APWA MINNESOTA CHAPTER
PUBLIC WORKS PROJECT OF THE YEAR NOMINATION FORM

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Submission Deadline: October 1, 2021

All nomination and supporting data are to be submitted as a PDF to Sarah at sarah.lloyd@bolton-menk.com with a maximum page size of 5 pages, including photos.

Project Nominated:

Minnehaha Park Area Sewer Rehabilitation

Managing Agency: Metropolitan Council
Contact Person: Chad Davison
Agency Address: 3565 Kennebec Drive, Eagan, MN 55122
Agency Phone Number: 651-602-4031

Project Design Firm: Brown and Caldwell, CNA Consulting Engineers
Project Construction Administration Firm: Metropolitan Council and Foth Infrastructure & Environment, LLC
Project General Contractor: Lametti and Sons

Name of Person Making Nomination: Chad Davison
Phone Number: 651-602-4031

Criteria for Nomination

- Project must be substantially completed by October 31, 2021.
- Includes use of innovative construction management techniques and completion of the project on schedule.
- Maintained excellent safety performance and safety program throughout construction.
- Evidence of strong community relations during all project phases.
- Consideration given to the environment. Sustainable design techniques involved.
- Unusual accomplishments given adverse conditions.
- Provides future value to the public works profession and perception by the public.
- Additional considerations such as value engineering, innovative project financing, multi-agency coordination and participation.

Reasons for Nomination: Describe the project with the aspects and features of the project that fulfilled any of the applicable criteria listed. (Include description on a separate page.)

APWA-MN 2021 Local Awards Program

PROJECT OF THE YEAR

Figure 1. Temporary conveyance of wastewater over Minnehaha Creek

Metropolitan Council Environmental Services (MCES) Minnehaha Park Area Sewer Rehabilitation

Project Overview

Major wastewater conveyance projects rarely attract public attention and yet they are vital to protect the health and welfare of the public and surrounding environment. Recognizing the need for centralized wastewater collection and treatment, the Twin Cities of Minneapolis and St. Paul joined forces in 1938 to construct the first major metropolitan wastewater collection and treatment system on the Mississippi River. Eighty years later, the MCES continues to operate, maintain, and rehabilitate these facilities through large-scale capital projects. The MCES Emergency Relief Structure–04 (ERS-04) is one such project that is the culmination of over eight years of planning, design and construction. Overcoming challenges associated with working up to 75-feet below the ground surface, maintaining wastewater flows in excess of 59,000 gallons-per-minute (gpm) throughout the construction period, avoiding impacts to a rare groundwater resource protected by state statute, and working with over 12 unique public stakeholder groups in the center of an urban area and a high-traffic park. This $20,000,000 project was successfully completed on schedule and within budget.

Because the original sewers were designed to carry both stormwater and wastewater, relief structures (formerly known as regulators) were incorporated to relieve rain induced peak flows directly to the river. Failure to provide this relief capability could result in upstream sewage backups, open discharge of sewage or over-pressurization, and damage to downstream interceptors. ERS-04, located adjacent the Minnehaha Park in Minneapolis as shown in Figure 2, was designed to protect upstream residential areas as well as the downstream interceptor system. Due to deliberated and intense sewer separation and infiltration/inflow reduction programs, there has not been a release of wastewater at ERS-04 for over 17 years. However, because of the age of these facilities and due to their corrosive environments, rehabilitation of the relief structure, deep tunnel sections and vortex drop shafts became necessary to provide safe, reliable service over the next 80 years.

Figure 2. Project map

Innovative Construction Management Techniques and Completion of the Project on Schedule

Rehabilitating an 80-year-old non-circular sewer located 75 feet below the ground surface presented many unique challenges, which were solved through careful planning and innovative solutions from the design team and the contractor. The unique shape of the 6-ft tall, inverted horseshoe sewer required the application of custom liners, which were provided by Channeline® and manufactured in Dubai, UAE. Installation of these custom fabricated structural shapes required temporary conveyance of the wastewater around the deep tunnel sections, field measurement of the sewer profile, custom fabrication and trans-oceanic shipment of the sections. All requiring careful planning and scheduling by the contractor. Arriving onsite, the over 700 two-ft liner sections were numbered and staged for insertion into the 60-ft deep access shafts. Figure 3 shows the liner sections being placed in the tunnel.

The temporary conveyance systems were carefully designed to maintain safe and reliable conveyance of wastewater around the construction site and monitored to provide continuous operation. With capacities of over 59,000 gpm, multiple systems were deployed with the necessary redundancy and back-up power systems. The discharge manifold and piping for the largest of the temporary conveyance systems is shown in Figure 4.

Additional measures that were taken to facilitate timely construction included tunnel lining during the night-time to avoid interferences with day-time work on the ERS-04 structure. Figure 5 shows crane operation during night-time insertion of the liner sections.

Maintain Excellent Safety Performance and Safety Program Throughout Construction

Implementation and execution of an effective safety program for construction was a high priority during planning and design activities. Constructability challenges, such as prolonged work in confined spaces with limited means of ingress and egress, required the development of ventilation strategy to be incorporated into the contract documents. As such, two ventilation shafts were included in the design to facilitate safety throughout construction. These 24-inch diameter shafts were drilled to the tunnel invert, 75 feet underground. The new shafts and existing access structures were used to ventilate the manned-entry workspace. The air was monitored continuously, and frequently had to be adjusted as barometric pressure, variation in the tunnel headpsace air flow, as well as vortex drop influenced the air flow and direction.

Figure 3. Liner installation

Figure 4. Discharge manifold and piping

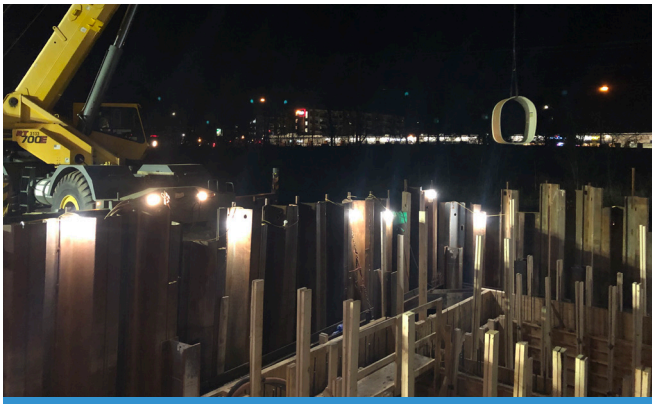


Figure 5. Night-time installation of tunnel sections

Additional safety challenges included work near high value and culturally significant areas within Minneapolis Park and Recreation Board (MPRB) properties, safe passage of pedestrians, vehicle and bicycle traffic around work areas and temporary conveyance piping corridor.

Four separate temporary conveyance systems operating around the clock required 24-hour monitoring. In aggregate, the peak wet weather flow pumping requirements for the combined system reached 85 million gallons per day (MGD). The magnitude

of this system and the potential impacts of a break or malfunction demanded additional safeguarding requirements. As a result, jersey barriers and fencing for protection against potential vehicular traffic impacts and vandals were implemented.

Significant traffic staging was planned to allow homeowners to safely access their residence. In some instances, traffic flow had to be reversed and maintained to access around the temporary conveyance piping. Traffic in and around the Minnehaha Park was also a significant concern. Pedestrian, vehicular, and bicycle traffic had to safely be routed through the work areas.

The COVID-19 pandemic brought the project challenges, safety procedures and protocols to unique standards. The onset of the pandemic resulted in various concerns, such as the potential transmission through contact or exposure with sanitary sewage. In response to the workers' concerns for their health and safety, the contractor constructed a small, enclosed space for personnel to have a shower following their work shift, and further minimize their exposure and transmission. All of which resulted in a COVID-free construction project.

Evidence of Strong Community Relations During all Project Phases

Community Relations and Engagement during Planning and Design

The ERS-04 project occurred in the center of a major urban area, adjacent to one of Minneapolis' premier parks receiving over 850,000 visitors annually and had the potential to impact a high value cultural and natural resource with Minnesota statutory protection. Success could only be achieved through a comprehensive public outreach program that began early in the design process and continued through final completion. Listening and educating were co-equal components of our communication strategy; Listening and understanding stakeholder concerns and providing stakeholder education on the need for the project and measures being taken to minimize disruptions.

Of particular concern on this project were potential impacts to Coldwater Spring (CWS), a protected groundwater resource that discharges to Minnehaha Creek just below the falls. Rehabilitating a 75-ft deep sewer without the ability to engage in any dewatering activity that could diminish flow in CWS was the one of the, if not the greatest challenge of the project.

Other interactions during the design phase included meeting with all impacted Minneapolis neighborhood associations including the Longfellow Neighborhood Association, the Nokomis East Neighborhood Association and the Standish Ericsson Neighborhood Association. Meetings with elected officials include the Minneapolis City Council member for this area and the Commissioner of the Minneapolis Park and Recreation Board.

Through meetings with the Minnehaha Creek Watershed District, Friends of CWS, the US National Park Service and the Mendota Mdewakanton Dakota Tribal Community the team developed an understanding of the natural and cultural significance of the Spring and was able to adapt construction techniques to avoid any impacts to the spring.

Community Relations and Engagement during Construction

Community relations and engagement began nearly six months prior to the start of construction with presentations and outreach to local businesses and residents. Communications was ongoing through the completion of the project in 2021. Targeted mailings and door-to-door notifications were prepared based on construction impacts and activities such as trail closures, parking restrictions, after-hours work and road impacts. Bicycle and pedestrian safety groups were contacted prior to the Hiawatha Bike Trail closure in an effort to reach regional trail users. In addition, several signs with a project overview and project contact information were installed along the trail and throughout the project area.

Total Outreach Activities	Total Inquiries Received (through project phone line/e-mail)	E-mail Subscribers
43	99	1,131
Door-to-door flyers and mailings to residents	Public meetings and events	Regular e-mail updates

The project featured a web site with a dedicated hotline to receive any questions or concerns. As construction progressed, project updates were posted to the project website and sent out to the 1,131 e-mail subscribers to help keep the community up to date on project activities and impacts.

Environmental Considerations and Sustainable Design

Coldwater Spring Area and Geology

CWS flows out of the limestone bedrock approximately 1.5 miles southeast of the project site. It was used as a source of drinking water by native Americans for hundreds of years and by soldiers during and after construction of Fort Snelling in the 1820s. Because of its historical and cultural significance, the spring is protected by Minnesota Statute. Because of possible hydraulic connectivity between the spring and limestone fractures in the project area, site dewatering had the potential of altering flows to the spring.

Groundwater investigations were performed in the project area in an attempt to assess the movement of groundwater and to avoid interrupting, plugging or redirecting groundwater. Cores were drilled into the bedrock to locate both horizontal and vertical fractures that could carry water to CWS. Figure 6 shows the historical CWS headhouse where groundwater comes to the surface downstream of Minnehaha falls. Because of the inability to definitively determine the direction and volume of groundwater movement in the area, more conservative construction techniques were implemented to avoid the need for site dewatering within the affected aquifers.

Monitoring

Monitoring of flow to CWS has been conducted by the National Park Service (NPS) at the CWS Headhouse for years. Statistical analyses were also performed on the NPS data collected to date to identify trends in the groundwater flow. During construction sampling frequency was increased to provide additional information. Throughout the construction and monitoring period no impact to CWS was detected.

Unusual Accomplishments in Adverse Conditions

Rehabilitation Instead of Replacement

The original design concept was to replace the 80-year-old tunnel downstream of ERS-04 with a new tunnel cored through the limestone. This would have also required the construction of two large access shafts. Because of potential impacts to CWS, MCES chose instead to line the existing tunnel. This decision not only further ensured protection of the spring, it allowed continued use of existing assets and eliminated the need for extensive truck traffic that would have been required in a residential area to remove the spoil materials created by the tunneling operation.

Figure 6. Coldwater Spring – Headhouse and Pond

Overcoming Adverse Conditions

Rehabilitation of two vortex drop shafts upstream of the regulator posed additional unique challenges. The atmosphere inside the drop structures was the source of many odor complaints, resulted in significant corrosion to the concrete structures, and created a barrier to adequate inspection. Once under construction and flows were fully diverted, a proper inspection was completed revealing greater levels of concrete corrosion than had been anticipated. Working collaboratively, MCES, the design team, and the contractor developed rehabilitation methods that could be quickly implemented, thus avoiding prolonged traffic impacts and increased costs from extended operation of the temporary conveyance system.

At the regulator structure, excavation revealed concrete deterioration far greater than had been anticipated. The evidence pointed to improper concrete placement at the time of the original construction requiring additional demolition to expose competent concrete to ensure a sound structure for the future.

The project was also in proximity to civil unrest during the spring and summer of 2020, which was also the height construction period. Through proper security measures and attentiveness on the part of the contractor, they were able to continue with construction and avoid any project delays.

Future Value to Public Works Profession and Perception of Public Works by the Public

Public Impacts

With major public works projects, some level of public disruption can't be avoided. This project had the potential for significant impacts to many constituents including users of the area's highway, light rail, and popular park and trail systems. Through proactive public involvement MCES communicated with and received valuable input from the public and other impacted stakeholders. This input was used to inform sustainable design concepts to minimize negative impacts of noise, odors, traffic and restricted use of the park. The team worked closely with Minneapolis to develop a safe detour for the bike trail during construction and provided a freshly paved trail at the end of construction.

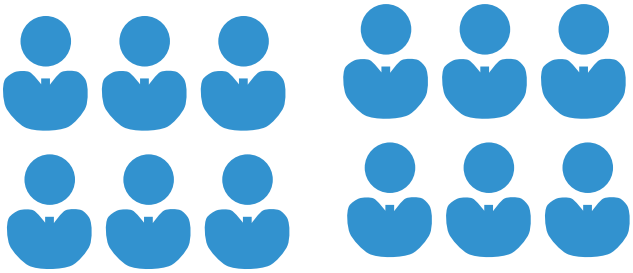
Other measures included installation of the temporary conveyance piping below grade or behind berms where appropriate in high traffic or high visibility areas.

By listening to stakeholders and responding responsibly, MCES was able to clearly communicate that large public works projects and the continued safe use of public services and enjoyment of public amenities can occur simultaneously.

Figure 7. This photo shows ERS-04 mid-construction. To the left is the sanitary outfall; to the right is the old 11- foot high outlet to the Mississippi River.

Additional Considerations - Multi Agency Coordination

This project required coordination with multiple regulatory and stakeholder groups with diverse interests in the project. These groups included:



- Minnehaha Creek Watershed District
- Minneapolis Public Works Department
- Mendota Mdewakanton Dakota Tribal Community
- Friends of Coldwater Spring US Fish and Wildlife Service
- Minnehaha Creek Watershed District
- Minneapolis Park and Recreation Board
- Metro Transit
- MN Pollution Control Agency
- MN Department of Transportation
- MN Department of Natural Resources
- MN Department of Health
- US National Park Service