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BARR

October 11, 2017

Elizabeth Stout, PE, CFM
Water Resources Regulatory Coordinator
City of Minneapolis – Public Works
105 S 5th Avenue, Suite 200
Minneapolis, MN 55401

Re: 90% Design Plans – Bassett Creek Main Stem Stabilization

Dear Ms. Stout:

Attached please find the 90% design plans for the Bassett Creek Main Stem Stabilization Project. The Bassett Creek Watershed Management Commission (BCWMC) is funding the Bassett Creek Main Stem Stabilization Project (BCWMC CIP 2017CR-M) through a 2017-2018 ad valorem levy (via Hennepin County). Per the cooperative agreement between the City of Minneapolis and the BCWMC, the city is to construct the project, and the plans and specifications are subject to approval by the Commission. Also, per the BCWMC's CIP project flow chart, the 90% design plans for this project must be submitted to the BCWMC for review and approval. If the attached 90% plans meet the city's approval, we recommend submitting them, along with this letter, to the BCWMC for inclusion in the meeting packet for their October 19 meeting. Barr staff will present the 90% plans to the BCWMC at the meeting and answer any questions from the BCWMC.

The remainder of this letter presents information about the feasibility study, the design features of the project, and approval/permitting needs.

Feasibility Study Summary and Selected Project

Bank erosion along the main stem of Bassett Creek in Minneapolis between Glenwood Avenue and Irving Avenue was evaluated in 2005 for an erosion inventory performed by Minneapolis Park and Recreation Board (MPRB). Portions of the reach were stabilized in a previous BCWMC CIP project (2012CR-M).

The BCWMC completed the *Feasibility Report for the Bassett Creek Main Stem Erosion Repair Project* (May 2016) to evaluate options for stabilizing additional eroding banks at sites along the Bassett Creek Main Stem between Cedar Lake Road and the entrances to the Old and New Bassett Creek tunnels as well as at the Fruen Mill site between Glenwood Avenue North and the Soo Line Railroad Bridge crossing. The study evaluated multiple stabilization options for 15 sites along Bassett Creek, including bioengineering and hard armoring techniques. The analysis considered various advantages and disadvantages of each option and included a detailed assessment of probable lifecycle costs. Based on the results of the analysis, the recommended stabilization measures for each site are summarized in Table 1.

Table 1 Bassett Creek Feasibility Study and 90% Design Summary

Site	Reach and Station (90% Design Plans)	Description	Recommended Alternative (Feasibility Study)	Design Modifications (90% Design Plans)
1	Reach 2 1+60 to 4+00	Eroding pedestrian trail	Design trail for sub-mergence at high flows	Trail surface stabilization with Class 5 aggregate
2	Reach 2 0+10 to 5+60	Bank armored with concrete and stone	Grade stream bank and vegetate	None
3	Reach 2 4+00 to 5+00	Bank erosion adjacent to riprap	Extend riprap to tie into historic wall	None
4	Reach 2 6+00 to 7+30	Undercut concrete swale and downstream banks	Install riprap toe protection	None
5	Reach 2 6+00 to 7+30	High eroding bank	Install VRSS and riprap toe protection	None
6	Reach 1 2+10 to 7+50	Steep undercut and eroding bank	Install VRSS and riprap toe protection	None
7	Reach 1 2+00 to 7+50	Stream bed with imported materials	Install boulder or log vanes to create step-pools	Boulder cross vanes selected
8	Reach 1 2+10 to 10+60	Paved top of stream bank	Remove debris and stabilize top of bank	Willow live stakes selected for stabilization
9	Reach 1 8+10 to 11+00	Undercut outer stream bank	Install willow stakes and live fascines	None
10	Reach 1 8+60	Culvert perched at low flows	Shorten culvert and add riprap	None
11	Reach 1 15+40	Culvert perched at low flows	Add riprap at existing culvert	None
12	Reach 1 13+70 to 15+80	Eroding stream bank toe	Install riprap toe protection and cross vane	None
13	Reach 1 16+80 to 21+40	Undercut outer stream bank	Install willow stakes and live fascines	None
14	Reach 1 22+70 to 27+70	Bare lower stream banks	Improve vegetation without grading	Willow live stakes selected for stabilization
15	Not applicable	Overflow channel with woody debris	Clear trees and remove woody debris	Not included in design, separate maintenance item addressed by City

Design Features – 90% Plans

The primary design features for the Project are shown in the 90% plans and summarized in Table 1. These features include:

- Installing a variety of stream stabilization measures, including riprap, live fascines, vegetated reinforced soil stabilization (VRSS), rock vanes, and riprap toe protection.

- Removing non-native channel bed material (brick and concrete block).
- Restoring the vegetative buffer and improving stream bank vegetation, using a custom native seed mix that focuses on resilient species that will be more resistant to invasive species and the industrial/urban environment; the seed mix specified includes species that are typically available and substitutions are possible in the event of seed unavailability. Trees and shrubs are also included to improve the stream bank vegetation, especially in areas stabilized with VRSS.

Hydraulic modeling of Bassett Creek for the project has been completed using the Bassett Creek model developed by the BCWMC, additional survey data collected by Barr, and hydraulic structure (bridge) information provided by the city. The model has been used to confirm the following items under the 100-year flood event:

- No locations show an increase in flood elevations for the 100-year flood event caused by the project.
- Flow velocities in the project areas for the project range from 1.1 ft/s to 7.7 ft/s, with the areas with highest velocity (Reach 1, Station 2+00 to 7+50) showing a decreased velocity relative to existing conditions due to the proposed bank grading.

Design elements that have been finalized and added to the plans for this 90% plan submittal include the following items:

- Stabilization of the foot path opposite the Fruen Mill site (Site 1 in Table 1), has been designed in consultation with the City and MPRB to include a compacted Class 5 aggregate base protected by riprap toe stabilization.
- Sizing of rock materials used for riprap toe stabilization and boulder vanes has been evaluated with the hydraulic model for the project and confirmed on the plans.
- Elevations and upstream/downstream stationing have been added to the plans for proposed toe stabilization measures following evaluation with the hydraulic model.
- Protocols for addressing invasive species in water, soil, and woody material have been added to the technical specifications.
- Quantities and species of tree and shrub plantings, as well as quantities of live stake plantings, have been added to the plans.

Contaminated soils are known to be present within the project site and many of the adjacent properties. In conjunction with the feasibility study, the BCWMC completed a *Phase II Investigation Report* (April 2016). As noted in the 90% plans and technical specifications, all disturbed soils will be tested and managed in accordance with the Response Action Plan prepared for the project, and Barr staff will provide environmental oversite during project grading activities.

As stated in the feasibility study, the total reduction in pollutant loading as a result of the project is estimated as 48,300 pounds per year total suspended sediment and 27.8 pounds per year total phosphorus.

Cost Estimate Summary

Cost estimate indicates the overall project costs will stay within the budget developed in the feasibility study as design and construction costs are projected to be below the amounts estimated during the feasibility study. A 90% cost estimate is attached to his memorandum.

Approvals/Permit Requirements

In addition to BCWMC approval of the plans, other permits/approvals will be required for this project. Permit applications have been submitted for the following permits:

- Minnesota Department of Natural Resources' (MDNR) public waters work permit
- USACE 404 permit, including a Section 106 review for historic and cultural resources

The following permit applications are being prepared for submittal at this time:

- Minnesota Pollution Control Agency (MPCA) National Pollutant Discharge Elimination System/State Disposal System Construction Stormwater (CSW) General Permit and Stormwater Pollution Prevention Plan (SWPPP), which is included in draft form in the 90% plans
- City of Minneapolis Erosion and Sediment Control plan
- MPRB Construction Permit
- Burlington Northern Santa Fe (BNSF) Railroad access agreements (pending discussion with BNSF)

Recommendations

We recommend that the city request 1) BCWMC approval of the 90% drawings, and 2) BCWMC authorization for the city to proceed with final plans, contract documents, and permitting.

If you have any questions, please contact me at 952-832-2706 or jweiss@barr.com.

Sincerely,

Jeff Weiss, P.E.
Senior Water Resources Engineer

BARR	**PREPARED BY: BARR ENGINEERING COMPANY**	**REV 0**	SHEET:	1	OF	1
			BY:	PJH2	DATE:	10/9/2017
			CHECKED BY:	JDW	DATE:	10/11/2017
ENGINEER'S COST ESTIMATE BASED ON 90% REVIEW PLANS			APPROVED BY:	JTL2	DATE:	
PROJECT:	Bassett Creek Main Stem Stabilization	ISSUED:			DATE:	
LOCATION:	City of Minneapolis, MN	ISSUED:			DATE:	
PROJECT #:	23271579	ISSUED:			DATE:	
OPINION OF COST - SUMMARY		ISSUED:			DATE:	

Engineer's Cost Estimate based on 90% Review Plans

Bid Item	ITEM DESCRIPTION	UNIT	ESTIMATED QUANTITY	UNIT COST	ITEM COST	NOTES
1	MOBILIZATION/DEMOBILIZATION	LS	1	$57,300.00	$57,300.00	1,2,3,5
2	CONTROL OF WATER	LS	1	$20,900.00	$20,900.00	1,2,3,5
3	RESTORE ACCESS PATHS & HAUL ROADS	LS	1	$10,500.00	$10,500.00	1,2,3,5
4	ROCK CONSTRUCTION ENTRANCE	EA	3	$1,500.00	$4,500.00	1,2,3,5
5	SILT FENCE	LF	2798	$3.50	$9,793.00	1,2,3,5
6	EROSION LOG	LF	1970	$3.50	$6,895.00	1,2,3,5
7	TURBIDITY CURTAIN	LF	92	$3.50	$322.00	1,2,3,5
8	CLEARING AND GRUBBING	ACRE	0.7	$7,000.00	$4,900.00	1,2,3,5
9	SELECT TREE REMOVAL	EA	105	$400.00	$42,000.00	1,2,3,5
10	CONCRETE REMOVAL	CY	100	$25.00	$2,500.00	1,2,3,5
11	DEBRIS REMOVAL	CY	338	$10.00	$3,380.00	1,2,3,5
12	REMOVE/REPLACE CHAIN LINK FENCE	LF	1050	$5.00	$5,250.00	1,2,3,5
13	GRADING	SY	3098	$6.00	$18,588.00	1,2,3,5
14	EXCAVATE & DISPOSE OF CONTAMINATED SOIL	CY	1866	$53.00	$98,898.00	1,2,3,5
15	STABILIZE CONTAMINATED SOIL	CY	302	$30.00	$9,060.00	1,2,3,5
16	IMPORT GRANULAR FILL	CY	134	$10.00	$1,340.00	1,2,3,5
17	FURNISH AND INSTALL BASE AGGREGATE	TON	13	$100.00	$1,300.00	1,2,3,5
18	FURNISH AND INSTALL FIELD STONE RIPRAP	TON	1174	$100.00	$117,400.00	1,2,3,5
19	ROCK BOULDER CROSS VANE	EA	11	$4,000.00	$44,000.00	1,2,3,5
20	VEGETATED REINFORCED SOIL SLOPE	SFF	1875	$40.00	$75,000.00	1,2,3,5
21	IMPORT TOPSOIL	CY	403	$33.00	$13,299.00	1,2,3,5
22	TREES	EA	91	$100.00	$9,100.00	1,2,3,5
23	SHRUBS	EA	315	$50.00	$15,750.00	1,2,3,5
24	SEEDING AND MULCH	ACRE	2.7	$8,000.00	$21,600.00	1,2,3,5
25	LIVE STAKES	EA	720	$5.00	$3,600.00	1,2,3,5
26	LIVE FASCINES	LF	758	$15.00	$11,370.00	1,2,3,5
27	EROSION CONTROL BLANKET	SY	1086	$3.00	$3,258.00	1,2,3,5
28	VEGETATION MANAGEMENT AND MAINTENANCE	LS	1	$20,900.00	$20,900.00	1,2,3,5
	ESTIMATED TOTAL PROJECT COST				$632,703.00	1,2,3,4,5
	ESTIMATED ACCURACY RANGE	**-10%**			**$570,000.00**	4
		10%			**$696,000.00**	4

Notes

[1] The opinion of probable construction cost provided in this table has been developed on the basis of Barr's experience and qualifications and represents our best judgment as experienced and qualified professionals familiar with the project.

[2] Estimated quantities are based on the project drawings dated 10/05/2017

[3] Estimated unit prices are based upon bid prices obtained from Kingsbury Creek, Mission Creek, Sawmill Creek, Flute River, Nine Mile Creek, and Purgatory Creek projects.

[4] This definitive-level (Class 1, 50-100% design completion per ASTM E 2516-11 and USACE EI 01D010 (9/1/97)) cost estimate is based on detailed designs, alignments, quantities and unit prices. Time value-of-money escalation costs are not included. The estimated accuracy range for the Total Project Cost as the project is defined is-10% to +10%. The accuracy range is based on professional judgement considering the level of design completed, the complexity of the project and the uncertainties in the project as scoped. The accuracy range are not intended to include costs for future scope changes that are not part of the project as currently scoped or costs for risk contingency.

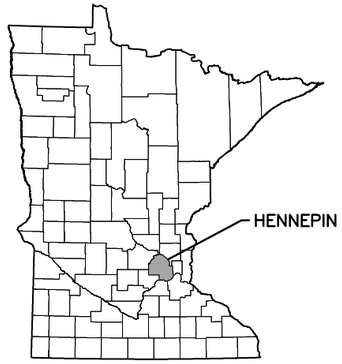
[5] Since we have no control over the cost of labor, materials, equipment, or services furnished by others, or over the contractor's methods of determining prices, or over competitive bidding or market conditions, Barr cannot and does not guarantee that proposals, bids, or actual construction costs will not vary from this opinion of probable construction cost.

BARR

BASSETT CREEK MAIN STEM STABILIZATION

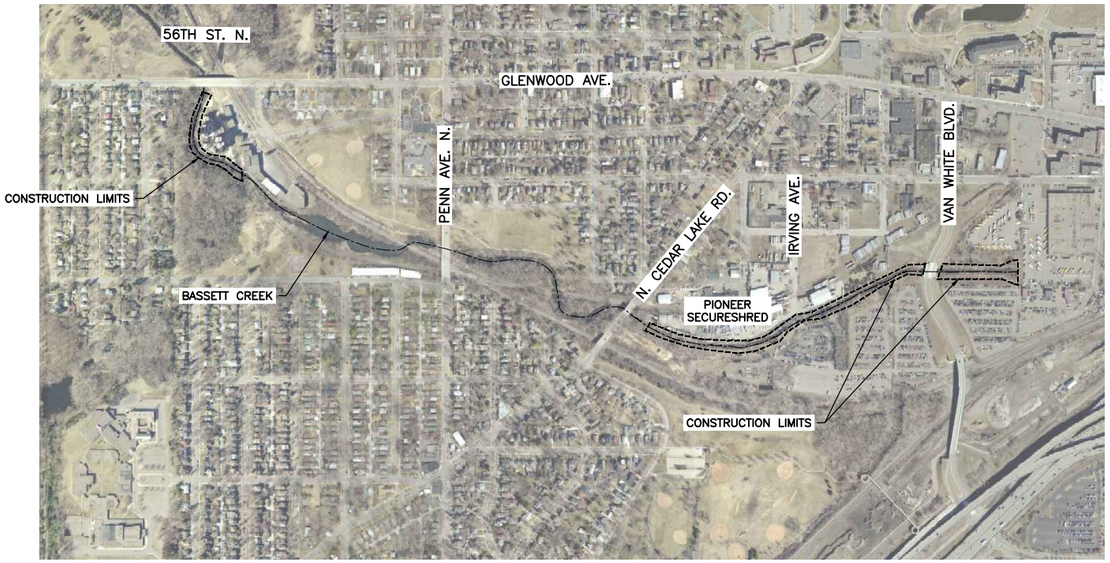
CITY OF MINNEAPOLIS

MINNEAPOLIS, MN



MINNESOTA COUNTY MAP

INDEX OF SHEETS



PROJECT LOCATION MAP

GOPHER STATE ONE CALL

GOPHER STATE ONE CALL:
CALL BEFORE YOU DIG.
1-800-252-1166

GENERAL NOTES:

1. TOPO AND CONTROL GROUND SURVEY CONDUCTED BY BARR ENGINEERING IN APRIL 2017 IN HENNEPIN COUNTY FEET PROJECTION.
2. IMAGERY; COPYRIGHT PICTOMETRY INTERNATIONAL CORP AND HENNEPIN COUNTY, MINNESOTA, 2015.

90% PLAN SET
ISSUED FOR REVIEW
NOT FOR CONSTRUCTION

NO.	BY	CHK.	APP.	DATE	REVISION DESCRIPTION
A	EPF	PJH2	JDW	10/05/2017	ISSUED FOR REVIEW

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.

PRINTED NAME JEFFREY D. WEISS

SIGNATURE

DATE 10/05/2017 LICENSE # 48031

RELEASED TO/FOR	A	B	C	0	1	2	3
	DATE RELEASED						

CLIENT	10/05/17
BID	
CONSTRUCTION	

BARR
Corporate Headquarters:
Minneapolis, Minnesota
Ph: 1-800-632-2277

Project Office:
BARR ENGINEERING CO.
4300 MARKETPOINTE DRIVE
Suite 200
MINNEAPOLIS, MN 55435
Ph: 1-800-632-2277
Fax: (952) 832-2601
www.barr.com

Scale	AS SHOWN
Date	10/05/2017
Drawn	EPF
Checked	AKH
Designed	BARR
Approved	JDW

CITY OF MINNEAPOLIS
MINNEAPOLIS, MINNESOTA

BASSETT CREEK MAIN STEM STABILIZATION
MINNEAPOLIS, MN

TITLE SHEET & INDEX

BARR PROJECT No.	
23/27-1579.00	
CLIENT PROJECT No.	
–	
DWG. No.	REV. No.
G-01	A

CADD USER: Eric P. Fitzgerald FILE: M:\DESIGN\23271579.00\23271579_G-01_TITLE SHEET.DWG PLOT SCALE: 1:2 PLOT DATE: 10/5/2017 8:10 AM
epf M:\Design\23821168.00\23821168_G-01_Title Sheet.dwg Plot at 0 06/12/2017 14:31:54

GENERAL CONSTRUCTION ACTIVITY INFORMATION:
The Stormwater Pollution Prevention Plan (SWPPP) is required for the General Permit Authorization to Discharge Stormwater Associated with Construction Activity (NPDES Permit) as required by the Minnesota Pollution Control Agency (MPCA) under the National Pollutant Discharge Elimination System/State Disposal System (NPDES/SDS).

This project is located in Minneapolis, Minnesota. Proposed construction will take place along Bassett Creek in 2 separate locations: First location is just south of Glenwood Ave. in S1/2 of SE 1/2 Section 20 T29N – R24W Latitude: 44.9800, Longitude: –93.3147 and the second location Basset Creek between Cedar Lake Rd. and Dupont Ave. N. in the north one half of Section 28 and N½ NE¼ of Section 21 T29N – R24W Latitude: 44.9765, Longitude –93.3069 in Hennepin County, Minnesota.

The project Work involves the repair of erosion to a stream and reduce the transport of sediment downstream to the Mississippi River. Construction will consist of construction of access, grading, repairing eroded banks and channel cutting, constructing rock vanes, minor regrading of channel thalweg, placement of riprap, and restoration through seeding and erosion control blankets. The project is not part of a larger common plan of development. The project proposed has a total disturbance area of less than five (5) acres with no added area of imperviousness. Redundant Erosion prevention measures are required to minimize sediment from being transported into Basset Creek an EPA – Approved impaired water. Refer to project drawings for further details.

The anticipated total area of disturbance is approximately 4.90 acres.
The total area of pre–construction impervious area is approximately 0.12 acres.
The total area of post–construction impervious area is approximately 0 acres.

DATES OF CONSTRUCTION: TBD

RESPONSIBLE PERSONS:
Below is a list of people responsible for this project who are knowledgeable and experienced in the application of erosion prevention and sediment control BMPs. They shall oversee the implementation of the SWPPP, inspection, and maintenance of erosion prevention, and sediment control BMPs before and during construction.

SWPPP CERTIFICATION:
This Stormwater Pollution Prevention Plan was prepared by individual(s) trained in accordance with the Permit's training requirements for the preparation SWPPPs. Individual(s) preparing this SWPPP:

PREPARED BY: Jacob N. Burggraff
Barr Engineering Co.
4300 MarketPointe Dr.
Bloomington, MN 55435
jburggraff@barr.com

TRAINING/CERTIFICATION
Date of Training/Certification: April 7, 2008
Certification Program: University of Minnesota/Mn/DOT
Recertification: 11/2010, 3/2014, 5/2017
Certification Expiration: 5/31/2020

RESPONSIBLE PERSONS IS PENDING CONTRACTOR SELECTION

OWNER: CITY OF MINNEAPOLIS

MAILING ADDRESS: 105 S. 5TH AVE., SUITE 200
MINNEAPOLIS, MN 55401

CONTACT PERSON: ELIZABETH STOUT

PHONE: (612) 673–5284
MOBLE:
EMAIL: ELIZABETH.STOUT@MINNEAPOLISMN.GOV

OWNER'S PROJECT MANAGER:

CONTACT PERSON: TBD

MAILING ADDRESS:

PHONE:
MOBILE:
EMAIL:

OWNER'S REPRESENTATIVE:
CONTACT: JEFF WEISS, PE
BARR ENGINEERING COMPANY

MAILING ADDRESS: 4300 MARKETPOINTE DR.
MINNEAPOLIS, MN 55435

PHONE: 952–832–2706
EMAIL: JWEISS@BARR.COM

CONTRACTOR:	TBD	Oversight of SWPPP Implementation, Revisions, and Amendments	TBD
MAILING ADDRESS:			
CONTACT PERSON:			
PHONE:		Performance of SWPPP Inspections	TBD
MOBILE:			
EMAIL:		Performance or Supervision of Installation Maintenance, and Repair of BMPs	TBD

RECEIVING WATERS:

Water body ID: 07010206–538 Water Body Name: Bassett Creek Water Body Type: Creek

Special Water? No Impaired Water? Yes DNR Work in Water Restrictions? Yes

The project discharges to Bassett Creek which has an EPA–approved impairment for: Coloride; Fecal Coliform; Fishes Bioassessments. These impairment(s) are considered to be construction related parameters and require the additional best management practices (BMPs) found in Appendix A of the Permit (C.1 & C.2).

Project Area Soil Type: Residential Land, densely vegetated. Range of soil particle size expected to be present on site and surounding area: clay, sandy clay, sandy silt, silty sand, sand, and gravel.

Wetland Impacts and Mitigation: N/A

Environmental Review/Endangered or Threatened Species Review/Archeological Site Review: N/A.

PROJECT PLANS AND SPECIFICATIONS:

Required Figure:	Sheet No.
Project Location	G–01
Stormwater Pollution Prevention Plan (SWPPP)	G–02
Erosion Control Plan	G–03
Construction Limits	C–02 through C–06
Existing and Final Grades with Flow Direction	C–02 through C–06
Impervious Surfaces	N/A
Potential Pollution generating activities	C–02 through C–06
Areas not to be disturbed	Areas Outside Construction Limits
Areas where construction will be phased	N/A
Temporary/Permanent erosion & sediment control BMPs	G–03
Standard Details for erosion and sediment control	D–04
Estimated Preliminary BMP Quantities	Bid Documents

TEMPORARY EROSION CONTROL PRACTICES

Timing:
1. Delineate areas of the site not to be disturbed (with flags, stakes, signs, silt fence, etc.) before work begins.
2. Construction phasing will be used when possible to minimize concurrent soil exposure; stabilizing areas as soon as work is completed; and restoring access paths when they are no longer needed.
3. Once construction activities begin, temporary seeding/mulching of exposed soil areas shall take place according to the MPCA guidelines for cover on exposed soils. Temporary erosion control activities will be required through the duration of the project. Unless precluded by snow cover, all exposed soil areas adjacent to or within the creek must be stabilized as soon as possible and shall be stabilized within 24 hours to limit erosion.
4. Other disturbed soil areas of the project beyond 200 feet of the creek shall be stabilized as soon as possible but in no case completed later than (7) days after the construction activity in that portion of the site has temporarily or permanently ceased.

BMPs:
1. Erosion control and stabilization practices to be installed are depicted on Drawings No. G–03, D–04 and include: silt fence, sediment control logs, erosion control blanket, turf reinforcement mat, floatation silt curtain, rock construction entrance, and vegetation (through seeding).
2. Soils stockpiles shall be stabilized and silt fence or sediment logs shall be placed around the perimeter of the stock piles.
3. Erosion control blanket shall be used to cover all disturbed slopes.
4. Direct construction site discharges to vegetated areas where feasible.
5. Install all BMPs in accordance with relevant manufacturer specifications and accepted engineering practices.

TEMPORARY SEDIMENT CONTROL PRACTICES

Timing:
1. Establish sediment control practices on all downgradient perimeters prior to commencing any upgradient land-disturbing activities.
2. If sediment control practices must be adjusted or removed to accommodate short-term activities, complete the activity as quickly as possible and re–install immediately after the activity has been completed or before the next precipitation event (even if the activity is not yet complete).
3. Maintain downgradient sediment control practices until final stabilization has been achieved for upgradient areas.
4. Protect all stormwater inlets and outlets with appropriate BMPs during construction, these practices shall remain in place until the potential sources for discharging sediment to inlets have been stabilized.

BMPs:
1. Minimize soil compaction where feasible.
2. Preserve topsoil where feasible; if topsoil must be removed, store in a segregated stockpile for reuse in site restoration.
3. Sediment control practices to be installed are depicted on Sheets G–03 and D–04 and include: silt fence, sediment logs, erosion control blanket, floatation silt curtain, turf reinforcement mat, and rock construction entrance.
4. Install silt fence or sediment logs around the perimeter of temporary soil stockpiles.
5. Install rock construction entrances as a vehicle tracking BMP to minimize the track out of sediment from the construction site.
6. Monitor adjacent paved surfaces for track out of sediment from construction site and remove sediment via daily street sweeping if necessary.
7. Install all BMPs in accordance with relevant manufacturer specifications and accepted engineering practices.

BMP DESIGN FACTORS

1. Expected amount, frequency, intensity, and duration of precipitation: Approximately 2.5 inches of precipitation from the 1–year, 24–hour storm event (Atlas 14)
2. Nature of stormwater runoff and run-on at the site, including factors such as expected flow from impervious surfaces, slopes, and site drainage features: Contractor shall install all erosion and sedimentation control devices to handle any off site runoff.
3. If any stormwater flow will be channelized at the site, design BMPs to control both peak flow rates and total stormwater volume to minimize erosion at outlets and to minimize downstream channel and streambank erosion: Peak flow rates and total stormwater volume should not be increased during this project. Channelized flow will be routed to vegetated areas where appropriate.
4. Range of soil particle sizes expected to be present on the site and surrounding area: clay, sandy clay, sandy silt, silty sand, sand, gravel.

PERMANENT STORMWATER MANAGEMENT SYSTEM

This project will NOT generate greater than one acre of new impervious surface and does NOT require a stormwater management system.

INSPECTION AND MAINTENANCE ACTIVITIES

Inspection Requirements:
1. Inspect the entire construction site at least daily during active construction and within 24 hours after a rainfall event greater than 0.5 inches in 24 hours.
2. Where parts of the site have permanent cover, but work remains on other parts of the site, inspection frequency may be reduced to once per week in areas with permanent cover.
3. Inspect all erosion prevention and sediment control BMPs and pollution prevention management measures for integrity and effectiveness.
4. Inspect surface waters for evidence of erosion and sediment deposition.
5. Inspect construction site vehicle exit locations for evidence of off-site sediment tracking onto paved surfaces and inspect streets and other areas adjacent to the project for evidence of off-site accumulations of sediment.
6. Inspections must be conducted by an appropriately trained individual in accordance with the CSW Permit.

Maintenance Requirements:
1. Repair, replace, or supplement all nonfunctional BMPs with functional BMPs by the end of the next business day after discovery or as soon as field conditions allow access.
2. Repair, replace or supplement all perimeter control devices when they become nonfunctional or the sediment reaches 1/2 of the height of the device.
3. Remove all deltas and sediment deposited in surface waters and restabilize within 24 hours of discovery the areas where sediment removal results in exposed soil.
4. Remove tracked sediment from all paved surfaces both on and off site within 24 hours of discovery.
5. Remove off–site accumulations of sediment in a manner and at a frequency sufficient to minimize off-site impacts.
6. Maintain all BMPs accordance with relevant manufacturer specifications and accepted engineering practices.

Recordkeeping:
1. All inspections and maintenance must be recorded within 24 hours in writing and records must be retained with the SWPPP.
2. Records of each inspection and maintenance activity shall include:
   a. Date and time of inspections
   b. Name of person(s) conducting inspections
   c. Findings of inspections, including the specific location where corrective actions are needed
   d. Corrective actions taken (including dates, times, and party completing maintenance activities)
   e. Date and amount of all rainfall events greater than 0.5 inches in 24 hours; rainfall amounts will be obtained from a properly maintained rain gauge installed onsite, a weather station that is within 1 mile of the site, or a weather reporting system that provides site specific rainfall data from radar summaries.
   f. If any discharge is observed to be occurring during the inspection, a record of all points of the property from which there is a discharge must be made, and the discharge should be described (i.e., color, odor, floating, settled, or suspended solids, foam, oil sheen, and other obvious indicators of pollutants) and photographed.
   g. Any amendments to the SWPPP proposed as a result of the inspection must be incorporated within 7 calendar days

RECORD RETENTION

This SWPPP including, all changes to it, and inspections and maintenance records must be kept at the site during construction in either the field office or in an on-site vehicle during normal working hours.
Upon request make this SWPPP (including all certificates, reports, records, or other information required by the CSW Permit) available to federal, state, county, Bassett Creek Waterrshed District, and local officials within 72 hours for the duration of the permit and for 3 years following the NOT.

POLLUTION PREVENTION MANAGEMENT MEASURES

1. Minimize exposure to stormwater for the following products, materials, or wastes: building products that have potential to leach pollutants shall be covered with plastic sheeting; pesticides, herbicides, insecticides, fertilizers, and treatment chemicals shall not be brought onto the site, and landscape materials shall be covered with plastic sheeting; hazardous materials and toxic waste (including oil, diesel fuel, gasoline, hydraulic fluids, paint solvents, petroleum-based products, wood preservatives, additives, curing compounds, and acids) shall be stored in sealed containers in restricted access storage areas and in compliance with Minn. R. ch. 7045 including secondary containment as applicable; solid waste shall be stored, collected, and disposed in compliance with Minn. R. ch. 7035.
2. Position portable toilets so that they are secure and will not be tipped or knocked over. Provide secondary containment measures around portable toilets.
3. Properly dispose of sanitary waste in accordance with Minn. R. ch. 7041.
4. Spill Prevention and Response: Take reasonable steps to prevent the discharge of spilled or leaked chemicals, ensure adequate supplies of absorbent and other dry clean–up materials are available at all times to clean up discharged materials and that an appropriate disposal method is available for recovered spilled materials, report and clean up spills immediately as required by Minn. Stat. §115.061.
5. Fueling and maintenance of equipment and/or vehicles shall not occur on–site unless approved by the Engineer.
6. Washing of vehicles and/or equipment shall not occur on–site.
7. Any external washing of concrete delivery trucks, pumping equipment, or tools must be limited to an on–site concrete washout station or washed out into a shelf contained system. All liquid and solid wastes generated by concrete washout operations must be contained in a leak–proof containment facility or impermeable liner. No drainage of washout containment shall be allowed into the ground and all liquids from the containment system must be removed from the project site.

MISCELLANEOUS ITEMS

Contractor shall be responsible for inspecting and cleaning of all equipment transported and delivered to the project site:

1. The project shall use Best Management Practices to control the spread of Terrestrial and Aquatic Invasive Species. The Contractor shall clean all equipment to be used on the project prior to being transported and delivered to the site. Remove all visible remnants of any plant materials, aquatic plants, or seeds and power wash off all mud and soils from equipment.
2. Equipment is any implement utilized in construction including heavy machinery, light machinery, construction mats, backhoes, pumps, hose, pipe, floatation silt curtains, hand tools or other material that is moved on and off of the site.

FINAL STABILIZATION

Ensure final stabilization of the site:

1. For final stabilization to be considered complete, the following must occur:
   a. Complete all soil disturbing activities at the site.
   b. Stabilize all exposed soils with permanent cover.
   C. Remove all temporary synthetic erosion and sediment control BMPs such as silt fence, sediment logs and construction entrances.
2. Permanent Cover shall consist of seeding, erosion control blanket or hydraulically applied mulch and tackifier on disturbed areas, and seeding in all other disturbed areas and mulched if necessary.
3. Storm sewer culverts shall have flared sections and riprap to eliminate erosion.
4. Within 30 days after all activities for final stabilization have been completed, submit a Notice of Termination (NOT) form to the MPCA.

SWPPP AMENDEMENTS

Record of SWPPP Amendments

DATE:	AMENDMENT	RESPONSIBLE INDIVIDUAL

90% PLAN SET
ISSUED FOR REVIEW
NOT FOR CONSTRUCTION

NO.	BY	CHK.	APP.	DATE	REVISION DESCRIPTION
A	EPF	PJH2	JDW	10/05/2017	ISSUED FOR REVIEW

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.
PRINTED NAME JEFFREY D. WEISS
SIGNATURE
DATE 10/05/2017 LICENSE # 48031

	10/05/17						
CLIENT							
BID							
CONSTRUCTION							
RELEASED TO/FOR	A	B	C	0	1	2	3
	DATE RELEASED						

BARR
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www.barr.com

Scale	AS SHOWN
Date	10/05/2017
Drawn	EPF
Checked	AKH
Designed	BARR
Approved	JDW

CITY OF MINNEAPOLIS
MINNEAPOLIS, MINNESOTA

BASSETT CREEK MAIN STEM STABILIZATION
MINNEAPOLIS, MN

STORMWATER POLLUTION PREVENTION PLAN (SWPPP)

BARR PROJECT No. 23/27–1579.00
CLIENT PROJECT No. –
DWG. No. G–02
REV. No. A

CADD USER: Eric P. Fitzgerald FILE: M:\DESIGN\23271579.00\23271579_G–02_SWPPP.DWG PLOT SCALE: 1:2 PLOT DATE: 10/5/2017 8:13 AM
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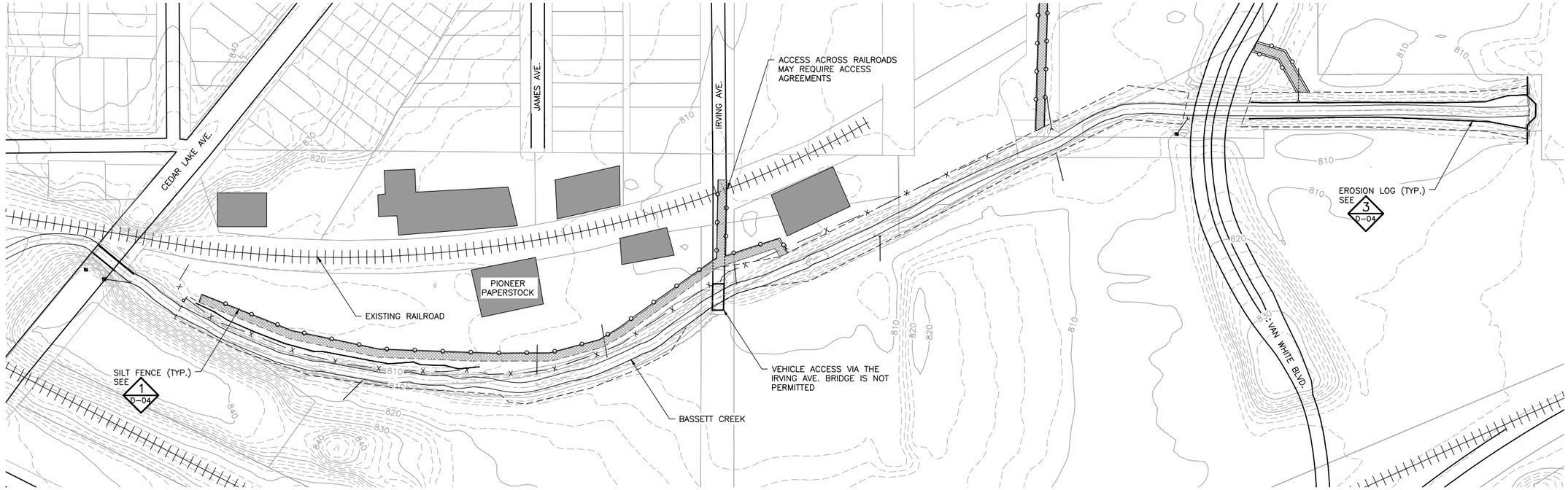
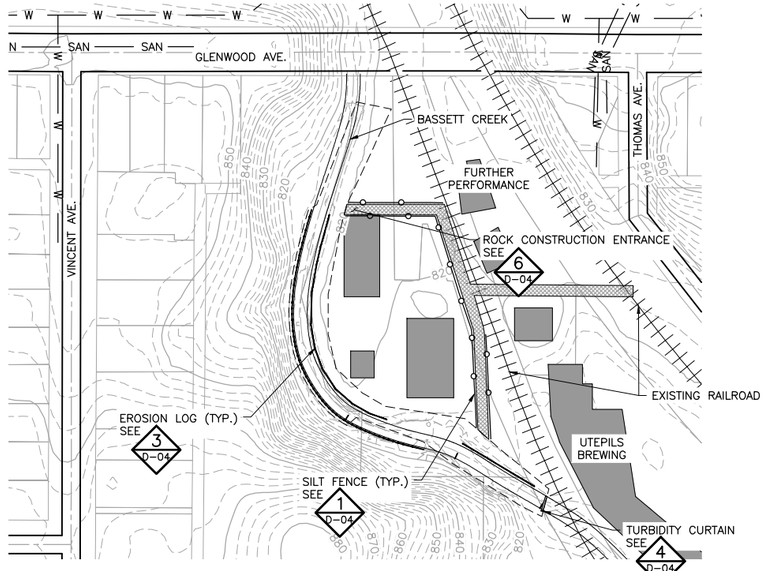


1 – PLAN: EROSION CONTROL – REACH 1

0 100 200 SCALE IN FEET



1 – PLAN: EROSION CONTROL – REACH 2

0 100 200 SCALE IN FEET

EROSION CONTOL LEGEND

- CONSTRUCTION LIMITS
- EROSION LOGS
- SILT FENCE
- CONSTRUCTION ACCESS ROUTE
- EXISTING 10' CONTOUR
- EXISTING 2' CONTOUR

EROSION & SEDIMENT CONTROL NOTES:

1. CONTRACTOR MUST CALL A CONSTRUCTION START 48 HOURS PRIOR TO ANY LAND DISTURBANCES 612–673–3867. FAILURE TO DO SO MAY RESULT IN FINES, THE REVOCATION OF PERMIT AND A STOP WORK ORDER BEING ISSUED.
2. INSTALL PERIMETER EROSION CONTROL AT THE LOCATIONS SHOWN ON THE PLANS PRIOR TO THE COMMENCEMENT OF ANY LAND DISTURBANCE OR CONSTRUCTION ACTIVITIES.
3. BEFORE BEGINNING CONSTRUCTION, INSTALL A TEMPORARY ROCK CONSTRUCTION ENTRANCE AT EACH POINT WHERE VEHICLES EXIT THE CONSTRUCTION SITE. USE 2 INCH OR GREATER DIAMETER ROCK IN A LAYER AT LEAST 6 INCHES THICK ACROSS THE ENTIRE WIDTH OF THE ENTRANCE. EXTEND THE ROCK ENTRANCE AT LEAST 50 FEET INTO THE CONSTRUCTION ZONE USING A GEO–TEXTILE FABRIC BENEATH THE AGGREGATE TO PREVENT MIGRATION OF SOIL INTO THE ROCK FROM BELOW.
4. REMOVE ALL SOILS AND SEDIMENTS TRACKED OR OTHERWISE DEPOSITED ONTO PUBLIC AND PRIVATE PAVEMENT AREAS. REMOVAL SHALL BE ON A DAILY BASIS WHEN TRACKING OCCURS AND MAY BE ORDERED BY MINNEAPOLIS INSPECTORS AT ANY TIME IF CONDITIONS WARRANT. SWEEPING SHALL BE MAINTAINED THROUGHOUT THE DURATION OF THE CONSTRUCTION AND DONE IN A MANNER TO PREVENT DUST BEING BLOWN TO ADJACENT PROPERTIES.
5. INSTALL INLET PROTECTION AT ALL PUBLIC AND PRIVATE CATCH BASIN INLETS, WHICH RECEIVE RUNOFF FROM THE DISTURBED AREAS. CONTRACTOR SHALL CLEAN, REMOVE SEDIMENT OR REPLACE STORM DRAIN INLET PROTECTION DEVICES ON A ROUTINE BASIS SUCH THAT THE DEVICES ARE FULLY FUNCTIONAL FOR THE NEXT RAIN EVENT. SEDIMENT DEPOSITED IN AND/OR PLUGGING DRAINAGE SYSTEMS IS THE RESPONSIBILITY OF THE CONTRACTOR. HAY BALES OR FILTER FABRIC WRAPPED GRATES ARE NOT ALLOWED FOR INLET PROTECTION.
6. LOCATE SOIL OR DIRT STOCKPILES NO LESS THAN 25 FEET FROM ANY PUBLIC OR PRIVATE ROADWAY OR DRAINAGE CHANNEL. IF REMAINING FOR MORE THAN SEVEN DAYS, STABILIZE THE STOCKPILES BY MULCHING, VEGETATIVE COVER, TARPS, OR OTHER MEANS. CONTROL EROSION FROM ALL STOCKPILES BY PLACING SILT BARRIERS AROUND THE PILES. TEMPORARY STOCKPILES LOCATED ON PAVED SURFACES MUST BE NO LESS THAN TWO FEET FROM THE DRAINAGE/GUTTER LINE AND SHALL BE COVERED IF LEFT MORE THAN 24 HOURS.
7. MAINTAIN ALL TEMPORARY EROSION AND SEDIMENT CONTROL DEVICES IN PLACE UNTIL THE CONTRIBUTING DRAINAGE AREA HAS BEEN STABILIZED. INSPECT TEMPORARY EROSION AND SEDIMENT CONTROL DEVICES ON A DAILY BASIS AND REPLACE DETERIORATED, DAMAGED, OR ROTTED EROSION CONTROL DEVICES IMMEDIATELY.
8. TEMPORARILY OR PERMANENTLY STABILIZE ALL CONSTRUCTION AREAS WHICH HAVE UNDERGONE FINAL GRADING, AND ALL AREAS IN WHICH GRADING OR SITE BUILDING CONSTRUCTION OPERATIONS ARE NOT ACTIVELY UNDERWAY AGAINST EROSION DUE TO RAIN, WIND AND RUNNING WATER WITHIN 7–14 DAYS. USE SEED AND MULCH, EROSION CONTROL MATTING, AND/OR SODDING AND STAKING IN GREEN SPACE AREAS. REMOVE ALL TEMPORARY SYNTHETIC, STRUCTURAL, NON–BIODEGRADABLE EROSION AND SEDIMENT CONTROL DEVICES AFTER THE SITE HAS UNDERGONE FINAL STABILIZATION WITH PERMANENT VEGETATION ESTABLISHMENT. FINAL STABILIZATION FOR PURPOSES OF THIS REMOVAL IS 70% ESTABLISHED COVER OVER DENUDED AREA.
9. CHANGES TO APPROVED EROSION CONTROL PLAN MUST BE APPROVED BY THE EROSION CONTROL INSPECTOR PRIOR TO IMPLEMENTATION. CONTRACTOR TO PROVIDE INSTALLATION AND DETAILS FOR ALL PROPOSED ALTERNATE TYPE DEVICES.
10. IF DEWATERING OR PUMPING OF WATER IS NECESSARY, THE CONTRACTOR IS RESPONSIBLE FOR OBTAINING ANY NECESSARY PERMITS AND/OR APPROVALS PRIOR TO DISCHARGE OF ANY WATER FROM THE SITE. IF THE DISCHARGE FROM THE DEWATERING OR PUMPING PROCESS IS TURBID OR CONTAINS SEDIMENT LADEN WATER, IT MUST BE TREATED THROUGH THE USE OF SEDIMENT TRAPS, VEGETATIVE FILTER STRIPS, OR OTHER SEDIMENT REDUCING MEASURES SUCH THAT THE DISCHARGE IS NOT VISIBLY DIFFERENT FROM THE RECEIVING WATER. ADDITIONAL EROSION CONTROL MEASURES MAY BE REQUIRED AT THE DISCHARGE POINT TO PREVENT SCOUR EROSION.

90% PLAN SET
ISSUED FOR REVIEW
NOT FOR CONSTRUCTION

NO.	BY	CHK.	APP.	DATE	REVISION DESCRIPTION
A	EPF	PJH2	JDW	10/05/2017	ISSUED FOR REVIEW

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PRINTED NAME JEFFREY D. WEISS

SIGNATURE

DATE 10/05/2017 LICENSE # 48031

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CLIENT	10/05/17						
BID							
CONSTRUCTION							
DATE RELEASED							

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www.barr.com

Scale	AS SHOWN
Date	10/05/2017
Drawn	EPF
Checked	AKH
Designed	BARR
Approved	JDW

CITY OF MINNEAPOLIS
MINNEAPOLIS, MINNESOTA

BASSET CREEK MAIN STEM STABILIZATION
MINNEAPOLIS, MN

EROSION CONTROL PLAN

BARR PROJECT No. 23/27–1579.00
CLIENT PROJECT No. –
DWG. No. G–03
REV. No. A

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1 PLAN: SITE LAYOUT
0 250 500
SCALE IN FEET

N

GENERAL NOTES:

1. TOPO AND CONTROL GROUND SURVEY CONDUCTED BY BARR ENGINEERING IN 2017 IN HENNEPIN COUNTY FEET PROJECTION.
2. IMAGERY; COPYRIGHT PICTOMETRY INTERNATIONAL CORP AND HENNEPIN COUNTY, MINNESOTA, 2015.
3. CONTRACTOR IS RESPONSIBLE TO LOCATE AND FIELD VERIFY ALL EXISTING UTILITIES PRIOR TO WORK.
4. ALL EXISTING ROADS, PARKING LOTS, TRAILS, FENCES, SIGNS, OR SIMILAR SHALL BE PROTECTED DURING CONSTRUCTION. CONTRACTOR RESPONSIBLE TO COORDINATE SURVEYS WITH THE CITY AND/OR OWNER TO DOCUMENT PRE-CONSTRUCTION EXISTING CONDITION ISSUES.
5. CONTRACTOR SHALL INSTALL AND MAINTAIN ALL EROSION CONTROL BMPS PRIOR TO COMMENCEMENT OF GRADING FOR EACH LOCATION DURING CONSTRUCTION. EROSION CONTROL PLANS ARE PROVIDED INSIDE THE PROJECT STORMWATER POLLUTION PREVENTION PLAN (SWPPP).
6. ALL GROUND DISTURBANCE GENERATED FROM GRADING ACTIVITIES SHALL BE STABILIZED AND RESTORED WITH TOPSOIL, SEED W/COVER CROP AND EROSION CONTROL BLANKET OR STRAW MULCH.
7. CONTRACTOR TO MAINTAIN EXISTING STREAM BOTTOM WIDTH SO NOT TO DECREASE CREEK CROSS SECTIONAL AREA DURING RIPRAP INSTALLATION.
8. CONSTRUCTION LIMITS AS SHOWN ARE APPROXIMATE FINAL CONSTRUCTION LIMITS TO BE COORDINATED WITH THE OWNER AND/OR ENGINEER AND STAKED IN THE FIELD.
9. TEST AND MANAGE DISTURBED SOILS ON SITE AS DESCRIBED IN THE RESPONSE ACTION PLAN.

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CONSTRUCTION							
DATE RELEASED							

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Drawn	EPF
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Designed	BARR
Approved	JDW

CITY OF MINNEAPOLIS
MINNEAPOLIS, MINNESOTA

BASSETT CREEK MAIN STEM STABILIZATION
MINNEAPOLIS, MN

SITE LAYOUT

BARR PROJECT No. 23/27-1579.00
CLIENT PROJECT No. –
DWG. No. C-01
REV. No. A

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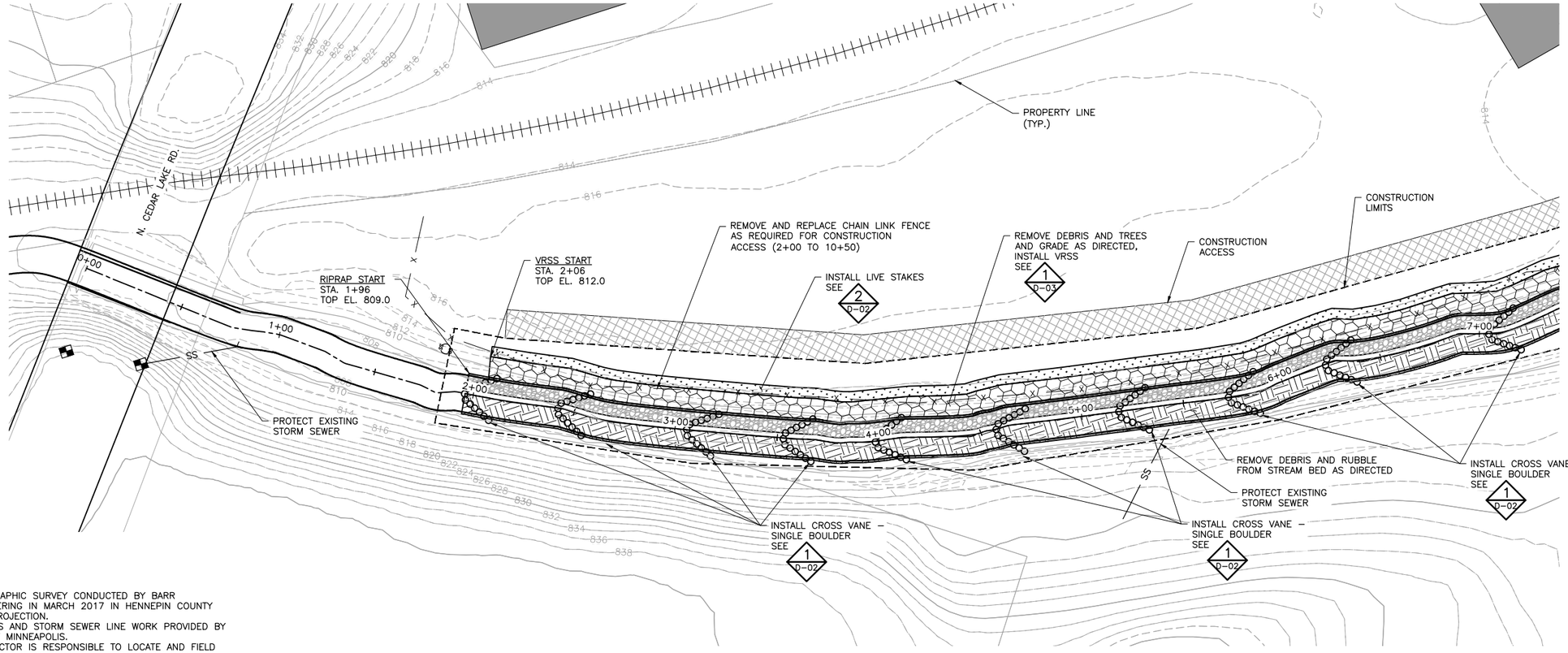

SYMBOL AND PATTERN LEGEND

- EXISTING 10' CONTOUR
- EXISTING 2' CONTOUR
- CONSTRUCTION LIMITS
- SS — CITY STORM SEWER
- SAN — CITY SANITARY SEWER
- W — WATERMAIN LINE
- BANK GRADING 2H TO 1V TYP.
- RIPRAP STABILIZATION
- LIVE STAKES
- FASCINES
- VRSS
- DEBRIS REMOVAL
- ROCK CROSS VANE–SINGLE BOULDER

NOTES

1. TOPOGRAPHIC SURVEY CONDUCTED BY BARR ENGINEERING IN MARCH 2017 IN HENNEPIN COUNTY FEET PROJECTION.
2. PARCELS AND STORM SEWER LINE WORK PROVIDED BY CITY OF MINNEAPOLIS.
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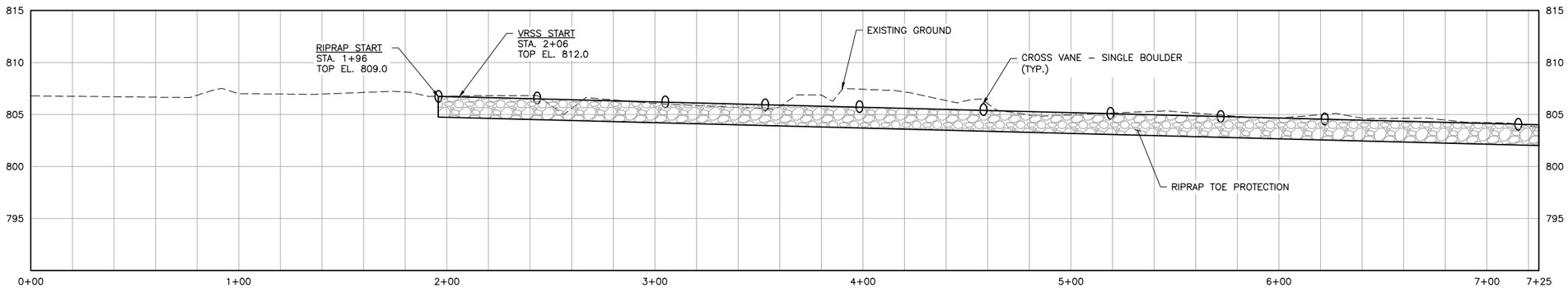
4. ALL EXISTING ROADS, PARKING LOTS, TRAILS, FENCES, AND SIGNS SHALL BE PROTECTED DURING CONSTRUCTION.
5. CONTRACTOR SHALL INSTALL AND MAINTAIN EROSION CONTROL BMPS PRIOR TO COMMENCEMENT OF WORK.
6. ALL GROUND DISTURBANCE SHALL BE STABILIZED AND RESTORED WITH TOPSOIL AND SEED WITH EROSION CONTROL BLANKET.
7. CONTRACTOR SHALL ONLY PERFORM TREE REMOVALS AT THE DIRECTION OF ENGINEER.

1 – PLAN: REACH 1 (STA. 0+00 TO 7+00)

0 30 60 SCALE IN FEET



2 – PROFILE: REACH 4 (STA. 0+00 TO 7+00)

0 30 60 HORIZONTAL SCALE IN FEET

0 6 12 VERTICAL SCALE IN FEET

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PRINTED NAME JEFFREY D. WEISS

SIGNATURE

DATE 10/05/2017 LICENSE # 48031

RELEASED TO/FOR: CLIENT 10/05/17; BID; CONSTRUCTION

DATE RELEASED: A B C 0 1 2 3

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Scale	AS SHOWN
Date	10/05/2017
Drawn	EPF
Checked	AKH
Designed	BARR
Approved	JDW

CITY OF MINNEAPOLIS
MINNEAPOLIS, MINNESOTA

BASSETT CREEK MAIN STEM STABILIZATION
MINNEAPOLIS, MN

PLAN AND PROFILE
REACH 1 (STA. 0+00 TO 7+00)

BARR PROJECT No. 23/27–1579.00
CLIENT PROJECT No. –
DWG. No. C–02
REV. No. A

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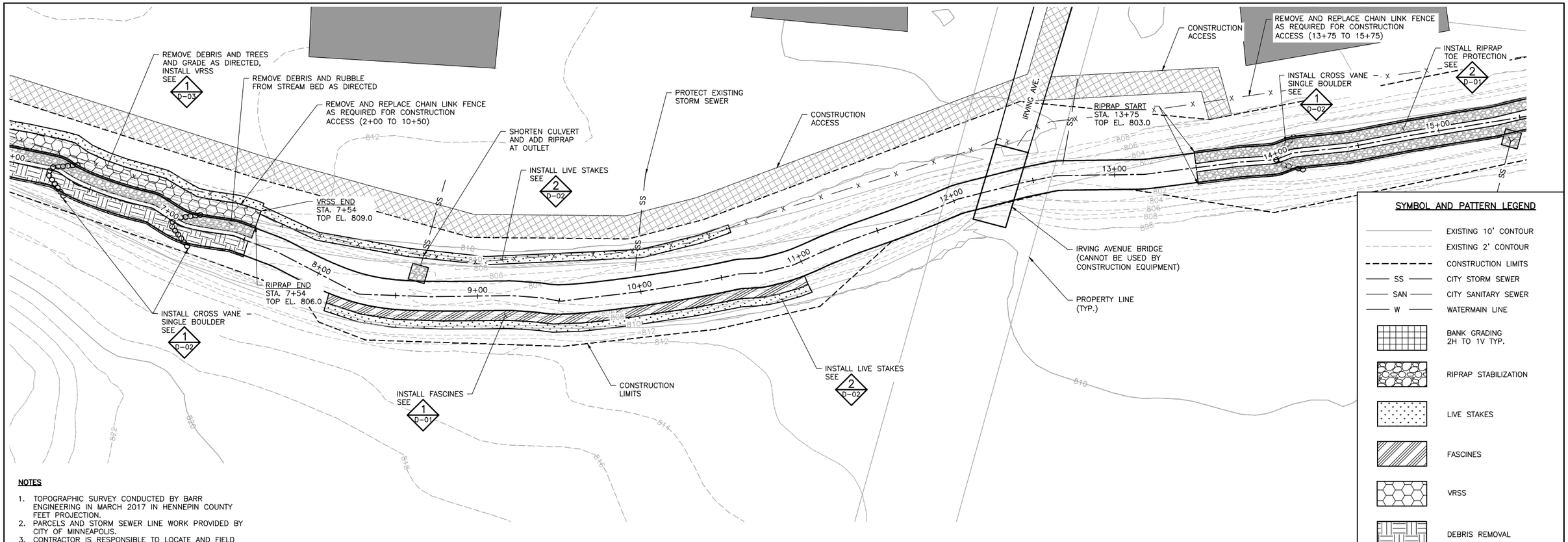

1 PLAN: REACH 1 (STA. 7+00 TO 15+00)

0 30 60
SCALE IN FEET

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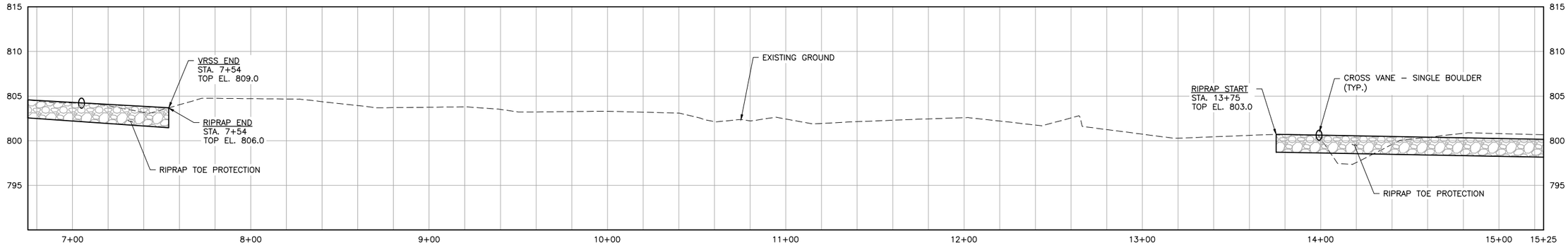
5. CONTRACTOR SHALL INSTALL AND MAINTAIN EROSION CONTROL BMPS PRIOR TO COMMENCEMENT OF WORK.
6. ALL GROUND DISTURBANCE SHALL BE STABILIZED AND RESTORED WITH TOPSOIL AND SEED WITH EROSION CONTROL BLANKET.
7. CONTRACTOR SHALL ONLY PERFORM TREE REMOVALS AT THE DIRECTION OF ENGINEER.



2 PROFILE: REACH 1 (STA. 7+00 TO 15+00)

0 30 60
HORIZONTAL SCALE IN FEET

0 6 12
VERTICAL SCALE IN FEET

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Approved	JDW

CITY OF MINNEAPOLIS
MINNEAPOLIS, MINNESOTA

BASSETT CREEK MAIN STEM STABILIZATION
MINNEAPOLIS, MN

PLAN AND PROFILE
REACH 1 (STA. 7+00 TO 15+00)

BARR PROJECT No. 23/27-1579.00
CLIENT PROJECT No. –
DWG. No. C-03
REV. No. A

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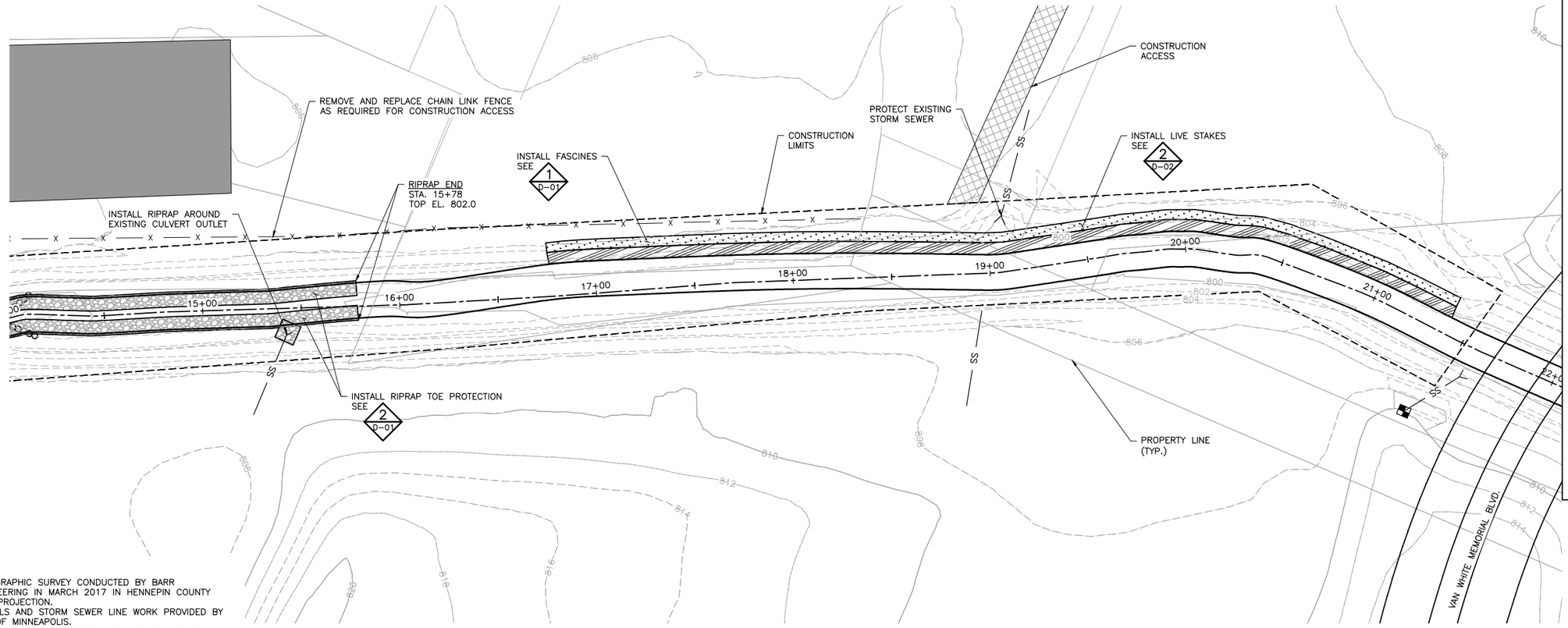

SYMBOL AND PATTERN LEGEND

- EXISTING 10' CONTOUR
- EXISTING 2' CONTOUR
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- W — WATERMAIN LINE
- BANK GRADING 2H TO 1V TYP.
- RIPRAP STABILIZATION
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NOTES

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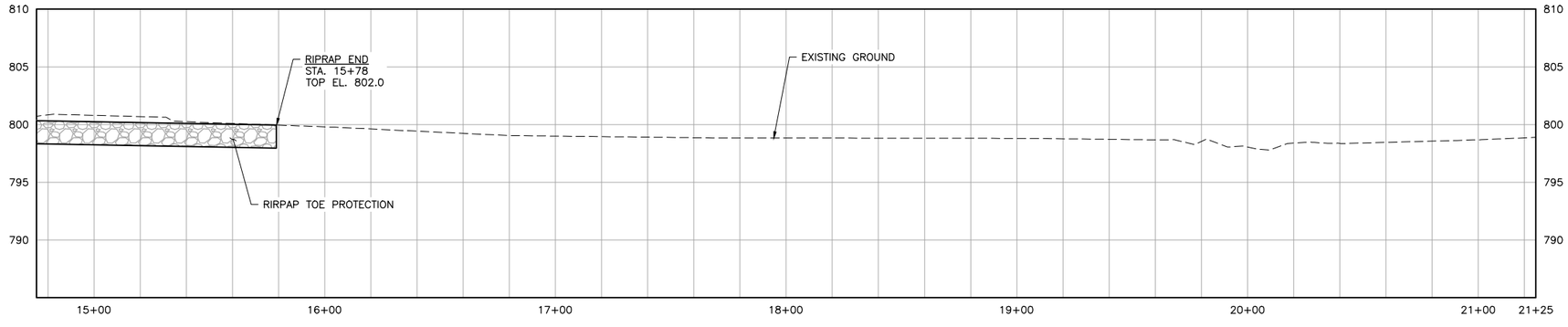
6. ALL GROUND DISTURBANCE SHALL BE STABILIZED AND RESTORED WITH TOPSOIL AND SEED WITH EROSION CONTROL BLANKET.
7. CONTRACTOR SHALL ONLY PERFORM TREE REMOVALS AT THE DIRECTION OF ENGINEER.

1 PLAN: REACH 1 (STA. 15+00 TO 21+00)

0 30 60
SCALE IN FEET



2 PROFILE: REACH 1 (STA. 15+00 TO 21+00)

0 30 60
HORIZONTAL SCALE IN FEET

0 6 12
VERTICAL SCALE IN FEET

90% PLAN SET
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NOT FOR CONSTRUCTION

NO.	BY	CHK.	APP.	DATE	REVISION DESCRIPTION
A	EPF	PJH2	JDW	10/05/2017	ISSUED FOR REVIEW

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.

PRINTED NAME JEFFREY D. WEISS

SIGNATURE

DATE 10/05/2017 LICENSE # 48031

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CLIENT	10/05/17						
BID							
CONSTRUCTION							
DATE RELEASED							

BARR
Corporate Headquarters: Minneapolis, Minnesota
Ph: 1–800–632–2277

Project Office:
BARR ENGINEERING CO.
4300 MARKETPOINTE DRIVE
Suite 200
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Ph: 1–800–632–2277
Fax: (952) 832–2601
www.barr.com

Scale	AS SHOWN
Date	10/05/2017
Drawn	EPF
Checked	AKH
Designed	BARR
Approved	JDW

CITY OF MINNEAPOLIS
MINNEAPOLIS, MINNESOTA

BASSETT CREEK MAIN STEM STABILIZATION
MINNEAPOLIS, MN

PLAN AND PROFILE
REACH 1 (STA. 15+00 TO 21+00)

BARR PROJECT No. 23/27–1579.00
CLIENT PROJECT No. –
DWG. No. C–04
REV. No. A

CADD USER: Eric P. Fitzgerald FILE: M:\DESIGN\23271579.00\23271579_C-02_PLAN & PROFILE.DWG PLOT SCALE: 1:2 PLOT DATE: 10/5/2017 9:58 AM
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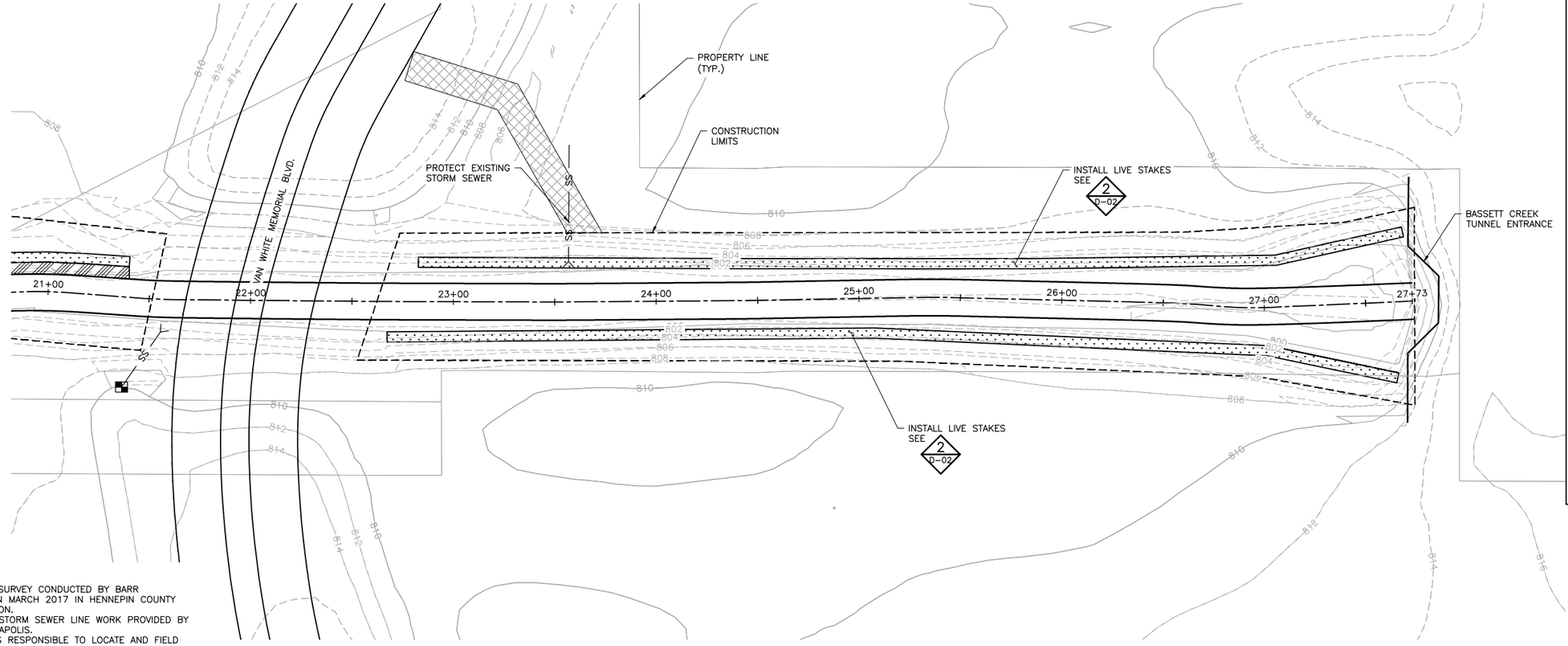


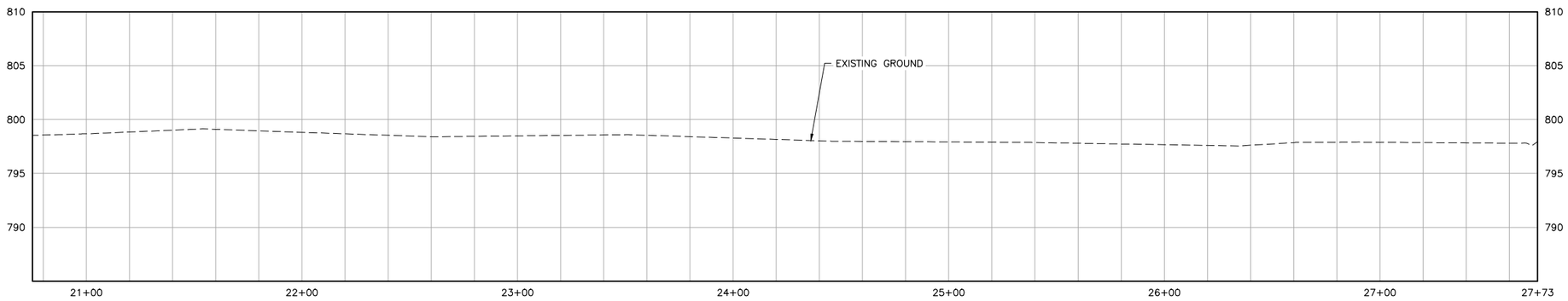
SYMBOL AND PATTERN LEGEND

- EXISTING 10' CONTOUR
- EXISTING 2' CONTOUR
- CONSTRUCTION LIMITS
- SS — CITY STORM SEWER
- SAN — CITY SANITARY SEWER
- W — WATERMAIN LINE
- BANK GRADING 2H TO 1V TYP.
- RIPRAP STABILIZATION
- LIVE STAKES
- FASCINES
- VRSS
- DEBRIS REMOVAL
- ROCK CROSS VANE–SINGLE BOULDER

NOTES

1. TOPOGRAPHIC SURVEY CONDUCTED BY BARR ENGINEERING IN MARCH 2017 IN HENNEPIN COUNTY FEET PROJECTION.
2. PARCELS AND STORM SEWER LINE WORK PROVIDED BY CITY OF MINNEAPOLIS.
3. CONTRACTOR IS RESPONSIBLE TO LOCATE AND FIELD VERIFY ALL EXISTING UTILITIES PRIOR TO WORK.
4. ALL EXISTING ROADS, PARKING LOTS, TRAILS, FENCES, AND SIGNS SHALL BE PROTECTED DURING CONSTRUCTION.
5. CONTRACTOR SHALL INSTALL AND MAINTAIN EROSION CONTROL BMPS PRIOR TO COMMENCEMENT OF WORK.
6. ALL GROUND DISTURBANCE SHALL BE STABILIZED AND RESTORED WITH TOPSOIL AND SEED WITH EROSION CONTROL BLANKET.
7. CONTRACTOR SHALL ONLY PERFORM TREE REMOVALS AT THE DIRECTION OF ENGINEER.

1 – PLAN: REACH 1 (STA. 21+00 TO 27+75) 0 30 60 SCALE IN FEET



2 – PROFILE: REACH 1 (STA. 21+00 TO 27+75) 0 30 60 HORIZONTAL SCALE IN FEET 0 6 12 VERTICAL SCALE IN FEET

90% PLAN SET
ISSUED FOR REVIEW
NOT FOR CONSTRUCTION

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CITY OF MINNEAPOLIS
MINNEAPOLIS, MINNESOTA

BASSETT CREEK MAIN STEM STABILIZATION
MINNEAPOLIS, MN

PLAN AND PROFILE
REACH 1 (STA. 21+00 TO 27+75)

BARR PROJECT No.	
23/27–1579.00	
CLIENT PROJECT No.	
–	
DWG. No.	REV. No.
C–05	A

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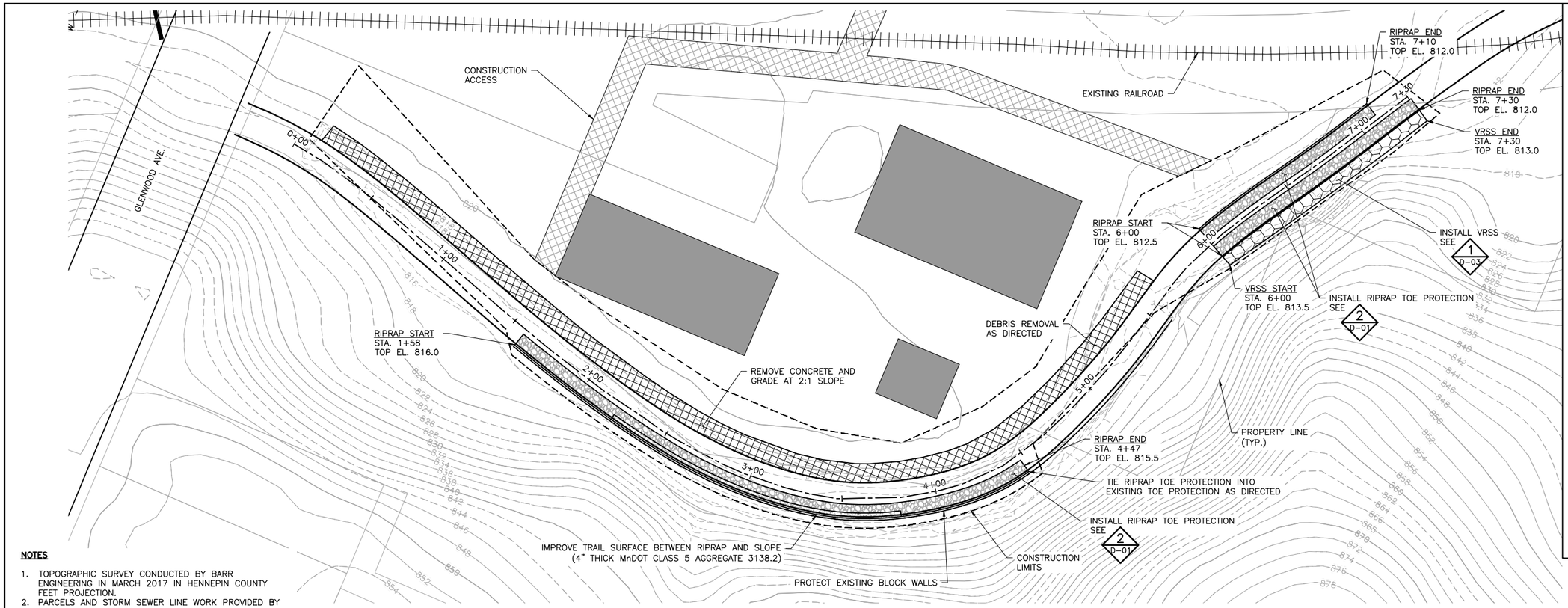

NOTES

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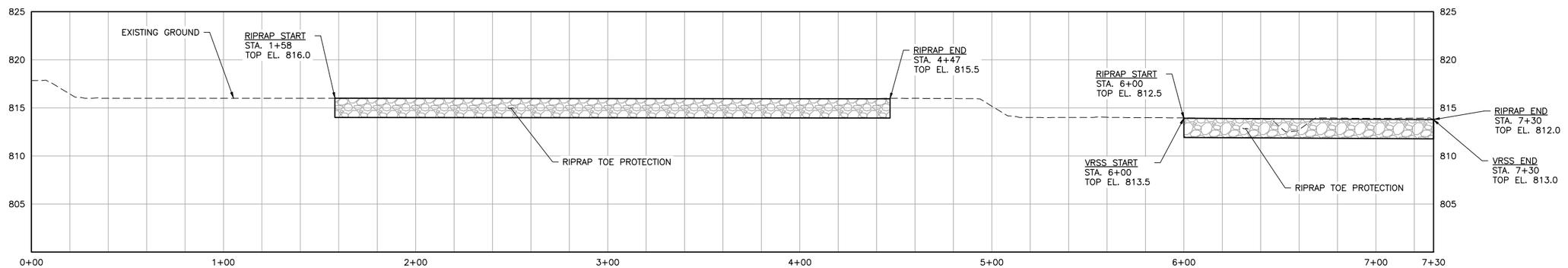
6. ALL GROUND DISTURBANCE SHALL BE STABILIZED AND RESTORED WITH TOPSOIL AND SEED WITH EROSION CONTROL BLANKET.
7. CONTRACTOR SHALL ONLY PERFORM TREE REMOVALS AT THE DIRECTION OF ENGINEER.

1 – PLAN: REACH 2 — 0 30 60 SCALE IN FEET



2 – PROFILE: REACH 2 — 0 30 60 HORIZONTAL SCALE IN FEET; 0 6 12 VERTICAL SCALE IN FEET

90% PLAN SET
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CONSTRUCTION	

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CITY OF MINNEAPOLIS
MINNEAPOLIS, MINNESOTA

BASSETT CREEK MAIN STEM STABILIZATION
MINNEAPOLIS, MN

PLAN AND PROFILE
REACH 2

BARR PROJECT No. 23/27–1579.00
CLIENT PROJECT No. –
DWG. No. C–06
REV. No. A

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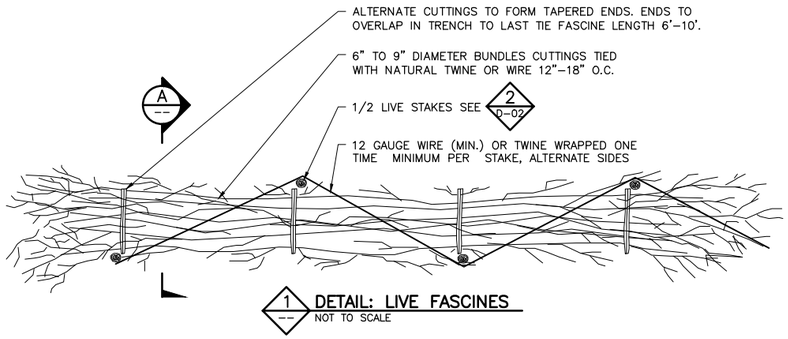
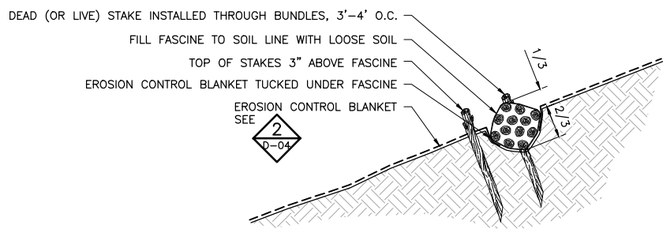


1 DETAIL: LIVE FASCINES
NOT TO SCALE



A SECTION: LIVE FASCINES
NOT TO SCALE

GENERAL

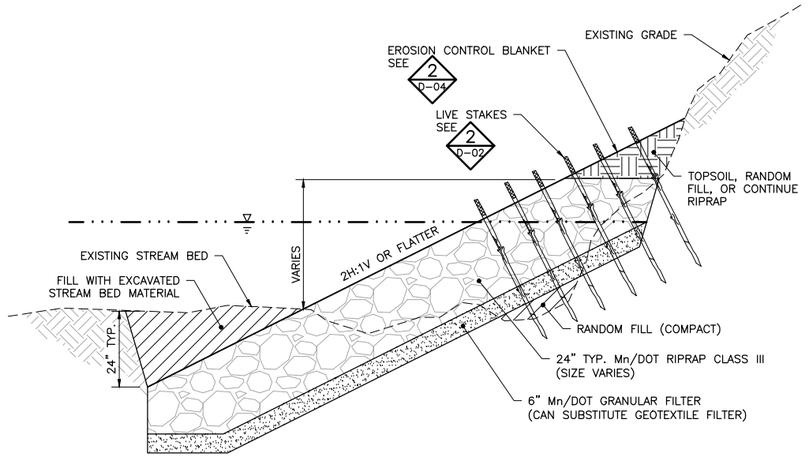
1. THE ENGINEER MUST BE NOTIFIED AT LEAST 3 DAYS PRIOR TO FASCINES INSTALLATION AND MUST BE ON SITE DURING INSTALLATION.
2. THE DORMANT CUTTINGS FOR FASCINES SHOULD ONLY BE INSTALLED DURING THE DORMANT SEASON, AFTER LEAF DROP IN THE FALL AND BEFORE BUD BREAK IN THE SPRING.
3. LIVE FASCINES ARE LIVE PLANT MATERIALS, HANDLE WITH CARE. SEE LIVE CUTTINGS DETAIL FOR SIZE, CARE, AND INSTALLATION METHODS.

PREPARATION

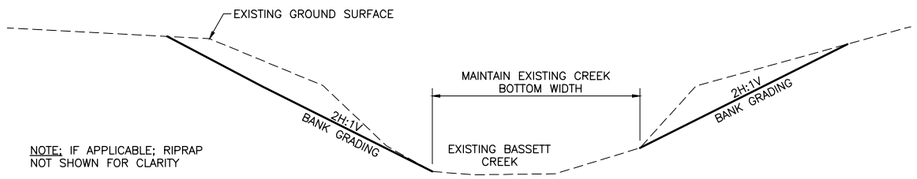
4. BRANCHES FOR FASCINE SHALL BE ½"–2" MINIMUM BUTT DIAMETER.
5. SOAK THE LIVE BRANCHES FOR A MINIMUM OF 24 HOURS (IDEALLY 5–7 DAYS) IN FLOWING WATER BEFORE PLANTING.
6. ASSEMBLE THE FASCINE BY LAYING OUT LIVE BRANCHES WITH THE CUT ENDS PLACED IN OPPOSITE DIRECTIONS IN A LONG SAUSAGE–LIKE BUNDLE.
7. TIE BUNDLES WITH TWINE AT 12"–18" INCREMENTS. FINISHED BUNDLES SHOULD BE 6–9" IN DIAMETER.

PLACEMENT

8. CONSTRUCT FASCINES FROM LOWEST TO HIGHEST ELEVATION.
9. INSTALL FASCINES PARALLEL TO CONTOURS, UNLESS SPECIFIED OTHERWISE.
10. EXCAVATE A HORIZONTAL TRENCH ALONG THE SLOPE. THE TRENCH SHOULD BE ROUGHLY 2/3 THE DIAMETER OF THE FASCINE.
11. DISPOSE EXCAVATED SOIL ON–SITE ABOVE ORDINARY HIGH WATER LINE.
12. INSTALL EROSION CONTROL BLANKET ACROSS THE TRENCH AND CUT ALONG THE CENTERLINE OF THE TRENCH. STAKE ENDS OF BLANKET IN THE BOTTOM OF THE TRENCH. 6–8" OF THE BLANKET SHOULD BE TUCKED UNDER THE FASCINE.
13. PLACE BUNDLES IN TRENCH, BACKFILL, COMPACT, AND WATER.
14. PLACE WOODEN (OR LIVE) STAKES AT A 3–4' INTERVAL THROUGH THE CENTER OF THE BUNDLE. LEAVE 3 INCHES OF STAKES ABOVE THE BUNDLE.



2 DETAIL: RIPRAP TOE PROTECTION
NOT TO SCALE



3 SECTION: BANK GRADING
NOT TO SCALE

90% PLAN SET
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CITY OF MINNEAPOLIS
MINNEAPOLIS, MINNESOTA

BASSETT CREEK MAIN STEM STABILIZATION
MINNEAPOLIS, MN
STREAM RESTORATION DETAILS

BARR PROJECT No. 23/27–1579.00
CLIENT PROJECT No. –
DWG. No. D–01
REV. No. A

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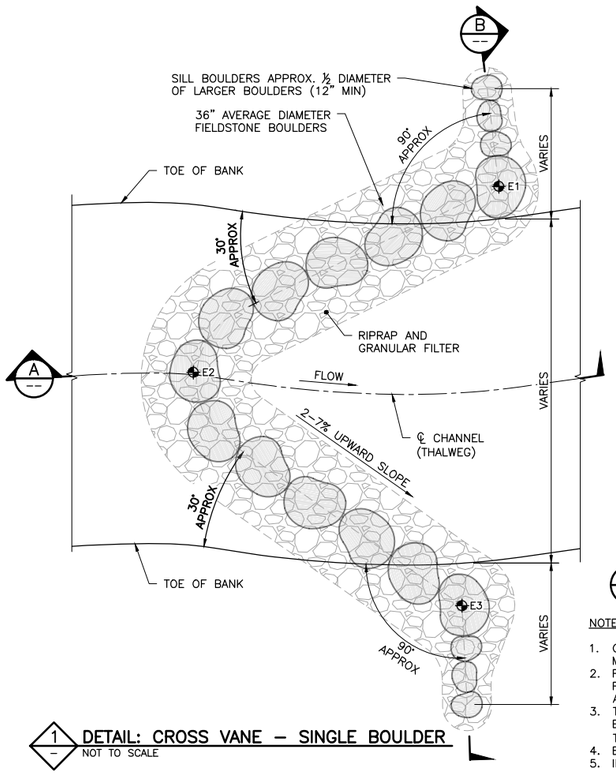
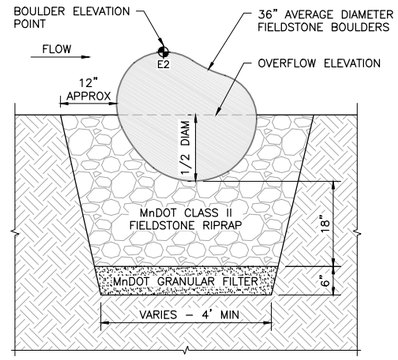


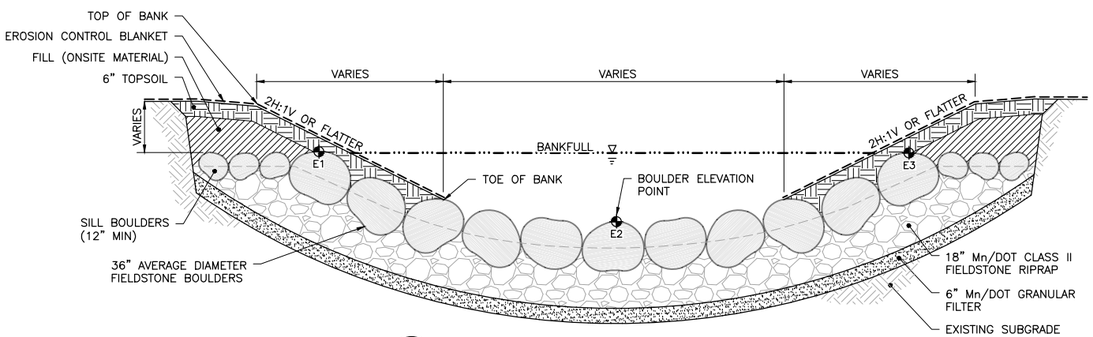
1 DETAIL: CROSS VANE – SINGLE BOULDER
NOT TO SCALE



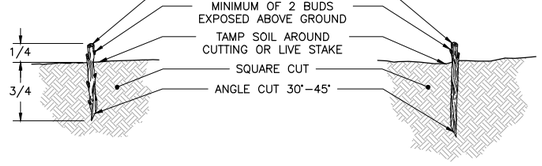
A SECTION: CROSS VANE – SINGLE BOULDER
NOT TO SCALE

NOTES:

1. CROSS VANE LOCATIONS AND ELEVATIONS ARE APPROXIMATE AND MAY BE MODIFIED IN THE FIELD BY THE ENGINEER.
2. FINAL BOULDER PLACEMENT TO BE APPROVED BY THE ENGINEER IN THE FIELD. CONTRACTOR MAY BE REQUIRED TO ADJUST BOULDER ELEVATIONS AND ROTATION.
3. THERE SHALL BE NO SIGNIFICANT GAPS BETWEEN BOULDERS. RIPRAP BEDDING SHALL BE PLACED ON THE UPSTREAM SIDE OF THE BOULDERS TO PLUG SMALL GAPS (MAY REQUIRE HAND PLACEMENT).
4. BOULDERS OF AN UNSUITABLE SHAPE MAY BE RE-LOCATED OR REJECTED.
5. INSTALL EROSION CONTROL BLANKET ON DISTURBED BANKS.



B SECTION: CROSS VANE – SINGLE BOULDER
NOT TO SCALE

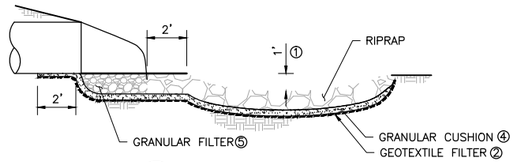


LIVE CUTTING LIVE STAKE

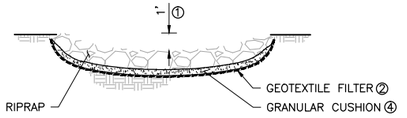
GENERAL NOTES:

1. LIVE STAKE OR CUTTING PLANTED PERPENDICULAR TO GROUND SURFACE.
2. SEE PLANT MATERIAL LIST FOR SPECIES LENGTH AND SPACING.
3. LIVE STAKES SHALL BE 2" DIAMETER MINIMUM.

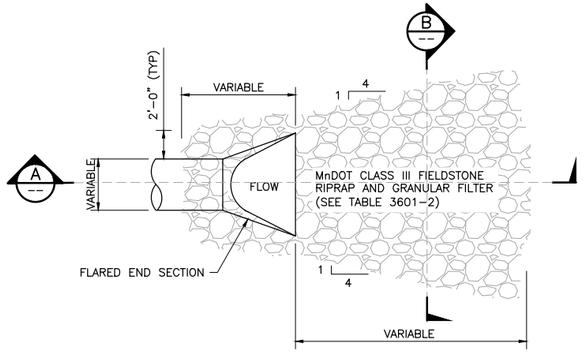
2 DETAIL: LIVE CUTTINGS OR LIVE STAKES
NOT TO SCALE



A SECTION: RIPRAP APRON
NOT TO SCALE



B SECTION: RIPRAP APRON
NOT TO SCALE



2 DETAIL: RIPRAP APRON
NOT TO SCALE

NOTES:

REQUIREMENTS FOR GEOTEXTILE TYPE, RIPRAP SIZE AND THICKNESS SHALL BE DESIGNATED IN THE PLANS.

PIPE SIZES LARGER THAN THOSE SHOWN REQUIRE A SPECIAL DESIGN.

① FOR PIPES GREATER THAN OR EQUAL TO 30", USE 1.5'.

② GEOTEXTILE FILTER, SPEC. 3733, SHALL COVER THE BOTTOM AND SIDES OF THE AREA EXCAVATED FOR THE RIPRAP.

③ DIMENSIONS W AND A ARE GIVEN ON STANDARD PLATES 3122 AND 3123.

④ GRANULAR FILTER, SPEC. 3601, MAY BE USED AS A CUSHION LAYER. PLACE FILTER PER SPEC. 2511. THE CUSHION LAYER IS INCIDENTAL.

⑤ GRANULAR FILTER OR RIPRAP, SPEC. 3601, TO EXTEND UNDER ENTIRE OPEN PORTION OF PIPE APRON. DEPTH OF MATERIAL UNDER APRON SHALL MATCH RIPRAP DEPTH. WHEN USING RIPRAP, INCREASE RIPRAP QUANTITY ACCORDINGLY AND PLACE A 3" LAYER OF 1.5" CRUSHED ROCK UNDER THE APRON TO AID IN GRADING FOR APRON PLACEMENT. CRUSHED ROCK IS INCIDENTAL.

90% PLAN SET
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CITY OF MINNEAPOLIS
MINNEAPOLIS, MINNESOTA

BASSETT CREEK MAIN STEM STABILIZATION
MINNEAPOLIS, MN

STREAM RESTORATION DETAILS

BARR PROJECT No. 23/27-1579.00
CLIENT PROJECT No. –
DWG. No. D-02
REV. No. A

CADD USER: Eric P. Fitzgerald FILE: M:\DESIGN\23271579.00\23271579_D-01_DETAILS.DWG PLOT SCALE: 1:2 PLOT DATE: 10/5/2017 11:51 AM
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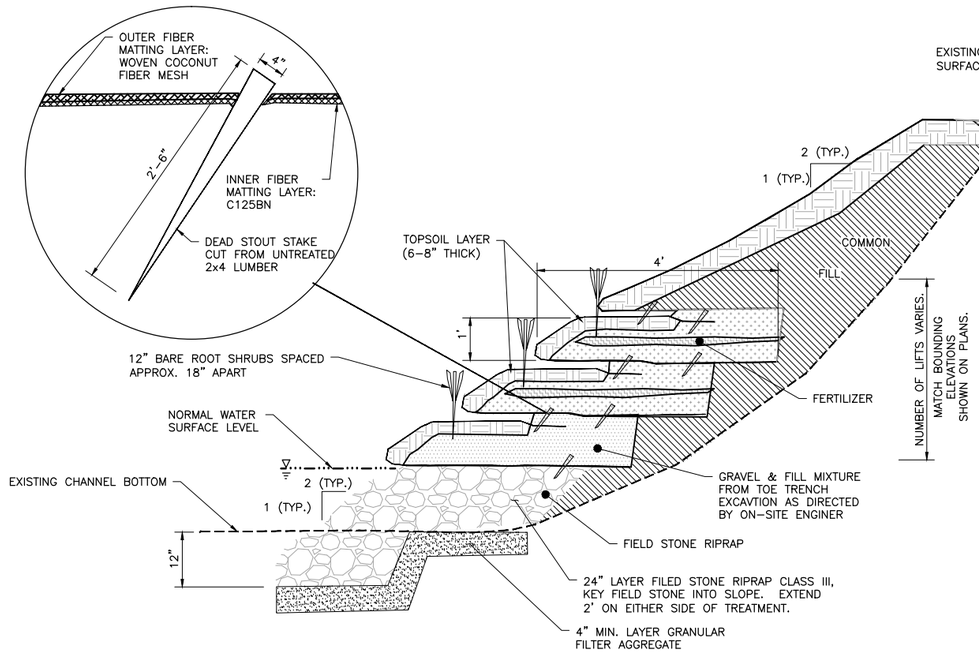
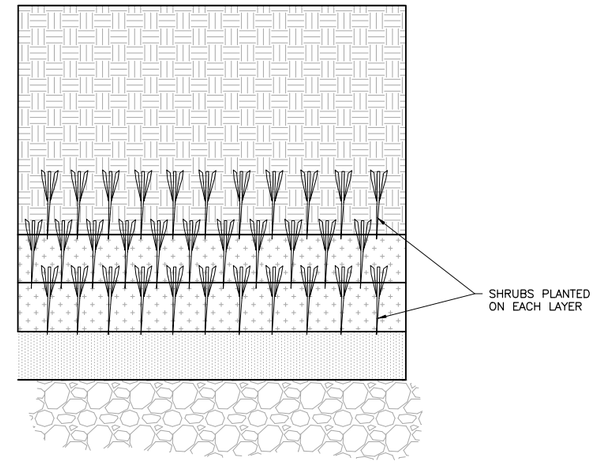
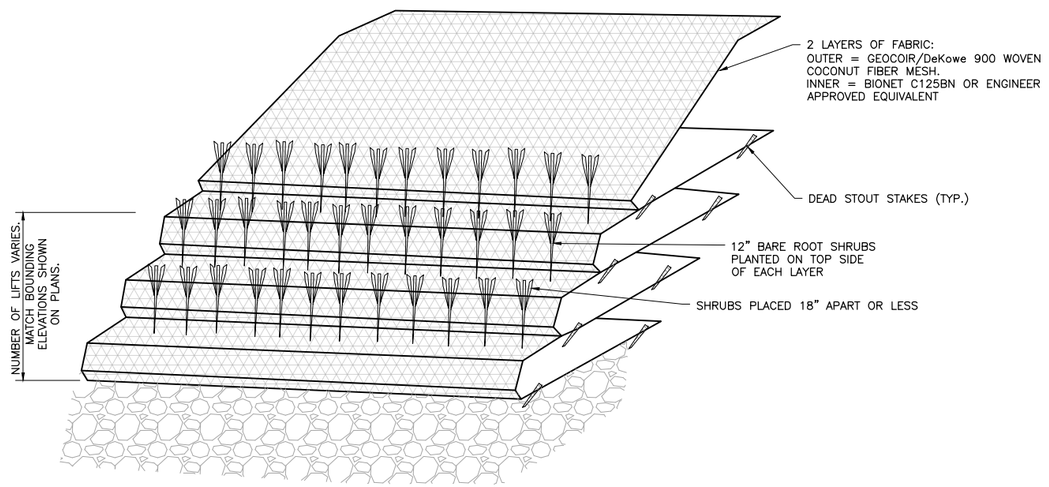
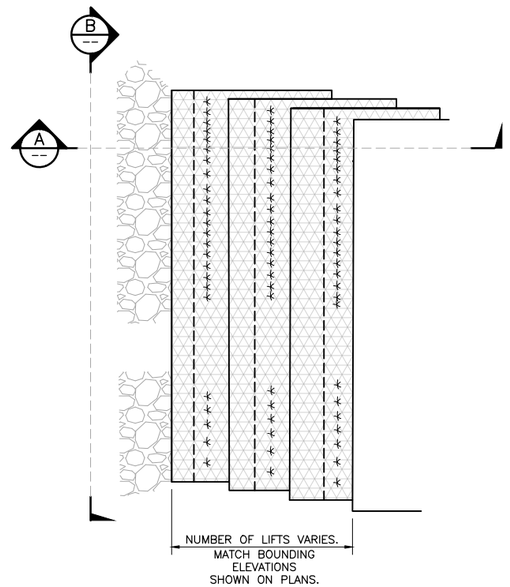


A -- SECTION: LIVE PLANT VEGETATED REINFORCED SOIL SLOPE (V.R.S.S.)
NOT TO SCALE



B -- ELEVATION: LIVE PLANT VEGETATED REINFORCED SOIL SLOPE (V.R.S.S.)
NOT TO SCALE





1 -- DETAIL: LIVE PLANT VEGETATED REINFORCED SOIL SLOPE (V.R.S.S.
NOT TO SCALE

NOTES:

1. THE ENGINEER MUST BE NOTIFIED AT LEAST 3 DAYS PRIOR TO ROOT WAD INSTALLATION AND MUST BE ON SITE DURING INSTALLATION.
2. SOAK DORMANT CUTTINGS FOR A MINIMUM OF 24 HOURS IN FLOWING WATER BEFORE PLANTING. SOAKING FOR 5-7 DAYS IS CONSIDERED IDEAL. THE DORMANT CUTTINGS SHOULD ONLY BE INSTALLED DURING THE DORMANT SEASON, AFTER LEAF DROP IN THE FALL AND BEFORE BUD BREAK IN THE SPRING. DORMANT CUTTINGS STORED IN COLD STORAGE WITH NO VISIBLE SIGN OF BUD BREAK MAY BE USED INTO LATE SPRING.
3. INSTALL RIPRAP AND GRANULAR FILTER AGGREGATE AS SPECIFIED IN SECTION 02375 AND AS SHOWN ON THE DRAWINGS.
4. EXCAVATE THE EXISTING STREAMBANK SLOPE SHOREWARD FROM AND LEVEL WITH THE TOP OF THE RIPRAP TO FORM A STABLE, UNDISTURBED SURFACE. A FLAT BENCH SHOULD BE CREATED FROM THE TOE OF THE STABLE CUT SLOPE TO THE TOE OF THE PROPOSED STREAM BANK RIPRAP.
5. DORMANT CUTTINGS ARE TO BE PLACED ON TOP OF THE RIPRAP EXCAVATED BENCH AT 3 BRANCHES PER LINEAR FOOT; THE BASAL END OF THE CUTTINGS SHOULD EXTEND AT LEAST 2 FOOT PAST THE BACK OF THE RIPRAP. NO MORE THAN 6 INCHES OF THE BUDDING END OF THE LIVE BRANCH SHOULD EXTEND PAST THE FRONT OF THE RIPRAP. COVER THE DORMANT CUTTINGS WITH TOPSOIL TO CREATE AN EVEN SURFACE FOR THE CONSTRUCTION OF THE FIRST SOIL LIFT.
6. LAY NATURAL FIBER MATTING ON BOTTOM OF THE BENCH, OVERLAPPING ADJACENT MATTING BY 1 FOOT. THE OUTER EXPOSED FIBER MATTING LAYER OF EACH SOIL LIFT SHALL BE GEOCOIR/DEKOWE 900 WOVEN COCONUT FIBER MESH, BIOD-MATTM 90, OR AN ENGINEER APPROVED EQUIVALENT.
7. THE INNER LAYER OF EACH SOIL LIFT SHALL BE BIONET C125BN OR AN ENGINEER APPROVED EQUIVALENT. LAY THE INNER LAYER OF BIONET ON TOP OF NATURAL FIBER MATTING OF EACH SOIL LIFT. FABRIC SHOULD BE INSTALLED SMOOTH WITH NO UNNECESSARY FOLDS OR WRINKLES. STAKE THE SHOREWARD END OF THE FIBER MATTING IN PLACE WITH WOODEN STAKES SPACED EVERY THREE FEET AS SHOWN ON THE DRAWINGS.
8. THE FIRST 6 TO 8 INCHES OF THE BOTTOM SOIL LIFT SHALL BE FILLED WITH GRAVEL AND SAND MATERIAL EXCAVATED FROM THE STREAM BED. THE TOP 6 TO 8 INCHES ON THE FRONT OF SURFACE LAYER SHOULD BE COMPRISED OF TOPSOIL MIX AS SHOWN ON THE DRAWINGS.
9. THE TOPSOIL LAYER SHALL BE SEEDED WITH THE VRSS SEED MIX AT 0.7 POUNDS PER 1,000 SQUARE FEET OF LIFT SURFACE AREA AS SHOWN ON THE DRAWINGS.
10. FOLD THE FIBER MATTING OVER THE FILL MATERIAL AND STAKE IN PLACE SO THE FABRIC IS TAUT AND SMOOTH WITH NO UNNECESSARY FOLDS OR WRINKLES. BACKFILL BEHIND THE BOTTOM SOIL LIFT WITH GRANULAR FILTER MATERIAL TO MEET THE EXISTING SLOPE AS SHOWN ON THE DRAWINGS.

90% PLAN SET
ISSUED FOR REVIEW
NOT FOR CONSTRUCTION

NO.	BY	CHK.	APP.	DATE	REVISION DESCRIPTION
A	EPF	PJH2	JDW	10/05/2017	ISSUED FOR REVIEW

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.
PRINTED NAME JEFFREY D. WEISS
SIGNATURE
DATE 10/05/2017 LICENSE # 48031

CLIENT	10/05/17							
BID								
CONSTRUCTION								
RELEASED TO/FOR	A	B	C	0	1	2	3	
	DATE RELEASED							

BARR
Corporate Headquarters: Minneapolis, Minnesota
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Fax: (952) 832-2601
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Scale	AS SHOWN
Date	10/05/2017
Drawn	EPF
Checked	AKH
Designed	BARR
Approved	JDW

CITY OF MINNEAPOLIS
MINNEAPOLIS, MINNESOTA

BASSETT CREEK MAIN STEM STABILIZATION
MINNEAPOLIS, MN

STREAM RESTORATION DETAILS

BARR PROJECT No. 23/27-1579.00
CLIENT PROJECT No. -
DWG. No. D-03
REV. No. A

CADD USER: Eric P. Fitzgerald FILE: M:\DESIGN\23271579.00\23271579_D-01_DETAILS.DWG PLOT SCALE: 1:2 PLOT DATE: 10/5/2017 8:22 AM
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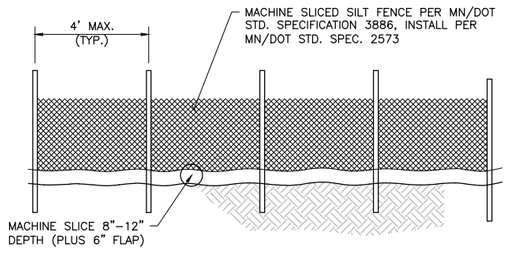
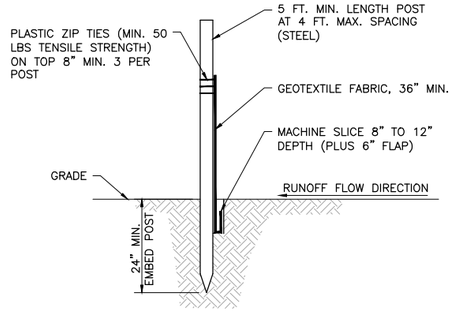


DOWNSTREAM VIEW



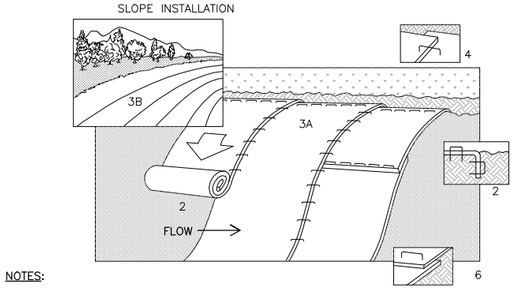
SECTION VIEW

NOTES:

1. INSTALL SILT FENCE PRIOR TO ANY GRADING WORK IN THE AREA TO BE PROTECTED AND MAINTAIN THROUGHOUT THE CONSTRUCTION PERIOD. REMOVE SILT FENCE AND ANY ACCUMULATED SEDIMENT IN CONJUNCTION WITH THE FINAL GRADING AND SITE STABILIZATION.
2. SILT FENCE MATERIALS AND INSTALLATION SHALL MEET THE REQUIREMENTS OF MN/DOT SPECIFICATIONS 2573 AND 3886.
3. NO HOLES OR GAPS SHALL BE PRESENT IN/UNDER SILT FENCE. PREPARE AREA AS NEEDED TO SMOOTH SURFACE OR REMOVE DEBRIS.
4. REMOVE ACCUMULATED SEDIMENT WHEN BUILD UP REACHES 1/3 OF FENCE HEIGHT. OR INSTALL A SECOND SILT FENCE DOWNSTREAM OF THE ORIGINAL FENCE AT A SUITABLE DISTANCE.
5. WHEN SPLICES ARE NECESSARY MAKE SPLICE AT POST ACCORDING TO SPLICE DETAIL. PLACE THE END POST OF THE SECOND FENCE INSIDE THE END POST OF THE FIRST FENCE. ROTATE BOTH POSTS TOGETHER AT LEAST 180 DEGREES TO CREATE A TIGHT SEAL WITH THE FABRIC MATERIAL. CUT THE FABRIC NEAR THE BOTTOM OF THE POSTS TO ACCOMMODATE THE 6 INCH FLAP, THEN DRIVE BOTH POSTS AND BURY THE FLAP AND COMPACT BACKFILL.

1 – DETAIL: SILT FENCE – MACHINE SLICED
NOT TO SCALE

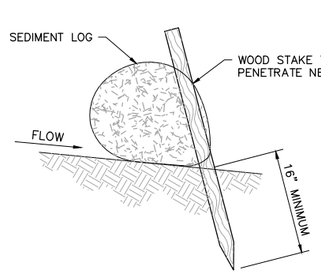
SEE ALSO CITY STD. PLATE NO. SEWR–8001



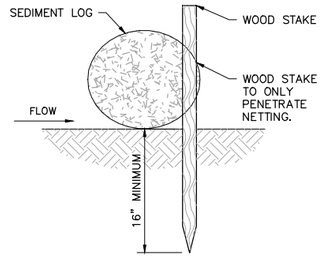
NOTES:

1. REFER TO MANUFACTURER RECOMMENDATIONS FOR STAPLE PATTERNS FOR SLOPE INSTALLATIONS.
2. PREPARE SOIL BY LOOSENING TOP 1–2 INCHES AND APPLY SEED (AND FERTILIZER WHERE REQUIRED) PRIOR TO INSTALLING BLANKETS. GROUND SHOULD BE SMOOTH AND FREE OF DEBRIS.
3. BEGIN (A) AT THE TOP OF THE SLOPE AND ROLL THE BLANKETS DOWN OR (B) AT ONE END OF THE SLOPE AND ROLL THE BLANKETS HORIZONTALLY ACROSS THE SLOPE.
4. THE EDGES OF PARALLEL BLANKETS MUST BE STAPLED WITH APPROXIMATELY 6" OVERLAP, WITH THE UPHILL BLANKET ON TOP.
5. WHEN BLANKETS MUST BE SPLICED DOWN THE SLOPE, PLACE BLANKETS END OVER END (SHINGLE STYLE) WITH APPROXIMATELY 6" OVERLAP. STAPLE THROUGH OVERLAPPED AREA, APPROXIMATELY 12" APART.
6. BLANKET MATERIALS SHALL BE AS SPECIFIED OR AS APPROVED BY ENGINEER.

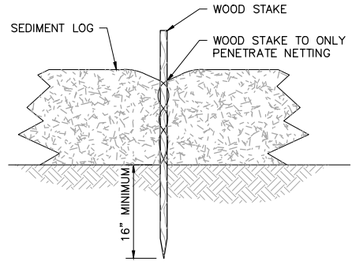
2 – DETAIL: EROSION CONTROL BLANKET – INSTALLATION
NOT TO SCALE



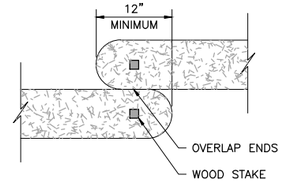
SIDE VIEW ON SLOPE



SIDE VIEW FLAT



FRONT VIEW

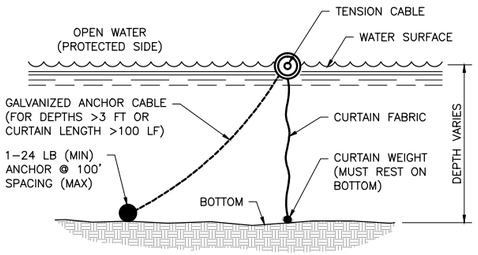


TOP VIEW

NOTES:

1. INSTALL SEDIMENT LOG ALONG CONTOURS (CONSTANT ELEVATION).
2. NO GAPS SHALL BE PRESENT UNDER SEDIMENT LOG. PREPARE AREA AS NEEDED TO SMOOTH SURFACE OR REMOVE DEBRIS.
3. REMOVE ACCUMULATED SEDIMENT WHEN REACHING 1/3 OF LOG HEIGHT.
4. MAINTAIN SEDIMENT LOG THROUGHOUT THE CONSTRUCTION PERIOD AND REPAIR OR REPLACED AS REQUIRED.

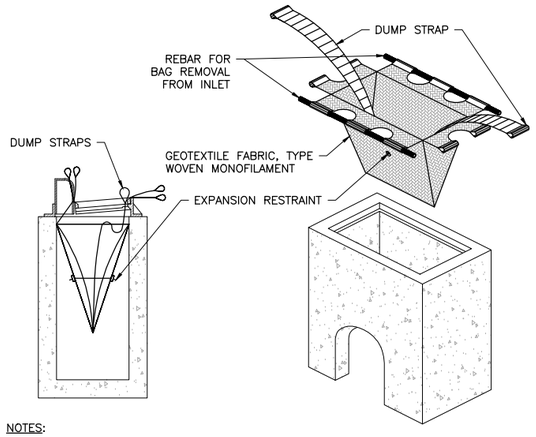
3 – DETAIL: EROSION LOG – STAKING
NOT TO SCALE



NOTES:

1. INSTALL SILT CURTAIN PRIOR TO ANY CONSTRUCTION ACTIVITIES IN AREAS DRAINING TO OPEN WATER OR WORK IN WATER.
2. ANCHOR TENSION CABLE AT SHORE AT BOTH END WITH STEEL POSTS OF DIAMETER AND LENGTH SUFFICIENT TO PREVENT BENDING AND PULL–OUT.
3. ELIMINATE ANCHOR AND CABLE FOR WATER DEPTHS LESS THAN 3'–0" OR DISTANCE BETWEEN SHORE ANCHORS FOR TENSION CABLE OF LESS THAN 100'
4. CURTAIN WEIGHT SHALL BE HEAVY ENOUGH TO HOLD CURTAIN VERTICAL IN CURRENT AND WAVES TYPICAL FOR THE SITE.
5. SILT CURTAIN MATERIALS SHALL CONFORM TO MN/DOT SPECIFICATION 3887.
6. MAINTAIN SILT CURTAIN AND REPAIR OR REPLACE AS REQUIRED TO PREVENT DISCHARGE OF SEDIMENT TO PROTECTED WATER BODY.
7. REMOVE ANY ACCUMULATED SEDIMENT PRIOR TO REMOVAL OF SILT CURTAIN.
8. REMOVE SILT CURTAIN FOLLOWING SITE STABILIZATION OR AS DIRECTED BY ENGINEER.

4 – DETAIL: FLOTATION SILT CURTAIN
NOT TO SCALE



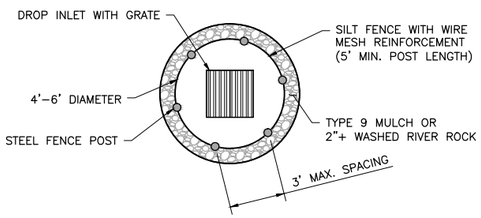
NOTES:

1. INSTALL INLET PROTECTION PRIOR TO ANY GRADING WORK IN THE AREA TO BE PROTECTED OR IMMEDIATELY FOLLOWING ANY CATCHBASIN INSTALLATION AND MAINTAIN THROUGHOUT THE CONSTRUCTION PERIOD.
2. MATERIALS SHALL BE SUFFICIENT TO ALLOW FLOW WHILE BLOCKING SEDIMENT. NO HOLES OR GAPS SHALL BE PRESENT IN/AROUND FILTER SACK.
3. CLEAN FILTER SACK AND REMOVE ACCUMULATED SEDIMENT AS REQUIRED TO ALLOW FLOW INTO THE CATCHBASIN AND PREVENT SEDIMENT FROM LEAVING THE DEVICE.
4. REMOVE DEVICE AND ANY ACCUMULATED SEDIMENT IN CONJUNCTION WITH THE FINAL GRADING AND SITE STABILIZATION.

TYPE C (FILTER SACK)

5 – DETAIL: INLET PROTECTION
NOT TO SCALE

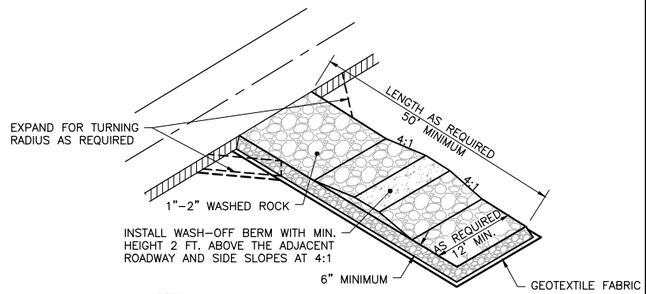
SEE ALSO CITY STD. PLATE NO. SEWR–8003



NOTES:

1. THE SEDIMENT CONTROL BARRIER SHALL BE A METAL OR PLASTIC\POLYETHELENE RISER SIZED TO FIN INSIDE THE CATCH BASIN/MANHOLE; HAVE PERFORATIONS TO ALLOW FOR WATER INFILTRATION; HAVE AND OVERFLOW OPENING, FLANGES AND A LID/COVER.
2. USE INLET PROTECTION TYPE A OR TYPE 9 MULCH AS DIRECTED BY THE ENGINEER.
3. PAID FOR AS SEDIMENT CONTROL BARRIER.

PLAN VIEW – TYPE A (SILT FENCE)



NOTES:

1. MAINTAIN ENTRANCE THROUGHOUT THE CONSTRUCTION PERIOD AND REPAIR OR REPLACE AS REQUIRED TO PREVENT TRACKING OFFSITE.
2. REMOVE ENTRANCE IN CONJUNCTION WITH FINAL GRADING AND SITE STABILIZATION.

6 – DETAIL: CONSTRUCTION ENTRANCE – ROCK
NOT TO SCALE

SEE ALSO CITY STD. PLATE NO. SEWR–8002

90% PLAN SET
ISSUED FOR REVIEW
NOT FOR CONSTRUCTION

NO.	BY	CHK.	APP.	DATE	REVISION DESCRIPTION
A	EPF	PJH2	JDW	10/05/2017	ISSUED FOR REVIEW

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PRINTED NAME JEFFREY D. WEISS
SIGNATURE
DATE 10/05/2017 LICENSE # 48031

	10/05/17
CLIENT	
BID	
CONSTRUCTION	

RELEASED TO/FOR: A B C 0 1 2 3 — DATE RELEASED

BARR
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Scale	AS SHOWN
Date	10/05/2017
Drawn	EPF
Checked	AKH
Designed	BARR
Approved	JDW

CITY OF MINNEAPOLIS
MINNEAPOLIS, MINNESOTA

BASSETT CREEK MAIN STEM STABILIZATION
MINNEAPOLIS, MN

EROSION CONTROL DETAILS

BARR PROJECT No. 23/27–1579.00
CLIENT PROJECT No. –
DWG. No. D–04
REV. No. A

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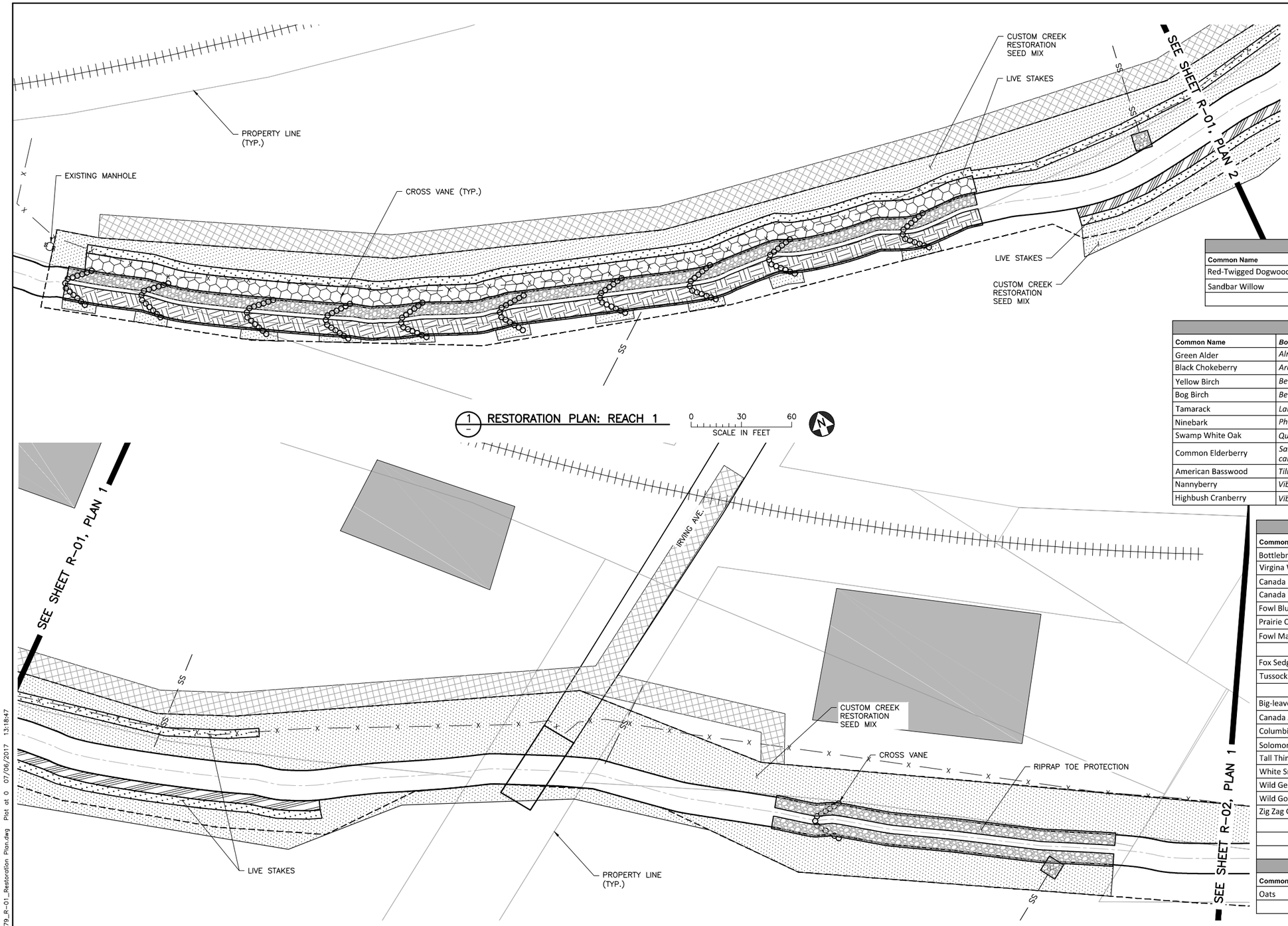

RESTORATION LEGEND

- CONSTRUCTION LIMITS
- SS — CITY STORM SEWER
- RIPRAP STABILIZATION
- ROCK CROSS VANE–SINGLE BOULDER
- CUSTOM CREEK RESTORATION SEED MIX

LIVE STAKES				
Common Name	***Botanic Name***	**Quantity**	**Spacing**	**Size**
Red-Twigged Dogwood	*Cornus sericea*		3' O.C.	Live Stake
Sandbar Willow	*Salix interior*		3' O.C.	Live Stake
	Total Live Stakes			

PLANTING SCHEDULE				
Common Name	***Botanic Name***	**Quantity**	**Spacing**	**Size**
Green Alder	*Alnus viridis ssp. Crispa*	50	Field Fit	#2 Cont.
Black Chokeberry	*Aronia melonocarpa*	60	Field Fit	#2 Cont.
Yellow Birch	*Betula alleghaniensis*	15	Field Fit	#5 Cont.
Bog Birch	*Betula pumila*	15	Field Fit	#5 Cont.
Tamarack	*Larix larcina*	21	Field Fit	#5 Cont.
Ninebark	*Physocarpus opulifolius*	50	Field Fit	#2 Cont.
Swamp White Oak	*Quercus bicolor*	20	Field Fit	#5 Cont.
Common Elderberry	*Sambucus Canadensis var. canadensis*	55	Field Fit	#2 Cont.
American Basswood	*Tilia americana*	20	Field Fit	#5 Cont.
Nannyberry	*Viburnum lentago*	50	Field Fit	#2 Cont.
Highbush Cranberry	*Viburnum trilobum*	50	Field Fit	#2 Cont.

RIPARIAN RESTORATION			
Common Name	***Botanic Name***	**Rate (lb/ac)**	**% of Mix (% by Wt)**
Bottlebrush Grass	*Elymus hystrix*	0.500	4.0
Virgina Wild Rye	*Elymus virginicus*	2.000	19.0
Canada Blue Joint Grass	*Calamagrostis canadensis*	2.000	5.0
Canada Wild Rye	*Elymus canadensis*	1.000	9.0
Fowl Bluegrass	*Poa palustris*	1.000	15.0
Prairie Cordgrass	*Spartina pectinata*	1.400	14.0
Fowl Manna Grass	*Glyceria striata*	1.000	12.0
Total Grasses		8.900	78.0
Fox Sedge	Carex stipata	1.000	4.5
Tussock Sedge	Carex stricta	0.800	3.0
Total Sedges		1.800	7.5
Big-leaved Aster	Aster macrophyllus	0.080	1.0
Canada Anemone	Anemone canadensis	0.080	1.0
Columbine	Aquilegia canadensis	0.125	1.5
Solomon's Plume	Smilacina racemosa	0.250	2.4
Tall Thimbleweed	Anemone virginiana	0.080	0.5
White Snakeroot	Eupatorium rugosum	0.125	1.0
Wild Geranium	Geranium maculatum	0.080	1.1
Wild Golden Glow	Rudbeckia laciniata	0.250	3.0
Zig Zag Goldenrod	Solidago flexicaulis	0.125	3.0
Total Forbs		1.195	14.5
	Total	11.90	100.00
COVER CROP			
Common Name	***Botanic Name***	Rate (lb/ac)	% of Mix (% by Wt)
Oats	Avena sativa	25.000	100.0
Total Cover Crop		25.000	100.0

90% PLAN SET
ISSUED FOR REVIEW
NOT FOR CONSTRUCTION

NO.	BY	CHK.	APP.	DATE	REVISION DESCRIPTION
A	EPF	PJH2	JDW	10/05/2017	ISSUED FOR REVIEW

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	CLIENT	10/05/17					
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	CONSTRUCTION						
DATE RELEASED							

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Scale	AS SHOWN
Date	10/05/2017
Drawn	EPF
Checked	AKH
Designed	BARR
Approved	JDW

CITY OF MINNEAPOLIS
MINNEAPOLIS, MINNESOTA

BASSETT CREEK MAIN STEM STABILIZATION
MINNEAPOLIS, MN

RESTORATION PLAN
REACH 1

BARR PROJECT No. 23/27–1579.00
CLIENT PROJECT No. –
DWG. No. R–01
REV. No. A

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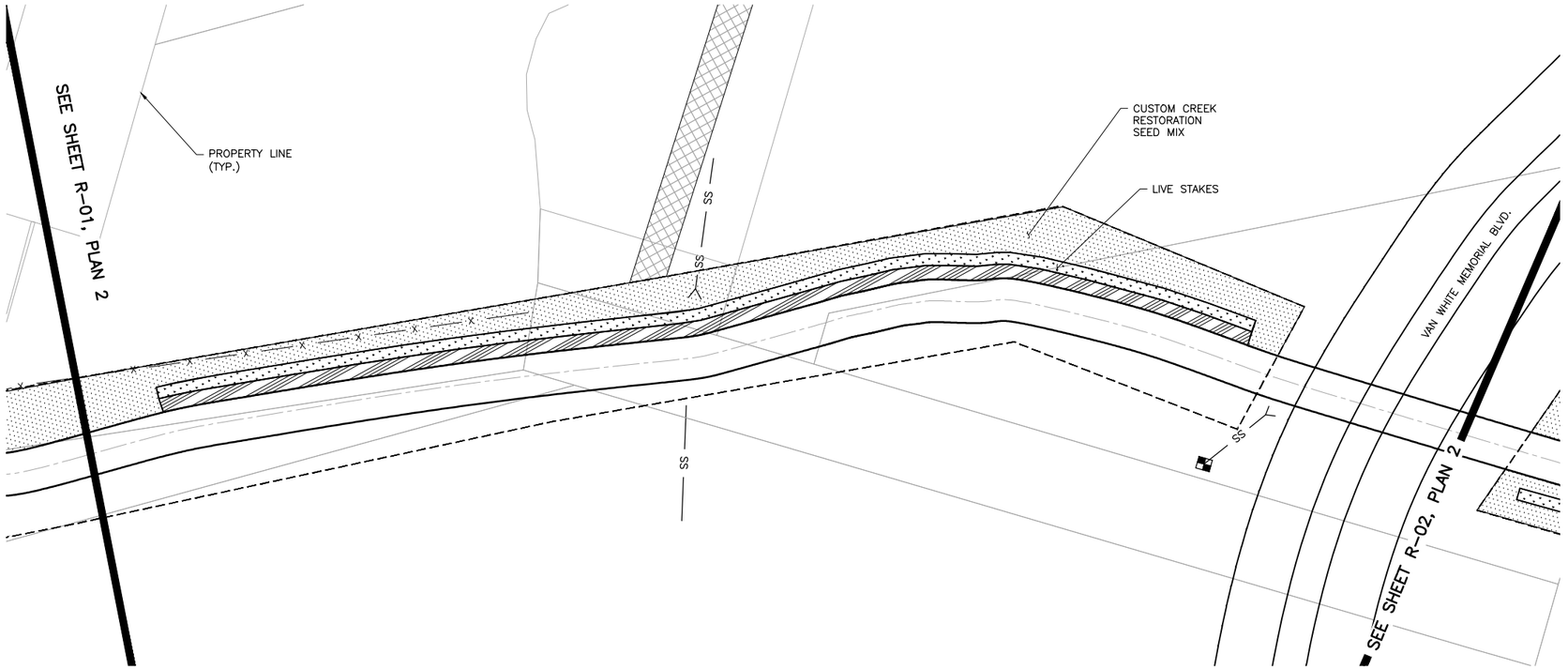

1 RESTORATION PLAN: REACH 1

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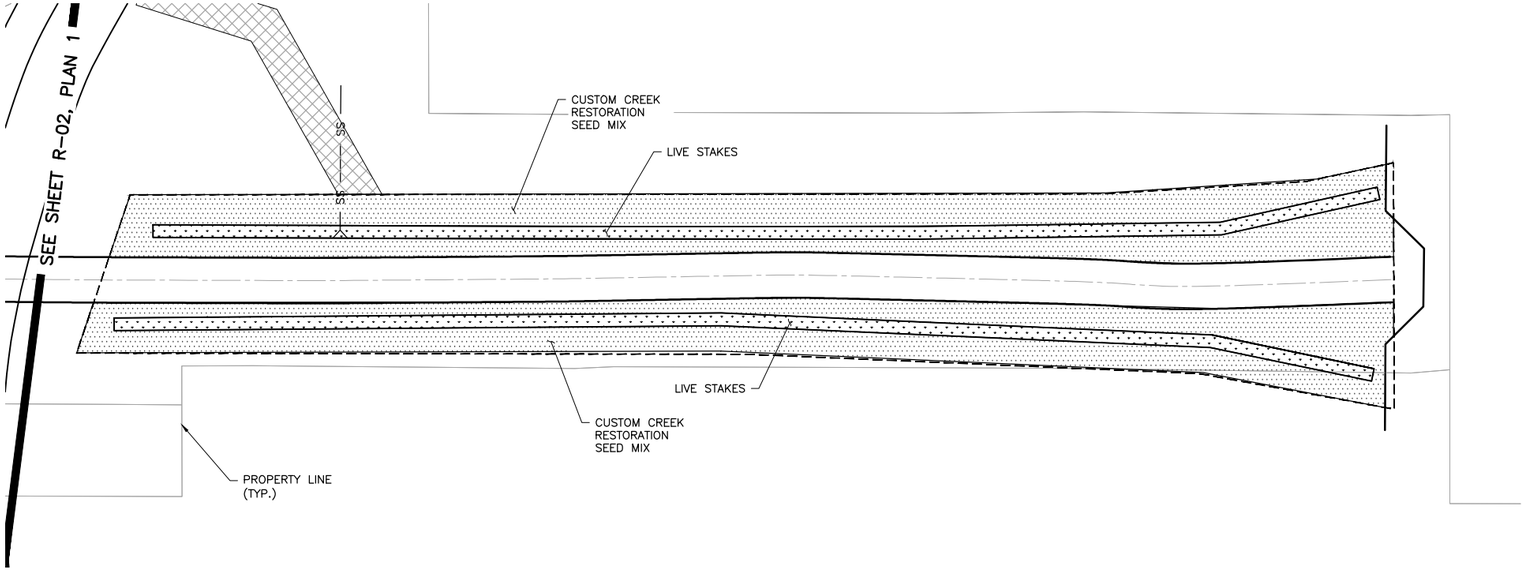

2 RESTORATION PLAN: REACH 1

0 30 60
SCALE IN FEET

RESTORATION LEGEND

- CONSTRUCTION LIMITS
- SS — CITY STORM SEWER
- RIPRAP STABILIZATION
- ROCK CROSS VANE–SINGLE BOULDER
- CUSTOM CREEK RESTORATION SEED MIX

LIVE STAKES				
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Fowl Manna Grass	*Glyceria striata*	1.000	12.0
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Tussock Sedge	Carex stricta	0.800	3.0
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Columbine	Aquilegia canadensis	0.125	1.5
Solomon's Plume	Smilacina racemosa	0.250	2.4
Tall Thimbleweed	Anemone virginiana	0.080	0.5
White Snakeroot	Eupatorium rugosum	0.125	1.0
Wild Geranium	Geranium maculatum	0.080	1.1
Wild Golden Glow	Rudbeckia laciniata	0.250	3.0
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PLANTING SCHEDULE				
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90% PLAN SET
ISSUED FOR REVIEW
NOT FOR CONSTRUCTION

NO.	BY	CHK.	APP.	DATE	REVISION DESCRIPTION
A	EPF	PJH2	JDW	10/05/2017	ISSUED FOR REVIEW

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.

PRINTED NAME JEFFREY D. WEISS

SIGNATURE

DATE 10/05/2017 LICENSE # 48031

		A	B	C	0	1	2	3
CLIENT	10/05/17							
BID								
CONSTRUCTION								
RELEASED TO/FOR	DATE RELEASED							

BARR
Corporate Headquarters:
Minneapolis, Minnesota
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Project Office:
BARR ENGINEERING CO.
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Scale	AS SHOWN
Date	10/05/2017
Drawn	EPF
Checked	AKH
Designed	BARR
Approved	JDW

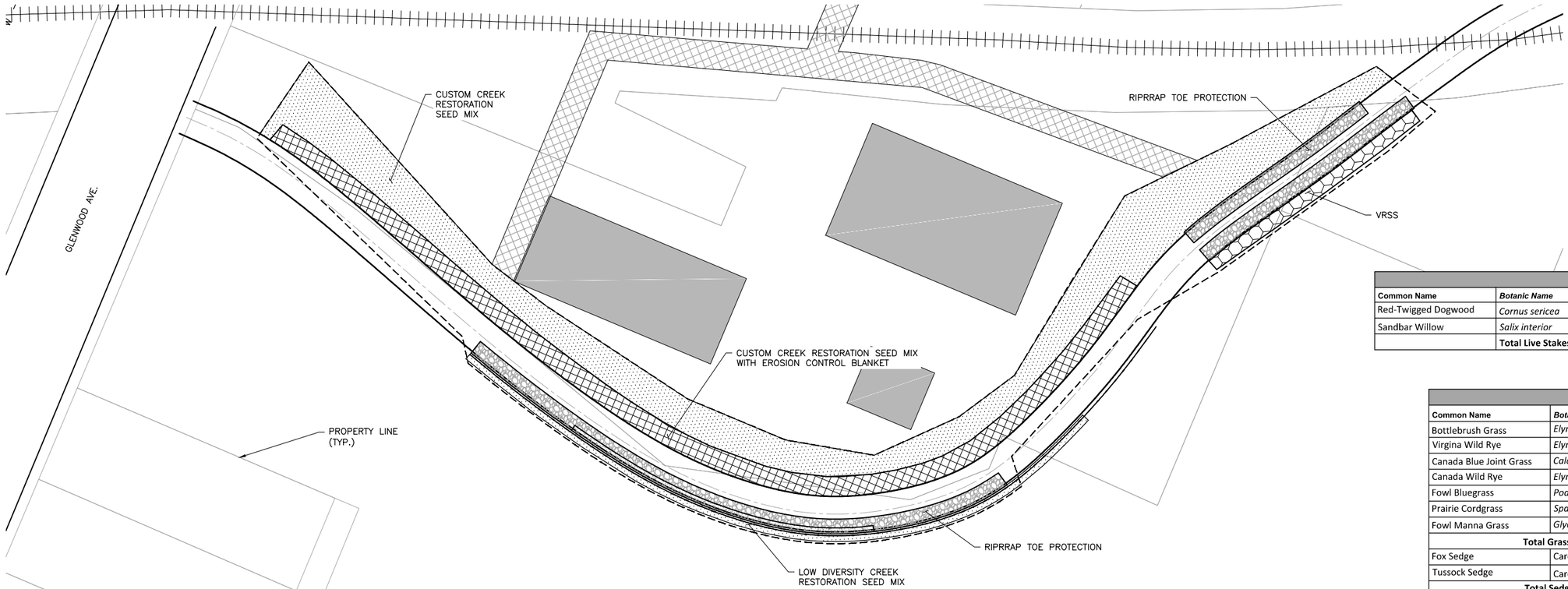
CITY OF MINNEAPOLIS
MINNEAPOLIS, MINNESOTA

BASSETT CREEK MAIN STEM STABILIZATION
MINNEAPOLIS, MN

RESTORATION PLAN
REACH 1

BARR PROJECT No. 23/27–1579.00
CLIENT PROJECT No. –
DWG. No. R–02
REV. No. A

CADD USER: Eric P. Fitzgerald FILE: M:\DESIGN\23271579.00\23271579_R-01_RESTORATION PLAN.DWG PLOT SCALE: 1:2 PLOT DATE: 10/5/2017 9:13 AM
Xrefs in Drawing – M:\Design\23271579.00\23271579_Planimetric_Existing.dwg M:\Design\23271579.00\23271579_Planimetric_Design.dwg
epf M:\Design\23271579.00\23271579_R-01_Restoration Plan.dwg Plot at 0 07/06/2017 14:58:02



RESTORATION LEGEND

- CONSTRUCTION LIMITS
- SS — CITY STORM SEWER
- RIPRAP STABILIZATION
- ROCK CROSS VANE–SINGLE BOULDER
- CUSTOM CREEK RESTORATION SEED MIX
- CUSTOM CREEK RESTORATION SEED MIX WITH EROSION CONTROL BLANKET

1 – RESTORATION PLAN: REACH 2

0 30 60
SCALE IN FEET

LIVE STAKES				
Common Name	***Botanic Name***	**Quantity**	**Spacing**	**Size**
Red-Twigged Dogwood	*Cornus sericea*		3' O.C.	Live Stake
Sandbar Willow	*Salix interior*		3' O.C.	Live Stake
	Total Live Stakes			

RIPARIAN RESTORATION			
Common Name	***Botanic Name***	**Rate (lb/ac)**	**% of Mix (% by Wt)**
Bottlebrush Grass	*Elymus hystrix*	0.500	4.0
Virgina Wild Rye	*Elymus virginicus*	2.000	19.0
Canada Blue Joint Grass	*Calamagrostis canadensis*	2.000	5.0
Canada Wild Rye	*Elymus canadensis*	1.000	9.0
Fowl Bluegrass	*Poa palustris*	1.000	15.0
Prairie Cordgrass	*Spartina pectinata*	1.400	14.0
Fowl Manna Grass	*Glyceria striata*	1.000	12.0
Total Grasses		8.900	78.0
Fox Sedge	Carex stipata	1.000	4.5
Tussock Sedge	Carex stricta	0.800	3.0
Total Sedges		1.800	7.5
Big-leaved Aster	Aster macrophyllus	0.080	1.0
Canada Anemone	Anemone canadensis	0.080	1.0
Columbine	Aquilegia canadensis	0.125	1.5
Solomon's Plume	Smilacina racemosa	0.250	2.4
Tall Thimbleweed	Anemone virginiana	0.080	0.5
White Snakeroot	Eupatorium rugosum	0.125	1.0
Wild Geranium	Geranium maculatum	0.080	1.1
Wild Golden Glow	Rudbeckia laciniata	0.250	3.0
Zig Zag Goldenrod	Solidago flexicaulis	0.125	3.0
Total Forbs		1.195	14.5
	Total	11.90	100.00
COVER CROP			
Common Name	***Botanic Name***	Rate (lb/ac)	% of Mix (% by Wt)
Oats	Avena sativa	25.000	100.0
Total Cover Crop		25.000	100.0

PLANTING SCHEDULE				
Common Name	***Botanic Name***	**Quantity**	**Spacing**	**Size**
Green Alder	*Alnus viridis ssp. Crispa*	50	Field Fit	#2 Cont.
Black Chokeberry	*Aronia melonocarpa*	60	Field Fit	#2 Cont.
Yellow Birch	*Betula alleghaniensis*	15	Field Fit	#5 Cont.
Bog Birch	*Betula pumila*	15	Field Fit	#5 Cont.
Tamarack	*Larix larcina*	21	Field Fit	#5 Cont.
Ninebark	*Physocarpus opulifolius*	50	Field Fit	#2 Cont.
Swamp White Oak	*Quercus bicolor*	20	Field Fit	#5 Cont.
Common Elderberry	*Sambucus Canadensis var. canadensis*	55	Field Fit	#2 Cont.
American Basswood	*Tilia americana*	20	Field Fit	#5 Cont.
Nannyberry	*Viburnum lentago*	50	Field Fit	#2 Cont.
Highbush Cranberry	*Viburnum trilobum*	50	Field Fit	#2 Cont.

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PRINTED NAME JEFFREY D. WEISS
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DATE 10/05/2017 LICENSE # 48031

RELEASED TO/FOR: CLIENT, BID, CONSTRUCTION — 10/05/17

DATE RELEASED: A B C 0 1 2 3

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CITY OF MINNEAPOLIS
MINNEAPOLIS, MINNESOTA

BASSETT CREEK MAIN STEM STABILIZATION
MINNEAPOLIS, MN

RESTORATION PLAN
REACH 2

BARR PROJECT No. 23/27–1579.00
CLIENT PROJECT No. –
DWG. No. R–03
REV. No. A

CADD USER: Eric P. Fitzgerald FILE: M:\DESIGN\23271579.00\23271579_R–01_RESTORATION PLAN.DWG PLOT SCALE: 1:2 PLOT DATE: 10/5/2017 9:02 AM
Xrefs in Drawing – M:\Design\23271579.00\23271579_Planimetric_Existing.dwg M:\Design\23271579.00\23271579_Planimetric_Design.dwg
epf M:\Design\23271579.00\23271579_R–01_Restoration Plan.dwg Plot at 0 07/06/2017 13:18:47