Item 6D.
BCWMC 2-17-22

Bassett Creek Main Stem Stabilization Project

Minneapolis, Minnesota

FINAL REPORT

February 2022

I. Project Overview

The Bassett Creek Watershed Management Commission (BCWMC), in cooperation with the City of Minneapolis, implemented the Main Stem Stabilization Project to reduce erosion within the Bassett Creek channel, minimize sediment and pollutant transportation downstream to the Mississippi River, and improve habitat for fish and other aquatic biota. These stabilization and restoration activities were completed along two reaches of Bassett Creek; Reach 1, located between Cedar Lake Road and the Bassett Creek tunnel entrance, and Reach 2, located upstream near the former Fruen Mill site. The project utilizes boulder vanes, fieldstone riprap, live stakes, fascines, and native vegetation plantings to restore and stabilize the stream bed and banks and minimize bank erosion. Construction began at both reaches on December 1, 2020 and was completed at Reach 2 on December 8, 2020 and at Reach 1 on December 15, 2020. Following construction activities at each site, native vegetation restoration activities were implemented during the 2021 growing season to reestablish plant communities.

II. Project Area

The project area is divided into two reaches along Bassett Creek. Reach 1 is located approximately 196 feet downstream of North Cedar Lake Road and extends 2,573 feet downstream to the Bassett Creek tunnel entrance. Reach 2, located upstream of Reach 1, is adjacent to the historic Fruen Mill site. The Project area starts approximately 158 feet downstream of Glenwood Avenue, and continues downstream for 583 feet. The Project areas for Reach 1 and Reach 2 are shown in Figure 1 (attached). Additional detail on the stabilization measures used and their extents is shown in Figures 2 through 4 (attached).

III. Project Descriptions and Outcomes

Barr Engineering Co. (Barr) was contracted to design the creek stabilization project and provide construction oversight, and Sunram Construction, Inc. (Sunram) was contracted to construct the project. Barr contracted 106 Group to complete a cultural resource inventory in the project area, and Sunram contracted Landbridge Ecological (Landbridge) for site restoration following construction activities. Permits were obtained from the Minnesota Department of Natural Resources (Public Waters Work Permit), US Army Corps of Engineers (USACE: General – Nationwide Permit for Bank Stabilization) and approval from the Minnesota State Historic Preservation Office, in addition to other state and city permits.

The feasibility study prepared for the project (Barr, 2016) recommended a combination of bioengineering and hard armoring measures to stabilize the eroding banks, remove non-native materials, and improve stream bank vegetation. The recommended measures were selected to achieve good bank stability and habitat quality while minimizing the potential for disturbing contaminated soils, especially in Reach 1. The total reduction in pollutant loading as a result of the project was estimated for the feasibility study as 48,300 pounds per year total suspended sediment and 27.8 pounds per year total phosphorus.

Compared to the approved design plans (90% plans, October 2017), the project design was modified prior to construction due to access restrictions on the Pioneer Paper property on the

north side of the creek in Reach 1 (Figure 2). The access allowed by the property owner was not sufficient for the installation of the proposed vegetated reinforced soil slope (VRSS); the modified design included debris removal and installation of riprap toe protection on the lower portions of the slope only (accessed via the creek channel), as well as bank grading, vegetation establishment, and installation of boulder vanes in the creek channel. In addition, the bid alternates designed for the east bank of the creek in Reach 2 on the Fruen Mill properties (Figure 4) were not constructed due to the pending redevelopment and restoration of larger areas on those properties that would need to coordinate with any work along the creek banks.

Prior to construction activities, trees and debris were removed along the southern bank approximately 800 feet upstream and 200 feet downstream of the Irving Avenue footbridge. Targeted tree removal was required in areas along the banks where interference with equipment was anticipated. Approximately 850 feet of chain linked fence was removed from the northern bank between the channel and Pioneer Paper and was replaced following tree clearing. Approximately 135 cubic yards of large debris and 259 tons of contaminated soils were removed from the channel and along the southern bank during the installation of boulder vanes. These quantities were reduced from the quantities estimated for the approved design plans (90% plans, October 2017) due to the modification of the design at the Pioneer Paper property and the removal of VRSS installation in Reach 1.

In Reach 1, Sunram installed a total of 1,220 feet of riprap (Figure 2 and Figure 3). Original plans called for 910 feet, but additional riprap was added beyond what was planned to further protect the bank and existing sewer outlets and to tie into the bank in a better position. Approximately 710 feet of fascines were installed by Landbridge along the edges of the banks in the center and downstream portions of the reach. Landbridge also installed approximately 1,380 feet of live stakes in the downstream portion of the reach. In spring 2022, Landbridge is expected to install additional rows of live stakes east of Van White Memorial Boulevard. Sunram installed 12 boulder vanes: 11 vanes in the upstream portion of Reach 1 and one vane further downstream. The original plan called for 10 vanes in the upstream portion of the reach; an additional vane was added to provide adequate spacing between vanes. Additional riprap and boulder vanes were also installed as part of the City's Irving Avenue Sanitary Sewer near the former Irving Avenue bridge as part of the sewer project site restoration, in coordination with this project. Those quantities are not reflected in this report.

At Reach 2, approximately 485 feet of the existing walking trail was improved using a 4-inch thick MnDOT class 5 aggregate (Figure 4). Sunram installed 417 feet of riprap to stabilize the toe of the stream bank below the walking trail and the VRSS. The riprap along the walking path was installed around the historic walls currently present, ensuring that no impacts were made to these structures. Sunram installed 141 feet of VRSS on the downstream portion of the Reach 2 project area. Additional VRSS was added to accommodate the contour of the existing slope and the creek's meander. The VRSS and riprap installed at the downstream portion of Reach 2 were designed to protect the toe of the exposed high bank and minimize further erosion caused by the creek flow; the high bank itself was not graded in order to minimize disturbance at the top of the bank and is anticipated to gradually vegetate over time.

Following construction activities at both sites, areas of exposed soil were covered using erosion control blankets and seeded with a native seed mix. Additionally, Landbridge planted native

vegetation in these areas to help reestablish plant communities and reduce the potential for soil erosion.

Compared to the pollutant reductions estimated for the feasibility study (48,300 pounds per year total suspended sediment and 27.8 pounds per year total phosphorus), the project as constructed is estimated to remove a very similar total pollutant load due to the similar (slightly longer) total length of stabilization: 50,500 pounds per year total suspended sediment and 29.0 pounds per year total phosphorus. The removal of VRSS at the Pioneer Paper site in Reach 1 from the project did not affect the calculation of pollutant loading because the riprap toe stabilization was designed to be sufficient to stabilize the lower bank and the upper bank remained undisturbed.

I. Timeline and Key Documents

- April 21, 2016: Final Feasibility Study Report approved by BCWMC
- August 2016: Response Action Plan submitted to MPCA
- October 2016: Response Action Plan approved by MPCA
- September 2016: Public hearing for proposed project
- August 17, 2017: 50% Plans approved by BCWMC
- September 2017: Public open house
- October 2017: 90% Plans approved by BCWMC
- January 2018: Environmental Response Fund (ERF) Grant agreement signed by Hennepin County
- April 2020: ERF Grant Extension approved by Hennepin County
- November 2020: USACE permit issued
- November 2020: Construction began (clearing and grubbing)
- December 15, 2020: Construction complete
- December 2020 – 2021: Vegetation establishment and management

The feasibility study was completed in 2016 and assessed site conditions, gathered input from stakeholders, and evaluated options for restoration and stabilization measures in both reaches. Additional information and documents can be found at: https://www.bassettcreekwmo.org/index.php?cID=281.

II. Project Budget and Funding

The project was funded through ad valorem tax levies collected in 2017 and 2018 totaling $914,172. In addition, Hennepin County provided $150,300 through an Environmental Response Fund (ERF) grant to provide financial assistance for disposing contaminated soils from the Reach 1 site of which approximately $36,000 is expected to be requested for reimbursement due to project scope changes resulting in a smaller volume of contaminated soil requiring disposal.

Original Budget:

- Feasibility Study: $104,600

- Commission Costs: $27,872
- Design, permitting, construction: $932,000
- TOTAL BUDGET: $1,064,472

Final Costs:

- Feasibility Study: $104,600
- Commission Costs: $25,629
- Design, Permitting and Engineering Costs: $210,000*
- Construction: $441,337
- TOTAL: $781,566

*Estimated costs at completion. Reporting related to ERF grant in progress.

Project Funding Sources:

- 2017 & 2018 Levy: $914,172
- ERF Grant: $36,000
- TOTAL: $950,172

III. Lessons Learned

The project schedule was delayed from 2018 to 2020 due to additional studies required by the State Historic Preservation Office to obtain the USACE permit, and difficulty in obtaining private property access, requiring modification of the design. These additional planning tasks resulted in the need to delay the project by more than a year in order to complete the construction work during a period of seasonal low flow in the creek. While the USACE permit was ultimately granted, the specific historical and archeological review requirements required a specialized subcontractor and multiple specific review steps and procedures. We recommend considering the schedule and cost implications of permitting studies as a significant portion of the planning and design effort early in the planning stages for future projects.

In addition, several modifications were required to the original October 2017 plans to adjust for field conditions and the inability to access to the creek through private property. For example, initial plans required access to Pioneer Paper (private property) to implement VRSS stabilization methods, but access was ultimately not granted by the property owner, despite numerous attempts at negotiation. Future designs may consider including alternates for features that rely on private property access or obtaining access agreements ahead of final plans and permitting. Maintaining flexibility in plans to accommodate unexpected or changing field conditions and access challenges during creek work would be beneficial in densely populated or hard to access areas.

IV. Maintenance

With the project's footprint traversing several different property owners including the Minneapolis Park and Recreation Board and several City of Minneapolis departments including, Public Works and Community Planning & Economic Development (CPED), as well as private property owners, Pioneer Paper and at Glenwood LLC, Surface Waters and Sewers

inspectors from Minneapolis Public Works department will assume the responsibility for ongoing erosion inspections and any necessary reporting.

The completion of the project resulted in the stabilization of eroding banks through the project area. Providing this stability reduces erosion and improves water quality in the project area as well as downstream waterbodies. While further work or maintenance is not anticipated or required, regulatory inspectors from Minneapolis Public Works will provide fall and spring inspections through 2023. These inspections will verify the ongoing success of the project as well as whether any future work is recommended to further stabilize the stream banks through this area.

V. Project Photos

Reach 1: Tree and shrub clearing along the southern bank upstream of the Irving Ave. footbridge (12/1/2020)

Reach 1: Debris and trash along the southern bank (12/1/2020)

Reach 1: Upstream portion of the reach prior to construction activities (12/1/2020)

Reach 1: Southern bank following tree and shrub clearing. Drum disposed of at landfill (12/3/2020)

Reach 1: Removal of debris within the channel and installation of riprap (12/7/2020)

Reach 1: Installation of downstream boulder vanes (12/8/2020)

Reach 1: Stockpile of debris and contaminated soils with erosion control logs (12/8/2020)

Reach 1: Installed riprap and erosion control blanket along northern bank (12/10/2020)

Reach 1: Landbridge Ecological installing fascines near culvert upstream of Van White Memorial Blvd. (12/10/2020)

Reach 1: Cleared southern bank downstream of Irving Ave. footbridge (12/10/2020)

Reach 1: Installation of riprap downstream of Irving Ave. footbridge (12/10/2020)

Reach 1: Installation of upstream riprap and boulder vanes (12/14/2020)

Reach 1: Upstream boulder vanes and riprap (6/17/2021)

Reach 1: View of boulder vanes, riprap, and vegetation reestablishment in upstream portion of reach (6/17/2021)

Reach 1: Riprap and native vegetation reestablishment upstream of Irving Ave. footbridge (6/17/2021)

Reach 1: Native vegetation reestablishment along southern bank (6/17/2021)

Reach 1: Riprap and native vegetation reestablishment along southern bank downstream of Irving Ave. footbridge (6/17/2021)

Reach 1: Native vegetation reestablishment and fascines upstream of Van White Memorial Blvd. (6/17/2021)

Reach 1: Section downstream of Van White Memorial Blvd. to Bassett Creek tunnel (6/23/2021)

Reach 2: Clearing for riprap and VRSS (12/1/2020)

Reach 2: Installation of riprap for VRSS and bank stabilization (12/1/2020)

Reach 2: Installed riprap on downstream portion of the reach (12/1/2020)

Reach 2: Installed riprap, erosion control blanket, and VRSS (12/4/2020)

Reach 2: Installed riprap and trail improvement (12/4/2020)

Reach 2: Installed riprap and trail improvement (12/8/2020)

Reach 2: Native vegetation reestablishment in VRSS (6/17/2021)

Reach 2: Riprap and native vegetation reestablishment at trailhead from Glenwood Ave. to site (6/17/2021)

Reach 1
Reach 2
Stream
Old Tunnel
New Tunnel
Municipal Boundary

Bassett Creek Watershed Management Commission

N

0 550 1,100
Feet

PROJECT LOCATION
Bassett Creek Main Stem Erosion Repair Project
Minneapolis, Minnesota

FIGURE 1

Barr Footer: ArcGIS 10.8.1, 2021-09-27 09:45 File: I:\Client\BassettCreek\Work_Orders\2021\Main Stem Repair Project\Maps\Reports\Response Action Implementation Report\Figure 1 - Project Location.mxd User: kac2

Reach 1

Construction Limits

Riprap Stabilization

Rock Cross Vane-Single Boulder

Fascines

Native Vegetation Planting Area

100 ft Stationing

Monitoring Well

Bassett Creek Watershed Management Commission

N

0 120 240

Feet

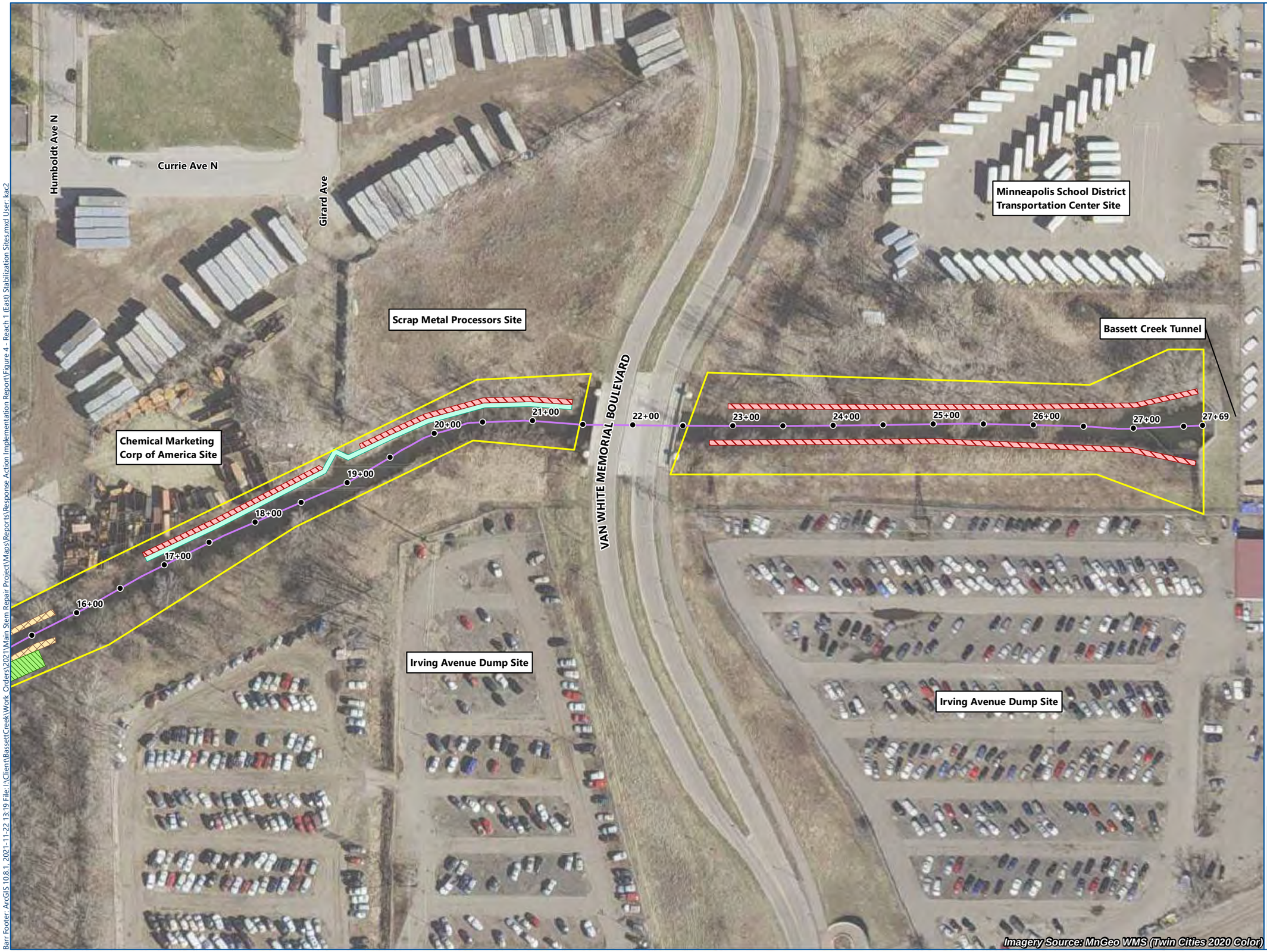
REACH 1 (WEST) STABILIZATION SITES

Bassett Creek Main Stem Erosion Repair Project

Minneapolis, Minnesota

FIGURE 2

Barr Footer: ArcGIS 10.8.1, 2021-11-22 13:38 File: I:\Client\BassettCreek\Work_Orders\2021\Main Stem Repair Project\Maps\Reports\Response Action Implementation Report\Figure 3 - Reach 1 (West) Stabilization Sites.mxd User: kac2



Reach 1

Construction Limits

Riprap Stabilization

Fascines

Native Vegetation Planting Area

Live Stakes

100 ft Stationing

Bassett Creek Watershed Management Commission

N

0 90 180

Feet

REACH 1 (EAST) STABILIZATION SITES
Bassett Creek Main Stem Erosion Repair Project
Minneapolis, Minnesota

FIGURE 3

Reach 2

Construction Limits

Riprap Stabilization

Vegetative Reinforced Soil Stabilization

Trail Improvement

100 ft Stationing

N

0 75 150

Feet

REACH 2 STABILIZATION SITES
Bassett Creek Main Stem Erosion Repair Project
Minneapolis, Minnesota

FIGURE 4

Barr Footer: ArcGIS 10.8.1, 2021-11-22 13:18 File: I:\Client\BassettCreek\Work_Orders\2021\Main Stem Repair Project\Maps\Reports\Response Action Implementation Report\Figure 5 - Reach 2 Stabilization Sites.mxd User: kac2