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FINAL TECHNICAL MEMORANDUM

TO: Chris Heim
City Council
City of Medicine Lake

FROM: David E. Hutton, PE

DATE: January 22, 2021

RE: Capital Improvement Plan Study
SEH No. MEDLK 157345

INTRODUCTION

A Capital Improvement Plan (CIP) is a comprehensive document whose purpose is to list major improvements necessary and desirable to meet the needs of the community over the near future. The program is established through the compiling of project needs and requests by the City Council and staff. The CIP is a valuable tool which City officials can use to rank the priority of public improvement projects and determine the level and method of financing required each year to support these projects.

The objectives of a CIP are to:

- Anticipate major capital improvements so that large expenditures can be budgeted over a period of several years.
- Develop a realistic list of needs which relate to the ability to finance improvements, thereby minimizing the impact on tax rates.
- Implement the goals and objectives contained in the City's comprehensive plan.
- Enable proper scheduling of various projects and improvements, thereby allowing adequate time for detailed design and engineering of the projects, preparation of environmental impact statements, processing of grant applications, and exploring alternative methods of financing.
- Provide an opportunity for sound coordination between the City and various units of State and local agencies, and public utilities.
- Enable the local officials to focus their attention on the needs of the entire community, and to put in perspective, pressures from special interest groups, and proponents of special projects.
- Enable the local officials to forecast and anticipate needed maintenance projects so that the public's investment in the infrastructure can be preserved.

The CIP includes major expenditures of public funds, beyond maintenance and operating costs, for the acquisition or construction of a needed physical facility or projects. Salaries, supplies, equipment, and other overhead expenditures are considered maintenance and operational costs and are provided for in the annual budget.

The purpose of this Technical Memorandum is to identify the City's infrastructure needs and document the estimated costs for the improvements to be included in the final CIP.

Engineers | Architects | Planners | Scientists

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BACKGROUND

The City of Medicine Lake (the City) is nestled in the western suburbs on the large peninsula on Medicine Lake, the second largest lake in the Twin Cities. The population was 371 at the 2010 census and there are 174 housing units according to the Metropolitan Council Housing Assessment (2016 data). The local government is composed of an executive mayor and four city council members and the City’s 2021 annual budget is \$574,807. The City’s budget includes \$180,000 annually for Maintenance Reserves for future infrastructure improvements.

The City, like most cities, has aging infrastructure. SEH was hired to develop a 5-year CIP. This plan is broken up into two sections – Infrastructure Needs and Costs and Funding Alternatives. The CIP will guide the City in budgeting or seeking funding to complete the improvements over the next 5 years.

INFRASTRUCTURE NEEDS ASSESSMENT

The following is a description of the infrastructure element improvements included in this study and assumptions used to develop the cost estimates. These costs include a 30% contingency and a 25% soft cost factor for LEAF costs (Legal, Engineering, Administrative and Financing), which is typical for a planning level detailed study. A complete summary of all cost estimates is shown in Exhibit 1 in the Appendix.

Street Rehabilitation (See Figure 1)

1. Existing Conditions:
 - a. The roadway system was reconstructed in 1967.
 - b. It has no curbs, gutters, sidewalks, or formal storm sewer system.
 - c. GoodPointe Technology, Inc. performed a detailed pavement surface condition evaluation on 9/25/2019. The road pavements evaluated were: Peninsula Road, Kaiser Road, and Colonial Circle. The following are the results of the evaluation:

Road Pavement	Total Survey Length	Weighted Average Pavement Condition Index (PCI)	Pavement Condition Rating from ASTM D6433-07
Peninsula Road	5,000 ft	61	Fair
Kaiser Road	1,313 ft	83	Satisfactory
Colonial Circle	250 ft (1)	91	Good

(1) Including 60 ft cul-de-sac.

2. Proposed Improvements:
 - a. Based on the pavement surface condition evaluation results, the rehabilitation of the streets can be completed in two stages: Stage 1 would be Peninsula Road as this street is in worse shape based on the pavement ratings and Stage 2 would be the Kaiser Road and Colonial Circle cul-de-sac. Because of its current condition, Peninsula Road should be rehabilitated sooner than Kaiser Road and Colonial Circle.
 - b. Perform a full depth reclaim (up to 6”), which means the asphalt will be ground up and mixed with the underlying gravel base to establish a new base for new asphalt. This reclaimed material will then be reshaped and recompact to receive 2” of new asphalt pavement.
 - c. Use reclaimed material to raise 12" from address 215 to 243 Peninsula Road south of Jevne Park. Also, slightly modify the bituminous surface from address 212 to 224 Peninsula Road east of Jevne Park to redirect runoff from the south side of Peninsula Road to the pond in Jevne Park; this modification will allow more runoff to be treated before draining into Medicine Lake (See Figure 4).
 - d. Excavate parking areas 18" deep for base storage and as a base for new parking lots.
 - e. Adjust the sewer manhole casting located within the roadway.

3. Total cost of the street improvements is \$1,312,000 as outlined in Exhibit 1 as follows:
 - a. Peninsula Road \$1,000,000
 - b. Kaiser Road/Colonial Circle \$312,000

Water System (See Figure 2)

1. Existing Conditions:
 - a. The City does not have a municipal water system and all private properties are served by private well systems.
 - b. The City's Fire Department does not have City water. Accordingly, the water necessary to extinguish fires must be hauled in by the City's tanker trucks from a nearby City of Plymouth hydrant.
2. Proposed Improvements:
 - a. Install a water system for the entire City. The proposed system begins with a connection to the 8" watermain owned by the City of Plymouth at the intersection of South Shore Drive and Peninsula Drive and closes the loop with a connection to the same pipe west of the intersection (see Figure 2). The estimated total of watermain is 7,700 LF. There are two methods of installation that have been identified:
 - Horizontal Directional Drilling
 - Open Cut
 - b. Because of the large number of connections to the watermain (valves, hydrants, service lines, etc.), both methods of installation show that there will be additional work after installing the watermain itself. However, using the open-cut method during the street rehabilitation project will be more cost effective related to restoration and traffic control costs. A comparative analysis of these two methods is included in Exhibit 2 – Forces and Issues Matrix.
 - c. An open cut watermain would utilize typical Ductile Iron Pipe (DIP) while a directional drilling watermain would utilize plastic pipe such as PVC or HDPE. Both are approved for use by AWWA for public water systems. We would recommend installing a service line and a curb stop to each property line to allow the property owner to connect to the City water service during the watermain installation or in the future. A curb stop valve would be installed at the property line for future use.
 - d. Install 16 hydrants at a maximum 500' spacing to provide adequate fire flow protection for the City.
 - e. Install 16 gate valves strategically placed throughout the systems to allow for isolation of certain portions of the system in the event of watermain breaks or maintenance.
3. The estimated cost of the water system improvements as shown on Exhibit 1 are as follows:
 - a. Open cut method: \$1,540,000 (assumes done with streets)
 - b. HDD method: \$2,695,000 (assumes done **without** streets)

Sanitary Sewer (See Figure 3)

1. Existing Conditions:
 - a. The sanitary sewer system consists of 9,914 linear feet of 8" diameter gravity mainline, 936 linear feet of 6" diameter force main, 47 manhole structures and a lift station. All of which were installed in 1967.
 - b. Over half of the gravity mainline is in fully developed residential back and side yard easements, adjacent to Medicine Lake while the remainder are in the roadway.
 - c. Based on the information provided by the Metropolitan Council, a significant amount of stormwater inflow and infiltration (I&I) is seeping into the sanitary sewer collections system. There are three potential primary sources of I&I for Medicine Lake:

- Gravity main line
 - Private sewer laterals
 - Manholes
- d. The Gravity mainline was rehabilitated in 2018 using the trenchless method of structural cured-in-place-pipe (CIPP) to reduce I&I.
2. Proposed Improvements
- a. Rehabilitate 133 private sewer laterals from the mainline connection using the trenchless method of structural CIPP to reduce I&I through the connections. For those connections in the back yards, we would suggest a 2-foot lateral liner to get thru the wye. For those connections of the streets, we would suggest a liner out to 5 feet beyond the edge of the pavement or to the right of way to avoid any future excavations into a new roadway for repairs to old laterals. These could all be done as a single project.
 - b. Rehabilitate 47 manhole structures using a geopolymer coating applied to manhole interiors including benches, manhole inverts, and pipe intrusions to reduce I&I. The City should do the manholes in the street with the street projects (21 manholes), but the manholes in the back yards (26 manholes) could be done as a separate project with the laterals
3. Total cost of these improvements:
- a. All laterals: \$798,000
 - b. Manholes lake side: \$208,000
 - c. Manholes street side: \$168,000
4. The City should apply for another I&I grant thru the Metropolitan Council for these improvements.

Sanitary Sewer Lift Station (See Figure 3)

1. Existing Conditions:
- a. The City's lift station is a flooded suction type lift station with two self-priming centrifugal pumps. It is 50 years old.
 - b. The lift station and the city sewer main were originally designed to serve a total of 300 homes in the city.
 - c. The lift station is connected to the Metropolitan Council interceptor by a 6" force main.
2. Proposed Improvements:
- a. Replace the two above-ground pumps.
 - b. Repair to the existing wet side and modification to connect to the existing force main and lining of the pipe.
 - c. Replace monitoring equipment.
 - d. This project could be done as a stand-alone project depending on how urgent the repairs are or combined with the street project for Kaiser Road.
 - e. We would recommend the City do a thorough engineering evaluation of the lift station to review all elements – mechanical, electrical, structural and communication (SCADA) – to determine the necessary improvements and recommended type of lift station.
3. Total costs of the lift station rehabilitation: \$1,157,000

Storm Sewer (See Figure 4)

1. Existing Conditions:

- a. Jevne Park is a public park surrounded by Peninsula Road.
- b. The wetland located in the park receives runoff from the adjacent road and residential areas.
- c. Water discharges from the wetland area via a 15-inch diameter corrugated metal pipe (CMP) culvert, which carries the water to the ditch on the south side of Peninsula Road. The outlet from the ditch is an 18-inch diameter CMP culvert that discharges into a small channel directly connected to Medicine Lake.
- d. There are several exiting CMP culverts along the City's street system. Except for the HDPE culverts recently replaced at the southwest side of the park, the culverts are generally in poor condition.
- e. The City obtained a 2019 grant from the watershed district to do a more comprehensive project involving water quality and quantity improvements and creating additional wildlife habitat but declined to move ahead with the project due to the limited overall benefit to the lake and overall cost/benefit of the project.

2. Proposed Improvements:

Most of the proposed improvements will be within the park area, focusing on the existing low area/wetland in the park. These improvements will likely require wetland mitigation.

- a. Increase the Jevne Park flood storage volume area to help improve conditions for smaller, more frequent storm events during which Peninsula Road is temporarily inundated. This improvement is not intended to reduce the 100-year flood elevations influenced by the Lake. This can be accomplished by a small excavation and sediment removal project in the existing wetland.
- b. Replacement of existing culverts in poor condition which cross under the roads during the street rehabilitation projects.

3. Total estimate costs of these improvements are \$160,000.

Private Utilities

1. Existing Conditions

- a. Electricity: Overhead Power is provided by Xcel Energy.
- b. Natural Gas: Underground natural gas is provided to the City by CenterPoint Energy Company.
- c. Cable Television and Internet Service: Overhead Power cable and internet service are provided by Comcast, Qwest, landline telephone company, and CenturyLink.

2. Proposed Improvements

- a. The City's Comprehensive plan indicates that they would like to change the overhead utility lines to underground. This work would be done by the private utility companies rather than the City. Some of the poles are owned by Xcel Energy and others owned by CenturyLink, so this would need to be a joint venture.
- b. We have met with Xcel Energy to determine the costs for doing this work and they are in the process of reviewing their electrical needs to go underground. Burying overhead lines in existing neighborhoods is a complicated task. There are several factors related to this work:
 - The main feed line would need to be buried along the roadway, including any joint use utilities on the poles, such as cable and internet.
 - Main line transformers would need to be located and placed for the underground lines.
 - Service lines would need to be run underground to each house, which is currently overhead. No more than 2 homes could be placed on a service line along the property lines to avoid easements. Transformer sizes would vary based on size of home and distance away from main

- line. Property owners would need to hire a private electrician to convert their meter from overhead feed to underground feed to avoid a pole near their house.
- c. We will continue to work with Xcel to obtain ballpark cost estimates for this improvement. Preliminarily, they have indicated it would be \$700,000 to bury their main line along with \$2,000 per lot to bury the services lines. This would total approximately \$1,000,000. To prepare actual cost estimates though, the electrical system would need to be designed by their engineering department, which the City would need to pay for up front to accomplish. The cost of private electricians to connect each house with a new meter and underground feed is not included in these costs.
 - d. This project would be different than the others in that Xcel does the work, not a city contractor. The City simply reimburses Xcel for their work. The best time to have them do their work is during the street project.
 - e. The City should continue discussions with Xcel and the other utility companies on the poles to determine if you want to continue to pursue undergrounding the overhead lines.

FUNDING ALTERNATIVES

Cities have several ways to finance public improvement projects, such as taxes, reserves, loans or grants and other State or Federal programs. In Exhibit 3 in the Appendix, we have provided a list of available funding opportunities and grant/loan programs. Unfortunately, due to the median income of the City and its location in the 7 County Metropolitan area, the availability of grant or loans to the City is relatively small.

1. Historically, the City has used the following sources of financing public improvements:
 - a. General property taxes.
 - b. Reserves created by property taxes.
 - c. Metropolitan Council I/I grant for sewer lining project.
 - d. Annual budget line items (i.e. property taxes) to pay for the sewer maintenance and usage. There is no enterprise fund set up so residents do not pay for sewage via a monthly utility bill.
2. The City is looking to borrow money to use to finance the infrastructure needs outlined in this report. There are two primary methods to do this:
 - a. Borrow money directly with GO Bonds and pay them back over time with property taxes. This is a way to leverage the funds for the projects ahead of time and pay back with interest over time. There would probably need to be an increase in property taxes to pay the debt service depending on the amount of the bond and payback time frame.
 - b. Utilize State bonding. This would require the City get included in the bi-annual state bonding request and compete with other projects in the state for legislative approval. The City would need to work with their local legislatures to advance their project in the next round of bonding in 2022.
3. In addition to bonding programs, there are State Statutes that allow cities in Minnesota to use the following revenue sources:
 - a. Enterprise funds, which are supported by direct charges to consumers. Examples of this would be to set up a Sewer or Water Utility to issue monthly bills based on usage. Currently, the City is not doing this for the existing sewer service being provided. Once a water system is installed and homes are connected and metered for use, the City may want to consider initiating sewer and water utilities and enterprise funds.
 - b. Special Assessments, which is basically a direct charge to properties for all or part of the cost of the improvements being constructed. Most cities do not charge 100% of the project using special assessments, but rather a cost share between special assessments and property taxes. It is a way to leverage more money by using Special Assessment bonds rather than GO bonds. The City has indicated they are not in favor of using this option.

- c. Storm Water utilities, which can be used by cities to help fund construction and maintenance of storm water management facilities and activities. This is a broad statute and not only includes storm pipes and culverts, but drainage ditches, ponds, wetlands and even street sweeping and other storm maintenance activities.
- d. Franchise fees levied against private utilities (i.e. Xcel, Century Link, Comcast, etc.). Cities can levy a fee to the private utilities which can then be used to help finance projects. The City council has indicated they are not in favor of this option.

The City has determined that they do not want to use any of these funding options for these improvements at this time.

POTENTIAL PHASING

We have studied improvements for public and private utilities. We recommend completing most of the suggested improvements at the same time as the street rehabilitation projects to avoid duplicating work related to street restoration and traffic control.

It is also prudent to tackle any stand-alone projects as the need arises. A prime example of this is the lift station rehabilitation project. Based on the condition of the lift station, this is a high priority project for the City. Another example is the lateral lining project to reduce I&I, as a project that can be completed as a separate project. Based on that, we are proposing the following phasing for the improvements, as follows:

- Phase 1 – 2021 construction - Lift Station rehabilitation project.
- Phase 2 – 2022 – Lateral and manhole lining project (backyards only). The City should pursue I & I grants from Metropolitan Council for this project.
- Phase 3 – 2023 Peninsula Road which includes, all street repair, any storm needs, any manhole rehabilitation in the roadway and the watermain in Peninsula Road as a comprehensive street and utility project.
- Phase 4 - 2025 (at the earliest) This phase will include rehabilitation of Kaiser Road and Colonial Circle, improvements of utilities located in the vicinity of these two streets, including watermain, storm culverts and manholes. As an alternative, if the City desires watermain to be installed in the entire City at the same time the watermain portion of this project could be done with Phase 3, either by open cut and patch the street trenches or directional drilling. This would allow the City to monitor the pavement deterioration and extend its' life before spending the funds to rehabilitate the streets.

The grand total of all phases is \$5,343,000. Please refer to Exhibit 1 for a complete summary of the cost estimates and phasing plan. The purpose of dividing up the projects and spreading them over time is develop a funding and financing plan to what the City and its's residents can afford.

The cost estimates associated with private utility improvements are not included in the previous grand total nor in any of the phasing. The ballpark cost estimate for these improvements as provided by Xcel Energy is \$700,000 plus \$2,000 each per service connection. In addition to these costs, each homeowner will have individual costs to hire a private electrician to install a new meter and convert their service to an underground feed. There may be some benefit to the City helping to coordinate this effort and getting bids to do multiple properties at once to obtain savings. If the City desires these improvements, they would be done with the street projects in close coordination with Xcel Energy.

CONCLUSIONS

This completes Phase 1 of our contract, namely determining the costs necessary to upgrade all of the City's infrastructure needs. Phase 2 is to consult with our financial advisor or a bond counsel to determine the most appropriate method to finance the recommended infrastructure improvements. If local bonds are going to be used, a bond counsel could determine the various options and terms to minimize the overall impact to the City's budget and residential property taxes.

We would propose to have the various financial scenarios prepared in the next 90 days to present to City Council. Once we have the scenario planning done, we can determine how to spread the projects out over an acceptable period to meet the City's overall financial goals. At that point, specific projects and year of construction can be established to complete the Capital Improvement Plan.

If the City wants to pursue the alternative to use State bonding to finance the projects, they should commence meetings with their legislators to determine the likelihood of success and next steps. The next biennium bonding year for the state would be 2022. We would suggest a strategy meeting with the City Council toward the end of Q1 for this option. Applications are due in June 2021 for the 2022 bonding bill.

Please note that these cost estimates are intended to be used for planning and budgeting purposes. The construction costs were based on 2020 bid prices. A Feasibility Report/Engineering Report should be completed before the design and bidding of any projects are authorized. A Feasibility Report/Engineering Report will better define the project scope, detailed design parameters and project costs. It is recommended the City authorize a Feasibility Study for projects one year before they want to begin construction. In other words, a feasibility report for a 2022 project should be completed in 2021.

I am available to meet with the City Council anytime to go over this report and costs.

APPENDIX:

Figure 1 – Street Rehabilitation

Figure 2 – Water System

Figure 3 – Sanitary Sewer

Figure 4 – Storm Sewer

Exhibit 1 – Cost Estimates

Exhibit 2 – Forces and Issues Matrix for watermain installation options

Exhibit 3 – Funding Opportunities