

Miscellaneous Collection System Improvements



Project Proposer/Champion: Erik Rehr

Project Purpose:

The purpose of the project(s) under this title is to address several collection system improvements. The small improvements (less than \$75,000) are combined into one larger project to provide the ability to make incremental improvements to the collection system's existing infrastructure on an as need basis. The project funding will provide flexibility to complete the highest priority improvements and bid work as combined improvement projects.

Project History and Status:

Collection system projects are typically funded through the CIP and these projects typically consist of pump station rehabs, capacity improvements, and interceptor replacement, relief and lining. In between these large CIP projects, smaller issues come up within the collection system that don't warrant a full CIP project but are too large and complex for internal maintenance staff to handle with their time and budget. These types of projects are identified each year individually for budgeting purposes but are rarely put together to form a single large project.

For 2019 planning it was suggested that perhaps several of these smaller projects could be rolled into a single package for purposes of funding as well as obtaining quotes for work. Several of these projects are addressed within, and are summarized as:

- Lower arcflash rating at PS 16
- Communication upgrade at PS 5 and PS 17
- Modify PS 18 bar screen controls
- Sampling piping modifications at PS 9, PS 14, PS 16 and PS 17
- PS 15 pump clean out access points
- Cast iron fitting replacement at PS16
- Sewer access road-NEI Deforest Extension
- Sewer access road-NSVI
- Removal of Pumping Station Stoplogs

Preliminary Path:

It is believed by staff that these projects can be broken into smaller appropriate size projects for bid and completion. In some cases consideration can be given to combining with work that is similar or would be handled by the same type of contractor in order to create efficiencies in cost and administration. When combination opportunities are believed to be potentially favorable identification of these opportunities will be pointed out for further investigation and consideration.

Alternatives

Alternatives generally are to defer work or not make improvements. Projects in this section are items that in many cases have been deferred or staff have (and are) operating "as-is". The downside to continued deferment or denial of projects depends on the project but generally could be classified as continued degradation of material condition, or continued operation in a less than optimal means (with respect to important operating considerations such as energy use or safety). An attempt will be made to touch on the specific risks or downside as each project is summarized below.

Project: Lower arcflash rating at PS 16

This project is a safety related project intended to lower the arcflash rating of the PS 16 motor control center (MCC) by replacing in with a modern MCC. The current MCC at the pump station was installed in the early 1980's when the station was constructed. During that era, the equipment was not designed with arcflash hazard in mind. To safely work in the MCC, all of the power to the MCC needs to be shut off, thus shutting down the pump station. Due to the age of the MCC and its electrical components, it is the opinion of staff that the risk of failure is becoming too great and that an update of this MCC represents a needed investment to help ensure continued and reliable service of the pump station.

This work would be completed by a contractor to ensure continued reliability of this critical pump station. Risk of not doing this work would be unplanned failure of the MCC or one of its components which could render the entire pump station inoperable until the issue is resolved. The installation of a modern MCC would allow staff to work on a single component of the MCC while keeping the pumping station operational.

Anticipated cost of this project is \$37,500.

Project: Communication upgrade at PS 5 and PS 17

This project is needed to update the PLCs at the two pump stations to the latest version of PLC and Controllogix software. The current PLCs at the stations are over 20 years old and are out of date. The PLC manufacturer no longer services these models and parts are hard to come by, if available at all. If one of these units were to fail, automatic station control would be lost and the station would have to be run manually until a replacement could be installed. Staff would rather forego the emergency situation and replace the PLCs in a controlled and scheduled manner.

This work should be done to ensure continued reliability of this critical pump station and to bring up the equipment to the standards of the rest of the pump stations. One alternative option would be to replace the PLC at PS 5 only, and keep the original parts as spares for PS 17 until its PLC can be replaced in an upcoming rehabilitation project. Work would be completed internally by MMSD staff.

Anticipated cost of this project is \$30,000 per pumping station for a total cost of \$60,000.

Project: Modify PS 18 Bar Screen Controls

This project is needed to improve operation and reduce wear on the bar screens at PS 18. As part of the PS 18 design, bar screens were installed in the influent channel that remove rags and debris from the wastewater stream, compact those screenings and dispose of them in a dumpster. The consulting engineer specified that the bar screens run on a timed basis which means the rake passes over the screen on the interval specified. This is problematic because the rake will cycle when there is no debris on the screen, or excessive debris will build up in between cycles and end up plugging the screen or compactor. This leads to excessive wear on the screen units and more maintenance for staff. The proper way to cycle the screens would be based on differential level which triggers the screen to run only when needed. This reduces wear, maintenance and power consumption and results in better screening of influent.

This work is not an emergency that will lead to failure if not completed but should be done as soon as practical to increase the longevity and reliability of these critical pump station assets. Work would be completed internally by MMSD staff.

Anticipated cost of this project is \$12,500

Project: Sampling piping modifications at PS 9, PS 14, PS 16 and PS 17

This project is to install and reroute sample piping in each of the above pump stations that currently discharge into the utility sinks at each station. This is a two-fold issue. First, discharging the sample piping into the sinks is effectively introducing raw wastewater into the dry well calling into question confined space issues. Also, the sinks drain into the sump pump which periodically clogs during sampling operations due to rags from the raw wastewater. Sump pumps that fail at these times have led to dry well flooding and emergency call outs. Not completing this work could lead to further dry well flooding and hazardous conditions in the dry well. This work would be completed by a contractor.

Anticipated cost of this project is \$15,000

Project: PS 15 pump clean out access points

This project is to fabricate new pieces in each of the PS 15 pump suction lines that allows for access by a mechanic to clean the pump without removing the expansion joints. When PS 15 was designed, it was unknown that the pumps lacked cleanout on the suction side and therefore no separate cleanout was designed. During the project, it was recommended to not complete this work so the contractor could keep on schedule and it would be handled as a maintenance project. Not completing this work will result in higher labor costs and more down time when a pump needs to be cleaned. This work would be completed by a contractor.

Anticipated cost of this project is \$12,500

Project: Cast Iron Fitting Replacement at PS16

This project is to replace all of the cast iron fittings that still remain in the PS16 pump room. Over the past two years, there have been two failures of cast iron fittings and more are anticipated at the pump station ages. Fittings would be replaced with ductile iron fittings which have been proven to be more durable. Not completing this work could result in a catastrophic failure and flooding of the pump room at PS16. This work would be completed by a contractor. (this could be accomplished over several years by doing one pump train at a time reducing yearly project cost)

Anticipated cost of this project is \$100,000

Project: Sewer access road-NEI Deforest Extension

This project is to install an access road for sewer maintenance staff so they can safely and reliably access manholes on the NEI Deforest Extension along the north side of the Cherokee Marsh. Currently these manholes are inaccessible due to high ground water and saturation conditions. In preparation for installation of an access road, sewer maintenance staff would clear the area for the road. The installation of the road would be completed by a contractor. Permitting needs may arise during the planning process that could make this project unfeasible.

Anticipated cost of this project is \$50,000

Project: Sewer access road-NSVI

This project is to install an access road for sewer maintenance staff so they can safely and reliably access manholes on the NSVI between Highway 14 and Syene Rd, and parts west of Syene Rd. Currently these manholes are inaccessible due to high ground water and saturation conditions. In preparation for installation of an access road, sewer maintenance staff would clear the area for the road. The installation of the road would be completed by a contractor. Permitting needs may arise during the planning process that could make this project unfeasible.

Anticipated cost of this project is \$100,000

Project: Removal of Pumping Station Stoplogs

This project is to permanently decommission stoplogs that remain at various points in the collection system. During the high flow event in 2018, the integrity of the stop logs had to be monitored continuously to verify lake water was not flowing into the collection system. Climate change is likely to bring larger storms that were seen in 2018, and the issues with stoplogs may be an ongoing problem. If this work is not completed, during a high flow event, lake water may breach the current stop logs and overwhelm the collections system. This work would be completed by a contractor with assistance from MMSD.

Anticipated cost of this project is \$50,000

Key Risks and Issues

N/A

Economic Analysis

N/A

Recommended Option:

N/A

Project schedule:

Project	Total Est. Cost
Lower arcflash rating at PS 16	\$37,500
Communication upgrade at PS 5 and PS 17	\$60,000
Modify PS 18 bar screen controls	\$12,500
Sampling piping modifications at PS 9, PS 14, PS 16 and PS 17	\$15,000
PS 15 pump clean out access points	\$12,500
Cast iron fitting replacement at PS16	\$50,000
Sewer access road-NEI Deforest Extension	\$50,000
Sewer access road-NSVI	\$50,000
Removal of Pumping Station Stoplogs	\$50,000

***Total 2020 budget not to exceed \$80,000 for Miscellaneous Collection System Improvements.**