaf-on conditions. ___Yes __X__No

E. Erosion Control and Stormwater Management. To prevent erosion: __X__Yes ___No

1) If necessary, time restrictions have been specified that limit the length of time bare ground can be exposed.
2) Temporary ground covers, sediment entrapment facilities, vegetated buffer strips or other appropriate techniques will be used to minimize erosion potential to surface waters.
3) If necessary because of special site conditions, an erosion control plan approved by the soil and water conservation district was required.
4) The project has been designed to effectively manage the quantity and quality of runoff. The project will not result in increased erosion, sedimentation or flood discharges or stages for runoff events up to and including the 100-year frequency event.
5) Impervious surface within any tier does not exceed 25 percent of the tier area (except that 35 percent impervious surface coverage may be allowed in the first tier of general development lakes with approved storm water management and vegetative control plans).

F. Accessory Structures: N/A ___Yes ___No

1) All accessory structures and facilities, except those that are water-oriented, meet or exceed the normal structure setback standards.
2) Water-oriented accessory structures allowed within the normal building setback area are centralized and meet the standards in Parts 6120.3300, Subpart 3. B. (3) and 6120.3300, Subpart 3. (H) (See Attachment A, Part D).

This section is N/A

Appendix 7B - Attachment A
SUPPLEMENTARY REGULATORY PROVISIONS

A. Resort Conversions
Part 6120.3800, Subpart 5. (D).

B. Provisions for Property Owners Association Agreement Documents
Part 6120.3800, Subpart 5. (C).

C. Nonriparian Over-Water Mooring/Controlled Access Lot Sizing
Part 6120.3300, Subpart E.

D. Accessory/Water Oriented Structures
Part 6120.3300, Subpart 3. (B)(3).
Part 6120.3300, Subpart 3. (H).

A. Conversions

Proposed conversions must be initially evaluated using the same procedures and standards for developments involving all new construction. Inconsistencies between existing features of the development and these standards must be identified.

Deficiencies involving water supply and sewage treatment, structure color, impervious coverage open space, and shore recreation facilities must be corrected as part of the conversion or as specified in the conditional use permit.

Shore and bluff impact zone deficiencies must be evaluated and reasonable improvements made as part of the conversion. These improvements must include, where applicable, the following:

___ Removal of extraneous buildings, docks, or other facilities that no longer need to be located in shore or bluff impact zones.

___ Remedial measures to correct erosion sites and improve vegetative cover and screening of buildings and other facilities as viewed from the water.

___ If existing dwelling units are located in shore or bluff impact zones, conditions are attached to approvals of conversions that preclude exterior expansions in any dimension or substantial alterations. The conditions must also provide for future relocation of dwelling units, where feasible, to other locations, meeting all setback and elevation requirements when they are rebuilt or replaced.

Existing dwelling unit or dwelling site densities that exceed the standards in Part 5 of this checklist may be allowed to continue but must not be allowed to be increased, either at the time of conversion or in the future. Efforts must be made during the conversion to limit impacts of high densities by requiring seasonal use, improving vegetative screening, centralizing shore recreation facilities, installing new sewage treatment systems or other means.

B. Provisions for Property Owners Association Agreement Documents

Open space preservation. Deed restrictions, covenants, permanent easements, public dedication and acceptance, or other equally effective and permanent means must be provided to ensure long term reservation and maintenance of open space. The instruments must include all of the following protections:

____ Commercial uses are prohibited.

____ Vegetation and topographic alterations other than routine maintenance are prohibited.

____ Construction of additional buildings or storage of vehicles and other materials is prohibited.

____ Uncontrolled beaching of watercraft is prohibited.

Development, organization and functioning. Unless an equally effective alternative community framework is established when applicable, all residential planned unit developments must use an owners association with the following features:

____ Membership is mandatory for each dwelling unit or site purchaser and any successive purchases.

____ Each member must pay a pro rata share of the association's expenses, and unpaid assessments can become liens on units or sites.

____ Assessments are adjustable to accommodate changing conditions.

____ The association are responsible for insurance, taxes, and maintenance of all commonly owned property and facilities.

C. Controlled Access for Nonriparian Owners/Over-Water Mooring Spaces

Nonriparian/non-first tier owners in residential PUD'S can be provided over-water mooring or docking spaces. Provisions of Part 6 C. of this checklist and the following provisions are satisfied.

Additional riparian open space equivalent to the width and size of a standard single residential lot is

provided for the first six additional watercraft allowed for nonriparian lots. For each additional watercraft above six, the width of the above-noted standard residential lot (using the same depth must be increased by the percentage from the following table and the calculations which follow:

CONTROLLED ACCESS FRONTAGE REQUIREMENTS

Ratio of lake size to shore length acres/mile)	Required increase in frontage (percent)
Less than 100	25
100-200	20
201-300	15
301-400	10
Greater than 400	5

CONTROLLED ACCESS SIZING REQUIREMENTS

1. Indicate the number of nonriparian/ non-Tier 1 over-water mooring spaces to be provided_____
2. Indicate the standard minimum single residential lot dimensions for this lake's classification. If 6 or less additional non-Tier 1 over-water mooring spaces are to be provided, the additional riparian open space to be provided must meet these dimensions and area. Recalculate the suitable area and allowable first tier densities in the table in Part 5. D. of this checklist to reflect the loss of suitable area due to this additional dedication of open spaces.

Width _____ Depth _____ Area _____

3. If more than 6 additional spaces are to be provided, then:
   a) Select the appropriate percentage increase multiplier from the table above ____%

   b) Multiply this multiplier in a) by the difference between the number of spaces proposed and six ___%

   c) Increase the lot width in 2. above by the total percentage multiplier calculated in b) immediately above. Assume the same lot depth in 2. above and recalculate the lot area. This is the area and dimensions for the additional open space and recalculate the figures in the table in Part 5. D of this checklist. Width _____ Depth _____ Area _____

D. Water-Oriented Accessory Structures

The structure or facility must not exceed ten feet in height, exclusive of safety rails, and detached decks must not exceed eight feet above grade at any point.

The setback of the structure or facility from the ordinary high water level must be at least ten feet.

The structure or facility must be treated to reduce visibility as viewed from public waters and adjacent shorelands by vegetation, topography, increased setbacks, color, or other means acceptable to the local unit of government, assuming summer, leaf-on conditions.

The roof may be used as a deck with safety rails, but must not be enclosed or used as a storage area.

The structure or facility must not be designed or used for human habitation and must not contain water supply or sewage treatment facilities.

The structure cannot occupy an area greater than 250 square feet. As an alternative for general development and recreational development waterbodies, water-oriented accessory structures used solely tor watercraft storage, and including storage of related boating and water-oriented sporting equipment, may occupy an area up to 400 square feet, provided the maximum width of the structure is 20 teet as measured parallel to the configuration of the shoreline.

NOTE: Water-oriented accessory structures may have the lowest floor placed lower than the flood protection elevation determined if the structure is constructed of flood-resistant materials to the elevation, electncal and mechanical equipment is placed above the elevation and, if long duration flooding is anticipated, the structure is built to withstand ice action and wind-driven waves and debris.

Attachment B
COMMERCIAL PLANNED UNIT DEVELOPMENT

FLOOR AREA RATIOS*

Public waters classes

Average unit floor area (sq.ft.)	Sewered general development first tier on unsewered general development lakes; urban, agricultural, tributary river segments	Second and additional tiers on unsewered general development lakes; recreational development lakes; transition and forested river segments	Natural environment lakes; remote river segments
200	.040	.020	.010
300	.048	.024	.012
400	.056	.028	.014
500	.065	.032	.016
600	.072	.038	.019
700	.082	.042	.021
800	.091	.046	.023
900	.099	.050	.025
1,000	.108	.054	.027
1,100	.116	.058	.029
1,200	.125	.064	.032
1,300	.133	.068	.034
1,400	.142	.072	.036
1,500	.150	.075	.038

* For average unit floor areas less than shown, use the floor area ratios listed for 200 square feet. For floor areas greater than shown, use the ratios listed for 1,500 square feet. For recreational camping areas, use the ratios listed at 400 square feet. Manufactured home sites in recreational camping areas shall use a ratio equal to the size of the manufactured home, or if unknown, the ratio listed for 1,000 square feet.

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Plymouth, MN 55447

Phone: (763) 544-7129
Bolton-Menk.com

TECHNICAL MEMORANDUM

Date: March 23, 2026

To: Nate Myhra, P.E.

From: Angie Smith, Environmental Planning Division Leader

Subject: Mesenbrink Development – Updated EAW Decision
BMI Project No.: 0M1.128460.000

Purpose

This memo provides a summary of why the client's proposed adjustment – from single-family homes to duplex structures with reduced building footprints – does **not** warrant preparation of a new Environmental Assessment Worksheet (EAW). These points can be used by both our client and the City (as the Responsible Governmental Unit, RGU) to document that the existing EAW continues to adequately address the potential for significant environmental effects.

Summary Conclusion

Based on Minnesota Rules 4410, EQB guidance, and EQB staff's direct interpretation, the proposed plan modification **does not constitute a substantial change** that would trigger a new EAW.

- The revised plan reduces building footprints and does not expand the development area.
- The change from single-family to duplex structures does not increase the potential for significant environmental effects.
- The adjustment occurs outside the shoreland overlay zone, avoiding sensitive resource areas.
- Under Minn. R. 4410.1000, Subp. 5, the RGU has discretion to determine whether a change is substantial; in this case, it is not.
- The criteria in Minn. R. 4410.1700, Subp. 7 are not triggered by the revised plan.
- EQB staff confirmed that no specific administrative action is required and that documenting the rationale is sufficient.
- The existing EAW continues to adequately address the project's potential environmental effects

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Regulatory Basis

1. RGU Discretion Under Minn. R. 4410.1000, Subp. 5

EQB staff confirmed that the RGU has full discretion to determine whether a project change is substantial enough to require a new EAW. The rule anticipates that projects evolve after EAW completion.

A new EAW is required only if:

- A substantial change has been made, and
- That change may affect the potential for significant adverse environmental effects not previously addressed.

In this case, neither condition is met.

2. Criteria for "Potential for Significant Environmental Effects" (Minn. R. 4410.1700, Subp. 7)

The revised plan does not introduce:

- New environmental impacts
- Increased intensity of previously evaluated impacts
- New areas of disturbance
- New proximity to sensitive resources

The shift to duplexes does not inherently increase environmental effects, and the reduced building footprints further decrease potential impacts.

3. EQB Staff Interpretation (email attached)

Key points from EQB staff:

- The RGU decides whether the existing EAW "covers" the potential for significant environmental effects.
- No specific administrative action is required by rule.
- EQB recommends documenting the rationale, but notes no formal record is required.
- The change must be evaluated only for whether it affects the potential for significant adverse environmental effects, not whether the land use type has changed.

This directly supports the conclusion that a new EAW is not required.

Project-Specific Justification

1. Minor Reduction in Building Footprints

- The revised plan results in slightly less impervious surface and overall disturbance area.
- A reduction in footprint is the opposite of a substantial change that could increase environmental effects.

2. Duplex vs. Single-Family Structures

- The structural form change does not alter the project's environmental footprint in a way that increases impacts.
- Density changes are modest and remain within the development envelope evaluated in the original EAW.
- Infrastructure demands (roads, utilities, grading) remain consistent with the previously reviewed plan.

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3. Location Outside the Shoreland Overlay Zone

- The adjustment occurs outside the most environmentally sensitive regulatory area.
- No new impacts to shoreland resources, water quality, or riparian habitat are introduced.

4. No New or Intensified Environmental Effects

The revised plan does not introduce:

- New areas of grading or vegetation removal
- New wetland impacts
- Increased stormwater discharge
- Increased traffic beyond what was previously analyzed
- New impacts to threatened or endangered species
- New cultural resource concerns

All environmental considerations remain within the scope of the original EAW.

Sincerely,

Bolton & Menk, Inc.



Angie Smith
Environmental Planning Division Leader

Attachments:

- Proposed design changes
- EQB staff email

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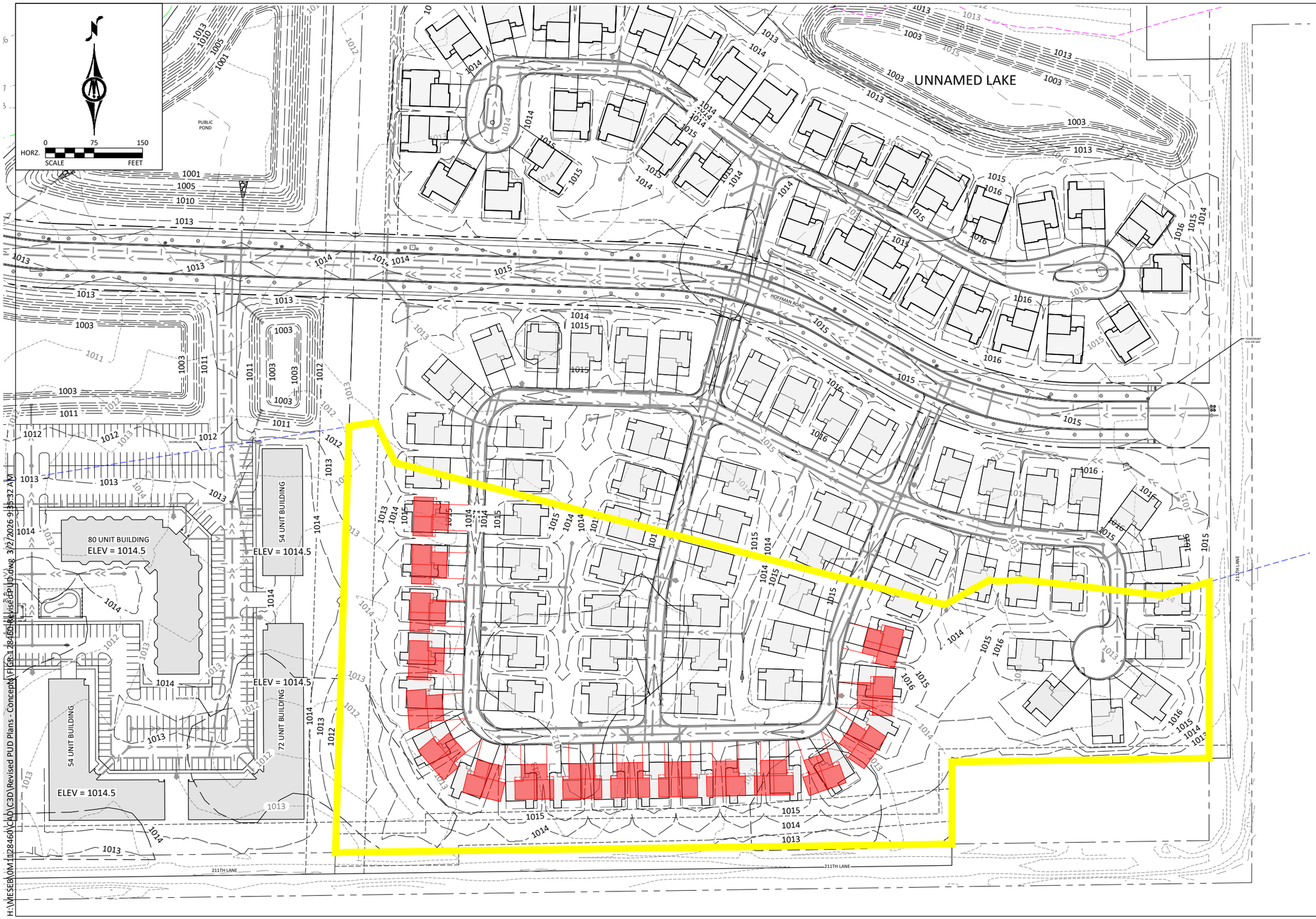
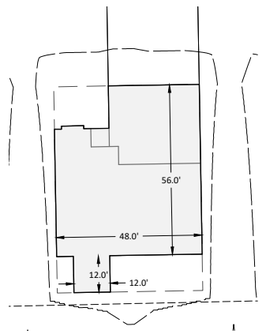
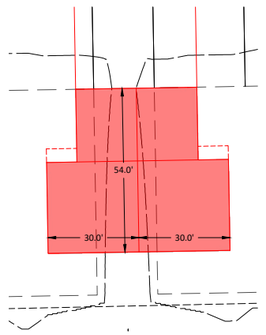




TYPICAL SINGLE BUILDING



TYPICAL TWIN BUILDING

PROJECT INFORMATION

ORIGINAL PROJECT HAD 72 UNITS SOUTH OF HOFFMAN ROAD
NEW PROJECT HAS 88 UNITS SOUTH OF HOFFMAN ROAD
HOMES LOCATED IN THE SHORELAND ZONE WILL STAY THE SAME.

ORIGINAL PROJECT INFORMATION

72 SINGLE FAMILY HOMES TOTAL
- 33 SINGLE FAMILY HOMES LOCATED INSIDE OF THE SHORELAND ZONE
- 39 SINGLE FAMILY HOMES LOCATED OUTSIDE OF THE SHORELAND ZONE

NEW PROJECT INFORMATION

88 SINGLE FAMILY AND SINGLE FAMILY ATTACHED HOMES TOTAL
- 33 SINGLE FAMILY HOMES LOCATED INSIDE OF THE SHORELAND ZONE
- 21 SINGLE FAMILY HOMES LOCATED OUTSIDE OF THE SHORELAND ZONE
- 34 SINGLE FAMILY ATTACHED HOMES LOCATED OUTSIDE OF THE SHORELAND ZONE (16 ADDITIONAL UNITS PROPOSED)

AREA INFORMATION

AREA OUTSIDE OF THE SHORELAND ZONE = 575,174 SQUARE FEET
R-2 ZONE REQUIRES 6,000 SQFT FOR SINGLE FAMILY HOMES
R-2 ZONE REQUIRES 8,000 SQFT FOR SINGLE FAMILY ATTACHED HOMES
575,174 / 6000 = 95 SINGLES FAMILY ALLOWED BY CODE
575,174 / 8000 = 71 SINGLE FAMILY ATTACHED ALLOWED BY CODE

DISCLAIMER:
LAYOUT, UTILITIES, AND GRADING ARE SHOWN FOR PURPOSES OF MASS GRADING ONLY AND ARE NOT FINAL DESIGN

H:\MESE\0M1028460\CADD\C3D\Revised PUD Plans - Concept\FIG 1 28460 Revised PUD.dwg 3/27/2026 9:35:32 AM

Outlook

RE: EAW Impacts due to Development Changes

From Lerohl, Sarah (She/Her/Hers) (EQB) <Sarah.Lerohl@state.mn.us>
Date Thu 2026-03-19 5:06 PM
To Angie Smith <Angie.Smith@bolton-menk.com>

***** WARNING: This email is from outside the company. Proceed with Caution*****

Thanks for the nudge, Angie! Short answer: the RGU decides if the existing EAW "covers" the potential for significant environmental effects, and Rule doesn't require any specific administrative actions in this instance.
Longer:
The RGU has discretion in their decision-making regarding the applicability of the EAW in light of a project change; it isn't unusual for projects to change after the EAW and Minn R 4410.1000 Subp. 5 anticipates this. It states "If, after a negative declaration has been issued but before the proposed project has received all approvals or been implemented, the RGU determines that a substantial change has been made in the proposed project or has occurred in the project's circumstances, **which change may affect the potential for significant adverse environmental effects** that were not addressed in the existing EAW, a new EAW is required."

EQB staff recommend the RGU follow past practice or any internal procedure they may have to document that the change does not "affect the potential for significant adverse environmental effects," (refer to criteria in 4410.1700 Subp. 7), but there is nor formal record required by Rule.
Thanks, happy to follow up with a call too if it's easier--
Sarah

Sarah Lerohl *(she/hers)* | Environmental Review
Minnesota Environmental Quality Board (EQB)
520 Lafayette Road N | Saint Paul, MN | 55155
218-302-6617
sarah.lerohl@state.mn.us |eqb.state.mn.us

MINNESOTA ENVIRONMENTAL QUALITY BOARD

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From: Angie Smith <Angie.Smith@bolton-menk.com>
Sent: Thursday, March 19, 2026 4:32 PM

To: Lerohl, Sarah (She/Her/Hers) (EQB) <Sarah.Lerohl@state.mn.us>
Subject: EAW Impacts due to Development Changes

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Hi Sarah -

I wanted to touch base and see if you had any time to think through the potential EAW impacts due to development plan changes.

I have a meeting about this tomorrow morning - I will dig into guidance as well but would love any of your insights.

Thank you,
Angie

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ENVIRONMENTAL ASSESSMENT WORKSHEET (EAW)

Mesenbrink Mixed-Use Development, Mankato, MN

January 2023

ENVIRONMENTAL ASSESSMENT WORKSHEET

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1 Project Title

Mesenbrink Mixed-Use Development, Mankato, MN

2 Proposer

Organization:	Mesenbrink Construction & Engineering, Inc.
Contact person:	John Mesenbrink
Title:	Owner
Address:	7765 East 175th Street
City, State, ZIP:	Prior Lake, MN 55372
Phone:	952 447 5058
Email:	jemmbc@mesenbrinkconstruction.com

3 RGU

Organization:	City of Mankato
Contact person:	Mark Konz
Title:	Associate Director - Planning and Development Services
Address:	10 Civic Center Plaza PO Box 3368
City, State, ZIP:	Mankato, MN 56002-3368
Phone:	507-387-8611
Fax:	507-388-7530
Email:	mkonz@mankatomn.gov

4 Reason for EAW Preparation

Required:

☐ EIS Scoping

☒ Mandatory EAW MS 4410-4300, Subpart 19.D.

Discretionary:

☐ Citizen petition

☐ RGU discretion

☐ Proposer initiated

Mandatory EAW, as identified in *Minnesota Rules, Part 4410.4300, Subpart 19.D.*

5 Project Location

County:	Blue Earth County		
City/Township:	Mankato		
PLS Location (¼, ¼, Section, Township, Range):	**Section**	**Township**	**Range**
SE Quarter	15	108N	26W
Watershed (82 major watershed scale):	Le Sueur River		
GPS Coordinates:	44.1549, -93.9339		
Tax Parcel Number:	R430915400009 and R430915400003		

6 Project Description

a. EQB Monitor Description

Provide the brief project summary to be published in the EQB Monitor, (approximately 50 words).

Mesenbrink Construction proposes the construction of a new mixed-use development consisting of retail space, apartment units and single family residential, located on approximately 105 acres in Blue Earth County (to be annexed into the City of Mankato).

b. Complete Description

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.

Project Description (Including Context/Need)

Mesenbrink Construction proposes the construction of a mixed-use development located on approximately 105 acres in Blue Earth County (to be annexed into the City of Mankato). The location of the Proposed Project is depicted on **Figure 1, "Regional Location,"** and **Figure 2, "USGS Location."** The existing property is primarily of agricultural use. In the northeast corner of the property contains part of an unnamed lake (07007100 as per the DNR). Mesenbrink Construction would develop the property from west to east starting with retail/residential units on the west side of the property. Then transition into apartment units in the middle of the development. Finishing with single family homes on the east side of the property. The development plans for the Proposed Project are depicted on **Figure 3, "Proposed Improvements."** The construction of the development would utilize traditional construction methods such as earth-moving equipment. Utilities within the Study Area would be installed as per the

City of Mankato guidelines. The construction of the development is planned to begin 2024 with finishing of the project to be determined. Construction is anticipated to commence in 2024, with full build-out completed over the course of five to ten years, depending on economic conditions.

The proposed mixed-use development follows the City of Mankato's *Land Use Plan* for the development of retail/residential, multiple-family residential, and single-family residential. According to the *Mankato Area Housing Study Update*, dated August 2022, the City of Mankato will have an estimated growth of 335 to 350 households per year. Vacancy rates for multiple-family units within the City of Mankato are currently low, necessitating the construction of additional multiple-family units.

Construction Methods

Traditional construction methods will be used during the construction of this development.

Modification to Existing Equipment

No modifications to existing equipment are anticipated to be required for the implementation of the Proposed Project.

c. Project Magnitude

Table 1: Project Magnitude

Total Project Acreage	105 acres
Linear project length	0.5 mile
Number and type of residential units	112 Single Family Homes 713 Apartment Units
Residential building area (in square feet)	3,436,764 square feet (land area)
Commercial building area (in square feet)	247,892 square feet (land area)
Industrial building area (in square feet)	N/A
Institutional building area (in square feet)	N/A
Other uses – specify (in square feet)	N/A
Structure height(s)	Max. 45 feet

d. Project Purpose

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 Project is to provide additional housing and commercial property in the City of Mankato. The Proposed Project would also provide an extension of sanitary sewer and watermain to services to the future development of the property to the east (in the proposed extension of Hoffman Road to the east).

e. Future Development

Are future stages of this development including development on any other property planned or likely to happen?

☐ *Yes* ☒ *No*

If yes, briefly describe future stages, relationship to present project, timeline and plans for environmental review.

f. Previous Development

Is this project a subsequent stage of an earlier project? ☐ *Yes* ☒ *No*

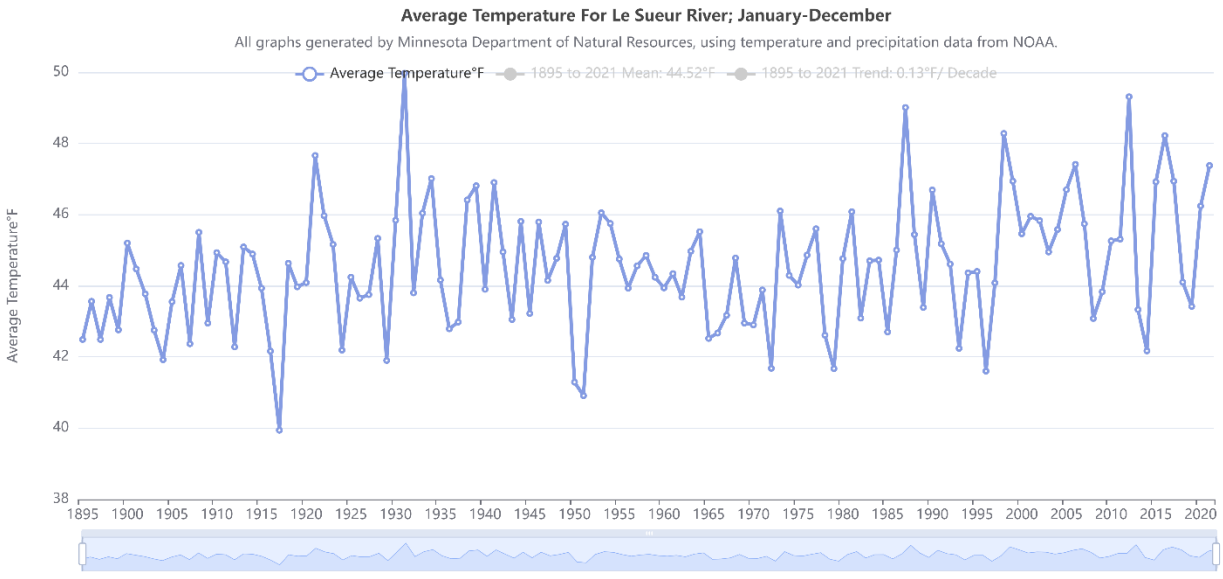
If yes, briefly describe the past development, timeline and any past environmental review.

7 Climate Adaptation and Resilience

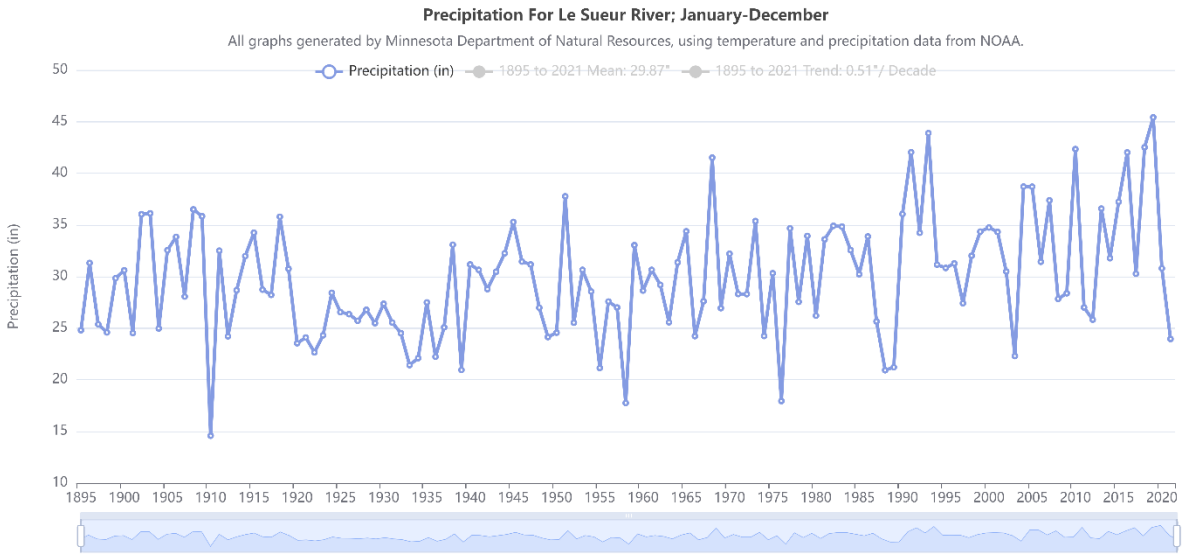
a. Climate Trends

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.

The Proposed Project is located within the Le Sueur River Watershed. Data from the Minnesota Department of Natural Resources (DNR) *Minnesota Climate Explorer* shows climate trends for this watershed.[1] Historical data from 1895 to 2021 shows variable average temperatures and precipitation totals from year to year, as shown in the graphs below:



[1] Minnesota Department of Natural Resources. 2022. Minnesota Climate Explorer. Electronic resource, https://arcgis.dnr.state.mn.us/ewr/climateexplorer/main/historical, accessed January 2023.



The trends for temperature and precipitation within the Le Sueur River Watershed are:

- Average daily mean temperature of 44.52 degrees Fahrenheit with an increase of 0.13 degrees F per decade
- Average daily maximum temperature of 54.89 degrees Fahrenheit with a decrease of 0.02 degrees F per decade
- Average daily minimum temperature of 34.15 degrees Fahrenheit with an increase of 0.25 degrees F per decade
- Average annual precipitation of 29.87 inches with an increase of 0.51 inch per decade

Projected future data for the Le Sueur River Watershed was also evaluated using the *Minnesota Climate Explorer*. The mid-century (2040-2059) projections fit with the life of the project and are summarized below. The data makes projections using RCP 4.5 (representative concentration pathway), which is an intermediate stabilization scenario. The information shown is the model mean of eight general circulation global climate models.

- Projected average daily mean temperature: 48.59 degrees Fahrenheit
- Projected daily maximum temperature: 55.36 degrees Fahrenheit
- Projected daily minimum temperature: 42.05 degrees Fahrenheit
- Projected average annual precipitation: 32.07 inches

Comparing the projected values with the historical values, the average daily mean, maximum, and minimum temperatures and the average annual precipitation are all expected to rise over the life of the project.

b. Resource Categories

Table 2: Resource Categories

Resource Category	Climate Considerations	Project Information	Adaptations
Project Design	The Proposed Project involves the construction of new residential and commercial spaces. This will add new impervious surface as well as increase energy consumption within the Study Area.	Climate change-related risks and vulnerabilities include: - During intense rainfall events, increases in the amount of impervious surfaces may result in more localized flooding in the area - Certain building construction materials such as dark roofing materials 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	The Study Area is outside of the 500-year flood plain according to FEMA's *Flood Insurance Risk Map*.[2] Blue Earth County's *Land Use Plan* identifies green infrastructure as a priority action.[3]
Land Use	Conversion of crop land to residential and commercial space will require the maintenance of associated roadways, sidewalks, and parking lots.	Climate change risks and vulnerabilities identified include: Increased freeze/thaw results in increased icing of roadways, trails, sidewalks, and parking lots, resulting in the need for increased salting. Chlorides degrade lake water quality and impact aquatic life. Chlorides also degrade soil and can kill landscape plantings	Blue Earth County's *Land Use Plan* identifies the following implementation action: "The development of future commercial uses in the rural area shall be reviewed for their emergency services, stormwater and wastewater treatment, access to transportation systems, and water supply needs and the corresponding impacts to those systems."[4]
Water Resources	Addressed in **Section 12**	Addressed in **Section 12**	Addressed in **Section 12**
Contamination/ Hazardous Materials/ Wastes	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.	N/A	N/A
Fish, wildlife, plant communities, and sensitive ecological resources (rare features)	Addressed in **Section 14**	Addressed in **Section 14**	Addressed in **Section 14**

[2] FEMA. Flood Map Area 2752310045D. Flood Map Service Center. 1990. Electronic resource, https://msc.fema.gov/portal/search?AddressQuery=Mankato%2C%20MN#, accessed October 2022.

8 Cover Types

Estimate the acreage of the site with each of the following cover types before and after development:

Project construction and disturbance limits were used to define the Study Area footprint. Existing and future land cover conditions within the Study Area are detailed in **Table 3**, **"Cover Types," Figure 4, "Existing Land Cover,"** and **Figure 5, "Future Land Cover."**

Table 3: Cover Types

Cover Type	Before (acres)	After (acres)	Cover Type	Before (acres)	After (acres)
Wetlands and shallow lakes (<2 meters deep)	28.59	21.5	Livestock rangeland/pastureland	0	0
Deep lakes (>2 meters deep)	0	0	Lawn/landscaping	3.52	43.51
Wooded/forest	0	0	Green infrastructure TOTAL (from table below*)	0	0
Rivers/Streams	0	0	Impervious surface	1.36	30.94
Brush/Grassland	0	0	Stormwater Pond (wet sedimentation basin)	0	3.56
Cropland	70.61	4.57	Other (describe)	0	0
			TOTAL	104.08	104.08

Table 4: Green Infrastructure

Green Infrastructure Type	Before (acres)	After (acres)
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**

[3] Blue Earth County. Blue Earth County Land Use Plan. 2018. Electronic document, https://www.blueearthcountymn.gov/DocumentCenter/View/4148/Approved-Land-Use-Plan---2018-, accessed October 2022.
[4] Blue Earth County 2018: 99.

Table 5: Trees

	Percent	Number
Percentage of tree canopy removed, or number of mature trees removed during development	0%	0
Number of new trees planted	TBD	TBD

9 Permits & 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 prohibited until all appropriate environmental review has been completed. See Minnesota Rules, Chapter 4410.3100.

All known permits at state, federal, and local levels required for the Proposed Project are listed in **Table 6, "Required Permits & Approvals."**

Table 6: Required Permits & Approvals

Government Agency	Type of Application/Permit	Status
State Agencies		
Minnesota Pollution Control Agency	National Pollutant Discharge Elimination System (NPDES) Construction Storm Water Permit	To be applied for
	Sanitary Sewer Extension Permit	To be applied for
Minnesota Department of Health	Watermain Extension Permit	To be applied for
Minnesota Department of Natural Resources	Water Appropriations Permit	To be applied for, if necessary
Local Agencies (if applicable)		
City of Mankato / Mankato Township	Conditional Use Permit (as needed)	To be applied for
City of Mankato / Mankato Township	Residential Building Permit	To be applied for
City of Mankato	Grading/Excavating Permit	To be applied for

10 Land Use

a. Existing Land Use

Description

Existing land use of the site as well as areas adjacent to and near the site, including parks and open spaces, cemeteries, trails, prime or unique farmlands.

Existing land uses within and adjacent to the Study Area are detailed in **Figure 6, "Existing Land Use."** The approximately 105-acre Study Area is comprised of mostly out-of-production agricultural fields with some forested areas in the north, as well as 28.59 acres of wetlands located in the northeast section of the Study Area. A review of available historic aerial imagery reveals the land has been largely in agricultural production since at least the late 1930s, with portions of the current forested area present in the north part of the Study Area. There are no anticipated significant potential environmental hazards due to these past land uses within the Study Area.

The land uses directly adjacent to the site include residential homes, agricultural land, a wetland, a senior living facility, and forested areas. The Minnesota Department of Transportation District Headquarters and the Blue Earth County Justice Center/County Jail are located farther to the north. To the east, past a small piece of agricultural land, is a solar farm. The southern extent of the property is bordered by a forested area, followed by agricultural land for approximately a mile. To the west, past a senior living facility, there are multiple apartment complexes, a middle school, and the site of a future low-density residential development.

There are no existing roadways within the Study Area, but the project is connected to US Highway 14 and MN Highway 83 via County Highway 12. Downtown Mankato is located approximately three miles west of the Study Area.

As shown on **Figure 15, "Outdoor Recreation,"** no parks, open space, or outdoor recreational facilities are located within the Study Area.

Local Plans

Describe planned land use as identified in comprehensive plan (if available) and any other applicable plan for land use, water, or resources management by a local, regional, state, or federal agency.

The City of Mankato's *Land Use Plan* provides the city with a guide for the future development of public and private property within city limits while sustaining Mankato's natural and economic environments. The *Land Use Plan* aligns with State of Minnesota Statute 462.353 and acts as the city's Comprehensive Plan. As shown in **Figure 7, "Proposed Land Use,"** Mankato's *Land Use Plan* designates the area as Parks/Open Space, Mixed Residential/Retail, High-Density Residential, and Public-Semi Public. Pending approval of the environmental review process, the subject property would be guided as Parks/Open Space, Mixed Residential/Retail, High-Density Residential, and Medium-Density Residential—where it was previously guided at Public-Semi Public.

The goal of the Mixed Residential/Retail land use designation is to encourage and support alternative development patterns which allow for a mixture of uses for retail, residential, and office to co-exist in the same areas, within nodes or urban villages. The goal of the High-Density Residential designation is to promote low, medium, and high-density residential development which provides affordable and lifecycle housing. The goal of the Medium-Density Residential Designation is to promote low and medium-density residential development which provides affordable and lifecycle housing opportunities. The *Land Use Plan* does not include goals for the Public/Open Space designations or the Public-Semi Public designations.

Zoning

Zoning, including special districts or overlays such as shoreland, floodplain, wild and scenic rivers, critical area, agricultural preserves, etc.

The subject property is not currently classified under *Chapter 10, "Land Use (Zoning),"* of the *Mankato City Code*. The surrounding properties to the north, east, and south also lack zoning classifications. However, the parcels to the west of the subject property, across 586th Avenue, are classified as R-4: Multiple Dwelling. The purpose of this district is to provide for high-density residential development.

Pending approval of the environmental review process, the subject property will be given zoning classifications aligned with the proposed land uses. The western extent of the subject property is anticipated to be zoned B-1, "Community Business District"; the middle section of the Study Area is anticipated to be zoned R-4, "Multiple-Family Dwelling District"; and the eastern extent is anticipated to be zoned R-1, "One-Family Dwelling District." The B-1, "Community Business District," is designed to provide for a broad range of retail developments which are adjacent to residential areas. The R-4, "Multiple-Family Dwelling District," is intended to provide for high-density residential development. The R-1, "One-Family Dwelling District," is intended to provide for low-density residential development.

In November 2022, the Mankato City Council adopted *Ordinance No. O-2022-1114-16*, creating *Mankato City Code Chapter 10, Section 10.65, "Shoreland Overlay District."* Effective as of January 1, 2023, the purpose of this Ordinance is to guide the subdivision, use, and development of shorelands of public waters in Minnesota. As shown on **Figure 3, "Proposed Improvements,"** a portion of the Study Area is located within a Shoreland Overlay District, as defined in *Minnesota Rules, Parts 6120.2500 – 6120.3900*, as land located within 1,000 feet from the ordinary high water (OHW) level of a lake, pond, or flowage.

All local and State regulations—including a 150-foot setback from the OHW level of public waters, depicted on **Figure 3, "Proposed Improvements"**—related to Shoreland Overlay Districts would be followed throughout the implementation of the Proposed Project. The residential portions of the Proposed Project would be designated as a Planned Unit Development (PUD) overlay district.

The subject property is not identified as a Special Flood Hazard Area on the effective FEMA FIRM panel 2752310045D, dated March 5, 1990. Thus, the subject property is not located in a Floodway District, Flood Fridge District, or General Floodplain District, as defined by *Chapter 10, "Land Use (Zoning),"* of the *Mankato City Code*.

Critical Facilities

Describe 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) that exist within or near the project area.

The subject property is surrounded by agricultural land or open space to the north, east, and south for approximately 1.5 miles. To the west, the subject property abuts a senior living facility. Past the facility, the area includes newly developed multiple-family dwellings, a middle school, and a planned low-density residential neighborhood. The Minnesota Department of Transportation District Headquarters and the Blue Earth County Justice Center/County Jail are located approximately half a mile northwest of the Study Area. The nearest hospital, the Mayo Clinic/Immanuel St. Joseph Hospital, is located approximately two miles northwest of the Study Area. The Study Area is located approximately one mile from Kennedy Elementary School, one-half mile from Prairie Winds Middle School, and one mile from Mankato East Senior High School. The Study Area connects to US Highway 14 and MN Highway 83 from County Highway 12. An existing 18-inch sanitary sewer line and 12-inch water main line connect to the Project Site at the intersection of County Highway 12 and Hoffman Road.

b. Project Compatibility

Discuss the project's compatibility with nearby land uses, zoning, and plans listed in Item 10a above, concentrating on implications for environmental effects.

The Proposed Project is generally consistent with the City of Mankato's approved land use and zoning plans. The goal of the Mesenbrink Mixed-Use Development Project is to provide area residents with a variety of housing options near a variety of retail and daily service destinations. This goal aligns well with the goals of the applicable land use and zoning classifications within the Study Area. The project will also include the construction of a park and five small stormwater ponds.

c. Project Incompatibility

Identify measures incorporated into the proposed project to mitigate any potential incompatibility as discussed in Item 10b above.

The eastern half of the Study Area is designated as Parks/Open Space in the north and Public/Semi-Public in the south in the Mankato Land Use Plan. According to the City's *Land Use Plan*, the Public/Semi-Public designation encompasses a wide spectrum of uses including government entities, churches, schools, hospitals, non-profit organizations, institutions, and universities. This is currently incompatible with the Proposed Project's intention to use this space as a site for single-family residential development. To mitigate this incompatibility, the project team will amend the City's *Land Use Plan* to change the designation of the subject property from Public/Semi-Public to Medium-Density Residential, pending approval of the Proposed Project's environmental review process. The goal of the Medium-Density Residential Designation is to promote low and medium-density residential development which provides affordable and lifecycle housing opportunities. The goal of this land use designation aligns with the Proposed Project and future zoning classifications.

11 Geology, Soils, & 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.

The Study Area is located within the Des Moines lobe glacial drift. According to the *Blue Earth County Geological Atlas* (1991), glacial drift deposits range in thickness from slightly less than 150 feet to over 300 feet. No geological site hazards to groundwater are known to occur within the Study Area. Sinkholes, unconfined/shallow aquifers, and shallow limestone bedrock are not known to exist within the Study Area. The nearest areas prone to surface karst feature development are located approximately three miles northwest of the Study Area, near the Minnesota River valley, and south of the Study Area, near the Le Sueur River. There are no wells identified within the Study Area. Local wells near the Study Area were drilled to a maximum depth of 262 feet, with none reaching bedrock.

b. Soils & 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.

According to the United States Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS) *Web Soil Survey*, there are nine soil classification types located within the Study Area, detailed in **Table 7, "NRCS Soil Classifications within Study Area,"** and **Figure 8, "Soils."** The area surrounding the Study Area contains largely similar soil types, though not all are redundant.

Table 7: NRCS Soil Classifications within Study Area

Percent of Study Area	Map Unit Symbol	Map Unit Name	Drainage Class	Hydrologic Soil Group	Wind Erodibility Group	K Factor, Whole Soil
31.7%	109	Cordova clay loam, 0 to 2 percent slopes	Poorly Drained	C / D	6	0.28
25.0%	110	Marna silty clay loam, 0 to 2 percent slopes	Poorly Drained	C / D	4	0.32

Percent of Study Area	Map Unit Symbol	Map Unit Name	Drainage Class	Hydrologic Soil Group	Wind Erodibility Group	K Factor, Whole Soil
10.2%	287	Minnetonka silty clay loam	Poorly Drained	C / D	6	0.32
8.6%	539	Klossner muck, lake plain depressional, 0 to 1 percent slopes	Very Poorly Drained	C / D	2	-
8.4%	525	Muskego soils, 0 to 1 percent slopes	Very Poorly Drained	C / D	2	-
5.7%	239	Le Sueur loam, 1 to 3 percent slopes	Somewhat Poorly Drained	C / D	6	0.28
4.4%	286	Shorewood silty clay loam, 1 to 6 percent slopes	Moderately Well Drained	C / D	6	0.28
4.1%	211	Lura silty clay, 0 to 1 percent slopes	Very Poorly Drained	C / D	4	0.28
2.0%	114	Glencoe silty clay loam, 0 to 1 percent slopes	Very Poorly Drained	C / D	6	0.28

NRCS classifies soils into hydrologic soil groups, A through D. Hydrologic soil groups are based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, are thoroughly wet, and receive precipitation from long-duration storms. NRCS definitions by hydrologic soil group are below.

- 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.
- 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 moderately fine texture to moderately course texture.
- 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.
- Group D – Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays with high swelling potential, soils with a permanent high-water table, soils with a claypan or clay layer at or near the surface, and shallow soils over nearly impervious material.
- 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.

Table 7 shows that the Study Area is primarily comprised of hydrologic soil groups. Soils in the C or C/D category may require additional artificial drainage measures.

Erodibility of soils within the Study Area is also noted in **Table 7**. For Wind Erodibility Group, those soils that are most susceptible to wind erosion have a rating of 1 while those that are least susceptible have a rating of 8. Within the Study Area, the majority of soils are rating 4 or above, indicating moderate wind erodibility. The K Factor, Whole Soil, rating is based upon the percentages of silt, sand, and organic matter within a given soil structure, modified by the presence of rock fragments. Values range from 0.02 to 0.69, with higher values indicating greater susceptibility of soils to sheet and rill erosion by water. The majority of soils within the Study Area are rated 0.28, indicating minimal water erosion susceptibility of these soils.

The Study Area is largely flat, with the northern end of the Study Area at a slightly higher elevation than the southern end. There are no steep slopes located within the Study Area.

As required by the NPDES permit, mitigation measures related to the preservation of existing soil conditions within the Study Area will be followed as part of the Proposed Project, including but not limited to:

- Construction phasing where possible to limit the amount of exposed soils.
- Soil stabilization in areas where construction activities are halted for 14 days or more.
- Stabilize exposed soils within 24 hours where the portion of the side drains to a public water.

For additional discussion of NPDES permitting requirements and erosion/sedimentation control related to stormwater runoff, please refer to **Section 12, "Water Resources."**

12 Water Resources

a. Surface Water & Groundwater Features

Describe surface water and groundwater features on or near the site in a.i and a.ii below.

i. Surface Water

Describe 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 species and 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 DNR Public Waters Inventory number(s), if any.

Public Waters – One Mile Search Area

Surface waters located within and adjacent to the Study Area are depicted on **Figure 10, "Surface Waters."** The Study Area is located within the Le Sueur River major watershed (HUC8: 07020011).

Portions of the site include:

- Unnamed Public Water Stream flowing to the Le Sueur River – PWI Number 7-23a
- Unnamed Public Water Wetland – DNR Basin ID: 7-71

- Unnamed Public Water Wetland – DNR Basin ID: 7-73

As shown on **Figure 3, "Proposed Improvements,"** a portion of the Study Area is located within a Shoreland Overlay District, as defined in *Minnesota Rules, Parts 6120.2500 – 6120.3900*, as land located within 1,000 feet from the ordinary high water (OHW) level of a lake, pond, or flowage.

Wetlands

A wetland delineation, approved by the Local Government Unit on February 22, 2022, identified 11 wetlands within the Study Area, totaling 28.59 acres. The approved wetland delineation report is included in **Appendix B, "Additional Assessments."** The following delineated wetlands were identified within the Study Area:

- Basin 1 (21.50 Acres) is a shallow open water community with fringing wetlands located in the northern part of the property which is listed as an Unnamed Public Water Wetland – DNR Basin ID: 7-71
- Basin 2 (0.07 Acres) is a seasonally flooded basin located along the western edge of the property
- Basin 3 (1.63 Acres) is a seasonally flooded basin located along the western edge of the property
- Basin 4 (0.33 Acres) is a seasonally flooded basin located along the western edge of the property
- Basin 5 (0.27 Acres) is a seasonally flooded basin located along the western edge of the property
- Basin 6 (0.62 Acres) is a seasonally flooded basin located along the western edge of the property
- Basin 7 (0.33 Acres) is a seasonally flooded basin located along the western edge of the property
- Basin 8 (0.15 Acres) is a seasonally flooded basin located along the western edge of the property
- Basin 9 (1.71 Acres) is a seasonally flooded basin located along the western edge of the property
- Basin 10 (1.30 Acres) is a seasonally flooded basin located along the western edge of the property
- Basin 12 (0.12 Acres) is a seasonally flooded basin located along the western edge of the property
- Basin 15 (0.58 Acres) is a seasonally flooded basin located along the western edge of the property

ii. Ground Water

Describe 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.

Groundwater data for the Study Area was obtained from MnDNR and Blue Earth County. The Proposed Project is located within the Shakopee (Prairie du Chien Group) aquifer formation and the Oneota Dolomite (Prairie du Chien) aquitard formation.

According to the MnDNR *Spring Inventory*, no springs are identified within the Study Area. Depth to groundwater within the Study Area is generally 0-10 feet. The Proposed Project is not within an existing DWSMA or wellhead protection area.

There are no existing domestic wells onsite, however, as detailed on **Figure 9, "Geologic Conditions & Groundwater,"** there are several wells located on properties adjacent to the Study Area. Any unexpected wells encountered during the construction of the Proposed Project will be sealed in accordance with the requirements of the Minnesota Department of Health.

b. Project Effects & Mitigations

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 and waste loadings, including any effects on, or required expansion of, municipal wastewater infrastructure.*

The Proposed Project would require the extension of City of Mankato sanitary sewer infrastructure from a planned connection point at the intersection of Hoffman Road and Blue Earth County CSAH 12. The sanitary sewer is sized to account for this development along with future development to the east. Wastewater would primarily be generated by single-family homes and apartment buildings, as well as a convenience store, car wash, and additional commercial facilities.

No wastewater treatment would be conducted on site. Wastewater would be collected in the extended sanitary sewer and routed to the Mankato Wastewater Reclamation Facility (WWRF). The Mankato WWRF currently has enough capacity to accommodate the Proposed Project, and also may be expanded during the life of the Proposed Project.

Wastewater generated by the Proposed Project was determined by the following:

- 112 single-family homes: 100 gal/capita/day, 3-person occupancy = **33,600 gallons/day**
- 713 apartments: 100 gal/capita/day, 2.7-person avg. occupancy = **192,510 gallons/day**
- Convenience Store: **assumed 1,000 gallons/day**
- Car Wash: **assumed 3,500 gallons/day**
- Retail Stores: assumed 8 stores with 200 gal/store/day = **1,600 gallons/day**
- Total estimated wastewater = **232,210 gallons/day**

A Minnesota Pollution Control Agency (MPCA) Sanitary Sewer Extension Permit would be obtained prior to the construction of the Proposed Project.

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 such a system. If septic systems are a 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.

Wastewater generated by the Proposed Project would be routed to the Mankato WWRF via sanitary sewer.

3. *If the wastewater discharge is to surface water, identify the wastewater treatment methods and identify discharge points and proposed effluent limitations to mitigate impacts. 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.*

Wastewater generated by the Proposed Project would be routed to the Mankato WWRF via sanitary sewer. The WWRF will treat sewage prior to discharge.

ii. Stormwater

Describe the 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 constructed-related water impairments or are classified as special as defined in the Construction Stormwater permit. Describe additional requirements for special and/or impaired waters.

Stormwater Quantity and Quality

The developable portions of the Study Area are currently used for row-crop agriculture. The Proposed Project would alter the landscape and hydrologic conditions of the site through changing the land use with the construction of streets, buildings, sidewalks, and driveways. It is anticipated that approximately 30 acres of new impervious area would be generated within the Study Area. Runoff from the Proposed Project would be collected into storm sewer pipes and routed to onsite stormwater wet sedimentation basins to remove pollutants and regulated discharge rates leaving the property to at or below existing conditions.

Soil conditions and depth to groundwater make constructing volume control stormwater best management practices (BMPs) infeasible. To meet City and State stormwater management requirements, multiple wet sedimentation basins are proposed. Smaller wet sedimentation basins

would be constructed in available green spaces near the proposed apartment units and the single-family homes, with one large regional wet sedimentation basin designed to manage and treat any remainder runoff needed to meet regulations.

The project would meet or exceed the City of Mankato's *City Ordinances* which are based on State MS4 requirements and the MPCA's NPDES Construction Stormwater Permit.

Runoff Routes

The existing property is relatively flat with small pocket depressions that store runoff on the landscape. In general, runoff from the property travels north to a large unnamed public water wetland. The outlet for this wetland is County Ditch 12, which routes around the property to the south and ultimately discharges into the Le Sueur River.

The Proposed Project would maintain the existing conditions characteristics and patterns with the mall collected runoff in the property discharging to the same unnamed public water wetland to the north. For areas draining directly to the unnamed public water wetland, converting what is row-crop agriculture today to turf will reduce pollutant loads including total suspended solids (TSS). Existing drainage patterns are shown on **Figure 11, "Existing Drainage Patterns,"** and proposed drainage patterns are shown on **Figure 12, "Proposed Drainage Patterns."**

Stormwater Controls

The construction plan will include: an erosion and sediment control plan, a turf establishment plan and a Stormwater Pollution Prevention Plan (SWPPP). Stormwater control measures would include standard erosion control best management practices including but not limited to silt fences, rock construction entrances, temporary sedimentation basins, inlet protections and any requirements outlined in the City grading permit and the MPCA NPDES Construction Stormwater Permit.

Grading activities will be phased to minimize any erosion that may occur during an unexpected rainfall event. Maximum efforts will be incorporated during construction and post-construction to reduce erosion and protect water quality to the downstream receiving water bodies.

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 DNR water appropriation permit is required. Describe any well abandonment. If connecting to an existing municipal water supply, identify the wells to be 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 the appropriation 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 Proposed Project would require the extension of City of Mankato watermain from a planned connection point at Hoffman Road and Blue Earth County CSAH 12. The watermain is sized to account for this development and future development to the east. A Minnesota Department of Health permit is required for the watermain installation and would be obtained prior to construction. Water flow and pressure will be adequate for the Proposed Project.

An estimate of daily water use was determined with the following criteria:

- Total estimated wastewater = **232,210 gallons/day** which is expected to be the same as water use
- Irrigation basis – as suggested by City of Mankato staff: If a person has an average of 8 zones in their yard and waters each zone 15 minutes per zone, they will use 2,880 gallons per week or 11,520 gallons per month. 11,520/30 days per month = 384 gallons per house per day of water. This can be reduced to approximately 6 months out of the year in Minnesota which yields 192 gal/day normalized.
    - 112 single-family homes = **21,504 gallons/day**
    - The multi-family and commercial area contains approximately 1/3 the green space as the single-family home area. Therefore, it can be approximated that this area would require **7,168 gallons/day**
- Total estimated water use is 260,882 gallons/day

It is not anticipated that the project will require dewatering activities. A MnDNR Water Appropriations permit would be obtained prior to construction if it is determined that dewatering activities are required.

iv. Surface Waters

1. *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.*

Wetlands

Delineated Wetlands

Impacts to Basin 1, a Public Water Wetland, would be avoided, and a 150-foot setback would be maintained from the OHW of the wetland. All other wetlands are considered isolated and heavily

degraded as a result of agricultural activities. These wetlands would be completely filled to allow for development.

Permitting and Sequencing Information

All wetland impacts would be properly permitted through the MNDNR, Wetland Conservation Act of Minnesota (WCA) and Section 404 of the Clean Water Act (CWA). A sequencing analysis is required as part of this permitting process. The only wetland under the jurisdiction of the MNDNR and CWA is Basin 1. No impacts to this basin are anticipated. Therefore, no sequencing analysis is necessary.

The remaining eleven wetlands are only under the jurisdiction of the WCA. Historically, these wetlands have been in crop rotation and have been heavily degraded by the removal of wetland hydrology and hydrophytic plant communities. Due to the degradation that has occurred, these wetlands are eligible for sequencing flexibility. MN Rule 8420.0520, Subpart 7a.A.1, allows for flexibility in sequencing if the wetlands to be impacted have been degraded to the point where replacement of it would result in a certain gain in functional and public value. There are several highly functional wetland banks in the Le Sueur River watershed with available wetland credit. Impacts to wetlands as a result of this project would be mitigated for within the same major watershed, allowing a functional lift to the watershed.

2. *Other Surface Waters- Describe any anticipated physical effects or alterations to surface water features (lakes, streams, ponds, intermittent channels, county/judicial ditches) 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 the water features. Discuss how the project will change the number or type of watercraft on any water body, including current and projected watercraft usage.*

All local and State regulations—including a 150-foot setback from the OHW level of public waters, depicted on **Figure 3, "Proposed Improvements"**—related to Shoreland Overlay Districts would be followed throughout the implementation of the Proposed Project. Direct or indirect adverse impacts to other surface water features are not anticipated to occur as a result of the Proposed Project.

13 Contamination/Hazardous Materials/Wastes

a. Pre-project Site Conditions

Describe existing contamination or potential environmental hazardson 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.

The MPCA's *What's in My Neighborhood* mapper identified 28 potentially contaminated sites located within a one-mile radius of the Study Area, detailed in **Table 8, "MPCA "What's in My Neighborhood" Sites within a One-Mile Radius".** As shown in **Figure 13, "MPCA WIMN,"** none of these sites are located within the Study Area. None of these sites pose a significant threat or impact to the Proposed Project.

Table 8: MPCA "What's in My Neighborhood" Sites within a One-Mile Radius

Site ID	Site Name	Program Name List	Distance from Site (Meters)
220708	Pillars of Mankato	Hazardous Waste; Stormwater	64
225332	Kwik Trip #1011	Stormwater; Tanks	579
89963	Mankato TACC	Hazardous Waste	619
123973	Blue Earth County Justice Center	Hazardous Waste; Stormwater	646
105806	MCHS Eastridge Clinic	Hazardous Waste	646
151637	Prairie Winds Middle School	Stormwater; Tanks	798
220913	Northern Natural Gas - M460B Hwy 83 Rplc	Hazardous Waste	799
46666	Nelson Cabinetry	Hazardous Waste	811
148864	Toppers Plus	Hazardous Waste	1,025
133941	58967 Madison Avenue	Hazardous Waste	1,030
128983	Mankato Ford LLC	Air Quality; Hazardous Waste; Investigation and Cleanup; Tanks	1,163
250733	ULTA Beauty #1660	Hazardous Waste	1,182
121122	59175 Madison Avenue	Hazardous Waste	1,315
76119	Walmart Supercenter 1473	Hazardous Waste; Stormwater	1,332
143225	PETCO Store 1655	Hazardous Waste	1,372
139017	Michael's Store 2729	Hazardous Waste	1,372

Site ID	Site Name	Program Name List	Distance from Site (Meters)
222562	Sally Beauty Supply #2996	Hazardous Waste	1,373
95221	Snell Collision Center	Air Quality; Hazardous Waste; Tanks	1,452
41670	Wellner Auto Clinic Inc	Hazardous Waste	1,454
47119	Alltel Retail Store	Hazardous Waste	1,529
105623	Oasis Market #5116	Investigation and Cleanup; Tanks	1,628
196526	Former Twin Cities Avanti Store 5116	Investigation and Cleanup	1,628
216556	Shopko 021 - Pharmacy	Hazardous Waste	1,646
49011	Shopko 021	Hazardous Waste	1,646
91172	Auto Tech N Tire Inc	Hazardous Waste	1,666
46519	Sam's Club 6510	Hazardous Waste; Tanks	1,687
42568	AutoZone 3159	Hazardous Waste	1,716
129251	Circle K Store 2746704	Tanks	1,732

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 solidwaste including source reduction and recycling.

Construction activities for this development would generate substantial waste. The amount of waste is anticipated to be representative of construction projects of this size and scope. The contractors would dispose of any wastes generated in an approved method and/or to an approved facility. The contractors will be encouraged to recycle as many construction materials as feasible. All brush and tree waste generated on site would be chipped or otherwise disposed of and will not be burned on site.

Typical municipal commercial and residential solid waste is anticipated to be generated throughout the life of the Proposed Project. All solid waste materials would be handled through licensed solid waste haulers. Numerous agencies and organizations offer best management practices to avoid or minimize waste generation through reuse and recycling activities or by encouraging sustainable purchasing

practices to reduce impacts. Local businesses will be encouraged to participate in these practices and take advantage of available resources.

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 adverseeffects from the use/storage of chemicals/hazardous materials including source reduction and recycling. Include development of a spill prevention plan.

Fuels and oils typical for the operation of construction equipment would be delivered but not stored on site. Building products used for home and facility construction will be used, stored, and disposed of in accordance with all State and local regulations.

No previous environmental hazards have been identified on the proposed development site. Normal construction, household, and commercial hazardous wastes are anticipated. Toxic or hazardous materials, such as fuel for construction equipment and materials used in the construction of homes and facilities (paint, adhesives, stains, acids, bases, etc.) would likely be used during site preparation and construction. Spills of these materials are not anticipated but could require notification of the Minnesota Duty Officer if a significant spill occurs. Builders and contractors are responsible for proper management and disposal of any wastes brought or generated on site. During construction, any toxic or hazardous materials would be properly used, stored and disposed of when finished.

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, anddisposal. Identify measures to avoid, minimize or mitigate adverse effects from the generation/storage of hazardous waste including source reduction and recycling.

Please refer to **Section 13b** and **Section 13c**.

14 Fish, Wildlife, Plant Communities, & Sensitive Ecological Resources (Rare Features)

a. Resources/Habitats/Vegetation

Describe fish and wildlife resources as well as habitats and vegetation on or near the site.

The approximately 105-acre Study Area is primarily comprised of agricultural fields with some forested areas in the north and 28.59 acres of wetland in the northeast portion of the subject property. A review

of available historic aerial imagery reveals the land has been largely in agricultural production since at least the late 1930s, with portions of the current forested area present in the north part of the Study Area.

Wildlife species typically associated with habitat of the type and quality present include white-tailed deer, raccoons, coyote, turkey, squirrel, other small rodents, and birds common to the area. Wildlife populations that temporarily use the agricultural and forested areas within the Study Area for cover may be temporarily displaced during the construction of the Proposed Project, however these wildlife species are anticipated to relocate to other nearby habitat in the area until construction is complete.

b. Rare Features

*Describe rare features such as state-listed (endangered, threatened or special concern) species, native plant communities, Minnesota County Biological Survey Sites of Biodiversity Significance, andother sensitive ecological resources on or within close proximity to the site. Provide the license agreement number (LA-____) and/or correspondence number (ERDB **20170450**) from which the data were obtained and attach the Natural Heritage letter from the DNR. Indicate if any additional habitat or species survey work has been conducted within the site and describe the results.*

The Proposed Project was submitted to the Minnesota Department of Natural Resources (MnDNR) Division of Ecological & Water Resources for Natural Heritage Information System (NHIS) review on September 15, 2022. NHIS review determined that the Proposed Project would not negatively affect any known occurrences of State-listed rare features. For more information, please refer to the Natural Heritage Letter and Project Report (MCE #2022-00619; received on September 15, 2022), which are included in **Appendix C, "Agency Coordination."**

Additionally, the United States Fish and Wildlife Service's (USFWS) online Information for Planning and Consultation (IPaC) tool identified one Federally-listed endangered species (Northern Long-Eared Bat), one candidate species (Monarch Butterfly), and one migratory bird (Bald Eagle) that may be located within the Study Area. The USFWS IPaC Official Species List (generated on September 15, 2022) is included in **Appendix C, "Agency Coordination."**

The MnDNR maintains a list of townships within Minnesota that contain documented Northern Long-Eared Bat (NLEB) maternity roost trees and/or hibernacula.[5] As of June 7, 2021, there are no identified NLEB trees or hibernacula located within Blue Earth County. Although no NLEB trees or hibernacula have been documented within Blue Earth County, there is potential for the species to be found throughout Minnesota. NLEBs hibernate in caves or mines during the winter (November to March) and roost in forest and woodland habitats during the active season (April to October). 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 potential impacts, the DNR recommends that tree removal be avoided during the months of June and July.

[5] 2022. Townships Containing Documented Northern Long-Eared Bat (NLEB) Maternity Roost Trees and/or Hibernacula Entrances in Minnesota. MnDNR Website. Electronic resource: https://files.dnr.state.mn.us/eco/ereview/minnesota_nleb_township_list_and_map.pdf, accessed October 2022.

As shown on **Figure 14, "Biotic Resources,"** the Study Area is located within a Rusty Patched Bumble Bee Low Potential Zone. Low Potential Zones represent areas where Rusty Patched Bumble Bees are not likely to be present.

No other Federally-listed endangered species, critical habitats, refuge lands, or fish hatcheries were identified within the Study Area. For more information, please refer to the USFWS IPaC Official Species List (generated on September 15, 2022), which is included in **Appendix C, "Additional Assessments."**

c. Project Effects

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. Separatelydiscuss effects to known threatened and endangered species.

As discussed in **Section 14b, "Rare Features,"** no State-listed threatened species, endangered species, species of special concern, or rare features were identified within the Study Area. Thus, no adverse impacts to these communities are anticipated as a result of the Proposed Project.

The primary impact that would occur as a result of the implementation of the Proposed Project is loss of habitat, primarily food and cover resources, and habitat fragmentation. The Study Area may currently serve as a corridor for wildlife species. This corridor would be temporarily impacted during construction activities. However, after the conclusion of construction activities, wildlife may continue to use the area to move from one location to another.

The project is not anticipated to have the potential to spread or introduce invasive species. The contractor will be required to control the State-listed noxious weeds.[6] The contractor will follow best management practices (BMPs) to control and appropriately manage any invasive species. Removed soil will remain on site and will not be transported to other areas. Construction vehicles that may come into contact with invasive species will be checked and washed on site prior to leaving the work area to minimize any spread of invasive species. Reseeding and landscaping material will be free of invasive plants or plant parts. The project will also minimize disturbance of the surrounding roadside and vegetation.

d. Control Measures

Identify measures that will be taken to avoid, minimize, or mitigate the adverse effects to fish, wildlife, plant communities, ecosystems, and sensitive ecological resources.

The City of Mankato will coordinate with the Developer to ensure that construction activities incorporate mitigation measures to minimize risk to plant and wildlife species.

[6] 2022. Minnesota Noxious Weed List. Minnesota Department of Agriculture (MDA) website. Electronic webpage: https://www.mda.state.mn.us/plants-insects/minnesota-noxious-weed-list, accessed October 2022.

Additionally, the following mitigation measures will be implemented to reduce impacts to the wetland habitat located in the northern portion of the Study Area:

- Do not park equipment or stockpile supplies in the area of the PWI
- Inspect and clean all equipment prior to bringing it to the site to prevent the introduction and spread of invasive species
- As soon as possible after construction, revegetate disturbed soil with native species suitable to the local habitat
- Use only weed-free mulches, topsoils, and seed mixes
- Ideally do not bring in topsoil
- Developer will follow all erosion and sediment control requirements throughout the construction process and will be in compliance with the NPDES Stormwater Permit, especially in proximity to the PWI

Mitigation measures related to the introduction and spread of invasive species are discussed in **Section 14c, "Project Effects."**

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.

A file search of the State Historic Preservation Office (SHPO) and the Office of the State Archaeologist (OSA) databases was conducted to identify all known archaeological, historical, architectural, or traditional cultural properties that have the potential to be impacted by the Proposed Project. As part of early agency coordination efforts, a request for project review was submitted to SHPO on September 14, 2022. A response to this request was received on October 12, 2022. In its review of the Proposed Project, SHPO concluded that "there are no properties listed in the National or State Registers of Historic Places and no known or suspected archaeological properties in the area that will be affected by this project."[7]

While no previously recorded or unconfirmed (alpha) archaeological sites are located within or directly adjacent to the Study Area, two archaeological sites (21BE0072 and 21BE0302) as well as one alpha site (21BEy) are located within one mile of the Study Area. Site 21BE0072 is the find spot of a single precontact lithic identified during surface reconnaissance survey. This site is located approximately 0.84 miles southwest of the Study Area. Site 21BE0302 is a sparse lithic scatter that was similarly identified approximately 0.65 miles east of the Study Area. Alpha site, 21BEy, is based on historical documentation

[7] SHPO Letter 2022-2791. RE: Mesenbrink Residential Development. Electronic Correspondence, dated October 12, 2022.

from the late 19th century of a mill in this vicinity. This location has not been field verified, but the current site boundaries extend to approximately 0.54 miles south of the Study Area.

There are no National Register of Historic Places (NRHP)-listed historic properties within one mile of the Study Area. However, according to SHPO files, there are 6 previously inventoried historic properties within the one-mile search radius. None of these properties are within or immediately adjacent to the Study Area. There is not anticipated to be any effect on any of these properties.

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 current visual expanse includes views of the surrounding agricultural, forested, and wetland areas. Visual impacts to the site will include removal of vegetation and construction of the residential facilities, interior roadway and surface parking lot areas, and the construction of infiltration pond features. This constitutes urban growth and will change the rural views of this location, but the surrounding wetlands to the north, agricultural land to the east, and forested and agricultural land to the south will not be affected by construction.

During construction activities, this land-use change will be pronounced with grading and excavation activities. Additional visual impacts are anticipated to include construction equipment and hauling vehicles to and from the site. Occasional dust plumes are anticipated as minimal due to exercised dust control measures.

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 effectsfrom stationary source emissions.

Stationary sources of air emissions associated with the Proposed Project would stem from domestic heat sources in residential facilities once they are constructed. The residential buildings to be constructed as part of the Proposed Project are anticipated to use efficient heating and cooling systems. Stationary source emissions from the Proposed Project will be minimal and will comply with current residential and industry standards for heating and cooling equipment. Therefore, the Proposed Project would not result in significant adverse impacts to air quality from stationary-source emissions.

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.

Mobile sources of air emissions associated with the Proposed Project include the use of vehicles and equipment during construction activities, as well as vehicle emissions once residential developments and interior roadways are complete. Projected vehicle emissions are not anticipated to result in significant adverse effects during or following construction activities.

c. Dust & Odors

Describe sources, characteristics, duration, quantities, and intensity of dust andodors 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 ormitigate the effects of dust and odors.

The Proposed Project is not anticipated to generate any odors.

Some dust generation is anticipated during construction activities. The primary source of dust generation will stem from vehicles entering and exiting the construction area prior to the implementation of paved roadways. A wet dust suppression plan, including watering dirt construction roads, will be followed during construction operations to minimize the effects of dust. Additionally, periodic cleanup of the construction site and limiting the amount of soil disturbance will help control dust generation.

Following development operations, dust should be limited to that typical of a residential area. No long-term or significant impacts are anticipated from dust and odors.

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.

Global climate change results from the total accumulation of greenhouse gas (GHG) 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.

Mesenbrink Construction proposes to construct a multi-use development on approximately 105 acres of agricultural land in Blue Earth County. This development would include retail/residential units, apartment units, single family homes, and a park or green space. Construction would be performed utilizing traditional construction methods involving standard earth moving equipment per City of Mankato guidelines.

Currently, the area designated for the Proposed Project is primarily used as cropland. The MPCA tracks emissions of different sectors, including agriculture, and reports on this information. In 2008, the MPCA determined that cropland in Minnesota averages a greenhouse gas output of 1,776 CO2e lbs per acre per year. Using this figure, we can calculate that the annual output for 105 acres of cropland would be 186,480 lbs or 84.59 MTCO2e.

In addition, existing roadways within the Study Area contribute to GHG emissions and may be impacted by the Proposed Project. A traffic study was conducted in 2022 to assess current traffic conditions and forecast the impact of the Proposed Project on these conditions. The results of this study are summarized below in **Table 9, "Existing, Build, and No-Build AADT**." For more information, please refer to **Section 20, "Transportation,"** and **Appendix B, "Additional Assessments."**

Table 9: Existing, Build, and No-Build AADT

Roadway	Existing AADT	Build AADT (2045)	No Build AADT (2045)
TH 22	18859	27415	26328
Hoffman Rd	2000	5793	2366
CSAH 12	4000	19197	16661

Mobile source emissions generated from the existing roadways were computed using the EPA estimation of 80% of vehicles utilizing gasoline and 20% using diesel. As the roadway closest to the Study Area and the one projected to have the most significant change in average annual daily traffic (AADT) resulting from the Proposed Project, CSAH 12 data was utilized for calculating traffic emissions. These calculations were further compared to emissions data derived from averaging the AADT of all three roadways to ensure this is an accurate reflection of traffic emissions, however focusing on a single roadway rather than using the average of all three is preferred to avoid possible duplication in vehicle counts. The results of this calculation indicate that current traffic conditions on CSAH 12 produce 1,667.8 MTCO2e annually and the Proposed Project would increase this amount by 6,336.2 MTCO2e per year.

Construction activities for this project are anticipated to include a wide variety of construction equipment of various equipment classes, sizes, and engine types. Typical construction equipment for this type of project includes, but is not limited to, excavators, material handlers, skid steers, cranes, bulldozers, pavers, compactors, jackhammers, and haul trucks. These types of vehicles primarily rely on diesel as a fuel source, which results in the emission of CO2 and, to a lesser extent, CH4 and N2O. **Table 10, "GHG Emissions,"** provides an estimate for the emissions generated by this equipment for the two construction seasons anticipated to complete the Proposed Project (approx. working 120 days per season) and utilize approx. 25 diesel-powered pieces of heavy equipment and 25 gasoline-powered passenger vehicles. The total emissions from these activities (213.3 MTCO2e) 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.[8] Annualized, this would be 7.11 MTCO2e.

Once construction of the project has been completed, operational GHG emissions will be the combined result of the commercial and residential spaces. In general, the annual averages for energy consumption for residential households is higher than that of commercial buildings.[9] For the purposes of calculating GHG emissions, the Proposed Project specifications of 673 residential units (113 single-family units, 30 townhomes, and 530 apartment units) is considered the equivalent of 673 households. The total commercial space is 26,400 sq ft (21,000 sq ft retail center and 5,400 sq ft gas station). Both commercial and residential spaces are anticipated to utilize the typical municipal energy sources for the area (natural gas and electricity) as well as the municipal waste management system. Estimates for each of these emissions sources are presented below in **Table 10, "GHG Emissions."** All calculations were facilitated by use of the EPA's Simplified GHG Emissions Calculator (SGEC) Version 7, dated June 2021, and information on national averages where more detailed local data was not available.

[8] Meridian Consultants, LLC. 2016. *Environmental Impact Report (EIR 15-01): Lompoc Motorsports Project, City of Lompoc*. Prepared for the City of Lompoc. Section 4.6 Greenhouse Gas Emissions: 4.6-16.
[9] U.S. Energy Information Administration. 2022. Use of Energy Explained. Electronic resource, https://www.eia.gov/energyexplained/use-of-energy/, accessed October 2022.

Table 10: GHG Emissions

Scope	Emission Type	Project-related Conditions (MTCO2e)	Calculation method(s)
Scope 1	Construction Mobile Equipment (annualized)	7.11	SGEC Tool[10] (2 construction seasons of 120 working days each, 25 gas-powered and 25 diesel-powered vehicles traveling 20 miles per day)
Scope 1	Construction Waste (annualized)	1.56	Based on national average per square foot[11]
Scope 1	Motor Vehicle Emissions	6336.2	SGEC Tool (using AADT for CSAH 12 for 2 miles of travel, 80% gas-powered and 20% diesel-powered vehicles)
Scope 1	Stationary Equipment/Facility Natural Gas Usage	2605	Based on annual national average usage for residential and commercial users[12]
Scope 2	Off-site Electricity Usage	5538.4	Based on annual national average electricity usage for residential and commercial users[13]
Scope 2	Water Usage	86.81	Water Energy Climate Calculator[14] for Mankato area
Scope 3	Off-site Waste Management	2.33	Based on 2015 MPCA annual averages for municipal waste management[15]
TOTAL		**14,577.41**	

Based on these calculations, the Proposed Project would result in an increase of 14,492.82 MTCO2e per year than is currently produced by the existing conditions. There are no Minnesota or National Ambient Air Quality Standards for GHGs. The assessment of GHG emissions and climate change is extremely complex. Currently it is not possible to model the physical impacts of global or regional climate change, such as storm frequency/intensity or temperature increases, caused by incremental GHG emissions, such as those from the Proposed Project. In other words, while this project will contribute to climate change generally, existing scientific tools do not allow local or state regulatory authorities to quantify the specific effects of a particular project on global or regional climate change impacts, and therefore cannot be added cumulatively to other potential project impacts. There is currently an absence of regulatory guidance for analyzing GHG emission impacts. If, in the future, climate models improve in their predictive capacity or more regulatory guidance is provided, the city will incorporate those tools into its environmental review process at that time.

[10] Environmental Protection Agency. 2021. Simplified GHG Emissions Calculator (SGEC), Version 7. Electronic resource, https://www.epa.gov/climateleadership/simplified-ghg-emissions-calculator, accessed July 2022.
[11] Wastecare Corporation 2013. "Waste Generated by Industry/Building Type." Electronic resource, https://www.wastecare.com/usefulinfo/Waste_Generated_by_Industry.htm, accessed July 2022.
[12] U.S. Energy Information Administration. 2022. Natural Gas Summary. Electronic resource, https://www.eia.gov/dnav/ng/NG_SUM_LSUM_A_EPG0_VRS_MMCF_M.htm, accessed October 2022.
[13] U.S. Energy Information Administration. 2022. Use of Energy Explained. Electronic resource, https://www.eia.gov/energyexplained/use-of-energy/, accessed October 2022.
[14] Pacific Institute. 2010. Water Energy Climate Calculator. Electronic resource, http://www.wecalc.org, accessed July 2022.
[15] Minnesota Pollution Control Agency. 2017. *Metropolitan Solid Waste Management Police Plan 2016-2036*. Electronic resource, https://www.pca.state.mn.us/sites/default/files/w-sw7-21e.pdf

b. GHG Assessment

i. GHG Mitigation Considerations

Describe any mitigation considered to reduce the project's GHG emissions.

At least some of these emissions may be mitigated or offset by practices that can remove carbon from the atmosphere and sequester it. Additional practices can reduce additional 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 plans to reduce electric and natural gas usage, and increasing recycling and energy reuse efforts. The majority of these mitigation efforts will depend on municipal policy and end-user efforts and are therefore not a part of the current project proposal. However, during construction, BMPs such as engine anti-idling would be implemented in order to minimize additional GHG output.

ii. GHG Reduction Calculations

Describe and quantify reductions from selected mitigation, if proposed to reduce theproject's GHG emissions. Explain why the selected mitigation was preferred.

No current on-site mitigation is planned as part of the Proposed Project. However, it should be noted that the inclusion of a green space in project plans will offset some of the emissions resulting from the retail and residential development. Unfortunately, there are currently no reliable and widely accepted methods for calculating the emissions reduction of urban and suburban park spaces.

iii. Project Lifetime GHG Emissions

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.[16] Current goals are to reduce GHG emissions statewide to 30% below 2005 levels by 2025, and 80% below 2005 levels by 2050. The Proposed Project does not involve any large energy facilities but is a mixed-use development of commercial and residential spaces. However, BMPs will be utilized in the planning and construction phases of the project in order to remain in keeping with State and local GHG reduction goals.

[16] 2020 Minnesota Statutes. CHAPTER 216H: GREENHOUSE GAS EMISSIONS. Electronic document, https://www.revisor.mn.gov/statutes/cite/216H, accessed July 2022.

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.

Existing noise sources in the area include vehicle traffic along Blue Earth County Highway 12.

a. Construction Noise

Noise associated with the construction of the Proposed Project will be generated from grading and excavation activities to prepare the site for utility and roadway installation. See **Table 11, "Typical Construction Equipment Noise Levels at 50 Feet,"** for typical noise levels of construction equipment measured at 50 feet.

Table 11: Typical Construction Equipment Noise Levels at 50 Feet

Equipment	Manufacturers Sampled	Total Number of Models in Sample	Peak Noise Level (dBA*)	
			Range	Average
Backhoes	5	6	74-92	83
Front Loaders	5	30	75-96	85
Dozers	8	41	65-95	85
Graders	3	15	72-92	84
Scrapers	2	27	76-98	87
Pile Drivers	N/A	N/A	95-105	101

*Units of "A-weighted Decibels"
Source: United States Environmental Protection Agency and Federal Highway Administration

Minnesota Rules, Part 7030, define daytime hours as 7am to 10pm, and nighttime as 10pm to 7am. Construction operations will occur within State noise standards as cited in **Table 12, "Noise Standards (MN Statute 7030.0040),"** below.

Table 12: Noise Standards (MN Statute 7030.0040)

Noise Area Classification	Daytime		Nighttime	
	L_{50}	L_{10}	L_{50}	L_{10}
1 (Residential)	60	65	50	55
2 (Commercial)	65	70	65	70
3 (Industrial)	75	80	75	80

*L_{10} is the sound level, expressed in dBA, which is exceeded 10% of the time for one hour.
*L_{50} is the sound level, expressed in dBA, which is exceeded 50% of the time for one hour.

b. Traffic Noise

Traffic noise is anticipated to increase during construction activities and post-construction with the established residential developments and interior roadways. Operators will ensure all vehicles and equipment have mufflers and operate in accordance with State and local regulations. Therefore, the Proposed Project would not result in significant adverse impacts from traffic noise.

20 Transportation

a. Project-Related Traffic

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.

S2 Traffic Solutions, LLC (SSTS) completed a Traffic Study Memorandum to estimate the trips generated by the Proposed Project and evaluate the potential need for transportation or roadway improvements. The complete Traffic Study is included in **Appendix B, "Additional Assessments."**

Existing and Proposed Parking Spaces

The subject property is currently undeveloped and does not have a defined parking area. The Proposed Project would include 713 apartment units that would have off-street parking and garages, there would be 1,426 parking stalls; 112 single family homes, that would have off-street parking and garages, there would be 224 parking stalls; 6,250 square feet of commercial retail space that would include off-street parking, there would be 25 parking stalls; and a convenience store/gas station that would include parking spaces on the lot for customers of the Convenience Store, there will be 25 parking stalls. 1,700 total off-street parking spaces would be provided.

Estimated Traffic Generation

SSTS prepared a Traffic Study Memorandum for the Proposed Project. The Traffic Study Memorandum assumed full development of the site by 2025. The complete Traffic Study Memorandum is included in **Appendix B, "Additional Assessments."**

Trip generation was estimated using the methodology outlined in the Institute of Transportation Engineers (ITE) *Trip Generation Manual, 11th Edition*. The Proposed Project is anticipated to generate approximately 7,876 vehicle trips per day. Within the PM peak hour, the Proposed Project is anticipated to generate 710 trips, consisting of 395 entering vehicles and 315 exiting vehicles. Project trip generation is detailed in **Table 13, "Project Trip Generation,"** and the Traffic Study Memorandum included in **Appendix B, "Additional Assessments,"** provides a full description and analysis of the peak-hour traffic and traffic recommendations.

Table 13: Project Trip Generation

Land Use	Type	Block No.	Land Use Code	Size		Trips Generated: AM peak Enter	AM peak Exit		PM Peak Enter	PM Peak Exit		Weekday ADT
Mid-Rise Apartment/Suburban	Residential	1	221	713	units	R 62	195	R	170	108	R	3,237
Single Family Housing	Residential	1	210	112	units	R 20	58	R	66	39	R	1,056
Shopping Center	Retail	2	822	6,250	s.f.	R 9	6	R	21	21	R	343
Convenience Store/Gas Station	Retail	2	945	16	fuel pos.	R 216	216	R	182	182	R	4,114
Totals - Gross						307	475		439	350		8,751
						782			789			
Shared Trips						31	48		44	35		875
						78			79			
Pass-By Trips						0	0		0	0		0
						0			0			
Totals - Net*						**276**	**428**		**395**	**315**		**7,876**
						704			**710**			

Availability of Transit and Alternative Transportation

Mankato Transit provides transit services in Mankato and North Mankato, however, transit routes currently do not serve the area within or adjacent to the Study Area. The nearest transit facility to the site is located in front of the Blue Earth County Justice Center, over half a mile from the site from the site.

Trails and sidewalks provide another alternative approach for local travel. The project would include internal sidewalks and trails, and sidewalks along some residential streets to link with existing and future local sidewalk and trail systems.

b. Potential Congestion

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.

SSTS documented existing conditions of the nearby roadways during the weeks of August 22, 2022, and September 5, 2022. The study focused on the following intersections:

1. TH 22 & Hoffman Road
2. 586th Avenue (CSAH 12) & Hoffman Road
3. CSAH 12 & 211th Lane

Peak hour turning movement counts were conducted at the above intersections and indicate the AM peak hour occurs at 7:15 AM to 8:15 AM, and the PM peak hour occurs at 4:45 PM to 5:45 PM.

SSTS analyzed intersection operations using *Synchro/Simtraffic, 11th Edition*, for the 2025 build-out year and for the 2045 planning horizon year. There are no improvement projects planned for the Study Area roadways and none were assumed for the no-build or build conditions.

Effects on Traffic and Roadways

The results of the analysis show that all intersections are expected to operate at acceptable LOS C or better for overall operations with manageable vehicle queues for both the 2025 No-Build and Build conditions. During the 2045 AM Peak hour for both the No-Build and Build conditions, the analysis indicates the intersection of TH 22 and Hoffman Road would be approaching capacity with long delays for some movements and long vehicle queues in the westbound direction. It is recommended that this intersection be monitored for potential future capacity improvements. All other studied intersections would operate acceptably.

c. Mitigation Measures

Identify measures that will be taken to minimize or mitigate project related transportationeffects.

No mitigation measures are required to accommodate site generated traffic. That said, if conditions deteriorate at the intersection of TH 22 and Hoffman Road by 2045, potential minimal improvements including protected permissive traffic signal phasing on the north and southbound approaches should be considered, and extension of the existing westbound right turn lane back to Coneflower Lane and conversion of the lane to a share through and right turn lane will provide adequate additional capacity.

21 Cumulative Potential Effects

a. Geographic Scales & Timeframes

Describe the geographic scales and timeframes of the project related environmental effects that could combine with other environmental effects resulting in cumulative potential effects.

It is estimated that the Proposed Project may take upwards of five to ten years to completely build out, depending on the development market. During this timeline, the City will promote sustainable practices to reduce impacts from other local and regional development.

b. Future Projects

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.

The City of Mankato will work closely with the County and area townships to determine any potential constraints or opportunities with regard to additional road or other improvements, or developments, in this area that may compound impacts identified within this EAW—especially during active construction. Zoning, as well as all permit and approval requirements, will be secured prior to construction of the Proposed Project.

c. Discussion/Summary of Cumulative Potential Effects

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.

Cumulative effects associated with the Proposed Project are essentially the effects of continued growth and development. This can have both positive and negative effects on the human and natural environment. The largest impact to this parcel is the loss of wildlife areas and an increase in impervious surfaces. Through responsible development and using best management practices, negative impacts can be minimized.

Future development within and near the Study Area is anticipated to generate more traffic, placing some additional pressure on the surrounding transportation systems. To account for this, continued transportation planning at the local and county levels is necessary to provide for the long-term development and anticipated growth in the City of Mankato.

Through the increase in traffic and impervious surfaces, and adding facilities with heating and cooling systems, there may be a minimal increase in greenhouse gas (GHG) emissions. It is unlikely this will grossly increase the regional impacts from climate change. Best management practices during the construction process, use of energy efficient building materials and appliances or other systems, and the addition of native landscape vegetation and tree species may help offset impacts from increased GHG emissions.

22 Other Potential Environmental Effects

If the project may cause any additional environmental effects not addressed by items 1 to 20, describe the effects here, discuss the how the environment will be affected, and identify measures that will be taken to minimize and mitigate these effects.

The Proposed Project is not anticipated to adversely affect any additional human or environmental elements not already addressed within this EAW document.

RGU CERTIFICATION

*The Environmental Quality Board will only accept **SIGNED** Environmental Assessment Worksheets for public notice in the EQB Monitor.*

I hereby certify that:

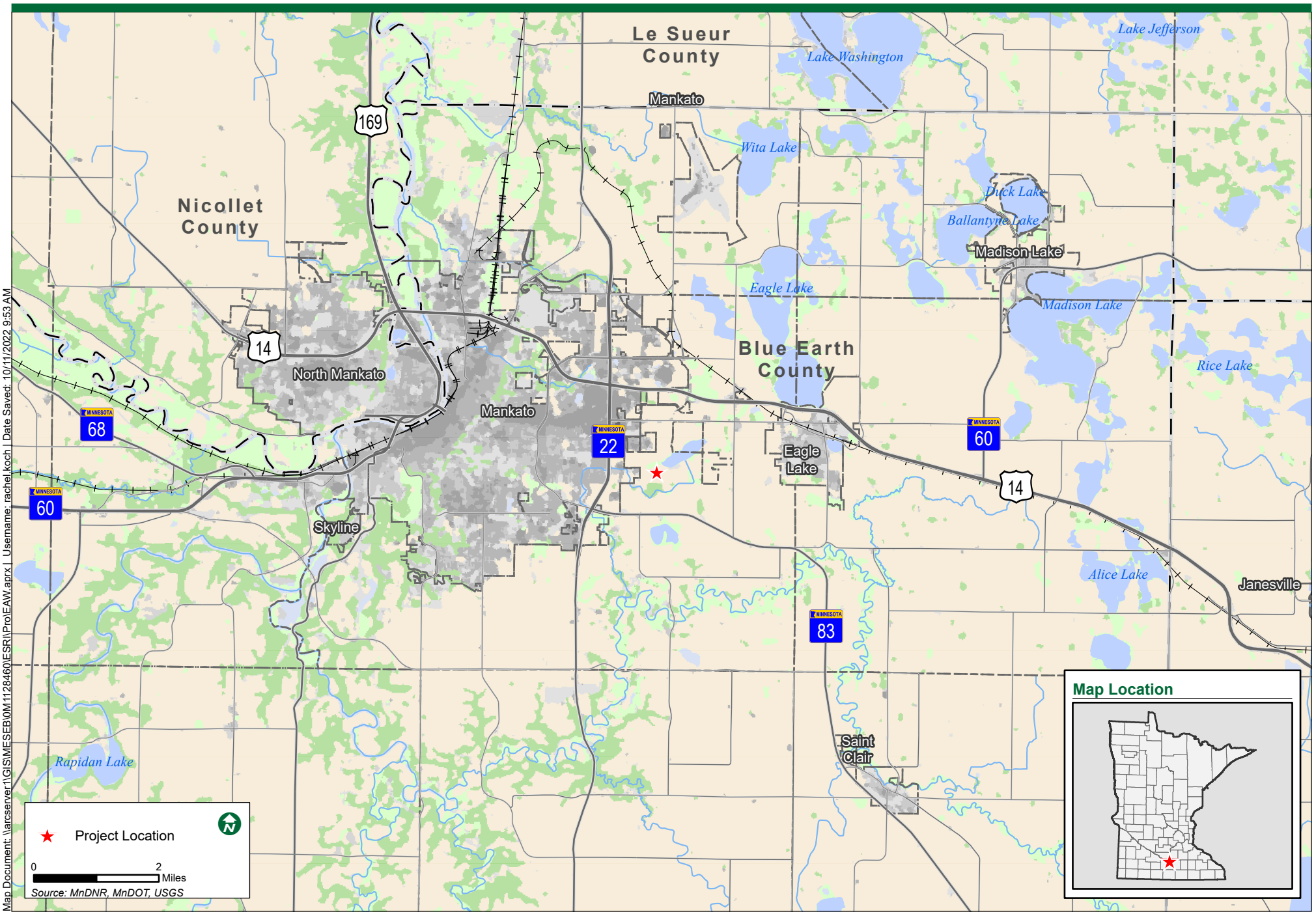
- The information contained in this document is accurate and complete to the best of my knowledge.
- The EAW describes the complete project; there are no other projects, stages or components other than those described in this document, which are related to the project as connected actions or phased actions, 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 Mark J. Kuz Date 1/27/23

Title Associate Director of Planning and Development Services

Appendix A: Figures

Figure 1: Regional Location



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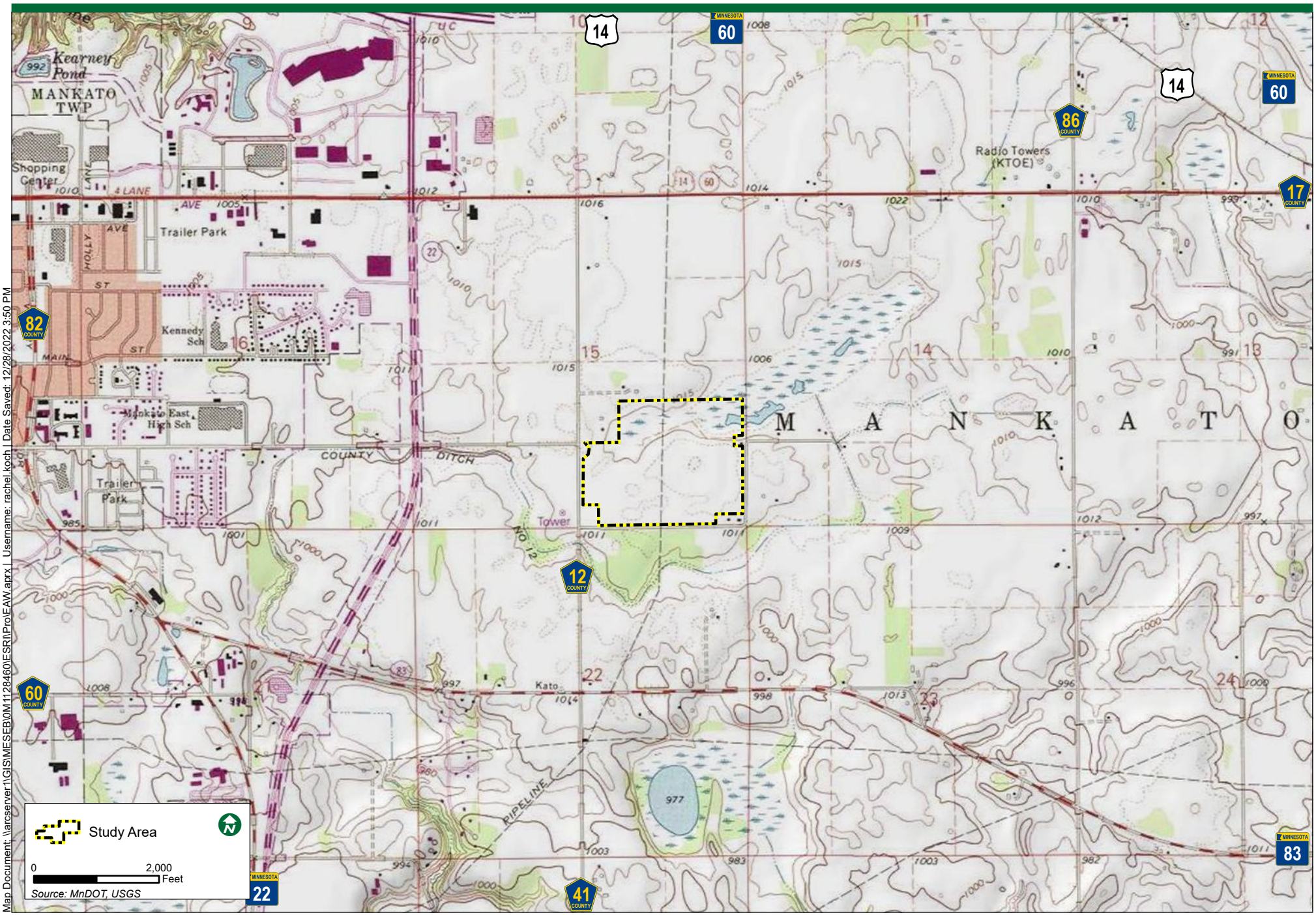

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Figure 3: Proposed Improvements

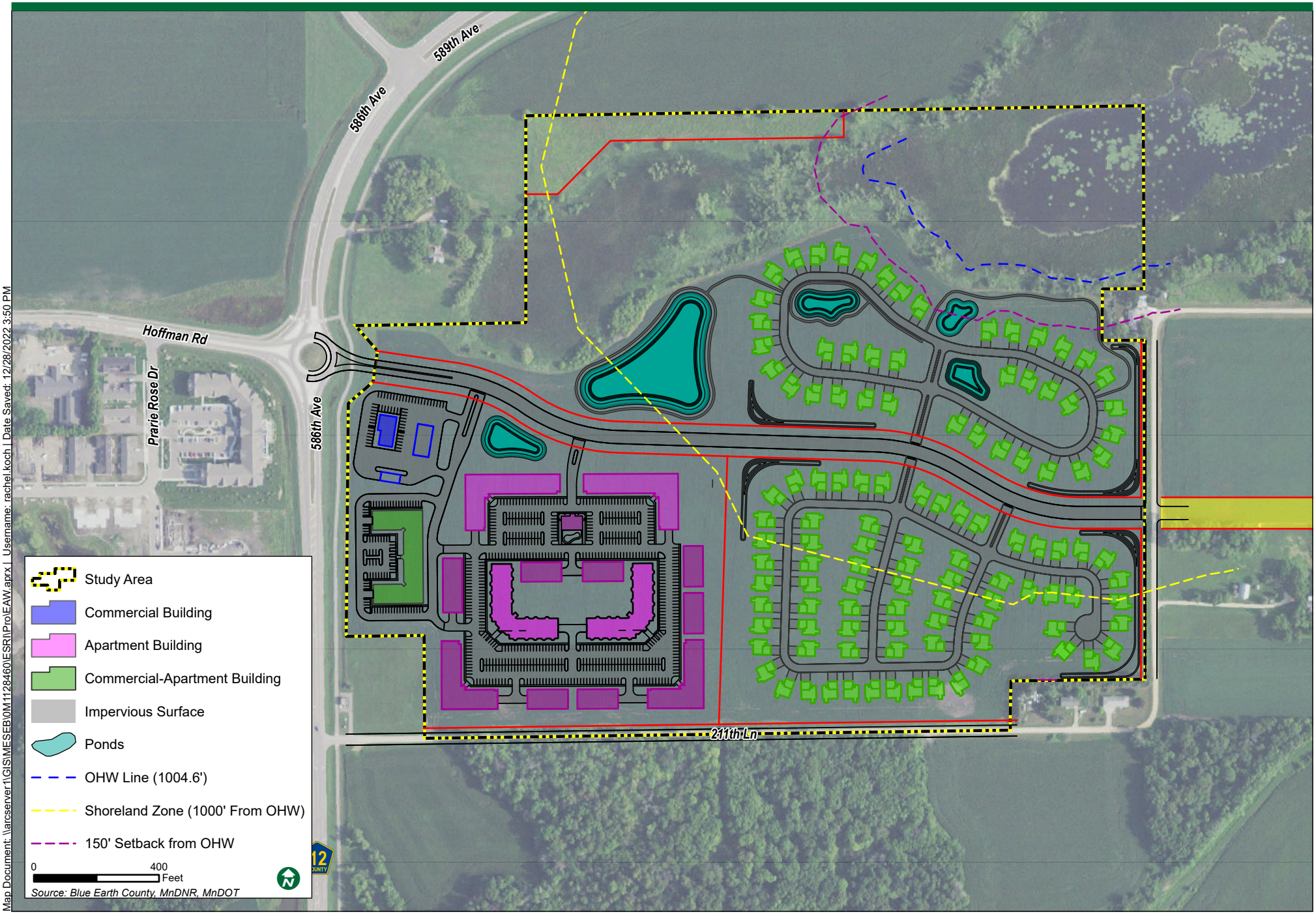

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Figure 4: Existing Land Cover

January 2023

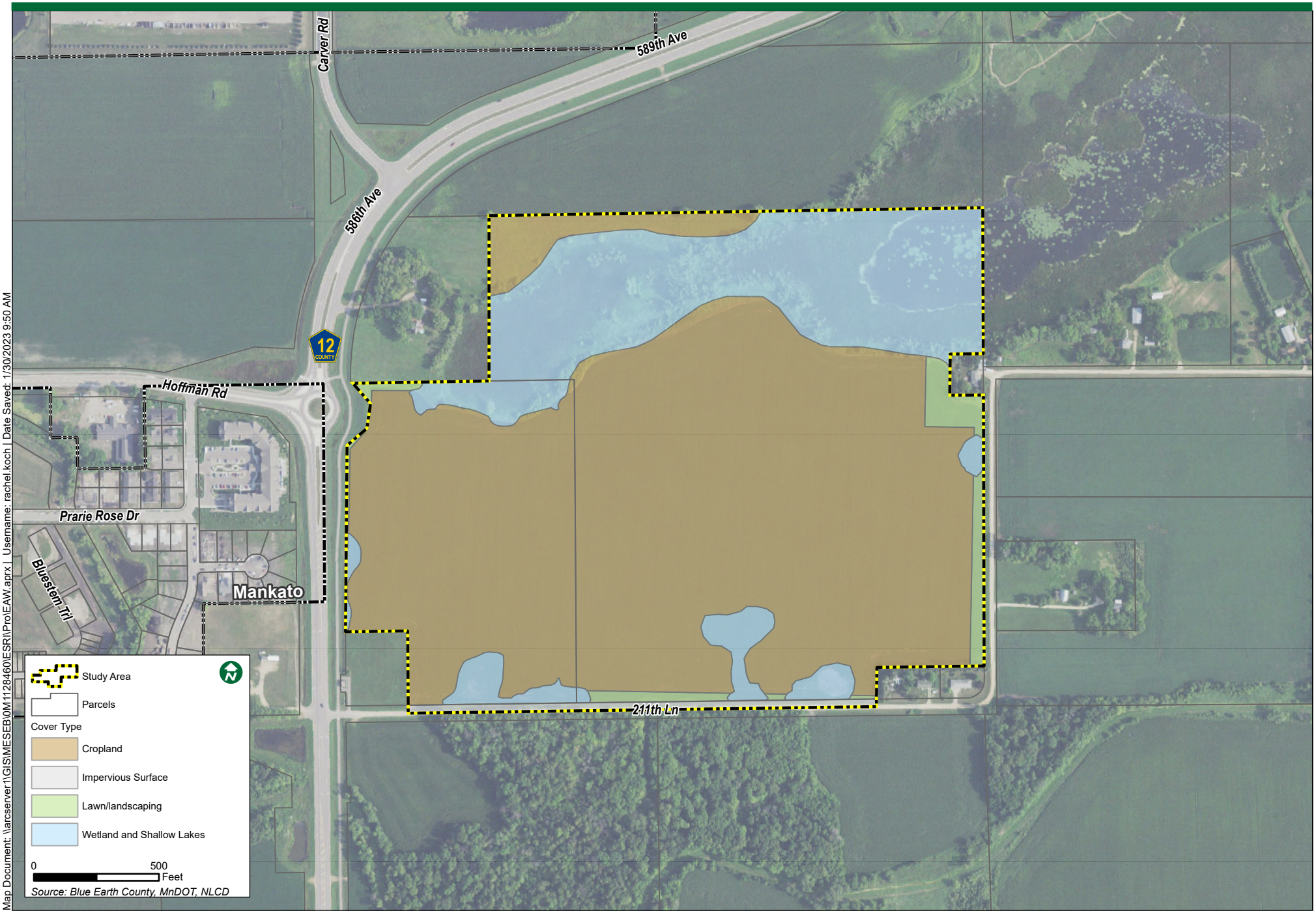

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Figure 5: Future Land Cover

January 2023

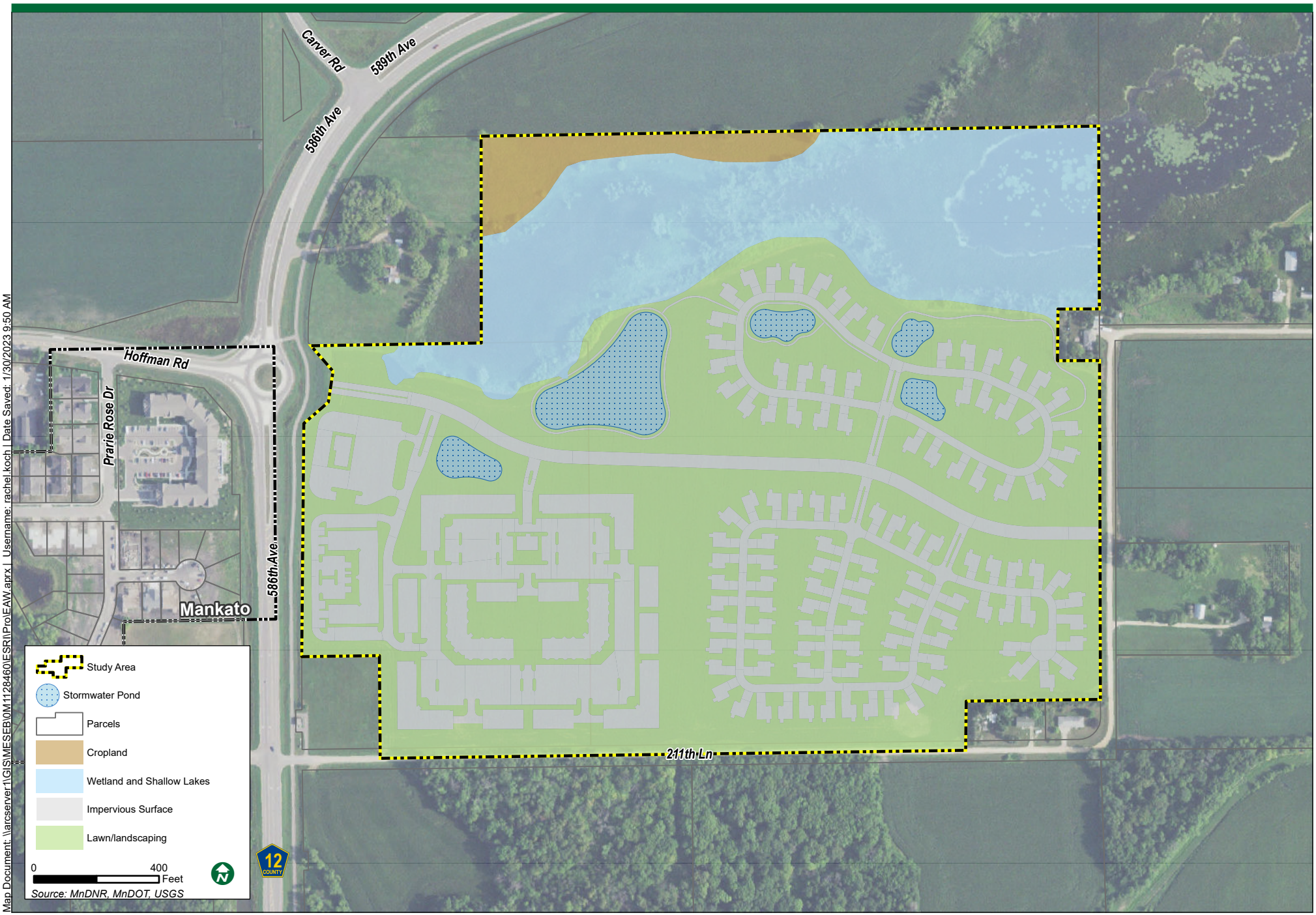

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Figure 6: Existing Land Use

December 2022

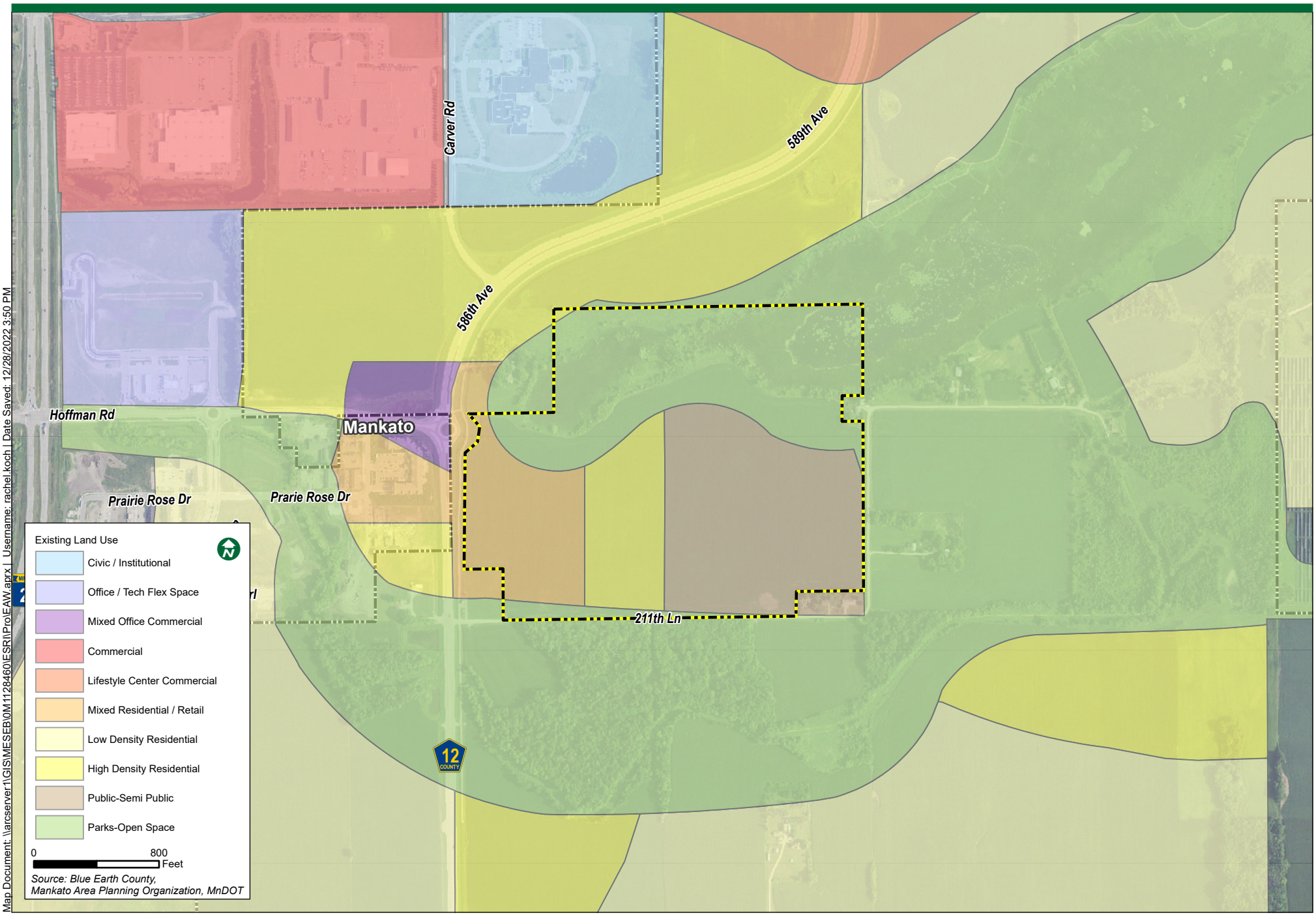

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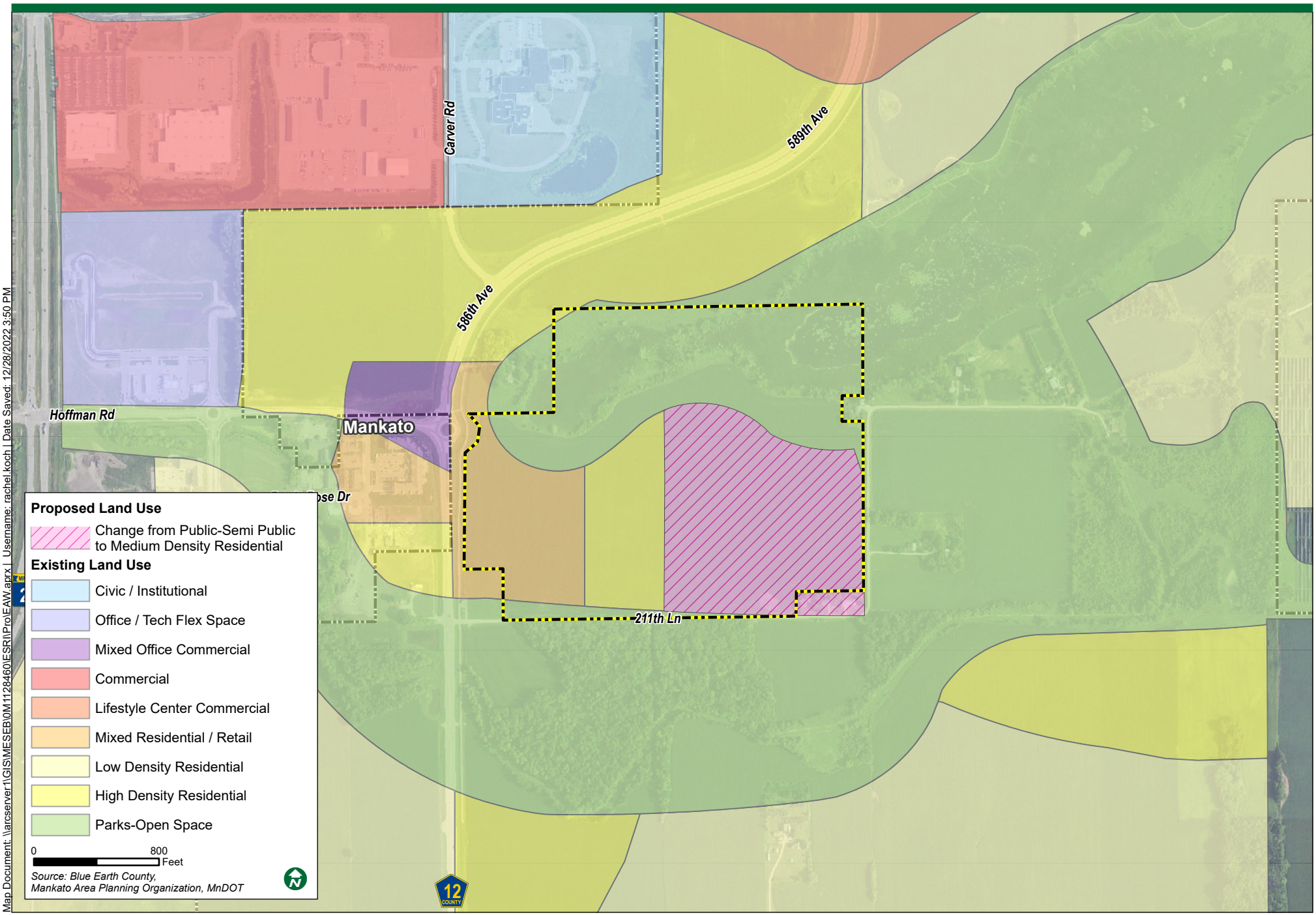
Figure 7: Proposed Land Use

December 2022



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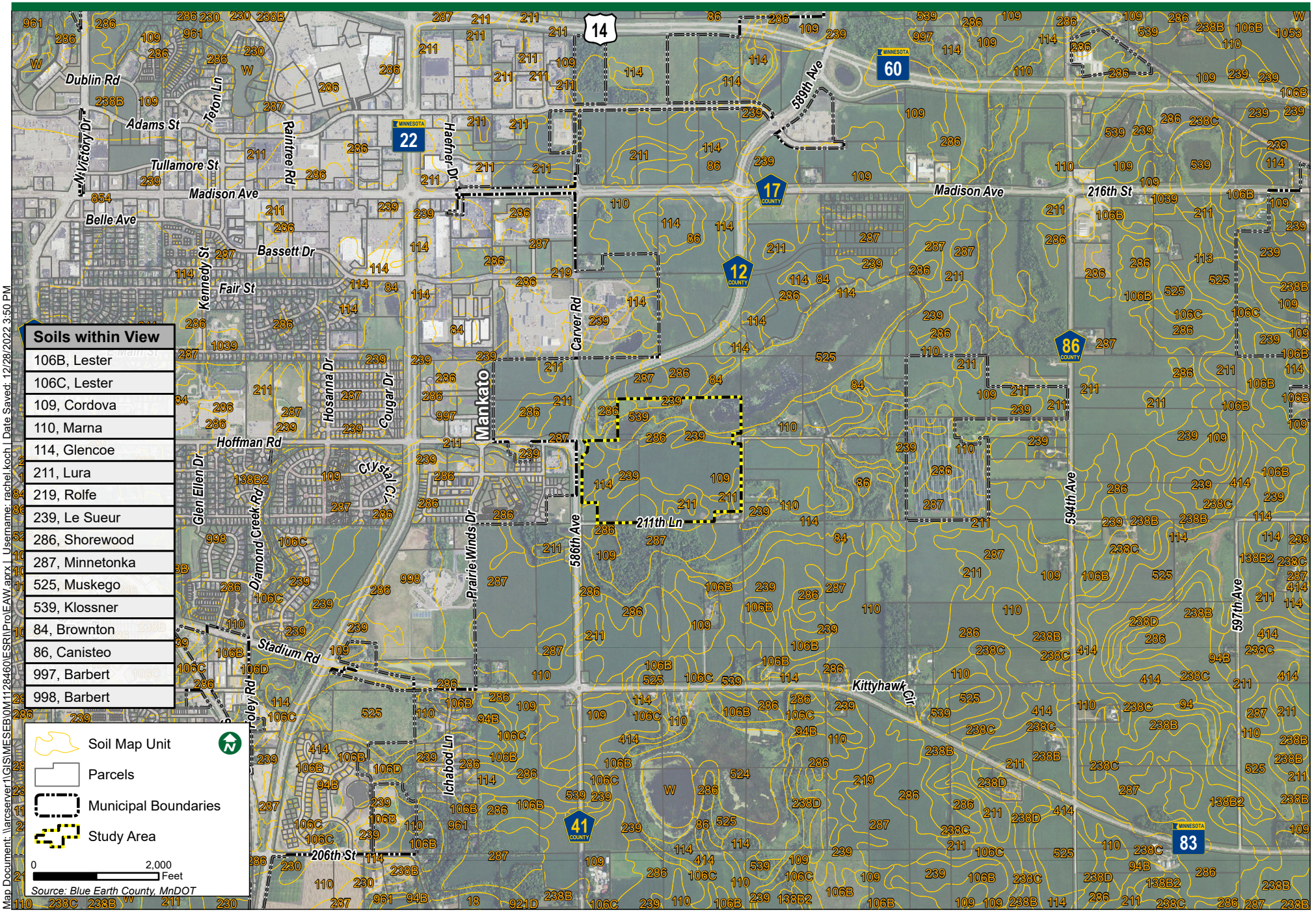

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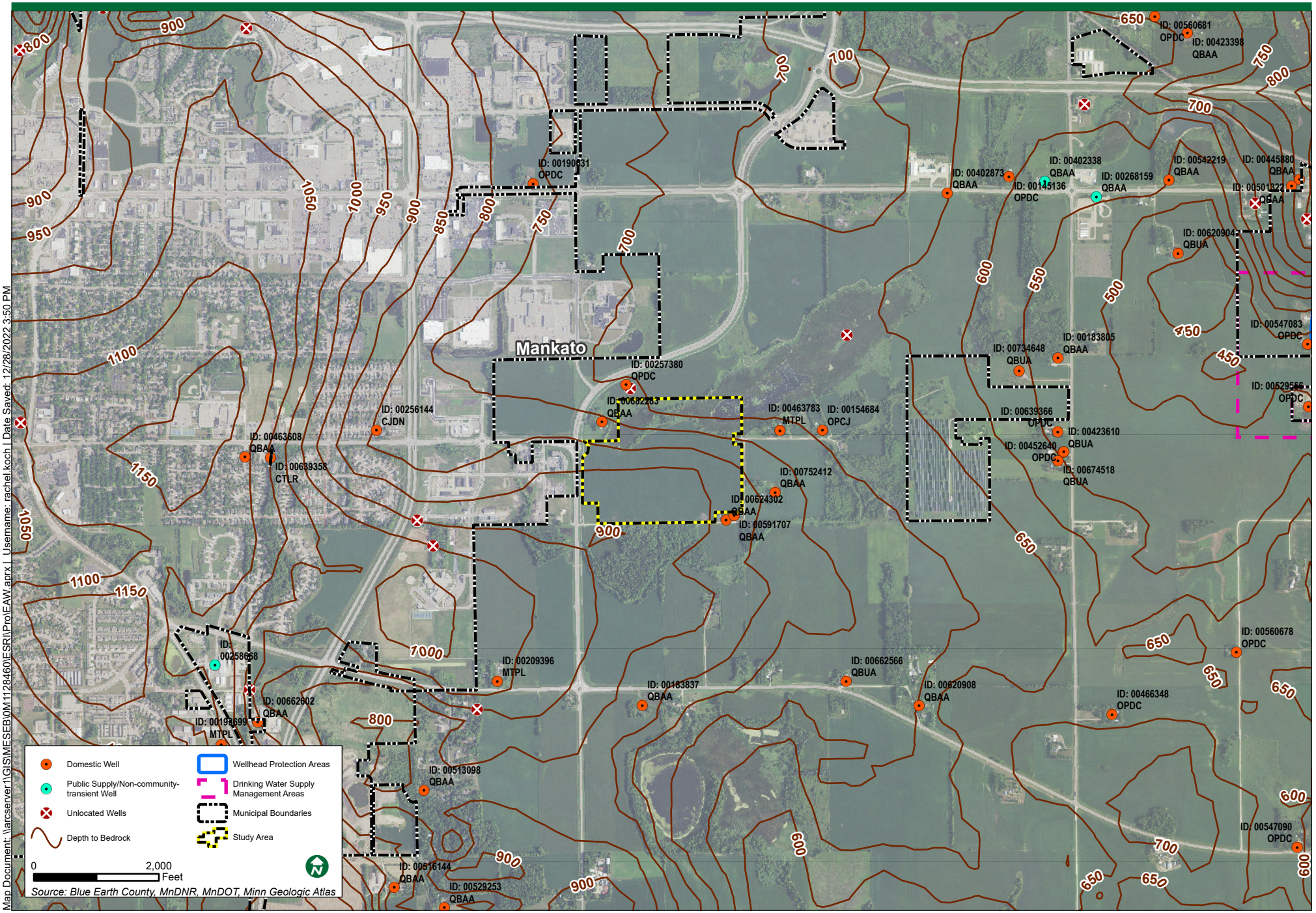

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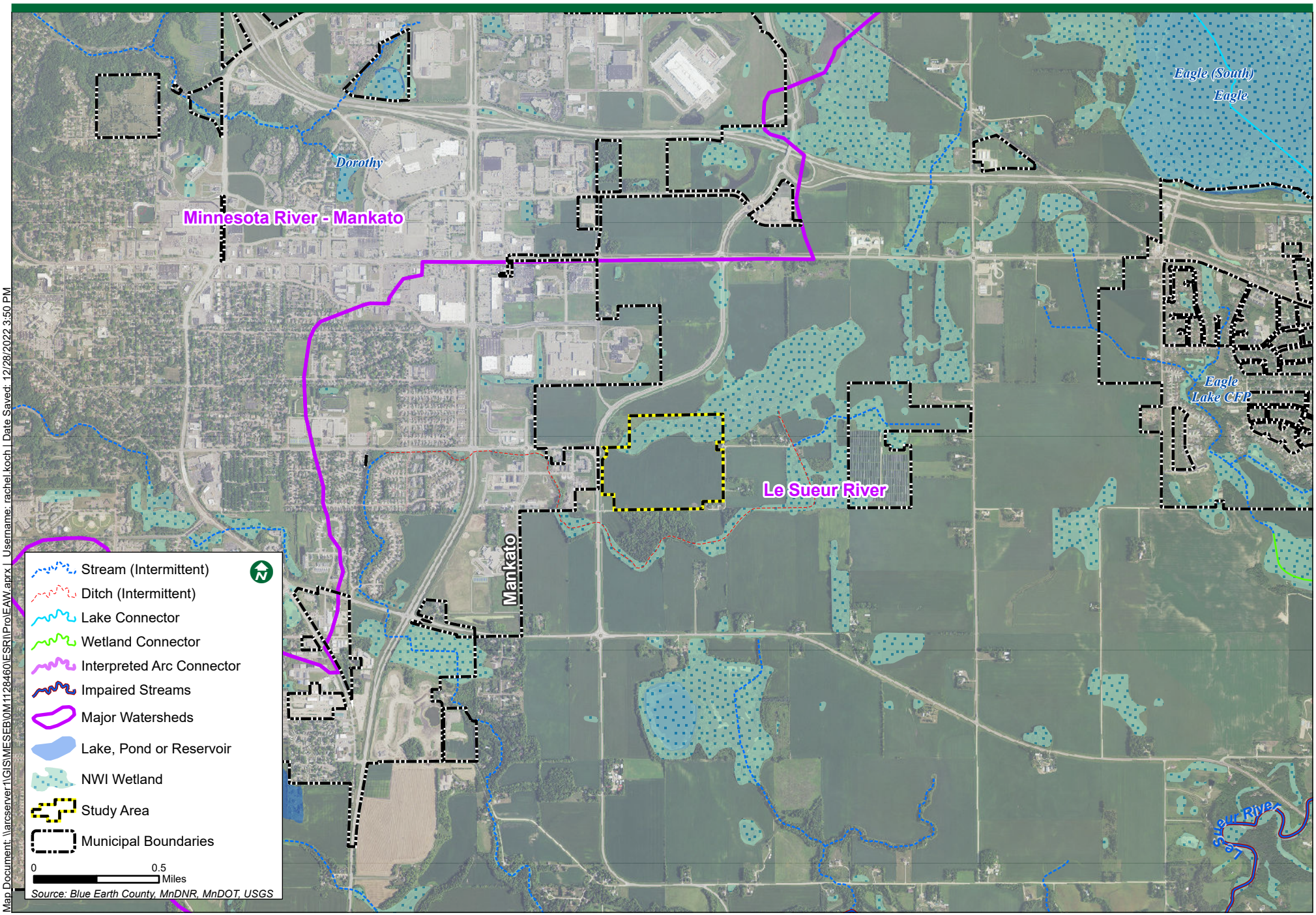

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Figure 11: Existing Drainage Patterns

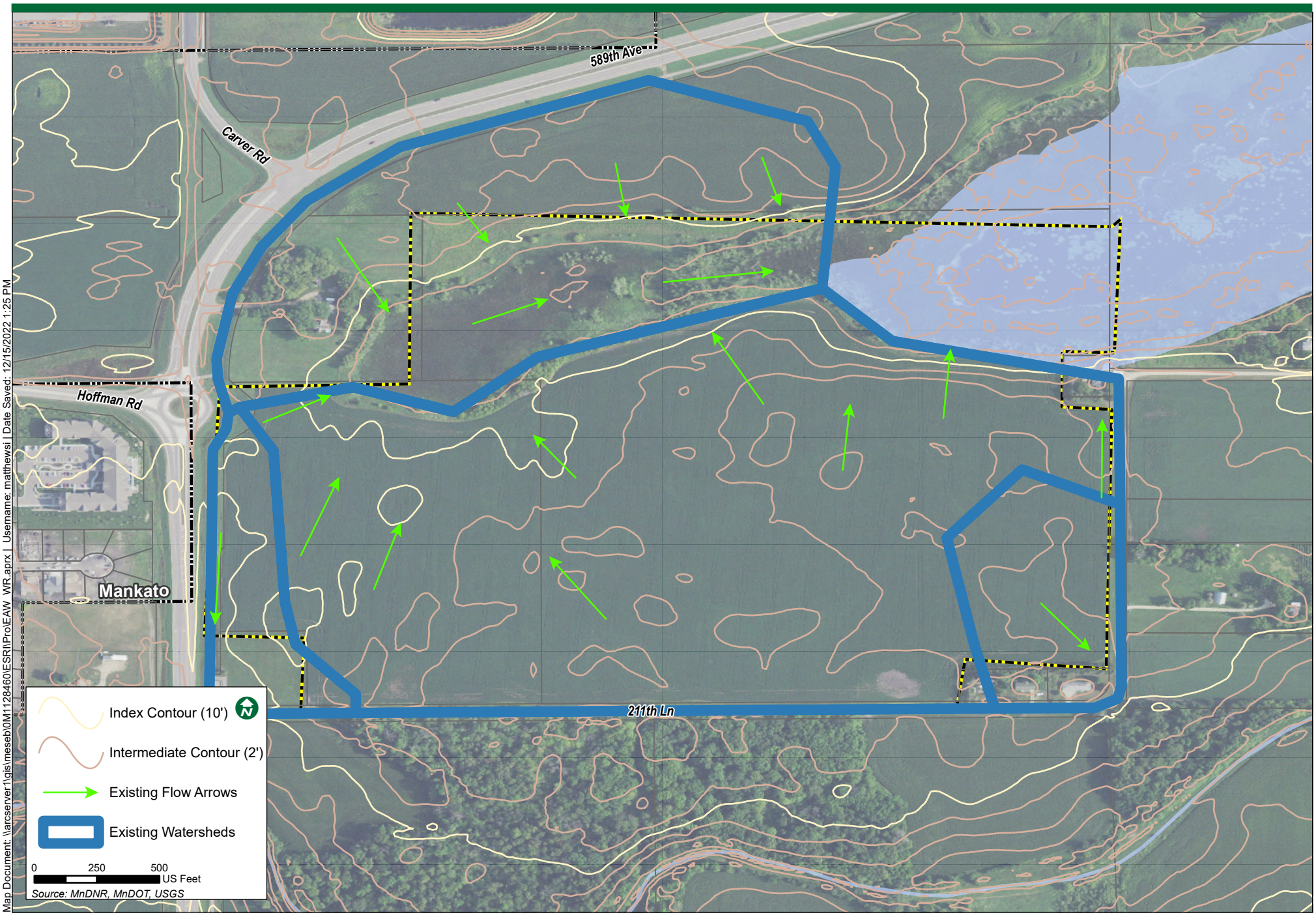

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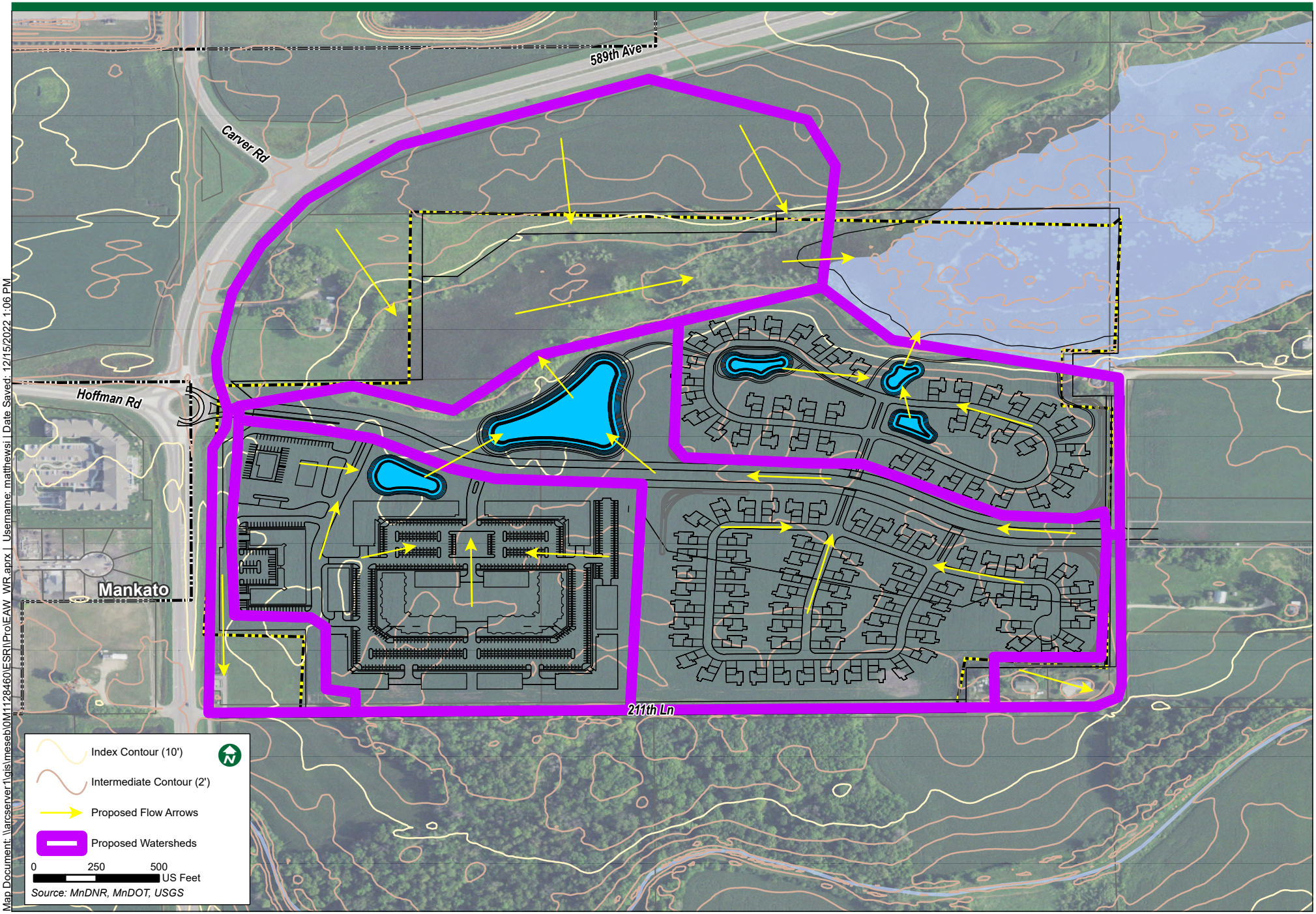
Figure 12: Proposed Drainage Patterns



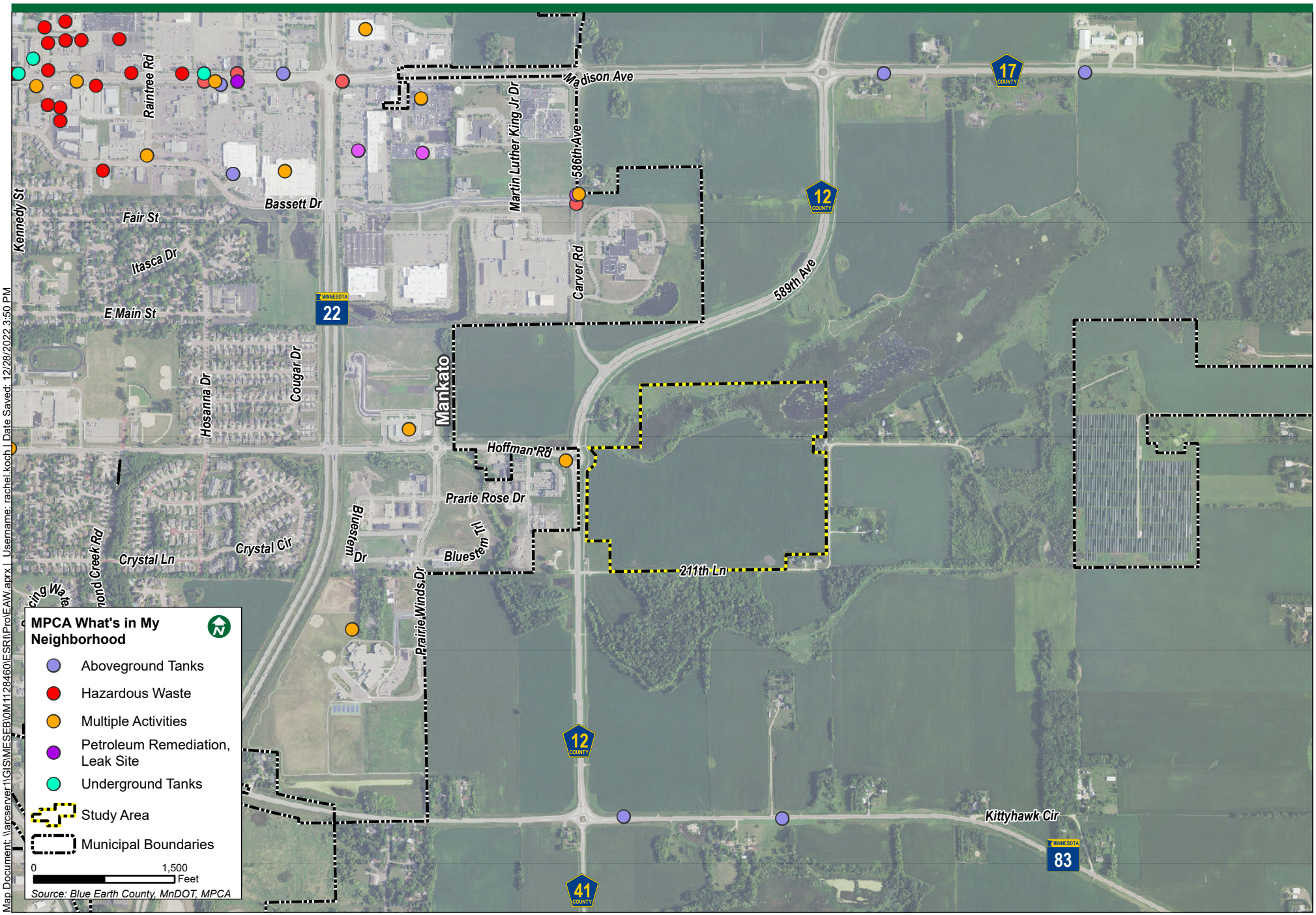


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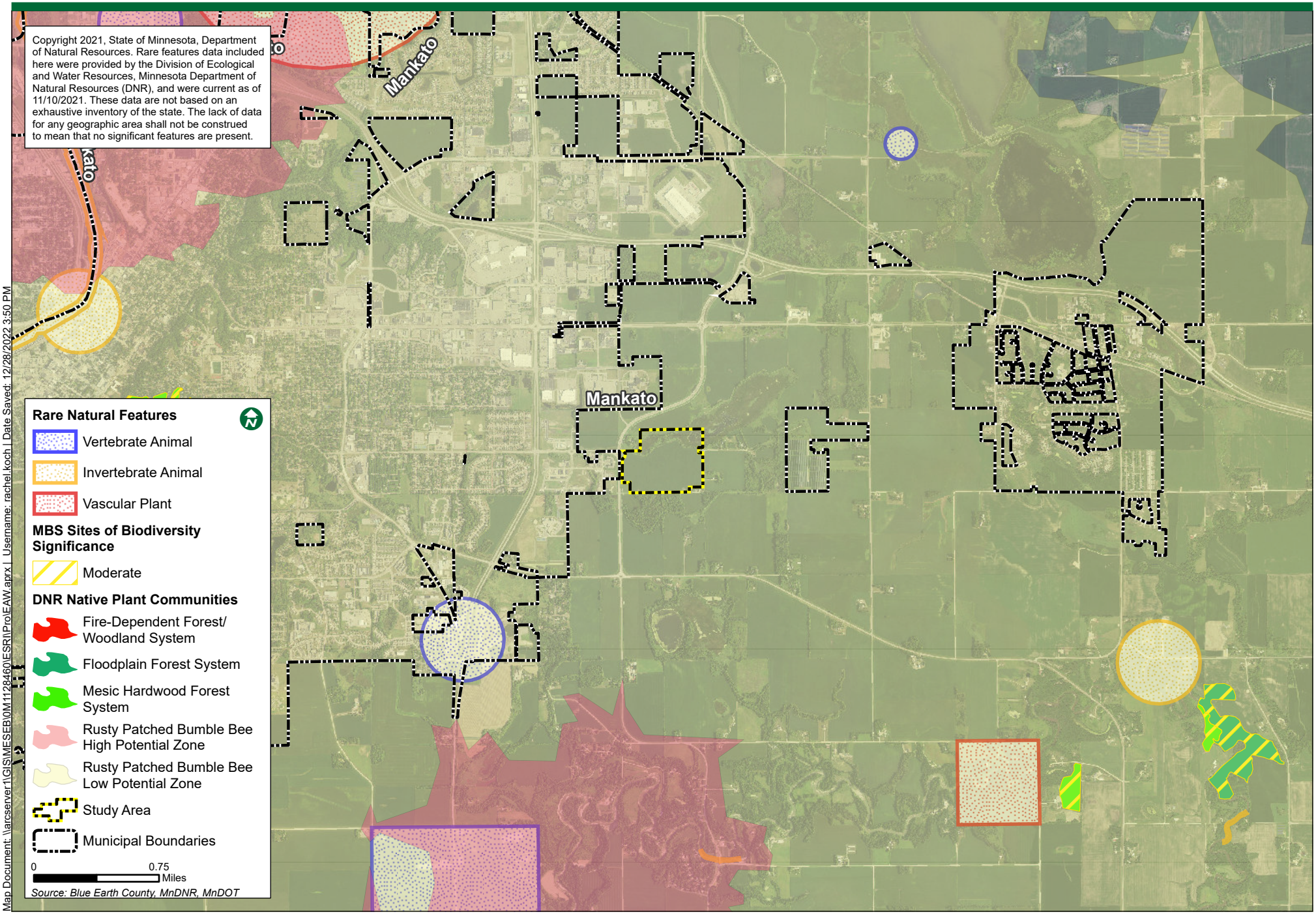
Figure 14: Biotic Resources

December 2022

BOLTON & MENK



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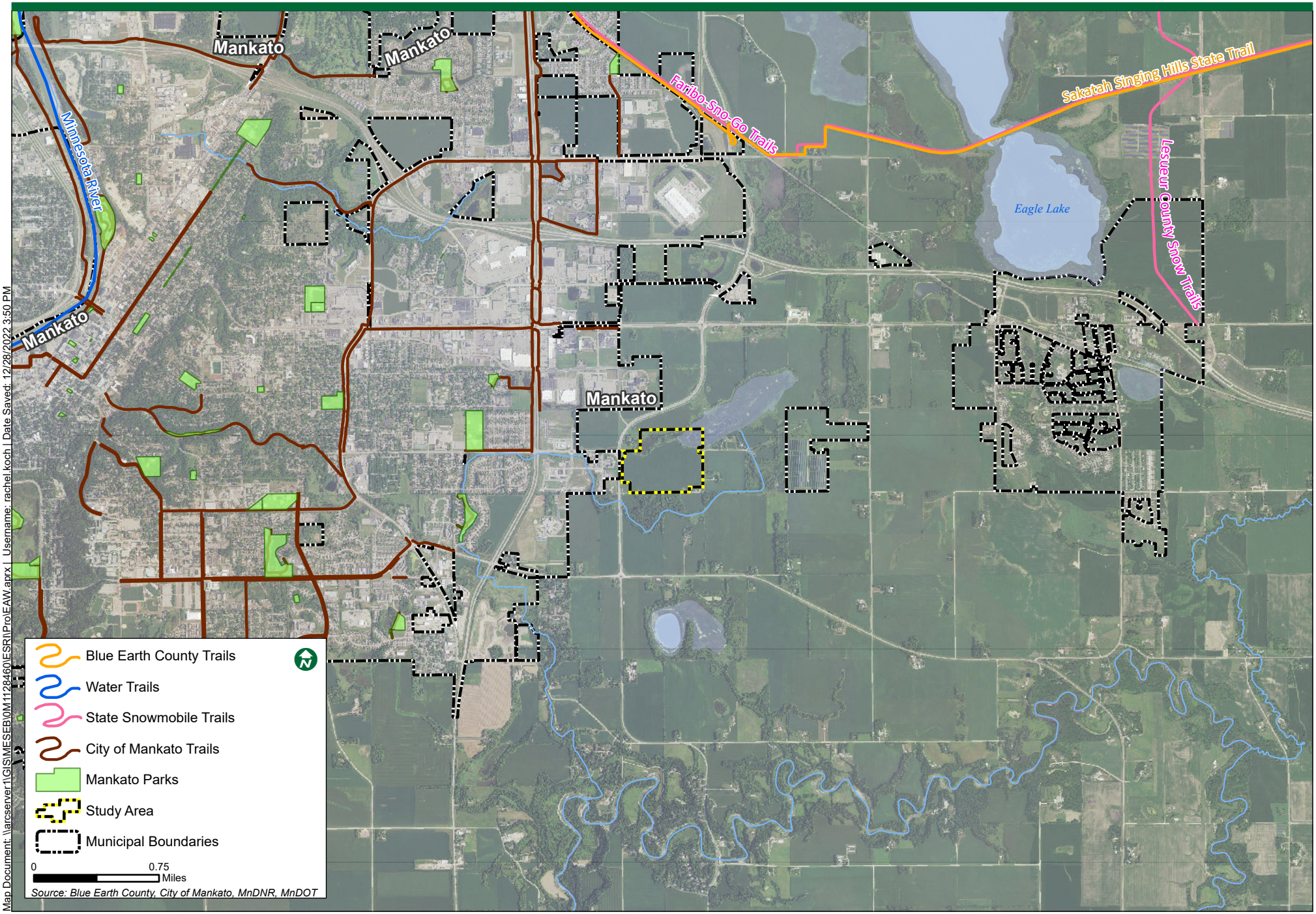

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Appendix B: Additional Assessments

Traffic Study Memorandum

SSTS
S² TRAFFIC SOLUTIONS

December 29, 2022

To: **John Mesenbrink, Mesenbrink Construction**

From: **Vernon Swing, PE**

Re: **Traffic Analysis – Mesenbrink Mixed Use, Mankato, MN**

Per your request, SSTS LLC has conducted a traffic study for the Mesenbrink Mixed Use Development (hereafter referred to as the Proposed Project) located on the east side of 586th Ave (CSAH 12) at Hoffman Rd in Mankato, MN. This traffic study reflects the anticipated development of 112 single family homes, 713 mid-rise multi-family units, 6,250 sq ft (6.25 K-sf) of retail/shopping center and a 4.7 K-sf convenience/gas station and assumes completion of the development by the 2025 design year. The Proposed Project will be accessed via an extension of Hoffman Dr from the roundabout at CSAH 12 to the east, and from 211th Ln. **Figure 1**, Vicinity Map, depicts the location. **Figure 2**, Site Plan, illustrates the site layout and access locations.

The study area for this memorandum includes the intersections listed below, and the study focuses on the traffic operations during the 2025 Design year and 2045 Planning Horizon Year with and without the Proposed Project.

- Hoffman Rd & TH 22
- Hoffman Rd & CSAH 12
- CSAH 12 & 211th Ln

The existing AM and PM peak hour traffic conditions were documented through new turning movement traffic counts at the listed intersections. Further, forecasts were developed for the 2025 traffic conditions and 2045 traffic conditions at these intersections without the development, and forecasts of the trip generation potential for the proposed land uses and distribution of these trips through the study area are documented.

Existing Conditions

The existing conditions of the roadways and intersection providing direct and indirect access to the Proposed Project were documented and are noted in **Table 1** (the descriptions reflect conditions adjacent to the site). Additionally, **Figure 3** shows the existing lane geometry and traffic control at the study intersections.

Table 1. Study Roadway Characteristics

Roadway	Functional Class	Typical Section	Posted Speed	AADT (Year)
TH 22	Principal Arterial	4-Lane Divided Rural	45 mph	18,859 (2021) (MnDOT)
Hoffman Rd	Major Collector	2-Lane Undivided Urban	30 mph	1,800 (2020) (MAPO)
CSAH 12	Major Collector	2-Lane Undivided Rural	45 mph	4,000 (2022) (Counts)
211th Ln	Local Street	2-Lane Undivided Rural	30 mph	N/A

Existing Traffic Volumes

AM and PM peak hour turning movement counts were conducted at the study area intersections on Thursday August 25, 2022, and on Thursday September 8, 2022. The following notes the peak hour timeframes:

- AM: 7:15 AM to 8:15 AM
- PM: 4:45 PM to 5:45 PM

Figure 4 illustrates the existing peak hour traffic volumes.

Future Conditions

To quantify the impacts of a development on the surrounding roadway system, it is necessary to first forecast and analyze traffic conditions that would be present on the roadway system without the inclusion of the proposed project. For this study, it is anticipated that the Proposed Project will be completed by 2025, thus year 2025 was selected for analysis, and again forecasts have been completed for the year 2045 to be consistent with the Planning Year Horizon. Review of the MAPO 2045 Transportation Plan indicates that traffic on TH 22 will grow at a rate of approximately 1.4 percent per year, traffic on Hoffman Rd will grow at approximately 1.1 percent per year, and traffic on CSAH 12 will grow at a rate of 6.4 percent per year. It is important to consider that these growth forecasts reflect the inclusion of development of this property, with approximately the same site usage. This analysis utilized the 1.4 percent growth in background traffic on both TH 22 and Hoffman Rd, and the 6.4 percent growth rate on CSAH 12. This will present a conservative analysis of the Build conditions as by 2045 the background numbers with the forecast growth will include development of the parcel, thus the results of the 2045 No-Build will essentially reflect the MAPO Build forecast for the subject property, and the Build results, as presented, are a worst case. **Figure 5** illustrates the No-Build traffic volumes for year 2025, and **Figure 6** illustrates the 2045 No-Build traffic volumes, with the growth applied to existing traffic volumes.

Trip Generation and Distribution

The trip generation estimates reflect the land uses discussed for the Proposed Project including 112 single family homes, 713 multi-family units, 6.25 K-sf of retail shopping, and a 4.7 K-sf Convenience/Gas Station. The volume of vehicle trips generated by the Proposed Project has been estimated for the weekday AM and PM peak hours and on a daily basis using the data methodology described in the Institute of Transportation Engineers' ***Trip Generation Manual*** [1]**,** 11th Edition. ITE's Land Use Codes corresponding to proposed uses are Single Family Homes 210, Mid-Rise Multi-Family 221, Retail Shopping Less than 40 K-sf 822, and Convenience Store/Gas Station 845. Table 2 summarizes the trip generation estimate for the Proposed Project.

[1] **Trip Generation Manual**, Institute of Transportation Engineers (ITE), 11th Edition

Table 2 - Trip Generation

Land Use	Type	Block No.	Land Use Code	Size	Trips Generated: AM peak Enter	AM peak Exit	PM Peak Enter	PM Peak Exit	Weekday ADT
Mid-Rise Apartment/Suburban	Residential	1	221	713 units	62	195	170	108	3,237
Single Family Housing	Residential	1	210	113 units	21	59	67	39	1,066
Shopping Center	Retail	2	822	6,250 s.f.	9	6	21	21	343
Convenience Store/Gas Station	Retail	2	945	16 fuel pos.	216	216	182	182	4,114
Totals - Gross					307	476	439	350	8,760
					783		790		
Shared Trips					31	48	44	35	876
					78		79		
Pass-By Trips					164	164	147	147	3,154
					328		293		
Totals - Net*					**112**	**264**	**249**	**169**	**4,730**
					376		**417**		

Further, the ITE Trip Generation Handbook, 3rd Edition, outlines a procedure to account for shared trips and pass-by trips within a proposed development which is reflected in Table 2. Shared trips are trips that visit more than one use within a multi-use development. For example, a resident of an apartment may also be a patron of a retail shop within a development and would not generate a new trip to visit the retail shop. ITE suggests between 10 and 40 percent of the traffic destined to retail from residential and visa versa can occur based on time of day. This analysis assumes 10 percent of the site traffic will be shared. Pass-by trips are those trips already using the adjacent roadway and enter the site as an intermediate stop on their way to another destination. The pass-by trips are not generated by the land use under study, and thus, are not new trips added to the network but are trips using the site accesses. The proposed retail uses within the Proposed Project are estimated to generate a larger amount of pass-by vehicle traffic than is realistic for this area as the roadways currently have lower volumes than the estimated pass-by trips. In order to be more accurate yet conservative in terms of traffic impacts, the traffic analysis does not assume any pass-by traffic at the intersections of CSAH 12 with Hoffman Rd and with 211th Ln. (This assumption is quite conservative when considering conditions in 2045 when the forecast traffic passing the site will be greater.) Table 3 reflects the trip generation for the Proposed Project without pass-by traffic that has been analyzed for this report.

Table 3 - Trip Generation w/o Pass-By

Land Use	Type	Block No.	Land Use Code	Size	Trips Generated: AM peak Enter	AM peak Exit	PM Peak Enter	PM Peak Exit	Weekday ADT
Mid-Rise Apartment/Suburban	Residential	1	221	713 units	62	195	170	108	3,237
Single Family Housing	Residential	1	210	112 units	20	58	66	39	1,056
Shopping Center	Retail	2	822	6,250 s.f.	9	6	21	21	343
Convenience Store/Gas Station	Retail	2	945	16 fuel pos.	216	216	182	182	4,114
Totals - Gross					307	475	439	350	8,751
					782		789		
Shared Trips					31	48	44	35	875
					78		79		
Pass-By Trips					0	0	0	0	0
					0		0		
Totals - Net*					**276**	**428**	**395**	**315**	**7,876**
					704		**710**		

As shown in Table 3, the Proposed Project will generate 704 trips (276 entering and 428 exiting) during the morning traffic peak hour, 710 trips (395 entering and 315 exiting) during the evening traffic peak hour and 7,876 daily trips.

The new trips have been assigned to the surrounding roadways according to the existing traffic patterns, and according to travel time forecasts from Apple Maps, and Google Maps. The distribution is consistent

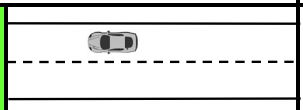
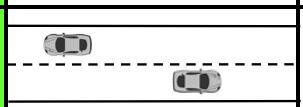
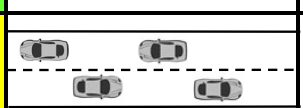
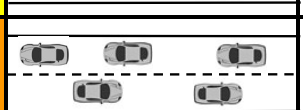
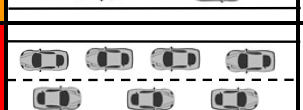
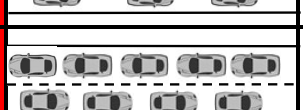
with the MAPO 2045 Plan and reflects the shortest travel time trips paths to destinations along Madison Avenue, Mankato State University, downtown Mankato, North Mankato, or outside the area. In general, the site traffic is distributed to the study area as follows:

- To/from the north 46 percent
- To/from the west 27 percent
- To/from the south 27 percent

Figure 7 illustrates the trip assignment. **Figures 8 & 9** illustrates the 2025 and 2045 Build conditions, respectively, by combining No-Build traffic with the trip assignment volumes.

Traffic Operations

The operating conditions of transportation facilities, such as roadways, traffic signals, roundabouts and stop-controlled intersections, are evaluated based on the relationship of the theoretical capacity of a facility to the actual traffic volume on that facility. Various factors affect capacity including travel speed, roadway geometry, grade, number of travel lanes, and intersection control. The current standards for evaluating capacity and operating conditions are contained in ***Highway Capacity Manual***[2]. The procedures describe operating conditions in terms of driver delay represented as a Level of Service (LOS). Operations are given letter designations with "A" representing the best operating conditions and "F" representing the worst. Generally, level of service "D" represents the threshold for acceptable overall intersection operating conditions during a peak hour. The Chart on the following page summarizes the level of service and delay criteria for signalized and unsignalized intersections.

Level of Service		Description	Delay (sec)	
			Signalized	Unsignalized/ Roundabout
A		Primarily free-flow operation.	0-10	0-10
B		Reasonably unimpeded operation.	>10-20	>10-15
C		Stable operation. The ability to maneuver is more restricted than LOS B.	>20-35	>15-25
D		Less stable operation. Small increases in flow may cause large increases in delay and reduced speeds.	>35-55	>25-35
E		Unstable operation. Low speeds and considerable delay.	>55-80	>35-50
F		Congested operation. High delay and extensive queuing.	>80	>50

For side street stop-controlled intersections special emphasis is given to providing an estimate for the level of service of the minor approaches. Traffic operations at an unsignalized intersection with side street stop-

[2] **Highway Capacity Manual (HCM),** Transportation Research Board, 6th Edition

control can be described two ways. First, consideration is given to the overall intersection level of service. This takes into account the total number of vehicles entering the intersection and the capability of the intersection to support these volumes. Second, it is important to consider the delay on the minor approaches, since the mainline does not have to stop. It is common for intersections with higher mainline traffic volumes to experience increased levels of delay and poor level of service on the side streets.

A final fundamental component of operational analyses is a study of vehicular queuing, or the line of vehicles waiting to pass through an intersection. An intersection can operate with an acceptable Level of Service, but if queues from the intersection extend back to block entrances to turn lanes or accesses to adjacent land uses, unsafe operating conditions could result. In this report, the Industry Design Standard 95th percentile queue length is used. The 95th Percentile Queue Length refers to that length of vehicle queue that has only a five-percent probability of occurring during an analysis hour.

This study has utilized the industry current Synchro/SimTraffic software package (11th Edition) to analyze the 2025 and 2045 No-Build and Build conditions for the AM and PM peak hours. It is noted, the reported results for the non-roundabout intersections are from the aggregate of 10 SimTraffic simulations which use a random number generator to seed the network with vehicles. These results reflect dynamic conditions and are more accurate for the non-roundabout intersections than the results of the static analysis reported by Synchro. Due to the random number generator results can sometimes show slightly better operations on minor movements under higher traffic conditions when the intersections are operating well. This can be seen when delays and queues noted in the Build Scenario are slightly less than the No-Build Scenarios. The results from the roundabout analysis are from the Synchro analysis which uses the methods developed for SIDRA (as adopted by the FHWA).

Analysis Results

Tables 4 summarizes the results of the operational analysis for the 2025 No-Build and Build Conditions. Note the 2025 No-Build and Build operations reflect the additional traffic associated with the annual growth rate applied to existing traffic volumes. Additionally, the Build operations include the net new traffic forecast for the Proposed Project.

Table 4
2025 No-Build and Build Traffic Operations

Intersection	Measure of Effectiveness (Delay in Sec and Queue in Ft)				
	Criteria	2025 No-Build		2025 Build	
		AM Pk Hr	PM Pk Hr	AM Pk Hr	PM Pk Hr
TH 22 & Hoffman Rd (Signal)	*Overall LOS & Delay*	C 22.0	C 20.1	C 24.6	C 21.6
	Worst Mvmt. LOS & Delay	D 44.1 (NBL)	D 54.7 (NBL)	D 42.5 (NBL)	D 41.3 (SBL)
	95th Percentile Queue	WBT - 378'	SBL - 198'	WBT - 374'	SBT - 238'
CSAH 12 & Hoffman Rd (RaB)	*Overall LOS & Delay*	A 2.8	A 2.7	A 4.2	A 4.3
	Worst Mvmt. LOS & Delay	A 4.2 (NB)	A 3.9 (NB)	A 4.4 (WB)	A 5.6 (EB)
	95th Percentile Queue	NB - 18'	NONE	EB - 20'	EB - 22'
TH 3 & TH 149 (Stop Control)	*Overall LOS & Delay*	A 0.4	A 0.2	A 1.2	A 1.0
	Worst Mvmt. LOS & Delay	A 2.4 (WB)	A 1.7 (WB)	A 7.1 (WB)	A 5.7 (WB)
	95th Percentile Queue	WB - 21'	SBL - 9'	WB - 46'	WB - 29'

The results shown in Table 4 indicate the 2025 No-Build operations of the study area intersections are acceptable with LOS C or better for overall operations, and acceptable operations for directional and individual travel lane operations, with manageable vehicle queuing. Further, the results in Table 4 indicate the 2025 Build overall operations and travel lane operations of the study area intersections and site access

are the same with acceptable LOS C or better for overall operations and acceptable operations for directional and individual travel lane operations, with manageable vehicle queuing. It is noted the westbound queue in the AM Peak for both scenarios does block the access to the turn lanes, however, the SimTraffic simulation shows these queues clear each cycle. These results suggest that no roadway improvements beyond the construction of Hoffman Rd to the east of CSAH 12 are required to accommodate the forecast traffic from the development, but the westbound approach to TH 22 should be monitored for future extension of the right turn lane.

Table 5
2045 No-Build and Build Traffic Operations

Intersection	Measure of Effectiveness (Delay in Sec and Queue in Ft)				
	Criteria	2045 No-Build		2045 Build	
		AM Pk Hr	PM Pk Hr	AM Pk Hr	PM Pk Hr
TH 22 & Hoffman Rd (Signal)	*Overall LOS & Delay*	C 31.1	C 22.6	D 40.9	C 29.5
	Worst Mvmt. LOS & Delay	E 63.6 (SBL)	D 44.6 (SBL)	E 78.4 (SBL)	D 43.2 (NBL)
	95th Percentile Queue	WB - 665'	SBT - 279'	WBT 786'	SBT 368'
CSAH 12 & Hoffman Rd (RaB)	*Overall LOS & Delay*	A 5.8	A 5.2	A 9.2	A 9.4
	Worst Mvmt. LOS & Delay	A 9.1 (NB)	A 7.5 (NB)	B 14.3 (NB)	B 11.3 (NB)
	95th Percentile Queue	NB - 62'	NB - 48'	NB - 130'	SB - 128'
TH 3 & TH 149 (Stop Control)	*Overall LOS & Delay*	A 1.1	A 0.9	A 2.4	A 2.4
	Worst Mvmt. LOS & Delay	A 3.4 (WB)	A 2.5 (WB)	C 24.6 (WB)	C 15.9 (WB)
	95th Percentile Queue	WB - 20'	SBL - 26'	WB - 49'	WB 29'

The results shown in Table 5 indicate the AM Peak 2045 No-Build and Build operations at the intersection of TH 22 and Hoffman Rd is approaching capacity, with poor operations for the southbound left turning movement and long vehicle queues on the westbound Hoffman Rd approach. The other study area intersections are operating at LOS A, with minor movements at level of service C or better for both the No-Build and Build conditions.

As stated earlier, this analysis includes background growth based on MAPO forecasts that include the development of the subject property and includes site traffic that has not been adjusted to reflect pass-by conditions. That said, if necessary, by 2045, review of mitigation strategies suggest that to improve the traffic operations at the intersection of TH 22 and Hoffman Rd, the traffic signal operations on TH 22 need to include protected/permissive phasing for the north and southbound left turning traffic, and the westbound approach should be modified to provide two through lanes, the right most lane serving as a share through and right. This extra through lane should extend to the intersection of Hoffman Rd and Coneflower Ln. This change will result in overall 2045 AM Peak Build operations at the TH 22 intersection of LOS D (37.2 sec of delay) and worst movement operations for the westbound left at LOS D (53.2 sec of delay), and will reduce the queue on the westbound approach to a manageable 418 feet.

Summary and Conclusions

The following provides a summary of the study, traffic operations and recommendations:

- AM and PM peak hour traffic operations were analyzed for the 2025 and 2045 conditions without and with the Proposed Project.
- The Proposed Project will generate 704 trips (276 entering and 428 exiting) during the morning traffic peak hour, 710 trips (395 entering and 315 exiting) during the evening traffic peak hour and 7,876 daily trips.

- Results of the traffic analysis for year 2025 for both the AM and PM peaks without the Proposed Project indicate acceptable operations with minimal vehicle delay and back-ups at adjacent intersections.
- Results of the traffic analysis for year 2025 for both the AM and PM peaks with the Proposed Project indicate acceptable operations with minimal vehicle delay and back-ups.
- Results of the traffic analysis for year 2045 AM Peak with and without the Proposed Project indicate the intersection of TH 22 and Hoffman Rd will be approaching capacity without improvements, long delays and long vehicle queues for some movements.
- Results of the traffic analysis for year 2045 PM Peak with and without the Proposed Project indicate acceptable operations with minimal vehicle delay and back-ups.
- The TH 22 and Hoffman Rd intersection may need to be modified by 2045 to include protected/permissive signal phasing on the north and southbound approaches, and the westbound approach may need an additional through lane from the intersection with TH 22 to Coneflower Ln. This new lane would be a shared through and right turn lane. It is suggested the traffic operations at this intersection be monitored to determine if improvements are needed.

Attachments: Figures 1-9
(The Appendices with Traffic Counts and Synchro/Simtraffic Worksheets are available upon request.)

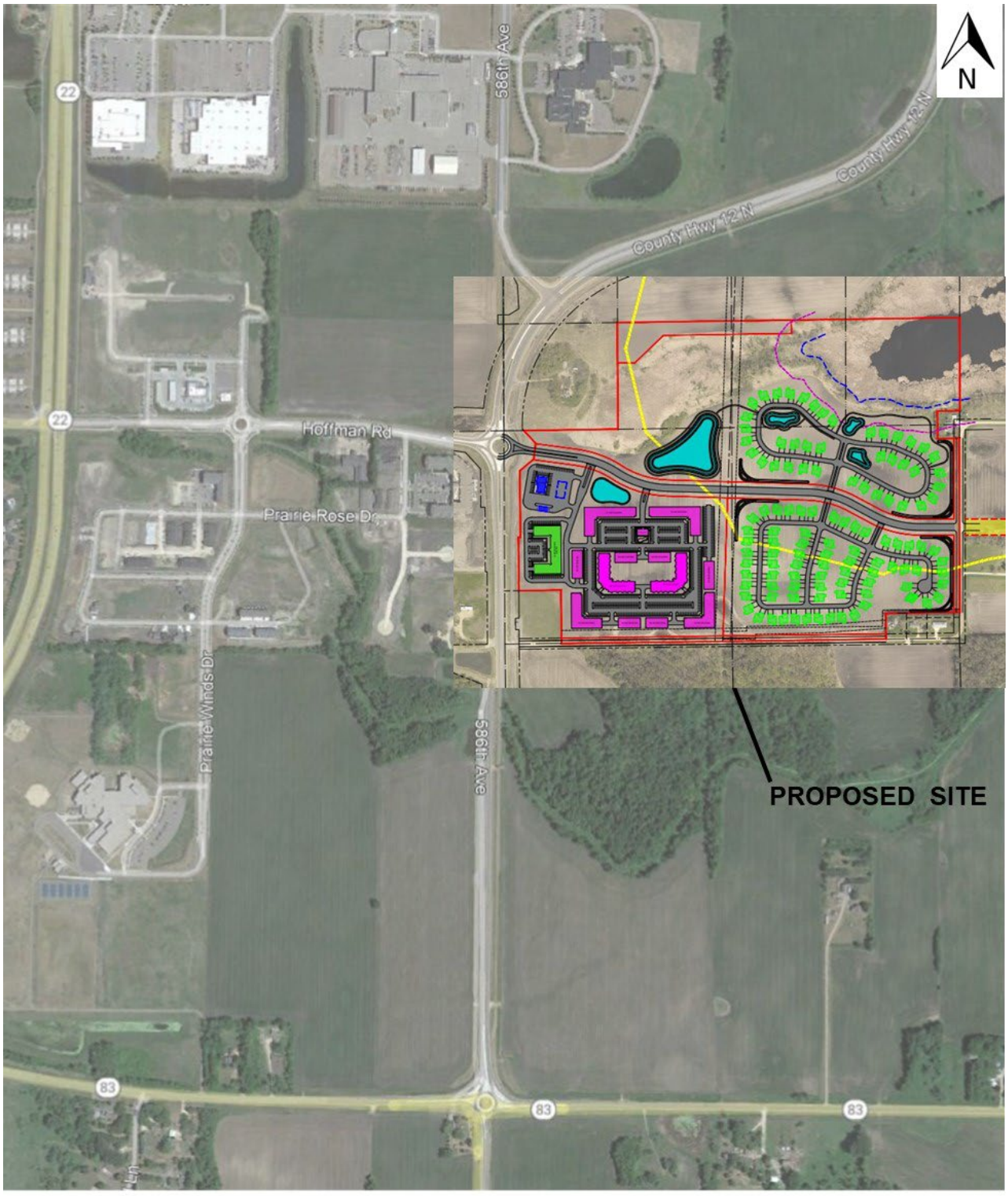


Figure 1 - Vicinity Map

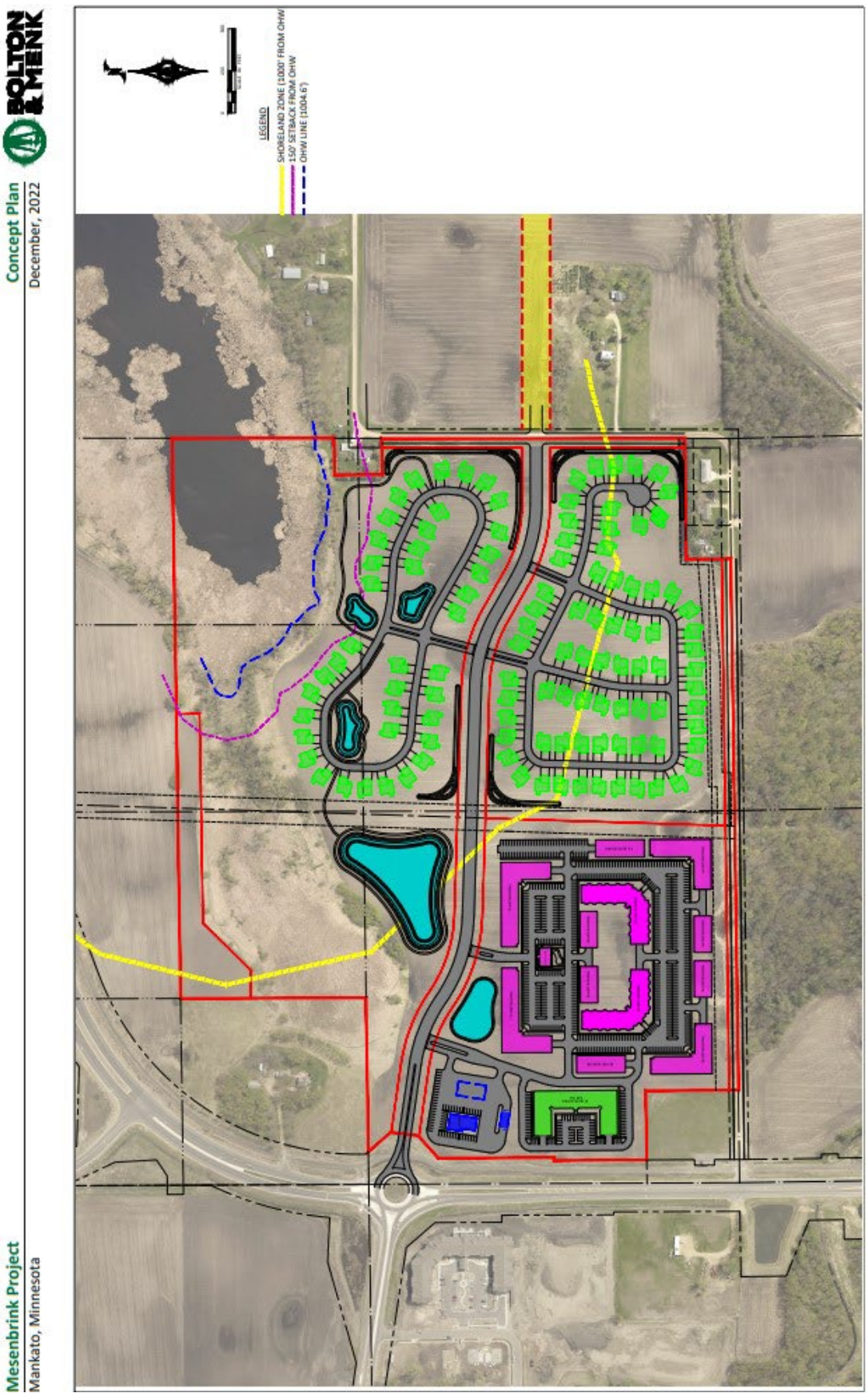


Figure 2 – Site Plan (By Others)

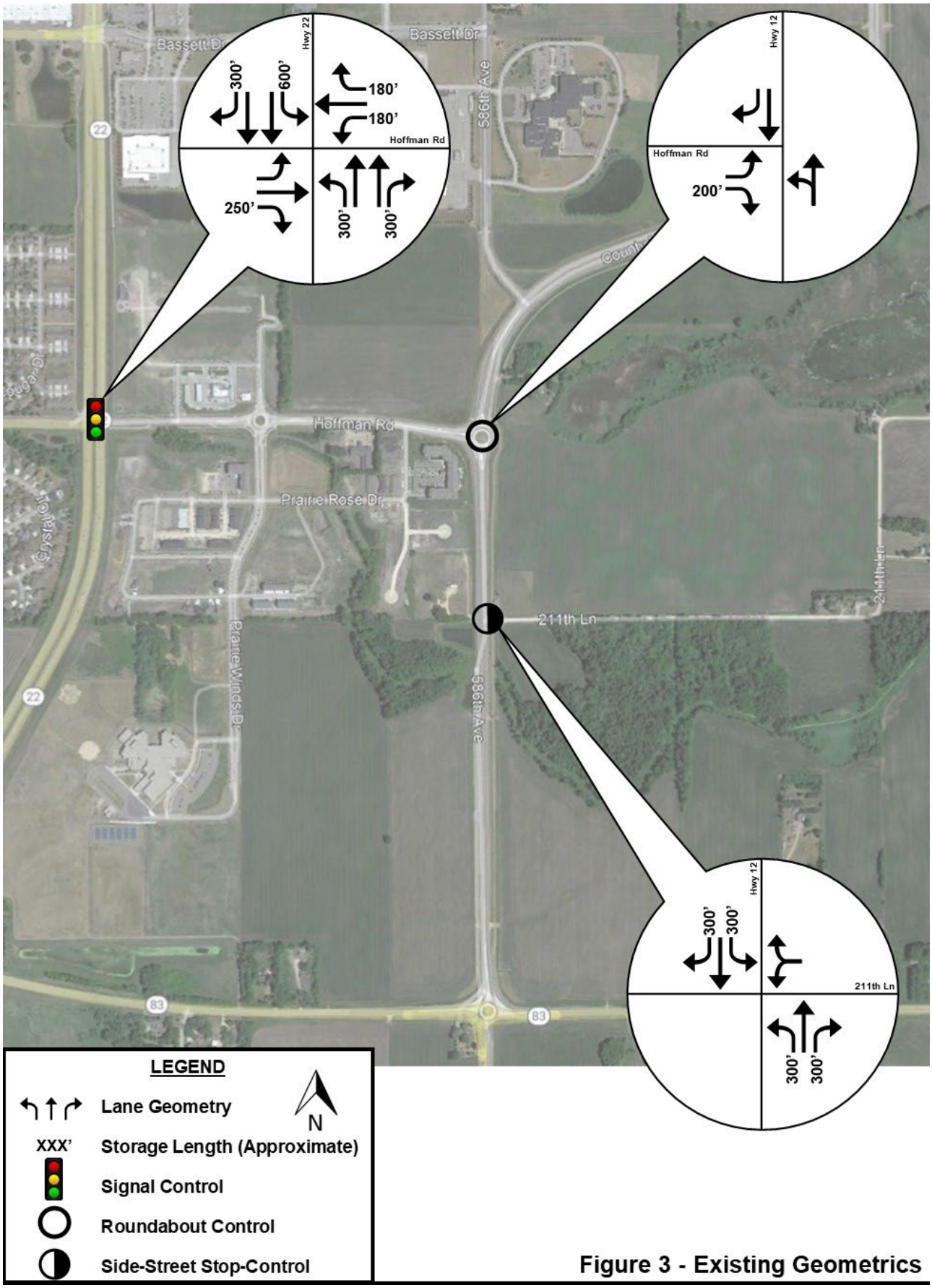


Figure 3 - Existing Geometrics

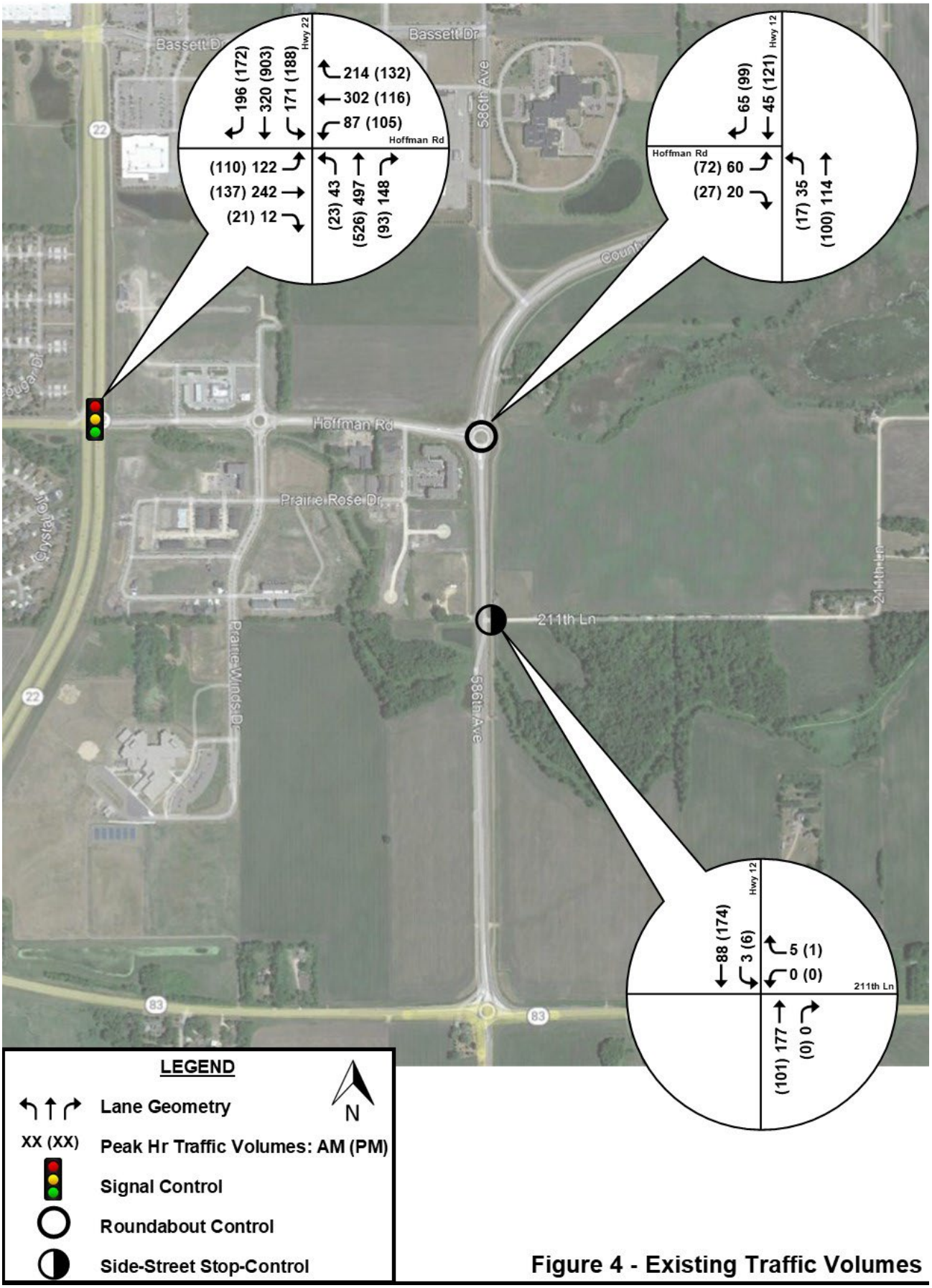


Figure 4 - Existing Traffic Volumes

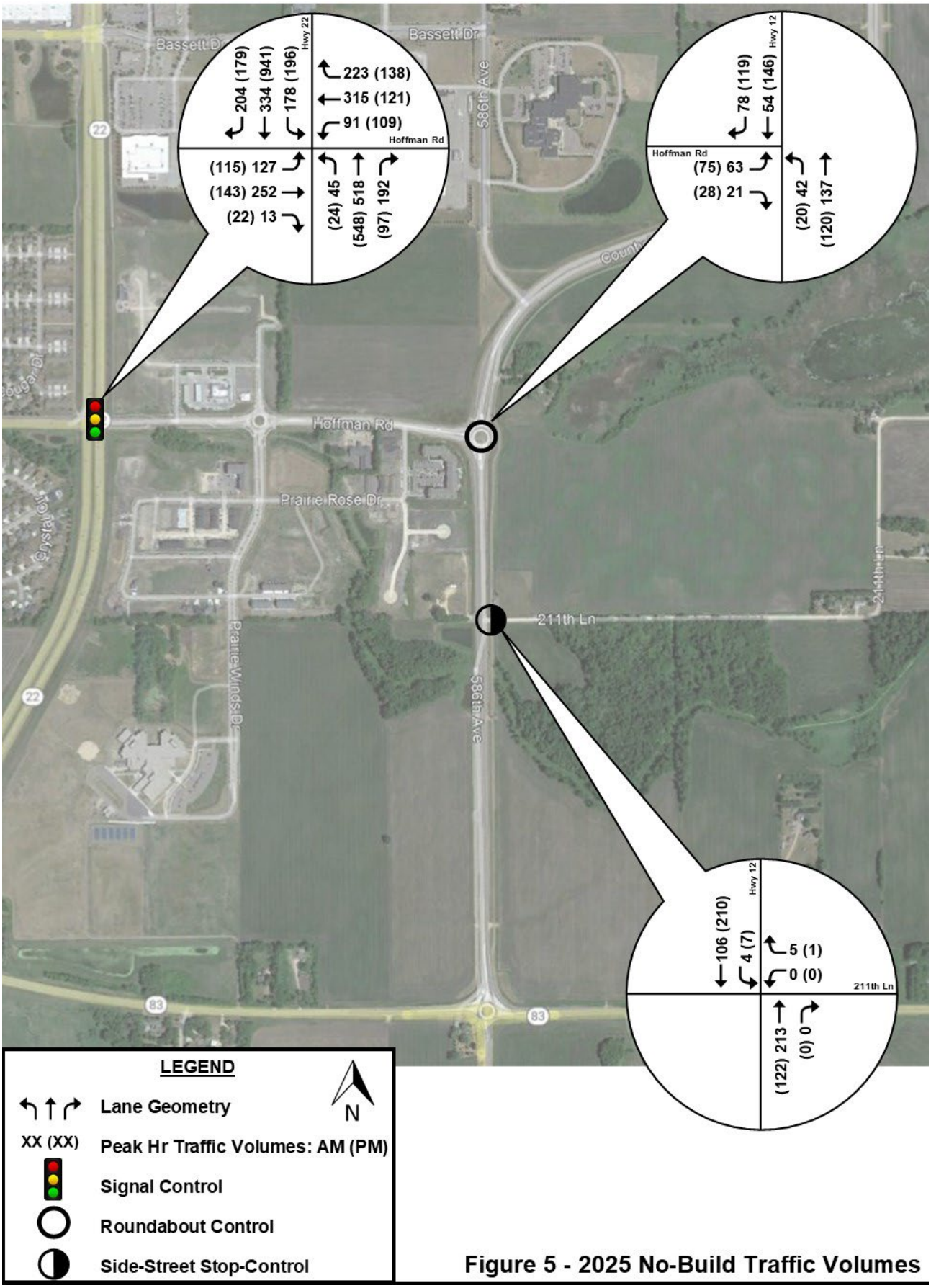


Figure 5 - 2025 No-Build Traffic Volumes

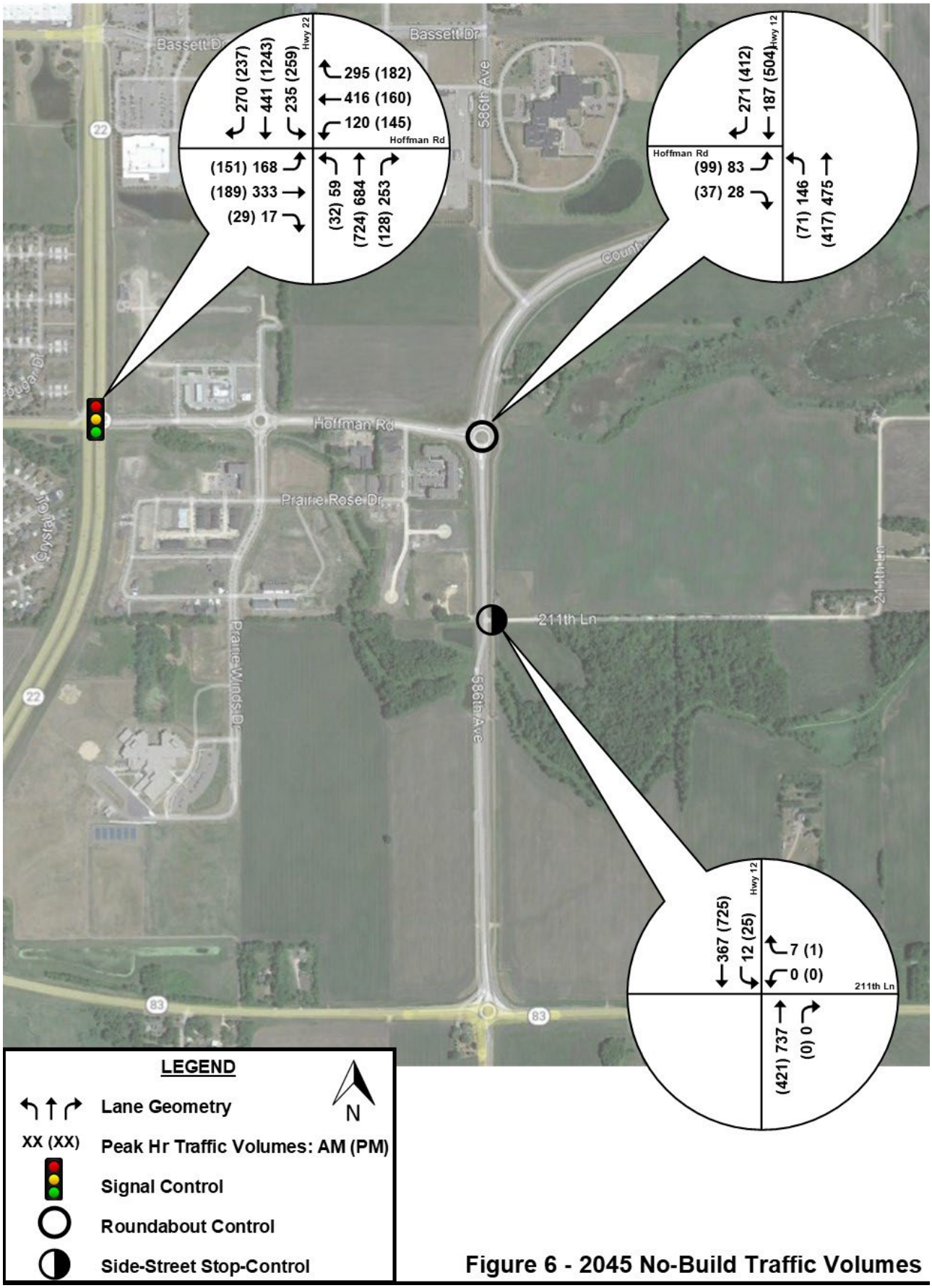


Figure 6 - 2045 No-Build Traffic Volumes

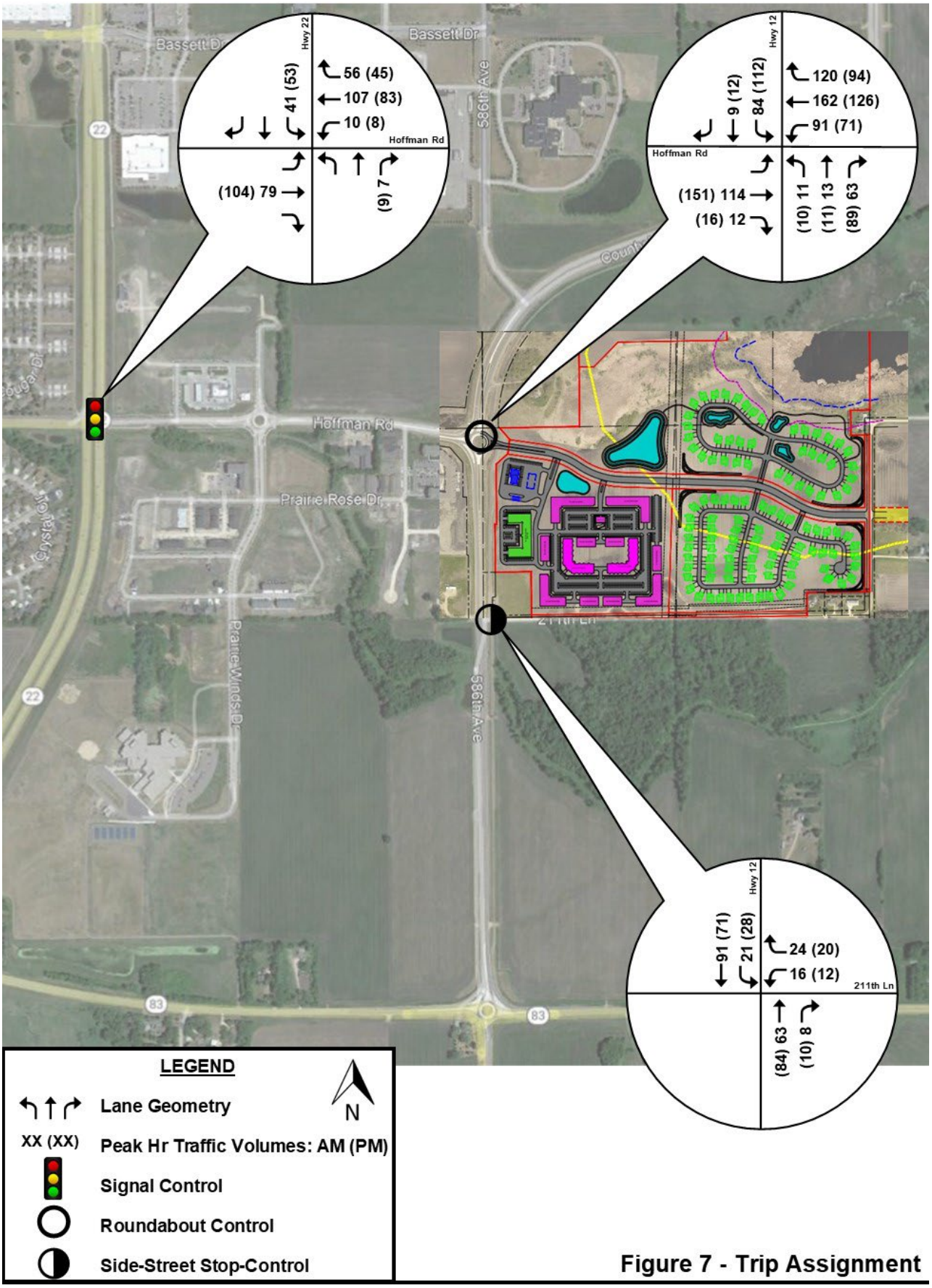


Figure 7 - Trip Assignment

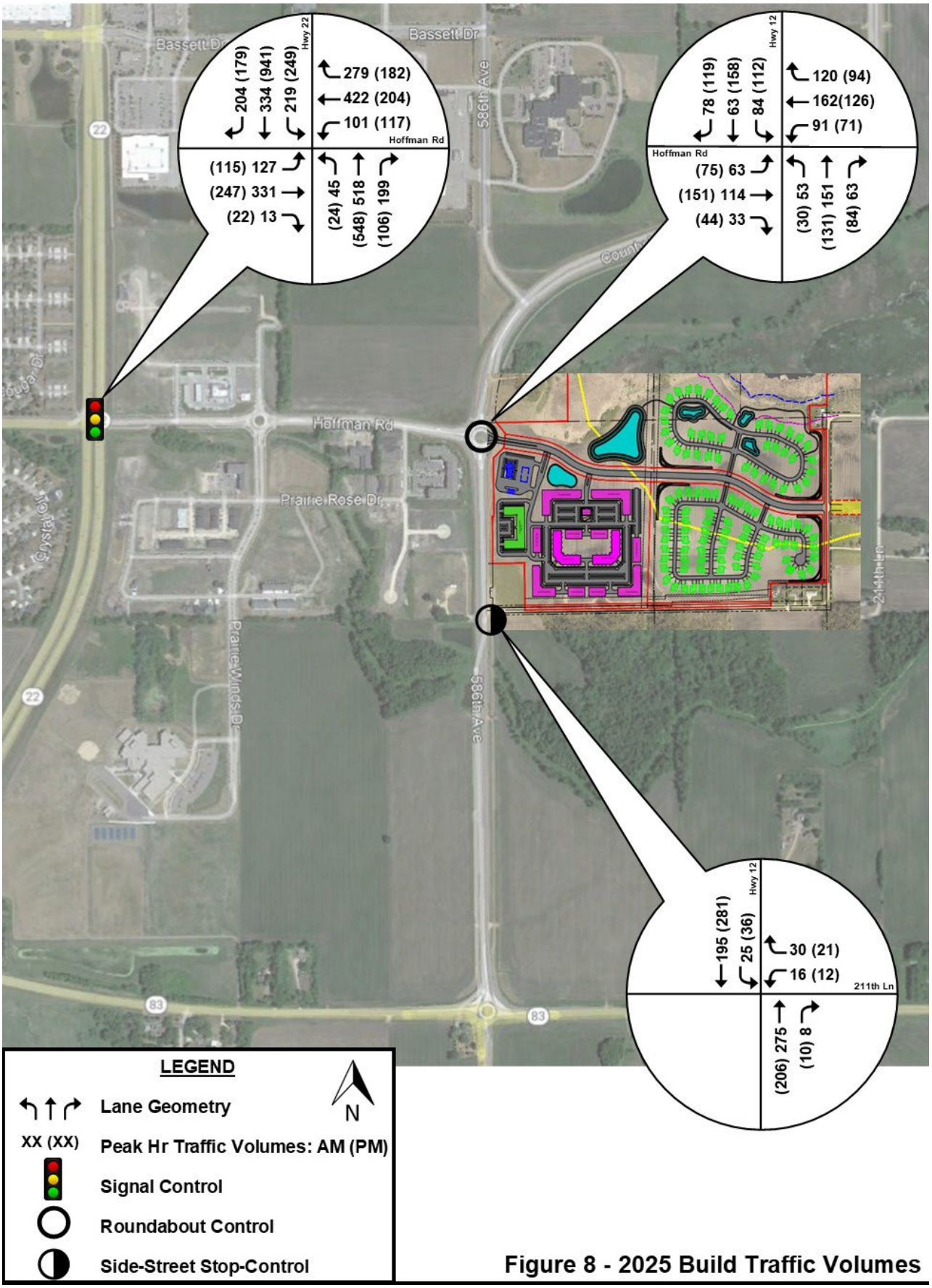


Figure 8 - 2025 Build Traffic Volumes

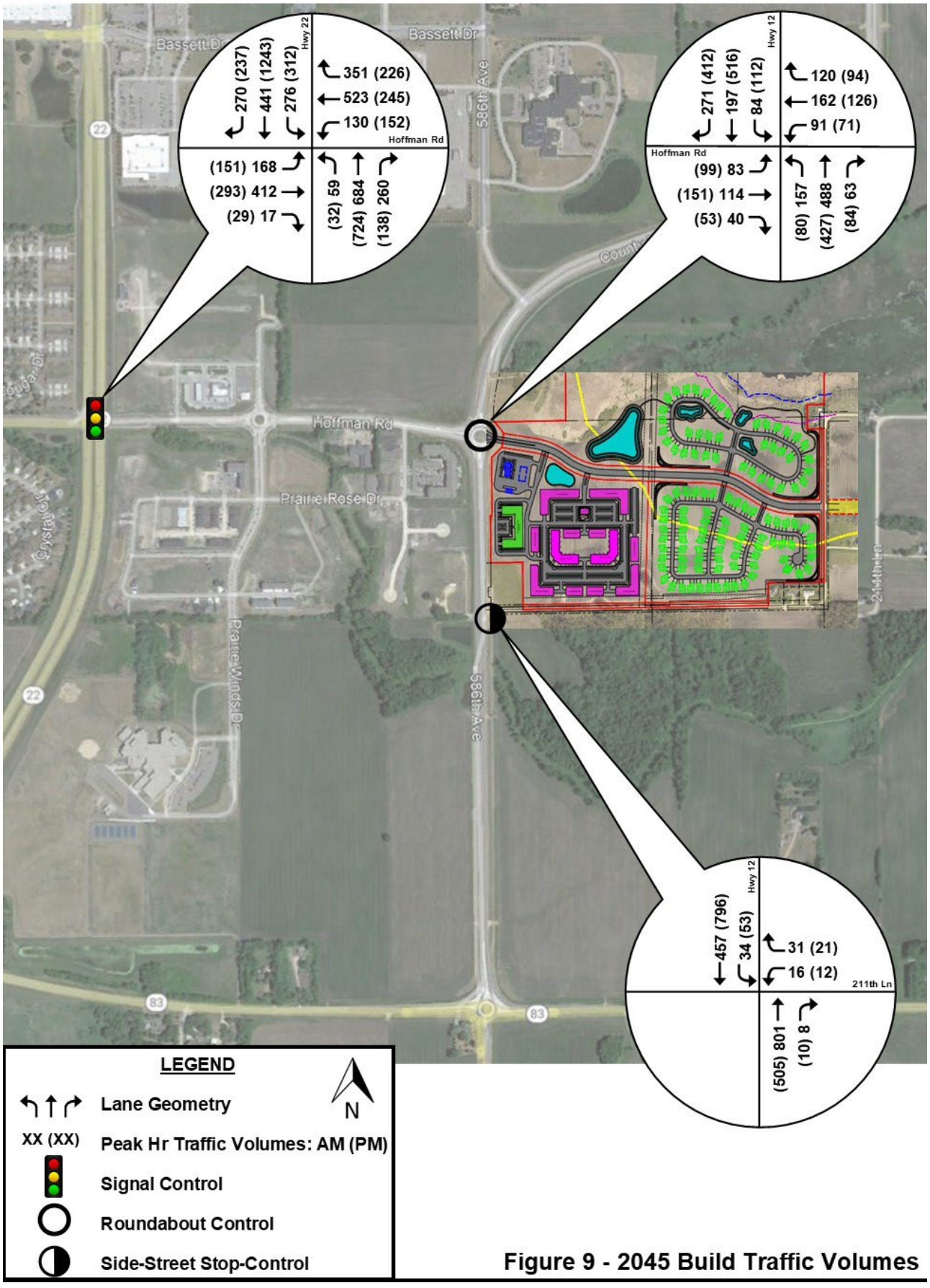


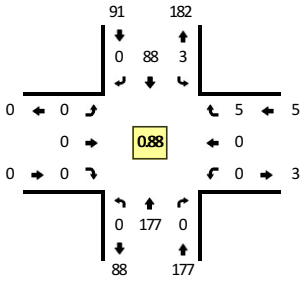
Figure 9 - 2045 Build Traffic Volumes

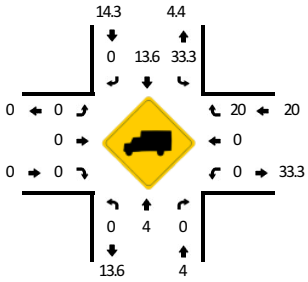
Appendix A: Traffic Counts

Type of peak hour being reported: Intersection Peak | Method for determining peak hour: Total Entering Volume

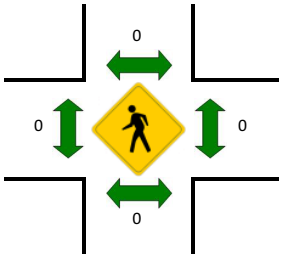
LOCATION: 586th Ave -- 211th Ln (Twp Rd 283) | **QC JOB #:** 15918803
CITY/STATE: Blue Earth, MN | **DATE:** Thu, Sep 8 2022

Peak-Hour: 7:15 AM -- 8:15 AM
Peak 15-Min: 7:45 AM -- 8:00 AM

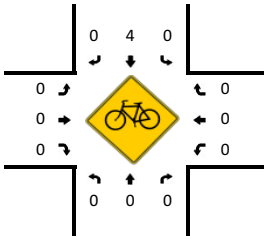


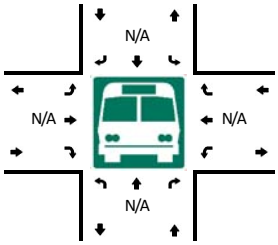


Quality Counts
DATA THAT DRIVES COMMUNITIES

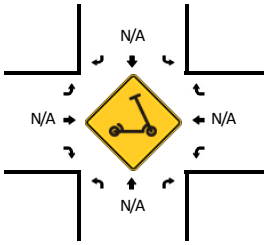












15-Min Count Period Beginning At	586th Ave (Northbound)				586th Ave (Southbound)				211th Ln (Twp Rd 283) (Eastbound)				211th Ln (Twp Rd 283) (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
7:00 AM	0	27	0	0	0	12	0	0	0	0	0	0	0	0	0	0	39	
7:15 AM	0	39	0	0	1	23	0	0	0	0	0	0	0	0	1	0	64	
7:30 AM	0	40	0	0	0	15	0	0	0	0	0	0	0	0	1	0	56	
7:45 AM	0	53	0	0	1	21	0	0	0	0	0	0	0	0	3	0	78	237
8:00 AM	0	45	0	0	1	29	0	0	0	0	0	0	0	0	0	0	75	273
8:15 AM	0	28	0	0	0	35	0	0	0	0	0	0	0	0	1	0	64	273
8:30 AM	0	25	0	0	0	26	0	0	0	0	0	0	0	0	0	0	51	268
8:45 AM	0	13	0	0	0	15	0	0	0	0	0	0	0	0	0	0	28	218

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	0	212	0	0	4	84	0	0	0	0	0	0	0	0	12	0	312
Heavy Trucks	0	12	0		0	8	0		0	0	0		0	0	0		20
Buses																	
Pedestrians		0				0				0				0			0
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0
Scooters																	

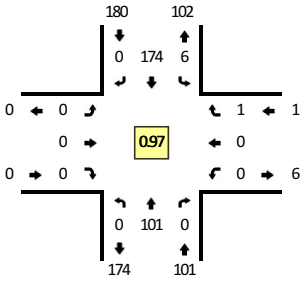
Comments:

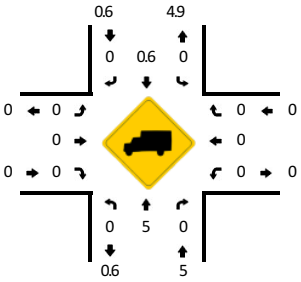
Report generated on 9/14/2022 9:47 AM | SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

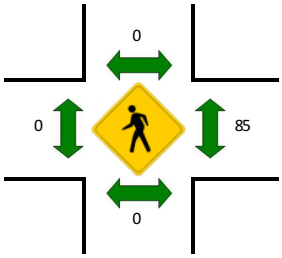
Type of peak hour being reported: Intersection Peak | Method for determining peak hour: Total Entering Volume

LOCATION: 586th Ave -- 211th Ln (Twp Rd 283) | **QC JOB #:** 15918804
CITY/STATE: Blue Earth, MN | **DATE:** Wed, Sep 7 2022

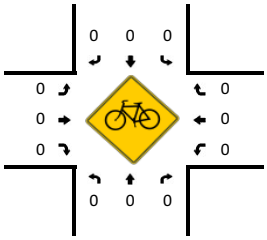
Peak-Hour: 4:15 PM -- 5:15 PM
Peak 15-Min: 4:45 PM -- 5:00 PM

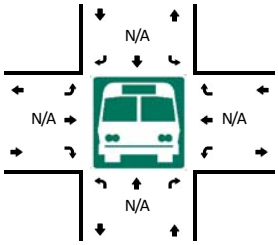




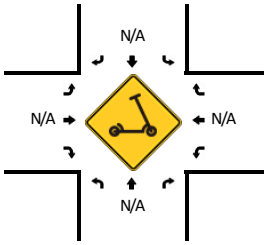












15-Min Count Period Beginning At	586th Ave (Northbound)				586th Ave (Southbound)				211th Ln (Twp Rd 283) (Eastbound)				211th Ln (Twp Rd 283) (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
4:00 PM	0	20	0	0	1	36	0	0	0	0	0	0	1	0	0	0	58	
4:15 PM	0	26	0	0	0	39	0	0	0	0	0	0	0	0	1	0	66	
4:30 PM	0	25	0	0	1	45	0	0	0	0	0	0	0	0	0	0	71	
4:45 PM	0	29	0	0	4	40	0	0	0	0	0	0	0	0	0	0	73	268
5:00 PM	0	21	0	0	1	50	0	0	0	0	0	0	0	0	0	0	72	282
5:15 PM	0	18	0	0	1	47	0	0	0	0	0	0	0	0	0	0	66	282
5:30 PM	0	20	0	0	2	42	0	0	0	0	0	0	0	0	3	0	67	278
5:45 PM	0	24	0	0	0	20	0	0	0	0	0	0	1	0	1	0	46	251

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	0	116	0	0	16	160	0	0	0	0	0	0	0	0	0	0	292
Heavy Trucks	0	0	0		0	0	0		0	0	0		0	0	0		0
Buses																	
Pedestrians		0				0				0				148			148
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0
Scooters																	

Comments:

Report generated on 9/14/2022 9:47 AM | SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

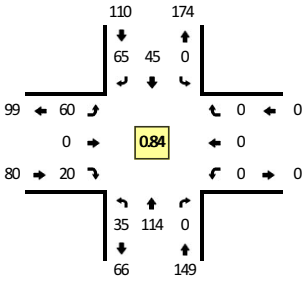
Type of peak hour being reported: Intersection Peak

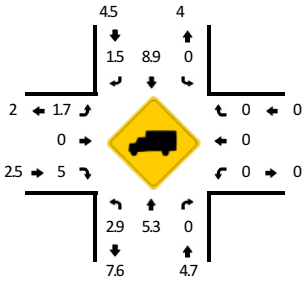
Method for determining peak hour: Total Entering Volume

LOCATION: CSAH 12/586th Ave -- Hoffman Rd
CITY/STATE: Mankato, MN

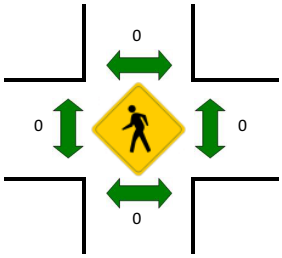
QC JOB #: 15918801
DATE: Thu, Aug 25 2022

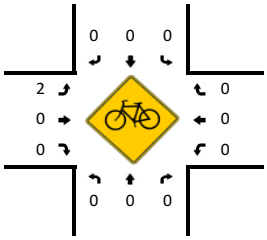
Peak-Hour: 7:15 AM -- 8:15 AM
Peak 15-Min: 7:45 AM -- 8:00 AM

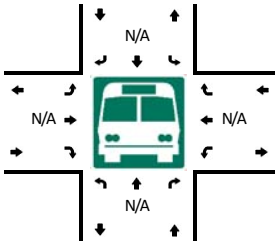


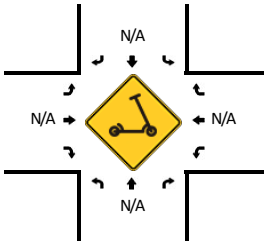


Quality Counts
DATA THAT DRIVES COMMUNITIES









15-Min Count Period Beginning At	CSAH 12/586th Ave (Northbound)				CSAH 12/586th Ave (Southbound)				Hoffman Rd (Eastbound)				Hoffman Rd (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
7:00 AM	5	6	0	0	0	12	14	0	8	0	5	0	0	0	0	0	50	
7:15 AM	6	30	0	0	0	12	17	0	17	0	2	0	0	0	0	0	84	
7:30 AM	7	23	0	0	0	11	22	0	19	0	3	0	0	0	0	0	85	
7:45 AM	13	34	0	1	0	18	13	0	13	0	9	0	0	0	0	0	101	320
8:00 AM	8	27	0	0	0	4	13	0	11	0	6	0	0	0	0	0	69	339
8:15 AM	9	18	0	0	0	8	25	0	6	0	5	0	0	0	0	0	71	326
8:30 AM	2	17	0	0	0	10	15	0	14	0	0	0	0	0	0	0	58	299
8:45 AM	3	12	0	0	0	11	20	0	6	0	4	2	0	0	0	0	58	256

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	52	136	0	4	0	72	52	0	52	0	36	0	0	0	0	0	404
Heavy Trucks	0	8	0		0	8	0		0	0	0		0	0	0		16
Buses																	
Pedestrians		0				0				0				0			0
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0
Scooters																	

Comments:

Report generated on 8/31/2022 9:04 AM

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

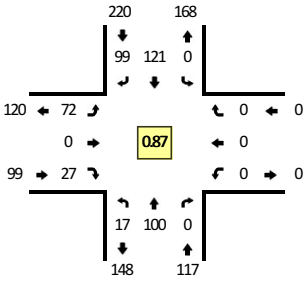
Type of peak hour being reported: Intersection Peak

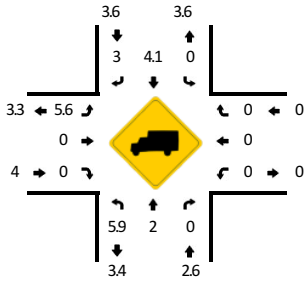
Method for determining peak hour: Total Entering Volume

LOCATION: CSAH 12/586th Ave -- Hoffman Rd
CITY/STATE: Mankato, MN

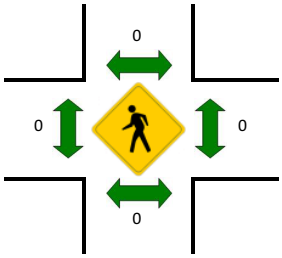
QC JOB #: 15918802
DATE: Thu, Aug 25 2022

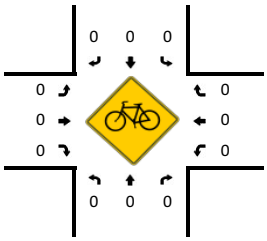
Peak-Hour: 4:30 PM -- 5:30 PM
Peak 15-Min: 4:30 PM -- 4:45 PM

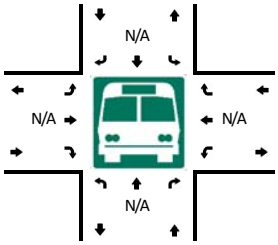


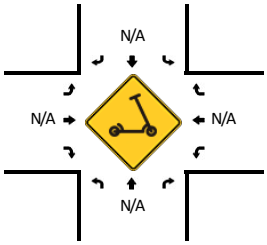


Quality Counts
DATA THAT DRIVES COMMUNITIES









15-Min Count Period Beginning At	CSAH 12/586th Ave (Northbound)				CSAH 12/586th Ave (Southbound)				Hoffman Rd (Eastbound)				Hoffman Rd (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
4:00 PM	4	23	0	0	0	18	19	1	16	0	11	0	0	0	0	0	92	
4:15 PM	4	20	0	0	0	23	14	0	17	0	9	0	0	0	0	0	87	
4:30 PM	2	30	0	0	0	42	26	0	18	0	4	3	0	0	0	0	125	
4:45 PM	4	34	0	0	0	29	16	0	17	0	12	1	0	0	0	0	113	417
5:00 PM	5	16	0	0	0	26	28	0	24	0	7	0	0	0	0	0	106	431
5:15 PM	6	20	0	0	0	24	29	0	9	0	4	0	0	0	0	0	92	436
5:30 PM	3	13	0	0	0	18	20	0	16	0	9	1	0	0	0	0	80	391
5:45 PM	4	11	0	0	0	18	17	0	12	0	9	2	0	0	0	0	73	351

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	8	120	0	0	0	168	104	0	72	0	16	12	0	0	0	0	500
Heavy Trucks	0	4	0		0	8	4		4	0	0		0	0	0		20
Buses																	
Pedestrians		0				0				0				0			0
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0
Scooters																	

Comments:

Report generated on 8/31/2022 9:04 AM

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

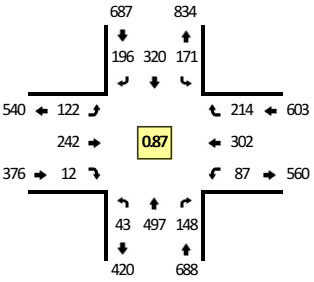
Type of peak hour being reported: Intersection Peak

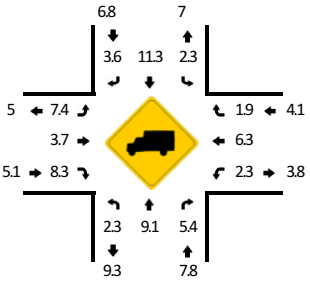
Method for determining peak hour: Total Entering Volume

LOCATION: MN-22 -- Hoffman Rd
CITY/STATE: Mankato, MN

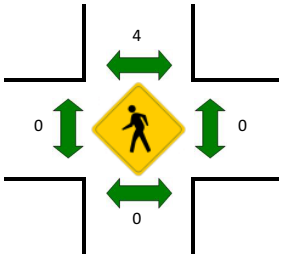
QC JOB #: 15918805
DATE: Thu, Sep 8 2022

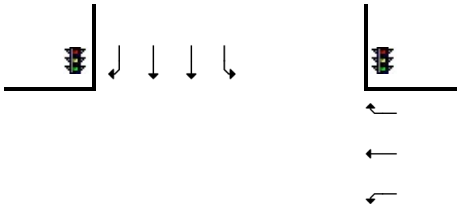
Peak-Hour: 7:45 AM -- 8:45 AM
Peak 15-Min: 8:15 AM -- 8:30 AM

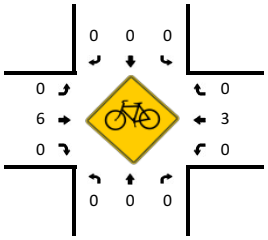


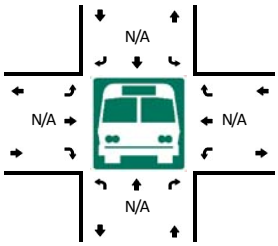


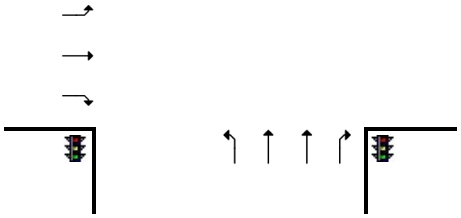
Quality Counts
DATA THAT DRIVES COMMUNITIES

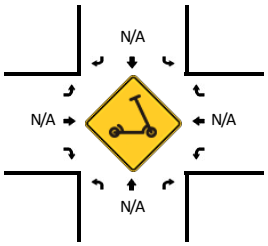












15-Min Count Period Beginning At	MN-22 (Northbound)				MN-22 (Southbound)				Hoffman Rd (Eastbound)				Hoffman Rd (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
7:00 AM	5	129	25	0	12	57	5	0	14	18	6	0	10	17	24	0	322	
7:15 AM	4	119	21	0	25	66	8	0	34	19	3	0	7	11	23	0	340	
7:30 AM	6	138	30	0	24	67	21	0	19	25	5	0	13	25	32	0	405	
7:45 AM	4	169	37	0	39	82	20	0	29	67	1	0	9	48	36	0	541	1608
8:00 AM	8	121	59	1	68	68	35	1	26	78	5	0	20	71	70	0	631	1917
8:15 AM	15	124	38	0	48	80	70	0	33	65	2	0	34	95	75	0	679	2256
8:30 AM	15	83	14	0	15	90	71	0	34	32	4	0	24	88	33	0	503	2354
8:45 AM	1	113	15	0	11	85	14	0	26	16	1	0	14	25	18	0	339	2152

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	60	496	152	0	192	320	280	0	132	260	8	0	136	380	300	0	2716
Heavy Trucks	4	48	28		4	28	4		12	28	4		0	24	4		188
Buses																	
Pedestrians		0				0				0				0			0
Bicycles	0	0	0		0	0	0		0	0	0		0	0	0		0
Scooters																	

Comments:

Report generated on 9/14/2022 9:47 AM

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

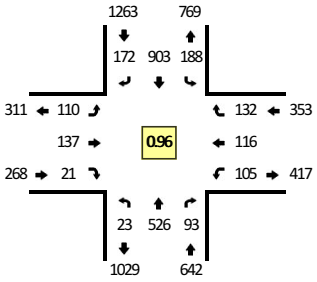
Type of peak hour being reported: Intersection Peak

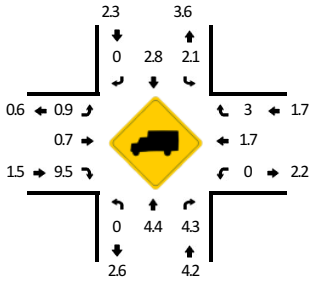
Method for determining peak hour: Total Entering Volume

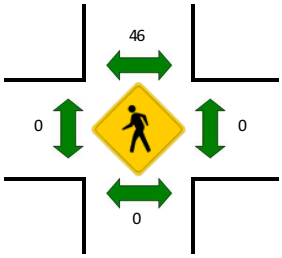
LOCATION: MN-22 -- Hoffman Rd
CITY/STATE: Mankato, MN

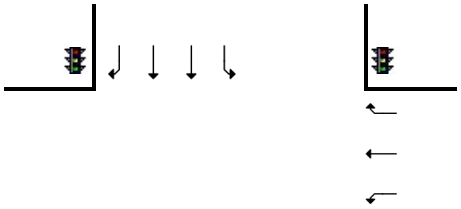
QC JOB #: 15918806
DATE: Wed, Sep 7 2022

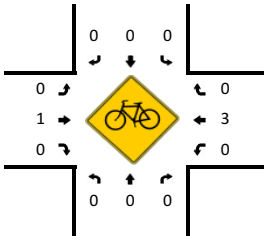
Peak-Hour: 4:45 PM -- 5:45 PM
Peak 15-Min: 5:00 PM -- 5:15 PM

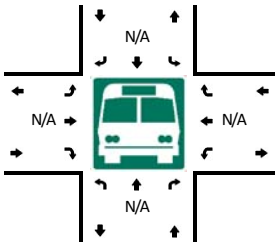


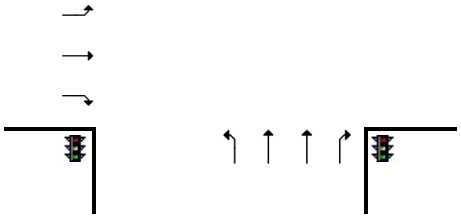


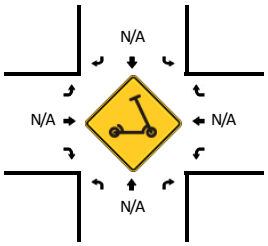












15-Min Count Period Beginning At	MN-22 (Northbound)				MN-22 (Southbound)				Hoffman Rd (Eastbound)				Hoffman Rd (Westbound)				Total	Hourly Totals
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U		
4:00 PM	5	156	26	0	29	176	36	1	30	24	4	0	20	22	23	0	552	
4:15 PM	3	145	18	0	27	217	49	1	27	25	7	0	12	14	25	0	570	
4:30 PM	5	147	18	0	37	196	44	0	36	24	5	0	27	15	20	0	574	
4:45 PM	3	141	20	0	49	232	30	0	34	40	5	0	25	20	29	0	628	2324
5:00 PM	6	144	25	0	48	244	48	0	16	27	0	0	30	34	37	0	659	2431
5:15 PM	5	140	20	0	39	227	40	0	24	27	9	0	22	25	27	0	605	2466
5:30 PM	9	101	28	0	51	200	54	1	36	43	7	0	28	37	39	0	634	2526
5:45 PM	8	125	17	0	29	163	47	0	40	28	5	0	29	46	34	0	571	2469

Peak 15-Min Flowrates	Northbound				Southbound				Eastbound				Westbound				Total
	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	Left	Thru	Right	U	
All Vehicles	24	576	100	0	192	976	192	0	64	108	0	0	120	136	148	0	2636
Heavy Trucks	0	24	12		4	20	0		4	0	0		0	0	4		68
Buses																	
Pedestrians		0				40				0				0			40
Bicycles	0	0	0		0	0	0		0	0	0		0	4	0		4
Scooters																	

Comments:

Report generated on 9/14/2022 9:47 AM

SOURCE: Quality Counts, LLC (http://www.qualitycounts.net) 1-877-580-2212

Appendix B: Synchro/Simtraffic Worksheets

2025 AM Build SimTraffic Report

5: TH 22 & Hoffman Rd Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Denied Del/Veh (s)	0.2	0.3	2.7	1.6	0.8	1.8	2.6	0.3	2.5	2.9	0.3	2.9
Total Del/Veh (s)	27.5	27.0	5.7	26.6	33.4	11.9	42.5	32.0	11.9	35.6	19.0	4.0

5: TH 22 & Hoffman Rd Performance by movement

Movement	All
Denied Del/Veh (s)	1.2
Total Del/Veh (s)	24.6

10: Highway 12 & Hoffman Rd Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Denied Del/Veh (s)	0.0	0.0	0.0	0.6	0.4	2.5	0.0	0.0	0.0	0.2	0.2	0.1
Total Del/Veh (s)	7.1	3.8	6.0	9.3	9.2	6.3	4.1	5.7	2.9	3.3	6.6	1.7

10: Highway 12 & Hoffman Rd Performance by movement

Movement	All
Denied Del/Veh (s)	0.3
Total Del/Veh (s)	5.2

15: Highway 12 & 211th Lane Performance by movement

Movement	WBL	WBR	NBT	NBR	SBL	SBT	All
Denied Del/Veh (s)	0.1	0.1	0.3	3.0	0.5	0.0	0.3
Total Del/Veh (s)	7.1	3.0	0.7	0.2	3.1	1.2	1.2

Total Network Performance

Denied Del/Veh (s)	1.1
Total Del/Veh (s)	24.2

Intersection: 5: TH 22 & Hoffman Rd

Movement	EB	EB	EB	WB	WB	WB	NB	NB	NB	NB	SB	SB
Directions Served	L	T	R	L	T	R	L	T	T	R	L	T
Maximum Queue (ft)	142	291	52	254	494	255	89	278	243	130	176	152
Average Queue (ft)	65	164	10	67	230	104	37	135	112	57	116	71
95th Queue (ft)	112	258	36	183	374	246	73	200	193	100	168	123
Link Distance (ft)	1142	1142			2488			1490	1490			1311
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)			230	230		230	300			300	300	
Storage Blk Time (%)		1			8	0						
Queuing Penalty (veh)		0			33	0						

Intersection: 5: TH 22 & Hoffman Rd

Movement	SB
Directions Served	T
Maximum Queue (ft)	137
Average Queue (ft)	53
95th Queue (ft)	100
Link Distance (ft)	1311
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 10: Highway 12 & Hoffman Rd

Movement	EB	WB	WB	NB	NB	SB
Directions Served	LT	LT	R	LT	R	LT
Maximum Queue (ft)	71	127	74	70	41	75
Average Queue (ft)	27	57	36	24	2	28
95th Queue (ft)	64	96	61	58	17	59
Link Distance (ft)	2488	1327		1128		891
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (ft)			200		200	
Storage Blk Time (%)						
Queuing Penalty (veh)						

Intersection: 15: Highway 12 & 211th Lane

Movement	WB	SB
Directions Served	LR	L
Maximum Queue (ft)	57	28
Average Queue (ft)	16	8
95th Queue (ft)	36	28
Link Distance (ft)	1382	
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		300
Storage Blk Time (%)		
Queuing Penalty (veh)		

Network Summary

Network wide Queuing Penalty: 34

2025 AM Build Synchro Report

HCM 6th ROUNDABOUT	
Node #	10
Zone:	
X East (ft):	3088
Y North (ft):	-1385
Z Elevation (ft):	0
Description	
Max v/c Ratio:	0.27
Intersection Delay (s):	4.1
Intersection LOS:	A
ICU:	0.55
ICU LOS:	A
Inside Radius (ft):	28
Outside Radius (ft):	60
Roundabout Lanes (#):	1
Circle Speed (mph):	18
Inside Color:	
Transparent Circle:	☐

HCM 6th ROUNDABOUT	EB			WB			NB			SB		
Entry Lanes	1			1			1			1		
Conflicting Circle Lanes	1			1			1			1		
Exit Lanes	1			1			1			1		
Adjusted Approach Flow (vph)	226			398			288			242		
Demand Flow Rate (pc/h)	230			406			293			247		
Vehicles Circulating (pc/h)	259			294			284			334		
Vehicles Exiting (pc/h)	235			215			168			235		
Ped Vol. Crossing Leg (#/hr)	0			0			0			0		
Ped Capacity Adjustment	1.000			1.000			1.000			1.000		
Approach Delay (sec/veh)	4.3			4.2			4.3			3.4		
Approach LOS	A			A			A			A		
Lane	Left	—	Bypass	Left	—	Bypass	Left	—	Bypass	Left	—	Bypass
Follow-Up Headway (s)	2.609	—	—	2.609	—	—	2.609	—	—	2.609	—	—
Critical Headway (s)	4.976	—	—	4.976	—	—	4.976	—	—	4.976	—	—
Designated Moves	LT	—	R	LT	—	R	LT	—	R	LT	—	R
Assumed Moves	LT	—	—	LT	—	—	LT	—	—	LT	—	—
Right Turn Channelized	—	—	Free	—	—	Free	—	—	Free	—	—	Free
Lane Utilization	1.000	—	—	1.000	—	—	1.000	—	—	1.000	—	—
Entry Flow Rate (pc/h)	193	—	37	275	—	131	225	—	68	160	—	87
Capacity, Entry Lane (pc/h)	1060	—	1938	1022	—	1938	1033	—	1938	982	—	1938
Entry HV Adjustment Factor	0.982	—	0.980	0.980	—	0.980	0.981	—	0.980	0.979	—	0.980
Flow Rate, Entry (vph)	190	—	36	270	—	128	221	—	67	157	—	85
Capacity, Entry (vph)	1041	—	1900	1002	—	1900	1013	—	1900	961	—	1900
Volume to Capacity Ratio	0.182	—	0.019	0.269	—	0.067	0.218	—	0.035	0.163	—	0.045
Control Delay (sec/veh)	5.1	—	0.0	6.3	—	0.0	5.6	—	0.0	5.3	—	0.0
Level of Service	A	—	A	A	—	A	A	—	A	A	—	A
95th-Percentile Queue (veh)	1	—	0	1	—	0	1	—	0	1	—	0

2025 AM Build

2025 AM No Build SimTraffic Report

5: TH 22 & Hoffman Rd Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Denied Del/Veh (s)	0.3	0.2	3.2	2.4	0.7	2.6	2.9	0.2	2.5	3.0	0.3	2.8
Total Del/Veh (s)	28.4	27.7	4.9	29.3	35.1	13.0	47.0	23.8	9.1	45.9	15.4	3.9

5: TH 22 & Hoffman Rd Performance by movement

Movement	All
Denied Del/Veh (s)	1.3
Total Del/Veh (s)	23.3

10: Highway 12 & Hoffman Rd Performance by movement

Movement	EBL	EBT	EBR	NBL	NBT	SBT	SBR	All
Denied Del/Veh (s)	0.0	0.0	0.0	0.0	0.0	0.1	0.2	0.0
Total Del/Veh (s)	4.9	2.6	5.2	2.0	3.9	4.3	2.0	3.1

15: Highway 12 & 211th Lane Performance by movement

Movement	WBR	NBT	SBL	SBT	All
Denied Del/Veh (s)	0.1	0.2	1.4	0.0	0.1
Total Del/Veh (s)	2.1	0.3	0.9	0.2	0.3

Total Network Performance

Denied Del/Veh (s)	1.2
Total Del/Veh (s)	23.9

Intersection: 5: TH 22 & Hoffman Rd

Movement	EB	EB	EB	WB	WB	WB	NB	NB	NB	NB	SB	SB
Directions Served	L	T	R	L	T	R	L	T	T	R	L	T
Maximum Queue (ft)	204	195	51	184	582	185	69	218	183	105	276	102
Average Queue (ft)	82	114	10	51	194	103	35	123	98	49	127	56
95th Queue (ft)	151	184	36	105	378	218	70	194	169	82	212	97
Link Distance (ft)	1142	1142			2490			1490	1490			1311
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)			230	160		160	300			300	300	
Storage Blk Time (%)					12	1						
Queuing Penalty (veh)					36	4						

Intersection: 5: TH 22 & Hoffman Rd

Movement	SB
Directions Served	T
Maximum Queue (ft)	110
Average Queue (ft)	39
95th Queue (ft)	86
Link Distance (ft)	1311
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 10: Highway 12 & Hoffman Rd

Movement	EB	NB
Directions Served	L	LT
Maximum Queue (ft)	31	18
Average Queue (ft)	6	1
95th Queue (ft)	26	6
Link Distance (ft)	2490	1127
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 15: Highway 12 & 211th Lane

Movement	WB	SB
Directions Served	LR	L
Maximum Queue (ft)	21	26
Average Queue (ft)	4	1
95th Queue (ft)	17	9
Link Distance (ft)	1382	
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		300
Storage Blk Time (%)		
Queuing Penalty (veh)		

Network Summary

Network wide Queuing Penalty: 40

2025 AM No Build Synchro Report

HCM 6th ROUNDABOUT	
Node #	10
Zone:	
X East (ft):	3088
Y North (ft):	-1385
Z Elevation (ft):	0
Description	
Max v/c Ratio:	0.15
Intersection Delay (s):	2.8
Intersection LOS:	A
ICU:	0.26
ICU LOS:	A
Inside Radius (ft):	28
Outside Radius (ft):	60
Roundabout Lanes (#):	1
Circle Speed (mph):	18
Inside Color:	
Transparent Circle:	☐

HCM 6th ROUNDABOUT	EB			NB			SB		
Entry Lanes	1			1			1		
Conflicting Circle Lanes	1			1			1		
Exit Lanes	1			1			1		
Adjusted Approach Flow (vph)	91			195			144		
Demand Flow Rate (pc/h)	92			199			147		
Vehicles Circulating (pc/h)	60			69			47		
Vehicles Exiting (pc/h)	47			60			221		
Ped Vol. Crossing Leg (#/hr)	0			0			0		
Ped Capacity Adjustment	1.000			1.000			1.000		
Approach Delay (sec/veh)	2.4			4.2			1.3		
Approach LOS	A			A			A		
Lane	Left	—	Bypass	Left	—	—	Left	—	Bypass
Follow-Up Headway (s)	2.609	—	—	2.609	—	—	2.609	—	—
Critical Headway (s)	4.976	—	—	4.976	—	—	4.976	—	—
Designated Moves	L	—	R	LT	—	—	T	—	R
Assumed Moves	L	—	—	LT	—	—	T	—	—
Right Turn Channelized	—	—	Free	—	—	Free	—	—	Free
Lane Utilization	1.000	—	—	1.000	—	—	1.000	—	—
Entry Flow Rate (pc/h)	69	—	23	199	—	—	60	—	87
Capacity, Entry Lane (pc/h)	1298	—	1938	1286	—	—	1315	—	1938
Entry HV Adjustment Factor	0.986	—	0.980	0.980	—	—	0.980	—	0.980
Flow Rate, Entry (vph)	68	—	23	195	—	—	59	—	85
Capacity, Entry (vph)	1279	—	1900	1260	—	—	1289	—	1900
Volume to Capacity Ratio	0.053	—	0.012	0.155	—	—	0.046	—	0.045
Control Delay (sec/veh)	3.2	—	0.0	4.2	—	—	3.2	—	0.0
Level of Service	A	—	A	A	—	—	A	—	A
95th-Percentile Queue (veh)	0	—	0	1	—	—	0	—	0

2025 AM No Build

2025 PM Build SimTraffic Report

5: TH 22 & Hoffman Rd Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Denied Del/Veh (s)	0.2	0.2	3.1	1.4	0.3	1.5	2.9	0.2	2.7	2.4	0.4	2.3
Total Del/Veh (s)	27.5	30.4	8.7	27.1	30.3	9.3	41.6	24.8	7.2	41.3	16.1	4.6

5: TH 22 & Hoffman Rd Performance by movement

Movement	All
Denied Del/Veh (s)	0.9
Total Del/Veh (s)	21.6

10: Highway 12 & Hoffman Rd Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Denied Del/Veh (s)	0.0	0.0	0.0	0.4	0.3	1.7	0.0	0.0	0.2	0.6	0.7	3.4
Total Del/Veh (s)	8.8	5.2	6.2	7.4	8.4	5.8	4.4	6.9	2.8	5.7	7.7	3.3

10: Highway 12 & Hoffman Rd Performance by movement

Movement	All
Denied Del/Veh (s)	0.5
Total Del/Veh (s)	6.0

15: Highway 12 & 211th Lane Performance by movement

Movement	WBL	WBR	NBT	NBR	SBL	SBT	All
Denied Del/Veh (s)	0.1	0.1	0.3	3.9	0.6	0.0	0.2
Total Del/Veh (s)	5.7	2.4	0.6	0.3	1.8	1.1	1.0

Total Network Performance

Denied Del/Veh (s)	1.0
Total Del/Veh (s)	21.9

Intersection: 5: TH 22 & Hoffman Rd

Movement	EB	EB	EB	WB	WB	WB	NB	NB	NB	NB	SB	SB
Directions Served	L	T	R	L	T	R	L	T	T	R	L	T
Maximum Queue (ft)	138	227	52	92	153	175	69	235	213	87	236	287
Average Queue (ft)	57	121	15	52	91	52	21	141	108	28	158	145
95th Queue (ft)	102	184	41	80	133	107	54	208	193	60	217	238
Link Distance (ft)	1142	1142			2488			1490	1490			1311
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)			230	160		160	300			300	300	
Storage Blk Time (%)		0			0	0						0
Queuing Penalty (veh)		0			0	0						0

Intersection: 5: TH 22 & Hoffman Rd

Movement	SB
Directions Served	T
Maximum Queue (ft)	244
Average Queue (ft)	117
95th Queue (ft)	203
Link Distance (ft)	1311
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 10: Highway 12 & Hoffman Rd

Movement	EB	WB	WB	NB	NB	SB
Directions Served	LT	LT	R	LT	R	LT
Maximum Queue (ft)	144	76	53	52	41	116
Average Queue (ft)	45	49	34	20	1	32
95th Queue (ft)	98	71	50	51	13	73
Link Distance (ft)	2488	1820		1128		891
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (ft)			200		200	
Storage Blk Time (%)						
Queuing Penalty (veh)						

Intersection: 15: Highway 12 & 211th Lane

Movement	WB	SB
Directions Served	LR	L
Maximum Queue (ft)	21	28
Average Queue (ft)	12	4
95th Queue (ft)	29	21
Link Distance (ft)	1382	
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		300
Storage Blk Time (%)		
Queuing Penalty (veh)		

Network Summary

Network wide Queuing Penalty: 0

2025 PM Build Synchro Report

HCM 6th ROUNDABOUT	
Node #	10
Zone:	
X East (ft):	3088
Y North (ft):	-1385
Z Elevation (ft):	0
Description	
Max v/c Ratio:	0.29
Intersection Delay (s):	4.5
Intersection LOS:	A
ICU:	0.60
ICU LOS:	B
Inside Radius (ft):	28
Outside Radius (ft):	60
Roundabout Lanes (#):	1
Circle Speed (mph):	18
Inside Color:	
Transparent Circle:	☐

HCM 6th ROUNDABOUT	EB			WB			NB			SB		
Entry Lanes	1			1			1			1		
Conflicting Circle Lanes	1			1			1			1		
Exit Lanes	1			1			1			1		
Adjusted Approach Flow (vph)	304			335			272			430		
Demand Flow Rate (pc/h)	310			342			278			439		
Vehicles Circulating (pc/h)	391			263			391			266		
Vehicles Exiting (pc/h)	182			307			260			229		
Ped Vol. Crossing Leg (#/hr)	0			0			0			0		
Ped Capacity Adjustment	1.000			1.000			1.000			1.000		
Approach Delay (sec/veh)	5.8			3.8			3.8			4.5		
Approach LOS	A			A			A			A		
Lane	Left	—	Bypass	Left	—	Bypass	Left	—	Bypass	Left	—	Bypass
Follow-Up Headway (s)	2.609	—	—	2.609	—	—	2.609	—	—	2.609	—	—
Critical Headway (s)	4.976	—	—	4.976	—	—	4.976	—	—	4.976	—	—
Designated Moves	LT	—	R	LT	—	R	LT	—	R	LT	—	R
Assumed Moves	LT	—	—	LT	—	—	LT	—	—	LT	—	—
Right Turn Channelized	—	—	Free	—	—	Free	—	—	Free	—	—	Free
Lane Utilization	1.000	—	—	1.000	—	—	1.000	—	—	1.000	—	—
Entry Flow Rate (pc/h)	260	—	50	232	—	110	179	—	99	307	—	132
Capacity, Entry Lane (pc/h)	926	—	1938	1055	—	1938	926	—	1938	1052	—	1938
Entry HV Adjustment Factor	0.979	—	0.980	0.979	—	0.980	0.979	—	0.980	0.979	—	0.980
Flow Rate, Entry (vph)	255	—	49	227	—	108	175	—	97	301	—	129
Capacity, Entry (vph)	907	—	1900	1033	—	1900	906	—	1900	1030	—	1900
Volume to Capacity Ratio	0.281	—	0.026	0.220	—	0.057	0.193	—	0.051	0.292	—	0.068
Control Delay (sec/veh)	6.9	—	0.0	5.6	—	0.0	5.9	—	0.0	6.4	—	0.0
Level of Service	A	—	A	A	—	A	A	—	A	A	—	A
95th-Percentile Queue (veh)	1	—	0	1	—	0	1	—	0	1	—	0

2025 PM Build

2025 PM No Build SimTraffic Report

5: TH 22 & Hoffman Rd Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Denied Del/Veh (s)	0.2	0.2	3.2	2.0	0.3	2.1	3.3	0.2	2.8	2.4	0.4	2.5
Total Del/Veh (s)	29.2	35.5	9.8	30.6	36.0	7.8	41.3	19.1	6.9	41.9	11.4	4.1

5: TH 22 & Hoffman Rd Performance by movement

Movement	All
Denied Del/Veh (s)	0.9
Total Del/Veh (s)	18.6

10: Highway 12 & Hoffman Rd Performance by movement

Movement	EBL	EBT	EBR	NBL	NBT	SBT	SBR	All
Denied Del/Veh (s)	0.0	0.0	0.0	0.0	0.0	0.2	0.2	0.1
Total Del/Veh (s)	5.3	2.4	5.2	1.8	4.6	5.0	2.4	3.5

15: Highway 12 & 211th Lane Performance by movement

Movement	NBT	SBL	SBT	All
Denied Del/Veh (s)	0.1	0.0	0.0	0.1
Total Del/Veh (s)	0.1	0.8	0.3	0.2

Total Network Performance

Denied Del/Veh (s)	0.9
Total Del/Veh (s)	19.6

Intersection: 5: TH 22 & Hoffman Rd

Movement	EB	EB	EB	WB	WB	WB	NB	NB	NB	NB	SB	SB
Directions Served	L	T	R	L	T	R	L	T	T	R	L	T
Maximum Queue (ft)	160	159	52	152	147	86	48	171	153	64	263	197
Average Queue (ft)	67	90	15	57	69	39	13	107	79	22	125	111
95th Queue (ft)	115	152	42	115	113	77	42	164	149	49	218	180
Link Distance (ft)	1142	1142			2490			1490	1490			1311
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)			230	160		160	300			300	300	
Storage Blk Time (%)				0	0							
Queuing Penalty (veh)				0	0							

Intersection: 5: TH 22 & Hoffman Rd

Movement	SB
Directions Served	T
Maximum Queue (ft)	173
Average Queue (ft)	85
95th Queue (ft)	153
Link Distance (ft)	1311
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 10: Highway 12 & Hoffman Rd

Movement	EB	NB	SB
Directions Served	L	LT	T
Maximum Queue (ft)	31	52	24
Average Queue (ft)	5	6	1
95th Queue (ft)	24	27	8
Link Distance (ft)	2490	1127	891
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 15: Highway 12 & 211th Lane

Movement
Directions Served
Maximum Queue (ft)
Average Queue (ft)
95th Queue (ft)
Link Distance (ft)
Upstream Blk Time (%)
Queuing Penalty (veh)
Storage Bay Dist (ft)
Storage Blk Time (%)
Queuing Penalty (veh)

Network Summary

Network wide Queuing Penalty: 0

2025 PM No Build Synchro Report

HCM 6th ROUNDABOUT	
Node #	10
Zone:	
X East (ft):	3088
Y North (ft):	-1385
Z Elevation (ft):	0
Description	
Max v/c Ratio:	0.12
Intersection Delay (s):	2.7
Intersection LOS:	A
ICU:	0.29
ICU LOS:	A
Inside Radius (ft):	28
Outside Radius (ft):	60
Roundabout Lanes (#):	1
Circle Speed (mph):	18
Inside Color:	
Transparent Circle:	☐

HCM 6th ROUNDABOUT	EB			NB			SB		
Entry Lanes	1			1			1		
Conflicting Circle Lanes	1			1			1		
Exit Lanes	1			1			1		
Adjusted Approach Flow (vph)	112			152			288		
Demand Flow Rate (pc/h)	115			155			294		
Vehicles Circulating (pc/h)	162			84			22		
Vehicles Exiting (pc/h)	22			162			217		
Ped Vol. Crossing Leg (#/hr)	0			0			0		
Ped Capacity Adjustment	1.000			1.000			1.000		
Approach Delay (sec/veh)	2.7			3.9			2.0		
Approach LOS	A			A			A		
Lane	Left	—	Bypass	Left	—	—	Left	—	Bypass
Follow-Up Headway (s)	2.609	—	—	2.609	—	—	2.609	—	—
Critical Headway (s)	4.976	—	—	4.976	—	—	4.976	—	—
Designated Moves	L	—	R	LT	—	—	T	—	R
Assumed Moves	L	—	—	LT	—	—	T	—	—
Right Turn Channelized	—	—	Free	—	—	Free	—	—	Free
Lane Utilization	1.000	—	—	1.000	—	—	1.000	—	—
Entry Flow Rate (pc/h)	84	—	31	155	—	—	162	—	132
Capacity, Entry Lane (pc/h)	1170	—	1938	1267	—	—	1349	—	1938
Entry HV Adjustment Factor	0.976	—	0.980	0.983	—	—	0.980	—	0.980
Flow Rate, Entry (vph)	82	—	30	152	—	—	159	—	129
Capacity, Entry (vph)	1142	—	1900	1245	—	—	1323	—	1900
Volume to Capacity Ratio	0.072	—	0.016	0.122	—	—	0.120	—	0.068
Control Delay (sec/veh)	3.8	—	0.0	3.9	—	—	3.7	—	0.0
Level of Service	A	—	A	A	—	—	A	—	A
95th-Percentile Queue (veh)	0	—	0	0	—	—	0	—	0

2025 PM No Build

2045 AM Build SimTraffic Report

5: TH 22 & Hoffman Rd Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Denied Del/Veh (s)	0.3	0.3	3.2	1.5	1.0	1.7	2.4	0.3	2.3	2.9	0.5	2.6
Total Del/Veh (s)	71.1	37.0	7.4	58.2	50.2	17.6	39.9	46.3	23.0	84.4	29.7	5.1

5: TH 22 & Hoffman Rd Performance by movement

Movement	All
Denied Del/Veh (s)	1.2
Total Del/Veh (s)	40.9

10: Highway 12 & Hoffman Rd Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Denied Del/Veh (s)	0.0	0.0	0.0	0.3	0.5	2.0	0.0	0.0	0.0	0.3	0.2	0.3
Total Del/Veh (s)	10.2	4.3	6.5	12.1	12.4	6.7	136.7	123.1	104.4	9.6	11.4	3.5

10: Highway 12 & Hoffman Rd Performance by movement

Movement	All
Denied Del/Veh (s)	0.2
Total Del/Veh (s)	41.6

15: Highway 12 & 211th Lane Performance by movement

Movement	WBL	WBR	NBT	NBR	SBL	SBT	All
Denied Del/Veh (s)	0.1	0.1	0.9	2.5	1.8	0.1	0.6
Total Del/Veh (s)	55.7	50.7	63.0	27.1	8.4	1.7	39.5

Total Network Performance

Denied Del/Veh (s)	1.1
Total Del/Veh (s)	65.4

Intersection: 5: TH 22 & Hoffman Rd

Movement	EB	EB	EB	WB	WB	WB	NB	NB	NB	NB	SB	SB
Directions Served	L	T	R	L	T	R	L	T	T	R	L	T
Maximum Queue (ft)	246	417	255	325	900	325	89	341	315	191	325	484
Average Queue (ft)	157	250	28	164	429	180	41	249	218	108	253	201
95th Queue (ft)	233	387	129	345	786	383	75	340	314	175	359	433
Link Distance (ft)	1142	1142			2488			1490	1490			1323
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)			230	300		300	300			300	300	
Storage Blk Time (%)		13	0	0	13	0		2	0		14	
Queuing Penalty (veh)		2	0	0	65	2		1	0		32	

Intersection: 5: TH 22 & Hoffman Rd

Movement	SB
Directions Served	T
Maximum Queue (ft)	481
Average Queue (ft)	142
95th Queue (ft)	334
Link Distance (ft)	1323
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 10: Highway 12 & Hoffman Rd

Movement	EB	EB	WB	WB	NB	NB	SB	SB
Directions Served	LT	R	LT	R	LT	R	LT	R
Maximum Queue (ft)	117	42	138	52	1132	225	152	41
Average Queue (ft)	39	5	64	35	812	172	59	8
95th Queue (ft)	77	27	108	52	1456	329	113	34
Link Distance (ft)	2488		1670		1128		891	891
Upstream Blk Time (%)					4			
Queuing Penalty (veh)					36			
Storage Bay Dist (ft)		200		200		200		
Storage Blk Time (%)					77	0		
Queuing Penalty (veh)					52	1		

Intersection: 15: Highway 12 & 211th Lane

Movement	WB	NB	NB	SB
Directions Served	LR	T	R	L
Maximum Queue (ft)	108	1165	325	53
Average Queue (ft)	29	431	32	14
95th Queue (ft)	73	1186	193	40
Link Distance (ft)	1382	1240		
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)			300	300
Storage Blk Time (%)		45		
Queuing Penalty (veh)		4		

Network Summary

Network wide Queuing Penalty: 197

2045 AM Build Synchro Report

HCM 6th ROUNDABOUT	
Node #	10
Zone:	
X East (ft):	3088
Y North (ft):	-1385
Z Elevation (ft):	0
Description	
Max v/c Ratio:	0.71
Intersection Delay (s):	9.1
Intersection LOS:	A
ICU:	0.86
ICU LOS:	E
Inside Radius (ft):	28
Outside Radius (ft):	60
Roundabout Lanes (#):	1
Circle Speed (mph):	18
Inside Color:	
Transparent Circle:	☐

HCM 6th ROUNDABOUT	EB			WB			NB			SB		
Entry Lanes	1			1			1			1		
Conflicting Circle Lanes	1			1			1			1		
Exit Lanes	1			1			1			1		
Adjusted Approach Flow (vph)	255			398			768			597		
Demand Flow Rate (pc/h)	260			406			783			609		
Vehicles Circulating (pc/h)	407			807			307			449		
Vehicles Exiting (pc/h)	350			215			316			633		
Ped Vol. Crossing Leg (#/hr)	0			0			0			0		
Ped Capacity Adjustment	1.000			1.000			1.000			1.000		
Approach Delay (sec/veh)	5.4			9.0			14.1			4.2		
Approach LOS	A			A			B			A		
Lane	Left	—	Bypass	Left	—	Bypass	Left	—	Bypass	Left	—	Bypass
Follow-Up Headway (s)	2.609	—	—	2.609	—	—	2.609	—	—	2.609	—	—
Critical Headway (s)	4.976	—	—	4.976	—	—	4.976	—	—	4.976	—	—
Designated Moves	LT	—	R	LT	—	R	LT	—	R	LT	—	R
Assumed Moves	LT	—	—	LT	—	—	LT	—	—	LT	—	—
Right Turn Channelized	—	—	Free	—	—	Free	—	—	Free	—	—	Free
Lane Utilization	1.000	—	—	1.000	—	—	1.000	—	—	1.000	—	—
Entry Flow Rate (pc/h)	216	—	44	275	—	131	715	—	68	308	—	301
Capacity, Entry Lane (pc/h)	911	—	1938	606	—	1938	1009	—	1938	873	—	1938
Entry HV Adjustment Factor	0.979	—	0.980	0.980	—	0.980	0.981	—	0.980	0.980	—	0.980
Flow Rate, Entry (vph)	212	—	43	270	—	128	701	—	67	302	—	295
Capacity, Entry (vph)	892	—	1900	594	—	1900	990	—	1900	855	—	1900
Volume to Capacity Ratio	0.237	—	0.023	0.454	—	0.067	0.709	—	0.035	0.353	—	0.155
Control Delay (sec/veh)	6.5	—	0.0	13.3	—	0.0	15.5	—	0.0	8.3	—	0.0
Level of Service	A	—	A	B	—	A	C	—	A	A	—	A
95th-Percentile Queue (veh)	1	—	0	2	—	0	6	—	0	2	—	1

2045 AM Build

2045 AM Build Synchro Report
Highway 12 and 211th Lane

15: Highway 12 & 211th Lane Performance by movement

Movement	WBL	WBR	NBT	NBR	SBL	SBT	All
Denied Del/Veh (s)	0.1	0.1	1.0	1.9	3.3	0.5	0.8
Total Del/Veh (s)	44.3	19.0	2.7	0.5	11.6	0.4	3.1

Queuing and Blocking Report
Baseline

Intersection: 15: Highway 12 & 211th Lane

Movement	WB	SB
Directions Served	LR	L
Maximum Queue (ft)	105	53
Average Queue (ft)	28	16
95th Queue (ft)	70	44
Link Distance (ft)	1382	
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		300
Storage Blk Time (%)		
Queuing Penalty (veh)		

2045 Build at 211th Ln (without RaB impact) – SimTraffic does not model RaB correctly

2045 AM Build SimTraffic Report with Mitigation Strategies

5: TH 22 & Hoffman Rd Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Denied Del/Veh (s)	0.3	0.3	3.5	1.7	0.8	1.7	2.3	0.3	2.3	2.8	0.4	2.7
Total Del/Veh (s)	44.7	41.0	13.3	53.2	43.9	41.3	42.3	48.3	24.8	42.6	20.4	4.7

5: TH 22 & Hoffman Rd Performance by movement

Movement	All
Denied Del/Veh (s)	1.2
Total Del/Veh (s)	37.2

10: Highway 12 & Hoffman Rd Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Denied Del/Veh (s)	0.0	0.0	0.0	0.4	0.5	2.0	0.0	0.0	0.0	0.2	0.3	0.3
Total Del/Veh (s)	10.7	4.4	5.7	15.1	13.2	6.6	110.9	86.4	85.2	7.3	10.1	3.7

10: Highway 12 & Hoffman Rd Performance by movement

Movement	All
Denied Del/Veh (s)	0.2
Total Del/Veh (s)	32.9

15: Highway 12 & 211th Lane Performance by movement

Movement	WBL	WBR	NBT	NBR	SBL	SBT	All
Denied Del/Veh (s)	0.1	0.1	0.8	2.6	1.8	0.2	0.6
Total Del/Veh (s)	61.6	35.6	3.2	1.6	17.5	1.7	4.8

Total Network Performance

Denied Del/Veh (s)	1.1
Total Del/Veh (s)	47.9

Intersection: 5: TH 22 & Hoffman Rd

Movement	EB	EB	EB	WB	WB	WB	NB	NB	NB	NB	SB	SB
Directions Served	L	T	R	L	T	TR	L	T	T	R	L	T
Maximum Queue (ft)	270	374	255	256	405	447	324	414	416	325	260	237
Average Queue (ft)	125	242	32	113	254	304	62	251	222	109	162	100
95th Queue (ft)	211	380	157	194	376	418	157	360	338	221	260	172
Link Distance (ft)	1142	1142			2488			1490	1490			1311
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)			230	300		980	300			300	300	
Storage Blk Time (%)		15	0		3			4	1	0		
Queuing Penalty (veh)		3	0		23			2	3	0		

Intersection: 5: TH 22 & Hoffman Rd

Movement	SB
Directions Served	T
Maximum Queue (ft)	162
Average Queue (ft)	89
95th Queue (ft)	151
Link Distance (ft)	1311
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 10: Highway 12 & Hoffman Rd

Movement	EB	EB	WB	WB	NB	NB	SB	SB
Directions Served	LT	R	LT	R	LT	R	LT	R
Maximum Queue (ft)	133	35	186	88	1097	225	135	60
Average Queue (ft)	51	3	67	36	664	165	49	10
95th Queue (ft)	103	18	120	60	1163	329	93	39
Link Distance (ft)	2488		1670		1128		891	891
Upstream Blk Time (%)								
Queuing Penalty (veh)								
Storage Bay Dist (ft)		200		200		200		
Storage Blk Time (%)			0		85	0		
Queuing Penalty (veh)			0		58	1		

Intersection: 15: Highway 12 & 211th Lane

Movement	WB	NB	SB
Directions Served	LR	T	L
Maximum Queue (ft)	168	71	73
Average Queue (ft)	43	4	25
95th Queue (ft)	115	29	60
Link Distance (ft)	1382	1240	
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)			300
Storage Blk Time (%)			
Queuing Penalty (veh)			

Network Summary

Network wide Queuing Penalty: 90

2045 AM Build Synchro Report
with Mitigation Strategies

HCM 6th ROUNDABOUT	
Node #	10
Zone:	
X East (ft):	3088
Y North (ft):	-1385
Z Elevation (ft):	0
Description	
Max v/c Ratio:	0.71
Intersection Delay (s):	9.1
Intersection LOS:	A
ICU:	0.86
ICU LOS:	E
Inside Radius (ft):	28
Outside Radius (ft):	60
Roundabout Lanes (#):	1
Circle Speed (mph):	18
Inside Color:	
Transparent Circle:	☐

HCM 6th ROUNDABOUT	EB			WB			NB			SB		
Entry Lanes	1			1			1			1		
Conflicting Circle Lanes	1			1			1			1		
Exit Lanes	1			1			1			1		
Adjusted Approach Flow (vph)	255			398			768			597		
Demand Flow Rate (pc/h)	260			406			783			609		
Vehicles Circulating (pc/h)	407			807			307			449		
Vehicles Exiting (pc/h)	350			215			316			633		
Ped Vol. Crossing Leg (#/hr)	0			0			0			0		
Ped Capacity Adjustment	1.000			1.000			1.000			1.000		
Approach Delay (sec/veh)	5.4			9.0			14.1			4.2		
Approach LOS	A			A			B			A		
Lane	Left	—	Bypass	Left	—	Bypass	Left	—	Bypass	Left	—	Bypass
Follow-Up Headway (s)	2.609	—	—	2.609	—	—	2.609	—	—	2.609	—	—
Critical Headway (s)	4.976	—	—	4.976	—	—	4.976	—	—	4.976	—	—
Designated Moves	LT	—	R	LT	—	R	LT	—	R	LT	—	R
Assumed Moves	LT	—	—	LT	—	—	LT	—	—	LT	—	—
Right Turn Channelized	—	—	Free	—	—	Free	—	—	Free	—	—	Free
Lane Utilization	1.000	—	—	1.000	—	—	1.000	—	—	1.000	—	—
Entry Flow Rate (pc/h)	216	—	44	275	—	131	715	—	68	308	—	301
Capacity, Entry Lane (pc/h)	911	—	1938	606	—	1938	1009	—	1938	873	—	1938
Entry HV Adjustment Factor	0.979	—	0.980	0.980	—	0.980	0.981	—	0.980	0.980	—	0.980
Flow Rate, Entry (vph)	212	—	43	270	—	128	701	—	67	302	—	295
Capacity, Entry (vph)	892	—	1900	594	—	1900	990	—	1900	855	—	1900
Volume to Capacity Ratio	0.237	—	0.023	0.454	—	0.067	0.709	—	0.035	0.353	—	0.155
Control Delay (sec/veh)	6.5	—	0.0	13.3	—	0.0	15.5	—	0.0	8.3	—	0.0
Level of Service	A	—	A	B	—	A	C	—	A	A	—	A
95th-Percentile Queue (veh)	1	—	0	2	—	0	6	—	0	2	—	1

2045 AM Build w/mitigation

2045 AM No Build SimTraffic Report

5: TH 22 & Hoffman Rd Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Denied Del/Veh (s)	0.3	0.3	2.8	1.4	0.7	1.6	2.4	0.3	2.4	2.8	0.4	2.7
Total Del/Veh (s)	32.5	28.9	6.1	38.3	50.9	25.7	48.6	33.6	15.1	47.4	20.1	4.2

5: TH 22 & Hoffman Rd Performance by movement

Movement	All
Denied Del/Veh (s)	1.1
Total Del/Veh (s)	30.4

10: Highway 12 & Hoffman Rd Performance by movement

Movement	EBL	EBT	EBR	NBL	NBT	SBT	SBR	All
Denied Del/Veh (s)	0.0	0.0	0.0	0.0	0.0	0.2	0.2	0.0
Total Del/Veh (s)	6.8	3.0	4.8	6.0	7.7	6.7	3.4	5.1

15: Highway 12 & 211th Lane Performance by movement

Movement	WBR	NBT	SBL	SBT	All
Denied Del/Veh (s)	0.1	0.6	3.0	0.1	0.5
Total Del/Veh (s)	7.2	1.1	1.7	0.6	1.0

Total Network Performance

Denied Del/Veh (s)	1.0
Total Del/Veh (s)	28.4

Intersection: 5: TH 22 & Hoffman Rd

Movement	EB	EB	EB	WB	WB	WB	NB	NB	NB	NB	SB	SB
Directions Served	L	T	R	L	T	R	L	T	T	R	L	T
Maximum Queue (ft)	161	294	31	255	942	255	114	295	298	166	282	171
Average Queue (ft)	101	158	10	103	316	147	43	179	163	73	147	76
95th Queue (ft)	149	244	32	233	670	302	88	254	243	135	219	130
Link Distance (ft)	1142	1142			2490			1490	1490			1311
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)			230	230		230	300			300	300	
Storage Blk Time (%)		1			18	1		0	0		0	
Queuing Penalty (veh)		0			74	4		0	0		0	

Intersection: 5: TH 22 & Hoffman Rd

Movement	SB
Directions Served	T
Maximum Queue (ft)	138
Average Queue (ft)	61
95th Queue (ft)	109
Link Distance (ft)	1311
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 10: Highway 12 & Hoffman Rd

Movement	EB	NB	SB	SB
Directions Served	L	LT	T	R
Maximum Queue (ft)	56	95	68	40
Average Queue (ft)	17	30	20	3
95th Queue (ft)	51	74	52	18
Link Distance (ft)	2490	1127	891	891
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 15: Highway 12 & 211th Lane

Movement	WB	SB
Directions Served	LR	L
Maximum Queue (ft)	21	26
Average Queue (ft)	5	2
95th Queue (ft)	19	12
Link Distance (ft)	1382	
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		300
Storage Blk Time (%)		
Queuing Penalty (veh)		

Network Summary

Network wide Queuing Penalty: 78

2045 AM No Build Synchro Report

HCM 6th ROUNDABOUT	
Node #	10
Zone:	
X East (ft):	3088
Y North (ft):	-1385
Z Elevation (ft):	0
Description	
Max v/c Ratio:	0.55
Intersection Delay (s):	5.8
Intersection LOS:	A
ICU:	0.58
ICU LOS:	B
Inside Radius (ft):	28
Outside Radius (ft):	60
Roundabout Lanes (#):	1
Circle Speed (mph):	18
Inside Color:	
Transparent Circle:	☐

HCM 6th ROUNDABOUT	EB			NB			SB		
Entry Lanes	1			1			1		
Conflicting Circle Lanes	1			1			1		
Exit Lanes	1			1			1		
Adjusted Approach Flow (vph)	120			675			498		
Demand Flow Rate (pc/h)	123			688			508		
Vehicles Circulating (pc/h)	207			92			162		
Vehicles Exiting (pc/h)	162			207			618		
Ped Vol. Crossing Leg (#/hr)	0			0			0		
Ped Capacity Adjustment	1.000			1.000			1.000		
Approach Delay (sec/veh)	3.0			9.1			1.9		
Approach LOS	A			A			A		
Lane	Left	—	Bypass	Left	—	—	Left	—	Bypass
Follow-Up Headway (s)	2.609	—	—	2.609	—	—	2.609	—	—
Critical Headway (s)	4.976	—	—	4.976	—	—	4.976	—	—
Designated Moves	L	—	R	LT	—	—	T	—	R
Assumed Moves	L	—	—	LT	—	—	T	—	—
Right Turn Channelized	—	—	Free	—	—	Free	—	—	Free
Lane Utilization	1.000	—	—	1.000	—	—	1.000	—	—
Entry Flow Rate (pc/h)	92	—	31	688	—	—	207	—	301
Capacity, Entry Lane (pc/h)	1117	—	1938	1256	—	—	1170	—	1938
Entry HV Adjustment Factor	0.978	—	0.980	0.981	—	—	0.980	—	0.980
Flow Rate, Entry (vph)	90	—	30	675	—	—	203	—	295
Capacity, Entry (vph)	1093	—	1900	1232	—	—	1147	—	1900
Volume to Capacity Ratio	0.082	—	0.016	0.548	—	—	0.177	—	0.155
Control Delay (sec/veh)	4.0	—	0.0	9.1	—	—	4.7	—	0.0
Level of Service	A	—	A	A	—	—	A	—	A
95th-Percentile Queue (veh)	0	—	0	3	—	—	1	—	1

2045 AM No Build

2045 PM No Build SimTraffic Report

5: TH 22 & Hoffman Rd Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Denied Del/Veh (s)	0.2	0.2	2.8	0.0	0.0	0.1	3.0	0.2	2.6	2.3	0.6	2.0
Total Del/Veh (s)	27.7	34.9	11.2	34.0	37.3	10.5	47.8	26.4	9.6	41.8	17.8	6.0

5: TH 22 & Hoffman Rd Performance by movement

Movement	All
Denied Del/Veh (s)	0.7
Total Del/Veh (s)	23.2

10: Highway 12 & Hoffman Rd Performance by movement

Movement	EBL	EBT	EBR	NBL	NBT	SBT	SBR	All
Denied Del/Veh (s)	0.0	0.0	0.0	0.0	0.0	0.4	0.3	0.2
Total Del/Veh (s)	8.2	2.6	5.7	4.9	8.0	10.1	4.5	6.5

15: Highway 12 & 211th Lane Performance by movement

Movement	WBR	NBT	SBL	SBT	All
Denied Del/Veh (s)	0.1	0.3	1.3	0.2	0.2
Total Del/Veh (s)	4.4	0.5	3.5	1.2	1.0

Total Network Performance

Denied Del/Veh (s)	0.7
Total Del/Veh (s)	22.5

Intersection: 5: TH 22 & Hoffman Rd

Movement	EB	EB	EB	WB	WB	WB	NB	NB	NB	NB	SB	SB
Directions Served	L	T	R	L	T	R	L	T	T	R	L	T
Maximum Queue (ft)	128	198	78	136	213	103	70	270	246	64	324	339
Average Queue (ft)	75	115	19	77	99	48	23	155	138	29	154	181
95th Queue (ft)	123	185	53	131	172	88	52	228	217	61	241	295
Link Distance (ft)	1142	1142			2490			1490	1490			1311
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)			230	230		230	300			300	300	
Storage Blk Time (%)					0							0
Queuing Penalty (veh)					0							1

Intersection: 5: TH 22 & Hoffman Rd

Movement	SB
Directions Served	T
Maximum Queue (ft)	301
Average Queue (ft)	166
95th Queue (ft)	261
Link Distance (ft)	1311
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	0
Queuing Penalty (veh)	0

Intersection: 10: Highway 12 & Hoffman Rd

Movement	EB	EB	NB	SB	SB
Directions Served	L	R	LT	T	R
Maximum Queue (ft)	55	47	66	185	40
Average Queue (ft)	30	5	23	44	3
95th Queue (ft)	62	28	58	121	20
Link Distance (ft)	2490		1127	891	891
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (ft)		200			
Storage Blk Time (%)					
Queuing Penalty (veh)					

Intersection: 15: Highway 12 & 211th Lane

Movement	WB	SB
Directions Served	LR	L
Maximum Queue (ft)	20	28
Average Queue (ft)	1	9
95th Queue (ft)	7	30
Link Distance (ft)	1382	
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		300
Storage Blk Time (%)		
Queuing Penalty (veh)		

Network Summary

Network wide Queuing Penalty: 1

2045 PM No Build Synchro Report

HCM 6th ROUNDABOUT	
Node #	10
Zone:	
X East (ft):	3088
Y North (ft):	-1385
Z Elevation (ft):	0
Description	
Max v/c Ratio:	0.44
Intersection Delay (s):	5.2
Intersection LOS:	A
ICU:	0.68
ICU LOS:	C
Inside Radius (ft):	28
Outside Radius (ft):	60
Roundabout Lanes (#):	1
Circle Speed (mph):	18
Inside Color:	
Transparent Circle:	☐

HCM 6th ROUNDABOUT	EB			NB			SB		
Entry Lanes	1			1			1		
Conflicting Circle Lanes	1			1			1		
Exit Lanes	1			1			1		
Adjusted Approach Flow (vph)	148			530			996		
Demand Flow Rate (pc/h)	151			541			1016		
Vehicles Circulating (pc/h)	559			110			79		
Vehicles Exiting (pc/h)	79			559			572		
Ped Vol. Crossing Leg (#/hr)	0			0			0		
Ped Capacity Adjustment	1.000			1.000			1.000		
Approach Delay (sec/veh)	4.5			7.5			4.0		
Approach LOS	A			A			A		
Lane	Left	—	Bypass	Left	—	—	Left	—	Bypass
Follow-Up Headway (s)	2.609	—	—	2.609	—	—	2.609	—	—
Critical Headway (s)	4.976	—	—	4.976	—	—	4.976	—	—
Designated Moves	L	—	R	LT	—	—	T	—	R
Assumed Moves	L	—	—	LT	—	—	T	—	—
Right Turn Channelized	—	—	Free	—	—	Free	—	—	Free
Lane Utilization	1.000	—	—	1.000	—	—	1.000	—	—
Entry Flow Rate (pc/h)	110	—	41	541	—	—	559	—	457
Capacity, Entry Lane (pc/h)	780	—	1938	1233	—	—	1273	—	1938
Entry HV Adjustment Factor	0.982	—	0.980	0.980	—	—	0.980	—	0.980
Flow Rate, Entry (vph)	108	—	40	530	—	—	548	—	448
Capacity, Entry (vph)	766	—	1900	1208	—	—	1248	—	1900
Volume to Capacity Ratio	0.141	—	0.021	0.439	—	—	0.439	—	0.236
Control Delay (sec/veh)	6.2	—	0.0	7.5	—	—	7.3	—	0.0
Level of Service	A	—	A	A	—	—	A	—	A
95th-Percentile Queue (veh)	0	—	0	2	—	—	2	—	1

2045 PM No Build

2045 PM Build SimTraffic Report

5: TH 22 & Hoffman Rd Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Denied Del/Veh (s)	0.3	0.2	3.0	0.0	0.0	0.0	2.1	0.2	2.4	2.4	0.7	2.2
Total Del/Veh (s)	29.8	42.3	12.5	39.6	38.4	22.7	42.0	34.4	13.9	43.2	24.2	7.6

5: TH 22 & Hoffman Rd Performance by movement

Movement	All
Denied Del/Veh (s)	0.8
Total Del/Veh (s)	29.5

10: Highway 12 & Hoffman Rd Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Denied Del/Veh (s)	0.0	0.0	0.0	0.2	0.3	2.3	0.8	1.5	0.4	82.9	95.4	98.2
Total Del/Veh (s)	23.4	8.6	7.0	15.7	17.2	6.0	96.1	95.7	51.4	181.3	187.6	21.9

10: Highway 12 & Hoffman Rd Performance by movement

Movement	All
Denied Del/Veh (s)	37.0
Total Del/Veh (s)	70.8

15: Highway 12 & 211th Lane Performance by movement

Movement	WBL	WBR	NBT	NBR	SBL	SBT	All
Denied Del/Veh (s)	0.1	0.1	0.5	3.0	1.1	0.2	0.4
Total Del/Veh (s)	15.9	4.4	1.1	0.1	5.5	2.9	2.4

Total Network Performance

Denied Del/Veh (s)	19.7
Total Del/Veh (s)	59.6

Intersection: 5: TH 22 & Hoffman Rd

Movement	EB	EB	EB	WB	WB	WB	NB	NB	NB	NB	SB	SB
Directions Served	L	T	R	L	T	TR	L	T	T	R	L	T
Maximum Queue (ft)	157	333	250	154	242	324	67	303	291	104	325	436
Average Queue (ft)	76	199	34	79	99	157	21	202	180	45	205	238
95th Queue (ft)	128	309	132	137	191	264	54	281	265	89	318	352
Link Distance (ft)	1142	1142			2488			1490	1490			1311
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)			230	250		980	300			300	300	
Storage Blk Time (%)		8	0		0			0	0		0	3
Queuing Penalty (veh)		2	0		0			0	0		3	8

Intersection: 5: TH 22 & Hoffman Rd

Movement	SB	SB
Directions Served	T	R
Maximum Queue (ft)	448	325
Average Queue (ft)	243	32
95th Queue (ft)	368	193
Link Distance (ft)	1311	
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		300
Storage Blk Time (%)	4	0
Queuing Penalty (veh)	9	0

Intersection: 10: Highway 12 & Hoffman Rd

Movement	EB	EB	WB	WB	NB	NB	SB	SB
Directions Served	LT	R	LT	R	LT	R	LT	R
Maximum Queue (ft)	202	44	174	75	757	225	930	930
Average Queue (ft)	89	10	78	32	505	202	858	620
95th Queue (ft)	177	39	137	56	732	313	1024	1279
Link Distance (ft)	2488		1485		1128		891	891
Upstream Blk Time (%)							61	46
Queuing Penalty (veh)							0	0
Storage Bay Dist (ft)		200		200		200		
Storage Blk Time (%)	0				89	0		
Queuing Penalty (veh)	0				81	1		

Intersection: 15: Highway 12 & 211th Lane

Movement	WB	SB
Directions Served	LR	L
Maximum Queue (ft)	22	52
Average Queue (ft)	15	15
95th Queue (ft)	29	41
Link Distance (ft)	1382	
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		300
Storage Blk Time (%)		
Queuing Penalty (veh)		

Network Summary

Network wide Queuing Penalty: 106

2045 PM Build Synchro Report

HCM 6th ROUNDABOUT	
Node #	10
Zone:	
X East (ft):	3088
Y North (ft):	-1385
Z Elevation (ft):	0
Description	
Max v/c Ratio:	0.71
Intersection Delay (s):	9.9
Intersection LOS:	A
ICU:	0.99
ICU LOS:	F
Inside Radius (ft):	28
Outside Radius (ft):	60
Roundabout Lanes (#):	1
Circle Speed (mph):	18
Inside Color:	
Transparent Circle:	☐

HCM 6th ROUNDABOUT	EB			WB			NB			SB		
Entry Lanes	1			1			1			1		
Conflicting Circle Lanes	1			1			1			1		
Exit Lanes	1			1			1			1		
Adjusted Approach Flow (vph)	340			335			650			1138		
Demand Flow Rate (pc/h)	346			342			663			1161		
Vehicles Circulating (pc/h)	788			674			417			322		
Vehicles Exiting (pc/h)	238			307			657			584		
Ped Vol. Crossing Leg (#/hr)	0			0			0			0		
Ped Capacity Adjustment	1.000			1.000			1.000			1.000		
Approach Delay (sec/veh)	11.0			6.5			11.7			9.5		
Approach LOS	B			A			B			A		
Lane	Left	—	Bypass	Left	—	Bypass	Left	—	Bypass	Left	—	Bypass
Follow-Up Headway (s)	2.609	—	—	2.609	—	—	2.609	—	—	2.609	—	—
Critical Headway (s)	4.976	—	—	4.976	—	—	4.976	—	—	4.976	—	—
Designated Moves	LT	—	R	LT	—	R	LT	—	R	LT	—	R
Assumed Moves	LT	—	—	LT	—	—	LT	—	—	LT	—	—
Right Turn Channelized	—	—	Free	—	—	Free	—	—	Free	—	—	Free
Lane Utilization	1.000	—	—	1.000	—	—	1.000	—	—	1.000	—	—
Entry Flow Rate (pc/h)	286	—	60	232	—	110	564	—	99	704	—	457
Capacity, Entry Lane (pc/h)	618	—	1938	694	—	1938	902	—	1938	994	—	1938
Entry HV Adjustment Factor	0.981	—	0.980	0.979	—	0.980	0.980	—	0.980	0.980	—	0.980
Flow Rate, Entry (vph)	281	—	59	227	—	108	553	—	97	690	—	448
Capacity, Entry (vph)	606	—	1900	679	—	1900	884	—	1900	974	—	1900
Volume to Capacity Ratio	0.463	—	0.031	0.334	—	0.057	0.625	—	0.051	0.709	—	0.236
Control Delay (sec/veh)	13.3	—	0.0	9.6	—	0.0	13.7	—	0.0	15.7	—	0.0
Level of Service	B	—	A	A	—	A	B	—	A	C	—	A
95th-Percentile Queue (veh)	2	—	0	1	—	0	5	—	0	6	—	1

2045 PM Build

Wetland Delineation Report and Minnesota Wetland Conservation Act Notice of Decision

BOARD OF WATER AND SOIL RESOURCES

Minnesota Wetland Conservation Act
Notice of Decision

Local Government Unit: Blue Earth County	**County:** Blue Earth
Applicant Name: Mesenbrink Development	**Applicant Representative:** Wayne Jacobson – Jacobson Environmental
Project Name: Mesenbrink Wetland Delineation #2	**LGU Project No. (if any):** PL2021195
Date Application Received by LGU: 12/29/21	
Date of LGU Decision: 2/22/2022	
Date this Notice was Sent: 2/22/22	

WCA Decision Type - check all that apply

☒Wetland Boundary/Type ☐Sequencing ☐Replacement Plan ☐Bank Plan (not credit purchase)
☐No-Loss (8420.0415) ☐Exemption (8420.0420)
Part: ☐ A ☐ B ☐ C ☐ D ☐ E ☐ F ☐ G ☐ H Subpart: ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6 ☐ 7 ☐ 8 ☐ 9

Replacement Plan Impacts (replacement plan decisions only)

Total WCA Wetland Impact Area:
Wetland Replacement Type: ☐ Project Specific Credits: ☐ Bank 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 approval is not valid until BWSR confirms the withdrawal of any required wetland bank credits. For project-specific replacement a financial assurance per MN Rule 8420.0522, Subp. 9 and evidence that all required forms have been recorded on the title of the property on which the replacement wetland is located must be provided to the LGU for the approval to be valid.*

LGU Findings – Attach document(s) and/or insert narrative providing the basis for the LGU decision[1].

☐ Attachment(s) (specify):
☒ Summary: Ashley Mack of Jacobson Environmental submitted a wetland delineation on behalf of Mesenbrink Development. The submitted delineation identifies 12 wetland basins. This property was previously delineated in 2021 by Paul Brandt of Soil Investigations and Design. The previous wetland delineation Boundary/Type application was denied for not identifying all of the wetlands on the site. According to MN 8420.0310 Blue Earth County reviewed the submitted report with the TEP at regularly scheduled TEP meetings and found the report to be mostly accurate. On January 25th, 2022 revision to some of the basins were requested. On January 26th revisions to the requested basins were submitted in an amended report. The amended report was again reviewed and found that it needed to be amended again to fix an error. On January 31st, 2022 a final copy of the report was submitted and reviewed by the TEP. The TEP is in concurrence that 12 wetlands exist on the site and that the boundaries appear accurate.

For more information regarding this application go to:
https://cityview.blueearthcountymn.gov/CityViewPortal/Planning/Status?planningId=14720

[1] *Findings must consider any TEP recommendations.*

Attached Project Documents

☒ Site Location Map ☒ Project Plan(s)/Descriptions/Reports (specify): Delineation Boundary Map

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 $500.00 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: Dan Girolamo	
☐ Watershed District or Watershed Mgmt. Org.:	
☒ Applicant (notice only): Mesenbrink Development – John Mesenbrink ☒ Agent/Consultant (notice only): Wayne Jacobson – Jacobson Environmental	

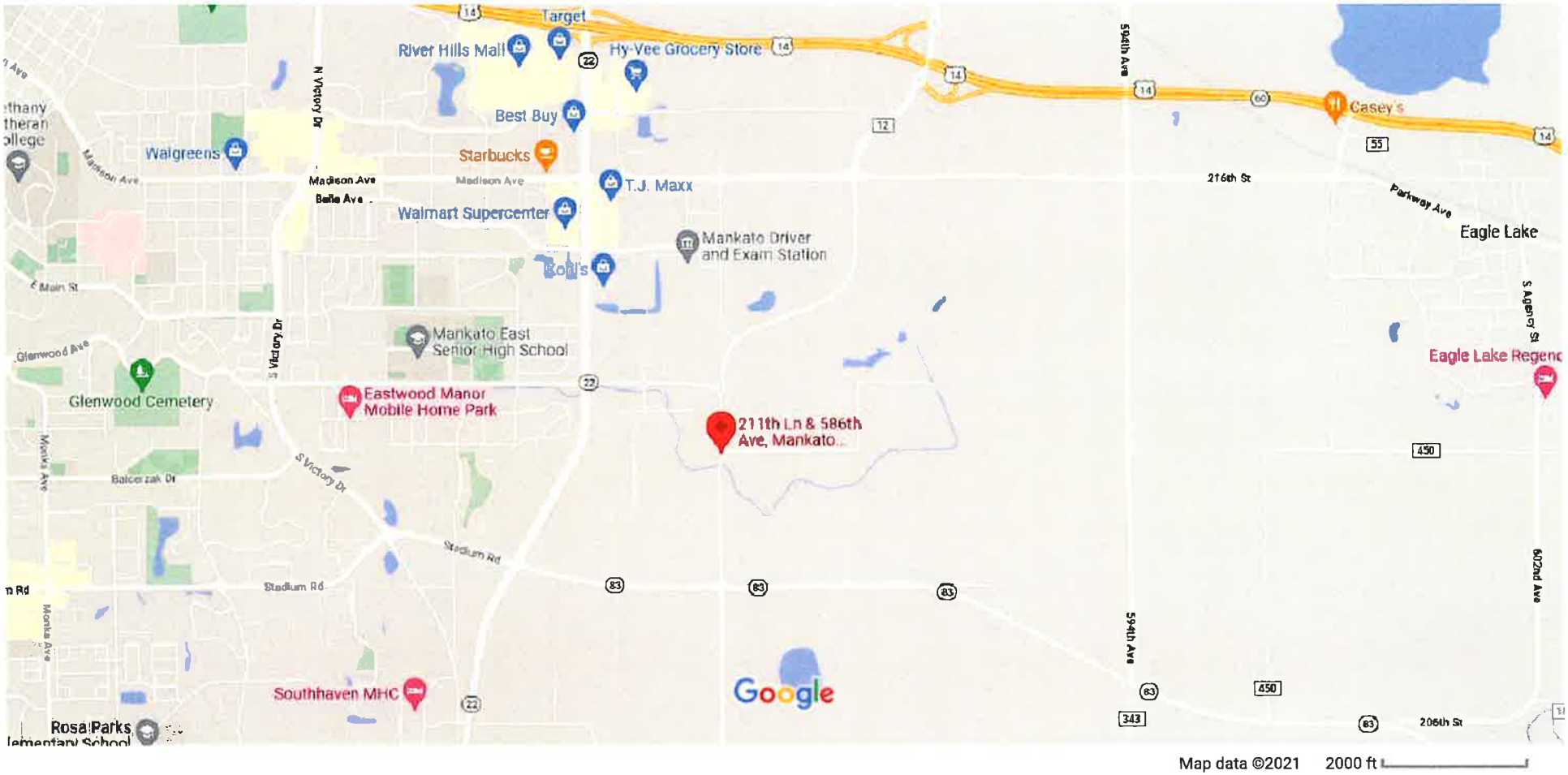
Optional or As Applicable:

☒ Corps of Engineers: David Studenski and Raelene Hegge	
☐ BWSR Wetland Mitigation Coordinator (required for bank plan applications only):	
☐ Members of the Public (notice only):	☒ Other: Chris Talamantez, Molly Westman – City of Mankato

Signature:	**Date:**
Dave Lynch	2/22/22

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.

Figure 1 Site Map



Jacobson Environmental, PLLC www.jacobsonenvironmental.com
Environmental Consultants Wayne Jacobson, P.S.S., W.D.C., P.W.S., A.F.S.

5821 Humboldt Avenue North, Brooklyn Center, MN 55430 **(612) 802-6619 Cell**
Email: jacobsonenv@msn.com

1.0 SUMMARY

Jacobson Environmental, PLLC (JE) visited the project site at PIDs R430915400003 and R430915400009 on November 29, 2021. The site was approximately 106.63 acres in size, and was located at Sec. 15, T108W, R26W, Mankato, Minnesota. See Figure 1 for a Site Location Map.

The purpose of the investigation was to identify areas within the project boundary meeting the technical criteria for wetlands, delineate the jurisdictional extent of the wetland basins, and classify the wetland habitat according to the 1987 U.S. Army Corps of Engineers Wetland Delineation Manual and the 2010 Regional Supplement to the Corps of Engineers Wetland Delineation: Midwest Region.

Wetlands are areas that are saturated or inundated with surface and or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in hydric soil conditions. Examples of wetlands include seasonally flooded basins, floodplain forests, wet meadows, shallow and deep marshes, shrub swamps, wooded swamps, fens, and bogs.

Wetland boundaries were determined through both a level one off-site hydrology analysis and a level two on site delineation.

Twelve basins were delineated within the project area, which are summarized below and shown on Figure 5.

Basin ID	Circular 39	Cowardin	Eggers & Reed	Dominant Vegetation	Size (acres)
1	Type 1/3/5/7	PEM1A/C/P UBH/PFO1 A	Seasonally flooded basin/shallow marsh/hardwood swamp/shallow open water community	Reed Canary Grass, Narrowleaf Cattail, Box Elder	21.50
2	Type 1	PEM2Af	Farmed seasonally flooded basin	-	0.069
3	Type 1	PEM2Af	Farmed seasonally flooded basin	-	1.63
4	Type 1	PEM2Af	Farmed seasonally flooded basin	-	0.327

5821 Humboldt Avenue North, Brooklyn Center, MN 55430 **(612) 802-6619 Cell**
Email: jacobsonenv@msn.com

5	Type 1	PEM2Af	Farmed seasonally flooded basin	-	0.267
6	Type 1	PEM2Af	Farmed seasonally flooded basin	-	0.620
7	Type 1	PEM2Af	Farmed seasonally flooded basin	-	0.325
8	Type 1	PEM2Af	Farmed seasonally flooded basin	-	0.148
9	Type 1	PEM2Af	Farmed seasonally flooded basin	-	1.71
10	Type 1	PEM2Af	Farmed seasonally flooded basin	-	1.30
12	Type 1	PEM2Af	Farmed seasonally flooded basin	-	0.119
15	Type 1	PEM2Af	Farmed seasonally flooded basin	-	0.575

All figures and appendices referenced by this report are presented at the end of the text.

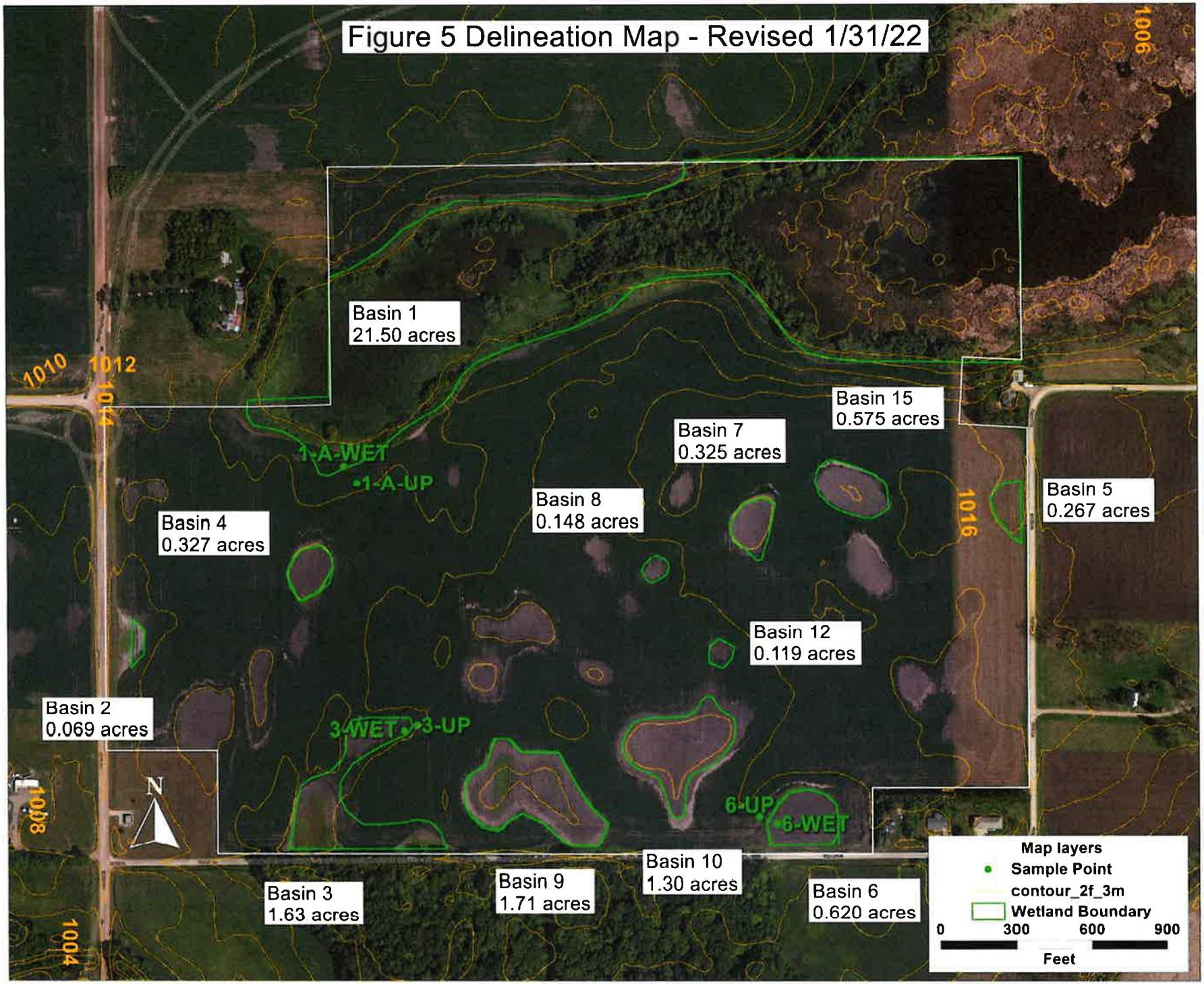


Figure 5 Delineation Map - Revised 1/31/22
1006
Basin 1
21.50 acres
1010
1012
1014
1-A-WET
1-A-UP
Basin 15
0.575 acres
Basin 7
0.325 acres
Basin 8
0.148 acres
Basin 4
0.327 acres
1016
Basin 5
0.267 acres
Basin 12
0.119 acres
Basin 2
0.069 acres
3-WET
3-UP
6-UP
6-WET
1008
N
Basin 10
1.30 acres
Basin 3
1.63 acres
Basin 9
1.71 acres
Basin 6
0.620 acres
1004
Map layers
Sample Point
contour_2f_3m
Wetland Boundary
0
300
600
900
Feet

Appendix C: Agency Correspondence

MnDNR Natural Heritage Determination Letter

Formal Natural Heritage Review - Cover Page

See next page for results of review. A draft watermark means the project details have not been finalized and the results are not official.

Project Name: Mesenbrink Residential Development

Project Proposer: Mesenbrink Construction & Engineering, Inc.

Project Type: Development, Mixed Use

Project Type Activities: Tree Removal;Wetland impacts (e.g., discharge, runoff, sedimentation, fill, excavation)

TRS: T108 R26 S15, T108 R26 S22

County(s): Blue Earth

DNR Admin Region(s): South

Reason Requested: State EAW

Project Description: Mesenbrink Construction & Engineering, Inc. is proposing a residential development project with a small commercial component along 586th Ave in Mankato ...

Existing Land Uses: Current landuse is mostly agricultural with the northern portion of the property covered in undeveloped green space.

Landcover / Habitat Impacted: Agricultural land will be developed to be suitable for building the abovementioned residential structures. Some tree removal around existing roadway boulevards will likely be removed.

Waterbodies Affected: A small wetland that intersects with the property is not anticipated to be directly impacted by the proposed work.

Groundwater Resources Affected: N/A

Previous Natural Heritage Review: No

Previous Habitat Assessments / Surveys: No

SUMMARY OF AUTOMATED RESULTS

Category	Results	Response By Category
Project Details	No Comments	No Further Review Required
Ecologically Significant Area	No Comments	No Further Review Required
State-Listed Endangered or Threatened Species	No Comments	No Further Review Required
State-Listed Species of Special Concern	No Comments	No Further Review Required
Federally Listed Species	No Records	Visit IPaC For Federal Review

DEPARTMENT OF NATURAL RESOURCES

Minnesota Department of Natural Resources
Division of Ecological & Water Resources
500 Lafayette Road, Box 25
St. Paul, MN 55155-4025

September 15, 2022

Project ID: MCE #2022-00619

Matthew Sitek
Bolton & Menk, Inc.
12224 Nicollet Avenue S
Burnsville, MN 55337-1649

RE: Automated Natural Heritage Review of the proposed Mesenbrink Residential Development
See Cover Page for location and project details.

Dear Matthew Sitek,

As requested, the above project has been reviewed for potential effects to rare features. Given the project details provided on the cover page, I do not believe the proposed project will negatively affect any known occurrences of rare features. 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.

Project Type and/or Project Type Activity Comments

- 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 below, all seven of Minnesota's bats, including the federally threatened northern long-eared bat (*Myotis septentrionalis*), can be found throughout Minnesota. 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 during the months of June and July.

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 rare or otherwise significant species, native plant communities, and other natural features. However, the NHIS is not an exhaustive inventory and thus does not represent all of the occurrences of rare features within 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 the project description provided on the cover page. If project details change or construction has not occurred within one year, please resubmit the project for review.

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 effects to these rare features. For information on the environmental review process or other natural resource concerns, you may 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,



Samantha Bump
Natural Heritage Review Specialist
Samantha.Bump@state.mn.us

Links: USFWS Information for Planning and Consultation (IPaC) tool
Information for Planning and Consultation (IPaC) tool
DNR Regional Environmental Assessment Ecologist Contact Info
https://www.dnr.state.mn.us/eco/ereview/erp_regioncontacts.html

Mesenbrink Residential Development

Aerial Imagery With Locator Map



N
W E
S

0 0.130.25 0.5 0.75 1 Miles

Project Boundary

Project Type: Development, Mixed Use

Project Size (acres): 102.74

County(s): Blue Earth

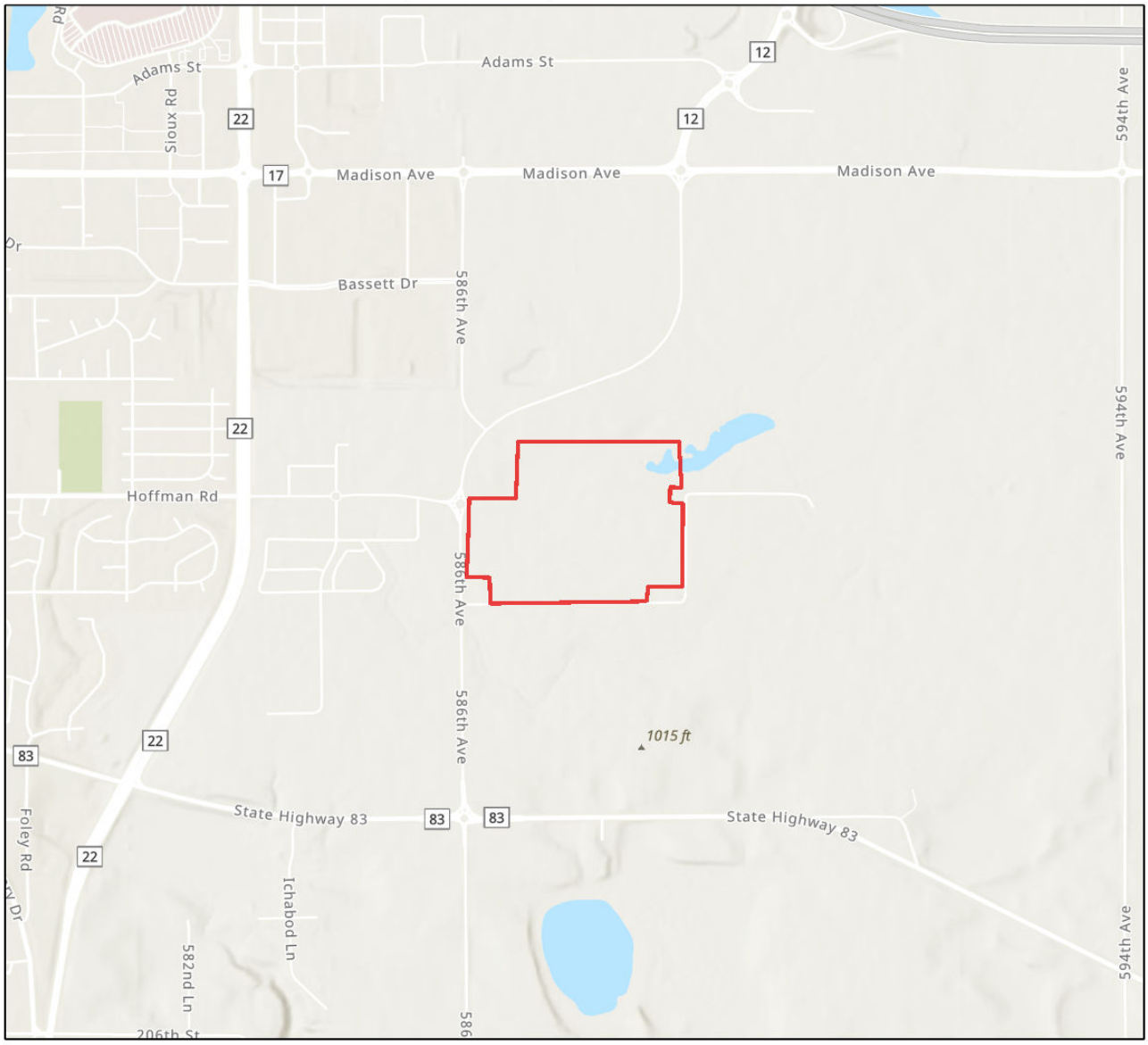
TRS: T108 R26 S15, T108 R26 S22



Esri, HERE, Garmin, SafeGraph, GeoTechnologies, Inc, METI/NASA, USGS, EPA, NPS, US Census Bureau, USDA
Esri, HERE, Garmin, FAO, NOAA, USGS, EPA

Mesenbrink Residential Development

USA Topo Basemap With Locator Map





Project Type: Development, Mixed Use

Project Size (acres): 102.74

County(s): Blue Earth

TRS: T108 R26 S15, T108 R26 S22

Esri, NASA, NGA, USGS, FEMA
Esri, HERE, Garmin, SafeGraph, GeoTechnologies, Inc, METI/NASA, USGS, EPA, NPS, US Census Bureau, USDA

MN SHPO Determination Letter and Request Form

DEPARTMENT OF ADMINISTRATION
STATE HISTORIC PRESERVATION OFFICE

October 12, 2022

Matthew Sitek
Bolton & Menk Inc.
12224 Nicollet Ave
Burnsville, MN 55407

RE: Mesenbrink Residential Development
T108 R26 S15 SE, Mankato, Blue Earth County
SHPO Number: 2022-2791

Dear Matthew Sitek:

Thank you for consulting with our office during the preparation of an Environmental Assessment Worksheet for the above-referenced project.

Based on our review of the project information, we conclude that there are no properties listed in the National or State Registers of Historic Places and no known or suspected archaeological properties in the area that will be affected by this project.

Please note that this comment letter 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. Be advised that comments and recommendations provided by our office for this state-level review may differ from findings and determinations made by the federal agency as part of review and consultation under Section 106.

Please contact Kelly Gragg-Johnson, Environmental Review Program Specialist, at 651-201-3285 or kelly.graggjohnson@state.mn.us if you have any questions regarding our review of this project.

Sincerely,

Sarah J. Beimers
Environmental Review Program Manager

Please mail the completed form and required material to:

State Historic Preservation Office
203 Administration Building
50 Sherburne Ave
St. Paul, MN 55155

DEPARTMENT OF ADMINISTRATION

Request for Project Review by the State Historic Preservation Office (SHPO)

◉ This is a new submittal
○ This is additional information relating to SHPO Project #: _____

DATE: 9/14/2022

I. GENERAL PROJECT INFORMATION

Project Title: Mesenbrink Residential Development

Project Address (or Location): 586th Ave

City / Township (circle one): Mankato Zip: 56001 County: USA

Legal Description: Township 108 Range 26 E/W (circle one) Section 15 Quarter-section SE

II. PROJECT CONTACT INFORMATION

Project Contact Name: Matthew Sitek Title: Cultural Resource Technician

Company/Agency: Bolton & Menk, Inc.

Street Address: 12224 Nicollet Avenue Phone Number: (612) 468-9241

City: Burnsville State: MN Zip: 55407 Email: matthew.sitek@bolton-menk.com

III. FEDERAL AND/OR STATE INVOLVEMENT

Federal Agency (if applicable): _____
(Agency providing funds, licenses, or permits)
Permit or Project Reference #: _____

State Agency (if applicable): _____
(Agency providing funds, licenses, or permits)
Permit or Project Reference #: _____

Local Agency (if applicable): _____

(Continued on Reverse Side)

Please refer to the **Instructions for Completing the Request for Project Review Form.** Submit one *Request for Project Review* form for each project. Project submittals will not be accepted via fax or e-mail. For questions regarding the SHPO review process, please visit our website or contact Kelly Gragg-Johnson, Environmental Review Specialist, at 651-201-3285 or kelly.graggjohnson@state.mn.us.

IV. PROJECT DESCRIPTION AND BOUNDARIES

A) REQUIRED FOR ALL PROJECTS

☑ Write a detailed description of the proposed project. (See attached.)

see attached

☑ Attach a map of project location, with project area(s) clearly marked. Road names must be included and legible.

B) Architecture

Are there any buildings or structures within the project area? ○ Yes ◉ No

If **No**, continue to the Archaeology section below. If **Yes**, submit all of the following information:

☐ List all buildings and structures within the project area and the year they were built. (See attached.)

☐ Photographs of ***each*** building and structure located within the project area, along with a photo key. Include streetscape images, if applicable. All photographs must be clear, crisp, focused, and taken at ground level. Aerial photos are insufficient.

☐ List known historic buildings or structures located within the project area (i.e., individual properties or districts which are listed in the National Register or which meet the criteria for listing in the National Register). (See attached.)

C) Archaeology

Does the proposed undertaking involve ground-disturbing activity? ◉ Yes ○ No

If **No**, this form is complete. If **Yes**, submit all of the following information:

☑ Attach the relevant portion of a 1:24000-scale USGS topographic map (photocopied or computer generated) ***with the project boundary marked***.

☑ Description of current and previous land use and disturbances: (See attached.)

see attached

☑ Any available information concerning known or suspected archaeological resources within the project area. (See attached.)

see attached

Request for Project Review by SHPO

Section IV (A).
Detailed Project Description of the Proposed Project

Mesenbrink Construction & Engineering, Inc. is proposing a residential development project with a small commercial component along 586th Ave in Mankato on an approximate 105-acre property. Of the 105 acres, only about 80 acres is buildable. The other 25 acres include wetland areas which will not be impacted directly. Parcel numbers for the study area include: R430915400009 and R430915400003. The current concept plan is attached to this proposal for reference. The EAW study area is proposed to include:

- 113 Single Family Residential Units
- 30 Townhomes (6 Unit Buildings)
- 530 Apartment Units (includes standalone buildings and units over the retail center)
- 21,000 sq ft of Retail Center
- 5,400 sq ft Gas Station/Commercial Node
- Internal Roadway and Parking
- Stormwater Ponds
- Open Green Space

This level of development requires the preparation and submittal of an Environmental Assessment Worksheet (EAW). The mandatory EAW is as identified in MN Rules 4410.4300, Subp. 19.D, which pertains to Residential Unit 250 unattached units or 375 attached units in a city not located within the seven-county Twin Cities metropolitan area that has filed with the EQB chair a certification that it has adopted a comprehensive plan. The Responsible Government Unit (RGU) is the City of Mankato.

The EAW study area was part of a previous AUAR development area that was adopted in 2007; an AUAR Update was initiated in 2016 but the document was never adopted.

Land Use Amendment process has started with two neighborhood meetings. The EAW will need to be completed before completing the Land Use Amendment with the City of Mankato.

Section IV (C).
Archaeology

A review of available historic documentation for these parcels (historic plat maps and aerial imagery) reveals consistent land use for the last century. These parcels have been under various forms of agricultural development for this time. Additional review of the OSA Portal revealed that there are no previously recorded or unconfirmed archaeological sites located within or directly adjacent to the Project Area. However, two archaeological sites (21BE0072 and 21BE0302) and one alpha (unconfirmed) site (21Bey) are located within one mile of the Project Area. 21BE0072 is defined a single lithic find spot site and 21BE0302 is a sparse lithic scatter, and both sites were investigated with surface reconnaissance.

USFWS IPaC Species List

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Minnesota-Wisconsin Ecological Services Field Office
4101 American Blvd E
Bloomington, MN 55425-1665
Phone: (952) 252-0092 Fax: (952) 646-2873

In Reply Refer To: September 15, 2022
Project Code: 2022-0085937
Project Name: Mesenbrink Residential Development

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 ECOS 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 ECOS 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, pipelines, buried utilities, telecommunications, and requests for a Conditional Letter of Map Revision (CLOMR) from FEMA.

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.

This species hibernates in caves or mines only during the winter. In Minnesota and Wisconsin, the hibernation season is considered to be November 1 to March 31. During the active season (April 1 to October 31) they roost in forest and woodland habitats. 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.

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 stand of eastern red cedar 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, please use the northern long-eared bat determination key in IPaC. This tool streamlines consultation under the 2016 rangewide programmatic biological opinion for the 4(d) rule. The key helps to determine if prohibited take might occur and, if not, will generate an automated verification letter. No further review by us is necessary.

Please note that on March 23, 2022, the Service published a proposal to reclassify the northern long-eared bat as endangered under the Endangered Species Act. The U.S. District Court for the District of Columbia has ordered the Service to complete a new final listing determination for the bat by November 2022 (Case 1:15-cv-00477, March 1, 2021). The bat, currently listed as threatened, faces extinction due to the range-wide impacts of white-nose syndrome (WNS), a deadly fungal disease affecting cave-dwelling bats across the continent. The proposed reclassification, if finalized, would remove the current 4(d) rule for the NLEB, as these rules may be applied only to threatened species. Depending on the type of effects a project has on NLEB, the change in the species' status may trigger the need to re-initiate consultation for any actions that are not completed and for which the Federal action agency retains discretion once the new listing determination becomes effective (anticipated to occur by December 30, 2022). If your project may result in incidental take of northern long-eared bats after the new listing goes into effect this will first need to addressed in an updated consultation that includes an Incidental Take Statement. If your project may require re-initiation of consultation, please contact our office for additional guidance.

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. Should bald or golden eagles occur within or near the project area please contact our office for further coordination. 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
- 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
4101 American Blvd E
Bloomington, MN 55425-1665
(952) 252-0092

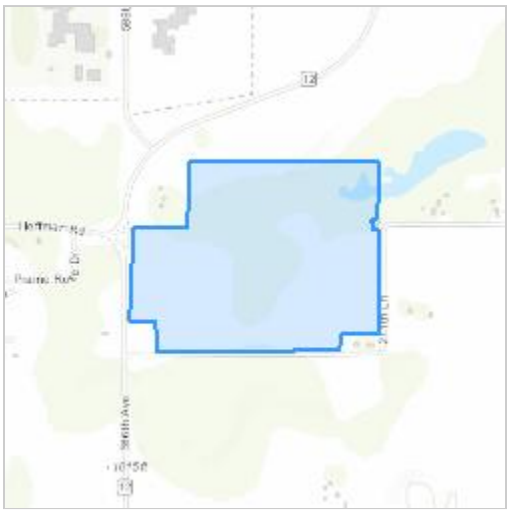
Project Summary

Project Code: 2022-0085937
Project Name: Mesenbrink Residential Development
Project Type: Residential Construction
Project Description: Mesenbrink Construction & Engineering, Inc. is proposing a residential development project with a small commercial component along 586th Ave in Mankato on an approximate 105-acre property. Of the 105 acres, only about 80 acres is buildable. The other 25 acres include wetland areas which will not be impacted directly. Parcel numbers for the study area include: R430915400009 and R430915400003. The current concept plan is attached to this proposal for reference. The EAW study area is proposed to include:

- 113 Single Family Residential Units
- 30 Townhomes (6 Unit Buildings)
- 530 Apartment Units (includes standalone buildings and units over the retail center)
- 21,000 sq ft of Retail Center
- 5,400 sq ft Gas Station/Commercial Node
- Internal Roadway and Parking
- Stormwater Ponds
- Open Green Space

Project Location:

Approximate location of the project can be viewed in Google Maps: https://www.google.com/maps/@44.1551489,-93.9338733924331,14z



Counties: Blue Earth County, Minnesota

Endangered Species Act Species

There is a total of 2 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.

---

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	Threatened

Insects

NAME	STATUS
Monarch Butterfly *Danaus plexippus* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/9743	Candidate

Critical habitats

THERE ARE NO CRITICAL HABITATS WITHIN YOUR PROJECT AREA UNDER THIS OFFICE'S JURISDICTION.

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.

Migratory Birds

Certain birds are protected under the Migratory Bird Treaty Act[1] and the Bald and Golden Eagle Protection Act[2].

Any person or organization who plans or conducts activities that may result in impacts to migratory birds, eagles, and their habitats should follow appropriate regulations and consider implementing appropriate conservation measures, as described below.

---

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)

The birds listed below are birds of particular concern either because they occur on the USFWS Birds of Conservation Concern (BCC) list or warrant special attention in your project location. To learn more about the levels of concern for birds on your list and how this list is generated, see the FAQ below. This is not a list of every bird you may find in this location, nor a guarantee that every bird on this list will be found in your project area. To see exact locations of where birders and the general public have sighted birds in and around your project area, visit the E-bird data mapping tool (Tip: enter your location, desired date range and a species on your list). For projects that occur off the Atlantic Coast, additional maps and models detailing the relative occurrence and abundance of bird species on your list are available. Links to additional information about Atlantic Coast birds, and other important information about your migratory bird list, including how to properly interpret and use your migratory bird report, can be found below.

For guidance on when to schedule activities or implement avoidance and minimization measures to reduce impacts to migratory birds on your list, click on the PROBABILITY OF PRESENCE SUMMARY at the top of your list 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

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 and understand the

FAQ "Proper Interpretation and Use of Your Migratory Bird Report" before using or attempting to interpret this report.

Probability of Presence (■)

Each green bar represents the bird's relative probability of presence in the 10km grid cell(s) your project overlaps during a particular week of the year. (A year is represented as 12 4-week months.) A taller bar indicates a higher probability of species presence. The survey effort (see below) can be used to establish a level of confidence in the presence score. One can have higher confidence in the presence score if the corresponding survey effort is also high.

How is the probability of presence score calculated? The calculation is done in three steps:

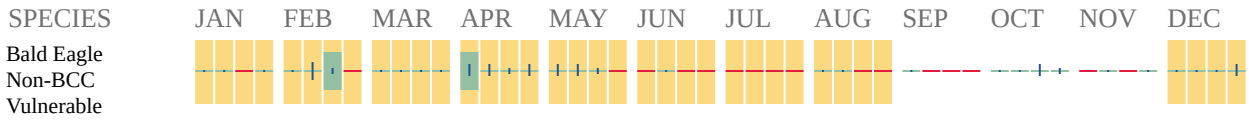
1. The probability of presence for each week is calculated as the number of survey events in the week where the species was detected divided by the total number of survey events for that week. For example, if in week 12 there were 20 survey events and the Spotted Towhee was found in 5 of them, the probability of presence of the Spotted Towhee in week 12 is 0.25.
2. To properly present the pattern of presence across the year, the relative probability of presence is calculated. This is the probability of presence divided by the maximum probability of presence across all weeks. For example, imagine the probability of presence in week 20 for the Spotted Towhee is 0.05, and that the probability of presence at week 12 (0.25) is the maximum of any week of the year. The relative probability of presence on week 12 is 0.25/0.25 = 1; at week 20 it is 0.05/0.25 = 0.2.
3. The relative probability of presence calculated in the previous step undergoes a statistical conversion so that all possible values fall between 0 and 10, inclusive. This is the probability of presence score.

Breeding Season (■)
Yellow bars denote a very liberal estimate of the time-frame inside which the bird breeds across its entire range. If there are no yellow bars shown for a bird, it does not breed in your project area.

Survey Effort (|)
Vertical black lines superimposed on probability of presence bars indicate the number of surveys performed for that species in the 10km grid cell(s) your project area overlaps. The number of surveys is expressed as a range, for example, 33 to 64 surveys.

No Data (–)
A week is marked as having no data if there were no survey events for that week.

Survey Timeframe
Surveys from only the last 10 years are used in order to ensure delivery of currently relevant information. The exception to this is areas off the Atlantic coast, where bird returns are based on all years of available data, since data in these areas is currently much more sparse.



Additional information can be found using the following links:

- Birds of Conservation Concern https://www.fws.gov/program/migratory-birds/species
- Measures for avoiding and minimizing impacts to birds https://www.fws.gov/library/collections/avoiding-and-minimizing-incidental-take-migratory-birds
- Nationwide conservation measures for birds https://www.fws.gov/sites/default/files/documents/nationwide-standard-conservation-measures.pdf

Migratory Birds FAQ

Tell me more about conservation measures I can implement to avoid or minimize impacts to migratory birds.

Nationwide Conservation Measures describes measures that can help avoid and minimize impacts to all birds at any location year round. Implementation of these measures is particularly important when birds are most likely to occur in the project area. When birds may be breeding in the area, identifying the locations of any active nests and avoiding their destruction is a very helpful impact minimization measure. To see when birds are most likely to occur and be breeding in your project area, view the Probability of Presence Summary. Additional measures or permits may be advisable depending on the type of activity you are conducting and the type of infrastructure or bird species present on your project site.

What does IPaC use to generate the list of migratory birds that potentially occur in my specified location?

The Migratory Bird Resource List is comprised of USFWS Birds of Conservation Concern (BCC) and other species that may warrant special attention in your project location.

The migratory bird list generated for your project is derived from data provided by the Avian Knowledge Network (AKN). The AKN data is based on a growing collection of survey, banding, and citizen science datasets and is queried and filtered to return a list of those birds reported as occurring in the 10km grid cell(s) which your project intersects, and that have been identified as warranting special attention because they are a BCC species in that area, an eagle (Eagle Act requirements may apply), or a species that has a particular vulnerability to offshore activities or development.

Again, the Migratory Bird Resource list includes only a subset of birds that may occur in your project area. It is not representative of all birds that may occur in your project area. To get a list of all birds potentially present in your project area, please visit the Rapid Avian Information Locator (RAIL) Tool.

What does IPaC use to generate the probability of presence graphs for the migratory birds potentially occurring in my specified location?

The probability of presence graphs associated with your migratory bird list are based on data provided by the Avian Knowledge Network (AKN). This data is derived from a growing collection of survey, banding, and citizen science datasets.

Probability of presence data is continuously being updated as new and better information becomes available. To learn more about how the probability of presence graphs are produced and how to interpret them, go the Probability of Presence Summary and then click on the "Tell me about these graphs" link.

How do I know if a bird is breeding, wintering or migrating in my area?
To see what part of a particular bird's range your project area falls within (i.e. breeding, wintering, migrating or year-round), you may query your location using the RAIL Tool and look at the range maps provided for birds in your area at the bottom of the profiles provided for each bird in your results. If a bird on your migratory bird species list has a breeding season associated with it, if that bird does occur in your project area, there may be nests present at some point within the timeframe specified. If "Breeds elsewhere" is indicated, then the bird likely does not breed in your project area.

What are the levels of concern for migratory birds?
Migratory birds delivered through IPaC fall into the following distinct categories of concern:

1. "BCC Rangewide" birds are Birds of Conservation Concern (BCC) that are of concern throughout their range anywhere within the USA (including Hawaii, the Pacific Islands, Puerto Rico, and the Virgin Islands);
2. "BCC - BCR" birds are BCCs that are of concern only in particular Bird Conservation Regions (BCRs) in the continental USA; and
3. "Non-BCC - Vulnerable" birds are not BCC species in your project area, but appear on your list either because of the Eagle Act requirements (for eagles) or (for non-eagles) potential susceptibilities in offshore areas from certain types of development or activities (e.g. offshore energy development or longline fishing).

Although it is important to try to avoid and minimize impacts to all birds, efforts should be made, in particular, to avoid and minimize impacts to the birds on this list, especially eagles and BCC species of rangewide concern. For more information on conservation measures you can implement to help avoid and minimize migratory bird impacts and requirements for eagles, please see the FAQs for these topics.

Details about birds that are potentially affected by offshore projects
For additional details about the relative occurrence and abundance of both individual bird species and groups of bird species within your project area off the Atlantic Coast, please visit the Northeast Ocean Data Portal. The Portal also offers data and information about other taxa besides birds that may be helpful to you in your project review. Alternately, you may download the bird model results files underlying the portal maps through the NOAA NCCOS Integrative Statistical Modeling and Predictive Mapping of Marine Bird Distributions and Abundance on the Atlantic Outer Continental Shelf project webpage.

Bird tracking data can also provide additional details about occurrence and habitat use throughout the year, including migration. Models relying on survey data may not include this information. For additional information on marine bird tracking data, see the Diving Bird Study and the nanotag studies or contact Caleb Spiegel or Pam Loring.

What if I have eagles on my list?
If your project has the potential to disturb or kill eagles, you may need to obtain a permit to avoid violating the Eagle Act should such impacts occur.

Proper Interpretation and Use of Your Migratory Bird Report
The migratory bird list generated is not a list of all birds in your project area, only a subset of birds of priority concern. To learn more about how your list is generated, and see options for identifying what other birds may be in your project area, please see the FAQ "What does IPaC use to generate the migratory birds potentially occurring in my specified location". Please be aware this report provides the "probability of presence" of birds within the 10 km grid cell(s) that overlap your project; not your exact project footprint. On the graphs provided, please also look carefully at the survey effort (indicated by the black vertical bar) and for the existence of the "no data" indicator (a red horizontal bar). A high survey effort is the key component. If the survey effort is high, then the probability of presence score can be viewed as more dependable. In contrast, a low survey effort bar or no data bar means a lack of data and, therefore, a lack of certainty about presence of the species. This list is not perfect; it is simply a starting point for identifying what birds of concern have the potential to be in your project area, when they might be there, and if they might be breeding (which means nests might be present). The list helps you know what to look for to confirm presence, and helps guide you in knowing when to implement conservation measures to avoid or minimize potential impacts from your project activities, should presence be confirmed. To learn more about conservation measures, visit the FAQ "Tell me about conservation measures I can implement to avoid or minimize impacts to migratory birds" at the bottom of your migratory bird trust resources page.

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.

WETLAND INFORMATION WAS NOT AVAILABLE WHEN THIS SPECIES LIST WAS GENERATED. PLEASE VISIT HTTPS://WWW.FWS.GOV/WETLANDS/DATA/MAPPER.HTML OR CONTACT THE FIELD OFFICE FOR FURTHER INFORMATION.

IPaC User Contact Information

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Bolton-Menk.com

Stormwater Management Memorandum

Date: March 24, 2026

To: City of Mankato Public Works

From: Alec Pietz, P.E. – Project Manager

Subject: Mesenbrink Construction – Aveyda Way PUD
BMI Project No.: 0M1.128460

I. Project Introduction

The proposed Aveyda Way Planned Unit Development (PUD) are proposed as part of the Mesenbrink Subdivision where Hoffman Road is currently under construction along with other public improvements. The PUD consists of private infrastructure for housing units in the eastern portion of the subdivision on the north and south sides of Hoffman Road. From a stormwater perspective, the public infrastructure provides all stormwater management needs and connection points to storm sewer where needed from the adjacent developments. Attached with this memo is the stormwater report that supports the entire subdivision, and provides additional detail omitted from this writing.

While the subdivision largely remains the same from the issuance of that report to the submittal of this PUD. There have been slight changes that have actually improved stormwater management as a whole. A development figure is provided with this as reference. Subsequent sections below briefly describe the drainage and any changes. Please note that the drainage report approved for the entire subdivision is more conservative now due to these changes.

II. Aveyda Preserve (North of Hoffman Road)

This portion of the PUD consists of 34 housing units with private infrastructure. Drainage is primarily conveyed through private storm sewer with direct discharge to the eastern public pond. Other areas discharge to adjacent property, other storm sewer, and to the private basin on the north end of the site. This basin is proposed primarily as a borrow site and was not included in the original subdivision stormwater report or its modeling. Ultimately, the basin provides additional water quality volume and retention prior to discharge to the wetland. Proposed peak flows to these areas must not exceed the existing peak flows.

III. Aveyda Preserve (South of Hoffman Road)

This portion of the PUD consists of 71 housing units, in which some are proposed to include duplexes. While some stormwater is discharged to adjacent property or Hoffman Road, the bulk of drainage is directed to onsite private storm sewer. Two connections to public storm sewer in Hoffman Road are made that route to the system of basins.

Bolton & Menk is an equal opportunity employer.

IV. Commercial and Multi-Family Area

This portion of the subdivision is not currently being formally submitted. However, it is worth mentioning alterations to the in-progress plan that have been made since issue of the subdivision report. Overall, impervious areas are planned to be decreased from prior plans and elective private basins are or will be excavated in 2026 similar to what is illustrated in the attached figure. The basins are elected to be constructed for fill material. A subsequent drainage update on this development will still be necessary when the project is brought forth.

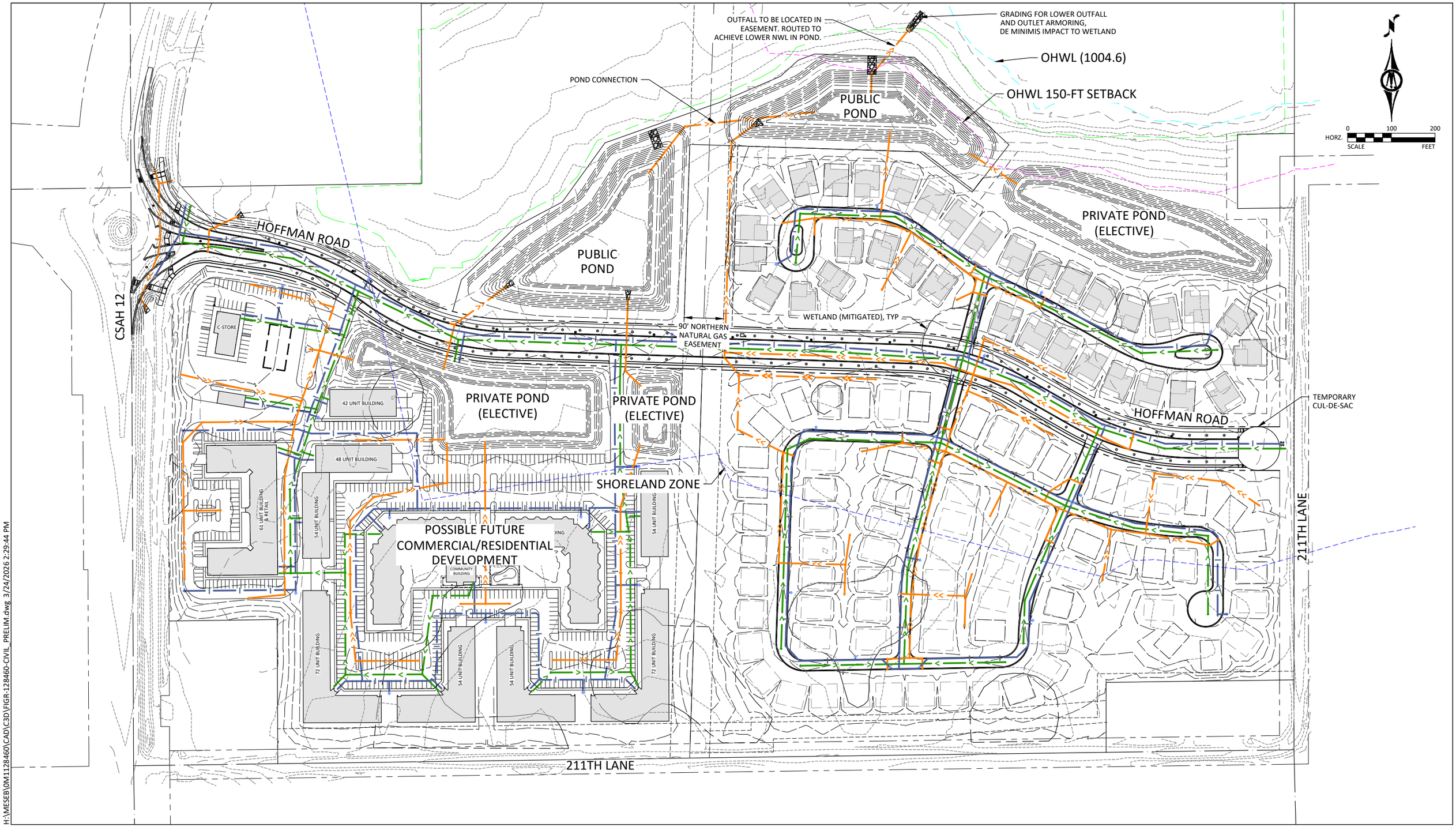
V. Water Quality

Given the changes in impervious surfaces and to reconcile that with the prior drainage report, a new summary is provided below:

- Public Improvements – 3.7 acres
- Aveyda Preserve (North of Hoffman Road) – 4.3 acres
- Aveyda Preserve (South of Hoffman Road) – 9.1 acres
- Commercial and Multi-Family Area – Approximately 15 acres

Total impervious area amounts to approximately 32.1 acres requiring 2.94 ac-ft of treatment volume which is more than satisfied by the public basins without considering the elective basins.

Please review the attached figure and PUD submittal construction documents and feel free to contact Alec Pietz, P.E. at Alec.Pietz@bolton-menk.com or 507-766-3283 with any questions.



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Drainage Report

Mesenbrink Subdivison

Mesenbrink Construction

October 2024

ATTACHMENT TO MEMO

Submitted by:
Bolton & Menk, Inc.
1960 Premier Drive
Mankato, MN 56001-5900
P: 507-625-4171
F: 507-625-4177
BMI No. 0M1.128460

BOLTON & MENK

Real People. Real Solutions.

Certification

Drainage Report

For

Mesenbrink Development

Mesenbrink Construction
0M1.128460

October 2024

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.

By: 

Alec Pietz, P.E.
License No. 59617

Date: 10-15-2024

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I. INTRODUCTION

Mesenbrink Construction is set to develop the Mesenbrink Subdivision property in Mankato. This project includes an extension of Hoffman Road and will consist of a mixture of residential densities and some retail area. Bolton & Menk has designed the Hoffman Road/public improvements as well as what is being referred to as the "North and South Single-Family PUD"—which are residential areas on either side of Hoffman. The mixed land has been designed as needed for stormwater applications, with design of those locations to be finalized when acquisition of those parcels occurs. This report serves to detail the proposed stormwater management design of all of those areas, the entire Mesenbrink Subdivision.

Boundaries of the project consist of: County Highway 12/586th Avenue to the west, 211th Lane to the south and east, and Unnamed Lake ID #07007100 to the north.

II. ANALYSIS

To understand the drainage conditions of the project area and guide the proposed stormwater management design, a hydrologic and hydraulic model was developed using Autodesk's Storm & Sanitary Analysis (SSA). SSA uses the Soil Conservation Service (SCS) Technical Release (TR-20) methodology to route watershed runoff through the system using a rainfall hydrograph. NOAA Atlas 14 rainfall depths were used along with the NRCS's MSE 3, 24-hour rainfall distribution. The rainfall depths used for the 2, 10, and 100-Year rainfall events were 2.87", 4.28" and 7.20", respectively. Time of concentrations were calculated using the NRCS's TR-55 methodology. Drainage areas were delineated using a combination of LiDAR data and survey data where available. Soil types within the project area are dominated by clay loams characterized by the hydrological soil group type D.

III. EXISTING CONDITIONS

Currently, land use in the project area is all straight-row cropland. During smaller rainfall events, much of the runoff within the project area sits in low points in the cropland. During large rainfall events, runoff from the site flows primarily to the north into the Unnamed Lake—with a small percentage flowing to the west and south into the ditch on the east side of County Highway 12/586th Avenue. There is also runoff towards the two homestead properties southeast of the site, that runoff eventually crosses under 211th Lane via an existing culvert. See *Existing Drainage Area Map* in Appendix A for more detail, including the drainage areas and flow directions. As part of the project, a Hydraulic Analysis was completed and submitted to the MNDNR. A copy of that report can be found in Appendix C.

IV. PROPOSED DESIGN

Mesenbrink Subdivision's proposed stormwater management system has been designed to meet the MPCA's NPDES Construction Stormwater Permit requirements and the City of Mankato Grading Manual design standards. Along with the necessary catch basins and storm sewer, the proposed stormwater management system will also include two wet sedimentation basins connected via a submerged pipe—allowing them to function hydraulically as a single basin. An existing gas line runs through the project area and is the reason for two smaller basins as opposed to a single, larger basin. Those two basins are labeled as "Pond A" and "Pond B". The proposed project has one primary outfall: a 30" outlet from Pond B. See *Proposed Drainage Area Map* in Appendix A for more site detail.

A. Water Quality Requirements

The proposed project has been designed to meet the more stringent water quality requirements of the City of Mankato Grading Manual Sec. 3.2.4.2.B., which states a permanent stormwater treatment basin is required for treatment of 1.1" of runoff over the new impervious surfaces. This exceeds the 1" requirement of the MPCA NPDES Construction Stormwater Permit. This requirement will be met through the construction of two wet sedimentation basins with a combined water quality volume (WQv) sufficient to meet this standard.

Table 1 shows the change in impervious surfaces for the proposed project.

Table 1 **– Impervious Calculation**			
	Existing Area (ac)	**Proposed Area (ac)**	**Difference (ac)**
Public Improvements	0.0	3.6	+3.6
North Single-Family PUD	0.0	5.0	+5.0
South Single-Family PUD	0.0	2.2	+7.9
Future Concept Area	0.0	14.8	+15.8
TOTAL Impervious	0.0	32.3	+32.3

Based on these values, the project will be required to treat 2.96 ac-ft (~128,950 cf) of runoff. This treatment volume accounts for the total treatment required by each section of the development.

B. Storm Sewer & Catch Basin Design

Storm sewer and catch basins were designed based on the guidance provided in the City of Mankato Grading Manual. Storm sewer has been sized based on two different design storm events. For the residential streets, the 5-Year rainfall event was selected—while storm sewer along Hoffman Road was designed for the 10-Year rainfall event per the manual's guidance. All inlets have been designed per Grading Manual Sec. 3.2.3.2.a, in which a single 12-foot driving lane must be maintained free from inundation for every two driving lanes on a roadway for the 10-year rainfall event. Additionally, the 2-Year 24-hour storm with frozen ground was analyzed to be sure the design still provided adequate performance during spring snowmelt conditions.

C. Wet Sedimentation Basins

Two wet sedimentation basins have been designed as part of the project. The first, denoted as "Pond A" within the plans, serves approximately the western half of the Hoffman Road extension and the future mixed-use areas. Its drainage area is approximately 28.3 acres.

Denoted as "Pond B" within the plans, the second basin will serve both of the residential areas, along with the remainder of Hoffman Road that is not served by Pond A. All runoff generated to Pond A will also route through Pond B. Both basins are designed per the MPCA NPDES Construction Stormwater Permit and the City of Mankato Grading Manual. The pond outlet control structure was designed to be skimming so that floatables such as oil and trash will be trapped within the pond, and contains orifices for rate control. The proposed basins have been designed to provide enough storage and rate control as to not cause an increase in high-water levels (HWLs) to the Unnamed Lake.

D. Water Quality Provided

Table 2 below shows the designed water quality volume provided for each Pond. The combined water quality worksheet can be found in Appendix B.

Table 2 – Water Quality Summary				
BASIN	**BOTTOM (ft)**	**NWL (ft)**	**WQ ELEVATION (ft)**	**WQv AVAILABLE (ac-ft)**
Pond A	1001.0	1005.5	1006.81	11.41
Pond B	999.0	1005.5	1006.81	7.07
			TOTAL WQv Avail.	18.48
			TOTAL WQv Req.	2.96

The WQv available far exceeds the required amount because the basins also must meet stringent requirements for minimum overtopping into the Unnamed Lake event via the emergency overflows (EOFs).

V. MODEL RESULTS

Table 3 below shows the pre- and post-construction discharge rates to the Unnamed Lake.

Table 3 – Discharge Rates (CFS) to Unnamed Lake #07007100			
	2-YEAR (2.87")	**10-YEAR (4.28")**	**100-YEAR (7.20")**
Existing	35.1	61.7	128.6
Proposed	6.8	9.2	22.6
Difference	-28.3	-52.5	-106.0

Table 4 below shows the proposed design reduces total discharge rates leaving the site for all rainfall events.

Table 4 – Total Project Discharge Rates (CFS)			
	2-YEAR (2.87")	**10-YEAR (4.28")**	**100-YEAR (7.20")***
Existing	45.7	83.8	175.6
Proposed	38.4	66.3	142.4
Difference	-7.3	-17.5	-33.2

Table 5 below shows the HWL results for the proposed basins.

Table 5 – HWLs of Proposed Basins			
Basin	**2-YEAR (2.87")**	**10-YEAR (4.28")**	**100-YEAR (7.20")**
	HWL (ft)	**HWL (ft)**	**HWL (ft)**
Pond A	1007.8	1009.4	1011.7
Pond B	1007.8	1009.4	1011.6

VI. SUMMARY

The goal of the Mesenbrink Subdivision is to continue to provide growth in the City of Mankato through various types of needs, thus includes opportunities for multiple types of housing as well as business. As has been discussed in this report, its storm sewer system has been designed to properly manage the stormwater runoff that the subdivision will produce, which includes minimizing the effects on the DNR managed area that the water will ultimately outlet to. Drainage patterns overall will remain relatively unchanged while also providing drainage capacity once the project is completed. The proposed design meets the MPCA NPDES Construction Stormwater Permit and the Mankato Grading manual requirements and all impacted wetlands will be mitigated for.

This report is being provided along with the proposed construction plans for the project. Please refer to the plan for additional design details.

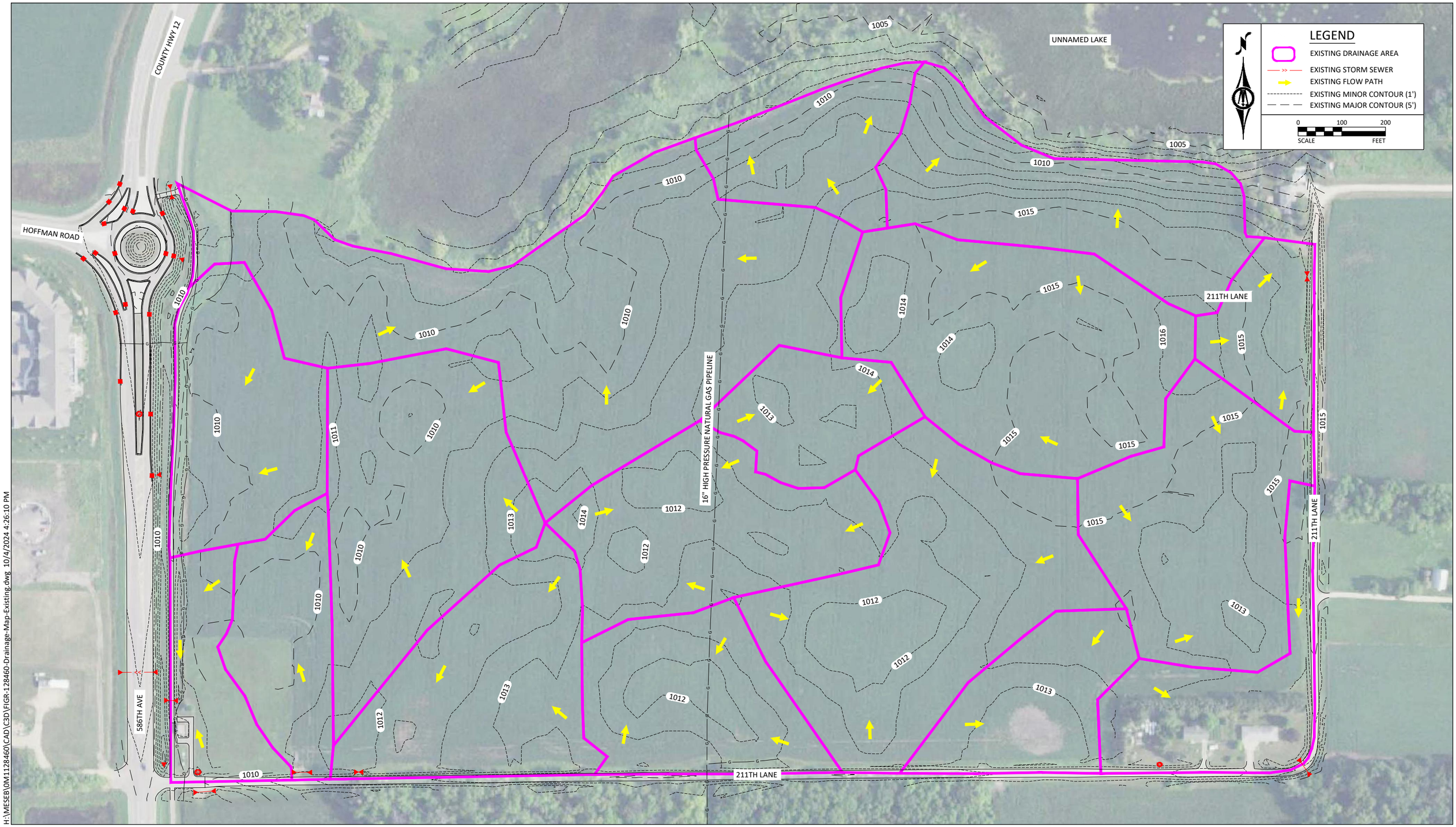
Please feel free to contact me with any questions or comments about this report at Alec.Pietz@Bolton-Menk.com or by phone at (507) 766-3283.

Appendix A: Figures

Mesenbrink Development
City of Mankato, MN

Existing Drainage Area Map
October 2024

BOLTON & MENK



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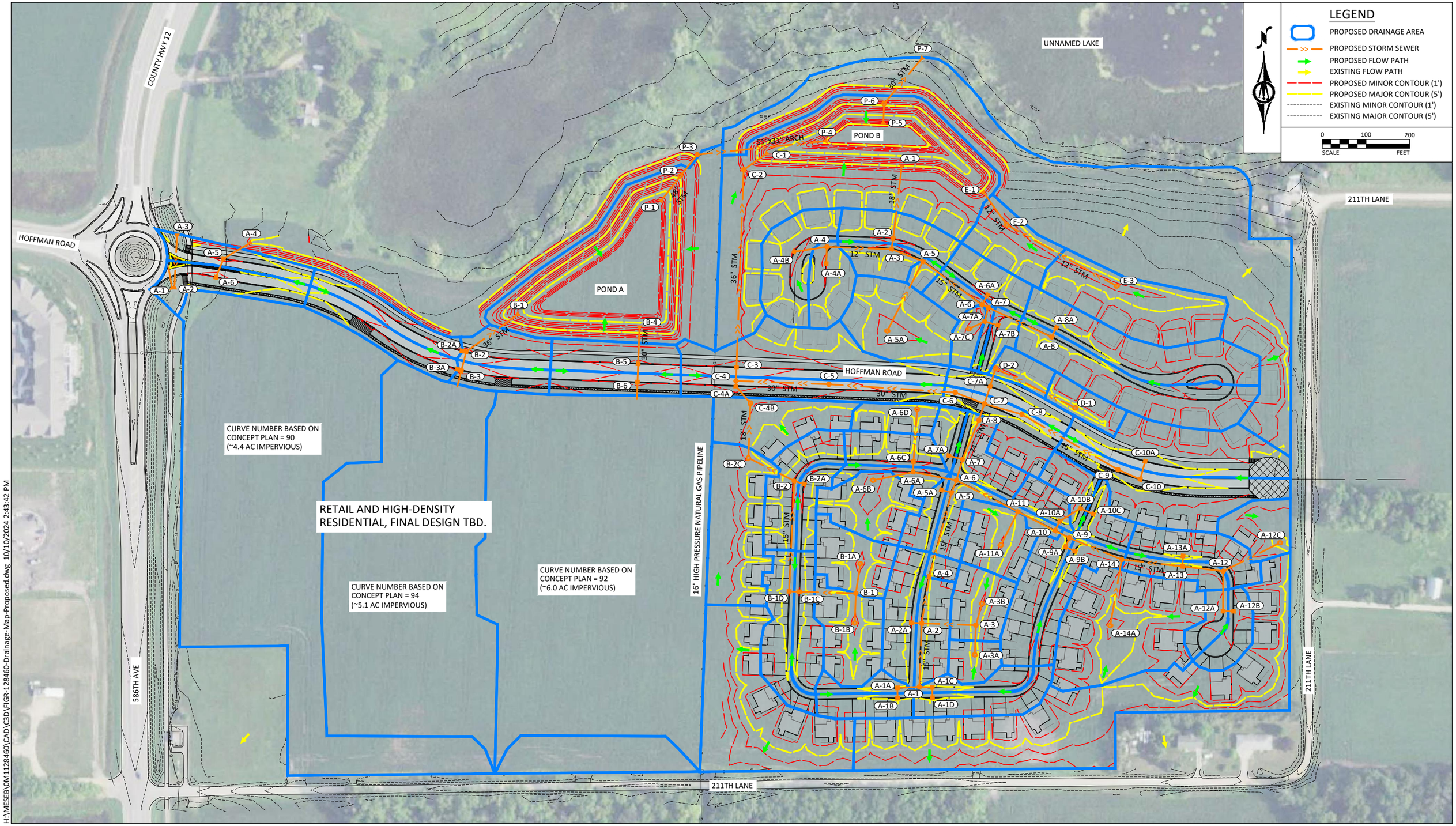
Mesenbrink Development
City of Mankato, MN

Proposed Drainage Area Map
October 2024

BOLTON & MENK



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Appendix B: Water Quality Spreadsheet & Subbasin Table

POND A & B COMBINED

Area Flowing to Proposed Basin	**74.86**	**ac**
Newly constructed impervious area =	**32.30**	**ac**
Required Water Quality Volume (WQV)= (1.1" over new impervious area)	**2.96**	**ac-ft**
Designed WQV =	**18.48**	**ac-ft**
Water surface elevation at WQV bounce =	**1006.81**	**ft**
Surface area at WQV bounce =	**2.41**	**ac**
Allowable Water Quality Release Rate =	**13.65**	**cfs**
Designed Water Quality Release Rate = (From hydraulic modeling)	**5.10**	**cfs**
Required Volume Below Outlet (dead storage) = (1800 CF Per Acre of Drainage Area)	**3.09**	**ac-ft**
Designed Volume Below Outlet (dead storage) =	**6.74**	**ac-ft**

	ELEV. (FT)	AREA (AC)	VOLUME (AC-FT)	AREA (SQ-FT)
	1013.5	0.00	0.00	
	1013.0	3.87	29.37	168363
	1012.0	3.61	25.64	157327
	1011.0	3.37	22.15	146623
	1010.0	3.13	18.90	136211
	1009.0	2.89	15.89	126103
	1008.0	2.67	13.11	116282
	1007.0	2.45	10.55	106761
	1006.0	2.24	8.20	97538
NWL	1005.50	1.96	7.15	85549
SAFETY BENCH	1005.0	1.87	6.19	81445
	1004.0	1.42	4.55	61723
	1003.0	1.29	3.19	56356
	1002.0	1.18	1.96	51305
	1001.0	1.07	0.84	46564
	1000.0	0.21	0.19	9258
	999.0	0.18	0.00	7716

Mesenbrink Construction
Mesenbrink Subdivision
BMI Project No. 0M1.128460.000

Subbasin Details

INLET	AREA (AC)	CURVE NUMBER	TIME OF CONCENTRATION (MIN.)
A-10 (SOUTH)	0.08	89.41	07
A-10A (SOUTH)	0.23	89.44	08
A-10B (SOUTH)	0.26	89.12	13
A-10C (SOUTH)	0.25	90.49	13
A-12A (SOUTH)	0.20	91.92	08
A-12B (SOUTH)	0.30	90.31	08
A-13 (SOUTH)	0.26	90.41	08
A-13A (SOUTH)	0.51	88.73	13
A-1A (SOUTH)	0.16	89.28	08
A-1B (SOUTH)	0.29	89.30	13
A-1C (SOUTH)	0.21	88.45	08
A-1D (SOUTH)	0.43	89.33	13
A-2 (NORTH)	0.46	88.91	13
A-2 (SOUTH)	0.41	89.14	13
A-2A (SOUTH)	0.53	88.87	13
A-3 (NORTH)	0.28	89.77	13
A-4 (SOUTH)	0.09	89.47	13
A-4A (NORTH)	0.40	89.78	16
A-4B (NORTH)	0.71	89.03	15
A-5	0.39	90.51	07
A-5 (NORTH)	0.09	89.55	07
A-5 (SOUTH)	0.33	90.33	08
A-5A (SOUTH)	0.21	90.07	08
A-6	0.52	88.96	07
A-6 (NORTH)	0.20	89.74	08
A-6A (NORTH)	0.36	88.83	13
A-6A (SOUTH)	0.19	91.01	07
A-6C (SOUTH)	0.38	89.02	13
A-7 (SOUTH)	0.40	89.46	13
A-7A (NORTH)	0.06	94.47	07
A-7A (SOUTH)	0.17	90.20	07
A-7B (NORTH)	0.18	91.40	08
A-8 (NORTH)	1.12	89.26	13
A-8A (NORTH)	1.06	89.40	13
A-9A (SOUTH)	0.58	88.91	13
A-9B (SOUTH)	0.41	90.49	13
B-1C (SOUTH)	0.42	89.89	13
B-1D (SOUTH)	0.55	89.18	13
B-2	0.37	87.28	07
B-2 (SOUTH)	0.56	88.75	13
B-2A	0.38	92.78	07
B-2A (SOUTH)	0.24	90.67	07
B-3	0.28	90.36	07
B-3A	0.46	90.89	07
B-5	0.48	88.33	07
B-6	0.36	89.40	07
C-11	1.08	91.07	13
C-11A	1.10	90.80	13
C-4	1.21	90.49	21
C-5A	0.65	90.21	09
C-8	0.55	90.98	13
C-8A	0.33	92.50	07

Appendix C: Supporting Documents

Hydraulic Analysis for Unnamed Lake ID #07007100

Mesenbrink Development

City of Mankato, Minnesota

May 2024

Submitted by:
Bolton & Menk, Inc.
1960 Premier Drive
Mankato, MN 56001-5900
P: (507) 625-4171

BOLTON & MENK

Real People. Real Solutions.

Certification

Hydraulic Analysis

For

Unnamed Lake #07007100

Mesenbrink Development
City of Mankato, MN
Blue Earth County

0M1.128460

~~December 2023~~
May 2024

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 Printed Name: Roberta Cronquist

Date: 5/29/2024 License Number: 52570

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Appendix

Appendix A: Water Surface Elevation Table
Appendix B: GIS Workmaps
Appendix C: Supporting Documentation
Appendix D: Digital XPSWMM Modeling Files

I. Project Background

The proposed Mesenbrink development is located directly east of County State Aid Highway No. 12/586th Ave and north & west of 211th Lane. The project is proposing to convert approximately 105 acres of agricultural land to mixed residential/retail, high density residential, and medium density residential land uses. The development will include the construction of new roadways and full utilities including sanitary sewer, watermain, and storm sewer. The newly platted parcels are being developed in conformance with City of Mankato zoning codes and will be annexed into the City of Mankato.

The Mesenbrink development project is proposing an increase of 29.7 acres of impervious area. Two large wet ponds are proposed to meet water quality and rate control requirements set by the City of Mankato and the NPDES Stormwater Construction Permit. This memo serves to provide a hydraulic analysis of the Unnamed Lake #07007100, referred to as Unnamed Lake in this report, which serves as the stormwater outlet for both ponds in this development.

Unnamed Lake is approximately 100 acres in size and is recognized as a Minnesota Public Water by the MNDNR. Unnamed Lake discharges south through Blue Earth County Ditch No. 12 and meanders south and west though the City of Mankato and eventually discharges to the Le Sueur River. The SCS TR-20 hydrology method was utilized in XPSWMM Version 2020.1 (x64) for the following analysis. XPSWMM models were developed for the historic, existing, and proposed conditions to analyze the cumulative impacts of development. NOAA Atlas 14 rainfalls for Mankato, Minnesota were used to develop rainfall events.

II. Vicinity Map

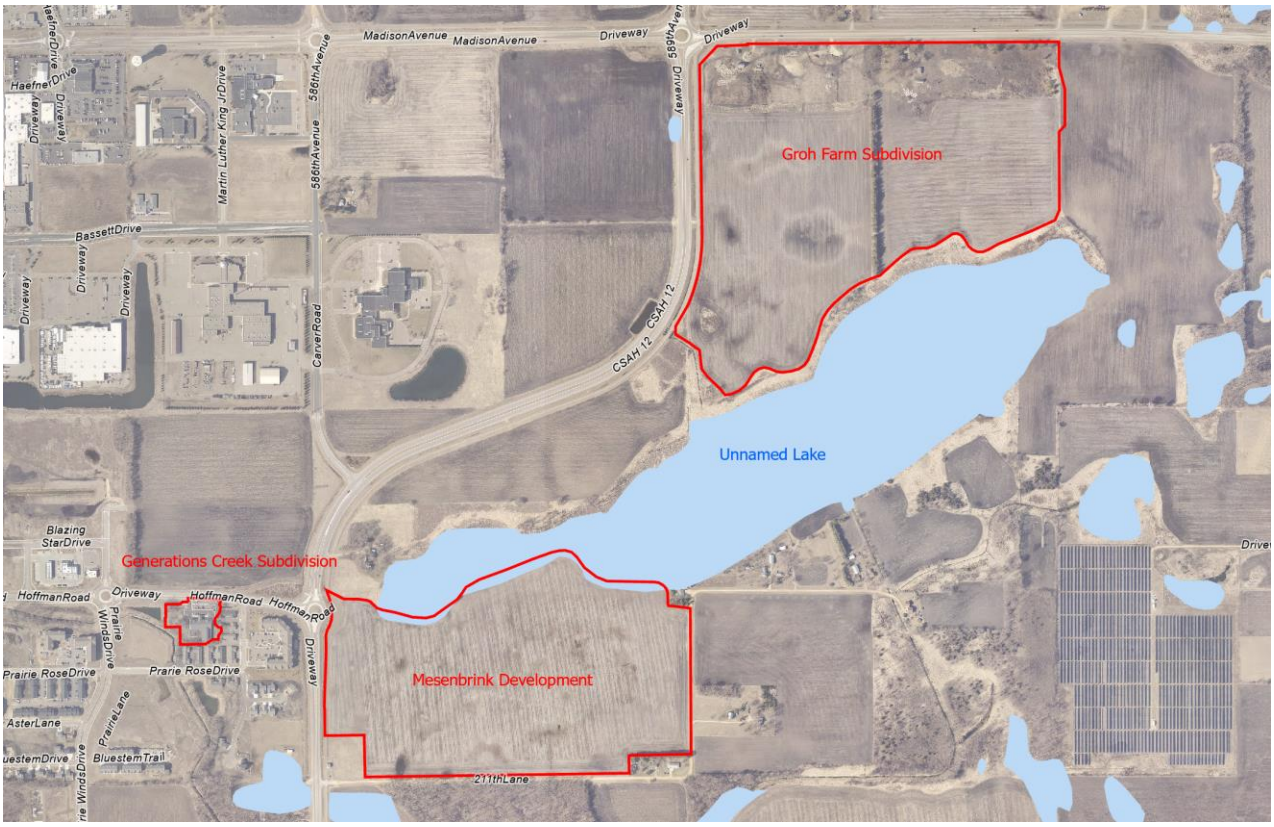

Figure 1: Vicinity Map
(not to scale)

III. Historical Model

Unnamed Lake has a drainage areas of approximately 1.7 square miles, or 1,090 acres. This drainage area consists of row crops, rural housing, a solar farm, and undeveloped space. The historical model reflects surface water conveyance and landuse types entering Unnamed Lake from prior to 2020. The entire drainage area to Unnamed Lake was included in the model to fully identify proposed impacts to Unnamed Lake.

Existing conditions models for each of the development area were used to build the historical XPSWMM model. These have all been previously submitted to and approved by the MNDNR. See Appendix D for the existing models that were utilized for this study.

Unnamed Lake was surveyed by the MNDNR in 2013 and an additional western node was added to the PWI. This location was included in the modeling as storage capacity underneath the OHWL elevation of 1004.6 feet. Unnamed Lake, its watershed outside of the three project boundaries, and County Ditch No. 12 remained unchanged throughout the models.

The main outlet for Unnamed Lake is County Ditch No. 12. The upstream section from Unnamed Lake to Highway 22 was included in the model to effectively model tailwater impacts. Several culvert crossings were included in the model from the Mankato GIS database, Bolton & Menk surveys, various as built plans, and published MNDNR reports online. All data links and references are attached in Appendix C.

For each model a 5, 10, 25, 50, 100, and 500-year storm event was modeled for 24, 48, and 72-hour rainfall events. A Huff Distribution was utilized to determine rainfall distributions for each of the previously listed events (Huff, 1990). See Appendix A for water surface elevations at Unnamed Lake and at road crossings along County Ditch No. 12 from Unnamed Lake to Highway 22. The Atlas 14 Rainfall Precipitation Depth estimates used for the storms can be seen in Table 1.

Table 1: Atlas 14 Precipitation Depths

Precipitation Depths for Mankato, MN (IN)						
Frequency	5-YR	10-YR	25-YR	50-YR	100-YR	500-YR
24-HR	3.61	4.29	5.34	6.24	7.21	9.79
48-HR	3.94	4.61	5.67	6.60	7.62	10.40
72-HR	4.24	4.92	6.00	6.93	7.96	10.70

IV. Existing Model

The existing XPSWMM model reflects landuse conditions as of December 2023. Full-buildout conditions of the Groh Farm and Generations Creek Subdivisions located northeast and due west, respectively, of Unnamed Lake were included in place of their existing models. Both models were left intact as they have gone through previous permitting applications with the MNDNR. Outfall conveyances were slightly edited to establish logical connections to Unnamed Lake. The Groh Farm and Generations Creek Subdivision altered land uses from primarily row crops to single family residential, multi-residential, and commercial land uses. As expected, the high water surface elevation in Unnamed Lake rose slightly with the impervious increases.

V. Proposed Modeling

The proposed model reflects the full buildout plans of the Mesenbrink Development southwest of Unnamed Lake. The Mesenbrink Development will alter 105 acres of land from row crops to single family residential, multi-residential, and commercial land uses.

Two proposed wet ponds will provide water quality treatment and rate control on the north side of the development and discharge to Unnamed Lake. The two ponds will provide adequate storage and rate control for the City of Mankato and NPDES rules. The pond outlets are designed to have a minimal grading impact to Unnamed Lake by discharging near the OHWL elevation and boundary.

VI. Model Results

The model results indicated a general increase in the bounce of Unnamed Lake from the historical model to the existing and proposed model. In the 24-hour, 100-year storm the water surface elevation goes from 1007.16 in the historical model to 1007.29 in the existing and 1007.53 in the proposed. The raised water surface elevations are consistent with impervious area increases. The models are increasingly varied with larger storm events.

Table 2: Unnamed Lake Water Level Changes

Unnamed Lake Water Level Changes									
Frequency	5-yr			10-yr			100-yr		
Condition	Existing	Proposed	Change	Existing	Proposed	Change	Existing	Proposed	Change
24-HR	1005.80	1005.93	0.13	1006.09	1006.24	0.15	1007.29	1007.53	0.24
48-HR	1005.90	1006.04	0.14	1006.15	1006.32	0.16	1007.31	1007.56	0.25
72-HR	1005.90	1006.33	0.44	1006.14	1006.65	0.51	1007.23	1008.03	0.79

See Appendix A for an expanded table of water level impacts and storm events listed in the Unnamed Lake Water Surface Elevation Comparison Table.

VII. Summary

The Mesenbrink Development will increase the 24-hour, 100-year rainfall event high water level of Unnamed Lake by 0.24 feet. This is an expected impact from an addition of 29.7 acres of impervious surface. This impact is expected to be negligible on the overall system given the size and capacity of the lake and outlet channel. The City of Mankato Construction Storm Water Rules and the NPDES Construction Storm Water Permit rules for water quality treatment and rate control are being met through the use of two well designed wet ponds on the north side of the property.

Additional benefits to Unnamed Lake by the Mesenbrink Development include reduction in sediment and fertilizer loading. Fish and waterfowl habitat will not be negatively impacted through the increased water level bounce.

Appendix A: Water Surface Elevation Table

Unnamed Lake Water Surface Elevation Comparison								
Model	Return Frequency	Node	Stor-19	Jun-04	Jun-06	Jun-13	Jun-07	Jun-08
		Location / Crossing	Unnamed Wetland	Field Entrance	CSAH 12	Prairie Rose Drive	Prairie Wing Drive	Highway 22
Historical Model (Pre-2022 Conditions)	24-HR	5-yr	1005.72	1005.57	1002.47	1001.38	1001.00	999.58
		10-yr	1006.00	1005.97	1003.49	1002.02	1001.51	999.91
		25-yr	1006.42	1006.83	1005.01	1002.97	1002.26	1000.34
		50-yr	1006.78	1007.56	1006.21	1003.72	1002.85	1000.63
		100-yr	1007.16	1008.34	1007.41	1004.55	1003.48	1000.91
		500-yr	1008.15	1011.25	1010.33	1006.43	1004.97	1001.54
	48-HR	5-yr	1005.81	1005.67	1002.38	1001.33	1000.96	999.55
		10-yr	1006.05	1005.94	1003.17	1001.81	1001.34	999.81
		25-yr	1006.45	1006.55	1004.40	1002.58	1001.96	1000.17
		50-yr	1006.79	1007.12	1005.42	1003.22	1002.47	1000.45
		100-yr	1007.17	1007.74	1006.50	1003.90	1002.99	1000.71
		500-yr	1008.18	1010.06	1009.09	1005.65	1004.38	1001.32
	72-HR	5-yr	1005.81	1005.51	1001.78	1000.98	1000.68	999.37
		10-yr	1006.05	1005.83	1002.43	1001.39	1001.02	999.62
		25-yr	1006.42	1006.27	1003.43	1002.03	1001.53	999.95
		50-yr	1006.75	1006.61	1004.26	1002.55	1001.96	1000.20
		100-yr	1007.11	1007.02	1005.16	1003.12	1002.41	1000.44
		500-yr	1008.04	1008.42	1007.40	1004.60	1003.56	1000.98
Existing Model (Includes Groh Farm & Generations Creek Subdivisions)	24-HR	5-yr	1005.80	1005.63	1002.48	1001.39	1001.00	999.59
		10-yr	1006.09	1006.02	1003.50	1002.03	1001.51	999.91
		25-yr	1006.52	1006.87	1005.02	1002.97	1002.25	1000.33
		50-yr	1006.89	1007.53	1006.22	1003.72	1002.84	1000.62
		100-yr	1007.29	1008.37	1007.42	1004.55	1003.47	1000.90
		500-yr	1008.31	1011.28	1010.32	1006.42	1004.95	1001.52
	48-HR	5-yr	1005.90	1005.76	1002.41	1001.35	1000.97	999.56
		10-yr	1006.15	1006.04	1003.19	1001.82	1001.34	999.81
		25-yr	1006.56	1006.61	1004.42	1002.59	1001.96	1000.17
		50-yr	1006.92	1007.17	1005.44	1003.23	1002.46	1000.44
		100-yr	1007.31	1007.79	1006.52	1003.90	1002.99	1000.70
		500-yr	1008.35	1010.13	1009.10	1005.65	1004.36	1001.30
	72-HR	5-yr	1005.90	1005.59	1001.81	1000.99	1000.70	999.38
		10-yr	1006.14	1005.91	1002.46	1001.40	1001.03	999.63
		25-yr	1006.53	1006.37	1003.46	1002.04	1001.54	999.96
		50-yr	1006.86	1006.73	1004.30	1002.57	1001.96	1000.20
		100-yr	1007.23	1007.12	1005.19	1003.13	1002.41	1000.44
		500-yr	1008.19	1008.51	1007.43	1004.61	1003.56	1000.98
Proposed Model (Mesenbrink Development)	24-HR	5-yr	1005.93	1005.73	1002.36	1001.31	1000.94	999.54
		10-yr	1006.24	1006.08	1003.36	1001.91	1001.42	999.86
		25-yr	1006.71	1006.90	1004.83	1002.82	1002.14	1000.27
		50-yr	1007.11	1007.55	1006.01	1003.53	1002.70	1000.55
		100-yr	1007.53	1008.34	1007.19	1004.31	1003.29	1000.83
		500-yr	1008.63	1011.20	1009.94	1006.06	1004.70	1001.43
	48-HR	5-yr	1006.04	1005.86	1002.31	1001.27	1000.91	999.51
		10-yr	1006.32	1006.17	1003.07	1001.72	1001.26	999.76
		25-yr	1006.76	1006.68	1004.27	1002.46	1001.85	1000.11
		50-yr	1007.14	1007.23	1005.26	1003.06	1002.34	1000.38
		100-yr	1007.56	1007.83	1006.31	1003.69	1002.84	1000.63
		500-yr	1008.67	1010.09	1008.79	1005.34	1004.14	1001.22
	72-HR	5-yr	1006.33	1009.45	1006.30	1003.40	1002.42	1000.34
		10-yr	1006.65	1011.33	1007.61	1004.23	1003.03	1000.62
		25-yr	1007.16	1014.08	1009.43	1005.32	1003.88	1000.97
		50-yr	1007.58	1015.28	1010.84	1006.13	1004.60	1001.25
		100-yr	1008.03	1016.03	1011.87	1006.81	1005.38	1001.53
		500-yr	1009.14	1017.06	1013.39	1008.37	1007.28	1002.66

Appendix B: GIS Workmaps

Mesenbrink Construction Development
City of Mankato, Minnesota

Unnamed Lake Watershed Overview
December 2023

BOLTON & MENK

Groh Farm Subdivision

Unnamed Lake

Generations Creek Subdivision

Mesenbrink Development

MadisonAvenue
Driveway
RaintreeRoad
MartinLutherKingJrDrive
586thAvenue
CarverRoad
CSAH 12
216thStreet
211thLane
594thAvenue
BassettDrive
FairStreet
ItascaDrive
MinnehahaCircle
HosannaCourt
KarenCourt
GretchenCourt
MainStreet
HosannaDrive
PantherLane
PantherTrail
CheetahLane
CheetahTrail
LynxCourt
LynxLane
LynxTrail
CougarCourt
CougarDrive
CougarTrail
HoffmanRoad
AmberCourt
CrystalCircle
JadeLane
TurquoiseCourt
OnyxCourt
Prairie RoseDrive
Prarie RoseDrive
AsterLane
PrairieLaneTrail
BluestemDrive
Prairie WindsDrive
BlazingStarDrive
StadiumRoad

Legend

- Project Location
- County Ditch 12 Streamline
- Existing Offsite Subbasins
- Blue Earth County NWI

Contours 2FT

- Index
- Intermediate

0 1,000 Feet

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Mesenbrink Construction Development
City of Mankato, Minnesota

County Ditch No. 12 Road Culvert Crossings
December 2023

BOLTON & MENK

Jun-08, 60" RCP

Jun-07, 54" x 88" RCP-Arch

Jun-13, 54" x 88" RCP-Arch

Jun-06, 54" RCP

Jun-04, 30" RCP

Flows offsite south to the Le Seuer River

Unnamed Lake

MadisonAvenue
SiouxRoad
RaintreeRoad
Driveway
BassettDrive
FairStreet
ItascaDrive
MinnehahaCircle
HosannaCourt
KarenCourt
GretchenCourt
MainStreet
PantherLane
PantherTrail
CheetahLane
CheetahTrail
LynxCourt
LynxLane
LynxTrail
CougarCourt
CougarDrive
CougarTrail
HoffmanRoad
AmberCourt
SunstoneDrive
TurquoiseCourt
CrystalCircle
StadiumRoad
Martin Luther King JrDrive
586thAvenue
CarverRoad
Blazing StarDrive
Prairie RoseDrive
Prarie RoseDrive
PrairieLane
AsterLane
BluestemTrail
BluestemDrive
Prairie WindsDrive
CSAH 12
211thLane
1020
594thAvenue
216thStreet

Legend

- Co. Ditch No. 12 Culvert Crossings
- County Ditch 12 Streamline
- Blue Earth County NWI

Contours 2FT

- Index
- Intermediate

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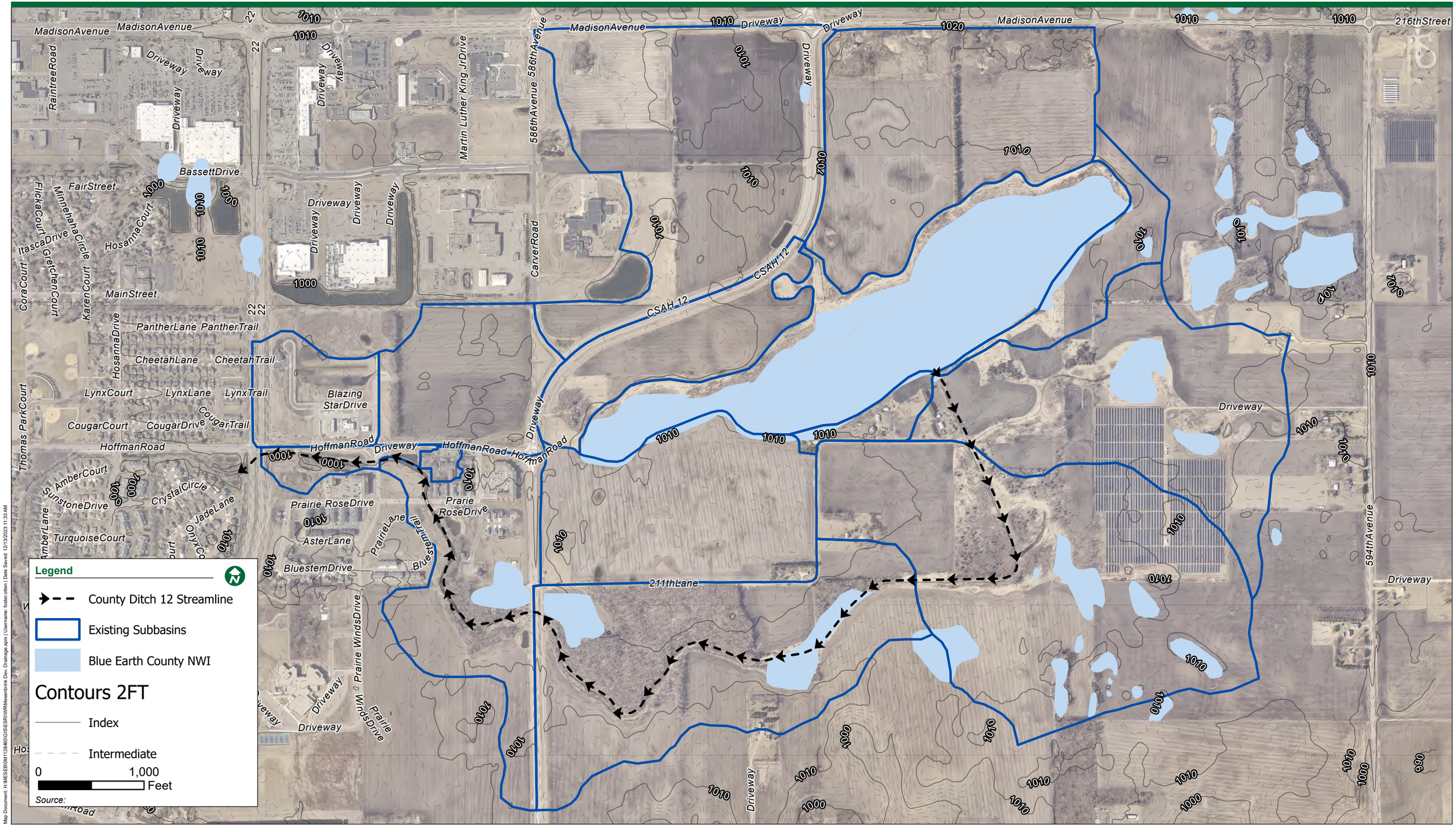

Legend

- County Ditch 12 Streamline
- Existing Subbasins
- Blue Earth County NWI

Contours 2FT

- Index
- Intermediate

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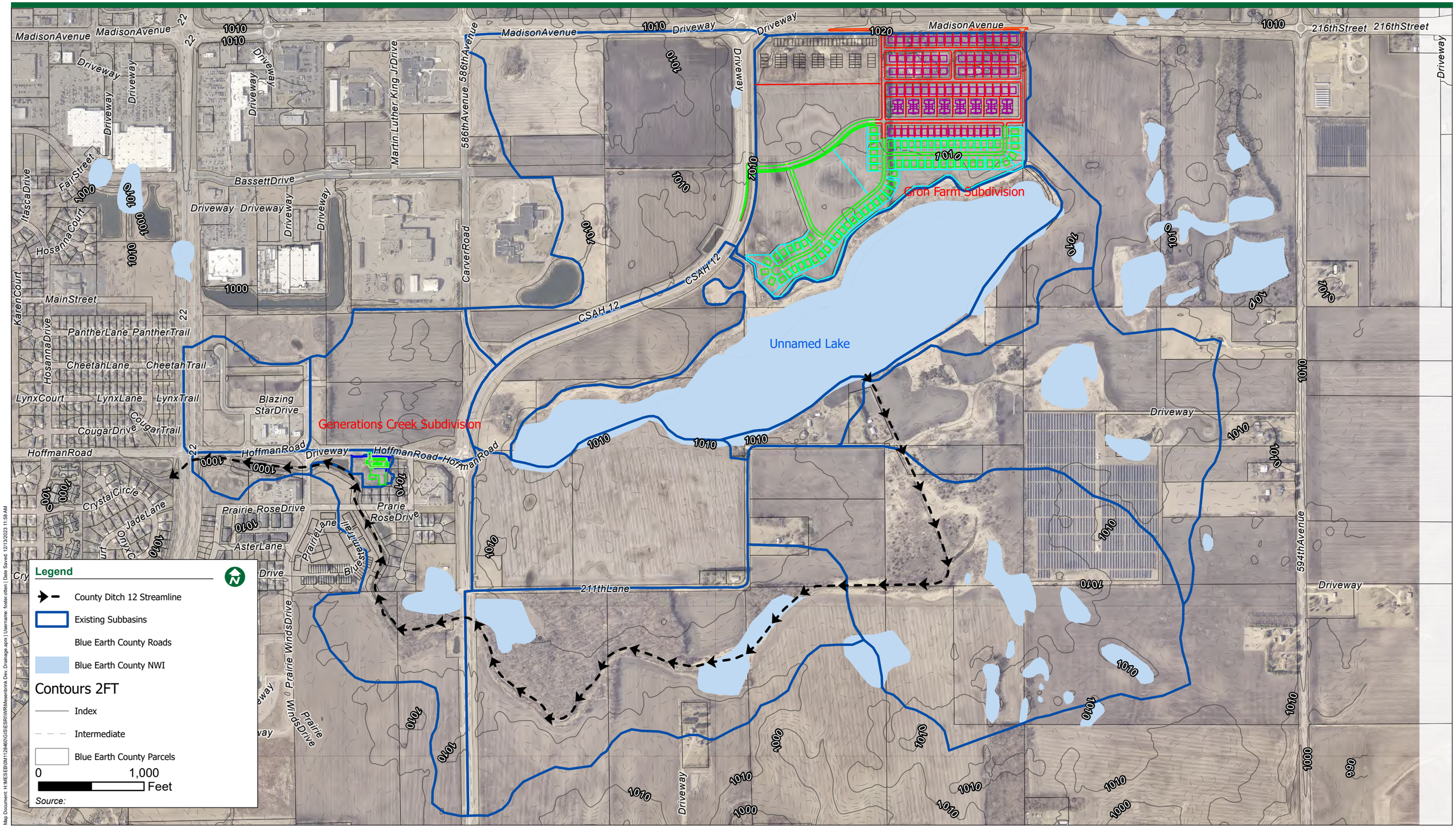

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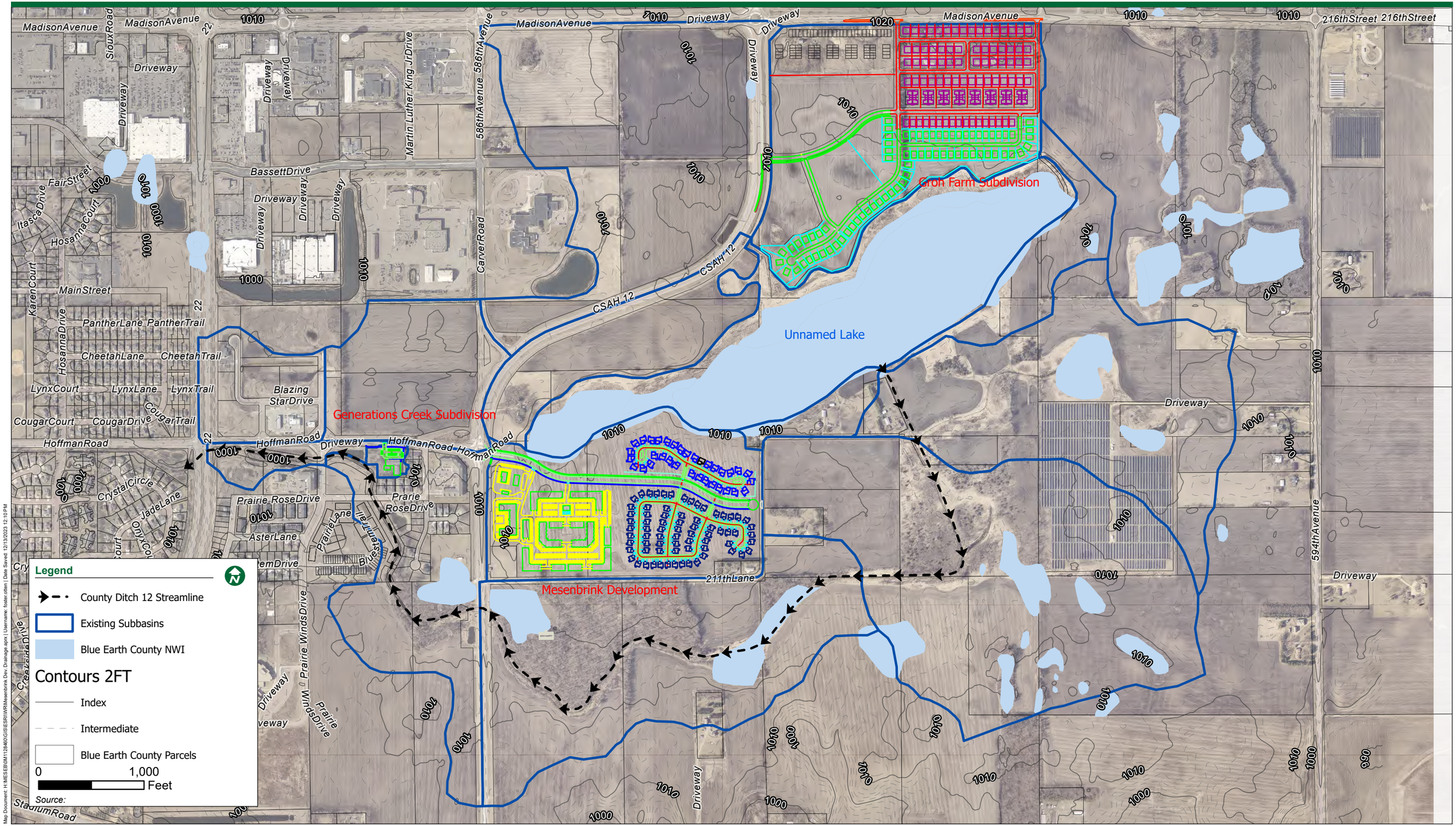
Mesenbrink Construction Development

City of Mankato, Minnesota

Proposed SSA Model Overview

December 2023

BOLTON & MENK



Legend

- County Ditch 12 Streamline
- Existing Subbasins
- Blue Earth County NWI

Contours 2FT

- Index
- Intermediate

- Blue Earth County Parcels

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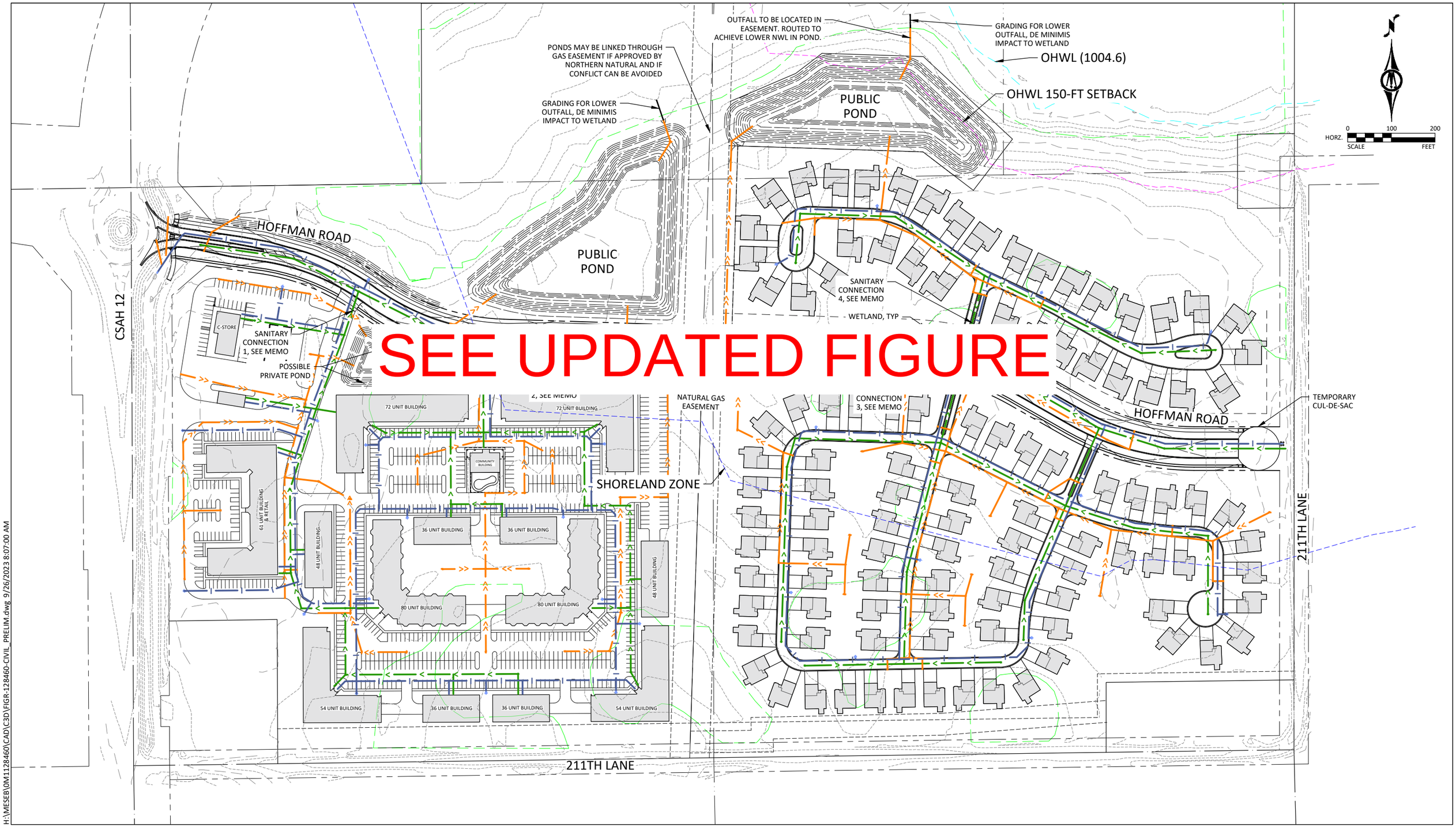
Appendix C: Supporting Documentation



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Site Plan and Traffic Advisory Review Committee **1. 4.**

Meeting Date: 04/14/2026

Title

CY19-26

Request of Brett Skilbred for an amended preliminary plat and final plat review of Quarry View Addition. The subject properties are described as Lots 1-6, Block 24, Germania Park Addition; Lots 1-8, Block 8 & Lots 1-2, Block 9, Columbia Park Addition; and the vacated portion of Lind Street.

Applicant

The applicant is Brett Skilbred.

Request

The applicant is seeking an amendment to the previously reviewed preliminary plat and a final plat review of Quarry View Addition.

Location

The subject properties are described as Lots 1-6, Block 24, Germania Park Addition; Lots 1-8, Block 8 & Lots 1-2, Block 9, Columbia Park Addition; and all that part of Lind Street located west of 8th Avenue and between Block 8 & 9, Columbia Park Addition.

Existing Land Use

The properties are currently vacant land.

Zoning

The subject properties are zoned R-3, Limited Multiple Dwelling District.

Other Board or Commission

The subject property in question was recently reviewed for multiple Planning & Zoning Approval Items:

Vacation of a portion of Lind Street included within the proposed preliminary plat area was reviewed and recommended for approval by the Planning Commission at their February 25, 2026, meeting. The City Council approved this request at their March 23, 2026, meeting.

Review of a Preliminary Plat of the subject property, known as Quarry View Addition, was reviewed and recommended for approval by the Planning Commission at their March, 25, 2026, meeting. The City Council is anticipated to act on this request at their April 11, 2026, meeting. This Preliminary Plat is now proposed to be amended as part of this request.

Environmentally Sensitive Areas

The site contains bluff areas (area exceeding 17.6% slope). Proposed Preliminary Plat displays pit wall & 10' bluff setback.
A recent evaluation determined there are no wetlands on site.

Public Utilities

Public utilities will be available to the subject property following completion of the Germania Park Phase 5 Capital Improvement Program (CIP) projects.

Review

The applicant is seeking an amendment to the previously reviewed preliminary plat and a final plat review of Quarry View Addition. The subject properties are described as Lots 1-6, Block 24, Germania Park Addition; Lots 1-8, Block 8 & Lots 1-2, Block 9, Columbia Park Addition; and the vacated portion of Lind Street.

Previous Request:

Following Council approval of the vacation of a portion of Lind Street within the subject property on March 23, 2026, the Planning Commission reviewed and recommended for approval the Preliminary Plat known as Quarry View Addition on March 25, 2026. The City Council is anticipated to act on this request at their April 11, 2026, meeting. If approved, the conditions of approval included with the Preliminary Plat would remain in effect for the current request. The applicant will be required to record the Vacation of Lind Street prior to Planning Commission review and approval of the proposed Final Plat.

The previously reviewed Preliminary Plat proposed a one-block subdivision that contained 2 lots, Lot 1A, and Lot 1B. Lot 1A was to be located on the northern side of the subdivision area and was 1.98 acres. Lot 1B was located on the southern portion of the proposal area and was 0.98 acres. During this review process, it was noted that no wetlands exist within the subject property and that there are areas that meet the Mankato City Code's definition of bluff within the proposed project area.

Current Request:

The amended preliminary plat creates 12 individual lots within Block 1. The proposed Final Plat created an approximately 2.78-acre subdivision. As proposed, Lots 1-3 and Lots 5-12 are shown to each have a two-family dwelling, for a total of 22 residential units.

Lot 4 is currently not shown with a structure. However, based on the size and layout of the lot, future development may occur on this parcel. If it is the applicant's intention to preserve this area for open space, it should be platted as an Outlot rather than a Lot of record.

The subject property is zoned as R-3, Limited Multiple Dwelling District and is subject to such standards.

The proposed Preliminary Plat incorrectly states the minimum lot area for the Two-Family dwelling in R-3, Zoning District as 10,000 Sq. Ft. The applicant shall provide an updated Preliminary Plat that states the minimum lot area as 6,000 Sq. Ft., as stated in Mankato City Code Sec. 10-167.

The currently proposed Final Plat does not contain a signature line for the Examiner of Title. As the subject property contains Torrens property, the plat must be reviewed and signed by the Examiner of Title for Blue Earth County. The applicant shall provide an updated Final Plat with all required signature lines.

There is an existing sealed well on the subject property, located approximately within the boundaries of the proposed Lot 4. As stated by Blue Earth County, the applicant shall not disturb it during current and future development of the subject property.

Lots & Block Standards:

The applicant proposed 12 individual lots, 11 of which are shown for residential development.

In the R-3, Zoning District, the minimum lot area is 6,000 Sq. Ft. for one- & two-family developments. Proposed residential lots range in size, but all conform to the minimum requirement:

- The larger corner lots are proposed at 11,191 Sq. Ft in area (Lot 1 & 12).
- The northern lots are proposed at 9,513 Sq. Ft. in area (Lot 2 & 3).
- The central lots are proposed at 8,813 Sq. Ft. in area (Lot 5 & 6).
- The southern lots are proposed at 8,820 Sq. Ft. in area (Lots 7, 8, 9*, 10, & 11).

- The "open space" lot is proposed to be 14,889 Sq. Ft. in area (Lot 4).

Lot 9 is unique to the development as it is divided into 9A & 9B. This is because the 9A portion is Abstract property and the 9B portion is Torrens property. Torrens and Abstract are two different ways of recording property records in the State of Minnesota. Torrens property has a Certificate of Title that gives conclusive proof of ownership with some exceptions. It consolidates records into a single document registered with the state. Abstract property, on the other hand, is recorded on individual Deeds separate from other documentation like mortgages and satisfactions. Because these systems operate in a very different manner, Blue Earth County must continue to record property records using the underlying system at the time of platting. In order to ensure these systems remain clear, property must be identified by its system, which necessitates that plats containing areas with differing systems are identified separately. Because of this, the split between the Abstract property, the northern lots, and the Torrens property, the southern lots, divide the proposed Lot 9 area in two. The proposed townhome unit that is divided between Lot 9A & 9B will be constructed across both Torrens & Abstract property, which will necessitate the future property owner to take extra steps in the recording process.

In the R-3, Zoning District, the required setbacks for one- and two-family dwellings are defined around providing a: 25' front yard setback, 12.5' corner side yard setback, 6' side yard setback, and 25' rear yard setback. The proposed concept development appears to conform to the required setbacks. There is a maximum ground coverage of 35% of the lot area. This dictates the total area of structure that may be permitted on a lot. The proposed development does not appear to exceed the 35% maximum coverage.

Proposed lots and blocks appear to conform to the Block & Lot standards of the Mankato City Code.

Easements:
The Mankato City Code requires that every lot be platted to include standard drainage & utility easements. Each development shall include easements at least 20 feet wide centered on exterior lot lines and ten feet wide centered on interior lot lines.

The proposed plats show the standard 10' drainage & utility easements along the front, corner-side, and a portion of the rear yards. The proposed easements must be depicted consistently across the entirety of the development. The standard 5' easements along the shared property lines are shown to only extend to the rear yard setbacks / bluff line. Code requires that the easement extend the full duration of the lot, even if there is reasonable doubt in the ability for easements to be utilized within the bluff/quarry area. The applicant shall provide updated plats depicting the code-required easements consistently throughout the subdivision.

Note: The plat provided shows proposed property monument locations that do not accurately reflect the boundaries of a portion of the lots due to the extreme elevation change between the proposed build area and the quarry below, due to the pit/quarry wall. The Surveyor will be required to set monuments that accurately reflect the proposed lot locations. This may require that additional pins be set within the quarry area of these lots.

Streets:
The proposed development is bounded by Cleveland Street, 8th Ave, Lind Street, and Harper Streets. The provided concept plan shows all proposed lots will be accessed from driveway connections to 8th Avenue. Note that 8th Ave is actively under construction as part of the Germania Park Phase 5 CIP Project and that occupation of the subject property will not be permitted until roadway improvements are fully completed.

A portion of Lind Street located west of 8th Avenue was recently vacated and is included within the proposed plat area.

Additionally, aerial imagery of the site shows that the Cleveland Street quarry access road encroaches into Lot 1, Block 1 of the proposed subdivision. The applicant shall modify this condition or provide an access agreement or easement that allows for continued access to the quarry through the subject property.

Utilities:
Private utility connections are proposed to be made to the public utilities within the 8th Ave ROW. These utilities

will be available for connection following completion of the Germania Park Phase 5 Capital Improvement Program (CIP) projects. Occupancy of the subject property will not be permitted until completion of utility improvements associated with this CIP Project has ensured sufficient utility connections are available to the proposed development.

Multiple private utilities were noted to be present within the subject property as part of previous approvals. The applicant shall work with the utility providers to vacate any existing utilities within the proposed development areas and dedicate any necessary easements to ensure continued service coverage. The applicant has already met with Xcel Energy to discuss overhead utility poles near the subject property. Xcel Energy and the applicant reached a verbal agreement that an existing span guy support pole on the west side of 8th Ave may be relocated by moving that particular pole to the north, and adding a second span guy pole to the south that will give support to the line that runs to the east. Xcel noted that these poles will need to be on the lot lines, and may assist in distributing power to any proposed future development.

The applicant proposes to utilize drainage facilities constructed south of the subject property within the Public ROW. The applicant shall work with the City Engineer on all proposed drainage improvements. Additionally, the applicant shall enter into a Subdivider's Agreement for any public improvements or improvements located in the public right of way.

Public Sites & Open Spaces:
The applicant does not propose any public open spaces as part of the proposed subdivision.

As the property was previously platted as part of Germania Park Addition and Columbia Park Addition, Parkland Dedication or payment-in-lieu-of Parkland Dedication is not required.

The applicant has stated that they intend to maintain Lot 4 as an open space to be utilized by the neighborhood. As stated above, in the proposed plans, Lot 4 is currently not shown with a structure. However, based on the size and layout of the lot, future development may occur on this parcel. If it is the applicant's intention to preserve this area for open space, it should be platted as an Outlot rather than as a Lot of record.

Environmentally Sensitive Areas:
A wetland analysis determined there are no existing wetlands on site.

The City's environmentally sensitive areas map identified portions of the subject property as slope exceeding 17.6%. The subject property has been surveyed as part of the proposed development process. Two main areas of elevation change were identified in this process, the quarry wall and a man-made earthen berm. The applicant states that all identified bluff areas were man-made as part of the quarrying process. The applicant proposes to remove much of the berm as part of the site grading process.

The proposed preliminary plat depicts the bluff line associated with the existing quarry wall. Structures will be required to be setback a minimum of 10' from the bluff line. Additionally, the applicant will be required to install safety fencing between the proposed development area and the quarry wall.

Concept Plan:
The proposed concept plan shows 11 twin-home (also known as duplexes) buildings, for a total of 22 new dwelling units. The proposed concept depicts duplicate units arranged as two-story duplexes with horizontal siding and front pedestrian and garage entries. Each unit contains three bedrooms, two bathrooms, and a large single stall garage. A second-story deck is shown along the rear elevation of the proposed units.

Any proposed deck shall be subject to structural setbacks and lot coverage requirements. If duplexes are constructed without the deck, but with the intention of future deck expansion (i.e. installation of a ledger board), the proposed building shall be reviewed to ensure any proposed deck will meet lot coverage and setback requirements.

In the future, if the applicant intends to rent the units, they will be restricted to Limited Occupancy only. Meaning that occupancy will be limited to two unrelated individuals of a family, as defined in the City of Mankato Rental

Code (Chapter 7).

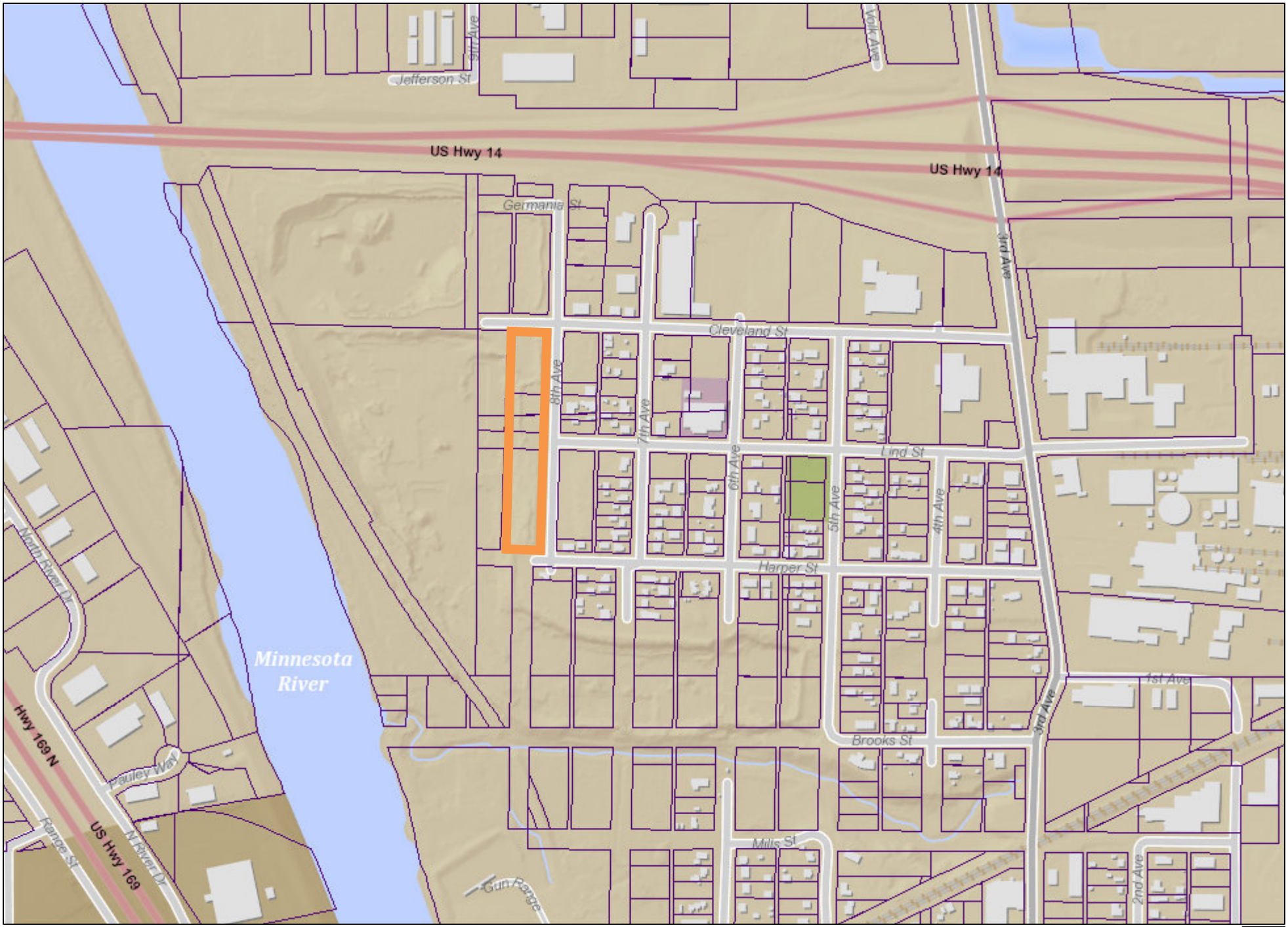
If the applicant proposes to construct any signage associated with the development, a sign permit shall be applied for and issued prior to installation. It is recommended that any proposed development signage be installed within shared common space to ensure continued maintenance access.

Blue Earth County Comment:
Blue Earth County (BEC) Staff provided feedback pertaining to the proposed Preliminary & Final Plats. BEC Staff asked for additional clarity regarding the bearings & distances defined by the plats and for clarification of the Lind Street Vacation status. These comments will be provided to the applicant as part of the Site Plan Review Comments.

Attachments

General Location Map
Aerial
Preliminary Plat
Preliminary Plat w/ Basemap
Final Plat
Final Plat w/ Basemap
Concept Plan
Sealed Well Map

General Location Map



Date: March 2026

Author:

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.

N

Aerial Map

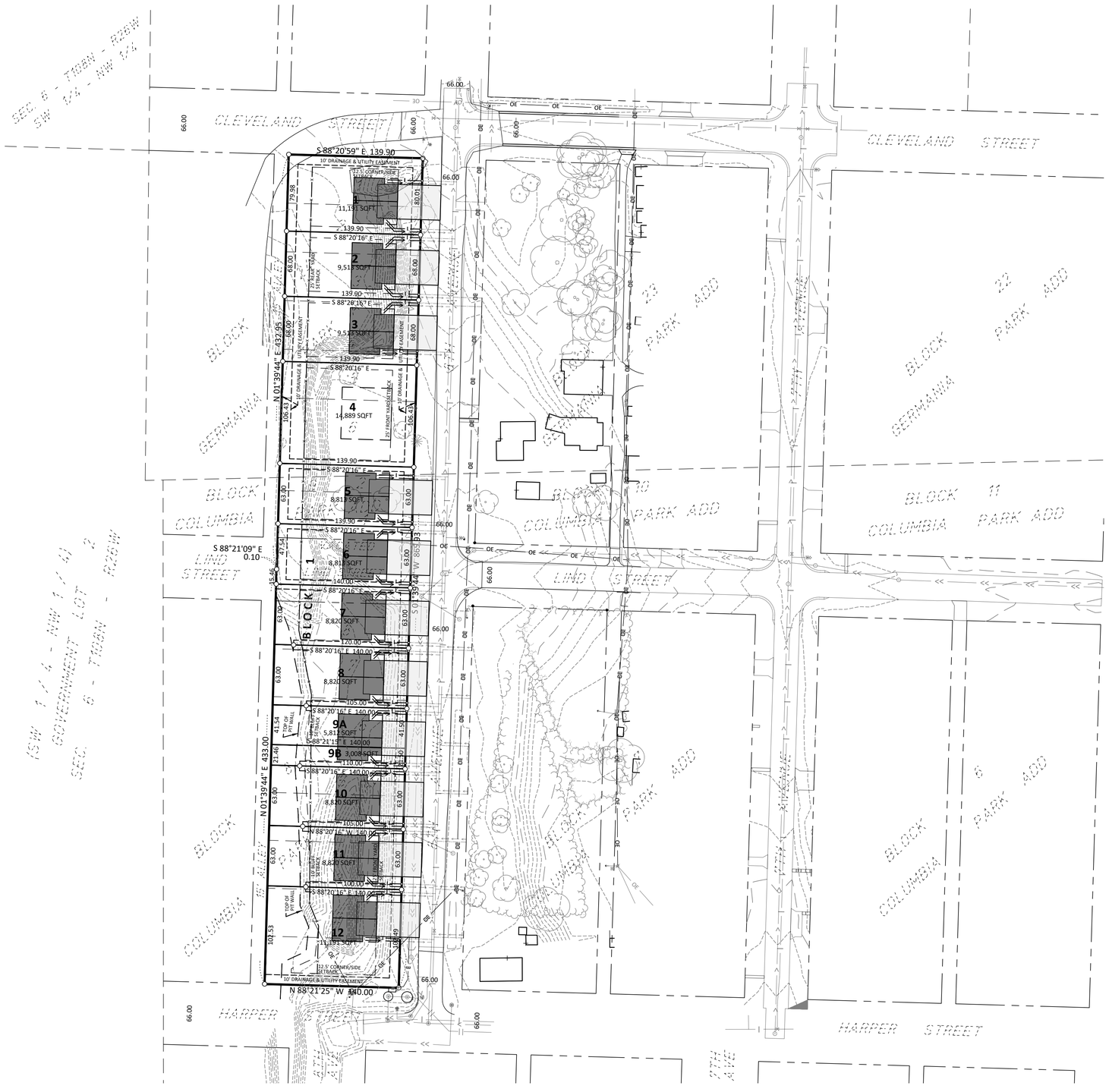


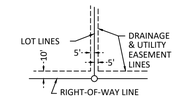
Date: March 2026

Author:

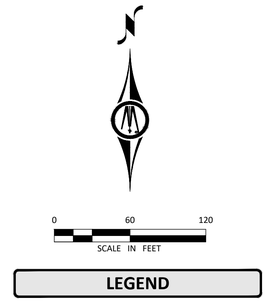
This information is to be used for reference purposes only. The City of Mankato does not guarantee accuracy of the material contained herein and is not responsible for misuse or misinterpretation.

N





BEING 5 FEET IN WIDTH AND ADJOINING LOT LINES AND BEING 10 FEET IN WIDTH AND ADJOINING RIGHT-OF-WAY LINES, UNLESS OTHERWISE INDICATED ON THE PLAT.



LEGEND

- ○ 3/4" IRON PIPE MONUMENT SET MARKED BY LIC. NO. 46564
- ● MONUMENT FOUND

UTILITY & SITE DATA

All Zoning and Setback information was obtained from the City of Mankato Code. For detailed zoning information and specific interpretation of code requirements, contact the City of Mankato.

ZONING:
Current zone is R-3, Limited Multiple-Family Dwelling District

SETBACKS:
Front
Main and Accessory Building 25 feet

Side
Main and Accessory Buildings 6 feet

Rear
Main and Accessory Building 25 feet

Lot Area (minimum) = 10,000 sq.ft. (for the first 4 units)
Lot Width (minimum) = 60 feet
Maximum Ground Coverage = 35% by all structures
Maximum Building Height = 35 feet

LEGAL DESCRIPTION

Lots 1 to 5, inclusive, all in Block 8, all in Columbia Park Addition to the City of Mankato, Blue Earth County, Minnesota. (Torrens)

AND

Lots 6, 7, and 8, Block 8; and Lots 1 and 2, Block 9, all in Columbia Park Addition to the City of Mankato, Blue Earth County, Minnesota. (Abstract)

AND

Lot 1, Block 24, Germania Park Addition to the City of Mankato, Blue Earth County, Minnesota. (Abstract)

AND

Lots 2 and 3, Block 24, Germania Park Addition to the City of Mankato, Blue Earth County, Minnesota. (Abstract)

AND

Lots 4, 5, and 6, Block 24, Germania Park Addition to the City of Mankato, Blue Earth County, Minnesota. (Abstract)

Containing 2.78 acres.

SURVEYOR'S CERTIFICATION

I hereby certify that this survey, plan, or report was prepared by me or under my direct supervision and that I am a duly Licensed Land Surveyor under the laws of the State of Minnesota.

03/27/2026
Date

Michael M. Eichers
License Number 46564

QUARRY VIEW ADDITION

PRELIMINARY PLAT
MANKATO, MINNESOTA

BOLTON & MENK
1960 PREMIER DRIVE
MANKATO, MN 56001
(507) 625-4171

LOTS 1-6, BLOCK 24, GERMANIA PARK ADD.; LOTS 1-8, BLOCK 8, & LOTS 1-2, BLOCK 9, COLUMBIA PARK ADDITION; AND VACATED LIND STREET

FOR: Quarry View I, LLC

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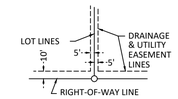

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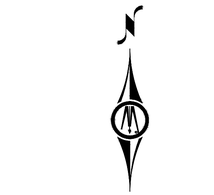

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Lots 2 and 3, Block 24, Germania Park Addition to the City of Mankato, Blue Earth County, Minnesota. (Abstract)

AND

Lots 4, 5, and 6, Block 24, Germania Park Addition to the City of Mankato, Blue Earth County, Minnesota. (Abstract)

Containing 2.78 acres.

SURVEYOR'S CERTIFICATION

I hereby certify that this survey, plan, or report was prepared by me or under my direct supervision and that I am a duly Licensed Land Surveyor under the laws of the State of Minnesota.

Michael M. Eichers
License Number 46564

03/27/2026
Date

QUARRY VIEW ADDITION

PRELIMINARY PLAT
MANKATO, MINNESOTA

LOTS 1-6, BLOCK 24, GERMANIA PARK ADD.; LOTS 1-8, BLOCK 8, & LOTS 1-2, BLOCK 9, COLUMBIA PARK ADDITION; AND VACATED LIND STREET

FOR: Quarry View I, LLC

BOLTON & MENK
1960 PREMIER DRIVE
MANKATO, MN 56001
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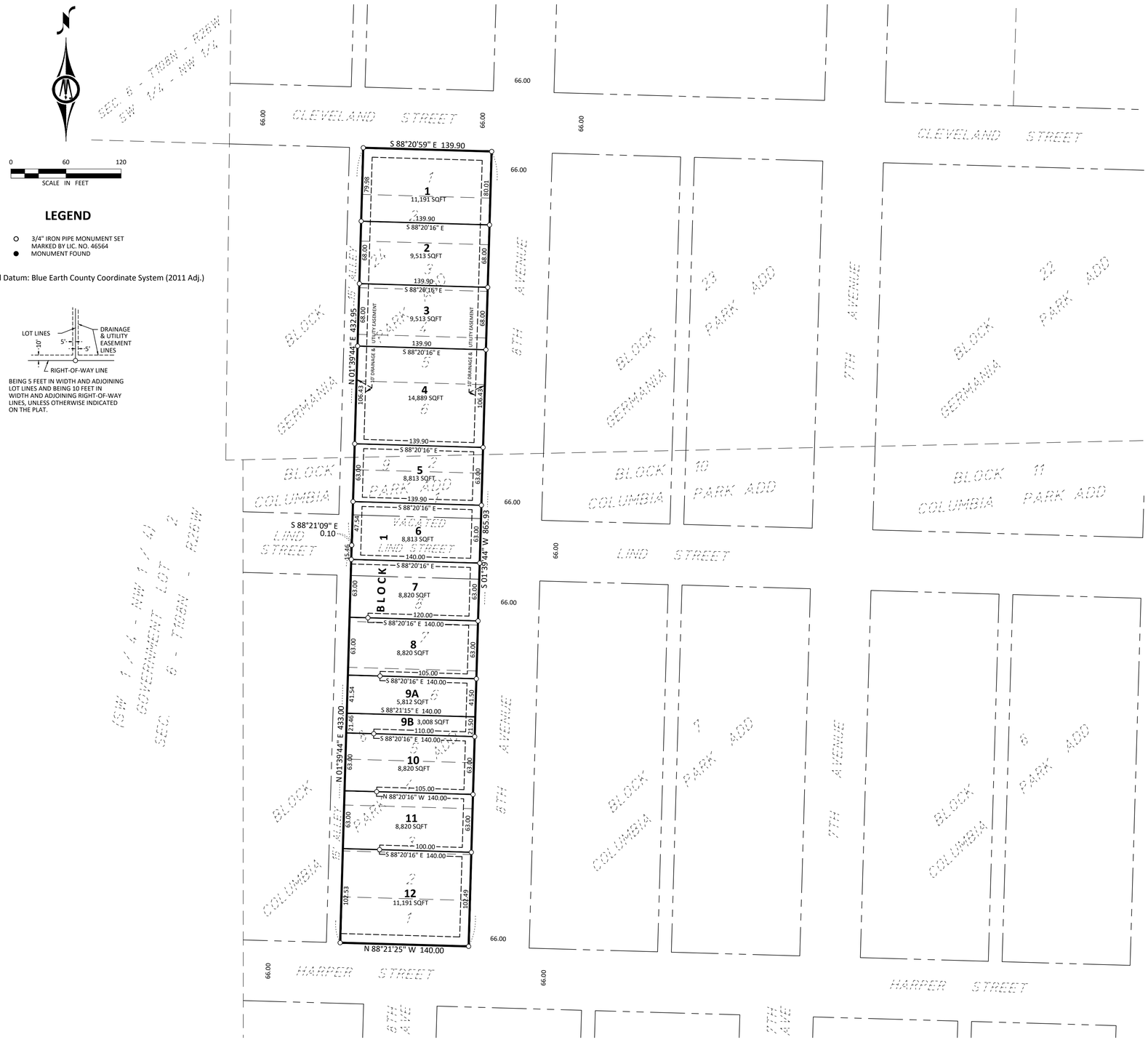
QUARRY VIEW ADDITION



INSTRUMENT OF DEDICATION

Know all men by these presents that we, Pentagon Acquisition, LLC, a Minnesota limited liability company, fee owner and Quarry View I, LLC, a Minnesota limited liability company, contract purchaser, of the following described property to wit:

Lots 1 to 5, inclusive, all in Block 8, all in Columbia Park Addition to the City of Mankato, Blue Earth County, Minnesota. (Torrens)

AND

Lots 6, 7, and 8, Block 8; and Lots 1 and 2, Block 9, all in Columbia Park Addition to the City of Mankato, Blue Earth County, Minnesota. (Abstract)

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AND

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Containing 2.78 acres.

do hereby declare that we have caused the above described property to be surveyed and platted and monuments to be set, that we have named said platted area QUARRY VIEW ADDITION, and that we dedicate to the public use the easements as shown hereon.

Dated this _____ day of _____ , 2026 by James Voda, secretary of Pentagon Acquisition, LLC, a Minnesota limited liability company.

_____
By: James Voda, secretary

NOTARY CERTIFICATES

State of Minnesota
County of _____

The foregoing instrument was acknowledged before me on this _____ day of _____ , 2026, by James Voda, it's secretary of Pentagon Acquisition, LLC, a Minnesota limited liability company.

_____
_____ , Notary Public
Notary Public-Minnesota,
My Commission Expires _____

Dated this _____ day of _____ , 2026 by Brett Skilbred, manager of Quarry View I, LLC, a Minnesota limited liability company.

_____
By: Brett Skilbred, manager

NOTARY CERTIFICATES

State of Minnesota
County of _____

The foregoing instrument was acknowledged before me on this _____ day of _____ , 2026, by Brett Skilbred, manager of Quarry View I, LLC, a Minnesota limited liability company.

_____
_____ , Notary Public
Notary Public-Minnesota,
My Commission Expires _____

SURVEYOR'S CERTIFICATE

I, Michael M. Eichers, do hereby certify that this plat was prepared by me or under my direct supervision; that I am a duly Licensed Land Surveyor in the State of Minnesota; that this plat is a correct representation of the boundary survey; that all mathematical data and labels are correctly designated on this plat; that all monuments depicted on this plat have been, or will be correctly set within one year; that all water boundaries and wet lands, as defined in Minnesota Statutes, Section 505.01, Subd. 3, as of the date of this certificate are shown and labeled on this plat; and all public ways are shown and labeled on this plat.

Dated this _____ day of _____ , 2026.

_____
Michael M. Eichers, Licensed Land Surveyor
Minnesota License No. 46564

State of Minnesota
County of Blue Earth

The foregoing Surveyor's Certificate was acknowledged before me this ____ day of _____ , 2026, by Michael M. Eichers, a Licensed Land Surveyor.

_____
Nathan P Myhra, Notary Public
Notary Public-Minnesota
My Commission Expires Jan. 31, 2028

APPROVALS

Be it known that on this the ____ day of _____ , 2026 , the Planning Commission of the City of Mankato did duly review this plat of QUARRY VIEW ADDITION.

_____ _____
Chair person: Secretary:

Be it known that on this the ____ day of _____ , 2026 , the City Council of the City of Mankato did duly approve this plat of QUARRY VIEW ADDITION.

_____ _____
Mayor: Clerk:

TITLE OPINION

I, _____ Licensed Attorney, State of Minnesota, do hereby certify that the owner as indicated hereon represents all ownership interest in the land encompassed by this plat.

_____
_____, Licensed Attorney

BLUE EARTH COUNTY PROPERTY AND ENVIRONMENTAL RESOURCES

I hereby certify that there are no delinquent taxes and/or delinquent special assessments, that the current taxes have been paid and that the transfer has been entered on the land described herein on the _____ day of _____ , 2026.

_____
Blue Earth County Property and
Environmental Resources Director

COUNTY RECORDER

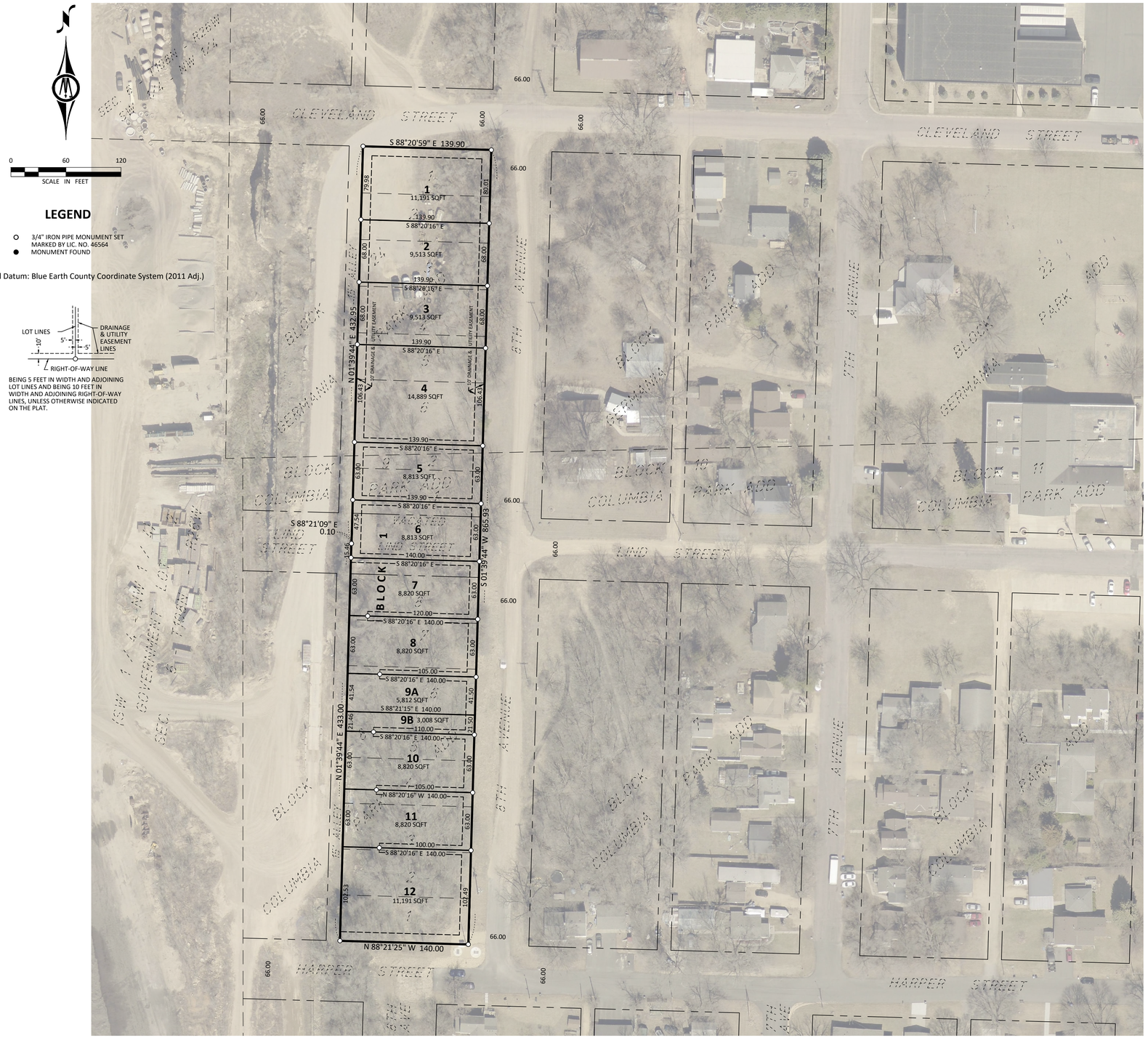
I hereby certify that this instrument was filed in my office for record on this, the ____ day of _____ , 2026, at __ o'clock, _ m., and that it was duly recorded on _____ Plats, Number _____.

_____
County Recorder

FINAL PLAT
PENDING FINAL REVIEW
(03-27-2026)

THIS PLAT PREPARED BY BOLTON & MENK, INC.

QUARRY VIEW ADDITION



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Containing 2.78 acres.

do hereby declare that we have caused the above described property to be surveyed and platted and monuments to be set, that we have named said platted area QUARRY VIEW ADDITION, and that we dedicate to the public use the easements as shown hereon.

Dated this _____ day of _____ , 2026 by James Voda, secretary of Pentagon Acquisition, LLC, a Minnesota limited liability company.

_____
By: James Voda, secretary

NOTARY CERTIFICATES

State of Minnesota
County of _____

The foregoing instrument was acknowledged before me on this _____ day of _____ , 2026, by James Voda, it's secretary of Pentagon Acquisition, LLC, a Minnesota limited liability company.

_____
_____ , Notary Public
Notary Public-Minnesota,
My Commission Expires _____

Dated this _____ day of _____ , 2026 by Brett Skilbred, manager of Quarry View I, LLC, a Minnesota limited liability company.

_____
By: Brett Skilbred, manager

NOTARY CERTIFICATES

State of Minnesota
County of _____

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Notary Public-Minnesota,
My Commission Expires _____

SURVEYOR'S CERTIFICATE

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Dated this _____ day of _____ , 2026.

_____
Michael M. Eichers, Licensed Land Surveyor
Minnesota License No. 46564

State of Minnesota
County of Blue Earth

The foregoing Surveyor's Certificate was acknowledged before me this ____ day of _____ , 2026, by Michael M. Eichers, a Licensed Land Surveyor.

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Nathan P Myhra, Notary Public
Notary Public-Minnesota
My Commission Expires Jan. 31, 2028

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Chair person: Secretary:

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_____ _____
Mayor: Clerk:

TITLE OPINION

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_____, Licensed Attorney

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Blue Earth County Property and
Environmental Resources Director

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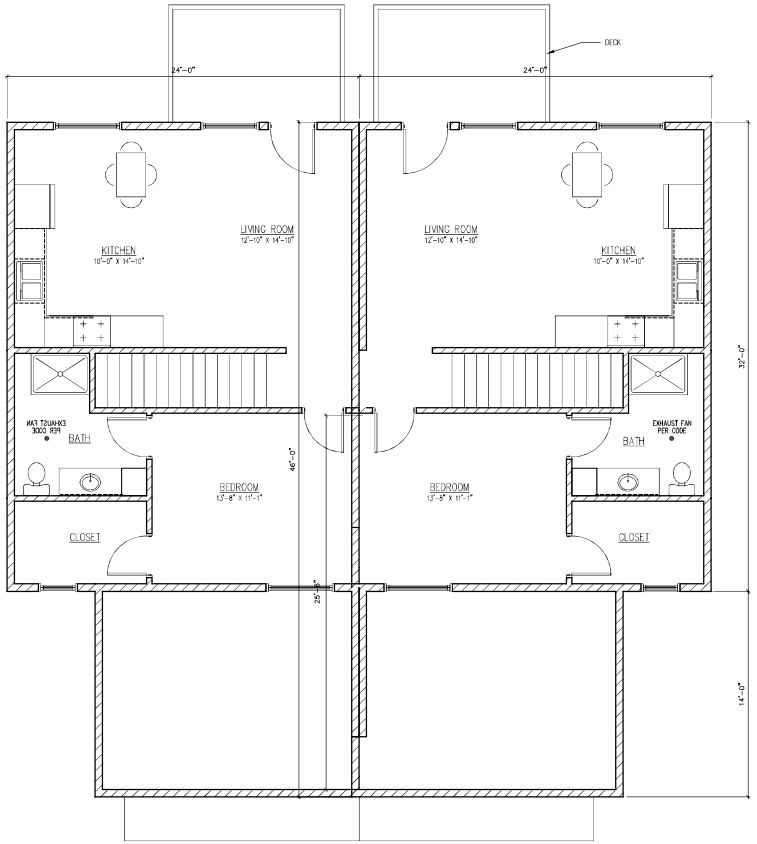
County Recorder

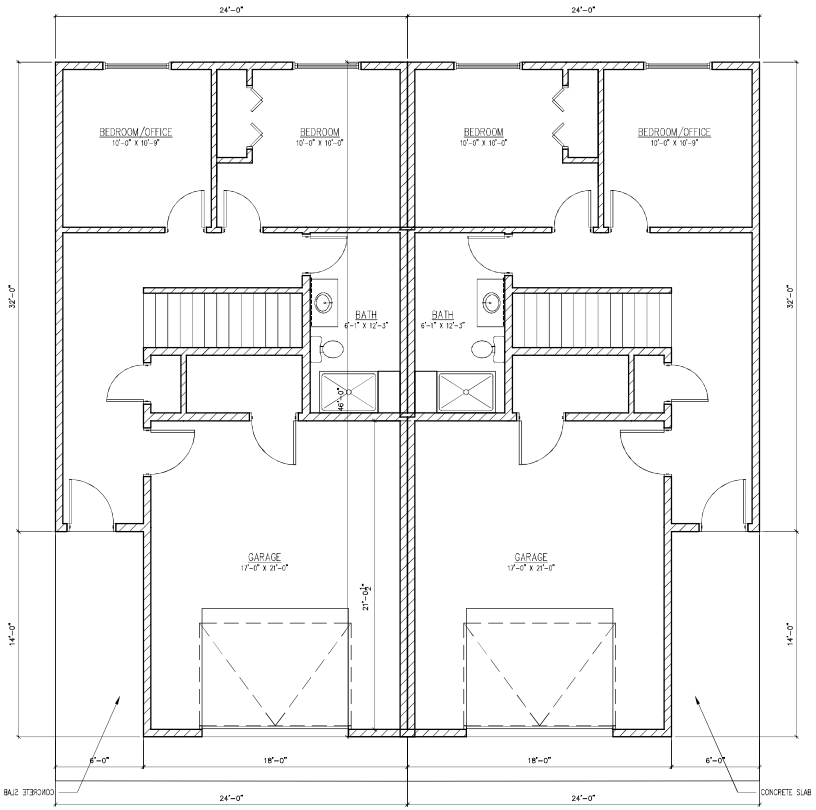
FINAL PLAT
PENDING FINAL REVIEW
(03-27-2026)

THIS PLAT PREPARED BY BOLTON & MENK, INC.



UPPER FLOOR PLAN 755 SF EA UNIT

SCALE: 1/4" = 1'-0"



MAIN FLOOR PLAN 632 SF EA UNIT

SCALE: 1/4" = 1'-0"



PROJECT TITLE:

SMALL HOME CONCEPT
JEFFERSON QUARRY
MANKATO, MN

DEVELOPER:

CONSULTANTS:

GENERAL CONTRACTOR:

No.	SUBMISSIONS & REVISIONS	Date
1	DESIGN DOCUMENTS	09-27-2024

DISCLAIMER - Project is design build. Due to the lack of "on site" consultation & supervision, and control over the actual construction process, and because of the various local building code requirements & weather conditions, the drafter/designer/architect ASSUMES NO RESPONSIBILITY in the use of these plans for any damages. This includes structural failures due to any deficiencies, omissions, or errors in the design or blueprints. It is recommended you consult with a local building official and/or inspector prior to the start of construction. General Contractor shall verify all existing dimensions and field conditions prior to ordering or fabricating any materials. Notify designer/architect if conditions, materials, sizes or dimensions are different from what is shown on documents. Cross reference plans with all other consultant sets. All construction materials shall be installed in accordance with manufacturers current specifications and industry standards. All construction components shall meet adopted code requirements.

FLOOR PLANS
ELEVATIONS

PROJ. NO.: C2412
DATE: 09-27-2024
DRAWN BY: AMS
CHECKED BY:

A2

Sealed Well Map



Sealed-Wells Labels

Wells

Sealed Wells

Parcels

N W E S

0 200 400 600 ft

Disclaimer: Blue Earth County Property & Environmental Resources Department may provide information to the public "as is" without warranty of any kind, expressed or implied, regardless of its format or the means of its transmission. There is no guarantee or representation to the user as to the accuracy, currency, suitability or reliability of the data for any purpose. In no event will Blue Earth County or its employees be liable to anyone for damages arising from the use of the property data. The user of data assumes responsibility for the installation and use of the results obtained from the data. If you have questions about this map please contact the Property & Environmental Resources Office at (507) 304-4251.

Site Plan and Traffic Advisory Review Committee **1. 5.**

Meeting Date: 04/14/2026

Title

CY20-26

Request of Southwest Minnesota Housing Partnership for a preliminary and final plat review of Good Counsel Hill subdivision, for a conditional use permit to accommodate more than one building on a single lot on a property zoned O-R, Office Residential, a planned unit development to establish and allow mixed uses within the subject development, and to amend the Institutional Overlay District to allow for an updated campus development plan to include the addition of parking and re-use of existing spaces located within the current structures on the existing campus. The subject property is described as Outlot B, School Sisters of Notre Dame Subdivision, according to the plat thereof on file at the County Recorder's Office, Blue Earth County, Minnesota (170 Good Counsel Drive, BE County PID's R010905379005, R010908201007).

Applicant

The applicant is Southwest Minnesota Housing Partnership.

Request

The applicant is seeking a preliminary plat review of Good Counsel Hill subdivision, a conditional use permit to accommodate more than one building on a single lot on a property zoned O-R, Office Residential, a planned unit development to establish and allow mixed uses within the subject development, and to amend the Institutional Overlay District to allow for an updated campus development plan to include the addition of parking and re-use of existing spaces located within the current structures on the existing campus.

Location

The subject property is legally described as Outlot B, School Sisters of Notre Dame Subdivision, according to the plat thereof on file at the County Recorder's Office, Blue Earth County, Minnesota. The address associated with the property is 170 Good Counsel Drive, and the Blue Earth County Parcel Identification Numbers are R010905379005 and R010908201007.

Existing Land Use

The property was previously the location of the School Sisters of Notre Dame campus. The buildings and infrastructure still exist on the subject property and are not proposed to change with this proposal.

Zoning

The subject property is zoned O-R, Office Residential.

Environmentally Sensitive Areas

There are environmentally sensitive areas on the site, including bluffs/slopes, woodlands and wetlands.

Review

Southwest Minnesota Housing Partnership is seeking a preliminary and final plat review of Good Counsel Hill subdivision, a conditional use permit to accommodate more than one building on a single lot on a property zoned O-R, Office Residential, a planned unit development to establish and allow mixed uses within the subject development, and to amend the Institutional Overlay District to allow for an updated campus development plan to include the addition of parking and re-use of existing spaces located within the current structures on the existing campus.

The property is described as Outlot B, School Sisters of Notre Dame Subdivision, according to the plat thereof on file at the County Recorder's Office, Blue Earth County, Minnesota. It is addressed as 70 Good Counsel Drive and the Blue Earth County parcel identification numbers are R010905379005 and R010908201007.

Preliminary and Final Plat

The applicant, Southwest Minnesota Housing Partnership (SWMHP), is seeking the preliminary and final plat review of Good Counsel Hill. The proposed Lot 1, Block 1 is an area of approximately 40 acres. The plat encompasses the current Outlot B, which is part of the School Sisters of Notre Dame Subdivision that occurred in 2022.

Institutional Overlay Amendment

In 2001, the School Sisters of Notre Dame established an institutional overlay district for the property, which was triggered because, at that time, an addition was proposed on the campus. The Overlay remains in place and, as changes are proposed, the campus master plan is to be updated to reflect those changes. In this case, the applicant is not proposing any building additions, but is planning for updated parking areas around the campus and additional infrastructure, such as stormwater ponds, to facilitate as much, and for uses within the building to be updated to closely reflect the historic uses within the existing structure. Thus, the request to update the campus plan for these added spaces and updated uses within the building is outlined as follows.

Planned Unit Development (PUD) and Conditional Use Permit (CUP)

The property is zoned Office-Residential with an Institutional Overlay. The applicant states that the existing and proposed uses are largely consistent with the existing permitted and historical uses of the property. The PUD is sought to acknowledge the mixed-use nature of the property, allow for shared parking arrangements and resolve any future zoning questions or conflicts with the continued use of the property consistent with the historical use, as outlined. The goal of SWMHP's acquisition of this property is to use the property as closely as possible to the historic use of the buildings and the land they are built upon.

The applicant's narrative notes that the overall PUD/project proposes up to 110 residential units and 51 assisted living beds. It also proposes up to 30,000 square feet of office and supporting space for the residential use, including a potential School Sisters museum, catering kitchens, educational space, maker space, leasing office, and accessory space to the apartment uses. The applicant's information states that the use of the property will be for events and recreational uses in order to utilize the historic chapel and organ as well as gym space, and that these uses will be on weekends and evenings, and will not exceed 15 events per year.

The applicant is also seeking a conditional use permit to accommodate more than one building on a single lot. This is because the main Good Counsel building, Florian, Schied, and Marian buildings are all located on one lot. The applicant has indicated their desire is to obtain this conditional use permit for any future use of these buildings.

Attachments

General Location Map

Aerial Plan

Preliminary Plat

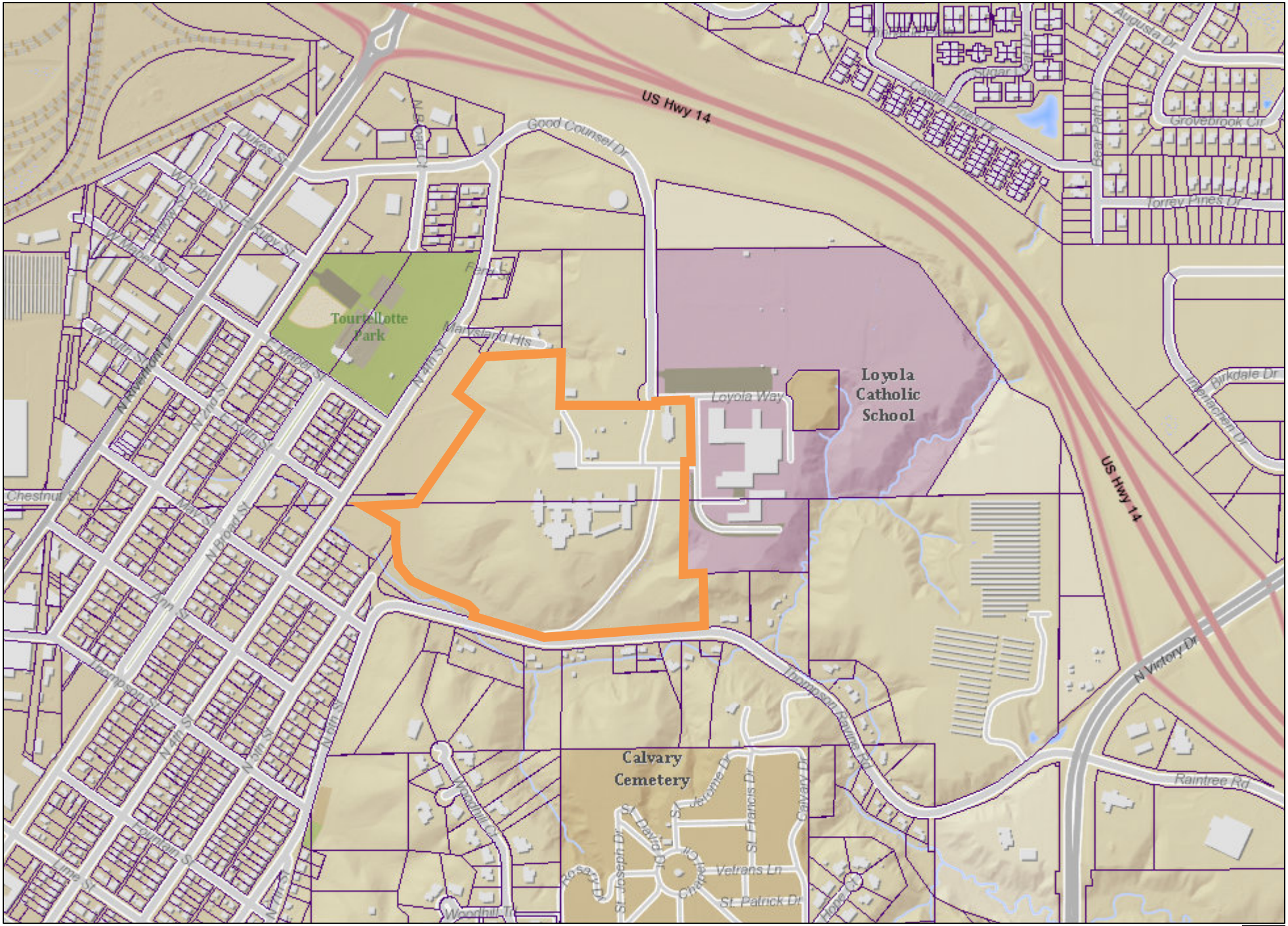
Final Plat

Site Plan

Grading Plan

Drainage Report
Fire Protection and Traffic Circulation Plan
Floor Plans
Building Fire Suppression System Plan
Utility Plan
Traffic Study
Landscape and Lighting Plan
Steam Distribution Plan
Loading, refuse and snow removal plan
Phasing Plan
ALTA Survey

General Location Map



Date: February 2026

Author:

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Aerial Map



Date: February 2026

Author:

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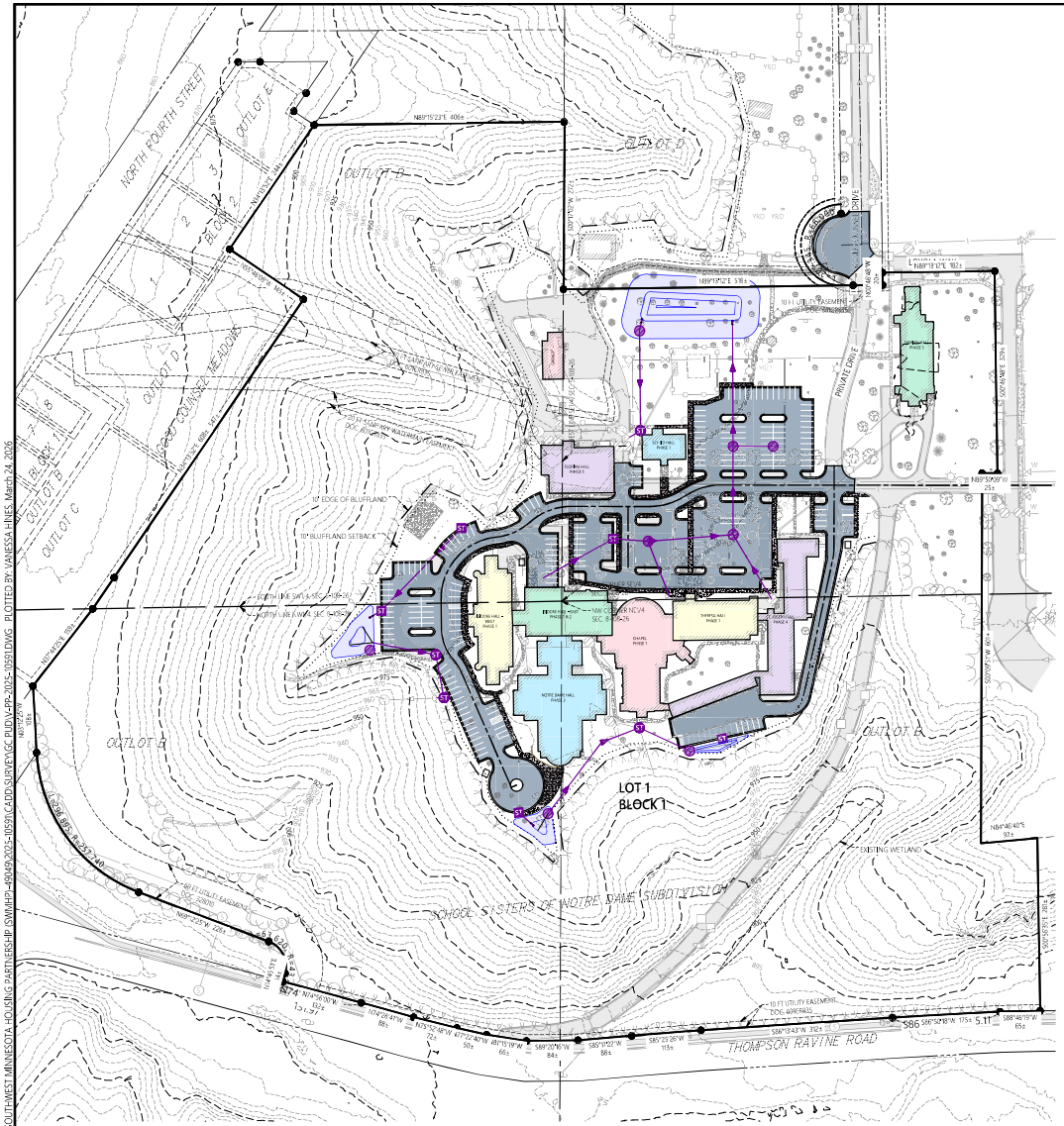
GOOD COUNSEL HILL

SEC. 5 & 8, TWN. 108, RGE. 26


NORTH FOURTH STREET
OUTLOT D
OUTLOT C
OUTLOT A
OUTLOT B
GOOD COUNSEL MEADOWS
LOT 1
BLOCK 1
10' EDGE OF BLUFFLAND
10' BLUFFLAND SETBACK
PRIVATE DRIVE
EXISTING WETLAND
SCHOOL SISTERS OF NOTRE DAME SUBDIVISION
THOMPSON RAVINE ROAD
10 FT UTILITY EASEMENT
DOC. 4067603
N89°15'22"E 406.4
N89°15'22"E 330.1
N89°15'22"E 330.1
N89°15'22"E 330.1
N89°50'38"W 251.1
N89°40'40"E 321.1
S89°40'40"W 321.1
S86°56'18"W 175.1
S89°40'40"W 65.2
S89°40'40"W 65.2
S89°33'28"W 113.1
S89°20'16"W 84.1
S89°19'19"W 66.2
S89°19'19"W 66.2
S89°19'19"W 66.2

GOOD COUNSEL HILL

INSTRUMENT OF DEDICATION

KNOW ALL PERSONS BY THESE PRESENTS: That GC Mankato Hill LLC, a Minnesota limited liability company, owner of the following described property:

Outlot B, SCHOOL SISTERS OF NOTRE DAME SUBDIVISION, according to the plat thereof on file at the County Recorder's Office, Blue Earth County, Minnesota;

EXCEPT

That part of GOOD COUNSEL MEADOWS, according to the plat thereof on file at said County Recorder's Office, described as follows:

Beginning at the most southerly corner of Outlot C, said GOOD COUNSEL MEADOWS; thence on an assumed bearing of North 55 degrees 42 minutes 25 seconds West, along the southwesterly line of said GOOD COUNSEL MEADOWS, a distance of 215.53 feet; thence North 89 degrees 05 minutes 18 seconds East 275.49 feet to the southeasterly line of said GOOD COUNSEL MEADOWS; thence South 37 degrees 44 minutes 24 seconds West along said southeasterly line a distance of 159.11 feet to the point of beginning.

Has caused the same to be surveyed and platted as GOOD COUNSEL HILL.

IN WITNESS WHEREOF, said GC Mankato Hill LLC, a Minnesota limited liability company, has caused these presents to be signed by its proper officer

this ____ day of _____, 20___.

GC Mankato Hill LLC

_____

Chad Adams, President

State of Minnesota

County of _____

This instrument was acknowledged before me on _____ by Chad Adams, President of GC Mankato Hill LLC, a Minnesota limited liability company.

_____

(Notary Signature)

_____

(Notary Printed Name)

Notary Public _____

My Commission Expires: _____

SURVEYOR'S CERTIFICATE

I, Peter G. Oetliker, do hereby certify that this plat was prepared by me or under my direct supervision; that I am a duly Licensed Land Surveyor in the State of Minnesota; that this plat is a correct representation of the boundary survey; that all mathematical data and labels are correctly designated on this plat; that all monuments depicted on this plat have been, or will be correctly set within one year; that all water boundaries and wet lands, as defined in Minnesota Statutes, Section 505.01, Subd. 3, as of the date of this certificate are shown and labeled on this plat; and all public ways are shown and labeled on this plat.

Dated this____ day of _____20___ .

_____

Peter G. Oetliker, Licensed Land Surveyor

Minnesota License Number 41887

State of Minnesota

County of Olmsted

The foregoing instrument was acknowledged before me on _____ by Peter G. Oetliker.

_____

(Notary Signature)

_____

(Notary Printed Name)

Notary Public, Olmsted County, Minnesota

My Commission Expires: _____

TITLE OPINION

I, _____, Licensed Attorney, State of Minnesota, do hereby certify that the owner as indicated hereon represents all ownership interest in the land encompassed

by this plat as of this_____ day of _____, 20____

_____

_____, Attorney

REVIEW

This plat was duly reviewed by the Planning Commission of the City of Mankato, Minnesota,

on this ____ day of _____ 20___.

_____ _____

Chairperson Secretary

APPROVAL

We do hereby certify that on the ____ day of _____, 20___, the City Council of Mankato, Minnesota, approved this plat of GOOD COUNSEL HILL, and said plat is in compliance with the provisions of MS Section 505.03, Subd. 2.

_____ _____

Mayor City Clerk

BLUE EARTH COUNTY PROPERTY AND ENVIRONMENTAL RESOURCES

I hereby certify that all taxes for 20___ on the land described hereon are paid and no

delinquent taxes are due and transfer entered this day of _____, 20___.

_____

Blue Earth County

Property and Environmental Resources Director

COUNTY RECORDER

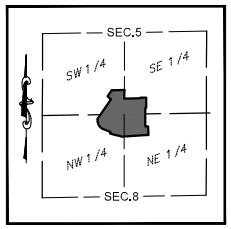
I hereby certify that this instrument was filed in the office of the County Recorder for record on

this ___ day of _____, 20___ at _____ o'clock __m and that it was duly recorded on

_____ Plat, Number _____ .

_____

Blue Earth County Recorder



VICINITY MAP

SEC. 5 AND 8, TWN. 108, RGE. 26
MANKATO TOWNSHIP
BLUE EARTH COUNTY, MN

NO SCALE

WIDSETH
ARCHITECTS ▪ ENGINEERS ▪ SCIENTISTS ▪ SURVEYORS

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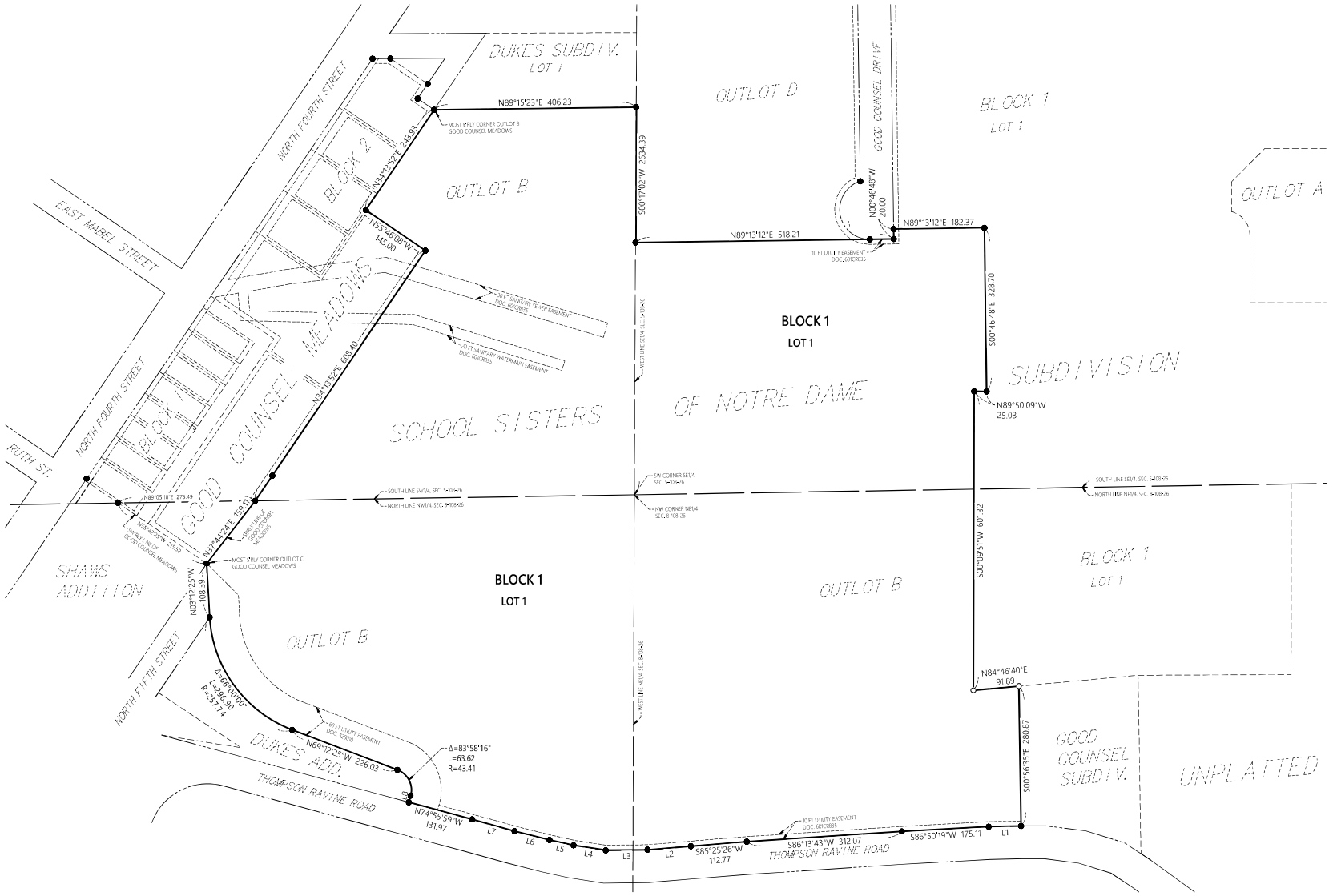
GOOD COUNSEL HILL



ORIENTATION OF THIS BEARING SYSTEM IS BASED ON THE BLUE EARTH COUNTY COORDINATE SYSTEM (NAD83-2011 ADJ.)

● DENOTES FOUND IRON MONUMENT

○ DENOTES 1/2 INCH DIAMETER BY 14 INCH LONG IRON PIPE SET AND MARKED BY LS 41887

LINE DATA TABLE		
SEGMENT	LENGTH	DIRECTION
L1	65.03	S88° 48' 19"W
L2	87.58	S85° 11' 22"W
L3	83.52	S89° 20' 18"W
L4	65.69	N81° 15' 19"W
L5	49.50	N77° 22' 40"W
L6	72.40	N75° 52' 48"W
L7	88.35	N74° 26' 41"W
L8	13.93	N14° 45' 51"E

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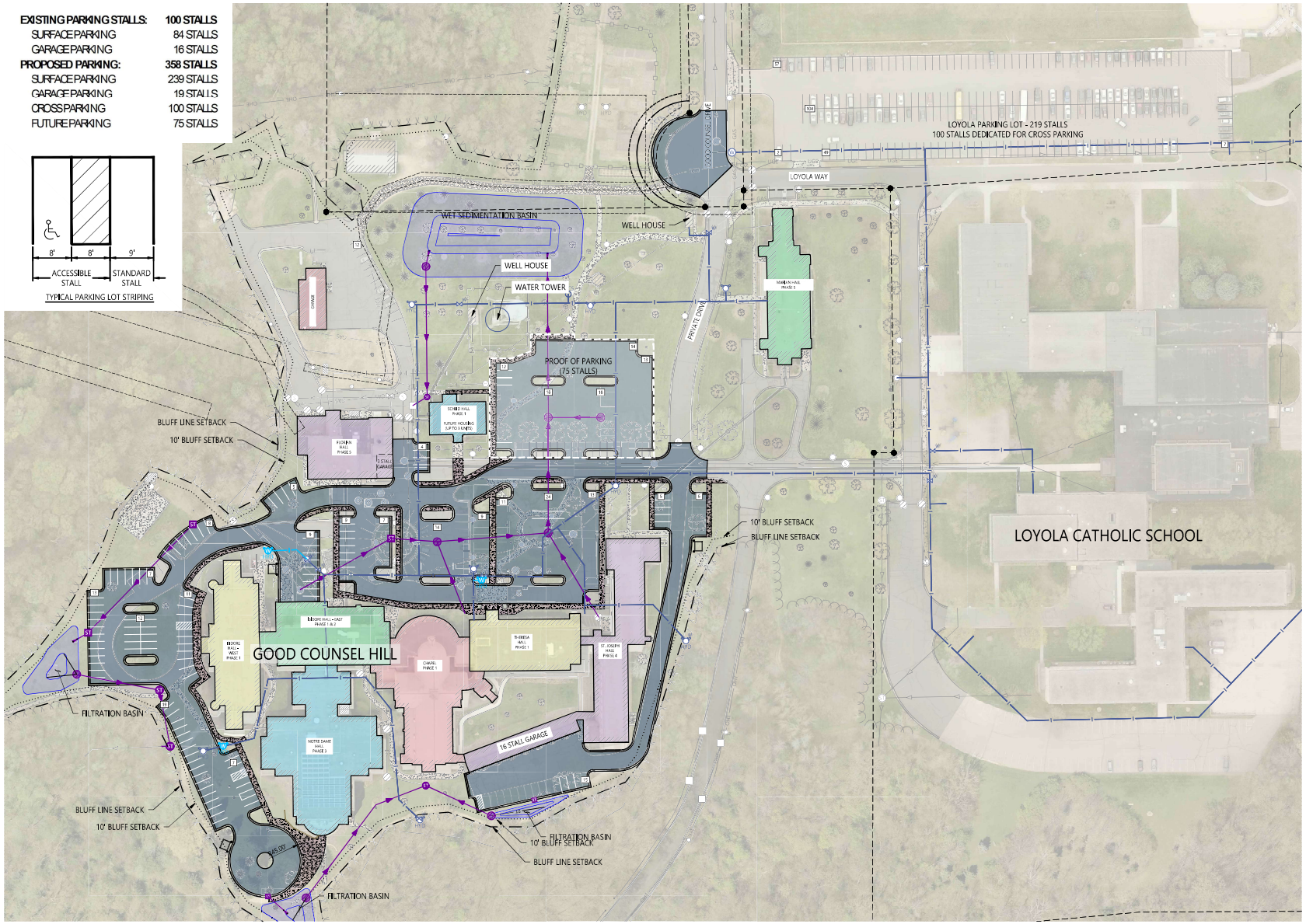
EXISTING PARKING STALLS:	**100 STALLS**
SURFACE PARKING	84 STALLS
GARAGE PARKING	16 STALLS
PROPOSED PARKING:	**358 STALLS**
SURFACE PARKING	239 STALLS
GARAGE PARKING	19 STALLS
CROSS PARKING	100 STALLS
FUTURE PARKING	75 STALLS

TYPICAL PARKING LOT STRIPING



PROPOSED LEGEND

- BITUMINOUS SURFACE
- CONCRETE SURFACE
- CURB & GUTTER
- STORM SEWER CATCH BASIN
- STORM SEWER CLEANOUT
- STORM SEWER INLET STRUCTURE
- STORM SEWER MANHOLE
- STORM SEWER GRAVITY MAIN
- STORM SEWER DRAINTILE
- HYDRANT
- WATER MAIN VALVE
- WATER MAIN PIPE

EXISTING LEGEND

- SHRUB
- TREE - CONIFEROUS
- TREE - DECIDUOUS
- EDGE OF WOODS
- BUILDING
- CHAINLINK FENCE
- RETAINING WALL
- FOC — UNDERGROUND FIBER OPTIC LINE
- OHT — OVERHEAD TELEPHONE LINE
- UGT — UNDERGROUND TELEPHONE LINE
- OHC — OVERHEAD TV LINE
- UGC — UNDERGROUND TV LINE
- FOC — UNDERGROUND FIBER OPTIC LINE
- UGT — UNDERGROUND TELEPHONE LINE
- LIGHT POLE
- UGE — UNDERGROUND ELECTRIC LINE
- GAS — NATURAL GAS LINE
- SANITARY MANHOLE
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- STORM SEWER MANHOLE
- STORM SEWER GRAVITY MAIN
- CURB STOP
- FIRE HYDRANT
- WATER MAIN LINE

N

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SCALE IN FEET

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DRAWN BY: RSH
CHECKED BY: CNB

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

CRAIG N. BRITTON LIC. NO.: 44228 DATE: 03/24/2026

DATE	REV#	REVISIONS DESCRIPTION

GOOD COUNSEL

SITE PLAN - OVERALL

C2.0

PROJECT #: 2025-10591

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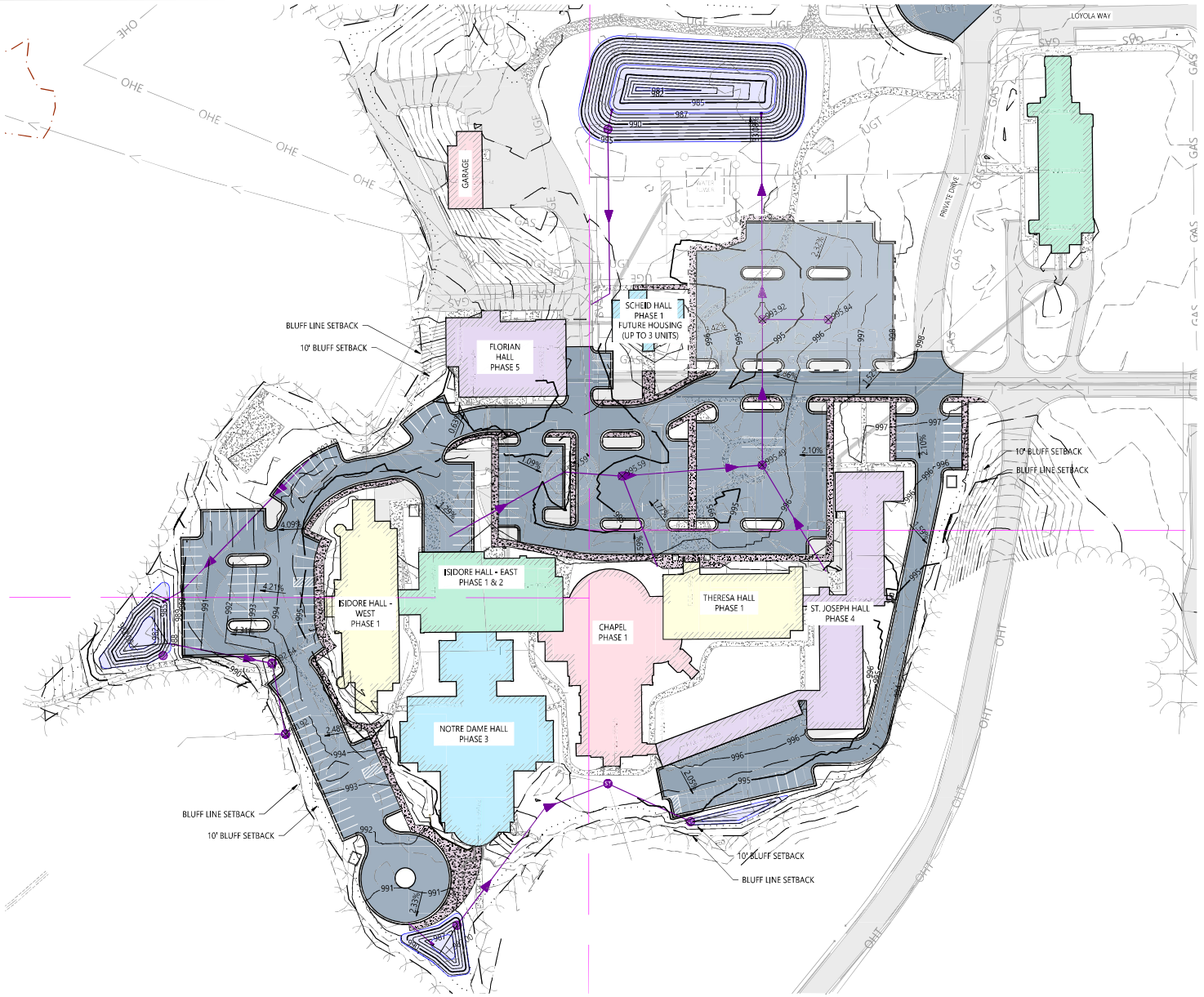

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GENERAL GRADING NOTES

- THE SUBSURFACE UTILITY INFORMATION IN THIS PLAN IS UTILITY QUALITY LEVEL D. THIS QUALITY LEVEL WAS DETERMINED ACCORDING TO THE GUIDELINES OF CI/ASCE 38-.2, ENTITLED "STANDARD GUIDELINES FOR THE COLLECTION AND DEPICTION OF EXISTING SUBSURFACE UTILITY DATA".
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CHECKED BY: CNB

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NOT FOR CONSTRUCTION

CRAIG N. BRITTON LIC. NO.: 44228 DATE: 03/24/2026

DATE	REV#	REVISIONS DESCRIPTION

GOOD COUNSEL

GRADING PLAN - OVERALL

C4.0

PROJECT #: 2025-10591

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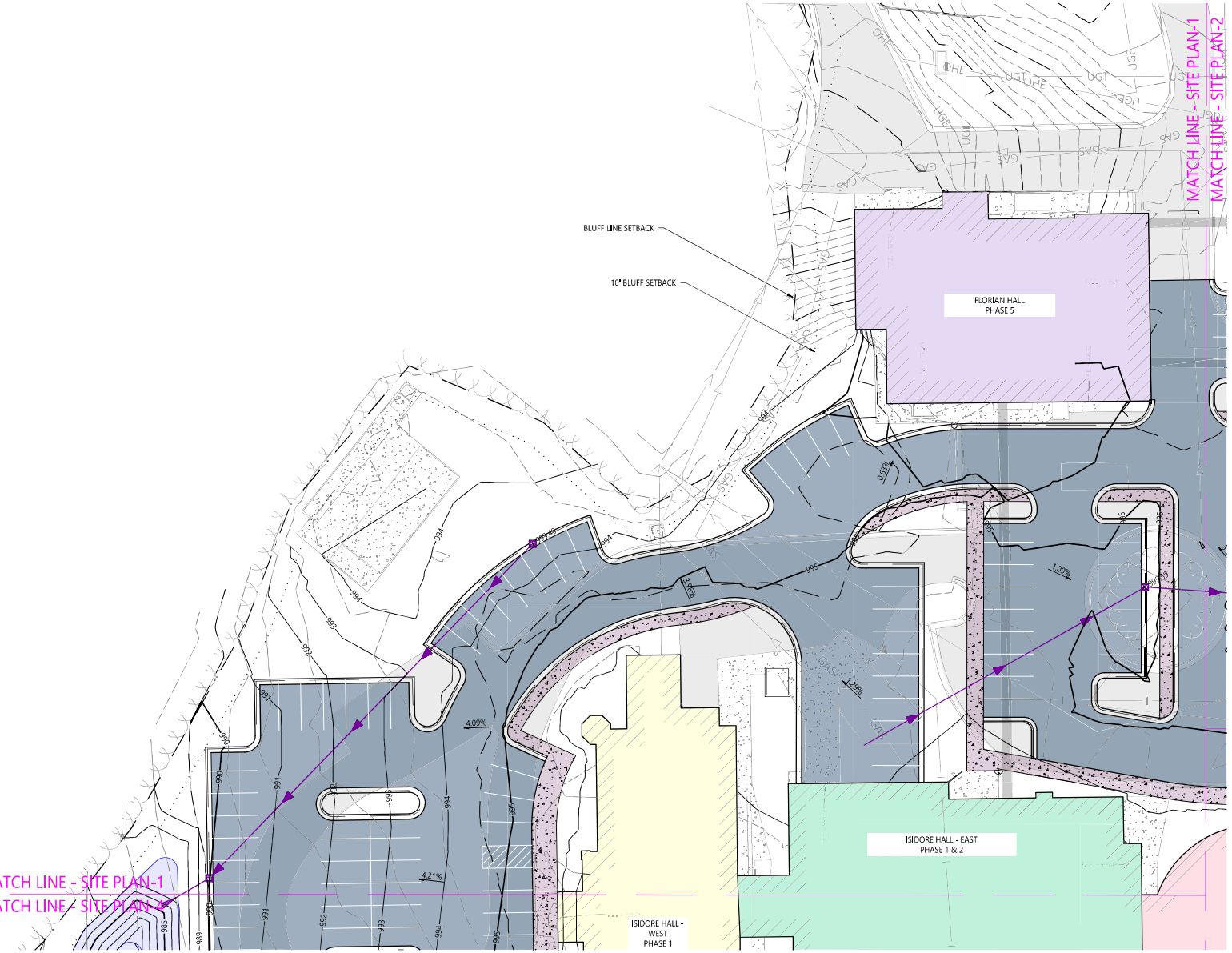

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GOOD COUNSEL

GRADING PLAN - ENLARGEMENT

C4.1

PROJECT #: 2025-10591

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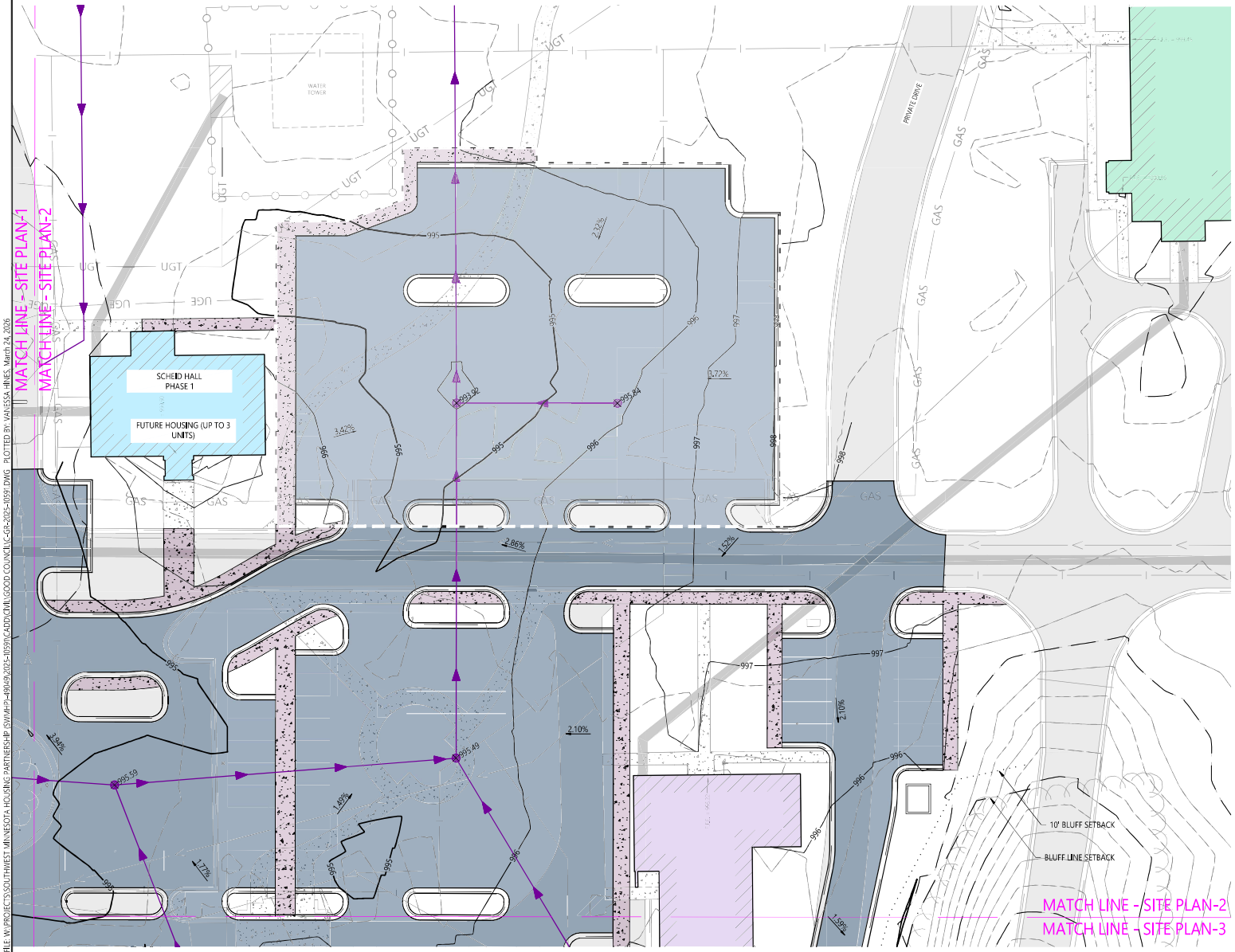

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GRADING PLAN - ENLARGEMENT

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PROJECT #: 2025-10591

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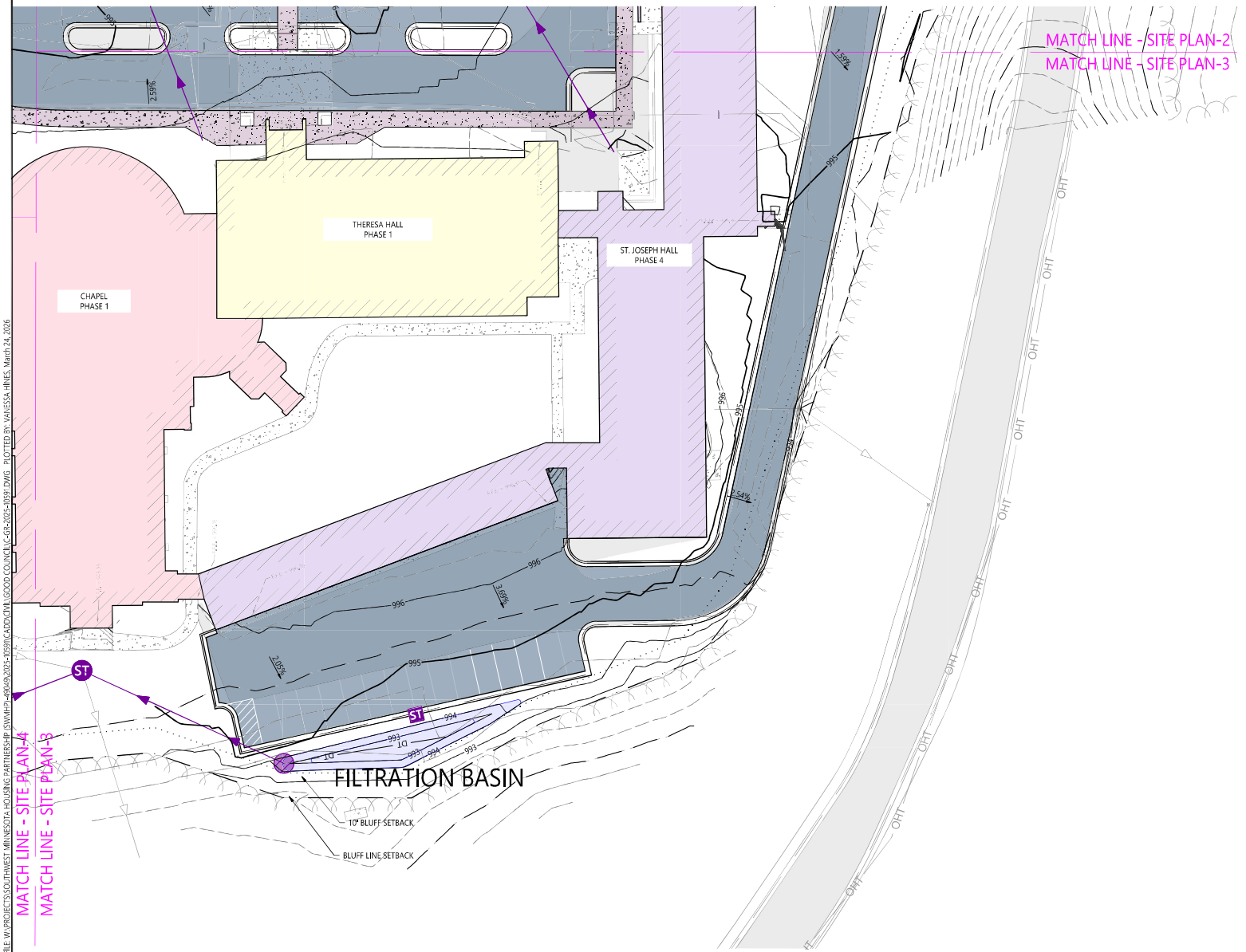

PROPOSED LEGEND

- BITUMINOUS SURFACE
- CONCRETE SURFACE
- CURB & GUTTER
- STORM SEWER CATCH BASIN
- STORM SEWER CLEANOUT
- STORM SEWER INLET STRUCTURE
- STORM SEWER MANHOLE
- STORM SEWER GRAVITY MAIN
- STORM SEWER DRAINTILE

EXISTING LEGEND

- SHRUB
- TREE - CONIFEROUS
- TREE - DECIDUOUS
- EDGE OF WOODS
- BUILDING
- CHAINLINK FENCE
- RETAINING WALL
- UNDERGROUND FIBER OPTIC LINE
- OVERHEAD TELEPHONE LINE
- UNDERGROUND TELEPHONE LINE
- OVERHEAD TV LINE
- UNDERGROUND TV LINE
- UNDERGROUND FIBER OPTIC LINE
- UNDERGROUND TELEPHONE LINE
- LIGHT POLE
- UNDERGROUND ELECTRIC LINE
- NATURAL GAS LINE
- SANITARY MANHOLE
- SANITARY GRAVITY MAIN
- STORM SEWER CATCH BASIN
- CULVERT APRON
- STORM SEWER INLET STRUCTURE
- STORM SEWER MANHOLE
- STORM SEWER GRAVITY MAIN
- CURB STOP
- FIRE HYDRANT
- WATER MAIN LINE

GENERAL GRADING NOTES

- THE SUBSURFACE UTILITY INFORMATION IN THIS PLAN IS UTILITY QUALITY LEVEL D. THIS QUALITY LEVEL WAS DETERMINED ACCORDING TO THE GUIDELINES OF CI/ASCE 38-2, ENTITLED "STANDARD GUIDELINES FOR THE COLLECTION AND DEPICTION OF EXISTING SUBSURFACE UTILITY DATA".
- ALL CONSTRUCTION SHALL CONFORM TO LOCAL, STATE, AND FEDERAL REGULATIONS INCLUDING THE NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM (NPDES) PERMIT REQUIREMENTS.
- HAULING HOURS MUST BE CONFIRMED WITH THE CITY PRIOR TO BEGINNING WORK.
- SPOT ELEVATIONS SHOWN INDICATE FINISHED PAVEMENT ELEVATIONS, GUTTER FLOW LINE OF CURB GUTTER (FL), BACK OF CURB ELEVATIONS (TC), TOP OF SIDEWALK (TW), AND FINISHED SURFACE GRADE, UNLESS OTHERWISE NOTED.
- ALL SLOPES SHALL BE GRADED TO 3:1 OR FLATTER, UNLESS OTHERWISE NOTED ON THE PLANS.

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SCALE IN FEET

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DRAWN BY: RSH
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NOT FOR CONSTRUCTION

CRAIG N. BRITTON LIC. NO.: 44228 DATE: 03/24/2026

DATE	REV#	REVISIONS DESCRIPTION

GOOD COUNSEL

GRADING PLAN - ENLARGEMENT

C4.3

PROJECT #: 2025-10591

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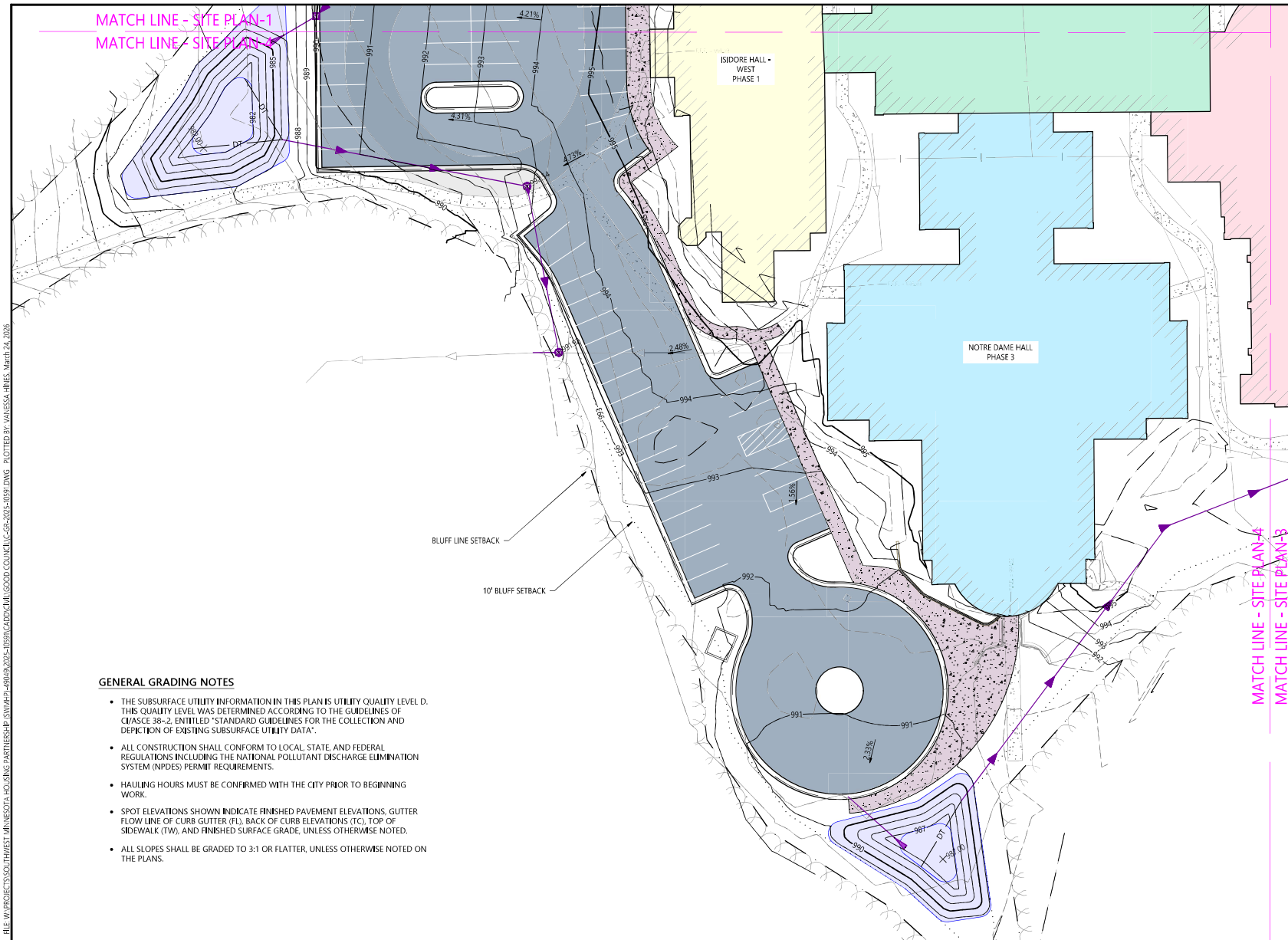

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SCALE IN FEET

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CRAIG N. BRITTON LIC. NO.: 44228 DATE: 03/24/2026

DATE	REV#	REVISIONS DESCRIPTION

GOOD COUNSEL

GRADING PLAN - ENLARGEMENT

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PROJECT #: 2025-10591

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WiDSETH

Good Counsel – Main Campus
Mankato, MN

HYDRAULIC DESIGN SUMMARY REPORT

For

Southwest Minnesota Housing Partnership

January 2026

Prepared by:
Widseth Consulting Engineers, Rochester, Minnesota

Project # 2025-10591

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.

Andre Ringle 01/27/2026

Andre T. Ringle Lic. No. 60708

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2.0 **Water Quality Volume**

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2 **Hydrologic Soils Group Map**

3 **Pre-Development Drainage Map & Hydraulic Model for the 2-year, 10-year, & 100-year storm events**

4 **Post-Development Drainage Map & Hydraulic Model for the 2-year, 10-year, & 100-year storm events**

DRAINAGE REPORT

Project Name: **Good Counsel Main Campus – Mankato, MN**
Widseth Project # 2025-10591

SECTION 1.0 – Project Summary and Proposed Site Improvements

We have completed our analysis and design recommendation for the stormwater management system associated with the above referenced project. This design was guided by the MPCA NPDES permit and MnDOT.

Hydrologic & Hydraulic Modeling

The HydroCAD™ Ver. 10.0 modeling software was utilized to develop the hydrologic contributions serving the proposed project site. This software is adept at modeling urban drainage settings and can provide storage routing calculations under dynamic outlet conditions.

In accordance with MnDOT Technical Memorandum No. 13_08_B_04, NOAA Atlas 14 precipitation frequency data was utilized. Basin characteristics developed using the survey, along with NOAA Atlas 14 rainfall data, peak flows were generated utilizing SCS procedures. Where storage routing calculations were completed, SCS Unit Hydrograph procedures were utilized. See Appendix 1 for NOAA Atlas 14 precipitation frequency table.

PRE-Improvement Condition

The existing site consists of a developed campus that includes several buildings, an existing parking lot, and on-site utilities. There are steep, forested slopes surrounding the existing campus.

The existing soils on the project site are classified as HSG C/D according to web soil survey. See Appendix 2 for Soils Map.

POST-Improvement Condition

Proposed site improvements include the reconstruction and expansion of the existing parking lot and the associated stormwater and utility improvements to accommodate the expanded parking lot.

The stormwater runoff from the site will flow to proposed stormwater treatment basins located throughout the site. There will be one wet sedimentation basin and three filtration basins. Infiltration was not considered due to the presence of type D soils. Stormwater from the basins will be routed to existing storm sewer that flows down the adjacent bluff. The proposed stormwater improvements will reduce the runoff rate from the site and peak rate of water flowing directly down the bluff.

SECTION 2.0 – Water Quality Volume

Impervious Area:

Proposed impervious surface:	6.54	acres
Existing impervious surface:	4.75	acres
New & Reconstructed Impervious surface:	3.76	acres

Subcatchment / Node	Basin Type	Subcatchment Area (acres)	Impervious Area (acres)	Elevation of Max Water Quality Volume	Proposed Water Quality Volume (ft^3)
1S (1P)	Wet Sedimentation Basin	4.032	2.359	989.0	12462
3S (2P)	Filtration Basin	1.421	1.089	994.8	3906
6S (3P)	Filtration Basin	0.506	0.353	989.0	3262
8S (4P)	Filtration Basin	0.290	0.211	993.7	265
Total		6.249	4.012		19895

Impervious area shown is the entire impervious area planned to be routed to the given basin and does not represent the new and reconstructed impervious in a given catchment area.

Water Quality Volume:

Required Water Quality Volume:	0.31	acres-feet
Proposed Water Quality Volume:	0.46	acres-feet
Excess Water Quality Volume:	0.15	acres-feet

The required water quality volume was calculated using 1" of depth across the entire new and reconstructed impervious area.

SECTION 3.0 – PRE & POST-Improvement Discharge Rates:

Discharge Rates:
See Tables 1 & 2 for the PRE-Improvement & POST-Improvement Conditions for discharge rates for the 2, 10, and 100-year storm events.

Table 1 – PRE-Improvement Discharge Rates

Subcatchment	HydroCAD Node	Area (acres)	CN	2-Year Storm (cfs)	10-Year Storm (cfs)	100-Year Storm (cfs)
NW Storm Sewer	1R	4.887	88	6	23.8	44.1
West Storm Sewer	2R	1.739	85	1.7	7.8	15.1
West Bluff	3R	0.613	92	1	3.3	5.8
South Storm Sewer	4R	1.19	91	1.8	6.2	11.1
SE Bluff - To Road	5R	1.578	85	1.7	7.3	13.9
East Storm Sewer	6R	0.411	88	0.9	2.4	4
North Bluff	7R	0.492	97	0.2	1.5	3.2
Total		10.91	88	13.3	52.3	97.2

Table 2 – POST-Improvement Discharge Rates

Subcatchment	HydroCAD Node	Area (acres)	CN	2-Year Storm (cfs)	10-Year Storm (cfs)	100-Year Storm (cfs)
NW Storm Sewer	1R	5.343	91	2.7	13.8	20.1
West Storm Sewer	2R	2.034	91	1	7.3	11.4
West Bluff	3R	0.502	82	0.4	2.1	4.1
South Storm Sewer	4R	2.144	91	2.1	7.3	13.6
SE Bluff - To Road	5R	0.099	80	0.1	1.5	3.1
East Storm Sewer	6R	0.788	91	1.4	4.3	7.5
North Bluff	7R	0.000	-	0.0	0.0	0.0
Total		10.91	90	7.7	36.3	59.8

SECTION 4.0 – Risk Assessment

All proposed stormwater treatment basins and low points have HWL's at least one foot below the lowest adjacent FFE and emergency overflow of sufficient width to convey flows beyond the design storm.

Minor Adjustments

Minor adjustments in placement of structures and conveyance piping orientation will not invalidate this design/analysis. A variety of design and performance data can be found in the attached summary results information. Additional calculations and results will be stored in the project design file. Any exceptions to system contribution, sizing, invert elevations or locations should be revisited before final plans, specifications, and engineering.

Appendix

1 NOAA Atlas 14 Precipitation Frequency Table
2 Hydrologic Soils Group Map
3 Pre-Development Drainage Map & Hydrology Calculations for the 2, 10, & 100-year storm events (HydroCAD)
4 Post-Development Drainage Map & Hydrology Calculations for the 2, 10, & 100-year storm events (HydroCAD)

APPENDIX 1

NOAA Atlas 14
Precipitation Frequency Table

NOAA Atlas 14, Volume 8, Version 2
Location name: Mankato, Minnesota, USA*
Latitude: 44.1661°, Longitude: -94.0054°
Elevation: 778 ft**
* source: ESRI Maps
** source: USGS

POINT PRECIPITATION FREQUENCY ESTIMATES

Sanja Perica, Deborah Martin, Sandra Pavlovic, Ishani Roy, Michael St. Laurent, Carl Trypaluk, Dale Unruh, Michael Yekta, Geoffery Bonnin

NOAA, National Weather Service, Silver Spring, Maryland

PF_tabular | PF_graphical | Maps_&_aerials

PF tabular

PDS-based point precipitation frequency estimates with 90% confidence intervals (in inches)[1]

Duration	Average recurrence interval (years)									
	1	2	5	10	25	50	100	200	500	1000
5-min	**0.376** (0.297-0.489)	**0.448** (0.353-0.582)	**0.569** (0.447-0.741)	**0.673** (0.525-0.879)	**0.821** (0.619-1.10)	**0.938** (0.690-1.27)	**1.06** (0.751-1.45)	**1.18** (0.805-1.66)	**1.36** (0.884-1.93)	**1.49** (0.944-2.14)
10-min	**0.551** (0.434-0.715)	**0.656** (0.517-0.853)	**0.833** (0.655-1.08)	**0.985** (0.769-1.29)	**1.20** (0.907-1.61)	**1.37** (1.01-1.86)	**1.55** (1.10-2.13)	**1.74** (1.18-2.43)	**1.99** (1.30-2.83)	**2.18** (1.38-3.14)
15-min	**0.671** (0.530-0.873)	**0.800** (0.631-1.04)	**1.02** (0.798-1.32)	**1.20** (0.938-1.57)	**1.46** (1.11-1.96)	**1.68** (1.23-2.26)	**1.89** (1.34-2.60)	**2.12** (1.44-2.96)	**2.42** (1.58-3.45)	**2.66** (1.69-3.82)
30-min	**0.909** (0.718-1.18)	**1.09** (0.857-1.41)	**1.39** (1.09-1.81)	**1.64** (1.28-2.15)	**2.01** (1.52-2.69)	**2.30** (1.69-3.11)	**2.60** (1.84-3.57)	**2.91** (1.98-4.07)	**3.34** (2.18-4.76)	**3.67** (2.32-5.27)
60-min	**1.18** (0.928-1.53)	**1.40** (1.10-1.81)	**1.78** (1.39-2.31)	**2.11** (1.65-2.76)	**2.60** (1.97-3.51)	**3.01** (2.22-4.08)	**3.44** (2.44-4.74)	**3.89** (2.64-5.45)	**4.52** (2.95-6.46)	**5.02** (3.18-7.21)
2-hr	**1.44** (1.15-1.84)	**1.70** (1.36-2.18)	**2.16** (1.72-2.78)	**2.58** (2.04-3.32)	**3.20** (2.46-4.27)	**3.72** (2.78-4.99)	**4.27** (3.08-5.83)	**4.86** (3.35-6.76)	**5.70** (3.76-8.07)	**6.38** (4.08-9.06)
3-hr	**1.62** (1.30-2.05)	**1.90** (1.53-2.41)	**2.41** (1.93-3.06)	**2.88** (2.29-3.67)	**3.59** (2.79-4.77)	**4.20** (3.17-5.61)	**4.85** (3.52-6.59)	**5.56** (3.86-7.69)	**6.58** (4.38-9.26)	**7.40** (4.76-10.4)
6-hr	**1.90** (1.55-2.38)	**2.23** (1.82-2.79)	**2.83** (2.30-3.55)	**3.39** (2.74-4.26)	**4.26** (3.35-5.59)	**5.00** (3.82-6.59)	**5.80** (4.27-7.79)	**6.68** (4.70-9.14)	**7.94** (5.35-11.1)	**8.98** (5.84-12.5)
12-hr	**2.17** (1.79-2.66)	**2.55** (2.10-3.14)	**3.24** (2.67-4.00)	**3.88** (3.18-4.81)	**4.87** (3.88-6.29)	**5.70** (4.41-7.41)	**6.60** (4.92-8.74)	**7.59** (5.39-10.2)	**9.00** (6.12-12.4)	**10.1** (6.68-14.0)
24-hr	**2.47** (2.07-2.99)	**2.87** (2.40-3.48)	**3.60** (3.00-4.37)	**4.28** (3.55-5.22)	**5.33** (4.31-6.79)	**6.22** (4.88-7.98)	**7.19** (5.42-9.40)	**8.25** (5.94-11.0)	**9.77** (6.72-13.3)	**11.0** (7.32-15.1)
2-day	**2.87** (2.44-3.42)	**3.24** (2.75-3.86)	**3.94** (3.33-4.70)	**4.61** (3.87-5.53)	**5.67** (4.65-7.14)	**6.59** (5.24-8.35)	**7.61** (5.82-9.83)	**8.73** (6.37-11.5)	**10.4** (7.23-14.0)	**11.7** (7.88-15.8)
3-day	**3.14** (2.69-3.70)	**3.52** (3.01-4.15)	**4.23** (3.61-5.01)	**4.91** (4.16-5.84)	**5.99** (4.95-7.46)	**6.92** (5.54-8.68)	**7.94** (6.11-10.2)	**9.07** (6.66-11.9)	**10.7** (7.52-14.4)	**12.1** (8.17-16.2)
4-day	**3.35** (2.89-3.93)	**3.75** (3.23-4.40)	**4.50** (3.86-5.29)	**5.20** (4.43-6.14)	**6.29** (5.22-7.76)	**7.22** (5.81-8.99)	**8.24** (6.37-10.5)	**9.36** (6.90-12.2)	**11.0** (7.74-14.6)	**12.3** (8.38-16.5)
7-day	**3.88** (3.38-4.49)	**4.35** (3.78-5.03)	**5.18** (4.49-6.01)	**5.93** (5.11-6.91)	**7.06** (5.90-8.56)	**8.00** (6.49-9.80)	**9.01** (7.02-11.3)	**10.1** (7.50-13.0)	**11.6** (8.26-15.3)	**12.9** (8.84-17.1)
10-day	**4.39** (3.86-5.04)	**4.92** (4.31-5.64)	**5.82** (5.08-6.69)	**6.61** (5.74-7.64)	**7.77** (6.52-9.30)	**8.72** (7.11-10.6)	**9.72** (7.62-12.0)	**10.8** (8.05-13.7)	**12.3** (8.74-16.0)	**13.4** (9.27-17.7)
20-day	**6.03** (5.37-6.80)	**6.70** (5.96-7.56)	**7.80** (6.90-8.82)	**8.72** (7.67-9.90)	**9.99** (8.46-11.7)	**11.0** (9.06-13.0)	**12.0** (9.49-14.6)	**13.0** (9.81-16.2)	**14.4** (10.4-18.4)	**15.4** (10.8-20.1)
30-day	**7.45** (6.69-8.31)	**8.26** (7.40-9.22)	**9.56** (8.54-10.7)	**10.6** (9.42-11.9)	**12.0** (10.3-13.9)	**13.1** (10.9-15.4)	**14.2** (11.3-17.0)	**15.2** (11.5-18.8)	**16.6** (12.0-21.0)	**17.5** (12.4-22.7)
45-day	**9.24** (8.37-10.2)	**10.3** (9.29-11.4)	**11.9** (10.7-13.2)	**13.2** (11.8-14.7)	**14.9** (12.7-16.9)	**16.1** (13.4-18.6)	**17.2** (13.8-20.5)	**18.3** (14.0-22.4)	**19.7** (14.4-24.8)	**20.7** (14.6-26.6)
60-day	**10.8** (9.80-11.8)	**12.0** (10.9-13.2)	**13.9** (12.6-15.3)	**15.4** (13.9-17.1)	**17.4** (14.9-19.6)	**18.8** (15.7-21.5)	**20.0** (16.1-23.6)	**21.2** (16.3-25.7)	**22.7** (16.6-28.3)	**23.6** (16.8-30.2)

[1] Precipitation frequency (PF) estimates in this table are based on frequency analysis of partial duration series (PDS).

Numbers in parenthesis are PF estimates at lower and upper bounds of the 90% confidence interval. The probability that precipitation frequency estimates (for a given duration and average recurrence interval) will be greater than the upper bound (or less than the lower bound) is 5%. Estimates at upper bounds are not checked against probable maximum precipitation (PMP) estimates and may be higher than currently valid PMP values.

Please refer to NOAA Atlas 14 document for more information.

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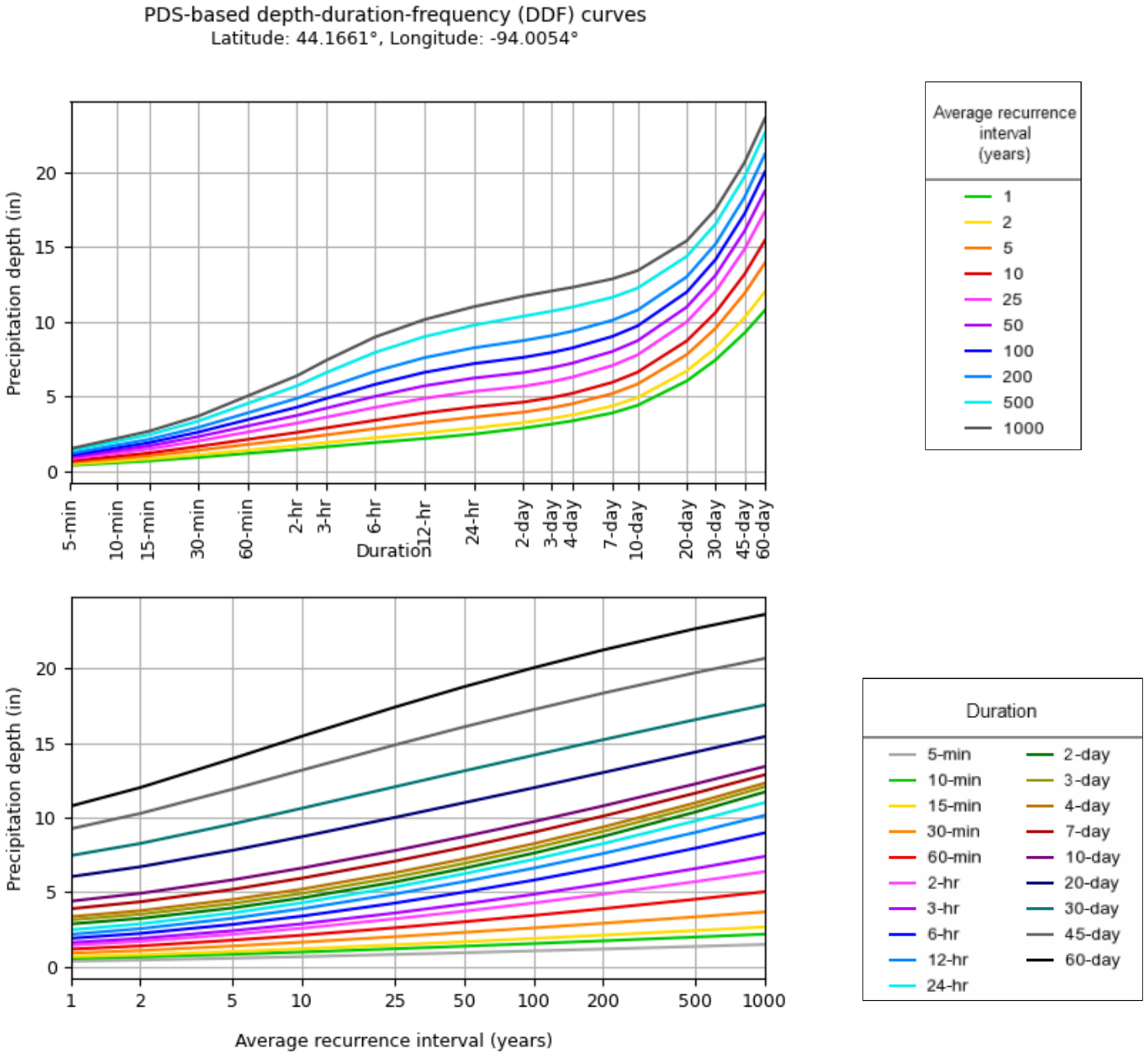
PF graphical



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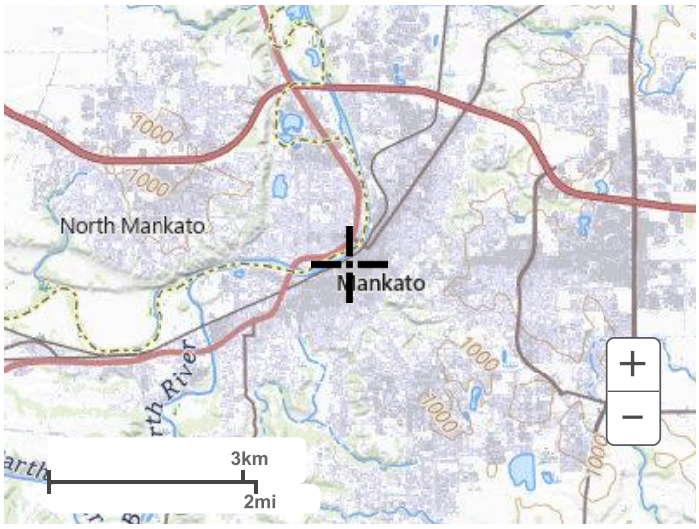
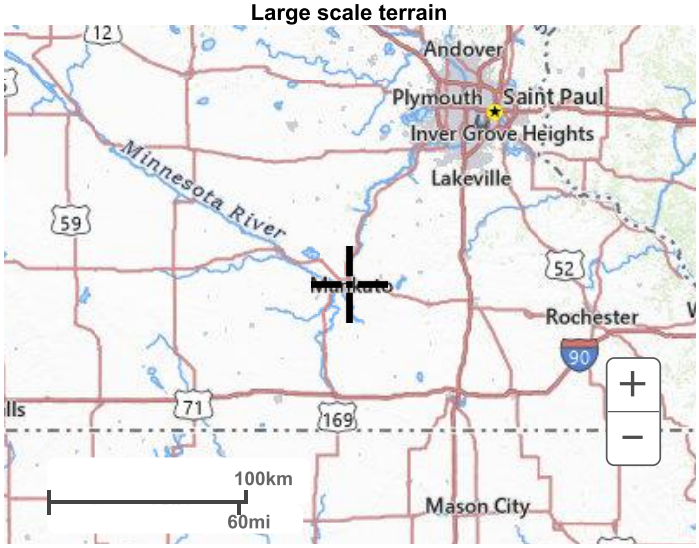
Maps & aerials

Small scale terrain



Large scale terrain



Large scale map



Large scale aerial



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US Department of Commerce
National Oceanic and Atmospheric Administration
National Weather Service
National Water Center
1325 East West Highway
Silver Spring, MD 20910
Questions?: HDSC.Questions@noaa.gov

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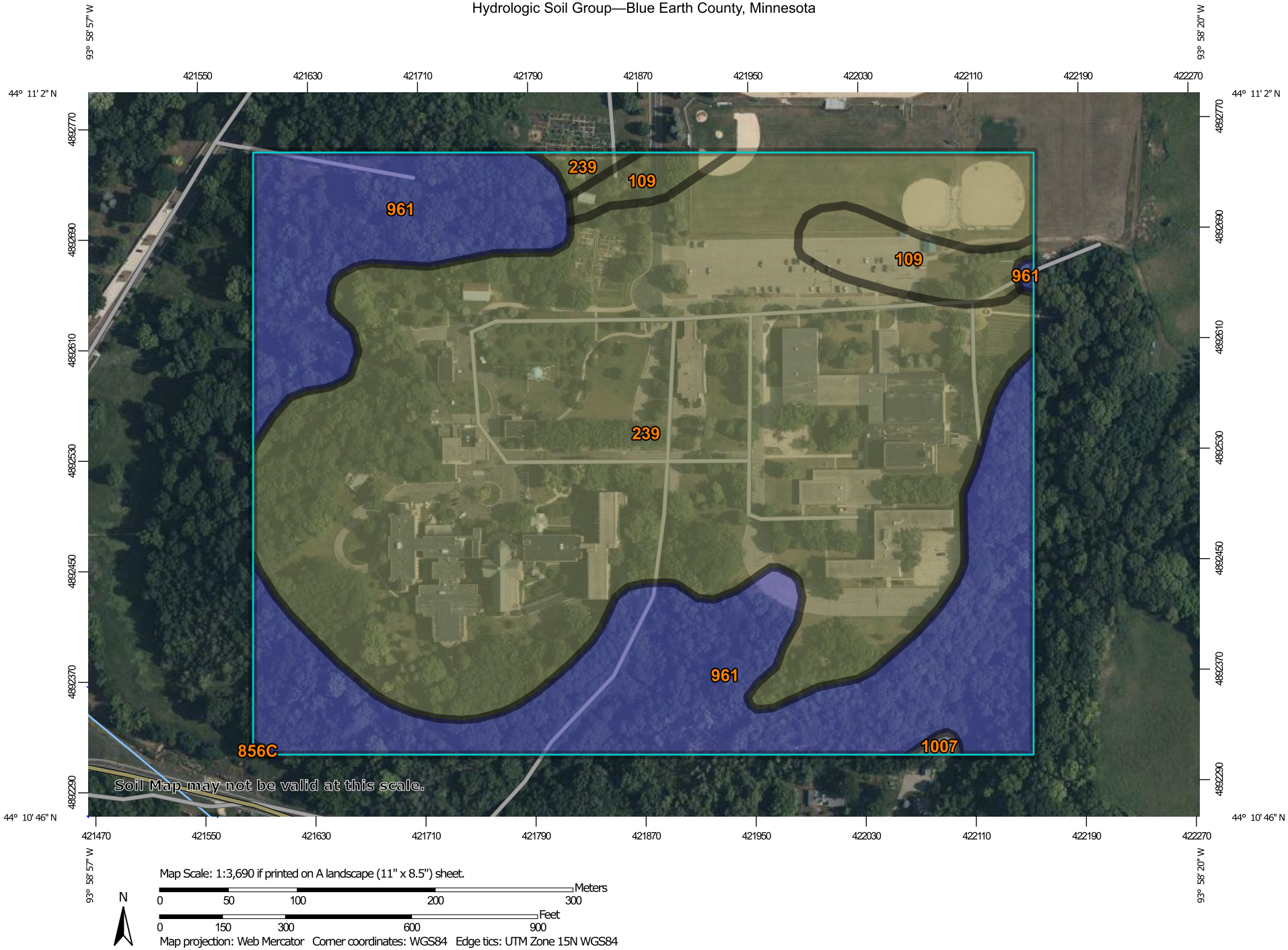
APPENDIX 2

Hydrologic Soils Group Map



Map Scale: 1:3,690 if printed on A landscape (11" x 8.5") sheet.

N

Meters
0 50 100 200 300

Feet
0 150 300 600 900

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 15N WGS84

MAP LEGEND

Area of Interest (AOI)

Area of Interest (AOI)

Soils

Soil Rating Polygons

A

A/D

B

B/D

C

C/D

D

Not rated or not available

Soil Rating Lines

A

A/D

B

B/D

C

C/D

D

Not rated or not available

Soil Rating Points

A

A/D

B

B/D

C

C/D

D

Not rated or not available

Water Features

Streams and Canals

Transportation

Rails

Interstate Highways

US Routes

Major Roads

Local Roads

Background

Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:12,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Blue Earth County, Minnesota
Survey Area Data: Version 23, Sep 9, 2025

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Jul 2, 2023—Aug 8, 2023

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Hydrologic Soil Group

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
109	Cordova clay loam, 0 to 2 percent slopes	C/D	2.4	4.0%
239	Le Sueur loam, 1 to 3 percent slopes	C/D	39.8	64.8%
856C	Terril-Urban land complex, 6 to 15 percent slopes	B	0.0	0.0%
961	Storden complex, very steep	B	19.0	31.0%
1007	Alluvial-Urban land complex		0.1	0.2%
Totals for Area of Interest			**61.4**	**100.0%**

Description

Hydrologic soil groups are based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, are thoroughly wet, and receive precipitation from long-duration storms.

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.

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 moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

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.

Rating Options

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher

APPENDIX 3

Pre-Development Drainage Area Map And HydroCAD Report

PRE-DEVELOPMENT DRAINAGE MAP

EXISTING SUBCATCHMENT BOUNDARY	
EXISTING IMPERVIOUS AREA	



DRAWN BY: ATR

CHECKED BY: CNB

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 PROFESSION UNDER THE LAWS OF THE STATE OF MINNESOTA.

SIGNER NAME LIC. NO.: NUMBER DATE: JANUARY 2026

DATE	REV#	REVISIONS DESCRIPTION

WIDSETH ARCHITECTS · ENGINEERS · SCIENTISTS · SURVEYORS

PRE-DEVELOPMENT DRAINAGE MAP

GOOD COUNSEL MAIN CAMPUS

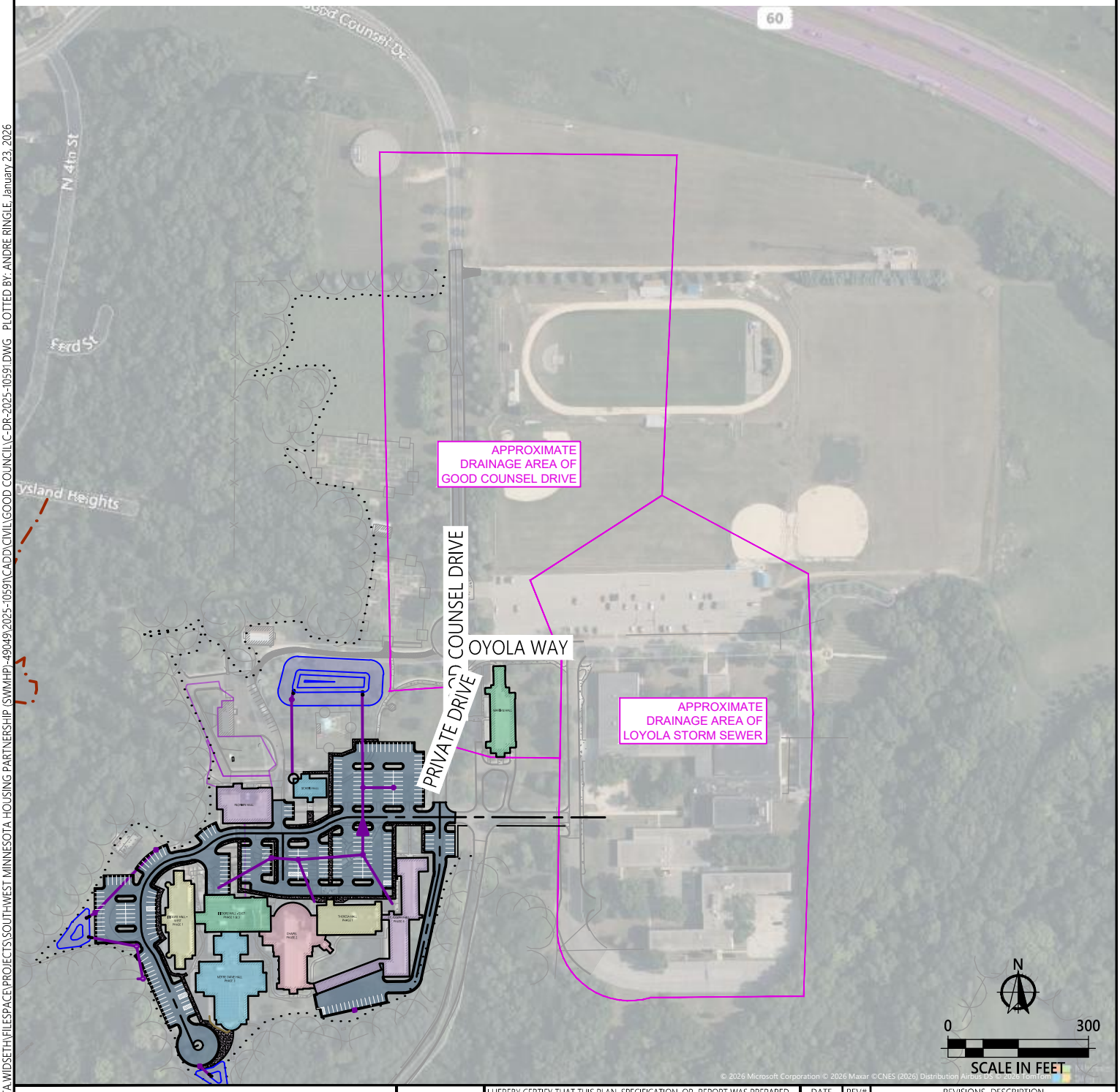
-

PROJECT #: 2025-10591

© 2026 WIDSETH FILE: \\DATA.WIDSETH\FILESPACE\PROJECTS\SOUTHWEST MINNESOTA HOUSING PARTNERSHIP (SWMHP)-49049\2025-10591\CADD\CIVIL\GOOD COUNCIL\C-DR-2025-10591.DWG PLOTTED BY: ANDRE RINGLE, January 22, 2026

LOYOLA STORM SEWER DRAINAGE MAP

SUBCATCHMENT BOUNDARY	



© 2026 WIDSETH FILE: \\DATA.WIDSETH\FILESPACE\PROJECTS\SOUTHWEST MINNESOTA HOUSING PARTNERSHIP (SWMHP)-49049\2025-10591\CADD\CIVIL\GOOD COUNCIL\C-DR-2025-10591.DWG PLOTTED BY: ANDRE RINGLE, January 23, 2026

	DRAWN BY: ATR CHECKED BY: CNB	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 PROFESSION UNDER THE LAWS OF THE STATE OF MINNESOTA. SIGNER NAME LIC. NO.: NUMBER DATE: JANUARY 2026	DATE / REV#	REVISIONS DESCRIPTION

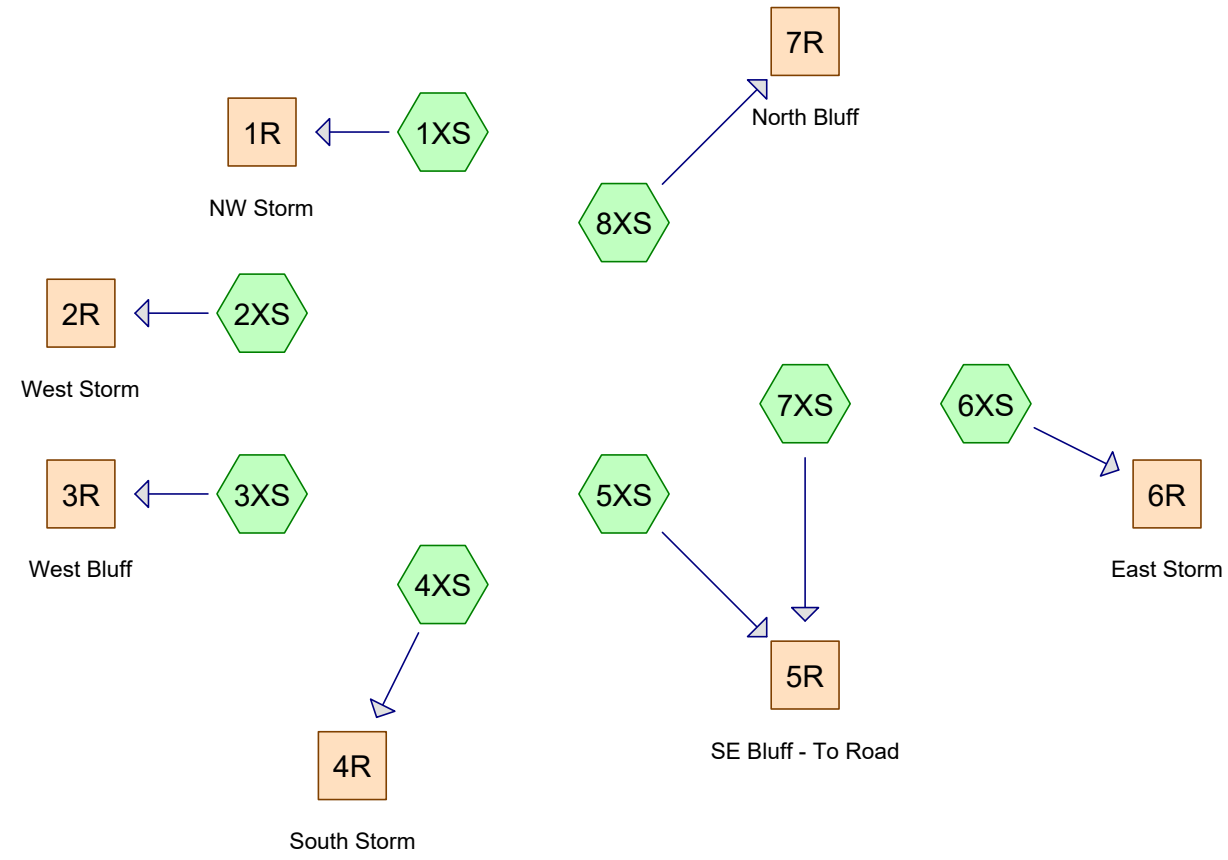
WIDSETH
ARCHITECTS · ENGINEERS · SCIENTISTS · SURVEYORS

LOYOLA STORM SEWER DRAINAGE MAP

GOOD COUNSEL MAIN CAMPUS

-

PROJECT #: 2025-10591



Subcat Reach Pond Link

Routing Diagram for Pre-Development
Prepared by Widseth Smith Nolting, Printed 1/22/2026
HydroCAD® 10.20-8a s/n 01722 © 2025 HydroCAD Software Solutions LLC

Rainfall Events Listing (selected events)

Event#	Event Name	Storm Type	Curve	Mode	Duration (hours)	B/B	Depth (inches)	AMC
1	2-YR	Type II 24-hr		Default	24.00	1	1.70	2
2	10-YR	Type II 24-hr		Default	24.00	1	4.28	2
3	100-YR	Type II 24-hr		Default	24.00	1	7.19	2

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
6.067	80	>75% Grass cover, Good, HSG D (1XS, 2XS, 3XS, 4XS, 5XS, 6XS, 7XS, 8XS)
4.753	98	Paved parking, HSG D (1XS, 2XS, 3XS, 4XS, 5XS, 6XS, 7XS)
10.821	**88**	**TOTAL AREA**

Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.000	HSG A	
0.000	HSG B	
0.000	HSG C	
10.821	HSG D	1XS, 2XS, 3XS, 4XS, 5XS, 6XS, 7XS, 8XS
0.000	Other	
10.821		**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	0.000	6.067	0.000	6.067	>75% Grass cover, Good	1XS, 2XS, 3XS, 4XS, 5XS, 6XS, 7XS, 8XS
0.000	0.000	0.000	4.753	0.000	4.753	Paved parking	1XS, 2XS, 3XS, 4XS, 5XS, 6XS, 7XS
0.000	**0.000**	**0.000**	**10.821**	**0.000**	**10.821**	**TOTAL AREA**	

Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment1XS: Runoff Area=212,871 sf 45.04% Impervious Runoff Depth>0.67"
Tc=7.0 min CN=88 Runoff=6.0 cfs 0.272 af

Subcatchment2XS: Runoff Area=75,763 sf 26.31% Impervious Runoff Depth>0.53"
Tc=7.0 min CN=85 Runoff=1.7 cfs 0.076 af

Subcatchment3XS: Runoff Area=26,713 sf 64.20% Impervious Runoff Depth>0.90"
Tc=7.0 min CN=92 Runoff=1.0 cfs 0.046 af

Subcatchment4XS: Runoff Area=51,828 sf 60.81% Impervious Runoff Depth>0.84"
Tc=7.0 min CN=91 Runoff=1.8 cfs 0.083 af

Subcatchment5XS: Runoff Area=41,786 sf 30.44% Impervious Runoff Depth>0.53"
Tc=7.0 min CN=85 Runoff=0.9 cfs 0.042 af

Subcatchment6XS: Runoff Area=17,899 sf 96.42% Impervious Runoff Depth>1.29"
Tc=7.0 min CN=97 Runoff=0.9 cfs 0.044 af

Subcatchment7XS: Runoff Area=26,971 sf 46.75% Impervious Runoff Depth>0.67"
Tc=7.0 min CN=88 Runoff=0.8 cfs 0.034 af

Subcatchment8XS: Runoff Area=17,512 sf 0.00% Impervious Runoff Depth>0.34"
Tc=7.0 min CN=80 Runoff=0.2 cfs 0.012 af

Reach 1R: NW Storm Inflow=6.0 cfs 0.272 af
Outflow=6.0 cfs 0.272 af

Reach 2R: West Storm Inflow=1.7 cfs 0.076 af
Outflow=1.7 cfs 0.076 af

Reach 3R: West Bluff Inflow=1.0 cfs 0.046 af
Outflow=1.0 cfs 0.046 af

Reach 4R: South Storm Inflow=1.8 cfs 0.083 af
Outflow=1.8 cfs 0.083 af

Reach 5R: SE Bluff - To Road Inflow=1.7 cfs 0.077 af
Outflow=1.7 cfs 0.077 af

Reach 6R: East Storm Inflow=0.9 cfs 0.044 af
Outflow=0.9 cfs 0.044 af

Reach 7R: North Bluff Inflow=0.2 cfs 0.012 af
Outflow=0.2 cfs 0.012 af

Total Runoff Area = 10.821 ac Runoff Volume = 0.609 af Average Runoff Depth = 0.68"
56.07% Pervious = 6.067 ac 43.93% Impervious = 4.753 ac

Summary for Subcatchment 1XS:

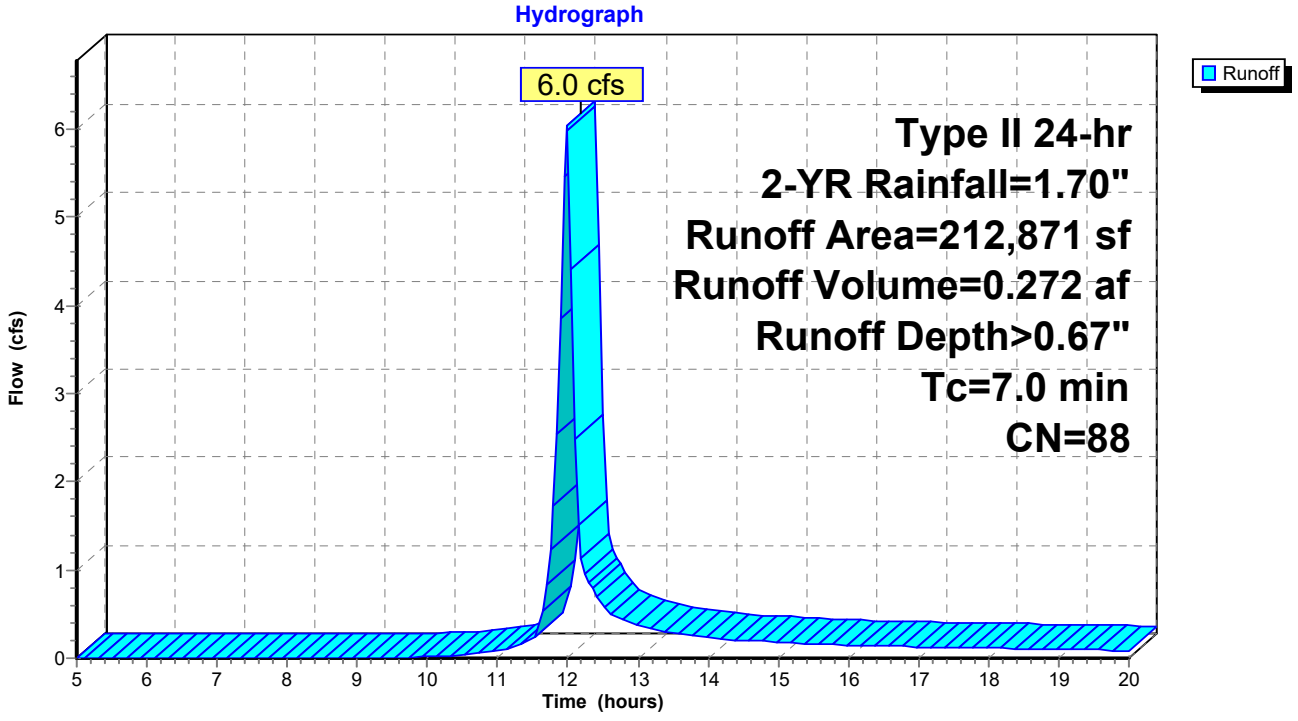
Runoff = 6.0 cfs @ 11.99 hrs, Volume= 0.272 af, Depth> 0.67"
Routed to Reach 1R : NW Storm

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 2-YR Rainfall=1.70"

Area (sf)	CN	Description
95,871	98	Paved parking, HSG D
117,000	80	>75% Grass cover, Good, HSG D
212,871	88	Weighted Average
117,000		54.96% Pervious Area
95,871		45.04% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.0					**Direct Entry,**

Subcatchment 1XS:



Summary for Subcatchment 2XS:

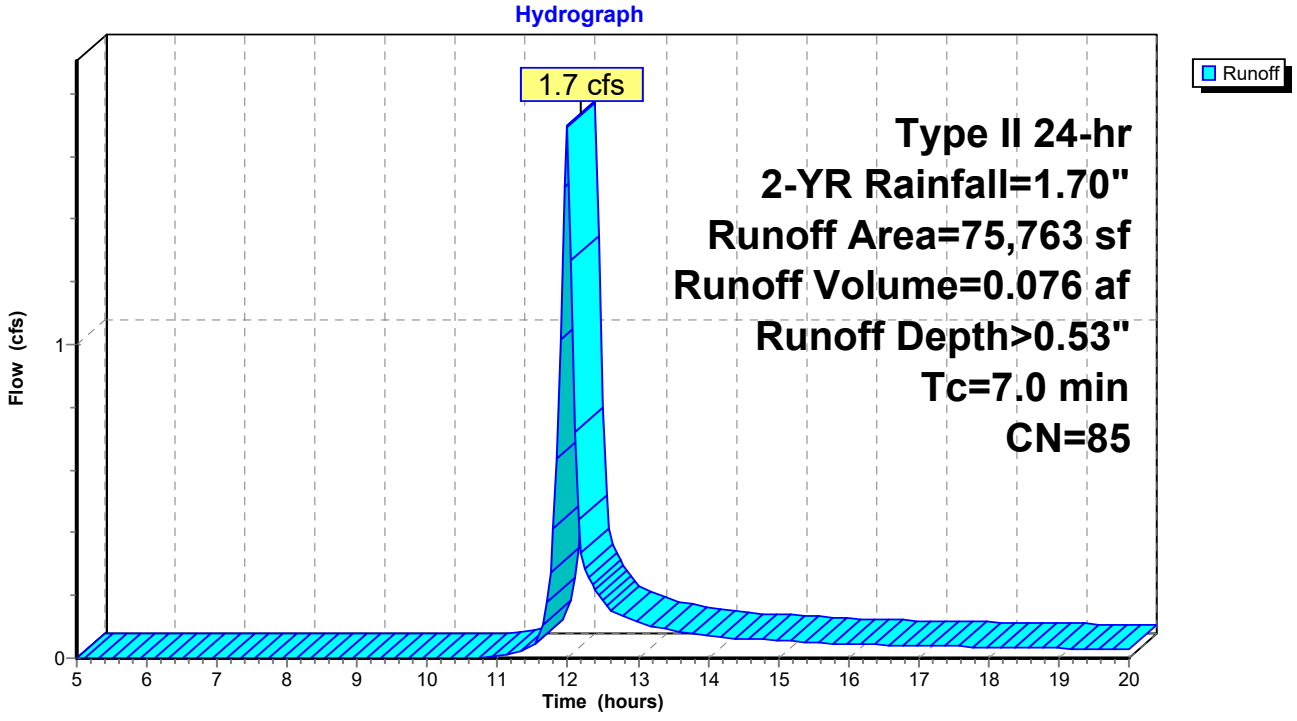
Runoff = 1.7 cfs @ 11.99 hrs, Volume= 0.076 af, Depth> 0.53"
Routed to Reach 2R : West Storm

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 2-YR Rainfall=1.70"

Area (sf)	CN	Description
19,931	98	Paved parking, HSG D
55,832	80	>75% Grass cover, Good, HSG D
75,763	85	Weighted Average
55,832		73.69% Pervious Area
19,931		26.31% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.0					**Direct Entry,**

Subcatchment 2XS:



Summary for Subcatchment 3XS:

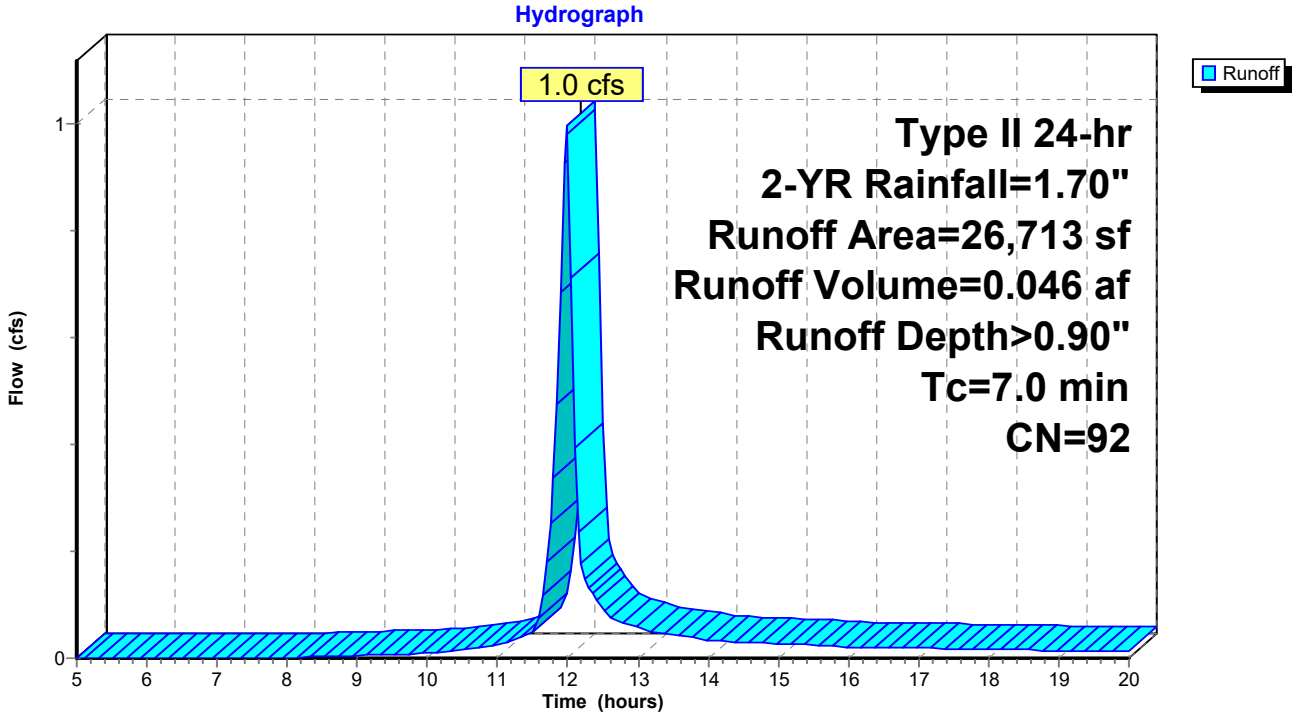
Runoff = 1.0 cfs @ 11.98 hrs, Volume= 0.046 af, Depth> 0.90"
Routed to Reach 3R : West Bluff

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 2-YR Rainfall=1.70"

Area (sf)	CN	Description
17,151	98	Paved parking, HSG D
9,562	80	>75% Grass cover, Good, HSG D
26,713	92	Weighted Average
9,562		35.80% Pervious Area
17,151		64.20% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.0					**Direct Entry,**

Subcatchment 3XS:



Summary for Subcatchment 4XS:

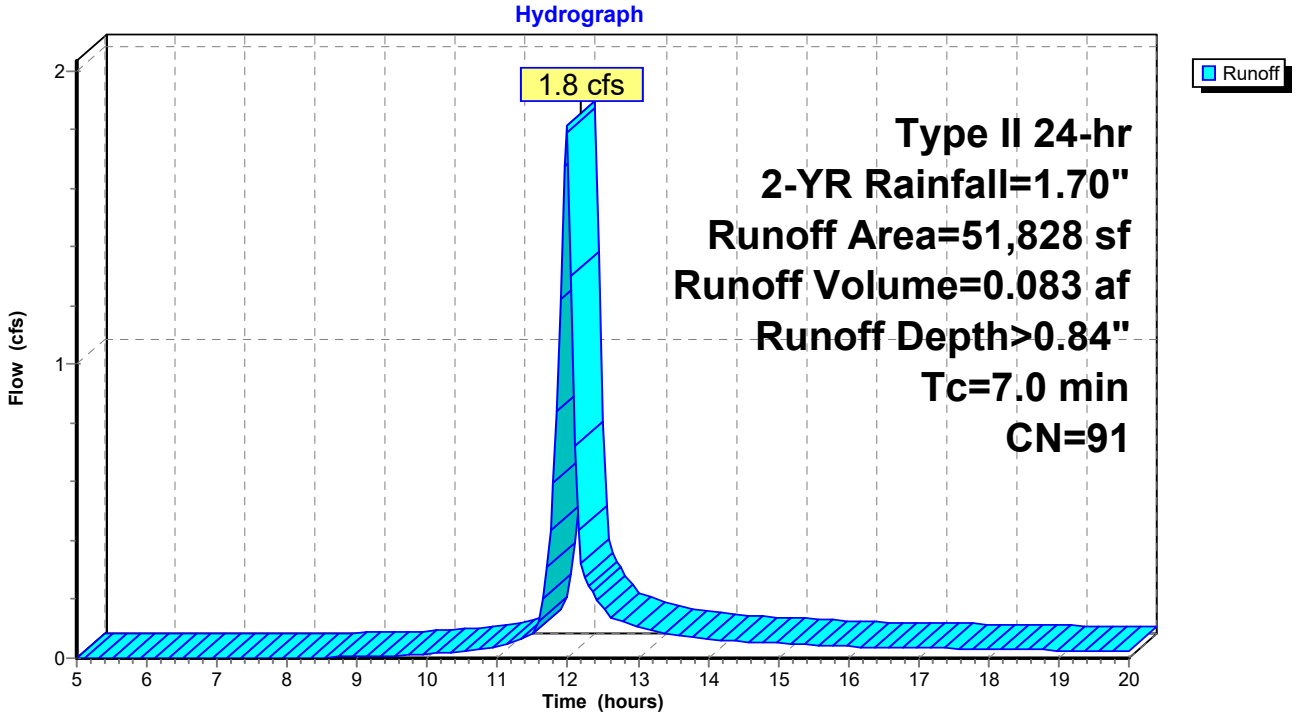
Runoff = 1.8 cfs @ 11.98 hrs, Volume= 0.083 af, Depth> 0.84"
Routed to Reach 4R : South Storm

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 2-YR Rainfall=1.70"

Area (sf)	CN	Description
31,516	98	Paved parking, HSG D
20,312	80	>75% Grass cover, Good, HSG D
51,828	91	Weighted Average
20,312		39.19% Pervious Area
31,516		60.81% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.0					**Direct Entry,**

Subcatchment 4XS:



Summary for Subcatchment 5XS:

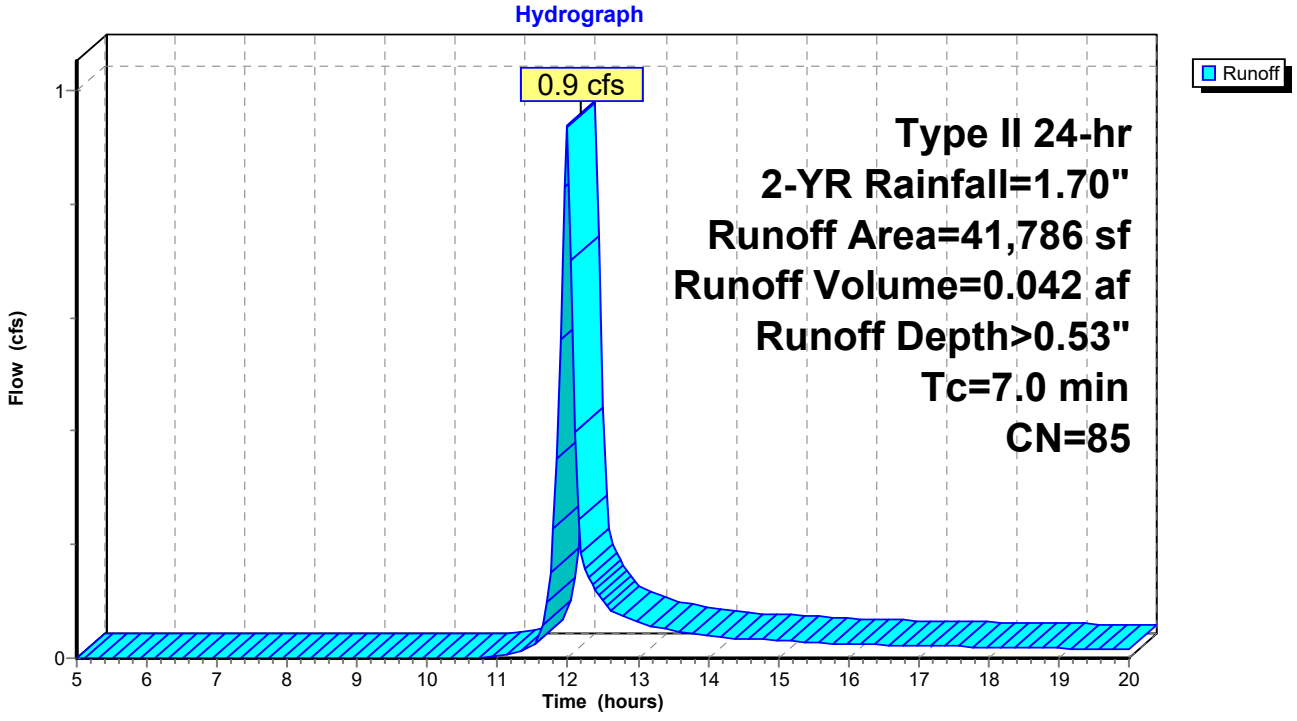
Runoff = 0.9 cfs @ 11.99 hrs, Volume= 0.042 af, Depth> 0.53"
Routed to Reach 5R : SE Bluff - To Road

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 2-YR Rainfall=1.70"

Area (sf)	CN	Description
12,719	98	Paved parking, HSG D
29,067	80	>75% Grass cover, Good, HSG D
41,786	85	Weighted Average
29,067		69.56% Pervious Area
12,719		30.44% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.0					**Direct Entry,**

Subcatchment 5XS:



Summary for Subcatchment 6XS:

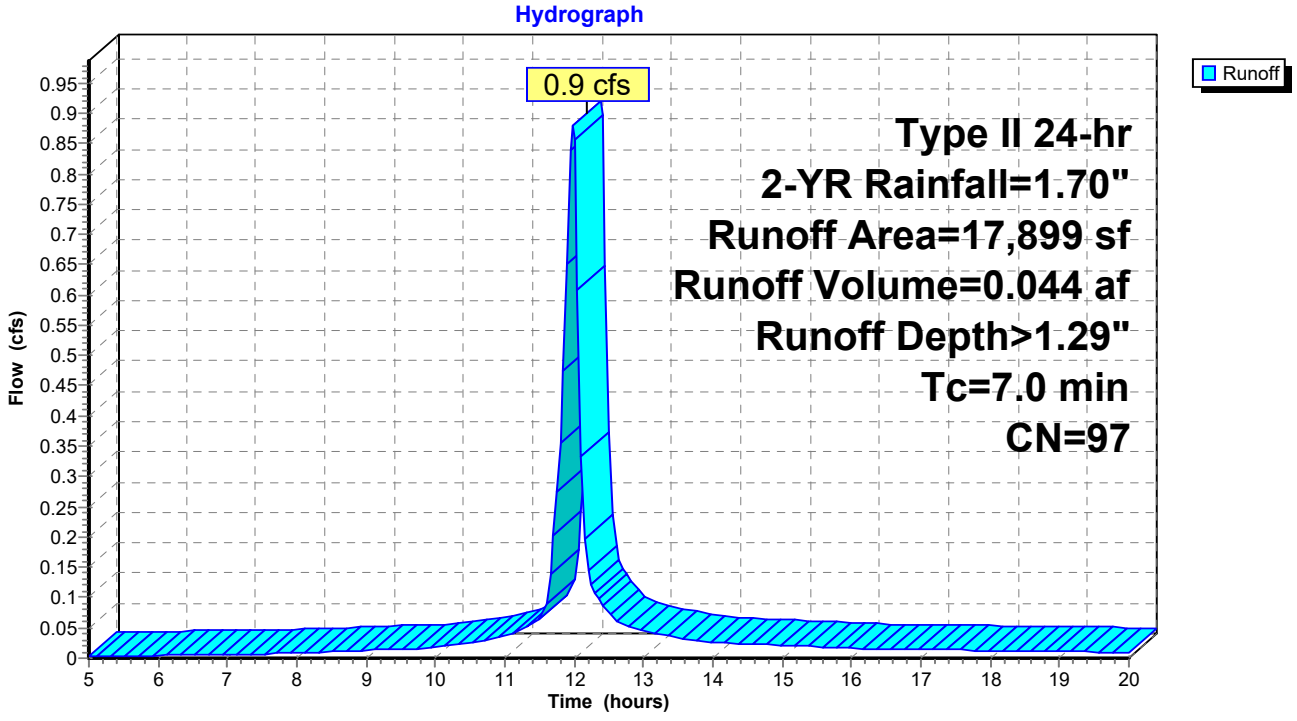
Runoff = 0.9 cfs @ 11.98 hrs, Volume= 0.044 af, Depth> 1.29"
Routed to Reach 6R : East Storm

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 2-YR Rainfall=1.70"

Area (sf)	CN	Description
17,259	98	Paved parking, HSG D
640	80	>75% Grass cover, Good, HSG D
17,899	97	Weighted Average
640		3.58% Pervious Area
17,259		96.42% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.0					**Direct Entry,**

Subcatchment 6XS:



Summary for Subcatchment 7XS:

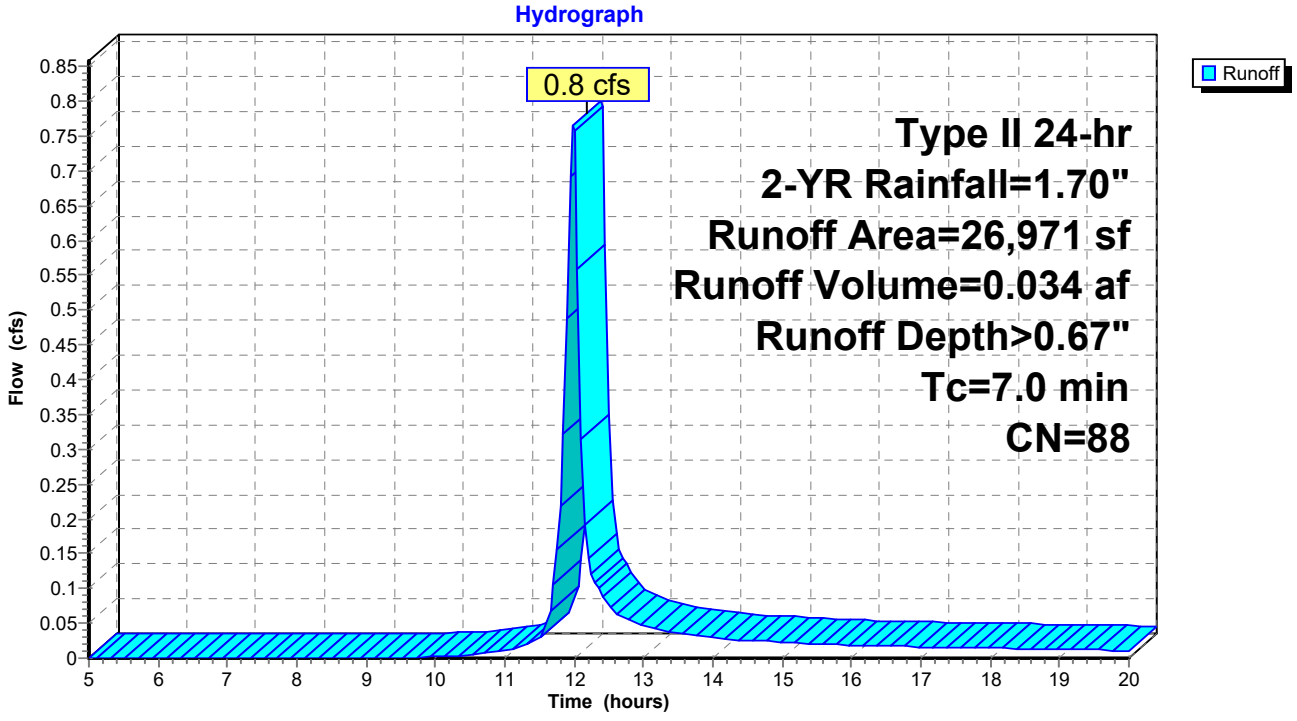
Runoff = 0.8 cfs @ 11.99 hrs, Volume= 0.034 af, Depth> 0.67"
Routed to Reach 5R : SE Bluff - To Road

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 2-YR Rainfall=1.70"

Area (sf)	CN	Description
12,609	98	Paved parking, HSG D
14,362	80	>75% Grass cover, Good, HSG D
26,971	88	Weighted Average
14,362		53.25% Pervious Area
12,609		46.75% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.0					**Direct Entry,**

Subcatchment 7XS:



Summary for Subcatchment 8XS:

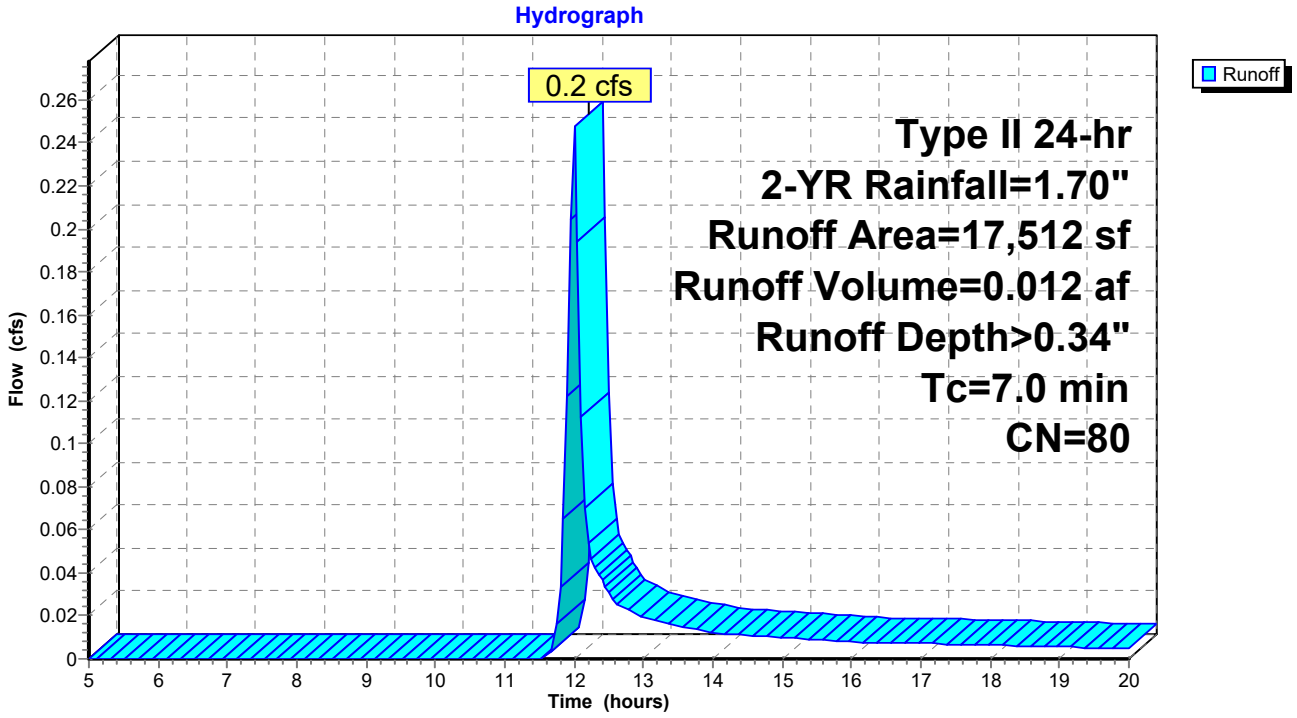
Runoff = 0.2 cfs @ 12.00 hrs, Volume= 0.012 af, Depth> 0.34"
Routed to Reach 7R : North Bluff

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 2-YR Rainfall=1.70"

Area (sf)	CN	Description
17,512	80	>75% Grass cover, Good, HSG D
17,512		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.0					**Direct Entry,**

Subcatchment 8XS:



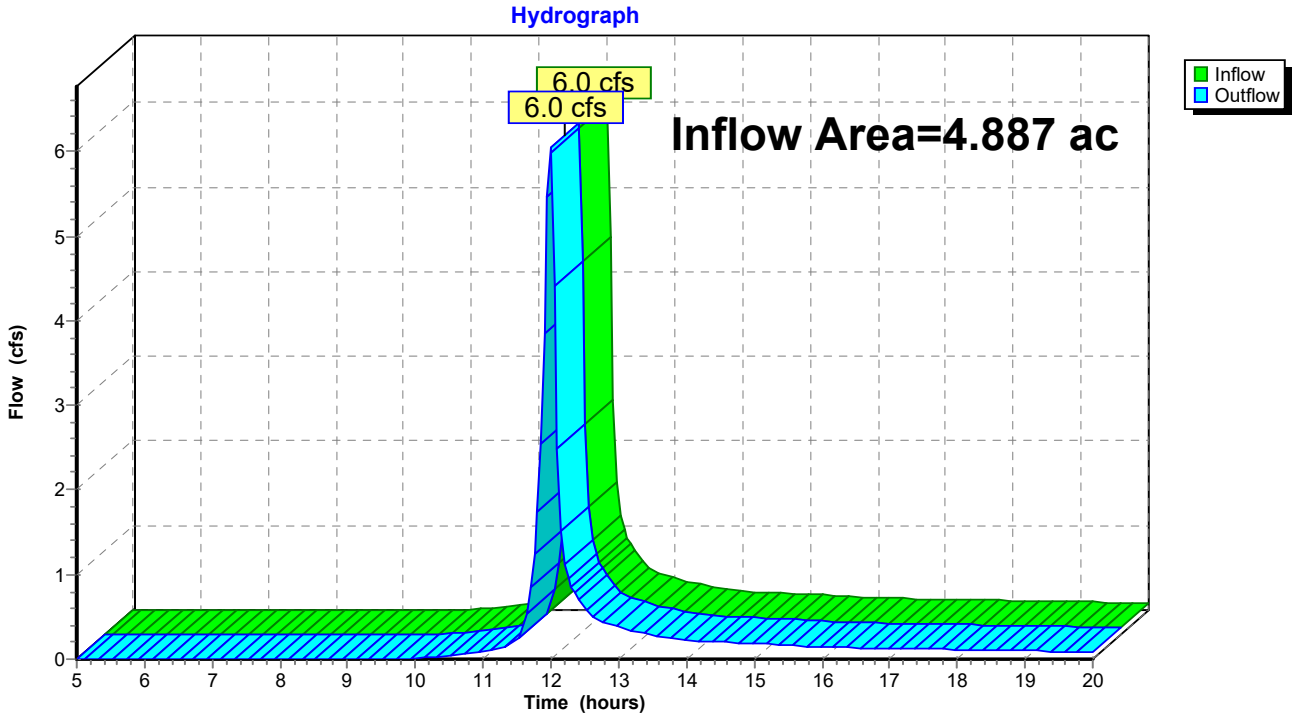
Summary for Reach 1R: NW Storm

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 4.887 ac, 45.04% Impervious, Inflow Depth > 0.67" for 2-YR event
Inflow = 6.0 cfs @ 11.99 hrs, Volume= 0.272 af
Outflow = 6.0 cfs @ 11.99 hrs, Volume= 0.272 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Reach 1R: NW Storm



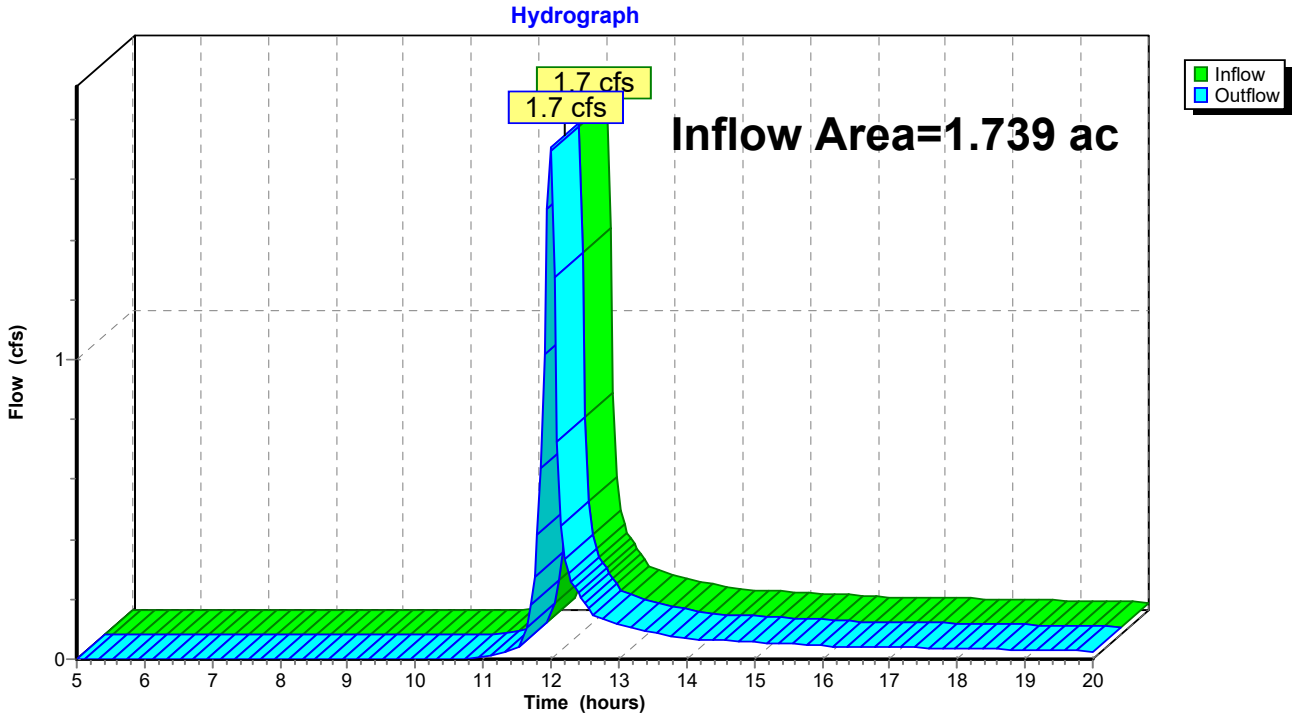
Summary for Reach 2R: West Storm

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 1.739 ac, 26.31% Impervious, Inflow Depth > 0.53" for 2-YR event
Inflow = 1.7 cfs @ 11.99 hrs, Volume= 0.076 af
Outflow = 1.7 cfs @ 11.99 hrs, Volume= 0.076 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Reach 2R: West Storm

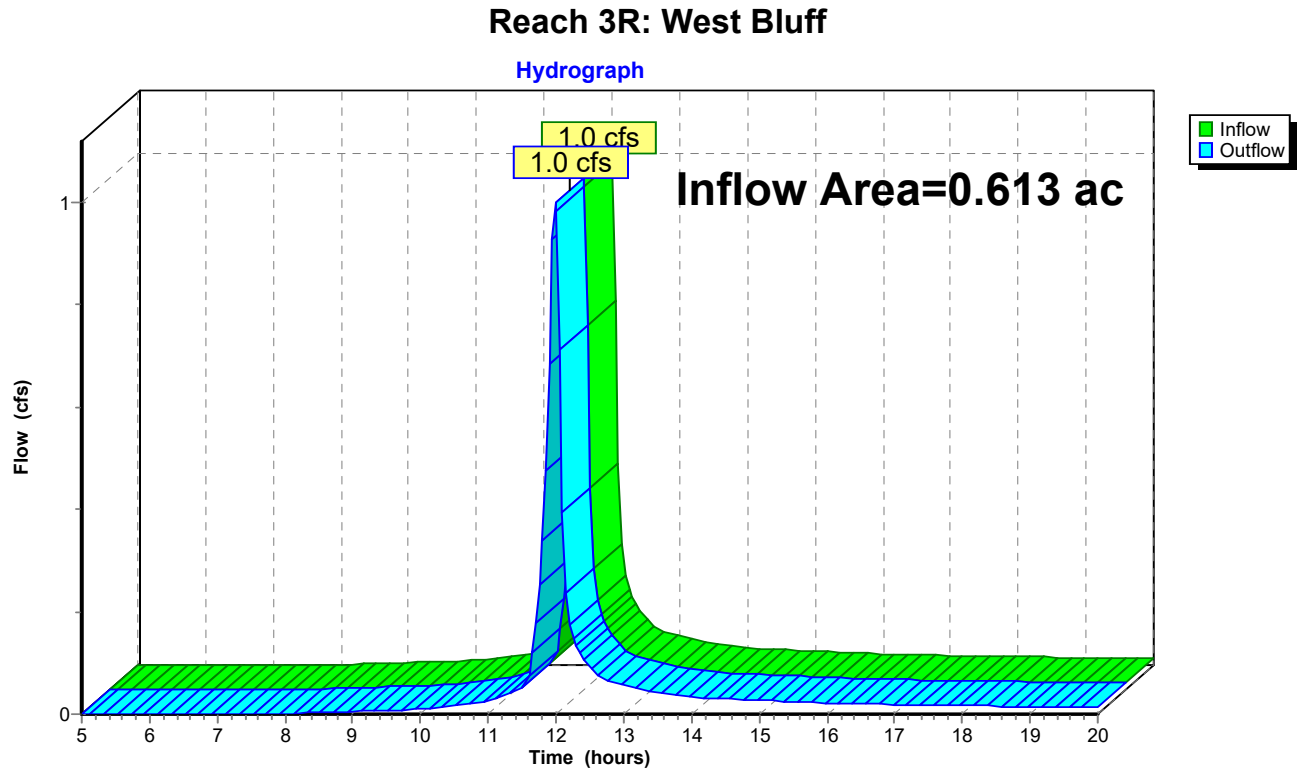


Summary for Reach 3R: West Bluff

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 0.613 ac, 64.20% Impervious, Inflow Depth > 0.90" for 2-YR event
Inflow = 1.0 cfs @ 11.98 hrs, Volume= 0.046 af
Outflow = 1.0 cfs @ 11.98 hrs, Volume= 0.046 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

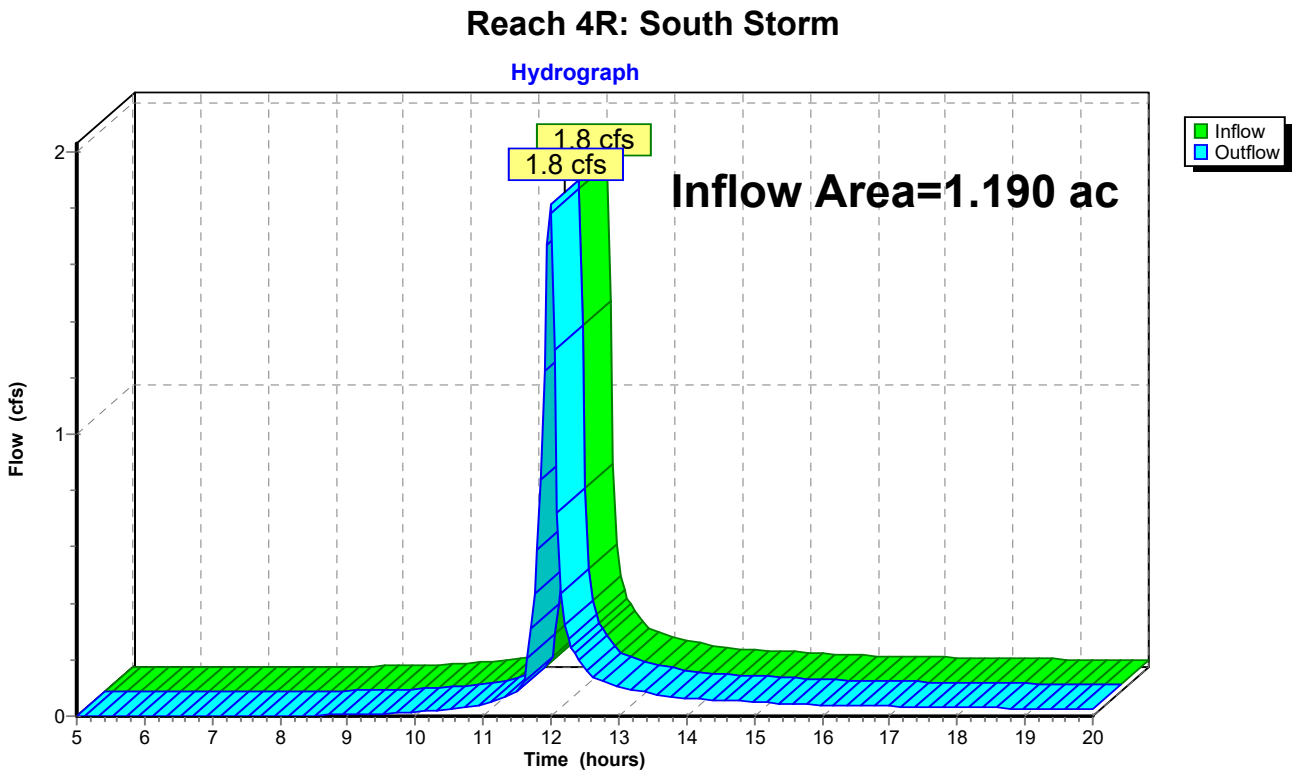


Summary for Reach 4R: South Storm

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 1.190 ac, 60.81% Impervious, Inflow Depth > 0.84" for 2-YR event
Inflow = 1.8 cfs @ 11.98 hrs, Volume= 0.083 af
Outflow = 1.8 cfs @ 11.98 hrs, Volume= 0.083 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs



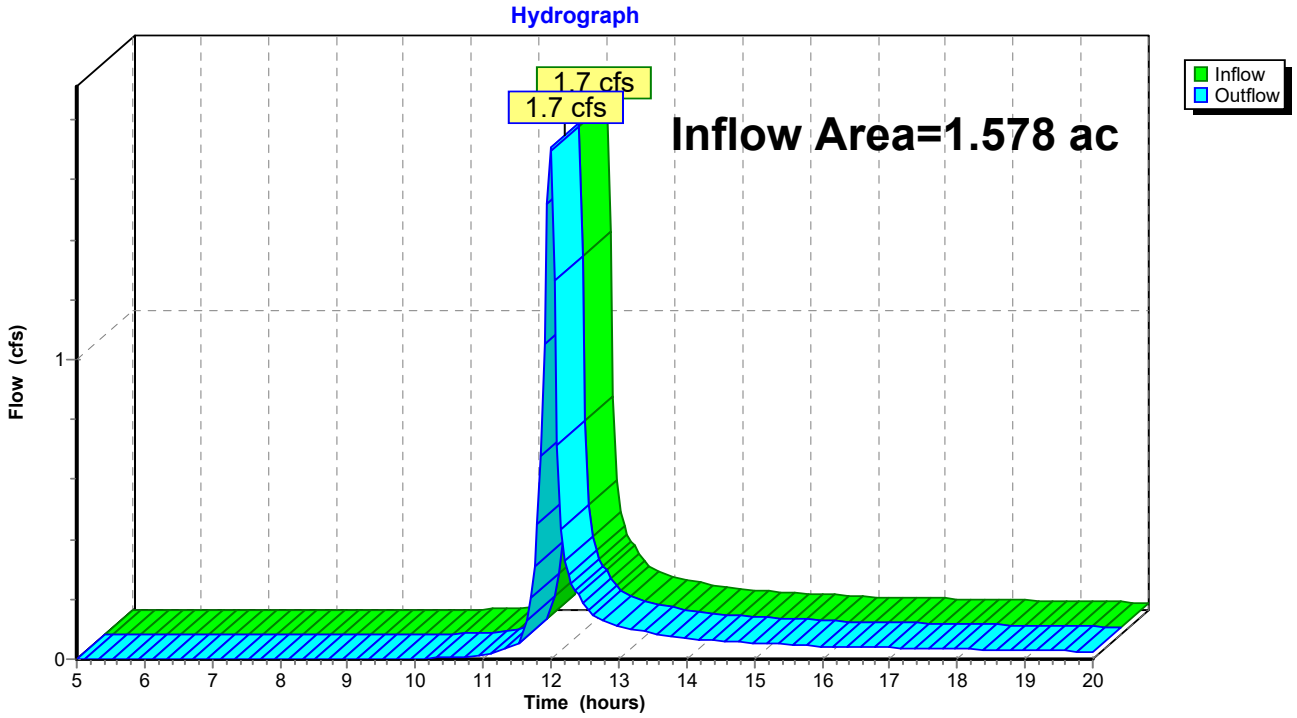
Summary for Reach 5R: SE Bluff - To Road

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 1.578 ac, 36.84% Impervious, Inflow Depth > 0.58" for 2-YR event
Inflow = 1.7 cfs @ 11.99 hrs, Volume= 0.077 af
Outflow = 1.7 cfs @ 11.99 hrs, Volume= 0.077 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Reach 5R: SE Bluff - To Road



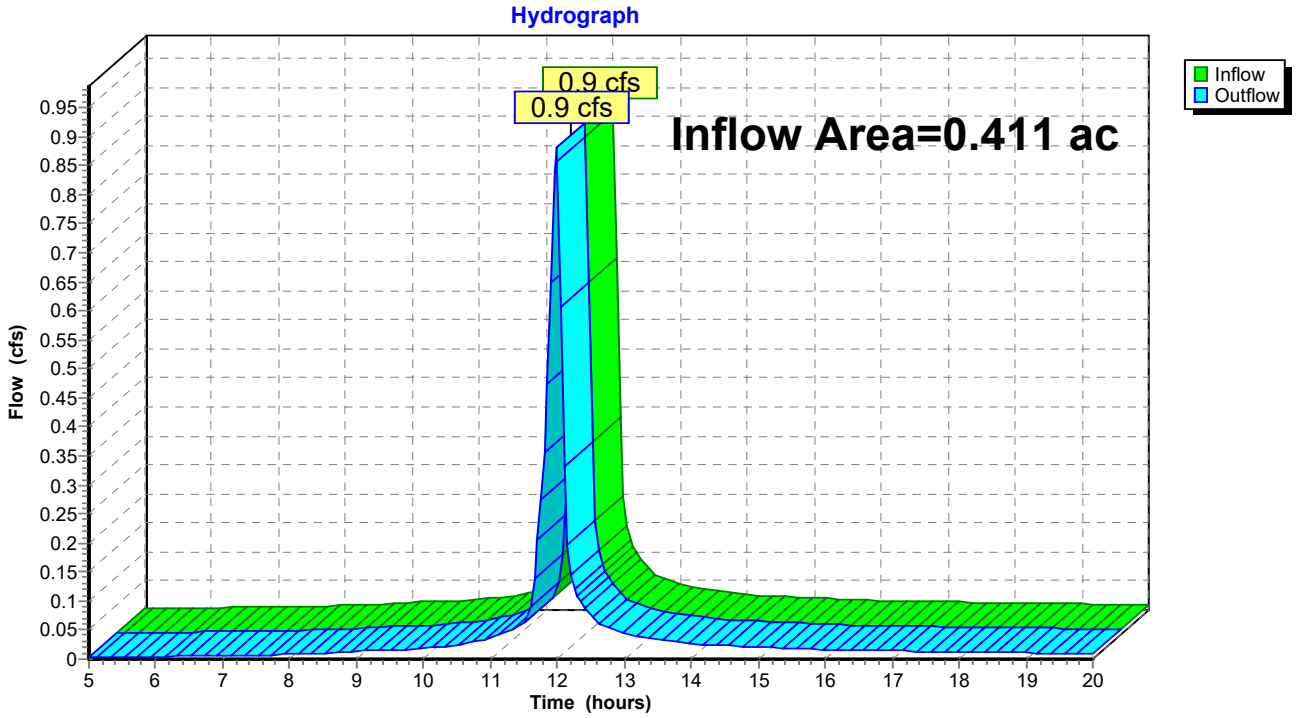
Summary for Reach 6R: East Storm

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 0.411 ac, 96.42% Impervious, Inflow Depth > 1.29" for 2-YR event
Inflow = 0.9 cfs @ 11.98 hrs, Volume= 0.044 af
Outflow = 0.9 cfs @ 11.98 hrs, Volume= 0.044 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Reach 6R: East Storm



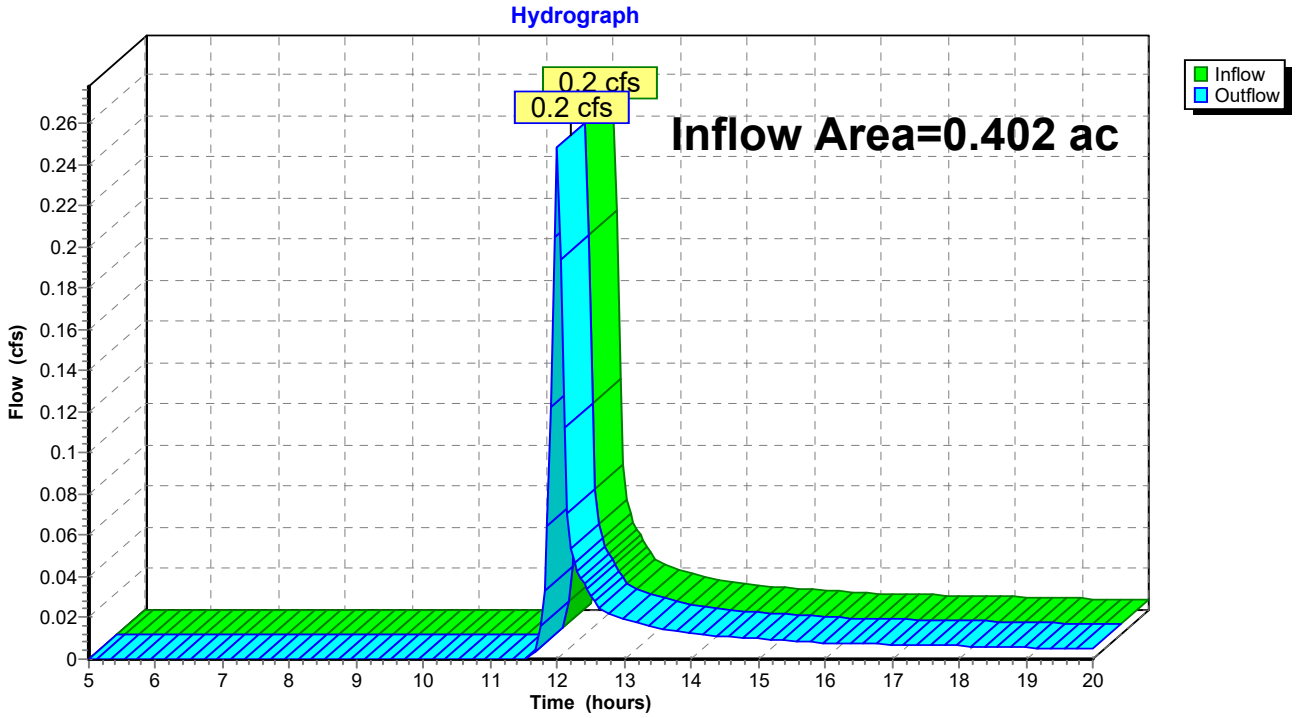
Summary for Reach 7R: North Bluff

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 0.402 ac, 0.00% Impervious, Inflow Depth > 0.34" for 2-YR event
Inflow = 0.2 cfs @ 12.00 hrs, Volume= 0.012 af
Outflow = 0.2 cfs @ 12.00 hrs, Volume= 0.012 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Reach 7R: North Bluff



Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment1XS: Runoff Area=212,871 sf 45.04% Impervious Runoff Depth>2.79"
Tc=7.0 min CN=88 Runoff=23.8 cfs 1.138 af

Subcatchment2XS: Runoff Area=75,763 sf 26.31% Impervious Runoff Depth>2.52"
Tc=7.0 min CN=85 Runoff=7.8 cfs 0.365 af

Subcatchment3XS: Runoff Area=26,713 sf 64.20% Impervious Runoff Depth>3.18"
Tc=7.0 min CN=92 Runoff=3.3 cfs 0.162 af

Subcatchment4XS: Runoff Area=51,828 sf 60.81% Impervious Runoff Depth>3.08"
Tc=7.0 min CN=91 Runoff=6.2 cfs 0.305 af

Subcatchment5XS: Runoff Area=41,786 sf 30.44% Impervious Runoff Depth>2.52"
Tc=7.0 min CN=85 Runoff=4.3 cfs 0.201 af

Subcatchment6XS: Runoff Area=17,899 sf 96.42% Impervious Runoff Depth>3.64"
Tc=7.0 min CN=97 Runoff=2.4 cfs 0.125 af

Subcatchment7XS: Runoff Area=26,971 sf 46.75% Impervious Runoff Depth>2.79"
Tc=7.0 min CN=88 Runoff=3.0 cfs 0.144 af

Subcatchment8XS: Runoff Area=17,512 sf 0.00% Impervious Runoff Depth>2.10"
Tc=7.0 min CN=80 Runoff=1.5 cfs 0.070 af

Reach 1R: NW Storm Inflow=23.8 cfs 1.138 af
Outflow=23.8 cfs 1.138 af

Reach 2R: West Storm Inflow=7.8 cfs 0.365 af
Outflow=7.8 cfs 0.365 af

Reach 3R: West Bluff Inflow=3.3 cfs 0.162 af
Outflow=3.3 cfs 0.162 af

Reach 4R: South Storm Inflow=6.2 cfs 0.305 af
Outflow=6.2 cfs 0.305 af

Reach 5R: SE Bluff - To Road Inflow=7.3 cfs 0.346 af
Outflow=7.3 cfs 0.346 af

Reach 6R: East Storm Inflow=2.4 cfs 0.125 af
Outflow=2.4 cfs 0.125 af

Reach 7R: North Bluff Inflow=1.5 cfs 0.070 af
Outflow=1.5 cfs 0.070 af

Total Runoff Area = 10.821 ac Runoff Volume = 2.512 af Average Runoff Depth = 2.79"
56.07% Pervious = 6.067 ac 43.93% Impervious = 4.753 ac

Summary for Subcatchment 1XS:

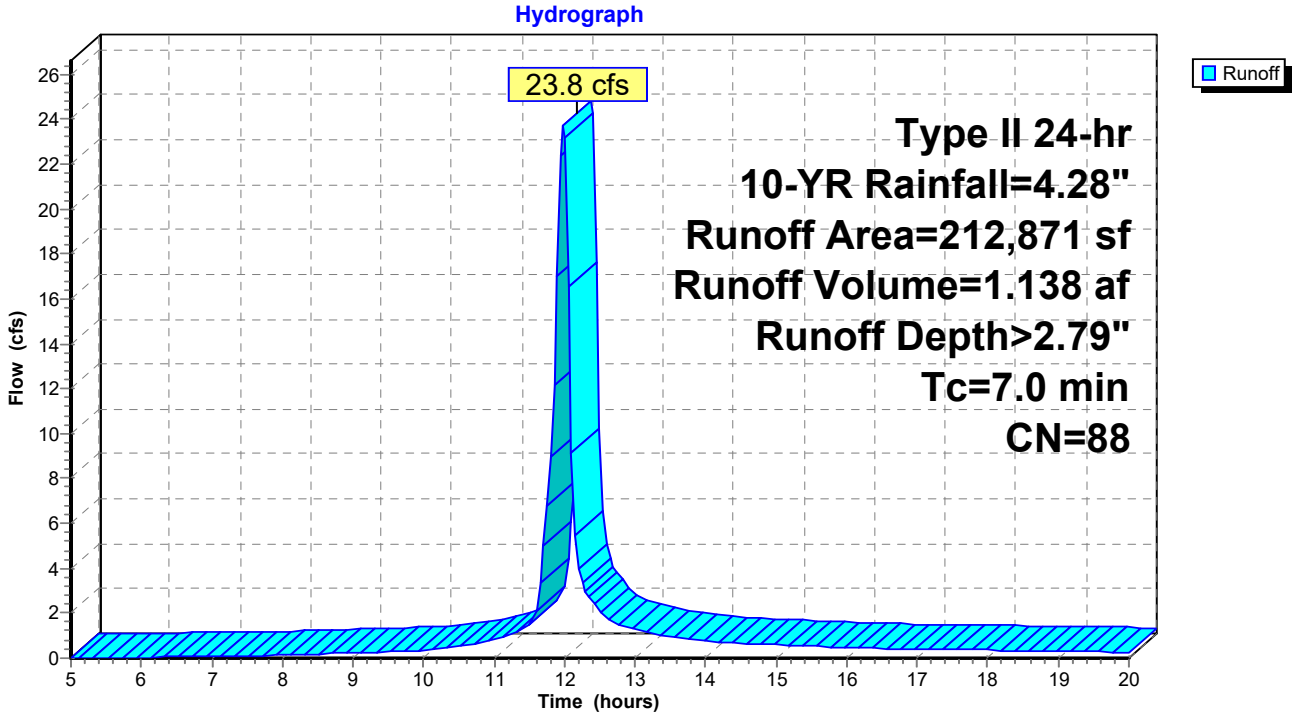
Runoff = 23.8 cfs @ 11.98 hrs, Volume= 1.138 af, Depth> 2.79"
Routed to Reach 1R : NW Storm

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 10-YR Rainfall=4.28"

Area (sf)	CN	Description
95,871	98	Paved parking, HSG D
117,000	80	>75% Grass cover, Good, HSG D
212,871	88	Weighted Average
117,000		54.96% Pervious Area
95,871		45.04% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.0					**Direct Entry,**

Subcatchment 1XS:



Summary for Subcatchment 2XS:

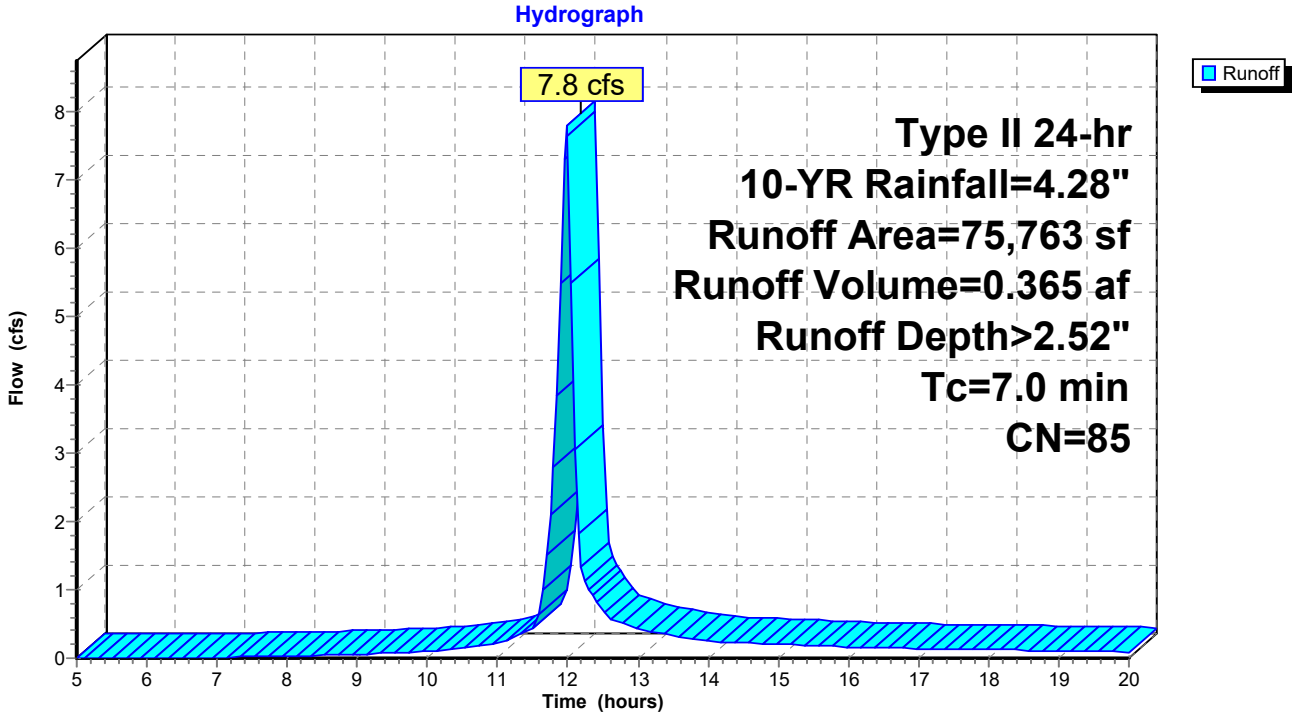
Runoff = 7.8 cfs @ 11.98 hrs, Volume= 0.365 af, Depth> 2.52"
Routed to Reach 2R : West Storm

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 10-YR Rainfall=4.28"

Area (sf)	CN	Description
19,931	98	Paved parking, HSG D
55,832	80	>75% Grass cover, Good, HSG D
75,763	85	Weighted Average
55,832		73.69% Pervious Area
19,931		26.31% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.0					**Direct Entry,**

Subcatchment 2XS:



Summary for Subcatchment 3XS:

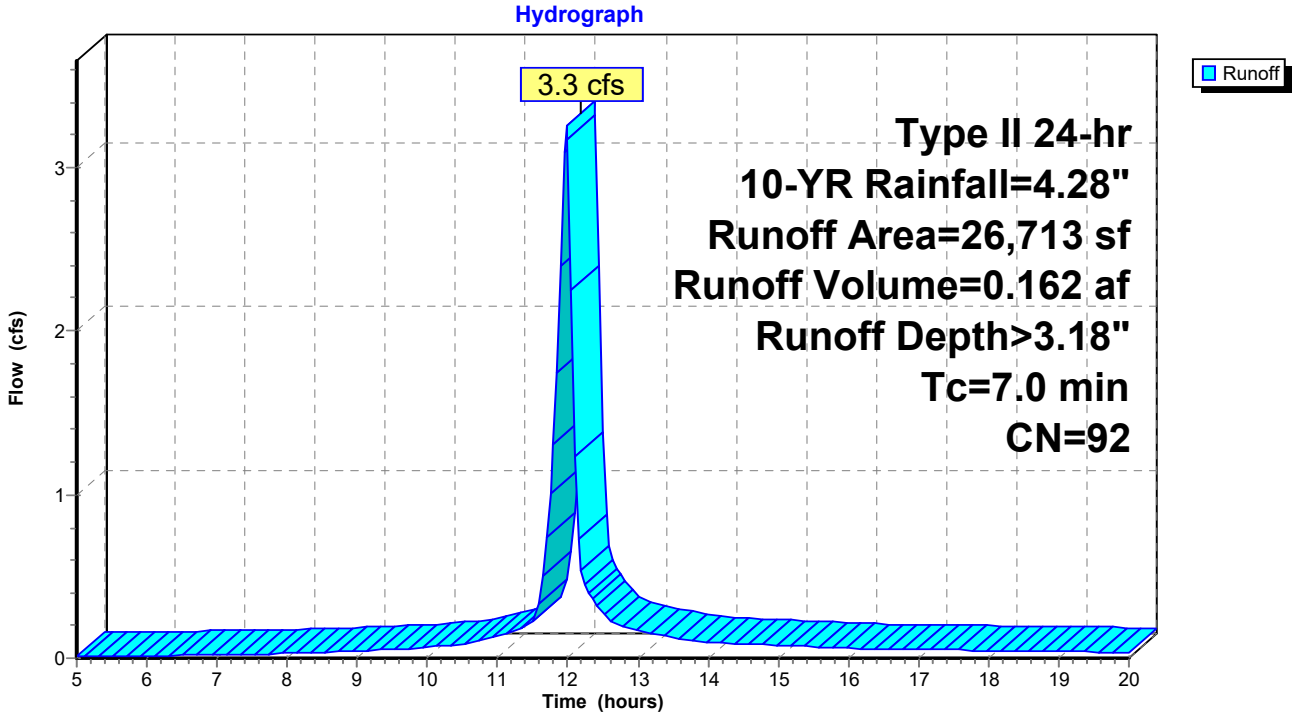
Runoff = 3.3 cfs @ 11.98 hrs, Volume= 0.162 af, Depth> 3.18"
Routed to Reach 3R : West Bluff

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 10-YR Rainfall=4.28"

Area (sf)	CN	Description
17,151	98	Paved parking, HSG D
9,562	80	>75% Grass cover, Good, HSG D
26,713	92	Weighted Average
9,562		35.80% Pervious Area
17,151		64.20% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.0					**Direct Entry,**

Subcatchment 3XS:



Summary for Subcatchment 4XS:

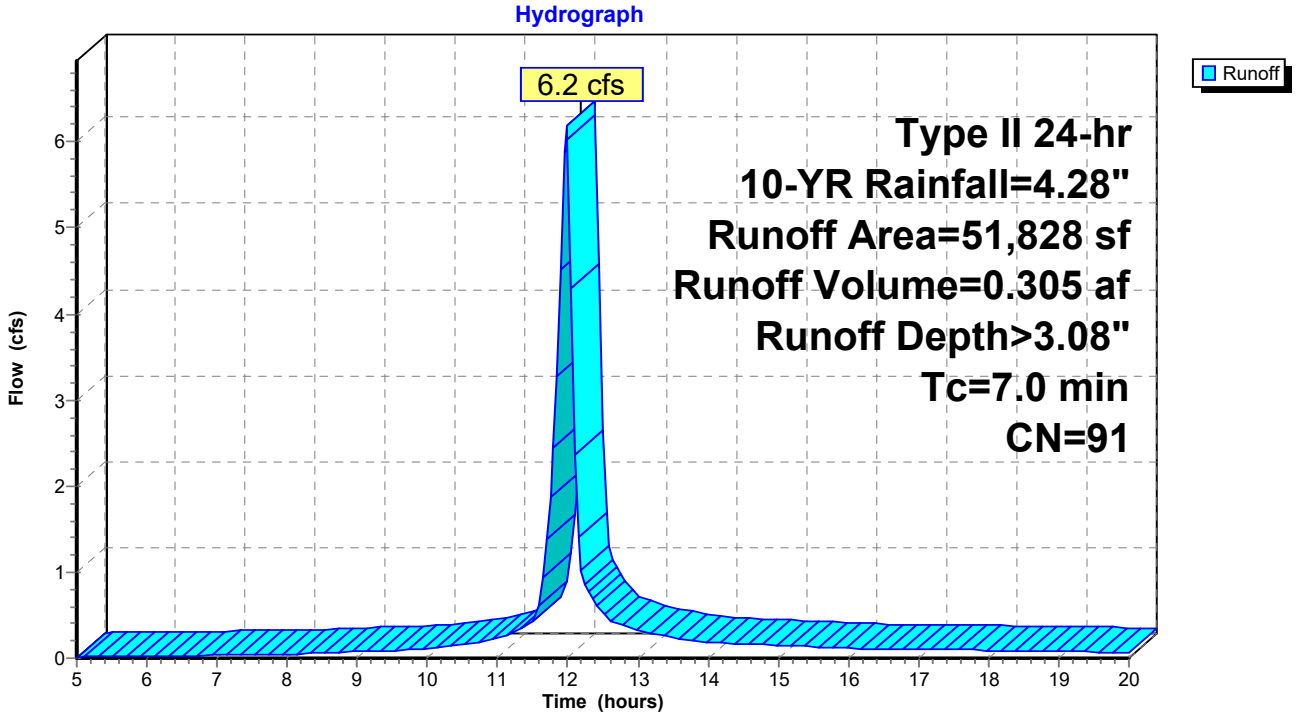
Runoff = 6.2 cfs @ 11.98 hrs, Volume= 0.305 af, Depth> 3.08"
Routed to Reach 4R : South Storm

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 10-YR Rainfall=4.28"

Area (sf)	CN	Description
31,516	98	Paved parking, HSG D
20,312	80	>75% Grass cover, Good, HSG D
51,828	91	Weighted Average
20,312		39.19% Pervious Area
31,516		60.81% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.0					**Direct Entry,**

Subcatchment 4XS:



Summary for Subcatchment 5XS:

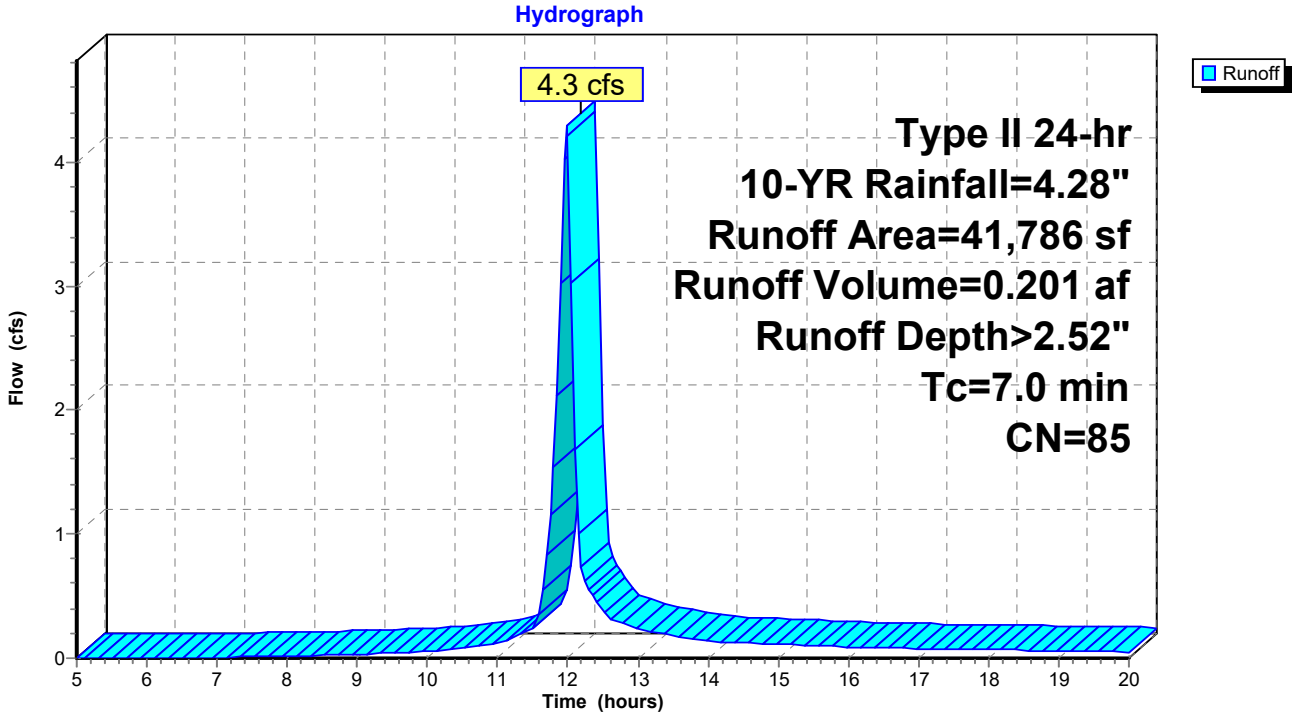
Runoff = 4.3 cfs @ 11.98 hrs, Volume= 0.201 af, Depth> 2.52"
Routed to Reach 5R : SE Bluff - To Road

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 10-YR Rainfall=4.28"

Area (sf)	CN	Description
12,719	98	Paved parking, HSG D
29,067	80	>75% Grass cover, Good, HSG D
41,786	85	Weighted Average
29,067		69.56% Pervious Area
12,719		30.44% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.0					**Direct Entry,**

Subcatchment 5XS:



Summary for Subcatchment 6XS:

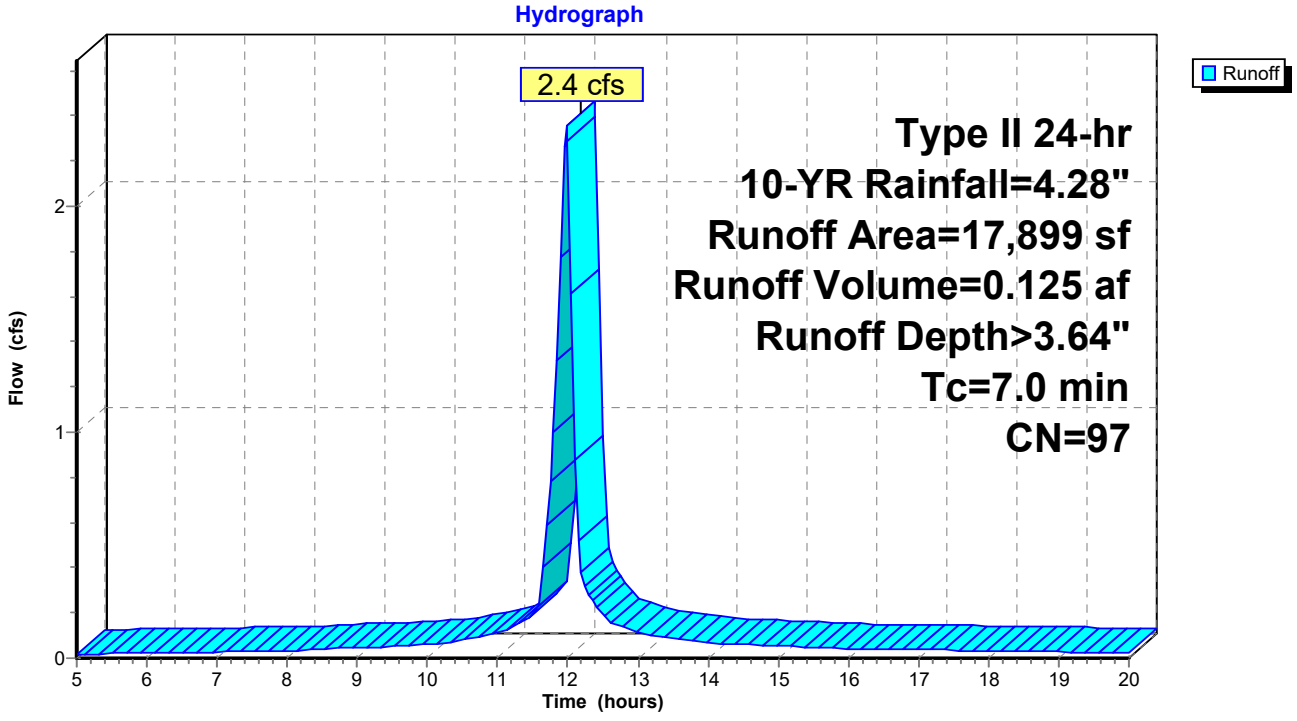
Runoff = 2.4 cfs @ 11.98 hrs, Volume= 0.125 af, Depth> 3.64"
Routed to Reach 6R : East Storm

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 10-YR Rainfall=4.28"

Area (sf)	CN	Description
17,259	98	Paved parking, HSG D
640	80	>75% Grass cover, Good, HSG D
17,899	97	Weighted Average
640		3.58% Pervious Area
17,259		96.42% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.0					**Direct Entry,**

Subcatchment 6XS:



Summary for Subcatchment 7XS:

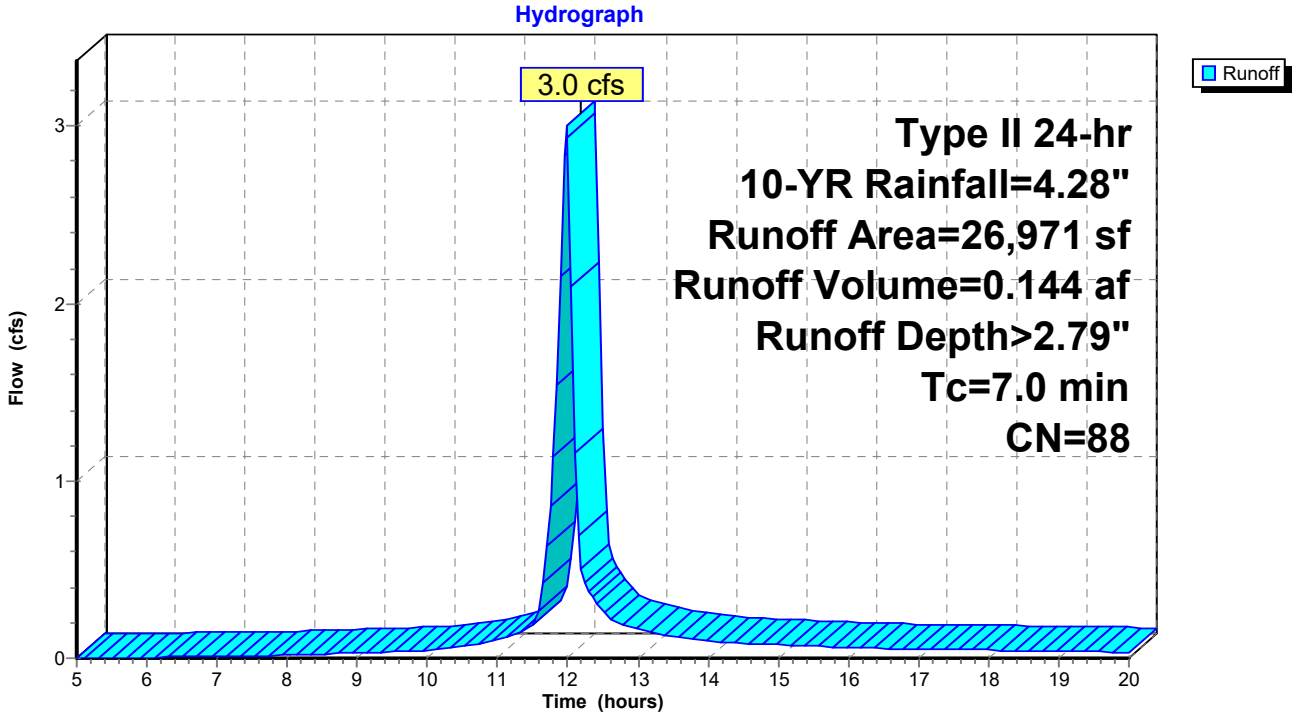
Runoff = 3.0 cfs @ 11.98 hrs, Volume= 0.144 af, Depth> 2.79"
Routed to Reach 5R : SE Bluff - To Road

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 10-YR Rainfall=4.28"

Area (sf)	CN	Description
12,609	98	Paved parking, HSG D
14,362	80	>75% Grass cover, Good, HSG D
26,971	88	Weighted Average
14,362		53.25% Pervious Area
12,609		46.75% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.0					**Direct Entry,**

Subcatchment 7XS:



Summary for Subcatchment 8XS:

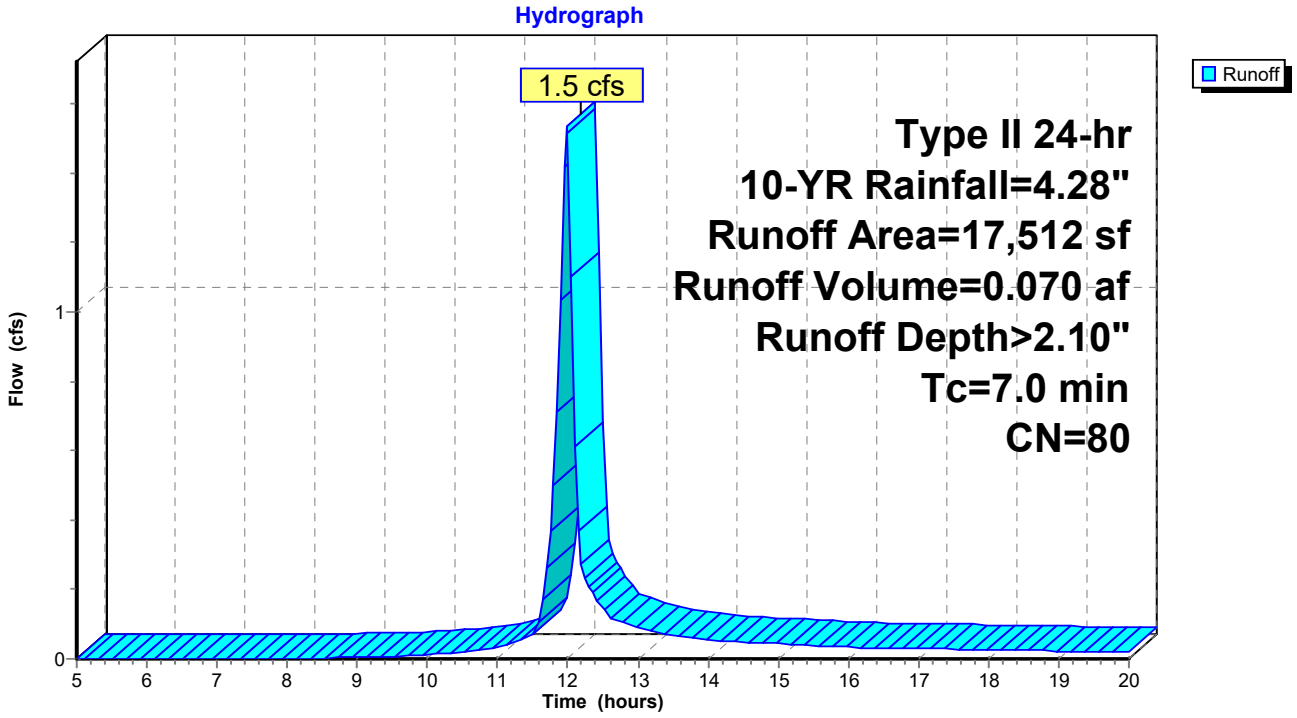
Runoff = 1.5 cfs @ 11.98 hrs, Volume= 0.070 af, Depth> 2.10"
Routed to Reach 7R : North Bluff

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 10-YR Rainfall=4.28"

Area (sf)	CN	Description
17,512	80	>75% Grass cover, Good, HSG D
17,512		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.0					**Direct Entry,**

Subcatchment 8XS:



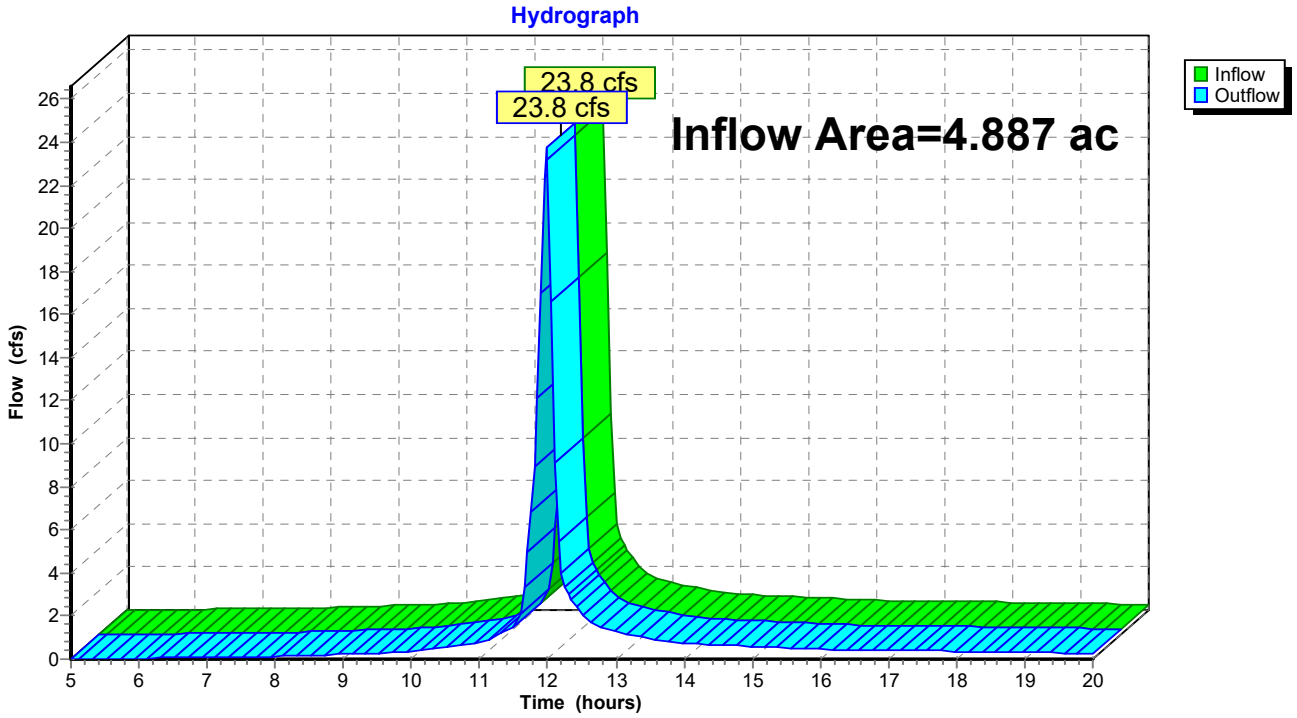
Summary for Reach 1R: NW Storm

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 4.887 ac, 45.04% Impervious, Inflow Depth > 2.79" for 10-YR event
Inflow = 23.8 cfs @ 11.98 hrs, Volume= 1.138 af
Outflow = 23.8 cfs @ 11.98 hrs, Volume= 1.138 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Reach 1R: NW Storm



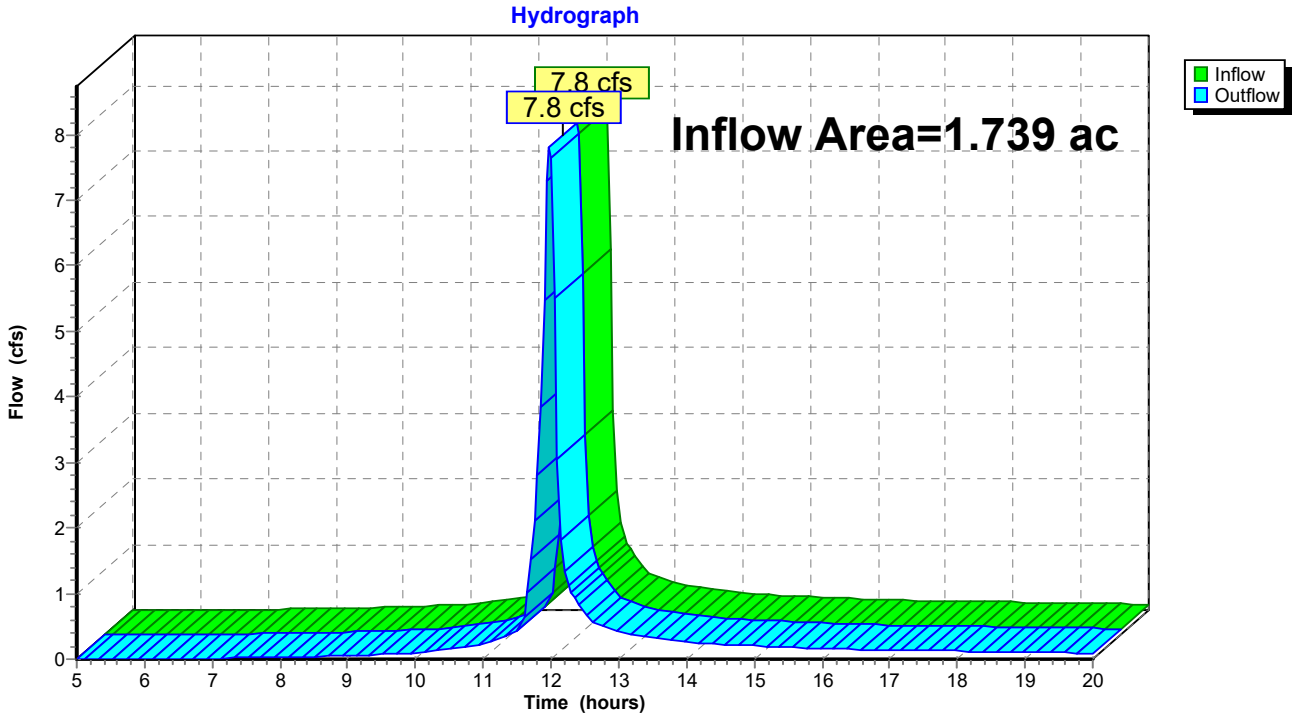
Summary for Reach 2R: West Storm

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 1.739 ac, 26.31% Impervious, Inflow Depth > 2.52" for 10-YR event
Inflow = 7.8 cfs @ 11.98 hrs, Volume= 0.365 af
Outflow = 7.8 cfs @ 11.98 hrs, Volume= 0.365 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Reach 2R: West Storm



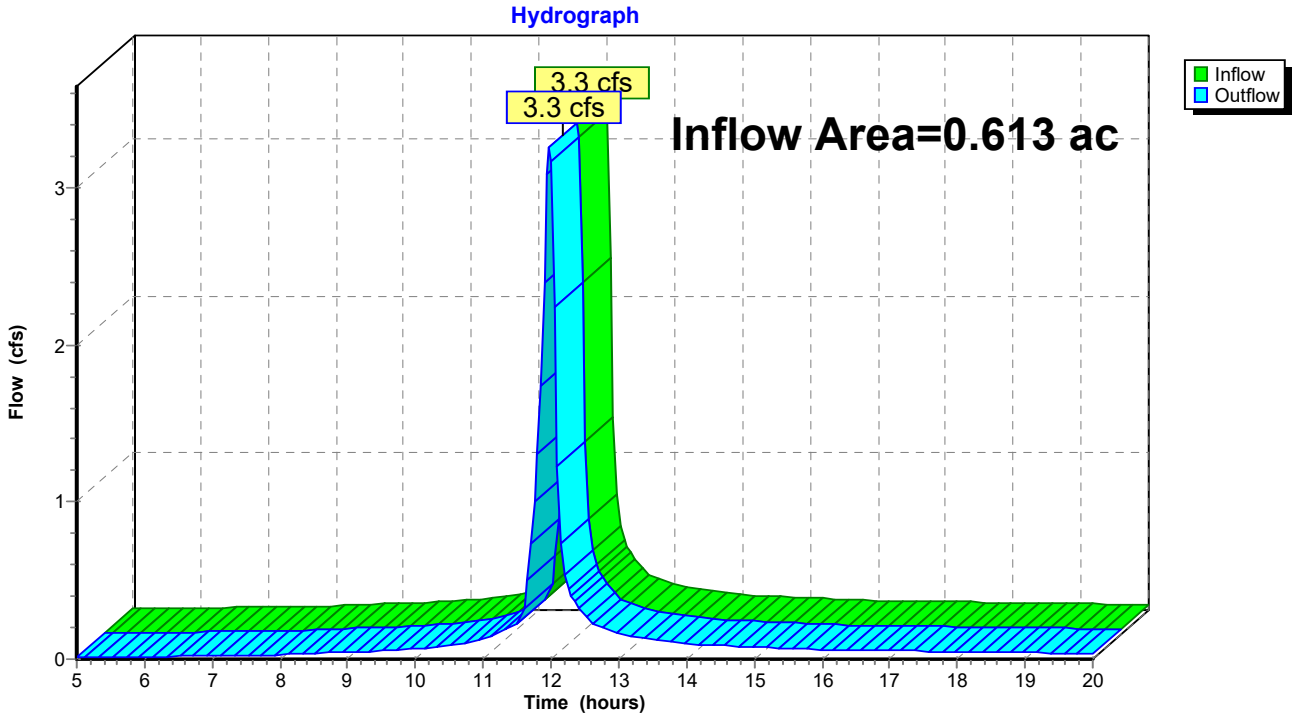
Summary for Reach 3R: West Bluff

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 0.613 ac, 64.20% Impervious, Inflow Depth > 3.18" for 10-YR event
Inflow = 3.3 cfs @ 11.98 hrs, Volume= 0.162 af
Outflow = 3.3 cfs @ 11.98 hrs, Volume= 0.162 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Reach 3R: West Bluff



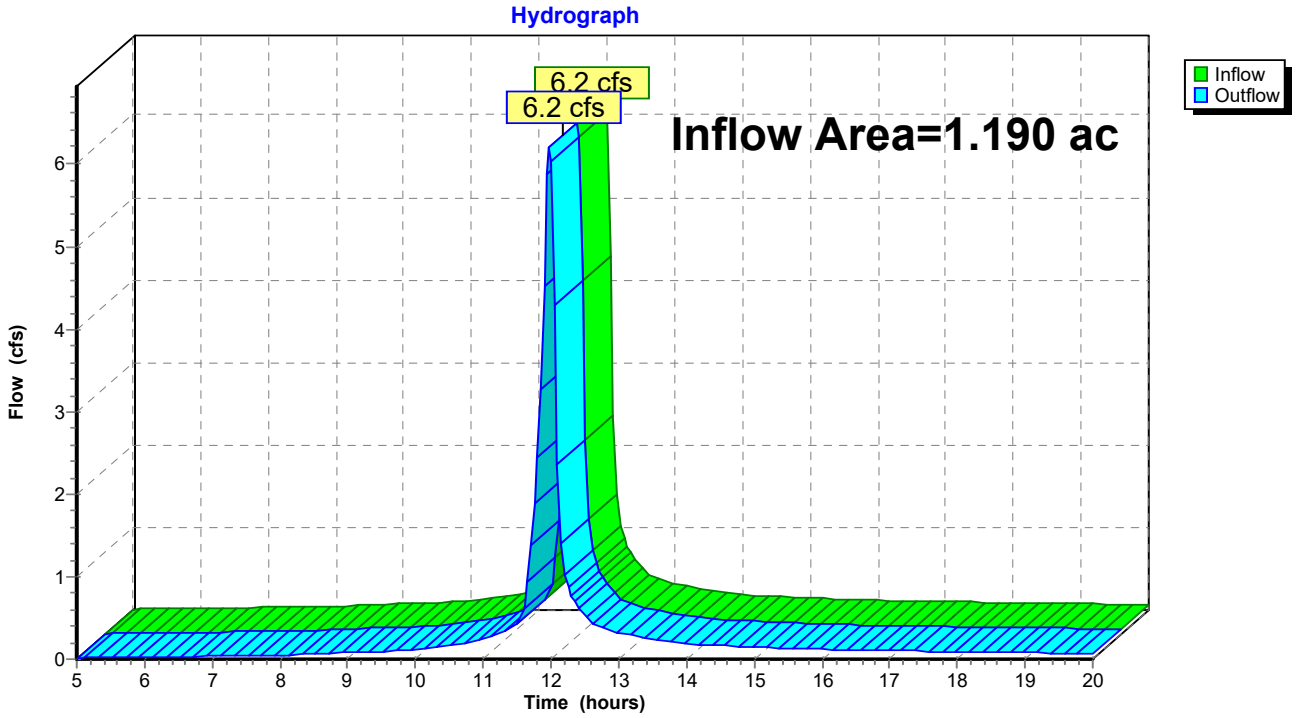
Summary for Reach 4R: South Storm

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 1.190 ac, 60.81% Impervious, Inflow Depth > 3.08" for 10-YR event
Inflow = 6.2 cfs @ 11.98 hrs, Volume= 0.305 af
Outflow = 6.2 cfs @ 11.98 hrs, Volume= 0.305 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Reach 4R: South Storm



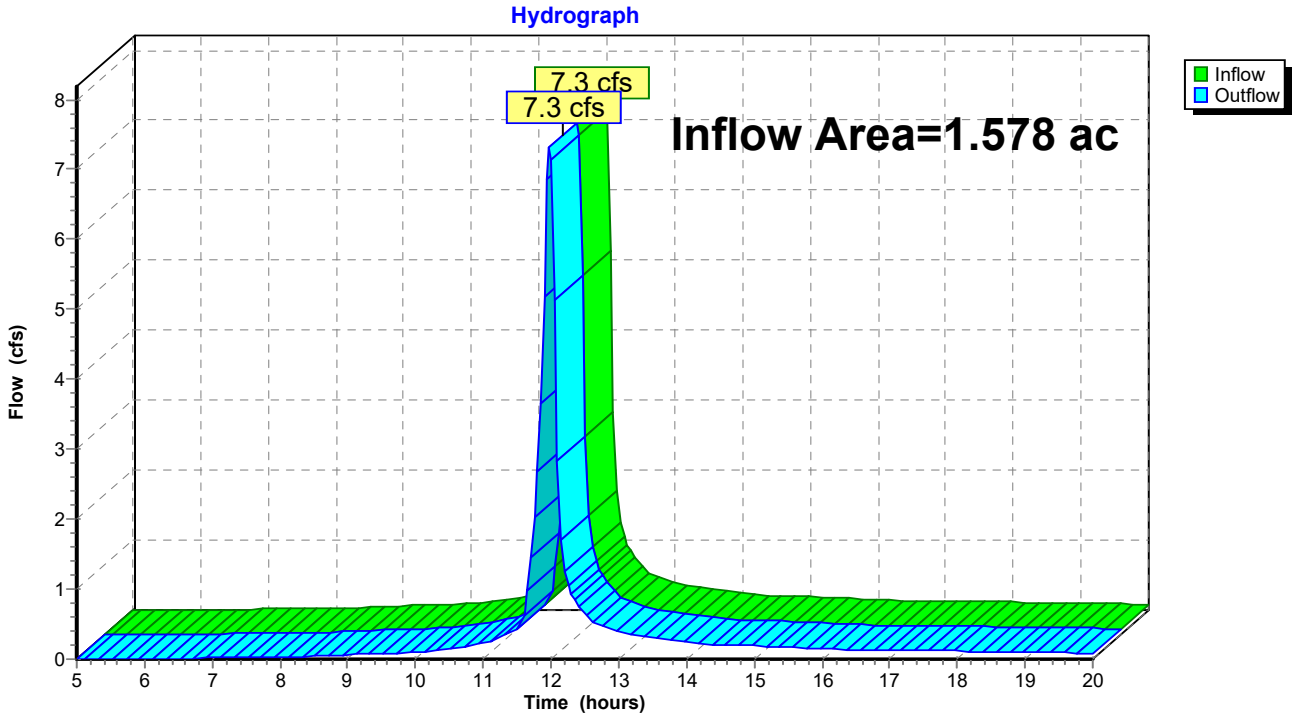
Summary for Reach 5R: SE Bluff - To Road

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 1.578 ac, 36.84% Impervious, Inflow Depth > 2.63" for 10-YR event
Inflow = 7.3 cfs @ 11.98 hrs, Volume= 0.346 af
Outflow = 7.3 cfs @ 11.98 hrs, Volume= 0.346 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Reach 5R: SE Bluff - To Road



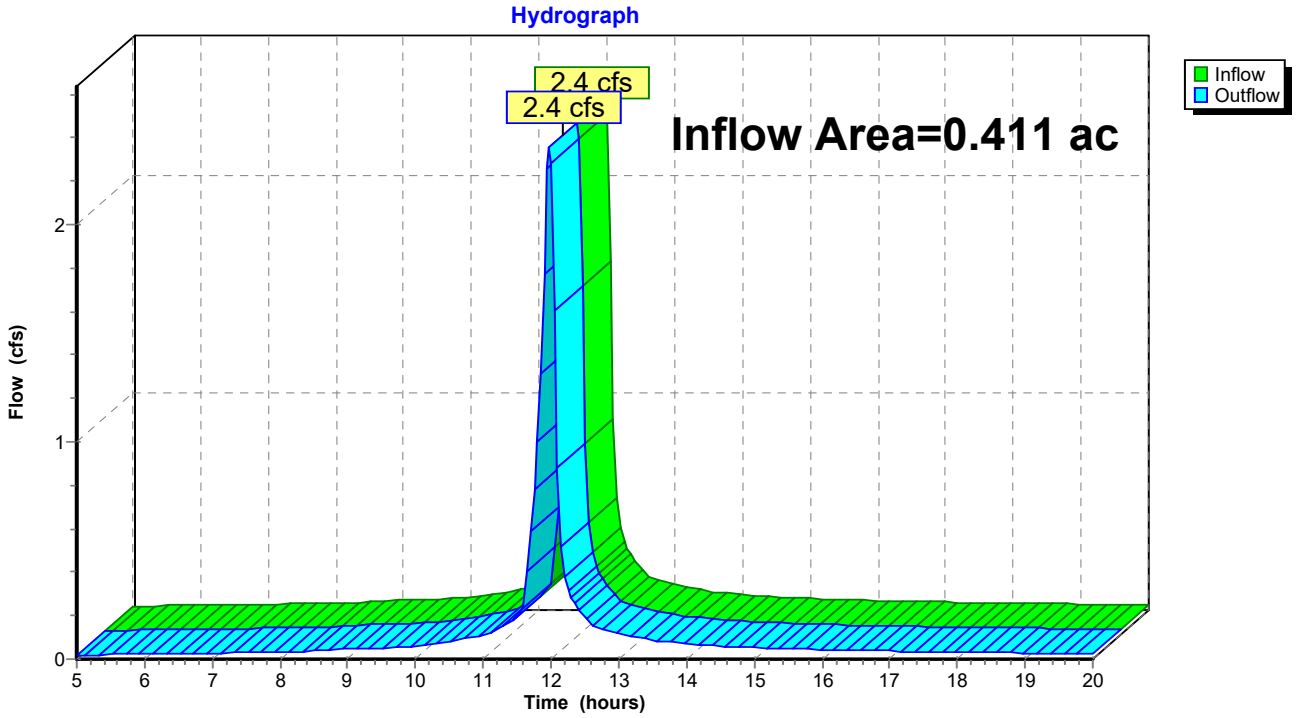
Summary for Reach 6R: East Storm

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 0.411 ac, 96.42% Impervious, Inflow Depth > 3.64" for 10-YR event
Inflow = 2.4 cfs @ 11.98 hrs, Volume= 0.125 af
Outflow = 2.4 cfs @ 11.98 hrs, Volume= 0.125 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Reach 6R: East Storm



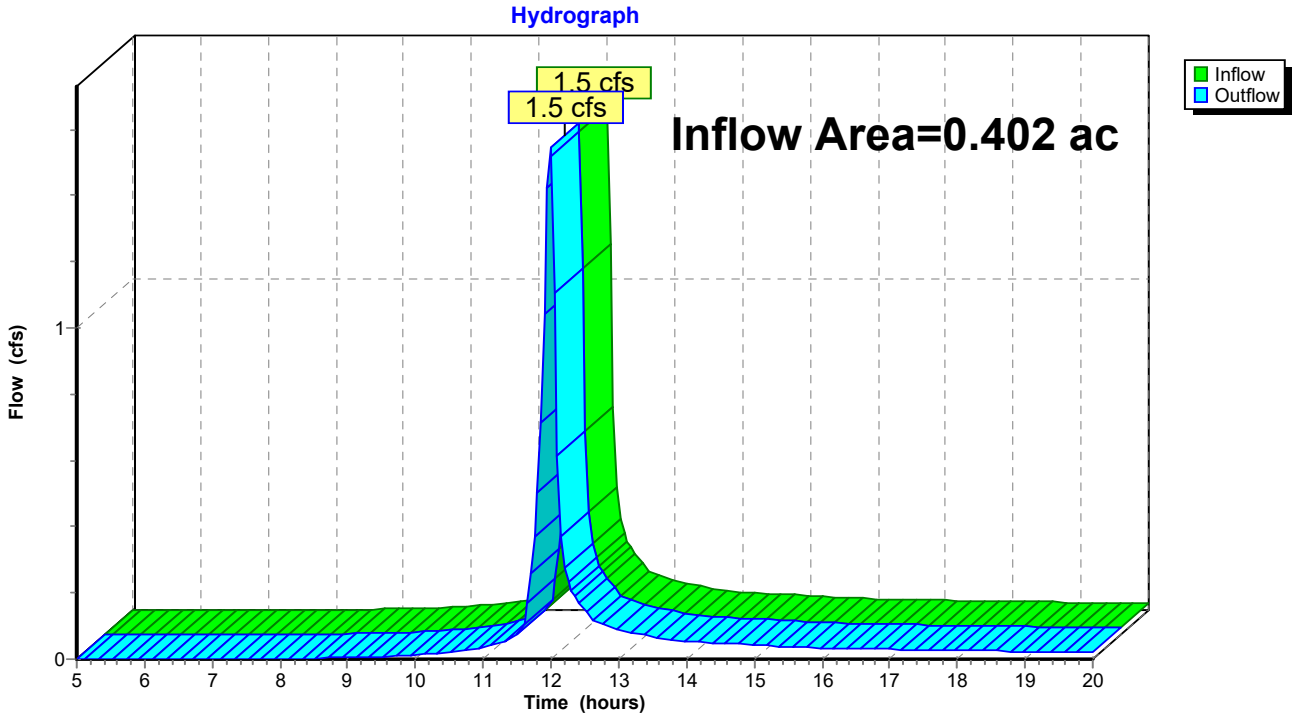
Summary for Reach 7R: North Bluff

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 0.402 ac, 0.00% Impervious, Inflow Depth > 2.10" for 10-YR event
Inflow = 1.5 cfs @ 11.98 hrs, Volume= 0.070 af
Outflow = 1.5 cfs @ 11.98 hrs, Volume= 0.070 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Reach 7R: North Bluff



Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment1XS: Runoff Area=212,871 sf 45.04% Impervious Runoff Depth>5.42"
Tc=7.0 min CN=88 Runoff=44.1 cfs 2.206 af

Subcatchment2XS: Runoff Area=75,763 sf 26.31% Impervious Runoff Depth>5.09"
Tc=7.0 min CN=85 Runoff=15.1 cfs 0.738 af

Subcatchment3XS: Runoff Area=26,713 sf 64.20% Impervious Runoff Depth>5.83"
Tc=7.0 min CN=92 Runoff=5.8 cfs 0.298 af

Subcatchment4XS: Runoff Area=51,828 sf 60.81% Impervious Runoff Depth>5.73"
Tc=7.0 min CN=91 Runoff=11.1 cfs 0.568 af

Subcatchment5XS: Runoff Area=41,786 sf 30.44% Impervious Runoff Depth>5.09"
Tc=7.0 min CN=85 Runoff=8.3 cfs 0.407 af

Subcatchment6XS: Runoff Area=17,899 sf 96.42% Impervious Runoff Depth>6.27"
Tc=7.0 min CN=97 Runoff=4.0 cfs 0.215 af

Subcatchment7XS: Runoff Area=26,971 sf 46.75% Impervious Runoff Depth>5.42"
Tc=7.0 min CN=88 Runoff=5.6 cfs 0.280 af

Subcatchment8XS: Runoff Area=17,512 sf 0.00% Impervious Runoff Depth>4.54"
Tc=7.0 min CN=80 Runoff=3.2 cfs 0.152 af

Reach 1R: NW Storm Inflow=44.1 cfs 2.206 af
Outflow=44.1 cfs 2.206 af

Reach 2R: West Storm Inflow=15.1 cfs 0.738 af
Outflow=15.1 cfs 0.738 af

Reach 3R: West Bluff Inflow=5.8 cfs 0.298 af
Outflow=5.8 cfs 0.298 af

Reach 4R: South Storm Inflow=11.1 cfs 0.568 af
Outflow=11.1 cfs 0.568 af

Reach 5R: SE Bluff - To Road Inflow=13.9 cfs 0.687 af
Outflow=13.9 cfs 0.687 af

Reach 6R: East Storm Inflow=4.0 cfs 0.215 af
Outflow=4.0 cfs 0.215 af

Reach 7R: North Bluff Inflow=3.2 cfs 0.152 af
Outflow=3.2 cfs 0.152 af

Total Runoff Area = 10.821 ac Runoff Volume = 4.864 af Average Runoff Depth = 5.39"
56.07% Pervious = 6.067 ac 43.93% Impervious = 4.753 ac

Summary for Subcatchment 1XS:

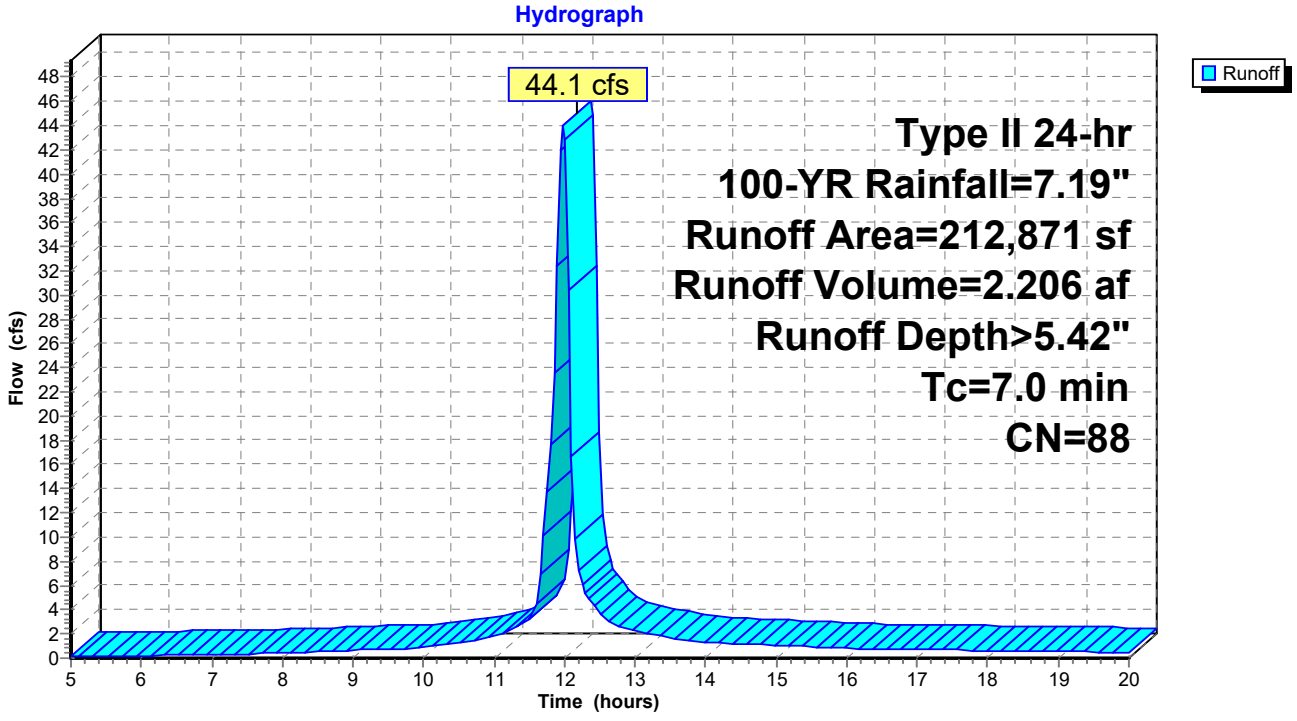
Runoff = 44.1 cfs @ 11.98 hrs, Volume= 2.206 af, Depth> 5.42"
Routed to Reach 1R : NW Storm

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 100-YR Rainfall=7.19"

Area (sf)	CN	Description
95,871	98	Paved parking, HSG D
117,000	80	>75% Grass cover, Good, HSG D
212,871	88	Weighted Average
117,000		54.96% Pervious Area
95,871		45.04% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.0					**Direct Entry,**

Subcatchment 1XS:



Summary for Subcatchment 2XS:

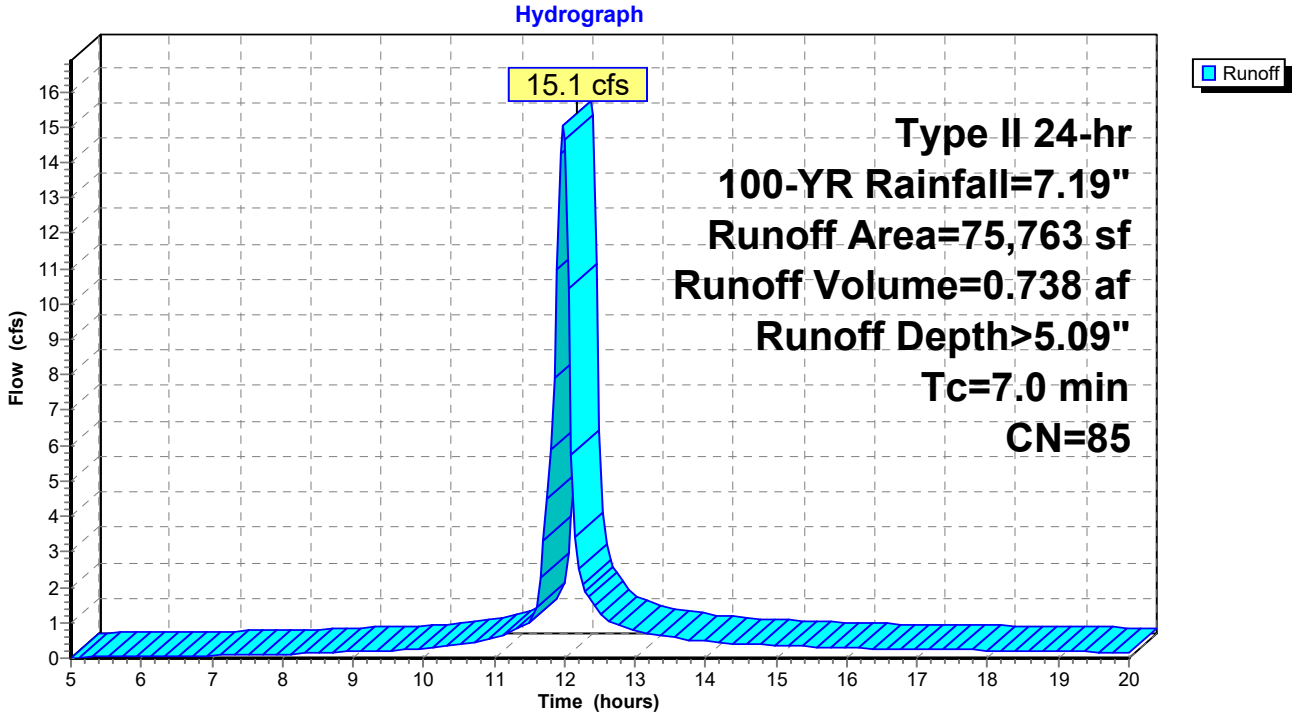
Runoff = 15.1 cfs @ 11.98 hrs, Volume= 0.738 af, Depth> 5.09"
Routed to Reach 2R : West Storm

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 100-YR Rainfall=7.19"

Area (sf)	CN	Description
19,931	98	Paved parking, HSG D
55,832	80	>75% Grass cover, Good, HSG D
75,763	85	Weighted Average
55,832		73.69% Pervious Area
19,931		26.31% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.0					**Direct Entry,**

Subcatchment 2XS:



Summary for Subcatchment 3XS:

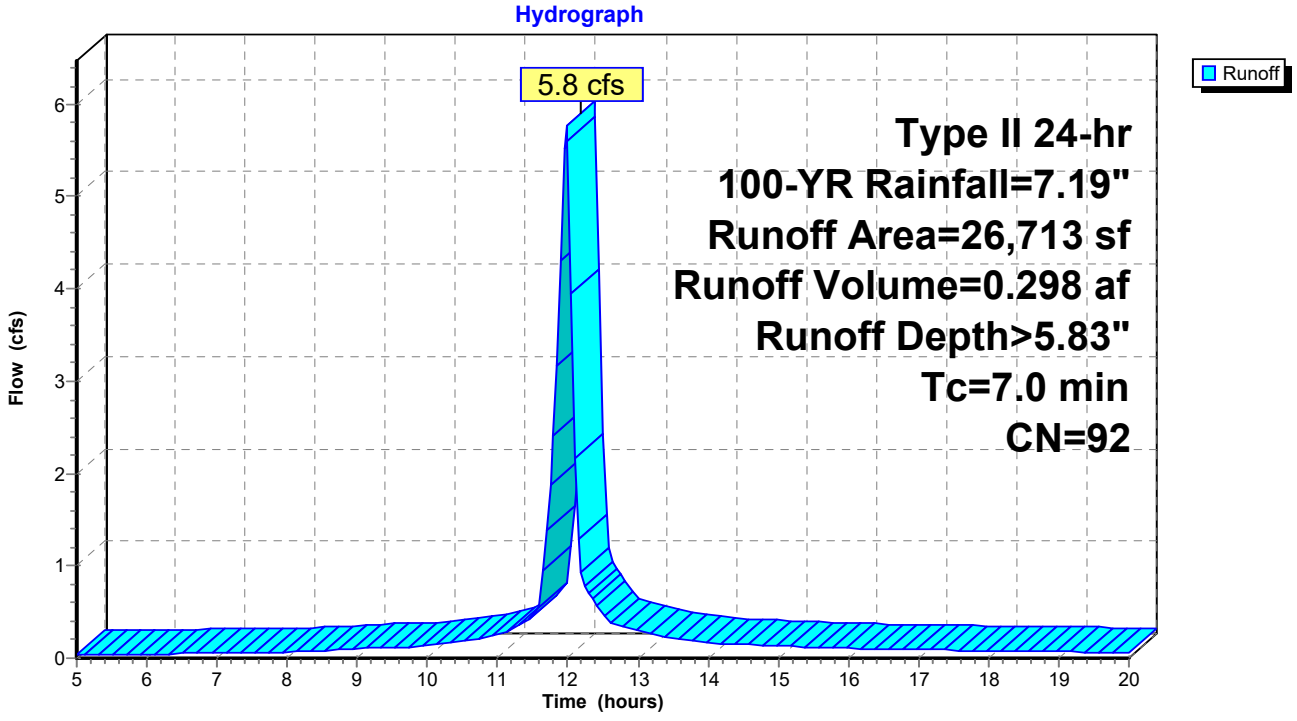
Runoff = 5.8 cfs @ 11.98 hrs, Volume= 0.298 af, Depth> 5.83"
Routed to Reach 3R : West Bluff

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 100-YR Rainfall=7.19"

Area (sf)	CN	Description
17,151	98	Paved parking, HSG D
9,562	80	>75% Grass cover, Good, HSG D
26,713	92	Weighted Average
9,562		35.80% Pervious Area
17,151		64.20% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.0					**Direct Entry,**

Subcatchment 3XS:



Summary for Subcatchment 4XS:

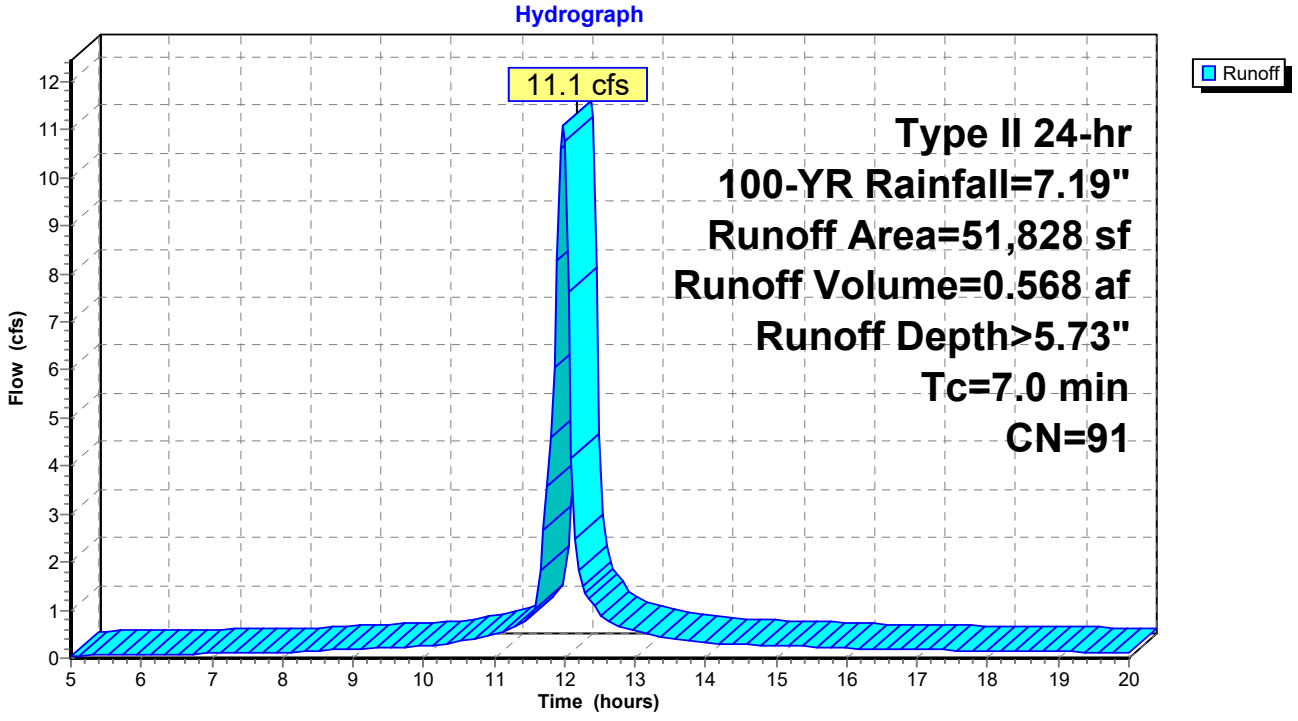
Runoff = 11.1 cfs @ 11.98 hrs, Volume= 0.568 af, Depth> 5.73"
Routed to Reach 4R : South Storm

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 100-YR Rainfall=7.19"

Area (sf)	CN	Description
31,516	98	Paved parking, HSG D
20,312	80	>75% Grass cover, Good, HSG D
51,828	91	Weighted Average
20,312		39.19% Pervious Area
31,516		60.81% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.0					**Direct Entry,**

Subcatchment 4XS:



Summary for Subcatchment 5XS:

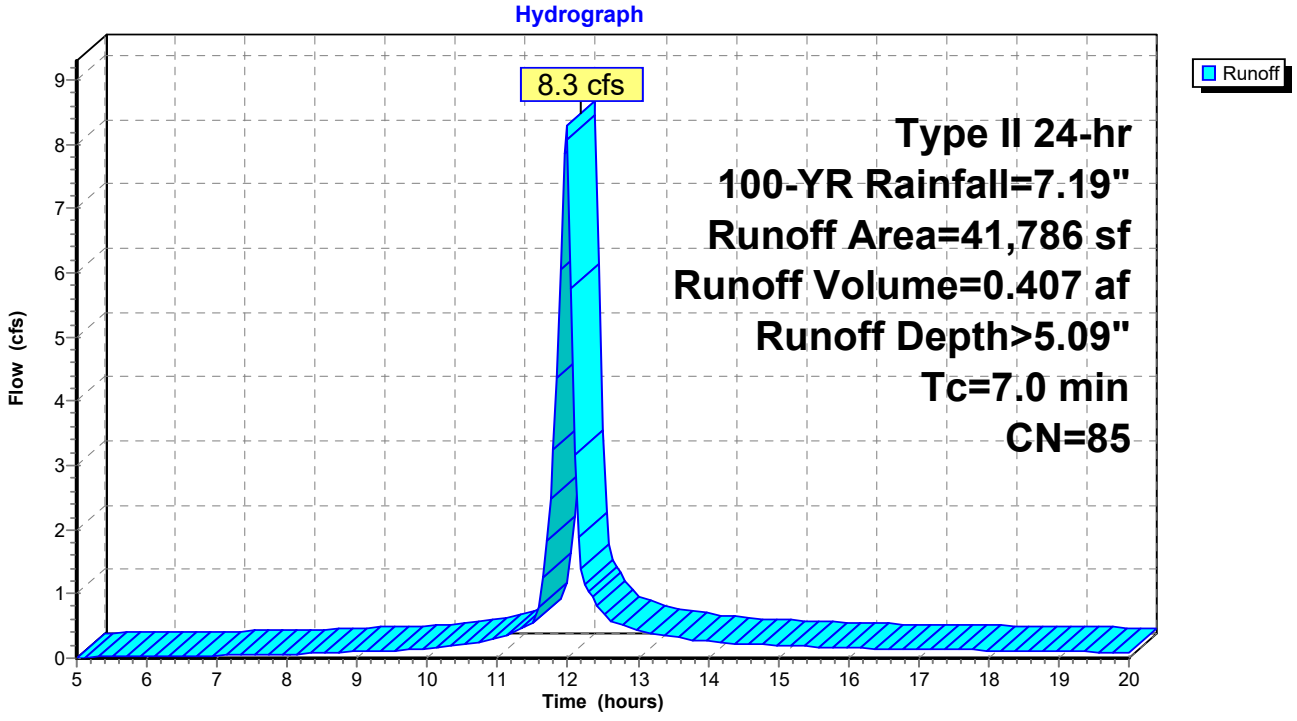
Runoff = 8.3 cfs @ 11.98 hrs, Volume= 0.407 af, Depth> 5.09"
Routed to Reach 5R : SE Bluff - To Road

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 100-YR Rainfall=7.19"

Area (sf)	CN	Description
12,719	98	Paved parking, HSG D
29,067	80	>75% Grass cover, Good, HSG D
41,786	85	Weighted Average
29,067		69.56% Pervious Area
12,719		30.44% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.0					**Direct Entry,**

Subcatchment 5XS:



Summary for Subcatchment 6XS:

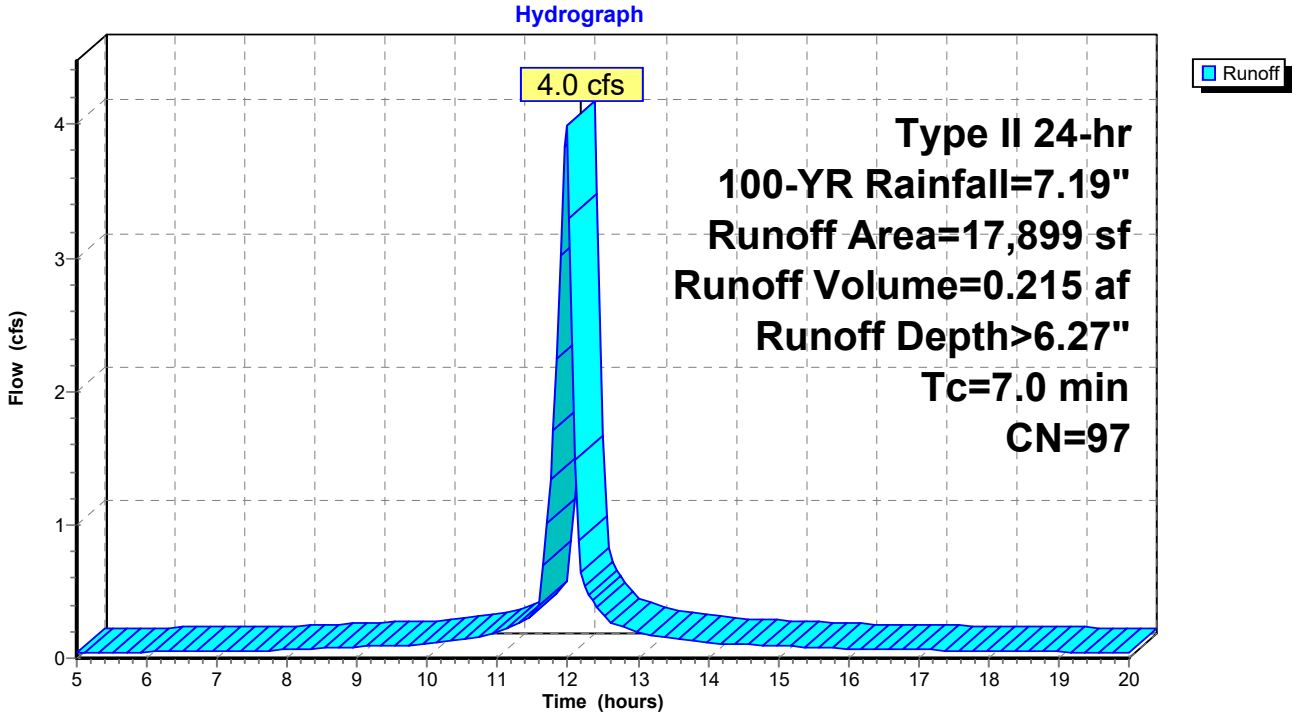
Runoff = 4.0 cfs @ 11.98 hrs, Volume= 0.215 af, Depth> 6.27"
Routed to Reach 6R : East Storm

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 100-YR Rainfall=7.19"

Area (sf)	CN	Description
17,259	98	Paved parking, HSG D
640	80	>75% Grass cover, Good, HSG D
17,899	97	Weighted Average
640		3.58% Pervious Area
17,259		96.42% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.0					**Direct Entry,**

Subcatchment 6XS:



Summary for Subcatchment 7XS:

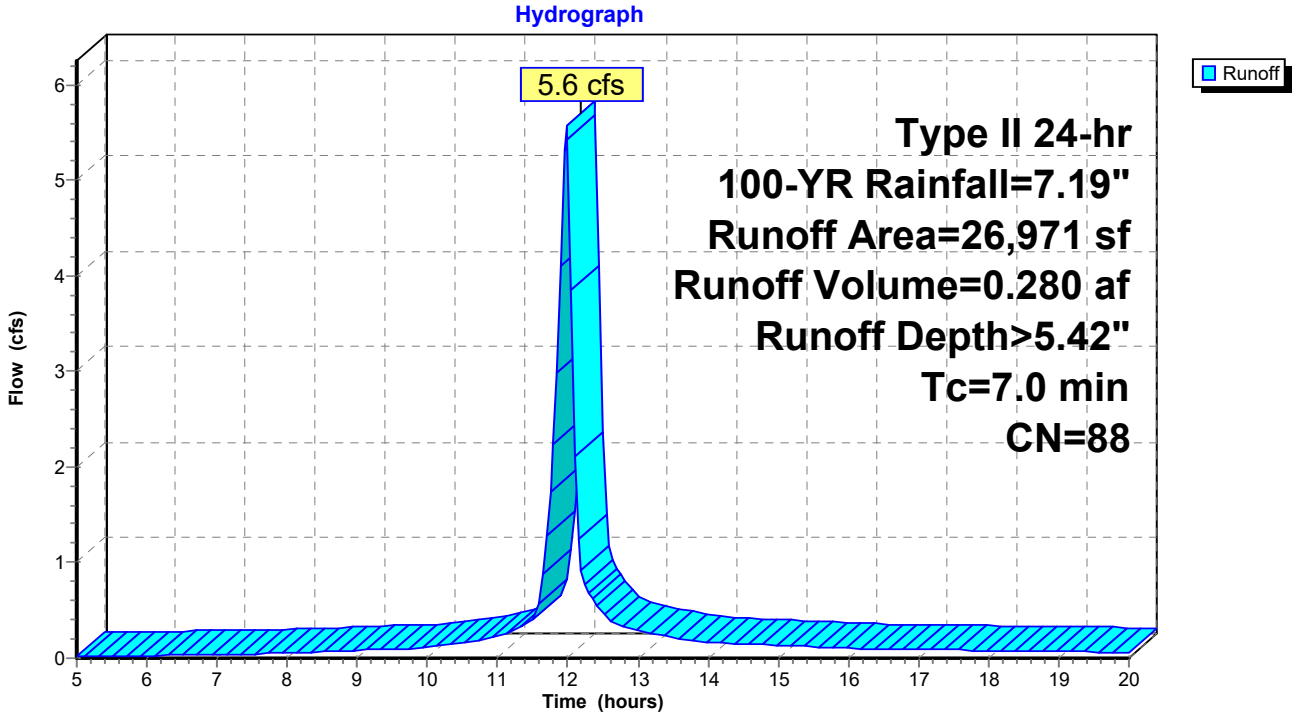
Runoff = 5.6 cfs @ 11.98 hrs, Volume= 0.280 af, Depth> 5.42"
Routed to Reach 5R : SE Bluff - To Road

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 100-YR Rainfall=7.19"

Area (sf)	CN	Description
12,609	98	Paved parking, HSG D
14,362	80	>75% Grass cover, Good, HSG D
26,971	88	Weighted Average
14,362		53.25% Pervious Area
12,609		46.75% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.0					**Direct Entry,**

Subcatchment 7XS:



Summary for Subcatchment 8XS:

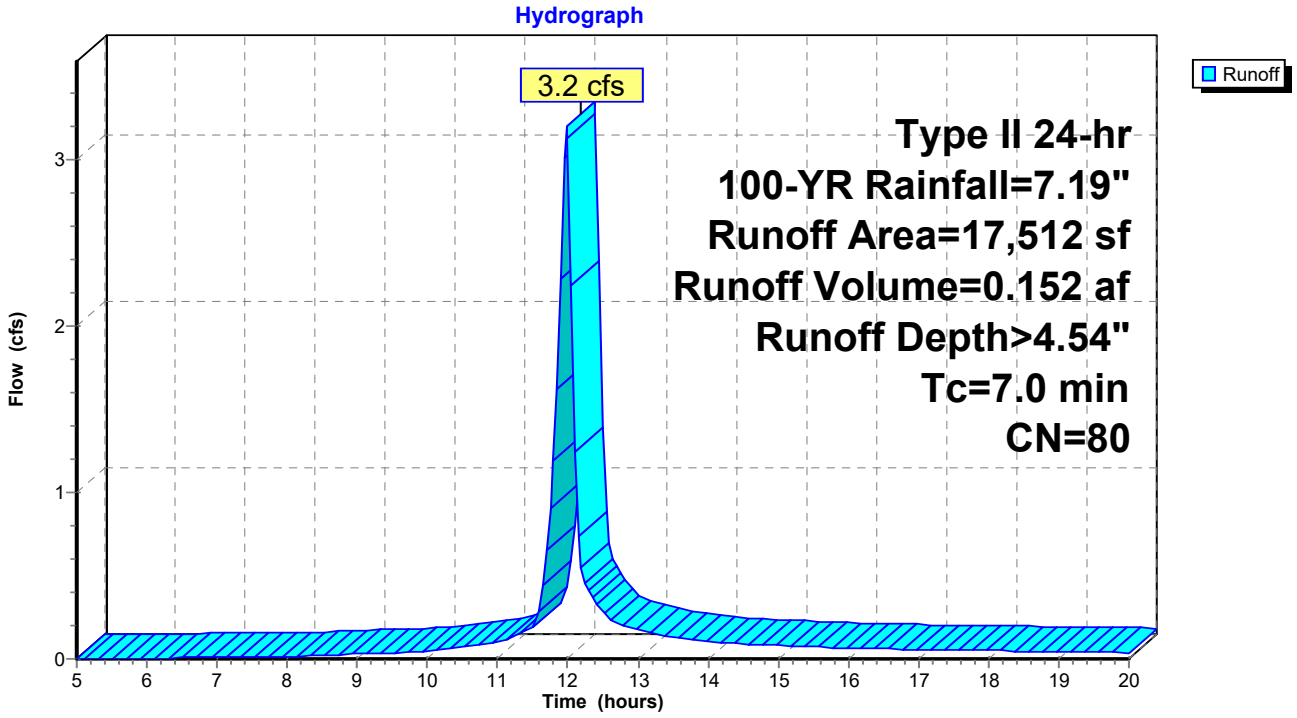
Runoff = 3.2 cfs @ 11.98 hrs, Volume= 0.152 af, Depth> 4.54"
Routed to Reach 7R : North Bluff

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 100-YR Rainfall=7.19"

Area (sf)	CN	Description
17,512	80	>75% Grass cover, Good, HSG D
17,512		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.0					**Direct Entry,**

Subcatchment 8XS:



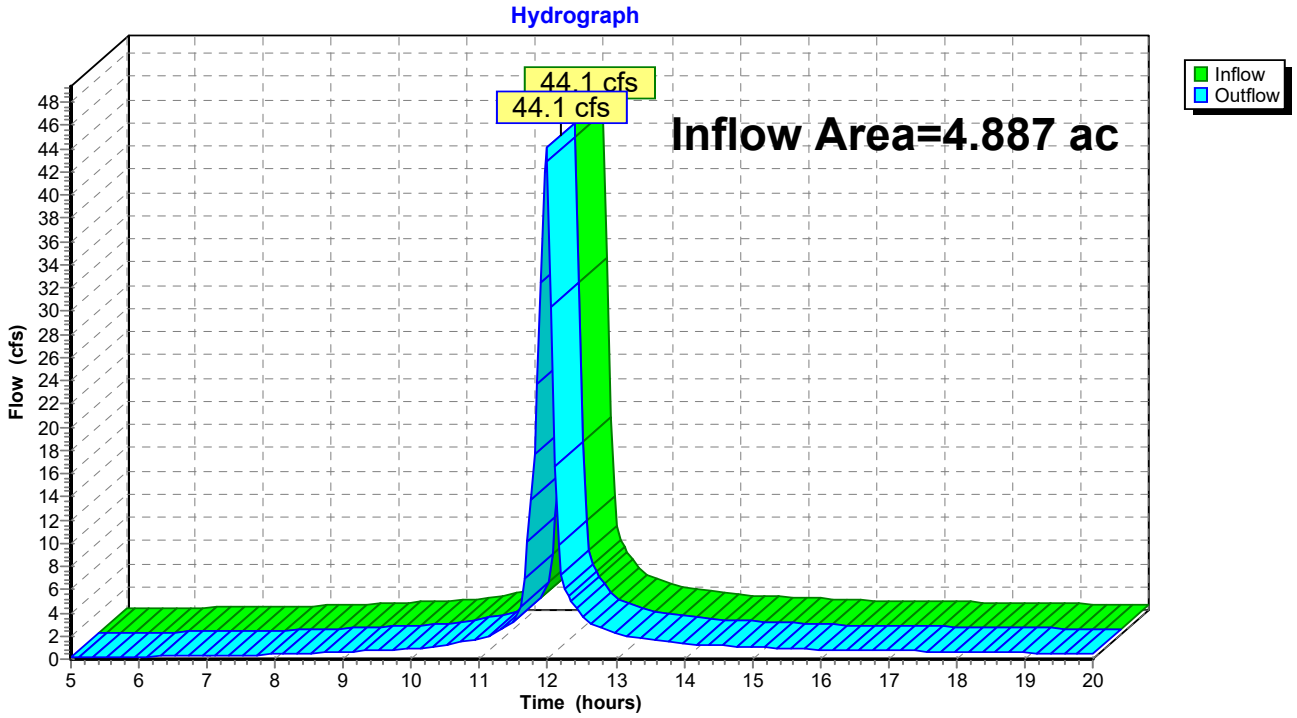
Summary for Reach 1R: NW Storm

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 4.887 ac, 45.04% Impervious, Inflow Depth > 5.42" for 100-YR event
Inflow = 44.1 cfs @ 11.98 hrs, Volume= 2.206 af
Outflow = 44.1 cfs @ 11.98 hrs, Volume= 2.206 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Reach 1R: NW Storm



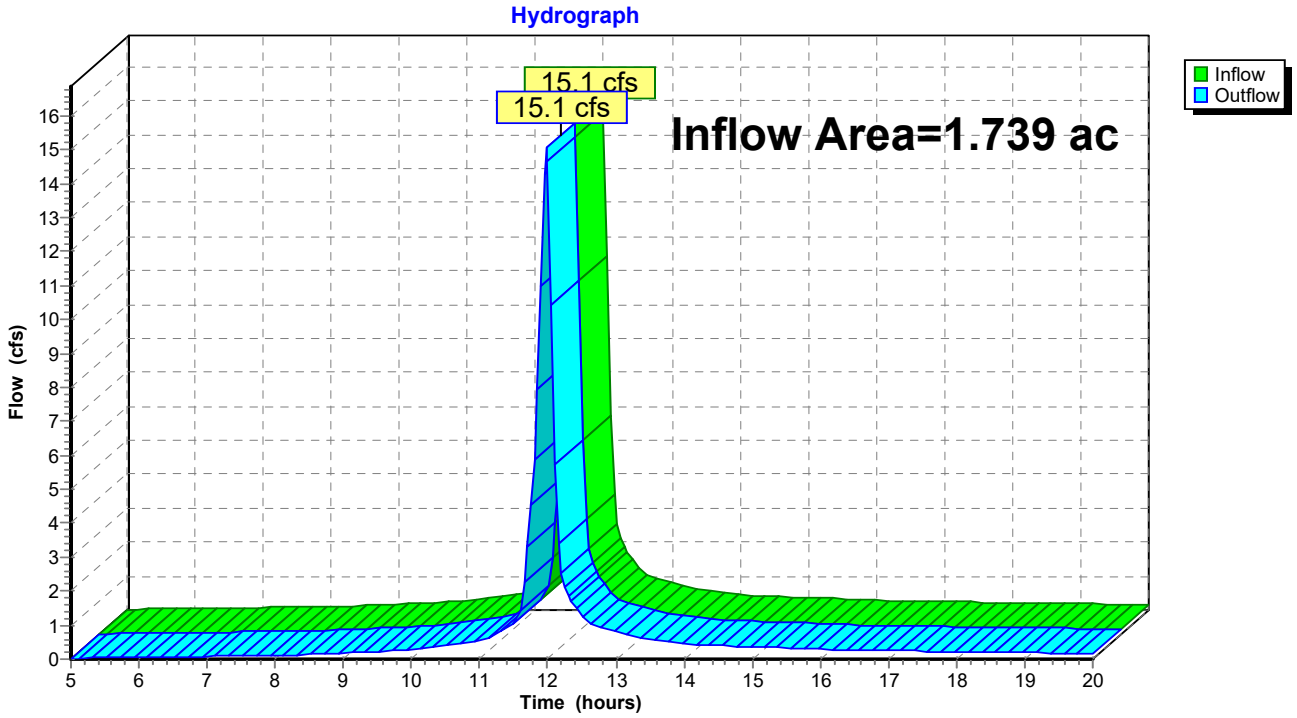
Summary for Reach 2R: West Storm

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 1.739 ac, 26.31% Impervious, Inflow Depth > 5.09" for 100-YR event
Inflow = 15.1 cfs @ 11.98 hrs, Volume= 0.738 af
Outflow = 15.1 cfs @ 11.98 hrs, Volume= 0.738 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Reach 2R: West Storm



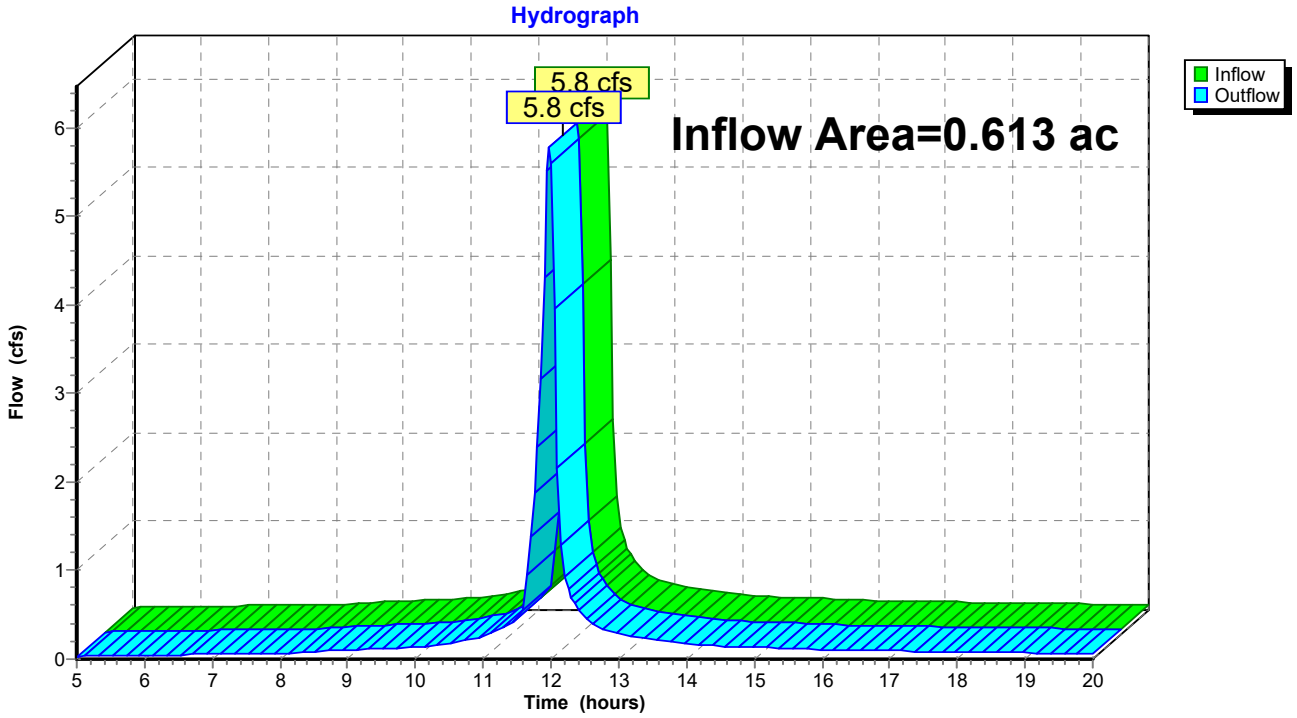
Summary for Reach 3R: West Bluff

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 0.613 ac, 64.20% Impervious, Inflow Depth > 5.83" for 100-YR event
Inflow = 5.8 cfs @ 11.98 hrs, Volume= 0.298 af
Outflow = 5.8 cfs @ 11.98 hrs, Volume= 0.298 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Reach 3R: West Bluff



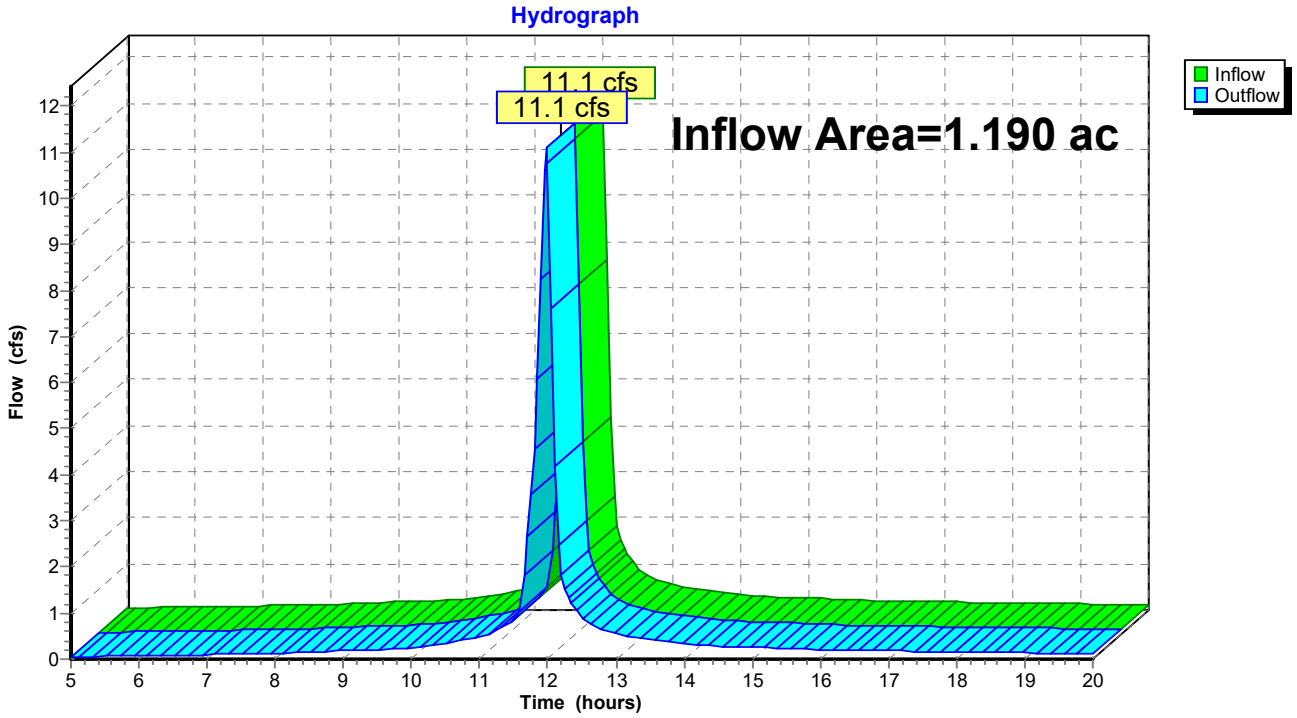
Summary for Reach 4R: South Storm

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 1.190 ac, 60.81% Impervious, Inflow Depth > 5.73" for 100-YR event
Inflow = 11.1 cfs @ 11.98 hrs, Volume= 0.568 af
Outflow = 11.1 cfs @ 11.98 hrs, Volume= 0.568 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Reach 4R: South Storm



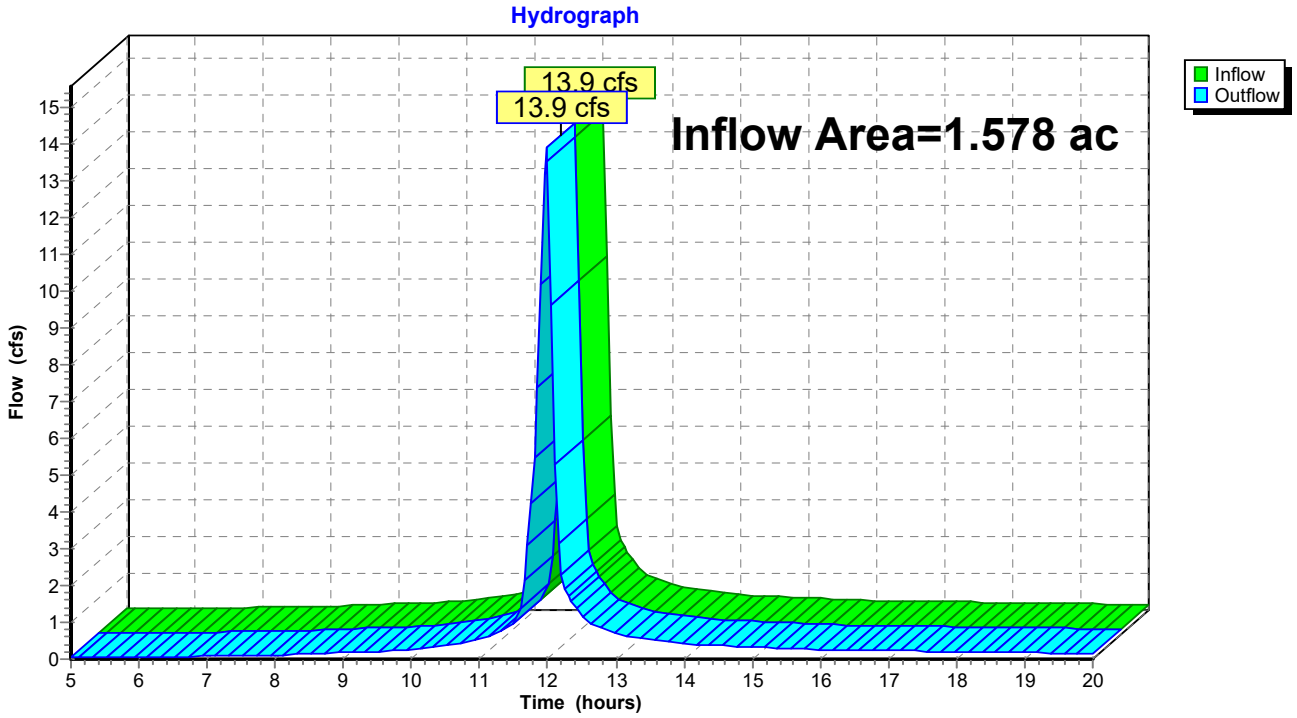
Summary for Reach 5R: SE Bluff - To Road

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 1.578 ac, 36.84% Impervious, Inflow Depth > 5.22" for 100-YR event
Inflow = 13.9 cfs @ 11.98 hrs, Volume= 0.687 af
Outflow = 13.9 cfs @ 11.98 hrs, Volume= 0.687 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Reach 5R: SE Bluff - To Road



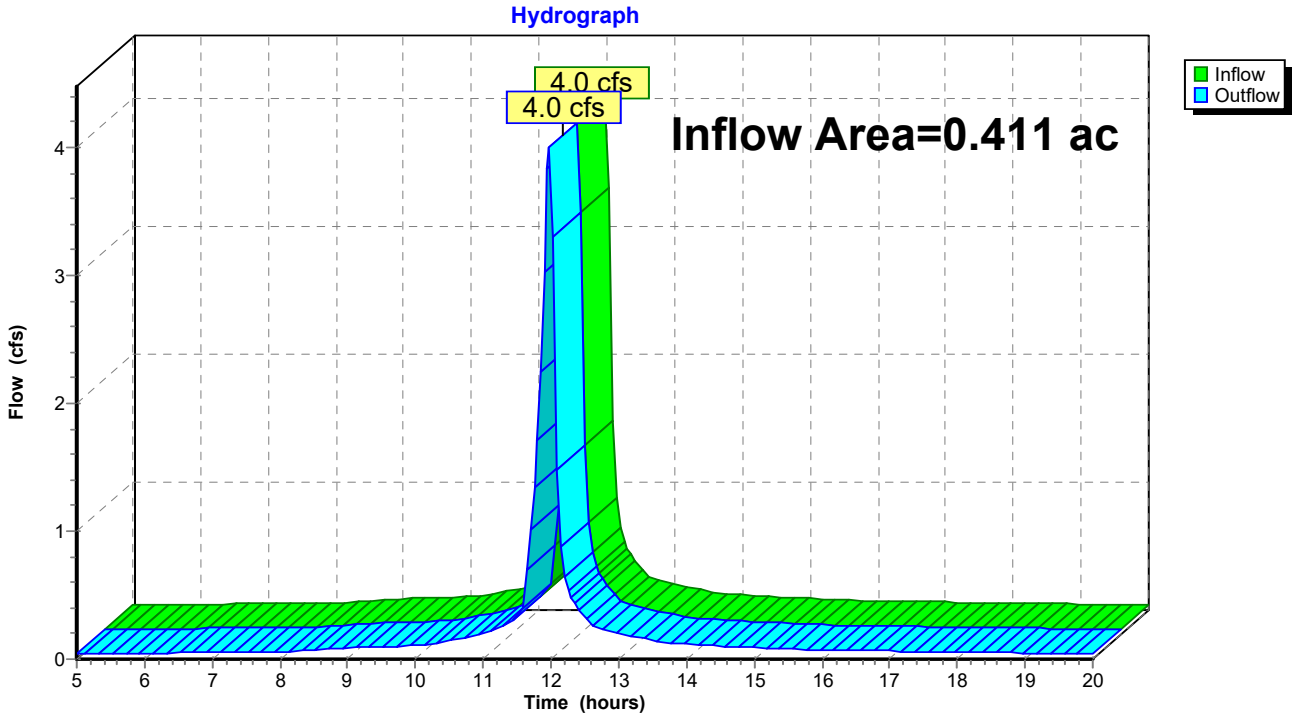
Summary for Reach 6R: East Storm

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 0.411 ac, 96.42% Impervious, Inflow Depth > 6.27" for 100-YR event
Inflow = 4.0 cfs @ 11.98 hrs, Volume= 0.215 af
Outflow = 4.0 cfs @ 11.98 hrs, Volume= 0.215 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Reach 6R: East Storm



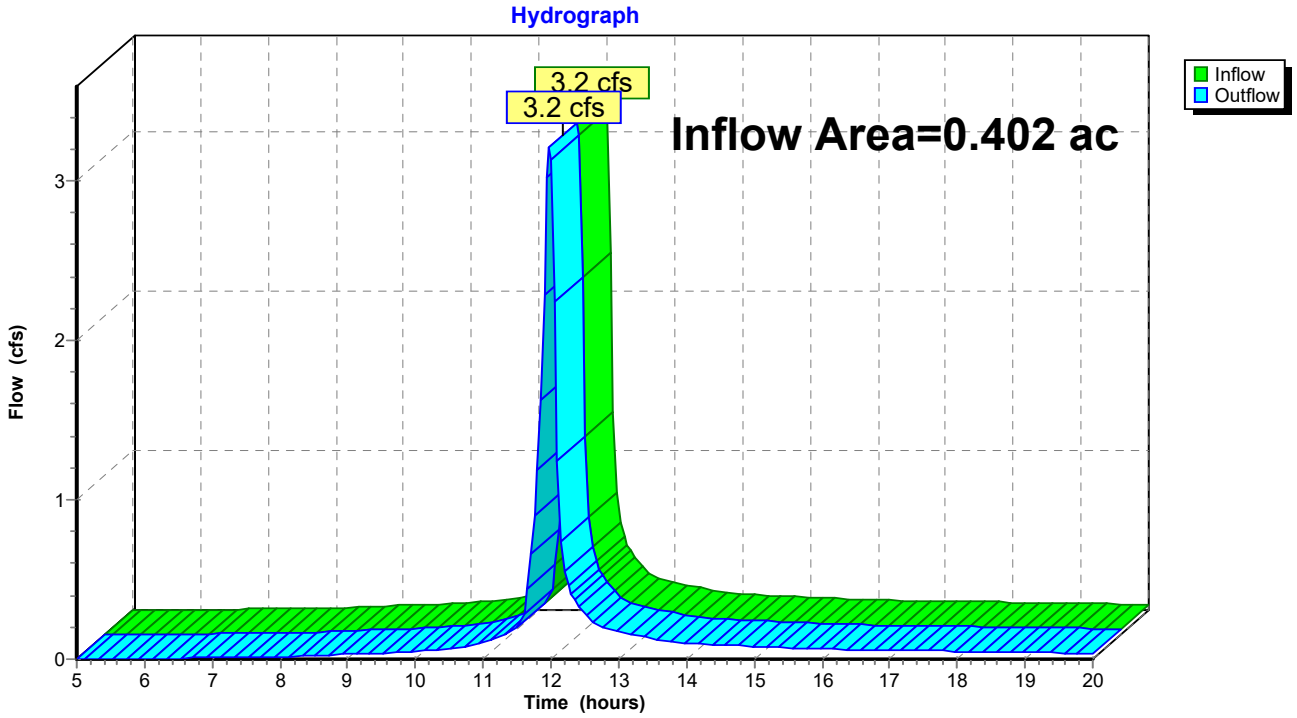
Summary for Reach 7R: North Bluff

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 0.402 ac, 0.00% Impervious, Inflow Depth > 4.54" for 100-YR event
Inflow = 3.2 cfs @ 11.98 hrs, Volume= 0.152 af
Outflow = 3.2 cfs @ 11.98 hrs, Volume= 0.152 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Reach 7R: North Bluff

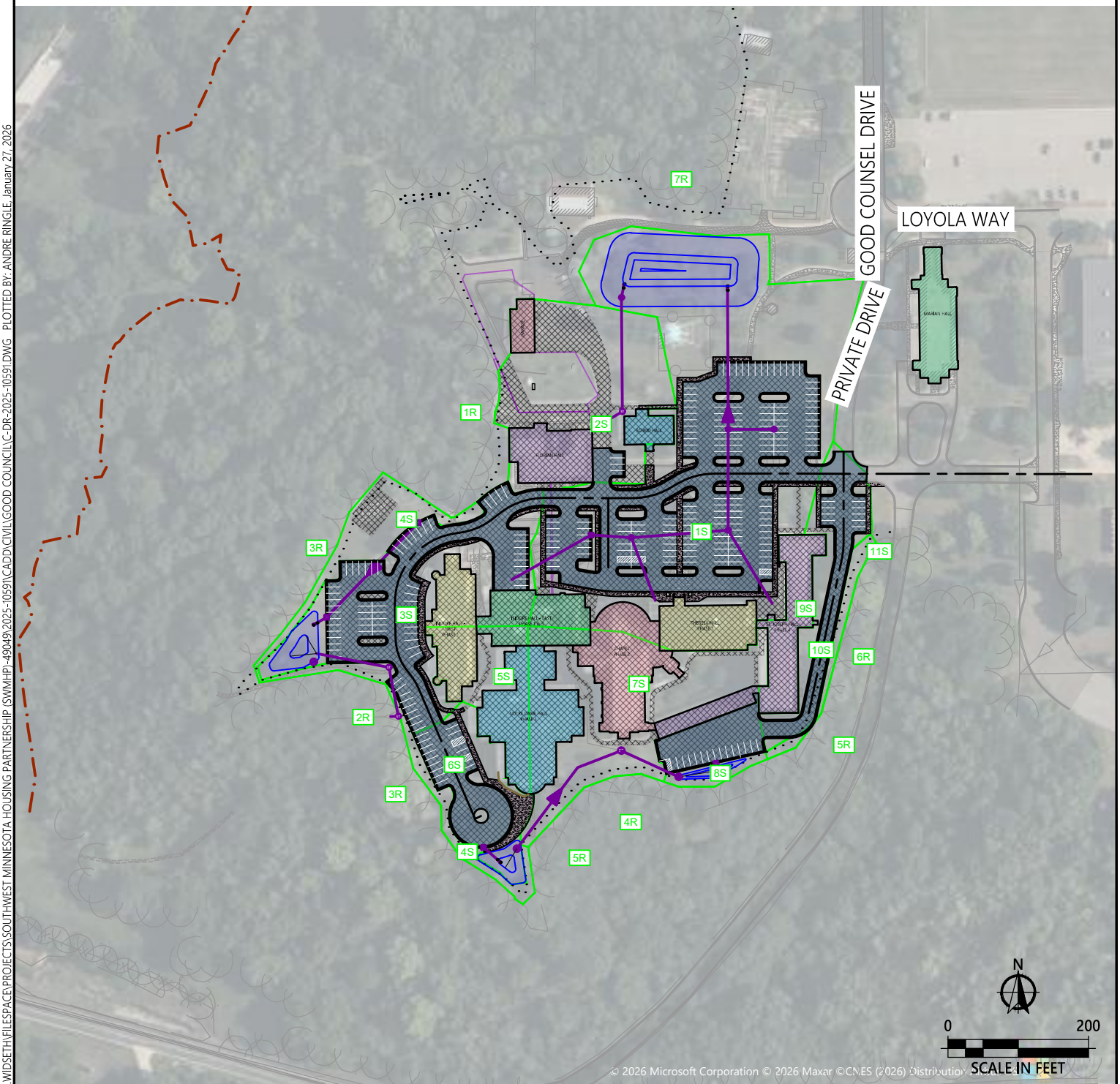


APPENDIX 4

Post-Development Drainage Area Map And HydroCAD Report

POST-DEVELOPMENT DRAINAGE MAP

PROPOSED SUBCATCHMENT BOUNDARY	
PROPOSED IMPERVIOUS AREA	



DRAWN BY: ATR CHECKED BY: CNB	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 PROFESSION UNDER THE LAWS OF THE STATE OF MINNESOTA. SIGNER NAME LIC. NO.: NUMBER DATE: JANUARY 2026	DATE	REV#	REVISIONS DESCRIPTION

WIDSETH
ARCHITECTS · ENGINEERS · SCIENTISTS · SURVEYORS

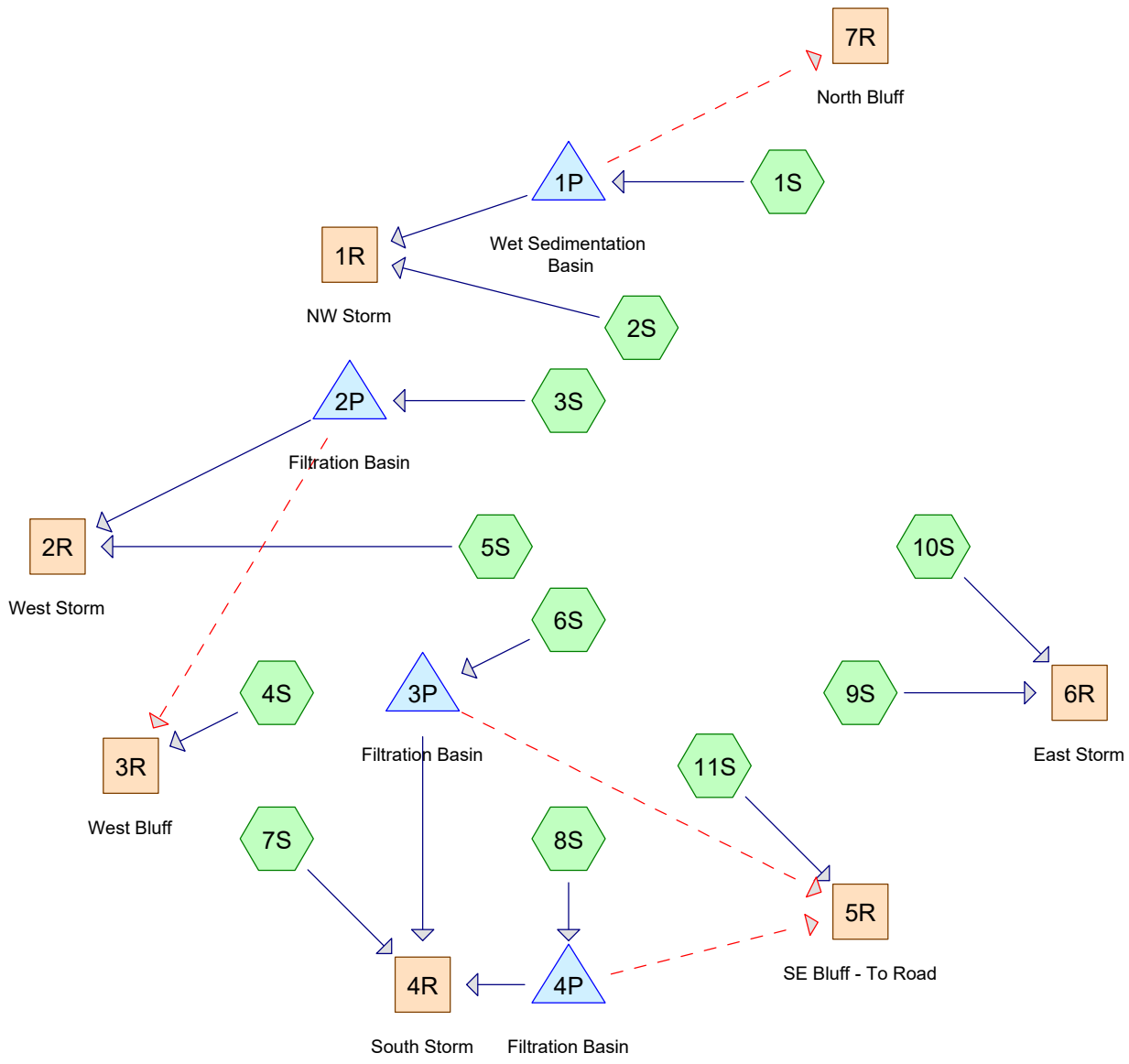
POST-DEVELOPMENT DRAINAGE MAP

GOOD COUNSEL MAIN CAMPUS

-

PROJECT #: 2025-10591

© 2026 WIDSETH FILE: \\DATA.WIDSETH\FILESPACE\PROJECTS\SOUTHWEST MINNESOTA HOUSING PARTNERSHIP (SWMHP)-49049\2025-10591\CADD\CIVIL\GOOD COUNCIL\C-DR-2025-10591.DWG PLOTTED BY: ANDRE RINGLE, January 27, 2026



Subcat Reach Pond Link

Routing Diagram for Post-Development
Prepared by Widseth Smith Nolting, Printed 1/22/2026
HydroCAD® 10.20-8a s/n 01722 © 2025 HydroCAD Software Solutions LLC

Rainfall Events Listing (selected events)

Event#	Event Name	Storm Type	Curve	Mode	Duration (hours)	B/B	Depth (inches)	AMC
1	2-YR	Type II 24-hr		Default	24.00	1	1.70	2
2	10-YR	Type II 24-hr		Default	24.00	1	4.28	2
3	100-YR	Type II 24-hr		Default	24.00	1	7.19	2

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
4.369	80	>75% Grass cover, Good, HSG D (1S, 2S, 3S, 4S, 5S, 6S, 7S, 8S, 10S, 11S)
6.541	98	Paved parking, HSG D (1S, 2S, 3S, 4S, 5S, 6S, 7S, 8S, 9S, 10S)
10.910	**91**	**TOTAL AREA**

Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.000	HSG A	
0.000	HSG B	
0.000	HSG C	
10.910	HSG D	1S, 2S, 3S, 4S, 5S, 6S, 7S, 8S, 9S, 10S, 11S
0.000	Other	
10.910		**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	0.000	4.369	0.000	4.369	>75% Grass cover, Good	1S, 2S, 3S, 4S, 5S, 6S, 7S, 8S, 10S, 11S
0.000	0.000	0.000	6.541	0.000	6.541	Paved parking	1S, 2S, 3S, 4S, 5S, 6S, 7S, 8S, 9S, 10S
0.000	**0.000**	**0.000**	**10.910**	**0.000**	**10.910**	**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	1P	981.69	980.00	169.0	0.0100	0.013	0.0	12.0	0.0	
2	2P	980.00	978.00	200.0	0.0100	0.013	0.0	12.0	0.0	
3	3P	984.50	982.35	215.0	0.0100	0.013	0.0	12.0	0.0	
4	4P	981.22	981.07	151.0	0.0010	0.011	0.0	6.0	0.0	

Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 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: Runoff Area=175,645 sf 58.50% Impervious Runoff Depth>0.84"
Tc=7.0 min CN=91 Runoff=6.2 cfs 0.281 af

Subcatchment2S: Runoff Area=57,101 sf 58.18% Impervious Runoff Depth>0.78"
Tc=7.0 min CN=90 Runoff=1.9 cfs 0.085 af

Subcatchment3S: Runoff Area=61,891 sf 76.15% Impervious Runoff Depth>1.04"
Tc=7.0 min CN=94 Runoff=2.6 cfs 0.123 af

Subcatchment4S: Runoff Area=21,859 sf 11.55% Impervious Runoff Depth>0.41"
Tc=7.0 min CN=82 Runoff=0.4 cfs 0.017 af

Subcatchment5S: Runoff Area=26,713 sf 64.20% Impervious Runoff Depth>0.90"
Tc=7.0 min CN=92 Runoff=1.0 cfs 0.046 af

Subcatchment6S: Runoff Area=22,043 sf 69.75% Impervious Runoff Depth>0.97"
Tc=7.0 min CN=93 Runoff=0.9 cfs 0.041 af

Subcatchment7S: Runoff Area=58,710 sf 53.68% Impervious Runoff Depth>0.78"
Tc=7.0 min CN=90 Runoff=1.9 cfs 0.087 af

Subcatchment8S: Runoff Area=12,647 sf 72.78% Impervious Runoff Depth>0.97"
Tc=7.0 min CN=93 Runoff=0.5 cfs 0.023 af

Subcatchment9S: Runoff Area=12,130 sf 100.00% Impervious Runoff Depth>1.38"
Tc=7.0 min CN=98 Runoff=0.6 cfs 0.032 af

Subcatchment10S: Runoff Area=22,212 sf 62.70% Impervious Runoff Depth>0.84"
Tc=7.0 min CN=91 Runoff=0.8 cfs 0.036 af

Subcatchment11S: Runoff Area=4,300 sf 0.00% Impervious Runoff Depth>0.34"
Tc=7.0 min CN=80 Runoff=0.1 cfs 0.003 af

Reach 1R: NW Storm Inflow=2.7 cfs 0.354 af
Outflow=2.7 cfs 0.354 af

Reach 2R: West Storm Inflow=1.0 cfs 0.088 af
Outflow=1.0 cfs 0.088 af

Reach 3R: West Bluff Inflow=0.4 cfs 0.017 af
Outflow=0.4 cfs 0.017 af

Reach 4R: South Storm Inflow=2.1 cfs 0.138 af
Outflow=2.1 cfs 0.138 af

Reach 5R: SE Bluff - To Road Inflow=0.1 cfs 0.003 af
Outflow=0.1 cfs 0.003 af

Reach 6R: East Storm Inflow=1.4 cfs 0.068 af
Outflow=1.4 cfs 0.068 af

Reach 7R: North Bluff Inflow=0.0 cfs 0.000 af
Outflow=0.0 cfs 0.000 af

Pond 1P: Wet Sedimentation Basin Peak Elev=987.51' Storage=11,085 cf Inflow=6.2 cfs 0.281 af
Primary=1.1 cfs 0.269 af Secondary=0.0 cfs 0.000 af Outflow=1.1 cfs 0.269 af

Pond 2P: Filtration Basin Peak Elev=984.77' Storage=3,843 cf Inflow=2.6 cfs 0.123 af
Primary=0.1 cfs 0.042 af Secondary=0.0 cfs 0.000 af Outflow=0.1 cfs 0.042 af

Pond 3P: Filtration Basin Peak Elev=988.01' Storage=1,034 cf Inflow=0.9 cfs 0.041 af
Primary=0.0 cfs 0.029 af Secondary=0.0 cfs 0.000 af Outflow=0.0 cfs 0.029 af

Pond 4P: Filtration Basin Peak Elev=993.84' Storage=374 cf Inflow=0.5 cfs 0.023 af
Primary=0.3 cfs 0.022 af Secondary=0.0 cfs 0.000 af Outflow=0.3 cfs 0.022 af

Total Runoff Area = 10.910 ac Runoff Volume = 0.774 af Average Runoff Depth = 0.85"
40.05% Pervious = 4.369 ac 59.95% Impervious = 6.541 ac

Summary for Subcatchment 1S:

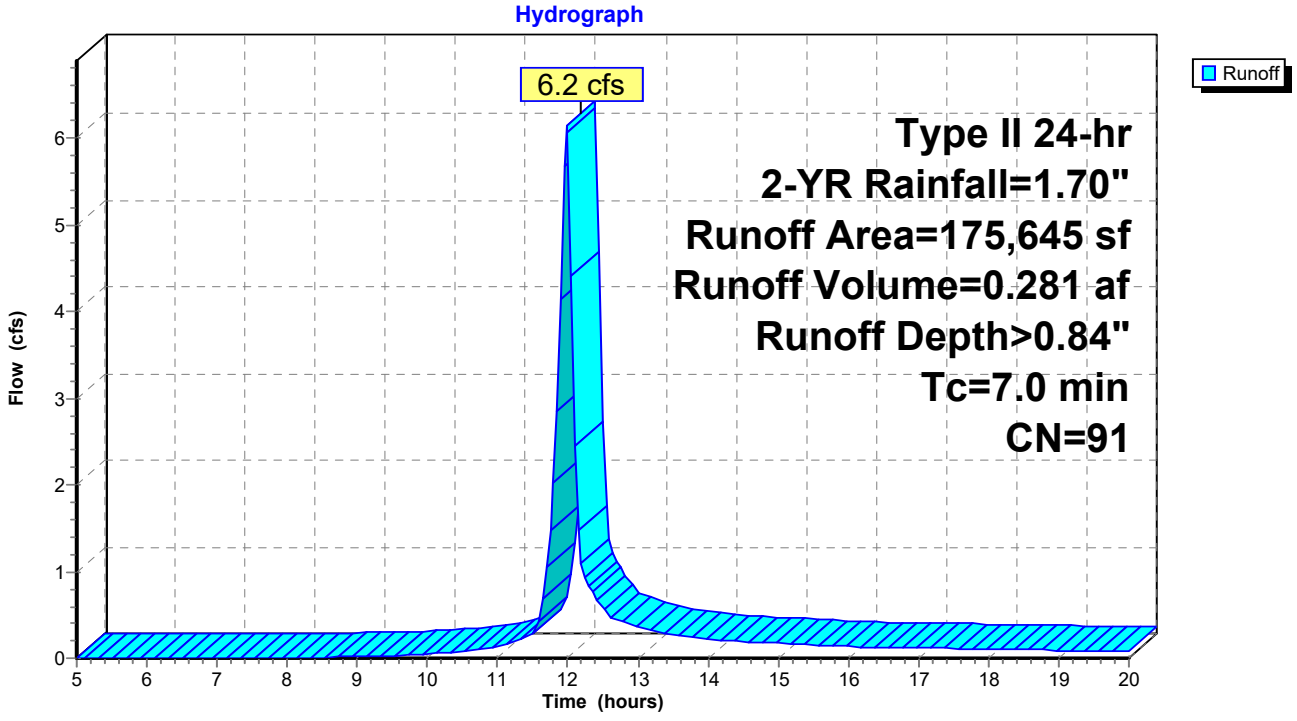
Runoff = 6.2 cfs @ 11.98 hrs, Volume= 0.281 af, Depth> 0.84"
Routed to Pond 1P : Wet Sedimentation Basin

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 2-YR Rainfall=1.70"

Area (sf)	CN	Description
102,749	98	Paved parking, HSG D
72,896	80	>75% Grass cover, Good, HSG D
175,645	91	Weighted Average
72,896		41.50% Pervious Area
102,749		58.50% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.0					**Direct Entry,**

Subcatchment 1S:



Summary for Subcatchment 2S:

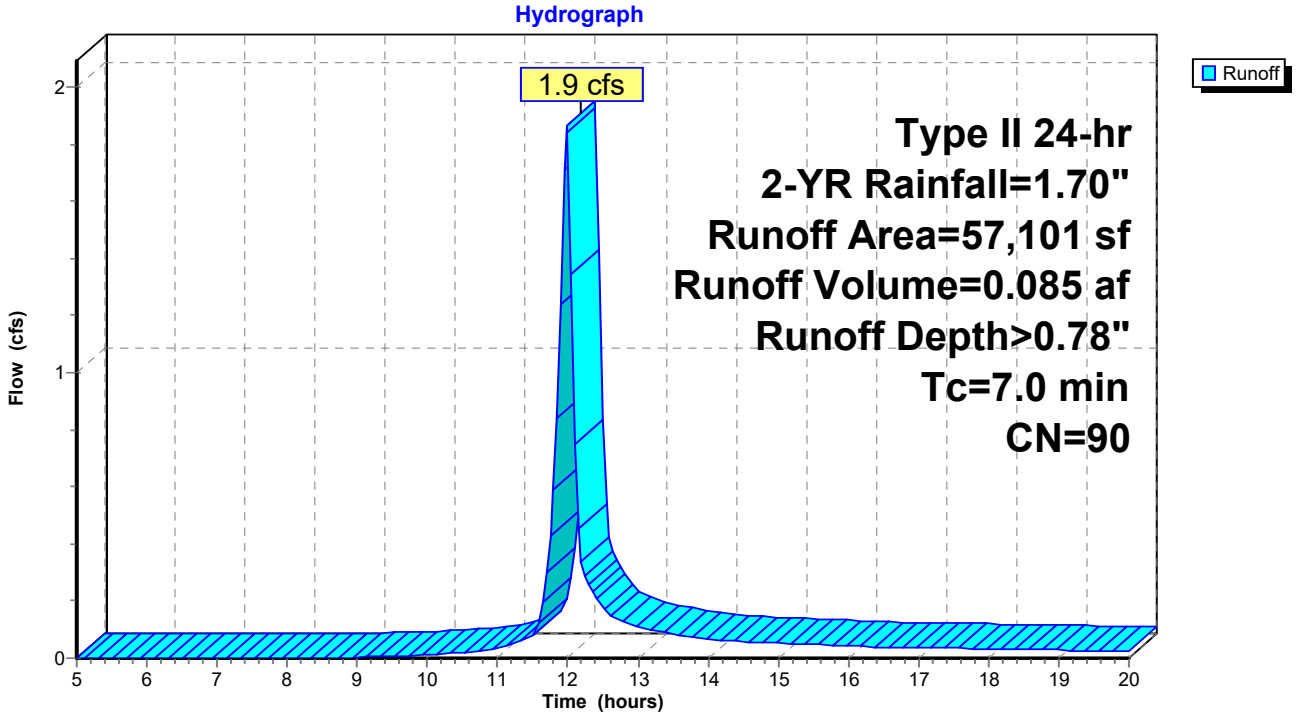
Runoff = 1.9 cfs @ 11.99 hrs, Volume= 0.085 af, Depth> 0.78"
Routed to Reach 1R : NW Storm

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 2-YR Rainfall=1.70"

Area (sf)	CN	Description
33,220	98	Paved parking, HSG D
23,881	80	>75% Grass cover, Good, HSG D
57,101	90	Weighted Average
23,881		41.82% Pervious Area
33,220		58.18% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.0					**Direct Entry,**

Subcatchment 2S:



Summary for Subcatchment 3S:

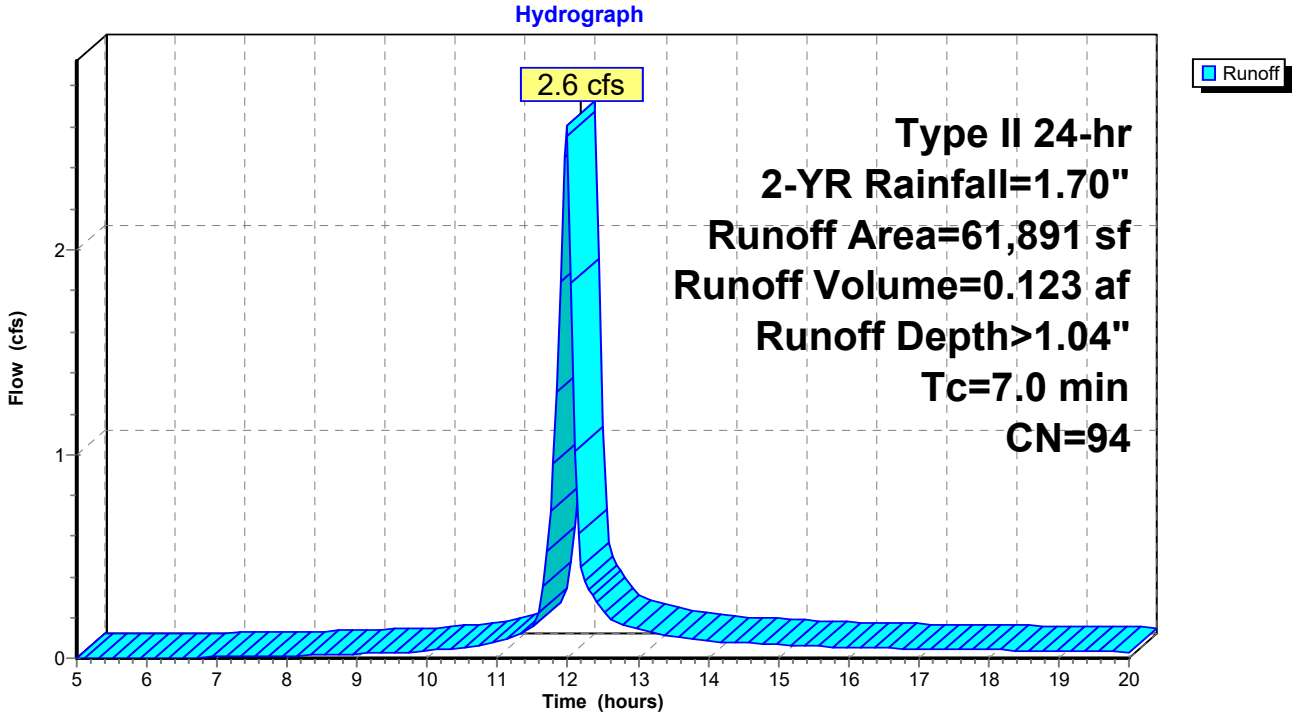
Runoff = 2.6 cfs @ 11.98 hrs, Volume= 0.123 af, Depth> 1.04"
Routed to Pond 2P : Filtration Basin

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 2-YR Rainfall=1.70"

Area (sf)	CN	Description
47,128	98	Paved parking, HSG D
14,763	80	>75% Grass cover, Good, HSG D
61,891	94	Weighted Average
14,763		23.85% Pervious Area
47,128		76.15% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.0					**Direct Entry,**

Subcatchment 3S:



Summary for Subcatchment 4S:

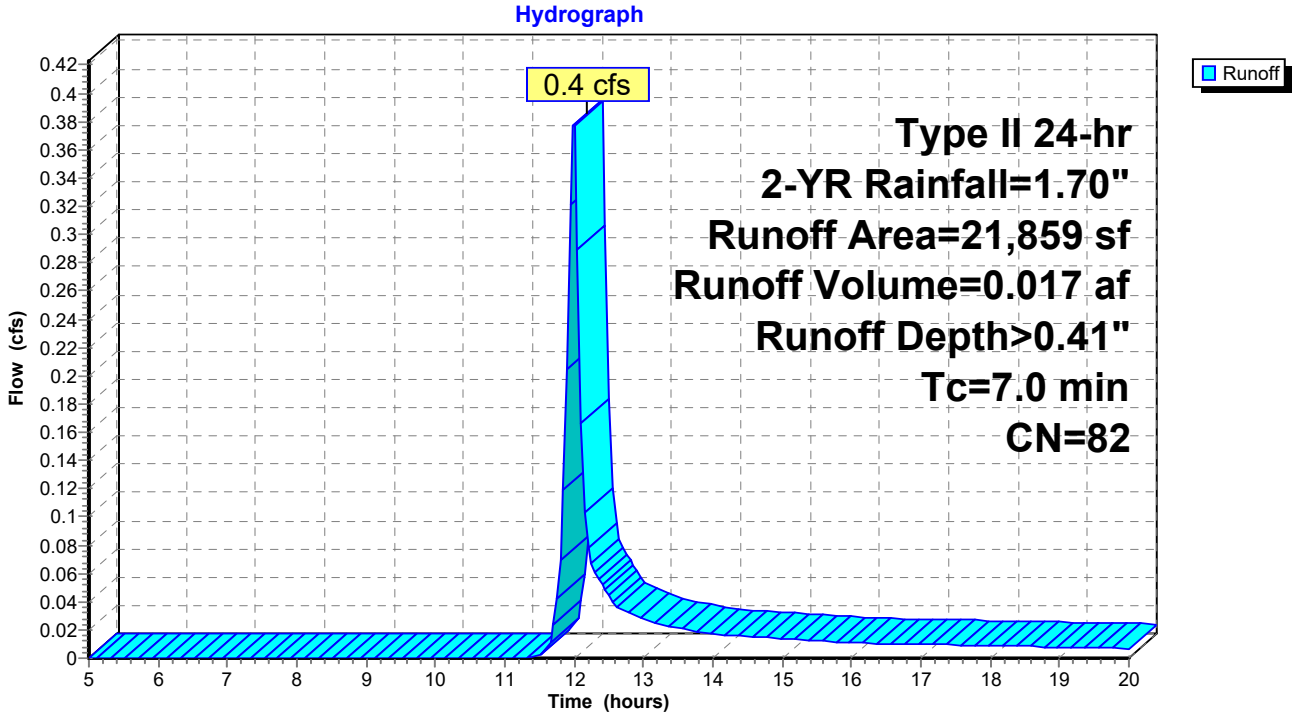
Runoff = 0.4 cfs @ 11.99 hrs, Volume= 0.017 af, Depth> 0.41"
Routed to Reach 3R : West Bluff

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 2-YR Rainfall=1.70"

Area (sf)	CN	Description
2,525	98	Paved parking, HSG D
19,334	80	>75% Grass cover, Good, HSG D
21,859	82	Weighted Average
19,334		88.45% Pervious Area
2,525		11.55% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.0					**Direct Entry,**

Subcatchment 4S:



Summary for Subcatchment 5S:

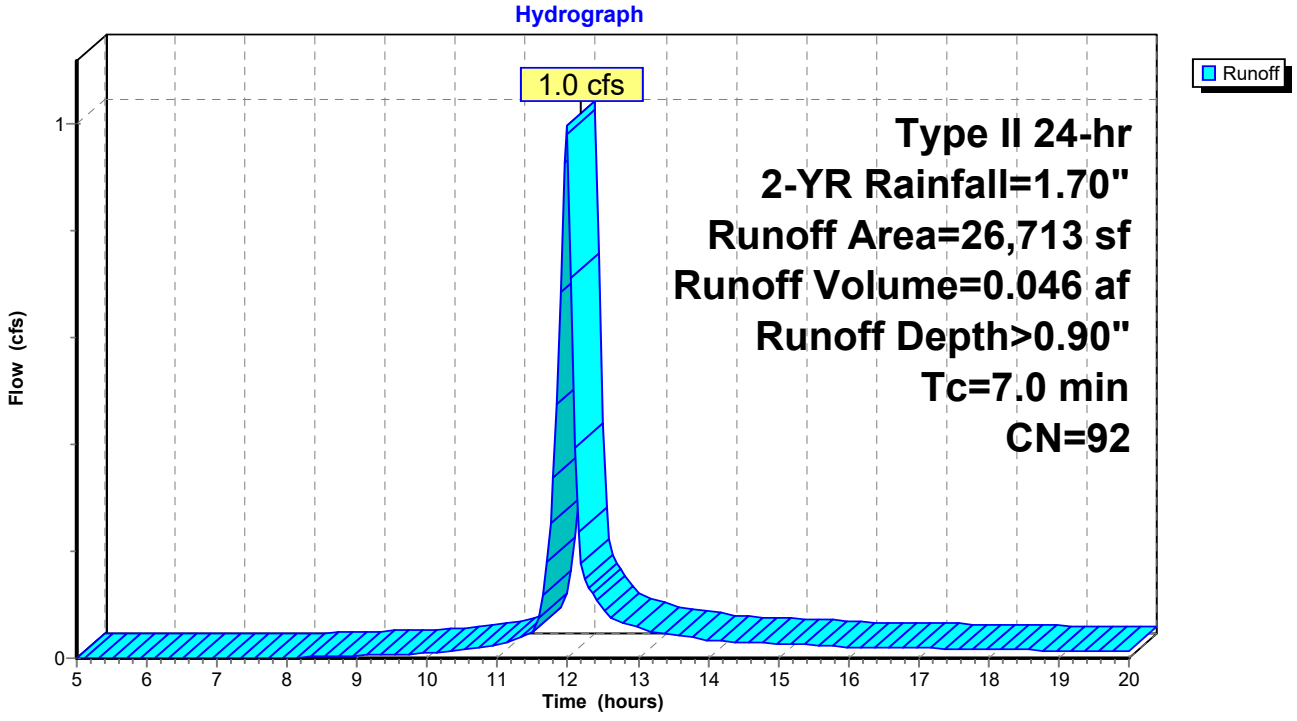
Runoff = 1.0 cfs @ 11.98 hrs, Volume= 0.046 af, Depth> 0.90"
Routed to Reach 2R : West Storm

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 2-YR Rainfall=1.70"

Area (sf)	CN	Description
17,151	98	Paved parking, HSG D
9,562	80	>75% Grass cover, Good, HSG D
26,713	92	Weighted Average
9,562		35.80% Pervious Area
17,151		64.20% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.0					**Direct Entry,**

Subcatchment 5S:



Summary for Subcatchment 6S:

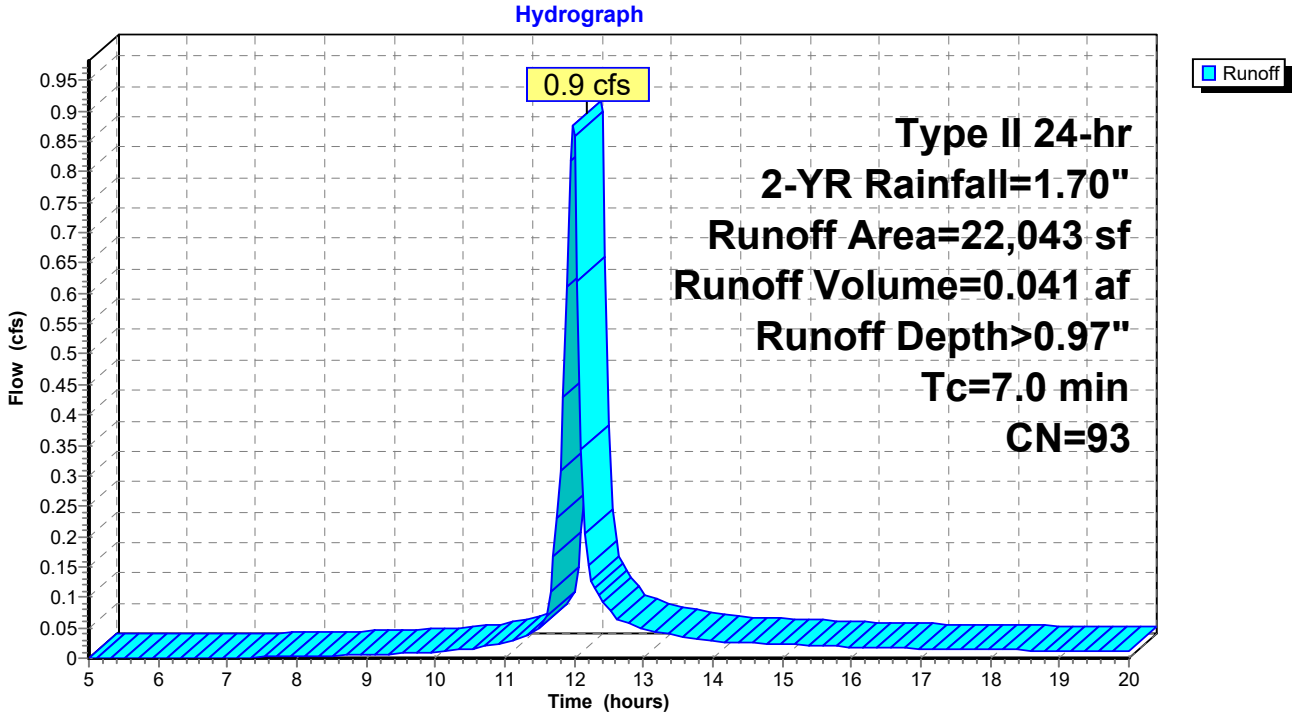
Runoff = 0.9 cfs @ 11.98 hrs, Volume= 0.041 af, Depth> 0.97"
Routed to Pond 3P : Filtration Basin

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 2-YR Rainfall=1.70"

Area (sf)	CN	Description
15,375	98	Paved parking, HSG D
6,668	80	>75% Grass cover, Good, HSG D
22,043	93	Weighted Average
6,668		30.25% Pervious Area
15,375		69.75% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.0					**Direct Entry,**

Subcatchment 6S:



Summary for Subcatchment 7S:

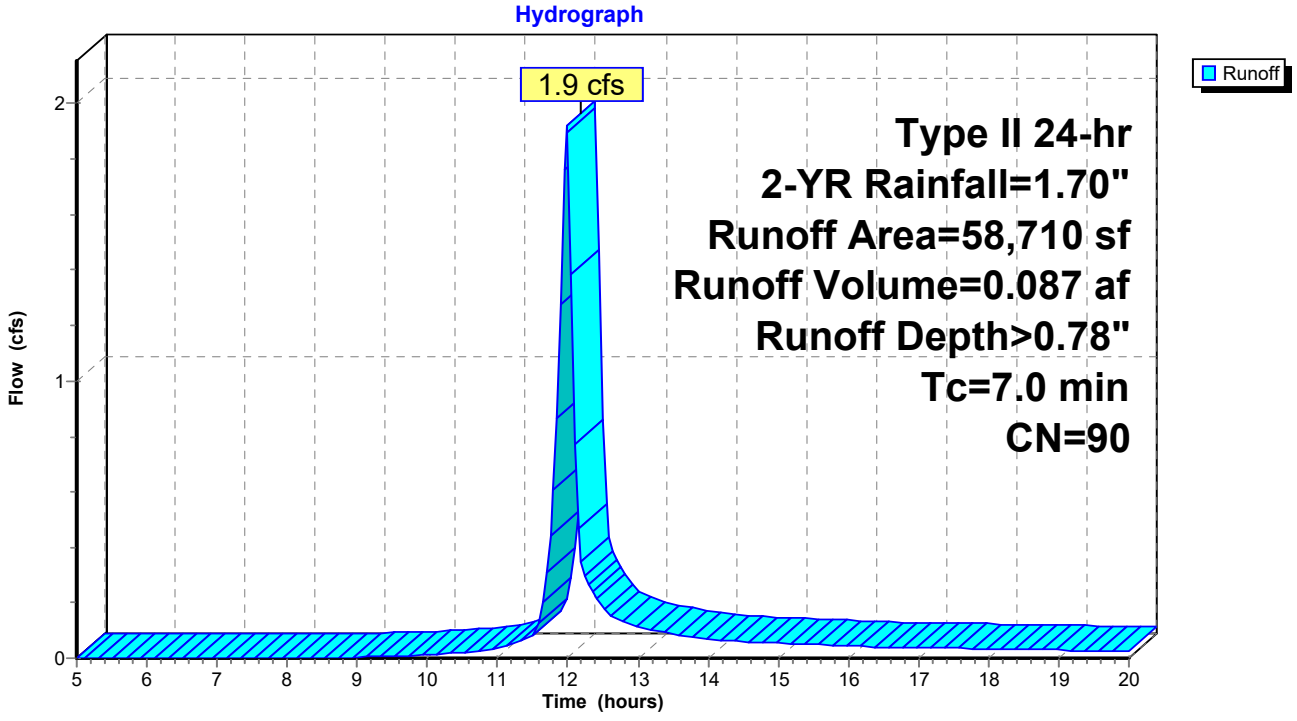
Runoff = 1.9 cfs @ 11.99 hrs, Volume= 0.087 af, Depth> 0.78"
Routed to Reach 4R : South Storm

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 2-YR Rainfall=1.70"

Area (sf)	CN	Description
31,516	98	Paved parking, HSG D
27,194	80	>75% Grass cover, Good, HSG D
58,710	90	Weighted Average
27,194		46.32% Pervious Area
31,516		53.68% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.0					**Direct Entry,**

Subcatchment 7S:



Summary for Subcatchment 8S:

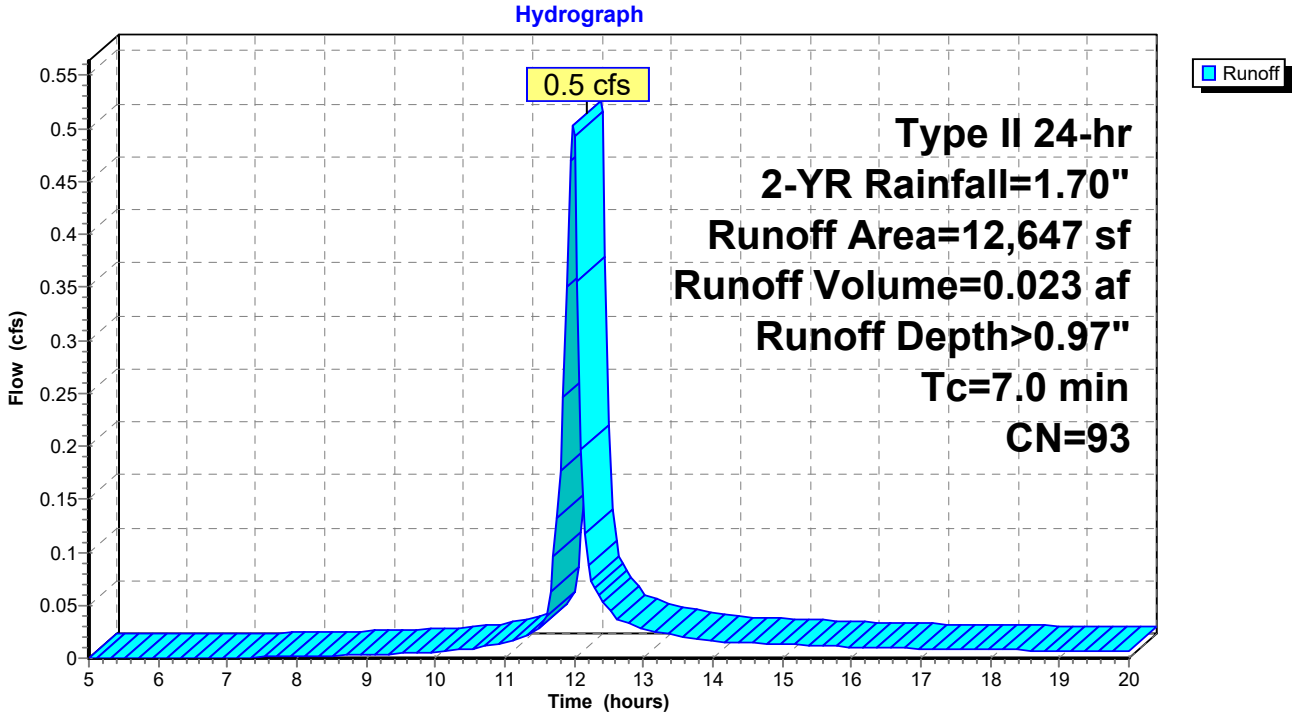
Runoff = 0.5 cfs @ 11.98 hrs, Volume= 0.023 af, Depth> 0.97"
Routed to Pond 4P : Filtration Basin

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 2-YR Rainfall=1.70"

Area (sf)	CN	Description
9,205	98	Paved parking, HSG D
3,442	80	>75% Grass cover, Good, HSG D
12,647	93	Weighted Average
3,442		27.22% Pervious Area
9,205		72.78% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.0					**Direct Entry,**

Subcatchment 8S:



Summary for Subcatchment 9S:

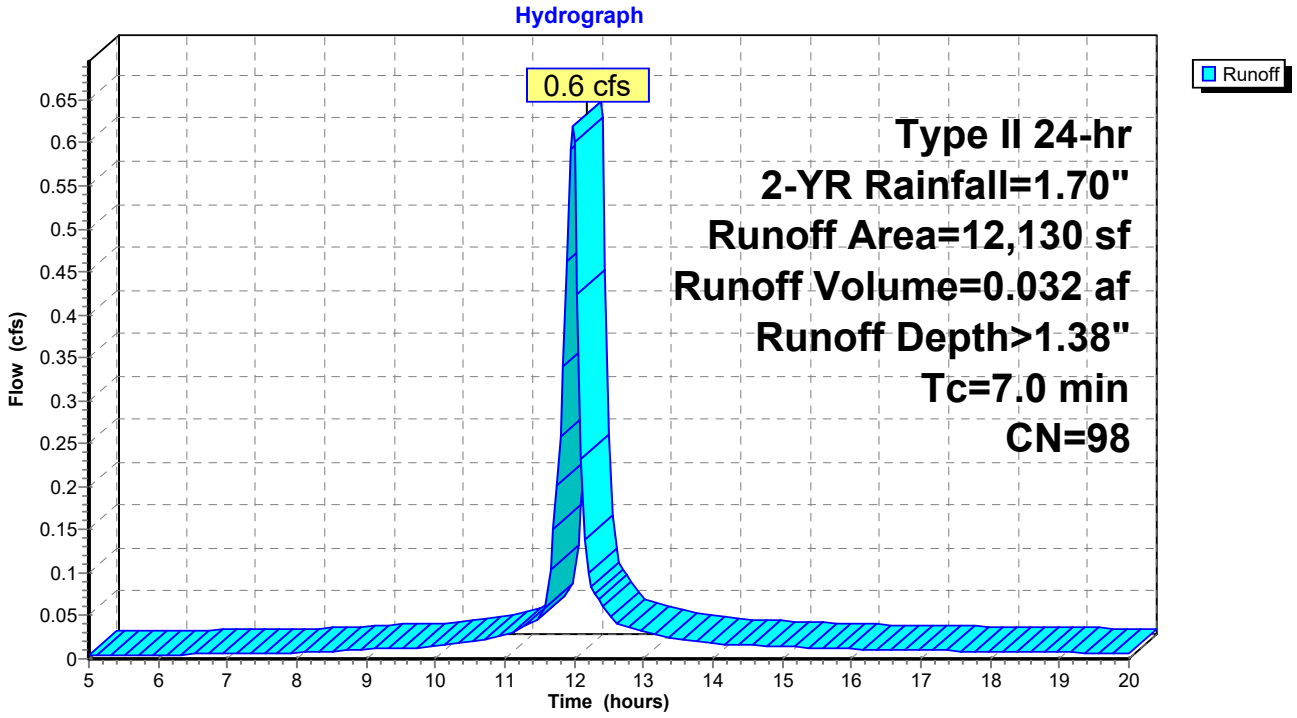
Runoff = 0.6 cfs @ 11.98 hrs, Volume= 0.032 af, Depth> 1.38"
Routed to Reach 6R : East Storm

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 2-YR Rainfall=1.70"

Area (sf)	CN	Description
12,130	98	Paved parking, HSG D
12,130		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.0					**Direct Entry,**

Subcatchment 9S:



Summary for Subcatchment 10S:

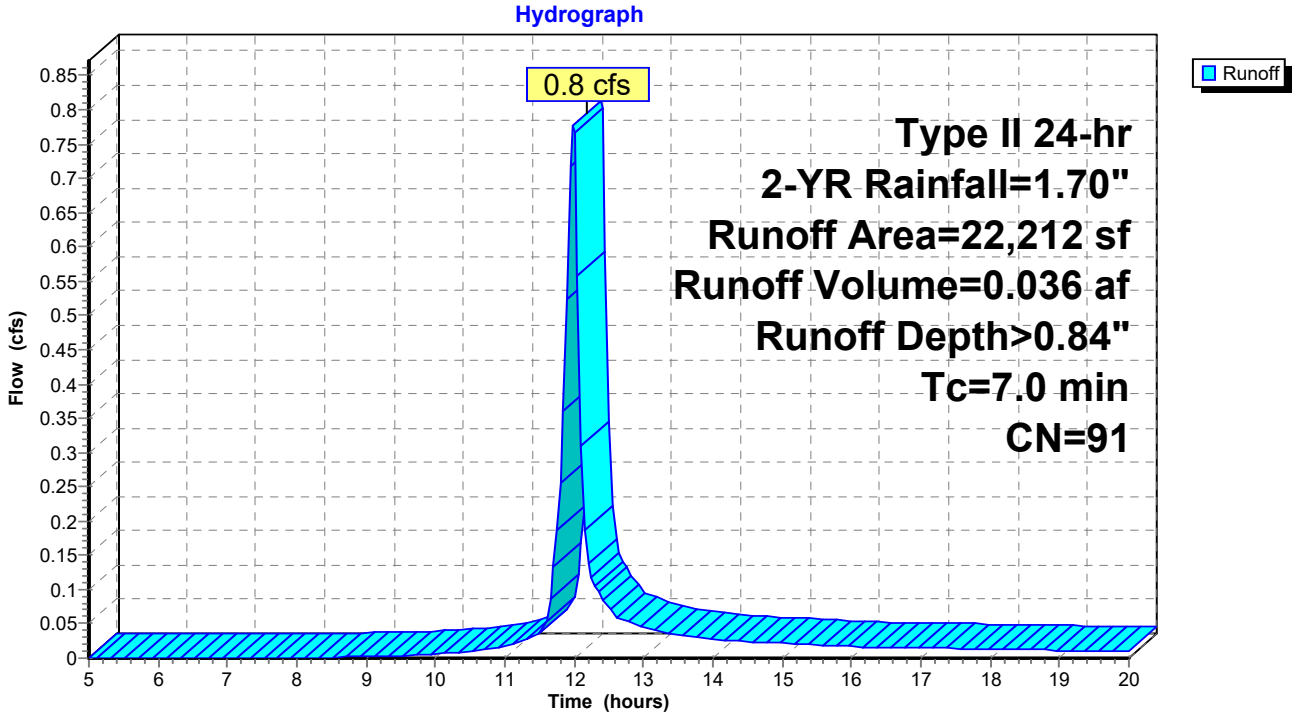
Runoff = 0.8 cfs @ 11.98 hrs, Volume= 0.036 af, Depth> 0.84"
Routed to Reach 6R : East Storm

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 2-YR Rainfall=1.70"

Area (sf)	CN	Description
13,928	98	Paved parking, HSG D
8,284	80	>75% Grass cover, Good, HSG D
22,212	91	Weighted Average
8,284		37.30% Pervious Area
13,928		62.70% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.0					**Direct Entry,**

Subcatchment 10S:



Summary for Subcatchment 11S:

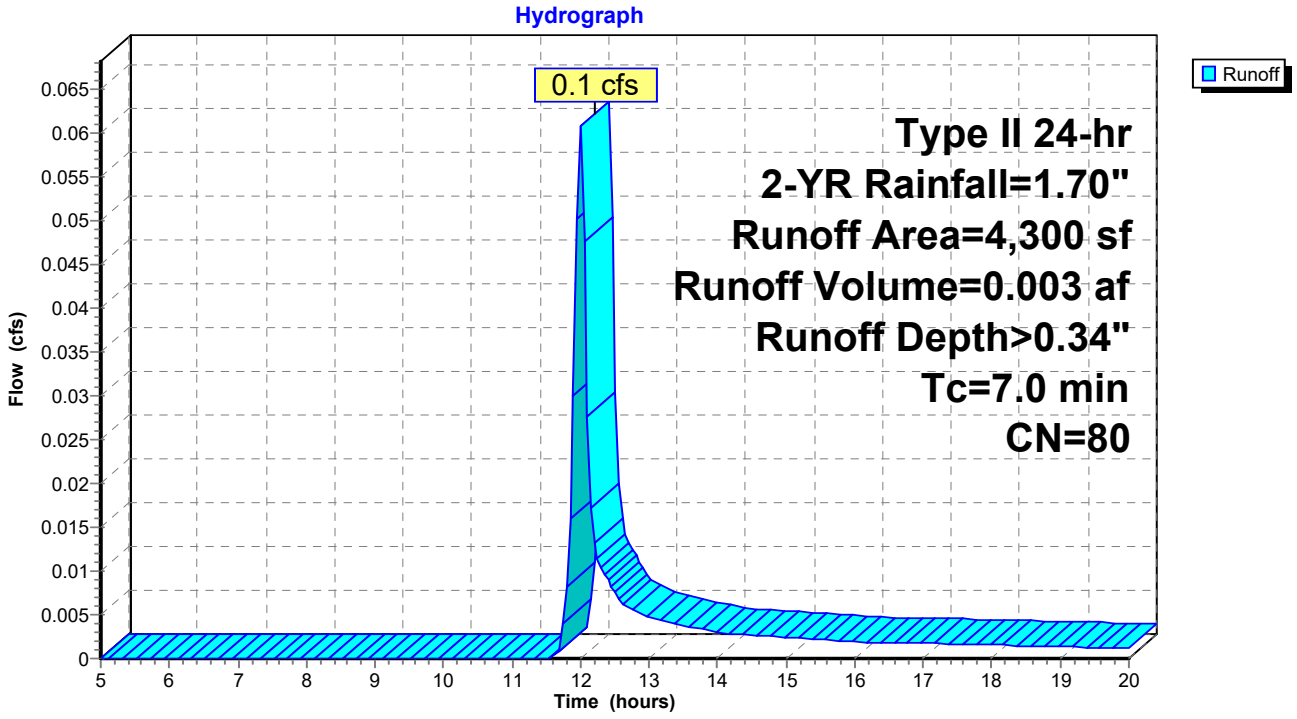
Runoff = 0.1 cfs @ 12.00 hrs, Volume= 0.003 af, Depth> 0.34"
Routed to Reach 5R : SE Bluff - To Road

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 2-YR Rainfall=1.70"

Area (sf)	CN	Description
0	98	Paved parking, HSG D
4,300	80	>75% Grass cover, Good, HSG D
4,300	80	Weighted Average
4,300		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.0					**Direct Entry,**

Subcatchment 11S:



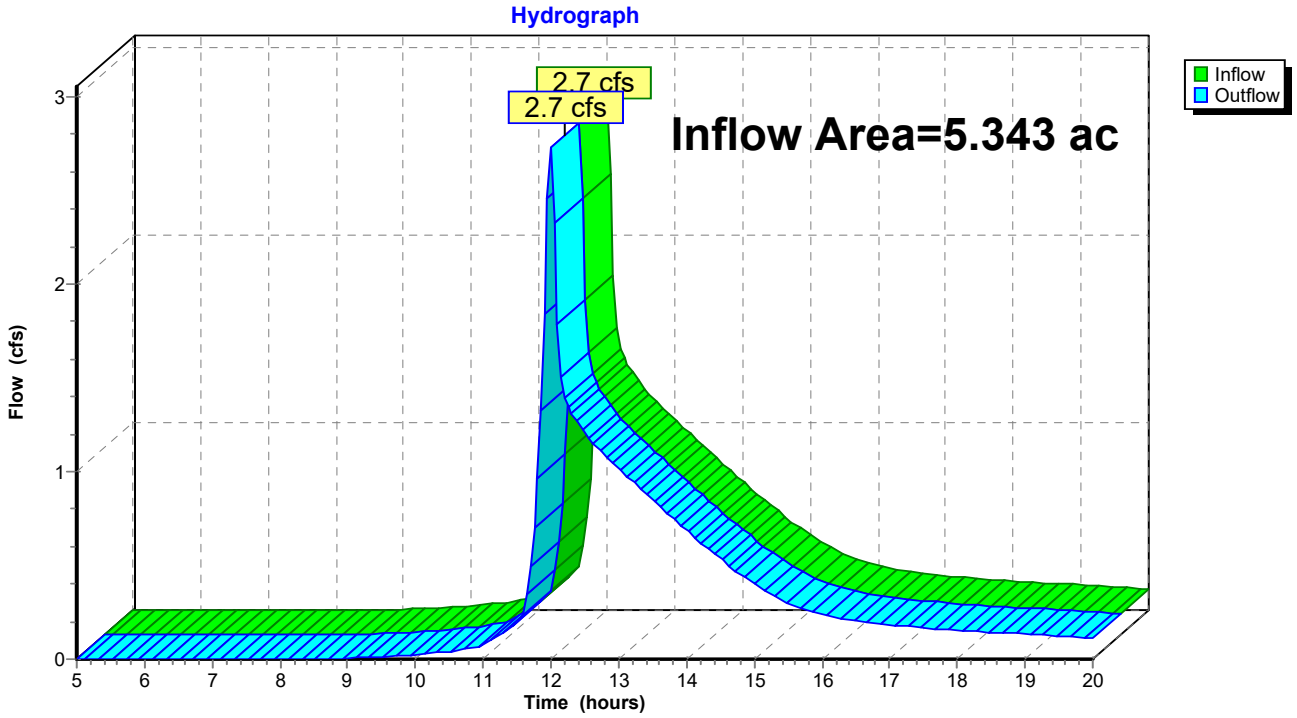
Summary for Reach 1R: NW Storm

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 5.343 ac, 58.42% Impervious, Inflow Depth > 0.80" for 2-YR event
Inflow = 2.7 cfs @ 12.00 hrs, Volume= 0.354 af
Outflow = 2.7 cfs @ 12.00 hrs, Volume= 0.354 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Reach 1R: NW Storm

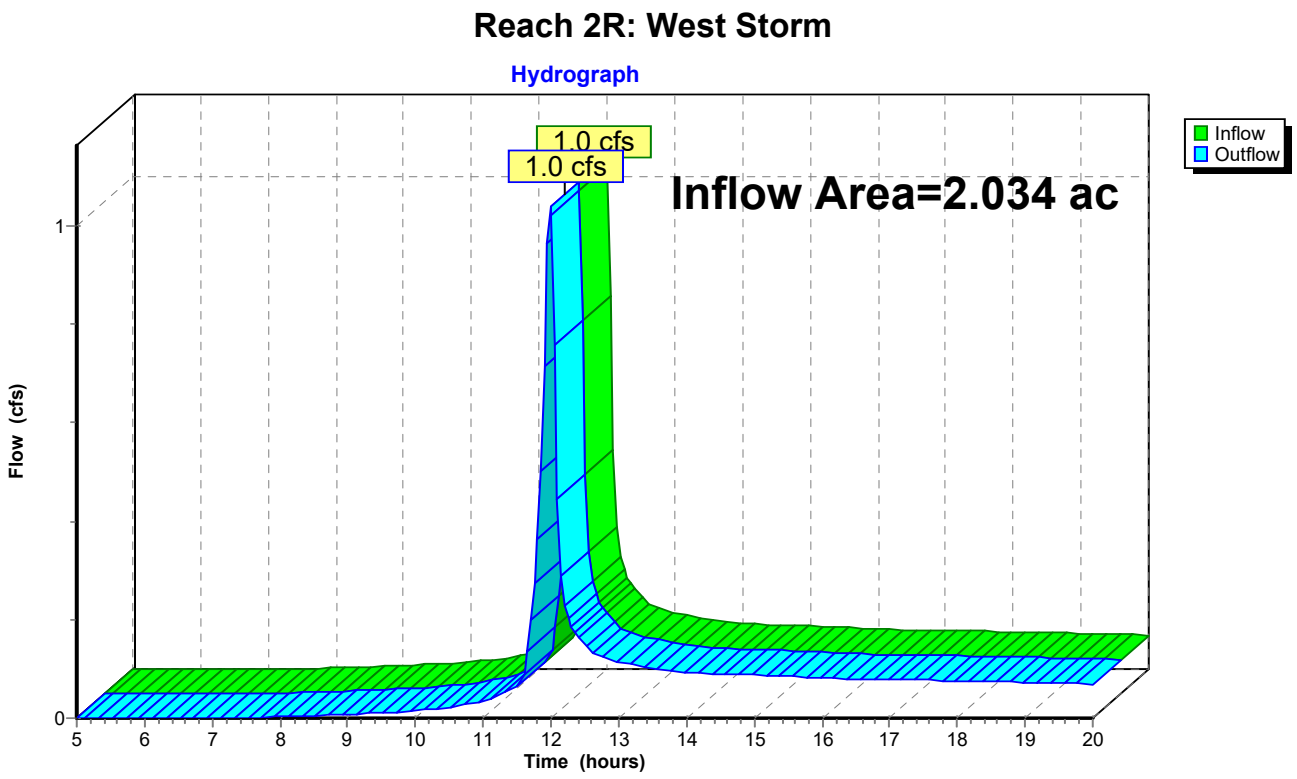


Summary for Reach 2R: West Storm

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 2.034 ac, 72.55% Impervious, Inflow Depth > 0.52" for 2-YR event
Inflow = 1.0 cfs @ 11.98 hrs, Volume= 0.088 af
Outflow = 1.0 cfs @ 11.98 hrs, Volume= 0.088 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs



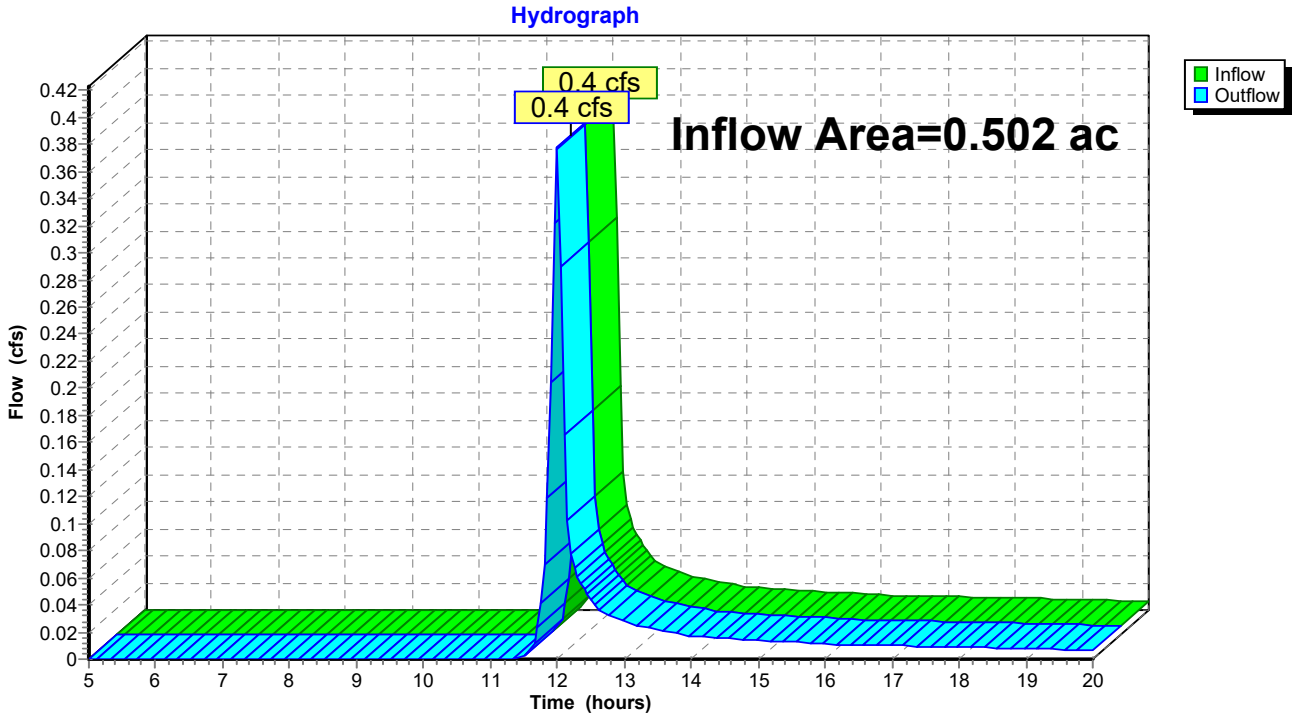
Summary for Reach 3R: West Bluff

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 0.502 ac, 11.55% Impervious, Inflow Depth > 0.41" for 2-YR event
Inflow = 0.4 cfs @ 11.99 hrs, Volume= 0.017 af
Outflow = 0.4 cfs @ 11.99 hrs, Volume= 0.017 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Reach 3R: West Bluff



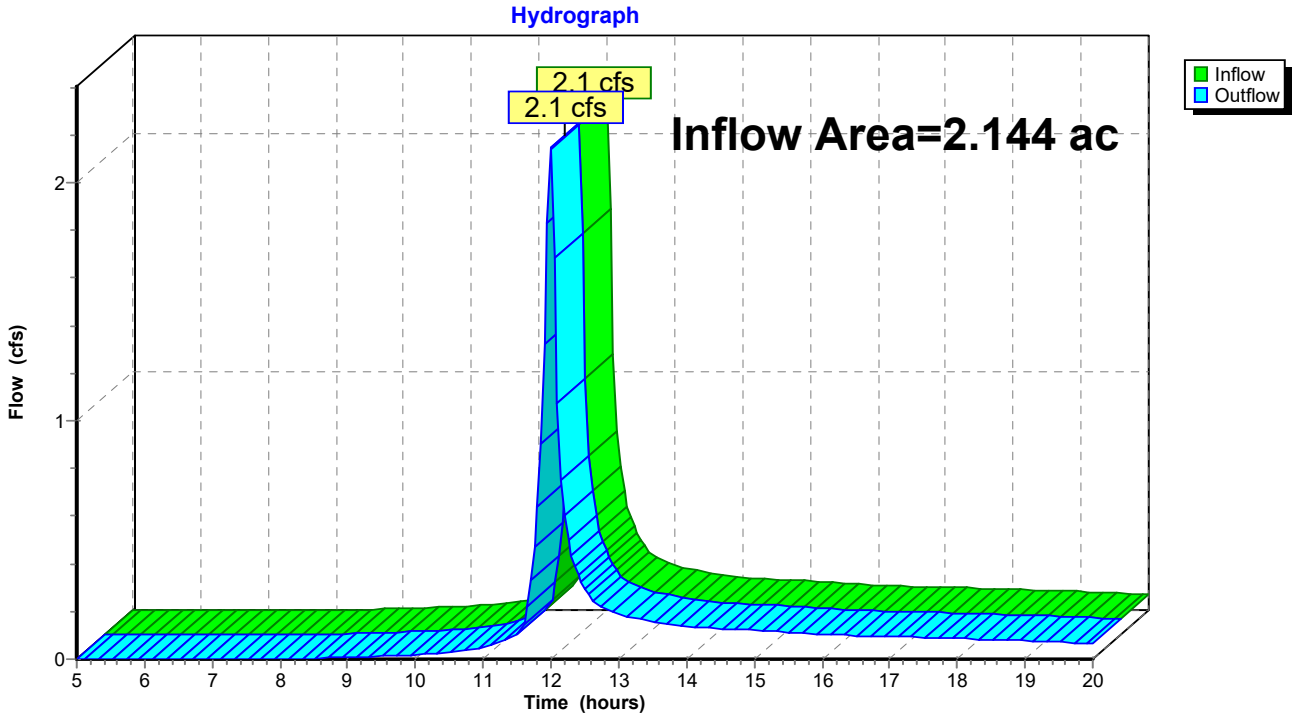
Summary for Reach 4R: South Storm

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 2.144 ac, 60.06% Impervious, Inflow Depth > 0.77" for 2-YR event
Inflow = 2.1 cfs @ 12.00 hrs, Volume= 0.138 af
Outflow = 2.1 cfs @ 12.00 hrs, Volume= 0.138 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Reach 4R: South Storm



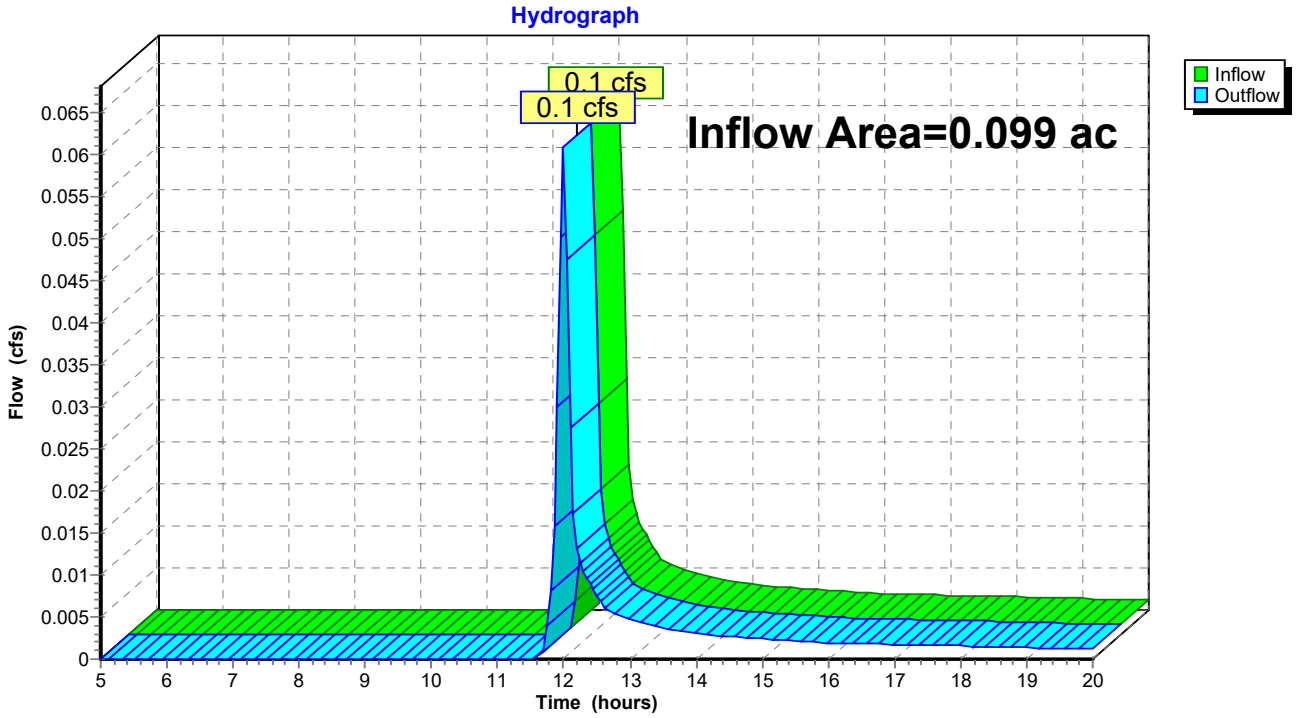
Summary for Reach 5R: SE Bluff - To Road

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 0.099 ac, 0.00% Impervious, Inflow Depth > 0.34" for 2-YR event
Inflow = 0.1 cfs @ 12.00 hrs, Volume= 0.003 af
Outflow = 0.1 cfs @ 12.00 hrs, Volume= 0.003 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Reach 5R: SE Bluff - To Road



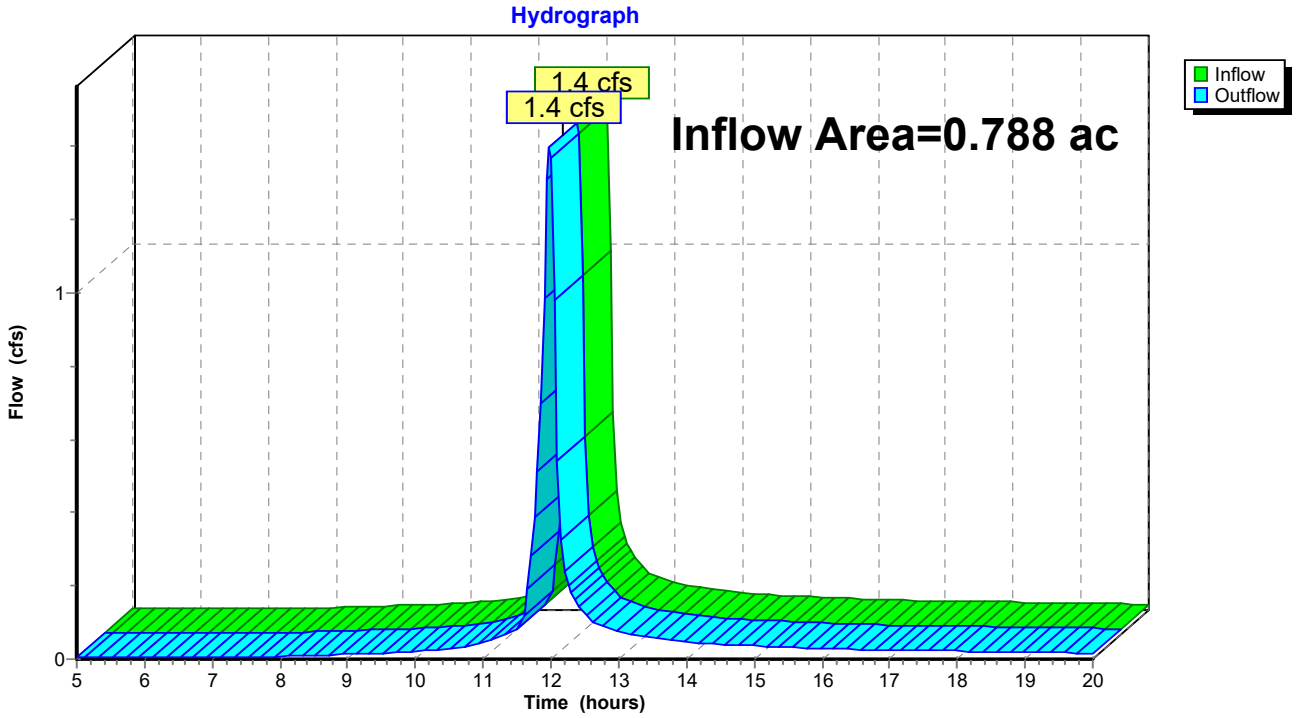
Summary for Reach 6R: East Storm

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 0.788 ac, 75.88% Impervious, Inflow Depth > 1.03" for 2-YR event
Inflow = 1.4 cfs @ 11.98 hrs, Volume= 0.068 af
Outflow = 1.4 cfs @ 11.98 hrs, Volume= 0.068 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Reach 6R: East Storm



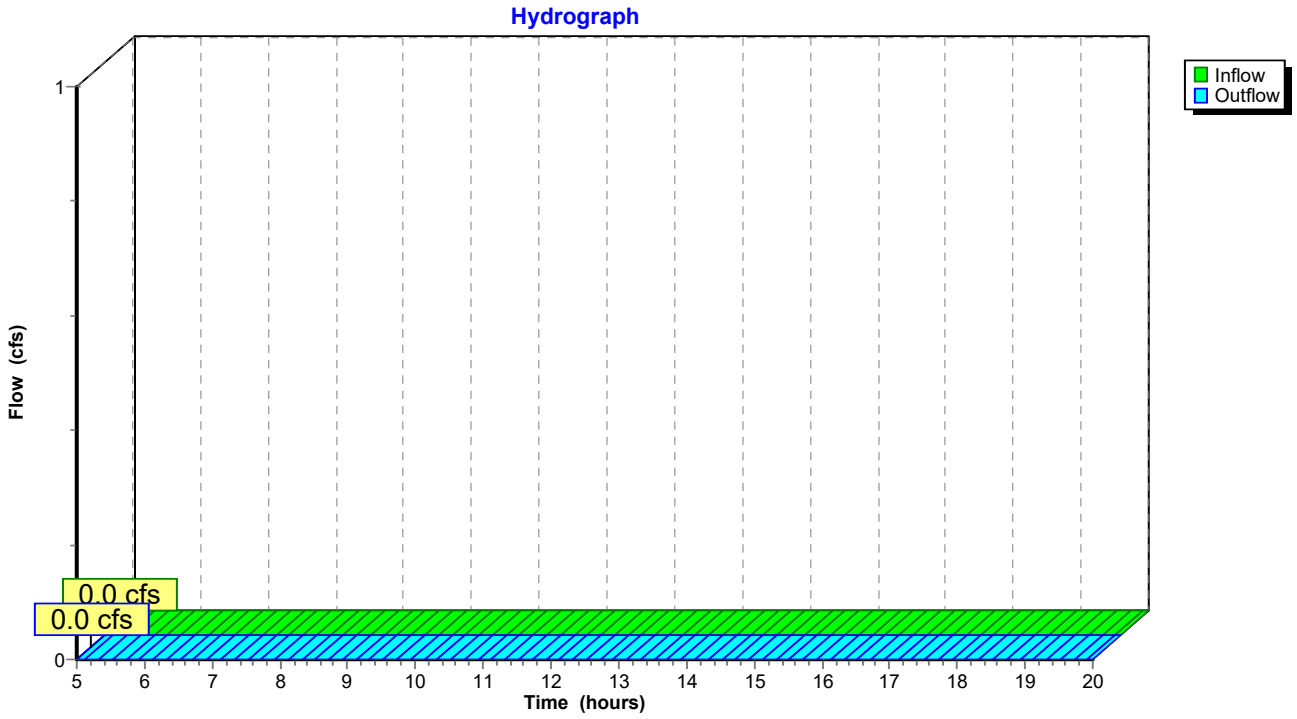
Summary for Reach 7R: North Bluff

[40] Hint: Not Described (Outflow=Inflow)

Inflow	=	0.0 cfs @	5.00 hrs,	Volume=	0.000 af
Outflow	=	0.0 cfs @	5.00 hrs,	Volume=	0.000 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Reach 7R: North Bluff



Summary for Pond 1P: Wet Sedimentation Basin

Inflow Area = 4.032 ac, 58.50% Impervious, Inflow Depth > 0.84" for 2-YR event
Inflow = 6.2 cfs @ 11.98 hrs, Volume= 0.281 af
Outflow = 1.1 cfs @ 12.22 hrs, Volume= 0.269 af, Atten= 83%, Lag= 13.9 min
Primary = 1.1 cfs @ 12.22 hrs, Volume= 0.269 af
Routed to Reach 1R : NW Storm
Secondary = 0.0 cfs @ 5.00 hrs, Volume= 0.000 af
Routed to Reach 7R : North Bluff

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Starting Elev= 986.00' Surf.Area= 2,905 sf Storage= 5,818 cf
Peak Elev= 987.51' @ 12.22 hrs Surf.Area= 3,762 sf Storage= 11,085 cf (5,267 cf above start)

Plug-Flow detention time= 222.7 min calculated for 0.135 af (48% of inflow)
Center-of-Mass det. time= 55.1 min (840.1 - 785.0)

Volume	Invert	Avail.Storage	Storage Description
#1	981.00'	52,963 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc) x 0.5

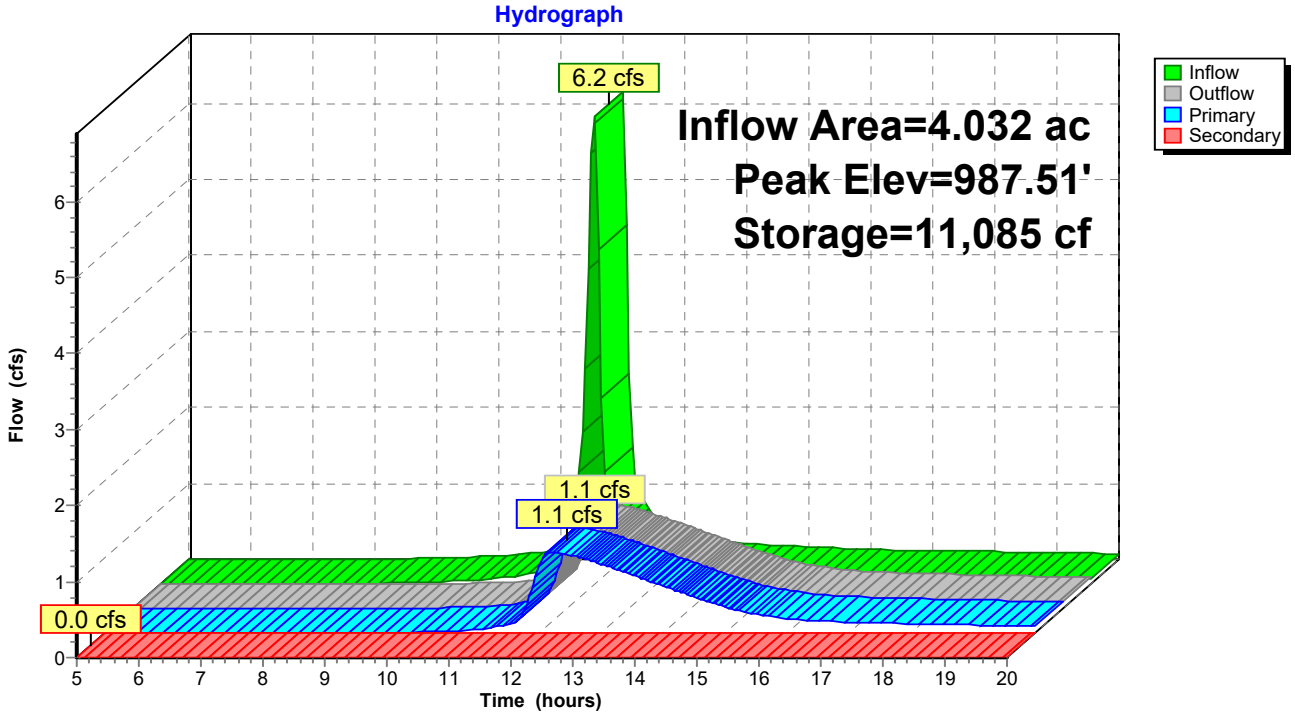
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
981.00	108	0	0
985.00	3,406	7,028	7,028
986.50	7,012	7,814	14,842
995.00	11,323	77,924	92,765
996.00	15,000	13,162	105,927

Device	Routing	Invert	Outlet Devices
#1	Primary	981.69'	**12.0" Round Culvert** L= 169.0' Ke= 0.500 Inlet / Outlet Invert= 981.69' / 980.00' S= 0.0100 '/' Cc= 0.900 n= 0.013 Concrete pipe, straight & clean, Flow Area= 0.79 sf
#2	Device 1	986.00'	**6.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Device 1	989.00'	**4.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s) 1.0' Crest Height
#4	Device 1	990.00'	**HAALA 48" ID Pond Skimmer** Head (feet) 0.00 0.10 0.20 0.30 0.40 0.50 0.60 0.70 0.80 0.90 1.00 1.50 2.00 2.50 3.00 3.50 4.00 4.50 5.00 Disch. (cfs) 0.000 1.320 3.740 6.870 10.580 14.790 19.250 20.790 22.220 23.570 24.850 30.430 35.140 39.280 43.030 46.480 49.690 52.700 55.560
#5	Secondary	995.50'	**20.0' long x 20.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Primary OutFlow Max=1.1 cfs @ 12.22 hrs HW=987.51' (Free Discharge)
└─**1=Culvert** (Passes 1.1 cfs of 6.2 cfs potential flow)
  └─**2=Orifice/Grate** (Orifice Controls 1.1 cfs @ 5.40 fps)
  └─**3=Sharp-Crested Rectangular Weir**(Controls 0.0 cfs)
  └─**4=HAALA 48" ID Pond Skimmer**(Controls 0.0 cfs)

Secondary OutFlow Max=0.0 cfs @ 5.00 hrs HW=986.00' (Free Discharge)
└─**5=Broad-Crested Rectangular Weir**(Controls 0.0 cfs)

Pond 1P: Wet Sedimentation Basin



Summary for Pond 2P: Filtration Basin

Inflow Area = 1.421 ac, 76.15% Impervious, Inflow Depth > 1.04" for 2-YR event
Inflow = 2.6 cfs @ 11.98 hrs, Volume= 0.123 af
Outflow = 0.1 cfs @ 15.45 hrs, Volume= 0.042 af, Atten= 98%, Lag= 208.0 min
Primary = 0.1 cfs @ 15.45 hrs, Volume= 0.042 af
Routed to Reach 2R : West Storm
Secondary = 0.0 cfs @ 5.00 hrs, Volume= 0.000 af
Routed to Reach 3R : West Bluff

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 984.77' @ 15.45 hrs Surf.Area= 2,185 sf Storage= 3,843 cf

Plug-Flow detention time= 263.9 min calculated for 0.042 af (34% of inflow)
Center-of-Mass det. time= 171.9 min (942.2 - 770.3)

Volume	Invert	Avail.Storage	Storage Description
#1	982.00'	13,880 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

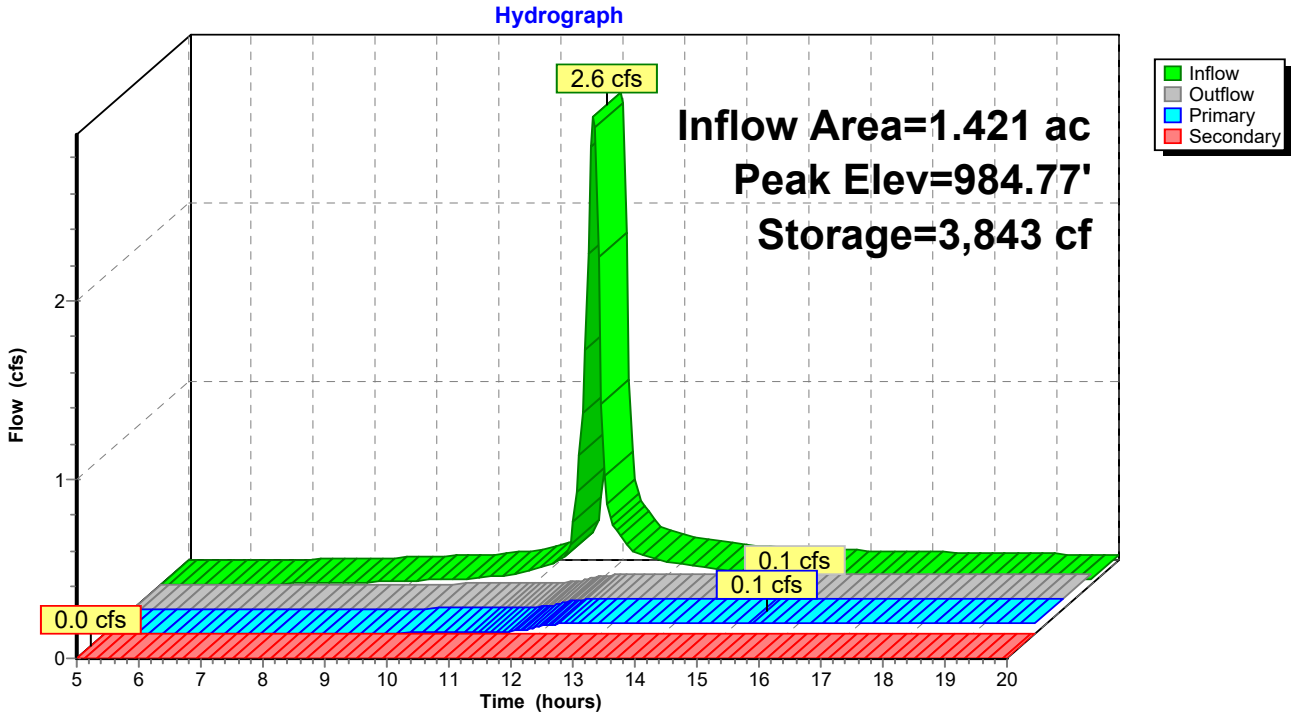
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
982.00	588	0	0
987.00	3,470	10,145	10,145
988.00	4,000	3,735	13,880

Device	Routing	Invert	Outlet Devices
#1	Primary	980.00'	**12.0" Round Culvert** L= 200.0' Ke= 0.500 Inlet / Outlet Invert= 980.00' / 978.00' S= 0.0100 '/' Cc= 0.900 n= 0.013 Concrete pipe, straight & clean, Flow Area= 0.79 sf
#2	Device 1	982.00'	**1.630 in/hr Exfiltration over Surface area above 982.00'** Excluded Surface area = 588 sf Phase-In= 0.01'
#3	Device 1	984.80'	**15" Nyloplast Dome Grate** Head (feet) 0.00 0.10 0.20 0.30 0.40 0.50 0.60 0.70 0.80 0.90 1.00 1.50 2.00 2.50 3.00 3.50 4.00 4.50 5.00 Disch. (cfs) 0.000 0.410 1.170 2.150 2.590 2.890 3.170 3.420 3.660 3.880 4.090 5.010 5.790 6.470 7.090 7.660 8.190 8.680 9.150
#4	Secondary	987.00'	**133.0' long x 3.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 Coef. (English) 2.44 2.58 2.68 2.67 2.65 2.64 2.64 2.68 2.68 2.72 2.81 2.92 2.97 3.07 3.32

Primary OutFlow Max=0.1 cfs @ 15.45 hrs HW=984.77' (Free Discharge)
└**1=Culvert** (Passes 0.1 cfs of 5.4 cfs potential flow)
└**2=Exfiltration** (Exfiltration Controls 0.1 cfs)
└**3=15" Nyloplast Dome Grate** (Controls 0.0 cfs)

Secondary OutFlow Max=0.0 cfs @ 5.00 hrs HW=982.00' (Free Discharge)
└**4=Broad-Crested Rectangular Weir** (Controls 0.0 cfs)

Pond 2P: Filtration Basin



Summary for Pond 3P: Filtration Basin

Inflow Area = 0.506 ac, 69.75% Impervious, Inflow Depth > 0.97" for 2-YR event
Inflow = 0.9 cfs @ 11.98 hrs, Volume= 0.041 af
Outflow = 0.0 cfs @ 13.05 hrs, Volume= 0.029 af, Atten= 95%, Lag= 63.9 min
Primary = 0.0 cfs @ 13.05 hrs, Volume= 0.029 af
Routed to Reach 4R : South Storm
Secondary = 0.0 cfs @ 5.00 hrs, Volume= 0.000 af
Routed to Reach 5R : SE Bluff - To Road

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 988.01' @ 13.05 hrs Surf.Area= 1,645 sf Storage= 1,034 cf

Plug-Flow detention time= 216.9 min calculated for 0.029 af (70% of inflow)
Center-of-Mass det. time= 150.3 min (926.0 - 775.7)

Volume	Invert	Avail.Storage	Storage Description
#1	987.00'	14,421 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

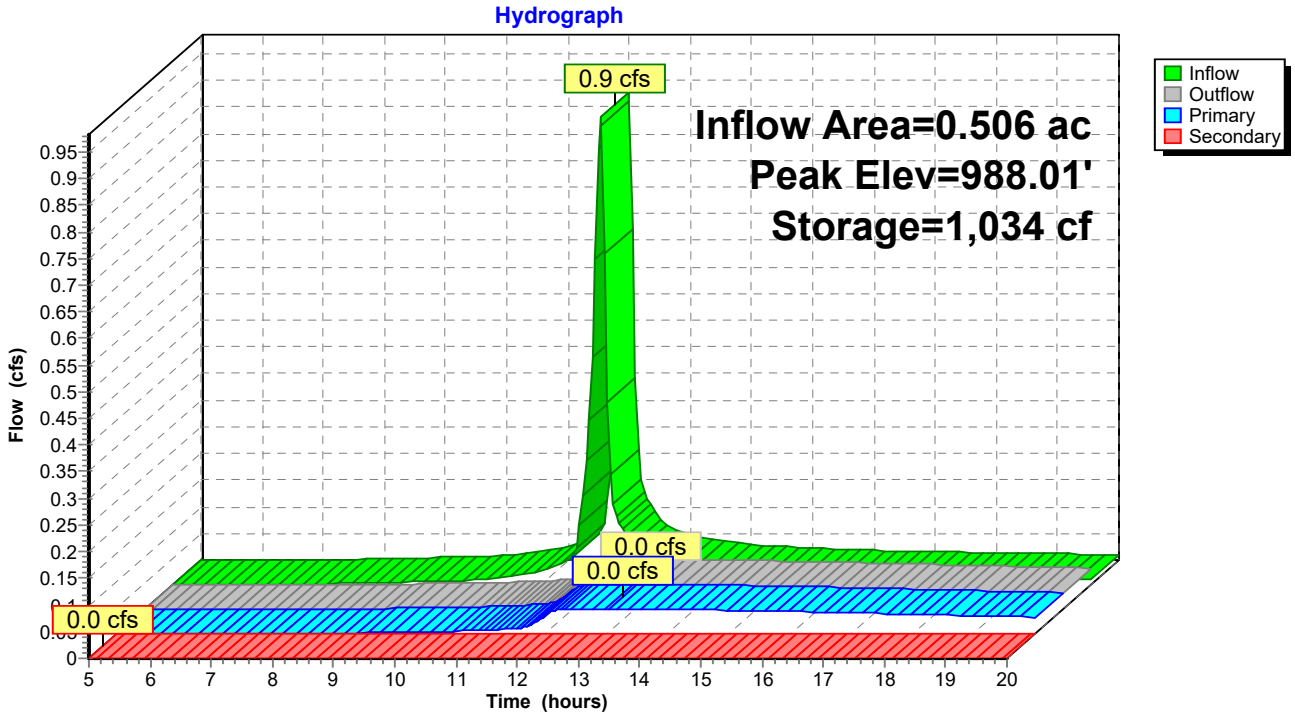
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
987.00	398	0	0
991.00	5,330	11,456	11,456
992.00	600	2,965	14,421

Device	Routing	Invert	Outlet Devices
#1	Primary	984.50'	**12.0" Round Culvert** L= 215.0' Ke= 0.500 Inlet / Outlet Invert= 984.50' / 982.35' S= 0.0100 '/' Cc= 0.900 n= 0.013 Concrete pipe, straight & clean, Flow Area= 0.79 sf
#2	Device 1	987.00'	**1.630 in/hr Exfiltration over Surface area above 987.00'** Excluded Surface area = 398 sf Phase-In= 0.01'
#3	Device 1	989.00'	**12" Nyloplast Dome Grate** Head (feet) 0.00 0.10 0.20 0.30 0.40 0.50 0.60 0.70 0.80 0.90 1.00 1.50 2.00 2.50 3.00 3.50 4.00 4.50 5.00 Disch. (cfs) 0.000 0.210 0.450 0.550 0.640 0.710 0.780 0.850 0.900 0.960 1.010 1.240 1.430 1.600 1.750 1.890 2.020 2.140 2.260
#4	Secondary	990.00'	**10.0' long x 5.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88

Primary OutFlow Max=0.0 cfs @ 13.05 hrs HW=988.01' (Free Discharge)
└**1=Culvert** (Passes 0.0 cfs of 4.7 cfs potential flow)
└**2=Exfiltration** (Exfiltration Controls 0.0 cfs)
└**3=12" Nyloplast Dome Grate** (Controls 0.0 cfs)

Secondary OutFlow Max=0.0 cfs @ 5.00 hrs HW=987.00' (Free Discharge)
└**4=Broad-Crested Rectangular Weir** (Controls 0.0 cfs)

Pond 3P: Filtration Basin



Summary for Pond 4P: Filtration Basin

Inflow Area = 0.290 ac, 72.78% Impervious, Inflow Depth > 0.97" for 2-YR event
Inflow = 0.5 cfs @ 11.98 hrs, Volume= 0.023 af
Outflow = 0.3 cfs @ 12.08 hrs, Volume= 0.022 af, Atten= 48%, Lag= 6.0 min
Primary = 0.3 cfs @ 12.08 hrs, Volume= 0.022 af
Routed to Reach 4R : South Storm
Secondary = 0.0 cfs @ 5.00 hrs, Volume= 0.000 af
Routed to Reach 5R : SE Bluff - To Road

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 993.84' @ 12.08 hrs Surf.Area= 840 sf Storage= 374 cf

Plug-Flow detention time= 95.9 min calculated for 0.022 af (93% of inflow)
Center-of-Mass det. time= 70.2 min (845.9 - 775.7)

Volume	Invert	Avail.Storage	Storage Description
#1	993.00'	1,615 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

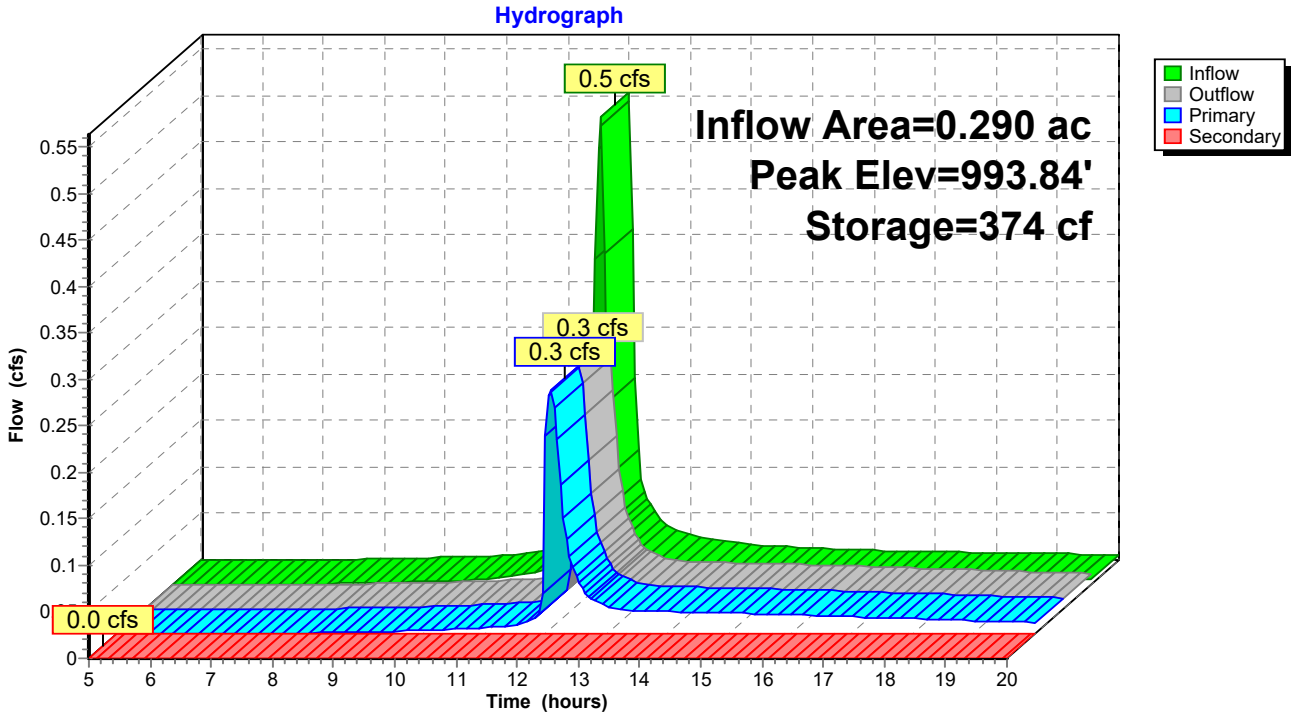
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
993.00	50	0	0
994.00	990	520	520
995.00	1,200	1,095	1,615

Device	Routing	Invert	Outlet Devices
#1	Primary	981.22'	**6.0" Round Culvert** L= 151.0' Ke= 0.500 Inlet / Outlet Invert= 981.22' / 981.07' S= 0.0010 '/' Cc= 0.900 n= 0.011 PVC, smooth interior, Flow Area= 0.20 sf
#2	Device 1	993.00'	**1.600 in/hr Exfiltration over Surface area above 993.00'** Excluded Surface area = 50 sf Phase-In= 0.01'
#3	Device 1	993.70'	**Nyloplast 8" Drop In Grate** Head (feet) 0.00 0.10 0.20 0.30 0.40 0.50 0.60 0.70 0.80 0.90 1.00 1.50 2.00 2.50 3.00 3.50 4.00 4.50 5.00 Disch. (cfs) 0.000 0.200 0.280 0.340 0.400 0.440 0.480 0.520 0.560 0.590 0.630 0.770 0.890 0.990 1.080 1.170 1.250 1.330 1.400
#4	Secondary	994.00'	**50.0' long x 3.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 Coef. (English) 2.44 2.58 2.68 2.67 2.65 2.64 2.64 2.68 2.68 2.72 2.81 2.92 2.97 3.07 3.32

Primary OutFlow Max=0.3 cfs @ 12.08 hrs HW=993.84' (Free Discharge)
└**1=Culvert** (Passes 0.3 cfs of 1.7 cfs potential flow)
└**2=Exfiltration** (Exfiltration Controls 0.0 cfs)
└**3=Nyloplast 8" Drop In Grate** (Custom Controls 0.2 cfs)

Secondary OutFlow Max=0.0 cfs @ 5.00 hrs HW=993.00' (Free Discharge)
└**4=Broad-Crested Rectangular Weir** (Controls 0.0 cfs)

Pond 4P: Filtration Basin



Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 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: Runoff Area=175,645 sf 58.50% Impervious Runoff Depth>3.08"
Tc=7.0 min CN=91 Runoff=21.0 cfs 1.035 af

Subcatchment2S: Runoff Area=57,101 sf 58.18% Impervious Runoff Depth>2.98"
Tc=7.0 min CN=90 Runoff=6.7 cfs 0.326 af

Subcatchment3S: Runoff Area=61,891 sf 76.15% Impervious Runoff Depth>3.37"
Tc=7.0 min CN=94 Runoff=7.8 cfs 0.399 af

Subcatchment4S: Runoff Area=21,859 sf 11.55% Impervious Runoff Depth>2.26"
Tc=7.0 min CN=82 Runoff=2.1 cfs 0.095 af

Subcatchment5S: Runoff Area=26,713 sf 64.20% Impervious Runoff Depth>3.18"
Tc=7.0 min CN=92 Runoff=3.3 cfs 0.162 af

Subcatchment6S: Runoff Area=22,043 sf 69.75% Impervious Runoff Depth>3.27"
Tc=7.0 min CN=93 Runoff=2.7 cfs 0.138 af

Subcatchment7S: Runoff Area=58,710 sf 53.68% Impervious Runoff Depth>2.98"
Tc=7.0 min CN=90 Runoff=6.9 cfs 0.335 af

Subcatchment8S: Runoff Area=12,647 sf 72.78% Impervious Runoff Depth>3.27"
Tc=7.0 min CN=93 Runoff=1.6 cfs 0.079 af

Subcatchment9S: Runoff Area=12,130 sf 100.00% Impervious Runoff Depth>3.72"
Tc=7.0 min CN=98 Runoff=1.6 cfs 0.086 af

Subcatchment10S: Runoff Area=22,212 sf 62.70% Impervious Runoff Depth>3.08"
Tc=7.0 min CN=91 Runoff=2.7 cfs 0.131 af

Subcatchment11S: Runoff Area=4,300 sf 0.00% Impervious Runoff Depth>2.10"
Tc=7.0 min CN=80 Runoff=0.4 cfs 0.017 af

Reach 1R: NW Storm Inflow=13.8 cfs 1.338 af
Outflow=13.8 cfs 1.338 af

Reach 2R: West Storm Inflow=7.3 cfs 0.471 af
Outflow=7.3 cfs 0.471 af

Reach 3R: West Bluff Inflow=2.1 cfs 0.095 af
Outflow=2.1 cfs 0.095 af

Reach 4R: South Storm Inflow=7.3 cfs 0.475 af
Outflow=7.3 cfs 0.475 af

Reach 5R: SE Bluff - To Road Inflow=1.5 cfs 0.034 af
Outflow=1.5 cfs 0.034 af

Reach 6R: East Storm Inflow=4.3 cfs 0.217 af
Outflow=4.3 cfs 0.217 af

Reach 7R: North Bluff Inflow=0.0 cfs 0.000 af
Outflow=0.0 cfs 0.000 af

Pond 1P: Wet Sedimentation Basin Peak Elev=990.46' Storage=23,276 cf Inflow=21.0 cfs 1.035 af
Primary=7.4 cfs 1.012 af Secondary=0.0 cfs 0.000 af Outflow=7.4 cfs 1.012 af

Pond 2P: Filtration Basin Peak Elev=985.93' Storage=6,773 cf Inflow=7.8 cfs 0.399 af
Primary=4.4 cfs 0.309 af Secondary=0.0 cfs 0.000 af Outflow=4.4 cfs 0.309 af

Pond 3P: Filtration Basin Peak Elev=989.08' Storage=3,506 cf Inflow=2.7 cfs 0.138 af
Primary=0.3 cfs 0.083 af Secondary=0.0 cfs 0.000 af Outflow=0.3 cfs 0.083 af

Pond 4P: Filtration Basin Peak Elev=994.04' Storage=561 cf Inflow=1.6 cfs 0.079 af
Primary=0.4 cfs 0.057 af Secondary=1.2 cfs 0.017 af Outflow=1.6 cfs 0.074 af

Total Runoff Area = 10.910 ac Runoff Volume = 2.804 af Average Runoff Depth = 3.08"
40.05% Pervious = 4.369 ac 59.95% Impervious = 6.541 ac

Summary for Subcatchment 1S:

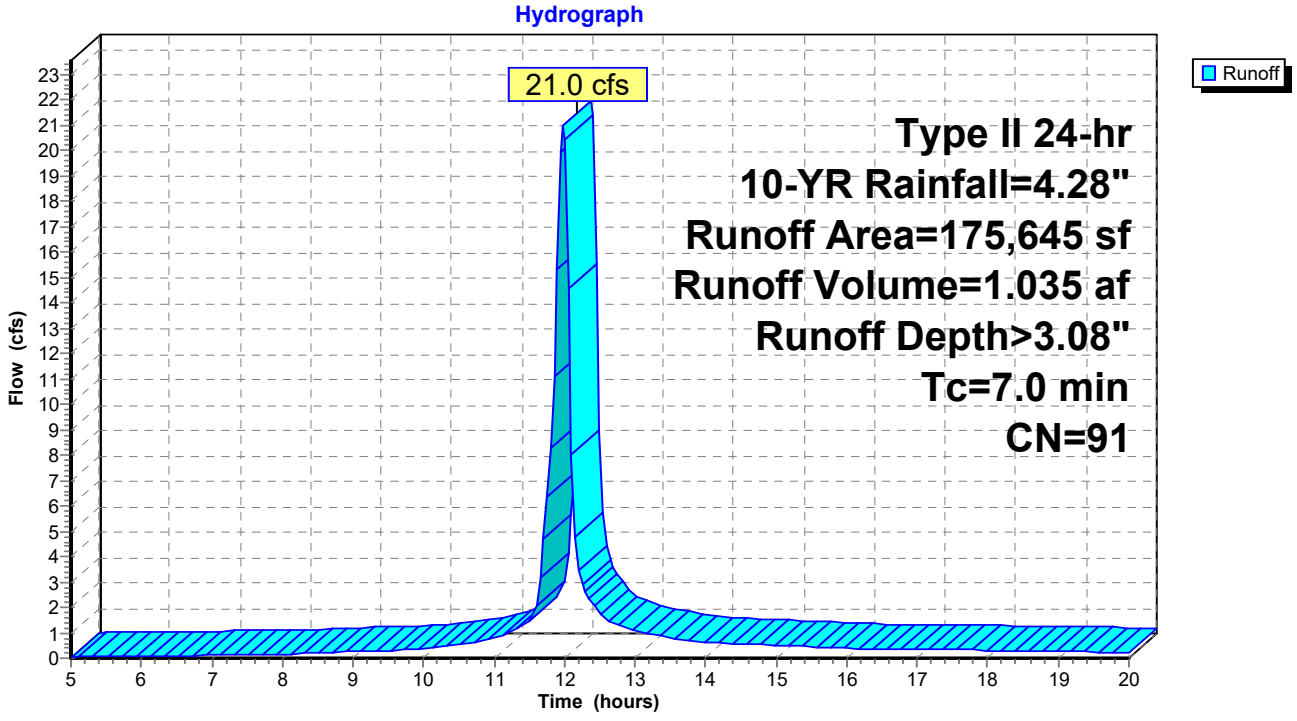
Runoff = 21.0 cfs @ 11.98 hrs, Volume= 1.035 af, Depth> 3.08"
Routed to Pond 1P : Wet Sedimentation Basin

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 10-YR Rainfall=4.28"

Area (sf)	CN	Description
102,749	98	Paved parking, HSG D
72,896	80	>75% Grass cover, Good, HSG D
175,645	91	Weighted Average
72,896		41.50% Pervious Area
102,749		58.50% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.0					**Direct Entry,**

Subcatchment 1S:



Summary for Subcatchment 2S:

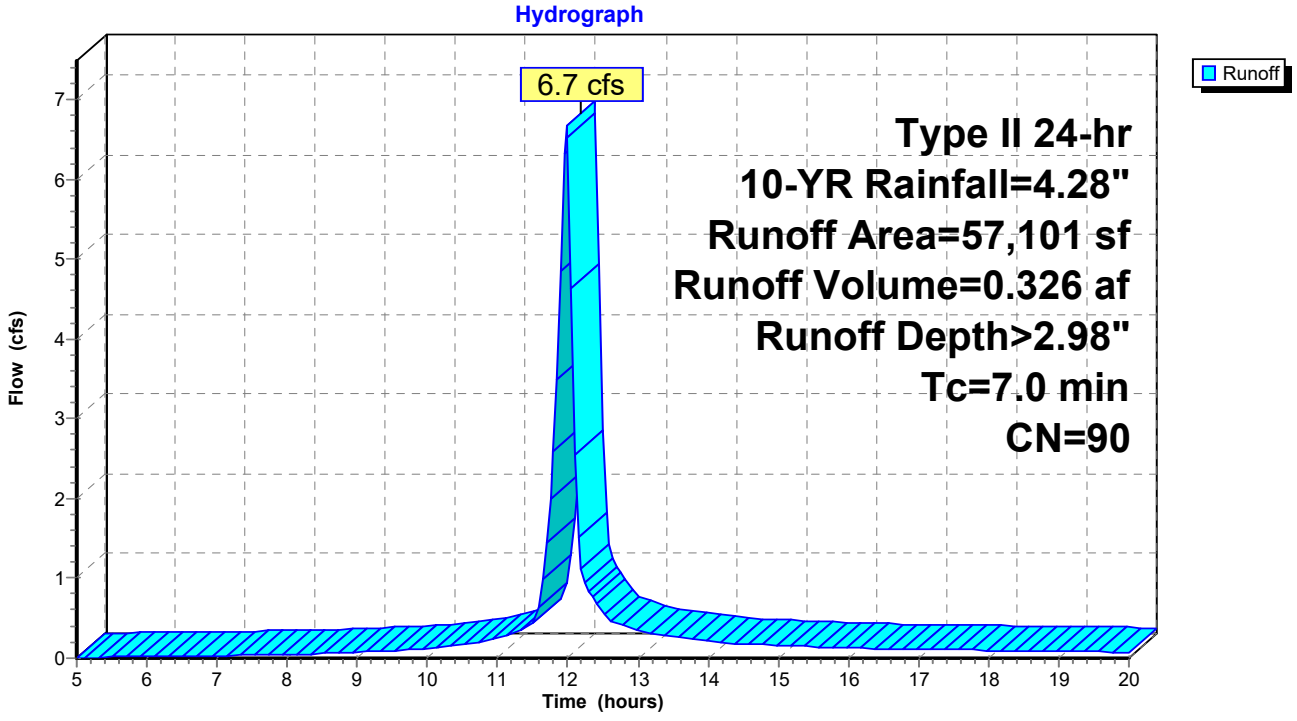
Runoff = 6.7 cfs @ 11.98 hrs, Volume= 0.326 af, Depth> 2.98"
Routed to Reach 1R : NW Storm

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 10-YR Rainfall=4.28"

Area (sf)	CN	Description
33,220	98	Paved parking, HSG D
23,881	80	>75% Grass cover, Good, HSG D
57,101	90	Weighted Average
23,881		41.82% Pervious Area
33,220		58.18% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.0					**Direct Entry,**

Subcatchment 2S:



Summary for Subcatchment 3S:

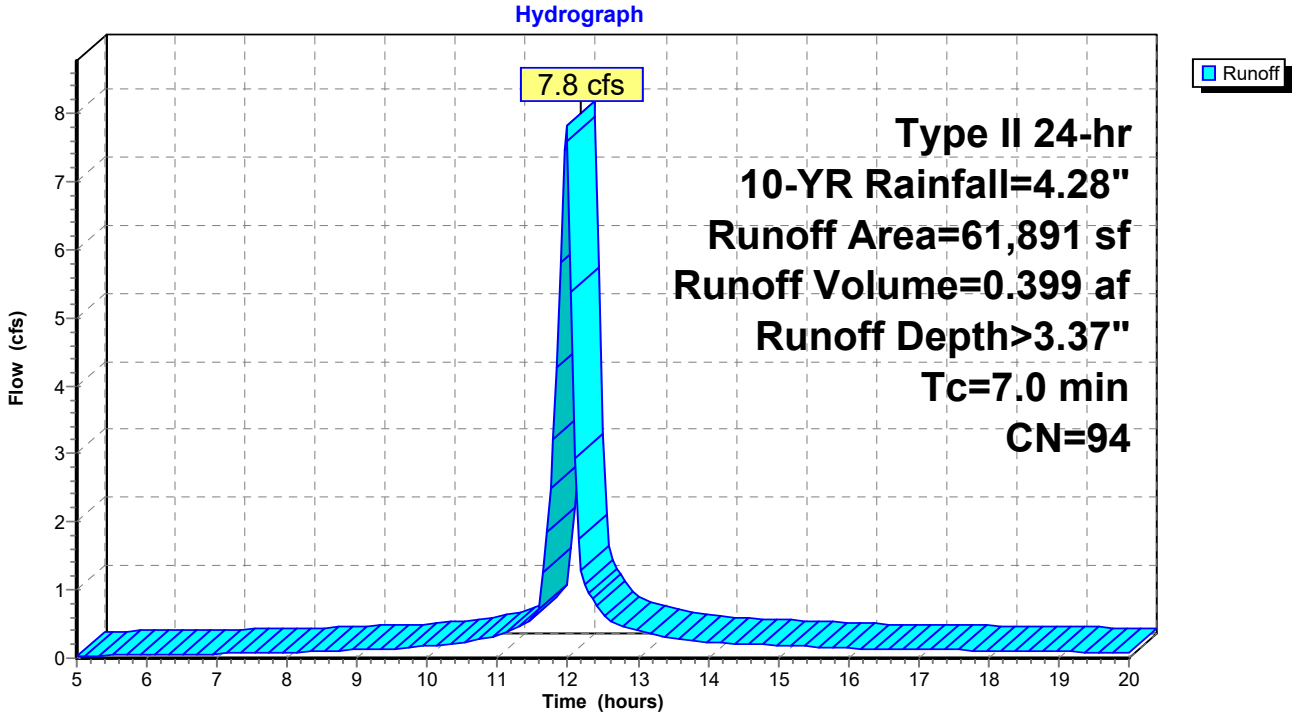
Runoff = 7.8 cfs @ 11.98 hrs, Volume= 0.399 af, Depth> 3.37"
Routed to Pond 2P : Filtration Basin

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 10-YR Rainfall=4.28"

Area (sf)	CN	Description
47,128	98	Paved parking, HSG D
14,763	80	>75% Grass cover, Good, HSG D
61,891	94	Weighted Average
14,763		23.85% Pervious Area
47,128		76.15% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.0					**Direct Entry,**

Subcatchment 3S:



Summary for Subcatchment 4S:

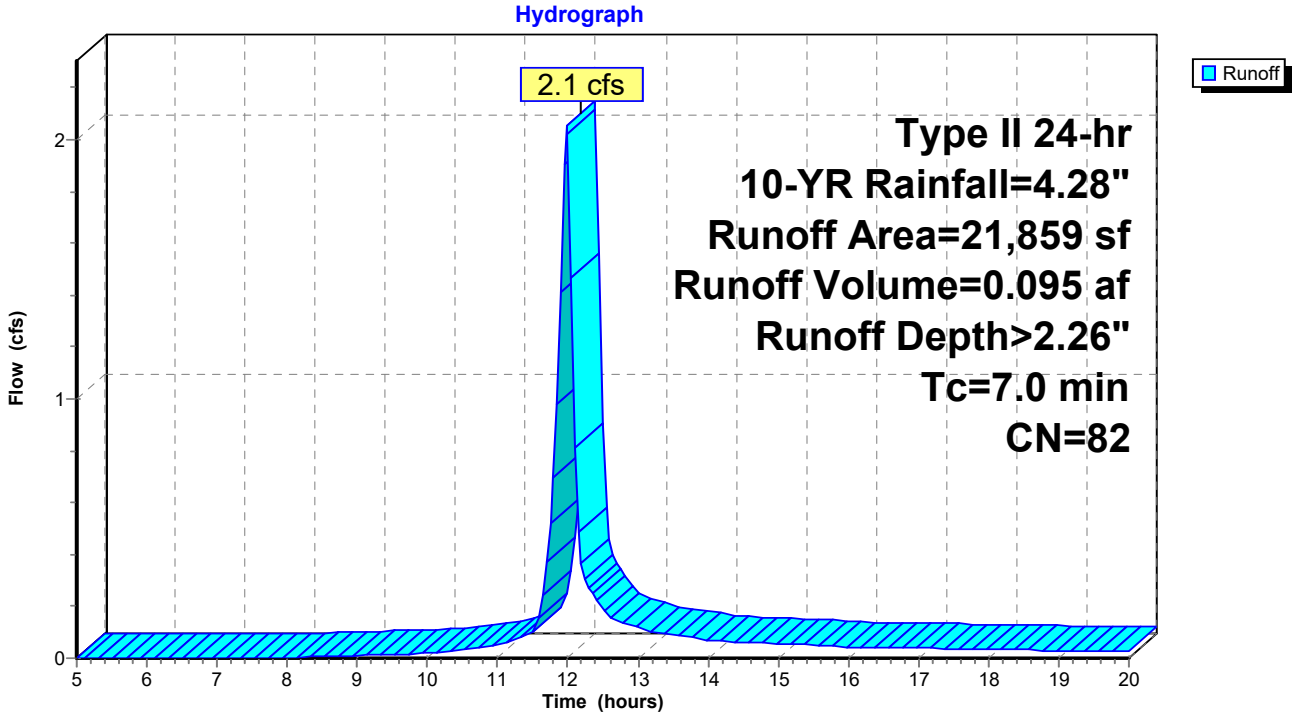
Runoff = 2.1 cfs @ 11.98 hrs, Volume= 0.095 af, Depth> 2.26"
Routed to Reach 3R : West Bluff

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 10-YR Rainfall=4.28"

Area (sf)	CN	Description
2,525	98	Paved parking, HSG D
19,334	80	>75% Grass cover, Good, HSG D
21,859	82	Weighted Average
19,334		88.45% Pervious Area
2,525		11.55% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.0					**Direct Entry,**

Subcatchment 4S:



Summary for Subcatchment 5S:

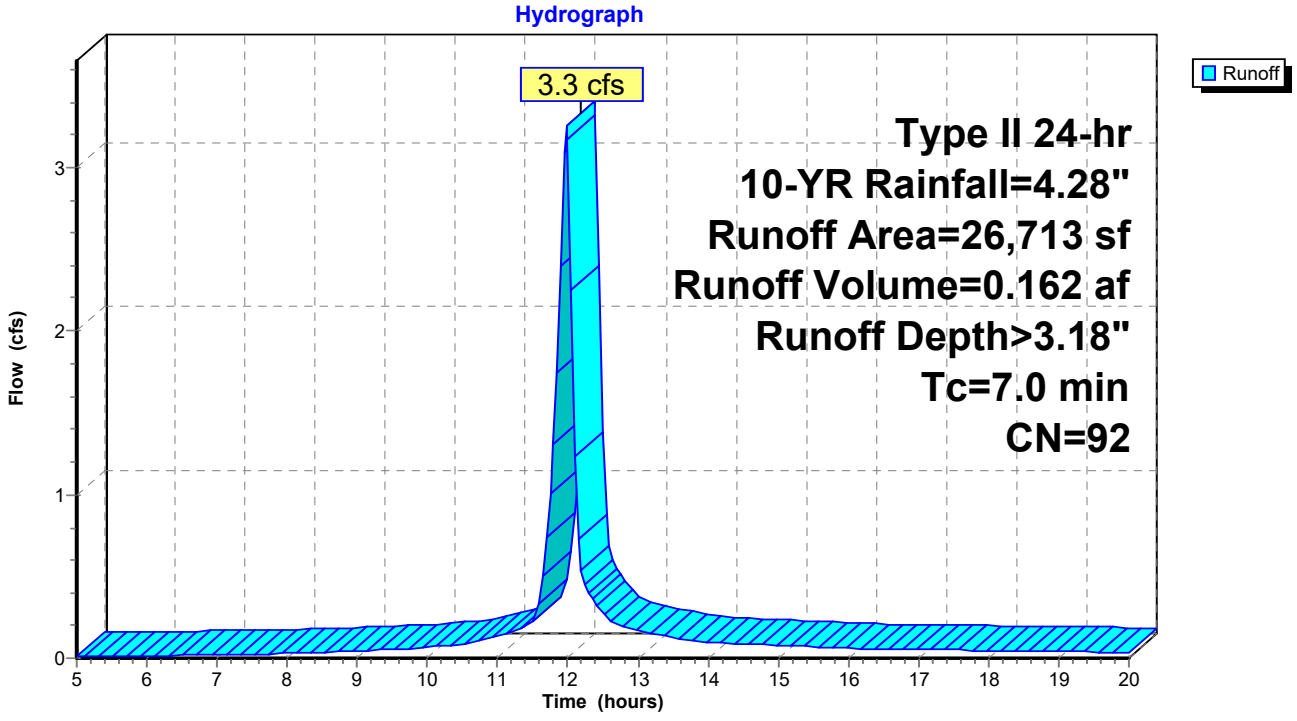
Runoff = 3.3 cfs @ 11.98 hrs, Volume= 0.162 af, Depth> 3.18"
Routed to Reach 2R : West Storm

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 10-YR Rainfall=4.28"

Area (sf)	CN	Description
17,151	98	Paved parking, HSG D
9,562	80	>75% Grass cover, Good, HSG D
26,713	92	Weighted Average
9,562		35.80% Pervious Area
17,151		64.20% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.0					**Direct Entry,**

Subcatchment 5S:



Summary for Subcatchment 6S:

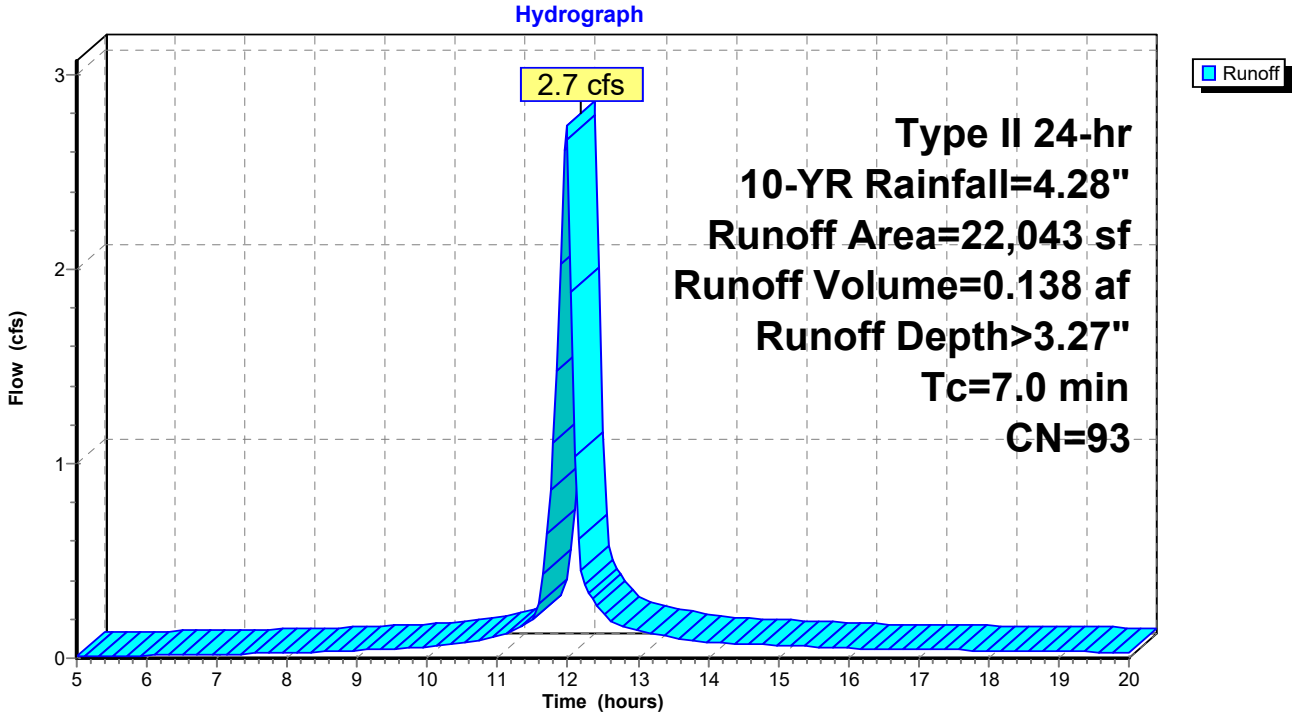
Runoff = 2.7 cfs @ 11.98 hrs, Volume= 0.138 af, Depth> 3.27"
Routed to Pond 3P : Filtration Basin

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 10-YR Rainfall=4.28"

Area (sf)	CN	Description
15,375	98	Paved parking, HSG D
6,668	80	>75% Grass cover, Good, HSG D
22,043	93	Weighted Average
6,668		30.25% Pervious Area
15,375		69.75% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.0					**Direct Entry,**

Subcatchment 6S:



Summary for Subcatchment 7S:

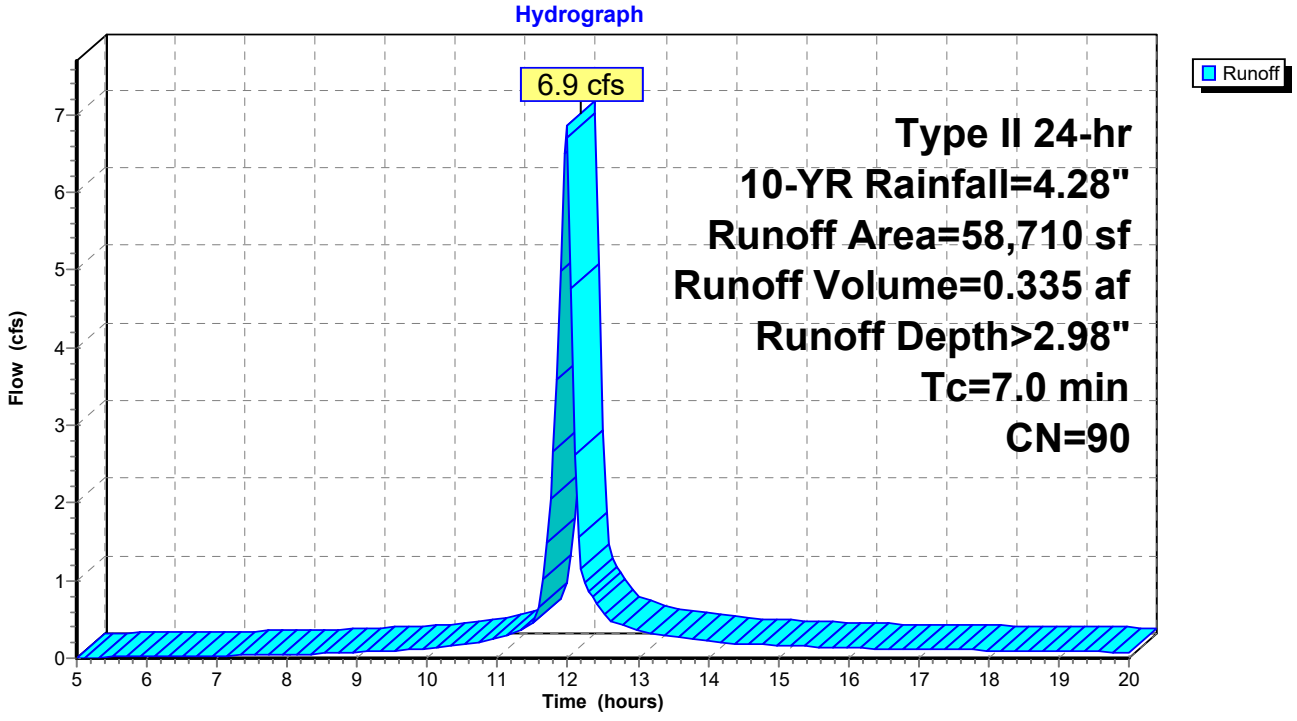
Runoff = 6.9 cfs @ 11.98 hrs, Volume= 0.335 af, Depth> 2.98"
Routed to Reach 4R : South Storm

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 10-YR Rainfall=4.28"

Area (sf)	CN	Description
31,516	98	Paved parking, HSG D
27,194	80	>75% Grass cover, Good, HSG D
58,710	90	Weighted Average
27,194		46.32% Pervious Area
31,516		53.68% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.0					**Direct Entry,**

Subcatchment 7S:



Summary for Subcatchment 8S:

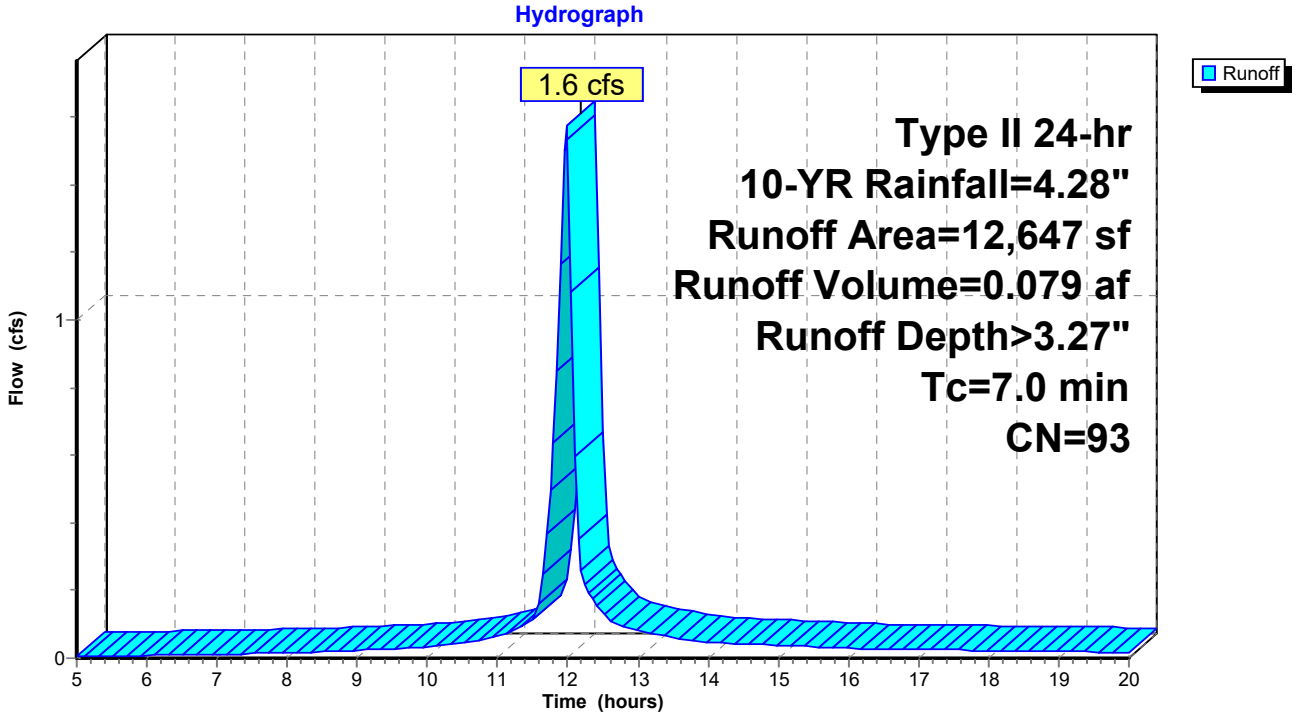
Runoff = 1.6 cfs @ 11.98 hrs, Volume= 0.079 af, Depth> 3.27"
Routed to Pond 4P : Filtration Basin

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 10-YR Rainfall=4.28"

Area (sf)	CN	Description
9,205	98	Paved parking, HSG D
3,442	80	>75% Grass cover, Good, HSG D
12,647	93	Weighted Average
3,442		27.22% Pervious Area
9,205		72.78% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.0					**Direct Entry,**

Subcatchment 8S:



Summary for Subcatchment 9S:

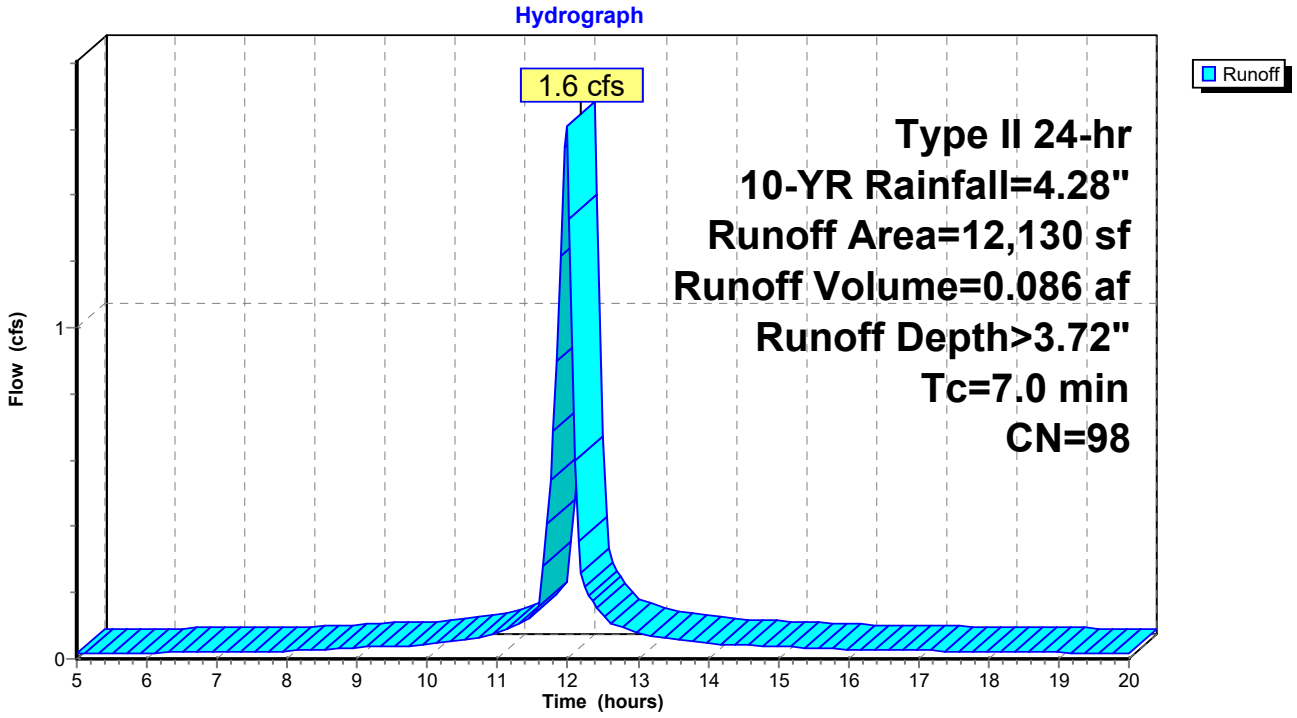
Runoff = 1.6 cfs @ 11.98 hrs, Volume= 0.086 af, Depth> 3.72"
Routed to Reach 6R : East Storm

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 10-YR Rainfall=4.28"

Area (sf)	CN	Description
12,130	98	Paved parking, HSG D
12,130		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.0					**Direct Entry,**

Subcatchment 9S:



Summary for Subcatchment 10S:

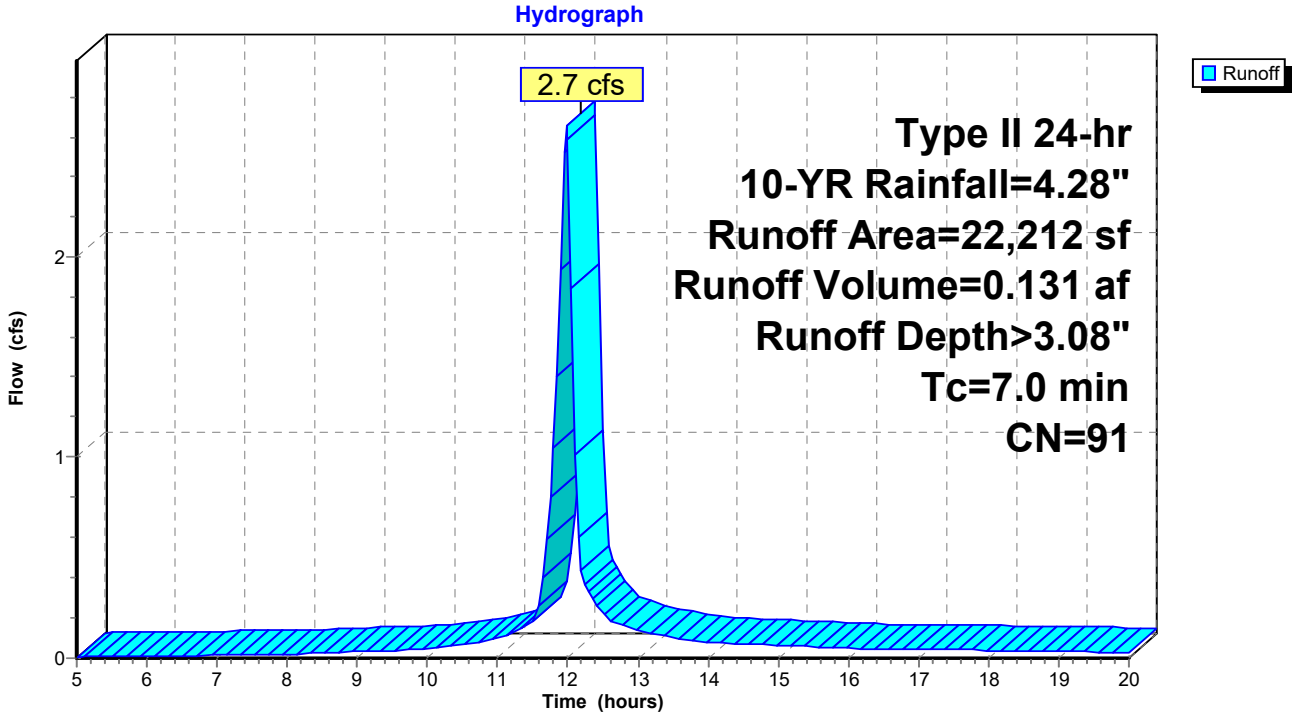
Runoff = 2.7 cfs @ 11.98 hrs, Volume= 0.131 af, Depth> 3.08"
Routed to Reach 6R : East Storm

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 10-YR Rainfall=4.28"

Area (sf)	CN	Description
13,928	98	Paved parking, HSG D
8,284	80	>75% Grass cover, Good, HSG D
22,212	91	Weighted Average
8,284		37.30% Pervious Area
13,928		62.70% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.0					**Direct Entry,**

Subcatchment 10S:



Summary for Subcatchment 11S:

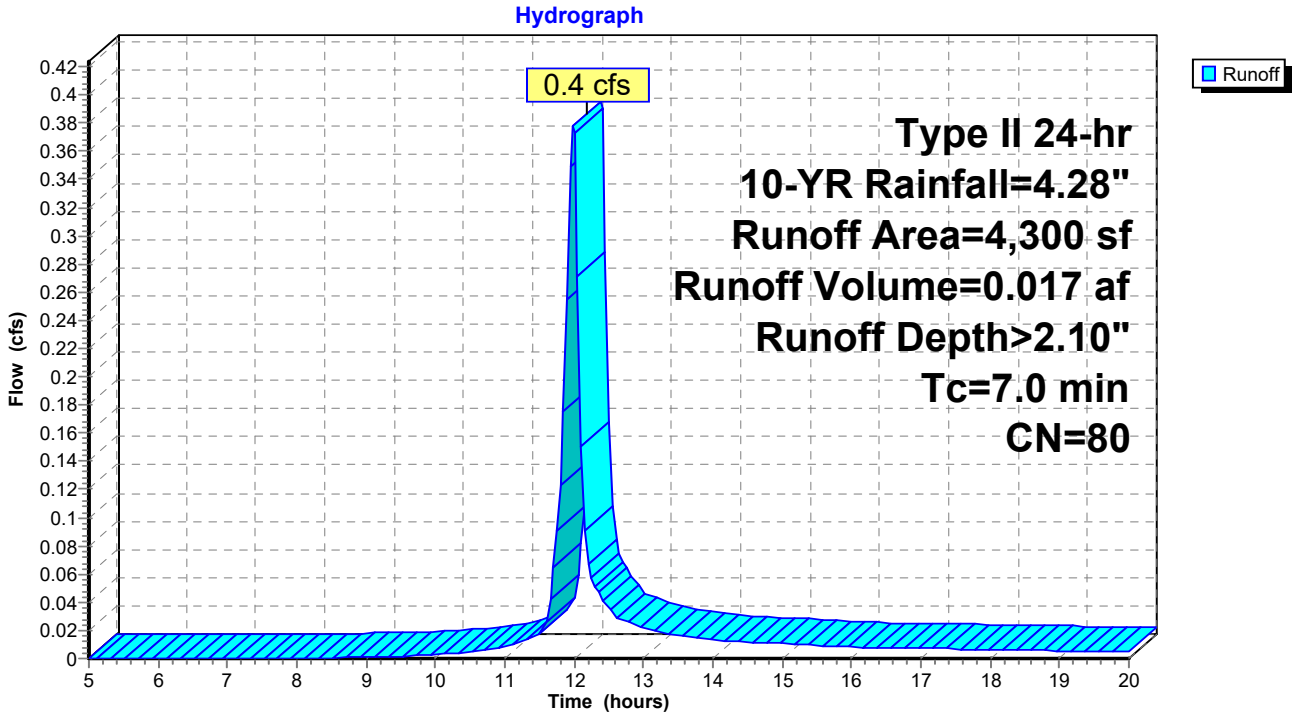
Runoff = 0.4 cfs @ 11.98 hrs, Volume= 0.017 af, Depth> 2.10"
Routed to Reach 5R : SE Bluff - To Road

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 10-YR Rainfall=4.28"

Area (sf)	CN	Description
0	98	Paved parking, HSG D
4,300	80	>75% Grass cover, Good, HSG D
4,300	80	Weighted Average
4,300		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.0					**Direct Entry,**

Subcatchment 11S:



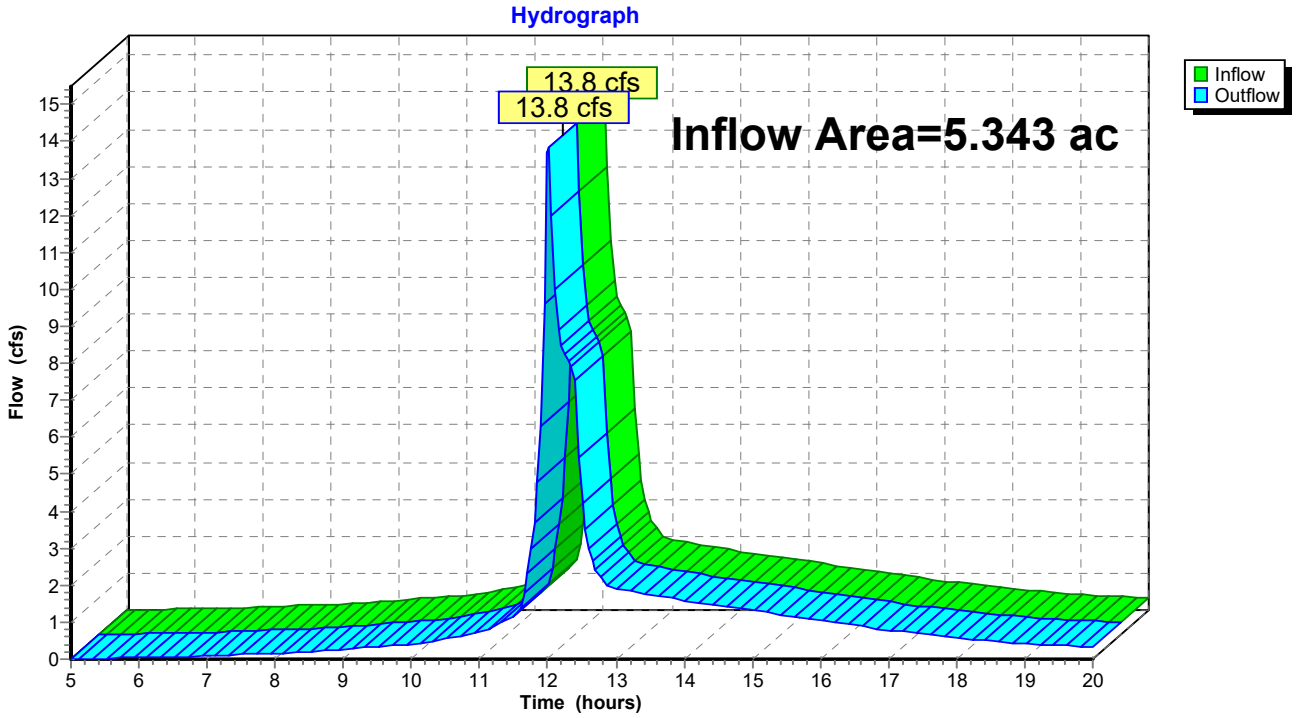
Summary for Reach 1R: NW Storm

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 5.343 ac, 58.42% Impervious, Inflow Depth > 3.01" for 10-YR event
Inflow = 13.8 cfs @ 12.01 hrs, Volume= 1.338 af
Outflow = 13.8 cfs @ 12.01 hrs, Volume= 1.338 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Reach 1R: NW Storm



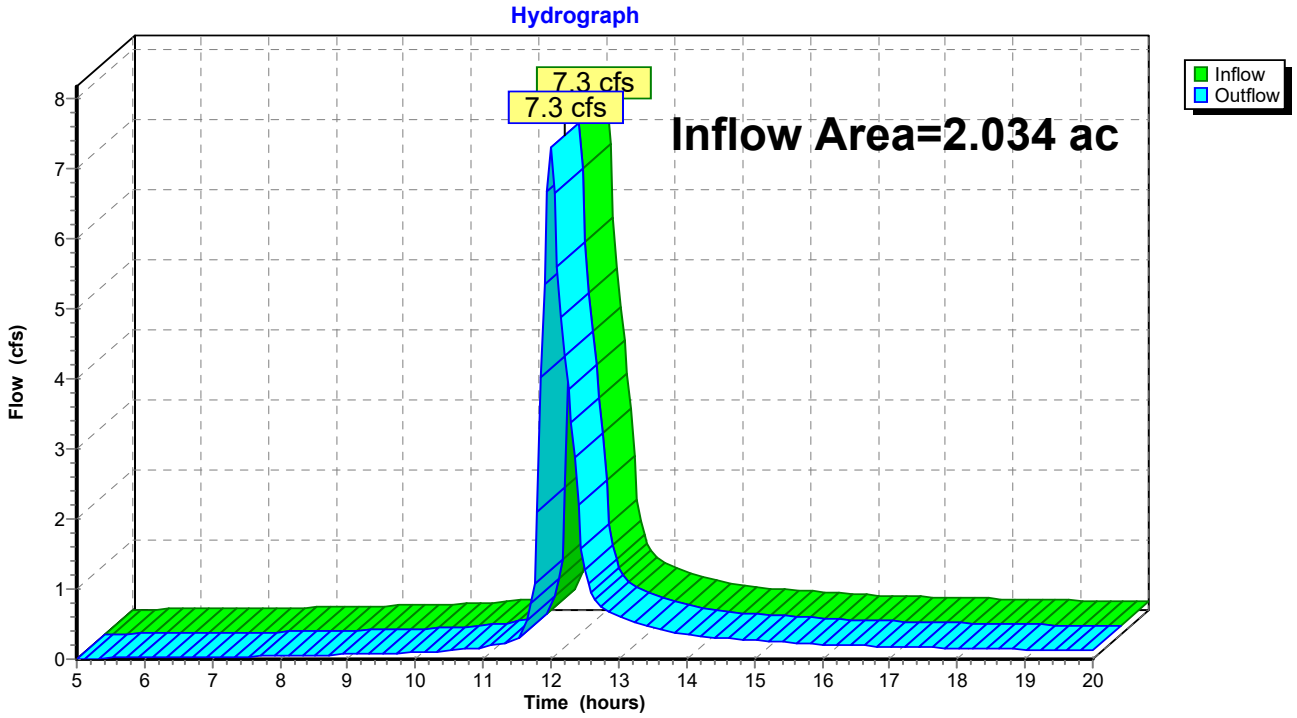
Summary for Reach 2R: West Storm

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 2.034 ac, 72.55% Impervious, Inflow Depth > 2.78" for 10-YR event
Inflow = 7.3 cfs @ 12.00 hrs, Volume= 0.471 af
Outflow = 7.3 cfs @ 12.00 hrs, Volume= 0.471 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Reach 2R: West Storm



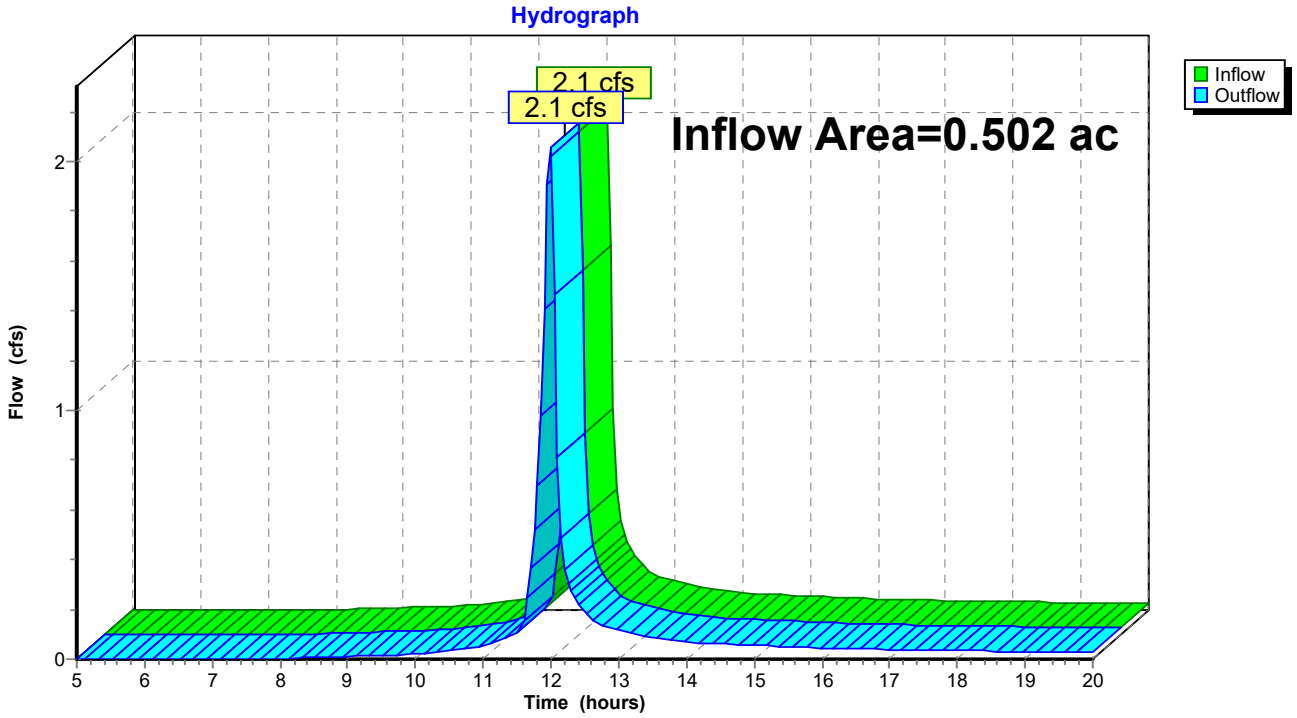
Summary for Reach 3R: West Bluff

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 0.502 ac, 11.55% Impervious, Inflow Depth > 2.26" for 10-YR event
Inflow = 2.1 cfs @ 11.98 hrs, Volume= 0.095 af
Outflow = 2.1 cfs @ 11.98 hrs, Volume= 0.095 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Reach 3R: West Bluff



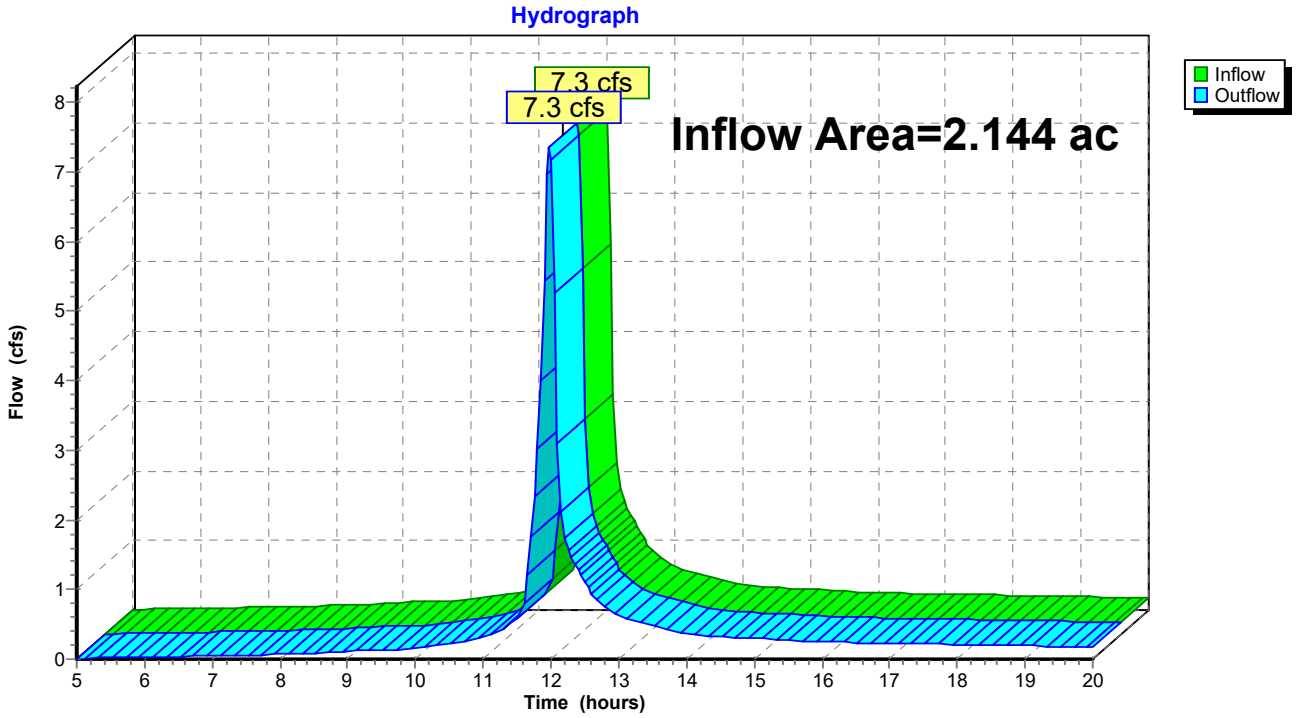
Summary for Reach 4R: South Storm

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 2.144 ac, 60.06% Impervious, Inflow Depth > 2.66" for 10-YR event
Inflow = 7.3 cfs @ 11.98 hrs, Volume= 0.475 af
Outflow = 7.3 cfs @ 11.98 hrs, Volume= 0.475 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Reach 4R: South Storm



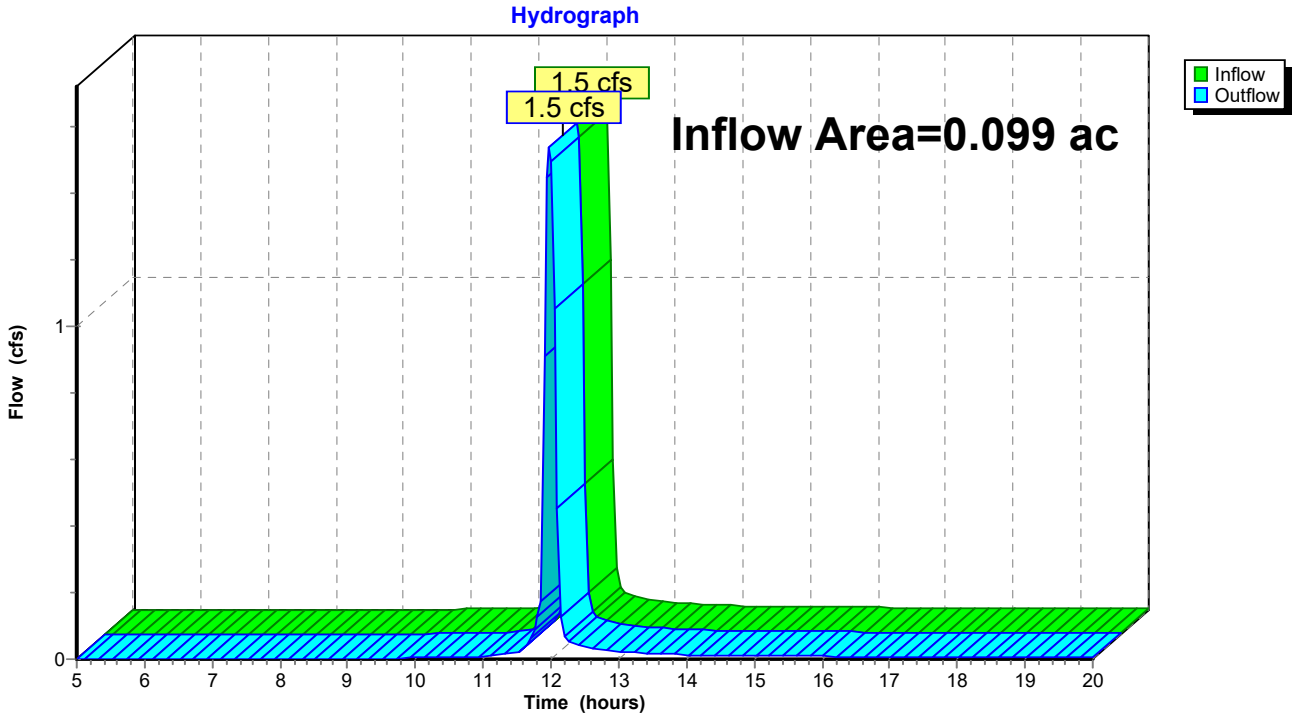
Summary for Reach 5R: SE Bluff - To Road

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 0.099 ac, 0.00% Impervious, Inflow Depth > 4.11" for 10-YR event
Inflow = 1.5 cfs @ 11.98 hrs, Volume= 0.034 af
Outflow = 1.5 cfs @ 11.98 hrs, Volume= 0.034 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Reach 5R: SE Bluff - To Road



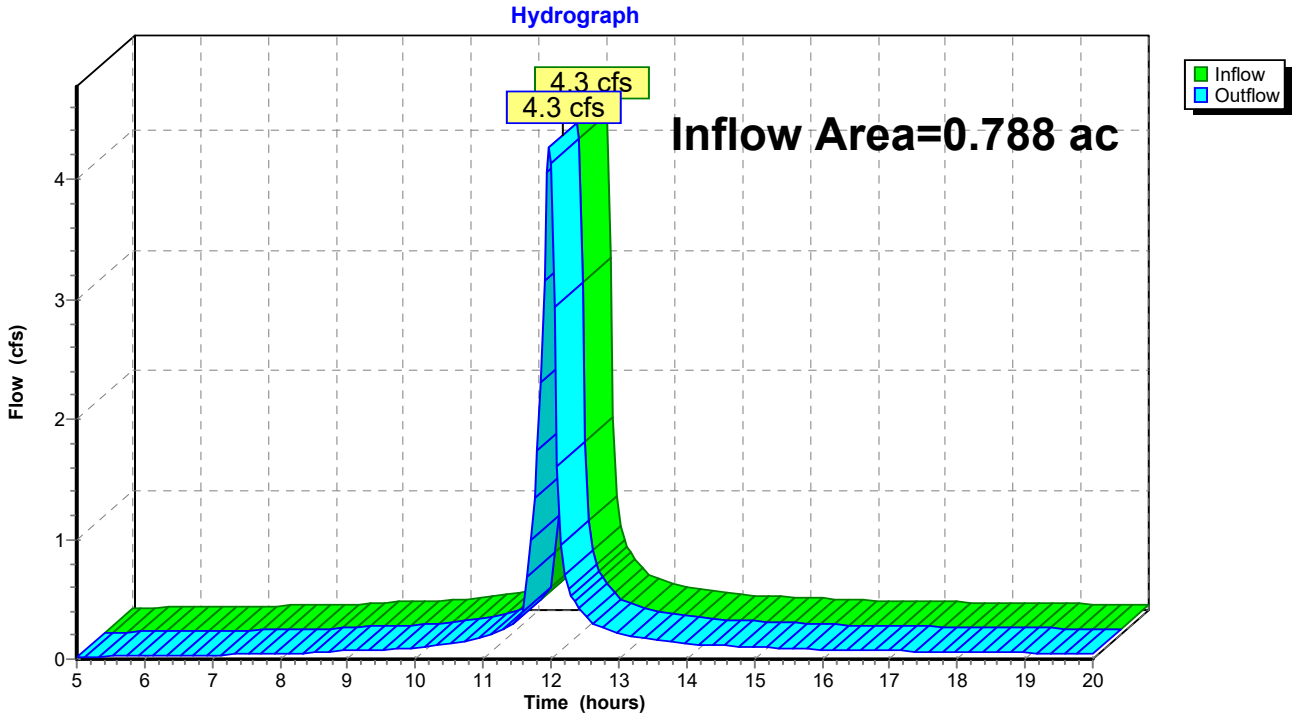
Summary for Reach 6R: East Storm

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 0.788 ac, 75.88% Impervious, Inflow Depth > 3.31" for 10-YR event
Inflow = 4.3 cfs @ 11.98 hrs, Volume= 0.217 af
Outflow = 4.3 cfs @ 11.98 hrs, Volume= 0.217 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Reach 6R: East Storm



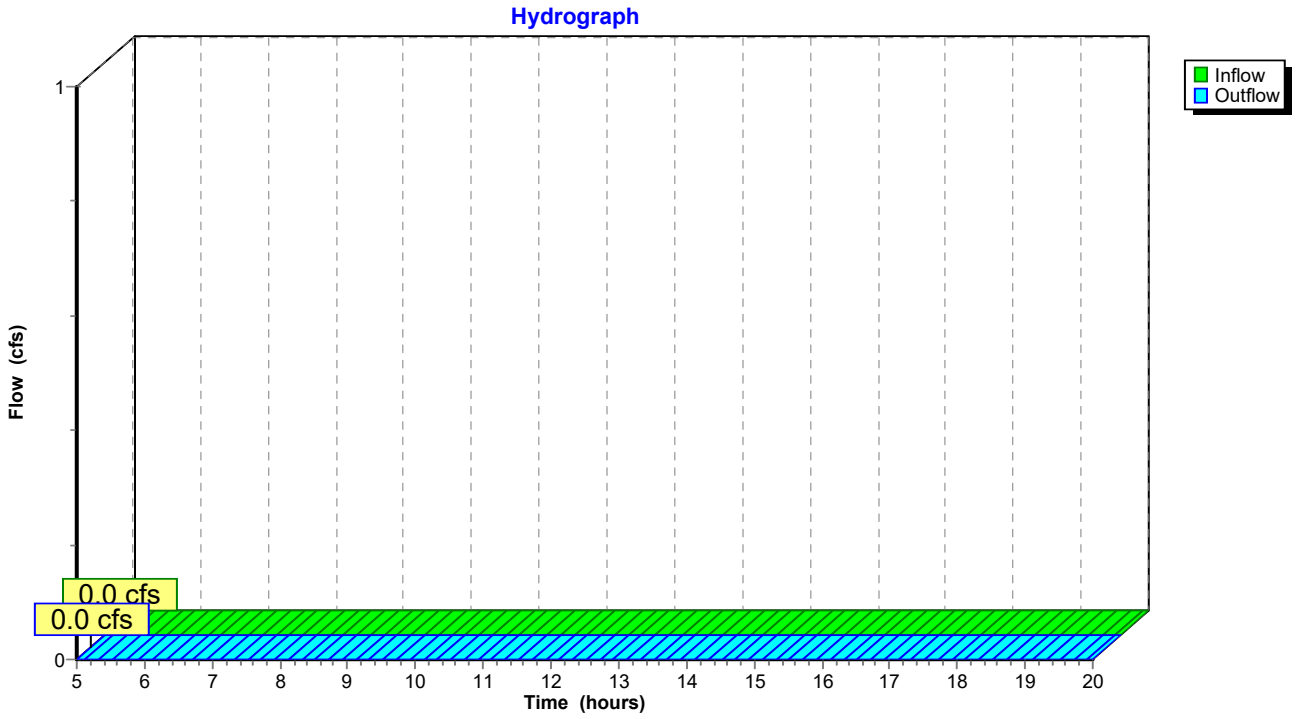
Summary for Reach 7R: North Bluff

[40] Hint: Not Described (Outflow=Inflow)

Inflow	=	0.0 cfs @	5.00 hrs,	Volume=	0.000 af
Outflow	=	0.0 cfs @	5.00 hrs,	Volume=	0.000 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Reach 7R: North Bluff



Summary for Pond 1P: Wet Sedimentation Basin

[82] Warning: Early inflow requires earlier time span

Inflow Area = 4.032 ac, 58.50% Impervious, Inflow Depth > 3.08" for 10-YR event
Inflow = 21.0 cfs @ 11.98 hrs, Volume= 1.035 af
Outflow = 7.4 cfs @ 12.11 hrs, Volume= 1.012 af, Atten= 65%, Lag= 8.1 min
Primary = 7.4 cfs @ 12.11 hrs, Volume= 1.012 af
Routed to Reach 1R : NW Storm
Secondary = 0.0 cfs @ 5.00 hrs, Volume= 0.000 af
Routed to Reach 7R : North Bluff

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Starting Elev= 986.00' Surf.Area= 2,905 sf Storage= 5,818 cf
Peak Elev= 990.46' @ 12.11 hrs Surf.Area= 4,509 sf Storage= 23,276 cf (17,458 cf above start)

Plug-Flow detention time= 134.5 min calculated for 0.876 af (85% of inflow)
Center-of-Mass det. time= 59.9 min (815.6 - 755.6)

Volume	Invert	Avail.Storage	Storage Description
#1	981.00'	52,963 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc) x 0.5

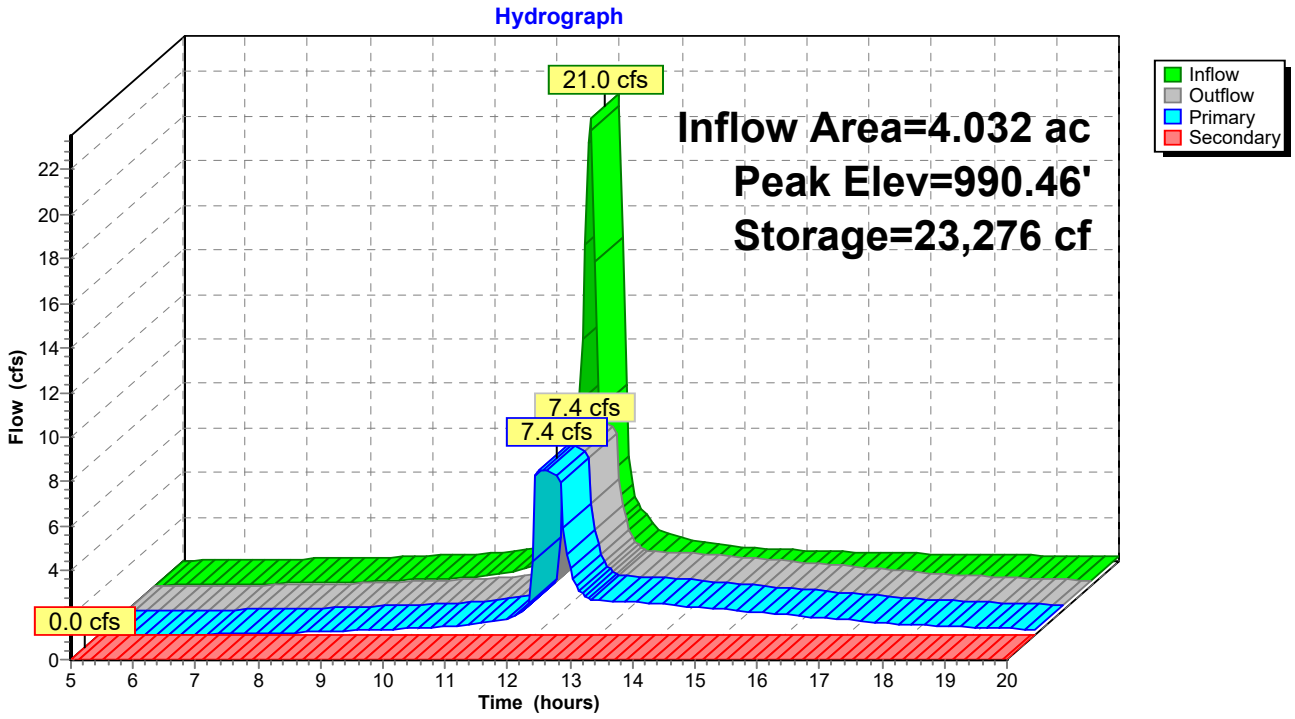
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
981.00	108	0	0
985.00	3,406	7,028	7,028
986.50	7,012	7,814	14,842
995.00	11,323	77,924	92,765
996.00	15,000	13,162	105,927

Device	Routing	Invert	Outlet Devices
#1	Primary	981.69'	**12.0" Round Culvert** L= 169.0' Ke= 0.500 Inlet / Outlet Invert= 981.69' / 980.00' S= 0.0100 '/' Cc= 0.900 n= 0.013 Concrete pipe, straight & clean, Flow Area= 0.79 sf
#2	Device 1	986.00'	**6.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Device 1	989.00'	**4.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s) 1.0' Crest Height
#4	Device 1	990.00'	**HAALA 48" ID Pond Skimmer** Head (feet) 0.00 0.10 0.20 0.30 0.40 0.50 0.60 0.70 0.80 0.90 1.00 1.50 2.00 2.50 3.00 3.50 4.00 4.50 5.00 Disch. (cfs) 0.000 1.320 3.740 6.870 10.580 14.790 19.250 20.790 22.220 23.570 24.850 30.430 35.140 39.280 43.030 46.480 49.690 52.700 55.560
#5	Secondary	995.50'	**20.0' long x 20.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Primary OutFlow Max=7.4 cfs @ 12.11 hrs HW=990.44' (Free Discharge)
└─**1=Culvert** (Barrel Controls 7.4 cfs @ 9.45 fps)
  ├─**2=Orifice/Grate** (Passes < 1.9 cfs potential flow)
  ├─**3=Sharp-Crested Rectangular Weir** (Passes < 24.6 cfs potential flow)
  └─**4=HAALA 48" ID Pond Skimmer** (Passes < 12.1 cfs potential flow)

Secondary OutFlow Max=0.0 cfs @ 5.00 hrs HW=986.00' (Free Discharge)
└─**5=Broad-Crested Rectangular Weir** (Controls 0.0 cfs)

Pond 1P: Wet Sedimentation Basin



Summary for Pond 2P: Filtration Basin

[82] Warning: Early inflow requires earlier time span

Inflow Area = 1.421 ac, 76.15% Impervious, Inflow Depth > 3.37" for 10-YR event
Inflow = 7.8 cfs @ 11.98 hrs, Volume= 0.399 af
Outflow = 4.4 cfs @ 12.07 hrs, Volume= 0.309 af, Atten= 44%, Lag= 5.6 min
Primary = 4.4 cfs @ 12.07 hrs, Volume= 0.309 af
Routed to Reach 2R : West Storm
Secondary = 0.0 cfs @ 5.00 hrs, Volume= 0.000 af
Routed to Reach 3R : West Bluff

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 985.93' @ 12.07 hrs Surf.Area= 2,855 sf Storage= 6,773 cf

Plug-Flow detention time= 101.8 min calculated for 0.308 af (77% of inflow)
Center-of-Mass det. time= 45.0 min (790.7 - 745.7)

Volume	Invert	Avail.Storage	Storage Description
#1	982.00'	13,880 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

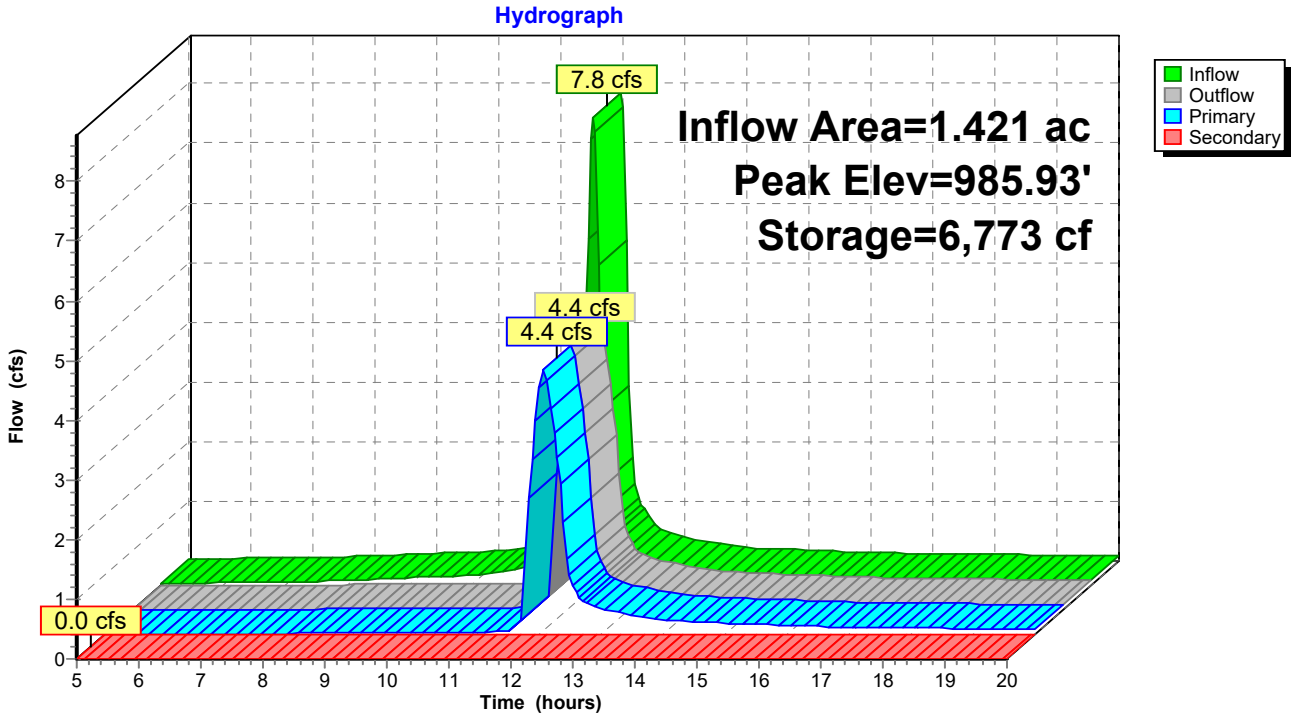
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
982.00	588	0	0
987.00	3,470	10,145	10,145
988.00	4,000	3,735	13,880

Device	Routing	Invert	Outlet Devices
#1	Primary	980.00'	**12.0" Round Culvert** L= 200.0' Ke= 0.500 Inlet / Outlet Invert= 980.00' / 978.00' S= 0.0100 '/' Cc= 0.900 n= 0.013 Concrete pipe, straight & clean, Flow Area= 0.79 sf
#2	Device 1	982.00'	**1.630 in/hr Exfiltration over Surface area above 982.00'** Excluded Surface area = 588 sf Phase-In= 0.01'
#3	Device 1	984.80'	**15" Nyloplast Dome Grate** Head (feet) 0.00 0.10 0.20 0.30 0.40 0.50 0.60 0.70 0.80 0.90 1.00 1.50 2.00 2.50 3.00 3.50 4.00 4.50 5.00 Disch. (cfs) 0.000 0.410 1.170 2.150 2.590 2.890 3.170 3.420 3.660 3.880 4.090 5.010 5.790 6.470 7.090 7.660 8.190 8.680 9.150
#4	Secondary	987.00'	**133.0' long x 3.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 Coef. (English) 2.44 2.58 2.68 2.67 2.65 2.64 2.64 2.68 2.68 2.72 2.81 2.92 2.97 3.07 3.32

Primary OutFlow Max=4.4 cfs @ 12.07 hrs HW=985.91' (Free Discharge)
└─**1=Culvert** (Passes 4.4 cfs of 5.9 cfs potential flow)
  └─**2=Exfiltration** (Exfiltration Controls 0.1 cfs)
  └─**3=15" Nyloplast Dome Grate** (Custom Controls 4.3 cfs)

Secondary OutFlow Max=0.0 cfs @ 5.00 hrs HW=982.00' (Free Discharge)
└─**4=Broad-Crested Rectangular Weir** (Controls 0.0 cfs)

Pond 2P: Filtration Basin



Summary for Pond 3P: Filtration Basin

[82] Warning: Early inflow requires earlier time span

Inflow Area = 0.506 ac, 69.75% Impervious, Inflow Depth > 3.27" for 10-YR event
Inflow = 2.7 cfs @ 11.98 hrs, Volume= 0.138 af
Outflow = 0.3 cfs @ 12.42 hrs, Volume= 0.083 af, Atten= 90%, Lag= 26.5 min
Primary = 0.3 cfs @ 12.42 hrs, Volume= 0.083 af
Routed to Reach 4R : South Storm
Secondary = 0.0 cfs @ 5.00 hrs, Volume= 0.000 af
Routed to Reach 5R : SE Bluff - To Road

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 989.08' @ 12.42 hrs Surf.Area= 2,967 sf Storage= 3,506 cf

Plug-Flow detention time= 205.5 min calculated for 0.083 af (60% of inflow)
Center-of-Mass det. time= 131.7 min (880.8 - 749.1)

Volume	Invert	Avail.Storage	Storage Description
#1	987.00'	14,421 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

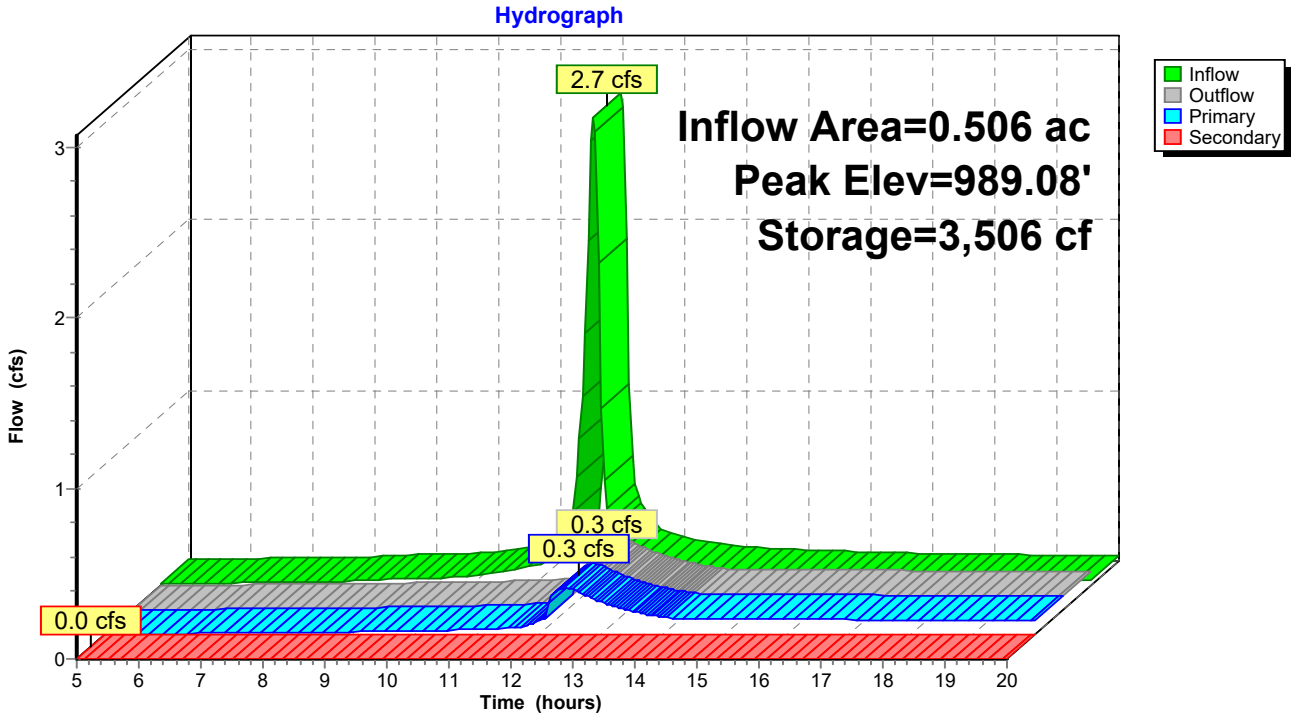
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
987.00	398	0	0
991.00	5,330	11,456	11,456
992.00	600	2,965	14,421

Device	Routing	Invert	Outlet Devices
#1	Primary	984.50'	**12.0" Round Culvert** L= 215.0' Ke= 0.500 Inlet / Outlet Invert= 984.50' / 982.35' S= 0.0100 '/' Cc= 0.900 n= 0.013 Concrete pipe, straight & clean, Flow Area= 0.79 sf
#2	Device 1	987.00'	**1.630 in/hr Exfiltration over Surface area above 987.00'** Excluded Surface area = 398 sf Phase-In= 0.01'
#3	Device 1	989.00'	**12" Nyloplast Dome Grate** Head (feet) 0.00 0.10 0.20 0.30 0.40 0.50 0.60 0.70 0.80 0.90 1.00 1.50 2.00 2.50 3.00 3.50 4.00 4.50 5.00 Disch. (cfs) 0.000 0.210 0.450 0.550 0.640 0.710 0.780 0.850 0.900 0.960 1.010 1.240 1.430 1.600 1.750 1.890 2.020 2.140 2.260
#4	Secondary	990.00'	**10.0' long x 5.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88

Primary OutFlow Max=0.3 cfs @ 12.42 hrs HW=989.08' (Free Discharge)
└─**1=Culvert** (Passes 0.3 cfs of 5.3 cfs potential flow)
  └─**2=Exfiltration** (Exfiltration Controls 0.1 cfs)
  └─**3=12" Nyloplast Dome Grate** (Custom Controls 0.2 cfs)

Secondary OutFlow Max=0.0 cfs @ 5.00 hrs HW=987.00' (Free Discharge)
└─**4=Broad-Crested Rectangular Weir** (Controls 0.0 cfs)

Pond 3P: Filtration Basin



Summary for Pond 4P: Filtration Basin

[82] Warning: Early inflow requires earlier time span

Inflow Area = 0.290 ac, 72.78% Impervious, Inflow Depth > 3.27" for 10-YR event
Inflow = 1.6 cfs @ 11.98 hrs, Volume= 0.079 af
Outflow = 1.6 cfs @ 11.98 hrs, Volume= 0.074 af, Atten= 1%, Lag= 0.0 min
Primary = 0.4 cfs @ 11.98 hrs, Volume= 0.057 af
Routed to Reach 4R : South Storm
Secondary = 1.2 cfs @ 11.98 hrs, Volume= 0.017 af
Routed to Reach 5R : SE Bluff - To Road

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 994.04' @ 11.98 hrs Surf.Area= 999 sf Storage= 561 cf

Plug-Flow detention time= 47.9 min calculated for 0.074 af (93% of inflow)
Center-of-Mass det. time= 22.9 min (772.0 - 749.1)

Volume	Invert	Avail.Storage	Storage Description
#1	993.00'	1,615 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

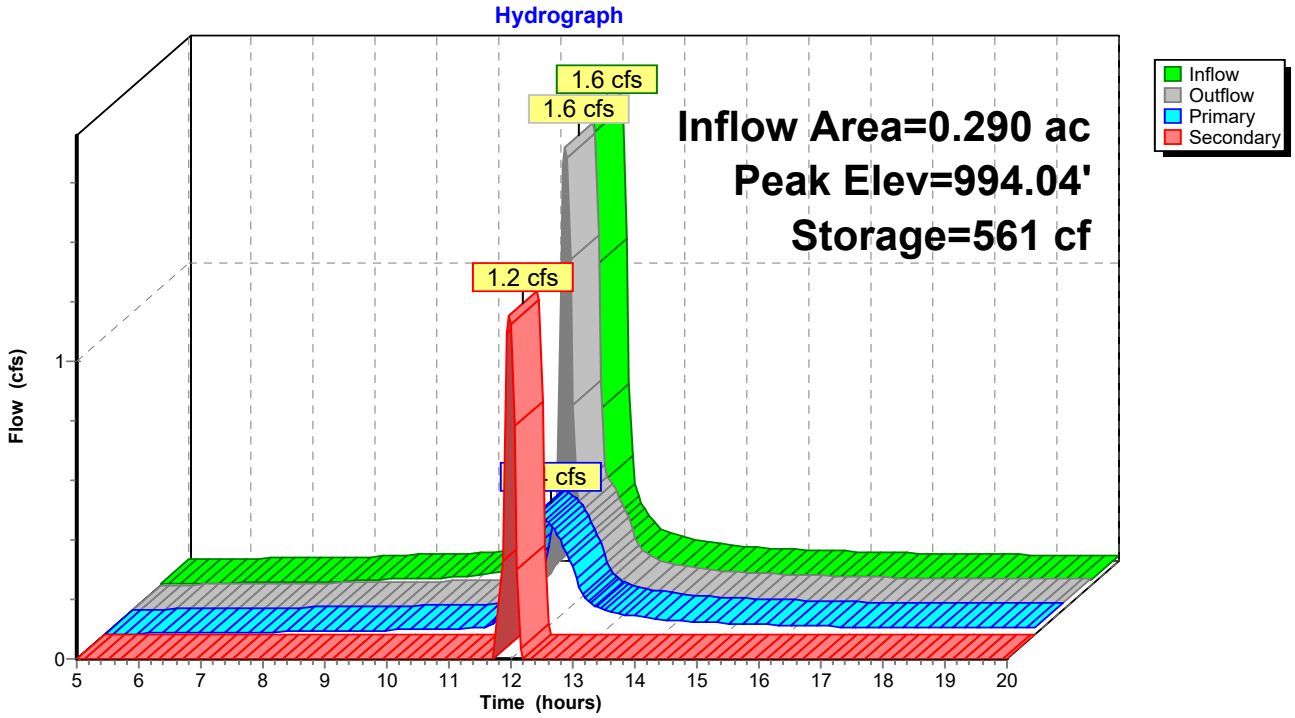
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
993.00	50	0	0
994.00	990	520	520
995.00	1,200	1,095	1,615

Device	Routing	Invert	Outlet Devices
#1	Primary	981.22'	**6.0" Round Culvert** L= 151.0' Ke= 0.500 Inlet / Outlet Invert= 981.22' / 981.07' S= 0.0010 '/' Cc= 0.900 n= 0.011 PVC, smooth interior, Flow Area= 0.20 sf
#2	Device 1	993.00'	**1.600 in/hr Exfiltration over Surface area above 993.00'** Excluded Surface area = 50 sf Phase-In= 0.01'
#3	Device 1	993.70'	**Nyloplast 8" Drop In Grate** Head (feet) 0.00 0.10 0.20 0.30 0.40 0.50 0.60 0.70 0.80 0.90 1.00 1.50 2.00 2.50 3.00 3.50 4.00 4.50 5.00 Disch. (cfs) 0.000 0.200 0.280 0.340 0.400 0.440 0.480 0.520 0.560 0.590 0.630 0.770 0.890 0.990 1.080 1.170 1.250 1.330 1.400
#4	Secondary	994.00'	**50.0' long x 3.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 Coef. (English) 2.44 2.58 2.68 2.67 2.65 2.64 2.64 2.68 2.68 2.72 2.81 2.92 2.97 3.07 3.32

Primary OutFlow Max=0.4 cfs @ 11.98 hrs HW=994.04' (Free Discharge)
└─**1=Culvert** (Passes 0.4 cfs of 1.8 cfs potential flow)
  └─**2=Exfiltration** (Exfiltration Controls 0.0 cfs)
  └─**3=Nyloplast 8" Drop In Grate** (Custom Controls 0.4 cfs)

Secondary OutFlow Max=1.0 cfs @ 11.98 hrs HW=994.04' (Free Discharge)
└─**4=Broad-Crested Rectangular Weir** (Weir Controls 1.0 cfs @ 0.49 fps)

Pond 4P: Filtration Basin



Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 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: Runoff Area=175,645 sf 58.50% Impervious Runoff Depth>5.73"
Tc=7.0 min CN=91 Runoff=37.6 cfs 1.926 af

Subcatchment2S: Runoff Area=57,101 sf 58.18% Impervious Runoff Depth>5.63"
Tc=7.0 min CN=90 Runoff=12.1 cfs 0.615 af

Subcatchment3S: Runoff Area=61,891 sf 76.15% Impervious Runoff Depth>6.03"
Tc=7.0 min CN=94 Runoff=13.6 cfs 0.713 af

Subcatchment4S: Runoff Area=21,859 sf 11.55% Impervious Runoff Depth>4.76"
Tc=7.0 min CN=82 Runoff=4.1 cfs 0.199 af

Subcatchment5S: Runoff Area=26,713 sf 64.20% Impervious Runoff Depth>5.83"
Tc=7.0 min CN=92 Runoff=5.8 cfs 0.298 af

Subcatchment6S: Runoff Area=22,043 sf 69.75% Impervious Runoff Depth>5.93"
Tc=7.0 min CN=93 Runoff=4.8 cfs 0.250 af

Subcatchment7S: Runoff Area=58,710 sf 53.68% Impervious Runoff Depth>5.63"
Tc=7.0 min CN=90 Runoff=12.4 cfs 0.632 af

Subcatchment8S: Runoff Area=12,647 sf 72.78% Impervious Runoff Depth>5.93"
Tc=7.0 min CN=93 Runoff=2.8 cfs 0.143 af

Subcatchment9S: Runoff Area=12,130 sf 100.00% Impervious Runoff Depth>6.34"
Tc=7.0 min CN=98 Runoff=2.7 cfs 0.147 af

Subcatchment10S: Runoff Area=22,212 sf 62.70% Impervious Runoff Depth>5.73"
Tc=7.0 min CN=91 Runoff=4.8 cfs 0.244 af

Subcatchment11S: Runoff Area=4,300 sf 0.00% Impervious Runoff Depth>4.54"
Tc=7.0 min CN=80 Runoff=0.8 cfs 0.037 af

Reach 1R: NW Storm Inflow=20.1 cfs 2.497 af
Outflow=20.1 cfs 2.497 af

Reach 2R: West Storm Inflow=11.4 cfs 0.913 af
Outflow=11.4 cfs 0.913 af

Reach 3R: West Bluff Inflow=4.1 cfs 0.207 af
Outflow=4.1 cfs 0.207 af

Reach 4R: South Storm Inflow=13.6 cfs 0.909 af
Outflow=13.6 cfs 0.909 af

Reach 5R: SE Bluff - To Road Inflow=3.1 cfs 0.081 af
Outflow=3.1 cfs 0.081 af

Reach 6R: East Storm Inflow=7.5 cfs 0.391 af
Outflow=7.5 cfs 0.391 af

Reach 7R: North Bluff Inflow=0.0 cfs 0.000 af
Outflow=0.0 cfs 0.000 af

Pond 1P: Wet Sedimentation Basin Peak Elev=993.74' Storage=39,468 cf Inflow=37.6 cfs 1.926 af
Primary=8.6 cfs 1.882 af Secondary=0.0 cfs 0.000 af Outflow=8.6 cfs 1.882 af

Pond 2P: Filtration Basin Peak Elev=987.03' Storage=10,243 cf Inflow=13.6 cfs 0.713 af
Primary=6.2 cfs 0.615 af Secondary=1.1 cfs 0.008 af Outflow=7.3 cfs 0.623 af

Pond 3P: Filtration Basin Peak Elev=989.75' Storage=5,743 cf Inflow=4.8 cfs 0.250 af
Primary=1.0 cfs 0.183 af Secondary=0.0 cfs 0.000 af Outflow=1.0 cfs 0.183 af

Pond 4P: Filtration Basin Peak Elev=994.07' Storage=589 cf Inflow=2.8 cfs 0.143 af
Primary=0.4 cfs 0.094 af Secondary=2.3 cfs 0.044 af Outflow=2.8 cfs 0.137 af

Total Runoff Area = 10.910 ac Runoff Volume = 5.205 af Average Runoff Depth = 5.73"
40.05% Pervious = 4.369 ac 59.95% Impervious = 6.541 ac

Summary for Subcatchment 1S:

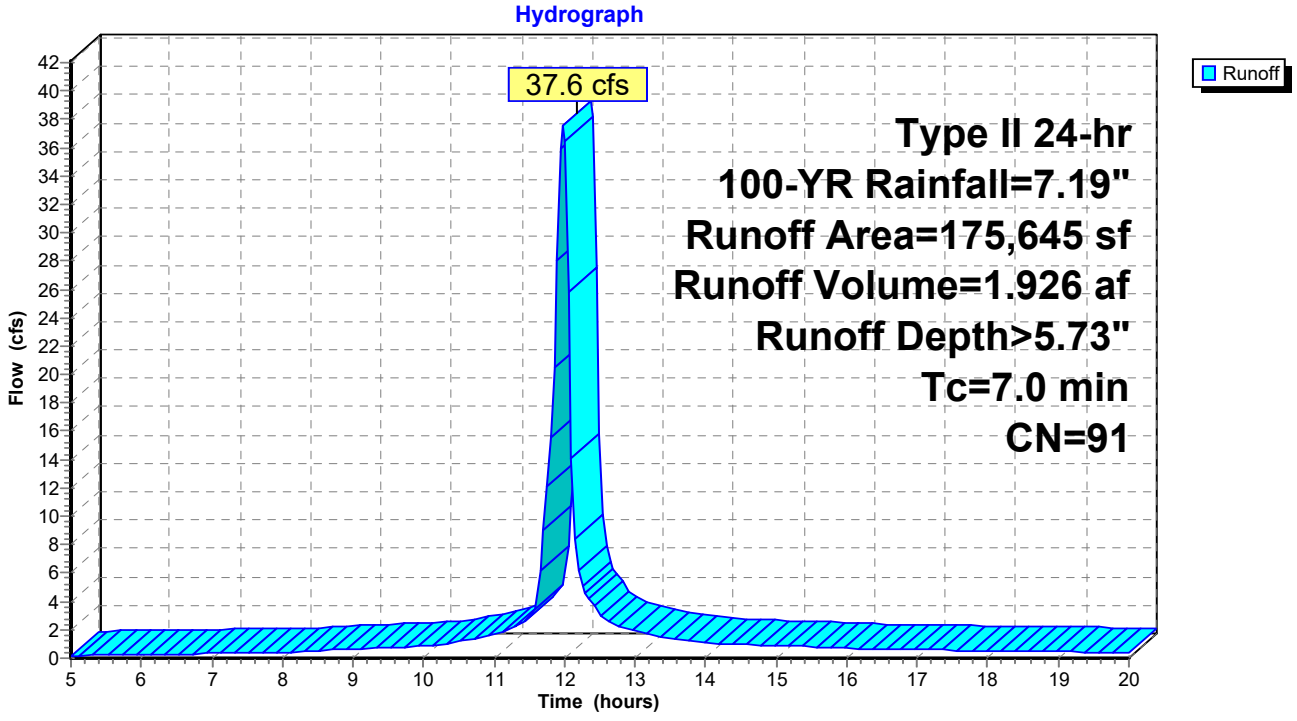
Runoff = 37.6 cfs @ 11.98 hrs, Volume= 1.926 af, Depth> 5.73"
Routed to Pond 1P : Wet Sedimentation Basin

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 100-YR Rainfall=7.19"

Area (sf)	CN	Description
102,749	98	Paved parking, HSG D
72,896	80	>75% Grass cover, Good, HSG D
175,645	91	Weighted Average
72,896		41.50% Pervious Area
102,749		58.50% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.0					**Direct Entry,**

Subcatchment 1S:



Summary for Subcatchment 2S:

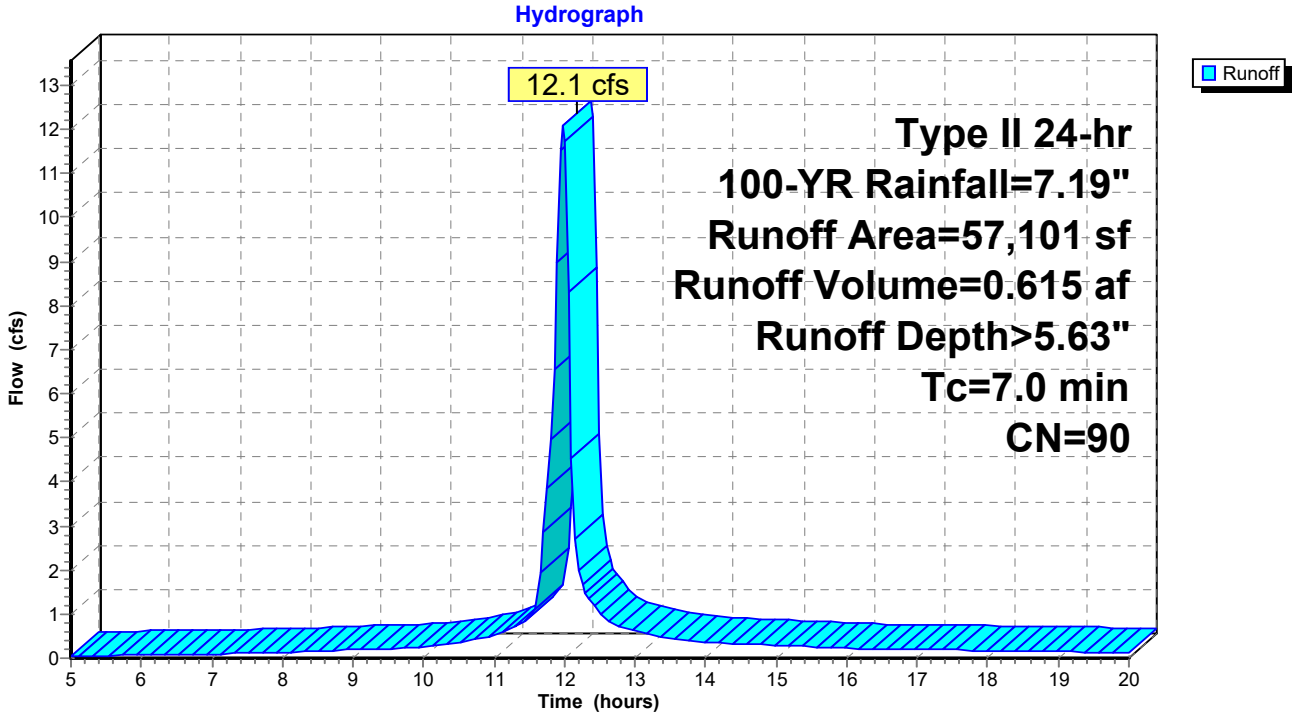
Runoff = 12.1 cfs @ 11.98 hrs, Volume= 0.615 af, Depth> 5.63"
Routed to Reach 1R : NW Storm

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 100-YR Rainfall=7.19"

Area (sf)	CN	Description
33,220	98	Paved parking, HSG D
23,881	80	>75% Grass cover, Good, HSG D
57,101	90	Weighted Average
23,881		41.82% Pervious Area
33,220		58.18% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.0					**Direct Entry,**

Subcatchment 2S:



Summary for Subcatchment 3S:

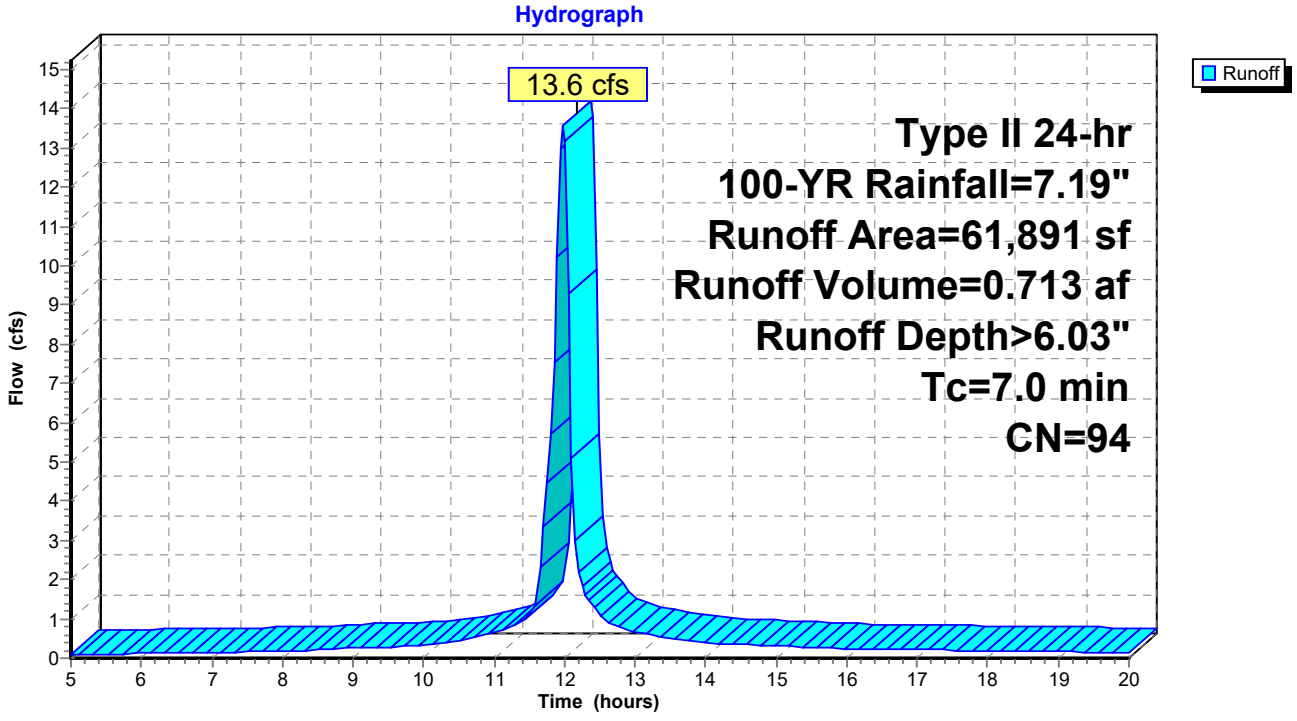
Runoff = 13.6 cfs @ 11.98 hrs, Volume= 0.713 af, Depth> 6.03"
Routed to Pond 2P : Filtration Basin

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 100-YR Rainfall=7.19"

Area (sf)	CN	Description
47,128	98	Paved parking, HSG D
14,763	80	>75% Grass cover, Good, HSG D
61,891	94	Weighted Average
14,763		23.85% Pervious Area
47,128		76.15% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.0					**Direct Entry,**

Subcatchment 3S:



Summary for Subcatchment 4S:

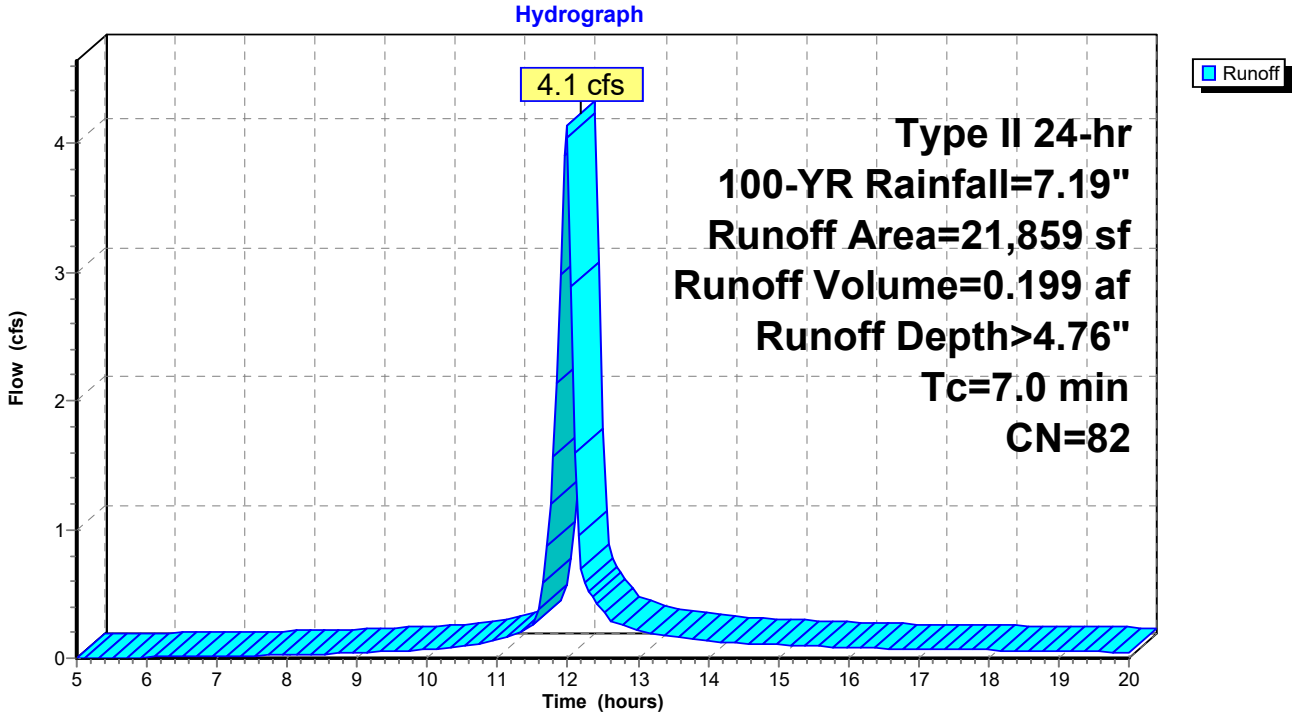
Runoff = 4.1 cfs @ 11.98 hrs, Volume= 0.199 af, Depth> 4.76"
Routed to Reach 3R : West Bluff

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 100-YR Rainfall=7.19"

Area (sf)	CN	Description
2,525	98	Paved parking, HSG D
19,334	80	>75% Grass cover, Good, HSG D
21,859	82	Weighted Average
19,334		88.45% Pervious Area
2,525		11.55% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.0					**Direct Entry,**

Subcatchment 4S:



Summary for Subcatchment 5S:

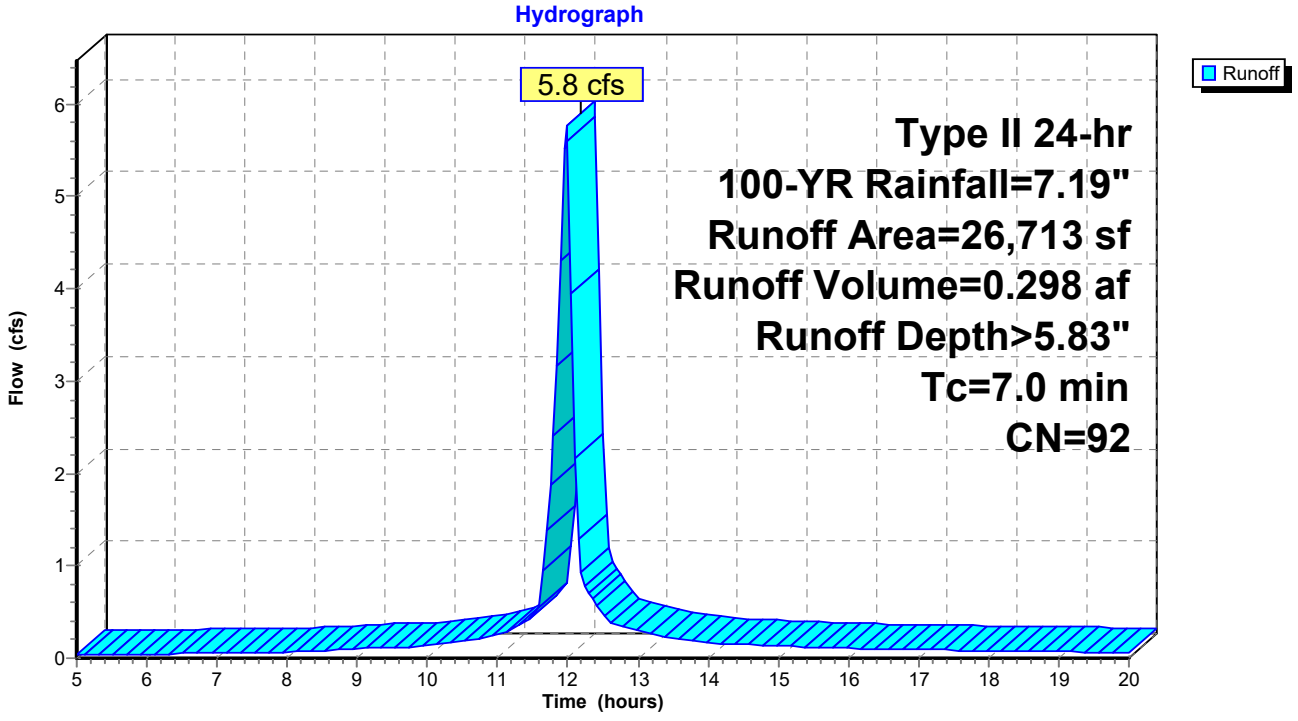
Runoff = 5.8 cfs @ 11.98 hrs, Volume= 0.298 af, Depth> 5.83"
Routed to Reach 2R : West Storm

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 100-YR Rainfall=7.19"

Area (sf)	CN	Description
17,151	98	Paved parking, HSG D
9,562	80	>75% Grass cover, Good, HSG D
26,713	92	Weighted Average
9,562		35.80% Pervious Area
17,151		64.20% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.0					**Direct Entry,**

Subcatchment 5S:



Summary for Subcatchment 6S:

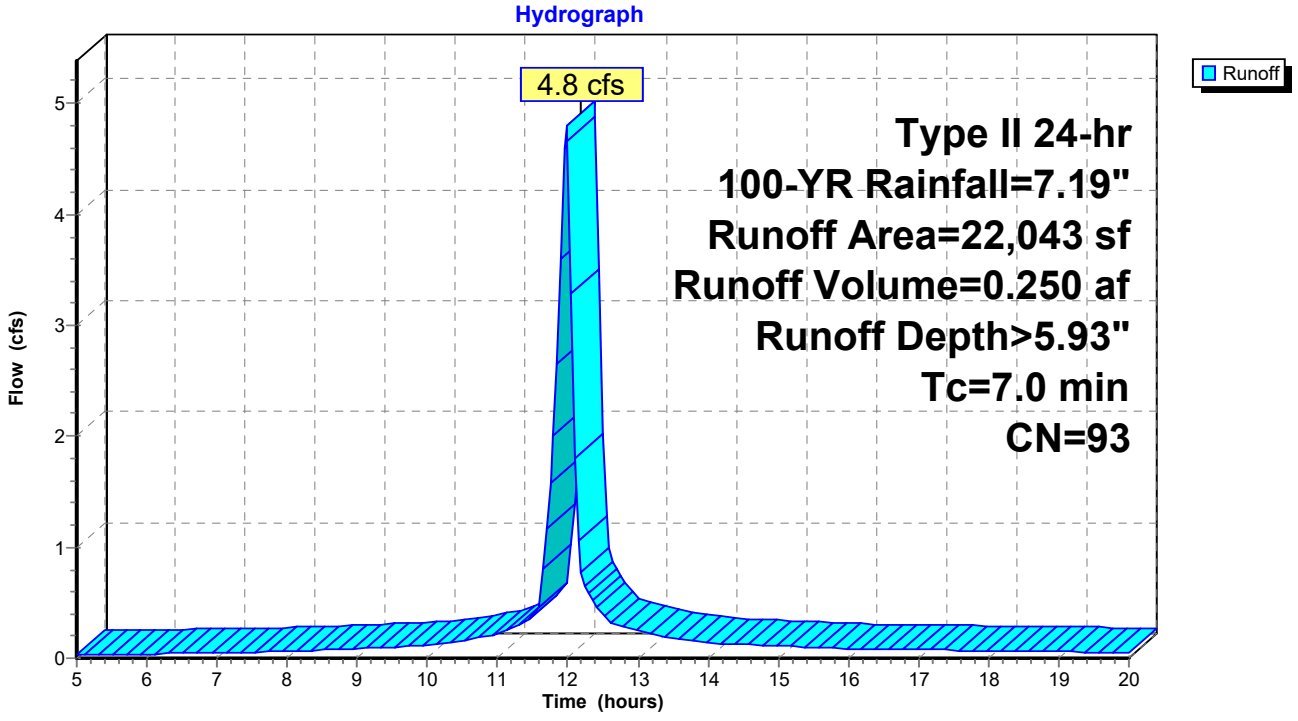
Runoff = 4.8 cfs @ 11.98 hrs, Volume= 0.250 af, Depth> 5.93"
Routed to Pond 3P : Filtration Basin

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 100-YR Rainfall=7.19"

Area (sf)	CN	Description
15,375	98	Paved parking, HSG D
6,668	80	>75% Grass cover, Good, HSG D
22,043	93	Weighted Average
6,668		30.25% Pervious Area
15,375		69.75% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.0					**Direct Entry,**

Subcatchment 6S:



Summary for Subcatchment 7S:

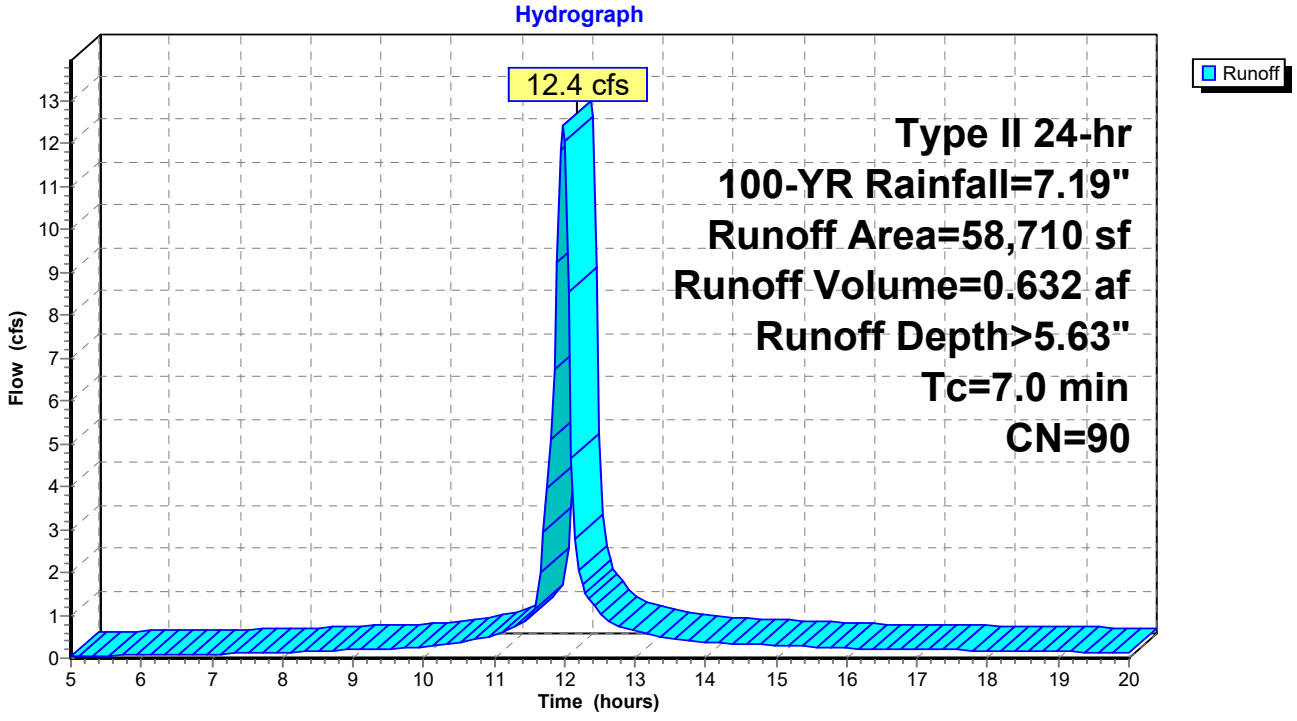
Runoff = 12.4 cfs @ 11.98 hrs, Volume= 0.632 af, Depth> 5.63"
Routed to Reach 4R : South Storm

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 100-YR Rainfall=7.19"

Area (sf)	CN	Description
31,516	98	Paved parking, HSG D
27,194	80	>75% Grass cover, Good, HSG D
58,710	90	Weighted Average
27,194		46.32% Pervious Area
31,516		53.68% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.0					**Direct Entry,**

Subcatchment 7S:



Summary for Subcatchment 8S:

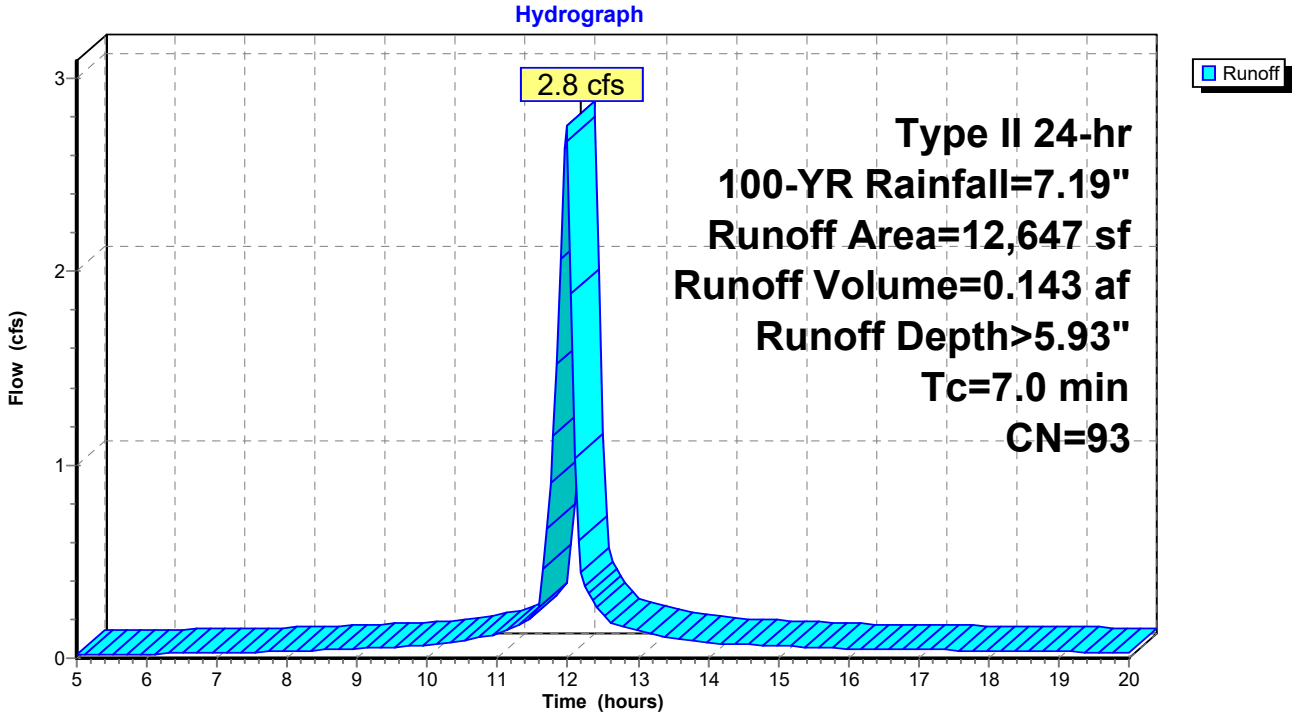
Runoff = 2.8 cfs @ 11.98 hrs, Volume= 0.143 af, Depth> 5.93"
Routed to Pond 4P : Filtration Basin

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 100-YR Rainfall=7.19"

Area (sf)	CN	Description
9,205	98	Paved parking, HSG D
3,442	80	>75% Grass cover, Good, HSG D
12,647	93	Weighted Average
3,442		27.22% Pervious Area
9,205		72.78% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.0					**Direct Entry,**

Subcatchment 8S:



Summary for Subcatchment 9S:

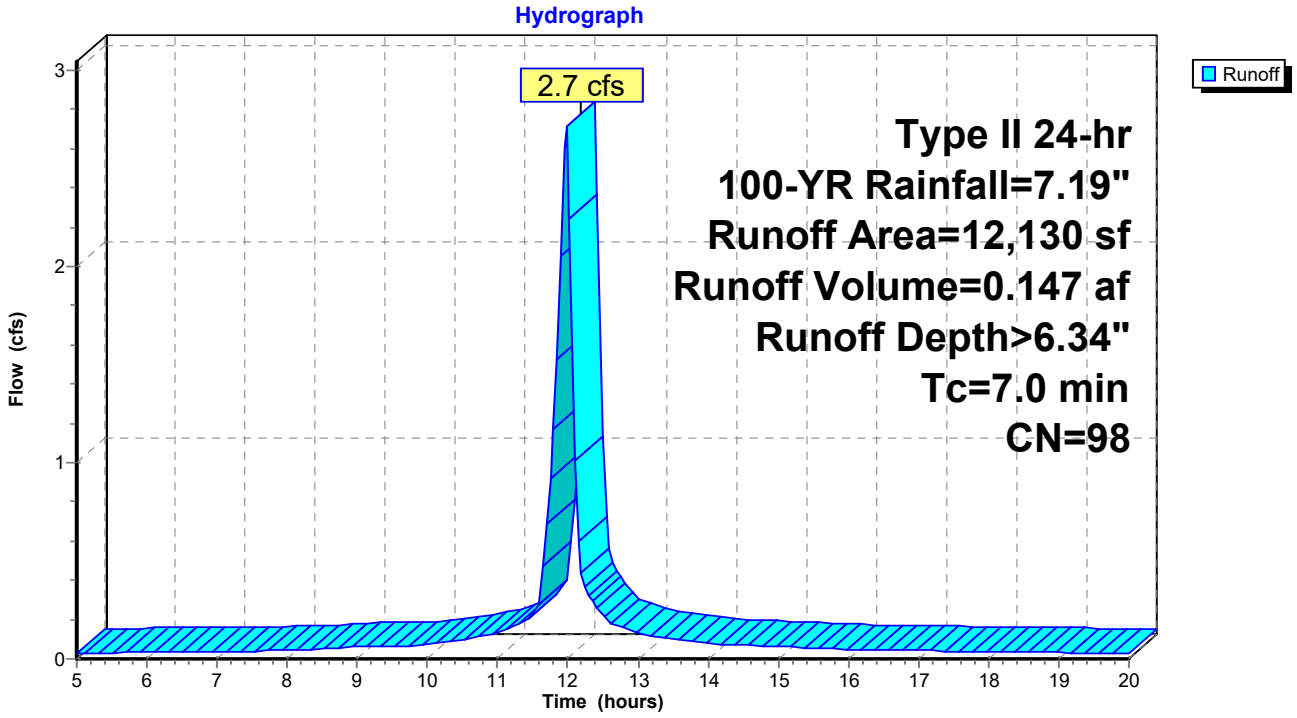
Runoff = 2.7 cfs @ 11.98 hrs, Volume= 0.147 af, Depth> 6.34"
Routed to Reach 6R : East Storm

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 100-YR Rainfall=7.19"

Area (sf)	CN	Description
12,130	98	Paved parking, HSG D
12,130		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.0					**Direct Entry,**

Subcatchment 9S:



Summary for Subcatchment 10S:

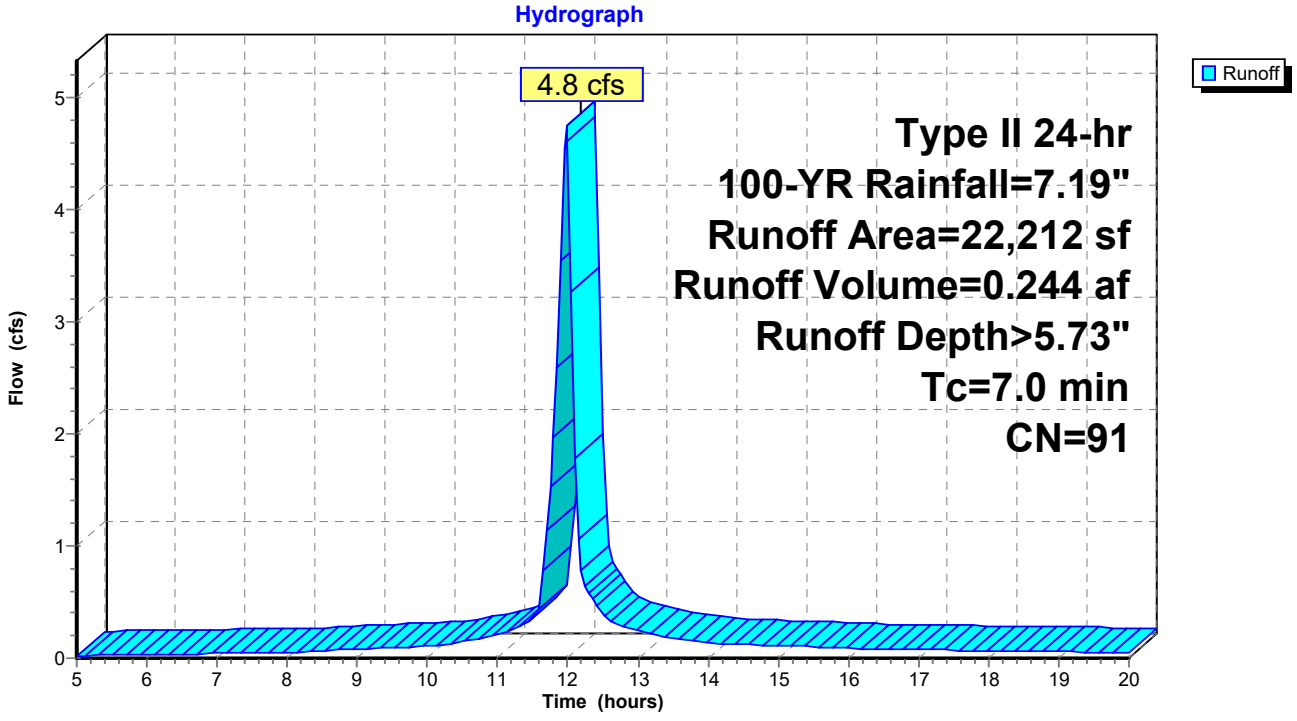
Runoff = 4.8 cfs @ 11.98 hrs, Volume= 0.244 af, Depth> 5.73"
Routed to Reach 6R : East Storm

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 100-YR Rainfall=7.19"

Area (sf)	CN	Description
13,928	98	Paved parking, HSG D
8,284	80	>75% Grass cover, Good, HSG D
22,212	91	Weighted Average
8,284		37.30% Pervious Area
13,928		62.70% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.0					**Direct Entry,**

Subcatchment 10S:



Summary for Subcatchment 11S:

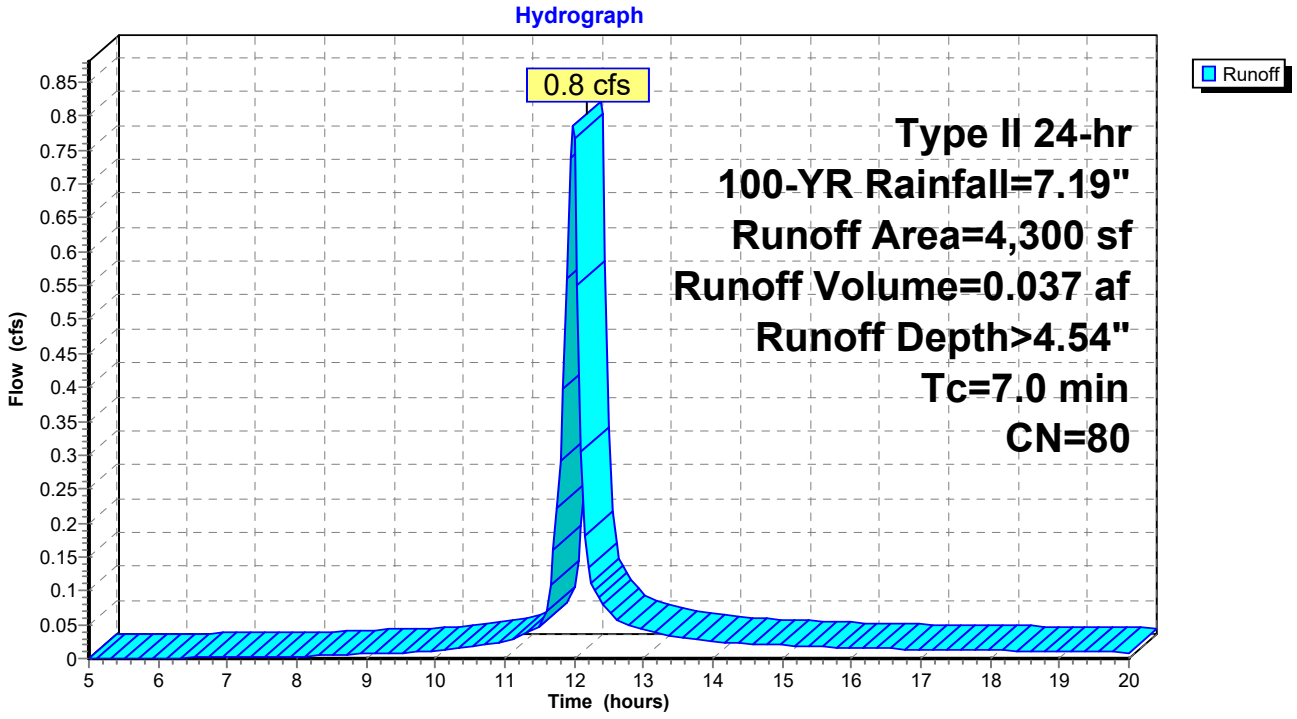
Runoff = 0.8 cfs @ 11.98 hrs, Volume= 0.037 af, Depth> 4.54"
Routed to Reach 5R : SE Bluff - To Road

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Type II 24-hr 100-YR Rainfall=7.19"

Area (sf)	CN	Description
0	98	Paved parking, HSG D
4,300	80	>75% Grass cover, Good, HSG D
4,300	80	Weighted Average
4,300		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.0					**Direct Entry,**

Subcatchment 11S:



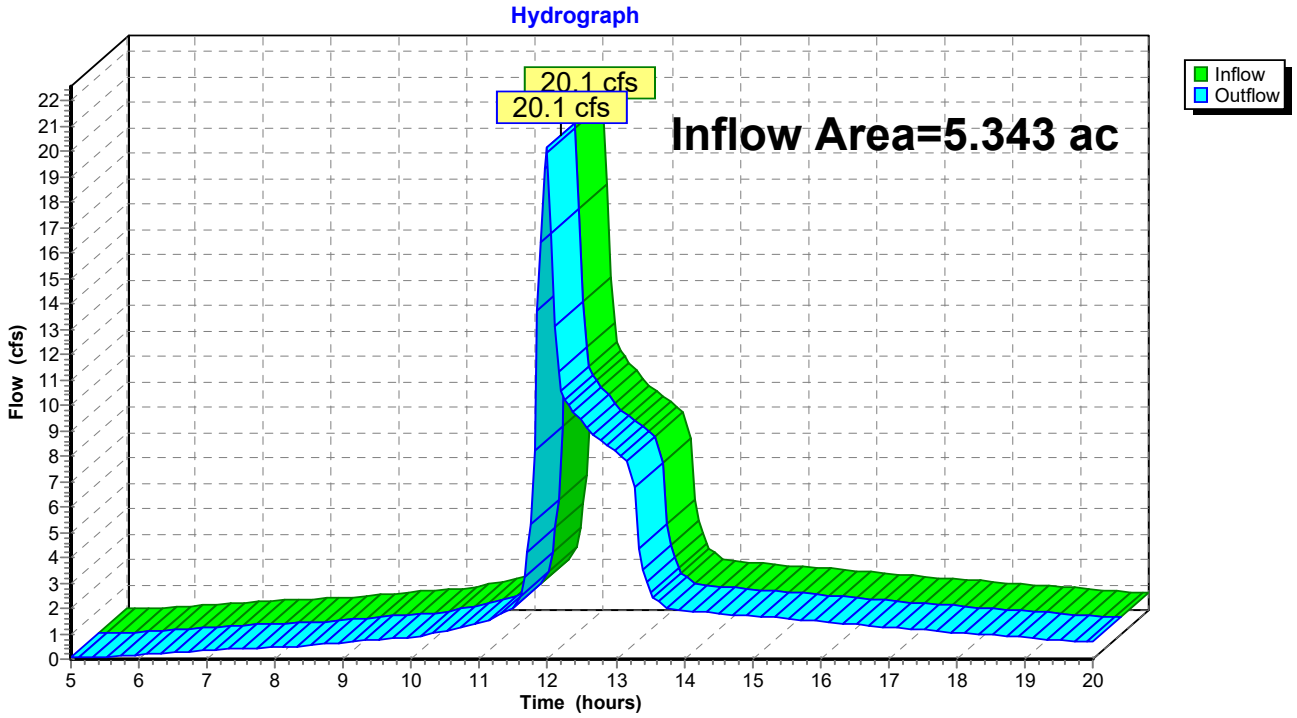
Summary for Reach 1R: NW Storm

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 5.343 ac, 58.42% Impervious, Inflow Depth > 5.61" for 100-YR event
Inflow = 20.1 cfs @ 11.98 hrs, Volume= 2.497 af
Outflow = 20.1 cfs @ 11.98 hrs, Volume= 2.497 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Reach 1R: NW Storm



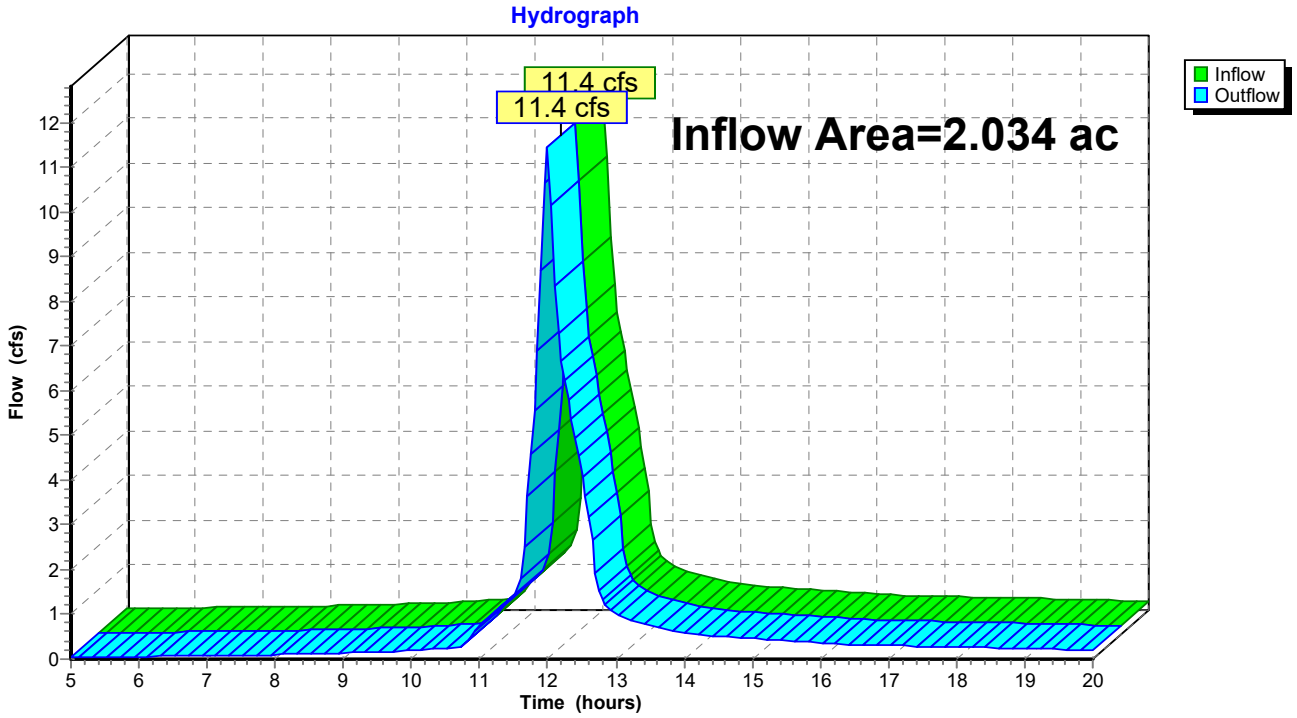
Summary for Reach 2R: West Storm

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 2.034 ac, 72.55% Impervious, Inflow Depth > 5.39" for 100-YR event
Inflow = 11.4 cfs @ 11.99 hrs, Volume= 0.913 af
Outflow = 11.4 cfs @ 11.99 hrs, Volume= 0.913 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Reach 2R: West Storm

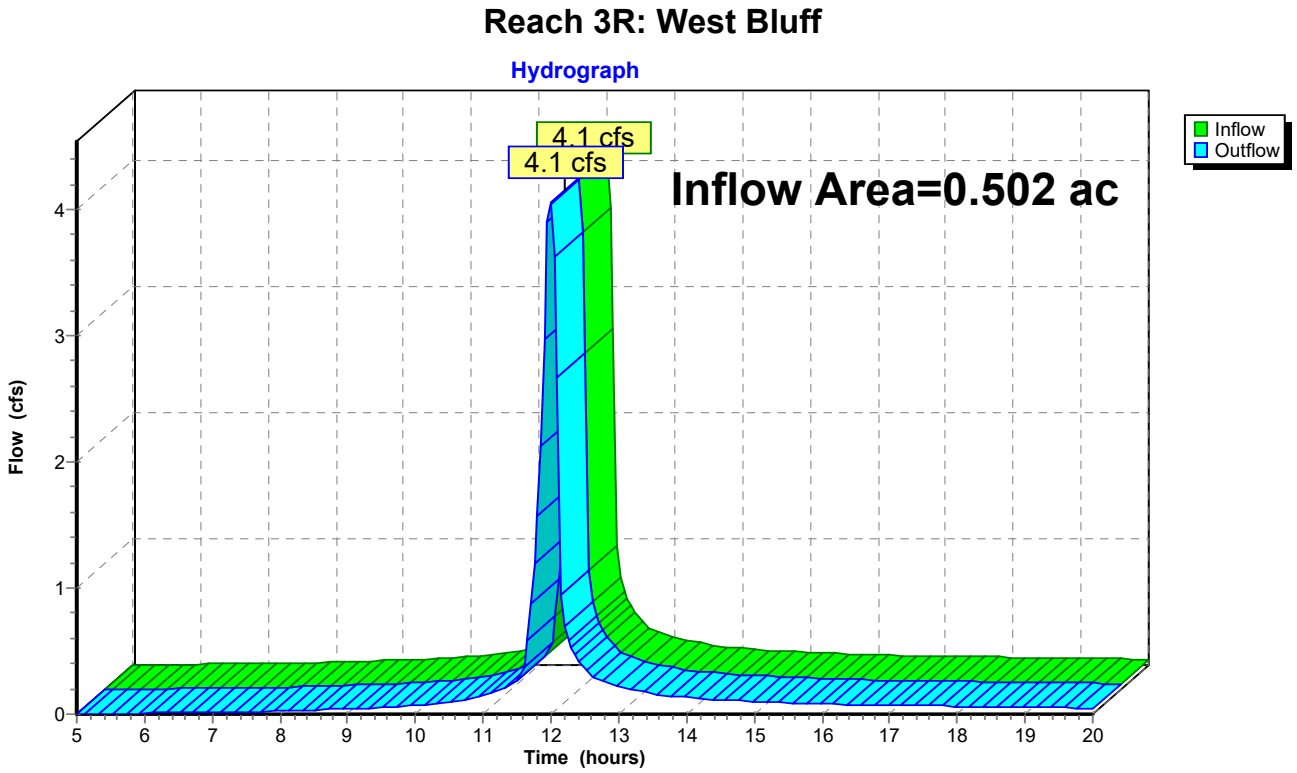


Summary for Reach 3R: West Bluff

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 0.502 ac, 11.55% Impervious, Inflow Depth > 4.94" for 100-YR event
Inflow = 4.1 cfs @ 11.99 hrs, Volume= 0.207 af
Outflow = 4.1 cfs @ 11.99 hrs, Volume= 0.207 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs



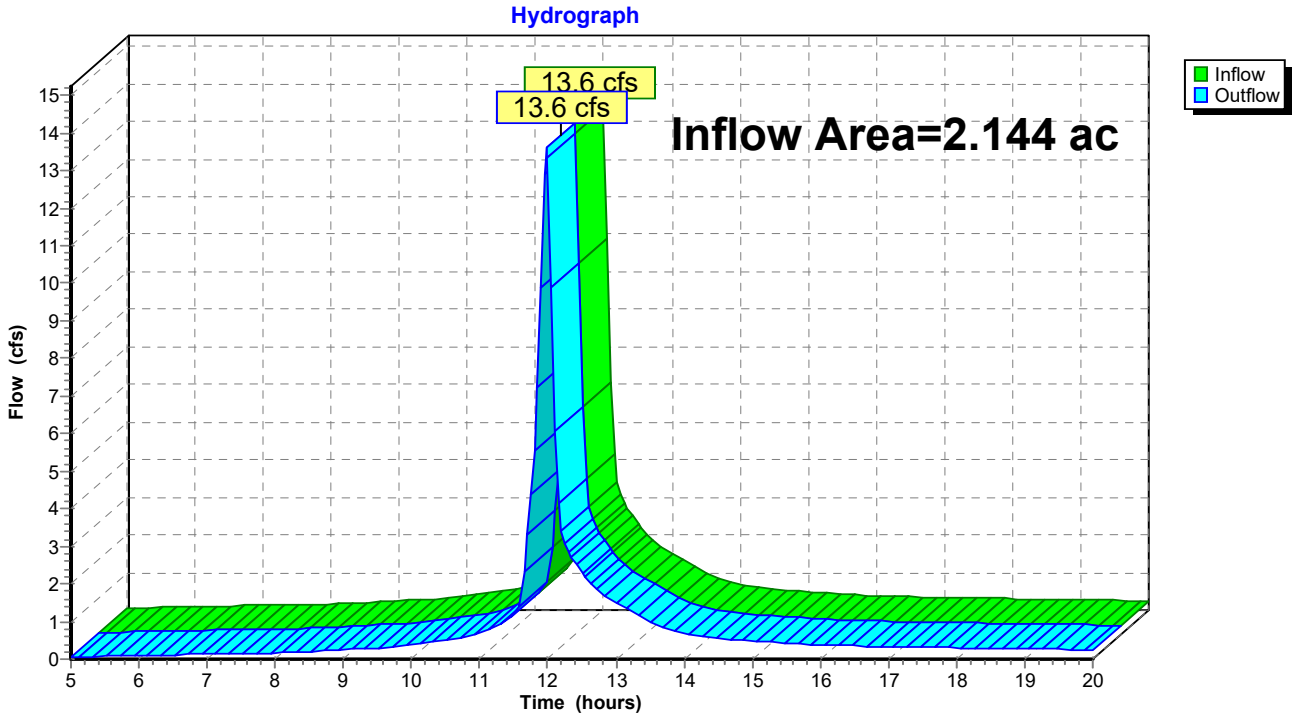
Summary for Reach 4R: South Storm

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 2.144 ac, 60.06% Impervious, Inflow Depth > 5.09" for 100-YR event
Inflow = 13.6 cfs @ 11.98 hrs, Volume= 0.909 af
Outflow = 13.6 cfs @ 11.98 hrs, Volume= 0.909 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Reach 4R: South Storm



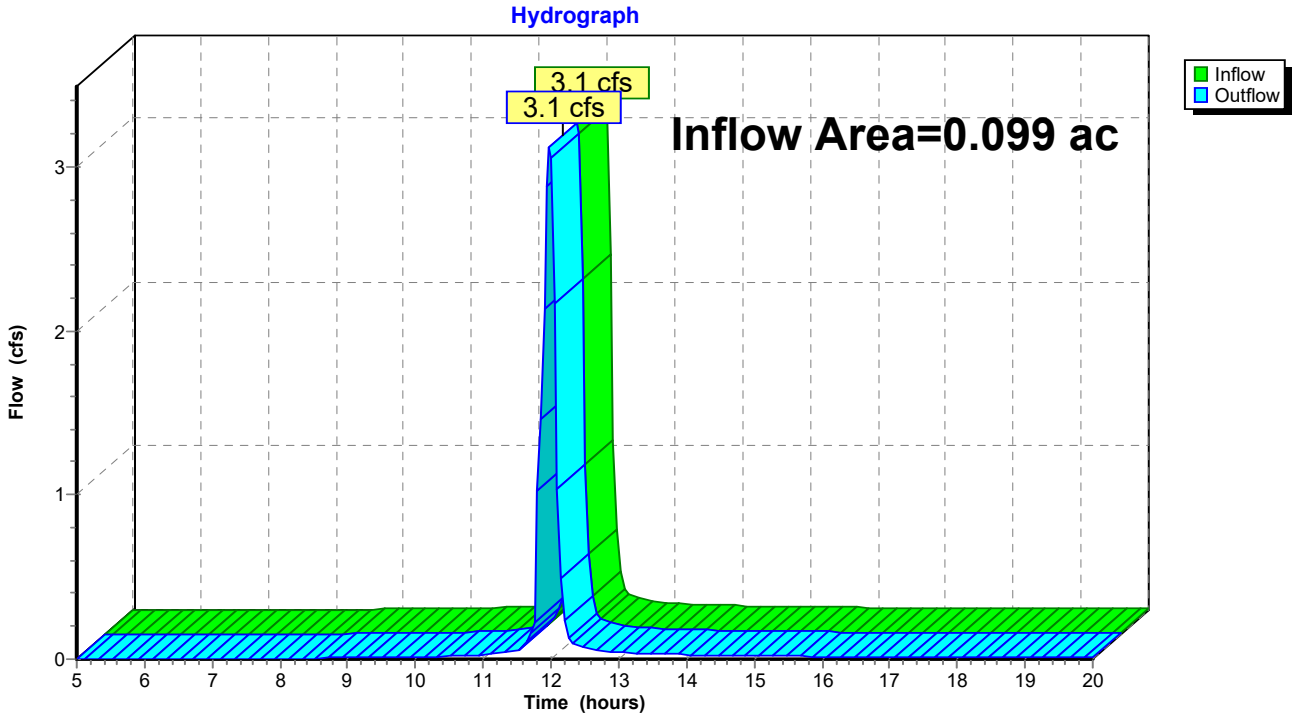
Summary for Reach 5R: SE Bluff - To Road

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 0.099 ac, 0.00% Impervious, Inflow Depth > 9.86" for 100-YR event
Inflow = 3.1 cfs @ 11.98 hrs, Volume= 0.081 af
Outflow = 3.1 cfs @ 11.98 hrs, Volume= 0.081 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Reach 5R: SE Bluff - To Road



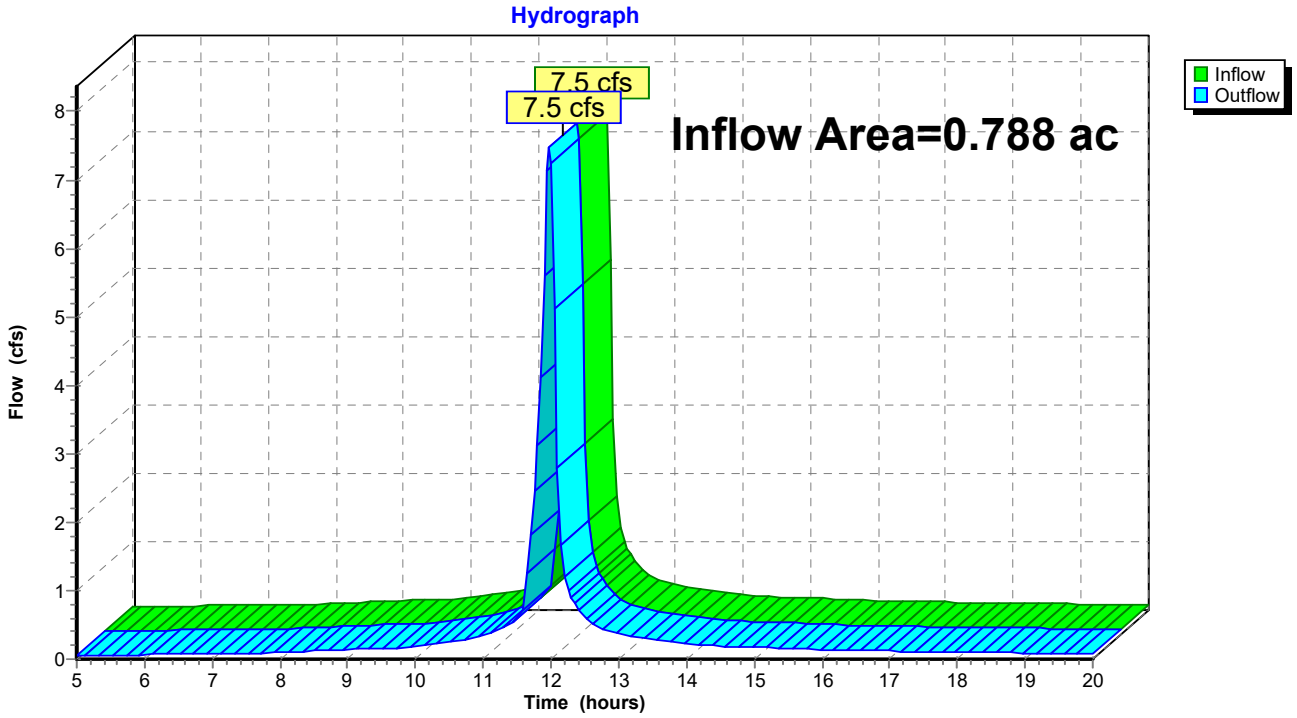
Summary for Reach 6R: East Storm

[40] Hint: Not Described (Outflow=Inflow)

Inflow Area = 0.788 ac, 75.88% Impervious, Inflow Depth > 5.95" for 100-YR event
Inflow = 7.5 cfs @ 11.98 hrs, Volume= 0.391 af
Outflow = 7.5 cfs @ 11.98 hrs, Volume= 0.391 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Reach 6R: East Storm



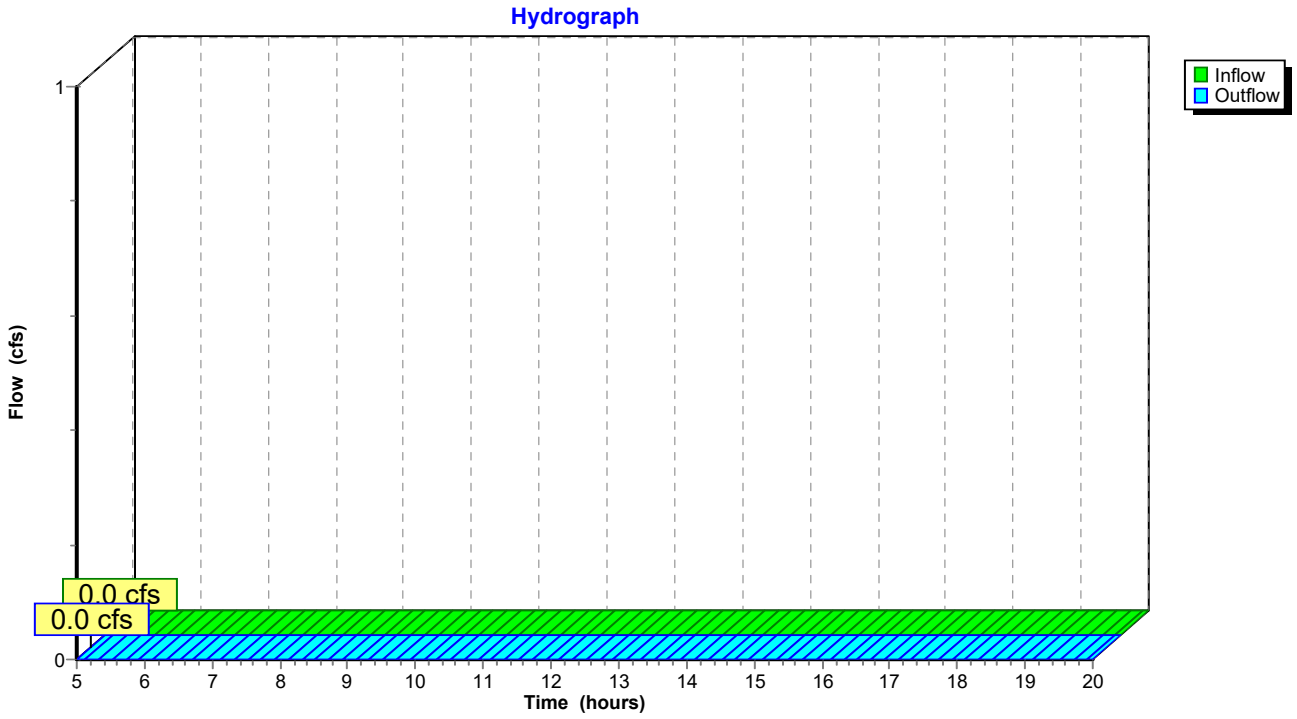
Summary for Reach 7R: North Bluff

[40] Hint: Not Described (Outflow=Inflow)

Inflow	=	0.0 cfs @	5.00 hrs,	Volume=	0.000 af
Outflow	=	0.0 cfs @	5.00 hrs,	Volume=	0.000 af, Atten= 0%, Lag= 0.0 min

Routing by Stor-Ind+Trans method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Reach 7R: North Bluff



Summary for Pond 1P: Wet Sedimentation Basin

[82] Warning: Early inflow requires earlier time span

Inflow Area = 4.032 ac, 58.50% Impervious, Inflow Depth > 5.73" for 100-YR event
Inflow = 37.6 cfs @ 11.98 hrs, Volume= 1.926 af
Outflow = 8.6 cfs @ 12.16 hrs, Volume= 1.882 af, Atten= 77%, Lag= 10.8 min
Primary = 8.6 cfs @ 12.16 hrs, Volume= 1.882 af
Routed to Reach 1R : NW Storm
Secondary = 0.0 cfs @ 5.00 hrs, Volume= 0.000 af
Routed to Reach 7R : North Bluff

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Starting Elev= 986.00' Surf.Area= 2,905 sf Storage= 5,818 cf
Peak Elev= 993.74' @ 12.16 hrs Surf.Area= 5,343 sf Storage= 39,468 cf (33,650 cf above start)

Plug-Flow detention time= 110.8 min calculated for 1.742 af (90% of inflow)
Center-of-Mass det. time= 56.3 min (800.5 - 744.2)

Volume	Invert	Avail.Storage	Storage Description
#1	981.00'	52,963 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc) x 0.5

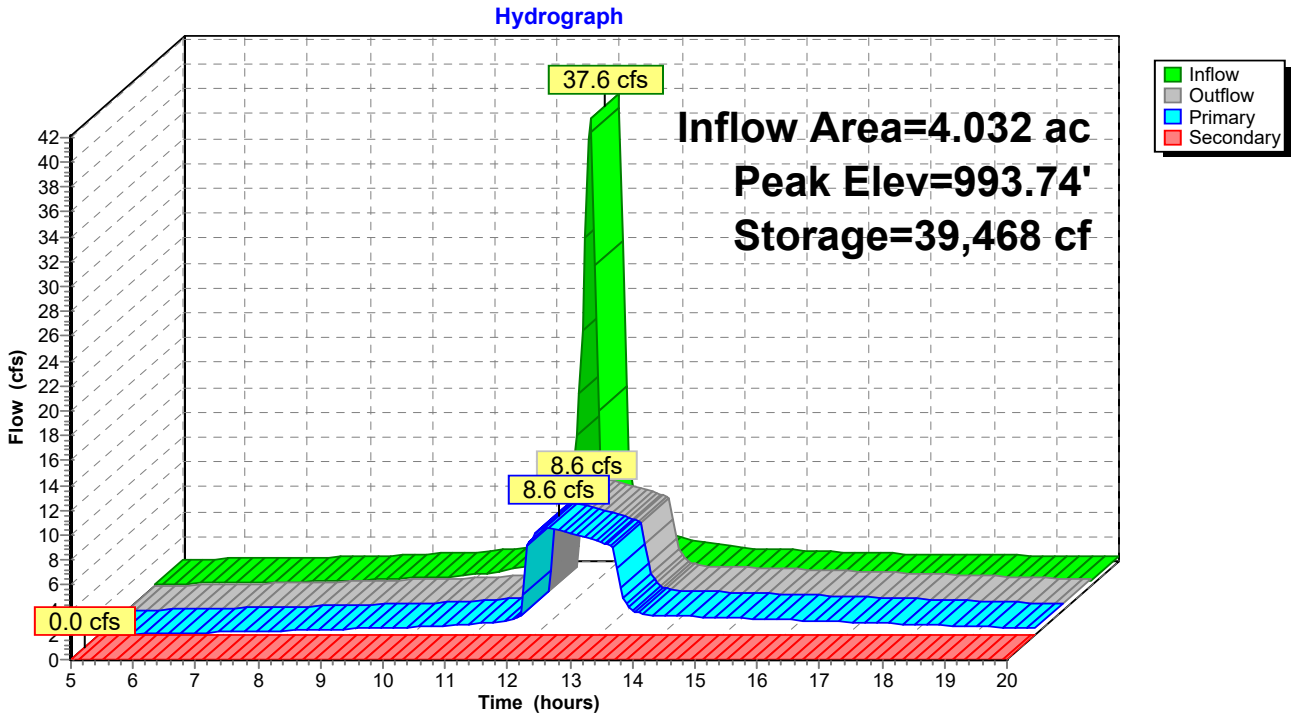
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
981.00	108	0	0
985.00	3,406	7,028	7,028
986.50	7,012	7,814	14,842
995.00	11,323	77,924	92,765
996.00	15,000	13,162	105,927

Device	Routing	Invert	Outlet Devices
#1	Primary	981.69'	**12.0" Round Culvert** L= 169.0' Ke= 0.500 Inlet / Outlet Invert= 981.69' / 980.00' S= 0.0100 '/' Cc= 0.900 n= 0.013 Concrete pipe, straight & clean, Flow Area= 0.79 sf
#2	Device 1	986.00'	**6.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Device 1	989.00'	**4.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s) 1.0' Crest Height
#4	Device 1	990.00'	**HAALA 48" ID Pond Skimmer** Head (feet) 0.00 0.10 0.20 0.30 0.40 0.50 0.60 0.70 0.80 0.90 1.00 1.50 2.00 2.50 3.00 3.50 4.00 4.50 5.00 Disch. (cfs) 0.000 1.320 3.740 6.870 10.580 14.790 19.250 20.790 22.220 23.570 24.850 30.430 35.140 39.280 43.030 46.480 49.690 52.700 55.560
#5	Secondary	995.50'	**20.0' long x 20.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Primary OutFlow Max=8.6 cfs @ 12.16 hrs HW=993.73' (Free Discharge)
└─**1=Culvert** (Barrel Controls 8.6 cfs @ 10.98 fps)
  └─**2=Orifice/Grate** (Passes < 2.6 cfs potential flow)
  └─**3=Sharp-Crested Rectangular Weir** (Passes < 162.4 cfs potential flow)
  └─**4=HAALA 48" ID Pond Skimmer** (Passes < 48.0 cfs potential flow)

Secondary OutFlow Max=0.0 cfs @ 5.00 hrs HW=986.00' (Free Discharge)
└─**5=Broad-Crested Rectangular Weir** (Controls 0.0 cfs)

Pond 1P: Wet Sedimentation Basin



Summary for Pond 2P: Filtration Basin

[82] Warning: Early inflow requires earlier time span

Inflow Area = 1.421 ac, 76.15% Impervious, Inflow Depth > 6.03" for 100-YR event
Inflow = 13.6 cfs @ 11.98 hrs, Volume= 0.713 af
Outflow = 7.3 cfs @ 12.09 hrs, Volume= 0.623 af, Atten= 46%, Lag= 6.5 min
Primary = 6.2 cfs @ 12.08 hrs, Volume= 0.615 af
Routed to Reach 2R : West Storm
Secondary = 1.1 cfs @ 12.09 hrs, Volume= 0.008 af
Routed to Reach 3R : West Bluff

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 987.03' @ 12.08 hrs Surf.Area= 3,485 sf Storage= 10,243 cf

Plug-Flow detention time= 81.1 min calculated for 0.620 af (87% of inflow)
Center-of-Mass det. time= 40.2 min (777.7 - 737.5)

Volume	Invert	Avail.Storage	Storage Description
#1	982.00'	13,880 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

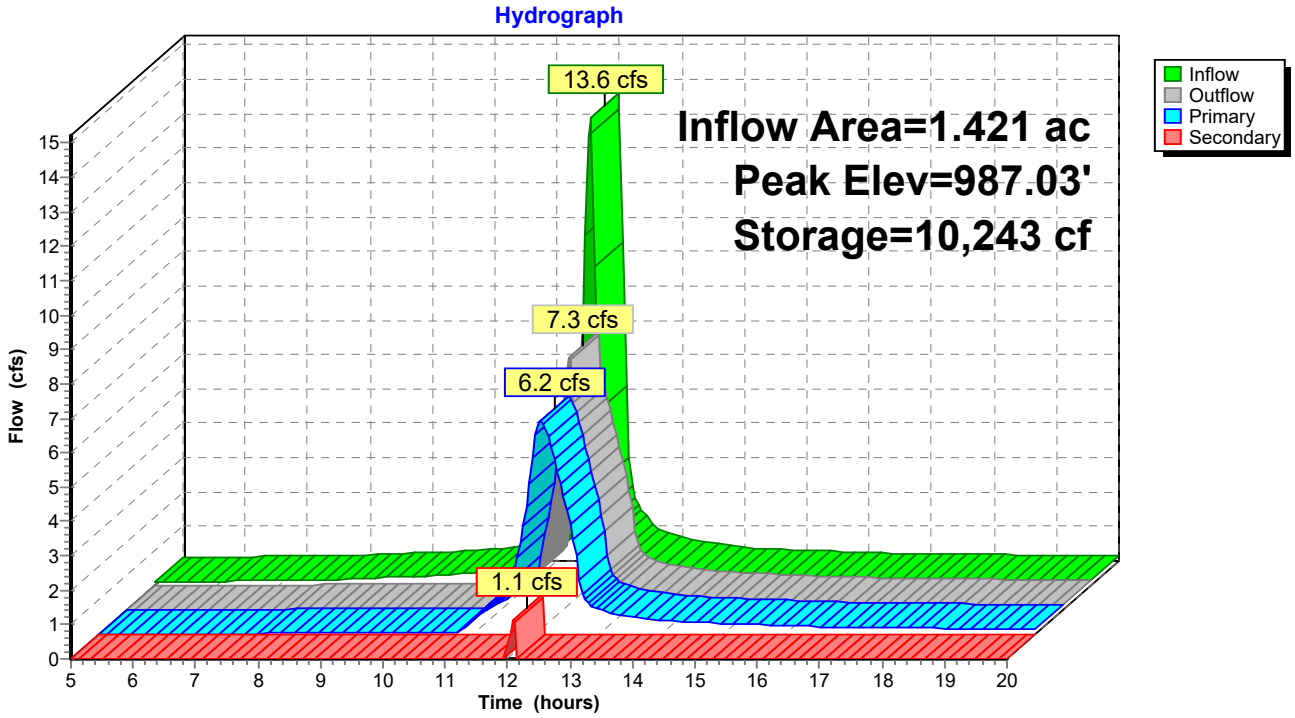
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
982.00	588	0	0
987.00	3,470	10,145	10,145
988.00	4,000	3,735	13,880

Device	Routing	Invert	Outlet Devices
#1	Primary	980.00'	**12.0" Round Culvert** L= 200.0' Ke= 0.500 Inlet / Outlet Invert= 980.00' / 978.00' S= 0.0100 '/' Cc= 0.900 n= 0.013 Concrete pipe, straight & clean, Flow Area= 0.79 sf
#2	Device 1	982.00'	**1.630 in/hr Exfiltration over Surface area above 982.00'** Excluded Surface area = 588 sf Phase-In= 0.01'
#3	Device 1	984.80'	**15" Nyloplast Dome Grate** Head (feet) 0.00 0.10 0.20 0.30 0.40 0.50 0.60 0.70 0.80 0.90 1.00 1.50 2.00 2.50 3.00 3.50 4.00 4.50 5.00 Disch. (cfs) 0.000 0.410 1.170 2.150 2.590 2.890 3.170 3.420 3.660 3.880 4.090 5.010 5.790 6.470 7.090 7.660 8.190 8.680 9.150
#4	Secondary	987.00'	**133.0' long x 3.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 Coef. (English) 2.44 2.58 2.68 2.67 2.65 2.64 2.64 2.68 2.68 2.72 2.81 2.92 2.97 3.07 3.32

Primary OutFlow Max=6.2 cfs @ 12.08 hrs HW=987.01' (Free Discharge)
└─**1=Culvert** (Passes 6.2 cfs of 6.4 cfs potential flow)
  └─**2=Exfiltration** (Exfiltration Controls 0.1 cfs)
  └─**3=15" Nyloplast Dome Grate** (Custom Controls 6.1 cfs)

Secondary OutFlow Max=0.4 cfs @ 12.09 hrs HW=987.01' (Free Discharge)
└─**4=Broad-Crested Rectangular Weir** (Weir Controls 0.4 cfs @ 0.26 fps)

Pond 2P: Filtration Basin



Summary for Pond 3P: Filtration Basin

[82] Warning: Early inflow requires earlier time span

Inflow Area = 0.506 ac, 69.75% Impervious, Inflow Depth > 5.93" for 100-YR event
Inflow = 4.8 cfs @ 11.98 hrs, Volume= 0.250 af
Outflow = 1.0 cfs @ 12.17 hrs, Volume= 0.183 af, Atten= 79%, Lag= 11.4 min
Primary = 1.0 cfs @ 12.17 hrs, Volume= 0.183 af
Routed to Reach 4R : South Storm
Secondary = 0.0 cfs @ 5.00 hrs, Volume= 0.000 af
Routed to Reach 5R : SE Bluff - To Road

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 989.75' @ 12.17 hrs Surf.Area= 3,784 sf Storage= 5,743 cf

Plug-Flow detention time= 138.6 min calculated for 0.183 af (73% of inflow)
Center-of-Mass det. time= 76.0 min (815.7 - 739.7)

Volume	Invert	Avail.Storage	Storage Description
#1	987.00'	14,421 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

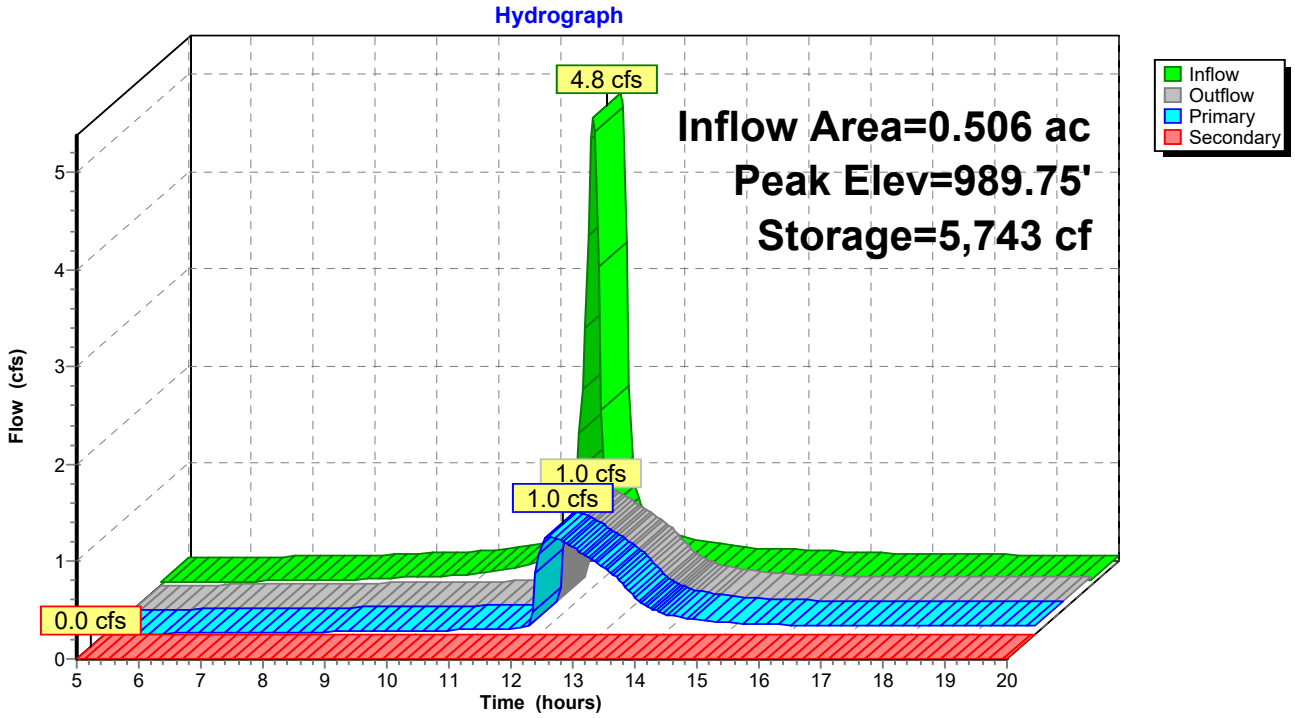
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
987.00	398	0	0
991.00	5,330	11,456	11,456
992.00	600	2,965	14,421

Device	Routing	Invert	Outlet Devices
#1	Primary	984.50'	**12.0" Round Culvert** L= 215.0' Ke= 0.500 Inlet / Outlet Invert= 984.50' / 982.35' S= 0.0100 '/' Cc= 0.900 n= 0.013 Concrete pipe, straight & clean, Flow Area= 0.79 sf
#2	Device 1	987.00'	**1.630 in/hr Exfiltration over Surface area above 987.00'** Excluded Surface area = 398 sf Phase-In= 0.01'
#3	Device 1	989.00'	**12" Nyloplast Dome Grate** Head (feet) 0.00 0.10 0.20 0.30 0.40 0.50 0.60 0.70 0.80 0.90 1.00 1.50 2.00 2.50 3.00 3.50 4.00 4.50 5.00 Disch. (cfs) 0.000 0.210 0.450 0.550 0.640 0.710 0.780 0.850 0.900 0.960 1.010 1.240 1.430 1.600 1.750 1.890 2.020 2.140 2.260
#4	Secondary	990.00'	**10.0' long x 5.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88

Primary OutFlow Max=1.0 cfs @ 12.17 hrs HW=989.74' (Free Discharge)
└─**1=Culvert** (Passes 1.0 cfs of 5.5 cfs potential flow)
  └─**2=Exfiltration** (Exfiltration Controls 0.1 cfs)
  └─**3=12" Nyloplast Dome Grate** (Custom Controls 0.9 cfs)

Secondary OutFlow Max=0.0 cfs @ 5.00 hrs HW=987.01' (Free Discharge)
└─**4=Broad-Crested Rectangular Weir** (Controls 0.0 cfs)

Pond 3P: Filtration Basin



Summary for Pond 4P: Filtration Basin

[82] Warning: Early inflow requires earlier time span

Inflow Area = 0.290 ac, 72.78% Impervious, Inflow Depth > 5.93" for 100-YR event
Inflow = 2.8 cfs @ 11.98 hrs, Volume= 0.143 af
Outflow = 2.8 cfs @ 11.98 hrs, Volume= 0.137 af, Atten= 0%, Lag= 0.4 min
Primary = 0.4 cfs @ 11.98 hrs, Volume= 0.094 af
Routed to Reach 4R : South Storm
Secondary = 2.3 cfs @ 11.98 hrs, Volume= 0.044 af
Routed to Reach 5R : SE Bluff - To Road

Routing by Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs
Peak Elev= 994.07' @ 11.98 hrs Surf.Area= 1,005 sf Storage= 589 cf

Plug-Flow detention time= 34.5 min calculated for 0.137 af (96% of inflow)
Center-of-Mass det. time= 16.9 min (756.6 - 739.7)

Volume	Invert	Avail.Storage	Storage Description
#1	993.00'	1,615 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

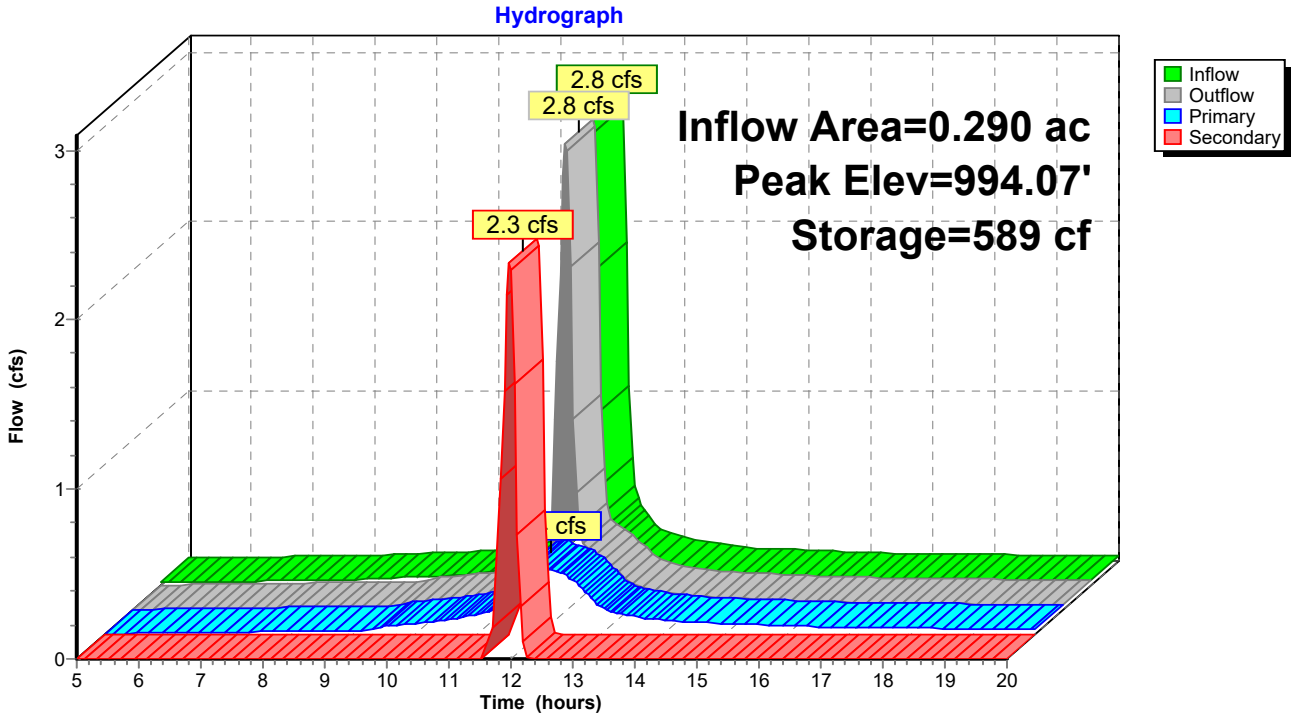
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
993.00	50	0	0
994.00	990	520	520
995.00	1,200	1,095	1,615

Device	Routing	Invert	Outlet Devices
#1	Primary	981.22'	**6.0" Round Culvert** L= 151.0' Ke= 0.500 Inlet / Outlet Invert= 981.22' / 981.07' S= 0.0010 '/' Cc= 0.900 n= 0.011 PVC, smooth interior, Flow Area= 0.20 sf
#2	Device 1	993.00'	**1.600 in/hr Exfiltration over Surface area above 993.00'** Excluded Surface area = 50 sf Phase-In= 0.01'
#3	Device 1	993.70'	**Nyloplast 8" Drop In Grate** Head (feet) 0.00 0.10 0.20 0.30 0.40 0.50 0.60 0.70 0.80 0.90 1.00 1.50 2.00 2.50 3.00 3.50 4.00 4.50 5.00 Disch. (cfs) 0.000 0.200 0.280 0.340 0.400 0.440 0.480 0.520 0.560 0.590 0.630 0.770 0.890 0.990 1.080 1.170 1.250 1.330 1.400
#4	Secondary	994.00'	**50.0' long x 3.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 Coef. (English) 2.44 2.58 2.68 2.67 2.65 2.64 2.64 2.68 2.68 2.72 2.81 2.92 2.97 3.07 3.32

Primary OutFlow Max=0.4 cfs @ 11.98 hrs HW=994.07' (Free Discharge)
└**1=Culvert** (Passes 0.4 cfs of 1.8 cfs potential flow)
└**2=Exfiltration** (Exfiltration Controls 0.0 cfs)
└**3=Nyloplast 8" Drop In Grate** (Custom Controls 0.4 cfs)

Secondary OutFlow Max=2.1 cfs @ 11.98 hrs HW=994.07' (Free Discharge)
└**4=Broad-Crested Rectangular Weir** (Weir Controls 2.1 cfs @ 0.63 fps)

Pond 4P: Filtration Basin



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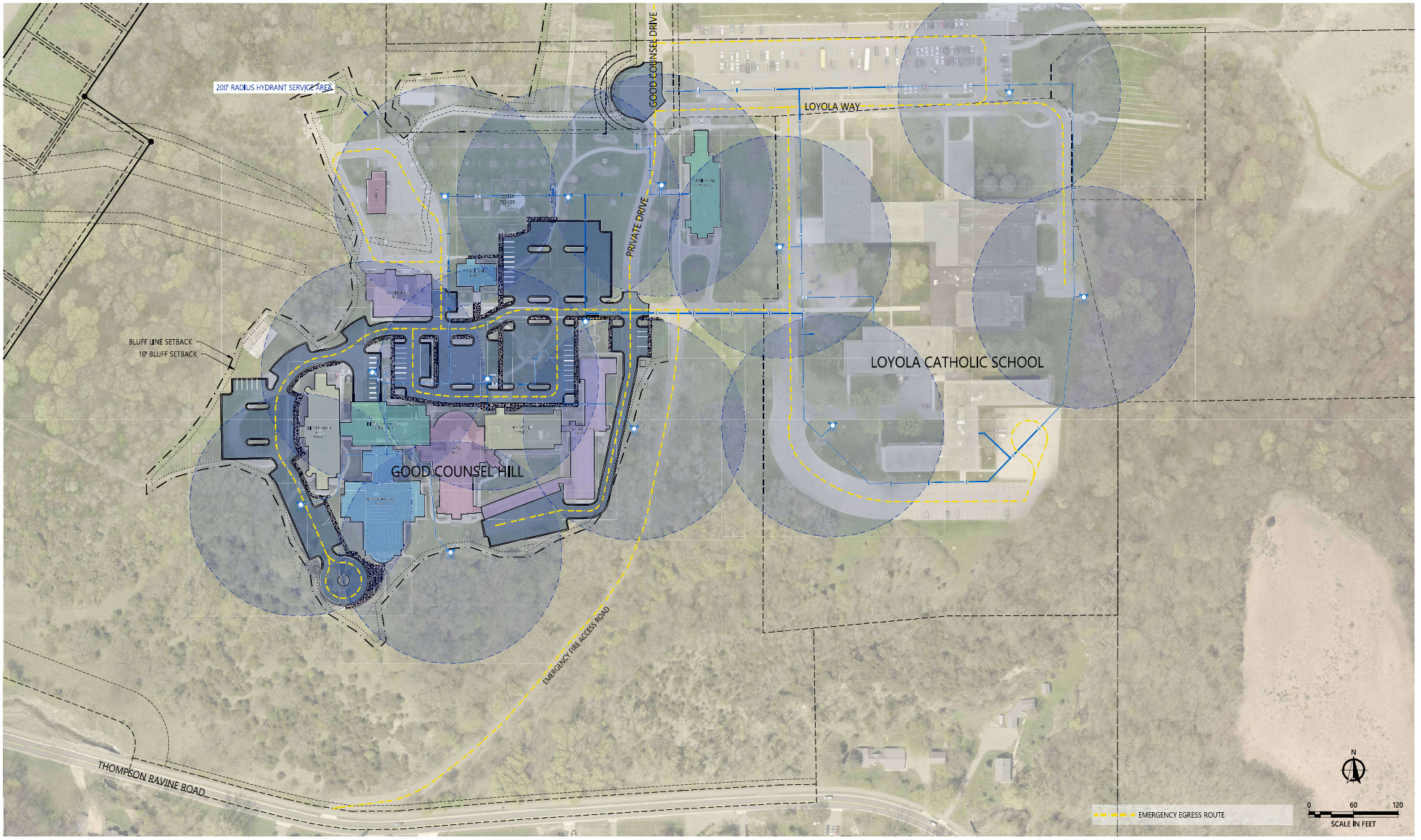

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CRAIG N. BRITTON LIC. NO.: 44228 DATE: 03/24/2026

DATE	REV#	REVISIONS DESCRIPTION

GOOD COUNSEL

FIRE PROTECTION & TRAFFIC CIRCULATION PLAN

PROJECT #: 2025-10591

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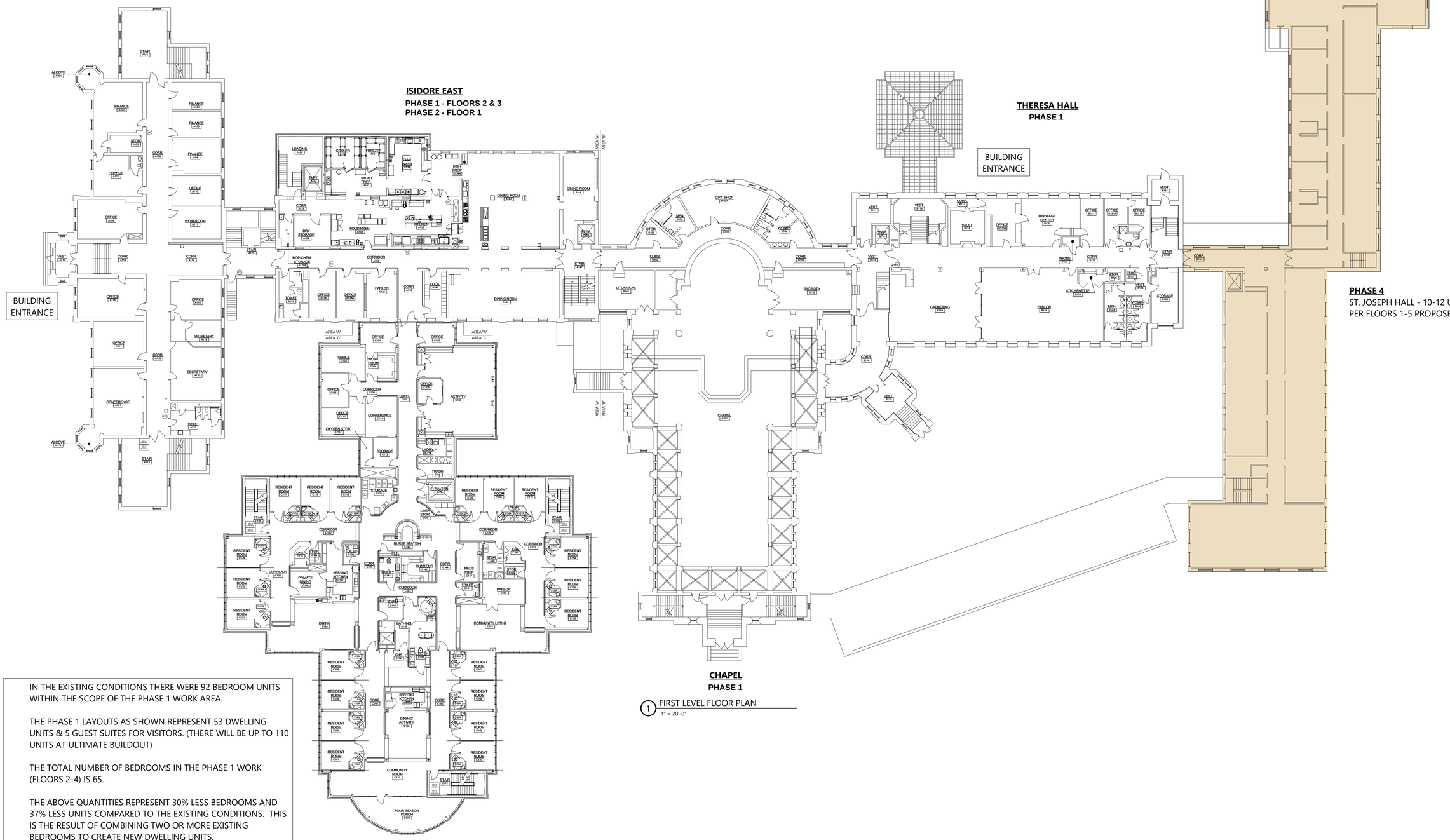
ISIDORE WEST
PHASE 1

ISIDORE EAST
PHASE 1 - FLOORS 2 & 3
PHASE 2 - FLOOR 1

THERESA HALL
PHASE 1

ST. JOSEPH HALL
PHASE 4



CHAPEL
PHASE 1

1 FIRST LEVEL FLOOR PLAN
1" = 20'-0"

NOTRE DAME HALL
PHASE 3

PHASE 4
ST. JOSEPH HALL - 10-12 UNITS PER FLOORS 1-5 PROPOSED

IN THE EXISTING CONDITIONS THERE WERE 92 BEDROOM UNITS WITHIN THE SCOPE OF THE PHASE 1 WORK AREA.

THE PHASE 1 LAYOUTS AS SHOWN REPRESENT 53 DWELLING UNITS & 5 GUEST SUITES FOR VISITORS. (THERE WILL BE UP TO 110 UNITS AT ULTIMATE BUILDOUT)

THE TOTAL NUMBER OF BEDROOMS IN THE PHASE 1 WORK (FLOORS 2-4) IS 65.

THE ABOVE QUANTITIES REPRESENT 30% LESS BEDROOMS AND 37% LESS UNITS COMPARED TO THE EXISTING CONDITIONS. THIS IS THE RESULT OF COMBINING TWO OR MORE EXISTING BEDROOMS TO CREATE NEW DWELLING UNITS.

N

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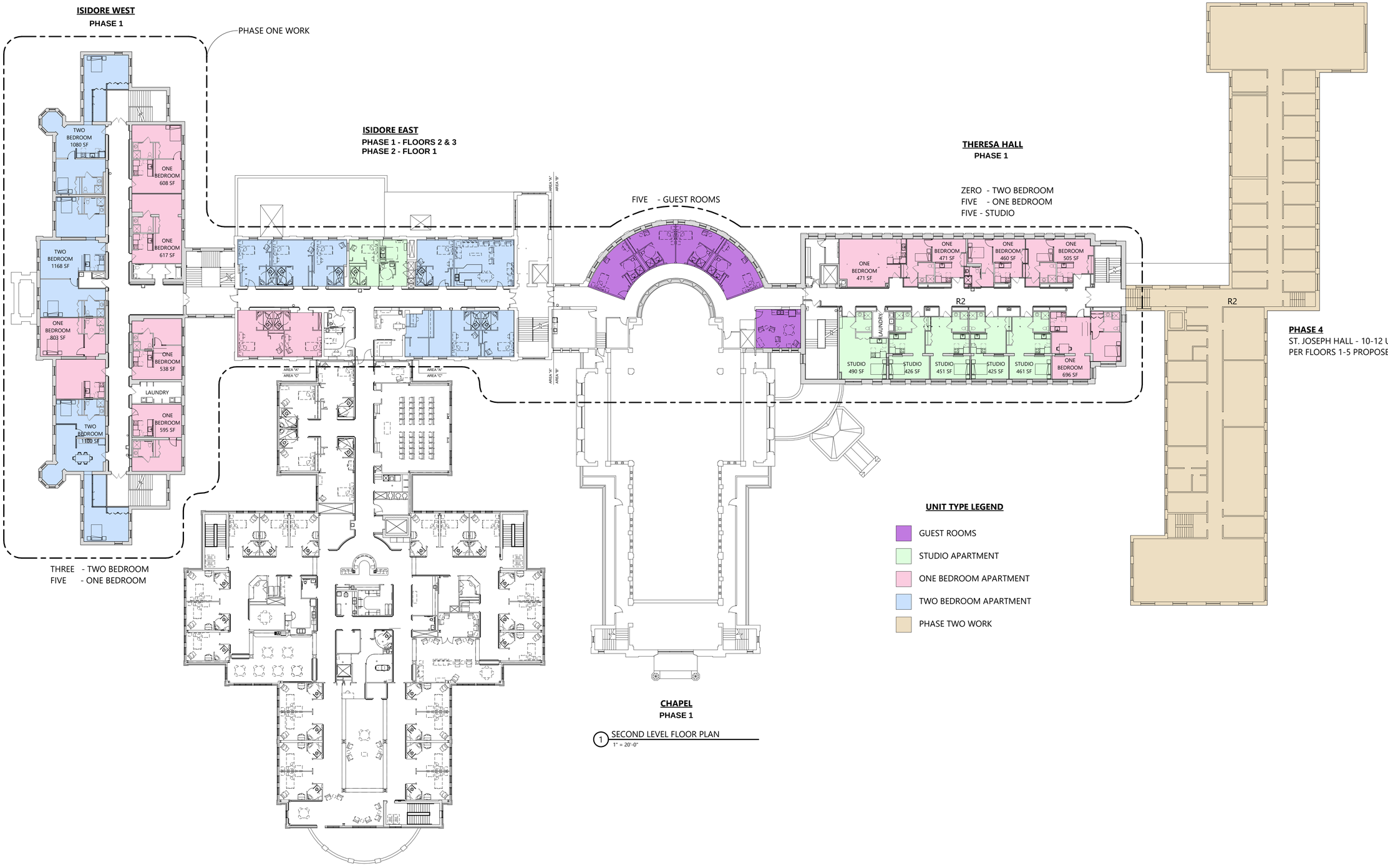
GOOD COUNSEL HILL

FIRST LEVEL FLOOR PLAN

A1.10

PROJECT #: <2024-00000>



1 SECOND LEVEL FLOOR PLAN
1" = 20'-0"

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SECOND LEVEL FLOOR PLAN

A1.20

PROJECT #: <2024-00000>

<2024-00000>
GOOD COUNSEL HILL

ISIDORE WEST
PHASE 1

PHASE ONE WORK

TWO BEDROOM 1102 SF
ONE BEDROOM 613 SF
TWO BEDROOM 1186 SF
ONE BEDROOM 638 SF
ONE BEDROOM 812 SF
ONE BEDROOM 550 SF
LAUNDRY
ONE BEDROOM 604 SF
TWO BEDROOM 1134 SF

THREE - TWO BEDROOM
FIVE - ONE BEDROOM

ISIDORE EAST
PHASE 1 - FLOORS 2 & 3
PHASE 2 - FLOOR 1

THREE - TWO BEDROOM
TWO - ONE BEDROOM
ONE - STUDIO

TWO BEDROOM 896 SF
STUDIO 486 SF
TWO BEDROOM 821 SF
ONE BEDROOM 694 SF
ONE BEDROOM 648 SF
TWO BEDROOM 900 SF
AREA "A"
AREA "C" ROOF
AREA "A"
AREA "C" ROOF
AREA "A"
AREA "B"
AREA "A"
AREA "B"

THERESA HALL
PHASE 1

EIGHT - ONE BEDROOM

ONE BEDROOM 659 SF
ONE BEDROOM 471 SF
ONE BEDROOM 460 SF
ONE BEDROOM 505 SF
ONE BEDROOM 790 SF
ONE BEDROOM 760 SF
LAUNDRY
ONE BEDROOM 869 SF
ONE BEDROOM 696 SF

ST. JOSEPH HALL
PHASE 4

PHASE 4
ST. JOSEPH HALL - 10-12 UNITS
PER FLOORS 1-5 PROPOSED

CHAPEL
PHASE 1

NOTRE DAME HALL
PHASE 3

1 THIRD LEVEL FLOOR PLAN
1" = 20'-0"

UNIT TYPE LEGEND

- GUEST ROOMS
- STUDIO APARTMENT
- ONE BEDROOM APARTMENT
- TWO BEDROOM APARTMENT
- PHASE TWO WORK

N

<2024-00000>
GOOD COUNSEL HILL

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GOOD COUNSEL HILL

THIRD LEVEL FLOOR PLAN

A1.30

PROJECT #: <2024-00000>

ISIDORE WEST
PHASE 1

ISIDORE EAST
PHASE 1 - FLOORS 2 & 3
PHASE 2 - FLOOR 1

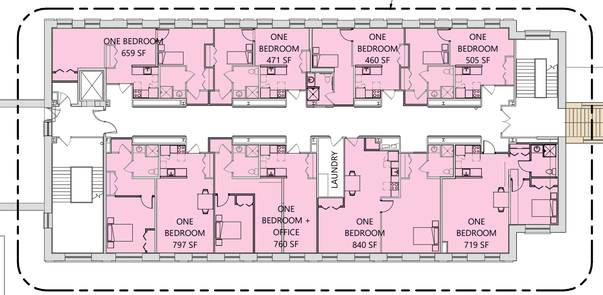
AREA 'A' ROOF
AREA 'B'

AREA 'A' ROOF
AREA 'B'

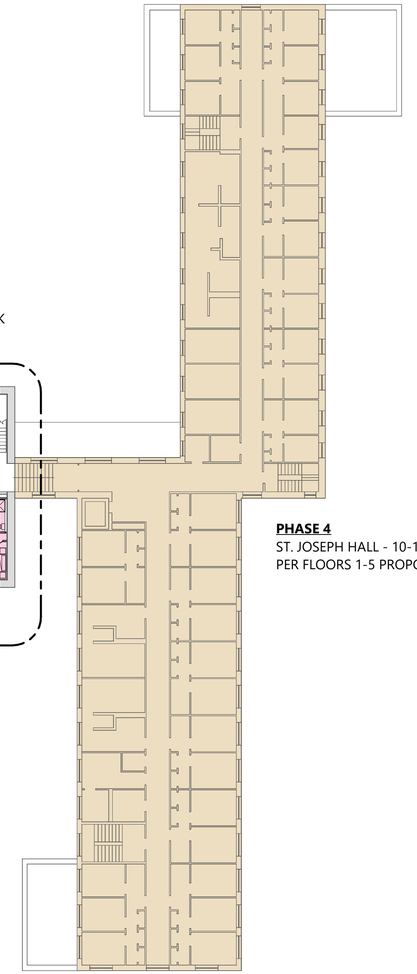
THERESA HALL
PHASE 1

EIGHT - ONE BEDROOM

PHASE ONE WORK



ST. JOSEPH HALL
PHASE 4



PHASE 4
ST. JOSEPH HALL - 10-12 UNITS
PER FLOORS 1-5 PROPOSED

UNIT TYPE LEGEND

- GUEST ROOMS
- STUDIO APARTMENT
- ONE BEDROOM APARTMENT
- TWO BEDROOM APARTMENT
- PHASE TWO WORK

CHAPEL
PHASE 1

1 FOURTH LEVEL FLOOR PLAN
1" = 20'-0"

N

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GOOD COUNSEL HILL

FOURTH LEVEL FLOOR PLAN

A1.40

PROJECT #: <2024-00000>

ISIDORE WEST

ISIDORE EAST

THERESA HALL

ST. JOSEPH HALL

BUILDING ENTRANCE

BUILDING ENTRANCE

NOTRE DAME HALL

CHAPEL

PHASE 4
ST. JOSEPH HALL - 10-12 UNITS
PER FLOORS 1-5 PROPOSED

EXISTING FIRE SUPPRESSION SYSTEM

FUTURE FIRE SUPPRESSION SYSTEM

FIRE SUPPRESSION NOT REQUIRED

1 FIRST LEVEL FLOOR PLAN - FIRE SUPPRESSION
1" = 20'-0"

N

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GOOD COUNSEL HILL

BUILDING FIRE SUPPRESSION PLAN

A1.10FP

PROJECT #: <2024-00000>

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CRAIG N. BRITTON LIC. NO.: 44228 DATE: 03/24/2026

DATE	REV#	REVISIONS DESCRIPTION

GOOD COUNSEL

SANITARY SERWER PLAN

PROJECT #: 2025-10591

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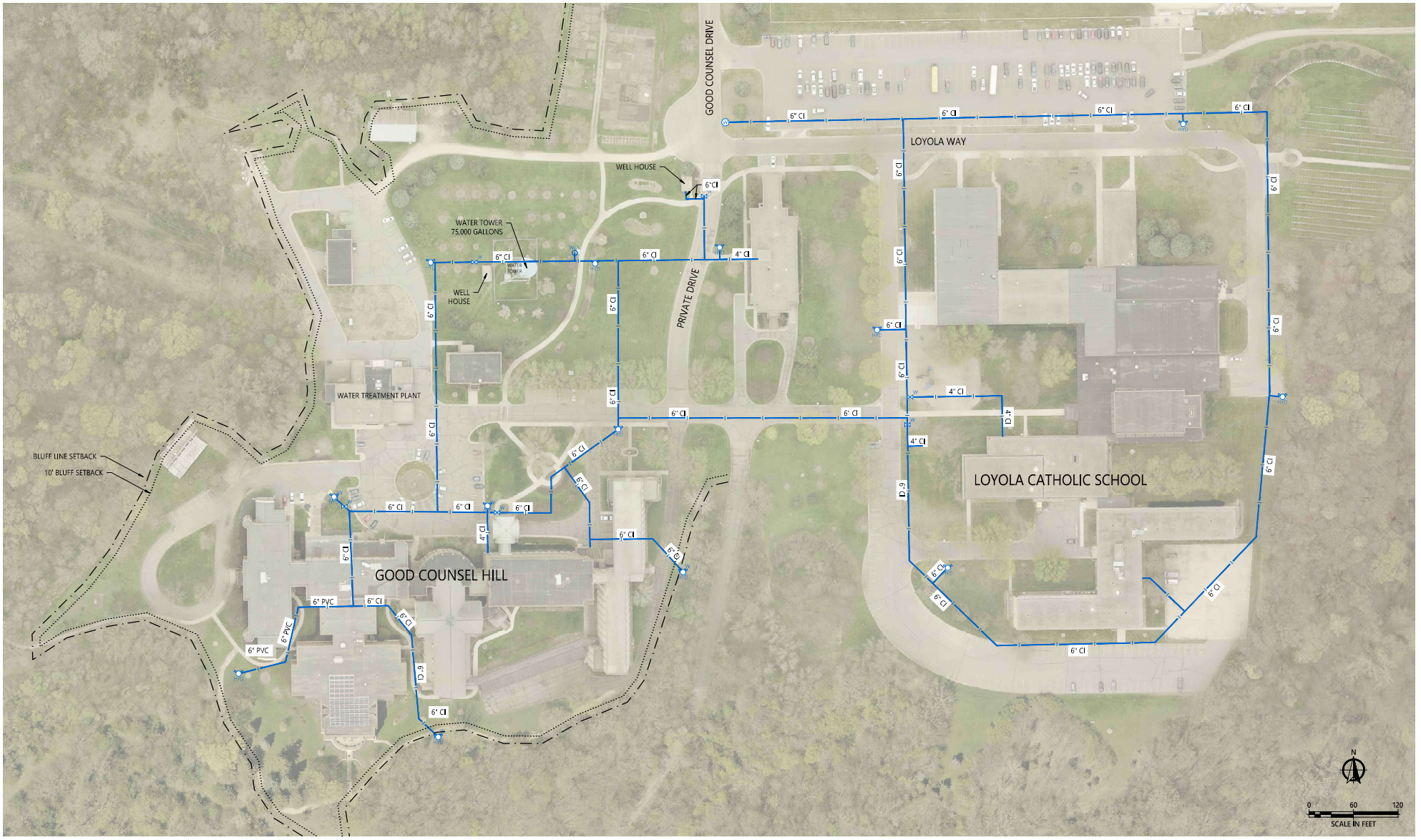

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CRAIG N. BRITTON LIC. NO.: 44228 DATE: 03/24/2026

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GOOD COUNSEL

WATER SUPPLY PLAN

PROJECT #: 2025-10591

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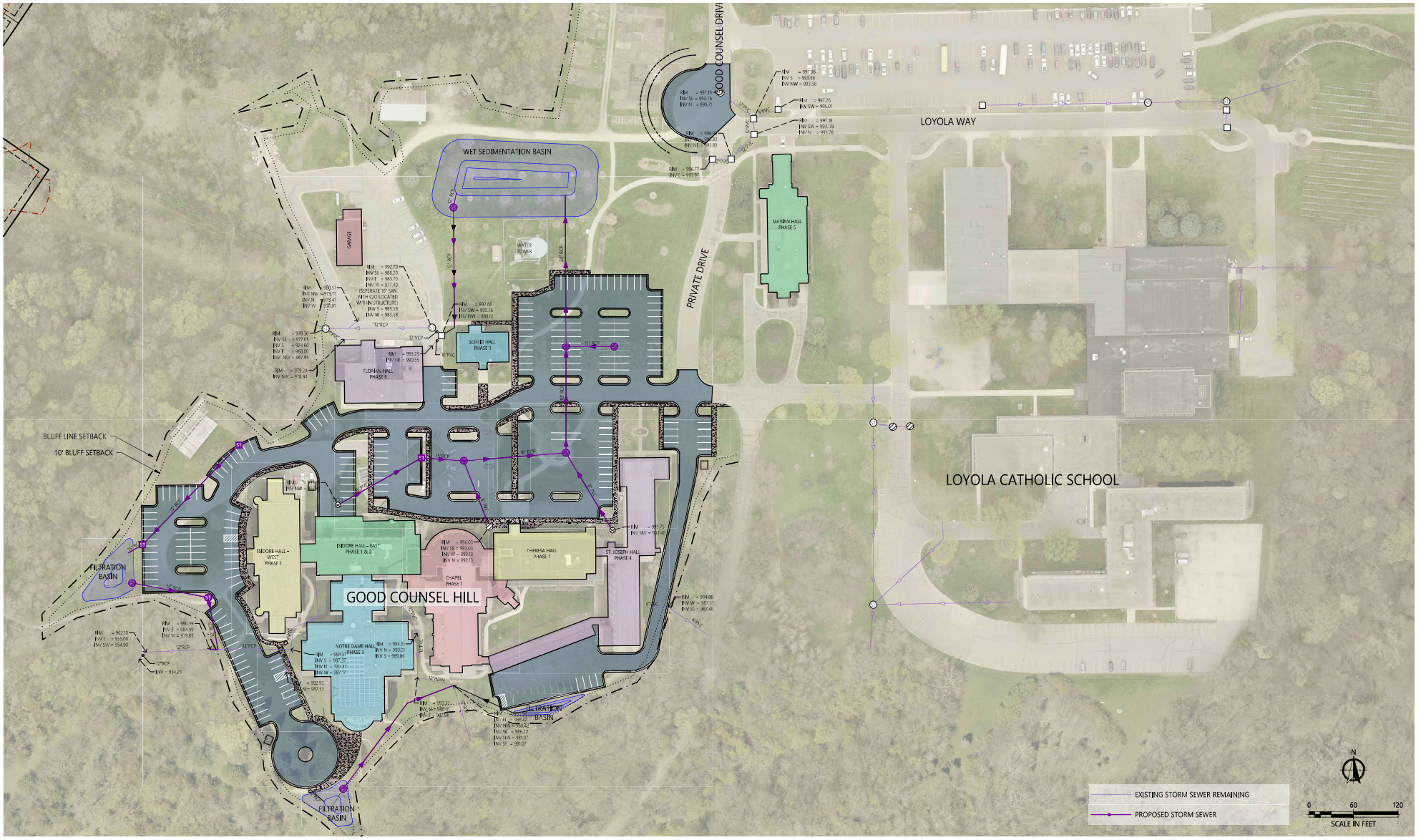

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CRAIG N. BRITTON LIC. NO.: 44228 DATE: 03/24/2026

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STORM SEWER PLAN

PROJECT #: 2025-10591

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MEMORANDUM

SRF Project No. 19777

To: Craig Britton, PE, Office Manager, VP

From: Justin Sebens, PE, Senior Project Manager
Ashley Stueve, PE, Engineer III

Date: March 9, 2026

Subject: School Sisters of Notre Dame Traffic Study Update; Mankato, Minnesota

Introduction

SRF has completed a traffic study update for the proposed School Sisters of Notre Dame residential development in the City of Mankato, Minnesota. The proposed development is generally located east of 4th Street and north of Thompson Ravine Road (see Figure 1) and was originally analyzed as part of the *School Sisters of Notre Dame Proposed Residential Development Traffic Impact Study* completed by Bolton & Menk in November 2023. Since completion of the 2023 study, development assumptions and site access conditions have changed, therefore, an updated traffic study is required. The main objectives of the study are to evaluate existing operations within the study area, identify any transportation impacts associated with the proposed development, and recommend improvements to address any issues, if necessary. The following information provides the assumptions, analysis, and study recommendations offered for consideration.

Previous Study

The *School Sisters of Notre Dame Proposed Residential Development Traffic Impact Study* was prepared by Bolton & Menk in November 2023 (hereafter referred to as the *School Sisters 2023 Study*). The study evaluated a proposed development consisting of 18 senior adult housing units, 10 single-family detached housing units, 250 multifamily housing units, and an event center. The primary objectives of the study were to collect traffic data at nine (9) study intersections, evaluate opening-year (2028) traffic operations, and identify any potential transportation infrastructure improvements. For the purpose of this study, Thompson Ravine Road access is expected to be used primarily for emergency purposes due to several geometric and safety constraints. These constraints include steep roadway grades exceeding 10 percent in some locations, a narrow access roadway approximately 22 feet wide, limited sight distance, insufficient vehicle stacking distance at the intersection, inadequate curb radii, and steep side slopes. Based on discussions with Widseth (Civil and Site Design Engineer), improvements necessary to address these constraints are considered infeasible. Therefore, public access from Thompson Ravine Road was not assumed in this study update.



SRF

Project Location

School Sisters of Notre Dame Traffic Study Update

City of Mankato

Figure 1

02619777
January 2026

Existing Conditions

Existing conditions were reviewed to establish a baseline to identify any future impacts associated with the proposed development. The evaluation of existing conditions includes a review of traffic volumes, roadway characteristics, and an intersection capacity analysis, which are summarized in the following sections.

Data Collection

Weekday a.m. and p.m. peak-period vehicular turning movement data collected by Bolton & Menk in April 2023 were utilized in this study at the following study intersections:

- Victory Drive and Thompson Ravine Road
- May Street and 5th Street
- May Street and Broad Street
- May Street and 2nd Street
- 4th Street and Mabel Street
- Broad Street and Mabel Street
- North Riverfront Drive and Good Counsel Drive
- 4th Street and Good Counsel Drive

It should be noted that the Bolten & Menk traffic counts were collected while area schools were in session. Intersections along Good Counsel Road, which is the primary roadway providing access to and from Loyola Catholic School, were analyzed using the school dismissal peak hour (2:30 p.m. to 3:30 p.m.), while the remaining study intersections were analyzed using the p.m. peak hour (4:30 p.m. to 5:30 p.m.). Existing year 2026 peak-period volumes were developed using turning movement data from the *School Sisters 2023 Study*, along with background traffic growth in the study area and additional enrollment-related traffic at the adjacent Loyola Catholic School between the 2022–2023 and 2025–2026 school years, which were added and distributed throughout the study area.

Roadway Characteristics

A field assessment was completed to identify various roadway characteristics within the transportation system study area, such as functional classification, general configuration, and posted speed limit. A summary of these roadway characteristics are shown in Table 1. Note that these are general characteristics and that there are some deviations within the area or segments of the roadways. For example, Good Counsel Drive transitions from an unposted speed limit roadway to a posted 20 mph speed limit upon entering the school campus.

Table 1: Existing Roadway Characteristics

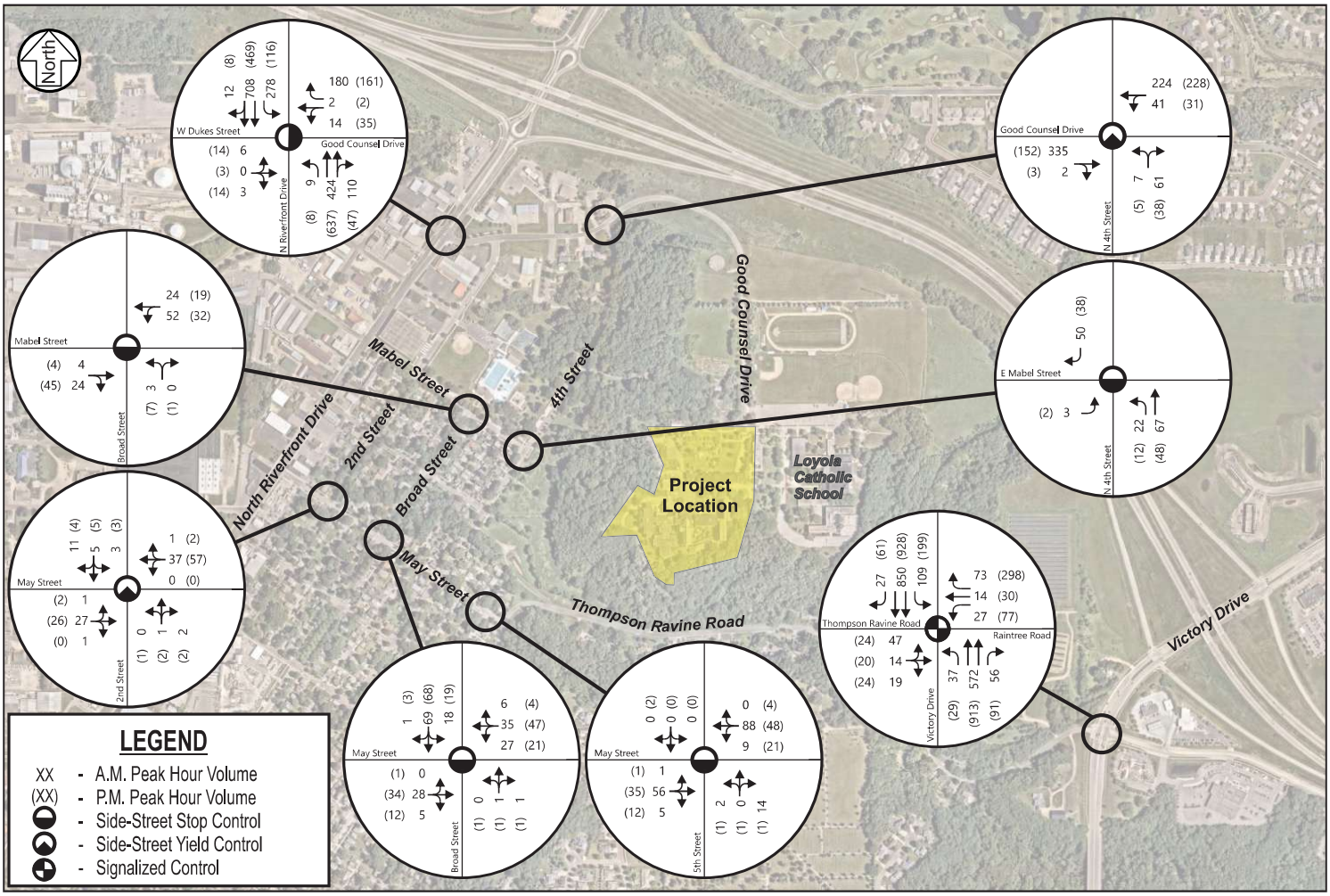
Roadway	Functional Classification [1]	General Configuration	Posted Speed Limit (mph)
Victory Drive	Minor Arterial	4-lane divided roadway	40
Thompson Ravine Road	Minor Collector	2-lane undivided roadway	Unposted [2]
May Street	Local Roadway	2-lane undivided	Unposted [2]
5th Street	Local Roadway	2-lane undivided	Unposted [2]
Broad Street	Local Roadway	2-lane divided	Unposted [2]
2nd Street	Local Roadway	2-lane undivided	Unposted [2]
4th Street	Local Roadway	2-lane (one way) undivided roadway	30
Mable Street	Local Roadway	2-lane undivided	Unposted [2]
North Riverfront Drive	Minor Arterial	4-lane divided/ 4-lane undivided [3]	30/ 35 [4]
Good Counsel Drive	Local Roadway	2-lane undivided	Unposted [2]/ 20 [5]

From a traffic control perspective, the Victory Drive and Thompson Ravine Road/Raintree Road intersection is signalized. All other study intersections are unsignalized with side-street stop control. Existing geometrics, traffic control, and traffic volumes in the study area are shown in Figure 2.

Intersection Capacity Analysis

An intersection capacity analysis was completed using Synchro/SimTraffic software to establish a baseline condition to which future traffic operations could be compared. Capacity analysis results identify a Level of Service (LOS) which indicates how well an intersection is operating. Intersections are graded from LOS A through LOS F. The LOS results are based on average delay per vehicle, which corresponds to the delay threshold values shown in Table 2. LOS A indicates the best traffic operation, while LOS F indicates an intersection where demand exceeds capacity. Overall intersection LOS A though LOS D is generally considered acceptable based on MnDOT guidelines.

[1] Functional Classification based on *MNDOT's Transportation Management System.*
[2] Speed Limit Assumed to be 30-mph.
[3] North Riverfront Drive transitions from a 4-lane divided roadway to a 4-lane undivided roadway south of Ruby Street.
[4] North Riverfront Drive transitions from a 35-mph speed limit to a 30-mph speed limit south of May Street.
[5] Good Counsel Drive transitions from an unposted speed limit to a 20-mph speed limit upon entering the school campus.



Existing Year 2026 Conditions

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Figure 2

Table 2: Level of Service Criteria for Signalized and Unsignalized Intersections

LOS Designation	Signalized Intersection Average Delay/Vehicle (seconds)	Unsignalized Intersection Average Delay/Vehicle (seconds)
A	≤ 10	≤ 10
B	> 10 - 20	> 10 - 15
C	> 20 - 35	> 15 - 25
D	> 35 - 55	> 25 - 35
E	> 55 - 80	> 35 - 50
F	> 80	> 50

For signalized, all-way stop, and roundabout controlled intersections, the overall intersection control delay dictates the LOS. At side-street stop-controlled intersections, the LOS is determined based on the worst side-street movement (or shared movement) or major-street left-turn delay and no overall LOS is provided.

Results of the existing capacity analysis summary, shown in Table 3, indicate that all study intersections currently operate at an acceptable overall LOS C or better during the weekday a.m., and p.m. peak hours with the existing traffic control and geometric layout. No significant side-street stop delay or queuing issues were observed.

Table 3: Existing Intersection Capacity Analysis Summary

Intersection	A.M. Peak Hour		P.M. Peak Hour	
	LOS	Delay	LOS	Delay
North Riverfront Drive & Good Counsel Drive [6]	C	22 sec.	C	16 sec.
4th Street & Good Counsel Drive [7]	A	3 sec.	A	1 sec.
Broad Street & Mabel Street [6]	A	2 sec.	A	4 sec.
4th Street & Mabel Street [6]	A	6 sec.	A	6 sec.
2nd Street & May Street [7]	A	2 sec.	A	2 sec.
Broad Street & May Street [6]	A	6 sec.	A	6 sec.
5th Street & May Street [6]	A	3 sec.	A	3 sec.
Thompson Ravine Road & Emergency Access [8]	A	1 sec.	A	1 sec.
Victory Drive & Thompson Ravine Road/Raintree Road [9]	A	8 sec.	B	13 sec.

[6] Indicates an unsignalized intersection with a side-street stop control, where the worst side-street movement LOS and delay are shown.
[7] Indicates an unsignalized intersection with a yield control, where the worst side-street movement LOS and delay are shown.
[8] Indicates an uncontrolled intersection, where the worst side-street movement LOS and delay are shown.
[9] Indicates a signalized controlled intersection, where the overall LOS and delay are shown.

Traffic Forecasts

The year 2030 build traffic forecasts account for general background growth, increased enrollment at Loyola Catholic School, and traffic generated by the proposed development. The following sections outline the traffic forecast development process and assumptions, as well as the proposed development trip generation.

Background Traffic Growth

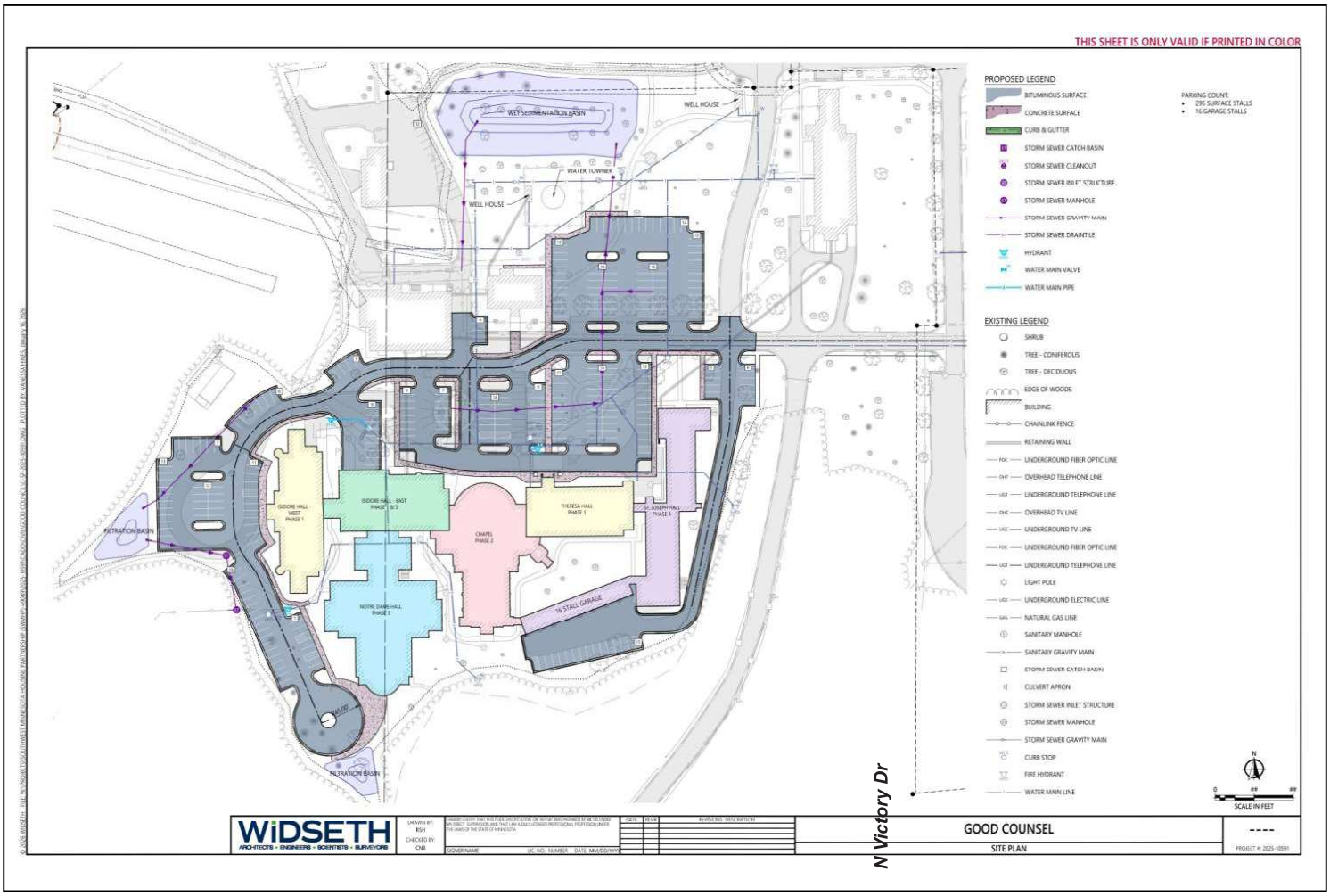
To account for general background growth in the area, an annual growth rate of one (1) percent was applied to the existing peak hour mainline through movements along North Riverfront Drive and Victory Drive to develop future background forecasts. This growth rate was developed using a combination of historical average daily traffic (ADT) volumes from surrounding roadways as published by MnDOT, traffic forecasts from the *MAPO 2050 Metropolitan Transportation Plan,* and engineering judgment. Note that no background growth was applied to the remaining intersections/movements due to limited availability for future development.

Loyola Catholic High School

Loyola Catholic School is a private school serving students from preschool through grade 12 and is located immediately east of the proposed development. Based on enrollment data provided by the school, 541 students were enrolled during the 2022–2023 school year, which corresponds to the period when traffic counts were collected as part of the *School Sisters 2023 Study*. Trips associated with this enrollment level were already using the adjacent roadway network at the time of data collection and were therefore not included in the trip generation estimates. For the 2025–2026 school year, enrollment has increased to 585 students. The increase in enrollment between the 2022–2023 count year and the 2025–2026 school year was accounted for and included in the existing conditions analysis. Additionally, the school is projecting approximately 600 students by the 2030 build year. To account for additional trips associated with the increase in enrollment to the 2030 build year, trip generation estimates were developed using the Institute of Transportation Engineers (ITE) *Trip Generation Manual*, 12th Edition, and distributed to the adjacent roadway network. Results of the trip generation analysis indicate that the increased school enrollment trips are expected to generate approximately 45 a.m. peak-hour trips, 30 p.m. peak-hour trips, and 103 daily trips between the 2022–2023 and 2029–2030 school years.

Proposed Development

As previously noted, the proposed development is generally located east of 4th Street and north of Thompson Ravine Road in Mankato, Minnesota. The proposed development consists of 118 multifamily housing units, 51 assisted living beds, 20,000 square feet of office space, a 3,850-square-foot karate/dance studio, a chapel and gym with a capacity of up to 350 people, and a 4,210-square-foot conference room available for outside rental. The development is anticipated to be fully constructed and operational by 2030. A preliminary site plan, shown in Figure 3, was used as the basis for the traffic analysis. Primary access to the site will be provided via Good Counsel Road, with emergency access provided from Thompson Ravine Road.



Site Plan

School Sisters of Notre Dame Traffic Study Update

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Figure 3

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Proposed Development Trip Generation

To account for traffic impacts associated with the proposed development, a trip generation estimate was developed for the weekday a.m. and p.m. peak hours and on a daily basis. The estimates, shown in Table 4, were developed using the *ITE Trip Generation Manual, 12th Edition*.

Table 4: Proposed Development Trip Generation Estimate

Land Use Type (ITE Code)	Size	A.M. Peak Hour		P.M. Peak Hour		Daily Trips
		In	Out	In	Out	
221 - Multifamily Housing (Mid-Rise)	118 DU	10	35	29	16	526
254 – Assisted Living	51 Beds	6	4	5	7	211
712 – Small Office Building	20,000 SF	27	6	15	28	288
494 – Boutique Fitness Studio	3,850 SF	23	22	25	6	158
Total		**66**	**67**	**74**	**57**	**1,183**

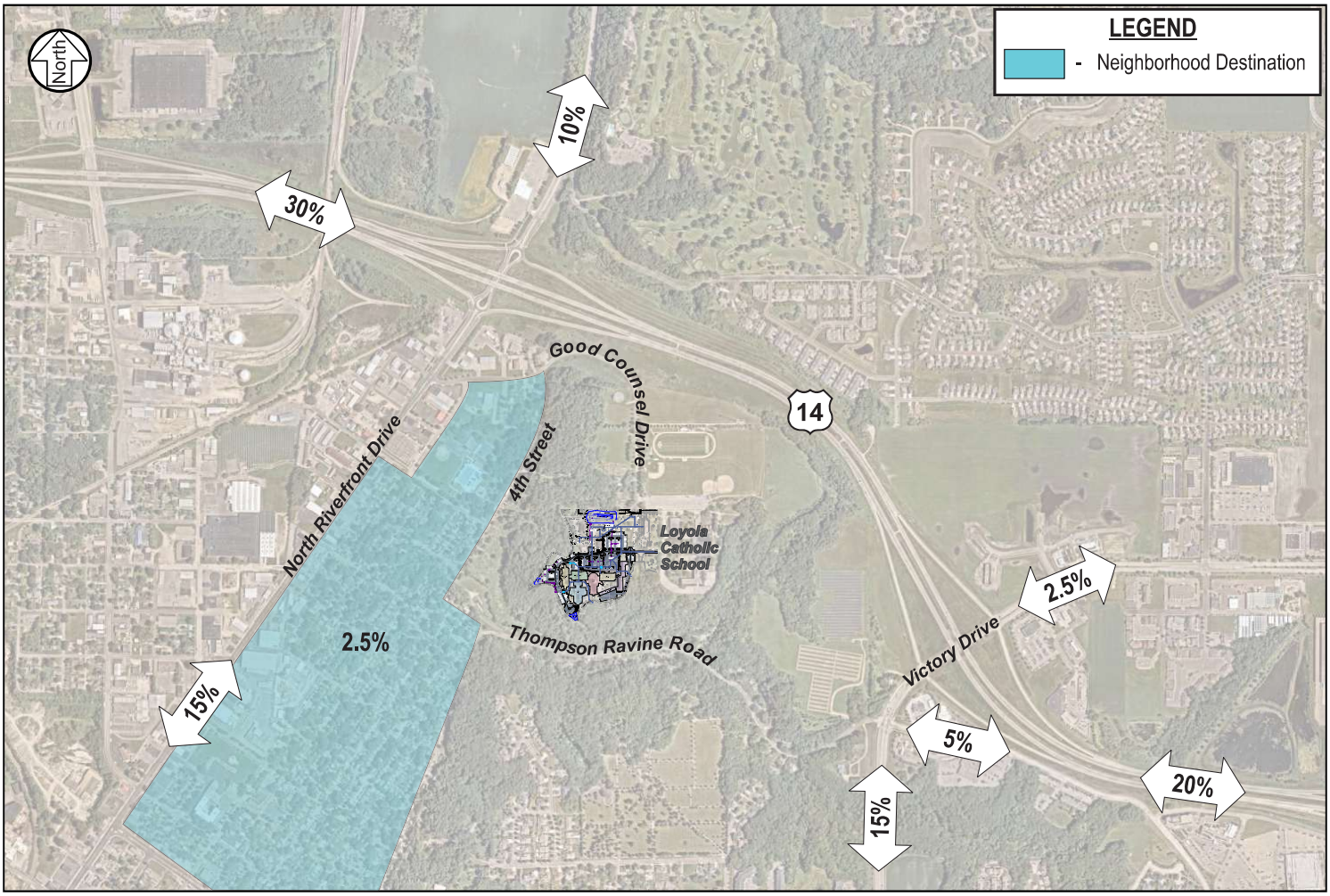
Results of the trip generation estimate indicate that the proposed development is expected to generate approximately 133 a.m. peak hour, 131 p.m. peak hour, and 1,183 daily trips. The trips generated were distributed throughout the area based on the directional distribution shown in Figure 4, which was developed based on existing travel patterns and engineering judgement.

Special Event Consideration

The proposed development includes a chapel and gym with a 350-person capacity, expected to host approximately 10 events per year, and a 4,210-square-foot conference room available for outside rental. Given the limited number of events and the likelihood that they will occur outside peak traffic hours, trips associated with these uses were not included in the trip generation estimates.

Traffic Forecast Summary

Based on the traffic forecast approach described in this study, peak-hour traffic forecasts were developed for the year 2030 build conditions. The forecasts include general area background growth, increased school enrollment trips, and traffic generated by the proposed development, which is shown in Figure 5.



SRF

Directional Distribution

School Sisters of Notre Dame Traffic Study Update

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Figure 4

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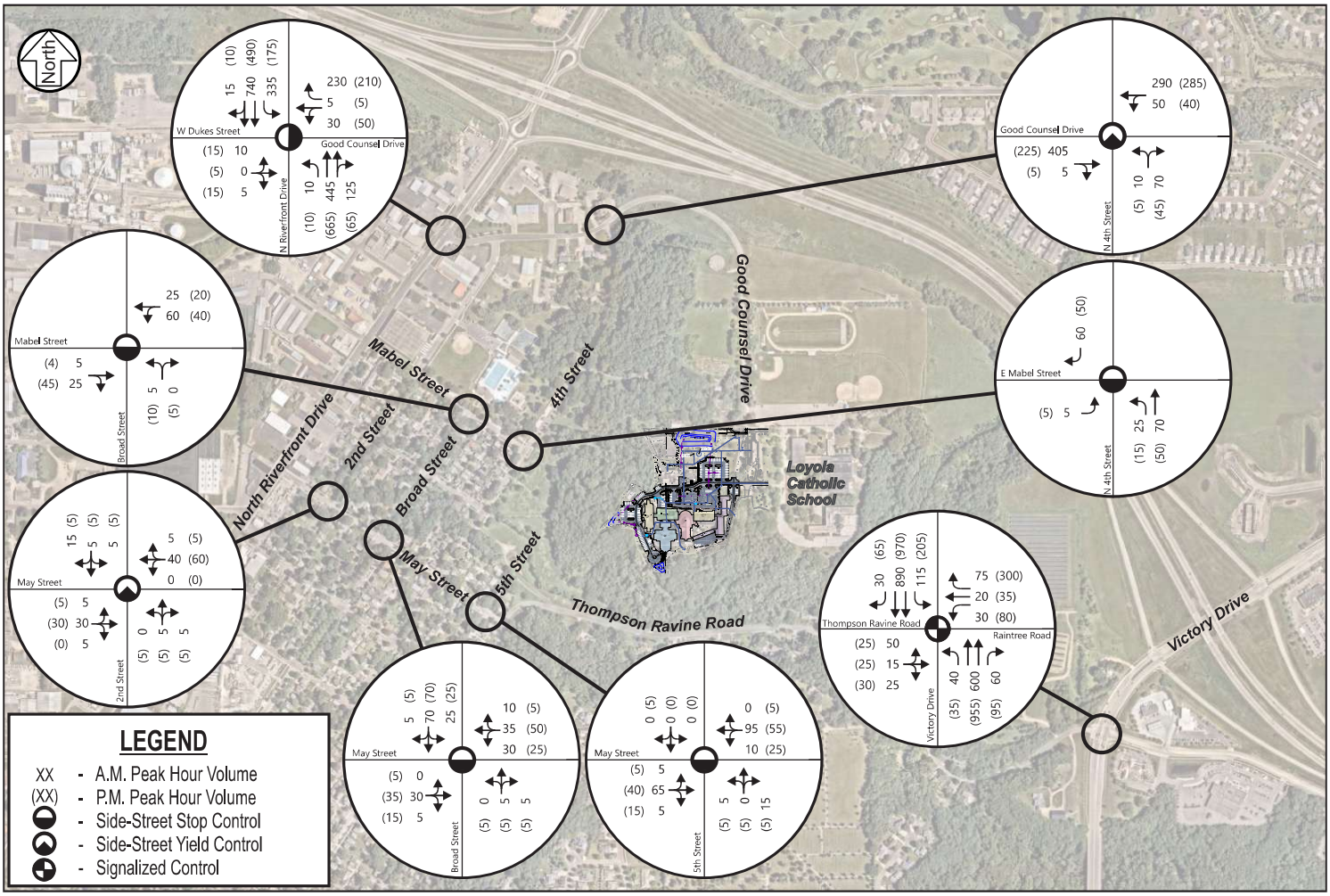

2030 Build Conditions

School Sisters of Notre Dame Traffic Study Update

City of Mankato

Figure 5

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Year 2030 Build Conditions

To determine how the study intersections and site access locations will operate under year 2030 build conditions, an intersection capacity analysis was completed using Synchro/SimTraffic software. The analysis assumes the expected increase enrollment at the Loyola Catholic School and the completion of the proposed development. Results of the analysis, summarized in Table 5, indicate that the North Riverfront Drive and Good Counsel Drive intersection is expected to operate at an overall LOS D and E during the weekday a.m. and p.m. peak hours, respectively. All remaining study intersections are expected to operate at an overall LOS B or better during the weekday a.m. and p.m. peak hours. Delays and queueing are expected to worsen compared to existing conditions as area development occurs (i.e. from background growth, adjacent school, and the proposed development).

Table 5: Year 2030 Build Intersection Capacity Analysis Summary

Intersection	A.M. Peak Hour		P.M. Peak Hour	
	LOS	Delay	LOS	Delay
North Riverfront Drive & Good Counsel Drive [10]	D	31 sec.	**E**	**40 sec.**
4th Street & Good Counsel Drive [11]	A	3 sec	A	2 sec.
Broad Street & Mabel Street [10]	A	2 sec.	A	4 sec.
4th Street & Mabel Street [10]	A	6 sec.	A	6 sec.
2nd Street & May Street [11]	A	2 sec.	A	2 sec.
Broad Street & May Street [10]	A	6 sec.	A	6 sec.
5th Street & May Street [10]	A	3 sec.	A	3 sec.
Thompson Ravine Road & Emergency Access [12]	A	1 sec.	A	1 sec.
Victory Drive & Thompson Ravine Road/Raintree Road [13]	A	9 sec.	B	14 sec.

[10] Indicates an unsignalized intersection with a side-street stop control, where the worst side-street movement LOS and delay are shown.
[11] Indicates an unsignalized intersection with a yield control, where the worst side-street movement LOS and delay are shown.
[12] Indicates an uncontrolled intersection, where the worst side-street movement LOS and delay are shown.
[13] Indicates a signalized controlled intersection, where the overall LOS and delay are shown.

The following information summarizes the operational and/or safety issues that warrant consideration as traffic volumes increase:

North Riverfront Drive and Good Counsel Drive

- Under 2030 build conditions, the North Riverfront Drive and Good Counsel Drive intersection is expected to operate at a LOS E during the p.m. peak hour, with an average delay of approximately 40 seconds for the westbound left-turn/through movement. Despite delays reaching 40 seconds, 95th-percentile queues are not expected to exceed five (5) vehicles and are not anticipated to extend to adjacent neighborhood intersections or block the westbound left-turn/through lane. Table 6 shows the westbound 95th-percentile and average queues expected under 2030 build conditions.

Table 6: North Riverfront and Good Counsel Drive Westbound Queuing Analysis

Westbound Movement	Storage Length Capacity	AM Peak Hour		PM Peak Hour	
		Average Queue	95th Percentile Queue	Average Queue	95th Percentile Queue
Left-Turn/ Through Movement	150 feet	27 feet	66 feet	45 feet	109 feet
Right-Turn Movement	-	55 feet	88 feet	52 feet	86 feet

Warrant Analysis

A warrants analysis was performed at the North Riverfront Drive and Good Counsel Drive Intersection for the applicable control alternatives as outlined in the *Minnesota Manual on Uniform Traffic Control Devices* (MN MUTCD), 11th Edition that went into effect on January 18, 2026. Analysis of signal warrants 1-3 and the Multiway Stop Applications (MWSA) Condition C was performed for existing year 2026, year 2030 no build and year 2030 build traffic volumes. Signal warrants 4-9 were investigated and determined to not be applicable to the subject intersection.

For the analysis, the northbound and southbound approaches were treated as the major approaches, which is consistent with the existing side street stop control on the eastbound and westbound legs of the intersection. The number of lanes assumed for each approach in the warrants analysis follows guidance from the MnDOT ICE Manual (2025). Right-turning vehicles on westbound Good Counsel Drive were evaluated under two scenarios, assuming either 0 percent or 50 percent of the westbound right-turn volumes, to allow for comparison given the high proportion of traffic destined northbound on North Riverfront Drive. The 70 percent traffic volume factor was not applied because the proposed conditions do not meet the required criteria, which include a mainline roadway speed limit above 40 mph or a population under 10,000. The assumed lane geometry and approach speeds used in the warrants analysis are summarized in Table 7, and the results of the warrant analysis for 0 percent and 50 percent of the westbound right-turn volumes are shown in Tables 8 and 9, respectively.

Table 7: Warrant Analysis Assumptions

Approach	Geometry	Speed Limit
Northbound North Riverfront Drive	Two or more approach lanes	35 mph
Southbound North Riverfront Drive	Two or more approach lanes	35 mph
Eastbound Good Counsel Drive	One approach Lane	30 mph
Westbound Good Counsel Drive	One approach Lane	30 mph

Table 8: Warrant Analysis – 0 Percent of Westbound Right Turn Volumes Included

MN MUTCD	Hours Required	Existing Year 2026 Volumes		Year 2030 No Build Volumes		Year 2030 Build Volumes	
		Hours Met	Warrant Met	Hours Met	Warrant Met	Hours Met	Warrant Met
Multiway Stop Applications Condition C Warrant	8	0	Not Met	0	Not Met	0	Not Met
Warrant 1A: Minimum Vehicular Volume	8	0	Not Met	0	Not Met	0	Not Met
Warrant 1B: Interruption of Continuous Traffic	8	0	Not Met	0	Not Met	0	Not Met
Warrant 1C: Combination of Warrants	8	0	Not Met	0	Not Met	0	Not Met
Warrant 2: Four-Hour Vehicular Volume	4	0	Not Met	0	Not Met	0	Not Met
Warrant 3B: Peak Hour Volume	1	0	Not Met	0	Not Met	0	Not Met

Table 9: Warrant Analysis – 50 Percent of Westbound Right Turn Volumes Included

MN MUTCD	Hours Required	Existing Year 2026 Volumes		Year 2030 No Build Volumes		Year 2030 Build Volumes	
		Hours Met	Warrant Met	Hours Met	Warrant Met	Hours Met	Warrant Met
Multiway Stop Applications Condition C Warrant	8	0	Not Met	0	Not Met	0	Not Met
Warrant 1A: Minimum Vehicular Volume	8	0	Not Met	0	Not Met	1	Not Met
Warrant 1B: Interruption of Continuous Traffic	8	6	Not Met	7	Not Met	**9**	**Met**
Warrant 1C: Combination of Warrants	8	1	Not Met	1	Not Met	4	Not Met
Warrant 2: Four-Hour Vehicular Volume	4	3	Not Met	**4**	**Met**	**6**	**Met**
Warrant 3B: Peak Hour Volume	1	0	Not Met	0	Not Met	0	Not Met

The results of the warrant analysis indicate that the intersection meets Warrant 2 under the 2030 no build conditions and meets Warrants 1B and 2 under the 2030 build conditions when 50 percent of the westbound right-turn volumes are included in the analysis. No warrants are met when 0 percent of the westbound right-turn volumes are included in the analysis. Based on these results, a signal would be warranted under the 2030 no build conditions when 50 percent of the right-turn volumes are included. However, a signal is not recommended at the subject intersection because it would be inconsistent with the existing traffic control along the corridor, and other viable unsignalized mitigation measures are available.

Potential Alternatives for Consideration:

Three (3) alternatives were identified for consideration at the North Riverfront Drive and Good Counsel Drive intersection: maintaining the existing geometry and traffic control, implementing a three-quarter access, and constructing a roundabout.

Maintaining Existing Geometry/Traffic Control (i.e. No Build)

- While changes to access or traffic control could improve safety and operations, they could also result in significant costs and unwanted trip rerouting. It should be noted that the anticipated LOS E condition during the p.m. peak hour is expected to occur only for a brief period.
    - **Advantages:** While the westbound left-turn/through lane is projected to operate at a LOS E during the p.m. peak, all other movements are expected to operate at acceptable levels under the year 2030 build conditions. Delays are anticipated to affect approximately 30 to 50 westbound left-turn and through vehicles during the peak hours. Additionally, queues are expected to be minimal and not impact the right-turn lane, which carries the highest volume of movements on the westbound leg of the intersection.
    - **Disadvantages:** The westbound left-turn/through lane is projected to operate at a LOS E during the p.m. peak hour and maintaining the existing geometry and traffic control would not improve this condition. If the delay for this movement becomes excessive, drivers may make more aggressive movements during unsafe gaps or choose to reroute to alternative intersections or residential streets, potentially degrading safety and operations elsewhere.

Three-Quarter Access

- If the North Riverfront Drive and Good Counsel Drive intersection were restricted to three-quarter access, which would prohibit eastbound and westbound left-turn and through movements, approximately 30 to 50 westbound left-turn and through movements are expected to reroute to adjacent intersections in the 2030 build conditions. Additionally, a yield-controlled channelized right-turn lane on the minor approaches could be considered to improve right-turn operations and reduce delay.
    - **Advantages:** While a three-quarter access configuration would result in a less direct route for some users, it would reduce conflict points and improve overall safety and operations at the North Riverfront Drive and Good Counsel Drive intersection. With fewer conflicting movements and yield-controlled right turns on the minor approaches, the westbound approach is expected to operate at LOS A during both the a.m. and p.m. peak hours, compared to the existing geometry, which operates at LOS D and LOS E during the a.m. and p.m. peak hours, respectively.
    - **Disadvantages:** The three-quarter access configuration would restrict left-turn and through movements from the minor approach, requiring those trips to use alternative routes and potentially increasing out-of-direction travel.

Roundabout

- A hybrid (two-lane northbound/southbound and one-lane eastbound/westbound) multilane roundabout could be considered at the North Riverfront Drive and Good Counsel Drive intersection to improve safety and operations.
    - **Advantages:** Installing a roundabout would provide acceptable operations and improve safety at the intersection by reducing conflict points and lowering the potential for severe crashes. It would also improve traffic flow by allowing continuous movement through the intersection and reduce the delay for all approaches. Additionally, it is not expected to reroute any additional trips through residential streets.
    - **Disadvantages:** Constructing a hybrid roundabout would be a high-cost improvement that may not be feasible in the area. Because of the multilane north and south approaches, RRFB crossings would be required, further increasing costs. Roundabouts may also require additional right-of-way and modifications to nearby driveways.

Site Plan Review

A review of the proposed site plan was completed to identify any issues and recommend potential improvements with regard to internal roadways, access, traffic controls, sight distance, and circulation. The following information should be considered when designing internal traffic controls and access roadways:

- Incorporate traffic controls, signing, and striping based on guidelines established in the Manual on Uniform Traffic Control Devices (MUTCD).
- Special consideration should be made to limit any sight distance impacts from future structures, landscaping, and signing.

In general, all internal intersections are expected to operate adequately with side-street stop control. As development occurs, internal intersections should be reviewed to determine if a higher level of traffic control (i.e. an all-way stop) should be considered. In addition, special consideration should be made to limit any sight distance impacts from future landscaping and signing at all internal and external intersections within the study area.

Neighborhood Traffic Impacts



As mentioned previously, the primary access to the development is via Good Counsel Drive. Depending on users' origins and destinations, a minimal amount of trips are expected to utilize residential streets in the neighborhood immediately west of the proposed development. Based on current development assumptions and anticipated routing, approximately 120 additional daily trips (from the proposed development) are expected to travel along 4th Street under 2030 conditions. This equates to approximately 10 to 15 vehicles during the peak hours (i.e., approximately 1 vehicle every 4 to 6 minutes), in addition to the existing traffic volumes of approximately 110 and 80 vehicles in the a.m. and p.m. peak hour, respectively, on 4th Street.

While these trips are minimal and are not expected to significantly affect traffic conditions within the residential neighborhood, mitigation measures could be considered if safety or operational issues arise. Mitigation measures include signage (e.g., "No Through Traffic") and/or restricting the westbound left-turn movement to limit use of the residential streets. Note that if trips are diverted from 4th Street, they would likely use the North Riverfront Drive and Good Counsel Drive intersection. Although the additional trips are minor, approximately 10 to 15 vehicles per peak hour, the intersection is already expected to operate at LOS E during the p.m. peak hour under 2030 build conditions, so these trips may contribute to increased delay or result in rerouting to nearby intersections.

Summary and Conclusion

SRF completed an updated transportation study for the proposed School Sisters of Notre Dame residential development, generally located east of 4th Street and north of Thompson Ravine Road in Mankato, Minnesota. The proposed development consists of 118 multifamily housing units, 51 assisted living beds, 20,000 square feet of office space, a 3,850-square-foot fitness studio, a chapel and gym with a capacity of up to 350 people, and a 4,210-square-foot conference room available for outside rental. The development is anticipated to be fully constructed and operational by 2030. The purpose of this study was to evaluate existing and future traffic conditions, assess operational and safety impacts associated with the proposed development, and identify potential improvements needed to maintain acceptable operations within the study area. Key findings of the study are summarized below.

1. Existing Conditions

a. All study intersections currently operate at an acceptable overall LOS C or better during the a.m. and p.m. peak hours and, no significant operational or queueing issues were observed.

2. Traffic Forecasts

a. **Background Growth:** An annual growth rate of 1 percent was applied to peak hour through traffic volumes along North Riverfront Drive and Victory Drive to account for general background growth in the area. No background growth was applied to other intersections due to limited potential for additional development.

b. **Loyola Catholic School Enrollment:** Based on data provided from the school, enrollment is projected to increase from 541 students in 2022–2023 to approximately 600 students by 2030. This increase was included in the traffic forecast and is expected to generate an additional 45 a.m. peak-hour trips, 30 p.m. peak-hour trips, and 103 daily trips by year 2030.

c. **Proposed Development:** The proposed development is expected to generate approximately 133 a.m. peak-hour trips, 131 p.m. peak-hour trips, and 1,183 daily trips.

3. Year 2030 Build Conditions

a. With background growth, increased enrollment at the Loyola Catholic School and the completion of the proposed development, the North Riverfront Drive and Good Counsel Drive intersection is projected to operate at a LOS E during the p.m. peak hour, while all remaining study intersections are expected to continue operating at an overall LOS B or better during the weekday a.m. and p.m. peak hours.

4. Alternative of Consideration at the North Riverfront Drive and Counsel Drive Intersection

a. **Maintaining Existing Geometry and Traffic Control**

i. **Advantages:** All lanes except the westbound left-turn/through lane are expected to operate at acceptable levels. Delays affect approximately 30–50 vehicles during the. peak hours, and queues are minimal.

ii. **Disadvantages:** The westbound left-turn/through lane is projected to operate at a LOS E during the p.m. peak hour. Drivers may make aggressive movements or reroute to residential streets, potentially increasing safety and operational concerns.

b. **Three-Quarter Access**

i. **Advantages:** Restricting eastbound and westbound left-turn/through movements reduces conflict points and improves safety. The intersection is expected to operate at acceptable levels of service.

ii. **Disadvantages:** Restricting left-turn and through movements from the minor approach would require those trips to use alternative routes and potentially increase out-of-direction travel.

c. **Roundabout**

i. **Advantages:** A hybrid (2x1) roundabout would provide acceptable operations, reduce conflict points, lower potential for severe crashes, improve continuous traffic flow, and is not expected to reroute trips through residential streets.

ii. **Disadvantages:** Constructing a multilane roundabout would be a high-cost improvement. RRFB crossings would be required on the north and south legs, and additional right-of-way and driveway modifications may be necessary.

5. Neighborhood Traffic Impacts

a. Development-related trips using residential streets are expected to be minimal, approximately 120 daily trips along 4th Street (10 to 15 vehicles per peak hour). While minor, these trips could be mitigated by signage or restricting westbound left-turn movements if operational or safety issues arise.

Appendix

- Year 2026 Existing Conditions Operations
- Year 2030 Build Operations
- Year 2026 Existing Conditions Warrant Analysis (0% WBR Volumes)
- Year 2030 No Build Warrant Analysis (0% WBR Volumes)
- Year 2030 Build Warrant Analysis (0% WBR Volumes)
- Year 2026 Existing Conditions Warrant Analysis (50% WBR Volumes)
- Year 2030 No Build Warrant Analysis (50% WBR Volumes)
- Year 2030 Build Warrant Analysis (50% WBR Volumes)

Year 2026 Existing Conditions Operations

10: N Riverfront Drive & W Dukes Street/Good Counsel Drive Performance by lane

Lane	EB	WB	WB	NB	NB	NB	SB	SB	SB	All
Movements Served	LTR	LT	R	L	T	TR	L	T	TR	
Denied Del/Veh (s)										0.5
Total Del/Veh (s)	22.0	12.5	3.8	3.5	0.5	0.8	6.6	0.8	0.4	2.3

20: N 4th Street & Good Counsel Drive Performance by lane

Lane	EB	WB	NB	All
Movements Served	TR	LT	LR	
Denied Del/Veh (s)				0.1
Total Del/Veh (s)	0.4	1.1	2.9	0.9

30: N Broad Street & E Mabel Street Performance by lane

Lane	EB	WB	NB	All
Movements Served	TR	LT	LR	
Denied Del/Veh (s)				0.1
Total Del/Veh (s)	0.1	1.3	1.8	1.0

40: N 4th Street & E Mabel Street Performance by lane

Lane	EB	NB	NB	SB	All
Movements Served	L	L	T	R	
Denied Del/Veh (s)					0.1
Total Del/Veh (s)	2.7	4.6	6.0	0.2	4.0

50: N 2nd Street & May Street Performance by lane

Lane	EB	WB	NB	SB	All
Movements Served	LTR	LTR	LTR	LTR	
Denied Del/Veh (s)					0.1
Total Del/Veh (s)	0.1	2.0	0.9	1.4	1.3

60: N Broad Street & May Street Performance by lane

Lane	EB	WB	NB	SB	All
Movements Served	LTR	LTR	LTR	LTR	
Denied Del/Veh (s)					0.0
Total Del/Veh (s)	5.5	4.3	0.2	0.6	3.0

70: N 5th Street & May Street Performance by lane

Lane	EB	WB	NB	All
Movements Served	LTR	LTR	LTR	
Denied Del/Veh (s)				0.1
Total Del/Veh (s)	1.1	0.6	2.9	1.0

80: Thompson Ravine Road & Emergency Access Performance by lane

Lane	EB	WB	All
Movements Served	LT	TR	
Denied Del/Veh (s)			0.1
Total Del/Veh (s)	0.1	0.6	0.3

90: Victory Drive & Thompson Ravine Road/Raintree Road Performance by lane

Lane	EB	WB	WB	WB	NB	NB	NB	NB	SB	SB	SB	SB
Movements Served	LTR	L	T	R	L	T	T	R	L	T	T	R
Denied Del/Veh (s)												
Total Del/Veh (s)	42.6	45.9	51.6	4.6	8.7	7.2	7.4	1.3	8.9	4.8	4.2	0.5

90: Victory Drive & Thompson Ravine Road/Raintree Road Performance by lane

Lane	All
Movements Served	
Denied Del/Veh (s)	0.7
Total Del/Veh (s)	8.2

Total Network Performance

Denied Del/Veh (s)	0.6
Total Del/Veh (s)	6.3

Intersection: 10: N Riverfront Drive & W Dukes Street/Good Counsel Drive

Movement	EB	WB	WB	NB	NB	SB
Directions Served	LTR	LT	R	L	TR	L
Maximum Queue (ft)	31	53	71	33	39	142
Average Queue (ft)	9	13	45	5	4	53
95th Queue (ft)	31	38	68	22	22	105
Link Distance (ft)	326	394			306	
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (ft)			80	75		250
Storage Blk Time (%)		0	0			0
Queuing Penalty (veh)		0	0			0

Intersection: 20: N 4th Street & Good Counsel Drive

Movement	WB	NB
Directions Served	LT	LR
Maximum Queue (ft)	74	56
Average Queue (ft)	10	20
95th Queue (ft)	43	49
Link Distance (ft)	1044	760
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 30: N Broad Street & E Mabel Street

Movement	WB	NB
Directions Served	LT	LR
Maximum Queue (ft)	30	30
Average Queue (ft)	2	2
95th Queue (ft)	14	15
Link Distance (ft)	344	926
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 40: N 4th Street & E Mabel Street

Movement	EB	NB	NB
Directions Served	L	L	T
Maximum Queue (ft)	27	44	67
Average Queue (ft)	2	18	31
95th Queue (ft)	14	44	54
Link Distance (ft)	344	632	632
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 50: N 2nd Street & May Street

Movement	SB
Directions Served	LTR
Maximum Queue (ft)	18
Average Queue (ft)	1
95th Queue (ft)	8
Link Distance (ft)	470
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 60: N Broad Street & May Street

Movement	EB	WB	SB
Directions Served	LTR	LTR	LTR
Maximum Queue (ft)	56	62	4
Average Queue (ft)	20	32	0
95th Queue (ft)	48	54	3
Link Distance (ft)	341	726	926
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 70: N 5th Street & May Street

Movement	WB	NB
Directions Served	LTR	LTR
Maximum Queue (ft)	18	36
Average Queue (ft)	1	12
95th Queue (ft)	8	37
Link Distance (ft)	103	399
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 80: Thompson Ravine Road & Emergency Access

Movement
Directions Served
Maximum Queue (ft)
Average Queue (ft)
95th Queue (ft)
Link Distance (ft)
Upstream Blk Time (%)
Queuing Penalty (veh)
Storage Bay Dist (ft)
Storage Blk Time (%)
Queuing Penalty (veh)

Intersection: 90: Victory Drive & Thompson Ravine Road/Raintree Road

Movement	EB	WB	WB	WB	NB	NB	NB	NB	SB	SB	SB	SB
Directions Served	LTR	L	T	R	L	T	T	R	L	T	T	R
Maximum Queue (ft)	124	69	61	55	39	170	140	28	102	161	131	6
Average Queue (ft)	57	23	12	21	13	70	35	4	33	60	35	1
95th Queue (ft)	109	58	41	41	33	144	98	15	68	129	90	4
Link Distance (ft)	1490		1014			1186	1186			1190	1190	
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)		200		435	175			275	275			300
Storage Blk Time (%)						0						
Queuing Penalty (veh)						0						

Network Summary

Network wide Queuing Penalty: 0

10: N Riverfront Drive & W Dukes Street/Good Counsel Drive Performance by lane

Lane	EB	WB	WB	NB	NB	NB	SB	SB	SB	All
Movements Served	LTR	LT	R	L	T	TR	L	T	TR	
Denied Del/Veh (s)										0.3
Total Del/Veh (s)	16.2	11.1	4.7	2.8	0.3	0.5	5.6	0.4	0.3	2.0

20: N 4th Street & Good Counsel Drive Performance by lane

Lane	EB	WB	NB	All
Movements Served	TR	LT	LR	
Denied Del/Veh (s)				0.1
Total Del/Veh (s)	0.3	0.9	1.1	0.7

30: N Broad Street & E Mabel Street Performance by lane

Lane	EB	WB	NB	All
Movements Served	TR	LT	LR	
Denied Del/Veh (s)				0.1
Total Del/Veh (s)	0.3	1.3	3.8	1.0

40: N 4th Street & E Mabel Street Performance by lane

Lane	EB	NB	NB	SB	All
Movements Served	L	L	T	R	
Denied Del/Veh (s)					0.1
Total Del/Veh (s)	1.1	4.3	5.8	0.1	3.1

50: N 2nd Street & May Street Performance by lane

Lane	EB	WB	NB	SB	All
Movements Served	LTR	LTR	LTR	LTR	
Denied Del/Veh (s)					0.1
Total Del/Veh (s)	0.1	1.8	1.7	2.1	1.4

60: N Broad Street & May Street Performance by lane

Lane	EB	WB	NB	SB	All
Movements Served	LTR	LTR	LTR	LTR	
Denied Del/Veh (s)					0.1
Total Del/Veh (s)	5.1	6.0	0.3	0.8	3.4

70: N 5th Street & May Street Performance by lane

Lane	EB	WB	NB	SB	All
Movements Served	LTR	LTR	LTR	LTR	
Denied Del/Veh (s)					0.1
Total Del/Veh (s)	1.5	0.7	3.0	2.7	1.1

80: Thompson Ravine Road & Emergency Access Performance by lane

Lane	EB	WB	All
Movements Served	LT	TR	
Denied Del/Veh (s)			0.1
Total Del/Veh (s)	0.1	0.8	0.5

90: Victory Drive & Thompson Ravine Road/Raintree Road Performance by lane

Lane	EB	WB	WB	WB	NB	NB	NB	NB	SB	SB	SB	SB
Movements Served	LTR	L	T	R	L	T	T	R	L	T	T	R
Denied Del/Veh (s)												
Total Del/Veh (s)	35.8	51.8	46.6	14.3	10.6	13.9	11.6	2.2	19.4	7.0	5.5	0.8

90: Victory Drive & Thompson Ravine Road/Raintree Road Performance by lane

Lane	All
Movements Served	
Denied Del/Veh (s)	1.0
Total Del/Veh (s)	13.0

Total Network Performance

Denied Del/Veh (s)	0.7
Total Del/Veh (s)	10.1

Intersection: 10: N Riverfront Drive & W Dukes Street/Good Counsel Drive

Movement	EB	WB	WB	NB	NB	SB
Directions Served	LTR	LT	R	L	TR	L
Maximum Queue (ft)	61	62	94	28	7	78
Average Queue (ft)	23	24	47	3	0	28
95th Queue (ft)	52	52	77	17	5	61
Link Distance (ft)	326	394			306	
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (ft)			80	75		250
Storage Blk Time (%)		0	0			
Queuing Penalty (veh)		0	0			

Intersection: 20: N 4th Street & Good Counsel Drive

Movement	WB	NB
Directions Served	LT	LR
Maximum Queue (ft)	45	34
Average Queue (ft)	7	7
95th Queue (ft)	30	29
Link Distance (ft)	1044	760
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 30: N Broad Street & E Mabel Street

Movement	WB	NB
Directions Served	LT	LR
Maximum Queue (ft)	30	31
Average Queue (ft)	2	8
95th Queue (ft)	15	30
Link Distance (ft)	344	926
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 40: N 4th Street & E Mabel Street

Movement	EB	NB	NB
Directions Served	L	L	T
Maximum Queue (ft)	16	31	49
Average Queue (ft)	1	10	25
95th Queue (ft)	9	34	48
Link Distance (ft)	344	632	632
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 50: N 2nd Street & May Street

Movement	NB	SB
Directions Served	LTR	LTR
Maximum Queue (ft)	6	18
Average Queue (ft)	0	1
95th Queue (ft)	4	11
Link Distance (ft)	455	470
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 60: N Broad Street & May Street

Movement	EB	WB	SB
Directions Served	LTR	LTR	LTR
Maximum Queue (ft)	54	54	18
Average Queue (ft)	27	29	1
95th Queue (ft)	52	53	8
Link Distance (ft)	341	726	926
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 70: N 5th Street & May Street

Movement	WB	NB	SB
Directions Served	LTR	LTR	LTR
Maximum Queue (ft)	12	31	18
Average Queue (ft)	0	3	1
95th Queue (ft)	6	19	10
Link Distance (ft)	103	399	183
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 80: Thompson Ravine Road & Emergency Access

Movement
Directions Served
Maximum Queue (ft)
Average Queue (ft)
95th Queue (ft)
Link Distance (ft)
Upstream Blk Time (%)
Queuing Penalty (veh)
Storage Bay Dist (ft)
Storage Blk Time (%)
Queuing Penalty (veh)

Intersection: 90: Victory Drive & Thompson Ravine Road/Raintree Road

Movement	EB	WB	WB	WB	NB	NB	NB	NB	SB	SB	SB	SB
Directions Served	LTR	L	T	R	L	T	T	R	L	T	T	R
Maximum Queue (ft)	127	146	75	200	94	309	259	53	163	186	146	18
Average Queue (ft)	53	70	25	83	16	150	98	10	69	82	51	2
95th Queue (ft)	108	126	61	155	57	260	204	32	129	154	116	9
Link Distance (ft)	1490		1014			1186	1186			1190	1190	
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)		200		435	175			275	275			300
Storage Blk Time (%)						5	0					
Queuing Penalty (veh)						1	0					

Network Summary

Network wide Queuing Penalty: 2

Year 2030 Build Operations

10: N Riverfront Drive & W Dukes Street/Good Counsel Drive Performance by lane

Lane	EB	WB	WB	NB	NB	NB	SB	SB	SB	All
Movements Served	LTR	LT	R	L	T	TR	L	T	TR	
Denied Del/Veh (s)										0.6
Total Del/Veh (s)	27.9	31.3	4.6	3.7	0.6	0.9	9.2	1.1	0.4	3.7

20: N 4th Street & Good Counsel Drive Performance by lane

Lane	EB	WB	NB	All
Movements Served	TR	LT	LR	
Denied Del/Veh (s)				0.1
Total Del/Veh (s)	0.5	1.5	2.9	1.1

30: N Broad Street & E Mabel Street Performance by lane

Lane	EB	WB	NB	All
Movements Served	TR	LT	LR	
Denied Del/Veh (s)				0.1
Total Del/Veh (s)	0.1	1.4	1.6	1.1

40: N 4th Street & E Mabel Street Performance by lane

Lane	EB	NB	NB	SB	All
Movements Served	L	L	T	R	
Denied Del/Veh (s)					0.1
Total Del/Veh (s)	2.3	4.6	6.1	0.2	3.8

50: N 2nd Street & May Street Performance by lane

Lane	EB	WB	NB	SB	All
Movements Served	LTR	LTR	LTR	LTR	
Denied Del/Veh (s)					0.1
Total Del/Veh (s)	0.1	2.1	1.2	1.7	1.3

60: N Broad Street & May Street Performance by lane

Lane	EB	WB	NB	SB	All
Movements Served	LTR	LTR	LTR	LTR	
Denied Del/Veh (s)					0.0
Total Del/Veh (s)	6.0	3.9	0.0	0.7	2.8

70: N 5th Street & May Street Performance by lane

Lane	EB	WB	NB	All
Movements Served	LTR	LTR	LTR	
Denied Del/Veh (s)				0.1
Total Del/Veh (s)	1.2	0.6	2.5	1.0

80: Thompson Ravine Road & Emergency Access Performance by lane

Lane	EB	WB	All
Movements Served	LT	TR	
Denied Del/Veh (s)			0.1
Total Del/Veh (s)	0.1	0.5	0.3

90: Victory Drive & Thompson Ravine Road/Raintree Road Performance by lane

Lane	EB	WB	WB	WB	NB	NB	NB	NB	SB	SB	SB	SB
Movements Served	LTR	L	T	R	L	T	T	R	L	T	T	R
Denied Del/Veh (s)												
Total Del/Veh (s)	44.1	50.9	49.5	4.8	8.5	8.2	7.7	1.2	9.0	5.1	4.3	0.5

90: Victory Drive & Thompson Ravine Road/Raintree Road Performance by lane

Lane	All
Movements Served	
Denied Del/Veh (s)	0.7
Total Del/Veh (s)	8.6

Total Network Performance

Denied Del/Veh (s)	0.6
Total Del/Veh (s)	7.2

Intersection: 10: N Riverfront Drive & W Dukes Street/Good Counsel Drive

Movement	EB	WB	WB	NB	NB	NB	B2	SB	SB	SB
Directions Served	LTR	LT	R	L	T	TR	T	L	T	TR
Maximum Queue (ft)	43	78	108	28	4	51	6	179	2	9
Average Queue (ft)	8	27	55	4	0	6	0	73	0	0
95th Queue (ft)	31	66	88	20	4	26	4	144	2	7
Link Distance (ft)	326	394			306	306	426		763	763
Upstream Blk Time (%)										
Queuing Penalty (veh)										
Storage Bay Dist (ft)			80	75				250		
Storage Blk Time (%)		2	1					0		
Queuing Penalty (veh)		5	0					1		

Intersection: 20: N 4th Street & Good Counsel Drive

Movement	WB	NB
Directions Served	LT	LR
Maximum Queue (ft)	71	61
Average Queue (ft)	17	24
95th Queue (ft)	53	51
Link Distance (ft)	1044	760
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 30: N Broad Street & E Mabel Street

Movement	WB	NB
Directions Served	LT	LR
Maximum Queue (ft)	30	30
Average Queue (ft)	3	2
95th Queue (ft)	17	16
Link Distance (ft)	344	926
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 40: N 4th Street & E Mabel Street

Movement	EB	NB	NB
Directions Served	L	L	T
Maximum Queue (ft)	27	38	63
Average Queue (ft)	2	19	33
95th Queue (ft)	14	44	53
Link Distance (ft)	344	632	632
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 50: N 2nd Street & May Street

Movement	EB	SB
Directions Served	LTR	LTR
Maximum Queue (ft)	6	24
Average Queue (ft)	0	2
95th Queue (ft)	4	13
Link Distance (ft)	350	470
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 60: N Broad Street & May Street

Movement	EB	WB	SB
Directions Served	LTR	LTR	LTR
Maximum Queue (ft)	57	60	18
Average Queue (ft)	23	31	1
95th Queue (ft)	51	52	8
Link Distance (ft)	341	726	926
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 70: N 5th Street & May Street

Movement	WB	NB
Directions Served	LTR	LTR
Maximum Queue (ft)	17	31
Average Queue (ft)	0	12
95th Queue (ft)	4	36
Link Distance (ft)	103	399
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 80: Thompson Ravine Road & Emergency Access

Movement
Directions Served
Maximum Queue (ft)
Average Queue (ft)
95th Queue (ft)
Link Distance (ft)
Upstream Blk Time (%)
Queuing Penalty (veh)
Storage Bay Dist (ft)
Storage Blk Time (%)
Queuing Penalty (veh)

Intersection: 90: Victory Drive & Thompson Ravine Road/Raintree Road

Movement	EB	WB	WB	WB	NB	NB	NB	NB	SB	SB	SB	SB
Directions Served	LTR	L	T	R	L	T	T	R	L	T	T	R
Maximum Queue (ft)	165	62	54	48	41	196	134	18	87	166	126	19
Average Queue (ft)	64	21	11	24	14	76	37	4	32	62	33	1
95th Queue (ft)	122	53	38	45	32	156	104	12	66	129	92	9
Link Distance (ft)	1490		1014			1186	1186			1190	1190	
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)		200		435	175			275	275			300
Storage Blk Time (%)						0						
Queuing Penalty (veh)						0						

Network Summary

Network wide Queuing Penalty: 6

10: N Riverfront Drive & W Dukes Street/Good Counsel Drive Performance by lane

Lane	EB	WB	WB	NB	NB	NB	SB	SB	SB	All
Movements Served	LTR	LT	R	L	T	TR	L	T	TR	
Denied Del/Veh (s)										0.4
Total Del/Veh (s)	30.6	40.3	5.2	2.4	0.4	0.8	7.6	0.6	0.3	4.2

20: N 4th Street & Good Counsel Drive Performance by lane

Lane	EB	WB	NB	All
Movements Served	TR	LT	LR	
Denied Del/Veh (s)				0.1
Total Del/Veh (s)	0.3	1.0	1.7	0.8

30: N Broad Street & E Mabel Street Performance by lane

Lane	EB	WB	NB	All
Movements Served	TR	LT	LR	
Denied Del/Veh (s)				0.1
Total Del/Veh (s)	0.2	1.4	4.0	1.1

40: N 4th Street & E Mabel Street Performance by lane

Lane	EB	NB	NB	SB	All
Movements Served	L	L	T	R	
Denied Del/Veh (s)					0.1
Total Del/Veh (s)	1.3	4.5	5.8	0.1	3.5

50: N 2nd Street & May Street Performance by lane

Lane	EB	WB	NB	SB	All
Movements Served	LTR	LTR	LTR	LTR	
Denied Del/Veh (s)					0.1
Total Del/Veh (s)	0.1	1.8	1.5	2.0	1.3

60: N Broad Street & May Street Performance by lane

Lane	EB	WB	NB	SB	All
Movements Served	LTR	LTR	LTR	LTR	
Denied Del/Veh (s)					0.0
Total Del/Veh (s)	5.3	5.7	0.5	0.7	3.3

70: N 5th Street & May Street Performance by lane

Lane	EB	WB	NB	SB	All
Movements Served	LTR	LTR	LTR	LTR	
Denied Del/Veh (s)					0.1
Total Del/Veh (s)	1.6	0.8	3.2	2.5	1.3

80: Thompson Ravine Road & Emergency Access Performance by lane

Lane	EB	WB	All
Movements Served	LT	TR	
Denied Del/Veh (s)			0.0
Total Del/Veh (s)	0.1	0.8	0.5

90: Victory Drive & Thompson Ravine Road/Raintree Road Performance by lane

Lane	EB	WB	WB	WB	NB	NB	NB	NB	SB	SB	SB	SB
Movements Served	LTR	L	T	R	L	T	T	R	L	T	T	R
Denied Del/Veh (s)												
Total Del/Veh (s)	39.0	50.8	47.3	14.7	11.2	15.2	13.2	2.3	20.4	7.3	5.9	0.8

90: Victory Drive & Thompson Ravine Road/Raintree Road Performance by lane

Lane	All
Movements Served	
Denied Del/Veh (s)	1.0
Total Del/Veh (s)	13.6

Total Network Performance

Denied Del/Veh (s)	0.8
Total Del/Veh (s)	11.2

Intersection: 10: N Riverfront Drive & W Dukes Street/Good Counsel Drive

Movement	EB	WB	WB	NB	NB	SB
Directions Served	LTR	LT	R	L	TR	L
Maximum Queue (ft)	82	148	110	28	24	115
Average Queue (ft)	27	45	52	3	2	43
95th Queue (ft)	65	109	86	18	12	89
Link Distance (ft)	326	394			306	
Upstream Blk Time (%)						
Queuing Penalty (veh)						
Storage Bay Dist (ft)			80	75		250
Storage Blk Time (%)		7	1			
Queuing Penalty (veh)		15	0			

Intersection: 20: N 4th Street & Good Counsel Drive

Movement	WB	NB
Directions Served	LT	LR
Maximum Queue (ft)	58	43
Average Queue (ft)	8	11
95th Queue (ft)	37	36
Link Distance (ft)	1044	760
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 30: N Broad Street & E Mabel Street

Movement	EB	WB	NB
Directions Served	TR	LT	LR
Maximum Queue (ft)	9	28	31
Average Queue (ft)	0	2	7
95th Queue (ft)	5	14	28
Link Distance (ft)	678	344	926
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 40: N 4th Street & E Mabel Street

Movement	EB	NB	NB
Directions Served	L	L	T
Maximum Queue (ft)	22	31	50
Average Queue (ft)	1	12	29
95th Queue (ft)	10	36	50
Link Distance (ft)	344	632	632
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 50: N 2nd Street & May Street

Movement	EB	NB	SB
Directions Served	LTR	LTR	LTR
Maximum Queue (ft)	6	18	12
Average Queue (ft)	0	1	1
95th Queue (ft)	5	8	9
Link Distance (ft)	350	455	470
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 60: N Broad Street & May Street

Movement	EB	WB	SB
Directions Served	LTR	LTR	LTR
Maximum Queue (ft)	63	61	10
Average Queue (ft)	28	31	0
95th Queue (ft)	52	52	5
Link Distance (ft)	341	726	926
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 70: N 5th Street & May Street

Movement	WB	NB	SB
Directions Served	LTR	LTR	LTR
Maximum Queue (ft)	24	25	18
Average Queue (ft)	2	3	2
95th Queue (ft)	12	19	14
Link Distance (ft)	103	399	183
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 80: Thompson Ravine Road & Emergency Access

Movement
Directions Served
Maximum Queue (ft)
Average Queue (ft)
95th Queue (ft)
Link Distance (ft)
Upstream Blk Time (%)
Queuing Penalty (veh)
Storage Bay Dist (ft)
Storage Blk Time (%)
Queuing Penalty (veh)

Intersection: 90: Victory Drive & Thompson Ravine Road/Raintree Road

Movement	EB	WB	WB	WB	NB	NB	NB	NB	SB	SB	SB	SB
Directions Served	LTR	L	T	R	L	T	T	R	L	T	T	R
Maximum Queue (ft)	122	146	87	198	135	324	266	54	178	206	178	29
Average Queue (ft)	54	65	25	88	17	167	117	9	75	82	56	3
95th Queue (ft)	102	121	63	155	58	282	225	30	148	158	133	13
Link Distance (ft)	1490		1014			1186	1186			1190	1190	
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)		200		435	175			275	275			300
Storage Blk Time (%)						6	0					
Queuing Penalty (veh)						2	0					

Network Summary

Network wide Queuing Penalty: 18

Year 2026 Existing Conditions Warrant Analysis (0% WBR Volumes)

WARRANTS ANALYSIS

Existing Conditions (Year 2026)

N Riverfront Drive & Good Cousel Drive
School Sisters of Notre Dame Traffic Study
Mankato

Background Information

Location : Mankato
Date: 2/25/2026
Analysis Prepared By: Ashley Stueve
Population Less than 10,000: No
Seventy Percent Factor Used: No

Speed (mph)	Lanes	RT Vol%	Approach	
35	2 or more	100%	Major Approach 1:	Northbound N Riverfront Drive
35	2 or more	100%	Major Approach 3:	Southbound N Riverfront Drive
30	1		Minor Approach 2:	Westbound Good Counsel Drive
30	1	100%	Minor Approach 4:	Eastbound Dukes Street

Notes: Warrant analysis calculations performed to align with Minnesota ICE Manual, 2025 v1

Warrants Analysis: Warrants 1A, 1B, and 1C

Hour	Major Approach 1	Major Approach 3	Total 1 + 3	Warrant Met 600	Warrant Met 900	Minor Approach 2	Minor Approach 4	Largest Minor App.	Warrant Met 150	Warrant Met 75	Met Same Hours Condition A	Met Same Hours Condition B	Combination A	Combination B	MWSA (C) 300	MWSA (C) 200
6 - 7 AM	236	308	544			11	3	11							X	
7 - 8 AM	499	943	1442	X	X	20	12	20							X	
8 - 9 AM	379	591	970	X	X	21	14	21							X	
9 - 10 AM	347	389	736	X		13	21	21							X	
10 - 11 AM	367	385	752	X		18	29	29							X	
11 - 12 AM	439	443	882	X		40	18	40							X	
12 - 1 PM	502	510	1012	X	X	39	22	39							X	
1 - 2 PM	439	395	834	X		31	17	31							X	
2 - 3 PM	504	527	1031	X	X	26	13	26							X	
3 - 4 PM	618	634	1252	X	X	48	16	48							X	
4 - 5 PM	719	671	1390	X	X	34	16	34							X	
5 - 6 PM	668	517	1185	X	X	43	17	43							X	
6 - 7 PM	358	300	658	X		28	17	28							X	
7 - 8 PM	0	0	0			0	0	0								
8 - 9 PM	0	0	0			0	0	0								
9 - 10 PM	0	0	0			0	0	0								
10 - 11 PM	0	0	0			0	0	0								
											0	0	0	0	0	

Warrant Summary

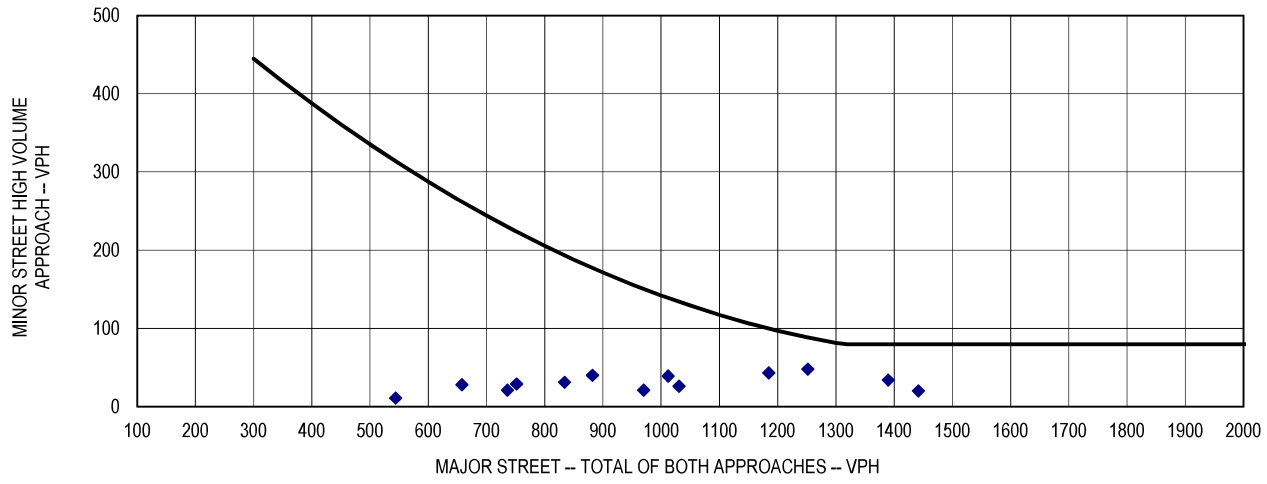
Warrant and Description	Hours Met	Hours Required	Met/Not Met
MWSA (C): Multiway Stop Applications Condition C	0	8	Not Met
Warrant 1A: Minimum Vehicular Volume	0	8	Not Met
Warrant 1B: Interruption of Continuous Traffic	0	8	Not Met
Warrant 1C: Combination of Warrants	0	8	Not Met
Warrant 2: Four-Hour Vehicular Volume	0	4	Not Met
Warrant 3B: Peak Hour	0	1	Not Met

WARRANTS ANALYSIS **Existing Conditions (Year 2026)**

N Riverfront Drive & Good Cousel Drive
School Sisters of Notre Dame Traffic Study
Mankato

Warrants Analysis: Warrant 2

WARRANT 2 - FOUR-HOUR VEHICULAR VOLUME



Number of Hours Satisfying Requirements:	0

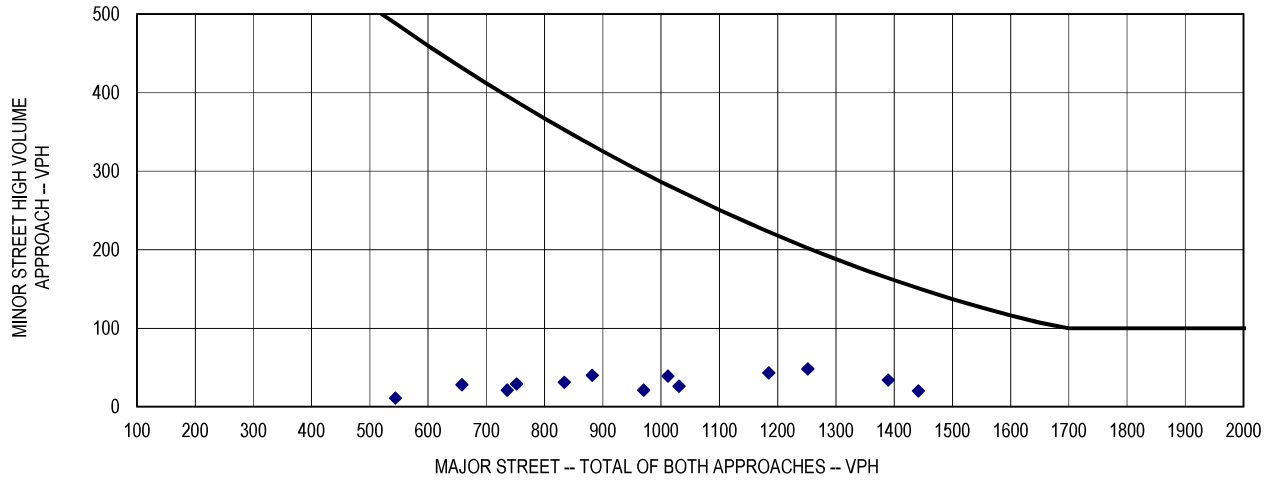
Notes: 1. 115 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACH WITH TWO OR MORE LANES AND 80 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACHING WITH ONE LANE.

WARRANTS ANALYSIS

Existing Conditions (Year 2026)

N Riverfront Drive & Good Cousel Drive
School Sisters of Notre Dame Traffic Study
Mankato

Warrants Analysis: Warrant 3



Number of Hours Satisfying Requirements:	0

Notes: 1. 150 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACH WITH TWO OR MORE LANES AND 100 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACHING WITH ONE LANE.

Year 2030 No Build Warrant Analysis
(0% WBR Volumes)

WARRANTS ANALYSIS

Year 2030 No Build Conditions (Year 2030)

N Riverfront Drive & Good Cousel Drive
School Sisters of Notre Dame Traffic Study
Mankato

Background Information

		Speed (mph)	Lanes	RT Vol%	Approach	
Location :	Mankato	35	2 or more	100%	Major Approach 1:	Northbound N Riverfront Drive
Date:	2/25/2026	35	2 or more	100%	Major Approach 3:	Southbound N Riverfront Drive
Analysis Prepared By:	Ashley Stueve	30	1		Minor Approach 2:	Westbound Good Counsel Drive
Population Less than 10,000:	No	30	1	100%	Minor Approach 4:	Eastbound Dukes Street
Seventy Percent Factor Used:	No					

Notes: Warrant analysis calculations performed to align with Minnesota ICE Manual, 2025 v1

Warrants Analysis: Warrants 1A, 1B, and 1C

Hour	Major Approach 1	Major Approach 3	Total 1 + 3	Warrant Met 600	Warrant Met 900	Minor Approach 2	Minor Approach 4	Largest Minor App.	Warrant Met 150	Warrant Met 75	Met Same Hours Condition A	Met Same Hours Condition B	Combination A	Combination B	MWSA (C) 300	MWSA (C) 200
6 - 7 AM	246	321	567			11	3	11							X	
7 - 8 AM	520	986	1506	X	X	23	12	23							X	
8 - 9 AM	394	616	1010	X	X	22	14	22							X	
9 - 10 AM	361	406	767	X		13	22	22							X	
10 - 11 AM	382	400	782	X		19	31	31							X	
11 - 12 AM	457	462	919	X	X	41	19	41							X	
12 - 1 PM	523	531	1054	X	X	41	23	41							X	
1 - 2 PM	457	411	868	X		34	18	34							X	
2 - 3 PM	525	549	1074	X	X	28	13	28							X	
3 - 4 PM	643	662	1305	X	X	54	17	54							X	
4 - 5 PM	748	700	1448	X	X	38	17	38							X	
5 - 6 PM	695	538	1233	X	X	46	18	46							X	
6 - 7 PM	372	312	684	X		30	18	30							X	
7 - 8 PM	0	0	0			0	0	0								
8 - 9 PM	0	0	0			0	0	0								
9 - 10 PM	0	0	0			0	0	0								
10 - 11 PM	0	0	0			0	0	0								
											0	0	0	0	0	

Warrant Summary

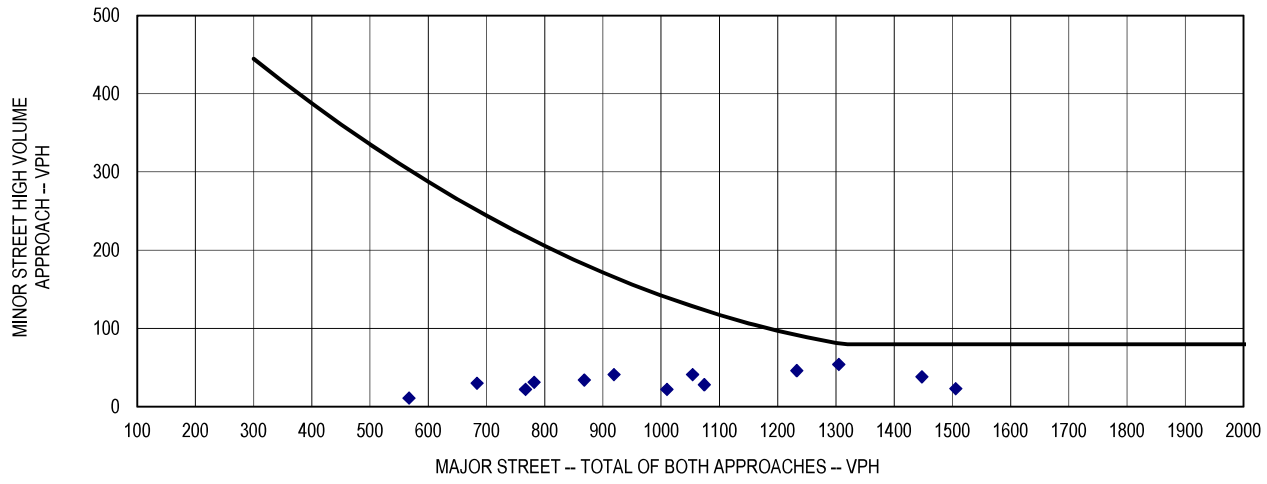
Warrant and Description		Hours Met	Hours Required	Met/Not Met
MWSA (C):	Multiway Stop Applications Condition C	0	8	Not Met
Warrant 1A:	Minimum Vehicular Volume	0	8	Not Met
Warrant 1B:	Interruption of Continuous Traffic	0	8	Not Met
Warrant 1C:	Combination of Warrants	0	8	Not Met
Warrant 2:	Four-Hour Vehicular Volume	0	4	Not Met
Warrant 3B:	Peak Hour	0	1	Not Met

WARRANTS ANALYSIS — Year 2030 No Build Conditions (Year 2030)

N Riverfront Drive & Good Cousel Drive
School Sisters of Notre Dame Traffic Study
Mankato

Warrants Analysis: Warrant 2

WARRANT 2 - FOUR-HOUR VEHICULAR VOLUME



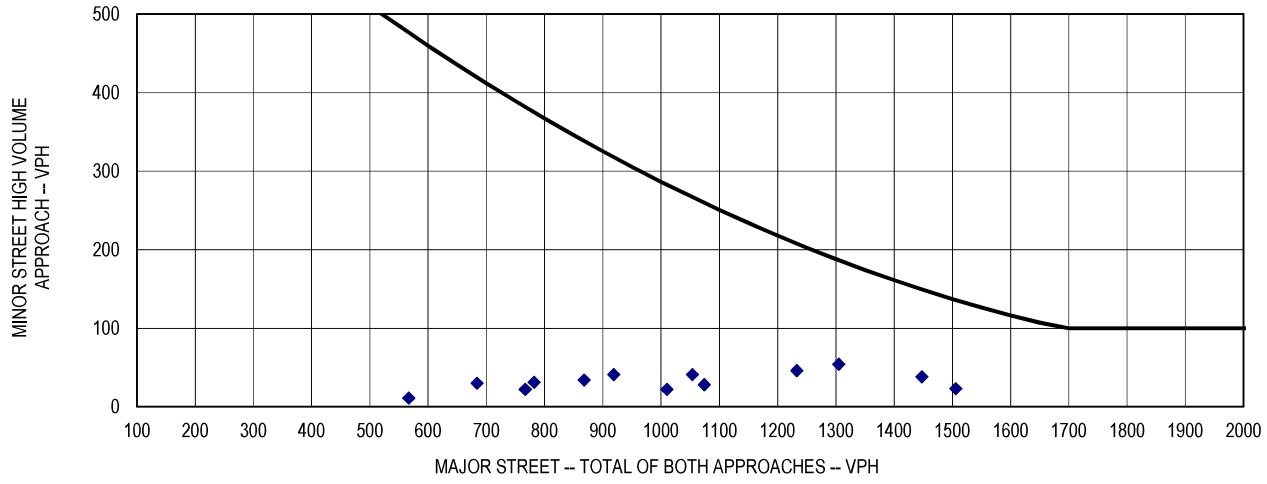
Number of Hours Satisfying Requirements:	0

Notes: 1. 115 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACH WITH TWO OR MORE LANES AND 80 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACHING WITH ONE LANE.

WARRANTS ANALYSIS — Year 2030 No Build Conditions (Year 2030)

N Riverfront Drive & Good Cousel Drive
School Sisters of Notre Dame Traffic Study
Mankato

Warrants Analysis: Warrant 3



Number of Hours Satisfying Requirements:	0

Notes: 1. 150 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACH WITH TWO OR MORE LANES AND 100 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACHING WITH ONE LANE.

Year 2030 Build Warrant Analysis
(0% WBR Volumes)

WARRANTS ANALYSIS

Year 2030 Build Conditions (Year 2030)

N Riverfront Drive & Good Cousel Drive
School Sisters of Notre Dame Traffic Study
Mankato

Background Information

		Speed (mph)	Lanes	RT Vol%	Approach	
Location :	Mankato	35	2 or more	100%	Major Approach 1:	Northbound N Riverfront Drive
Date:	2/25/2026	35	2 or more	100%	Major Approach 3:	Southbound N Riverfront Drive
Analysis Prepared By:	Ashley Stueve	30	1		Minor Approach 2:	Westbound Good Counsel Drive
Population Less than 10,000:	No	30	1	100%	Minor Approach 4:	Eastbound Dukes Street
Seventy Percent Factor Used:	No					

Notes: Warrant analysis calculations performed to align with Minnesota ICE Manual, 2025 v1

Warrants Analysis: Warrants 1A, 1B, and 1C

Hour	Major Approach 1	Major Approach 3	Total 1 + 3	Warrant Met 600	Warrant Met 900	Minor Approach 2	Minor Approach 4	Largest Minor App.	Warrant Met 150	Warrant Met 75	Met Same Hours Condition A	Met Same Hours Condition B	Combination A	Combination B	MWSA (C) 300	MWSA (C) 200
6 - 7 AM	252	338	590			19	3	19							X	
7 - 8 AM	532	1032	1564	X	X	25	12	25							X	
8 - 9 AM	416	638	1054	X	X	37	14	37							X	
9 - 10 AM	380	425	805	X		26	22	26							X	
10 - 11 AM	400	418	818	X		31	31	31							X	
11 - 12 AM	478	483	961	X	X	52	19	52							X	
12 - 1 PM	540	588	1128	X	X	52	23	52							X	
1 - 2 PM	471	456	927	X	X	42	18	42							X	
2 - 3 PM	540	602	1142	X	X	36	13	36							X	
3 - 4 PM	657	713	1370	X	X	53	17	53							X	
4 - 5 PM	762	754	1516	X	X	40	17	40							X	
5 - 6 PM	714	606	1320	X	X	55	18	55							X	
6 - 7 PM	387	365	752	X		38	18	38							X	
7 - 8 PM	0	0	0			0	0	0								
8 - 9 PM	0	0	0			0	0	0								
9 - 10 PM	0	0	0			0	0	0								
10 - 11 PM	0	0	0			0	0	0								
											0	0	0	0	0	

Warrant Summary

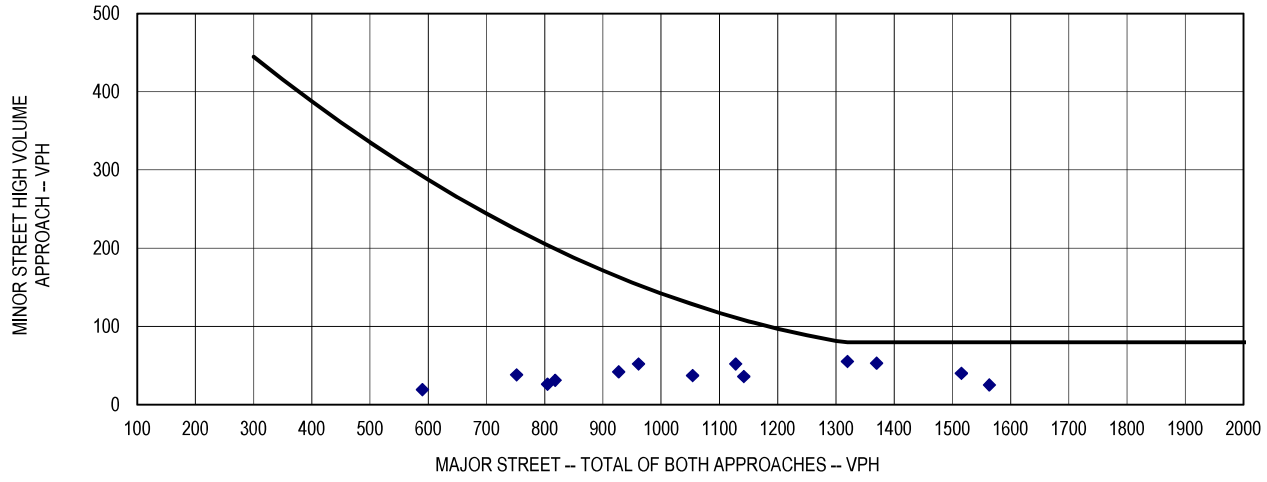
Warrant and Description		Hours Met	Hours Required	Met/Not Met
MWSA (C):	Multiway Stop Applications Condition C	0	8	Not Met
Warrant 1A:	Minimum Vehicular Volume	0	8	Not Met
Warrant 1B:	Interruption of Continuous Traffic	0	8	Not Met
Warrant 1C:	Combination of Warrants	0	8	Not Met
Warrant 2:	Four-Hour Vehicular Volume	0	4	Not Met
Warrant 3B:	Peak Hour	0	1	Not Met

WARRANTS ANALYSIS — Year 2030 Build Conditions (Year 2030)

N Riverfront Drive & Good Cousel Drive
School Sisters of Notre Dame Traffic Study
Mankato

Warrants Analysis: Warrant 2

WARRANT 2 - FOUR-HOUR VEHICULAR VOLUME



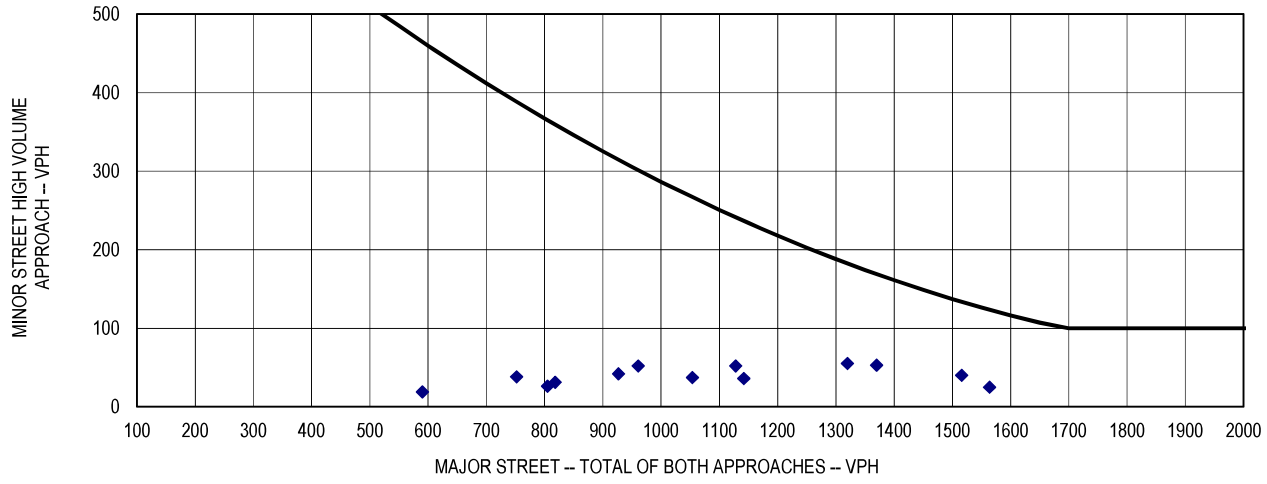
Number of Hours Satisfying Requirements:	0

Notes: 1. 115 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACH WITH TWO OR MORE LANES AND 80 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACHING WITH ONE LANE.

WARRANTS ANALYSIS — Year 2030 Build Conditions (Year 2030)

N Riverfront Drive & Good Cousel Drive
School Sisters of Notre Dame Traffic Study
Mankato

Warrants Analysis: Warrant 3



Number of Hours Satisfying Requirements:	0

Notes: 1. 150 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACH WITH TWO OR MORE LANES AND 100 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACHING WITH ONE LANE.

Year 2026 Existing Conditions Warrant Analysis (50% WBR Volumes)

WARRANTS ANALYSIS

Existing Conditions (Year 2026)

N Riverfront Drive & Good Counsel Drive
School Sisters of Notre Dame Traffic Study
Mankato

Background Information

		Speed (mph)	Lanes	RT Vol%	Approach	
Location :	Mankato	35	2 or more	100%	Major Approach 1:	Northbound N Riverfront Drive
Date:	2/25/2026	35	2 or more	100%	Major Approach 3:	Southbound N Riverfront Drive
Analysis Prepared By:	Ashley Stueve	30	1	50%	Minor Approach 2:	Westbound Good Counsel Drive
Population Less than 10,000:	No	30	1	100%	Minor Approach 4:	Eastbound Dukes Street
Seventy Percent Factor Used:	No					

Notes: Warrant analysis calculations performed to align with Minnesota ICE Manual, 2025 v1

Warrants Analysis: Warrants 1A, 1B, and 1C

Hour	Major Approach 1	Major Approach 3	Total 1 + 3	Warrant Met 600	Warrant Met 900	Minor Approach 2	Minor Approach 4	Largest Minor App.	Warrant Met 150	Warrant Met 75	Met Same Hours Condition A	Met Same Hours Condition B	Combination A	Combination B	MWSA (C) 300	MWSA (C) 200
6 - 7 AM	236	308	544			14	3	14							X	
7 - 8 AM	499	943	1442	X	X	81	12	81		X		X		X	X	
8 - 9 AM	379	591	970	X	X	61	14	61						X	X	
9 - 10 AM	347	389	736	X		27	21	27							X	
10 - 11 AM	367	385	752	X		30	29	30							X	
11 - 12 AM	439	443	882	X		83	18	83		X				X	X	
12 - 1 PM	502	510	1012	X	X	93	22	93		X		X		X	X	
1 - 2 PM	439	395	834	X		57	17	57							X	
2 - 3 PM	504	527	1031	X	X	76	13	76		X		X		X	X	
3 - 4 PM	618	634	1252	X	X	125	16	125		X		X	X	X	X	
4 - 5 PM	719	671	1390	X	X	90	16	90		X		X		X	X	
5 - 6 PM	668	517	1185	X	X	95	17	95		X		X		X	X	
6 - 7 PM	358	300	658	X		62	17	62							X	
7 - 8 PM	0	0	0			0	0	0								
8 - 9 PM	0	0	0			0	0	0								
9 - 10 PM	0	0	0			0	0	0								
10 - 11 PM	0	0	0			0	0	0								
											0	6	1	8	0	

Warrant Summary

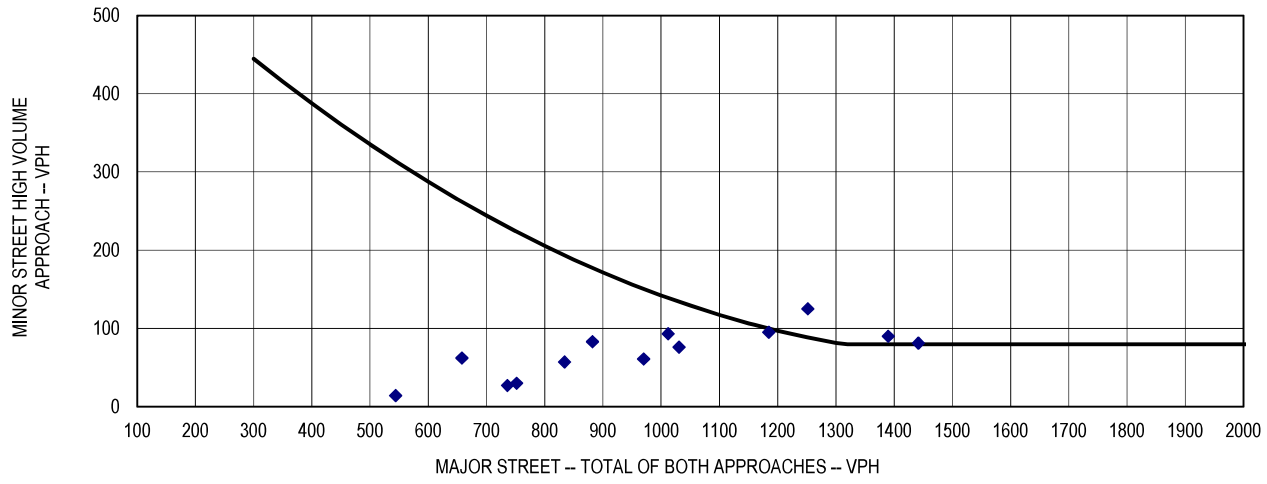
Warrant and Description	Hours Met	Hours Required	Met/Not Met
MWSA (C): Multiway Stop Applications Condition C	0	8	Not Met
Warrant 1A: Minimum Vehicular Volume	0	8	Not Met
Warrant 1B: Interruption of Continuous Traffic	6	8	Not Met
Warrant 1C: Combination of Warrants	1	8	Not Met
Warrant 2: Four-Hour Vehicular Volume	3	4	Not Met
Warrant 3B: Peak Hour	0	1	Not Met

WARRANTS ANALYSIS **Existing Conditions (Year 2026)**

N Riverfront Drive & Good Cousel Drive
School Sisters of Notre Dame Traffic Study
Mankato

Warrants Analysis: Warrant 2

WARRANT 2 - FOUR-HOUR VEHICULAR VOLUME



Number of Hours Satisfying Requirements:	3

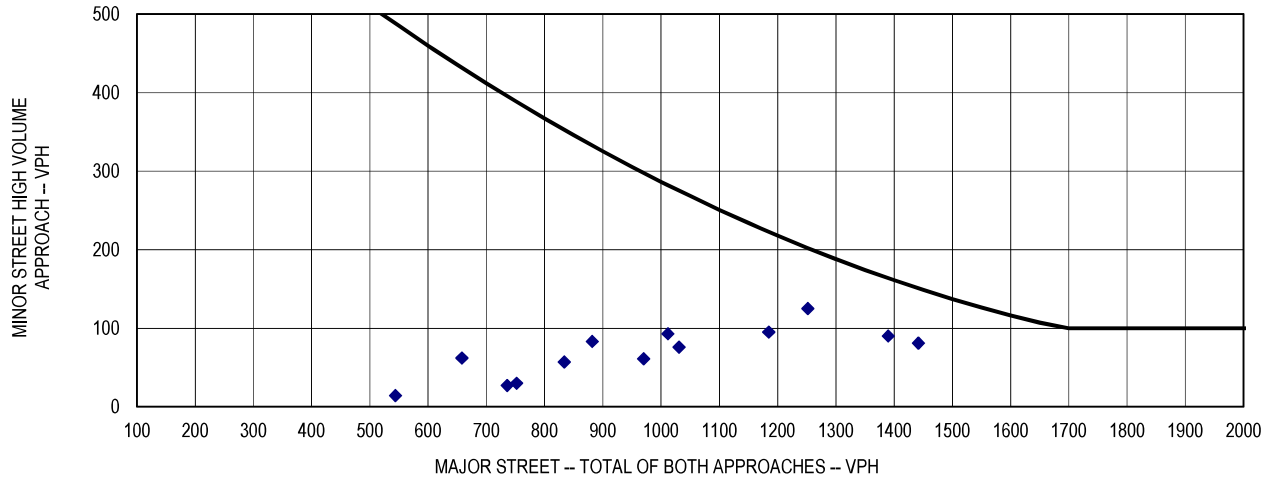
Notes: 1. 115 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACH WITH TWO OR MORE LANES AND 80 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACHING WITH ONE LANE.

WARRANTS ANALYSIS

Existing Conditions (Year 2026)

N Riverfront Drive & Good Cousel Drive
School Sisters of Notre Dame Traffic Study
Mankato

Warrants Analysis: Warrant 3



Number of Hours Satisfying Requirements:	0

Notes: 1. 150 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACH WITH TWO OR MORE LANES AND 100 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACHING WITH ONE LANE.

Year 2030 No Build Warrant Analysis (50% WBR Volumes)

WARRANTS ANALYSIS

Year 2030 No Build Conditions (Year 2030)

N Riverfront Drive & Good Counsel Drive
School Sisters of Notre Dame Traffic Study
Mankato

Background Information

		Speed (mph)	Lanes	RT Vol%	Approach	
Location :	Mankato	35	2 or more	100%	Major Approach 1:	Northbound N Riverfront Drive
Date:	2/25/2026	35	2 or more	100%	Major Approach 3:	Southbound N Riverfront Drive
Analysis Prepared By:	Ashley Stueve	30	1	50%	Minor Approach 2:	Westbound Good Counsel Drive
Population Less than 10,000:	No	30	1	50%	Minor Approach 4:	Eastbound Dukes Street
Seventy Percent Factor Used:	No					

Notes: Warrant analysis calculations performed to align with Minnesota ICE Manual, 2025 v1

Warrants Analysis: Warrants 1A, 1B, and 1C

Hour	Major Approach 1	Major Approach 3	Total 1 + 3	Warrant Met 600	Warrant Met 900	Minor Approach 2	Minor Approach 4	Largest Minor App.	Warrant Met 150	Warrant Met 75	Met Same Hours Condition A	Met Same Hours Condition B	Combination A	Combination B	MWSA (C) 300	MWSA (C) 200
6 - 7 AM	246	321	567			15	3	15							X	
7 - 8 AM	520	986	1506	X	X	87	12	87		X		X		X	X	
8 - 9 AM	394	616	1010	X	X	63	14	63						X	X	
9 - 10 AM	361	406	767	X		28	22	28							X	
10 - 11 AM	382	400	782	X		31	31	31							X	
11 - 12 AM	457	462	919	X	X	86	19	86		X		X		X	X	
12 - 1 PM	523	531	1054	X	X	98	23	98		X		X		X	X	
1 - 2 PM	457	411	868	X		60	18	60						X	X	
2 - 3 PM	525	549	1074	X	X	80	13	80		X		X		X	X	
3 - 4 PM	643	662	1305	X	X	135	17	135		X		X	X	X	X	
4 - 5 PM	748	700	1448	X	X	97	17	97		X		X		X	X	
5 - 6 PM	695	538	1233	X	X	101	18	101		X		X		X	X	
6 - 7 PM	372	312	684	X		66	18	66							X	
7 - 8 PM	0	0	0			0	0	0								
8 - 9 PM	0	0	0			0	0	0								
9 - 10 PM	0	0	0			0	0	0								
10 - 11 PM	0	0	0			0	0	0								
											0	7	1	9	0	

Warrant Summary

Warrant and Description	Hours Met	Hours Required	Met/Not Met
MWSA (C): Multiway Stop Applications Condition C	0	8	Not Met
Warrant 1A: Minimum Vehicular Volume	0	8	Not Met
Warrant 1B: Interruption of Continuous Traffic	7	8	Not Met
Warrant 1C: Combination of Warrants	1	8	Not Met
Warrant 2: Four-Hour Vehicular Volume	4	4	Met - Warrant 2 Satisfied
Warrant 3B: Peak Hour	0	1	Not Met

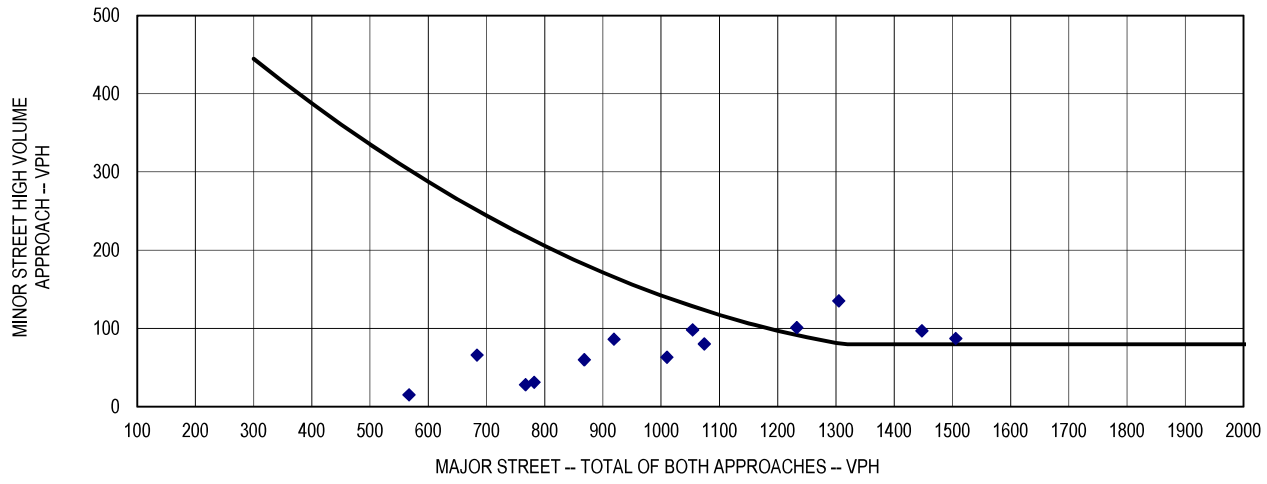
WARRANTS ANALYSIS

Year 2030 No Build Conditions (Year 2030)

N Riverfront Drive & Good Cousel Drive
School Sisters of Notre Dame Traffic Study
Mankato

Warrants Analysis: Warrant 2

WARRANT 2 - FOUR-HOUR VEHICULAR VOLUME



Number of Hours Satisfying Requirements:	4

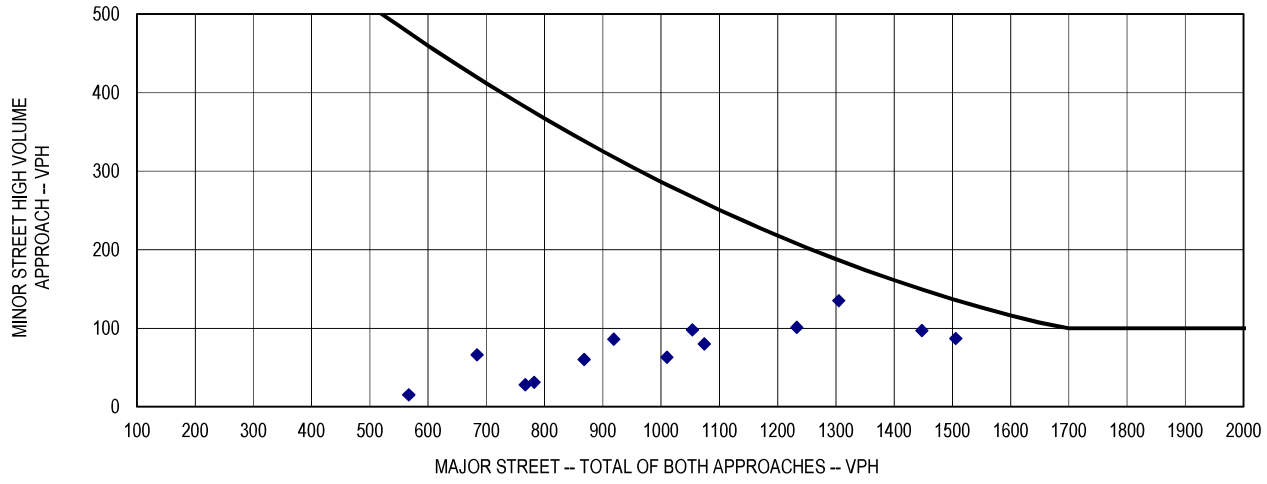
Notes: 1. 115 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACH WITH TWO OR MORE LANES AND 80 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACHING WITH ONE LANE.

WARRANTS ANALYSIS

Year 2030 No Build Conditions (Year 2030)

N Riverfront Drive & Good Cousel Drive
School Sisters of Notre Dame Traffic Study
Mankato

Warrants Analysis: Warrant 3



Number of Hours Satisfying Requirements:	0

Notes: 1. 150 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACH WITH TWO OR MORE LANES AND 100 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACHING WITH ONE LANE.

Year 2030 Build Warrant Analysis
(50% WBR Volumes)

WARRANTS ANALYSIS

Year 2030 Build Conditions (Year 2030)

N Riverfront Drive & Good Cousel Drive
School Sisters of Notre Dame Traffic Study
Mankato

Background Information

		Speed (mph)	Lanes	RT Vol%	Approach	
Location :	Mankato	35	2 or more	100%	Major Approach 1:	Northbound N Riverfront Drive
Date:	2/25/2026	35	2 or more	100%	Major Approach 3:	Southbound N Riverfront Drive
Analysis Prepared By:	Ashley Stueve	30	1	50%	Minor Approach 2:	Westbound Good Counsel Drive
Population Less than 10,000:	No	30	1	50%	Minor Approach 4:	Eastbound Dukes Street
Seventy Percent Factor Used:	No					

Notes: Warrant analysis calculations performed to align with Minnesota ICE Manual, 2025 v1

Warrants Analysis: Warrants 1A, 1B, and 1C

Hour	Major Approach 1	Major Approach 3	Total 1 + 3	Warrant Met 600	Warrant Met 900	Minor Approach 2	Minor Approach 4	Largest Minor App.	Warrant Met 150	Warrant Met 75	Met Same Hours Condition A	Met Same Hours Condition B	Combination A	Combination B	MWSA (C) 300	MWSA (C) 200
6 - 7 AM	252	338	590			34	3	34							X	
7 - 8 AM	532	1032	1564	X	X	119	12	119		X		X		X	X	
8 - 9 AM	416	638	1054	X	X	106	14	106		X		X		X	X	
9 - 10 AM	380	425	805	X		63	22	63						X	X	
10 - 11 AM	400	418	818	X		62	31	62						X	X	
11 - 12 AM	478	483	961	X	X	116	19	116		X		X		X	X	
12 - 1 PM	540	588	1128	X	X	135	23	135		X		X	X	X	X	
1 - 2 PM	471	456	927	X	X	87	18	87		X		X		X	X	
2 - 3 PM	540	602	1142	X	X	110	13	110		X		X		X	X	
3 - 4 PM	657	713	1370	X	X	162	17	162	X	X	X	X	X	X	X	
4 - 5 PM	762	754	1516	X	X	123	17	123		X		X	X	X	X	
5 - 6 PM	714	606	1320	X	X	139	18	139		X		X	X	X	X	
6 - 7 PM	387	365	752	X		87	18	87		X				X	X	
7 - 8 PM	0	0	0			0	0	0								
8 - 9 PM	0	0	0			0	0	0								
9 - 10 PM	0	0	0			0	0	0								
10 - 11 PM	0	0	0			0	0	0								
											1	9	4	12	0	

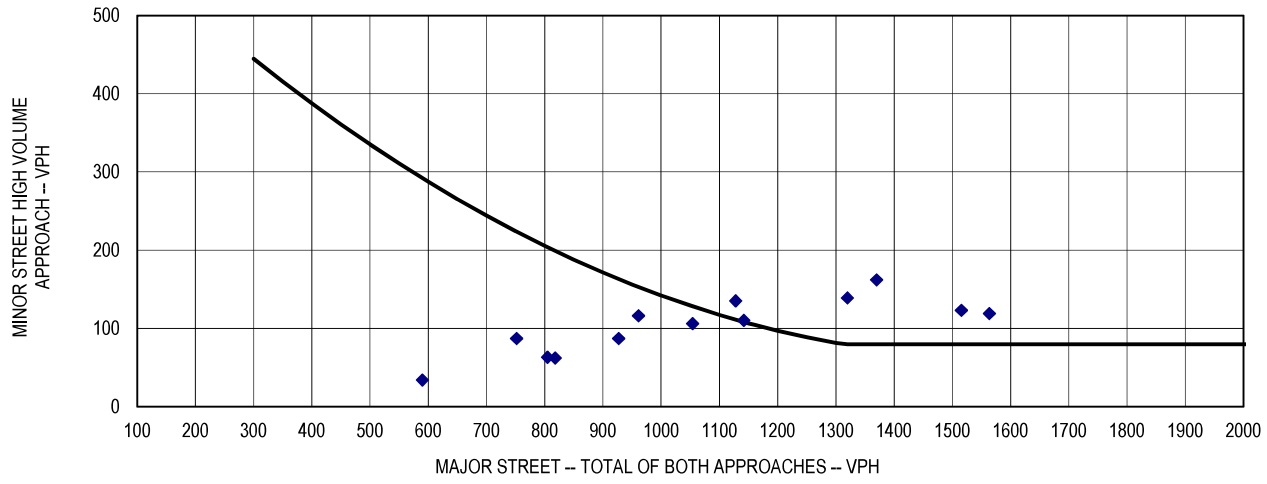
Warrant Summary

Warrant and Description	Hours Met	Hours Required	Met/Not Met
MWSA (C): Multiway Stop Applications Condition C	0	8	Not Met
Warrant 1A: Minimum Vehicular Volume	1	8	Not Met
Warrant 1B: Interruption of Continuous Traffic	9	8	Met - Warrant 1B Satisfied
Warrant 1C: Combination of Warrants	4	8	Not Met
Warrant 2: Four-Hour Vehicular Volume	6	4	Met - Warrant 2 Satisfied
Warrant 3B: Peak Hour	0	1	Not Met

WARRANTS ANALYSIS — Year 2030 Build Conditions (Year 2030)

N Riverfront Drive & Good Cousel Drive
School Sisters of Notre Dame Traffic Study
Mankato

Warrants Analysis: Warrant 2



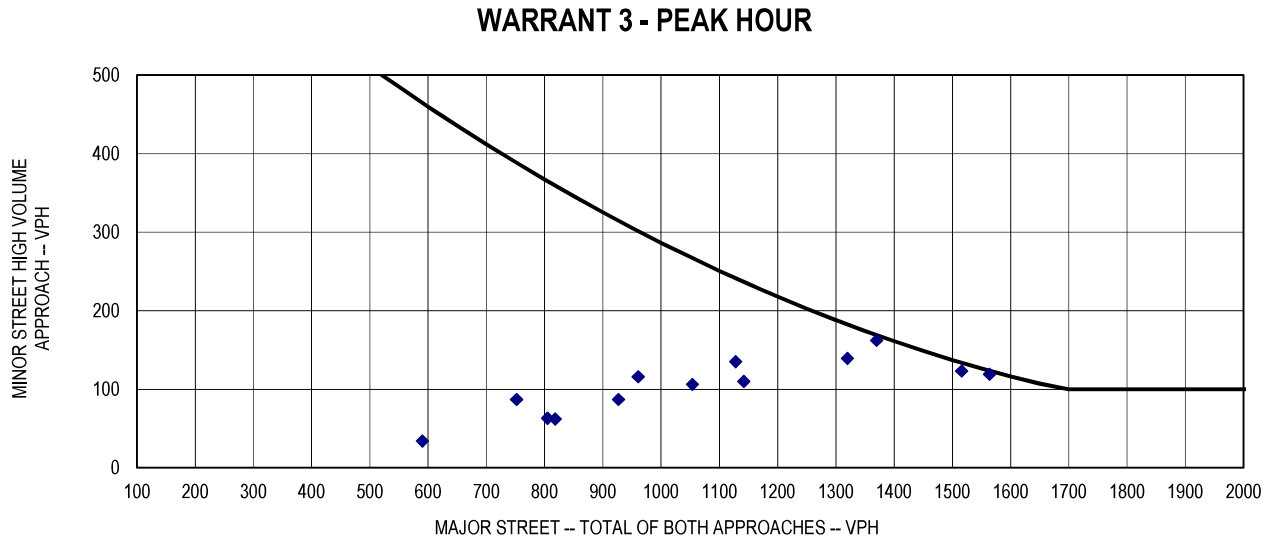
Number of Hours Satisfying Requirements:	6

Notes: 1. 115 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACH WITH TWO OR MORE LANES AND 80 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACHING WITH ONE LANE.

WARRANTS ANALYSIS — Year 2030 Build Conditions (Year 2030)

N Riverfront Drive & Good Cousel Drive
School Sisters of Notre Dame Traffic Study
Mankato

Warrants Analysis: Warrant 3



Number of Hours Satisfying Requirements:	0

Notes: 1. 150 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACH WITH TWO OR MORE LANES AND 100 VPH APPLIES AS THE LOWER THRESHOLD VOLUME FOR A MINOR STREET APPROACHING WITH ONE LANE.

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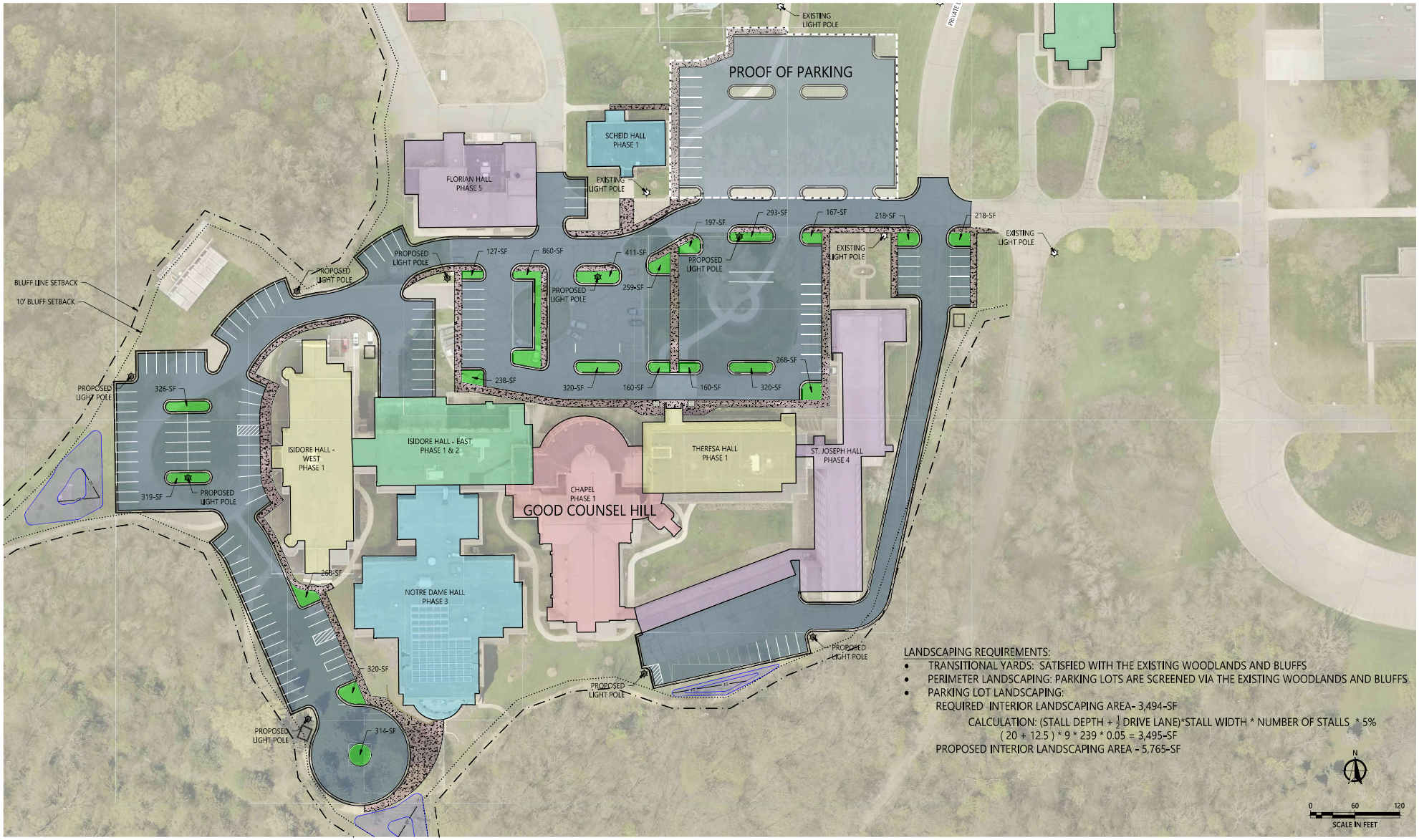

LANDSCAPING REQUIREMENTS:

- TRANSITIONAL YARDS: SATISFIED WITH THE EXISTING WOODLANDS AND BLUFFS
- PERIMETER LANDSCAPING: PARKING LOTS ARE SCREENED VIA THE EXISTING WOODLANDS AND BLUFFS
- PARKING LOT LANDSCAPING:

REQUIRED INTERIOR LANDSCAPING AREA- 3,494-SF

CALCULATION: (STALL DEPTH + $\frac{1}{2}$ DRIVE LANE)*STALL WIDTH * NUMBER OF STALLS * 5%

(20 + 12.5) * 9 * 239 * 0.05 = 3,495-SF

PROPOSED INTERIOR LANDSCAPING AREA - 5,765-SF

WIDSETH
ARCHITECTS • ENGINEERS • SCIENTISTS • SURVEYORS

DRAWN BY: RSH
CHECKED BY: CNB

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

CRAIG N. BRITTON LIC. NO.: 44228 DATE: 03/24/2026

DATE	REV#	REVISIONS DESCRIPTION

GOOD COUNSEL

LANDSCAPE AND LIGHTING PLAN

PROJECT #: 2025-10591

© 2026 WIDSETH FILE: W:\PROJECTS\SOUTHWEST MINNESOTA HOUSING PARTNERSHIP (SWMHP)-49049\2025-10591\CADD\CIVIL\GOOD COUNCIL\C-UT-2025-10591.DWG PLOTTED BY: VANESSA HINES, March 24, 2026

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CRAIG N. BRITTON LIC. NO.: 44228 DATE: 03/24/2026

DATE	REV#	REVISIONS DESCRIPTION

GOOD COUNSEL

STEAM DISTRIBUTION PLAN

PROJECT #: 2025-10591

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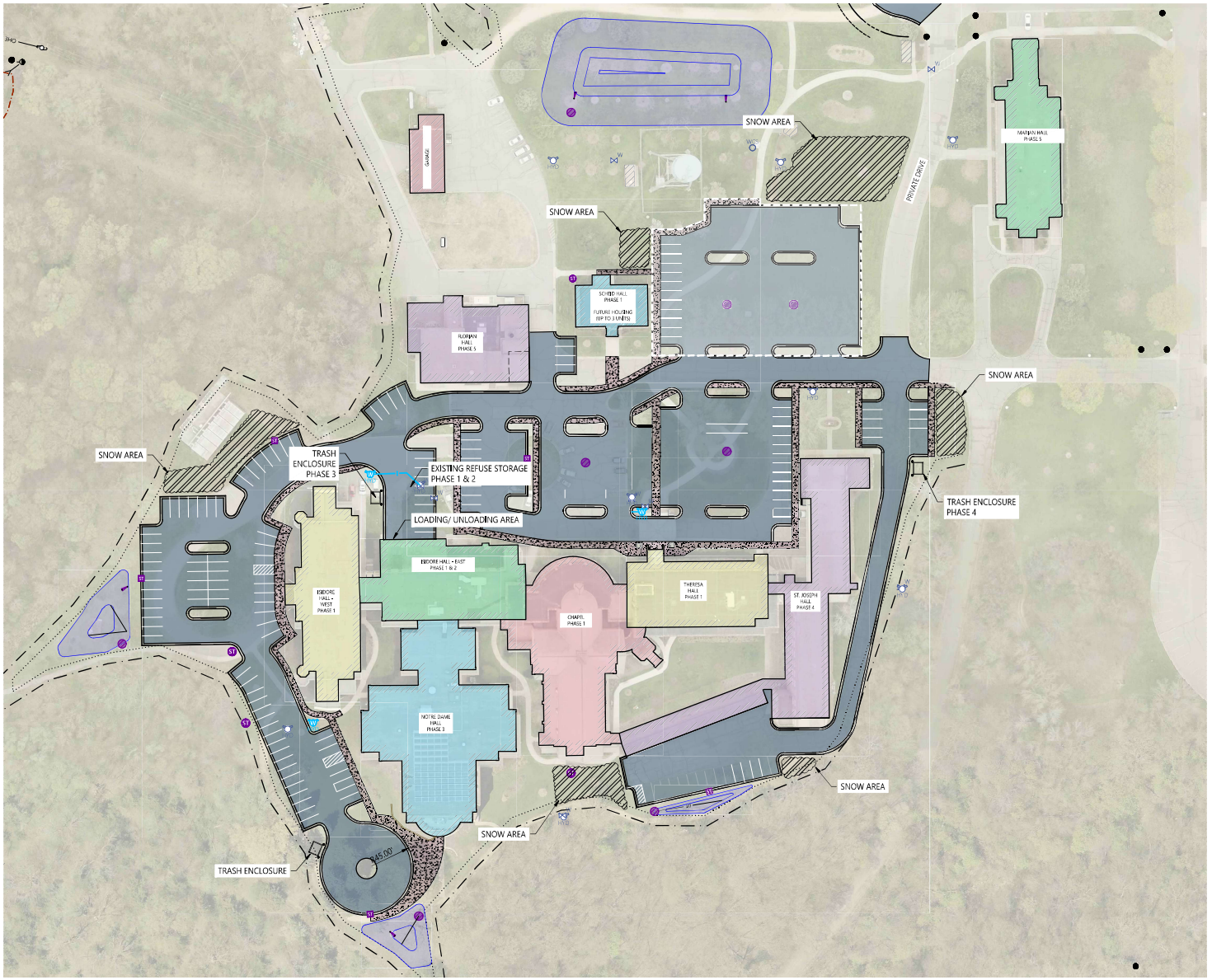

ROADWAY/PAVEMENT LINEWORK - PROPOSED

SNOW PILING AREA

0 50 100

SCALE IN FEET

N

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CHECKED BY: ###

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#

########## LIC. NO.: ###### DATE: ##########

DATE	REV#	REVISIONS DESCRIPTION

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#

PROJECT #: ##########

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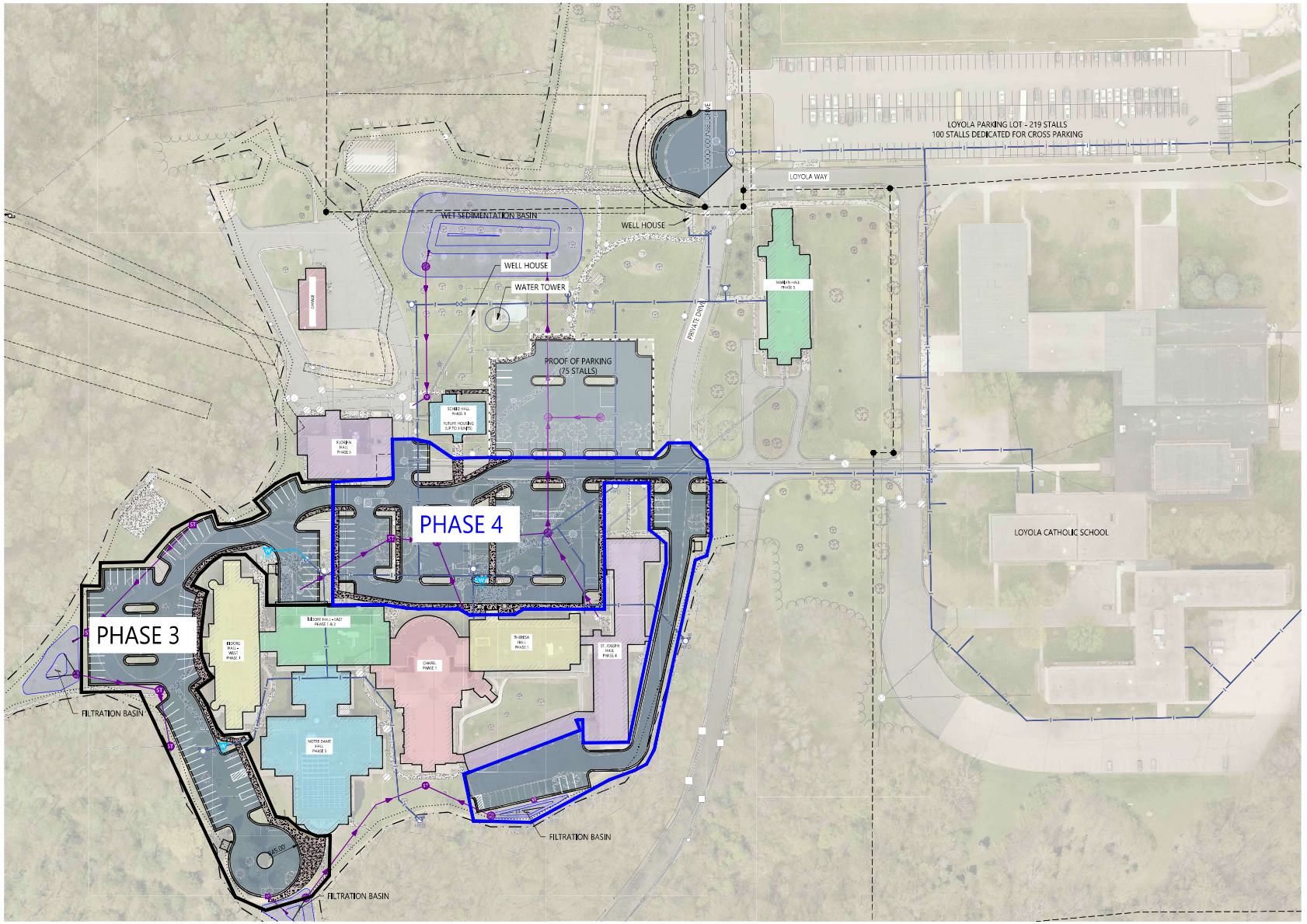
THIS SHEET IS ONLY VALID IF PRINTED IN COLOR



PROPOSED LEGEND

- BITUMINOUS SURFACE
- CONCRETE SURFACE
- CURB & GUTTER
- STORM SEWER CATCH BASIN
- STORM SEWER CLEANOUT
- STORM SEWER INLET STRUCTURE
- STORM SEWER MANHOLE
- STORM SEWER GRAVITY MAIN
- STORM SEWER DRAINTILE
- HYDRANT
- WATER MAIN VALVE
- WATER MAIN PIPE

EXISTING LEGEND

- SHRUB
- TREE - CONIFEROUS
- TREE - DECIDUOUS
- EDGE OF WOODS
- BUILDING
- CHAINLINK FENCE
- RETAINING WALL
- FOC — UNDERGROUND FIBER OPTIC LINE
- OHT — OVERHEAD TELEPHONE LINE
- UGT — UNDERGROUND TELEPHONE LINE
- OHC — OVERHEAD TV LINE
- UGC — UNDERGROUND TV LINE
- FOC — UNDERGROUND FIBER OPTIC LINE
- UGT — UNDERGROUND TELEPHONE LINE
- LIGHT POLE
- UGE — UNDERGROUND ELECTRIC LINE
- GAS — NATURAL GAS LINE
- SANITARY MANHOLE
- SANITARY GRAVITY MAIN
- STORM SEWER CATCH BASIN
- CULVERT APRON
- STORM SEWER INLET STRUCTURE
- STORM SEWER MANHOLE
- STORM SEWER GRAVITY MAIN
- CURB STOP
- FIRE HYDRANT
- WATER MAIN LINE

N

0 ## ##

SCALE IN FEET

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DRAWN BY: RSH
CHECKED BY: CNB

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

CRAIG N. BRITTON LIC. NO.: 44228 DATE: 03/24/2026

DATE	REV#	REVISIONS DESCRIPTION

GOOD COUNSEL

PHASING PLAN

C2.5

PROJECT #: 2025-10591

© 2026 WIDSETH FILE: W:\PROJECTS\SOUTHWEST MINNESOTA HOUSING PARTNERSHIP (SWMHP)-49049\2025-10591\CADD\CIVIL\GOOD COUNCIL\C-SP-2025-10591.DWG PLOTTED BY: VANESSA HINES, March 24, 2026

ALTA/LAND TITLE SURVEY

OUTLOTS B, C AND D, SCHOOL SISTERS OF NOTRE DAME SUBDIVISION
EAST 1/2 OF NE 1/4 OF SEC. 8, T108N, R26W
CITY OF MANKATO, BLUE EARTH COUNTY, MINNESOTA

PROPERTY DESCRIPTION

Per ALTA Commitment For Title Insurance, issued by Stewart Title Guaranty Company
File Number: 01040-25333a, Third Revision; Commitment Date 07/22/2025

PARCEL 1:

A part of the East Half of the Southeast Quarter of the Northeast Quarter of Section 8, Township 108 North, Range 26 West, Blue Earth County, Minnesota, described as follows: Beginning at the Northwest corner of said East Half of the Southeast Quarter of the Northeast Quarter; thence South, on the West line thereof, 209.4 feet to the center of the highway known as the Thompson Ravine Road; thence along the centerline of said highway North 73 degrees 4 minutes East, 65 feet; thence North 68 degrees 27 minutes East, 195 feet; thence North 60 degrees 44 minutes East, 100 feet; thence North 53 degrees 38 minutes East, 250 feet; thence North 48 degrees 12 minutes East, 100 feet; thence North 45 degrees 37 minutes East, 37.15 feet to a point on the North line of said East Half of the Southeast Quarter of the Northeast Quarter, which point is 26 feet West of the Northeast corner of said East Half; thence West, along said North line, 643 feet to the point of beginning.

EXCEPTING that part of Parcel E of Raintree Road Subdivision that lies within the East Half of the Southeast Quarter of the Northeast Quarter of Section 8, Township 108 North, Range 26 West, Blue Earth County, Minnesota.

PARCEL 2:

All of the Northeast Quarter of the Northeast Quarter of Section 8, Township 108 North of Range 26 West, Blue Earth County, Minnesota.

LESS AND EXCEPT the following portion of said Northeast Quarter of the Northeast Quarter: Beginning at the Southeast corner of said NE¼ NE¼ of said Section 8; thence in a Northerly direction on the West line of said NE¼ NE¼ a distance of 457.4 feet; thence North 87 degrees 56 minutes East, 250 feet; thence South 58 degrees 47 minutes East, 125 feet; thence South 33 degrees 57 minutes East, 100 feet; thence South 13 degrees 22 minutes East, 339.5 feet to the South line of said Northeast Quarter of the Northeast Quarter; thence West, along said South line, 487.6 feet to the point of beginning.

AND ALSO EXCEPTING that part of Parcel E of Raintree Road Subdivision that lies within the Northeast Quarter of the Northeast Quarter of Section 8, Township 108 North, Range 26 West, Blue Earth County, Minnesota.

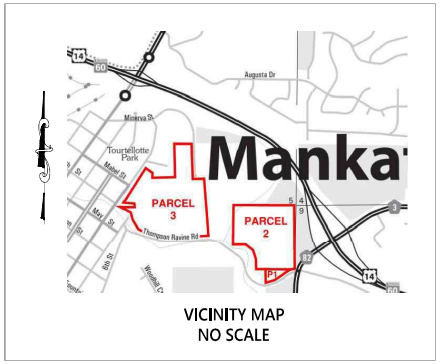
PARCEL 3:

Outlot B, Outlot C and Outlot D, School Sisters of Notre Dame Subdivision, Blue Earth County, Minnesota.

ALTA COMMITMENT FOR TITLE INSURANCE
Issued by Stewart Title Guaranty Company, File Number 01040-25333a, Third Revision; Commitment Date 07/22/2025

SCHEDULE B PART II – Exceptions Responses

11	A portion of the Land contains wetlands which may be subject to federal, state, or local regulation.	Outlot B: One (1) wetland shown on sheet 3 of 4, per Notice of Decision, approved by City of Mankato, dated 10/6/2021; the southwesterly part of Outlot B, south of Ruth Street, has no wetlands per Notice of Decision, approved by City of Mankato, dated 5/21/2021 Outlot C: No wetlands per Notice of Decision, approved by City of Mankato, dated 5/21/2021
12	Intentionally Deleted.	
13	Easement for power and transmission lines purposes in favor of Northern States Power Company, a Minnesota corporation as contained in Pole Line Agreement, dated July 27, 1925, recorded August 10, 1925, as Document No. 125052. (Parcels 1-3)	shown on survey, Blanket in Nature
14	Intentionally Deleted.	
15	Intentionally Deleted.	
16	Easement for transmission of electrical energy purposes in favor of Northern States Power Company, a Minnesota corporation, and the terms and conditions as contained in Easement, dated November 2, 1948, recorded June 10, 1949, as Document No. 214081. (Parcel 3)	shown on survey, Blanket in Nature
17	Intentionally Deleted.	
18	Intentionally Deleted.	
19	Easement for electric transmission lines purposes in favor of Northern States Power Company, a Minnesota corporation and the terms and conditions as contained in Easement, dated October 15, 1975, recorded October 15, 1975, as Document No. 306118. (Parcels 1-2)	50+/- utility easement shown on survey; together with additional access rights Blanket in Nature, also shown on survey
20	Easement for electric transmission lines purposes in favor of Northern States Power Company, a Minnesota corporation and the terms and conditions as contained in Easement, dated October 26, 1977, recorded November 2, 1977, as Document No. 316362. (Parcel 3)	shown on survey; Blanket in Nature
21	Intentionally Deleted.	
22	Easements and the terms and conditions of Notice of Lis Pendens dated January 8, 1980, recorded January 10, 1980, as Document No. 328010. As affected by Final Certificate dated December 3, 1980, recorded December 5, 1980, in Book 260 of County Records, page 342 as Document No. 332030. (Parcel 3)	shown on survey
23	Intentionally Deleted.	
24	Easement for underground telephone cable purposes, together with the right of ingress and egress in favor of Mankato Citizens Telephone company, a Minnesota corporation, and the terms and conditions as contained in Easement for Underground Telephone cable, dated September 21, 1981, recorded September 21, 1981, as Document No. 335541. (Parcel 3)	shown on survey
25	Easement for facilities for the transmission and distribution of electrical energy purposes in favor of Northern States Power Company, a Minnesota corporation as contained in Electric Easement, dated October 27, 2017, recorded November 3, 2017, as Document No. 560CR555. (Parcels 1-2)	shown on survey
26	Terms, conditions and easements of unrecorded Land Lease and Solar Easement dated November 7, 2016, and as amended October 23, 2017, as evidenced by Memorandum of Land Lease and Solar Easement dated October 23, 2017, recorded October 26, 2017 as Document No. 560CR371, by and between School Sisters of Notre Dame Central Pacific Province, Inc., a Missouri non-profit corporation, as Landlord, and School sisters CSG LLC, a Minnesota limited liability company, as Tenant. (Parcels 1-2) Amended by Amendment to Memorandum of Land Lease and Solar Easement, dated November 10, 2017, recorded November 22, 2017, as Document No. 560CR931. Amended by Second Amendment to Memorandum of Land Lease and Solar Easement, dated March 6, 2018, recorded April 4, 2018, as Document No. 563CR390.	shown on survey
27	Easements and the terms and conditions of Utility and Access Easement Agreement dated September 28, 2022, recorded September 29, 2022, as Document No. 602CR328. (Parcel 3) As affected by Driveway and Reciprocal Utility Easement Agreement, dated _____ 2025 between GC Mankato Hill LLC, a Minnesota limited liability comany and Crusader Holdings, LLC, a Minnesota limited liability company, recorded _____ 2025, as Document No. _____	shown on survey, Blanket in Nature The new Driveway and Utility Easement Agreement will replace Doc. 602CR328; exception 27 will no longer be Blanket in nature.
28	Drainage and utility, underground telephone cable, sanitary sewer, watermain easements as shown on the recorded plat of School Sisters of Notre Dame Subdivision, dated August 18, 2022, recorded September7, 2022, as Document No. 601CR835.	shown on survey
29	Easement for Underground Electrical Distribution System and Incidental Rights purposes in favor of Northern States Power Company, a Minnesota corporation as contained in Electrical Easement, dated April 17, 2025, recorded May 1, 2025 as Document No. 617CR864. (Parcel 3 - Outlots B and D)	shown on survey



VICINITY MAP
NO SCALE

SURVEYOR NOTES

A. Deleted.

B. ⚠5 There appear to be four grassy trail connections crossing the east property line, but no access or cross access easement is listed in the title commitment. See ⚠5 on Sheet 4 of 4.

C. All sanitary sewer, water, storm sewer, steam lines, shown on Sheet 3 of 4, in the area of the campus of Good Counsel are private, and the mapping is based on visible structures and plans provided.

D. All walkable tunnels, shown on Sheet 3 of 4, in the area of the campus of Good Counsel are based on plans provided. No survey of the actual underground structures took place.

CERTIFICATION

To Southwest Minnesota Housing Partnership, a Minnesota non-profit corporation; GC Mankato Hill LLC, a Minnesota limited liability company; MinnWest Bank, a Minnesota banking corporation, its successors and/or assigns and Stewart Title Guaranty Company:

This is to certify that this map or plat and the survey on which it is based were made in accordance with the 2021 Minimum Standard Detail Requirements for ALTA/NSPS Land Title Surveys, jointly established and adopted by ALTA and NSPS, and includes Items 1, 2, 3, 4, 6(a), 6(b), 7(a), 8, 9, 11b • Gopher State One Call only), 13, 16, 17, and 18 of Table A thereof. The fieldwork was completed on 10/15/2025.

Date: December 17, 2025

Peter G. Ostlker
Minnesota LS No. 41887

DATE	August 28, 2025	DATE	AMENDMENTS
SCALE	AS SHOWN	12/17/2025	UPDATE CERTIFICATION ON SHEET 1 OF 4
DRAWN BY	MWG		
CHECKED BY	PGO		
FILE NUMBER	2025-10591		

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ALTA/LAND TITLE SURVEY

OUTLOTS B, C AND D, SCHOOL SISTERS OF NOTRE DAME SUBDIVISION
EAST 1/2 OF NE 1/4 OF SEC. 8, T108N, R26W
CITY OF MANKATO, BLUE EARTH COUNTY, MINNESOTA

ALTA TABLE A RESPONSES - PARCEL 3 (WEST PART)

TABLE A ITEM 1 - PROPERTY CORNER MONUMENTS
See survey map. We located all property corner currently in place. No missing monuments were set with this survey.

TABLE A ITEM 2 - PROPERTY ADDRESS
Parcel R010908201007 (part of Outlot B) - 170 Good Counsel Drive, Mankato MN - Physical access to Thompson Ravine Road
Parcel R010905379005 (part of Outlot B) - no address assigned - Physical access to Good Counsel Drive
Parcel R010905379004 (Outlot C) - no address assigned - Physical access to Fourth Street
Parcel R010905400013 (Outlot D) - no address assigned - Physical access to Good Counsel Drive

TABLE A ITEM 3 - FLOOD ZONE CLASSIFICATION
The property lies within Zone X for "Areas determined to be outside the 0.2% annual chance floodplain" per Flood Insurance Rate Map, Map Number 27013C0115F (effective date February 22, 2024).

TABLE A ITEM 4 - GROSS LAND AREA
54.94 acres

TABLE A ITEM 6(A) - ZONING

Outlot B (Parcels R010908201007 and R010905379005) is zoned "OR" Office Residential:

Minimum Building Setbacks:	Front	20 ft.
	Side	5 ft.
	Rear	10 ft.
Maximum Ground Coverage:		60%
Maximum Floor Area Ratio:		2.5
Maximum Permitted Height:		45 ft.
Minimum Lot Area:		see zoning code - needs interpretation by City
Minimum Lot Frontage:		80 ft.

Part of Outlot B is within environmentally sensitive overlays.

Outlot C (Parcel R010905379004) is zoned "R-2" One and Two Family Dwelling:

Minimum Building Setbacks:	Front	30 ft.
	Side	6 ft.
	Rear	25 ft.
Maximum Ground Coverage:		30%
Maximum Floor Area Ratio:		none
Maximum Permitted Height:		35 ft.
Minimum Lot Area:		see zoning code - needs interpretation by City
Minimum Lot Width:		50 ft. for one-family dwelling, otherwise 60 ft.

Part of Outlot C is within environmentally sensitive overlays.

Outlot D (Parcel R010905400013) is zoned "R-1" One Family Dwelling:

Minimum Building Setbacks:	Front	30 ft.
	Side	6 ft.
	Rear	25 ft.
Maximum Ground Coverage:		30%
Maximum Floor Area Ratio:		none
Maximum Permitted Height:		35 ft.
Minimum Lot Area:		7000 sq.ft.
Minimum Lot Width:		60 ft.

Part of Outlot D is within environmentally sensitive overlays.

Source:
Zoning Map Mankato
Zoning Ordinance Mankato
Zoning Report Mankato Community Development, dated March 13, 2025

TABLE A ITEM 6(B) - SETBACK LINES
Because of the unique lay of the parcels the setback requirements would require the land surveyor to interpret the requirements. He therefore cannot depict the setback lines.

TABLE A ITEM 7(A) - EXTERIOR BUILDING DIMENSIONS
See survey map.

TABLE A ITEM 8 - SUBSTANTIAL FEATURES
See survey map.

TABLE A ITEM 9 - MARKED PARKING SPACES

Regular Parking Stalls	49
Handicapped parking	3
Total marked parking spaces	52

TABLE A ITEM 11(B) - UTILITIES
The utilities shown on this survey are according to visible evidence along with GOPHER STATE ONE CALL markings (ticket number 252062459). Widseth Smith Nolting assumes no responsibility for the completeness and accuracies of these locations. Further locations and verifications are recommended prior to any construction or excavation.

Utility Carriers:

City of Mankato	Electric, Traffic, Water	(507) 387-8600
Center Point Energy	Gas	(608) 223-2014
Xcel Energy	Electric	(800) 848-7558

TABLE A ITEM 13 - ADJOINING OWNERS
See survey map.

TABLE A ITEM 16 - RECENT CONSTRUCTION
No evidence of recent earth moving work, building construction, or building additions were observed while conducting the fieldwork.

TABLE A ITEM 17 - PROPOSED CHANGES TO RIGHT-OF-WAY
No information about proposed changes in street right-of-way lines have been made available to land surveyor by the City of Mankato.

TABLE A ITEM 18 - OFFSITE EASEMENTS
See ALTA Commitment For Title Insurance, issued by Stewart Title Guaranty Company
File Number: 01040-25333a, Commitment Date 07/22/2025

There are no offsite easements listed in the ALTA Commiment for Title Insurance.

ALTA TABLE A RESPONSES - PARCELS 1 AND 2 (PART EAST)

TABLE A ITEM 1 - PROPERTY CORNER MONUMENTS
See survey map. We located all property corner currently in place. No missing monuments were set with this survey.

TABLE A ITEM 2 - PROPERTY ADDRESS
Parcel R010908226010 (Parcels 1 and 2) - 1081 Thompson Ravine Road, Mankato, MN 56001 - Physical access to Thompson Ravine Road

TABLE A ITEM 3 - FLOOD ZONE CLASSIFICATION
The property lies within Zone X for "Areas determined to be outside the 0.2% annual chance floodplain" per Flood Insurance Rate Map, Map Number 27013C0115F (effective date February 22, 2024).

TABLE A ITEM 4 - GROSS LAND AREA
38.34 acres - excluding Parcel E, Raintree Subdivision. See Surveyor Note 4

TABLE A ITEM 6(A) - ZONING
Parcel R010908226010 (Parcels 1 and 2) is zoned "R-1" One Family Dwelling:

Minimum Setbacks:	Front	30 ft.
	Side	10% of lot width, min. 10 ft, max. 30 ft.
	Rear	25% of lot depth, min. 25 ft, max. 75 ft.
Maximum Ground Coverage:		30%
Maximum Floor Area Ratio:		none
Maximum Permitted Height:		35 ft.
Minimum Lot Area:		8,000 sq.ft.
Minimum Lot Width:		60 ft.

Source:
Zoning Map Mankato
Zoning Ordinance Mankato
Zoning Report Mankato Community Development, dated March 13, 2025

TABLE A ITEM 6(B) - SETBACK LINES
Because of the unique lay of the Parcel R010908226010 the setback requirements would require the land surveyor to interpret the requirements. He therefore cannot depict the setback lines.

TABLE A ITEM 7(A) - EXTERIOR BUILDING DIMENSIONS
No building on site.

TABLE A ITEM 8 - SUBSTANTIAL FEATURES
See survey map.

TABLE A ITEM 9 - MARKED PARKING SPACES
No marked parking stalls.

TABLE A ITEM 11(B) - UTILITIES
The utilities shown on this survey are according to visible evidence along with GOPHER STATE ONE CALL markings (ticket number 252091660). Widseth Smith Nolting assumes no responsibility for the completeness and accuracies of these locations. Further locations and verifications are recommended prior to any construction or excavation.

Utility Carriers:

City of Mankato	Electric, Traffic, Water	(507) 387-8600
Charter Communications	TV, FO	(800) 811-7981
Consolidated Communication	FO, TEL	(800) 776-9140
Center Point Energy	Gas	(608) 223-2014
Xcel Energy	Electric	(800) 848-7558

TABLE A ITEM 13 - ADJOINING OWNERS
See survey map.

TABLE A ITEM 16 - RECENT CONSTRUCTION
No evidence of recent earth moving work, building construction, or building additions were observed while conducting the fieldwork.

TABLE A ITEM 17 - PROPOSED CHANGES TO RIGHT-OF-WAY
No information about proposed changes in street right-of-way lines have been made available to land surveyor by the City of Mankato.

TABLE A ITEM 18 - OFFSITE EASEMENTS
See ALTA Commitment For Title Insurance, issued by Stewart Title Guaranty Company
File Number: 01040-25333a, Commitment Date 07/22/2025

There are no offsite easements listed in the ALTA Commitment for Title Insurance.

LEGEND

- BOUNDARY LINE
- SUBDIVISION LINE
- PLATTED LOT LINE
- RIGHT-OF-WAY LINE
- EASEMENT LINE
- LEASE LINE
- SECTION LINE
- QUARTER SECTION LINE
- QUARTER QUARTER SECTION LINE
- STORM SEWER GRAVITY MAIN
- SANITARY GRAVITY MAIN
- WATER MAIN LINE
- OHE — OVERHEAD ELECTRIC LINE
- UGE — UNDERGROUND ELECTRIC LINE
- FOC — UNDERGROUND FIBER OPTIC LINE
- OHT — OVERHEAD TELEPHONE LINE
- UGT — UNDERGROUND TELEPHONE LINE
- GAS — NATURAL GAS LINE
- FENCE - CHAINLINK
- WOOD FENCE
- EDGE OF WOODS
- BITUMINOUS SURFACE
- CONCRETE SURFACE
- GRAVEL SURFACE
- BUILDING WALL HATCH
- STORM SEWER INLET STRUCTURE
- STORM SEWER MANHOLE
- STORM SEWER CATCH BASIN
- SANITARY MANHOLE
- FIRE HYDRANT
- WATER MAIN VALVE
- WATER MANHOLE
- CURB STOP
- WATER HANDHOLE
- LIGHT POLE
- ELECTRIC MANHOLE
- ELECTRIC POLE
- TRANSFORMER
- ELECTRIC HANDHOLE
- GUY WIRE ANCHOR
- TELECOM PEDESTAL
- NATURAL GAS METER
- FLAG POLE
- FENCE POST
- SIGN - SINGLE
- ACCESSIBLE PARKING MARKING
- TREE - CONIFEROUS
- TREE - DECIDUOUS

- WALKING TUNNEL CONTAINING STEAM HEAT
- SLOPE 17.6% AND GREATER (USGS LIDAR DATA)

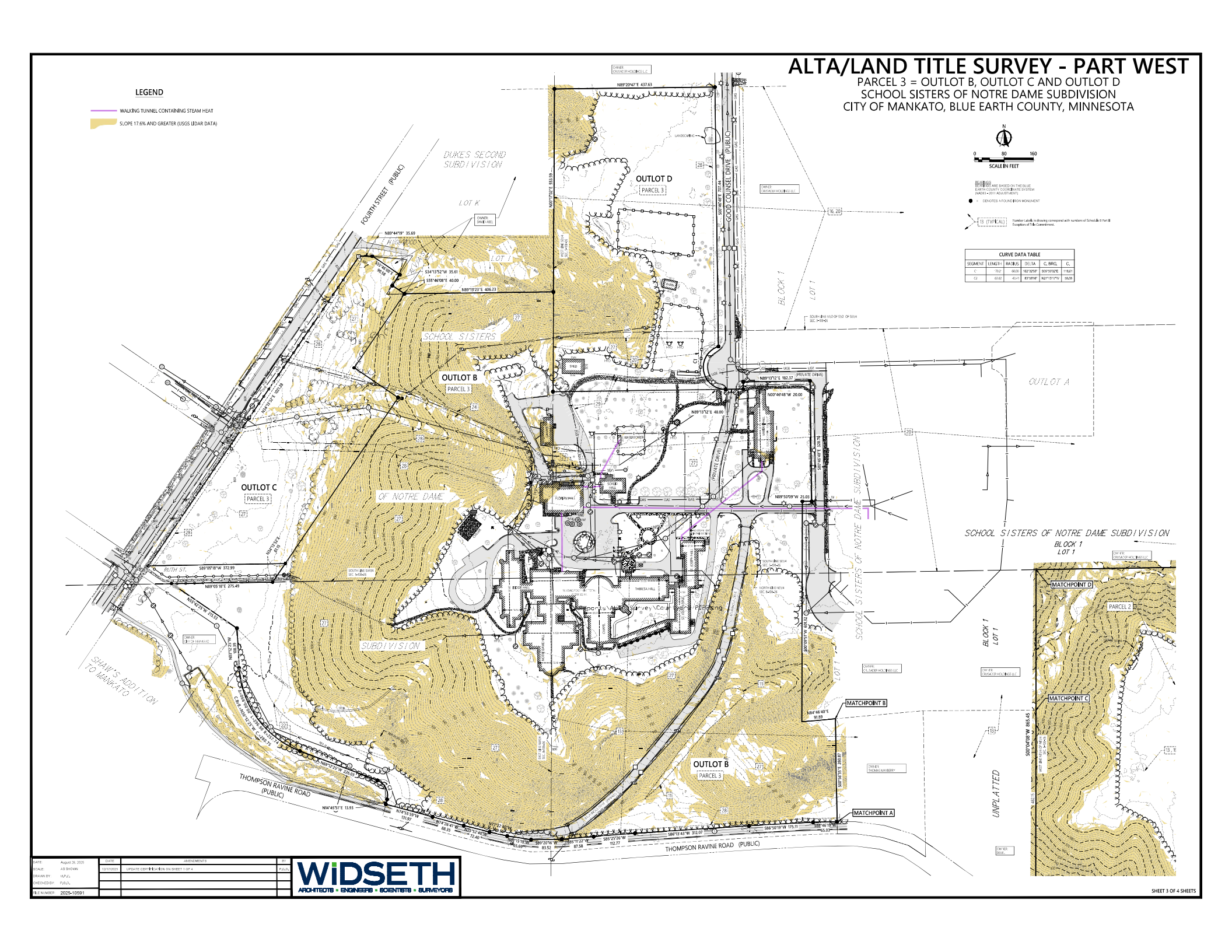
DATE:	August 26, 2025
SCALE:	AS SHOWN
DRAWN BY:	M.P.Z.
CHECKED BY:	P.W.D.
FILE NUMBER:	2025-10591

DATE	AMENDMENTS	BY
09/17/2025	UPDATE CERTIFICATION ON SHEET 1 OF 4	P.W.D.

WIDSETH
ARCHITECTS ▪ ENGINEERS ▪ SCIENTISTS ▪ SURVEYORS

ALTA/LAND TITLE SURVEY - PART WEST

PARCEL 3 = OUTLOT B, OUTLOT C AND OUTLOT D
SCHOOL SISTERS OF NOTRE DAME SUBDIVISION
CITY OF MANKATO, BLUE EARTH COUNTY, MINNESOTA



DATE	August 26, 2025
SCALE	AS SHOWN
DRAWN BY	V.P.J.
CHECKED BY	P.W.D.
FILE NUMBER	2025-10591

DATE	AMENDMENTS	BY
09/17/2025	UPDATE CERTIFICATION ON SHEET 1 OF 4	P.W.D.

WIDSETH
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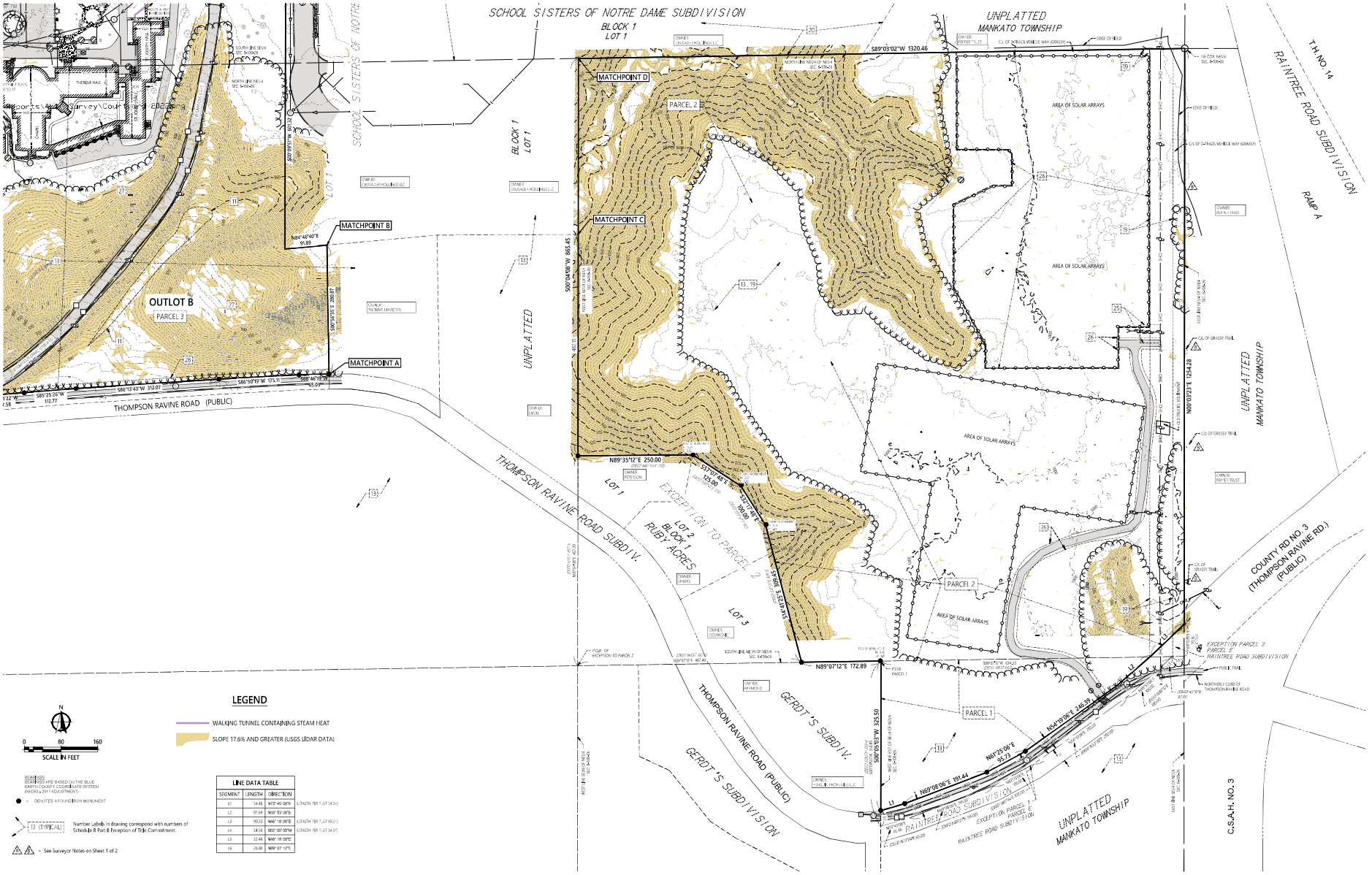
ALTA/LAND TITLE SURVEY - PART EAST

PARCELS 1 AND 2 = PART OF EAST 1/2 OF NE 1/4 OF SEC. 8, T108N, R26W
CITY OF MANKATO, BLUE EARTH COUNTY, MINNESOTA



LEGEND

WALKING TUNNEL CONTAINING STEAM HEAT

SLOPE 17.6% AND GREATER (USGS LIDAR DATA)

0 80 160
SCALE IN FEET

BEARINGS
BEARINGS ARE BASED ON THE BLUE EARTH COUNTY COORDINATE SYSTEM (NAD83 - 2011 ADJUSTMENT)

● = DENOTES A FOUND IRON MONUMENT

13 (TYPICAL) Number Labels in drawing correspond with numbers of Schedule B Part II Exception of Title Commitment.

A B = See Surveyor Notes on Sheet 1 of 2

LINE DATA TABLE			
SEGMENT	LENGTH	DIRECTION	
L1	14.43	N72° 45' 06"E	(LENGTH PER P.J.AT 54.54)
L2	97.69	N40° 53' 00"E	
L3	99.33	N40° 18' 00"E	(LENGTH PER P.J.AT 59.21)
L4	54.58	S00° 00' 00"W	(LENGTH PER P.J.AT 34.37)
L5	32.44	N40° 18' 00"E	
L6	26.00	N89° 07' 12"E	

DATE:	August 28, 2025	DATE	AMENDMENTS	BY
SCALE:	AS SHOWN	10/17/2025	UPDATE CERTIFICATION ON SHEET 1 OF 4	P.J.O.
DRAWN BY:	JMW/SMK			
CHECKED BY:	SWK			
FILE NUMBER:	2025-10393			

WIDSETH
ARCHITECTS • ENGINEERS • SCIENTISTS • SURVEYORS

Site Plan and Traffic Advisory Review Committee **1. 6.**

Meeting Date: 04/14/2026

Title

*****FOR INFORMATION ONLY. Request of the Planning Agency to amend Chapter 10 of Mankato City Code related to parkland dedication ordinances.**

Site Plan and Traffic Advisory Review Committee **1. 7.**

Meeting Date: 04/14/2026

Title

*****FOR INFORMATION ONLY. Request of the Planning Agency to review Chapter 10 of Mankato City Code related to temporary signage ordinances.**