City of Ramsey
Agenda
Revised
Regular City Council
Tuesday, February 11, 2020
7:00 pm
Council Chambers, 7550 Sunwood Drive NW

1. Call to Order

2. Presentation

3. Citizen Input

4. Approve Agenda

5. Consent Agenda

1. Receive December 2019 Financial Reports - General Fund and Enterprise Funds

2. Receive Cash and Investments for Period Ending January 31, 2020

3. Approve the Following Meeting Minutes:

1. City Council Special Work Session dated 1/28/2020
2. City Council Work Session dated 1/28/2020

4. Approve Business Licenses

5. Approve Rental Licenses

6. Adopt Resolution #20-032 Approving Cash Disbursements Made and Authorizing Payment of Accounts Payable Invoicing Received During the Period of January 23, 2020 through February 5, 2020

7. Adopt Resolution #20-031 to Hire a Part-time Community Service Officer Back-filling a Vacant Position

8. Report from Public Works Committee.
The Public Works Committee held its regular meeting on January 21, 2020 and discussed the following cases:
~~1. 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: Motion for City Council to ratify the recommendation of the Public Works Committee 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.~~ **Pull this portion of the Report from Public Works Committee from the Consent Agenda to be considered as Regular Agenda Item 7.03.**

2. Consider City Council Recommendation to Indefinitely Suspend Pavement Sealcoating Program:

Motion for City Council to ratify the recommendation of the Public Works Committee to table the recommendation related to the City's annual sealcoating program to the February meeting.

3. Consider City Council Recommendation to Accept Feasibility Report for 2020 Pavement Overlay Improvements, Improvement Project No. 20-02: Motion for City Council to ratify the recommendation of the Public Works Committee to direct staff to bring back additional information to the Committee at the next meeting related to both options one and option three.

6. Public Hearing

7. Council Business

1. Receive Update on Highway 10/169 Planning Efforts (Ramsey Gateway)

2. Authorization to Enter Into a Contract for Architectural and Engineering Services for a New Public Works Facility

3. Report from Public Works Committee.
The Public Works Committee held its regular meeting on January 21, 2020 and discussed the following cases:
1. 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: Motion for City Council to ratify the recommendation of the Public Works Committee 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. T**his portion of the Report from Public Works Committee was pulled from the Consent Agenda to be considered as Regular Agenda Item 7.03.**

~~2. Consider City Council Recommendation to Indefinitely Suspend Pavement Sealcoating Program: Motion for City Council to ratify the recommendation of the Public Works Committee to table the recommendation related to the City's annual sealcoating program to the February meeting.~~

~~3. Consider City Council Recommendation to Accept Feasibility Report for 2020 Pavement Overlay Improvements, Improvement Project No. 20-02: Motion for City Council to ratify the recommendation of the Public Works Committee to direct staff to bring back additional information to the Committee at the next meeting related to both options one and option three.~~

8. Mayor/Council/Staff Input

9. Adjournment

CC Regular Session **5. 1.**

Meeting Date: 02/11/2020

By: Diana Lund, Finance

Information

Title

Receive December 2019 Financial Reports - General Fund and Enterprise Funds

Purpose/Background:

Purpose: Receive December monthly financial reports for the funds of: General, Water, Sewer, Street Lighting, Recycling and Storm Drainage.

A brief summary of actual revenues and expenditures-to-date in comparison to adopted budget for the respective funds.

Note: The city does not close 2019 activity until after audit is completed in mid April. Numbers reflected in the attached are as of January 16, 2020.

Recommendation:

Informational only.

Action:

No action required. Informational only.

Attachments

December 2019 General Fund Financial Report - Budget to Actual

December 2019 Enterprise Funds Financial Reports - Budget to Actual

Form Review

Inbox	Reviewed By	Date
Kurt Ulrich	Kurt Ulrich	02/06/2020 11:18 AM
Form Started By: Diana Lund		Started On: 01/29/2020 08:29 AM
Final Approval Date: 02/06/2020		

CITY OF RAMSEY
FINANCIAL STATEMENT

JANUARY 1, 2019 THROUGH PERIOD ENDING: December 31, 2019

GENERAL FUND EXPENDITURES - BY DEPARTMENT -

Dept	-CURRENT YEAR ADOPTED BUDGET-	CURRENT YTD GENERAL LEDGER
Admin	2,217,852.00	1,979,511.93
Com Dev	1,144,856.00	1,269,697.88
Contingency	131,373.00	61,853.00
Council	133,275.00	122,611.51
Finance	513,002.00	511,220.02
Fire	1,040,085.00	985,511.24
Legal	123,300.00	149,411.89
Police	3,827,771.00	3,820,012.02
Public Works	3,707,268.00	3,398,711.00
Grand Total	**12,838,782.00**	**12,298,540.49**

GENERAL FUND EXPENDITURES - BY CATEGORY -

Category	-CURRENT YEAR ADOPTED BUDGET-	-CURRENT YTD GENERAL LEDGER-
Capital Outlay	824,450.00	620,122.93
Debt Service	106,373.00	61,853.00
Other Services & Charges	2,674,679.00	2,458,894.51
Personal Services	8,271,485.00	8,258,822.09
Supplies	961,795.00	898,847.96
Grand Total	**12,838,782.00**	**12,298,540.49**

GENERAL FUND REVENUES - BY CATEGORY -

Category	-CURRENT YEAR ADOPTED BUDGET-	-CURRENT YTD GENERAL LEDGER-
Taxes	9,927,432.00	9,809,029.42
Charges for Services	703,600.00	782,468.76
Business Licenses/Permits	23,400.00	78,836.89
Fines and Forfeits	61,500.00	46,395.48
Federal Intergovernmental	8,000.00	-
State Intergovernmental	367,800.00	433,139.72
Interest	90,000.00	-
Miscellaneous	15,700.00	16,633.19
Non-Business Licenses/Permits	508,900.00	822,323.14
Transfers in	1,132,450.00	395,000.00
Grand Total	**12,838,782.00**	**12,383,826.60**

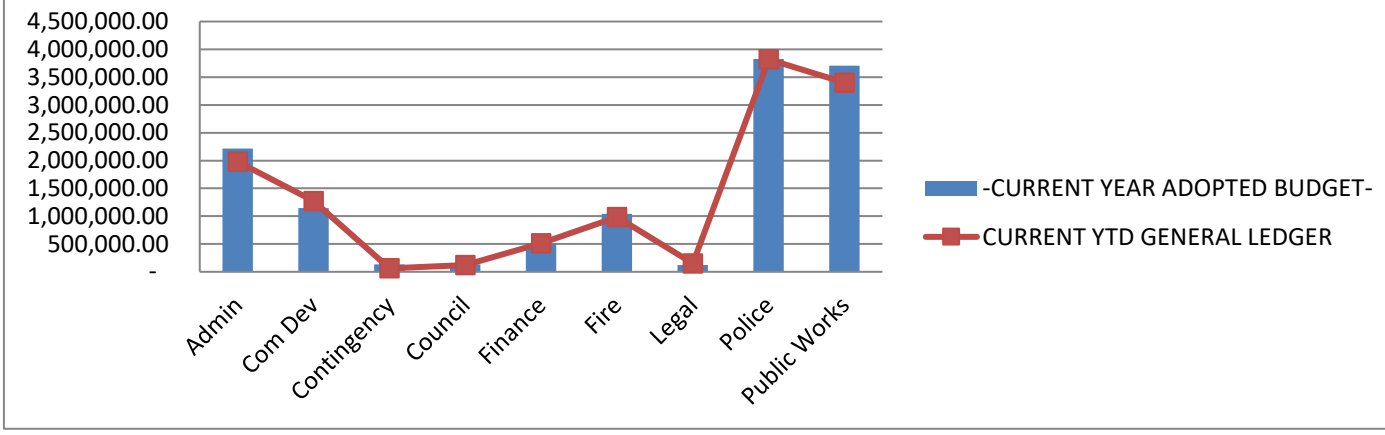
This report reflects year to date revenue and expenditures as compared to annual budget.
It does not reflect fund balance.

PREPARED BY: FINANCE DEPARTMENT

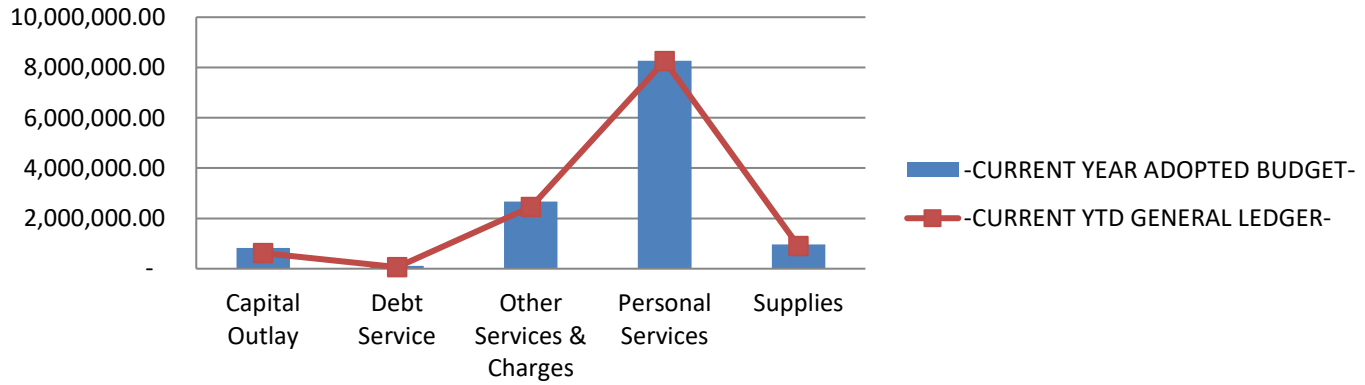
CITY OF RAMSEY
FINANCIAL STATEMENT

JANUARY 1, 2019 THROUGH PERIOD ENDING: **December 31, 2019**

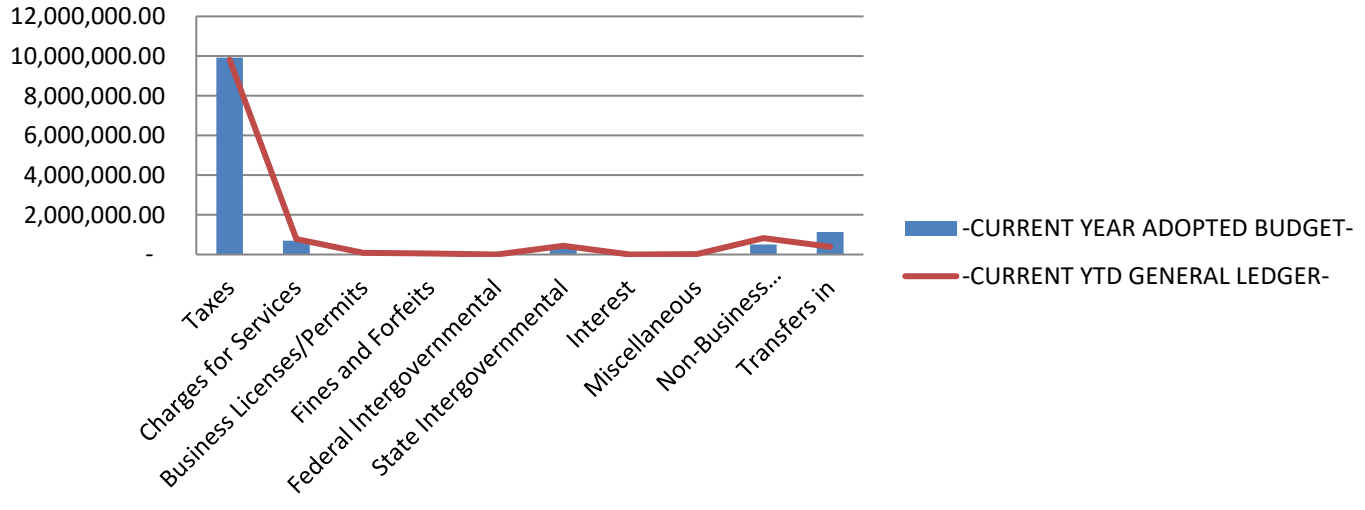
GENERAL FUND EXPENDITURES - BY DEPARTMENT



GENERAL FUND EXPENDITURES - BY CATEGORY



GENERAL FUND REVENUES



This report reflects year to date revenue and expenditures as compared to annual budget.
It does not reflect fund balance.

PREPARED BY: FINANCE DEPARTMENT

CITY OF RAMSEY
FINANCIAL STATEMENT

JANUARY 1, 2019 THROUGH PERIOD ENDING: December 31, 2019

REVENUES

BUSINESS UNIT 9601 WATER UTILITY

	GENERAL LEDGER ACCOUNT	CURRENT YEAR REQUESTED BUDGET	CURRENT YTD GENERAL LEDGER	-% of Budget-
4140	CREDIT CARD PROCESSING FEES	(14,000.00)	(11,813.95)	84.39%
4609	OTHER MISCELLANEOUS REVENUES	62,000.00	67,069.80	108.18%
4651	WATER REVENUE		53.64	0.00%
4652	WATER SALES - RESIDENTIAL	1,142,606.00	1,061,067.66	92.86%
4653	WATER SALES-COMMERCIAL	666,194.00	608,705.99	91.37%
4654	WATER PENALTIES	36,576.00	33,183.79	90.73%
4655	WATER METER INSTALLATION	12,000.00	18,340.00	152.83%
4656	WATER METERS	30,000.00	55,396.14	184.65%
4657	CONNECTION/RECONNECTION FEES	500.00	150.00	30.00%
4701	INTEREST ON INVESTMENTS	130,000.00	-	0.00%
4702	MISCELLANEOUS INTEREST	-	8,178.65	0.00%
4606	DEVELOPER FEES (WAC)		839,858.00	0.00%
4601	MISCELLANEOUS REVENUE		940.08	0.00%
Grand Total		**2,065,876.00**	**2,681,129.80**	

EXPENSES

BUSINESS UNIT 9601 WATER UTILITY

	GENERAL LEDGER ACCOUNT	CURRENT YEAR REQUESTED BUDGET	CURRENT YTD GENERAL LEDGER	-% of Budget-
6102	F.T. REGULAR-WAGES & SALARIES	239,868.00	254,599.74	106.14%
6103	FULL TIME-REGULAR-OVERTIME	13,500.00	12,948.49	95.91%
6105	TEMPORARY-WAGES & SALARIES	17,066.00	7,683.76	45.02%
6121	PERA CONTRIBUTIONS	48,701.00	20,706.94	42.52%
6122	FICA/MEDICARE CONTRIBUTIONS	20,887.00	21,717.80	103.98%
6131	GROUP INSURANCE	33,931.00	32,996.20	97.24%
6133	WORKERS COMP INSURANCE PREMIUM	14,518.00	8,141.46	56.08%
6208	MISCELLANEOUS OFFICE SUPPLIES	600.00	513.80	85.63%
6223	GASOLINE	3,000.00	4,705.02	156.83%
6225	DIESEL FUEL	3,500.00	962.86	27.51%
6229	SHOP MATERIALS	600.00	215.38	35.90%
6231	UNIFORMS & TURN-OUT GEAR	2,900.00	2,020.00	69.66%
6249	MISCELLANEOUS OPERATING SUPPLY	18,000.00	13,989.94	77.72%
6257	OTHER VEHICLE PARTS	7,000.00	4,527.53	64.68%
6273	UTILITY SYSTEM MAINT SUPPLIES	75,000.00	67,929.59	90.57%
6281	SMALL TOOLS & MINOR EQUIPMENT	6,000.00	2,584.24	43.07%
6292	WATER METERS FOR RESALE	60,000.00	62,492.71	104.15%
6315	MISCELLANEOUS PROFESSIONAL SER	150,000.00	20,875.86	13.92%
6322	POSTAGE	2,600.00	2,747.59	105.68%
6323	CELLULAR PHONES	2,900.00	3,460.08	119.31%
6334	MILEAGE REIMBURSEMENT		161.54	0.00%
6335	TRAINING	1,500.00	1,384.46	92.30%
6352	GENERAL NOTICE & PUBLIC INFOR	300.00	172.00	57.33%
6361	GENERAL LIABILITY/PROPERTY INS	30,000.00	27,389.94	91.30%
6371	ELECTRIC UTILITIES	150,000.00	126,828.84	84.55%
6373	GAS	3,000.00	2,358.81	78.63%
6374	REFUSE/RECYCLING	700.00	537.36	76.77%
6381	BUILDING & STRUCTURE REPAIR	3,000.00	934.26	31.14%
6439	OTHER MISCELLANEOUS	58,000.00	11,581.32	19.97%
6451	MEMBERSHIP DUES	1,400.00	994.00	71.00%
6489	OTHER CONTRACTED SERVICES	76,000.00	26,582.88	34.98%
6722	DEPRECIATION	760,000.00	-	0.00%
6820	OPERATING TRANSFERS TO OTHER F	43,000.00	43,000.00	100.00%
Grand Total		**1,847,471.00**	**787,744.40**	

Note: The Finance Department has highlighted line items that may be trending towards exceeding budget OR not may not have been included in the adopted budget.

CITY OF RAMSEY
FINANCIAL STATEMENT

JANUARY 1, 2019 THROUGH PERIOD ENDING: December 31, 2019

REVENUES

BUSINESS UNIT	9602	SEWER UTILITY		
GENERAL LEDGER ACCOUNT		CURRENT YEAR REQUESTED BUDGET	CURRENT YTD GENERAL LEDGER	-% of Budget-
4140	CREDIT CARD PROCESSING FEES	(11,500.00)	(10,464.49)	91.00%
4356	SEWER AVAILABILITY CHARGE-ADM	5,000.00	7,902.30	158.05%
4609	OTHER MISCELLANEOUS REVENUES	5,000.00	-	0.00%
4661	RESIDENTIAL-SEWER CHARGES	1,196,052.00	956,080.02	79.94%
4662	COMMERCIAL-SEWER CHARGES	370,800.00	269,483.82	72.68%
4663	SEWER PENALTIES	40,000.00	29,933.36	74.83%
4701	INTEREST ON INVESTMENTS	85,000.00	-	0.00%
4702	MISCELLANEOUS INTEREST	15,000.00	-	0.00%
4606	DEVELOPER FEES (WAC)	-	216,093.00	0.00%
4601	MISCELLANEOUS REVENUE		2,087.69	0.00%
Grand Total		**1,705,352.00**	**1,471,115.70**	

EXPENSES

BUSINESS UNIT	9602	SEWER UTILITY		
GENERAL LEDGER ACCOUNT		CURRENT YEAR REQUESTED BUDGET	CURRENT YTD GENERAL LEDGER	-% of Budget-
6102	F.T. REGULAR-WAGES & SALARIES	162,793.00	137,942.98	84.74%
6103	FULL TIME-REGULAR-OVERTIME	-	897.88	0.00%
6105	TEMPORARY-WAGES & SALARIES	-	9,481.71	0.00%
6121	PERA CONTRIBUTIONS	26,908.00	10,682.33	39.70%
6122	FICA/MEDICARE CONTRIBUTIONS	12,561.00	11,582.70	92.21%
6131	GROUP INSURANCE	6,867.00	6,868.00	100.01%
6133	WORKERS COMP INSURANCE PREMIUM	8,229.00	4,126.47	50.15%
6223	GASOLINE	3,500.00	3,497.14	99.92%
6225	DIESEL FUEL	2,500.00	2,151.94	86.08%
6249	MISCELLANEOUS OPERATING SUPPLY	17,000.00	16,387.94	96.40%
6275	OTHER EQUIPMENT PARTS	5,000.00	8,816.01	176.32%
6315	MISCELLANEOUS PROFESSIONAL SER	70,000.00	38,481.75	54.97%
6334	MILEAGE REIMBURSEMENT		129.92	0.00%
6335	TRAINING	1,500.00	780.00	52.00%
6361	GENERAL LIABILITY/PROPERTY INS	20,000.00	17,569.38	87.85%
6371	ELECTRIC UTILITIES	17,000.00	12,445.40	73.21%
6373	GAS	2,000.00	1,449.70	72.49%
6374	REFUSE/RECYCLING	700.00	537.36	76.77%
6377	SEWER SERVICE CHARGE	780,705.00	780,704.52	100.00%
6489	OTHER CONTRACTED SERVICES	26,000.00	30,938.33	118.99%
6722	DEPRECIATION	525,300.00	-	0.00%
6820	OPERATING TRANSFERS TO OTHER F	37,000.00	37,000.00	100.00%
Grand Total		**1,725,563.00**	**1,132,471.46**	

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CITY OF RAMSEY
FINANCIAL STATEMENT

JANUARY 1, 2019 THROUGH PERIOD ENDING: December 31, 2019

REVENUES

BUSINESS UNIT	9603	STREET LIGHT UTILITY	
GENERAL LEDGER ACCOUNT	CURRENT YEAR REQUESTED BUDGET	CURRENT YTD GENERAL LEDGER	-% of Budget-
4140 CREDIT CARD PROCESSING FEES	(3,300.00)	(2,733.90)	82.85%
4681 CHARGES FOR STREET LIGHTS	148,000.00	118,261.03	79.91%
4682 ST LIGHT O/M CHARGE	-	4,802.00	0.00%
4683 STREET LIGHTING PENALTIES	7,000.00	4,604.87	65.78%
4701 INTEREST ON INVESTMENTS	11,000.00	-	0.00%
4684 PRIORITY STREET LIGHT	51,380.00	39,484.19	76.85%
Grand Total	**214,080.00**	**164,418.19**	

EXPENSES

BUSINESS UNIT	9603	STREET LIGHT UTILITY	
GENERAL LEDGER ACCOUNT	CURRENT YEAR REQUESTED BUDGET	CURRENT YTD GENERAL LEDGER	-% of Budget-
6371 ELECTRIC UTILITIES	125,000.00	118,304.10	94.64%
6489 OTHER CONTRACTED SERVICES	14,300.00	10,668.14	74.60%
6722 DEPRECIATION	47,380.00	-	0.00%
6820 OPERATING TRANSFERS TO OTHER F	21,000.00	21,000.00	100.00%
Grand Total	**207,680.00**	**149,972.24**	

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CITY OF RAMSEY
FINANCIAL STATEMENT

JANUARY 1, 2019 THROUGH PERIOD ENDING: **December 31, 2019**

REVENUES

BUSINESS UNIT	9604	RECYCLING UTILITY		
GENERAL LEDGER ACCOUNT		CURRENT YEAR REQUESTED BUDGET	CURRENT YTD GENERAL LEDGER	-% of Budget-
4140	CREDIT CARD PROCESSING FEES	(3,800.00)	(3,248.73)	85.49%
4287	OTHER LOCAL GOVERNMENT GRANTS	69,000.00	29,328.97	42.51%
4609	OTHER MISCELLANEOUS REVENUES	-	927.78	0.00%
4671	RECYCLING CHARGES	310,000.00	236,612.32	76.33%
4672	RECYCLING PENALTIES	8,000.00	6,689.37	83.62%
4701	INTEREST ON INVESTMENTS	3,000.00	-	0.00%
Grand Total		**386,200.00**	**270,309.71**	

EXPENSES

BUSINESS UNIT	9604	RECYCLING UTILITY		
GENERAL LEDGER ACCOUNT		CURRENT YEAR REQUESTED BUDGET	CURRENT YTD GENERAL LEDGER	-% of Budget-
6102	F.T. REGULAR-WAGES & SALARIES	21,733.00	21,307.68	98.04%
6103	FULL TIME-REGULAR-OVERTIME	-	814.32	0.00%
6104	PART TIME-WAGES & SALARIES	7,280.00	-	0.00%
6121	PERA CONTRIBUTIONS	2,176.00	1,648.59	75.76%
6122	FICA/MEDICARE CONTRIBUTIONS	2,230.00	1,586.52	71.14%
6131	GROUP INSURANCE	3,422.00	969.00	28.32%
6133	WORKERS COMP INSURANCE PREMIUM	1,230.00	114.35	9.30%
6249	MISCELLANEOUS OPERATING SUPPLY	30,000.00	27,041.77	90.14%
6322	POSTAGE	300.00	-	0.00%
6489	OTHER CONTRACTED SERVICES	322,000.00	326,483.35	101.39%
Grand Total		**390,371.00**	**379,965.58**	

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CITY OF RAMSEY
FINANCIAL STATEMENT

JANUARY 1, 2019 THROUGH PERIOD ENDING: **December 31, 2019**

REVENUES

BUSINESS UNIT	9605	STORM WATER UTILITY	
GENERAL LEDGER ACCOUNT	CURRENT YEAR REQUESTED BUDGET	CURRENT YTD GENERAL LEDGER	-% of Budget-
4140 CREDIT CARD PROCESSING FEES	(6,000.00)	(5,290.20)	88.17%
4609 OTHER MISCELLANEOUS REVENUES	-	505.00	0.00%
4693 STORM WATER-RESIDENTIAL	552,874.00	427,647.08	77.35%
4694 STORM WATER-COMMERCIAL	543,309.00	435,673.72	80.19%
4695 STORM WATER-PENALTIES	19,901.00	18,753.02	94.23%
4701 INTEREST ON INVESTMENTS	11,000.00	-	0.00%
Grand Total	**1,121,084.00**	**877,288.62**	

EXPENSES

BUSINESS UNIT	9605	STORM WATER UTILITY	
GENERAL LEDGER ACCOUNT	CURRENT YEAR REQUESTED BUDGET	CURRENT YTD GENERAL LEDGER	-% of Budget-
6102 F.T. REGULAR-WAGES & SALARIES	128,315.00	157,543.98	122.78%
6103 FULL TIME-REGULAR-OVERTIME	-	872.43	0.00%
6105 TEMPORARY-WAGES & SALARIES	-	1,144.96	0.00%
6121 PERA CONTRIBUTIONS	25,322.00	11,966.19	47.26%
6122 FICA/MEDICARE CONTRIBUTIONS	9,846.00	12,213.05	124.04%
6131 GROUP INSURANCE	16,585.00	15,674.00	94.51%
6133 WORKERS COMP INSURANCE PREMIUM	5,717.00	4,684.73	81.94%
6225 DIESEL FUEL	5,000.00	4,755.05	95.10%
6249 MISCELLANEOUS OPERATING SUPPLY	10,000.00	2,694.99	26.95%
6257 OTHER VEHICLE PARTS	9,500.00	2,609.96	27.47%
6315 MISCELLANEOUS PROFESSIONAL SER	60,000.00	10,197.56	17.00%
6334 MILEAGE REIMBURSEMENT		18.56	0.00%
6361 GENERAL LIABILITY/PROPERTY INS	8,400.00	6,278.65	74.75%
6371 ELECTRIC UTILITIES	2,500.00	2,518.41	100.74%
6373 GAS	2,500.00	1,449.67	57.99%
6374 REFUSE/RECYCLING	700.00	537.33	76.76%
6451 MEMBERSHIP DUES	21,000.00	21,010.00	100.05%
6489 OTHER CONTRACTED SERVICES	40,000.00	11,558.82	28.90%
6722 DEPRECIATION	334,750.00	-	0.00%
6820 OPERATING TRANSFERS TO OTHER F	32,000.00	32,000.00	100.00%
Grand Total	**712,135.00**	**299,728.34**	

Note: The Finance Department has highlighted line items that may be trending towards exceeding budget OR not may not have been included in the adopted budget.

CC Regular Session **5. 2.**

Meeting Date: 02/11/2020

By: Diana Lund, Finance

Information

Title

Receive Cash and Investments for Period Ending January 31, 2020

Purpose/Background:

Purpose: Receive reports of the city's cash and investments for the period ending January 31, 2020.

Cash and investment report shows the monthly cash flow - receipts and expenditures through January 31, 2020 with the current listing of the city's investment portfolio.

Recommendation:

Informational only.

Action:

No action required. Informational only.

Attachments

Cash & Investments for Period Ending January 31, 2020

Form Review

Inbox	Reviewed By	Date
Kurt Ulrich	Kurt Ulrich	02/06/2020 11:18 AM
Form Started By: Diana Lund		Started On: 02/05/2020 09:55 AM
Final Approval Date: 02/06/2020		

CITY OF RAMSEY
REPORT OF POOLED CASH FLOWS
Period Ended January 31, 2020

	January-20 CURRENT MONTH	2020 YEAR-TO-DATE
CASH AND TEMPORARY INVESTMENTS		
BEGINNING BALANCE	$ 84,144,038.99	$ 84,144,038.99
CASH INFLOWS:		
Daily Deposit	724,189.02	724,189.02
Tax Settlements	116,640.63	116,640.63
U/B Receipts	12,202.68	12,202.68
Credit Cards (Includes Utility Billing)	127,142.52	127,142.52
Interest Earnings [Net of Interest Paid on Investments]	164,624.47	164,624.47
Bond Proceeds		-
TOTAL CASH INFLOW	$ 1,144,799.32	$ 1,144,799.32
TOTAL CASH AVAILABLE	$ 85,288,838.31	$ 85,288,838.31
CASH OUTFLOWS:		
Prepaid Checks	910,741.95	910,741.95
Bills Lists	427,124.51	427,124.51
Pay Estimates	-	-
Credit Cards	2,951.36	2,951.36
Payroll - Net	364,436.17	364,436.17
Flex Reimbursement	4,991.12	4,991.12
Void Checks/Dormant Checks Paid	(44,127.08)	(44,127.08)
Debt Service	398,097.50	398,097.50
Miscellaneous [Bank Charges; etc.]	115.50	115.50
TOTAL CASH OUTFLOW	$ 2,064,331.03	$ 2,064,331.03
POOLED CASH AND TEMPORARY INVESTMENTS ENDING BALANCE	**$ 83,224,507.28**	**$ 83,224,507.28**
MEMO - NET 2019 CASH INFLOW (OUTFLOW)	**(919,531.71)**	**(919,531.71)**
INVESTMENT PORTFOLIO SUMMARY		
BEGINNING BALANCE	**$ 73,537,171.61**	**73,537,171.61**
Purchases	2,465,000.00	2,465,000.00
Maturities/Sales	(4,026,036.26)	(4,026,036.26)
ENDING BALANCE	**$ 71,976,135.35**	**$ 71,976,135.35**

Prepared by the City of Ramsey Finance Department
2/4/2020

2020 CASH AND INVESTMENT ACTIVITY

CITY INVEST #	STATED MAT DATE	BROKER	SECURITY DESCRIP	FDIC #	CUSIP	PRIN BAL 1/1/2020	PURCH 2020	SOLD/ MATURE 2020	BV PRIN BAL 12/31/2020	PAR
191205	12/4/2020	4M	Term Series 4M			500,000.00		0.00	500,000.00	500,000.00
190927	3/31/2020	4M	Term Series 4M			1,750,000.00		0.00	1,750,000.00	1,750,000.00
190328	3/31/2020	4M	Term Series 4M			1,000,000.00		0.00	1,000,000.00	1,000,000.00
190131C	1/30/2020	4M	Term Series 4M			2,000,000.00		2,000,000.00	0.00	2,000,000.00
									3,250,000.00	
160322B	1/1/2020	BAIRD	MINNENOTONKA MN ISD 276		604195D20	100,000.00		100,000.00	0.00	100,000
150701A	2/1/2020	BAIRD	WINTHROP MN TAX		976367ND0	290,000.00		0.00	290,000.00	290,000
191008A	12/1/2020	BAIRD	ROCK ISLAND IL TAX		7724872H6	255,000.00		0.00	255,000.00	255,000
150701B	2/1/2021	BAIRD	WINTHROP MN TAX		976367NE8	305,000.00		0.00	305,000.00	305,000
160322A	3/22/2021	BAIRD	FNMA		3136H3BT1	250,000.00		0.00	250,000.00	250,000
140904	9/1/2021	BAIRD	OKLAHOMA TAXABLE		678519RP6	535,000.00		0.00	535,000.00	535,000
191008B	12/1/2021	BAIRD	ROCK ISLAND IL TAX		7724872J2	270,000.00		0.00	270,000.00	270,000
191008C	12/1/2022	BAIRD	ROCK ISLAND IL TAX		7724872K9	270,000.00		0.00	270,000.00	270,000
									2,175,000.00	
180302	1/2/2020	ICD SEC	CD-AXIOM BANK	31390	05464LAV3	200,000.00		200,000.00	0.00	200,000
200130A	1/30/2023	ICD SEC	CD-UNION BANK	34934	90520VATO		245,000.00	0.00	245,000.00	245,000
200130B	7/30/2021	ICD SEC	CD-COMMUNITY BANKE	26871	20361LCG7		245,000.00	0.00	245,000.00	245,000
180124A	1/24/2020	ICD SEC	CD-CROSSFIRST BANK	58648	2766ACD5	249,000.00		249,000.00	0.00	249,000
170728B	1/28/2020	ICD SEC	CD-NATIONWIDE BANK	34710	63861NAH8	249,000.00		249,000.00	0.00	249,000
180129	1/29/2020	ICD SEC	CD-FORTUNE BANK	58107	34969RCD8	248,000.00		248,000.00	0.00	248,000
180730	2/28/2020	ICD SEC	CD-METABANK	30776	59101LEF0	245,000.00		0.00	245,000.00	245,000.00
170928	3/27/2020	ICD SEC	CD-CONNECTONE BANK	57919	20786ABV6	249,000.00		0.00	249,000.00	249,000
170929	3/27/2020	ICD SEC	CD-LANDMARK COMM B	34982	51507LBM5	249,000.00		0.00	249,000.00	249,000
180329	3/30/2020	ICD SEC	CD-CITIBANK-Semiannual	7213	17312QHS1	249,000.00		0.00	249,000.00	249,000
180406C	4/6/2020	ICD SEC	CD-SYNCHRONY BANK-S	27314	87164WUX4	249,000.00		0.00	249,000.00	249,000
180712	4/13/2020	ICD SEC	CD-HADDON SAVINGS B/	28222	404730BV4	245,000.00		0.00	245,000.00	245,000.00
180417	4/17/2020	ICD SEC	CD-SOUTHWEST NATION	4801	845182BK9	151,000.00		0.00	151,000.00	151,000
180727B	4/27/2020	ICD SEC	CD-PLUS INTERNATIONA	57083	7294OUJH9	245,000.00		0.00	245,000.00	245,000.00
180430B	4/30/2020	ICD SEC	CD-MAGYAR BANK-Semi	30704	55977RBP7	225,000.00		0.00	225,000.00	225,000
190607	5/7/2020	ICD SEC	CD-BANK OZARK	110	064417NJE4	245,000.00		0.00	245,000.00	245,000
181217A	5/18/2020	ICD SEC	CD-FIRST SOURCE BANK	9087	33646CKN3	245,000.00		0.00	245,000.00	245,000
170922	5/26/2020	ICD SEC	CD-TEXAS EXCHANGE B.	20096	88241TCA6	249,000.00		0.00	249,000.00	249,000
190827	5/27/2020	ICD SEC	CD-ZIONS BANKCORP	2270	9897OI2Q5	245,000.00		0.00	245,000.00	245,000.00
190530C	5/29/2020	ICD SEC	CD-BANK UNITED	58979	066519JV2	245,000.00		0.00	245,000.00	245,000
171130C	5/29/2020	ICD SEC	CD-HENRY COUNTY BAN	15384	426336BM4	200,000.00		0.00	200,000.00	200,000
180531A	5/29/2020	ICD SEC	CD-STEARNS BANK	10988	857894WV9	249,000.00		0.00	249,000.00	249,000
180530	5/29/2020	ICD SEC	CD-WEX BANK-Semiannua	34697	92937CHA9	249,000.00		0.00	249,000.00	249,000
181207	6/8/2020	ICD SEC	CD-CIT BANK	58978	12556LAN6	245,000.00		0.00	245,000.00	245,000
190612	6/11/2020	ICD SEC	CD-FIRST FINANCIAL BA	6600	32021SGD2	245,000.00		0.00	245,000.00	245,000
181212B	6/12/2020	ICD SEC	CD-BANK OF AMERICA	3510	06051VD37	245,000.00		0.00	245,000.00	245,000
171215B	6/15/2020	ICD SEC	CD-PACIFIC CITY BANK	57463	69406PCT4	249,000.00		0.00	249,000.00	249,000
181214	6/15/2020	ICD SEC	CD-PINNACLE BANK	35583	72345SHM6	245,000.00		0.00	245,000.00	245,000
181221	6/22/2020	ICD SEC	CD-BROOKLINE BANK	17798	11373QFZ6	245,000.00		0.00	245,000.00	245,000
180629B	6/25/2020	ICD SEC	CD-FIRST INTERNET BAN	34607	32056GC21	249,000.00		0.00	249,000.00	249,000
181228B	6/29/2020	ICD SEC	CD-COMMUNITY FIRST E	57511	20368TCH1	245,000.00		0.00	245,000.00	245,000
180706	7/6/2020	ICD SEC	CD-ORIENTAL BANK	31469	68621KBWO	245,000.00		0.00	245,000.00	245,000.00
190711	7/13/2020	ICD SEC	CD-SECURITY BANK	15731	81404QABO	245,000.00		0.00	245,000.00	245,000
180117	7/17/2020	ICD SEC	CD-CITIZENS NATIONAL	06531	175144DH4	150,000.00		0.00	150,000.00	150,000
180718A	7/20/2020	ICD SEC	CD-UNITED STATE BANK	12214	91153QAE6	245,000.00		0.00	245,000.00	245,000.00
170726	7/27/2020	ICD SEC	CD-GOLDMAN SACHS	33124	38148PLS4	249,000.00		0.00	249,000.00	249,000
190514	8/14/2020	ICD SEC	CD-DIME COMMUNITY B	16012	25432JAA1	245,000.00		0.00	245,000.00	245,000
180831A	8/31/2020	ICD SEC	CD-PROVIDENT BANK	90141	743837DK9	204,000.00		0.00	204,000.00	204,000.00
180921A	9/21/2020	ICD SEC	CD-DISCOVER BANK	5649	254673TS5	145,000.00		0.00	145,000.00	145,000
190621B	9/21/2020	ICD SEC	CD-GREAT SOUTHERN B.	29546	39120VSJ4	245,000.00		0.00	245,000.00	245,000
171012	10/13/2020	ICD SEC	CD-ALLY BANK	57803	03006L5Z2	74,000.00		0.00	74,000.00	74,000
181217B	10/16/2020	ICD SEC	CD-FARM BUREAU BANK	35157	307660LA6	245,000.00		0.00	245,000.00	245,000
190726A	10/26/2020	ICD SEC	CD-COMMUNITY WEST E	27572	20415Q6W3	245,000.00		0.00	245,000.00	245,000
171027	10/27/2020	ICD SEC	CD-THIRD FEDERAL SAV	30012	88413QBS6	249,000.00		0.00	249,000.00	249,000
190523	11/23/2020	ICD SEC	CD-CIBC BANK	33306	12547CAE8	245,000.00		0.00	245,000.00	245,000
181213	12/14/2020	ICD SEC	CD-ALLY BANK	57803	02007GGP2	75,000.00		0.00	75,000.00	75,000
181228F	12/28/2020	ICD SEC	CD-BANK OF PRINCETON	58513	065452OAV1	245,000.00		0.00	245,000.00	245,000
181228E	12/28/2020	ICD SEC	CD-FIRST BANK OF PUER	30387	33767A6W6	249,000.00		0.00	249,000.00	249,000
191230E	12/29/2020	ICD SEC	CD-BANK OF CHINA	33653	06428FPU5	245,000.00		0.00	245,000.00	245,000
171229B	12/29/2020	ICD SEC	CD-STATE BANK OF FEN	11406	856188AV9	249,000.00		0.00	249,000.00	249,000
190118B	1/19/2021	ICD SEC	CD-NBT BANK NA	7230	628779GB0	245,000.00		0.00	245,000.00	245,000
190719B	1/19/2021	ICD SEC	CD-WELLSLEY BANK	26605	94948LCR0	245,000.00		0.00	245,000.00	245,000
180726	4/26/2021	ICD SEC	CD-SIGNATURE BANK	57269	82668XFZ6	245,000.00		0.00	245,000.00	245,000.00
190712	7/12/2021	ICD SEC	CD-TIAA FSB	34775	8727OLCJ0	85,000.00		0.00	85,000.00	85,000
180717	7/16/2021	ICD SEC	CD-CURRIE STATE BANK	8833	23130SDL4	245,000.00		0.00	245,000.00	85,000
190118A	7/19/2021	ICD SEC	CD-TIAA FSB	34775	8727OLBQ5	156,000.00		0.00	156,000.00	85,000
197023	7/23/2021	ICD SEC	CD-SECURITY STATE BA	11907	81500JAT0	245,000.00		0.00	245,000.00	85,000

2020 CASH AND INVESTMENT ACTIVITY

CITY INVEST #	STATED MAT DATE	BROKER	SECURITY DESCRIP	FDIC #	CUSIP	PRIN BAL 1/1/2020	PURCH 2020	SOLD/ MATURE 2020	BV PRIN BAL 12/31/2020	PAR
190731B	7/30/2021	ICD SEC	CD-CURRIE STATE BANK	8172	510354AB9	245,000.00		0.00	245,000.00	85,000
190909	9/9/2021	ICD SEC	CD-READING COOP BANI	26620	755324CH1	245,000.00		0.00	245,000.00	245,000
180718B	10/18/2021	ICD SEC	CD-HERITAGE BANK	30090	42724JEH4	245,000.00		0.00	245,000.00	245,000.00
191023	10/22/2021	ICD SEC	CD-GREAT WESTERN BA	15289	391414BMO	245,000.00		0.00	245,000.00	245,000
190719C	11/19/2021	ICD SEC	CD-BANK OF NEW ENGL/	24540	06426KBF4	245,000.00		245,000.00	0.00	245,000
191211	12/13/2021	ICD SEC	CD-SALLIE MAE BANK	58177	7954505X9	245,000.00		0.00	245,000.00	245,000
181228D	12/28/2021	ICD SEC	CD-BAR HARBOR BANK /	11971	066851WK8	245,000.00		0.00	245,000.00	245,000
181228C	12/28/2021	ICD SEC	CD-BMW BANK	35141	05580AQB3	96,000.00		0.00	96,000.00	96,000
190628A	12/28/2021	ICD SEC	CD-FLAGSTAR BANK	32541	33847E2Q9	245,000.00		0.00	245,000.00	245,000
191231A	12/31/2021	ICD SEC	CD-IOWA TRUST & SAVII	18400	462595BB4	245,000.00		0.00	245,000.00	245,000
190130	1/30/2022	ICD SEC	CD-SECURITY FIRST BAN	5415	8142PAX9	245,000.00		245,000.00	0.00	245,000
190828A	2/28/2022	ICD SEC	CD-SB ONE BANK	22221	78414TBD3	245,000.00		0.00	245,000.00	245,000.00
191121	5/20/2022	ICD SEC	CD-AMERICAN NATIONA	33812	066519JV2	245,000.00		0.00	245,000.00	245,000
190718	7/18/2022	ICD SEC	CD-WESTERN BANK OF V	341	95772AAK9	245,000.00		0.00	245,000.00	245,000
190719A	7/19/2022	ICD SEC	CD-FRONTIER BANK	33922	359067CZ6	245,000.00		0.00	245,000.00	245,000
180727A	7/27/2022	ICD SEC	CD-KANSAS STATE BANI	19899	50116CBY4	245,000.00		0.00	245,000.00	245,000.00
191025	10/25/2022	ICD SEC	CD-FLORIDA CAPITAL BA	26323	340569GH7	245,000.00		0.00	245,000.00	245,000
191220C	12/20/2022	ICD SEC	CD-FRANKLIN SYNERGY	58714	35471TFQ0	245,000.00		0.00	245,000.00	245,000
191227A	12/27/2022	ICD SEC	CD-PROMISEONE BANK	58657	74348HAB4	245,000.00		0.00	245,000.00	245,000
191227B	12/27/2022	ICD SEC	CD-LCA BANK	58148	501798PB2	245,000.00		0.00	245,000.00	245,000
191230D	12/30/2022	ICD SEC	CD-FIRST NATIONAL BAI	03330	32112UDL2	245,000.00		0.00	245,000.00	245,000
191230C	6/30/2023	ICD SEC	CD-BANK OF SOUTHERN	57044	065104AF8	245,000.00		0.00	245,000.00	245,000
191115B	11/15/2023	ICD SEC	CD-LIVE OAKS BANKING	58665	066519JV2	245,000.00		0.00	245,000.00	245,000
191206	12/6/2023	ICD SEC	CD-LIBERTY NATIONAL I	6516	530880AL7	245,000.00		0.00	245,000.00	245,000
191220B	12/20/2024	ICD SEC	CD-FIRST BANK MCCOM	05907	319234BF6	245,000.00		0.00	245,000.00	245,000
									17,538,000.00	
150903	11/1/2021	Northland	BROOKFIELD WI, TAXABLE		112857-BL-0	500,000.00		0.00	500,000.00	500,000
200123	12/15/2022	Northland	LUVERNE MN TAX		550629-VE-6		330,000.00	0.00	330,000.00	330,000
200130D	3/1/2022	Northland	RICHLAND SCHOOL DISTRICT		764080-FN-2		200,000.00	0.00	200,000.00	200,000
200113	3/1/2027	Northland	RICHLAND SCHOOL DISTRICT		764080-FT-9		165,000.00	0.00	165,000.00	165,000
190627	2/1/2020	Northland	MOORHEAD MINN ISD #152		616157-SK-0	500,000.00		0.00	500,000.00	500,000
110310	2/1/2020	Northland	BROOKLYN CENTER ISD#286		113853-KG-9	285,000.00		0.00	285,000.00	285,000
100803D	2/1/2020	Northland	NEW PRAGUE BAB		648159-TZ-4	70,000.00		0.00	70,000.00	70,000
161003C	2/1/2020	Northland	OLIVIA MN TAX		681079-YF-0	100,000.00		0.00	100,000.00	100,000
171228A	2/1/2020	Northland	SCOTT COUNTY TAX		809557-AY-7	60,000.00		0.00	60,000.00	60,000
140502	2/15/2020	Northland	COLLINGSWOOD NJ TAX		194756-PQ-9	145,000.00		0.00	145,000.00	145,000
171218B	3/1/2020	Northland	GLENDALE RIVER HILLS WIS TAX		378541-CN-4	135,000.00		0.00	135,000.00	135,000
160606	5/1/2020	Northland	ANCHOR BAY MI SCH DISTRICT		355185-PJ-2	500,000.00		0.00	500,000.00	500,000
160728A	5/1/2020	Northland	WISCONSIN STATE TAX		97705M-DS-1	500,000.00		0.00	500,000.00	500,000
140730B	6/1/2020	Northland	DES MOINES IA TAXABLE		25009X-GC-3	145,000.00		0.00	145,000.00	145,000
180212C	6/1/2020	Northland	IOWA WESTIN COMM COLLEGE		462612-SB-9	160,000.00		0.00	160,000.00	160,000
141006	6/1/2020	Northland	NORTHEAST IOWA COMM COLLEGE		664214-JQ-7	320,000.00		0.00	320,000.00	320,000
170620B	6/1/2020	Northland	WATERLOO IOWA TAXABLE		941647-VT-3	210,000.00		0.00	210,000.00	210,000
181011	10/1/2020	Northland	OKLAHOMA COUNTY ISD #6		678720-KJ-1	400,000.00		0.00	400,000.00	400,000
191003B	12/1/2020	Northland	SOUTH-WESTERN CITY SCHOOL DIST C		840658-PX-0	230,000.00		0.00	230,000.00	230,000
140620	12/1/2020	Northland	CELINA OHIO SCHOOL DISTR		151069-FD-8	300,000.00		0.00	300,000.00	300,000
130815A	12/1/2020	Northland	CHASKA, MN TAX		161664-DY-0	75,000.00		0.00	75,000.00	75,000
120308A	12/1/2020	Northland	SHOREWOOD WIS TAX		825230-KU-8	75,000.00		0.00	75,000.00	150,000
130702B	1/1/2021	Northland	MINNETONKA ISD #276		604195-VY-0	400,000.00		0.00	400,000.00	400,000
130722	2/1/2021	Northland	MOUND MN TAXABLE		620S35-W4-2	95,000.00		0.00	95,000.00	95,000
171228B	2/1/2021	Northland	SCOTT COUNTY TAX		809557-AZ-4	115,000.00		0.00	115,000.00	115,000
190220A	3/1/2021	Northland	FRANKLIN WIS TAX		419791-U97	500,000.00		0.00	500,000.00	500,000
170712	7/1/2021	Northland	GARDENDALE ALA TAX		365478-DQ-6	240,000.00		0.00	240,000.00	240,000
190628A	8/1/2021	Northland	WASHINGTON STATE GO TAX		93974DYX0	500,000.00		0.00	500,000.00	500,000
190731A	11/30/2021	Northland	CD-ENERBANK		29266N7E1	148,000.00		0.00	148,000.00	148,000
191017	12/1/2021	Northland	COLUMBS OH SCHOOL DISTR		199507-6J-8	130,000.00		0.00	130,000.00	130,000
130815B	12/1/2021	Northland	CHASKA, MN TAX		161664-DZ-7	75,000.00		0.00	75,000.00	75,000
141104	2/1/2022	Northland	DULUTH MN TAXABLE		264438-G5-5	150,000.00		0.00	150,000.00	150,000
150430	2/1/2022	Northland	MINNETONKA ISD #276		604195-YG-6	270,000.00		0.00	270,000.00	270,000
130624B	2/1/2022	Northland	RAMSEY COUNTY TAXABLE		751622-HG-9	285,000.00		0.00	285,000.00	285,000
190826	3/1/2022	Northland	OCONOMOWOC WIS TAX BOND		675635-KW-5	250,000.00		0.00	250,000.00	250,000
120321	3/1/2022	Northland	MADISION WI SCHOOL DISTR		558495-KN-6	500,000.00		0.00	500,000.00	500,000
190703	4/1/2022	Northland	WEST ALLIS WIS TAX		951173-JA-2	180,000.00		0.00	180,000.00	180,000
190424	5/15/2022	Northland	TEXAS A&M TAX		88213AEH4	130,000.00		0.00	130,000.00	130,000
120606B	6/1/2022	Northland	CEDAR RAPIDS IO TAX		150528-N2-6	135,000.00		0.00	135,000.00	135,000
170109	6/1/2022	Northland	DESMOINES IA TAX		250097-J3-7	200,000.00		0.00	200,000.00	200,000
150109	10/1/2022	Northland	HUBBARD COUNTY TAX		443348-DE-4	135,000.00		0.00	135,000.00	140,000
190515	11/1/2022	Northland	MICHICAN STATE SCHOOL TAX		594612-CY-7	205,000.00		0.00	205,000.00	205,000
120308B	12/1/2022	Northland	SHOREWOOD WIS TAX		825230-KW-4	150,000.00		0.00	150,000.00	150,000
130624A	2/1/2023	Northland	RAMSEY COUNTY TAXABLE		751622-HH-7	595,000.00		0.00	595,000.00	595,000
190628B	4/1/2023	Northland	WEST ALLIS WIS TAX		951173NP4	240,000.00		0.00	240,000.00	240,000
160812	5/1/2023	Northland	MONROE MI TAX		611101-MF-0	190,000.00		0.00	190,000.00	190,000
191107A	6/1/2023	Northland	NEWTON IOWA TAX		652810-YZ-9	315,000.00		0.00	315,000.00	315,000
190726B	6/1/2023	Northland	DESMOINES IA COMM COLLEGE TAX		250097L75	250,000.00		0.00	250,000.00	250,000

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120606A	6/1/2023	Northland	CEDAR RAPIDS IO TAX		150528-PA-9	140,000.00		0.00	140,000.00	140,000
180913	7/31/2023	Northland	CD-BANK NEW ENGLAND SALEM		06426K-AN-8	245,000.00		0.00	245,000.00	245,000
121228B	9/1/2023	Northland	MIDDLETON WIS REFUND		596782-T6-7	300,000.00		0.00	300,000.00	300,000
190220B	11/1/2023	Northland	HAWAII ST GO BONDS		214471-PA-6	200,000.00		0.00	200,000.00	200,000
161114B	2/1/2024	Northland	ANDOVER MN TAX		034313-ZU-3	300,000.00		0.00	300,000.00	300,000
130412	2/1/2024	Northland	BECKER MN TAX		075671LJ4	50,000.00		0.00	50,000.00	50,000
180730	10/1/2024	Northland	HUBBARD COUNTY TAX		443348-DG-9	100,000.00		0.00	100,000.00	100,000
120214B	9/1/2025	Northland	MIDDLETON WIS REFUND		596782-TJ-1	315,000.00		0.00	315,000.00	315,000
190227	12/1/2025	Northland	COOK COUNTY SCHOOL DISTRICT		032879-TC-2	500,000.00		0.00	500,000.00	500,000
190726C	7/17/2026	Northland	FFCB		3133EKVJ2	485,000.00		0.00	485,000.00	485,000
190404	9/1/2026	Northland	TUSCOLA COUNTY MISC TAX		900764RL7	395,000.00		0.00	395,000.00	395,000
191015	10/15/2026	Northland	FFCB		3133EK2H8	400,000.00		0.00	400,000.00	400,000
191003A	12/1/2026	Northland	SCOTT BLUFF CTY SCHOOL DIST		810164-CQ-4	385,000.00		0.00	385,000.00	385,000
120308C	12/1/2027	Northland	SHOREWOOD WIS TAX		825230-LB-9	225,000.00		0.00	225,000.00	225,000
190402	2/1/2028	Northland	CLOQUET MN TAX		189036-PS-9	150,000.00		0.00	150,000.00	150,000
191016B	4/1/2028	Northland	COLUMBUS OH TAX		199492E339	285,000.00		0.00	285,000.00	285,000
120308D	12/1/2028	Northland	SHOREWOOD WIS TAX		825230-LC-7	465,000.00		0.00	465,000.00	465,000
									16,728,000.00	
150310	4/1/2020	UBS	MONTGOMERY ALA TAX		613035L69	400,000.00		0.00	400,000.00	400,000
200113	4/15/2026	UBS	PHILADELPHIA AUTHORITY-ZERO COU		71781LBU2		300,000.00	0.00	300,000.00	300,000
200116	1/17/2023	UBS	CD-MORGAN STANLEY	32992	6169OURY8		245,000.00	0.00	245,000.00	245,000
200128	1/27/2021	UBS	CD-FIRST NATIONAL BAI	5452	33213SJA1		245,000.00	0.00	245,000.00	245,000
200130C	7/30/2020	UBS	CD-INVESTORS BANK	28892	46176PMT9		245,000.00	0.00	245,000.00	245,000
200131	7/31/2020	UBS	CD-BANK OF BARODA	33681	06063HKR3		245,000.00	0.00	245,000.00	400,000
160526	5/1/2020	UBS	MILAN MICH SCHOOL TAX		598801JD1	500,000.00		0.00	500,000.00	500,000
180531B	6/1/2020	UBS	CD-MORGAN STANLY	34221	6176OALP2	245,000.00		0.00	245,000.00	245,000
190725B	8/25/2020	UBS	CD-BMO HARRIS	16571	05581WX59	245,000.00		0.00	245,000.00	245,000
180831E	8/28/2020	UBS	CD-FIRST REPUBLIC BAN	59017	33616CBL3	245,000.00		0.00	245,000.00	245,000
151207	12/1/2020	UBS	SACRAMENTO TAXABLE		786060BB8	300,000.00		0.00	300,000.00	300,000
160613	12/1/2020	UBS	SCHILLER PARK TAX		8062721LM6	325,000.00		0.00	325,000.00	325,000
190123	1/25/2021	UBS	CD-ALLEGIANCE BANK	58629	01748DBM7	245,000.00		0.00	245,000.00	245,000
970625	2/25/2021	UBS	FNMA FNR-1991-7 H		31358FZW2	1,000.00		0.00	1,000.00	129,000
160927A	5/1/2021	UBS	YPSILANTI MI SCHOOL DISTR		987864NY7	405,000.00		0.00	405,000.00	405,000.00
160422	5/15/2021	UBS	UNIVERSITY OF CA TAX		91412GFS9	500,000.00		0.00	500,000.00	500,000
180629A	6/29/2021	UBS	CD-WELLS FARGO	3511	949763RX6	245,000.00		0.00	245,000.00	245,000
180907	7/1/2021	UBS	FLORIDA STATE BOARD OF ADMIN		341271ABO	400,000.00		0.00	400,000.00	400,000
171211	7/1/2021	UBS	FLORIDA STATE BOARD OF ADMIN		341271AB0	235,000.00		0.00	235,000.00	235,000
180815A	8/16/2021	UBS	CD-DISCOVER BANK	5649	254673SV9	145,000.00		0.00	145,000.00	145,000
180926A	9/27/2021	UBS	CD-TOWNEBANK PORTSMOUTH VA		89214PCA5	200,000.00		0.00	200,000.00	200,000
160705	11/1/2021	UBS	MICHIGAN STATE TAX		594612CX9	300,000.00		0.00	300,000.00	300,000
160718	12/1/2021	UBS	LITTLE MIAMI OHIO SCHOOL		537292KY9	345,000.00		0.00	345,000.00	345,000
181214	12/14/2021	UBS	CD-BMW BANK		05580AQA5	95,000.00		0.00	95,000.00	95,000
181228G	12/28/2021	UBS	CD-ALLY BANK		02007GGT4	100,000.00		0.00	100,000.00	100,000
190705	1/3/2022	UBS	CD-BANCO POPULAR	34967	05970EAM6	245,000.00		245,000.00	0.00	245,000
160601	2/15/2022	UBS	MCALLEN TAX'		582018Ff5	200,000.00		0.00	200,000.00	200,000
151104	3/1/2022	UBS	NEW YORK TAXALBE		64966KQC0	500,000.00		0.00	500,000.00	500,000
190322	3/22/2022	UBS	CD-MEDALLION BANK	57449	58404DDP3	245,000.00		0.00	245,000.00	245,000
190327	3/28/2022	UBS	CD-VALLEY NATIONAL E	9396	919853DK4	245,000.00		0.00	245,000.00	245,000
160727	5/1/2022	UBS	NORTH BRANCH SCHOOL TAX		657740F50	500,000.00		0.00	500,000.00	500,000
190710	5/15/2022	UBS	CONVENTION CENTER AUTHORITY		32115AAG7	175,000.00		0.00	175,000.00	175,000
001127	7/25/2022	UBS	FNR G92-35		31358PHV2C	232.79		14.79	218.00	75,215
190726D	7/26/2022	UBS	CD-OLD NATIONAL BANI	3832	680061HN1	245,000.00		0.00	245,000.00	245,000
160830C	8/1/2022	UBS	NEW YORK CITY TAXABLE		64966MED7	300,000.00		0.00	300,000.00	300,000
190823	8/23/2022	UBS	CD-CALPRIVATE BANK	58291	13135NAH3	245,000.00		0.00	245,000.00	245,000
021004	8/25/2022	UBS	FNR 1992-125L		31358PS40C	314.43		11.76	302.67	52,000
190913	9/13/2022	UBS	CD-PEOPLES SAVINGS B/	34973	712233AD7	245,000.00		0.00	245,000.00	2
180108	10/1/2022	UBS	PALM BEACH COUNTY SOLID WASTE		696560LD1	450,000.00		0.00	450,000.00	450,000
020826	10/15/2022	UBS	FHR 1391D		312912LUO	240.93		9.71	231.22	59,990
191213	12/13/2022	UBS	CD-WELLS FARGO NEV	27389	949495AA3	245,000.00		0.00	245,000.00	245,000
161216B	12/16/2022	UBS	CD-MERCANTIL COMM E	22953	58733ADQ9	245,000.00		0.00	245,000.00	245,000
191219C	12/19/2022	UBS	CD-MORGAN STANLY	32992	61690UQG8	245,000.00		245,000.00	0.00	245,000
161208A	4/1/2023	UBS	NEW HOPE CULTURAL ED TAX		64542WAY6	250,000.00		0.00	250,000.00	250,000
150812	6/1/2023	UBS	CHARLOTTE TAXABLE		161037L61	300,000.00		0.00	300,000.00	300,000
191122B	6/15/2023	UBS	CD-TOYOTA FINANCIAL	57542	89235MHH7	245,000.00		0.00	245,000.00	245,000
010328	6/25/2023	UBS	FHG14A		312916PD5R	2,000.00		0.00	2,000.00	152,000
180628	6/28/2023	UBS	CD-COMENITY BANK	27499	981996UP3	200,000.00		0.00	200,000.00	200,000
191230B	6/30/2023	UBS	CD-RAYMOND JAMES	33893	75472RAR2	245,000.00		0.00	245,000.00	245,000
160830D	8/24/2023	UBS	FNMA		3136G32Y0	250,000.00		0.00	250,000.00	250,000
160830B	8/28/2023	UBS	FHLMC		3134GAAKO	300,000.00		0.00	300,000.00	300,000
190930	9/30/2024	UBS	CD-JP MORGAN CHASE BANK		48128ICA5	245,000.00		0.00	245,000.00	245,000

2020 CASH AND INVESTMENT ACTIVITY

CITY INVEST #	STATED MAT DATE	BROKER	SECURITY DESCRIP	FDIC #	CUSIP	PRIN BAL 1/1/2020	PURCH 2020	SOLD/ MATURE 2020	BV PRIN BAL 12/31/2020	PAR
190118C	1/18/2024	UBS	CD-CAPITAL ONE	4297	14042RLP4	245,000.00		0.00	245,000.00	245,000
190118C	1/18/2024	UBS	CD-CAPITAL ONE USA	33954	14042TAP2	245,000.00		0.00	245,000.00	245,000
190315	3/15/2024	UBS	CD-COMENITY CAPITAL	57570	20033AS31	245,000.00		0.00	245,000.00	245,000
190325	3/25/2024	UBS	CD-BANK HAPOALIM	33686	06251AW48	245,000.00		0.00	245,000.00	245,000
161018	7/1/2024	UBS	SELMA ALA TAX		816459QV6	500,000.00		0.00	500,000.00	500,000
160726	7/26/2024	UBS	FHLMC		3134G9N78	500,000.00		0.00	500,000.00	500,000
180814	8/16/2024	UBS	FHLB-STEP		3130A8UZ4	430,000.00		0.00	430,000.00	430,000
190828C	8/28/2024	UBS	CD-FIRST OKLAHOMA B/	12484	335857BN7	245,000.00		0.00	245,000.00	245,000
151009	9/1/2024	UBS	NJ ENVIRONMENTAL INFRASTRUCTUR		645791CAO	270,000.00		0.00	270,000.00	270,000
190916	9/16/2024	UBS	CD-JONESBORO ST BANK	9325	4804OPFB6	245,000.00		0.00	245,000.00	2
190918	9/18/2024	UBS	CD-FIRST NATIONAL BAI	4779	334342CF7	245,000.00		0.00	245,000.00	2
161026	10/1/2024	UBS	HONOLULU TAX		4386705W7	300,000.00		0.00	300,000.00	300,000
151023	10/1/2024	UBS	MADISON TAXABLE		55844RKN3	640,000.00		0.00	640,000.00	640,000
161208B	11/1/2024	UBS	MICHIGAN FIN AUTH REV		59447TJX2	250,000.00		0.00	250,000.00	250,000
191127	11/27/2024	UBS	CD-STATE BANK INDIA II	33682	856285RS2	245,000.00		0.00	245,000.00	245,000
191107B	12/1/2024	UBS	CORPUS CHRISTI TEX TRANS		220228BK5	400,000.00		0.00	400,000.00	400,000
190418	12/5/2024	UBS	CD-DELTA NATIONAL BA	26633	2477RBD6	200,000.00		0.00	200,000.00	200,000
191220A	12/20/2024	UBS	CD-TEXAS SECURITY	58739	88269AAU2	245,000.00		0.00	245,000.00	245,000
191230A	12/30/2024	UBS	CD-BRADFORD NATIONA	3799	10427OAL7	245,000.00		0.00	245,000.00	245,000
150311	3/11/2025	UBS	CD-HBSC BANK	57890	40434ASB6	240,000.00		0.00	240,000.00	240,000
160928	3/28/2025	UBS	FHLB		3130A9CN9	300,000.00		0.00	300,000.00	300,000.00
180629C	6/1/2025	UBS	MARYLAND STATE TAX		57420PGR1	300,000.00		0.00	300,000.00	300,000
190621	6/20/2025	UBS	CD-CELTIC BANK	57056	15118RRB5	245,000.00		0.00	245,000.00	245,000
161114A	7/1/2025	UBS	LEXINGTON FAYETTE AIRPORT		52909MCA0	300,000.00		0.00	300,000.00	300,000
190729B	7/29/2025	UBS	CD-FIRST NATIONAL BAI	17438	32115AAG7	245,000.00		0.00	245,000.00	245,000
191101	8/1/2025	UBS	MASSACHUSETTS ST WATER		576051VFO	400,000.00		0.00	400,000.00	400,000
190830A	8/29/2025	UBS	CD-MERRICK BANK	34519	59013KCA2	245,000.00		0.00	245,000.00	245,000
191122A	12/1/2025	UBS	WARRENSVILLE HEIGHTS OHIO		936121JM5	500,000.00		0.00	500,000.00	500,000
191105	3/1/2026	UBS	MARYLAND STATE COMM DEV		57419TDZ1	320,000.00		0.00	320,000.00	320,000
191115A	7/1/2026	UBS	LEXINGTON FAYETEE URBAN COUNTY		52909MDR2	470,000.00		0.00	470,000.00	470,000
160830A	8/28/2026	UBS	FHLB		3130A8ZF3	300,000.00		0.00	300,000.00	300,000
190830B	8/31/2026	UBS	CD-FIRST UNITED BANK	4239	33742CAP2	245,000.00		0.00	245,000.00	245,000
191219B	11/1/2026	UBS	OPELIKA ALABAMA TAX		683489ZE1	400,000.00		0.00	400,000.00	400,000
191016A	12/1/2026	UBS	DENVER CITY & COUNTY HSG		24917NAG6	500,000.00		0.00	500,000.00	500,000
190401	5/25/2027	UBS	FHLB STEP		3130A86VO	300,000.00		0.00	300,000.00	300,000
191219A	6/1/2027	UBS	UNIVERSITY OF NORTHERN COLORAD		914733DY3	360,000.00		0.00	360,000.00	360,000
191022	10/1/2027	UBS	NEW YORK NY TAX		64966QEK2	500,000.00		0.00	500,000.00	500,000
160802	12/1/2027	UBS	TOOLE CITY UT TAX		89033RBU7	400,000.00		0.00	400,000.00	400,000
190725A	12/1/2027	UBS	WRIGHT COUNTY TAXABLE		982276BK2	630,000.00		0.00	630,000.00	630,000
191108	8/1/2028	UBS	CORONA-NORCO CAL		219764SC2	405,000.00		0.00	405,000.00	405,000
180713C	8/24/2028	UBS	FHLB		3130A8Y56	500,000.00		0.00	500,000.00	500,000
191212	10/1/2028	UBS	UNIVERSITY OF ALABAMA TAX		914745GG2	400,000.00		0.00	400,000.00	400,000
191024	2/1/2029	UBS	PULASKI COUNTY		745401EGO3	400,000.00		0.00	400,000.00	400,000
180914	5/28/2038	UBS	FHLB STEP		3130A83X9	300,000.00		0.00	300,000.00	300,000
190630	6-30///	UBS	MM			3,000,000.00		0.00	3,000,000.00	3,000,000
191231B		UBS	PRIME MM		01748DBM7	6,383.46		0.00	6,383.46	6,383
191031		UBS	PRIME MM			1,500,000.00		0.00	1,500,000.00	1,500,000
									32,285,135.35	
	TOTAL INVESTMENTS					73,537,171.61	2,465,000.00	4,026,036.26	71,976,135.35	
			Unamortized Premiums			1,492,823.94			1,492,823.94	
			Unamortized Discounts			(3,461,129.52)	(43,920.00)		(3,505,049.52)	
			BOW			6,069,365.65	3,156,996.43	4,530,559.68	4,695,802.40	
			Money Market Accounts			6,505,807.31	2,058,987.80		8,564,795.11	
			Net Cash and Investments			84,144,038.99	7,637,064.23	8,556,595.94	83,224,507.28	

CC Regular Session **5. 3.**

Meeting Date: 02/11/2020

By: Katie Schmidt, Administrative Services

Information

Title

Approve the Following Meeting Minutes:

1. City Council Special Work Session dated 1/28/2020
2. City Council Work Session dated 1/28/2020

Purpose/Background:

Purpose: The purpose of this case is for Council review and approval of meeting minutes.

Background: Attached are the meeting minutes referenced above.

Recommendation:

Approve the meeting minutes.

Action:

Motion to approve the following Council meeting minutes:

1. City Council Special Work Session dated 1/28/2020
2. City Council Work Session dated 1/28/2020

Attachments

1-28-20 CCWS Minutes

1-28-20 CC Minutes

Form Review

Inbox	Reviewed By	Date
Colleen Lasher	Colleen Lasher	02/05/2020 12:03 PM
Kurt Ulrich	Kurt Ulrich	02/06/2020 11:18 AM
Form Started By: Katie Schmidt		Started On: 01/30/2020 07:37 AM
Final Approval Date: 02/06/2020		

CITY COUNCIL WORK SESSION
CITY OF RAMSEY
ANOKA COUNTY
STATE OF MINNESOTA

The Ramsey City Council conducted a City Council Work Session on Tuesday, January 28, 2020, at the Ramsey Municipal Center, 7550 Sunwood Drive NW, Ramsey, Minnesota.

Members Present: Mayor John LeTourneau
Councilmember Nadine Heinrich
Councilmember Mark Kuzma
Councilmember Jeff Menth
Councilmember Debra Musgrove
Councilmember Chris Riley
Councilmember Dan Specht

Also Present: City Administrator Kurtis Ulrich
Fire Chief Matt Kohner
Police Chief Jeff Katers
Public Works Superintendent Grant Riemer
Deputy City Administrator Timothy Gladhill
City Engineer Bruce Westby

1. CALL TO ORDER

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

2. TOPICS FOR DISCUSSION

2.01: Interview Architectural Firms for Design and Engineering Services for the New Public Works Facility

Public Works Superintendent Riemer reviewed the staff report.

Andrew Cooper, Oertel Architects, introduced the members of his team present tonight, Thomas Stomsodt and Mike Aaron. He reviewed the overall design approach, noting that his company focuses on public works facilities, which are 95 percent of their work. He provided information on how their number of hours and fee was determined. He stated that they have proposed an aggressive schedule with overlapping phases and provided additional details on that process. He explained that they based their design process on the ability to meet the City's 2021 construction objective.

Thomas Stomsodt, Oertel Architects, explained that they began by reviewing the City's studies and would then use their tools to further review the programming and schematic needs for the new facility, providing additional details on that process. He noted that those details are used to create the floor plan for the facility.

Mike Aaron, SRF Consulting, reviewed some of the critical information that would be necessary but was not included in the scope.

Mr. Cooper provided details on the construction administration process, which would start early in the process to ensure what has been scoped in the initial documents and program worksheets would be usable for RJM in the construction documents and bidding process. He stated that working together early on helps to make the process smoother when it is time to bid the project. He reviewed some of the greatest challenges with the project including project scoping and budgeting, and the project timeline. He reviewed some of the lessons his firm has learned through past projects and highlighted some of the recommended additional services.

Brad Barickman, RJM, stated that the firm proposes continuous programming and a tight timeline and asked if there would be any risks with that strategy.

Mr. Cooper replied that one risk could be not identifying all the possible spaces early on. He explained that their goal would be to quickly move through the programming phase in order to ensure that the risks and programming are identified early in the process to ensure something does not come up halfway through the design process that was not planned for.

Mr. Stomsodt explained that the continuous programming would not be continuously adding space but adding more details on those spaces throughout the process.

Councilmember Menth asked how detailed and complete the construction documents would be.

Mr. Cooper provided additional details on the information that would be included in the bid documents. He explained that their early onset focus on detail and extensive experience has allowed them to be more prepared going into bidding and react to things that may come up. He stated that they have integrated real-time document updating and modeling.

City Administrator Ulrich asked how the firm would help the City stay within the desired budget.

Mr. Cooper stated that they estimate a project at the programming phase using their experience and knowledge from recently bid projects. He explained that using that knowledge they can tell during that programming phase if the project is going above the budgeted amount and can guide things that could be scaled back and perhaps phased in the future.

Mr. Stomsodt stated that they are always looking at opportunities to eliminate redundancy and increase flexibility.

Mr. Cooper agreed that they provide input on elements that are perhaps "would be nice if" items to identify items that could be eliminated in order to meet the desired budget.

Dan Lind, HCM Architects, stated that his team has been working together on this type of project since 2012. The members of his team introduced themselves: Scott Vander Heiden, Emanuelson

Podas; Mike St. Martin, Loucks; Jill Isola Johnson, Isola Design; and Dan Lawrence, HCM Architects.

Mr. Lawrence provided information on their recent experience. He stated that they would recommend a dedicated project manager and leadership team to work with Mr. Barickman and the architect. He recognized the City's aggressive schedule to begin in 2021 and stated that they are confident that they could deliver on time and perhaps even one month early. He provided details on the construction administration process, noting that they would go through design and construction administration, continuously from beginning to end to ensure the vision of the City is met.

Mr. St. Martin provided details on the site analysis and design.

Mr. Lind stated that it does not appear that soil borings or a site survey have been completed. He noted that those are two critical items that would be necessary.

Mr. Lawrence explained that they would begin by reviewing the 2015 study and updating that information. He provided details on the schematic design, and existing building review.

Mr. Vander Heiden provided details on the review of the mechanical and electrical systems and needs. He noted that those elements were not included in the City's 2015 study. He stated that they would want to ensure that their drawings match the needs of the intended uses. He explained that they will bring sustainable design elements to the City, with the pros and cons, for the City to make the decisions.

Mr. Lind noted that Connexus also has great energy design programs that they can work with the City on.

Ms. Isola provided additional details related to furniture, fixtures, and equipment. She explained that this process includes determining the actual needs of employees and how often those employees are in the office compared to out in the field.

Mr. Lawrence stated that one of the key things for this team is that they listen and respond to owner feedback and requests. He stated that one comment that they heard during the walk through was that the plan from 2015 did not have a drive-through maintenance bay and provided an example of how that could be added to the design from the 2015 study. He stated that they transform the information from the programming phase to ensure that those details are included.

Mr. Lind stated that they provide detailed meeting minutes throughout the whole process to ensure that decisions are documented. He reviewed some of the recommended City provided services.

Mr. Vander Heiden stated that one of the lessons they have learned is that it is important to get the City provided services on board early because of the coordination with the building and building infrastructure.

Mr. Lind highlighted some of the recent public works projects that his team completed.

Councilmember Menth referenced the proposed schedule with the bid packet one proposed for early May. He asked the percentage of the specifications and dimensions that would be provided in the bid documents.

Mr. Lawrence stated that bid pack one would be proposed to be issued in mid to late June and would be a core and shell building set that would include a lot of details.

Mr. Lind stated that the purpose of that set of bids is to ensure you can order the precast panels. He noted that the more detailed construction information would be included in bid pack two.

Public Works Superintendent Riemer asked what opportunity the City would have to purchase equipment off the State bid.

Mr. Lind stated that Wright County looked at purchasing lifts off the State contract but ended up not choosing that option. He identified some items that could possibly be purchased off the State bid.

Ms. Isola noted that some furniture packages are available on the State contract.

Mr. Barickman asked the biggest challenge to stay on schedule, or potential risks with the schedule.

Mr. Lind stated that the biggest challenge is that the schedule is very aggressive. He stated that once a firm is brought on board, he would recommend a meeting to ensure everyone is ready to move and stay on pace. He noted that if the City is ready to go and make decisions, this team would be committed to meeting the desired schedule.

Councilmember Heinrich asked if geotechnical evaluation is included in the bid price.

Mr. St. Martin stated that is not included in the scope and estimated $10,000 to $15,000.

Councilmember Riley commended staff for narrowing it down to these two qualified candidates, noting that he would be comfortable with either candidate, and would welcome input from staff.

Councilmember Heinrich stated that both teams mentioned doing site tours and asked if the City would entertain that as they have already toured facilities.

Public Works Superintendent Riemer confirmed that staff would be open to that.

Mr. Barickman noted that one component that he noticed was different from the two proposals was that Oertel did not include furniture, fixtures and equipment while HCM did include that element.

Councilmember Kuzma stated that he preferred HCM.

Councilmember Heinrich stated that she had an opposite view, believing that Oertel was her preferred choice.

Mayor LeTourneau stated that he thought there was a lot of information related to time management from Oertel. He stated that HCM talked about how collaborative they are, but with an aggressive timeline he believed that Oertel understood the choices of the City without having to go through all the possibilities and therefore leans towards Oertel.

Councilmember Musgrove stated that she agrees that Oertel would be more respective of the City's needs to remove some of the minutia.

Councilmember Specht stated that he believes that both groups would do a great job. He stated that Oertel made a comment that they would review the existing structures to determine if funds would be better spent rehabilitating those buildings or investing into the new facility whereas HCM seemed set on keeping the existing buildings.

Councilmember Menth commented that he was not satisfied with the answer to his question from either group.

Mr. Barickman stated that RJM has worked with both firms and has experienced success with both groups. He stated that with the aggressive timeline, he believes that Oertel will push harder to meet the timeline.

Public Works Superintendent Riemer echoed the comments about Oertel. He stated that the comment from Oertel related to the existing buildings was to leave that for now and design the main building, as the existing buildings could be improved if there are additional funds available.

Councilmember Riley stated that both firms made comments about the aggressive timeline and asked why the City has an aggressive timeline.

Mr. Barickman stated that inflation continues on construction with prices increasing five to six percent each year and therefore they want to attempt to move forward.

Mayor LeTourneau confirmed that the City would not sacrifice quality for time.

Mayor LeTourneau confirmed the consensus of the Council and staff to choose Oertel.

Councilmember Heinrich referenced the five-year budget assumption and asked if the City could consider increasing use of the sewer and water utility fund to decrease debt on the building.

Mayor LeTourneau confirmed that staff could present options to bundle the financing in future discussions.

2.02: Fire Service Joint Powers Agreement Update

City Administrator Ulrich reviewed the staff report and provided an update to the Council.

Fire Chief Kohner stated that he amended the contract language as discussed at the Fire Board meeting, which is being reviewed by the City Attorney and will then go back to the Fire Board.

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

ATTEST:

_____
Katie M. Schmidt
Administrative Assistant

Drafted by Amanda Staple
TimeSaver Off Site Secretarial, Inc.

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CITY COUNCIL
CITY OF RAMSEY
ANOKA COUNTY
STATE OF MINNESOTA

The Ramsey City Council conducted a regular meeting on Tuesday, January 28, 2020, at the Ramsey Municipal Center, 7550 Sunwood Drive NW, Ramsey, Minnesota.

Members Present: Mayor John LeTourneau
Councilmember Nadine Heinrich
Councilmember Mark Kuzma
Councilmember Jeff Menth
Councilmember Debra Musgrove
Councilmember Chris Riley
Councilmember Dan Specht

Members Absent: None

Also Present: City Administrator Kurtis Ulrich
Police Chief Jeff Katers
Public Works Superintendent Grant Riemer
Deputy City Administrator Timothy Gladhill
City Engineer Bruce Westby

1. CALL TO ORDER

Mayor LeTourneau called the regular meeting of the Ramsey City Council to order at 7:05 p.m., followed by the Pledge of Allegiance led by Mayor LeTourneau.

2. PRESENTATION

None.

3. CITIZEN INPUT

None.

4. APPROVE AGENDA

Mayor LeTourneau requested to pull Item 5.01 from the Consent Agenda to be considered as Item 7.05. He stated that case 5.13 has been withdrawn by the applicant and should be removed from the Consent Agenda.

Motion by Councilmember Riley, seconded by Councilmember Kuzma, to approve the agenda as amended.

Motion carried. Voting Yes: Mayor LeTourneau, Councilmembers Riley, Kuzma, Heinrich, Menth, Musgrove, and Specht. Voting No: None.

5. CONSENT AGENDA

Motion by Councilmember Menth, seconded by Councilmember Heinrich, to approve the following items on the Consent Agenda as revised to remove Items 5.01 and 5.13:

~~5.01: Receive Update on Meeting with United States Post Office Regarding Ramsey Zip Code~~
This item was removed from the Consent Agenda and considered as 7.05

5.02: Note the Following Boards and Commissions Meeting Minutes:
- Planning Commission Meeting Minutes dated November 7, 2019
- Planning Commission Meeting Minutes dated December 5, 2019
- Economic Development Authority Meeting Minutes dated November 14, 2019
- Environmental Policy Board Meeting Minutes dated November 18, 2019
- Environmental Policy Board Meeting Minutes dated December 16, 2019

5.03: Approve the following Meeting Minutes:
1) City Council Work Session dated January 14, 2020
2) City Council Regular dated January 14, 2020

5.04: Approve Rental Licenses

5.05: Approve Business Licenses

5.06: Adopt Resolution #20-021 Approving Cash Disbursements Made and Authorizing Payment of Accounts Payable Invoicing Received During the Period of January 9, 2020 through January 22, 2020

5.07: Adopt Resolution #20-018 to Enter into Clean Water Fund Grant Agreement with the Metropolitan Council to Accept Water Efficiency Grant Funds

5.08: Adopt Resolution #20-019 Approving a Beekeeping License for the Property Located at 7520 149th Avenue NW (Project No. 20-100); Case of Noah and Kimberly Barka

5.09: Adopt Resolution #20-020 Approving Registered Land Survey for 9340 Highway 10 NW

5.10: Adopt Resolution #20-023 Authorizing Re-Conveyance of Lot 1, Block 1, Autumn Heights 2nd Addition to State of Minnesota

5.11: Adopt Resolution #20-024 Approving Snow Storage Agreement on City Owned Land

5.12: Adopt Resolution #20-025 for Updated Code Enforcement Action Plan for 5431 164th Ln NW

~~5.13: Adopt Resolution #20-029 Denying a Massage Establishment and Massage Therapy License~~

5.14: Adopt Resolution #20-030 Appointing Election Judges for the Presidential Nomination Primary Election on March 3, 2020

Motion carried. Voting Yes: Mayor LeTourneau, Councilmembers Menth, Heinrich, Kuzma, Musgrove, Riley, and Specht. Voting No: None.

6. PUBLIC HEARING

None.

7. COUNCIL BUSINESS

7.01: Adopt Ordinance #20-01 Rezoning Two Parcels at 9340 Highway 10 NW; Case of MYWC, LLC

Deputy City Administrator Gladhill reviewed the staff report and recommendation of the Planning Commission to adopt Ordinance #20-01 approving a Zoning Amendment for both properties from B-1 Business to R-1 Residential (MUSA).

Motion by Councilmember Heinrich, seconded by Councilmember Musgrove, to waive the City Charter requirement to read the ordinance aloud and adopt Ordinance #20-01 Amending section 117-90 "MAP" of the Chapter 117 of the City Code of Ramsey, Minnesota.

A roll call vote was performed by the Recording Secretary:

Councilmember Heinrich	aye
Councilmember Riley	aye
Councilmember Menth	aye
Councilmember Kuzma	aye
Councilmember Musgrove	aye
Councilmember Specht	aye
Mayor LeTourneau	aye

Motion carried.

7.02: Adopt Resolution #20-022 Approving Purchase Agreement and Preliminary TIF Financing Deal Structure for Part of Outlot A, COR Stone Brook Academy; Case of Cobblestone Hotel Development, LLC (Portions may be closed to the public)

Deputy City Administrator Gladhill reviewed the staff report and recommendation of the EDA to approve the Purchase Agreement and Structure of Tax Increment Financing Deal Structure. Assuming the City Council is comfortable with the structure of the payment for the land, the EDA recommends approval of Resolution #20-022 approving Purchase Agreement and preliminary TIF financing deal structure for part of Outlot A, COR Stone Brook Academy; subject to City Attorney approval as to legal form.

Councilmember Heinrich asked when the TIF district decertifies.

Deputy City Administrator Gladhill stated that the date would be sometime after 2030, noting that he can follow up with the exact year.

Councilmember Menth stated that it gives him comfort that both the Planning Commission and EDA have reviewed and are supportive of this project. He asked for additional details on the land sale.

Deputy City Administrator Gladhill explained that the land sale would be $1 and then the actual land price would be captured and paid back to the City of Ramsey within nine to ten years through the TIF generated.

Councilmember Musgrove referenced the contingencies on the term sheet and asked for additional details.

Deputy City Administrator Gladhill stated that the developer has given an estimated acreage needed. He explained that staff is working with this applicant and another applicant to determine where the property line will fall and the exact acreage that will be obtained for this project. He stated that the details will occur prior to closing.

Councilmember Musgrove asked where the TIF funds are distributed when provided to the City.

Deputy City Administrator Gladhill stated that the City is still working on the payback of internal loans used to purchase The COR properties that the City owns. He explained that any land sale funds are therefore placed into the appropriate fund to payback those internal loans. He noted that once that original obligation is paid, the land sale funds would be allocated per the City's policy. He confirmed that staff could include additional details on the fund balances and allocation policy.

Mayor LeTourneau explained how the deal ranges were setup to fulfill the City's obligations to The COR.

Deputy City Administrator Gladhill confirmed that the deal ranges were set to first recover the cost for the land the City purchased and also for needed infrastructure within The COR.

Brian Wogernese, Cobblestone Hotels, stated that he is present to address any questions the Council may have.

Councilmember Kuzma asked for a brief overview of the Cobblestone brand.

Mr. Wogernese stated that Cobblestone is a developer, builder, franchise owner, management company and restaurant owner. He stated that the Ramsey location would be corporately owned with the Wissota Chophouse restaurant. He explained that the restaurant is an ala carte steakhouse with a shareables menu and craft beers and wine selection. He stated that it has a high-end feel, but patrons can still get a good meal for $20 or $30.

Councilmember Specht asked if the swimming pool would be available to the public for a fee.

Mr. Wogernese stated that due to liability issues, insurance companies have made it difficult to do that. He noted therefore the pool would be for guest use.

Councilmember Menth asked for an estimate on the cost for the room range.

Mr. Wogernese stated that he would need to verify the market study but would estimate between $109 and $120 per night.

Mayor LeTourneau asked why Ramsey and why now.

Mr. Wogernese stated that Cobblestone is a Wisconsin based company, with hotels in some other midwestern states, and they would like to branch out into Minnesota.

Councilmember Menth asked why Ramsey and not another town.

Mr. Wogernese stated that they are looking at other markets as well. He stated that this building will fit well into The COR district as well.

Mayor LeTourneau stated that Ramsey is a growing community and aims to be friendly to new businesses. He explained that was the reasoning behind the questions related to why Cobblestone selected Ramsey.

Mr. Wogernese stated that Cobblestone has a boutique feel with an outside patio and fits well into the Main Street concept. He stated that with the new buildings in The COR, they feel that this would be a good fit.

Deputy City Administrator Gladhill noted that this lead was generated through the ICSC convention that staff attended.

Councilmember Riley stated that this hits multiple goals of the community and the terms of the agreement are good for the City, as it will obtain full asking price for the land over the course of ten years.

Motion by Councilmember Riley, seconded by Councilmember Kuzma, to Adopt Resolution #20-022 Approving Purchase Agreement and Preliminary TIF Financing Deal Structure for Part of Outlot A, COR Stone Brook Academy, subject to City Attorney approval as to legal form.

Motion carried. Voting Yes: Mayor LeTourneau, Councilmembers Riley, Kuzma, Heinrich, Menth, Musgrove, and Specht. Voting No: None.

7.03: Adopt Resolution #20-026 Approving a Home Occupation Permit for Garbage Hauling Company at 17030 Baugh St NW; Case of the Birchems (#19-141)

Deputy City Administrator Gladhill reviewed the staff report and stated that based on Planning Commission feedback, staff recommends approving an amended request for a Home Occupation Permit for a Garbage Hauling Company at 17030 Baugh St NW. This would be a less-intensive permit than originally applied for, with bookkeeping and two trucks.

Councilmember Heinrich asked if the garbage truck proposed to be outside has an ability to be stored indoors with the other truck.

Allen Birchem, 17030 Baugh Street NW, stated that the one truck that would be stored outdoors does not fit inside the doors and that is why it would remain outside. He stated that he met with Senior Planner McGuire Brigl the previous week to ensure that almost all the conditions have been met. He noted that the recycling containers have since been taken to Anoka County Recycling. He estimated that 90 percent of the conditions have been met, with the exception of the items frozen to the ground.

Councilmember Heinrich expressed appreciation to Mr. Birchem for cleaning up the property in this residential area.

Councilmember Kuzma referenced the truck that would be stored outdoors and asked if that would be full when on the property.

Mr. Birchem stated that the trucks are emptied and washed before returning to the property.

Councilmember Musgrove asked pros and cons of tabling this until the spring. She asked why a Home Occupation Permit would be needed for storing a truck outside.

Deputy City Administrator Gladhill explained that the City is bound by the 60-day rule and if the City is comfortable with the conditions and parameters, this can move forward. He noted that this can always be brought back if needed to address other elements. He explained why a Home Occupation Permit would be needed.

Councilmember Riley asked if staff could confirm 90 percent of the property has been cleaned up.

Deputy City Administrator Gladhill confirmed that staff is pleased with the progress that has been made on site.

Councilmember Riley asked for details on what the City may do to continue enforcing this.

Deputy City Administrator Gladhill noted that he would review the information and provide a response.

Motion by Councilmember Musgrove, seconded by Councilmember Menth, to Adopt Resolution #20-026 Approving the Request for a Home Occupation Permit to Operate a Garbage Hauling Business on the Property Located at 17030 Baugh Street NW.

Further discussion: Deputy City Administrator Gladhill stated that a clause was included as a method to ensure that the remaining clean-up activities occur on site.

Motion carried. Voting Yes: Mayor LeTourneau, Councilmembers Musgrove, Menth, Heinrich, Kuzma, Riley, and Specht. Voting No: None.

7.04: Staff Authorization for Filling a Building Permit Technician During Leave of Absence

Deputy City Administrator Gladhill reviewed the staff report and recommendation to fill the temporary position with the City's previous Ramsey Permit Technician for the duration of the anticipated leave (mid-March to mid-May 2020).

Councilmember Heinrich asked what it would look like to reassign an administrative assistance from another department and whether they would have training with that position. She asked the cost of hiring temporary staff to fill this gap.

Deputy City Administrator Gladhill stated that in the past Community Development has utilized the administrative assistant from Engineering. He noted Engineering continues to fall behind when that position is reassigned, and that position cannot fill the number of hours needed. He stated that pulling away from another department and not receiving a one to one match on the Permit Technician position would be concerning. He stated that he could gain additional information on the cost for the position through Human Resources.

Councilmember Riley stated that it appears the City has the opportunity to hire an experienced former employee, which presents a special opportunity to fill this need with an experienced candidate. He stated that Engineering does have an administrative assistant, which is important for that department and if that position is taken away, Engineering would continue to fall behind which he would not support.

Councilmember Kuzma agreed that this is an opportunity to hire someone that already knows the job and can provide assistance during the busy season.

Councilmember Musgrove stated that it seems that hiring the previous employee to fill the gap would be the best choice heading into the busy season. She asked if this person would be paid at the same level they left or whether a new rate would be negotiated.

Deputy City Administrator Gladhill stated that would need to be negotiated. He explained that the fee for this service is funded by development activity and not through the general fund.

Mayor LeTourneau stated that from the case presentation he heard concern with keeping up with the customer service expectations going into the busy season. He stated that although it was not clear the amount the employee would be paid, it was stated that the position would fall within the budgeted amount for the department for the year and therefore he would support bringing this previous employee back to fill the necessary gap.

Motion by Councilmember Kuzma, seconded by Councilmember Riley, to authorize staff to commence hiring discussions and negotiate terms with the City's former Building Permit Technician to serve as a Temporary Permit Technician from approximately mid-March to mid-May 2020.

Motion carried. Voting Yes: Mayor LeTourneau, Councilmembers Kuzma, Riley, Heinrich, Menth, Musgrove, and Specht. Voting No: None.

7.05: Receive Update on Meeting with United States Post Office Regarding Ramsey Zip Code

Deputy City Administrator Gladhill reviewed the staff report and provided an update to the Council.

Councilmember Riley stated that a good stride forward was made in getting an audience with the U.S. Post Office. He commented that the City did a great job and will continue to move forward.

8. MAYOR, COUNCIL AND STAFF INPUT

City Administrator Ulrich announced upcoming meetings and events.

Councilmember Heinrich thanked the Public Works staff, noting that she recently had the opportunity to ride along on a recent plow event. She encouraged residents to move their vehicles and trashcans off the street.

Councilmember Specht advised of an upcoming open house on February 6 related to the proposed townhome development on Nowthen Boulevard. He commended PACT Charter School's Robotics Team.

9. ADJOURNMENT

Motion by Councilmember Musgrove, seconded by Councilmember Heinrich, to adjourn the meeting.

Motion carried.

The regular meeting of the City Council adjourned at 8:02 p.m.

Respectfully submitted,

_____
Kurtis G. Ulrich
City Administrator

ATTEST:

_____
Katie M. Schmidt

Administrative Assistant

Drafted by Amanda Staple
TimeSaver Off Site Secretarial, Inc.

A recording of this meeting is available for viewing online at www.qctv.org <http://www.qctv.org>. Recordings are available for 36 months after the date of the meeting.

CC Regular Session **5. 4.**

Meeting Date: 02/11/2020

By: Wendy Schlueter, Community Development

Information

Title

Approve Business Licenses

Purpose/Background:

Purpose:
To obtain City Council approval of various license requests.

Background:
Certain businesses in the City of Ramsey are required to apply for a business license in addition to the Business Registration Certificate (BRC). Other businesses that may require a license, but are not required to have a BRC, may also be included in this approval. Those new license requests and/or renewals are attached for City Council approval.

Recommendation:

Staff recommends approval of business license applications contingent upon completion of background checks.

Action:

Motion to approve the attached business license applications contingent upon completion of background checks.

Attachments

Business Licenses

Form Review

Inbox	Reviewed By	Date
Sean Sullivan	Sean Sullivan	02/04/2020 04:44 PM
Tim Gladhill	Tim Gladhill	02/05/2020 05:02 PM
Kurt Ulrich	Kurt Ulrich	02/06/2020 11:18 AM
Form Started By: Wendy Schlueter		Started On: 02/03/2020 11:21 AM
Final Approval Date: 02/06/2020		

Report Name: License Report - License Types
Council Dates: 2/11/2020 to 2/11/2020
Status: Active, Inactive
License Type(s): 3.2 Beer Off-Sale, 3.2 Beer On-Sale Temporary, Liquor 2 A.M. Closing, Liquor Off-Sale, Liquor On-Sale, Liquor On-Sale Sunday, Temporary Intoxicating, Wine On-Sale, Amusement Center, Amusement Devices/Billiard Tables, Business License-1st Year, Business License-Renewal, Garbage Haulers, Pawnbroker, Second Hand Goods Dealer, Special Events, Temporary Amusement/Carnival/Circus, Therapeutic Massage Establishment, Therapeutic Massage Therapist, Tobacco, Transient Merchant/Peddler/Solicitor

City of Ramsey
License Report - License Types

Company	Location	Complex	Exp. Date	Council Date	Status
Transient Merchant/Peddler/Solicitor					
Edward Jones - Matthew Finn			12/31/2020	2/11/2020	A
Legacy Restoration LLC - Moshier			12/31/2020	2/11/2020	A

Transient Merchant/Peddler/Solicitor License Count: 2

Total Licenses: 2

CC Regular Session **5. 5.**

Meeting Date: 02/11/2020

By: JoAnn Shaw, Community Development

Information

Title

Approve Rental Licenses

Purpose/Background:

Purpose: The purpose of this case is to approve rental license requests for 2020.

Background: Detached Single-Family Homes and Attached Single-Family Homes (townhomes, duplexes, etc.) are required to obtain a license (registration), but are not subject to inspections (unless the City has sufficient evidence of a violation of City Code).

Multi-Family Units (apartments, condos, etc.) will continue to be subject to the license and inspection program as required today, but the inspection frequency will be reduced.

New license application requests are attached for Council approval.

Recommendation:

Staff recommends approval of license applications.

Action:

Motion to approve rental license applications.

Attachments

Rental Licenses

Form Review

Inbox	Reviewed By	Date
Tim Gladhill	Tim Gladhill	02/05/2020 05:02 PM
Kurt Ulrich	Kurt Ulrich	02/06/2020 11:18 AM
Form Started By: JoAnn Shaw		Started On: 01/31/2020 02:06 PM
Final Approval Date: 02/06/2020		

Report Name: License Report - License Types
Council Dates: 2/11/2020 to 2/11/2020
Status: Active, Inactive
License Type(s): Rental

City of Ramsey
License Report - License Types

Printed: 2/4/2020

Company	Location	Complex	Exp. Date	Council Date	Status
Rental					
Robert Walker	14503 Bowers Dr NW		2/11/2023	2/11/2020	A
Daniel and Maria Toay	14748 Fluorine St NW		2/11/2023	2/11/2020	A
Maria C Byrnes	13915 Ironstone Ter NW		2/11/2023	2/11/2020	A

Rental License Count: 3

Total Licenses: 3

CC Regular Session **5. 6.**

Meeting Date: 02/11/2020

By: Jackie Lipski, Finance

Information

Title

Adopt Resolution #20-032 Approving Cash Disbursements Made and Authorizing Payment of Accounts Payable Invoicing Received During the Period of January 23, 2020 through February 5, 2020

Purpose/Background:

Adopt Resolution #20-032 Approving Cash Disbursements Made and Authorizing Payment of Accounts Payable Invoicing Received During the Period of January 23, 2020 through February 5, 2020

Recommendation:

Staff recommends adopting Resolution #20-032 Approving Cash Disbursements Made and Authorizing Payment of Accounts Payable Invoicing Received During the Period of January 23, 2020 through February 5, 2020

Action:

Motion to Adopt Resolution #20-032 Approving Cash Disbursements Made and Authorizing Payment of Accounts Payable Invoicing Received During the Period of January 23, 2020 through February 5, 2020.

Attachments

Bills List 2/11/2020

Resolution 2/11/2020

Form Review

Inbox	Reviewed By	Date
Diana Lund	Diana Lund	02/05/2020 12:58 PM
Kurt Ulrich	Kurt Ulrich	02/06/2020 11:18 AM
Form Started By: Jackie Lipski		Started On: 02/05/2020 12:42 PM
Final Approval Date: 02/06/2020		

CITY OF RAMSEY - FINANCE OFFICE Printed 2/5/2020

RAMSEY CITY COUNCIL MEETING

2/11/2020

BILLS LIST

DISBURSEMENTS TO BE APPROVED THIS MEETING:

DISBURSEMENT TYPE:	SUBMITTED FOR APPROVAL
Purchase Journal:	
Prepaids 1/23/20-2/5/20	606,490.85
Accounts Payable 1/23/20-2/5/20	240,384.54
Payroll 1/24/2020	190,983.56
Debt Service	398,097.50

TOTAL SUBMITTED FOR APPROVAL THIS MEETING
(Invoices Available for Reviewal) **$ 1,435,956.45**

	APPROVED PREV. MTG	2020 Y.T.D.
DISBURSEMENTS PREVIOUSLY APPROVED AND PAID:		
NET PAYROLL TOTAL	$ 173,452.61	$ 173,452.61
- CORRECTION TO PAYROLL		
PREPAIDS	287,951.60	304,251.10
- PREPAID ADJUSTMENTS		
WIRE TRANSFERS FOR DEBT SERVICE		
- CORRECTION TO D.S.		
ACCOUNTS PAYABLE INVOICING - PREVIOUS MEETING:		
- BILLS LIST SUBMITTED	302,723.47	427,124.51
ADD (DELETE) BILLS LIST SUBMITTED		
PAY ESTIMATE(S)		
- CHECKS VOIDED	0.00	0.00
TOTAL CASH DISBURSEMENTS PREVIOUSLY APPROVED	**$ 764,127.68**	**$ 904,828.22**

CITY OF RAMSEY

Council Check Register by GL

Council Check Register and Summary

1/23/2020 -- 12/31/2020

Check #	Date	Amount	Supplier / Explanation	PO #	Doc No	Inv No	Account No	Subledger	Account Description
110095	**1/23/2020**		**117397 ADVANTAGE CONSTRUCTION INC**						
		50.00	REF PART PERMIT RA42821		100325	011520	9101.4205		BUILDING PERMIT
		50.00							
110096	**1/23/2020**		**115203 ALL AMERICAN TITLE CO INC**						
		213.17	UB REFUND 15447 TUNGSTEN WAY		100326	012320	9601.4651		WATER REVENUE
		213.17							
110097	**1/23/2020**		**117080 BLIP II LLC**						
		4,846.29	TIF 2ND PAYMENT 2/1/20		100328	010920	9216.6433		REFUNDS
		4,846.29							
110098	**1/23/2020**		**100297 CENTERPOINT ENERGY**						
		355.30	15050 ARMSTRONG BLVD		100311	5914352-9 DEC 2019	0220.6373		GAS
		642.15	5650 ALPINE DR		100312	5961540-1 DEC 2019	0220.6373		GAS
		3,483.93	7550 SUNWOOD DR		100313	6702493-5 DEC 2019	0194.6373		GAS
		294.61	6701 HIGHWAY 10-YOUTH FIRST		100314	6011580-5 DEC 2019	9410.6373	00041012	GAS
		146.62	14515 E TOWN CENTER DR		100315	8782239-1 DEC 2019	9601.6373		GAS
		114.80	14515 E TOWN CENTER DR		100316	8782239-1 NOV 2019	9601.6373		GAS
		2,581.20	7550 SUNWOOD DR		100317	6702493-5 NOV 2019	0194.6373		GAS
		206.41	6701 HIGHWAY 10		100318	6011580-5 NOV 2019	9410.6373	00041012	GAS
		493.81	5650 ALPINE DR		100319	5961540-1 11/2019	0220.6373		GAS
		347.12	15050 ARMSTRONG BLVD		100320	5914352-9 11/2019	0220.6373		GAS
		8,665.95							
110099	**1/23/2020**		**110734 CITY OF RAMSEY**						
		26.17	48903907		100332	012320	9601.4651		WATER REVENUE
		26.17							
110100	**1/23/2020**		**106583 DELTA DENTAL PLAN OF MINNESOTA**						
		3,810.25	FEB 20 DENTAL INSURANCE		100333	RIS0002620566	9101.2170		DENTAL/DISABILITY/LIFE
		3,810.25							
110101	**1/23/2020**		**117403 ERHART, WILLIAM AND ELIZABETH**						
		100.00	REF HOME ESC 14520 BOWERS DR		100334	012320	9804.6433	00116897	REFUNDS
		100.00							
110102	**1/23/2020**		**115574 HEALTHPARTNERS**						
		59,413.50	FEB 20 MEDICAL INS		100335	94780310	9101.2176		LIFE/HEALTH-EMPLOYEE
		59,413.50							
110103	**1/23/2020**		**117400 IVANSHIN, ANDREY**						
		100.00	REF HOME ESC 8020 ALPINE DR		100336	012320	9804.6433	00116964	REFUNDS
		100.00							
110104	**1/23/2020**		**117399 KEEFE, MIKE AND SUSAN**						

Check #	Date	Amount	Supplier / Explanation	PO #	Doc No	Inv No	Account No	Subledger	Account Description
									Continued.
110104	1/23/2020		117399 KEEFE, MIKE AND SUSAN						
		500.00	REF HOME ESC 9321 INVERNESS LN		100337	012320	9804.6433	00116591	REFUNDS
		500.00							
110105	1/23/2020		117398 KRAFT, RYAN DOUGLAS						
		250.00	REF ADMIN HEARING FEE		100338	011720	9101.4454		ADMINISTRATIVE FINES
		250.00							
110106	1/23/2020		115826 LIFE FITNESS						
		30,941.18	TIF 6TH PAYMENT 2/1/20		100339	010920	9215.6433		REFUNDS
		3,788.30	TIF 6TH PAYMENT 2/1/20		100339	010920	9215.6433		REFUNDS
		34,729.48							
110107	1/23/2020		117404 MORTON BUILDING INC						
		500.00	REF HOME IMPRO ESC 16201 WOLFR		100340	012320	9804.6433	00116262	REFUNDS
		500.00							
110108	1/23/2020		100351 NCPERS GROUP LIFE INS						
		368.00	FEB 20 LIFE INS		100341	704800022020	9101.2170		DENTAL/DISABILITY/LIFE
		368.00							
110109	1/23/2020		117401 ORTH, BRIAN AND DIANE						
		100.00	REF HOME ESC 8201 154TH LN		100343	012320	9804.6433	00116918	REFUNDS
		100.00							
110110	1/23/2020		117114 PARK VIEW EAST-MINNEAPOLIS LLC						
		6,945.88	TIF 4TH PAYMENT 2/1/20		100344	010920	9214.6433		REFUNDS
		60,476.94	TIF 4TH PAYMENT 2/1/20		100344	010920	9214.6433		REFUNDS
		67,422.82							
110111	1/23/2020		112959 PREMIUM WATERS INC						
		11.00	DEC 2019 BOTTLED WATER- FIRE		100321	317291994	0220.6489		OTHER CONTRACTED SE
		78.39	DEC 19 BOTTLED WATER- FIRE		100322	317269405	0220.6489		OTHER CONTRACTED SE
		89.39							
110112	1/23/2020		117405 RCA PROPERTIES LLC						
		1,500.00	REF ERO ESC 6316 RIVERDALE		100345	012320	9804.6433	00117214	REFUNDS
		1,500.00							
110113	1/23/2020		114811 RESIDENCE AT THE COR APARTMENTS LLC						
		79,953.46	TIF 10TH PAYMENT 2/1/20		100346	010920	9214.6433		REFUNDS
		92,594.37	TIF 10TH PAYMENT 2/1/20		100346	010920	9214.6433		REFUNDS
		172,547.83							
110114	1/23/2020		117320 SADLER, DANIEL						
		100.00	REF HOME ESC 16158 NOWTHEN		100347	012320	9804.6433	00117216	REFUNDS
		100.00							
110115	1/23/2020		113370 SCHUSTER CONSTRUCTION LLC						
		1,500.00	REF ERO ESC 17910 UTE ST		100349	012320	9804.6433	00116985	REFUNDS
		1,500.00							
110116	1/23/2020		117406 STAFFORD CONSTRUCTION LLC						
		100.00	REF HOME ESC 16737 SODIUM ST		100350	012320	9804.6433	00117027	REFUNDS
		100.00							

Check #	Date	Amount	Supplier / Explanation	PO #	Doc No	Inv No	Account No	Subledger	Account Description
									Continued.
110117	1/23/2020		112615 W S AND D PERMIT SERVICE						
		50.00	REF CANCELLED PERMIT RA42697		100351	011520	9101.4205		BUILDING PERMIT
		1.00	REF CANCELLED PERMIT RA42697		100351	011520	9101.2081		SURCHARGES-PERMITS
		51.00							
110118	1/23/2020		117402 WELTER CONSTRUCTION LLC						
		500.00	REF HOME ESC 16314 OKAPI ST		100352	012320	9804.6433	00116633	REFUNDS
		500.00							
110119	1/23/2020		117155 WEST TITLE LLC						
		37.21	UB REF 8450 166TH CIR NW		100353	012320	9601.4651		WATER REVENUE
		37.21							
110173	1/30/2020		115203 ALL AMERICAN TITLE CO INC						
		223.08	UB REF 5365 140TH AVE NW		100421	012720	9601.4651		WATER REVENUE
		223.08							
110174	1/30/2020		100297 CENTERPOINT ENERGY						
		898.57	DEC 19 PW ACCOUNTS		100419	8000014064-2 12/2019	0311.6373		GAS
		582.92	DEC 19 PW ACCOUNTS		100419	8000014064-2 12/2019	0452.6373		GAS
		299.52	DEC 19 PW ACCOUNTS		100419	8000014064-2 12/2019	9601.6373		GAS
		299.52	DEC 19 PW ACCOUNTS		100419	8000014064-2 12/2019	9602.6373		GAS
		299.53	DEC 19 PW ACCOUNTS		100419	8000014064-2 12/2019	9605.6373		GAS
		2,380.06							
110175	1/30/2020		111696 CITY OF RAMSEY						
		75.00	CREDIT TO CITY INV 27036		100422	012720	9601.4651		WATER REVENUE
		75.00							
110176	1/30/2020		115887 DVS RENEWAL						
		14.25	TAB RENEWAL 396		100423	012720	0211.6249		MISCELLANEOUS OPERA
		14.25							
110177	1/30/2020		115887 DVS RENEWAL						
		14.25	TAB RENEWAL 367		100424	012720A	0211.6249		MISCELLANEOUS OPERA
		14.25							
110178	1/30/2020		115887 DVS RENEWAL						
		14.25	TAB RENWAL 366		100425	012720B	0211.6249		MISCELLANEOUS OPERA
		14.25							
110179	1/30/2020		114251 EXECUTIVE ASSOCIATED TITLE						
		70.36	UB REF 7012 139TH AVE NW		100426	013020	9601.4651		WATER REVENUE
		70.36							
110180	1/30/2020		114616 FERIANCEK, JOE						
		26.34	REIMB. MILEAGE TO TRAINING		100427	012820	0301.6331		TRAVEL & LODGING
		26.34							
110181	1/30/2020		117413 FRANCIS, PATRICK AND ANDREA						
		203.75	UB REF 15171 QUICKSILVER ST		100428	012720	9601.4651		WATER REVENUE

Check #	Date	Amount	Supplier / Explanation	PO #	Doc No	Inv No	Account No	Subledger	Account Description
									Continued.
110181	1/30/2020		117413 FRANCIS, PATRICK AND ANDREA						
		203.75							
110182	1/30/2020		117407 FREEDOM CHEVROLET BY ED MORSE						
		40,000.00	2020 CHEV TAHOE 572		100429	42627	9702.6550		MOTOR VEHICLES
		40,000.00							
110183	1/30/2020		116450 LENDSERV						
		235.86	UB REF 15338 ZUNI CT NW		100430	012720	9601.4651		WATER REVENUE
		235.86							
110184	1/30/2020		113719 NEOFUNDS BY NEOPOST						
		2,000.00	REFILL 7900044034448047		100431	012720	9101.1551		POSTAGE METER DEPOS
		2,000.00							
110185	1/30/2020		117409 NOAH ACQUISITIONS LLC						
		25.00	REFUND PERMIT RA42622		100432	012120	9101.4206		PLUMBING PERMIT
		1.00	REFUND PERMIT RA42622		100432	012120	9101.2081		SURCHARGES-PERMITS
		26.00							
110186	1/30/2020		100678 PETTY CASH						
		26.00	332 CITY VEH PLATES		100420	012720	0194.6249		MISCELLANEOUS OPERA
		21.00	607 CITY VEH PLATES		100420	012720	0194.6249		MISCELLANEOUS OPERA
		14.00	MEAL- CLERKS MEETING		100420	012720	0130.6249		MISCELLANEOUS OPERA
		61.00							
110187	1/30/2020		117038 RESULTS TITLE						
		36.28	UB REF 17200 WOLFRAM ST NW		100433	012720	9601.4651		WATER REVENUE
		36.28							
110188	1/30/2020		117414 SCHREIFELS, TROY D						
		290.58	UB REF 4975 155TH LN NW		100434	012720	9601.4651		WATER REVENUE
		290.58							
110189	1/30/2020		115045 TITLE NEXUS LLC						
		183.31	UB REF 5551 148TH LANE NW		100436	012720	9601.4651		WATER REVENUE
		183.31							
110190	1/30/2020		113903 TITLE ONE INC						
		279.52	UB REF 15079 HELIUM ST NW		100437	012720	9601.4651		WATER REVENUE
		279.52							
110191	1/30/2020		114606 TITLE SMART INC						
		52.34	UB REF 6211 177TH LN NW		100438	012720	9601.4651		WATER REVENUE
		52.34							
110192	1/30/2020		114074 TITLE SPECIALIST INC						
		189.94	UB REF 6970 137TH AVE NW		100439	012720	9601.4651		WATER REVENUE
		189.94							
1000916	1/24/2020		116114 AVESIS THIRD PARTY ADMINISTRATORS						
		197.56	FEB 20 VISION INS		100327	2470236	9101.2170		DENTAL/DISABILITY/LIFE
		197.56							
1000917	1/24/2020		107604 BONINE, JAMES						
		17.23	REIMB. MEALS- COM VEH TRAIN		100329	012120	0211.6331		TRAVEL & LODGING

Check #	Date	Amount	Supplier / Explanation	PO #	Doc No	Inv No	Account No	Subledger	Account Description
									Continued.
1000917	1/24/2020		107604 BONINE, JAMES						
		17.23							
1000918	1/24/2020		112663 CAPSTONE HOMES INC						
		47,771.00	REL SURETY BROOKFIELD 8		100330	012220	9804.6433	00115722	REFUNDS
		1,500.00	REF ERO ESC 14341 BOWERS DR NW		100331	012320A	9804.6433	00117059	REFUNDS
		49,271.00							
1000919	1/24/2020		107244 NORTHLAND TRUST SERVICES INC						
		365,000.00	BONDS 2011A		100342	RAMS11A 1/23/2020	9345.6602		BOND PRINCIPAL
		32,602.50	BONDS 2011A		100342	RAMS11A 1/23/2020	9345.6611		BOND INTEREST
		495.00	BONDS 2011A		100342	RAMS11A 1/23/2020	9345.6310		FISCAL AGENT FEES
		398,097.50							
1000920	1/24/2020		116813 SCHMIDT, KATIE						
		37.98	REITREMENT CAKE- J. THIELING		100348	012120	0130.6249		MISCELLANEOUS OPERA
		37.98							
1000921	1/24/2020		100510 VERIZON WIRELESS						
		1,664.30	DEC 2019 SERVICE		100323	9845401843	0211.6323		CELLULAR PHONES
		386.58	DEC 2019 SERVICE		100323	9845401843	0211.6415		OTHER EQUIPMENT REN
		95.30	DEC 2019 SERVICE		100323	9845401843	0280.6323		CELLULAR PHONES
		70.41	DEC 19 SERVICE		100324	9845933652	0130.6323		CELLULAR PHONES
		70.41	DEC 19 SERVICE		100324	9845933652	0192.6321		TELEPHONE
		165.23	DEC 19 SERVICE		100324	9845933652	0191.6323		CELLULAR PHONES
		118.34	DEC 19 SERVICE		100324	9845933652	0194.6323		CELLULAR PHONES
		547.79	DEC 19 SERVICE		100324	9845933652	0220.6323		CELLULAR PHONES
		47.65	DEC 19 SERVICE		100324	9845933652	0240.6323		CELLULAR PHONES
		208.05	DEC 19 SERVICE		100324	9845933652	0301.6323		CELLULAR PHONES
		289.67	DEC 19 SERVICE		100324	9845933652	0311.6323		CELLULAR PHONES
		256.63	DEC 19 SERVICE		100324	9845933652	0452.6323		CELLULAR PHONES
		286.14	DEC 19 SERVICE		100324	9845933652	9601.6323		CELLULAR PHONES
		4,206.50							
1000922	1/28/2020		100257 LAW ENFORCEMENT LABOR SRV INC						
		775.00			100119	0109201424172	9101.2177		UNION DUES
		837.00			100360	0123201254282	9101.2177		UNION DUES
		1,612.00							
1000923	1/28/2020		100298 MN AFSCME COUNCIL 5						
		566.50			100120	0109201424173	9101.2177		UNION DUES
		566.28			100361	0123201254283	9101.2177		UNION DUES
		1,132.78							
1000960	1/31/2020		105706 TINKLENBERG GROUP INC						
		4,500.00	RETAINER FEB 20 (8 OF 12)		100435	2104	9400.6315		MISCELLANEOUS PROFE
		4,500.00							
90542557	1/24/2020		100398 PUBLIC EMPLOYEES RETIREMENT ASSN						
		82.73			100270	0121201354261	9101.2174		PERA-EMPLOYEE
		82.73			100271	0121201354262	9101.2183		PERA-EMPLOYER
		22,473.15			100362	0123201254284	9101.2174		PERA-EMPLOYEE
		30,161.71			100363	0123201254285	9101.2183		PERA-EMPLOYER

Check #	Date	Amount	Supplier / Explanation	PO #	Doc No	Inv No	Account No	Subledger	Account Description
									Continued.
90542557	1/24/2020		100398 PUBLIC EMPLOYEES RETIREMENT ASSN						
		52,800.32							
94091315	1/24/2020		101306 IRS						
		280.10			100267	012120945292	9101.2171		FEDERAL WITHHOLDING
		1,238.16			100268	012120945293	9101.2173		FICA & MEDICARE-EMPL(
		1,238.16			100269	012120945294	9101.2182		FICA & MEDICARE-EMPL(
		327.70			100273	0121201354264	9101.2171		FEDERAL WITHHOLDING
		259.76			100274	0121201354265	9101.2173		FICA & MEDICARE-EMPL(
		259.76			100275	0121201354266	9101.2182		FICA & MEDICARE-EMPL(
		24,190.57			100365	0123201254287	9101.2171		FEDERAL WITHHOLDING
		13,585.69			100366	0123201254288	9101.2173		FICA & MEDICARE-EMPL(
		13,585.69			100367	0123201254289	9101.2182		FICA & MEDICARE-EMPL(
		54,965.59							
94582688	1/24/2020		100601 MN DEPT OF REV WH						
		340.91			100266	012120945291	9101.2172		STATE WITHHOLDING
		50.00			100272	0121201354263	9101.2172		STATE WITHHOLDING
		11,016.14			100364	0123201254286	9101.2172		STATE WITHHOLDING
		11,407.05							
98012420	1/24/2020		115568 ALERUS FINANCIAL NA						
		3,735.45			100359	01232012542814	9101.2176		LIFE/HEALTH-EMPLOYEE
		3,735.45-			100359	01232012542814	9101.2176		LIFE/HEALTH-EMPLOYEE
		3,735.65			100359	01232012542814	9101.2176		LIFE/HEALTH-EMPLOYEE
		3,735.65							
99012420	1/24/2020		107962 TOTAL ADMINISTRATIVE SERVICE CORP						
		1,778.51			100355	01232012542810	9101.2176		LIFE/HEALTH-EMPLOYEE
		1,778.51							
99240120	1/24/2020		114486 SUN LIFE ASSURANCE COMPANY OF CANADA						
		879.31			100115	01092014241711	9101.2176		LIFE/HEALTH-EMPLOYEE
		871.19			100356	01232012542811	9101.2176		LIFE/HEALTH-EMPLOYEE
		14.65	COBRA Life		100356	01232012542811	9101.2176		LIFE/HEALTH-EMPLOYEE
		915.80	LTD		100356	01232012542811	9101.2170		DENTAL/DISABILITY/LIFE
		2,680.95							
99272365	1/24/2020		100223 ICMA RETIREMENT TRUST 457						
		2,168.41			100354	0123201254281	9101.2175		DEFERRED COMPENSAT
		2,168.41							
99627908	1/24/2020		114790 GREAT WEST LIFE AND ANNUITY INS CO						
		8,996.01			100357	01232012542812	9101.2175		DEFERRED COMPENSAT
		8,996.01							
99654489	1/24/2020		114790 GREAT WEST LIFE AND ANNUITY INS CO						
		3,086.08			100358	01232012542813	9101.2176		LIFE/HEALTH-EMPLOYEE
		3,086.08							
		1,004,588.35	Grand Total						

Payment Instrument Totals

Checks	403,897.23
EFT Payments	141,618.57
A/P ACH Payment	459,072.55
Total Payments	1,004,588.35

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CITY OF RAMSEY
Create Payment Control Groups

Payment Group Control Number	2992		
Bank Account	999.1010	CASH IN BANK	00002224
Version	LOGIS004V		
Originator	JLIPSKI		
Payment Instrument	Check Payment		
Pay Through Date	12/31/2020		

Payee Number	Payee Name / Mailing Address	Stub Message	Document Ty	Number	Itm	Co	Due Date	Invoice Number	Payment Amount
100012	ACE SOLID WASTE INC	FEB 20 CONTRACT RECYCLING	PV	100524	001	09604	2/1/2020	5606422-20	26,508.70
							Summary Total		26,508.70
	ACE SOLID WASTE INC PO BOX 679859	OCT-DEC 19 BILL INCREASE	PV	100526	001	09604	2/1/2020	5606422-19	203.55
	DALLAS TX 75267-9859						Summary Total		203.55
							Payment Amount		26,712.25
115568	ALERUS FINANCIAL NA	2019 ENROLL PACKET	PV	100527	001	09101	12/6/2019	120619	2.50
							Summary Total		2.50
	ALERUS FINANCIAL NA P O BOX 6001 GRAND FORKS ND 58206-6001						Payment Amount		2.50
102953	AMERIGAS OF ANOKA	PROPANE	PV	100440	001	09101	1/29/2020	660820278	105.24
							Summary Total		105.24
	AMERIGAS OF ANOKA P O BOX 371473 PITTSBURGH PA 15250-7473						Payment Amount		105.24
100063	ASPEN MILLS	J. HINNENKAMP- EAR PIECE	PV	100371	001	09101	1/15/2020	250740	39.99
							Summary Total		39.99
	ASPEN MILLS 8201 C CENTRAL AVE NE	A. PIPENHAGEN BOOTS	PV	100372	001	09101	1/15/2020	250741	134.95
	SPRING LAKE PARK MN 55432						Summary Total		134.95
		MISC NAME TAGS- RANK TAGS	PV	100373	001	09101	1/21/2020	250993	68.55
							Summary Total		68.55
		M. TJOSAAS- MISC ITEMS	PV	100374	001	09101	1/15/2020	250739	268.15
							Summary Total		268.15
							Payment Amount		511.64
106953	ATOM	CLASS B. HESSE MAY 20	PV	100503	001	09101	1/31/2020	1047	525.00
							Summary Total		525.00
	ATOM PO BOX 26274 MINNEAPOLIS MN 55426						Payment Amount		

CITY OF RAMSEY
Create Payment Control Groups

Payment Group Control Number	2992		
Bank Account	999.1010	CASH IN BANK	00002224
Version	LOGIS004V		
Originator	JLIPSKI		
Payment Instrument	Check Payment		
Pay Through Date	12/31/2020		

Payee Number	Payee Name / Mailing Address	Stub Message	Document Ty	Number	Itm	Co	Due Date	Invoice Number	Payment Amount
									525.00
104586	BLAINE, CITY OF	THERMO PAPER MAY 2019	PV	100474	001	09101	1/14/2020	101	314.52
				Summary Total					314.52
	CITY OF BLAINE 10801 TOWN SQUARE DRIVE BLAINE MN 55449								
				Payment Amount					314.52
100101	CANVAS CRAFT	SHOOTING BACKDROP TARP	PV	100376	001	09101	1/23/2020	61608	247.78
				Summary Total					247.78
	CANVAS CRAFT 5781 QUEENS AVENUE NE OTSEGO MN 55330								
				Payment Amount					247.78
114519	CAPSTONE LLC PUBLIC SECTOR SOLUTIONS	TRAIN- FIRE INSPEC II (3)	PV	100377	001	09101	1/16/2020	1072	1,125.00
				Summary Total					1,125.00
	CAPSTONE LLC PUBLIC SECTOR SOLUTIONS 19070 LITHIUM STREET NW ANOKA MN 55303-9764								
				Payment Amount					1,125.00
110536	CBIZ FINANCIAL SOLUTIONS INC	2019 4TH QTR ADV SERVICE	PV	100473	001	09101	12/31/2019	5068	48.20
				Summary Total					48.20
	CBIZ FINANCIAL SOLUTIONS INC P O BOX 643792 CINCINNATI OH 45264-3792								
				Payment Amount					48.20
110734	CITY OF RAMSEY	14700 ERKIUM ST NW	PV	100475	001	09101	1/25/2020	726294 4TH QTR 19	42.63
				Summary Total					42.63
	CITY OF RAMSEY P O BOX 251100	16303 QUICKSILVER ST	PV	100476	001	09101	1/25/2020	724874 4TH QTR 19	132.98
	ST PAUL MN 55125-6100			Summary Total					132.98
		16303 QUICKSILVER-IRRIG	PV	100477	001	09101	1/25/2020	724931 4TH QTR 19	2.43
				Summary Total					2.43
		14779 ZEOLITE ST NW	PV	100478	001	09101	1/25/2020	722164 4TH QTR 19	2.43

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CITY OF RAMSEY
Create Payment Control Groups

Payment Group Control Number	2992		
Bank Account	999.1010	CASH IN BANK	00002224
Version	LOGIS004V		
Originator	JLIPSKI		
Payment Instrument	Check Payment		
Pay Through Date	12/31/2020		

Payee Number	Payee Name / Mailing Address	Stub Message	Document Ty	Number	Itm	Co	Due Date	Invoice Number	Payment Amount
									2.43
				Summary Total					117.03
		6860 RIVERDALE DR NW	PV	100479	001	09101	1/25/2020	723960 4TH QTR 19	
				Summary Total					117.03
		14700 TOWN CENTER DR NW	PV	100480	001	09101	1/25/2020	724470 4TH QTR 19	2.43
				Summary Total					2.43
		7401 E RAMSEY PKWY	PV	100481	001	09101	1/25/2020	724628 4TH QTR 19	117.03
				Summary Total					117.03
		161ST/URANIMATE IRRIG WEST	PV	100482	001	09101	1/25/2020	727919 4TH QTR 19	2.43
				Summary Total					2.43
		161ST/URANIMITE IRRIG EAST	PV	100483	001	09101	1/25/2020	727918	2.43
				Summary Total					2.43
		15050 ARMSTRONG BLVD	PV	100484	001	09101	1/25/2020	727978 4TH QTR 19	563.55
				Summary Total					563.55
		7650 SUNWOOD DR NW	PV	100485	001	09240	1/25/2020	444931372 4TH QTR 19	117.03
				Summary Total					117.03
		7550 SUNWOOD DR NW	PV	100486	001	09101	1/25/2020	444931294 4TH QTR 19	232.04
				Summary Total					232.04
		6701 HWY 10	PV	100487	001	09410	1/25/2020	719019 4TH QTR 19	117.03
				Summary Total					117.03
		5650 ALPINE DR NW	PV	100488	001	09101	1/25/2020	726528 4TH QTR 19	335.80
				Summary Total					335.80
				Payment Amount					1,787.27
114451	COMPASS MINERALS	ROAD SALT	PV	100448	001	09101	1/15/2020	575325	2,282.45
				Summary Total					2,282.45
	COMPASS MINERALS P O BOX 277043	ROAD SALT	PV	100449	001	09101	1/14/2020	574053	2,290.89
	ATLANTA GA 30384-7043			Summary Total					2,290.89
				Payment Amount					4,573.34
100167	CORNERSTONE FORD	WORK ON 681	PV	100450	001	09602	1/21/2020	16285358/2	3,766.89
	CORNERSTONE FORD	WORK ON 681	PV	100450	002	09602	1/21/2020	16285358/2	4,923.26
				Summary Total					8,690.15
	17219 HIGHWAY 10 NW PO BOX 304	RETURN PART- CREDIT	PD	100451	001	09101	1/22/2020	15287626	80.00-

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Payment Group Control Number	2992		
Bank Account	999.1010	CASH IN BANK	00002224
Version	LOGIS004V		
Originator	JLIPSKI		
Payment Instrument	Check Payment		
Pay Through Date	12/31/2020		

Payee Number	Payee Name / Mailing Address	Stub Message	Document Ty	Number	Itm	Co	Due Date	Invoice Number	Payment Amount
	ELK RIVER MN 55330								
				Summary Total					80.00-
		MISC PARTS 698	PV	100452	001	09101	1/21/2020	15287491	206.06
				Summary Total					206.06
		LAMP ASSY- REAR 601	PV	100518	001	09101	2/3/2020	15288713	121.84
				Summary Total					121.84
				Payment Amount					8,938.05
112353	DEMARS SIGNS	HWY 10 SIGN	PV	100490	001	09412	11/15/2019	IN3625	10,624.63
				Summary Total					10,624.63
	DEMARS SIGNS 410 93RD AVENUE NW COON RAPIDS MN 55433								
				Payment Amount					10,624.63
106065	DIVERSIFIED TEXTURING AND ENGRAVING	TAGS ENGRAVED	PV	100388	001	09101	1/14/2020	993	60.00
				Summary Total					60.00
	DIVERSIFIED TEXTURING AND ENGRAVING 1609 99TH LANE NE BLAINE MN 55449-4430								
				Payment Amount					60.00
104267	ELITE SANITATION	DEC 19 TOILET RENTAL	PV	100491	001	09101	1/17/2020	26393	162.00
				Summary Total					162.00
	ELITE SANITATION PO BOX 526 ELK RIVER MN 55330								
				Payment Amount					162.00
100169	EMERGENCY APPARATUS MAINTENANCE INC	WORK ON 560	PV	100391	001	09101	1/16/2020	109666	157.41
				Summary Total					157.41
	EMERGENCY APPARATUS MAINTENANCE INC 7512 4TH AVENUE	WORK ON 556	PV	100492	001	09101	11/27/2019	109626	1,443.38
	LINO LAKES MN 55014			Summary Total					1,443.38
				Payment Amount					1,600.79
106962	F I R E	TRAINING 1/28/20	PV	100456	001	09101	1/28/2020	4386	1,200.00
				Summary Total					1,200.00
	F I R E P O BOX 810	TRAINING 2 CLASSES 1/22/20	PV	100457	001	09101	1/22/2020	4361	1,100.00

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Create Payment Control Groups

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Version	LOGIS004V		
Originator	JLIPSKI		
Payment Instrument	Check Payment		
Pay Through Date	12/31/2020		

Payee Number	Name / Mailing Address	Stub Message	Document Ty	Number	Itm	Co	Due Date	Invoice Number	Payment Amount
	36015 ECHO DRIVE CROSSLAKE MN 56442			Summary Total					1,100.00
				Payment Amount					2,300.00
100143	FERGUSON WATERWORKS # 2516	METER SUPPLIES	PV	100393	001	09601	1/22/2020	0349571	217.69
	FERGUSON WATERWORKS 2516 P O BOX 802817 CHICAGO IL 60680-2817			Summary Total					217.69
				Payment Amount					217.69
115760	HENRY SCHEIN INC	2 OXYGEN REGULATORS	PV	100398	001	09101	1/13/2020	72796196	130.00
				Summary Total					130.00
	HENRY SCHEIN INC DEPT CH 10241	RETURN- VENT COMPACT CHEST	PD	100493	001	09101	8/20/2019	19875901	30.24-
	PALATINE IL 60055-0241			Summary Total					30.24-
				Payment Amount					99.76
100229	IPMA HR	C. LASHER MEMBERSHIP 20-21	PV	100504	001	09101	1/8/2020	52361-K9P3D8	156.00
				Summary Total					156.00
	IPMA HR 1617 DUKE STREET ALEXANDRIA VA 22314			Payment Amount					156.00
115007	ITERIS, INC	CLEAR PATH JAN 2020	PV	100458	001	09101	1/31/2020	119173	400.00
				Summary Total					400.00
	ITERIS, INC P O BOX 842123 LOS ANGELES CA 90084-2123			Payment Amount					400.00
100258	LEAGUE OF MINNESOTA CITIES	26 PATROL SUBSCRIPTION	PV	100505	001	09101	1/13/2020	314163	2,340.00
				Summary Total					2,340.00
	LEAGUE OF MN CITIES FINANCE DEPT 145 UNIVERSITY AVE WEST ST PAUL MN 55103-2044			Payment Amount					2,340.00

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Payment Group Control Number	2992		
Bank Account	999.1010	CASH IN BANK	00002224
Version	LOGIS004V		
Originator	JLIPSKI		
Payment Instrument	Check Payment		
Pay Through Date	12/31/2020		

Payee Number	Name / Mailing Address	Stub Message	Document Ty	Number	Itm	Co	Due Date	Invoice Number	Payment Amount
108208	METRO PRODUCTS INC	MISC PARTS	PV	100405	001	09101	1/22/2020	149088	37.24
				Summary Total					37.24
	METRO PRODUCTS INC 7401 CENTRAL AVENUE NE	PARK GLOVES/SHOP TOOL	PV	100461	001	09101	1/30/2020	149243	116.50
	FRIDLEY MN 55432	PARK GLOVES/SHOP TOOL	PV	100461	002	09101	1/30/2020	149243	160.13
				Summary Total					276.63
				Payment Amount					313.87
101164	MILLER CHEVROLET	WORK ON 373	PV	100406	001	09101	1/21/2020	CTCS636976	280.00
				Summary Total					280.00
	MILLER CHEVROLET P O BOX 130 21150 JOHN MILLESS DRIVE ROGERS MN 55374								
				Payment Amount					280.00
106555	MINNEAPOLIS, CITY OF	NOV 19 TRANSACTIONS	PV	100494	001	09101	1/21/2020	400451003503	41.40
				Summary Total					41.40
	MINNEAPOLIS FINANCE DEPT P O BOX 77038 MINNEAPOLIS MN 55480-7738								
				Payment Amount					41.40
100345	NAPA AUTO PARTS ELK RIVER	MISC SUPPLIES	PV	100463	001	09601	1/29/2020	048762	42.38
	NAPA AUTO PARTS ELK RIVER	MISC SUPPLIES	PV	100463	002	09601	1/29/2020	048762	184.41
				Summary Total					226.79
	17137 YALE STREET NW P O BOX 1041	PD GARAGE SUPPLIES	PV	100507	001	09101	2/1/2020	049145	23.96
				Summary Total					23.96
	ELK RIVER MN 55330	MISC FILTERS 655	PV	100522	001	09101	2/3/2020	049262	105.81
				Summary Total					105.81
				Payment Amount					356.56
115167	NET TRANSCRIPTS INC	JAN 20 TRANSCRIPTIONS	PV	100408	001	09101	1/15/2020	0029810	144.73
				Summary Total					144.73
	NET TRANSCRIPTS INC 3707 N. 7TH STREET SUITE 320 PHOENIX AZ 85014								

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Create Payment Control Groups

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Bank Account	999.1010	CASH IN BANK	00002224
Version	LOGIS004V		
Originator	JLIPSKI		
Payment Instrument	Check Payment		
Pay Through Date	12/31/2020		

Payee Number	Name / Mailing Address	Stub Message	Document Ty	Number	Itm	Co	Due Date	Invoice Number	Payment Amount
				Payment Amount					144.73
108137	NORTHERN STAR JUVENILE DIVERSION	2019 SUPPORT	PV	100511	001	09270	2/4/2020	475-111419-11	5,000.00
				Summary Total					5,000.00
	NORTHERN STAR JUVENILE DIVERSION 6202 BLOOMINGTON ROAD FORT SNELLING MN 55111								
				Payment Amount					5,000.00
115803	POWER LODGE- TWIN CITIES	20 POLARIS SPORTSMAN PD	PV	100525	001	09101	1/28/2020	112430	8,973.97
				Summary Total					8,973.97
	POWER LODGE- TWIN CITIES 6781 WEST HIGHWAY 10 RAMSEY MN 55303								
				Payment Amount					8,973.97
107711	SCHINDLER ELEVATOR	FEB-APR 20 CITY HALL	PV	100466	001	09101	2/1/2020	8105259032	673.35
				Summary Total					673.35
	SCHINDLER ELEVATOR P O BOX 93050 CHICAGO IL 60673-3050								
				Payment Amount					673.35
116913	SELLMARK CORPORATION	NECK STRAPS	PV	100509	001	09290	1/29/2020	491600	34.82
				Summary Total					34.82
	SELLMARK CORPORATION 2201 HERITAGE PARKWAY MANSFIELD TX 76063								
				Payment Amount					34.82
100529	WENDELL'S INC	BADGE- D. SPECHT	PV	100417	001	09101	1/17/2020	2453336	5.23
				Summary Total					5.23
	WENDELL'S INC 6601 BUNKER LAKE BLVD PO BOX 458 RAMSEY MN 55303-0458								
				Payment Amount					5.23
				Total Amount to be Processed					78,675.59
				Total Number of Payments to be Processed					32

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Create Payment Control Groups

Payment Group Control Number 2993
Bank Account 999.1010 CASH IN BANK 00002224
Version LOGIS004V
Originator JLIPSKI
Payment Instrument T A/P ACH Payment
Pay Through Date 12/31/2020

Payee Number	Name / Mailing Address	Stub Message	Document Ty	Number	Itm	Co	Due Date	Invoice Number	Payment Amount
110789	4IMPRINT	PD TUMBLERS WITH STRAW	PV	100469	001	09290	12/23/2019	8031126	415.80
							Summary Total		415.80
	4IMPRINT P O BOX 320	BIKE SAFETY BOOKS-PD	PV	100470	001	09101	12/26/2019	8036298	250.68
							Summary Total		250.68
	101 COMMERCE STREET OSHKOSH WI 54901						Payment Amount		666.48
115149	ADVANCED FIRST AID INC	DEFIB PADS/USB ADAPTER	PV	100368	001	09101	1/9/2020	0120-878	547.95
							Summary Total		547.95
	ADVANCED FIRST AID INC 4201 DREW AVENUE NORTH	DEFIB PADS/BATTERIES	PV	100502	001	09101	1/9/2020	0120-877	482.00
							Summary Total		482.00
	ROBBINSDALE MN 55422-1549						Payment Amount		1,029.95
110744	ALLINA HEALTH SYSTEM	DEC 19 QTR MED DIRECT/ED	PV	100471	001	09101	12/31/2019	II10026284	1,894.31
							Summary Total		1,894.31
	ALLINA HEALTH SYSTEM LAWSON MISC BILLING NW 7710 P O BOX 9383 MINNEAPOLIS MN 55440-9383						Payment Amount		1,894.31
117343	AMAZON CAPITAL SERVICES INC	2 TRIJICON SCOPE CROSSHAIR	PV	100369	001	09101	1/23/2020	1XMP-PJQ4-3NTK	1,890.70
							Summary Total		1,890.70
	AMAZON CAPITAL SERVICES INC 410 TERRY AVENUE NORTH	CREDIT SURFACE PRO RETURNED	PD	100513	001	09101	2/11/2020	19TV-K4CD-GRG7	1,299.00-
							Summary Total		1,299.00-
	SEATTLE WA 98109	CREDIT SURFACE PRO RETURNED	PD	100514	001	09101	2/11/2020	1P7D-RR9Q-F1WV	1,299.00-
							Summary Total		1,299.00-
		CREDIT SURFACE PRO RETURNED	PD	100515	001	09101	2/11/2020	1P7D-RR9Q-DYYT	1,299.00-
							Summary Total		1,299.00-
		3 SURFACE PROS	PV	100516	001	09101	1/11/2020	1KT6-6XNQ-H7XQ	4,182.00
							Summary Total		4,182.00

Payment Group Control Number 2993
Bank Account 999.1010 CASH IN BANK 00002224
Version LOGIS004V
Originator JLIPSKI
Payment Instrument T A/P ACH Payment
Pay Through Date 12/31/2020

Payee Number	Name / Mailing Address	Stub Message	Document Ty	Number	Itm	Co	Due Date	Invoice Number	Payment Amount
				Payment Amount					2,175.70
100029	ANOKA AREA CHAMBER OF COMMERCE	2020 GALA DINNER-SILVER SPON.	PV	100370	001	09101	1/21/2020	26077	1,000.00
				Summary Total					1,000.00
	ANOKA AREA CHAMBER OF COMMERCE 12 BRIDGE SQUARE ANOKA MN 55303			Payment Amount					1,000.00
107587	ANOKA COUNTY TREASURY DEPARTMENT	FEB 20 CAC FIBER	PV	100441	001	09101	1/21/2020	B20012101M	529.50
				Summary Total					529.50
	ANOKA COUNTY TREASURY DEPARTMENT 2100 THIRD AVENUE	JAN 20 CAC FIBER	PV	100442	001	09101	1/21/2020	B202120M	529.50
	ANOKA MN 55303			Summary Total					529.50
		SEPT 19 3RD QTR SIGNALS	PV	100472	001	09101	1/24/2020	HWYSQ32019	992.97
				Summary Total					992.97
				Payment Amount					2,051.97
106346	BAUER BUILT INCORPORATED	WORK ON 600	PV	100443	001	09101	1/29/2020	940064129	200.00
	BAUER BUILT INCORPORATED	WORK ON 600	PV	100443	002	09101	1/29/2020	940064129	1,048.28
				Summary Total					1,248.28
	8270 W 35W SERVICE DR BLAINE MN 55449	WORK ON 682	PV	100444	001	09101	1/29/2020	940064130	100.00
		WORK ON 682	PV	100444	002	09101	1/29/2020	940064130	1,048.28
				Summary Total					1,148.28
				Payment Amount					2,396.56
103641	BOYER TRUCKS ROGERS	MISC PARTS	PV	100375	001	09101	1/24/2020	73983R	76.29
				Summary Total					76.29
	BOYER TRUCKS P O BOX 18338	MISC FILTERS 662	PV	100517	001	09101	2/3/2020	74369R	112.00
	MINNEAPOLIS MN 55418			Summary Total					112.00
				Payment Amount					188.29
112019	CENTRAL HYDRAULICS INC	MISC PARTS	PV	100445	001	09101	1/31/2020	63725	452.40
				Summary Total					452.40
	CENTRAL HYDRAULICS INC								

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Payment Group Control Number	2993		
Bank Account	999.1010	CASH IN BANK	00002224
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Originator	JLIPSKI		
Payment Instrument	T	A/P ACH Payment	
Pay Through Date	12/31/2020		

Payee Number	Payee Name / Mailing Address	Stub Message	Document Ty	Number	Itm	Co	Due Date	Invoice Number	Payment Amount
	21877 INDUSTRIAL COURT	MISC PARTS 644	PV	100446	001	09101	1/28/2020	63661	105.81
							Summary Total		105.81
	ROGERS MN 55374						Payment Amount		558.21
114549	CHETS SHOES INC	M. GRAF- WORK BOOTS	PV	100378	001	09601	1/1/2020	49076	150.00
							Summary Total		150.00
	CHETS SHOES INC 8870 RENDOVA STREET NE CIRCLE PINES MN 55014						Payment Amount		150.00
116197	CINTAS CORPORATION	UNIFORM CLEANING	PV	100379	001	09101	1/22/2020	4040692734	28.00
	CINTAS CORPORATION	UNIFORM CLEANING	PV	100379	002	09101	1/22/2020	4040692734	4.00
	CINTAS LOC #4K	UNIFORM CLEANING	PV	100379	003	09101	1/22/2020	4040692734	31.29
	P O BOX 650838	UNIFORM CLEANING	PV	100379	004	09101	1/22/2020	4040692734	31.29
							Summary Total		94.58
	DALLAS TX 75265-0838	FIRE- MATS	PV	100380	001	09101	1/15/2020	4040094661	16.56
							Summary Total		16.56
		FIRE- MATS	PV	100381	001	09101	1/22/2020	4040692600	13.20
							Summary Total		13.20
		UNIFORM CLEANING	PV	100447	001	09101	1/29/2020	4041287283	28.00
		UNIFORM CLEANING	PV	100447	002	09101	1/29/2020	4041287283	4.00
		UNIFORM CLEANING	PV	100447	003	09101	1/29/2020	4041287283	35.46
		UNIFORM CLEANING	PV	100447	004	09101	1/29/2020	4041287283	35.46
							Summary Total		102.92
							Payment Amount		227.26
100125	COUNTRYSIDE PRINTING INC	PW WORK DOOR HANGERS	PV	100382	001	09101	1/21/2020	36152	256.50
							Summary Total		256.50
	COUNTRYSIDE PRINTING 6250 BUNKER LAKE BLVD NW	BUSINESS CARDS- J. BAGNE	PV	100383	001	09101	1/22/2020	36155	59.00
							Summary Total		59.00
	SUITE 113 RAMSEY MN 55303	PD ENVELOPES	PV	100384	001	09101	1/20/2020	36150	491.50
							Summary Total		491.50
		FUEL USEAGE FORMS	PV	100453	001	09101	1/29/2020	36168	55.00
							Summary Total		55.00
							Payment Amount		862.00

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Bank Account	999.1010	CASH IN BANK	00002224
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Originator	JLIPSKI		
Payment Instrument	T	A/P ACH Payment	
Pay Through Date	12/31/2020		

Payee Number	Name / Mailing Address	Stub Message	Document Ty	Number	Itm	Co	Due Date	Invoice Number	Payment Amount
100129	CRYSTEEL TRUCK EQUIPMENT	BLADES	PV	100385	001	09101	1/17/2020	F46256	1,197.36
								Summary Total	1,197.36
	CRYSTEEL MANUFACTURING 1130 73RD AVENUE NE FRIDLEY MN 55432							Payment Amount	1,197.36
113306	DEFINITIVE TECHNOLOGY SOLUTIONS INC	CONTRACT PRINTERS JAN-FEB 20	PV	100468	001	09101	1/22/2020	INV196077	305.07
								Summary Total	305.07
	DEFINITIVE TECHNOLOGY SOLUTIONS INC 9401 JAMES AVENUE SOUTH SUITE 120	19 CONTRACT OV OCT 19-JAN 20	PV	100489	001	09101	1/22/2020	INV196077A	40.29
								Summary Total	40.29
	BLOOMINGTON MN 55431							Payment Amount	345.36
100144	DEHN OIL COMPANY	DIESEL FUEL	PV	100386	001	09101	1/22/2020	69845	2,336.76
								Summary Total	2,336.76
	DEHN OIL COMPANY 6735 141ST AVENUE NW	DIESEL FUEL	PV	100387	001	09101	1/16/2020	71230	1,282.50
								Summary Total	1,282.50
	RAMSEY MN 55303							Payment Amount	3,619.26
101185	DO ALL PRINTING COM INC	4 WHITE FRAMES	PV	100389	001	09230	1/15/2020	46321	291.80
								Summary Total	291.80
	DO ALL PRINTING COM INC 6360 HIGHWAY 10 NW RAMSEY MN 55303							Payment Amount	291.80
100158	ECM PUBLISHERS INC	2020 BUDGET SUMMARY	PV	100390	001	09101	1/17/2020	753421	118.25
								Summary Total	118.25
	ECM PUBLISHERS INC 4095 COON RAPIDS BLVD	ORD 20-01	PV	100519	001	09101	1/31/2020	755901	64.50
								Summary Total	64.50
	COON RAPIDS MN 55433							Payment Amount	182.75
113991	EMERGENCY RESPONSE SOLUTIONS	CHEMGUARD FOAM	PV	100392	001	09101	1/14/2020	14455	450.00
								Summary Total	450.00
	EMERGENCY RESPONSE SOLUTIONS								

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Originator	JLIPSKI		
Payment Instrument	T A/P ACH Payment		
Pay Through Date	12/31/2020		

Payee Number	Name / Mailing Address	Stub Message	Document Ty	Number	Itm	Co	Due Date	Invoice Number	Payment Amount
	4817 VIKING BLVD SUITE 102	REPAIR FIRE PANTS	PV	100455	001	09101	1/20/2020	14474	357.90
	EAST BETHEL MN 55092			Summary Total					357.90
				Payment Amount					807.90
106428	FORCE AMERICA INC	JOY STICK/RUBBER BOOT	PV	100394	001	09101	1/23/2020	001-1410769	278.41
				Summary Total					278.41
	FORCE AMERICA INC 501 EAST CLIFF ROAD SUITE 100	TOOL- TAP TEST	PV	100395	001	09101	1/27/2020	001-1411558	90.77
	BURNSVILLE MN 55337			Summary Total					90.77
				Payment Amount					369.18
100186	FRANKENSIGNS INC	4 CUBE SIGNS	PV	100396	001	09101	1/7/2020	275355	92.00
				Summary Total					92.00
	FRANKENSIGNS 9991 GOODHUE STREET NE P O BOX 490301 BLAINE MN 55449								
				Payment Amount					92.00
100200	GOPHER STATE ONE CALL INC	2020 ANNUAL FAC. OPP. FEE	PV	100397	001	09601	1/31/2020	0000686	16.66
	GOPHER STATE ONE CALL	2020 ANNUAL FAC. OPP. FEE	PV	100397	002	09601	1/31/2020	0000686	16.66
	7223 PARKWAY DRIVE SUITE 210	2020 ANNUAL FAC. OPP. FEE	PV	100397	003	09601	1/31/2020	0000686	16.68
				Summary Total					50.00
	HANOVER MD 21076-1317			Payment Amount					50.00
100650	GRAINGER	VACUUM HOSE	PV	100520	001	09101	1/30/2020	94286090391	28.88
				Summary Total					28.88
	GRAINGER INC DEPT. 806511127 PALATINE IL 60038-0001								
				Payment Amount					28.88
112475	INNOVATIVE OFFICE SOLUTIONS	OFFICE SUPPLIES	PV	100399	001	09101	1/23/2020	IN2846979	17.99
	INNOVATIVE OFFICE SOLUTIONS	OFFICE SUPPLIES	PV	100399	002	09101	1/23/2020	IN2846979	80.89

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Payment Instrument T A/P ACH Payment
Pay Through Date 12/31/2020

Payee Number	Name / Mailing Address	Stub Message	Document Ty	Number	Itm	Co	Due Date	Invoice Number	Payment Amount
				Summary Total					98.88
	P O BOX 860627 MINNEAPOLIS MN 55486-0001	41 OFFICE CHAIRS	PV	100400	001	09101	1/24/2020	IN2849213	3,100.32
		41 OFFICE CHAIRS	PV	100400	002	09101	1/24/2020	IN2849213	1,722.45
		41 OFFICE CHAIRS	PV	100400	003	09101	1/24/2020	IN2849213	688.98
		41 OFFICE CHAIRS	PV	100400	004	09101	1/24/2020	IN2849213	1,033.47
		41 OFFICE CHAIRS	PV	100400	005	09101	1/24/2020	IN2849213	2,239.19
		41 OFFICE CHAIRS	PV	100400	006	09101	1/24/2020	IN2849213	2,239.18
		41 OFFICE CHAIRS	PV	100400	007	09101	1/24/2020	IN2849213	688.98
		41 OFFICE CHAIRS	PV	100400	008	09101	1/24/2020	IN2849213	1,377.96
		41 OFFICE CHAIRS	PV	100400	009	09101	1/24/2020	IN2849213	1,033.47
				Summary Total					14,124.00
		OFFICE SUPPLIES	PV	100401	001	09101	1/24/2020	IN2848909	48.29
				Summary Total					48.29
		OFFICE SUPPLIES	PV	100402	001	09101	1/17/2020	IN2839652	40.07
				Summary Total					40.07
				Payment Amount					14,311.24
117415	KIFFMEYER, ALISA M. ALISA M KIFFMEYER 1121 160TH LANE NE HAM LAKE MN 55304	YOGA JAN 13 & 27,2020	PV	100459	001	09101	1/13/2020	120	90.00
				Summary Total					90.00
				Payment Amount					90.00
100266	LOGIS LOCAL GOVERNMENT INFORMATION SYSTEMS ASS 5750 DULUTH STREET GOLDEN VALLEY MN 55422-4036	FEB 2020 SERVICES	PV	100506	001	09101	2/1/2020	48324	15,437.00
				Summary Total					15,437.00
		NETWORK SER. 01/25/20	PV	100521	001	09101	1/31/2020	48296	1,343.75
				Summary Total					1,343.75
				Payment Amount					16,780.75
100283	MENARDS COON RAPIDS MENARDS COON RAPIDS 3045 MAIN STREET COON RAPIDS MN 55433	MISC SUPPLIES	PV	100403	001	09101	1/16/2020	19015	42.29
				Summary Total					42.29
		MISC SUPPLIES	PV	100404	001	09101	1/12/2020	18716	286.54
				Summary Total					286.54
				Payment Amount					328.83
100284	MENARDS ELK RIVER	MISC SUPPLIES	PV	100460	001	09601	1/22/2020	3645	14.46

Payment Group Control Number 2993
Bank Account 999.1010 CASH IN BANK 00002224
Version LOGIS004V
Originator JLIPSKI
Payment Instrument T A/P ACH Payment
Pay Through Date 12/31/2020

Payee Number	Payee Name / Mailing Address	Stub Message	Document Ty	Number	Itm	Co	Due Date	Invoice Number	Payment Amount
	MENARDS ELK RIVER 19521 EVANS STREET NW ELK RIVER MN 55330-1077			Summary Total					14.46
				Payment Amount					14.46
113909	MOBILE VEHICLE INTEGRATION	BUILD 572 TO RFD SPECS	PV	100407	001	09702	1/14/2020	1912216	1,675.00
	MOBILE VEHICLE INTEGRATION 835 XENIA AVENUE NW ELK RIVER MN 55330			Summary Total					1,675.00
				Payment Amount					1,675.00
113946	MUNICIPAL EMERGENCY SERVICES INC	RESCUE ROPE/THROW BAG	PV	100462	001	09101	1/27/2020	IN1420076	783.27
	MUNICIPAL EMERGENCY SERVICES INC			Summary Total					783.27
	DEPOSITORY ACCOUNT	RIVER RESCUE ROPE	PV	100495	001	09101	1/6/2020	IN1413140	2,643.23
	75 REMITTANCE DRIVE SUITE 3135 CHICAGO IL 60675			Summary Total					2,643.23
				Payment Amount					3,426.50
100363	NORTHERN SANITARY SUPPLY CO	CLEANING SUPPLIES	PV	100409	001	09101	1/15/2020	197587	129.45
	NORTHERN SANITARY SUPPLY CO			Summary Total					129.45
	341 COON RAPIDS BLVD	MISC SUPPLIES	PV	100410	001	09101	1/21/2020	197648	356.36
	MINNEAPOLIS MN 55433			Summary Total					356.36
		MISC SUPPLIES	PV	100523	001	09101	1/30/2020	197754	187.10
				Summary Total					187.10
				Payment Amount					672.91
115232	NORTHERN TECHNOLOGIES LLC	ACE SOLID WASTE TEST DEC 19	PV	100496	001	09101	1/11/2020	34005	1,280.71
	NORTHERN TECHNOLOGIES LLC 3522 4TH AVENUE S FARGO ND 58103			Summary Total					1,280.71
				Payment Amount					1,280.71
115071	NORTHLAND OCCUPATIONAL HEALTH	DRUG SCREENS	PV	100508	001	09101	1/31/2020	5716	100.00

R04570

CITY OF RAMSEY
Create Payment Control Groups

Payment Group Control Number	2993		
Bank Account	999.1010	CASH IN BANK	00002224
Version	LOGIS004V		
Originator	JLIPSKI		
Payment Instrument	T	A/P ACH Payment	
Pay Through Date	12/31/2020		

Payee Number	Payee Name / Mailing Address	Stub Message	Document Ty	Number	Itm	Co	Due Date	Invoice Number	Payment Amount
	NORTHLAND OCCUPATIONAL HEALTH 7533 SUNWOOD DRIVE NW SUITE 212 RAMSEY MN 55303			Summary Total					100.00
				Payment Amount					100.00
110547	NORTHWEST LIGHTING SYSTEMS CO.	MISC BULBS	PV	100411	001	09101	1/16/2020	115235	105.00
				Summary Total					105.00
	NORTHWEST LIGHTING SYSTEMS CO. 746 CRAIG AVENUE TRACY MN 56175	MISC TUBE LIGHTS	PV	100412	001	09101	1/16/2020	115234	16.00
				Summary Total					16.00
				Payment Amount					121.00
113444	PRECISE	DEC 19 SERVICE	PV	100497	001	09101	1/29/2020	200-1024384	825.00
				Summary Total					825.00
	PRECISE 501 EAST CLIFF ROAD SUITE 100 BURNSVILLE MN 55337								
				Payment Amount					825.00
113241	RANGER CHEVROLET	20 CHEVY SILVERADO 611	PV	100413	001	09601	1/28/2020	9988680	17,381.00
	RANGER CHEVROLET	20 CHEVY SILVERADO 611	PV	100413	002	09601	1/28/2020	9988680	17,381.00
				Summary Total					34,762.00
	1502 E. HOWARD STREET HIBBING MN 55746	20 CHEV TAHOE 573 FIRE	PV	100464	001	09101	1/22/2020	25243	37,121.16
				Summary Total					37,121.16
				Payment Amount					71,883.16
113737	RATWIK ROSZAK AND MALONEY PA	RETAINER DEC 2019	PV	100498	001	09605	12/31/2019	65805	391.50
	RATWIK ROSZAK AND MALONEY PA	RETAINER DEC 2019	PV	100498	002	09605	12/31/2019	65805	2,745.50
				Summary Total					3,137.00
	300 U.S. TRUST BUILDING 730 SECOND AVENUE SOUTH MINNEAPOLIS MN 55402	DEC 19 SERVICES	PV	100499	001	09101	12/31/2019	65806	500.00
				Summary Total					500.00
				Payment Amount					3,637.00
115583	SANDARIN, BARBARA	YOGA 1-16,23 &30-2020	PV	100465	001	09101	1/16/2020	011620	135.00

R04570

CITY OF RAMSEY
Create Payment Control Groups

Payment Group Control Number	2993		
Bank Account	999.1010	CASH IN BANK	00002224
Version	LOGIS004V		
Originator	JLIPSKI		
Payment Instrument	T	A/P ACH Payment	
Pay Through Date	12/31/2020		

Payee Number	Name / Mailing Address	Stub Message	Document Ty	Number	Itm	Co	Due Date	Invoice Number	Payment Amount
	BARBARA SANDARIN 1824 113TH LANE NW COON RAPIDS MN 55433			Summary Total					135.00
				Payment Amount					135.00
100976	SHRED IT	PD SHREDDING JAN 20	PV	100414	001	09101	1/15/2020	8129003404	72.80
	SHRED IT USA MINNEAPOLIS 28883 NETWORK PLACE CHICAGO IL 60673-1288			Summary Total					72.80
				Payment Amount					72.80
100469	STREICHER'S POLICE EQUIPMENT	MISC PD AMMO	PV	100510	001	09101	1/27/2020	I1409882	5,501.41
	STREICHER'S POLICE EQUIPMENT 10911 WEST HWY 55 MINNEAPOLIS MN 55441			Summary Total					5,501.41
				Payment Amount					5,501.41
100485	TIMESAVER OFF SITE SECRETARIAL INC	JAN 20 MEETINGS	PV	100415	001	09101	1/14/2020	M25387	331.50
	TIMESAVER OFF SITE SECRETARIAL INC 5291 RIVER OAK DRIVE SAVAGE MN 55378			Summary Total					331.50
				Payment Amount					331.50
112079	TOKLE INSPECTIONS INC	DEC 2019 SERVICE	PV	100500	001	09101	12/31/2019	123119	4,402.50
	TOKLE INSPECTIONS INC 1748 123RD AVENUE NW COON RAPIDS MN 55448			Summary Total					4,402.50
				Payment Amount					4,402.50
107705	TWIN CITY GARAGE DOOR CO	PD GARAGE DOOR REPAIR	PV	100416	001	09101	1/15/2020	Z123865	230.25
	TWIN CITY GARAGE DOOR CO 5601 BOONE AVE N MINNEAPOLIS MN 55428			Summary Total					230.25
				Payment Amount					230.25

R04570

CITY OF RAMSEY
Create Payment Control Groups

Payment Group Control Number	2993		
Bank Account	999.1010	CASH IN BANK	00002224
Version	LOGIS004V		
Originator	JLIPSKI		
Payment Instrument	T	A/P ACH Payment	
Pay Through Date	12/31/2020		

Payee Number	Payee Name / Mailing Address	Stub Message	Document Ty	Document Number	Document Itm	Document Co	Due Date	Invoice Number	Payment Amount
112318	WINTER EQUIPMENT COMPANY	MISC PLOW SUPPLIES	PV	100467	001	09101	1/28/2020	IV43871	703.71
	WINTER EQUIPMENT COMPANY 1900 JOSEPH LLOYD PARKWAY WILLOUGHBY OH 44094						Summary Total		703.71
							Payment Amount		703.71
101257	YOUTH FIRST	20 PARTNER CONTRIB/SUPPORT	PV	100418	001	09270	1/23/2020	1003	15,000.00
	YOUTH FIRST 6701 HWY 10 NW RAMSEY MN 55303						Summary Total		15,000.00
							Payment Amount		15,000.00
							Total Amount to be Processed		161,708.95
							Total Number of Payments to be Processed		44

NORTHLAND TRUST SERVICES
150 S. Fifth Street, Suite 3300
Minneapolis, MN 55402
Phone 612-851-4931
Fax 612-851-4933

RECEIVED
DEC 19 2019
BY:

INVOICE

CITY OF RAMSEY
ATTN: FINANCE OFFICER
7550 SUNWOOD DRIVE NW
RAMSEY MN 55303-5137

12/11/2019

Vendor # 107244 RAMS11A
9345 6602 365,000
9345 6611 32,602.50
9345 6310 495

Date Rec'd: 12/19 Total Due: 398,097.50
Reviewed By:
Dept Approval:

RE: CITY OF RAMSEY, MINNESOTA
$4,365,000 GENERAL OBLIGATION BONDS,
SERIES 2011A

Debt Service: 02/01/2020

Principal:	365,000.00
Interest:	32,602.50
Total Principal & Interest:	397,602.50
Less Cash on Hand (Escrow Funds)	(0.00)
Paying Agent Annual Fee	495.00

Total Amount Due: 398,097.50

IF PAYING BY WIRE, PLEASE NOTIFY US VIA EMAIL

CHECK PAYMENTS due: 01-27-2020

Make Checks payable to:
NORTHLAND TRUST SERVICES INC.

WIRE PAYMENTS due: 01-29-2020

Wells Fargo Bank, San Francisco, CA
ABA: 121-000-248
ACCT: 143-6412710 Northland Trust Services
REF: Issuer name & series number

***MN SCHOOL DISTRICTS should wire funds 3 days prior to debt service date according to State Credit Enhancement requirements.**

Thank you for your business!

ACH PAYMENTS due: 01-29-2020

Wells Fargo Bank, Minneapolis, MN
ABA: 091-000-019
CHECKING ACCT: 143-6412710
REF: Issuer name & series number

If you have questions please contact:

Rhonda Magee
PH:612-851-4931
rmagee@northlandtrust.com

Scott Miles
PH: 612-851-5914
smiles@northlandtrust.com

Councilmember introduced the following resolution and moved for its adoption:

RESOLUTION #20-032

RESOLUTION APPROVING CASH DISBURSEMENTS MADE AND AUTHORIZING PAYMENT OF ACCOUNTS PAYABLE INVOICING RECEIVED DURING THE PERIOD OF JANUARY 23, 2020 THROUGH FEBRUARY 5, 2020

WHEREAS, the City of Ramsey Finance Department has made cash disbursements and received accounts payable invoicing during the period of January 23, 2020, through February 5, 2020, in the amount of $ 1,435,956.45 and

WHEREAS, the City Council of the City of Ramsey is required to authorize payment for all disbursement transactions.

NOW THEREFORE, BE IT RESOLVED BY THE CITY COUNCIL OF THE CITY OF RAMSEY, ANOKA COUNTY, STATE OF MINNESOTA, as follows:

1) That the Ramsey City Council hereby approves the cash disbursements made and authorizes payment of the accounts payable invoices as detailed in the attached Bills List for the period January 23, 2020, through February 5, 2020, in the amount of $ 1,435,956.45.

The motion for the adoption of the foregoing resolution was duly seconded by Councilmember Heinrich, and upon vote being taken thereon, the following voted in favor thereof:

Mayor
Councilmember
Councilmember
Councilmember
Councilmember
Councilmember
Councilmember

and the following voted against the same:

None

and the following abstained:

None

and the following were absent:

None

Whereupon said resolution was declared duly passed and adopted by the Ramsey City Council this the 11th day of February, 2020.

_____
Mayor

ATTEST:

_____
City Clerk

CC Regular Session **5. 7.**

Meeting Date: 02/11/2020

By: Katie Schmidt, Administrative Services

Information

Title

Adopt Resolution #20-031 to Hire a Part-time Community Service Officer Back-filling a Vacant Position

Purpose/Background:

The purpose of this case is to request the City Council to hire a part-time Community Service Officer, back-filling the current vacancy.

The City employs two part-time Community Service Officers (CSO). The positions are needed to support the City's basic daily work and the Strategic Plan. Specifically, it works to maintain a highly functional staff by employing a dedicated/cost effective person to handle somewhat routine police and community tasks. Community Service Officers are responsible for handling animal control duties, some code enforcement activities, support services to patrol officers, administrative errands, vehicle maintenance and repairs, receiving and investigating ordinance complaints and documenting findings, as well as assisting with crime prevention issues.

The City conducted an internal and external recruitment process. Mr. Nolan Goebel was part of that recruitment. Staff reached out to Mr. Goebel and advanced him in this hiring process. Mr. Goebel successfully passed the City's background investigations and pre-employment testing. If hired, Mr. Goebel will be subject to a 6-month probationary period, the City's Personnel Policy and AFSCME union contract.

Attachment: Job Description and Resolution

Funding Source:

The funding required for this position is within the 2020 budget.

Recommendation:

Staff recommends adopting the attached resolution.

Action:

Motion to adopt resolution #20-031 hiring Mr. Nolan Goebel as a part-time Community Service Officer working an average of 25 hours per week, effective on or near February 12, 2020 at $20.53 per hour, which is step 1 of the 2020 wage scale.

Attachments

Job Description
Resolution #20-031

Form Review

Inbox	Reviewed By	Date
Colleen Lasher	Colleen Lasher	02/05/2020 12:41 PM
Kurt Ulrich	Kurt Ulrich	02/06/2020 11:18 AM
Form Started By: Katie Schmidt		Started On: 01/28/2020 03:09 PM
Final Approval Date: 02/06/2020		

CITY OF RAMSEY JOB DESCRIPTION / POSITION ANALYSIS

POSITION TITLE: Community Service Officer

DEPARTMENT: Police

POSITION TITLE OF IMMEDIATE SUPERVISOR: Sergeant

SUBJECT TO RANDOM D.O.T DRUG AND ALCOHOL TESTING: Yes

FLSA STATUS: Non-Exempt

PRIMARY OBJECTIVE OF POSITION:

Perform support duties to police operations and the community. Perform regularly scheduled community service work for public protection and crime prevention. Primary service goals include providing cost-effective public safety and superior customer service.

This is a uniformed, non-sworn position with the City of Ramsey Police Department.

RESPONSIBILITIES:

A. Perform animal control duties
B. Perform code enforcement activities
C. Provide support services to patrol officers as needed
D. Perform administrative errands as needed
E. Assist with vehicle maintenance and repairs
F. Receive and investigate ordinance complaints and document findings
G. Assist with crime prevention issues
H. Perform other duties as assigned by the Supervisor

TASKS RELATED TO RESPONSIBILITIES:

A. Perform animal control duties
    1. Respond to complaints of barking dogs and other nuisances created by pets or wild animals
    2. Enforce animal control ordinances
    3. Impound loose, abandoned, vicious, or rabid animals
    4. Dispose of dead animal carcasses
    5. Investigate animal bite cases and prepare animal bite reports and properly quarantine animals as needed

B. Perform code enforcement activities
   1. Receive and investigate code enforcement complaints and violations of municipal ordinances including, but not limited to, junk cars, burning violations, trash violations, parking violations, or others
   2. Follow City Code and/or City policies for issuing verbal and/or written citations
   3. Work with Community Development Department as needed
   4. Coordinate abatement procedures and maintain necessary documents

C. Provide support services to patrol officers as needed
   1. Assist with motor vehicle traffic control
   2. Assist motorists and respond to vehicle lock-outs
   3. Perform other duties as needed
   4. Render first-aid as appropriate
   5. Perform vehicle lock-outs

D. Perform administrative errands as needed
   1. Pick-up or deliver equipment or operational supplies
   2. Make various deliveries, at the verbal or written direction of a supervisor

E. Assist with vehicle maintenance and repairs
   1. Set-up maintenance schedules
   2. Maintain vehicle maintenance and equipment repair records
   3. Assist in squad car set-up
   4. Conduct minor repairs and/or coordinate servicing of police department equipment

F. Receive and investigate ordinance complaints and document findings
   1. Take calls from dispatch
   2. Take calls when assigned by office personnel
   3. Complete all necessary paperwork
   4. Maintain records of complaints, violations, abatement, and other activity

G. Assist with crime prevention issues
   1. Assist the Crime Prevention Specialist in various programs as needed
   2. Maintain and foster excellent community relations
   3. Participate in emergency preparedness activities

H. Performs other duties as assigned at the verbal or written direction of a supervisor

KNOWLEDGE, SKILLS, AND ABILITIES:

- Ability to effectively communicate in English, both orally and in written form
- Ability to maintain effective working relationships with all levels of staff, residents, and personnel from other agencies
- Ability to cope with situations firmly, courteously, tactfully, and with respect to citizens' rights – even under stressful conditions

- Ability to maintain confidentiality, prioritize duties, and work independently with limited supervision
- Ability to act in a decisive manner, using good judgment
- Ability to prepare accurate and thorough reports
- Ability to maintain certification as a First Responder or in First Aid
- Knowledge of principles, procedures, techniques, and equipment of law enforcement
- Knowledge of animal restraint and care techniques
- Knowledge and ability to use computers including word processing and spreadsheets
- Demonstrate consistent, regular attendance at work
- Ability to work outdoors in all weather conditions

TRAINING AND EXPERIENCE:

Minimum Requirements

- High school degree or equivalent
- Must be a minimum of 18 years old
- Must possess a valid class D Driver's License with a good driving record
- Must have been certified in First Aid or C.P.R. or able to acquire an equivalent level of certification within six months of hire (Dept. Paid)
- Must pass job-related physical examination, drug screen, and extensive background investigation
- Computer experience including word processing and the use of spreadsheet software

Desirable Training and Experience

- Current status as a law enforcement student
- Formal training in traffic and pedestrian control
- Experience/training in observation and recollection of events
- Experience/training in law enforcement or security
- Experience/training in dealing with animals
- Experience/training as a fire fighter
- One year or more of public contact or customer service experience

This Job Description is not intended to be all-inclusive. It is within the City of Ramsey's discretion to assign additional duties and responsibilities or remove duties and responsibilities at any time. This Job Description does not constitute a Contract of Employment.

Updated: January 2014
Updated: March 2015
Updated: June 2019

JOB ACTIVITY REQUIREMENTS
Community Service Officer

	Job activity requirements				
	Physical Activities	**Very Important**	**Important**	**Slightly Important**	**Not Important**
1	Standing	x			
2	Sitting	x			
3	Walking	x			
4	Lifting	x			
5	Pushing / Pulling	x			
6	Carrying	x			
7	Climbing			x	
8	Kneeling		x		
9	Crawling			x	
10	Crouching	x			
11	Bending at waist	x			
12	Reaching	x			
13	Handling Objects	x			
14	Repetitive Hand Motion	x			
15	Use of Arm Muscles over Extended Periods		x		
16	Use of Leg Muscles over Extended Periods		x		
17	Overhead Work			x	
18	Stationary desk or bench work	x			

This job requires employees to be able to lift and carry up to 50 pounds without assistance.

	Job working conditions		
		Yes	**No**
1	Working Outdoors	x	
2	Working Indoors	x	
3	Operating forklifts or dangerous equipment		x
4	Operating motor vehicles	x	
5	Providing work direction to other employees		x
6	Working with chemicals		x
7	Working near fumes and vapors	x	
8	Driving a City vehicle or personal vehicle	x	
9	Driving is an essential function of this job	x	
10	Subject to random DOT drug and alcohol testing		x

Councilmember introduced the following resolution and moved for its adoption:

RESOLUTION #20-031

RESOLUTION TO HIRE A PART-TIME COMMUNITY SERVICE OFFICER

WHEREAS, there is a Community Service Officer vacancy; and

WHEREAS, an internal and external recruitment process was conducted; and

WHEREAS, Mr. Nolan Goebel has been selected as the top candidate for the position averaging 25 hours per week; and

WHEREAS, staff has completed the necessary background checks and is recommending that Mr. Nolan Goebel be hired as a part-time Community Service Officer at $20.53 per hour effective on or near Wednesday, February 12, 2020; and

WHEREAS, Mr. Nolan Goebel will be subject to a 6-month probationary period, the City's Personnel Policy and AFSCME union contract.

NOW THEREFORE BE IT RESOLVED BY THE CITY COUNCIL OF THE CITY OF RAMSEY, ANOKA COUNTY, STATE OF MINNESOTA, as follows:

1) Motion to adopt resolution #20-031 hiring Mr. Nolan Goebel as a part-time Community Service Officer working an average of 25 hours per week, effective on or near February 12, 2020 at $20.533 per hour, which is step 1 of the 2020 wage scale.

The motion for the adoption of the foregoing resolution was duly seconded by Councilmember, and upon vote being taken thereon, the following voted in favor thereof:

and the following voted against the same:

and the following abstained:

and the following were absent:

Whereupon said resolution was declared duly passed and adopted by the Ramsey City Council this the 11th day of February 2020.

_____
Mayor

ATTEST:

_____
City Clerk

CC Regular Session **5. 8.**

Meeting Date: 02/11/2020

Submitted For: Grant Riemer, Engineering/Public Works

By: MaryJo Warner, Engineering/Public Works

Information

Title

Report from Public Works Committee.
The Public Works Committee held its regular meeting on January 21, 2020 and discussed the following cases:
~~1. 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: Motion for City Council to ratify the recommendation of the Public Works Committee 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.~~ **Pull this portion of the Report from Public Works Committee from the Consent Agenda to be considered as Regular Agenda Item 7.03.**

2. Consider City Council Recommendation to Indefinitely Suspend Pavement Sealcoating Program: Motion for City Council to ratify the recommendation of the Public Works Committee to table the recommendation related to the City's annual sealcoating program to the February meeting.

3. Consider City Council Recommendation to Accept Feasibility Report for 2020 Pavement Overlay Improvements, Improvement Project No. 20-02: Motion for City Council to ratify the recommendation of the Public Works Committee to direct staff to bring back additional information to the Committee at the next meeting related to both options one and option three.

Purpose/Background:

1. 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. Motion for City Council to ratify the recommendation of the Public Works Committee 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.

2. 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. Motion for City Council to ratify the recommendation of the Public Works Committee to table the recommendation related to the City's annual sealcoating program to the February meeting.

3. 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. 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. City Engineer Westby stated that staff can do a deeper dive to determine what the potential costs would be 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. Ratify the recommendation of the Public Works Committee for City Council to direct staff to bring back additional information to the Committee at the next meeting related to both options one and option three.

Recommendation:

1. Motion for City Council to ratify the recommendation of the Public Works Committee 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.

2. Motion for City Council to ratify the recommendation of the Public Works Committee to table the recommendation related to the City's annual sealcoating program to the February meeting.

3. Motion for City Council to ratify the recommendation of the Public Works Committee to direct staff to bring back additional information to the Committee at the next meeting related to both options one and option three.

Action:

Motion for City Council to ratify the recommendation of the Public Works Committee as follows:
1. Motion for City Council to ratify the recommendation of the Public Works Committee 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.

2. Motion for City Council to ratify the recommendation of the Public Works Committee to table the recommendation related to the City's annual sealcoating program to the February meeting.

3. Motion for City Council to ratify the recommendation of the Public Works Committee to direct staff to bring back additional information to the Committee at the next meeting related to both options one and option three.

Attachments

Agenda

Form Review

Inbox	Reviewed By	Date
Chris Anderson	Chris Anderson	02/04/2020 11:19 AM
Grant Riemer	Grant Riemer	02/05/2020 09:55 AM
Bruce Westby	Bruce Westby	02/06/2020 03:00 PM
Kurt Ulrich	Kurt Ulrich	02/06/2020 03:57 PM
Form Started By: MaryJo Warner		Started On: 01/30/2020 09:15 AM
Final Approval Date: 02/06/2020		

City of Ramsey
Agenda
Public Works Committee
Tuesday, January 21, 2020
5:30 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 minutes dated November 19, 2019.

5. Committee Business

1. 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

2. Consider City Council Recommendation to Indefinitely Suspend Pavement Sealcoating Program

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

6. Committee/Staff Input

1. Receive Update on Bunker Lake Boulevard Reconstruction - Armstrong Boulevard to Ramsey Boulevard

2. Staff Updates on Improvement Projects and Items of Interest

3. Review Future Topics Calendar

7. Adjournment

Public Works Committee **4. 1.**

Meeting Date: 01/21/2020
Submitted For: Grant Riemer, Engineering/Public Works
By: MaryJo Warner, Engineering/Public Works

Title:

Approve the following meeting minutes.
1. Public Works Committee meeting minutes dated November 19, 2019.

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 November 19, 2019.

Action:

Motion to approve meeting minutes dated November 19, 2019.

Attachments

November Minutes

Form Review

Inbox	Reviewed By	Date
Mark Riverblood	Mark Riverblood	01/13/2020 03:19 PM
Bruce Westby	Bruce Westby	01/14/2020 01:37 PM
Grant Riemer	Grant Riemer	01/14/2020 01:45 PM
Kurt Ulrich	Kurt Ulrich	01/16/2020 09:57 AM
Form Started By: MaryJo Warner		Started On: 01/13/2020 11:12 AM
Final Approval Date: 01/16/2020		

PUBLIC WORKS COMMITTEE
CITY OF RAMSEY
ANOKA COUNTY
STATE OF MINNESOTA

The Public Works Committee conducted a regular meeting on Tuesday, November 19, 2019, 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
Parks and Assistant Public Works Superintendent Mark Riverblood
City Engineer Bruce Westby

1. CALL TO ORDER

Chairperson Kuzma called the regular meeting of the Public Works Committee to order at 5:36 p.m.

2. CITIZEN INPUT

There was none.

3. APPROVE AGENDA

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

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

4. APPROVE MINUTES

4.01: Approve October 15, 2019, Meeting Minutes

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

Regular Meeting Minutes dated October 15, 2019

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

5. COMMITTEE BUSINESS

5.01: Consider Replacing Monument and Shelter Roof at Rivers' Bend Park and HVAC Replacement at Central Park

Parks and Assistant Public Works Superintendent Riverblood stated that the purpose of this case is to consider a recommendation to City Council for authorization to perform maintenance/replacement activity for two structures at Rivers' Bend Park, and one of three HVAC systems at Central Park's buildings. Funding is request to be allocated from the City's Capital Maintenance Fund (not the Park Trust Fund) and therefore is being brought to the Public Works Committee, because the project funding source is limited, and also to be used for other (non-park) capital maintenance needs of the community. In 2017, the Council expanded the scope of this fund (previously entitled Park Maintenance Fund) to allow use for other non-park capital maintenance needs. The facilities this case discusses may be considered higher priority maintenance items.

Parks and Assistant Public Works Superintendent Riverblood stated that if the Committee recommends replacement of the three items utilizing the Capital Maintenance Fund, staff would proceed to obtain competitive quotes consistent with the City's Purchasing Policy for re-roofing the hex shelter at Rivers' Bend and also the HVAC replacement at Central Park. The HVAC system is anticipated to cost less than $15,000; the roof replacement to a standing seam steel roof with trim, with sandblasting and sealing the underside and support columns at less than $18,000. Should the costs be consistent with the estimates, staff will proceed upon City Council ratification of the Public Works Committee recommendation. For the monument replacement at Rivers' Bend, the replacement cost is unknown, as neither the design nor specifications are fully understood at this time. The cost may be between $8,000 to $15,000, or more. Staff proposes utilizing the approved sign and streetscape guide and amending these examples to something suitable for the park. This project would subsequently be routed for Council consideration and approval via the Park and Recreation Commission. The Capital Maintenance Fund is proposed for funding in a total amount for the two projects in an amount not to exceed $33,000. This does not include the park monument sign, which would advance for consideration separately. Staff recommends replacing the HVAC system and roof shelter as described.

Councilmember Riley commented that the monument sign clearly needs to be replaced. He noted that as future signs are replaced, there could then be similar entrance signs installed at those parks for consistency.

Parks and Assistant Public Works Superintendent Riverblood agreed that staff would continue to review parks signs as they are in need of replacement to find something consistent but also appropriate for the scale of the park. He noted that there may be costs savings in bundling the Rivers' Bend Park monument sign with the City monument sign that will be installed at Bunker Lake Boulevard and 47.

Councilmember Menth commented on the possibility of vandalism with a wooden sign.

Parks and Assistant Public Works Superintendent Riverblood referenced a steel sign that was installed at another location and has not experienced any vandalism. He noted that option could be reviewed as well and perhaps that become a standard for community park signs.

Motion by Councilmember Riley, seconded by Councilmember Menth, to recommend to City Council the replacement of the HVAC system at Central Park, and roof shelter at Rivers' Bend Park as discussed, at a not to exceed cost of $33,000 from the Capital Maintenance Fund.

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

Councilmember Riley noted that these are maintenance items for parks that already exist. He stated that there has been discussion that parks are not always as up to date as desired and asked if there are other park projects that should be considered to ensure they are usable and long lasting.

Parks and Assistant Public Works Superintendent Riverblood explained that only so many projects can be managed at one time. He noted that the projects with the highest needs have been brought forward first. He noted that the proposed budget for 2020 includes a $90,000 line item for trail maintenance in order to keep pace on the needed improvements. He noted that Ford Brook Park is proposed to receive updated playground equipment in 2020.

5.02: Consider Recommending City Council Approval to Solicit Requests for Proposals to Prepare Plans and Specifications for Bunker Lake Boulevard/CSAH 116 Improvements, Improvement Project #20-03

City Engineer Westby stated that the purpose of this case is to consider recommending City Council approval to solicit Requests for Proposals to prepare plans and specifications for Bunker Lake Boulevard/CSAH 116 Improvements, Improvement Project #20-03. 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 JPA, including the two amendments were included in the case.

City Engineer Westby stated that 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 was had 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, railroad 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. It 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.

City Engineer Westby stated that Anoka County Highway Department staff recently informed City staff that they want to expand Bunker Lake Boulevard to a four lane divided highway all the way to 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 Ramey begin designing the required improvements for Bunker Lake Boulevard between Armstrong Boulevard and Ramsey Boulevard per the JPA. He stated that in speaking with Economic Development Manager Sullivan, because of the use of TIF it would be recommended to complete the project in 2021. City staff is in the process of developing a Request for Proposals (RFP) to solicit engineering services for the preparation of plans and specifications for improvements to Bunker Lake Boulevard between Armstrong Boulevard and Ramsey Boulevard. Staff is prepared to present a draft RFP to the City Council on December 10, 2019, and to request authorization to solicit proposals directly to engineering companies as selected by Anoka County. Staff therefore requests that the Public Works Committee recommend City Council approval of this request.

Chairperson Kuzma asked if the speed would change.

City Engineer Westby confirmed that would be part of the traffic study.

Councilmember Menth asked and received confirmation that the estimated cost of $5,000,000 would only apply to the section from Armstrong to Ramsey Boulevard.

Councilmember Riley asked why the City would be responsible for paying and improving a County road. He asked if there is something historical that relates to the creation of that JPA.

City Engineer Westby stated that he could review information from the past to determine where that decision came from.

Councilmember Riley stated that he would want to better understand the reasoning for the JPA and why the financing and construction of the County road would fall to the City.

City Engineer Westby stated that he will do his best to find that information in preparation for bringing this case forward to the City Council in the future.

Parks and Assistant Public Works Superintendent Riverblood stated that perhaps part of the discussion should be what would happen if the City did not move forward with this project. He noted that there may be related impacts to the Highway 10 project as this would be a detour route for that project.

City Engineer Westby agreed that would be a concern to him, in that Bunker Lake Boulevard will be a detour route for Highway 10.

Councilmember Riley reviewed some of the answers he would want from the County. He noted that if the City is responsible for building and financing the improvements, he would think the City should have additional say in the allowed access points onto the roadway.

Chairperson Kuzma asked if there is a timeline for this process.

City Engineer Westby replied that the County is hoping to have the City segment and County segment completed by 2022. He noted that while there is no connection to the projects and they can be done independently, it may be helpful to have one segment completed before the other. He confirmed that the item does not have to move forward to the Council on December 10th.

Chairperson Kuzma confirmed the consensus of the Committee for the additional information requested to be brought back to the Committee before considering moving this item forward.

Councilmember Riley noted that once the questions are answered, it may make sense to bid the two segments together as one project, even if the City is funding one segment.

Motion by Councilmember Riley, seconded by Councilmember Menth, to direct staff to gather additional information on the history on the conditions of the JPA and discuss options with Anoka County related to renegotiating the JPA, working together to find efficiencies, and opportunities for an additional access onto Bunker Lake Boulevard.

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

6. COMMITTEE / STAFF INPUT

6.01: Update on New PW Campus

Public Works Superintendent Riemer reported that staff visited two sites (Elk River and Chanhassen). He highlighted items that he liked from each of the locations as well as input he received from the staff at those locations. He noted that he will be visited Woodbury the following week. He stated that the draft RFP was sent to the City Attorney today for review and

once approved would be sent out for bids. He hoped that a design team would be brought on in January, noting that it would follow a similar process as the process to select RJM.

Councilmember Menth provided input on electrical services.

Councilmember Riley commented that the underbody wash bay seemed to make sense. He asked if the Ramsey police would use the public works facility for washing.

Public Works Superintendent Riemer commented that if the facilities were available, he would think the police would most likely want to use them.

Councilmember Riley stated that he is confident that staff will be the most knowledgeable on the elements that will be needed.

Parks and Assistant Public Works Superintendent Riverblood stated that he found it useful to go on the tours not only to see the sites in action but also to obtain input from those staff members. He commented that the designated meeting spaces and conference rooms for morning meetings will be helpful. He noted that Chanhassen also uses some of those spaces for voting precincts.

6.02: Staff Updates on Improvement Projects and Items of Interest

City Engineer Westby provided updates on City improvement projects, Anoka County improvement projects, and MnDOT improvement projects.

Regarding the COR Infiltration Basin project, City Engineer Westby discussed the two soil stockpiles on site. One stockpile includes approximately 8,000 cubic yards of clean sand, and the other includes just under 12,000 cubic yards of sandy topsoil, He said the clean sand can be used as structural fill on City-owned properties in The COR, and that Staff is developing plans for such use and that this work can be completed in 2020. He added that the sandy topsoil has very little value to the City since it cannot be used as structural fill and would generally cost more to haul and stockpile elsewhere than it would cost to import new material. It was the consensus of the Committee that the City should retain the stockpile of clean sand for use in further developing The COR, and that staff could continue discussions with the River Walk Village contractor, and/or other contractors or developers, to remove the sandy topsoil stockpile as soon as possible. The consensus of the Committee was that if the topsoil cannot be used in a timely and cost-effective manner to prepare The COR for development, the topsoil may instead be offered to builders, contractors and/or developers at no cost to allow for its removal as soon as possible.

City Engineer Westby provided an update on other items of interest.

Councilmember Riley asked for an update on the sealcoat study.

City Engineer Westby reported that staff has collected data and is tabulating the results to present to the Committee in January.

Chairperson Kuzma noted that a December meeting is not needed.

Motion by Councilmember Menth, seconded by Councilmember Riley, to cancel the December meeting.

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

6.02: Review Future Topics Calendar

City Engineer Westby provided a brief review.

7. ADJOURNMENT

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

Motion carried.

The regular meeting of the Public Works Committee adjourned at 6:57 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: 01/21/2020

By: Chris Anderson, Community Development

Title:

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

Purpose/Background:

The City of Ramsey has been awarded $28,000 in grant funds through the Metropolitan Council's 2019-2022 Water Efficiency Grant Program (the "Program") for use in a rebate program. As the name of the Program implies, the purpose of the grant is to implement water efficient technologies to reduce the demand on water supply.

There are two (2) primary financial requirements of the Program. First, the municipality must contribute twenty-five percent (25%) of the grant award, which equates to $9,340, Second, that rebate recipients must also have a financial contribution (e.g. the grant funds and the City contribution cannot entirely cover the cost of the purchase). Other important eligibility requirements include the rebate recipient being a municipal water customer (this means that anyone on a private well is not eligible), only applicable to replacement devices (meaning that new construction is not eligible), and the rebate is only applicable for the cost of the device and its installation, excluding any owner labor costs.

Timeframe:

Staff estimates 20 minutes for the presentation and questions.

Observations/Alternatives:

While the funds are provided through the Metropolitan Council via the Clean Water, Land and Legacy Amendment, grant recipients are responsible for developing their own program. Staff from the Engineering, Utilities, Community Development and Administration Departments met to discuss the framework for a rebate program. While it was clear that more efficient irrigation controllers would likely provide the biggest water savings, it was acknowledged that that alone would exclude a number of otherwise eligible property owners (all properties that do not have in-ground irrigation systems). Thus, it was agreed to also consider WaterSense labeled toilets as another option for rebates.

During the summer months, the greatest demand for water comes from irrigation. Therefore, replacement of older, clock-timer irrigation controllers with a WaterSense labeled smart controller is one of the eligible rebate options. Additionally, an irrigation audit, which helps ensure an irrigation system is operating efficiently and accurately, conducted by a WaterSense certified irrigation professional, is another eligible rebate option. If residents take full advantage of this part of the Program, it could result in an estimated savings of approximately 1 million gallons of water (based on numbers provided by the Metropolitan Council from the 2015-2017 Water Efficiency Grant Program).

As previously noted, Staff wanted to ensure that any municipal water customer (excluding new construction/new development) had an opportunity to realize both water savings and financial savings. Thus, another option available for those customers is a rebate for the replacement of older toilets with a WaterSense labeled toilet. If residents take full advantage of this part of the Program, it could result in an estimated savings of about 900,000 gallons of water (again, based on numbers provided by the Metropolitan Council from the 2015-2017 Water Efficiency Grant Program).

The rebates would be available on a first come first served basis, as long as funds last (or until the close of the program, which is June 30, 2022). Rebates for an individual device can be up to $200, and cumulatively, shall not exceed $500 per metered water supply customer. The water supply customer shall be responsible for the sales tax on the device, thus satisfying the requirement that they have a financial investment in the upgrade.

There is a wide range of price points for qualifying devices (both WaterSense labeled smart controllers and toilets). The intention is to incentivize the water efficiency upgrades significantly by having the rebate cover as much of the device cost as possible while also attempting to spread the rebates out across a number of households. There are a number of these devices that could be entirely covered by the rebate amount; however, there are also eligible devices that greatly exceed the rebate maximum. Thus, the cap on the rebate amount will help spread the funds out to benefit more property owners.

Administration of the rebate program will be coordinated by the Community Development and Engineering Departments, but will also include Finance Staff as well for issuance of the rebates. Per the required Grant Agreement, the City will have to provide quarterly reporting to the Metropolitan Council. Reporting forms will be provided by Metropolitan Council staff and is assumed to include: property address, property type (residential/commercial), device replaced, number of devices, grant amount per device, estimated annual water savings, municipal contribution, and eligible grant amount (rebate amount per device minus municipal contribution).

At their January 13, 2020 meeting, the Environmental Policy Board reviewed this case and provided support with moving forward. They did, however, note a desire for the City to offer a similar program for any property owner, regardless of whether they were a municipal water customer or not. They acknowledged that those on private wells are not eligible for this grant, but if this program is successful, it should be considered a pilot program the City could build and expand upon in the future with the goal for further reducing demand on groundwater.

Alternatives

Alternative 1: Motion to recommend the City Council authorize the execution of the Clean Water Fund Grant Agreement with the Metropolitan Council and accept the $28,000 Water Efficiency Grant. A Smart Irrigation Rebate Program has been on the Environmental Policy Board's Work Plan since 2017 and in 2019 it was added to the City Council's Strategic Plan. This grant will help accomplish that action from both plans. Furthermore, if this program proves to be valuable and effective, it could serve as a blue print for an expanded program that also includes those on private wells. Staff supports this option.

Alternative 2: Motion to recommend the City Council not execute the Clean Water Fund Grant Agreement and not accept the grant funds. If the City wants to implement any sort of incentive program to reduce the demand on drinking water supply, this action would result in the City fully funding any such program.

Funding Source:

Funding for this program would consist of three sources: $28,000 from the Water Efficiency Grant from the Metropolitan Council, $9,340 from the City's Water Fund (this is equivalent to the required 25% municipal contribution), and any rebate participant would cover the sales tax on the purchase of the device (thus satisfying the requirement for the rebate participant to have a financial contribution in the program).

Recommendation:

The Environmental Policy Board (EPB) reviewed this information at their January meeting and recommended City Council 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.

Action:

Motion 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.

Attachments

Metropolitan Council Grant Program Guidelines
City of Ramsey Application
Metropolitan Council Grant Acceptance Letter
Clean Water Fund Grant Agreement
Draft EPB Meeting Minutes Dated January 13, 2020
Resolution #20-018

Form Review

Inbox	Reviewed By	Date
Tim Gladhill	MaryJo Warner	01/16/2020 04:31 PM
Bruce Westby	MaryJo Warner	01/16/2020 04:31 PM
Grant Riemer	MaryJo Warner	01/16/2020 04:31 PM
Kurt Ulrich	Kurt Ulrich	01/16/2020 04:37 PM
Form Started By: Chris Anderson		Started On: 01/13/2020 08:23 AM
Final Approval Date: 01/16/2020		

Metropolitan Council
Water Efficiency Grant Program

Overview
The Metropolitan Council (Council) will implement a water efficiency grant program effective September 30, 2019 to June 30, 2022. Grants will be awarded on a competitive basis to municipalities that manage municipal water systems. The Council will provide 75% of the program cost; the municipality must provide the remaining 25%. Municipalities will use the combined Council and municipality funds to run their own grant or rebate programs.

Grants will be made available in amounts with a minimum of $2,000 and a maximum of $50,000. Grantees will be required to provide estimated water savings achieved through this program for Clean Water, Land & Legacy Amendment reporting purposes.

Legislative Directive - Minnesota 2019 Session Law
> $375,000 the first year and $375,000 the second year are for the water demand reduction grant program to encourage municipalities in the metropolitan area to implement measures to reduce water demand to ensure the reliability and protection of drinking water supplies. Fiscal year 2020 appropriations are available until June 30, 2021, and fiscal year 2021 appropriations are available until June 30, 2022.

Grant Program Goal
The goal of the water efficiency grant program is to support technical and behavioral changes that improve municipal water use efficiency in the seven-county metropolitan area.

Critical Points to Remember
- The applying municipality must be a water supplier
- New construction and new developments are not eligible
- Funds are for rebates or grants only; consulting and city staff time are ineligible
- Combined Council and municipality funds cannot pay for 100% of an eligible activity's cost
- A portion of each eligible activity's cost must be paid by the property owner
- Grant recipients must display the Clean Water, Land and Legacy Amendment logo and the Metropolitan Council logo on program-related web pages and paper communications

Grant Program Structure: Administration and Funding
The Water Efficiency Grant Program will be administered by Metropolitan Council Environmental Services (MCES) and will be funded with $750,000 appropriated by the 2019 Minnesota Legislature. Grant applications will be reviewed and ranked by the MCES Water Supply Planning Unit staff.

Grants are only for water efficiency programs offering rebates or grants to property owners who are customers of the municipal water supply system and who replace specified water using devices with approved devices that use substantially less water.

Grants will be awarded to municipalities in amounts ranging from $2,000 to $50,000 for providing rebates or grants to property owners. Municipalities will be responsible for the design and operation of their rebate or grant program and its details. Grant payments to the municipality will be for 75% of approved program amounts. The municipality must provide the remaining 25% of the program cost. Municipality rebates or grants are eligible for reimbursement on device replacements conducted September 30, 2019 through June 30, 2022.

Here is an example showing the grant funding design:

Metropolitan Council Grant Amount	**$15,000**
Municipality Match	$5,000
Municipality Grant/Rebate Program Total	$20,000

Eligibility

Per legislative language, the grant program is limited to municipalities in the seven-county metropolitan area.

Municipalities eligible per above must apply to participate and, if approved, sign a standard Council Grant Agreement, before any eligible rebates or grants can be submitted for reimbursement. Agreements shall require that municipalities:

- Entirely pass through grants received (as is being done by MCES)
- Verify purchase of devices to receive grants
- Retain records and cooperate with any audits
- Conduct all communications with property owners and ensure all written communications to property owners include both the Clean Water, Land and Legacy Amendment and the Metropolitan Council's logo
- Provide quantitative information for state reporting purposes

Eligible water efficiency devices consist of the following:

- Toilet replacement with a US EPA WaterSense labeled toilet
- Irrigation controller replacement with a US EPA WaterSense labeled controller
- Clothes washing machine replacement with an US DOE Energy Star labeled clothes washing machine
- Irrigation spray sprinkler body replacement with a US EPA WaterSense labeled spray sprinkler body
- Irrigation system audit by an Irrigation Professional certified by a US EPA WaterSense program

Expenses eligible for reimbursement are the out-of-pocket cost of the device and its installation only, not to include any owner labor costs. In addition, new construction and new developments are ineligible, as this program is intended as a current infrastructure replacement program.

Application Process

- Applicants must be municipal water suppliers
- Municipalities will submit MCES supplied application form by September 30, 2019. Required information includes:
    - the municipality's rebate or grant program design and work plan
    - proposed examples of communications to property owners
    - requested total grant amount
    - estimated annual amount of water saved by the applying municipality

- Application form is available at: https://metrocouncil.org/Wastewater-Water/Funding-Finance/Available-Funding-Grants.aspx
- Submit competed application to: brian.davis@metc.state.mn.us
- Metropolitan Council will notify municipalities of grant awards and provide grant agreements by December 2, 2019.

Proposal Selection Criteria

In the event that funds requested exceed funds available, the following criteria will be used to determine the amount granted to a given municipality:

- Municipalities that are supplied 100% with groundwater
- Municipalities with identified water supply issues in Master Water Supply Plan Community Profiles or Local Water Supply Plans
- Municipalities' ratio of peak monthly water use to winter monthly water use
- Municipalities' average residential per capita water use
- The order in which applications are received and until grant funds are completely committed

Funding Process and Reporting Requirements

- Utilizing forms provided by MCES, the following information must be reported on a quarterly basis:
    - Number, type and amount of rebates or grants provided to property owners, along with each property address
    - Estimated annual gallons of water saved per device installation
    - Municipality matching funds disbursed
    - Number of unmet funding requests from property owners, if any
- Upon review and confirmation of the above information, MCES will process a grant payment in the amount of 75% of approved total rebates or grants for the reporting period.
- MCES will provide confirmation of grant balances available upon request and reserves the right to amend grant agreements, in collaboration with grantee municipality, if quarterly reporting indicates rebate or grant programs will not fully utilize grant awards within the grant period.

Qualified Activities

- Toilet replacement with a US EPA WaterSense labeled toilet: http://www.epa.gov/WaterSense/product_search.html

- Irrigation controller replacement with a US EPA WaterSense labeled controller: https://www.epa.gov/watersense/product-search

- Clothes washing machine replacement with an US DOE Energy Star labeled clothes washing machine: https://www.energystar.gov/productfinder/product/certified-clothes-washers/results

- Irrigation spray sprinkler body replacement with a US EPA WaterSense labeled spray sprinkler body https://www.epa.gov/watersense/product-search

- Irrigation system audit by an Irrigation Professionals certified by a US EPA WaterSense program https://www.epa.gov/watersense/find-pro

Reporting Example

Community	Property Street Address	Property Type	Device Replaced	Cost per Device	# of Devices	Rebate or Grant per Device	Est. Annual Water (Gal) Saved Per Device	Total Rebate or Grant	Municipality Contribution	Eligible Grant Amount
Anytown	652 Silvis St	Residential	Clothes Washer	$624.60	1	$150.00	3,000	$150.00	$37.50	$112.50
Anytown	1952 Ingram Way	Residential	Irrigation Controller	$199.99	1	$100.00	8,800	$100.00	$25.00	$75.00
Anytown	630 Gibbons Ave	Residential	Clothes Washer	$599.90	1	$150.00	3,000	$150.00	$37.50	$112.50
Anytown	4424 Barriger Blvd	Residential	Toilet	$168.00	1	$50.00	4,000	$50.00	$12.50	$37.50

Metropolitan Council Water Efficiency Grant Application Form

Applicant Information:

Municipality: _____

Municipal Utility: _____

Mailing Address: _____

Primary Contact Information: Municipality primary authorized representative (all correspondence regarding the Water Efficiency Grant Program should be addressed to individual named below):

NAME: _____

TITLE: _____

STREET: _____

CITY, ZIP: _____

PHONE: _____

EMAIL: _____

Secondary Contact Information: Municipality secondary authorized representative:

NAME: _____

TITLE: _____

STREET: _____

CITY, ZIP: _____

PHONE: _____

EMAIL: _____

Municipal Total Per Capita Water Use (2018): _____ (gallons per person-day)

Municipal Residential Per Capita Water Use (2018): _____ (gallons per person-day)

Municipal Ratio of Peak Month to Winter Month Water Use (2018): _____

Municipality's estimated annual water savings from proposed program: _____ (gallons)

Municipal Utility Grant or Rebate Program Design:

Requested Grant Amount (must equal 75% of total program budget): $_____

Required Utility Matching Amount (must equal 25% of total program budget): $_____

Will your program be a grant program or rebate program? _____

Estimated Number of Items:

Item	**Estimated Number**
Toilets	
Irrigation Controllers	
Clothes Washing Machines	
Irrigation Spray Sprinkler Bodies	
Irrigation System Audits	

Project Work Plan and Schedule:*

Task Description	Responsible Person	Start Date	Completion Date

*** Municipal utility may create own project plan and schedule form**

Communications to Property Owners:

How will your program be advertised (check all that apply):

Newsletter ____

Print Media ____

Email ____

Twitter ____

Website____

Radio ____

Television ____

Facebook ____

Nextdoor ____

Other Social Media ____

Please attach examples of proposed newsletter, print media, or email communications

Critical Points to Remember:

- The applying municipality must be a water supplier
- New construction and new developments are not eligible
- Funds are for rebates or grants only; consulting and city staff time are ineligible
- Combined Council and municipality funds cannot pay for 100% of an eligible activity's cost
- A portion of each eligible activity's cost must be paid by the property owner
- Grant recipients must display the Clean Water, Land and Legacy Amendment logo and the Metropolitan Council logo on program-related web pages and paper communications

Chris Anderson
City Planner
7550 Sunwood Drive NW
Ramsey, MN 55303

November 18, 2019

The Metropolitan Council is pleased to award the city of Ramsey the amount of $28,000 as part of our 2019-2022 Water Efficiency Grant Program. The amount of matching funds required from your municipality, based on the grant award above, is $9,340. The city of Ramsey is one of forty in the Twin Cities Metropolitan Area that applied for and was accepted into this grant program. We are pleased to report that all available grant funds have been awarded and that all applicants will receive an award.

The amount of funds requested totaled $1,393,527, while the amount of funds available is $787,600. Because funds requested exceed funds available, a set of ranking factors and an objective scoring system were developed to establish a method to distribute the available funds. A committee of three staff members reviewed the applications and developed this ranking and scoring system. If you are interested in learning more about the ranking factors and scoring system, please contact me at brian.davis@metc.state.mn.us and I will send you a detailed description of this process.

Below are some critical points to remember:

- New construction and new developments are not eligible
- Funds are for rebates or grants only; consulting and city staff time are ineligible
- Grant recipients must display the Clean Water, Land and Legacy Amendment logo and the Metropolitan Council logo on all documents which are intended for public use

The Clean Water, Land and Legacy Amendment is available here: http://www.legacy.leg.mn/legacy-logo/legacy-logo-download

To obtain electronic and print versions of the Metropolitan Council logo, please contact me at brian.davis@metc.state.mn.us.

As you prepare your municipality's grant or rebate program, please be aware that the following information must be reported on a quarterly basis, on forms to be provided by the Metropolitan Council:

- Number, type and amount of rebates or grants provided to property owners, along with each property address
- Estimated annual gallons of water saved per installation
- Municipality matching funds disbursed
- Number of unmet funding requests from property owners
- Electronically scanned copies of receipts to verify the cost of eligible devices being reported

Reporting forms and instructions will be made available in early 2020 on our website:
http://www.metrocouncil.org/Wastewater-Water/Funding-Finance/Available-Funding-Grants.aspx

Quarterly reporting periods and reporting form due dates are shown below.

Quarterly Period	Reporting Form Due Date
Jan. 1, 2020 – March 31, 2020	April 30, 2020
April 1, 2020 – June 30, 2020	July 31, 2020
July 1, 2020 – September 30, 2020	October 31, 2020
October 1, 2020 – December 31, 2020	January 31, 2021
Jan. 1, 2021 – March 31, 2021	April 30, 2021
April 1, 2021 – June 30, 2021	July 31, 2021
July 1, 2021 – September 30, 2021	October 31, 2021
October 1, 2021 – December 31, 2021	January 31, 2022
January 1, 2022 – March 31, 2022	April 30, 2022
April 1, 2022 – June 30, 2022	July 31, 2022

In early December a Grant Agreement will be mailed to your municipality for your signature. Instructions will be provided in that mailing.

Again, congratulations on your grant award. We look forward to working with you to increase the water efficiency of our region.

Sincerely,

Brian M. Davis

Brian M. Davis, Ph.D, P.G., P.E.
Senior Engineer, Water Supply Planning
Phone: 651-602-1519
brian.davis@metc.state.mn.us

CLEAN WATER LAND & LEGACY AMENDMENT

METROPOLITAN COUNCIL
CLEAN WATER FUND GRANT AGREEMENT NO. SG-13467

This Clean Water Fund Grant Agreement ("Grant Agreement") is entered into between the Metropolitan Council, a public corporation and political subdivision of the State of Minnesota ("Council") and the City of Ramsey, a municipal corporation ("Grantee").

RECITALS

1. Minnesota Session Laws 2019, 1st Special Session, chapter 2, article 2, section 9, appropriated to the Council funds from the Legacy Amendment's Clean Water Fund ("Clean Water Fund") for State fiscal years 2020 and 2021, to establish a water demand reduction grant program that encourages implementation of water demand reduction measures in municipalities in the seven-county metropolitan area.

2. The Council is authorized by Minnesota Statutes sections 473.129, subdivision 4 to apply for and use grants from the State for any Metropolitan Council purpose and may dispose of the money in accordance with the terms of the appropriation.

3. The Grantee is authorized to receive grants from the Clean Water Fund to protect, enhance and restore water quality in lakes, rivers and streams, to protect groundwater from degradation and protect drinking water sources by encouraging implementation of water demand reduction measures by municipalities in the seven-county metropolitan area to ensure reliability and protection of drinking water supplies.

4. On July 10, 2019, the Council authorized the granting of portions of the appropriation to the Grantees participating in the grant program.

5. The Grantee represents that it is duly qualified and agrees to perform all services described in this Grant Agreement to the reasonable satisfaction of the Council.

GRANT AGREEMENT

1. Term of Grant Agreement.

1.1. Effective Date. The effective date of this Grant Agreement is the date this agreement is fully executed.

1.2. Grant Activity Period. The first day of the month following the Effective Date through and including the expiration date.

1.3. Expiration Date. Upon satisfactory fulfillment of obligations, but in no event later than June 30, 2022.

1.4. Survival of Terms. The following clauses survive the expiration, termination or cancellation of this Grant Agreement; 9. Liability and Insurance; 10. Audits; 11. Government Data Practices; 13. Data Availability; 14. Governing Law, Jurisdiction and Venues; 16. Data Disclosure; 18. Future Eligibility.

2. Duties, Representations and Warranties of Grantee and Use of Grant Funds.

2.1. The Grantee agrees to conduct, administer and complete in a satisfactory manner and in accordance with the terms and conditions of this Grant Agreement the program ("Grantee Program") which is described in Grantee's application to Council for assistance under the Council's Clean Water Fund grant program. Grantee's application is incorporated into this Grant Agreement as **Exhibit A**. Grantee agrees to perform the Grantee Program in accordance with the timeline in **Exhibit B** of this Grant Agreement and to undertake the financial responsibilities described in **Exhibit B**. The Grantee has the responsibility and obligation to complete the Grantee Program as described in **Exhibit B**. The Council makes no representation or warranties with respect to the success and effectiveness of the Grantee Program. The Council acknowledges that Grantee Program work may be limited to soliciting participation by its residents and businesses in the Grantee Program and requires additional work by the Grantee only to the extent that residents and businesses choose to participate in the Grantee Program, as described in **Exhibit B.**

The Grant Funds must be entirely passed through and can only be used for authorized rebates or grants for qualifying activities.

2.2. Grantee Representations and Warranties. The Grantee represents and warrants to Council, as follows:

A. It has the legal authority to enter into this Grant Agreement and to conduct and administer the Grantee Program and use the Grant Funds for the purpose or purposes described in this Agreement

B. It has taken all actions necessary for its execution of the Agreement and has provided to Council a copy of the resolution by its governing body authorizing Grantee to enter into this Agreement.

C. It has the legal authority to undertake the Clean Water Fund Grant Program, including the Grantee's financial responsibilities in **Exhibit B**

D. As specified in Exhibit A only Grantee's authorized representative may provide certifications required in this Grant Agreement and submit pay claims for reimbursement of Grantee Program costs.

E. It will comply with all the terms of this Agreement.

F. It will comply with all requirements of Clean Water Funding legislation and appropriations, except for requirements that this Grant Agreement explicitly states will be handled by the Council.

G. It has made no material false statement or misstatement of fact in connection with the Grant Funds, and all of the information it has submitted or will submit to the Council relating to the Grant Funds or the disbursement of any of the Grant Funds is and will be true and correct. It agrees that all representations contained in its application for the Clean Water Fund Grant are material representations of fact upon which the Council relied in awarding this Grant and are incorporated into this Agreement by reference.

H. It is not in violation of any provisions of its charter or of the laws of the State of Minnesota, and there are no material actions, suits, or proceedings pending, or to its knowledge threatened, before any judicial body or governmental authority against or affecting it and is not in default with respect to any order, writ, injunction, decree, or demand of any court or any governmental authority which would impair its ability to enter into this Grant Agreement, or to perform any of the acts required of it in the Agreement.

I. Compliance with the requirements of this Grant Agreement is not prevented by, is a breach of, or will result in a breach of, any term, condition, or provision of any agreement to which it is bound.

J. The Grantee Program will not violate any applicable zoning or use statute, ordinance, building code, rule or regulation, or any covenant or agreement of record relating thereto.

K. The Grantee Program will be conducted in full compliance with all applicable laws, statutes, rules, ordinances, and regulations issued by any federal, state, or other political subdivisions having jurisdiction over the Grantee Program.

L. It will comply with the financial responsibility requirements contained in **Exhibit B.**

M. It will furnish satisfactory evidence regarding these representations if requested by the Council.

3. Time.

Grantee must comply with all time requirements described in this Grant Agreement. In the performance of this Grant Agreement, time is of the essence.

4. Eligible Costs.

Eligible costs are those costs incurred by parties within the jurisdiction of the Grantee for 75% of rebate or grant payments as defined in **Exhibit B**. The Council will not reimburse Grantee for non-eligible costs. Any cost not defined as an eligible cost or not included in the Grant Grantee Program or approved in writing by the Council is a non-eligible cost.

5. Consideration and Payment.

5.1 Consideration. The Council will reimburse Grantee for eligible costs performed by the Grantee during the Grant Period as specified in this agreement. The Council bears no responsibility for any cost overruns that may be incurred by the Grantee or sub-recipients of any tier. The initial Grant amount to Grantee under this Grant Agreement is $28,000.00. The Grantee may be eligible to receive additional Grant amounts or an adjustment in Grant amount in accordance with the procedure in the Grant Amendment Form attached and incorporated as **Exhibit C**. Upon signature by both Grantee and Council on **Exhibit C** this Grant is amended by the amount in **Exhibit C**.

5.2. **Advance.** The Council will make no advance of the Grant Amount to Grantee.

5.3. **Payment.** To receive payment, the Grantee must submit a Reimbursement Request/Progress Report on forms provided by the Council, including electronically scanned receipts to verify the cost of eligible devices reported for each reporting period. Reimbursement Request/Progress Reports must be submitted quarterly, even if there are no eligible costs to report. The Grantee must describe its compliance with its the financial requirements, work completed including specific addresses where work was done, and provide sufficient documentation of grant eligible expenditures and any other information the Council reasonably requests. The Council will promptly pay the Grantee after the Grantee presents to the Council a Reimbursement Request/Progress Report and scanned copies of all receipts verifying the cost for all eligible devices reported and the Council's Authorized Representative accepts the invoiced services.

6. Conditions of Payment.

6.1. For each approved device for which Grantee requests payment, Grantee must certify the following to the Council: (1) the device has been purchased ; (2) Grantee received receipts for the device; (3) the purchase was not performed in violation of federal, Council, or local law, or regulation.

6.2. Conditions Precedent to Any Reimbursement Request. The obligation of the Council to make reimbursement payments is subject to the following conditions precedent:

A. The Council's receipt of a Reimbursement Request/Progress Report for the funds requested, and electronic copies of receipts verifying the cost for all eligible devices for that reporting period

B. If requested by the Council (in form and substance acceptable to the Council), evidence that (i) the Grantee has legal authority to and has taken all actions necessary to enter into this Agreement and (ii) this Agreement is binding and enforceable against the Grantee.

C. There is no Event of Default under this Grant Agreement or event which would constitute an Event of Default but for the requirement that notice be given or that a period of grace or time elapse.

D. The Grantee has supplied to the Council all other items that the Council may reasonably require to assure good fiscal oversight of state's funding through the Clean Water Fund.

7. Authorized Representative.

The Council's Authorized Representative is:

Name:	Brian Davis or successor
Title:	Senior Engineer
Mailing Address:	390 North Robert Street St. Paul, MN 55101
Phone:	651-602-1519
E-Mail Address:	brian.davis@metc.state.mn.us

The Council's Authorized Representative has the responsibility to monitor the Grantee's performance and the authority to accept the services provided under this grant contract. If the services are satisfactory, the Council's Authorized Representative will certify acceptance on each invoice submitted for payment.

The Grantee's Authorized Representative is:

Name:	Chris Anderson
Title:	City Planner
Mailing Address:	7550 Sunwood Drive NW Ramsey, MN 55303
Phone:	763-433-9817
E-Mail Address:	canderson@cityoframsey.com

If the Grantee's Authorized Representative changes at any time during this Grant Agreement, the Grantee must immediately notify the Council and within 30 days provide a new City resolution (if such resolution is necessary) specifying the new Representative.

8. Assignment, Amendments, Waiver, and Grant contract Complete.

8.1 Assignment. The Grantee may neither assign nor transfer any rights or obligations under this Grant Agreement without the prior written consent of the Council and a fully executed Assignment Agreement.

8.2 Amendments. Any amendment to this Grant Agreement must be in writing and will not be effective until it has been executed and approved by the appropriate parties.

8.3 Waiver. If the Council fails to enforce any provision of this Grant Agreement, that failure does not waive the provision or its right to enforce it.

8.4 Grant Contract Complete. This Grant Agreement contains all negotiations and agreements between the Council and the Grantee. No other understanding regarding this Grant Agreement, whether written or oral, may be used to bind either party.

9. Liability and Insurance.

9.1 Liability. The Grantee and the Council agree that they will be responsible for their own acts and the results thereof to the extent authorized by law, and they shall not be responsible for the acts of the other party and the results thereof. The liability of the Council is governed by the Minn. Stat. Chapter 466 and other applicable laws. The liability of the Grantee is governed by the provisions contained in Chapter 466 and other applicable laws.

9.2 Relationship of the Parties. Nothing contained in this Grant Agreement is intended or should be construed in any manner as creating or establishing the relationship of co-partners or a joint venture between the Grantee and the Council, nor shall the Grantee be considered or deemed to be an agent, representative, or employee of the Council in the performance of this Grant Agreement, or the Grantee Program.

The Grantee represents that it has already or will secure or cause to be secured all personnel required for the performance of this Grant Agreement and the Grantee Program. All personnel of the Grantee or other persons while engaging in the performance of this Grant Agreement the Grantee Program shall not have any contractual relationship with the Council related to the work of the Grantee Program and shall not be considered employees of the Council. In addition, all claims that may arise on behalf of said personnel or other persons out of employment or alleged employment including, but not limited to, claims under the Workers' Compensation Act of the State of Minnesota, claims of discrimination against the Grantee, its officers, agents, contractors, or employees shall in no way be the responsibility of the Council. Such personnel or other persons shall not require nor be entitled to any compensation, rights or benefits of any kind whatsoever from the Council, including but not limited to, tenure rights, medical and hospital care, sick and vacation leave, disability benefits, severance pay and retirement benefits.

10. Audits.

Under Minn. Stat. § 16C.05, subd. 5, the Grantee's books, records, documents, and accounting procedures and practices relevant to this grant contract are subject to examination by the Council and/or the State Auditor or Legislative Auditor, as appropriate, for a minimum of six years from the termination date of this Grant Agreement.

11. Government Data Practices.

The Grantee and Council must comply with the Minnesota Government Data Practices Act, Minn. Stat. Chapter 13, as it applies to all data provided by the Council under this grant contract, and as it applies to all data created, collected, received, stored, used, maintained, or disseminated by the Grantee under this Grant Agreement. The civil remedies of Minn. Stat. § 13.08 apply to the release of the data referred to in this clause by either the Grantee or the Council. If the Grantee receives a request to release the data referred to in this Clause, the Grantee must immediately notify the Council.

12. Workers' Compensation.

The Grantee certifies that it is in compliance with Minn. Stat. § 176.181, subd. 2, pertaining to workers' compensation insurance coverage. The Grantee's employees and agents will not be considered Council employees. Any claims that may arise under the Minnesota Workers Compensation Act on behalf of these employees and any claims made by any third party as a consequence of any act or omission on the part of these employees are in no way the Council's obligation or responsibility.

13. Data Availability.

To the extent and as requested by the Council, Grantee agrees to comply with Minn. Stat. § 114D.50, subd. 5 requirements for data collected by the Grantee Programs funded with money from the Clean Water Fund that have value for planning and management of natural resources, emergency preparedness and infrastructure investments, including but not limited to the requirement that to the extent practicable, summary data and results of Grantee Programs funded with money from the Clean Water Fund should be readily accessible on the internet and identified as a Clean Water Fund Grantee Program. The Council will put overall summary information on the internet and will encourage the Grantee put its city information on the web. Grantee understands and agrees that Council may list its name and summary information on the internet or in any other Grantor reporting.

Data collected by the Grantee Programs, if any, funded with money from the Clean Water Fund that have value for planning and management of natural resources, emergency preparedness, and infrastructure investments must conform to the enterprise information architecture developed by the Office of MN.IT Services. Spatial data must conform to geographic information system guidelines and standards outlined in that architecture and adopted by the Minnesota Geographic Data Clearinghouse at the Minnesota Geospatial Information Office. A description of these data that adheres to the Office of MN.IT Services geographic metadata standards must be submitted to the Minnesota Geospatial Information Office to be made available online through the clearinghouse and the data must be accessible and free to the public unless made private under chapter 13. To the extent practicable, summary data and results of the Grantee Program funded with money from the clean water fund should be readily accessible on the Internet and identified as a Clean Water Fund Grantee Program.

14. Governing Law, Jurisdiction, and Venue.

Minnesota law, without regard to its choice-of-law provisions, governs this Grant Agreement. Venue for all legal proceedings out of this grant contract, or its breach, must be in the appropriate state or federal court of competent jurisdiction in Ramsey County, Minnesota.

15. Termination.

The Council may cancel this Grant Agreement at any time, with or without cause, upon 30 days' written notice to the Grantee. Upon termination, the Grantee will be entitled to payment for services prequalified and satisfactorily performed before the termination notice.

16. Data Disclosure.

Under Minn. Stat. § 270C.65, subd. 3, and other applicable law, the Grantee consents to disclosure of its federal employer tax identification number, and/or Minnesota tax identification number, already provided to the Council, to federal and state tax agencies and Council personnel involved in the payment of Council obligations. Grantee will require compliance with this Section 16 by Grantee's subrecipient of Grant funds and shall submit evidence of such compliance to Council as requested.

17. Notices.

In addition to any notice required under applicable law to be given in another manner, any notices required hereunder must be in writing and must be personally served or sent by email or United States mail, to the business address of the party to whom it is directed. The business address is the address specified below or such different address as may be specified, by either party by written notice to the other:

To the Grantee at:

Name:	Chris Anderson
Title:	City Planner
Mailing Address:	7550 Sunwood Drive NW Ramsey, MN 55303
Phone:	763-433-9817
E-Mail Address:	canderson@cityoframsey.com

To the Council's Authorized Representative at:

Name:	Brian Davis or successor
Title:	Senior Engineer
Mailing Address:	390 North Robert Street St. Paul, MN 55101
Phone:	651-602-1519
E-Mail Address:	brian.davis@metc.state.mn.us

18. Miscellaneous.

18.1 Report to Legislature. As provided in Minn. Stat. § 3.195, the Council must submit a report on the expenditure and use of money appropriated under the Clean Water Fund to the legislature by January 15 of each year. The report must detail the outcomes in terms of additional use of Clean Water Fund resources, user satisfaction surveys, and other appropriate outcomes. The grantee agrees to provide to the Council by January 1 of each year a report on any user satisfaction surveys it has related to this Grantee Program, and other appropriate outcomes of the Grantee Program as prescribed in Section 18.3 of this Agreement.

18.2 Supplement. The funds granted under this agreement are to supplement and shall not substitute for traditional sources of funding. Grantee certifies to the Council that there was and is no

traditional Grantee sources of funding for the City to help fund one-fourth of the subject water efficiency rebate or grant work.

18.3 Measurable Outcomes. If requested by the Council, Grantee agrees to demonstrate compliance with the following: A Grantee Program or program receiving funding from the Clean Water Fund must meet or exceed the constitutional requirement to protect, enhance, and restore water quality in lakes, rivers and streams and to protect groundwater and drinking water from degradation. A Grantee Program or program receiving funding from the Clean Water Fund must include measurable outcomes, as defined in section 3.303, subdivision 10, and a plan for measuring and evaluating the results. A Grantee Program or program must be consistent with current science and incorporate state-of-the-art technology. All information for funded Grantee Program work, including the proposed measurable outcomes, must be made available for publication on the web site required under Minn. Stat. § 3.303, subdivision 10, as soon as practicable and forwarded to the Council and the Legislative Coordinating Commission under the provisions of Minn. Stat. § 3.303, subd. 10. The Grantee must compile and submit all information for funded Grantee Programs or programs, including the proposed measurable outcomes and all other items required under section 3.303, subdivision 10, to the Council and, if requested by the Council, the Legislative Coordinating Commission as soon as practicable or by January 15 of the applicable fiscal year, whichever comes first.

18.4 Minn. Stat. § 16B.98. Grants funded by the Clean Water Fund must be implemented according to section 16B.98 and must account for all expenditures.

18.5 Benefit to Minnesota Waters. Money from the Clean Water Fund may only be spent on Grantee Programs that benefit Minnesota waters.

18.6 Website. If the Grantee has information on its website about the water efficiency grant program under Minn. Stat. § 114D.50, the Grantee will when practicable in accordance with Minn. Stat. § 114D.50, subd. 4 (f) prominently display on the Grantee's website home page the Legacy logo accompanied by the phrase "Click here for more information." When a person clicks on the Legacy logo image, the website must direct the person to a web page that includes both the contact information that a person may use to obtain additional information, as well as a link to the Council's and Legislative Coordinating Commission Website required under section 3.303, subdivision 10.

18.7 Future Eligibility. Future eligibility for money from the Clean Water Fund is contingent upon the Grantee satisfying all application requirements related to Council's fulfillment of Minn. Stat. § 114D.50 as well as any additional requirements contained in 2019, 1st Special Session, chapter 2, article 2, section 9.

18.8 Prevailing Wages. The Grantee agrees to comply with all of the applicable provisions contained in chapter 177 of the Minnesota Statutes, and specifically those provisions contained in Minn. Stat. §§ 177.41 through 177.435, as they may be amended, modified or replaced from time to time with respect to the Grantee Program. By agreeing to this provision, the Grantee is not acknowledging or agreeing that the cited provisions apply to the Grantee Program.

18.9 Disability Access. Where appropriate, Grantee of clean water funds, in consultation with the Council on Disability and other appropriate governor-appointed disability councils, boards, committees, and commissions, should make progress toward providing greater access to programs, print publications, and digital media for people with disabilities related to the programs the recipient funds using appropriations made in this agreement.

18.10. General Provisions.

(i) Grants. The Grantee shall implement this Grant Agreement according to Minnesota Statutes, section 16B.98, and shall account for all expenditures of funds.

(ii) Lawsuit. This Grant shall be canceled to the extent that a court determines that the appropriation illegally substitutes for a traditional source of funding.

(iii) Termination Due to Lack of Funds. Grantee recognizes that Council's obligation to reimburse Grantee for eligible Grantee Program costs is dependent upon Council's receipt of funds from the State of Minnesota appropriated to Council under 2019 Session Laws, 1st Special Session, Chapter 2, Article 2, Section 9. Should the State of Minnesota terminate such appropriation or should such funds become unavailable to Council for any reason, Council shall, upon written notice to Grantee of termination or unavailability of such funds, have no further obligations for reimbursement or otherwise under this Grant Agreement. In the event of such written notice, Grantee has no further obligation to complete the Grantee Program as required by this Grant Agreement.

19. Default and Remedies.

19.1 Defaults. The Grantee's failure to fully comply with all of the provisions contained in this Grant Agreement shall be an event of default hereunder ("Event of Default").

19.2. Remedies. Upon an event of default, the Council may exercise any one or more of the following remedies:

a. Refrain from disbursing the Grant.

b. Demand that all or any portion of the Grant already disbursed be repaid to it, and upon such demand the Grantee shall repay such amount to the Council.

c. Enforce any additional remedies the Council may have at law or in equity.

IN WITNESS WHEREOF, the parties have caused this agreement to be executed by their duly authorized representatives.

METROPOLITAN COUNCIL

By: _____
Regional Administrator, successor, or delegate

Date: _____

GRANTEE:

The Grantee certifies that the appropriate person(s) have executed the grant contract on behalf of the Grantee as required by applicable articles, bylaws, resolutions, or ordinances.

By: _____

_____

Printed Name and Title

Date: _____

EXHIBIT A

(Application from community)

Metropolitan Council Water Efficiency Grant Application Form

Applicant Information:

Municipality: City of Ramsey

Municipal Utility: City of Ramsey Water Utility

Mailing Address: 7550 Sunwood Drive NW, Ramsey, MN 55303

Primary Contact Information: Municipality primary authorized representative (all correspondence regarding the Water Efficiency Grant Program should be addressed to individual named below):

NAME: Chris Anderson

TITLE: City Planner

STREET: 7550 Sunwood Drive NW

CITY, ZIP: Ramsey, MN 55303

PHONE: 763-433-9817

EMAIL: canderson@cityoframsey.com

Secondary Contact Information: Municipality secondary authorized representative:

NAME: Bruce Westby

TITLE: City Engineer

STREET: 7550 Sunwood Drive NW

CITY, ZIP: Ramsey, MN 55303

PHONE: 763-433-9825

EMAIL: bwestby@cityoframsey.com

Municipal Total Per Capita Water Use (2018): 130 (gallons per person-day)

Municipal Residential Per Capita Water Use (2018): 79 (gallons per person-day)

Municipal Ratio of Peak Month to Winter Month Water Use (2018): 4.34

Municipality's estimated annual water savings from proposed program: 3,000,000 (gallons)

Municipal Utility Grant or Rebate Program Design:

Requested Grant Amount (must equal 75% of total program budget): $ 50,000.00

Required Utility Matching Amount (must equal 25% of total program budget): $ 16,667.00

Will your program be a grant program or rebate program? Rebate

Estimated Number of Items:

Item	Estimated Number
Toilets	100
Irrigation Controllers	100
Clothes Washing Machines	
Irrigation Spray Sprinkler Bodies	
Irrigation System Audits	5

Project Work Plan and Schedule:*

Task Description	Responsible Person	Start Date	Completion Date
Obtain recommendations from Environmental Policy Board and Public Works Committee to seek Water Efficiency grant funds Obtain City Council authorization to seek Water Efficiency grant funds	City Planner City Engineer	8/19/19	9/24/19
Establish/develop rebate program	City Planner City Engineer Utilities Supervisor Asst. Public Works Superintendent	9/1/19	12/31/19
Develop marketing campaign through outlets including Ramsey Resident newsletter, Facebook/social media, develop website content, and QCTV spots.	City Planner Communications and Event Coordinator	10/1/19	12/31/19
Program administration, which would include intake, review, and processing of customer invoices/receipts, coordinating rebates (utility billing credits), ongoing promotion of grant program.	Engineering Administrative Asst. Finance Staff Communications and Event Coordinator	1/1/20	6/30/22
Quarterly reporting	City Planner Engineering Administrative Asst.	4/1/20	7/1/22

*** Municipal utility may create own project plan and schedule form**

Communications to Property Owners:

How will your program be advertised (check all that apply):

Newsletter ☑

Print Media ☐

Email ☑

Twitter ☐

Website ☑

Radio ☐

Television ☑

Facebook ☑

Nextdoor ☐

Other Social Media ☐

Please attach examples of proposed newsletter, print media, or email communications

Critical Points to Remember:

- The applying municipality must be a water supplier
- New construction and new developments are not eligible
- Funds are for rebates or grants only; consulting and city staff time are ineligible
- Combined Council and municipality funds cannot pay for 100% of an eligible activity's cost
- A portion of each eligible activity's cost must be paid by the property owner
- Grant recipients must display the Clean Water, Land and Legacy Amendment logo and the Metropolitan Council logo on program-related web pages and paper communications

EXHIBIT B

Clean Water Fund Grant Program Overview & Goal, Structure, and Qualified Activities (should anything herein be contradicted by the Agreement language, the Agreement terms prevail).

Overview

The Metropolitan Council (Council) will implement a water efficiency grant program effective September 30, 2019 to June 30, 2022. Grants will be awarded on a competitive basis to municipalities that manage municipal water systems. The Council will provide 75% of the program cost; the municipality must provide the remaining 25%. Municipalities will use the combined Council and municipality funds to run their own grant or rebate programs.

Grants will be made available in amounts with a minimum of $2,000 and a maximum of $50,000. Grantees will be required to provide estimated water savings achieved through this program for Clean Water, Land & Legacy Amendment reporting purposes.

Legislative Directive - Minnesota 2019 Session Law

$375,000 the first year and $375,000 the second year are for the water demand reduction grant program to encourage municipalities in the metropolitan area to implement measures to reduce water demand to ensure the reliability and protection of drinking water supplies. Fiscal year 2020 appropriations are available until June 30, 2021, and fiscal year 2021 appropriations are available until June 30, 2022.

Grant Program Goal

The goal of the water efficiency grant program is to support technical and behavioral changes that improve municipal water use efficiency in the seven-county metropolitan area.

Critical Points to Remember

- The applying municipality must be a water supplier
- New construction and new developments are not eligible
- Funds are for rebates or grants only; consulting and city staff time are ineligible
- Combined Council and municipality funds cannot pay for 100% of an eligible activity's cost
- A portion of each eligible activity's cost must be paid by the property owner
- Grant recipients must display the Clean Water, Land and Legacy Amendment logo and the Metropolitan Council logo on program-related web pages and paper communications

Grant Program Structure: Administration and Funding

The Water Efficiency Grant Program will be administered by Metropolitan Council Environmental Services (MCES) and will be funded with $750,000 appropriated by the 2019 Minnesota Legislature. Grant applications will be reviewed and ranked by the MCES Water Supply Planning Unit staff.

Grants are only for water efficiency programs offering rebates or grants to property owners who are customers of the municipal water supply system and who replace specified water using devices with approved devices that use substantially less water.

Grants will be awarded to municipalities in amounts ranging from $2,000 to $50,000 for providing rebates or grants to property owners. Municipalities will be responsible for the design and operation of their rebate or grant program and its details. Grant payments to the municipality will be for 75% of approved program amounts. The municipality must provide the remaining 25% of the program cost. Municipality rebates or grants are eligible for reimbursement on device replacements conducted September 30, 2019 through June 30, 2022.

Here is an example showing the grant funding design:

Metropolitan Council Grant Amount	**$15,000**
Municipality Match	$5,000
Municipality Grant/Rebate Program Total	$20,000

Eligibility

Per legislative language, the grant program is limited to municipalities in the seven-county metropolitan area.

Municipalities eligible per above must apply to participate and, if approved, sign a standard Council Grant Agreement, before any eligible rebates or grants can be submitted for reimbursement. Agreements shall require that municipalities:

- Entirely pass through grants received (as is being done by MCES)
- Verify purchase of devices to receive grants
- Retain records and cooperate with any audits
- Conduct all communications with property owners and ensure all written communications to property owners include both the Clean Water, Land and Legacy Amendment and the Metropolitan Council's logo
- Provide quantitative information for state reporting purposes

Eligible water efficiency devices consist of the following:

- Toilet replacement with a US EPA WaterSense labeled toilet
- Irrigation controller replacement with a US EPA WaterSense labeled controller
- Clothes washing machine replacement with an US DOE Energy Star labeled clothes washing machine
- Irrigation spray sprinkler body replacement with a US EPA WaterSense labeled spray sprinkler body
- Irrigation system audit by an Irrigation Professional certified by a US EPA WaterSense program

Expenses eligible for reimbursement are the out-of-pocket cost of the device and its installation only, not to include any owner labor costs. In addition, new construction and new developments are ineligible, as this program is intended as a current infrastructure replacement program.

Application Process

- Applicants must be municipal water suppliers
- Municipalities will submit MCES supplied application form by September 30, 2019. Required information includes:
    - the municipality's rebate or grant program design and work plan
    - proposed examples of communications to property owners
    - requested total grant amount
    - estimated annual amount of water saved by the applying municipality
- Application form is available at: https://metrocouncil.org/Wastewater-Water/Funding-Finance/Available-Funding-Grants.aspx
- Submit competed application to: brian.davis@metc.state.mn.us
- Metropolitan Council will notify municipalities of grant awards and provide grant agreements by December 2, 2019.

Proposal Selection Criteria

In the event that funds requested exceed funds available, the following criteria will be used to determine the amount granted to a given municipality:

- Municipalities that are supplied 100% with groundwater
- Municipalities with identified water supply issues in Master Water Supply Plan Community Profiles or Local Water Supply Plans
- Municipalities' ratio of peak monthly water use to winter monthly water use
- Municipalities' average residential per capita water use
- The order in which applications are received and until grant funds are completely committed

Funding Process and Reporting Requirements

- Utilizing forms provided by MCES, the following information must be reported on a quarterly basis:
    - Number, type and amount of rebates or grants provided to property owners, along with each property address
    - Estimated annual gallons of water saved per device installation
    - Municipality matching funds disbursed
    - Number of unmet funding requests from property owners, if any
- Upon review and confirmation of the above information, MCES will process a grant payment in the amount of 75% of approved total rebates or grants for the reporting period.
- MCES will provide confirmation of grant balances available upon request and reserves the right to amend grant agreements, in collaboration with grantee municipality, if quarterly reporting indicates rebate or grant programs will not fully utilize grant awards within the grant period.

Qualified Activities

- Toilet replacement with a US EPA WaterSense labeled toilet:

  http://www.epa.gov/WaterSense/product_search.html
- Irrigation controller replacement with a US EPA WaterSense labeled controller:

  https://www.epa.gov/watersense/product-search
- Clothes washing machine replacement with an US DOE Energy Star labeled clothes washing machine: https://www.energystar.gov/productfinder/product/certified-clothes-washers/results
- Irrigation spray sprinkler body replacement with a US EPA WaterSense labeled spray sprinkler body

  https://www.epa.gov/watersense/product-search
- Irrigation system audit by an Irrigation Professionals certified by a US EPA WaterSense program

https://www.epa.gov/watersense/find-pro

Reporting Example

Community	Property Street Address	Property Type	Device Replaced	Cost per Device	# of Devices	Rebate or Grant per Device	Est. Annual Water (Gal) Saved Per Device	Total Rebate or Grant	Municipality Contribution	Eligible Grant Amount
Anytown	652 Silvis St	Residential	Clothes Washer	$624.60	1	$150.00	3,000	$150.00	$37.50	$112.50
Anytown	1952 Ingram Way	Residential	Irrigation Controller	$199.99	1	$100.00	8,800	$100.00	$25.00	$75.00
Anytown	630 Gibbons Ave	Residential	Clothes Washer	$599.90	1	$150.00	3,000	$150.00	$37.50	$112.50
Anytown	4424 Barriger Blvd	Residential	Toilet	$168.00	1	$50.00	4,000	$50.00	$12.50	$37.50

EXHIBIT C Revision # [ ]

METROPOLITAN COUNCIL ENVIRONMENTAL SERVICES

2019 CLEAN WATER FUND WATER EFFICIENCY GRANT PROGRAM GRANT AMENDMENT FORM

NOTICE TO GRANTEE: Submission of this form is required to modify your city's agreement with Metropolitan Council Environmental Services (MCES) 2019 Clean Water Fund Water Efficiency Grant program (Grantee Program).

After determination of your city's initial grant amount, completion and submission of this form is necessary when 1) you are requesting additional grant funds to meet unexpected rebate or grant demand, or 2) when your city has determined that the previously approved program's rebate or grant demand will not be met, requiring less grant funds than anticipated when the agreement was signed.

The process for modifying your agreement is as follows:

1. Your City's designated authorized representative submits 2 signed copies of Exhibit C to MCES, with an attachment itemizing requests for changes to prior granted amounts.
2. Upon receipt of signed Exhibit C, MCES Program Administrator obtains Council authorized signatures that modifies the agreement and returns a fully signed copy of Exhibit A indicating new grant amount to City's designated authorized representative.

Instructions: Indicate the date of your change request in #1 box. Indicate the number of this particular change request in #2 box (and in box at top of page – must match). Enter the current grant agreement amount (as MCES approved) in #3 box. If you wish to <u>increase</u> your municipality's grant amount, enter the amount you are requesting in #4 box. If you wish to <u>decrease</u> your grant amount due to less demand than anticipated, enter the amount in #5 box. Enter in #6 box the amount derived from adding #3 to #4 or derived from subtracting #5 from #3.

Grant Agreement # [ ]

1. Date of change request: [ ]
2. Change request number: [ ]
3. Current Grant Agreement Amount (as MCES approved): [ ]

4. Increase due to request for additional funding: ☐

5. Decrease due to less demand: ☐

6. Amended Grant Agreement Amount requested: ☐

CITY NAME:_____

I request the above changes (sign with title and date):

_____

MCES PROGRAM ADMINISTRATOR APPROVAL (signature and date):

_____

COUNCIL AUTHORIZED SIGNATURE AND DATE

_____

Questions may be directed to the MCES Authorized Representative:

Brian Davis
MCES Senior Engineer
390 Robert Street North
St. Paul, MN 55101-1805
Phone: (651) 602-1519
Email: brian.davis@metc.state.mn.us

5.02: Overview of Framework for Water Efficiency Grant Program

City Planner Anderson presented the staff report. He stated that the City of Ramsey has been awarded $28,000 in grant funds through the Metropolitan Council's 2019-2022 Water Efficiency Grant Program for use in a rebate program. As the name of the program implies, the purpose of the grant is to implement water efficient technologies to reduce the demand on water supply.

City Planner Anderson stated that there are two primary financial requirements of the program. First, the municipality must contribute 25 percent of the grant award, which equates to $9,340. Second, that rebate recipients must also have a financial contribution. Other important eligibility requirements include the rebate recipient being a municipal water customer, only applicable to replacement devices, and the rebate is only applicable for the cost of the device and its installation, excluding any owner labor costs.

Councilmember Musgrove asked if there would be a provision in the application that would require a 30-day waiting period once opened to the public. She stated that in searching smart sense devices, there is a wide range of pricing available. She stated that requiring residents to only pay tax is not a big commitment and asked if it would make more sense to require residents to pay an additional amount (such as $20 or $25) to ensure that they are being smart with their purchases, rather than the resident choosing higher priced items simply because this program is paying the cost.

Chairperson Valentine stated that it an interesting question as there is a science to figuring out how big the rebate should be in order to attract participants. He stated that his concern would be that if the rebate is not enough, residents may not choose to participate.

Board Member Hiatt stated that he thought he read that there is a maximum rebate per device, which is $200.

City Planner Anderson agreed that there is a wide range of prices and staff attempted to make the program as attractive as possible but also creating the opportunity for as many residents to participate as possible. He used the example of toilets, noting that there is a wide variety available for $200 or less, while there is a wide variety available above $200. He stated that there would be a device maximum of $200, with a household maximum of $500. He stated that this could also be used as a pilot for the City to implement its own program in the future, if desired.

Board Member Hiatt stated that this money will greatly help with the cost for the devices, but the homeowner would also be responsible for labor costs to install the new devices. He commented that the $500 maximum per household would help to serve the intent desired by Councilmember Musgrove. He noted that half of the City would not be eligible for the program as they are not connected to municipal water services. He hoped that the City could also investigate options for those residents that are not connected to City services in the future.

Board Member Fetterley stated that she would suspect that the majority of devices purchased will be irrigation upgrades, which will cost significantly more than $200. She stated that this information will all be distributed to the public and did not see the purpose of a waiting period as

DRAFT

it will already take time for residents to complete research and find the appropriate devices and contractors.

Councilmember Musgrove stated that Councilmembers, Commissioners, Board Members, and City staff have a head start on the availability of grant funds from the program, which would put them at advantage so to speak. She explained that her thinking was perhaps to provide the same amount of notice to residents.

City Planner Anderson stated that as the structure of the rebate program is finalized there will be a number of public promotions completed to notify the public. He stated that staff could incorporate a start date for applications if desired.

Chairperson Valentine agreed that it would be fair to have public notice. He noted that there would also be a seasonal concern with irrigation uses.

Board Member Covart asked if a public notice stating that the grants funds would be available in 30 days from the publication would suffice the intent of Councilmember Musgrove. She referenced audit services, which would not be covered under this grant, but noted that service would be available to those on private wells as well and is something the City could look at for a future program.

Motion by Board Member Hiatt and seconded by Board Member Bernard to recommend that 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 Valentine, Board Member Hiatt, Bernard, Covart, Fetterley, and Moore. Voting No: None. Absent: None.

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Councilmember_____introduced the following resolution and moved for its adoption:

RESOLUTION #20-018

RESOLUTION TO ENTER INTO A CLEAN WATER FUND GRANT AGREEMENT WITH THE METROPOLITAN COUNCIL TO RECEIVE A WATER EFFICIENCY GRANT

WHEREAS, the City of Ramsey owns and maintains a municipal water supply system which is essential to the quality of life, health and welfare of City residents and businesses; and

WHEREAS, the City of Ramsey currently relies on groundwater as the sole source of its municipal water supply system; and

WHEREAS, the City of Ramsey is planning to construct two new municipal water supply system groundwater wells to accommodate planned growth in the next ten years; and

WHEREAS, Minnesota Statutes 473.1565 directs the Metropolitan Council to undertake planning activities that emphasize conservation, inter-jurisdictional cooperation, and long-term sustainability; and

WHEREAS, the Metropolitan Council received an allocation of $787,600 from the Clean Water Funds to assist local units of government by helping property owners pay for water saving audits and/or more water efficient appliances to conserve water; and

WHEREAS, the primary objective of the Water Efficiency Grant Program is to assist local units of government to conserve water to ensure long-term groundwater sustainability; and

WHEREAS, this grant program is consistent with the goals and objectives of the City's Strategic Action Plan; and

WHEREAS, the City has the capability to adequately fund its local cost share for this grant program through the water enterprise fund; and

WHEREAS, on September 24, 2019, the Ramsey City Council authorized staff to apply for grant funding up to $50,000; and

WHEREAS, the City of Ramsey submitted an application for grant funds to offer rebates for WaterSense labeled smart irrigation controllers, irrigation audits, and WaterSense labeled toilets for water supply customers; and

WHEREAS, the Metropolitan Council received grant applications totaling $1,393,527; and

WHEREAS, the City of Ramsey was one of forty (40) communities accepted into the grant program with a grant allocation of $28,000; and

WHEREAS, to accept the grant funds, the City of Ramsey must enter into a Clean Water Fund Grant Agreement with the Metropolitan Council.

NOW THEREFORE, BE IT RESOLVED BY THE CITY COUNCIL OF THE CITY OF RAMSEY, ANOKA COUNTY, STATE OF MINNESOTA, as follows:

1. That the Ramsey City Council hereby authorizes the execution of the Clean Water Fund Grant Agreement with the Metropolitan Council and to accept the $28,000 grant allocation for a water efficiency rebate program.

The motion for the adoption of the foregoing resolution was duly seconded by Councilmember _____, and upon vote being taken thereon, the following voted in favor thereof:

and the following voted against the same:

and the following abstained:

and the following were absent:

Whereupon said resolution was declared duly passed and adopted by the Ramsey City Council this the 28th day of January, 2020.

_____
Mayor

ATTEST:

_____
City Clerk

Public Works Committee **5. 2.**

Meeting Date: 01/21/2020

By: Bruce Westby, Engineering/Public Works

Title:

Consider City Council Recommendation to Indefinitely Suspend Pavement Sealcoating Program

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 sealcoating program.

Background:

Since 2015, the City of Ramsey has budgeted $500,000 each year for the purpose of cracksealing and sealcoating between 13 and 23 miles of City streets annually. Prior to 2015, cracksealing and sealcoating was generally completed on a less frequent basis based on availability of funding.

The purpose of sealcoating is to protect existing bituminous pavement from damage caused by 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 of several streets sealcoated since 2015. Staff has since been monitoring streets sealcoated since 2015 to document the scope and severity of observed pavement stripping issues, and to explore 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 issues under sealcoats over the last decade or more, including cities in the northwest metro. Since last spring, Staff has discussed pavement stripping issues experienced by numerous metro area cities, including those cities that have been experiencing this issue the longest, with the goal of better understanding the cause(s) of pavement stripping, how to cost-effectively repair damaged pavement, 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 current sealcoat program without first identifying the root cause(s) for pavement stripping is likely to result in additional damage to streets moving forward. Instead, Staff would like to indefinitely suspend the sealcoating program while continuing to monitor the scope and severity of the pavement stripping observed to date on City streets, to continue researching the sealcoat practices and findings of other metro area cities and alternative treatments to sealcoating, and to determine how to best repair City streets previously damaged by pavement stripping. Given the degraded condition of streets in Business Park 95, significant repairs are likely needed this year.

Timeframe:

Staff estimates 15 minutes will be sufficient to present this case and respond to questions.

Observations/Alternatives:

Alternative #1– Motion to recommend that the City Council indefinitely suspend the City's annual sealcoating program.

Alternative #2 – Motion of other.

Funding Source:

The City annually budgets $500,000 for crack sealing and sealcoating projects. Staff recommends that the City continue to complete crack sealing projects at an estimated amount of up to $200,000 annually. Based on discussions at this evening's Public Works Committee meeting, Staff will develop recommendations for repairing streets previously damaged by pavement stripping, and for implementing alternative pavement maintenance practices to sealcoating, and proposes to present the recommendations at the February Public Works Committee meeting.

Recommendation:

Staff recommends providing a recommendation to the City Council to indefinitely suspend the City's annual sealcoating program for reasons noted herein.

Action:

Motion to recommend that the City Council indefinitely suspend the City's annual sealcoating program.

Attachments

LRRB Rpt 2013-08
LRRB Rpt 2017-35
Unity St in BP 95 North of McKinly
Unity St in BP 95 North of 140th Av
McKinley St in BP 95 West of Radium St
Sodium St and Radium St Intersection
Tungsten St and Sodium St Intersection
Pavement Stripping Research Summary

Form Review

Inbox	Reviewed By	Date
Grant Riemer	Grant Riemer	01/16/2020 12:39 PM
Kurt Ulrich	Kurt Ulrich	01/16/2020 04:05 PM
Form Started By: Bruce Westby		Started On: 01/14/2020 08:06 AM
Final Approval Date: 01/16/2020		

Stripping of Hot-Mix Asphalt Pavements under Chip Seals

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

April 2013

Research Project
Final Report 2013-08

Minnesota Department of Transportation

RESEARCH SERVICES

Office of Policy Analysis, Research & Innovation

LRRB
LOCAL ROAD RESEARCH BOARD

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(Please request at least one week in advance).

Technical Report Documentation Page

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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.

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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:

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St. Paul, Minnesota 55155

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. This report does not contain a standard or specified technique.

The authors 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

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

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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.

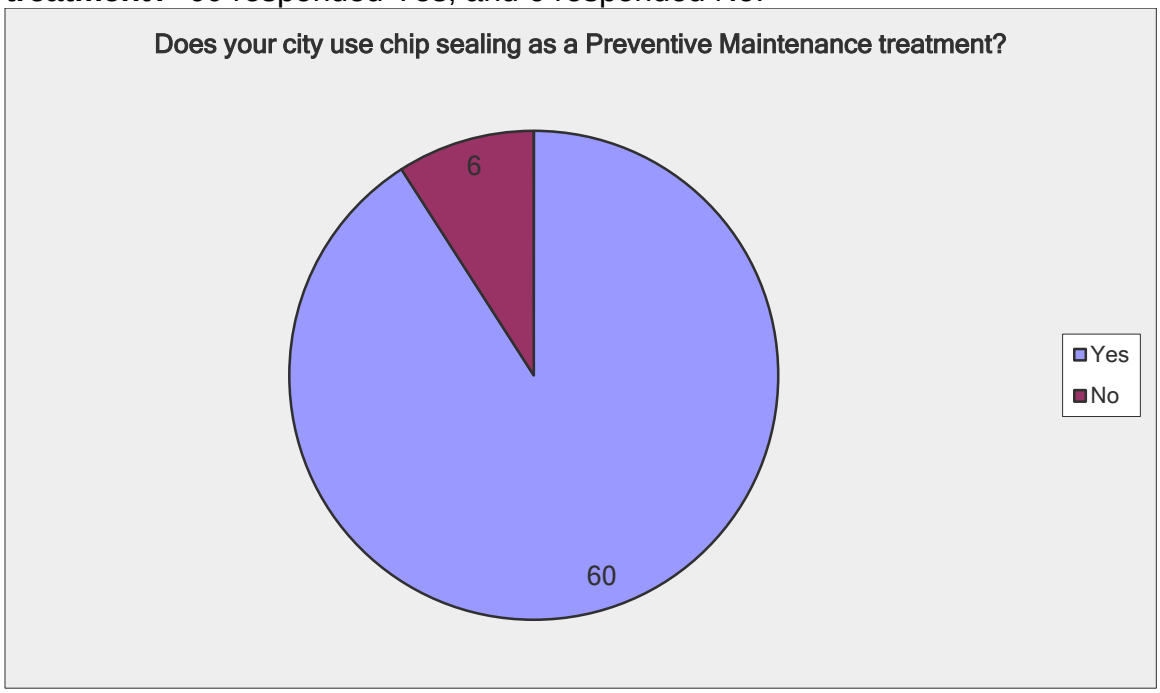


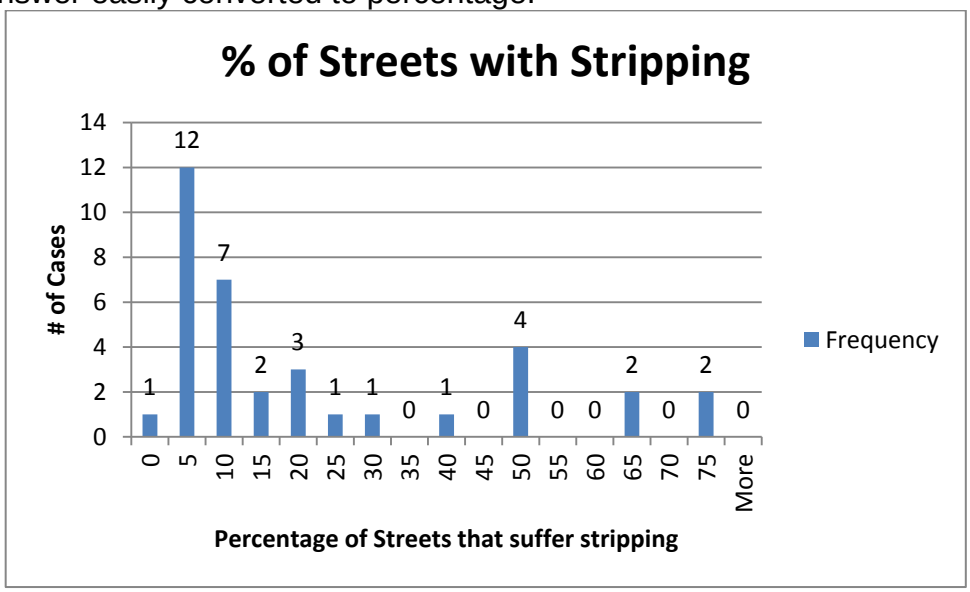


Figure 2 Picture used in survey

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

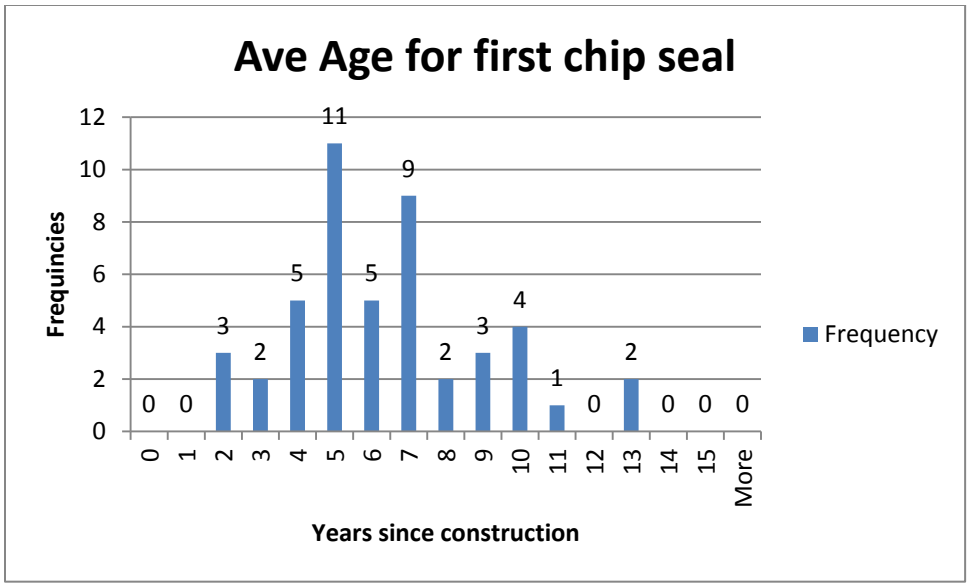


Question 4: **What percentage of streets does it happen on?** 40 out of 66 supplied answer to this question. See below histogram for breakdown of data. Most of the agencies reported a percentage but four (4) reported in format that did not give an answer easily converted to percentage.

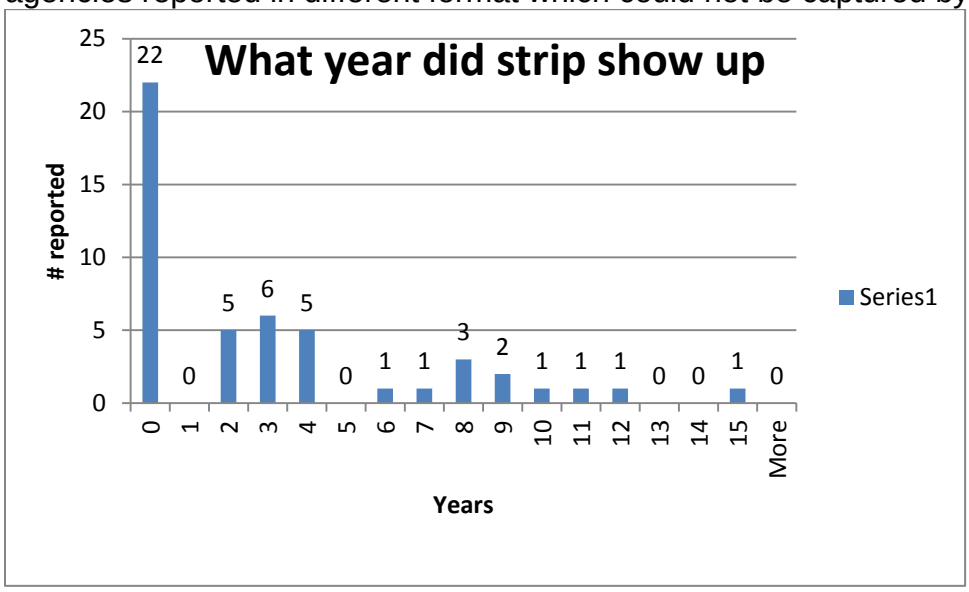


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Question 5: **On average, what is the age of the street when the first chip seal is placed?** 52 responded to question see histogram for data below. Five (5) agencies reported in a different format which could not be captured by the histogram.

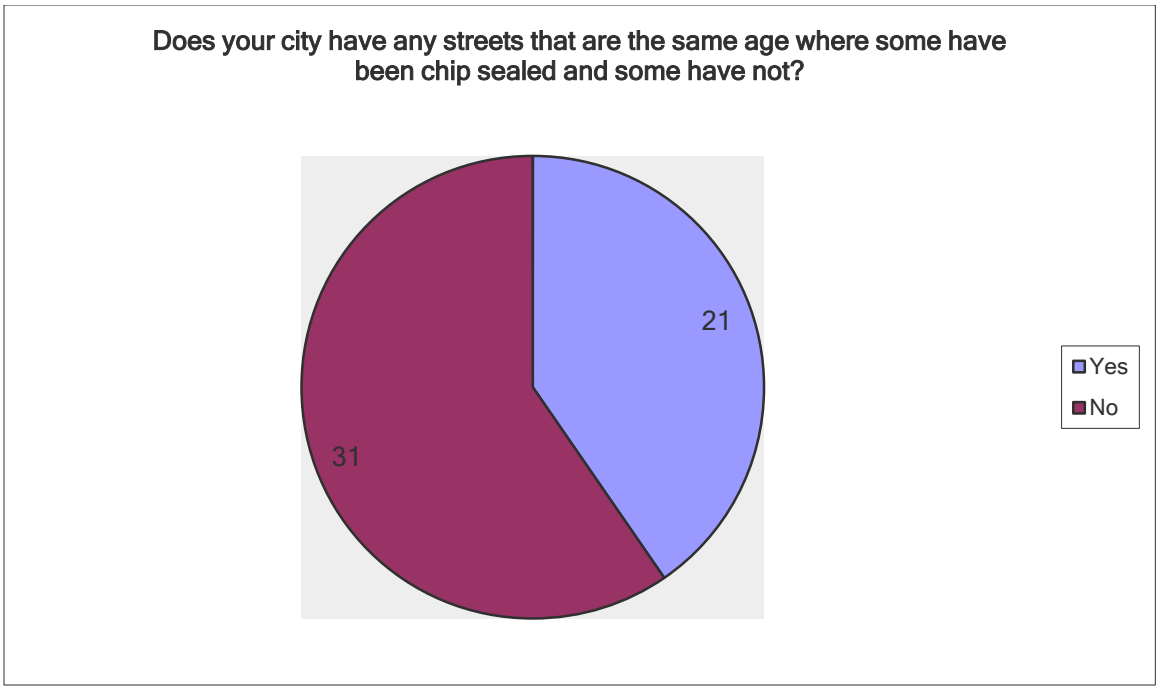


Question 6: **How long after the chip seal is placed does the stripping problem show up?** 52 responded to this question, see histogram below for data. Three (3) agencies reported in different format which could not be captured by the histogram.

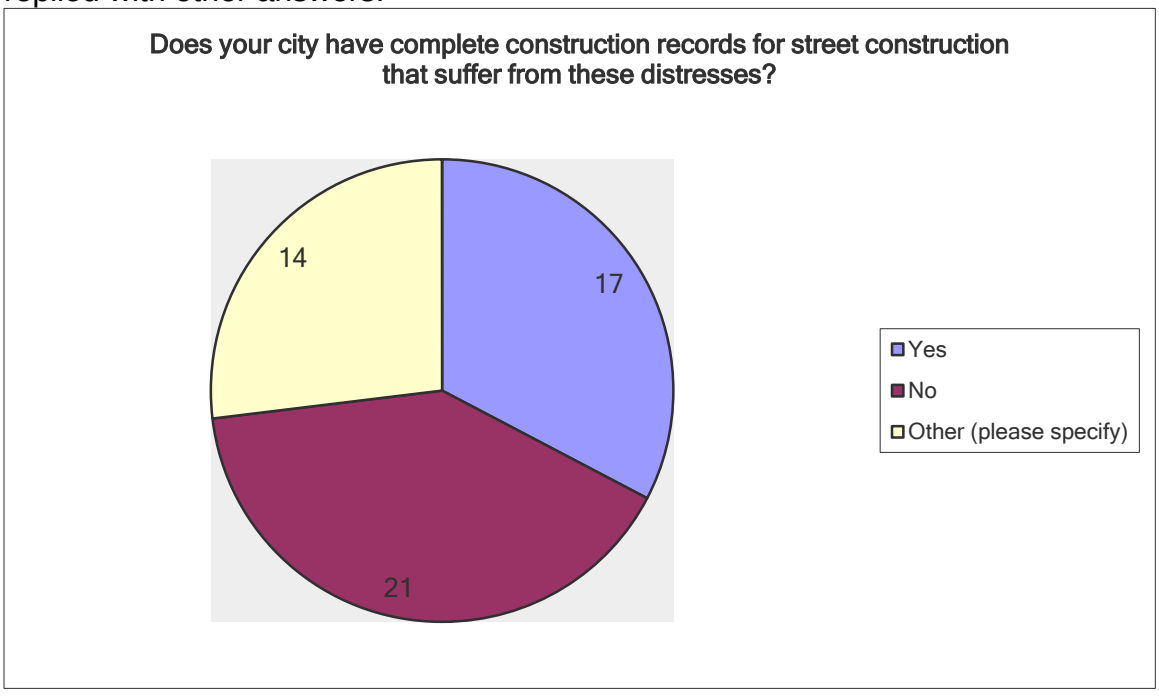


The responders that listed year zero have not seen any damage to their streets.

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

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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.

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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.

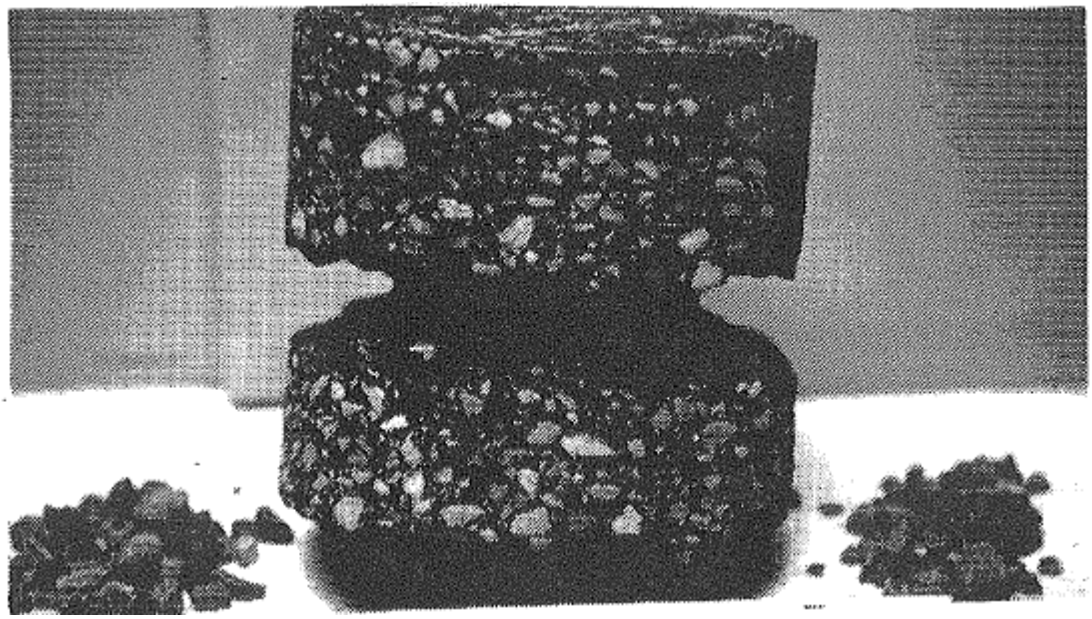


Figure 1.2. A Core showing Stripping below the surface (3)

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).

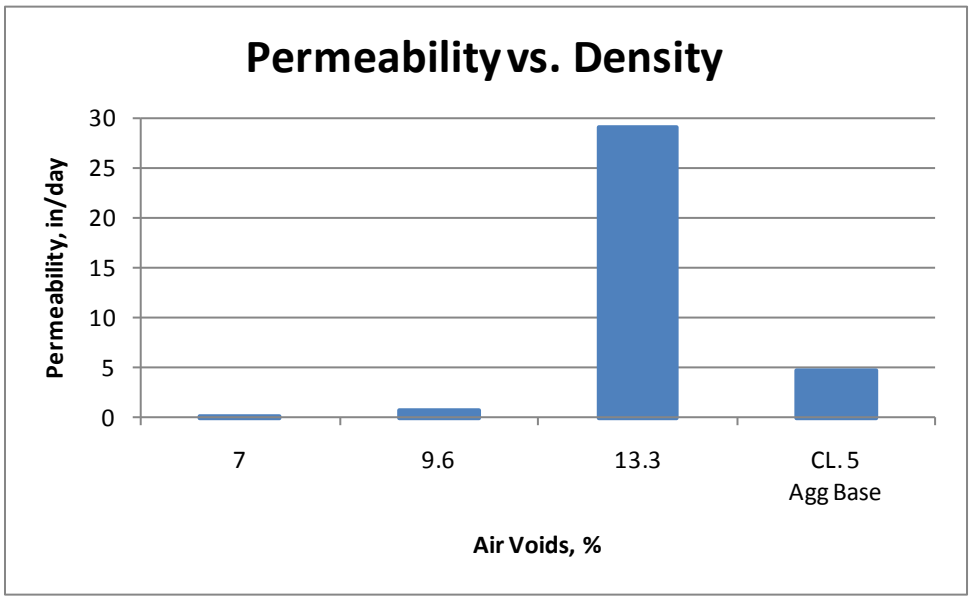


Figure 2.2. Permeability vs. Air Voids

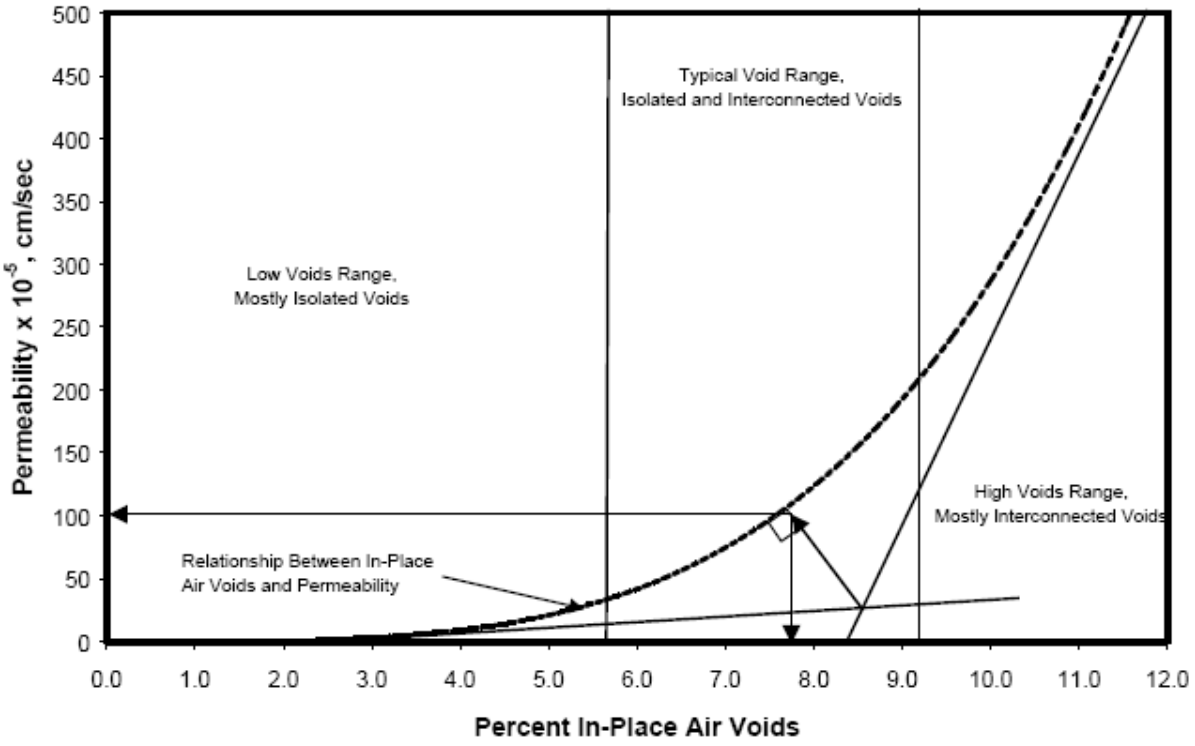


Figure 2.3. Permeability vs. In-Place Air Voids (Cooley Jr., Brown and Maghsoodloo, 2001).

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.

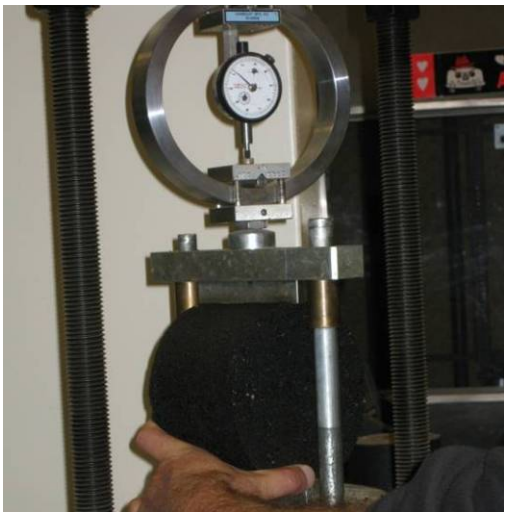


Figure 2.4. Lottman Testing

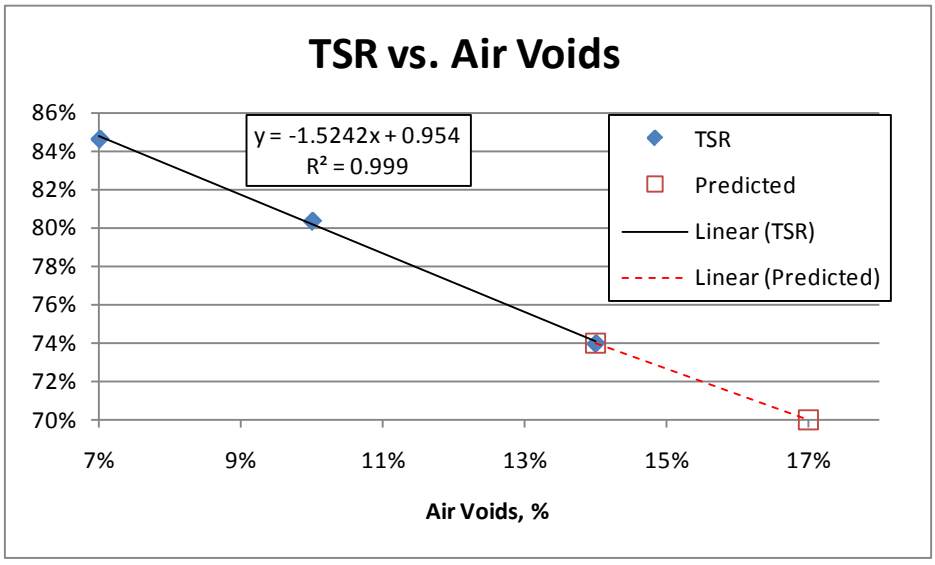


Figure 2.5. Tensile Strength Results (TSR) vs. Air Voids

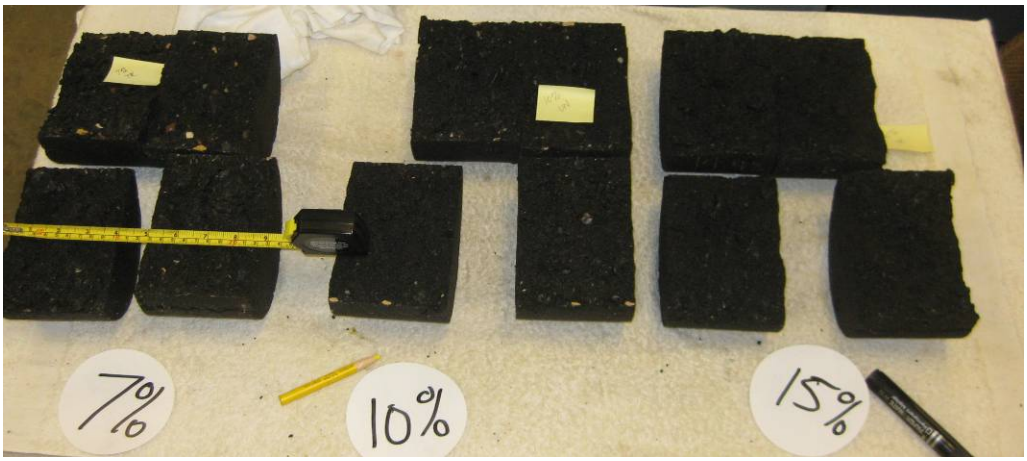


Figure 2.6. Visual Examination of TSR specimens

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.

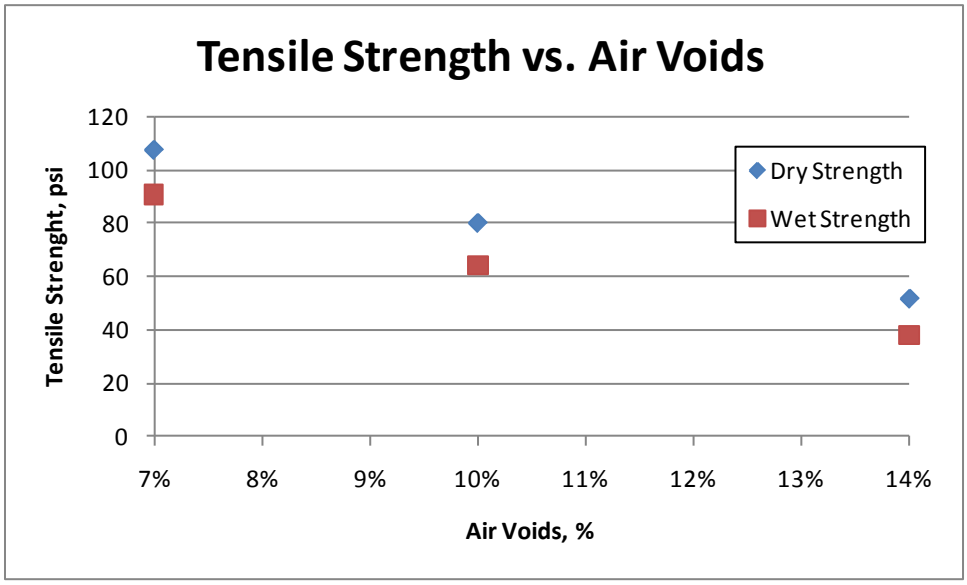
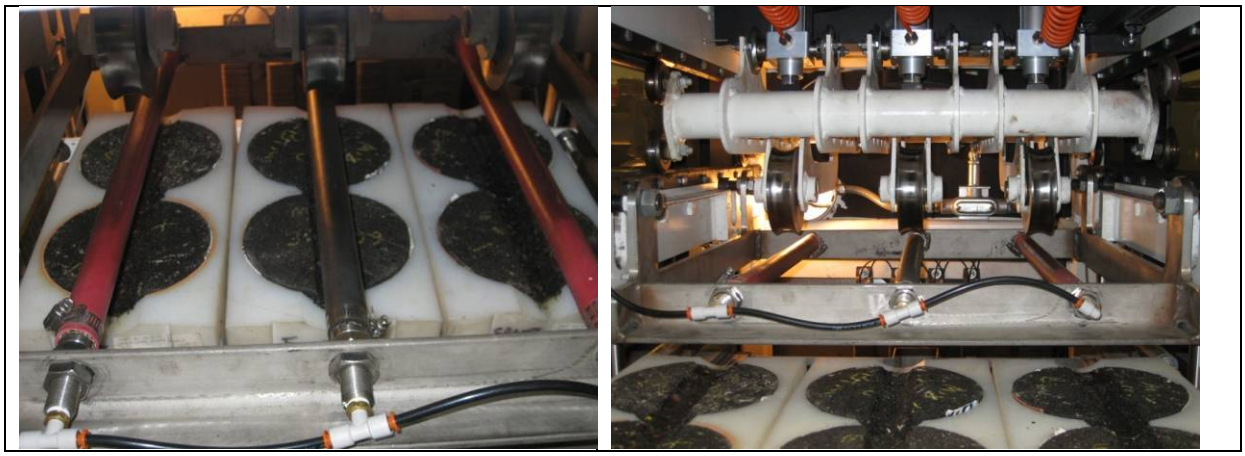


Figure 2.7. Tensile Strength vs. Air Voids

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.

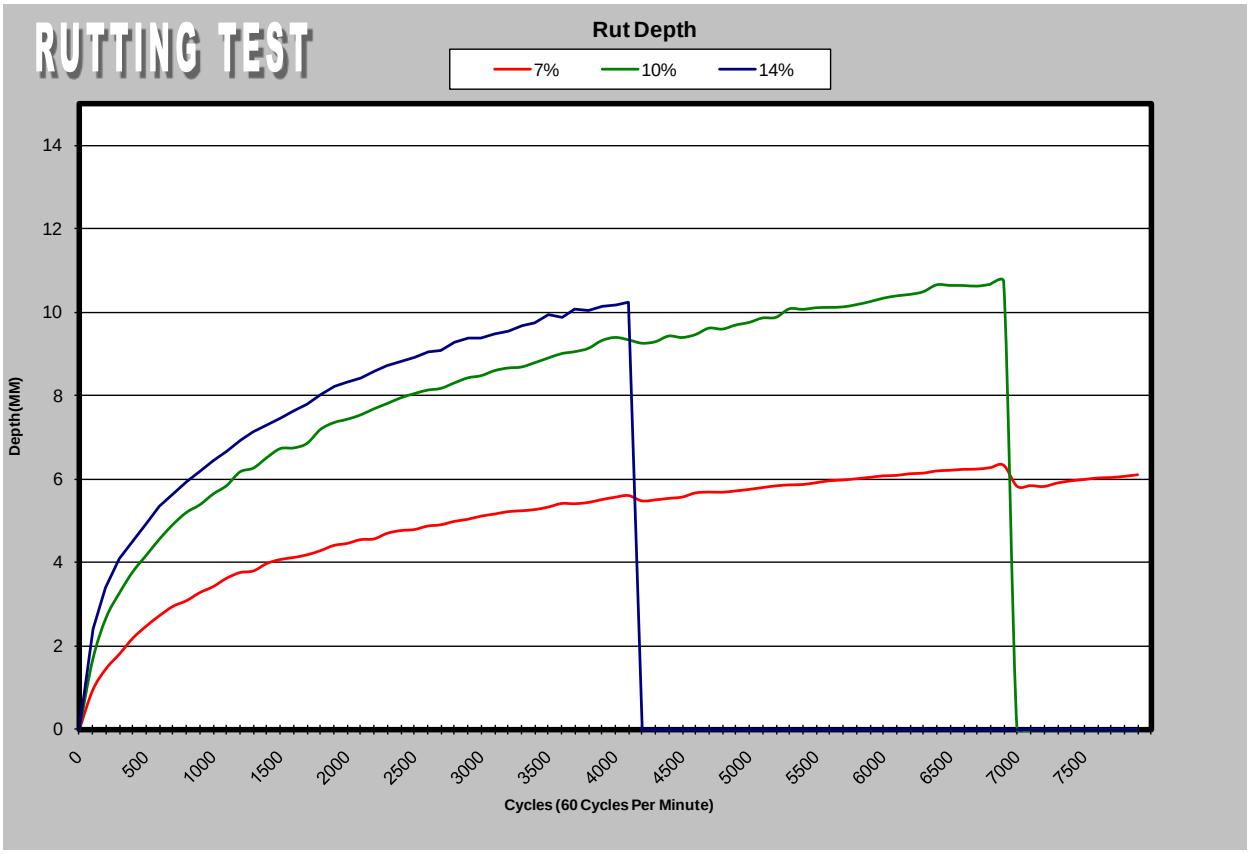


Figure 2.9. Asphalt Pavement Analyzer (APA) Test Results of Dry Test

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	

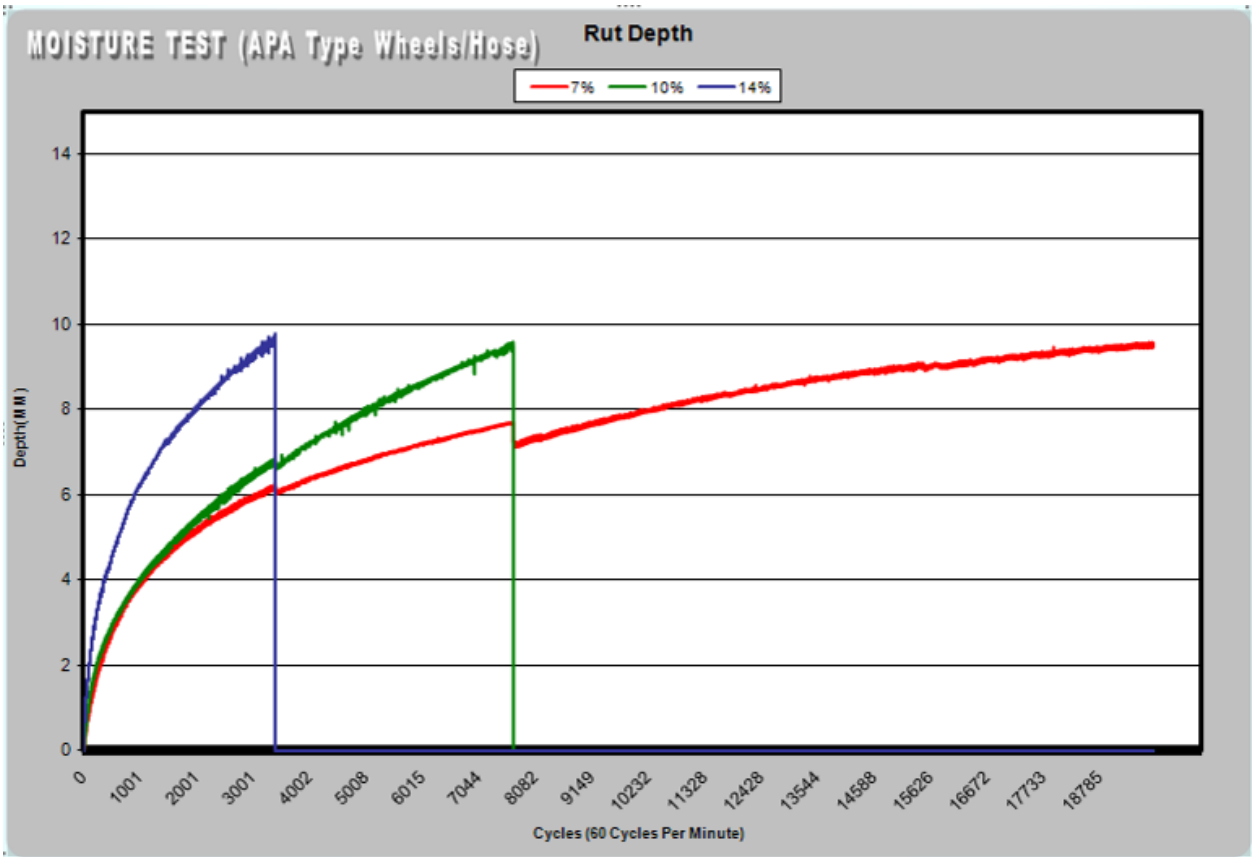


Figure 2.10. Asphalt Pavement Analyzer (APA) Test Results of Wet Test

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
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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.

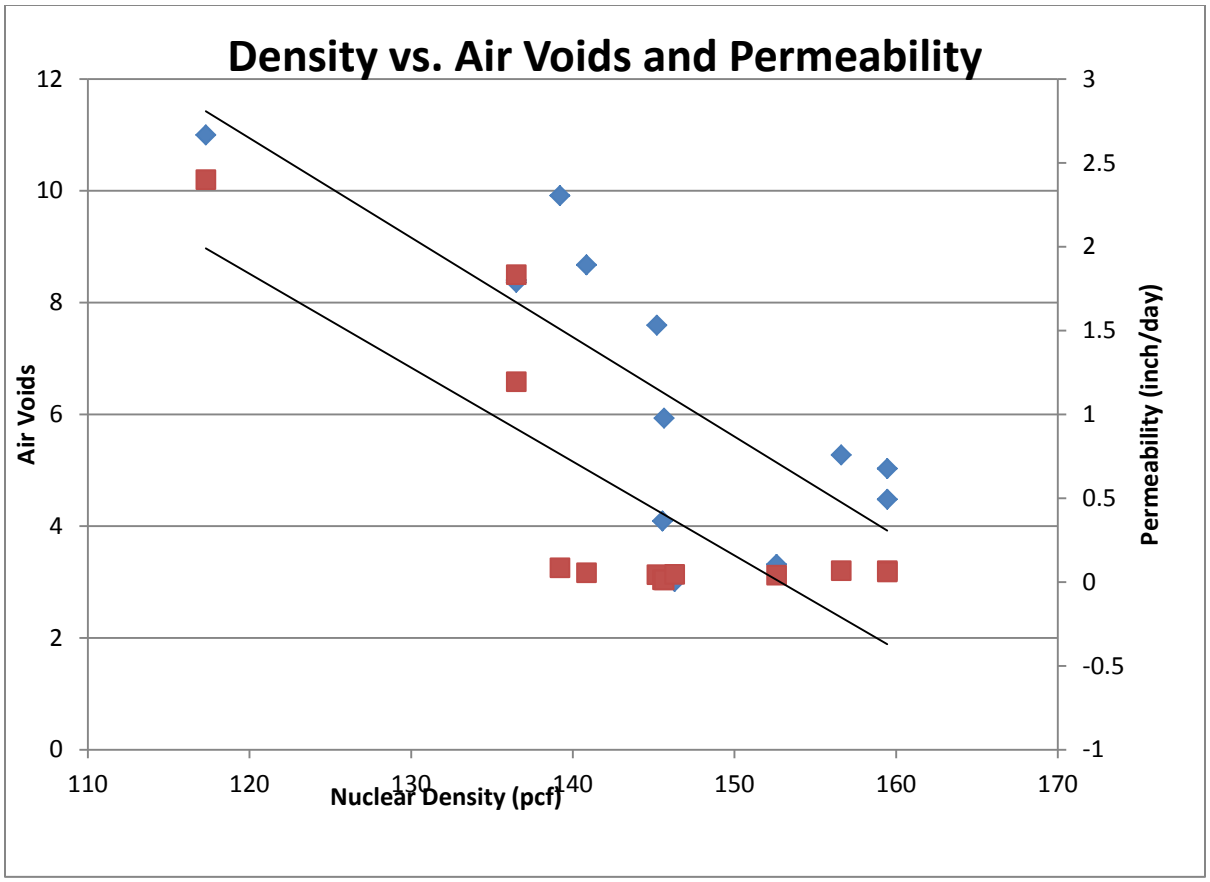


Figure 19 Graph comparing Density vs. Air Voids & Permeability

The results from different test methods will be discussed in-depth in Task 5.

Appendix D: Task 4 Report

Chapter 5. Memo

Office of Materials
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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

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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.

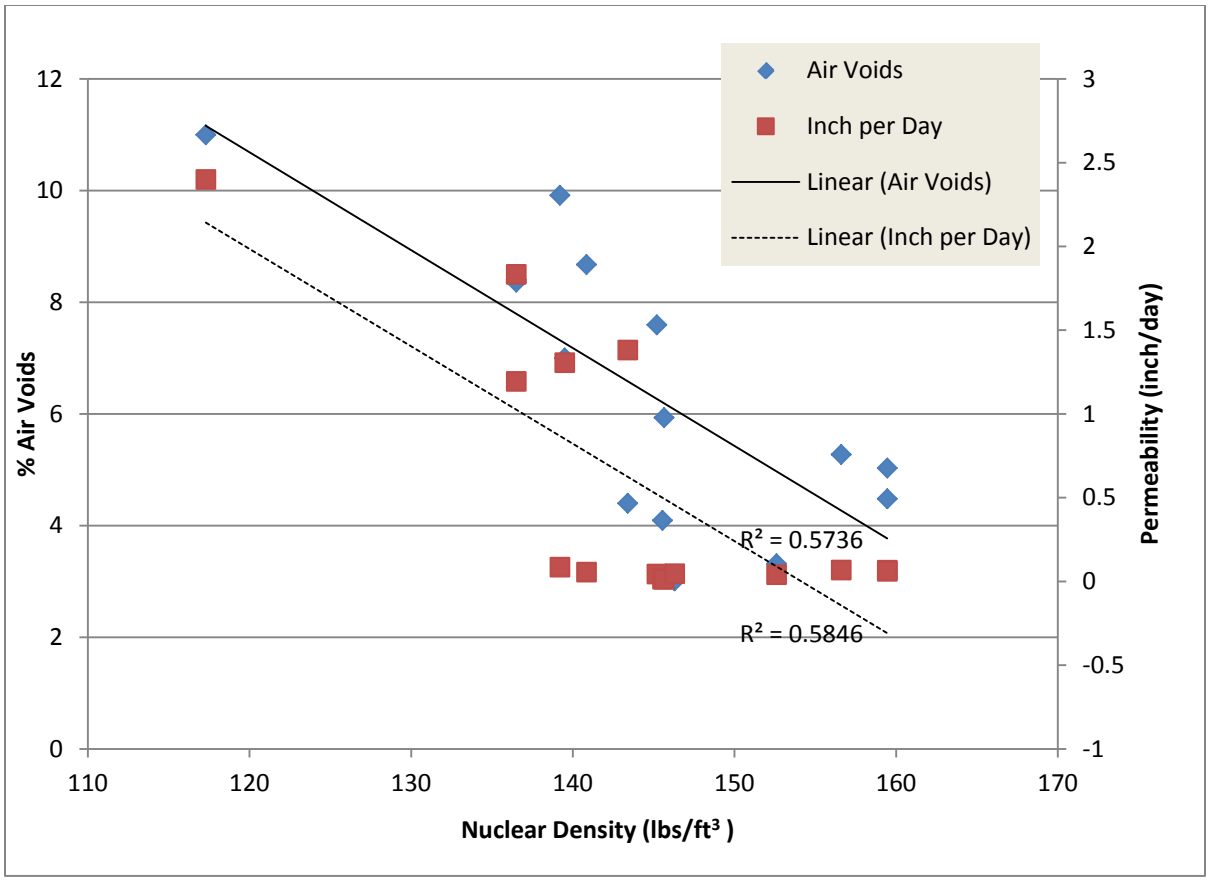


Figure 20 Air Voids and Permeability vs. Density

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.

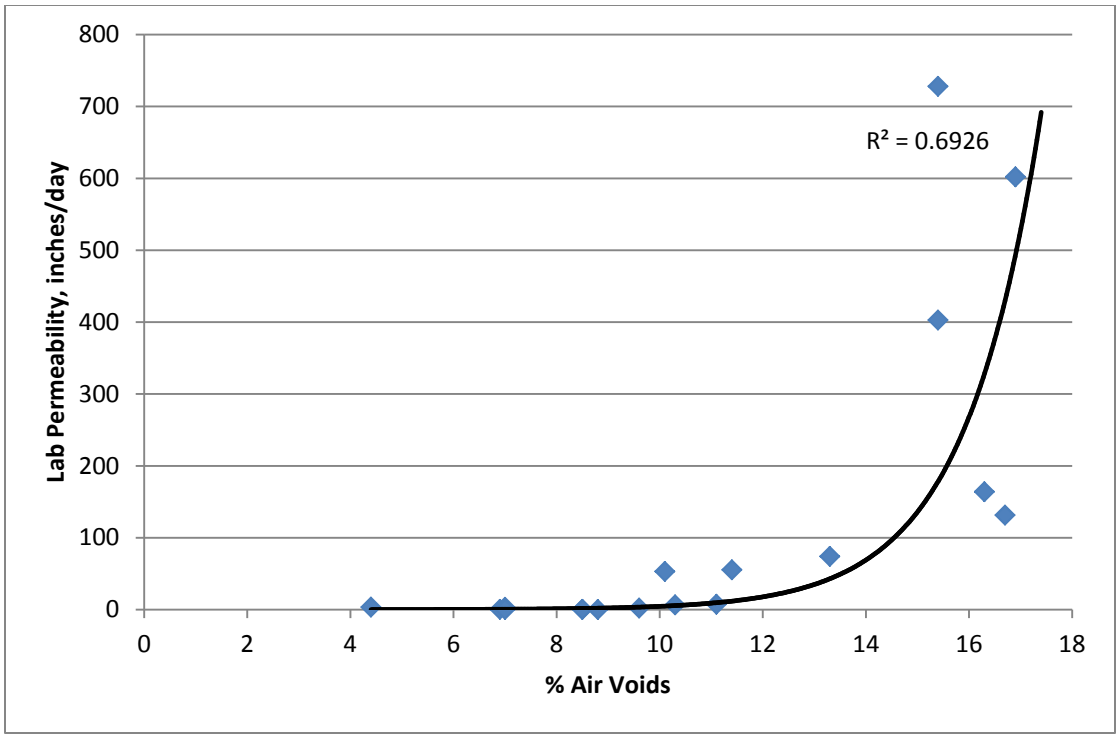


Figure 21 Air Voids vs. Lab Permeability

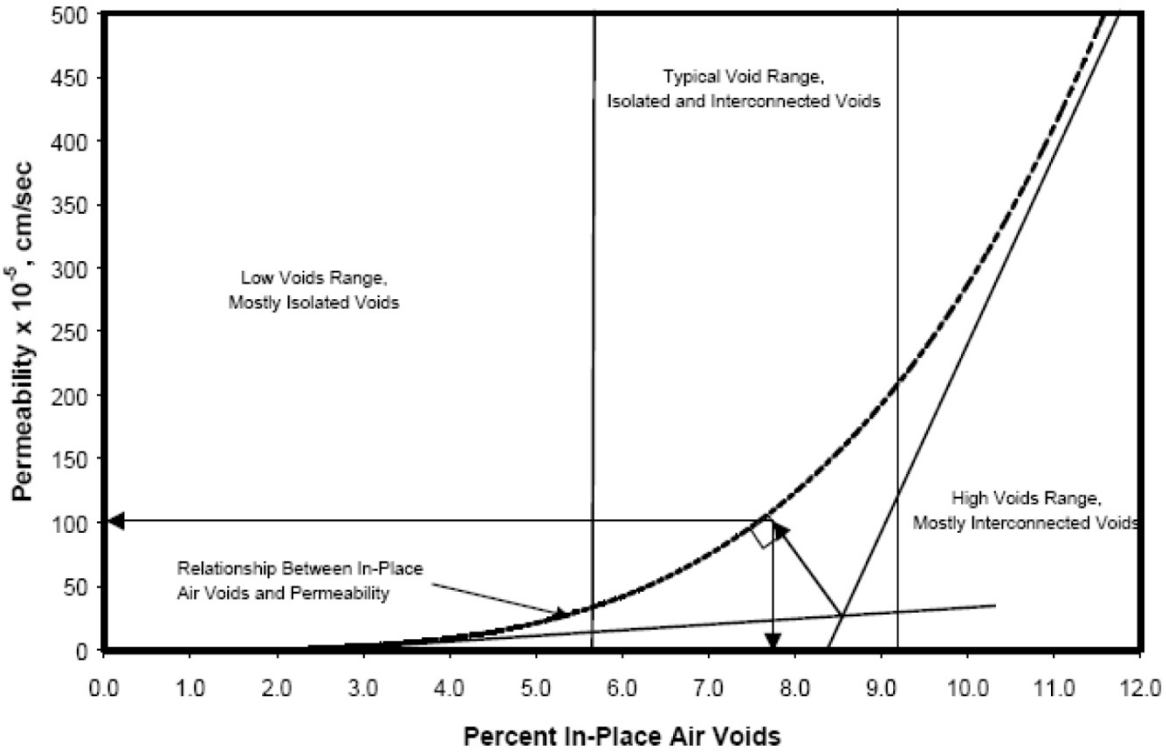


Figure 22 Permeability vs. In-Place Air Voids (Cooley Jr., Brown and Maghsoodloo, 2001).

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

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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.

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Prevention of Stripping Under Chip Seals

FINAL REPORT

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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.

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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

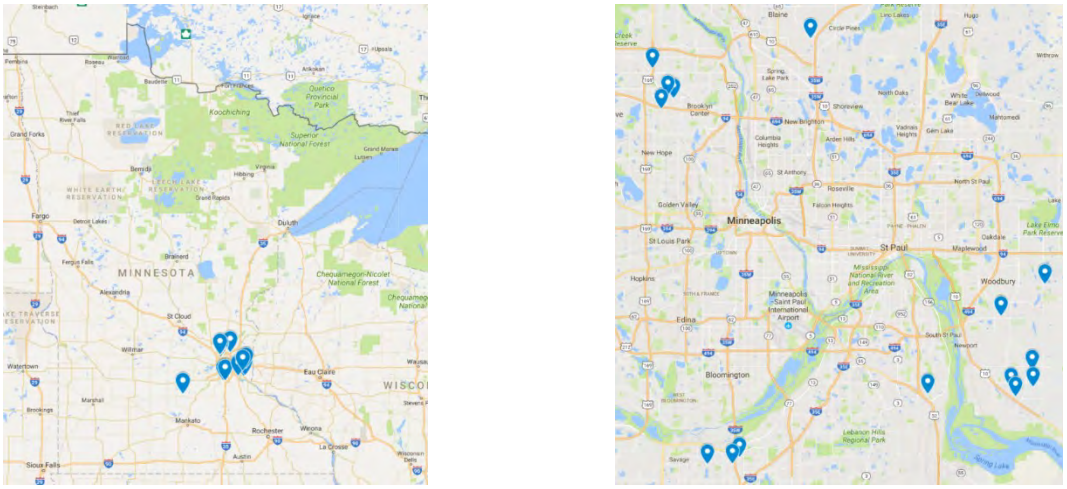
City and county engineers collaborated with the research team to identify 18 locations for the study of chip seal performance, most notably stripping. These locations were used for field testing (i.e., distress condition surveys and density testing) and pavement samples (to be used for further laboratory 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.



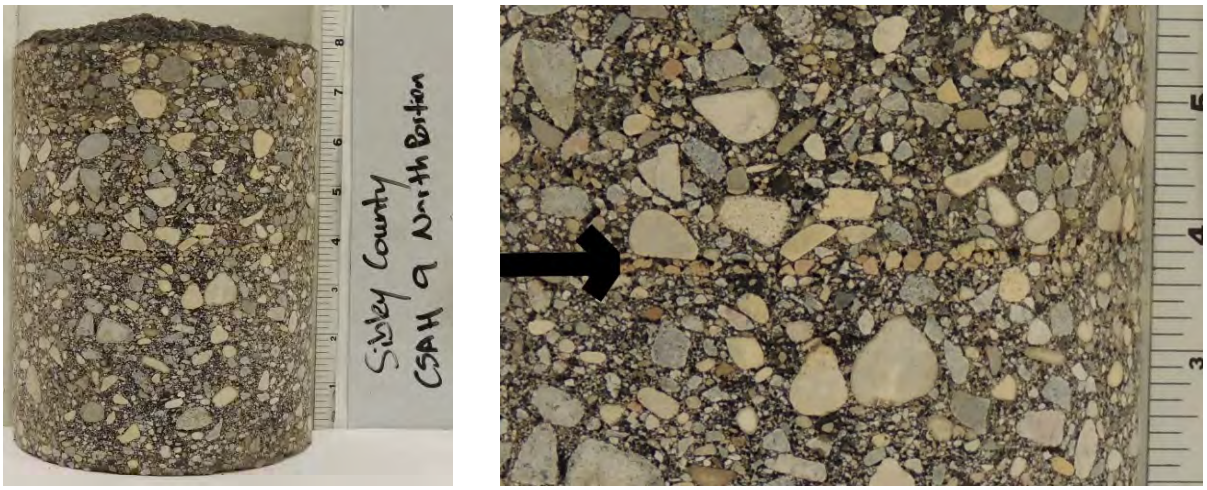
Figure 5. Vehicle-mounted GPR used for site evaluation

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.

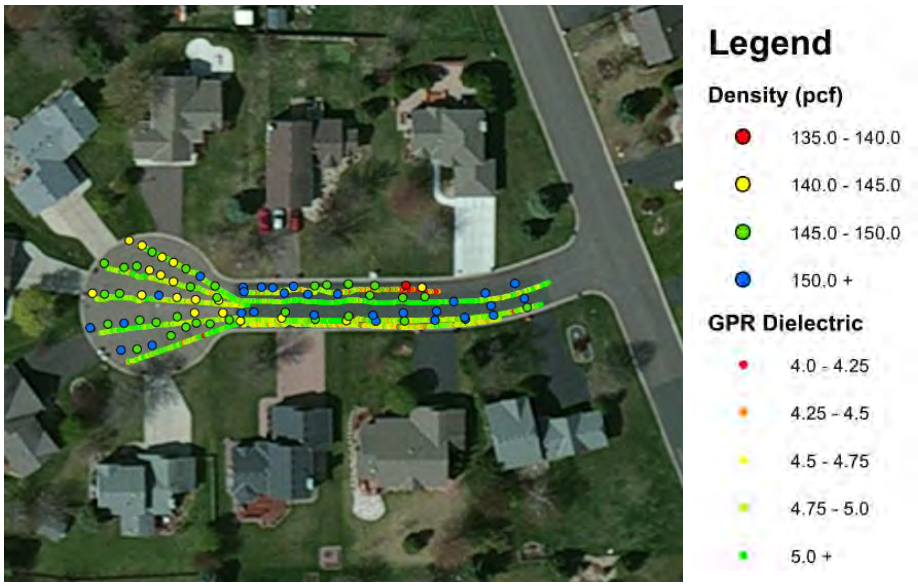


Figure 10. Map of dielectric and density data collected at Newbury Alcove site in Woodbury, MN

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.

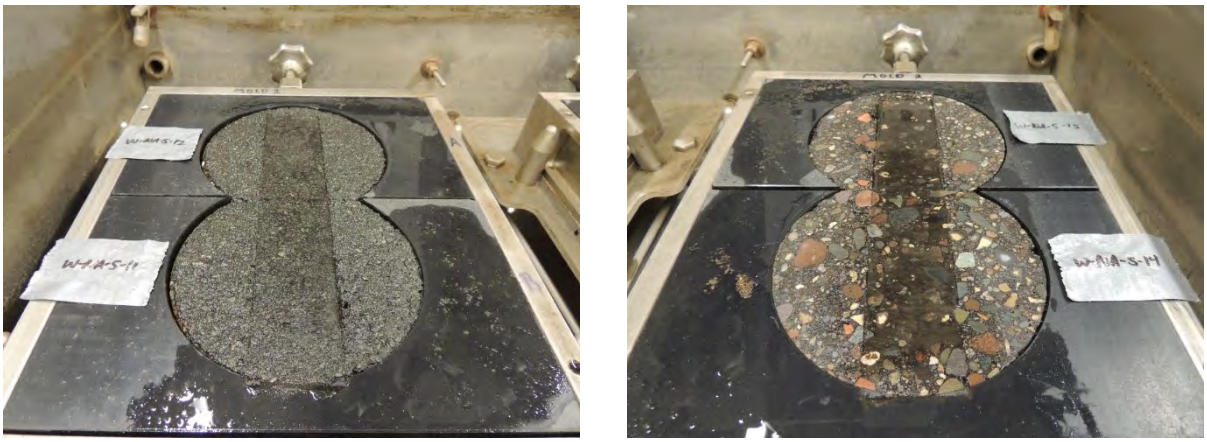


Figure 11. Specimens for stripping study undergoing Hamburg wheel testing

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.

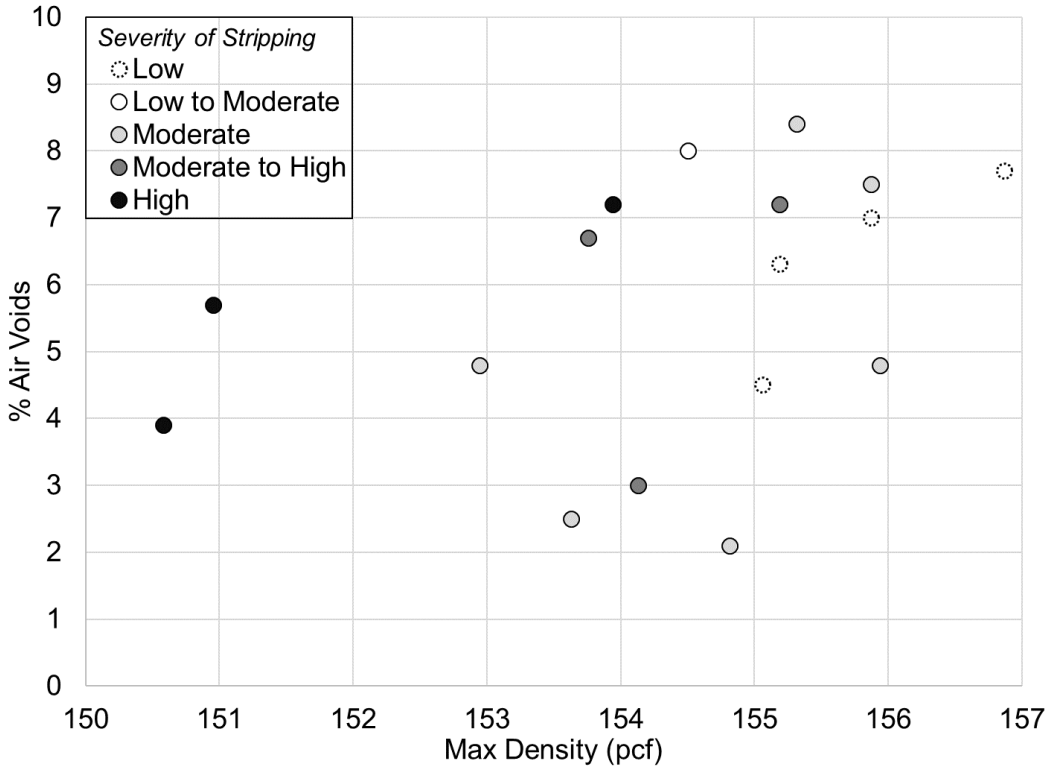


Figure 12. Severity of stripping in chip-sealed pavements in 18 locations with maximum theoretical density and percent air voids

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.



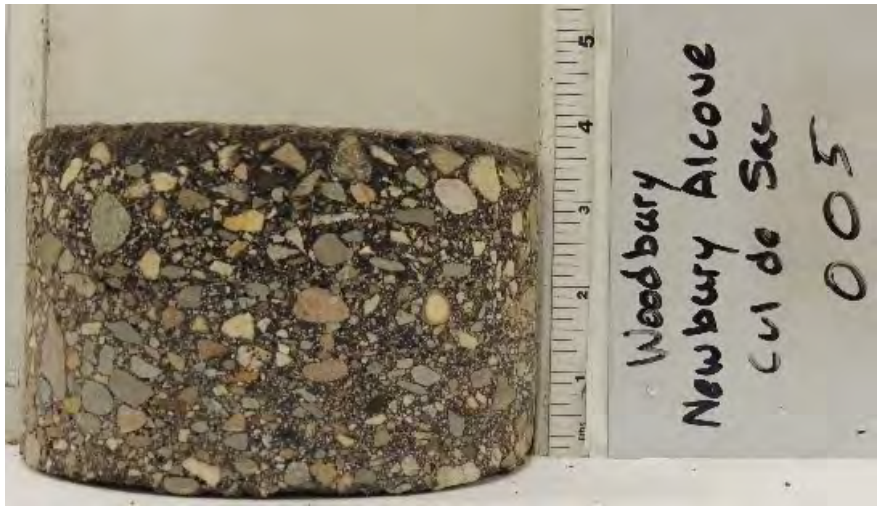
(a)



(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

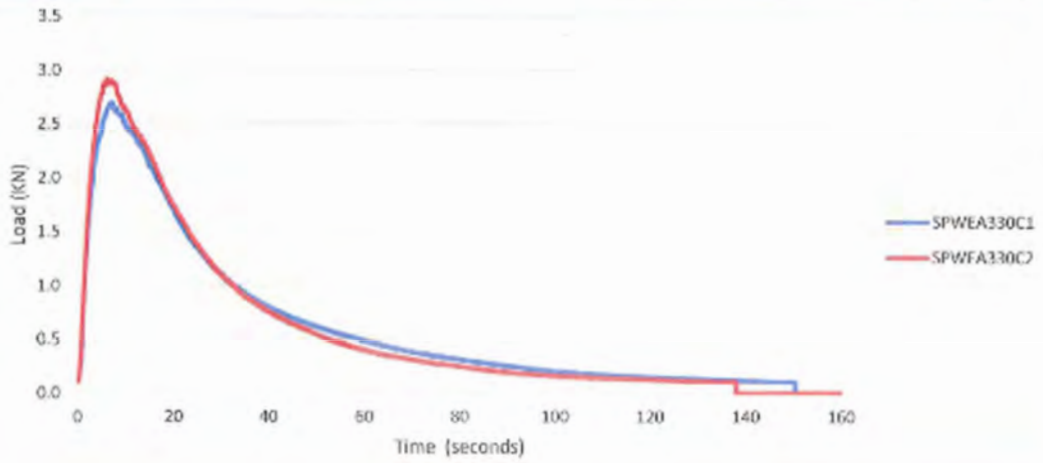
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Date of
Reviewed By:

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:

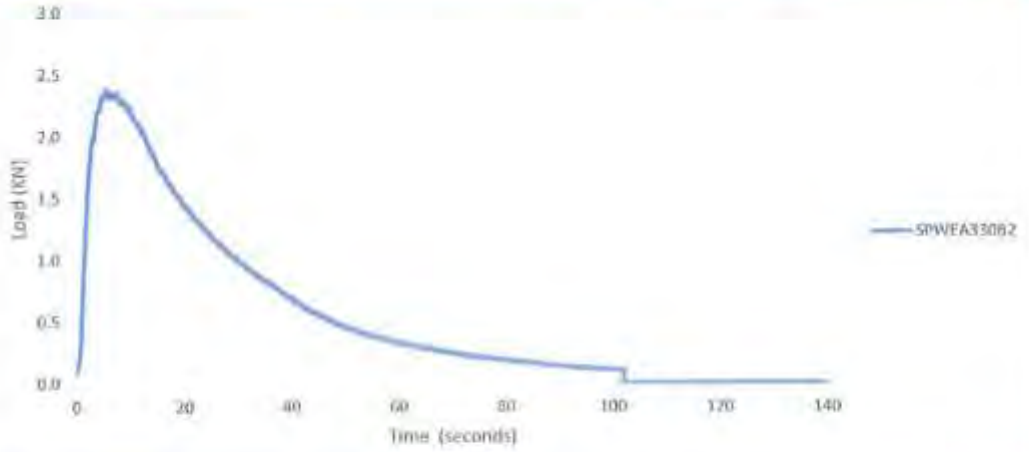
Project: 27-00006
LRRB Asphalt Stripping Study

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

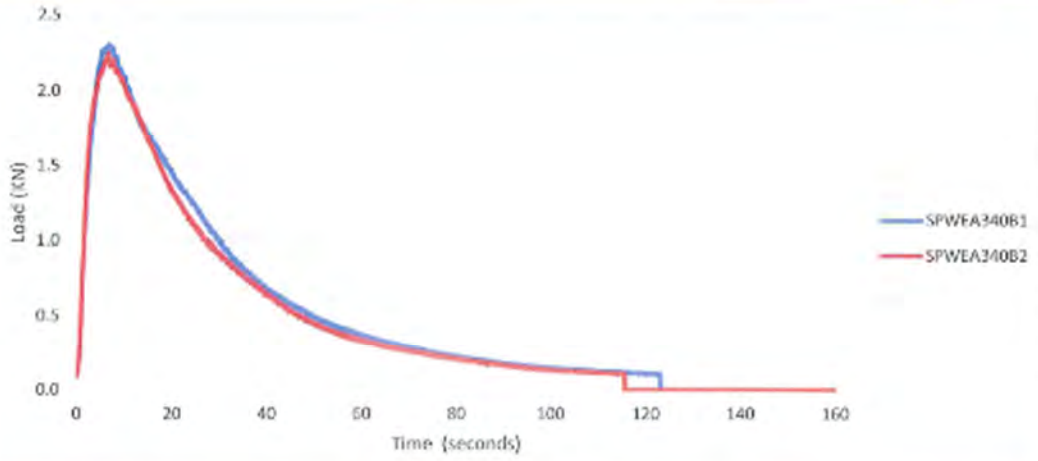
Client: LRRB CC:
Project: 27-00006
LRRB Asphalt Stripping Study

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:

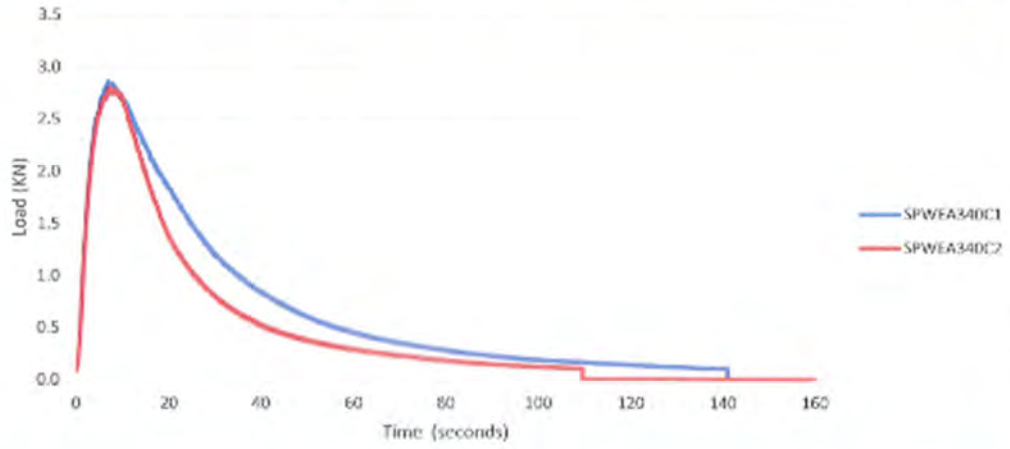
Project: 27-00006
LRRB Asphalt Stripping Study

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

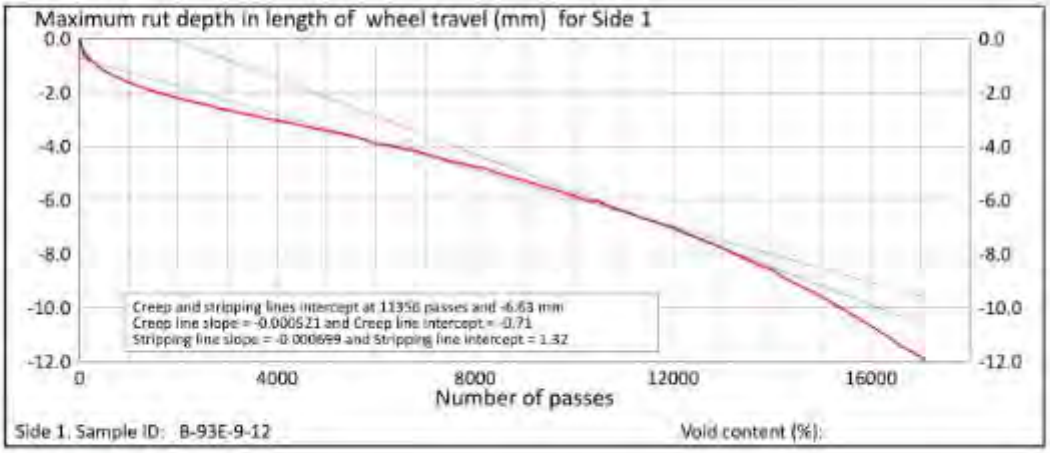
APPENDIX E

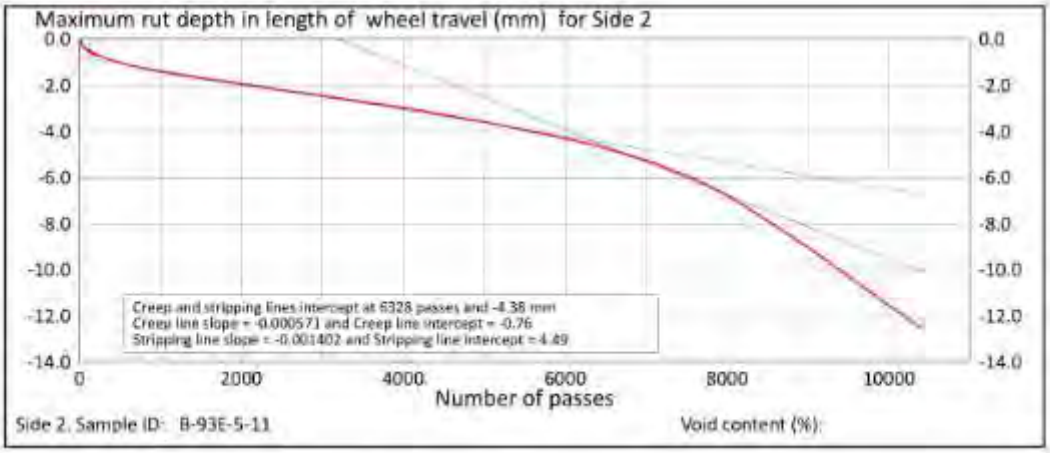
HAMBURG TEST DATA

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	

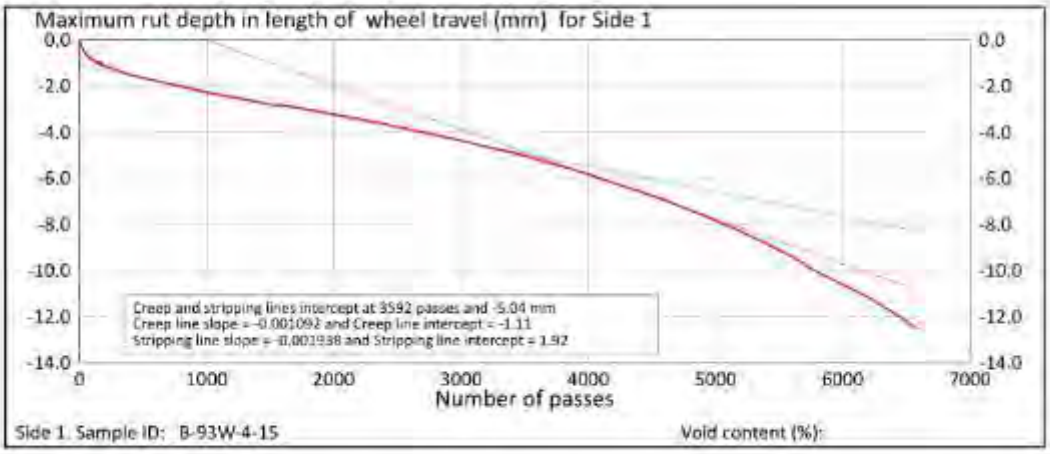
Mix type:
Asphalt grade:
Mix source:
Test temperature (°C): 50.0
Mix depth (mm): 60.0

Signature .....

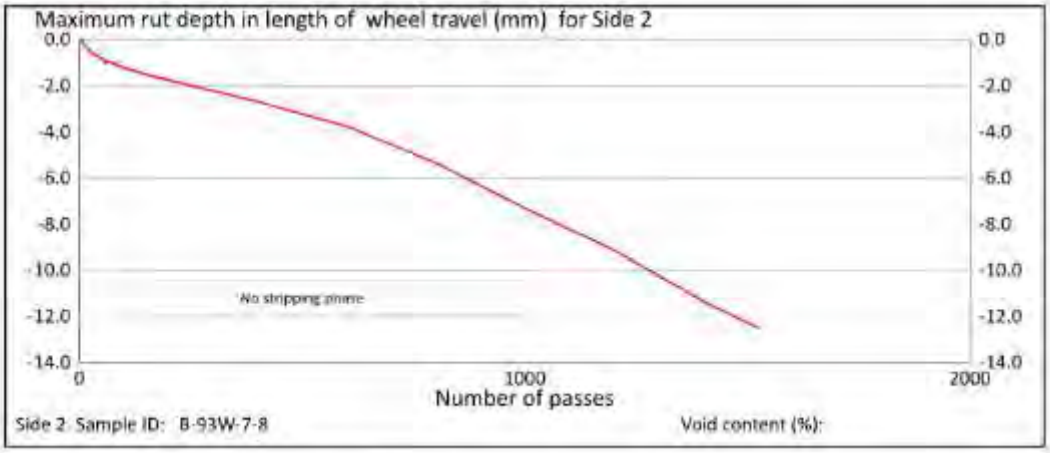
Hamburg Wheel-Tracker Test Results

AASHTO 324 (Modified)
Date/time of test: 12/23/2014 7:10 AM
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	

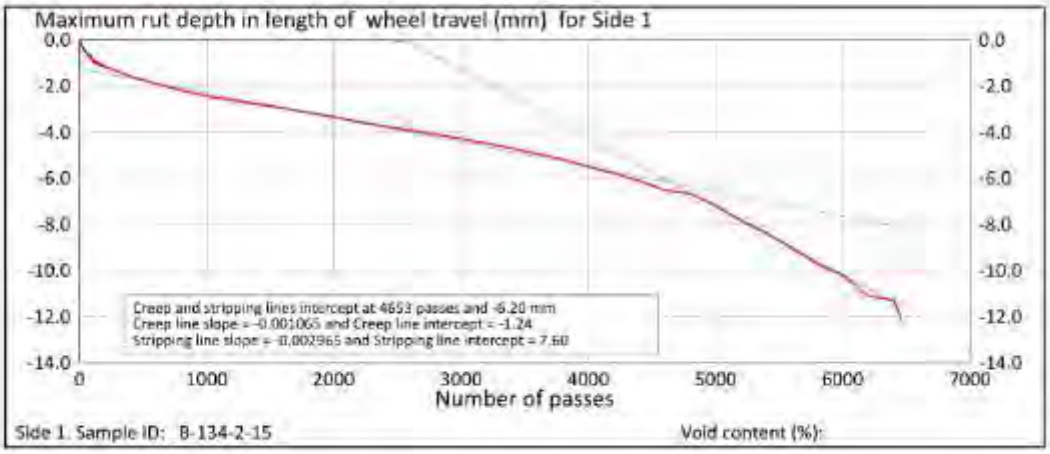
Mix type:
Asphalt grade:
Mix source:
Test temperature (°C): 50.0
Mix depth (mm): 60.0

Signature .....

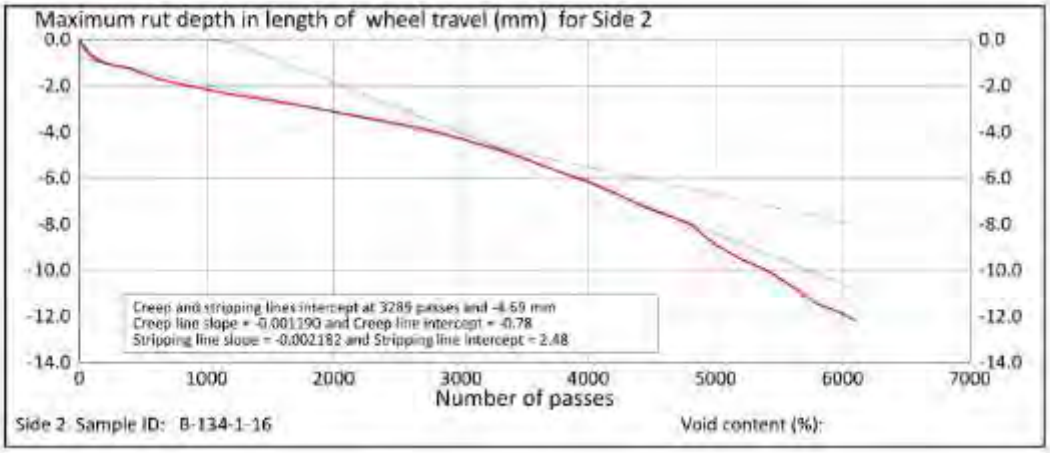
Hamburg Wheel-Tracker Test Results

AASHTO 324 (Modified)
Date/time of test: 12/22/2014 7:27 AM
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	

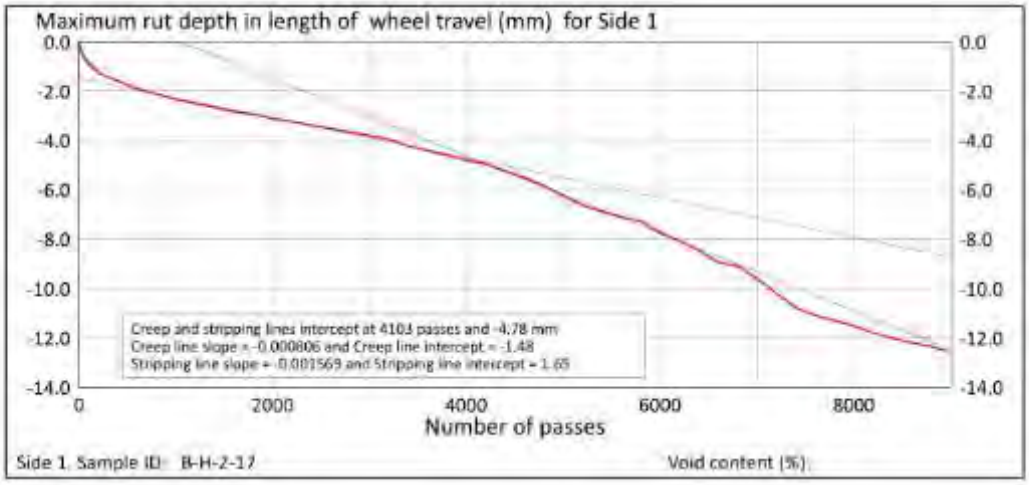
Mix type:
Asphalt grade:
Mix source:
Test temperature (°C): 50.0
Mix depth (mm): 60.0

Signature .....

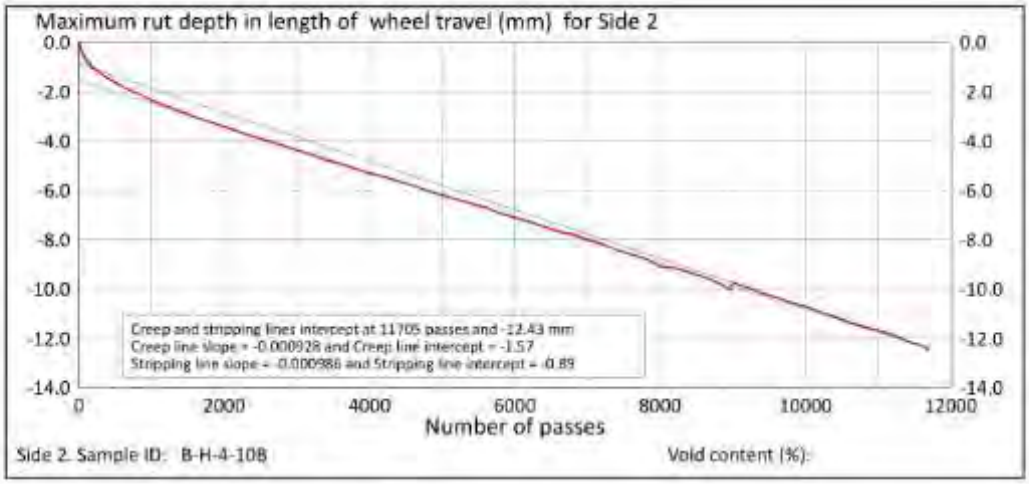
Hamburg Wheel-Tracker Test Results

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

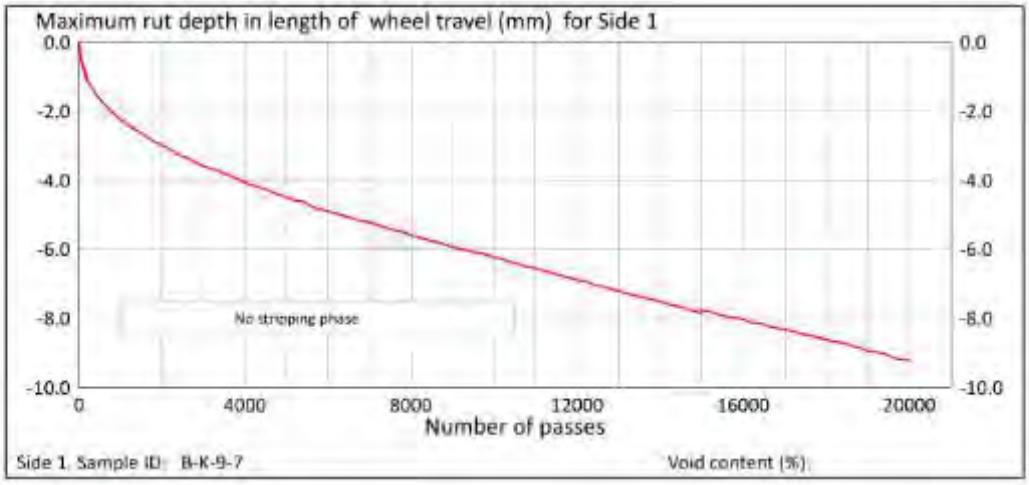
Mix type:
Asphalt grade:
Mix source:
Test temperature (°C): 50.0
Mix depth (mm): 60.0

Signature .....

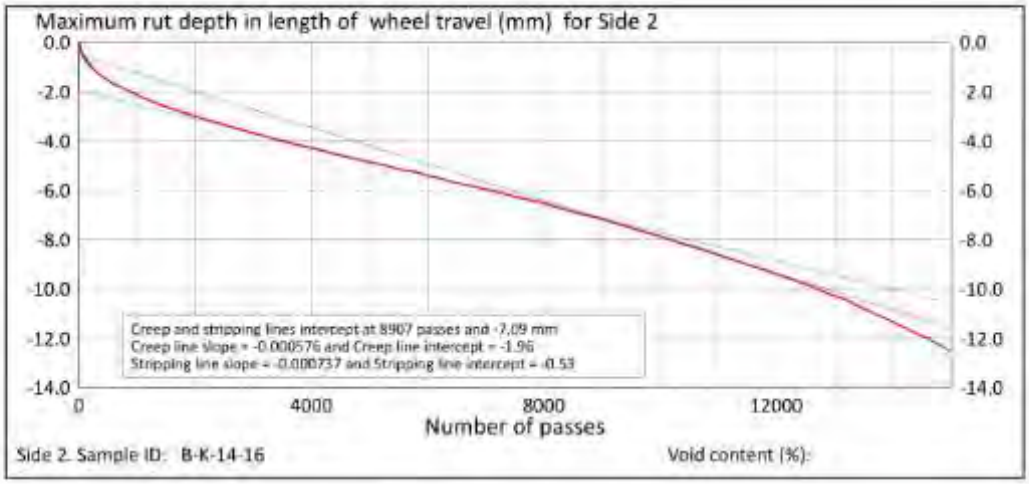
Hamburg Wheel-Tracker Test Results

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:



Side 1. Sample ID: B-K-9-7 Void content (%):



Side 2. Sample ID: B-K-14-16 Void content (%):

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

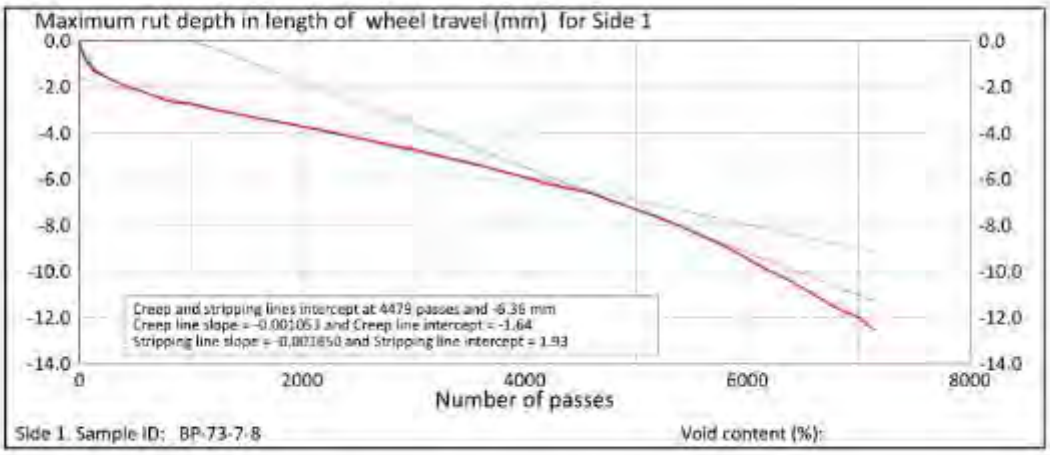
Mix type:
Asphalt grade:
Mix source:
Test temperature (°C): 50.0
Mix depth (mm): 60.0

Signature .....

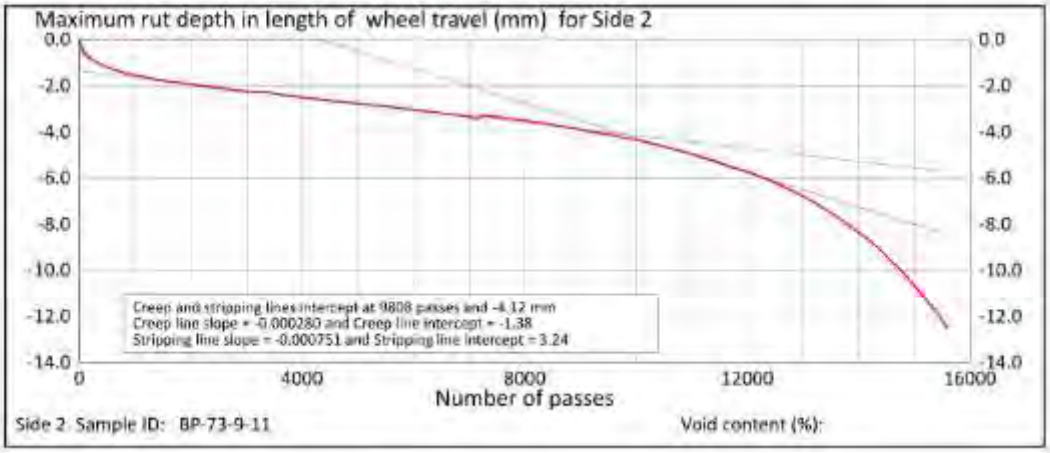
Hamburg Wheel-Tracker Test Results

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

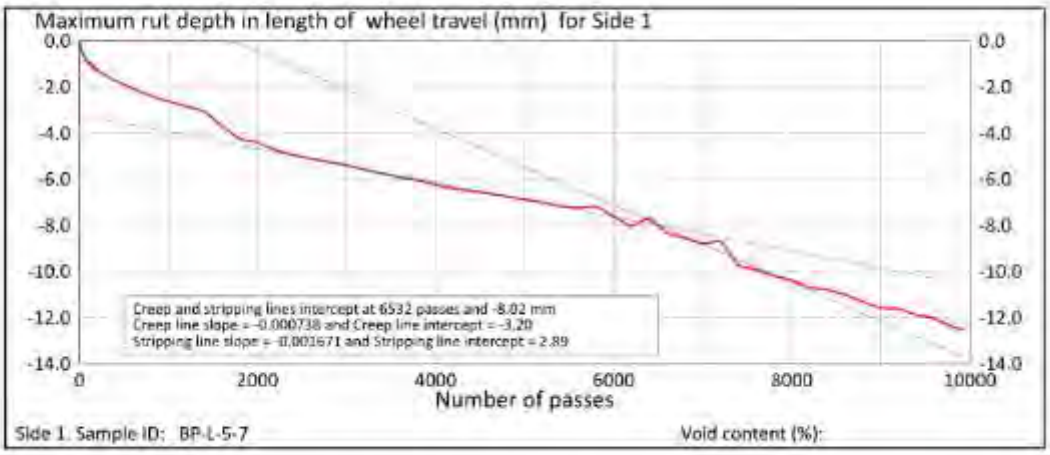
Mix type:
Asphalt grade:
Mix source:
Test temperature (°C): 50.0
Mix depth (mm): 60.0

Signature .....

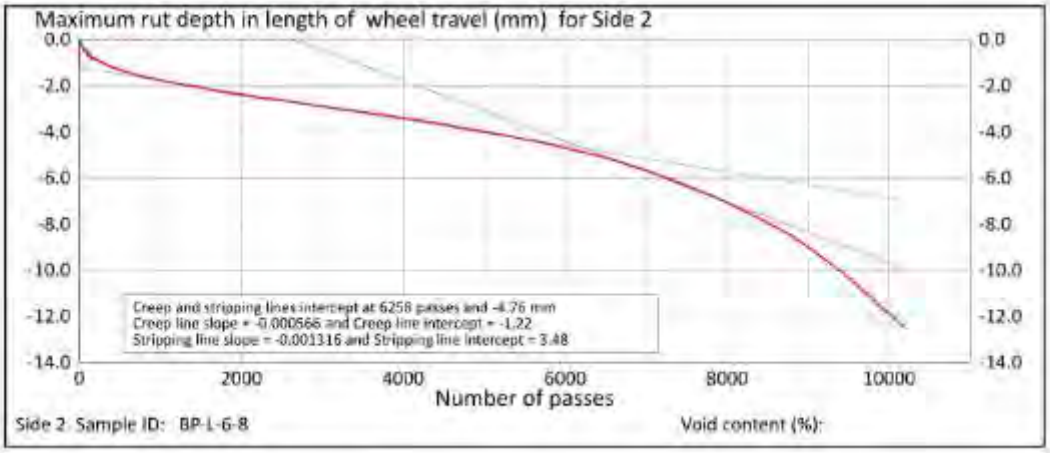
Hamburg Wheel-Tracker Test Results

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

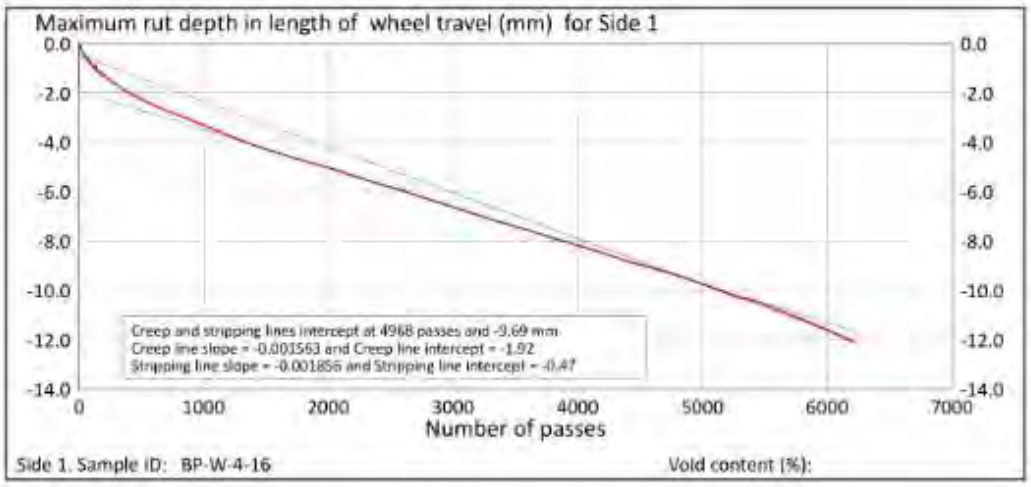
Mix type:
Asphalt grade:
Mix source:
Test temperature (°C): 50.0
Mix depth (mm): 60.0

Signature .....

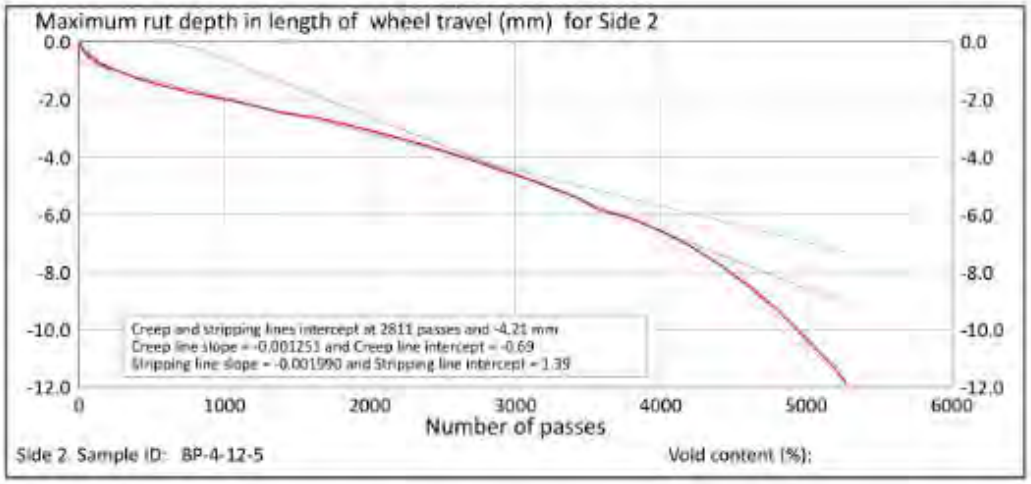
Hamburg Wheel-Tracker Test Results

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	

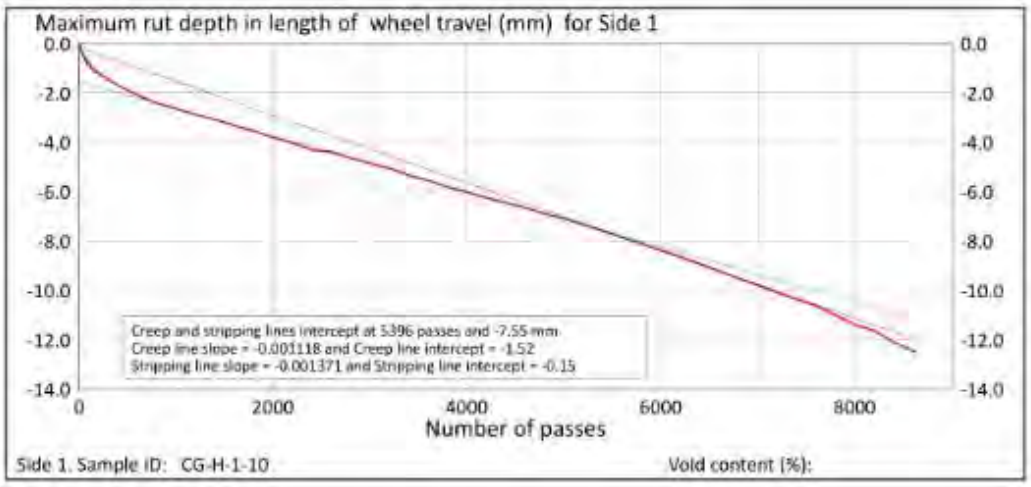
Mix type:
Asphalt grade:
Mix source:
Test temperature (°C): 50.0
Mix depth (mm): 60.0

Signature .....

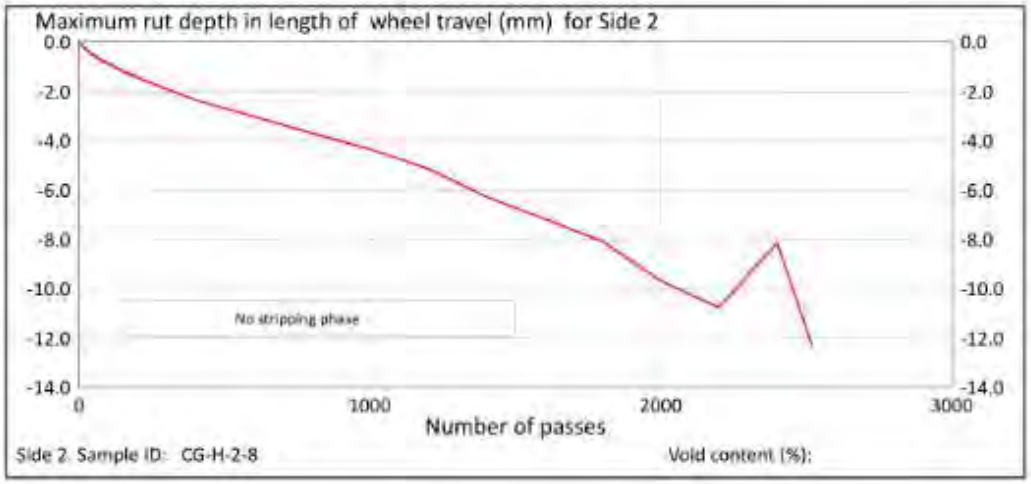
Hamburg Wheel-Tracker Test Results

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	

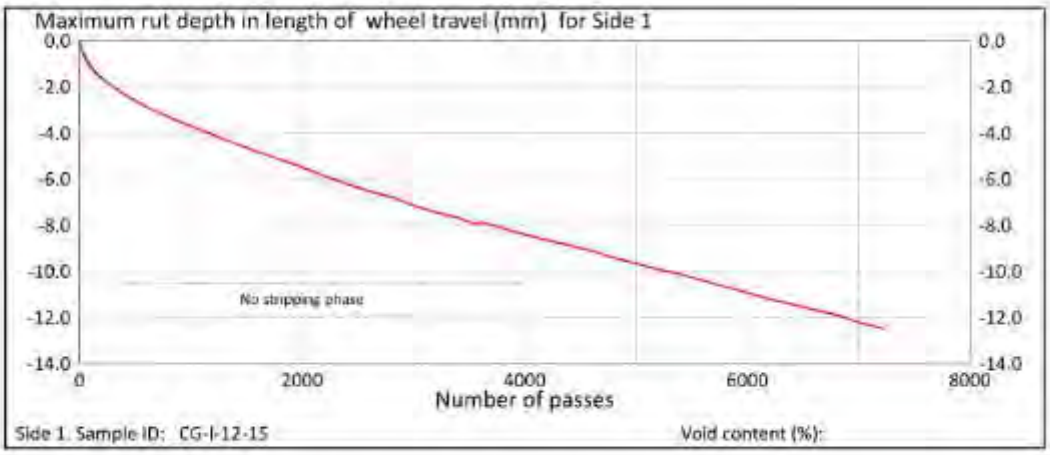
Mix type:
Asphalt grade:
Mix source:
Test temperature (°C): 50.0
Mix depth (mm): 60.0

Signature .....

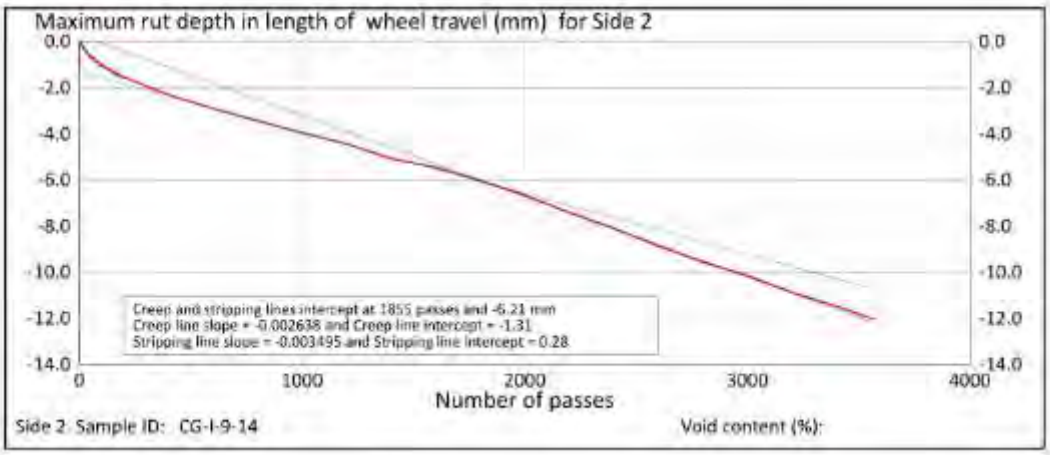
Hamburg Wheel-Tracker Test Results

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	

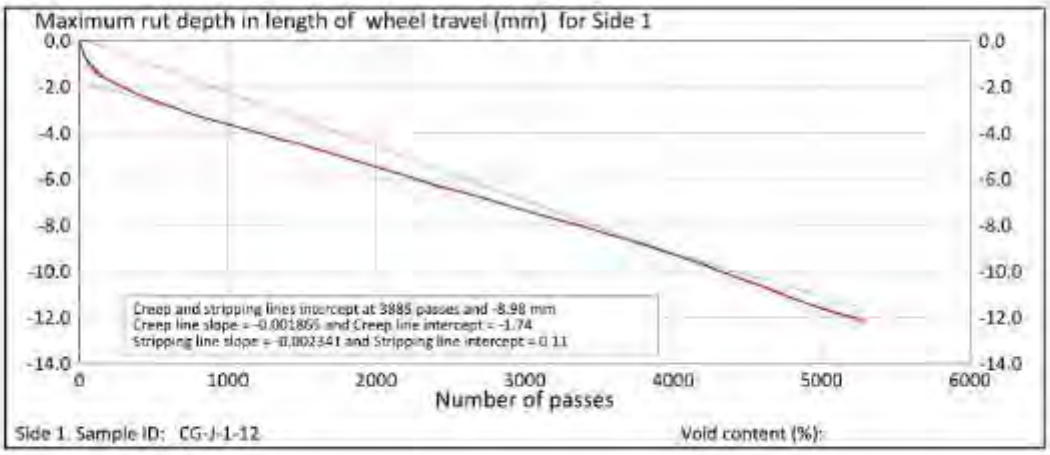
Mix type:
Asphalt grade:
Mix source:
Test temperature (°C): 50.0
Mix depth (mm): 60.0

Signature .....

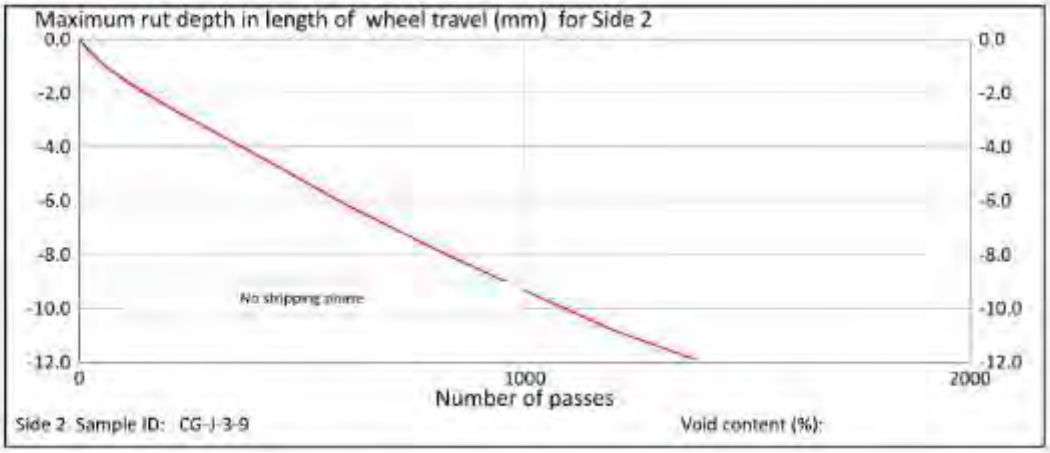
Hamburg Wheel-Tracker Test Results

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	

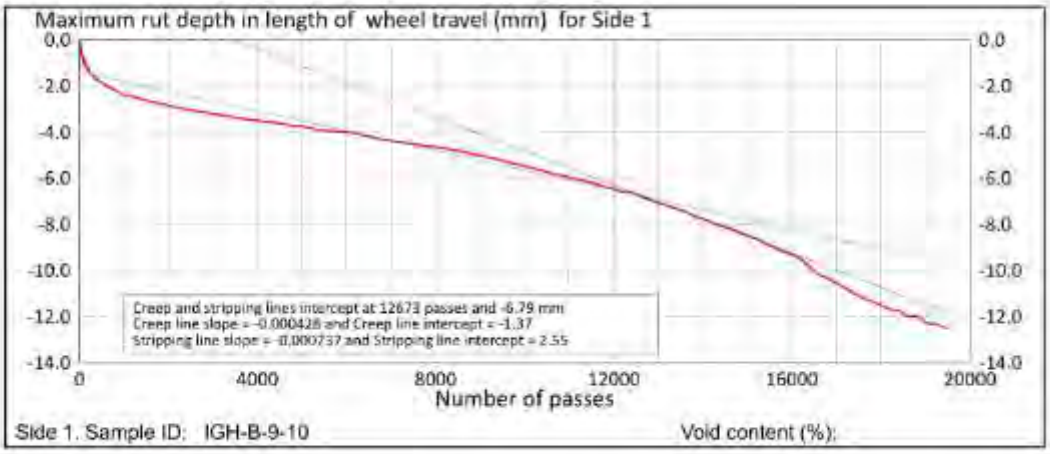
Mix type:
Asphalt grade:
Mix source:
Test temperature (°C): 50.0
Mix depth (mm): 60.0

Signature .....

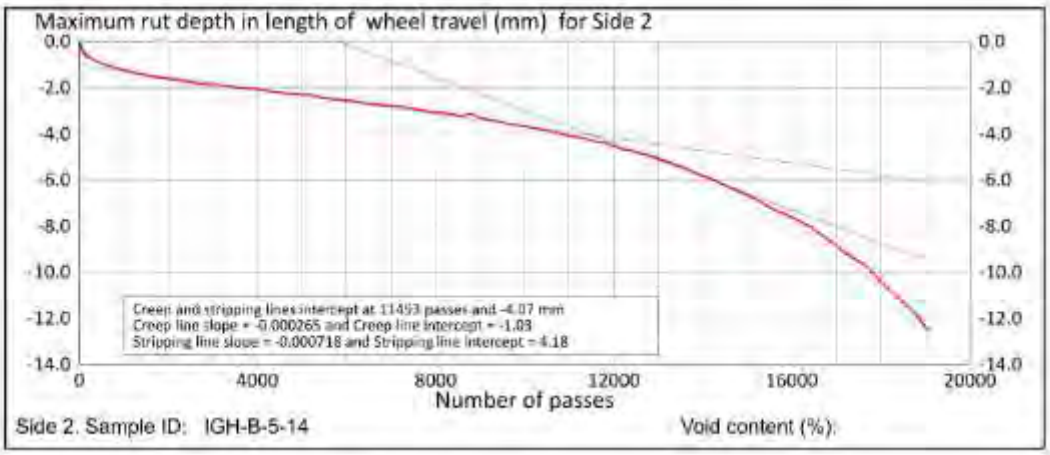
Hamburg Wheel-Tracker Test Results

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	

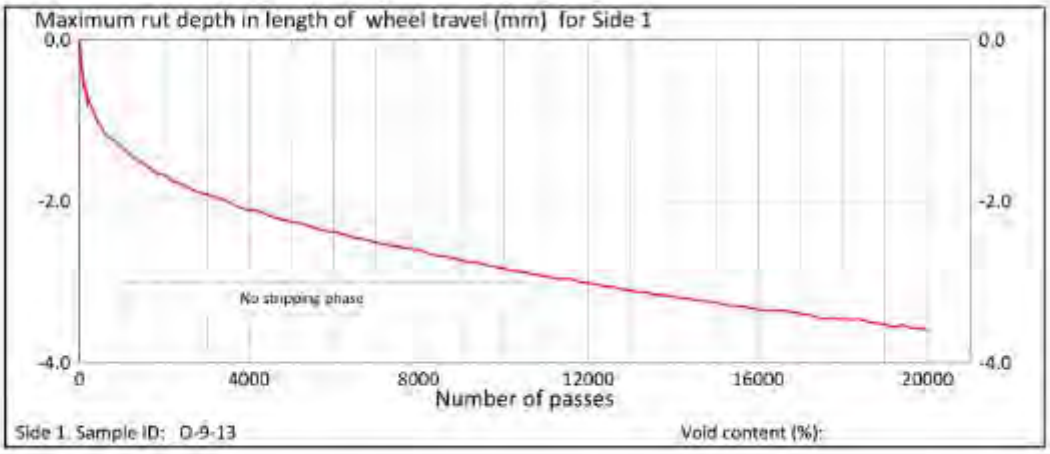
Mix type:
Asphalt grade:
Mix source:
Test temperature (°C): 45.0
Mix depth (mm): 60.0

Signature .....

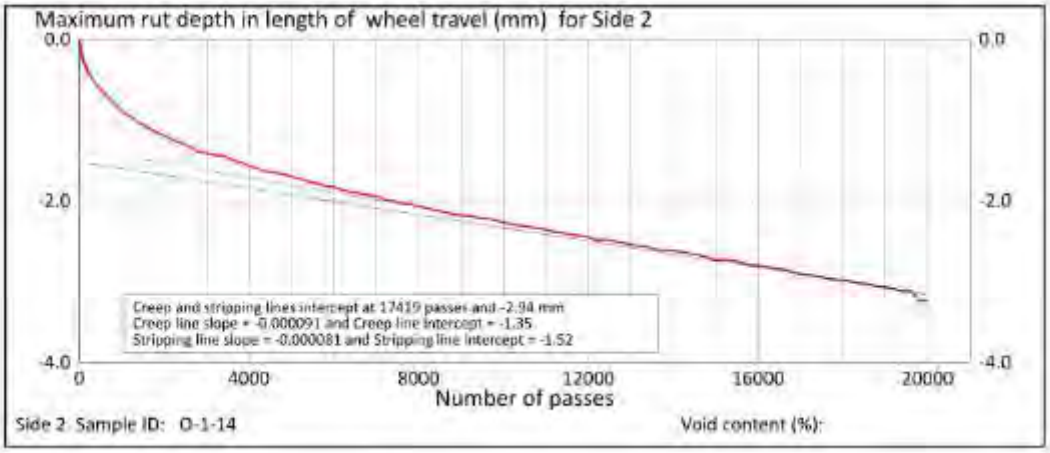
Hamburg Wheel-Tracker Test Results

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

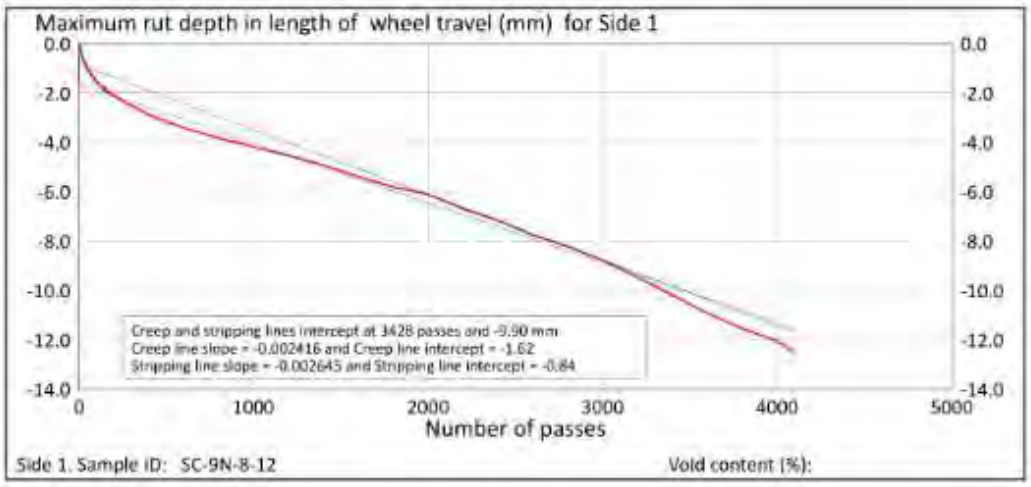
Mix type:
Asphalt grade:
Mix source:
Test temperature (°C): 50.0
Mix depth (mm): 60.0

Signature .....

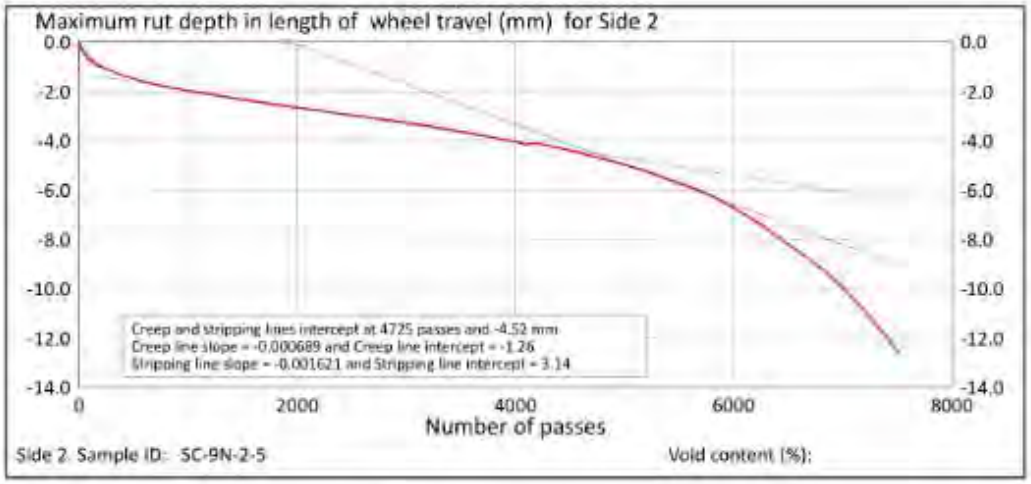
Hamburg Wheel-Tracker Test Results

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

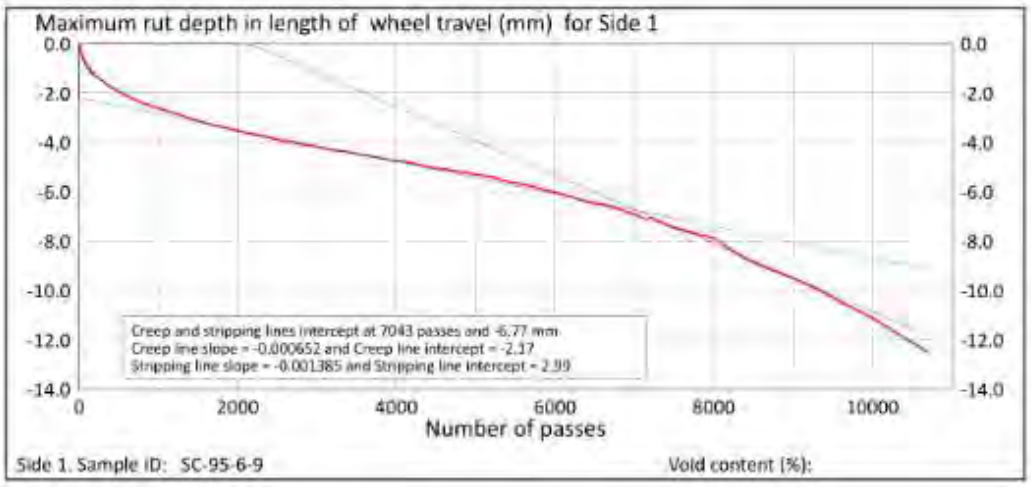
Mix type:
Asphalt grade:
Mix source:
Test temperature (°C): 50.0
Mix depth (mm): 60.0

Signature .....

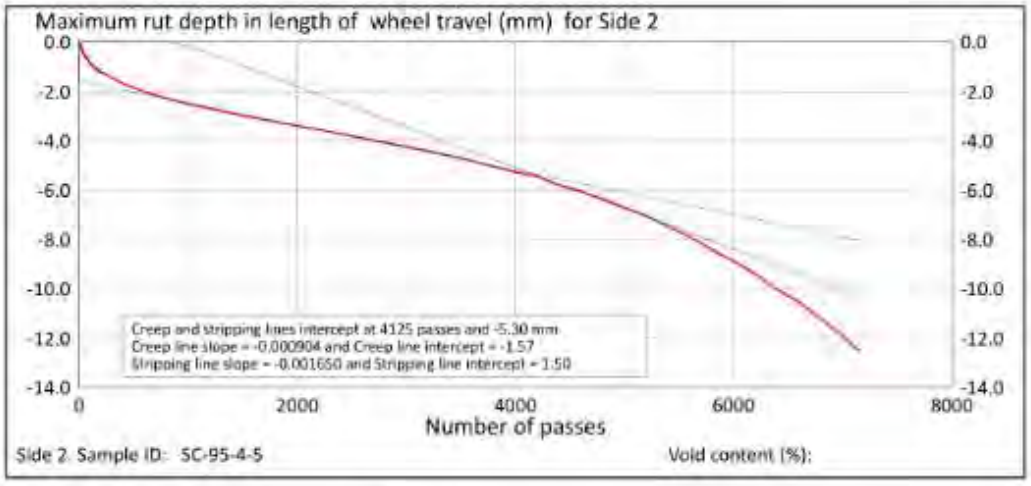
Hamburg Wheel-Tracker Test Results

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	

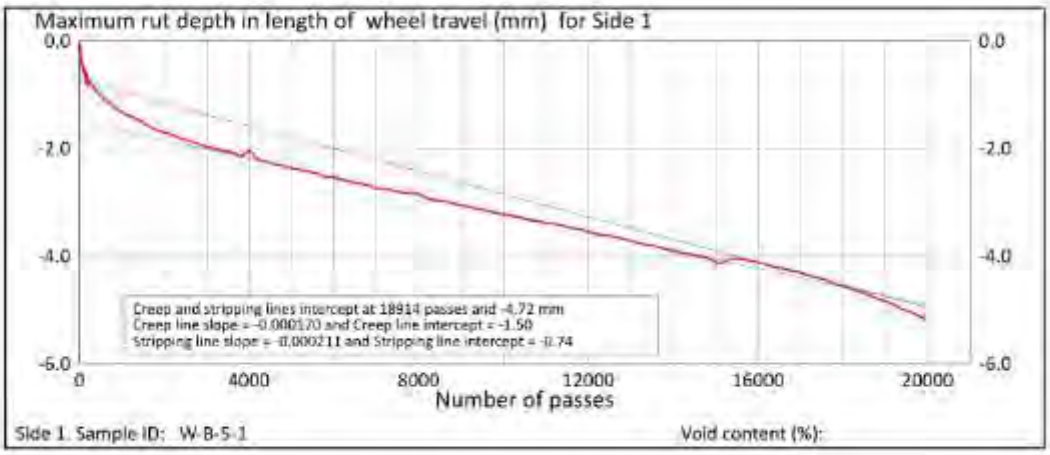
Mix type:
Asphalt grade:
Mix source:
Test temperature (°C): 50.0
Mix depth (mm): 60.0

Signature .....

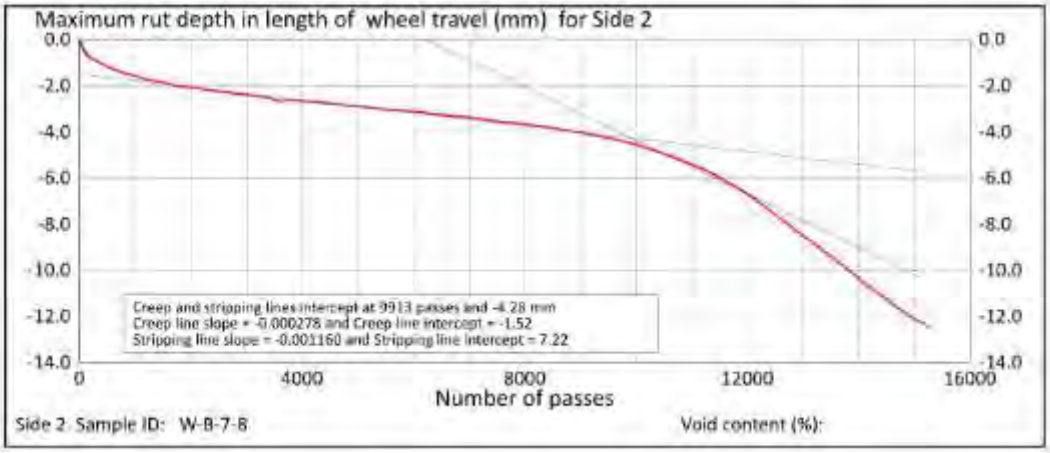
Hamburg Wheel-Tracker Test Results

AASHTO 324 (Modified)
Date/time of test: 12/18/2014 7:09 Af
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

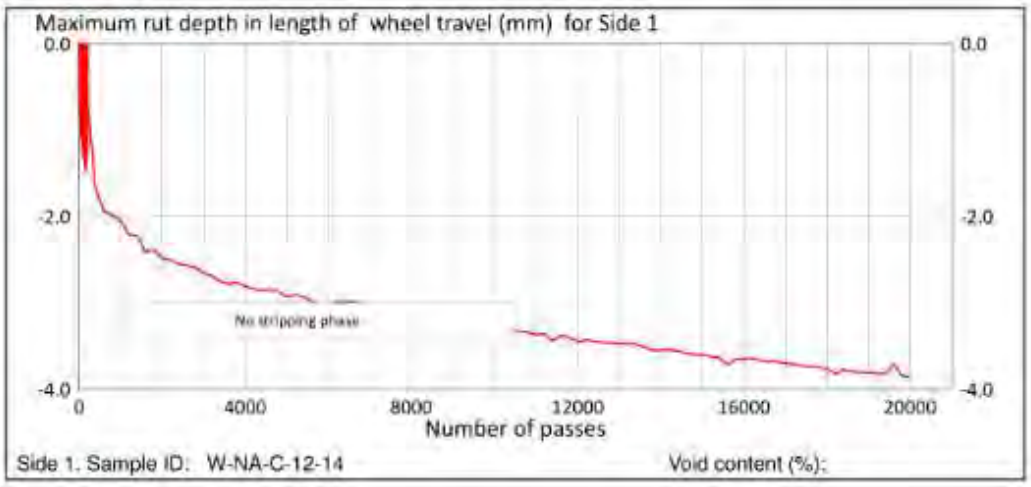
Mix type:
Asphalt grade:
Mix source:
Test temperature (°C): 50.0
Mix depth (mm): 60.0

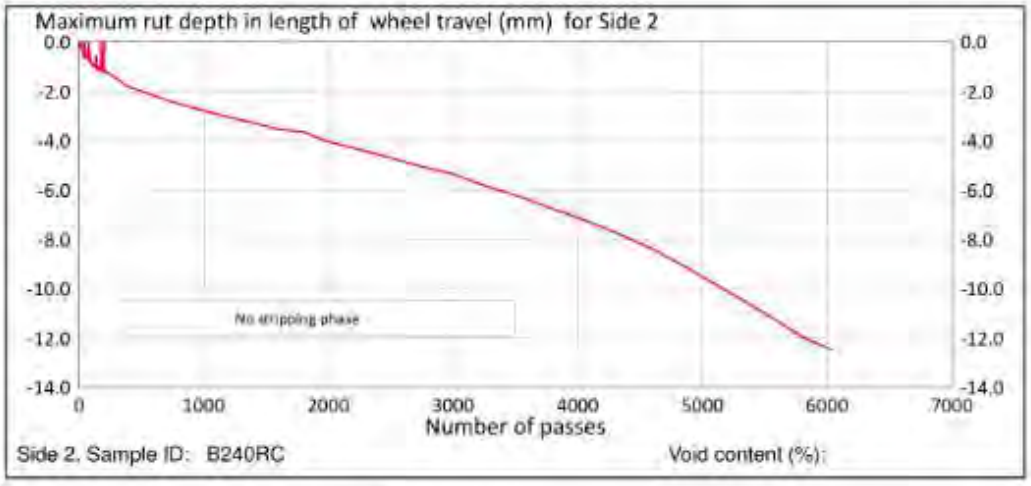
Signature .....

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

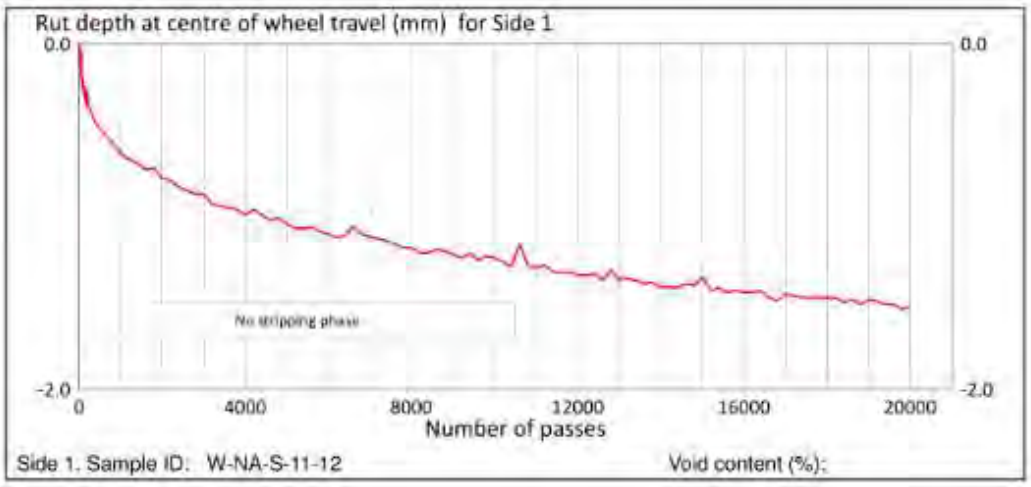
Mix type:
Asphalt grade:
HMA Production: Field
Compaction method: SGC
Mix source:
Test temperature (°C): 45.0
Mix depth (mm): 60.0

Signature .....

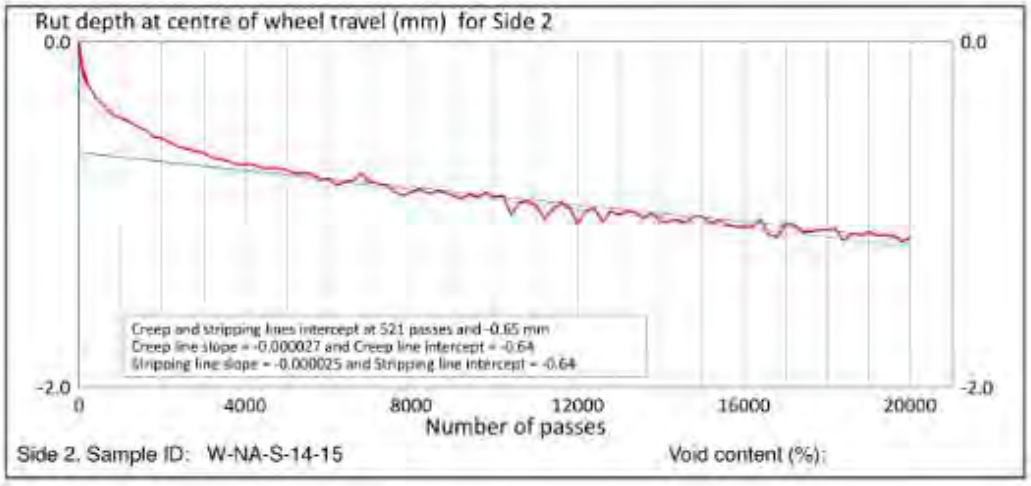
Hamburg Wheel-Tracker Test Results

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

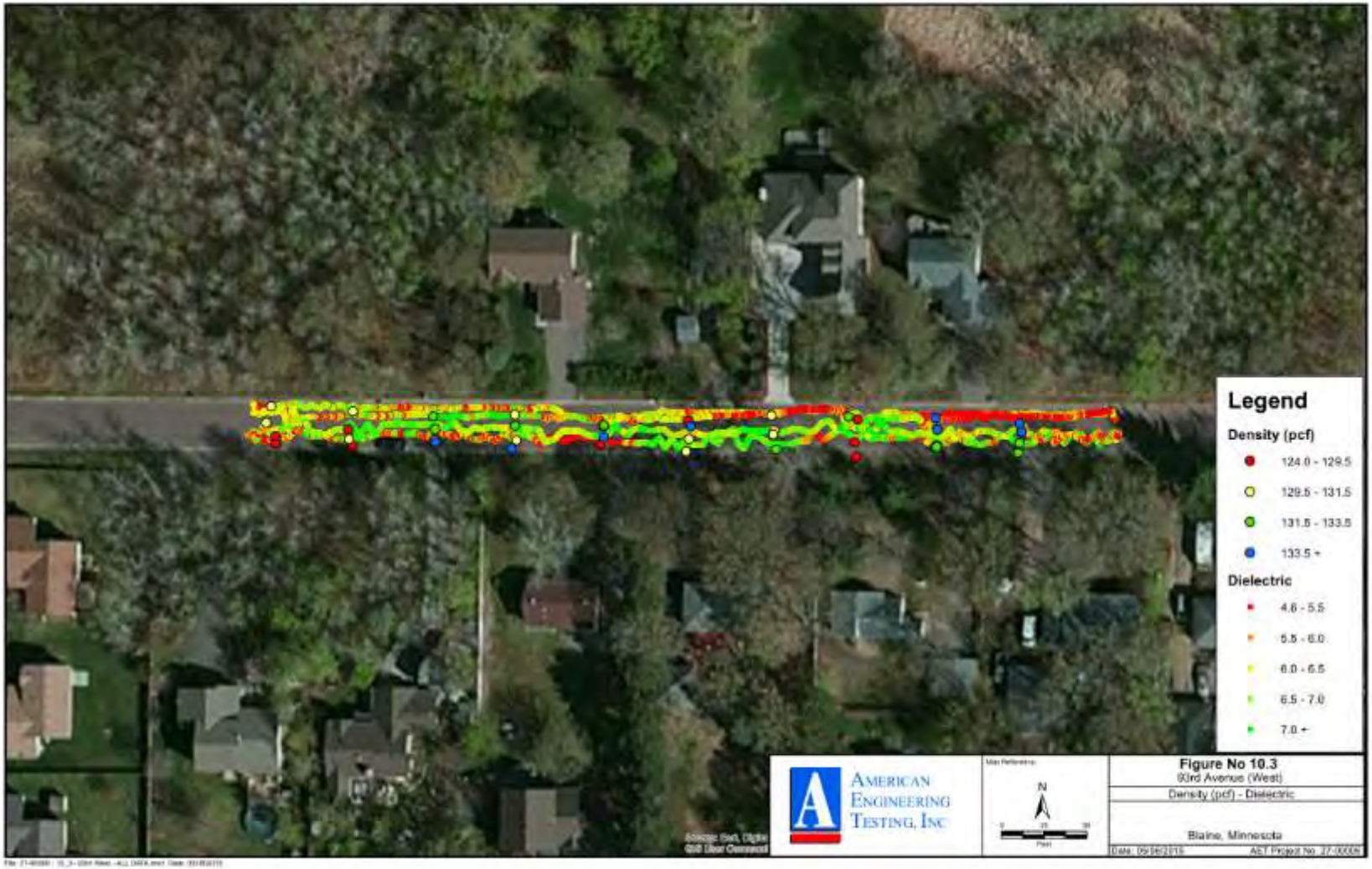

Legend
Density (pcf)
135.0 - 140.0
140.0 - 145.0
145.0 - 150.0
150.0 +
GPR Dielectric
4.0 - 5.5
5.5 - 6.3
6.3 - 7.1
7.1 - 8.7
8.7+
AMERICAN ENGINEERING TESTING, INC
N
Figure No 5.3
Bridgewater
Density (pcf) - Dielectric
Woodbury, Minnesota


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
N
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
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 +
American Engineering Testing, Inc
N
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

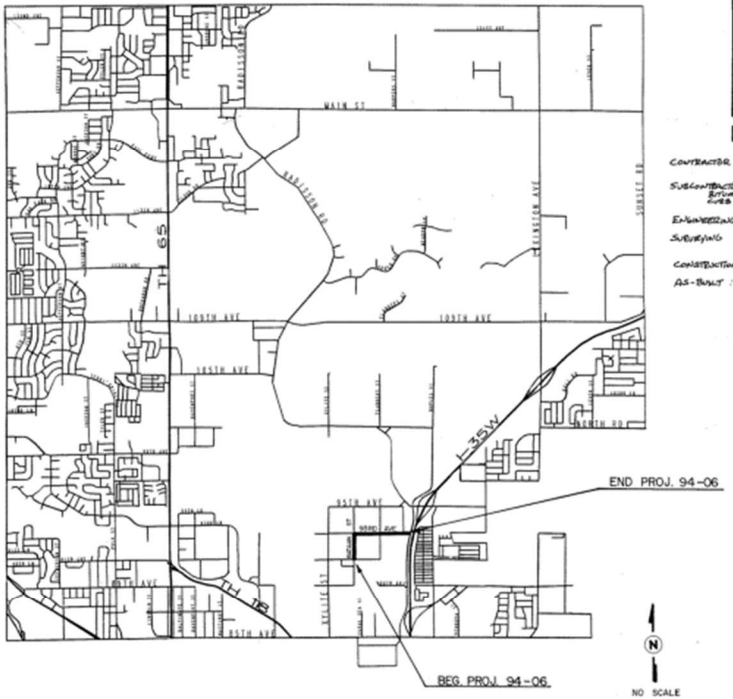
LEGEND

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.

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.



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 PLAN DESIGN SHALL BE IN ACCORDANCE WITH THE 2011 MINNESOTA MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES INCLUDING APPENDIX B, DATED NOVEMBER 2012

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

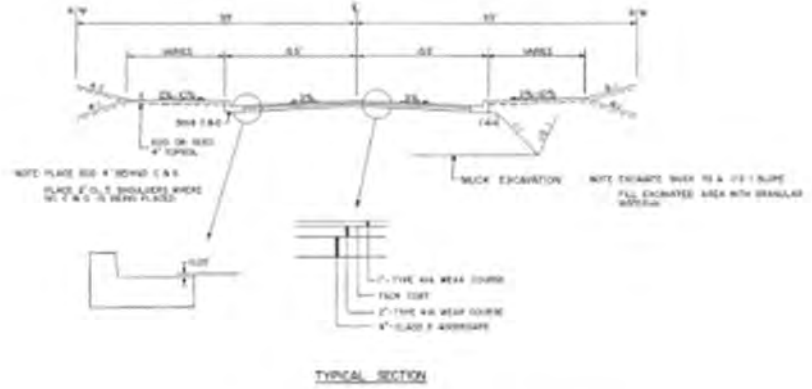
CLASS 5 FOR DRIVEWAYS = XXX TONS

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 (0.679) FOR NORMAL GRADING EV TO CV

ENGINEERING DEPARTMENT
9150 Central Ave. N.E. Blaine, Minnesota 55434
Phone (612) 784-6700

DATE | REVISION

PROJECT NO. 04-06
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-FOOT)
- STREET SIGN
- POWER POLE, 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
- 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

INDEX TO PLANS

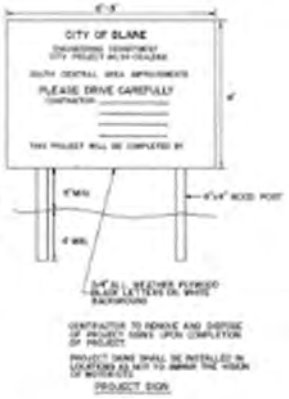
SHEET	DRAWING NO.
TITLE SHEET	1
TYPICAL SECTION, SIGNING, NOTES AND TEMPORARY MAILBOXES	2
DETAILS	3-7
SANITARY SEWER AND WATERMAIN	8-10
STREET AND STORM SEWER	11-13
DITCH CLEANING	14
X-SECTIONS	15-21

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 (2)

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 PLAN REVISION SHALL BE IN ACCORDANCE WITH THE 2001 MINNESOTA MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES INCLUDING APPENDIX B, DATED NOVEMBER 2002.

EXISTING SIGNING SHALL REMAIN IN PLACE UNTIL NEW SIGNING 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 TREES 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.

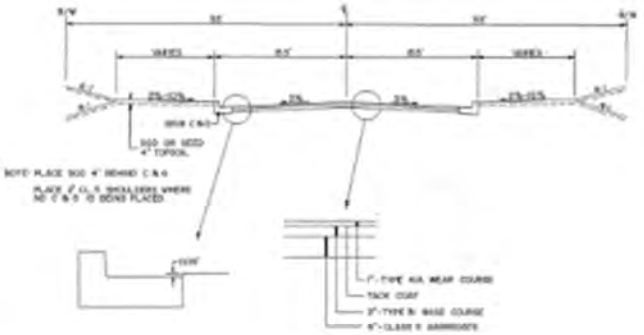
SANITARY, WATERMAIN & STORM SEWER

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.

PLUGS FOR STORM SEWER ARE INCIDENTAL.

STORM SEWER LENGTHS SHOWN DO NOT INCLUDE APRON LENGTHS. APRONS TAKE SEPARATELY.



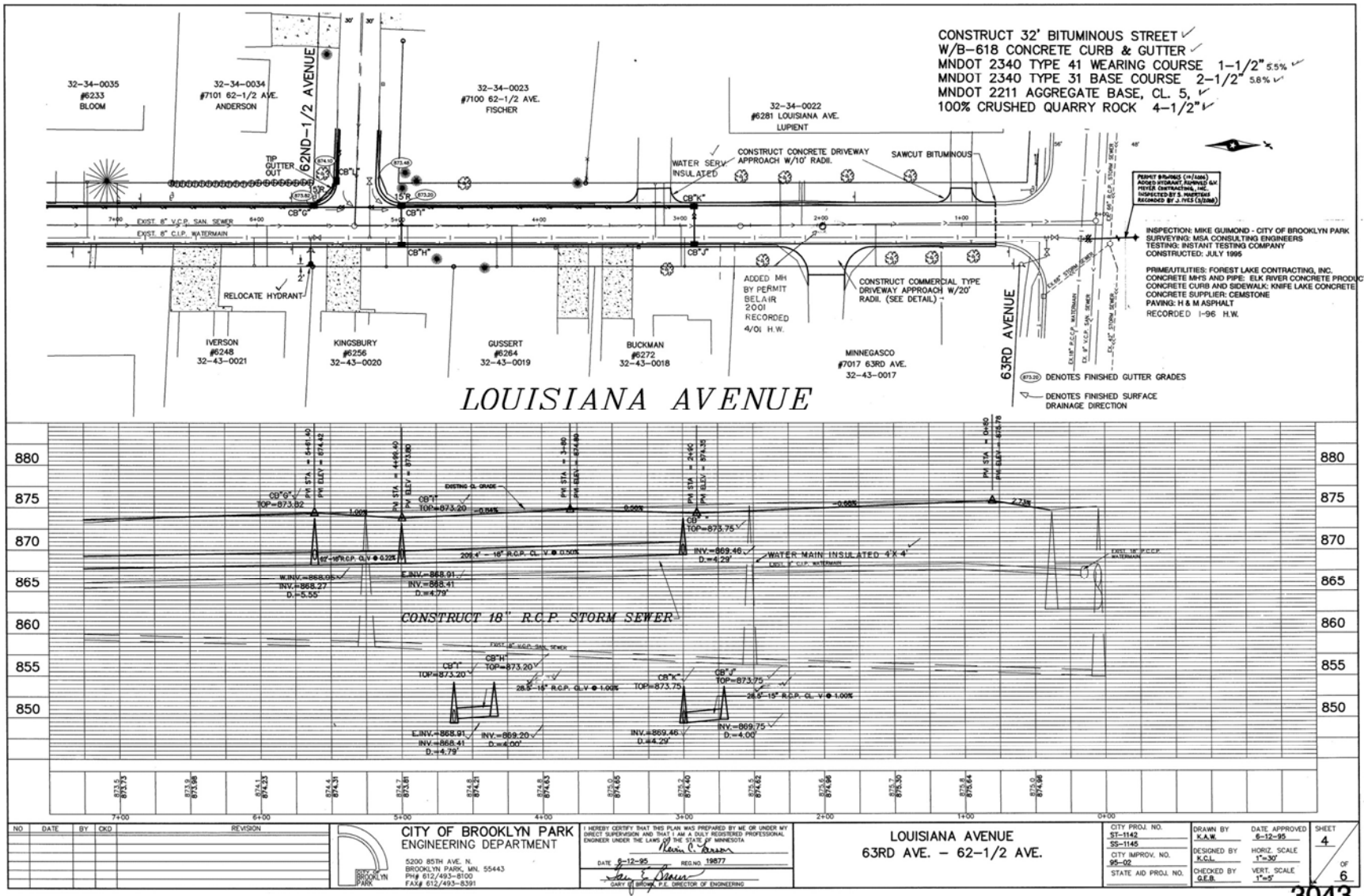
TYPICAL SECTION

EARTHWORK SUMMARY



NOTE: USE SHRINKAGE FACTOR OF 15% FOR NORMAL GRADING 1:1 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

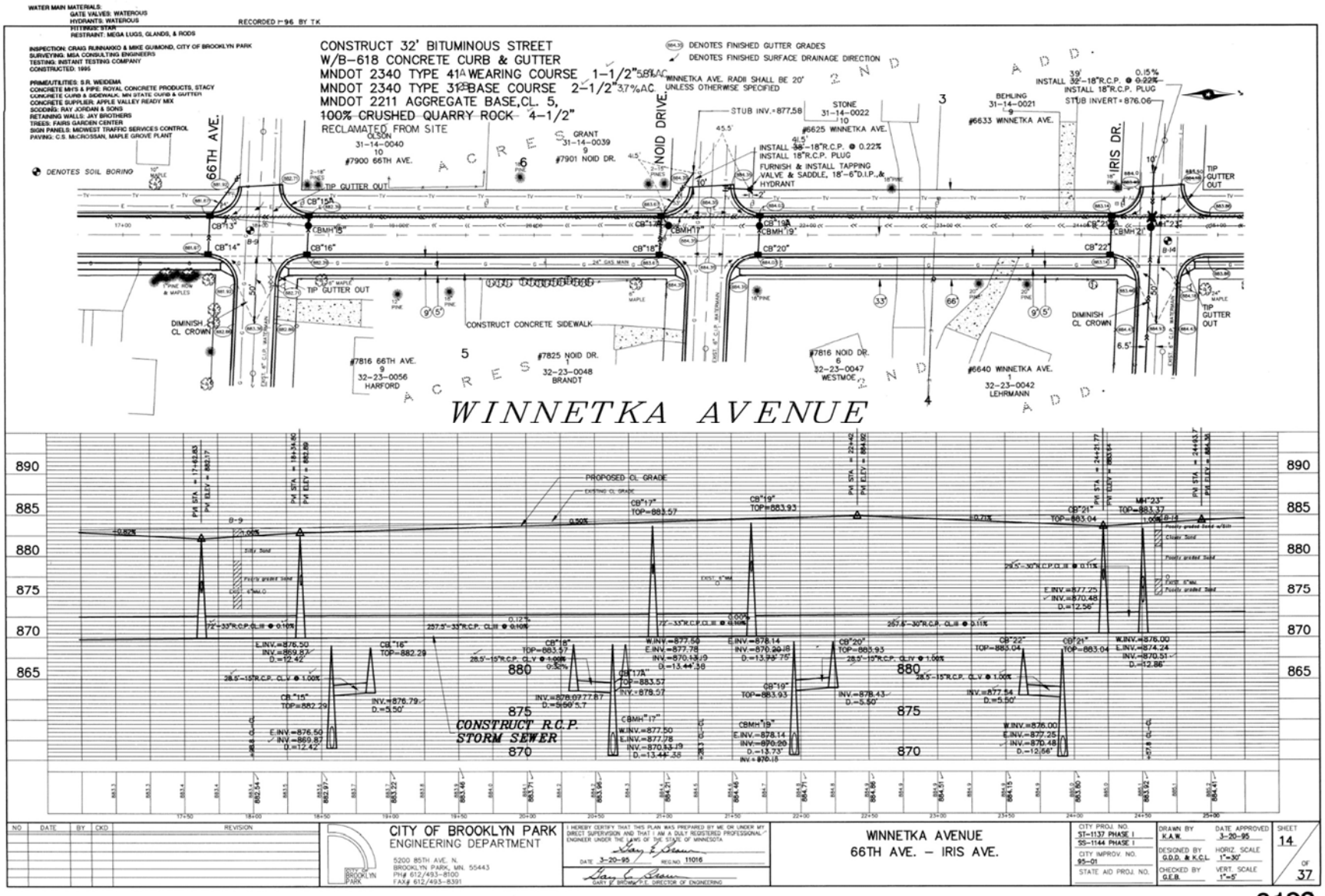
CITY OF BROOKLYN PARK
ENGINEERING DEPARTMENT
5200 85TH AVE. N.
BROOKLYN PARK, MN. 55443
PH# 612/493-8100
FAX# 612/493-8391

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. ST-1142 SS-1145	DRAWN BY K.A.W.	DATE APPROVED 6-12-95	SHEET 4 OF 6
CITY IMPROV. NO. 95-02	DESIGNED BY K.C.L.	HORIZ. SCALE 1"=30'	
STATE AID PROJ. NO.	CHECKED BY G.E.B.	VERT. SCALE 1"=5'	

3043



NO	DATE	BY	CKD	REVISION

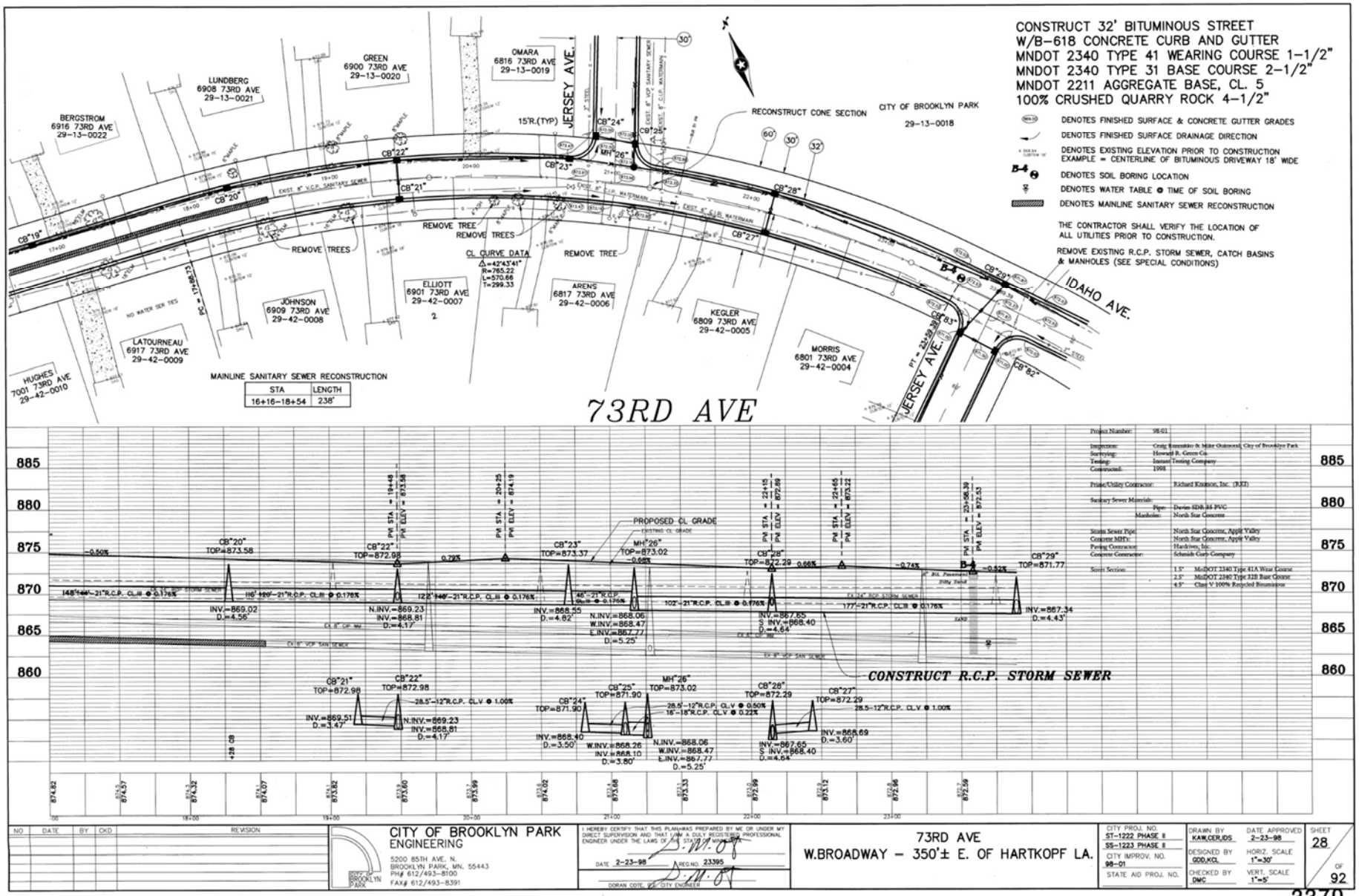
CITY OF BROOKLYN PARK
ENGINEERING DEPARTMENT
5200 85TH AVE. N.
BROOKLYN PARK, MN. 55443
PH# 612/493-8100
FAX# 612/493-8391

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
Gary E. Braun
DATE 3-20-95 REG.NO. 11016
Gary E. Braun
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
EXISTING 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-7/947	Severe throughout project
1965 Street, Recon	05-10	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	05-10	McNamara Contracting Inc	McNamara Contracting Inc	2 (MnDOT 2350 MV-3 (B)	8/31/2005	Light along joint - long term severity?




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 USAH 5 BETWEEN 100 West SOUTH OF USAH 15 AND NORTH COUNTY LINE (Geographic Description)

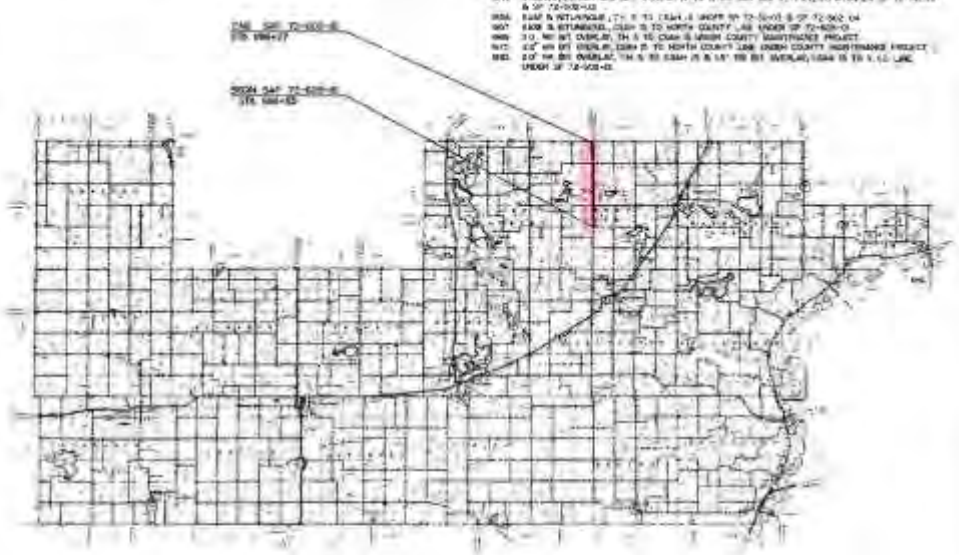
FROM S.W. COR. SEC. 28, T.114N., R27W TO NW. COR. SEC. 6, T.111N., R27W. (Legal Description)

STATE AID PROJ. NO. 72-020-18 STATE AID PROJ. NO.

GROSS LENGTH	2,072	FEET	.39	MILES	
BRIDGES LENGTH		FEET		MILES	
EXCEPTIONS LENGTH		FEET		MILES	
NET LENGTH	2,072	FEET	.39	MILES	

GROSS LENGTH		FEET	MILES
BRIDGES LENGTH		FEET	MILES
EXCEPTIONS LENGTH		FEET	MILES
NET LENGTH		FEET	MILES

NOTE



MNRR PROJ. NO.
MNRR 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	'C' 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 65 MPH
Based on Stopping Sight Distance
Height of eye 3.5 Height of object .05
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 7-1-91 REG. NO. 3018 ENGR. Graeme A. Huffman

COUNTY SIBLEY

Recommended for Approval _____ 19__

Recommended for Approval Mel Hunter 4/26 1991

Recommended for Approval _____ 19__

Approved 5-9 1991

DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION
APPROVED
_____

STATE A/D PROJ. NO. 72-020-18
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:\PublicWorks\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



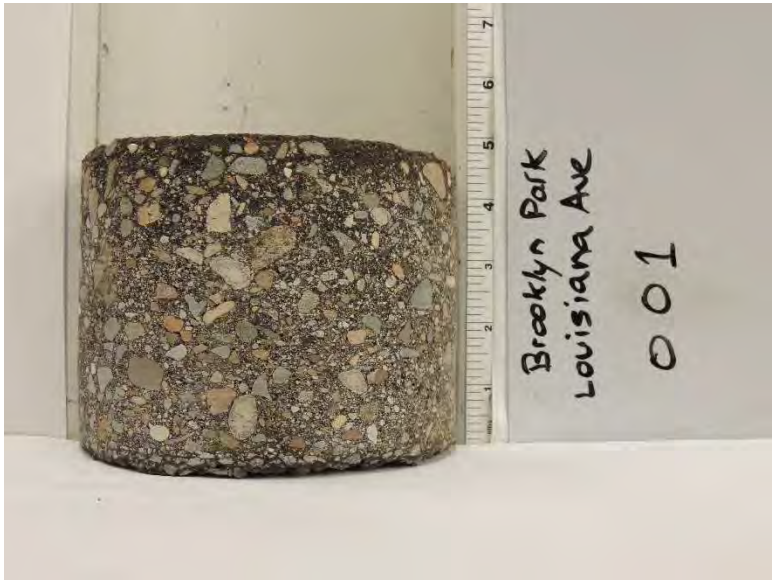


Figure I-4. Coring operations and sample core extracted from Louisiana Avenue in Brooklyn Park





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



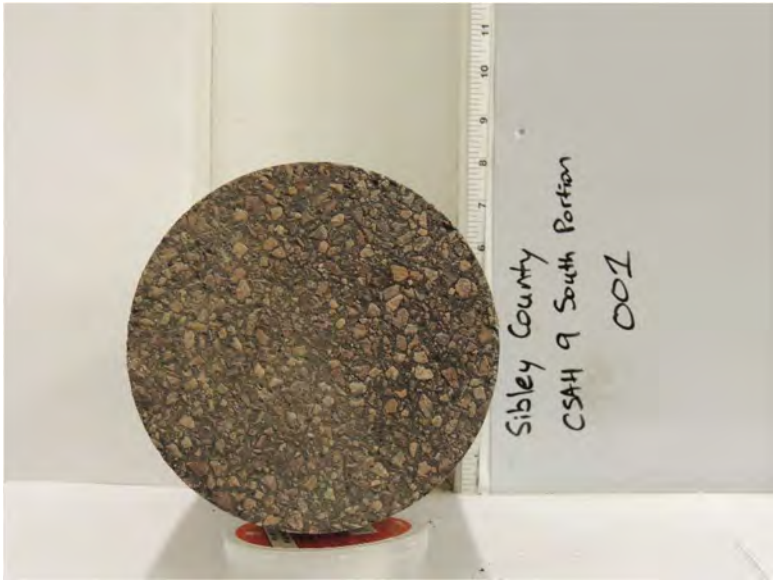


Figure I-15. Coring operations and sample core extracted from the south part of CSAH 9 in Sibley County, MN



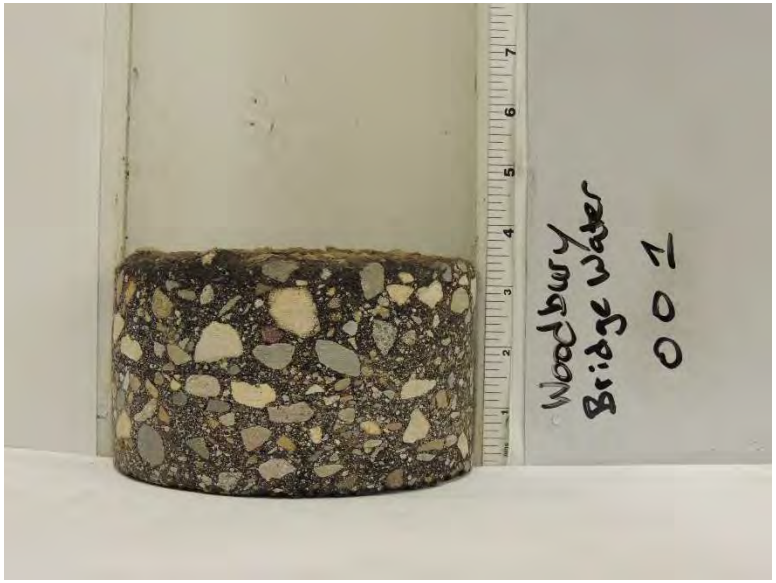


Figure I-16. Coring operations and sample core extracted from Bridgewater Road in Woodbury, MN





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

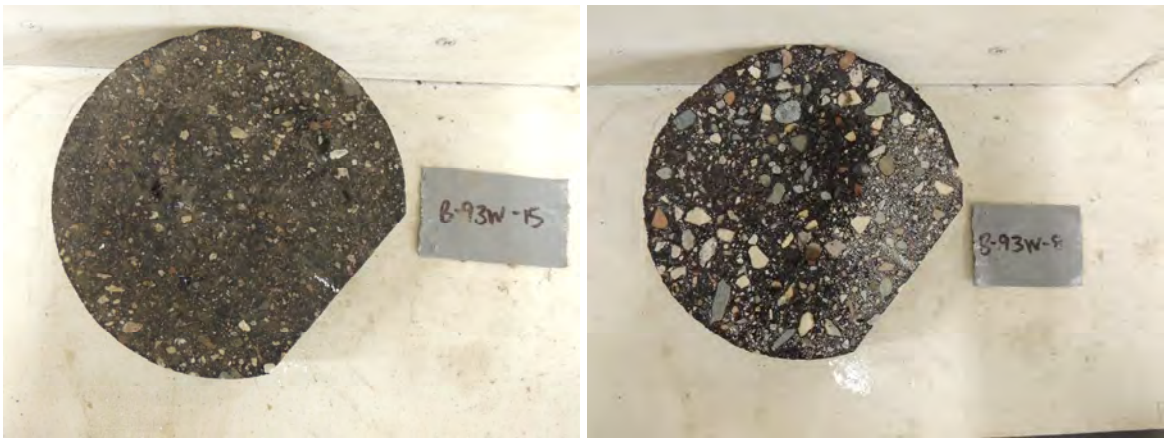


Figure J-2. Specimen from the west end of 93rd Avenue in Blaine, MN, before Hamburg test



Figure J-3. Specimen from 73rd Avenue in Brooklyn Park, MN, after Hamburg test

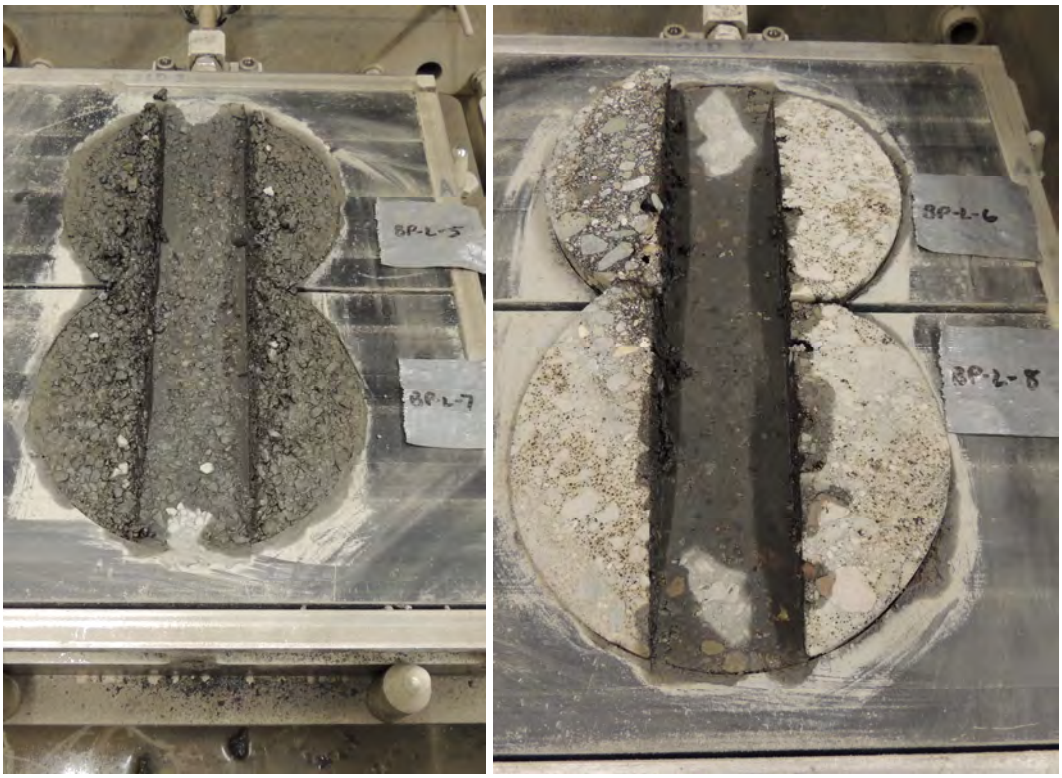


Figure J-4. Paired specimens from Louisiana Avenue in Brooklyn Park, MN, after Hamburg test



Figure J-5. Paired specimens from 134th Avenue in Burnsville, MN, before Hamburg test

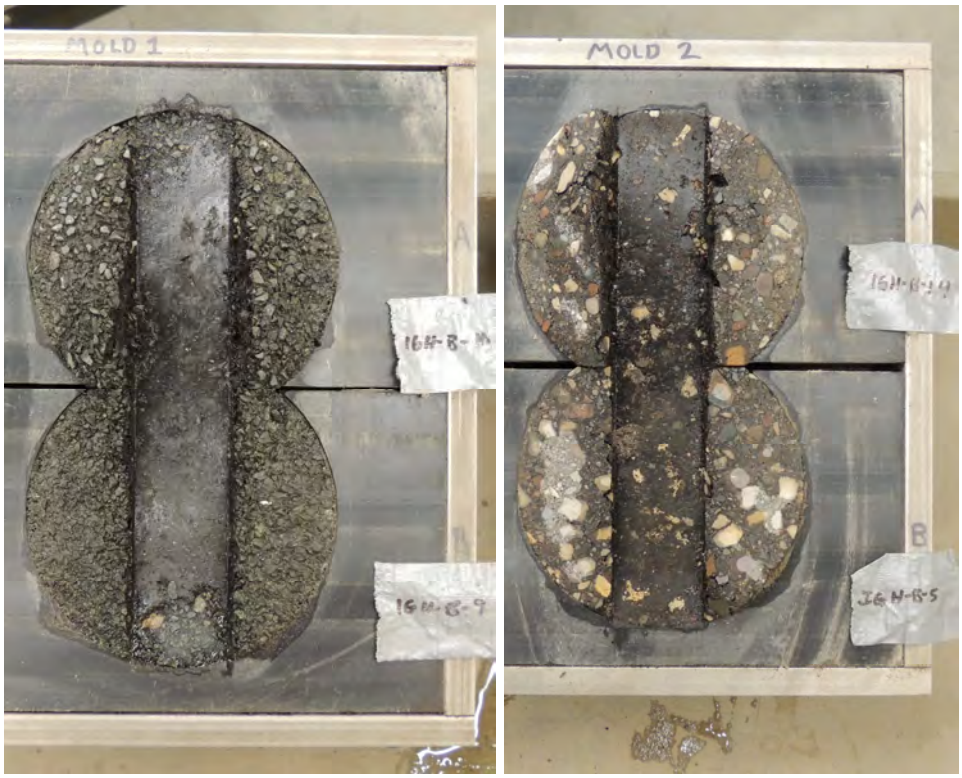


Figure J-6. Paired specimen from Brooks Blvd in Inver Grove Heights, MN, after Hamburg test

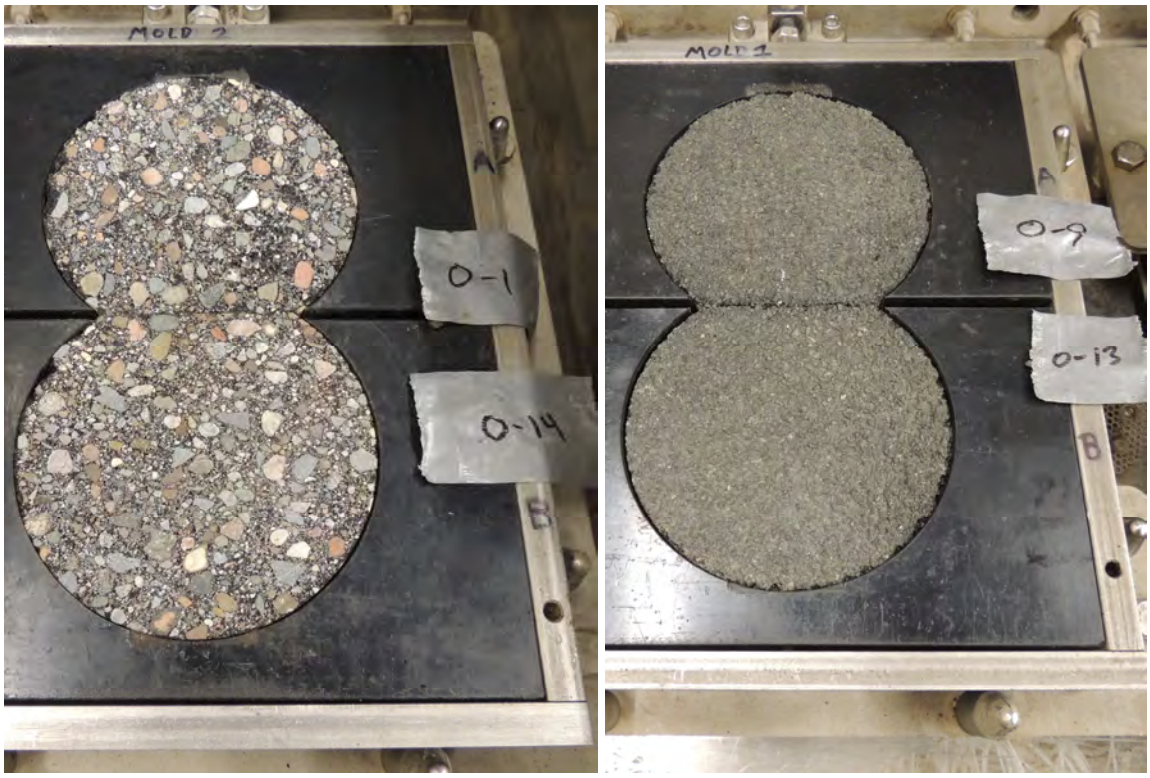


Figure J-7. Paired specimens from Osseo, MN, before Hamburg test

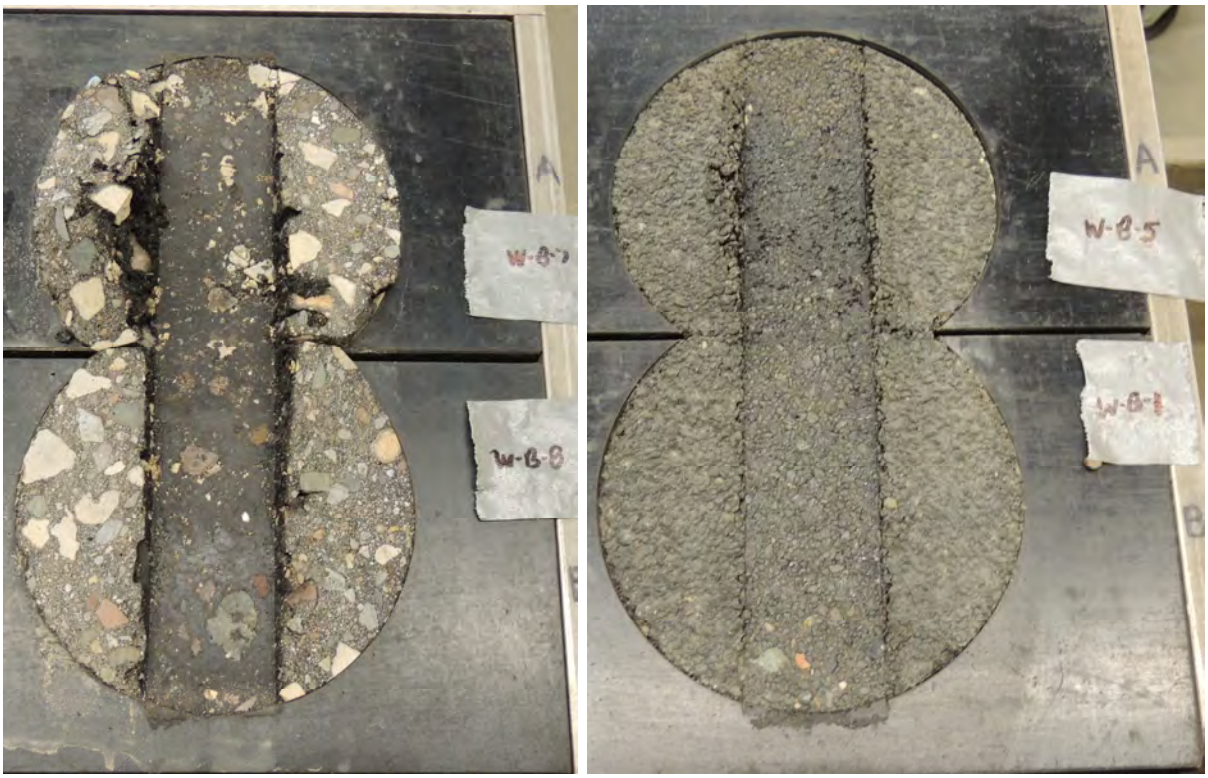


Figure J-8. Paired specimens from Bridgewater Road in Woodbury, MN, after Hamburg test

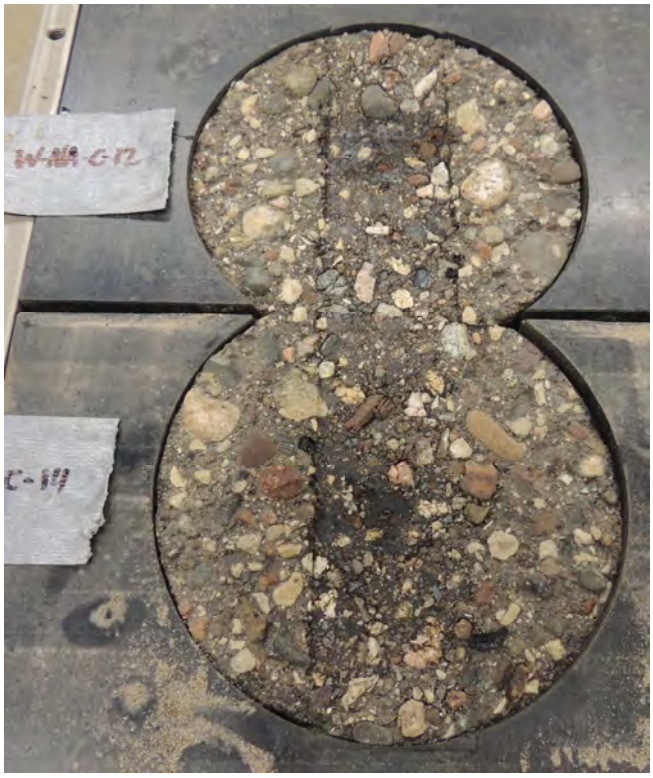


Figure J-9. Specimen without chip seal from Newbury Alcove Cul de Sac in Woodbury, MN, after Hamburg test

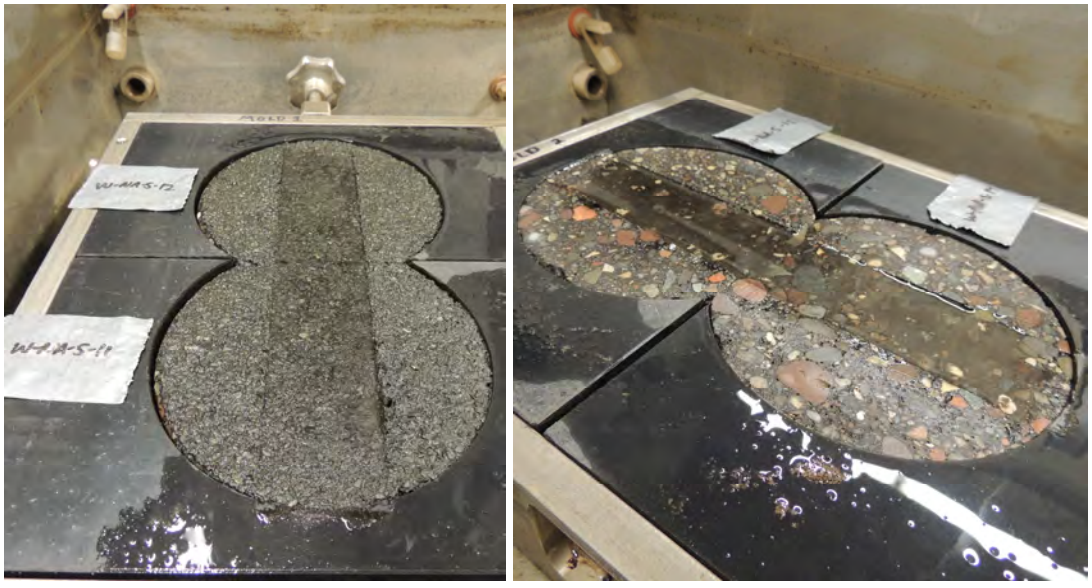


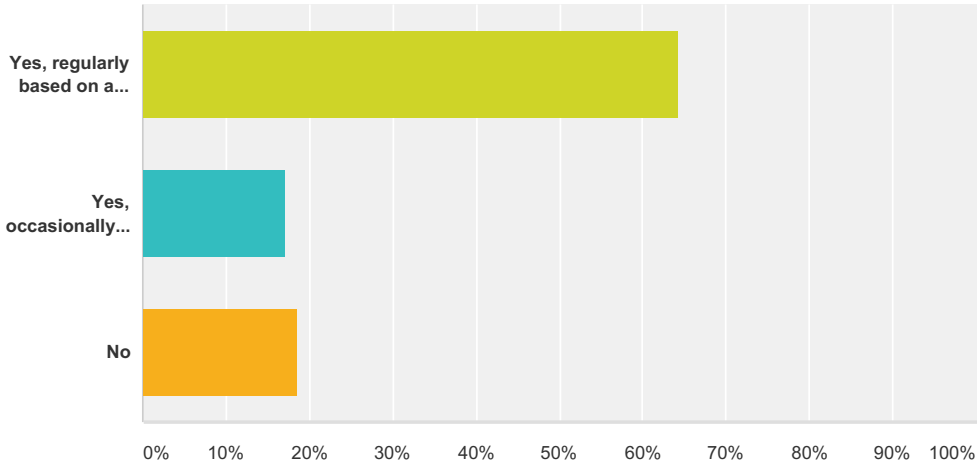
Figure J-10. Paired specimen from Newbury Alcove Straightaway in Woodbury, MN, after Hamburg test

APPENDIX K

CITY/COUNTY SURVEY AND RESPONSES

Q1 Are you currently using chipseals as part of your pavement maintenance program?

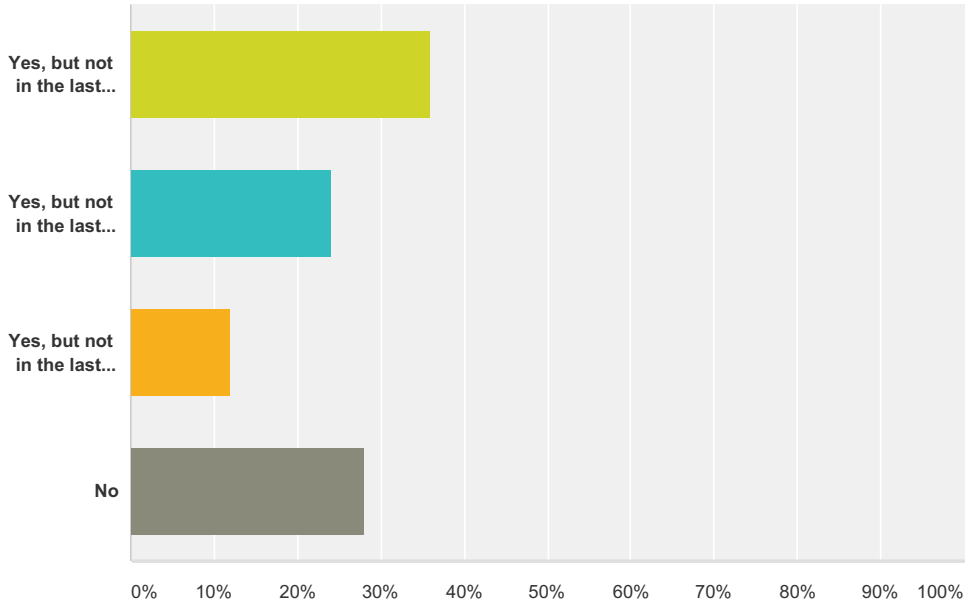
Answered: 129 Skipped: 0



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?

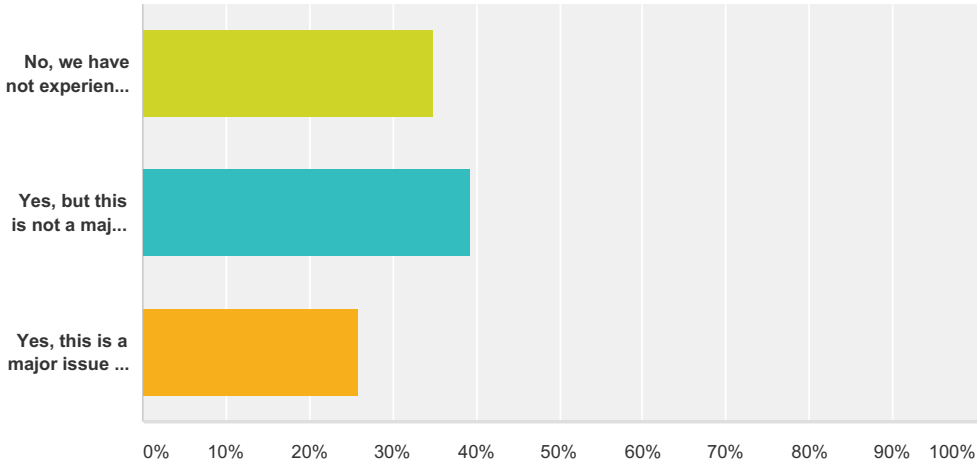
Answered: 25 Skipped: 104



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.

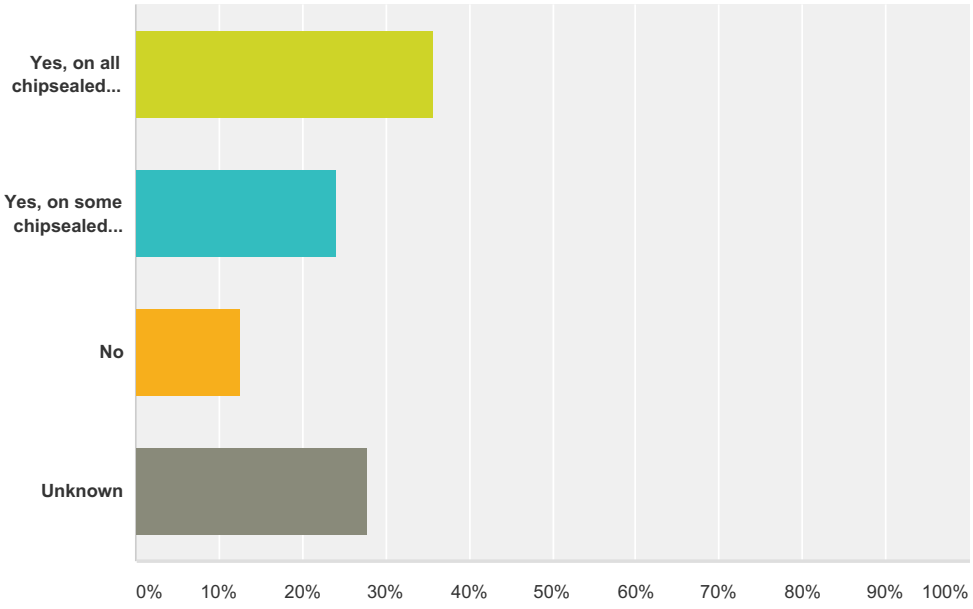
Answered: 112 Skipped: 17



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?

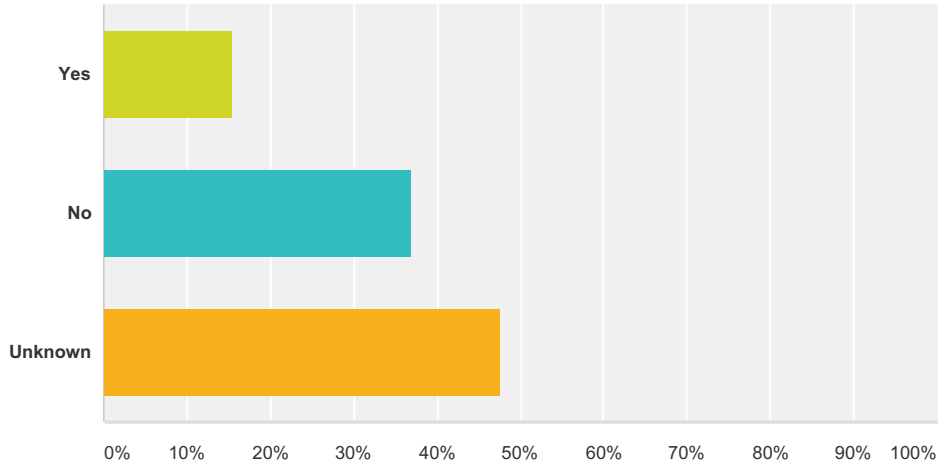
Answered: 51 Skipped: 78

#	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?

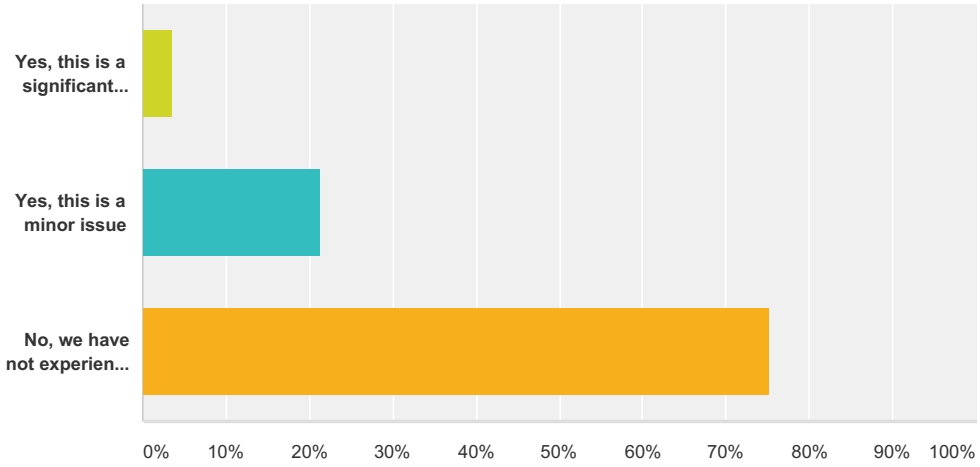
Answered: 65 Skipped: 64



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.


Dynamic Group




FOR LEASE


Sodium St
Radium St


Tungsten St
NO PARKING
ON
COLLECTOR
DRIVEWAYS

Bituminous Pavement Stripping Research Findings
City of Ramsey January 16, 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
  - Significant stripping issues since early 2010's
  - More input will be obtained January 17
- 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.

Public Works Committee **5. 3.**

Meeting Date: 01/21/2020

By: Bruce Westby, Engineering/Public Works

Title:

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

Background:

Pavement and Surface Evaluation Rating (PASER) values are assigned annually to all public street segments. Street segments with a PASER value between 3 and 6 indicates the segments may be good candidates for overlays. Overlays are typically completed every 20 years on bituminous pavement sections, until such time that the street needs to be reconstructed.

Overlay improvements increase the structural capacity of the pavement section, and help prevent stormwater runoff from infiltrating into the underlying aggregate base and subgrade sections. Overlays are one tool the City uses to cost-effectively maintain streets over their serviceable life, which when properly constructed is anticipated to be 60 years.

Attached is a figure showing the street segments proposed to receive overlay improvements in 2020 per the 2020 – 2029 Capital Improvement Program (CIP). The streets 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 are also being explored in more detail than was done to develop the Capital Improvement Program (CIP). A preliminary project schedule is also being developed within the Feasibility Report.

(This paragraph was modified January 17th) 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 after such time as their PASER ratings fall to a rating of 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.

The proposed improvements are designated as City Improvement Project #20-02, 2020 Overlay Improvements.

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

Observations/Alternatives:

Observations:
No ground penetrating radar or pavement coring data existed for these streets and Staff had intended to complete field reviews and to research as-built plans and other documentation to determine if any of the street segments had degraded to the point that mill and overlay improvements were no longer feasible, meaning the street required reconstruction instead.

While reviewing as-built plans it was determined that the existing pavement sections were generally constructed with less than 3½ inches of pavement, which makes it difficult to complete mill and overlay improvements. Staff therefore contacted WSB and Associates to order pavement corings along each street segment to verify pavement section thicknesses. The corings revealed that the bituminous pavement sections generally varied between 2 and 3 inches. This would make it difficult to complete a standard mill and overlay project. In addition, the corings revealed significant degradation of the pavement in most areas meaning the pavement structure was inadequate to support an overlay in most areas. Staff met with Mr. Thomas Wood from WSB on January 16th to discuss the pavement coring results and options for moving this project forward. Three options were generally identified as being feasible.

The first option would be to repair damaged curb and gutter and complete a variable-depth mill and paving project in 2020 by milling all existing pavements to full depth, then leveling, shaping and compacting the underlying aggregate base, then paving all streets with about 2½ -inches of new bituminous pavement. The cost for this option would be significantly more than a standard 2-inch mill and overlay, and the resulting anticipated pavement life would be roughly 25 years.

The second option would be to repair damaged curb and gutter and reconstruct the streets using a full-depth reclamation process in 2020. Though the cost for this option would be significantly more than the first option, the resulting anticipated pavement life would be 60 years.

The third option would be to wait to reconstruct the streets until the end of the useful life of the pavement, which is estimated to be 5 to 10 years out.

(This paragraph was modified January 17th) Staff recommends the third option as noted in the draft Feasibility Report. If the Feasibility Report is accepted as is, the City Council will be approving Staff's recommendations to not mill and overlay the streets identified within the 2020 - 2029 CIP, but instead review the current CIP to identify other streets that are the best candidates for 2020 mill and overlay improvements based on available funding sources, and authorize Staff to prepare a new Feasibility Report for proposed 2020 mill and overlay improvements under City Improvement Project No. 20-02.

This winter and spring, Staff intends to review our current pavement rating system and processes for adding pavement management projects to the Capital Improvement Plan (CIP) to ensure that projects included in the CIP moving forward are identified accurately and can be constructed as proposed.

Before the pavement coring results were received and Staff was able to discuss the findings with Mr. Wood from WSB, notices were mailed to property owners having direct access to streets proposed to receive mill and overlay improvements inviting them to a public engagement workshop on Wednesday, January 22nd. The purpose of the workshop was to explain the need for and scope of the proposed improvements, anticipated construction impacts, estimated costs, proposed funding program, and preliminary project schedule. Based on the findings of the pavement corings and Staff's discussions with Mr. Wood from WSB, a second letter was mailed to the same property owners on January 17th canceling the workshop for January 22nd.

Alternatives:
Alternative #1 – Motion to recommend City Council acceptance of the Feasibility Report for the 2020 Pavement

Overlay Improvements, Improvement Project No. 20-02.

Alternative #2 – Motion of other.

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

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.

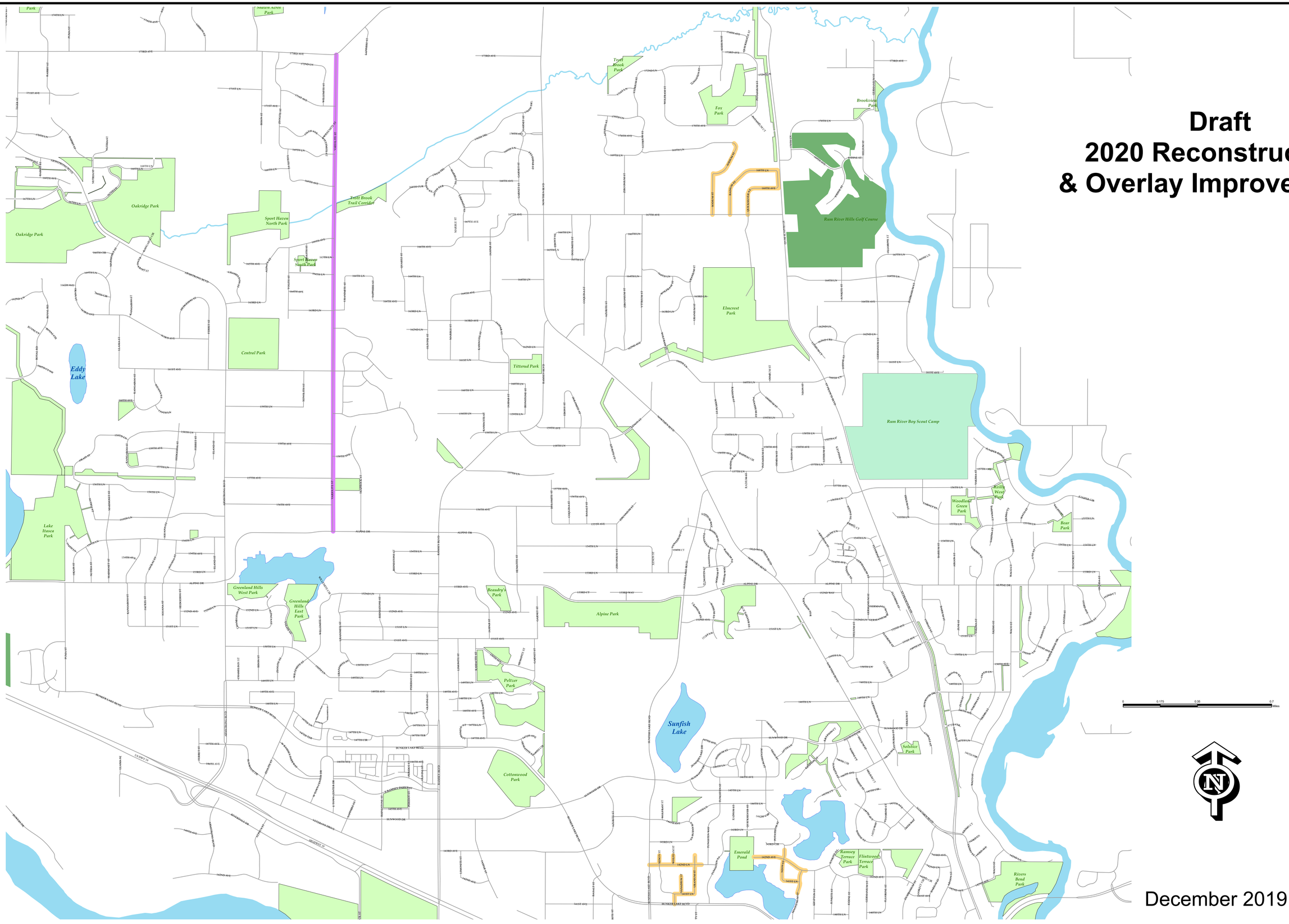
Attachments

2020 Overlays Map
Draft Feas Rpt IP2002

Form Review

Inbox	Reviewed By	Date
Grant Riemer	MaryJo Warner	01/16/2020 04:03 PM
Kurt Ulrich	Kurt Ulrich	01/16/2020 04:10 PM
Bruce Westby (Originator)	Bruce Westby	01/17/2020 02:21 PM
Form Started By: Bruce Westby		Started On: 01/14/2020 08:12 AM
Final Approval Date: 01/17/2020		

Draft
2020 Reconstruction & Overlay Improvements



Legend

- Road_Centerlines
- Overlays
- Reconstruction
- ScoutCamp
- Golf_Courses
- Parks
- Rivers
- Lakes_Ponds
- Creeks

December 2019

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

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TITLE SHEET
LETTER OF TRANSMITTAL
CERTIFICATION SHEET
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Appendix C
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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

Public Works Committee **6. 1.**

Meeting Date: 01/21/2020

By: Bruce Westby, Engineering/Public Works

Title:

Receive Update on Bunker Lake Boulevard Reconstruction - Armstrong Boulevard to Ramsey Boulevard

Purpose/Background:

Purpose:

The purpose of this case is to receive an update on the Bunker Lake Boulevard Reconstruction project between Armstrong Boulevard and Ramsey Boulevard, including attempts to amend the Ramsey Town Center Joint Powers Agreement.

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 then 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.

While addressing the Public Works Committee on November 19th, the Committee asked Staff why the City would be responsible for paying and improving a County road. It was also noted that the Committee wanted to better understand the reasoning for the terms within the JPA that require the City to finance and construct County Road 116 / Bunker Lake Boulevard, and that if the City is responsible for building and financing the improvements, the City should have additional say in which access points are allowed onto the roadway. The Committee ultimately directed Staff to gather additional information on the history of the terms and conditions in the JPA, and to discuss options with Anoka County related to renegotiating the JPA, working together to find efficiencies, and opportunities for additional access onto Bunker Lake Boulevard.

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.

City Staff also contacted Anoka County Engineer Joe MacPherson per the Committee's direction. He said he 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, but first he wanted to review the JPA with some of his staff. City staff is still waiting for a return call.

Timeframe:

Staff anticipates this case will take approximately 15 minutes to present and respond to questions.

Observations/Alternatives:

Additional information, if available, will be presented during the meeting. There is no set schedule at this time for moving this item forward so Staff plans to present new information to the Committee each month as it becomes available.

Funding Source:

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:

N/A

Action:

This case is informational only. No action is required at this time.

Attachments

RTC JPA
2020-2029 CIP Project Sheet
BLB Aerial Image

Form Review

Inbox	Reviewed By	Date
Grant Riemer	MaryJo Warner	01/16/2020 04:03 PM
Kurt Ulrich	Kurt Ulrich	01/16/2020 04:09 PM
Form Started By: Bruce Westby		Started On: 01/14/2020 08:10 AM
Final Approval Date: 01/16/2020		

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**


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

Public Works Committee **6. 2.**

Meeting Date: 01/21/2020

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)**
  - Grading and storm sewer work complete
  - Lift station not operable; control panel installed January 2020
  - 8K CY sand stockpile proposed to be moved in spring 2020
  - 20K CY topsoil stockpile removed (River Walk Village debris backfill)
  - Processing Change Order #1 addressing excess topsoil removal/backfill
  - WMO Permit extended to June 30, 2020
- **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)**
  - Construction complete
  - 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
- **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 will be advertised this winter
  - Construction in 2020
- **Variolite Street Reconstruction (#20-01)**
  - Final design / preparation of plans and specifications in progress
  - Detailed update provided during February PWC meeting

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 is proposed to begin in 2022 pending City and County approvals, but Anoka County is considering moving construction up a year
- **CSAH 116 & TH 47 Intersection Improvements**
  - Constructing additional turn lanes to improve congestion and safety in 2021

MnDOT Improvement Projects

- **Ferry Street / Trunk Highway 47 Grade Separation @ BNSF Rail Crossing**
  - Preliminary design on hold - MnDOT exploring realignment of Highway 47 to remove S-curve at Anoka County fair grounds
  - TH 47 traffic study in progress
  - MnDOT may combine project with Anoka Solution improvements

Items of Interest

- **Northwest Metro Surface Water Supply Feasibility Study**
  - Study is roughly 90% complete
  - Member cities include Corcoran, Dayton, Ramsey and Rogers
  - MCES is funding 100% using Clean Water Funds
  - Completion anticipated February 2020
- **Centralized Water Treatment Facility Study**
  - Kickoff meeting held November 7, 2019
  - Data exchange in progress
  - Completion anticipated by June 2020
- **Ramsey Gateway Highway 10 Improvements**
  - Preferred vision layout complete
  - Additional updates to be provided during the meeting

Timeframe:

Staff estimates up to 10 minutes will be needed for updates and discussion.

Observations/Alternatives:

N/A

Funding Source:

N/A

Recommendation:

N/A

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	01/16/2020 12:34 PM
Kurt Ulrich	Kurt Ulrich	01/16/2020 04:02 PM
Form Started By: Bruce Westby		Started On: 01/14/2020 08:02 AM
Final Approval Date: 01/16/2020		

Public Works Committee **6. 3.**

Meeting Date: 01/21/2020

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:

N/A

Funding Source:

N/A

Recommendation:

N/A

Action:

No formal action required. For Committee review and discussion purposes only.

Attachments

PWC Calendar Jan2020

Form Review

Inbox	Reviewed By	Date
Grant Riemer	Grant Riemer	01/16/2020 12:40 PM
Kurt Ulrich	Kurt Ulrich	01/16/2020 04:03 PM
Form Started By: Bruce Westby		Started On: 01/14/2020 08:03 AM
Final Approval Date: 01/16/2020		

Public Works Committee Future Topics Calendar *

Date	Topics for Discussion – Committee Action
February 2020	Sunfish Lake Sedimentation Basin Improvements *(Westby)*
March 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)*
March 2020	Draft Trail Maintenance Policy *(Westby)*
March 2020	Draft Stormwater Pond Maintenance Policy *(Westby)*
Date	**Topics for Discussion – Planning and Budget**
April 2020	Municipal State Aid System (MSAS) Revisions *(Westby)*
May 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
Ongoing	Centralized Water Treatment Facility - Preliminary Design Report

* Dates are subject to change based on the availability of information and required attendees, staff workload, and competing interests and objectives.

CC Regular Session **7. 1.**

Meeting Date: 02/11/2020

By: Tim Gladhill, Community Development

Information

Title:

Receive Update on Highway 10/169 Planning Efforts (Ramsey Gateway)

Purpose/Background:

The purpose of this case is consider further analysis of two refinements to the planned Sunfish Lake Boulevard Interchange on the south side of Highway 10/169.

As the City Council is aware, the City has approved a planning-level layout for future Highway 10/169 improvements at and associated with planned interchanges at Sunfish Lake Boulevard and Ramsey Boulevard. These are planning-level layouts that will naturally evolve as more detailed design evolves. Evaluating these refinements of the same approach will not slow current efforts in funding advocacy.

Notification:

Notification is not required.

Observations/Alternatives:

This case is being primarily driven by Connections Church that is considering a Purchase Agreement on the parcel on the south side of Highway 10/169 just west of Comfort Suites Hotel. This site is impacted by the entrance/exit ramp associated with the Highway 10/169 Interchange. Current drawings show a right-in/right-out access in the middle of this vacant parcel. Based on discussions with Connections Church and the current Property Owners, two alternatives are offered to the City Council to evaluate further.

1. Shift Right-In/Right-Out tight to East Property Line (least impactful)
2. Tight Diamond on South Side of Highway 10/169 (more traditional, higher cost)

Staff has worked closely with Anoka County Staff on this analysis. Before diving further into these details, Staff desires to check in with the City Council first.

Funding Source:

This case is being handled as part of normal Staff duties.

Recommendation:

Staff recommends authorization to explore two additional refinements to the Sunfish Lake Boulevard Interchange Layout.

Action:

Motion to authorize Staff to explore two additional refinements to the Sunfish Lake Boulevard Interchange Layout.

Attachments

Current Highway 10/169 Plan

Potential Sunfish Interchange Alternatives

Form Review

Inbox	Reviewed By	Date
Kurt Ulrich	Kurt Ulrich	02/06/2020 11:26 AM
Form Started By: Tim Gladhill		Started On: 01/24/2020 07:48 AM
Final Approval Date: 02/06/2020		

The Ramsey Gateway Project

will provide grade separations of US Highway 10/169 and the BNSF Railway to address major crash and congestion issues that are greatly impacting the movement of goods and people between the Minneapolis/Saint Paul metro area and greater northern Minnesota.

Anoka County MINNESOTA
Respectful, Innovative, Fiscally Responsible

GREATER MN GATEWAY

DEPARTMENT OF TRANSPORTATION

Investment Results:

- 42% Crash Reduction
- Reliable movement of regional railroad and highway freight and commuter traffic
- 1 + Benefit-cost Ratio
- 94% Average Delay Reduction
- Accommodates 74,000 Vehicles Per Day



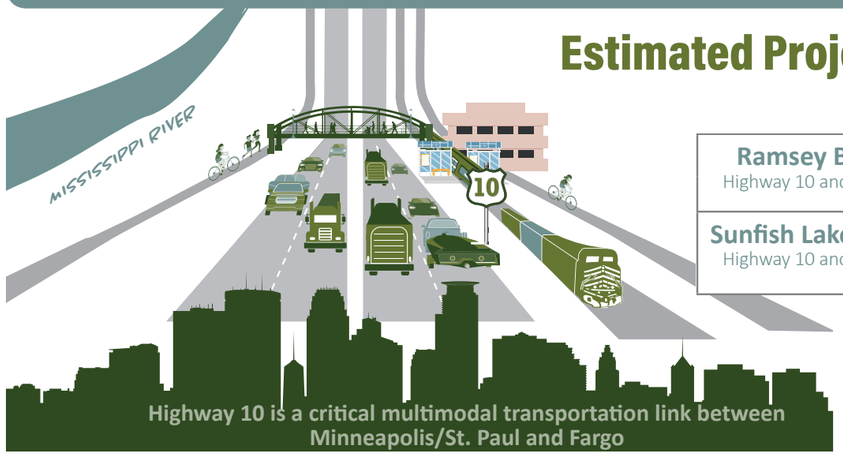
NOTES:
- Green shading denotes potential grading areas.
- Frontage road alignments are preliminary.
- Right-in/right-out locations on Highway 10 are preliminary.
- Intersection controls to be determined in preliminary design.

US Highway 10/169 Importance

» A principal arterial carrying up to 55,000 vehicles per day (1,650 trucks)
» Significant commuter and freight corridor between Minneapolis – St Paul, northwestern Minnesota, and into North Dakota
» Busiest BNSF rail line in MN with 57-81 freight trains and 14 transit trains per day
» Connection to northern Minnesota lakes and outdoor tourism industry

Project Need

» 218 crashes in the last 5 years, 4 fatal crashes in the last 10 years
» Crash rate 2x the state average
» Traffic backups approaching 1 mile by 2025 and almost 4 miles in 2045
» Fully funded Anoka and Elk River 2023/24 projects will result in Ramsey having the only two remaining at-grade traffic signals on the US Highway 10/169 freeway system from Minneapolis/St Paul to Elk River.



Highway 10 is a critical multimodal transportation link between Minneapolis/St. Paul and Fargo

Estimated Project Costs:

	Preliminary Engineering & Environmental Documentation		Final Design		Right-of Way Acquisition		Construction		Construction Engineering/ Administration		Total Estimated Costs
	G.O.	T.H.	G.O.	T.H.	G.O.	T.H.	G.O.	T.H.	G.O.	T.H.	
Ramsey Blvd (CSAH 56) Highway 10 and RR Grade Separation	**$1,500,000**		**$2,000,000**		**$22,000,000**		**$38,000,000**		**$2,500,000**		**$66,000,000**
	$1,500,000	NA	$2,000,000	NA	$11,000,000	$11,000,000	$19,000,000	$19,000,000	$1,250,000	$1,250,000	
Sunfish Lake Blvd (CSAH 57) Highway 10 and RR Grade Separation	**$2,500,000**		**$3,000,000**		**$15,000,000**		**$48,000,000**		**$3,500,000**		**$72,000,000**
	$2,500,000	NA	$3,000,000	NA	$7,500,000	$7,500,000	$24,000,000	$24,000,000	$1,750,000	$1,750,000	

Cost Breakdown Notes:
- Costs in red are already funded
- ROW costs include funds for Right-of-Way Acquisition Loan Funds (RALF) payback
- Costs for the frontage road between Ramsey Blvd and Sunfish Lake Blvd are split between the two interchange projects

Total Investment Needed: $138M
Inflated to 2025 dollars

Alternative 1: Modified Right-In/Right-out



Alternative 1: Modified Right-In/Right Out




Alternative 2: Tight Diamond South Side Only
Not an Official Plan.
For Discussion with
Connection Church and
Hamilton/Holasek Only.
Lumenrt
Designer
Willy McCoy's
Comfort Suites
Plants and Things
Do All Printing

Alternative 2: Tight Diamond South Side Only



CC Regular Session **7. 2.**

Meeting Date: 02/11/2020

Submitted For: Grant Riemer, Engineering/Public Works

By: Grant Riemer, Engineering/Public Works

Information

Title:

Authorization to Enter Into a Contract for Architectural and Engineering Services for a New Public Works Facility

Purpose/Background:

Purpose/Background:

Purpose:

The purpose of this case is to receive council authorization to enter into a contract with Oertel Architects to provide architectural and engineering services for the design of a new City of Ramsey Public Works facility. The scope of their duties will include schematic design/final design of the new PW campus, preparing construction documents and participating in the bidding and award phase of the project, as outlined in their proposal. During the construction administration phase Oertel will work closely with city staff, and our construction manager (RJM) to oversee the actual construction of the building.

Background:

The city of Ramsey has long planned for a new public works facility and added it to our Capital Improvement Plan (CIP) in 2006. The land was secured in 2008 by the purchase of the former Bury Carlson site. That purchase was finalized in 2013 and the BKV Group was hired in 2015 to perform a space needs study. This study would be used to determine the size of facility needed to serve the PW department's needs for now and into the future. The size of the current facility is 32,000 sq.ft which consists of 3 separate buildings, with offsite equipment storage spread out over 3 additional sites. The space needs study determined that the new facility should be sized at approximately 66,000 sq. ft or more than double our current size. The new facility would allow all personnel and equipment to be located under one roof. It is anticipated that the existing buildings will be re-used as storage facilities for PW and the police department. The current utilities department, which is the smallest of the 3 buildings, will be redesigned and used as a future recycling center. The new PW facility will be designed to serve the needs of the PW department for the next 30-50 years.

Notification:

N/A

Observations/Alternatives:

On December 13th, 2019 the city issued a Request for Proposals (RFP) for architectural/engineering services for he new public works facility. Eight firms requested plans, with four firms submitting proposals at the deadline on January 10th, 2020.

The City Administrator, City Engineer, Public Works Superintendent and Brad Barickman from RJM Construction Management Services met on January 17th, 2020 to vet and rank the four proposals. The top 2 firms selected after that process were Oertel Architects and HCM Architects. The final criteria for selection was based on experience in designing public works facilities, construction time line and estimated cost for their services.

At the January 28th,2020 City Council work session, the top 2 firms were interviewed by council, staff and Brad Barickman our construction manager from RJM Construction. After discussion within the group the consensus was to move Oertel Architects ahead for final consideration.

Oertel's proposed fee is a not to exceed amount of $585,491.20 for the services outlined in their proposal.

Funding Source:

Funding for architectural/engineering services will come from the facility fund. An amount of $1,000,000.00 has been earmarked from this fund for the new PW campus.

Recommendation:

Staff recommends entering that the city Council authorize staff to enter into a contract with Oertel Architects for architectural/engineering services for the new Public Works Facility, in an amount not to exceed $585,491.20, subject to the review and approval of the contract by the City Attorney.

Action:

Motion to authorize staff to enter into a contract with Oertel Architects for architectural/engineering services for the new Public Works Facility, in an amount not to exceed $585,491.20, subject to the review and approval of the contract by the City Attorney.

Attachments

Oertel Proposal

Form Review

Inbox	Reviewed By	Date
Kurt Ulrich	Kurt Ulrich	02/06/2020 11:18 AM
Form Started By: Grant Riemer		Started On: 01/31/2020 09:50 AM
Final Approval Date: 02/06/2020		



City of RAMSEY

January 10, 2020

RAMSEY PUBLIC WORKS FACILITY

PROPOSAL FOR ARCHITECTURAL & ENGINEERING SERVICES

OERTEL ARCHITECTS

Submitted by:

Andrew Cooper, AIA
1795 St. Clair Avenue
St. Paul, MN
(651) 696-5186 x 313
acooper@oertelarchitects.com

OERTEL ARCHITECTS

January 10, 2020

City of Ramsey
Mr. Grant Riemer, Public Works Superintendent
7550 Sunwood Drive NW
Ramsey, MN 55303

RE: ARCHITECTURAL/ENGINEERING SERVICES FOR THE CITY OF RAMSEY PUBLIC WORKS FACILITY

Dear Mr. Riemer and Evaluation Committee,

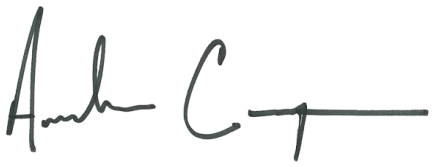
Oertel Architects and our team of consultants are very happy to present our proposal for the design and construction of Ramsey's new full-service Public Works Facility. We feel that our experience and passion for this project type will become very evident to you as you review this proposal.

We would also like to thank you for your time in meeting with us to review your current operations and discussing the anticipated project scope. In this proposal, we will address some of our initial preconceptions and observations on your project, address opportunities and challenges, and present previous projects that will demonstrate the possibilities and lessons learned for your project. In addition, we have provided a list of references that we encourage you to contact and discuss our previous work experience.

Renovation and relocation projects can be a challenging venture. Your study executed in 2015 provided some insight into these aspects. Now, with the implementation of the actual construction project with a faster than typical design timeline, it will be extremely critical that this previous work effort is thoroughly reviewed, confirmed, and/or augmented to meet budgetary constraints and constructability efforts. During this process we will rely on our critical eye for public works operations, our cooperative experience working with Construction Managers during the preconstruction process, and our up-front and honest nature with our clients.

We appreciate the opportunity to present our qualifications and want to congratulate you on moving forward with a much-needed building project that will provide the public works department a new home long into the future.

Sincerely,



Andrew Cooper, AIA, Principal

CONTACT INFORMATION:
Andrew Cooper, AIA
1795 St. Clair Avenue
St. Paul, MN 55105
p: (651) 696-5186 ext. 313
acooper@oertelarchitects.com

B. SCOPE OF PERFORMANCE/ SCHEDULE

REVIEW OF SCOPE & CONFIRMATION/ CONCEPTUAL PLAN DEVELOPMENT PHASE

Week of February 3 – March 2, 2020 *(4 weeks)*

We recognize that a tremendous effort went into the 2015 space needs and existing facility study to scope this project. However, regardless of the consultant selected to execute this design and construction project, we feel that a thorough review and revision to the space needs will be critical for several reasons. First, the space needs assessment is several years old. Newer standards for space, recent developments, trends in vehicle sizes and maintenance practices, and updated community growth projections need to be accounted for to make sure the developed design is viable for a long-range solution for Ramsey. Second, some critical components and spaces were absent from the space needs. For example, locker rooms are not present within the identified building program. Third, developments within the last three years in equipment sizes and service needs have changed the size of interior parking solutions and the design of vehicle service bays. This is not an all-inclusive list of influencing factors that need to be reviewed and confirmed, however, it is a list that is meant to begin the conversation and discussion for this first and critical step in your project process.

This critical step must be engaged and fully executed early in the total project timeline to meet your overall project schedule goals. As such, you need a consultant extremely familiar with the building typology to be able to facilitate discussions quickly and accurately while making experienced judgments and recommendations for anticipated project needs and operating procedures. This phase can take several weeks to fully execute. We feel that based on your timeline and project schedule, this stage should take no longer than four to five weeks and would include the kick-off meeting, touring of additional facilities, staff reviews and creation of revised and updated concept plans. It is also critical to involve the Construction Manager early in these project scope discussions to relay critical construction cost impacts, construction timeline and phasing issues and any other factors that can impact budget and schedule.

Oertel Architects' concept plans that will be developed in this phase, will not be simple colored blocks on an aerial. We will develop plans with a high level of vehicle parking and circulation detail, equipment service bay design and workshop layouts, and detailed office, locker room, and training room layouts to adequately illustrate the real project. Despite remaining at a conceptual design task in the overall process, building and site plans require early detail development essential to make sure the appropriate project is scoped. This detail allows building system engineers to begin design quickly with a building concept that has been vetted and verified by city staff and the Construction Manager.

It will be crucial to have a full site survey from Ramsey at this point because civil site designers need to be part of this concept design process and engaged early to make sure regulatory reviews can be executed within the total project schedule.

Also crucial will be a full geotechnical evaluation, complete with soil draining capabilities and structural capacities identified. Our current work plan and associated fee is based on an understanding of working with site and geographic locations similar to your identified site, that more advanced stormwater treatment and retention designs won't be necessary, and more involved structural foundation designs beyond typical spread footings would not be necessary. If they are

identified as necessary at this stage, we would have to evaluate the design impacts, additional fee considerations and impact on the total project budget with Ramsey and RJM.

SCHEMATIC AND DESIGN DEVELOPMENT PHASE

Week of February 17 - March 23, 2020 *(6 weeks)*

Because of our depth of experience in the design and construction of Public Works facilities, our initial concept plans will already be developed to a higher level of detail than typically expected for this phase of the project. As such, we are proposing that the traditional schematic design and design development phases be executed as one stage. This will allow the design team to get into the details early and often with staff and RJM.

During this phase, building system engineers for structural, mechanical and electrical will begin to describe building systems for scoping initial cost estimates, and designing specific components to help influence detailed space layouts, accounting for structural components, mechanical and electrical equipment layouts, and space needs including necessary clearances.

As the deliverable for this phase, Ramsey and RJM will receive a design drawing set that would be approximately 35% or more complete. This set will have the majority of the civil, site and landscape design elements determined, building floor plans, exterior elevations and 3-dimensional imagery, general building sections, initial wall sections and construction details and building system narratives from structural, mechanical and electrical engineers to begin a more detailed construction cost estimate.

Towards the end of this phase is where we foresee having to update city council on the progress of the design. Thus, we have included the development of 3-dimensional graphics and presentations in the deliverables. These are very powerful tools to explain the design and impact on the area. Given the site location and surrounding areas, we don't foresee a significant need for neighborhood meetings or updates.

Because the schedule for your project requires an early bid pack for site work and structural construction, the design development portion of this phase is very heavily loaded with time and effort from our team members to execute the design quickly. Though these buildings are industrial in nature, there is a significant amount of coordination and detail that have to be evaluated and considered at this phase to make sure the set of bid documents obtains the most representative price for the project and ensures as smooth a construction process as possible.

To meet the demands of the schedule and the scope of this project, Oertel Architects is including two design architects to coordinate the work. As we have evaluated your anticipated schedule, we are anticipating overlap of phase durations to ensure that critical timelines are met. To accomplish this, our two project architects will focus on specific tasks and portions of the project to make sure that progress is maintained. Andrew Cooper and Thomas Stromsodt have been working closely on projects at Oertel Architects for nearly 18 years. They have dozens of executed building projects between them, have extensive experience in programming and planning large public works facility projects, and have experience working with construction managers, specifically RJM on various projects as well.

Andrew Cooper will manage the project in general and be the primary contact for RJM and the City of Ramsey. He will manage the overall design process and focus at the beginning on the programming, planning, and overall design of the facility. As the project progresses, he will focus on keeping the project moving forward, meeting schedule goals and monitoring project costs and development with RJM and the City of Ramsey. Andrew will be the

primary contact during bidding and construction administration phases as well.

Thomas Stromsodt will manage the design document process, coordinating with the engineering consultants and the development of the deliverable drawing packages. He will be involved in the early programming and planning stages as well, focusing on details at the early design stages to be considered and how those decisions will impact the final product. Thomas will be the primary contact for the consulting engineers during the course of the design process but will also be an available contact for the City of Ramsey and RJM at any point, when needing to discuss specific needs in regard to the engineering of the building or specific design and equipment needs.

CONSTRUCTION DOCUMENTS PHASE

Bid Pack 1 – Week of February 24 – June 29
(19 weeks)
Bid Pack 2 – Week of May 25 – September 21
(18 weeks)

As required by the RFP, we are anticipating multiple issues of drawings for two bid packs. Based on our experience with issuing bid packs and the design and engineering of these types of facilities, in order for bid pack number 1 for site work, structural and precast to be accurate, we anticipate having to advance the entire building design to a significant level to be ready at the first bid package. For example, structural steel and roof structure cannot be economically and accurately designed without a full mechanical evaluation and design of the HVAC system and equipment. If the structural system needs to be overdesigned for unknown loads, the project cost could be inflated to accommodate those unknowns, and still would require additional design coordination during the construction administration phase, leading to possible cost overruns and schedule delays.

This is where we feel our approach with two, very experienced project architects will benefit the process. As noted previously, the phases we are proposing, require some schedule overlap to meet the demands of the ultimate schedule goal. By having two Project Architects, we essentially have two Project Managers as well, one making progress in design while the other directs details and constructability.

We are anticipating that the work for bid pack no. 1 would begin at a stage nearly in the middle of the schematic-design development phase. This early start would include the heavy involvement of civil site design elements and working with structural engineers to get early designs started.

We are anticipating that the work for bid pack no. 2 would begin in final detail no later than halfway in the anticipated duration for bid pack no. 1. This would include final HVAC and Electrical design details, including schedules and final diagrams. Much of the engineering calculation we anticipate will have been completed in the early stages of the development of bid pack no. 1, as detailed previously to influence structural designs. Additional tasks also included in bid pack no. 2 include furniture planning and selection which will utilize various cooperative purchasing agreements and state contract pricing (specific to municipalities and other government agencies).

BIDDING AND AWARD PHASE

Week of September 28 – October 26 *(5 weeks)*

Oertel Architects and our team will be involved in the bidding and award phase of this project as well. We will participate in the pre-bid conference, answer questions and RFI's during the bidding period, issue addenda, attend the bid opening and review bids as necessary with RJM and the City of Ramsey. This time period and duration, is flexible, depending on the actual bid-pack release.

OERTEL ARCHITECTS

B. SCOPE OF PERFORMANCE/ SCHEDULE

WORKING IN PARTNERSHIP WITH CM

Because of our schedule overlap, finding critical review time and milestone dates will be difficult. Close coordination and constant conversation with RJM will be critical to ensure design decisions are made with consideration to the overall schedule and construction budget. Our team anticipates having to deliver several milestone design packages to RJM for budgeting.

The first and most critical opportunity for this will be at the early onset of the process in the Review of Programming and Concept Development phase. This will be the first real test of Ramsey's anticipated design and budget, to help scope what is possible with the funds available. Oertel Architects highly advocates for designing a municipal facility for a minimum of 30 years of service, with a common goal of 50 years being programmed. As the design needs to plan for long-term project success, this stage is where any possible early value engineering, including a possible long-term phasing plan, may be needed to provide a viable solution for the current funding and needs.

The second critical juncture will be the deliverable package at the "conclusion" of the schematic and design development phase. This package will include detail on building volume, material selections and building system design so that a more accurate project price can be evaluated. It might be that this phase identifies project bid alternatives, additional value engineering options, or phasing portions of the project.

During the construction document phase, milestone sets will be more difficult, as designs will be progressing quickly to meet the bid pack schedule. However, by utilizing real-time document review and integrating RJM's preconstruction and project management team in the design process, we can continually update progress and discuss cost impacts during regular project design meetings. Ideally, by involving RJM early and often as a design partner, many of these actions have already taken place and do not cause project delays.

Oertel Architects and our team believe the bid pack schedule is aggressive but attainable. Part of our confidence in being able to meet this schedule is the level of comfort we have working with RJM on current and past projects. Our project durations and schedules as identified in the work plan to this point has been coordinated to meet the deadlines as listed in the RFP.

CONSTRUCTION ADMINISTRATION

November 2020 – November 2021

Oertel Architects believes that in order to deliver a successful, completed project, the people involved with the design of the project must be involved in the construction process as well. Our team will review all shop drawings, answer Requests For Information (RFI), prepare documents for proposal requests and review pricing when necessary, attend bi-weekly construction meetings and conduct pre-construction meetings for critical construction activities.

We believe that monitoring construction progress on-site is critical to ensuring the delivery of a quality project. As you will see in our project experience, we have completed many projects of similar scope and scale all over the area. Every project has challenges and lessons learned from the construction process. Oertel Architects believes in being proactive wherever possible and providing quick responses to submittals and requests to keep the project moving forward. We work throughout the construction process to ensure the best possible product for our client. We also enjoy working with contractors wherever possible and value their expertise and recommendations for constructability where it has a positive impact. Though we have years of experience and expertise, there are also

years of experience and expertise on-site within the specific trades that are also valuable and useful.

Oertel Architects and our team will be present from the pre-construction meeting through post-occupancy evaluation. As our references will illustrate, we are always available and present for any issues that arise during construction and after construction, and we value our continued relationships after the project is complete.

RENOVATION AND REMODEL APPROACH

Based on the RFP, evaluation of the 2015 study and verification during our tour with Grant Riemer, we realize that repurposing the existing permanent building assets is a part of this project scope. We feel the best value to the City of Ramsey is to approach the renovation and remodel projects as a third bid pack, once the primary facility has been designed and bid. This approach will make sure that funds available are going towards a long-term immediate needs solution. We feel this is a viable approach for several reasons:

One, the existing uses of the primary block maintenance and storage building and the metal framed storage building, are higher in intensity and daily activity now, than they will be in the future at the completion of the new facility. Thus, any improvements necessary to meet a variety of codes will be less intense as they will be needed to meet a lower occupancy and use demand.

Second, we feel that there are portions of the existing buildings that could require some significant utilization of the project budget if occupancy and use were to remain as-is. For example, if operable vehicles are to still be stored in the metal building, the renovation would need to include a fire suppression system and floor drains with a flammable waste interceptor. Thus, some significant funds would be needed for the renovation that would detract from the new construction budget and program.

Third, remodels need to have a higher level of contingency funds associated for unknown encounters. The era of the block building, for instance, is such that it could have hazardous materials integrated into the existing construction or mold growth on the backside of the gypsum board interior sheathing. The metal building, with the punctured membrane and fiber insulation, could have had water intrusion and developed mold growth. These are items that need to be addressed for long term viability of the structures in any use, but some items may only need to be immediately addressed if remodeling and renovation activities disturb those areas.

Fourth, work on the remodel is best operationally to happen after the new building is constructed and the bulk of the equipment and personnel have been relocated. Thus, this bid pack can be completed while bid pack one and two construction is beginning.

Finally, forecasting design work and fees without a fully identified programmatic scope is difficult. We would want to provide you a more accurate design fee for only necessary activities in these facilities. We have included time within the design phases to review and discuss and an allowance of fee to perform up to a Design Development package to acquire pricing for a to-be-determined renovation scope. This would allow RJM to budget price this work so that we all know what the potential impact is on this project's budget or necessary funds for future work.

C. FIRM PROFILE

Oertel Architects, Ltd. was established and incorporated, in the state of Minnesota in January of 1996 by Jeff Oertel, with a commitment to solve design and building challenges so that each and every project achieves its maximum potential at the least overall cost, to serve all clients, large and small, using our attention to detail, understandable design process and problem-solving method of tackling the big issues, regardless of project size and complexity. We have instituted a hands-on approach in working out details, understanding building conditions and working with user groups.

Our firm provides a full range of consulting services including planning, architectural design, interior design, and construction-related services. Our firm has worked with over sixty cities, thirteen counties and several state agencies to date.

Oertel Architects is a small firm by choice as we prefer a direct approach to all of the projects we work on. Our ten employees include five registered architects, four designers, and one interior designer.

Address
1795 St. Clair Avenue
St. Paul, MN 55105
www.oertelarchitects.com

Legal Status
S Corporation

Ownership
Jeff Oertel, Founder/ President
Diane Trout Oertel, Vice President
Deb Brandwick, Principal
Thomas Stromsodt, Principal
Andrew Cooper, Principal
Brenda Dever, Partner

Contact Name
Andrew Cooper, AIA, Principal,
Project Manager
(651) 696-5186 x 313
acooper@oertelarchitects.com



OERTEL ARCHITECTS

C. FIRM PROFILE

OERTEL'S DESIGN PHILOSOPHY

COMMUNICATION

Oertel Architects prides itself on listening to our clients and providing them with as much feedback and ongoing communication as is necessary. This is most important in the initial phases of a project, which encompasses the entirety of a facility study project. Clients have complimented us on our practical, constructive, and humanistic approach and have realized the benefits and advantages of using a smaller, specialized firm. As the owner, you will work with the same people from project inception to completion. A smaller firm means lower overhead, which translates to more services per consultant dollar. We have had the pleasure of working in many counties and cities on multiple occasions and look forward to developing that relationship in every project.

QUALITY OF WORK | QUALITY CONTROL | QUALITY ASSURANCE

At Oertel Architects, the quality of our work begins with QA/QC. Quality Assurance and Quality Control checks are critical to ensuring a smooth bidding and construction process. These checks and meetings will take place periodically during design coordination among the design consultants and the County. This process culminates in the Final Review Set at 95%, which all project team members will review and provide final comments prior to issuing the bid documents.

We also encourage you to contact the references listed in the prior section to get an unbiased opinion of the quality of our work. While any work may not be perfect, we stand by our quality and our efforts to make quality a priority.

WORKING WITHIN BUDGET CONSTRAINTS & COST CONTROL

Cost control is a major factor when dealing with any project, but especially when public funds are involved. The entire team has a responsibility to focus on what is needed in the project and to make sure the project scope and design does not spiral out of control between wants and needs. It is the project manager's responsibility to coordinate this effort and ensure the budget accurately reflects the team's decisions and requirements. We have found that the best resource we have for this pricing information is our past projects. This data gives us accurate "real-life" examples of similar projects, provided by the same contractors who will likely be bidding this project. Throughout the process, we will be mindful of project costs, and prepare cost estimates at each phase. If problems are noted, we will advise the owner's representatives as to the areas that have increased, and provide recommended solutions. This will allow the team to make informed decisions on some of the more difficult scope items.

Based on our extensive previous experience, we feel that is critical that the project budget includes a sufficient contingency fund as unforeseen conditions may occur during construction, such as unknown below-grade contaminants, undesirable fill, brownfields, etc. Although we will take every precaution we can in order to minimize the unknowns, it is better to have planned for the unknown by having an appropriate contingency fund in lieu of having no funds available (or requesting additional funds from the community) once the project has progressed.

We approach every project with the assumption that each project has a life cycle of its own that needs to be cultivated and refined, while keeping it on task, on time and on budget. We start with a very wide lens that tries to capture as much as possible before focusing on more detailed design activities.

OERTEL ARCHITECTS

C. FIRM PROFILE, *consultants*

For your project we have partnered with the following consultants:

emanuelson-podas
consulting engineers

ROLE ON YOUR PROJECT:
Mechanical, Electrical, Plumbing

LOCATION:
7705 Bush Lake Road, Edina, MN 55439

PRIME CONTACT:
Scott Vander Heiden, P.E., LEED AP BD+C
e: svanderheiden@epinc.com | p: (952) 940-4012

At Emauelson-Podas, everything about how we work begins and ends with three simple words- family, service, and trust. These are our company values, and they are at the core of everything we do.

Since our founding, we have chosen to work across multiple industries, including the industrial, corporate, civic, education, fitness, financial, healthcare, hospitality, housing, municipal, restaurant, retail and worship sectors. Our experience in a broad range of markets provides us with a healthy, valuable perspective when considering building design solutions.

In all we do, we strive to deliver inspired, expert building system solutions to those with whom we work. The core of our work resides in providing exceptional mechanical, electrical and plumbing design services.

SRF

ROLE ON YOUR PROJECT:
Civil Engineering & Landscape Architecture

LOCATION:
1 Carlson Parkway North, Suite 150, Minneapolis, MN 55447

PRIME CONTACT:
Michael Aaron, P.E., LEED AP
e: maaron@srfconsulting.com | p: (763) 249-6756

Since 1961, SRF has offered comprehensive, integrated planning and engineering consulting services. Our core values - innovation, service, quality, and collaboration - are the cornerstone of our corporate philosophy that we apply to every project.

Finding creative yet implementable and sustainable solutions to difficult engineering challenges requires a multidisciplinary, collaborative approach. The team structure at SRF fosters this, encouraging staff to seek out experts within and outside the company for ideas to bring cost effective, innovative solutions to our clients. Each project benefits from overall SRF staff experience - from planning to construction and everything in-between.

SRF team members meet and exceed the experiential and credential requirements necessary to effectively complete site projects. We have a committed staff with an in-depth knowledge of site development, landscape architecture, wetlands, stormwater management, surveying, and environmental and natural resources. Brownfield or greenfield we have the expertise to deliver the best possible solutions, timely product delivery, and high-quality plans and documents.

MEYER BORGMAN JOHNSON

STRUCTURAL DESIGN + ENGINEERING

ROLE ON YOUR PROJECT:
Structural Engineering

LOCATION:
510 Marquette Avenue South, Suite 900, Minneapolis, MN 55402

PRIME CONTACT:
Murphy Curran, P.E.
e: mcurran@mbjeng.com | p: (612) 604-3623

Meyer Borgman Johnson is a full service, sole discipline, structural engineering firm with four office locations and more than 70 staff. MBJ was founded in 1955 by John Meyer, whose integrity and pursuit of partnership and technical expertise are still strongly held values of our firm today.

Whether your project involves special foundations, seismic design, extreme wind resistance, or other structural challenges, we work with you to find fitting solutions, using a project approach that emphasizes early design integration, full architectural expression, constructability, and best-value for the owner. A repeat-client rate of 75% and low employee turnover demonstrates our firm's ability to form long lasting relationships and fulfill client expectations.

Our 64 years of experience covers all types of structural systems and delivery methods, including complex, phased projects requiring multiple bid packages. We offer a full range of structural engineering services for new construction, building rehabilitation, or adaptive reuse. We work with all types of structural materials and methods, as well as all delivery methods, from traditional, design build, negotiated including complex, phased projects requiring multiple bid packages.

As your project partner, we would rather help you figure out how to achieve your project goals than tell you why it cannot be done. Curiosity and imagination inform our approach as much as knowledge and experience. We listen carefully, and when appropriate, work with you as early as the programming phase to help integrate structure into the overall design, which often helps avoid costly design changes later on.

D. RESUMES & QUALIFICATIONS



PROJECT MANAGER
ANDREW COOPER, AIA

Principal- **OERTEL ARCHITECTS**

RESPONSIBILITIES Andrew will lead the project team and serve as the primary contact for both the consultants and the client. He will manage the project coordination and ensure we are staying on budget.

Since joining our firm in 2002 Andrew has been integral in providing common-sense design solutions to a variety of municipal projects. He has provided project management services on numerous projects, all within the municipal sector. His experience spans new construction, building renovations, and phased expansions.

CURRENT PROJECTS
Andover Public Works
National Guard Vehicle Maintenance Shop, New Ulm, MN
Woodhaven Park, Eagan, MN
South Valley Park, Inver Grove Heights

EDUCATION
Bachelor of Architecture, North Dakota State University
Registered Architect in Minnesota: #46485

AVAILABILITY
Immediately available to work on your project

PERCENT OF TIME
50% available



PROJECT ARCHITECT
THOMAS STROMSODT,

AIA

Principal- **OERTEL ARCHITECTS**

RESPONSIBILITIES Thomas will lead the project design and will serve as a secondary contact for both the consultants and you, the client. Thomas will manage the document coordination between disciplines.

Thomas joined our firm in 2000 and has extensive experience in parks and recreational facilities. He has a proven track record with past and present clients of providing a clear and accessible explanation of the design process, exploring and explaining different building systems, and making sure everyone has realistic expectations to ensure a successful outcome.

EDUCATION
Bachelor of Architecture, Bachelor of Science in Environmental Design, North Dakota State University
Registered Architect in Minnesota: #48038

AVAILABILITY
Immediately available to work on your project

PERCENT OF TIME
30% available

CURRENT PROJECTS
Anoka Greenhaven Maintenance Building
MnDOT Arden Hills Training Room
MnDOT Oakdale Sign Shop
RDO Equipment Company
Robbinsdale Water Systems Improvements



INTERIOR DESIGNER
BRENDA DEVER

Partner- **OERTEL ARCHITECTS**

RESPONSIBILITIES Brenda will work closely with the project architect on the space planning, furniture planning/selection, and finishes for this project.

Brenda joined the firm in 2003 and is an active member of the APWA. She has an engaging personality which allows her to connect with the client to create visually exciting spaces.

EDUCATION
FIDER accredited Interior Design degree, Dakota County Technical College

AVAILABILITY
Immediately available to work on your project

PERCENT OF TIME
30% available

CURRENT PROJECTS
The Ledge Amphitheater- Waite Park
New Ulm National Guard Facility
Robbinsdale Water Systems Improvements

NOTE: We anticipate additional Architectural CAD support staff *(not pictured)* **to work on this project.**

D. RESUMES & QUALIFICATIONS



MECHANICAL ENGINEERING LEAD
SCOTT VANDER HEIDEN,

PE, LEED AP BD+C
Managing Partner- **EMANUELSON PODAS**

EDUCATION
Bachelor of Science Mechanical Engineering, South Dakota State University. Professional Engineer in MN: #40918

AVAILABILITY
Immediately available to work on your project

PERCENT OF TIME
35% available

RESPONSIBILITIES Scott is a managing partner and registered mechanical engineer with more than 24 years of experience. He has been heavily involved in all aspects of HVAC and plumbing design and has a special focus on leading and designing sustainable projects. He thrives on helping building owners make informed decisions about building systems by engaging early in the design process and leveraging his experience and energy modeling technologies.

CURRENT PROJECTS
Montevideo, MN Public Works Facility
Buhler Industries Corporate Office Remodel, Minneapolis, MN
University of Minnesota Lab School and Child Development Center, Minneapolis, MN



MECHANICAL ENGINEERING DESIGNER
BRIAN RINGSVEN,

EMANUELSON PODAS

EDUCATION
Associate Degree in Architectural Drafting, Dakota County Technical College Coursework, College of Architecture, North Dakota State Univ.

RESPONSIBILITIES Brian has been involved in the engineering field for more than 29 years. He has a diverse background which includes HVAC and plumbing design in the public and civic sectors, as well as with the corporate and financial sector, K-12 school facilities, churches, restaurants, tenant build-out projects, and sports/recreational facilities. Brian works tirelessly to provide the most appropriate solution to the need, balancing cost, efficiency, complexity and the owner's goals. His attention to detail has proven to be a key attribute in delivering high-quality designs – that work the first time.

BRIAN *continued*

AVAILABILITY
Immediately available to work on your project

PERCENT OF TIME
50% available

CURRENT PROJECTS
Montevideo, MN Public Works
Bloomington Treatment Plant
St. Paul Conway Park Dome & Community Building



ELECTRICAL ENGINEERING
CORY MEIER

EMANUELSON PODAS

EDUCATION
University of Minnesota, Electrical Engineering Coursework
University of Nevada, Electrical Engineering Coursework

AVAILABILITY
Immediately available to work on your project

PERCENT OF TIME
50% available

RESPONSIBILITIES Cory has more than 35 years in the electrical engineering field. He leads clients through the design process, educating them on the good / better / best solutions available in each aspect of the electrical field, including lighting selection, security systems, access control, communications systems, power distribution, and emergency systems. Cory's passion is centered around power distribution, and he works hard to "right-size" systems to match the building load, avoiding waste that is common in many designs.

CURRENT PROJECTS
Montevideo, MN Public Works
Bloomington Treatment Plant
St. Paul Conway Park Dome & Community Building

OERTEL ARCHITECTS

D. RESUMES & QUALIFICATIONS



LANDSCAPE ARCHITECTURE

KEN GRIESHABER, PLA, ASLA

SRF CONSULTING GROUP

EDUCATION

B.L.A, Iowa State University, 1987. Professional Engineer in MN: #24860

AVAILABILITY

Immediately available to work on your project

PERCENT OF TIME

45% available

RESPONSIBILITIES Ken has 30 years of landscape architecture and urban design experience, with an emphasis on park and trail improvements. He has been involved in the planning and design of more than 60 neighborhood, community, and regional parks. Ken's skills include project management, conceptual and detailed design, and preparation of construction drawings and cost estimates. His work is mindful of operations and maintenance considerations and emphasizes sustainability. In addition, Ken is known for his skill in fostering an open, collaborative design process that includes residents, city officials, and design professionals.

Ken's areas of expertise include: urban design, site planning and design, park and trail improvements, public involvement, master planning, and project management.

CURRENT PROJECTS

Carpenter St. Croix Nature Center Site Development
Pillsbury Drive and Church Street Streetscape – University of Minnesota
Town Center Park, St. Michael
National Guard Vehicle Maintenance Shop, New Ulm, MN *(with Oertel)*



CIVIL ENGINEERING

MIKE AARON, P.E., LEED

SRF CONSULTING GROUP

EDUCATION

Bachelor of Science in Civil Engineering, Bradley University, 1991. A.A.S. Technology in Highway Engineering, Morrison Institute of Technology, 1987. Professional Engineer in MN: #25721

AVAILABILITY

Immediately available to work on your project

PERCENT OF TIME

35% available

RESPONSIBILITIES Mike has more than 25 years of experience in site planning, municipal engineering, highway and trail design, hydraulic analysis and stormwater management. His municipal and site development expertise includes project management, feasibility, predesign, demolition, layout, drainage, utilities, grading, detailing, and supporting specifications as well as permitting and contract administration. He has demonstrated his outstanding civil/site skills on many of SRF's well-known municipal facilities, commercial, and retail site development projects.

Mike's areas of expertise include: Project management, transit facilities, site planning, construction document preparation, drainage design, utility design, highway and street design, trail design, hydraulic analysis, stormwater management, construction administration

CURRENT PROJECTS

-National Guard Vehicle Maintenance Shop, New Ulm, MN *(with Oertel)*
-Pillsbury Drive Reconstruction Project, Minneapolis, Minnesota
-I-94 and Manning Avenue Park and Ride Facility, Lake Elmo, Minnesota
-Parking Lot Improvements, Blaine, Minnesota

D. RESUMES & QUALIFICATIONS



STRUCTURAL ENGINEERING

MURPHY CURRAN, PLA, ASLA

SRF CONSULTING GROUP

EDUCATION
Bachelor of Civil Engineering, University of Minnesota, 2004

AVAILABILITY
Immediately available to work on your project

PERCENT OF TIME
45% available

RESPONSIBILITIES As project manager and lead structural engineer at MBJ, Murphy is responsible for a wide variety of activities, which include proposal/contract preparation, collaborative decision-making about design direction, structural coordination with other project disciplines, preparation of specifications, shop drawing reviews, field observation, and project budget management. He is competent in the use of all types of structural systems and materials. His strong communication skills help preserve the integrity of both schedule and budget, while his creative and organizational approaches help each project to achieve efficiency, constructability, and full expression of architectural vision. As an Associate of MBJ, Murphy provides leadership within the firm and works to strengthen relationships with clients and colleagues. His knowledge of engineering is shared both internally and with clients through teaching and mentoring, especially at the initial phases of a project when communication is critical for collaborative coordination and problem-solving.

CURRENT PROJECTS
National Guard Vehicle Maintenance Shop, New Ulm, MN *(with Oertel)*
Cleary Lake Maintenance Building *(with Oertel)*
Waite Park Amphitheater *(with Oertel)*
Andover Community Center Addition
Bakken Museum Addition and Renovation

OERTEL ARCHITECTS

E. REFERENCES

FRIDLEY PUBLIC WORKS FACILITY
Jim Kosluchar, Public Works Director
p: (763) 572-3550
e: jim.kosluchar@fridleymn.gov

ANDOVER PUBLIC WORKS FACILITY
Dave Berkowitz, Director of Public Works
p: (763) 767-5133
e: d.berkowitz@andovermn.gov

MOUNDS VIEW PUBLIC WORKS FACILITY
Don Peterson, Public Works Director
p: (763) 717-4053
e: don.peterson@ci.mounds-view.mn.us

MONTICELLO PUBLIC WORKS STUDY
Matt Leonard, Public Works Director
p: (763) 271-3271
e: matt.leonard@ci.monticello.mn.us

APPLE VALLEY PUBLIC WORKS STUDY
Matt Saam, Public Works Director
p: (952) 953-2400
e: msaam@ci.apple-valley.mn.us

LAKEVILLE PUBLIC WORKS STUDY
Paul Oehme, Public Works Director
p: (952) 985-2700
e: poehme@lakevillemn.gov
**Mr. Oehme was also the public works director at Chanhassen where we worked with him on their new facility completed in 2010.*

F. EXPERIENCE WITH CONSTRUCTION MANAGER

Over the years Oertel Architects has worked with Construction Managers on several projects, most of which are public works facilities. We view the Construction Manager as a vital part of our team. RJM, the design team, the City of Ramsey, and other stakeholders will work as a unified team to ensure the success of your project. We will assist RJM in the development of accurate and up-to-date cost estimates throughout the project and develop bid packages that will provide the most benefit to the interest of the City, the budget, and the schedule.

PROJECTS THAT UTILIZED A CONSTRUCTION MANAGER:

- Fridley Public Works *(McGough Construction)*
- Andover Public Works *(RJM Construction)*
- Chanhassen Public Works *(RJM Construction)*
- Little Canada Public Works (*James Steele Construction)*
- Edina Public Works *(JE Dunn Construction)*
- Waconia Public Works *(Kraus Anderson Construction)*
- Steele County Highway Department/ Public Works *(AMCON)*
- The Legacy *(RJM Construction)*
- Portland Tower *(RJM Construction)*

OERTEL ARCHITECTS

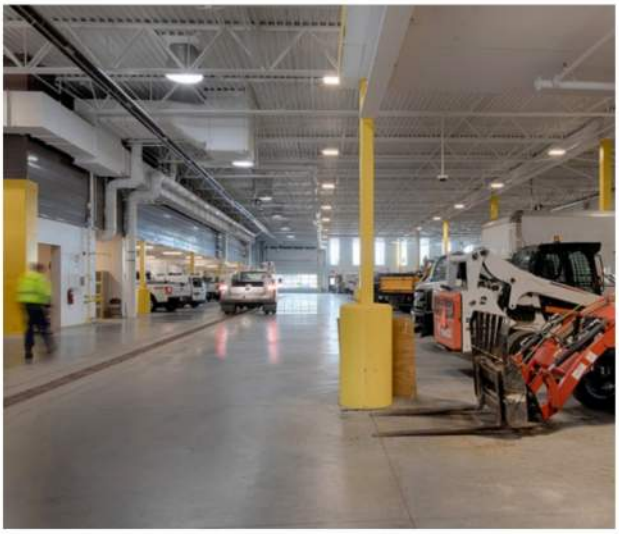
G. PUBLIC WORKS EXPERIENCE *(in the last 7 years)*



FRIDLEY PUBLIC WORKS FACILITY

The new City of Fridley Public Works facility is one building component of a larger realization of a city facility campus including their new city hall and public safety center, outdoor gathering space, and large stormwater treatment area. Oertel Architects was responsible for the public works portion of the project. Some of the key features of the public works facility include: conditioned vehicle storage for the entire fleet, on-site cold storage for equipment, on-site salt storage and fueling facilities, separation of clean and dirty daily operations (office administration vs. maintenance areas).







OERTEL ARCHITECTS

G. PUBLIC WORKS EXPERIENCE *(in the last 7 years)*



MOUNDS VIEW PUBLIC WORKS FACILITY

Oertel Architects has been working with the City of Mounds View on the analysis and evaluation of their existing public works operations since 2015. We met with city staff to kick-off the in-depth study and gain background information on the Public Works Department's current operations and any future aspirations and expectations. The existing facility, site, and building were due for a number of improvements and expansions to allow the public works department to better serve the City of Mounds View. In 2016 our firm was selected to proceed with a design for a new facility and the construction wrapped up in the spring of 2018.







OERTEL ARCHITECTS

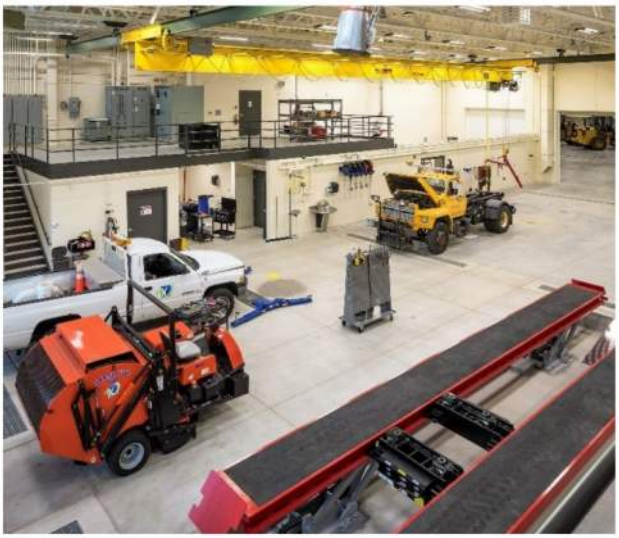
G. PUBLIC WORKS EXPERIENCE *(in the last 7 years)*



WAITE PARK PUBLIC WORKS

The Waite Park public works facility project began with multiple masterplans to explore the current and future needs of the entire site. The site design was planned for the current public works facility along with the future requirements of a community center, a fire station, and the associated infrastructure needs. The master plan of the entire site occurred in conjunction with the development and construction of an adjacent roadway which will also serve the future amphitheater that we are working on. All of the utility and infrastructure requirements had to be planned during the masterplan/study phase of the project in order to avoid costly changes in the future.







OERTEL ARCHITECTS

G. PUBLIC WORKS EXPERIENCE *(in the last 7 years)*



MANKATO TRANSIT FACILITY

The building is an addition to the existing, 1960's City of Mankato Public Works Facility, which was recently purchased and inhabited by the City of Mankato from MnDOT. The bus parking area is approximately 40,000 square feet of parking for up to 35 full size buses. This was a requirement of the Federal Transit Authority funding to accommodate a future, larger, regional bus fleet. The maintenance bays include a full drive-thru bay that allows for full height lifting of the bus for undercarriage maintenance and also features a pull-in / pull-out in-ground oil changing pit, which is the preferred method for changing oil on this type of vehicle. Some of the features of this project that were implemented include bird-safe glass, increase stormwater management practices, increased mechanical and electrical equipment control and sensitivity and renewable energy generation (solar panels).





OERTEL ARCHITECTS

G. PUBLIC WORKS EXPERIENCE *(in the last 7 years)*



ANDOVER PUBLIC WORKS FACILITY

The City of Andover Public Works Facility project was programmed and designed as a two phase implementation to achieve the space needs of the department while meeting available funding resources. The first phase, which is scheduled for completion of construction and occupancy in early 2020, was the vehicle and equipment maintenance facility, an unconditioned equipment storage building, fleet fueling facility and site development and improvements. The second phase, which is scheduled for funding and planning in 15 years, will include a complete heated storage building for the entire department's vehicle and equipment fleet and complete administrative and staff support spaces. Phase 1 of the public works facility improvements is a $12 Million project.





OERTEL ARCHITECTS

G. PUBLIC WORKS EXPERIENCE *(in the last 7 years)*

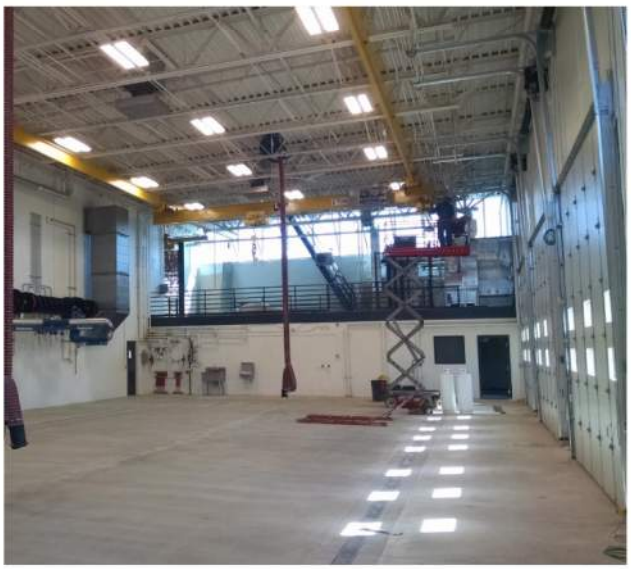
MnDOT PLYMOUTH TRUCK STATION EXPANSION

As metro communities mature and approach 100% build-out, more and more agencies are looking to renovate and expand facilities on existing sites. The project scope consisted of site upgrades to drainage, paving, and fencing and the construction of a 38,600 square foot addition that would house additional fleet parking, multiple wash bays, and consolidated maintenance and office functions. The existing building would be retrofitted for code compliance (fire, ADA, etc.) and dedicated to bridge crew staff and operations. During the initial site preparation phase, a high level of soil contamination was discovered throughout the site. This discovery threatened to shut down the project. The design team, owner, and contractor worked together to design and implement a comprehensive and thoughtful approach that combined material removal and contaminate encapsulation to mitigate potential costs and to keep the project moving forward. Various sustainable design strategies were implemented for this project. These include but are not limited to; clerestory windows with stepped daylighting controls, energy-efficient overhead doors, CO/NO2 sensors for building exhaust, dual-level lighting fixtures, occupancy sensors, high-efficiency gas boilers, and unit heaters, and heat-recovery units. These strategies represent a 28% reduction in Energy Use Intensity and will result in an estimated energy cost savings of $18,700 annually when compared to a code baseline building.









G. PUBLIC WORKS EXPERIENCE *(in the last 7 years)*



STEELE COUNTY PUBLIC WORKS FACILITY

The Steele County Highway Department project began as a study after the existing facility was condemned by FEMA due to damage from a flood. The study phase included analyzing the options of reconstructing on the existing site, purchasing an existing building to remodel, or purchasing undeveloped land for new construction. Due to limitations of existing options, a new site was deemed most cost-effective. The final project consists of the main building, fuel island, and salt/sand storage facility with provisions for a future cold storage building. The size of the site also allowed a layout to accommodate a future County department building or sale of a portion of the site to a commercial entity. The project went through the B3 Benchmarking process which required life-cycle cost and payback analysis of several items including a photovoltaic system, energy recovery systems, lighting control systems, increased insulation and opening

Above: *A photo of the new facility*

Below: *A view of the existing flooded facility*





OERTEL ARCHITECTS

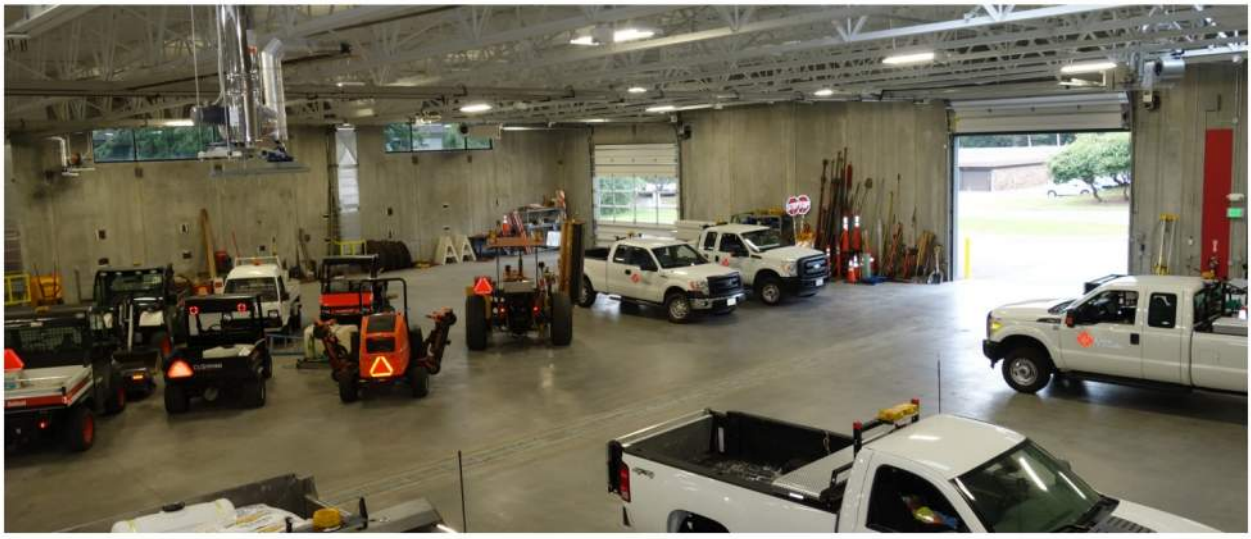
G. PUBLIC WORKS EXPERIENCE *(in the last 7 years)*



LITTLE CANADA PUBLIC WORKS FACILITY

The Little Canada Public Works Facility project involved consolidating and relocating the existing public works department to an industrial site in the center of the city. We worked with a Construction Manager early in the process to come up with a design that met the needs of the city while respecting their original budget constraints. The building was designed for flexibility, growth, and adaptation for use by the department for the next 30 years.





OERTEL ARCHITECTS

G. CONSULTANT EXPERIENCE *(SRF)*

SRF Projects for the City of Ramsey:

- Ramsey Quiet Zone Update Letter
- Preliminary Investigation of 2nd Parking Ramp at the COR
- Ramsey Municipal Parking Ramp Renovations
- Mississippi Skyway Preliminary Engineering
- City of Ramsey Biking & Walking Trails
- Rum River Estates Traffic Study
- Shade Tree Cottages Traffic Study
- Town Center Gardens Traffic Study
- Ramsey Town Center AUAR Review
- Rivenwick Traffic Study
- Lord of Life – Senior Housing
- Alpine Meadows
- Wildlife Sanctuary 2nd and 3rd Additions
- Birch Hill Lodges Noise Analysis
- Sunwood Estates Noise Analysis
- Evergreen Point Noise Analysis
- River Pines Noise Analysis
- County Road 116 Access and Corridor Study
- Centex Addition Residential Development
- Royal Oaks Residential Development
- Trunk Highway 47 (149th Avenue NW Storm Sewer)

SRF Projects in the City Ramsey for Other Clients:

- Nowthen Boulevard and 170th Avenue Intersection Improvements
- Ramsey Northstar Station Construction Observation
- U.S. Highway 10 and Armstrong Boulevard Grade Separation

OERTEL ARCHITECTS

G. CONSULTANT EXPERIENCE *(EP)*

Emauelson Podas Relevant Experience:

- Woodbury Public Works, Woodbury, Minn.
- Rogers Police Station – Rogers, MN
- Minnetrista Public Safety Building – Minnetrista, MN
- Mound Fire Station – Mound, MN
- Shakopee Mdwekanton Sioux Community Fire Station – Prior Lake, MN
- Shoreview Maintenance Facility, Shoreview, Minn. (LEED Gold Certified)
- Washington County Public Works Facility, Stillwater, Minn.
- Wright County Highway Department Facility, Buffalo, Minn.
- City of Minneapolis East Side Offices & Fleet Service Center, Minneapolis, Minn. (pursuing LEED Gold)
- Woodbury Public Works, Woodbury, Minn.
- St. Louis Park City Hall, St. Louis Park, Minn.
- Apple Valley City Hall, Apple Valley, Minn.

Meyer Borgman Johnson Relevant Experience with Oertel Architects:

- City of Eagan- Bridle Ridge Park Building
- City of Burnsville Alimagnet Park Dugouts
- City of Crystal – Becker Park Restroom Building
- City of Crystal Community Center Operable Partition
- City of South Saint Paul Cold Storage Facility
- City of Waite Park - River's Edge Park Building
- City of Waite Park - River's Edge Wood Framed Structure Revision
- Cleary Lake Park Maintenance Building- Three Rivers Park District
- Cobblestone Park Pavilion and Restroom Building
- Eagan Public Works
- Eagan Public Works Utility Storage Building
- Hilltop City Hall Addition
- National Guard - New Ulm Vehicle Maintenance Facility
- Steele County Public Works Facility
- Trapp Farm Park Building
- Waconia Square City Park
- Waite Park Amphitheater
- Waite Park Community Park
- Waite Park Pavilion - Preliminary Design
- Waite Park Restroom Building
- Winsted Ballpark Retaining Wall Review

OERTEL ARCHITECTS

I. PROOF OF INSURANCE

ACORD

CERTIFICATE OF LIABILITY INSURANCE

DATE (MM/DD/YYYY)

THIS CERTIFICATE IS ISSUED AS A MATTER OF INFORMATION ONLY AND CONFERS NO RIGHTS UPON THE CERTIFICATE HOLDER. THIS CERTIFICATE DOES NOT AFFIRMATIVELY OR NEGATIVELY AMEND, EXTEND OR ALTER THE COVERAGE AFFORDED BY THE POLICIES BELOW. THIS CERTIFICATE OF INSURANCE DOES NOT CONSTITUTE A CONTRACT BETWEEN THE ISSUING INSURER(S), AUTHORIZED REPRESENTATIVE OR PRODUCER, AND THE CERTIFICATE HOLDER.

IMPORTANT: If the certificate holder is an ADDITIONAL INSURED, the policy(ies) must be endorsed. If SUBROGATION IS WAIVED, subject to the terms and conditions of the policy, certain policies may require an endorsement. A statement on this certificate does not confer rights to the certificate holder in lieu of such endorsement(s).

PRODUCER	CONTACT NAME: Jeanne Danmeier
H. Robert Anderson and Associates, Inc. 8201 Norman Center Drive Suite 220 Bloomington MN 55437	PHONE (A/C, No, Ext): (952) 893-1933 FAX (A/C, No): (952) 893-1819 E-MAIL ADDRESS:

INSURER(S) AFFORDING COVERAGE	NAIC #
INSURER A: The Charter Oak Fire Ins. Co.	
INSURER B: Travelers Property Casualty Co	
INSURER C: The Phoenix Insurance Company	
INSURER D: XL Specialty Insurance Co.	37885
INSURER E:	
INSURER F:	

INSURED

Oertel Architects, Ltd.
1795 St. Clair Avenue
St. Paul MN 55105

COVERAGES **CERTIFICATE NUMBER:** 2019 - 2020 1 **REVISION NUMBER:**

THIS IS TO CERTIFY THAT THE POLICIES OF INSURANCE LISTED BELOW HAVE BEEN ISSUED TO THE INSURED NAMED ABOVE FOR THE POLICY PERIOD INDICATED. NOTWITHSTANDING ANY REQUIREMENT, TERM OR CONDITION OF ANY CONTRACT OR OTHER DOCUMENT WITH RESPECT TO WHICH THIS CERTIFICATE MAY BE ISSUED OR MAY PERTAIN, THE INSURANCE AFFORDED BY THE POLICIES DESCRIBED HEREIN IS SUBJECT TO ALL THE TERMS, EXCLUSIONS AND CONDITIONS OF SUCH POLICIES. LIMITS SHOWN MAY HAVE BEEN REDUCED BY PAID CLAIMS.

INSR LTR	TYPE OF INSURANCE	ADDL INSD	SUBR WVD	POLICY NUMBER	POLICY EFF (MM/DD/YYYY)	POLICY EXP (MM/DD/YYYY)	LIMITS	
A	X COMMERCIAL GENERAL LIABILITY CLAIMS-MADE X OCCUR GEN'L AGGREGATE LIMIT APPLIES PER: X POLICY PRO-JECT LOC OTHER:			680 0J753878 19	5/8/2019	5/8/2020	EACH OCCURRENCE DAMAGE TO RENTED PREMISES (Ea occurrence) MED EXP (Any one person) PERSONAL & ADV INJURY GENERAL AGGREGATE PRODUCTS - COMP/OP AGG	$ 2,000,000 $ 300,000 $ 5,000 $ 2,000,000 $ 4,000,000 $ 4,000,000
A	AUTOMOBILE LIABILITY ANY AUTO ALL OWNED AUTOS SCHEDULED AUTOS X HIRED AUTOS X NON-OWNED AUTOS			680 0J753878 19	5/8/2019	5/8/2020	COMBINED SINGLE LIMIT (Ea accident) BODILY INJURY (Per person) BODILY INJURY (Per accident) PROPERTY DAMAGE (Per accident)	$ 2,000,000 $ $ $
B	X UMBRELLA LIAB X OCCUR EXCESS LIAB CLAIMS-MADE DED X RETENTION $ 10,000			CUP 1H39896A 19	5/8/2019	5/8/2020	EACH OCCURRENCE AGGREGATE	$ 2,000,000 $ 2,000,000
C	WORKERS COMPENSATION AND EMPLOYERS' LIABILITY ANY PROPRIETOR/PARTNER/EXECUTIVE OFFICER/MEMBER EXCLUDED? (Mandatory in NH) Y/N If yes, describe under DESCRIPTION OF OPERATIONS below	N/A		UB-4K870952-19	5/8/2019	5/8/2020	X PER STATUTE OTH-ER E.L. EACH ACCIDENT E.L. DISEASE - EA EMPLOYEE E.L. DISEASE - POLICY LIMIT	$ 500,000 $ 500,000 $ 500,000
D	Professional Liability			DPR 9942668	5/15/2019	5/15/2020	Each Claim/ Each Policy Year Aggregate	$2,000,000 $4,000,000

DESCRIPTION OF OPERATIONS / LOCATIONS / VEHICLES (ACORD 101, Additional Remarks Schedule, may be attached if more space is required)

If required by written, executed contract with Insured, the Owner is additional insured under above general liability coverage, per that policy's language; such coverage is primary.
If required by written, executed contract with Insured, the Owner is additional insured under above automobile liability, per that policy's language; such coverage is primary.

This certificate or memorandum of insurance does not affirmatively or negatively amend, extend, or alter the coverages afforded by the insurance policies.

CERTIFICATE HOLDER

CANCELLATION

SHOULD ANY OF THE ABOVE DESCRIBED POLICIES BE CANCELLED BEFORE THE EXPIRATION DATE THEREOF, NOTICE WILL BE DELIVERED IN ACCORDANCE WITH THE POLICY PROVISIONS.

AUTHORIZED REPRESENTATIVE

Theresa M. Anderson

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INS025 (201401)

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OERTEL ARCHITECTS

J. PROPOSED FEE

City of RAMSEY	OERTEL ARCHITECTS	EMANUELSON PODAS *(Mechanical & Electrical)*	SRF *(Civil Engineering & Landscape Architecture)*	MEYER BORGMAN JOHNSON *(Structural Engineering)*	EXPENSES	PHASE TOTALS
PROGRAMMING / SCHEMATIC DESIGN	$6,570	-	$5,600	$2,000	$76.05	$14,246.05
DESIGN DEVELOPMENT	$23,820	$39,000	$14,200	$30,800	$152.10	$107,972.10
CONSTRUCTION DOCUMENTS	$153,686	$66,000	$16,000	$20,400	$608.40	$256,694.40
CONSTRUCTION ADMINISTRATION	$118,400	$27,000	$9,900	$14,800	$988.66	$171,088.66
RENOVATION & REMODEL	$14,490	$5,000	-	$16,000	-	$35,490.00
DISCIPLINE TOTALS:	$316,966	$137,000	$45,700	$84,000	$1,825.20	
					TOTAL NOT-TO-EXCEED FEE:	$585,491.20

HOURS PER PHASE *(blended hourly rate shown beneath each discipline)*	OERTEL ARCHITECTS *(blended hourly rate: $100.78/hr.)*	EMANUELSON PODAS *(blended hurly rate: $140/hr.)*	SRF *(blended hourly rate: $125/hr.)*	MBJ *(blended hourly rate: $128.33/hr.)*	PHASE TOTALS
PROGRAMMING / SCHEMATIC DESIGN	54	-	44.8	15.6	114.4
DESIGN DEVELOPMENT	240	278.6	113.6	240	643.6
CONSTRUCTION DOCUMENTS	1,703.2	471.4	128	159	2,461.6
CONSTRUCTION ADMINISTRATION	995	192.8	79.2	115.3	1,382.3
RENOVATION & REMODEL	153	35.7	-	124.7	313.4
TOTAL HOURS:	3,145.20	978.6	365.6	654.6	5,144

CONCLUSION

Thank you again for the opportunity to submit our qualifications to you. The planning and design of public works facilities is our firm's primary specialty. Oertel Architects has first-hand knowledge and field-tested experience of what works and what doesn't in a maintenance facility. Our experience is hard to match. We dedicate our time to maintaining a high level of expectations and quality within this sector. More important than all of this, we are problem solvers and we aim to do our best to provide our clients with the best value possible. If there is anything further that we can provide to demonstrate our commitment to making your project a success, please let us know.

CONTACT US

Oertel Architects
Andrew Cooper, AIA
1795 St. Clair Avenue
Saint Paul, MN 55105
p: (651) 696-5186 ext. 313
acooper@oertelarchitects.com

CC Regular Session **7. 3.**

Meeting Date: 02/11/2020

By: Kathy Schmitz, Administrative Services

Information

Title

Report from Public Works Committee.
The Public Works Committee held its regular meeting on January 21, 2020 and discussed the following cases:
1. 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: Motion for City Council to ratify the recommendation of the Public Works Committee 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. T**his portion of the Report from Public Works Committee was pulled from the Consent Agenda to be considered as Regular Agenda Item 7.03.**

~~2. Consider City Council Recommendation to Indefinitely Suspend Pavement Sealcoating Program: Motion for City Council to ratify the recommendation of the Public Works Committee to table the recommendation related to the City's annual sealcoating program to the February meeting.~~

~~3. Consider City Council Recommendation to Accept Feasibility Report for 2020 Pavement Overlay Improvements, Improvement Project No. 20-02: Motion for City Council to ratify the recommendation of the Public Works Committee to direct staff to bring back additional information to the Committee at the next meeting related to both options one and option three.~~

Purpose/Background:

1. 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. Motion for City Council to ratify the recommendation of the Public Works Committee 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.

2. 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. Motion for City Council to ratify the recommendation of the Public Works Committee to table the recommendation related to the City's annual sealcoating program to the February meeting.

3. 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. 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. City Engineer Westby stated that staff can do a deeper dive to determine what the potential costs would be 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. Ratify the recommendation of the Public Works Committee for City Council to direct staff to

bring back additional information to the Committee at the next meeting related to both options one and option three.

Recommendation:

1. Motion for City Council to ratify the recommendation of the Public Works Committee 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.

2. Motion for City Council to ratify the recommendation of the Public Works Committee to table the recommendation related to the City's annual sealcoating program to the February meeting.

3. Motion for City Council to ratify the recommendation of the Public Works Committee to direct staff to bring back additional information to the Committee at the next meeting related to both options one and option three.

Action:

Motion for City Council to ratify the recommendation of the Public Works Committee as follows:

1. Motion for City Council to ratify the recommendation of the Public Works Committee 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.

2. Motion for City Council to ratify the recommendation of the Public Works Committee to table the recommendation related to the City's annual sealcoating program to the February meeting.

3. Motion for City Council to ratify the recommendation of the Public Works Committee to direct staff to bring back additional information to the Committee at the next meeting related to both options one and option three.

Attachments

Agenda

Form Review

Form Started By: Kathy Schmitz Started On: 02/19/2020 02:47 PM

Final Approval Date: 02/19/2020

City of Ramsey
Agenda
Public Works Committee
Tuesday, January 21, 2020
5:30 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 minutes dated November 19, 2019.

5. Committee Business

1. 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

2. Consider City Council Recommendation to Indefinitely Suspend Pavement Sealcoating Program

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

6. Committee/Staff Input

1. Receive Update on Bunker Lake Boulevard Reconstruction - Armstrong Boulevard to Ramsey Boulevard

2. Staff Updates on Improvement Projects and Items of Interest

3. Review Future Topics Calendar

7. Adjournment

Public Works Committee **4. 1.**

Meeting Date: 01/21/2020
Submitted For: Grant Riemer, Engineering/Public Works
By: MaryJo Warner, Engineering/Public Works

Title:

Approve the following meeting minutes.
1. Public Works Committee meeting minutes dated November 19, 2019.

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 November 19, 2019.

Action:

Motion to approve meeting minutes dated November 19, 2019.

Attachments

November Minutes

Form Review

Inbox	Reviewed By	Date
Mark Riverblood	Mark Riverblood	01/13/2020 03:19 PM
Bruce Westby	Bruce Westby	01/14/2020 01:37 PM
Grant Riemer	Grant Riemer	01/14/2020 01:45 PM
Kurt Ulrich	Kurt Ulrich	01/16/2020 09:57 AM
Form Started By: MaryJo Warner		Started On: 01/13/2020 11:12 AM
Final Approval Date: 01/16/2020		

PUBLIC WORKS COMMITTEE
CITY OF RAMSEY
ANOKA COUNTY
STATE OF MINNESOTA

The Public Works Committee conducted a regular meeting on Tuesday, November 19, 2019, 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
Parks and Assistant Public Works Superintendent Mark Riverblood
City Engineer Bruce Westby

1. CALL TO ORDER

Chairperson Kuzma called the regular meeting of the Public Works Committee to order at 5:36 p.m.

2. CITIZEN INPUT

There was none.

3. APPROVE AGENDA

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

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

4. APPROVE MINUTES

4.01: Approve October 15, 2019, Meeting Minutes

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

Regular Meeting Minutes dated October 15, 2019

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

5. COMMITTEE BUSINESS

5.01: Consider Replacing Monument and Shelter Roof at Rivers' Bend Park and HVAC Replacement at Central Park

Parks and Assistant Public Works Superintendent Riverblood stated that the purpose of this case is to consider a recommendation to City Council for authorization to perform maintenance/replacement activity for two structures at Rivers' Bend Park, and one of three HVAC systems at Central Park's buildings. Funding is request to be allocated from the City's Capital Maintenance Fund (not the Park Trust Fund) and therefore is being brought to the Public Works Committee, because the project funding source is limited, and also to be used for other (non-park) capital maintenance needs of the community. In 2017, the Council expanded the scope of this fund (previously entitled Park Maintenance Fund) to allow use for other non-park capital maintenance needs. The facilities this case discusses may be considered higher priority maintenance items.

Parks and Assistant Public Works Superintendent Riverblood stated that if the Committee recommends replacement of the three items utilizing the Capital Maintenance Fund, staff would proceed to obtain competitive quotes consistent with the City's Purchasing Policy for re-roofing the hex shelter at Rivers' Bend and also the HVAC replacement at Central Park. The HVAC system is anticipated to cost less than $15,000; the roof replacement to a standing seam steel roof with trim, with sandblasting and sealing the underside and support columns at less than $18,000. Should the costs be consistent with the estimates, staff will proceed upon City Council ratification of the Public Works Committee recommendation. For the monument replacement at Rivers' Bend, the replacement cost is unknown, as neither the design nor specifications are fully understood at this time. The cost may be between $8,000 to $15,000, or more. Staff proposes utilizing the approved sign and streetscape guide and amending these examples to something suitable for the park. This project would subsequently be routed for Council consideration and approval via the Park and Recreation Commission. The Capital Maintenance Fund is proposed for funding in a total amount for the two projects in an amount not to exceed $33,000. This does not include the park monument sign, which would advance for consideration separately. Staff recommends replacing the HVAC system and roof shelter as described.

Councilmember Riley commented that the monument sign clearly needs to be replaced. He noted that as future signs are replaced, there could then be similar entrance signs installed at those parks for consistency.

Parks and Assistant Public Works Superintendent Riverblood agreed that staff would continue to review parks signs as they are in need of replacement to find something consistent but also appropriate for the scale of the park. He noted that there may be costs savings in bundling the Rivers' Bend Park monument sign with the City monument sign that will be installed at Bunker Lake Boulevard and 47.

Councilmember Menth commented on the possibility of vandalism with a wooden sign.

Parks and Assistant Public Works Superintendent Riverblood referenced a steel sign that was installed at another location and has not experienced any vandalism. He noted that option could be reviewed as well and perhaps that become a standard for community park signs.

Motion by Councilmember Riley, seconded by Councilmember Menth, to recommend to City Council the replacement of the HVAC system at Central Park, and roof shelter at Rivers' Bend Park as discussed, at a not to exceed cost of $33,000 from the Capital Maintenance Fund.

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

Councilmember Riley noted that these are maintenance items for parks that already exist. He stated that there has been discussion that parks are not always as up to date as desired and asked if there are other park projects that should be considered to ensure they are usable and long lasting.

Parks and Assistant Public Works Superintendent Riverblood explained that only so many projects can be managed at one time. He noted that the projects with the highest needs have been brought forward first. He noted that the proposed budget for 2020 includes a $90,000 line item for trail maintenance in order to keep pace on the needed improvements. He noted that Ford Brook Park is proposed to receive updated playground equipment in 2020.

5.02: Consider Recommending City Council Approval to Solicit Requests for Proposals to Prepare Plans and Specifications for Bunker Lake Boulevard/CSAH 116 Improvements, Improvement Project #20-03

City Engineer Westby stated that the purpose of this case is to consider recommending City Council approval to solicit Requests for Proposals to prepare plans and specifications for Bunker Lake Boulevard/CSAH 116 Improvements, Improvement Project #20-03. 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 JPA, including the two amendments were included in the case.

City Engineer Westby stated that 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 was had 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, railroad 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. It 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.

City Engineer Westby stated that Anoka County Highway Department staff recently informed City staff that they want to expand Bunker Lake Boulevard to a four lane divided highway all the way to 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 Ramey begin designing the required improvements for Bunker Lake Boulevard between Armstrong Boulevard and Ramsey Boulevard per the JPA. He stated that in speaking with Economic Development Manager Sullivan, because of the use of TIF it would be recommended to complete the project in 2021. City staff is in the process of developing a Request for Proposals (RFP) to solicit engineering services for the preparation of plans and specifications for improvements to Bunker Lake Boulevard between Armstrong Boulevard and Ramsey Boulevard. Staff is prepared to present a draft RFP to the City Council on December 10, 2019, and to request authorization to solicit proposals directly to engineering companies as selected by Anoka County. Staff therefore requests that the Public Works Committee recommend City Council approval of this request.

Chairperson Kuzma asked if the speed would change.

City Engineer Westby confirmed that would be part of the traffic study.

Councilmember Menth asked and received confirmation that the estimated cost of $5,000,000 would only apply to the section from Armstrong to Ramsey Boulevard.

Councilmember Riley asked why the City would be responsible for paying and improving a County road. He asked if there is something historical that relates to the creation of that JPA.

City Engineer Westby stated that he could review information from the past to determine where that decision came from.

Councilmember Riley stated that he would want to better understand the reasoning for the JPA and why the financing and construction of the County road would fall to the City.

City Engineer Westby stated that he will do his best to find that information in preparation for bringing this case forward to the City Council in the future.

Parks and Assistant Public Works Superintendent Riverblood stated that perhaps part of the discussion should be what would happen if the City did not move forward with this project. He noted that there may be related impacts to the Highway 10 project as this would be a detour route for that project.

City Engineer Westby agreed that would be a concern to him, in that Bunker Lake Boulevard will be a detour route for Highway 10.

Councilmember Riley reviewed some of the answers he would want from the County. He noted that if the City is responsible for building and financing the improvements, he would think the City should have additional say in the allowed access points onto the roadway.

Chairperson Kuzma asked if there is a timeline for this process.

City Engineer Westby replied that the County is hoping to have the City segment and County segment completed by 2022. He noted that while there is no connection to the projects and they can be done independently, it may be helpful to have one segment completed before the other. He confirmed that the item does not have to move forward to the Council on December 10th.

Chairperson Kuzma confirmed the consensus of the Committee for the additional information requested to be brought back to the Committee before considering moving this item forward.

Councilmember Riley noted that once the questions are answered, it may make sense to bid the two segments together as one project, even if the City is funding one segment.

Motion by Councilmember Riley, seconded by Councilmember Menth, to direct staff to gather additional information on the history on the conditions of the JPA and discuss options with Anoka County related to renegotiating the JPA, working together to find efficiencies, and opportunities for an additional access onto Bunker Lake Boulevard.

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

6. COMMITTEE / STAFF INPUT

6.01: Update on New PW Campus

Public Works Superintendent Riemer reported that staff visited two sites (Elk River and Chanhassen). He highlighted items that he liked from each of the locations as well as input he received from the staff at those locations. He noted that he will be visited Woodbury the following week. He stated that the draft RFP was sent to the City Attorney today for review and

once approved would be sent out for bids. He hoped that a design team would be brought on in January, noting that it would follow a similar process as the process to select RJM.

Councilmember Menth provided input on electrical services.

Councilmember Riley commented that the underbody wash bay seemed to make sense. He asked if the Ramsey police would use the public works facility for washing.

Public Works Superintendent Riemer commented that if the facilities were available, he would think the police would most likely want to use them.

Councilmember Riley stated that he is confident that staff will be the most knowledgeable on the elements that will be needed.

Parks and Assistant Public Works Superintendent Riverblood stated that he found it useful to go on the tours not only to see the sites in action but also to obtain input from those staff members. He commented that the designated meeting spaces and conference rooms for morning meetings will be helpful. He noted that Chanhassen also uses some of those spaces for voting precincts.

6.02: Staff Updates on Improvement Projects and Items of Interest

City Engineer Westby provided updates on City improvement projects, Anoka County improvement projects, and MnDOT improvement projects.

Regarding the COR Infiltration Basin project, City Engineer Westby discussed the two soil stockpiles on site. One stockpile includes approximately 8,000 cubic yards of clean sand, and the other includes just under 12,000 cubic yards of sandy topsoil, He said the clean sand can be used as structural fill on City-owned properties in The COR, and that Staff is developing plans for such use and that this work can be completed in 2020. He added that the sandy topsoil has very little value to the City since it cannot be used as structural fill and would generally cost more to haul and stockpile elsewhere than it would cost to import new material. It was the consensus of the Committee that the City should retain the stockpile of clean sand for use in further developing The COR, and that staff could continue discussions with the River Walk Village contractor, and/or other contractors or developers, to remove the sandy topsoil stockpile as soon as possible. The consensus of the Committee was that if the topsoil cannot be used in a timely and cost-effective manner to prepare The COR for development, the topsoil may instead be offered to builders, contractors and/or developers at no cost to allow for its removal as soon as possible.

City Engineer Westby provided an update on other items of interest.

Councilmember Riley asked for an update on the sealcoat study.

City Engineer Westby reported that staff has collected data and is tabulating the results to present to the Committee in January.

Chairperson Kuzma noted that a December meeting is not needed.

Motion by Councilmember Menth, seconded by Councilmember Riley, to cancel the December meeting.

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

6.02: Review Future Topics Calendar

City Engineer Westby provided a brief review.

7. ADJOURNMENT

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

Motion carried.

The regular meeting of the Public Works Committee adjourned at 6:57 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: 01/21/2020

By: Chris Anderson, Community Development

Title:

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

Purpose/Background:

The City of Ramsey has been awarded $28,000 in grant funds through the Metropolitan Council's 2019-2022 Water Efficiency Grant Program (the "Program") for use in a rebate program. As the name of the Program implies, the purpose of the grant is to implement water efficient technologies to reduce the demand on water supply.

There are two (2) primary financial requirements of the Program. First, the municipality must contribute twenty-five percent (25%) of the grant award, which equates to $9,340, Second, that rebate recipients must also have a financial contribution (e.g. the grant funds and the City contribution cannot entirely cover the cost of the purchase). Other important eligibility requirements include the rebate recipient being a municipal water customer (this means that anyone on a private well is not eligible), only applicable to replacement devices (meaning that new construction is not eligible), and the rebate is only applicable for the cost of the device and its installation, excluding any owner labor costs.

Timeframe:

Staff estimates 20 minutes for the presentation and questions.

Observations/Alternatives:

While the funds are provided through the Metropolitan Council via the Clean Water, Land and Legacy Amendment, grant recipients are responsible for developing their own program. Staff from the Engineering, Utilities, Community Development and Administration Departments met to discuss the framework for a rebate program. While it was clear that more efficient irrigation controllers would likely provide the biggest water savings, it was acknowledged that that alone would exclude a number of otherwise eligible property owners (all properties that do not have in-ground irrigation systems). Thus, it was agreed to also consider WaterSense labeled toilets as another option for rebates.

During the summer months, the greatest demand for water comes from irrigation. Therefore, replacement of older, clock-timer irrigation controllers with a WaterSense labeled smart controller is one of the eligible rebate options. Additionally, an irrigation audit, which helps ensure an irrigation system is operating efficiently and accurately, conducted by a WaterSense certified irrigation professional, is another eligible rebate option. If residents take full advantage of this part of the Program, it could result in an estimated savings of approximately 1 million gallons of water (based on numbers provided by the Metropolitan Council from the 2015-2017 Water Efficiency Grant Program).

As previously noted, Staff wanted to ensure that any municipal water customer (excluding new construction/new development) had an opportunity to realize both water savings and financial savings. Thus, another option available for those customers is a rebate for the replacement of older toilets with a WaterSense labeled toilet. If residents take full advantage of this part of the Program, it could result in an estimated savings of about 900,000 gallons of water (again, based on numbers provided by the Metropolitan Council from the 2015-2017 Water Efficiency Grant Program).

The rebates would be available on a first come first served basis, as long as funds last (or until the close of the program, which is June 30, 2022). Rebates for an individual device can be up to $200, and cumulatively, shall not exceed $500 per metered water supply customer. The water supply customer shall be responsible for the sales tax on the device, thus satisfying the requirement that they have a financial investment in the upgrade.

There is a wide range of price points for qualifying devices (both WaterSense labeled smart controllers and toilets). The intention is to incentivize the water efficiency upgrades significantly by having the rebate cover as much of the device cost as possible while also attempting to spread the rebates out across a number of households. There are a number of these devices that could be entirely covered by the rebate amount; however, there are also eligible devices that greatly exceed the rebate maximum. Thus, the cap on the rebate amount will help spread the funds out to benefit more property owners.

Administration of the rebate program will be coordinated by the Community Development and Engineering Departments, but will also include Finance Staff as well for issuance of the rebates. Per the required Grant Agreement, the City will have to provide quarterly reporting to the Metropolitan Council. Reporting forms will be provided by Metropolitan Council staff and is assumed to include: property address, property type (residential/commercial), device replaced, number of devices, grant amount per device, estimated annual water savings, municipal contribution, and eligible grant amount (rebate amount per device minus municipal contribution).

At their January 13, 2020 meeting, the Environmental Policy Board reviewed this case and provided support with moving forward. They did, however, note a desire for the City to offer a similar program for any property owner, regardless of whether they were a municipal water customer or not. They acknowledged that those on private wells are not eligible for this grant, but if this program is successful, it should be considered a pilot program the City could build and expand upon in the future with the goal for further reducing demand on groundwater.

Alternatives

Alternative 1: Motion to recommend the City Council authorize the execution of the Clean Water Fund Grant Agreement with the Metropolitan Council and accept the $28,000 Water Efficiency Grant. A Smart Irrigation Rebate Program has been on the Environmental Policy Board's Work Plan since 2017 and in 2019 it was added to the City Council's Strategic Plan. This grant will help accomplish that action from both plans. Furthermore, if this program proves to be valuable and effective, it could serve as a blue print for an expanded program that also includes those on private wells. Staff supports this option.

Alternative 2: Motion to recommend the City Council not execute the Clean Water Fund Grant Agreement and not accept the grant funds. If the City wants to implement any sort of incentive program to reduce the demand on drinking water supply, this action would result in the City fully funding any such program.

Funding Source:

Funding for this program would consist of three sources: $28,000 from the Water Efficiency Grant from the Metropolitan Council, $9,340 from the City's Water Fund (this is equivalent to the required 25% municipal contribution), and any rebate participant would cover the sales tax on the purchase of the device (thus satisfying the requirement for the rebate participant to have a financial contribution in the program).

Recommendation:

The Environmental Policy Board (EPB) reviewed this information at their January meeting and recommended City Council 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.

Action:

Motion 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.

Attachments

Metropolitan Council Grant Program Guidelines
City of Ramsey Application
Metropolitan Council Grant Acceptance Letter
Clean Water Fund Grant Agreement
Draft EPB Meeting Minutes Dated January 13, 2020
Resolution #20-018

Form Review

Inbox	Reviewed By	Date
Tim Gladhill	MaryJo Warner	01/16/2020 04:31 PM
Bruce Westby	MaryJo Warner	01/16/2020 04:31 PM
Grant Riemer	MaryJo Warner	01/16/2020 04:31 PM
Kurt Ulrich	Kurt Ulrich	01/16/2020 04:37 PM
Form Started By: Chris Anderson		Started On: 01/13/2020 08:23 AM
Final Approval Date: 01/16/2020		

Metropolitan Council
Water Efficiency Grant Program

Overview
The Metropolitan Council (Council) will implement a water efficiency grant program effective September 30, 2019 to June 30, 2022. Grants will be awarded on a competitive basis to municipalities that manage municipal water systems. The Council will provide 75% of the program cost; the municipality must provide the remaining 25%. Municipalities will use the combined Council and municipality funds to run their own grant or rebate programs.

Grants will be made available in amounts with a minimum of $2,000 and a maximum of $50,000. Grantees will be required to provide estimated water savings achieved through this program for Clean Water, Land & Legacy Amendment reporting purposes.

Legislative Directive - Minnesota 2019 Session Law
> $375,000 the first year and $375,000 the second year are for the water demand reduction grant program to encourage municipalities in the metropolitan area to implement measures to reduce water demand to ensure the reliability and protection of drinking water supplies. Fiscal year 2020 appropriations are available until June 30, 2021, and fiscal year 2021 appropriations are available until June 30, 2022.

Grant Program Goal
The goal of the water efficiency grant program is to support technical and behavioral changes that improve municipal water use efficiency in the seven-county metropolitan area.

Critical Points to Remember
- The applying municipality must be a water supplier
- New construction and new developments are not eligible
- Funds are for rebates or grants only; consulting and city staff time are ineligible
- Combined Council and municipality funds cannot pay for 100% of an eligible activity's cost
- A portion of each eligible activity's cost must be paid by the property owner
- Grant recipients must display the Clean Water, Land and Legacy Amendment logo and the Metropolitan Council logo on program-related web pages and paper communications

Grant Program Structure: Administration and Funding
The Water Efficiency Grant Program will be administered by Metropolitan Council Environmental Services (MCES) and will be funded with $750,000 appropriated by the 2019 Minnesota Legislature. Grant applications will be reviewed and ranked by the MCES Water Supply Planning Unit staff.

Grants are only for water efficiency programs offering rebates or grants to property owners who are customers of the municipal water supply system and who replace specified water using devices with approved devices that use substantially less water.

Grants will be awarded to municipalities in amounts ranging from $2,000 to $50,000 for providing rebates or grants to property owners. Municipalities will be responsible for the design and operation of their rebate or grant program and its details. Grant payments to the municipality will be for 75% of approved program amounts. The municipality must provide the remaining 25% of the program cost. Municipality rebates or grants are eligible for reimbursement on device replacements conducted September 30, 2019 through June 30, 2022.

Here is an example showing the grant funding design:

Metropolitan Council Grant Amount	**$15,000**
Municipality Match	$5,000
Municipality Grant/Rebate Program Total	$20,000

Eligibility

Per legislative language, the grant program is limited to municipalities in the seven-county metropolitan area.

Municipalities eligible per above must apply to participate and, if approved, sign a standard Council Grant Agreement, before any eligible rebates or grants can be submitted for reimbursement. Agreements shall require that municipalities:

- Entirely pass through grants received (as is being done by MCES)
- Verify purchase of devices to receive grants
- Retain records and cooperate with any audits
- Conduct all communications with property owners and ensure all written communications to property owners include both the Clean Water, Land and Legacy Amendment and the Metropolitan Council's logo
- Provide quantitative information for state reporting purposes

Eligible water efficiency devices consist of the following:

- Toilet replacement with a US EPA WaterSense labeled toilet
- Irrigation controller replacement with a US EPA WaterSense labeled controller
- Clothes washing machine replacement with an US DOE Energy Star labeled clothes washing machine
- Irrigation spray sprinkler body replacement with a US EPA WaterSense labeled spray sprinkler body
- Irrigation system audit by an Irrigation Professional certified by a US EPA WaterSense program

Expenses eligible for reimbursement are the out-of-pocket cost of the device and its installation only, not to include any owner labor costs. In addition, new construction and new developments are ineligible, as this program is intended as a current infrastructure replacement program.

Application Process

- Applicants must be municipal water suppliers
- Municipalities will submit MCES supplied application form by September 30, 2019. Required information includes:
    - the municipality's rebate or grant program design and work plan
    - proposed examples of communications to property owners
    - requested total grant amount
    - estimated annual amount of water saved by the applying municipality

- Application form is available at: https://metrocouncil.org/Wastewater-Water/Funding-Finance/Available-Funding-Grants.aspx
- Submit competed application to: brian.davis@metc.state.mn.us
- Metropolitan Council will notify municipalities of grant awards and provide grant agreements by December 2, 2019.

Proposal Selection Criteria

In the event that funds requested exceed funds available, the following criteria will be used to determine the amount granted to a given municipality:

- Municipalities that are supplied 100% with groundwater
- Municipalities with identified water supply issues in Master Water Supply Plan Community Profiles or Local Water Supply Plans
- Municipalities' ratio of peak monthly water use to winter monthly water use
- Municipalities' average residential per capita water use
- The order in which applications are received and until grant funds are completely committed

Funding Process and Reporting Requirements

- Utilizing forms provided by MCES, the following information must be reported on a quarterly basis:
    - Number, type and amount of rebates or grants provided to property owners, along with each property address
    - Estimated annual gallons of water saved per device installation
    - Municipality matching funds disbursed
    - Number of unmet funding requests from property owners, if any
- Upon review and confirmation of the above information, MCES will process a grant payment in the amount of 75% of approved total rebates or grants for the reporting period.
- MCES will provide confirmation of grant balances available upon request and reserves the right to amend grant agreements, in collaboration with grantee municipality, if quarterly reporting indicates rebate or grant programs will not fully utilize grant awards within the grant period.

Qualified Activities

- Toilet replacement with a US EPA WaterSense labeled toilet: http://www.epa.gov/WaterSense/product_search.html

- Irrigation controller replacement with a US EPA WaterSense labeled controller: https://www.epa.gov/watersense/product-search

- Clothes washing machine replacement with an US DOE Energy Star labeled clothes washing machine: https://www.energystar.gov/productfinder/product/certified-clothes-washers/results

- Irrigation spray sprinkler body replacement with a US EPA WaterSense labeled spray sprinkler body https://www.epa.gov/watersense/product-search

- Irrigation system audit by an Irrigation Professionals certified by a US EPA WaterSense program https://www.epa.gov/watersense/find-pro

Reporting Example

Community	Property Street Address	Property Type	Device Replaced	Cost per Device	# of Devices	Rebate or Grant per Device	Est. Annual Water (Gal) Saved Per Device	Total Rebate or Grant	Municipality Contribution	Eligible Grant Amount
Anytown	652 Silvis St	Residential	Clothes Washer	$624.60	1	$150.00	3,000	$150.00	$37.50	$112.50
Anytown	1952 Ingram Way	Residential	Irrigation Controller	$199.99	1	$100.00	8,800	$100.00	$25.00	$75.00
Anytown	630 Gibbons Ave	Residential	Clothes Washer	$599.90	1	$150.00	3,000	$150.00	$37.50	$112.50
Anytown	4424 Barriger Blvd	Residential	Toilet	$168.00	1	$50.00	4,000	$50.00	$12.50	$37.50

Metropolitan Council Water Efficiency Grant Application Form

Applicant Information:

Municipality: _____

Municipal Utility: _____

Mailing Address: _____

Primary Contact Information: Municipality primary authorized representative (all correspondence regarding the Water Efficiency Grant Program should be addressed to individual named below):

NAME: _____

TITLE: _____

STREET: _____

CITY, ZIP: _____

PHONE: _____

EMAIL: _____

Secondary Contact Information: Municipality secondary authorized representative:

NAME: _____

TITLE: _____

STREET: _____

CITY, ZIP: _____

PHONE: _____

EMAIL: _____

Municipal Total Per Capita Water Use (2018): _____ (gallons per person-day)

Municipal Residential Per Capita Water Use (2018): _____ (gallons per person-day)

Municipal Ratio of Peak Month to Winter Month Water Use (2018): _____

Municipality's estimated annual water savings from proposed program: _____ (gallons)

Municipal Utility Grant or Rebate Program Design:

Requested Grant Amount (must equal 75% of total program budget): $_____

Required Utility Matching Amount (must equal 25% of total program budget): $_____

Will your program be a grant program or rebate program? _____

Estimated Number of Items:

Item	**Estimated Number**
Toilets	
Irrigation Controllers	
Clothes Washing Machines	
Irrigation Spray Sprinkler Bodies	
Irrigation System Audits	

Project Work Plan and Schedule:*

Task Description	Responsible Person	Start Date	Completion Date

*** Municipal utility may create own project plan and schedule form**

Communications to Property Owners:

How will your program be advertised (check all that apply):

Newsletter ____

Print Media ____

Email ____

Twitter ____

Website____

Radio ____

Television ____

Facebook ____

Nextdoor ____

Other Social Media ____

Please attach examples of proposed newsletter, print media, or email communications

Critical Points to Remember:

- The applying municipality must be a water supplier
- New construction and new developments are not eligible
- Funds are for rebates or grants only; consulting and city staff time are ineligible
- Combined Council and municipality funds cannot pay for 100% of an eligible activity's cost
- A portion of each eligible activity's cost must be paid by the property owner
- Grant recipients must display the Clean Water, Land and Legacy Amendment logo and the Metropolitan Council logo on program-related web pages and paper communications

Chris Anderson
City Planner
7550 Sunwood Drive NW
Ramsey, MN 55303

November 18, 2019

The Metropolitan Council is pleased to award the city of Ramsey the amount of $28,000 as part of our 2019-2022 Water Efficiency Grant Program. The amount of matching funds required from your municipality, based on the grant award above, is $9,340. The city of Ramsey is one of forty in the Twin Cities Metropolitan Area that applied for and was accepted into this grant program. We are pleased to report that all available grant funds have been awarded and that all applicants will receive an award.

The amount of funds requested totaled $1,393,527, while the amount of funds available is $787,600. Because funds requested exceed funds available, a set of ranking factors and an objective scoring system were developed to establish a method to distribute the available funds. A committee of three staff members reviewed the applications and developed this ranking and scoring system. If you are interested in learning more about the ranking factors and scoring system, please contact me at brian.davis@metc.state.mn.us and I will send you a detailed description of this process.

Below are some critical points to remember:

- New construction and new developments are not eligible
- Funds are for rebates or grants only; consulting and city staff time are ineligible
- Grant recipients must display the Clean Water, Land and Legacy Amendment logo and the Metropolitan Council logo on all documents which are intended for public use

The Clean Water, Land and Legacy Amendment is available here: http://www.legacy.leg.mn/legacy-logo/legacy-logo-download

To obtain electronic and print versions of the Metropolitan Council logo, please contact me at brian.davis@metc.state.mn.us.

As you prepare your municipality's grant or rebate program, please be aware that the following information must be reported on a quarterly basis, on forms to be provided by the Metropolitan Council:

- Number, type and amount of rebates or grants provided to property owners, along with each property address
- Estimated annual gallons of water saved per installation
- Municipality matching funds disbursed
- Number of unmet funding requests from property owners
- Electronically scanned copies of receipts to verify the cost of eligible devices being reported

Reporting forms and instructions will be made available in early 2020 on our website:
http://www.metrocouncil.org/Wastewater-Water/Funding-Finance/Available-Funding-Grants.aspx

Quarterly reporting periods and reporting form due dates are shown below.

Quarterly Period	Reporting Form Due Date
Jan. 1, 2020 – March 31, 2020	April 30, 2020
April 1, 2020 – June 30, 2020	July 31, 2020
July 1, 2020 – September 30, 2020	October 31, 2020
October 1, 2020 – December 31, 2020	January 31, 2021
Jan. 1, 2021 – March 31, 2021	April 30, 2021
April 1, 2021 – June 30, 2021	July 31, 2021
July 1, 2021 – September 30, 2021	October 31, 2021
October 1, 2021 – December 31, 2021	January 31, 2022
January 1, 2022 – March 31, 2022	April 30, 2022
April 1, 2022 – June 30, 2022	July 31, 2022

In early December a Grant Agreement will be mailed to your municipality for your signature. Instructions will be provided in that mailing.

Again, congratulations on your grant award. We look forward to working with you to increase the water efficiency of our region.

Sincerely,

Brian M. Davis

Brian M. Davis, Ph.D, P.G., P.E.
Senior Engineer, Water Supply Planning
Phone: 651-602-1519
brian.davis@metc.state.mn.us

CLEAN WATER LAND & LEGACY AMENDMENT

METROPOLITAN COUNCIL
CLEAN WATER FUND GRANT AGREEMENT NO. SG-13467

This Clean Water Fund Grant Agreement ("Grant Agreement") is entered into between the Metropolitan Council, a public corporation and political subdivision of the State of Minnesota ("Council") and the City of Ramsey, a municipal corporation ("Grantee").

RECITALS

1. Minnesota Session Laws 2019, 1st Special Session, chapter 2, article 2, section 9, appropriated to the Council funds from the Legacy Amendment's Clean Water Fund ("Clean Water Fund") for State fiscal years 2020 and 2021, to establish a water demand reduction grant program that encourages implementation of water demand reduction measures in municipalities in the seven-county metropolitan area.

2. The Council is authorized by Minnesota Statutes sections 473.129, subdivision 4 to apply for and use grants from the State for any Metropolitan Council purpose and may dispose of the money in accordance with the terms of the appropriation.

3. The Grantee is authorized to receive grants from the Clean Water Fund to protect, enhance and restore water quality in lakes, rivers and streams, to protect groundwater from degradation and protect drinking water sources by encouraging implementation of water demand reduction measures by municipalities in the seven-county metropolitan area to ensure reliability and protection of drinking water supplies.

4. On July 10, 2019, the Council authorized the granting of portions of the appropriation to the Grantees participating in the grant program.

5. The Grantee represents that it is duly qualified and agrees to perform all services described in this Grant Agreement to the reasonable satisfaction of the Council.

GRANT AGREEMENT

1. Term of Grant Agreement.

1.1. Effective Date. The effective date of this Grant Agreement is the date this agreement is fully executed.

1.2. Grant Activity Period. The first day of the month following the Effective Date through and including the expiration date.

1.3. Expiration Date. Upon satisfactory fulfillment of obligations, but in no event later than June 30, 2022.

1.4. Survival of Terms. The following clauses survive the expiration, termination or cancellation of this Grant Agreement; 9. Liability and Insurance; 10. Audits; 11. Government Data Practices; 13. Data Availability; 14. Governing Law, Jurisdiction and Venues; 16. Data Disclosure; 18. Future Eligibility.

2. Duties, Representations and Warranties of Grantee and Use of Grant Funds.

2.1. The Grantee agrees to conduct, administer and complete in a satisfactory manner and in accordance with the terms and conditions of this Grant Agreement the program ("Grantee Program") which is described in Grantee's application to Council for assistance under the Council's Clean Water Fund grant program. Grantee's application is incorporated into this Grant Agreement as **Exhibit A**. Grantee agrees to perform the Grantee Program in accordance with the timeline in **Exhibit B** of this Grant Agreement and to undertake the financial responsibilities described in **Exhibit B**. The Grantee has the responsibility and obligation to complete the Grantee Program as described in **Exhibit B**. The Council makes no representation or warranties with respect to the success and effectiveness of the Grantee Program. The Council acknowledges that Grantee Program work may be limited to soliciting participation by its residents and businesses in the Grantee Program and requires additional work by the Grantee only to the extent that residents and businesses choose to participate in the Grantee Program, as described in **Exhibit B.**

The Grant Funds must be entirely passed through and can only be used for authorized rebates or grants for qualifying activities.

2.2. Grantee Representations and Warranties. The Grantee represents and warrants to Council, as follows:

A. It has the legal authority to enter into this Grant Agreement and to conduct and administer the Grantee Program and use the Grant Funds for the purpose or purposes described in this Agreement

B. It has taken all actions necessary for its execution of the Agreement and has provided to Council a copy of the resolution by its governing body authorizing Grantee to enter into this Agreement.

C. It has the legal authority to undertake the Clean Water Fund Grant Program, including the Grantee's financial responsibilities in **Exhibit B**

D. As specified in Exhibit A only Grantee's authorized representative may provide certifications required in this Grant Agreement and submit pay claims for reimbursement of Grantee Program costs.

E. It will comply with all the terms of this Agreement.

F. It will comply with all requirements of Clean Water Funding legislation and appropriations, except for requirements that this Grant Agreement explicitly states will be handled by the Council.

G. It has made no material false statement or misstatement of fact in connection with the Grant Funds, and all of the information it has submitted or will submit to the Council relating to the Grant Funds or the disbursement of any of the Grant Funds is and will be true and correct. It agrees that all representations contained in its application for the Clean Water Fund Grant are material representations of fact upon which the Council relied in awarding this Grant and are incorporated into this Agreement by reference.

H. It is not in violation of any provisions of its charter or of the laws of the State of Minnesota, and there are no material actions, suits, or proceedings pending, or to its knowledge threatened, before any judicial body or governmental authority against or affecting it and is not in default with respect to any order, writ, injunction, decree, or demand of any court or any governmental authority which would impair its ability to enter into this Grant Agreement, or to perform any of the acts required of it in the Agreement.

I. Compliance with the requirements of this Grant Agreement is not prevented by, is a breach of, or will result in a breach of, any term, condition, or provision of any agreement to which it is bound.

J. The Grantee Program will not violate any applicable zoning or use statute, ordinance, building code, rule or regulation, or any covenant or agreement of record relating thereto.

K. The Grantee Program will be conducted in full compliance with all applicable laws, statutes, rules, ordinances, and regulations issued by any federal, state, or other political subdivisions having jurisdiction over the Grantee Program.

L. It will comply with the financial responsibility requirements contained in **Exhibit B.**

M. It will furnish satisfactory evidence regarding these representations if requested by the Council.

3. Time.

Grantee must comply with all time requirements described in this Grant Agreement. In the performance of this Grant Agreement, time is of the essence.

4. Eligible Costs.

Eligible costs are those costs incurred by parties within the jurisdiction of the Grantee for 75% of rebate or grant payments as defined in **Exhibit B**. The Council will not reimburse Grantee for non-eligible costs. Any cost not defined as an eligible cost or not included in the Grant Grantee Program or approved in writing by the Council is a non-eligible cost.

5. Consideration and Payment.

5.1 Consideration. The Council will reimburse Grantee for eligible costs performed by the Grantee during the Grant Period as specified in this agreement. The Council bears no responsibility for any cost overruns that may be incurred by the Grantee or sub-recipients of any tier. The initial Grant amount to Grantee under this Grant Agreement is $28,000.00. The Grantee may be eligible to receive additional Grant amounts or an adjustment in Grant amount in accordance with the procedure in the Grant Amendment Form attached and incorporated as **Exhibit C**. Upon signature by both Grantee and Council on **Exhibit C** this Grant is amended by the amount in **Exhibit C**.

5.2. **Advance.** The Council will make no advance of the Grant Amount to Grantee.

5.3. **Payment.** To receive payment, the Grantee must submit a Reimbursement Request/Progress Report on forms provided by the Council, including electronically scanned receipts to verify the cost of eligible devices reported for each reporting period. Reimbursement Request/Progress Reports must be submitted quarterly, even if there are no eligible costs to report. The Grantee must describe its compliance with its the financial requirements, work completed including specific addresses where work was done, and provide sufficient documentation of grant eligible expenditures and any other information the Council reasonably requests. The Council will promptly pay the Grantee after the Grantee presents to the Council a Reimbursement Request/Progress Report and scanned copies of all receipts verifying the cost for all eligible devices reported and the Council's Authorized Representative accepts the invoiced services.

6. Conditions of Payment.

6.1. For each approved device for which Grantee requests payment, Grantee must certify the following to the Council: (1) the device has been purchased ; (2) Grantee received receipts for the device; (3) the purchase was not performed in violation of federal, Council, or local law, or regulation.

6.2. Conditions Precedent to Any Reimbursement Request. The obligation of the Council to make reimbursement payments is subject to the following conditions precedent:

A. The Council's receipt of a Reimbursement Request/Progress Report for the funds requested, and electronic copies of receipts verifying the cost for all eligible devices for that reporting period

B. If requested by the Council (in form and substance acceptable to the Council), evidence that (i) the Grantee has legal authority to and has taken all actions necessary to enter into this Agreement and (ii) this Agreement is binding and enforceable against the Grantee.

C. There is no Event of Default under this Grant Agreement or event which would constitute an Event of Default but for the requirement that notice be given or that a period of grace or time elapse.

D. The Grantee has supplied to the Council all other items that the Council may reasonably require to assure good fiscal oversight of state's funding through the Clean Water Fund.

7. Authorized Representative.

The Council's Authorized Representative is:

Name:	Brian Davis or successor
Title:	Senior Engineer
Mailing Address:	390 North Robert Street St. Paul, MN 55101
Phone:	651-602-1519
E-Mail Address:	brian.davis@metc.state.mn.us

The Council's Authorized Representative has the responsibility to monitor the Grantee's performance and the authority to accept the services provided under this grant contract. If the services are satisfactory, the Council's Authorized Representative will certify acceptance on each invoice submitted for payment.

The Grantee's Authorized Representative is:

Name:	Chris Anderson
Title:	City Planner
Mailing Address:	7550 Sunwood Drive NW Ramsey, MN 55303
Phone:	763-433-9817
E-Mail Address:	canderson@cityoframsey.com

If the Grantee's Authorized Representative changes at any time during this Grant Agreement, the Grantee must immediately notify the Council and within 30 days provide a new City resolution (if such resolution is necessary) specifying the new Representative.

8. Assignment, Amendments, Waiver, and Grant contract Complete.

8.1 Assignment. The Grantee may neither assign nor transfer any rights or obligations under this Grant Agreement without the prior written consent of the Council and a fully executed Assignment Agreement.

8.2 Amendments. Any amendment to this Grant Agreement must be in writing and will not be effective until it has been executed and approved by the appropriate parties.

8.3 Waiver. If the Council fails to enforce any provision of this Grant Agreement, that failure does not waive the provision or its right to enforce it.

8.4 Grant Contract Complete. This Grant Agreement contains all negotiations and agreements between the Council and the Grantee. No other understanding regarding this Grant Agreement, whether written or oral, may be used to bind either party.

9. Liability and Insurance.

9.1 Liability. The Grantee and the Council agree that they will be responsible for their own acts and the results thereof to the extent authorized by law, and they shall not be responsible for the acts of the other party and the results thereof. The liability of the Council is governed by the Minn. Stat. Chapter 466 and other applicable laws. The liability of the Grantee is governed by the provisions contained in Chapter 466 and other applicable laws.

9.2 Relationship of the Parties. Nothing contained in this Grant Agreement is intended or should be construed in any manner as creating or establishing the relationship of co-partners or a joint venture between the Grantee and the Council, nor shall the Grantee be considered or deemed to be an agent, representative, or employee of the Council in the performance of this Grant Agreement, or the Grantee Program.

The Grantee represents that it has already or will secure or cause to be secured all personnel required for the performance of this Grant Agreement and the Grantee Program. All personnel of the Grantee or other persons while engaging in the performance of this Grant Agreement the Grantee Program shall not have any contractual relationship with the Council related to the work of the Grantee Program and shall not be considered employees of the Council. In addition, all claims that may arise on behalf of said personnel or other persons out of employment or alleged employment including, but not limited to, claims under the Workers' Compensation Act of the State of Minnesota, claims of discrimination against the Grantee, its officers, agents, contractors, or employees shall in no way be the responsibility of the Council. Such personnel or other persons shall not require nor be entitled to any compensation, rights or benefits of any kind whatsoever from the Council, including but not limited to, tenure rights, medical and hospital care, sick and vacation leave, disability benefits, severance pay and retirement benefits.

10. Audits.

Under Minn. Stat. § 16C.05, subd. 5, the Grantee's books, records, documents, and accounting procedures and practices relevant to this grant contract are subject to examination by the Council and/or the State Auditor or Legislative Auditor, as appropriate, for a minimum of six years from the termination date of this Grant Agreement.

11. Government Data Practices.

The Grantee and Council must comply with the Minnesota Government Data Practices Act, Minn. Stat. Chapter 13, as it applies to all data provided by the Council under this grant contract, and as it applies to all data created, collected, received, stored, used, maintained, or disseminated by the Grantee under this Grant Agreement. The civil remedies of Minn. Stat. § 13.08 apply to the release of the data referred to in this clause by either the Grantee or the Council. If the Grantee receives a request to release the data referred to in this Clause, the Grantee must immediately notify the Council.

12. Workers' Compensation.

The Grantee certifies that it is in compliance with Minn. Stat. § 176.181, subd. 2, pertaining to workers' compensation insurance coverage. The Grantee's employees and agents will not be considered Council employees. Any claims that may arise under the Minnesota Workers Compensation Act on behalf of these employees and any claims made by any third party as a consequence of any act or omission on the part of these employees are in no way the Council's obligation or responsibility.

13. Data Availability.

To the extent and as requested by the Council, Grantee agrees to comply with Minn. Stat. § 114D.50, subd. 5 requirements for data collected by the Grantee Programs funded with money from the Clean Water Fund that have value for planning and management of natural resources, emergency preparedness and infrastructure investments, including but not limited to the requirement that to the extent practicable, summary data and results of Grantee Programs funded with money from the Clean Water Fund should be readily accessible on the internet and identified as a Clean Water Fund Grantee Program. The Council will put overall summary information on the internet and will encourage the Grantee put its city information on the web. Grantee understands and agrees that Council may list its name and summary information on the internet or in any other Grantor reporting.

Data collected by the Grantee Programs, if any, funded with money from the Clean Water Fund that have value for planning and management of natural resources, emergency preparedness, and infrastructure investments must conform to the enterprise information architecture developed by the Office of MN.IT Services. Spatial data must conform to geographic information system guidelines and standards outlined in that architecture and adopted by the Minnesota Geographic Data Clearinghouse at the Minnesota Geospatial Information Office. A description of these data that adheres to the Office of MN.IT Services geographic metadata standards must be submitted to the Minnesota Geospatial Information Office to be made available online through the clearinghouse and the data must be accessible and free to the public unless made private under chapter 13. To the extent practicable, summary data and results of the Grantee Program funded with money from the clean water fund should be readily accessible on the Internet and identified as a Clean Water Fund Grantee Program.

14. Governing Law, Jurisdiction, and Venue.

Minnesota law, without regard to its choice-of-law provisions, governs this Grant Agreement. Venue for all legal proceedings out of this grant contract, or its breach, must be in the appropriate state or federal court of competent jurisdiction in Ramsey County, Minnesota.

15. Termination.

The Council may cancel this Grant Agreement at any time, with or without cause, upon 30 days' written notice to the Grantee. Upon termination, the Grantee will be entitled to payment for services prequalified and satisfactorily performed before the termination notice.

16. Data Disclosure.

Under Minn. Stat. § 270C.65, subd. 3, and other applicable law, the Grantee consents to disclosure of its federal employer tax identification number, and/or Minnesota tax identification number, already provided to the Council, to federal and state tax agencies and Council personnel involved in the payment of Council obligations. Grantee will require compliance with this Section 16 by Grantee's subrecipient of Grant funds and shall submit evidence of such compliance to Council as requested.

17. Notices.

In addition to any notice required under applicable law to be given in another manner, any notices required hereunder must be in writing and must be personally served or sent by email or United States mail, to the business address of the party to whom it is directed. The business address is the address specified below or such different address as may be specified, by either party by written notice to the other:

To the Grantee at:

Name:	Chris Anderson
Title:	City Planner
Mailing Address:	7550 Sunwood Drive NW Ramsey, MN 55303
Phone:	763-433-9817
E-Mail Address:	canderson@cityoframsey.com

To the Council's Authorized Representative at:

Name:	Brian Davis or successor
Title:	Senior Engineer
Mailing Address:	390 North Robert Street St. Paul, MN 55101
Phone:	651-602-1519
E-Mail Address:	brian.davis@metc.state.mn.us

18. Miscellaneous.

18.1 Report to Legislature. As provided in Minn. Stat. § 3.195, the Council must submit a report on the expenditure and use of money appropriated under the Clean Water Fund to the legislature by January 15 of each year. The report must detail the outcomes in terms of additional use of Clean Water Fund resources, user satisfaction surveys, and other appropriate outcomes. The grantee agrees to provide to the Council by January 1 of each year a report on any user satisfaction surveys it has related to this Grantee Program, and other appropriate outcomes of the Grantee Program as prescribed in Section 18.3 of this Agreement.

18.2 Supplement. The funds granted under this agreement are to supplement and shall not substitute for traditional sources of funding. Grantee certifies to the Council that there was and is no

traditional Grantee sources of funding for the City to help fund one-fourth of the subject water efficiency rebate or grant work.

18.3 Measurable Outcomes. If requested by the Council, Grantee agrees to demonstrate compliance with the following: A Grantee Program or program receiving funding from the Clean Water Fund must meet or exceed the constitutional requirement to protect, enhance, and restore water quality in lakes, rivers and streams and to protect groundwater and drinking water from degradation. A Grantee Program or program receiving funding from the Clean Water Fund must include measurable outcomes, as defined in section 3.303, subdivision 10, and a plan for measuring and evaluating the results. A Grantee Program or program must be consistent with current science and incorporate state-of-the-art technology. All information for funded Grantee Program work, including the proposed measurable outcomes, must be made available for publication on the web site required under Minn. Stat. § 3.303, subdivision 10, as soon as practicable and forwarded to the Council and the Legislative Coordinating Commission under the provisions of Minn. Stat. § 3.303, subd. 10. The Grantee must compile and submit all information for funded Grantee Programs or programs, including the proposed measurable outcomes and all other items required under section 3.303, subdivision 10, to the Council and, if requested by the Council, the Legislative Coordinating Commission as soon as practicable or by January 15 of the applicable fiscal year, whichever comes first.

18.4 Minn. Stat. § 16B.98. Grants funded by the Clean Water Fund must be implemented according to section 16B.98 and must account for all expenditures.

18.5 Benefit to Minnesota Waters. Money from the Clean Water Fund may only be spent on Grantee Programs that benefit Minnesota waters.

18.6 Website. If the Grantee has information on its website about the water efficiency grant program under Minn. Stat. § 114D.50, the Grantee will when practicable in accordance with Minn. Stat. § 114D.50, subd. 4 (f) prominently display on the Grantee's website home page the Legacy logo accompanied by the phrase "Click here for more information." When a person clicks on the Legacy logo image, the website must direct the person to a web page that includes both the contact information that a person may use to obtain additional information, as well as a link to the Council's and Legislative Coordinating Commission Website required under section 3.303, subdivision 10.

18.7 Future Eligibility. Future eligibility for money from the Clean Water Fund is contingent upon the Grantee satisfying all application requirements related to Council's fulfillment of Minn. Stat. § 114D.50 as well as any additional requirements contained in 2019, 1st Special Session, chapter 2, article 2, section 9.

18.8 Prevailing Wages. The Grantee agrees to comply with all of the applicable provisions contained in chapter 177 of the Minnesota Statutes, and specifically those provisions contained in Minn. Stat. §§ 177.41 through 177.435, as they may be amended, modified or replaced from time to time with respect to the Grantee Program. By agreeing to this provision, the Grantee is not acknowledging or agreeing that the cited provisions apply to the Grantee Program.

18.9 Disability Access. Where appropriate, Grantee of clean water funds, in consultation with the Council on Disability and other appropriate governor-appointed disability councils, boards, committees, and commissions, should make progress toward providing greater access to programs, print publications, and digital media for people with disabilities related to the programs the recipient funds using appropriations made in this agreement.

18.10. General Provisions.

(i) Grants. The Grantee shall implement this Grant Agreement according to Minnesota Statutes, section 16B.98, and shall account for all expenditures of funds.

(ii) Lawsuit. This Grant shall be canceled to the extent that a court determines that the appropriation illegally substitutes for a traditional source of funding.

(iii) Termination Due to Lack of Funds. Grantee recognizes that Council's obligation to reimburse Grantee for eligible Grantee Program costs is dependent upon Council's receipt of funds from the State of Minnesota appropriated to Council under 2019 Session Laws, 1st Special Session, Chapter 2, Article 2, Section 9. Should the State of Minnesota terminate such appropriation or should such funds become unavailable to Council for any reason, Council shall, upon written notice to Grantee of termination or unavailability of such funds, have no further obligations for reimbursement or otherwise under this Grant Agreement. In the event of such written notice, Grantee has no further obligation to complete the Grantee Program as required by this Grant Agreement.

19. Default and Remedies.

19.1 Defaults. The Grantee's failure to fully comply with all of the provisions contained in this Grant Agreement shall be an event of default hereunder ("Event of Default").

19.2. Remedies. Upon an event of default, the Council may exercise any one or more of the following remedies:

a. Refrain from disbursing the Grant.

b. Demand that all or any portion of the Grant already disbursed be repaid to it, and upon such demand the Grantee shall repay such amount to the Council.

c. Enforce any additional remedies the Council may have at law or in equity.

IN WITNESS WHEREOF, the parties have caused this agreement to be executed by their duly authorized representatives.

METROPOLITAN COUNCIL

By: _____
Regional Administrator, successor, or delegate

Date: _____

GRANTEE:

The Grantee certifies that the appropriate person(s) have executed the grant contract on behalf of the Grantee as required by applicable articles, bylaws, resolutions, or ordinances.

By: _____

_____

Printed Name and Title

Date: _____

EXHIBIT A

(Application from community)

Metropolitan Council Water Efficiency Grant Application Form

Applicant Information:

Municipality: City of Ramsey

Municipal Utility: City of Ramsey Water Utility

Mailing Address: 7550 Sunwood Drive NW, Ramsey, MN 55303

Primary Contact Information: Municipality primary authorized representative (all correspondence regarding the Water Efficiency Grant Program should be addressed to individual named below):

NAME: Chris Anderson

TITLE: City Planner

STREET: 7550 Sunwood Drive NW

CITY, ZIP: Ramsey, MN 55303

PHONE: 763-433-9817

EMAIL: canderson@cityoframsey.com

Secondary Contact Information: Municipality secondary authorized representative:

NAME: Bruce Westby

TITLE: City Engineer

STREET: 7550 Sunwood Drive NW

CITY, ZIP: Ramsey, MN 55303

PHONE: 763-433-9825

EMAIL: bwestby@cityoframsey.com

Municipal Total Per Capita Water Use (2018): 130 (gallons per person-day)

Municipal Residential Per Capita Water Use (2018): 79 (gallons per person-day)

Municipal Ratio of Peak Month to Winter Month Water Use (2018): 4.34

Municipality's estimated annual water savings from proposed program: 3,000,000 (gallons)

Municipal Utility Grant or Rebate Program Design:

Requested Grant Amount (must equal 75% of total program budget): $ 50,000.00

Required Utility Matching Amount (must equal 25% of total program budget): $ 16,667.00

Will your program be a grant program or rebate program? Rebate

Estimated Number of Items:

Item	Estimated Number
Toilets	100
Irrigation Controllers	100
Clothes Washing Machines	
Irrigation Spray Sprinkler Bodies	
Irrigation System Audits	5

Project Work Plan and Schedule:*

Task Description	Responsible Person	Start Date	Completion Date
Obtain recommendations from Environmental Policy Board and Public Works Committee to seek Water Efficiency grant funds Obtain City Council authorization to seek Water Efficiency grant funds	City Planner City Engineer	8/19/19	9/24/19
Establish/develop rebate program	City Planner City Engineer Utilities Supervisor Asst. Public Works Superintendent	9/1/19	12/31/19
Develop marketing campaign through outlets including Ramsey Resident newsletter, Facebook/social media, develop website content, and QCTV spots.	City Planner Communications and Event Coordinator	10/1/19	12/31/19
Program administration, which would include intake, review, and processing of customer invoices/receipts, coordinating rebates (utility billing credits), ongoing promotion of grant program.	Engineering Administrative Asst. Finance Staff Communications and Event Coordinator	1/1/20	6/30/22
Quarterly reporting	City Planner Engineering Administrative Asst.	4/1/20	7/1/22

*** Municipal utility may create own project plan and schedule form**

Communications to Property Owners:

How will your program be advertised (check all that apply):

Newsletter ☑

Print Media ☐

Email ☑

Twitter ☐

Website ☑

Radio ☐

Television ☑

Facebook ☑

Nextdoor ☐

Other Social Media ☐

Please attach examples of proposed newsletter, print media, or email communications

Critical Points to Remember:

- The applying municipality must be a water supplier
- New construction and new developments are not eligible
- Funds are for rebates or grants only; consulting and city staff time are ineligible
- Combined Council and municipality funds cannot pay for 100% of an eligible activity's cost
- A portion of each eligible activity's cost must be paid by the property owner
- Grant recipients must display the Clean Water, Land and Legacy Amendment logo and the Metropolitan Council logo on program-related web pages and paper communications

EXHIBIT B

Clean Water Fund Grant Program Overview & Goal, Structure, and Qualified Activities (should anything herein be contradicted by the Agreement language, the Agreement terms prevail).

Overview

The Metropolitan Council (Council) will implement a water efficiency grant program effective September 30, 2019 to June 30, 2022. Grants will be awarded on a competitive basis to municipalities that manage municipal water systems. The Council will provide 75% of the program cost; the municipality must provide the remaining 25%. Municipalities will use the combined Council and municipality funds to run their own grant or rebate programs.

Grants will be made available in amounts with a minimum of $2,000 and a maximum of $50,000. Grantees will be required to provide estimated water savings achieved through this program for Clean Water, Land & Legacy Amendment reporting purposes.

Legislative Directive - Minnesota 2019 Session Law

$375,000 the first year and $375,000 the second year are for the water demand reduction grant program to encourage municipalities in the metropolitan area to implement measures to reduce water demand to ensure the reliability and protection of drinking water supplies. Fiscal year 2020 appropriations are available until June 30, 2021, and fiscal year 2021 appropriations are available until June 30, 2022.

Grant Program Goal

The goal of the water efficiency grant program is to support technical and behavioral changes that improve municipal water use efficiency in the seven-county metropolitan area.

Critical Points to Remember

- The applying municipality must be a water supplier
- New construction and new developments are not eligible
- Funds are for rebates or grants only; consulting and city staff time are ineligible
- Combined Council and municipality funds cannot pay for 100% of an eligible activity's cost
- A portion of each eligible activity's cost must be paid by the property owner
- Grant recipients must display the Clean Water, Land and Legacy Amendment logo and the Metropolitan Council logo on program-related web pages and paper communications

Grant Program Structure: Administration and Funding

The Water Efficiency Grant Program will be administered by Metropolitan Council Environmental Services (MCES) and will be funded with $750,000 appropriated by the 2019 Minnesota Legislature. Grant applications will be reviewed and ranked by the MCES Water Supply Planning Unit staff.

Grants are only for water efficiency programs offering rebates or grants to property owners who are customers of the municipal water supply system and who replace specified water using devices with approved devices that use substantially less water.

Grants will be awarded to municipalities in amounts ranging from $2,000 to $50,000 for providing rebates or grants to property owners. Municipalities will be responsible for the design and operation of their rebate or grant program and its details. Grant payments to the municipality will be for 75% of approved program amounts. The municipality must provide the remaining 25% of the program cost. Municipality rebates or grants are eligible for reimbursement on device replacements conducted September 30, 2019 through June 30, 2022.

Here is an example showing the grant funding design:

Metropolitan Council Grant Amount	**$15,000**
Municipality Match	$5,000
Municipality Grant/Rebate Program Total	$20,000

Eligibility

Per legislative language, the grant program is limited to municipalities in the seven-county metropolitan area.

Municipalities eligible per above must apply to participate and, if approved, sign a standard Council Grant Agreement, before any eligible rebates or grants can be submitted for reimbursement. Agreements shall require that municipalities:

- Entirely pass through grants received (as is being done by MCES)
- Verify purchase of devices to receive grants
- Retain records and cooperate with any audits
- Conduct all communications with property owners and ensure all written communications to property owners include both the Clean Water, Land and Legacy Amendment and the Metropolitan Council's logo
- Provide quantitative information for state reporting purposes

Eligible water efficiency devices consist of the following:

- Toilet replacement with a US EPA WaterSense labeled toilet
- Irrigation controller replacement with a US EPA WaterSense labeled controller
- Clothes washing machine replacement with an US DOE Energy Star labeled clothes washing machine
- Irrigation spray sprinkler body replacement with a US EPA WaterSense labeled spray sprinkler body
- Irrigation system audit by an Irrigation Professional certified by a US EPA WaterSense program

Expenses eligible for reimbursement are the out-of-pocket cost of the device and its installation only, not to include any owner labor costs. In addition, new construction and new developments are ineligible, as this program is intended as a current infrastructure replacement program.

Application Process

- Applicants must be municipal water suppliers
- Municipalities will submit MCES supplied application form by September 30, 2019. Required information includes:
    - the municipality's rebate or grant program design and work plan
    - proposed examples of communications to property owners
    - requested total grant amount
    - estimated annual amount of water saved by the applying municipality
- Application form is available at: https://metrocouncil.org/Wastewater-Water/Funding-Finance/Available-Funding-Grants.aspx
- Submit competed application to: brian.davis@metc.state.mn.us
- Metropolitan Council will notify municipalities of grant awards and provide grant agreements by December 2, 2019.

Proposal Selection Criteria

In the event that funds requested exceed funds available, the following criteria will be used to determine the amount granted to a given municipality:

- Municipalities that are supplied 100% with groundwater
- Municipalities with identified water supply issues in Master Water Supply Plan Community Profiles or Local Water Supply Plans
- Municipalities' ratio of peak monthly water use to winter monthly water use
- Municipalities' average residential per capita water use
- The order in which applications are received and until grant funds are completely committed

Funding Process and Reporting Requirements

- Utilizing forms provided by MCES, the following information must be reported on a quarterly basis:
    - Number, type and amount of rebates or grants provided to property owners, along with each property address
    - Estimated annual gallons of water saved per device installation
    - Municipality matching funds disbursed
    - Number of unmet funding requests from property owners, if any
- Upon review and confirmation of the above information, MCES will process a grant payment in the amount of 75% of approved total rebates or grants for the reporting period.
- MCES will provide confirmation of grant balances available upon request and reserves the right to amend grant agreements, in collaboration with grantee municipality, if quarterly reporting indicates rebate or grant programs will not fully utilize grant awards within the grant period.

Qualified Activities

- Toilet replacement with a US EPA WaterSense labeled toilet:

  http://www.epa.gov/WaterSense/product_search.html
- Irrigation controller replacement with a US EPA WaterSense labeled controller:

  https://www.epa.gov/watersense/product-search
- Clothes washing machine replacement with an US DOE Energy Star labeled clothes washing machine: https://www.energystar.gov/productfinder/product/certified-clothes-washers/results
- Irrigation spray sprinkler body replacement with a US EPA WaterSense labeled spray sprinkler body

  https://www.epa.gov/watersense/product-search
- Irrigation system audit by an Irrigation Professionals certified by a US EPA WaterSense program

https://www.epa.gov/watersense/find-pro

Reporting Example

Community	Property Street Address	Property Type	Device Replaced	Cost per Device	# of Devices	Rebate or Grant per Device	Est. Annual Water (Gal) Saved Per Device	Total Rebate or Grant	Municipality Contribution	Eligible Grant Amount
Anytown	652 Silvis St	Residential	Clothes Washer	$624.60	1	$150.00	3,000	$150.00	$37.50	$112.50
Anytown	1952 Ingram Way	Residential	Irrigation Controller	$199.99	1	$100.00	8,800	$100.00	$25.00	$75.00
Anytown	630 Gibbons Ave	Residential	Clothes Washer	$599.90	1	$150.00	3,000	$150.00	$37.50	$112.50
Anytown	4424 Barriger Blvd	Residential	Toilet	$168.00	1	$50.00	4,000	$50.00	$12.50	$37.50

EXHIBIT C Revision # [ ]

METROPOLITAN COUNCIL ENVIRONMENTAL SERVICES

2019 CLEAN WATER FUND WATER EFFICIENCY GRANT PROGRAM GRANT AMENDMENT FORM

NOTICE TO GRANTEE: Submission of this form is required to modify your city's agreement with Metropolitan Council Environmental Services (MCES) 2019 Clean Water Fund Water Efficiency Grant program (Grantee Program).

After determination of your city's initial grant amount, completion and submission of this form is necessary when 1) you are requesting additional grant funds to meet unexpected rebate or grant demand, or 2) when your city has determined that the previously approved program's rebate or grant demand will not be met, requiring less grant funds than anticipated when the agreement was signed.

The process for modifying your agreement is as follows:

1. Your City's designated authorized representative submits 2 signed copies of Exhibit C to MCES, with an attachment itemizing requests for changes to prior granted amounts.
2. Upon receipt of signed Exhibit C, MCES Program Administrator obtains Council authorized signatures that modifies the agreement and returns a fully signed copy of Exhibit A indicating new grant amount to City's designated authorized representative.

Instructions: Indicate the date of your change request in #1 box. Indicate the number of this particular change request in #2 box (and in box at top of page – must match). Enter the current grant agreement amount (as MCES approved) in #3 box. If you wish to increase your municipality's grant amount, enter the amount you are requesting in #4 box. If you wish to decrease your grant amount due to less demand than anticipated, enter the amount in #5 box. Enter in #6 box the amount derived from adding #3 to #4 or derived from subtracting #5 from #3.

Grant Agreement # [ ]

1. Date of change request: [ ]
2. Change request number: [ ]
3. Current Grant Agreement Amount (as MCES approved): [ ]

4. Increase due to request for additional funding: ☐

5. Decrease due to less demand: ☐

6. Amended Grant Agreement Amount requested: ☐

CITY NAME:_____

I request the above changes (sign with title and date):

_____

MCES PROGRAM ADMINISTRATOR APPROVAL (signature and date):

_____

COUNCIL AUTHORIZED SIGNATURE AND DATE

_____

Questions may be directed to the MCES Authorized Representative:

Brian Davis
MCES Senior Engineer
390 Robert Street North
St. Paul, MN 55101-1805
Phone: (651) 602-1519
Email: brian.davis@metc.state.mn.us

5.02: Overview of Framework for Water Efficiency Grant Program

City Planner Anderson presented the staff report. He stated that the City of Ramsey has been awarded $28,000 in grant funds through the Metropolitan Council's 2019-2022 Water Efficiency Grant Program for use in a rebate program. As the name of the program implies, the purpose of the grant is to implement water efficient technologies to reduce the demand on water supply.

City Planner Anderson stated that there are two primary financial requirements of the program. First, the municipality must contribute 25 percent of the grant award, which equates to $9,340. Second, that rebate recipients must also have a financial contribution. Other important eligibility requirements include the rebate recipient being a municipal water customer, only applicable to replacement devices, and the rebate is only applicable for the cost of the device and its installation, excluding any owner labor costs.

Councilmember Musgrove asked if there would be a provision in the application that would require a 30-day waiting period once opened to the public. She stated that in searching smart sense devices, there is a wide range of pricing available. She stated that requiring residents to only pay tax is not a big commitment and asked if it would make more sense to require residents to pay an additional amount (such as $20 or $25) to ensure that they are being smart with their purchases, rather than the resident choosing higher priced items simply because this program is paying the cost.

Chairperson Valentine stated that it an interesting question as there is a science to figuring out how big the rebate should be in order to attract participants. He stated that his concern would be that if the rebate is not enough, residents may not choose to participate.

Board Member Hiatt stated that he thought he read that there is a maximum rebate per device, which is $200.

City Planner Anderson agreed that there is a wide range of prices and staff attempted to make the program as attractive as possible but also creating the opportunity for as many residents to participate as possible. He used the example of toilets, noting that there is a wide variety available for $200 or less, while there is a wide variety available above $200. He stated that there would be a device maximum of $200, with a household maximum of $500. He stated that this could also be used as a pilot for the City to implement its own program in the future, if desired.

Board Member Hiatt stated that this money will greatly help with the cost for the devices, but the homeowner would also be responsible for labor costs to install the new devices. He commented that the $500 maximum per household would help to serve the intent desired by Councilmember Musgrove. He noted that half of the City would not be eligible for the program as they are not connected to municipal water services. He hoped that the City could also investigate options for those residents that are not connected to City services in the future.

Board Member Fetterley stated that she would suspect that the majority of devices purchased will be irrigation upgrades, which will cost significantly more than $200. She stated that this information will all be distributed to the public and did not see the purpose of a waiting period as

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it will already take time for residents to complete research and find the appropriate devices and contractors.

Councilmember Musgrove stated that Councilmembers, Commissioners, Board Members, and City staff have a head start on the availability of grant funds from the program, which would put them at advantage so to speak. She explained that her thinking was perhaps to provide the same amount of notice to residents.

City Planner Anderson stated that as the structure of the rebate program is finalized there will be a number of public promotions completed to notify the public. He stated that staff could incorporate a start date for applications if desired.

Chairperson Valentine agreed that it would be fair to have public notice. He noted that there would also be a seasonal concern with irrigation uses.

Board Member Covart asked if a public notice stating that the grants funds would be available in 30 days from the publication would suffice the intent of Councilmember Musgrove. She referenced audit services, which would not be covered under this grant, but noted that service would be available to those on private wells as well and is something the City could look at for a future program.

Motion by Board Member Hiatt and seconded by Board Member Bernard to recommend that 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 Valentine, Board Member Hiatt, Bernard, Covart, Fetterley, and Moore. Voting No: None. Absent: None.

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Councilmember_____introduced the following resolution and moved for its adoption:

RESOLUTION #20-018

RESOLUTION TO ENTER INTO A CLEAN WATER FUND GRANT AGREEMENT WITH THE METROPOLITAN COUNCIL TO RECEIVE A WATER EFFICIENCY GRANT

WHEREAS, the City of Ramsey owns and maintains a municipal water supply system which is essential to the quality of life, health and welfare of City residents and businesses; and

WHEREAS, the City of Ramsey currently relies on groundwater as the sole source of its municipal water supply system; and

WHEREAS, the City of Ramsey is planning to construct two new municipal water supply system groundwater wells to accommodate planned growth in the next ten years; and

WHEREAS, Minnesota Statutes 473.1565 directs the Metropolitan Council to undertake planning activities that emphasize conservation, inter-jurisdictional cooperation, and long-term sustainability; and

WHEREAS, the Metropolitan Council received an allocation of $787,600 from the Clean Water Funds to assist local units of government by helping property owners pay for water saving audits and/or more water efficient appliances to conserve water; and

WHEREAS, the primary objective of the Water Efficiency Grant Program is to assist local units of government to conserve water to ensure long-term groundwater sustainability; and

WHEREAS, this grant program is consistent with the goals and objectives of the City's Strategic Action Plan; and

WHEREAS, the City has the capability to adequately fund its local cost share for this grant program through the water enterprise fund; and

WHEREAS, on September 24, 2019, the Ramsey City Council authorized staff to apply for grant funding up to $50,000; and

WHEREAS, the City of Ramsey submitted an application for grant funds to offer rebates for WaterSense labeled smart irrigation controllers, irrigation audits, and WaterSense labeled toilets for water supply customers; and

WHEREAS, the Metropolitan Council received grant applications totaling $1,393,527; and

WHEREAS, the City of Ramsey was one of forty (40) communities accepted into the grant program with a grant allocation of $28,000; and

WHEREAS, to accept the grant funds, the City of Ramsey must enter into a Clean Water Fund Grant Agreement with the Metropolitan Council.

NOW THEREFORE, BE IT RESOLVED BY THE CITY COUNCIL OF THE CITY OF RAMSEY, ANOKA COUNTY, STATE OF MINNESOTA, as follows:

1. That the Ramsey City Council hereby authorizes the execution of the Clean Water Fund Grant Agreement with the Metropolitan Council and to accept the $28,000 grant allocation for a water efficiency rebate program.

The motion for the adoption of the foregoing resolution was duly seconded by Councilmember _____, and upon vote being taken thereon, the following voted in favor thereof:

and the following voted against the same:

and the following abstained:

and the following were absent:

Whereupon said resolution was declared duly passed and adopted by the Ramsey City Council this the 28th day of January, 2020.

_____
Mayor

ATTEST:

_____
City Clerk

Public Works Committee **5. 2.**

Meeting Date: 01/21/2020

By: Bruce Westby, Engineering/Public Works

Title:

Consider City Council Recommendation to Indefinitely Suspend Pavement Sealcoating Program

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 sealcoating program.

Background:

Since 2015, the City of Ramsey has budgeted $500,000 each year for the purpose of cracksealing and sealcoating between 13 and 23 miles of City streets annually. Prior to 2015, cracksealing and sealcoating was generally completed on a less frequent basis based on availability of funding.

The purpose of sealcoating is to protect existing bituminous pavement from damage caused by 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 of several streets sealcoated since 2015. Staff has since been monitoring streets sealcoated since 2015 to document the scope and severity of observed pavement stripping issues, and to explore 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 issues under sealcoats over the last decade or more, including cities in the northwest metro. Since last spring, Staff has discussed pavement stripping issues experienced by numerous metro area cities, including those cities that have been experiencing this issue the longest, with the goal of better understanding the cause(s) of pavement stripping, how to cost-effectively repair damaged pavement, 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 current sealcoat program without first identifying the root cause(s) for pavement stripping is likely to result in additional damage to streets moving forward. Instead, Staff would like to indefinitely suspend the sealcoating program while continuing to monitor the scope and severity of the pavement stripping observed to date on City streets, to continue researching the sealcoat practices and findings of other metro area cities and alternative treatments to sealcoating, and to determine how to best repair City streets previously damaged by pavement stripping. Given the degraded condition of streets in Business Park 95, significant repairs are likely needed this year.

Timeframe:

Staff estimates 15 minutes will be sufficient to present this case and respond to questions.

Observations/Alternatives:

Alternative #1– Motion to recommend that the City Council indefinitely suspend the City's annual sealcoating program.

Alternative #2 – Motion of other.

Funding Source:

The City annually budgets $500,000 for crack sealing and sealcoating projects. Staff recommends that the City continue to complete crack sealing projects at an estimated amount of up to $200,000 annually. Based on discussions at this evening's Public Works Committee meeting, Staff will develop recommendations for repairing streets previously damaged by pavement stripping, and for implementing alternative pavement maintenance practices to sealcoating, and proposes to present the recommendations at the February Public Works Committee meeting.

Recommendation:

Staff recommends providing a recommendation to the City Council to indefinitely suspend the City's annual sealcoating program for reasons noted herein.

Action:

Motion to recommend that the City Council indefinitely suspend the City's annual sealcoating program.

Attachments

LRRB Rpt 2013-08
LRRB Rpt 2017-35
Unity St in BP 95 North of McKinly
Unity St in BP 95 North of 140th Av
McKinley St in BP 95 West of Radium St
Sodium St and Radium St Intersection
Tungsten St and Sodium St Intersection
Pavement Stripping Research Summary

Form Review

Inbox	Reviewed By	Date
Grant Riemer	Grant Riemer	01/16/2020 12:39 PM
Kurt Ulrich	Kurt Ulrich	01/16/2020 04:05 PM
Form Started By: Bruce Westby		Started On: 01/14/2020 08:06 AM
Final Approval Date: 01/16/2020		

Stripping of Hot-Mix Asphalt Pavements under Chip Seals

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

April 2013

Research Project
Final Report 2013-08

Minnesota Department of Transportation

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(Please request at least one week in advance).

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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.

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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

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St. Paul, Minnesota 55155

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The authors 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

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.

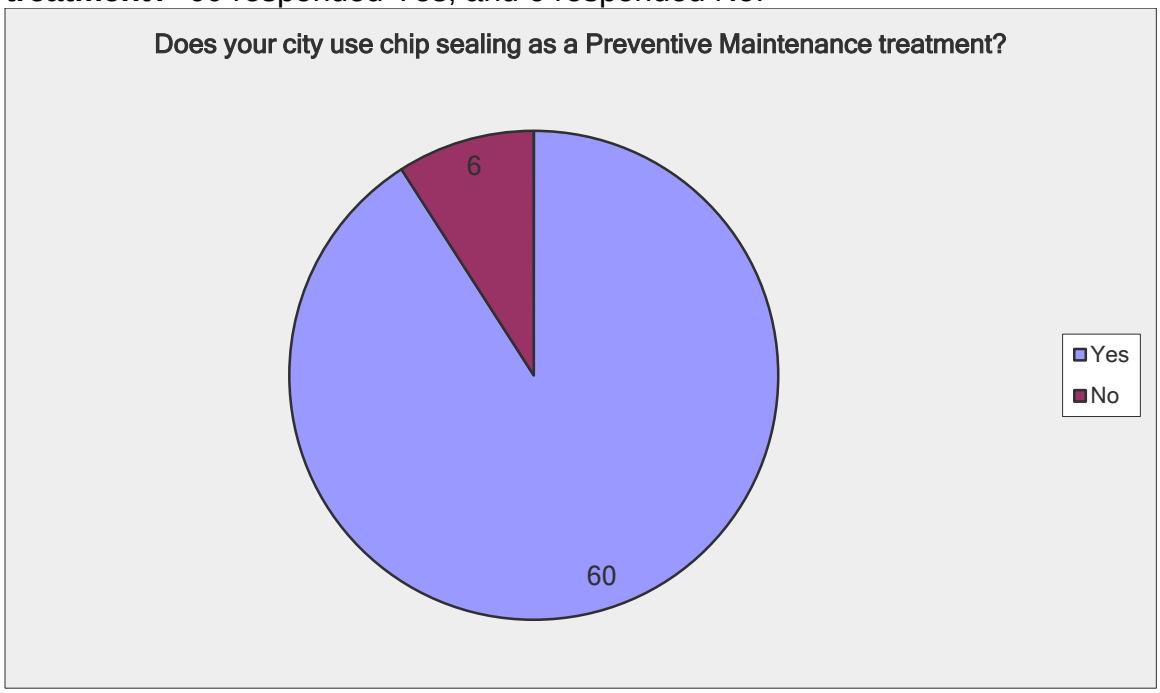


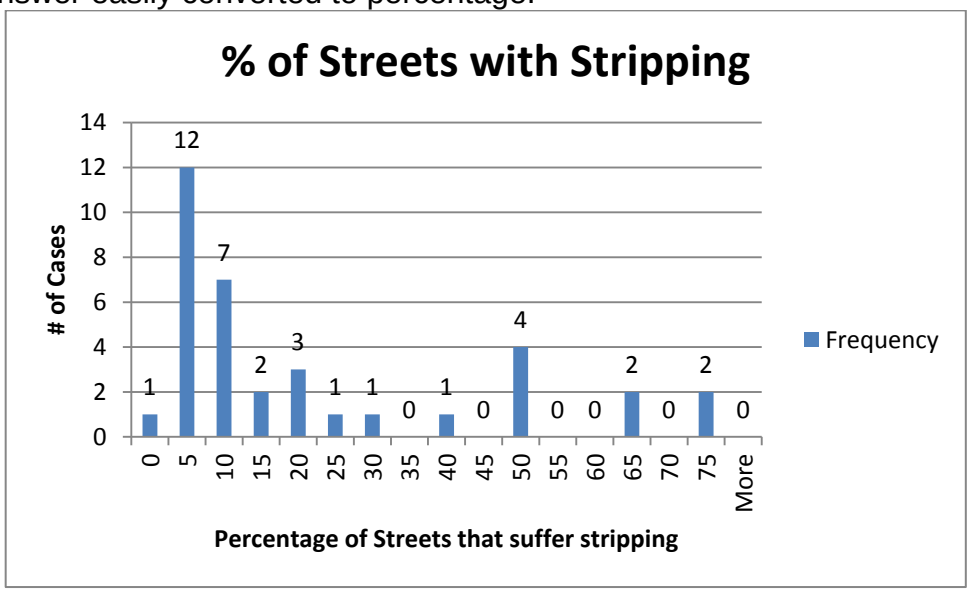


Figure 2 Picture used in survey

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

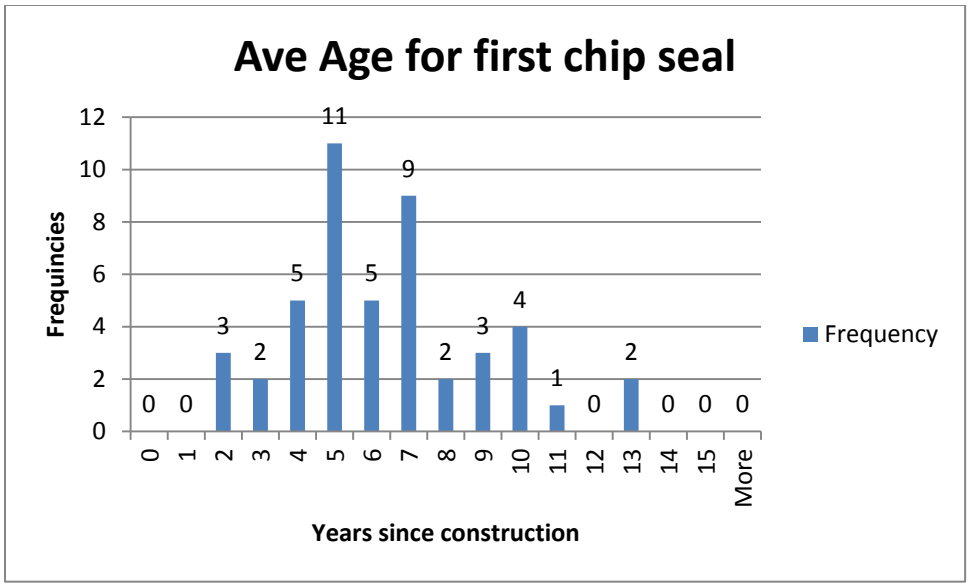


Question 4: **What percentage of streets does it happen on?** 40 out of 66 supplied answer to this question. See below histogram for breakdown of data. Most of the agencies reported a percentage but four (4) reported in format that did not give an answer easily converted to percentage.

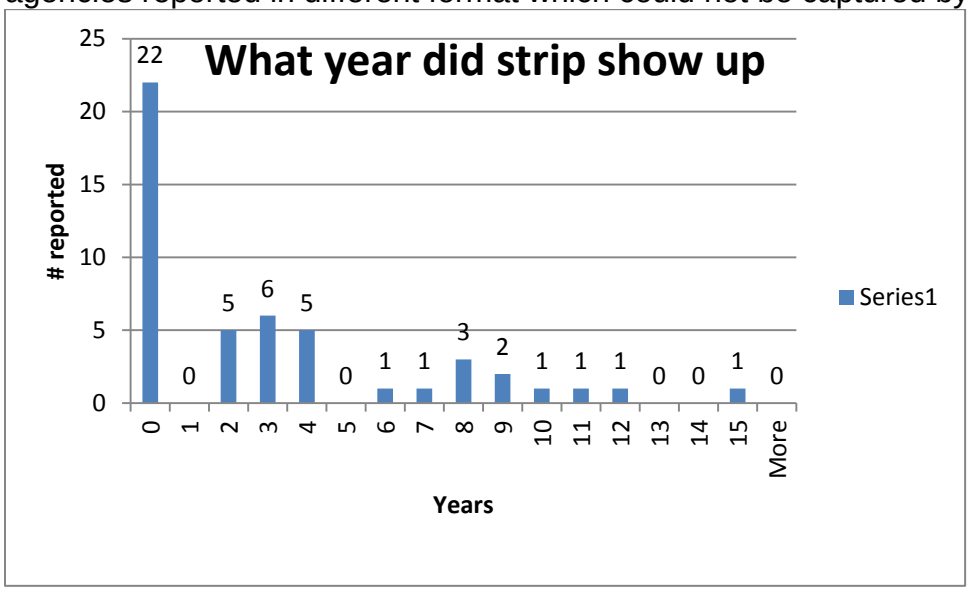


.

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.

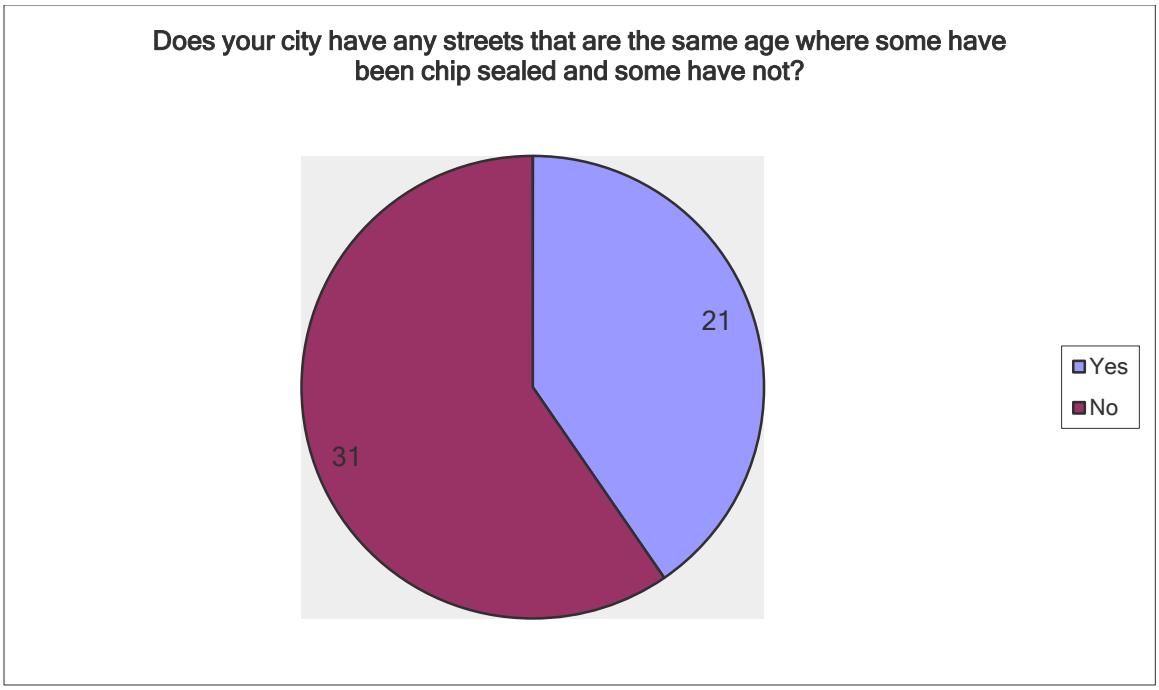


Question 6: **How long after the chip seal is placed does the stripping problem show up?** 52 responded to this question, see histogram below for data. Three (3) agencies reported in different format which could not be captured by the histogram.

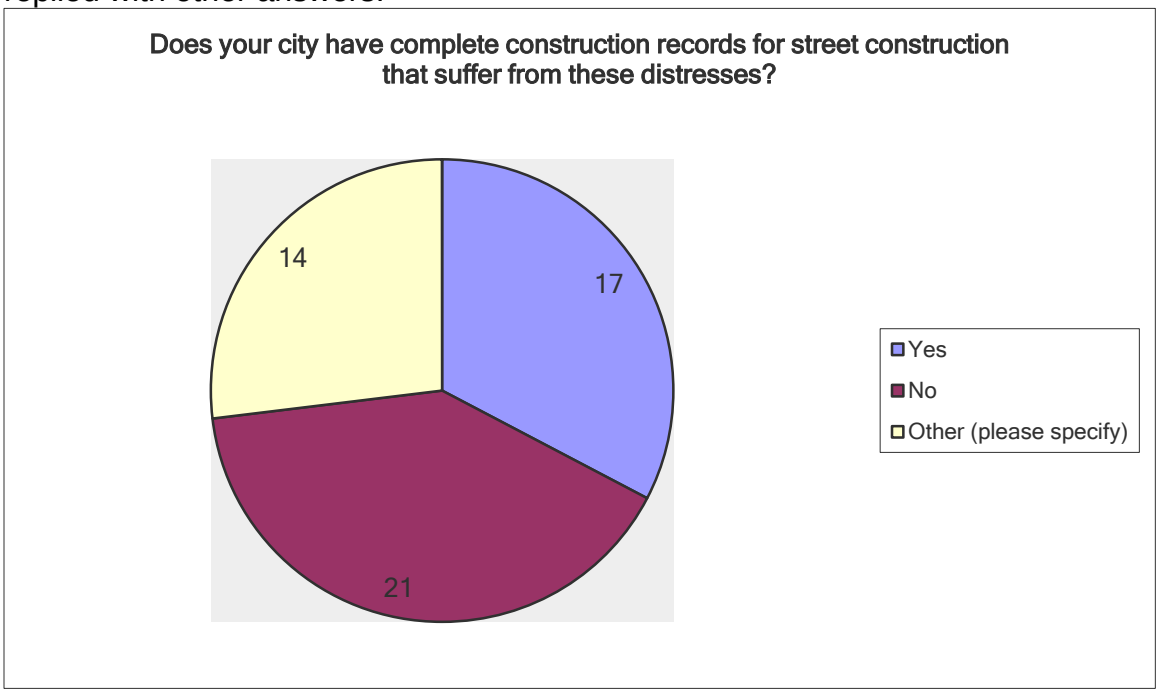


The responders that listed year zero have not seen any damage to their streets.

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.

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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.

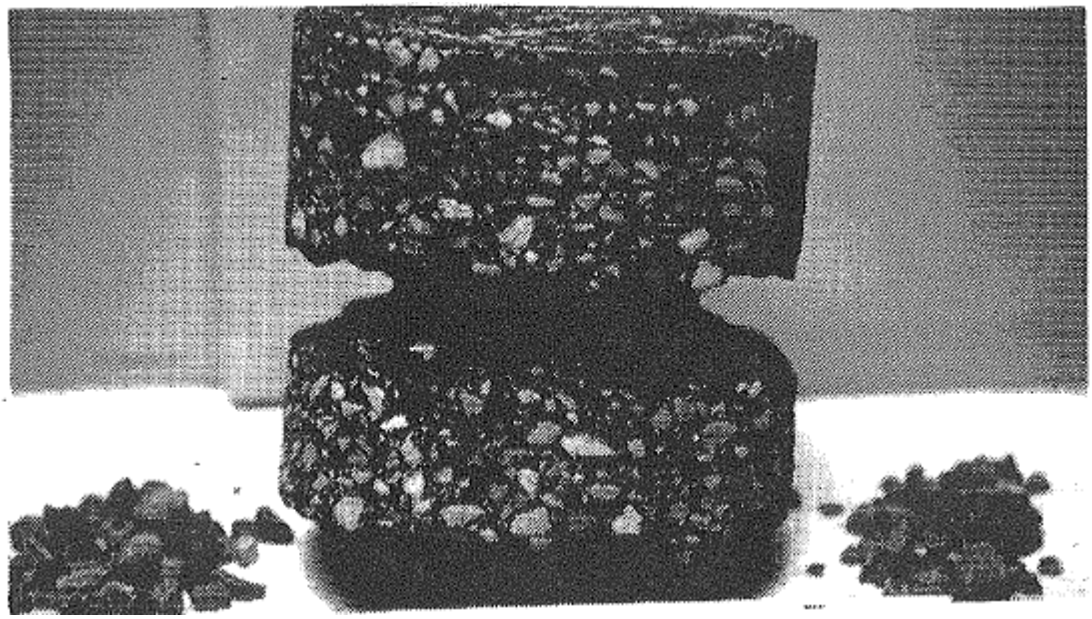


Figure 1.2. A Core showing Stripping below the surface (3)

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).

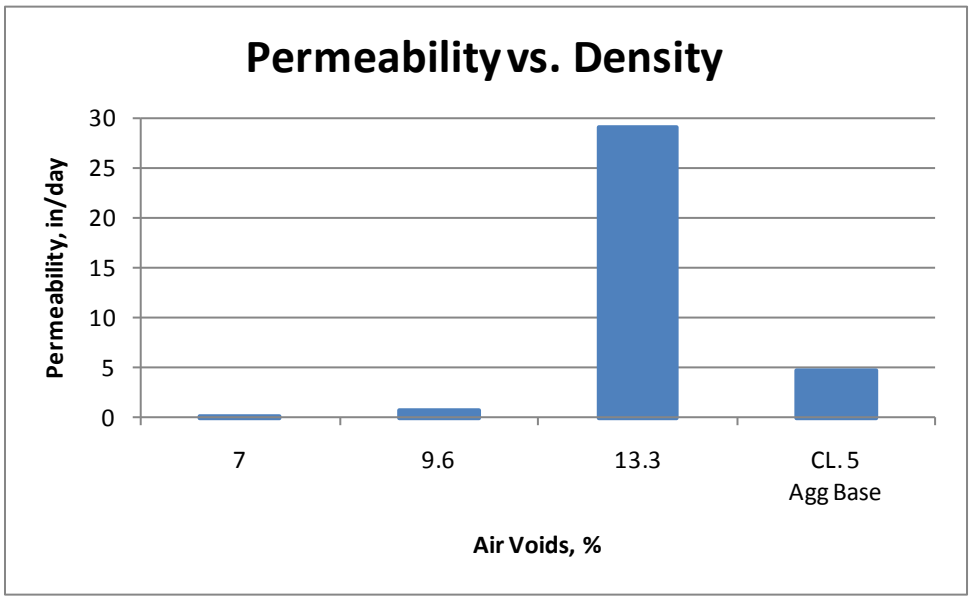


Figure 2.2. Permeability vs. Air Voids

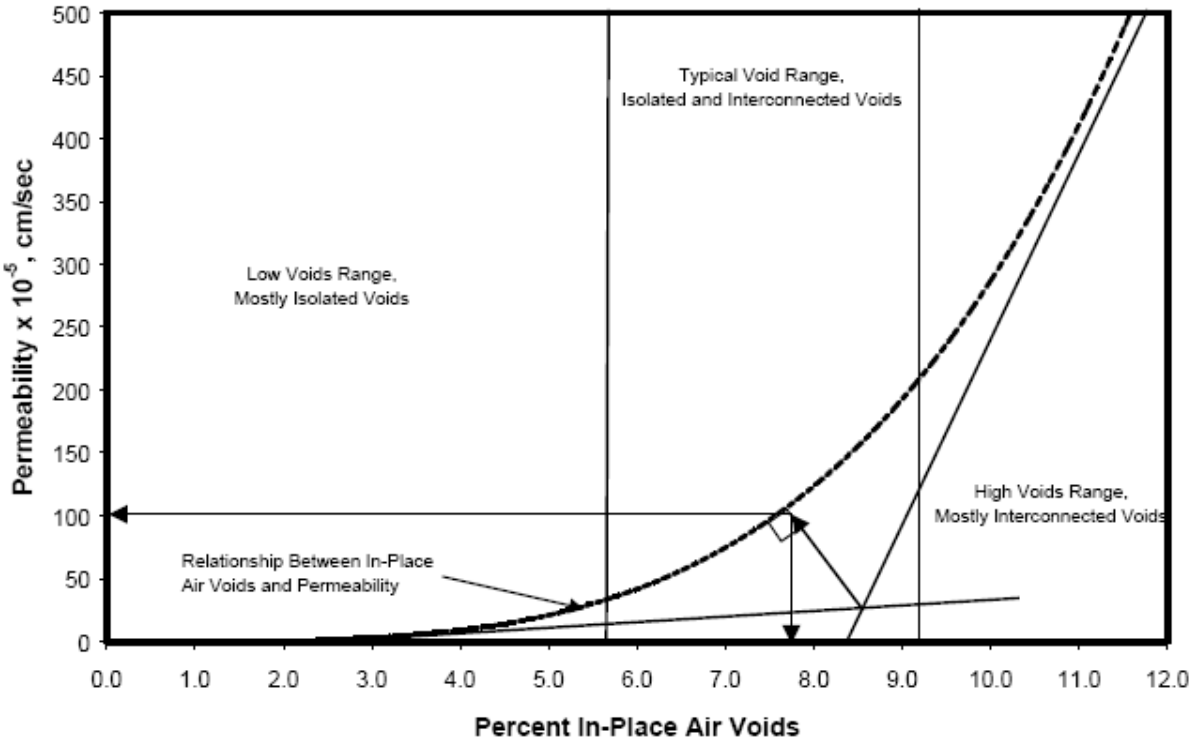


Figure 2.3. Permeability vs. In-Place Air Voids (Cooley Jr., Brown and Maghsoodloo, 2001).

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.

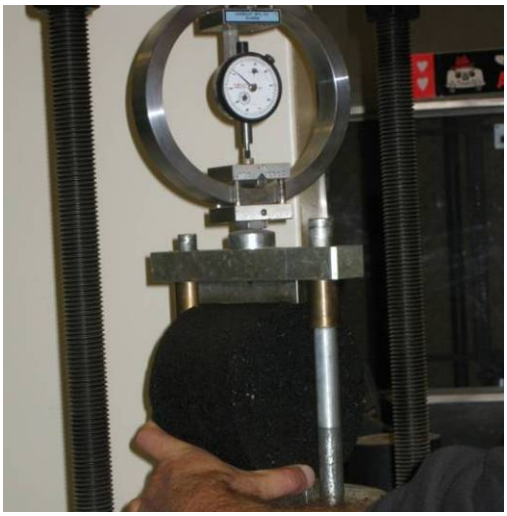


Figure 2.4. Lottman Testing

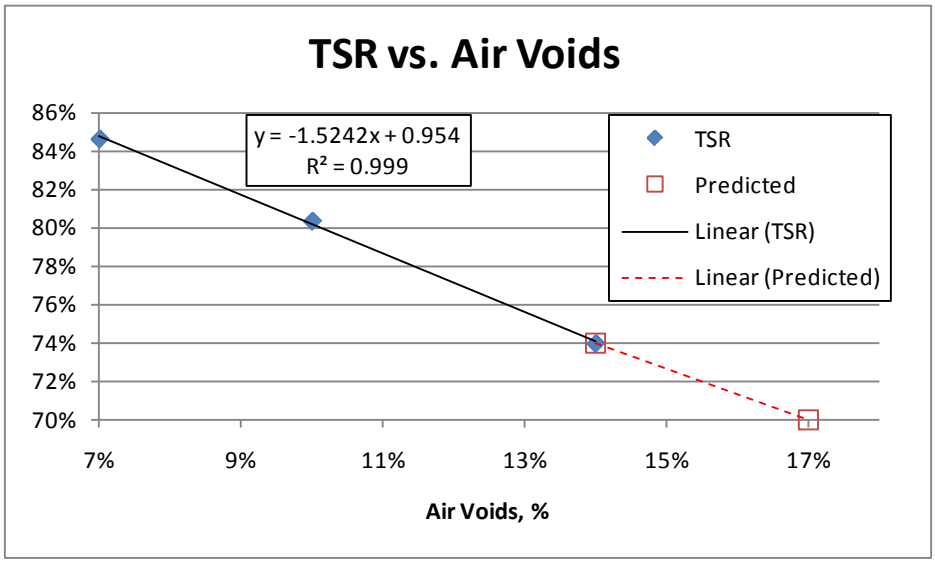


Figure 2.5. Tensile Strength Results (TSR) vs. Air Voids

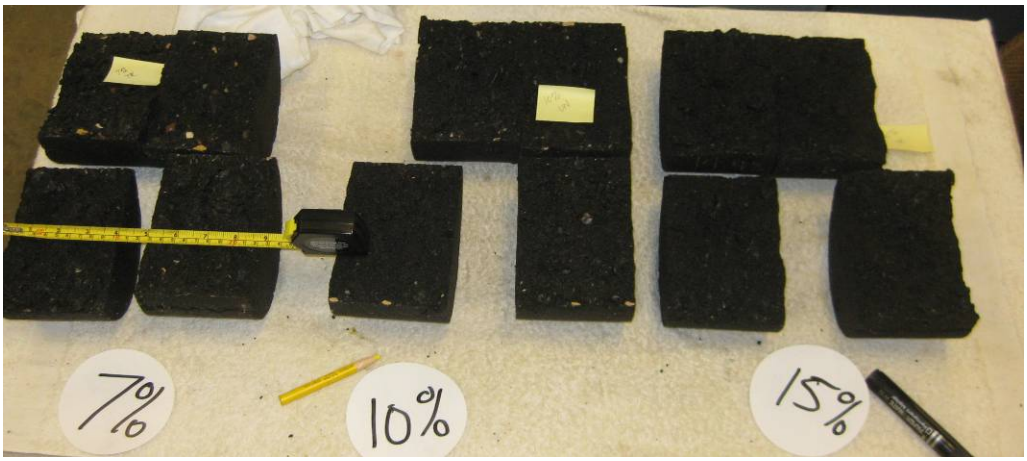


Figure 2.6. Visual Examination of TSR specimens

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.

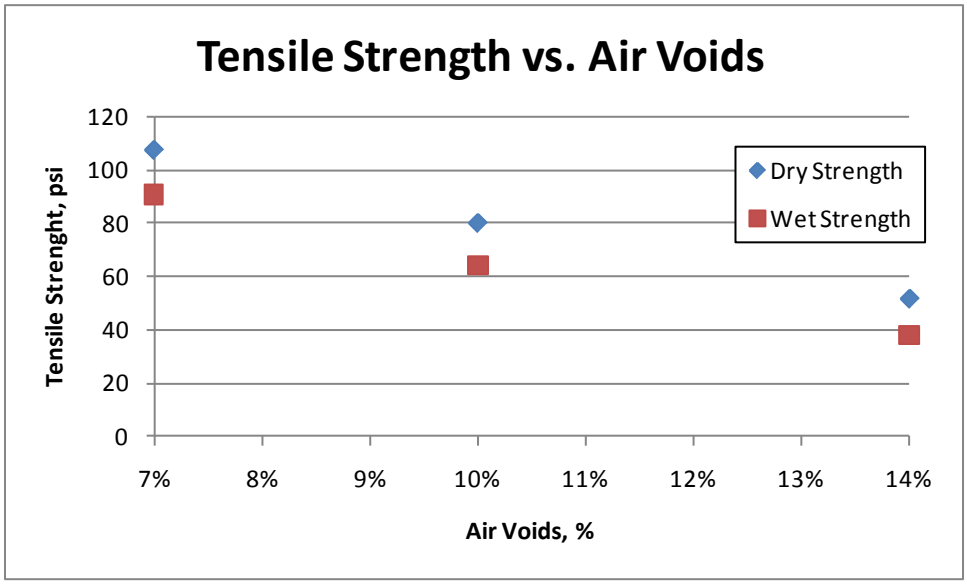
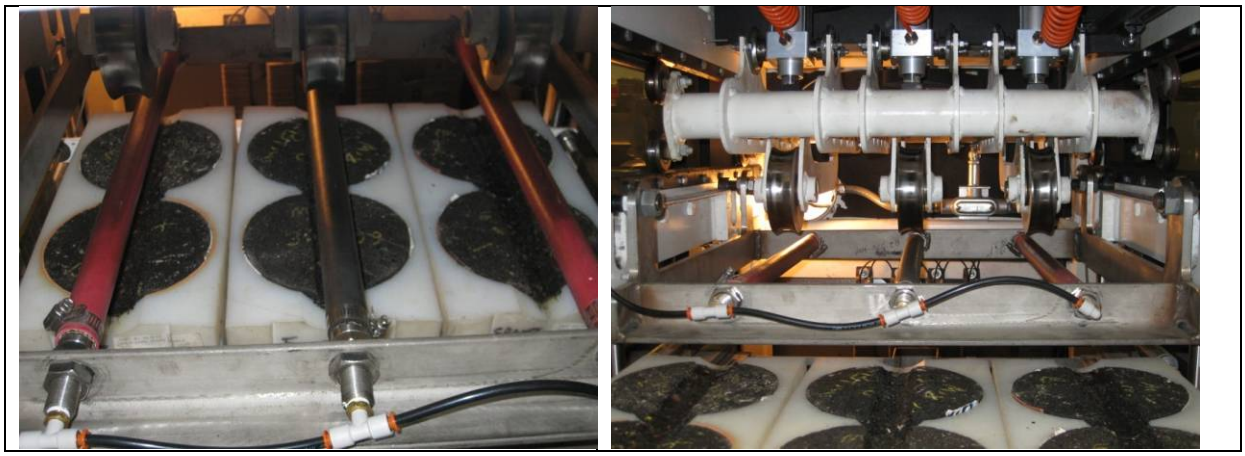


Figure 2.7. Tensile Strength vs. Air Voids

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.

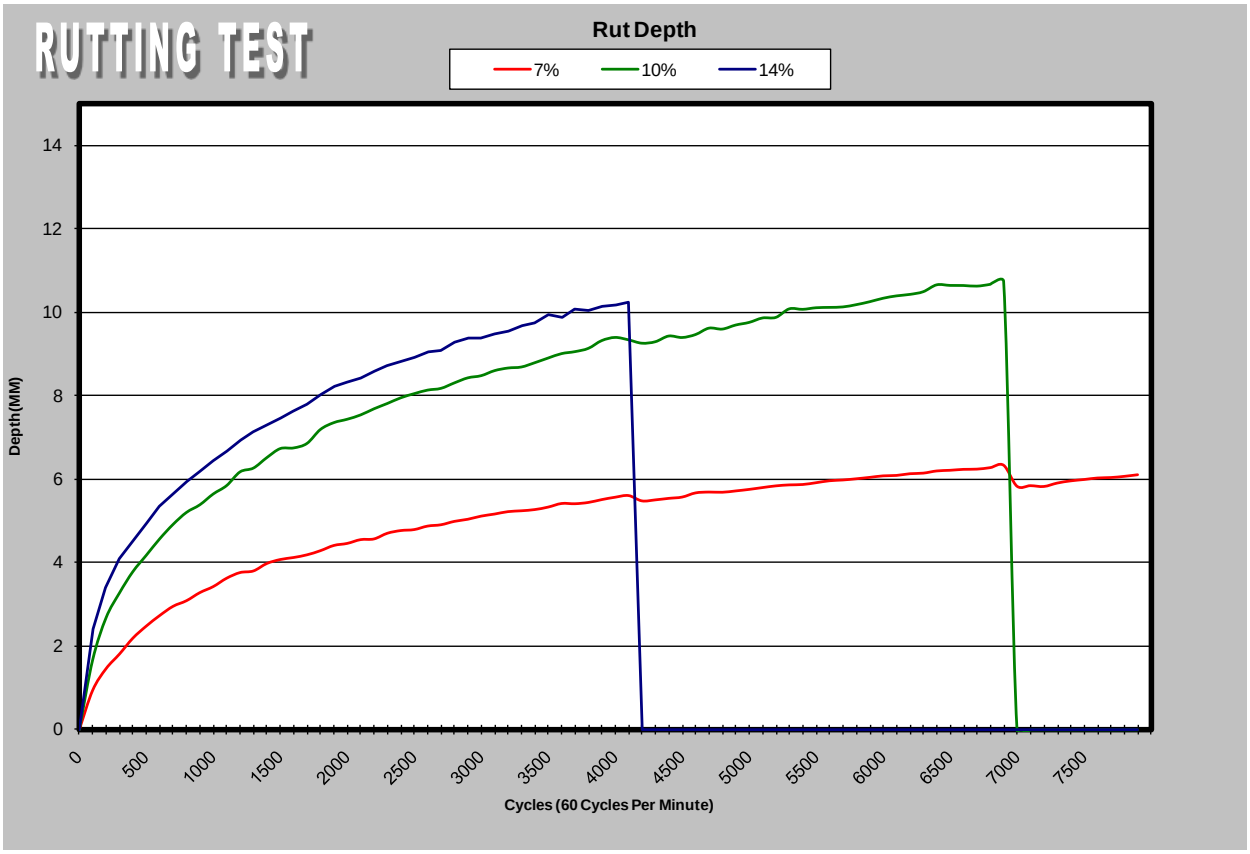


Figure 2.9. Asphalt Pavement Analyzer (APA) Test Results of Dry Test

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	

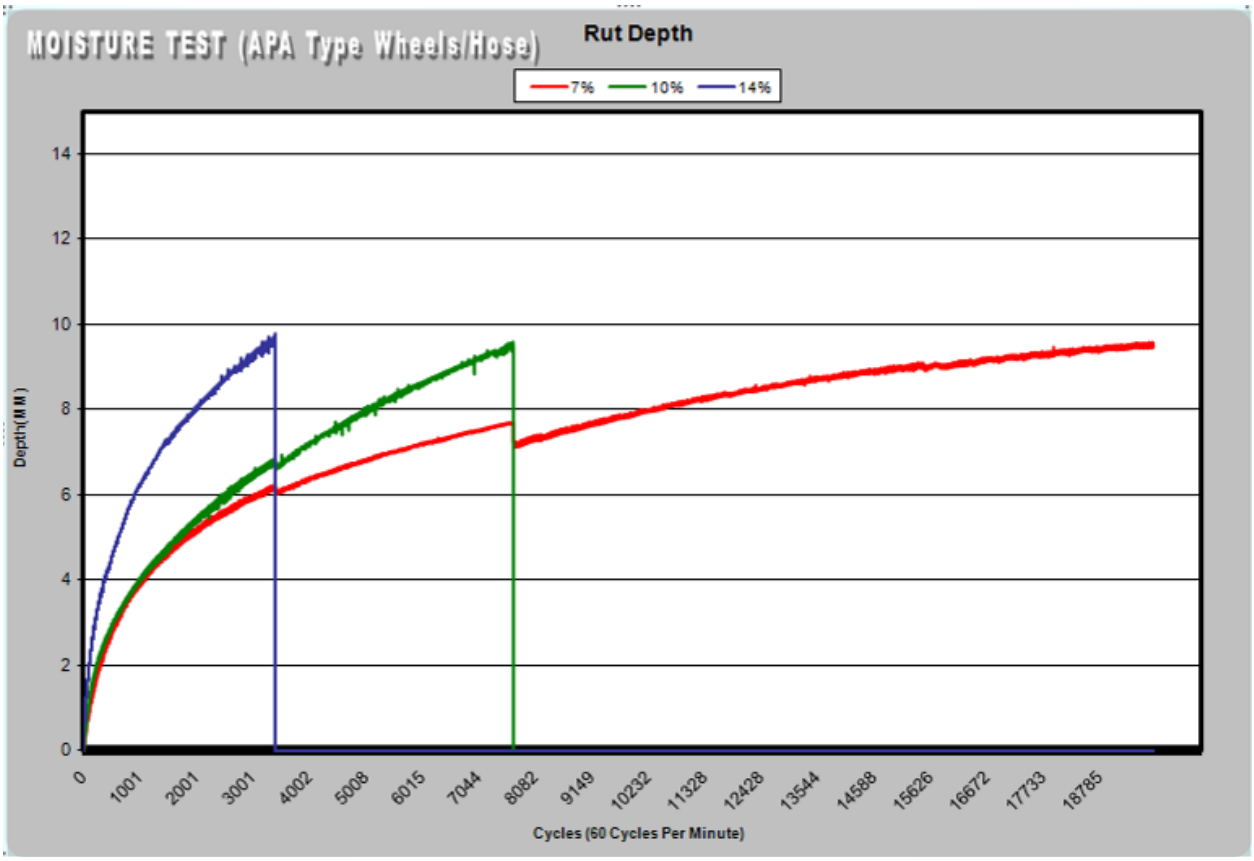


Figure 2.10. Asphalt Pavement Analyzer (APA) Test Results of Wet Test

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.

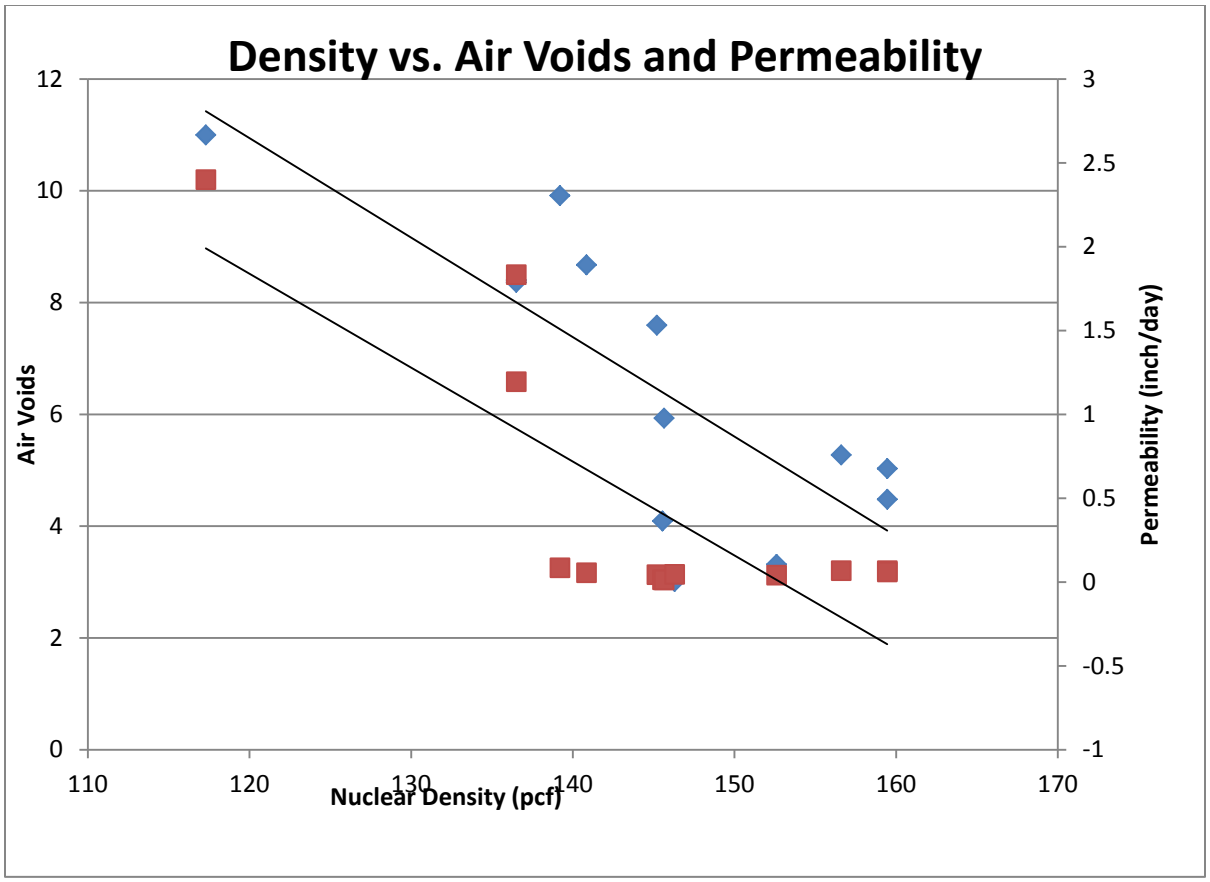


Figure 19 Graph comparing Density vs. Air Voids & Permeability

The results from different test methods will be discussed in-depth in Task 5.

Appendix D: Task 4 Report

Chapter 5. Memo

Office of Materials
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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

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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.

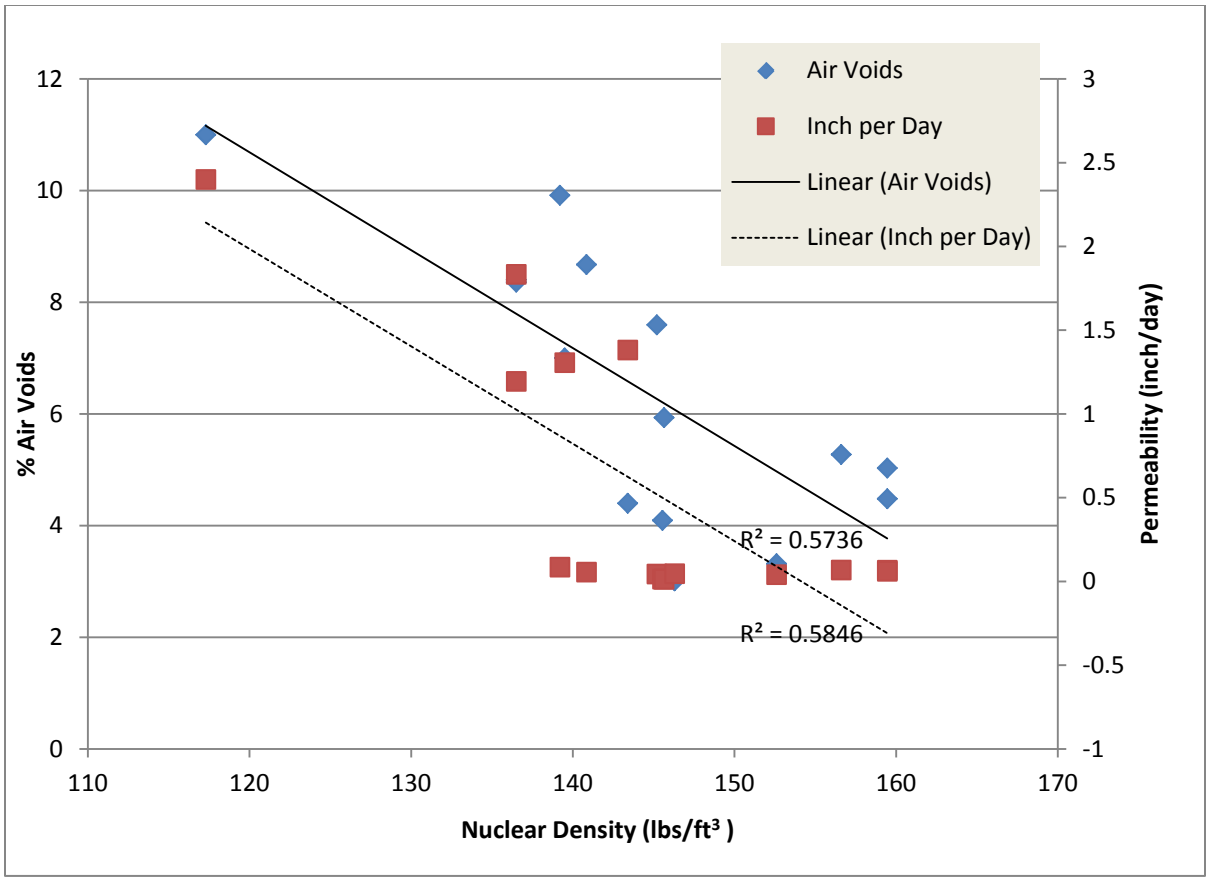


Figure 20 Air Voids and Permeability vs. Density

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.

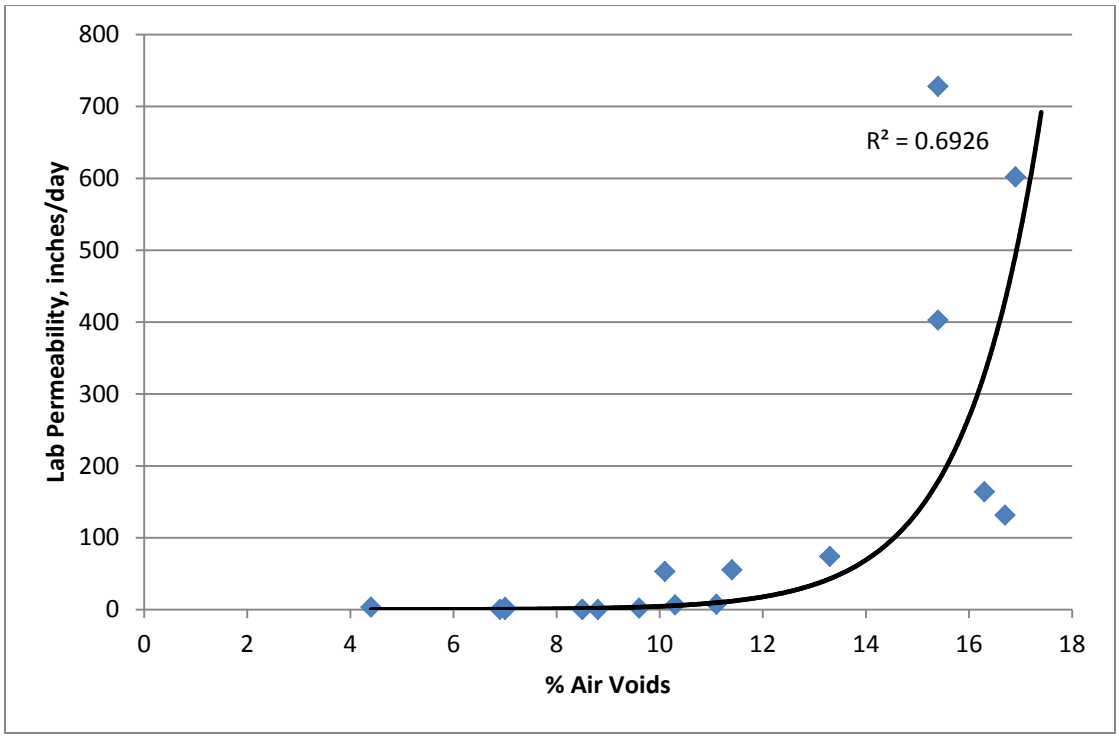


Figure 21 Air Voids vs. Lab Permeability

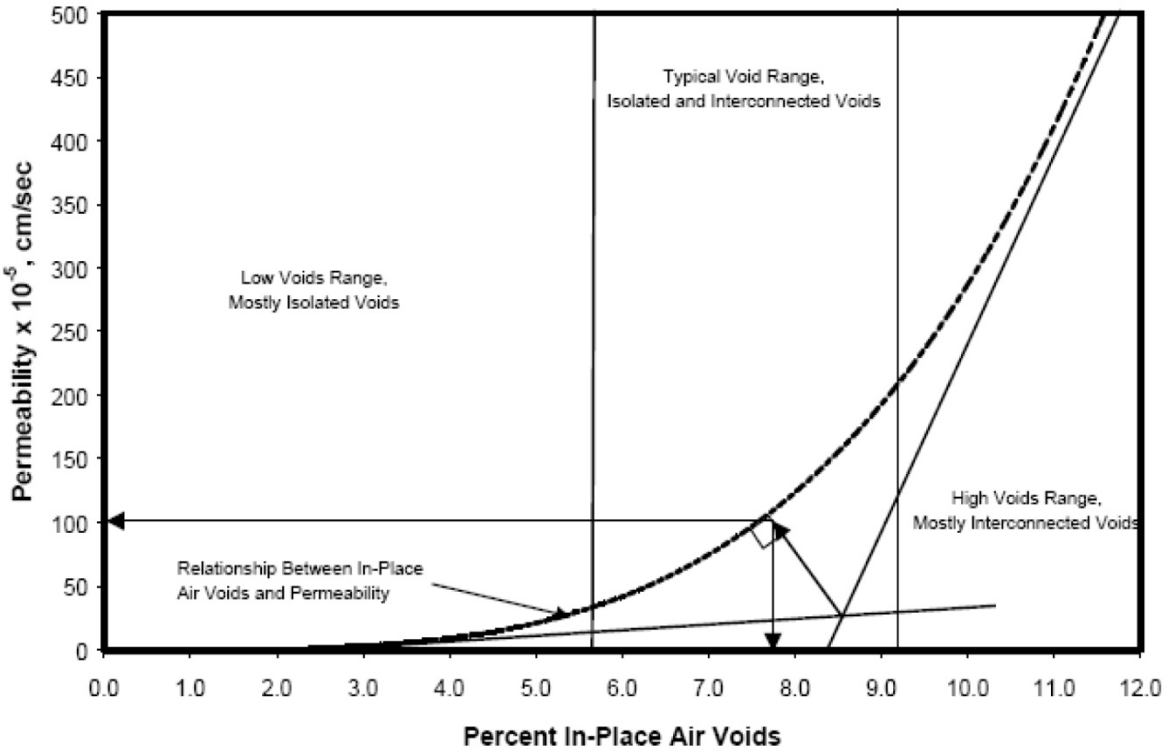


Figure 22 Permeability vs. In-Place Air Voids (Cooley Jr., Brown and Maghsoodloo, 2001).

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.

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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.

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Prevention of Stripping Under Chip Seals

FINAL REPORT

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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

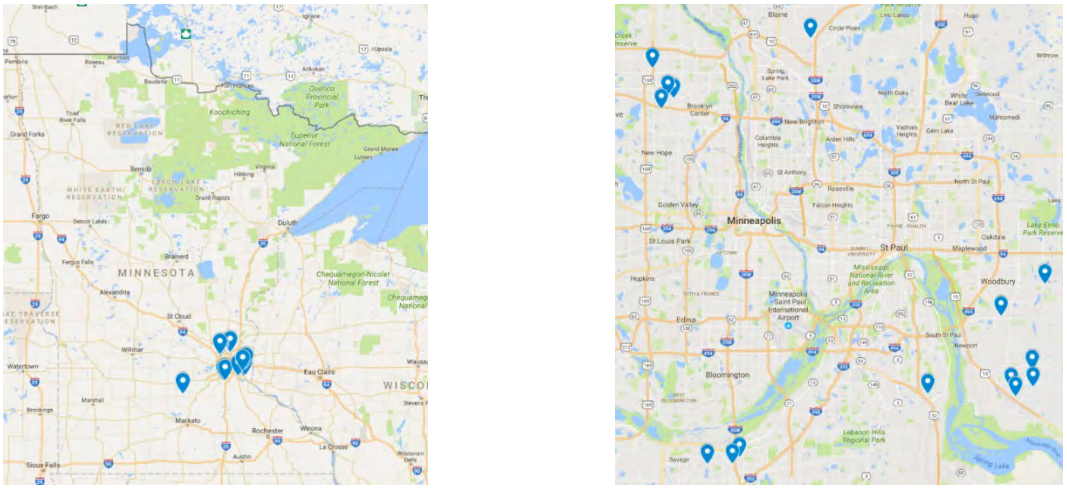
City and county engineers collaborated with the research team to identify 18 locations for the study of chip seal performance, most notably stripping. These locations were used for field testing (i.e., distress condition surveys and density testing) and pavement samples (to be used for further laboratory 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.



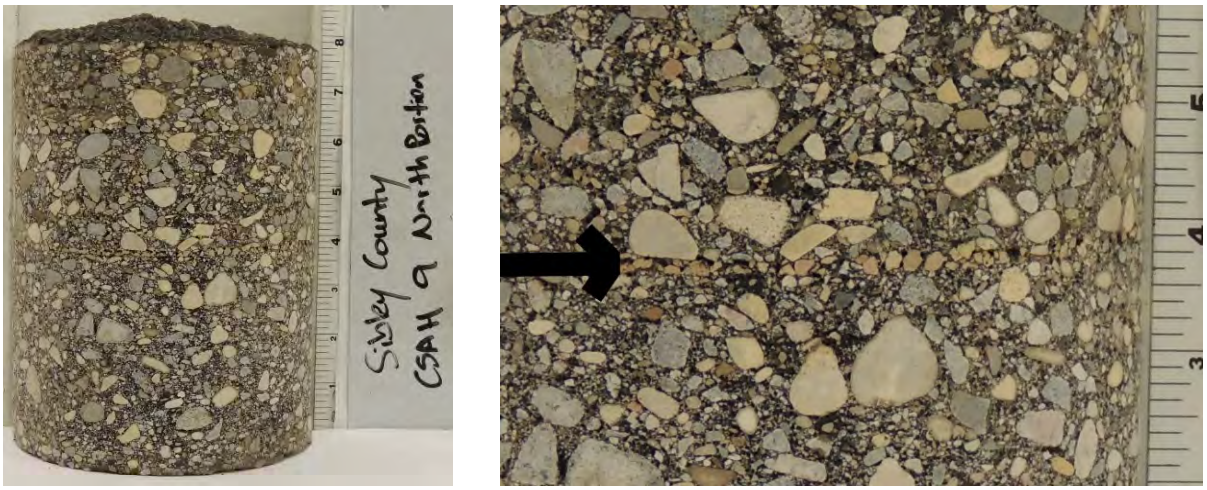
Figure 5. Vehicle-mounted GPR used for site evaluation

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.

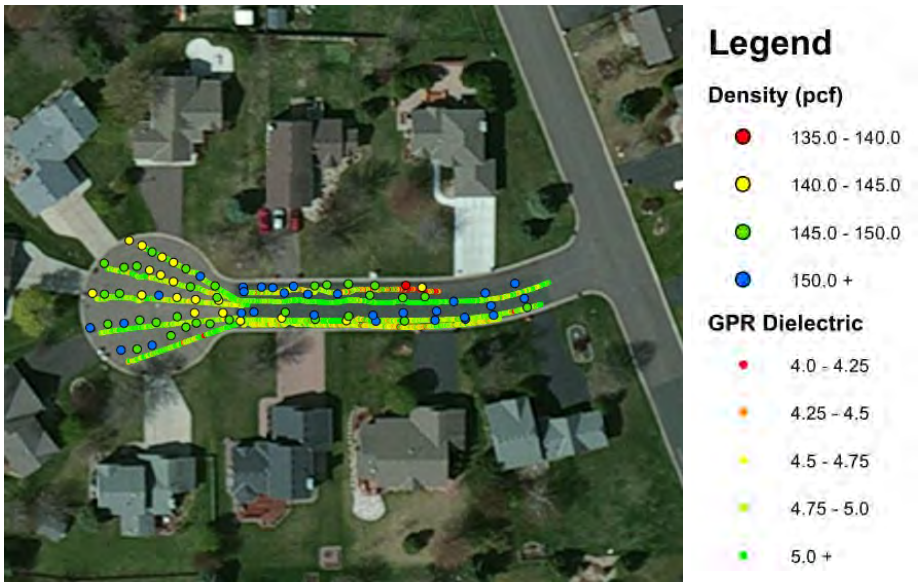


Figure 10. Map of dielectric and density data collected at Newbury Alcove site in Woodbury, MN

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.

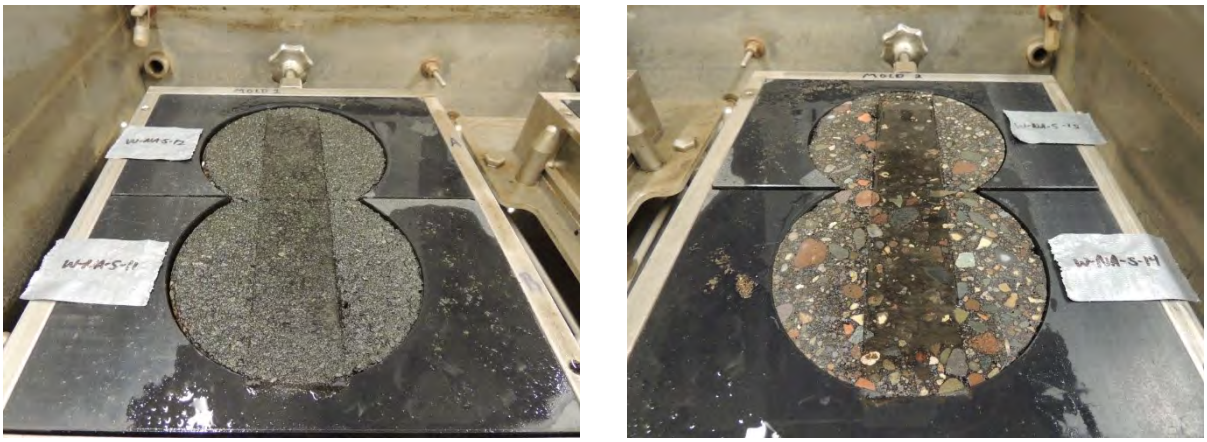


Figure 11. Specimens for stripping study undergoing Hamburg wheel testing

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.

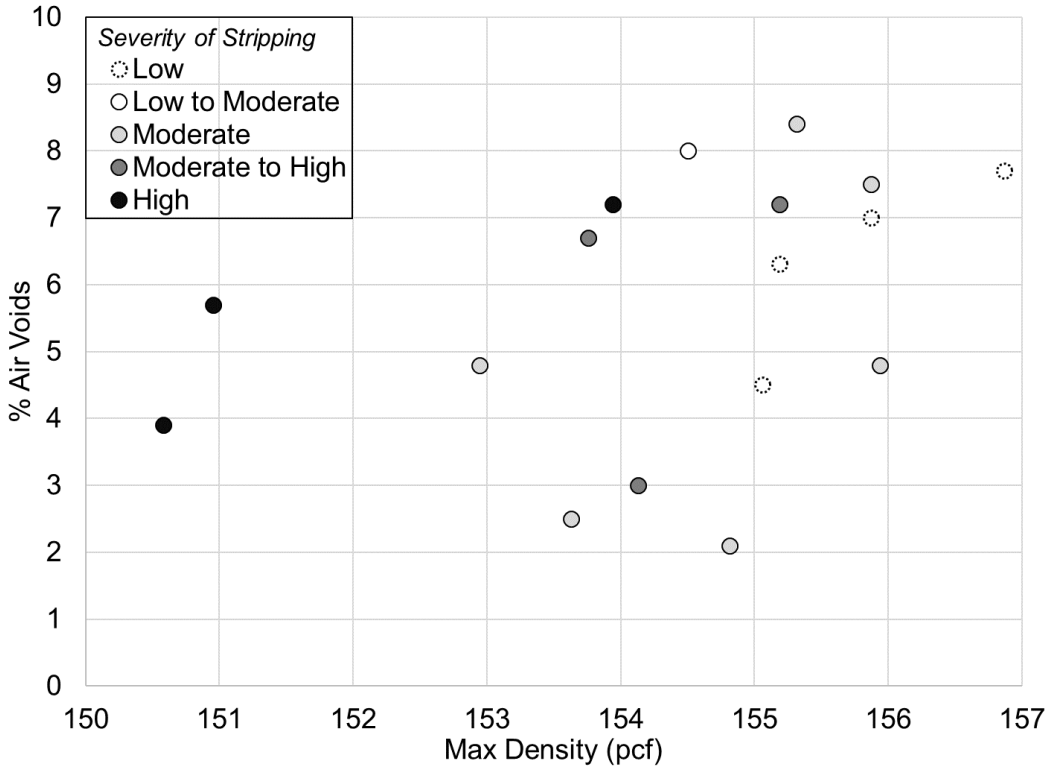


Figure 12. Severity of stripping in chip-sealed pavements in 18 locations with maximum theoretical density and percent air voids

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.



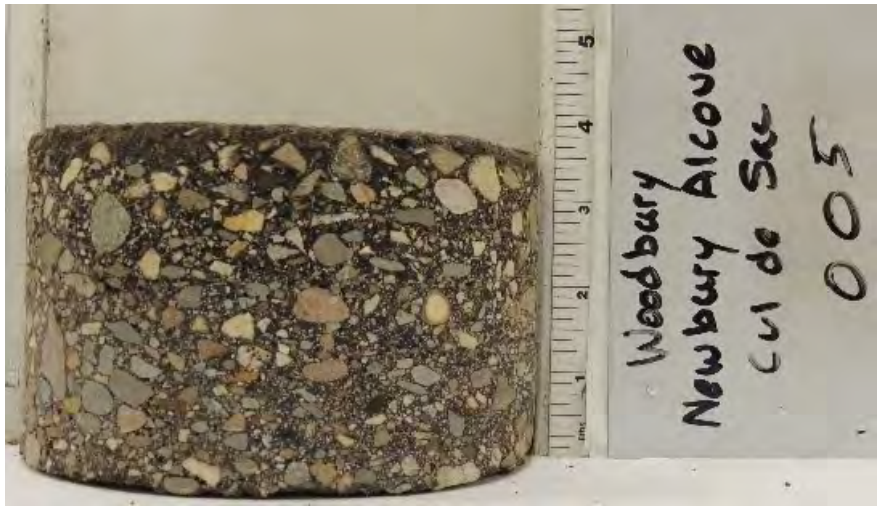
(a)



(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

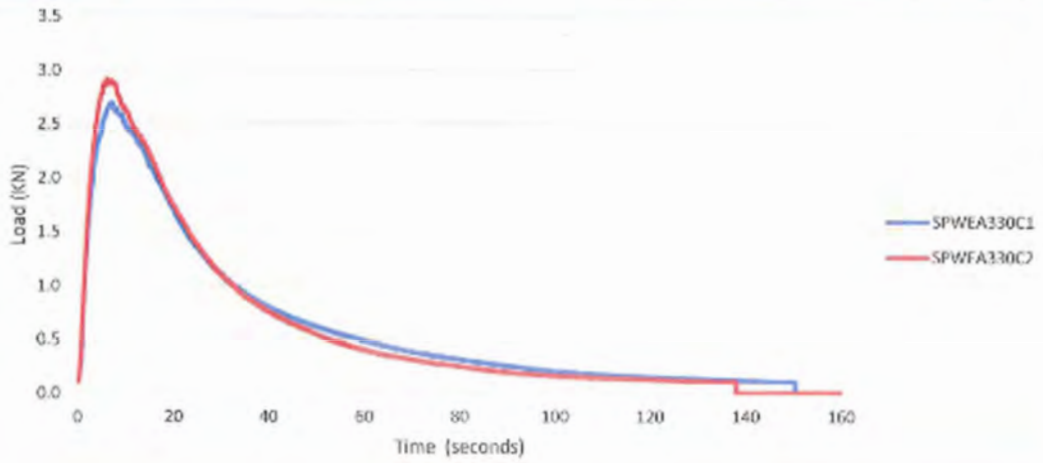
This document shall not be reproduced except in full without the written approval of the American Engineering Testing, Inc.

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:

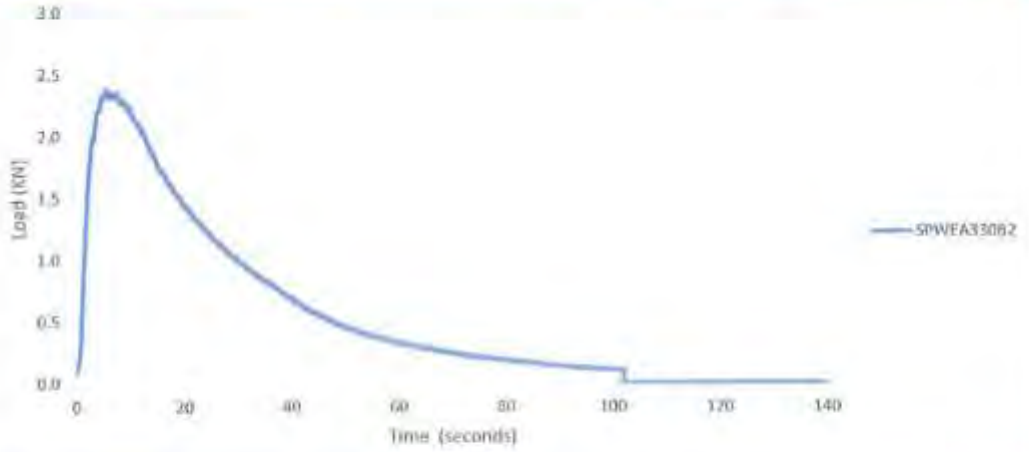
Project: 27-00006
LRRB Asphalt Stripping Study

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

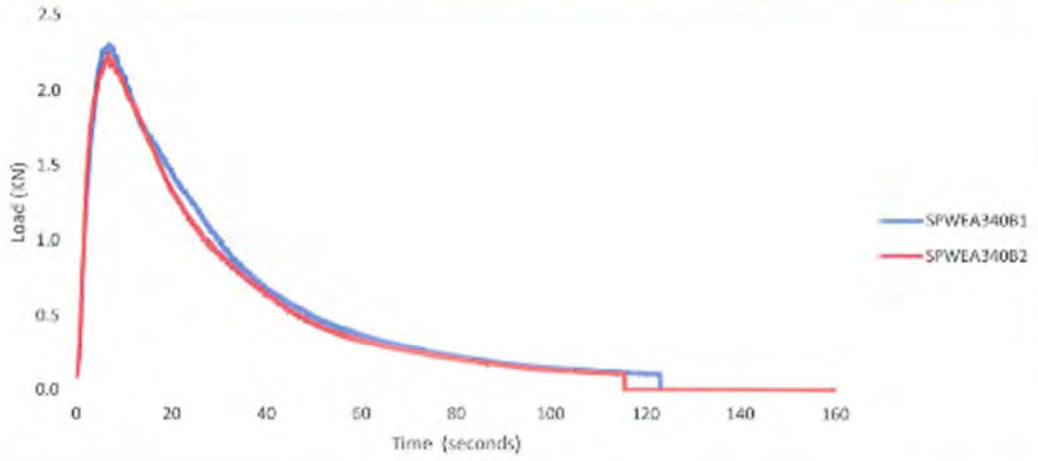
Client: LRRB CC:
Project: 27-00006
LRRB Asphalt Stripping Study

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:

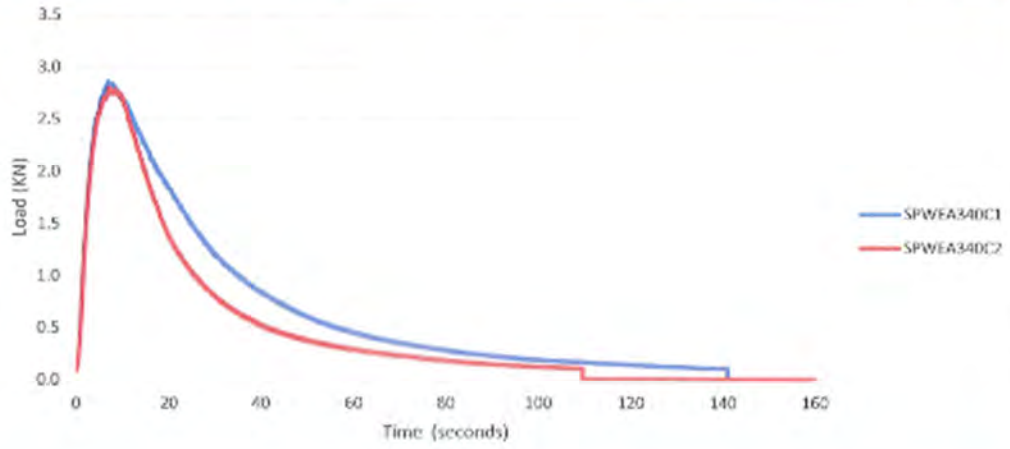
Project: 27-00006
LRRB Asphalt Stripping Study

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

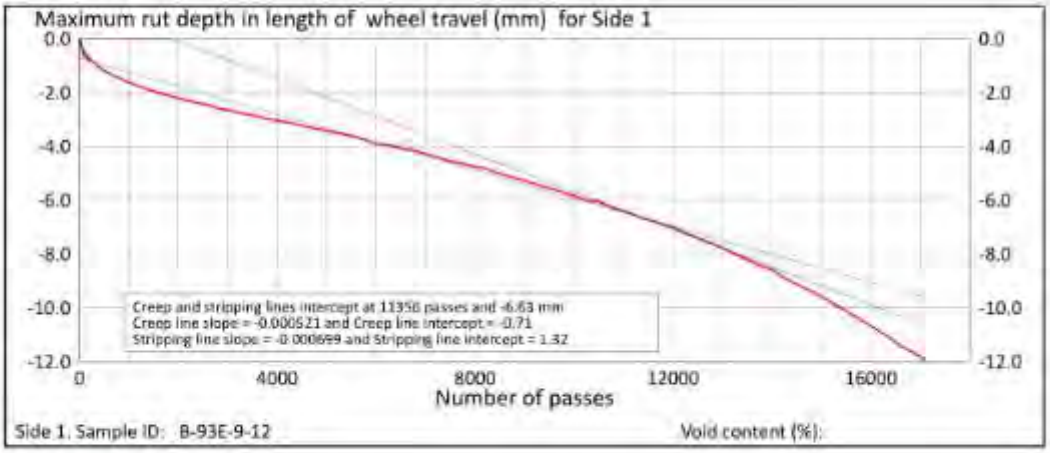
APPENDIX E

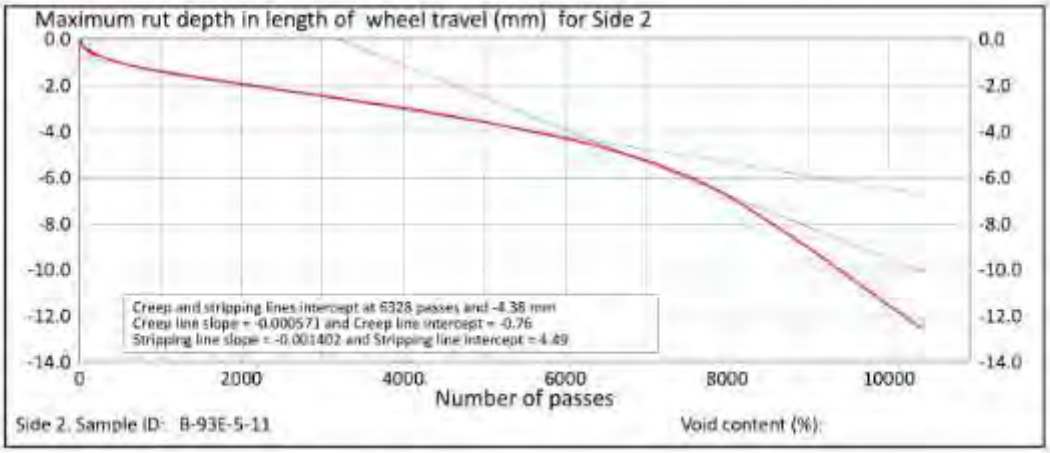
HAMBURG TEST DATA

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	

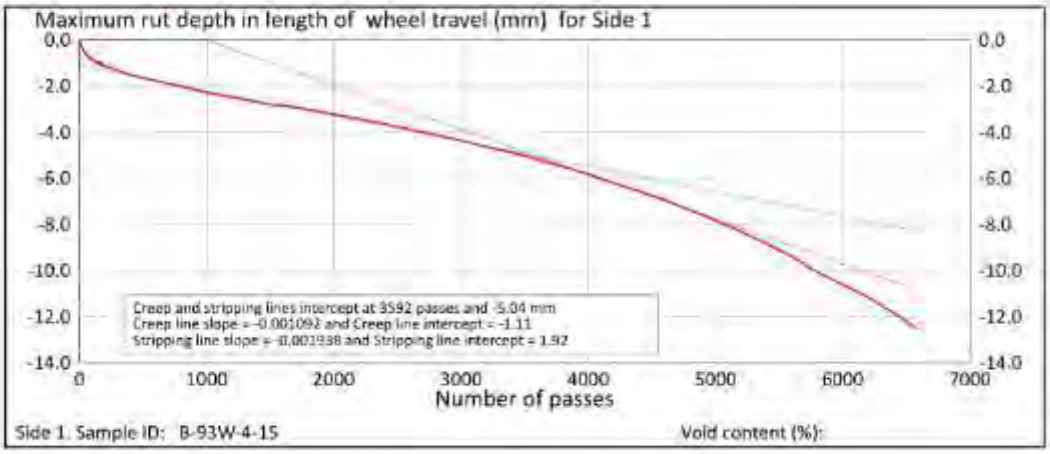
Mix type:
Asphalt grade:
Mix source:
Test temperature (°C): 50.0
Mix depth (mm): 60.0

Signature .....

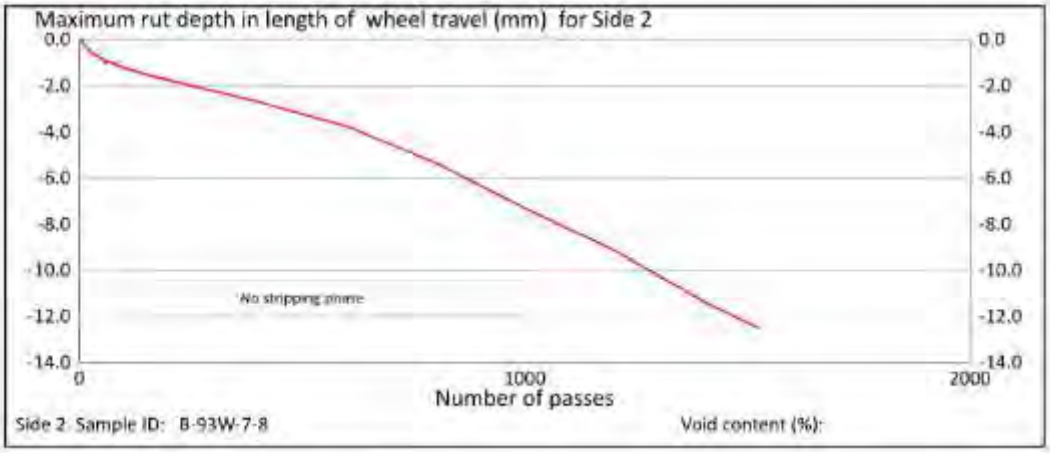
Hamburg Wheel-Tracker Test Results

AASHTO 324 (Modified)
Date/time of test: 12/23/2014 7:10 AM
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	

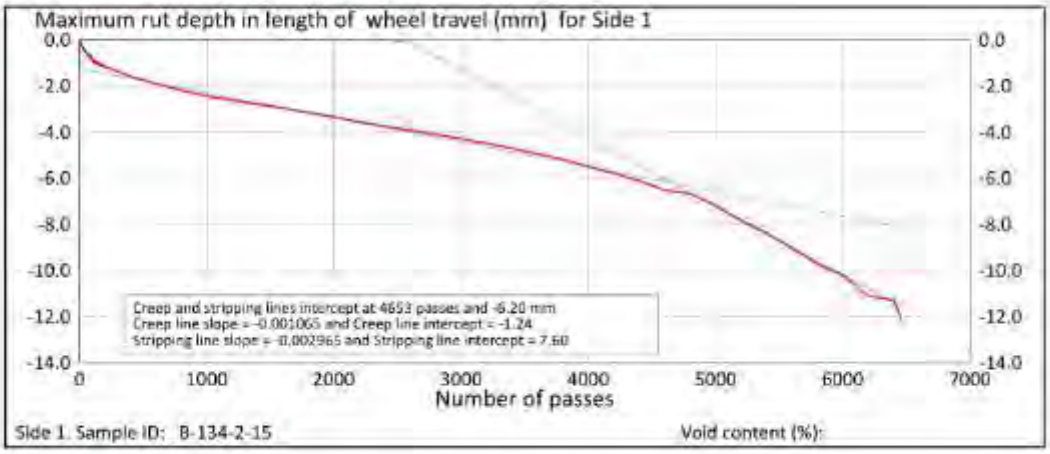
Mix type:
Asphalt grade:
Mix source:
Test temperature (°C): 50.0
Mix depth (mm): 60.0

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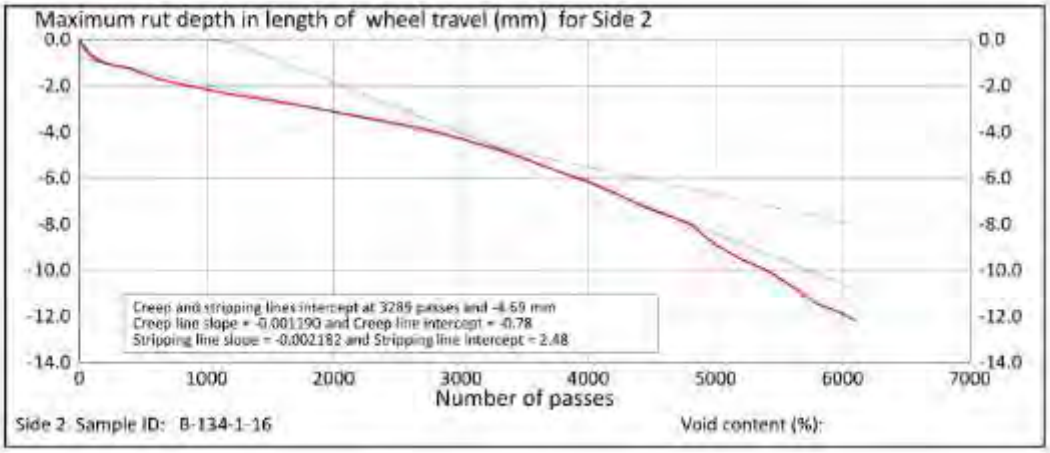
Hamburg Wheel-Tracker Test Results

AASHTO 324 (Modified)
Date/time of test: 12/22/2014 7:27 AM
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	

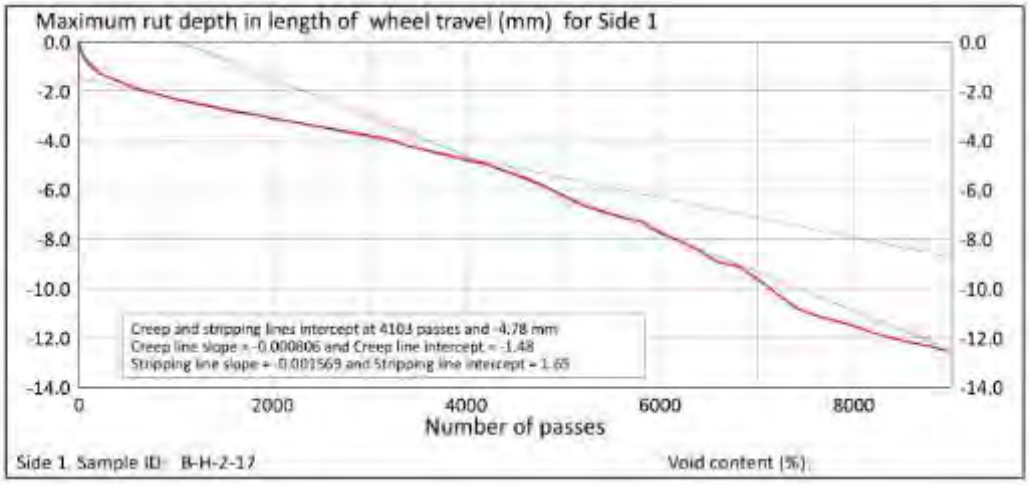
Mix type:
Asphalt grade:
Mix source:
Test temperature (°C): 50.0
Mix depth (mm): 60.0

Signature .....

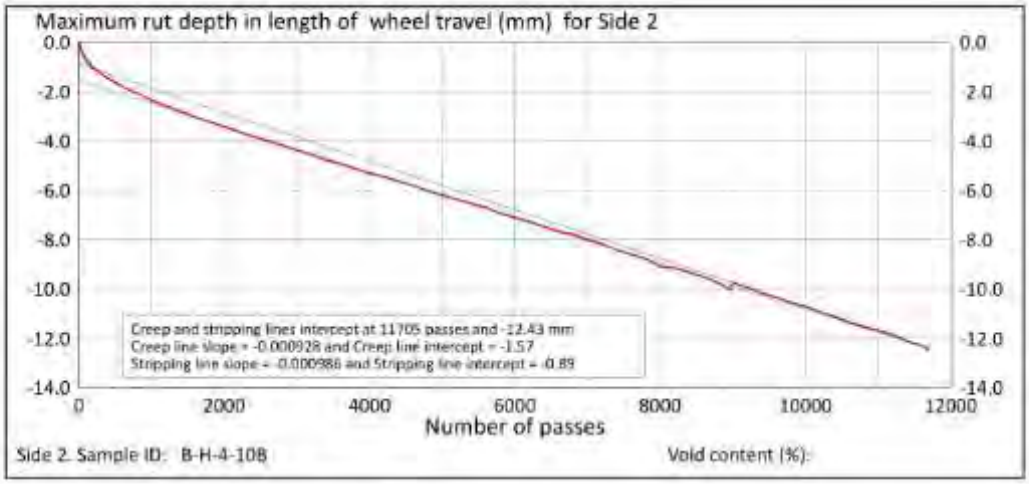
Hamburg Wheel-Tracker Test Results

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

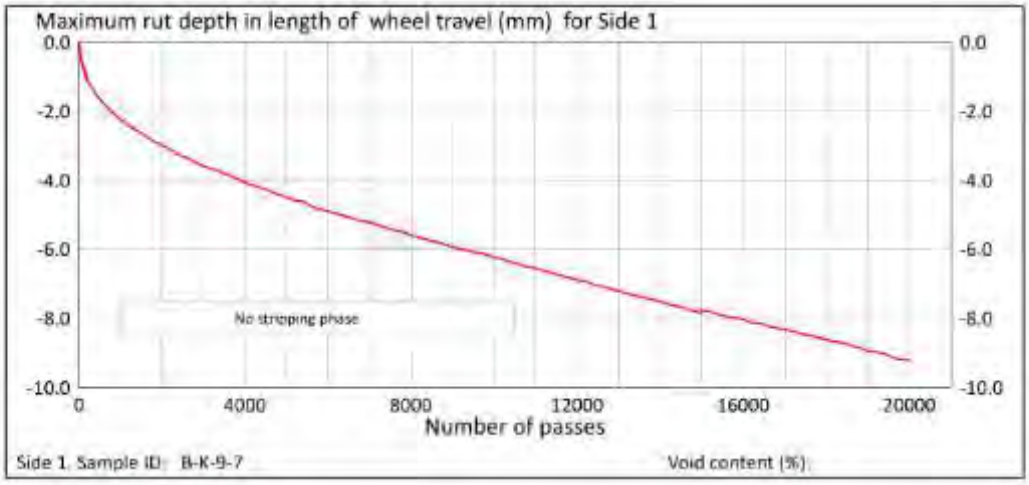
Mix type:
Asphalt grade:
Mix source:
Test temperature (°C): 50.0
Mix depth (mm): 60.0

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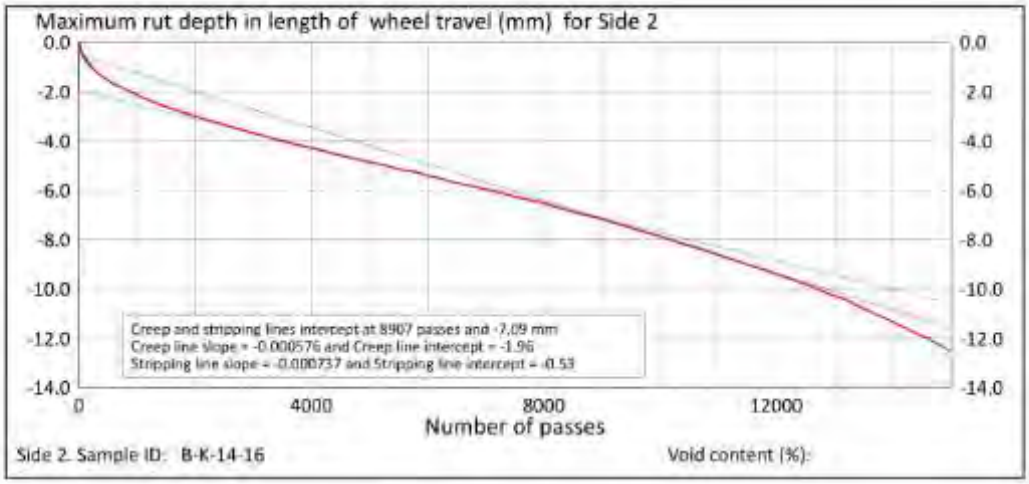
Hamburg Wheel-Tracker Test Results

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:



Side 1. Sample ID: B-K-9-7 Void content (%):



Side 2. Sample ID: B-K-14-16 Void content (%):

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

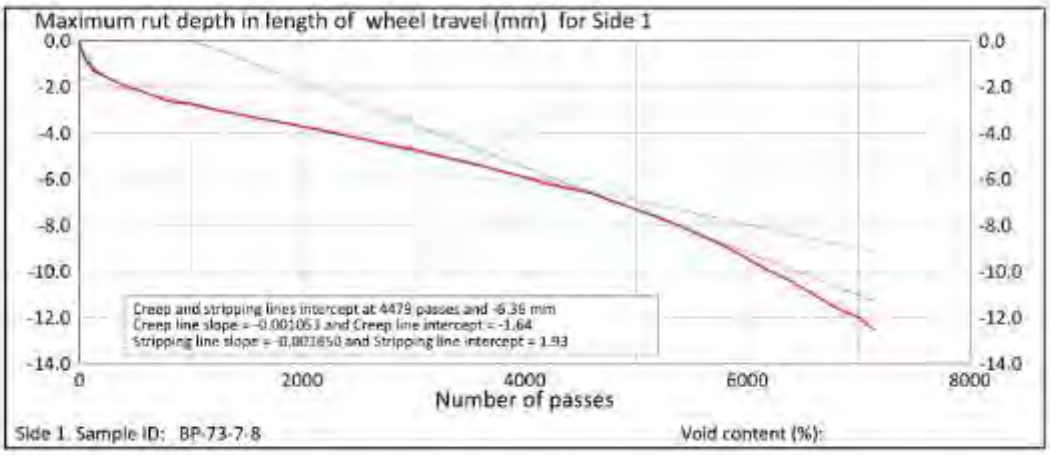
Mix type:
Asphalt grade:
Mix source:
Test temperature (°C): 50.0
Mix depth (mm): 60.0

Signature .....

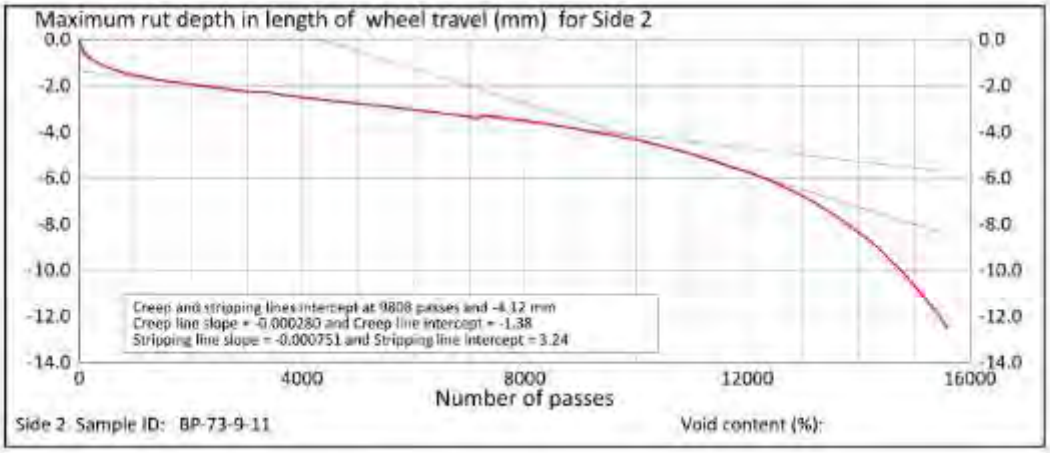
Hamburg Wheel-Tracker Test Results

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

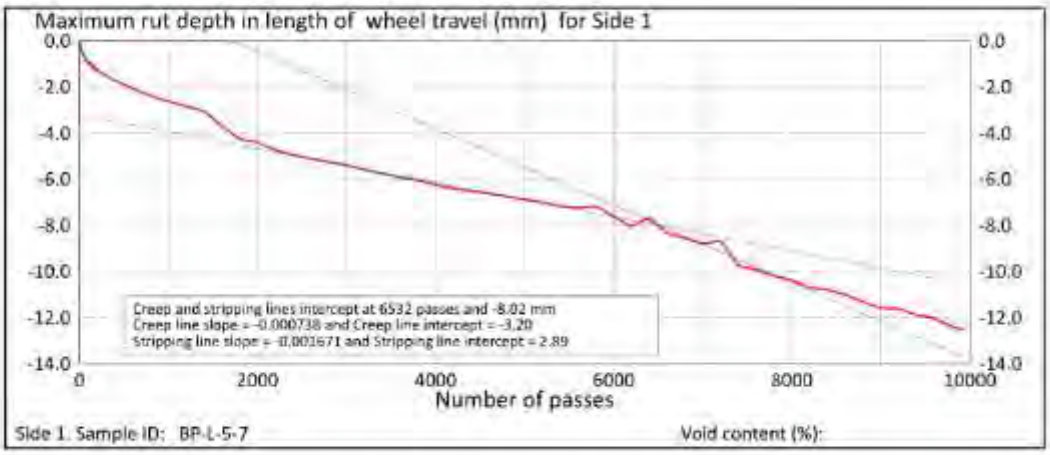
Mix type:
Asphalt grade:
Mix source:
Test temperature (°C): 50.0
Mix depth (mm): 60.0

Signature .....

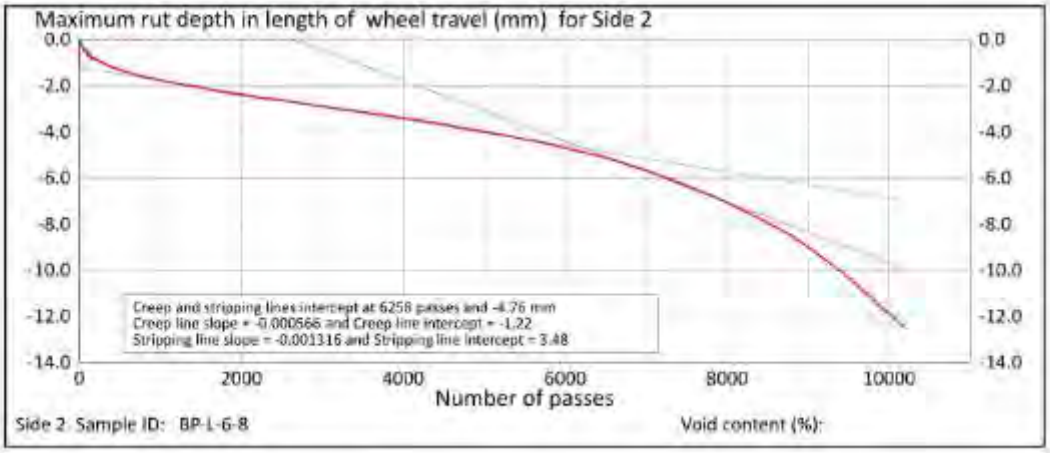
Hamburg Wheel-Tracker Test Results

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

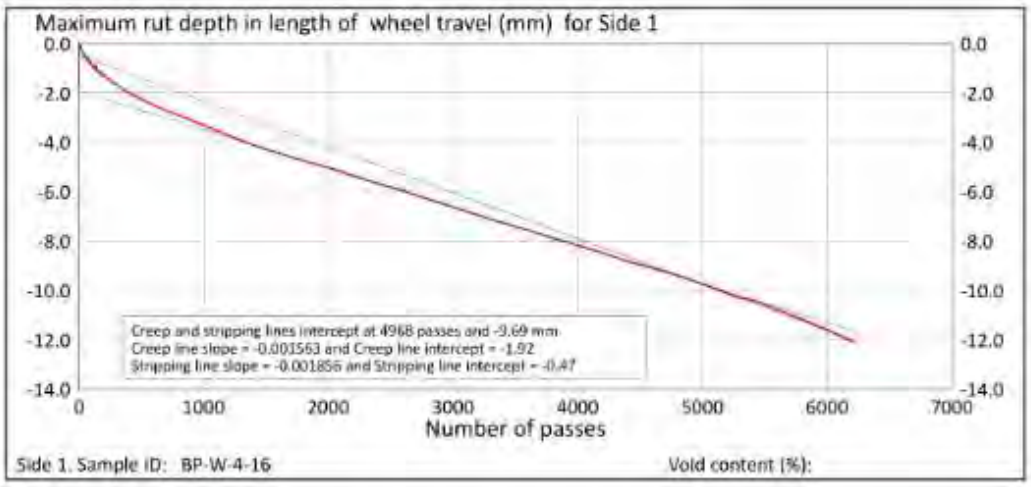
Mix type:
Asphalt grade:
Mix source:
Test temperature (°C): 50.0
Mix depth (mm): 60.0

Signature .....

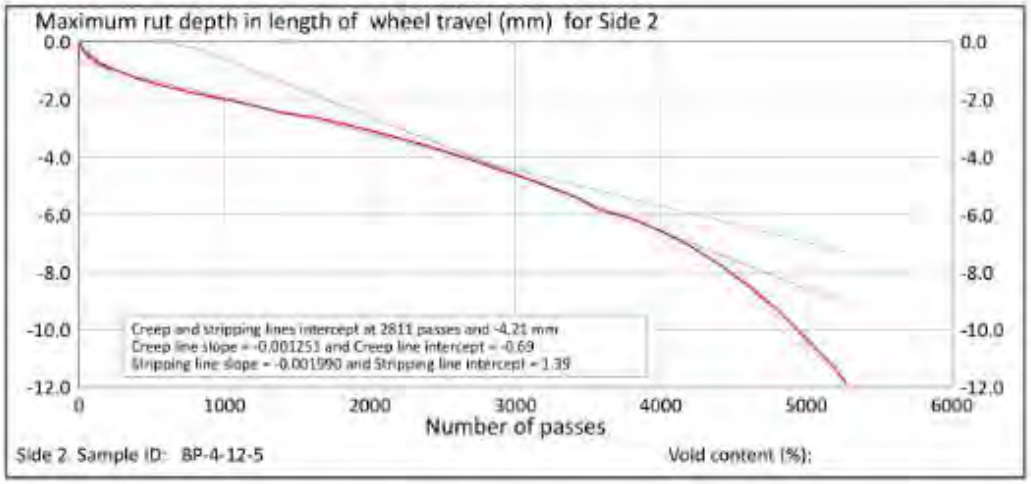
Hamburg Wheel-Tracker Test Results

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	

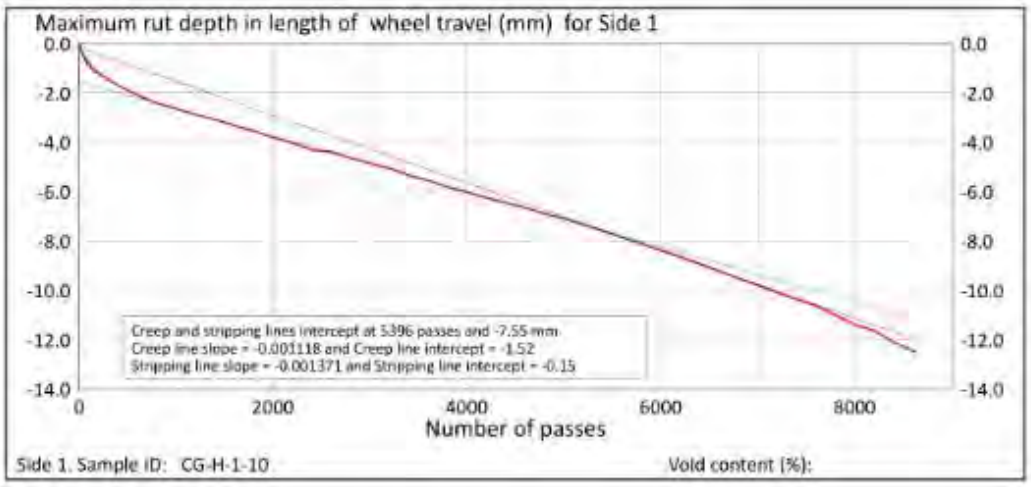
Mix type:
Asphalt grade:
Mix source:
Test temperature (°C): 50.0
Mix depth (mm): 60.0

Signature .....

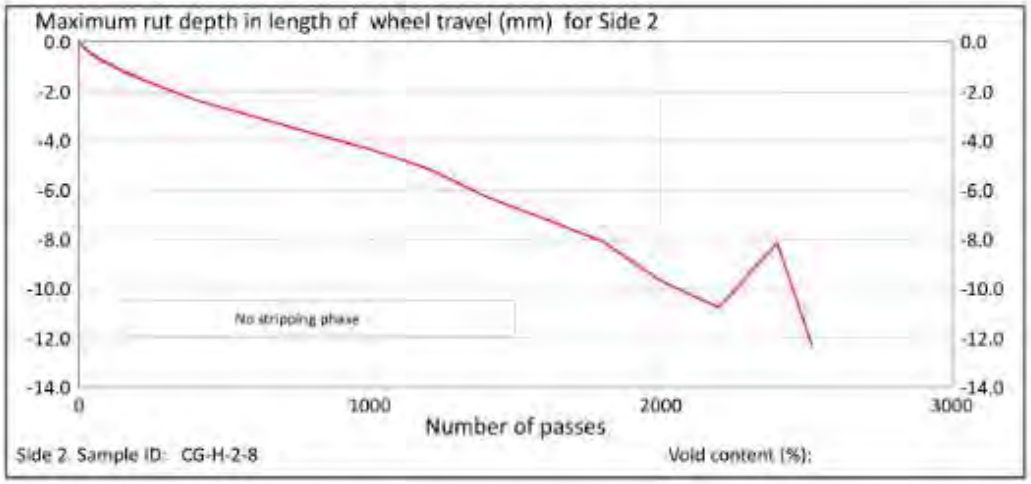
Hamburg Wheel-Tracker Test Results

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	

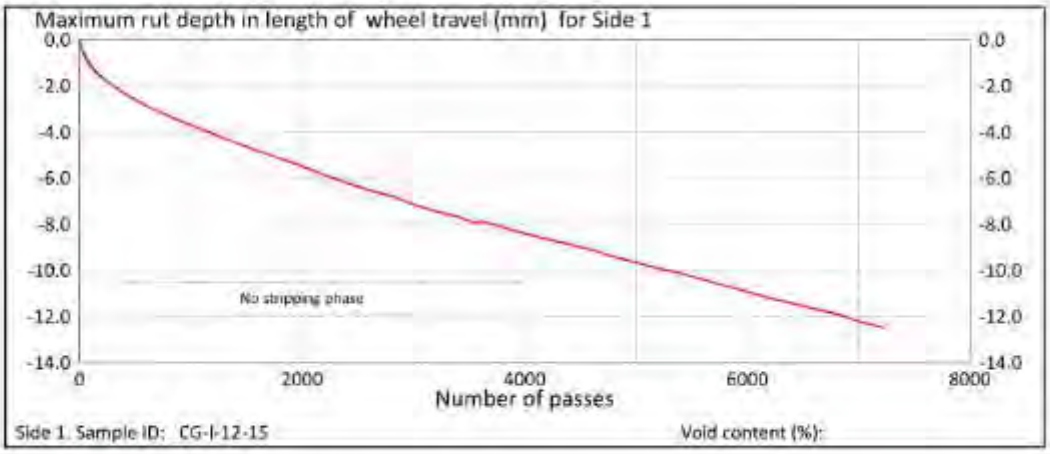
Mix type:
Asphalt grade:
Mix source:
Test temperature (°C): 50.0
Mix depth (mm): 60.0

Signature .....

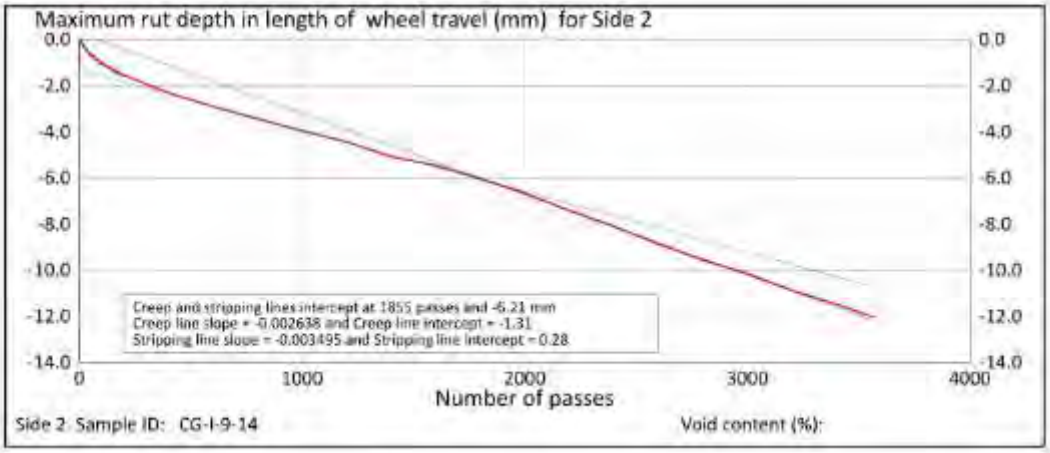
Hamburg Wheel-Tracker Test Results

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	

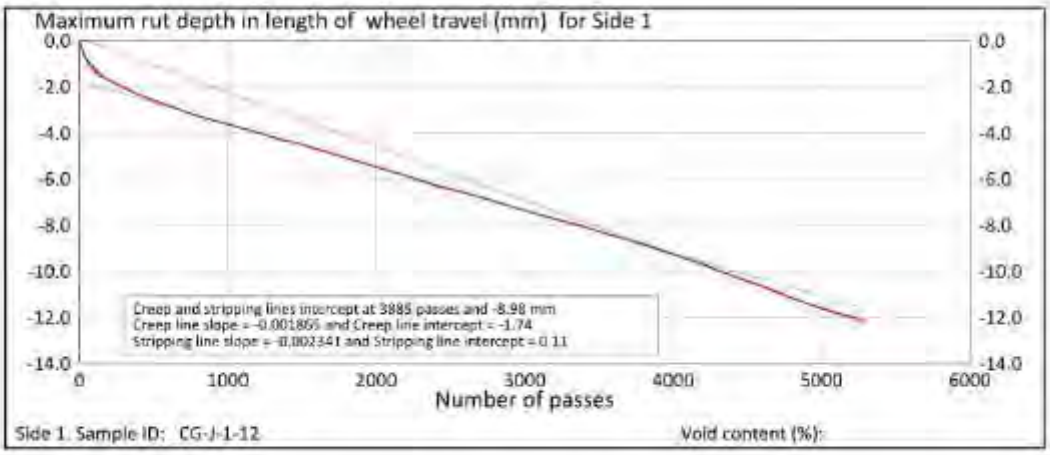
Mix type:
Asphalt grade:
Mix source:
Test temperature (°C): 50.0
Mix depth (mm): 60.0

Signature .....

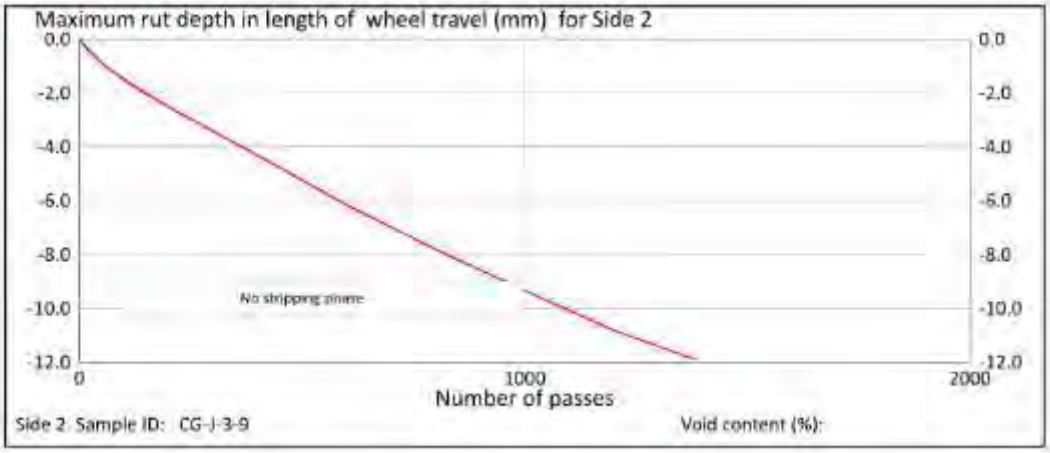
Hamburg Wheel-Tracker Test Results

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	

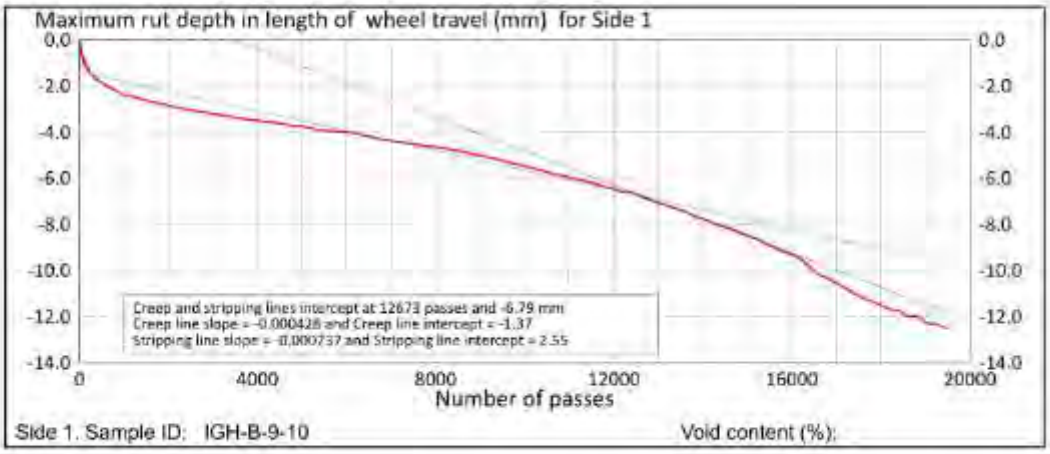
Mix type:
Asphalt grade:
Mix source:
Test temperature (°C): 50.0
Mix depth (mm): 60.0

Signature .....

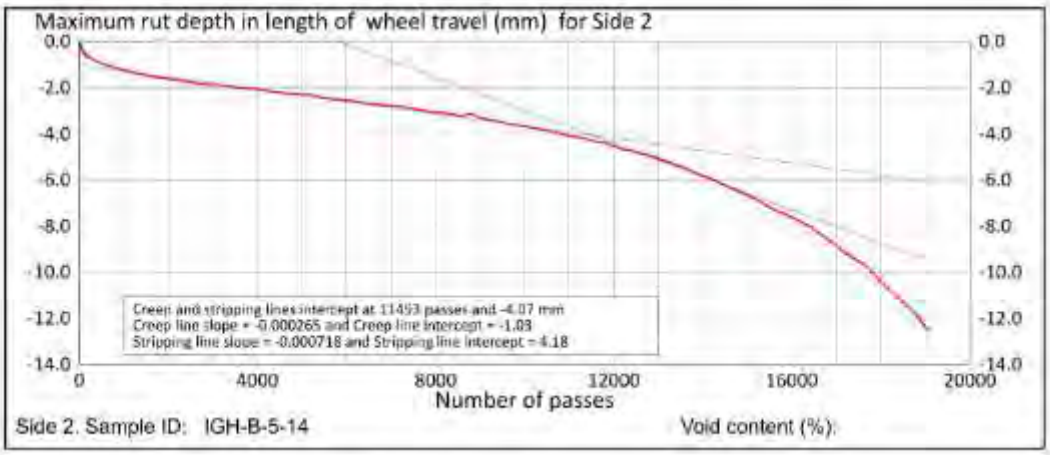
Hamburg Wheel-Tracker Test Results

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	

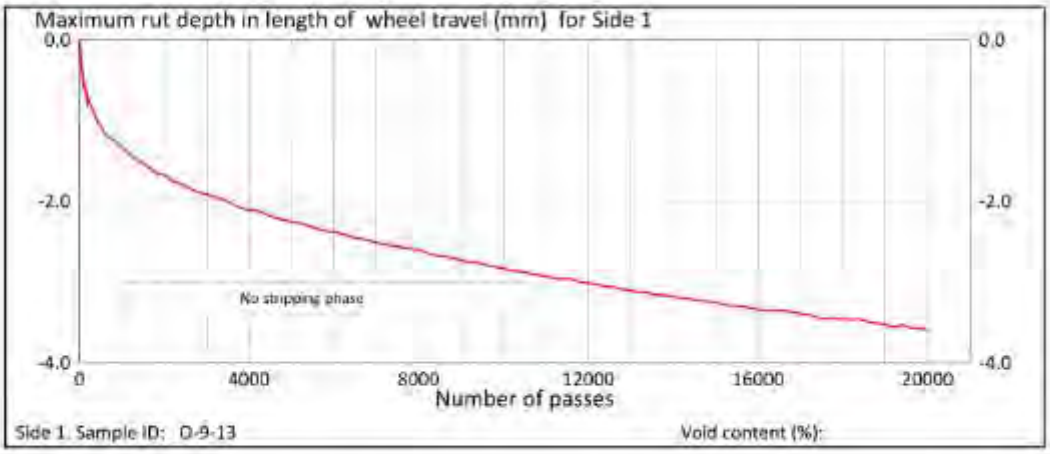
Mix type:
Asphalt grade:
Mix source:
Test temperature (°C): 45.0
Mix depth (mm): 60.0

Signature .....

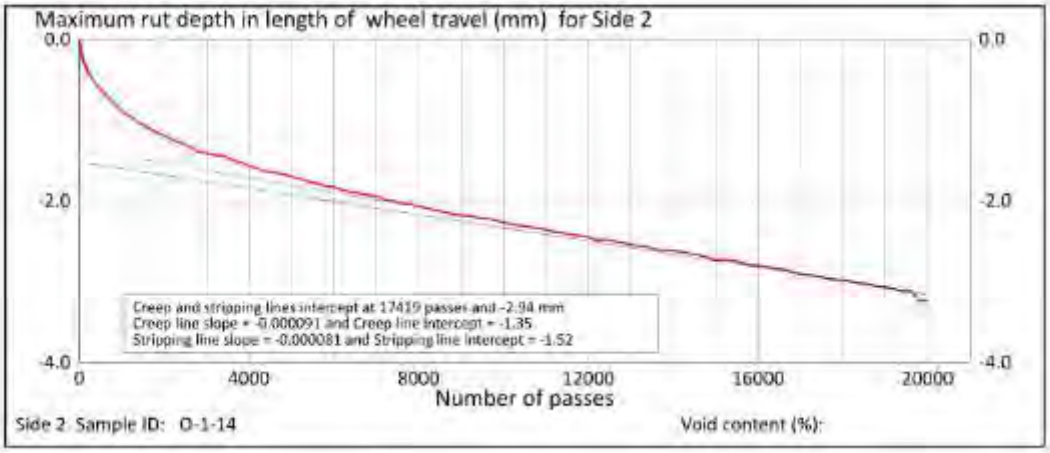
Hamburg Wheel-Tracker Test Results

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

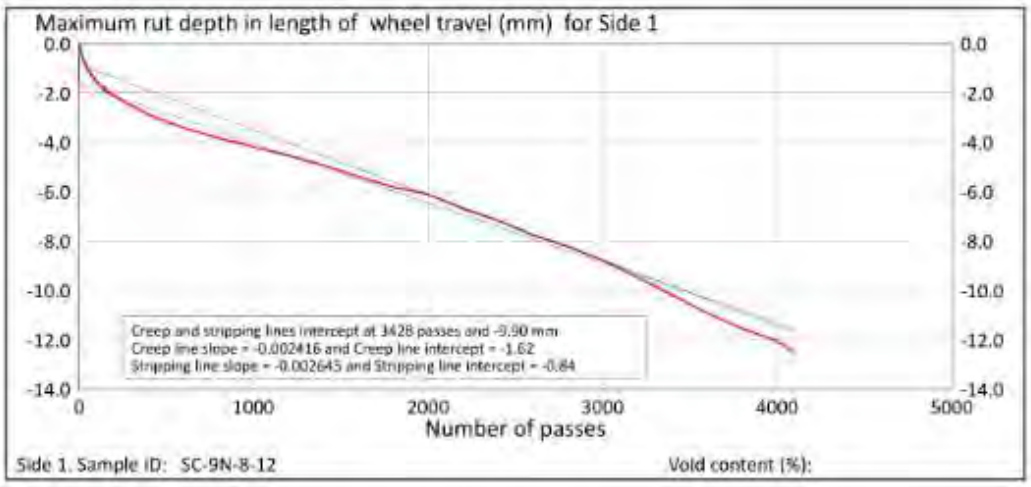
Mix type:
Asphalt grade:
Mix source:
Test temperature (°C): 50.0
Mix depth (mm): 60.0

Signature .....

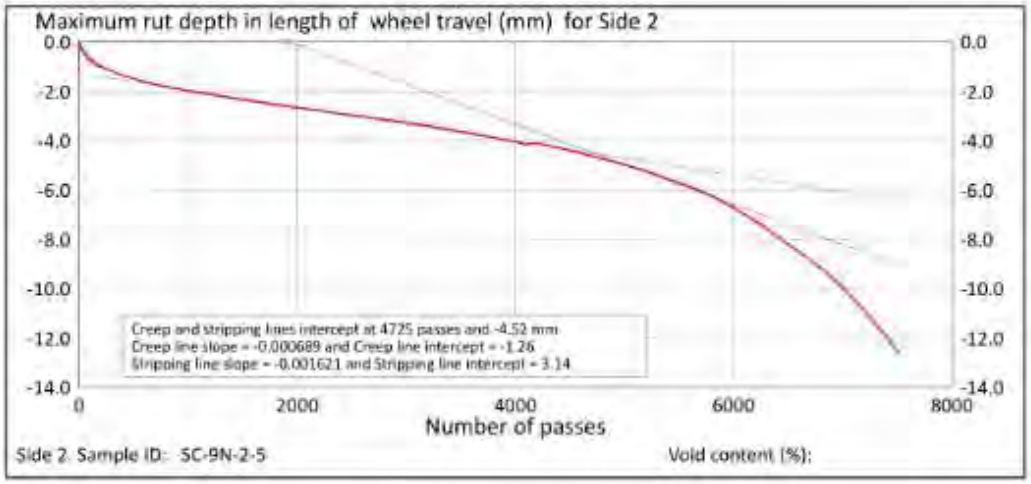
Hamburg Wheel-Tracker Test Results

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

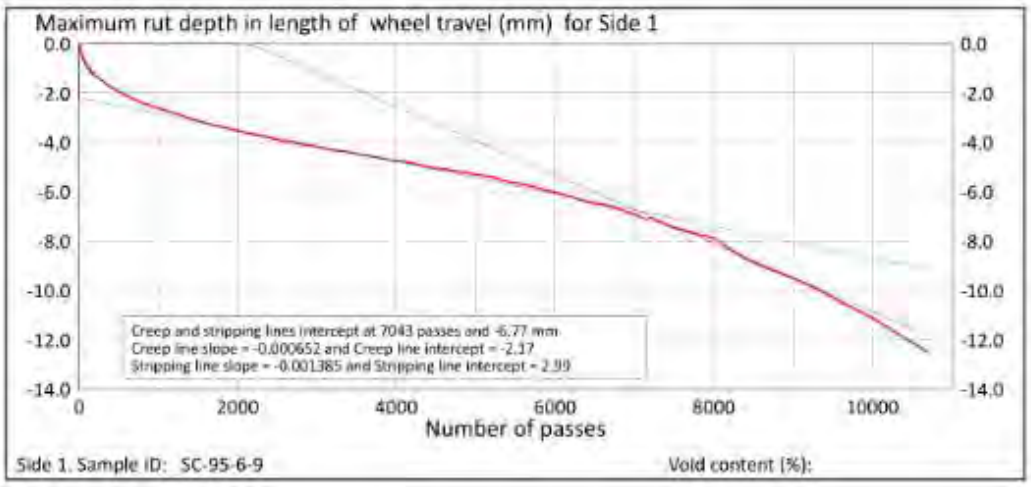
Mix type:
Asphalt grade:
Mix source:
Test temperature (°C): 50.0
Mix depth (mm): 60.0

Signature .....

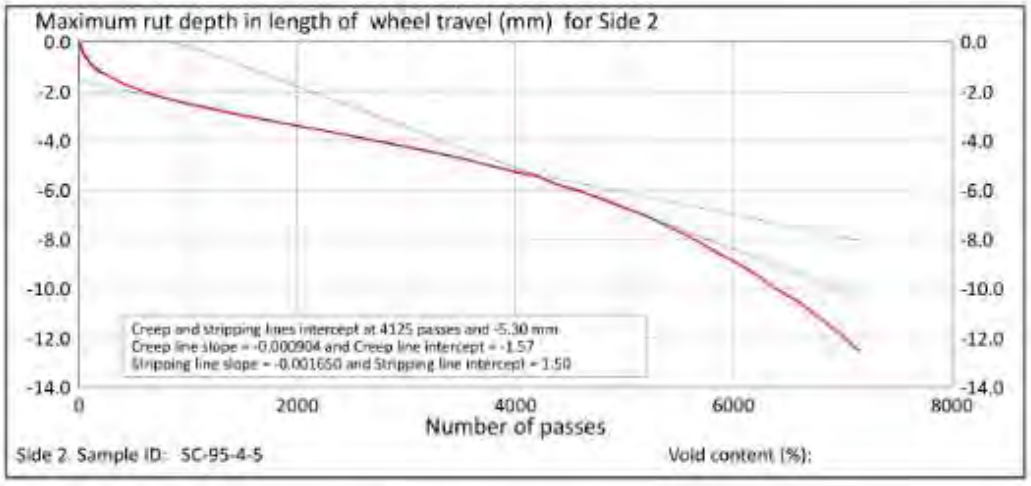
Hamburg Wheel-Tracker Test Results

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	

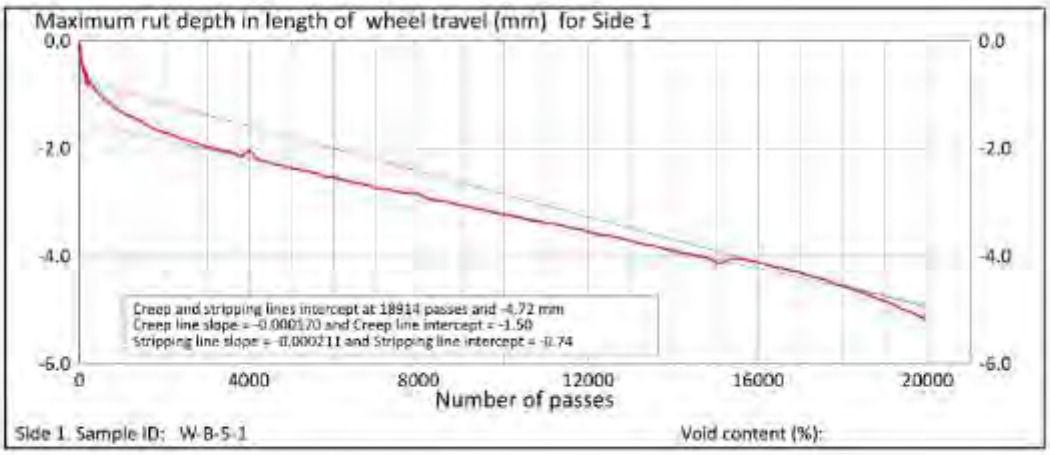
Mix type:
Asphalt grade:
Mix source:
Test temperature (°C): 50.0
Mix depth (mm): 60.0

Signature .....

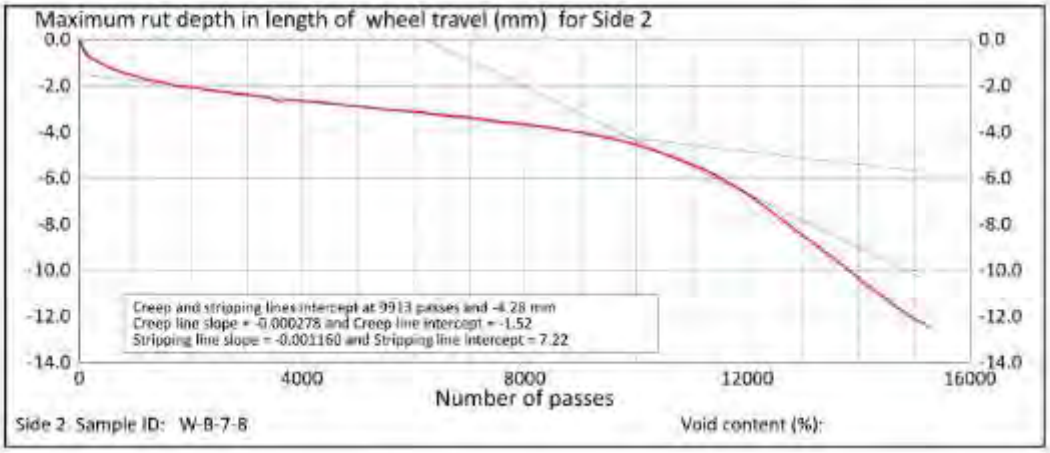
Hamburg Wheel-Tracker Test Results

AASHTO 324 (Modified)
Date/time of test: 12/18/2014 7:09 Af
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

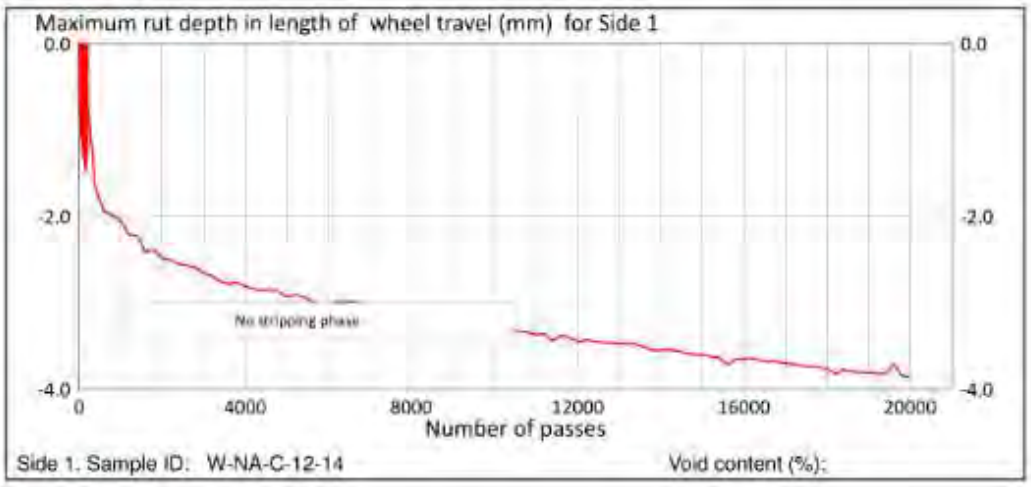
Mix type:
Asphalt grade:
Mix source:
Test temperature (°C): 50.0
Mix depth (mm): 60.0

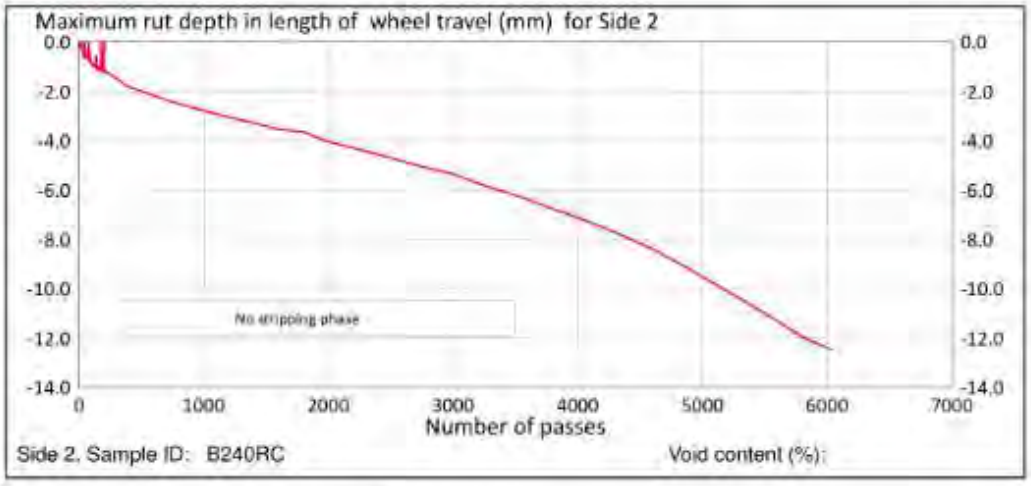
Signature .....

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

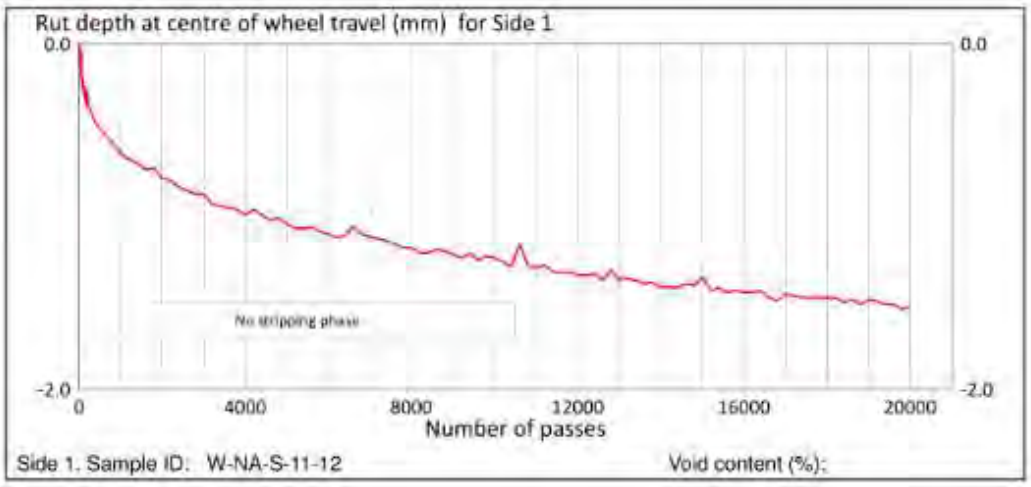
Mix type:
Asphalt grade:
HMA Production: Field
Compaction method: SGC
Mix source:
Test temperature (°C): 45.0
Mix depth (mm): 60.0

Signature .....

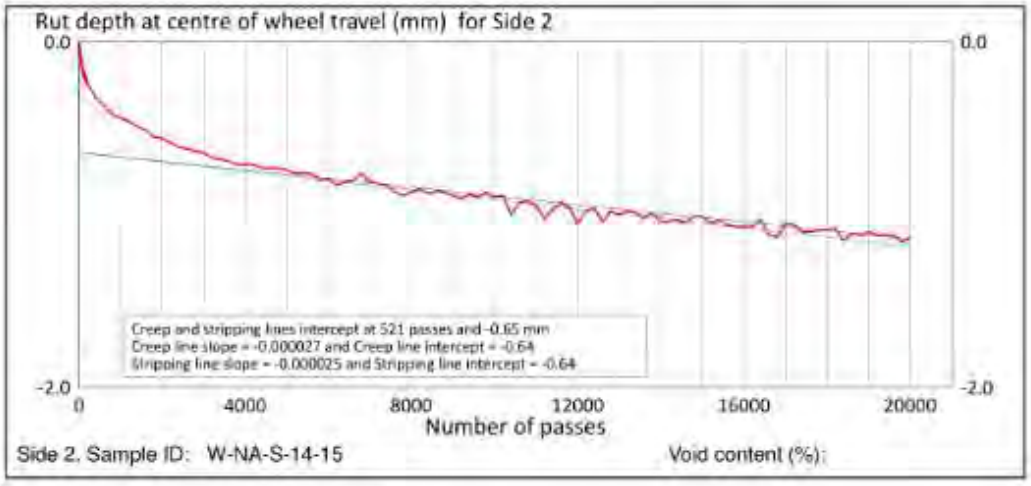
Hamburg Wheel-Tracker Test Results

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

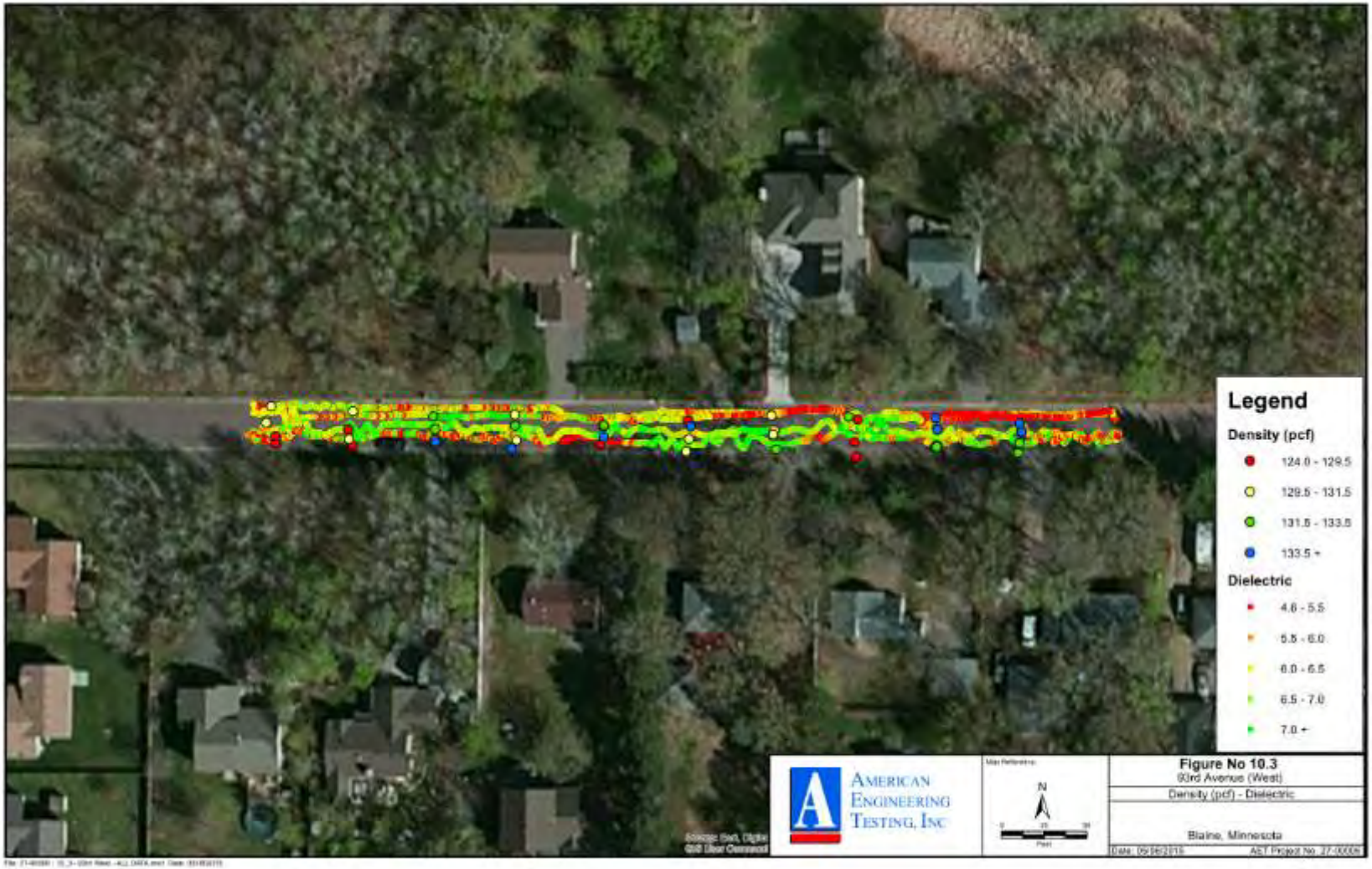

Legend
Density (pcf)
135.0 - 140.0
140.0 - 145.0
145.0 - 150.0
150.0 +
GPR Dielectric
4.0 - 5.5
5.5 - 6.3
6.3 - 7.1
7.1 - 8.7
8.7+
AMERICAN ENGINEERING TESTING, INC
N
Figure No 5.3
Bridgewater
Density (pcf) - Dielectric
Woodbury, Minnesota


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
N
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
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 +
American Engineering Testing, Inc
N
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

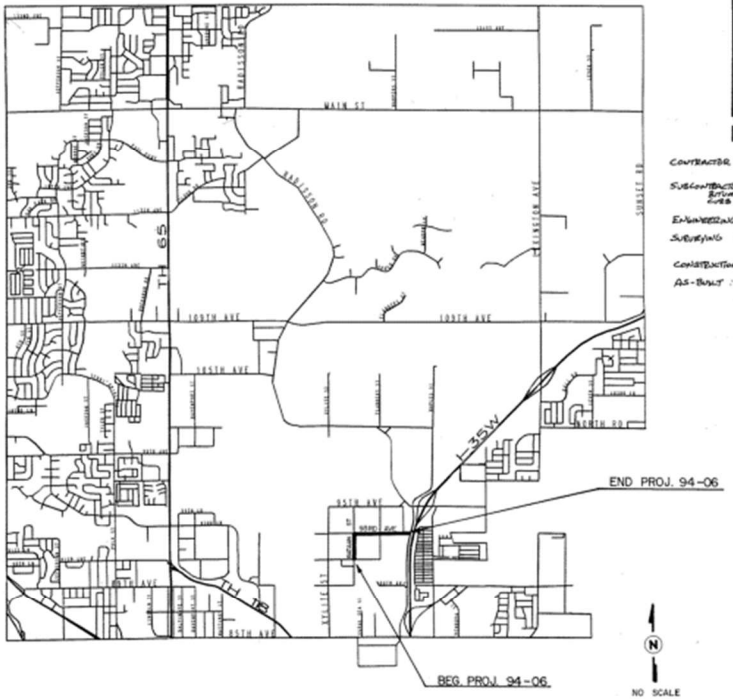
LEGEND

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 Excavation, Min.

SUBCONTRACTORS : Bituminous & Agg. Base - Midwest Asphalt Curb & Gutter - Halvorson Concrete

ENGINEERING : City of Blaine

SURVEYING : E. G. Rud & Sons Inc. Circle Pines, Min.

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.

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.



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 PLAN DESIGN SHALL BE IN ACCORDANCE WITH THE 2011 MINNESOTA MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES INCLUDING APPENDIX B, DATED NOVEMBER 2012

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

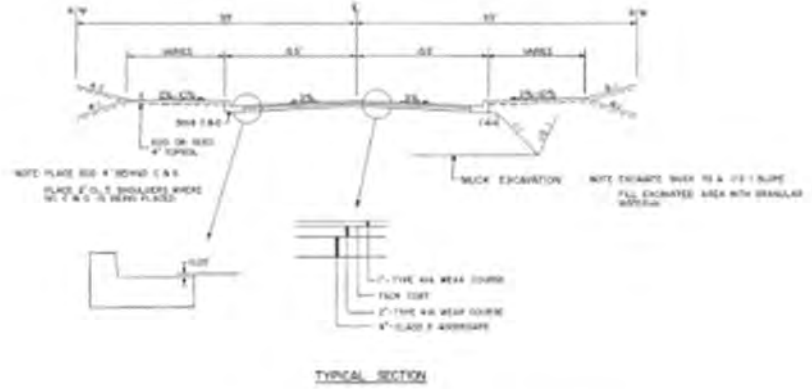
CLASS 5 FOR DRIVEWAYS = XXX TONS

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 (0.679) FOR NORMAL GRADING EV TO CV

ENGINEERING DEPARTMENT
9150 Central Ave. N.E. Blaine, Minnesota 55434
Phone (612) 784-6700

DATE | REVISION

PROJECT NO. 04-06
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-FOOT)
- STREET SIGN
- POWER POLE, 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
- 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

INDEX TO PLANS

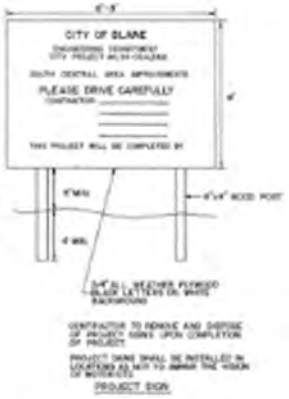
SHEET	DRAWING NO.
TITLE SHEET	1
TYPICAL SECTION, SIGNING, NOTES AND TEMPORARY MAILBOXES	2
DETAILS	3-7
SANITARY SEWER AND WATERMAIN	8-10
STREET AND STORM SEWER	11-13
DITCH CLEANING	14
X-SECTIONS	15-21

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 (2)

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 PLAN REVISION SHALL BE IN ACCORDANCE WITH THE 2001 MINNESOTA MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES INCLUDING APPENDIX B, DATED NOVEMBER 2002.

EXISTING SIGNING SHALL REMAIN IN PLACE UNTIL NEW SIGNING 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 TREES 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.

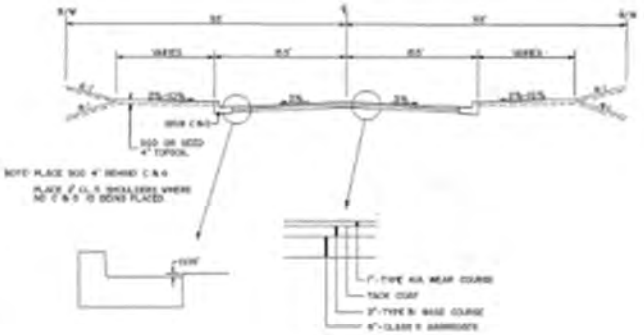
SANITARY, WATERMAIN & STORM SEWER

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.

PLUGS FOR STORM SEWER ARE INCIDENTAL.

STORM SEWER LENGTHS SHOWN DO NOT INCLUDE APRON LENGTHS. APRONS TAKE SEPARATELY.



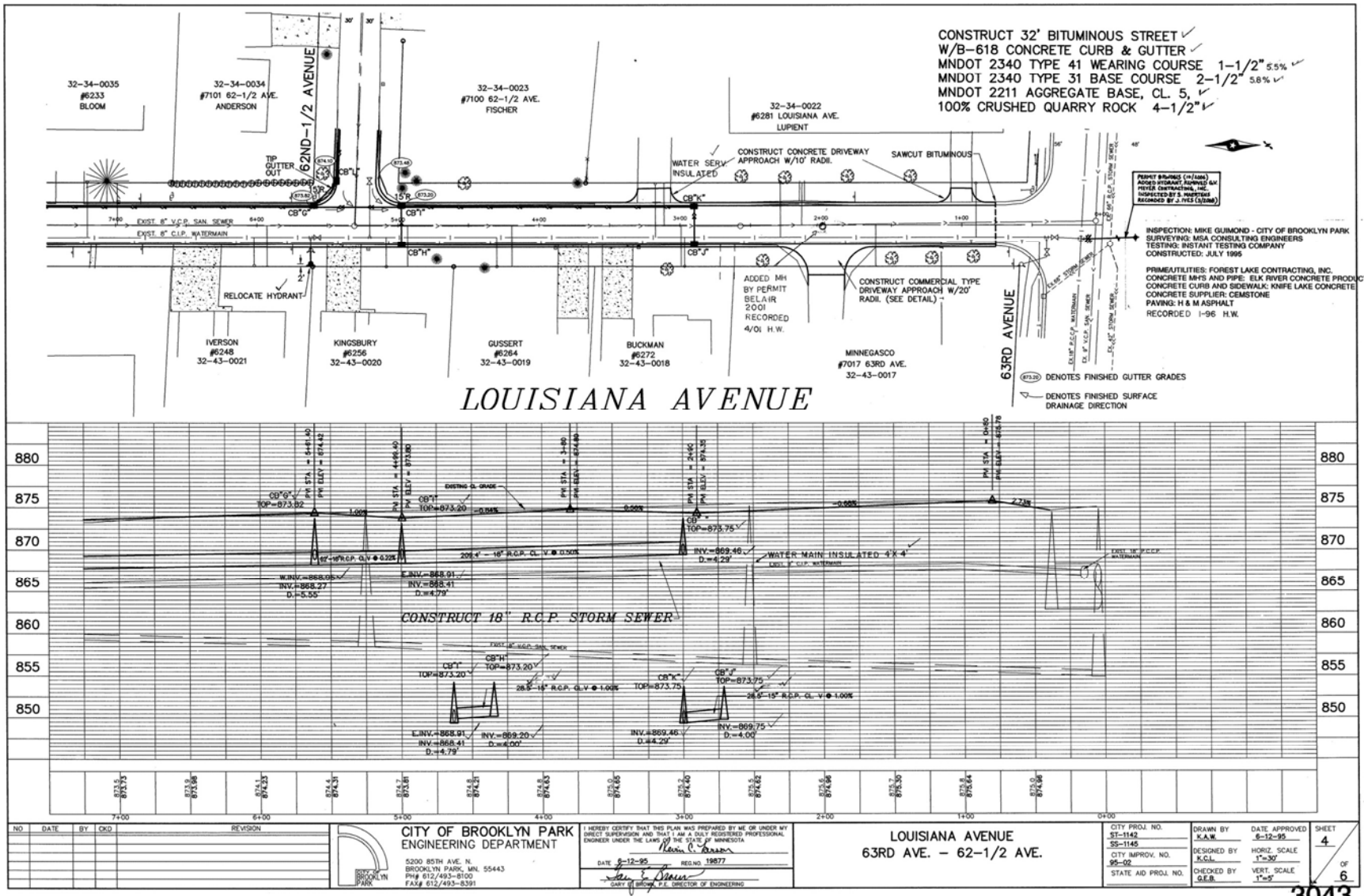
TYPICAL SECTION

EARTHWORK SUMMARY



NOTE: USE SHRINKAGE FACTOR OF 15% FOR NORMAL GRADING 1:1 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

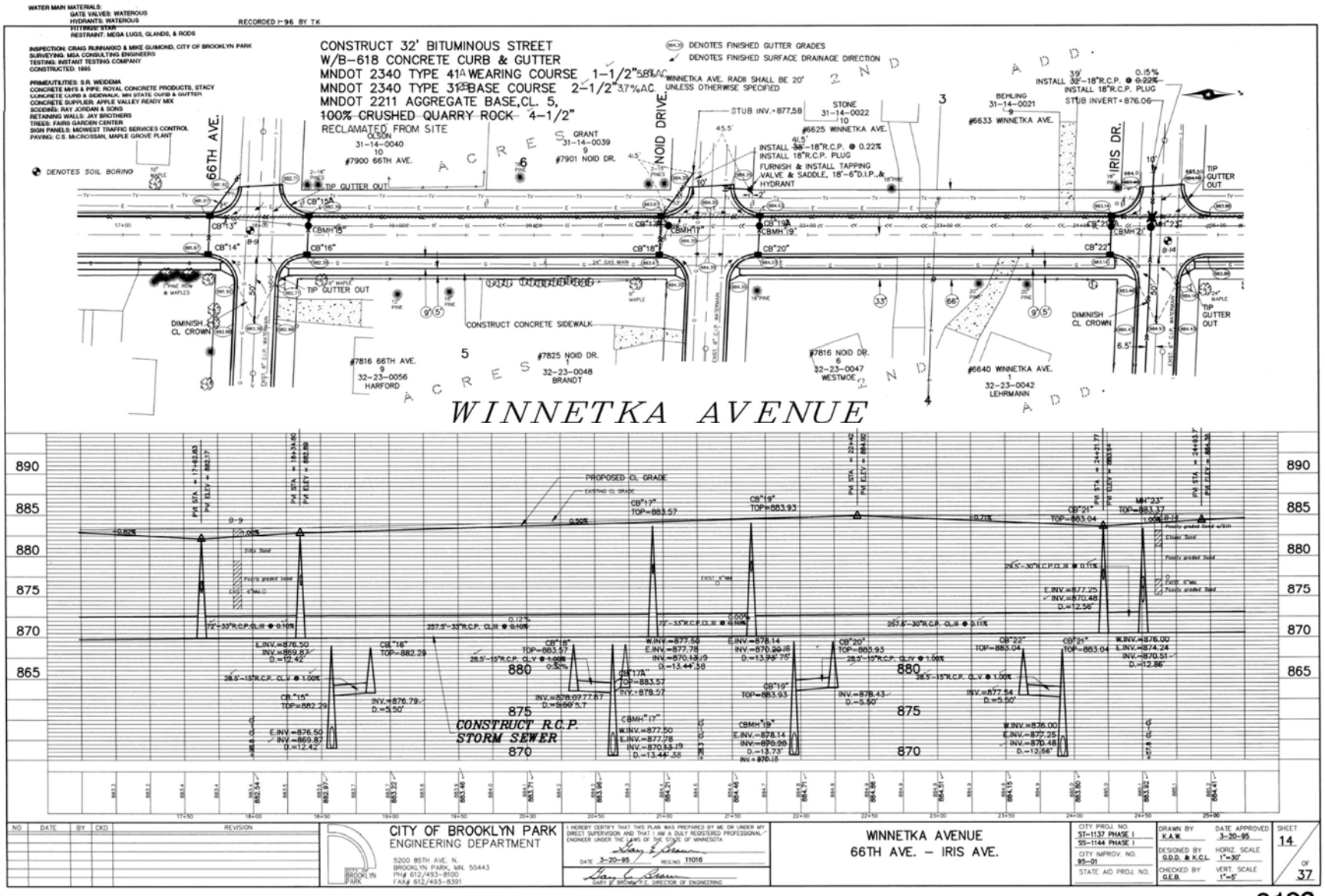
CITY OF BROOKLYN PARK
ENGINEERING DEPARTMENT
5200 85TH AVE. N.
BROOKLYN PARK, MN. 55443
PH# 612/493-8100
FAX# 612/493-8391

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. ST-1142 SS-1145	DRAWN BY K.A.W.	DATE APPROVED 6-12-95	SHEET 4 OF 6
CITY IMPROV. NO. 95-02	DESIGNED BY K.C.L.	HORIZ. SCALE 1"=30'	
STATE AID PROJ. NO.	CHECKED BY G.E.B.	VERT. SCALE 1"=5'	

3043



NO	DATE	BY	CKD	REVISION

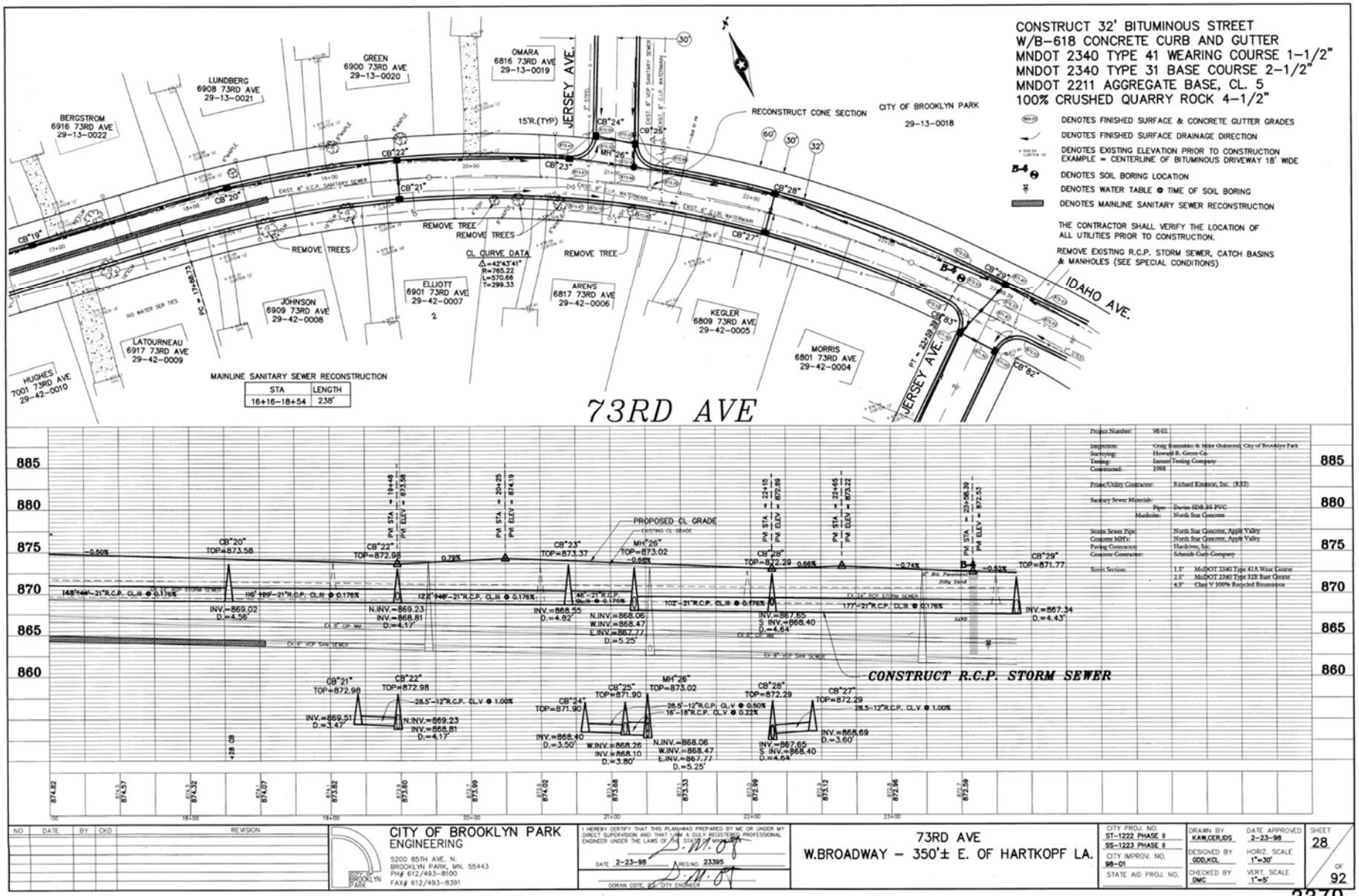
CITY OF BROOKLYN PARK
ENGINEERING DEPARTMENT
5200 85TH AVE. N.
BROOKLYN PARK, MN. 55443
PH# 612/493-8100
FAX# 612/493-8391

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
Gary E. Braun
DATE 3-20-95 REG.NO. 11016
Gary E. Braun
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
EXISTING 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-7/947	Severe throughout project
1965 Street, Recon	05-10	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	05-10	McNamara Contracting Inc	McNamara Contracting Inc	2 (MnDOT 2350 MV-3 (B)	8/31/2005	Light along joint - long term severity?




City of
Inver Grove Heights
STREET CONDITION MAP
46th Neighborhood
47th Neighborhood
Cahill Brooks
College Trail
Pine Valley Estates
Alamedan Area
Pine Valley Estates 2nd

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 USAH 5 BETWEEN 100 West SOUTH OF USAH 15 AND NORTH COUNTY LINE (Geographic Description)

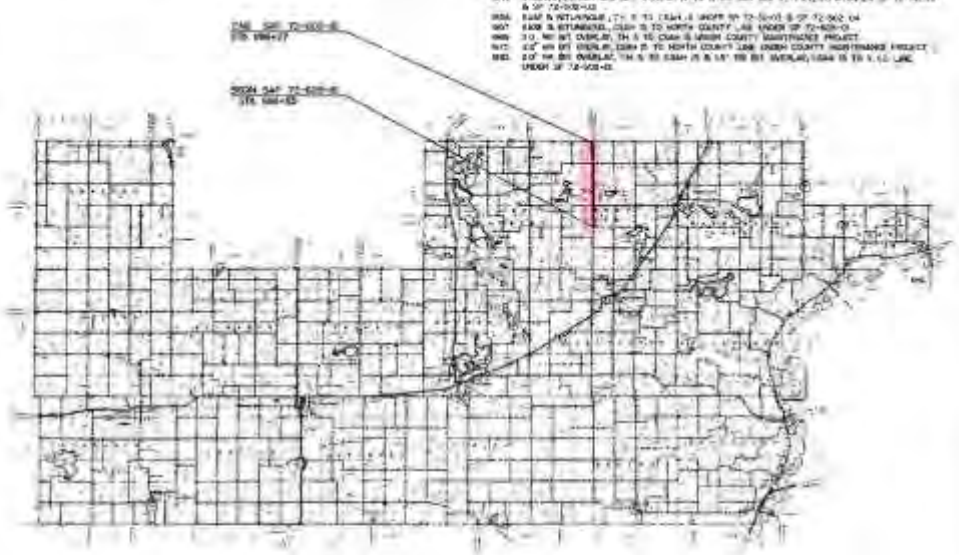
FROM S.W. COR. SEC. 28, T.114N., R27W TO NW. COR. SEC. 6, T.111N., R27W. (Legal Description)

STATE AID PROJ. NO. 72-020-18 STATE AID PROJ. NO.

GROSS LENGTH	2,072	FEET	.39	MILES	
BRIDGES LENGTH		FEET		MILES	
EXCEPTIONS LENGTH		FEET		MILES	
NET LENGTH	2,072	FEET	.39	MILES	

GROSS LENGTH		FEET	MILES
BRIDGES LENGTH		FEET	MILES
EXCEPTIONS LENGTH		FEET	MILES
NET LENGTH		FEET	MILES

NOTE



MNRR PROJ. NO.
MNRR 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	'C' 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 65 MPH
Based on Stopping Sight Distance
Height of eye 3.5 Height of object .05
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 7-1-91 REG. NO. 3018 ENGR. Graeme A. Huffman

COUNTY SIBLEY

Recommended for Approval _____ 19__

Recommended for Approval Mel Hunter 4/26 1991

Recommended for Approval _____ 19__

Approved 5-9 1991

DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION
APPROVED
_____

STATE A/D PROJ. NO. 72-020-18
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:\PublicWorks\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



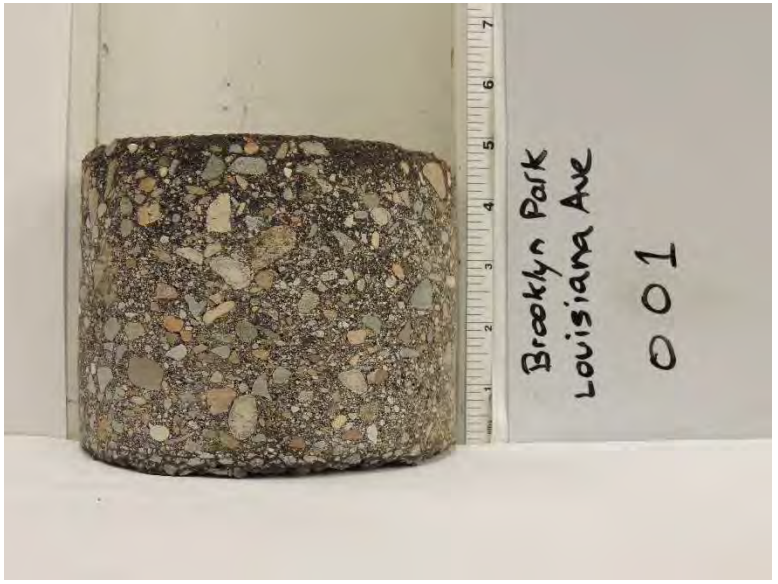


Figure I-4. Coring operations and sample core extracted from Louisiana Avenue in Brooklyn Park





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



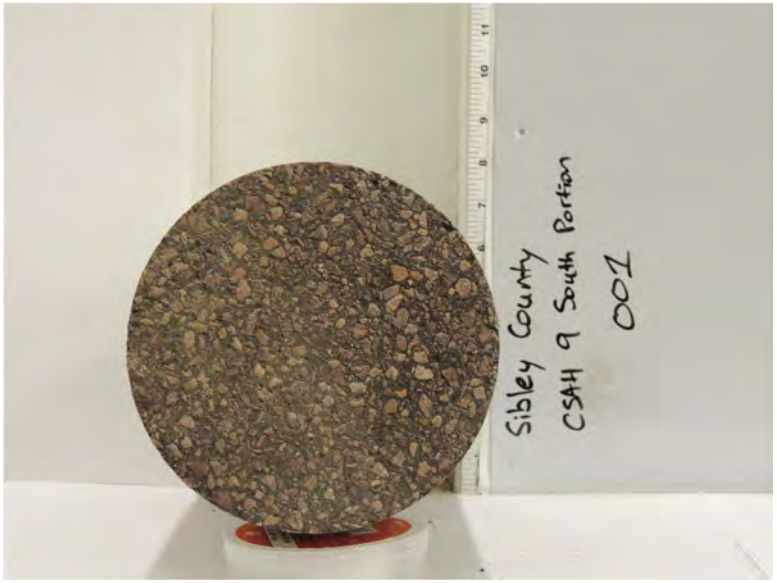


Figure I-15. Coring operations and sample core extracted from the south part of CSAH 9 in Sibley County, MN



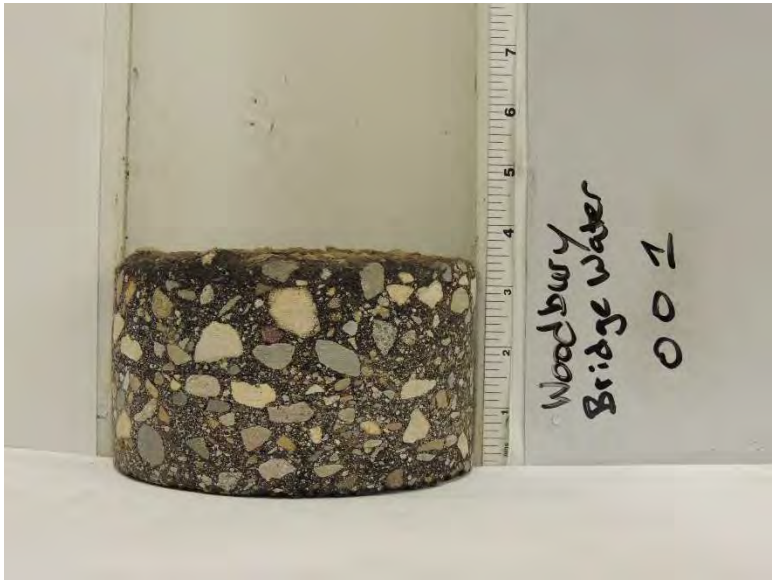


Figure I-16. Coring operations and sample core extracted from Bridgewater Road in Woodbury, MN





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

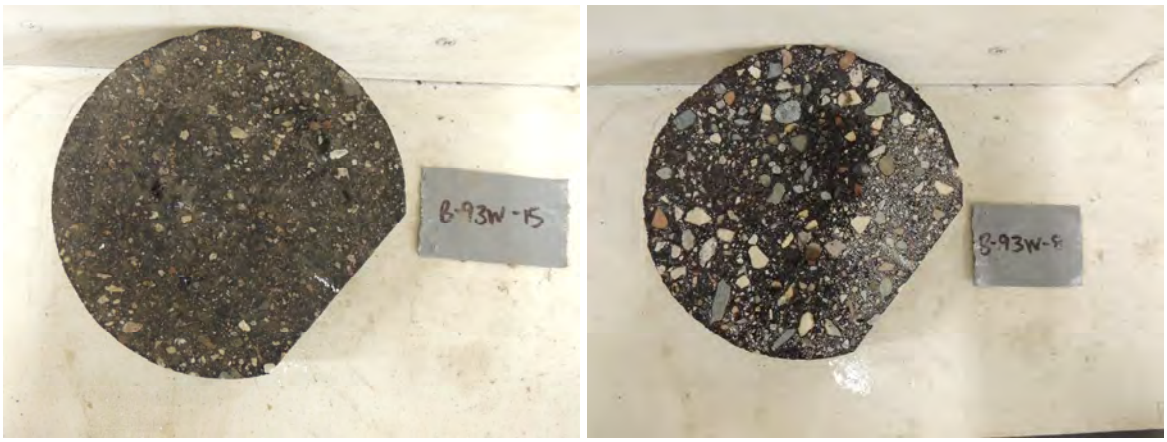


Figure J-2. Specimen from the west end of 93rd Avenue in Blaine, MN, before Hamburg test



Figure J-3. Specimen from 73rd Avenue in Brooklyn Park, MN, after Hamburg test

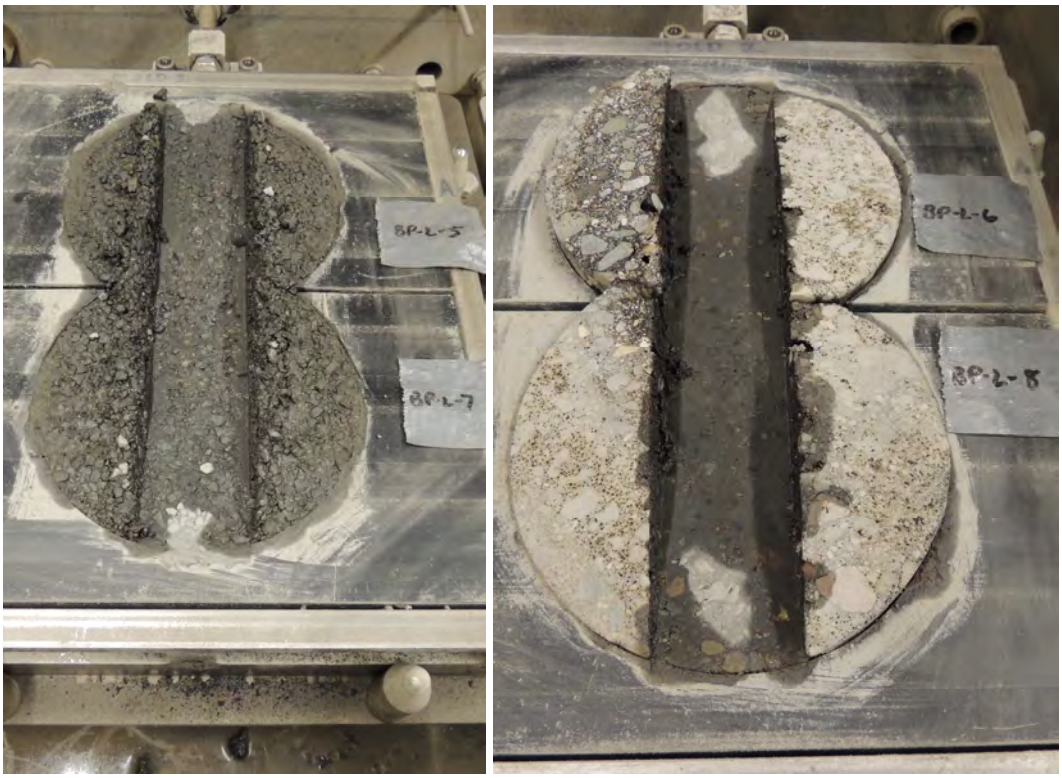


Figure J-4. Paired specimens from Louisiana Avenue in Brooklyn Park, MN, after Hamburg test



Figure J-5. Paired specimens from 134th Avenue in Burnsville, MN, before Hamburg test

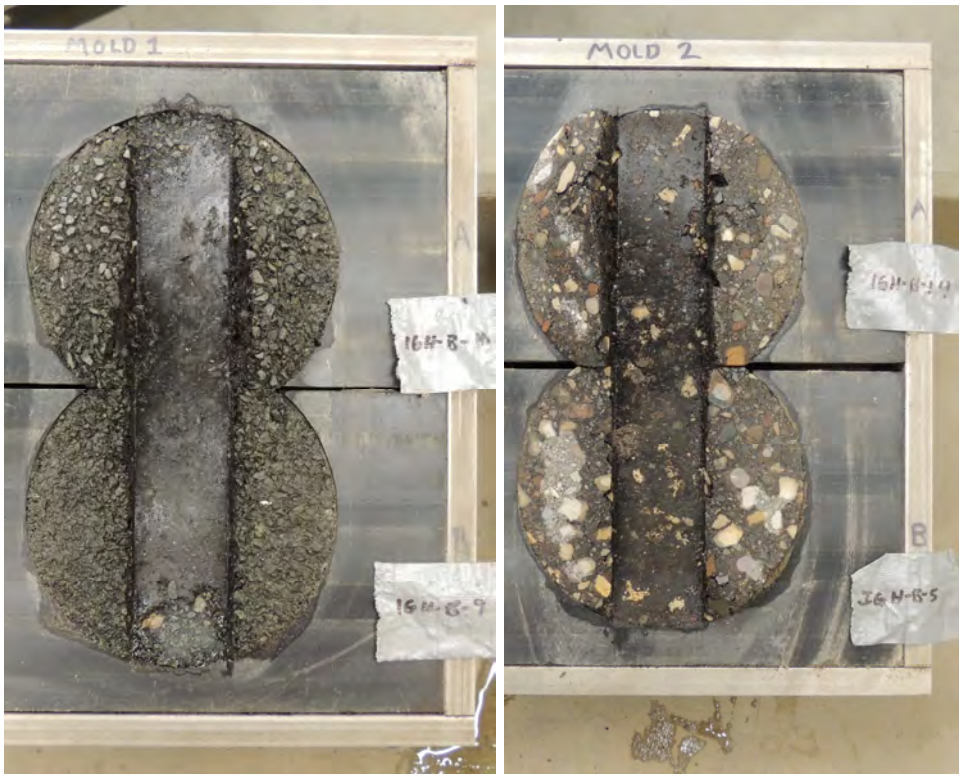


Figure J-6. Paired specimen from Brooks Blvd in Inver Grove Heights, MN, after Hamburg test

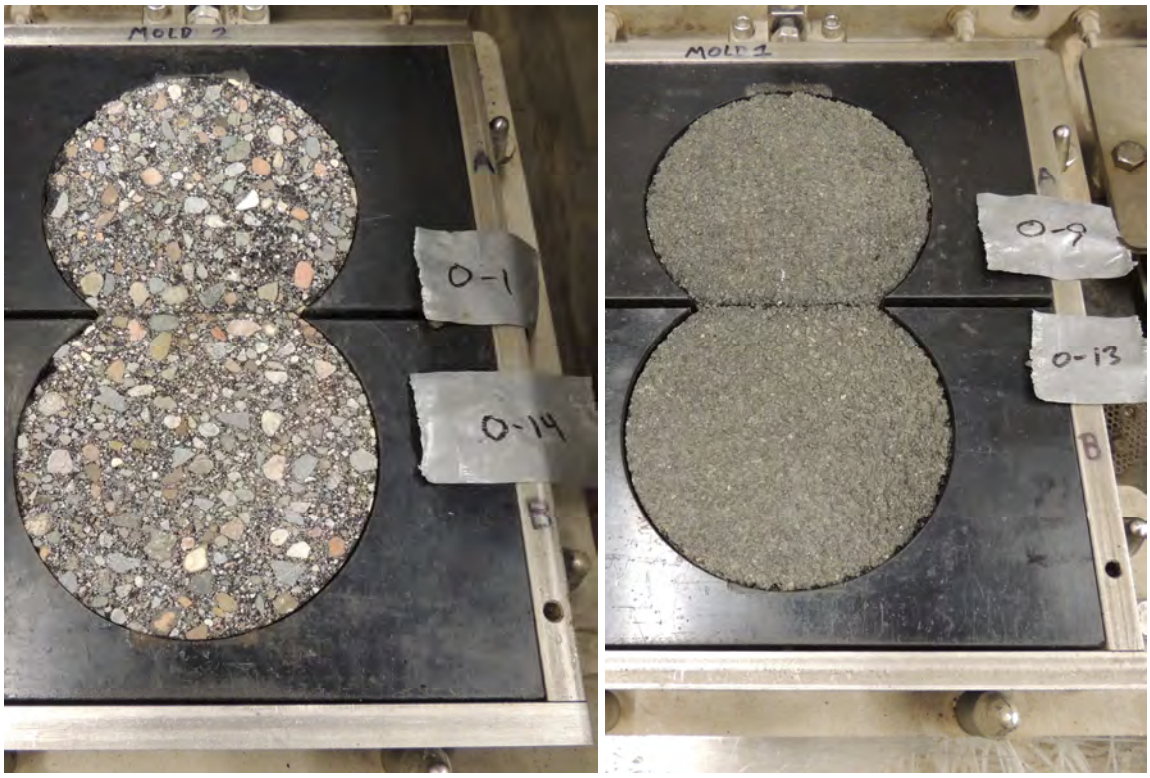


Figure J-7. Paired specimens from Osseo, MN, before Hamburg test

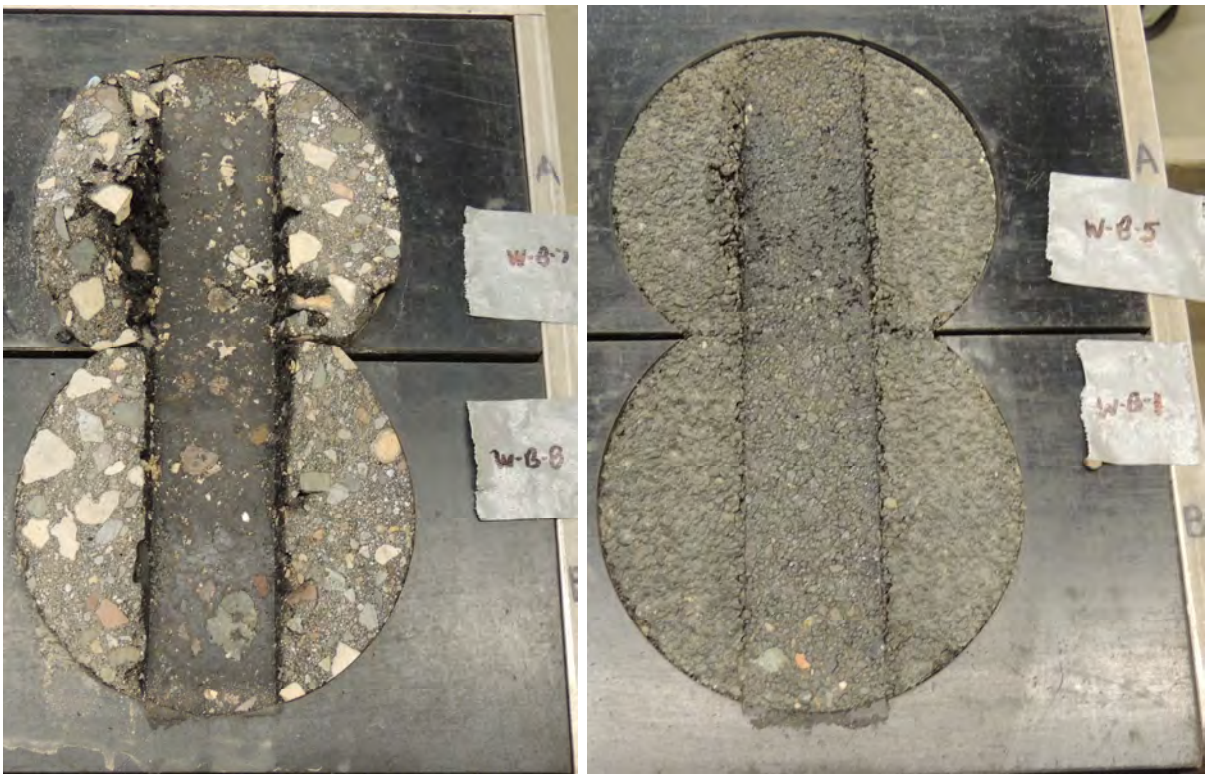


Figure J-8. Paired specimens from Bridgewater Road in Woodbury, MN, after Hamburg test

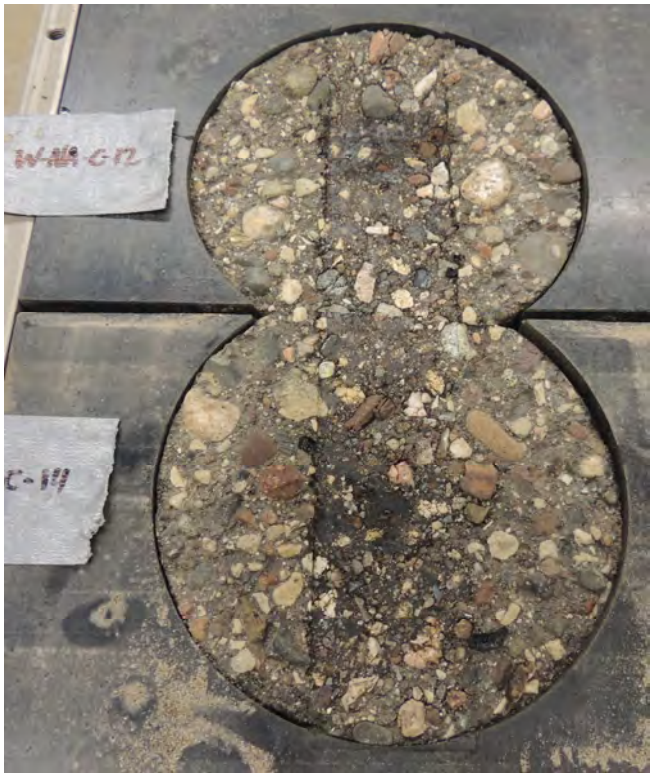


Figure J-9. Specimen without chip seal from Newbury Alcove Cul de Sac in Woodbury, MN, after Hamburg test

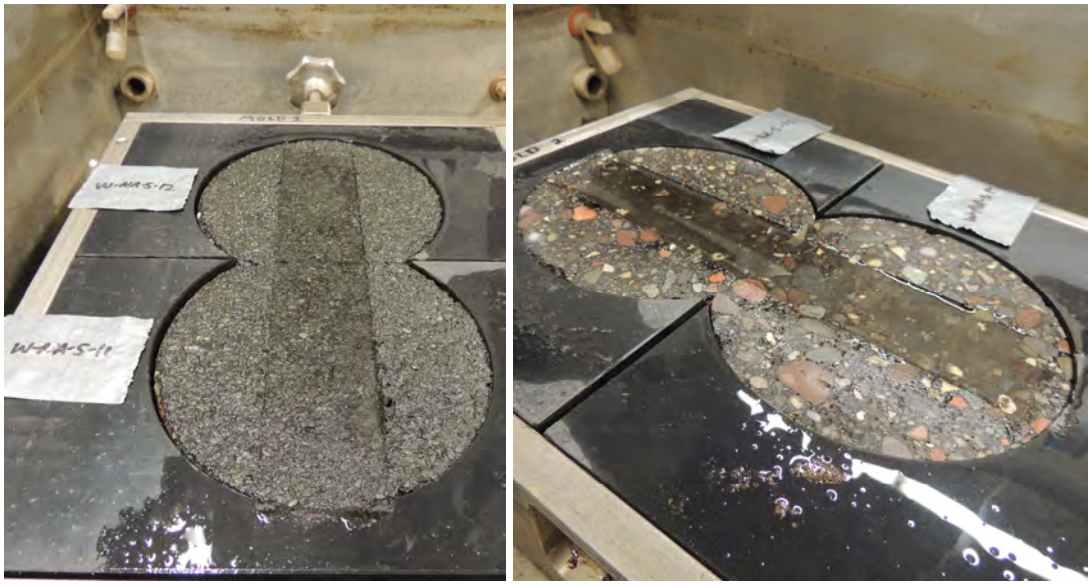


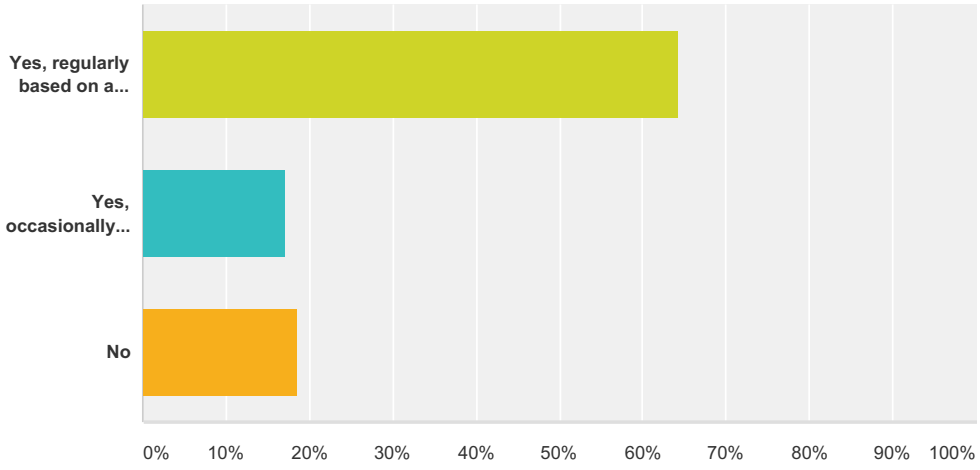
Figure J-10. Paired specimen from Newbury Alcove Straightaway in Woodbury, MN, after Hamburg test

APPENDIX K

CITY/COUNTY SURVEY AND RESPONSES

Q1 Are you currently using chipseals as part of your pavement maintenance program?

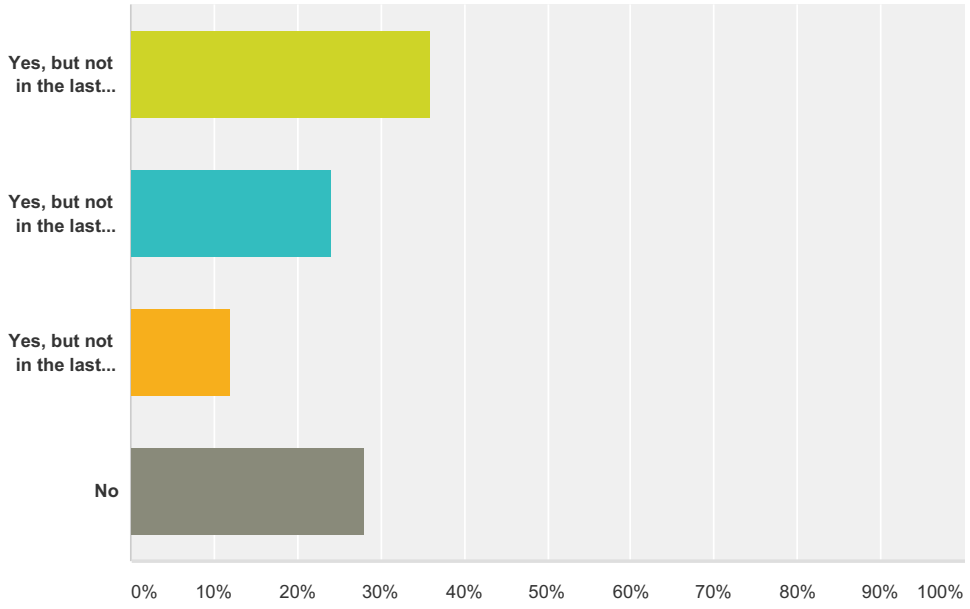
Answered: 129 Skipped: 0



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?

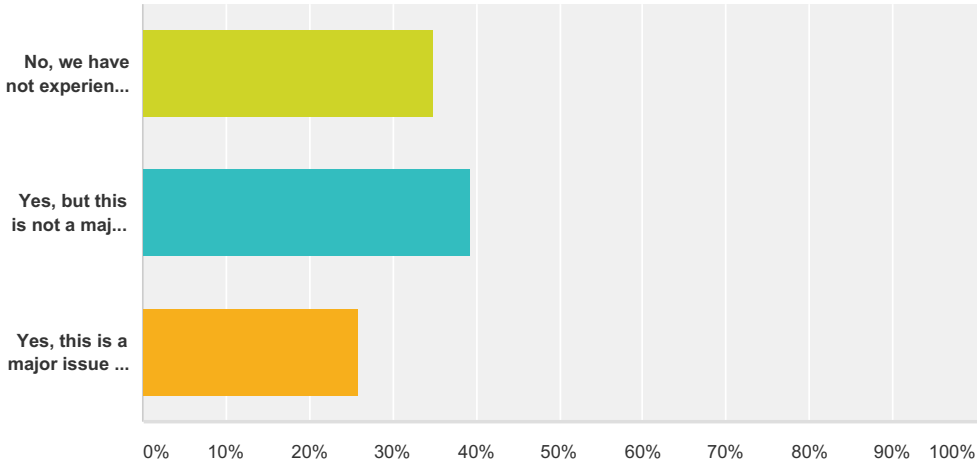
Answered: 25 Skipped: 104



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.

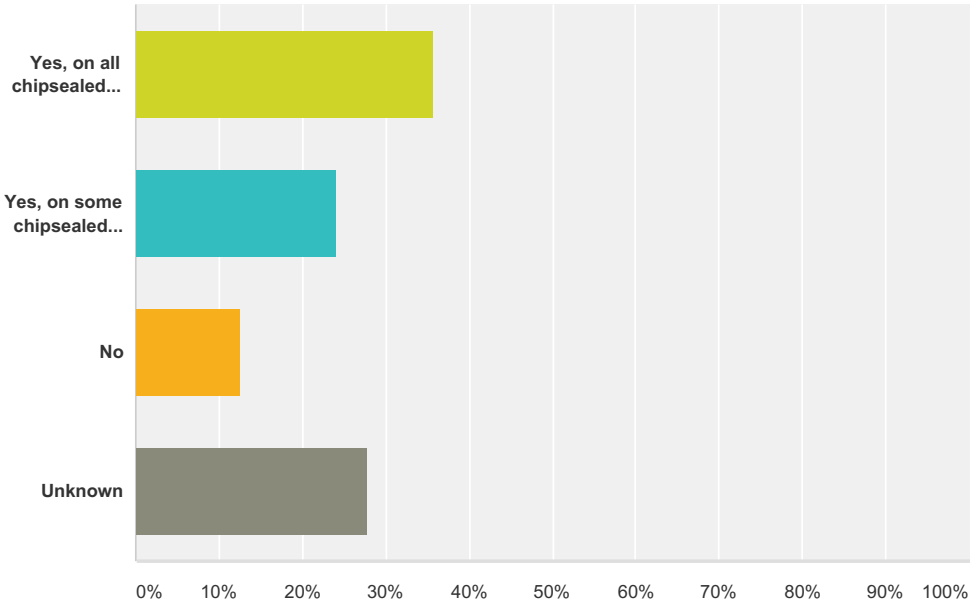
Answered: 112 Skipped: 17



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?

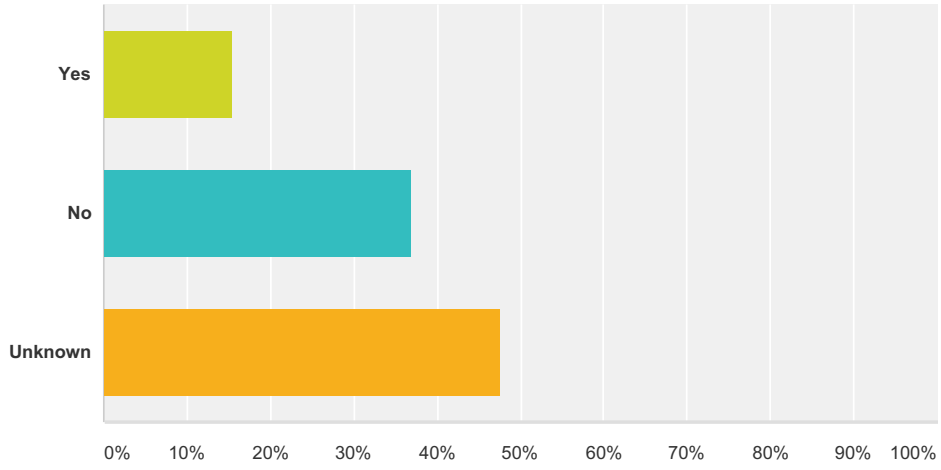
Answered: 51 Skipped: 78

#	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?

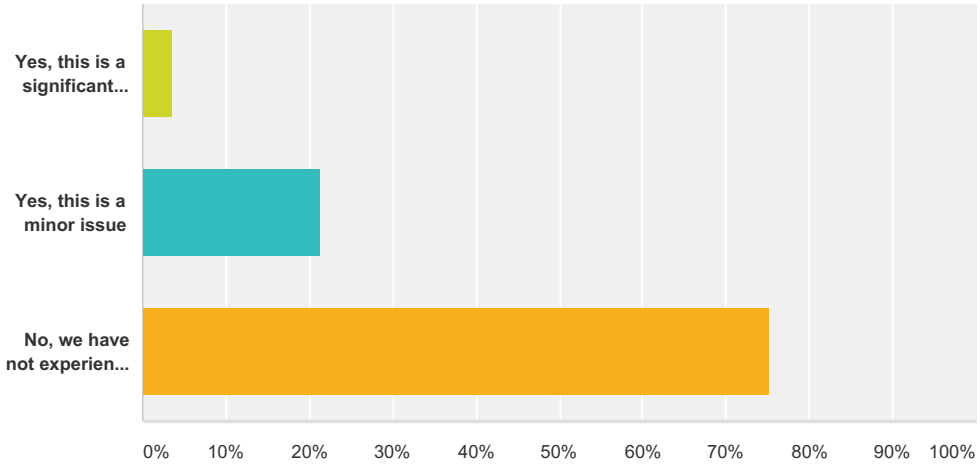
Answered: 65 Skipped: 64



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.


Dynamic Group




FOR LEASE


Sodium St
Radium St


Tungsten St
NO PARKING
ON
COLLECTOR
DRIVEWAYS

Bituminous Pavement Stripping Research Findings
City of Ramsey January 16, 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
  - Significant stripping issues since early 2010's
  - More input will be obtained January 17
- 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.

Public Works Committee **5. 3.**

Meeting Date: 01/21/2020

By: Bruce Westby, Engineering/Public Works

Title:

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

Background:

Pavement and Surface Evaluation Rating (PASER) values are assigned annually to all public street segments. Street segments with a PASER value between 3 and 6 indicates the segments may be good candidates for overlays. Overlays are typically completed every 20 years on bituminous pavement sections, until such time that the street needs to be reconstructed.

Overlay improvements increase the structural capacity of the pavement section, and help prevent stormwater runoff from infiltrating into the underlying aggregate base and subgrade sections. Overlays are one tool the City uses to cost-effectively maintain streets over their serviceable life, which when properly constructed is anticipated to be 60 years.

Attached is a figure showing the street segments proposed to receive overlay improvements in 2020 per the 2020 – 2029 Capital Improvement Program (CIP). The streets 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 are also being explored in more detail than was done to develop the Capital Improvement Program (CIP). A preliminary project schedule is also being developed within the Feasibility Report.

(This paragraph was modified January 17th) 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 after such time as their PASER ratings fall to a rating of 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.

The proposed improvements are designated as City Improvement Project #20-02, 2020 Overlay Improvements.

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

Observations/Alternatives:

Observations:
No ground penetrating radar or pavement coring data existed for these streets and Staff had intended to complete field reviews and to research as-built plans and other documentation to determine if any of the street segments had degraded to the point that mill and overlay improvements were no longer feasible, meaning the street required reconstruction instead.

While reviewing as-built plans it was determined that the existing pavement sections were generally constructed with less than 3½ inches of pavement, which makes it difficult to complete mill and overlay improvements. Staff therefore contacted WSB and Associates to order pavement corings along each street segment to verify pavement section thicknesses. The corings revealed that the bituminous pavement sections generally varied between 2 and 3 inches. This would make it difficult to complete a standard mill and overlay project. In addition, the corings revealed significant degradation of the pavement in most areas meaning the pavement structure was inadequate to support an overlay in most areas. Staff met with Mr. Thomas Wood from WSB on January 16th to discuss the pavement coring results and options for moving this project forward. Three options were generally identified as being feasible.

The first option would be to repair damaged curb and gutter and complete a variable-depth mill and paving project in 2020 by milling all existing pavements to full depth, then leveling, shaping and compacting the underlying aggregate base, then paving all streets with about 2½ -inches of new bituminous pavement. The cost for this option would be significantly more than a standard 2-inch mill and overlay, and the resulting anticipated pavement life would be roughly 25 years.

The second option would be to repair damaged curb and gutter and reconstruct the streets using a full-depth reclamation process in 2020. Though the cost for this option would be significantly more than the first option, the resulting anticipated pavement life would be 60 years.

The third option would be to wait to reconstruct the streets until the end of the useful life of the pavement, which is estimated to be 5 to 10 years out.

(This paragraph was modified January 17th) Staff recommends the third option as noted in the draft Feasibility Report. If the Feasibility Report is accepted as is, the City Council will be approving Staff's recommendations to not mill and overlay the streets identified within the 2020 - 2029 CIP, but instead review the current CIP to identify other streets that are the best candidates for 2020 mill and overlay improvements based on available funding sources, and authorize Staff to prepare a new Feasibility Report for proposed 2020 mill and overlay improvements under City Improvement Project No. 20-02.

This winter and spring, Staff intends to review our current pavement rating system and processes for adding pavement management projects to the Capital Improvement Plan (CIP) to ensure that projects included in the CIP moving forward are identified accurately and can be constructed as proposed.

Before the pavement coring results were received and Staff was able to discuss the findings with Mr. Wood from WSB, notices were mailed to property owners having direct access to streets proposed to receive mill and overlay improvements inviting them to a public engagement workshop on Wednesday, January 22nd. The purpose of the workshop was to explain the need for and scope of the proposed improvements, anticipated construction impacts, estimated costs, proposed funding program, and preliminary project schedule. Based on the findings of the pavement corings and Staff's discussions with Mr. Wood from WSB, a second letter was mailed to the same property owners on January 17th canceling the workshop for January 22nd.

Alternatives:
Alternative #1 – Motion to recommend City Council acceptance of the Feasibility Report for the 2020 Pavement

Overlay Improvements, Improvement Project No. 20-02.

Alternative #2 – Motion of other.

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

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.

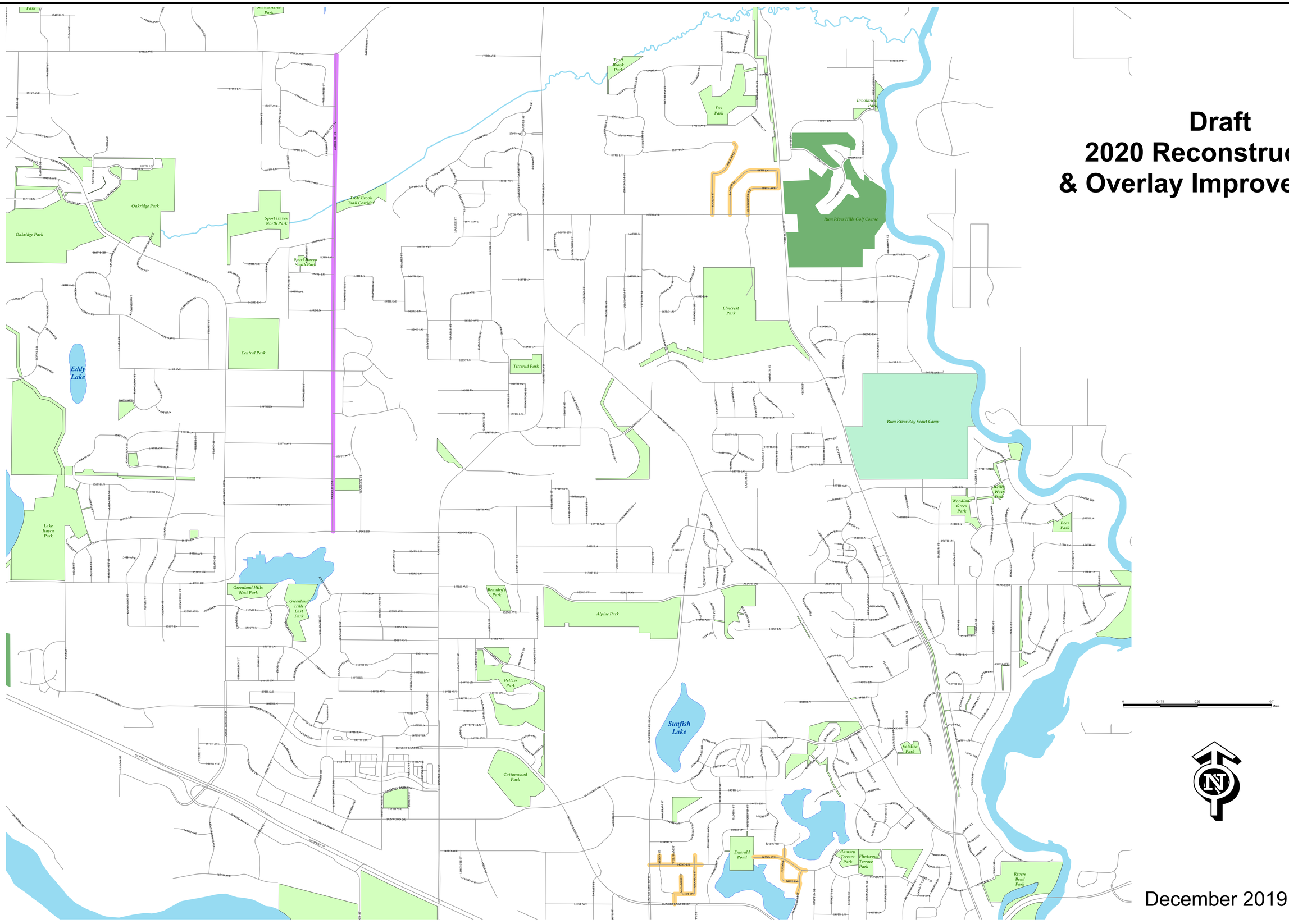
Attachments

2020 Overlays Map
Draft Feas Rpt IP2002

Form Review

Inbox	Reviewed By	Date
Grant Riemer	MaryJo Warner	01/16/2020 04:03 PM
Kurt Ulrich	Kurt Ulrich	01/16/2020 04:10 PM
Bruce Westby (Originator)	Bruce Westby	01/17/2020 02:21 PM
Form Started By: Bruce Westby		Started On: 01/14/2020 08:12 AM
Final Approval Date: 01/17/2020		

Draft
2020 Reconstruction & Overlay Improvements



Legend

- Road_Centerlines
- Overlays
- Reconstruction
- ScoutCamp
- Golf_Courses
- Parks
- Rivers
- Lakes_Ponds
- Creeks

December 2019

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

DRAFT

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
TABLE OF CONTENTS

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Appendix C
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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

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Public Works Committee **6. 1.**

Meeting Date: 01/21/2020

By: Bruce Westby, Engineering/Public Works

Title:

Receive Update on Bunker Lake Boulevard Reconstruction - Armstrong Boulevard to Ramsey Boulevard

Purpose/Background:

Purpose:

The purpose of this case is to receive an update on the Bunker Lake Boulevard Reconstruction project between Armstrong Boulevard and Ramsey Boulevard, including attempts to amend the Ramsey Town Center Joint Powers Agreement.

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 then 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.

While addressing the Public Works Committee on November 19th, the Committee asked Staff why the City would be responsible for paying and improving a County road. It was also noted that the Committee wanted to better understand the reasoning for the terms within the JPA that require the City to finance and construct County Road 116 / Bunker Lake Boulevard, and that if the City is responsible for building and financing the improvements, the City should have additional say in which access points are allowed onto the roadway. The Committee ultimately directed Staff to gather additional information on the history of the terms and conditions in the JPA, and to discuss options with Anoka County related to renegotiating the JPA, working together to find efficiencies, and opportunities for additional access onto Bunker Lake Boulevard.

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.

City Staff also contacted Anoka County Engineer Joe MacPherson per the Committee's direction. He said he 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, but first he wanted to review the JPA with some of his staff. City staff is still waiting for a return call.

Timeframe:

Staff anticipates this case will take approximately 15 minutes to present and respond to questions.

Observations/Alternatives:

Additional information, if available, will be presented during the meeting. There is no set schedule at this time for moving this item forward so Staff plans to present new information to the Committee each month as it becomes available.

Funding Source:

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:

N/A

Action:

This case is informational only. No action is required at this time.

Attachments

RTC JPA
2020-2029 CIP Project Sheet
BLB Aerial Image

Form Review

Inbox	Reviewed By	Date
Grant Riemer	MaryJo Warner	01/16/2020 04:03 PM
Kurt Ulrich	Kurt Ulrich	01/16/2020 04:09 PM
Form Started By: Bruce Westby		Started On: 01/14/2020 08:10 AM
Final Approval Date: 01/16/2020		

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**


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

Public Works Committee **6. 2.**

Meeting Date: 01/21/2020

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)**
  - Grading and storm sewer work complete
  - Lift station not operable; control panel installed January 2020
  - 8K CY sand stockpile proposed to be moved in spring 2020
  - 20K CY topsoil stockpile removed (River Walk Village debris backfill)
  - Processing Change Order #1 addressing excess topsoil removal/backfill
  - WMO Permit extended to June 30, 2020
- **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)**
  - Construction complete
  - 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
- **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 will be advertised this winter
  - Construction in 2020
- **Variolite Street Reconstruction (#20-01)**
  - Final design / preparation of plans and specifications in progress
  - Detailed update provided during February PWC meeting

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 is proposed to begin in 2022 pending City and County approvals, but Anoka County is considering moving construction up a year
- **CSAH 116 & TH 47 Intersection Improvements**
  - Constructing additional turn lanes to improve congestion and safety in 2021

MnDOT Improvement Projects

- **Ferry Street / Trunk Highway 47 Grade Separation @ BNSF Rail Crossing**
  - Preliminary design on hold - MnDOT exploring realignment of Highway 47 to remove S-curve at Anoka County fair grounds
  - TH 47 traffic study in progress
  - MnDOT may combine project with Anoka Solution improvements

Items of Interest

- **Northwest Metro Surface Water Supply Feasibility Study**
  - Study is roughly 90% complete
  - Member cities include Corcoran, Dayton, Ramsey and Rogers
  - MCES is funding 100% using Clean Water Funds
  - Completion anticipated February 2020
- **Centralized Water Treatment Facility Study**
  - Kickoff meeting held November 7, 2019
  - Data exchange in progress
  - Completion anticipated by June 2020
- **Ramsey Gateway Highway 10 Improvements**
  - Preferred vision layout complete
  - Additional updates to be provided during the meeting

Timeframe:

Staff estimates up to 10 minutes will be needed for updates and discussion.

Observations/Alternatives:

N/A

Funding Source:

N/A

Recommendation:

N/A

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	01/16/2020 12:34 PM
Kurt Ulrich	Kurt Ulrich	01/16/2020 04:02 PM
Form Started By: Bruce Westby		Started On: 01/14/2020 08:02 AM
Final Approval Date: 01/16/2020		

Public Works Committee **6. 3.**

Meeting Date: 01/21/2020

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:

N/A

Funding Source:

N/A

Recommendation:

N/A

Action:

No formal action required. For Committee review and discussion purposes only.

Attachments

PWC Calendar Jan2020

Form Review

Inbox	Reviewed By	Date
Grant Riemer	Grant Riemer	01/16/2020 12:40 PM
Kurt Ulrich	Kurt Ulrich	01/16/2020 04:03 PM
Form Started By: Bruce Westby		Started On: 01/14/2020 08:03 AM
Final Approval Date: 01/16/2020		

Public Works Committee Future Topics Calendar *

Date	Topics for Discussion – Committee Action
February 2020	Sunfish Lake Sedimentation Basin Improvements *(Westby)*
March 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)*
March 2020	Draft Trail Maintenance Policy *(Westby)*
March 2020	Draft Stormwater Pond Maintenance Policy *(Westby)*
Date	**Topics for Discussion – Planning and Budget**
April 2020	Municipal State Aid System (MSAS) Revisions *(Westby)*
May 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
Ongoing	Centralized Water Treatment Facility - Preliminary Design Report

* Dates are subject to change based on the availability of information and required attendees, staff workload, and competing interests and objectives.