City of Minnetonka Beach
Utilities Commission

Members:
Alan Carlson, Chair
Nate Arnold
Kevin Dunphy
Lindsay Paine
Pete Scherer

Council Liaison: Jason Mohr

Staff: Jason Hilgers, Public Works Director
Heidi Honey, City Administrator
Alan Offerman, City Engineer

AGENDA

Utilities Commission Meeting

October 28, 2024 – 5:00 p.m.

1. Call to Order and Roll Call

2. Approve Agenda

3. Approve Minutes – October 8, 2024

4. Old Business
   - 4.1. Utilities Commission 2026 – 2035 Objectives
     - 4.1.1. Stantec/Public Works List of Infrastructure Needs Presentation
     - 4.1.2. Discussion, amendments and approval of Projects
   - 4.2. Appoint Vice Chair

5. Adjourn

Unapproved
City of the Village of Minnetonka Beach
Utilities Commission Regular Meeting Minutes
October 8, 2024 – 5:00pm

1. **Call to Order and Roll Call**

Chair Alan Carlson called the meeting to order at 5:00pm.

Utilities Commission Members Present: Chair Alan Carlson, Nate Arnold, Kevin Dunphy, Lindsay Paine, Pete Scherer and Council Liaison Jason Mohr. Absent: none

Staff present: City Administrator Heidi Honey Public Works Superintendent Jason Hilgers, City Engineer Alan Offerman

2. **Approve Agenda –**
(Scherer motion, Dunphy second to approve agenda; All ayes.) Motion passed.

3. **Approve Minutes** – April 29, 2024
Carlson noted two edits.
(Arnold motion, Dunphy second to approve the April 29, 2024 meeting minutes as amended. All ayes.) Motion passed.

4. **New Business**
4.1. General Overview of City Infrastructure
Carlson gave background on the deferred infrastructure projects in the city, stating the city has a lot of needs and projects are usually dealt with as they come up. The city has not reserved money for future needs and water fees have been historically very low. The water treatment plant being built now cost $12 million and will be paid by water usage rates and tax increase of approximately 8%. Carlson speculated that residents will likely not have an appetite for a lot of new projects but there is still a lot of existing aging infrastructure in the City. A Utilities Exploratory Group met consisting of Mayor Pagano, Council Member Mohr, Treasurer Chris Zinn, Administrator Honey, Utilities Chair Carlson, Public Works Superintendent Hilgers, and City Engineer Offerman to identify the components of the this Infrastructure Needs project. Council has now given direction to the Utilities Commission to critically examine what needs to be done, and recommend a plan with prioritized projects for the City to use for planning purposes. The City has a lot of financial obligations right now and it will be difficult to pay for additional projects and it needs to plan ahead.

Carlson went on to explain that prior to building the water treatment plant, the city council looked at buying water from Orono but chose to sell its own water. When the bonds are paid off, there will then be water revenues that can be used to pay for additional projects. In the past, water rates were lower than they should have been and tax increases have also been low. There was discussion that Minnetonka Beach only receives 20% of overall property taxes.

Offerman provided a high-level overview of the infrastructure that exists in the city. When projects are evaluated, street conditions must also be taken into consideration. There are 31,000 feet of water main that was originally installed in 1930s, of that 9,600 remains to be replaced. Replacements beginning in 2002 were for upgrading undersized water mains but cast iron 1930s water main still remains with 1930s valves. Some infrastructure is not located where it is thought to be. Water mains can be found in yards and in streets. Some water mains are not in easements. Breaks usually start at 50-75 years, and replacements should happen at that timing. The city doesn't have hot soils which has helped with water mains lasting longer. Two wells located at public works provide water to the water treatment plant, which is then pumped into the water tower to provide pressure, and it then flows through water mains to private service lines.

There is 25,500 feet of pvc sanitary sewer which was installed in 1974. The sanitary sewer system includes manholes, 8” pvc pipe and sewer services, gravity sewer, and 4,000 ft of force main sewer lines. Many cities with infrastructure as old as Minnetonka Beach have clay, not pvc, so this has benefitted the city. Sewer lines should be monitored and put on a plan for replacement at 70+ years. The system drains to the Met Council interceptor through lift stations and force mains. There are 4 lift stations that pump sewage. The lift stations have intricate pumps and electronics to pump the sewage. Sewer gas is corrosive, and some lift stations are deteriorating. Hilgers has many concerns about the force main system. A break last year cost the city $45,000. The City has minimalistic corrugated steel storm sewers that drain to the lake, most are in very poor condition and isolated to specific areas of low points. Usually, storm sewer is tied to curb and gutter, or ditches. The city generally handles its stormwater but there are still drainage issues. City has 29,000 ft of centerline road. In 2018, a pavement management study was completed which can be updated to reflect the current conditions. Life of a street is directly dependent on drainage.

Carlson asked about past recommendations of letting some roads go and others being replaced. Offerman will review and explained that if a road is too far past being fixable, it may not be worth saving. City would not want to put a new road over a 100 yr old water main. Typically, the underground infrastructure is replaced before a new road goes in but there may be a reason to replace a road. Past studies include a drainage study 2013, road condition assessment 2018, lift station report study in 2024, and water main study from many years ago. Carlson asked that the road assessment be provided to the commission at a future meeting. Curb and gutter are not needed on all roads but it must be reviewed to determine where it needs to go. When projects are reviewed, a feasibility study can be done to determine if curb and gutter are needed. Carlson stated that the project will be driven by what is under the road and associated health and safety risks, not the road condition alone.

City projects have historically been paid for by all the residents, and not assessed to specific addresses. Statute 429 process dictates the amount that can be assessed. There was discussion about whether residents could contribute to a new road if they want one. That would get messy. Carlson asked if the city could charge additional fees for roads on building permits. Honey explained that they have researched that, but the city cannot charge a tax on public roads and the city cannot increase building permit fees beyond what is allowed by state building code. People can use public roads in a reasonable manner.

The Commissioners talked about costs and noted the City tries to keep CIP at $150,000 but that is for a number of projects, not just city infrastructure. Honey explained that the City used to budget to zero annually but it is now budgeting for reserves. Council will need to determine how much they think is reasonable to help build the reserves and if the money will be used for smaller projects every couple of years or saved up for larger projects. The Finance Committee will be involved in these discussions. The bond will be paid in approximately 20 years. Offerman stated the city should also start saving for a future replacement of the water tower and plant. Carlson stated now there is a big cost and still many other needs.

4.2. Utilities Commission 2026 – 2035 Objectives

4.2.1. Council Direction to Commission

Carlson referred to the 2026 -2035 Infrastructure Needs Outline in the packet that shows the different groups that would be involved in this project to determine needs, prioritize projects and determine how to pay for them. The outline shows what each group is responsible for what, and it includes collaboration with Utilities and the Finance Committee. Mohr stated that Council understands a lot of work is not going to happen soon and there is a long stretch of time to be able to plan for projects which has not been done in the past. The City needs to look very far down the road, which has not been done in the past. Planning for projects will also help the City when it tries to secure state and federal funding in the future. The City has tried to get funding but it has been unsuccessful. Carlson stated the city has too much wealth so it is difficult to get money.

4.2.2. Stantec/Public Works Identification of Infrastructure Needs
Offerman gave a high-level overview of the project including identifying projects and determining costs and prioritization based on those. Carlson recommended that Offerman prioritize based on safety of residents and environmental issues (functional items), and not the cost. Once that is prioritized, they can look at costs. Hilgers stated they could prioritize the top 3 projects but that may take up to 15 years. Offerman reviewed his map in the packet with proposed projects and discussed an idea of how to rate the projects if there are multiple issues at that location as well as making sure travel routes are not new roads if they will be ruined by a project.

Offerman included a map of the projects in the packet. Hilgers confirmed that the map identifies over 90% of the projects in the city. Commissioners supported having Offerman and Hilgers prioritize projects by what is most critical with a timeline from most critical to least. It will cost less to do things now than repair something later. There was discussion about short term, immediate need and long-term plan. Hilgers and Offerman will identify the top 5 projects for the next meeting and they can go from there.

4.3. Appoint Vice Chair
Carlson stated they need a vice chair since he is gone for the winter. The vice chair needs to know how to run a meeting. The commission decided to table this item and agreed to meet and discuss it on October 28 at 5 pm. A quorum for meeting is three members. Electronic meetings are not allowed.

5. **Old Business** – 2024 CIP Request Updates
5.1. Force Main System Study to Determine Replacement or Lining Needs
Stantec recently completed the study of force mains and lift stations. The information can be used for future project prioritization. This was a 2024 CIP project. There may be a stand-alone project, but most of the lift stations and force main will be part of a project. They are already identified in the map Offerman provided earlier.

5.2. Woodbridge/Lafayette Roads Esthetic Problem (caused by water)
Carlson stated this corner has a problem with water causing esthetic problems. He stated that Hilgers has done a lot of things to make the corner look better. Hilgers was able to get the drainage better, but he has not gotten grass to grow yet. Carlson thanked him for his work on the corner.

6. **Adjournment**
(Dunphy motion, Arnold second to adjourn the meeting. All ayes.) Motion passed.

With no other business, Chair Carlson adjourned the meeting at 6:12 p.m.

Minutes taken by City Administrator Heidi Honey

Stantec Consulting Services Inc.
733 Marquette Avenue Suite 1000, Minneapolis MN 55402-2309

October 28, 2024
File: 193805540

Attention: Utilities Commission
City of Minnetonka Beach
2945 Westwood Road
Minnetonka Beach, MN 55361

Dear Utilities Commission,

Reference: Utility Capital Improvement Project Priority List

The Utilities Commission met October 8th to review the proposed infrastructure projects that were assembled by City Staff and Stantec. Direction was received during the meeting to prioritize the top five projects provided including estimated costs. Since the meeting, Stantec and City Staff have discussed the various projects and have the following project recommendations for review. The top five projects are in no particular order at this time.

Figure 1 includes all previously identified potential projects and their estimated quantities of each water main, sanitary force main and approximate road centerline length for review. These projects may be broken up into phases depending on available funding. Several projects included do not contain utility work however since they are either surrounded by an adjacent project or are used for access to the utility project they should be considered for reconstruction.

Estimated project costs have been provided on Appendix A for the top-rated projects to deliver an order of magnitude of potential costs in 2024 dollars. This estimate is a high-level review of potential project costs and should be used for initial budgeting purposes only. Further project analysis and in-depth feasibility reports will be required to provide a more accurate detail of potential costs.

Top Five Project Consideration List

A. Brooks Lane watermain and street replacement project (Project no. 4&5) – These projects should be combined into one project and constructed at the same time. A portion of this project was previously included in the 2019 infrastructure project and also analysed as a part of the Brooks Lane drainage study in 2020. This would replace the existing watermain and streets. It is also recommended to review the drainage issues in this area as well.

    a. This project was prioritized because a portion of it was a part of the 2019 Infrastructure Project that was not selected, the area has been identified as having drainage concerns as a part of the 2013 Drainage Study as well as the 2020 Brooks Lane Drainage Study.

Reference: **Utility Capital Improvement Project Priority List**

B. Westwood Rd watermain and street replacement project (Project no. 2) –This project was a part of the 2019 Infrastructure project that did not get constructed due to costs. It includes replacement of existing watermain and street reconstruction.

   a. This project was prioritized because most engineering has been completed as a part of the 2019 Infrastructure Project that was removed to due project budgets.

C. Woodbridge Rd watermain and street project (Project no. 10) - This watermain project would upsize the existing pipe from the new water tower and WTP to the existing 12" main across Shoreline drive. Similar to Arcola Ln, there is not an immediate utility replacement need, the street is under additional stress due to the WTP project which would increase this projects priority.

   a. This project was prioritized because the water treatment plant construction is causing more damage to the roadway than originally anticipated.

D. Arcola Ln watermain and street project (Project no. 9) – Original water main from the 1930's is still in service. Although there is not an immediate utility replacement need, the street is under additional stress due to the WTP project which would increase this projects priority.

   a. This project was prioritized because the water treatment plant construction is causing more damage to the roadway than originally anticipated.

E. Forcemain replacement projects (Project no. 1, 7&11) – Although identified as three separate projects projects, these should be considered to be completed at the same time due to their complexity and specialty construction requirements. These forecemain projects have been prioritized because of the potential for unplanned significant emergency costs to repair if a break / leak were to occur.

   a. Lake Rd forcemain and street project – The watermain was previously upgraded however the 1974 forcemain still exists and is in service. The forcemain could be replaced via trenchless methods and various options exist for the street.

   b. Shoreline Dr. forcemain – The existing forcemain is located in ditch along Shoreline Dr. This project would be a trenchless project such as HDD, pipe bursting or lining.

   c. Crystal Bay force main – The force main identified is located in the front yard of the existing homes on Crystal Bay. This project will most likely be a trenchless utility replacement project such as pipe bursting, HDD or lining.

Remaining Project Consideration List

F. Northview Rd watermain and street replacement project (Project no. 3) – This project includes replacement of existing 1930's water main as well as street reconstruction.

G. Westwood Rd street and drainage project (Project no. 6) – There are no public utilities along this corridor that are due for replacement however due to the potential projects to the west, it should be

Reference: **Utility Capital Improvement Project Priority List**

considered to upgrade the streets along this corridor after the western projects are completed. Possible improvements could include a mill and overlay, reclaim shape and pave or the addition of concrete curb and gutter as well as storm sewer.

H. Woodbridge Rd forcemain, watermain and street improvement project (Project no.8) – This corridor includes a forcemain that was constructed in 1974 as well as original 1930's water main. Utility replacements would be the driving factor for a full street replacement project as well.

I. Huntington Point Rd watermain and street project (Project no. 12) – This project would include the replacement of the existing 1930's watermain and upgrade the street along this corridor as well.

J. Northview Rd street project (Project no. 13) – The retaining wall was replaced in the summer of 2024. The street is in rough shape and should be considered for replacement.

K. Woodbridge Rd and Lafayette Rd street project (Project no. 14) – There are no utilities up for replacement along this corridor however due to the utility projects in the vicinity this project should be considered for replacement. There are also existing drainage concerns in the area that would need to be addressed as well.

L. Crosspoint Rd street project (Project no. 15) – There are no utilities up for replacement along this corridor however due to the utility projects in the vicinity, this project should be considered for replacement.

Closing

On behalf of our Stantec team, we thank you for this opportunity to be of service to your community. We have enjoyed working with you and your staff through the design development process and we look forward to continuing our partnership with the City of Minnetonka Beach.

Regards,

Stantec Consulting Services Inc.

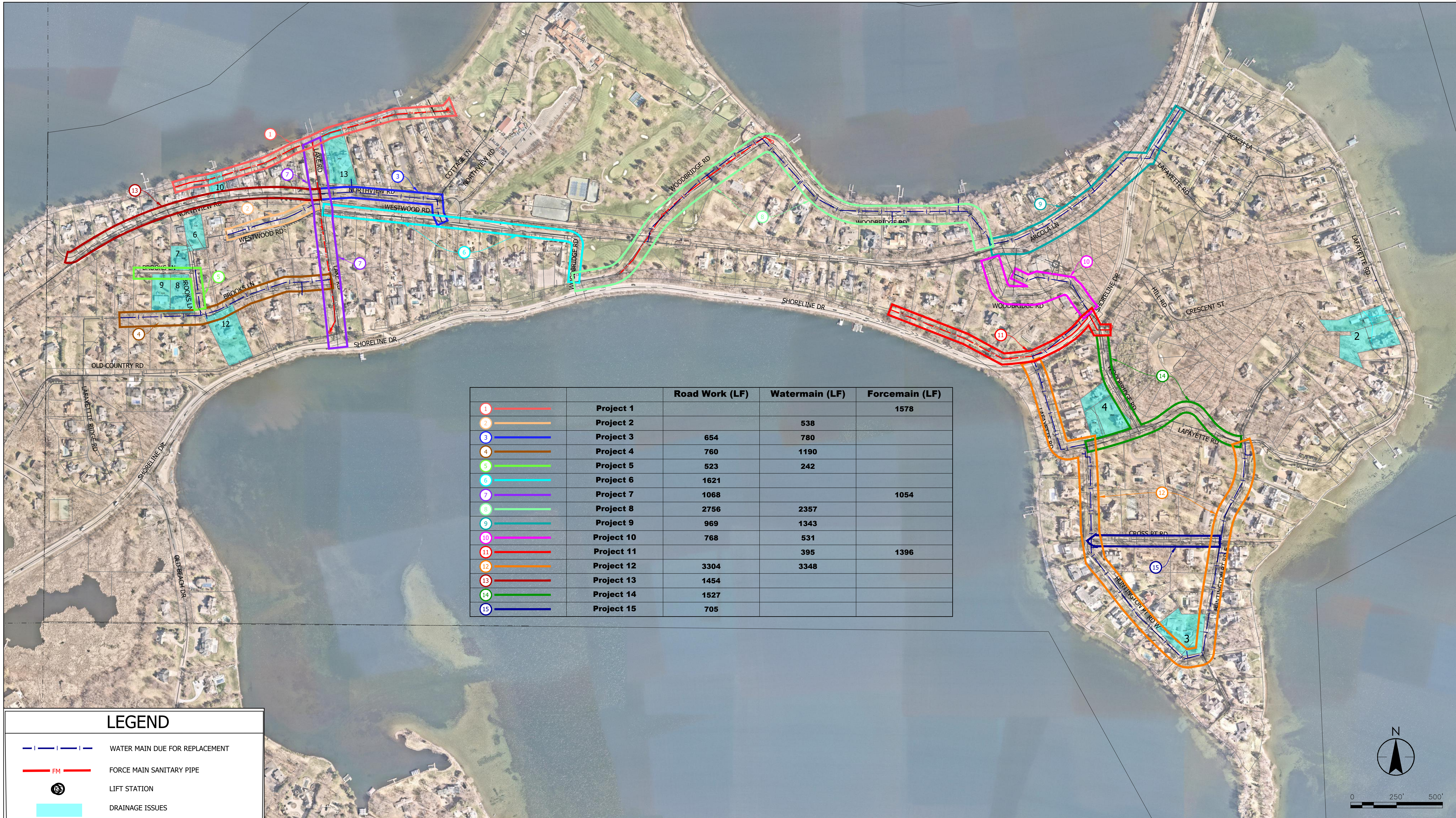
Alan Offerman PE
Associate
Phone: 651-308-9560
alan.offerman@stantec.com

Attachment: Figure 1, Appendix A

c. C.C.

Design with community in mind

Reference: Utility Capital Improvement Project Priority List



		Road Work (LF)	Watermain (LF)	Forcemain (LF)
1	Project 1			1578
2	Project 2		538	
3	Project 3	654	780	
4	Project 4	760	1190	
5	Project 5	523	242	
6	Project 6	1621		
7	Project 7	1068		1054
8	Project 8	2756	2357	
9	Project 9	969	1343	
10	Project 10	768	531	
11	Project 11		395	1396
12	Project 12	3304	3348	
13	Project 13	1454		
14	Project 14	1527		
15	Project 15	705		

MINNETONKA BEACH UTILITY STUDY

MINNETONKA BEACH

FIGURE 1

Stantec
733 Marquette Avenue, Suite 1000
Minneapolis, MN 55402
www.stantec.com

DATE 9/30/2024 PROJ. NO. 193805540

Appendix A

ENGINEERS OPINION OF PROBABLE COST

PROJECT NO. 193805540

THE CITY OF THE VILLAGE OF MINNETONKA BEACH, MINNESOTA

OCTOBER, 2024

No.	Item	Units	Qty	EE Unit Price	EE Total Price
	PART A - BROOKS LANE WATERMAIN AND STREET REPLACEMENT PROJECT (PROJECT NO. 4&5)				
	WATERMAIN	LS	1	$329,360.00	$329,360.00
	ROADWORK	LS	1	$1,007,347.45	$1,007,347.45
	FORCEMAIN	LS	1	$0.00	$0.00
	SUBTOTAL				$1,336,707.45
	25% ENGINEERING, ADMINISTRATION & LEGAL				$334,176.86
	30% CONTINGENCY				$401,012.24
	PART A TOTAL ESTIMATED PROJECT COSTS				$2,071,896.55
	PART B - WESTWOOD RD WATERMAIN AND STREET REPLACEMENT PROJECT (PROJECT NO. 2)				
	WATERMAIN	LS	1	$123,740.00	$123,740.00
	ROADWORK	LS	1	$422,410.70	$422,410.70
	FORCEMAIN	LS	1	$0.00	$0.00
	SUBTOTAL				$546,150.70
	25% ENGINEERING, ADMINISTRATION & LEGAL				$136,537.68
	30% CONTINGENCY				$163,845.21
	PART B TOTAL ESTIMATED PROJECT COSTS				$846,533.59
	PART C - WOODBRIDGE RD WATERMAIN AND STREET PROJECT (PROJECT NO. 10)				
	WATERMAIN	LS	1	$122,130.00	$122,130.00
	ROADWORK	LS	1	$602,995.20	$602,995.20
	FORCEMAIN	LS	1	$0.00	$0.00
	SUBTOTAL				$725,125.20
	25% ENGINEERING, ADMINISTRATION & LEGAL				$181,281.30
	30% CONTINGENCY				$217,537.56
	PART C TOTAL ESTIMATED PROJECT COSTS				$1,123,944.06
	PART D - ARCOLA LN WATERMAIN AND STREET PROJECT (PROJECT NO. 9)				
	WATERMAIN	LS	1	$308,890.00	$308,890.00
	ROADWORK	LS	1	$760,810.35	$760,810.35
	FORCEMAIN	LS	1	$0.00	$0.00

No.	Item	Units	Qty	EE Unit Price	EE Total Price
	SUBTOTAL				$1,069,700.35
	25% ENGINEERING, ADMINISTRATION & LEGAL				$267,425.09
	30% CONTINGENCY				$320,910.11
	PART D TOTAL ESTIMATED PROJECT COSTS				$1,658,035.54
	PART E - FORCEMAIN REPLACEMENT PROJECTS (PROJECT NO. 1, 7 & 11)				
	WATERMAIN	LS	1	$90,850.00	$90,850.00
	ROADWORK	LS	1	$838,540.20	$838,540.20
	FORCEMAIN	LS	1	$886,000.00	$886,000.00
	SUBTOTAL				$1,815,390.20
	25% ENGINEERING, ADMINISTRATION & LEGAL				$453,847.55
	30% CONTINGENCY				$544,617.06
	PART E TOTAL ESTIMATED PROJECT COSTS				$2,813,854.81
	PART A TOTAL ESTIMATED PROJECT COSTS				$2,071,896.55
	PART B TOTAL ESTIMATED PROJECT COSTS				$846,533.59
	PART C TOTAL ESTIMATED PROJECT COSTS				$1,123,944.06
	PART D TOTAL ESTIMATED PROJECT COSTS				$1,658,035.54
	PART E TOTAL ESTIMATED PROJECT COSTS				$2,813,854.81
	GRAND TOTAL				$8,514,264.55

Minnetonka Beach, Minnesota

Pavement Management Program Study

October 2018

Project Number: 193804355

October 5, 2018

Honorable Mayor and Council
Minnetonka Beach
2945 Westwood Road
Minnetonka Beach, MN 55361

Re: Pavement Management Program Study
Stantec File No.: 193804355

Dear Honorable Mayor and Council:

Enclosed for your review is the Pavement Management Program Study for Minnetonka Beach. This study reviews a 20-year street maintenance/rehabilitation plan as well as costs. This plan provides a tool to assist the City in planning street improvements by properly matching the maintenance and rehabilitation method with the pavement condition. The goal is to extend the life of the City's streets and reduce lifecycle costs.

The Pavement Management Program Study identifies proposed street maintenance and rehabilitation options, estimated costs in year 2019 construction data, and a recommended improvements program.

We would be pleased to meet with the Council to discuss the process identified in this Plan at any mutually convenient time.

Sincerely,

STANTEC CONSULTING SERVICES INC.

Dan D. Boyum

Dan D. Boyum, P.E.

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.

Dan D. Boyum

Dan D. Boyum, P.E.

Date: October 5, 2018 Reg. No. 23451

Table of Contents

Tables

Figures

Executive Summary

PURPOSE OF THE STUDY

Minnetonka Beach authorized the preparation of this Pavement Management Program Study to determine the current condition of the existing city street system and develop a street maintenance and rehabilitation program. The purpose of this plan is to provide information to guide decision making for street maintenance and rehabilitation including:

1. Developing a pavement management plan that will preserve and/or improve the quality of the City's asphalt streets in a fiscally responsible manner.
2. Developing and implementing a plan that considers immediate and long-term needs.
3. Preparing a systematic plan and a workable method of financing.
4. Providing information for the public and city committees to be better informed and involved in decision making.

ANALYSIS METHODOLOGY

Basic source data was collected to develop the information and recommendations presented in this report. The data collected consists of the following:

1. A pavement condition evaluation of all asphalt City streets to produce a numerical pavement rating index using the Pavement Surface Evaluation and Rating (PASER) system, which rates the existing condition of the pavement based on visual surface observation.
2. An inventory of the characteristics and age and typical section of each street.
4. Past record plans.
5. Input from the City Engineer on existing street conditions.

This data was studied and professional judgment from both an engineering perspective and maintenance/rehabilitation perspective was applied to develop the opinions and recommendations presented in this plan.

SUMMARY OF FINDINGS

Minnetonka Beach's Street Network and ratings are identified on the Figure 1 – Roadway Ratings. Figure 2 – Road Maintenance and Rehabilitation Options identifies the pavement condition for each City streets and the most cost-effective method of maintenance for different points in the street's lifecycle. The recommendations in this plan address the funding and implementation of crack route/seal, seal coat, and patching of streets generally with a condition rating of 5 and greater, for the period of 2019 through 2038. Those roads identified as needing a reclaim or full depth reconstruction require funding that is significantly beyond the typical budget for general street maintenance. Further budgetary discussions and planning is necessary to address those roads as well as the City's policies for funding sources.

Table 1 provides different pavement maintenance and rehabilitation options for the City's bituminous streets and presents estimated costs per foot for each. These cost estimates include contingencies and other costs associated with the improvement projects. Detailed cost estimates for each of the options can be found in Appendix E of this report. Table 2 provides a summary of condition ratings and mileage of City streets.

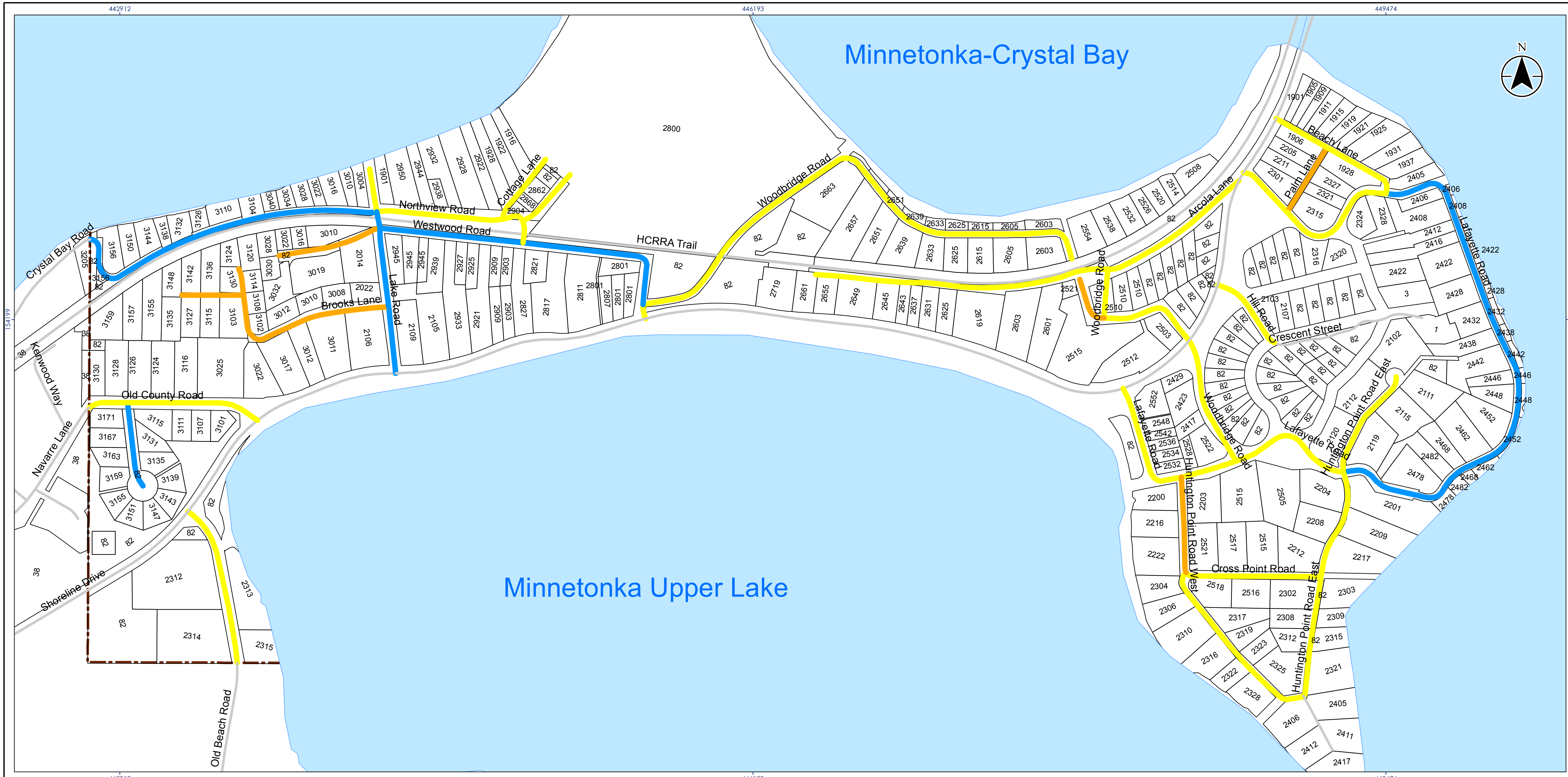
TABLE 1: PAVEMENT MAINTENANCE AND REHABILITATION OPTIONS

Pavement Maintenance/Rehabilitation Option		Cost/Foot*
1	Crack Route/Seal	$7.04
2	Seal Coat	$5.53
3	Bituminous Patching	$9.00
4A	Reclaim & Pave - no curb	$185
4B	Reclaim & Pave – add curb	$290
5A	Reconstruct – no curb	$253
5B	Reconstruct – add curb	$3367

*Based on an average street pavement width of 22'.

TABLE 2: RATING & MILEAGE SUMMARY

Surface Type	Pavement Condition Rating	Mileage	% of Total System
Bituminous/Asphalt	Good	0.00	0%
Bituminous/Asphalt	OK	1.43	26.7%
Bituminous/Asphalt	Fair	3.37	62.9%
Bituminous/Asphalt	Failing	0.56	10.4%
Bituminous/Asphalt	Failed/Replace	0.00	0%
Total		**5.36**	**100%**



Pavement Rating INdex (PRI)

- 1 - 2 (Failed)
- 3 - 4 (Failing)
- 5 - 6 (Fair)
- 7 - 8 (OK)
- 9 - 10 (Good)
- County/Private Road

Figure 1

Roadway Ratings

Minnetonka Beach

0 250 500 Feet

1:6,000 (At original document size of 11x17)

Stantec

Revised: 2018-10-05 By: dmerickson
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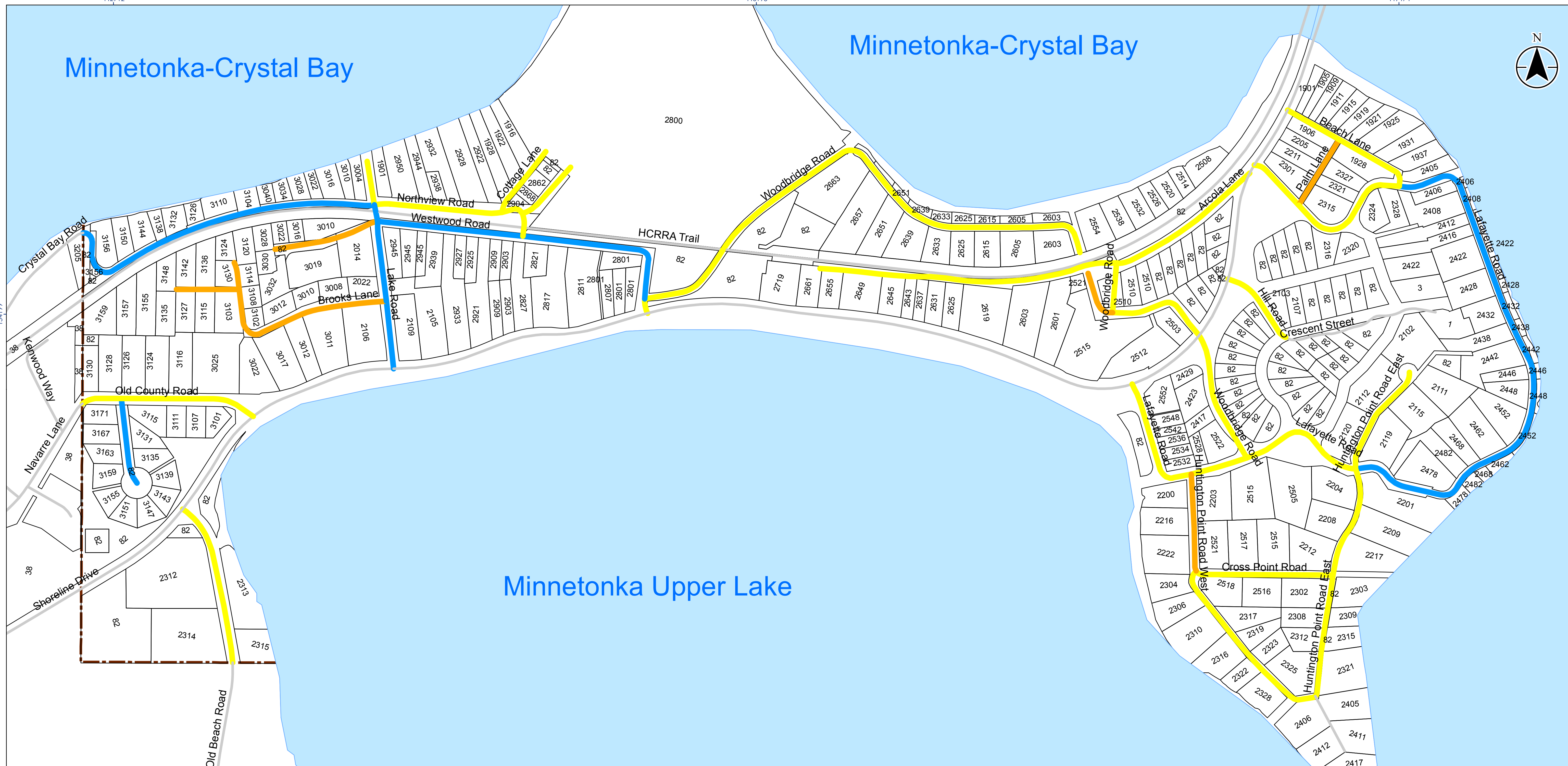

Pavement Rating Index (PRI)

- Reconstruction
- Reclaim and Pave
- Crack Fill and Seal Coat/Alternative
- Crack Fill and Seal Coat
- No Repair
- County/Private Road

Figure 2

Road Maintenance and Rehabilitation Options

Minnetonka Beach

0 250 500 Feet

1:6,000 (At original document size of 11x17)

Stantec

Revised: 2018-10-05 By: dmerickson
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POLICY DECISIONS AND RECOMMENDATIONS

This plan has been prepared to help the city determine an annual maintenance budget and policy for the future maintenance of the City streets. The information in this plan provides a summary of the potential costs and different lifecycle maintenance options that can be used to manage the city's street system over the next 20 years.

Minnetonka Beach has several options to maintain and rehabilitate streets. None of the streets have deteriorated to a point where full reconstruction is required. Some of the roads need subgrade corrections and pavement rehabilitation. Also, edge cracking exists along many streets. The edge cracking could require more immediate attention to depending on its condition. The lifecycle of many of the existing streets can be extended using less expensive maintenance methods than full reconstruction. The cost of rehabilitation with lower condition ratings will need to be considered by the Council.

Recommendations:

1. Adopt this plan as a framework for future maintenance of City streets

2. At a minimum, formalize an ongoing program to extend the life of the streets generally with condition ratings of 5 and higher. Maintenance methods for these streets include crack route and seal, seal coat, and patching. The cost to maintain the streets with these methods over the next 20 years is around $1,000,000, or an average of $52,000/year.

3. Financing methods will need to be determined for street rehabilitation (reclaim and pave or reconstruction) for streets generally with condition ratings of 1-4. As streets continue to deteriorate over the cycle of this 20-year plan, the total cost to address roads in this 1-4 rating category is around $8,900,000 (no curb) to $13,200,000 (add curb). If these roads were to be addressed in the period of this plan, an additional $445,000/year (no curb) to $661,000/year on average would be needed over the next 20 years.

4. The City should review the streets proposed each year and the proposed maintenance method of those streets to ensure the neediest of the maintenance are completed first.

Introduction

STREET LIFECYCLE

Lifecycle maintenance of the city street system is a significant endeavor. There are several programs to consider for maintaining streets including routine crack route/seal and seal coat programs, as well as more extensive reclaim and pave and reconstruction rehabilitation programs. The following figures identify the lifecycle of a typical street and the required maintenance based on condition.

Asphalt pavements perform well, deteriorating slowly during the first ten years of the street lifecycle, and then after that tend to deteriorate more rapidly. Proactive maintenance in the early years of a road lifecycle, such as repairing cracks and seal coating, is recommended as a cost-effective maintenance practice. As the pavement condition deteriorates and surface observations indicate a significant level of stress due to traffic loading, seal coat applications are no longer recommended as the most cost-effective maintenance. This condition is illustrated in Figure 1 on the following page, when pavement condition ratings fall get in the 5 to 6 level, then a thin-overlay begins to be a more cost-effective option.

Figure 1 generally illustrates that a road's condition will deteriorate 40% during the first 75% of its life, and another 40% during the next 12% of its life. A road's condition will deteriorate quickly beyond 75% of its life, which typically occurs 15 to 20 years after a road is constructed.

These timeframes are for typical residential streets. The expected life of a street depends on several factors including initial design section and traffic loading. Some roads that receive less traffic, (especially heavy truck traffic) such as dead-end streets, may last longer due to minimal effects from traffic loading.

Preventative maintenance during the early stages of a pavement's lifecycle can be the most cost-effective method for extending the life of a pavement, as shown in Figure 2 on the following page. By protecting the street subgrade from the negative effects of water intrusion with crack sealing and seal coating or pavement overlay, additional cost savings can be realized in future lower cost reconstruction methods.

The maintenance and rehabilitation options listed in Table 1 can be considered for maintaining public streets.

FIGURE 1: TYPICAL PAVEMENT LIFECYCLE

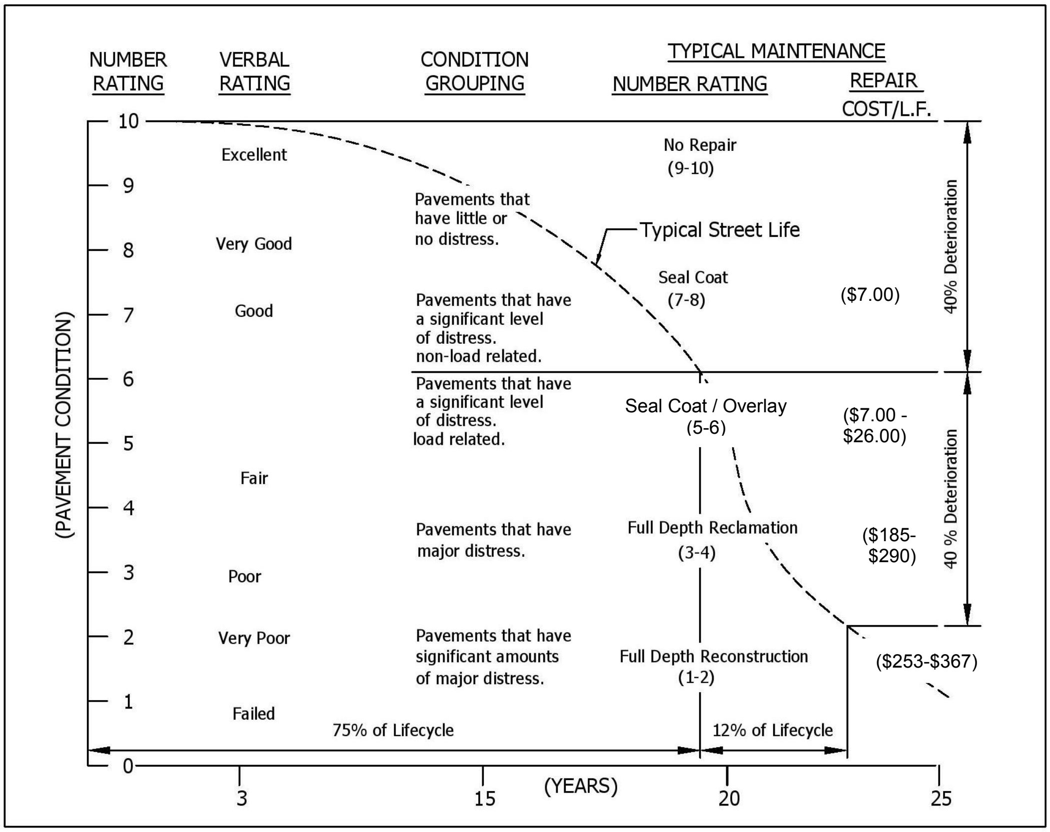
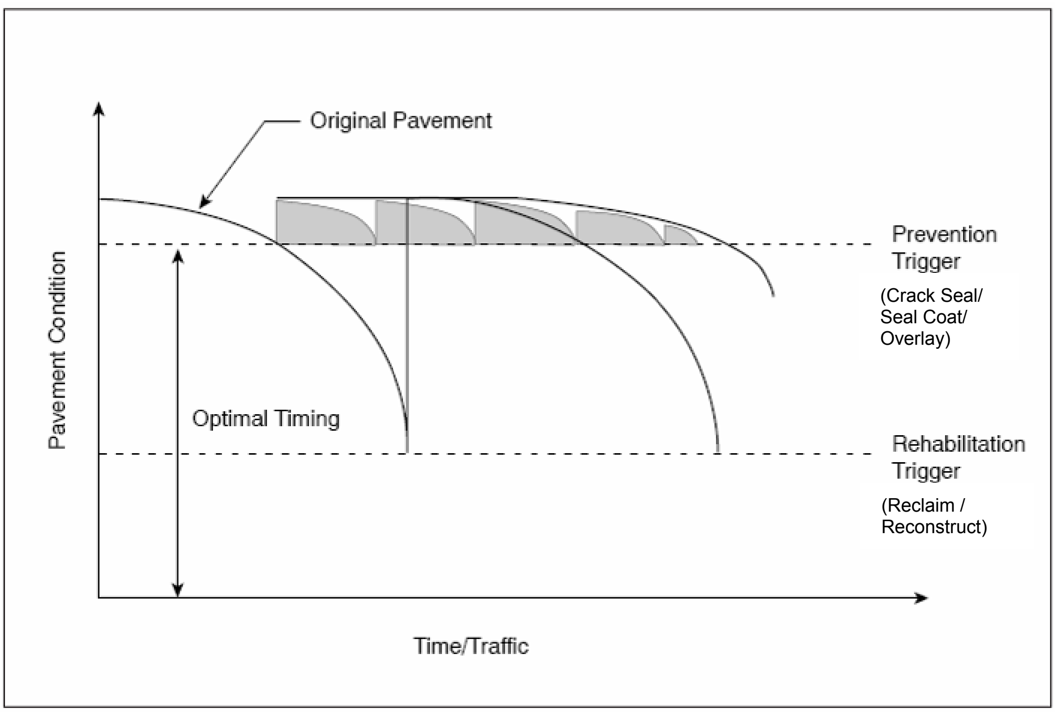


FIGURE 2: EXTENDED PAVEMENT LIFECYCLE



Existing Conditions

STREET CONDITION

The condition of a street is affected by several factors, including:

- Surface condition (roughness, cracking)
- Drainage (street profile, cross section, culverts)
- Street section (bituminous and gravel base thickness)
- Subgrade soil (sand, clay, silt)
- Traffic characteristics and loading
- Age
- Maintenance program (crack route/seal, seal coating, patching)

Each of the above listed items contributes to the overall condition and lifecycle of a public street. It is common for streets in the same area, constructed at the same time, to vary in condition. This makes it difficult to develop an efficient street maintenance and rehabilitation program that can be applied uniformly to adjacent areas. Most of the streets in the city follow the typical condition rating curve as shown in Figure 1.

STREET SURFACE EVALUATION

The streets in Minnetonka Beach were evaluated using a visual survey that observed the condition of the pavement surface. The pavement was rated using the PASER (Pavement Surface Evaluation and Rating) System. The methodology is based on a consistent numeric rating scale ranging from 10 for a newly surfaced road to 1 for a failed surface. The results of the pavement condition survey are shown in Appendix A, Pavement Management Plan – Inventory and Street Costs. Table 3 shows a summary of typical recommended maintenance and rehabilitation options based on the current pavement condition rating.

TABLE 3: PAVEMENT CONDITION RANKING

Pavement Condition Rating	Typical Recommended Maintenance
Good (9-10)	Do Nothing
OK (7-8)	Crack Route/Seal, Seal Coat, and/or Bituminous Patching
Fair (5-6)	Crack Route/Seal, Seal Coat or Overlay
Failing (3-4)	Reclaim and Pave
Failed (1-2)	Full Depth Reconstruction

Proposed Improvements

BITUMINOUS CITY STREETS

Proposed improvements include a combination of the pavement maintenance and rehabilitation options discussed previously. Depending on the goals and budget for the City, various approaches can be taken with the information compiled. Under a constrained budget, more emphasis should be put on the crack route/seal and seal coating and bituminous patching, so that roads in good condition are kept in good condition. Overlaying would be another option but raising the road elevation in many areas may restrict drainage runoff.

The following is a description of each proposed maintenance method and the potential benefits of each.

Crack Route/Seal – provides for the sealing of cracks in the existing pavement through a route and seal, where the existing cracks are ground out to a consistent width and filled with a sealant. This procedure reduces the amount of moisture and debris entering the pavement sub-grade through surface cracks. This protection provides for a more stable street base and can reduce pavement breakup and potholing because of freeze/thaw cycles.

Seal Coat – provides for the installation of a thin surface coating, typically an oil emulsion and trap rock to reseal the pavement surface. This provides for an extension of the pavement surface life by minimizing the effects of the sun and weather on the existing bituminous material and reestablishing a wearing surface with a higher level of friction than the existing pavement. This cannot prevent ultimate pavement failure due to age or poor sub-grade conditions.

Patching – provides for the correction of localized pavement deterioration typically known as pothole filling. This process can include the replacement of small areas that have experienced pavement failure due to a soft base material or other contributing conditions. Patching also provides for a smooth driving surface and extends the life of the pavement.

Overlay – provides for the addition of another layer of bituminous pavement on the existing roadway. This process includes placing an additional layer of pavement on top of the existing surface. This extends the life of the roadway by adding additional material to the surface, reestablishing the cross slope of the road to promote drainage, and creating a smooth driving surface. This method typically results in reflection of existing cracks in the roadway appearing in the new surface in as soon as 6 months, but more typically within 1 to 2 years.

Reclaim and Pave – provides for the full depth grinding of the existing pavement in place. This process would be similar to milling, but some amount of the existing gravel would be affected. Additional gravel would be added to the existing gravel base. After shaping the existing base to develop a crown with the new and existing gravel base, the street would be paved to match the existing section. Reclaiming would eliminate the reflection of cracks. We estimate there would be some subgrade correction needed on the streets. Reclaiming can be a cost-effective means to replace the pavement and strengthen the road, especially if the area may allow for some reusing the existing pavement. This process provides for a new roadway surface with some reusing and strengthening of the base. It is typically less expensive than full-depth reconstruction.

Full Reconstruction – provides for the removal of the existing roadway and the rebuilding of the road from the sub-grade through bituminous surface. Sub-grade correction consists of the removal of unsuitable materials and backfill with gravel materials, aggregate base, and bituminous pavement. This method is typically applied in areas where pavements are showing significant areas of major distress and when widening of the roadway is desired.

UTILITIES

Proposed sanitary sewer and water main improvements are not analyzed in this report. However, some quantities of storm sewer piping have been included for the Reclaim and Pave and Reconstruction options where new curb and gutter is proposed.

Other maintenance items that should be considered over time include the cleaning of existing culverts and maintenance to provide storm capacity.

PROPOSED LIFECYCLE AND BUDGET

In analyzing the alternatives for the city, the present road condition and preferred maintenance strategies were considered. The goal of the lifecycle analysis is to find the most cost-effective method for the City to use in managing and preserving its pavement.

It is recommended that the City focus maintenance funds on streets that are currently in good condition. Focusing limited funding on streets that are in the worst condition typically minimizes the mileage addressed and allows the streets in relatively good condition to deteriorate faster.

The City will also need to budget for the reconstruction of streets when they get to poor/failing condition. There are options for bonding for projects to help absorb these higher cost project amounts over the long term, which will help to maintain a steady street fund from year to year. Some cities consider an assessment policy to provide a fair and consistent method of additional funding for reconstruction projects throughout the City.

The proposed lifecycle for a typical City Street as shown below in Table 4 is proposed based on cost and impact to the entire system.

TABLE 4: PROPOSED LIFECYCLE

Schedule of Improvements	
Activity	**Years after Construction**
Seal Coat	1
Crack Seal	4
Crack & Seal Coat	7
Crack Seal	10
Crack & Seal Coat	13
Overlay	16
Crack Seal	19
Crack & Seal Coat	22
Patching	As needed
Crack & Seal Coat	25
Reclaim or Reconstruct	30

PROPOSED LONG TERM MAINTENANCE AND CAPITAL IMPROVEMENTS PLAN (CIP)

To prepare a long-range plan that efficiently maintains the streets in the City utilizing the crack route/seal, seal coat, and patching, the condition rating and proposed maintenance and CIP recommendation for each individual street was reviewed. When it comes to reclaim/pave or reconstruction, it would be good to group projects in the same area. This helps reduce mobilization costs for contractors are the City's maintenance funds will be maximized. The listing of maintenance and rehabilitation on streets each year can be found in Appendix C and D.

Prioritizing roads could be done based on condition rating and traffic volumes. For example, if two streets have similar condition ratings, and are in a similar condition, but there is only enough in the budget for one street, a street with higher levels of traffic should be maintained before one with lower levels of traffic.

Also, a street that may be proposed to receive a reclaim and pave may perform better than expected through the life of this plan and may only need crack sealing and seal coating.

The City should review the streets proposed each year and the proposed maintenance method to ensure that the streets most in need of maintenance are completed first with the right method. The planned streets could be adjusted annually, as needed, in response to this review.

Cost Estimate

The costs associated with street maintenance (crack route/seal, seal coat, patching, and overlay) and rehabilitation (reclaim, shape, and pave or reconstruction) will vary, depending on the construction process/methods required. The costs to remove and reconstruct the existing bituminous surfaces and gravel base will be much greater than patching and mill/overlaying roads.

Detailed costs on maintenance and rehabilitation methods are included in Appendix E.

The following table summarizes the lifecycle cost per foot of street for the proposed lifespan identified in the previous section of this report. The Reclaim and Pave column represents roads that have sufficient base material under the pavement and would not necessarily need full reconstruction. So, for these roads, reclaim and pave is the ultimate rehabilitation method needed. The Reconstruct column represents streets that have insufficient base or subgrade material and the only feasible rehabilitation option would be to fully reconstruct the road. Storm sewer costs are included with the curb options.

TABLE 5: LIFECYCLE COST (22-FOOT STREET)

Maintenance Alternatives	**Year**	**Reclaim & Pave Cost/ft**	**Reconstruct Cost/ft**
Seal Coat	1	$5.53	$5.53
Crack Route/Seal	4	$1.51	$1.51
Crack Route/Seal, Seal Coat	7	$7.04	$7.04
Crack Route/Seal	10	$1.51	$1.51
Crack Route/Seal, Seal Coat	13	$7.04	$7.04
Crack Route/Seal	16	$1.51	$1.51
Crack Route/Seal, Seal Coat	19	$7.04	$7.04
Crack Route/Seal	22	$1.51	$1.51
Crack Route/Seal, Seal Coat	25	$7.04	$7.04
Rehabilitation Alternatives			
Reclaim and Pave – No Curb	30	$185	---
Reclaim and Pave – Add Curb (Includes some Storm Sewer)	30	$290	
Full Reconstruct – No Curb	30	---	$253
Full Reconstruct – Add Curb (includes some Storm Sewer)	30	---	$367
Maintenance & Rehabilitation Program Costs		**No Curb**	**Add Curb**
Maintenance cost over 20-year life (See Appendix C & D)		+/-$1,032,000	+/-$1,032,000
Maintenance Cost per year		**$51,600**	**$51,600**
Maint.+ Rehab. Cost over 20-year life		+/- $8,918,000	+/- $13,216,000
Maint + Rehab Cost per year		**$445,900**	**$660,800**

Financing

We recommend the City review these costs with their financial consultant. To fund an increased pavement management budget, sources of potential revenue include:

1. Increase General Tax Levy
2. Loans
3. Grants/Local Road Improvement Program
4. Bonding
5. Special Assessments

We will highlight some of these items below.

BONDING

Is a method of borrowing money (typically for a period of 10 to 20 years) to complete a project that exceeds the annual budget with repayment occurring over time.

Subject to applicable limitations, the City may borrow money and issue bonds to finance any project undertaken for a public purpose.

SPECIAL ASSESSMENTS

The City could decide to fund rehabilitation projects through special assessments to benefitting properties. The City's residents benefit from street rehabilitation; however, many times the use of a local street may be isolated to the street's residents and their guests. Typically, only the properties that directly benefit from a project would be assessed.

Appendix A: Inventory and Street Costs – No Curb

APPENDIX A - NO CURB

Minnetonka Beach
Pavement Management Plan - Inventory And Street Costs
Option 1 - No Curb Placement
Our File No. 193804355
October 4, 2018

Legend:

1.) Planning Project Costs include 10% Contingencies and 30% Indirect Costs.
2.) 12.5% subgrade corrections are anticipated on Reconstruct and Reclaim and Pave Projects.
3.) Crack filling assumed to be 1 crack every 20'. If more or less, cost would need to be adjusted. Best check on numbers would be to have crack fill contractor look at streets and give additional feedback on lbs of material.
4.) No Seal Coating assumed on "Good" ranking (PRI 9 -10) .
5.) Street Costs below do not include Utility Improvements.
6.) Staff/Consultants to review tonnage requirements.
7.) Original construction dates taken from record plans and assume October 30 of the year of construction.

ID	Street Name	From	To	Rounded C/L Length (ft)	Proposed Width face-to-face (ft.)	Residential Equivalent Units (1)	Est. Orig. Construction	2018 Ranking	Pavement Rating Index (PRI)	Street Cost/LF (2019 $)	Total Street
1	Arcola Lane	Woodbridge Road (East)	Shoreline Drive (CR 15)	832.0	18	17.0	10/30/1974	Fair	6	5.76	$4,791.79
2	Arcola Lane	West End	Woodbridge Road (East)	1527.0	14	25.0		Fair	5	4.48	$6,840.20
3	Beach Lane	Palm Lane	Lafayette Road	414.0	15	5.0	10/30/1974	Fair	5	4.80	$1,986.98
4	Beach Lane	Shoreline Drive (CR 15)	Palm Lane	304.0	13	7.0		Fair	5	4.16	$1,264.50
5	Brooks Lane	Brooks Lane	West End	321.0	21	7.0	10/30/1974	Failing	3	180.33	$57,887.16
6	Brooks Lane	SE Corner of 3130 Brooks Lane	North End of Street	320.0	21	3.5		Failing	3	180.33	$57,706.83
7	Brooks Lane	Lake Road	North End of Street	961.0	21	10.0	10/30/1974	Failing	4	180.33	$173,300.82
8	Cottage Lane	Northview Road	NE End of Street	385.0	18	3.0		Fair	6	$5.76	$2,217.35
9	Cross Point Road	Huntington Point Road West	Huntington Point Road East	705.0	18	5.0		Fair	6	$5.76	$4,060.35
10	Hill Road	Shoreline Drive (CR 15)	Crescent Street	432.0	20	1.0	10/30/1974	Fair	5	$6.40	$2,764.49
11	Huntington Point Road East	Cross Point Road	Woodwinds Lane (Private)	627.0	18	7.0	10/30/1974	Fair	6	$5.76	$3,611.12
12	Huntington Point Road East	Lafayette Road	Cross Point Road	574.0	20	5.0	10/30/1974	Fair	6	$6.40	$3,673.19
13	Huntington Point Road East	Lafayette Road	End of Culdesac	610.0	22	5.0	10/30/2012	Fair	6	$7.04	$4,293.92
14	Huntington Point Road West	Cross Point Road	Woodwinds Lane (Private)	969.0	19	10.5	10/30/1974	Fair	5	$6.08	$5,890.86
15	Huntington Point Road West	Lafayette Road	Cross Point Road	496.0	22	3.5	10/30/1974	Failing	4	$185.48	$91,999.05
16	Lafayette Ridge Road	Old County Road	End of Culdesac	660.0	26	11.0	10/30/1985	OK	8	$8.32	$5,490.59
17	Lafayette Road	Huntington Point Road East	Beach Lane	2706.0	20	16.0	10/30/2012	OK	7	$6.40	$17,316.47
18	Lafayette Road	Shoreline Drive (CR 15)	Palm Lane	311.0	20	1.5		Fair	6	$6.40	$1,990.18
19	Lafayette Road	Woodbridge Road	Huntington Point Road East	659.0	20	5.0	10/30/2012	Fair	6	$6.40	$4,217.13
20	Lafayette Road	Palm Lane	Beach Lane	669.0	20	7.0		Fair	6	$6.40	$4,281.12
21	Lafayette Road	Huntington Point Road West	Woodbridge Road	297.0	20	3.0	10/30/2012	Fair	6	$6.40	$1,900.59
22	Lafayette Road	Shoreline Drive (CR 15)	Huntington Point Road West	639.0	22	12.0	10/30/1974	Fair	5	$7.04	$4,498.06
23	Lake Road	Westwood Road	Trail	52.0	30	2.0	10/30/2002	OK	7	$9.60	$499.14
24	Lake Road	Brooks Lane	Shoreline Drive (CR 15)	347.0	25	2.0	10/30/2002	OK	7	$8.00	$2,775.69
25	Lake Road	Northview Road	North End of Street	226.0	15	1.0	10/30/1974	Fair	5	$4.80	$1,084.68
26	Lake Road	Northview Road	Trail	35.0	30	2.0	10/30/2002	OK	7	$9.60	$335.96
27	Lake Road	Brooks Lane	Westwood Road	411.0	25	1.5	10/30/2002	OK	7	$8.00	$3,287.63
28	Northview Road	Northview Road	NE End of Street	344.0	16	4.5	10/30/1974	Fair	5	$4.80	$1,651.02
29	Northview Road	Westwood Road	Trail	44.0	40	2.0	10/30/1974	Fair	5	$12.80	$563.14
30	Northview Road	Trail	Northview Road	75.0	40	2.0	10/30/1974	Fair	5	$12.80	$959.89
31	Northview Road	West City Limits	Lake Road	1707.0	18	28.0	10/30/2002	OK	7	$5.76	$9,831.22
32	Northview Road	Lake Road	Cottage Lane	654.0	21	13.0	10/30/1974	Fair	5	$6.72	$4,394.39
33	Northview Road	Cottage Lane	Northview Road	114.0	21	1.0	10/30/1974	Fair	5	$6.72	$765.99
34	Old Beach Road	Shoreline Drive (CR 15)	South City Limits	846.0	21	6.0	10/30/1974	Fair	5	$6.72	$5,684.49
35	Old County Road	Lafayette Ridge Road	Shoreline Drive (CR 15)	699.0	21	7.5	10/30/2002	Fair	5	$6.72	$4,696.76
36	Old County Road	West City Limits	Lafayette Ridge Road	205.0	26	2.5	10/30/2002	Fair	5	$8.32	$1,705.41
37	Palm Lane	Lafayette Road	Beach Lane	395.0	15	3.0	10/30/1974	Failing	4	$149.45	$59,030.83
38	Westwood Road	Lake Road	West End	546.0	16	7.5	10/30/1974	Failing	4	$154.59	$84,407.91
39	Westwood Road	Woodbridge Road	Shoreline Drive (CR 15)	76.0	26	0.5	10/30/1974	Fair	6	$8.32	$632.25
40	Westwood Road	Northview Road	N/S Westwood Road	635.0	25	7.0	10/30/2012	OK	7	$8.00	$5,079.43
41	Westwood Road	E/W Westwood Road	Woodbridge Road	241.0	26	2.0	10/30/1974	OK	7	$8.32	$2,004.90
42	Westwood Road	Lake Road	Northview Road	745.0	22	22.0	10/30/2002	OK	8	$7.04	$5,244.22
43	Woodbridge Road	Trail	East End of Road	2252.0	21	15.0	10/30/1974	Fair	6	$6.72	$15,131.75
44	Woodbridge Road	NE Woodbridge Road	Shoreline Drive (CR 15)	529.0	22	4.5	10/30/1974	Fair	6	$7.04	$3,723.74
45	Woodbridge Road	Shoreline Drive (CR 15)	Lafayette Road	682.0	20	10.5	10/30/2012	Fair	5	$6.40	$4,364.31
46	Woodbridge Road	Arcola Lane	Woodbridge Road (East)	255.0	20	1.5	10/30/1974	Fair	6	$6.40	$1,631.82
47	Woodbridge Road	Arcola Lane	Woodbridge Road (West)	260.0	19	1.0	10/30/1974	Failing	4	$170.04	$44,209.78
48	Woodbridge Road	Westwood Road	Trail	505.0	21	4.0	10/30/1974	Fair	6	$6.72	$3,393.22
TOTALS (2019 Dollars - Not Adjusted For Construction Year of Inflation)				**28298.0**	**21.5**	**323.5**					**$729,072.32**
Minus Reclaim and Pave Projects						**35.5**					**$568,542.38**
Subtotal - Maintenance Projects (2019 Dollars - Not Adjusted For Construction Year of Inflation)											**$160,529.94**

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Appendix B: Inventory and Street Costs – Add Curb

APPENDIX B - ADD NEW CURB

Minnetonka Beach
Pavement Management Plan - Inventory And Street Costs
Option 2 - Add New Curb
Our File No. 193804355
October 4, 2018

Legend:

1.) Planning Project Costs include 10% Contingencies and 30% Indirect Costs.
2.) 12.5% subgrade corrections are anticipated on Reconstruct and Reclaim and Pave Projects.
3.) Crack filling assumed to be 1 crack every 20'. If more or less, cost would need to be adjusted. Best check on numbers would be to have crack fill contractor look at streets and give additional feedback on lbs of material.
4.) No Seal Coating assumed on "Good" ranking (PRI 9 -10) .
5.) Street Costs below do not include Utility Improvements.
6.) Staff/Consultants to review tonnage requirements.
7.) Original construction dates taken from record plans and assume October 30 of the year of construction.
8.) Storm sewer costs have been added to the Street Cost/LF on the "Add New Curb" Option 2.. The estimated increase per foot is around $61 per foot for Project Costs.

ID	Street Name	From	To	Rounded C/L Length (ft)	Proposed Width face-to-face (ft.)	Residential Equivalent Units	Est. Orig. Construction	2018 Ranking	Pavement Rating Index (PRI)	Street Cost/LF (2019 $)	Total Street
1	Arcola Lane	Woodbridge Road (East)	Shoreline Drive (CR 15)	832.0	18	17.0	10/30/1974	Fair	6	5.76	$4,791.79
2	Arcola Lane	West End	Woodbridge Road (East)	1527.0	14	25.0		Fair	5	4.48	$6,840.20
3	Beach Lane	Palm Lane	Lafayette Road	414.0	15	5.0	10/30/1974	Fair	5	4.80	$1,986.98
4	Beach Lane	Shoreline Drive (CR 15)	Palm Lane	304.0	13	7.0		Fair	5	4.16	$1,264.50
5	Brooks Lane	Brooks Lane	West End	321.0	21	7.0	10/30/1974	Failing	3	284.72	$91,396.35
6	Brooks Lane	SE Corner of 3130 Brooks Lane	North End of Street	320.0	21	3.5		Failing	3	284.72	$91,111.63
7	Brooks Lane	Lake Road	North End of Street	961.0	21	10.0	10/30/1974	Failing	4	284.72	$273,619.61
8	Cottage Lane	Northview Road	NE End of Street	385.0	18	3.0		Fair	6	$5.76	$2,217.35
9	Cross Point Road	Huntington Point Road West	Huntington Point Road East	705.0	18	5.0		Fair	6	$5.76	$4,060.35
10	Hill Road	Shoreline Drive (CR 15)	Crescent Street	432.0	20	1.0	10/30/1974	Fair	5	$6.40	$2,764.49
11	Huntington Point Road East	Cross Point Road	Woodwinds Lane (Private)	627.0	18	7.0	10/30/1974	Fair	6	$5.76	$3,611.12
12	Huntington Point Road East	Lafayette Road	Cross Point Road	574.0	20	5.0	10/30/1974	Fair	6	$6.40	$3,673.19
13	Huntington Point Road East	Lafayette Road	End of Culdesac	610.0	22	5.0	10/30/2012	Fair	6	$7.04	$4,293.92
14	Huntington Point Road West	Cross Point Road	Woodwinds Lane (Private)	969.0	19	10.5	10/30/1974	Fair	5	$6.08	$5,890.86
15	Huntington Point Road West	Lafayette Road	Cross Point Road	496.0	22	3.5	10/30/1974	Failing	4	$222.98	$110,597.30
16	Lafayette Ridge Road	Old County Road	End of Culdesac	660.0	26	11.0	10/30/1985	OK	8	$8.32	$5,490.59
17	Lafayette Road	Huntington Point Road East	Beach Lane	2706.0	20	16.0	10/30/2012	OK	7	$6.40	$17,316.47
18	Lafayette Road	Shoreline Drive (CR 15)	Palm Lane	311.0	20	1.5		Fair	6	$6.40	$1,990.18
19	Lafayette Road	Woodbridge Road	Huntington Point Road East	659.0	20	5.0	10/30/2012	Fair	6	$6.40	$4,217.13
20	Lafayette Road	Palm Lane	Beach Lane	669.0	20	7.0		Fair	6	$6.40	$4,281.12
21	Lafayette Road	Huntington Point Road West	Woodbridge Road	297.0	20	3.0	10/30/2012	Fair	6	$6.40	$1,900.59
22	Lafayette Road	Shoreline Drive (CR 15)	Huntington Point Road West	639.0	22	12.0	10/30/1974	Fair	5	$7.04	$4,498.06
23	Lake Road	Westwood Road	Trail	52.0	30	2.0	10/30/2002	OK	7	$9.60	$499.14
24	Lake Road	Brooks Lane	Shoreline Drive (CR 15)	347.0	25	2.0	10/30/2002	OK	7	$8.00	$2,775.69
25	Lake Road	Northview Road	North End of Street	226.0	15	1.0	10/30/1974	Fair	5	$4.80	$1,084.68
26	Lake Road	Northview Road	Trail	35.0	30	2.0	10/30/2002	OK	7	$9.60	$335.96
27	Lake Road	Brooks Lane	Westwood Road	411.0	25	1.5	10/30/2002	OK	7	$8.00	$3,287.63
28	Northview Road	Northview Road	NE End of Street	344.0	16	4.5	10/30/1974	Fair	5	$4.80	$1,651.02
29	Northview Road	Westwood Road	Trail	44.0	40	2.0	10/30/1974	Fair	5	$12.80	$563.14
30	Northview Road	Trail	Northview Road	75.0	40	2.0	10/30/1974	Fair	5	$12.80	$959.89
31	Northview Road	West City Limits	Lake Road	1707.0	18	28.0	10/30/2002	OK	7	$5.76	$9,831.22
32	Northview Road	Lake Road	Cottage Lane	654.0	21	13.0	10/30/1974	Fair	5	$6.72	$4,394.39
33	Northview Road	Cottage Lane	Northview Road	114.0	21	1.0	10/30/1974	Fair	5	$6.72	$765.99
34	Old Beach Road	Shoreline Drive (CR 15)	South City Limits	846.0	21	6.0	10/30/1974	Fair	5	$6.72	$5,684.49
35	Old County Road	Lafayette Ridge Road	Shoreline Drive (CR 15)	699.0	21	7.5	10/30/2002	Fair	5	$6.72	$4,696.76
36	Old County Road	West City Limits	Lafayette Ridge Road	205.0	26	2.5	10/30/2002	Fair	5	$8.32	$1,705.41
37	Palm Lane	Lafayette Road	Beach Lane	395.0	15	3.0	10/30/1974	Failing	4	$253.84	$100,264.88
38	Westwood Road	Lake Road	West End	546.0	16	7.5	10/30/1974	Failing	4	$258.98	$141,404.85
39	Westwood Road	Woodbridge Road	Shoreline Drive (CR 15)	76.0	26	0.5	10/30/1974	Fair	6	$8.32	$632.25
40	Westwood Road	Northview Road	N/S Westwood Road	635.0	25	7.0	10/30/2012	OK	7	$8.00	$5,079.43
41	Westwood Road	E/W Westwood Road	Woodbridge Road	241.0	26	2.0	10/30/1974	OK	7	$8.32	$2,004.90
42	Westwood Road	Lake Road	Northview Road	745.0	22	22.0	10/30/2002	OK	8	$7.04	$5,244.22
43	Woodbridge Road	Trail	East End of Road	2252.0	21	15.0	10/30/1974	Fair	6	$6.72	$15,131.75
44	Woodbridge Road	NE Woodbridge Road	Shoreline Drive (CR 15)	529.0	22	4.5	10/30/1974	Fair	6	$7.04	$3,723.74
45	Woodbridge Road	Shoreline Drive (CR 15)	Lafayette Road	682.0	20	10.5	10/30/2012	Fair	5	$6.40	$4,364.31
46	Woodbridge Road	Arcola Lane	Woodbridge Road (East)	255.0	20	1.5	10/30/1974	Fair	6	$6.40	$1,631.82
47	Woodbridge Road	Arcola Lane	Woodbridge Road (West)	260.0	19	1.0	10/30/1974	Failing	4	$274.43	$71,351.18
48	Woodbridge Road	Westwood Road	Trail	505.0	21	4.0	10/30/1974	Fair	6	$6.72	$3,393.22
TOTALS (2019 Dollars - Not Adjusted For Construction Year of Inflation)				28298.0	21.5	323.5					**$1,040,275.74**
Minus Reclaim and Pave Projects						35.5					$879,745.80
Subtotal - Maintenance Projects (2019 Dollars - Not Adjusted For Construction Year of Inflation)											**$160,529.94**

Appendix C: Pavement Management Program – 20-yr-No Curb

Minnetonka Beach
Pavement Management Program
Option 1 - No Curb Placement

Proposed Lifecycle Schedule of Improvements	
Activity	**Years after Construction**
Seal Coat (sc)	1
Crack Seal (cs)	4
Crack & Seal Coat (cs/sc)	7
Crack Seal (cs)	10
Crack & Seal Coat (cs/sc)	13
Crack Seal (cs)	16
Crack & Seal Coat (cs/sc)	19
Crack Seal (cs)	22
Patching	As needed
Crack & Seal Coat (cs/sc)	25
Reclaim (rc) or Reconstruct (rcn)	30

ID	Street	From	To	Parcels	Length (ft)	Width	PRI	Condition Description	Year Constructed	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038
1	Arcola Lane	Woodbridge Road (East)	Shoreline Drive (CR 15)	17.0	832	18	6	Fair	10/30/1974	cs/sc			cs			cs/sc					rc	sc			cs/sc			cs	
2	Arcola Lane	West End	Woodbridge Road (E.)	25.0	1,527	14	5	Fair		cs/sc					rc	sc			cs			cs/sc			cs			cs/sc	
3	Beach Lane	Palm Lane	Lafayette Road	5.0	414	15	5	Fair	10/30/1974	cs/sc					rc	sc			cs			cs/sc			cs			cs/sc	
4	Beach Lane	Shoreline Drive (CR 15)	Palm Lane	7.0	304	13	5	Fair		cs/sc					rc	sc			cs			cs/sc			cs			cs/sc	
5	Brooks Lane	Brooks Lane	West End	7.0	321	21	3	Failing	10/30/1974		rc	sc			cs			cs/sc			cs					rcn	sc		
6	Brooks Lane	SE Corner of 3130 Brooks Lane	North End of Street	3.5	320	21	3	Failing			rc	sc			cs			cs/sc			cs					rcn	sc		
7	Brooks Lane	Lake Road	North End of Street	10.0	961	21	4	Failing	10/30/1974		rc	sc			cs			cs/sc			cs					rcn	sc		
8	Cottage Lane	Northview Road	NE End of Street	3.0	385	18	6	Fair		cs/sc			cs			cs/sc					rc	sc			cs/sc			cs	
9	Cross Point Road	Huntington Point Rd W.	Huntington Point Rd E.	5.0	705	18	6	Fair		cs/sc			cs			cs/sc					rc	sc			cs/sc			cs	
10	Hill Road	Shoreline Drive (CR 15)	Crescent Street	1.0	432	20	5	Fair	10/30/1974	cs/sc					rc	sc			cs			cs/sc			cs			cs/sc	
11	Huntington Point Road East	Cross Point Road	Woodwinds Ln (Private)	7.0	627	18	6	Fair	10/30/1974	cs/sc			cs			cs/sc					rc	sc			cs/sc			cs	
12	Huntington Point Road East	Lafayette Road	Cross Point Road	5.0	574	20	6	Fair	10/30/1974	cs/sc			cs			cs/sc					rc	sc			cs/sc			cs	
13	Huntington Point Road East	Lafayette Road	End of Culdesac	5.0	610	22	6	Fair	10/30/2012	cs/sc			cs			cs/sc					rc	sc			cs/sc			cs	
14	Huntington Point Road West	Cross Point Road	Woodwinds Ln (Private)	10.5	969	19	5	Fair	10/30/1974	cs/sc					rc	sc			cs			cs/sc			cs			cs/sc	
15	Huntington Point Road West	Lafayette Road	Cross Point Road	3.5	496	22	4	Failing	10/30/1974		rc	sc			cs			cs/sc			cs					rcn	sc		
16	Lafayette Ridge Road	Old County Road	End of Culdesac	11.0	660	26	8	OK	10/30/1985		cs/sc			cs			cs/sc			cs				rc	sc			cs/sc	
17	Lafayette Road	Huntington Point Rd E.	Beach Lane	16.0	2,706	20	7	OK	10/30/2012		cs/sc			cs			cs/sc			cs				rc	sc			cs/sc	
18	Lafayette Road	Shoreline Drive (CR 15)	Palm Lane	1.5	311	20	6	Fair		cs/sc			cs			cs/sc					rc	sc			cs/sc			cs	
19	Lafayette Road	Woodbridge Road	Huntington Point Rd E.	5.0	659	20	6	Fair	10/30/2012	cs/sc			cs			cs/sc					rc	sc			cs/sc			cs	
20	Lafayette Road	Palm Lane	Beach Lane	7.0	669	20	6	Fair		cs/sc			cs			cs/sc					rc	sc			cs/sc			cs	
21	Lafayette Road	Huntington Point Rd W.	Woodbridge Road	3.0	297	20	6	Fair	10/30/2012	cs/sc			cs			cs/sc					rc	sc			cs/sc			cs	
22	Lafayette Road	Shoreline Drive (CR 15)	Huntington Point Rd W.	12.0	639	22	5	Fair	10/30/1974	cs/sc					rc	sc			cs			cs/sc			cs			cs/sc	
23	Lake Road	Westwood Road	Trail	2.0	52	30	7	OK	10/30/2002		cs/sc			cs			cs/sc			cs				rc	sc			cs/sc	
24	Lake Road	Brooks Lane	Shoreline Drive (CR 15)	2.0	347	25	7	OK	10/30/2002		cs/sc			cs			cs/sc			cs				rc	sc			cs/sc	
25	Lake Road	Northview Road	North End of Street	1.0	226	15	5	Fair	10/30/1974	cs/sc					rc	sc			cs			cs/sc			cs			cs/sc	
26	Lake Road	Northview Road	Trail	2.0	35	30	7	OK	10/30/2002		cs/sc			cs			cs/sc			cs				rc	sc			cs/sc	
27	Lake Road	Brooks Lane	Westwood Road	1.5	411	25	7	OK	10/30/2002		cs/sc			cs			cs/sc			cs				rc	sc			cs/sc	
28	Northview Road	Northview Road	NE End of Street	4.5	344	16	5	Fair	10/30/1974	cs/sc					rc	sc			cs			cs/sc			cs			cs/sc	
29	Northview Road	Westwood Road	Trail	2.0	44	40	5	Fair	10/30/1974	cs/sc					rc	sc			cs			cs/sc			cs			cs/sc	
30	Northview Road	Trail	Northview Road	2.0	75	40	5	Fair	10/30/1974	cs/sc					rc	sc			cs			cs/sc			cs			cs/sc	
31	Northview Road	West City Limits	Lake Road	28.0	1,707	18	7	OK	10/30/2002		cs/sc			cs			cs/sc			cs				rc	sc			cs/sc	
32	Northview Road	Lake Road	Cottage Lane	13.0	654	21	5	Fair	10/30/1974	cs/sc					rc	sc			cs			cs/sc			cs			cs/sc	
33	Northview Road	Cottage Lane	Northview Road	1.0	114	21	5	Fair	10/30/1974	cs/sc					rc	sc			cs			cs/sc			cs			cs/sc	
34	Old Beach Road	Shoreline Drive (CR 15)	South City Limits	6.0	846	21	5	Fair	10/30/1974	cs/sc					rc	sc			cs			cs/sc			cs			cs/sc	
35	Old County Road	Lafayette Ridge Road	Shoreline Drive (CR 15)	7.5	699	21	5	Fair	10/30/2002	cs/sc					rc	sc			cs			cs/sc			cs			cs/sc	
36	Old County Road	West City Limits	Lafayette Ridge Road	2.5	205	26	5	Fair	10/30/2002	cs/sc					rc	sc			cs			cs/sc			cs			cs/sc	
37	Palm Lane	Lafayette Road	Beach Lane	3.0	395	15	4	Failing	10/30/1974		rc	sc			cs			cs/sc			cs					rcn	sc		
38	Westwood Road	Lake Road	West End	7.5	546	16	4	Failing	10/30/1974		rc	sc			cs			cs/sc			cs					rcn	sc		
39	Westwood Road	Woodbridge Road	Shoreline Drive (CR 15)	0.5	76	26	6	Fair	10/30/1974	cs/sc			cs			cs/sc					rc	sc			cs/sc			cs	
40	Westwood Road	Northview Road	N/S Westwood Road	7.0	635	25	7	OK	10/30/2012		cs/sc			cs			cs/sc			cs				rc	sc			cs/sc	
41	Westwood Road	E/W Westwood Road	Woodbridge Road	2.0	241	26	7	OK	10/30/1974		cs/sc			cs			cs/sc			cs				rc	sc			cs/sc	
42	Westwood Road	Lake Road	Northview Road	22.0	745	22	8	OK	10/30/2002		cs/sc			cs			cs/sc			cs				rc	sc			cs/sc	
43	Woodbridge Road	Trail	East End of Road	15.0	2,252	21	6	Fair	10/30/1974	cs/sc			cs			cs/sc					rc	sc			cs/sc			cs	
44	Woodbridge Road	NE Woodbridge Road	Shoreline Drive (CR 15)	4.5	529	22	6	Fair	10/30/1974	cs/sc			cs			cs/sc					rc	sc			cs/sc			cs	
45	Woodbridge Road	Shoreline Drive (CR 15)	Lafayette Road	10.5	682	20	5	Fair	10/30/2012	cs/sc					rc	sc			cs			cs/sc			cs			cs/sc	
46	Woodbridge Road	Arcola Lane	Woodbridge Road (E.)	1.5	255	20	6	Fair	10/30/1974	cs/sc			cs			cs/sc					rc	sc			cs/sc			cs	
47	Woodbridge Road	Arcola Lane	Woodbridge Road (W.)	1.0	260	19	4	Failing	10/30/1974		rc	sc			cs			cs/sc			cs					rcn	sc		
48	Woodbridge Road	Westwood Road	Trail	4.0	505	21	6	Fair	10/30/1974	cs/sc			cs			cs/sc					rc	sc			cs/sc			cs	
					28,298																								

Minnetonka Beach
Pavement Management Program
Option 1 - No Curb Placement - Life Cycle Costs

Maintenance and Rehabilitation Method (Based on an Average Street Width of 22')

1. Crack Route/Seal (cs) =	$1.51	Inflation Percentage =	3.00%
2. Seal Coat (sc) =	$5.53	Cost Estimate Year	2019
3. Crack & Seal Coat (cs/sc) =	$7.04		
4. Patching (patch) =	$9.00		
5. Reclaim w/ corrections (rc) =	$185.48		
6. Reconstruct w/ corr. (rcn) =	$253.09		

ID	Street	From	To	Parcels	Length (ft)	Width	PRI		Year Constructed	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	Totals
1	Arcola Lane	Woodbridge Road (East)	Shoreline Drive (CR 15)	17.0	832	18	6	Fair	10/30/1974	$5,857.28	$0.00	$0.00	$1,369.39	$0.00	$0.00	$6,911.59	$0.00	$0.00	$0.00	$0.00	$205,244.75	$6,257.31	$0.00	$0.00	$8,493.06	$0.00	$0.00	$1,934.73	$0.00	$236,068.11
2	Arcola Lane	West End	Woodbridge Road (E.)	25.0	1,527	14	5	Fair		$10,750.08	$0.00	$0.00	$0.00	$0.00	$325,712.15	$9,964.29	$0.00	$0.00	$2,928.33	$0.00	$0.00	$14,620.11	$0.00	$0.00	$3,343.37	$0.00	$0.00	$16,555.12	$0.00	$383,873.45
3	Beach Lane	Palm Lane	Lafayette Road	5.0	414	15	5	Fair	10/30/1974	$2,914.56	$0.00	$0.00	$0.00	$0.00	$88,307.03	$2,701.52	$0.00	$0.00	$793.93	$0.00	$0.00	$3,963.80	$0.00	$0.00	$906.45	$0.00	$0.00	$4,488.42	$0.00	$104,075.71
4	Beach Lane	Shoreline Drive (CR 15)	Palm Lane	7.0	304	13	5	Fair		$2,140.16	$0.00	$0.00	$0.00	$0.00	$64,843.81	$1,983.72	$0.00	$0.00	$582.98	$0.00	$0.00	$2,910.62	$0.00	$0.00	$665.61	$0.00	$0.00	$3,295.85	$0.00	$76,422.75
5	Brooks Lane	Brooks Lane	West End	7.0	321	21	3	Failing	10/30/1974	$0.00	$61,325.25	$1,881.64	$0.00	$0.00	$557.42	$0.00	$0.00	$2,802.20	$0.00	$0.00	$644.66	$0.00	$0.00	$0.00	$0.00	$120,238.00	$2,680.45	$0.00	$0.00	$190,129.62
6	Brooks Lane	SE Corner of 3130 Brooks Lane	North End of Street	3.5	320	21	3	Failing		$0.00	$61,134.21	$1,875.78	$0.00	$0.00	$555.68	$0.00	$0.00	$2,793.47	$0.00	$0.00	$642.66	$0.00	$0.00	$0.00	$0.00	$119,863.42	$2,672.10	$0.00	$0.00	$189,537.32
7	Brooks Lane	Lake Road	North End of Street	10.0	961	21	4	Failing	10/30/1974	$0.00	$183,593.67	$5,633.19	$0.00	$0.00	$1,668.78	$0.00	$0.00	$8,389.15	$0.00	$0.00	$1,929.98	$0.00	$0.00	$0.00	$0.00	$359,964.85	$8,024.64	$0.00	$0.00	$569,204.26
8	Cottage Lane	Northview Road	NE End of Street	3.0	385	18	6	Fair		$2,710.40	$0.00	$0.00	$633.67	$0.00	$0.00	$3,198.27	$0.00	$0.00	$0.00	$0.00	$94,975.03	$2,895.51	$0.00	$0.00	$3,930.08	$0.00	$0.00	$895.28	$0.00	$109,238.24
9	Cross Point Road	Huntington Point Rd W.	Huntington Point Rd E.	5.0	705	18	6	Fair		$4,963.20	$0.00	$0.00	$1,160.36	$0.00	$0.00	$5,856.58	$0.00	$0.00	$0.00	$0.00	$173,915.32	$5,302.16	$0.00	$0.00	$7,196.64	$0.00	$0.00	$1,639.41	$0.00	$200,033.67
10	Hill Road	Shoreline Drive (CR 15)	Crescent Street	1.0	432	20	5	Fair	10/30/1974	$3,041.28	$0.00	$0.00	$0.00	$0.00	$92,146.46	$2,818.97	$0.00	$0.00	$828.45	$0.00	$0.00	$4,136.14	$0.00	$0.00	$945.86	$0.00	$0.00	$4,683.57	$0.00	$108,600.73
11	Huntington Point Road East	Cross Point Road	Woodwinds Ln (Private)	7.0	627	18	6	Fair	10/30/1974	$4,414.08	$0.00	$0.00	$1,031.98	$0.00	$0.00	$5,208.61	$0.00	$0.00	$0.00	$0.00	$154,673.63	$4,715.54	$0.00	$0.00	$6,400.42	$0.00	$0.00	$1,458.03	$0.00	$177,902.29
12	Huntington Point Road East	Lafayette Road	Cross Point Road	5.0	574	20	6	Fair	10/30/1974	$4,040.96	$0.00	$0.00	$944.75	$0.00	$0.00	$4,768.33	$0.00	$0.00	$0.00	$0.00	$141,599.14	$4,316.94	$0.00	$0.00	$5,859.39	$0.00	$0.00	$1,334.78	$0.00	$162,864.29
13	Huntington Point Road East	Lafayette Road	End of Culdesac	5.0	610	22	6	Fair	10/30/2012	$4,294.40	$0.00	$0.00	$1,004.00	$0.00	$0.00	$5,067.39	$0.00	$0.00	$0.00	$0.00	$150,479.92	$4,587.69	$0.00	$0.00	$6,226.88	$0.00	$0.00	$1,418.49	$0.00	$173,078.77
14	Huntington Point Road West	Cross Point Road	Woodwinds Ln (Private)	10.5	969	19	5	Fair	10/30/1974	$6,821.76	$0.00	$0.00	$0.00	$0.00	$206,689.64	$6,323.11	$0.00	$0.00	$1,858.25	$0.00	$0.00	$9,277.59	$0.00	$0.00	$2,121.63	$0.00	$0.00	$10,505.51	$0.00	$243,597.49
15	Huntington Point Road West	Lafayette Road	Cross Point Road	3.5	496	22	4	Failing	10/30/1974	$0.00	$94,758.02	$2,907.45	$0.00	$0.00	$861.30	$0.00	$0.00	$4,329.88	$0.00	$0.00	$996.12	$0.00	$0.00	$0.00	$0.00	$185,788.31	$4,141.75	$0.00	$0.00	$293,782.83
16	Lafayette Ridge Road	Old County Road	End of Culdesac	11.0	660	26	8	OK	10/30/1985	$0.00	$4,785.79	$0.00	$0.00	$1,116.19	$0.00	$0.00	$5,622.14	$0.00	$0.00	$1,295.58	$0.00	$0.00	$0.00	$173,831.86	$5,292.21	$0.00	$0.00	$7,155.46	$0.00	$199,099.23
17	Lafayette Road	Huntington Point Rd E.	Beach Lane	16.0	2,706	20	7	OK	10/30/2012	$0.00	$19,621.75	$0.00	$0.00	$4,576.39	$0.00	$0.00	$23,050.79	$0.00	$0.00	$5,311.88	$0.00	$0.00	$0.00	$712,710.61	$21,698.06	$0.00	$0.00	$29,337.37	$0.00	$816,306.85
18	Lafayette Road	Shoreline Drive (CR 15)	Palm Lane	1.5	311	20	6	Fair		$2,189.44	$0.00	$0.00	$511.87	$0.00	$0.00	$2,583.54	$0.00	$0.00	$0.00	$0.00	$76,720.09	$2,338.97	$0.00	$0.00	$3,174.69	$0.00	$0.00	$723.20	$0.00	$88,241.80
19	Lafayette Road	Woodbridge Road	Huntington Point Rd E.	5.0	659	20	6	Fair	10/30/2012	$4,639.36	$0.00	$0.00	$1,084.65	$0.00	$0.00	$5,474.44	$0.00	$0.00	$0.00	$0.00	$162,567.66	$4,956.21	$0.00	$0.00	$6,727.07	$0.00	$0.00	$1,532.44	$0.00	$186,981.83
20	Lafayette Road	Palm Lane	Beach Lane	7.0	669	20	6	Fair		$4,709.76	$0.00	$0.00	$1,101.11	$0.00	$0.00	$5,557.52	$0.00	$0.00	$0.00	$0.00	$165,034.54	$5,031.42	$0.00	$0.00	$6,829.15	$0.00	$0.00	$1,555.69	$0.00	$189,819.19
21	Lafayette Road	Huntington Point Rd W.	Woodbridge Road	3.0	297	20	6	Fair	10/30/2012	$2,090.88	$0.00	$0.00	$488.83	$0.00	$0.00	$2,467.24	$0.00	$0.00	$0.00	$0.00	$73,266.45	$2,233.68	$0.00	$0.00	$3,031.78	$0.00	$0.00	$690.64	$0.00	$84,269.50
22	Lafayette Road	Shoreline Drive (CR 15)	Huntington Point Rd W.	12.0	639	22	5	Fair	10/30/1974	$4,498.56	$0.00	$0.00	$0.00	$0.00	$136,299.98	$4,169.73	$0.00	$0.00	$1,225.41	$0.00	$0.00	$6,118.04	$0.00	$0.00	$1,399.09	$0.00	$0.00	$6,927.78	$0.00	$160,638.59
23	Lake Road	Westwood Road	Trail	2.0	52	30	7	OK	10/30/2002	$0.00	$377.06	$0.00	$0.00	$87.94	$0.00	$0.00	$442.96	$0.00	$0.00	$102.08	$0.00	$0.00	$0.00	$13,695.84	$416.96	$0.00	$0.00	$563.76	$0.00	$15,686.60
24	Lake Road	Brooks Lane	Shoreline Drive (CR 15)	2.0	347	25	7	OK	10/30/2002	$0.00	$2,516.17	$0.00	$0.00	$586.85	$0.00	$0.00	$2,955.88	$0.00	$0.00	$681.16	$0.00	$0.00	$0.00	$91,393.42	$2,782.42	$0.00	$0.00	$3,762.04	$0.00	$104,677.94
25	Lake Road	Northview Road	North End of Street	1.0	226	15	5	Fair	10/30/1974	$1,591.04	$0.00	$0.00	$0.00	$0.00	$48,206.25	$1,474.74	$0.00	$0.00	$433.40	$0.00	$0.00	$2,163.81	$0.00	$0.00	$494.83	$0.00	$0.00	$2,450.20	$0.00	$56,814.27
26	Lake Road	Northview Road	Trail	2.0	35	30	7	OK	10/30/2002	$0.00	$253.79	$0.00	$0.00	$59.19	$0.00	$0.00	$298.14	$0.00	$0.00	$68.71	$0.00	$0.00	$0.00	$9,218.36	$280.65	$0.00	$0.00	$379.46	$0.00	$10,558.30
27	Lake Road	Brooks Lane	Westwood Road	1.5	411	25	7	OK	10/30/2002	$0.00	$2,980.24	$0.00	$0.00	$695.08	$0.00	$0.00	$3,501.06	$0.00	$0.00	$806.79	$0.00	$0.00	$0.00	$108,249.84	$3,295.60	$0.00	$0.00	$4,455.90	$0.00	$123,984.51
28	Northview Road	Northview Road	NE End of Street	4.5	344	16	5	Fair	10/30/1974	$2,421.76	$0.00	$0.00	$0.00	$0.00	$73,375.89	$2,244.74	$0.00	$0.00	$659.69	$0.00	$0.00	$3,293.59	$0.00	$0.00	$753.19	$0.00	$0.00	$3,729.51	$0.00	$86,478.37
29	Northview Road	Westwood Road	Trail	2.0	44	40	5	Fair	10/30/1974	$309.76	$0.00	$0.00	$0.00	$0.00	$9,385.29	$287.12	$0.00	$0.00	$84.38	$0.00	$0.00	$421.27	$0.00	$0.00	$96.34	$0.00	$0.00	$477.03	$0.00	$11,061.19
30	Northview Road	Trail	Northview Road	2.0	75	40	5	Fair	10/30/1974	$528.00	$0.00	$0.00	$0.00	$0.00	$15,997.65	$489.41	$0.00	$0.00	$143.83	$0.00	$0.00	$718.08	$0.00	$0.00	$164.21	$0.00	$0.00	$813.12	$0.00	$18,854.30
31	Northview Road	West City Limits	Lake Road	28.0	1,707	18	7	OK	10/30/2002	$0.00	$12,377.80	$0.00	$0.00	$2,886.88	$0.00	$0.00	$14,540.91	$0.00	$0.00	$3,350.84	$0.00	$0.00	$0.00	$449,592.39	$13,687.58	$0.00	$0.00	$18,506.61	$0.00	$514,943.01
32	Northview Road	Lake Road	Cottage Lane	13.0	654	21	5	Fair	10/30/1974	$4,604.16	$0.00	$0.00	$0.00	$0.00	$139,499.51	$4,267.61	$0.00	$0.00	$1,254.18	$0.00	$0.00	$6,261.66	$0.00	$0.00	$1,431.93	$0.00	$0.00	$7,090.41	$0.00	$164,409.46
33	Northview Road	Cottage Lane	Northview Road	1.0	114	21	5	Fair	10/30/1974	$802.56	$0.00	$0.00	$0.00	$0.00	$24,316.43	$743.90	$0.00	$0.00	$218.62	$0.00	$0.00	$1,091.48	$0.00	$0.00	$249.60	$0.00	$0.00	$1,235.94	$0.00	$28,658.53
34	Old Beach Road	Shoreline Drive (CR 15)	South City Limits	6.0	846	21	5	Fair	10/30/1974	$5,955.84	$0.00	$0.00	$0.00	$0.00	$180,453.49	$5,520.49	$0.00	$0.00	$1,622.37	$0.00	$0.00	$8,099.94	$0.00	$0.00	$1,852.32	$0.00	$0.00	$9,171.99	$0.00	$212,676.44
35	Old County Road	Lafayette Ridge Road	Shoreline Drive (CR 15)	7.5	699	21	5	Fair	10/30/2002	$4,920.96	$0.00	$0.00	$0.00	$0.00	$149,098.10	$4,561.25	$0.00	$0.00	$1,340.47	$0.00	$0.00	$6,692.51	$0.00	$0.00	$1,530.46	$0.00	$0.00	$7,578.28	$0.00	$175,722.03
36	Old County Road	West City Limits	Lafayette Ridge Road	2.5	205	26	5	Fair	10/30/2002	$1,443.20	$0.00	$0.00	$0.00	$0.00	$43,726.91	$1,337.71	$0.00	$0.00	$393.13	$0.00	$0.00	$1,962.75	$0.00	$0.00	$448.85	$0.00	$0.00	$2,222.53	$0.00	$51,535.08
37	Palm Lane	Lafayette Road	Beach Lane	3.0	395	15	4	Failing	10/30/1974	$0.00	$75,462.54	$2,315.41	$0.00	$0.00	$685.92	$0.00	$0.00	$3,448.19	$0.00	$0.00	$793.28	$0.00	$0.00	$0.00	$0.00	$147,956.41	$3,298.37	$0.00	$0.00	$233,960.12
38	Westwood Road	Lake Road	West End	7.5	546	16	4	Failing	10/30/1974	$0.00	$104,310.24	$3,200.54	$0.00	$0.00	$948.13	$0.00	$0.00	$4,766.36	$0.00	$0.00	$1,096.53	$0.00	$0.00	$0.00	$0.00	$204,516.97	$4,559.26	$0.00	$0.00	$323,398.03
39	Westwood Road	Woodbridge Road	Shoreline Drive (CR 15)	0.5	76	26	6	Fair	10/30/1974	$535.04	$0.00	$0.00	$125.09	$0.00	$0.00	$631.35	$0.00	$0.00	$0.00	$0.00	$18,748.32	$571.58	$0.00	$0.00	$775.81	$0.00	$0.00	$176.73	$0.00	$21,563.92
40	Westwood Road	Northview Road	N/S Westwood Road	7.0	635	25	7	OK	10/30/2012	$0.00	$4,604.51	$0.00	$0.00	$1,073.91	$0.00	$0.00	$5,409.18	$0.00	$0.00	$1,246.51	$0.00	$0.00	$0.00	$167,247.32	$5,091.75	$0.00	$0.00	$6,884.42	$0.00	$191,557.60
41	Westwood Road	E/W Westwood Road	Woodbridge Road	2.0	241	26	7	OK	10/30/1974	$0.00	$1,747.54	$0.00	$0.00	$407.58	$0.00	$0.00	$2,052.93	$0.00	$0.00	$473.08	$0.00	$0.00	$0.00	$63,474.97	$1,932.46	$0.00	$0.00	$2,612.83	$0.00	$72,701.39
42	Westwood Road	Lake Road	Northview Road	22.0	745	22	8	OK	10/30/2002	$0.00	$5,402.14	$0.00	$0.00	$1,259.94	$0.00	$0.00	$6,346.21	$0.00	$0.00	$1,462.44	$0.00	$0.00	$0.00	$196,219.29	$5,973.78	$0.00	$0.00	$8,076.99	$0.00	$224,740.79
43	Woodbridge Road	Trail	East End of Road	15.0	2,252	21	6	Fair	10/30/1974	$15,854.08	$0.00	$0.00	$3,706.57	$0.00	$0.00	$18,707.81	$0.00	$0.00	$0.00	$0.00	$555,542.28	$16,936.84	$0.00	$0.00	$22,988.42	$0.00	$0.00	$5,236.80	$0.00	$638,972.80
44	Woodbridge Road	NE Woodbridge Road	Shoreline Drive (CR 15)	4.5	529	22	6	Fair	10/30/1974	$3,724.16	$0.00	$0.00	$870.68	$0.00	$0.00	$4,394.51	$0.00	$0.00	$0.00	$0.00	$130,498.16	$3,978.50	$0.00	$0.00	$5,400.03	$0.00	$0.00	$1,230.14	$0.00	$150,096.18
45	Woodbridge Road	Shoreline Drive (CR 15)	Lafayette Road	10.5	682	20	5	Fair	10/30/2012	$4,801.28	$0.00	$0.00	$0.00	$0.00	$145,471.96	$4,450.32	$0.00	$0.00	$1,307.87	$0.00	$0.00	$6,529.74	$0.00	$0.00	$1,493.24	$0.00	$0.00	$7,393.97	$0.00	$171,448.38
46	Woodbridge Road	Arcola Lane	Woodbridge Road (E.)	1.5	255	20	6	Fair	10/30/1974	$1,795.20	$0.00	$0.00	$419.70	$0.00	$0.00	$2,118.34	$0.00	$0.00	$0.00	$0.00	$62,905.54	$1,917.80	$0.00	$0.00	$2,603.04	$0.00	$0.00	$592.98	$0.00	$72,352.60
47	Woodbridge Road	Arcola Lane	Woodbridge Road (W.)	1.0	260	19	4	Failing	10/30/1974	$0.00	$49,671.54	$1,524.07	$0.00	$0.00	$451.49	$0.00	$0.00	$2,269.70	$0.00	$0.00	$522.16	$0.00	$0.00	$0.00	$0.00	$97,389.03	$2,171.08	$0.00	$0.00	$153,999.07
48	Woodbridge Road	Westwood Road	Trail	4.0	505	21	6	Fair	10/30/1974	$3,555.20	$0.00	$0.00	$831.18	$0.00	$0.00	$4,195.14	$0.00	$0.00	$0.00	$0.00	$124,577.64	$3,798.00	$0.00	$0.00	$5,155.04	$0.00	$0.00	$1,174.33	$0.00	$143,286.53
					28,298																									
					5.36 miles																									
	Total - Maintenance & Rehabilitation (Adjusted for Inflation)									**$122,918.40**	**$684,922.26**	**$19,338.08**	**$15,283.83**	**$12,749.95**	**$1,749,259.27**	**$130,479.29**	**$64,220.20**	**$28,798.95**	**$15,675.29**	**$14,799.07**	**$2,297,373.86**	**$148,099.28**	**$0.00**	**$1,985,633.90**	**$173,139.95**	**$1,235,716.99**	**$27,547.65**	**$191,947.74**	**$0.00**	**$8,917,903.96**
	Minus Rehabilitation (Reclamation/Pave and Reconstruct) - Adjusted for Inflation										$630,255.47				$1,743,530.55						$2,290,748.47			$1,985,633.90		$1,235,716.99				$7,885,885.38
	Total - Maintenance (Adjusted for Inflation)									**$122,918.40**	**$54,666.79**	**$19,338.08**	**$15,283.83**	**$12,749.95**	**$5,728.72**	**$130,479.29**	**$64,220.20**	**$28,798.95**	**$15,675.29**	**$14,799.07**	**$6,625.39**	**$148,099.28**	**$0.00**	**$0.00**	**$173,139.95**	**$0.00**	**$27,547.65**	**$191,947.74**	**$0.00**	**$1,032,018.58**

Appendix D: Pavement Management Program – 20-yr-Add Curb

Minnetonka Beach
Pavement Management Program
Option 2 - Add Curb and Gutter

Proposed Lifecycle

Schedule of Improvements	
Activity	**Years after Construction**
Seal Coat (sc)	1
Crack Seal (cs)	4
Crack & Seal Coat (cs/sc)	7
Crack Seal (cs)	10
Crack & Seal Coat (cs/sc)	13
Crack Seal (cs)	16
Crack & Seal Coat (cs/sc)	19
Crack Seal (cs)	22
Patching	As needed
Crack & Seal Coat (cs/sc)	25
Reclaim (rc) or Reconstruct (rcn)	30

ID	Street	From	To	Parcels	Length (ft)	Width	PRI	Condition Description	Year Constructed	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038
1	Arcola Lane	Woodbridge Road (East)	Shoreline Drive (CR 15)	17.0	832	18	6	Fair	10/30/1974	cs/sc			cs			cs/sc					rc	sc			cs/sc			cs	
2	Arcola Lane	West End	Woodbridge Road (E.)	25.0	1,527	14	5	Fair		cs/sc					rc	sc			cs			cs/sc			cs			cs/sc	
3	Beach Lane	Palm Lane	Lafayette Road	5.0	414	15	5	Fair	10/30/1974	cs/sc					rc	sc			cs			cs/sc			cs			cs/sc	
4	Beach Lane	Shoreline Drive (CR 15)	Palm Lane	7.0	304	13	5	Fair		cs/sc					rc	sc			cs			cs/sc			cs			cs/sc	
5	Brooks Lane	Brooks Lane	West End	7.0	321	21	3	Failing	10/30/1974		rc	sc			cs			cs/sc			cs					rcn	sc		
6	Brooks Lane	SE Corner of 3130 Brooks Lane	North End of Street	3.5	320	21	3	Failing			rc	sc			cs			cs/sc			cs					rcn	sc		
7	Brooks Lane	Lake Road	North End of Street	10.0	961	21	4	Failing	10/30/1974		rc	sc			cs			cs/sc			cs					rcn	sc		
8	Cottage Lane	Northview Road	NE End of Street	3.0	385	18	6	Fair		cs/sc			cs			cs/sc					rc	sc			cs/sc			cs	
9	Cross Point Road	Huntington Point Rd W.	Huntington Point Rd E.	5.0	705	18	6	Fair		cs/sc			cs			cs/sc					rc	sc			cs/sc			cs	
10	Hill Road	Shoreline Drive (CR 15)	Crescent Street	1.0	432	20	5	Fair	10/30/1974	cs/sc					rc	sc			cs			cs/sc			cs			cs/sc	
11	Huntington Point Road East	Cross Point Road	Woodwinds Ln (Private)	7.0	627	18	6	Fair	10/30/1974	cs/sc			cs			cs/sc					rc	sc			cs/sc			cs	
12	Huntington Point Road East	Lafayette Road	Cross Point Road	5.0	574	20	6	Fair	10/30/1974	cs/sc			cs			cs/sc					rc	sc			cs/sc			cs	
13	Huntington Point Road East	Lafayette Road	End of Culdesac	5.0	610	22	6	Fair	10/30/2012	cs/sc			cs			cs/sc					rc	sc			cs/sc			cs	
14	Huntington Point Road West	Cross Point Road	Woodwinds Ln (Private)	10.5	969	19	5	Fair	10/30/1974	cs/sc					rc	sc			cs			cs/sc			cs			cs/sc	
15	Huntington Point Road West	Lafayette Road	Cross Point Road	3.5	496	22	4	Failing	10/30/1974		rc	sc			cs			cs/sc			cs					rcn	sc		
16	Lafayette Ridge Road	Old County Road	End of Culdesac	11.0	660	26	8	OK	10/30/1985		cs/sc			cs			cs/sc			cs				rc	sc			cs/sc	
17	Lafayette Road	Huntington Point Rd E.	Beach Lane	16.0	2,706	20	7	OK	10/30/2012		cs/sc			cs			cs/sc			cs				rc	sc			cs/sc	
18	Lafayette Road	Shoreline Drive (CR 15)	Palm Lane	1.5	311	20	6	Fair		cs/sc			cs			cs/sc					rc	sc			cs/sc			cs	
19	Lafayette Road	Woodbridge Road	Huntington Point Rd E.	5.0	659	20	6	Fair	10/30/2012	cs/sc			cs			cs/sc					rc	sc			cs/sc			cs	
20	Lafayette Road	Palm Lane	Beach Lane	7.0	669	20	6	Fair		cs/sc			cs			cs/sc					rc	sc			cs/sc			cs	
21	Lafayette Road	Huntington Point Rd W.	Woodbridge Road	3.0	297	20	6	Fair	10/30/2012	cs/sc			cs			cs/sc					rc	sc			cs/sc			cs	
22	Lafayette Road	Shoreline Drive (CR 15)	Huntington Point Rd W.	12.0	639	22	5	Fair	10/30/1974	cs/sc					rc	sc			cs			cs/sc			cs			cs/sc	
23	Lake Road	Westwood Road	Trail	2.0	52	30	7	OK	10/30/2002		cs/sc			cs			cs/sc			cs				rc	sc			cs/sc	
24	Lake Road	Brooks Lane	Shoreline Drive (CR 15)	2.0	347	25	7	OK	10/30/2002		cs/sc			cs			cs/sc			cs				rc	sc			cs/sc	
25	Lake Road	Northview Road	North End of Street	1.0	226	15	5	Fair	10/30/1974	cs/sc					rc	sc			cs			cs/sc			cs			cs/sc	
26	Lake Road	Northview Road	Trail	2.0	35	30	7	OK	10/30/2002		cs/sc			cs			cs/sc			cs				rc	sc			cs/sc	
27	Lake Road	Brooks Lane	Westwood Road	1.5	411	25	7	OK	10/30/2002		cs/sc			cs			cs/sc			cs				rc	sc			cs/sc	
28	Northview Road	Northview Road	NE End of Street	4.5	344	16	5	Fair	10/30/1974	cs/sc					rc	sc			cs			cs/sc			cs			cs/sc	
29	Northview Road	Westwood Road	Trail	2.0	44	40	5	Fair	10/30/1974	cs/sc					rc	sc			cs			cs/sc			cs			cs/sc	
30	Northview Road	Trail	Northview Road	2.0	75	40	5	Fair	10/30/1974	cs/sc					rc	sc			cs			cs/sc			cs			cs/sc	
31	Northview Road	West City Limits	Lake Road	28.0	1,707	18	7	OK	10/30/2002		cs/sc			cs			cs/sc			cs				rc	sc			cs/sc	
32	Northview Road	Lake Road	Cottage Lane	13.0	654	21	5	Fair	10/30/1974	cs/sc					rc	sc			cs			cs/sc			cs			cs/sc	
33	Northview Road	Cottage Lane	Northview Road	1.0	114	21	5	Fair	10/30/1974	cs/sc					rc	sc			cs			cs/sc			cs			cs/sc	
34	Old Beach Road	Shoreline Drive (CR 15)	South City Limits	6.0	846	21	5	Fair	10/30/1974	cs/sc					rc	sc			cs			cs/sc			cs			cs/sc	
35	Old County Road	Lafayette Ridge Road	Shoreline Drive (CR 15)	7.5	699	21	5	Fair	10/30/2002	cs/sc					rc	sc			cs			cs/sc			cs			cs/sc	
36	Old County Road	West City Limits	Lafayette Ridge Road	2.5	205	26	5	Fair	10/30/2002	cs/sc					rc	sc			cs			cs/sc			cs			cs/sc	
37	Palm Lane	Lafayette Road	Beach Lane	3.0	395	15	4	Failing	10/30/1974		rc	sc			cs			cs/sc			cs					rcn	sc		
38	Westwood Road	Lake Road	West End	7.5	546	16	4	Failing	10/30/1974		rc	sc			cs			cs/sc			cs					rcn	sc		
39	Westwood Road	Woodbridge Road	Shoreline Drive (CR 15)	0.5	76	26	6	Fair	10/30/1974	cs/sc			cs			cs/sc					rc	sc			cs/sc			cs	
40	Westwood Road	Northview Road	N/S Westwood Road	7.0	635	25	7	OK	10/30/2012		cs/sc			cs			cs/sc			cs				rc	sc			cs/sc	
41	Westwood Road	E/W Westwood Road	Woodbridge Road	2.0	241	26	7	OK	10/30/1974		cs/sc			cs			cs/sc			cs				rc	sc			cs/sc	
42	Westwood Road	Lake Road	Northview Road	22.0	745	22	8	OK	10/30/2002		cs/sc			cs			cs/sc			cs				rc	sc			cs/sc	
43	Woodbridge Road	Trail	East End of Road	15.0	2,252	21	6	Fair	10/30/1974	cs/sc			cs			cs/sc					rc	sc			cs/sc			cs	
44	Woodbridge Road	NE Woodbridge Road	Shoreline Drive (CR 15)	4.5	529	22	6	Fair	10/30/1974	cs/sc			cs			cs/sc					rc	sc			cs/sc			cs	
45	Woodbridge Road	Shoreline Drive (CR 15)	Lafayette Road	10.5	682	20	5	Fair	10/30/2012	cs/sc					rc	sc			cs			cs/sc			cs			cs/sc	
46	Woodbridge Road	Arcola Lane	Woodbridge Road (E.)	1.5	255	20	6	Fair	10/30/1974	cs/sc			cs			cs/sc					rc	sc			cs/sc			cs	
47	Woodbridge Road	Arcola Lane	Woodbridge Road (W.)	1.0	260	19	4	Failing	10/30/1974		rc	sc			cs			cs/sc			cs					rcn	sc		
48	Woodbridge Road	Westwood Road	Trail	4.0	505	21	6	Fair	10/30/1974	cs/sc			cs			cs/sc					rc	sc			cs/sc			cs	

28,298

Minnetonka Beach
Pavement Management Program
Option 2 - Add Concrete Curb and Gutter - Life Cycle Costs

Maintenance and Rehabilitation Method (Based on an Average Street Width of 22')

1. Crack Route/Seal (cs) =	$1.51	Inflation Percentage =	3.00%
2. Seal Coat (sc) =	$5.53	Cost Estimate Year	2019
3. Crack & Seal Coat (cs/sc) =	$7.04		
4. Patching (patch) =	$9.00		
5. Reclaim w/ corrections (rc) =	$289.87		
6. Reconstruct w/ corr. (rcn) =	$366.86		

ID	Street	From	To	Parcels	Length (ft)	Width	PRI	Condition Description	Year Constructed	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	Totals
1	Arcola Lane	Woodbridge Road (East)	Shoreline Drive (CR 15)	17.0	832	18	6	Fair	10/30/1974	$5,857.28	$0.00	$0.00	$1,369.39	$0.00	$0.00	$6,911.59	$0.00	$0.00	$0.00	$0.00	$320,760.72	$6,257.31	$0.00	$0.00	$8,493.06	$0.00	$0.00	$1,934.73	$0.00	$351,584.08
2	Arcola Lane	West End	Woodbridge Road (E.)	25.0	1527	14	5	Fair		$10,750.08	$0.00	$0.00	$0.00	$0.00	$509,029.66	$9,964.29	$0.00	$0.00	$2,928.33	$0.00	$0.00	$14,620.11	$0.00	$0.00	$3,343.37	$0.00	$0.00	$16,555.12	$0.00	$567,190.96
3	Beach Lane	Palm Lane	Lafayette Road	5.0	414	15	5	Fair	10/30/1974	$2,914.56	$0.00	$0.00	$0.00	$0.00	$138,008.04	$2,701.52	$0.00	$0.00	$793.93	$0.00	$0.00	$3,963.80	$0.00	$0.00	$906.45	$0.00	$0.00	$4,488.42	$0.00	$153,776.72
4	Beach Lane	Shoreline Drive (CR 15)	Palm Lane	7.0	304	13	5	Fair		$2,140.16	$0.00	$0.00	$0.00	$0.00	$101,339.24	$1,983.72	$0.00	$0.00	$582.98	$0.00	$0.00	$2,910.62	$0.00	$0.00	$665.61	$0.00	$0.00	$3,295.85	$0.00	$112,918.18
5	Brooks Lane	Brooks Lane	West End	7.0	321	21	3	Failing	10/30/1974	$0.00	$95,840.37	$1,881.64	$0.00	$0.00	$557.42	$0.00	$0.00	$2,802.20	$0.00	$0.00	$644.66	$0.00	$0.00	$0.00	$0.00	$174,287.88	$2,680.45	$0.00	$0.00	$278,694.62
6	Brooks Lane	SE Corner of 3130 Brooks Lane	North End of Street	3.5	320	21	3	Failing		$0.00	$95,541.80	$1,875.78	$0.00	$0.00	$555.68	$0.00	$0.00	$2,793.47	$0.00	$0.00	$642.66	$0.00	$0.00	$0.00	$0.00	$173,744.93	$2,672.10	$0.00	$0.00	$277,826.42
7	Brooks Lane	Lake Road	North End of Street	10.0	961	21	4	Failing	10/30/1974	$0.00	$286,923.97	$5,633.19	$0.00	$0.00	$1,668.78	$0.00	$0.00	$8,389.15	$0.00	$0.00	$1,929.98	$0.00	$0.00	$0.00	$0.00	$521,777.75	$8,024.64	$0.00	$0.00	$834,347.46
8	Cottage Lane	Northview Road	NE End of Street	3.0	385	18	6	Fair		$2,710.40	$0.00	$0.00	$633.67	$0.00	$0.00	$3,198.27	$0.00	$0.00	$0.00	$0.00	$148,428.94	$2,895.51	$0.00	$0.00	$3,930.08	$0.00	$0.00	$895.28	$0.00	$162,692.15
9	Cross Point Road	Huntington Point Rd W.	Huntington Point Rd E.	5.0	705	18	6	Fair		$4,963.20	$0.00	$0.00	$1,160.36	$0.00	$0.00	$5,856.58	$0.00	$0.00	$0.00	$0.00	$271,798.45	$5,302.16	$0.00	$0.00	$7,196.64	$0.00	$0.00	$1,639.41	$0.00	$297,916.80
10	Hill Road	Shoreline Drive (CR 15)	Crescent Street	1.0	432	20	5	Fair	10/30/1974	$3,041.28	$0.00	$0.00	$0.00	$0.00	$144,008.39	$2,818.97	$0.00	$0.00	$828.45	$0.00	$0.00	$4,136.14	$0.00	$0.00	$945.86	$0.00	$0.00	$4,683.57	$0.00	$160,462.66
11	Huntington Point Road East	Cross Point Road	Woodwinds Ln (Private)	7.0	627	18	6	Fair	10/30/1974	$4,414.08	$0.00	$0.00	$1,031.98	$0.00	$0.00	$5,208.61	$0.00	$0.00	$0.00	$0.00	$241,727.13	$4,715.54	$0.00	$0.00	$6,400.42	$0.00	$0.00	$1,458.03	$0.00	$264,955.79
12	Huntington Point Road East	Lafayette Road	Cross Point Road	5.0	574	20	6	Fair	10/30/1974	$4,040.96	$0.00	$0.00	$944.75	$0.00	$0.00	$4,768.33	$0.00	$0.00	$0.00	$0.00	$221,294.05	$4,316.94	$0.00	$0.00	$5,859.39	$0.00	$0.00	$1,334.78	$0.00	$242,559.20
13	Huntington Point Road East	Lafayette Road	End of Culdesac	5.0	610	22	6	Fair	10/30/2012	$4,294.40	$0.00	$0.00	$1,004.00	$0.00	$0.00	$5,067.39	$0.00	$0.00	$0.00	$0.00	$235,173.12	$4,587.69	$0.00	$0.00	$6,226.88	$0.00	$0.00	$1,418.49	$0.00	$257,771.97
14	Huntington Point Road West	Cross Point Road	Woodwinds Ln (Private)	10.5	969	19	5	Fair	10/30/1974	$6,821.76	$0.00	$0.00	$0.00	$0.00	$323,018.82	$6,323.11	$0.00	$0.00	$1,858.25	$0.00	$0.00	$9,277.59	$0.00	$0.00	$2,121.63	$0.00	$0.00	$10,505.51	$0.00	$359,926.67
15	Huntington Point Road West	Lafayette Road	Cross Point Road	3.5	496	22	4	Failing	10/30/1974	$0.00	$148,089.79	$2,907.45	$0.00	$0.00	$861.30	$0.00	$0.00	$4,329.88	$0.00	$0.00	$996.12	$0.00	$0.00	$0.00	$0.00	$269,304.64	$4,141.75	$0.00	$0.00	$430,630.93
16	Lafayette Ridge Road	Old County Road	End of Culdesac	11.0	660	26	8	OK	10/30/1985	$0.00	$4,785.79	$0.00	$0.00	$1,116.19	$0.00	$0.00	$5,622.14	$0.00	$0.00	$1,295.58	$0.00	$0.00	$0.00	$271,668.00	$5,292.21	$0.00	$0.00	$7,155.46	$0.00	$296,935.37
17	Lafayette Road	Huntington Point Rd E.	Beach Lane	16.0	2706	20	7	OK	10/30/2012	$0.00	$19,621.75	$0.00	$0.00	$4,576.39	$0.00	$0.00	$23,050.79	$0.00	$0.00	$5,311.88	$0.00	$0.00	$0.00	$1,113,838.82	$21,698.06	$0.00	$0.00	$29,337.37	$0.00	$1,217,435.06
18	Lafayette Road	Shoreline Drive (CR 15)	Palm Lane	1.5	311	20	6	Fair		$2,189.44	$0.00	$0.00	$511.87	$0.00	$0.00	$2,583.54	$0.00	$0.00	$0.00	$0.00	$119,899.74	$2,338.97	$0.00	$0.00	$3,174.69	$0.00	$0.00	$723.20	$0.00	$131,421.45
19	Lafayette Road	Woodbridge Road	Huntington Point Rd E.	5.0	659	20	6	Fair	10/30/2012	$4,639.36	$0.00	$0.00	$1,084.65	$0.00	$0.00	$5,474.44	$0.00	$0.00	$0.00	$0.00	$254,064.08	$4,956.21	$0.00	$0.00	$6,727.07	$0.00	$0.00	$1,532.44	$0.00	$278,478.25
20	Lafayette Road	Palm Lane	Beach Lane	7.0	669	20	6	Fair		$4,709.76	$0.00	$0.00	$1,101.11	$0.00	$0.00	$5,557.52	$0.00	$0.00	$0.00	$0.00	$257,919.38	$5,031.42	$0.00	$0.00	$6,829.15	$0.00	$0.00	$1,555.69	$0.00	$282,704.03
21	Lafayette Road	Huntington Point Rd W.	Woodbridge Road	3.0	297	20	6	Fair	10/30/2012	$2,090.88	$0.00	$0.00	$488.83	$0.00	$0.00	$2,467.24	$0.00	$0.00	$0.00	$0.00	$114,502.32	$2,233.68	$0.00	$0.00	$3,031.78	$0.00	$0.00	$690.64	$0.00	$125,505.37
22	Lafayette Road	Shoreline Drive (CR 15)	Huntington Point Rd W.	12.0	639	22	5	Fair	10/30/1974	$4,498.56	$0.00	$0.00	$0.00	$0.00	$213,012.41	$4,169.73	$0.00	$0.00	$1,225.41	$0.00	$0.00	$6,118.04	$0.00	$0.00	$1,399.09	$0.00	$0.00	$6,927.78	$0.00	$237,351.02
23	Lake Road	Westwood Road	Trail	2.0	52	30	7	OK	10/30/2002	$0.00	$377.06	$0.00	$0.00	$87.94	$0.00	$0.00	$442.96	$0.00	$0.00	$102.08	$0.00	$0.00	$0.00	$21,404.15	$416.96	$0.00	$0.00	$563.76	$0.00	$23,394.91
24	Lake Road	Brooks Lane	Shoreline Drive (CR 15)	2.0	347	25	7	OK	10/30/2002	$0.00	$2,516.17	$0.00	$0.00	$586.85	$0.00	$0.00	$2,955.88	$0.00	$0.00	$681.16	$0.00	$0.00	$0.00	$142,831.51	$2,782.42	$0.00	$0.00	$3,762.04	$0.00	$156,116.03
25	Lake Road	Northview Road	North End of Street	1.0	226	15	5	Fair	10/30/1974	$1,591.04	$0.00	$0.00	$0.00	$0.00	$75,337.72	$1,474.74	$0.00	$0.00	$433.40	$0.00	$0.00	$2,163.81	$0.00	$0.00	$494.83	$0.00	$0.00	$2,450.20	$0.00	$83,945.74
26	Lake Road	Northview Road	Trail	2.0	35	30	7	OK	10/30/2002	$0.00	$253.79	$0.00	$0.00	$59.19	$0.00	$0.00	$298.14	$0.00	$0.00	$68.71	$0.00	$0.00	$0.00	$14,406.64	$280.65	$0.00	$0.00	$379.46	$0.00	$15,746.58
27	Lake Road	Brooks Lane	Westwood Road	1.5	411	25	7	OK	10/30/2002	$0.00	$2,980.24	$0.00	$0.00	$695.08	$0.00	$0.00	$3,501.06	$0.00	$0.00	$806.79	$0.00	$0.00	$0.00	$169,175.08	$3,295.60	$0.00	$0.00	$4,455.90	$0.00	$184,909.75
28	Northview Road	Northview Road	NE End of Street	4.5	344	16	5	Fair	10/30/1974	$2,421.76	$0.00	$0.00	$0.00	$0.00	$114,673.35	$2,244.74	$0.00	$0.00	$659.69	$0.00	$0.00	$3,293.59	$0.00	$0.00	$753.19	$0.00	$0.00	$3,729.51	$0.00	$127,775.83
29	Northview Road	Westwood Road	Trail	2.0	44	40	5	Fair	10/30/1974	$309.76	$0.00	$0.00	$0.00	$0.00	$14,667.52	$287.12	$0.00	$0.00	$84.38	$0.00	$0.00	$421.27	$0.00	$0.00	$96.34	$0.00	$0.00	$477.03	$0.00	$16,343.42
30	Northview Road	Trail	Northview Road	2.0	75	40	5	Fair	10/30/1974	$528.00	$0.00	$0.00	$0.00	$0.00	$25,001.46	$489.41	$0.00	$0.00	$143.83	$0.00	$0.00	$718.08	$0.00	$0.00	$164.21	$0.00	$0.00	$813.12	$0.00	$27,858.11
31	Northview Road	West City Limits	Lake Road	28.0	1707	18	7	OK	10/30/2002	$0.00	$12,377.80	$0.00	$0.00	$2,886.88	$0.00	$0.00	$14,540.91	$0.00	$0.00	$3,350.84	$0.00	$0.00	$0.00	$702,632.25	$13,687.58	$0.00	$0.00	$18,506.61	$0.00	$767,982.87
32	Northview Road	Lake Road	Cottage Lane	13.0	654	21	5	Fair	10/30/1974	$4,604.16	$0.00	$0.00	$0.00	$0.00	$218,012.70	$4,267.61	$0.00	$0.00	$1,254.18	$0.00	$0.00	$6,261.66	$0.00	$0.00	$1,431.93	$0.00	$0.00	$7,090.41	$0.00	$242,922.65
33	Northview Road	Cottage Lane	Northview Road	1.0	114	21	5	Fair	10/30/1974	$802.56	$0.00	$0.00	$0.00	$0.00	$38,002.21	$743.90	$0.00	$0.00	$218.62	$0.00	$0.00	$1,091.48	$0.00	$0.00	$249.60	$0.00	$0.00	$1,235.94	$0.00	$42,344.31
34	Old Beach Road	Shoreline Drive (CR 15)	South City Limits	6.0	846	21	5	Fair	10/30/1974	$5,955.84	$0.00	$0.00	$0.00	$0.00	$282,016.43	$5,520.49	$0.00	$0.00	$1,622.37	$0.00	$0.00	$8,099.94	$0.00	$0.00	$1,852.32	$0.00	$0.00	$9,171.99	$0.00	$314,239.38
35	Old County Road	Lafayette Ridge Road	Shoreline Drive (CR 15)	7.5	699	21	5	Fair	10/30/2002	$4,920.96	$0.00	$0.00	$0.00	$0.00	$233,013.58	$4,561.25	$0.00	$0.00	$1,340.47	$0.00	$0.00	$6,692.51	$0.00	$0.00	$1,530.46	$0.00	$0.00	$7,578.28	$0.00	$259,637.51
36	Old County Road	West City Limits	Lafayette Ridge Road	2.5	205	26	5	Fair	10/30/2002	$1,443.20	$0.00	$0.00	$0.00	$0.00	$68,337.32	$1,337.71	$0.00	$0.00	$393.13	$0.00	$0.00	$1,962.75	$0.00	$0.00	$448.85	$0.00	$0.00	$2,222.53	$0.00	$76,145.49
37	Palm Lane	Lafayette Road	Beach Lane	3.0	395	15	4	Failing	10/30/1974	$0.00	$117,934.41	$2,315.41	$0.00	$0.00	$685.92	$0.00	$0.00	$3,448.19	$0.00	$0.00	$793.28	$0.00	$0.00	$0.00	$0.00	$214,466.40	$3,298.37	$0.00	$0.00	$342,941.98
38	Westwood Road	Lake Road	West End	7.5	546	16	4	Failing	10/30/1974	$0.00	$163,018.19	$3,200.54	$0.00	$0.00	$948.13	$0.00	$0.00	$4,766.36	$0.00	$0.00	$1,096.53	$0.00	$0.00	$0.00	$0.00	$296,452.29	$4,559.26	$0.00	$0.00	$474,041.30
39	Westwood Road	Woodbridge Road	Shoreline Drive (CR 15)	0.5	76	26	6	Fair	10/30/1974	$535.04	$0.00	$0.00	$125.09	$0.00	$0.00	$631.35	$0.00	$0.00	$0.00	$0.00	$29,300.26	$571.58	$0.00	$0.00	$775.81	$0.00	$0.00	$176.73	$0.00	$32,115.86
40	Westwood Road	Northview Road	N/S Westwood Road	7.0	635	25	7	OK	10/30/2012	$0.00	$4,604.51	$0.00	$0.00	$1,073.91	$0.00	$0.00	$5,409.18	$0.00	$0.00	$1,246.51	$0.00	$0.00	$0.00	$261,377.55	$5,091.75	$0.00	$0.00	$6,884.42	$0.00	$285,687.83
41	Westwood Road	E/W Westwood Road	Woodbridge Road	2.0	241	26	7	OK	10/30/1974	$0.00	$1,747.54	$0.00	$0.00	$407.58	$0.00	$0.00	$2,052.93	$0.00	$0.00	$473.08	$0.00	$0.00	$0.00	$99,199.98	$1,932.46	$0.00	$0.00	$2,612.83	$0.00	$108,426.40
42	Westwood Road	Lake Road	Northview Road	22.0	745	22	8	OK	10/30/2002	$0.00	$5,402.14	$0.00	$0.00	$1,259.94	$0.00	$0.00	$6,346.21	$0.00	$0.00	$1,462.44	$0.00	$0.00	$0.00	$306,655.55	$5,973.78	$0.00	$0.00	$8,076.99	$0.00	$335,177.05
43	Woodbridge Road	Trail	East End of Road	15.0	2252	21	6	Fair	10/30/1974	$15,854.08	$0.00	$0.00	$3,706.57	$0.00	$0.00	$18,707.81	$0.00	$0.00	$0.00	$0.00	$868,212.91	$16,936.84	$0.00	$0.00	$22,988.42	$0.00	$0.00	$5,236.80	$0.00	$951,643.43
44	Woodbridge Road	NE Woodbridge Road	Shoreline Drive (CR 15)	4.5	529	22	6	Fair	10/30/1974	$3,724.16	$0.00	$0.00	$870.68	$0.00	$0.00	$4,394.51	$0.00	$0.00	$0.00	$0.00	$203,945.22	$3,978.50	$0.00	$0.00	$5,400.03	$0.00	$0.00	$1,230.14	$0.00	$223,543.24
45	Woodbridge Road	Shoreline Drive (CR 15)	Lafayette Road	10.5	682	20	5	Fair	10/30/2012	$4,801.28	$0.00	$0.00	$0.00	$0.00	$227,346.58	$4,450.32	$0.00	$0.00	$1,307.87	$0.00	$0.00	$6,529.74	$0.00	$0.00	$1,493.24	$0.00	$0.00	$7,393.97	$0.00	$253,323.00
46	Woodbridge Road	Arcola Lane	Woodbridge Road (E.)	1.5	255	20	6	Fair	10/30/1974	$1,795.20	$0.00	$0.00	$419.70	$0.00	$0.00	$2,118.34	$0.00	$0.00	$0.00	$0.00	$98,310.08	$1,917.80	$0.00	$0.00	$2,603.04	$0.00	$0.00	$592.98	$0.00	$107,757.14
47	Woodbridge Road	Arcola Lane	Woodbridge Road (W.)	1.0	260	19	4	Failing	10/30/1974	$0.00	$77,627.71	$1,524.07	$0.00	$0.00	$451.49	$0.00	$0.00	$2,269.70	$0.00	$0.00	$522.16	$0.00	$0.00	$0.00	$0.00	$141,167.76	$2,171.08	$0.00	$0.00	$225,733.97
48	Woodbridge Road	Westwood Road	Trail	4.0	505	21	6	Fair	10/30/1974	$3,555.20	$0.00	$0.00	$831.18	$0.00	$0.00	$4,195.14	$0.00	$0.00	$0.00	$0.00	$194,692.50	$3,798.00	$0.00	$0.00	$5,155.04	$0.00	$0.00	$1,174.33	$0.00	$213,401.39
					28,298																									
					5.36 miles																									
	Total - Maintenance & Rehabilitation (Adjusted for Inflation)									**$122,918.40**	**##########**	**$19,338.08**	**$15,283.83**	**$12,749.95**	**$2,730,554.15**	**$130,479.29**	**$64,220.20**	**$28,798.95**	**$15,675.29**	**$14,799.07**	**$3,586,654.29**	**$148,099.28**	**$0.00**	**$3,103,189.53**	**$173,139.95**	**$1,791,201.65**	**$27,547.65**	**$191,947.74**	**$0.00**	**$13,216,240.33**
	Minus Rehabilitation (Reclamation/Pave and Reconstruct) - Adjusted for Inflation										$984,976.24				$2,724,825.43						$3,580,028.90			$3,103,189.53		$1,791,201.65				$12,184,221.75
	Total - Maintenance (Adjusted for Inflation)									**$122,918.40**	**$54,666.79**	**$19,338.08**	**$15,283.83**	**$12,749.95**	**$5,728.72**	**$130,479.29**	**$64,220.20**	**$28,798.95**	**$15,675.29**	**$14,799.07**	**$6,625.39**	**$148,099.28**	**$0.00**	**$0.00**	**$173,139.95**	**$0.00**	**$27,547.65**	**$191,947.74**	**$0.00**	**$1,032,018.58**

Appendix E: Maintenance and Rehabilitation Cost Estimates

1. Crack Route/Seal
2. Seal Coat
3. Bituminous Patching
4. Reclaim and Pave
5. Full Reconstruction
6. Storm Sewer

Crack Fill

Street Width (feet)	Crack Seal	Seal Coat Rock	Seal Coat Oil	Subtotal	Construction	**Cost per ft. Project Costs**
13	0.63	0.00	0.00	0.63	0.69	**0.89**
14	0.67	0.00	0.00	0.67	0.74	**0.96**
15	0.72	0.00	0.00	0.72	0.79	**1.03**
16	0.77	0.00	0.00	0.77	0.85	**1.10**
17	0.82	0.00	0.00	0.82	0.90	**1.17**
18	0.87	0.00	0.00	0.87	0.95	**1.24**
19	0.91	0.00	0.00	0.91	1.00	**1.31**
20	0.96	0.00	0.00	0.96	1.06	**1.38**
21	1.01	0.00	0.00	1.01	1.11	**1.44**
22	1.06	0.00	0.00	1.06	1.16	**1.51**
23	1.11	0.00	0.00	1.11	1.22	**1.58**
24	1.15	0.00	0.00	1.15	1.27	**1.65**
25	1.20	0.00	0.00	1.20	1.32	**1.72**
26	1.25	0.00	0.00	1.25	1.38	**1.79**
27	1.30	0.00	0.00	1.30	1.43	**1.86**
28	1.35	0.00	0.00	1.35	1.48	**1.93**
30	1.44	0.00	0.00	1.44	1.59	**2.06**
32	1.54	0.00	0.00	1.54	1.69	**2.20**
34	1.63	0.00	0.00	1.63	1.80	**2.34**
36	1.73	0.00	0.00	1.73	1.90	**2.48**
38	1.83	0.00	0.00	1.83	2.01	**2.61**
40	1.92	0.00	0.00	1.92	2.12	**2.75**
42	2.02	0.00	0.00	2.02	2.22	**2.89**
44	2.12	0.00	0.00	2.12	2.33	**3.03**
46	2.21	0.00	0.00	2.21	2.43	**3.16**
48	2.31	0.00	0.00	2.31	2.54	**3.30**
50	2.40	0.00	0.00	2.40	2.64	**3.44**
52	2.50	0.00	0.00	2.50	2.75	**3.58**
54	2.60	0.00	0.00	2.60	2.86	**3.71**
56	2.69	0.00	0.00	2.69	2.96	**3.85**
58	2.79	0.00	0.00	2.79	3.07	**3.99**

Assumed Construction Costs:

Crack filling (per pound)	$2.75
Seal Coat Rock (per ton) - FA-2	$0.00
Seal Coat Oil (per Gallon) - CRS2	$0.00

Assumed Road Characteristics:

Crack rate for 3/4" x 3/4" - (ft/lb)	2.86
(1) # of cracks (1 every so many feet)	20
Rate of rock placement (lbs/sy)	18
Rate of oil placement (gal/sy)	0.24

Crack Fill and Seal Coat

Street Width (feet)	Crack Seal	Seal Coat Rock	Seal Coat Oil	Subtotal	Construction	**Cost per ft. Project Costs**
13	0.63	0.81	1.21	2.64	2.91	**4.16**
14	0.67	0.87	1.31	2.85	3.13	**4.48**
15	0.72	0.93	1.40	3.05	3.36	**4.80**
16	0.77	0.99	1.49	3.25	3.58	**5.12**
17	0.82	1.05	1.59	3.46	3.80	**5.44**
18	0.87	1.12	1.68	3.66	4.03	**5.76**
19	0.91	1.18	1.77	3.86	4.25	**6.08**
20	0.96	1.24	1.87	4.07	4.48	**6.40**
21	1.01	1.30	1.96	4.27	4.70	**6.72**
22	1.06	1.36	2.05	4.48	4.92	**7.04**
23	1.11	1.43	2.15	4.68	5.15	**7.36**
24	1.15	1.49	2.24	4.88	5.37	**7.68**
25	1.20	1.55	2.33	5.09	5.59	**8.00**
26	1.25	1.61	2.43	5.29	5.82	**8.32**
27	1.30	1.67	2.52	5.49	6.04	**8.64**
28	1.35	1.74	2.61	5.70	6.27	**8.96**
30	1.44	1.86	2.80	6.10	6.71	**9.60**
32	1.54	1.98	2.99	6.51	7.16	**10.24**
34	1.63	2.11	3.17	6.92	7.61	**10.88**
36	1.73	2.23	3.36	7.32	8.06	**11.52**
38	1.83	2.36	3.55	7.73	8.50	**12.16**
40	1.92	2.48	3.73	8.14	8.95	**12.80**
42	2.02	2.60	3.92	8.54	9.40	**13.44**
44	2.12	2.73	4.11	8.95	9.85	**14.08**
46	2.21	2.85	4.29	9.36	10.29	**14.72**
48	2.31	2.98	4.48	9.76	10.74	**15.36**
50	2.40	3.10	4.67	10.17	11.19	**16.00**
52	2.50	3.22	4.85	10.58	11.64	**16.64**
54	2.60	3.35	5.04	10.98	12.08	**17.28**
56	2.69	3.47	5.23	11.39	12.53	**17.92**
58	2.79	3.60	5.41	11.80	12.98	**18.56**

Assumed Construction Costs:

Crack filling (per pound)	$2.75
Seal Coat Rock (per ton) - FA-2	$62.00
Seal Coat Oil (per Gallon) - CRS2	$3.50

Assumed Road Characteristics:

Crack rate for 3/4" x 3/4" - (ft/lb)	2.86
(1) # of cracks (1 every so many feet)	20
Rate of rock placement (lbs/sy)	18
Rate of oil placement (gal/sy)	0.24

Reclaim and Pave - No Curb

05-Oct-2018

Street Width	Cost per Foot for Construction													Cost per foot
		12.50%	12.50%	Subg	Addit.			100.00%	4"					
(feet)	Reclaim	Excavation	Exc. Fill	Prep	Cl 5	Wear	Base	Curb & Gutter	Draintile	Driveway	Sodding	Subtotal	Construction	**Project Costs**
13	$11.56	$2.08	$4.74	$2.50	$4.22	$10.22	$13.28	$0.00	$0.00	$37.50	$11.20	$97.31	$107.04	**$139.15**
14	$12.44	$2.22	$5.06	$2.67	$4.50	$11.01	$14.30	$0.00	$0.00	$37.50	$11.20	$100.91	$111.00	**$144.30**
15	$13.33	$2.36	$5.38	$2.83	$4.78	$11.80	$15.33	$0.00	$0.00	$37.50	$11.20	$104.51	$114.96	**$149.45**
16	$14.22	$2.50	$5.69	$3.00	$5.06	$12.58	$16.35	$0.00	$0.00	$37.50	$11.20	$108.11	$118.92	**$154.59**
17	$15.11	$2.64	$6.01	$3.17	$5.34	$13.37	$17.37	$0.00	$0.00	$37.50	$11.20	$111.71	$122.88	**$159.74**
18	$16.00	$2.78	$6.33	$3.33	$5.62	$14.16	$18.39	$0.00	$0.00	$37.50	$11.20	$115.31	$126.84	**$164.89**
19	$16.89	$2.92	$6.64	$3.50	$5.90	$14.94	$19.41	$0.00	$0.00	$37.50	$11.20	$118.91	$130.80	**$170.04**
20	$17.78	$3.06	$6.96	$3.67	$6.18	$15.73	$20.44	$0.00	$0.00	$37.50	$11.20	$122.51	$134.76	**$175.19**
21	$18.67	$3.19	$7.27	$3.83	$6.47	$16.52	$21.46	$0.00	$0.00	$37.50	$11.20	$126.11	$138.72	**$180.33**
22	$19.56	$3.33	$7.59	$4.00	$6.75	$17.30	$22.48	$0.00	$0.00	$37.50	$11.20	$129.71	$142.68	**$185.48**
23	$20.44	$3.47	$7.91	$4.17	$7.03	$18.09	$23.50	$0.00	$0.00	$37.50	$11.20	$133.31	$146.64	**$190.63**
24	$21.33	$3.61	$8.22	$4.33	$7.31	$18.88	$24.52	$0.00	$0.00	$37.50	$11.20	$136.91	$150.60	**$195.78**
25	$22.22	$3.75	$8.54	$4.50	$7.59	$19.66	$25.54	$0.00	$0.00	$37.50	$11.20	$140.51	$154.56	**$200.93**
26	$23.11	$3.89	$8.86	$4.67	$7.87	$20.45	$26.57	$0.00	$0.00	$37.50	$11.20	$144.11	$158.52	**$206.07**
27	$24.00	$4.03	$9.17	$4.83	$8.15	$21.24	$27.59	$0.00	$0.00	$37.50	$11.20	$147.71	$162.48	**$211.22**
28	$24.89	$4.17	$9.49	$5.00	$8.43	$22.02	$28.61	$0.00	$0.00	$37.50	$11.20	$151.31	$166.44	**$216.37**
30	$26.67	$4.44	$10.12	$5.33	$9.00	$23.60	$30.65	$0.00	$0.00	$37.50	$11.20	$158.51	$174.36	**$226.67**
32	$28.44	$4.72	$10.75	$5.67	$9.56	$25.17	$32.70	$0.00	$0.00	$37.50	$11.20	$165.71	$182.28	**$236.96**
34	$30.22	$5.00	$11.39	$6.00	$10.12	$26.74	$34.74	$0.00	$0.00	$37.50	$11.20	$172.91	$190.20	**$247.26**
36	$32.00	$5.28	$12.02	$6.33	$10.68	$28.31	$36.78	$0.00	$0.00	$37.50	$11.20	$180.11	$198.12	**$257.56**
38	$33.78	$5.56	$12.65	$6.67	$11.24	$29.89	$38.83	$0.00	$0.00	$37.50	$11.20	$187.31	$206.04	**$267.85**
40	$35.56	$5.83	$13.28	$7.00	$11.81	$31.46	$40.87	$0.00	$0.00	$37.50	$11.20	$194.51	$213.96	**$278.15**
42	$37.33	$6.11	$13.92	$7.33	$12.37	$33.03	$42.91	$0.00	$0.00	$37.50	$11.20	$201.71	$221.88	**$288.44**
44	$39.11	$6.39	$14.55	$7.67	$12.93	$34.61	$44.96	$0.00	$0.00	$37.50	$11.20	$208.91	$229.80	**$298.74**
46	$40.89	$6.67	$15.18	$8.00	$13.49	$36.18	$47.00	$0.00	$0.00	$37.50	$11.20	$216.11	$237.72	**$309.04**
48	$42.67	$6.94	$15.81	$8.33	$14.06	$37.75	$49.05	$0.00	$0.00	$37.50	$11.20	$223.31	$245.64	**$319.33**
50	$44.44	$7.22	$16.45	$8.67	$14.62	$39.33	$51.09	$0.00	$0.00	$37.50	$11.20	$230.51	$253.56	**$329.63**
52	$46.22	$7.50	$17.08	$9.00	$15.18	$40.90	$53.13	$0.00	$0.00	$37.50	$11.20	$237.71	$261.48	**$339.93**
54	$48.00	$7.78	$17.71	$9.33	$15.74	$42.47	$55.18	$0.00	$0.00	$37.50	$11.20	$244.91	$269.40	**$350.22**
56	$49.78	$8.06	$18.34	$9.67	$16.30	$44.04	$57.22	$0.00	$0.00	$37.50	$11.20	$252.11	$277.32	**$360.52**
58	$51.56	$8.33	$18.98	$10.00	$16.87	$45.62	$59.26	$0.00	$0.00	$37.50	$11.20	$259.31	$285.24	**$370.81**

Assumed Construction Costs:

Reclaim & Remove (per square yard) - Entire width	$8.00
Subgrade Excavation (per cubic yard) - 12.5%	$30.00
Subgrade Preparation (per square yard)	$1.50
Additional Class 5 (per ton)	$20.00
Bituminous Wear (per ton)	$78.00
Bituminous Base (per ton)	$76.00
Curbs and Gutter (per foot) - Remove and replace	$0.00
4" Draintile (per linear foot)	$0.00
Sodding (per square yard)	$7.00
Driveway Removal and Replacement (per each)	$1,500.00
Subgrade Fill (Class 5 per ton)	$30.00

Assumed Road Characteristics:

Depth of Bituminous Wear (inches)	1.5
Depth of Bituminous Base (inches)	2.0
Depth of Patch Excavation (inches)	12
Depth of Additional Class 5 (inches)	2

Sodding = 0.8 SY per foot or 7 feet wide

Driveways = 0.025 each units per foot

Reclaim and Pave - Add Curb and Gutter

05-Oct-2018

Street Width	Cost per Foot for Construction														Cost per foot
		12.50%	12.50%	Subg	Addit.			100.00%	4"		Storm				
(feet)	Reclaim	Excavation	Exc. Fill	Prep	Cl 5	Wear	Base	Curb & Gutter	Draintile	Driveway	Sewer	Sodding	Subtotal	Construction	**Project Costs**
13	$11.56	$2.36	$5.38	$2.83	$4.78	$10.22	$13.28	$30.00	$0.00	$37.50	$43.00	$11.20	$172.11	$189.32	**$246.12**
14	$12.44	$2.22	$5.06	$2.67	$4.50	$11.01	$14.30	$30.00	$0.00	$37.50	$43.00	$11.20	$173.91	$191.30	**$248.69**
15	$13.33	$2.36	$5.38	$2.83	$4.78	$11.80	$15.33	$30.00	$0.00	$37.50	$43.00	$11.20	$177.51	$195.26	**$253.84**
16	$14.22	$2.50	$5.69	$3.00	$5.06	$12.58	$16.35	$30.00	$0.00	$37.50	$43.00	$11.20	$181.11	$199.22	**$258.98**
17	$15.11	$2.64	$6.01	$3.17	$5.34	$13.37	$17.37	$30.00	$0.00	$37.50	$43.00	$11.20	$184.71	$203.18	**$264.13**
18	$16.00	$2.78	$6.33	$3.33	$5.62	$14.16	$18.39	$30.00	$0.00	$37.50	$43.00	$11.20	$188.31	$207.14	**$269.28**
19	$16.89	$2.92	$6.64	$3.50	$5.90	$14.94	$19.41	$30.00	$0.00	$37.50	$43.00	$11.20	$191.91	$211.10	**$274.43**
20	$17.78	$3.06	$6.96	$3.67	$6.18	$15.73	$20.44	$30.00	$0.00	$37.50	$43.00	$11.20	$195.51	$215.06	**$279.58**
21	$18.67	$3.19	$7.27	$3.83	$6.47	$16.52	$21.46	$30.00	$0.00	$37.50	$43.00	$11.20	$199.11	$219.02	**$284.72**
22	$19.56	$3.33	$7.59	$4.00	$6.75	$17.30	$22.48	$30.00	$0.00	$37.50	$43.00	$11.20	$202.71	$222.98	**$289.87**
23	$20.44	$3.47	$7.91	$4.17	$7.03	$18.09	$23.50	$30.00	$0.00	$37.50	$43.00	$11.20	$206.31	$226.94	**$295.02**
24	$21.33	$3.61	$8.22	$4.33	$7.31	$18.88	$24.52	$30.00	$0.00	$37.50	$43.00	$11.20	$209.91	$230.90	**$300.17**
25	$22.22	$3.75	$8.54	$4.50	$7.59	$19.66	$25.54	$30.00	$0.00	$37.50	$43.00	$11.20	$213.51	$234.86	**$305.32**
26	$23.11	$3.89	$8.86	$4.67	$7.87	$20.45	$26.57	$30.00	$0.00	$37.50	$43.00	$11.20	$217.11	$238.82	**$310.46**
27	$24.00	$4.03	$9.17	$4.83	$8.15	$21.24	$27.59	$30.00	$0.00	$37.50	$43.00	$11.20	$220.71	$242.78	**$315.61**
28	$24.89	$4.17	$9.49	$5.00	$8.43	$22.02	$28.61	$30.00	$0.00	$37.50	$43.00	$11.20	$224.31	$246.74	**$320.76**
30	$26.67	$4.44	$10.12	$5.33	$9.00	$23.60	$30.65	$30.00	$0.00	$37.50	$43.00	$11.20	$231.51	$254.66	**$331.06**
32	$28.44	$4.72	$10.75	$5.67	$9.56	$25.17	$32.70	$30.00	$0.00	$37.50	$43.00	$11.20	$238.71	$262.58	**$341.35**
34	$30.22	$5.00	$11.39	$6.00	$10.12	$26.74	$34.74	$30.00	$0.00	$37.50	$43.00	$11.20	$245.91	$270.50	**$351.65**
36	$32.00	$5.28	$12.02	$6.33	$10.68	$28.31	$36.78	$30.00	$0.00	$37.50	$43.00	$11.20	$253.11	$278.42	**$361.95**
38	$33.78	$5.56	$12.65	$6.67	$11.24	$29.89	$38.83	$30.00	$0.00	$37.50	$43.00	$11.20	$260.31	$286.34	**$372.24**
40	$35.56	$5.83	$13.28	$7.00	$11.81	$31.46	$40.87	$30.00	$0.00	$37.50	$43.00	$11.20	$267.51	$294.26	**$382.54**
42	$37.33	$6.11	$13.92	$7.33	$12.37	$33.03	$42.91	$30.00	$0.00	$37.50	$43.00	$11.20	$274.71	$302.18	**$392.83**
44	$39.11	$6.39	$14.55	$7.67	$12.93	$34.61	$44.96	$30.00	$0.00	$37.50	$43.00	$11.20	$281.91	$310.10	**$403.13**
46	$40.89	$6.67	$15.18	$8.00	$13.49	$36.18	$47.00	$30.00	$0.00	$37.50	$43.00	$11.20	$289.11	$318.02	**$413.43**
48	$42.67	$6.94	$15.81	$8.33	$14.06	$37.75	$49.05	$30.00	$0.00	$37.50	$43.00	$11.20	$296.31	$325.94	**$423.72**
50	$44.44	$7.22	$16.45	$8.67	$14.62	$39.33	$51.09	$30.00	$0.00	$37.50	$43.00	$11.20	$303.51	$333.86	**$434.02**
52	$46.22	$7.50	$17.08	$9.00	$15.18	$40.90	$53.13	$30.00	$0.00	$37.50	$43.00	$11.20	$310.71	$341.78	**$444.32**
54	$48.00	$7.78	$17.71	$9.33	$15.74	$42.47	$55.18	$30.00	$0.00	$37.50	$43.00	$11.20	$317.91	$349.70	**$454.61**
56	$49.78	$8.06	$18.34	$9.67	$16.30	$44.04	$57.22	$30.00	$0.00	$37.50	$43.00	$11.20	$325.11	$357.62	**$464.91**
58	$51.56	$8.33	$18.98	$10.00	$16.87	$45.62	$59.26	$30.00	$0.00	$37.50	$43.00	$11.20	$332.31	$365.54	**$475.20**

Assumed Construction Costs:

Reclaim & Remove (per square yard) - Entire width	$8.00
Subgrade Excavation (per cubic yard) - 12.5%	$30.00
Subgrade Preparation (per square yard)	$1.50
Additional Class 5 (per ton)	$20.00
Bituminous Wear (per ton)	$78.00
Bituminous Base (per ton)	$76.00
Curbs and Gutter (per foot) - Place	$15.00
4" Draintile (per linear foot)	$0.00
Sodding (per square yard)	$7.00
Driveway Removal and Replacement (per each)	$1,500.00
Subgrade Fill (Class 5 per ton)	$30.00
Storm Sewer (See Storm Sewer Tab)	$43.00

Assumed Road Characteristics:

Depth of Bituminous Wear (inches)	1.5
Depth of Bituminous Base (inches)	2.0
Depth of Patch Excavation (inches)	12
Depth of Additional Class 5 (inches)	2
Sodding = 0.8 SY per foot or 7 feet wide	
Driveways = 0.025 each units per foot	

Reconstruction - Residential Street Section - No Curb

05-Oct-2018

Street Width face to face (feet)	Cost per Foot for Reconstruction															
	Bituminous Wear	Bituminous Base	Concrete Curb & Gutter	4" Drain Tile	Class 5 Aggregate Base	Excavation	Subgrade Excavation	Subgrade Borrow (Cl 5)	Reclaim of Bit. Surface	Fabric	Select Granular	Driveway	Sodding	Subtotal	Construction	**Cost per ft. Project Costs**
13	$10.22	$13.28	$0.00	$0.00	$25.30	$14.35	$1.39	$3.16	$5.78	$5.00	$0.00	$37.50	$11.20	$127.19	$139.91	**$181.88**
14	$11.01	$14.30	$0.00	$0.00	$26.99	$15.31	$1.48	$3.37	$6.22	$5.33	$0.00	$37.50	$11.20	$132.72	$145.99	**$189.79**
15	$11.80	$15.33	$0.00	$0.00	$28.67	$16.27	$1.57	$3.58	$6.67	$5.67	$0.00	$37.50	$11.20	$138.25	$152.08	**$197.70**
16	$12.58	$16.35	$0.00	$0.00	$30.36	$17.22	$1.67	$3.80	$7.11	$6.00	$0.00	$37.50	$11.20	$143.79	$158.17	**$205.62**
17	$13.37	$17.37	$0.00	$0.00	$32.05	$18.18	$1.76	$4.01	$7.56	$6.33	$0.00	$37.50	$11.20	$149.32	$164.25	**$213.53**
18	$14.16	$18.39	$0.00	$0.00	$33.73	$19.14	$1.85	$4.22	$8.00	$6.67	$0.00	$37.50	$11.20	$154.85	$170.34	**$221.44**
19	$14.94	$19.41	$0.00	$0.00	$35.42	$20.09	$1.94	$4.43	$8.44	$7.00	$0.00	$37.50	$11.20	$160.39	$176.42	**$229.35**
20	$15.73	$20.44	$0.00	$0.00	$37.11	$21.05	$2.04	$4.64	$8.89	$7.33	$0.00	$37.50	$11.20	$165.92	$182.51	**$237.26**
21	$16.52	$21.46	$0.00	$0.00	$38.79	$22.01	$2.13	$4.85	$9.33	$7.67	$0.00	$37.50	$11.20	$171.45	$188.60	**$245.18**
22	$17.30	$22.48	$0.00	$0.00	$40.48	$22.96	$2.22	$5.06	$9.78	$8.00	$0.00	$37.50	$11.20	$176.99	$194.68	**$253.09**
23	$18.09	$23.50	$0.00	$0.00	$42.17	$23.92	$2.31	$5.27	$10.22	$8.33	$0.00	$37.50	$11.20	$182.52	$200.77	**$261.00**
24	$18.88	$24.52	$0.00	$0.00	$43.85	$24.88	$2.41	$5.48	$10.67	$8.67	$0.00	$37.50	$11.20	$188.05	$206.86	**$268.91**
25	$19.66	$25.54	$0.00	$0.00	$45.54	$25.83	$2.50	$5.69	$11.11	$9.00	$0.00	$37.50	$11.20	$193.58	$212.94	**$276.82**
26	$20.45	$26.57	$0.00	$0.00	$47.23	$26.79	$2.59	$5.90	$11.56	$9.33	$0.00	$37.50	$11.20	$199.12	$219.03	**$284.74**
27	$21.24	$27.59	$0.00	$0.00	$48.91	$27.75	$2.69	$6.11	$12.00	$9.67	$0.00	$37.50	$11.20	$204.65	$225.11	**$292.65**
28	$22.02	$28.61	$0.00	$0.00	$50.60	$28.70	$2.78	$6.33	$12.44	$10.00	$0.00	$37.50	$11.20	$210.18	$231.20	**$300.56**
30	$23.60	$30.65	$0.00	$0.00	$53.97	$30.62	$2.96	$6.75	$13.33	$10.67	$0.00	$37.50	$11.20	$221.25	$243.37	**$316.39**
32	$25.17	$32.70	$0.00	$0.00	$57.35	$32.53	$3.15	$7.17	$14.22	$11.33	$0.00	$37.50	$11.20	$232.31	$255.55	**$332.21**
34	$26.74	$34.74	$0.00	$0.00	$60.72	$34.44	$3.33	$7.59	$15.11	$12.00	$0.00	$37.50	$11.20	$243.38	$267.72	**$348.03**
36	$28.31	$36.78	$0.00	$0.00	$64.09	$36.36	$3.52	$8.01	$16.00	$12.67	$0.00	$37.50	$11.20	$254.45	$279.89	**$363.86**
38	$29.89	$38.83	$0.00	$0.00	$67.47	$38.27	$3.70	$8.43	$16.89	$13.33	$0.00	$37.50	$11.20	$265.51	$292.06	**$379.68**
40	$31.46	$40.87	$0.00	$0.00	$70.84	$40.19	$3.89	$8.86	$17.78	$14.00	$0.00	$37.50	$11.20	$276.58	$304.24	**$395.51**
42	$33.03	$42.91	$0.00	$0.00	$74.21	$42.10	$4.07	$9.28	$18.67	$14.67	$0.00	$37.50	$11.20	$287.64	$316.41	**$411.33**
44	$34.61	$44.96	$0.00	$0.00	$77.59	$44.01	$4.26	$9.70	$19.56	$15.33	$0.00	$37.50	$11.20	$298.71	$328.58	**$427.15**
46	$36.18	$47.00	$0.00	$0.00	$80.96	$45.93	$4.44	$10.12	$20.44	$16.00	$0.00	$37.50	$11.20	$309.78	$340.75	**$442.98**
48	$37.75	$49.05	$0.00	$0.00	$84.33	$47.84	$4.63	$10.54	$21.33	$16.67	$0.00	$37.50	$11.20	$320.84	$352.93	**$458.80**
50	$39.33	$51.09	$0.00	$0.00	$87.71	$49.75	$4.81	$10.96	$22.22	$17.33	$0.00	$37.50	$11.20	$331.91	$365.10	**$474.63**
52	$40.90	$53.13	$0.00	$0.00	$91.08	$51.67	$5.00	$11.39	$23.11	$18.00	$0.00	$37.50	$11.20	$342.97	$377.27	**$490.45**
54	$42.47	$55.18	$0.00	$0.00	$94.45	$53.58	$5.19	$11.81	$24.00	$18.67	$0.00	$37.50	$11.20	$354.04	$389.44	**$506.28**
56	$44.04	$57.22	$0.00	$0.00	$97.83	$55.49	$5.37	$12.23	$24.89	$19.33	$0.00	$37.50	$11.20	$365.10	$401.62	**$522.10**
58	$45.62	$59.26	$0.00	$0.00	$101.20	$57.41	$5.56	$12.65	$25.78	$20.00	$0.00	$37.50	$11.20	$376.17	$413.79	**$537.92**

Assumed Costs:

Remove/replace Concrete Curbs and Gutters (per linear foot)	$0.00
4" Drain Tile (per linear foot)	$0.00
Bituminous Wear (per ton)	$78.00
Bituminous Base (per ton)	$76.00
Class 5 Aggregate Base (per ton)	$20.00
Excavation (per cubic yard)	$20.00
Reclaimation of Bituminous Surface (per square yard)	$4.00
Geotextile Fabric (per square yard)	$3.00
Select Granular (per cubic yard)	$0.00
Sodding (per square yard)	$7.00
Driveway Removal and Replacement (per each)	$1,500.00
Subgrade Excavation (per cubic yard)	$20.00

Assumed Road Characteristics:

Depth of Type 41 Bituminous Wear (inches)	1.5
Depth of Type 31 Bituminous Base (inches)	2.0
Depth of Class 5 Aggregate Base (inches)	12.0
Depth of Select Granular (inches)	0.0
Total Depth of Excavation (inches)	15.5
Sodding = 0.8 SY per foot or 7 feet wide	
Driveways = 0.025 each units per foot	
Subgrade Excavation = 12" on 10-15%, so 12.5%	12.0

05-Oct-2018

Reconstruction - Residential Street Section - Add Curb and Gutter

Street Width face to face (feet)	Cost per Foot for Reconstruction																
	Bituminous Wear	Bituminous Base	Concrete Curb & Gutter	4" Drain Tile	Class 5 Aggregate Base	Excavation	Subgrade Excavation	Subgrade Borrow (Cl 5)	Reclaim of Bit. Surface	Fabric	Select Granular	Driveway	Sodding	Storm Sewer	Subtotal	Construction	**Cost per ft. Project Costs**
13	$10.22	$13.28	$30.00	$0.00	$28.67	$16.27	$1.57	$3.58	$5.78	$5.67	$0.00	$37.50	$11.20	$43.00	$206.75	$227.42	**$295.65**
14	$11.01	$14.30	$30.00	$0.00	$30.36	$17.22	$1.67	$3.80	$6.22	$6.00	$0.00	$37.50	$11.20	$43.00	$212.28	$233.51	**$303.56**
15	$11.80	$15.33	$30.00	$0.00	$32.05	$18.18	$1.76	$4.01	$6.67	$6.33	$0.00	$37.50	$11.20	$43.00	$217.81	$239.60	**$311.48**
16	$12.58	$16.35	$30.00	$0.00	$33.73	$19.14	$1.85	$4.22	$7.11	$6.67	$0.00	$37.50	$11.20	$43.00	$223.35	$245.68	**$319.39**
17	$13.37	$17.37	$30.00	$0.00	$35.42	$20.09	$1.94	$4.43	$7.56	$7.00	$0.00	$37.50	$11.20	$43.00	$228.88	$251.77	**$327.30**
18	$14.16	$18.39	$30.00	$0.00	$37.11	$21.05	$2.04	$4.64	$8.00	$7.33	$0.00	$37.50	$11.20	$43.00	$234.41	$257.86	**$335.21**
19	$14.94	$19.41	$30.00	$0.00	$38.79	$22.01	$2.13	$4.85	$8.44	$7.67	$0.00	$37.50	$11.20	$43.00	$239.95	$263.94	**$343.12**
20	$15.73	$20.44	$30.00	$0.00	$40.48	$22.96	$2.22	$5.06	$8.89	$8.00	$0.00	$37.50	$11.20	$43.00	$245.48	$270.03	**$351.04**
21	$16.52	$21.46	$30.00	$0.00	$42.17	$23.92	$2.31	$5.27	$9.33	$8.33	$0.00	$37.50	$11.20	$43.00	$251.01	$276.11	**$358.95**
22	$17.30	$22.48	$30.00	$0.00	$43.85	$24.88	$2.41	$5.48	$9.78	$8.67	$0.00	$37.50	$11.20	$43.00	$256.55	$282.20	**$366.86**
23	$18.09	$23.50	$30.00	$0.00	$45.54	$25.83	$2.50	$5.69	$10.22	$9.00	$0.00	$37.50	$11.20	$43.00	$262.08	$288.29	**$374.77**
24	$18.88	$24.52	$30.00	$0.00	$47.23	$26.79	$2.59	$5.90	$10.67	$9.33	$0.00	$37.50	$11.20	$43.00	$267.61	$294.37	**$382.68**
25	$19.66	$25.54	$30.00	$0.00	$48.91	$27.75	$2.69	$6.11	$11.11	$9.67	$0.00	$37.50	$11.20	$43.00	$273.14	$300.46	**$390.60**
26	$20.45	$26.57	$30.00	$0.00	$50.60	$28.70	$2.78	$6.33	$11.56	$10.00	$0.00	$37.50	$11.20	$43.00	$278.68	$306.54	**$398.51**
27	$21.24	$27.59	$30.00	$0.00	$52.29	$29.66	$2.87	$6.54	$12.00	$10.33	$0.00	$37.50	$11.20	$43.00	$284.21	$312.63	**$406.42**
28	$22.02	$28.61	$30.00	$0.00	$53.97	$30.62	$2.96	$6.75	$12.44	$10.67	$0.00	$37.50	$11.20	$43.00	$289.74	$318.72	**$414.33**
30	$23.60	$30.65	$30.00	$0.00	$57.35	$32.53	$3.15	$7.17	$13.33	$11.33	$0.00	$37.50	$11.20	$43.00	$300.81	$330.89	**$430.16**
32	$25.17	$32.70	$30.00	$0.00	$60.72	$34.44	$3.33	$7.59	$14.22	$12.00	$0.00	$37.50	$11.20	$43.00	$311.87	$343.06	**$445.98**
34	$26.74	$34.74	$30.00	$0.00	$64.09	$36.36	$3.52	$8.01	$15.11	$12.67	$0.00	$37.50	$11.20	$43.00	$322.94	$355.23	**$461.81**
36	$28.31	$36.78	$30.00	$0.00	$67.47	$38.27	$3.70	$8.43	$16.00	$13.33	$0.00	$37.50	$11.20	$43.00	$334.01	$367.41	**$477.63**
38	$29.89	$38.83	$30.00	$0.00	$70.84	$40.19	$3.89	$8.86	$16.89	$14.00	$0.00	$37.50	$11.20	$43.00	$345.07	$379.58	**$493.45**
40	$31.46	$40.87	$30.00	$0.00	$74.21	$42.10	$4.07	$9.28	$17.78	$14.67	$0.00	$37.50	$11.20	$43.00	$356.14	$391.75	**$509.28**
42	$33.03	$42.91	$30.00	$0.00	$77.59	$44.01	$4.26	$9.70	$18.67	$15.33	$0.00	$37.50	$11.20	$43.00	$367.20	$403.92	**$525.10**
44	$34.61	$44.96	$30.00	$0.00	$80.96	$45.93	$4.44	$10.12	$19.56	$16.00	$0.00	$37.50	$11.20	$43.00	$378.27	$416.10	**$540.93**
46	$36.18	$47.00	$30.00	$0.00	$84.33	$47.84	$4.63	$10.54	$20.44	$16.67	$0.00	$37.50	$11.20	$43.00	$389.34	$428.27	**$556.75**
48	$37.75	$49.05	$30.00	$0.00	$87.71	$49.75	$4.81	$10.96	$21.33	$17.33	$0.00	$37.50	$11.20	$43.00	$400.40	$440.44	**$572.57**
50	$39.33	$51.09	$30.00	$0.00	$91.08	$51.67	$5.00	$11.39	$22.22	$18.00	$0.00	$37.50	$11.20	$43.00	$411.47	$452.61	**$588.40**
52	$40.90	$53.13	$30.00	$0.00	$94.45	$53.58	$5.19	$11.81	$23.11	$18.67	$0.00	$37.50	$11.20	$43.00	$422.53	$464.79	**$604.22**
54	$42.47	$55.18	$30.00	$0.00	$97.83	$55.49	$5.37	$12.23	$24.00	$19.33	$0.00	$37.50	$11.20	$43.00	$433.60	$476.96	**$620.05**
56	$44.04	$57.22	$30.00	$0.00	$101.20	$57.41	$5.56	$12.65	$24.89	$20.00	$0.00	$37.50	$11.20	$43.00	$444.67	$489.13	**$635.87**
58	$45.62	$59.26	$30.00	$0.00	$104.57	$59.32	$5.74	$13.07	$25.78	$20.67	$0.00	$37.50	$11.20	$43.00	$455.73	$501.30	**$651.70**

Assumed Costs:

Concrete Curbs and Gutters (per linear foot)	$15.00
4" Drain Tile (per linear foot)	$0.00
Bituminous Wear (per ton)	$78.00
Bituminous Base (per ton)	$76.00
Class 5 Aggregate Base (per ton)	$20.00
Excavation (per cubic yard)	$20.00
Reclaimation of Bituminous Surface (per square yard)	$4.00
Geotextile Fabric (per square yard)	$3.00
Select Granular (per cubic yard)	$0.00
Sodding (per square yard)	$7.00
Driveway Removal and Replacement (per each)	$1,500.00
Subgrade Excavation (per cubic yard)	$20.00
Storm Sewer (From Storm Sewer Tab)	$43.00

Assumed Road Characteristics:

Depth of Type 41 Bituminous Wear (inches)	1.5
Depth of Type 31 Bituminous Base (inches)	2.0
Depth of Class 5 Aggregate Base (inches)	12.0
Depth of Select Granular (inches)	0.0
Total Depth of Excavation (inches)	15.5
Sodding = 0.8 SY per foot or 7 feet wide	
Driveways = 0.025 each units per foot	
Subgrade Excavation = 12" on 10-15%, so 12.5%	12.0

Storm Sewer Costs:

Item	Unit	Unit Price	+10%	**+30%**	Comments
12" RCP	LF	$40.00	$44.00	**$45.30**	Unit Price includes improved pipe foundation and removal of existing pipe
15" RCP	LF	$45.00	$49.50	**$58.50**	Unit Price includes improved pipe foundation and removal of existing pipe
18" RCP	LF	$50.00	$55.00	**$65.00**	Unit Price includes improved pipe foundation and removal of existing pipe
21" RCP	LF	$55.00	$60.50	**$71.50**	Unit Price includes improved pipe foundation and removal of existing pipe
24" RCP	LF	$60.00	$66.00	**$78.00**	Unit Price includes improved pipe foundation and removal of existing pipe
27" RCP	LF	$65.00	$71.50	**$84.50**	Unit Price includes improved pipe foundation and removal of existing pipe
30" RCP	LF	$70.00	$77.00	**$91.00**	Unit Price includes improved pipe foundation and removal of existing pipe
36" RCP	LF	$75.00	$82.50	**$97.50**	Unit Price includes improved pipe foundation and removal of existing pipe
42" RCP	LF	$80.00	$88.00	**$104.00**	Unit Price includes improved pipe foundation and removal of existing pipe
48" RCP	LF	$85.00	$93.50	**$110.50**	Unit Price includes improved pipe foundation and removal of existing pipe
Catchbasin	EA	$2,500.00	$2,750.00	**$3,250.00**	Unit price includes new structure and removal of existing structure
Manhole	EA	$3,000.00	$3,300.00	**$3,900.00**	Unit price includes new structure and removal of existing structure
Connect to ex.	EA	$500.00	$550.00	**$650.00**	
Flared End Section & Riprap	EA	$1,500.00	$1,650.00	**$1,950.00**	
Sod	sy	$7.00	$7.70	**$9.10**	

Assume Brooks Lane is a typical layout for entire city. Add new structures at ex. low point and then add some pipe and structures to get to another low point. So: Length (ft) = 1281

Item	Unit	Qty	Project Unit Price	Total Project	
12" RCP	LF	42	$45.30	$1,902.60	
15" RCP	LF	550	$58.50	$32,175.00	
18" RCP	LF	21	$65.00	$1,365.00	
2 x 3 CB	EA	1	$3,250.00	$3,250.00	
4' Dia CBMH	EA	5	$3,900.00	$19,500.00	
Connect to ex.	EA	2	$650.00	$1,300.00	
Subtotal				$59,492.60	
Divide by footage =		1281		$46.44	Cost per foot
Assume rear yard piping/flared end					
15" RCP	LF	200	$58.50	$11,700.00	
Flared End	EA	1	$1,950.00	$1,950.00	
Sodd	SY	556	$9.10	$5,059.60	
Subtotal				$18,709.60	
Divide by footage =		1281		$14.61	Cost per foot
Subtotal				$61.05	
Storm Sewer Cost per Foot				**$61.00**	Project Cost
Storm Sewer Cost per Foot				**$43.00**	Construction (if put into tables)