City of Ramsey
Agenda
Public Works Committee
Tuesday, February 18, 2020
5:00 pm
Lake Itasca Room, 7550 Sunwood Drive NW

1. Call to Order

2. Citizen Input

3. Approve Agenda

4. Approve Minutes

1. Approve the following meeting minutes.
1. Public Works Committee meeting dated January 21, 2020.

5. Committee Business

1. Consider Recommendation on Cost Share Alternatives for Puma Street Development Initiated Expansion and Safety Improvement Project

2. Receive Update on Riverdale Drive Development Initiated Expansion and Safety Improvement Project

3. Consider Request for City to Acquire Driveway Between Blue Velvet Car Wash and Riversbend Bar and Grill

4. Discuss Options for Northern Nine (9) Acres of Lot 1, Block 1, Bury and Carlson Addition (Future Public Works Campus Site and Economic Development Parcel)

5. Consider Recommendation to City Council to Accept Feasibility Report for 2020 Pavement Overlay Improvements, Improvement Project No. 20-02

6. Consider Recommendation to City Council to Indefinitely Suspend Pavement Sealcoat Program and Reallocate Budgeted Funds

7. Consider Recommendation to City Council to Order Traffic Study for Bunker Lake Boulevard Reconstruction - Armstrong Boulevard to Ramsey Boulevard

6. Committee/Staff Input

1. Staff Updates on Improvement Projects and Items of Interest

2. Review Future Topics Calendar

7. Adjournment

Our Mission: To work together to responsibly grow our community, and to provide quality, cost-effective, and efficient government services

Public Works Committee **4. 1.**

Meeting Date: 02/18/2020
Submitted For: Grant Riemer, Engineering/Public Works
By: MaryJo Warner, Engineering/Public Works

Title:

Approve the following meeting minutes.
1. Public Works Committee meeting dated January 21, 2020.

Purpose/Background:

Purpose: To review and approve meeting minutes.
Background: Attached are the meeting minutes for review.

Timeframe:

5 minutes.

Observations/Alternatives:

n/a

Funding Source:

n/a

Recommendation:

To review and approve meeting minutes dated January 21, 2020.

Action:

Motion to approve meeting minutes dated January 21, 2020.

Attachments

Minutes

Form Review

Inbox	Reviewed By	Date
Grant Riemer	Grant Riemer	02/14/2020 10:08 AM
Kurt Ulrich	MaryJo Warner	02/14/2020 11:05 AM
Form Started By: MaryJo Warner		Started On: 02/13/2020 03:58 PM
Final Approval Date: 02/14/2020		

PUBLIC WORKS COMMITTEE
CITY OF RAMSEY
ANOKA COUNTY
STATE OF MINNESOTA

The Public Works Committee conducted a regular meeting on Tuesday, January 21, 2020, at the Ramsey Municipal Center, 7550 Sunwood Drive NW, Ramsey, Minnesota.

Members Present: Chairperson Mark Kuzma
Councilmember Jeff Menth
Councilmember Chris Riley

Also Present: Public Works Superintendent Grant Riemer
City Engineer Bruce Westby
City Planner Chris Anderson

1. CALL TO ORDER

Chairperson Kuzma called the regular meeting of the Public Works Committee to order at 5:30 p.m.

2. CITIZEN INPUT

There was none.

3. APPROVE AGENDA

Motion by Councilmember Riley, seconded by Councilmember Menth, to approve the agenda, as presented.

Motion carried. Voting Yes: Chairperson Kuzma, Councilmembers Riley and Menth. Voting No: None.

4. APPROVE MINUTES

4.01: Approve November 19, 2019, Meeting Minutes

Motion by Councilmember Riley, seconded by Councilmember Menth, to approve the following minutes:

Regular Meeting Minutes dated November 19, 2019

Motion carried. Voting Yes: Chairperson Kuzma, Councilmembers Riley and Menth. Voting No: None.

5. COMMITTEE BUSINESS

5.01: Receive Overview of Framework for Water Efficiency Grant Program and Consider Recommending Adoption of Resolution #20-018 to Enter into Clean Water Fund Grant Agreement with Metropolitan Council to Receive Grant Funds

City Planner Anderson reviewed the staff report and the recommendation from the Environmental Policy Board (EPB) to adopt Resolution #20-018 to enter into the Clean Water Fund Agreement with the Metropolitan Council to accept the $28,000 grant to implement a water efficiency rebate program.

Chairperson Kuzma commented that it seems like a good program. He noted that he is a bit disappointed that only residents on City sewer/water will be eligible but acknowledged that this will still be open to half the residents.

City Planner Anderson noted that the EPB had a similar comment and discussion and had suggested that perhaps this be used as a pilot program and the City could eventually continue with its own program that could be open to all residents.

Councilmember Menth asked how the program would work in terms of the resident purchasing the device and receiving a rebate.

City Planner Anderson explained the process that residents would follow to receive a rebate from the City.

Councilmember Riley asked if the City would have a list of preferred vendors.

City Planner Anderson explained that some cities choose to purchase certain devices and sell to residents at a discount, but the City opted not do that with this program. He explained how residents would receive the rebate for the eligible water sense labeled devices. He explained that the rebate funds are available on a first come, first serve basis.

Councilmember Menth asked for additional information on how new construction is defined.

City Planner Anderson explained that only replacement devices are eligible.

Motion by Councilmember Menth, seconded by Councilmember Riley, to recommend the City Council adopt Resolution #20-018 to enter into the Clean Water Fund Grant Agreement with the Metropolitan Council and to accept the $28,000 grant to implement a water efficiency rebate program.

Motion carried. Voting Yes: Chairperson Kuzma, Councilmembers Menth and Riley. Voting No: None.

5.02: Consider City Council Recommendation to Indefinitely Suspend Pavement Sealcoating Program

City Engineer Westby reviewed the staff report and the recommendation that the Committee provide a recommendation to the City Council to indefinitely suspend the City's annual sealcoat program for reasons noted in the staff report.

Councilmember Menth asked if sealcoating is causing the pavement damage.

City Engineer Westby stated that there are many theories, but the most common theory is that the issues begin after the second sealcoat with the freeze/thaw cycles. He confirmed that roads that have not been sealcoated are not experiencing the same issues. He stated that staff is reviewing the most cost-effective manner to address the issue going forward. He stated that the discussion will continue in February and therefore the Committee can take action on its recommendation tonight or wait until the February meeting.

Motion by Councilmember Riley, seconded by Councilmember Menth, to table the recommendation related to the City's annual sealcoating program to the February meeting.

Motion carried. Voting Yes: Chairperson Kuzma, Councilmembers Riley and Menth. Voting No: None.

5.03: Consider City Council Recommendation to Accept Feasibility Report for 2020 Pavement Overlay Improvements, Improvement Project No. 20-02

City Engineer Westby reviewed the staff report and the recommendation for the Committee to recommend City Council acceptance of the Feasibility Report for the 2020 Pavement Overlay Improvements, Improvement Project No. 20-02.

Chairperson Kuzma stated that the funding source right now is extremely limited and therefore the City will need to be creative on what it can do for road maintenance. He believed there should be continued communication with the public in terms of what the City will be able to do in terms of road repair.

Councilmember Riley stated that it appears that the biggest problem the City continues to run into is that there is not enough pavement to mill for road projects. He asked how the City is going to be proactive when it continues to make decisions not to do anything. He stated that he is frustrated by the situation the City continues to be in because of past road construction practices and pavement sections that are too thin to be milled.

City Engineer Westby reviewed some of the available options. He stated that the City needs to do overlays at the right time, noting that previous attempts to complete overlays on pavement sections that were in a condition that was considered borderline for receiving an overlay generally did not provide the desired lifespan after the repair. He confirmed that the timing may not be the issue for some older streets, as the issue on some of those roads are the inconsistent/lack of pavement depth.

Motion by Councilmember Menth to recommend City Council acceptance of the Feasibility Report for the 2020 Pavement Overlay Improvements, Improvement Project No. 20-02.

Further discussion: Councilmember Riley stated that he is not happy with this as it would not seem to make sense to not fix things that need to be fixed. Chairperson Kuzma stated that is not what staff is saying. He stated that the City is going to look for better candidates for this type of repair rather than attempting to do a mill and overlay on streets that will not receive the desired benefit from the repair. Councilmember Menth agreed that the City would simply be looking for better prospects for this type of repair. City Engineer Westby stated that there are some additional options for rural roads that do not have curb and gutter and could just have an overlay without the mill. He noted that staff would also look for roads that are ready for their first overlay in order to maintain the repair schedule for those roads. Councilmember Riley asked if residents have already been alerted of the potential overlay improvements. City Engineer Westby noted that a mailing was sent to residents alerting them of the potential overlays and about a public open house, but a follow up letter was sent alerting residents that the overlays may no longer be completed, that the public meeting was canceled, and that they would receive another letter if improvements were again proposed for their street. He stated that the letter briefly summarized the information, but additional information is available to residents online. He stated that it is hard to put out information on the pavement management program and funding because there are so many unknowns. Councilmember Riley referenced option one and asked for additional information. City Engineer Westby explained that funding for this year is limited and that option has double in cost so only a portion of the roads may be able to be completed. Councilmember Riley asked if the improvements would be assessed. City Engineer Westby confirmed that assessments are proposed to pay for up to 25-percent of the project.

Councilmember Menth withdrew his motion.

Councilmember Menth asked if the Committee would feel more comfortable completing overlays on some of the roads.

Chairperson Kuzma stated that the City only has a limited amount of funds for repairs this year.

City Engineer Westby stated that staff can do a deeper dive to determine estimated costs and return that information to the Committee in February. He noted that staff could also bring other potential candidates for overlays so that the Committee could discuss both options.

Motion by Councilmember Riley, seconded by Councilmember Menth, to direct staff to bring back additional information to the Committee at the next meeting related to both options one and option three.

Motion carried. Voting Yes: Chairperson Kuzma, Councilmembers Riley and Menth. Voting No: None.

6. COMMITTEE / STAFF INPUT

6.01: Receive Update on Bunker Lake Boulevard Reconstruction – Armstrong Boulevard to Ramsey Boulevard

City Engineer Westby reviewed the staff report.

Councilmember Riley asked if a brief update could be sent related to the County communication via email as well. He asked if the County would be open to completing the work in one project, rather than the City completing one segment and the City completing the other segment.

City Engineer Westby confirmed he would bring additional information to the February meeting.

6.02: Staff Updates on Improvement Projects and Items of Interest

City Engineer Westby reviewed the staff updates on improvement projects and items of interest.

6.03: Review Future Topics Calendar

City Engineer Westby reviewed the future topics calendar.

7. ADJOURNMENT

Motion by Councilmember Riley, seconded by Councilmember Menth, to adjourn the Public Works Committee meeting.

Motion carried.

The regular meeting of the Public Works Committee adjourned at 6:39 p.m.

Respectfully submitted,

_____
Grant Riemer
Public Works Superintendent

Drafted by Amanda Staple
TimeSaver Off Site Secretarial, Inc.

Public Works Committee **5. 1.**

Meeting Date: 02/18/2020

By: Tim Gladhill, Community Development

Title:

Consider Recommendation on Cost Share Alternatives for Puma Street Development Initiated Expansion and Safety Improvement Project

Purpose/Background:

The purpose of this case is to consider a recommendation to the City Council on acceptable funding alternatives for the Puma Street Development Initiated Expansion and Safety Improvement Project.

The need for this project is being driven by two development projects at the intersection of Puma Street and Alpine Drive.

- Riverstone by Capstone Homes
- Outlot A, Alpha Development by AKM Farm (Paxmar)

This topic was discussed at the February 11, 2020 Work Session with the City Council and Planning Commission. Consensus at that meeting was that this improvement was necessary and that a general cost-share model of an even split between Capstone, Paxmar and the City was desired. That model has since been updated based on discussions with the City Attorney to meet the requirements of Minnesota Statutes Chapter 429 (Local Improvements, Special Assessments).

As a sidebar, there was some discussion about the City paying 50% of the costs of the improvements and assessing the remaining balance to the development parcels. However, Staff does not believe there was enough support for this alternative, based on discussion, and therefore has not run this model. If the City Council desires Staff to explore this model, Staff is willing to move forward.

Finally, process is governed by Minnesota Statutes Chapter 429 as well as City Charter Chapter 8. City Charter does not allow for a petition against this project due to size and zoning district (Section 8.4.3).

Timeframe:

20 minutes

Observations/Alternatives:

In 2016, the City began exploring infrastructure needs in the area generally north of Highway 10, west of Armstrong Boulevard and south of Alpine Drive. As that infrastructure analysis was being completed, the City received multiple development proposals.

- Bunker Lake Industrial Park by PSD, LLC and Hageman Holdings, LLC (approved, partially complete)
- Riverstone by Capstone - Single-Family Neighborhood (approved, partially complete)
- Northfork Meadows by Paxmar - Single-Family Neighborhood (denied)
- Villas at Northfork by Paxmar - Single-Family Neighborhood (withdrawn)

Assessment Method

In discussing this topic with the City Attorney, Staff is recommending that the City employ the 'Per Net-Developable Acreage' model of assessment. This allows the City to scale the assessment based on the true impacts of new development as opposed to the 'Per Front Foot' model. The Per Front Foot model works great for reconstruction of existing residential roads in residential neighborhoods as each lot derives as similar benefit. In the

case of development parcel, impacts are driven more by the overall size of the project as opposed to a road frontage calculation.

The City owns real property (Outlot C, Alpha Development) at the southeast corner of Alpine Drive and Puma Street. This parcel was acquired for park dedication purposes that could either be developed as a park OR any cash received for sale conveyed to the Park Dedication Fund. As owner of real property, the City will be responsible for a portion of the base assessment.

City Contribution to Collector Road

As noted above, the City will be responsible for a portion of the base assessment as real property owners of Outlot C, Alpha Development. The City should consider this assessment amount in land sale transactions to adjacent developers.

At the February 11, 2020 Joint Work Session with the Planning Commission, consensus was that a general City contribution (Municipal Contribution) was appropriate given the status as a collector road. Direction was given that an approximate 33% contribution was desired.

Total Assessment Amount and Preliminary Assessment Amount

Attached to this case is a detailed breakdown of the proposed Project Proforma.

Future Discussions

This case is intended to serve as high-level policy direction. Next steps including, but not limited to Feasibility Report, Approving Plans, Awarding Contract and holding Assessment Hearing will provide additional levels of detail. The intent of this step is to limit the number of alternatives Staff should explore.

Alternatives

Alternative 1 - Recommend that the City Council proceed forward with funding discussions as proposed (Contribute $225,000 to the Collector Road and assess remaining balance using the per acre method).

Alternative 2 - Recommend that the City Council proceed with a Cost Share as outlined above, but with modifications.

1. Collector Road Contribution Amount
2. Assessment Method (linear frontage vs. net developable acreage)

Alternative 3 - Recommend that the City not proceed with the project.

Funding Source:

The funding for this project is proposed to be a combination of City Contributions and Developer Assessments as outline below. As it pertains to the City's Cost Share (Municipal Contribution to Collector Road + Assessment Amount for Ownership of Real Property), several funding sources are available.

1. City's Public Improvement Revolving (PIR) Fund (generated from local property tax revenue)
2. Anoka County Redevelopment Authority (ACHRA)
3. State of Minnesota Municipal State Aid (MSA) Account

Cost Share Breakdown

Property/Party	Amount	Percentage
Paxmar/AKM Farm Outlot A, Alpha Development	$225,025	29.21%

City Outlot C, Alpha Development + Municipal Contribution to Collector Road	$254,960	33.55%
Capstone/Riverstone Outlot H, Riverstone	$283,015	37.24%
Total Project Cost minus Trunk Utilities	$760,000	100%

Recommendation:

Staff recommends that the City Council approve the proposed Funding Plan for the Puma Street Developer Initiated Expansion and Safety Improvement Project.

Action:

Motion to recommend that the City Council approve the proposed Funding Plan for the Puma Street Developer Initiated Expansion and Safety Improvement Project.

Attachments

Riverstone Addition Preliminary Plat Plans

Outlot A, Alpha Development Concept Plan

Puma Street Project Background

Proposed Funding Plan

DRAFT Work Session Minutes dated February 11, 2020

Paxmar/AKM Farm Response

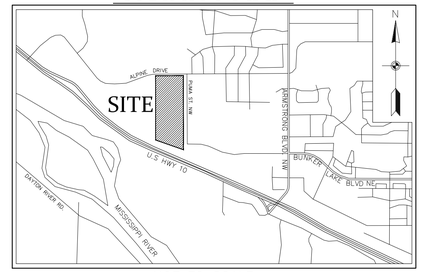
Form Review

Inbox	Reviewed By	Date
Diana Lund	Diana Lund	02/13/2020 11:42 AM
Bruce Westby	Bruce Westby	02/13/2020 12:21 PM
Grant Riemer	Grant Riemer	02/13/2020 12:47 PM
Kurt Ulrich	Kurt Ulrich	02/13/2020 01:18 PM
Form Started By: Tim Gladhill		Started On: 02/13/2020 08:24 AM
Final Approval Date: 02/13/2020		

RIVERSTONE

RAMSEY, MINNESOTA

VICINITY MAP



NOT TO SCALE

PUMA STREET N.W.
ALPINE DRIVE N.W.
152ND AVENUE NW
152ND COURT
OUTLOT A
OUTLOT B
OUTLOT C
OUTLOT D
OUTLOT E
OUTLOT F
OUTLOT G
OUTLOT H
151ST AVENUE NW
150TH LANE NW
152ND LANE NW
QUINTANA STREET NW
QUINTANA CIRCLE NW
149TH COURT
RABBIT STREET NW
149TH AVENUE NW
SNOWY OWL STREET NW
TIGER STREET NW
BUNKER LAKE BLVD.
BURLINGTON NORTHERN INC.
US HIGHWAY NO. 10 & 169

SHEET INDEX

1. COVER
2. EXISTING CONDITIONS
3. PRELIMINARY PLAT INDEX
4–7. PRELIMINARY PLAT
8. PRELIMINARY SITE & UTILITY PLAN
9. GRADING INDEX
10–13. PRELIMINARY GRADING & EROSION CONTROL PLANS
14–15. DETAILS
16. RETAINING WALL PROFILES
L1–L5. LANDSCAPE PLANS

BENCHMARK

1. Anoka County Benchmark No. 3076
   Elev.= 890.186 (NAVD 88)
2. Anoka County Benchmark No. 2078
   Elev.= 899.499 (NAVD 88)

0 50 100 200
(IN FEET)

CALL BEFORE YOU DIG

811 Know what's below. Call before you dig.

The subsurface utility information shown on this plan is utility Quality Level D. This quality level was determined according to the guidelines of CI/ASCE 38-02, entitled "Standard Guideline for the Collection and Depiction of Existing Subsurface Utility Data."

Carlson McCain
• environmental
• engineering
• surveying

3890 Pheasant Ridge Drive NE, Suite 100
Blaine, MN 55449
Phone: (763) 489-7900
Fax: (763) 489-7959
www.carlsonmccain.com

I hereby certify that this plan, specification or report was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota

Print Name: Brian J. Krystofiak, P.E.
Signature:
Date: 3/08/17 License #: 25063

Drawn: ADB
Designed: BJK
Date: 3/08/17

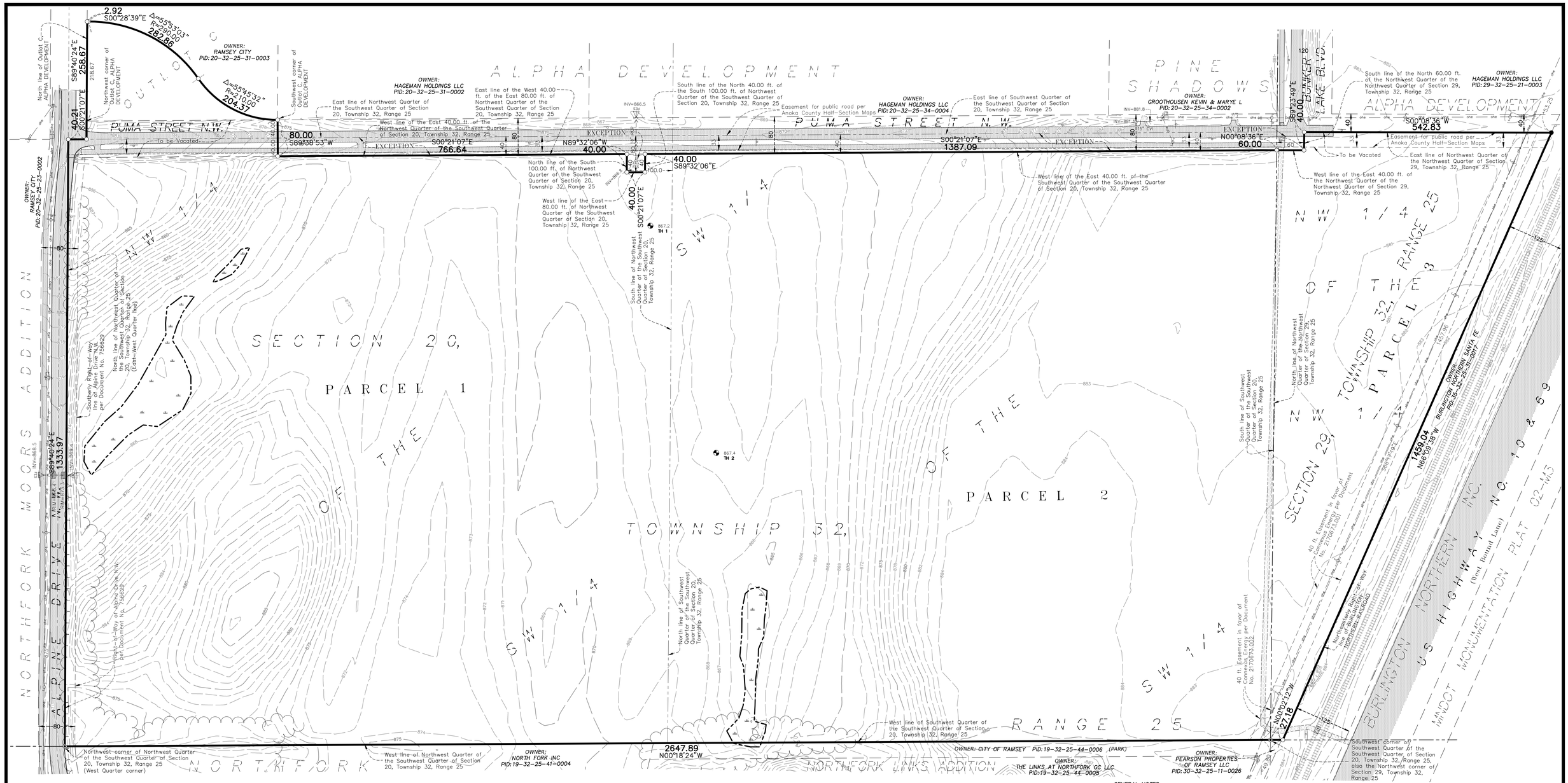
Revisions:
1. 5/24/17 Per City Comments
2. 6/23/17 Per City Comments
3. 4/13/18 Revise Street names, B12L15-28 & B13L1-13 & add NE Trail
4. 6/13/18 Per City Comments
5. 12/4/19 Revise Layout Per Owner

RIVERSTONE DEVELOPMENT, LLC.
14015 Sunfish Lake B, Suite 400
Ramsey, MN 55303

RIVERSTONE
Ramsey, MN

COVER SHEET

Save Date: 12/05/19 F:\jobs\6421 - 6440\6435 - ramsey site\cad c3d\engineering\preliminary\6435_cover.dwg



Parcel Description:
(Per Schedule A of Title Commitment No. 1273, with a commitment date of October 12th, 2016 at 7:30 A.M., prepared by Old Republic National Title Insurance Company)

Parcel 1:
The Northwest Quarter of Southwest Quarter of Section 20, Township 32, Range 25, Anoka County, Minnesota, EXCEPT the East 40.00 feet of said Northwest Quarter of Southwest Quarter lying southerly of the southerly right of way line of Alpine Drive as described in Document No. 756629.
AND ALSO EXCEPT the North 40.00 feet of the South 100.00 feet of the West 40.00 feet of the East 80.00 feet of said Northwest Quarter of Southwest Quarter.

Parcel 2:
The Southwest Quarter of Southwest Quarter of Section 20, Township 32, Range 25, Anoka County, Minnesota, EXCEPT the East 40.00 feet thereof.

Parcel 3:
The Northwest Quarter of Northwest Quarter of Section 29, Township 32, Range 25, Anoka County, Minnesota, lying northeasterly of the northeasterly right of way line of Burlington Northern Railroad, EXCEPT the North 60.00 feet of the East 40.00 feet of said Northwest Quarter of Northwest Quarter.

(Proposed Legal Description, subject to City approved parcel subdivision)
That part of Outlot C, ALPHA DEVELOPMENT, according to the recorded plat thereof, Anoka County, Minnesota lying westerly and northwesterly of the following described line:

Commencing at the Northwest corner of said Outlot C; thence South 89 degrees 40 minutes 24 seconds East, assumed bearing, along the North line of said Outlot C, a distance of 218.67 feet to the point of beginning of the line to be described; thence South 00 degrees 28 minutes 39 seconds East, 2.92 feet; thence southwesterly 282.86 feet along a tangential curve concave to the northwest, having a radius of 290.00 feet and a central angle of 55 degrees 53 minutes 03 seconds to a point of reverse curvature; thence continuing southwesterly 204.37 feet along a reverse curve concave to the southeast, having a radius of 210.00 feet and a central angle of 55 degrees 45 minutes 32 seconds to the Southwest corner of said Outlot C and said line there terminating.

(Proposed Legal Description, subject to City approved Right-of-Way Vacation)
That part of Puma Street Northwest, as created and dedicated in the plat of ALPHA DEVELOPMENT, according to the recorded plat thereof, Anoka County, Minnesota, lying southerly of the westerly extension of the north line of Outlot C, said plat, and lying northerly of the following described line:

Beginning at the southwest corner of said Outlot C; thence South 89 degrees 38 minutes 53 seconds West, 80.00 feet, assuming the North line of said Outlot C has a bearing of South 89 degrees 40 minutes 24 seconds East, and said line there terminating.

And

That part of the East 40.00 feet of the Northwest Quarter of the Southwest Quarter of Section 20, Township 32, Range 25, Anoka County, Minnesota, lying southerly of the southerly right of way line of Alpine Drive NW as described in Doc. No. 756629 and lying northerly of the following described line:

Beginning at the southwest corner of said Outlot C; thence South 89 degrees 38 minutes 53 seconds West, 80.00 feet, assuming the North line of said Outlot C has a bearing of South 89 degrees 40 minutes 24 seconds East, and said line there terminating.

LEGEND

- ◉ – Denotes Anoka County Cast Iron Monument
- ● – Denotes Found Iron Monument
- ○ – Denotes Set Iron Pipe, Marked with RLS 40361
- –o– – Denotes Miscellaneous Sign
- E – Denotes Electric Box
- CB or CBMH – Denotes Catch Basin
- EM – Denotes Electric Meter
- T – Denotes Telephone Box
- UP – Denotes Utility Pole
- FES – Denotes Flared End Section
- HH – Denotes Hand Hole
- OHE – Denotes Overhead Electric
- >> – Denotes Storm Sewer
- x – x – Denotes Existing Fence as noted
- – Denotes Wetland delineated by Kjolhaug Environmental Services Company in 2016
- – Denotes Gravel Surface
- – Denotes Bituminous Surface
- – Denotes Existing 1 Ft. Contour
- – Denotes Existing 5 Ft. Contour

0 50 100 200 (IN FEET)

GENERAL NOTES:

1. The field work for this survey was completed on November 28th, 2016.
2. Bearings shown hereon are based on the North line of Outlot C, ALPHA DEVELOPMENT, according to the recorded plat thereof, Anoka County, Minnesota, which is assumed to bear South 89 degrees 40 minutes 24 seconds East.
3. BENCHMARK: Anoka County Benchmark No. 3076 Elevation= 890.186 (NAVD 88)
4. Surveyed property contains ±3,934,125 sq.ft. (±90.32 acres).
5. Wetlands shown hereon were delineated by Kjolhaug Environmental Services Company in 2016.
6. Above ground utilities have been field located as shown. Underground utilities shown hereon are those which were field marked by utility companies responding to Gopher State One Call, Ticket No. 162941258 and 162941314, dated 10/20/2016 or were taken from utility plans provided by the City of Ramsey. All underground locations shown hereon are APPROXIMATE. Prior to any excavations or digging, contact Gopher State One Call for an on-site location (651-454-0002).

Carlson McCain
• environmental
• engineering
• surveying
3890 Pheasant Ridge Drive NE, Suite 100
Blaine, MN 55449
Phone: (763) 489-7900
Fax: (763) 489-7959
www.carlsonmccain.com

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 Land Surveyor under the laws of the State of Minnesota

Print Name: Thomas R. Balluff, L.S.
Signature: Thomas R. Balluff
Date: 3/8/2017 License #: 40361

DRAWN BY: JAB
ISSUE DATE: 3/8/2017
FILE NO: 1308

Revisions:
1. 5/24/2017-Per City Comments
2. 6/23/2017-Per City Comments

RIVERSTONE DEVELOPMENT, LLC
14015 Sunfish Lake B, Suite 400
Ramsey, MN, 55303

RIVERSTONE
Ramsey, Minnesota

EXISTING CONDITIONS

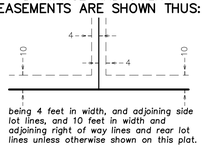
Save Date: 06/29/17 | F:\jobs\6421 - 6440\6435 - ramsey site\cad c3d\survey\6435_excon.dwg

RIVERSTONE

SITE DATA

TOTAL SITE AREA	±90.32 AC.	TOTAL LOT AREA	±51.31 AC.
TOTAL ROW AREA	±16.77 AC.	TOTAL NUMBER OF LOTS	279
TOTAL OUTLOT AREA	±22.24 AC.	SMALLEST LOT	±5,046 S.F.
OUTLOT A	±1.18 AC.	LARGEST LOT	±19,592 S.F.
OUTLOT B	±2.78 AC.	AVERAGE LOT	±8,161 S.F.
OUTLOT C	±0.44 AC.	EXISTING ZONING	R-1, R-2, R-3, B-2
OUTLOT D	±6.13 AC.	PROPOSED ZONING	PUD
OUTLOT E	±6.36 AC.	UTILITIES	AVAILABLE
OUTLOT F	±0.11 AC.	GROSS DENSITY	3.09 (LOTS/AC.)
OUTLOT G	±0.66 AC.		
OUTLOT H	±4.58 AC.		

PROPOSED DRAINAGE AND UTILITY EASEMENTS ARE SHOWN THUS:



being 4 feet in width, and adjoining side lot lines, and 10 feet in width and adjoining right of way lines and rear lot lines unless otherwise shown on this plat.

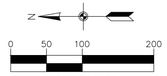
BENCHMARK

1. Anoka County Benchmark No. 3076 Elev.= 890.186 (NAVD 88)
2. Anoka County Benchmark No. 2078 Elev.= 899.499 (NAVD 88)

LEGEND

- ◉ – Denotes Anoka County Monument
- ● – Denotes Found Iron Monument
- ○ – Denotes 5/8 inch by 14 inch rebar, marked with RLS 40361

Bearings shown hereon are based on the North line of Outlot C, ALPHA DEVELOPMENT, according to the recorded plat thereof, Anoka County, Minnesota, which is assumed to bear South 89 degrees 40 minutes 24 seconds East.



LEGAL DESCRIPTION

Parcel Description:
(Per Schedule A of Title Commitment No. 1273, with a commitment date of October 12th, 2016 at 7:30 A.M., prepared by Old Republic National Title Insurance Company)

Parcel 1:
The Northwest Quarter of Southwest Quarter of Section 20, Township 32, Range 25, Anoka County, Minnesota. EXCEPT the East 40.00 feet of said Northwest Quarter of Southwest Quarter lying southerly of the southerly right of way line of Alpine Drive as described in Document No. 756629. AND ALSO EXCEPT the North 40.00 feet of the South 100.00 feet of the West 40.00 feet of the East 80.00 feet of said Northwest Quarter of Southwest Quarter.

Parcel 2:
The Southwest Quarter of Southwest Quarter of Section 20, Township 32, Range 25, Anoka County, Minnesota, EXCEPT the East 40.00 feet thereof.

Parcel 3:
The Northwest Quarter of Northwest Quarter of Section 29, Township 32, Range 25, Anoka County, Minnesota, lying northeasterly of the northeasterly right of way line of Burlington Northern Railroad, EXCEPT the North 60.00 feet of the East 40.00 feet of said Northwest Quarter of Northwest Quarter.

(Proposed Legal Description, which may be subject to City approved parcel subdivision)
That part of Outlot C, ALPHA DEVELOPMENT, according to the recorded plat thereof, Anoka County, Minnesota lying westerly and northwesterly of the following described line:

Commencing at the Northwest corner of said Outlot C; thence South 89 degrees 40 minutes 24 seconds East, assumed bearing, along the North line of said Outlot C, a distance of 218.67 feet to the point of beginning of the line to be described; thence South 00 degrees 28 minutes 39 seconds East, 2.92 feet; thence southwesterly 282.86 feet along a tangential curve concave to the northwest, having a radius of 290.00 feet and a central angle of 55 degrees 53 minutes 03 seconds to a point of reverse curvature; thence continuing southwesterly 204.37 feet along a reverse curve concave to the southeast, having a radius of 210.00 feet and a central angle of 55 degrees 45 minutes 32 seconds to the Southwest corner of said Outlot C and said line there terminating.

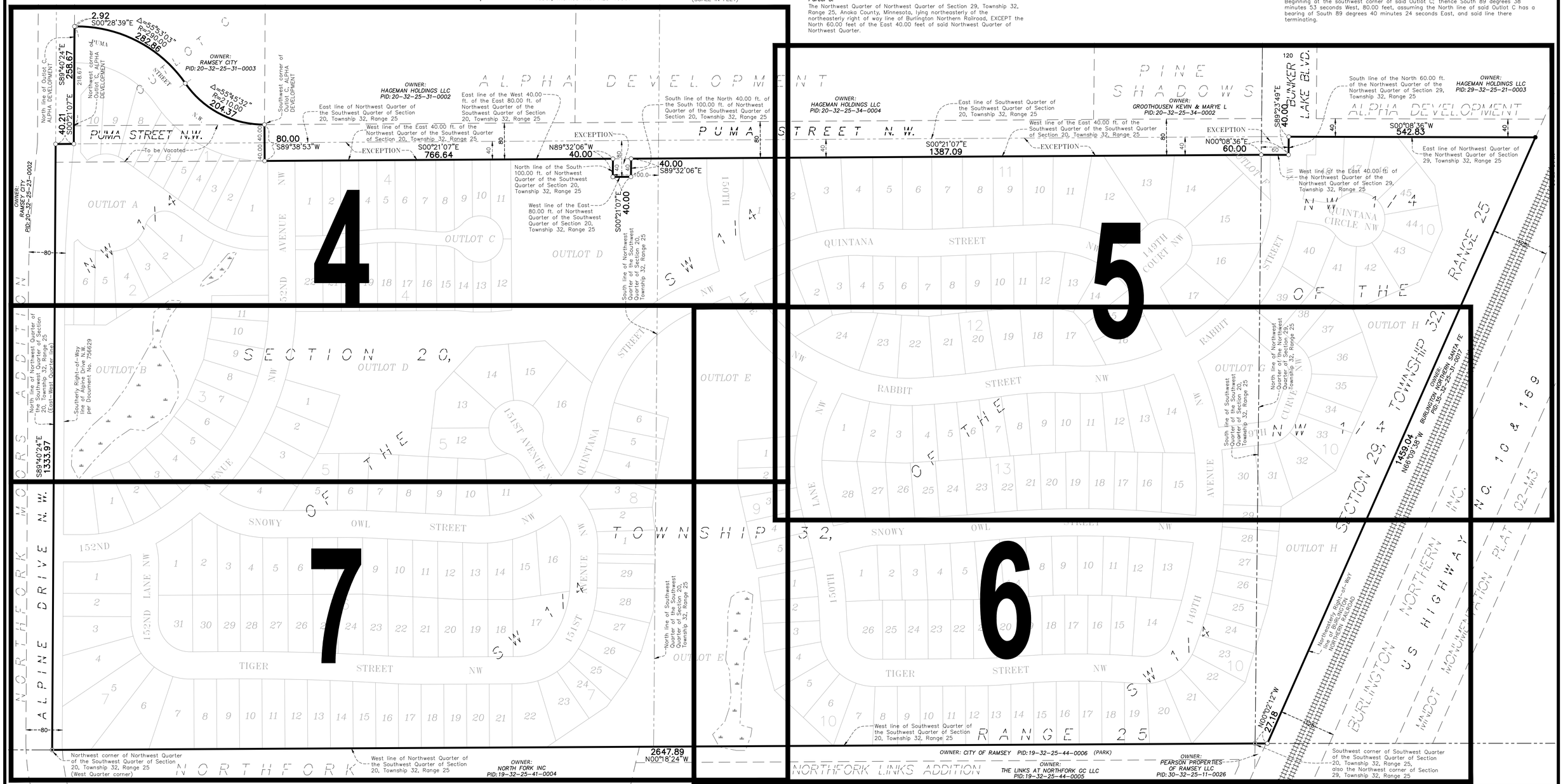
(Proposed Legal Description, which may be subject to City approved parcel subdivision)
That part of Puma Street Northwest, as created and dedicated in the plat of ALPHA DEVELOPMENT, according to the recorded plat thereof, Anoka County, Minnesota, lying southerly of the westerly extension of the north line of Outlot C, said plat, and lying northerly of the following described line:

Beginning at the southwest corner of said Outlot C; thence South 89 degrees 38 minutes 53 seconds West, 80.00 feet, assuming the North line of said Outlot C has a bearing of South 89 degrees 40 minutes 24 seconds East, and said line there terminating.

AND

That part of the East 40.00 feet of the Northwest Quarter of the Southwest Quarter of Section 20, Township 32, Range 25, Anoka County, Minnesota, lying southerly of the southerly right of way line of Alpine Drive NW as described in Doc. No. 756629 and lying northerly of the following described line:

Beginning at the southwest corner of said Outlot C; thence South 89 degrees 38 minutes 53 seconds West, 80.00 feet, assuming the North line of said Outlot C has a bearing of South 89 degrees 40 minutes 24 seconds East, and said line there terminating.



Carlson McCain
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3890 Pheasant Ridge Drive NE, Suite 100
Blaine, MN 55449
Phone: (763) 489-7900
Fax: (763) 489-7959
www.carlsonmccain.com

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 Land Surveyor under the laws of the State of Minnesota

Print Name: Thomas R. Balluff, L.S.
Signature:
Date: 03/08/2017 License #: 40361

DRAWN BY: JAB
ISSUE DATE: 03/08/2017
FILE NO: 1308

Revisions:
1. 5/24/2017-Per City Comments
2. 6/23/2017-Per City Comments
3. 3/26/2018-Layout Change
4. 4/13/2018-Revise Street Names
5. 12/04/2019-Revise Layout per Owner

RIVERSTONE DEVELOPMENT, LLC
14015 Sunfish Lake B, Suite 400
Ramsey, MN, 55303

RIVERSTONE
Ramsey, MN

PRELIMINARY PLAT INDEX

[Save Date: 12/05/19] F:\jobs\6421 - 6440\6435 - ramsey site\cad c3d\survey\6435_prp-index.dwg

LEGEND

- ◉ – Denotes Anoka County Monument
- ● – Denotes Found Iron Monument
- ○ – Denotes 5/8 inch by 14 inch rebar, marked with RLS 40361

Bearings shown hereon are based on the North line of Outlot C, ALPHA DEVELOPMENT, according to the recorded plat thereof, Anoka County, Minnesota, which is assumed to bear South 89 degrees 40 minutes 24 seconds East.

N

0 25 50 100

(SCALE IN FEET)

ALPHA DEVELOPMENT

PUMA STREET N.W.

PUMA STREET N.W. (To be Vacated)

OWNER: RAMSEY CITY PID: 20-32-25-31-0003

OWNER: HAGEMAN HOLDINGS LLC PID: 20-32-25-31-0002

OWNER: RAMSEY CITY PID: 20-32-25-23-0002

Northwest corner of Outlot C, ALPHA DEVELOPMENT

North line of Outlot C, ALPHA DEVELOPMENT

Southwest corner of Outlot C, ALPHA DEVELOPMENT

S89°40'24"E 238.67

S00°21'07"E 40.00

2.92 S00°28'39"E

Δ=55°53'03" R=290.00 282.86

243.8 R=250.00

Δ=55°45'32" R=210.00 204.37

243.3 R=250.00

S89°38'53"W 80.00

East line of Northwest Quarter of Section 20, Township 32, Range 25

West line of the East 40.00 ft. of the Northwest Quarter of the Southwest Quarter of Section 20, Township 32, Range 25

EXCEPTION

S00°21'07"E 766.64

East line of the West 40.00 ft. of the East 80.00 ft. of Northwest Quarter of the Southwest Quarter of Section 20, Township 32, Range 25

EXCEPTION 40.00 N89°32'06"W

S89°32'06"E 40.00

S00°21'07"E 40.00

North line of the South 100.00 ft. of Northwest Quarter of the Southwest Quarter of Section 20, Township 32, Range 25

West line of the East 80.00 ft. of Northwest Quarter of the Southwest Quarter of Section 20, Township 32, Range 25

South line of the North 40.00 ft. of the South 100.00 ft. of Northwest Quarter of the Southwest Quarter of Section 20, Township 32, Range 25

SECTION 20, TOWNSHIP 32, RANGE 25

OUTLOT A ±51,502 sq.ft. Drainage & Utility Easement (Over all of Outlot A)

OUTLOT B ±121,264 sq.ft. Drainage & Utility Easement (Over all of Outlot B)

OUTLOT C ±19,152 sq.ft. Drainage & Utility Easement (Over all of Outlot C)

OUTLOT D ±266,699 sq.ft. Drainage & Utility Easement (Over all of Outlot D)

152ND AVENUE NW

150TH LANE NW

150TH LANE NW

151ST AVENUE NW

QUINTANA STREET NW

THORK MOORS ADDITION

ALPINE DRIVE N.W.

Southerly Right-of-Way line of Alpine Drive N.W. per Document No. 756629

North line of the Northwest Quarter of the Southwest Quarter of Section 20, Township 32, Range 25 (East–West Quarter line)

S89°40'24"E 1333.97

SEE SHEET 5

SEE SHEET 7

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RIVERSTONE
Ramsey, MN

PRELIMINARY PLAT

4 of 16

[Save Date: 12/05/19] F:\jobs\6421 - 6440\6435 - ramsey site\cad c3d\survey\6435_prp.dwg

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0 25 50 100 (SCALE IN FEET)

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ALPHA DEVELOPMENT
OWNER: HAGEMAN HOLDINGS LLC
PID: 20-32-25-34-0004

PINE SHADOWS
OWNER: GROOTHOUSEN KEVIN & MARYE L
PID: 20-32-25-34-0002

ALPHA DEVELOPMENT
OWNER: HAGEMAN HOLDINGS LLC
PID: 29-32-25-21-0003

BUNKER LAKE BLVD.

PUMA STREET N.W.
S00°21'07"E 1387.09
East line of Southwest Quarter of the Southwest Quarter of Section 20, Township 32, Range 25
West line of the East 40.00 ft. of the Southwest Quarter of the Southwest Quarter of Section 20, Township 32, Range 25
EXCEPTION
West line of the East 40.00 ft. of the Northwest Quarter of the Northwest Quarter of Section 29, Township 32, Range 25
EXCEPTION N00°08'36"E 60.00
S89°23'49"E 40.00
South line of the North 60.00 ft. of the Northwest Quarter of Section 29, Township 32, Range 25
PUMA STREET N.W. S00°08'36"W 542.83
East line of Northwest Quarter of the Northwest Quarter of Section 29, Township 32, Range 25
Easement for public road per Anoka County Half-Section Maps (To be Vacated)

QUINTANA STREET NW
QUINTANA CIRCLE NW
149TH COURT
149TH CURVE NW
RABBIT STREET NW
SNOWY OWL STREET NW
LANE NW
STREET NW
AVENUE NW

OUTLOT F ±4,941 sq.ft.
OUTLOT G ±28,544 sq.ft.
OUTLOT H ±199,714 sq.ft. Drainage & Utility Easement (Over all of Outlot H)

Utility Easement per Document No. 2170073.001

SEE SHEET 4
SEE SHEET 6

RANGE 25
TOWNSHIP 32
SECTION 29
SECTION 20

BURLINGTON NORTHERN SANTA FE RAILWAY CO.
BURLINGTON NORTHERN SANTA FE OWNER: BURLINGTON NORTHERN SANTA FE PID 35-32-25-31-0017
U.S. HIGHWAY 10
MNDOT MONUMENTATION PLAT 02-M5
1459.04 N66°39'38"W

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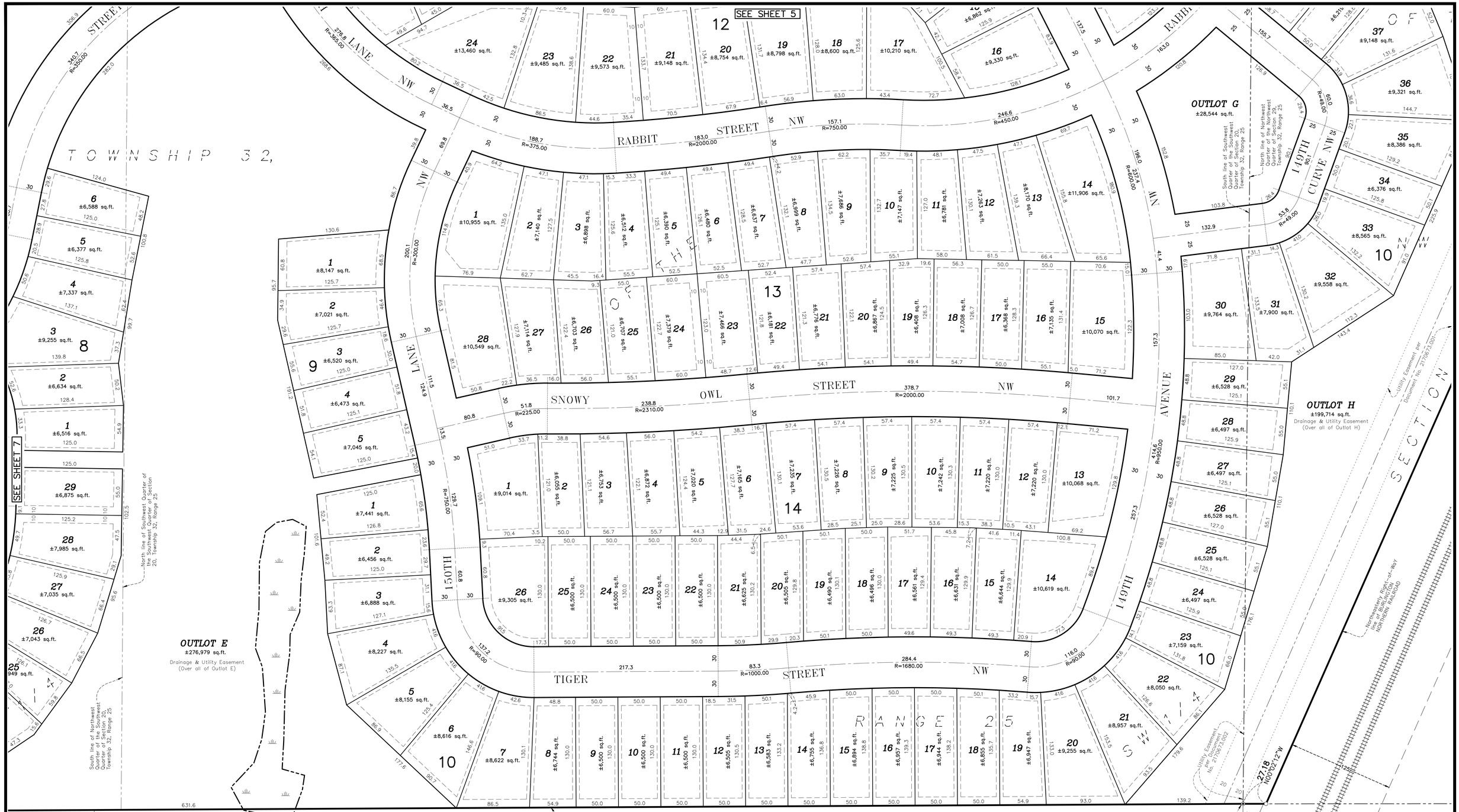
Ramsey, MN

PRELIMINARY PLAT

5 of 16

[Save Date: 12/05/19] F:\jobs\6421 - 6440\6435 - ramsey site\cad c3d\survey\6435_prp.dwg



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PRELIMINARY PLAT

6 of 16

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SEE SHEET 4

NORTHFORK MOORS

ALPINE DRIVE N.W.

North line of Northwest Quarter of the Southwest Quarter of Section 20, Township 32, Range 25 (East-West Quarter line)

S89°40'24"E 1333.97

ALPINE DRIVE N.W. 889.6

Southerly Right-of-Way line of Alpine Drive N.W. per Document No. 7586629

461.8

OUTLOT B
±121,264 sq.ft.
Drainage & Utility Easement
(Over all of Outlot B)

OUTLOT D
±266,699 sq.ft.
Drainage & Utility Easement
(Over all of Outlot D)

151ND AVENUE NW

152ND LANE NW

444.3

SNOWY OWL STREET NW

TIGER STREET NW

151ST AVENUE NW

QUINTANA STREET NW

TOWNSHIP 32,

OUTLOT E
±276,979 sq.ft.
Drainage & Utility Easement
(Over all of Outlot E)

SEE SHEET 6

North line of Southwest Quarter of the Southwest Quarter of Section 20, Township 32, Range 25

South line of Northwest Quarter of the Southwest Quarter of Section 20, Township 32, Range 25

2647.89
N00°18'24"W

631.6

Northwest corner of Northwest Quarter of the Southwest Quarter of Section 20, Township 32, Range 25 (West Quarter corner)

West line of Northwest Quarter of the Southwest Quarter of Section 20, Township 32, Range 25

NORTHFORK

OWNER:
NORTH FORK INC
PID: 19-32-25-41-0004

LEGEND

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- ● – Denotes Found Iron Monument
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0 25 50 100
(SCALE IN FEET)

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Ramsey, MN

PRELIMINARY PLAT

7 of 16

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BENCHMARK

1. Anoka County Benchmark No. 3076
   Elev.= 890.186 (NAVD 88)
2. Anoka County Benchmark No. 2078
   Elev.= 899.499 (NAVD 88)

0 50 100 200

SITE PLAN LEGEND

	EXISTING	PROPOSED
LIGHT POLE	☼	●
SANITARY MANHOLE	SAN	●
MISCELLANEOUS SIGN		
EXISTING SPOT ELEVATION	,0000.0	
EXISTING TREE		
TELEVISION BOX	TV	
FIRE HYDRANT	FH	☀
FLUSHING HYDRANT		☀
GATE VALVE	GV	⋈
CLEANOUT	CO	◉
ELECTRIC BOX	EB	
GAS METER	GM	
CATCH BASIN	or	or
RAIN GUARDIAN		RG
ELECTRIC METER	EM	
TELEPHONE BOX	TB	
UTILITY POLE	UP	
FLARED END SECTION	FES	▲
STORM MANHOLE	STRM	●
SERVICE	SRV	
SOIL BORING/TEST HOLE		

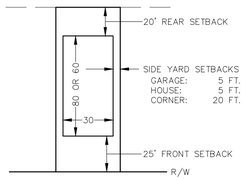
	MODULAR	ROCK
RETAINING WALL		
WATERMAIN		
SANITARY SEWER		
FORCEMAIN	FM	FM
STORM SEWER		
PROPERTY LINE		
SETBACK LINE		
CURB		
WETLAND		
DITCH		
UNDERGROUND TELEPHONE	ut	ut
UNDERGROUND ELECTRIC	ue	ue
UNDERGROUND GAS	ug	ug
UNDERGROUND FIBEROPTIC	ufo	ufo
FENCE	x	x
OVERHEAD ELECTRIC	ohe	ohe
CONCRETE SURFACE		
BITUMINOUS SURFACE		

PEDESTRIAN CROSSING ADVANCED WARNING SIGNAL. (FINAL LOCATION/DESIGN TO BE SUBMITTED & REVISED W/FINAL PLANS PRIOR TO INSTALLATION.

STREET SECTION

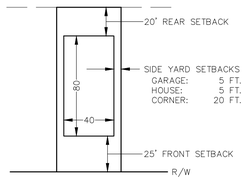
1.5" TYPE SP 9.5 WEARING COURSE MIXTURE (SPWEA340B)
BITUMINOUS MATERIAL FOR TACK COAT
2" TYPE SP 12.5 NON WEARING COURSE MIXTURE (SPNWB330B)
MIN. 4" MODIFIED CLASS 5 AGGREGATE BASE
PLACED ON PREPARED SUBGRADE

40' LOT DETAIL



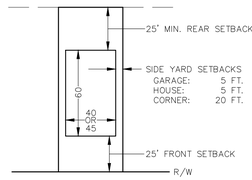
TYPICAL SERVICES SHALL BE:
WATER: 1" COPPER TYPE K
SEWER: 4" PVC SDR 26
CURB STOP TO BE PLACED AT THE R/W

50' VILLA LOT DETAIL



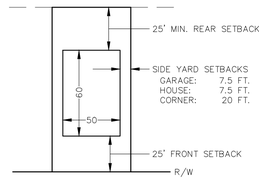
TYPICAL SERVICES SHALL BE:
WATER: 1" COPPER TYPE K
SEWER: 4" PVC SDR 26
CURB STOP TO BE PLACED AT THE R/W

50'/55' LOT DETAIL



TYPICAL SERVICES SHALL BE:
WATER: 1" COPPER TYPE K
SEWER: 4" PVC SDR 26
CURB STOP TO BE PLACED AT THE R/W

65' LOT DETAIL



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WATER: 1" COPPER TYPE K
SEWER: 4" PVC SDR 26
CURB STOP TO BE PLACED AT THE R/W

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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

Print Name: Brian J. Krystofiak, P.E.
Signature:
Date: 3/08/17 License #: 25063

Drawn: ADB
Designed: BJK
Date: 3/08/17

Revisions:
1. 5/24/17 Per City Comments
2. 6/23/17 Per City Comments
3. 4/13/18 Revise Street names, B12L15-28 & B13L1-13 & add NE Trail
4. 6/13/18 Per City Comments
5. 12/4/19 Revise Layout Per Owner

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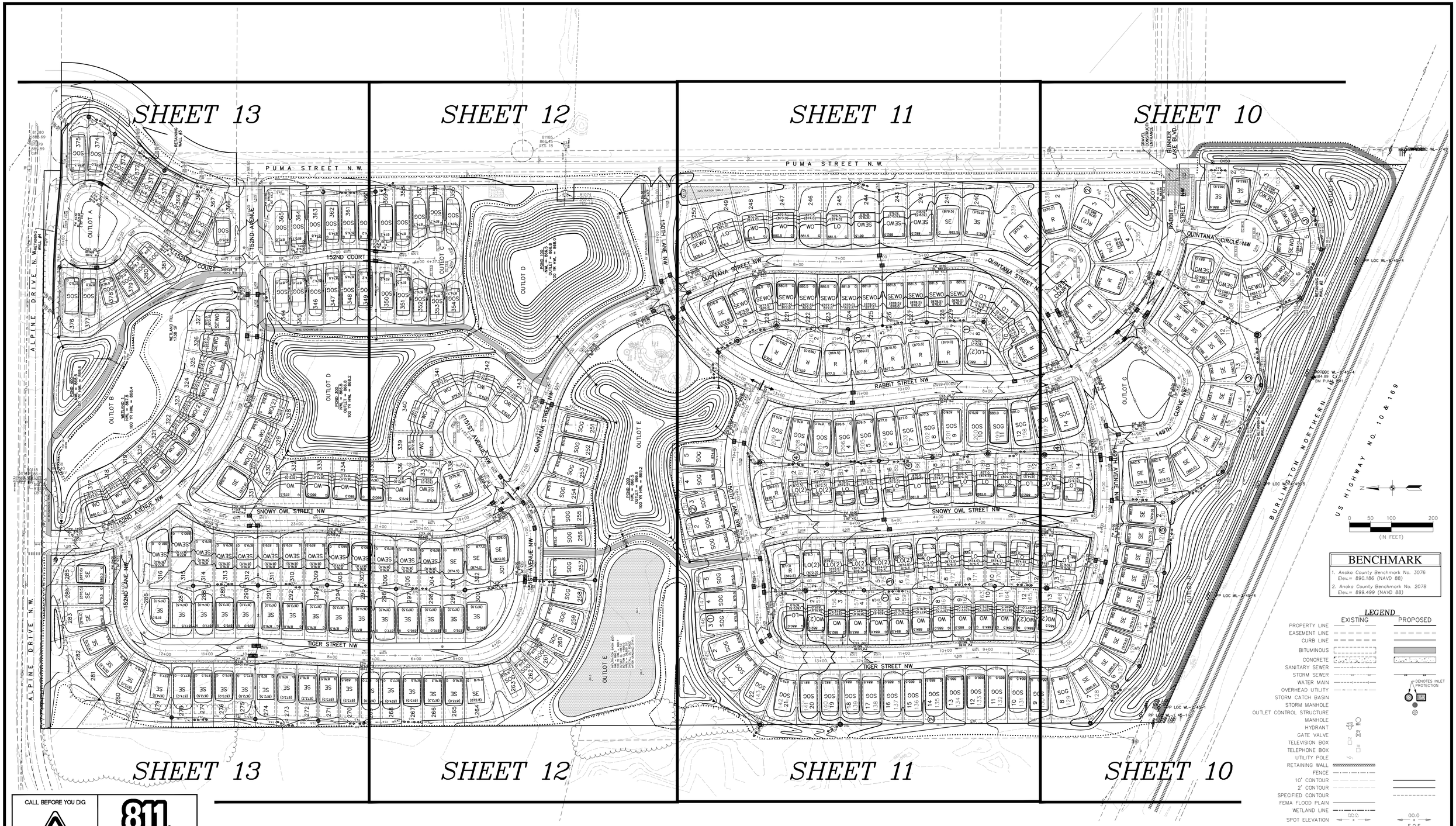
RIVERSTONE
Ramsey, MN

PRELIMINARY SITE & UTILITY PLAN

8 of 16

Save Date: 12/02/19 | F:\jobs\6421 - 6440\6435 - ramsey site\cad c3d\engineering\preliminary\6435_site.dwg



BENCHMARK

1. Anoka County Benchmark No. 3076 Elev.= 890.186 (NAVD 88)
2. Anoka County Benchmark No. 2078 Elev.= 899.499 (NAVD 88)

LEGEND

	EXISTING	PROPOSED
PROPERTY LINE		
EASEMENT LINE		
CURB LINE		
BITUMINOUS		
CONCRETE		
SANITARY SEWER		
STORM SEWER		
WATER MAIN		
OVERHEAD UTILITY		
STORM CATCH BASIN		DENOTES INLET PROTECTION
STORM MANHOLE		
OUTLET CONTROL STRUCTURE		
MANHOLE	MH	
HYDRANT		
GATE VALVE	GV	
TELEVISION BOX	TV	
TELEPHONE BOX	TB	
UTILITY POLE		
RETAINING WALL		
FENCE		
10' CONTOUR		
2' CONTOUR		
SPECIFIED CONTOUR		
FEMA FLOOD PLAIN		
WETLAND LINE		
SPOT ELEVATION	000.0	000.0
EMERGENCY OVERFLOW		E.O.F. 000.0
SILT FENCE		
TREE FENCE		
GRADING LIMITS		
TREELINE		
SOIL BORING		TB

WETLAND SUMMARY

WETLAND FILL = 1738 SF

NOTE: WETLAND FILL TOTAL IS LESS THAN THE DEMINIMUS AMOUNT; NO WETLAND REPLACEMENT WILL BE REQUIRED

CALL BEFORE YOU DIG

811 Know what's below. Call before you dig.

The subsurface utility information shown on this plan is utility Quality Level D. This quality level was determined according to the guidelines of CI/ASCE 38-02, entitled "Standard Guideline for the Collection and Depiction of Existing Subsurface Utility Data."

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Print Name: Brian J. Krystofiak, P.E.
Signature: [signature]
Date: 3/08/17 License #: 25063

Drawn: LC
Designed: BJK
Date: 3/08/17

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Ramsey, MN

GRADING INDEX

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149TH AVENUE NW

149TH CURVE NW

149TH COURT

QUINTANA STREET NW

RABBIT STREET NW

QUINTANA CIRCLE NW

BUNKER LAKE BLVD.

GRAVEL CONSTRUCTION ENTRANCE

OUTLOT F

OUTLOT G

OUTLOT H

OUTLOT H

RETAINING WALL #1

RETAINING WALL #2

BURLINGTON NORTHERN INC.

US HIGHWAY NO. 10 & 169

SEE SHEET 11

LEGEND

	EXISTING	PROPOSED
PROPERTY LINE		
EASEMENT LINE		
CURB LINE		
BITUMINOUS		
CONCRETE		
SANITARY SEWER		
STORM SEWER		
WATER MAIN		
OVERHEAD UTILITY		
STORM CATCH BASIN		DENOTES INLET PROTECTION
STORM MANHOLE		
OUTLET CONTROL STRUCTURE		
MANHOLE		
HYDRANT		
GATE VALVE		
TELEVISION BOX		
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FENCE		
10' CONTOUR		
2' CONTOUR		
SPECIFIED CONTOUR		
FEMA FLOOD PLAIN		
WETLAND LINE		
SPOT ELEVATION	00.0	00.0
EMERGENCY OVERFLOW		E.O.F. 000.0
SILT FENCE		
TREE FENCE		
GRADING LIMITS		
TREELINE		
SOIL BORING		TB

0 25 50 100
(IN FEET)

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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

Print Name: Brian J. Krystofiak, P.E.
Signature:
Date: 3/08/17 License #: 25063

Drawn: LC
Designed: BJK
Date: 3/08/17

Revisions:
1. 5/24/17 Per City Comments
2. 6/23/17 Per City Comments
3. 4/13/18 Revise Street names, B12L15-28 & B13L1-13 & add NE Trail
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RIVERSTONE DEVELOPMENT, LLC.
14015 Sunfish Lake B, Suite 400
Ramsey, MN 55303

RIVERSTONE
Ramsey, MN

PRELIMINARY GRADING & EROSION CONTROL PLAN

10 of 16

[Save Date: 12/02/19] F:\jobs\6421 - 6440\6435 - ramsey site\cad c3d\engineering\preliminary\6435_gr.dwg

NWL = 866.5
OUTLET = 866.8
100 YR HWL = 869.2

OUTLOT E

SEE SHEET 12

150TH LANE NW

10' BITUMINOUS TRAIL

INFILTRATION SWALE

TIGER STREET NW

SNOWY OWL STREET NW

RABBIT STREET NW

QUINTANA STREET NW

149TH COURT

PUMA STREET N. W.

SEE SHEET 10

LEGEND

	EXISTING	PROPOSED
PROPERTY LINE		
EASEMENT LINE		
CURB LINE		
BITUMINOUS		
CONCRETE		
SANITARY SEWER		
STORM SEWER		
WATER MAIN		
OVERHEAD UTILITY		
STORM CATCH BASIN		DENOTES INLET PROTECTION
STORM MANHOLE		
OUTLET CONTROL STRUCTURE		
MANHOLE	HS SAN	
HYDRANT		
GATE VALVE	GV	
TELEVISION BOX	TV	
TELEPHONE BOX	TB	
UTILITY POLE		
RETAINING WALL		
FENCE		
10' CONTOUR		
2' CONTOUR		
SPECIFIED CONTOUR		
FEMA FLOOD PLAIN		
WETLAND LINE		
SPOT ELEVATION		00.0
EMERGENCY OVERFLOW		E.O.F. 000.0
SILT FENCE		
TREE FENCE		
GRADING LIMITS		
TREELINE		
SOIL BORING		

0 25 50 100
(IN FEET)

BENCHMARK

1. Anoka County Benchmark No. 3076
   Elev.= 890.186 (NAVD 88)
2. Anoka County Benchmark No. 2078
   Elev.= 899.499 (NAVD 88)

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• engineering
• surveying

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11 of 16

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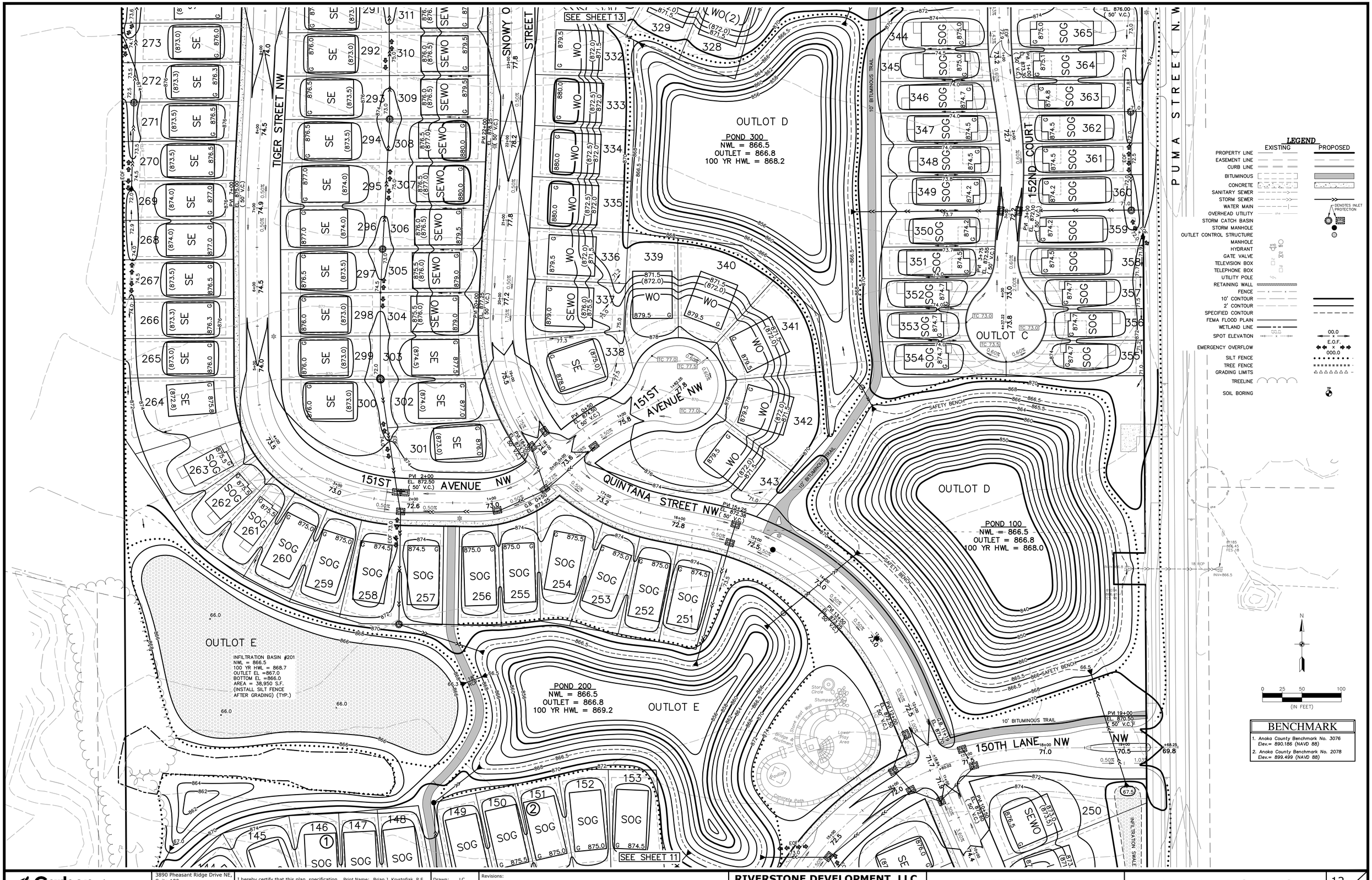

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ALPINE DRIVE N.W.

ALPINE DRIVE N.W.

RETAINING WALL #4

10' BITUMINOUS TRAIL

TOP OF BERM

POND 400
NWL = 868.5
100 YR HWL = 869.6

OUTLOT B

WETLAND 1
NWL = 867.5
100 YR HWL = 868.4

TOP OF BERM

WETLAND FILL
1738 SF

10' BITUMINOUS TRAIL

OUTLOT A

RETAINING WALL #3

152ND LANE NW

152ND AVENUE NW

152ND COURT

151ST AVENUE NW

SNOWY OWL STREET NW

TIGER STREET NW

PUMA STREET N.W.

OUTLOT D

POND 300
NWL = 866.5
OUTLET = 866.8
100 YR HWL = 868.2

OUTLOT C

SEE SHEET 12

N

0 25 50 100
(IN FEET)

BENCHMARK

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   Elev.= 890.186 (NAVD 88)
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LEGEND

	EXISTING	PROPOSED
PROPERTY LINE		
EASEMENT LINE		
CURB LINE		
BITUMINOUS		
CONCRETE		
SANITARY SEWER		
STORM SEWER		
WATER MAIN		
OVERHEAD UTILITY		
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STORM MANHOLE		
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GATE VALVE		
TELEVISION BOX		
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SILT FENCE		
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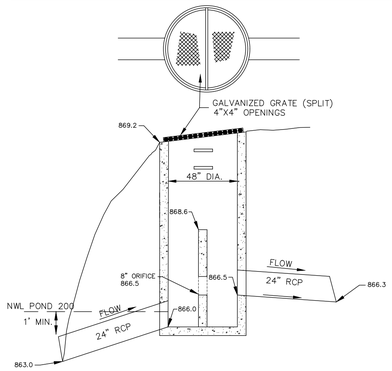
PRELIMINARY GRADING & EROSION CONTROL PLAN

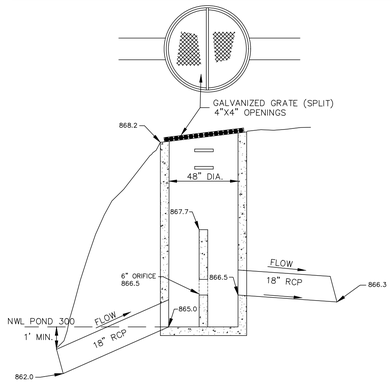
13 of 16

Save Date: 12/02/19 | F:\jobs\6421 - 6440\6435 - ramsey site\cad c3d\engineering\preliminary\6435_gr.dwg

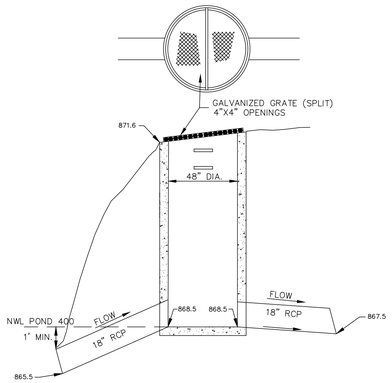
OUTLET CONTROL STRUCTURE POND 200



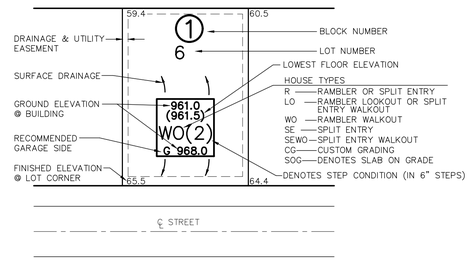
OUTLET CONTROL STRUCTURE POND 300



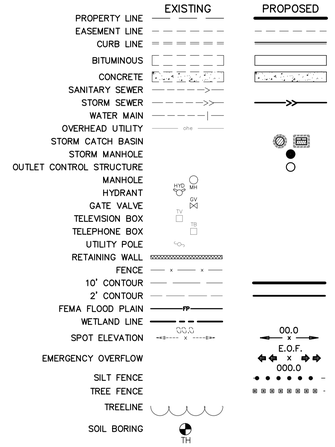
OUTLET CONTROL STRUCTURE POND 400



GRADING PLAN LOT KEY

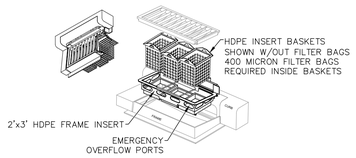


LEGEND



INFRASAFE – 2'x3' DEBRIS COLLECTION DEVICE

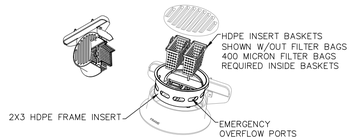
AS MANUFACTURED BY ROYAL ENVIRONMENTAL SYSTEMS



– MEETS MN/DOT SPECIFICATION 3891.F
"STORM DRAIN INLET PROTECTION – FILTER BAG INSERT"
– DESIGNED FOR NEENAH R–3067 OR R–3290 SERIES

INFRASAFE – 27" DEBRIS COLLECTION DEVICE

AS MANUFACTURED BY ROYAL ENVIRONMENTAL SERVICES



– MEETS MN/DOT SPECIFICATION 3891.F
"STORM DRAIN INLET PROTECTION – FILTER BAG INSERT"
– DESIGNED FOR NEENAH R–3250–A OR R–3250–1 (MNDOT 801) FRAME CASTING

TABLE A
MODIFIED CLASS 5 SPECIFICATIONS

% PASSING

1"	100
3/4"	90 – 100
3/8"	50 – 80
No.4	35 – 70
No.10	20 – 60
No.40	10 – 35
No.200	5 – 10

NOTES:
1. THE AGGREGATE BASE CONSTRUCTION WILL BE ACCEPTED FOR PAYMENT IN ACCORDANCE WITH THE PROVISIONS IN TABLE A.
2. IF THE AGGREGATE BASE FAILS TO MEET THE REQUIREMENTS OF TABLE A THE MATERIAL CAN BE CORRECTED IN PLACE OR REMOVED AND REPLACED WITH MATERIAL THAT MEET THE REQUIREMENTS OF TABLE A.
3. IN THE EVENT THAT RECYCLED MATERIAL IS USE IT MUST MEET MNDOT REQUIREMENTS FOR RECYCLED BASE.

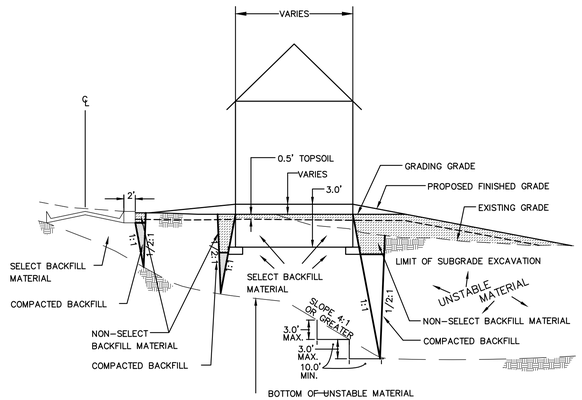
APPROVED: 2 – 2003

City of RAMSEY

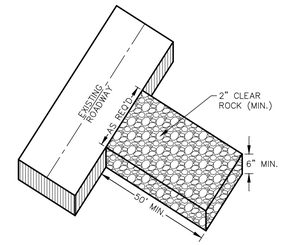
STANDARD DETAILS: MODIFIED CLASS 5 SPECIFICATIONS

CITY PLATE No. STR-26

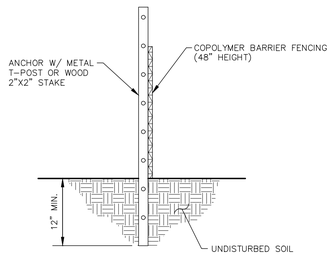
SUBGRADE CORRECTION



ROCK CONSTRUCTION ENTRANCE



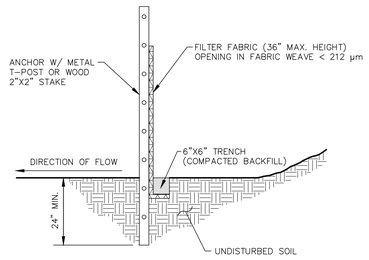
TREE FENCE



NOTES:

1. TREE FENCING SHALL BE PLACED A MINIMUM OF 1 FOOT PER CALIPER INCH OF TREE DIAMETER FROM TREE(S) THAT IS/ARE TO BE SAVED.
2. ANCHOR POST MAY BE SPACED UP TO 10 FEET APART.
3. SECURELY ATTACH TREE FENCE TO ANCHOR POSTS W/ MINIMUM OF TWO ATTACHMENTS PER POST.
4. SEE MNDOT SPECIFICATION 2572.

SILT FENCE



NOTES:

1. DIG A 6"X6" TRENCH ALONG THE INTENDED SILT FENCE LINE.
2. DRIVE ALL ANCHOR POSTS INTO THE GROUND AT THE DOWNHILL SIDE OF THE TRENCH.
3. POSTS SHALL BE SPACED A MAXIMUM OF 6 FEET APART.
4. LAY OUT SILT FENCE ALONG THE UPHILL SIDE OF THE ANCHOR POSTS AND BACK FILL 6"X6" TRENCH.
5. SECURELY ATTACH SILT FENCE TO ANCHOR POSTS W/ MINIMUM OF THREE ATTACHMENTS PER POST.
6. SEE MNDOT SPECIFICATIONS 2573 & 3886.

TURF ESTABLISHMENT

TURF ESTABLISHMENT SHALL APPLY TO ALL DISTURBED AREAS AND SHALL BE ACCORDING TO MnDOT STANDARD SPECIFICATIONS FOR CONSTRUCTION (LATEST EDITION) EXCEPT AS MODIFIED BELOW.

TURF ESTABLISHMENT SHALL OCCUR AS SOON AS POSSIBLE BUT IN NO CASE MORE THAN 7 DAYS.

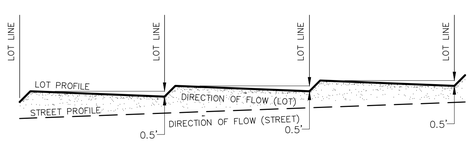
SEED: MnDOT MIXTURE 25–141 AT 60 POUNDS PER ACRE.

DORMANT SEED: SHALL BE APPLIED AT TWICE THE NORMAL RATE AFTER NOVEMBER 1ST.

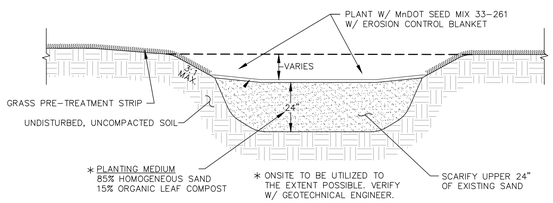
MULCH: TYPE 1 AT 2 TONS PER ACRE (DISK ANCHORED).

FERTILIZER: TYPE 1 10–10–10 AT 200 POUNDS PER ACRE.

LOT BENCHING DETAIL

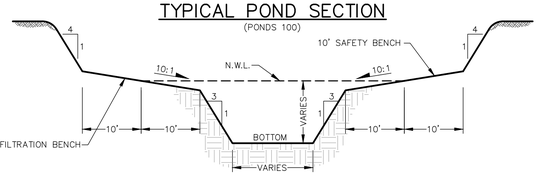


INFILTRATION BASIN



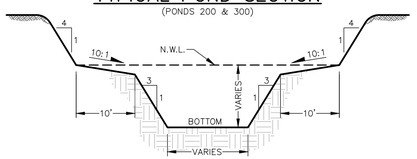
TYPICAL POND SECTION

(PONDS 100)



TYPICAL POND SECTION

(PONDS 200 & 300)



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RIVERSTONE
Ramsey, MN

DETAILS

14 of 16

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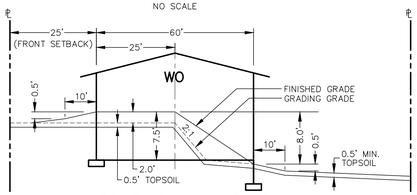
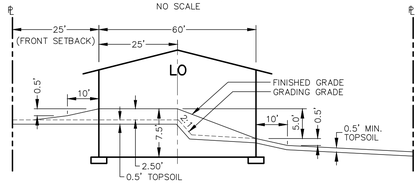
65' LOTS

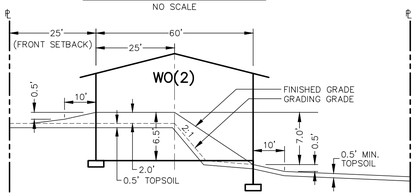
WALKOUT
NO SCALE



LOOKOUT
NO SCALE



MODIFIED WALKOUT
NO SCALE



MODIFIED LOOKOUT
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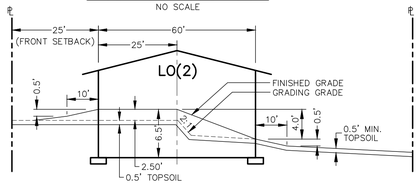

RAMBLER
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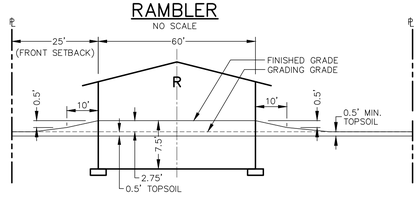
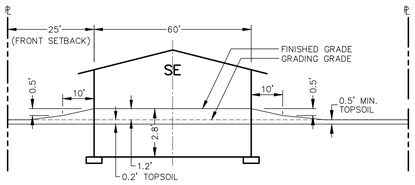
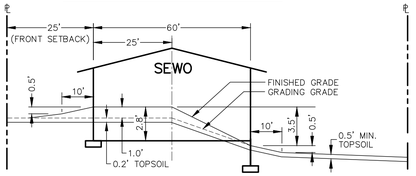


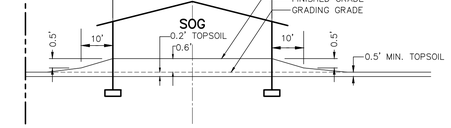
SE
NO SCALE



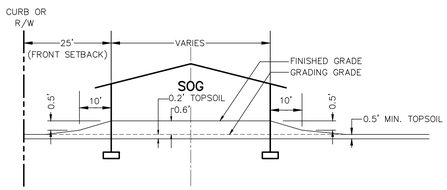
SPLIT ENTRY WALKOUT
NO SCALE



50' VILLAS
SINGLE FAMILY HOLDOWNS

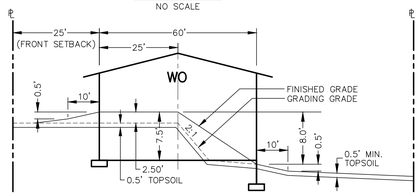


40 'LOTS
DETACHED TOWNHOME HOLDDOWNS

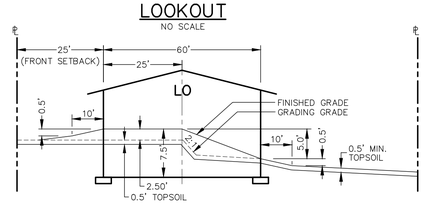


50' LOTS

WALKOUT
NO SCALE



LOOKOUT
NO SCALE



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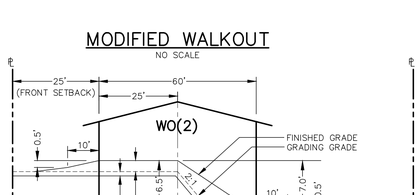
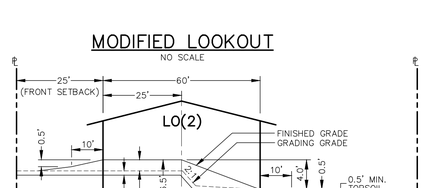


MODIFIED LOOKOUT
NO SCALE



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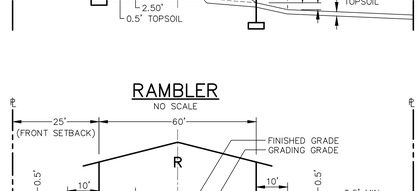

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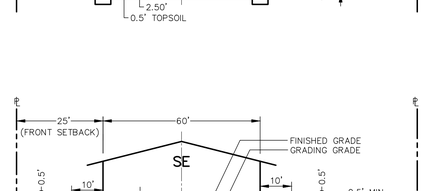

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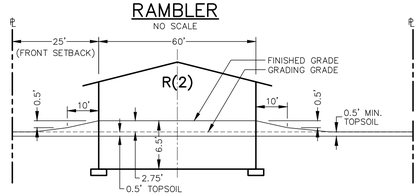
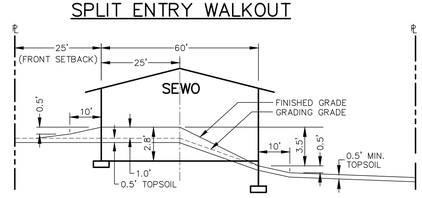


SPLIT ENTRY WALKOUT



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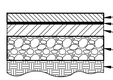
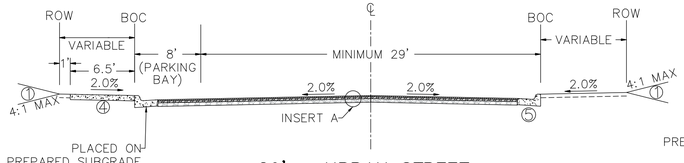


1.5" TYPE SP 9.5 WEARING COURSE MIXTURE (SPWEA340B)
BITUMINOUS MATERIAL FOR TACK COAT
2" TYPE SP 12.5 NON WEARING COURSE MIXTURE (SPNWB330B)
MIN. 4" MODIFIED CLASS 5 AGGREGATE BASE (2)
PLACED ON PREPARED SUBGRADE (3)

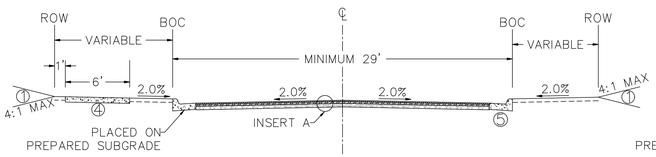
REFERENCE NOTES:

1. GRADE TO MATCH EXISTING SURFACE MINIMUM 4" COMMON TOPSOIL BORROW IN BOULEVARDS. SEE CITY PLATE No. ERO-6
2. CLASS 5 GRADATION IS MODIFIED PER CITY PLATE No. STR-26
3. CONTRACTOR SHALL SCARIFY AND COMPACT, ACCORDING TO THE SPECIFIED DENSITY METHOD, THE TOP 12 INCHES OF MATERIAL PRIOR TO PLACING ANY FILL MATERIALS OR CLASS 5 AGGREGATE BASE.
4. ALL SIDEWALKS SHALL BE 6" THICK, 6' WIDE, PLACED ON PREPARED SUBGRADE.
5. CONCRETE CURB AND GUTTER PER PLAN. SEE CITY PLATE No. STR-1.

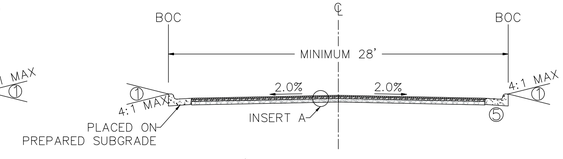
29' – URBAN STREET
W/ PARKING BAY
NOTE: NOT TO SCALE



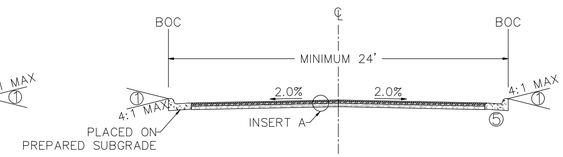
29' – URBAN STREET
NOTE: NOT TO SCALE



28' – PRIVATE STREET
NOTE: NOT TO SCALE



24' – PRIVATE STREET
NOTE: NOT TO SCALE



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Print Name: Brian J. Krystofiak, P.E.
Signature:
Date: 3/08/17 License #: 25063

Drawn: ADB
Designed: BJK
Date: 3/08/17

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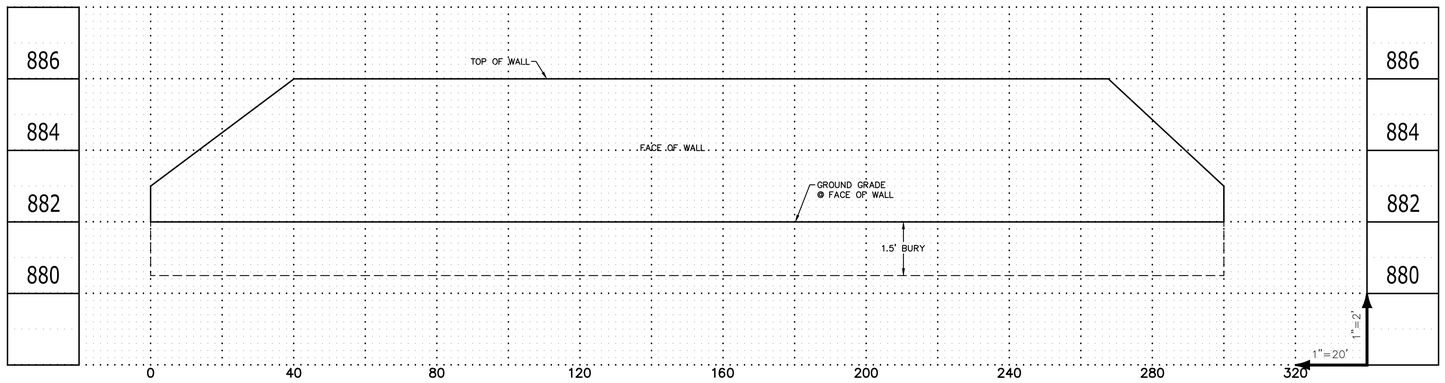
RIVERSTONE
Ramsey, MN

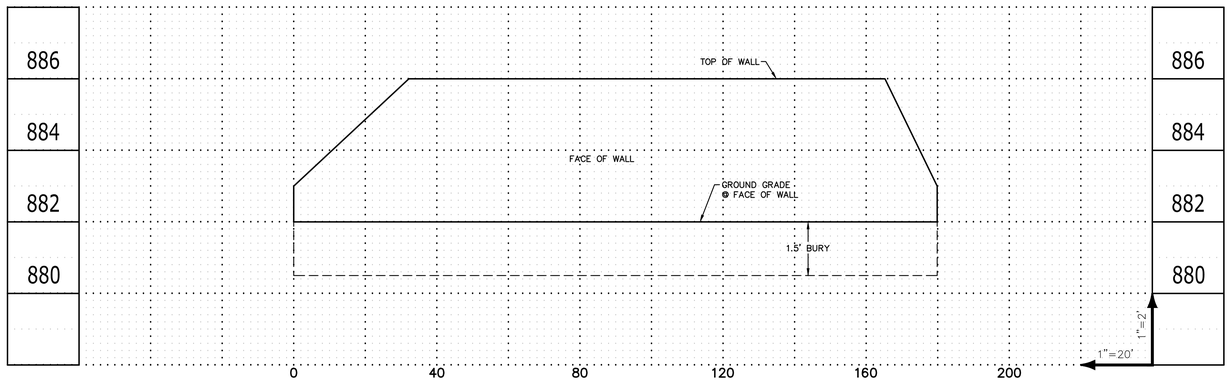
DETAILS

15 of 16

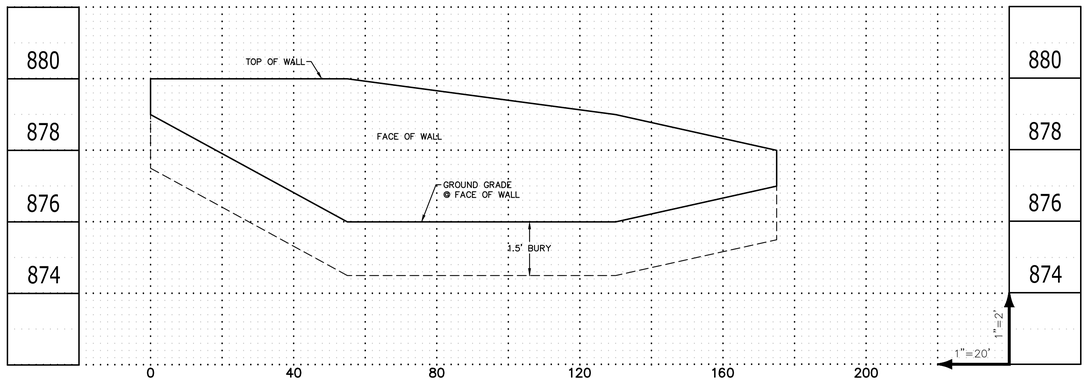
MODULAR RETAINING WALL #1
(1542 SF)



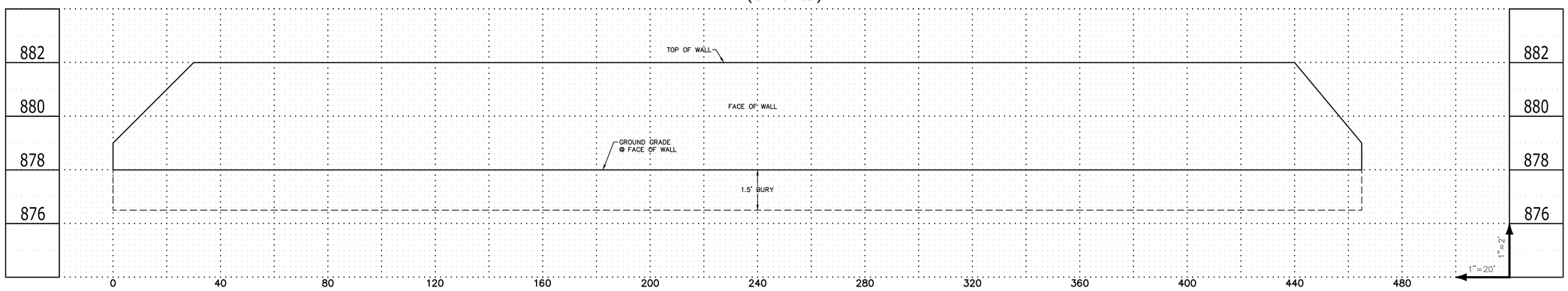
MODULAR RETAINING WALL #2
(919 SF)



MODULAR RETAINING WALL #3
(755 SF)



MODULAR RETAINING WALL #4
(2475 SF)



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RETAINING WALL PROFILES

16 of 16

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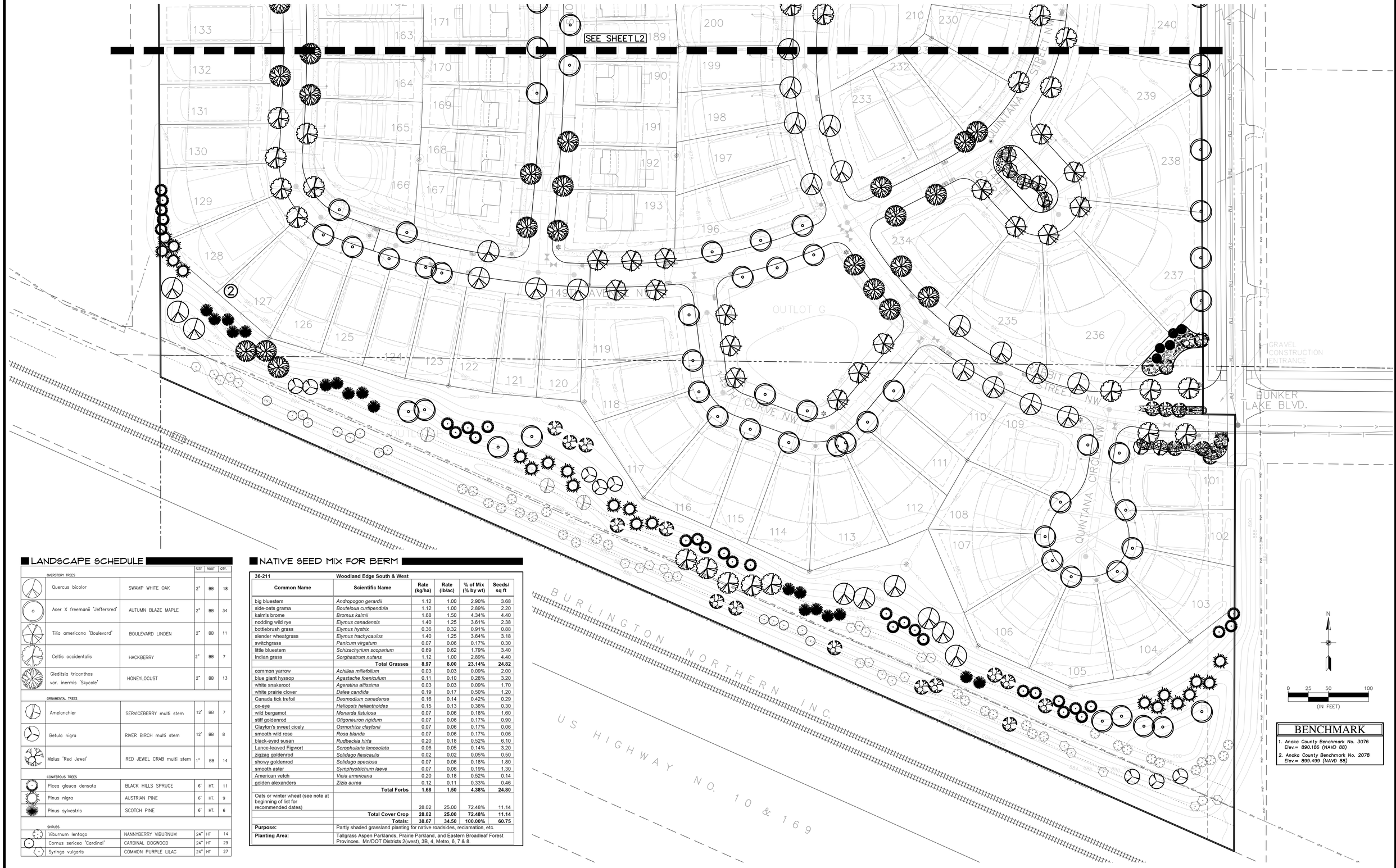

LANDSCAPE SCHEDULE

			SIZE	ROOT	QTY.
	OVERSTORY TREES				
	Quercus bicolor	SWAMP WHITE OAK	2"	BB	18
	Acer X freemanii 'Jeffersred'	AUTUMN BLAZE MAPLE	2"	BB	34
	Tilia americana 'Boulevard'	BOULEVARD LINDEN	2"	BB	11
	Celtis occidentalis	HACKBERRY	2"	BB	7
	Gleditsia tricanthos var. inermis 'Skycole'	HONEYLOCUST	2"	BB	13
	ORNAMENTAL TREES				
	Amelanchier	SERVICEBERRY multi stem	12'	BB	7
	Betula nigra	RIVER BIRCH multi stem	12'	BB	8
	Malus 'Red Jewel'	RED JEWEL CRAB multi stem	1"	BB	14
	CONIFEROUS TREES				
	Picea glauca densata	BLACK HILLS SPRUCE	6'	HT.	11
	Pinus nigra	AUSTRIAN PINE	6'	HT.	9
	Pinus sylvestris	SCOTCH PINE	6'	HT.	6
	SHRUBS				
	Viburnum lentago	NANNYBERRY VIBURNUM	24"	HT	14
	Cornus sericea 'Cardinal'	CARDINAL DOGWOOD	24"	HT	29
	Syringa vulgaris	COMMON PURPLE LILAC	24"	HT	27

NATIVE SEED MIX FOR BERM

36-211	Woodland Edge South & West				
Common Name	**Scientific Name**	**Rate (kg/ha)**	**Rate (lb/ac)**	**% of Mix (% by wt)**	**Seeds/ sq ft**
big bluestem	*Andropogon gerardii*	1.12	1.00	2.90%	3.68
side-oats grama	*Bouteloua curtipendula*	1.12	1.00	2.89%	2.20
kalm's brome	*Bromus kalmii*	1.68	1.50	4.34%	4.40
nodding wild rye	*Elymus canadensis*	1.40	1.25	3.61%	2.38
bottlebrush grass	*Elymus hystrix*	0.36	0.32	0.91%	0.88
slender wheatgrass	*Elymus trachycaulus*	1.40	1.25	3.64%	3.18
switchgrass	*Panicum virgatum*	0.07	0.06	0.17%	0.30
little bluestem	*Schizachyrium scoparium*	0.69	0.62	1.79%	3.40
Indian grass	*Sorghastrum nutans*	1.12	1.00	2.89%	4.40
	Total Grasses	**8.97**	**8.00**	**23.14%**	**24.82**
common yarrow	*Achillea millefolium*	0.03	0.03	0.09%	2.00
blue giant hyssop	*Agastache foeniculum*	0.11	0.10	0.28%	3.20
white snakeroot	*Ageratina altissima*	0.03	0.03	0.09%	1.70
white prairie clover	*Dalea candida*	0.19	0.17	0.50%	1.20
Canada tick trefoil	*Desmodium canadense*	0.16	0.14	0.42%	0.29
ox-eye	*Heliopsis helianthoides*	0.15	0.13	0.38%	0.30
wild bergamot	*Monarda fistulosa*	0.07	0.06	0.18%	1.60
stiff goldenrod	*Oligoneuron rigidum*	0.07	0.06	0.17%	0.90
Clayton's sweet cicely	*Osmorhiza claytonii*	0.07	0.06	0.17%	0.06
smooth wild rose	*Rosa blanda*	0.07	0.06	0.17%	0.06
black-eyed susan	*Rudbeckia hirta*	0.20	0.18	0.52%	6.10
Lance-leaved Figwort	*Scrophularia lanceolata*	0.06	0.05	0.14%	3.20
zigzag goldenrod	*Solidago flexicaulis*	0.02	0.02	0.05%	0.50
showy goldenrod	*Solidago speciosa*	0.07	0.06	0.18%	1.80
smooth aster	*Symphyotrichum laeve*	0.07	0.06	0.19%	1.30
American vetch	*Vicia americana*	0.20	0.18	0.52%	0.14
golden alexanders	*Zizia aurea*	0.12	0.11	0.33%	0.46
	Total Forbs	**1.68**	**1.50**	**4.38%**	**24.80**
Oats or winter wheat (see note at beginning of list for recommended dates)		28.02	25.00	72.48%	11.14
	Total Cover Crop	**28.02**	**25.00**	**72.48%**	**11.14**
	Totals:	**38.67**	**34.50**	**100.00%**	**60.75**
Purpose:	Partly shaded grassland planting for native roadsides, reclamation, etc.				
Planting Area:	Tallgrass Aspen Parklands, Prairie Parkland, and Eastern Broadleaf Forest Provinces. Mn/DOT Districts 2(west), 3B, 4, Metro, 6, 7 & 8.				

BENCHMARK

1. Anoka County Benchmark No. 3076 Elev.= 890.186 (NAVD 88)
2. Anoka County Benchmark No. 2078 Elev.= 899.499 (NAVD 88)

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Print Name: Ryan J. Ruttger
Signature:
Date: 12/04/19 License #: 56346

Drawn: SDB
Designed: SDB
Date: 04/13/18

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RIVERSTONE
Ramsey, MN

LANDSCAPE PLAN

L1 of 5

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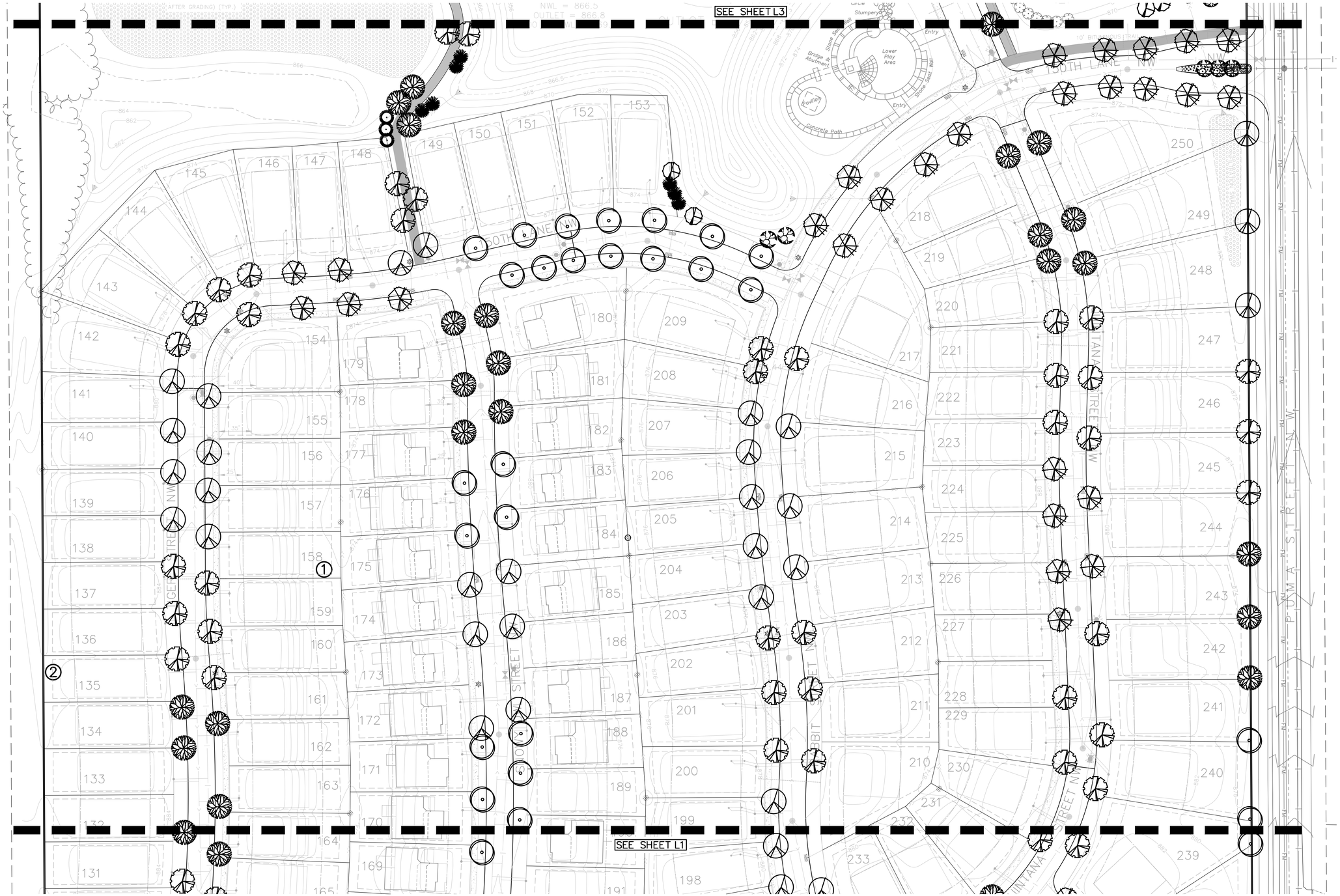
LANDSCAPE SCHEDULE

			SIZE	ROOT	QTY.
	OVERSTORY TREES				
	Quercus bicolor	SWAMP WHITE OAK	2"	BB	28
	Acer X freemanii 'Jeffersred'	AUTUMN BLAZE MAPLE	2"	BB	24
	Tilia americana 'Boulevard'	BOULEVARD LINDEN	2"	BB	27
	Celtis occidentalis	HACKBERRY	2"	BB	39
	Gleditsia tricanthos var. inermis 'Skycole'	HONEYLOCUST	2"	BB	22
	ORNAMENTAL TREES				
	Amelanchier	SERVICEBERRY multi stem	12'	BB	2
	Betula nigra	RIVER BIRCH multi stem	12'	BB	–
	Malus 'Red Jewel'	RED JEWEL CRAB multi stem	1"	BB	5
	CONIFEROUS TREES				
	Picea glauca densata	BLACK HILLS SPRUCE	6'	HT.	3
	Pinus nigra	AUSTRIAN PINE	6'	HT.	–
	Pinus sylvestris	SCOTCH PINE	6'	HT.	7
	SHRUBS				
	Viburnum lentago	NANNYBERRY VIBURNUM	24"	HT	–
	Cornus sericea 'Cardinal'	CARDINAL DOGWOOD	24"	HT	–
	Syringa vulgaris	COMMON PURPLE LILAC	24"	HT	–



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(IN FEET)

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Ramsey, MN

LANDSCAPE PLAN

L2 of 5

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LANDSCAPE SCHEDULE

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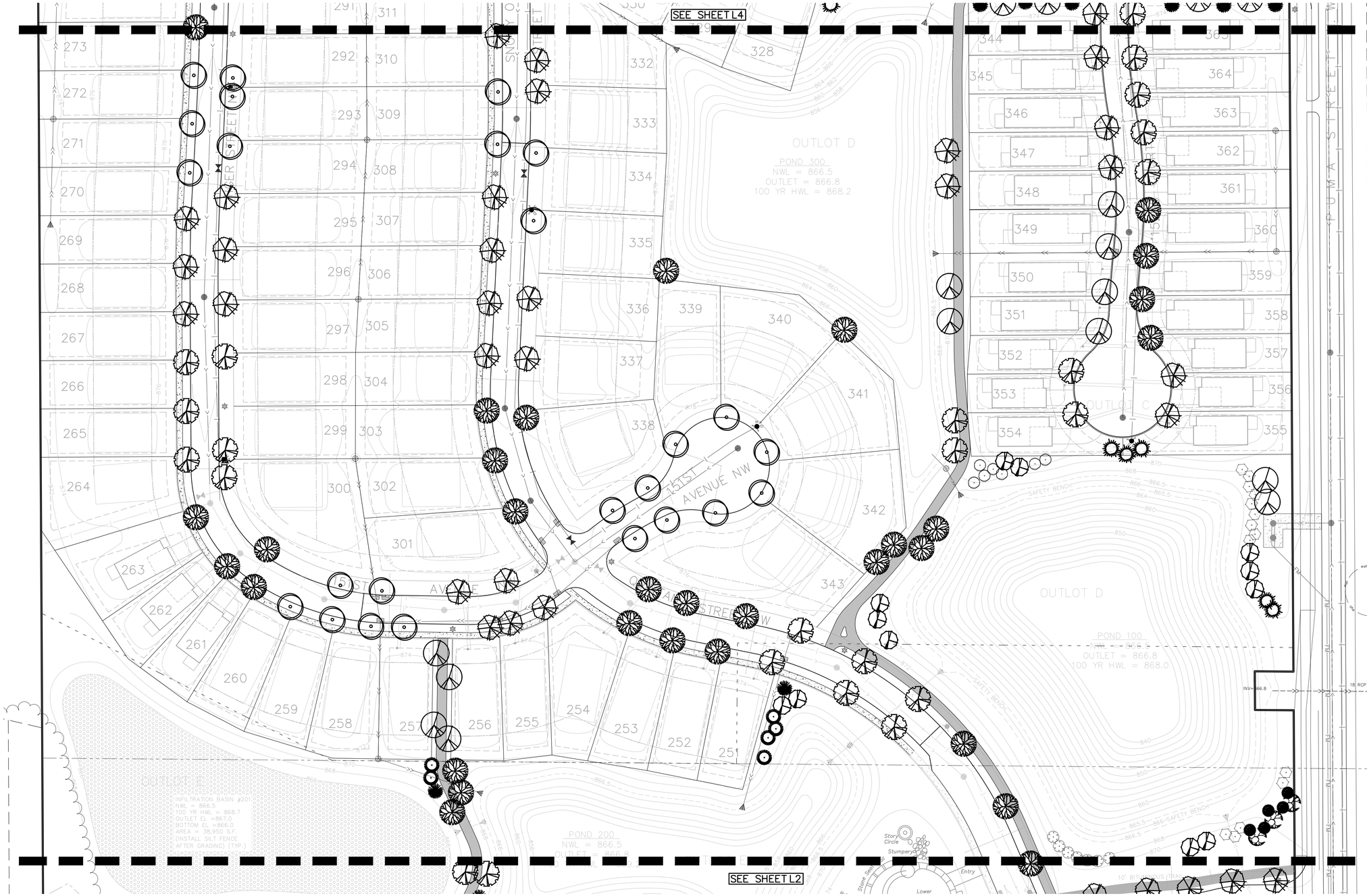
OVERSTORY TREES					
	Quercus bicolor	SWAMP WHITE OAK	2"	BB	12
	Acer X freemanii 'Jeffersred'	AUTUMN BLAZE MAPLE	2"	BB	25
	Tilia americana 'Boulevard'	BOULEVARD LINDEN	2"	BB	27
	Celtis occidentalis	HACKBERRY	2"	BB	20
	Gleditsia tricanthos var. inermis 'Skycole'	HONEYLOCUST	2"	BB	30
ORNAMENTAL TREES					
	Amelanchier	SERVICEBERRY multi stem	12'	BB	12
	Betula nigra	RIVER BIRCH multi stem	12'	BB	–
	Malus 'Red Jewel'	RED JEWEL CRAB multi stem	1"	BB	3
CONFEROUS TREES					
	Picea glauca densata	BLACK HILLS SPRUCE	6'	HT.	6
	Pinus nigra	AUSTRIAN PINE	6'	HT.	5
	Pinus sylvestris	SCOTCH PINE	6'	HT.	2
SHRUBS					
	Viburnum lentago	NANNYBERRY VIBURNUM	24"	HT	7
	Cornus sericea 'Cardinal'	CARDINAL DOGWOOD	24"	HT	7
	Syringa vulgaris	COMMON PURPLE LILAC	24"	HT	14



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PRELIMINARY LANDSCAPE PLAN

L3 of 5

[Save Date: 12/06/19] F:\jobs\6421 - 6440\6435 - ramsey site\cad c3d\la\6435_lscp.dwg

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	OVERSTORY TREES				
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	Celtis occidentalis	HACKBERRY	2"	BB	25
	Gleditsia tricanthos var. inermis 'Skycole'	HONEYLOCUST	2"	BB	19
	ORNAMENTAL TREES				
	Amelanchier	SERVICEBERRY multi stem	12'	BB	–
	Betula nigra	RIVER BIRCH multi stem	12'	BB	–
	Malus 'Red Jewel'	RED JEWEL CRAB multi stem	1"	BB	–
	CONIFEROUS TREES				
	Picea glauca densata	BLACK HILLS SPRUCE	6'	HT.	8
	Pinus nigra	AUSTRIAN PINE	6'	HT.	3
	Pinus sylvestris	SCOTCH PINE	6'	HT.	8
	SHRUBS				
	Viburnum lentago	NANNYBERRY VIBURNUM	24"	HT	–
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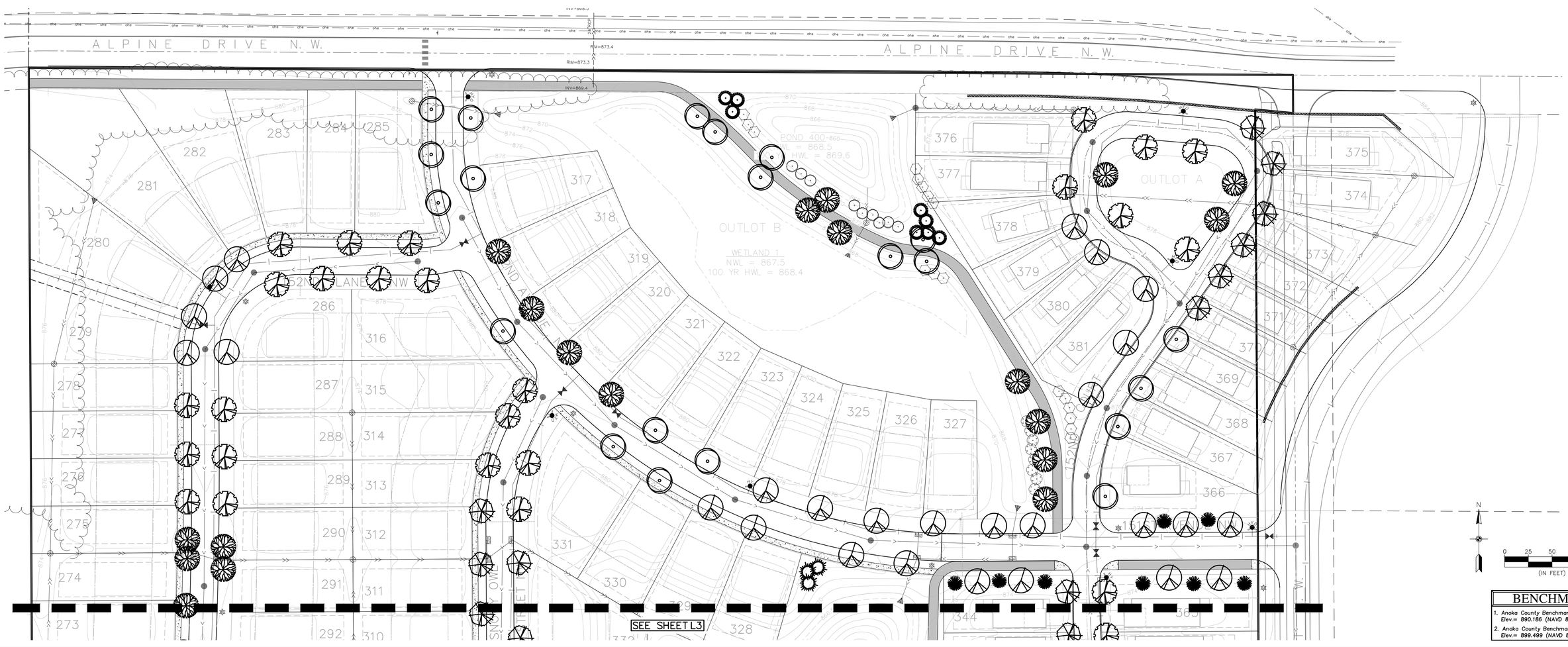

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PRELIMINARY LANDSCAPE PLAN

L4 of 5

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CITY OF RAMSEY REQUESTED NOTES:

1. CONTRACTOR SHALL GUARANTEE NEW PLANT MATERIAL THROUGH ONE CALENDAR YEARS FROM THE DATE OF LANDSCAPE ARCHITECT ACCEPTANCE WITH ALL REPLACEMENTS TO BE PROVIDED AT NO ADDITIONAL COST TO THE OWNER. THE CITY IS REQUIRING AN ADDITIONAL TWO YEARS (3 TOTAL) FOR ALL TREES AT NO ADDITIONAL COST TO THE OWNER.
2. TREES SHALL NOT BE PLANTED WITHIN THE VISION TRIANGLE AS DEFINED IN CITY CODE 117-348
3. ALL TREES IN ISLANDS/CENTER MEDIAN SHALL BE PRIVATELY MAINTAINED PER THE PER THE HOME OWNERS ASSOCIATION DOCTRINE
4. TOPSOIL MEETING THE CITY'S SPECIFICATION SHALL BE REQUIRED PER EACH LOT. COPIES OF THE LOAD TICKET SHALL BE PROVIDED AND CITY INSPECTION IS REQUIRED PRIOR TO INSTALLATION OF SOD.
5. NO TOPSOIL (OR OTHER FILL) SHALL BE PLACED WITHIN ANY WETLAND OR WETLAND SETBACK AREA.
6. IRRIGATION SYSTEM SHALL BE DESIGN BUILT BY THE CONTRACTOR AND SHALL UTILIZE MATCH PRECIPITATION HEADS, HEAD TO HEAD COVERAGE AND WEATHER COMPENSATING SMART CONTROLLER.

GENERAL NOTES:

1. LANDSCAPE CONTRACTOR TO VERIFY ALL UTILITY LOCATIONS ON THE PROPERTY WITH THE GENERAL CONTRACTOR AND BY GOPHER STATE ONE CALL PRIOR TO STAKING PLANT LOCATIONS.
2. COORDINATE THE PHASES OF CONSTRUCTION AND PLANTING INSTALLATION WITH OTHER CONTRACTORS WORKING ON THE SITE.
3. WHERE EXISTING TREES AND/OR SIGNIFICANT SHRUB MASSINGS ARE FOUND ON THE SITE WHETHER SHOWN ON THE DRAWINGS OR NOT, THEY SHALL BE PROTECTED AND SAVED UNLESS NOTED TO BE REMOVED AND/OR ARE WITHIN THE GRADING LIMITS. ANY QUESTION REGARDING WHETHER PLANT MATERIAL SHOULD OR SHOULD NOT REMAIN SHOULD BE BROUGHT TO THE ATTENTION OF THE LANDSCAPE ARCHITECT PRIOR TO REMOVAL
4. ALL EXISTING TREES TO REMAIN SHALL BE FERTILIZED AND PRUNED TO REMOVE DEAD WOOD AND DAMAGED OR RUBBING BRANCHES.
5. BB TREES AND SHRUBS ARE BALLED AND BURLAPPED.
6. NO PLANT MATERIAL SUBSTITUTIONS WILL BE ACCEPTED UNLESS APPROVAL IS REQUESTED OF THE LANDSCAPE ARCHITECT BY THE LANDSCAPE CONTRACTOR PRIOR TO SUBMISSION OF BID AND/OR QUOTATION.
7. ALL PLANT MATERIAL SHALL COMPLY WITH THE LATEST ADDITION OF THE AMERICAN STANDARD FOR NURSERY STOCK, AMERICAN ASSOCIATION OF NURSERYMEN.
8. THE CONTRACTOR IS RESPONSIBLE FOR ON-GOING MAINTENANCE OF ALL NEWLY INSTALLED MATERIALS UNTIL TIME OF OWNER ACCEPTANCE. ANY ACTS OF VANDALISM OR DAMAGE WHICH MAY OCCUR PRIOR TO OWNER ACCEPTANCE SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR.
9. CONTRACTOR SHALL PROVIDE A WRITTEN REQUEST FOR THE OWNER ACCEPTANCE INSPECTION.
10. WARRANTY FOR THE LANDSCAPE MATERIALS SHALL BEGIN ON THE DATE OF ACCEPTANCE BY THE LANDSCAPE ARCHITECT AFTER THE COMPLETION OF PLANTING ALL LANDSCAPE MATERIALS. NO PARTIAL ACCEPTANCE WILL BE CONSIDERED.
11. CONTRACTOR SHALL GUARANTEE NEW PLANT MATERIAL THROUGH ONE CALENDAR YEARS FROM THE DATE OF LANDSCAPE ARCHITECT ACCEPTANCE WITH ALL REPLACEMENTS TO BE PROVIDED AT NO ADDITIONAL COST TO THE OWNER. THE CITY IS REQUIRING AN ADDITIONAL TWO YEARS (3 TOTAL) FOR ALL TREES AT NO ADDITIONAL COST TO THE OWNER.

LANDSCAPE SCHEDULE

KEY	BOTANICAL NAME	COMMON NAME	SIZE	ROOT	QTY.
	DECIDUOUS TREES				
	Quercus bicolor	SWAMP WHITE OAK	2"	BB	85
	Acer X freemanii 'Jeffersred'	AUTUMN BLAZE MAPLE	2"	BB	104
	Tilia americana 'Boulevard'	BOULEVARD LINDEN	2"	BB	75
	Celtis occidentalis	HACKBERRY	2"	BB	91
	Gleditsia tricanthos var. inermis 'Skycole'	HONEYLOCUST	2"	BB	84

KEY	BOTANICAL NAME	COMMON NAME	SIZE	ROOT	QTY.
	ORNAMENTAL TREES				
	Amelanchier	SERVICEBERRY multi stem	12'	BB	21
	Betula nigra	RIVER BIRCH multi stem	12'	BB	8
	Malus 'Red Jewel'	RED JEWEL CRAB multi stem	8"	BB	22
KEY	BOTANICAL NAME	COMMON NAME	SIZE	ROOT	QTY.
	CONIFEROUS TREES				
	Picea glauca densata	BLACK HILLS SPRUCE	6'	HT.	28
	Pinus nigra	AUSTRIAN PINE	6'	HT.	17
	Pinus sylvestris	SCOTCH PINE	6'	HT.	23

KEY	BOTANICAL NAME	COMMON NAME	SIZE	ROOT	QTY.
	SHRUBS				
	Viburnum lentago	NANNYBERRY VIBURNUM	24"	HT	29
	Cornus sericea 'Cardinal'	CARDINAL DOGWOOD	24"	HT	35
	Syringa vulgaris	COMMON PURPLE LILAC	24"	HT	44

LANDSCAPE REQUIRMENTS

2 TREES PER LOT 2 X 279 = 558 TREES

TOTAL TREES TO BE PLANTED = 558 TREES

PLANTING SPECIFICATIONS:

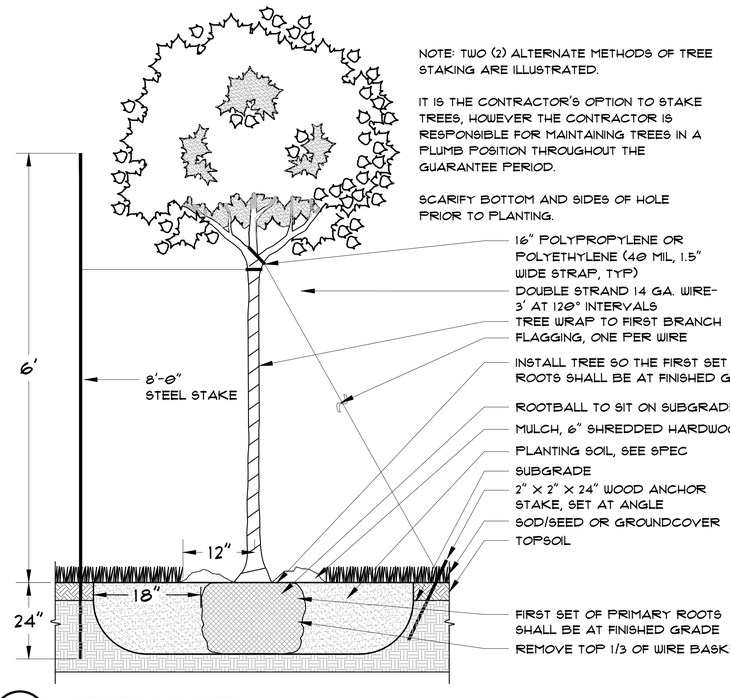
1. PLANTING BED PREPARATION: ALL MASS PLANTING BEDS SHALL BE TILLED TO A MINIMUM DEPTH OF 10". AMENDMENTS SHALL BE APPLIED AFTER CULTIVATION.
2. BACKFILL SOIL: USE SOIL EXCAVATED FROM PLANTING HOLES & PROVIDE AMENDMENTS. REMOVE ALL DEBRIS AND ROCKS LARGER THAN 3" IN DIA.
9. FERTILIZATION: IT IS RECOMMENDED THAT NEWLY PLANTED TREES AND SHRUBS SHOULD NOT BE FERTILIZED THE FIRST YEAR. IF NECESSARY, BEGIN FERTILIZING TREES AND SHRUBS THE SECOND YEAR AFTER ESTABLISHMENT AT A RATIO AND RATE BASED ON A SOIL TEST.
10. MULCH MATERIAL: AS SPECIFIED ON LANDSCAPE PLANS. MASS MULCH ALL PLANTING BEDS TO 3" DEPTH OVER FIBER MAT WEED BARRIER. ALL PERRENIAL PLANTING BEDS TO RECEIVE 3" DEEP SHREDDED HARDWOOD MULCH WITH NO FIBER WEED MAT BARRIER. ALL DECIDUOUS AND EVERGREEN TREES TO RECEIVE 6" DEEP SHREDDED HARDWOOD MULCH WITH NO MULCH IN DIRECT CONTACT WITH TREE TRUNK.
11. TREE STAKING: IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO STAKE AND/OR GUY THE TREES ACCORDING TO THE DETAILS. IT IS THE CONTRACTOR'S RESPONSIBILITY TO TAKE EVERY STEP NECESSARY TO MAINTAIN THE TREES AND SHRUBS ON AN UPRIGHT AND PLUMB CONDITION AT ALL TIMES UNTIL THE END OF THE PLANT GUARANTEE PERIOD, ESPECIALLY WHERE VANDALISM, SOIL OR WIND CONDITIONS ARE A PROBLEM.
12. TREE WRAPPING: WRAPPING MATERIAL SHALL BE QUALITY, HEAVY WATERPROOF CREPE PAPER MANUFACTURED FOR THIS PURPOSE. WRAP ALL DECIDUOUS TREES IN THE FALL PRIOR TO 12-1 AND REMOVE ALL WRAPPING BY 5-1.
13. RODENT PROTECTION: PROVIDE ON ALL TREES, EXCEPT SPRUCE UNLESS OTHERWISE NOTED.
14. PLANTING PLAN: ALL PROPOSED PLANTS SHALL BE LOCATED CAREFULLY AS SHOWN ON THE PLANS. THE PLAN TAKES PRECEDENCE OVER THE NOTES. RESPECT STATED DIMENSIONS. DO NOT SCALE DRAWINGS.
15. EDGING: EDGING SHALL BE 4" P.V.C COMMERCIAL GRADE EDGING WITH THREE (3) METAL ANCHOR STAKES PER 20 FOOT SECTION, UNLESS OTHERWISE NOTED ON THE PLAN. ALL MASS PLANTING BEDS SHALL HAVE EDGING PLACED BETWEEN MULCH AND ANY ADJACENT TURF AREAS.

PLANTING NOTES:

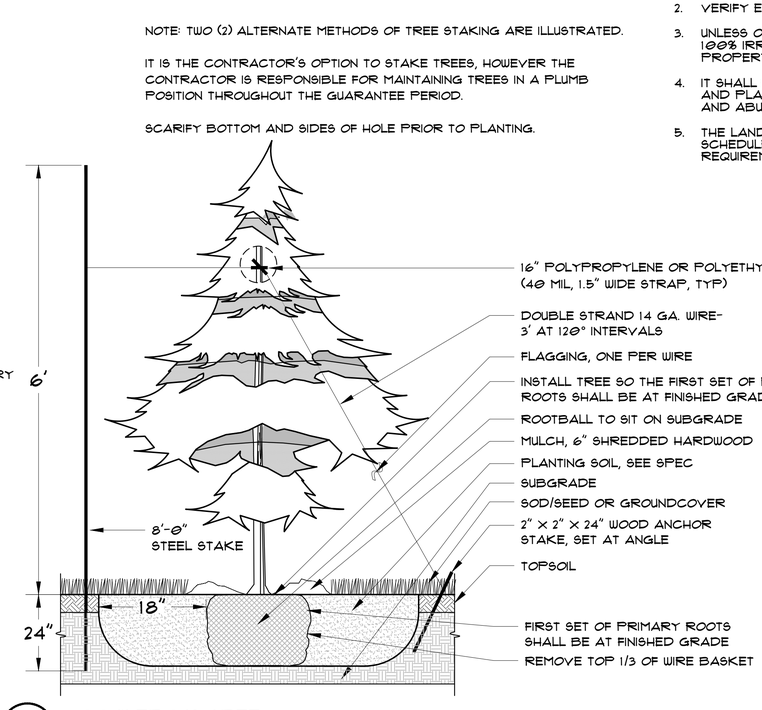
1. NO PLANTING TO BE INSTALLED UNTIL GRADING AND CONSTRUCTION HAS BEEN COMPLETED IN THE IMMEDIATE AREA.
2. ALL PLANT MATERIAL LOCATIONS MUST BE REVIEWED AND APPROVED BY THE LANDSCAPE ARCHITECT PRIOR TO ANY AND ALL DIGGING.
3. IF THE LANDSCAPE CONTRACTOR PERCEIVES AND DEFICIENCIES IN THE PLANT SELECTIONS, SOIL CONDITIONS, OR ANY OTHER SITE CONDITION WHICH MIGHT NEGATIVELY AFFECT PLANT MATERIAL ESTABLISHMENT, SURVIVAL OR GUARANTEE, THEY SHALL BRING THESE DEFICIENCIES TO THE ATTENTION OF THE LANDSCAPE ARCHITECT PRIOR TO INSTALLATION.
4. ADJUSTMENTS IN THE LOCATION OF PROPOSED PLANT MATERIAL MAY BE NEEDED IN THE FIELD. SHOULD AN ADJUSTMENT BE ADVISED, THE LANDSCAPE ARCHITECT MUST BE NOTIFIED.
5. ALL PLANTS TO BE INSTALLED PER PLANTING DETAILS.
6. ONE SHRUB PER TYPE AND SIZE IN EACH PLANTING BED AND EVERY TREE SHOULD BE CLEARLY IDENTIFIED (COMMON OR LATIN NOMENCLATURE) WITH A PLASTIC TAG WHICH SHALL NOT BE REMOVED PRIOR TO OWNER ACCEPTANCE.
7. WHERE SOD/SEED ABUTS PAVED SURFACES, FINISHED GRADE OF SEED/SOD SHALL BE HELD 1" BELOW SURFACE ELEVATION OF TRAIL, SLAB, CURB, ETC.
8. SOD SHALL BE LAID PARALLEL TO THE CONTOURS AND SHALL HAVE STAGGERED JOINTS. ON SLOPES STEEPER THAN 3 : 1 OR IN DRAINAGE SWALES, THE SOD SHALL BE STAKED TO THE GROUND.
9. SEED ALL AREAS DISTURBED DUE TO GRADING OTHER THAN THOSE TO RECEIVE SOD.
10. REPAIR ALL DAMAGE TO PROPERTY FROM PLANTING OPERATORS AT NO COST TO THE OWNER.

IRRIGATION NOTES:

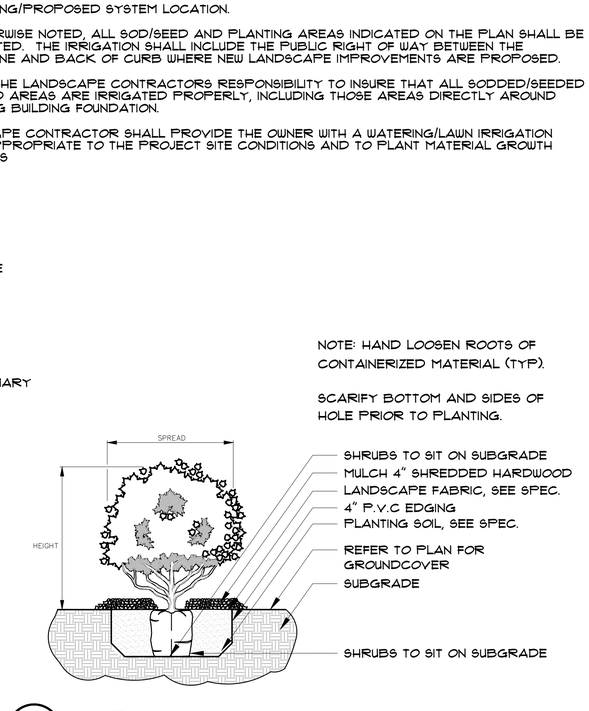
1. LANDSCAPE CONTRACTOR SHALL BE RESPONSIBLE FOR PROVIDING SHOP DRAWINGS ILLUSTRATING IRRIGATION PLANS AND SPECIFICATIONS AS PART OF THE SCOPE OF WORK WHEN BIDDING. THESE SHALL BE APPROVED BY THE LANDSCAPE ARCHITECT PRIOR TO ORDER.
2. VERIFY EXISTING/PROPOSED SYSTEM LOCATION.
3. UNLESS OTHERWISE NOTED, ALL SOD/SEED AND PLANTING AREAS INDICATED ON THE PLAN SHALL BE 100% IRRIGATED. THE IRRIGATION SHALL INCLUDE THE PUBLIC RIGHT OF WAY BETWEEN THE PROPERTY LINE AND BACK OF CURB WHERE NEW LANDSCAPE IMPROVEMENTS ARE PROPOSED.
4. IT SHALL BE THE LANDSCAPE CONTRACTORS RESPONSIBILITY TO INSURE THAT ALL SODDED/SEEDED AND PLANTED AREAS ARE IRRIGATED PROPERLY, INCLUDING THOSE AREAS DIRECTLY AROUND AND ABUTTING BUILDING FOUNDATION.
5. THE LANDSCAPE CONTRACTOR SHALL PROVIDE THE OWNER WITH A WATERING/LAWN IRRIGATION SCHEDULE APPROPRIATE TO THE PROJECT SITE CONDITIONS AND TO PLANT MATERIAL GROWTH REQUIREMENTS



1 L2 DECIDUOUS TREE — LEVEL SITE



2 L2 CONIFEROUS TREE — LEVEL SITE



3 L2 SHRUB — LEVEL SITE

Carlson McCain
• environmental
• engineering
• surveying
3890 Pheasant Ridge Drive NE, Suite 100
Blaine, MN 55449
Phone: (763) 489-7900
Fax: (763) 489-7959
www.carlsonmccain.com

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 Landscape Architect under the laws of the State of Minnesota

Print Name: Ryan J. Ruttger
Signature:
Date: 12/04/19 License #: 56346

Drawn: SDB
Designed: SDB
Date: 04/13/18

Revisions:
1. 5/24/17 Per City Comments
2. 6/23/17 Per City Comments
3. 4/13/18 Revise Street names, B12L15-28 & B13L1-13 & add NE Trail
4. 6/13/18 Per City Comments
5. 12/4/19 Revise Layout Per Owner

RIVERSTONE DEVELOPMENT, LLC.
14015 Sunfish Lake B, Suite 400
Ramsey, MN 55303

RIVERSTONE
Ramsey, MN

PRELIMINARY LANDSCAPE DETAILS

L5 of 5

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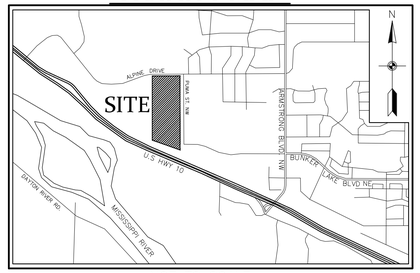
RIVERSTONE
TREE PRESERVATION PLAN
RAMSEY, MINNESOTA

1 / TP1 TREE PRESERVATION PLAN

0 100 200 300

SCALE 1" = 100'

VICINITY MAP



NOT TO SCALE

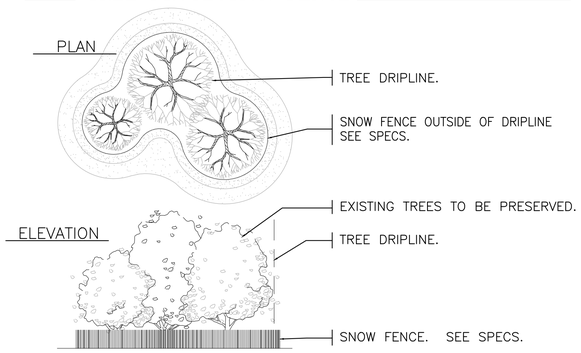
SHEET INDEX

1. COVER
2. TREE PRESERVATION PLAN & TREE TABLES

TREE REMOVAL/REPLACEMENT SUMMARY

REMOVED/SAVED	REPLACEMENT/CREDIT
1. SIGNIFICANT TREES;	
1.1. OAK AND EVERGREEN OVER 4 DBH	
1.2. ALL TREES OVER 8 DBH	
2. REMOVAL THRESHOLD	
2.1. AT LEAST 40% OF THE EXISTING SIGNIFICANT TREE DBH SHALL BE RETAINED ON-SITE	
2.2. FOR EVERY SIGNIFICANT DBH REMOVED ABOVE THE 40%, REPLACE AT 1.25%	
SIGNIFICANT TREES (OAK / EVERGREEN)	374 dbh
SIGNIFICANT TREES (ALL OTHERS)	1884 dbh
TOTAL DBH ON SITE -	2258 dbh
TOTAL (2258 TOTAL- 882 EXEMPT TREES = 1376DBH)	1376 DBH
EXEMPT TREES	882 dbh
40% TO REMAIN ON-SITE	550 dbh
60% ALLOWABLE REMOVAL	826 dbh
TREES REMOVED FOR GRADING	939 dbh
TOTAL REPLACEMENT REQUIRED	113 dbh
REPLACE TREES @ 125%	141 dbh
REPLACEMENT TREES @ 2.5 DBH	57 ADDITIONAL TREES

TREE PROTECTION FENCE



ERECT PROTECTIVE SNOW FENCE PRIOR TO ANY CONSTRUCTION ACTIVITY.
DO NOT STORE ANY EQUIPMENT OR MATERIALS WITHIN PROTECTIVE AREA.
REMOVE THE PROTECTIVE SNOW FENCE ONLY AFTER CONSTRUCTION OPERATIONS ARE COMPLETED.

BENCHMARK

1. Anoka County Benchmark No. 3076 Elev.= 890.186 (NAVD 88)
2. Anoka County Benchmark No. 2078 Elev.= 899.499 (NAVD 88)

Carlson McCain
• environmental
• engineering
• surveying

3890 Pheasant Ridge Drive NE, Suite 100
Blaine, MN 55449
Phone: (763) 489-7900
Fax: (763) 489-7959
www.carlsonmccain.com

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 Landscape Architect under the laws of the State of Minnesota

Print Name: James A. Kalkes
Signature: James A. Kalkes
Date: 06/19/18 License #: 45071

Drawn: JAK
Designed: JAK
Date: 06/19/18

Revisions:
1.

RIVERSTONE DEVELOPMENT, LLC.
14015 Sunfish Lake B, Suite 400
Ramsey, MN 55303

RIVERSTONE
Ramsey, MN

COVER

TP1 of 2

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1 TP2 TREE PRESERVATION PLAN

SCALE 1" = 50'

2 TP2 TREE PRESERVATION PLAN

SCALE 1" = 50'

Tree No.	Tree Species	(DBH)	Saved	Removed	Removed for...
001	Boxelder	8	X		
002	Elm	16	X		
003	Boxelder	9	X		
004.01	Boxelder	15	X		
004.02	Boxelder	12	X		
005	Boxelder	15		X	Grading
006	Boxelder	13		X	Grading
007	Boxelder	10	Off Site		
008	Boxelder	10	Off Site		
009	Boxelder	14	X		
010	Boxelder	12	X		
011	Boxelder	12	X		
012	Elm	10	X		
013	Elm	9	X		
014	Boxelder	11	X		
015	Boxelder	12	X		
016	Boxelder	12		X	Exempt - Trail
017	Boxelder	13		X	Exempt - Trail
018	Boxelder	12		X	Exempt - Trail
019	Boxelder	13		X	Exempt - Trail
020	Boxelder	12	X		
021	Boxelder	10		X	Grading
022	Boxelder	8		X	Grading
023.01	Boxelder	9		X	Exempt - Trail
023.02	Boxelder	8		X	Exempt - Trail
024	Boxelder	8		X	Grading
025	Hackberry	18		X	Grading
026	35' Red Pine	9		X	Exempt - Trail
027	35' Red Pine	9		X	Exempt - Trail
028	Boxelder	8		X	Grading
029	Boxelder	8		X	Exempt - Trail
030.01	25' Red Pine	6		X	Exempt - Trail
030.02	25' Red Pine	6		X	Exempt - Trail
031	40' Red Pine	9		X	Exempt - Trail
032	Elm	9		X	Grading
033	Elm	9		X	Exempt - Trail
034	30' Red Pine	12		X	Grading
035	30' Red Pine	12		X	Grading
036	40' Pine	14		X	Exempt - Trail
037	40' Pine	14		X	Exempt - Trail
038.01	Boxelder	10		X	Exempt - Trail
038.02	Boxelder	8		X	Exempt - Trail
039	Elm	10		X	Exempt - Trail
040	Hack	10		X	Grading
041	Elm	10		X	Grading
042	Elm	15		X	Grading
043	Boxelder	11		X	Grading
044	Boxelder	12		X	Exempt - Trail
045	Boxelder	12		X	Exempt - Trail

Tree No.	Tree Species	(DBH)	Saved	Removed	Removed for...
046	Elm	9		X	Exempt - Trail
047	Elm	8		X	Exempt Road
048	Elm	8		X	Exempt Road
049	Elm	9		X	Exempt Road
050	Elm	8		X	Exempt Road
051	Elm	8		X	Exempt - Trail
052	Ash	10		X	Exempt Road
053.01	Elm	10		X	Exempt Road
053.02	Elm	11		X	Exempt Road
054	Elm	14		X	Exempt Road
055	Boxelder	13		X	Exempt Road
056	Elm	10		X	Exempt Road
057.01	Elm	15		X	Exempt - Trail
057.02	Elm	12		X	Exempt - Trail
057.03	Elm	10		X	Exempt - Trail
058	Elm	9		X	Grading
059	Elm	9		X	Exempt - Trail
060	Elm	10		X	Exempt - Trail
061	Elm	14		X	Exempt - Trail
062	Elm	15		X	Exempt - Trail
063	Elm	16	X		
0	25' Red Pine	8		X	Exempt - Sight Distance
0	25' Red Pine	8		X	Exempt - Sight Distance
0	25' Red Pine	8		X	Exempt - Sight Distance
0	25' Red Pine	8		X	Exempt - Sight Distance
0	25' Red Pine	8		X	Exempt - Sight Distance
0	25' Red Pine	8		X	Exempt - Sight Distance
0	25' Red Pine	8		X	Exempt - Sight Distance
0	25' Red Pine	8		X	Exempt - Sight Distance
0	25' Red Pine	8		X	Exempt - Sight Distance
0	25' Red Pine	8		X	Exempt - Sight Distance
0	25' Red Pine	8		X	Exempt - Sight Distance
0	25' Red Pine	8		X	Exempt - Sight Distance
0	25' Red Pine	8		X	Exempt - Sight Distance
0	25' Red Pine	8		X	Exempt - Sight Distance
0	25' Red Pine	8		X	Exempt - Sight Distance
0	25' Red Pine	8		X	Exempt - Sight Distance
082	Boxelder	8	X		
083	Boxelder	22		X	Grading
084	Boxelder	10		X	Grading
085	Elm	10		X	Exempt - Trail
086	Elm	10		X	Exempt - Trail
087	Elm	24		X	Grading
088	Elm	12	X		
089	Elm	10	X		
090	Elm	12	Off Site		
091	Boxelder	10	Off Site		

Tree No.	Tree Species	(DBH)	Saved	Removed	Removed for...
092	Boxelder	12	Off Site		
093	Boxelder	24		X	Exempt - Trail
1668.01	Boxelder	20		X	
1668.02	Boxelder	15		X	
1668.03	Boxelder	12		X	
1668.04	Boxelder	13		X	
1668.05	Boxelder	17		X	
1669.01	Boxelder	13	X		
1669.02	Boxelder	12	X		
1669.03	Boxelder	17	X		
1670	Oak	25	X		
1671	Oak	12	X		
1672	Boxelder	30	X		
1673.01	Box - Broken	10	X		
1673.02	Box - Broken	12	X		
1673.03	Box - Broken	15	X		
1673.04	Box - Broken	10	X		
1674	Oak	20	X		
1675.01	Boxelder	20	X		
1675.02	Boxelder	20	X		
1675.03	Boxelder	24	X		
1676	Oak	13	X		
1677	Boxelder	10	X		
1678	Boxelder	10	X		
1679	Boxelder	12	X		
1680	Boxelder	10	X		
1681	Boxelder	10	X		
1682	Boxelder	8	X		
1683	Boxelder	12	X		
1684.01	Oak	20	X		
1684.02	Oak	19	X		
1685	Boxelder	11	X		
1686	Boxelder	8	Off Site		
1687	Boxelder	9	X		
1688.01	Boxelder	8	X		
1688.02	Boxelder	10	X		
1689	Boxelder	9	X		
1690	Boxelder	9	Off Site		
1691	Cottonwood	20	X		
1692	Poplar	9	X		
1692.02	Cottonwood	19	X		
1693	Poplar	8	X		
1694	Boxelder	10	X		
1695	Boxelder	14	X		
1696	Oak	41	X		
1697.01	Boxelder	10	Off Site		
1697.02	Boxelder	8	Off Site		
1698	Boxelder	14	Off Site		
1699	Boxelder	18	X		

Tree No.	Tree Species	(DBH)	Saved	Removed	Removed for...
1700.01	Boxelder	12	X		
1700.02	Boxelder	10	X		
6386.01	Boxelder	14	X		
6386.02	Boxelder	12	X		
6386.03	Boxelder	12	X		
6387.01	Boxelder	19	X		
6387.02	Boxelder	17	X		
6389	Boxelder	8	X		
6390	Boxelder	8	X		
6391.01	Boxelder	11	X		
6391.02	Boxelder	8	X		
6391.03	Boxelder	8	X		
6392.01	Boxelder	9	X		
6392.02	Boxelder	8	X		
6393	Boxelder	8	X		
6394	25' Red Pine	8		X	Grading
6395	Elm	15		X	Grading
6396	Boxelder	10		X	Grading
6397	Elm	8		X	Grading
6398	Elm	8		X	Grading
6399	Elm	12		X	Grading
6400	Elm	16		X	Grading
8379	Elm	10		X	Grading
8380	Elm	15		X	Grading
8381	Elm	8		X	Grading
8382	Elm	12		X	Grading
8383	Elm	14		X	Grading
8384.01	Elm	26		X	Grading
8384.02	Elm	24		X	Grading
8385	Elm	8		X	Grading
8386	Elm	9	X		
8387.01	Elm	10		X	Grading
8387.02	Elm	8		X	Grading
8388	Elm	18		X	Grading
8389	Elm	12		X	Grading
8390	Elm	10		X	Grading
8391.01	Elm	10		X	Grading
8391.02	Elm	10		X	Grading
8391.03	Elm	10		X	Grading
8391.04	Elm	10		X	Grading
8391.05	Elm	10		X	Grading
8392	Elm	12		X	Grading
8393	Elm	16		X	Grading
8394	Elm	24	X		
8395.01	Elm	22	X		
8395.02	Elm	20	X		
8396	35' Red Pine	14		X	Grading
8397	Hackberry	14	X		
8398	Boxelder	12	Off Site		

Tree No.	Tree Species	(DBH)	Saved	Removed	Removed for...
8399.01	Boxelder	14	Off Site		
8399.02	Boxelder	10	Off Site		
8400.01	Boxelder	20	Off Site		
8400.02	Boxelder	18	X		

TREE LEGEND

- EVERGREEN TREES TO REMAIN
- EVERGREEN TO BE REMOVED
- DECIDUOUS TO REMAIN
- DECIDUOUS TO BE REMOVED

BENCHMARK

1. Anoka County Benchmark No. 3076
   Elev.= 890.186 (NAVD 88)
2. Anoka County Benchmark No. 2078
   Elev.= 899.499 (NAVD 88)

Carlson McCain
• environmental
• engineering
• surveying
3890 Pheasant Ridge Drive NE, Suite 100
Blaine, MN 55449
Phone: (763) 489-7900
Fax: (763) 489-7959
www.carlsonmccain.com

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 Landscape Architect under the laws of the State of Minnesota

Print Name: James A. Kalkes
Signature: James A. Kalkes
Date: 06/19/18 License #: 45071

Drawn: JAK
Designed: JAK
Date: 06/19/18

Revisions:
1.

RIVERSTONE DEVELOPMENT, LLC.
14015 Sunfish Lake B, Suite 400
Ramsey, MN 55303

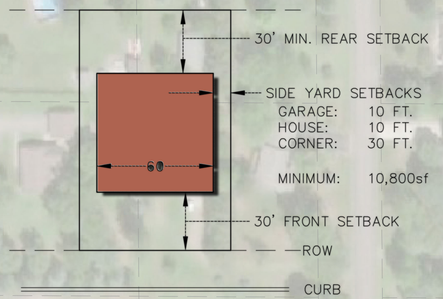
RIVERSTONE
Ramsey, MN

[Save Date: 06/19/18] F:\jobs\6421 - 6440\6435 - ramsey site\cad c3d\engineering\tree preservation\6435_tree.dwg

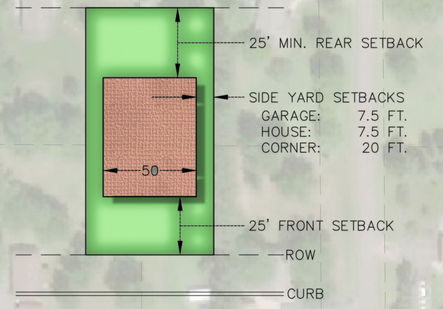
North Fork Meadows

PAXMAR©

80' SINGLE FAMILY - R1



65' SINGLE FAMILY - R2

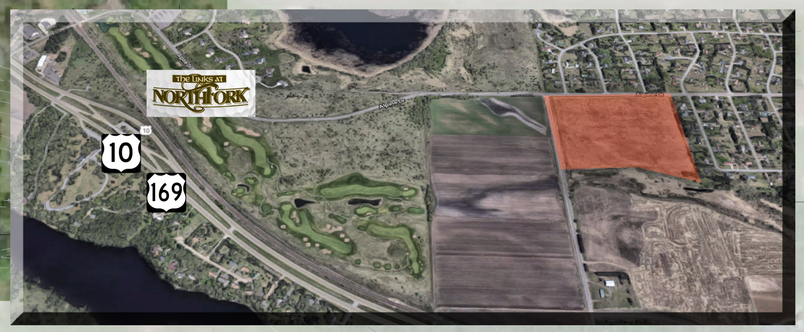


NOTES

1) Subject property address – Southeast quadrant of Puma Street & Alpine Drive NW, Ramsey, MN 55303.

SITE DATA

TOTAL BOUNDARY AREA	±33.5 AC.
TOTAL NUMBER OF LOTS	89
65 FT. LOTS	48
80 FT. LOTS	41
NET DENSITY (EXCLUDES ROW AND WETLAND)	3.34 LOTS/AC



Carlson McCain
ENVIRONMENTAL · ENGINEERING · SURVEYING

BOLTON & MENK
Real People. Real Solutions.

7533 Sunwood Drive NW
Suite 206
Ramsey, MN 55303-5119

Ph: (763) 433-2851
Fax: (763) 427-0833
Bolton-Menk.com

December 18, 2019

Mr. Bruce Westby, P.E.
City Engineer
City of Ramsey
7550 Sunwood Drive NW
Ramsey, Minnesota 55303

RE: Proposal for Engineering Services
Puma Street Improvement Project

Dear Mr. Westby:

We appreciate the opportunity to present this scope of services for the Puma Street Improvement project. Our scope and fees were prepared based on our understanding of the project and our previous experience in delivering State Aid projects.

The following proposal is based on our December 13, 2019 discussion related to the project as well as the Future Business Park study and the recently constructed Bunker Lake Boulevard and Puma Street Improvements project.

SCOPE

The improvements will be generally as described in our December 3, 2015 report for the Future Business Park. The phasing will be as generally described in our March 2017 Update Report. The improvements will consist of the following items as presented in the above reports, depicted on the attached figures, and as constructed in 2018:

- Puma Street construction will include the Phase 2 area identified in the Business Park Study Update, which includes street and utility improvements from the Puma Street lift station to Alpine Drive.
- A 10-foot bituminous trail will be constructed along the west side of Puma Street.
- 10-inch sanitary sewer and 16-inch watermain will extend the entire length of the project.
- The Alpine Drive and Puma Street intersection will be relocated to line up with Okapi Street NW.

Project scope assumptions used in creating this fee proposal include the following:

- A full topographic survey was previously completed. Only verification survey is required.
- The Developer will design the storm pond and provide an easement to the City. We will coordinate discharge of the street stormwater into this pond.
- No additional turn lanes will be added to Alpine Drive at this time. Additional development and traffic may warrant turn lanes in the future.
- The Right-of-Way plat for the road realignment will be provided by the City.

- State Aid formatted plans, including plan review checklist and spread calculations are required.
- Street lighting will be completed separately by the City.
- Geotechnical borings will extend 5-feet below the anticipated sanitary sewer depth.
- The anticipated plan set will include the following 34 sheets:
    - Title (1 sheet)
    - Legend (1 sheet)
    - Details & MnDOT Standard Plan Sheets (10 sheets)
    - Tables & SEQ (3 sheets)
    - Existing Conditions & Removals (1 sheet)
    - Erosion Control Plan & SWPPP (5 sheets)
    - Traffic Control Plan (1 sheet)
    - Sanitary Sewer & Water Plan & Profiles (2 sheets)
    - Street & Storm Sewer Plan & Profiles (2 sheets)
    - Storm Sewer Leads (1 sheet)
    - Intersection Detail (1 sheet)
    - Signage & Striping (1 sheet)
    - Cross-Sections (5 sheets)

Construction costs associated with the improvements described above are estimated at approximately $990,000, which includes a 10 percent construction contingency. We will create a detailed engineer's estimate based on actual design quantities.

SCHEDULE

Schedule has changed and will be updated based on discussion.

The proposed schedule for these improvements is as follows:

Task	Date
City Council Action (Authorize Plans)	January 14, 2020
City Council Approves Plans and Orders Bids	February 25, 2020
Public Bid Opening	March 31, 2020
City Council Accepts Bids / Awards Contracts	April 14, 2020
Begin Construction	May 18, 2020
Substantial Completion	September 18, 2020
Final Completion	October 23, 2020

PERMITTING AND APPROVALS

The work associated with the roadway improvements will require the following permits:

- State Aid Approvals
- Lower Rum River Watershed Management Organization (Stormwater and Erosion Control)
- MPCA (NPDES – Construction Stormwater General Permit)
- MPCA (Sanitary Sewer Extension Permit)
- MDH (Watermain Installation Permit)

FEES

We have attached a fee spreadsheet depicting hours, rates, and total compensation on a per task basis. We are proposing to enlist Northern Technologies for geotechnical services.

Our proposed fees for the work are as follows:

Design Task	**Fees**
Design, Permitting, and Bidding	$ 47,625
Geotechnical Evaluation (NTI)	$ 5,500
Total Not-to-Exceed Fee	**$ 53,125**

Construction Task	**Fees**
Construction Staking & Administration	$ 8,930

If there are any questions related to the scope and/or fee portion of this submittal, please call me at (651) 968-7760.

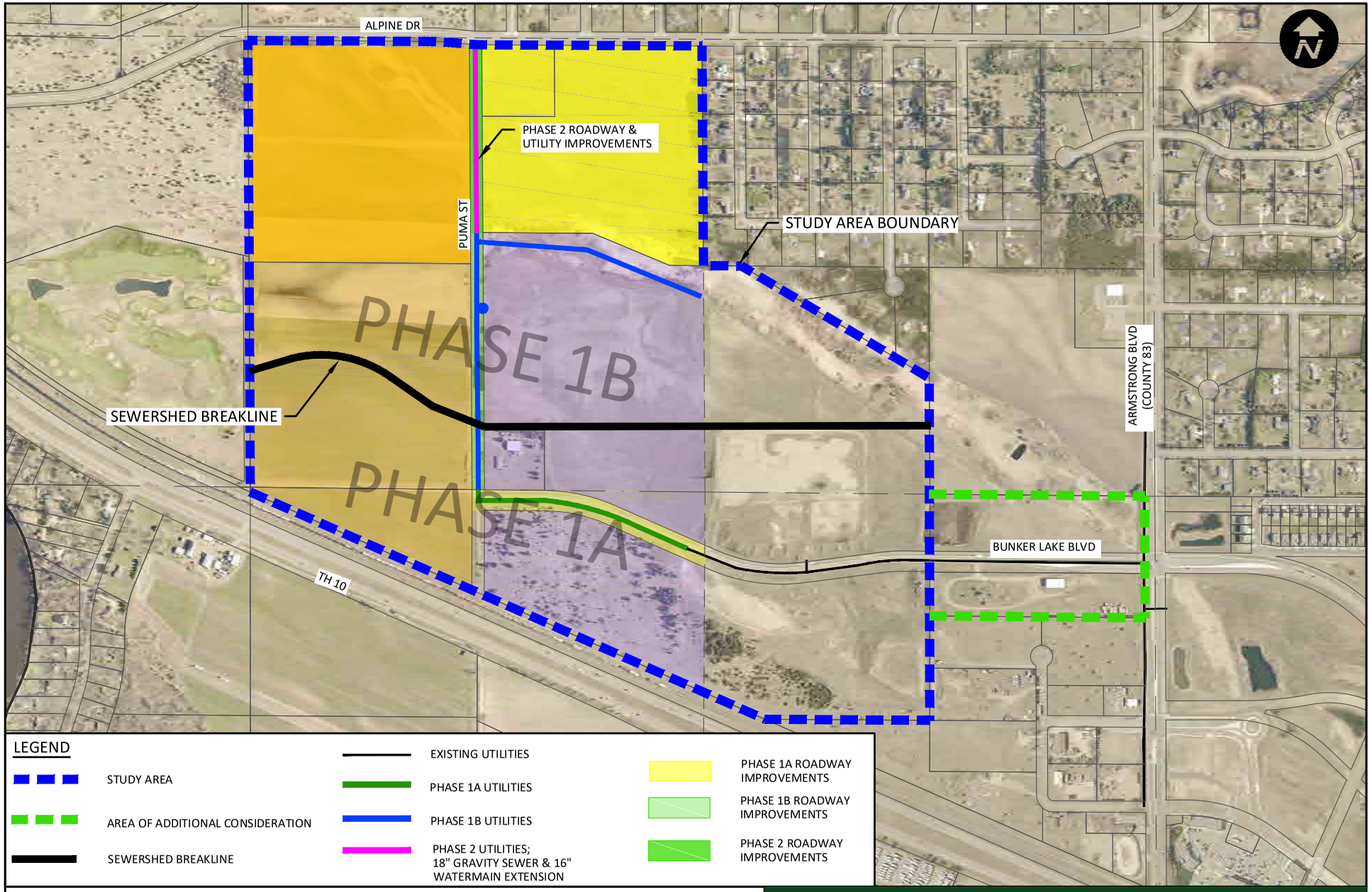
Sincerely,

Bolton & Menk, Inc.

Kevin P. Kielb, P.E.
Project Manager

ATTACHMENTS:

- Improvements Exhibits
- Detailed Fee Spreadsheet



BOLTON & MENK

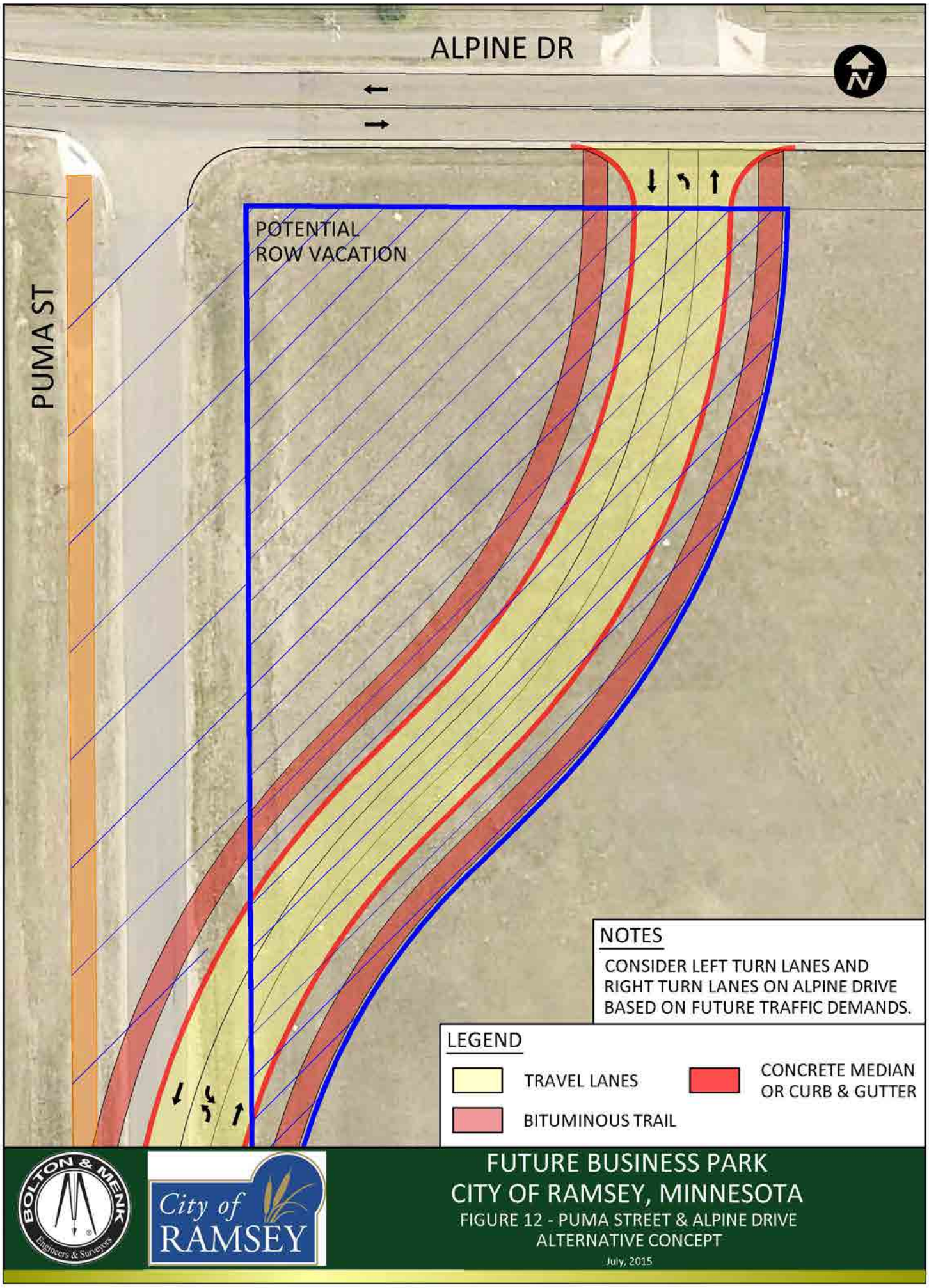
7533 SUNWOOD DR NW, SUITE 206
RAMSEY, MINNESOTA 55303
Phone: (763) 433-2851
Email: Ramsey@bolton-menk.com
www.bolton-menk.com

City of RAMSEY

FUTURE BUSINESS PARK
FEBRUARY 2017 UPDATE
CITY OF RAMSEY, MINNESOTA
PHASE 2 IMPROVEMENTS

FIGURE 6

© Bolton & Menk, Inc. 2017, All Rights Reserved
H:\RAMS\R16109828\CAD\C3D\109828New Land Use.dwg 3/6/2017 11:36 AM



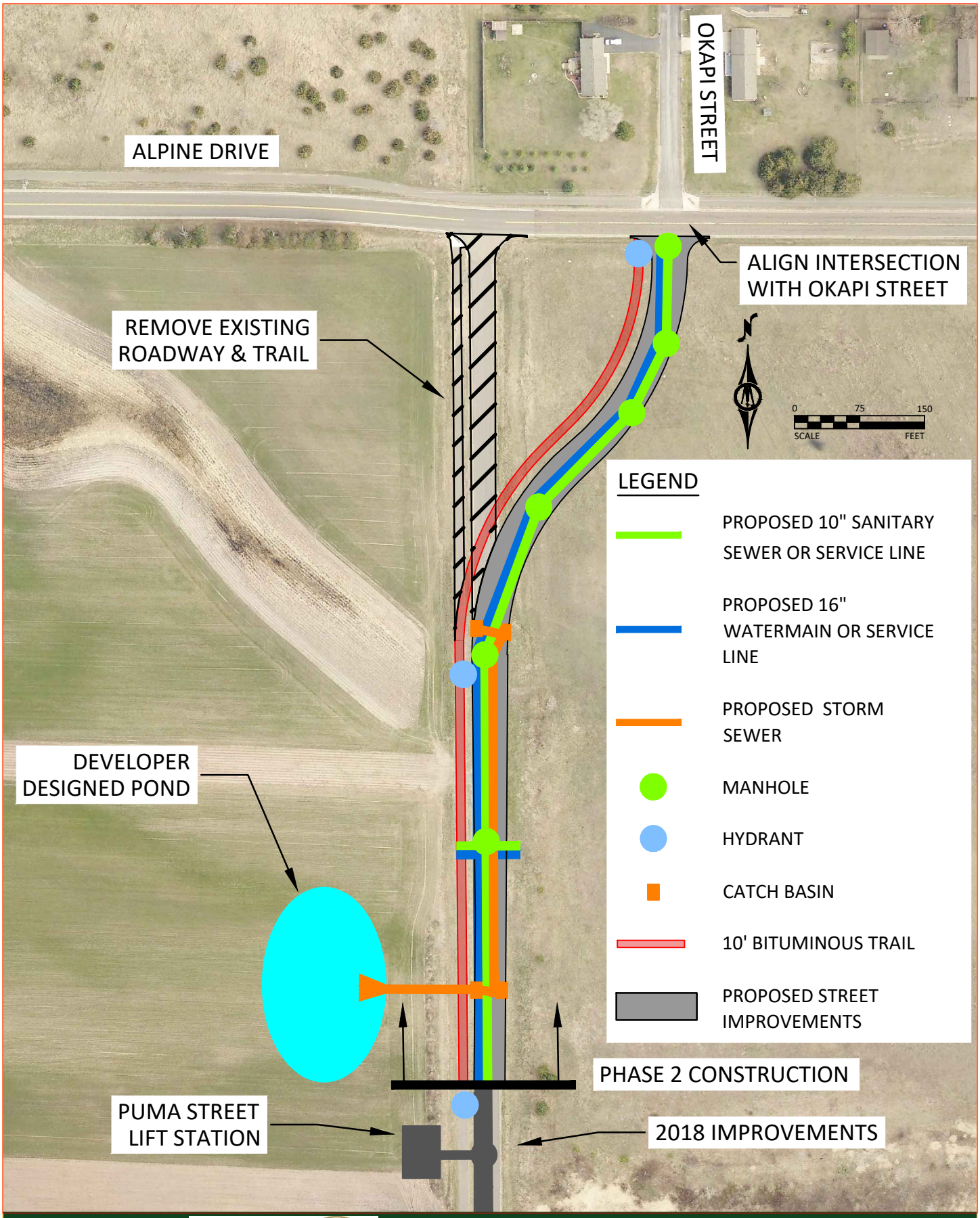
BOLTON & MENK
Engineers & Surveyors

City of RAMSEY

FUTURE BUSINESS PARK
CITY OF RAMSEY, MINNESOTA

FIGURE 12 - PUMA STREET & ALPINE DRIVE
ALTERNATIVE CONCEPT

July, 2015



City of RAMSEY

PUMA STREET IMPROVEMENTS
CITY OF RAMSEY, MINNESOTA

FIGURE 1

DECEMBER 2019

Fee Proposal

CLIENT: City of Ramsey PROJECT: Puma Street Improvements	BOLTON & MENK, INC.						
WORK TASK DESCRIPTION	**Project Manager**	**Senior Designer**	**Designer**	**Surveyor**	**Clerical**	**Total Hours**	**Cost**
Topographic Survey, Final Design and Construction Staking							
1.0 Roadway Design (Includes Topo and State Aid Plan Developement)	4	45	98	10	2	**159**	$19,265
2.0 Trunk Utility Design (Sanitary Sewer and Water)	2	8	34	0	0	**44**	$5,220
4.0 Storm Water Management and Storm Sewer Design	2	24	36	0	0	**62**	$7,760
5.0 Reviews and Approvals	2	8	16	0	2	**28**	$3,410
6.0 Permitting	2	24	40	0	2	**68**	$8,370
7.0 Bidding Services (Questions & Addenda)	4	12	8	0	4	**28**	$3,600
Subtotal Bolton & Menk	**16**	**121**	**232**	**10**	**10**	**389**	$47,625
					SUBCONSULTANT - Northern Technologies		$5,500
					TOTAL for Design through Bidding		**$53,125**
Construction Services							
1.0 Construction Administration (Shop Drawings, Pay Requests, As Builts)	4	16	12	0	2	**34**	$4,450
2.0 Construction Staking	0	4	2	32	0	**38**	$4,480

Puma Street Development Initiated Expansion and Safety Improvement Project

Assessment Amount	
Total Project Costs	$990,000.00
Trunk Utilities	-$230,000.00
Subtotal	*$760,000.00*
Municipal Contribution to Collector Road	-$225,000.00
Assessment Amount	**$535,000.00**

Based on a Council Directed Targed of 33.3% (1/3) of total project costs minus utilities.

Preliminary Assessment Roll			
Property/Party	**Net Acreage**	**Percentage**	**Assessment Amount**
Paxmar/AKM Farms (Outlot A, Alpha Development)	30.5	41.50%	$222,025.00
City (Outlot C, Alpha Development)	4.1	5.60%	$29,960.00
Capstone/Riverstone (Outlot H, Riverstone)	38.97	52.90%	$283,015.00
Total	**73.57**	**100.00%**	**$535,000.00**

DRAFT
For Discussion Only
NOT Reviewed by City Council

Total City Contribution	
Assessment Amount as Real Property Owner	$29,960.00
Municipal Contribution to Collector Road	$225,000.00
Total	**$254,960.00**
Percentage of Total Project Minus Utilities	*33.55%*

Total Contribution by Party			
Property/Party	**Amount**	**Percentage**	
Paxmar/AKM Farms (Outlot A, Alpha Development)	$222,025.00	29.21%	
City (Outlot C, Alpha Development) + Municipal Contribution to Collector	$254,960.00	33.55%	*33.3% (1/3) was target*
Capstone/Riverstone (Outlot H, Riverstone)	$283,015.00	37.24%	
Total Project Costs minus Utilities	*$760,000.00*	*100.00%*	

JOINT CITY COUNCIL AND PLANNING COMMISSION WORK SESSION
CITY OF RAMSEY
ANOKA COUNTY
STATE OF MINNESOTA

The Ramsey City Council conducted a City Council Work Session on Tuesday, February 11, 2020, at the Ramsey Municipal Center, 7550 Sunwood Drive NW, Ramsey, Minnesota.

Members Present: Mayor John LeTourneau (attending remotely)
Acting Mayor Chris Riley
Councilmember Nadine Heinrich
Councilmember Mark Kuzma
Councilmember Jeff Menth
Councilmember Debra Musgrove
Councilmember Dan Specht

Planning Commission
Members Present: Chairperson Randy Bauer
Commissioner Bruce Anderson (attending remotely)
Commissioner Cheri Gengler
Commissioner Torrey Johnson
Commissioner Gary VanScoy
Commissioner Matt Woestehoff

Also Present: City Administrator Kurtis Ulrich
Fire Marshal Carey Schiferli
Police Captain Brad Bluml
Public Works Superintendent Grant Riemer
Administrative Services Director Colleen Lasher
Deputy City Administrator Timothy Gladhill
City Engineer Bruce Westby
Senior Planner Chloe McGuire Brigl

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1. CALL TO ORDER

Acting Mayor Riley called the City Council Work Session to order at 5:30 p.m.

2. TOPICS FOR DISCUSSION

2.01: Receive Update on Riverstone Preliminary Plat (Master Plan) and Discuss Puma Street Reconstruction Options

Deputy City Administrator Gladhill provided a broad overview of the purpose of the discussion tonight.

Senior Planner McGuire Brigl reviewed the staff report and details related to the proposed land use changes to the plat.

Acting Mayor Riley asked the number and location of 40-foot lots.

Heather Lorch, Capstone, identified a total of 38 proposed detached townhomes, that would replace the 48 proposed quad homes, and pointed out the location for those homes.

Councilmember Kuzma asked the price range and size of the homes.

Ms. Lorch replied that the price range would be between $265,000 and $295,000 with square footage ranging between 1,800 and 2,400 square feet.

Acting Mayor Riley asked for details on the discussion that occurred related to the potential connector street between this development and the neighboring development.

Ms. Lorch replied that they did receive the suggestion from the comment but both developers believed that it would be better to have standalone developments. She stated that Capstone is willing to provide a pedestrian connection that could connect the two developments.

Councilmember Kuzma asked for input related to the sewer and water connection to the adjacent development that was previously discussed.

Stephen Bona, Capstone, replied that Capstone came to an agreement with AKM following the last discussion, that has since expired, and they are awaiting a new agreement to be signed.

Councilmember Musgrove stated that she likes that Capstone heard the comments from the residents to eliminate the quad homes and adjust the plan in this manner. She commented that she also does not like the idea of a connecting road between the developments and appreciated the willingness of Capstone to put in the pedestrian connection between neighborhoods.

Planning Commissioner Chair Bauer disclosed that he lives in the Riverstone development and does not believe that a connecting road with the adjacent parcel would provide benefit.

Deputy City Administrator Gladhill reviewed the remainder of the staff report related to the Puma Street reconstruction. He noted that Paxmar submitted an email in opposition of the proposed assessment.

Acting Mayor Riley asked if there is a reason that the roadway would not be improved to the City's street standards.

Mayor LeTourneau asked how the new alignment would lay with the density of the housing.

Deputy City Administrator Gladhill identified the proposed realignment, which has always been contemplated following the Preliminary Plat approval of Paxmar.

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Planning Commission Chair Bauer stated that Puma Street might be utilized by more than just the residents, with the industrial park in that area. He stated that the employees and possibly trucks accessing the industrial park will increase traffic on Puma Street and therefore believed the City should contribute to the project.

Councilmember Kuzma asked if this is an MSA street.

Deputy City Administrator Gladhill stated that this roadway is included in the MSA system, and would be eligible for MSA funds, but the City would need to decide if this is the correct project to use MSA funds on as there is a large demand on the limited MSA funding. He noted that the Public Works Committee will continue that discussion.

Councilmember Specht agreed that the City should financially contribute towards the project.

Councilmember Musgrove asked for background information on the temporary construction of Puma Street.

Deputy City Administrator Gladhill provided background information on the creation of Puma Street.

Councilmember Heinrich asked if there have been similar projects in years past.

Deputy City Administrator Gladhill replied that there have been a variety of similar projects. He stated that some projects in The COR have been funded by the City at a rate of 60 percent, that could be reimbursed through TIF.

Councilmember Specht asked if the cost-share is lesser in this case because these are residential developments rather than commercial.

Deputy City Administrator Gladhill stated that looking holistically at the City's transportation needs, this is not the same setup as the Bunker Lake industrial park scenario. He noted that the Bunker Lake industrial park scenario was more linked through economically development and the City funded its portion through the County HRA funds.

Councilmember Specht asked for details on the position of Paxmar in its email.

Deputy City Administrator Gladhill stated that Paxmar stated that he is unsure of the exact amount Paxmar feels would be fair but believes that one third is too much for their development to be assessed. He noted that the Paxmar parcel is still awaiting rezoning to support its proposed development.

Mayor LeTourneau asked if the City is still the owner of the parcel east of Puma Street.

Deputy City Administrator Gladhill stated that the City largely owns the four-acre parcel where the road alignment would occur.

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Councilmember Kuzma suggested that the City proceed with the benefit analysis study to support any potential assessment.

Deputy City Administrator Gladhill stated that Capstone does have an aggressive schedule for this next phase of development, and they would not be able to build on those lots within the realignment area until the Puma Street agreement is finalized.

Planning Commissioner Anderson asked what would happen in the case that the third party does not move forward, specifically whether the City and Capstone would be then stuck with a 50/50 split.

Deputy City Administrator Gladhill stated that as long as the City follows the proper metrics, appraisals show the increase in value is equal to the assessment amount, the City would be fully protected.

Councilmember Heinrich asked for input from Capstone on their thoughts on the potential cost-share split.

Ms. Lorch stated that Capstone was aware that there was a need for an assessment on this part of the parcel and was under the impression that it would be a similar cost-share to the previous. She stated that they hoped that the cost-share would be less with another developer. She stated that Capstone did fund 18 percent of the improvement cost for Bunker Lake Boulevard because it felt that improvement would provide benefit to its residents. She stated that Capstone would agree to the third split, with the caveat that the City and other developer equally contribute.

Planning Commissioner Woestehoff asked if there are safety concerns with Alpine in that area.

Police Captain Bluml stated that this would correct the safety concern with the Alpine walking trail that previously existed.

Planning Commissioner Woestehoff suggested that the City take a larger share in this from a safety standpoint and contribute at a rate of 50/25/25.

Deputy City Administrator Gladhill noted that the Public Works Committee can discuss that option.

Councilmember Menth asked if Paxmar is on board with this proposal.

Deputy City Administrator Gladhill confirmed that Paxmar does not agree with this proposal. He noted that Paxmar was invited to attend tonight but chose not to be a part of the discussion.

Councilmember Musgrove asked if Paxmar would perhaps accept the cost-share of 50/25/25 in order to allow this project to proceed at a quicker pace and without the need for the additional study.

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Councilmember Heinrich stated that while she supports the safety aspect, she does support the third split scenario and would support moving forward on that.

Councilmember Kuzma stated that it would be difficult to determine what would be assessed until the benefit analysis study is completed. He stated that if supported, he would support the third split scenario.

Deputy City Administrator Gladhill stated that staff can bring forward the two cost-share scenarios (the third scenario and 50/25/25) to the Public Works Committee for further discussion.

Mr. Bona stated that the schedule is moving fast, and they would like to begin grading in March, with roads paved by June. He appreciated any assistance the City could provide in the Puma Street agreement moving forward to allow their schedule to continue to move at that pace.

2.02: Discuss Policy Direction on Pearson South/Riverstone South Subdivision; Case of Capstone Homes

Deputy City Administrator Gladhill reviewed the staff report related to land use.

Acting Mayor Riley commented that he would like to see less 40-foot wide lots.

Planning Commissioner Woestehoff asked if this property is zoned R-1 MUSA.

Deputy City Administrator Gladhill confirmed that to be true and noted that a Comprehensive Plan amendment and zoning amendment would be needed.

Councilmember Menth referenced the surrounding area and asked how that land is planned to be developed.

Deputy City Administrator Gladhill identified the landowners and land use guiding of the surrounding properties.

Councilmember Menth stated that in the past he has heard discussion of connecting Bowers Drive to another roadway.

Deputy City Administrator Gladhill noted that would be a separate discussion that would involve the development of a different parcel.

Councilmember Kuzma asked the reasoning for the smaller lots.

Tom Bakritges, Capstone, stated that their goal is to have spring construction in 2021. He stated that this is a good opportunity to move to the south with development. He stated that this piece of ground is contained and is unique as they will be faced with challenges from the adjacent uses (solar farm, industrial/commercial, and residential). He stated that they would like to mirror what they have done to the north, noting that they attempt to provide housing to all the different

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markets. He stated that the smaller lots would be bordered by the future commercial/industrial area and the solar farm and noted that the site would transition as you move south in order to match the existing residential development.

Mr. Bakritges stated that the solar farm and commercial/industrial is not very attractive to be adjacent to residential and therefore that is why they are proposing a lesser price point residential product in that area.

Councilmember Specht commented that he believes that this is a good mix of housing products and supports the plan moving forward. He stated that residents on Bowers Drive have commented that it would be nice to have another method to connect rather than only having access onto Highway 10.

Mayor LeTourneau stated that the plan as presented is a great place to start. He stated that as a resident of Bowers Drive, there has been a discussion of those resident. He stated he is appreciative of the 50-foot buffer and prefers this use to additional commercial/industrial. He appreciated that this product would mirror the existing residential that it would border.

Planning Commissioner VanScoy stated that he supports the suggestion of staff to connect this to Bowers Drive. He commented that from a safety perspective he would imagine that this would be an issue.

Police Captain Bluml stated that the Police would like access to Bowers Drive as it would provide additional opportunity in emergency situations.

Fire Marshal Schiferli commented that it is important to have two accesses for many reasons. He stated that this is the longest cul-de-sac in the City, and this is a non-hydrant area, therefore the Fire Department needs to bring in water. He commented that if a tree goes down, or a power line, that could block the only entrance to Bowers Drive as it currently exists. He noted that the new development would also be connected to City water and therefore would have hydrants and the road connection would only improve the element of safety.

Deputy City Administrator Gladhill advised that an Environmental Assessment Worksheet (EAW) would be required as this moves forward and would include a traffic study.

Public Works Superintendent Riemer stated that if a connection is going to be made, Public Works would like to have a full road connection.

Mayor LeTourneau stated that as a homeowner on Bowers Drive, he can comment that the resistance that the City would have to the homes is less now resistant but there would be quite a bit of resistance in regard to a second access point.

Councilmember Heinrich appreciated the input from Mayor LeTourneau. She commented that while residents enjoy their privacy, public safety is of utmost importance for the residents and therefore supports a full road connection.

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Councilmember Menth asked if the Bowers Drive connection would occur through this design proposal or whether it would connection across Armstrong.

Deputy City Administrator Gladhill stated that currently the plan includes an oversized road connection with breakaway barriers for Public Safety, but Public Safety would like that to be a full road connection in that point. He stated that conceptually it is not difficult to add that road at this step in the plan and noted that is the purpose of tonight's discussion.

Councilmember Musgrove commented that she would support the full road connection.

Mayor LeTourneau stated that the residents are all in favor of having the access to Highway 10 changed and would support the connection to Riverdale Drive.

Acting Mayor Riley confirmed the consensus of the Council to provide direction for a full road connection.

Deputy City Administrator Gladhill reviewed the Riverdale Drive extension element and potential cost-share elements. He noted that the City could attempt to compete for MnDOT funds. He noted that staff could bring forward the discussion to the Public Works Committee.

Councilmember Specht stated that because the roadway is part of the Highway 10 plan, he would support the City having a higher share of the cost.

Deputy City Administrator Gladhill confirmed that staff would prioritize Riverdale over Puma Street and that is why the third/third/third cost-share scenario the City was proposed on Puma Street.

2.03: Discuss Policy Direction on Outlot C, Northfork Development Proposal; Case of BK Land Development

Deputy City Administrator Gladhill provided a broad overview of the purpose of the discussion tonight.

Senior Planner McGuire Brigl reviewed the staff report.

Councilmember Heinrich asked if a gate of fence would be around the entire development.

Luke ___, BK Land Development, commented that would go along Alpine as a form of buffer. He stated that they would be open to suggestion from the City and noted that the fence could also be berming or landscaping.

Deputy City Administrator Gladhill asked for input on the appropriate/desired mix between the housing products.

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Councilmember Kuzma stated that he supported this plan when it was previously presented, primarily because the demand for the smaller product is high and those homes sell quickly. He stated that he continues to support the plan as presented.

Councilmember Menth asked public safety to comment on the road width.

Fire Marshal Schiferli stated that the parking would need to be restricted on one side. He noted that the aerial truck would take up the entire road width. He stated that the narrow roads can work but would need to be posted for no parking on one side. He commented that he would like to see wider roads.

Police Captain Bluml stated that he would defer to fire, as fire trucks are much larger than police vehicles. He stated that a narrower road provides less time for driver reaction for pedestrians. He noted that parking could occur on one side during the day, but overnight parking is not allowed overnight on any City road.

Councilmember Kuzma commented that the neighboring development already has roads of this width.

Public Works Superintendent commented that Public Works can live with the 29-foot road, but no parking has to be enforced in order to support snowplows.

Councilmember Musgrove asked, and received confirmation that the road would be signed and designated as no parking on one side.

Acting Mayor Riley stated that this would match the adjacent development and therefore would be a good use. He commented that he would like to see the overall number of the smaller lots reduced.

Planning Commissioner Woestehoff stated that he has received resident comments that the housing prices are too expensive, noting that the smaller homes have a lesser cost and therefore he will support this proposal.

Councilmember Specht commented that he will also support the plan as proposed.

Councilmember Musgrove asked if the villa product would be part of an HOA.

Mr. [redacted] confirmed that the villas would have a full HOA, while the single-family product would have an HOA that only maintains common areas.

Councilmember Musgrove commented that she supports this proposal.

Planning Commission Chair Bauer commented that he lives in a villa in Riverstone and there is a high demand for that product. He commented that he and his neighbors are very satisfied, noting that the villa is a great product for snowbirds. He believed that it would not make sense to increase the number of single-family lots, as there is high demand for the villa product.

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Mayor LeTourneau commented that he would welcome the mix of house styles and has a greater concern with the tax base that will be generated through this project. He noted that the growth in the housing community will also support the desire of the overall community to attract additional retailers.

Councilmember Menth stated that during the previous review he expressed a desire for less villas and more single-family homes. He stated that he has since driven through the adjacent development and has no problem with the mix proposed. He stated that he spoke with residents that live in the villas and are very satisfied with the product.

Councilmember Heinrich stated that she originally had concern with the number of smaller lots but noted that she could support the smaller lots if the road width were increased.

Mr. [redacted] stated that they could look into doing increasing the road width but would want to ensure that the mix of products would not be impacted and the separation between products could continue to be provided.

Deputy City Administrator Gladhill noted that the input has been received by the developer and it will be their choice whether to move forward on the project.

2.04: Note Additional Policy Projects and Development Proposals of Interest

No discussion.

3. TOPICS FOR FUTURE DISCUSSION

3.01: Review Future Topics/ Calendar

Noted.

4. MAYOR / COUNCIL / STAFF INPUT

None.

5. ADJOURNMENT

The Work Session of the City Council was adjourned at 6:58 p.m.

Respectfully submitted,

_____

Kurtis G. Ulrich
City Administrator

DRAFT/COPY

ATTEST:

_____

Katie M. Schmidt
Administrative Assistant

Drafted by Amanda Staple
TimeSaver Off Site Secretarial, Inc.

DRAFT/COPY

From:	Tim Gladhill
To:	Jay Roos
Cc:	Chloe McGuire Brigl; Bruce Westby; Kurt Ulrich; Diana Lund; Kent Roessler; David Allen
Subject:	RE: Puma Street Assessment
Date:	Thursday, February 13, 2020 10:54:00 AM
Attachments:	image001.png image002.png image006.png Assessment Amounts.pdf image008.png

Jay:

Thank you for your feedback as we work towards an ultimate solution that is equitable to all parties. Your feedback is helpful as we get into the more granular detail based on high-level policy direction.

Attached you will find a proposal that we think is fair to all involved. We have taken your feedback and revised the proposal in an attempt to find a reasonable solution. The assessment amounts are based on net developable acreage to be able to provide appropriate scale based on project size as opposed for per foot frontage. This has not been approved by the City. The intent of this email is to garner your feedback prior to policy and implementation discussions with the City Council.

Some High-Level Clarifying Points

- The Assessed Amount does NOT include Trunk Water and Trunk Sanitary Sewer – those will be paid by the City from Trunk Fees
- City Staff is proposing a contribution to the project as the municipality in the amount of $225,000 to acknowledge the role of Puma Street as a Collector Road serving multiple neighborhoods and districts
- City Staff is proposing that the City would incur the assessment amount for Outlot C, Alpha Development as Property Owner to your concern raised in Paragraph 3 of your email response
- In this scenario, your assessed amount would be less than the other two parties (City and Capstone)

City Staff also would like to clarify a couple of policy points based on your response below. I want to clarify that my comments below are intended to be helpful and find a solution to move forward, as I acknowledge that responses via email can come across with a negative tone.

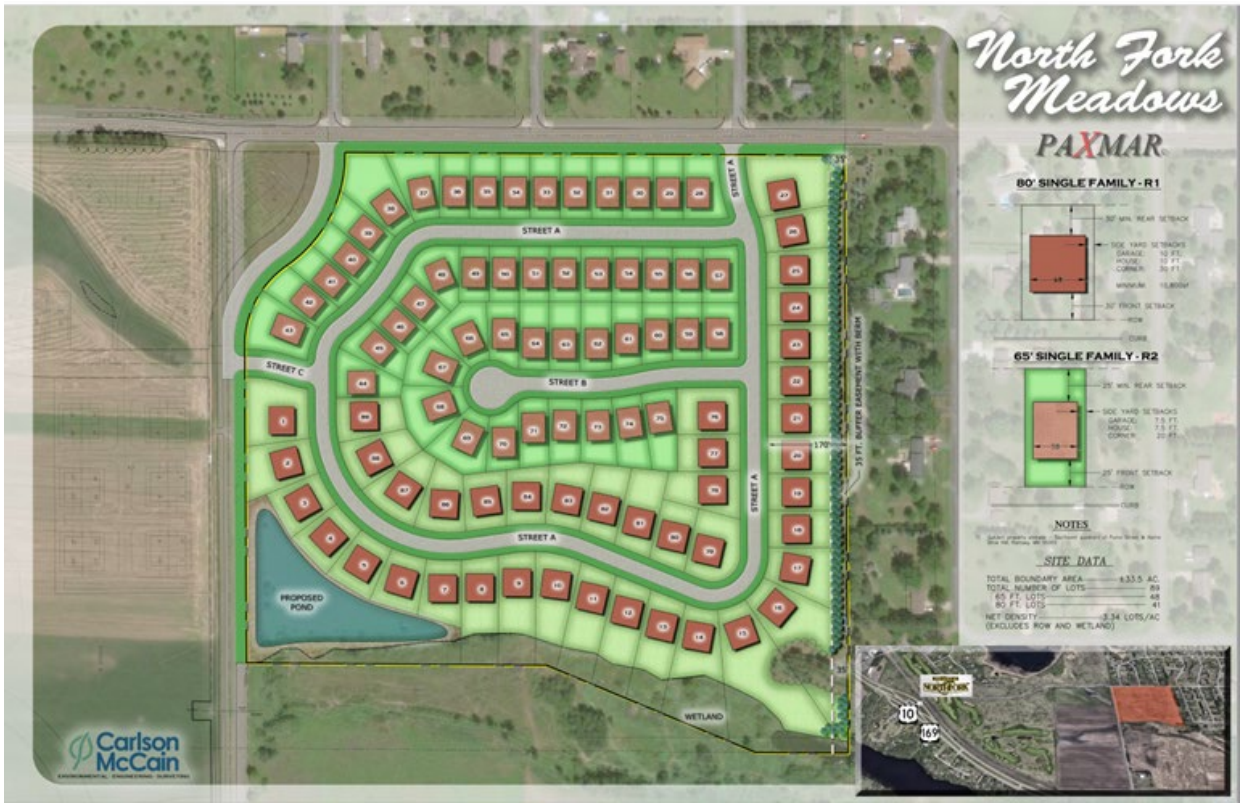
On Paragraph 2, you note that the parcel is not within the Metropolitan Urban Service Area (MUSA). This is not correct. The site is within the MUSA. The site is guided as Low Density Residential in the Comprehensive Plan and located in the R-1 Residential (MUSA) District. The Comprehensive Plan Amendment and Zoning Amendment on the table is to introduce Medium Density Residential in the Comprehensive Plan and R-2 Medium Density Residential (Detached) to the Zoning Map/Code. Any development scenario will create capacity needs on Alpine Drive and Puma Street.

On Paragraph 4, you note that your property will not will not gain direct benefit and that your future project will not gain direct access to Puma Street. Staff desires to go on record to note that it is our direction and interpretation that we will only allow one access onto Alpine Drive and a secondary access must be constructed on Puma Street. Setting that argument aside, there is still capacity needs on Puma Street and benefit to your property from this project. Additionally, as noted above, we agree with your argument that this road serves more than just the two adjacent residential development properties and serves a much broader area, including a Business Park. It is with that in mind that City Staff is recommending an additional contribution of $225,000 in addition to taking on the assessment amount for Outlot C, Alpha Development.

At the end of the day, our goal is for a fair and equitable distribution of costs. We agree that the City has an elevated role, but we also feel that development should contribute to the additional capacity needs. Additional capacity needs as a result of new development should not be borne by the general taxpayer alone. Our baseline traffic analysis demonstrates a clear need for safety and capacity improvements, largely driven by new development. These baseline traffic studies do not even include your requested land use changes, which is only going to exacerbate the issue. We look forward to being partners in the solution to Puma Street so we can keep your future land use goals and Land Use Applications moving forward.

Sincerely,

Tim



Tim Gladhill

Tim Gladhill, AICP | tgladhill@cityoframsey.com
Deputy City Administrator | City of Ramsey
P: 763-433-9826 | F: 763-433-9848
7550 Sunwood Drive NW | Ramsey, MN 55303
www.cityoframsey.com

Our Mission: To work together to responsibly grow our community, and to provide quality, cost-effective, and efficient government services.

www.ramseygateway.com

From: Jay Roos
Sent: Thursday, February 6, 2020 8:23 AM
To: Tim Gladhill <tgladhill@ci.ramsey.mn.us>
Cc: Chloe McGuire Brigl; Bruce Westby; Kurt Ulrich; Diana Lund; Kent Roessler; David Allen

Subject: RE: Puma Street Assessment

Tim –

Thanks for the updates and the opportunity to comment.

AKM Farm, LLC (AKM), is the owner of the 30.5+/- acre parcel of land located at the southeast corner of Alpine

Drive and Puma Street. The parcel, which is outside of the Metro Urban Service Area, is identified as County Parcel #20-32-25-31-0002. At the present time AKM is not intending to pursue any development plans nor incur any additional engineering design expenses on this parcel until after such time that the MUSA and zoning is approved.

AKM is not in agreement with the cost share proposal as presently proposed for the street improvements, as well as the cost share proposal for the development of plans and specifications. Under the present plan AKM is being assigned costs for a portion of land at the proposed realignment of Puma Street (north end) that is not directly adjacent to our land and we are not agreeable to this. The land encompassing the proposed realignment route is owned by the City of Ramsey and is not under contract by AKM Farm, LLC. AKM may have a future interest in the property but it is not essential to the future development of our 30.5 +/- acres.

Regarding the portion of Puma Street that is directly adjacent to our property, we do not agree with the ability to assess these street improvements as a 429 project since our parcel doesn't gain direct benefits as a result. Any lots on our parcel would back up to Puma Street (i.e. not have direct access) and our property subdivision could be designed with all public street access from Alpine Drive via two access points. Also, the collector street improvements of Puma Street serve a much wider area other than just the two adjacent residential/future residential properties. Puma serves as the secondary access to the entire business park; without a Puma Street connection to Alpine Drive the entire business park is on a single ¾ mile long dead end street.

We are not in opposition to the proposed improvements, but we are opposed to the cost distribution as proposed. Thank you for your time and consideration.

Jay Roos
(763)753-6176 x450
2850 Cutters Grove Ave.; Suite 207
Anoka, MN 55303
www.paxmar.com |
PAXMAR©

From: Tim Gladhill <tgladhill@ci.ramsey.mn.us>
Sent: Wednesday, February 5, 2020 3:30 PM
Cc: Chloe McGuire Brigl; Bruce Westby; Kurt Ulrich; Diana Lund
Subject: Puma Street Assessment

This message has been copied to Paxmar and Capstone Homes.

All:

Our design engineer on the project provided clarification today on the project costs. The Trunk Water and Sanitary Sewer estimated costs are $230,000 to be paid by the City's Trunk Water and Sanitary Sewer Accounts (paid for by Developer Trunk Fees).

The remaining costs (road, storm, trail and lighting) result in $760,000. This is the amount that we would proposed to split three ways ($253,333 each).

Please let me know if you have any additional questions. We will be presenting this information next week at the 2/11 Joint Work Session in concept, with a more detailed review at the 2/18 Public Works Committee.

Sincerely,

Tim Gladhill

Tim Gladhill, AICP | tgladhill@cityoframsey.com
Deputy City Administrator | City of Ramsey
P: 763-433-9826 | F: 763-433-9848
7550 Sunwood Drive NW | Ramsey, MN 55303
www.cityoframsey.com

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www.ramseygateway.com

Public Works Committee **5. 2.**

Meeting Date: 02/18/2020

By: Tim Gladhill, Community Development

Title:

Receive Update on Riverdale Drive Development Initiated Expansion and Safety Improvement Project

Purpose/Background:

At the February 11, 2020 Joint Work Session between the Planning Commission and City Council, it was discussed bringing this project forward for a more detailed analysis of funding sources. Based on preliminary funding analysis and several items yet to be confirmed, the Developer (Capstone Homes) and the City mutually agreed to postpone this discussion until the March Public Works at the earliest.

Timeframe:

NA

Observations/Alternatives:

NA

Funding Source:

NA

Recommendation:

No action requested.

Action:

No action requested.

Attachments

No file(s) attached.

Form Review

Inbox	Reviewed By	Date
Grant Riemer	Grant Riemer	02/13/2020 02:13 PM
Kurt Ulrich	Kurt Ulrich	02/13/2020 02:38 PM
Form Started By: Tim Gladhill		Started On: 02/13/2020 02:02 PM
Final Approval Date: 02/13/2020		

Public Works Committee **5. 3.**

Meeting Date: 02/18/2020

By: Sean Sullivan, Community Development

Title:

Consider Request for City to Acquire Driveway Between Blue Velvet Car Wash and Riversbend Bar and Grill

Purpose/Background:

Purpose:

Provide recommendation / direction concerning request by Owner of Blue Velvet Car Wash to purchase driveway between Blue Velvet Car Wash and Riversbend Bar and Grill.

Background:
City staff was contacted by the owner of Blue Velvet Car Wash on December 12, 2019. The owner has requested that the City purchase and/or maintain the driveway between the two businesses. The owner pays taxes on the half of the driveway and has to maintain the driveway at his own cost. The owner claims the driveway is in rough condition with large potholes and that it is a well traveled "Road" that the public, police and fire use on a regular basis. The owner has indicated that he is considering stopping the maintenance on the road and potentially putting up a chain or cones to prevent travel through to Xkimo Street.

Staff has reviewed the Rivers Bend Plaza Plat and it appears this is not a dedicated street and the the driveway is privately owned.

Timeframe:

Staff was contacted on December 12, 2019. A response should be provided to the owner when a recommendation / direction has been determined.

Observations/Alternatives:

The City should consider the following options:

1) Communicate to owner that the City has no interest in purchasing driveway.
2) Begin negotiations to purchase parcel, and dedicate roadway.
3) Begin negotiation to obtain an easement and to maintain driveway.
4) Something else.

Funding Source:

TBD

Recommendation:

Staff recommendation would be to not purchase/maintain Blue Velvet Lane at this time. As the committee is aware, a long term road maintenance funding strategy has yet be be formalized and the list road maintenance needs is quite long at this time.

Action:

Motion to committee is to decline the offer to purchase/maintain Blue Velvet Lane and have it remain a private road.

Attachments

Rivers Bend Plat

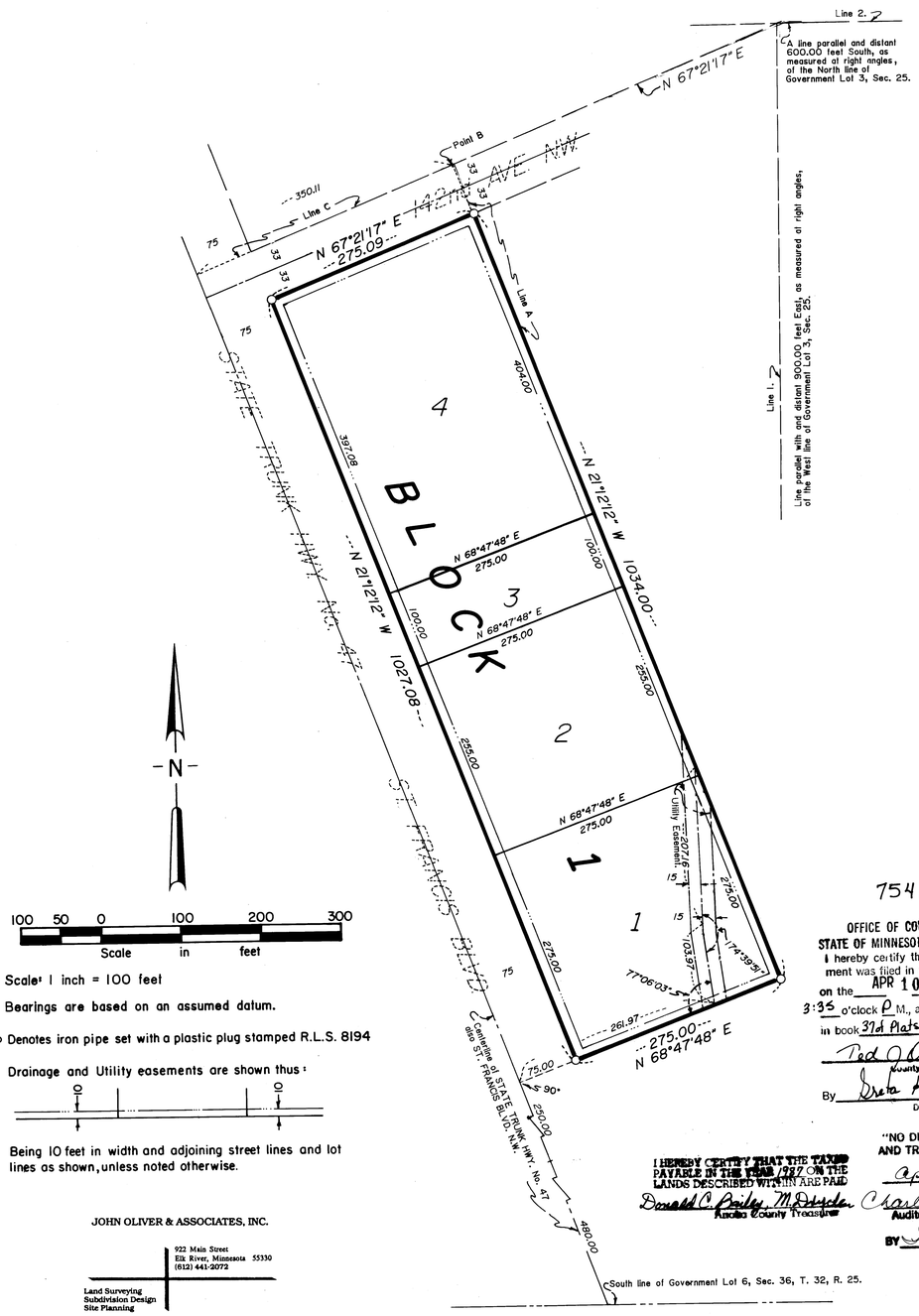
Blue Velvet Car Wash Site

Form Review

Inbox	Reviewed By	Date
Grant Riemer	Grant Riemer	02/13/2020 08:13 AM
Kurt Ulrich	Kurt Ulrich	02/13/2020 01:04 PM
Form Started By: Sean Sullivan		Started On: 02/05/2020 09:01 AM
Final Approval Date: 02/13/2020		

RIVER'S BEND PLAZA

CITY OF RAMSEY,
ANOKA COUNTY, MN.



-N-

100 50 0 100 200 300
Scale in feet

Scale: 1 inch = 100 feet

Bearings are based on an assumed datum.

o Denotes iron pipe set with a plastic plug stamped R.L.S. 8194

Drainage and Utility easements are shown thus:

Being 10 feet in width and adjoining street lines and lot lines as shown, unless noted otherwise.

JOHN OLIVER & ASSOCIATES, INC.
922 Main Street
Elk River, Minnesota 55330
(612) 441-2072
Land Surveying
Subdivision Design
Site Planning

KNOW ALL MEN BY THESE PRESENTS: That Ramsey Center Partnership, a partnership under the laws of the State of Minnesota, fee owner; and Oxbow Properties, a partnership under the laws of the State of Minnesota, contract purchaser; of the following described property situated in said State of Minnesota, County of Anoka, to-wit:

All that part of Government Lot 6, Section 36, Township 32, Range 25; and of Government Lot 3, Section 25, said Township and Range, both in Anoka County, Minnesota, described as Commencing at a point on the centerline of St. Francis Boulevard N.W. distant 480.00 feet northwesterly from the intersection of said centerline with the South line of said Government Lot 6, as measured along said centerline; thence northwesterly along said centerline for 250.00 feet to the actual Point Of Beginning of the land to be hereby described; thence northeasterly, at a right angle to said centerline, for 350.00 feet; thence northwesterly along a line to be hereafter known as Line "A" for the purposes of this description, parallel with said centerline, for 1100.00 feet to a point to be hereafter known as Point "B" for the purposes of this description; thence southwesterly along the southwesterly extension of a line to be hereafter known as Line "C" for the purposes of this description, said Line "C" to be hereinafter described, for 350.11 feet, more or less, to intersect said centerline of St. Francis Boulevard N.W.; thence southeasterly along said centerline to the Point Of Beginning.

Said Line "C" being described as Beginning at the afore described Point "B"; thence northeasterly to terminate at the point of intersection of the two following described lines:

Line 1 is described as a line parallel with and distant 900.00 feet easterly from the West line of said Government Lot 3 as measured at right angles to said West line of Government Lot 3;

Line 2 is described as a line parallel with and distant 600.00 feet southerly of the North line of said Government Lot 3 as measured at right angles to said North line of Government Lot 3.

Excepting therefrom the Northwesterly 66.00 feet thereof, as measured at right angles to the afore described Line "C" and the southwesterly extension thereof.

Also excepting therefrom the southwesterly 75.00 feet, as measured at right angles, thereof taken for right-of-way for said St. Francis Boulevard N.W., also known as State Trunk Highway No. 47.

Subject to easements of record.

Have caused the same to be surveyed and platted as RIVER'S BEND PLAZA, and do hereby donate and dedicate to the public for the public use forever the easements as shown on this plat for drainage and utility purposes only. In witness whereof said Ramsey Center Partnership has caused these presents to be signed by its Authorized Agent and General Partner this 5th day of March, 1987.

RAMSEY CENTER PARTNERSHIP

By: Arthur K. Raudio, Arthur K. Raudio, President of First Guaranty Corporation, Authorized Agent and General Partner

Also in witness whereof said Oxbow Properties has caused these presents to be signed by its Authorized Agent and General Partner this 5th day of March, 1987.

OXBOW PROPERTIES

By: Lyle E. McLaughlin, Lyle E. McLaughlin, Authorized Agent and General Partner

State of Minnesota, County of ANOKA

The foregoing instrument was acknowledged before me this 5th day of March, 1987, by Arthur K. Raudio, President of First Guaranty Corporation, a Minnesota Corporation, Authorized Agent and General Partner of Ramsey Center Partnership, a Minnesota Partnership, on behalf of the partnership.

RITA MILLER NOTARY PUBLIC - MINNESOTA ANOKA COUNTY My Comm. Expires Jan 31, 1992

Rita Miller Notary Public, Anoka County, Minnesota

My commission expires: 1-31-92

State of Minnesota, County of Anoka

The foregoing instrument was acknowledged before me this 5th day of March, 1987, by Lyle E. McLaughlin, Authorized Agent and General Partner, on behalf of Oxbow Properties, a Minnesota Partnership.

RITA MILLER NOTARY PUBLIC - MINNESOTA ANOKA COUNTY My Comm. Expires Jan 31, 1992

Rita Miller Notary Public, Anoka County, Minnesota

My commission expires: 1-31-92

I hereby certify that I have surveyed and platted the property described in this plat as RIVER'S BEND PLAZA and that this plat is a correct representation of said survey; that all monuments have been correctly placed in the ground as shown on the plat; that all distances are correctly shown on the plat in feet and hundreths of a foot; that the outside boundary lines are correctly designated on the plat; and that there are no wet lands or public highways to be designated on the plat other than as shown thereon.

John O. Oliver
John O. Oliver, Land Surveyor
Minnesota Registration No. 8194

State of Minnesota, County of Sherburne

The foregoing instrument was acknowledged before me this 26th day of February, 1987, by John O. Oliver, Land Surveyor.

SHARON L. SHERWOOD NOTARY PUBLIC - MINNESOTA SHERBURNE COUNTY My Commission Expires JUNE 25, 1991

Sharon L. Sherwood Notary Public, Sherburne County, Minnesota

My commission expires: June 25, 1991

754177

OFFICE OF COUNTY RECORDER
STATE OF MINNESOTA, COUNTY OF ANOKA
I hereby certify that the within instrument was filed in this office for record on the APR 10 1987 A.D., 19___ at 3:35 o'clock P M., and was duly recorded in book 31d Plats page 36

Ted J. Arendall
County Recorder

By Greta Kay Ege
Deputy

"NO DELINQUENT TAXES AND TRANSFER ENTERED"
April 9 1987
Charles R. Lefebvre
Auditor, Anoka County
BY S. Culver
Deputy

I HEREBY CERTIFY THAT THE TAXES PAYABLE IN THE YEAR 1987 ON THE LANDS DESCRIBED WITHIN ARE PAID
Donald A. Bailey, M. Snyder
Anoka County Treasurer

Annexed plat of RIVER'S BEND PLAZA was approved by the City Council of Ramsey, Minnesota at a regular meeting thereof held this 24th day of February, 1987. If applicable, the written comments and recommendations of the Commissioner of Transportation and the County Highway Engineer have bee received by the City or the prescribed 30 day period has elapsed without receipt of such comments and recommendations, as provided by Minnesota Statutes Section 505.03, Subdivision 2.

By: Jerry R. Heimann, Mayor Attest: Paul R. Hatlen, Clerk

This plat has been checked and approved this 9th day of April, 1987.

Mary D. Anderson Deputy, Anoka County Surveyor

CITY OF RAMSEY MUNICIPAL CORP. ANOKA COUNTY, MN

869104

Numerical
Grantor
Grantee
Recorded
Checked
Margin
Tr. Index

$15.00 P

OFFICE OF COUNTY RECORDER
STATE OF MINNESOTA, COUNTY OF ANOKA
I hereby certify that the within instrument was filed in this office for record on the MAR - 6 1992 at 1:10 o'clock P.M., and was duly recorded
Ted J. Arendall
County Recorder
By Greta Kay Ege
Deputy

1:10

922 Main St.
Elk River, MN 55330

869104

CERTIFICATE OF CORRECTION TO PLAT OF "RIVER'S BEND PLAZA", City of Ramsey, Anoka County, Minnesota.

I, the undersigned John O. Oliver, a Licensed Land Surveyor, Minnesota License Number 8194, do hereby certify that I am the surveyor who prepared the plat of RIVER'S BEND PLAZA, City of Ramsey, Anoka County, Minnesota, which was recorded April 10, 1987 as Document Number 754177, in the office of the County Recorder in and for said Anoka County.

I do hereby also certify that said plat is incorrect in that an angle on the south line of Lot 1, Block 1, thereof to the centerline of an easement is in the wrong quadrant.

I do hereby also certify that the correct angle, in the same quadrant as it now appears, should read 102 degrees 53 minutes 57 seconds.

John O. Oliver
John O. Oliver, Land Surveyor
Minnesota License No. 8194

Dated: January 27, 1992

Subscribed and sworn to before me this 27th day of January, 1992.

Sharon L. Sherwood
Notary Public, Sherburne County, Minnesota.

SHARON L. SHERWOOD NOTARY PUBLIC - MINNESOTA SHERBURNE COUNTY My Comm. Exp. JUNE 25, 1997

The above certificate of correction to the plat of RIVER'S BEND PLAZA, City of Ramsey, Anoka County, Minnesota, was approved by the City Council of the City of Ramsey, at a regular meeting thereof held this 11th day of February, 1992.

By: James H. Hufstetler, Mayor

Attest: Jan Schneider, City Administrator

CITY OF RAMSEY MUNICIPAL CORP. ANOKA COUNTY, MN

Drafted by:
John Oliver & Assoc., Inc.
922 Main St
Elk River, MN
55330

001 ACRA 4-10-87 #194 $30.00

Record ID 1484048

THIS DOCUMENT NUMBER REPRESENTS A PLAT

ABSTRACT DOCUMENT NUMBER	*RECORD ID*
754177.0	1484048
TORRENS DOCUMENT NUMBER	*RECORD ID*

MAP NUMBER 348

ABBREVIATED NAME RIVERS BEND PLAZA

FULL NAME RIVER'S BEND PLAZA

BOOK TYPE Abstract Plats

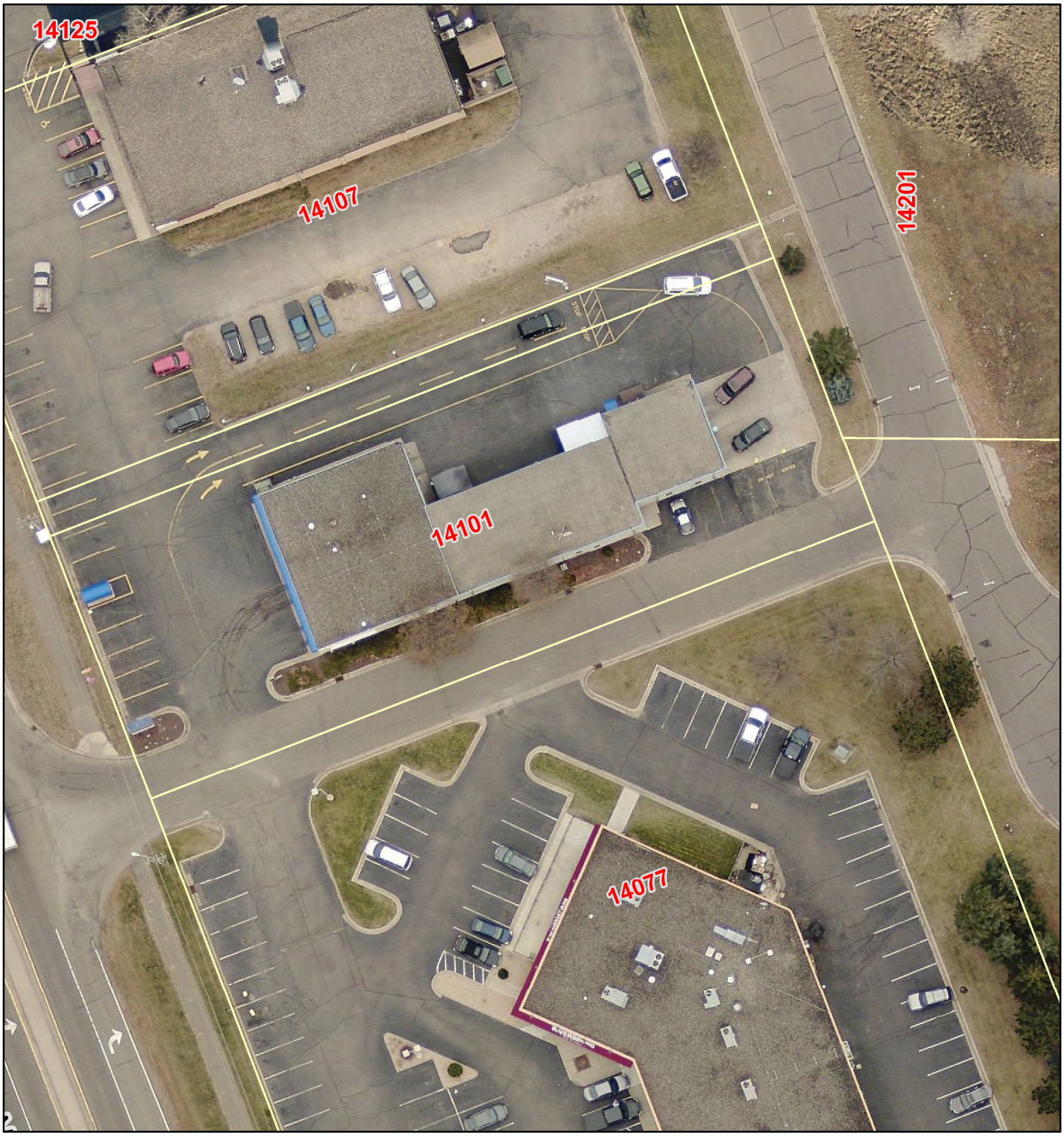
BOOK NUMBER 37

BOOK PAGE NUMBER 36

BOOK PAGE LETTER

CITY NAME RAMSEY

Blue Velvet Car Wash



December 12, 2019

1:600

0 25 50 100 ft

0 5 10 20 m

Disclaimer: Map and parcel data are believed to be accurate, but accuracy is not guaranteed. This is not a legal document and should not be substituted for a title search,appraisal, survey, or for zoning verification.

Public Works Committee **5. 4.**

Meeting Date: 02/18/2020

By: Sean Sullivan, Community Development

Title:

Discuss Options for Northern Nine (9) Acres of Lot 1, Block 1, Bury and Carlson Addition (Future Public Works Campus Site and Economic Development Parcel)

Purpose/Background:

Purpose:

To provide an update relating to Anderson Dahlen Purchase Agreement and to get recommendation from Public Works Committee on the future listing of the property.

Background:

The City did not receive a "Notice to Proceed" from Knoll Properties to move forward with their expansion on the North 9.3 acres of the Bury and Carlson site. Failure to give a "Notice to Proceed" by January 31, 2020 (end of "Inspection Period") terminates the Purchase Agreement. As a result, the City will refund the $67,500 Earnest Money according to the terms and conditions outlined in Paragraph 4(c) and 9(b). This is the third project proposed on this site that has not moved forward (previously Platinum Properties/Adrenaline Sports Center and Sharp Construction). Additionally, this scenario was conceived prior to execution of the Bunker Lake Industrial Park when developable industrial land was in scarce supply. The immediate urgency is not as strong as in previous years, but marketing this property does provide a number of economic development benefits.

The property is currently listed on MNCAR and Costar. Staff has received interest from two potential buyers and other brokers
while the property was under contract with Anderson Dahlen. Staff has obtained shovel ready certification for this site for the purposes of marketing and selling the site to the private sector for development. Staff believes that this site has the potential to develop by the private sector in the near future.

Staff is aware that that southern half of the site has been designated for the future Public Works Campus. The City did complete a Space Needs Analysis as it relates to the Future Public Works Campus that identified the northern 9 acres as potential for industrial development. Previous direction from the City Council has guided this property for private industrial development. The planning and feasibility for the future Public Works Campus is underway. As the final planning stages are underway for the Future Public Works Campus Site, the Public Works Department has requested that the City at least consider pausing listing this property until final plans and specifications are complete to ensure additional land is not necessary for public works use. An architect has been selected to prepare final plans and specification. As part of that process, it has been discussed re-evaluating the reuse of existing buildings on site, which may impact the space needs on this parcel.

Notification:

N/A

Observations/Alternatives:

Funding Source:

This action is being handled under normal staff duties

Recommendation:

After review by the EDA and Public Works Superintendent, the current recommendation is to revise the listing from 9 acres to 7 acres to allow flexibility in final Public Works Campus Design.

Action:

Motion to recommend that the City Council revise the listing from 9 acres to 7 acres to allow flexibility in final Public Works Campus Design.

Attachments

Site Location Map

Original Purchase Agreement

Current Purchase Agreement Extension

Revised Listing Diagram

Form Review

Inbox	Reviewed By	Date
Sean Sullivan	JoAnn Shaw	02/13/2020 12:45 PM
Tim Gladhill (Originator)	Tim Gladhill	02/13/2020 01:07 PM
Grant Riemer	Grant Riemer	02/13/2020 01:10 PM
Kurt Ulrich	Kurt Ulrich	02/13/2020 01:20 PM
Form Started By: Tim Gladhill		Started On: 02/13/2020 12:01 PM
Final Approval Date: 02/13/2020		

Site Location Map - Anderson Dahlen

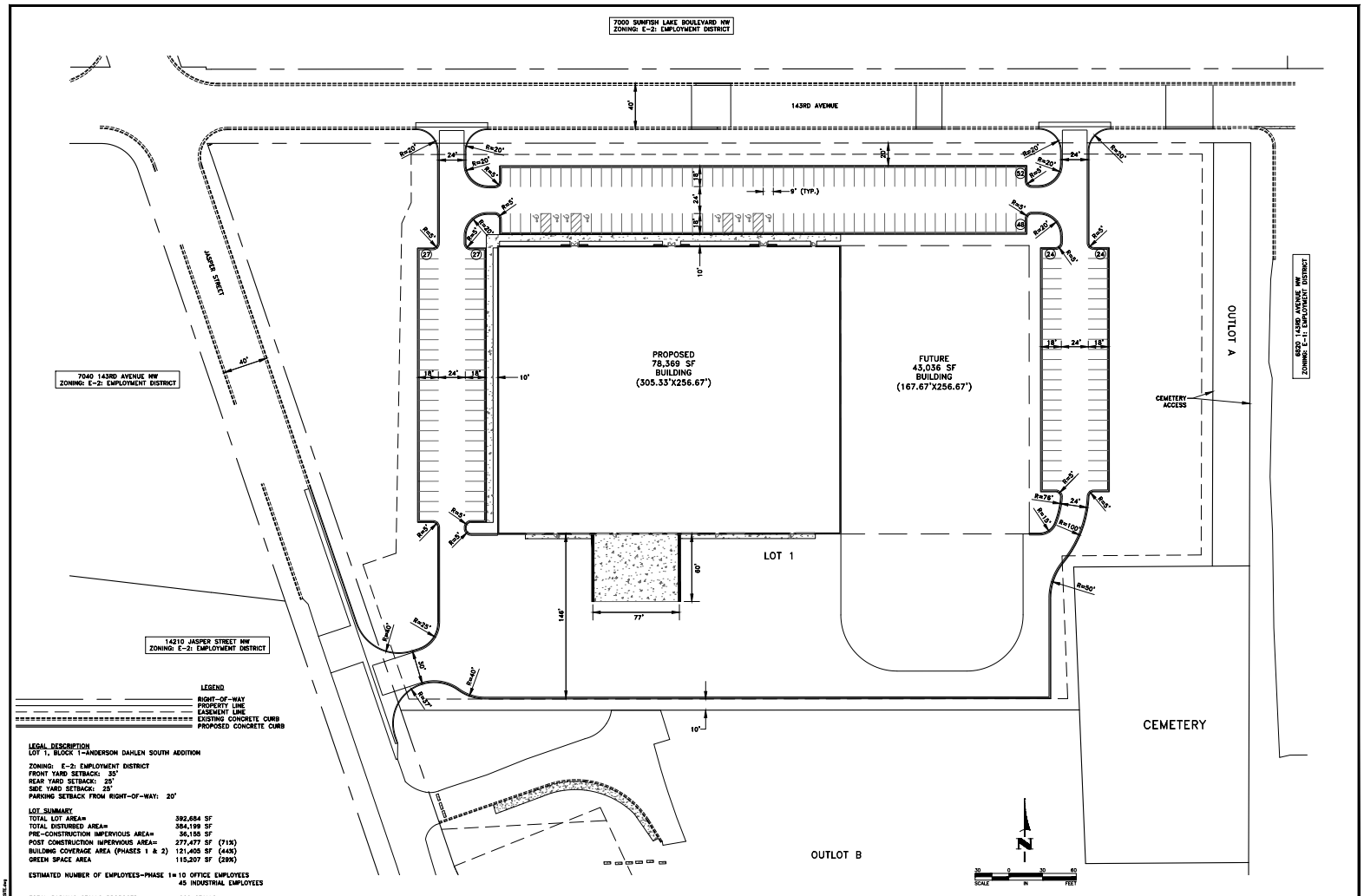
November 26, 2019

1:4,800

0 225 450 900 ft

0 65 130 260 m

Disclaimer: Map and parcel data are believed to be accurate, but accuracy is not guaranteed. This is not a legal document and should not be substituted for a title search,appraisal, survey, or for zoning verification.



LEGEND

- RIGHT-OF-WAY
- PROPERTY LINE
- EASEMENT LINE
- EXISTING CONCRETE CURB
- PROPOSED CONCRETE CURB

LEGAL DESCRIPTION
LOT 1, BLOCK 1-ANDERSON DAHLEN SOUTH ADDITION

ZONING: E-2: EMPLOYMENT DISTRICT
FRONT YARD SETBACK: 35'
REAR YARD SETBACK: 25'
SIDE YARD SETBACK: 25'
PARKING SETBACK FROM RIGHT-OF-WAY: 20'

LOT SUMMARY

TOTAL LOT AREA=	392,684 SF
TOTAL DISTURBED AREA=	384,199 SF
PRE-CONSTRUCTION IMPERVIOUS AREA=	36,155 SF
POST CONSTRUCTION IMPERVIOUS AREA=	277,477 SF (71%)
BUILDING COVERAGE AREA (PHASES 1 & 2)	121,405 SF (44%)
GREEN SPACE AREA	115,207 SF (29%)

ESTIMATED NUMBER OF EMPLOYEES-PHASE 1= 10 OFFICE EMPLOYEES
45 INDUSTRIAL EMPLOYEES

TOTAL PARKING STALLS PROPOSED= 202 STALLS

DATE	REVISION	DATE	REVISION
4/4/19	CITY SUBMITTAL		
4/25/19	SITE PLAN REVISIONS		
5/30/19	PLAN REVISIONS PER CITY REVIEW		

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.

Timothy A. Erdmann, P.E. Date 4/19/19 Lic. No. 43262

DRAWN TAE
DESIGN TAE
CHECKED CJJ

Hakanson Anderson
Civil Engineers and Land Surveyors
3601 Thurston Ave., Anoka, Minnesota 55303
763-427-5860 FAX 763-427-0520
www.hakanson-anderson.com

LOT 1, BLOCK 1
ANDERSON DAHLEN SOUTH ADDITION

SITE PLAN

CITY OF RAMSEY, MINNESOTA

SHEET C5 OF C9 SHEETS

3395.10

PURCHASE AGREEMENT

This Agreement is entered into by and between the **City of Ramsey**, a Minnesota municipal corporation ("Seller"), and **KNOLL PROPERTIES, LLC**, a Minnesota Limited Liability Company ("Buyer").

In consideration of the Earnest Money, the mutual covenants set forth below, and other good and valuable consideration, the receipt and sufficiency of which are hereby acknowledged, Seller and Buyer agree as follows:

1. **EFFECTIVE DATE.** The effective date of this Agreement is **April 23, 2019** (the "Effective Date").

2. **SALE OF PROPERTY.** Seller agrees to sell to Buyer, and Buyer agrees to buy from Seller 9.3 acres of vacant land, legally described as follows:

   The North 9.3 acres of Lot 1, Block 1, Bury and Carlson Addition, Anoka County, Minnesota. (the "Property")

   Addresses: 7XXX 143rd Avenue Northwest, Ramsey, MN 55303

   Anoka County Property Identification: The North 9.3 acres of 27-32-25-34-0009;

3. **PURCHASE PRICE.** The purchase price for the Property is $675,000.00 (the "Purchase Price").

4. **EARNEST MONEY AND ADDITIONAL EARNEST MONEY.** Within (5) business days after the Effective Date, Buyer must deposit the sum of $67,500.000 (the "Earnest Money") with Commercial Partners Title Company, 200 South 6th Street, #1300, Minneapolis, MN 55402 ("Escrow Agent"), via wire transfer or delivery of a certified check payable to Escrow Agent.

   a. If Buyer does not deposit the Earnest Money with Escrow Agent as required above, then Seller may terminate this Agreement by written notice to Buyer; provided, however, if Buyer deposits the Earnest Money with Escrow Agent before Seller exercises Seller's right to terminate, Seller's right to terminate is extinguished.

b. Upon Seller's receipt of a Notice to Proceed from Buyer in accordance with Section 9(b), all of the Earnest Money becomes non-refundable (except in accordance with Section 22 as a result of a default by Seller).

c. If Buyer does not provide a Notice to Proceed to Seller in accordance with Section 9(b), this Agreement automatically terminates and Escrow Agent must disburse all Earnest Money Escrow Agent holds to Buyer.

d. At Closing, Escrow Agent shall disburse to Seller any Earnest Money not previously disbursed to Seller, and Buyer shall receive a credit against the Purchase Price owing at Closing in an amount equal to the amount of the Earnest Money.

5. **SURVEY.** Seller shall, at Seller's expense, obtain an ALTA/NSPS 2016 survey (Table A, items 1-4 and 6, 8, and 11) (the "Survey") from a duly licensed surveyor and deliver it to Buyer within thirty (30) days after the Effective Date. Buyer may arrange with the surveyor to include additional information on the Survey at Buyer's expense.

6. **TITLE COMMITMENT.**

a. Seller makes no representations or warranties with respect to the status of title to the Property. Within thirty (30) business days after the Effective Date, Seller shall, at Seller's expense, obtain a commitment from Escrow Agent to issue an owner's policy of title insurance insuring Buyer's title to the Property (the "Title Commitment") and deliver the Title Commitment and copies of or internet access to copies of all recorded documents referenced in the Title Commitment to Buyer.

b. Buyer shall have until the date thirty (30) days after the receipt of the Title Commitment and the Survey (collectively, "**Title/Survey**") to review Title/Survey and to give Seller written notice of (i) any defects in the marketability of Seller title to the Property or any encumbrances on Seller's title to the Property that are objectionable to Buyer, and (ii) the specific actions Buyer requests that Seller take with respect to each such defect or encumbrance (a "**Title Objection Notice**"). Any defects in or encumbrances on Seller's title that Buyer does not identify in a timely Title Objection Notice are each a "**Permitted Exception**." Within three (3) business days after Seller's receipt of a Title Objection Notice from Buyer, Seller will notify Buyer, in writing, of the actions, if any, that Seller is willing to take with respect to each of the matters identified in the Title Objection Notice and the time frame in which Seller will take those actions ("**Seller's Title Notice**"). If Seller's Title Notice indicates that Seller unconditionally agrees to make Seller's title to the Property marketable on or before the closing date established pursuant to Section 10, the parties shall proceed to closing pursuant to the terms of this Agreement. If Seller's Title Notice indicates that Seller does not unconditionally agree to make Seller's Title to the Property marketable on or before the closing date established in Section 10, Buyer may, at any time with three (3) business days after Buyer's receipt of

Seller's Title Notice, terminate this Agreement by written notice to Buyer in which case this Agreement is terminated and Escrow Agent must disburse any Earnest Money to Buyer ("**Buyer's Title Termination Notice**"). If Buyer does not deliver a Buyer's Title Termination Notice to Seller within the three (3) business days after Buyer's receipt of Seller's Title Notice, than Seller must perform in accordance with Seller's Title Notice, Buyer shall be deemed to have waived Buyer's objections to the extent Seller has not agreed to address them in Seller's Title Notice, the matters to which Buyer objected and Seller did not agree to resolve are deemed Permitted Exceptions, and the parties shall proceed to Closing in accordance with the terms of this Agreement and the terms of Seller's Title Notice.

7. **RIGHT OF ENTRY.** At all times after Buyer has deposited the Earnest Money with Seller and before the Closing, Buyer (and its employees, agents, and contractors) may enter the Property for the purpose of conducting soil tests, environmental tests and additional survey work, subject to the following conditions:

   a. Within one week after the termination of this Agreement, if either Seller or Buyer terminate this Agreement in accordance with the provisions hereof prior to Closing, Buyer must repair and or restore any damage Buyer or its employees, agents or contractors cause to the Property and remove any personal property, refuse or debris Buyer or its employees, agents or contractors brought onto or authorized third parties to bring onto the Property.

   b. Buyer must defend and indemnify Seller from and against and hold Seller harmless Seller from all "Claims," as defined in Section 10, arising out of, resulting from or relating to any loss of or damage to any property or business or out of any injury to or death of any person, if the loss, damage, injury, or death arises or is alleged to arise either directly or indirectly and either wholly or in part from: (a) any action or omission of Buyer or its employees, agents, or contractors, while on the Property pursuant to this Section; or (b) actions or omissions of Buyer or Buyer's employees, agents, or contractors that cause or result in the release of any Hazardous Substance onto the Property or onto other property.

   c. Buyer must comply with and shall cause it employees, agents, and contractors to comply with all applicable laws, while on the Property.

   d. Other than a standard Phase 1 environmental assessment, Buyer may not commence any environmental testing on the Property until Buyer submits a work plan for such testing to Seller and Seller approves the work plan, in writing. Seller may not unreasonably withhold, condition or delay Seller's approval of a work plan.

   e. Buyer must, promptly and without demand from Seller, provide Seller with true and complete copies of all draft and final reports relating to Buyer's geotechnical and environmental investigations and testing of the Property including, without

limitation, any reports relating to any Phase I Environmental Site Assessment of the Property.

f. The cost of any test or additional survey work will be borne solely by Buyer.

8. **PROPERTY SOLD AS IS.** Subject to Buyer's right to terminate this Agreement pursuant to Section 9, Buyer agrees to accept the Property in its current condition, including, without limitation, its current environmental and geological condition, and in an "AS-IS" and with "ALL FAULTS" condition. Buyer's payment of the Purchase Price at Closing constitutes Buyer's acknowledgment and agreement that:

   a. Seller has not made any written or oral representations or warranties of any kind with respect to the Property (including without limitation express or implied warranties of title, merchantability, or fitness for a particular purpose);

   b. Buyer has not relied on any written or oral representation or warranty made by Seller, its agents or employees with respect to the condition or value of the Property;

   c. Buyer has had an adequate opportunity to inspect the condition of the Property, including without limitation any environmental testing, and to inspect documents applicable thereto, and Buyer is relying solely on such inspection and testing;

   d. The condition of the Property is fit for Buyer's intended use; and

   e. Buyer accepts all risk of Claims (including without limitation all Claims under any Environmental Law and all Claims arising at common law, in equity or under a federal, state or local statute, rule or regulation) whether past, present or future, existing or contingent, known or unknown, arising out of, resulting from or relating to the condition of the Property, known or unknown, contemplated or uncontemplated, suspected or unsuspected, including without limitation the presence of any Hazardous Substance on the Property, whether such Hazardous Substance is located on or under the Property, or has migrated from or to the Property.

9. **INSPECTION PERIOD.**

   a. Except as otherwise provided in Section 6, Buyer shall have from the date that Buyer deposits the Earnest Money with Escrow Agent to **June 23, 2019** (the "**Inspection Period**") to investigate the Property and determine, in Buyer's sole judgment, whether (i) the condition of the Property is suitable to Buyer's intended use; and (ii) Buyer will be able to obtain all governmental approvals (including, but not limited to, approvals necessary to subdivide and re-plat the Property) and utilities necessary for Buyer's intended use of the Property. Buyer acknowledges and agrees that Seller has not made any covenants, representations or warranties regarding Buyer's ability to obtain governmental approvals from the City of

Ramsey or any other governmental entity. The City of Ramsey will review, consider and act on any applications Buyer submits to the City for governmental approvals in accordance with City Code.

b. Buyer may, at any time on or before 5:00 p.m. on the last day of the Inspection Period, terminate the Agreement by written notice to Seller based on Buyer's determination, in Buyer's sole and absolute discretion, that the condition of the Property is not suitable for Buyer's intended use or that Buyer may not be able to obtain all governmental approvals and utilities necessary for Buyer's intended use of the Property. In addition, this Agreement automatically terminates at 5:00 p.m. on the last day of the Inspection Period unless, prior to that time Buyer delivers a written notice of Buyer's intention to proceed (a "**Notice to Proceed**") to Seller.

c. If, pursuant to Section 9(b) either Buyer terminates this Agreement or this Agreement is automatically terminated, the Escrow Agent must disburse to Buyer any Earnest Money Escrow Agent holds.

10. DEFINITIONS. As used in this Agreement:

"**Claim**" or "**Claims**" means any and all liabilities, suits, claims, counterclaims, causes of action, demands, penalties, debts, obligations, promises, acts, fines, judgments, damages, consequential damages, losses, costs, and expenses of every kind (including without limitation any attorney's fees, consultant's fees, costs, remedial action costs, cleanup costs and expenses which may be related to any claims).

"**Environmental Law**" means the Comprehensive Environmental Response, Compensation and Liability Act ("CERCLA"), 42 U.S.C. § 9601 et seq., the Resource Conservation and Recovery Act, 42 U.S.C. § 6901 et seq., the Federal Water Pollution Control Act (the Clean Water Act), 33 U.S.C. § 1251 et seq. the Clean Air Act, 42 U.S.C. § 7401 et seq., and the Toxic Substances Control Act, 15 U.S.C. § 2601 et seq., all as amended from time to time, and any other federal, state, local or other governmental statute, regulation, rule, law or ordinance dealing with the protection of human health, safety, natural resources or the environment now existing or hereafter enacted.

"**Hazardous Substance**" or "**Hazardous Substances**" means any pollutant, contaminant, hazardous substance or waste, solid waste, petroleum product, distillate, or fraction, radioactive material, chemical known to cause cancer or reproductive toxicity, polychlorinated biphenyl or any other chemical, substance or material listed or identified in or regulated by any Environmental Law.

11. RELEASE. By accepting the deed to the Property, Buyer, for itself, its directors, officers, stockholders, divisions, agents, affiliates, subsidiaries, predecessors, successors, and assigns and anyone acting on its behalf or their behalf hereby fully releases and forever discharges Seller from any and all Claims (including without limitation all Claims arising under any Environmental Law and all Claims arising at common law, in equity or under a federal, state or local statute, rule or regulation), past, present and future, known

and unknown, existing and contingent, arising out of, resulting from, or relating to the condition of the Property, and Buyer hereby waives any and all causes of action (including without limitation any right of contribution) Buyer had, has or may have against Seller and anyone acting on its behalf with respect to the condition of the Property, whether arising at common law, in equity or under a federal, state or local statute, rule or regulation. The foregoing shall apply to any condition of the Property, known or unknown, contemplated or uncontemplated, suspected or unsuspected, including without limitation the presence of any Hazardous Substance on the Property, whether such Hazardous Substance is located on or under the Property, or has migrated from or to the Property.

12. **NOTICES.** Notices permitted or required by this Agreement must be in writing and shall be deemed given when delivered in legible form to the party to whom addressed. Notices may be sent by certified mail or e-mail. Notices are effective two business days after they are mailed via certified mail, return receipt requested or, if sent by email, upon email transmission (provided that any email transmission that occurs after 5:00 pm Pacific Time will be deemed provided on the following day). If delivered at the Closing, a notice shall be deemed given when hand-delivered to the party's representative at the Closing. The business addresses of the parties are as follows:

Seller: City Administrator
City of Ramsey
7550 Sunwood Drive N.W.
Ramsey, MN 55303
Email: kulrich@cityoframsey.com

Buyer: Knoll Properties , LLC
David Knoll
6850 Sunwood Drive NW
Ramsey, MN 55303
Email: knod@andersondahlen.com

Notices not given in the manner or within the time limits set forth in this Agreement are of no effect and may be disregarded by the party to whom they are directed.

13. **CLOSING.** This transaction shall close within 30 days after Buyer delivers a Notice to Proceed to Seller or on such earlier date as Seller and Buyer may establish by mutual, written agreement; provided, however, Buyer may extend the Closing a total of two (2) times, each time for a period of thirty (60) days at a cost of Five Thousand and 00/100's Dollars ($5,000.00). Each $5,000.00 extension payment to the City shall be non-refundable, but applicable to the Purchase Price. The Closing shall take place at the offices of the Escrow Agent, or at some other place as the parties may mutually agree prior to such date. At the option of either Party, the executed closing documents, Purchase Price and closing costs may be deposited with the Escrow Agent and disbursed by the Escrow Agent to avoid the necessity for a Closing at which the Parties are present.

a. **Seller's Obligations at Closing.** At Closing, Seller must deliver to Escrow Agent, for delivery to Buyer:

i. A limited warranty deed, duly executed and acknowledged on behalf of the City and with the City's seal affixed, conveying title to the Property, subject to (A) the lien of real estate taxes, if any, not yet due and payable and any installments of special assessments certified for payment therewith; (B) Building, Subdivision and Zoning Ordinances; (C) Matters that would be disclosed by an accurate survey of the Property; and (D) matters that constitute Permitted Exceptions pursuant to Section 6;

ii. A certified copy of a duly adopted City Ordinance and Resolution authorizing Seller's sale of the Property to Buyer; and

iii. Seller's affidavits, well disclosure certificate (if required), settlement statement approved by Seller and Buyer, and any other documents required by the Escrow Agent.

b. **Buyer's Obligations at Closing.** At Closing, Buyer must:

i. Wire Transfer (or deliver a certified check in) an amount equal to the amount of the Purchase Price adjusted for to reflect Buyer's prior payment of the Earnest Money and to reflect amounts Buyer must pay or will receive pursuant to Section 14(c), to Escrow Agent for disbursement to Seller and others pursuant to this Agreement and the Settlement Statement; and

ii. File or cause Escrow Agent to file an Electronic Certificate of Real Estate Value, if required and necessary.

c. **Closing Costs.**

i. At Closing, the following Seller closing costs and expenses must be paid from the Purchaser Price or, if the Purchase Price is not sufficient, paid by Seller:

1. Seller's portion of the prorated property taxes.
2. Seller's own attorney's fees.
3. One-half the cost of any closing fees.
4. The cost of real estate broker commission fees as prescribed in Section 15.

ii. At Closing Buyer must pay the Purchase Price to Seller and the following costs and expenses:

1. Buyer's portion of prorated property taxes.

2. Buyer's own attorney's fees.
3. One-half the cost of any closing fees.
4. Documentary and recording fees for the deed(s).
5. The cost of the owner's title insurance policy, if Buyer elects to purchase an Owner's title insurance policy.
6. State deed tax.

d. **Possession.** Seller must deliver possession of the Property to Buyer at Closing.

14. REAL ESTATE BROKERS. Seller and Buyer represent and warrant to each other that they have dealt with no brokers, real estate agents, finders or the like in connection with this transaction. To the extent allowed by law, Seller and Buyer agree to indemnify each other and to hold each other harmless against all claims, damages, costs or expenses of or for any broker's fees or commissions resulting for their actions or agreements regarding the execution or performance of this Agreement, other than the fees payable to Seller's Broker, and will pay all costs of defending any action or lawsuit brought to recover any such fees or commissions incurred by the other party, including reasonable attorney's fees.

15. ASSIGNMENT. This Agreement may not be assigned without the written consent of the non-assigning Party.

16. THIRD PARTY BENEFICIARY. There are no third party beneficiaries of this Agreement, intended or otherwise.

17. JOINT VENTURE. Seller and Buyer, by entering into this Agreement and completing the transactions described herein, shall not be considered joint venturers or partners.

18. CAPTIONS. The paragraph headings or captions appearing in this Agreement are for convenience only, are not a part of this Agreement, and are not to be considered in interpreting this Agreement.

19. ENTIRE AGREEMENT / MODIFICATION. This written Agreement constitutes the complete agreement between the parties and supersedes any prior oral or written agreements between the parties regarding the Property. There are no verbal agreements that change this Agreement and no waiver or modification of any of its terms will be effective unless in writing executed by the parties.

20. BINDING EFFECT. This Agreement binds and benefits the Parties and their successors and assigns.

21. CONTROLLING LAW. This Agreement is made under the laws of the State of Minnesota and such laws will control its interpretation.

22. REMEDIES.

a. If Buyer fails to perform any of the terms or conditions of this Agreement within the specified time limits, Seller may declare this Agreement terminated pursuant to Minnesota Statutes section 559.21. Seller's sole remedy in the event of Buyer's default is retention of the Earnest Money, unless Buyer defaults under Section 7 or 12 of this Agreement, in which case Seller may retain the Earnest money or suspend the performance of its obligations under this Agreement and commence an action in Anoka County District Court to recover its actual damages arising from the default.

b. If Seller fails to perform any of the terms or conditions of this Agreement within the specified time limits, Buyer may, as its sole remedy, declare this Agreement terminated in which case Escrow Agent and, if applicable, Seller, shall refund the Earnest Money (both the Initial Disbursement and the Remaining Earnest Money) to Buyer, or, in the alternative, Buyer may have this Agreement specifically enforced and recover any incidental damages. Buyer waives all claims for consequential damages against Seller based on Seller's breach or alleged default hereunder.

23. **WAIVER.** Failure of Seller or Buyer to insist upon the performance of any of the covenants, agreements and/or conditions of this Agreement or to exercise any right or privilege herein shall not be deemed a waiver of any such covenant, condition or right.

24. **SURVIVAL OF TERMS AND CONDITIONS.** The terms and conditions of this Agreement shall survive and be in full force and effect after the delivery of the deed and shall not be deemed to have merged therein.

25. **SEVERABILITY.** Each provision of this Agreement shall apply to the extent permitted by applicable law and is intended to be severable. If any provision is illegal or invalid for any reason whatsoever, such illegality or invalidity shall not affect the legality or validity of the remainder of the Agreement.

26. **CONSTRUCTION.** The Parties acknowledge that this Agreement was initially prepared by Seller solely as a convenience and that all Parties and their counsel hereto have read and full negotiated all the language used in this Agreement. The Parties acknowledge that because all Parties and their counsel participated in negotiating and drafting this Agreement, no rule of construction shall apply to this Agreement to construe ambiguous or unclear language in favor of or against any Party.

27. **COUNTERPARTS; DIGITAL COPIES.** This Agreement may be executed in any number of counterparts and the signature pages of the separate counterparts combined into a single copy of this Agreement which will then constitute a fully executed version of this Agreement. A facsimile, .pdf file or digital copy of a signed counterpart or of an assemblage of counterparts of this Agreement shall be deemed to be an original thereof.

28. **CONSTRUCTION DEADLINE.** Buyer shall obtain a certificate of occupancy from the City of Ramsey for the construction of a minimum of 60,000 SF manufacturing facility

on the Property by July 31, 2020. At Closing, a "Right of Re-Entry Agreement" must be executed and recorded to the Property providing that, in the event the above deadline is not met, Seller has the right to reclaim title to the parcel(s) for which a certificate of occupancy was not obtained or in the alternative, and at Seller's sole discretion, Buyer shall pay Seller a $150,000 penalty. In the event the penalty is not paid within 30 days of receipt of notice, Seller may certify the penalty to Anoka County as an assessment against the Property.

29. **TIME PERIODS.** The time for performance of any obligation or taking any action under this Agreement shall be deemed to expire at 5:00 p.m. Pacific Time on the last day of the applicable time period provided for in this Agreement. If the time for the performance of any obligation or taking any action under this Agreement expires on a Saturday, Sunday or legal holiday, the time for performance or taking such action shall be extended to the next succeeding day which is not a Saturday, Sunday or legal holiday.

30. **PLATTING & DEVELOPMENT AGREEMENT.** Buyer must obtain an approved final plat, development agreement, and building exterior visual renderings with the City of Ramsey for its intended project before Closing. The Development Agreement and Site Plan must comply with all local zoning ordinances and design standards, including The COR Design Standards.

SELLER: The City of Ramsey, a Minnesota municipal corporation

By: _____ Dated: 4-26-2019, 2019
John LeTourneau, Mayor

By: _____ Dated: 4/26, 2019
Kurt Ulrich, City Administrator

BUYER: KNOLL PROPERTIES, LLC, a Minnesota Limited Liability Company.

By: _____ Dated: APRIL 25, 2019
David J. Knoll, Chief Manager

PURCHASE AGREEMENT

This Purchase Agreement (this "**Agreement**") is entered into by and between the **City of Ramsey**, a Minnesota municipal corporation ("**Seller**"), and **KNOLL PROPERTIES, LLC**, a Minnesota Limited Liability Company ("**Buyer**").

RECITALS

A. **WHEREAS,** Buyer and Seller previously entered into that certain Purchase Agreement dated effective April 23, 2019 (the "**Prior Agreement**"), wherein Buyer agreed to purchase the Property (as defined below).

B. **WHEREAS,** prior to the transaction closing, the Prior Agreement automatically terminated pursuant to its terms and is null and void and of no effect.

C. **WHEREAS,** Seller desires to sell the Property to Buyer, and Buyer desires to purchase the Property from Seller, pursuant to the terms and conditions set forth in this Agreement.

NOW, THEREFORE, in consideration of the Earnest Money, the mutual covenants set forth below, and other good and valuable consideration, the receipt and sufficiency of which are hereby acknowledged, Seller and Buyer agree as follows:

1. **EFFECTIVE DATE.** The effective date of this Agreement is **November 26, 2019** (the "**Effective Date**").

2. **SALE OF PROPERTY.** Seller agrees to sell to Buyer, and Buyer agrees to buy from Seller 9.3 acres of vacant land, legally described as follows:

   The North 9.3 acres of Lot 1, Block 1, Bury and Carlson Addition, Anoka County, Minnesota.

   To be platted as Lot 1, Block 1, Anderson Dahlen South Addition, Anoka County Minnesota (the "**Property**")

   Addresses: 7XXX 143rd Avenue Northwest, Ramsey, MN 55303

   Anoka County Property Identification: The North 9.3 acres of 27-32-25-34-0009;

3. **PURCHASE PRICE.** The purchase price for the Property is $675,000.00 (the "**Purchase Price**").

4. **EARNEST MONEY AND ADDITIONAL EARNEST MONEY.** The parties agree that Buyer has deposited $67,500.000 (the "**Earnest Money**") with Commercial Partners Title Company, 200 South 6th Street, #1300, Minneapolis, MN 55402 ("**Escrow Agent**").

   a. Intentionally deleted.

   b. Upon Seller's receipt of a Notice to Proceed (as defined in Section 9(b) below) from Buyer in accordance with Section 9(b), all of the Earnest Money becomes non-refundable (except in accordance with Section 22 as a result of a default by Seller).

   c. If Buyer does not provide a Notice to Proceed to Seller in accordance with Section 9(b), this Agreement automatically terminates and Escrow Agent must immediately disburse all Earnest Money Escrow Agent holds to Buyer.

   d. At Closing, Escrow Agent shall disburse to Seller any Earnest Money not previously disbursed to Seller, and Buyer shall receive a credit against the Purchase Price owing at Closing in an amount equal to the amount of the Earnest Money.

5. **SURVEY.** Seller shall, at Seller's expense, obtain an ALTA/NSPS 2016 survey (Table A, items 1-4 and 6, 8, and 11) (the "**Survey**") from a duly licensed surveyor and deliver it to Buyer within thirty (30) days after the Effective Date. Buyer may arrange with the surveyor to include additional information on the Survey at Buyer's expense.

6. **TITLE COMMITMENT.**

   a. Seller makes no representations or warranties with respect to the status of title to the Property; provided, however, Buyer shall have the rights described in subsection 6(b) below to satisfy itself as to the unconditional marketability of title to the Property. Within thirty (30) business days after the Effective Date, Seller shall, at Seller's expense, obtain a commitment from Escrow Agent to issue an owner's policy of title insurance insuring Buyer's title to the Property (the "**Title Commitment**") and deliver the Title Commitment and copies of or internet access to copies of all recorded documents referenced in the Title Commitment to Buyer.

   b. Buyer shall have until December 31, 2019 to review the Title Commitment and the Survey and to give Seller written notice of (i) any defects in the marketability of Seller title to the Property or any encumbrances on Seller's title to the Property that are objectionable to Buyer, and (ii) the specific actions Buyer requests that Seller take with respect to each such defect or encumbrance (a "**Title Objection Notice**"). Any defects in or encumbrances on Seller's title that Buyer does not identify in a timely Title Objection Notice are each a "**Permitted Exception.**" Within three (3) business days after Seller's receipt of a Title Objection Notice from Buyer, Seller will notify Buyer, in writing, of the actions, if any, that Seller is willing to take with respect to each of the matters identified in the Title Objection Notice and the time frame in which Seller will take those actions ("**Seller's Title Notice**"). If Seller's Title Notice indicates that Seller unconditionally agrees to make Seller's title to the

Property marketable on or before the closing date established pursuant to Section 10, the parties shall proceed to closing pursuant to the terms of this Agreement. If Seller's Title Notice indicates that Seller does not unconditionally agree to make Seller's Title to the Property marketable on or before the closing date established in Section 10, Buyer may, at any time with three (3) business days after Buyer's receipt of Seller's Title Notice, terminate this Agreement by written notice to Buyer in which case this Agreement is terminated and Escrow Agent must disburse any Earnest Money to Buyer and neither Party will have any further obligations under this Agreement ("**Buyer's Title Termination Notice**"). If Buyer does not deliver a Buyer's Title Termination Notice to Seller within the three (3) business days after Buyer's receipt of Seller's Title Notice, then Seller must perform in accordance with Seller's Title Notice, Buyer shall be deemed to have waived Buyer's objections to the extent Seller has not agreed to address them in Seller's Title Notice, the matters to which Buyer objected and Seller did not agree to resolve are deemed Permitted Exceptions, and the parties shall proceed to Closing in accordance with the terms of this Agreement and the terms of Seller's Title Notice.

7. **RIGHT OF ENTRY.** At all times before the Closing, Buyer (and its employees, agents, and contractors) may enter the Property for the purpose of conducting soil tests, environmental tests and additional survey work, subject to the following conditions:

   a. Within one week after the termination of this Agreement, if either Seller or Buyer terminate this Agreement in accordance with the provisions hereof prior to Closing, Buyer must repair and or restore any damage Buyer or its employees, agents or contractors cause to the Property and remove any personal property, refuse or debris Buyer or its employees, agents or contractors brought onto or authorized third parties to bring onto the Property.

   b. Buyer must defend and indemnify Seller from and against and hold Seller harmless Seller from all "**Claims**," as defined in Section 10, arising out of, resulting from or relating to any loss of or damage to any property or business or out of any injury to or death of any person, if the loss, damage, injury, or death arises or is alleged to arise either directly or indirectly and either wholly or in part from: (a) any action or omission of Buyer or its employees, agents, or contractors, while on the Property pursuant to this Section; or (b) actions or omissions of Buyer or Buyer's employees, agents, or contractors that cause or result in the release of any Hazardous Substance onto the Property or onto other property.

   c. Buyer must comply with and shall cause it employees, agents, and contractors to comply with all applicable laws, while on the Property.

   d. Other than a standard Phase 1 environmental assessment, Buyer may not commence any environmental testing on the Property until Buyer submits a work plan for such testing to Seller and Seller approves the work plan, in writing. Seller may not unreasonably withhold, condition or delay Seller's approval of a work plan.

e. Buyer must, promptly and without demand from Seller, provide Seller with true and complete copies of all draft and final reports relating to Buyer's geotechnical and environmental investigations and testing of the Property including, without limitation, any reports relating to any Phase I Environmental Site Assessment of the Property.

f. The cost of any test or additional survey work will be borne solely by Buyer.

8. **PROPERTY SOLD AS IS.** Except as expressly set forth in this Agreement, and subject to Buyer's right to terminate this Agreement pursuant to Section 9, Buyer agrees to accept the Property in its current condition, including, without limitation, its current environmental and geological condition, and in an "**AS-IS**" and with "**ALL FAULTS**" condition. Buyer's payment of the Purchase Price at Closing constitutes Buyer's acknowledgment and agreement that:

a. Seller has not made any written or oral representations or warranties of any kind with respect to the Property (including without limitation express or implied warranties of title, merchantability, or fitness for a particular purpose);

b. Buyer has not relied on any written or oral representation or warranty made by Seller, its agents or employees with respect to the condition or value of the Property;

c. Buyer has had an adequate opportunity to inspect the condition of the Property, including without limitation any environmental testing, and to inspect documents applicable thereto, and Buyer is relying solely on such inspection and testing;

d. The condition of the Property is fit for Buyer's intended use; and

e. Buyer accepts all risk of Claims (including without limitation all Claims under any Environmental Law and all Claims arising at common law, in equity or under a federal, state or local statute, rule or regulation) whether past, present or future, existing or contingent, known or unknown, arising out of, resulting from or relating to the condition of the Property, known or unknown, contemplated or uncontemplated, suspected or unsuspected, including without limitation the presence of any Hazardous Substance on the Property, whether such Hazardous Substance is located on or under the Property, or has migrated from or to the Property.

9. **INSPECTION PERIOD.**

a. Except as otherwise provided in Section 6, Buyer shall have through **January 31, 2020** (the "**Inspection Period**") to investigate the Property and determine, in Buyer's sole judgment, whether (i) the condition of the Property is suitable to Buyer's intended use and the purchase and development of the Property is economically feasible; and (ii) Buyer will be able to obtain all governmental approvals (including, but not limited to, approvals necessary to subdivide and re-

plat the Property) and utilities necessary for Buyer's intended use of the Property. Buyer acknowledges and agrees that Seller has not made any covenants, representations or warranties regarding Buyer's ability to obtain governmental approvals from the City of Ramsey or any other governmental entity. The City of Ramsey will review, consider and act on any applications Buyer submits to the City for governmental approvals in accordance with City Code.

b. Buyer may, at any time on or before 5:00 p.m. on the last day of the Inspection Period, terminate this Agreement by written notice to Seller based on Buyer's determination, in Buyer's sole and absolute discretion, that the condition of the Property is not suitable for Buyer's intended use, that the development of the Property is not economically feasible, or that Buyer may not be able to obtain all governmental approvals and utilities necessary for Buyer's intended use of the Property. In addition, this Agreement automatically terminates at 5:00 p.m. on the last day of the Inspection Period unless, prior to that time Buyer delivers a written notice of Buyer's intention to proceed (a "**Notice to Proceed**") to Seller.

c. If, pursuant to Section 9(b) either Buyer terminates this Agreement or this Agreement is automatically terminated, the Escrow Agent must immediately disburse to Buyer any Earnest Money Escrow Agent holds and neither Party will have any further obligations under this Agreement.

10. DEFINITIONS. As used in this Agreement:

"**Claim**" or "**Claims**" means any and all liabilities, suits, claims, counterclaims, causes of action, demands, penalties, debts, obligations, promises, acts, fines, judgments, damages, consequential damages, losses, costs, and expenses of every kind (including without limitation any attorney's fees, consultant's fees, costs, remedial action costs, cleanup costs and expenses which may be related to any claims).

"**Environmental Law**" means the Comprehensive Environmental Response, Compensation and Liability Act ("CERCLA"), 42 U.S.C. § 9601 et seq., the Resource Conservation and Recovery Act, 42 U.S.C. § 6901 et seq., the Federal Water Pollution Control Act (the Clean Water Act), 33 U.S.C. § 1251 et seq. the Clean Air Act, 42 U.S.C. § 7401 et seq., and the Toxic Substances Control Act, 15 U.S.C. § 2601 et seq., all as amended from time to time, and any other federal, state, local or other governmental statute, regulation, rule, law or ordinance dealing with the protection of human health, safety, natural resources or the environment now existing or hereafter enacted.

"**Hazardous Substance**" or "**Hazardous Substances**" means any pollutant, contaminant, hazardous substance or waste, solid waste, petroleum product, distillate, or fraction, radioactive material, chemical known to cause cancer or reproductive toxicity, polychlorinated biphenyl or any other chemical, substance or material listed or identified in or regulated by any Environmental Law.

11. **RELEASE.** By accepting the deed to the Property, Buyer, for itself, its directors, officers, stockholders, divisions, agents, affiliates, subsidiaries, predecessors, successors, and assigns and anyone acting on its behalf or their behalf hereby fully releases and forever discharges Seller from any and all Claims (including without limitation all Claims arising under any Environmental Law and all Claims arising at common law, in equity or under a federal, state or local statute, rule or regulation), past, present and future, known and unknown, existing and contingent, arising out of, resulting from, or relating to the condition of the Property, and Buyer hereby waives any and all causes of action (including without limitation any right of contribution) Buyer had, has or may have against Seller and anyone acting on its behalf with respect to the condition of the Property, whether arising at common law, in equity or under a federal, state or local statute, rule or regulation. The foregoing shall apply to any condition of the Property, known or unknown, contemplated or uncontemplated, suspected or unsuspected, including without limitation the presence of any Hazardous Substance on the Property, whether such Hazardous Substance is located on or under the Property, or has migrated from or to the Property.

12. **NOTICES.** Notices permitted or required by this Agreement must be in writing and shall be deemed given when delivered in legible form to the party to whom addressed. Notices may be sent by certified mail or e-mail. Notices are effective two business days after they are mailed via certified mail, return receipt requested or, if sent by email, upon email transmission (provided that any email transmission that occurs after 5:00 pm Pacific Time will be deemed provided on the following day). If delivered at the Closing, a notice shall be deemed given when hand-delivered to the party's representative at the Closing. The business addresses of the parties are as follows:

Seller: City Administrator
City of Ramsey
7550 Sunwood Drive N.W.
Ramsey, MN 55303
Email: kulrich@cityoframsey.com

Buyer: Knoll Properties , LLC
David Knoll
6850 Sunwood Drive NW
Ramsey, MN 55303
Email: knod@andersondahlen.com

Notices not given in the manner or within the time limits set forth in this Agreement are of no effect and may be disregarded by the party to whom they are directed.

13. **CLOSING.** This transaction shall close within 45 days after Buyer delivers a Notice to Proceed to Seller or on such other date as Seller and Buyer may establish by mutual, written agreement. The Closing shall take place at the offices of the Escrow Agent, or at some other place as the parties may mutually agree prior to such date. At the option of either Party, the executed closing documents, Purchase Price and closing costs may be deposited

with the Escrow Agent and disbursed by the Escrow Agent to avoid the necessity for a Closing at which the Parties are present.

a. **Seller's Obligations at Closing.** At Closing, Seller must deliver to Escrow Agent, for delivery to Buyer:

   i. A limited warranty deed, duly executed and acknowledged on behalf of the City and with the City's seal affixed, conveying title to the Property, subject to (A) the lien of real estate taxes, if any, not yet due and payable and any installments of special assessments certified for payment therewith; (B) Building, Subdivision and Zoning Ordinances; (C) Matters that would be disclosed by an accurate survey of the Property; and (D) matters that constitute Permitted Exceptions pursuant to Section 6;

   ii. A certified copy of a duly adopted City Ordinance and Resolution authorizing Seller's sale of the Property to Buyer; and

   iii. Seller's affidavits, well disclosure certificate (if required), settlement statement approved by Seller and Buyer, and any other documents required by the Escrow Agent.

b. **Buyer's Obligations at Closing.** At Closing, Buyer must:

   i. Wire Transfer (or deliver a certified check in) an amount equal to the amount of the Purchase Price adjusted for to reflect Buyer's prior payment of the Earnest Money and to reflect amounts Buyer must pay or will receive pursuant to Section 13(c), to Escrow Agent for disbursement to Seller and others pursuant to this Agreement and the Settlement Statement; and

   ii. File or cause Escrow Agent to file an Electronic Certificate of Real Estate Value, if required and necessary.

c. **Closing Costs.**

   i. At Closing, the following Seller closing costs and expenses must be paid from the Purchaser Price or, if the Purchase Price is not sufficient, paid by Seller:

      1. Seller's portion of the prorated property taxes.
      2. Seller's own attorney's fees.
      3. One-half the cost of any closing fees.
      4. The cost of real estate broker commission fees as prescribed in Section 14.

   ii. At Closing Buyer must pay the Purchase Price to Seller and the following costs and expenses:

1. Buyer's portion of prorated property taxes.
2. Buyer's own attorney's fees.
3. One-half the cost of any closing fees.
4. Documentary and recording fees for the deed(s).
5. The cost of the owner's title insurance policy, if Buyer elects to purchase an Owner's title insurance policy.
6. State deed tax.

d. **Possession.** Seller must deliver possession of the Property to Buyer at Closing.

14. REAL ESTATE BROKERS. Seller and Buyer represent and warrant to each other that they have dealt with no brokers, real estate agents, finders or the like in connection with this transaction. To the extent allowed by law, Seller and Buyer agree to indemnify each other and to hold each other harmless against all claims, damages, costs or expenses of or for any broker's fees or commissions resulting for their actions or agreements regarding the execution or performance of this Agreement, other than the fees payable to Seller's Broker, and will pay all costs of defending any action or lawsuit brought to recover any such fees or commissions incurred by the other party, including reasonable attorney's fees.

15. ASSIGNMENT. This Agreement may not be assigned without the written consent of the non-assigning Party.

16. THIRD PARTY BENEFICIARY. There are no third party beneficiaries of this Agreement, intended or otherwise.

17. JOINT VENTURE. Seller and Buyer, by entering into this Agreement and completing the transactions described herein, shall not be considered joint venturers or partners.

18. CAPTIONS. The paragraph headings or captions appearing in this Agreement are for convenience only, are not a part of this Agreement, and are not to be considered in interpreting this Agreement.

19. ENTIRE AGREEMENT / MODIFICATION. The Recitals set forth above shall be considered a substantive part of this Agreement and are hereby incorporated by this reference. This written Agreement constitutes the complete agreement between the parties and supersedes any prior oral or written agreements between the parties regarding the Property, including the Prior Agreement. There are no verbal agreements that change this Agreement and no waiver or modification of any of its terms will be effective unless in writing executed by the parties.

20. BINDING EFFECT. This Agreement binds and benefits the Parties and their successors and assigns.

21. CONTROLLING LAW. This Agreement is made under the laws of the State of Minnesota and such laws will control its interpretation.

22. REMEDIES.

a. If Buyer fails to perform any of the terms or conditions of this Agreement within the specified time limits, Seller may declare this Agreement terminated pursuant to Minnesota Statutes section 559.21. Seller's sole remedy in the event of Buyer's default is retention of the Earnest Money, unless Buyer defaults under Section 7 or 12 of this Agreement, in which case Seller may retain the Earnest money or suspend the performance of its obligations under this Agreement and commence an action in Anoka County District Court to recover its actual damages arising from the default.

b. If Seller fails to perform any of the terms or conditions of this Agreement within the specified time limits, Buyer may, as its sole remedy, declare this Agreement terminated in which case Escrow Agent and, if applicable, Seller, shall refund the Earnest Money (both the Initial Disbursement and the Remaining Earnest Money) to Buyer, or, in the alternative, Buyer may have this Agreement specifically enforced and recover any incidental damages. Buyer waives all claims for consequential damages against Seller based on Seller's breach or alleged default hereunder.

23. WAIVER. Failure of Seller or Buyer to insist upon the performance of any of the covenants, agreements and/or conditions of this Agreement or to exercise any right or privilege herein shall not be deemed a waiver of any such covenant, condition or right.

24. SURVIVAL OF TERMS AND CONDITIONS. The terms and conditions of this Agreement shall survive and be in full force and effect after the delivery of the deed and shall not be deemed to have merged therein.

25. SEVERABILITY. Each provision of this Agreement shall apply to the extent permitted by applicable law and is intended to be severable. If any provision is illegal or invalid for any reason whatsoever, such illegality or invalidity shall not affect the legality or validity of the remainder of this Agreement.

26. CONSTRUCTION. The Parties acknowledge that this Agreement was initially prepared by Seller solely as a convenience and that all Parties and their counsel hereto have read and full negotiated all the language used in this Agreement. The Parties acknowledge that because all Parties and their counsel participated in negotiating and drafting this Agreement, no rule of construction shall apply to this Agreement to construe ambiguous or unclear language in favor of or against any Party.

27. COUNTERPARTS; DIGITAL COPIES. This Agreement may be executed in any number of counterparts and the signature pages of the separate counterparts combined into a single copy of this Agreement which will then constitute a fully executed version of this Agreement. A facsimile, .pdf file or digital copy of a signed counterpart or of an assemblage of counterparts of this Agreement shall be deemed to be an original thereof.

28. **CONSTRUCTION DEADLINE.** Buyer shall obtain a certificate of occupancy from the City of Ramsey for the construction of a minimum of 60,000 SF manufacturing facility on the Property by December 31, 2020. At Closing, a "**Right of Re-Entry Agreement**" must be executed and recorded to the Property providing that, in the event the above deadline is not met, Seller has the right to reclaim title to the parcel(s) for which a certificate of occupancy was not obtained or in the alternative, and at Seller's sole discretion, Buyer shall pay Seller a $150,000 penalty. In the event the penalty is not paid within 30 days of receipt of notice, Seller may certify the penalty to Anoka County as an assessment against the Property.

29. **TIME PERIODS.** The time for performance of any obligation or taking any action under this Agreement shall be deemed to expire at 5:00 p.m. Central Standard Time on the last day of the applicable time period provided for in this Agreement. If the time for the performance of any obligation or taking any action under this Agreement expires on a Saturday, Sunday or legal holiday, the time for performance or taking such action shall be extended to the next succeeding day which is not a Saturday, Sunday or legal holiday.

30. **PLATTING & DEVELOPMENT AGREEMENT.** Buyer must obtain an approved final plat, development agreement, and building exterior visual renderings with the City of Ramsey for its intended project before Closing. The Development Agreement and Site Plan must comply with all local zoning ordinances and design standards, including The COR Design Standards.

[***Remainder intentionally left blank***]

SELLER: The City of Ramsey, a Minnesota municipal corporation

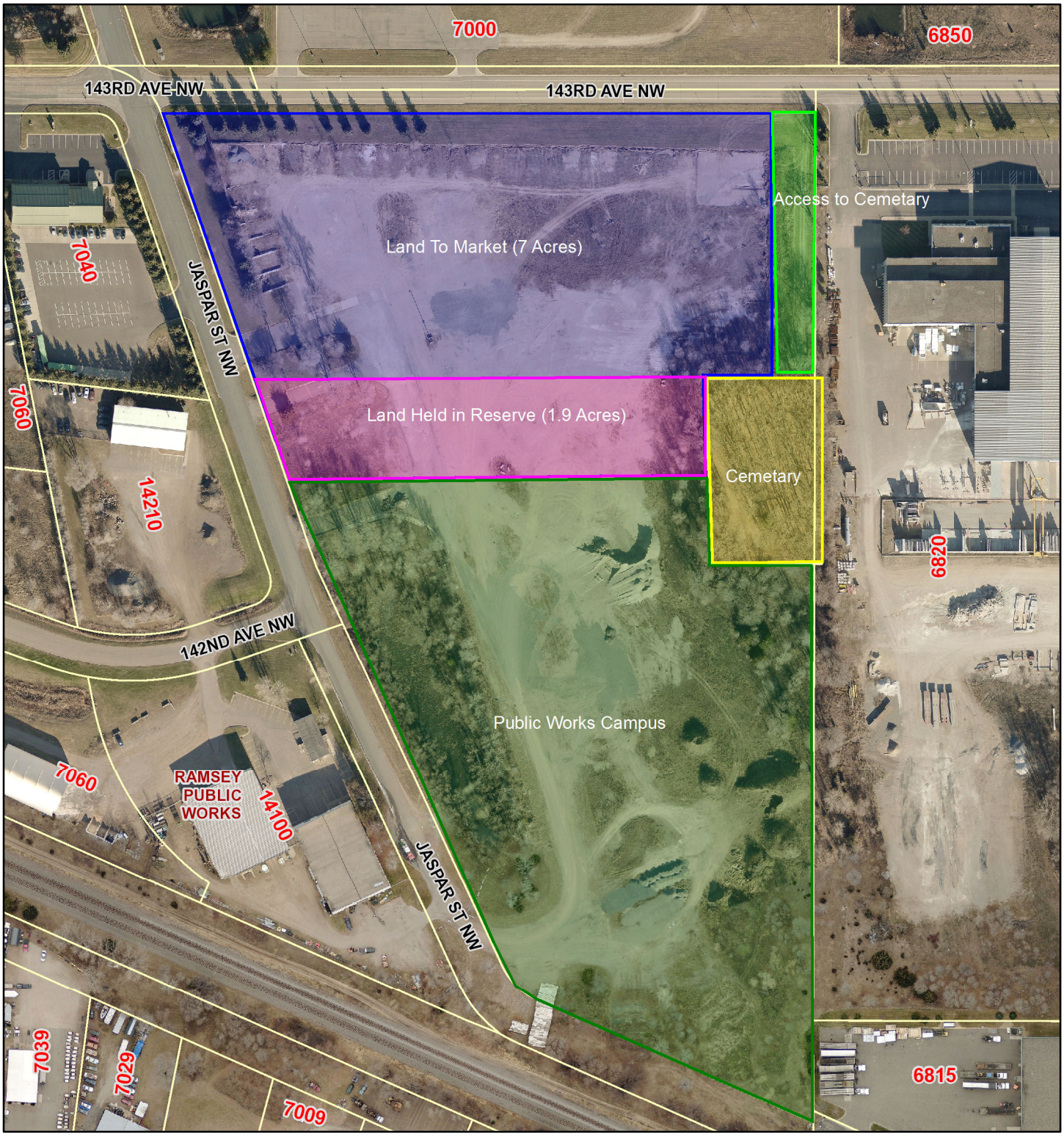
By: _____ Dated: 12/3/2019, 2019
John LeTourneau, Mayor

By: _____ Dated: 12/3/19 ~~, 2019~~
Kurt Ulrich, City Administrator

BUYER: KNOLL PROPERTIES, LLC, a Minnesota Limited Liability Company.

By: _____ Dated: 11/29/19, 2019
David J. Knoll, Chief Manager

Bury and Carlson Site Diagram



February 12, 2020

1:2,400

0 112.5 225 450 ft

0 30 60 120 m

Disclaimer: Map and parcel data are believed to be accurate, but accuracy is not guaranteed. This is not a legal document and should not be substituted for a title search,appraisal, survey, or for zoning verification.

Public Works Committee **5. 5.**

Meeting Date: 02/18/2020

By: Bruce Westby, Engineering/Public Works

Title:

Consider Recommendation to City Council to Accept Feasibility Report for 2020 Pavement Overlay Improvements, Improvement Project No. 20-02

Purpose/Background:

Purpose:

The purpose of this case is to consider providing a recommendation to the City Council to accept the Feasibility Report for 2020 Pavement Overlay Improvements, Improvement Project No. 20-02.

Background:

As was presented at the January Public Works Committee, the street segments proposed to receive overlay improvements in 2020 per the 2020 – 2029 Capital Improvement Program (CIP) are located in the following residential developments:

- Klemish and Flores
- Sunfish Square
- Sunfish Square 2nd Addition
- Windemere Woods
- Windemere Woods 2nd Addition

On December 10, 2019, the City Council ordered Staff to prepare a Feasibility Report to explore numerous aspects of the proposed improvements including whether they are feasible, necessary and cost-effective, whether they should be completed alone or in conjunction with other improvements, and to explore design options, if necessary. Estimated project costs and funding sources were also explored in more detail than was done to develop the Capital Improvement Program (CIP). A preliminary project schedule was also developed within the Feasibility Report.

A copy of the draft Feasibility Report is attached. In summary, the proposed improvements were not found to be feasible and cost-effective from an engineering standpoint, and Staff does not support construction of the 2020 bituminous overlays as identified within the current CIP. These streets would be most cost-effectively maintained by reconstructing them with a full-depth reclamation project after their PASER ratings fall to a rating of 3 or below. Instead, Staff recommends preparing a new Feasibility Report for proposed 2020 mill and overlay improvements under City Improvement Project No. 20-02 to include mill and overlay improvements on all streets within Business Park 95, and on all streets in Regency Pond 1st, 2nd and 3rd Additions.

The streets in Business Park 95 are currently proposed for mill and overlay improvements in 2024 per the 2020 - 2029 CIP, but are exhibiting significant pavement stripping issues and will therefore require extensive patching in 2020 and beyond if mill and overlay improvements are not completed in 2020. Estimated costs for these improvements total $500,000. Assuming $250,000 were to be funded with unspent sealcoat funds as discussed in another case this evening, $250,000 would be required to fund the remaining costs.

The Regency Pond 1st, 2nd and 3rd Additions are currently proposed for mill and overlay improvements in 2022 per the 2020 - 2029 CIP. These streets were constructed between 1996 and 1998, have PASER ratings of 6 and 7, and are excellent candidates for mill and overlay improvements. Estimated costs for these improvements total $525,000.

If the Committee approves of Staff's recommendations, Staff would request Council approval of the draft Feasibility Report, and authorization to prepare a new Feasibility Report including the new streets. This is

necessary to follow the Chapter 429 process allowing for the use of Special Assessments to pay a portion of the costs.

Timeframe:
Staff estimates 20 minutes will be needed to present this case and respond to questions.

Observations/Alternatives:

Observations:
On January 21st, the Public Works Committee directed Staff to bring additional information back to this meeting. This information is included below.

Option 1 – Full-depth mill and 3.5-inches new pavement for 2020 Overlays in CIP

- 1.5 miles
- Estimated project cost = $835,000
- Anticipated life = 20 – 40 years
- Staff does not recommend this option.

Option 2 – Full-depth reclamation for 2020 Overlays in CIP

- 1.5 miles
- Estimated project cost = $811,000
- Anticipated life = 30 – 60 years
- Staff does not recommend this option, but would recommend it over option 1.

Option 3 – Mill and Overlay streets in Business Park 95 and Regency Ponds

- 2.8 miles
- Estimated project cost = $1,025,000
- Anticipated life = 20 years
- Staff recommends this option as noted earlier.

Alternatives:
Alternative #1 – Motion to recommend City Council acceptance of the Feasibility Report for the 2020 Pavement Overlay Improvements, Improvement Project No. 20-02, and to recommend that a new Feasibility Report be ordered including the streets in Business Park 95 and Regency Ponds 1st, 2nd and 3rd Additions.

Alternative #2 – Motion of other.

Funding Source:
The draft Feasibility Report was prepared in-house as part of Staff's normal duties, as would the new Feasibility Report.

The 2020 pavement mill and overlay improvements are proposed to be funded through the Road Reconstruction/Overlay Fund, which has a current balance of $811,000. However, the 2019 street reconstruction projects are also utilizing this funding source and have approximately $35,000 in outstanding obligations so the amount available to fund 2020 pavement mill and overlay improvements is approximately $775,000.

Recommendation:
Staff recommends alternative #1.

Action:

Motion to recommend City Council acceptance of the Feasibility Report for the 2020 Pavement Overlay Improvements, Improvement Project No. 20-02, and to recommend that a new Feasibility Report be ordered including the streets in Business Park 95 and Regency Ponds 1st, 2nd and 3rd Additions.

Attachments

Draft Feasibility Report IP2002

Form Review

Inbox	Reviewed By	Date
Grant Riemer	Grant Riemer	02/13/2020 03:20 PM
Kurt Ulrich	Kurt Ulrich	02/13/2020 03:29 PM
Bruce Westby (Originator)	Bruce Westby	02/14/2020 10:20 AM
Form Started By: Bruce Westby		Started On: 02/13/2020 05:21 AM
Final Approval Date: 02/14/2020		

FEASIBILITY REPORT

2020 PAVEMENT OVERLAY IMPROVEMENTS

CITY IMPROVEMENT PROJECT NO. 20-02

January 20, 2020

Prepared By:

City of Ramsey
Engineering Department
7550 Sunwood Drive NW
Ramsey, MN 55303
763-433-9839
763-433-9848 (Fax)

January 17, 2020

Honorable Mayor and City Council
City of Ramsey
7550 Sunwood Drive NW
Ramsey, MN 55303

Re: Feasibility Report – City of Ramsey Improvement Project #20-02
2020 Pavement Overlay Improvements

Dear Mayor and City Council Members:

Transmitted herewith is a Feasibility Report for the proposed 2020 Pavement Overlay Improvements, Improvement Project No. 20-02.

The report examines the feasibility of completing 2-inch bituminous pavement mill and overlay improvements on approximately 19,612 square yards of bituminous pavement on 1.51 miles of public streets in three residential neighborhoods within the City, and necessary appurtenant improvements.

This Feasibility Report examines the scope of the proposed improvements, explores estimated costs and available funding sources, defines a preliminary project schedule, and determines the necessity, feasibility and general cost-effectiveness of the proposed improvements, including any alternate designs, as well as whether the improvements would best be completed separately or in conjunction with another project.

I would be happy to discuss this report with you at your convenience. Please feel free to contact me at 763-433-9825 or bwestby@cityoframsey.com with any questions.

Sincerely,
City of Ramsey

Bruce Westby, PE
City Engineer

Enclosure

C: Kurt Ulrich, City Administrator
Joe Feriancek, Civil Engineer II

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CERTIFICATION

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.

Bruce Westby, PE

Date: January 17, 2020 License No. 40116

I hereby certify that this plan, specification or report was reviewed for Quality Control and Quality Assurance purposes and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.

Joe Feriancek, PE

Date: January 17, 2020 License No. 57095

DRAFT

TITLE SHEET
LETTER OF TRANSMITTAL
CERTIFICATION SHEET
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Opinion of Probable Costs

Appendix C
Street Segment Summary

Appendix D
WSB Pavement Forensics Report

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1. EXECUTIVE SUMMARY

City Improvement Project 20-02 proposed to complete 2-inch bituminous pavement mill and overlay improvements to numerous public street segments within the City of Ramsey, including other associated appurtenant improvements as outlined in this report. Approximately 19,612 square yards of bituminous pavement on 1.51 miles of public streets in the City were proposed to receive bituminous pavement overlay improvements in 2020 per the City's 10-Year Capital Improvement Program (CIP). The street segments are located in the residential neighborhoods of Klemish, Klemish & Flores, Sunfish Square, Sunfish Square 2nd, Windemere Woods, Windemere Woods 2nd.

Appendix A includes exhibits showing the proposed project areas.

City Staff typically rates the pavement sections of all city streets on an annual basis using the Pavement Surface Evaluation and Rating (PASER) system. The last three years of PASER rating for each street segment proposed to receive an overlay with this project is included in the street segments summary found in ***Appendix B***.

On December 10, 2019, the Ramsey City Council ordered this feasibility report which explores the necessity, feasibility and cost-effectiveness of the proposed improvements by examining the scope of the improvements, exploring estimated costs and available funding sources, and determining whether the improvements should be completed as proposed or in connection with other improvements.

The engineer's opinion of probable costs for the project as proposed is $538,661.97. Estimated costs include 10% contingency costs, plus 14% indirect costs for administrative, engineering, finance and legal costs.

The improvements proposed with this project are identified in the City's current 10-year Capital Improvement Program, and can be funded using a combination of Road Reconstruction Funds, special assessments to benefitting properties, and Stormwater Funds. ***Appendix C*** includes a detailed opinion of probable costs.

The proposed improvements were not found to be feasible and cost-effective from an engineering standpoint, and Staff does not support construction of the 2020 bituminous overlays as proposed herein. The proposed street segments would be most cost-effectively reconstructed after such time as their PASER ratings fall to a 3 or below. Instead, Staff recommends reviewing the current CIP to identify other street segments for 2020 mill and overlay improvements based on available funding, and authorizing Staff to prepare a new Feasibility Report for proposed 2020 mill and overlay improvements under City Improvement Project No. 20-02.

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2. INTRODUCTION

2.1 Authorization

Preparation of this feasibility report was authorized by the Ramsey City Council on December 10, 2019

2.2 Program Overview

This project is designated as 2020 Pavement Overlay Improvements, Improvement Project No. 20-02.

This feasibility report explores proposed bituminous pavement mill and overlay improvements to approximately 19,612 square yards of public streets within several residential neighborhoods of the City. The street segments were proposed to receive 2-inch bituminous mill and overlay improvements. Associated appurtenant improvements were also proposed to be completed as necessary and as outlined in this report.

Maps showing the scope of the proposed improvements are included in ***Appendix A***.

2.3 Scope

The scope of this report addresses proposed mill and overlay improvements to approximately 19,612 square yards of public streets within several residential neighborhoods of the City as shown in ***Appendix A***.

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3. EXISTING CONDITIONS

3.1 Existing Streets

3.1.a Klemish, Klemish & Flores neighborhood

The existing right-of-ways along the street segments proposed in the 10-year CIP to receive overlays as part of this project generally are 66-feet in width. The paved street width is 24-feet as measured from the edge of bituminous. All streets in this project were constructed as a rural section, with bituminous pavement and ditches.

The streets segments proposed to receive overlays in 2020 have 2018 PASER ratings of 5, with the exception of Sodium Street which had one section of pavement with a 2018 PASER rating of 8. In 2019 these PASER ratings fell to 3, with the exception of Sodium Street which half the street was rated a 4 and the other half 5. Staff determined this neighborhood was structurally beyond an overlay improvement, with the exception of Sodium Street.

WSB was employed to complete a pavement forensics, which included pavement corings of the proposed overlay street segments. This included 2 corings on Sodium Street; both cores were in poor condition, which showed degradation and deterioration. The WSB pavement forensics report is included in ***Appendix D*** of this report.

Based on the manner in which the existing pavement is deteriorating, Staff does not support completing an overlay improvement for the Klemish and Klemish & Flores neighborhood. The existing streets are still serviceable with moderate maintenance patching. Staff recommends not completing a more involved full-depth reclamation (FDR) or reconstruction project at this time.

3.1.b Sunfish Square, Sunfish Square 2nd neighborhood

The existing right-of-ways along the street segments proposed in the 10-year CIP to receive overlays as part of this project generally are 60-feet in width. The paved street width is 31-feet as measured from the back-of-curb. All streets in this project were constructed with bituminous pavement and concrete curbing, and many of the street segments contain storm sewer.

The street segments proposed to receive overlays in 2020 in the Sunfish Square and Sunfish Square 2nd subdivisions had 2017 PASER ratings of 7, and 2018 PASER ratings of 5. Staff did not rate these street segments in 2019. When visually inspecting the street segments in December, Staff felt there would be several areas which would require full-depth patching, and the overlay would likely have high amounts of reflective cracking.

WSB was employed to complete a pavement forensics, which included 6 pavement corings spread out among the street segments. Of the 6 corings, 4 were in good condition, 1 was starting to show signs of deterioration, and 1 was in poor condition showing deterioration. The bituminous depth ranged from 2 to 3-inches thick, with 3.5 to 4.5-inches of aggregate below.

The WSB pavement forensics report is included in ***Appendix D*** of this report.

The street segments were all constructed in 1994 through 1995, and in their 25 to 26-year lifespan have received 3 sealcoats and no overlays. Most of the streets within this neighborhood would still be a candidate for an overlay, in conjunction with full-depth patching, but not all. Staff does not recommend selectively completing overlay improvements on street segments within the same neighborhood, and does not support completing an overlay improvement on the Sunfish Square and Sunfish Square 2nd neighborhoods at this time. With the limited financial resources of the City, Staff recommends maintaining the existing streets until such time as they have degraded to a level requiring reconstruction.

3.1.c Windemere Woods, Windemere Woods 2nd neighborhood

The existing right-of-ways along the street segments proposed in the 10-year CIP to receive overlays as part of this project generally are 60-feet in width. The paved street width is 31-feet as measured from the back-of-curb. All streets in this project were constructed with bituminous pavement and concrete curbing, and many of the street segments contain storm sewer.

The street segments proposed to receive overlays in 2020 in the Windemere Woods and Windemere Woods 2nd subdivisions had 2017 PASER ratings of 8, 2018 PASER ratings varied from 5 to 8, and 2019 ratings varied from 3 to 7. When visually inspecting the street segments in December, Staff felt there were large areas which would require full-depth patching, particularly Magnesium Street, which would require several hundred feet of full-depth patching and full curb and gutter replacement.

WSB was employed to complete a pavement forensics, which included 4 pavement corings spread out among the street segments. Of the 4 corings, 2 were in good condition, 1 was in poor condition showing deterioration, and 1 was in very poor condition being severely deteriorated. The bituminous depth ranged from 2 to 3.25-inches thick, with 4 to 4.5-inches of aggregate below. The WSB pavement forensics report is included in ***Appendix D*** of this report.

The street segments were all constructed in 1992, and in their 28-year lifespan have received 3 sealcoats and no overlays. Half of the streets are well beyond overlay improvements, while the other half could still be overlaid with bituminous patching. Staff does not recommend selectively completing overlay improvements on street segments within the same neighborhood, and does not support completing overlay improvements on the Sunfish Square and Sunfish Square 2nd neighborhoods at this time. With the limited financial resources of the City, Staff recommends maintaining the existing streets until such time as they have degraded to a level requiring reconstruction.

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3.2 Utilities

3.2.a Watermain

Watermain exists under all streets within the Sunfish Square, Sunfish Square 2nd, Windemere Woods, and Windemere Woods 2nd neighborhoods. No improvements to the watermain is proposed in conjunction with this project. Watermain does not exist under any of the streets within the Klemish, and Klemish & Flores neighborhoods.

3.2.b Sanitary Sewer

Sanitary Sewer exists under all the streets within the Sunfish Square, Sunfish Square 2nd, Windemere Woods, and Windemere Woods 2nd neighborhoods. No improvements to the sanitary sewer is proposed in conjunction with this project. Sanitary Sewer does not exist under any of the streets within the Klemish, and Klemish & Flores neighborhoods.

3.2.c Storm Sewer/Drainage

Storm sewer exists under several of the streets within the Sunfish Square, Sunfish Square 2nd, Windemere Woods, and Windemere Woods 2nd neighborhoods, but it is not proposed to complete any significant repairs or storm sewer construction as part of this project. Drainage within the Klemish, and Klemish & Flores neighborhood is handled with ditching, and is not proposed to be improved as part of this project.

4. CONSIDERED IMPROVEMENTS

4.1 Project Area Selection

The City's 10-year Capital Improvement Program calls for proposed 2020 overlay improvements on several street segments in the Klemish, Klemish & Flores, Sunfish Square, Sunfish Square 2nd, Windemere Woods, and Windemere Woods 2nd residential neighborhoods. In total, approximately 19,612 square yards of pavement was proposed to receive overlay improvements in 2020. The scope of these proposed improvements is included in ***Appendix A*** of this report.

4.2 Pavement Condition Evaluations/Ratings

City Staff generally evaluates and rates the pavement conditions of all city streets on an annual basis using the Pavement Surface Evaluation and Rating (PASER) system. This system requires a visual evaluation of each pavement surface, which is reflected by a 0 to 10 scale, with 10 being a new street. The PASER Ratings of the streets proposed for 2020 overlays fell significantly from 2017 when they were originally placed in the CIP to 2019. Ratings were generally 5 for Klemish/Klemish & Flores, 7 for Sunfish Square/Sunfish Square 2nd, and 8 for Windemere Woods/Windemere Woods 2nd in 2017. By 2019 these ratings fell to a range of 3 to 7, with rating point drops by as many as 5 on some street segments. A PASER rating summary of the proposed street segments is included in ***Appendix B*** of this report.

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4.3 Bituminous Overlay Review

Staff reviewed this project from the traditional overlay procedure. The rural sections in the Klemish, and Klemish & Flores neighborhood, has previously received an overlay. Staff proposed to complete a 6 to 7-foot edge mill of the pavement, down to 2-inches along the outside edge of the pavement, followed by a 2-inch bituminous overlay. This allows the edge of the pavement to match existing driveways, and builds up the crown of the road. The urban sections in the Sunfish Square, and Windemere Woods neighborhoods proposed to receive a 2-inch mill, followed by a 2-inch bituminous overlay. While reviewing the proposed streets, Staff discovered the pavement has deteriorated in several areas, beyond the point where a bituminous overlay is feasible.

An engineer's estimate was completed for the proposed project areas, with the exception of all of Klemish outside of Sodium Street. To complete the bituminous overlay as described above, the project costs are estimated to be $538,661.97.

Staff felt this was not a cost-effective solution, given the poor condition of the streets, which in general are distressed beyond a typical bituminous overlay treatment.

4.4 Full-Depth Reclamation

In the recent past, including the 2017 and 2018 reconstruction programs, streets with similar conditions received full-depth reclamation treatments. This included grinding up the existing bituminous pavement and underlying aggregate base, after which 3.5-inches of the reclaimed material is removed with the remaining used as new aggregate base. Then 3.5-inches of new bituminous pavement is placed on top. In general, the streets are still at the stage where with maintenance, Staff feels they can be useful for 5 to 10 years to come, and the City's limited funds can be spent on streets which are better candidates for overlays, or are ready for reconstruction.

An engineer's estimate was completed for the proposed project areas, with the exception of all of Klemish outside of Sodium Street. To complete the full-depth reclamation as described above, the project costs are estimated to be $751,863.92.

Staff felt this was not a cost-effective solution, and given the limited founding available there are other City streets which are at the proper condition for overlay treatments.

5. CONCLUSIONS AND RECOMMENDATIONS

This feasibility report explores proposed bituminous pavement overlay improvements to approximately 19,612 square yards of public streets in 2020. The street segments were proposed to receive 2-inch bituminous overlays, in conjunction with milling and full-depth patching as needed. Full-depth reclamation options were also looked at for the proposed street segments as a possible alternative to the poor conditions found during Staff review of the streets.

It is the recommendation of City Staff that the 2020 mill and overlay improvements as proposed in the current CIP not be completed under City Improvement Project No. 20-02 since these improvements are not generally feasible or cost-effective from an engineering standpoint. Instead, Staff recommends reviewing the current CIP to identify other street segments as the best candidates for 2020 mill and overlay improvements based on available funding sources, and authorizing Staff to prepare a new Feasibility Report for proposed 2020 mill and overlay improvements under City Improvement Project No. 20-02.

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APPENDIX A

Project Scope – Klemish, Klemish & Flores
Project Scope – Sunfish Square, Sunfish Square 2nd
Project Scope – Windemere Woods, Windemere Woods 2nd

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KLEMISH / KLEMISH & FLORES PROJECT SCOPE

0 250 500 750

SCALE (FEET)

City of RAMSEY

SUNFISH SQUARE 1ST & 2ND PROJECT SCOPE

City of RAMSEY

WINDEMERE WOODS 1ST & 2ND PROJECT SCOPE

0 250 500 750

SCALE (FEET)

N

City of RAMSEY

APPENDIX B

Street Segment History

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PLAT	STREET	DESCRIPTION	LENGTH (MILES)	YEAR CONST.	SC 1	SC 2	OL	SC 3	SC4	RATING 2017	RATING 2018	RATING 2019
Klemish												
	Quicksilver Street	167th Ave / 168th Ave	0.12	1977	1983	1991	1998	2004	2012	5	5	3
	168th Lane	Radium St / TH 47 Frontage Rd	0.15	1977	1983	1991	1998	2004	2012	5	5	3
	Radium Street	167th Ave / 168th Ln	0.24	1977	1983	1991	1998	2004	2012	5	5	3
	168th Avenue	Quicksilver St / TH 47 Frontage Rd	0.14	1977	1983	1991	1998	2004	2012	5	5	3
	Sodium Street	167th Ave / Eyebrow 168th	0.19	1977	1983	1991	1999	2004	2012	5	5	4
	TH 47 Frontage Road	168th Ave / 168th Ln	0.09	1977	1983	1991	1996	2004	2012	5	5	3
Klemish & Flores												
	Sodium Street	Eyebrow 168th / 169th Ln	0.2	1977	1983	1991	1999	2004	2012	8	5	5
Sunfish Square												
	141st Lane	Wolfram St / Uranium St	0.09	1994	1998	2005		2013		7	5	n/a
	Uranium Street	141st Ln / 142nd Ln	0.14	1994	1998	2005		2013		7	5	n/a
	Uranium Street	142nd Ln / CDS	0.04	1994	1998	2005		2013		7	5	n/a
	142nd Lane	Uranium St / E EOP	0.03	1994	1998	2005		2013		7	5	n/a
	Wolfram Street	CR 116 / 141st Ln	0.05	1994	1998	2005		2013		7	5	n/a
	142nd Lane	Uranium St / W EOP	0.03	1994	1998	2005		2013		7	5	n/a

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PLAT	STREET	DESCRIPTION	LENGTH (MILES)	YEAR CONST.	SC 1	SC 2	OL	SC 3	SC4	RATING 2017	RATING 2018	RATING 2019
Sunfish Square 2nd												
	142nd Lane	Xenon St / Wolfram St	0.07	1995	1998	2005		2013		7	5	n/a
	Wolfram Street	142nd Ln / CDS	0.04	1995	1998	2005		2013		7	5	n/a
	Vanadium Street	S EOP / CDS	0.08	1995	1998	2005		2013		7	5	n/a
	Xenon Street	142nd Ln / CDS	0.04	1995	1998	2005		2013		7	5	n/a
	142nd Lane	Sunfish Lk Blvd / Xenon St	0.05	1995	1998	2005		2013		7	5	n/a
	142nd Lane	Wolfram St / E EOP	0.07	1995	1998	2005		2013		7	5	n/a
Windemere Woods												
	141st Lane	Magnesium St / W EOP	0.08	1992	1998	2005		2013		8	8	7
	142nd Ave	E EOP / Magnesium St	0.02	1992	1998	2005		2013		8	6	6
	142nd Ave	Magnesium St / Neon St	0.1	1992	1998	2005		2013		8	5	5
	Neon Street	142nd Ave / N EOP	0.04	1992	1998	2005		2013		8	8	n/a
	Magnesium Street	E CDS / 141st Ln	0.06	1992	1998	2005		2013		8	6	3
	Magnesium Street	141st Ln / 142nd Ave	0.06	1992	1998	2005		2013		8	6	5
Windemere Woods 2nd												
	142nd Avenue	Neon St / W EOP	0.14	1992	1998	2005		2013		8	5	n/a
	Neon Street	S EOP / 142nd Ave	0.1	1992	1998	2005		2013		8	8	7
		Project Total Miles	**2.46**									

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APPENDIX C

Engineer's Estimate

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20-02 2020 Street Overlay Improvements

Engineer's Estimate

All Areas

ITEM No.	MNDOT No.	DESCRIPTION	UNIT	ESTIMATED QUANTITY	UNIT COST	COST EXTENSION
1	2021.501	MOBILIZATION (5%)	LS	1	$ 20,400.00	$ 20,400.00
2	2231.604	BITUMINOUS PATCH	SY	2,470	$ 20.00	$ 49,400.00
3	2232.501	EDGE MILL BITUMINOUS PAVEMENT 7' X (0" - 2")	SY	3,140	$ 2.00	$ 6,280.00
4	2232.501	MILL BITUMINOUS PAVEMENT	SY	19,610	$ 1.50	$ 29,415.00
5	2357.502	BITUMINOUS MATERIAL FOR TACK COAT	GAL	1,760	$ 3.00	$ 5,280.00
6	2360.501	TYPE SP 9.5 WEARING COURSE MIXTURE (SPWEA340C) (2.0")	TON	2,770	$ 90.00	$ 249,300.00
7	2506.602	RESET CATCH BASIN / MANHOLE CASTING	EA	14	$ 1,000.00	$ 14,000.00
8	2531.501	REMOVE & REPLACE CONCRETE CURB & GUTTER DESIGN SURMOUNTABLE	LF	840	$ 50.00	$ 42,000.00
9	2531.604	REMOVE & REPLACE 7" CONCRETE VALLEY GUTTER	SY	131	$ 80.00	$ 10,480.00
10	2563.601	TRAFFIC CONTROL	LS	1	$ 3,000.00	$ 3,000.00
					Non-Assessable Construction Cost	*$ 49,400.00*
					Street Construciton Cost	*$ 366,155.00*
					Storm Sewer Construction Cost	*$ 14,000.00*
					2020 Overlay Program Construction Cost	*$ 429,555.00*
					10% Contingency Cost	*$ 42,955.50*
					2020 Overlay Program Project Cost (14% Indirect Cost)	**$ 538,661.97**
					Total Project Assessments (25% of Assessable Cost)	*$ 120,589.90*
Miles	***0.38***				***Klemish / Klemish & Flores Individual Assessment (20 Properties)***	**$ 1,054.30**
Miles	***0.38***				***Sunfish Square Individual Assessment (33 Properties)***	**$ 991.50**
Miles	***0.15***				***Sunfish Square 2nd Individual Assessment (34 Properties)***	**$ 516.60**
Miles	***0.31***				***Windemere Woods Individual Assessment (28 Properties)***	**$ 1,005.00**
Miles	***0.29***				***Windemere Woods 2nd Individual Assessment (25 Properties)***	**$ 843.20**
Total Miles	***1.51***					
					Stormwater Utility Fund	*$ 13,167.00*
					Road Reconstruction / Overlay Fund	***$ 404,905.07***

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20-02 2020 Street Overlay Improvements

Engineer's Estimate - Assuming Full Depth Reclamation (FDR)

All Areas

ITEM No.	MNDOT No.	DESCRIPTION	UNIT	ESTIMATED QUANTITY	UNIT COST	COST EXTENSION
1	2021.501	MOBILIZATION (5%)	LS	1	$ 25,000.00	$ 25,000.00
2	2215.501	BITUMINOUS PAVEMENT RECLAMATION (FULL DEPTH)	SY	25,130	$ 1.25	$ 31,412.50
3	2331.607	HAUL AND DISPOSE BIT PAVEMENT RECLAMATION (LV)	CY	3,050	$ 15.00	$ 45,750.00
4	2357.502	BITUMINOUS MATERIAL FOR TACK COAT	GAL	1,760	$ 3.00	$ 5,280.00
5	2360.502	TYPE SP 12.5 NON-WEARING COURSE MIXTURE (SPNWB330C) (2.0")	TON	2,770	$ 85.00	$ 235,450.00
6	2360.501	TYPE SP 9.5 WEARING COURSE MIXTURE (SPWEA340C) (1.5")	TON	2,080	$ 90.00	$ 187,200.00
7	2506.602	RESET CATCH BASIN / MANHOLE CASTING	EA	14	$ 1,000.00	$ 14,000.00
8	2531.501	REMOVE & REPLACE CONCRETE CURB & GUTTER DESIGN SURMOUNTABLE	LF	840	$ 50.00	$ 42,000.00
9	2531.604	REMOVE & REPLACE 7" CONCRETE VALLEY GUTTER	SY	131	$ 80.00	$ 10,480.00
10	2563.601	TRAFFIC CONTROL	LS	1	$ 3,000.00	$ 3,000.00

Street Construciton Cost	*$ 585,572.50*
Storm Sewer Construction Cost	*$ 14,000.00*
2020 Overlay Program Construction Cost	*$ 599,572.50*
10% Contingency Cost	*$ 59,957.25*
2020 Overlay Program Project Cost (14% Indirect Cost)	**$ 751,863.92**
Total Project Assessments (25% of Assessable Cost)	*$ 187,964.00*

Miles	***0.38***	***Klemish / Klemish & Flores Individual Assessment (20 Properties)***	**$ 1,849.20**
Miles	***0.38***	***Sunfish Square Individual Assessment (33 Properties)***	**$ 1,543.00**
Miles	***0.15***	***Sunfish Square 2nd Individual Assessment (34 Properties)***	**$ 775.30**
Miles	***0.31***	***Windemere Woods Individual Assessment (28 Properties)***	**$ 1,441.10**
Miles	***0.29***	***Windemere Woods 2nd Individual Assessment (25 Properties)***	**$ 1,334.00**
Total Miles	***1.51***		

Stormwater Utility Fund	*$ 13,167.00*
Road Reconstruction / Overlay Fund	***$ 550,732.92***

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APPENDIX D

WSB Pavement Forensics Report

DRAFT

Memorandum

To: Joe Feriancek, PE

From: Andrea Blanchette, PE
Tom Wood
Sheue Torng Lee

Date: January 10, 2020

Re: Pavement Coring Forensic Report
City of Ramsey
WSB Project No. 015367-000

Introduction

WSB is pleased to submit this pavement forensics report detailing the results of the pavement coring which was completed on January 9, 2020 in the City of Ramsey. The various characteristics of the pavement cores were summarized to provide information to the City to assist in determining the appropriate pavement maintenance or rehabilitation method for the roadways.

A total of 13 pavement cores were obtained in the Sunfish Square/Windemere Woods neighborhood and the Klemish & Flores neighborhood. The locations of the pavement cores are summarized in **Figure 1** and **Figure 2**. A summary of the pavement depths and conditions for the streets are shown in **Table 1**. Pictures of the cores obtained can be found in the **Appendix**.

701 XENIA AVENUE S | SUITE 300 | MINNEAPOLIS, MN | 55416 | 763.541.4800 | WSBENG.COM

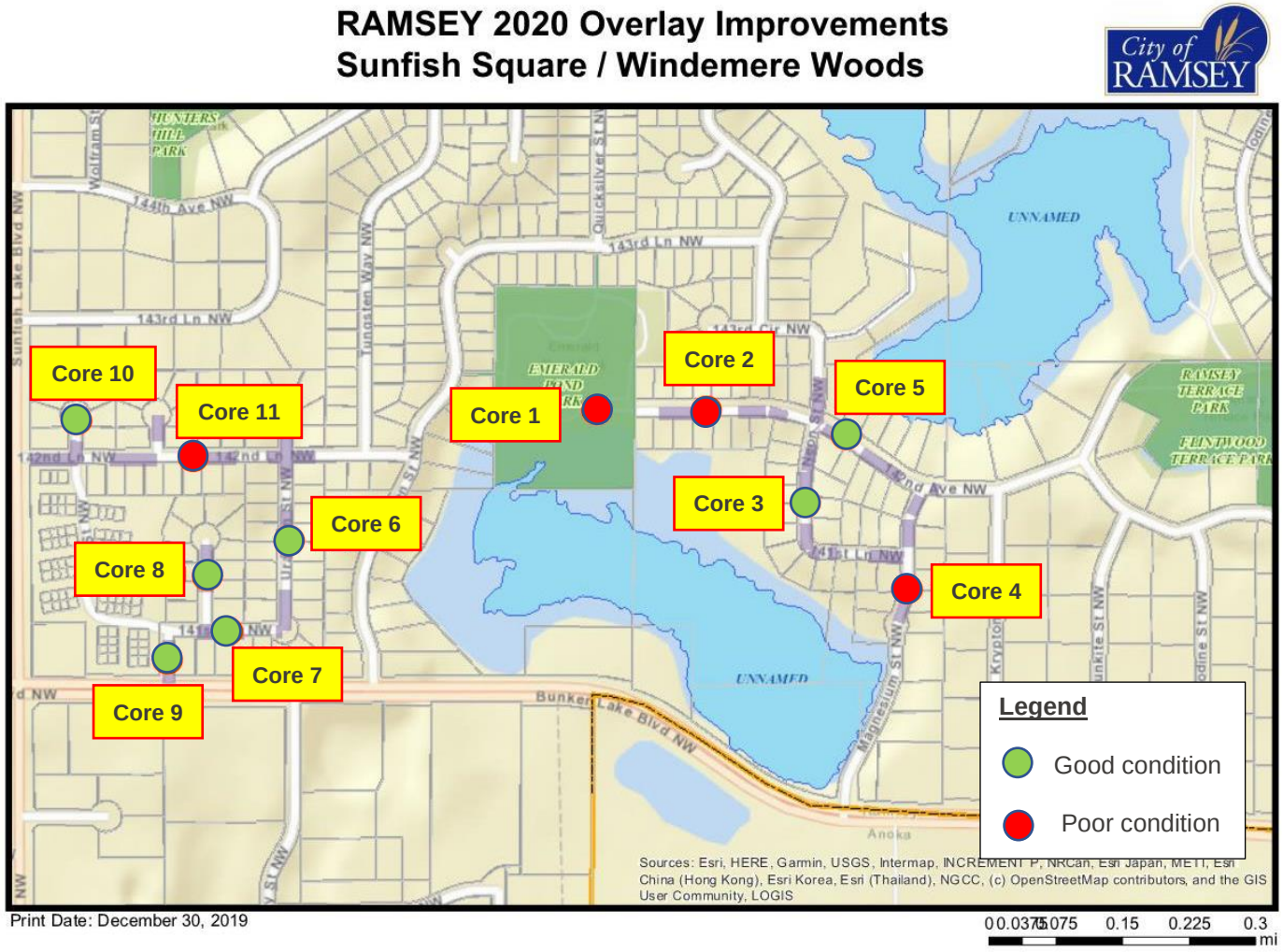


Figure 1. Pavement core locations in Sunfish Square/Windemere Woods neighborhood.

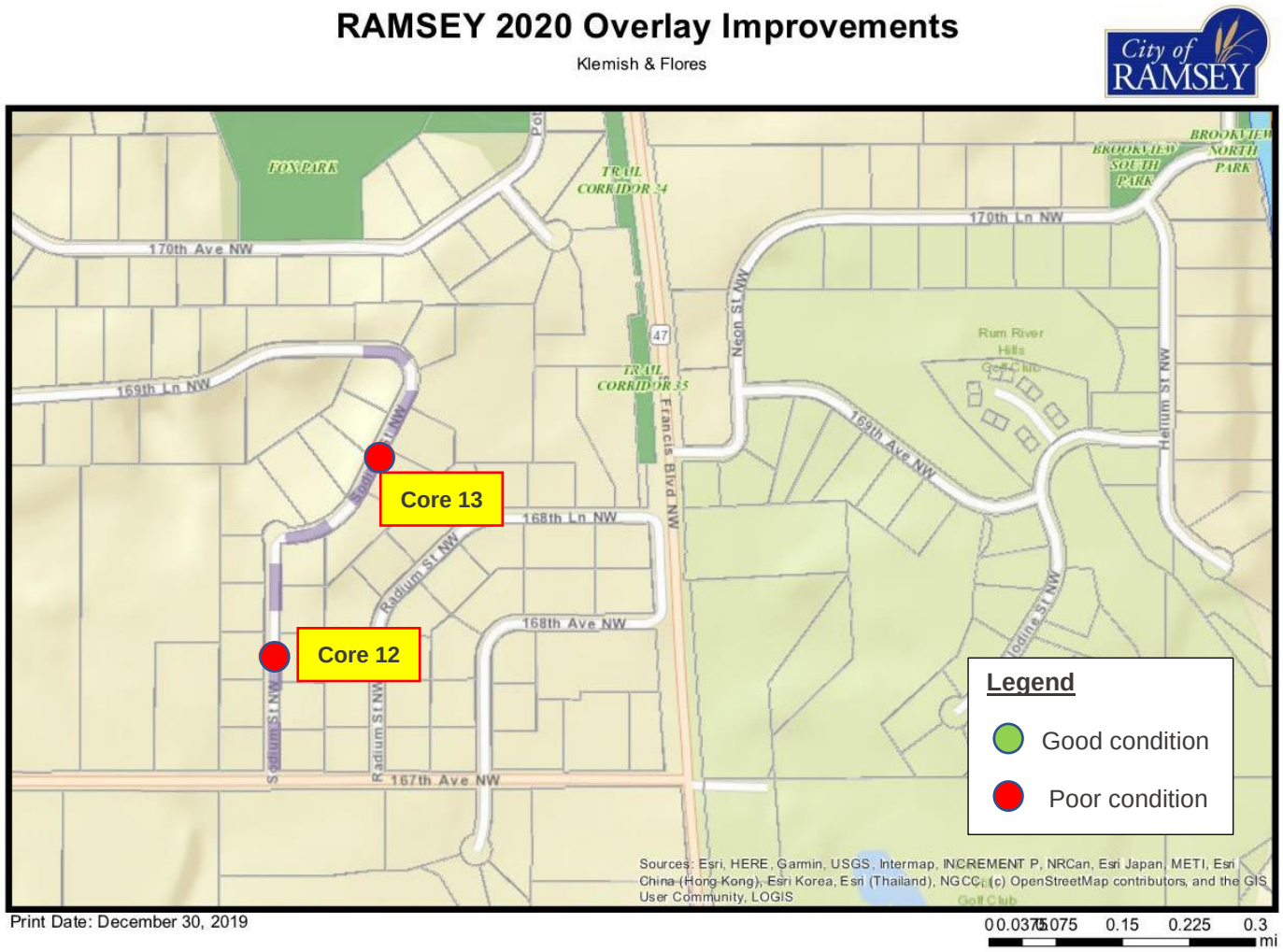


Figure 2. Pavement core locations in Klemish & Flores neighborhood.

Table 1. Pavement core location and information.

Core ID	Location	Bituminous Depth (inches)	Aggregate Depth [1] (inches)	Notes
1	Emerald Pond Park	3.25	4	Top lift was 2 inches. Core was in poor condition showing deterioration, losing fines and binder.
2	142nd Avenue NW	3.25	4	Top lift was 2 inches. Core was in very poor condition and it had severely deteriorated.
3	Neon Street NW	3.25	4.5	Top lift was 1.5 inches. Core was in good condition.
4	Magnesium Street NW	3.25	4	Top lift was 1.5 inches. Core was in poor condition showing deterioration, losing fines and binder.
5	142nd Avenue NW	2	4	Core was in good condition.
6	Uranium Street NW	2.75	3.5	Top lift was 1.75 inches. Core was in good condition.
7	141st Lane NW	3	3.5	Top lift was 2 inches. Core was in good condition.
8	Vanadium Street NW	2.5	4	Top lift was 1.5 inches. Core was in good condition.
9	Wolfram Street NW	2.5	4	Top lift was 1.5 inches. Core was in moderately good condition, started to exhibit signs of deterioration.
10	Xenon Street NW	2	4	Core was in good condition.
11	142nd Lane NW	2.5	4.5	Top lift was 1.5 inches. Core was in poor condition showing deterioration, losing fines and binder.
12	Sodium Street NW	2.75	2.5	Top lift was 1.5 inches. Core was in very poor condition and it had severely deteriorated.
13		3	2.5	Top lift was 1.5 inches. Core was in poor condition showing deterioration, losing fines and binder.

[1] Subgrade material was observed to be select granular material on all core locations.

Summary of Findings

One core obtained at the parking lot in Emerald Pond Park had a bituminous thickness of 3.25 inches. There was 4 inches of aggregate base and the core was in poor condition exhibiting deterioration.

A total of 10 cores were obtained along the residential streets in Sunfish Square/Windemere Woods neighborhood as shown in Figure 1. The bituminous depths were ranging from 2 inches to 3.25 inches, with at least 3.5 inches of underlying aggregate base. Half of the cores obtained along the streets east of Emerald Pond Park were in good condition, while the other half were deteriorated. Most of the cores obtained along the streets west of Emerald Pond Park were in good condition, except for the core obtained along 142nd Lane NW (Core 11) had deterioration, losing fines and binder.

Two cores obtained along Sodium Street NW had bituminous depths of 2.75 inches and 3 inches, with 2.5 inches of aggregate underneath. Both cores were in poor condition, which showed degradation and deterioration.

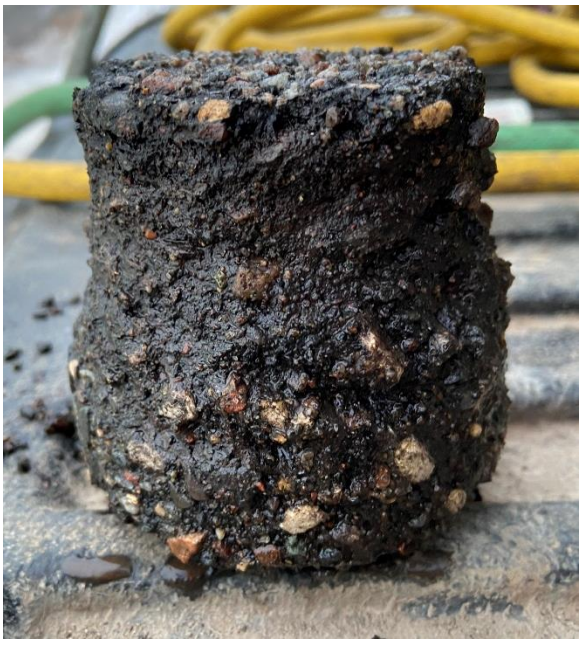
Appendix

City of Ramsey

Coring Pictures

Core 1 (Emerald Pond Park)

Core 2 (5951 142nd Avenue NW)

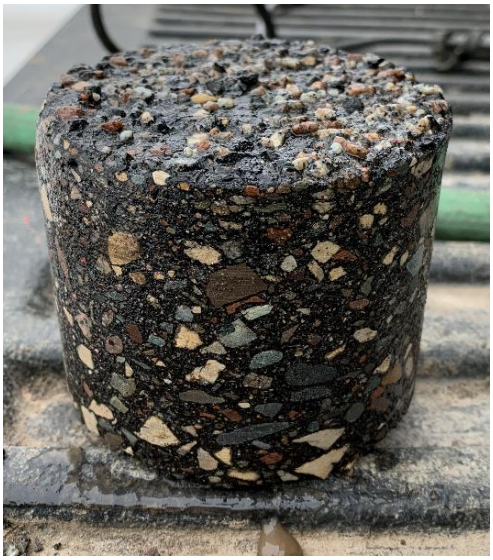


Core 3 (14177 Neon Street NW)

Core 4 (14150 Magnesium Street NW)

Core 5 (5859 142nd Ave NW)

Core 6 (14211 Uranium Street NW)



Core 7 (6260 141st Lane NW)

Core 8 (14191 Vanadium Street NW)

Core 9 (Wolfram Street NW)

Core 10 (14260 Xenon Street NW)

Core 11 (6280 142nd Lane NW)

Core 12 (16742 Sodium Street NW)

Core 13 (16863 Sodium Street NW)

Public Works Committee **5. 6.**

Meeting Date: 02/18/2020

By: Bruce Westby, Engineering/Public Works

Title:

Consider Recommendation to City Council to Indefinitely Suspend Pavement Sealcoat Program and Reallocate Budgeted Funds

Purpose/Background:

Purpose:

The purpose of this case is to consider a recommendation to the City Council to indefinitely suspend the City's annual pavement sealcoat program and to reallocate budgeted funds.

Background:

Since 2015, the City of Ramsey has budgeted $500,000 annually for crack sealing and sealcoating between 13 and 23 miles of City streets. Prior to 2015, cracksealing and sealcoating was completed less frequently based on availability of funding.

The purpose of sealcoating was to protect existing bituminous pavement from damage due to stormwater runoff, ultraviolet rays from the sun, and petroleum deposits left by vehicles using the streets. In addition, a small amount of oil in the sealcoat emulsion is absorbed by the underlying pavement, helping to rejuvenate up to the top quarter-inch of pavement.

In the spring of 2019, Staff began observing significant damage to the underlying pavement on several streets sealcoated since 2015. Staff has since been monitoring streets sealcoated since 2015 and documenting the scope and severity of observed pavement stripping issues in hopes of better understanding the root cause(s) of pavement stripping observed in Ramsey. Pictures of damage caused by pavement stripping under sealcoats on several streets in Ramsey are attached.

Numerous cities across the Twin Cities metro area have experienced pavement stripping under sealcoats over the last decade or more, including several cities in the northwest metro. Since last spring, Staff has discussed the pavement stripping issues experienced by various metro area cities, including those that have been experiencing this issue the longest. Staff's goal is to better understand the cause(s) of pavement stripping, how to cost-effectively repair damaged pavements, and if reasonable alternatives to sealcoating exist.

Attached to this case is a summary of Staff's research into pavement stripping, which includes findings and practices of other metro area cities, general comments and/or observations received from other cities and from sealcoat practitioners and experts, as well as conclusions and recommendations reached by pavement stripping research reports completed by the Minnesota Local Road Research Board (LRRB). The LRRB was established in 1959 through state legislation with the goal of improving the quality of Minnesota's transportation systems through grassroots research efforts. Copies of LRRB Technical Reports #2013-08 and #2017-35 are attached for reference.

In summary, Staff is concerned that continuing the sealcoat program will continue to cause unnecessary damage to our public streets. Staff therefore recommends indefinitely suspending the City's sealcoating program, which will allow Staff to further study the causes of pavement stripping in Ramsey and in other northern tier cities, to determine if reasonable alternatives to sealcoating exist, and to verify how to most cost-effectively repair pavement sections damaged by pavement stripping.

Timeframe:

Staff estimates 25 minutes will be needed to present this case and respond to questions.

Observations/Alternatives:

Observations:
As noted earlier, the City budgets $500,000 for annual crack seal and sealcoat improvements, of which $175,000 is typically spent on crack sealing, and $325,000 is spent on sealcoating. After reviewing our current crack seal needs, Staff recommends allocating $150,000 for crack seal improvements in 2020, and recommends allocating the unspent $350,000 as follows in 2020.

Business Park 95 Pavement Mill and Overlay
The streets in Business Park 95 were sealcoated in 2015 and are exhibiting the most signs of damage as a result of stripping under sealcoats of any streets in the City. If these streets do not receive a mill and overlay this year, extensive patching will be required. This carries significant cost and takes time away from patching other streets across the City. Staff therefore recommends completing a 2-inch mill and overlay on all streets in Business Park 95 in 2020, which are currently included in the CIP as a mill and overlay project in 2024. Staff recommends allocating **$250,000** towards this work. The estimated cost for this work is $500,000. The remaining $250,000 would best be allocated from the 2020 overlay improvements funding source.

Collect Ground Penetrating Radar Data
Staff recommends contracting with Braun Intertec to collect ground penetrating radar data on all street segments for which pavement section data is not available. This data will assist Staff in completing a comprehensive review and making the necessary revisions to all pavement management program improvement projects in the 10-year Capital Improvement Program (CIP) this fall. This will help ensure that all pavement overlay and reconstruction improvement projects identified within the CIP are able to be completed as proposed, and that the scope, cost and schedule of all proposed street improvement projects are accurate. The estimated cost for this work is **$75,000**.

Increase Spray Patching Program
Staff recommends increasing the spray patching program to allow Staff to rent additional spray patching equipment and purchase additional patching materials. This will allow Staff to spray patch more streets in 2020 to help hold the streets together until they receive their scheduled pavement mill and overlay and/or reclamation/reconstruction improvements. Staff budgeted $60,000 for Spray patching in 2020 and recommends allocating an additional **$25,000** This should allow Staff to continue spray patching streets through September and into October, weather permitting.

Alternatives:
Alternative #1– Motion to recommend that the City Council indefinitely suspend the City's annual sealcoat program and approve Staff's proposed sealcoat budget reallocations.

Alternative #2 – Motion to recommend that the City Council indefinitely suspend the City's annual sealcoat program and reallocate the sealcoat budget as follows; _____.

Alternative #3 – Motion of other.

Funding Source:

The City annually budgets $500,000 for crack seal and sealcoat projects. Staff recommends that the City continue to complete crack seal projects at an estimated cost of $150,000 in 2020. The remaining $350,000 is recommended to be allocated as follows;

- $250,000 for mill and overlay improvements in Business Park 95
- $ 75,000 for pavement section data using ground penetrating radar
- $ 25,000 for additional spray patching

Recommendation:

Staff recommends that the City's sealcoat program be indefinitely suspended to allow Staff to further study the causes of pavement stripping in Ramsey and in other northern tier cities, to determine if reasonable alternatives to sealcoating exist, and to verify how to most cost-effectively repair pavement sections damaged by pavement stripping.

Staff also recommends that the 2020 sealcoat budget be reallocated as follows;

- $250,000 for mill and overlay improvements in Business Park 95;
- $ 75,000 for pavement section data using ground penetrating radar; and
- $ 25,000 for additional spray patching.

Action:

Motion to recommend that the City Council indefinitely suspend the City's annual sealcoat program and approve Staff's proposed sealcoat budget reallocations.

Attachments

Pavement Stripping Summary
LRRB Report 2013-08
LRRB Report 2017-35
McKinley St Picture
Unity St Picture
Alpine Acres Picture
Sealcoat Years Map
Stripping Ratings Map

Form Review

Inbox	Reviewed By	Date
Grant Riemer	Grant Riemer	02/13/2020 11:41 AM
Kurt Ulrich	Kurt Ulrich	02/13/2020 01:14 PM
Form Started By: Bruce Westby		Started On: 02/13/2020 05:23 AM
Final Approval Date: 02/13/2020		

Bituminous Pavement Stripping Research Findings
City of Ramsey February 13, 2020

Findings and Practices of other Cities

- Andover
  - Moving away from sealcoating streets.
  - Collects funds for first crackseal of new streets from developers .
- Anoka
  - Sealcoating AND fog sealing all streets.
  - Cracksealing streets one year before sealcoating/fog sealing.
- Brooklyn Park
  - Streets constructed before 1990's did not experience pavement stripping.
  - Mill and overlay improvements completed in mid-1990's to early-2000's. Pavement stripping was observed after.
  - Stripping often starts at intersections, but once it starts it will continue to progress.
  - Don't do spot repairs. Mill and overlay entire streets to repair.
  - Quit sealcoating streets 2 years ago.
  - Do not rejuvenate streets.
- Coon Rapids
  - Administers Northwest Metro Pavement Management Group (JPA).
  - Planning to try faster curing fog seal emulsion offered by FHR this year (CQS-1hd50).
  - Crack filling only applied to collector streets (no sealcoats).
  - Sealcoating only applied to local streets.
  - Fog sealing only applied to cul-de-sacs.
- Saint Michael
  - Stripping issues experienced since mid-2010's.
  - Stopped sealcoating streets 4 years ago.
  - Applying Reclamite to streets with wear course (new and overlays) $\leq$ 2 years old.
- Woodbury
  - Stripping issues first experienced in late 2000's.
  - Stopped sealcoating streets around 2009.
  - Replaced around 85 miles of residential street pavement since 2014.
  - Adopted new mix design per MnDOT Tech Memo 17-sa-01.
  - Applying Reclamite to all new pavement within 1 year .

General Comments and Observations

- Stripping issues are observed more often after the second sealcoat.
- Once stripping is observed it continues to expand.
- Freeze thaw cycles accelerate stripping.
- Based on weather trends, northern climates should expect to experience increased;
  - Rain events each winter, resulting in greater saturation of pavements
  - Freeze-thaw events each winter
- Mill and infill is effective to repair stripping damage *if done before stripping progresses into pavement base course*.
- Pavement rejuvenators (Reclamite, Replay, etc.);
  - Penetrate into pavements roughly 3/8-inch
  - Replace maltenes in oxidized pavements
  - Effectively seal pavement surfaces
  - Numerous U.S. cities have used for decades, including Chicago

Local Road Research Board (LRRB) Pavement Stripping Research Conclusions and Recommendations

- 2013-08 Stripping of Hot-Mix Asphalt Pavements under Chip Seals (Wood & Cole, MnDOT)
    - Conclusions: Stripping of HMA pavement after application of chip seal caused by areas of high air voids or low density.
    - Recommendations: Agencies should use specified density methods to ensure proper uniform compaction of HMA paving. Three options for addressing existing streets with low density and high air voids variability include:
        1. Do nothing and allow pavement to fail prematurely.
        2. Chip seal early in pavement life, preferably within first 4 years, to keep pavement structure as dry as possible to limit moisture damage.
        3. Fog seal pavement with a CSS-1h diluted to one part water and one part emulsion.
- 2017-35 Prevention of Stripping Under Chip Seals (David L. Rettner, AET)
    - Conclusions:
        1. Study could not verify conclusions of 2013 LRRB research that high air voids is the primary cause of stripping (Wood & Cole, 2013).
        2. Study unable to identify mix designs or construction practices that correlated with incidence of stripping (e.g., bituminous mixture, contractor, geographic location, or year of construction).
        3. Primary conclusion of study is that while stripping under chip seals is a concern, it cannot be addressed with a simple mix design or paving rule of thumb.
    - Recommendations:
        1. Stripping under chip seals may be due to trapped moisture and water vapor between the chip seal and the asphalt pavement. This phenomenon would be similar to stripping behavior observed in conventional overlays of asphalt (Kandhal & Rickards, 2001).
        2. Ensure appropriate drainage in chip-sealed pavements. Utilization of subsurface drainage will reduce the probability of saturated subbase and base layers, which will reduce the amount of moisture moving through pavement.
        3. Minimize trapped water vapor between chip seal and the underlying asphalt. If first lift of pavement is damaged due to insufficient structural capacity to withstand heavy loads, the pavement may already have significant microscopic sized cracks that allow water vapor to be transmitted from subgrade soils into the pavement and be trapped. Causes of this cracking can include staggered construction of bituminous pavement layers across multiple construction seasons subjecting pavement to heavy loads while not at full strength.
        4. Explore use of thin bituminous overlays, approximately five-eighths inches in thickness, as an alternative to chip seal treatments. In Texas, these fine-mix overlays have shown promise as a surface treatment on oxidized pavement and as a surface treatment to extend the life of roadways exhibiting signs of stripping. Studies have shown these thin overlays can extend the service life by an additional three to five years before a mill-and-overlay is required.
        5. Maintain better municipal records on both the paving contractor and paving materials. While many city and county engineers were able to provide valuable detail on their chip-sealed roads for this study, the results and conclusions were limited by a lack of information (see Section 3.4). Detailed records of contractor and materials would benefit future research efforts and municipal efforts to maintain roads.

- NS462 – Is Seal Coating Counterproductive or Not?
    - Study not yet complete.

Stripping of Hot-Mix Asphalt Pavements under Chip Seals

Minnesota Department of Transportation

RESEARCH SERVICES

Office of Policy Analysis, Research & Innovation

Thomas J. Wood, Primary Author
Office of Materials and Road Research
Minnesota Department fo Transportation

April 2013

Research Project
Final Report 2013-08

LRRB
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Technical Report Documentation Page

1. Report No.	2.	3. Recipients Accession No.	
MN/RC 2013-08			
4. Title and Subtitle Stripping of Hot-Mix Asphalt Pavements under Chip Seals		5. Report Date April 2013 6.	
7. Author(s) Thomas J. Wood and Melissa K. Cole		8. Performing Organization Report No.	
9. Performing Organization Name and Address Office of Materials and Road Research Minnesota Department of Transportation 395 John Ireland Boulevard, MS 330 St. Paul, MN 55155		10. Project/Task/Work Unit No. 11. Contract (C) or Grant (G) No. (C) LAB904	
12. Sponsoring Organization Name and Address Minnesota Department of Transportation Research Services 395 John Ireland Boulevard, MS 330 St. Paul, MN 55155		13. Type of Report and Period Covered Final Report 14. Sponsoring Agency Code	
15. Supplementary Notes http://www.lrrb.org/pdf/201308.pdf			
16. Abstract (Limit: 250 words) The higher costs of hot-mix asphalt pavement are causing more agencies to choose pavement preservation techniques to maintain their pavements. Some agencies have experienced stripping of the asphalt surface under chip seals, this distress appears to occur mostly in urban areas on curb and gutter streets. The main objective of the study was to determine what causes the stripping and to develop test methods to determine if the street will strip prior to placement of the chip seal. Both field and lab methods were used. Research focused on determining air voids, permeability, and density of the samples. Once these were determined, correlations were developed to determine the conclusions.			
17. Document Analysis/Descriptors Chip seals, Stripping (Pavements), Air voids, Density, Pavements, Permeability, Preservation		18. Availability Statement No restrictions. Document available from: National Technical Information Services, Alexandria, Virginia 22312	
19. Security Class (this report) Unclassified	20. Security Class (this page) Unclassified	21. No. of Pages 60	22. Price

Stripping of Hot-Mix Asphalt Pavements under Chip Seals

Final Report

Prepared by:

Thomas J. Wood
Melissa K. Cole

Office of Materials and Road Research
Minnesota Department of Transportation

April 2013

Published by:

Minnesota Department of Transportation
Research Services
395 John Ireland Boulevard, MS 330
St. Paul, Minnesota 55155

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Acknowledgements

Many thanks are given to the Local Road Research Board for funding the project.

Thanks also to the Technical Advisory Panel (TAP), MnDOT bituminous office, and cities of Brooklyn Center, Eden Prairie, and Woodbury, and numerous other cities for all their help with this project. Without it the project could not have been completed.

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Executive Summary

Stripping of hot-mix asphalt (HMA) under chip seals on urban streets has been an issue for years. This project studied the issue to determine what causes the stripping and how to deal with the stripping. Low density or high air voids appear to be the main cause of the stripping. Lab testing validated the theory that HMA mixes not prone to stripping will strip if not properly compacted. Better construction methods are recommended.

Chapter 1. Introduction

Objectives of Research and Methodology

This report represents task 6 – Draft Final Report of Local Road Research Board (LRRB) project number 904, Minnesota State Planning and Research project number MPR 10-(042) study entitled, "Stripping of Hot-Mix Asphalt Pavements under Chip Seals".

The objectives of this research project were to determine why some streets suffer from stripping of the hot-mix asphalt (HMA) pavement after placement of asphalt chip seal. Using this data we will recommend how to determine if streets will suffer from stripping prior to chip sealing. Also recommendations will be made on how to improve performance of streets starting with paving of the asphalt pavement.

The research efforts where made up of the following tasks:

- Task 1 Survey Cities and Counties to determine the extent of the stripping under chip seals.
- Task 2 Develop and modify existing test methods to determine is the HMA in place on streets is prone to stripping.
- Task 3 Core and test the cores from City streets.
- Task 4 Review past and present construction methods of cities for asphalt paving streets.
- Task 5 Analyzed the test results from cores.
- Task 6 Draft final report
- Task 7 Final Report
- Task 8 Implementation Plan

Background: Stripping Under Chip Seal Distress

For more than twenty years, Cities have experienced pavement deterioration of the upper 0.5 to 1.0 inch of HMA pavements under chip seals. The distress causing this is stripping of the asphalt layer directly beneath the chip seal (Figures 1 and 2). This distress starts as a small blister and becomes enlarged to the size of a small pothole; at which time the chip seal delaminates off of the asphalt pavement.

With the high cost of asphalt, the use of pavement preservation treatments has grown rapidly as agencies preserve their roadway system. Most of the incidents of this distress have been located on urban curb and gutter streets. If the distress is localized small patch will restore the street. However, as the area of deterioration expands a thin mill and overlay may be required to restore the street. This distress may lead to an expensive maintenance problem.

Figure 1: Stripping of asphalt pavement under chip seal.

Figure 2: Asphalt deterioration under chip seal.

Chapter 2. Research Methodology

Task 1

In this task surveys were sent to Cities and Counties using the Survey Monkey™ tool to determine the extent of the stripping under chip seals in Minnesota. See Appendix A for a copy of the Interim Report for Task 1 submitted in November 2010. This report includes all the questions asked and results of the survey. Sixty-six responses were received.

More than 60 percent of the respondents stated their agency was experiencing stripping under chip seal. Based on these findings and interviews with select cities the next step was to determine the cause of the stripping problems. One observation made was that streets suffering from stripping issues had density variability. Areas close to the stripped areas had high air voids. When coring, complete cores in the areas with low density and high air voids were not able to be obtained as they fell apart. Based on preliminary field sampling the following hypothesis was developed: **Low density may cause asphalt paving mixes to stripping to strip because of this low density and high air voids.**

Task 2

This task looked at stripping test methods and selected tests to determine if stripping can be determined. To test the laboratory methods selected, a level 3 super pave mix that has been proven to not be prone to stripping was selected. The HMA samples were compacted at three (3) levels of air voids (density), 7, 10, and 14 percent air voids. Based on these tests the higher the air voids or lower density the HMA suffered more stripping tendencies. This finding supports the hypothesis that low density and air voids may cause stripping.

Task 3

In Task 3 we cored and tested the cores from city streets experiencing stripping. A group of streets where selected to be sampled for lab testing to validate findings from Task 2 and determine what causes stripping of the chip seals on streets.

Efforts were made to develop field test requirements that could be performed to determine if the street is a good candidate for a chip seal, i.e. will not strip 2-4 years after placement. The Nuclear Density Tester (NDT) and NCAT Field Permeameter were used on streets without a chip seal. Lab testing on the cores taken from both streets with and without a chip seal included the following; air voids (ASTM T269, T166 & T209) and lab permeability (ASTM PS 129-1).

The data from the city's streets correlates with the finding in Task 2. As air voids increased and density decreased the chance of stripping also increased. The best method to check for variability in density in the pavement is NDT. A second hypothesis that was brought forward was the one could fog seal the street with light application of asphalt emulsion and that it would stop water infiltration into the mat but would allow water vapors to escape similar to TYVEK® house wrap does for homes.

Using cores from a two (2) year old fog seal and the lab permeability (ASTM PS 129-1) test method it was demonstrated that fog seal did not allow water in liquid state to infiltrate the HMA but allowed water in a vapor state to escape. (See Appendix C).

Figure 3: Nuclear density tester.

Task 4

In Task 4 current methods used by cities to construct their streets was reviewed. These methods were compared to MnDOT's standard specifications for paving. During discussion with agency personnel one fact that relates to density became apparent. Most cities were using ordinary compaction to obtain density. Ordinary compaction, when executed properly should yield good density of the pavement. However, one issue with ordinary compaction is that contractor and agency personnel must ensure that all areas of the pavement receive proper number of rolling passes at proper temperature of asphalt mixture. When streets have variable widths and curves are present it is more difficult to ensure the rolling pattern is consistent throughout asphalt pavement placement. MnDOT recommends using specified density methods. With specified density the agency will take cores randomly from pavement to verify that proper density has been achieved (see Appendix D).

Task 5

Analysis of the data collected in Task 3 was discussed and presented in Task 5. Using the different methods outline above, it was shown that all the test methods correlated. The data showed that streets had high variability in density from 7 to 12 percent air voids in areas close stripped areas. In the areas with severe stripping cores were not able to be retained for testing. This was due to the cores breaking into many pieces after pulling the core from the pavement. Nuclear density testing showed great amount of variability in the mix weight per cubic foot from

areas of not stripping to areas suffering from stripping. One street had weight from 145 lbs. per cubic foot in areas of the street with no issues to a low of 117.3 lbs. per cubic foot in areas suffering from stripping.. For field evaluation of streets the nuclear density tester is the fastest and easiest to use of method tested. After discuss with experts from around the country it is recommend to not chip seal a street if the variability in density varies more than 6 lbs. per cubic foot as measured with nuclear density tester. (See appendix E)

Task 6 and 7

Task 6 and 7 was developing the draft final report and a final report of the findings from Tasks 1-5.

Task 8

Task 8 will develop a draft implementation outline for the Research Implementation Committee (RIC) to use. Three (3) main recommendations for the outline are:

1. Present finding of study at many conferences.
2. Include data about variability of density into bituminous training classes offered by MnDOT to help insure better constructions methods are followed.
3. Develop a handout to inform agencies about the stripping under chip seal issues and recommendation on preventing this distress.

Chapter 3. Conclusions and Recommendations

Conclusions

The stripping of the HMA pavement after application of chip seal is caused by areas of high air voids or low density. The lack of proper compaction allows water to permeate into the HMA and cause pavement to strip. This also occurs in HMA that are not prone to stripping. A cause for lack of uniform density is the use of the ordinary compaction method. For ordinary compaction to work, inspections must ensure all areas of the pavement receive proper compaction efforts at the correct temperature for the mat.

Recommendations

It is recommended that agencies use specified density methods to ensure proper uniform compaction of the HMA paving. An observation by a city's personnel was when the city switched to specified density the same Contractor brought two 20- to 25-ton steel rollers and a 20- to 25-ton pneumatic roller instead of one 6- to 8-ton steel roller they used in the past when ordinary compaction was specified. The cost of the HMA was the same per ton. Areas that need more research into are what effects recycled asphalt (RAP) now used in wear course have on stripping.

There are currently three options for existing streets with low density and high air voids variability. These options are as follows:

1. Do nothing and allow the street to fail prematurely.
2. Chip seal earlier in pavement life to try to keep pavement structure as dry as possible to limit moisture damage. From the surveys in Task 1, it appears that chip sealing the pavement within the first 1-4 years of life helped to limit the stripping issues.
3. Fog seal pavement with a CSS-1h diluted to one part water and one part emulsion.

Appendix A: Task 1 Report

Minnesota Local Road Research Board (LRRB)
Investigation No. 010-042

Stripping of Hot Mix Asphalt Pavements under Chip Seals

Interim Report

Submitted to the LRRB technical advisory panel in fulfillment of:
Task 1 on November 9, 2010

Thomas J. Wood, Research Project Supervisor
Mn/DOT Office of Materials and Road Research
1400 Gervais Avenue, Maplewood, Minnesota 55109

Introduction: In recent years, Mn/DOT has received reports of stripping, or deterioration, of the upper ½ to 1 inch of hot mixed asphalt (HMA) pavements under chip seal surface treatments. This distress (Figure 4) usually starts out as a small blister and develops to small potholes, at which point the chip seal delaminates from the pavement. These distresses can become an expensive maintenance problem. These distresses could also impede the deployment of cost saving preventive maintenance (PM) treatments if the treatments are viewed as the cause of the distresses.

Figure 1. Early stage of HMA deterioration under a chip seal (251 Reid).

This report represents task 1 of the Minnesota Local Road Research Board (LRRB) project number 2010-042, entitled, "Stripping of Hot Mixed Asphalt Pavements under Chip Seals". The overall goal of this research project is to determine the underlying cause of the stripping distresses, identifying which pavements are at greatest risk and implement risk mitigation strategies that include improved specifications and practices. The main purpose of this task report was to identify the extent of the problem among local government entities.

Minnesota cities and counties were asked to complete an online survey, using the Survey Monkey ™ tool, describing their experience with the stripping under chip seal distress. Appendix A is a draft of the survey that was used to populate Survey Monkey™. The survey opened for response in early September and received 66 responses.

Findings and Observations: The survey responses show that the problem of stripping of the HMA under a chip seal happens in over 60% of the agencies that responded. The first chip seals were applied when the streets were between four (4) and eight (8) years of age. The distress seems to appear between two (2) to four (4) years after chip seal application. Note that 60 percent of respondents reported that they did not have un-chip sealed roadways the same age as the chip sealed roadways. The ninth question asked for comments. Appendix A lists all the comments received. Below are a few selected comments.

"As a rule of thumb, we will seal coat a street twice over a 15 to 20 year period prior to mill and overlay. Stripping more common after second seal coat."
"We have one road we sealed when it was only a year old and the stripping has not occurred on that road yet."
"So far this has only shown up in our first recycled asphalt wear courses installed from 1996 to 1998. We have heard that there was a problem with the Mn/DOT formula that hopefully has been corrected."
"We think this is occurring in pavements put down in the early 1990's where they first started to use RAP in the mix."

Recommendations for next task: Based on the information from the survey, the research should to study the types of HMA mixes used to determine if some types, or blends, of HMA and recycled asphalt pavement (RAP) are more prone to stripping. Density may also be a contributing factor.

Appendix A: Survey Results

Question 1: **asked the name of the Agency fill out survey**.

Question 2: **Does your city use chip sealing as a Preventive Maintenance treatment?** 60 responded Yes, and 6 responded No.

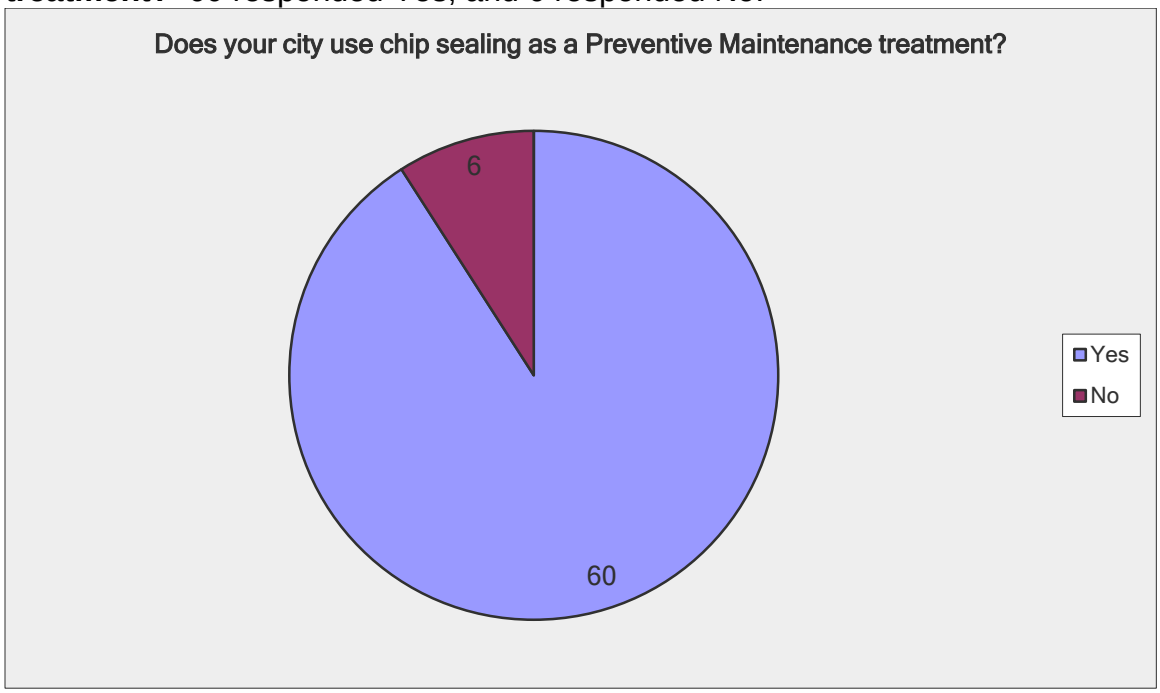
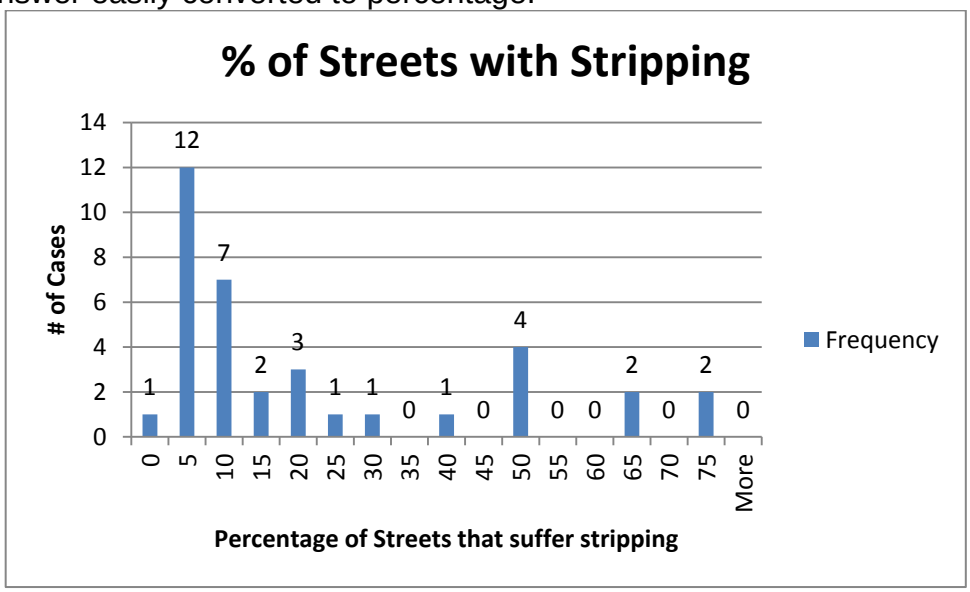


Figure 2 Picture used in survey

Question 3: **Using the pictures (Figure 2) above as guidance, do any of your streets suffer from stripping under chip seals?** 42 agencies reported yes and 24 reported No

Question 4: **What percentage of streets does it happen on?** 40 out of 66 supplied answer to this question. See below histogram for breakdown of data. Most of the agencies reported a percentage but four (4) reported in format that did not give an answer easily converted to percentage.



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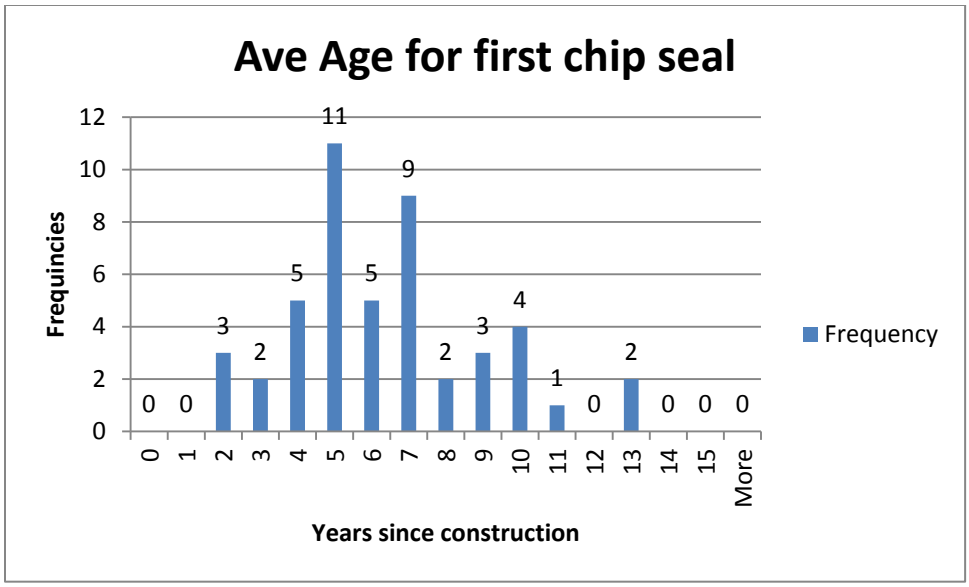
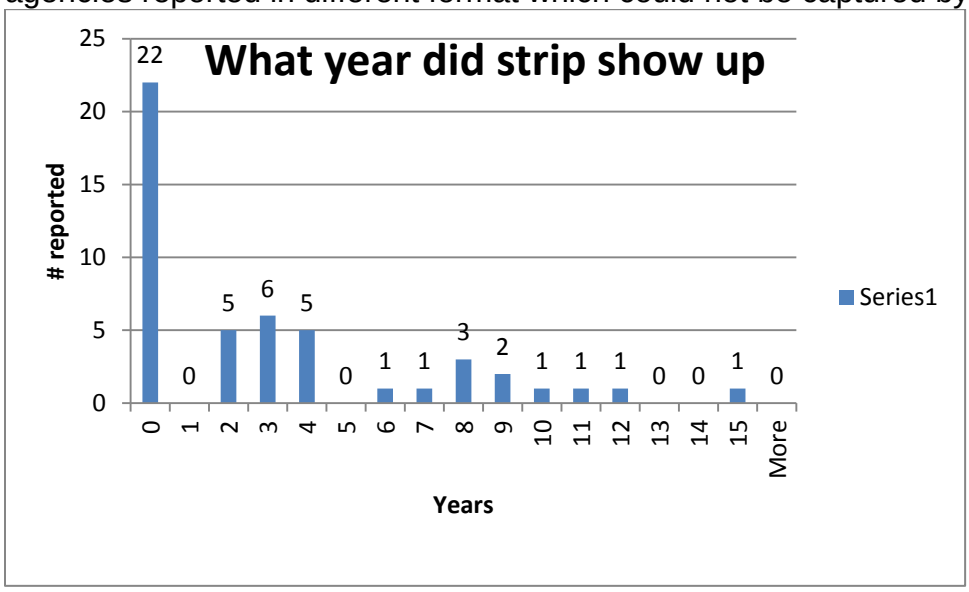
Question 5: **On average, what is the age of the street when the first chip seal is placed?** 52 responded to question see histogram for data below. Five (5) agencies reported in a different format which could not be captured by the histogram.

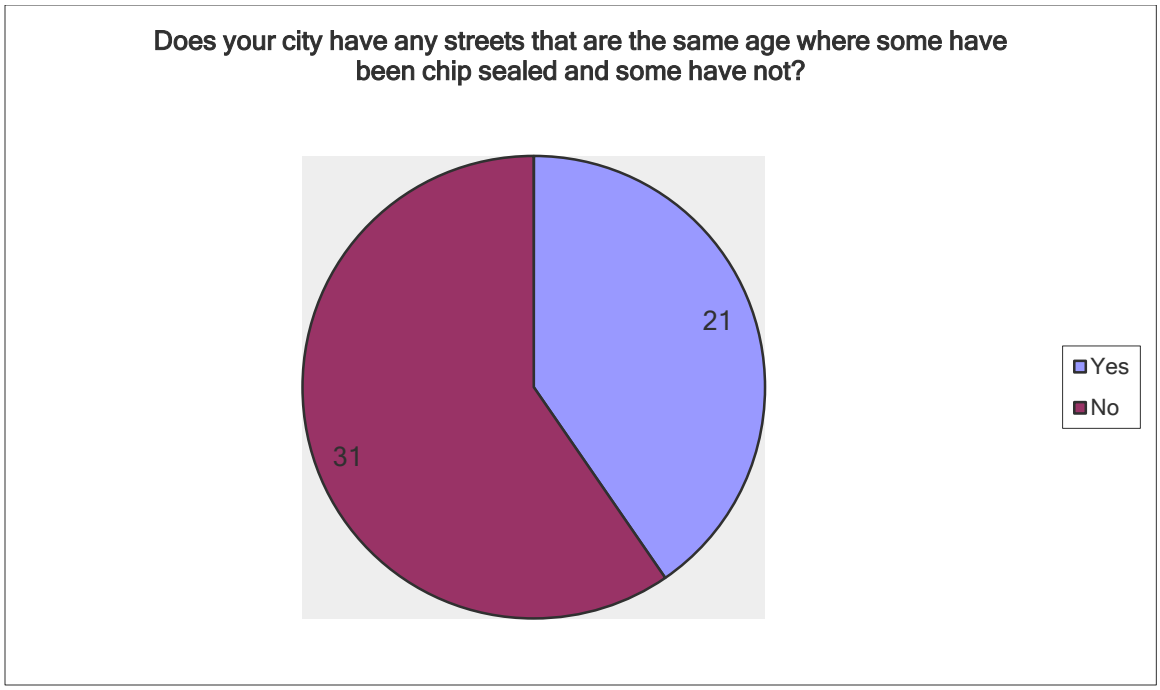


Question 6: **How long after the chip seal is placed does the stripping problem show up?** 52 responded to this question, see histogram below for data. Three (3) agencies reported in different format which could not be captured by the histogram.

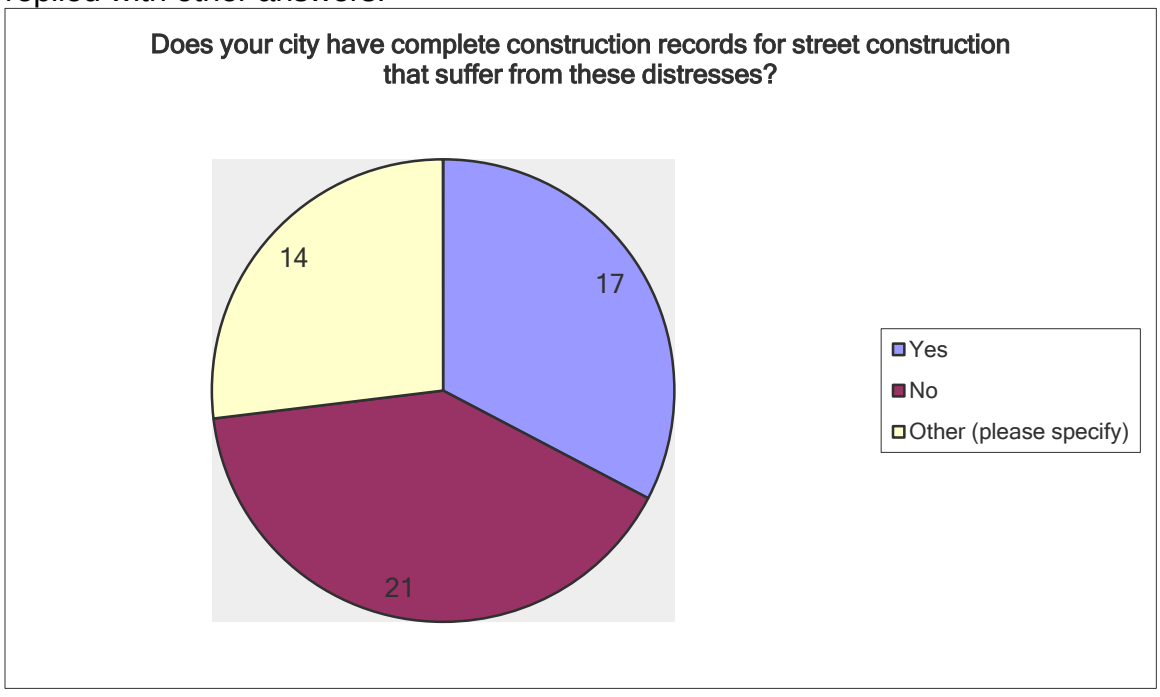


The responders that listed year zero have not seen any damage to their streets.

Question 7: **Does your city have any streets that are the same age where some have been chip sealed and some have not?** 52 responded. 21 replied yes and 31 replied no.



Question 8: **Does your city have complete construction records for street construction that suffer from these distresses?** 17 replied yes, 21 said no, and 14 replied with other answers.



Question 9: **Are there any comments or additional information that you need or would like to share?** 16 responded with additional comments or information. See comments below.

- *I'm going to pass this on to my Public Works guys, as they have noticed this problem for several years. I will have them reply too, as they can offer more*

details. I would encourage everyone that this study include street maintenace personnel (field people) in addtion to City engineers/Public Works Directors (office people).

- *As a rule of thumb, we will seal coat a street twice over a 15 to 20 year period prior to mill and overlay. Stripping more common after second seal coat.*
- *We have one road we sealed when it was only a year old and the stripping has not occured on that road yet*
-
- *You know all our comments about the chip seal material on sticking to our truck engines and tranny's...*
-
- *The City has been very consistent over the last 10 years or more about seal coating and keeping up with the 5 year timing. To date we have not noticed any problems with the surface coat below the chip seal.*
- *We use MC oil and no emulsifiers which helps prevent this from happening.*
- *Our experience is limited to stripping on 61 wear course roads, we haven't seen other significant stripping issues on other roads.*
- *We have attributed the problem more to the wear course being chip sealed then the chip seal itself*
- *Maplewood, like other metro cities is dealing with this issue and there are a number of state aid roadways with this problem.*
- *We are currently formulating an approach to fix these streets since it is very difficult to patch the great number of thin failures areas.*
- *According to our Street Superintendent the issue could be a result of using trap rock which is left for only 2-3 days before being swept up.*
- *Streets with pea rock left down for 2-3 weeks such as North Saint Paul and Lake Elmo don't seem to be having the failures.*
- *We have not seen this problem in Faribault County.*
- *Marshall County has not completed a chip seal.*
- *So far this has only shown up in our first recycled asphalt wear courses installed from 1996 to 1998. We have heard that there was a problem with the Mn/DOT formula that hopefully has been corrected.*

- *In response to the question seven, we have not determined the ages for all occurrences of this type of stripping. We have however, noted that the stripping occurs in certain areas, where presumably the pavement is of approximately same age and sealing is also conducted at the same time (sealing is performed on an area basis). We seal streets on an 8-year cycle, and do not perform "early sealing" on new pavement after 2-3 years as some cities do. This program was initiated in the early 80s. We have started to examine the practice of early sealing, and would like to determine whether this would be more effective for our City.*

- *We think this is occurring in pavements put down in the early 1990's where they first started to use RAP in the mix.*

- *Just a quick glance revealed two areas with most noticeable stripping were built around 1994- 1999 and mostly likely had two seal coat applications to date. Also these are areas of clay soils.*

- *Most problems appear where there are just thin overlays.*

- *One of the segments is approximately 15 years and the problem is pretty much continuous for the 10 mile segment. The problem is occurring in the center of lane and appears as a stripping problem created in the original mix placement. Possibly a segregation problem created by the paver during placement.*

Appendix B: Task 2 Report

Stripping of Hot-Mix Asphalt Pavements under Chip Seals

Development of a Methodology to Asses Potential at Risk Streets

LRRB 10-0142, 2010-042 Interim (Task 2) Report

Prepared by

Mark J. Watson

Thomas J. Wood

Minnesota Department of Transportation
Office of Materials and Road Research
1400 Gervais Avenue
Maplewood, MN 55109-2043

April 2011

The contents of this report reflect the views of the author who is responsible for the facts and accuracy of the data presented herein. The contents do not necessarily reflect the views or policies of the Minnesota Department of Transportation at the time of publication. This report does not constitute a standard, specification, or regulation.

Acknowledgements

The bituminous trial mix lab is gratefully acknowledged for their assistance in preparing and testing the bituminous mixtures. The TAP is gratefully acknowledged for their technical guidance.

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This report represents task 2 of the Minnesota Local Road Research Board (LRRB) project number (Investigation) 2010-042, entitled, "Stripping of Hot Mixed Asphalt Pavements (HMA) under Chip Seals". The goal of this specific task report is to identify, or develop a methodology that can be used to asses potential at-risk streets before they are treated with a surface treatment. The preliminary methodology being investigated by the research team involves testing the in-place pavement for air void content, or permeability (either in-situ or laboratory). If the pavement is found to have excessive permeability and/or air void content, then caution should be exercised before placing a chip seal surface treatment; a fog seal surface treatment may be more appropriate. These recommendations are preliminary and need to be validated with more testing of laboratory and plant produced (in-place) pavement mixtures in accordance with the work plan.

Based on previously completed forensic investigations, and survey responses the research team has hypothesized that low density (high-interconnected air voids) are a contributing factor to the observed stripping distresses. Thus, the experimental plan investigated the influence of various air void contents (7, 10 and 14%) on a mixture's susceptibility to moisture induced damage. The mixtures susceptibility was tested with: permeability tests, Mn/DOT modified Lottman, Asphalt Pavement Analyzer (APA) tested under wet and dry conditions, and a modified Iowa Boiling Test.

Permeability testing indicated that the mixtures became significantly more permeable when the air void content was near 14%. The Lottman test did not show any visual evidence of stripping and all tensile strength ratios (TSR) were above 70%. However, the mixtures with the highest air void content had the lowest TSR at 74% and the mixture with the lowest air void content had the highest TSR at 84%. The change in air void content had the most dramatic influence on tensile strength values; a doubling of the air voids from 7% to 14% corresponded with a reduction of 52% and 58% in the dry and wet tensile strengths respectively. APA test results were mixed as the greatest difference in rutting rates between 'wet' and 'dry' testing conditions were at the 10% and 7% air void contents; the mixture with 14% air void content showed little difference. None of the mixtures showed signs of visual stripping. In the modified Iowa boiling test, the specimens with 14% air voids lost an average of 12.2% of their initial weight and the specimens with 7% air voids lost an average of 3.4% of their initial weight. In addition, empirical observations after the test showed that the specimen with the higher air voids (14%) was much less intact than the comparable specimens with lower air voids (7%).

There was no test that explicitly showed asphalt stripping away from mixtures with higher air voids; however, the results of the laboratory testing did indicate that the higher voids do contribute to reduced pavement durability through reduced strength, increased susceptibility to rutting and increased permeability. The permeability and the modified Iowa Boiling test results indicate that pavements with higher air void contents may be more susceptible to moisture induced damage than pavements constructed with the proper amount. These factors will also reduce the life of a chip seal that's placed on top of a compromised pavement. Future testing within this project will entail conducting the same tests (permeability, Mn/DOT modified Lottman, wet and dry APA, and modified Iowa Boiling) but on sealed specimens of varying density to more closely simulate field conditions. In addition, to the research team intends to modify the laboratory Permeameter to examine whether or not moisture (from the bottom) can penetrate a chip seal or a fog seal surface treatment.

Chapter 1. Introduction

Objectives of Report and Research

This report represents task 2 of the Minnesota Local Road Research Board (LRRB) project number (Investigation) 2010-042, entitled, "Stripping of Hot Mixed Asphalt Pavements (HMA) under Chip Seals". The overall goal of this research project is to determine why stripping distresses are observed in the underlying HMA pavements of some streets and not others. Identify which pavements are at greatest risk and implement risk mitigation strategies that include improved specifications and practices. The goal of this specific task report is to identify, or develop a methodology that can be used to asses potential at-risk streets before they are treated with a surface treatment. This methodology (in the form of a laboratory test) is designed to provide guidance on the susceptibility of the proposed pavement section to the stripping under chip seal distress, which would allow agencies to make informed decisions on the application of preventive maintenance (PM) treatments.

Stripping Under Chip Seal Distress

This problem has been observed for more than twenty years; however recently, Mn/DOT has received increased reports of stripping of the upper ½ to 1 inch of hot mixed asphalt (HMA) pavements under chip seal surface treatments. This stripping distress (Figure 1.1) usually starts out as a small blister and develops to small potholes, at which point the chip seal delaminates from the pavement. These stripping distresses can become an expensive maintenance problem.

Figure 1.1. Early stage of HMA deterioration under a chip seal (251 Reid).

The distress appears to be limited to local, low speed roads (30 - 40 miles/hour) with curb and gutter and Task 1 of this research project (1) surveyed local agencies and found that (60% of 66 respondents) have this problem. Due to the relative widespread nature of the phenomenon the study will not focus on material specific causes of the stripping, such as aggregate/asphalt incompatibility. The focus of the study will be on the stripping phenomenon as it relates to the pavement structure as a whole, specifically, it is theorized that pavements with poor drainage, low density and traffic action are at an increased risk of stripping when a chip seal is applied. The basis for this theory is that many observed cases have been local streets (with presumably higher density) and curb and gutter (no edge drains for water to escape).

Review of Published Literature

The vast majority of the literature found focused on a "microscopic" investigation of the problem, namely the properties/performance of the asphalt and aggregate, or the mixture as a whole. The following paragraph is an excerpt from Kiggundu and Roberts (2), "Hubbard states

that stripping effects have been observed since the advent of paving with bituminous. Since this phenomenon has been detected, there have been numerous technical papers, articles, and presentations. Stripping is a complex problem to which there is no definitive, qualitative and quantitative solution towards understanding and predicting the stripping potential of HMA. There currently are a number of hypothesized mechanisms, including: detachment, displacement, spontaneous emulsification, film rupture, pore pressure, and hydraulic scouring. There are a number of postulated theories, which include: mechanical interlock, chemical reaction, molecular orientation, or Interracial phenomenon, none of which are universally accepted."

Aschenbrener (3) reported on several pavements in Colorado which required complete rehabilitation at less than two years old and often less than one year old. The pavements designed to be a rut resistant composite pavement that used a plant mixed seal coat placed over an HMA layer; however the underlying HMA layer experienced severe moisture damage as shown below.

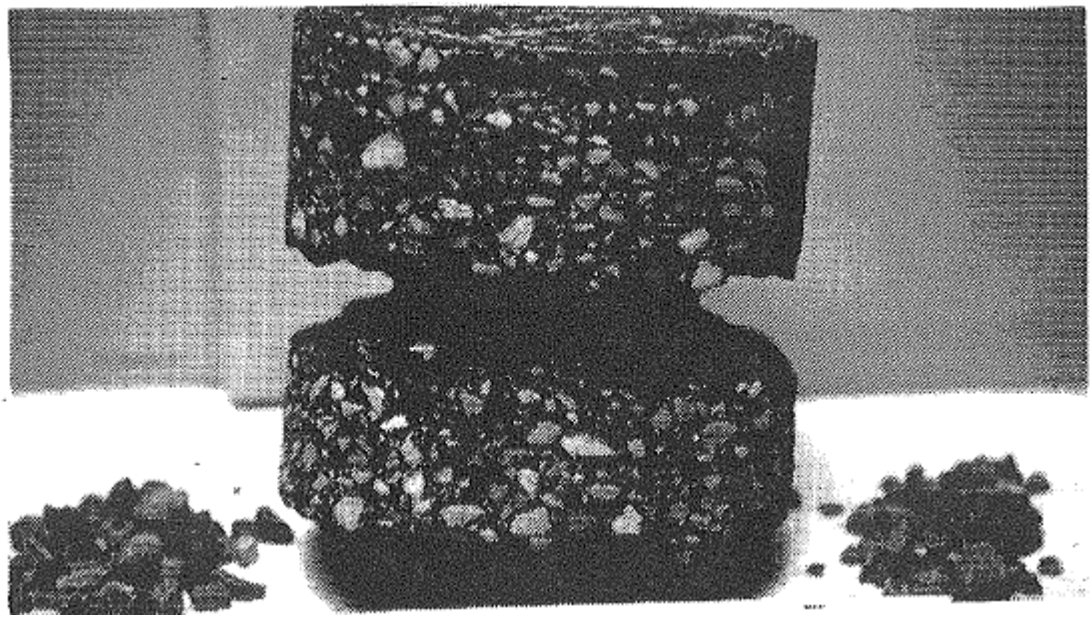

Figure 1.2. A Core showing Stripping below the surface (3)

Although the plant mixed seal coat was reported a contributing factor, the HMA mixtures were also deemed to be susceptible to moisture induced damage (the only reason to explain the rapid failures), and it was observed, through analysis of weather conditions, that the failures occurred during high levels of precipitation during the hottest part of the summer. The severe moisture damage did not correspond to freezing conditions. The failures were attributed to high temperatures, high moisture and high traffic.

Kandhal and Rickards (3) was another reference that discussed the stripping problem in context of the pavement system and not in isolation. The researchers presented case histories of premature stripping of asphalt overlays due to stripping. The researchers observed that, "In each of the observed cases, saturation was the cause of the problem; stripping was the outcome." They also noted that, "If subsurface drainage of the pavement is inadequate, moisture and/or moisture vapor can move upwards due to capillary action and saturate the asphalt courses." The researchers hypothesized that, "In addition to high air void content, there are three essential ingredients to promote stripping: the presence of water, high stress and high temperature." Furthermore, the researchers argued that if the concept of mat "breathing" (ingress of moisture

balanced by the egress of moisture in the form of water vapor) wasn't true, there would be substantially more stripping problems.

The current investigation is concerned with stripping of generally older pavements with chip seals applied 'late' (>7 years) in the pavement's service life. So, it is interesting to note that stripping almost universally occurs from the bottom up, or at the interface of two layers outward, so, based on this, it is logical to be concerned with the application of a chip seal over an HMA pavement, as the new pavement is now a "lower layer". In addition, section 7 (surface treatments) of the Texas DOT Pavement Design Guide (5) recommends testing HMA mixtures for susceptibility to stripping before the application of a chip seal because, "A surface treatment will generally seal off the vertical escape of moisture migrating upward out of a pavement which can set up accelerated stripping in the existing HMA layer beneath the seal". The sealing off of the vertical escape of moisture will not increase the pavement's stripping susceptibility if there isn't moisture, in other words if the moisture can escape through the sides (edge drains), or if the moisture is intercepted with a permeable base layer. Thus this implies that the stripping mechanisms of the pavement were already in-place, merely accelerated by the presence of the chip seal surface treatment.

Texas currently, as of 2011, has two standard methods for testing moisture susceptibility of HMA mixtures:

1. Placing a 200g sample of prepared HMA, no more than one aggregate thick in a beaker which is immersed in boiling oil
2. Modified Lottman Test which involves comparing the Tensile Strength Ration of moisture conditioned specimens with that of non-conditioned specimens.

Aschenbrener and McGennis () reported on using the boiling water test and seven versions of the modified Lottman test (AASHTO T 283) to predict the stripping of materials extracted from twenty sites of known field (stripping) performance. They reported that two levels of severity for conditioning laboratory samples correlated well with what was observed in the field; the most severe conditioning cycle included a 30-minute vacuum (610 mm HG) saturation a 15 hour freeze, followed by a 16 hour soak in a high temperature water bath, the milder conditioning consisted of: 55-80% saturation and no freeze, followed by a 16 hour soak in a high temperature water bath. They recommended the severe conditioning for mixtures placed under high traffic, high temperature, high moisture and possibly freeze conditions and milder laboratory conditioning for mixtures placed on low traffic sites. They went further, stating that it is critical that the conditioning in the laboratory (vacuum saturation, freeze, hot-water soak) be equal, or greater than the severity expected in the field. The authors did not recommend the boiling test as it is a very severe test that does not consider important factors of: gradation, void structure, or permeability, all of which influence field performance related to moisture susceptibility.

Chapter 2. Laboratory Testing and Evaluation

Introduction

There is no one test that is universally accepted as an indicator of stripping potential, some tests worked well on some materials and not on others. One of the goals of this project is to provide a test(s) that can be performed relatively inexpensively and provide results quickly and accurately. With this in mind, excessive conditioning, such as multiple freeze-thaw cycles in the Lottman test, is not being considered. Preference was given to accepted tests and methodologies which could be implemented/performed with little investment.

In addition, an experimental plan was formulated based upon recent data findings from forensic investigations of local streets. These forensic investigations revealed that pavements with stripping problems also seemed to have high in-place air voids. All of them had in-place voids greater than 10%, up to as high as 14%, other samples were unable to be tested due to disintegration of the core during the coring operation. This led the researchers to hypothesize that reduced density would lead to an increased susceptibility of the pavement to experience moisture induced damage.

The hypothesis was tested by utilizing the current standard employed by Mn/DOT (Lottman test with Mn/DOT modified conditioning), experimenting with the Asphalt Pavement Analyzer (APA), or rutting test conducted on saturated and dry specimens as well as a new method proposed by the researchers that involves immersing a sample into boiling water for a pre-determined period of time (referred to as the modified boiling test)".

Laboratory Procedure and Test Results

Laboratory Permeameter (Karol-Warner flexible wall Permeameter)

The laboratory testing was conducted on a level 3 SuperPave mixture, derived from a relatively common Minnesota job mix formula. This mixture has not been observed to be susceptible to striping problems. The samples were sampled from the field and prepared in the laboratory by trained Mn/DOT personnel using a SuperPave gyratory compactor. The mixture had 30% RAP content, with 4.8% new asphalt binder and it conformed to Mn/DOT's gradation requirements.

Permeability testing was accomplished using the laboratory Permeameter (Figure 2.1), also known as the Karol-Warner flexible wall permeameter. The coefficient of water permeability, k was found using the relationship described in Figure 2.1.

The coefficient of permeability provides an indication of the ease with which water can pass through the specimen, higher values indicate that it's easier for water to flow through the specimen and lower values indicate that it's more difficult for water to flow through the specimen. According to the Mn/DOT pavement design manual, permeability for class 5 aggregate base is approximately 4.8 inches per day (in/day) and drainable bases have permeability values between 3,600 to 12,000 in/day.

$$k = \frac{al}{At}\ln\left(\frac{h_1}{h_2}\right).$$

Where:

k	coefficient of permeability, cm/sec
a	inside cross-sectional area of standpipe, cm^2
l	thickness of test specimen, cm
A	cross-sectional area of specimen, cm^2
h_1	hydraulic head on specimen at time, t_1
h_2	hydraulic head on specimen at time, t_2

Figure 2.1. Laboratory Permeameter (Left) and Permeability Calculation (Right)

Figure 2.2 shows the graphical relationship between permeability and air voids. As the air voids are increased greater than 9.6%, the permeability increases dramatically. Although the permeability of the mixture with 13% air voids is still much lower than that of permeable bases, it is still approximately six times more permeable than class 5 aggregate base. This relationship was also found by Cooley, Brown and Maghsoodloo (2001) who reported that coarse, dense graded SuperPave mixtures with a nominal maximum aggregate size of 3/4" (19.0 mm) became excessively permeable at approximately 5.5% in-place air voids, which corresponded to a field permeability value of 40.82 in/day. They also observed that permeability appeared to increase exponentially with in-place voids (Figure 2.3).

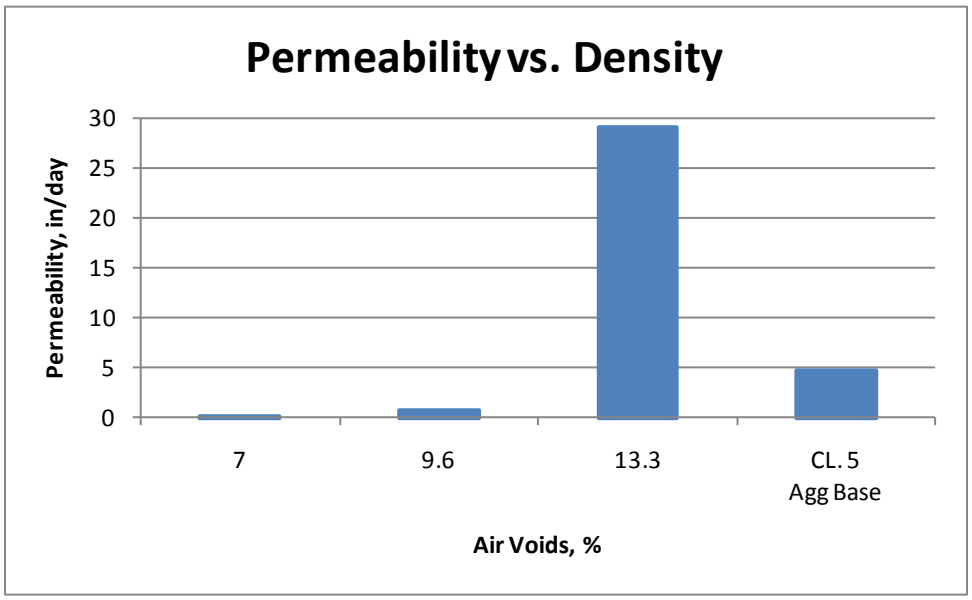

Figure 2.2. Permeability vs. Air Voids

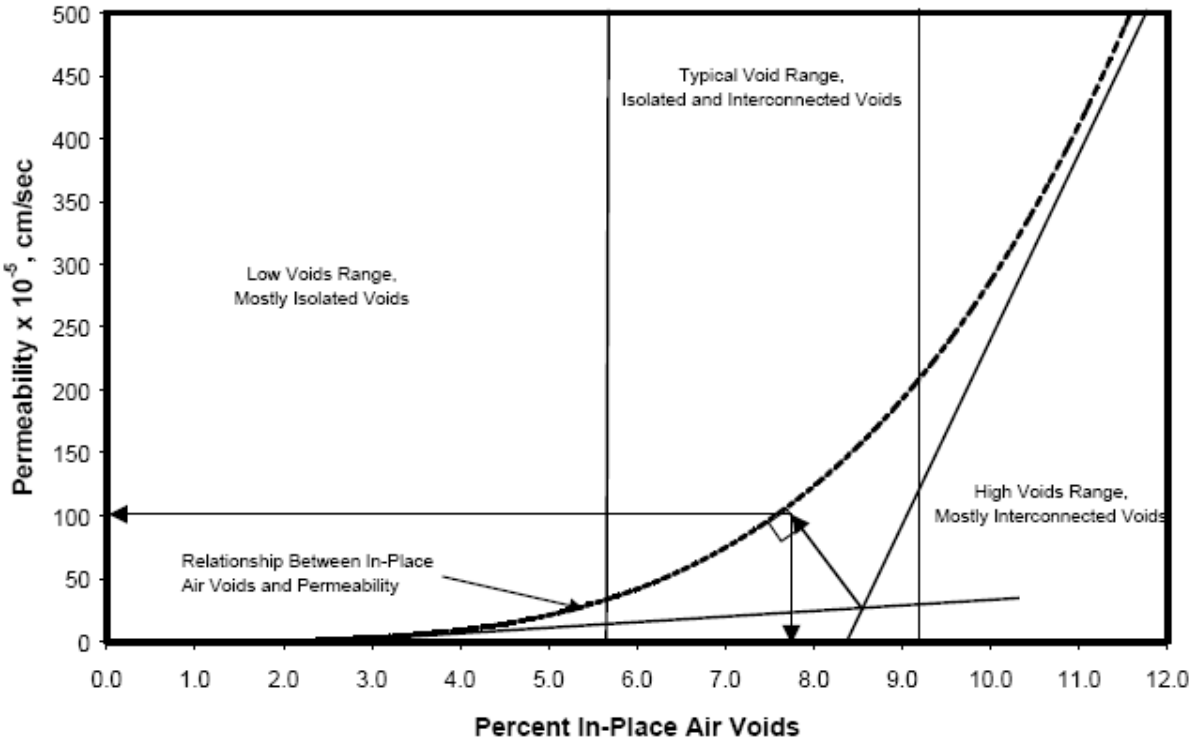

Figure 2.3. Permeability vs. In-Place Air Voids (Cooley Jr., Brown and Maghsoodloo, 2001).

Lottman Test (Mn/DOT Modified)

The moisture sensitivity was ascertained by performing modified Lottman tests in accordance with ASTM D 4867, Mn/DOT modified (See Appendix A). The moisture sensitivity was gauged by comparing splitting tensile test (Figure 2.4) results of control, or non-moisture conditioned specimens (dry strength) against those of moisture conditioned specimens (wet strength). The ratio of the wet strength to the dry strength represents the tensile strength ratio, or TSR. The generally accepted minimum threshold value for TSR is 70%.

Figure 2.5 shows the TSR values vs. the air void content of the mix. All three TSR values are above the 70% criterion; however, the increase in air voids appears to correspond with a decrease in the TSR, which suggests reduced resistance to moisture induced damage. In addition, the apparent relationship appears to suggest that a mixture with 17% air voids, would have a TSR value of 70%. Figure 2.5 compares the visual appearance of the 'wet' and 'dry' specimens after testing. From this figure, there does not appear to be a relationship between air void content and stripping potential as all three sets appear to be relatively the same.

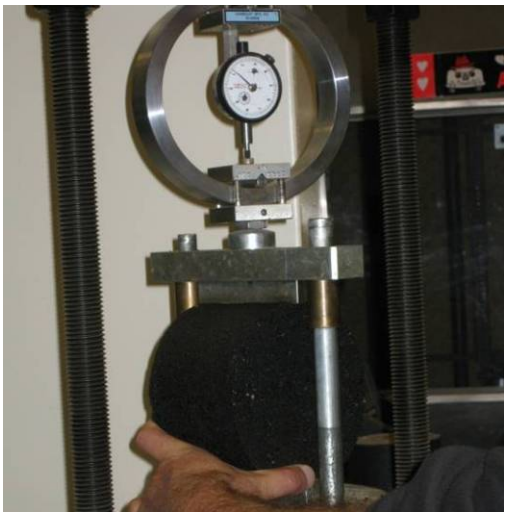

Figure 2.4. Lottman Testing

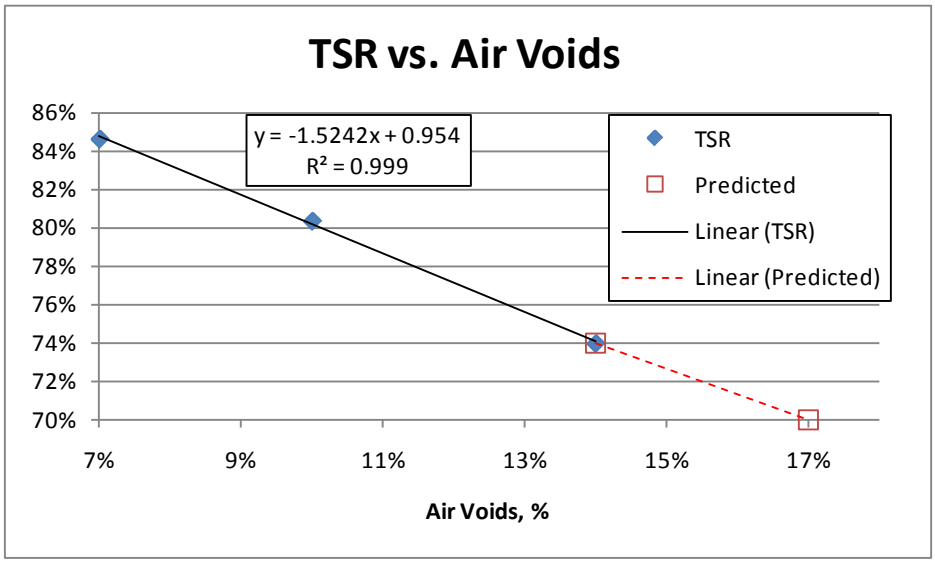

Figure 2.5. Tensile Strength Results (TSR) vs. Air Voids

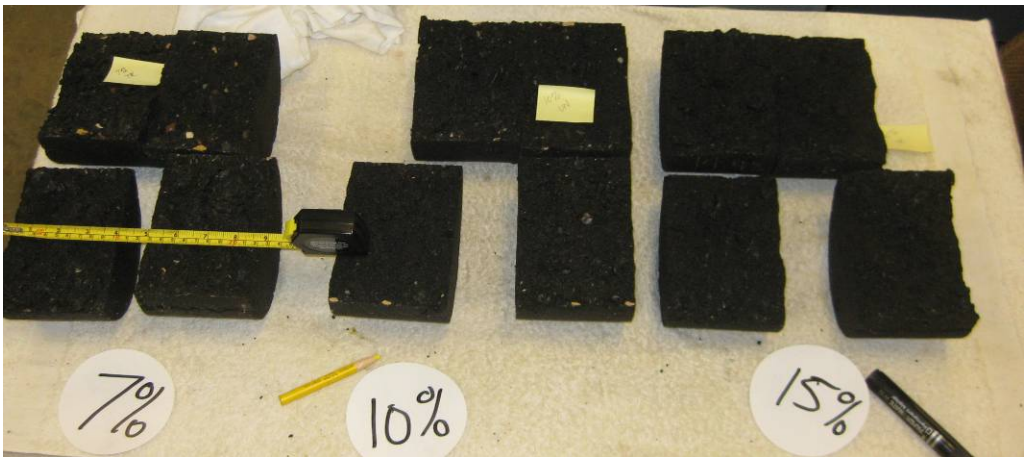

Figure 2.6. Visual Examination of TSR specimens

Figure 2.7 shows the dry and wet tensile strength values of the three mixtures. There is a much more noticeable impact on these strength values due to the increase of air voids than there was on the TSR. Generally speaking, a doubling of the air voids from 7 to 14 corresponds with a reduction of 52% and 58% in the dry and wet tensile strengths respectively. These reduced strength values could be expected to contribute to a less durable pavement. It should also be considered that the tests were conducted on newly prepared mixtures; pavements in the field degrade and loose strength and durability over time. A pavement that has initial TSR value near the borderline, will most likely reach a compromised state sooner than one that has a higher initial TSR value.

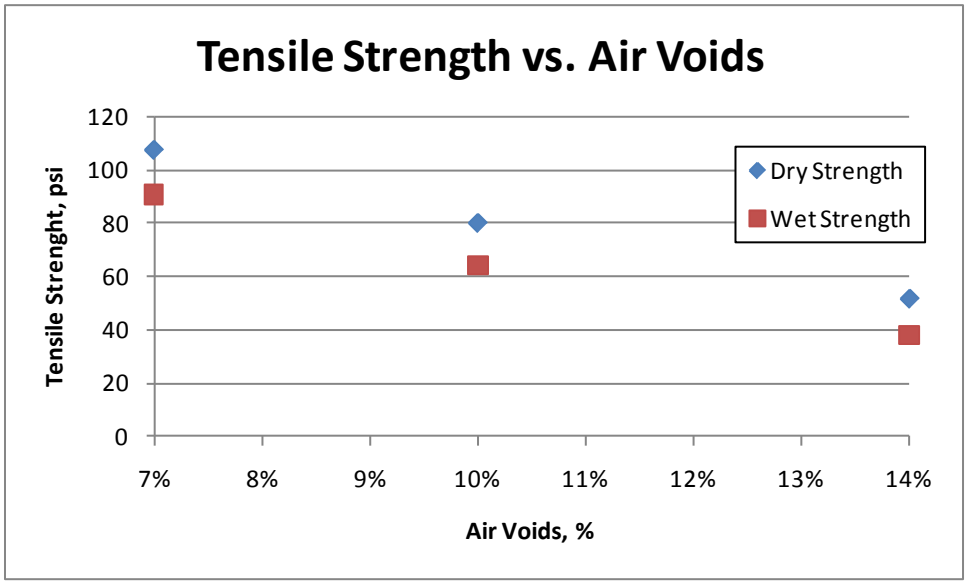

Figure 2.7. Tensile Strength vs. Air Voids

Asphalt Pavement Analyzer (APA) Test "Wet" (Mn/DOT Modified).

The asphalt pavement analyzer (APA) device, as shown in Figure 2.8, was used to experimentally evaluate the mixture's susceptibility to rutting. The "dry" test consisted of applying 8,000 cycles of 100 lbf strokes to the lab-compacted gyratory specimens at 137 ºF (58ºC), which is approximately equivalent to 1,000,000 ESALS. The "wet" test consisted of applying a number of cycles until the mixture reached a set rutting value while immersed in water. A mixture's susceptibility to rutting is typically dependant upon the binder (content and stiffness) as well as the gradation of the mixture and air void content. Higher rut depths indicate a softer mixture where lower rut depths indicate a stiffer mixture; typical level three mixtures evaluated by Mn/DOT have rut depths between 6 – 10mm.

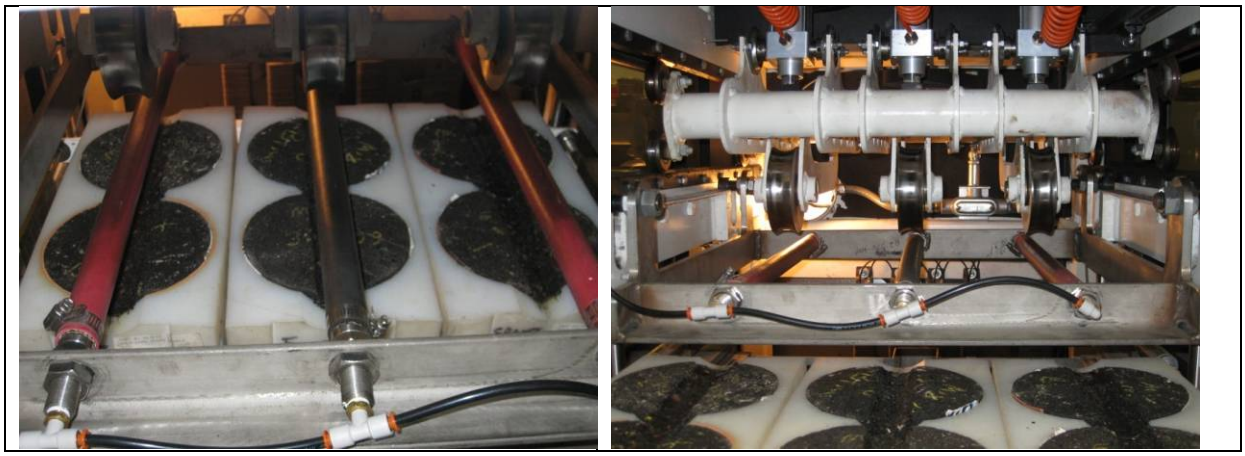
Figure 2.8. Asphalt Pavement Analyzer (APA), or Rut Tester

This test was performed under dry and wet (submerged) conditions. The wet APA was intended to simulate the three factors identified in the literature search as contributing to the stripping phenomenon: presence of water (saturation), high stress and high temperatures. Figure 2.9 and Figure 2.10 show the rut depth vs. the number of applied cycles for the wet and dry tests respectively. Table 2.1 shows the average rutting rate in mm per hour (mm/hr) for the three air void contents in the two different testing conditions (wet and dry). For consistency purposes the average rutting rate (measured rutting/number of cycles) was computed based upon the same number of cycles for both testing conditions, the test conditioned that governed the number of cycles appears as bold in the table.

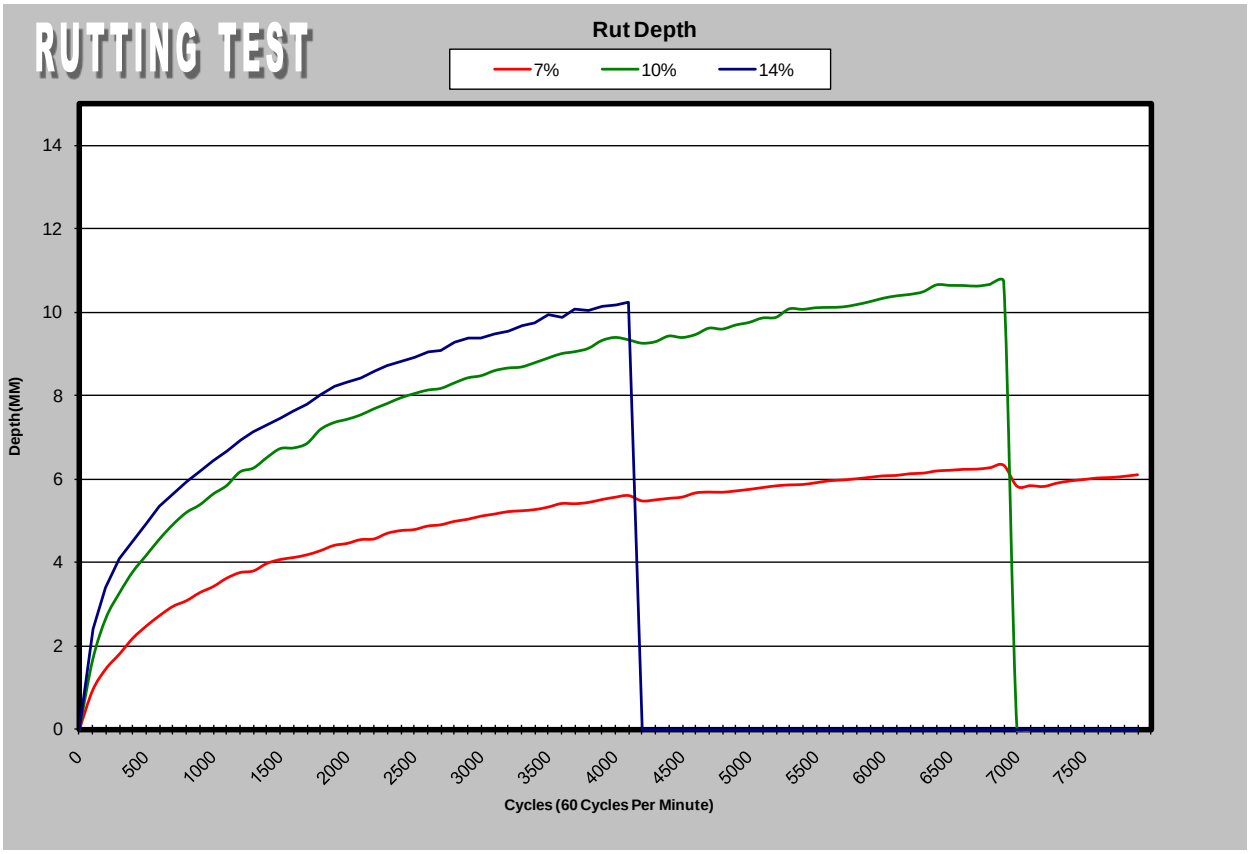

Figure 2.9. Asphalt Pavement Analyzer (APA) Test Results of Dry Test

Table 2.1. Average Rutting Rates (mm/hr)

AV	Test	Cycles	Rutting (mm)	Avg. Rate (mm/hr)	% Difference
7	wet	8,000	7.275	3.27	16.5
	dry	8,000	6.164	2.77	
10	wet	6,965	8.92	4.61	19.3
	dry	6,965	10.822	5.59	
14	**wet**	3,404	9.799	10.36	0.2
	dry	3,404	9.781	10.34	

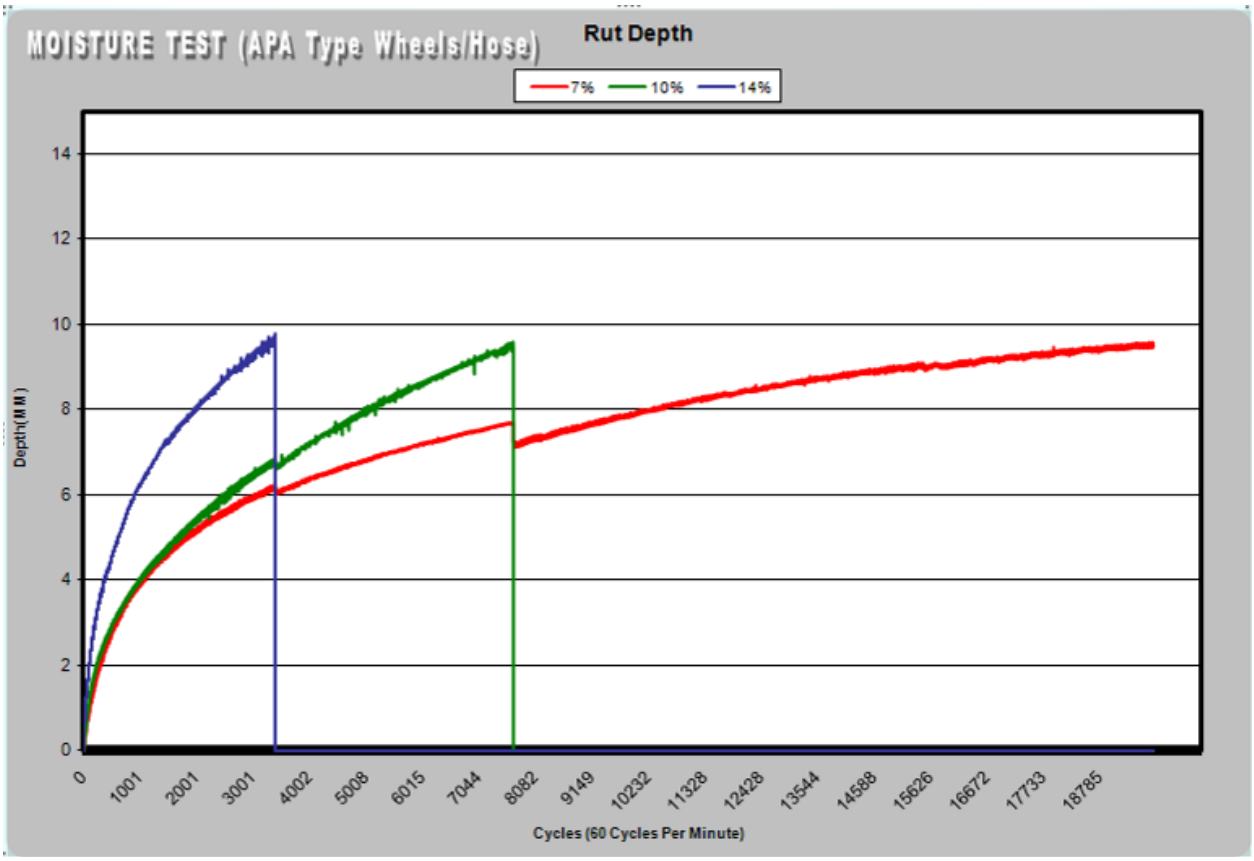

Figure 2.10. Asphalt Pavement Analyzer (APA) Test Results of Wet Test

The mixtures with the higher air void contents rutted at a faster rate than those with smaller air void contents. The greatest difference in rutting rates between 'wet' and 'dry' testing conditions were at the 10% and 7% air void contents; the mixture with 14% air void content showed little difference. After testing in the wet condition the specimens were broken opened and examined for any visual evidence of stripping (Figure 2.11); there was no visual evidence of stripping among any of the test specimens, although there did appear to be some evidence of stripping where the hose interfaced with the mixture surface.

Figure 2.11. Visual Examination of APA 'wet' specimens

Modified Boiling Test (Proposed by Research Team)

One half of the sample left over from the dry indirect tensile strength tests was used in the modified Iowa boiling test. A total of four samples were tested, two that had the highest air voids (14%) and two that had the lowest air voids (7%). These samples were weighed, placed in a pot of boiling water for 6 minutes, allowed to cool and reach an air dried state and the final weight was measured. Neither of the specimens showed any visual cues of stripping (asphalt removed from aggregate particles) as the before test condition (Figure 2.12) looked similar to the after test condition (Figure 2.13).

However, the specimens with 14% air voids lost an average of 12.2% of their initial weight and the specimens with 7% air voids lost an average of 3.4% of their initial weight. In addition, empirical observations after the test showed that the specimen with higher air voids was much less intact than the comparable specimens with lower air voids (Note the distorted shape in Figure 2.13). The 14% air void specimens crumbled after the test and had to be handled very delicately and the 7% air void specimens were still intact and could be handled 'normally'.

Figure 2.12. 7% and 14% Air Void Specimens (left and Right) *before* Modified Boiling Test

Figure 2.13. 7% and 14% Air Void Specimens (left and Right) *after* Modified Boiling Test

Chapter 3. Conclusions

This report represents task 2 of the Minnesota Local Road Research Board (LRRB) project number (Investigation) 2010-042, entitled, "Stripping of Hot Mixed Asphalt Pavements (HMA) under Chip Seals". The goal of this specific task report is to identify, or develop a methodology that can be used to asses potential at-risk streets before they are treated with a surface treatment. Based on previously completed forensic investigations, and survey responses the research team has hypothesized that low density (high-interconnected air voids) are a contributing factor to the observed stripping distresses. Thus, the experimental plan investigated the influence of various air void contents (7, 10 and 14%) on a mixture's susceptibility to moisture induced damage. The mixtures susceptibility was tested with: permeability tests, Mn/DOT modified Lottman, Asphalt Pavement Analyzer (APA) tested under wet and dry conditions, and a modified Iowa Boiling Test.

Permeability testing indicated that the mixtures became significantly more permeable when the air void content was near 14%. The Lottman test did not show any visual evidence of stripping and all tensile strength ratios (TSR) were above 70%. However, the mixtures with the highest air void content had the lowest TSR at 74% and the mixture with the lowest air void content had the highest TSR at 84%. The change in air void content had the most dramatic influence on tensile strength values; a doubling of the air voids from 7% to 14% corresponded with a reduction of 52% and 58% in the dry and wet tensile strengths respectively. APA test results were mixed as the greatest difference in rutting rates between 'wet' and 'dry' testing conditions were at the 10% and 7% air void contents; the mixture with 14% air void content showed little difference. None of the mixtures showed signs of visual stripping. In the modified Iowa boiling test, the specimens with 14% air voids lost an average of 12.2% of their initial weight and the specimens with 7% air voids lost an average of 3.4% of their initial weight. In addition, empirical observations after the test showed that the specimen with the higher air voids (14%) was much less intact than the comparable specimens with lower air voids (7%).

There was no test that explicitly showed asphalt stripping away from mixtures with higher densities; however, the results of the laboratory testing did indicate that the higher air voids do contribute to reduced pavement durability through reduced strength, increased susceptibility to rutting and increased permeability. The permeability and the modified Iowa Boiling test results indicate that pavements with higher air void contents may be more susceptible to moisture induced damage than pavements constructed with the proper amount. These factors will also reduce the life of a chip seal that's placed on top of a compromised pavement. Future testing within this project will entail conducting the same tests (permeability, Mn/DOT modified Lottman, wet and dry APA, and modified Iowa Boiling) but on sealed specimens of varying density to more closely simulate field conditions. In addition, to the research team intends to modify the laboratory Permeameter to examine whether or not moisture (from the bottom) can penetrate a chip seal or a fog seal surface treatment.

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Appendix C: Task 3 Report

Chapter 2. Minnesota Department of Transportation

Chapter 3. Memo

Office of Materials
1400 Gervais Avenue, Mail Stop 645
Maplewood, MN 55109

Office Tel: 651/366-5573
Fax: 651/366-5461

TO: **Tom Tesch**

DATE: **July 17, 2012**

SUBJECT: **Task 3 memo for LRRB 904 Stripping Under Chip Seal Study**

This memo will document what was completed in Task 3 of the LRRB Research Project INV. 904 *Stripping of Hot-Mix Asphalt Pavements under Chip Seals.* Task 3 was to test cores from city streets to test the hypothesis developed in Task 2. The hypothesis states that areas of low density or high air voids in the asphalt pavements are the major contributing factor to stripping of the Hot Mix Asphalt (HMA) after a chip seal has been placed.

Numerous streets were reviewed and three (3) cities were picked for study, Brooklyn Center, Eden Prairie and Woodbury. These cities were selected based on a significant amount of streets having stripping issues. Selection of streets to evaluate and the evaluation procedures are described below.

First a visual review with City Street Department personnel was conducted. Based on this review, areas were selected for further evaluation. On the streets that had previously received a chip seal, the following methods were used for evaluation. A nuclear density gauge was used to perform a nuclear density test (NDT). The gauge was place on pavement close to the area of stripping ensuring uniform contact from gauge and the street. Two (2) reading were taken at 90° to each other (Figure 1). Then the gauge was placed as close to the stripped area as possible that showed no sign of damage. Two (2) more tests were performed similarly as previously described. This process continued until the complete paving pass had been tested. Then cores were cut at same location as the NDT readings (Figure 2)

Figure 14 Nuclear Density Gauge

Figure 15 Coring at NI location

The cores were then taken to the MnDOT Materials Lab. The chip seal was sliced off the samples, then air voids (ASTM T269, T166 & T209) and permeability were measured using the Flexible Wall Permeameter ASTM PS 129-01.

The streets that did not have a current chip seal were evaluated using the nuclear density gauge to measure density, then field permeability with NCAT Field Permeameter tester, sample coring, lab permeability ASTM PS 129-1 and in place air voids same as chip sealed streets.

Non chip sealed streets were evaluated in hopes of determining a method to predict the possibility of stripping of the street after it was chip sealed. Task 5 will analyze the data collected develop recommendations on how to evaluate existing streets for a chip seal.

$$k = \frac{al}{At} \ln\left(\frac{h_1}{h_2}\right).$$

Where:

k	coefficient of permeability, cm/sec
a	inside cross-sectional area of standpipe, cm^2
l	thickness of test specimen, cm
A	cross-sectional area of specimen, cm^2
h_1	hydraulic head on specimen at time, t_1
h_2	hydraulic head on specimen at time, t_2

Figure 16 Lab Permeameter

Conclusions:

Field testing: Based on ease of use and quick results, the nuclear density gauge is the best test method to used test and evaluates a large number of locations. The negative to this method of evaluation is the gauge requires a trained and licensed operator and has special storage requirements. The NCAT Field Permeameter tester is a slow test taking over 20 minutes to complete on test location in field. The result can vary from operator to operator. Some pavement surfaces are more difficult to seal the tester to which can give false readings. One interesting observation was that in areas of stripping under chip seal, we had difficulty in obtaining cores. The action of the core barrel and water in many cases completely destroyed the remaining pavement. Areas close to site of destroyed cores had air voids up to 11% this leads us to believe that areas with worst stripping have even higher voids. See figure 4 & 5 below.

Figure 17 Destroyed cores

Figure 18 Pavement in area of stripping

Figure 6 is graph of some of the data obtained for field samples. Base on the information gathered both NDI and Lab permeability correlate and are acceptable tools to determine variability in density.

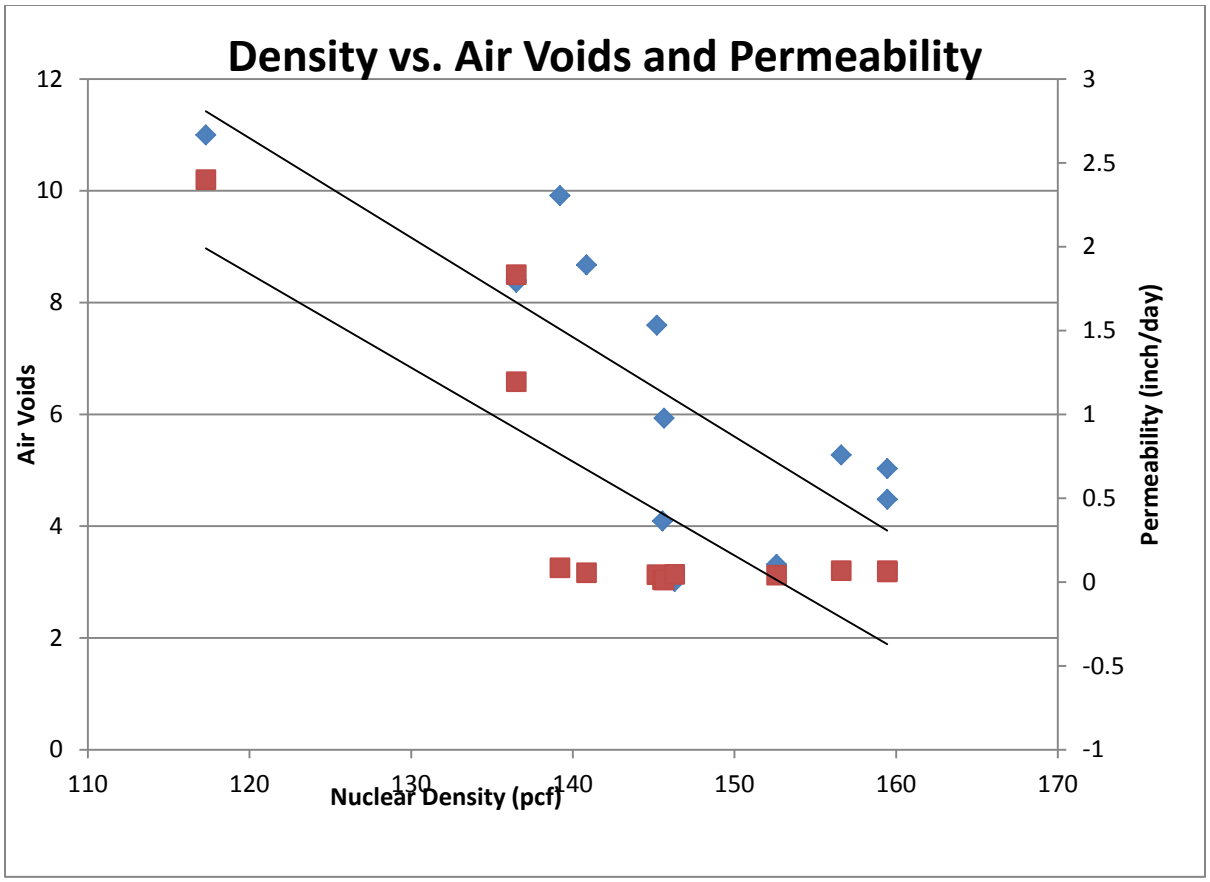

Figure 19 Graph comparing Density vs. Air Voids & Permeability

The results from different test methods will be discussed in-depth in Task 5.

Appendix D: Task 4 Report

Chapter 4. Minnesota Department of Transportation

Chapter 5. Memo

Office of Materials
1400 Gervais Avenue, Mail Stop 645
Maplewood, MN 55109

Office Tel: 651/366-5573
Fax: 651/366-5461

TO: **Tom Tesch T.L.**

DATE:

SUBJECT: Task 4 for LRRB 904 Stripping Under Chip Seals

In Task 4 we will discuss the different construction practices used for streets among many Cities. Some of the areas discussed are the following: history of the MnDOT HMA specification, type of mixes used, construction methods.

Hot Mix Asphalt (HMA) Mixtures History in Minnesota

Please see below for a brief history of the HMA specifications:

- Specification 2331 (Pre 1988)
- Specification 2340 (1988)
- Specification 2340 Modified (1997)
- Specification 2350 (1998)
- Specification 2360 (1998)
- Combined 2350/2360 (2003)

2331

MnDOT Specification 2331 was the standard HMA specification prior to 1988. In this specification the MnDOT designed the mixes for the contractor, process control and acceptance testing was performed by MnDOT. The Contractor's only role was to produce and place the HMA mix.

2340

MnDOT Specification 2340 was implemented as a quality management specification in 1988 and modified in 1997. This specification addressed problems with rutting, flushing, and raveling. In this specification, the Contractor was responsible for the mix design and the Quality Control (QC) testing. Air voids was used as the primary acceptance criteria.

2340 was modified in 1997 to include new mixture quality measurements. These were Voids in Mineral Aggregate (VMA) and Tensile Strength Ratio (TSR) testing. TSR testing is a measure of moisture susceptibility in the HMA.

2350/2360

The Minnesota Department of Transportation (MnDOT) adopted Super-Pave mix designs (MnDOT Specification 2360) in 1998. Some cities continue to use older mix methods such as MnDOT Specification 2331, 2340, and 2350. The table below gives a brief comparison between old specification 2340 and the newer Super Pave 2360 mixes:

2340 Mixes	**2360 Super Pave**
Crushing	
Type 31 No crushing requirement	Level 2 30% + 4
Volumetric	
Air Voids	Air Voids
	4%
	VMA*
	AFT **
No TSR***	TSR Required
Compaction	
Ordinary Compaction	Max Density
Modified specified	Higher Requirements

* Void in mineral aggregate

**Asphalt Film Thickness

*** Tensile Strength Ration (TSR) - Stripping Test

Crushing:

Requiring minimum amount of crushed aggregates increases the structural stability of the HMA. This allows resistance to the traffic loadings without rutting occurring. During the 1980's rutting in HMA pavements was common due to the lack of crushed aggregates.

Air Voids

Air voids requirement for Super Pave mixes (2360) are stricter than the older 2340 mixes. Some of the volumetric for 2360 deal with voids in mineral aggregate which insures proper density and amount of asphalt without issues of rutting and flushing that 2340 mixes had.

Asphalt Film Thickness (AFT)

In late 1980's, to help reduce the rutting in the HMA the asphalt binder content was decreased, creating drier HMA mixes. The theory was that the drier mix would be more stable. However, the drier mixes were more susceptible to stripping, cracking, and other forms of water damage. These problems did not occur as frequently in the 1970's and the early 80's as it did later in the 80's.

AFT is a requirement to help insure proper amount of asphalt in the HMA to deal with durability issues. AFT came about to make sure that high Recycled Asphalt Pavement (RAP) used in new HMA have enough new asphalt to perform properly.

TSR

TSR is tested to determine how likely the HMA is to suffer water damage. Since this study is looking at stripping i.e. water damage. It is recommended that TSR be tested on all new HMA projects.

General Discussion

In discussion with some of the HMA Contractors and mix Suppliers, normally they see little to no cost differences between 2340 mixes and 2360 level 2. This can be explained because suppliers are do the quality control (QC) testing for 2360 mixes daily as it is the current specification. QC testing for 2340 mixes is not, thus some extra time is needed from the supplier to review the older specification. Suppliers are also producing 2360 Level 2 & 3 mixes on most other jobs throughout their area, i.e. county and state occurring at the same time and using the similar mix designs, increases the plant production rates.

Based on finding from samples and testing in Task 3, it is apparent that variability in density is a major factor in stripping under chip seal. Air voids ranged from 5% in great performing streets to over 11% on streets that are showing severe stripping.

In Task 2 it was demonstrated that an asphalt mixture that has not had issues with stripping when properly constructed would strip when the air voids were greater than 8%. This shows that a better job of compaction during construction the asphalt pavement is needed. Ordinary compaction when done properly would not have had these issues. If the test strip was properly constructed and represented the true condition of the paving job then uniform density would have been achieved. The main issue with the ordinary compaction method is lack of enforcement of the established rolling pattern. The inspector needs to be present at all times to ensure that the pavement receives proper number of passes with the roller and to make sure the temperature of the mix is with in the specified requirements during compaction. The benefit of maximum density is the ability of the agency to test density in areas that may not meet minimum requirements.

Many of the projects that were looked at as part of this study were originally constructed in the 1990's. At this time the 2340 specification was the current specification and required ordinary compaction methods. See Appendix A for bituminous specifications from the City of Brooklyn Center from the time the streets studied were constructed and also the cities current bituminous specification.

One city that switched from ordinary compaction to maximum density stated that the asphalt pavement was the same price. The contractor used two 20 to 25 ton double drum steel roller and a pneumatic roller when maximum density was specified. Prior to specification using the maximum density contractor on an ordinary compaction job had only one 6 to 8 ton roller on the job**.**

Recommendations

1. Switch from 2340 mixture requirements to 2360 level 2 or 3 as need for traffic.
2. Use specified density for compaction
    a. The use of the MnDOT's incentive program is optional.
3. Pay close attention to areas that are difficult to pave and compact.
    a. Sharp radius, skewed intersections, cross streets etc...
4. Spend more time and effort on inspection of paving
5. If doing a mill and over lay then the existing street should be cored to determine quality of base course before designing project.
6. Chip seal earlier in pavement life.

Additional Needs for Research

1. Bond strength of tack coat bond strength
    a. In coring many streets as part of this project, the lack of bonding of base course to wear course of HMA is very apparent.
    b. It is hypothesized that the lack of strong bond reduces the durability of the wear course because it is independent of the underlying layers, causing movement between layers. This movement could increase the stripping effect.
2. Study priming granular base materials before paving to waterproof bottom of the asphalt pavements.
3. Develop quick setting fog sealing product.
    a. Lab testing done as part of this study shows that a fog seal will keep water out but still all water vapors to migrate out of the HMA.
4. Study using lower air voids design mixes
    a. Maybe as low as 1 to 2%
5. Use softer based asphalt binder
    a. PG -34

Appendix E: Task 5 Report

Chapter 6. Minnesota Department of Transportation

Chapter 7. Memo

Office of Materials
1400 Gervais Avenue, Mail Stop 645
Maplewood, MN 55109

Office Tel: 651/366-5573
Fax: 651/366-5461

TO: **Tom Tesch T.L.**

DATE: September 20, 2012

SUBJECT: Task 5 for LRRB 904 Stripping Under Chip Seals

Background

Analysis of the data collected in Task 3 will be discussed and presented in Task 5. It was shown in task 3 that all the tests, permeability, air voids, and density, correlated. The data showed that streets had high variability in density from 7 to 12 percent air voids in areas close to the stripped areas.

In the areas with severe stripping cores were not able to be retained for testing. This was due to the cores disintegrating into many pieces after pulling the core from the pavement. Nuclear density testing showed great amount of variability in the mix density from areas of not stripping to areas suffering from stripping. One street had the density varied from 145 lbs/ft^3 in areas of the street with no issues to a low of 117.3 lbs/ft^3 in areas experiencing stripping. For field evaluation of streets the nuclear density tester is the fastest and easiest to use of method tested. After discuss with experts from around the country it is recommend to not chip seal a street if the variability in density varies more than 6 lbs. per cubic foot as measured with nuclear density tester.

Data

Figure 1 shows that that when comparing the density to either air voids or lab permeability, the correlation is similar. This indicates density, air voids, and lab permeability are correlated to each other. As density increased and lab permeability and air voids decreased, less stripping was observed.

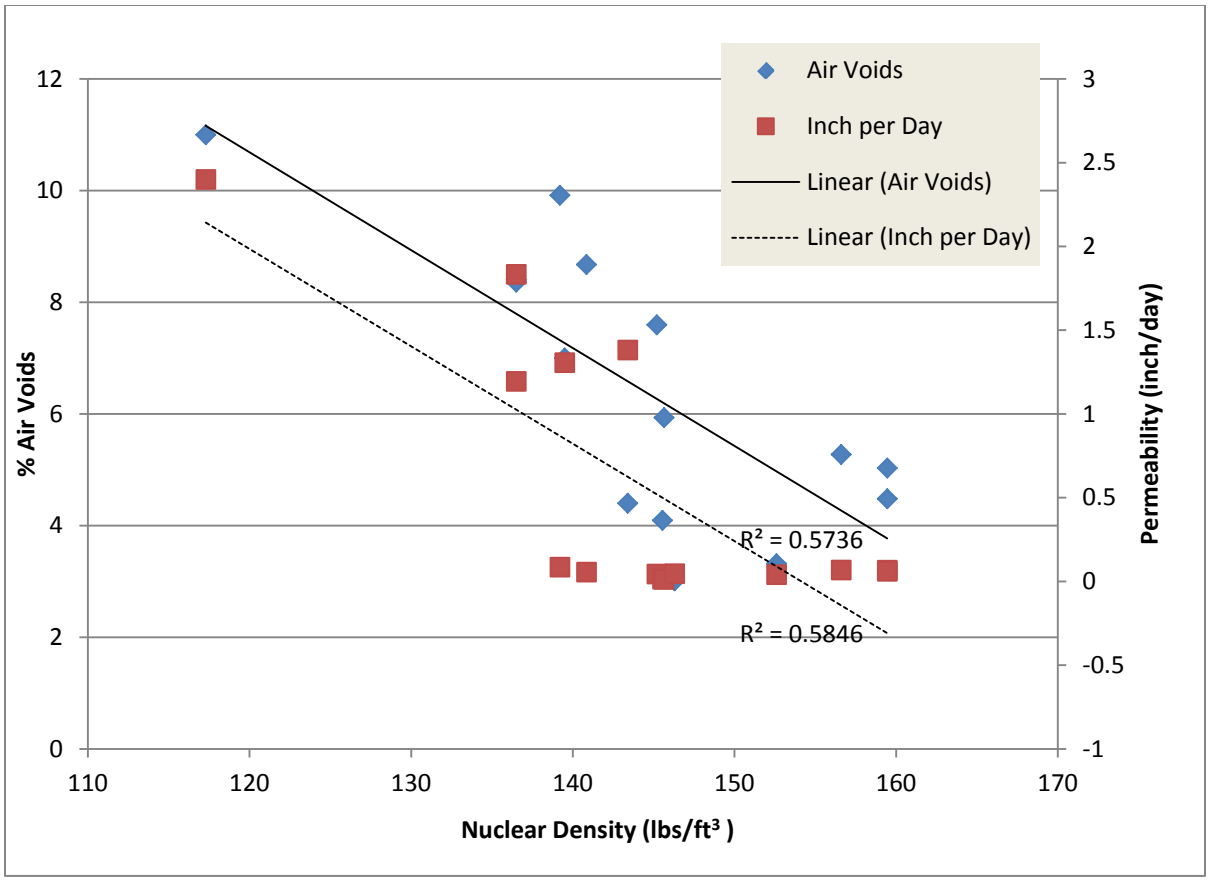

Figure 20 Air Voids and Permeability vs. Density

Figure 2 was made to compare it to the results found in a report from Cooley Jr., Brown and Maghsoodloo, "Development of Critical Field Permeability and Pavement Density Values for Coarse Graded Super Pave Pavements." In this report the authors compared lab permeability to air voids. We saw similar results, it is important to note in this study the mixes tested are dense graded. Our results show a similar curve but less permeability.

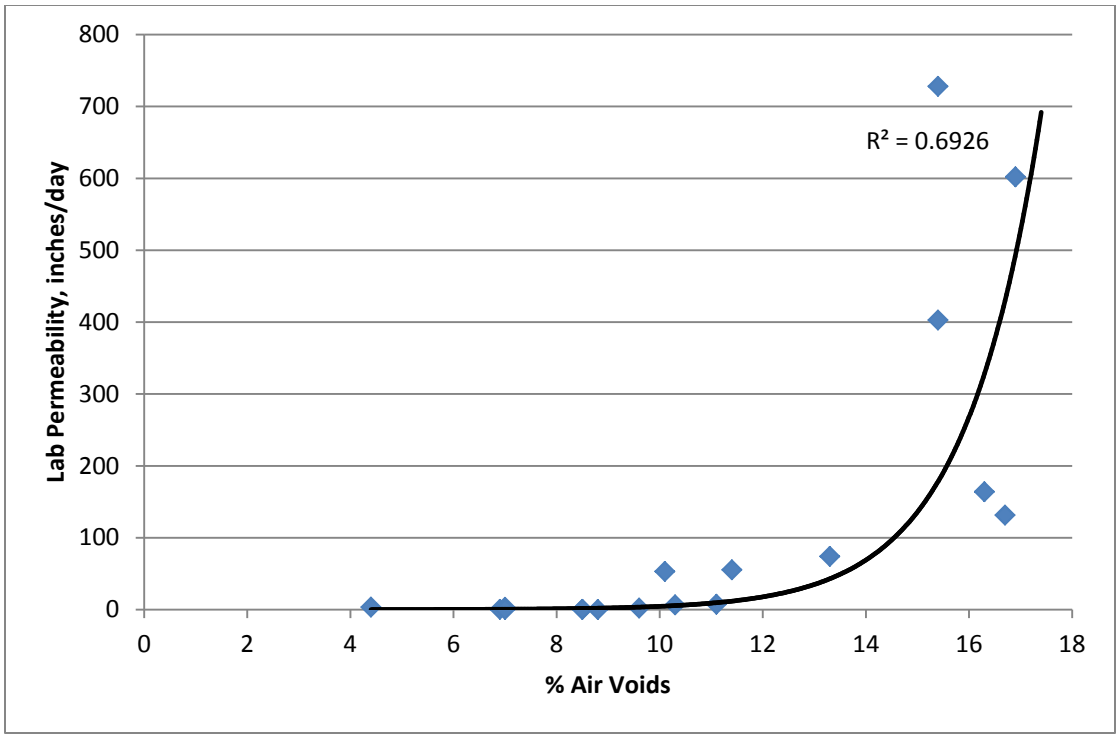

Figure 21 Air Voids vs. Lab Permeability

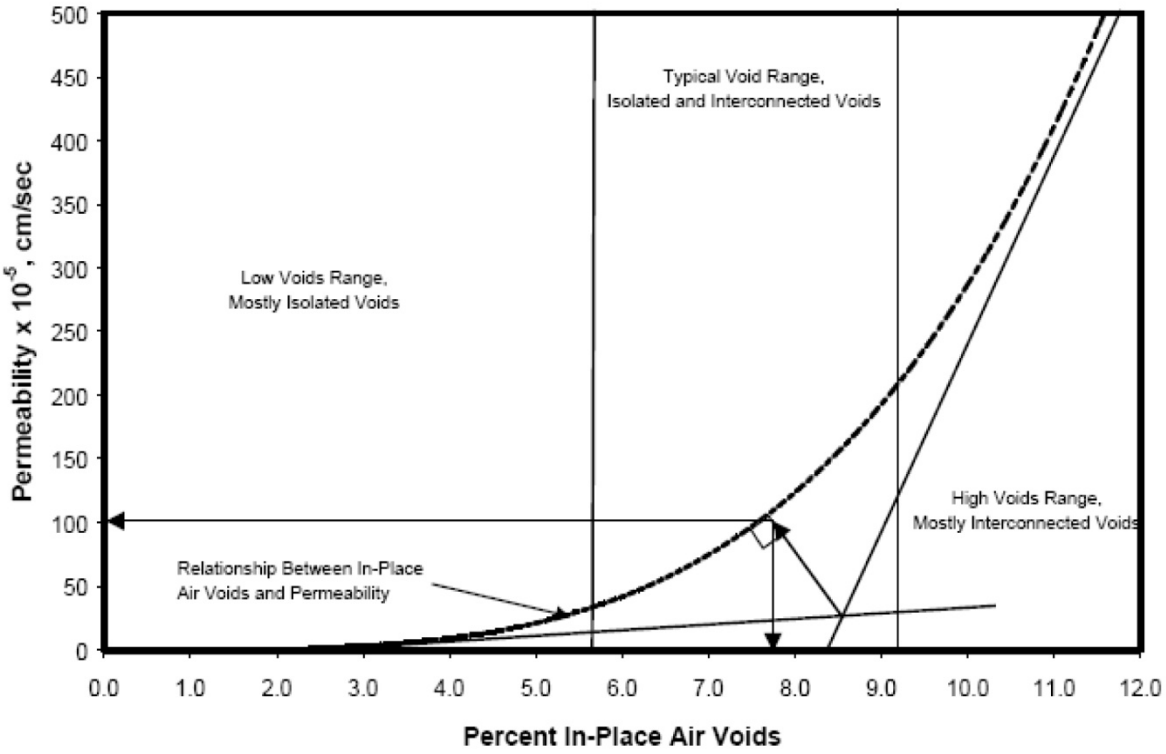

Figure 22 Permeability vs. In-Place Air Voids (Cooley Jr., Brown and Maghsoodloo, 2001).

Conclusions / Recommendations

Based on the field testing from this research project, it was determined that all three field test evaluated in this task are valid tests to perform to help predict if streets may strip after placement of a chip seal. All three evaluations correlated to each other and to stripping.

The easiest and least invasive test for agencies to perform to predict if the streets will strip is a nuclear density test. The air voids and lab permeability test require cores to be taken from the pavements and brought back to a lab for evaluations. After discuss with experts from around the country it is recommended to not chip seal a street if the variability in density varies more than 6 lbs/ft^3 as measured with nuclear density gauge.

DEPARTMENT OF TRANSPORTATION

Prevention of Stripping Under Chip Seals

David L. Rettner, Principal Investigator
American Engineering Testing, Inc.

October 2017

Research Project
Final Report 2017-35

LRRB
LOCAL ROAD RESEARCH BOARD

To request this document in an alternative format, such as braille or large print, call 651-366-4718 or 1-800-657-3774 (Greater Minnesota) or email your request to ADArequest.dot@state.mn.us. Please request at least one week in advance.

Technical Report Documentation Page

1. Report No. MN/RC 2017-35	2.	3. Recipients Accession No.	
4. Title and Subtitle Prevention of Stripping under Chip Seals		5. Report Date September 2017 6.	
7. Author(s) David L. Rettner and Derek Tompkins		8. Performing Organization Report No.	
9. Performing Organization Name and Address American Engineering Testing, Inc. 550 Cleveland Ave N St Paul, Minnesota 55114		10. Project/Task/Work Unit No. 11. Contract (C) or Grant (G) No. (C) 1027053	
12. Sponsoring Organization Name and Address Minnesota Local Road Research Board Minnesota Department of Transportation Research Services & Library 395 John Ireland Boulevard, MS 330 St. Paul, Minnesota 55155-1899		13. Type of Report and Period Covered Final Report 14. Sponsoring Agency Code	
15. Supplementary Notes http:// mndot.gov/research/reports/2017/201735.pdf			

16. Abstract (Limit: 250 words)

Eighteen chip-sealed roadways in eight cities and counties in Minnesota were evaluated both in the field (for condition surveys and density tests) and in the laboratory (for permeability, stripping, tensile-strength ratio, asphalt film thickness, and mix properties) to evaluate factors associated with stripping in asphalt pavements under chip-seal treatments. Analysis of the test data did not support an earlier MnDOT finding that high air voids were a cause of stripping under chip seals. For those locations that did exhibit stripping, the test data did not support a direct relationship between asphalt pavement density and stripping. In addition, the research did not determine a direct relationship between incidence of stripping and site/supplier data (e.g., bituminous mixture, contractor, geographic location, or year of construction). This observation agreed with observations made by Minnesota city/county engineers. An additional outcome of the research is the large amount of testing data developed, which is documented fully in appendices to the final report.

17. Document Analysis/Descriptors asphalt pavements, seal coating, chip seals, stripping (pavements), pavement maintenance		18. Availability Statement No restrictions. Document available from: National Technical Information Services, Alexandria, Virginia 22312	
19. Security Class (this report) Unclassified	20. Security Class (this page) Unclassified	21. No. of Pages 165	22. Price

Prevention of Stripping Under Chip Seals

FINAL REPORT

Prepared by:

David Rettner
Derek Tompkins
American Engineering Testing, Inc.

October 2017

Published by:

Minnesota Department of Transportation
Research Services & Library
395 John Ireland Boulevard, MS 330
St. Paul, Minnesota 55155-1899

This report documents the results of research conducted by the authors and does not necessarily represent the views or policies of the Minnesota Department of Transportation or American Engineering Testing. This report does not contain a standard or specified technique.

The authors, American Engineering Testing, and the Minnesota Department of Transportation do not endorse products or manufacturers. Trade or manufacturers' names appear herein solely because they are considered essential to this report.

ACKNOWLEDGEMENTS

The authors gratefully acknowledge the support of the Minnesota Local Road Research Board for the project investigation. The authors thank the project technical liaison Klay Eckles with the city of Woodbury, Minnesota, for his support of the project work. The authors also thank David Newcomb for his willingness to review and provide feedback on research results. The authors also thank the members of the technical advisory panel for their participation.

- Tim Becker, Sibley County, county engineer
- Marc Culver, city of Roseville, city engineer
- John Garrity, Minnesota Department of Transportation, bituminous engineer
- John Gorder, city of Eagan, city engineer
- Dave Hanson, Bolton & Menk, senior technician
- Tony Kutzke, city of Woodbury, principal engineer
- Jennifer Levitt, city of Cottage Grove, city engineer
- Aaron Nelson, city of Eagan, assistant city engineer
- Jill Thomas, Minnesota Asphalt Pavement Association, executive director

The authors are also grateful to municipal engineers who provided data in support of the project activities.

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EXECUTIVE SUMMARY

The Minnesota Department of Transportation (MnDOT) recently conducted a study that identified less dense areas, or high air voids, in underlying asphalt pavements as the main cause of stripping under chip seals (Wood & Cole, 2013). This research project follows the work of MnDOT with extensive testing and analysis of low-volume roads in Minnesota that have experienced stripping under chip seal surface treatments.

The project focus was on 18 chip-sealed roadways in eight cities and counties in Minnesota. The research team evaluated the *in-situ* roads and collected pavement samples for laboratory tests. The research conducted included field studies of pavement distress and density (using ground-penetrating radar and nuclear gauge tests) and laboratory tests for permeability, stripping, tensile strength ratio, asphalt film thickness, and mix properties.

A major outcome of the research is that the research was unable to verify the earlier finding that high air voids were a cause of stripping under chip seals. For those locations that did exhibit stripping, the test data did not support a direct relationship between asphalt pavement density and stripping. In addition, the research did not determine a direct relationship between incidence of stripping and site/supplier data (e.g., bituminous mixture, contractor, geographic location, or year of construction). This observation agreed with observations made by Minnesota city/county engineers.

Other observations from 129 municipal engineers in Minnesota were obtained through an eight-question survey. The survey found that 64 percent of the respondents used chip-seal treatments on a regular basis. Of that fraction, 26 percent reported stripping in chip-sealed pavements as a major issue, 39 percent reported observing stripping but did not perceive it as a major issue, and 35 percent reported that they did not observe stripping in their chip seals. Given the survey and field data results, it is clear that not all roads with chip seals exhibit stripping.

Finally, an additional outcome of the research is the large amount of testing data developed under the project work. This data, which is documented fully in appendices to the final report, will help support and improve future research on stripping in chip seals in Minnesota and chip seal performance in general.

CHAPTER 1: INTRODUCTION

1.1 BACKGROUND

Preventative maintenance ensures that roadways at all agency levels provide a maximum return on investment. Effective maintenance efforts rely on an understanding of pavement loads (environment and traffic) and proper construction and materials. A critical variable that relies on engineer experience and awareness is timing, or when to initiate maintenance on a given roadway. Unfortunately, the timing of maintenance events, such as chip sealing, can be complicated by unforeseen distresses that reduce the life span for a treatment.

Identifying the factors that contribute to chip seal, or seal coat, performance has been a pavement engineering research concern for many decades, with studies on surface treatments dating back to 1928 (Gransberg & James, 2005). In addition, recent major studies have attempted to isolate factors (such as materials, design, and construction practices) that contribute to better performing chip seals (Gransberg & James, 2005). These major studies provide sound, general advice on the use of chip sealing as preventative maintenance; however, ultimately chip seal performance is a local issue given that (1) the treatment itself is thin and short-lived, (2) small variations in materials or construction, which are known to vary by source/location, can have large effects on performance, and (3) overall performance can depend heavily on the environment.

At the 2014 City Engineers Association of Minnesota, a discussion on asphalt paving mixes included the topic of stripping under chip seals, which was emerging as a major concern for over one-half of city engineers (Garrity, 2014). Stripping is understood to be the loss of asphalt concrete material near the asphalt surface (at the bottom of the chip seal), due to a break-down in the bond between the binder and aggregate in the asphalt. This phenomenon is illustrated in Figure 1 using a sample taken from a Minnesota road during the research. Figure 1b shows how material from the stripped asphalt remains bonded to the chip.

(a) **(b)**

Figure 1. (a) Surface and (b) underside of chip seal that has "flaked" with stripped material from underlying asphalt pavement

Surveys conducted in a Minnesota Local Road Research Board (LRRB) and Minnesota Department of Transportation (MnDOT) study found that 40 of 66 local Minnesota agency engineers observed stripping under chip seals (Wood & Cole, 2013). This concern is particularly important in terms of asphalt pavements constructed in the mid- to late-1990s, which have been found to experience premature aging and thus given to stripping. Given Minnesota's experience with stripping and chip seals, the MnDOT study of chip seals attempted to identify causes of stripping in chip-sealed pavements (Wood & Cole, 2013). The primary hypothesis of this study was that low density (i.e., high air voids) makes asphalt paving mixes more prone to stripping.

Wood and Cole (2013) conducted a study of three locations in Minnesota, from which they collected specimens for air void and permeability analysis in the laboratory. In addition to laboratory testing of 16 field specimens, the authors conducted a laboratory trial of SuperPave mixes common to Minnesota with three levels of air voids (7%, 10%, and 14%). The laboratory trials found that there "was no test that explicitly showed asphalt stripping away from mixtures with higher air voids" (p. B-5). However, on the basis of the 16 field specimens, the authors concluded that less dense areas, or high air voids, were the main cause of stripping in Minnesota chip-sealed pavements.

1.2 RESEARCH SCOPE AND OBJECTIVES

This research project originated from a MnDOT research needs statement that used Wood and Cole (2013) as a starting point for additional investigation of an important issue for local pavement maintenance practices. Thus, the main research objective for this project was to investigate stripping in chip-sealed pavements using testing and analysis of local Minnesota roads.

The research team was provided access to eight municipalities, which provided a total of 18 locations for study. The project scope included the use of these locations for field observation and pavement samples for laboratory examination. The first phase of the project work utilized field surveys, specimen collection, laboratory testing, and analysis to:

1. Verify the finding of Wood and Cole (2013) that high air voids is the primary cause of stripping
2. Investigate why high air voids occurred for locations where observed
3. Identify mix design or construction practices that may have led to observed stripping.

Upon completion of the first phase work, the project objectives were to develop and/or suggest practices to address stripping. Possible practices discussed with LRRB prior to the project work included maintenance techniques to extend the life of chip seals that have failed in stripping; best practices to prevent stripping in Minnesota pavements; and specification, mix design, and construction guidelines for low-volume residential streets if current mix designs are susceptible to failure in stripping

1.3 OVERVIEW OF REPORT

This report documents the full research effort (including data), which included field testing/evaluation and material collection at 18 locations in eight Minnesota municipalities and laboratory testing of collected materials. The report discusses (A) the results of field and laboratory tests and (B) an analysis of collected data. Finally, the report provides recommendations based on testing and analysis.

CHAPTER 2: EVALUATION OF CHIP SEALS IN MINNESOTA

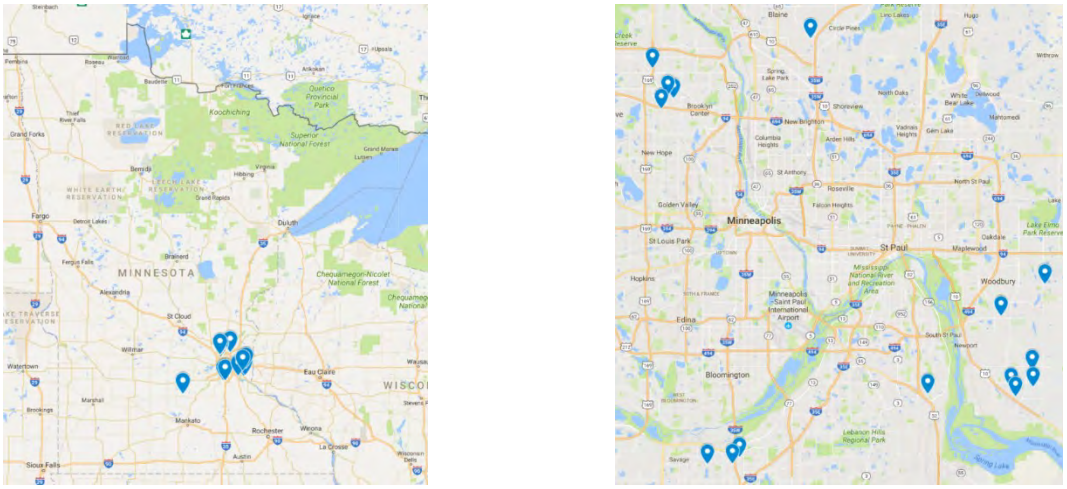
City and county engineers collaborated with the research team to identify 18 locations for the study of chip seal performance, most notably stripping. These locations were used for field testing (i.e., distress condition surveys and density testing) and pavement samples (to be used for further laboratory studies). The following sections describe the locations visited and tests conducted as a part of the project work.

2.1 FIELD LOCATIONS

In the early stages of the project work, during October 2014, members of the research team visited 31 locations in Minnesota as potential sites of stripping in chip seals that could provide data for research. The original 31 sites considered for study are summarized in Table 1. Of the sites considered, 18 were selected for inclusion based on a combination of factors, including the ability to obtain intact cores, the possibility of stripping, and proximity to the Minneapolis-St. Paul metropolitan area to limit travel costs.

The primary 18 sections, located in seven municipalities and one county, consulted for the project work are indicated in the subsections below and shown in Figure 2. Appendix A to this report provides survey condition and core identification information for each location, and Appendix H provides all section information provided to the research team by city/county engineers during the project work.

In addition to the primary sections, additional pavement sections were assessed for the project work. Those additional sections will be noted where applicable (e.g. nuclear gauge testing included extra test locations in six municipalities).



(a) **(b)**

Figure 2. (a) State view and (b) Minneapolis-St. Paul metropolitan area view of locations of pavements surveyed for field and laboratory work

Table 1. Initial sites considered for study under project work

#	City	Street	Condition	Year Constr.	Year Seal Coat	Year last sealed	Last year seal rock	Mix Design	Street Section
1	Woodbury	Lochaven Drive	Stripping in various stages	1989			1/8" Trap Rock	1.5" 2341 Wear; 1.5" Type 2331 Base	8" CL5, 12" Sand
2	Woodbury	Newbury Alcove	Stripping in various stages	1989			1/8" Trap Rock	1.5" 2341 Wear; 1.5" Type 2331 Base	8" CL5, 12" Sand
3	Woodbury	Newbury Alcove	Non-sealed cul-de-sac	1989	n/a	N/A	N/A	1.5" 2341 Wear; 1.5" Type 2331 Base	8" CL5, 12" Sand
4	Woodbury	Torrey Drive	Stripping in various stages	1989			1/8" Trap Rock	1.5" Type 41B Wear; 1.5" Type 31 Base	8" CL5, 12" Sand
5	Woodbury	Bridgewater Parkway	Stripping in various stages	1998			1/8" Trap Rock	1.5" Type 41B Wear; 1.5" Type 31 Base	8" CL5, 12" Sand
6	Woodbury	Salem Drive	Stripping in various stages	1980			Buckshot	2" 2341 Wear	6" CL5, 4" Sand
7	Cottage Grove	Inberg Tr. So.	Stripping in Various stages	reconstructed in 1995	2000?	2007	1/8" Granite	1.5" 2341 Wear; 1.5" 2331 Base	6"-7" reclaimed gravel base
8	Cottage Grove	Islay Ave.	No signs of stripping	1980	2003	2010	1/8" Granite	1.5" 2341 Wear; 1.5" 2331 Base	4" CL 5 gravel base
9	Cottage Grove	Jergen	Stripping invarious stages	1991	2003	2010	1/8" Granite	1.5" 2341 Wear; 1.5" 2331 Base	6" CL 5 gravel base
10	Cottage Grove	Jensen	No signs of stripping	1986	2003	2010	1/8" Granite	1.5" 2341 Wear; 1.5" 2331 Base	6" CL 5 gravel base

11	Cottage Grove	Hyde	No signs of stripping	1996	2000?	2007	1/8" Granite	1.5" Type 41B Wear; 1.5" Type 31B Base	5-9" reclaimed base
12	Brooklyn Park	Louisiana Ave	Stripping invarious stages	1995	1999, 2006	2014		1.5" Type 41A Wear; 2.5" Type 31B Base	4.5" Class 5 100% crushed Quarry
13	Brooklyn Park	Boone Avenue	Stripping invarious stages	1994	1999, 2006	2014		1.5" Type 41A Wear; 1.5" Type 41 Binder 7" Type 31 Base	6" Class 5 100% Crushed Quarry 16" Select Gran.
14	Brooklyn Park	63rd Avenue	Stripping invarious stages	1993/1994 (wear)	1999, 2006	2014		1.5" Type 41 Wear; 2.5" Type 41 Binder; 3.5" Type 31 Base	6" Class 5 (RAP), 18" Sel Gran/Gran
15	Brooklyn Park	Winnetka	Stripping invarious stages	1995	1999, 2006	2014		1.5" Type 41 Wear; 2.5" Type 31 Base	4.5" Class 5 100% crushed Quarry
16	Brooklyn Park	73rd Avenue	unsure	1998	2000	2007		1.5" Type 41 Wear; 2.5" Type 31 Base	4.5" Class 5 100% crushed Quarry
17	Brooklyn Park	Hampshire	unsure	1999	2000	2007		1.5" Type 41 Wear; 2.5" Type 31 Base	4.5" Class 5 100% crushed Quarry
18	Moundsview	Program Avenue	moderate to severe stripping in wheelpaths in both wear and non-wear	1994		records still being searched		1.5" Type 41 Wear; 1.5" Type 41 Binder; 2.0" Type 31 Base	
19	Blaine	93rd Avenue	moderate to severe in wheelpaths	1995		2004	FA-2 Granite	3.0" Type 41 Wear	4" Class 5
20	Blaine	93rd Avenue	moderate to severe in wheelpaths	1994		2004	FA-2 Granite	3.0" Type 41 Wear	4" Class 5
21	Burnsville	1990 Street Recon	moderate throughout project locations	8/1990 base, 7/91 wear	2001	2006		Type 41 Wear, Type 31 Base	
22	Burnsville	1991 Street Recon	moderate to severe throughout project locations	8-9/91 Base, 6-7/92 Wear	1999	2008		Type 41 Wear, Type 31 Base	

23	Burnsville	1992 Street Recon	Light (Frontier Lane) to Severe (Harold Drive)	8-9/92 Base, 6-7/93 Wear	1999/2000	None/2010		Type 41 Wear, Type 31 Base	
24	Burnsville	1993 Street Recon	Severe Throughout	8-9/93 Base, 6-7/94 Wear	1999	2010		Type 41 Wear, Type 31 Base	
25	Burnsville	1995 Street Recon	Light to Moderate Scattered	8-9/95 Base, 6-7/96 Wear		2002		Type 41 Wear, Type 31 Base	
26	Burnsville	2005 Street Recon	Light Along Joint (possible joint density problem)	8/31/2005		2011		2" Mill and Overlay; 2" MV3 (B)	
27	Inver Grove Heights	Cahill Avenue/Brooks Blvd	none	2009 (Mill and Overlay)		2011		2" Mill and Overlay; 2" MV3 (B)	previously stripped roadway
28	Sibley County	CSAH 9	Mostly Severe	1996				1.5" 31B Wear, 1.0" 31B Level	Existing Roadway
29	Sibley County	CSAH 9	Moderate to Severe	1997				1.5"31B Wear, 1.0" 31B Level	Existing Roadway
30	Sibley County	CSAH 9	Moderate to Severe	1997				1.5"31B Wear, 1.0" 31B Level	Existing Roadway
31	Osseo	City Wide	Moderate to Severe	1992				Depends on Roadway	

2.1.1 Blaine

Two locations in Blaine, MN, were examined for the project work. Separate ends (west and east) of a stretch of 93rd Avenue were surveyed and cored on December 1, 2014.

2.1.2 Brooklyn Park

Three locations in Brooklyn Park, MN, were examined for the project work. Sections of 73rd Avenue, Louisiana Avenue, and Winnetka Avenue were surveyed and cored on December 2, 2014, and December 3, 2014.

2.1.3 Burnsville

Three locations in Burnsville, MN, were examined for the project work. Sections of 134th Street, Heritage Circle, and Knob Hill were surveyed and cored on November 24, 2014, and November 25, 2014.

2.1.4 Cottage Grove

Four locations in Cottage Grove, MN, were examined for the project work. Sections of Hyde Avenue, Ingberg Trail, Jensen Avenue, and Jergen Avenue were surveyed and cored on November 18, 2014, and November 19, 2014. The cores from Jergen Avenue could not be extracted intact and therefore were not included in the study.

2.1.5 Inver Grove Heights

One location in Inver Grove Heights, MN, was examined for the project work. A section of Brooks Boulevard was surveyed and cored on November 21, 2014.

2.1.6 Osseo

One location in Osseo, MN, was examined for the project work. A section of 8th Avenue was surveyed and cored on December 5, 2014.

2.1.7 Sibley County

Two locations in Sibley County, MN, were examined for the project work. Separate ends (north and south) of a stretch of County State Aid Highway (CSAH) 9 were surveyed and cored on December 4, 2014.

2.1.8 Woodbury

Three locations in Woodbury, MN, were examined for the project work. Sections of Bridgewater Parkway and Newbury Alcove (the cul-de-sac and a straight portion) were surveyed and cored on November 19, 2014, and November 20, 2014. The Newbury Alcove cul-de-sac portion was unsealed and included for a comparison of the chip-sealed and unsealed portions of the road.

2.2 FIELD WORK CONDUCTED

The project research included surveys and extraction of cores from field locations indicated in Section 2.1. A total of 280 cores were collected for testing. The subsections below detail survey and testing procedures and core extraction operation; data and results are presented in Chapter 3.

2.2.1 Condition surveys

Members of the research team noted the general condition of all sections used for the project research. Condition surveys included observations and notes on localized distresses. The process of coring allowed the technician to assess the presence of stripping; this information was recorded with other general information on the pavement condition. In addition, ground penetrating radar (GPR) tests, detailed below, included supporting video surveys that could be used to examine the pavement condition.

2.2.2 Coring for laboratory testing

Coring operations for the project research involved the use of a coring rig mounted to the rear of a truck. The rig is shown in Figure 3. Six-inch diameter cores were obtained by drilling through the asphalt course to the top of the base layer. In addition to providing an intact specimen for testing, it allowed for the measurement of the in-situ pavement thickness.

Figure 3. Truck-mounted rig used to obtain cores on-site

2.2.3 Permeability testing

Field permeability tests using the NCAT Permeameter were investigated for the Cottage Grove, Inver Grove Heights, and Blaine sections. An illustration of one test is shown in Figure 4. Depending on surface roughness, obtaining a good seal was difficult, which complicated both the test and the usefulness of results from the test. Future permeability tests for this project were ruled out, given that the field permeability test has too many variables to confidently measure the permeability of an in-situ pavement with uncertain design.

Figure 4. Configuration of the NCAT Permeameter in attempts at field permeability testing

2.2.4 Evaluation using ground penetrating radar

Field work in support of the project research included ground penetrating radar (GPR) testing of pavement sections. GPR data was continuously collected at residential roadway speeds (20-40 miles per hour) using equipment mounted with 400 MHz and 2 GHz antennas and a SIR-20 control and data acquisition processor. The GPR configuration used for the study met or exceeded the ASTM D4748 and ASTM D6087 standards. Multiple passes were conducted to ensure that sufficient data was collected at 13 locations across five municipalities. The truck-mounted antenna is shown in Figure 5. All GPR data was coupled with precise GPS location data in support of more sophisticated analysis, which is presented in Chapter 3.

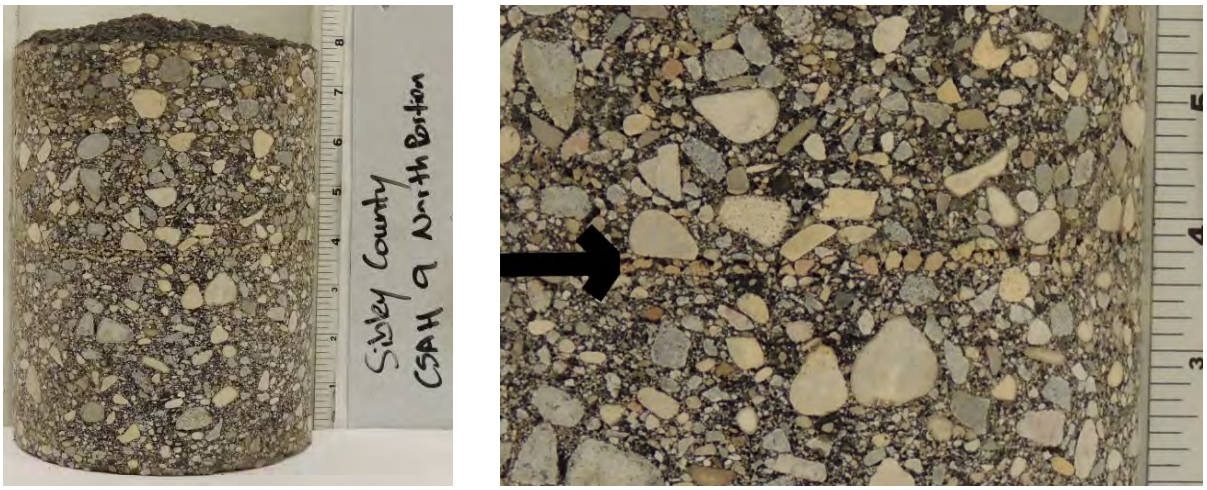
Figure 5. Vehicle-mounted GPR used for site evaluation

2.2.5 Nuclear density gauge testing

A nuclear gauge was used to assess the density of pavements on site. Backscatter testing was applied in accordance with ASTM D2950 to quickly assess both properties. Initially, nuclear gauge testing was conducted in six municipalities at 37 separate locations to compare asphalt densities. Of these 37 locations, mix data was available for 29 locations assessed. Extensive nuclear gauge testing was later conducted in these six municipalities to be coupled with the results of GPR testing. More details on these locations are included in the Chapter 3 analysis of test results.

2.3 LABORATORY WORK CONDUCTED

The research team conducted extensive laboratory testing to understand the behavior of chip sealed pavements. The laboratory testing relied upon the collection of a minimum of 12 cores from each of the locations; an example of a collected core is shown in Figure 6.



(a) **(b)**

Figure 6. (a) Example of core extracted from pavement for study and (b) close-up of core shows evidence of past chip seal treatments

The subsections below detail the laboratory test procedures applied in this study; data and results from these tests are presented in Chapter 3.

2.3.1 Testing to determine volumetric properties of asphalt samples

Six samples from each of each of the 18 locations were used for volumetric analysis of the underlying asphalt. Specimens were compacted according to AASHTO T 312 for:

- Maximum theoretical specific density (G_{mm}) testing according to AASHTO T 209 and ASTM D 2401 and
- Bulk specific gravity (G_{mb}) testing according to AASHTO T 166.

In preparing cores for G_{mm} testing under AASHTO T 209, the cores were trimmed to remove cut aggregate, and testing was conducted with between 2000 and 2050 grams of material from the center of the core, which is briefly heated to 230°F to dry moisture from the core sample.

Given the results of the G_{mm} and G_{mb} tests, properties such as the percent air voids and the effective specific gravity were calculated. These properties in turn were used to determine the percent voids in mineral aggregate (VMA) and the percent voids filled with asphalt (VFA). Finally, given surface area characteristics for the sieve sizes of the aggregate, the average film thickness (AFT) was calculated.

2.3.2 Hamburg wheel tracker testing

Circular specimens were tested using a Hamburg wheel tracking (HWT) device. AASHTO T 324 procedures were followed for all tests on a total of 18 specimens from 18 locations. The laboratory equipment used for the tests is shown in Figure 7a. The tests were conducted using paired specimens: the first of the pair was compacted with the chip seal, the second of the pair was compacted without the chip seal.

2.3.3 Fracture energy testing

Disk-shaped compact tension (DCT) tests were conducted on specimens to evaluate the fracture energy of asphalt mixes and field specimens. DCT tests were conducted on a total of seven specimens, and all tests were conducted in accordance with ASTM D7313. The laboratory equipment used for the tests is shown in Figure 7b.

(a) **(b)**

Figure 7. (a) Hamburg wheel tracker test machine and (b) DCT test machine used for the project research

2.3.4 Permeability testing

Falling head permeability tests were conducted and coefficients of permeability were calculated according to the standard outlined in ASTM PS 129-01. Laboratory permeability tests were conducted on a total of 68 samples from 18 locations. The laboratory equipment used for the tests is shown in Figure 8a.

2.3.5 Tensile strength ratio testing

The tensile strength ratio (TSR) test measures tensile strength loss due to damage under accelerated water conditioning in the laboratory. The modified Lottman tensile strength ratio (TSR) test was conducted according to AASHTO T 283. TSR tests were applied to a total of 18 specimens. The laboratory equipment used for the tests is shown in Figure 8b.

(a) **(b)**

Figure 8. (a) Asphalt permeability test and (b) TSR test rig used for the project research

2.4 SURVEY OF MUNICIPAL ENGINEERS

An eight-question survey of Minnesota city and county engineers on their chip sealing practices was performed during Fall 2015. One-hundred twenty nine engineers responded to the survey, which was coordinated online by engineers at the City of Woodbury. The questions are indicated in Table 2. A summary of responses is provided in the results of Chapter 3. Full responses are provided in Appendix K.

Table 2. Questionnaire for survey of Minnesota local engineer chip sealing practices

Item	Question
Q1	Are you currently using chipseals as part of your pavement maintenance program?
Q2	Has your organization used chipseals in the past?
Q3	On roads where chipseals have been used, have you experienced any problems with stripping or or delamination of the chipseal with the underlying layer of asphalt? Stripping is defined as a loss in the asphalt/aggregate bond resulting in raveling, a shallow surface pothole, or delamination of the chipseal surface.
Q4	Do you use a polymer modified emulsion with your chipseals?
Q5	When did you start specifying the polymer modified emulsion?
Q6	Have you noticed any difference in the incidence of stripping/delamination on roads with polymer modified emulsion?
Q7	Do you have any pavements which are not chipsealed that are experiencing stripping failures? Stripping is defined as a loss in the asphalt/aggregate bond resulting in raveling, a shallow surface pothole, or delamination of the chipsealed surface.
Q8	Is there anything else you'd like to share about your use or non-use of chipseals?

CHAPTER 3: RESULTS AND DISCUSSION

The results of field testing, laboratory testing, and surveys of municipal engineers are summarized and discussed in this chapter. Additional information on testing or survey data can be found in the appendices to the final report.

3.1 SUMMARY OF FIELD DATA AND SPECIMENS COLLECTED

Given the extent of the data, it is summarized in this chapter rather than being presented in full. The full field data are recorded in Appendix A (Condition surveys and core collection information) and Appendix F (GPR and nuclear density). In addition, while example photographs of core collection are provided in Appendix I, a full record of all core photographs, including cores used for Hamburg Wheel and permeability tests, is hosted online by MnDOT at:

ftp://ftp2.dot.state.mn.us/pub/outbound/researchservices/Chip%20Seal%20Research/

Table 3 records locations and nomenclature used to identify field specimens collected and used for laboratory testing.

Table 3. Identification nomenclature for core and field assessments

Core ID Designation	City/County	Road Location
B-93E	Blaine	93rd Ave, East
B-93W	Blaine	93rd Ave, West
BP-L	Brooklyn Park	Louisiana Ave
BP-73	Brooklyn Park	73rd Ave
BP-W	Brooklyn Park	Winnetka Ave
B-134	Burnsville	134th St
B-H	Burnsville	Heritage Circle Area
B-K	Burnsville	Knob Hill Area
CG-H	Cottage Grove	Hyde Ave
CG-I	Cottage Grove	Ingberg Trail
CG-J	Cottage Grove	Jensen Ave
IGH-B	Inver Grove Heights	Brooks Blvd
O-8	Osseo	8th Ave
SC-9N	Sibley County	CSAH 9, North
SC-9S	Sibley County	CSAH 9, South
W-B	Woodbury	Bridgewater
W-NA-C	Woodbury	Newbury Alcove, Cul de sac (Unsealed)
W-NA-S	Woodbury	Newbury Alcove, Straight section

3.1.1 Condition of pavement sections

The level of stripping varied from site to site. In the collection of core specimens, field observations were made on the extent of stripping in the vicinity of coring, in addition to general notes on the core itself. A comparison of core condition is shown in Figure 9 using cores collected for the study from a location in Shoreview, MN, that was not included in the final database. Figure 9b shows not only stripping behavior under the chip seal, but also stripping in asphalt lifts. An intact core from a nearby location is shown in Figure 9a to illustrate the extent of stripping through the core depth.

(a) **(b)**

Figure 9. (a) Intact core and (b) core stripped under chip seal and between asphalt lifts, recovered from city of Shoreview, MN

A rough assessment of stripping for all cores on a given site location is recorded in Table 4, based on the extent of condition notes. As a rule, sites with more cores with notes on stripping were considered to have higher levels of stripping than sites with cores with fewer notes. Given its dependency on the observer, this measure is not comprehensive nor objective, and levels of stripping are referred to only in a general sense in the discussion and conclusions. Individual condition surveys and core collection notes are recorded in Appendix A.

Table 4. General observed levels of stripping in field

City/County	Road Location	Observed levels of stripping
Blaine	93rd Ave, East	Moderate to High
Blaine	93rd Ave, West	Moderate to High
Brooklyn Park	Louisiana Ave	Moderate
Brooklyn Park	73rd Ave	Moderate
Brooklyn Park	Winnetka Ave	Moderate
Burnsville	134th St	Low
Burnsville	Heritage Circle Area	High
Burnsville	Knob Hill Area	Low to Moderate
Cottage Grove	Hyde Ave	Low
Cottage Grove	Ingberg Trail	Moderate
Cottage Grove	Jensen Ave	Low
Inver Grove Heights	Brooks Blvd	Low
Osseo	8th Ave	Moderate to High
Sibley County	CSAH 9, North	High
Sibley County	CSAH 9, South	High
Woodbury	Bridgewater	Moderate
Woodbury	Newbury Alcove, Cul de sac (Unsealed)	n/a
Woodbury	Newbury Alcove, Straight section	Moderate

3.1.2 Overview of GPR and nuclear gauge testing

The GPR testing included constant GIS information to provide exact locations of measurements. Likewise, the exact location of all nuclear density testing was recorded. This information has been presented in tandem to potentially allow for correlations between nuclear density and GPR dielectric readings. The reporting of this information results in “heat maps” for all sites surveyed. An example of such a map is shown in Figure 10. All maps for all locations are presented in Appendix F. Given the

limitations of the GPR antenna used for the testing, which is a longer-wave antenna, correlating the dielectric with density data does not provide reliable maps of density in the asphalt.

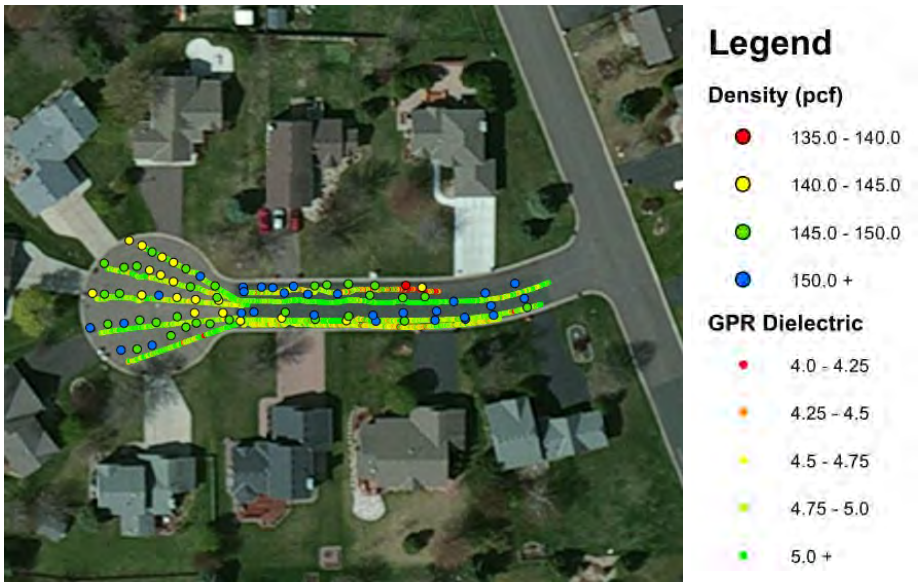


Figure 10. Map of dielectric and density data collected at Newbury Alcove site in Woodbury, MN

However, the nuclear gauge density data can provide useful feedback when viewed alongside other information, such as the results of core testing data from the laboratory. In this study, two rounds of nuclear gauge density testing at a total of 37 locations were conducted in two stages.

Results of the initial testing stage are shown in Table 5. For those initial tests at 9 of the 18 test sites, it was observed that densities did not match the cores, as average field densities were observed to range between 85.3 and 97.2 percent of the maximum core density (i.e. all air voids removed) obtained from volumetric testing. Furthermore, the average densities for some locations were unreasonably low. This raised concerns about compaction on municipal roads.

To address more general concerns about asphalt compaction – rather than issues specific to chip seal treatments – a second round of nuclear gauge testing was conducted on roads with and without chip seals. The results of the second round of tests are shown in Table 6.

The observed densities in the second round of tests were more reasonable. The second round of testing showed that municipal roads had adequate densities in most cases: of the 28 locations in the second round, only two had an average density below 91 percent, and the average maximum density across all locations was 93.3 percent. The second round of testing also indicated that “ordinary” compaction practices in the field produce adequate results. Thus, the cause of stripping is not necessarily related to density if 92 percent field density, as indicated in the MnDOT specification for asphalt compaction, is

considered adequate (MnDOT, 2016). Additional volumetric lab testing is discussed in Section 3.2 to elaborate on density in asphalt under chip sealed pavements.

Table 5. First round of nuclear gauge density tests for locations with available mix design information

Location	Mix	Year Paved	Maximum density (pcf)	Statistics (% of max density)	
				Standard Deviation	Average
Woodbury - Newbury Alcove	41 Wear	1989	154.8*	2.7%	97.2%
Woodbury - Newbury Alcove (CDS)	41 Wear	1989	155.7*	1.9%	94.3%
Blaine - 93rd Ave East End	41A Wear	1994	154.1*	1.4%	90.5%
Blaine - 93rd Ave West End	41A Wear	1995	153.8*	1.7%	85.3%
Brooklyn Park - Louisiana Ave	41A Wear	1995	152.9*	1.9%	91.5%
Brooklyn Park - Winnetka Ave	41A Wear	1995	153.6*	1.1%	93.7%
Brooklyn Park - 73rd Ave	41A Wear	1998	155.3*	1.6%	90.0%
Woodbury - Bridgewater Pkwy	41B Wear	1998	155.9*	2.3%	90.4%
Inver Grove Heights - Brooks Blvd	MVWE35035B	2009	154.6	1.3%	89.9%

**Obtained from lab-batched mix design and not volumetric testing of field core*

Table 6. Second round of nuclear gauge density tests

Location	Mix	Year Paved	Maximum density (pcf)	Statistics (% of max density)	
				Standard Deviation	Average
Woodbury - Dunmore Rd	LVWE35030B	2005	153.4	1.5%	92.9%
Woodbury - Evergreen Dr	LVWE35035B	2006	152.9	1.6%	96.7%

Cottage Grove - Hedgecroft Ave	LVWE35030B	2007	153.4	2.3%	95.4%
Cottage Grove - 77th Street S	LVWE35030B	2008	153.4	2.1%	92.2%
Woodbury - Paul Rd	MVWE35035B	2008	154.6	1.7%	92.1%
Woodbury - Hillcrest Dr	MVWE35035B	2009	154.2	1.6%	95.2%
Cottage Grove - 63rd Street S	LVWE35030C	2010	154.1	1.2%	96.1%
Woodbury - Crackleberry Tr	SPWEB240B	2010	156	0.9%	92.5%
Cottage Grove - Lock Ridge Ave S	SPWEB240B	2011	155.8	1.4%	88.4%
Inver Grove Heights - Addisen Path	SPWEB240C(R)	2011	156	1.4%	91.5%
Inver Grove Heights - 68th Street SE	SPWEB240C(R)	2012	156	1.6%	91.6%
Inver Grove Heights - Borden Way	SPWEB240C(R)	2012	156	1.0%	91.5%
Cottage Grove - Jeffery Lane S	SPWEB340C	2013	159.3	1.3%	95.9%
Inver Grove Heights - Conroy Way	SPWEB240C(R)	2013	156	1.1%	90.6%
Cottage Grove - Jasmine Ave S	SPWEA330C	2014	152.7	1.5%	94.4%
Inver Grove Heights - Bower Path	SPWEB240C(R)	2014	156	1.2%	94.2%
Woodbury - Somerset Rd	SPWEA330C	2014	155.1	1.5%	96.1%
Osseo - 1.5 St NE	SPWEA240(R)	2015	152.8	0.9%	93.5%
Osseo - 1st Ave	SPWEA240(R)	2015	152.8	1.6%	96.0%
Osseo - 1st St. NE	SPWEA240(R)	2015	152.8	1.1%	91.9%

Osseo - 1st St. SE	SPWEA240(R)	2015	152.8	1.3%	93.0%
Osseo - 3rd Ave. NE	SPWEA240(R)	2015	152.8	1.4%	92.0%
Osseo - 3rd St. NE	SPWEA240(R)	2015	152.8	1.3%	91.3%
Osseo - 4th St. NE	SPWEA240(R)	2015	152.8	1.1%	97.1%
Osseo - 5th Ave. NE	SPWEA240(R)	2015	152.8	0.9%	92.8%
Osseo - 6th Ave. NE	SPWEA240(R)	2015	152.8	1.2%	92.9%
Osseo - 7th St. NE	SPWEA240(R)	2015	152.8	1.1%	92.6%
Osseo - E. Broadway	SPWEA240(R)	2015	152.8	1.2%	92.6%

**Obtained from lab-batched mix design and not volumetric testing of field core*

3.2 SUMMARY OF LABORATORY DATA

As with the field data, laboratory data is summarized in the body of the final report. The following appendices record the laboratory data in full:

- Appendix B, Volumetric testing and summary properties
- Appendix C, Fracture energy testing
- Appendix D, Lab permeability testing
- Appendix E, Hamburg wheel tracking testing
- Appendix G, Tensile strength ratio testing
- Appendix J, Hamburg test photographs

3.2.1 Volumetric testing of asphalt samples

Table 7 summarizes the results of volumetric tests conducted on samples collected from 18 locations considered in the study. Six samples were tested for each location. Chapter 3 details the testing and calculations involved in the development of Table 7. The average air void content across all samples was 5.5 percent, and over 60 percent of tested samples had air void contents between 5 and 8 percent.

Table 7. Summary averages of volumetric testing of asphalt samples from 18 locations

Location	Air Voids (%)	VMA (%)	AFT (microns)	VFA (%)	Extracted asphalt content (%)	Max Density (pcf)
Blaine - 93rd Ave East End	3.0	15.3	9	80.5	5.3	154.1
Blaine - 93rd Ave West End	6.7	17.4	7.3	61.3	4.8	153.8
Brooklyn Park 73rd Ave	8.4	17.7	9.2	52.6	4.2	155.3
Brooklyn Park - Louisiana Ave	4.8	17.2	8.2	72.1	5.5	152.9
Brooklyn Park - Winnetka Ave	2.5	16.0	10.9	84.3	5.8	153.6
Burnsville - 134th St	7.0	18.0	9.1	61.1	4.9	155.9
Burnsville - Heritage Cir Area	7.2	18.4	9.7	60.5	5.0	153.9
Burnsville - Knob Hill Area	8.0	19.3	8.7	58.5	5.1	154.5
Cottage Grove - Hyde Ave S	6.3	16.6	8.9	62.3	4.6	155.2
Cottage Grove - Ingberg Trl S	7.5	18.4	7.1	59.2	4.9	155.9
Cottage Grove - Jensen Ave	7.7	17.6	7	56.4	4.4	156.9
Inver Grove Heights - Brooks Blvd	4.5	15.1	7.9	70.0	4.6	155.1
Osseo 8th Ave SE	7.2	17.9	8.7	59.6	4.8	155.2
Sibley County CSAH 9 North Portion	5.7	17.6	9.7	67.6	5.4	151.0
Sibley County CSAH 9 South Portion	3.9	16.4	8.2	76.3	5.6	150.6
Woodbury - Bridgewater	4.8	16.1	7.3	70.0	4.9	155.9
Woodbury - Newbury Alcove Cul-de-sac	1.4	13.2	11	89.7	5.0	155.7
Woodbury - Newbury Alcove Straight Portion	2.1	13.2	8.5	84.1	4.7	154.8

3.2.2 Summary of Hamburg wheel tracking tests

The results of Hamburg wheel tracking tests (tested samples shown in Figure 11) are used to directly assess the susceptibility of asphalt mixes to moisture and the likelihood of stripping due to moisture damage. These results are presented in Appendix E. The general result of Hamburg testing was that the majority of mixes performed well in stripping resistance; the only clear outlier was the performance of

the Woodbury Newbury Alcove Straight Section sample, which showed signs of stripping after only 521 passes. An additional observation from the data is that mixes from older pavements performed better than those of newer pavements due to higher stiffness values for the aged binders.

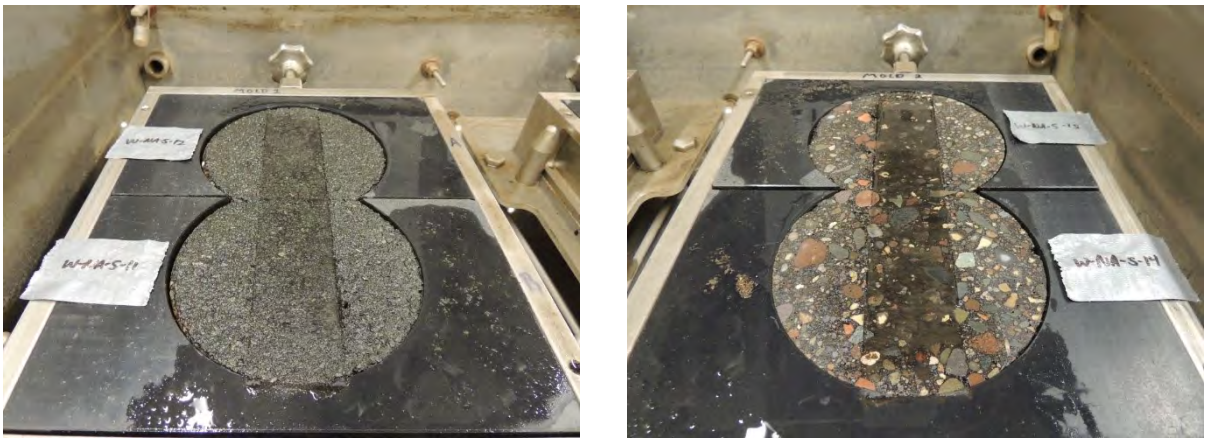


Figure 11. Specimens for stripping study undergoing Hamburg wheel testing

3.2.3 Fracture energy testing

The results of DCT tests are reported in Appendix C. As the tests provided no useful information about stripping behavior in chip-sealed asphalt, DCT testing was discontinued after seven tests.

3.2.4 Laboratory permeability tests

The majority of locations yielded four samples for permeability tests, the exceptions being the west end of 93rd Avenue in Blaine (2 samples) and the cul-de-sac of Newbury Alcove in Woodbury (2 samples). The average permeability results (K and K_{20}, the permeability at 20 deg Celsius) are reported in Table 8. Full data from all 68 samples tested are presented in Appendix D. As noted in Table 8, the specimens collected were relatively impermeable, with the highest measured permeability from a single test no higher than 23.7×10^{-5} cm/sec across all samples.

Table 8. Average calculated coefficients of permeability from laboratory permeability testing according to ASTM PS 129-01

Location	Permeability, K (10^{-5} cm/sec)	Permeability, K_{20} (10^{-5} cm/sec)
Blaine - 93rd Ave East End	0.8	0.6
Blaine - 93rd Ave West End	1	0.8
Brooklyn Park 73rd Ave	10.7	7.8
Brooklyn Park - Louisiana Ave	0	0
Brooklyn Park - Winnetka Ave	0	0
Burnsville - 134th St	3.1	2.3
Burnsville - Heritage Cir Area	0.4	0.3
Burnsville - Knob Hill Area	0.4	0.3
Cottage Grove - Hyde Ave S	0.2	0.2
Cottage Grove - Ingberg Trl S	3.5	2.5
Cottage Grove - Jensen Ave	6.9	5
Inver Grove Heights - Brooks Blvd	0	0
Osseo 8th Ave SE	4	2.9
Sibley County CSAH 9 North Portion	0	0
Sibley County CSAH 9 South Portion	0	0
Woodbury - Bridgewater	0.3	0.2
Woodbury - Newbury Alcove Cul de sac (Unsealed)	0	0
Woodbury - Newbury Alcove Straight Portion	0	0

3.2.5 Overview of tensile strength ratio testing

As the results of TSR tests are sometimes used to infer long-term behavior of asphalt in terms of stripping, the results of these tests are relevant to this study. For this project material obtained from the roadway cores was heated and re-compacted at 7% and 11% air voids and TSR tests were performed on

these specimens. Further analysis using the laboratory data aggregated TSR data with condition surveys from field site visits. Results are summarized in Table 9 and Table 10.

Table 9. Summary of tensile strength ratios on mixtures re-compacted at 7% air voids and 11% air voids by location and extent of stripping observed in field

Location	Amount of Stripping Observed	TSR (7% voids)	TSR (11% voids)	Extracted asphalt content (%)
Burnsville - 134th St	Low	0.79	0.7	4.9
Cottage Grove - Hyde Ave S	Low	0.77	0.7	4.6
Cottage Grove - Jensen Ave	Low	0.65	0.51	4.4
Inver Grove Heights - Brooks Blvd	Low	0.76	0.63	4.6
Burnsville - Knob Hill Area	Low to Moderate	0.7	0.65	5.1
Brooklyn Park - 73rd Ave	Moderate	0.7	0.65	4.2
Brooklyn Park - Louisiana Ave	Moderate	0.77	0.74	5.5
Brooklyn Park - Winnetka Ave	Moderate	0.93	0.87	5.8
Cottage Grove - Ingberg Trl S	Moderate	0.73	0.66	4.9
Woodbury - Bridgewater	Moderate	0.91	0.69	4.9
Woodbury - Newbury Alcove Straight Portion	Moderate	0.76	0.65	4.7
Blaine - 93rd Ave East End	Moderate to High	0.76	0.67	5.3
Blaine - 93rd Ave West End	Moderate to High	0.69	0.61	4.8
Osseo - 8th Ave SE	Moderate to High	0.81	0.76	4.8
Burnsville - Heritage Cir Area	High	0.75	0.66	5
Sibley County - CSAH 9 North Portion	High	0.78	0.69	5.4
Sibley County - CSAH 9 South Portion	High	0.84	0.78	5.6

Table 10. Correlating TSR and observed stripping for field sections visited

Amount of Stripping Observed	Count	Average TSR (7% voids)	Average TSR (11% voids)	Average extracted asphalt content (%)
Low	4	0.74	0.64	4.63
Low to Moderate	1	0.77	0.70	4.60
Moderate	6	0.80	0.71	5.00
Moderate to High	3	0.75	0.68	4.97
High	3	0.79	0.71	5.33

3.3 SURVEY RESULTS

As noted in Section 2.4, 129 municipal engineers responded to the survey on local experience with chip seal treatments. Responses are summarized in Table 11, and full responses are provided in Appendix K.

Of the engineers surveyed, 64 percent “regularly” used chip seals, 17 percent “sometimes” used chip seals, and 19 percent “never” used chip seals. Of the respondents who use chip seals, 35 percent reported that they do not observe stripping in pavements treated with chip seals. 39 percent reported observing some stripping in chip-sealed pavements, yet did not consider it a major issue. The remaining 26 percent reported stripping as a major issue for their chip-sealed pavements.

Finally, only four percent of respondents reported significant stripping in roads that were not treated with chip seals (unsealed). Twenty-one percent of respondents reported stripping in unsealed roads as a minor issue, and 75 percent did not observe stripping in unsealed roads and did not consider it a significant issue.

Table 11 Questionnaire for survey of Minnesota local engineer chip sealing practices

Item	Question	Answered	Skipped	Responses	
Q1	Are you currently using chipseals as part of your pavement maintenance program?	129	0	83	Yes, regularly based on a schedule for most roadways
				22	Yes, occasionally depending on pavement and traffic conditions
				24	No
Q2	Has your organization used chipseals in the past?	25	104	9	Yes, but not in the last approximately 5 years
				6	Yes, but not in the last approximately 10 years
				3	Yes, but not in the last approximately 20 years
				7	No
Q3	On roads where chipseals have been used, have you experienced any problems with stripping or delamination of the chipseal with the underlying layer of asphalt? Stripping is defined as a loss in the asphalt/aggregate bond resulting in raveling, a shallow surface pothole, or delamination of the chipseal surface.	112	17	39	No, we have not experienced this issue
				44	Yes, but this is not a major issue on our roadway network
				29	Yes, this is a major issue on our roadway network

Q4	Do you use a polymer modified emulsion with your chipseals?	112	17	40 27 14 31	Yes, on all chipsealed roadways Yes, on some chipsealed roadways No Unknown
Q5	When did you start specifying the polymer modified emulsion?	51	78		*See Appendix K*
Q6	Have you noticed any difference in the incidence of stripping/delamination on roads with polymer modified emulsion?	65	64	10 24 31	Yes No Unknown
Q7	Do you have any pavements which are not chipsealed that are experiencing stripping failures? Stripping is defined as a loss in the asphalt/aggregate bond resulting in raveling, a shallow surface pothole, or delamination of the chipsealed surface.	113	16	4 24 85	Yes, this is a significant issue Yes, this is a minor issue No, we have not experienced stripping on non-chipsealed surfaces
Q8	Is there anything else you'd like to share about your use or non-use of chipseals?	34	95		*See Appendix K*

3.4 DISCUSSION AND OBSERVATIONS

3.4.1 Lab and field data

Given the extent of the field and laboratory testing, there is sufficient data to support general observations that would be unsubstantiated in smaller studies. First, based on the condition surveys

from field testing, not all roads with chip seals exhibited stripping. Information provided by city engineers for field sites locations identified less than Moderate levels of stripping in 6 of the 18 primary field sites. Condition information relative to volumetric core data (percent air voids and maximum density) is described in Figure 12.

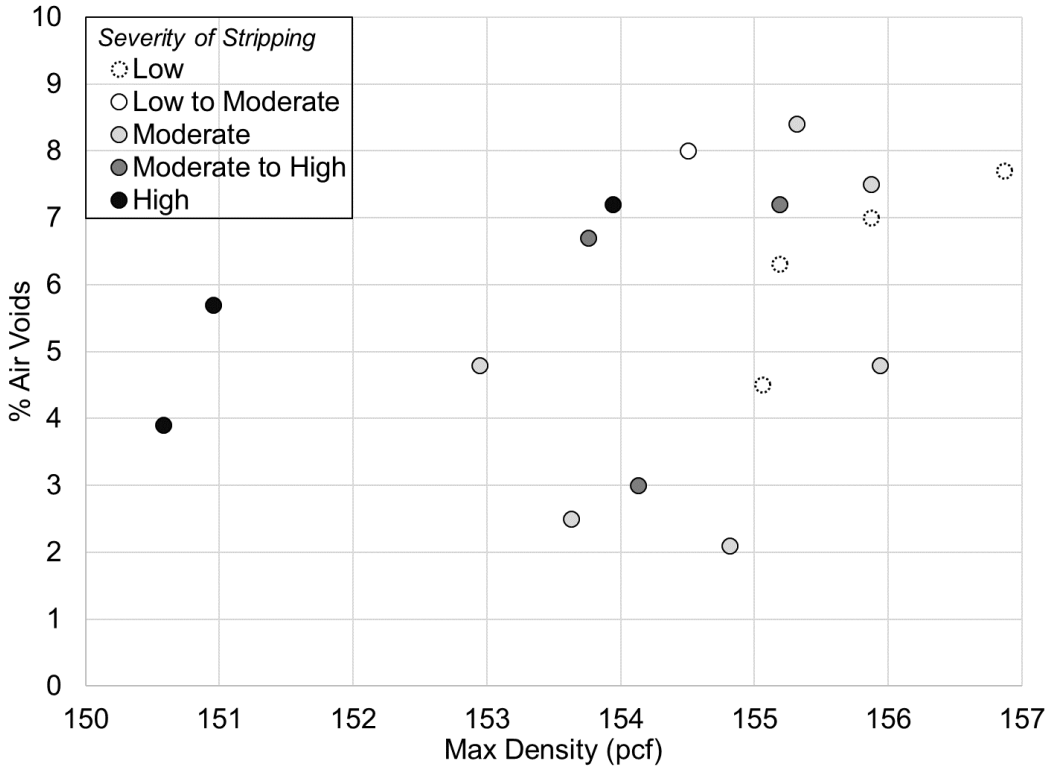


Figure 12. Severity of stripping in chip-sealed pavements in 18 locations with maximum theoretical density and percent air voids

Figure 12 does not describe an observable trend relating the extent of stripping to air void content. As the air void content for all sections examined is 8.5 percent or lower, no sections with excessive air voids were considered in the study. Thus, it is difficult to correlate stripping behavior directly with excessive air voids or air void content in general.

In addition, previous to the MnDOT study published in 2013 (Wood & Cole, 2013), many state and city/county engineers supposed that there may exist a relationship between (A) a specific bituminous mixture, contractor, geographic location, or year of construction and (B) the likelihood and extent of stripping. Table 12 summarizes data addressing this hypothesis. One limitation of the project was the lack of pavement information from municipalities on the sections considered; much of the information provided lacked specific detail on the mix design, for instance. However, based on the data available to this project, a correlation is not apparent between stripping in chip-sealed pavements and a specific mix, contractor, or paving year.

Table 12. Summary of level of stripping and pavement information by section

Location	Amount of Stripping Observed	HMA Design	Year Paved
Burnsville - 134th St	Low	41A Wear	2005
Cottage Grove - Hyde Ave S	Low	LVWE35030B	1996
Cottage Grove - Jensen Ave	Low	SPWEB340C	1986
Inver Grove Heights - Brooks Blvd	Low	MVWE35035B	2009
Burnsville - Knob Hill Area	Low to Moderate	41A Wear	1996
Brooklyn Park - 73rd Ave	Moderate	41A Wear	1998
Brooklyn Park - Louisiana Ave	Moderate	41A Wear	1995
Brooklyn Park - Winnetka Ave	Moderate	41A Wear	1995
Cottage Grove - Ingberg Trl S	Moderate	LVWE35030B	1995
Woodbury - Bridgewater	Moderate	SPWEA240(R)	1998
Woodbury - Newbury Alcove Straight Portion	Moderate	41 Wear	1995
Blaine - 93rd Ave East End	Moderate to High	41A Wear	1994
Blaine - 93rd Ave West End	Moderate to High	41A Wear	1995
Osseo - 8th Ave SE	Moderate to High	SPWEA240(R)	1992
Burnsville - Heritage Cir Area	High	41A Wear	1994
Sibley County - CSAH 9 North Portion	High	SPWEA240(R)	1996
Sibley County - CSAH 9 South Portion	High	SPWEA240(R)	1997

Other questions were proposed to the research team through the course of the study, and these questions were addressed based on limited information available to the study. Those questions include:

- *Is there a relationship between the use of a granular subbase and stripping in chip-sealed pavements?*
  No relationship was apparent based on the performance of qualified sections in the study. This can be observed in Table 1.
- *Does the use of polymer-modified emulsions for chip seals lead to stripping?*
  A large percentage of municipalities surveyed were unable to identify dates or years for polymer-modified emulsion adoption for their chip seal treatments. Therefore, a relationship between the presence of polymers and stripping could not be determined.

3.4.2 Field behaviors associated with stripping

One important outcome of the study was the project survey, which identified important information in the understanding of stripping. First, the stripping behavior observed under chip-sealed pavements is not typically seen on roadways that were unsealed (four percent of engineers reported significant stripping and 21 percent of respondents reported minor stripping in unsealed roads). In this regard, the survey suggests that the presence of the chip seal treatment itself, and not properties of the underlying asphalt, may contribute to stripping.

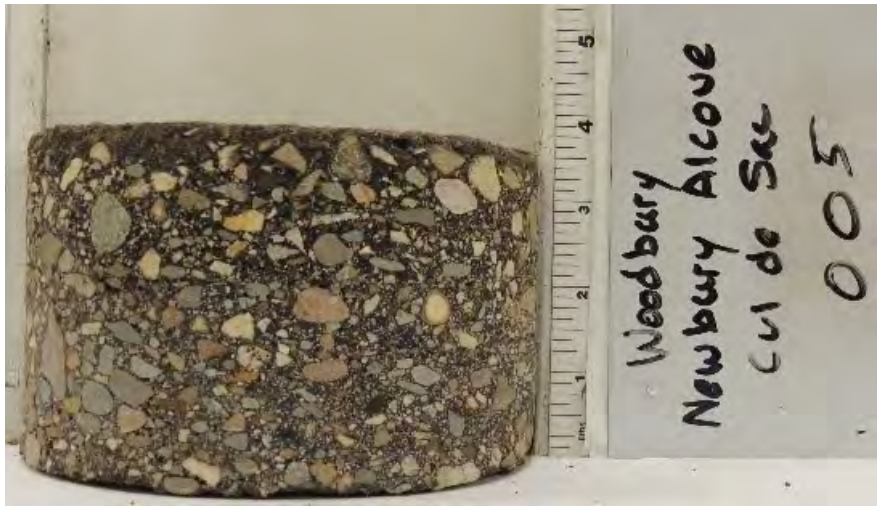
While not as thorough as the lab and field studies, the project research included surveys of field sections in cities and counties to study how a chip seal may encourage stripping. Municipal engineers have observed that often in roads featuring neighboring chip-sealed and unsealed portions, the chip-sealed roadway will exhibit stripping behaviors, while the unsealed portion experiences only surface raveling. One type of road that was useful for such a survey was a road ending in a cul-de-sac, as these roads are often chip-sealed on their straight portions while the cul-de-sacs are unsealed.

The project included one such road, Newbury Alcove in Woodbury, MN. The relative material lost due to stripping can be seen in comparing Figure 13b and Figure 13d. One confounding factor in this observation, however, is the fact that the Hamburg Wheel test found that the straight portion mix was the only mix susceptible to stripping due to moisture damage.

(a)

(c)

(b)



(d)

Figure 13. Comparison of stripping of cores collected from (a-b) straight portion (with chip seal) and (c-d) cul-de-sac (unsealed) of Newbury Alcove in Woodbury, MN

In addition, it has been observed that the presence of the chip seal can exacerbate distresses, as illustrated from a survey of Blue Heron Road in Woodbury, MN, in Figure 14. In other words, a road with sealed and unsealed sections may experience more block cracking in areas with the chip seal (Figure 14b) than in areas without the chip seal (Figure 14a).

(a) **(b)**

Figure 14. Possible contribution of chip seal to advanced cracking in (a) unsealed and (b) chip-sealed pavement on Blue Heron Road in Woodbury, MN

These observations raise questions about how a chip seal may create conditions that (A) contribute to the incidence of stripping and (B) exacerbate other distress in the asphalt pavement. While the project research was extensive, the scope did not include the complex phenomena that govern this problem. It is possible that the chip seal may "trap" moisture/vapor in the asphalt layer immediately beneath the seal. Freeze-thaw cycling may break down the asphalt at an accelerated rate due to the presence of trapped moisture. This is an issue for future research.

CHAPTER 4: CONCLUSIONS AND RECOMMENDATIONS

4.1 CONCLUSIONS

The field and laboratory work conducted in this project represents an extensive study of chip-sealed pavement performance in Minnesota. In spite of this effort, many concerns surrounding the behavior chip-sealed pavements remain unresolved.

First, the study was not able to verify the conclusion of earlier MnDOT research that high air voids is the primary cause of stripping (Wood & Cole, 2013). High air voids were not observed in the locations used for the study; furthermore, not all chip-sealed pavements considered in the study exhibited signs of stripping. The latter observation agrees with municipal experience: survey data indicated that 74 percent of city engineers did not identify stripping in chip seals as a major issue.

The study was also unable to identify mix design or construction practices that correlated with the incidence of stripping. That is, based on the results of this study:

- There does not appear to be direct relationship between pavement density and stripping under chip seals.
- There does not appear to be a direct relationship between any specific bituminous mixture, contractor, geographic location, or year of construction and this distress.

The main conclusion of the study is that while stripping under chip seals is a concern, it is not a concern that can be addressed with a simple mix design or paving rule of thumb.

Finally, the distress was observed to be a complex phenomenon that may be caused by the presence of the chip seal as much as it is the composition of the underlying asphalt. Perhaps the matrix of binder and densely packed, angular chip creates too tight of a “seal” on the pavement, thereby trapping moisture and vapor and creating conditions that become damaging under freeze-thaw action. It is hoped that the field and laboratory data collected in this study will be of value to future work that examines this phenomenon in detail.

4.2 RECOMMENDATIONS

Based on field observations and discussions with state, city, and county engineers, the following recommendations and observations are provided on the use of chip-seal treatments and the incidence of stripping under chip seals. As the study was unable to point to an overwhelming cause for the stripping behavior, the recommendations are intended to be a starting point for future discussions and studies of important issues in the use of chip seals.

First, it was observed that stripping behavior under chip seals may be due to trapped moisture and water vapor between the chip seal and the asphalt pavement. This phenomenon would be similar to

stripping behavior observed in conventional overlays of asphalt (Kandhal & Rickards, 2001). Thus, appropriate drainage is important in chip-sealed pavements. The utilization of subsurface drainage will reduce the probability of saturated subbase and base layers, which will reduce the amount of moisture that would be moving through the pavement.

Another factor is to minimize trapped water vapor between the chip seal and the underlying asphalt. If the first lift of pavement is damaged due to insufficient structural capacity to withstand heavy loads (which often occur immediately after the initial lift of bituminous is placed during the construction of a housing development), the pavement may already have significant microscopic sized cracking that allows water vapor to be transmitted from the subgrade soils into the pavement layer and be trapped. Causes of this cracking can include staggered construction of bituminous pavement layers across multiple construction seasons, which subjects the pavement to heavy loads while it is not at full strength.

Many of the cities surveyed during this project have explored the use of thin bituminous overlays, approximately five-eighths inches in thickness, as an alternative to chip seal treatments. In Texas, these fine-mix overlays have shown promise as a surface treatment on oxidized pavement and as a surface treatment to extend the life of roadways exhibiting signs of stripping. Studies have shown these thin overlays can extend the service life by an additional three to five years before a mill-and-overlay is required (Newcomb et al., 2013).

MnDOT has taken steps toward providing guidance on alternatives to chip-seal treatments. Modifications to Sections 2360 and 3139 of the 2016 MnDOT Standard Specifications for Construction account for the use of an overlay, or “thinlay,” using aggregate passing the three-eighths inch sieve as a surface treatment (MnDOT, 2016). As noted, the state of Texas has similar experience and the Texas Department of Transportation has also developed a specification for its fine-mix overlay, detailed in Newcomb et al. (2013). Either of these resources serve as a starting point for municipal efforts in Minnesota.

Finally, one observation of this study was a need for better municipal records on both the paving contractor and the paving materials. While many city and county engineers were able to provide valuable detail on their chip-sealed roads for this study, the results and conclusions were limited by a lack of information (as noted in Section 3.4). More detailed records of the contractor and materials would benefit both future research efforts and municipal efforts to maintain roads.

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APPENDIX A

FIELD CORE IDENTIFICATION AND OBSERVATIONS

CORE ID	DISTANCE FROM CURB (inch)	PHOTO ID	LAT.	LONG.	CORE THICKNESS (in)	Other details	Ravel Level	Lab Notes
B-93E-1	86	2666	45.13897	-93.19541	3.5		Moderate	
B-93E-2	87	2667	45.13894	-93.19551	3.5	Chipped Top	Moderate	
B-93E-3	146	2668	45.13894	-93.19579	3			Perm
B-93E-4	150	2669	45.13894	-93.1958	3			
B-93E-5	89	2670	45.13894	-93.19602	3.25	Chipped Top		Ham - Chip Seal Removed
B-93E-6	89	2671	45.13896	-93.19606	3.25			Perm
B-93E-7	143	2672	45.13895	-93.19621	3.25	Chipped Top		
B-93E-8	143	2673	45.13895	-93.19611	3.25	Chipped Top		
B-93E-9	132	2674	45.13894	-93.1962	3.5			Ham
B-93E-10	132	2675	45.13894	-93.19618	3.5			
B-93E-11	98	2676	45.13892	-93.19595	3.5			Ham - Chip Seal Removed
B-93E-12	98	2677	45.13891	-93.19595	3.75			Ham
B-93E-13	146	2678	45.13897	-93.19575	3.5			Perm
B-93E-14	154	2679	45.13895	-93.19583	3.5	Rounded Top		Perm - Chip Seal Removed
B-93E-15	141	2680	45.13893	-93.1955	2.75	Chipped Top		
B-93E-16	141	2681	45.13896	-93.19571	2.75	Chipped Top		
B-93W-1	159	2682	45.13901	-93.2012	3.5	Chipped Top	Moderate	
B-93W-2	159	2683	45.139	-93.2012	3.5	No Good		
B-93W-3	94	2684	45.13899	-93.20131	3.25			Perm - Chip Seal Removed
B-93W-4	94	2685	45.13902	-93.20133	3.25			Ham
B-93W-5	151	2686	45.13905	-93.20158	4			
B-93W-6	151	2687	45.13906	-93.20157	4		Top 1.5" Moderate Ravel	
B-93W-7	144	2688	45.139	-93.20202	4		Top 1.5" Moderate Ravel	Ham - Chip Seal Removed
B-93W-8	144	2689	45.139	-93.20204	4.25		Top 1.5" Moderate Ravel	Ham - Chip Seal Removed
B-93W-9	94	2690	45.139	-93.20229	3.75	No Good		
B-93W-10	96	2691	45.139	-93.20232	3.25	Chipped Top	Top 2" Moderate Ravel	
B-93W-11	108	2692	45.13901	-93.20217	3.5		Top 2.5" Moderate Ravel	
B-93W-12	108	2693	45.13901	-93.20205	3.5	No Good		
B-93W-13	94	2694	45.139	-93.20171	4		Top 2" Moderate Ravel	
B-93W-14	94	2695	45.13899	-93.20164	4	Chipped Top	Top 2" Moderate Ravel	
B-93W-15	100	2696	45.13899	-93.20151	3.5			Ham
B-93W-16	100	2697	45.13898	-93.20165	3.5			Perm
BP-73-1	147	2717	45.08731	-93.37563	4.5	Core Barrel Marking		
BP-73-2	144	2718	45.08734	-93.37559	4.5			Perm - Chip Seal Removed

CORE ID	DISTANCE FROM CURB (inch)	PHOTO ID	LAT.	LONG.	CORE THICKNESS (in)	Other details	Ravel Level	Lab Notes
BP-73-3	66	2719	45.08723	-93.37544	5	Broke off @ 5 inches	Top 1.5" Moderate Ravel	
BP-73-4	67	2720	45.08728	-93.37553	5	Broke off @ 5 inches, Chipped Top		
BP-73-5	95	2721	45.08724	-93.37529	4.75		Top 2" Moderate Ravel	
BP-73-6	100	2722	45.08724	-93.37528	4.75	Chipped Top	Top 2" Moderate Ravel	
BP-73-7	65	2723	45.08724	-93.33752	5.5			Ham
BP-73-8	72	2724	45.08724	-93.375	5		Top 2" Moderate Ravel	Ham
BP-73-9	73	2725	45.08726	-93.37497	5.25			Ham - Chip Seal Removed
BP-73-10	104	2726	45.08727	-93.37494	5.25	Slight - moderate Ravel	Top 2" Moderate Ravel	
BP-73-11	65	2727	45.08731	-93.37468	5	Chipped Top		Ham - Chip Seal Removed
BP-73-12	62	2728	45.08732	-93.37473	5	No Good		Perm
BP-73-13	114	2729	45.08731	-93.37521	4.5	No Good		
BP-73-14	110	2730	45.0873	-93.37522	4.5	Moderate - Servere Ravel		
BP-73-15	56	2731	45.0873	-93.37529	5	Slight - moderate Ravel	Top 2" Moderate Ravel	Perm
BP-73-16	58	2732	45.08731	-93.3753	5.25	Chipped Top	Top 2" Moderate Ravel	Perm - Chip Seal Removed
BP-L-1	79	2733	45.0689	-93.37054	4.5	Chipped Top		Perm - Chip Seal Removed
BP-L-2	78	2734	45.06887	-93.37055	4.5	Chipped Top		
BP-L-3	98	2735	45.06854	-93.3705	4.5			Perm - Chip Seal Removed
BP-L-4	83	2736	45.06854	-93.37048	4.75			Perm
BP-L-5	124	2737	45.06829	-93.37048	4.5			Ham
BP-L-6	134	2738	45.06827	-93.3705	4.5			Ham - Chip Seal Removed
BP-L-7	135	2739	45.06813	-93.37042	4.75			Ham
BP-L-8	123	2740	45.06812	-93.37042	5			Ham - Chip Seal Removed
BP-L-9	75	2741	45.06804	-93.37046	5	Slight - Moderate Ravel	Top 2" Moderate Ravel	
BP-L-10	78	2742	45.06802	-93.37044	5			Perm
BP-L-11	70	2743	45.06792	-93.37044	6			
BP-L-12	68	2744	45.06796	-93.37045	5.5			
BP-L-13	124	2745	45.06808	-93.37044	4.75		Top 2.5" Moderate Ravel	
BP-L-14	122	2746	45.06811	-93.37045	Broke Off	No Good		
BP-L-15	66	2747	45.06842	-93.37041	5.5		Top 2.5" Moderate Ravel	
BP-L-16	72	2748	45.06842	-93.37044	5.25		Top 2" Moderate Ravel	
BP-W-1	98	2700	45.07529	-93.38113	4.25			
BP-W-2	105	2701	45.07533	-93.38116	4.5			

CORE ID	DISTANCE FROM CURB (inch)	PHOTO ID	LAT.	LONG.	CORE THICKNESS (in)	Other details	Ravel Level	Lab Notes
BP-W-3	55	2702	45.07533	-93.3811	6	No Good Top Raveled		
BP-W-4	144	2703/4	45.07534	-93.38115	5	Crack on Side		
BP-W-5	138	2705	45.07536	-93.38115	6		Moderate	
BP-W-6	88	2706	45.07537	-93.38112	4.75			
BP-W-7	86	2707	45.07543	-93.38112	4.75			Perm
BP-W-8	100	2708	45.07545	-93.38112	broken	No Good		
BP-W-9	89	2709	45.07543	-93.38109	4			
BP-W-10	138	2710	45.07553	-93.3811	4			
BP-W-11	135	2711	45.07554	-93.38111	4.5			Perm - Chip Seal Removed
BP-W-12	76	2712	45.07565	-93.38113	5.25			
BP-W-13	80	2713	45.07565	-93.38112	5			Perm
BP-W-14	98	2714	45.07574	-93.38114	4.5	Chipped Top		
BP-W-15	100	2715	45.07575	-93.38113	4.75			Perm - Chip Seal Removed
BP-W-16	96	2716	45.07579	-93.38116	4.5			
B-134-1	183	2650	44.76126	-93.2654	5.5		Top 1.5" Moderate Ravel	Ham
B-134-2	183	2651	10 feet away		5		Top 1.5" Moderate Ravel	Ham
B-134-3	173	2652	44.76124	-93.26577	5.5	Chipped Top	Top 1.5" Moderate Ravel	Perm - Chip Seal Removed
B-134-4	168	2653	10 feet away		5.25		Top 1" High - Moderate Ravel	
B-134-5	142	2654	44.76131	-93.26618	6.5		Moderate, High @ 2"	
B-134-6	142	2655	10 feet away		6		High Ravel @ 2.5"	
B-134-7	208	2656	44.76111	-93.26701	5.25	Core Barrel Marking on Top	Top 1.5" Moderate Ravel	Perm
B-134-8	208	2657	10 feet away		5.25		Top 1.5" Moderate Ravel	
B-134-9	130	2658	44.76098	-93.26761	6	No Good		
B-134-10	154	2659	10 feet away		6.5		High	
B-134-11	168	2660	44.76082	-93.26806	6		Top 1" Moderate Ravel	Perm - Chip Seal Removed
B-134-12	168	2661	10 feet away		6.75	severe raveling bottom 2/3, Chipped Top		Perm
B-134-13	205	2662	44.76073	-93.26856	6		Top 1.5" Moderate Ravel	

CORE ID	DISTANCE FROM CURB (inch)	PHOTO ID	LAT.	LONG.	CORE THICKNESS (in)	Other details	Ravel Level	Lab Notes
B-134-14	205	2663	10 feet away		6		Top 1.5" Moderate Ravel	
B-134-15	160	2664	44.76096	-93.26978	4.25	Possible Different Construction		Ham
B-134-16	160	2665	10 feet away		4	Possible Different Construction		Ham
B-H-1	Abor Ln 78		44.76486	-93.27869	3	Chipped Top	Moderate - High	
B-H-2	Mayo Dr 110		44.76518	-93.2803	3.5	Lift Line	Moderate	
B-H-3	Northern Dr 138		44.76423	-93.28109	2.5	Lift Line, Chipped Top	Moderate	Perm
B-H-4	Abor Ln 92		44.76486	-93.28234	3.5	Chipped Top	Moderate	
B-H-5	Donegal Dr center of sac		44.76547	-93.28194	3.5	No Good		
B-H-6	Pleasant Dr 115		44.7656	-93.28356	3.25		Top 1.5" High, Moderate Rest	
B-H-7	Grand 100		44.76534	-93.28476	3		Moderate	Perm - Chip Seal Removed
B-H-8	Grand 138		44.76627	-93.28479	2.5	Core Barrel Marking on Top	Moderate	
B-H-9	Grand 100		44.76714	-93.28475	2.75	Rounded Top	Moderate	
B-H-10	Herit Cir S Center of sac	2643	44.76633	-93.27958	4.25/4	A: Cracked B: ok	Moderate	
B-H-11	Herit Cir S 106	2644	44.76658	-93.2803	3		Top 1.5" High, Moderate Rest	
B-H-12	Herit Cir S 126	2645	44.76659	-93.28212	3	Chipped Top	Moderate	Perm
B-H-13	Herit Cir N 64	2646	44.76757	-93.28385	4	No Good		
B-H-14	Herit Cir N 77	2647	44.76756	-93.28137	3.5	No Good		

CORE ID	DISTANCE FROM CURB (inch)	PHOTO ID	LAT.	LONG.	CORE THICKNESS (in)	Other details	Ravel Level	Lab Notes
B-H-15	Herit Cir N 107	2648	44.7675	-93.28015	3		Top 1.5" High, Moderate Rest	
B-H-16	Herit Cir 92	2649	44.76712	-93.27862	3.25		Moderate	
B-H-17	Herit Cir 92	2649	4 feet away from 16		3		Moderate	Perm - Chip Seal Removed
B-K-1	Bryant Ave 110		44.75992	-93.29125	3.5		Top 0.5" High, Moderate Rest	Perm
B-K-2	Bryant Ave 123		44.75891	-93.2913	3.4	Chipped Top	Top 0.5" High, Moderate Rest	Perm - Chip Seal Removed
B-K-3	Bryant Ave 101		44.75788	-93.29139	3.25		Moderate	
B-K-4	Colfax 104		44.75774	-93.29266	3	Chipped Top	Moderate	
B-K-5	Colfax 78		44.75892	-93.29265	3	Chipped Top	High	
B-K-6	Colfax 48		44.75993	-93.2925	3.5		Moderate	Perm
B-K-7	Emerson 112		44.76019	-93.29412	3.5		Moderate	
B-K-8	Emerson 53		44.75954	-93.29377	3.25	Chipped Top	Moderate	
B-K-9	Fremont 77		44.75933	-93.29339	3.5	Chipped Top	Moderate	
B-K-10	Fremont 120		44.75878	-93.29481	3.25	Chipped Top	Moderate	
B-K-11	Knob Hill Ln 109		44.75994	-93.29603	2.75	Chipped Top	Moderate	
B-K-12	Knob Hill Ln 116		44.76014	-93.29677	3.25	Chipped Top	Moderate	Perm - Chip Seal Removed
B-K-13	Knob Hill Ln 112		44.76012	-93.29755	3.5	No Good		
B-K-14	Holly Ln 75		44.75829	-93.29541	3.5		Moderate	
B-K-15	Holly Ln 86		44.75829	-93.29443	3.25	Chipped Top	Moderate	

CORE ID	DISTANCE FROM CURB (inch)	PHOTO ID	LAT.	LONG.	CORE THICKNESS (in)	Other details	Ravel Level	Lab Notes
B-K-16	Holly Ln 74		44.75829	-93.29342	4.25	Chipped Top	Moderate	
CG-H-1	101	2536	44.82561	-92.94412	3		Moderate	
CG-H-2	93	2537	44.82587	-92.94413	3.5		Moderate	
CG-H-3	110	2538	44.82605	-92.94406	3		Moderate	Perm
CG-H-4	101	2539	44.82628	-92.9441	2.75		Moderate	
CG-H-5	59	2540	44.82649	-92.94407	3	Chipped Top	Moderate - High	
CG-H-6	120	2541	44.82665	-92.94411	3	Core barrel Markings on Top	Moderate	
CG-H-7	130	2542	44.82668	-92.94409	3	Core barrel Markings on Top	Moderate	
CG-H-8	93	2543	44.82705	-92.94408	3.75	Core barrel Markings on Top	Moderate - High	
CG-H-9	110	2544	44.82715	-92.94412	2.75	Chipped Top	Moderate	Perm - Chip Seal Removed
CG-H-10	72	2545	44.8269	-92.94417	3.25	Lift Line	Moderate	
CG-H-11	95	2546	44.82687	-92.94418	3.25	Rounded Top		
CG-H-12	78	2547	44.82646	-92.9442	3			Perm
CG-H-13	134	2548	44.82619	-92.94416	3	Core barrel Markings on Top		Perm - Chip Seal Removed
CG-I-1	160	2521	44.82075	-92.93758	2.75	No Good		
CG-I-2	142	2522	44.82073	-92.93755	2.75		Top 1" High, Moderate Rest	Perm
CG-I-3	82	2523	44.82078	-92.93761	3		Low	Perm - Chip Seal Removed
CG-I-4	84	2524	44.82079	-92.93761	3.25		Low	
CG-I-5	90	2519/2520	44.82086	-92.93775	3.5	Cracked on one side (HAM sample)	Top 0.25" High, Moderate Rest	
CG-I-6	118	2525	44.82101	-92.93814	3.25		Low	
CG-I-7	140	2526	44.82112	-92.93827	3.5		Top 1.5" High, Moderate Rest	
CG-I-8	50	2527	44.82122	-92.93843	4		Top 1.5" High, Moderate Rest	
CG-I-9	112	2528	44.82137	-92.93872	3.5		Top 0.25" High, Moderate Rest	
CG-I-10	88	2529	44.82152	-92.93897	3.5	Core Barrel Markings on Top	Top 0.25" High, Moderate Rest	
CG-I-11	80	2530	44.82128	-92.93864	4.25	No Good		
CG-I-12	55	2531	44.82116	-92.93843	3.75	Almost debonded	Low	

CORE ID	DISTANCE FROM CURB (inch)	PHOTO ID	LAT.	LONG.	CORE THICKNESS (in)	Other details	Ravel Level	Lab Notes
CG-I-13	88	2532	44.82107	-92.93822	3	Core Barrel Markings on Top		Perm
CG-I-14	93	2533	44.82092	-92.93806	3.75	Rounded Top	Top 0.5" Moderate, Low Rest	
CG-I-15	134	2534	44.82076	-92.93768	3.75	Rounded Top	Top 1/8" Moderate, Low Rest	
CG-I-16	112	2535	44.82068	-92.93753	3.75	Rounded Top	Low	Perm - Chip Seal Removed
CG-J-1	72	2626	44.82964	-92.91728	3.5		High	
CG-J-2	117	2627	44.82983	-92.91727	3.25		High	
CG-J-3	71	2628	44.83004	-92.91725	5.5		Top 1" High	
CG-J-4	117	2629/30	44.83018	-92.91727	3.25		High	
CG-J-5	116	2631	44.83034	-92.91724	3.75		High Ravel @ 1"	
CG-J-6	82	2632	44.83049	-92.91724	3.75		High Ravel @ 1"	Perm - Chip Seal Removed
CG-J-7	103	2633	44.83088	-92.91724	3.5	Rounded Top, Possible different mix		
CG-J-8	100	2635	44.83104	-92.91723	4		High	Perm
CG-J-9	112	2636	44.83137	-92.91727	4			
CG-J-10	80	2637	44.83143	-92.91724	4.25	Rounded Top	High Ravel @ 1"	
CG-J-11	110	2638	44.8316	-92.91723	3.5	Chipped Top		Perm - Chip Seal Removed
CG-J-12	78	2639	44.83175	-92.91721	3.5			
CG-J-13	98	2640	44.83176	-92.91737	3.5			Perm
CG-J-14	103	2641	44.83159	-92.91733	3.5		High Ravel @ 1-2"	
CG-JE-1	172		44.82842	-92.91596	3.75	8" extremely raveled		
IGH-B-1	75	2610	44.82507	-93.04418	4.25	Chipped Top	Low	
IGH-B-2	126	2611	44.82491	-93.0448	5.25	Rounded Top	Low	
IGH-B-3	60	2612	44.82484	-93.0453	5		Low	
IGH-B-4	107	2613	44.82478	-93.04596	5.5		Low	Perm - Chip Seal Removed
IGH-B-5	59	2614	44.82465	93.04664	4.5		Low	Ham - Chip Seal Removed
IGH-B-6	128	2615	44.82448	-93.04708	4.25	Chipped Top	Low	
IGH-B-7	96	2616	44.82426	-93.04741	5.25	Rounded Top	Low	Perm - Chip Seal Removed
IGH-B-8	70	2617	44.82396	-93.04767	5		Low	
IGH-B-9	118	2618	44.82349	-93.04776	4.5	Rounded Top	Low	Ham
IGH-B-10	58	2619	44.82327	-93.04777	5.5	Chipped & Rounded Top	Low	Ham
IGH-B-11	136	2620	44.82311	-93.04774	5	Chipped & Rounded Top	Low	
IGH-B-12	78	2621	44.82274	-93.04776	5.25	Chipped Top	Low	Perm
IGH-B-13	114	2622	44.82243	-93.04782	5.5	Chipped & Rounded Top	Low	Perm

CORE ID	DISTANCE FROM CURB (inch)	PHOTO ID	LAT.	LONG.	CORE THICKNESS (in)	Other details	Ravel Level	Lab Notes
IGH-B-14	68	2623	44.82227	-93.04788	6		Low	
IGH-B-15	124	2624	44.82211	-93.04791	5	Chipped & Rounded Top	Low	
IGH-B-16	52	2625	44.82198	-93.04798	3.75	Chipped Top	Low	Ham - Chip Seal Removed
O-1	120	2777	45.11086	-93.39199	4.75	Rounded Top		Ham - Chip Seal Removed
O-2	93	2778	45.11093	-93.39205	4.5	No Good		
O-3	56	2780	45.11119	-93.39204	5			
O-4	56	2781	45.1112	-93.39204	5			Perm
O-5	62	2782	45.11136	-93.39204	5.5	Chipped Top		
O-6	67	2783	45.11138	-93.39203	5.5		Top 1.5" Moderate Ravel	
O-7	100	2784	45.11155	-93.39208	4			
O-8	100	2785	45.11157	-93.39205	3.75			
O-9	52	2786	45.11163	-93.39206	5.25			Ham
O-10	53	2787	45.11163	-93.39206	5.25			Perm
O-11	102	2788	45.11175	-93.39207	4			
O-12	104	2789	45.11178	-93.39205	4.25			Perm - Chip Seal Removed
O-13	58	2790	45.11179	-93.39205	5.25			Ham
O-14	54	2791	45.11177	-93.39205	5			Ham - Chip Seal Removed
O-15	116	2792	45.11194	-93.39202	4			
O-16	118	2793	45.11189	-93.39202	4.5			Perm - Chip Seal Removed
SC-9N-1	43	2763	44.65232	-94.09159	8			
SC-9N-2	43	2764	44.65234	-94.09158	6			
SC-9N-3	58	2765	44.6524	-94.09161	8			
SC-9N-4	60	2766	44.65242	-94.09162	8		Moderate Ravel @ 2"	Perm - Chip Seal Removed
SC-9N-5	26	2767	44.6525	-94.09158	8.5			
SC-9N-6	26	2768	44.65254	-94.09159	8.5		Moderate Ravel @ 2"	Perm
SC-9N-7	48	2769	44.65262	-94.09158	8.5	Chip @ top		
SC-9N-8	52	2770	44.65266	-94.0916	9		Moderate Ravel @ 2.5"	
SC-9N-9	33	2771	44.65275	-94.09158	9.5			Perm
SC-9N-10	36	2772	44.65276	-94.09158	9			Perm - Chip Seal Removed
SC-9N-11	90	2773	44.65284	-94.0916	8			
SC-9N-12	87	2774	44.65289	-94.09159	8	Lift Line		
SC-9N-13	22	2775	44.65297	-94.09158	7.5			
SC-9N-14	19	2776	44.65301	-94.09158	7.5	Core Barrel Marking		
SC-9S-1	36	2749	44.6018	-94.0921	9.25		Low	Perm

CORE ID	DISTANCE FROM CURB (inch)	PHOTO ID	LAT.	LONG.	CORE THICKNESS (in)	Other details	Ravel Level	Lab Notes
SC-9S-2	30	2750	44.60182	-94.0921	10		Low	
SC-9S-3	46	2751	44.60195	-94.09214	9	No Good Top Broke Off		
SC-9S-4	85	2752	44.60199	-94.09213	9		Low	
SC-9S-5	23	2753	44.60221	-94.09209	8.5		Low	
SC-9S-6	23	2754	44.60223	-94.09209	10		Low	
SC-9S-7	68	2755	44.60231	-94.09211	8.25	Chipped Top	Low	
SC-9S-8	70	2756	44.60235	-94.09213	9	Chipped Top	Low	Perm - Chip Seal Removed
SC-9S-9	96	2757	44.60242	-94.09214	9.5		Low	
SC-9S-10	98	2758	44.60245	-94.09212	9.25	Chipped Top	Low	
SC-9S-11	23	2759/60	44.60259	-94.09213	6.75		Low	Perm
SC-9S-12	23	2761	44.60257	-94.09209	8.5		Low	Perm - Chip Seal Removed
SC-9S-13	18	2762	44.60265	-94.09211	8		Low	
W-B-1	116	2562	44.92165	-92.90073	3.25	Small crack on top (HAM Sample) Chipped on Top	Low	Ham
W-B-2	122	2563	44.92155	-92.90065	3.5	Chipped on Top	Low	Perm
W-B-3	114	2564	44.92151	-92.90055	3.5		Low	
W-B-4	88	2565	44.92149	-92.90059	3.5		Low	Perm - Chip Seal Removed
W-B-5	104	2566	44.92144	-92.90052	3.5	Chipped on Top	Low	Ham
W-B-6	98	2567	44.92139	-92.90045	3	Chipped & Rounded on Top	Low	
W-B-7	105	2568	44.92136	-92.90038	3.25		Low	Ham - Chip Seal Removed
W-B-8	78	2569	44.92131	-92.90029	3.5		Low	Ham - Chip Seal Removed
W-B-9	92	2570	44.92125	-92.90021	3.75		Low	Perm - Chip Seal Removed
W-B-10	67	2571	44.92127	-92.90017	3.5	Chipped on Top	Low	
W-B-11	85	2572	44.9214	-92.90035	3.75	Chipped on Top	Top 1" moderate Rest Low	
W-B-12	63	2573	44.92145	-92.90044	3.75		Low	
W-B-13	64	2574	44.9215	-92.90048	4		Low	
W-B-14	79	2575	44.92154	-92.90054	4		Low	Perm
W-B-15	74	2576	44.92166	-92.90065	3.75		Low	
W-B-16	70	2577	44.92171	-92.90071	3.5	Chipped & Rounded on Top	Top 1.5" moderate Rest Low	
W-NA-C-1	Middle of Circle	2578	44.89251	-92.95605	3.25		Low	
W-NA-C-2	185	2579	44.8926	-92.95605	3.25	Chipped Top	Low	

CORE ID	DISTANCE FROM CURB (inch)	PHOTO ID	LAT.	LONG.	CORE THICKNESS (in)	Other details	Ravel Level	Lab Notes
W-NA-C-3	360	2580	44.89255	-92.95609	2.5	Chipped Top	Low	
W-NA-C-4	105	2581	44.89252	-92.95612	4		Low	Perm Tested(12/5), No water level movement @ 20 min
W-NA-C-5	158	2582	44.89251	-92.95616	3.5	Core Barrel Moved creating a ring on top	Low	Perm Tested(12/5), No water level movement @ 20 min
W-NA-C-6	173	2583	44.89248	-92.95617	4		Low	
W-NA-C-7	200	2584	44.89248	-92.95621	3.5		Low	
W-NA-C-8	287	2585	44.89246	-92.95616	3		Low	
W-NA-C-9	312	2586	44.89245	-92.95615	3		Low	
W-NA-C-10	208	2587	44.89242	-92.95613	3		Low	
W-NA-C-11	336	2588	44.89242	-92.95609	3		Low	
W-NA-C-12	336	2589	44.89244	-92.95602	4		Low	Hamburg Sample
W-NA-C-13	270	2590	44.89244	-92.95603	3.25		Low	
W-NA-C-14	251	2591	44.89249	-92.95598	4		Low	Hamburg Sample
W-NA-C-15	190	2592	44.89255	-92.95604	3		Low	
W-NA-C-16	120	2593	44.89256	-92.95602	3.5		Low	
W-NA-S-1	92	2594	44.89271	-92.95601	3.5		Low	Chip seal removed by saw, Perm Tested(12/5), No water level movement @ 20 min
W-NA-S-2	94	2595	44.89272	-92.95603	3.25	Rounded Top Edges	Low	
W-NA-S-3	88	2596	44.89277	-92.95604	3.25		Low	
W-NA-S-4	70	2597	44.89287	-92.95602	3	Chipped Top	Low	
W-NA-S-5	62	2598	44.8929	-92.95599	3.25	Chipped Top, Bit Marking on Top	Low	

CORE ID	DISTANCE FROM CURB (inch)	PHOTO ID	LAT.	LONG.	CORE THICKNESS (in)	Other details	Ravel Level	Lab Notes
W-NA-S-6	63	2599	44.89293	-92.95602	3.5	Chipped Top	Low	
W-NA-S-7	86	2600	44.89304	-92.95605	3	Chipped Top	Low	
W-NA-S-8	93	2601	44.89303	-92.95605	3.25	Rounded Top Edges, Bit Markings on Surface	Low	
W-NA-S-9	70	2602	44.89315	-92.95607	4.5	Chipped Top	Low	Chip seal removed by saw, Perm Tested(12/5), No water level movement @ 20 min
W-NA-S-10	147	2603	44.89305	-92.95608	3.5	Rounded Top Edges	Low	Perm Tested(12/5), No water level movement @ 20 min
W-NA-S-11	168	2604	44.89277	-92.95607	4		Low	Hamburg Sample
W-NA-S-12	132	2605	44.89275	-92.95605	3.5	Chipped & Rounded Top	Low	Hamburg Sample
W-NA-S-13	124	2606	44.8927	-92.95609	3.5		Low	Perm Tested(12/5), No water level movement @ 20 min
W-NA-S-14	180	2607	44.89265	-92.95606	3.5		Low	Hamburg Sample Chip seal removed with saw
W-NA-S-15	130	2608	44.8926	-92.95607	3.5	Chipped & Rounded Top	Low	Hamburg Sample Chip seal removed with saw
W-NA-S-16	91	2609	44.89257	-92.95611	3.25	Chipped & Rounded Top	Low	

APPENDIX B

MIX TESTING AND PROPERTIES

Project Road	Year	Mix	Extracted A/C	Gradation Sieves											
				3/4"	1/2"	3/8"	#4	#8	#10	#16	#30	#40	#50	#100	#200
Blaine - 93rd Ave East End	1994	2340/41A wear	5.3	100	99	91	70	56		46	34		17	8	4.4
Blaine - 93rd Ave West End	1995	2340/41A wear	4.8	100	99	95	81	69		56	39		19	9	5.0
Brooklyn Park - 73rd Ave	1998	2340/41 wear	4.2	100	98	93	71	57		48	32		12	3	1.9
Brooklyn Park - Louisiana Ave	1995	2340/41 wear	5.5	100	100	97	79	66		53	38		21	10	5.6
Brooklyn Park - Winnetka Ave	1995	2340/41 Wear	5.8	100	100	969	73	58		45	29		14	6	3.8
Burnsville - 134th St	2005	2350 MV3-B	4.9	100	95	88	69	56		44	29		12	6	4.1
Burnsville - Heritage Cir Area	1994	2331-31/41	5.0	100	100	97	72	56		43	27		13	6	3.8
Burnsville - Knob Hill Area	1996	2331-31/41	5.1	100	100	98	77	62		48	31		14	7	5.1
Cottage Grove - Hyde Ave S	1996	2340/41B wear	4.6	100	93	83	67	54		40	24		11	6	4.4
Cottage Grove - Ingberg Trail	1995	2341	4.9	100	91	83	72	63		56	45		25	10	5.2
Cottage Grove - Jensen Ave	1986	2340/41B wear	4.4	100	93	85	68	54		45	34		19	9	5.4
Inver Grove Heights - Brooks Blvd	2009	MVWE3503 5B R	4.6	100	97	90	74	59		47	34		18	8	3.8
Osseo - 8th Ave	1992		4.8	100	99	96	78	61		46	30		14	7	3.6
Sibley County - CSAH 9 North Portion	1996	31B Wear	5.4	100	97	93	77	60		46	32		13	6	4.1
Sibley County - CSAH 9 South Portion	1997	31B Wear	5.6	100	96	92	74	57		43	30		14	11	8.5
Woodbury - Bridgewater	1998	41 Wear	4.9	100	93	86	74	64		54	41		22	10	5.2
Woodbury - Newbury Alcove Cul de sac	1998	41B Wear	5.0	100	91	83	62	47		35	24		11	6	2.9
Woodbury - Newbury Alcove Striaght Portion	1995	41B Wear	4.7	100	94	90	70	54		42	29		14	7	4.3

Project Road	SpG	SpG -#4	Core Gmm	Core Gmb	Core Air Voids	Core VMA	Core AFT	Core VFA	TSR 7% Air Voids	TSR 11% Air Voids	Perm Test
Blaine - 93rd Ave East End	2.684	2.684	2.474	154.1	2.400	3.0	15.3	9.0	80.5	76.0	67.0
Blaine - 93rd Ave West End	2.652	2.652	2.468	153.8	2.302	6.7	17.4	7.3	61.3	69.0	61.0
Brooklyn Park - 73rd Ave	2.658	2.658	2.493	155.3	2.284	8.4	17.7	9.2	52.6	70.0	65.0
Brooklyn Park - Louisiana Ave	2.668	2.668	2.455	152.9	2.337	4.8	17.2	8.2	72.1	77.0	74.0
Brooklyn Park - Winnetka Ave	2.697	2.697	2.466	153.6	2.404	2.5	16.0	10.9	84.3	93.0	87.0
Burnsville - 134th St	2.698	2.698	2.502	155.9	2.327	7.0	18.0	9.1	61.1	79.0	70.0
Burnsville - Heritage Cir Area	2.667	2.667	2.471	153.9	2.292	7.2	18.4	9.7	60.5	75.0	66.0
Burnsville - Knob Hill Area	2.683	2.683	2.480	154.5	2.281	8.0	19.3	8.7	58.5	70.0	65.0
Cottage Grove - Hyde Ave S	2.672	2.672	2.491	155.2	2.335	6.3	16.6	8.9	62.3	77.0	70.0
Cottage Grove - Ingberg Trail	2.698	2.698	2.502	155.9	2.314	7.5	18.4	7.1	59.2	73.0	66.0
Cottage Grove - Jensen Ave	2.697	2.697	2.518	156.9	2.325	7.7	17.6	7.0	56.4	65.0	51.0
Inver Grove Heights - Brooks Blvd	2.671	2.671	2.489	155.1	2.376	4.5	15.1	7.9	70.0	76.0	63.0
Osseo - 8th Ave	2.679	2.679	2.491	155.2	2.311	7.2	17.9	8.7	59.6	81.0	76.0
Sibley County - CSAH 9 North Portion	2.622	2.622	2.423	151.0	2.285	5.7	17.6	9.7	67.6	78.0	69.0
Sibley County - CSAH 9 South Portion	2.623	2.623	2.417	150.6	2.323	3.9	16.4	8.2	76.3	84.0	78.0
Woodbury - Bridgewater	2.700	2.700	2.503	155.9	2.382	4.8	16.1	7.3	70.0	91.0	69.0
Woodbury - Newbury Alcove Cul de sac	2.699	2.699	2.499	155.7	2.465	1.4	13.2	11.0	89.7	97.0	78.0
Woodbury - Newbury Alcove Striaght Portion	2.671	2.671	2.485	154.8	2.433	2.1	13.2	8.5	84.1	76.0	65.0

APPENDIX C

FRACTURE ENERGY TESTING

AMERICAN ENGINEERING TESTING, INC.

American Engineering Testing, Inc.
Saint Paul
550 Cleveland Ave N
St. Paul, MN 55114
Toll Free: (800)972-6364
www.amengtest.com

Disk-Shaped Compact Tension Test Report

Client: LRRB **CC:**

Project: 27-00006
LRRB Asphalt Stripping Study

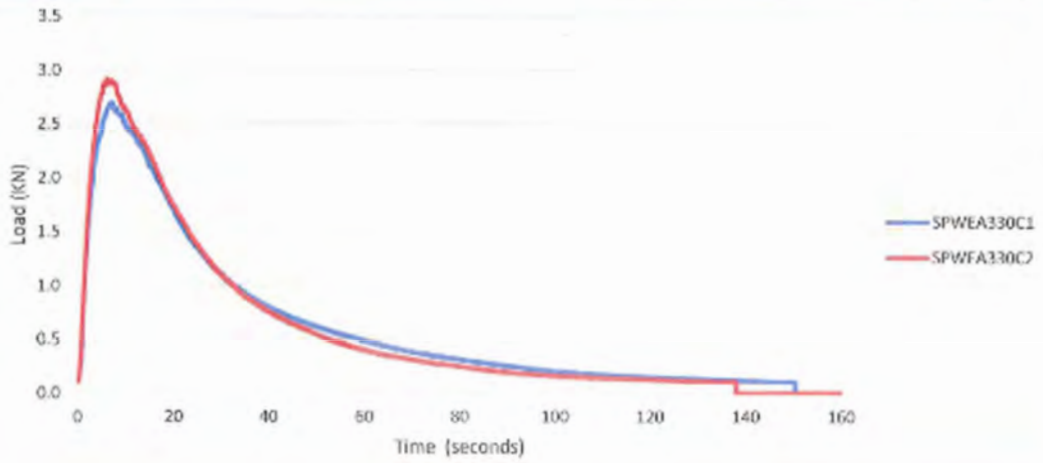
This document shall not be reproduced except in full without the written approval of the American Engineering Testing, Inc.

Date of
Reviewed By:

Sample Information

Asphalt Mixture Type: SPWEA330C Testing Temperature: -24.0 C

Time vs. Load



Specimen Information

ID	Air Voids	Thickness	Ligament	Peak Load	Actual Slope	Fracture Energy	Area Under the Curve	Length of Test
	%	mm	mm	kN	mm/s	J/m²	Nmm	s
SPWEA330 C1		49.88	80.10	2.70	0.017	412.53	1648.21	150.40
SPWEA330 C2		49.75	80.78	2.92	0.017	394.79	1586.60	138.16

Average Fracture Energy: 403.66 J/m² †
Standard Deviation: 12.54 J/m²

Tested By	Remarks

American Engineering Testing, Inc.
Saint Paul
550 Cleveland Ave N
St. Paul, MN 55114
TOLL Free: (800)972-6364
www.aeengtest.com

Disk-Shaped Compact Tension Test Report

Client: LRRB CC:

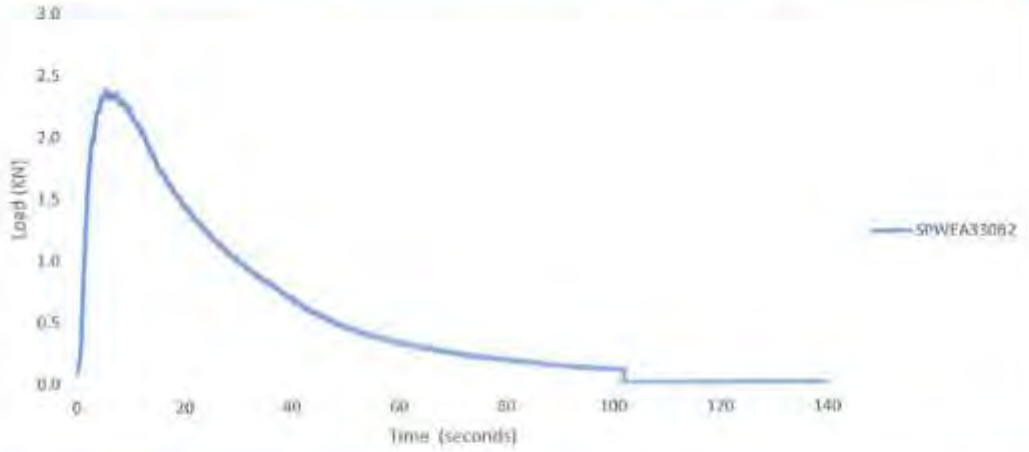
Project: 27-00006
LRRB Asphalt Stripping Study

Date of
Reviewed By

Sample Information

Asphalt Mixture Type: SPWEA330B Testing Temperature: -18.0 C

Time vs. Load



Specimen Information

ID	Air Voids	Thickness	Ligament	Peak Load	Actual Slope	Fracture Energy	Area Under the Curve	Length of Test
	%	mm	mm	kN	mm/s	J/m²	Nmm	s
SPWEA330B2		49.91	79.28	2.39	0.017	322.30	1275.31	102.20

Average Fracture Energy: 322.30 J/m² †
Standard Deviation: N/A J/m²

Tested By	Remarks

American Engineering Testing, Inc.
Saint Paul
550 Cleveland Ave N
St. Paul, MN 55114
Toll Free: (800)972-6364
www.amengtest.com

Disk-Shaped Compact Tension Test Report

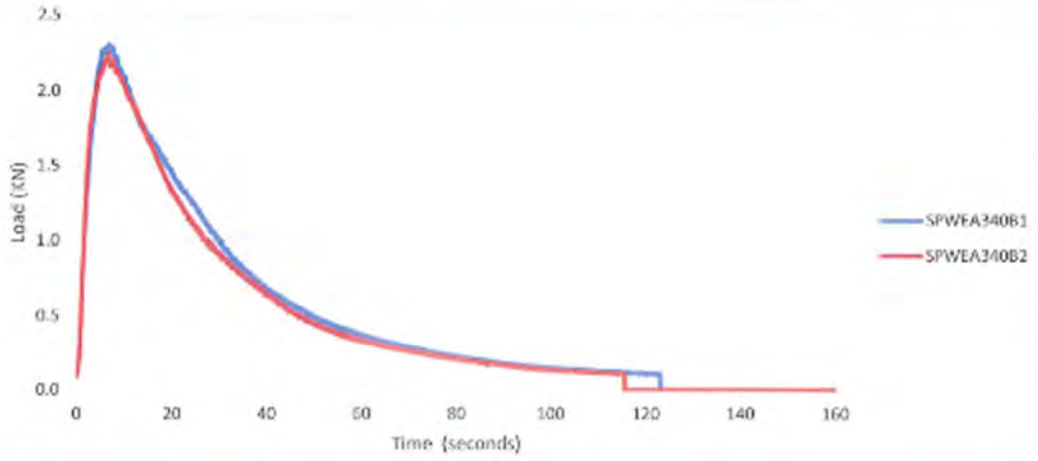
Client: LRRB CC:
Project: 27-00006
LRRB Asphalt Stripping Study

Date of
Reviewed By:

Sample Information

Asphalt Mixture Type: SPWEA340B Testing Temperature: -18.0 C

Time vs. Load



Specimen Information

ID	Air Voids	Thickness	Ligament	Peak Load	Actual Slope	Fracture Energy	Area Under the Curve	Length of Test
	%	mm	mm	kN	mm/s	J/m²	Nmm	s
SPWEA340 B1		49.72	79.24	2.31	0.017	335.30	1321.02	123.28
SPWEA340 B2		50.00	78.88	2.25	0.017	314.06	1238.65	115.76

Average Fracture Energy: 324.68 J/m²
Standard Deviation: 15.02 J/m²

Tested By	Remarks

American Engineering Testing, Inc.
Saint Paul
550 Cleveland Ave N
St. Paul, MN 55114
Toll Free: (800)972-6364
www.aetgtest.com

Disk-Shaped Compact Tension Test Report

Client: LRRB CC:

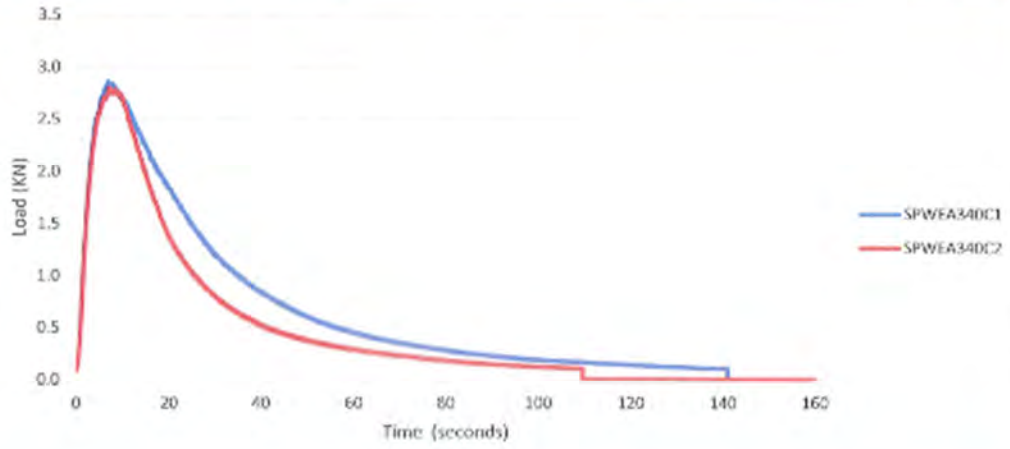
Project: 27-00006
LRRB Asphalt Stripping Study

Date of
Reviewed By:

Sample Information

Asphalt Mixture Type: SPWEA340C Testing Temperature: -24.0 C

Time vs. Load



Specimen Information

ID	Air Voids	Thickness	Ligament	Peak Load	Actual Slope	Fracture Energy	Area Under the Curve	Length of Test
	%	mm	mm	kN	mm/s	J/m²	Nmm	s
SPWEA340 C1		49.88	80.22	2.86	0.017	420.32	1681.86	141.18
SPWEA340 C2		49.88	79.59	2.80	0.017	318.88	1265.93	109.68

Average Fracture Energy: 369.60 J/m²
Standard Deviation: 71.73 J/m²

Tested By	Remarks

APPENDIX D

LAB PERMEABILITY TESTING

Location	Permeability (10-5 cm/sec)	Sample 1	Sample 2	Sample 3	Sample 4	Average
Blaine - 93rd Ave East End	K=	0.9	0.0	2.3	0.1	0.8
	K20=	0.6	0.0	1.7	0.0	0.6
Blaine - 93rd Ave West End	K=	1.5	0.5	-	-	1.0
	K20=	1.1	0.4	-	-	0.8
Brooklyn Park 73rd Ave	K=	1.0	9.4	12.5	19.9	10.7
	K20=	0.7	6.8	9.1	14.4	7.8
Brooklyn Park - Louisiana Ave	K=	0.0	0.0	0.0	0.0	0.0
	K20=	0.0	0.0	0.0	0.0	0.0
Brooklyn Park - Winnetka Ave	K=	0.0	0.0	0.1	0.0	0.0
	K20=	0.0	0.0	0.0	0.0	0.0
Burnsville - 134th St	K=	9.8	1.2	1.5	0.1	3.1
	K20=	7.1	0.9	1.1	0.1	2.3
Burnsville - Heritage Cir Area	K=	0.1	0.1	1.2	0.3	0.4
	K20=	0.0	0.1	0.9	0.2	0.3
Burnsville - Knob Hill Area	K=	0.0	0.9	0.3	0.3	0.4
	K20=	0.0	0.7	0.2	0.2	0.3
Cottage Grove - Hyde Ave S	K=	0.0	0.5	0.1	0.5	0.2
	K20=	0.0	0.3	0.0	0.3	0.2
Cottage Grove - Ingberg Trl S	K=	12.7	0.1	1.3	0.0	3.5
	K20=	9.2	0.0	1.0	0.0	2.5
Cottage Grove - Jensen Ave	K=	3.7	0.0	0.1	23.7	6.9
	K20=	2.7	0.0	0.1	17.2	5.0
Inver Grove Heights - Brooks Blvd	K=	0.0	0.0	0.0	0.0	0.0
	K20=	0.0	0.0	0.0	0.0	0.0
Osseo 8th Ave SE	K=	0.0	4.2	11.9	0.0	4.0
	K20=	0.0	3.1	8.6	0.0	2.9
Sibley County CSAH 9 North Portion	K=	0.0	0.0	0.2	0.0	0.0
	K20=	0.0	0.0	0.1	0.0	0.0
Sibley County CSAH 9 South Portion	K=	0.0	0.0	0.1	0.0	0.0
	K20=	0.0	0.0	0.0	0.0	0.0
Woodbury - Bridgewater	K=	1.0	0.0	0.0	0.0	0.3
	K20=	0.8	0.0	0.0	0.0	0.2
Woodbury - Newbury Alcove Cul de sac	K=	0.0	0.0	-	-	0.0
	K20=	0.0	0.0	-	-	0.0
Woodbury - Newbury Alcove Straight Portion	K=	0.0	0.0	0.0	0.0	0.0
	K20=	0.0	0.0	0.0	0.0	0.0

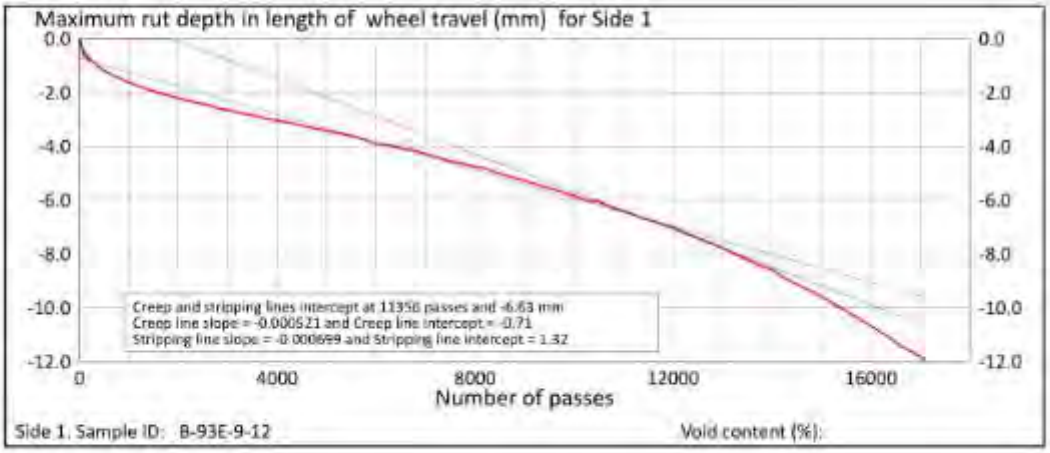
APPENDIX E

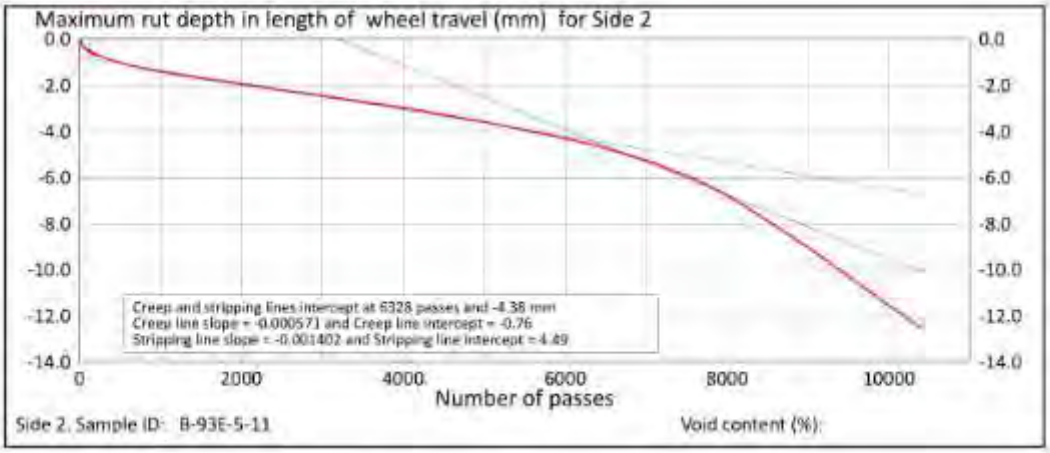
HAMBURG TEST DATA

Hamburg Wheel-Tracker Test Results

AASHTO 324 (Modified)
Date/time of test: 12/29/2014 6:56 AM
Lab. No.: B-93E
Project name: LRRB Study
Submitted by:

Date sampled:
Job No.:
Project No.:
Project Engineer.:





Rut depths (mm)		
Pass No.	Side 1	Side 2
5000	-3.42	-3.57
10000	-5.83	-11.54
15000	-9.55	
10384		-12.51
17102	-11.98	

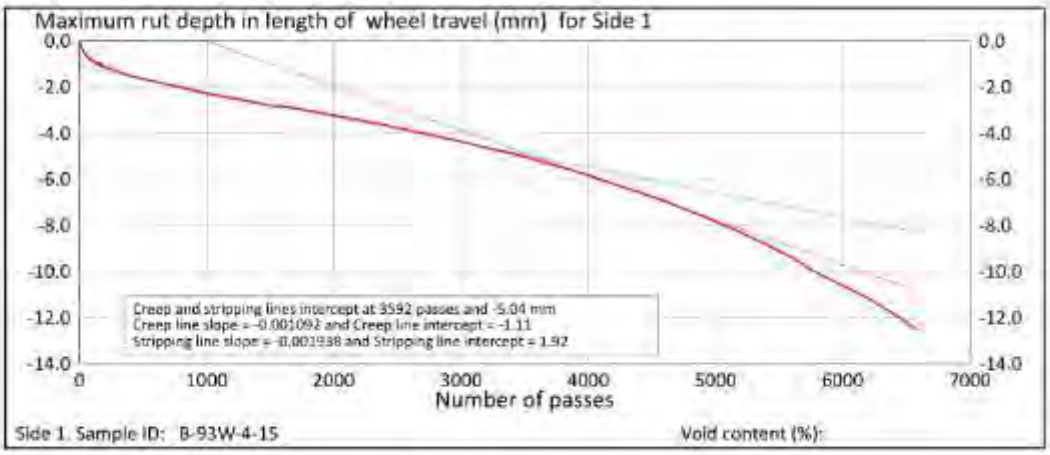
Mix type:
Asphalt grade:
Mix source:
Test temperature (°C): 50.0
Mix depth (mm): 60.0

Signature .....

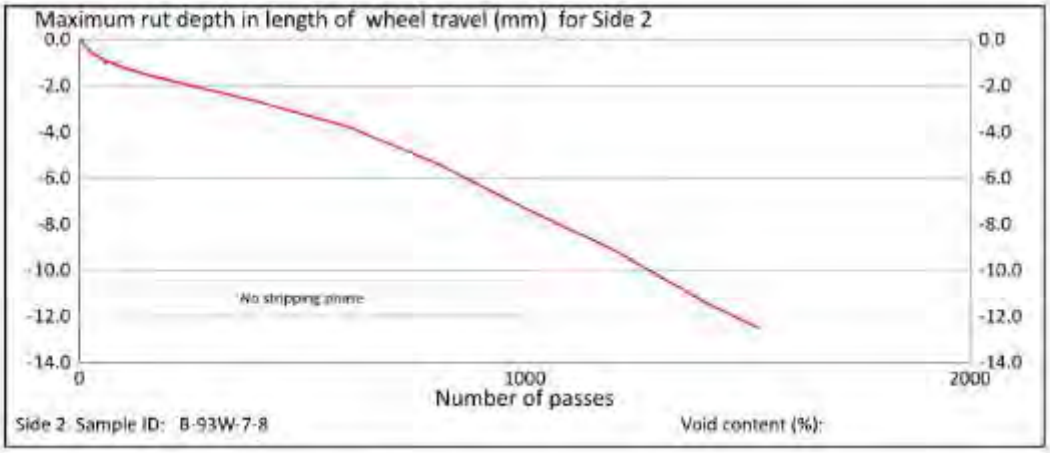
Hamburg Wheel-Tracker Test Results

AASHTO 324 (Modified)
Date/time of test: 12/23/2014 7:10 Al
Lab. No.: B-93W
Project name: LRRB Study
Submitted by:

Date sampled:
Job No.:
Project No.:
Project Engineer.:



Side 1 Sample ID: B-93W-4-15 Void content (%):



Side 2 Sample ID: B-93W-7-8 Void content (%):

Rut depths (mm)		
Pass No.	Side 1	Side 2
5000	-7.82	
1526		-12.53
6586	-12.52	

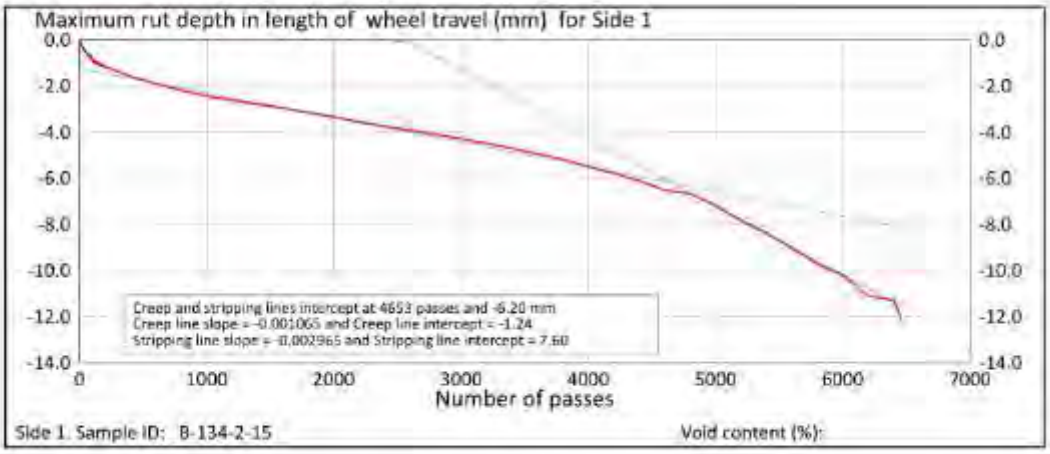
Mix type:
Asphalt grade:
Mix source:
Test temperature (°C): 50.0
Mix depth (mm): 60.0

Signature .....

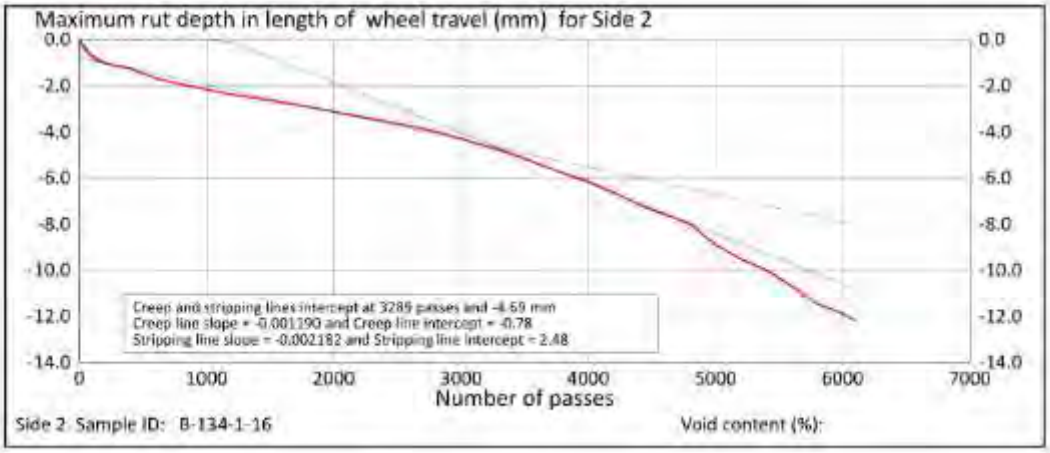
Hamburg Wheel-Tracker Test Results

AASHTO 324 (Modified)
Date/time of test: 12/22/2014 7:27 Al
Lab. No.: B-134
Project name: LRRB Study
Submitted by:

Date sampled:
Job No.:
Project No.:
Project Engineer.:



Side 1 Sample ID: B-134-2-15 Void content (%):



Side 2 Sample ID: B-134-1-16 Void content (%):

Rut depths (mm)		
Pass No.	Side 1	Side 2
5000	-7.17	-8.9
6090		-12.18
6460	-12.11	

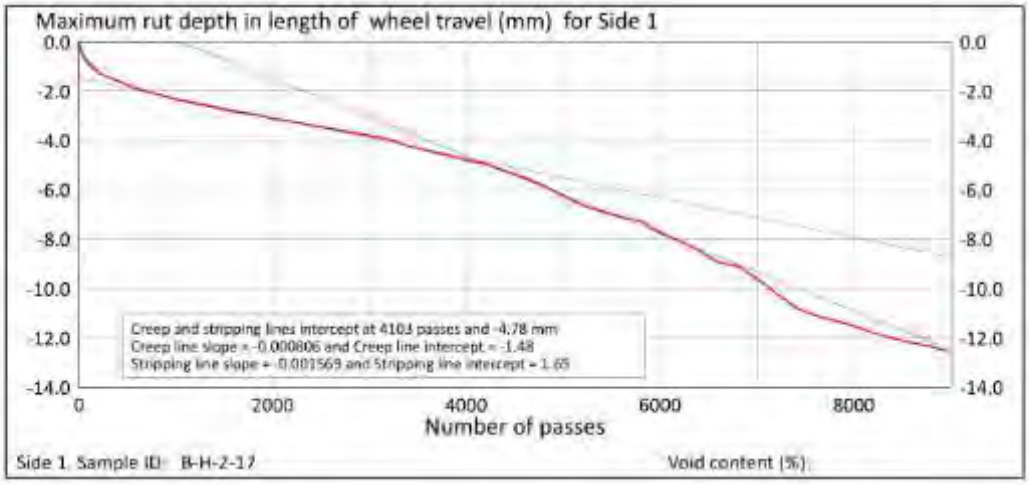
Mix type:
Asphalt grade:
Mix source:
Test temperature (°C): 50.0
Mix depth (mm): 60.0

Signature .....

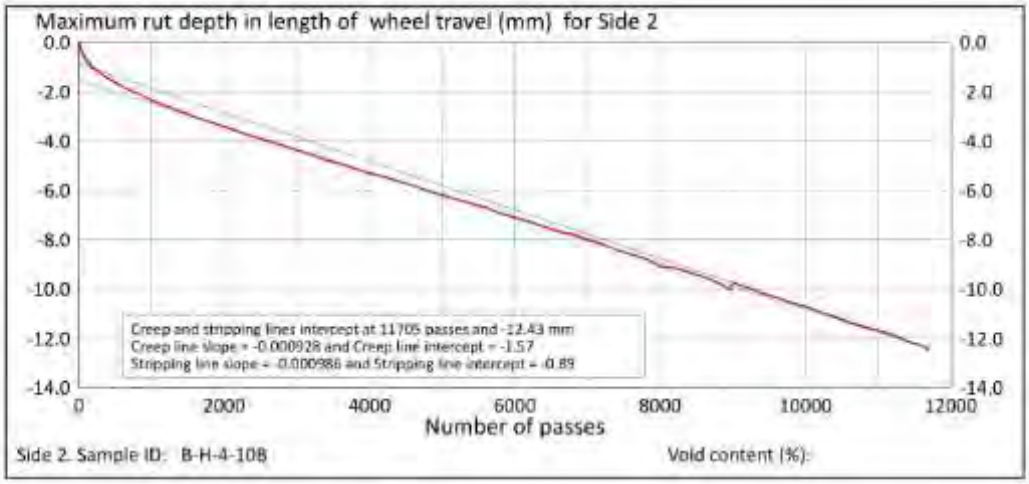
Hamburg Wheel-Tracker Test Results

AASHTO 324 (Modified)
Date/time of test: 1/7/2015 6:39 AM
Lab. No.: B-H
Project name: LRRB Study
Submitted by:

Date sampled:
Job No.:
Project No.:
Project Engineer:



Side 1. Sample ID: B-H-2-17 Void content (%):



Side 2. Sample ID: B-H-4-10B Void content (%):

Rut depths (mm)		
Pass No.	Side 1	Side 2
5000	-6.25	-6.2
10000		-10.72
8968	-12.53	
11696		-12.51

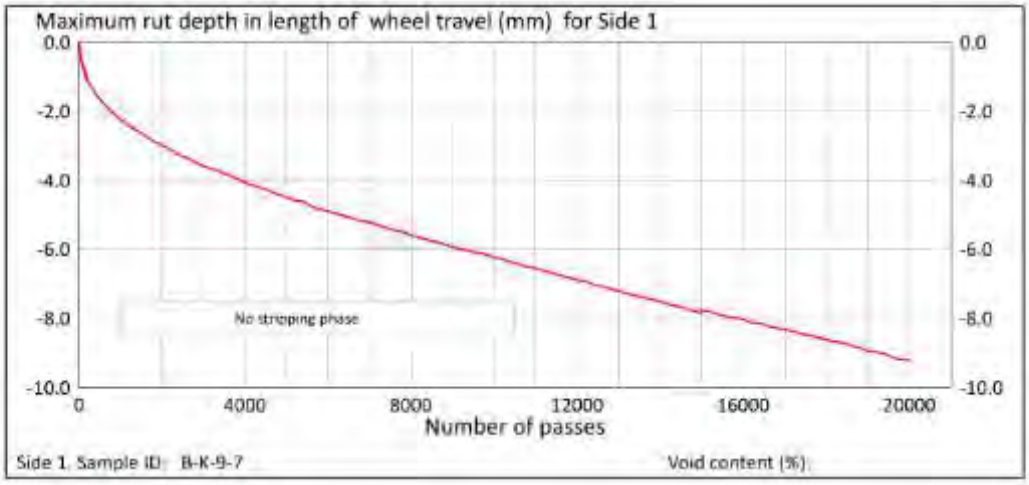
Mix type:
Asphalt grade:
Mix source:
Test temperature (°C): 50.0
Mix depth (mm): 60.0

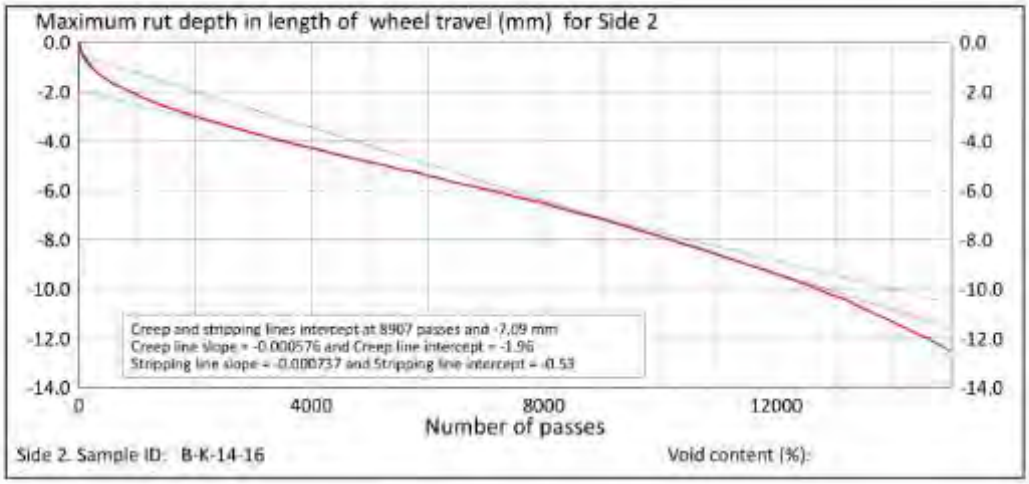
Signature .....

Hamburg Wheel-Tracker Test Results

AASHTO 324 (Modified)
Date/time of test: 1/6/2015 9:12 AM
Lab. No.: B-K
Project name: LRRB Study
Submitted by:

Date sampled:
Job No.:
Project No.:
Project Engineer:





Rut depths (mm)		
Pass No.	Side 1	Side 2
5000	-4.5	-4.87
10000	-6.25	-7.87
15000	-7.76	
20000	-9.22	
14976		-12.56

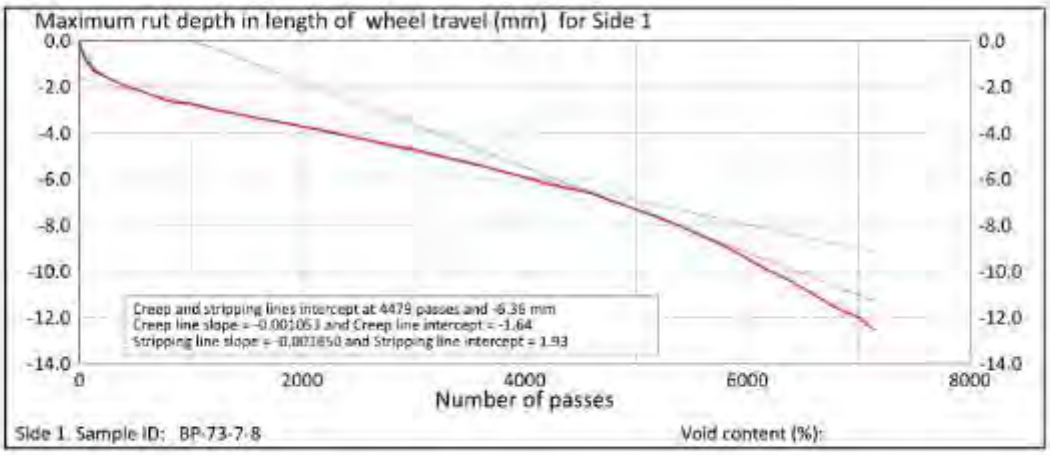
Mix type:
Asphalt grade:
Mix source:
Test temperature (°C): 50.0
Mix depth (mm): 60.0

Signature .....

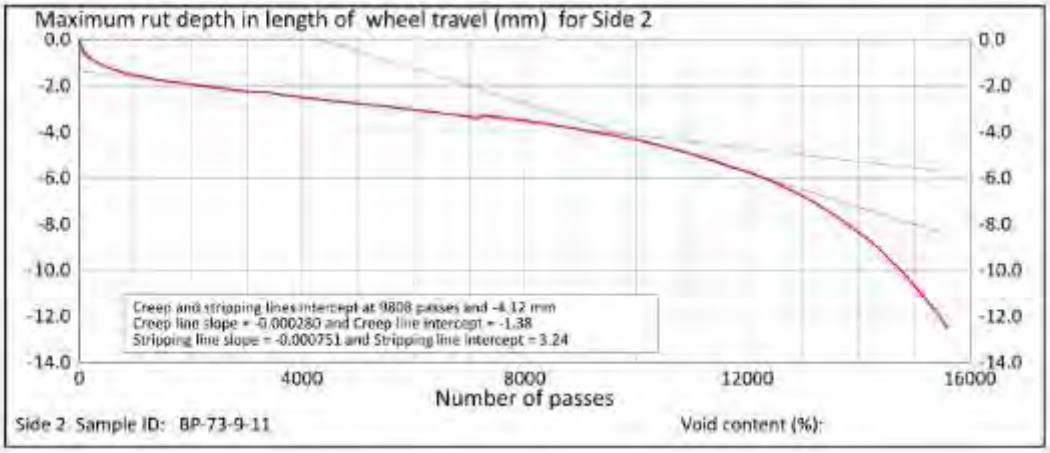
Hamburg Wheel-Tracker Test Results

AASHTO 324 (Modified)
Date/time of test: 12/22/2014 12:15 Pf
Lab. No.: BP-73
Project name: LRRB Study
Submitted by:

Date sampled:
Job No.:
Project No.:
Project Engineer.:



Side 1 Sample ID: BP-73-7-8 Void content (%):



Side 2 Sample ID: BP-73-9-11 Void content (%):

Rut depths (mm)		
Pass No.	Side 1	Side 2
5000	-7.31	-2.79
10000		-4.36
15000		-10.69
7134	-12.51	
15590		-12.5

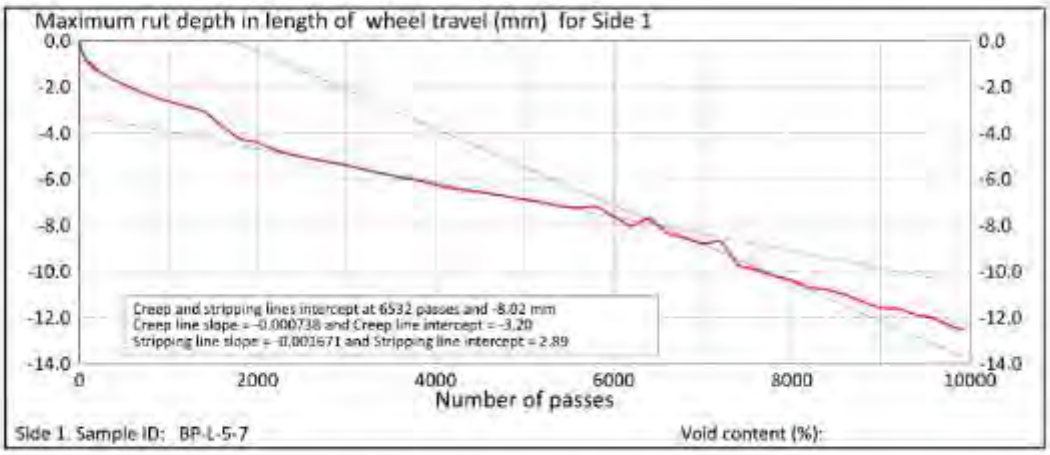
Mix type:
Asphalt grade:
Mix source:
Test temperature (°C): 50.0
Mix depth (mm): 60.0

Signature .....

Hamburg Wheel-Tracker Test Results

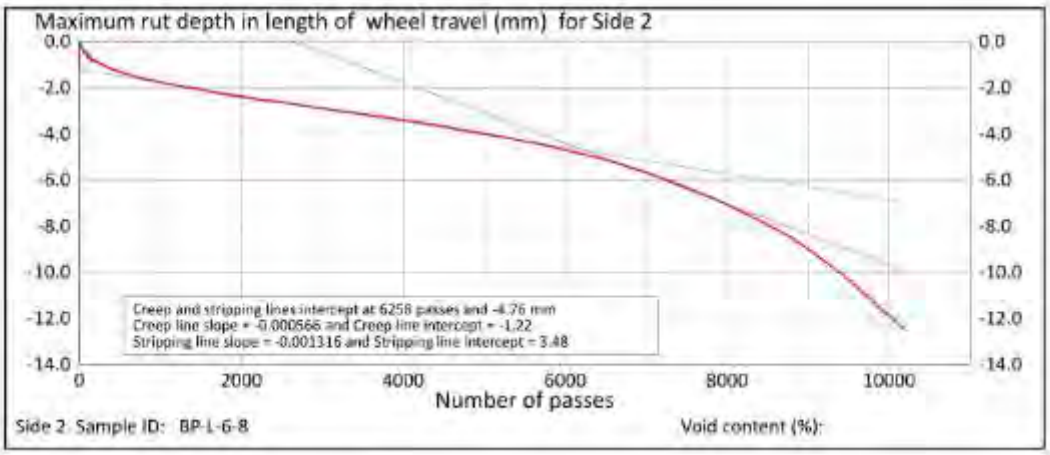
AASHTO 324 (Modified)
Date/time of test: 12/17/2014 4:25 PM
Lab. No.: BP-L
Project name: LRRB Study
Submitted by:

Date sampled:
Job No.:
Project No.:
Project Engineer.:



Side 1 Sample ID: BP-L-5-7

Void content (%):



Side 2 Sample ID: BP-L-6-8

Void content (%):

Rut depths (mm)		
Pass No.	Side 1	Side 2
5000	-6.87	-4.01
10000		-11.86
9936	-12.5	
10194		-12.51

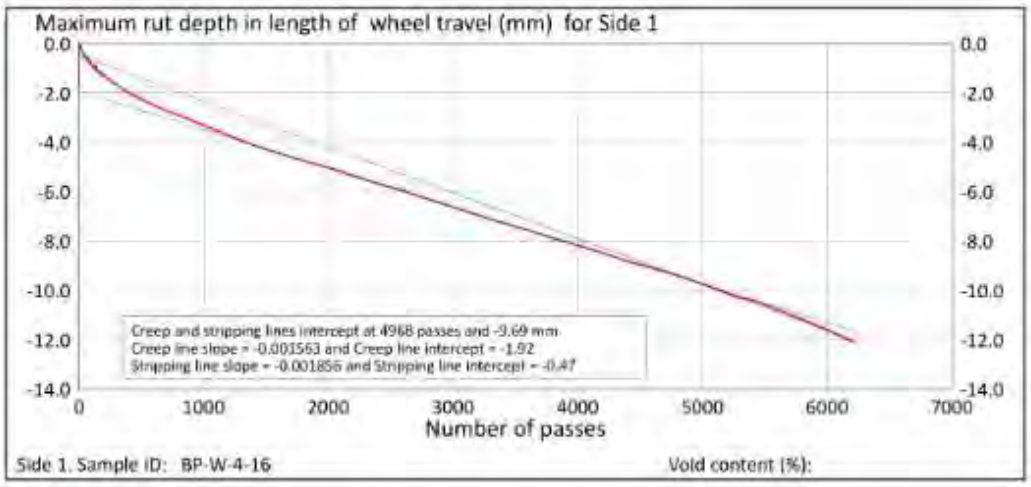
Mix type:
Asphalt grade:
Mix source:
Test temperature (°C): 50.0
Mix depth (mm): 60.0

Signature .....

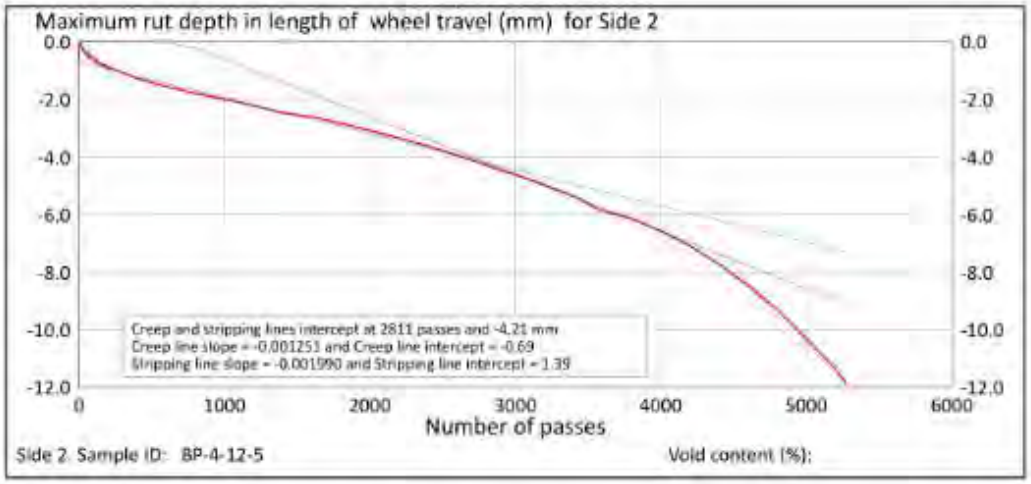
Hamburg Wheel-Tracker Test Results

AASHTO 324 (Modified)
Date/time of test: 1/7/2015 1:05 PM
Lab. No.: BP-W
Project name: LRRB Study
Submitted by:

Date sampled:
Job No.:
Project No.:
Project Engineer.:



Side 1. Sample ID: BP-W-4-16 Void content (%):



Side 2. Sample ID: BP-4-12-5 Void content (%):

Rut depths (mm)		
Pass No.	Side 1	Side 2
5000	-9.74	-10.32
5272		-11.85
6220	-12.11	

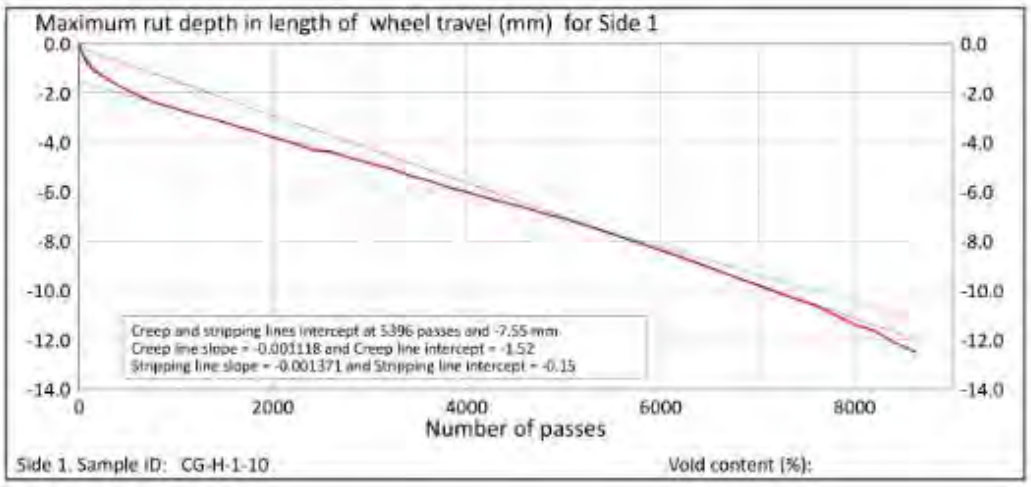
Mix type:
Asphalt grade:
Mix source:
Test temperature (°C): 50.0
Mix depth (mm): 60.0

Signature .....

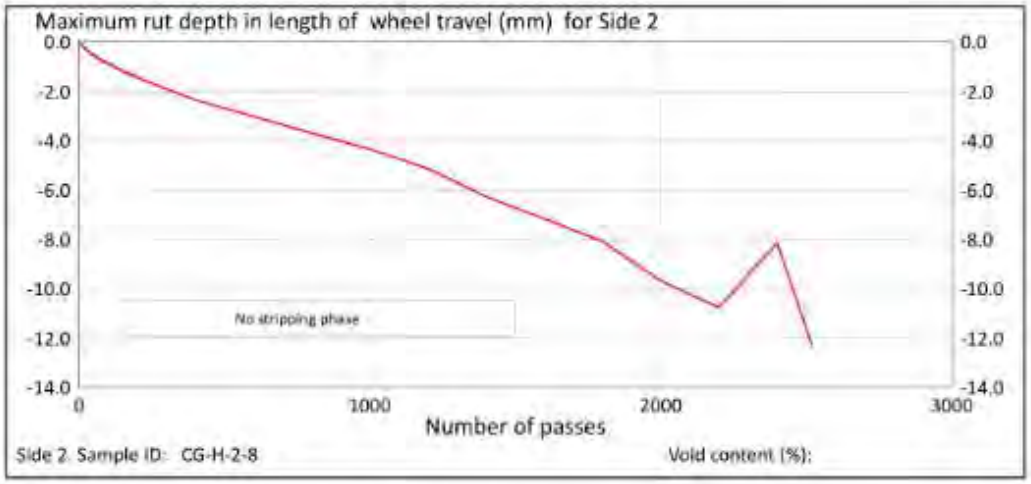
Hamburg Wheel-Tracker Test Results

AASHTO 324 (Modified)
Date/time of test: 1/5/2015 1:56 PM
Lab. No.: CG-H
Project name: LRRB Study
Submitted by:

Date sampled:
Job No.:
Project No.:
Project Engineer.:



Side 1. Sample ID: CG-H-1-10 Void content (%):



Side 2. Sample ID: CG-H-2-8 Void content (%):

Rut depths (mm)		
Pass No.	Side 1	Side 2
5000	-7.09	
2518		-12.25
8626	-12.5	

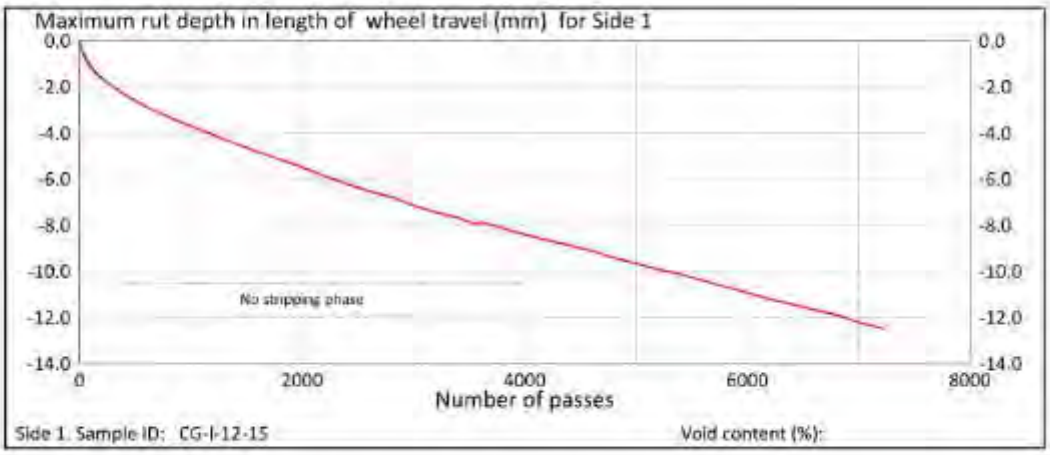
Mix type:
Asphalt grade:
Mix source:
Test temperature (°C): 50.0
Mix depth (mm): 60.0

Signature .....

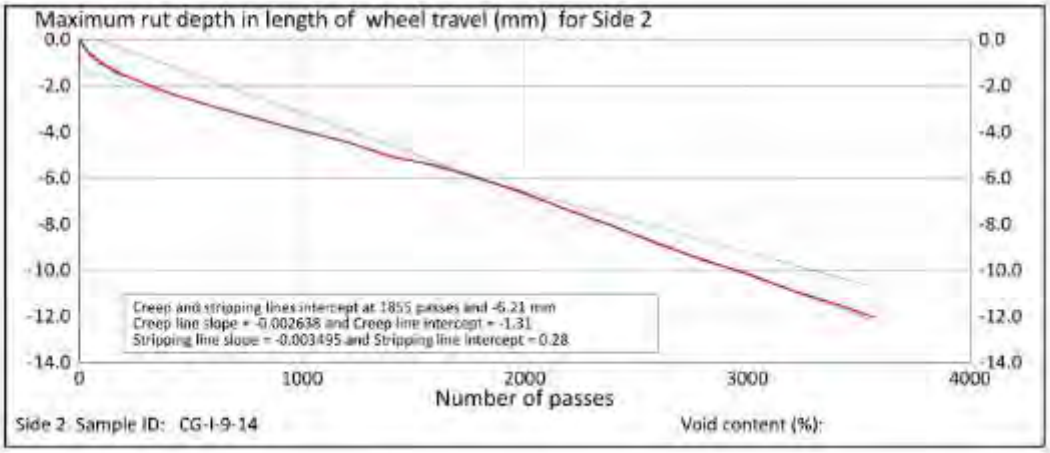
Hamburg Wheel-Tracker Test Results

AASHTO 324 (Modified)
Date/time of test: 12/30/2014 7:02 Af
Lab. No.: CG-I
Project name: LRRB Study
Submitted by

Date sampled:
Job No.:
Project No.:
Project Engineer.:



Side 1. Sample ID: CG-I-12-15 Void content (%):



Side 2. Sample ID: CG-I-9-14 Void content (%):

Rut depths (mm)		
Pass No.	Side 1	Side 2
5000	-9.65	
3564		-12.04
7224	-12.53	

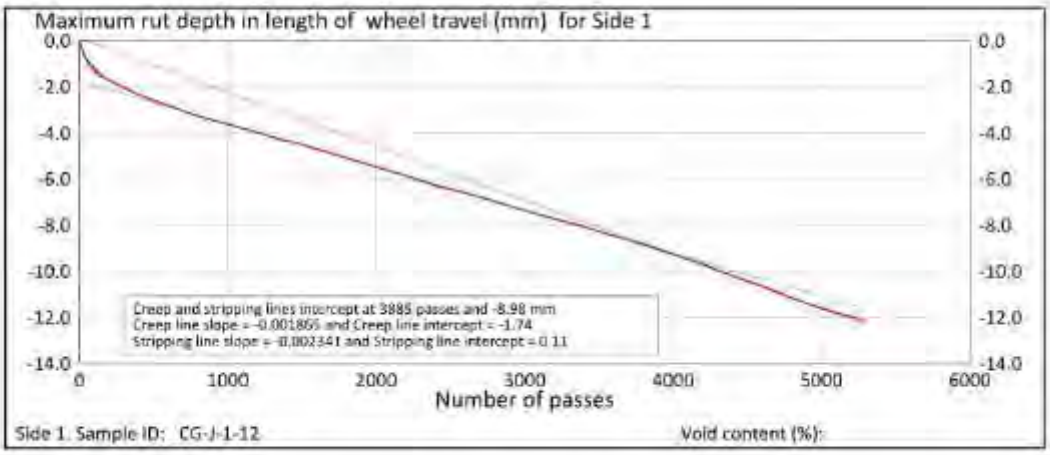
Mix type:
Asphalt grade:
Mix source:
Test temperature (°C): 50.0
Mix depth (mm): 60.0

Signature .....

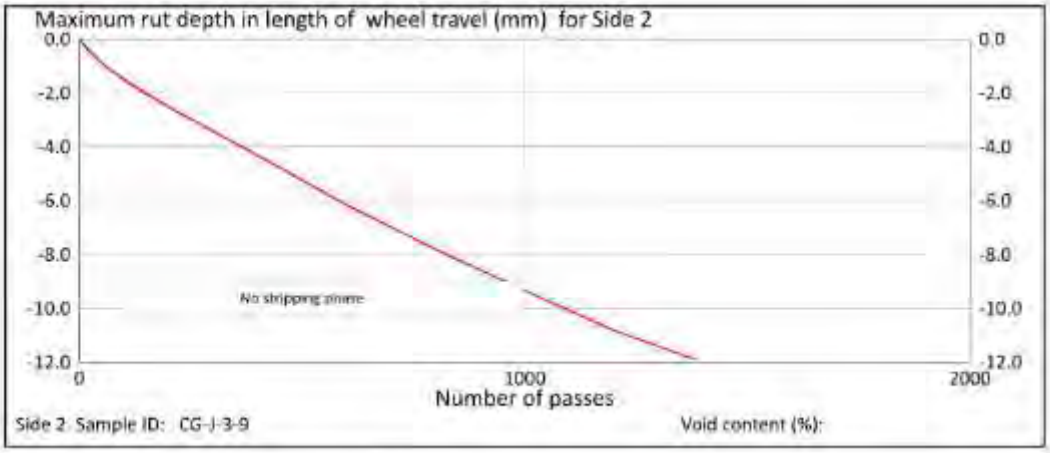
Hamburg Wheel-Tracker Test Results

AASHTO 324 (Modified)
Date/time of test: 12/31/2014 6:58 Af
Lab. No.: CG-J
Project name: LRRB Study
Submitted by

Date sampled:
Job No.:
Project No.:
Project Engineer.:



Side 1 Sample ID: CG-J-1-12 Void content (%):



Side 2 Sample ID: CG-J-3-9 Void content (%):

Rut depths (mm)		
Pass No.	Side 1	Side 2
5000	-11.6	
1382		-11.89
5288	-12.15	

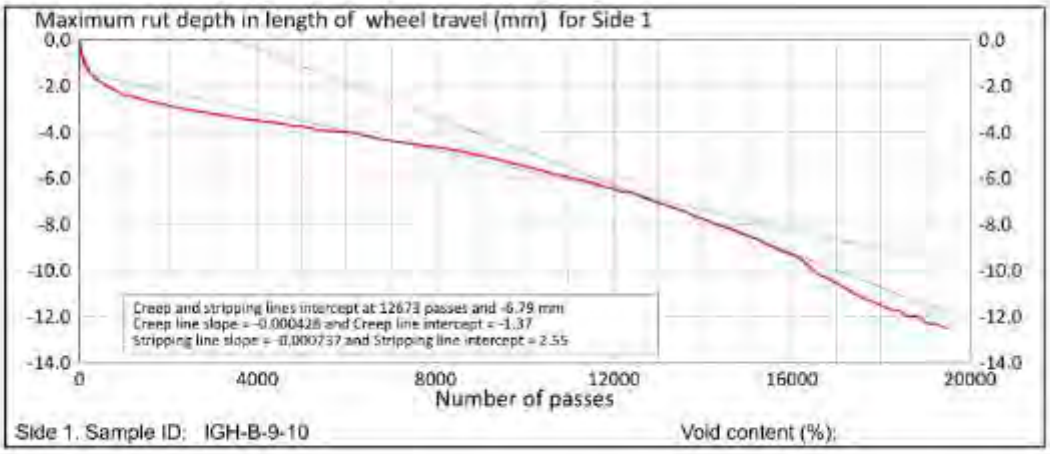
Mix type:
Asphalt grade:
Mix source:
Test temperature (°C): 50.0
Mix depth (mm): 60.0

Signature .....

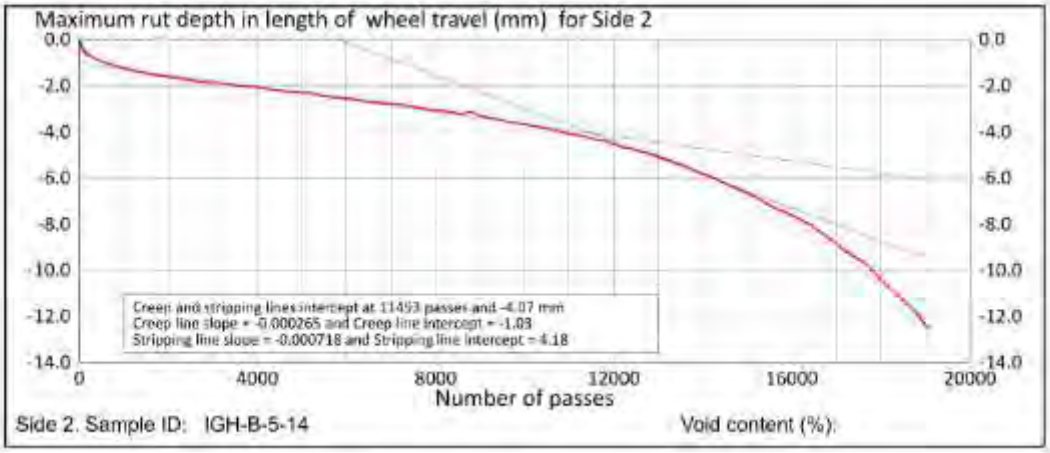
Hamburg Wheel-Tracker Test Results

AASHTO 324 (Modified)
Date/time of test: 12/17/2014 8:13 AM
Lab. No.: IGH-B
Project name: LRRB Study
Submitted by:

Date sampled:
Job No.:
Project No.:
Project Engineer.:



Side 1. Sample ID: IGH-B-9-10 Void content (%):



Side 2. Sample ID: IGH-B-5-14 Void content (%):

Rut depths (mm)		
Pass No.	Side 1	Side 2
5000	-3.75	-2.31
10000	-5.47	-3.68
15000	-8.48	-6.68
19078		-12.51
19472	-12.51	

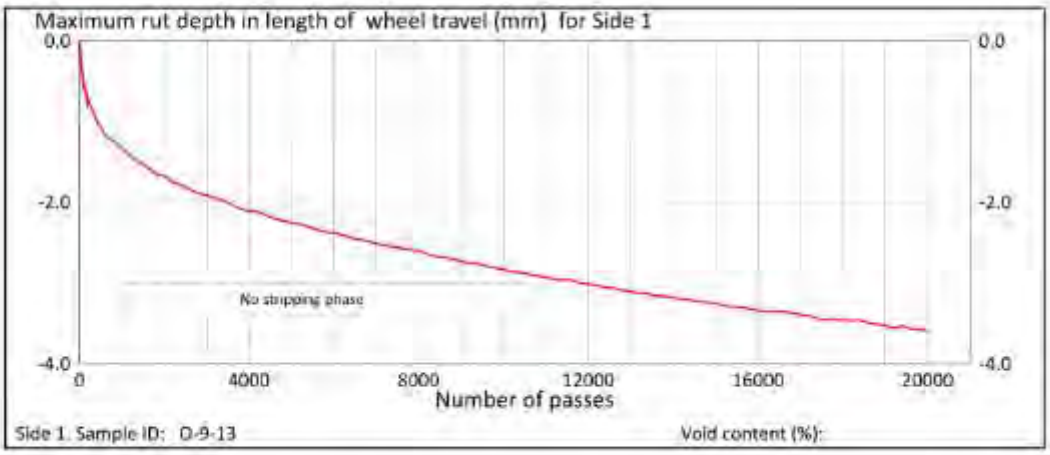
Mix type:
Asphalt grade:
Mix source:
Test temperature (°C): 45.0
Mix depth (mm): 60.0

Signature .....

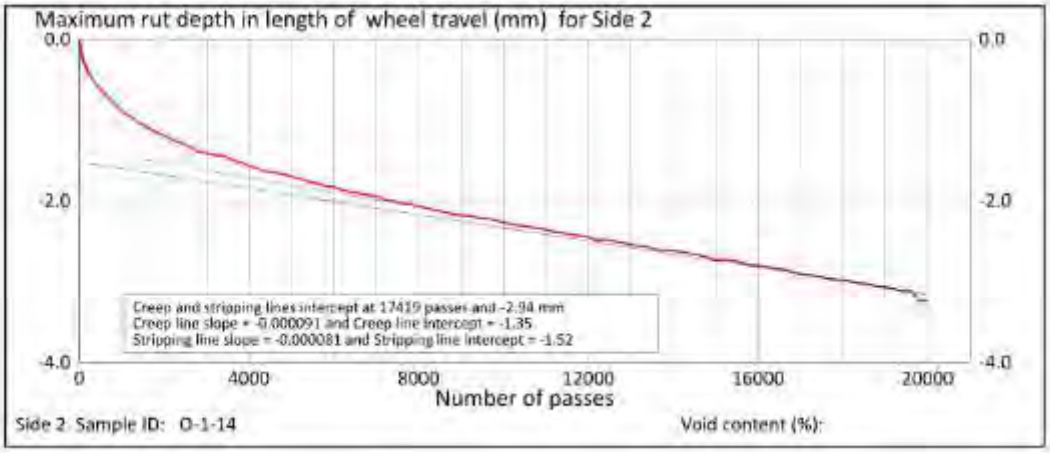
Hamburg Wheel-Tracker Test Results

AASHTO 324 (Modified)
Date/time of test: 12/19/2014 7:05 Af
Lab. No.: O
Project name: LRRB Study
Submitted by

Date sampled:
Job No.:
Project No.:
Project Engineer.:



Side 1 Sample ID: O-9-13 Void content (%):



Side 2 Sample ID: O-1-14 Void content (%):

Rut depths (mm)		
Pass No.	Side 1	Side 2
5000	-2.25	-1.7
10000	-2.83	-2.27
15000	-3.25	-2.74
20000	-3.59	-3.24

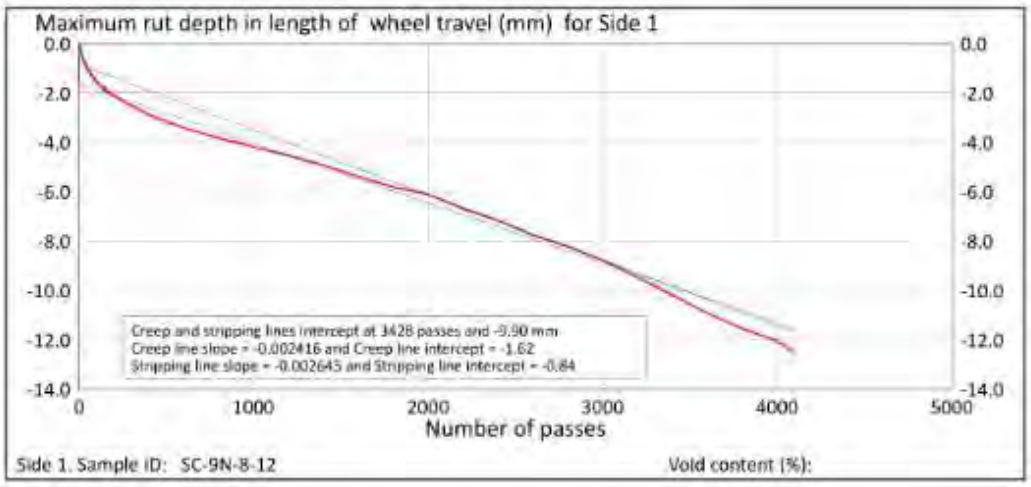
Mix type:
Asphalt grade:
Mix source:
Test temperature (°C): 50.0
Mix depth (mm): 60.0

Signature .....

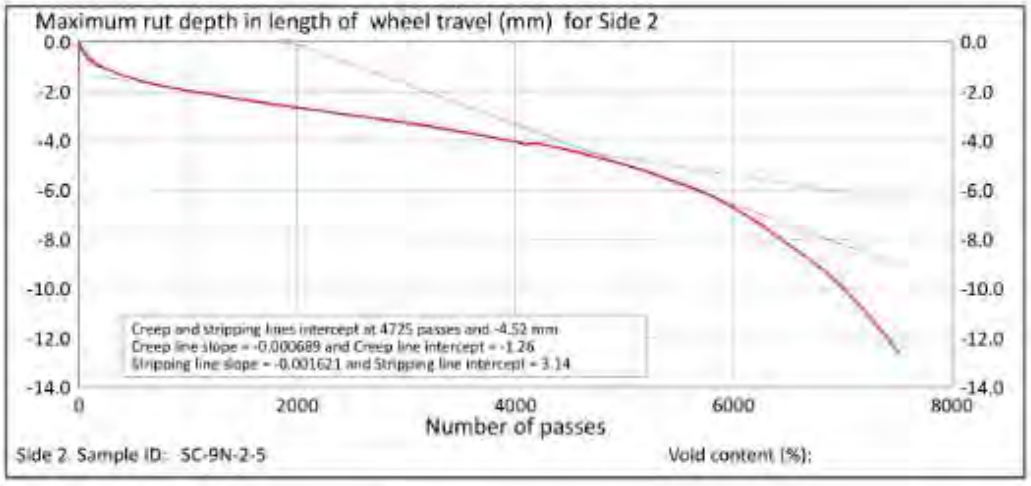
Hamburg Wheel-Tracker Test Results

AASHTO 324 (Modified)
Date/time of test: 1/5/2015 8:01 AM
Lab. No.: SC-9N
Project name: LRRB Study
Submitted by:

Date sampled:
Job No.:
Project No.:
Project Engineer.:



Side 1. Sample ID: SC-9N-8-12 Void content (%):



Side 2. Sample ID: SC-9N-2-5 Void content (%):

Rut depths (mm)		
Pass No.	Side 1	Side 2
5000		-4.98
4102	12.53	
7506		-12.59

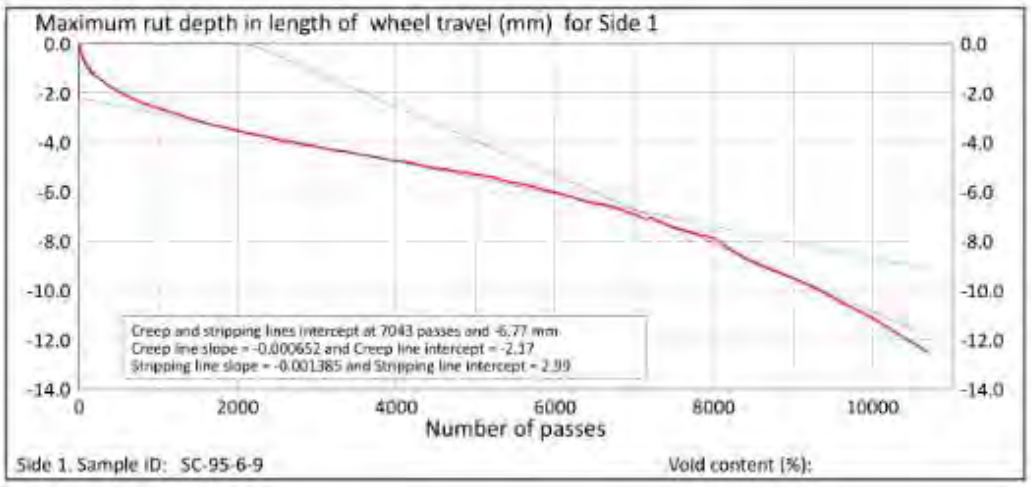
Mix type:
Asphalt grade:
Mix source:
Test temperature (°C): 50.0
Mix depth (mm): 60.0

Signature .....

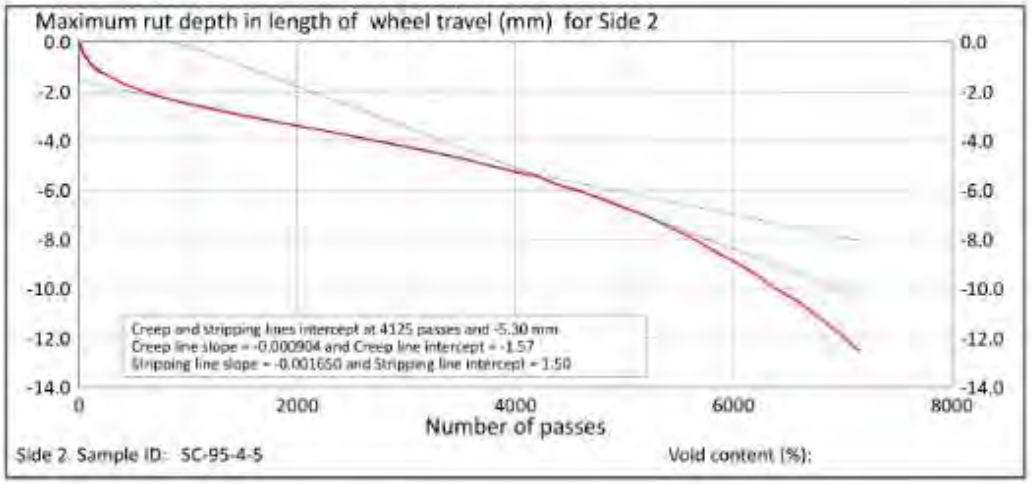
Hamburg Wheel-Tracker Test Results

AASHTO 324 (Modified)
Date/time of test: 12/31/2014 11:23 AM
Lab. No.: SC-95
Project name: LRRB Study
Submitted by:

Date sampled:
Job No.:
Project No.:
Project Engineer.:



Side 1. Sample ID: SC-95-6-9 Void content (%):



Side 2. Sample ID: SC-95-4-5 Void content (%):

Rut depths (mm)		
Pass No.	Side 1	Side 2
5000	-5.3	-6.72
10000	-11.12	
7150		-12.53
10702	-12.51	

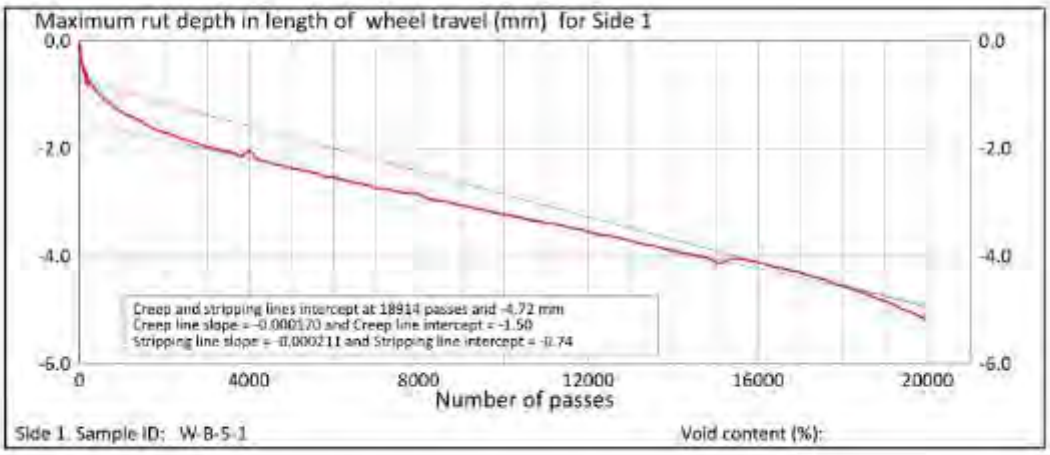
Mix type:
Asphalt grade:
Mix source:
Test temperature (°C): 50.0
Mix depth (mm): 60.0

Signature .....

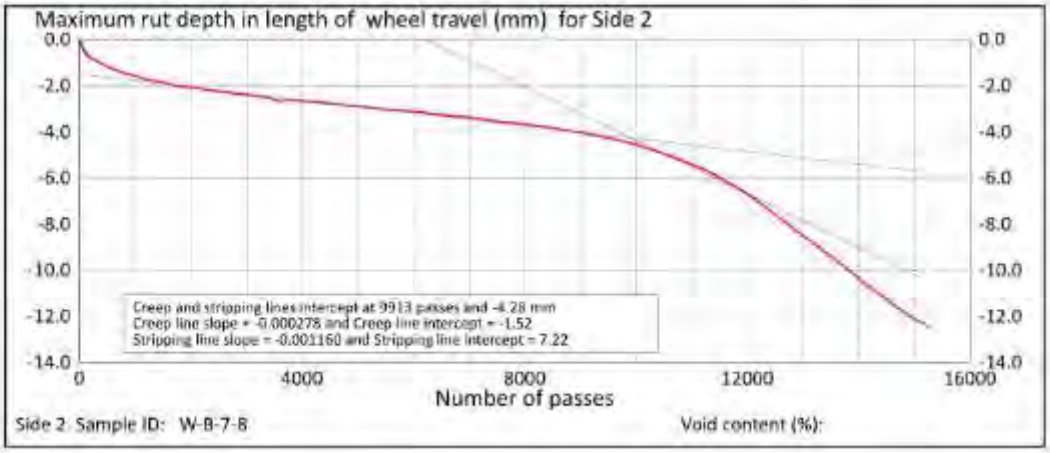
Hamburg Wheel-Tracker Test Results

AASHTO 324 (Modified)
Date/time of test: 12/18/2014 7:09 Al
Lab. No.: W-B
Project name: LRRB Study
Submitted by:

Date sampled:
Job No.:
Project No.:
Project Engineer.:



Side 1 Sample ID: W-B-5-1 Void content (%):



Side 2 Sample ID: W-B-7-8 Void content (%):

Rut depths (mm)		
Pass No.	Side 1	Side 2
5000	-2.37	-2.91
10000	-3.23	-4.56
15000	-4.11	-12.14
20000	-5.19	
15254		-12.53

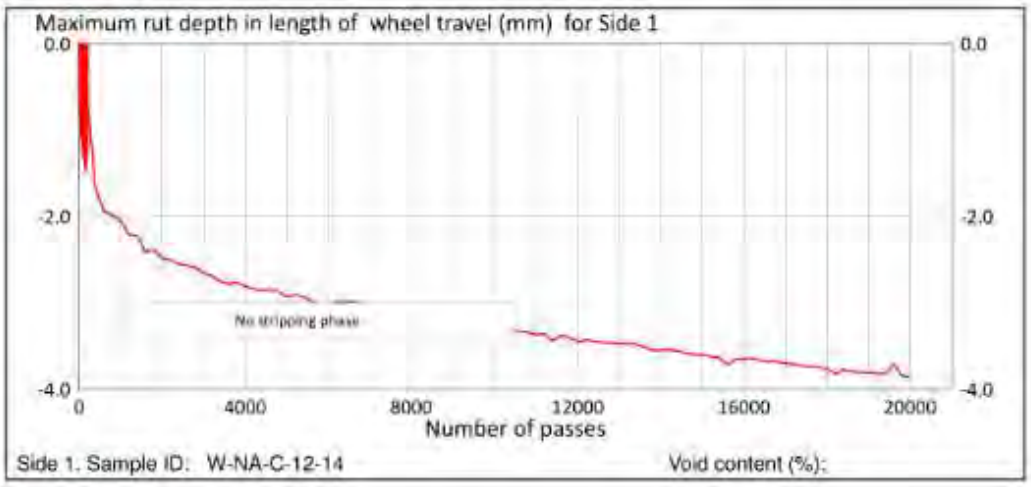
Mix type:
Asphalt grade:
Mix source:
Test temperature (°C): 50.0
Mix depth (mm): 60.0

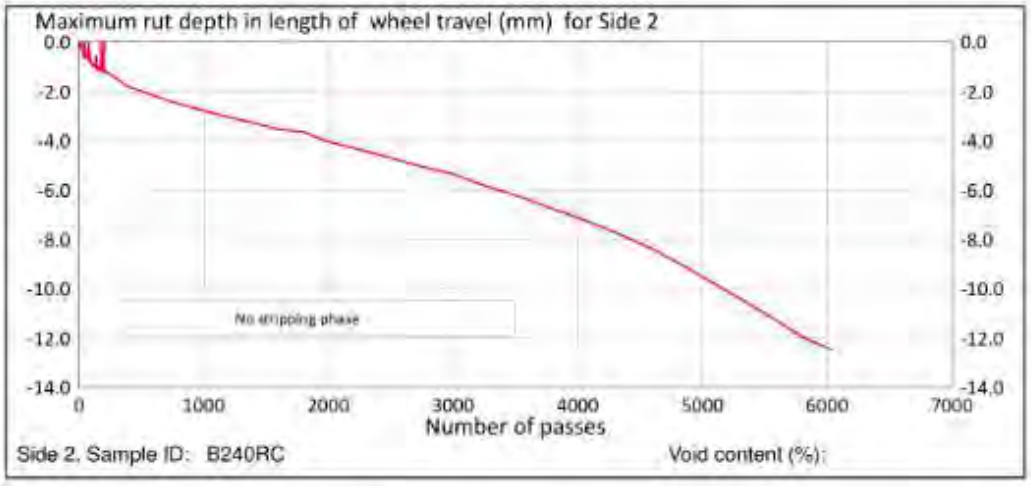
Signature .....

Hamburg Wheel-Tracker Test Results

AASHTO 324 (Modified)
Date/time of test: 12/15/2014 9:45 AM
Lab. No.:
Project name:
Submitted by:

Date sampled:
Job No.:
Project No.: 27-00006
Project Engineer.:





Rut depths (mm)		
Pass No.	Side 1	Side 2
5000	-2.93	-9.51
10000	-3.29	
15000	-3.6	
20000	-3.86	
6036		-12.5

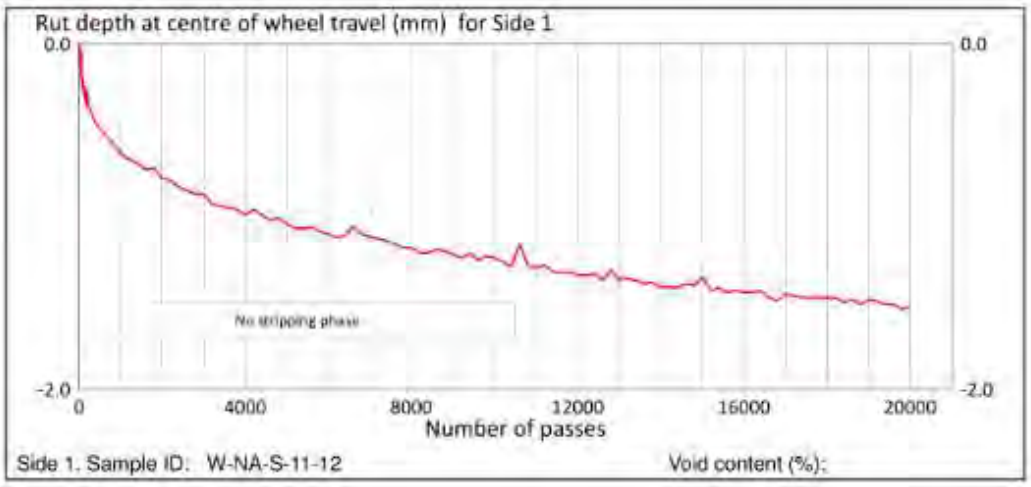
Mix type:
Asphalt grade:
HMA Production: Field
Compaction method: SGC
Mix source:
Test temperature (°C): 45.0
Mix depth (mm): 60.0

Signature .....

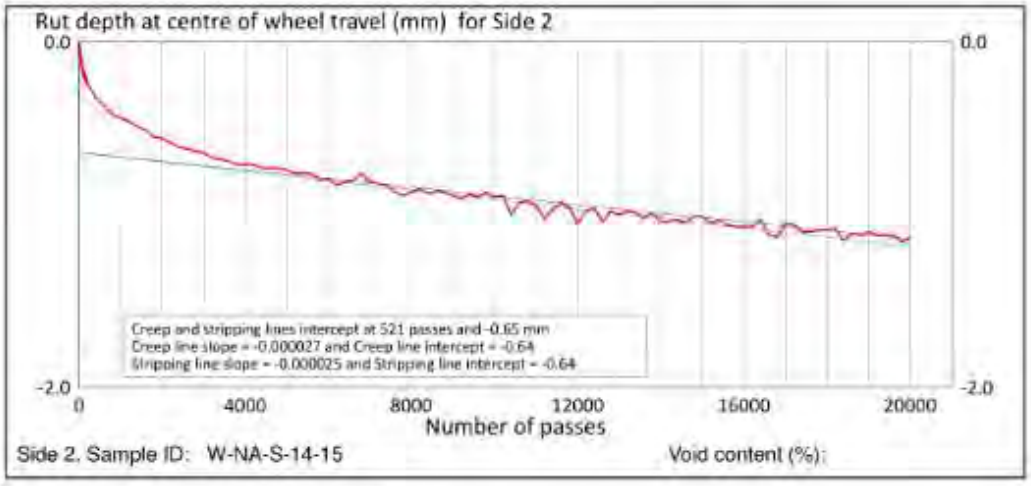
Hamburg Wheel-Tracker Test Results

AASHTO 324 (Modified)
Date/time of test: 12/16/2014 8:14 AM
Lab. No.:
Project name:
Submitted by:

Date sampled:
Job No.:
Project No.: 27-00006
Project Engineer.:



Side 1. Sample ID: W-NA-S-11-12 Void content (%):



Side 2. Sample ID: W-NA-S-14-15 Void content (%):

Rut depths (mm)		
Pass No.	Side 1	Side 2
5000	-1.04	-.74
10000	-1.24	-.9
15000	-1.35	-1.01
20000	-1.52	-1.13

Mix type:
Asphalt grade:
HMA Production: Not selected
Compaction method: Not selected
Mix source:
Test temperature (°C): 45.0
Mix depth (mm): 60.0

Signature .....

APPENDIX F

GROUND PENETRATING RADAR AND NUCLEAR DENSITY DATA

Legend
Density (pcf)
135.0 - 140.0
140.0 - 145.0
145.0 - 150.0
150.0 +
GPR Dielectric
4.0 - 4.25
4.25 - 4.5
4.5 - 4.75
4.75 - 5.0
5.0 +
American Engineering Testing, Inc
N
Figure No 2.3
Newbury Alcove
Density (pcf) - Dielectric
Woodbury, Minnesota

Legend
Density (pcf)
133.0 - 135.0
135.0 - 137.5
137.5 - 140.0
140.0 +
GPR Dielectric
4.4 - 4.75
4.75 - 5.25
5.0 - 5.25
5.25 - 5.5
5.5 +
AMERICAN ENGINEERING TESTING, INC
N
Figure No 3.3
Hyde
Density (pcf) - Dielectric
Cottage Grove, Minnesota

Legend
Density (pcf)
135.0 - 140.0
140.0 - 145.0
145.0 - 150.0
150.0 +
GPR Dielectric
4.0 - 4.75
4.75 - 5.25
5.25 - 5.75
5.75 - 6.25
6.25 +
American Engineering Testing, Inc
N
Figure No 4.3
Eagle Ridge
Density (pcf) - Dielectric
Woodbury, Minnesota

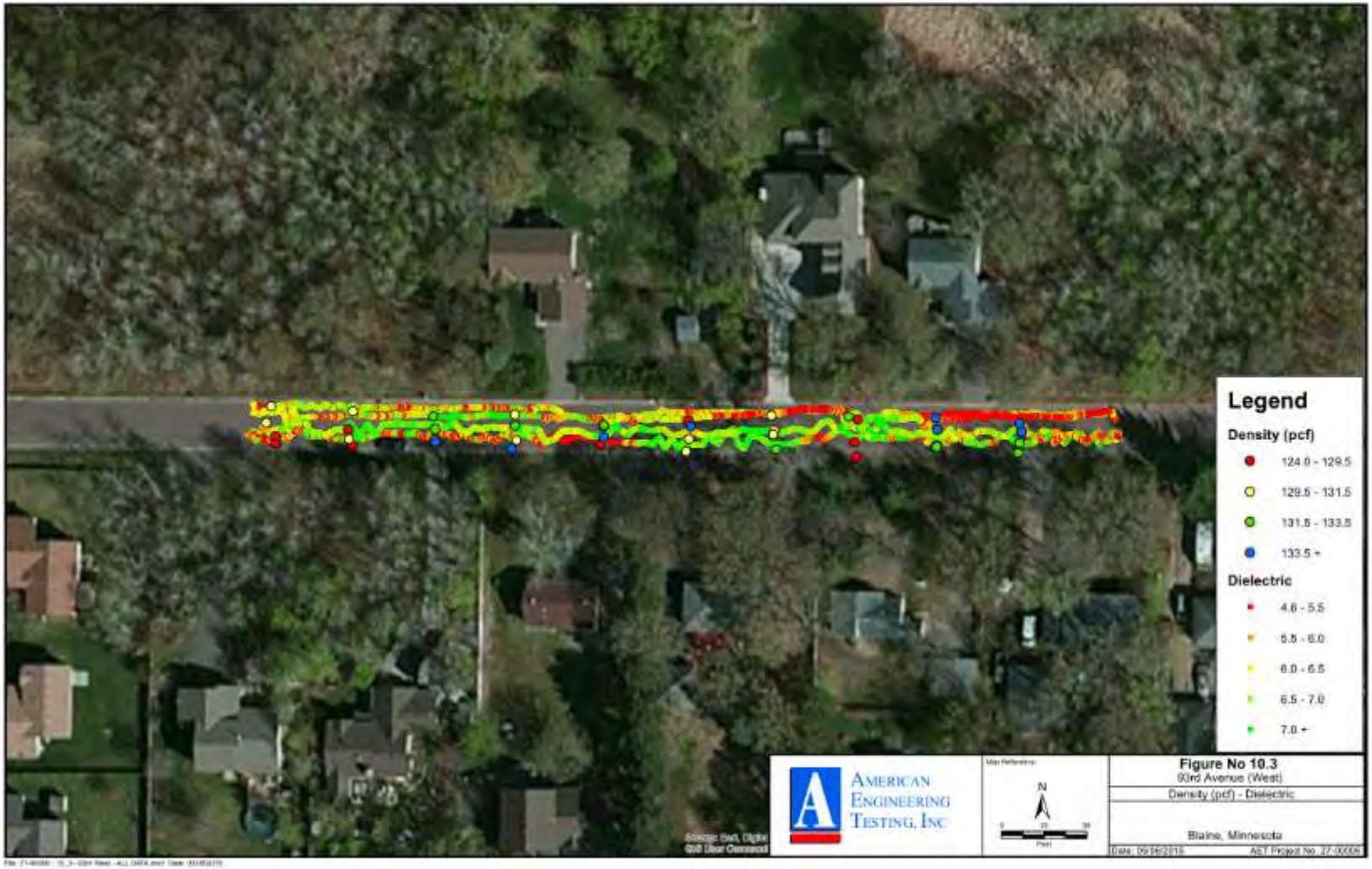
Legend
Density (pcf)
135.0 - 140.0
140.0 - 145.0
145.0 - 150.0
150.0 +
GPR Dielectric
4.0 - 5.5
5.5 - 6.3
6.3 - 7.1
7.1 - 8.7
8.7+
AMERICAN ENGINEERING TESTING, INC
N
Figure No 5.3
Bridgewater
Density (pcf) - Dielectric
Woodbury, Minnesota

Legend
Density (pcf)
131.0 - 133.0
133.0 - 135.5
135.5 - 137.5
137.5 +
GPR Dielectric
3.5 - 4.1
4.1 - 4.6
4.6 - 5.1
5.1 - 5.7
5.7 +
AMERICAN ENGINEERING TESTING, INC
Figure No 6.3
Jensen
Density (pcf) - Dielectric
Cottage Grove, Minnesota

Legend
Density (pcf)
135.3 - 140.0
140.0 - 142.5
142.5 - 145.0
145.0 +
Dielectric
3.0 - 5.0
5.0 - 5.5
5.5 - 6.5
6.5 - 7.5
7.5 +
American Engineering Testing, Inc
N
Figure No 7.3
Jergen
Density (pcf) - Dielectric
Cottage Grove, Minnesota

Legend
Density (pcf)
130.3 - 139.0
139.0 - 141.5
141.5 - 144.0
144.0 +
Dielectric
4.0 - 4.75
4.75 - 5.0
5.0 - 5.5
5.5 - 6.0
6.0 +
American Engineering Testing, Inc
N
Figure No 8.3
Inberg
Density (pcf) - Dielectric
Cottage Grove, Minnesota

Legend
Density (pcf)
133.8 - 137.0
137.0 - 138.5
138.5 - 140.0
140.0 +
Dielectric
4.60 - 5.40
5.40 - 5.55
5.55 - 5.75
5.75 - 5.90
5.90 +
AMERICAN ENGINEERING TESTING, INC
N
Figure No 9.3
93rd Avenue (East)
Density (pcf) - Dielectric
Blaine, Minnesota


Legend
Density (pcf)
124.0 - 129.5
129.5 - 131.5
131.5 - 133.5
133.5 +
Dielectric
4.6 - 5.5
5.5 - 6.0
6.0 - 6.5
6.5 - 7.0
7.0 +
AMERICAN ENGINEERING TESTING, INC
N
Figure No 10.3
93rd Avenue (West)
Density (pcf) - Dielectric
Blaine, Minnesota

Legend
Density (pcf)
135.4 - 137.0
137.0 - 140.0
140.0 - 142.0
142.0 - 144.0
144.0 +
Dielectric
4.25 - 5.50
5.50 - 5.75
5.75 - 6.00
6.00 - 6.50
6.50 +
N
American Engineering Testing, Inc
Figure No 11.3
Brooks
Density (pcf) - Dielectric
Inver Grove Heights, Minnesota

Legend
Density (pcf)
135.0 - 137.0
137.0 - 139.0
139.0 - 141.0
141.0 - 143.0
143.0 +
Dielectric
4.60 - 5.40
5.40 - 5.55
5.55 - 5.75
5.75 - 5.90
5.90 +
N
American Engineering Testing, Inc
Figure No 12.3
Louisiana Ave
Density (pcf) - Dielectric
Brooklyn Park, Minnesota

Legend
Density (pcf)
140.0 - 141.5
141.5 - 143.0
143.0 - 144.5
144.5 - 145.5
145.5 +
Dielectric
4.65 - 5.0
5.0 - 5.3
5.3 - 5.5
5.5 - 5.7
5.7 +
American Engineering Testing, Inc
N
Figure No 13.3
Winnetka
Density (pcf) - Dielectric
Brooklyn Park, Minnesota

Legend
Density (pcf)
134.5 - 136.5
136.5 - 138.5
138.5 - 141.0
141.0 - 143.0
143.0 +
Dielectric
4.5 - 6.0
6.0 - 6.5
6.5 - 7.0
7.0 - 7.5
7.5 +
American Engineering Testing, Inc
N
Figure No 14.3
73rd Avenue
Density (pcf) - Dielectric
Brooklyn Park, Minnesota

APPENDIX G

TENSILE STRENGTH RATIO DATA

MODIFIED LOTTMAN

SPEC 2360 MIX TYPE SPWEA330B 7% DATE 5/7/2015

	TREATED SPECIMENS				*UNTREATED SPECIMENS*			
SAMPLE I.D.	2		3		1		4	
DIAMETER	150		150		150		150	
THICKNESS	95.00		95		95.00		95.00	
DRY WT. IN AIR	3760.7		3759.6		3726.0		3762.5	
SSD WT.	3773.7		3766.3		3743.2		3770.1	
WT. IN H20	2114.3		2109.1		2100.0		2111.6	
VOLUME	1659.4		1657.2		1643.2		1658.5	
BULK Sp. Gr.	2.266		2.269	2.267	2.268		2.269	2.268
MAX Sp. Gr.	2.438		2.438	2.438	2.438		2.438	2.438
% AIR VOIDS	7.0		6.9	7.0	7.0		6.9	7.0
VOLUME AIR VOIDS	116.87		115.12	115.99				
LOAD, POUNDS					2110		2225	2168

SATURATED FOR ____ MIN. @ ____ mm.Hg

SSD WT.	3837.0		3835.0	
WT. IN H20	2177.0		2176.9	
VOLUME	1660.0		1658.1	
VOL. OF ABS. H20	76.3		75.4	
% SATURATION	65.3		65.5	65.4
% SWELL	0.04		0.05	0.0

BLOWS na

CONDITIONED 24 HOURS IN 140 DEGREE F. WATER

DIAMETER	149.82		149.96					
THICKNESS	95.050		95.030					
SSD WT.	3822.4		3823.3					
WT. IN H2O.	2162.1		2164.5					
VOLUME	1660.3		1658.8					
VOL. OF ABS. H2O	61.7		63.7					
% SATERATION	52.8		55.3					
% SWELL	0.05		0.10	0.08				
LOAD IN POUNDS	1994		1970	1982				
DRY STRENGTH					60.8		64.1	62.5
WET STRENGTH	57.5		56.8	57.1				
TSR	92.1		90.9	91.5				
% VIS. STRIPPING	<10	----------			<10	----------		
% BROKEN AGG.	<10	----------			<10	----------		

Tested By: CW
Date: 5/8/15

Reviewed By: AH
Date: 5/12/15

MODIFIED LOTTMAN

SPEC 2360 MIX TYPE SPWEA340C 7% DATE 5/28/2015

	TREATED SPECIMENS				*UNTREATED SPECIMENS*			
SAMPLE I.D.	1		4		2		3	
DIAMETER	150		150		150		150	
THICKNESS	95.00		95		95.00		95.00	
DRY WT. IN AIR	3754.7		3753.5		3756.8		3756.9	
SSD WT.	3763.3		3758.9		3764.5		3764.4	
WT. IN H20	2113.0		2108.7		2114.3		2110.8	
VOLUME	1650.3		1650.2		1650.2		1653.6	
BULK Sp. Gr.	2.275		2.275	2.275	2.277		2.272	2.274
MAX Sp. Gr.	2.451		2.451	2.451	2.451		2.451	2.451
% AIR VOIDS	7.2		7.2	7.2	7.1		7.3	7.2
VOLUME AIR VOIDS	118.39		118.78	118.59				
LOAD, POUNDS					2040		2040	2040

SATURATED FOR _____ MIN. @ _____ mm.Hg

SSD WT.	3828.5		3829.0	
WT. IN H20	2174.8		2178.2	
VOLUME	1653.7		1650.8	
VOL. OF ABS. H20	73.8		75.5	
% SATURATION	62.3		63.6	62.9
% SWELL	0.21		0.04	0.1

BLOWS na

CONDITIONED 24 HOURS IN 140 DEGREE F. WATER

DIAMETER	149.65		150.2					
THICKNESS	94.950		95.020					
SSD WT.	3820.8		3824.1					
WT. IN H2O.	2162.3		2165.6					
VOLUME	1658.5		1658.5					
VOL. OF ABS. H2O	66.1		70.6					
% SATERATION	55.8		59.4					
% SWELL	0.50		0.50	0.50				
LOAD IN POUNDS	1645		1645	1645				
DRY STRENGTH					58.8		58.8	58.8
WET STRENGTH	47.5		47.3	47.4				
TSR	80.9		80.5	80.7				
% VIS. STRIPPING	<10	---------->			<10	---------->		
% BROKEN AGG.	<10	---------->			<10	---------->		

Tested By: CW
Date: 5/8/15

Reviewed By: AH
Date: 5/12/15

MODIFIED LOTTMAN

SPEC 2360 MIX TYPE SPWEA340B 7% DATE 5/7/2015

	TREATED SPECIMENS				*UNTREATED SPECIMENS*			
SAMPLE I.D.	2		3		1		4	
DIAMETER	150		150		150		150	
THICKNESS	95.00		95		95.00		95.00	
DRY WT. IN AIR	3786.8		3780.7		3746.0		3782.0	
SSD WT.	3794.3		3786.9		3759.3		3790.4	
WT. IN H20	2141.2		2135.2		2106.1		2144.4	
VOLUME	1653.1		1651.7		1653.2		1646.0	
BULK Sp. Gr.	2.291		2.289	2.290	2.266		2.298	2.282
MAX Sp. Gr.	2.451		2.451	2.451	2.451		2.451	2.451
% AIR VOIDS	6.5		6.6	6.6	7.6		6.3	6.9
VOLUME AIR VOIDS	108.10		109.19	108.64				
LOAD, POUNDS					2295		2133	2214

SATURATED FOR ____ MIN. @ ____ mm.Hg

SSD WT.	3858.1		3851.9	
WT. IN H20	2204.1		2193.5	
VOLUME	1654.0		1658.4	
VOL. OF ABS. H20	71.3		71.2	
% SATURATION	66.0		65.2	65.6
% SWELL	0.05		0.41	0.2

BLOWS na

CONDITIONED 24 HOURS IN 140 DEGREE F. WATER

DIAMETER	149.95		150.09					
THICKNESS	94.920		94.930					
SSD WT.	3788.1		3779.7					
WT. IN H2O.	2192.6		2184.3					
VOLUME	1595.5		1595.4					
VOL. OF ABS. H2O	1.3		-1.0					
% SATERATION	1.2		-0.9					
% SWELL	-3.48		-3.41	-3.45				
LOAD IN POUNDS	1994		1970	1982				
DRY STRENGTH					66.1		61.5	63.8
WET STRENGTH	57.5		56.8	57.2				
TSR	90.2		89.0	89.6				
% VIS. STRIPPING	<10	----------			<10	----------		
% BROKEN AGG.	<10	----------			<10	----------		

Tested By: CW
Date: 5/8/15

Reviewed By: AH
Date: 5/12/15

MODIFIED LOTTMAN

SPEC 2360 MIX TYPE SPWEA340C 11% DATE 5/28/2015

	TREATED SPECIMENS				*UNTREATED SPECIMENS*			
SAMPLE I.D.	1		2		3		4	
DIAMETER	150		150		150		150	
THICKNESS	95.00		95		95.00		95.00	
DRY WT. IN AIR	3564.4		3561.1		3564.5		3561.6	
SSD WT.	3586.0		3576.0		3578.5		3576.2	
WT. IN H20	1935.9		1941.2		1934.8		1919.5	
VOLUME	1650.1		1634.8		1643.7		1656.7	
BULK Sp. Gr.	2.160		2.178	2.169	2.169		2.150	2.159
MAX Sp. Gr.	2.438		2.438	2.438	2.438		2.438	2.438
% AIR VOIDS	11.4		10.7	11.0	11.1		11.8	11.4
VOLUME AIR VOIDS	188.08		174.14	181.11				
LOAD, POUNDS					1367		1413	1390

SATURATED FOR _____ MIN. @ _____ mm.Hg

SSD WT.	3688.0		3675.0	
WT. IN H20	2013.0		2038.6	
VOLUME	1675.0		1636.4	
VOL. OF ABS. H20	123.6		113.9	
% SATURATION	65.7		65.4	65.6
% SWELL	1.51		0.10	0.8

BLOWS na

CONDITIONED 24 HOURS IN 140 DEGREE F. WATER

DIAMETER	149.74		149.58					
THICKNESS	94.280		94.720					
SSD WT.	3647.6		3644.9					
WT. IN H2O.	2005.7		2016.8					
VOLUME	1641.9		1628.1					
VOL. OF ABS. H2O	83.2		83.8					
% SATERATION	44.2		48.1					
% SWELL	-0.50		-0.41	-0.45				
LOAD IN POUNDS	1062		1086	1074				
DRY STRENGTH					39.4		40.7	40.1
WET STRENGTH	30.9		31.5	31.2				
TSR	77.1		78.6	77.9				
% VIS. STRIPPING	<10	----------			<10	----------		
% BROKEN AGG.	<10	----------			<10	----------		

Tested By: DK
Date: 6/2/15

Reviewed By: AH
Date: 6/2/15

MODIFIED LOTTMAN

SPEC 2360 MIX TYPE SPWEA340C 7% DATE 5/28/2015

	TREATED SPECIMENS				*UNTREATED SPECIMENS*			
SAMPLE I.D.	1		4		2		3	
DIAMETER	150		150		150		150	
THICKNESS	95.00		95		95.00		95.00	
DRY WT. IN AIR	3754.7		3753.5		3756.8		3756.9	
SSD WT.	3763.3		3758.9		3764.5		3764.4	
WT. IN H20	2113.0		2108.7		2114.3		2110.8	
VOLUME	1650.3		1650.2		1650.2		1653.6	
BULK Sp. Gr.	2.275		2.275	2.275	2.277		2.272	2.274
MAX Sp. Gr.	2.451		2.451	2.451	2.451		2.451	2.451
% AIR VOIDS	7.2		7.2	7.2	7.1		7.3	7.2
VOLUME AIR VOIDS	118.39		118.78	118.59				
LOAD, POUNDS					2040		2040	2040

SATURATED FOR _____ MIN. @ _____ mm.Hg

SSD WT.	3828.5		3829.0	
WT. IN H20	2174.8		2178.2	
VOLUME	1653.7		1650.8	
VOL. OF ABS. H20	73.8		75.5	
% SATURATION	62.3		63.6	62.9
% SWELL	0.21		0.04	0.1

BLOWS na

CONDITIONED 24 HOURS IN 140 DEGREE F. WATER

DIAMETER	149.65		150.2					
THICKNESS	94.950		95.020					
SSD WT.	3820.8		3824.1					
WT. IN H2O.	2162.3		2165.6					
VOLUME	1658.5		1658.5					
VOL. OF ABS. H2O	66.1		70.6					
% SATERATION	55.8		59.4					
% SWELL	0.50		0.50	0.50				
LOAD IN POUNDS	1645		1645	1645				
DRY STRENGTH					58.8		58.8	58.8
WET STRENGTH	47.5		47.3	47.4				
TSR	80.9		80.5	80.7				
% VIS. STRIPPING	<10	---------->			<10	---------->		
% BROKEN AGG.	<10	---------->			<10	---------->		

Tested By: CW
Date: 5/8/15

Reviewed By: AH
Date: 5/12/15

MODIFIED LOTTMAN

SPEC 2360 MIX TYPE SPWEA340B 11% DATE 5/7/2015

	TREATED SPECIMENS				*UNTREATED SPECIMENS*			
SAMPLE I.D.	1		3		2		4	
DIAMETER	150		150		150		150	
THICKNESS	95.00		95		95.00		95.00	
DRY WT. IN AIR	3587.7		3591.1		3588.7		3592.0	
SSD WT.	3597.0		3602.0		3600.1		3604.3	
WT. IN H20	1950.9		1958.0		1961.0		1960.2	
VOLUME	1646.1		1644.0		1639.1		1644.1	
BULK Sp. Gr.	2.180		2.184	2.182	2.189		2.185	2.187
MAX Sp. Gr.	2.451		2.451	2.451	2.451		2.451	2.451
% AIR VOIDS	11.1		10.9	11.0	10.7		10.9	10.8
VOLUME AIR VOIDS	182.33		178.84	180.59				
LOAD, POUNDS					2249		2296	2273

SATURATED FOR ____ MIN. @ ____ mm.Hg

SSD WT.	3706.4		3707.5	
WT. IN H20	2052.2		2051.5	
VOLUME	1654.2		1656.0	
VOL. OF ABS. H20	118.7		116.4	
% SATURATION	65.1		65.1	65.1
% SWELL	0.49		0.73	0.6

BLOWS na

CONDITIONED 24 HOURS IN 140 DEGREE F. WATER

DIAMETER	150.1		149.95					
THICKNESS	94.780		94.500					
SSD WT.	3672.2		3676.8					
WT. IN H2O.	2029.5		2029.2					
VOLUME	1642.7		1647.6					
VOL. OF ABS. H2O	84.5		85.7					
% SATERATION	46.3		47.9					
% SWELL	-0.21		0.22	0.01				
LOAD IN POUNDS	1529		1529	1529				
DRY STRENGTH					64.8		66.2	65.5
WET STRENGTH	44.1		44.3	44.2				
TSR	67.4		67.7	67.5				
% VIS. STRIPPING	<10	----------			<10	----------		
% BROKEN AGG.	<10	----------			<10	----------		

Tested By: CW
Date: 5/8/15

Reviewed By: AH
Date: 5/12/15

MODIFIED LOTTMAN

SPEC 2360 MIX TYPE SPWEA340C 11% DATE 5/28/2015

	TREATED SPECIMENS				*UNTREATED SPECIMENS*			
SAMPLE I.D.	1		2		3		4	
DIAMETER	150		150		150		150	
THICKNESS	95.00		95		95.00		95.00	
DRY WT. IN AIR	3564.4		3561.1		3564.5		3561.6	
SSD WT.	3586.0		3576.0		3578.5		3576.2	
WT. IN H20	1935.9		1941.2		1934.8		1919.5	
VOLUME	1650.1		1634.8		1643.7		1656.7	
BULK Sp. Gr.	2.160		2.178	2.169	2.169		2.150	2.159
MAX Sp. Gr.	2.438		2.438	2.438	2.438		2.438	2.438
% AIR VOIDS	11.4		10.7	11.0	11.1		11.8	11.4
VOLUME AIR VOIDS	188.08		174.14	181.11				
LOAD, POUNDS					1367		1413	1390

SATURATED FOR _____ MIN. @ _____ mm.Hg

SSD WT.	3688.0		3675.0	
WT. IN H20	2013.0		2038.6	
VOLUME	1675.0		1636.4	
VOL. OF ABS. H20	123.6		113.9	
% SATURATION	65.7		65.4	65.6
% SWELL	1.51		0.10	0.8

BLOWS na

CONDITIONED 24 HOURS IN 140 DEGREE F. WATER

DIAMETER	149.74		149.58					
THICKNESS	94.280		94.720					
SSD WT.	3647.6		3644.9					
WT. IN H2O.	2005.7		2016.8					
VOLUME	1641.9		1628.1					
VOL. OF ABS. H2O	83.2		83.8					
% SATERATION	44.2		48.1					
% SWELL	-0.50		-0.41	-0.45				
LOAD IN POUNDS	1062		1086	1074				
DRY STRENGTH					39.4		40.7	40.1
WET STRENGTH	30.9		31.5	31.2				
TSR	77.1		78.6	77.9				
% VIS. STRIPPING	<10	----------			<10	----------		
% BROKEN AGG.	<10	----------			<10	----------		

Tested By: DK
Date: 6/2/15

Reviewed By: AH
Date: 6/2/15

MODIFIED LOTTMAN

SPEC 2360 MIX TYPE SPWEA340B 11% DATE 5/7/2015

	TREATED SPECIMENS				*UNTREATED SPECIMENS*			
SAMPLE I.D.	1		2		3		4	
DIAMETER	150		150		150		150	
THICKNESS	95.00		95		95.00		95.00	
DRY WT. IN AIR	3569.3		3576.9		3566.3		3570.7	
SSD WT.	3579.8		3586.9		3578.1		3582.2	
WT. IN H20	1930.5		1939.7		1924.6		1934.4	
VOLUME	1649.3		1647.2		1653.5		1647.8	
BULK Sp. Gr.	2.164		2.172	2.168	2.157		2.167	2.162
MAX Sp. Gr.	2.438		2.438	2.438	2.438		2.438	2.438
% AIR VOIDS	11.2		10.9	11.1	11.5		11.1	11.3
VOLUME AIR VOIDS	185.27		180.05	182.66				
LOAD, POUNDS					1947		1924	1936

SATURATED FOR _____ MIN. @ _____ mm.Hg

SSD WT.	3691.0		3695.0	
WT. IN H20	2037.0		2041.1	
VOLUME	1654.0		1653.9	
VOL. OF ABS. H20	121.7		118.1	
% SATURATION	65.7		65.6	65.6
% SWELL	0.28		0.41	0.3

BLOWS na

CONDITIONED 24 HOURS IN 140 DEGREE F. WATER

DIAMETER	149.85		149.91					
THICKNESS	94.900		94.800					
SSD WT.	3664.9		3658.5					
WT. IN H2O.	2010.6		2018.2					
VOLUME	1654.3		1640.3					
VOL. OF ABS. H2O	95.6		81.6					
% SATERATION	51.6		45.3					
% SWELL	0.30		-0.42	-0.06				
LOAD IN POUNDS	1250		1297	1274				
DRY STRENGTH					56.1		55.5	55.8
WET STRENGTH	36.1		37.5	36.8				
TSR	64.7		67.2	66.0				
% VIS. STRIPPING	<10	----------			<10	----------		
% BROKEN AGG.	<10	----------			<10	----------		

Tested By: CW
Date:5/8/15

Reviewed By: AH
Date: 5/12/15

MODIFIED LOTTMAN

SPEC 2360 MIX TYPE SPWEA340C PM 11 DATE 4/27/2015

	TREATED SPECIMENS				*UNTREATED SPECIMENS*			
SAMPLE I.D.	1		2		3		4	
DIAMETER	150		150		150		150	
THICKNESS	95.00		95		95.00		95.00	
DRY WT. IN AIR	3596.5		3583.9		3584.4		3584.5	
SSD WT.	3609.0		3592.9		3607.3		3607.3	
WT. IN H20	1965.5		1945.0		1962.4		1960.2	
VOLUME	1643.5		1647.9		1644.9		1647.1	
BULK Sp. Gr.	2.188		2.175	2.182	2.179		2.176	2.178
MAX Sp. Gr.	2.456		2.456	2.456	2.456		2.456	2.456
% AIR VOIDS	10.9		11.4	11.2	11.3		11.4	11.3
VOLUME AIR VOIDS	179.13		188.66	183.89				
LOAD, POUNDS					2272.3		2434	2353

SATURATED FOR ____ MIN. @ ____ mm.Hg

SSD WT.	3719.6		3707.1	
WT. IN H20	2078.6		2048.5	
VOLUME	1641.0		1658.6	
VOL. OF ABS. H20	123.1		123.2	
% SATURATION	68.7		65.3	67.0
% SWELL	-0.15		0.65	0.2

BLOWS na

CONDITIONED 24 HOURS IN 140 DEGREE F. WATER

DIAMETER	150.01		150.04					
THICKNESS	94.380		94.780					
SSD WT.	3709.0		3696.6					
WT. IN H2O.	2058.1		2041.1					
VOLUME	1650.9		1655.5					
VOL. OF ABS. H2O	112.5		112.7					
% SATERATION	62.8		59.7					
% SWELL	0.45		0.46	0.46				
LOAD IN POUNDS	1529		1413	1471				
DRY STRENGTH					65.5		70.2	67.8
WET STRENGTH	44.4		40.8	42.6				
TSR	65.4		60.2	62.8				
% VIS. STRIPPING	<10	---------->			<10	---------->		
% BROKEN AGG.	<10	---------->			<10	---------->		

Tested By: CW
Date: 4/27/15

Reviewed By: AH
Date: 4/27/15

MODIFIED LOTTMAN

SPEC 2360 MIX TYPE SPWEA340C PM 7% DATE 4/27/2015

	TREATED SPECIMENS				*UNTREATED SPECIMENS*			
SAMPLE I.D.	1		2		3		4	
DIAMETER	150		150		150		150	
THICKNESS	95.00		95		95.00		95.00	
DRY WT. IN AIR	3755.8		3755.1		3756.8		3755.9	
SSD WT.	3763.2		3764.8		3766.7		3764.2	
WT. IN H20	2114.7		2113.6		2116.6		2116.7	
VOLUME	1648.5		1651.2		1650.1		1647.5	
BULK Sp. Gr.	2.278		2.274	2.276	2.277		2.280	2.278
MAX Sp. Gr.	2.456		2.456	2.456	2.456		2.456	2.456
% AIR VOIDS	7.2		7.4	7.3	7.3		7.2	7.2
VOLUME AIR VOIDS	119.27		122.25	120.76				
LOAD, POUNDS					3239		3216	3228

SATURATED FOR _____ MIN. @ _____ mm.Hg

SSD WT.	3834.7		3836.7	
WT. IN H20	2185.3		2184.5	
VOLUME	1649.4		1652.2	
VOL. OF ABS. H20	78.9		81.6	
% SATURATION	66.2		66.7	66.5
% SWELL	0.05		0.06	0.1

BLOWS na

CONDITIONED 24 HOURS IN 140 DEGREE F. WATER

DIAMETER	150		150					
THICKNESS	94.680		94.680					
SSD WT.	3826.6		3824.2					
WT. IN H2O.	2164.3		2161.7					
VOLUME	1662.3		1662.5					
VOL. OF ABS. H2O	70.8		69.1					
% SATERATION	59.4		56.5					
% SWELL	0.84		0.68	0.76				
LOAD IN POUNDS	2411		2434	2423				
DRY STRENGTH					93.4		92.7	93.0
WET STRENGTH	69.7		70.4	70.1				
TSR	75.0		75.7	75.3				
% VIS. STRIPPING	<10	----------			<10	----------		
% BROKEN AGG.	<10	----------			<10	----------		

Tested By: CW
Date: 4/27/15

Reviewed By: AH
Date: 4/27/15

MODIFIED LOTTMAN

SPEC 2360 MIX TYPE SPWEA340B 7% DATE 4/27/2015

	TREATED SPECIMENS				*UNTREATED SPECIMENS*			
SAMPLE I.D.	1		2		3		4	
DIAMETER	150		150		150		150	
THICKNESS	95.00		95		95.00		95.00	
DRY WT. IN AIR	3754.6		3751.8		3754.5		3755.9	
SSD WT.	3763.0		3758.6		3762.7		3764.2	
WT. IN H20	2113.3		2115.0		2112.5		2116.7	
VOLUME	1649.7		1643.6		1650.2		1647.5	
BULK Sp. Gr.	2.276		2.283	2.279	2.275		2.280	2.277
MAX Sp. Gr.	2.456		2.456	2.456	2.456		2.456	2.456
% AIR VOIDS	7.3		7.1	7.2	7.4		7.2	7.3
VOLUME AIR VOIDS	120.95		115.99	118.47				
LOAD, POUNDS					2710		2733	2722

SATURATED FOR _____ MIN. @ _____ mm.Hg

SSD WT.	3833.7		3827.9	
WT. IN H20	2177.6		2183.1	
VOLUME	1656.1		1644.8	
VOL. OF ABS. H20	79.1		76.1	
% SATURATION	65.4		65.6	65.5
% SWELL	0.39		0.07	0.2

BLOWS na

CONDITIONED 24 HOURS IN 140 DEGREE F. WATER

DIAMETER	149.99		150.01					
THICKNESS	95.020		94.150					
SSD WT.	3829.1		3825.9					
WT. IN H2O.	2169.5		2175.7					
VOLUME	1659.6		1650.2					
VOL. OF ABS. H2O	74.5		74.1					
% SATERATION	61.6		63.9					
% SWELL	0.60		0.40	0.50				
LOAD IN POUNDS	2179		2272	2226				
DRY STRENGTH					78.1		78.8	78.4
WET STRENGTH	62.8		66.1	64.4				
TSR	80.1		84.2	82.1				
% VIS. STRIPPING	<10	---------->			<10	---------->		
% BROKEN AGG.	<10	---------->			<10	---------->		

Tested By: CW
Date: 4/27/15

Reviewed By: AH
Date: 4/27/15

MODIFIED LOTTMAN

SPEC 2360 MIX TYPE SPWEA340B 11% DATE 4/27/2015

	TREATED SPECIMENS				*UNTREATED SPECIMENS*			
SAMPLE I.D.	1		2		3		4	
DIAMETER	150		150		150		150	
THICKNESS	95.00		95		95.00		95.00	
DRY WT. IN AIR	3586.8		3589.9		3591.9		3591.8	
SSD WT.	3609.0		3593.5		3607.3		3606.2	
WT. IN H20	1962.5		1947.1		1964.0		1960.2	
VOLUME	1646.5		1646.4		1643.3		1646.0	
BULK Sp. Gr.	2.178		2.180	2.179	2.186		2.182	2.184
MAX Sp. Gr.	2.456		2.456	2.456	2.456		2.456	2.456
% AIR VOIDS	11.3		11.2	11.3	11.0		11.2	11.1
VOLUME AIR VOIDS	186.08		184.71	185.40				
LOAD, POUNDS					1900.7		1923.9	1912

SATURATED FOR _____ MIN. @ _____ mm.Hg

SSD WT.	3712.6		3715.1	
WT. IN H20	2068.4		2071.0	
VOLUME	1644.2		1644.1	
VOL. OF ABS. H20	125.8		125.2	
% SATURATION	67.6		67.8	67.7
% SWELL	-0.14		-0.14	-0.1

BLOWS na

CONDITIONED 24 HOURS IN 140 DEGREE F. WATER

DIAMETER	149.83		150.03					
THICKNESS	94.370		94.600					
SSD WT.	3707.0		3700.1					
WT. IN H2O.	2060.7		2055.5					
VOLUME	1646.3		1644.6					
VOL. OF ABS. H2O	120.2		110.2					
% SATERATION	64.6		59.7					
% SWELL	-0.01		-0.11	-0.06				
LOAD IN POUNDS	1343		1390	1367				
DRY STRENGTH					54.8		55.5	55.1
WET STRENGTH	39.0		40.2	39.6				
TSR	70.8		73.0	71.9				
% VIS. STRIPPING	<10	---------->			<10	---------->		
% BROKEN AGG.	<10	---------->			<10	---------->		

Tested By: CW
Date: 4/27/15

Reviewed By: AH
Date: 4/27/15

MODIFIED LOTTMAN

SPEC 2360 MIX TYPE SPWEA340B 7% DATE 4/27/2015

	TREATED SPECIMENS				*UNTREATED SPECIMENS*			
SAMPLE I.D.	1		2		3		4	
DIAMETER	150		150		150		150	
THICKNESS	95.00		95		95.00		95.00	
DRY WT. IN AIR	3754.6		3751.8		3754.5		3755.9	
SSD WT.	3763.0		3758.6		3762.7		3764.2	
WT. IN H20	2113.3		2115.0		2112.5		2116.7	
VOLUME	1649.7		1643.6		1650.2		1647.5	
BULK Sp. Gr.	2.276		2.283	2.279	2.275		2.280	2.277
MAX Sp. Gr.	2.456		2.456	2.456	2.456		2.456	2.456
% AIR VOIDS	7.3		7.1	7.2	7.4		7.2	7.3
VOLUME AIR VOIDS	120.95		115.99	118.47				
LOAD, POUNDS					2710		2733	2722

SATURATED FOR _____ MIN. @ _____ mm.Hg

SSD WT.	3833.7		3827.9	
WT. IN H20	2177.6		2183.1	
VOLUME	1656.1		1644.8	
VOL. OF ABS. H20	79.1		76.1	
% SATURATION	65.4		65.6	65.5
% SWELL	0.39		0.07	0.2

BLOWS na

CONDITIONED 24 HOURS IN 140 DEGREE F. WATER

DIAMETER	149.99		150.01					
THICKNESS	95.020		94.150					
SSD WT.	3829.1		3825.9					
WT. IN H2O.	2169.5		2175.7					
VOLUME	1659.6		1650.2					
VOL. OF ABS. H2O	74.5		74.1					
% SATERATION	61.6		63.9					
% SWELL	0.60		0.40	0.50				
LOAD IN POUNDS	2179		2272	2226				
DRY STRENGTH					78.1		78.8	78.4
WET STRENGTH	62.8		66.1	64.4				
TSR	80.1		84.2	82.1				
% VIS. STRIPPING	<10	----------			<10	----------		
% BROKEN AGG.	<10	----------			<10	----------		

Tested By: CW
Date: 4/27/15

Reviewed By: AH
Date: 4/27/15

MODIFIED LOTTMAN

SPEC 2360 MIX TYPE SPWEA330C PM 7% DATE 4/27/2015

	TREATED SPECIMENS				*UNTREATED SPECIMENS*			
SAMPLE I.D.	3		4		1		2	
DIAMETER	150		150		150		150	
THICKNESS	95.00		95		95.00		95.00	
DRY WT. IN AIR	3732.7		3730.5		3702.0		3711.2	
SSD WT.	3742.6		3742.0		3714.0		3720.1	
WT. IN H20	2096.5		2089.7		2067.0		2081.7	
VOLUME	1646.1		1652.3		1647.0		1638.4	
BULK Sp. Gr.	2.268		2.258	2.263	2.248		2.265	2.256
MAX Sp. Gr.	2.439		2.439	2.439	2.439		2.439	2.439
% AIR VOIDS	7.0		7.4	7.2	7.8		7.1	7.5
VOLUME AIR VOIDS	115.68		122.78	119.23				
LOAD, POUNDS					2917		2917	2917

SATURATED FOR _____ MIN. @ _____ mm.Hg

SSD WT.	3811.1		3813.8	
WT. IN H20	2166.1		2163.6	
VOLUME	1645.0		1650.2	
VOL. OF ABS. H20	78.4		83.3	
% SATURATION	67.8		67.8	67.8
% SWELL	-0.07		-0.13	-0.1

BLOWS na

CONDITIONED 24 HOURS IN 140 DEGREE F. WATER

DIAMETER	150.35		150.48					
THICKNESS	94.600		94.760					
SSD WT.	3816.5		3819.1					
WT. IN H2O.	2165.4		2164.0					
VOLUME	1651.1		1655.1					
VOL. OF ABS. H2O	83.8		88.6					
% SATERATION	72.4		72.2					
% SWELL	0.30		0.17	0.24				
LOAD IN POUNDS	2318.7		2202.6	2261				
DRY STRENGTH					84.1		84.1	84.1
WET STRENGTH	67.0		63.4	65.2				
TSR	79.6		75.5	77.5				
% VIS. STRIPPING	<10	---------->			<10	---------->		
% BROKEN AGG.	<10	---------->			<10	---------->		

Tested By: CW
Date: 4/27/15

Reviewed By: AH
Date: 4/27/15

MODIFIED LOTTMAN

SPEC 2360 MIX TYPE SPWEA330C PM 11 DATE 4/27/2015

	TREATED SPECIMENS				*UNTREATED SPECIMENS*			
SAMPLE I.D.	1		2		3		4	
DIAMETER	150		150		150		150	
THICKNESS	95.00		95		95.00		95.00	
DRY WT. IN AIR	3592.6		3596.4		3587.0		3586.9	
SSD WT.	3604.6		3608.9		3607.3		3597.3	
WT. IN H20	1952.2		1957.5		1962.4		1956.2	
VOLUME	1652.4		1651.4		1644.9		1641.1	
BULK Sp. Gr.	2.174		2.178	2.176	2.181		2.186	2.183
MAX Sp. Gr.	2.439		2.439	2.439	2.439		2.439	2.439
% AIR VOIDS	10.9		10.7	10.8	10.6		10.4	10.5
VOLUME AIR VOIDS	179.42		176.86	178.14				
LOAD, POUNDS					2480		2457	2469

SATURATED FOR _____ MIN. @ _____ mm.Hg

SSD WT.	3710.5		3711.4	
WT. IN H20	2065.1		2075.9	
VOLUME	1645.4		1635.5	
VOL. OF ABS. H20	117.9		115.0	
% SATURATION	65.7		65.0	65.4
% SWELL	-0.42		-0.96	-0.7

BLOWS na

CONDITIONED 24 HOURS IN 140 DEGREE F. WATER

DIAMETER	150.15		150.08					
THICKNESS	94.840		94.440					
SSD WT.	3727.2		3722.4					
WT. IN H2O.	2069.1		2085.3					
VOLUME	1658.1		1637.1					
VOL. OF ABS. H2O	134.6		126.0					
% SATERATION	75.0		71.2					
% SWELL	0.34		-0.87	-0.26				
LOAD IN POUNDS	1622		1622	1622				
DRY STRENGTH					71.5		70.8	71.1
WET STRENGTH	46.8		47.0	46.9				
TSR	65.8		66.1	65.9				
% VIS. STRIPPING	<10	---------->			<10	---------->		
% BROKEN AGG.	<10	---------->			<10	---------->		

Tested By: CW
Date: 4/27/15

Reviewed By: AH
Date: 4/27/15

MODIFIED LOTTMAN

SPEC 2360 MIX TYPE SPWEA330B 7% DATE 4/27/2015

	TREATED SPECIMENS				*UNTREATED SPECIMENS*			
SAMPLE I.D.	1		2		3		4	
DIAMETER	150		150		150		150	
THICKNESS	95.00		95		95.00		95.00	
DRY WT. IN AIR	3729.4		3731.9		3723.9		3729.4	
SSD WT.	3739.3		3740.6		3736.6		3748.2	
WT. IN H20	2087.4		2088.3		2082.1		2091.1	
VOLUME	1651.9		1652.3		1654.5		1657.1	
BULK Sp. Gr.	2.258		2.259	2.258	2.251		2.251	2.251
MAX Sp. Gr.	2.439		2.439	2.439	2.439		2.439	2.439
% AIR VOIDS	7.4		7.4	7.4	7.7		7.7	7.7
VOLUME AIR VOIDS	122.83		122.21	122.52				
LOAD, POUNDS					2411		2457	2434

SATURATED FOR _____ MIN. @ _____ mm.Hg

SSD WT.	3809.2		3812.0	
WT. IN H20	2159.1		2166.3	
VOLUME	1650.1		1645.7	
VOL. OF ABS. H20	79.8		80.1	
% SATURATION	65.0		65.5	65.3
% SWELL	-0.11		-0.40	-0.3

BLOWS na

CONDITIONED 24 HOURS IN 140 DEGREE F. WATER

DIAMETER	150.47		149.94					
THICKNESS	95.160		94.900					
SSD WT.	3822.2		3826.5					
WT. IN H2O.	2170.0		2175.9					
VOLUME	1652.2		1650.6					
VOL. OF ABS. H2O	92.8		94.6					
% SATERATION	75.6		77.4					
% SWELL	0.02		-0.10	-0.04				
LOAD IN POUNDS	2318.7		2434	2376				
DRY STRENGTH					69.5		70.8	70.2
WET STRENGTH	66.5		70.3	68.4				
TSR	94.8		100.1	97.5				
% VIS. STRIPPING	<10	---------->			<10	---------->		
% BROKEN AGG.	<10	---------->			<10	---------->		

Tested By: CW
Date: 4/27/15

Reviewed By: AH
Date: 4/27/15

MODIFIED LOTTMAN

SPEC 2360 MIX TYPE SPWEA330B 11% DATE 4/27/2015

	TREATED SPECIMENS				*UNTREATED SPECIMENS*			
SAMPLE I.D.	1		2		3		4	
DIAMETER	150		150		150		150	
THICKNESS	95.00		95		95.00		95.00	
DRY WT. IN AIR	3588.5		3588.3		3587.0		3586.9	
SSD WT.	3599.6		3608.9		3607.3		3597.3	
WT. IN H20	1952.2		1948.5		1962.4		1956.2	
VOLUME	1647.4		1660.4		1644.9		1641.1	
BULK Sp. Gr.	2.178		2.161	2.170	2.181		2.186	2.183
MAX Sp. Gr.	2.439		2.439	2.439	2.439		2.439	2.439
% AIR VOIDS	10.7		11.4	11.0	10.6		10.4	10.5
VOLUME AIR VOIDS	176.10		189.18	182.64				
LOAD, POUNDS					1761.4		1993.6	1878

SATURATED FOR _____ MIN. @ _____ mm.Hg

SSD WT.	3705.4		3717.3	
WT. IN H20	2068.4		2061.9	
VOLUME	1637.0		1655.4	
VOL. OF ABS. H20	116.9		129.0	
% SATURATION	66.4		68.2	67.3
% SWELL	-0.63		-0.30	-0.5

BLOWS na

CONDITIONED 24 HOURS IN 140 DEGREE F. WATER

DIAMETER	150.55		150.85					
THICKNESS	94.350		94.180					
SSD WT.	3724.7		3740.1					
WT. IN H2O.	2083.1		2080.6					
VOLUME	1641.6		1659.5					
VOL. OF ABS. H2O	136.2		151.8					
% SATERATION	77.3		80.2					
% SWELL	-0.35		-0.05	-0.20				
LOAD IN POUNDS	1622		1459.5	1541				
DRY STRENGTH					50.8		57.5	54.1
WET STRENGTH	46.9		42.2	44.5				
TSR	86.7		78.0	82.3				
% VIS. STRIPPING	<10	----------			<10	----------		
% BROKEN AGG.	<10	----------			<10	----------		

Tested By: CW
Date: 4/27/15

Reviewed By: AH
Date: 4/27/15

APPENDIX H

FIELD SITE SECTION PLANS AND INFORMATION

CONSTRUCTION PLANS FOR : IMPROVEMENT PROJECT 94-06

SOUTH CENTRAL AREA IMPROVEMENTS

CONSTRUCTION OF : AGGREGATE BASE, BITUMINOUS SURFACING, TRUNK SANITARY SEWER, TRUNK WATERMAIN, STORM SEWER AND CURB & GUTTER.

LOCATION MAP

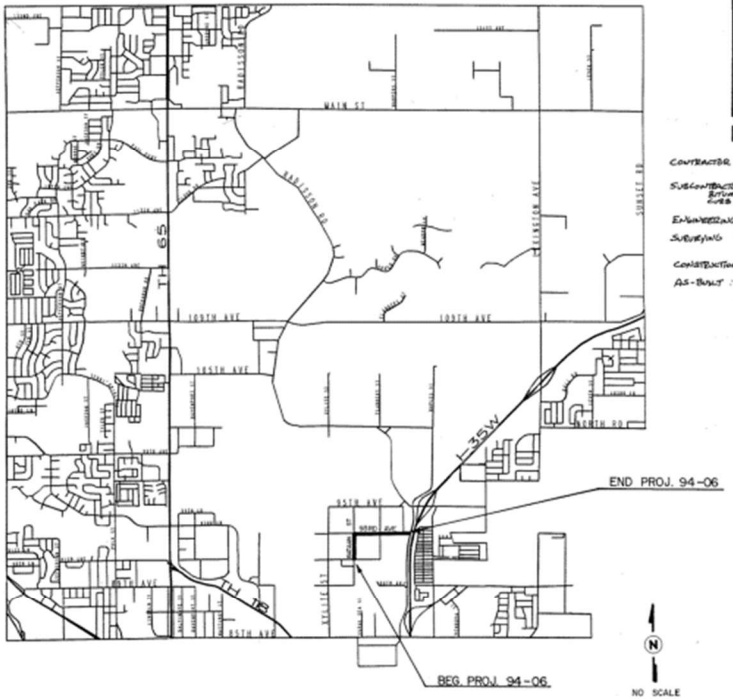
LEGEND

EXISTING

- STORM SEWER & MANHOLE
- SANITARY SEWER & MANHOLE
- WATERMAIN, HYDRANT VALVE & MANHOLE
- CULVERT
- CATCH BASIN
- BULKHEAD
- UNDERGROUND TELEPHONE CABLE OR CONDUIT
- TELEPHONE MANHOLE
- UNDERGROUND ELECTRIC CABLE OR CONDUIT
- ELECTRIC MANHOLE
- GAS MAIN & VALVE
- STREET LIGHT
- MAILBOX
- SIGN (HWY., PARK, STOP, ETC.)
- STREET SIGN
- POWER POLE W/GUY WIRE
- TREE (DECIDUOUS)
- TREE (CONIFEROUS)
- BUSH-SHRUB
- HEDGE
- WOODED AREA
- FENCE
- GUARD RAIL
- DITCH
- TRAFFIC SIGNAL
- HANDHOLE
- CONCRETE CURB & GUTTER
- BITUMINOUS CURB
- CONCRETE PAVEMENT
- BUILDING
- SECTION LINE
- QUARTER LINE
- SIXTEENTH LINE
- RIGHT OF WAY LINE

PROPOSED

- SLOPE EASEMENT
- CONSTRUCTION CENTERLINE
- RIGHT OF WAY
- STORM SEWER & MANHOLE
- SANITARY SEWER & MANHOLE
- WATERMAIN, HYDRANT VALVE & MANHOLE
- CULVERT
- CATCH BASIN
- BULKHEAD
- CONCRETE CURB & GUTTER



CONTRACTOR : Bonine Excavating Excavel, Minn.

SUBCONTRACTORS : Bituminous & Agg. Base - Midwest Asphalt Curb & Gutter - Halvorson Concrete

ENGINEERING : City of Blaine

SURVEYING : E. G. Rud & Sons Inc. Circle Pines, Minn.

CONSTRUCTION : Aug. 1994 - Nov. 1994

AS-BUILT : E. G. Rud & Sons Inc. M.G.C. City of Blaine Nov. 1995

BLAINE

ENGINEERING DEPARTMENT
9150 Central Ave., N.E. Blaine, Minnesota 55434
Phone (612) 784-6700

I hereby certify that this plan, specification or report was prepared by me or under my direct supervision and that I am a duly Registered Professional Engineer under the laws of the State of Minnesota.

Jon M. Lehy

Date 7 July 94 Minnesota Registration No. 20678

INDEX TO PLANS

SHEET	DRAWING NO.
TITLE SHEET	1
TYPICAL SECTION, SIGNING & NOTES	2
DETAILS	3-7
SANITARY SEWER & WATERMAIN	8-10
STREET & STORM SEWER	11-13
X-SECTIONS	14-21

PLAN SET NO. ( )

SIGNING

PROJECT SIGN

GENERAL CONSTRUCTION NOTES

STREET & STREWORK

ALL WORK SHALL BE CONFINED TO WITHIN THE R/W

CONTRACTOR SHALL CLEAR & GRUB OUT TO THE R/W UNLESS OTHERWISE DIRECTED BY THE ENGINEER

SIGNING, PAVEMENT MARKINGS, TRAFFIC CONTROL DEVICES, AND FLAG PERSON SHALL BE IN ACCORDANCE WITH THE 1988 MINNESOTA MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES INCLUDING APPENDIX B, DATED NOVEMBER 1992.

ALL ROAD APPROACHES SHALL BE CONSTRUCTED TO A WIDTH OF 30 FEET TO BACK OF CURB AND HAVING 30 RADII UNLESS OTHERWISE NOTED.

AT ROAD APPROACHES, CONTRACTOR SHALL END BITUMINOUS AT END OF PAVE. CLASS 5 WILL BE PLACED WHEN MATCHING INTO EXISTING GRAVEL.

CONTRACTOR SHALL INSTALL A 2' TAPER AT ENDS OF CURB AND GUTTER.

CONTRACTOR SHALL SOD ALL DISTURBED AREAS ADJACENT TO EXISTING HOUSES AND SEED REMAINING AREAS LOCATIONS WILL BE DETERMINED IN FIELD. BID PRICE SHALL INCLUDE PLACING 4" TOPSOIL.

CONTRACTOR SHALL REMOVE ALL EXISTING SIGNS AND STREET NAME SIGNS. SIGNS SHALL BE DELIVERED TO BLAINE'S PUBLIC WORKS.

DRIVEWAYS WILL BE PAVED TO R/W LINE WITH 2" TYPE 41A WEAR AND 4" CLASS 5 AGGREGATE UNLESS SHOWN OTHERWISE.

CONTRACTOR SHALL DEPRESS BACK OF CURB AT ALL DRIVEWAYS.

CONSTRUCTION LIMITS ARE DEFINED AS EXISTING R/W UNLESS SHOWN OTHERWISE.

CONCRETE DRIVEWAYS SHALL BE PLACED 6" IN DEPTH.

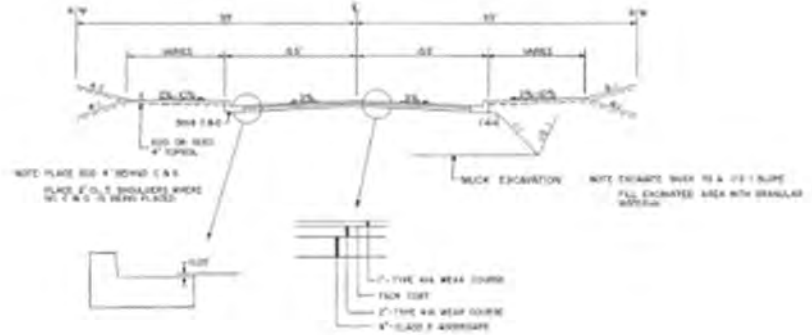
CLASS 5 FOR DRIVEWAYS = 600 TONS

SANITARY, WATERMAIN & STORM SEWER

ANY EXTENSIONS OR ADJUSTMENTS NEEDED TO PLACE HYDRANT AND GATE VALVE AT PROPER GRADE IS INCIDENTAL.

ALL SANITARY AND WATERMAIN SERVICES SHALL END 5' FROM R/W, AND BE FIELD VERIFIED AS TO PRESERVE TREES.

PLUGS FOR STORM SEWER ARE INCIDENTAL



TYPICAL SECTION

EARTHWORK SUMMARY

MUCK EXCAVATION = 674 CY (EV)

COMMON EXCAVATION = 4043 CY (EV)

GRANULAR EMBANKMENT = 2748 CY (CV)

NOTE: USE SHRINKAGE FACTOR OF (0.0% FOR NORMAL GRADING EV TO CV

ENGINEERING DEPARTMENT
9150 Central Ave. N.E. Blaine, Minnesota 55434
Phone (612) 784-6700

DATE | REVISION

PROJECT NO. 94-06
DESIGN BY: D. KNAPP | DRAWN BY: D. KNAPP
CHECKED BY: | APPROVED BY:
AS BUILT BY: | DATE:

SOUTH CENTRAL AREA IMPROVEMENTS
TYPICAL SECTION, SIGNING & NOTES

SHEET NO. 2 OF 2+ SHEETS

CONSTRUCTION PLANS FOR: IMPROVEMENT PROJECTS 94-06 A,B & D

SOUTH CENTRAL AREA IMPROVEMENTS

CONSTRUCTION OF : AGGREGATE BASE, BITUMINOUS SURFACING, CONCRETE CURB AND GUTTER, SANITARY SEWER, WATERMAIN AND STORM SEWER

LOCATION MAP

LEGEND

EXISTING

- STORM SEWER & MANHOLE
- SANITARY SEWER & MANHOLE
- WATERMAIN, HYDRANT VALVE & MANHOLE
- CULVERT
- CATCH BASIN
- BULKHEAD
- UNDERGROUND TELEPHONE CABLE OR CONDUIT
- TELEPHONE MANHOLE
- UNDERGROUND ELECTRIC CABLE OR CONDUIT
- ELECTRIC MANHOLE
- GAS MAIN & VALVE
- STREET LIGHT
- MAILBOX
- SIGN (ONE-, TWO-, FOUR-FT.)
- STREET SIGN
- POWER POLE, W/GUY WIRE
- TREE (DECIDUOUS)
- TREE (CONIFEROUS)
- BUSH, SHRUB
- HEDGE
- WOODED AREA
- FENCE
- GUARD RAIL
- DITCH
- TRAFFIC SIGNAL
- MANHOLE
- CONCRETE CURB & GUTTER
- BITUMINOUS CURB
- CONCRETE PAVEMENT
- BUILDING
- SECTION LINE
- QUARTER LINE
- SIXTEENTH LINE
- RIGHT OF WAY LINE
- OVERHEAD ELECTRIC

PROPOSED

- SLOPE EASEMENT
- CONSTRUCTION CENTERLINE
- RIGHT OF WAY
- STORM SEWER & MANHOLE
- SANITARY SEWER & MANHOLE
- WATERMAIN, HYDRANT VALVE & MANHOLE
- CULVERT
- CATCH BASIN
- BULKHEAD
- CONCRETE CURB & GUTTER
- SILT FENCE

NO SCALE

BLAINE

ENGINEERING DEPARTMENT

9150 Central Ave., N.E. Blaine, Minnesota 55434

Phone (612) 784-6700

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

Date: 8 Mar 95 License No. 20570

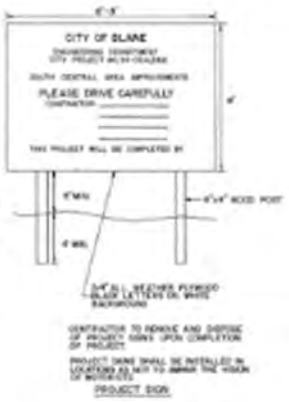
INDEX TO PLANS

SHEET	DRAWING NO.
TITLE SHEET	1
TYPICAL SECTION, SIGNING, NOTES AND TEMPORARY MAILBOXES	2
DETAILS	3-7
SANITARY SEWER AND WATERMAIN	8-10
STREET AND STORM SEWER	11-13
DITCH CLEANING	14
X-SECTIONS	15-21

PLAN SET NO.

SIGNING / TEMPORARY MAILBOXES

NOTE: EXACT SIGN LOCATIONS SHALL BE DETERMINED IN THE FIELD BY THE ENGINEER



CONTRACTOR TO REMOVE AND DISPOSE OF PROJECT SIGNS UPON COMPLETION OF PROJECT

PROJECT SIGNS SHALL BE INSTALLED IN LOCATIONS AS MAY TO ANNOUNCE THE START OF WORK (CC)

PROJECT SIGN

GENERAL CONSTRUCTION NOTES

STREET & SITEWORK

ALL WORK SHALL BE CONFINED TO WITHIN THE R/W.

CONTRACTOR SHALL CLEAR & GRUB OUT TO THE R/W UNLESS OTHERWISE DIRECTED BY THE ENGINEER.

SIGNING, PAVEMENT MARKINGS, TRAFFIC CONTROL DEVICES, AND FLAG PERSON SHALL BE IN ACCORDANCE WITH THE 2001 MINNESOTA MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES INCLUDING APPENDIX B, DATED NOVEMBER 2002.

EXISTING SIGNAGE SHALL REMAIN IN PLACE UNTIL NEW SIGNAGE IS INSTALLED.

THE CONTRACTOR SHALL PREPARE AND SUBMIT FOR APPROVAL A TRAFFIC CONTROL PLAN AND HAVE ALL CONTROL DEVICES INSTALLED PRIOR TO THE BEGINNING OF ANY WORK.

CONTRACTOR SHALL INSTALL A 2' TAPER AT ENDS OF CURB AND GUTTER.

CONTRACTOR SHALL SOD ALL DISTURBED AREAS ADJACENT TO EXISTING HOUSES AND SEED REMAINING AREAS LOCATIONS WILL BE DETERMINED IN FIELD.

CONTRACTOR SHALL REMOVE ALL EXISTING SIGNS AND STREET NAME SIGNS. SIGNS SHALL BE DELIVERED TO BLAINES PUBLIC WORKS.

DRIVEWAYS WILL BE PAVED TO R/W LINE WITH 2" TYPE 41A WEAR AND 4" CLASS 5 AGGREGATE. BITUMINOUS SAW CUT SHALL BE INCIDENTAL.

CONTRACTOR SHALL DEPRESS BACK OF CURB AT ALL DRIVEWAYS.

CONSTRUCTION LIMITS ARE DEFINED AS EXISTING R/W UNLESS SHOWN OTHERWISE.

CLASS 5 FOR DRIVEWAYS = 100 TONS

TEMPORARY MAILBOXES SHALL BE INSTALLED PRIOR TO ANY EXCAVATION AND THEY SHALL MEET ALL U.S. POSTAL SERVICE REQUIREMENTS.

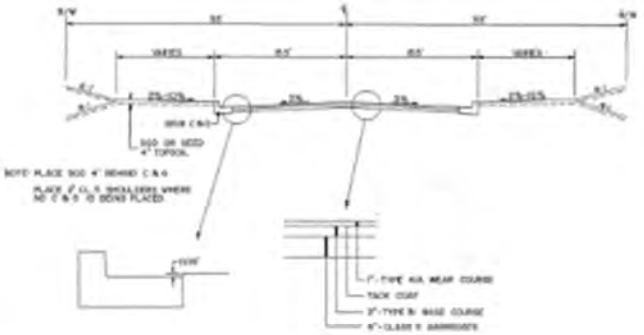
SANITARY, WATERMAIN & STORM SEWER

ANY EXTENSIONS OR ADJUSTMENTS NEEDED TO PLACE HYDRANT AND GATE VALVE AT FINISHED GRADE IS INCIDENTAL.

ALL SANITARY AND WATERMAIN SERVICES SHALL END 2' FROM R/W. AND BE FIELD VERIFIED AS TO PRESERVE TREES.

FLUES FOR STORM SEWER ARE INCIDENTAL.

STORM SEWER LENGTHS SHOWN DO NOT INCLUDE APRON LENGTHS. APRONS TAKE SEPARATELY.



TYPICAL SECTION

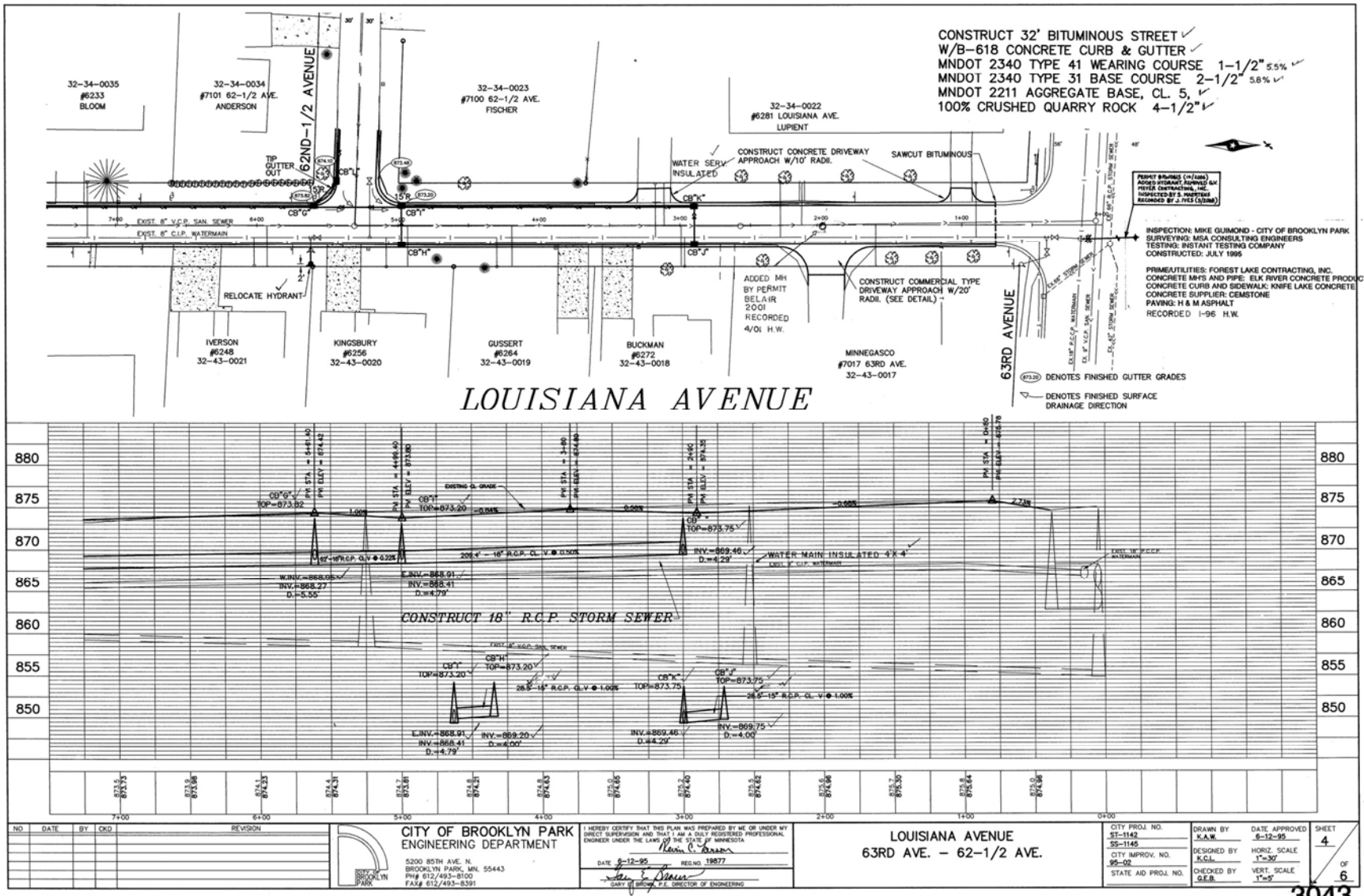
EARTHWORK SUMMARY

EXCAVATION
COMMON
4900 CY (EST)
EXTRA CLEARING
1280 CY (EST)
DRAINAGE
5060 CY (EST)

EMBANKMENT
TOPSOIL BORROW
1210 CY

NOTE: USE SHRINKAGE FACTOR OF 15% FOR NORMAL GRADING 1.2 TO CY

ENGINEERING DEPARTMENT 9150 Central Ave., N.E. Blaine, Minnesota 55434 Phone (612) 784-6700		DATE	REVISION	PROJECT NO. 94-06 DESIGN BY / DRAWN BY CHECKED BY / APPROVED BY AS BUILT BY / DATE	SOUTH CENTRAL AREA IMPROVEMENTS TYPICAL SECTION, SIGNING & NOTES SHEET NO. 2 OF 21 SHEETS



NO	DATE	BY	CKD	REVISION

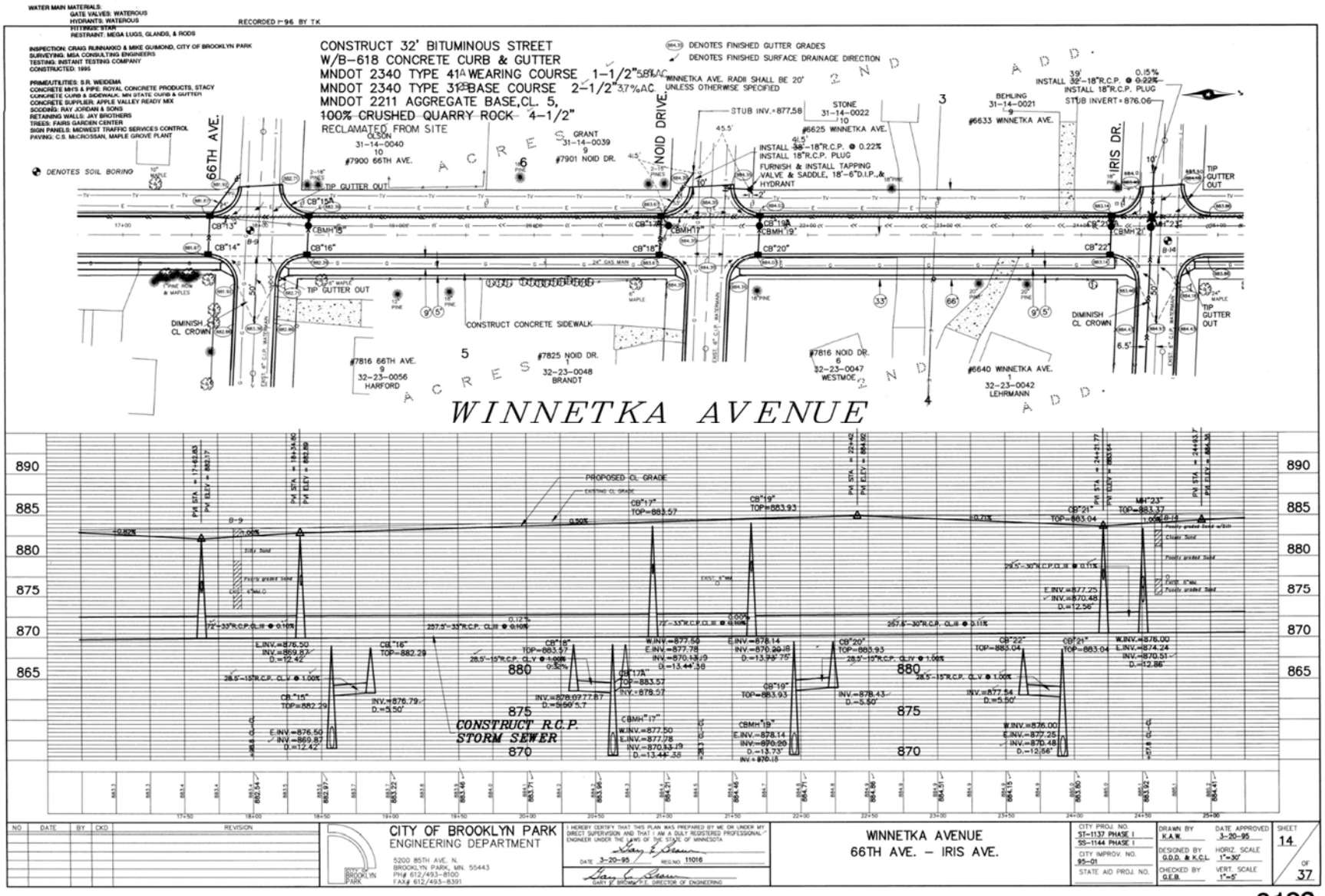
CITY OF BROOKLYN PARK
ENGINEERING DEPARTMENT
5200 85TH AVE. N.
BROOKLYN PARK, MN. 55443
PH# 612/493-8100
FAX# 612/493-8391

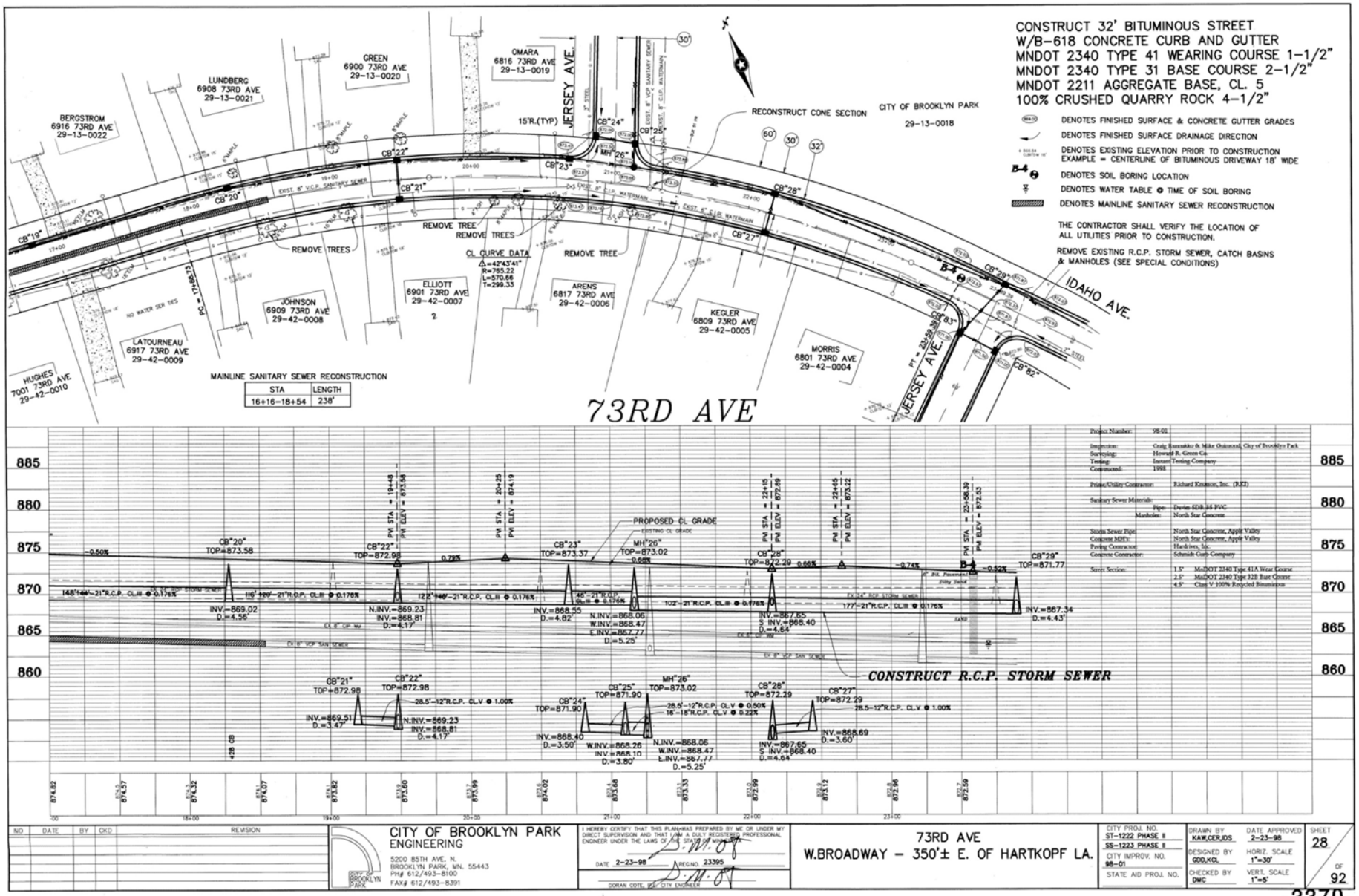
I HEREBY CERTIFY THAT THIS PLAN WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY REGISTERED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA
DATE 6-12-95 REG.NO. 19877
GARY E. BROWN, P.E. DIRECTOR OF ENGINEERING

LOUISIANA AVENUE
63RD AVE. – 62-1/2 AVE.

CITY PROJ. NO.	DRAWN BY	DATE APPROVED	SHEET
ST-1142 SS-1145	K.A.W.	6-12-95	4
CITY IMPROV. NO. 95-02	DESIGNED BY K.C.L.	HORIZ. SCALE 1"=30'	OF 6
STATE AID PROJ. NO.	CHECKED BY G.E.B.	VERT. SCALE 1"=5'	

3043


WATER MAIN MATERIALS:
GATE VALVES: WATEROUS
HYDRANTS: WATEROUS
FITTINGS: STAR
RESTRAINT: MEGA LUGS, GLANDS, & RODS
RECORDED 1-96 BY TK
INSPECTION: CRAIG RUNNAKKO & MIKE GUIMOND, CITY OF BROOKLYN PARK
SURVEYING: MSA CONSULTING ENGINEERS
TESTING: INSTANT TESTING COMPANY
CONSTRUCTED: 1995
PRIMEUTILITIES: S.R. WEIDEMA
CONCRETE MH'S & PIPE: ROYAL CONCRETE PRODUCTS, STACY
CONCRETE CURB & SIDEWALK: MN STATE CURB & GUTTER
CONCRETE SUPPLIER: APPLE VALLEY READY MIX
SODDING: RAY JORDAN & SONS
RETAINING WALLS: JAY BROTHERS
TREES: FAIRS GARDEN CENTER
SIGN PANELS: MIDWEST TRAFFIC SERVICES CONTROL
PAVING: C.S. McCROSSAN, MAPLE GROVE PLANT
DENOTES SOIL BORING
CONSTRUCT 32' BITUMINOUS STREET
W/B-618 CONCRETE CURB & GUTTER
MNDOT 2340 TYPE 41A WEARING COURSE 1-1/2" 5.8%AC
MNDOT 2340 TYPE 31 BASE COURSE 2-1/2" 3.7%AC UNLESS OTHERWISE SPECIFIED
MNDOT 2211 AGGREGATE BASE, CL. 5,
100% CRUSHED QUARRY ROCK 4-1/2"
RECLAMATED FROM SITE
DENOTES FINISHED GUTTER GRADES
DENOTES FINISHED SURFACE DRAINAGE DIRECTION
WINNETKA AVE. RADII SHALL BE 20'
STUB INV.=877.58
INSTALL 38'-18"R.C.P. @ 0.22%
INSTALL 18"R.C.P. PLUG
FURNISH & INSTALL TAPPING VALVE & SADDLE, 18'-6"D.I.P. & HYDRANT
INSTALL 32'-18"R.C.P. @ 0.15%
INSTALL 18"R.C.P. PLUG
STUB INVERT=876.06
66TH AVE.
NOID DRIVE
IRIS DR.
OLSON 31-14-0040 10 #7900 66TH AVE.
GRANT 31-14-0039 9 #7901 NOID DR.
STONE 31-14-0022 10 #6625 WINNETKA AVE.
BEHLING 31-14-0021 9 #6633 WINNETKA AVE.
#7816 66TH AVE. 9 32-23-0056 HARFORD
#7825 NOID DR. 32-23-0048 BRANDT
#7816 NOID DR. 6 32-23-0047 WESTMOE
#6640 WINNETKA AVE. 1 32-23-0042 LEHRMANN
TIP GUTTER OUT
CONSTRUCT CONCRETE SIDEWALK
DIMINISH CL CROWN
WINNETKA AVENUE
PROPOSED CL GRADE
EXISTING CL GRADE
CONSTRUCT R.C.P. STORM SEWER
CITY OF BROOKLYN PARK
ENGINEERING DEPARTMENT
5200 85TH AVE. N.
BROOKLYN PARK, MN. 55443
PH# 612/493-8100
FAX# 612/493-8391
I HEREBY CERTIFY THAT THIS PLAN WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY REGISTERED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA
DATE 3-20-95 REG.NO. 11016
GARY E. BROWN P.E. DIRECTOR OF ENGINEERING
WINNETKA AVENUE
66TH AVE. – IRIS AVE.
CITY PROJ. NO. ST-1137 PHASE I SS-1144 PHASE I
CITY IMPROV. NO. 95-01
STATE AID PROJ. NO.
DRAWN BY K.A.K.
DESIGNED BY G.D.D. & K.C.L.
CHECKED BY G.E.B.
DATE APPROVED 3-20-95
HORIZ. SCALE 1"=30'
VERT. SCALE 1"=5'
SHEET 14 OF 37
3123


CONSTRUCT 32' BITUMINOUS STREET
W/B-618 CONCRETE CURB AND GUTTER
MNDOT 2340 TYPE 41 WEARING COURSE 1-1/2"
MNDOT 2340 TYPE 31 BASE COURSE 2-1/2"
MNDOT 2211 AGGREGATE BASE, CL. 5
100% CRUSHED QUARRY ROCK 4-1/2"
DENOTES FINISHED SURFACE & CONCRETE GUTTER GRADES
DENOTES FINISHED SURFACE DRAINAGE DIRECTION
DENOTES EXISTING ELEVATION PRIOR TO CONSTRUCTION
EXAMPLE = CENTERLINE OF BITUMINOUS DRIVEWAY 18' WIDE
DENOTES SOIL BORING LOCATION
DENOTES WATER TABLE @ TIME OF SOIL BORING
DENOTES MAINLINE SANITARY SEWER RECONSTRUCTION
THE CONTRACTOR SHALL VERIFY THE LOCATION OF ALL UTILITIES PRIOR TO CONSTRUCTION.
REMOVE EXISTING R.C.P. STORM SEWER, CATCH BASINS & MANHOLES (SEE SPECIAL CONDITIONS)
RECONSTRUCT CONE SECTION
CITY OF BROOKLYN PARK
29-13-0018
JERSEY AVE.
IDAHO AVE.
73RD AVE
BERGSTROM 6916 73RD AVE 29-13-0022
LUNDBERG 6908 73RD AVE 29-13-0021
GREEN 6900 73RD AVE 29-13-0020
OMARA 6816 73RD AVE 29-13-0019
JOHNSON 6909 73RD AVE 29-42-0008
ELLIOTT 6901 73RD AVE 29-42-0007
ARENS 6817 73RD AVE 29-42-0006
KEGLER 6809 73RD AVE 29-42-0005
MORRIS 6801 73RD AVE 29-42-0004
LATOURNEAU 6917 73RD AVE 29-42-0009
HUGHES 7001 73RD AVE 29-42-0010
REMOVE TREES
REMOVE TREE
CL CURVE DATA
Δ=42°43'41"
R=765.22
L=570.66
T=299.33
MAINLINE SANITARY SEWER RECONSTRUCTION
STA | LENGTH
16+16-18+54 | 238'
PROPOSED CL GRADE
CONSTRUCT R.C.P. STORM SEWER
Project Number: 98-01
Inspection: Craig Rasmussen & Mike Guimont, City of Brooklyn Park
Surveying: Howard R. Green Co.
Testing: Instant Testing Company
Constructed: 1998
Prime/Utility Contractor: Richard Knutson, Inc. (RKI)
Sanitary Sewer Materials: Pipe: Davies SDR 35 PVC; Manholes: North Star Concrete
Storm Sewer Pipe: North Star Concrete, Apple Valley
Concrete MH's: North Star Concrete, Apple Valley
Paving Contractor: Hardrives, Inc.
Concrete Contractor: Schmidt Curb Company
Street Section: 1.5" MnDOT 2340 Type 41A Wear Course; 2.5" MnDOT 2340 Type 32B Base Course; 4.5" Class V 100% Recycled Bituminous
CITY OF BROOKLYN PARK
ENGINEERING
5200 85TH AVE. N.
BROOKLYN PARK, MN. 55443
PH# 612/493-8100
FAX# 612/493-8391
I HEREBY CERTIFY THAT THIS PLAN WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY REGISTERED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA
DATE 2-23-98 REG NO. 23395
DORAN COTE, P.E. CITY ENGINEER
73RD AVE
W.BROADWAY - 350'± E. OF HARTKOPF LA.
CITY PROJ. NO. ST-1222 PHASE II; SS-1223 PHASE II
CITY IMPROV. NO. 98-01
STATE AID PROJ. NO.
DRAWN BY KAW,CER,IDS
DESIGNED BY GDD,KCL
CHECKED BY DMC
DATE APPROVED 2-23-98
HORIZ. SCALE 1"=30'
VERT. SCALE 1"=5'
SHEET 28 OF 92
3370

City of Burnsville Stripping Under Seal Coat

Owner's Project Name	Owner's Project No.	General Contractor	Paving Contractor / Supplier	Spec	Paving Date	Stripping Observations
1950 Street, Recon	90 Recon - 1	Progressive Contractors Inc	Lola Asphalt / Alexander Sand Co	2331 + 2341	Base 8/01, Wear 8-/2027	Mod throughout project
1963 Street, Recon	91 Recon - 1	Valley Paving Inc	Valley Paving Inc	2331 Type 31 & 41	Base 8-9/02 /, Wear G-7/322/	Mod to Severe throughout project
1962 Street, Recon	92 Recon - 1	Ryan Contracting Inc	McNamara Contracting Inc	2331 Type 31 & 41	Base 8-9/02 /, Wear G-7/33 /	Erratic Area Severe / Frontier Light
1965 Street, Recon	93 Recon - 1	Richard Knutson Inc	No records - we think Valley	2331 Type 31 & 41	Base 8-9/957, Wear G-7/347	Severe throughout project
1965 Street, Recon	95-101	Valley Paving Inc	Valley Paving Inc	2331 Type 31 & 41	Base 8-9/957, Wear G-7/957	Light to Mod scattered
1965 Street, Rehab	95-101	McNamara Contracting Inc	McNamara Contracting Inc	2 MBO 2350 MV-3 (B)	8/31/2005	Light along joint - long term history?

City of
Inver Grove Heights
STREET CONDITION MAP
46th Neighborhood
47th Neighborhood
Cahill Brooks
College Trail
Pine Valley Estates
Alamedan Area
Pine Valley Estates Area

Listing of Historical Maintenance Projects

		Date	Project Type	Strategy
BROOKS BOULEVARD				
From	87TH STREET EAST			
To	BREWSTER AVENUE			
		6/1/1994	Global	Construction-AC
		9/17/2001	Local	Crack Seal
		6/5/2002	Global	Seal Coat
		9/30/2009	Global	Overlay 1
		6/15/2010	Local	Crack Seal
		6/30/2011	Local	Crack Seal
From	BAXTER WAY			
To	87TH STREET EAST			
		6/1/1994	Global	Construction-AC
		9/17/2001	Local	Crack Seal
		6/5/2002	Global	Seal Coat
		9/30/2009	Global	Overlay 1
From	BECHTEL AVENUE			
To	CAHILL AVENUE EAS			
		6/1/1994	Global	Construction-AC
		9/17/2001	Local	Crack Seal
		6/5/2002	Global	Seal Coat
		9/30/2009	Global	Overlay 1
		6/15/2010	Local	Crack Seal
		6/30/2011	Local	Crack Seal
From	BEVERLY WAY			
To	BECHTEL AVENUE			
		6/1/1994	Global	Construction-AC
		9/17/2001	Local	Crack Seal
		6/5/2002	Global	Seal Coat
		9/30/2009	Global	Overlay 1
		6/15/2010	Local	Crack Seal
		6/30/2011	Local	Crack Seal
From	BRANSON AVENUE			
To	BAXTER WAY			
		6/1/1994	Global	Construction-AC
		9/17/2001	Local	Crack Seal
		6/5/2002	Global	Seal Coat
		9/30/2009	Global	Overlay 1
		6/15/2010	Local	Crack Seal
		6/30/2011	Local	Crack Seal
From	BREWSTER AVENUE			
To	BEVERLY WAY			
		6/1/1994	Global	Construction-AC
		9/17/2001	Local	Crack Seal
		6/5/2002	Global	Seal Coat
		9/30/2009	Global	Overlay 1
		6/15/2010	Local	Crack Seal
From	BRODERICK BOULEV			
To	BRANSON AVENUE			
		6/1/1994	Global	Construction-AC
		9/17/2001	Local	Crack Seal
		6/5/2002	Global	Seal Coat
		9/30/2009	Global	Overlay 1
		6/15/2010	Local	Crack Seal

PLANS SYMBOLS

UTILITIES SYMBOLS

MINNESOTA DEPARTMENT OF TRANSPORTATION

SIBLEY COUNTY

CONSTRUCTION PLAN FOR GRADING

LOCATED ON CSAH 9 BETWEEN 1201 FEET SOUTH OF CSAH 15 AND NORTH COUNTY LINE (Geographic Description)

FROM S.W. COR. SEC. 28, T.114N., R27W TO NW. COR. SEC. 6, T.113N., R27W (Legal Description)

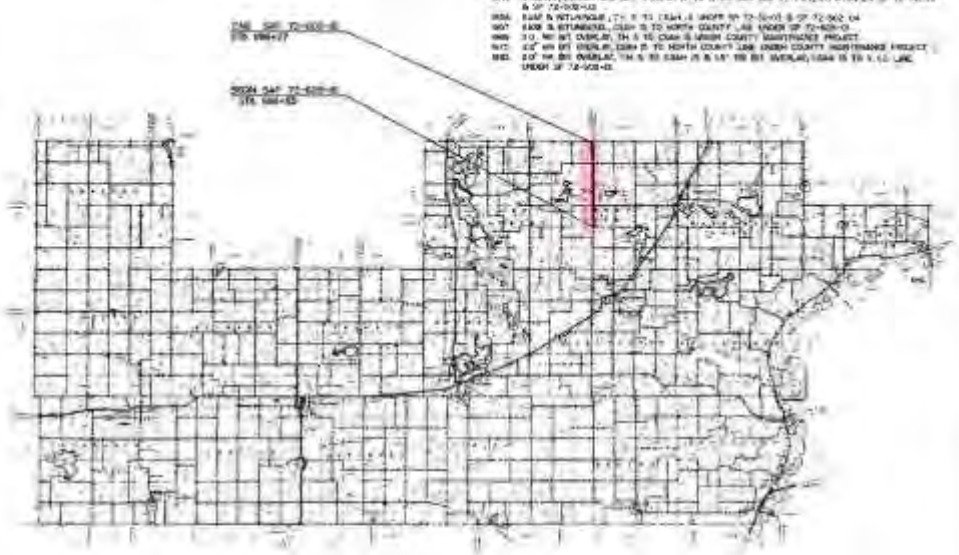
STATE AID PROJ. NO. 72-609-18

GROSS LENGTH	2,072	FEET	.39	MILES	
BRIDGE LENGTH		FEET		MILES	
EXCEPTIONS LENGTH		FEET		MILES	
NET LENGTH	2,072	FEET	.39	MILES	

STATE AID PROJ. NO.

GROSS LENGTH		FEET	MILES
BRIDGE LENGTH		FEET	MILES
EXCEPTIONS LENGTH		FEET	MILES
NET LENGTH		FEET	MILES

NOTE



MNDOT PROJ. NO.
MNRL PROJ. NO.

GOVERNING SPECIFICATIONS

THE 1988 EDITION OF THE MINNESOTA DEPARTMENT OF TRANSPORTATION STANDARD SPECIFICATIONS FOR CONSTRUCTION AND AMENDMENTS THERETO, INCLUDING SPECIAL PROVISIONS AND SPECIAL PUBLICATIONS.

INDEX

SHEET NO. 1	TITLE SHEET
SHEET NO. 2	ESTIMATED QUANTITIES & TYPICAL SECTIONS
SHEET NO. 3-7	PLAN SHEETS
SHEET NO. 8	'S' CULVERTS
SHEET NO. 9-40	X-SECTION SHEETS

THIS PLAN CONTAINS 40 SHEETS

DESIGN DESIGNATION

ESAL$_{20}$
R Value
ADT (1995) = 1250
Proj. ADT (2015) = 1625
Proj. HCADT (2015) = 90
Soil Factor .80
9 Ton Design
Shoulder Width 6 FEET

OR

Functional Classification
No. of Traffic Lanes 2 No. of Parking Lanes 0

Design Speed 60 MPH
Based on Stopping Sight Distance
Height of eye 3.5 Height of object 0.0
Design Speed not achieved at:
STA. TO STA. MPH
STA. TO STA. MPH
STA. TO STA. MPH

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

DATE 7-6-95 REG. NO. 3018 ENGR. Duane Johnson

COUNTY SIBLEY

Recommended for Approval _____ 19__

Approved _____ 19__

Recommended for Approval _____ 19__

Approved 7-6 1995

DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION
APPROVED
_____ DATE

STATE A/D PROJ. NO. 72-609-18
STATE PROJ. NO.

SHEET NO. 1 OF 40 SHEETS

DEPARTMENT OF TRANSPORTATION - STATE OF MINNESOTA 07/01/97 08:34:05

AGGREGATE TEST REPORT - BITUMINOUS AGGREGATE Lab Nos: D7-BA97057
Tested At: DISTRICT 7 Lab - Mankato, MN Submitted By: -57- EHLERS
Project Nos: SP 72-609-17 (G.ISAKSON) Bridge Nos: NA
-57- Geo-Code: 7211402533340 Pit: DUFFY
Sampled From: -57- REC 7-97014 "BELT" PRODUCTION
To Be Used For: -57- 3139-2331-31B-BA2 31LEVEL

Lab. No. BA 97	57	FIELD	REQ'D.
Date Sampled	05/30/97		3139
Date Received	06/30/97		TYPE
Field ID/Result #	31LV112	32LV112	31B
19.0 mm (3/4") SIEVE	100	100	100-100
16.0 mm (5/8") SIEVE	99	98	
12.5 mm (1/2") SIEVE	96	96	
9.5 mm (3/8") SIEVE	92	92	
4.75 mm (#4) SIEVE	72	73	40-85
2.00 mm (#10) SIEVE	57	50	
0.850 mm (#20) SIEVE	40		
0.425 mm (#40) SIEVE	23	19	
0.180 mm (#80) SIEVE	8		
0.075 mm (#200) SIEV	4.5	4	2-8

NO QUALITY TESTS PERFORMED

MEETS REQUIREMENTS

APPROVED BY

Copies: ~~PIT ENG~~
PROJ ENG (2)

MINNESOTA DEPARTMENT OF TRANSPORTATION

CONSTRUCTION PLAN FOR 2009 BITUMINOUS SEAL COAT

LOCATED ON CSAH 9, 10, 21, CR 117 & ARLINGTON SHOP LOT

COUNTY PROJECT 1101

GOVERNING SPECIFICATIONS

THE 2005 EDITION OF THE MINNESOTA DEPARTMENT OF TRANSPORTATION "STANDARD SPECIFICATIONS FOR CONSTRUCTION", SHALL GOVERN.

ALL TRAFFIC CONTROL DEVICES SHALL CONFORM TO THE LATEST EDITION OF THE "MINNESOTA MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES" (MN MUTCD), INCLUDING THE LATEST "FIELD MANUAL FOR TEMPORARY TRAFFIC CONTROL ZONE LAYOUTS."

CSAH 9 FROM TRUNK HIGHWAY 5 TO NORTH COUNTY LINE
CSAH 10 FROM CSAH 3 SOUTH TO TRUNK HIGHWAY 15
CSAH 21 FROM 13TH STREET EAST TO CSAH 12
CR 117 FROM TRUNK HIGHWAY 5 TO 0.5 MILES NORTH
SIBLEY COUNTY SHOP LOT AT ARLINGTON

SEE SHEETS 4-7 FOR LOCATION MAPS

INDEX

SHEET NO.	SHEET DESCRIPTION
1	TITLE SHEET
2	ESTIMATED QUANTITIES/NOTES
3	TYPICAL SECTIONS
4-7	LOCATION MAPS
8-11	TRAFFIC CONTROL PLANS

THIS PLAN CONTAINS 11 SHEETS.

I HEREBY CERTIFY THAT THIS PLAN 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

DATE 4/23/09 LIC. NO. 25434 PRINT NAME BRETT BENZKOFER

COUNTY: SIBLEY

DISTRICT: 7

SibleyCounty Public Works

SIBLEY COUNTY PUBLIC WORKS
111 8TH STREET
P.O. BOX 897
GAYLORD, MN 55334
P (507) 237.4092
F (507) 237.4356
www.co.sibley.mn.us

S.A.P.

COUNTY PROJECT 1101 SHEET NO. 1 OF 11 SHEETS

2:17:20 PM
4/23/2009
S:\Public Works\Highway\Projects\1101\Design\Sealcoat plan\SEALCOAT TITLE SHEET.dgn

APPENDIX I

FIELD CORES AND FIELD CORE OPERATION PHOTOGRAPHS

Full core photographs can be found online at:
ftp://ftp2.dot.state.mn.us/pub/outbound/researchservices/Chip%20Seal%20Research/

Figure I-1. Coring operations and sample core extracted from the east end of 93rd Avenue in Blaine, MN

Figure I-2. Coring operations and sample core extracted from the east end of 93rd Avenue in Blaine, MN

Figure I-3. Coring operations and sample core extracted from 73rd Avenue in Brooklyn Park, MN

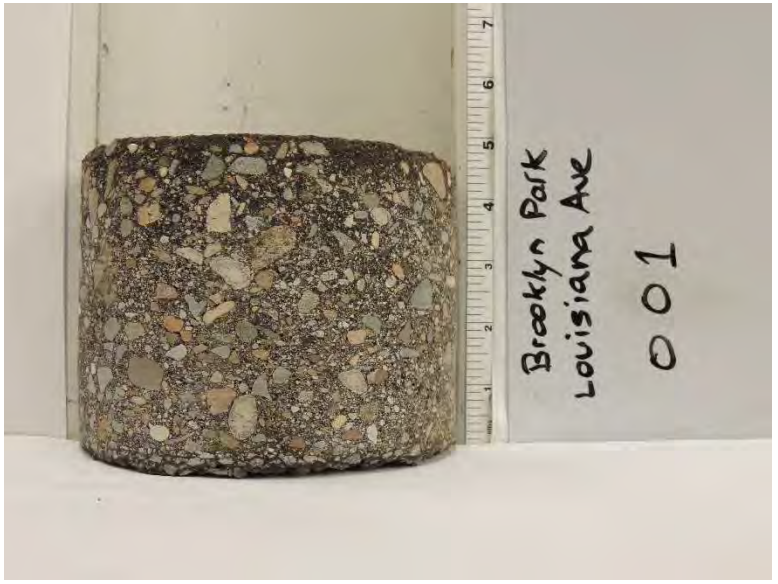


Figure I-4. Coring operations and sample core extracted from Louisiana Avenue in Brooklyn Park

Figure I-5. Coring operations and sample core extracted from Winnetka Avenue in Brooklyn Park, MN

Figure I-6. Coring operations and sample core extracted from 134th Street in Burnsville, MN

Figure I-7. Coring operations and sample core extracted from Heritage Circle in Burnsville, MN

Figure I-8. Coring operations and sample core extracted from Knob Hill in Burnsville, MN

Figure I-9. Coring operations and sample core extracted from Hyde Ave in Cottage Grove, MN

Figure I-10. Coring operations and sample core extracted from Ingberg Trail in Cottage Grove, MN

Figure I-11. Coring operations and sample core extracted from Jensen Ave in Cottage Grove, MN

Figure I-12. Coring operations and sample core extracted from Brooks Blvd. in Inver Grove Heights, MN

Figure I-13. Coring operations and sample core extracted from Osseo, MN

Figure I-14. Coring operations and sample core extracted from the north part of CSAH 9 in Sibley County, MN

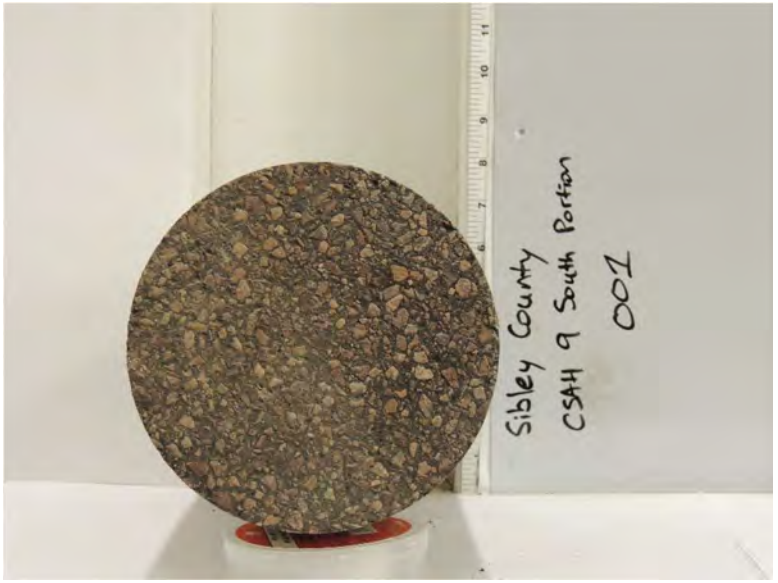


Figure I-15. Coring operations and sample core extracted from the south part of CSAH 9 in Sibley County, MN

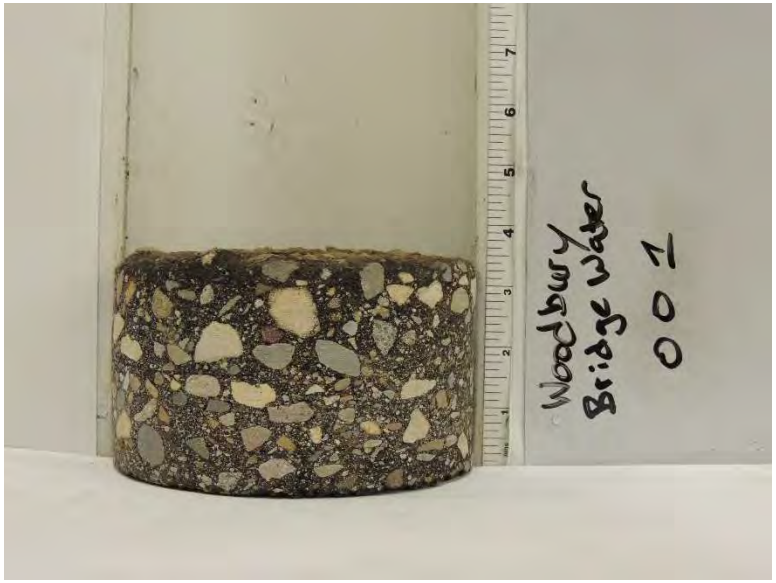


Figure I-16. Coring operations and sample core extracted from Bridgewater Road in Woodbury, MN

Figure I-17. Coring operations and sample core extracted from Newbury Alcove Cul de sac in Woodbury, MN

Figure I-18. Coring operations and sample core extracted from Newbury Alcove straight portion in Woodbury, MN

APPENDIX J

HAMBURG TEST PHOTOGRAPHS

Full core photographs can be found online at:
ftp://ftp2.dot.state.mn.us/pub/outbound/researchservices/Chip%20Seal%20Research/

Figure J-1. Paired specimen from the east end of 93rd Avenue in Blaine, MN, before Hamburg test

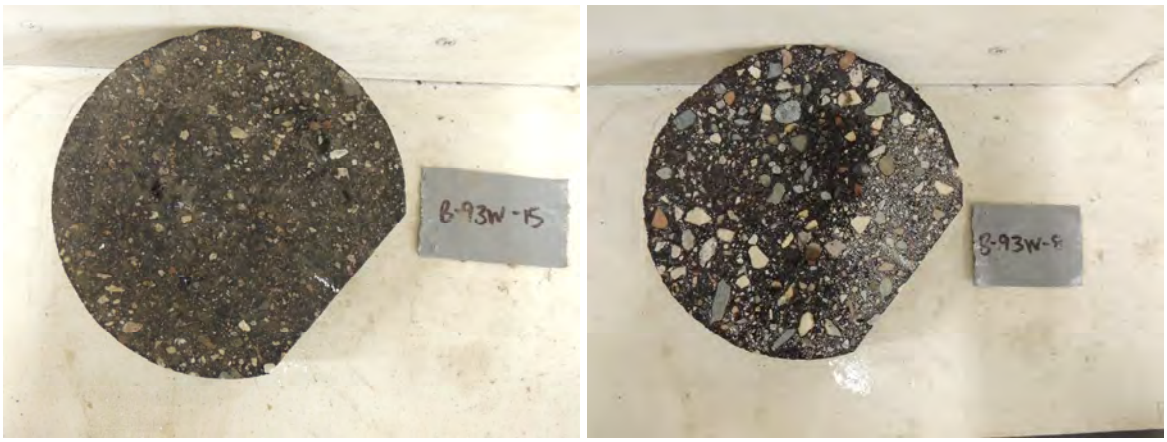


Figure J-2. Specimen from the west end of 93rd Avenue in Blaine, MN, before Hamburg test

Figure J-3. Specimen from 73rd Avenue in Brooklyn Park, MN, after Hamburg test

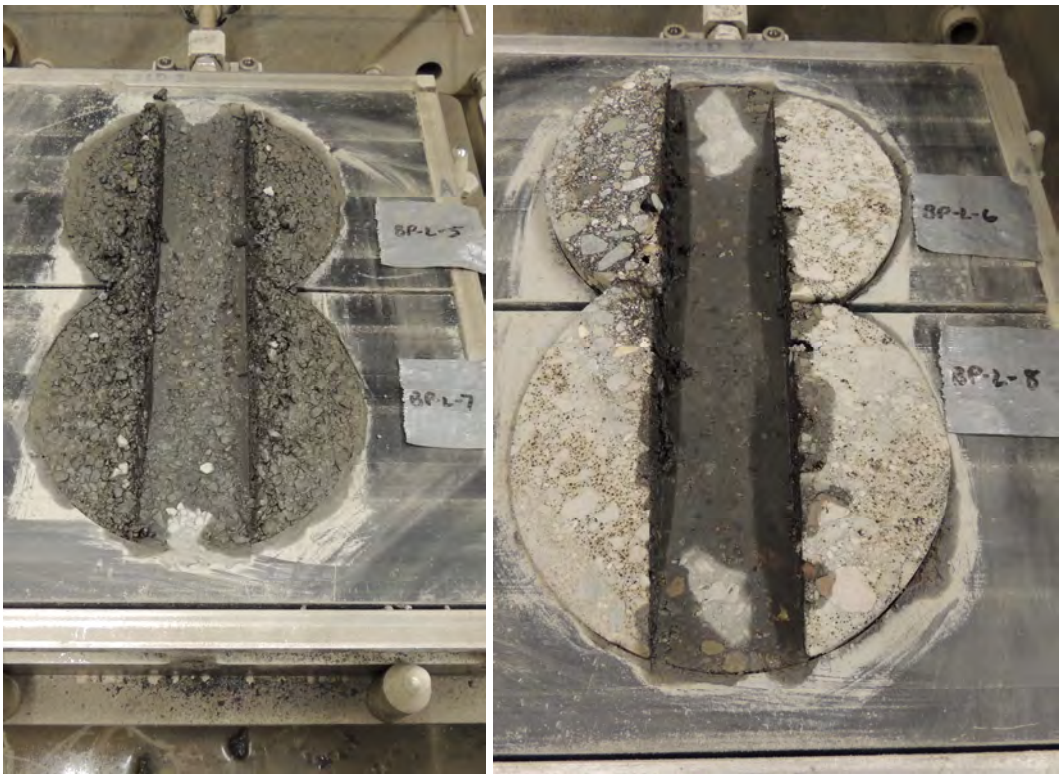


Figure J-4. Paired specimens from Louisiana Avenue in Brooklyn Park, MN, after Hamburg test

Figure J-5. Paired specimens from 134th Avenue in Burnsville, MN, before Hamburg test

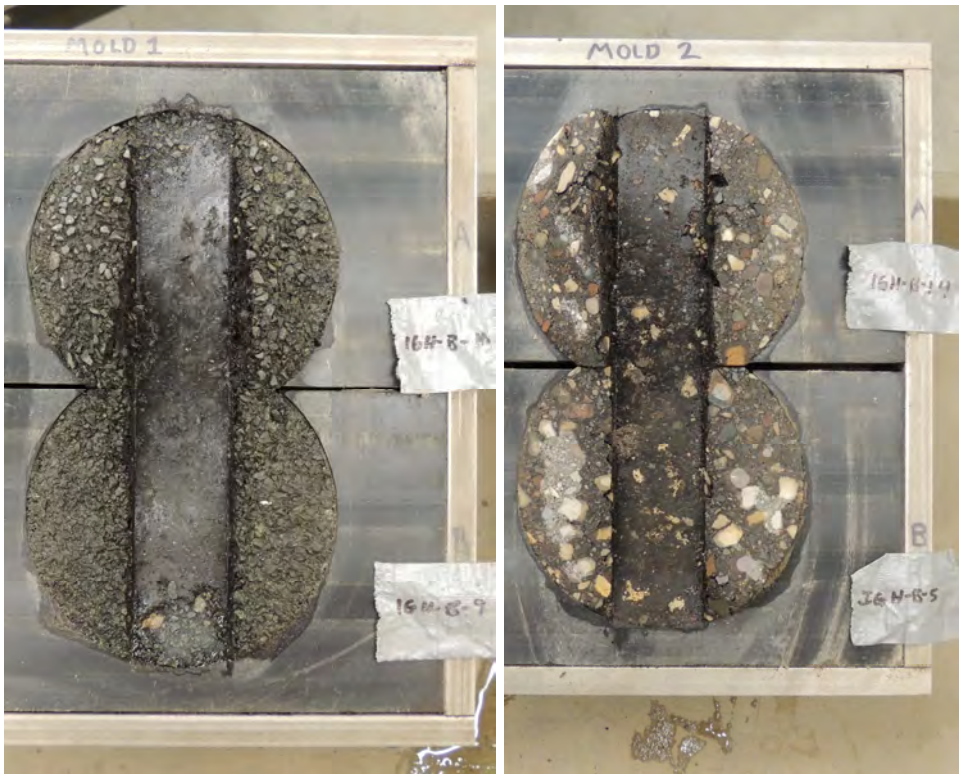


Figure J-6. Paired specimen from Brooks Blvd in Inver Grove Heights, MN, after Hamburg test

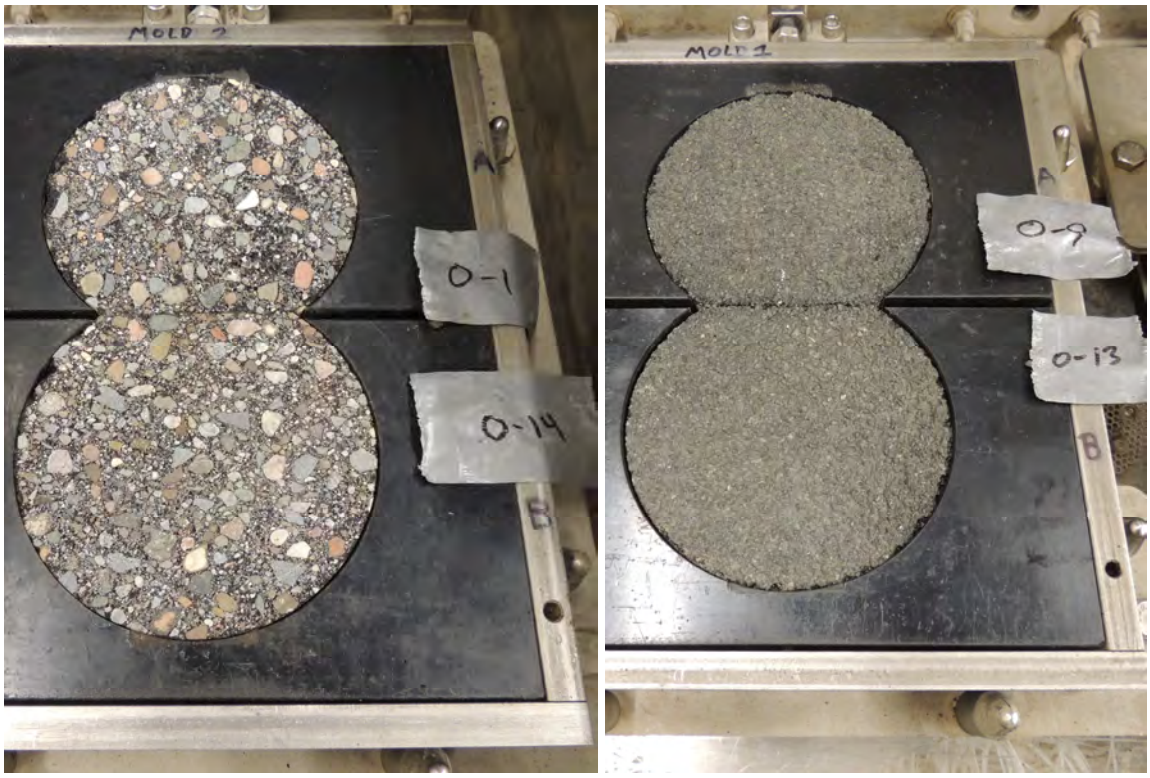


Figure J-7. Paired specimens from Osseo, MN, before Hamburg test

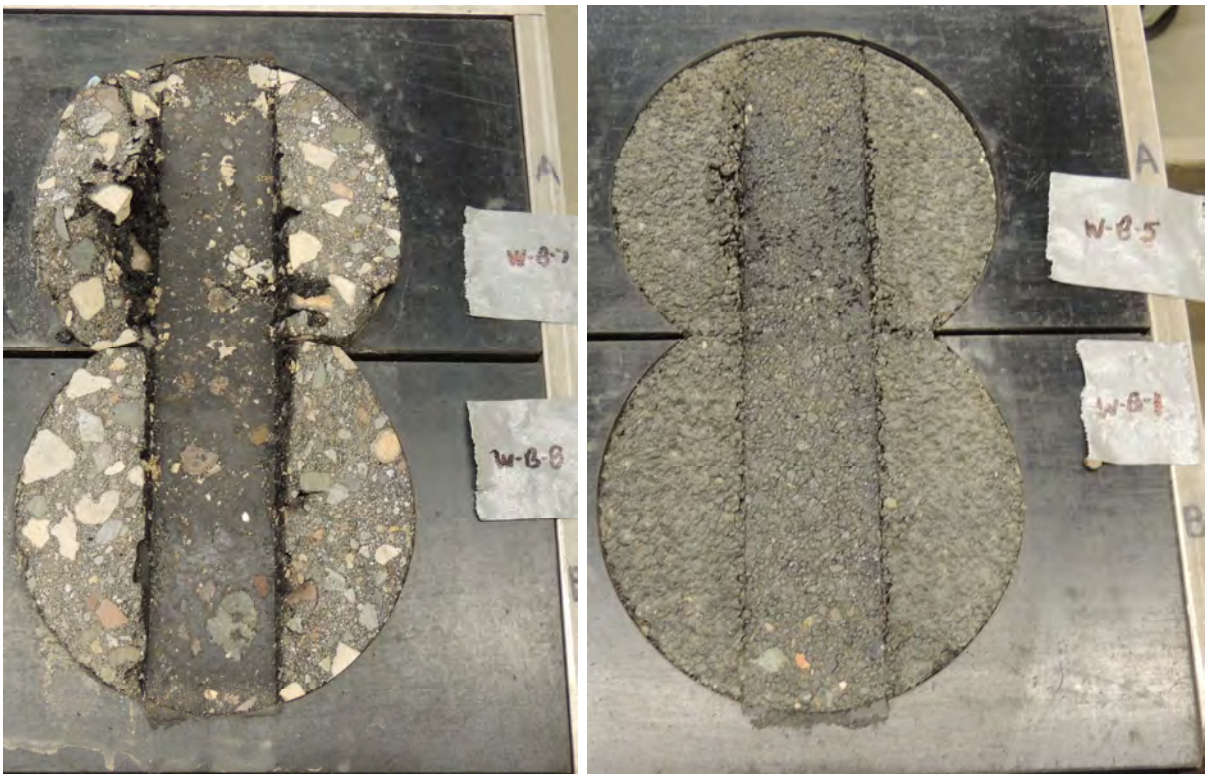


Figure J-8. Paired specimens from Bridgewater Road in Woodbury, MN, after Hamburg test

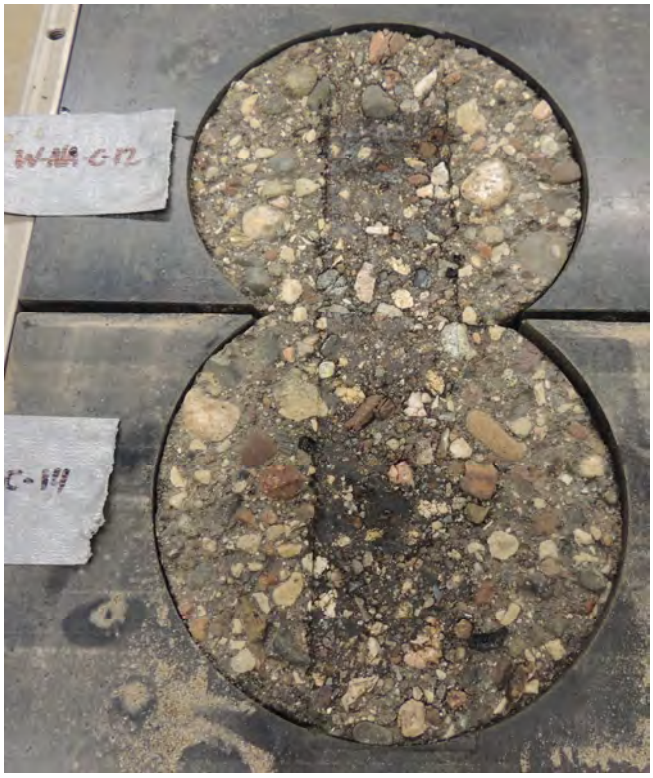


Figure J-9. Specimen without chip seal from Newbury Alcove Cul de Sac in Woodbury, MN, after Hamburg test

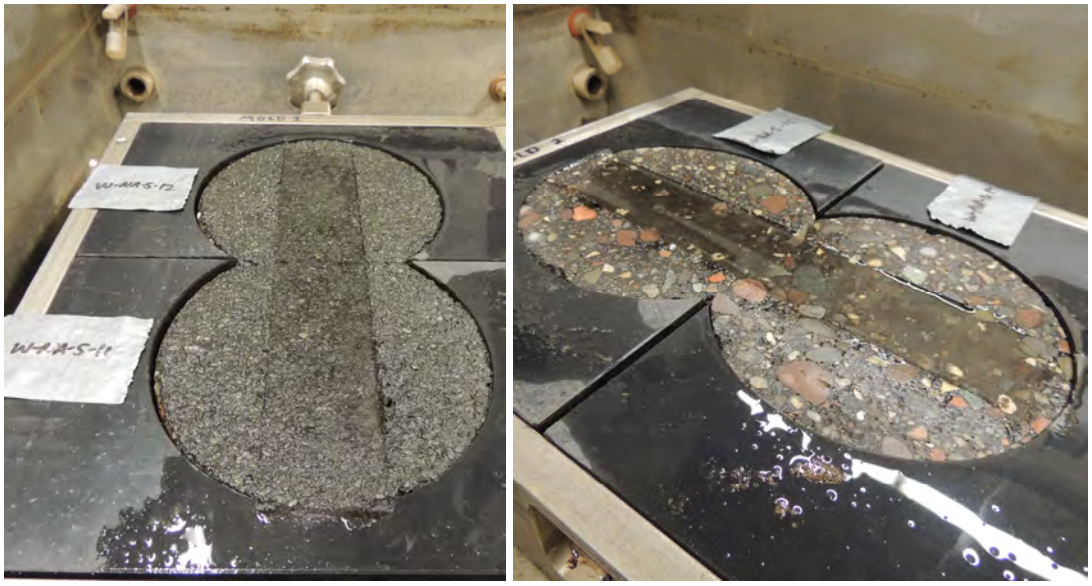


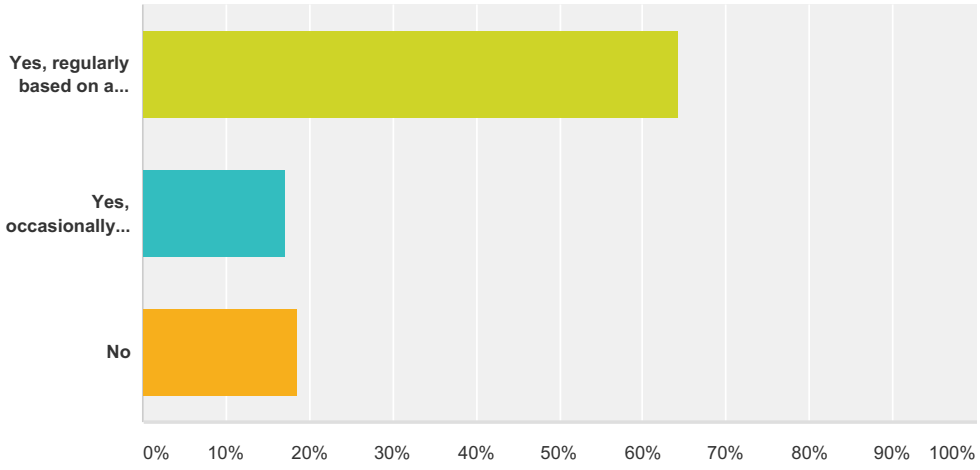
Figure J-10. Paired specimen from Newbury Alcove Straightaway in Woodbury, MN, after Hamburg test

APPENDIX K

CITY/COUNTY SURVEY AND RESPONSES

Q1 Are you currently using chipseals as part of your pavement maintenance program?

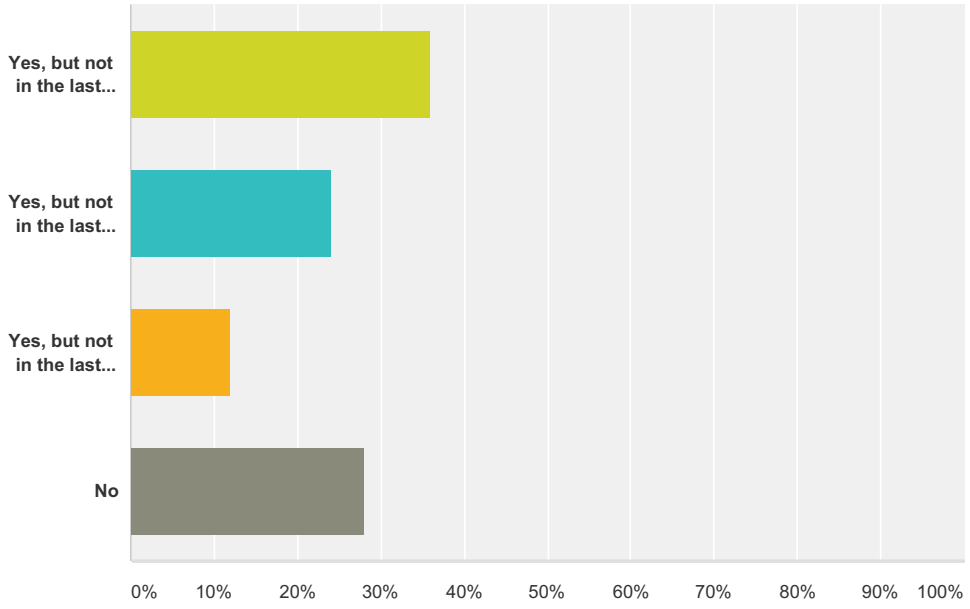
Answered: 129 Skipped: 0



Answer Choices	Responses	
Yes, regularly based on a schedule for most roadways	**64.34%**	83
Yes, occasionally depending on pavement and traffic conditions	**17.05%**	22
No	**18.60%**	24
Total		**129**

Q2 Has your organization used chipseals in the past?

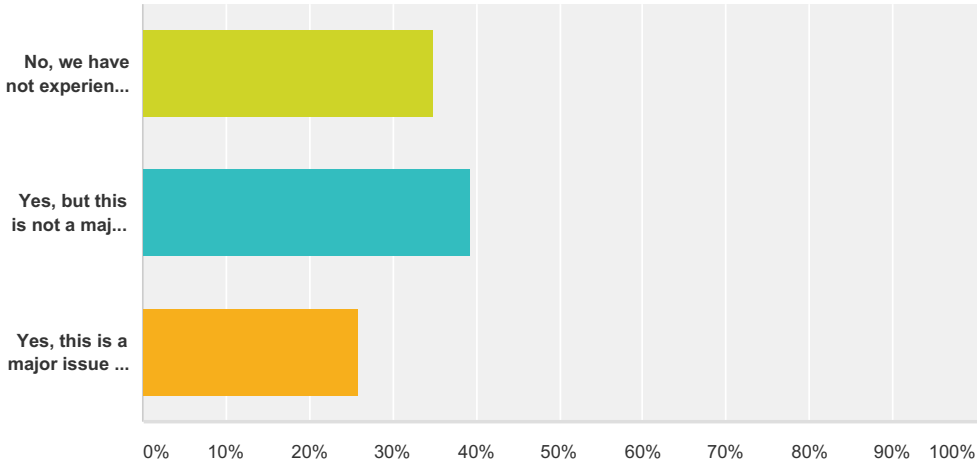
Answered: 25 Skipped: 104



Answer Choices	Responses	
Yes, but not in the last approximately 5 years	**36.00%**	9
Yes, but not in the last approximately 10 years	**24.00%**	6
Yes, but not in the last approximately 20 years	**12.00%**	3
No	**28.00%**	7
Total		**25**

Q3 On roads where chipseals have been used, have you experienced any problems with stripping or or delamination of the chipseal with the underlying layer of asphalt?Stripping is defined as a loss in the asphalt/aggregate bond resulting in raveling, a shallow surface pothole, or delamination of the chipseal surface.

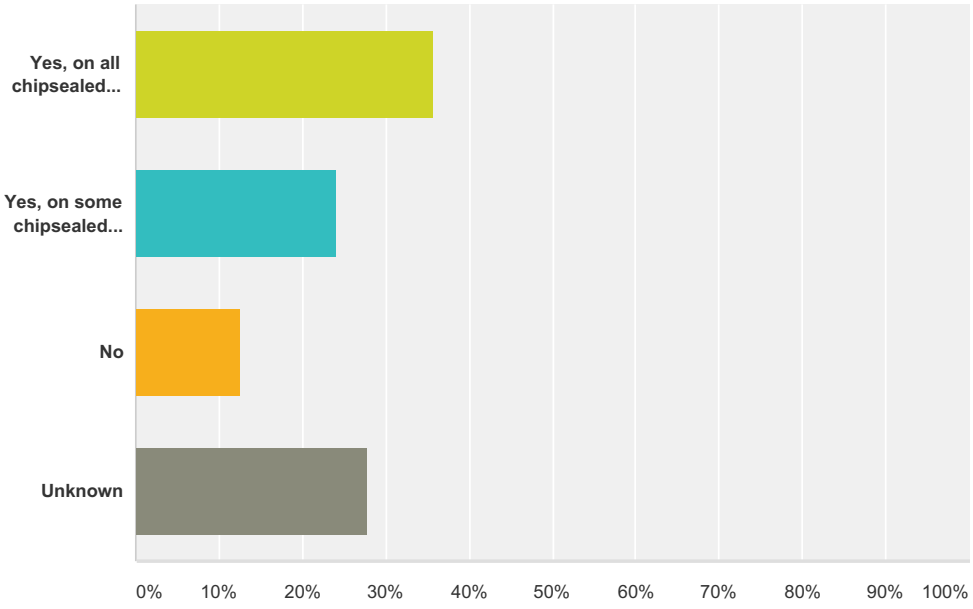
Answered: 112 Skipped: 17



Answer Choices	Responses	
No, we have not experienced this issue	**34.82%**	39
Yes, but this is not a major issue on our roadway network	**39.29%**	44
Yes, this is a major issue on our roadway network	**25.89%**	29
Total		**112**

Q4 Do you use a polymer modified emulsion with your chipseals?

Answered: 112 Skipped: 17



Answer Choices	Responses	
Yes, on all chipsealed roadways	**35.71%**	40
Yes, on some chipsealed roadways	**24.11%**	27
No	**12.50%**	14
Unknown	**27.68%**	31
Total		**112**

Q5 When did you start specifying the polymer modified emulsion?

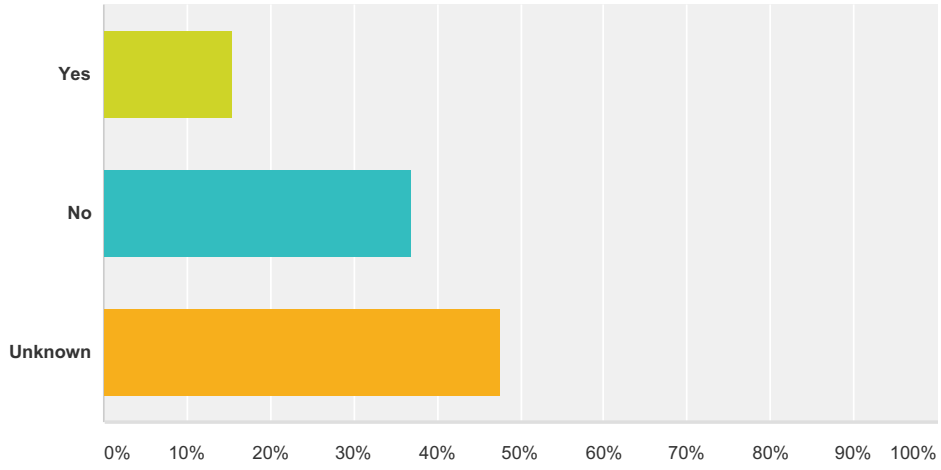
Answered: 51 Skipped: 78

#	Responses	Date
1	2005	10/28/2015 10:31 PM
2	Started doing cul-de-sacs a number of years ago. All streets this past year.	10/27/2015 12:41 PM
3	2000	10/26/2015 3:46 PM
4	?	10/24/2015 6:07 PM
5	unknown - at least 5 years	10/24/2015 10:06 AM
6	We reference MNDOT Spec 3151 & bid item is CRS-2. Not sure when MNDOT spec changed.	10/23/2015 2:26 PM
7	2008	10/22/2015 1:35 PM
8	2008	10/22/2015 10:46 AM
9	2008	10/22/2015 7:05 AM
10	2008	10/21/2015 10:26 PM
11	2014	10/21/2015 5:36 PM
12	2014	10/21/2015 4:38 PM
13	not known	10/21/2015 4:34 PM
14	5 to 10 years ago	10/21/2015 4:21 PM
15	2010	10/21/2015 2:51 PM
16	2010	10/21/2015 2:39 PM
17	2014	10/21/2015 12:01 PM
18	We have been using CRS2P for several years	10/21/2015 11:55 AM
19	2005	10/21/2015 11:35 AM
20	prior to my tenure	10/21/2015 11:30 AM
21	3 years ago	10/21/2015 11:25 AM
22	We use st. Louis County's Spec. They bid out our work	10/21/2015 11:05 AM
23	2005	10/21/2015 10:56 AM
24	2008	10/21/2015 10:53 AM
25	Not sure - likely more than 10 years ago. Used on cul-de-sac ends.	10/21/2015 10:51 AM
26	2014	10/21/2015 10:41 AM
27	2008	10/21/2015 10:30 AM
28	2010	10/21/2015 10:18 AM
29	2008	10/21/2015 10:14 AM
30	2004, for FA-3 chip seals only	10/21/2015 10:09 AM
31	Stopped chip sealing all together	10/21/2015 10:04 AM
32	On cul-de-sacs & High Volume Roads 2008	10/21/2015 10:02 AM
33	unknown	10/21/2015 9:36 AM
34	2012	10/21/2015 9:24 AM

35	2000	10/21/2015 9:22 AM
36	6 years ago.	10/21/2015 9:19 AM
37	we bid it every year, but typically don't use it because of the price difference. We use the cheaper oil with a cheaper chip. On a few occasions we've used a higher quality chip and have used the polymer emulsion. But not usually.	10/21/2015 9:14 AM
38	2012	10/21/2015 9:14 AM
39	2012	10/21/2015 9:12 AM
40	The City of Hastings has used CRS-2P oil since 2004.	10/21/2015 9:09 AM
41	2004	10/21/2015 9:08 AM
42	2014	10/21/2015 9:04 AM
43	2010	10/21/2015 9:03 AM
44	2009 or so	10/21/2015 9:02 AM
45	Don't know	10/21/2015 9:02 AM
46	over 10 years ago	10/21/2015 9:01 AM
47	yes, we used emulsion -but are not currently chip sealing	10/21/2015 9:00 AM
48	2014	10/21/2015 8:58 AM
49	2013	10/21/2015 8:57 AM
50	7-10 years ago maybe?	10/21/2015 8:55 AM
51	2015	10/21/2015 8:53 AM

Q6 Have you noticed any difference in the incidence of stripping/delamination on roads with polymer modified emulsion?

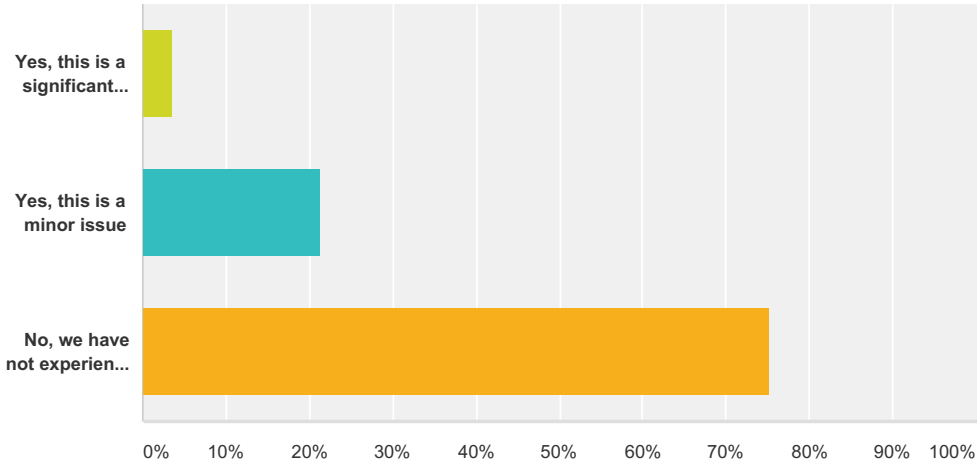
Answered: 65 Skipped: 64



Answer Choices	Responses	
Yes	**15.38%**	10
No	**36.92%**	24
Unknown	**47.69%**	31
Total		**65**

Q7 Do you have any pavements which are not chipsealed that are experiencing stripping failures? Stripping is defined as a loss in the asphalt/aggregate bond resulting in raveling, a shallow surface pothole, or delamination of the chipsealed surface.

Answered: 113 Skipped: 16



Answer Choices	Responses	
Yes, this is a significant issue	**3.54%**	4
Yes, this is a minor issue	**21.24%**	24
No, we have not experienced stripping on non-chipsealed surfaces.	**75.22%**	85
Total		**113**

Q8 Is there anything else you'd like to share about your use or non-use of chipseals?

Answered: 34 Skipped: 95

RespondentID	StartDate	Is there anything else you'd like to share about your use or non-use of chipseals?
4273372900	10/21/2015	Almost appears to be worse on roads with multiple chip seals. Maybe something to do with moisture getting trapped between the chip seal and the wear course.
4273395006	10/21/2015	Based on analysis done on our streets by Tom Wood @ MnDOT, the failure seems to be due to high air voids in the wearing course (possibly due to poor compaction).
4273399156	10/21/2015	Chip seal stripping, from our experience, has been late in the chip seal's life (year 5-7). Our specification on tack material is for a CRS-2P/CRS-2 (MnDOT Spec 3151) with an FA-2 Modified 1/8" aggregate. Not entirely sure if the CRS-2P/CRS-2 material is a polymer modified emulsion or not.
4278472353	10/23/2015	I have observed that the quantity of road salt that is placed on the road in the winter, affects the amount and area where stripping failure occurs. Please contact me if you would like to discuss. By Paul Pearson, PE, Sambatek, Inc. (ppearson@sambatek.com)
4274077158	10/21/2015	I have told our City Council for last 2 years that we no longer should do seal coating. No plans to start it up again.
4273391423	10/21/2015	I'm torn between answering number 6 as "unknown" instead of "no." Most of our roads built since the 90s have been chip sealed. The roads which haven't been chip sealed are really old roads built in the 80s (or earlier) that are now dilapidated in more ways than one.
4274626934	10/21/2015	In general, Albert Lea has not experienced a problem with this.
4273379811	10/21/2015	In regard to 6, we have limited number of non seal coated streets thus no answer. We have experienced striping below seal coat on streets paved around 1997 which is prior to us specifying anti strip additives in the bit pavement mix. The seal coats on those streets appeared to do little to prevent stripping in the mix.
4273428867	10/21/2015	Lakeville has gone away from the use of chip seals primarily because of the raveling issue, but also because we have we have started using c-oil with our bituminous mix designs, and have seen less thermal cracking, and therefore can better manage surface failures with crack filling alone.
4273512769	10/21/2015	Lots of info about non-use that I would love to share! However, the use of chip seals should all come down to a simple question: did the use extend the life of a street and safe money. In most cases and in my opinion, it cost cities millions more to use a chip seal vs. not using them. Even if there was just minor stripping and potholes, that cost still negates the benefits of using a chip seal. There are many cities that have not used chip seals and instead put the same money into crack filling and overlays. Their streets look great and they are not looking at spending millions to correct a problem that nobody can with 100% certainty tell us how to correct. If this answer to this question was known, Klayton would not have had to send this survey out.
4274195066	10/21/2015	Not finding chipseals indicated for the distresses associated with local roads. Our focus is on routing and sealing cracks and reserving resources for thin overlays to extend pavement life when patching/ride/visuals prompt complaints. There is discussion from time to time whether some sort of surface treatment is desired by the community for aesthetic purposes.
4276394004	10/22/2015	Only 3 projects done-2008, 2014 & 2015. These are thin sealcoats with a fine FA-2 trap rock.
4273380854	10/21/2015	Our focus is now on mill and overlay as we are dedicating more money to addressing the chip seal issue.
4273393443	10/21/2015	Past practice was to chipseal to the amount budgeted, which resulted in a 50 year rotation on bit streets. We now budget based on a goal of 7 year rotation, with a budget reality of about 12.
4273378017	10/21/2015	Since chip seals have not been used in over 20 years, streets that were sealed have since been overlaid or reconstructed. Not able to give condition related to stripping as a result.

RespondentID	StartDate	Is there anything else you'd like to share about your use or non-use of chipseals?
4273459913	10/21/2015	Spring Lake Park is considering using polymer modified emulsion with our future chipseals.
4273638348	10/21/2015	The answer to question 6 is because we seal coat all of our roads. On question 2, I characterized the problem as "not a major issue" only because we are seeing the failures on roads that were constructed in the 1990's (give or take). Older roads are not showing signs of this type of failure, nor are newer roads.
4273401330	10/21/2015	The City did not have a proactive Pavement Management program until 2002. As a result, we did not have many paving projects in the 1990s. Also, we used to perform sealcoats using our own crews until 2000.
4276855573	10/22/2015	There has not been any stripping issues on our new pavements where we chose not to chip seal.
4273482462	10/21/2015	This is not scientific - the correlation between stripping and seal coating seems to be more associated with pavements in the late 80's and 90's. Previous to that there seems to be less of an issue. Again - not carefully documented or analyzed.
4276693172	10/22/2015	Typically this is bid as part of the City's material bids in the spring and administered and managed by the public works director. I have little say in which roads get treated and the frequency. The public works director does this on an as needed basis as funds are available.
4274773816	10/21/2015	Using the underbelly plows seems to have an effect on removing chip seals on the high spots of the road. We started using the polymer based oil last year and have not had enough time to see if it is better.
4273395125	10/21/2015	Very minor amount of stripping observed. Seemed to be in a few isolated, heavily shaded, flat grad sections. These observations are from WI
4273383483	10/21/2015	we are actually exploring using chip seals again.
4274663236	10/21/2015	We chip seal all newly constructed roadway surfaces within one year of completion.
4273573011	10/21/2015	We continue to chipseal roads that have previously been chipseal but will no long chipseal new pavements due to major issues. Feel free to contact me for more discussion.
4274407207	10/21/2015	We have decided to forgo second round of sealcoat between overlays (or between construction and first overlay) as of 2015.
4291598661	10/29/2015	We have greatly reduced the amount of chip sealing in the last 7 years due to the issues associated with stripping of the chip seal.
4273380373	10/21/2015	We have had success extending the life of our roads by using seal coating.
4273847397	10/21/2015	we have not experienced any stripping problems with our chipseals
4275194344	10/22/2015	We have stopped chipsealing because of the stripping failures. Very frustrating.
4275713929	10/22/2015	We heard about the stripping issues and decided not to use it. We are concerned about all forms of sealcoating.
4273775103	10/21/2015	We just started chip seals this year, so we don't have much history of failures.
4273454365	10/21/2015	We quit chip sealing when the failures occurred on the chip sealed roads and there were no failures on non-chip sealed roads of the same age.

FOR LEASE

Sodium St
Radium St

Seal Coat Year

2015 - 2018
Seal Coat Program Review

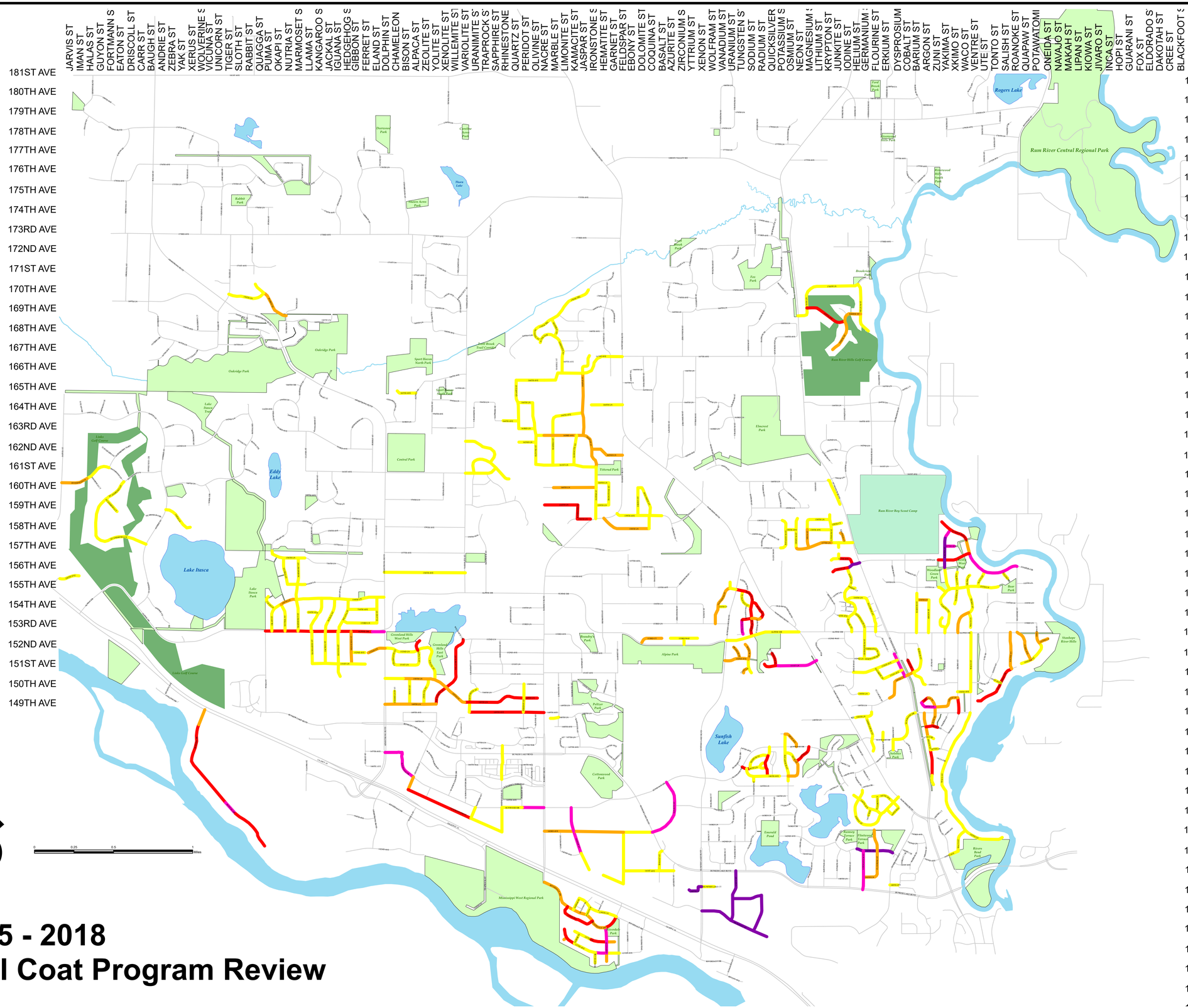
Legend

SC_YR

- 0
- 2015
- 2016
- 2017
- 2018
- Road_Centerlines
- ScoutCamp
- Golf_Courses
- Parks
- Rivers
- Lakes_Ponds
- Creeks

0 0.25 0.5 1 Miles

Stripping Ratings



2015 - 2018
Seal Coat Program Review

Public Works Committee **5. 7.**

Meeting Date: 02/18/2020

By: Bruce Westby, Engineering/Public Works

Title:

Consider Recommendation to City Council to Order Traffic Study for Bunker Lake Boulevard Reconstruction - Armstrong Boulevard to Ramsey Boulevard

Purpose/Background:

Purpose:

The purpose of this case is to consider a recommendation to the City Council to order a Traffic Study for the proposed reconstruction of Bunker Lake Boulevard between Armstrong Boulevard and Ramsey Boulevard.

Background:

In April of 2005, a Joint Powers Agreement (JPA) was executed between the City of Ramsey and Anoka County defining required public works improvements related to the Ramsey Town Center development, now referred to as The COR. Two amendments have been executed since, one in February of 2009, and the other in February of 2012. A copy of the executed JPA, including the two amendments, is attached.

The required public works improvements, which total slightly more than $13,000,000 in 2005 dollars, are generally intended to be constructed in four separate phases per the JPA. Individual project cost summaries are included in Schedules A through C. The JPA outlines the requirements of each party as related to the design and construction of the improvements, allowable use and access to County-owned properties and highways, and other terms and conditions.

Phase 1 identifies required improvements to Ramsey Boulevard from Highway 10 to 1,000 feet north of Bunker Lake Boulevard including expansion to a four lane divided highway with turn lanes and signal system modifications at Highway 10, railway crossing upgrades, and signal systems installed at Sunwood Drive and Bunker Lake Boulevard. **This work has been completed.**

Phase 2 identifies required improvements to Armstrong Boulevard from Highway 10 to 1,000 feet north of Bunker Lake Boulevard including expansion to a four lane divided highway with turn lanes and signal system modifications at Highway 10, railway crossing upgrades, and signal systems installed at Sunwood Drive and Bunker Lake Boulevard. **This work has been completed.**

Phase 3 is one of the larger and more costly improvements required by the JPA. This work includes the expansion of Bunker Lake Boulevard between Armstrong Boulevard and Ramsey Boulevard to a four lane divided highway with turn lanes and construction of signal systems at Center Street and Sunwood Drive. This project was estimated to cost $3,170,109 in 2005. **This work has not been completed and was originally intended to be completed in 2007 based on anticipated development, but was delayed when development slowed in the late 2000's.**

Phase 4 identifies required improvements to Sunfish Lake Boulevard from Highway 10 to 1,000 feet north of Bunker Lake Boulevard including expansion to a four lane divided highway with turn lanes and signal system modifications at Highway 10, railway crossing upgrades, and a signal system installed at Bunker Lake Boulevard. **This work has been completed.**

In the fall of 2019, Anoka County Highway Department staff informed City staff they want to expand Bunker Lake Boulevard to a four lane divided highway between Sunfish Lake Boulevard and Armstrong Boulevard in anticipation of the need for a reliever route due to the work proposed to Highway 10 through the cities of Coon

Rapids (adding a third lane to Highway 10 in each direction) and Anoka (the Anoka Solution improvements). Anoka County is starting to explore their right of way needs related to expanding Bunker Lake Boulevard between Sunfish Lake Boulevard and Ramsey Boulevard, and asked that the City of Ramsey begin designing the required improvements for Bunker Lake Boulevard between Armstrong Boulevard and Ramsey Boulevard per the JPA.

City Staff began developing a Request for Proposals (RFP) to solicit engineering services for completing a traffic study and preparing plans and specifications for improvements to Bunker Lake Boulevard between Armstrong Boulevard and Ramsey Boulevard. Before presenting a draft RFP to the City Council to request authorization to solicit proposals from Anoka County approved engineering consultants, the Public Works Committee was asked to recommend City Council approval of the request on November 19, 2019.

On November 19th the Public Works Committee questioned why the terms within the JPA require the City to finance and reconstruct County Road 116/Bunker Lake Boulevard, and why the City should be responsible for building and financing the improvements. If so, the Committee felt the City should have additional say in which access points are allowed onto the roadway.

The Committee directed Staff to gather additional information as follows;

1. What is the history of the terms and conditions within the JPA?
2. Contact Anoka County to discuss options for renegotiating the JPA to find efficiencies and opportunities for additional access onto Bunker Lake Boulevard.

Update on JPA Terms and Conditions

City Staff contacted the City's former Public Works Director, who was primarily charged with executing the JPA on behalf of the City of Ramsey, to inquire why the City agreed to upgrade the County Road to a 4-lane section. His response was that this was the proposed design per the mitigation section (Appendix C) of The COR AUAR (see italicized text below).

ITEM 21. TRANSPORTATION

Bunker Lake Boulevard (formerly Industry Avenue)—widen to five lane cross section west of Ramsey Boulevard to provide two through lanes in each direction and a left turn lane/center median.

Update on Anoka County Discussions

City Staff contacted Anoka County Engineer Joe MacPherson. Though the County Engineer was open the idea of discussing the renegotiation of terms within the JPA regarding the reconstruction of Bunker Lake Boulevard and the number of allowable accesses to it, he first wanted to review the JPA with some of his staff and would get back to us. However, he also was quick to point out that Anoka County's cost share would need to be renegotiated if the scope of the improvements change due to the renegotiations. As of the time this case was prepared, City staff has not received a return call.

During a meeting with the County Engineer on February 12, Staff asked if Anoka County would be open to conducting a traffic study in advance of final design for the purpose of verifying the necessary scope of the improvements based on existing and proposed traffic volumes, turning movements, and land uses. It was discussed that there have been many changes since the AUAR and JPA were executed and that a 4-lane road may no longer be necessary. The County Engineer confirmed that he thought this made sense and that he would support this.

Staff then asked if Anoka County would consider partnering with the City on a traffic study for the entire segment of Bunker Lake Boulevard between Armstrong Boulevard and Sunfish Lake Boulevard, which could offer cost-savings due to economies of scale and would ensure that the entire corridor was being studied consistently since the same engineer would be completing the study. The County Engineer expressed his willingness to consider this, and asked City Staff to send an email with such a request that he could share with his County Board on Friday to seek their approval. Staff submitted an email on February 13th is awaiting a reply.

Update on Anoka County Contributions to JPA Required Improvements

In 2005, the City issued a $4,335,000 bond on behalf of Anoka County for their share of improvements to County Roads within The COR identified in the Ramsey Town Center (RTC) Alternative Urban Area-wide Review (AUAR) and Joint Powers Agreement (JPA). Each year the city invoices Anoka County for their share of the bond payments. To date, the city has invoiced the county a total of $4,666,704.14, of which the County has paid $4,328,193.88 (their 2020 payment has not yet been received). Their annual payments go into the respective debt service fund used to pay the principal and interest payments in June and December of the respective year. These annual payments from Anoka County will end in 2025 when the bond expires. Thus, five (5) payments of $338,510.26 each are still outstanding from the county, which totals $1,692,551.30. The city must continue to pay this debt so this amount cannot be renegotiated.

Update on Availability and Use of TIF Funds

TIF funds are available to help fund the reconstruction of Bunker Lake Boulevard north of The COR between Ramsey and Armstrong Boulevards. TIF 1 has an available balance of $1,100,000, of which $1,000,000 is designated to help fund this project. TIF 2 has an available balance of $2,200,000, of which $1,500,000 is designated to help fund this project. TIF 14 has an available balance of $575,000, of which $1,150,000 is designated to help fund this project. It should be noted that TIF 14 has an existing 10 year rule date of November 28, 2021, which means that in order for project expenses to be 100% eligible for TIF 14, the work must be complete and payment must be made by November 28, 2021.

Timeframe:

Staff anticipates this case will take approximately 20 minutes to present and respond to questions.

Observations/Alternatives:

Observations:

Additional information, if available, will be presented during the meeting.

Alternatives:

Alternative #1– Motion to recommend that the City Council order a Traffic Study for the proposed reconstruction of Bunker Lake Boulevard between Armstrong Boulevard and Ramsey Boulevard.

Alternative #2 – Motion of other.

Funding Source:

Staff estimates that a traffic study required to help define the scope of the proposed improvements should take no more than two months to complete at a cost no to exceed $20,000. Attached is a copy of the project summary sheet from the adopted 2020 – 2029 CIP, which identifies estimated project costs and proposed funding sources.

Recommendation:

Staff recommends alternative #1 to allow the project to keep moving forward to ensure funds from TIF 14 can be captured in full.

Action:

Motion to recommend that the City Council order a Traffic Study for the proposed reconstruction of Bunker Lake Boulevard between Armstrong Boulevard and Ramsey Boulevard.

Attachments

Aerial Map

RTC JPA

2020-2029 CIP Sheet

Form Review

Inbox	Reviewed By	Date

Grant Riemer	Grant Riemer	02/13/2020 02:55 PM
Kurt Ulrich	Kurt Ulrich	02/13/2020 03:33 PM
Form Started By: Bruce Westby		Started On: 02/13/2020 05:28 AM
Final Approval Date: 02/13/2020		

Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, (c) OpenStreetMap contributors, and the GIS User Community, LOGIS

COPY

Anoka County Contract No. 2005-0516

JOINT POWERS AGREEMENT BETWEEN ANOKA COUNTY AND THE CITY OF RAMSEY FOR THE PUBLIC WORKS IMPROVEMENTS RELATED TO THE RAMSEY TOWN CENTER DEVELOPMENT RAMSEY, MINNESOTA

This Agreement is made and entered into this 12th day of April, 2005, by and between the County of Anoka, a political subdivision of the State of Minnesota, 2100 3rd Avenue North, Anoka, Minnesota 55303, hereinafter referred to as the "County," and the City of Ramsey, 15153 Nowthen Boulevard, Ramsey, Minnesota 55303, hereinafter referred to as the "City."

WITNESSETH:

WHEREAS, the City has entered into a development agreement with Ramsey Town Center, L.L.C. for the development of the Ramsey Town Center (hereinafter referred to as "RTC") between Trunk Highway 10, County Road No. 116, County State Aid Highway 83, and County Road No. 56, which project would require the major reconstruction and expansion of both County and State highways, as well as construction and extension of utilities to serve the RTC and surrounding areas; and,

WHEREAS, the RTC development is intense and will have a substantial impact on the movement of traffic on Trunk Highway 10, County Road No. 56, County State Aid Highway No. 83, and County Road No. 116 in the City of Ramsey as well as impacts on County State Aid Highway No. 57 in the City of Ramsey; and,

WHEREAS, because of the substantial development, significant improvements need to be made to the highway/road infrastructure; and,

WHEREAS, the City does not have sufficient funds available to pay for the cost of the improvements necessary for the development of the RTC; and,

WHEREAS, the City has proposed to use funds generated by RTC together with funds to be contributed by the County as hereinafter set forth, and other funds of and available to the City, to pay for said improvements; and,

WHEREAS, the parties hereto have agreed in principal as to the nature and extent of the improvements to be made, which improvements are described in Schedules A, B, and C (the Schedules), which are attached hereto and incorporated herein by reference and which are hereinafter collectively referred to as the "Improvements"; and,

WHEREAS, the parties hereto agree that the cost of certain of the Improvements be shared by the parties; and,

WHEREAS, the parties have agreed that it is in their best interest that the City undertake the construction of the Improvements on behalf of both parties, except as provided herein; and,

WHEREAS, Minn. Stat. § 471.59 authorizes political subdivisions of the State to enter into joint powers agreements for the joint exercise of powers common to each;

NOW, THEREFORE, it is mutually stipulated and agreed as follows:

1. PURPOSE

The parties have joined together for the purpose of constructing and/or reconstructing the roadways, drainage, trails, sidewalk, traffic control systems with EVP, as well as other utilities on a portion of County State Aid Highway No. 83 and County Road Nos. 116 and 56 and other improvements as described in the Schedules and to share in the cost of certain of said improvements, as provided hereinafter.

2. METHOD

The City shall provide all engineering services, and shall cause the construction of the Improvements referred to in the Schedules in conformance with plans and specifications to be prepared by the City and approved in writing by the County as to the Improvements to be made to the County highway system, except for those projects where the County is the lead agency as hereinafter provided. All design on County State Aid Highways and County Roads shall be based on a County approved Traffic Analysis and a sketch plan which clearly shows projected peak hour turning volumes and lane configuration at all intersections. The letting of bids and acceptance of all bid proposals shall be done by the City, except as hereinafter provided. All plans and specifications submitted to the County for review and approval shall include a detailed traffic control plan for all state and county roadways involved in the reconstruction projects. The plans and specifications must include a requirement for the contractor to obtain permits from both the state and county prior to commencing work on the facilities controlled by the State or County from the appropriate agency. All plans and specifications must be submitted to the County for review and comment a minimum of sixty (60) days prior to the advertisement for bids for work which impacts any of the county facilities located in and around the proposed development.

3. USE OF COUNTY PROPERTY

A. The County agrees to accommodate the storm water pipe and storage ponds for the RTC development on property located south of T.H. 10. Three issues need to be resolved to the satisfaction of the County by the City. First, the site has been secured with the intention of building a river crossing approach on that property. Secondly, the existence of a five year "License Agreement" with Diamonds Sports Bar and Grill for the use of the property for special events. There is at least an expectation that Diamonds Sports Bar and Grill would be compensated for their costs, should the property be unavailable to them for the initial five year period ending February 2008. Third, the alternate use of that property from the County perspective would be as replacement property for a County project related to "4-F" or "6-F" encroachment elsewhere in the County.

B. The City is to agree that they will be responsible to find, design, construct and pay for drainage and storage alternatives if the river crossing is built in this corridor.

C. The City will facilitate the cancellation of the five-year parking agreement with Gary Gruber at Diamonds Sports Bar and Grill. At a minimum, the City must obtain a letter from Diamonds Sports Bar and Grill which allows the County to rescind the existing license agreement between the County and Diamonds Sports Bar and Grill at no cost to the County.

D. The City will assist the County in finding suitable replacement property for 4F or 6F encroachments on other park land for a potential river crossing between Dayton and Ramsey, regardless of the alignment. The City's responsibility in the procurement of replacement property for 4F or 6F impacts will be limited to the acquisition of 4.47 acres of replacement property with a value of not less than $447,000.

4. ACCESS TO COUNTY HIGHWAY

A. Only three (3) full turn accesses will be allowed from the RTC development to Bunker Lake Boulevard (C.R. 116). These accesses will line up with accesses on the north side of Bunker Lake Boulevard (C.R. 116) for a total of six access points as directed in the Highway 116 Corridor Study. No additional right-in, right-out accesses onto Bunker Lake Boulevard (C.R. 116) are being allowed at this time. This provision is in agreement with the original Joint Powers Agreement between the City and the County at the time the roadway (C.R. 116) was constructed.

B. A total of three accesses are acceptable along the west side of Ramsey Boulevard (C.R. 56) as follows:

(1) A full access with Sunwood Drive, a three quarter turn access at what is to be known as Ramsey Parkway (northbound Ramsey Boulevard left onto westbound Ramsey Parkway). The City would close the left turn movements onto Ramsey Parkway at Ramsey Boulevards when traffic operation issues arise. No signalization will be requested at this location.

(2) A three quarter turn access located in the south east corner of the development property will be used for emergency vehicles (left turns out of the RTC eastbound to northbound Ramsey Boulevard). The City would post the access as emergency only and would be committed to stop illegal use by issuing tickets or installing a gate. This access point would be posted and special consideration would be given to the use of a traffic control device (i.e. gate or stop arm) to prohibit unauthorized use.

(3) No additional full access points will be allowed on the east side of Ramsey Blvd.

C. A total of two accesses along the east side of Armstrong Boulevard (C.S.A.H. 83) as follows:

(1) A full-turn access where Sunwood Drive exits the RTC development onto Armstrong Boulevard (C.S.A.H. 83), and a three quarter turn at what is to be known as Ramsey Parkway (southbound Armstrong Boulevard left onto Ramsey Parkway). The City would close the left turn movements onto Ramsey Parkway at Armstrong Boulevards when traffic operation issues arise. No signalization will be requested at this location.

(2) No additional full access points will be allowed along the west side of Armstrong Blvd.

D. Future signal systems at Sunwood Drive and Armstrong Boulevard and at Sunwood Drive and Ramsey Boulevard may need railroad pre-emption so that the queue at the signals does not back up over the tracks (northbound green prior to train arrival). The City will coordinate this design with the BNSF Rail Road and MnDOT. The County's position is that these signals should be coordinated with the respective railroad signals and Traffic control signals on TH 10. This may require the County and City to enter into a separate agreement with BNSF and MnDOT.

5. PHASES

The Improvements shall be constructed in phases, as follows:

A. Phase I (2005) - Phase one of the project includes the following components:

(1) Ramsey Boulevard is improved to a four lane divided highway from T.H. 10 to 1,000 feet north of Bunker Lake Boulevard.. This project includes signal modifications at T.H. 10 and railroad crossing upgrades (signal and surface).

(2) A full traffic actuated signal is installed at Ramsey Boulevard and Bunker Lake Boulevard and at Ramsey Boulevard and Sunwood Drive with right and left turn lanes as required for all approaches to the intersection.

(3) Turn lanes (both left and right) will be added on Bunker Lake Boulevard at Town Center Drive.

(4) Left turn lane s as required for south bound traffic and a right turn lane for north bound traffic will be added on Armstrong Boulevard at Sunwood Drive.

(5) Several city streets will be constructed south of Bunker Lake Boulevard.

B. Phase II (2006) - Phase two of the project includes the following components:

(1) Armstrong Boulevard is reconstructed from T.H. 10 to 1,000 feet north of Bunker Lake Boulevard to a four lane divided roadway. This project includes signal modifications at T.H. 10 and railroad crossing upgrades (signal and surface).

(2) Full traffic actuated signal systems would be installed at the intersections of Bunker Lake Boulevard and Armstrong Boulevard, and at Armstrong Boulevard and Sunwood Drive. All signals on Bunker Lake Boulevard shall be interconnected with an interconnect system compatible with other County interconnects.

C. Phase III (2007) - Phase three of the project includes the following components:

(1) Bunker Lake Boulevard is reconstructed to a four lane divided roadway from Armstrong Boulevard to 1,000 feet west of Ramsey Boulevard (C.R. 56).

(2) Full traffic actuated signal systems would be installed at the intersection of Bunker Lake Boulevard and Town Center Drive, Bunker Lake Boulevard at Sunfish Lake Boulevard. All signals on Bunker Lake Boulevard shall be interconnected with an interconnect system compatible with other County interconnects.

(3) The County will consider the addition of a full traffic actuated signal system at the intersection of Bunker Lake Boulevard and Sunwood Drive following receipt of additional traffic information to justify said signal system.

(4) The remaining City streets south of Bunker Lake Boulevard would be constructed. Town Center Drive north of Bunker Lake Boulevard will be

constructed. The City will insure that only six full accesses will connect to Bunker Lake Boulevard between Armstrong Boulevard and Ramsey Boulevard, with a four-legged intersection counting as two accesses. This provision is in agreement with the original Joint Powers Agreement between the City and the County at the time the roadway was constructed.

(5) Any modification of the signals existing on the project as a result of prior construction.

D. Phase IV (2007) - Phase four of the project includes the following components: Sunfish Lake Boulevard is reconstructed to a four lane divided roadway from T.H. 10 to 1000 feet north of Bunker Lake Blvd. (C.R. 116). This project includes signal improvements at C.R. 116 and C.R./C.S.A.H. 57 and at T.H. 10 and C.S.A.H. 57 and a railroad crossing upgrade to the crossing surface and signal. The County will be the lead agency on this project.

6. TERMS

A. The RTC design shall provide a pedestrian bridge over U.S. Highway 10, connecting the RTC development to Mississippi West Regional Park. This should be aligned with the proposed trail through the treatment pond south of U.S. Highway 10. This section does not prohibit the City from seeking other sources of funding to assist in construction of the pedestrian bridge.

B. The design of the Ramsey Boulevard and U.S. Highway 10 intersection must also accommodate vehicular connection between the park and Ramsey Boulevard, south of Highway 10. Ingress/egress to the park is to be constructed with turn lanes and stacking from Highway 10 to the park entrance and from the park entrance to Highway 10.

C. The proposed settling pond, treatment pond, and infiltration ponds should be designed in such a manner as to meet the following objectives:

(1) Grade a "bench" to accommodate a future trail with a minimum width of 10 feet, plus 2-foot shoulders; provide holding capacity to accommodate a 100 year flood event without over-topping the trail; and

(2) Incorporate native plant materials that are suitable to the conditions of the site and provide an aesthetic park-like appeal; and

(3) Use an outlet structure at the Mississippi River which minimizes visual and physical intrusion in the park.

D. The view shed from the park to the RTC development should be considered. To the extent possible, plant materials should be used to screen the view of buildings or other man-made structures. Consideration of evening uses of the park should also be considered in lighting of the RTC development. Light cast into the park or that is visible from the park will have a long-term detrimental impact on use of the park for evening activities.

E. The RTC design should preserve a wildlife corridor between Lake Itaska and the Mississippi River. To that end, provisions should be made in the design, development of the RTC and the future park to ensure continuity in both the alignment and natural characteristics of the wildlife corridor.

F. The City shall facilitate meetings prior to detailed design, to explore possibilities for achieving harmony in the architectural vernacular between the RTC development and the future park development, particularly where the two projects will interface, e.g. lighting, site furnishings, landscaping, etc.

G. The design of the storm sewer system throughout the development and along the outfall to the Mississippi River will provide for adequate capacity for the county roadways in and around the development area including all roadways and ditches that now naturally drain toward the intersections of Bunker Lake Boulevard (C.R. 116) with Armstrong Boulevard (C.S.A.H. 83) and Ramsey Boulevard (C.R. 56), along with all county highways and intersections between Bunker Lake Boulevard and Highway 10, inclusive of Armstrong Boulevard and Ramsey Boulevard. Adequate storage and drainage systems will be provided by the City for the ultimate section of each of those roadways listed above in their final configuration as anticipated by this Agreement.

7. COSTS

A. The contract cost of the work, or if the work is not contracted the cost of all labor, materials, normal engineering costs, equipment rental required to do the work and right-of-way acquisition costs shall constitute the actual "construction costs" and shall be so referred to herein. Total Construction Costs shall include construction costs and administrative costs such as bonding expenses, legal expenses and engineering fees, provided however, that said administrative costs shall not exceed 26 percent (26%) of the construction costs. "Estimated total construction costs" are good faith projections of costs which will be incurred for the projects.

B. Total estimated construction cost of the Improvements described in the Schedules is $13,050,372.08. These figures are based on the City estimates included in the "Summary of Estimated Project Costs for the Ramsey Town Center Improvements" which is incorporated herein by reference. The project costs shall be paid for by special assessments, City funds, State funds, Federal funds and County contributions as hereinafter provided. The projects for which the costs are to be shared by the County and the City, the estimated total cost of each project, and the County participation in each project is listed in the Schedules of this Agreement.

C. The estimated costs for the signal projects are $2,801,250 of which $1,012,500 is on T.H. 10. The remaining $1,788,750 in estimated signal costs are on County highways. Since only two of the signal systems on the County highway system are warranted, the County will not participate in paying for the cost of construction of the unwarranted signals. The county will participate in construction of and will provide ongoing maintenance for the signal systems at Armstrong Boulevard (CSAH 83) at Bunker Lake Boulevard (C.R. 116) and Sunfish Lake Boulevard (CSAH/CR 57) at Bunker Lake Boulevard (CSAH 116), in accordance with the County cost sharing policy.

(1) The City shall submit plans for each signal system, including EVP, to the County for review and approval sixty (60) days prior to the advertising for bids. The City shall pay to the County a plan review fee of $1,000 for each signal plan submitted.

(2) At a rate of six percent (6%) of the actual construction costs, the County shall provide construction observation for the construction of the signal system. The County shall have final authority to accept all roadway and signal work done within the county right of way. The estimated cost to the City for construction observation is $107,325.

(3) The City shall be responsible for all remaining construction and engineering costs.

(4) The cost participation is summarized below:

Anoka County:	$0
City of Ramsey, Signal Construction Inspection:	$107,325
City of Ramsey:	ALL REMAINING COSTS

(5) The total cost to the City for the signal inspection is estimated at $107,325.

(6) Upon award of the contract for each signal, the City shall pay to the County, upon written demand by the County, ninety five percent (95%) of its portion of

the cost of inspection of the signal system. The City's share of the cost of the project shall include only construction engineering expense and does not include administrative expenses incurred by the County.

8. CONSULTANT SERVICES

The City shall contract with a qualified consulting firm with significant experience in the design of high- speed highways. The City shall not contract with a consultant until the qualifications of said consultant are reviewed by and approved in writing by the appropriate staff of the Anoka County Highway Department. The proposed Improvements contemplated by this Agreement on T.H. 10, C.S.A.H. 83, C.R. 116, C.R. 56 and C.S.A.H./ C.R. 57 are in fact highway improvements. The design of highways is considerably different from the design of city streets and the County needs to be assured that the consultant engaged by the City are experienced in the design of highways. While the City retains the oversight for the direction given the consultants hired for these projects, the County, by entering into this Joint Powers Agreement is assured by the City that the roadways designed and built under this agreement will conform to the standards for County State Aid Highway and County Roads in Anoka County. Critical factors in design include but are not limited to: the cross section of the roadway, the transfer slope of the roadways, super elevation in curves, turn lane and taper lengths for lane changes and turn lane introductions, curb height and type, and median and edge of road drainage.

The City shall provide or contract with a qualified consulting firm, with significant and proper experience with respect to the construction and construction administration of county highways. Additionally, the city shall provide an adequate number of individuals to provide the amount of construction inspection and administration. All inspection, control of material and associated documentation for construction are to be performed in accordance with the approved construction plans, current MnDOT specifications and technical memorandums, and/or special provisions. All inspectors shall be MnDOT certified as it pertains to the operations that is being inspected. County concurrence must be obtained prior to the City authorizing Change Orders, Work Orders and/or Supplemental Agreements that significantly increase the County's cost participation.

At all times, while work is actually being performed, the City, or contracted consultant, shall have at the site of work a competent individual(s) who is (are):
Thoroughly experienced in the type of work being performed.

Authorized and fully capable of inspecting, overseeing and documenting the work in progress. Capable of reading and thoroughly understanding the plans, specification and all other pertinent documentation.

Authorized to receive instructions from the Engineer.

Should the County feel, at any time, that these requirements are not being met, the County shall have the right to request replacement of the inspection personnel.

9. DISBURSEMENT OF FUNDS

The County shall pay to the City the County's portion of the actual construction costs of each project in the form of an annual payment. The first payment amount is $266,070.76 based on an interest rate of 4.5 percent interest per year and a principal of $4,334,000 for 30 years, the payment thereafter will be $338,510.26 based on the balance of $4,262,959.05 after the first payment, at 4.5 percent interest per year over 19 years. In addition the County will obtain the $247,500 in Federal funds and apply it to the BNSF crossing improvement on Sunfish Lake Blvd. (CSAH 57). All funds disbursed by the County or City pursuant to this Agreement shall be disbursed by each entity pursuant to the method provided by law. This payment shall be made each year for twenty years on January 31 of each year. The first payment will be due on January 31, 2006.

The County shall be the lead agency on the Sunfish Lake Blvd. (CSAH 57) project. The City shall pay to the County the City's share of the actual construction cost of the work within forty-five days of the receipt of a claim voucher, containing such information as the City may reasonably require, representing that payments have been made for right of way, or on a contract or contracts for the projects outlined in this agreement.

10. CONTRACTS AND PURCHASES

All contracts let and purchases made pursuant to this Agreement shall be made by the City in conformance to the State laws.

11. CONTRACTOR INDEMNIFICATION AND INSURANCE

A. The City shall include the following wording in all of its agreements with its contractors for the design and contract services of the Improvements described in the Schedules:

> "The Contractor agrees that it will hold harmless, indemnify, and defend the County of Anoka, its commissioners, officers, agents and employees against any and all claims, expenses (including attorneys fees), losses, damages or lawsuits for damages arising from or related to providing or failing to provide services hereunder, including but not limited to the negligence of the Contractor."

In addition, all contractors providing the design and contract services of the Improvements described herein shall obtain the insurance coverage as described in Schedule D, which is attached hereto and incorporated herein by reference.

B. The City shall include the following wording in all of its Agreements with its contractors for the construction of the Improvements described in the Schedules:

> "The Contractor agrees that it will hold harmless, indemnify, and defend the County of Anoka, its commissioners, officers, agents and employees against any and all claims, expenses (including attorneys fees), losses, damages or lawsuits for damages arising from or related to providing or failing to provide services hereunder, including but not limited to the negligence of the Contractor."

In addition, all contractors providing the construction of the Improvements described herein shall obtain the insurance coverage as described in Schedule E, which is attached hereto and incorporated herein by reference.

Prior to execution, all contracts shall be forwarded to the Anoka County Attorney's office for approval as to the requirements of this section.

12. TERMINATION OF AGREEMENT BY THE COUNTY

A. The County may terminate this Agreement if the City, and the Developer of the Ramsey Town Center (RTC) do not enter into a development agreement on or before the date of this agreement which agreement provides for the development of a RTC. RTC means a unified, concentrated development having the following characteristics:

(1) Commercial mixed use development occupying a minimum of 1.0 million gross square feet of space; and

(2) Transit station suitable for conversion to a commuter rail station; and

(3) A minimum of 1,500 units of medium and high density residential units

B. The City shall provide copies of all agreements with the Developer of RTC. The County may terminate this agreement with the City if the City modifies, alters or changes any of the terms or conditions of its agreement with the Developer of the RTC.

13. TERM

This Agreement shall continue until (1) it is terminated as provided herein, or (2) until the construction provided for herein is completed and payments provided for herein are made, whichever of (1) or (2) shall first occur. Maintenance portions of this Agreement shall not terminate unless a subsequent agreement, specifically approved by the governing bodies of both parties, replaces this Agreement.

14. STRICT ACCOUNTABILITY

A strict accounting shall be made of all funds and report of all receipts and disbursements shall be made upon request by either party.

15. RIGHT OF WAY

The City shall acquire the majority of the right of way needed for this project as part of their development process. The City shall notify the County of any right of way needs not acquired through the City process a minimum of 12 months prior to the need for said right of way.

The County then shall acquire said right of way, form private property owners, that is required for the construction of the County Highway improvements through either direct purchase or condemnation. The City shall reimburse the County all costs incurred by the County in acquiring the necessary parcels. Reimbursable costs include, but are not limited to, the purchase price, recording fees, appraisal fees, attorney fees, and all costs incurred by the County in acquiring the parcels through eminent domain (hereinafter collectively referred to as "Land Acquisition Costs"). These costs shall not include County staff time.

Upon written demand by the County, the City shall pay to the County the appraised value portion of the Land Acquisition Costs. Upon final completion of the each parcel acquisition, the City shall pay for all remaining Land Acquisition Costs within 30 days after receipt of an invoice from the County documenting the expenses incurred.

After construction has been completed, the City shall convey the property it acquired to widen/improve the county highways by warranty deed to the County.

16. SIGNALIZATION POWER

The City shall at their sole expense, install or cause the installation of an adequate electrical power source to the service cabinet for all signalized intersections including any necessary extension of power lines. The City shall be the lead agency in this matter. Upon completion of said traffic control signal installations, the ongoing cost of the electrical power to the signal shall be the sole cost and expense of the City.

17. MAINTENANCE

Maintenance of the completed water main, sanitary sewer, storm sewer (except catch basins and catch basin leads on county highways), detention basins (including ponds and their outlet structures and any grit chambers/collectors including the "Vetch Stormwater Treatment System") shall be the sole obligation of the City.

The County will maintain the County State Aid Highways and County Roads following completion of the construction and during winter suspension of work so long as the road surface is bituminous. If for any reason the road surface is not hard surfaced by winter suspension of work the City shall maintain the road surface continuously until work resumes.

Maintenance of all trails and sidewalks, including snow plowing, shall be the sole responsibility of the City.

Maintenance of streetlights and cost of electrical power to the streetlights shall be the sole obligation of the City.

Maintenance of all city streets shall be the solid obligation of the City.

The City shall be responsible to maintain all medians which the City has designated for plantings. Maintenance shall be performed in accordance with the "Anoka County Highway Department Landscape/Streetscape Guidelines dated June 2000." If the City does not comply with these

guidelines, the County at any time may remove all plantings and landscaping items and replace with hard surfacing in its place. The City shall be billed by the County for all costs incurred.

Nothing in this Agreement shall affect the terms and conditions of the Maintenance Agreement between the State of Minnesota, the City, and the County for the signals located at the intersections of T.H. 10 with C.R. 56, Ramsey Boulevard and T.H. 10 at the intersection with C.S.A.H. 83 (Armstrong Boulevard).

Maintenance of the completed signal systems at the intersections of Bunker Lake Boulevard (C.R. 116) at Armstrong Boulevard (CSAH 83) and Bunker Lake Boulevard at Sunfish Lake Boulevard shall be the sole obligation of the County except that the city shall provide the electrical power at these locations. The exception being that the City shall reimburse the County for maintaining the luminaries and EVP.

This Agreement contemplates the installation of several unwarranted signal systems. These traffic signals are located at the intersections of Armstrong Boulevard and Sunwood Drive, Bunker Lake Boulevard and Town Center Drive, Bunker Lake Boulevard and Ramsey Boulevard, and Ramsey Boulevard and Sunwood Drive, and the possibility for a signal system exists at the intersection of Sunwood Drive and Bunker Lake Boulevard. None of these signal systems are currently warranted under the standard warranting procedure. Consequently, the cost of maintenance of these traffic signals falls entirely to the City of Ramsey and the City will be billed on a quarterly basis for the maintenance of said signal systems by the County, in accordance with the following:

Maintenance of the completed signals and signal equipment shall be performed by the County at the sole obligation of the City.

The County shall perform and maintain the traffic signal controller, traffic signal and pedestrian indications, loop detectors and associated wiring of the said traffic control signals and bill the costs to the City on a quarterly basis for all costs incurred.

Painting of the traffic signals, if standard colors are used, shall be the sole obligation of the City. Timing of the traffic signals shall be determined by the County.

Only the County shall have access to the controller cabinets.

The traffic control signals shall be the property of the County.

The City shall be responsible for maintenance of the luminaries, luminary relamping, and luminary painting.

All maintenance of the EVP Systems shall be completed by the County. The City shall be billed by the County on a quarterly basis for all incurred costs at all locations.

EVP Emitter Units may be installed on and used only by Emergency Vehicles responding to an emergency, as defined in Minnesota Statutes §169.01, Subdivision 5, and §169.03. The City shall provide a list to the County Traffic Engineer, or the County's duly appointed representative, of all such vehicles with emitter units on an annual basis.

Malfunctions of the EVP Systems shall be immediately reported to the County.

All timing of said EVP Systems shall be determined by the County.

In the event said EVP Systems or components are, in the opinion of the County, being misused, or the conditions set forth are violated, and such misuse or violation continues after receipt by the City of written notice thereof from the County, the County shall remove the EVP Systems. Upon removal of the EVP Systems pursuant to this paragraph, the field wiring, cabinet wiring, detector receiver, infrared detector heads and indicator lamps and all other components shall become the property of the County.

18. NOTICE

For purposes of delivery of any notices hereunder, the notice shall be effective if delivered to the County Administrator of Anoka County, 2100 3rd Avenue North, Anoka, Minnesota 55303, on behalf of the County, and the City Administrator of Ramsey, 15153 Nowthen Boulevard North West, Ramsey, Minnesota 55303, on behalf of the City.

19. INDEMNIFICATION

The City and the County mutually agree to indemnify and hold harmless each other from any claims, losses, costs, expenses or damages resulting from the acts or omissions of the respective officers, agents or employees relating to activities conducted by either party under this Agreement.

20. ENTIRE AGREEMENT REQUIREMENT OF A WRITING

It is understood and agreed that the entire agreement of the parties is contained herein and that this Agreement supersedes all oral agreements and all negotiations between the parties relating to the subject matter thereof, as well as any previous agreement presently in effect between the parties to the subject matter thereof. Any alterations, variations, or modifications of the provisions of this Agreement shall be valid only when they have been reduced to writing and duly signed by the parties.

IN WITNESS WHEREOF, the parties of this Agreement have hereto set their hands on the dates written below:

COUNTY OF ANOKA

By: _____
Margaret Langfeld Chair
County Board of Commissioners

Dated: 5/12/05

CITY OF RAMSEY

By: _____

Title: Mayor

Dated: 4-26-2005

ATTEST

By: _____
John "Jay" McLinden
County Administrator

Dated: 5/12/05

By: _____

Title: City Administrator

Dated: 4-26-2005

RECOMMENDED FOR APPROVAL

By: _____
Douglas W. Fischer, P.E.
County Engineer

Dated: 5/11/05

By: _____

Title: _____

Dated: _____

APPROVED AS TO FORM

By: _____
Dan Klint
Assistant County Attorney

Dated: 5-12-05

By: _____

Title: _____

Dated: _____

Schedule A – Improvements to County Highway

ESTIMATED TOTAL PROJECT	COST	COUNTY SUBTOTALS	COUNTY PARTICIPATION
C.S.A.H. No. 83	$1,991,400.53	$1,123,650.00	
COUNTY ROAD 56	$2,689,002.90	$1,350,450.00	
C.S.A.H. No. 57	$ 847,500.00	$ 678,900.00	
COUNTY ROAD 116	$3,170,109.15	$1,228,500.00	
Subtotal Schedule A	**$8,698,012.58**		**$4,134,000**
Federal funds obtained by the County for BNSF Crossing On Sunfish Lake Blvd. (CSAH 57)			**$ 247,500**

Schedule B – Traffic Signals

Ramsey Blvd (C.R.56) at Bunker Lake Blvd. (C.R. 116)	$ 200,000.00	$0
Bunker Lake Blvd. (C.R. 116) at "N" Street	$ 200,000.00	$0
Armstrong Blvd. (C.S.A.H. 83) at Bunker Lake Blvd (C.R. 116)	$ 200,000.00	$100,000
Armstrong Blvd. (C.S.A.H. 83) at Sunwood Drive	$ 175,000.00	$0
Bunker Lake Blvd. (C.R. 116) at "A" Street	NOT ALLOWED $0.	$0
Bunker Lake Blvd. (C.R. 116) at "B" Street	NOT ALLOWED $0	$0
Ramsey Blvd. (C.R. 56) at Sunwood Dr..	$ 175,000.00	$0
Sunwood Dr at Industry Ave (C.R. 116)	$ 175,000.00	$0
Bunker Lake Blvd. (C.R. 116) at Sunfish Lake Blvd. (C.S.A.H./C.R. 57)	$ 200,000.00	$100,000
T.H. 10 at Armstrong Blvd. (C.R. 83)	$ 250,000.00	$0
T.H. 10 at Ramsey Blvd. (C.R. 56)	$ 250,000.00	$0
T.H. 10 at Sunfish Lake Blvd. (C.S.A.H. 57	$ 250,000.00	$0
	$2,075,000.00	$0
OVERHEAD & CONTINGENCY:	$ 726,250.00	$0

Subtotal B – Traffic Signals:	**$2,801,250.00**	**$200,000**

Schedule C – Trunk Storm Sewer Improvements & Outfall to River

Item	Description	Extension	
1.	Jack 60" Casing	$78,000.00	
2.	Jack 48" RCP	$126,000.00	
3.	48" Carrier Pipe	$13,760.00	
4.	42" RC Pipe Sewer Design 3006 CL III	$21,600.00	
5.	48" RC Pipe Sewer Design 3006 CL III	$13,760.00	
6.	Jack 42" RCP	$434,000.00	
7.	42" FES	$3,200.00	
8.	48" FES	$15,200.00	
9.	42" Outlet Structure	$5,000.00	
10.	Skimmer Structure	$12,000.00	
11.	Pond Liner	$254,250.00	
12.	Sand Cushion	$169,200.00	
13.	Storm Manhole	$3,000.00	
	Subtotal:	$1,148,970.00	$0
	OVERHEAD & CONTINGENCY 35%:	$402,139.50	$0

Subtotal C – Trunk Storm Sewer Costs: $1,551,109.50

MAXIMUM TOTAL COUNTY PARTICIPATION: $4,581,500

SCHEDULE D
INSURANCE REQUIREMENTS

Bidders/contractors/consultants shall procure and maintain for the duration of the contract, insurance coverage for injuries to persons or damages to property which may arise from or in connection with the performance of the work hereunder by the bidder/contractor/consultant, their agents, representatives, employees or subcontractors. **ANOKA COUNTY CONTRACT NUMBER:** _____.

1. Minimum Scope of Insurance: Coverage shall be at least as broad as follows:

1.1 Insurance Services Office (ISO) Commercial General Liability coverage (occurrence form CG 00 01 or a substitute form providing equivalent coverage), and shall cover liability arising from premises, operations, independent contractors, products-completed operations, personal injury, advertising, and liability assumed under an insured contract (including the tort liability of another assumed in a business contract).

1.2 Business Automobile Liability coverage shall be written on ISO form CA 00 01, CA 00 05, CA 00 12, CA 00 20, or substitute for providing equivalent liability coverage. Such insurance shall cover liability arising out of any auto (including owned, hired, and non-owned autos).

1.3 Workers' Compensation as required by the State of Minnesota, and Employer's Liability insurance.

1.4 Professional Liability or Errors and Omissions insurance appropriate for the profession. Coverage shall be maintained for at least two years following the completion of work.

2. Minimum Limits of Insurance: Bidder/contractor/consultant shall maintain **NO LESS THAN:**

2.1 Commercial General Liability (CGL) and if necessary, Commercial Umbrella Liability: $1,000,000 each occurrence. If Commercial General Liability insurance contains a general aggregate limit, it shall apply separately to this project/location, or the general aggregate limit shall be twice the required occurrence limit.

2.2 Business Automobile Liability and if necessary, Commercial Umbrella Liability: $1,000,000 each accident for bodily injury and property damage.

2.3 Employers Liability: as required by the State of Minnesota

2.4 Professional Liability or Errors and Omissions: $1,000,000 per occurrence.

3. Deductibles and Self-Insured Retention

Any deductibles or self-insured retention must be declared to and approved by the County. At the option of the County, either: the insurer shall reduce or eliminate such deductibles or self-insured retention as respects Anoka County, agents, officers, directors, and employees; or the bidder/contractor/consultant shall procure a bond guaranteeing payment of losses and related investigations, claim administration and defense expenses; or the bidder/contractor/consultant shall provide County-requested financial statements for the

purpose of verifying financial solvency, and acceptance of deductibles or self-insured retention based on this verification.

4. Other Insurance Provisions

4.1 The General Liability policy is to contain, or be endorsed to contain, the following provision: **Anoka County, its agents, officers, directors, and employees are to be covered as an additional insured for all liability coverages using ISO additional insured endorsement CG 20 10 or substitute providing equivalent coverage.** This insurance shall apply as primary insurance with respect to any other insurance or self-insurance program. The County's insurance shall be excess of the contractor/consultant's insurance and shall not contribute to it. The contractor/consultant's coverage shall contain no special limitations on the scope of protection afforded to the County, its agents, officers, directors, and employees.

4.2 Any failure to comply with reporting provisions of the policies shall not affect coverage provided to the County, its officers, officials, employees or volunteers.

4.3 Each insurance policy required by this clause shall be endorsed to state that coverage shall not be suspended, voided, or canceled by either party, reduced in coverage or in limits, or non-renewed, except after thirty (30) days prior written notice by certified mail, return receipt requested, has been given to the County.

4.4 The Contractor shall include all subcontractors as insured under its policies or **furnish separate certificates and endorsements for each subcontractor where applicable.** All coverage for subcontractors shall be subject to all of the requirements stated herein.

4.5 Each insurance policy shall include an endorsement that waives any claim or right in the nature of subrogation to recover against the County, its agents, officers, directors, and employees.

5. Acceptability of Insurers

Insurance is to be placed with insurers with a current A.M. Best rating of A:VII, unless otherwise acceptable to the County.

6. Verification of Coverage

Contractor shall furnish the County with certificates of insurance and original endorsements effecting coverage required by this clause. ***The certificate attached to this contract should be signed by a person authorized by that insurer to bind coverage on its behalf. A certificate other than the one attached may be used if coverages and endorsements match or exceed the coverages identified on the attached certificate.*** All certificates and endorsements are to be received and approved by the County before work commences. The County reserves the right to require complete, certified copies of all required insurance policies and endorsements at any time.

SCHEDULE E
INSURANCE REQUIREMENTS

Bidders/contractors/consultants shall procure and maintain for the duration of the contract, insurance coverage for injuries to persons or damages to property which may arise from or in connection with the performance of the work hereunder by the bidder/contractor/consultant, their agents, representatives, employees or subcontractors. **ANOKA COUNTY CONTRACT NUMBER:** _____.

1. Minimum Scope of Insurance: Coverage shall be at least as broad as follows:

1.1 Insurance Services Office (ISO) Commercial General Liability coverage (occurrence form CG 00 01 or a substitute form providing equivalent coverage), and shall cover liability arising from premises, operations, independent contractors, products-completed operations, personal injury, advertising, and liability assumed under an insured contract (including the tort liability of another assumed in a business contract).

1.2 Business Automobile Liability coverage shall be written on ISO form CA 00 01, CA 00 05, CA 00 12, CA 00 20, or substitute for providing equivalent liability coverage. Such insurance shall cover liability arising out of any auto (including owned, hired, and non-owned autos).

1.3 Workers' Compensation as required by the State of Minnesota, and Employer's Liability insurance.

1.4 Umbrella Liability insurance.

2. Minimum Limits of Insurance: Bidder/contractor/consultant shall maintain **NO LESS THAN:**

2.1 Commercial General Liability (CGL) and if necessary, Commercial Umbrella Liability: $2,000,000 each occurrence. If Commercial General Liability insurance contains a general aggregate limit, it shall apply separately to this project/location, or the general aggregate limit shall be twice the required occurrence limit.

2.2 Business Automobile Liability and if necessary, Commercial Umbrella Liability: $2,000,000 each accident for bodily injury and property damage.

2.3 Employers Liability: $1,000,000 for bodily injury or disease.

2.4 Umbrella Liability: $1,000,000 each occurrence.

3. Deductibles and Self-Insured Retention

Any deductibles or self-insured retention must be declared to and approved by the County. At the option of the County, either: the insurer shall reduce or eliminate such deductibles or self-insured retention as respects Anoka County, agents, officers, directors, and employees; or the bidder/contractor/consultant shall procure a bond guaranteeing payment of losses and related investigations, claim administration and defense expenses; or the bidder/contractor/consultant

shall provide County-requested financial statements for the purpose of verifying financial solvency, and acceptance of deductibles or self-insured retention based on this verification.

4. Other Insurance Provisions

4.1 The General Liability policy is to contain, or be endorsed to contain, the following provision: **Anoka County, its agents, officers, directors, and employees are to be covered as an additional insured for all liability coverages using ISO additional insured endorsement CG 20 10 or substitute providing equivalent coverage.** This insurance shall apply as primary insurance with respect to any other insurance or self-insurance program. The County's insurance shall be excess of the contractor/consultant's insurance and shall not contribute to it. The contractor/consultant's coverage shall contain no special limitations on the scope of protection afforded to the County, its agents, officers, directors, and employees.

4.2 Any failure to comply with reporting provisions of the policies shall not affect coverage provided to the County, its officers, officials, employees or volunteers.

4.3 Each insurance policy required by this clause shall be endorsed to state that coverage shall not be suspended, voided, or canceled by either party, reduced in coverage or in limits, or non-renewed, except after thirty (30) days prior written notice by certified mail, return receipt requested, has been given to the County.

4.4 The Contractor shall include all subcontractors as insured under its policies or **furnish separate certificates and endorsements for each subcontractor where applicable.** All coverage for subcontractors shall be subject to all of the requirements stated herein.

4.5 Each insurance policy shall include an endorsement that waives any claim or right in the nature of subrogation to recover against the County, its agents, officers, directors, and employees.

5. Acceptability of Insurers

Insurance is to be placed with insurers with a current A.M. Best rating of A:VII, unless otherwise acceptable to the County.

6. Verification of Coverage

Contractor shall furnish the County with certificates of insurance and original endorsements effecting coverage required by this clause. ***The certificate attached to this contract should be signed by a person authorized by that insurer to bind coverage on its behalf. A certificate other than the one attached may be used if coverages and endorsements match or exceed the coverages identified on the attached certificate.*** All certificates and endorsements are to be received and approved by the County before work commences. The County reserves the right to require complete, certified copies of all required insurance policies and endorsements at any time.

Anoka County Contract No. 2005-0516A

AMENDMENT NO. 1
TO JOINT POWERS AGREEMENT
BETWEEN ANOKA COUNTY AND THE CITY OF RAMSEY
FOR THE PUBLIC WORKS IMPROVEMENTS
RELATED TO THE RAMSEY TOWN CENTER DEVELOPMENT
RAMSEY, MINNESOTA

THIS AMENDMENT is made this _____ day of February, 2009, the date of the signature of the parties notwithstanding, by and between the County of Anoka, a political subdivision of the State of Minnesota, 2100 Third Avenue, Anoka, Minnesota 55303, hereinafter referred to as the "County," and the City of Ramsey, 15153 Nowthen Boulevard, Ramsey, Minnesota 55303, hereinafter referred to as the "City."

WITNESSETH:

WHEREAS, the County wishes to amend its Joint Powers Agreement with the City for public works improvements related to the Ramsey Town Center Development, Ramsey, Minnesota dated May 12, 2005; and

WHEREAS, Paragraph 20 ENTIRE AGREEMENT REQUIREMENT OF A WRITING of said Agreement provides that any alterations, variations or modifications of the provisions of this Agreement shall be valid only when they have been reduced to writing and duly signed by the parties.

NOW, THEREFORE, in consideration of the mutual covenants hereinafter stated or contained in the Agreement, the parties do hereby agree as follows:

1. The parties agree to delete Section 5, B. in its entirety and replace it with the following:

1. The County and City agree that a grade separated interchange should be designed for the intersection of Trunk Highway 10 and Armstrong Boulevard. The County shall issue a request for proposals and contract for the preliminary design and environmental documentation for the grade separation. The County and City shall each pay 50% of the cost for the preliminary design and environmental documentation. Upon award of the contract for said work, the City shall pay to the County one-half of the cost of the contracted amount. Upon completion of the work the City shall pay the County one-half of any increase in the contract amount. If the actual contract price is less the contracted amount

the County shall reimburse the City one-half of the difference between the contracted amount and the actual contract price. Both the County and City agree to pursue all other funding sources to assist with the payment for the interchange project.

2. Only one access point to Armstrong Boulevard shall be allowed between Trunk Highway 10 and Bunker Lake Boulevard.

3. Full traffic actuated signal systems will be installed at the intersections of Bunker Lake Boulevard and Armstrong Boulevard, and at the intersection of West Ramsey Parkway. A grade separated crossing shall be constructed at the intersection of Armstrong Boulevard and Sunwood Drive. All signals on Bunker Lake Boulevard shall be interconnected with an interconnect system compatible with other County interconnects.

2. **The parties agree to amend Paragraph 5.D. by adding the following:**

The City shall provide the construction inspection with its own personnel. The City shall reimburse the County for all construction survey work and construction administration related to the project. Anoka County contract number 2007-0604 is a joint powers agreement between the City and County relating to the turnback of County Road 63. That joint powers agreement contemplates that the County will make a payment to the City in the amount of $425,000.00. In lieu of making the payment under contract number 2007-0604, the County shall deduct said amount from the amount the City is required to reimburse the County under this agreement.

3. **This Amendment is hereby made a part of and shall be amended to the Agreement of the parties.**

4. **All other terms and conditions of the original Agreement shall remain in full force and effect.**

IN WITNESS WHEREOF, the parties have signed this Amendment on the dates written below.

COUNTY OF ANOKA

By: _____
Dennis D. Berg, Chair
Board of Commissioners

Dated: 4/7/09

CITY OF RAMSEY

By: _____
Bob Ramsey
Mayor

Dated: 4-1-09

ATTEST

By: _____
Terry L. Johnson
County Administrator

Dated: 4/7/09

By: _____
Kurtis G. Ulrich
City Administrator

Dated: 4/1/09

APPROVED AS TO FORM

By: _____
Dan Klint
Assistant County Attorney

Dated: 4-8-09

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Anoka County Contract No. 2005-0516B

AMENDMENT NO. 2
TO JOINT POWERS AGREEMENT
BETWEEN ANOKA COUNTY AND THE CITY OF RAMSEY
FOR THE PUBLIC WORKS IMPROVEMENTS
RELATED TO THE RAMSEY TOWN CENTER DEVELOPMENT
RAMSEY, MINNESOTA

THIS AMENDMENT is made this _____ day of February, 2012, the date of the signature of the parties notwithstanding, by and between the County of Anoka, a political subdivision of the State of Minnesota, 2100 Third Avenue, Anoka, Minnesota 55303, hereinafter referred to as the "County," and the City of Ramsey, 15153 Nowthen Boulevard, Ramsey, Minnesota 55303, hereinafter referred to as the "City."

WITNESSETH:

WHEREAS, the County wishes to amend its Joint Powers Agreement with the City for public works improvements related to the Ramsey Town Center (RTC) Development, Ramsey, Minnesota dated May 12, 2005; and

WHEREAS, Paragraph 20 ENTIRE AGREEMENT REQUIREMENT OF A WRITING of said Agreement provides that any alterations, variations or modifications of the provisions of this Agreement shall be valid only when they have been reduced to writing and duly signed by the parties.

WHEREAS, the City has made improvements to the transportation system in and around the RTC (Currently referred to as "The COR"), that greatly improve the movement of traffic in the COR and on surrounding Streets and Highways and rail related safety improvements.

Whereas, the County has worked to improve the overall transportation system throughout Anoka County and wishes to participate in these additional system wide improvements.

NOW, THEREFORE, in consideration of the mutual covenants hereinafter stated or contained in the Agreement, the parties do hereby agree as follows:

1. **The parties agree to add to Section 9. DISBURSEMENT OF FUNDS the following:**

The County and City agree that the County shall pay to the City an additional Sum of $1,700,000 as a lump sum payment to be used by the City for additional transportation improvements in the area of the RTC (COR). Said payment to be made after this amendment is fully executed and within 30 days of the County receiving an invoice from the City for that amount.

2. This Amendment is hereby made a part of and shall be amended to the Agreement of the parties.

3. All other terms and conditions of the original Agreement shall remain in full force and effect.

IN WITNESS WHEREOF, the parties have signed this Amendment on the dates written below.

COUNTY OF ANOKA

By: _____
Rhonda Sivarajah, Chair
Board of Commissioners

Dated: 3-20-12

CITY OF RAMSEY

By: _____
Bob Ramsey, Mayor

Dated: 3/8/12

ATTEST

By: _____
Jerry Soma
County Administrator

Dated: 3-20-12

ATTEST

By: _____
Kurtis Ulrich
City Administrator

Dated: 3/8/12

APPROVED AS TO FORM

By: _____
Dan Klint
Assistant County Attorney

Dated: 3-21-12

By: _____
William K. Goodrich
City of Ramsey City Attorney

Dated: 3/8/12

Capital Improvement Program

2020 *thru* **2029**

City of Ramsey, Minnesota

Project # **04-STR-014**

Project Name **COR Bunker Lake Blvd (Armstrong to Ramsey Blvd)**

Department Street Improvements
Contact Unassigned
Type Improvement
Useful Life 60 Years
Category Street Improvement
Priority 4-New Addition (Med)
Status Active

Total Cost **$5,020,000**

Description

Upgrades Bunker Lake Blvd between Armstrong and Ramsey Blvds, necessitated by the COR Development. Upgrades include traffic signals at Town Center Drive.

Total Cost for Bunker Lake Blvd. = $4,870,000
Street Improvements: $3,650,000
Bunker & Sunwood Signal: $350,000
Storm Water Improvements: $530,000
Water Utility Improvements: $340,000
Total Cost for Regional Roadway improvements = $14,607,860 (Per JPA)

Justification

The construction of the COR will add additional traffic to Bunker Lake Blvd. This project will upgrade Bunker Lake Blvd to handle traffic from the COR.

Expenditures	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	Total
Improvements Other than Building Cost	400,000	4,620,000									5,020,000
Total	**400,000**	**4,620,000**									**5,020,000**

Funding Sources	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	Total
MSA		350,000									350,000
Tax Increment Fund #2		1,500,000									1,500,000
Tax Increment Fund #1		1,000,000									1,000,000
Storm Water Utility Fund		530,000									530,000
Street Light Utility Fund		150,000									150,000
Water Utility Fund		340,000									340,000
Tax Increment Fund #14 (BONDING)	400,000	750,000									1,150,000
Total	**400,000**	**4,620,000**									**5,020,000**

Public Works Committee **6. 1.**

Meeting Date: 02/18/2020

By: Bruce Westby, Engineering/Public Works

Title:

Staff Updates on Improvement Projects and Items of Interest

Purpose/Background:

The purpose of this case is to update the Public Works Committee on current and proposed improvement projects within the City, and on other items of interest to the Committee.

City Improvement Projects

- **The COR Regional Infiltration Basin (#18-09)**
  - Lift station not operable; control panel installed January 2020
  - Working on plan to remove 8,000 CY sand stockpile
  - Processing Change Order #1 addressing excess topsoil removal/backfill
  - Final completion by June 30, 2020 per LRRWMO Permit
- **Ford Brook Estates Street Reconstructions (#19-01)**
  - Punch list work and final payment in 2020
- **Wood Pond Hills and Chestnut Ridge Street Reconstructions (#19-03)**
  - Punch list work and final payment in 2020
- **RTC 9th Addition Pond Lining Improvements (#19-06)**
  - Punch list work and final payment in 2020
- **Wetland 114P Outlet Control Improvements (#19-07)**
  - Engineering Staff collecting topographic survey data this winter/spring
  - Construction proposed for 2020/2021
- **Germanium Street Drainage Improvements (#19-09)**
  - Terminated by property owner request
- **Hedgehog Street Drainage Improvements (#19-10)**
  - First bids rejected due to high costs
  - Second bids advertised soon
  - Construction proposed for 2020
- **Variolite Street Reconstruction (#20-01)**
  - Final design / preparation of plans and specifications in progress
  - Meeting with MnDOT State Aid soon to review;
  - Proposed pedestrian crossing design at 161st Avenue NW
  - Proposed pavement width and speed limit reductions on south end
  - Proposed stabilized full-depth reclamation (SFDR) pavement design
  - PWC recommendation for City Council approval of plans anticipated in March or April

Anoka County Improvement Projects

- **Roundabout at Armstrong Boulevard/CSAH 83 and Alpine Drive**
  - Anoka County received $1.35M in HSIP funds (est. project cost = $1.5M)
  - Anoka County and City of Ramsey share is $150,000 each (per $1.5M est.)
  - Anoka County beginning project design in 2020
  - Construction proposed to begin in 2022 pending City and County approvals
  - Anoka County is considering moving construction up to 2021
- **CSAH 116 & TH 47 Intersection Improvements**

- Constructing additional turn lanes to improve congestion and safety in 2021
- Staff will provide a detailed update on this project in March or April

MnDOT Improvement Projects

- **US 10 / 169 & Ferry Street / TH 47 Interchange**
  - Proposed for construction 2022 - 2024
- **Ferry Street / Trunk Highway 47 Grade Separation @ BNSF Rail Crossing**
  - Proposed for construction 2022 - 2024
  - Preliminary design on hold
  - MnDOT exploring realignment of Highway 47 to remove S-curve
  - Requires relocation of Alter Recycling…in discussions
- **Rum River Bridge Replacement**
  - MnDOT requested funding to replace bridge 2022 - 2024
  - Proposing three lanes between Highway 47 and 7th Street

Items of Interest

- **Northwest Metro Surface Water Supply Feasibility Study**
  - Member cities include Corcoran, Dayton, Ramsey and Rogers
  - MCES is funding 100% using Clean Water Funds
  - Reviewing draft study in March 2020
  - Completion anticipated April 2020
- **City of Ramsey Centralized Water Treatment Facility Study**
  - Water System Model is complete - requires final calibration
  - Pilot Study complete – favorable results
  - Designing preliminary plant layout
  - Touring other WTF's in March / April
  - Staff will review in more detail in March / April
- **Ramsey Gateway Highway 10 Improvements**
  - Preferred vision layout complete
  - RFP issued for preliminary design of Ramsey Blvd. improvements

Timeframe:

Staff estimates up to 15 minutes will be needed for updates and discussion.

Observations/Alternatives:

NA

Funding Source:

NA

Recommendation:

NA

Action:

No formal action required. For Committee review and discussion purposes only.

Attachments

No file(s) attached.

Form Review

Inbox	Reviewed By	Date
Grant Riemer	Grant Riemer	02/13/2020 08:16 AM
Kurt Ulrich	Kurt Ulrich	02/13/2020 01:07 PM
Form Started By: Bruce Westby		Started On: 02/13/2020 05:14 AM
Final Approval Date: 02/13/2020		

Public Works Committee **6. 2.**

Meeting Date: 02/18/2020

By: Bruce Westby, Engineering/Public Works

Title:

Review Future Topics Calendar

Purpose/Background:

Attached is a calendar of future topics for review and discussion by the Public Works Committee. The calendar includes topics drawn from Committee requests received during meetings and/or unresolved topics previously discussed by the Committee. Calendar dates are subject to change based on the availability of information and required attendees, staff workload, and competing interests and objectives.

Timeframe:

Staff estimates less than 5 minutes will be necessary to review the future topics calendar and address questions.

Observations/Alternatives:

NA

Funding Source:

NA

Recommendation:

NA

Action:

No formal action required. For Committee review and discussion purposes only.

Attachments

PWC Calendar Feb2020

Form Review

Inbox	Reviewed By	Date
Grant Riemer	Grant Riemer	02/13/2020 08:14 AM
Kurt Ulrich	Kurt Ulrich	02/13/2020 01:09 PM
Form Started By: Bruce Westby		Started On: 02/13/2020 05:16 AM
Final Approval Date: 02/13/2020		

Public Works Committee Future Topics Calendar *

Date	Topics for Discussion – Committee Action
April 2020	Sunfish Lake Sedimentation Basin Improvements *(Westby)*
April 2020	Gibbon Street Basement Flooding Funding Options *(Westby)*
Future/TBD	Sunwood Drive Roundabout Landscaping *(Riemer)*
Date	**Topics for Discussion – Regulatory**
Future/TBD	Sunfish Lake Boulevard Speed Zone Study Results *(Westby)*
Future/TBD	Bunker Lake Boulevard Speed Study Results *(Westby)*
Future/TBD	County Ditch Maintenance / Buffer Law *(Westby)*
Date	**Topics for Discussion – Policy**
Future/TBD	Landscaped Median Maintenance Policy *(Riemer)*
May 2020	Draft Trail Maintenance Policy *(Westby)*
May 2020	Draft Stormwater Pond Maintenance Policy *(Westby)*
Date	**Topics for Discussion – Planning and Budget**
April 2020	Municipal State Aid System (MSAS) Revisions *(Westby)*
June 2020	Review 1996 and 2007 (unadopted) TH 47 Corridor Studies *(Westby)*
Ongoing	Public Works Facility Review/Update *(Riemer)*
Date	**Topics for Discussion – Staff Updates**
Ongoing	Water Conservation Opportunities / Incentives *(Westby)*
Future/TBD	Asset Management Program *(Westby)*
Ongoing	NW Metro Area Regional Surface Water Supply Study *(Westby)*
Ongoing	Centralized Water Treatment Facility – Prelim. Design Report *(Westby)*

* Dates subject to change based on availability of information, required attendees, staff workload, and competing interests and objectives.