



Agenda
Lake City Common Council
Workshop April 8, 2024
5:00 PM
City Hall Council Chambers

-
1. Call to Order/Introductions
 2. Review and adopt/amend agenda
 3. Informational Reports
 - a. Pavement Management Plan Presentation
 4. Adjourn



April 8, 2024

Agenda Item Description: Pavement Management Plan Presentation

Originating Department: Public Works

Board/Commission/Committee Action: **Consent Agenda?:** No

Action Requested:

Presentation of the draft Pavement Management Plan by City Engineer Matt Mohs, Bolton & Menk, Inc.

Introduction/ Background/Justification/Key/Legal Issues:

City and Bolton & Menk staff have been developing the Pavement Management Plan over the last several months. The plan provides a guide to pavement maintenance, pavement rehabilitation and full reconstruction projects. Pavement conditions were rated using a process called Roadbotics. This provides an objective and data driven assessment of roadways using a scale of 1 to 5, with 1 being excellent and 5 being poor.

While the plan delivers specific direction, it is intended to be flexible based on changing street conditions from year to year.

Budgetary/Fiscal Impact:

The plan identifies a recommended annual budget for preventative maintenance, direction on what streets should be in a street rehabilitation program and those streets that require full reconstruction.

Reviewed By: Administration, Finance

Preparer: Public Works Director Scott Jensen

ATTACHMENTS:

Description

- ▣ Pavement Management Plan



Pavement Management Plan

City of Lake City, MN
March 2024

Project No. 0H1.127585

Submitted by:
Bolton & Menk, Inc.
2900 43rd Street NW, Suite 100
Rochester, MN 55901
P: (507) 208-4332



Certification

Pavement Management Plan


City of Lake City, Minnesota

Project No. OH1.127585

March 2024

PROFESSIONAL ENGINEER

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

Signature: 

Typed or Printed Name: Matthew E. Mohs

Date: March 28, 2024 License Number: 42853

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I. INTRODUCTION

A. Purpose

The purpose of this report is to summarize the overall condition of the roadway pavements within the City of Lake City and provide high-level recommendations based on the findings of the report. Once the existing pavement conditions are understood, the need for maintenance and replacement costs can be better understood. This report will provide the information needed for budgeting and planning future projects, which can then be used to update the city's Capital Improvement Plan.

B. Method & Scope

Traditionally, cities approach pavement management from a reactive standpoint; as issues arise, a city will respond to the most immediate needs first. This type of pavement management may seem efficient since only the most critical infrastructure is being replaced; however, proactive management of these systems has proven to be a more efficient and effective method.

This report will discuss the existing conditions, maintenance, and replacement procedures for public streets, and present a pavement management strategy that is more proactive than traditional methods. Proper timing for maintenance and replacement will ensure that the useful life of a pavement within a given corridor is maximized. This approach will also improve the overall quality of a pavement over its useful life and reduce the potential for unplanned and unforeseen replacements.

C. Collaboration

This report and the resulting recommendations were developed in collaboration with and using input from the City of Lake City Public Works staff.

II. PAVEMENT MANAGEMENT

A. Overview & Approach

The timing of maintenance and rehabilitation activities can greatly influence their effectiveness, a city's maintenance costs, and the overall useful life of a pavement. In general, once a pavement needs attention, the sooner a maintenance or rehabilitation activity is undertaken, the more cost-effective it will be. Lake City maintains over 40 miles of municipal state aid and local bituminous paved streets. This represents a significant portion of the city's capital worth and should be managed efficiently.

Pavement conditional data for this report was collected by driving local streets with a specialized camera and then sent to RoadBotics for processing. RoadBotics is a platform that provides an objective and data-driven roadway assessment using trained algorithms (AI) to locate and identify pavement distresses. Road sections are aggregated to provide ratings using a scale of 1-5 based on overall condition. More information about this process and the rating system is included in **Appendix A – Pavement Management Terminology**.

Total reconstruction of a street is a very costly procedure. Research shows that periodic maintenance of streets in good condition can extend their service life at a reduced cost. Maintenance of streets after reconstruction is more cost effective than undergoing multiple reconstructions without maintenance.

B. Street Life Cycle

The condition of a street pavement is affected by a number of factors, including (but not limited to):

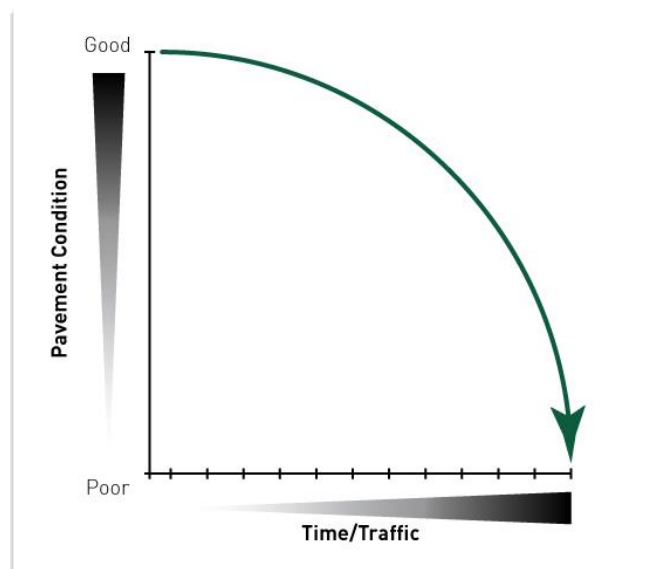
- Pavement section (bituminous surface and aggregate base thickness)
- Traffic characteristics and loading
- Subgrade soil (sand, clay, silt) and moisture conditions
- Drainage (street profile, cross section, storm sewer)
- Age of pavement

Each of the above-listed items contributes to the overall condition and useful life span of a public street. It is not uncommon for streets in the same area that were constructed at the same time to vary in condition.

In many cases, the management approach utilized by cities includes rehabilitation and reconstruction to address the poorest condition road segments first, with less attention given to preventative maintenance. **The approach advocated by pavement experts recommends that more attention be placed on preventative maintenance and preserving pavement condition to extend the useful life of a road segment.**

In general, bituminous pavements deteriorate slowly during the first 15 to 20 years of their life cycle, after which they tend to deteriorate much more rapidly. **Figure 1** below illustrates how a typical pavement will deteriorate with little to no maintenance or rehabilitation.

Figure 1: Typical Pavement Life Cycle with No Preventative Maintenance



The first and most cost-effective approach to extending the life of a pavement is through preventative maintenance, which in Lake City includes, RePlay, flex patching (mastic), and crack filling. This type of maintenance is intended to slow the oxidation and associated weakening of bituminous surfaces and limit the permeation of surface water into underlying soils. Collectively, RePlay, flex patching and crack filling will increase the life span of pavements at a moderate level, if completed on a regular 4-to-6-year cycle. **Figure 2** illustrates the typical life cycle of a pavement with a regular preventative maintenance program.

Figure 2: Typical Pavement Life Cycle with RePlay, Flex Patch & Crack Fill



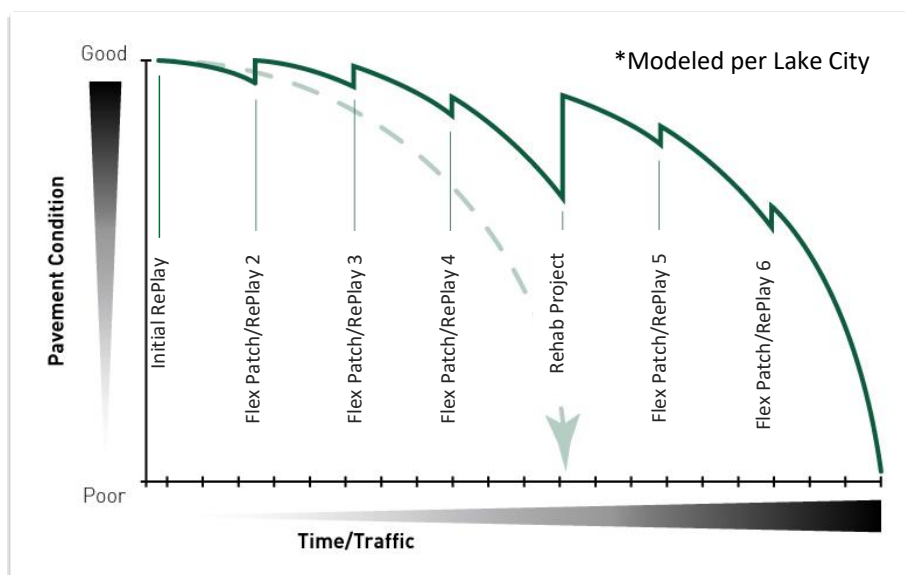
Eventually, pavements will deteriorate to a degree where the cost of preventative maintenance outweighs the benefit. When it gets to this point, the next level of pavement management typically includes *rehabilitation projects* such as bituminous mill & overlays or reclaiming and repaving, with patching as needed.

A **mill & overlay** involves the grinding and removal of the top portion of pavement and replacement with a new surface layer, maintaining or increasing the section thickness.

Reclaiming and repaving involves grinding the existing bituminous pavement and blending with the underlying aggregate base to create a recycled (reconditioned) aggregate base. This process, coupled with paving a new bituminous surface, can be used in certain situations where a mill & overlay would not be sufficient, based on the condition of the existing pavement section and need.

With the proper combination of preventative maintenance and periodic rehabilitation projects, a pavement lifespan can be extended up to 50 years or more. **Figure 3** shows how the pavement life cycle can be maximized using the proper combination of maintenance and rehabilitation.

Figure 3: Typical Pavement Life Cycle with Preventative Maintenance and Rehabilitation Projects



In any scenario, roadway pavement will eventually deteriorate to a point where low-cost maintenance or rehabilitation activities are no longer effective and a complete replacement of the street section (reconstruction) is required. The amount of effort a city puts into maintaining the pavement before it reaches this point will ultimately influence how often these costly reconstructions need to occur.

Table 1 provides an example analysis comparing the costs of pavement management with and without an active maintenance program over a 50-year period.

Item	Year	Approx. Cost Per Foot of Street	
		<u>With</u> Maintenance	<u>Without</u> Maintenance
Initial Construction (w/ RePlay)	0	\$1,250.00	\$1,250.00
RePlay	5	\$10.00	-
RePlay	10	\$10.00	-
RePlay	15	\$10.00	-
Mill & Overlay (w/ RePlay)	20	\$150.00	-
RePlay	25	\$10.00	-
Full Reconstruction (w/ RePlay)		-	\$1,250.00
RePlay	30	\$10.00	-
RePlay	35	\$10.00	-
Mill & Overlay (w/ RePlay)	40	\$150.00	-
RePlay	45	\$10.00	-
Salvage Value Adjustment*	50	(\$160.00)	\$0.00
Life Cycle Cost Per Foot**:		\$1,780.00	\$2,500.00
Difference:		-\$720.00	

Good Pavement Condition
 Fair Pavement Condition
 Poor Pavement Condition

*Salvage value represents the value of the remaining life of the pavement at the end of the life cycle analysis.

**Costs indicated above are based on typical costs for the area in 2023 dollars. Unit pricing per foot is based on an average 36-ft wide residential bituminous street.

In this example, the overall life cycle costs for managing pavements with an active maintenance program results in net savings compared to management without maintenance. It is important to note, however, that these costs are subjective and can vary significantly based on many factors. The point at which a pavement has “failed” is also subjective and will vary depending on the expectations of street users and city officials. The actual service life of any pavement is highly dependent on several factors and will vary from the scenario presented in **Table 1**.

However, when holding all variables equal, driving surface conditions are drastically improved when pavements are regularly addressed with preventative maintenance. It is also important to note that the additional reconstruction project needed for a street without regular maintenance will result in a major disruption to adjacent landowners for at least one construction season. In comparison, the street with regular maintenance will not require major disruption until after 50 years or more of service life.

C. Pavement Survey Findings

As mentioned previously, the bituminous streets in Lake City were driven with a specialized camera to gather visual data. RoadBotics then analyzed the pavement in 10-foot increments using trained algorithms (AI) to locate and identify pavement distresses. The pavement was rated using a numerical condition rating system ranging from 1.0 for a newly surfaced street to 5.0 for a failed surface. Gravel surfaces were not included in this evaluation. The pavement condition ratings are illustrated in **Appendix B-5**.

Table 2 shows the typical recommended maintenance and rehabilitation activities based on the pavement condition ratings.

Table 2 – Pavement Conditional Ratings Description		
Conditional Rating	Condition Description	Typical Recommended Maintenance Activity
1.0 – 2.4	Excellent to Good	RePlay, Flex Patch, or Crack Fill (every 4-6 years)
2.5 – 3.4	Good to Fair	Mill & Overlay, Patching as Needed Reclaim & Re-pave, Patching as Needed
3.5 – 5.0	Fair to Very Poor	Full Depth Reconstruction

Table 3 provides a summary of the overall pavement condition throughout Lake City, MN.

Table 3 – Pavement Conditional Ratings Summary		
Conditional Rating	Total Street Length (Miles)	Percentage of Total Miles
0.5 – 2.4	18.97	47%
2.5 – 3.4	19.84	49%
3.5 – 5.0	1.80	4%
Total	40.61	100%

Currently 47% of the streets in Lake City are rated as excellent to good condition (1.0 - 2.4). As discussed, the condition of these streets into the future is highly dependent on the City's ability to provide timely maintenance.

A similar percentage (49%) of streets are rated as fair to good condition (2.5 - 3.4). These streets are beginning to deteriorate more rapidly; preventative maintenance for these streets will likely be costly and will not adequately address the needs of the street section. When considering pavement management options *based on pavement condition alone*, streets falling within this rating are typically planned for a rehabilitation project such as bituminous overlays or reclaiming and re-paving.

A very small portion of Lake City streets (4%) currently have a fair to very poor rating. Due to the advanced deterioration of these pavements, neither maintenance nor overlays would be appropriate methods of rehabilitation. These streets generally need correction through full depth replacement of the pavement surface and aggregate base.

Based on the percentages in Table 3, the vast majority (~96%) of Lake City streets fall within excellent to fair condition. This is a testament to the effort and commitment the Lake City Public Works staff puts into monitoring and maintaining the city's public streets.

When prioritizing pavement management projects, it is important to first consider the streets in good condition and continue with regularly scheduled maintenance programs. Once a preventative maintenance program is properly funded, a regular overlay and patching program can be funded. *For most cities following this approach, these programs exhaust the street maintenance budget.* As a result, the more costly full street reconstructions for heavily deteriorated pavements are given a minimal amount of attention until a project can be financed or funded with alternative sources.

Prior to executing an effective pavement management plan, understanding the needs of underground public utilities is crucial. In many cases, the needs of utilities will drastically change future pavement maintenance activities. This report does not consider utilities; however, utility condition is inherently built into the considerations for full reconstruction segments.

III. EXECUTION

Pavement management programs can be broken down into a few separate categories, as summarized in **Table 4**.

Program	Improvement Type	Goal
Preventative Maintenance	RePlay	Rejuvenate asphalt binder; preserve condition of existing surface <i>*To be applied in year zero of a new asphalt</i>
	Flex Patch	Fill wide defects; restore ride quality <i>*City is split into 5 maintenance regions</i>
	Crack Fill	Prevent intrusion of water and debris
Street Rehabilitation	Mill & Overlay (w/ Patching)	Rehabilitate the existing surface
	Reclaim & Re-pave (w/ Patching)	Reclaim existing surface and blend with aggregate base; re-pave surface
Street Reconstruction	Full Reconstruction	Replace existing roadway and necessary pedestrian facilities; Replace poor quality and/or undersized utilities (cast-iron water main pipe, clay sewer pipe, etc.)

As presented above, pavement management within Lake City can be divided into three general programs: Preventative Maintenance (RePlay, Flex Patch & Crack Fill), Street Rehabilitation (Bituminous Mill & Overlay, Reclaim and Re-Pave), and Full Street Reconstruction. Additional details for each program are included below.

A. Preventative Maintenance Program (RePlay, Flex Patch & Crack Fill)

“RePlay” is a preservation agent intended to be applied to newer bituminous surfaces (street rating ± 1.0) to reverse the effects of oxidation and seal the pavement surface, as well as rejuvenate the asphalt binder (see **Appendix A** for more info). Streets that have recently undergone rehabilitation or reconstruction projects are to be considered for RePlay as a part of the Preventive Maintenance Program. These streets should be applied with RePlay after the initial construction and on a regular ± 5 -year cycle. These streets are illustrated in the *Street Maintenance Map* located in **Appendix B-2**. Planning level cost estimates for these streets are included in **Appendix C-2**. These cost estimates include planned applications in 2026 and 2028. Note that all rehabilitation and reconstruction project cost estimates include the initial application of RePlay. **It is recommended that budget planning for RePlay applications be reviewed annually.**

Regular flex patching & crack filling should be completed for all streets in good or better condition (1.0 - 2.4) that do not qualify for an application of RePlay on a regular 4-6-year cycle. All streets to be considered for preventative maintenance are illustrated in the *Overall Map* in **Appendix B-1**, and specific street maintenance activities are indicated in the *Street Maintenance Map* in **Appendix B-2**. The flex patch program is proposed to be implemented across five maintenance regions as denoted in the *Street Maintenance Overview Map* in **Appendix B-3**. Planning level cost estimates for these streets are included in **Appendix C-2**.

It is recommended that the city budget \$330,000 annually for flex patching and crack filling. This amount is averaged over a five-year span across the five maintenance regions. This budget is based on an anticipated 40% contracted maintenance and 60% public works staff. This budget considers current street conditions and an average useful life of 4-6 years between maintenance needs. Over time, this budget will change as more streets are overlaid or reconstructed.

It is important to note that many of the streets that fall under the Preventative Maintenance Program may require replacement of utilities in the future. Ideally, the city would be able to address those utility needs as soon as possible. However, due to lack of comprehensive utility infrastructure data, **for the purposes of this report it is assumed that utility replacement for streets in good condition can be delayed until a future date when the pavement for that street has deteriorated to a level that warrants reconstruction.** In the interim, it is recommended that the city continue to maintain these streets as they would any other street in good condition, including the use of spot utility repairs as needed.

B. Street Rehabilitation Program (Mill & Overlay, Reclaim & Re-pave)

Generally, streets with pavement in the good to fair rating (2.5 - 3.4) are recommended to be included in the Street Rehabilitation Program. These streets are illustrated in the *Street Rehabilitation Map* in **Appendix B-4**. Planning level cost estimates for these projects are included in **Appendix C-3**. Currently, there is approximately \$1.2 million in recommended mill & overlay projects and approximately \$700,000 in recommended reclaim & re-pave projects. Note that the initial application of RePlay for these streets following project completion is included in these costs. The city may implement these improvements in phases; however, failure to address these streets within the next 5 to 10 years will likely result in further deterioration of the pavement, leading to the need for more robust repairs such as full reconstruction.

Although completing street rehabilitation projects over older utilities is not recommended, there may be cases in the future of a street deteriorating rapidly while funds are insufficient to include utility replacement as a part of the project. In these cases, the city will be taking a risk that the older utility may fail shortly after the street improvements are completed. This is sometimes unavoidable; however, this type of planning should be avoided.

C. Street Reconstruction Program

Street reconstruction projects are expensive and invasive. When planning for these projects, it is important that adequate funds are available. Proper timing will also ensure a high degree of value with each project. Streets designated as full reconstructions are shown in the *Overall Map* in **Appendix B-1** and the *Street Rehabilitation Map* in **Appendix B-4**. It is important to note that utility condition has been taken into consideration for these evaluations; however, utility condition ratings are outside the scope of this plan and not included as a part of this report. The condition of the existing utilities is generally known by Lake City Public Works staff, and documentation of utility condition is currently underway. Including utility condition in the reconstruction program is based on historical knowledge and should not be omitted. **It is recommended that a full utility evaluation be completed, as utility conditions will play a major role in determining priority order.**

Complete excavation and replacement of a pavement surface provides an opportunity for more cost-effective underground utility replacement. Streets requiring reconstruction based on poor conditions of both street and utility conditions will provide the most value to the city. A complete list of all streets currently recommended for reconstruction and their

estimated project costs is provided in **Appendix C-1**.

Based on the reconstruction cost estimates provided, approximately \$16.8 million of reconstruction projects have pavement and utility needs to address in the future. Although addressing the total reconstruction needs of the city is financially infeasible within a standard capital improvement planning period of 5 to 10 years, it is important to note that the city will benefit from regular and steady progress. Over time, properly planned improvements will result in less costly maintenance and an overall increase in the quality of the street and utility systems.

IV. CONCLUSION & RECOMMENDATIONS

This report is intended to be used for high-level pavement management. The recommendations below summarize the key takeaways:

- 1) **Strategic infrastructure planning requires an understanding of pavement and utility performance.** To couple with this plan, the city is currently working on a city-wide analysis of existing sanitary and water main infrastructure. It is imperative that this data be combined with the pavement management plan to create a comprehensive infrastructure management plan, which will better help the city plan and budget for the future.

Further, in the summer of 2024, the city is planning to institute a comprehensive, web-based GIS mapping application that will include highly accurate locations and detailed attribute data for the city's existing utility infrastructure. Additional information that is developed or collected during the modeling and analysis processes could be integrated into the GIS data and made available via the mapping application. Once added to the GIS platform, much of this data can be maintained and updated over time along with future projects to facilitate efficient updates to the infrastructure management plan.

- Water system data that is important for analyzing performance includes, but is not limited to:
 - Watermain material type and year of installation
 - Watermain break history
 - Information on historical performance by the Fire Department
 - Creation of a water system model to evaluate system pressures, fire flows (undersized segments), water age, need for specific loops, and for long-term growth planning. Additionally, a water model can be used to create a uni-directional flushing program from the model data.
- Sanitary sewer system data that is important for analyzing performance includes, but is not limited to:
 - Televising mains and assigning condition ratings to each segment (1-5)
 - Evaluating manhole conditions for infiltration and inflow
 - Sewer back-up history
 - Recurring sewer maintenance history
 - Creation of a sanitary system model to evaluate the system for undersized segments, bottlenecks, and long-term growth planning.

- 2) Implement a continuous **Preventative Maintenance Program** (RePlay, flex patch & crack fill) for streets with pavement in good or better condition (1.0 - 2.4).
 - Recommended budget: \$330,000/year for flex patching & crack filling.
 - Evaluate RePlay needs annually.
 - Budgeting can be placed on a 4–6-year average rotation.
- 3) Implement a **Street Rehabilitation Program** for streets beginning to show signs of aging (2.5 - 3.4 rating).
 - Determine funding source (cash or financing).
 - Determine which streets should be Reclaimed & Re-paved as opposed to milled and overlayed.
 - Complete recommended projects within the next 5-10 years.
- 4) Continue regularly scheduled street **reconstruction projects**, as financially feasible.
 - When evaluating projects, consider the needs of both pavement & utilities.
 - Update the Capital Improvement Plan and Financing Plan with the city's finance department and Public Works staff.
 - Once the Capital Improvement Plan is developed, prioritize streets with both pavement and utility needs for individual project selection.
- 5) We recommend that the information in this report be updated **every five years**, or with every regularly scheduled reconstruction projects.
 - Include collaboration with Lake City Public Works staff.

Following discussion with the City Council, the next step in the process will include finance planning with the city's finance department. The finance plan can then be used for updating the city's capital improvement plan and selecting specific projects over the next 5 to 10 years.

Appendix A: Pavement Management Terminology

Pavement Management Terminology

RoadBotics – RoadBotics is a platform that uses machine vision and machine learning to identify road issues at a large scale. It provides an objective and data-driven assessment of roadways using impartial technology. Visual pavement data is analyzed in 10-foot increments using trained algorithms (AI) to locate and identify pavement distresses. Road sections are aggregated to provide ratings using a scale of 1.0 – 5.0 based on overall condition.

Preventative Maintenance:

- **RePlay®** is an 88% bio-based sealant and rejuvenator developed by BioSpan Technologies, Inc. RePlay is intended to be applied to a bituminous pavement in good condition to reverse effects of oxidation and seal the pavement surface to prevent water and air intrusion. It also provides essential polymers to rejuvenate the asphalt binder and improve pavement resistance to raveling, rutting, and cracking. It has been tested to be an effective way to lengthen pavement life. *Pavement management recommendations involving RePlay are based on the application of this specific product.*

RePlay is only intended to be applied to new pavements and reapplied to the same pavements with previous applications. RePlay is not intended to be applied to any pavement that is not new or does not have a previous application. RePlay was first used in Lake City as a method of preventative maintenance in 2017.

- **Crack Filling** is a repair that uses an elastic material designed to seal joints and cracks in order to reduce the amount of moisture and debris infiltrating into the sub-grade. This protection provides for a more stable roadway base and can reduce pavement breakup and risk of potholes due to the effects of freeze/thaw cycles. Crack filling is effective for a few years and then must be repeated. It is, however, an effective way to lengthen pavement life. This treatment should be applied in the fall or spring when cracks are at their mid-point.

Two methods of crack filling are typically used: the rout-and-seal method and the clean-and-seal method. The rout-and-seal method involves a cutting/sawing out a reservoir over the existing cracks and pouring the sealant into the reservoir. This method is more time consuming and approximately doubles the cost compared to the standard clean-and-seal method.

- **Crack Sealing** is a maintenance for cracks in their infancy, when they are smaller and more manageable. Crack sealing involves cleaning out the crack and injecting sealant into or above the crack to prevent them from getting larger and becoming more of a problem.
- **Flex Patching** is a process that uses GAP Mastic, a hot-applied polymer modified asphalt mixture, designed for situations where crack sealants are ineffective, and paving is impractical. GAP Mastic is mixed with engineered aggregates and modifiers and used to fill wide cracks and defects to prevent water infiltration and restore ride quality. It is designed as a permanent repair solution for wide thermal cracks, fatigue cracking, rutting and depressed broken-up areas. GAP Mastic combines the flexibility and adhesion of rubberized asphalt sealants with the strength and load bearing qualities of engineered aggregates. The result provides a stable, flexible repair that bonds firmly with existing pavement to seal out water and prevent further damage.

Street Rehabilitation:

- General **pavement patching** provides for the correction of localized pavement and subgrade deterioration and is generally done to “buy time” until a full rehabilitation or reconstruction procedure can be done. Patching is generally cost effective on small sections of roadway that

have experienced pavement failure due to a soft base material or other contributing conditions. A roadway's need for patching generally increases each year, meaning that at a certain point, the annual cost of street patching will exceed the cost of major maintenance procedures. Patching also provides for a smoother driving surface and extends the life of the pavement.

- A **mill and overlay** includes the milling (grinding and removal) of the upper 1.5 to 3 inches of pavement and placement of a new layer of bituminous pavement to maintain or increase the pre-existing pavement section thicknesses. In urban sections (streets with curb and gutter), edge milling is done adjacent to the curb and gutter to maintain the existing surface elevations, following which a bituminous pavement overlay is placed. In some situations, the city may want to consider a mill and inlay approach, which would result in the removal of a thin layer of pavement in the driving lanes and replacement of the bituminous layer.

Mill and overlay treatment can extend the life of the roadway by adding additional bituminous material to the surface, re-establishing the cross slope of the road to promote drainage, and creating a smooth driving surface. A mill and overlay does not address existing cracking in the underlying pavement. Generally, these cracks will propagate through the new overlay pavement (via reflective cracking) in as little as 6 months, but more typically within 1 to 3 years, at which point crack sealing would be necessary. The life expectancy of a mill and overlay can range from approximately 10 to 20 years before the pavement has reached its original deficient condition, depending on factors such as existing pavement composition, traffic, etc.

- **Reclaiming and re-paving** a roadway surface involves the “reclamation,” or salvage, of the bituminous surface by grinding and blending it with a portion of the underlying aggregate base. A new bituminous surface is then paved over the recycled (reconditioned) aggregate base. This rehabilitation method is generally used in situations where a standard Mill & Overlay project would not be sufficient based on existing pavement section and other needs.

Similar to mill and overlay treatment, reclaim and re-paving projects can extend the life of the roadway by adding bituminous material to the surface, re-establishing the cross slope of the road to promote drainage, and creating a smooth driving surface. The life expectancy of a reclaim and re-pave project can range from 10 to 20 years before the pavement has reached its original deficient condition, depending on factors such as existing pavement composition, traffic, etc.

- Note that if a street rehabilitation project is programmed, it is recommended that preventative maintenance projects cease within 5-years prior to the project to avoid unnecessary costs.

Street Reconstruction:

A full **street reconstruction** includes the complete removal of existing layers of bituminous pavement and aggregate base and replacement with new base and pavement. In many cases, a portion of the existing subgrade soils are removed and replaced with a structural sand or rock layer (a.k.a. subgrade correction). Portions (or all) of the curb and gutter may be replaced in urban sections.

This option requires the largest investment and is typically applied in areas where pavements are showing significant areas of major distress or the underlying municipal utility conditions warrant replacement. However, this improvement provides for a period of 20-30 years before any major rehabilitation is required.

In a street reconstruction project, all pedestrian facilities / ADA components of the reconstruction corridor are reviewed and addressed for necessary improvements in final design. Any ADA improvements are per federal and state standards.

Pavement Distresses and Pavement Cracks

Pavement Distresses – common pavement distresses include surface defects such as *raveling*, *flushing*, and *polishing*, and surface deformations such as *rutting*, *settling*, and *frost heave*. These distresses are defined below:

Raveling is progressive loss of pavement material caused by stripping of the bituminous film from the aggregate, asphalt hardening due to aging, poor compaction, or insufficient asphalt content. Raveling in the wheel paths can be accelerated by traffic.

Flushing is excess asphalt on the surface caused by a poor initial asphalt mix design or by paving or sealcoating over a flushed surface.

Polishing is a smooth slippery surface caused by traffic wearing off sharp edges of aggregates.

Rutting is displacement of material, creating channels in wheel paths. It is caused by traffic compaction or displacement of unstable material. Rutting of any severity can cause safety concerns because water can collect in ruts, increasing vehicle stopping distances and increasing the chances of hydroplaning. In freezing temperatures ice can form in the ruts. Severe rutting (2 inches or more in depth) may be caused by base or subgrade consolidation.

Pavement Cracks – common crack types observed in pavements include *transverse*, *reflection*, *slippage*, *longitudinal*, *block*, and *alligator* cracks. Cracks usually start as hairline or vary narrow and widen and erode with age. Without crack filling, they can ravel, develop further, and become wide enough to require patching. Filling and sealing cracks will reduce moisture penetration and prevent further subgrade weakening. Common crack types are defined below:

Transverse cracks appear at approximately right angles to the center line. They are often regularly spaced. The cause is movement due to temperature changes and hardening of the asphalt with aging. Transverse cracks will initially be widely spaced (over 50'). Additional cracking will occur with aging until they are closely spaced (within several feet).

Reflection cracks reflect the crack pattern in the pavement underneath and are difficult to prevent and correct.

Slippage cracks are crescent or rounded cracks in the direction of traffic, caused by slippage between an overlay and an underlying pavement. Slippage is most likely to occur at intersections where traffic is stopping and starting.

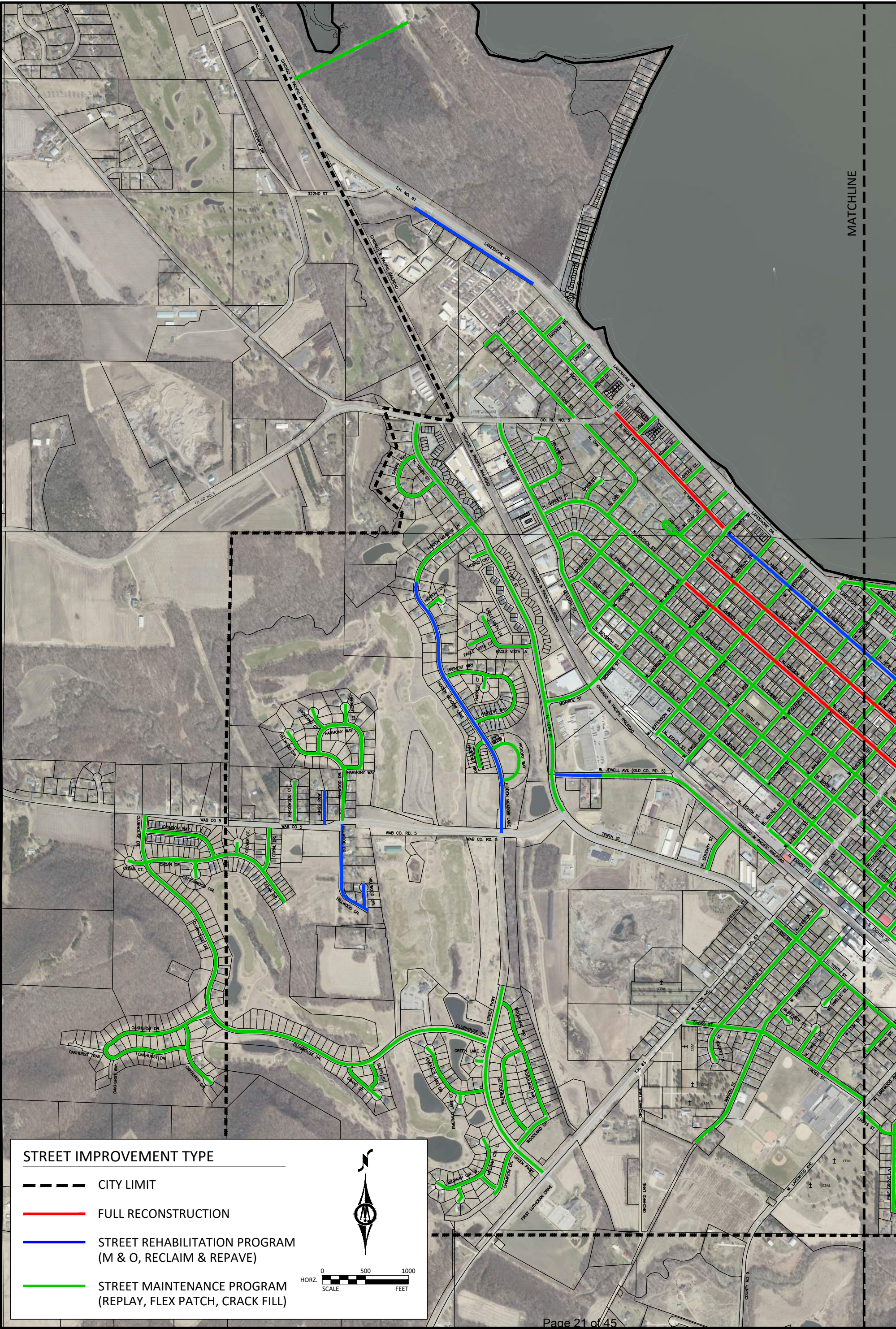
Longitudinal cracks are cracks running in the direction of traffic. Centerline or lane cracks are caused by inadequate bonding during construction or reflect cracks in underlying pavement. Longitudinal cracks in the wheel path indicate fatigue failure from heavy vehicle loads. Cracks within one foot of the edge are caused by insufficient shoulder support, poor drainage, or frost action.

Block cracks are interconnected cracks forming large blocks. Cracks usually intersect at nearly right angles. Blocks may range from one foot to approximately 10' or more across. The closer spacing indicates more advanced aging caused by shrinking and hardening of the asphalt over time.

Alligator cracks are interconnected cracks forming small pieces ranging in size from about 1" to 6". This is caused by failure of the surfacing due to traffic loading (fatigue) and very often also due to inadequate base or subgrade support.

Potholes are holes and loss of pavement material caused by traffic loading, fatigue, and inadequate strength, often combined with poor drainage.

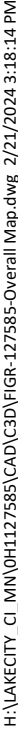
Appendix B: Figures

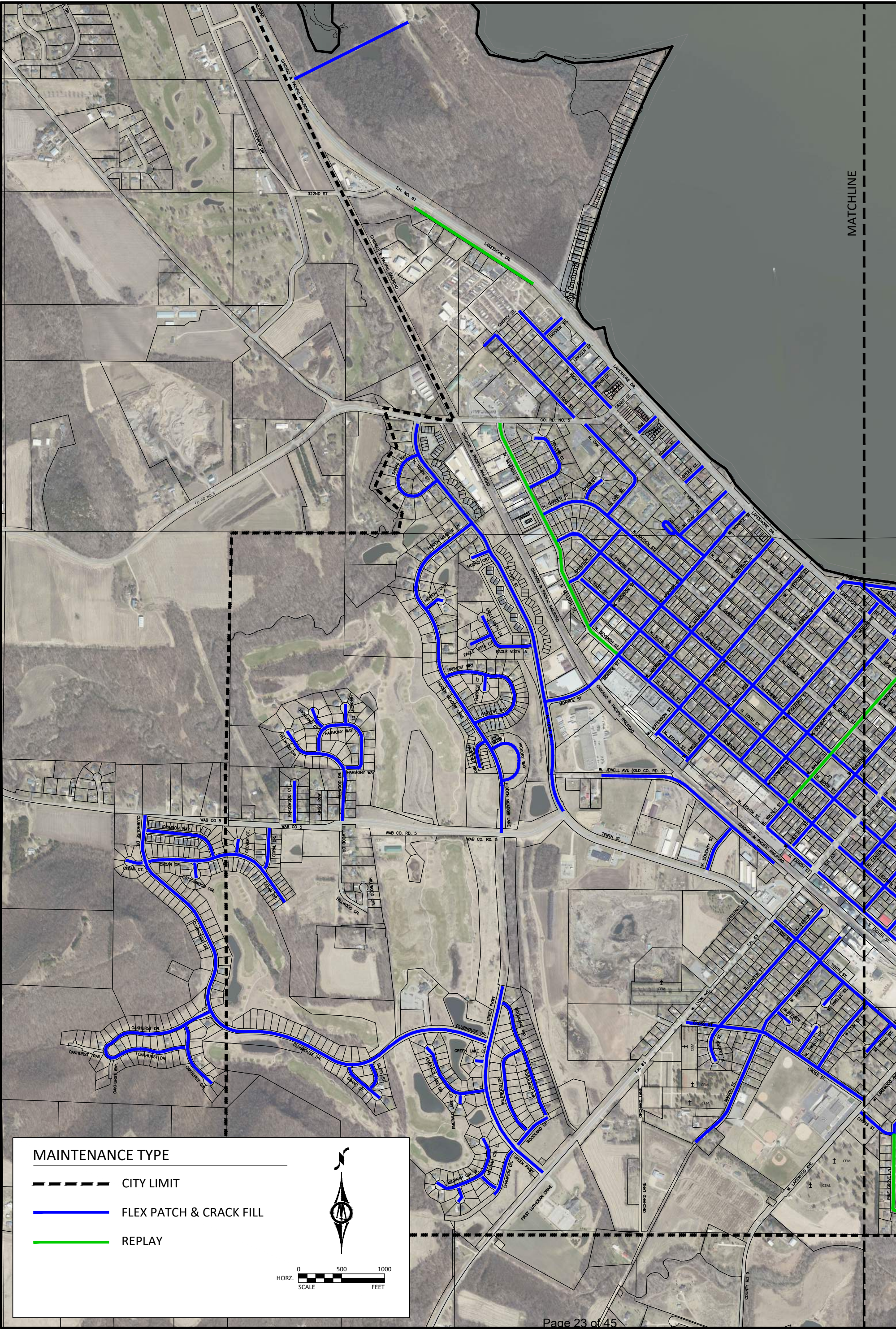


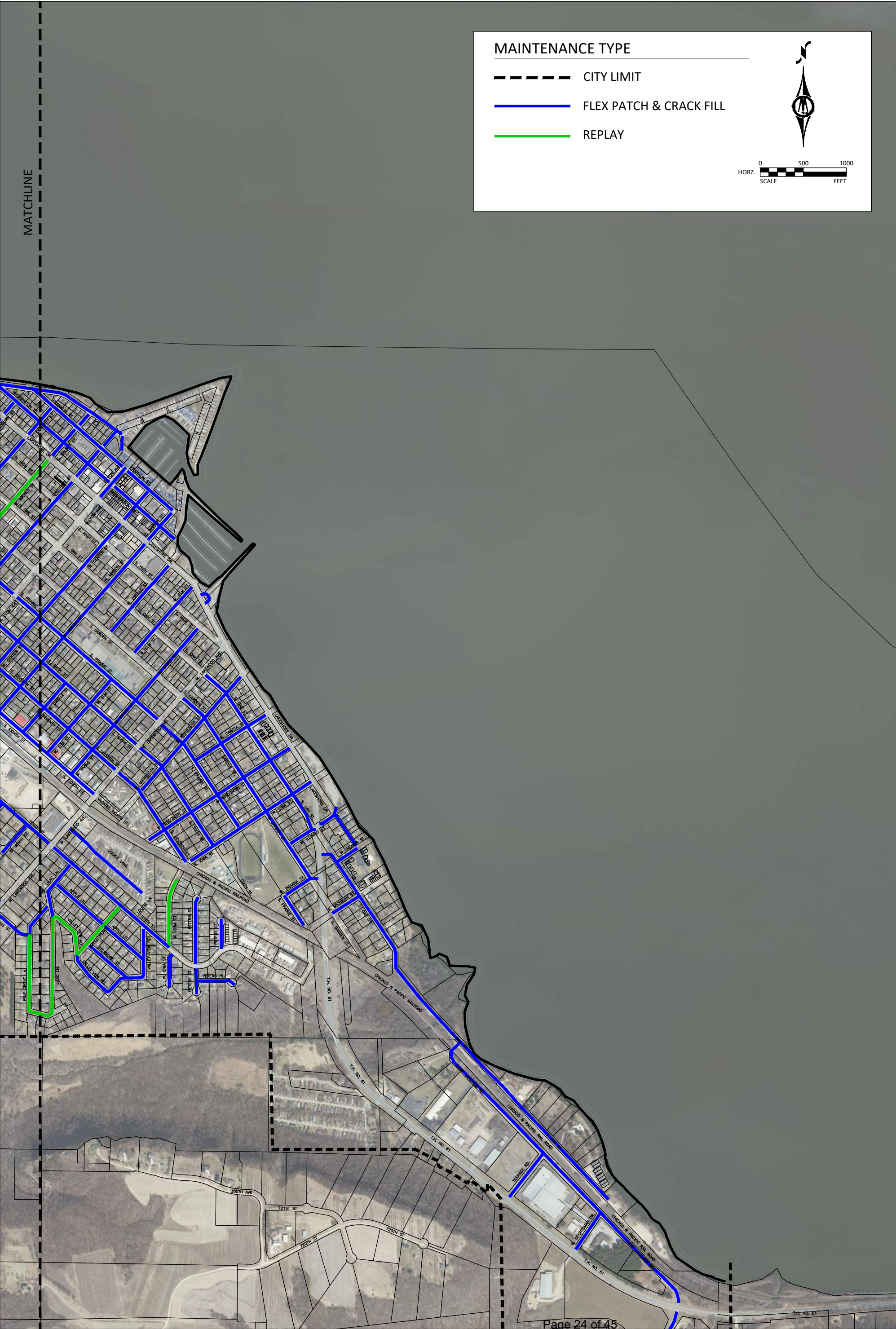
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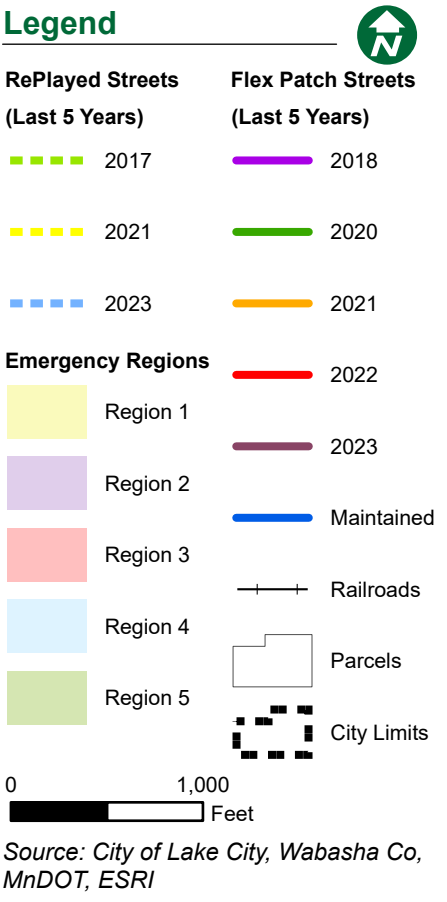
Pavement Management Plan

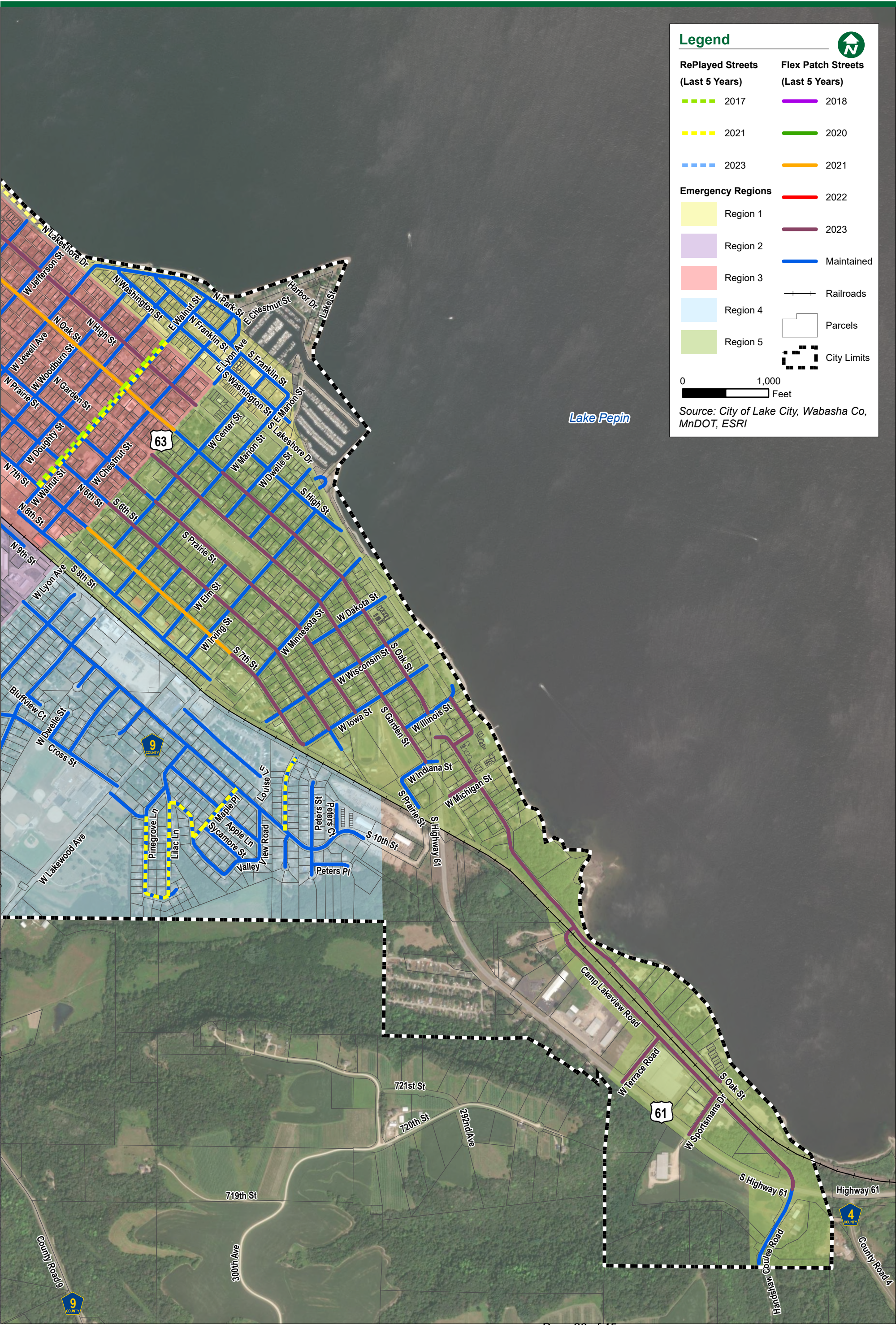
City of Lake City, Minnesota

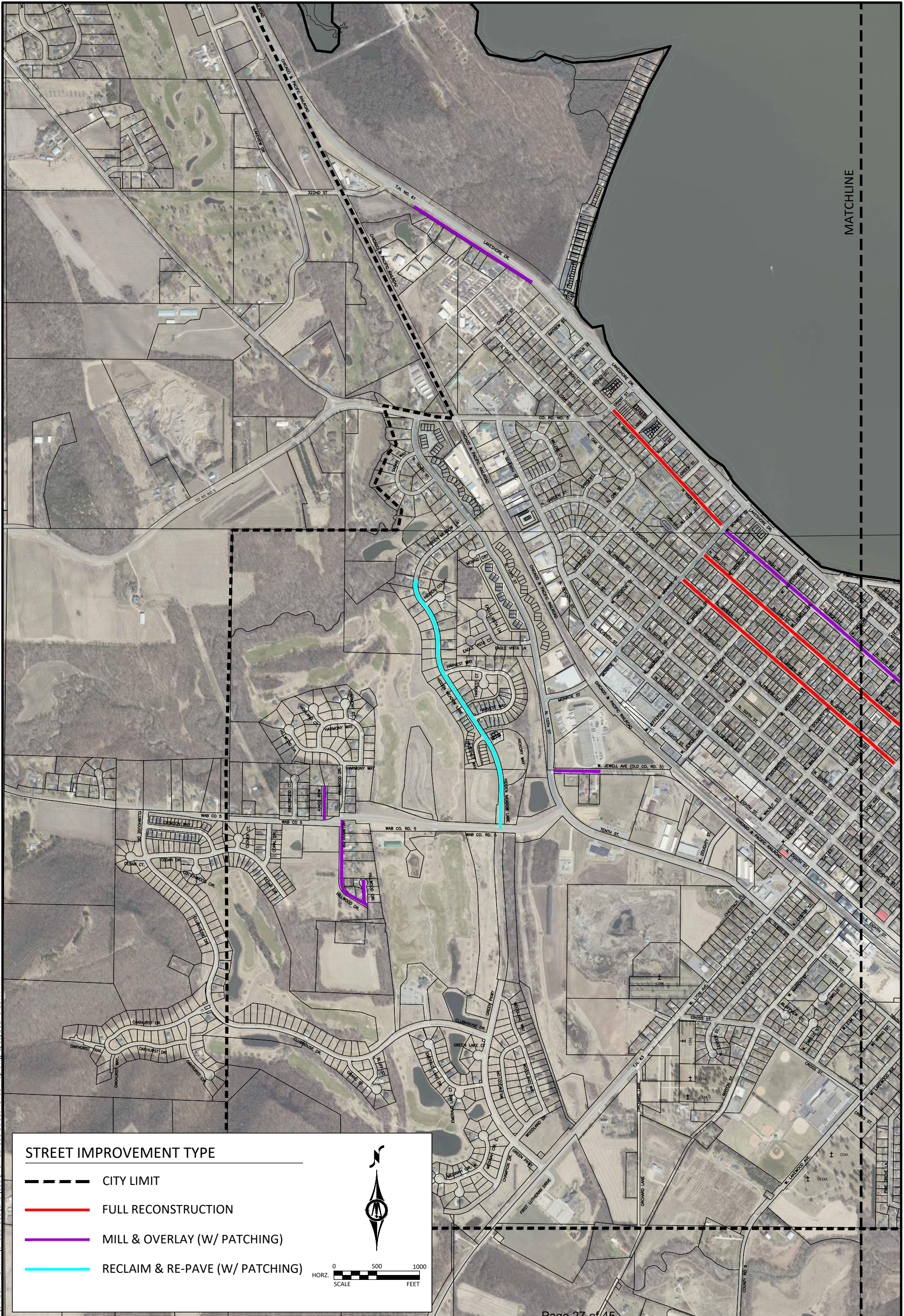


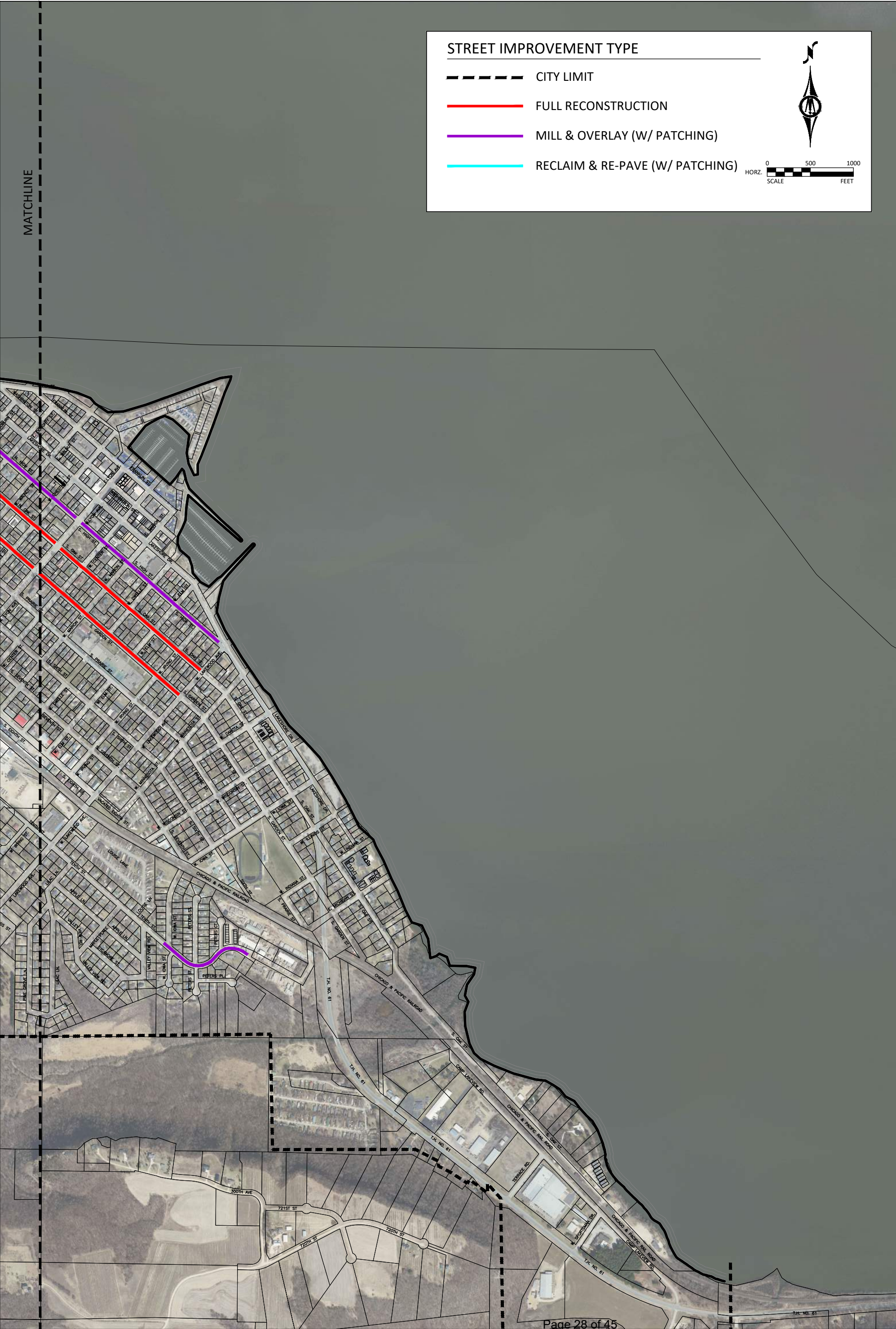





**BOLTON
& MENK**










Appendix C: Cost Estimates

<div><div>BOLTON & MENK</div><div>PAVEMENT MANAGEMENT PLAN</div><div>RECONSTRUCTION PROJECTS (by street segment)</div><div>CITY OF LAKE CITY, MN</div></div>										
Street	From	To	Year	MSAS (Yes or No)	Improvement Length & Cost			Street Rating (1-5)	Previous Street Improvements	
					Street & Drainage Improvements				Year	Project
					36' Street w/ Curb (FT)	40' Street w/Curb (FT)	Estimated Total Street and Drainage Cost			
					Cost per Lineal Foot					
					\$1,245.00	\$1,385.00				
Named Streets										
N High St	W Grant St (Co 5 Blvd)	W Vine St	TBD	No	395	0	\$491,775.00	3.4	2005	M & O
N High St	W Vine St	W Adam St	TBD	No	395	0	\$491,775.00	4	2005	M & O
N High St	W Adam St	W Green St	TBD	No	400	0	\$498,000.00	3.8	2005	M & O
N High St	W Green St	W Clay St	TBD	No	405	0	\$504,225.00	3.4	2005	M & O
N High St	W Clay St	W Monroe St	TBD	No	345	0	\$429,525.00	2.9	2005	M & O
N Garden St	W Monroe St	W Madison St	2025	No	475	0	\$591,375.00	3.3	2001	M & O
N Garden St	W Madison St	W Jefferson St	2025	No	475	0	\$591,375.00	3.2	2001	M & O
N Garden St	W Jefferson St	W Jewell Ave	2025	No	465	0	\$578,925.00	3.7	2001	M & O
N Garden St	W Jewell Ave	W Woodburn St	2025	No	475	0	\$591,375.00	3.8	2001	M & O
N Garden St	W Woodburn St	W Doughty St	2025	No	380	0	\$473,100.00	3.8	2002	M & O
N Garden St	W Doughty St	W Walnut St	2025	No	370	0	\$460,650.00	4	2002	M & O
N Garden St	W Walnut St	W Chestnut St	2025	No	360	0	\$448,200.00	3.9	2002	M & O
N Garden St	W Chestnut St	W Lyon Ave (TH 63)	2025	No	185	185	\$486,550.00	3.7	2002	M & O
S Garden St	W Lyon Ave	W Center St	TBD	No	0	370	\$512,450.00	3.9	2000	M & O
S Garden St	W Center St	W Marion St	TBD	No	0	370	\$512,450.00	3.9	2000	M & O
S Garden St	W Marion St	W Dwelle St	TBD	No	0	365	\$505,525.00	3.8	2000	M & O
S Garden St	W Dwelle St	W Elm St	TBD	No	0	380	\$526,300.00	3.9	2000	M & O
S Garden St	W Elm St	W Irving St	TBD	No	0	375	\$519,375.00	3.8	2000	M & O
S Garden St	W Irving St	W Lakewood Ave	TBD	No	0	380	\$526,300.00	3.8	2000	M & O
N Oak St	W Monroe St	W Madison St	2028	No	470	0	\$585,150.00	2.9	2005	M & O
N Oak St	W Madison St	W Jefferson St	2028	No	475	0	\$591,375.00	3	2005	M & O
N Oak St	W Jefferson St	W Jewell Ave	2028	No	470	0	\$585,150.00	2.9	2005	M & O
N Oak St	W Jewell Ave	W Woodburn St	2028	No	470	0	\$585,150.00	3	2005	M & O
N Oak St	W Woodburn St	W Doughty St	2028	No	380	0	\$473,100.00	2.9	2002	M & O
N Oak St	W Doughty St	W Walnut St	2028	No	370	0	\$460,650.00	2.9	2002	M & O
N Oak St	W Walnut St	W Chestnut St	2028	No	365	0	\$454,425.00	2.8	2002	M & O
N Oak St	W Chestnut St	W Lyon Ave (TH 63)	2028	No	185	185	\$486,550.00	2.9	2002	M & O
S Oak St	W Lyon Ave	W Center St	TBD	Yes	0	565	\$782,525.00	2.7	2012	M & O
S Oak St	W Center St	W Marion St	TBD	No	370	0	\$460,650.00	2.8	2012	M & O
S Oak St	W Marion St	W Dwelle St	TBD	No	375	0	\$466,875.00	3	2012	M & O
S Oak St	W Dwelle St	W Elm St	TBD	No	370	0	\$460,650.00	2.8	2012	M & O
S Oak St	W Elm St	W Irving St	TBD	No	375	0	\$466,875.00	2.8	2012	M & O
S Oak St	W Irving St	W Lakewood Ave	TBD	No	190	190	\$499,700.00	2.9	2012	M & O
Total Estimated Reconstruction Costs:							\$17,098,075.00			


Notes: 1) Refer to attached figures for illustrations of referenced projects.


2) Street & Site costs include estimated pavement, aggregate base, curb & gutter, sidewalk (both sides), driveways, drainage improvements, and turf reestablishment.


3) Costs presented above are in 2023 dollars and inlcude estimated design and construction costs.


4) RePlay is included in the cost as a year zero application.


5) Apply RePlay in 5-year increments as a part of the preventative maintenance program (5, 10, 15, 20 yrs out). Subsequent applications not included in budget numbers.


<div><div></div><div>PAVEMENT MANAGEMENT PLAN</div><div>PREVENTATIVE MAINTENANCE - FLEX PATCH / CRACK FILL (by street segment)</div><div>CITY OF LAKE CITY, MN</div></div>										
Street	From	To	MSAS (Yes or No)	Street Length	Street Width (FC-FC)	Pavement Area	Flex Patch & Crack Fill Estimated Cost ¹	Street Rating	Previous Street Improvement	
				FT	FT	SY			Year	Project
Numbered Streets										
N 6th St	Harrison St	W Jackson St	No	465	36	1710	\$5,557.50	1.2	2017/18	M&O
N 6th St	W Jackson St	W Monroe St	No	475	36	1740	\$5,655.00	1.1	2017/18	M&O
N 6th St	W Monroe St	W Madison St	No	475	36	1740	\$5,655.00	2.8	2008	M&O
N 6th St	W Madison St	W Jefferson St	No	480	36	1760	\$5,720.00	3	2008	M&O
N 6th St	W Jefferson St	W Jewell Ave	No	470	36	1720	\$5,590.00	3	2008	M&O
N 6th St	W Jewell Ave	W Woodburn St	No	475	36	1740	\$5,655.00	2.9	2008	M&O
N 6th St	W Woodburn St	W Doughty St	No	370	36	1360	\$4,420.00	3.1	2008	M&O
N 6th St	W Doughty St	W Walnut St	No	375	36	1380	\$4,485.00	3.1	2008	M&O
N 6th St	W Walnut St	W Chestnut St	No	375	36	1380	\$4,485.00	2.9	2008	M&O
N 6th St	West terminus	W Lyon Ave (TH 63)	No	360	36	1320	\$4,290.00	3	2008	M&O
S 6th St	W Iowa St	South terminus	No	280	36	1030	\$3,347.50	3	2009	M&O
N 7th St	W Monroe St	W Madison St	Yes	360	42	1520	\$4,940.00	1.4	2010	Reconstruct
N 7th St	W Madison St	W Jefferson St	Yes	375	42	1580	\$5,135.00	1.1	2010	Reconstruct
N 7th St	W Jefferson St	W Jewell Ave	Yes	370	42	1560	\$5,070.00	1	2010	Reconstruct
N 7th St	W Jewell Ave	W Woodburn St	Yes	375	42	1580	\$5,135.00	1	2010	Reconstruct
N 7th St	W Woodburn St	W Doughty St	Yes	470	42	1980	\$6,435.00	1.2	2010	Reconstruct
N 7th St	W Doughty St	W Walnut St	Yes	470	42	1980	\$6,435.00	1.1	2010	Reconstruct
N 7th St	W Walnut St	W Chestnut St	Yes	475	42	2010	\$6,532.50	1	2010	Reconstruct
N 7th St	W Chestnut St	W Lyon Ave (TH 63)	Yes	475	42	2010	\$6,532.50	1.1	2010	Reconstruct
N 8th St	W Jefferson St	W Jewell Ave	Yes	460	42	1940	\$6,305.00	2	2010	Reconstruct
N 8th St	W Walnut St	W Chestnut St	Yes	370	42	1560	\$5,070.00	1.9	2010	Reconstruct
N 8th St	W Chestnut St	W Lyon Ave (TH 63)	Yes	360	42	1520	\$4,940.00	2.4	2002	M&O
S 8th St	W Lyon Ave (TH 63)	W Marion St	Yes	750	42	3170	\$10,302.50	2.1	N/A	N/A
S 8th St	W Marion St	W Dwelle St	Yes	375	42	1580	\$5,135.00	1.8	2016	Conc Rehab
S 8th St	W Dwelle St	W Elm St	Yes	385	42	1630	\$5,297.50	1.2	2016	Conc Rehab
S 8th St	W Elm St	W Irving St	Yes	365	42	1540	\$5,005.00	1.3	2016	Conc Rehab
S 8th St	W Irving St	W Lakewood Ave	Yes	365	42	1540	\$5,005.00	1.3	2016	Conc Rehab
N 10th St	W Grant St (Co 5 Blvd)	Safari Way (N Intersection)	Yes	435	42	1840	\$5,980.00	1.5	N/A	N/A


<div><div></div><div><div>PAVEMENT MANAGEMENT PLAN</div><div>PREVENTATIVE MAINTENANCE - FLEX PATCH / CRACK FILL (by street segment)</div><div>CITY OF LAKE CITY, MN</div></div></div>										
Street	From	To	MSAS (Yes or No)	Street Length	Street Width (FC-FC)	Pavement Area	Flex Patch & Crack Fill Estimated Cost ¹	Street Rating	Previous Street Improvement	
				FT	FT	SY			Year	Project
S 10th St	W Lyon Ave (TH 63)	W Center St	Yes	385	42	1630	\$5,297.50	2.8	2008	M&O
S 10th St	W Center St	W Marion St	Yes	365	42	1540	\$5,005.00	2.8	2008	M&O
S 10th St	W Marion St	W Dwelle St (W)	Yes	370	42	1560	\$5,070.00	2.8	2008	M&O
S 10th St	W Dwelle St (W)	W Dwelle St (E)	Yes	70	42	300	\$975.00	2.8	2008	M&O
S 10th St	W Dwelle St (E)	W Elm St	Yes	305	42	1290	\$4,192.50	2.8	2008	M&O
S 10th St	W Elm St	W Irving St	Yes	375	42	1580	\$5,135.00	2.8	2008	M&O
S 10th St	W Irving St	W Lakewood Ave	Yes	385	42	1630	\$5,297.50	2.8	2008	M&O
Named Streets										
Hok Si La Park	TH 61	East terminus	No	1575	20	3500	\$11,375.00	2.6	N/A	N/A
N High St	Cherry St	Bay View St	No	410	36	1500	\$4,875.00	2.7	2011	M&O
N High St	Bay View St	Lincoln St	No	390	36	1430	\$4,647.50	2.6	2011	M&O
N High St	Lincoln St	Pepin St	No	405	36	1490	\$4,842.50	2.5	2011	M&O
N High St	Pepin St	W Grant St (Co 5 Blvd)	No	400	36	1470	\$4,777.50	2.2	2011	M&O
Bay View St	N High St	TH 61	No	370	30	1110	\$3,607.50	2.5	2011	M&O
Lincoln St	N High St	TH 61	No	360	30	1080	\$3,510.00	2.2	2011	M&O
W Pepin St	N High St	TH 61	No	350	30	1050	\$3,412.50	2.2	2011	M&O
W Vine St	N High St	TH 61	No	340	36	1250	\$4,062.50	2.4	2013	M&O & Reclaim
W Adams St	N High St	TH 61	No	340	36	1250	\$4,062.50	3.4	N/A	N/A
W Green St	N High St	TH 61	No	345	36	1270	\$4,127.50	2.7	2013	M&O & Reclaim
N Park St	N Lakeshore Dr (TH 61)	N Washington St	Yes	410	36	1500	\$4,875.00	2.3	2012	M&O
N Park St	N Washington St	N Franklin St	Yes	435	36	1600	\$5,200.00	2.2	2012	M&O
N Park St	N Franklin St	E Walnut St	Yes	670	36	2460	\$7,995.00	2.3	2012	M&O
N Park St	E Walnut St	E Chestnut St	Yes	370	24	860	\$2,795.00	2.3	2012	M&O
N Franklin St	N Park St	E Doughty St	No	260	36	950	\$3,087.50	2.7	2013	M&O & Reclaim
N Franklin St	E Doughty St	E Walnut St	No	375	36	1380	\$4,485.00	2.6	2013	M&O & Reclaim
N Franklin St	E Walnut St	E Chestnut St	No	365	36	1340	\$4,355.00	2.5	2013	M&O & Reclaim
N Franklin St	E Chestnut St	Unnamed Road (Parking Lot)	Yes	195	40	800	\$2,600.00	3	2008	M&O
N Franklin St	Unnamed Road (Parking Lot)	E Lyon Ave	Yes	170	40	700	\$2,275.00	3	2008	M&O
S Franklin St	E Lyon Ave	W Center St	Yes	380	42	1650	\$5,362.50	2.6	2008	M&O


<div><div></div><div>PAVEMENT MANAGEMENT PLAN</div><div>PREVENTATIVE MAINTENANCE - FLEX PATCH / CRACK FILL (by street segment)</div><div>CITY OF LAKE CITY, MN</div></div>										
Street	From	To	MSAS (Yes or No)	Street Length	Street Width (FC-FC)	Pavement Area	Flex Patch & Crack Fill Estimated Cost ¹	Street Rating	Previous Street Improvement	
				FT	FT	SY			Year	Project
S Franklin St	W Center St	E Marion St	Yes	345	42	1500	\$4,875.00	2.9	2008	M&O
N Washington St	N Park St	E Woodburn St	Yes	255	36	940	\$3,055.00	2.8	2013	M&O & Reclaim
N Washington St	E Woodburn St	E Doughty St	Yes	370	36	1360	\$4,420.00	2.5	2013	M&O & Reclaim
N Washington St	E Doughty St	E Walnut St	Yes	380	36	1390	\$4,517.50	2.5	2013	M&O & Reclaim
N Washington St	E Walnut St	E Chestnut St	Yes	370	36	1360	\$4,420.00	2.6	2013	M&O & Reclaim
N Washington St	E Chestnut St	E Lyon Ave	Yes	365	48	1830	\$5,947.50	2.8	2008	M&O
S Washington St	E Lyon Ave	W Center St	Yes	380	48	1900	\$6,175.00	2.6	2008	M&O
S Washington St	W Center St	E Marion St	Yes	370	48	1850	\$6,012.50	2.8	2008	M&O
S Washington St	E Marion St	South terminus	No	205	48	1030	\$3,347.50	2.9	2008	M&O
Cherry St	West terminus	N Oak St	No	365	30	1220	\$3,965.00	4.9	N/A	N/A
N Oak St	Cherry St	W Grant St (Co 5 Blvd)	No	1400	36	5130	\$16,672.50	2.8	2008	M&O
N Oak St	W Grant St (Co 5 Blvd)	Oak Ct N	No	960	36	3520	\$11,440.00	1.1	2017/18	M&O
N Oak St	Oak Ct N	N Garden St	No	490	36	1800	\$5,850.00	1.3	2017/18	M&O
N Oak St	Residential Complex Loop	W Clay St	No	485	24	1130	\$3,672.50	3.7	N/A	N/A
N Oak St	W Clay St	W Monroe Ave	No	380	36	1390	\$4,517.50	2.2	2013	M&O & Reclaim
Camp Lakeview Rd	Terrace Rd	W Sportsman Dr	Yes	945	24	2520	\$8,190.00	2.7	N/A	N/A
Handshaw Coulee Rd	TH 61	South terminus	No	960	24	2560	\$8,320.00	2.3	2012	M&O
N Garden St	N 7th St	N Garden Ct	No	545	36	2180	\$7,085.00	1.4	2017/18	M&O
N Garden St	N Garden Ct	N Oak St	No	295	36	1180	\$3,835.00	1.7	2017/18	M&O
N Garden St	N Oak St	W Harrison St	No	230	36	920	\$2,990.00	1.7	2017/18	M&O
N Garden St	W Harrison St	W Monroe St	No	940	36	3760	\$12,220.00	1.4	2017/18	M&O


<div><div></div><div>PAVEMENT MANAGEMENT PLAN</div><div>PREVENTATIVE MAINTENANCE - FLEX PATCH / CRACK FILL (by street segment)</div><div>CITY OF LAKE CITY, MN</div></div>										
Street	From	To	MSAS (Yes or No)	Street Length	Street Width (FC-FC)	Pavement Area	Flex Patch & Crack Fill Estimated Cost ¹	Street Rating	Previous Street Improvement	
				FT	FT	SY			Year	Project
N Garden Ct	N Garden St	North cul-de-sac	No	305	36	1120	\$3,640.00	1.4	2017/18	M&O
Willers Ct	N 7th St	North cul-de-sac	No	920	36	3370	\$10,952.50	1.2	2017/18	M&O
N Prairie St	N 7th St	W Harrison St	No	625	36	2500	\$8,125.00	1.4	2017/18	M&O
N Prairie St	W Harrison St	W Jackson St	No	475	36	1900	\$6,175.00	1.4	2017/18	M&O
N Prairie St	W Jackson St	W Monroe St	No	470	36	1880	\$6,110.00	1.5	2017/18	M&O
N Prairie St	W Monroe St	W Madison St	No	475	36	1900	\$6,175.00	2.9	2008	M&O
N Prairie St	W Madison St	W Jefferson St	No	470	36	1880	\$6,110.00	2.8	2008	M&O
N Prairie St	W Jefferson St	W Jewell Ave	No	475	36	1900	\$6,175.00	2.8	2008	M&O
N Prairie St	W Jewell Ave	W Woodburn St	No	475	36	1900	\$6,175.00	2.6	2008	M&O
N Prairie St	W Woodburn St	W Doughty St	No	370	36	1480	\$4,810.00	3	2008	M&O
N Prairie St	W Doughty St	E Walnut St	No	375	36	1500	\$4,875.00	2.8	2008	M&O
N Prairie St	E Walnut St	W Chestnut St	No	370	36	1480	\$4,810.00	3	2008	M&O
N Prairie St	W Chestnut St	W Lyon Ave (TH 63)	No	365	36	1340	\$4,355.00	2.9	2008	M&O
S Prairie St	W Indiana St	S terminus	No	380	36	1520	\$4,940.00	2.2	2012	M&O
W Jewell Ave (Co Rd 5)	975 W Jewell Ave	N 9th St (Co Rd 5)	Yes	850	24	2270	\$7,377.50	1.4	N/A	N/A
N 9th St (Co Rd 5)	W Jewell Ave	W Doughty St	Yes	40	24	110	\$357.50	3	N/A	N/A
N 9th St (Co Rd 5)	W Doughty St	South terminus	Yes	300	24	800	\$2,600.00	3	N/A	N/A
W Harrison St	N 7th St	N 6th St	No	155	36	570	\$1,852.50	1.5	2017/18	M&O
W Harrison St	N 6th St	N Prairie St	No	380	36	1390	\$4,517.50	1.1	2017/18	M&O
W Harrison St	N Prairie St	N Garden St	No	385	36	1410	\$4,582.50	1.2	2017/18	M&O
W Jackson St	N 7th St	N 6th St	No	365	36	1340	\$4,355.00	1.5	2017/18	M&O
W Jackson St	N 6th St	N Prairie St	No	380	36	1390	\$4,517.50	1.3	2017/18	M&O
W Clay St	N Oak St	N High St	No	425	36	1560	\$5,070.00	2.4	2013	M&O & Reclaim
W Clay St	N High St	TH 61	No	350	36	1280	\$4,160.00	2.2	2013	M&O & Reclaim
W Monroe St	N 10th St	RR Crossing	Yes	485	44	2210	\$7,182.50	1.1	2012	Reconstruct
W Monroe St	RR Crossing	N 7th St	Yes	905	44	4120	\$13,390.00	1.7	2012	Reconstruct
W Monroe St	N 7th St	N 6th St	Yes	385	44	1750	\$5,687.50	1.1	2012	Reconstruct
W Monroe St	N 6th St	N Prairie St	Yes	370	44	1690	\$5,492.50	1.2	2012	Reconstruct
W Monroe St	N Prairie St	N Garden St	Yes	385	44	1750	\$5,687.50	1.3	2012	Reconstruct
W Monroe St	N Garden St	N Oak St	Yes	390	44	1780	\$5,785.00	1.5	2012	Reconstruct
W Monroe St	N Oak St	N High St	Yes	385	44	1750	\$5,687.50	1.4	2012	Reconstruct
W Monroe St	N High St	TH 61	Yes	360	44	1640	\$5,330.00	1.9	2012	Reconstruct


<div><div>BOLTON & MENK</div><div>PAVEMENT MANAGEMENT PLAN</div><div>PREVENTATIVE MAINTENANCE - FLEX PATCH / CRACK FILL (by street segment)</div><div>CITY OF LAKE CITY, MN</div></div>										
Street	From	To	MSAS (Yes or No)	Street Length	Street Width (FC-FC)	Pavement Area	Flex Patch & Crack Fill Estimated Cost ¹	Street Rating	Previous Street Improvement	
				FT	FT	SY			Year	Project
W Madison St	N 7th St	N 6th St	No	380	36	1390	\$4,517.50	2.1	2013	M&O & Reclaim
W Madison St	N 6th St	N Prairie St	No	375	36	1380	\$4,485.00	1.4	2013	M&O & Reclaim
W Madison St	N Prairie St	N Garden St	No	385	36	1410	\$4,582.50	1.5	2013	M&O & Reclaim
W Madison St	N Garden St	N Oak St	No	390	36	1430	\$4,647.50	1.5	2013	M&O & Reclaim
W Madison St	N Oak St	N High St	No	385	36	1410	\$4,582.50	1.7	2013	M&O & Reclaim
W Madison St	N High St	TH 61	No	330	36	1210	\$3,932.50	2.2	2013	M&O & Reclaim
W Jefferson St	N 8th St	N 7th St	Yes	370	40	1520	\$4,940.00	1.6	2010	Reconstruct
W Jefferson St	N 7th St	N 6th St	No	385	36	1410	\$4,582.50	1.2	2013	M&O & Reclaim
W Jefferson St	N 6th St	N Prairie St	No	380	36	1390	\$4,517.50	1.5	2013	M&O & Reclaim
W Jefferson St	N Prairie St	N Garden St	No	370	36	1360	\$4,420.00	1.3	2013	M&O & Reclaim
W Jefferson St	N Garden St	N Oak St	No	395	36	1450	\$4,712.50	1.7	2013	M&O & Reclaim
W Jefferson St	N Oak St	N High St	No	380	36	1390	\$4,517.50	1.6	2013	M&O & Reclaim
W Jefferson St	N High St	TH 61	No	340	36	1250	\$4,062.50	1.3	2013	M&O & Reclaim
W Jewell Ave	N 8th St	N 7th St	Yes	395	40	1620	\$5,265.00	2.5	2002	M&O
W Jewell Ave	N 7th St	N 6th St	No	380	36	1390	\$4,517.50	2.2	2013	M&O & Reclaim
W Jewell Ave	N 6th St	N Prairie St	No	385	36	1410	\$4,582.50	2.5	2013	M&O & Reclaim
W Jewell Ave	N Prairie St	N Garden St	No	375	36	1380	\$4,485.00	1.9	2013	M&O & Reclaim
W Jewell Ave	N Garden St	N Oak St	No	385	36	1410	\$4,582.50	2.6	2013	M&O & Reclaim
W Jewell Ave	N Oak St	N High St	No	385	36	1410	\$4,582.50	2.7	2013	M&O & Reclaim
W Jewell Ave	N High St	N Lakeshore Dr (TH 61)	No	335	36	1230	\$3,997.50	2.5	2013	M&O & Reclaim
W Woodburn St	W terminus	N 7th St	No	165	40	680	\$2,210.00	3.9	N/A	N/A
W Woodburn St	N 7th St	N 6th St	No	385	36	1410	\$4,582.50	1.4	2013	M&O & Reclaim
W Woodburn St	N 6th St	N Prairie St	No	380	36	1390	\$4,517.50	1.4	2013	M&O & Reclaim
W Woodburn St	N Prairie St	N Garden St	No	380	36	1390	\$4,517.50	1.3	2016	Reclaim
W Woodburn St	N Garden St	N Oak St	No	385	36	1410	\$4,582.50	1.3	2016	Reclaim
W Woodburn St	N Oak St	N High St	No	385	36	1410	\$4,582.50	1.3	2016	Reclaim
W Woodburn St	N High St	N Lakeshore Dr (TH 61)	No	335	36	1230	\$3,997.50	1.4	2016	Reclaim
E Woodburn St	N Lakeshore Dr (TH 61)	N Washington St	No	245	36	900	\$2,925.00	2.5	2013	M&O & Reclaim


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Street	From	To	MSAS (Yes or No)	Street Length	Street Width (FC-FC)	Pavement Area	Flex Patch & Crack Fill Estimated Cost ¹	Street Rating	Previous Street Improvement	
				FT	FT	SY			Year	Project
W Doughty St	N 10th St	N 9th St	Yes	645	36	2370	\$7,702.50	2.6	2016	Reclaim
W Doughty St	N 7th St	N 6th St	No	380	36	1390	\$4,517.50	1.2	2016	Reclaim
W Doughty St	N 6th St	N Prairie St	No	385	36	1410	\$4,582.50	1.5	2016	Reclaim
W Doughty St	N Prairie St	N Garden St	No	380	36	1390	\$4,517.50	1.2	2016	Reclaim
W Doughty St	N Garden St	N Oak St	No	385	36	1410	\$4,582.50	1.6	2016	Reclaim
W Doughty St	N Oak St	N High St	No	390	36	1430	\$4,647.50	1.3	2016	Reclaim
W Doughty St	N High St	N Lakeshore Dr (TH 61)	No	330	36	1210	\$3,932.50	1.4	2016	Reclaim
E Doughty St	N Lakeshore Dr (TH 61)	N Washington St	No	245	36	900	\$2,925.00	2.3	2013	M&O & Reclaim
E Doughty St	N Washington St	N Franklin St	No	230	36	840	\$2,730.00	2.8	2013	M&O & Reclaim
W Walnut St	N 8th St	N 7th St	Yes	385	36	1410	\$4,582.50	1.4	2010	Reconstruct
E Walnut St	N Lakeshore Dr (TH 61)	N Washington St	No	235	36	860	\$2,795.00	1.5	2013	M&O & Reclaim
E Walnut St	N Washington St	N Franklin St	No	235	36	860	\$2,795.00	1.4	2013	M&O & Reclaim
E Walnut St	N Franklin St	N Park St	No	240	36	880	\$2,860.00	2.5	2013	M&O & Reclaim
W Chestnut St	N 7th St	N 6th St	No	375	36	1380	\$4,485.00	2	2013	M&O & Reclaim
W Chestnut St	N 6th St	N Prairie St	No	395	36	1450	\$4,712.50	1.3	2013	M&O & Reclaim
W Chestnut St	N Prairie St	N Garden St	No	380	36	1390	\$4,517.50	1.3	2013	M&O & Reclaim
W Chestnut St	N Garden St	N Oak St	No	380	36	1390	\$4,517.50	2.2	2013	M&O & Reclaim
W Chestnut St	N Oak St	N High St	No	375	36	1380	\$4,485.00	2.3	2013	M&O & Reclaim
W Chestnut St	N High St	N Lakeshore Dr (TH 61)	No	390	36	1430	\$4,647.50	2.5	2013	M&O & Reclaim
E Chestnut St	N Lakeshore Dr (TH 61)	N Washington St	Yes	245	40	1010	\$3,282.50	2.7	2012	M&O
E Chestnut St	N Washington St	N Franklin St	Yes	240	40	990	\$3,217.50	2.8	2012	M&O
E Chestnut St	N Franklin St	N Park St	Yes	275	36	1010	\$3,282.50	2.5	2012	M&O
Chestnut St	N Franklin St	E terminus	No	315	24	740	\$2,405.00	3.2	2009	M&O
E Lyon Ave	N Lakeshore Dr (TH 61)	S Washington St	Yes	240	62	1570	\$5,102.50	2	2008	M&O
E Lyon Ave	S Washington St	S Franklin St	Yes	235	62	1540	\$5,005.00	2.5	2008	M&O
W Center St	W cul-de-sac	Cross St	No	425	36	1560	\$5,070.00	1.2	2015	Reconstruct
W Center St	Cross St	S 10th St	No	1345	36	4930	\$16,022.50	2.8	2011	M&O
W Center St	S 10th St	E cul-de-sac	No	465	36	1710	\$5,557.50	2.6	N/A	N/A


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Street	From	To	MSAS (Yes or No)	Street Length	Street Width (FC-FC)	Pavement Area	Flex Patch & Crack Fill Estimated Cost ¹	Street Rating	Previous Street Improvement	
				FT	FT	SY			Year	Project
W Center St	S 7th St	S 6th St	No	375	36	1380	\$4,485.00	2.9	2012	M&O
W Center St	S 6th St	S Prairie St	No	380	36	1390	\$4,517.50	2.7	2012	M&O
W Center St	S Prairie St	S Garden St	No	390	36	1430	\$4,647.50	2.6	2012	M&O
W Center St	S Garden St	S Oak St	No	385	36	1410	\$4,582.50	2.5	2012	M&O
W Center St	S Oak St	S High St	Yes	385	48	1930	\$6,272.50	2.3	2012	M&O
W Center St	S High St	S Lakeshore Dr (TH 61)	Yes	330	48	1650	\$5,362.50	2.7	2008	M&O
E Center St	S Lakeshore Dr (TH 61)	S Washington St	Yes	245	60	1550	\$5,037.50	2.1	2008	M&O
E Center St	S Washington St	S Franklin St	Yes	235	48	1180	\$3,835.00	2.6	2008	M&O
W Marion St	W terminus (City Limits)	Cross St	No	1130	36	4140	\$13,455.00	2.3	2012	M&O
W Marion St	Cross St	Bluffview Ct	No	295	36	1080	\$3,510.00	2.9	2012	M&O
W Marion St	Bluffview Ct	S 10th St	No	780	36	2860	\$9,295.00	2.9	2012	M&O
W Marion St	S 10th St	E terminus	No	400	36	1470	\$4,777.50	1.8	N/A	N/A
Bluffview Ct	W Marions St	S cul-de-sac	No	190	36	700	\$2,275.00	3	2012	M&O
W Marion St	S 8th St	S 7th St	No	385	36	1410	\$4,582.50	2.8	2008	M&O
W Marion St	S 7th St	S 6th St	No	380	36	1390	\$4,517.50	2.8	2008	M&O
W Marion St	S 6th St	S Prairie St	No	385	36	1410	\$4,582.50	2.7	2008	M&O
W Marion St	S Prairie St	S Garden St	No	375	36	1380	\$4,485.00	2.8	2008	M&O
W Marion St	S Garden St	S Oak St	No	390	36	1430	\$4,647.50	2.9	2008	M&O
W Marion St	S Oak St	S High St	No	385	36	1410	\$4,582.50	2.9	2008	M&O
W Marion St	S High St	S Lakeshore Dr (TH 61)	Yes	330	40	1360	\$4,420.00	2.8	2008	M&O
E Marion St	S Lakeshore Dr (TH 61)	S Washington St	Yes	245	48	1230	\$3,997.50	2.2	2008	M&O
E Marion St	S Washington St	S Franklin St	Yes	245	42	1060	\$3,445.00	3	2008	M&O
W Dwelle St	Cross St	E cul-de-sac	No	370	36	1360	\$4,420.00	2.9	2012	M&O
W Dwelle St	W cul-de-sac	S 6th St	No	320	36	1170	\$3,802.50	3	2012	M&O
W Dwelle St	S 8th St	S 7th St	No	385	36	1410	\$4,582.50	2.3	N/A	N/A
W Dwelle St	S 7th St	S 6th St	No	385	36	1410	\$4,582.50	2.5	2012	M&O
W Dwelle St	S Garden St	S Oak St	No	390	36	1430	\$4,647.50	2.9	N/A	N/A
W Dwelle St	S Oak St	S High St	No	380	36	1390	\$4,517.50	2.7	N/A	N/A
W Dwelle St	S High St	S Lakeshore Dr (TH 61)	Yes	330	36	1210	\$3,932.50	2.3	N/A	N/A
W Elm St	Cross St	S 10th St	No	970	36	3560	\$11,570.00	2.3	2012	M&O

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Street	From	To	MSAS (Yes or No)	Street Length	Street Width (FC-FC)	Pavement Area	Flex Patch & Crack Fill Estimated Cost ¹	Street Rating	Previous Street Improvement	
				FT	FT	SY			Year	Project
W Elm St	S 8th St	S 7th St	No	395	36	1450	\$4,712.50	2.6	N/A	N/A
W Elm St	S 7th St	S 6th St	No	380	36	1390	\$4,517.50	2.4	2012	M&O
W Elm St	S 6th St	S Prairie St	No	385	36	1410	\$4,582.50	2.3	2012	M&O
W Elm St	S Garden St	S Oak St	No	390	36	1430	\$4,647.50	2.6	N/A	N/A
W Elm St	S Oak St	S High St	No	380	36	1390	\$4,517.50	2.7	N/A	N/A
W Elm St	S High St	S Lakeshore Dr (TH 61)	No	315	36	1160	\$3,770.00	2.6	N/A	N/A
Lake City Concourse Loop	TH 61	TH 61	No	265	40	1090	\$3,542.50	2	N/A	N/A
W Irving St	W cul-de-sac	S 10th St	No	420	36	1540	\$5,005.00	2.1	N/A	N/A
W Irving St	S 8th St	S 7th St	No	390	36	1430	\$4,647.50	2.1	2012	M&O
W Irving St	S 7th St	S 6th St	No	380	36	1390	\$4,517.50	2.6	2012	M&O
W Irving St	S 6th St	S Prairie St	No	380	36	1390	\$4,517.50	2.1	2012	M&O
W Irving St	S Prairie St	S Garden St	No	385	36	1410	\$4,582.50	2.3	2012	M&O
W Irving St	S Garden St	S Oak St	No	385	36	1410	\$4,582.50	2.5	2012	M&O
W Irving St	S Oak St	S High St	No	375	36	1380	\$4,485.00	2.6	2012	M&O
W Minnesota St	S 7th St	S 6th St	No	395	36	1450	\$4,712.50	2.8	2012	M&O
W Minnesota St	S 6th St	S Prairie St	No	380	36	1390	\$4,517.50	2.5	2012	M&O
W Minnesota St	S Garden St	S Oak St	No	380	36	1390	\$4,517.50	2.5	2012	M&O
W Minnesota St	S Oak St	S High St	No	390	36	1430	\$4,647.50	2.4	2012	M&O
W Minnesota St	S High St	TH 61	No	300	36	1100	\$3,575.00	2.6	2012	M&O
W Dakota St	S Prairie St	S Oak St	No	360	36	1320	\$4,290.00	2.5	2012	M&O
W Dakota St	S Oak St	S High St	No	375	36	1380	\$4,485.00	2.6	2012	M&O
W Dakota St	S High St	TH 61	No	300	36	1100	\$3,575.00	2.5	2012	M&O
W Wisconsin St	W terminus	S 7th St	No	195	36	720	\$2,340.00	2.5	2012	M&O
W Wisconsin St	S 7th St	S 6th St	No	365	36	1340	\$4,355.00	2.8	2012	M&O
W Wisconsin St	S 6th St	S Prairie St	No	365	36	1340	\$4,355.00	2.5	2012	M&O
W Wisconsin St	S Garden St	S Oak St	No	375	36	1380	\$4,485.00	2.5	2012	M&O
W Wisconsin St	S Oak St	S High St	No	370	36	1360	\$4,420.00	2.8	2012	M&O
W Wisconsin St	S High St	TH 61	No	305	36	1120	\$3,640.00	2.6	2012	M&O
W Iowa St	S cul-de-sac	S 10th St	No	395	36	1450	\$4,712.50	2	N/A	N/A
W Iowa St	S 7th St	S 6th St	Yes	350	36	1280	\$4,160.00	2.3	2015	M&O
W Iowa St	S 6th St	S Prairie St	Yes	365	36	1340	\$4,355.00	2.6	2012	M&O
W Iowa St	S Prairie St	S Garden St	Yes	365	36	1340	\$4,355.00	2.3	2012	M&O
W Iowa St	S Garden St	S Oak St	Yes	365	36	1340	\$4,355.00	2.5	2012	M&O

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				FT	FT	SY			Year	Project
W Iowa St	S Oak St	TH 61	Yes	265	36	970	\$3,152.50	2.6	2012	M&O
W Illinois St	S Garden St	S Oak St	No	335	36	1230	\$3,997.50	2.7	2012	M&O
W Illinois St	S Oak St	TH 61	No	70	36	260	\$845.00	2.8	2012	M&O
W Illinois St	TH 61	Lakeshore Dr	No	250	36	920	\$2,990.00	3	N/A	N/A
W Illinois St	Lakeshore Dr	E terminus	No	160	36	590	\$1,917.50	4	N/A	N/A
S Lakeshore Dr	W Illinois St	W Indiana St	No	485	24	1130	\$3,672.50	2.9	2012	M&O
W Indiana St	S Prairie St	S Garden St	No	355	24	950	\$3,087.50	2.3	2012	M&O
W Indiana St	S Garden St	TH 61	No	135	36	500	\$1,625.00	2.7	2012	M&O
W Indiana St	S Oak St	Lakeshore Dr	No	260	28	720	\$2,340.00	2.7	2012	M&O
Safari Way	N 10th St	N 10th St	No	1055	24	2460	\$7,995.00	2.3	2017/18	M&O
Hidden Meadow Ln	N 10th St	1015 Hidden Meadow Ln	No	1050	36	3850	\$12,512.50	2.3	2017/18	M&O
Mounds Ct	W cul-de-sac	N 10th St	No	205	24	480	\$1,560.00	3	N/A	N/A
Eagle Vista Ln	N cul-de-sac	Eagle Vista Ct	No	235	24	550	\$1,787.50	1	N/A	N/A
Eagle Vista Ln	Eagle Vista Ct	N 10th St	No	575	24	1340	\$4,355.00	1.4	N/A	N/A
Eagle Vista Ct	W cul-de-sac	Eagle Vista Ln	No	250	24	580	\$1,885.00	1.2	N/A	N/A
Harvest Way	Hidden Meadow Ln	Harvest Ct	No	485	24	1130	\$3,672.50	2.3	N/A	N/A
Harvest Way	Harvest Ct	Hidden Meadow Ln	No	1120	24	2610	\$8,482.50	2.3	N/A	N/A
Harvest Ct	Harvest Way	S cul-de-sac	No	150	24	350	\$1,137.50	2	N/A	N/A
Hazlenut Way	S terminus	Hidden Meadow Ln	No	340	24	790	\$2,567.50	3	N/A	N/A
Hickory Way	Hidden Meadow Ln	Hidden Meadow Ln	No	850	24	1980	\$6,435.00	2.6	N/A	N/A
Hillwood Dr	W cul-de-sac	Harmony Way	No	470	24	1100	\$3,575.00	2.8	N/A	N/A
Hillwood Dr	Harmony Way	Harmony Way	No	330	24	770	\$2,502.50	2.9	N/A	N/A
Hillwood Dr	Harmony Way	Wabasha Co Rd 5	No	640	24	1490	\$4,842.50	2.6	N/A	N/A
Harmony Way	Hillwood Dr	Highland Ct	No	325	24	760	\$2,470.00	2.8	N/A	N/A
Harmony Way	Highland Ct	Harmony Ct	No	260	24	610	\$1,982.50	2.4	N/A	N/A
Harmony Way	Harmony Ct	Hillwood Dr	No	815	24	1900	\$6,175.00	2.9	N/A	N/A

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				FT	FT	SY			Year	Project
Highland Ct	N cul-de-sac	Harmony Way	No	240	24	560	\$1,820.00	2.9	N/A	N/A
Harmony Ct	N cul-de-sac	Harmony Way	No	200	24	470	\$1,527.50	3.1	N/A	N/A
Kingswood Ct	N cul-de-sac	Wabasha Co Rd 5	No	490	24	1140	\$3,705.00	3.4	N/A	N/A
Clubhouse Dr	Wabasha Co Rd 5	Crimson Way	No	220	36	810	\$2,632.50	1.9	N/A	N/A
Clubhouse Dr	Crimson Way	Cedar Dr	No	370	36	1360	\$4,420.00	1.6	N/A	N/A
Clubhouse Dr	Cedar Dr	Oakhurst Dr	No	2030	36	7440	\$24,180.00	1.2	N/A	N/A
Clubhouse Dr	Oakhurst Dr	Grand Dr	No	1805	36	6620	\$21,515.00	1.4	N/A	N/A
Clubhouse Dr	Grand Dr	Bluff Dr	No	245	36	900	\$2,925.00	1.3	N/A	N/A
Clubhouse Dr	Bluff Dr	Jewel Golf Club Entrance	No	780	36	2860	\$9,295.00	1.3	N/A	N/A
Clubhouse Dr	Jewel Golf Club Entrance	Green Pkwy	No	1435	36	5260	\$17,095.00	1.1	N/A	N/A
Cedar Ct	W cul-de-sac	Clubhouse Dr	No	195	24	460	\$1,495.00	1.9	N/A	N/A
Crimson Way	Clubhouse Dr	Cedar Dr	No	970	24	2260	\$7,345.00	2.7	N/A	N/A
Cedar Dr	Clubhouse Dr	Cottonwood Cir	No	580	36	2130	\$6,922.50	2.7	N/A	N/A
Cedar Dr	Cottonwood Cir	Crimson Way	No	225	36	830	\$2,697.50	2.8	N/A	N/A
Cedar Dr	Crimson Way	Clover Ct	No	275	36	1010	\$3,282.50	2.8	N/A	N/A
Cedar Dr	Clover Ct	Coral Dr	No	355	36	1300	\$4,225.00	2.4	N/A	N/A
Cedar Dr	Coral Dr	S terminus	No	520	36	1910	\$6,207.50	2.6	N/A	N/A
Cottonwood Cir	Cedar Dr	S cul-de-sac	No	160	36	590	\$1,917.50	2.9	N/A	N/A
Clover Ct	N cul-de-sac	Cedar Dr	No	145	24	340	\$1,105.00	1.8	N/A	N/A
Coral Dr	Wabasha Co Rd 5	Cedar Dr	No	565	36	2070	\$6,727.50	2.7	N/A	N/A
Oakhurst Dr	Clubhouse Dr	Oakhurst Cir	No	560	40	2300	\$7,475.00	2	N/A	N/A
Oakhurst Dr	Oakhurst Cir	Oakhurst Trail	No	1045	24	2440	\$7,930.00	2.2	N/A	N/A
Oakhurst Dr	Oakhurst Trail	Oakhurst Way	No	120	24	280	\$910.00	2.8	N/A	N/A
Oakhurst Dr	Oakhurst Way	Oakhirst Cir	No	900	24	2100	\$6,825.00	2.7	N/A	N/A
Oakhurst Cir	Oakhurst Dr	Oakhurst Dr	No	275	24	640	\$2,080.00	2.4	N/A	N/A
Oakhurst Cir	Oakhurst Dr	S cul-de-sac	No	475	24	1110	\$3,607.50	2.3	N/A	N/A
Grand Dr	Clubhouse Dr	Bluff Dr	No	390	24	910	\$2,957.50	2.2	N/A	N/A
Grand Dr	Bluff Dr	S cul-de-sac	No	110	30	330	\$1,072.50	2.8	N/A	N/A

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				FT	FT	SY			Year	Project
Bluff Dr	Clubhouse Dr	Grand Dr	No	365	24	850	\$2,762.50	2.7	N/A	N/A
Green Pkwy	N terminus	Woodland Way	No	205	36	750	\$2,437.50	1.5	N/A	N/A
Green Pkwy	Woodland Way	Clubhouse Dr	No	470	36	1720	\$5,590.00	1.2	N/A	N/A
Green Pkwy	Clubhouse Dr	Green Lake Ct	No	215	36	790	\$2,567.50	1.6	N/A	N/A
Green Pkwy	Green Lake Ct	Emerald Lake Dr	No	330	36	1210	\$3,932.50	1.4	N/A	N/A
Green Pkwy	Emerald Lake Dr	Woodland Dr	No	770	36	2820	\$9,165.00	1.5	N/A	N/A
Green Pkwy	Woodland Dr	W Lyon Ave (TH 63)	No	960	40	3950	\$12,837.50	1.4	N/A	N/A
Green Lake Ct	W cul-de-sac	Green Pkwy	No	90	36	330	\$1,072.50	3.1	N/A	N/A
Emerald Lake Dr	N cul-de-sac	Emerald Lake Ct	No	655	24	1530	\$4,972.50	2.2	N/A	N/A
Emerald Lake Dr	Emerald Lake Ct	Green Pkwy	No	315	24	740	\$2,405.00	2.2	N/A	N/A
Emerald Lake Ct	S cul-de-sac	Emerald Lake Dr	No	70	40	290	\$942.50	2.3	N/A	N/A
Woodland Way	Green Pkwy	Wildwood Dr	No	620	36	2270	\$7,377.50	2	N/A	N/A
Woodland Way	Wildwood Dr	Woodland Dr	No	845	24	1970	\$6,402.50	2.2	N/A	N/A
Wildwood Dr	Woodland Way	Woodland Dr	No	1170	24	2730	\$8,872.50	2.2	N/A	N/A
Woodland Dr	Green Pkwy	Woodland Way	No	445	36	1630	\$5,297.50	2.1	N/A	N/A
Medinah Cir W	W cul-de-sac	Winged Foot Cir	No	430	24	1000	\$3,250.00	2.5	N/A	N/A
Medinah Cir W	Winged Foot Cir	Inverness Dr	No	220	24	510	\$1,657.50	2.5	N/A	N/A
Medinah Cir W	Inverness Dr	E cul-de-sac	No	300	24	700	\$2,275.00	2.3	N/A	N/A
Winged Foot Cir	Medinah Cir W	S cul-de-sac	No	155	24	360	\$1,170.00	3.1	N/A	N/A
Inverness Dr	Medinah Cir W	Champion Dr	No	270	36	990	\$3,217.50	2.2	N/A	N/A
Champion Dr	Inverness Dr	Green Pkwy	No	520	36	1910	\$6,207.50	1.7	N/A	N/A
Cross St	W Lyon Ave (TH 63)	W Center St	No	475	36	1740	\$5,655.00	3.1	2008	M&O
Cross St	W Center St	W Marion St	No	500	36	1830	\$5,947.50	3	2008	M&O
Cross St	W Marion St	W Dwelle St	No	495	36	1820	\$5,915.00	3	2008	M&O
Cross St	W Dwelle St	W Elm St	No	280	36	1030	\$3,347.50	2.9	2008	M&O
Cross St	W Elm St	W Lakewood Ave	No	680	36	2490	\$8,092.50	3	2008	M&O
Cross St	W Lakewood Ave	Pine Grove Ln	No	515	36	1890	\$6,142.50	2.9	2008	M&O

<div><div></div><div><div>PAVEMENT MANAGEMENT PLAN</div><div>PREVENTATIVE MAINTENANCE - FLEX PATCH / CRACK FILL (by street segment)</div><div>CITY OF LAKE CITY, MN</div></div></div>										
Street	From	To	MSAS (Yes or No)	Street Length	Street Width (FC-FC)	Pavement Area	Flex Patch & Crack Fill Estimated Cost ¹	Street Rating	Previous Street Improvement	
				FT	FT	SY			Year	Project
Louise Ln	W Lakewood Ave	Maplewood Pk	No	1175	28	3660	\$11,895.00	2.5	N/A	N/A
Pine Grove Ln	Lilac Ln	Cross St	No	440	36	1610	\$5,232.50	2.9	N/A	N/A
Lilac Ln	S 10th St	Apple Ln	No	310	36	1140	\$3,705.00	2.9	2008	M&O
Lilac Ln	Apple Ln	Pine Grove Ln	No	255	36	940	\$3,055.00	2.7	2008	M&O
Lilac Ln	Pine Grove Ln	Valley View Rd	No	205	36	750	\$2,437.50	2.7	2008	M&O
Apple Ln	Lilac Ln	Maple Pl	No	755	36	2770	\$9,002.50	2.9	N/A	N/A
Apple Ln	Maple Pl	Valley View Rd	No	615	36	2260	\$7,345.00	1.9	N/A	N/A
Valley View Rd	Maple Pl	Sycamore St	No	840	36	3080	\$10,010.00	2	N/A	N/A
Valley View Rd	Sycamore St	Apple Ln	No	405	36	1490	\$4,842.50	1.9	N/A	N/A
Valley View Rd	Apple Ln	S 10th St	No	395	36	1450	\$4,712.50	2.1	N/A	N/A
Sycamore St	Maple Pl	Valley View Rd	No	595	36	2180	\$7,085.00	2.1	N/A	N/A
Peters Pl	Peters St	E cul-de-sac	No	425	30	1280	\$4,160.00	2.4	N/A	N/A
Peters St	N cul-de-sac	S 10th St	No	780	30	2340	\$7,605.00	1.7	N/A	N/A
Peters St	S 10th St	Peters Pl	No	180	30	540	\$1,755.00	2.4	N/A	N/A
Peters St	Peters Pl	S cul-de-sac	No	125	30	380	\$1,235.00	2.8	N/A	N/A
Peters Ct	N cul-de-sac	S 10th St	No	345	30	1040	\$3,380.00	2.2	N/A	N/A
Total Estimated Flex Patch & Crack Fill Costs ¹ :							\$1,616,193			

- Notes:
- 1) Estimated total cost is based on a 40 / 60 split of contracted flex patching at \$4.50/SY vs. in-house flex patching at \$1.00/SY. Crack fill is included for all streets at a rate of \$0.85/SY. Refer to the Pavement Management Plan Report for more information.


2) Costs used for flex patching and crack filling are based on historical maintenance data for the area.

3) Refer to attached figures for illustrations of referenced projects.


4) Costs presented above are in 2024 dollars.

5) Total estimated costs shown represent flex patch plus crack filling. Preventative maintenance needs (flex patch only, crack fill only, or combination) can and will change based on pavement conditions.

6) Assumption - streets have B618 C&G (if present) for estimating purposes.

<div><div></div><div><div>PAVEMENT MANAGEMENT PLAN</div><div>MILL & OVERLAY PROJECTS (by street segment)</div><div>CITY OF LAKE CITY, MN</div></div></div>											
Street	From	To	Year	MSAS (Yes or No)	Street Length	Street Width (FC-FC)	Pavement Area	Mill & Overlay w/ Partial Patch Estimated Cost	Street Rating (1-5)	Previous Street Improvement	
					FT	FT	SY	Cost per SY		Year	Project
								\$36.00			
Numbered Streets											
S 10th St	W Iowa St (N)	W Iowa St (S)	TBD	Yes	65	36	240	\$8,640.00	3.6	2008	M & O
S 10th St	W Iowa St (S)	Peters St	TBD	Yes	320	36	1170	\$42,120.00	4	2008	M & O
S 10th St	Peters St	Peters Ct	TBD	Yes	360	36	1320	\$47,520.00	4	N/A	N/A
Named Streets											
N High St	W Monroe St	W Madison St	TBD	No	465	36	1710	\$61,560.00	2.8	2005	M & O
N High St	W Madison St	W Jefferson St	TBD	No	475	36	1740	\$62,640.00	3	2005	M & O
N High St	W Jefferson St	W Jewell Ave	TBD	No	475	36	1740	\$62,640.00	3	2005	M & O
N High St	W Jewell Ave	W Woodburn St	TBD	No	470	36	1720	\$61,920.00	2.8	2005	M & O
N High St	W Woodburn St	W Doughty St	TBD	No	375	36	1380	\$49,680.00	2.9	2005	M & O
N High St	W Doughty St	W Walnut St	TBD	No	375	36	1380	\$49,680.00	3	2005	M & O
N High St	W Walnut St	W Chestnut St	TBD	No	375	36	1380	\$49,680.00	2.8	2005	M & O
N High St	W Chestnut St	W Lyon Ave (TH 63)	TBD	No	365	36	1340	\$48,240.00	2.7	2005	M & O
S High St	W Lyon Ave	W Center St	TBD	Yes	380	36	1390	\$50,040.00	2.4	2008	M & O
S High St	W Center St	W Marion St	TBD	Yes	365	36	1340	\$48,240.00	2.9	2008	M & O
S High St	W Marion St	W Dwelle St	TBD	Yes	375	36	1380	\$49,680.00	2.9	2005	M & O
S High St	W Dwelle St	W Elm St	TBD	Yes	375	36	1380	\$49,680.00	2.8	2005	M & O
S High St	W Elm St	W Irving St	TBD	Yes	370	36	1360	\$48,960.00	3	2005	M & O
S High St	W Irving St	W Lakewood Ave	TBD	Yes	380	36	1390	\$50,040.00	2.7	2005	M & O
TH 61 Frontage Rd	N terminus	TH 61 entrance	2026	No	1255	22	3070	\$110,520.00	3.1	2005	M & O
W Jewell Ave (Co Rd 5)	N 10th St	975 W Jewell Ave	TBD	Yes	470	26	1360	\$48,960.00	3.9	N/A	N/A
King's Row Dr	N cul-de-sac	Wabasha Co Rd 5	TBD	No	415	26	1060	\$38,160.00	4	N/A	N/A
Hillwood Dr	Wabasha Co Rd 5	Hillwood Cir	TBD	No	1135	36	4160	\$149,760.00	3.7	N/A	N/A
Hillwood Cir	N cul-de-sac	Hillwood Dr	TBD	No	240	26	610	\$21,960.00	4.6	N/A	N/A
Total Estimated Mill & Overlay Costs:								\$1,210,320.00			

- Notes: 1) Refer to attached figures for illustrations of referenced projects.
- 2) Costs presented above are in 2023 dollars and include estimated construciton and engineering costs.
- 3) Costs based on a 2" mill & overlay with 25% of surface area requiring a full depth pavement patch, contingency and engineering.
- 4) Pricing for mill & overlay projects is highly dependent on bituminous prices.
- 5) Assumption - Streets have B618 C&G (if present) for estimating purposes.
- 6) RePlay is included in the cost as a year zero application.
- 7) Apply RePlay in 5-year increments as a part of the preventative maintenance program (5, 10, 15, 20 yrs out). Subsequent applications not included in budget numbers.

<div><div></div><div><div>PAVEMENT MANAGEMENT PLAN</div><div>RECLAIM AND REPAVE PROJECTS (by street segment)</div><div>CITY OF LAKE CITY, MN</div></div></div>											
Street	From	To	Year	MSAS (Yes or No)	Street Length	Street Width (FC-FC)	Pavement Area	Reclaim and Repave Estimated Cost	Street Rating	Previous Street Improvement	
					FT	FT	SY	Cost per SY		Year	Project
								\$61.00			
Named Streets											
Hidden Meadow Ln	1015 Hidden Meadow Ln	Hidden Ct	TBD	No	265	36	970	\$59,170.00	2.3	N/A	N/A
Hidden Meadow Ln	Hidden Ct	Harvest Way (N Intersection)	TBD	No	850	36	3120	\$190,320.00	2.1	N/A	N/A
Hidden Meadow Ln	Harvest Way (N Intersection)	Harvest Way (S Intersection)	TBD	No	640	36	2350	\$143,350.00	2.1	N/A	N/A
Hidden Meadow Ln	Harvest Way (S Intersection)	Hazelnut Way	TBD	No	245	36	900	\$54,900.00	2.7	N/A	N/A
Hidden Meadow Ln	Hazelnut Way	Hickory Way (N Intersection)	TBD	No	120	36	440	\$26,840.00	2.5	N/A	N/A
Hidden Meadow Ln	Hickory Way (N Intersection)	Hickory Way (S Intersection)	TBD	No	380	36	1390	\$84,790.00	2.9	N/A	N/A
Hidden Meadow Ln	Hickory Way (S Intersection)	Entrance Median	TBD	No	395	36	1450	\$88,450.00	2.9	N/A	N/A
Hidden Meadow Ln	Entrance Median	Wabasha Co Rd 5	TBD	No	235	18	390	\$23,790.00	2.9	N/A	N/A
Hidden Meadow Ln	Entrance Median	Wabasha Co Rd 5	TBD	No	235	18	390	\$23,790.00	2.9	N/A	N/A
Total Estimated Reclaim & Repave Costs:								\$695,400.00			

- Notes:
- 1) Refer to attached figures for illustrations of referenced projects.

2) Costs presented above are in 2023 dollars and include estimated construciton costs and engineering costs.

3) Assumption - Streets have B618 C&G (if present) for estimating purposes.

6) RePlay is included in the cost as a year zero application.

7) Apply RePlay in 5-year increments as a part of the preventative maintenance program (5, 10, 15, 20 yrs out). Subsequent applications not included in budget numbers.