

Applicant: Julie Long; City of Bloomington
Consultant:
Project: Stream Channel Stabilization
Location: 7808 CreekrIDGE Circle: Bloomington
Rule(s): 2,5, 7 and 10
Reviewer: BCO

General Background & Comments

The proposed project involves maintenance repairs to the southern bank of the South Fork of Nine Mile Creek immediately upstream of the CreekrIDGE Circle crossing of the creek in Bloomington. Heavy rainstorms of the past several decades have resulted in a shifting of the creek channel which is now affecting the stability of the side slope of the driveway entryway to the office building at 7808 CreekrIDGE Circle. The project is located on both City of Bloomington property and within a drainage easement on private property. The City has obtained a temporary Construction Easement and Right of Entry dated October 31, 2018 from the property owner to undertake the work as proposed. The stabilization is a combination of field stone toe boulders, field stone rip-rap and vegetated natural coir fabric bioengineering to comply with the requirements of District Rule 7.0, Shoreline and Stream Bank Improvements. To benefit from the authorization available under Department of Natural Resources General Permit #97-6112 issued for work in the Nine Mile Creek watershed, the city will need to comply with the terms and conditions of General Permit #97-6112.

The stabilization project will restore the eroded area which is approximately 120 feet in length and 9+ feet high to the original dimensions to the extent practical with the creek channel in its current location. The creek has shifted as much as 25 feet over the past 30+ years into the slope of the entryway to the site. Rather than import a significant volume of material to reestablish the location of the creek channel, since the creek is still located within the existing drainage and utility easement, the objective as stated will be to stabilize the creek bank in its current location. The project will result in 82 cubic yards of fill within the floodplain with the placement of the toe boulder protection and rip-rap. Without a substantial amount of additional disturbance in the area to compensate this volume as required in Rule 2.3.2, an exemption to this Rule is requested to be considered.

The project will disturb more than 50 cubic yards of earth but less than 5000 square feet of surface area. The District's Stormwater Rule (4) applies since the project will meet Rule 4.2.1a. However since there are no impermeable areas associated with the project that will be created to generate runoff, the requirements of Rules 4.3.1a) volume retention, b) limit peak flow rates for the 2, 10, and 100 year storm events to existing conditions and c) water quality management and 4.3.3 Chloride management are not imposed. The District's Erosion and Sediment Control Rule (5.2.1a) applies to the project because of the volume of disturbance

proposed. The District's Shoreline and Streambank Improvements Rule (7) applies to the project because of the city's plan involves installation of a streambank improvement.

Exhibits

1. Permit Application dated November 19, 2018.
2. Plans dated November 5, 2018 prepared by the City of Bloomington
3. E-mail correspondence dated December 3, 2018 from the MDNR stating the project will not require a separate permit from the MDNR as long as a NMCWD permit is obtained for the work
4. Temporary Construction Easement and Right of Entry dated October 31, 2018 from the authorized representative of the owner for the City to undertake the work as proposed.

2.0 Floodplain Management and Drainage Alterations

The creek will bounce approximately 8 feet in this area at flood stage. The stabilization proposed, using the field stone toe boulders and rip-rap is considered placement of fill below the 100-year flood elevation of Nine Mile Creek, defined by District rule 2.2.1. Rule 2.3.2 requires that the fill placement in the floodplain of the creek must be fully compensated at the same elevation +/- 1 foot. As previously stated, the stabilization is to take place at the location of the current creek channel that has shifted approximately 25 feet since the building was constructed in 1984. This has resulted in an erosion area that is approximately 120 feet in length, more than 9 feet high having a vertical slope. Continued erosion would result in a failure of the of the entryway embankment onto the site.

2.3.1: The low floor elevation of all new and reconstructed structures must be constructed in accordance with the NMCWD Stormwater Rule, subsection 4.3.3

This section of the rule does not apply to the proposed project.

2.3.2: Placement of fill below the 100-year flood elevation is prohibited unless fully compensatory storage is provided within the floodplain and:

- a. at the same elevation +/- 1 foot for fill in the floodplain and:*
- b. at or below the same elevation for fill in the floodplain of a water basin or constructed stormwater facility.*

The plan, as stated, is to stabilize the creek in its current location to minimize the potential of a failure of the driveway embankment onto the site. The 120 foot section along the creek will be stabilized using eight-two (82) cubic yards of toe boulders and rip-rap and bioengineering. Stabilizing the erosion section in its current location rather than trying to reestablish the historic location of the creek minimizes the amount of material necessary for providing a non-eroding condition.

2.3.3. The District will issue a permit to alter surface flows only if it finds that the alteration will not have an adverse impact on any upstream or downstream landowner and will not adversely affect flood risk, basin or channel stability, groundwater hydrology, stream base-flow, water quality or aquatic or riparian habitat.

The project as stated is to correct an erosion problem that has introduced sediment into the creek and if not corrected has the potential of a slope failure of the driveway embankment

onto the site. In our opinion there is no resultant rise of the District's management elevation for the creek and does not propose any flood risk. The project will fill 82 cubic yards (0.0018 acre-feet) for the stabilization. The XP-SWMM model for the creek (Atlas 14) indicates 8.1 acre-feet of flood storage is provided in this reach. The project will not alter the creek channel or the stability of the channel itself but will provide a stable creek bank. The project will not affect the groundwater hydrology or stream base flow conditions. The work is to be completed during the winter months when the creek flow is at a minimum. The project will improve the water quality of the creek by the stabilization of the erosion problem however may have a temporary impact on riparian habitat during the construction phase of the project.

2.3.4 No structure may be placed, constructed or reconstructed and no surface may be paved within 50 feet of the centerline of any water course, except that this provision does not apply to:

a. Bridges, culverts, and other structures and associated impervious surface regulated under Rule 6.0;

b. Trails 10 feet wide or less, designed primarily for nonmotorized use.

This section of the rule does not apply to the proposed project.

5.0 Erosion and Sediment Control

The work proposed is to be undertaken between January and March during typically a low flow period. Erosion control measures include in stream sediment traps and silt fence upstream of the 66-inch pipe inlet beneath CreekrIDGE Circle. The project contact is Steve Segar, City of Bloomington.

7.0 Shoreline and Streambank Improvements

Rule 7.0 states that it is the policy of the Board of Managers to prevent erosion of shorelines and streambanks and to foster the use of natural materials and bioengineering for the maintenance and restoration of shorelines.

Rule 7.0 applies, under paragraph 7.2, to the proposed work because it will involve installation of stabilization along 120 feet of Nine Mile Creek streambank. The project will provide stabilization techniques, including field stone toe boulders, rip-rap, vegetated natural coir fabric bioengineering (VRSS, vegetative reinforced soil slopes).

Rule 7.3.1 states, *An applicant for a shoreline alteration permit must demonstrate a need to prevent shoreline erosion or restore eroded shoreline:*

Rainstorm events have resulted in a movement of the creek in this area over the years that has now resulted in a substantial failure/erosion of the side slope of the driveway entrance to the office building at 7808 CreekrIDGE Circle. If not corrected, the driveway embankment will fail as the erosion continues.

Rule 7.3.2 states, *An applicant must first consider maintenance or restoration of a shoreline using bioengineering. If bioengineering cannot provide a stable shoreline, a combination of rip-rap and bioengineering may be used to restore or maintain shoreline. If a combination of rip-rap and bioengineering cannot provide a stable shoreline within a reasonable period, rip-rap may be used to restore or maintain shoreline:*

As stated, the eroded bank is to be stabilized in its current location with field stone toe boulders, rip-rap, and coir fabric wrap geogrid (soil lifts) including live cutting and plugs (harvested on-site if available). The rock stabilization will be at and below the anticipated normal level of the creek with the bioengineering located at elevations above. Structural stabilization as proposed, rock toe protection, is required to minimize the impacts that flow velocities in the creek, approximately 6 feet per second for the more frequent storm events (e.g. 10-year), will have on the vertical slope of the creek channel in this area. Bioengineering alone will not provide the structural component required.

Rule 7.3.2a states, *Live plantings incorporated in shoreline bioengineering must be native aquatic vegetation and/or native upland plants:*

The rock stabilization will provided the foundation of the stabilization proposed. The coir fabric geo grid is a form of VRSS – soil pillows being 1 foot thick of top soil material rapped with the fabric.

Rule 7.3.2b states: *Riprap to be used in shoreline erosion protection must be sized appropriately in relation to the erosion potential of the wave or current action of the particular water body, but in no case shall the riprap rock average less than six inches in diameter or more than 30 inches in diameter. Riprap shall be durable, natural stone and of a gradation that will result in a stable shoreline embankment. Stone, granular filter and geotextile material shall conform to standard Minnesota Department of Transportation specifications, except that neither limestone nor dolomite shall be used for shoreline or stream bank riprap, but may be used at stormwater outfalls. All materials used must be free from organic material, soil, clay, debris, trash or any other material that may cause siltation or pollution:*

The project proposes the use of Class III field stone rip-rap, MnDot 2511 and 3601, having a maximum size of 18-inches, with 8-inches of granular filter material, MnDot 3601. The objective is to maintain the natural characteristics of the creek system yet provide for a stable slope that forms the creek bank.

Rule 7.3.2c states: *Riprap shall be placed to conform to the natural alignment of the shoreline.*

The creek has established its own bank as a result of the erosion. The stabilization will not move, alter or change the location of the channel from its current location. The stabilization will follow the alignment of the existing stream channel.

Rule 7.3.2d states: *A transitional layer consisting of graded gravel, at least six inches deep, and an appropriate geotextile filter fabric shall be placed between the existing shoreline and any riprap. The thickness of riprap layers should be at least 1.25 times the maximum stone diameter. Toe boulders, if used, must be at least 50 percent buried.*

Filter material used will be 8-inches in depth complying with MnDot 3601. In discussions with the City, they are reviewing their stabilization detail for incorporating geotextile filter fabric into the proposed stabilization design. The toe boulders are shown to be installed half buried below the normal level of the creek.

Rule 7.3.2e states: *Riprap must not cover emergent vegetation unless authorized by a Department of Natural Resources permit.*

The rip-rap to be installed will not cover emergent vegetation.

Rule 7.3.2f states: *Riprap shall extend no higher than the top of bank or two feet above the 100-year high water elevation, whichever is lower.*

The thalweg of the creek in this area is approximately 817 M.S.L. The toe boulders and field stone rip-rap will extend to the elevation of the bank opposite the stabilization, approximately elevation 821 M.S.L. The 100-year flood elevation of the creek at this location is 825 M.S.L. Stabilization to the top of the creek bank complies with the rule. The bioengineering will continue approximately 8 to 10 feet above the creek level to the top of the eroded area. Areas that have not been subject to erosion will remain in its current condition.

Rule 7.3.3 states: *The finished slope of any shoreline shall not be steeper than 3:1 (horizontal to vertical).*

The plans show the stabilized channel banks at a slope of 3:1.

Rule 7.3.4 states: *Horizontal encroachment from a shoreline shall be the minimal amount necessary to permanently stabilize the shoreline and shall not unduly interfere with water flow or navigation. No riprap or filter material shall be placed more than six feet waterward of the OHW. Streambank riprap shall not reduce the cross-sectional area of the channel or result in a stage increase of more than 0.01 feet at or upstream of the treatment.*

The creek channel will not be changed or reconstructed by the project. Only the eroded bank will be stabilized. Navigation within this reach of the creek is not applicable.

Rule 7.3.5 states: *The design of any shoreline erosion protection shall reflect the engineering properties of the underlying soils and any soil corrections or reinforcements necessary. The design shall conform to engineering principles for dispersion of wave energy and resistance to deformation from ice pressures and movement, considering prevailing winds, fetch and other factors that induce wave energy.*

The erosion that occurred over time has resulted from the natural movement of the creek channel. This movement has now affected the side slope of the driveway entrance to the existing office building. The stabilization methods have been sized to provide a stable condition with the creek in its current location thereby minimizing further disturbance that would result from the project. Ice loading and wave energy is not applicable for stream channel stabilization.

Rule 7.3.6 states: *Placement of rip-rap for merely cosmetic purposes is prohibited.*

The project is to provide a stable creek section and is not for cosmetic purposes

Rule 7.3.7 states: *Retaining walls extending below the OHW of a water body are prohibited except where:*

- a. *There is a demonstrable need for a retaining wall in a public improvement project and*
- b. *The design of the retaining wall has been certified by a registered engineer.*

This rule does not apply in this instance.

10.0 Variances and Exceptions

Rule 10.2 Exceptions states; The Board of Managers may approve an exception from a provision of the rules requiring a particular treatment or management strategy, or setting forth a design specification, if an applicant demonstrates that better natural resource protection or enhancement can be achieved by the project as proposed, with such further conditions as the Board of Managers may impose, than would strict compliance with the provision.

As previously stated, the proposed stabilization will result in 82 cubic yards (0.0018 acre-feet) of boulders and rip-rap, considered fill, placed below the 825 M.S.L., the 100-year frequency flood elevation of the creek. District Rule 2.3.2 as previously described in the floodplain discussion, requires that compensatory storage be provided for the placement of fill within the floodplain. Within this reach of the creek, 8.1 acre-feet of storage is provided within the floodplain. The impact that this fill has on the management elevation and adjacent properties both upstream and downstream of the project is so minor that it cannot be determined within a standard degree of engineering accuracy.

The stabilization proposed is necessary to prevent further movement of the creek channel into the embankment of the entryway which would result in further erosion and eventually a failure of the embankment and entryway. The proposed stabilization will eliminate an on-going source of sediment being introduced into the creek. – (The Creek has been recently delisted as being impaired for turbidity by the MPCA.)

Since the benefits of the bank stabilization provide for a better natural resource protection than the minimal impacts that the stabilization fill will have on flood risk, the engineer finds that there is ample factual and analytical basis for a determination by the managers that an Exception is warranted from compliance with 2.3.2.

11.0 Fees

Because the property owner is a public entity, no fees are charged.

Rules 2.0-6.0 \$0

12.0 Sureties

Because the property owner is a public entity, the District’s financial assurance requirements do not apply.

Sureties for the project are: \$0

Findings

1. The proposed project includes the information necessary, plan sheets and erosion control plan for review.
2. Rule 5, 6 and 7 are met.
3. The proposed stabilization project provides substantial natural resource protection and flood-risk mitigation, substantially offsetting the risk created by the compensatory storage volume shortfall resulting from the placement of toe boulders and rip-rap to be installed.

Recommendation

Approval, contingent upon:

1. General Conditions

By accepting the permit, when issued, the applicant agrees to the following stipulations:

1. No activity affecting the bed of a protected watercourse may be conducted between March 15 and June 15.

Board Action

It was moved by Manager _____, seconded by Manager _____ to approve permit application No. 18-129 with the conditions recommended by staff.

Permit #: 2018-129
Project Name: Streambank Stabilization – 7808 CreekrIDGE Circle: Bloomington
Approval Date: December 19, 2018

General Provisions

1. All temporary erosion control measures shown on the erosion and sedimentation control plans must be installed prior to commencement of surface or vegetation alteration and be maintained until completion of construction and vegetation is established as determined by NMCWD.

If silt fence is used, the bottom flap must be buried and the maximum allowable spacing between posts is 4-foot on center. All posts must be either 2-inch x 2-inch pine, hardwood, or steel fence posts. If hay bales are used, all bales must be staked in place and reinforced on the downstream side with snow fence.

2. All areas altered because of construction must be restored with seed and disced mulch, sod, wood fiber blanket, or be hard surfaced within two weeks after completion of land alteration and no later than the end of the permit period.
3. Upon final stabilization, the permit applicant is responsible for the removal of all erosion control measures installed throughout the project site.
4. At the entryway onto the site, a rock filter dike being a minimum of two feet in height and having maximum side slopes of 4:1 must be constructed. This rock filter dike will enable construction traffic to enter the site and also provide an erosion control facility.
5. If dewatering is required and sump pumps are used, all pumped water must be discharged through an erosion control facility prior to leaving the construction site. Proper energy dissipation must be provided at the outlet of the pump system.
6. The NMCWD must be notified a minimum of 48 hours prior to commencement of construction.
7. The NMCWD, its officers, employees and agents review, comment upon, and approve plans and specifications prepared by permit applicants and their consultants for the limited administrative purpose of determining whether there is reasonable assurance that the proposed project will comply with the regulations and criteria of the NMCWD. The determination of the NMCWD that issuance of this permit is appropriate was made in reliance on the information provided by the applicant.
8. The grant of this permit shall not in any way relieve the permittee, its engineer, or other professional consultants of responsibility, nor shall it make the NMCWD responsible for the technical adequacy of the engineer's or consultant's work. The grant of this permit shall not relieve the permittee from complying with all conditions and requirements of the permit which shall be retained by the permittee with the permit.
9. The issue of this permit does not convey any property rights in either real or personal property, or any exclusive privileges, nor does it authorize any injury to private property or any invasion of personal rights, nor any infringement of federal, state, or local laws or regulations.
10. This permit is permissive only. No liability shall be imposed upon the NMCWD or any of its officers, agents or employees, officially or personally, on account of the granting of this permit or on account of any damage to any person or property resulting from any act or omission of the permittee or any of its agents, employees, or contractors.

11. In all cases where the doing by the permittee of anything authorized by this permit shall involve the taking, using, or damaging of any property, rights or interests of any other person or persons, or of any publicly-owned lands or improvements or interests, the permittee, before proceeding therewith, shall obtain the written consent of all persons, agencies, or authorities concerned, and shall acquire all necessary property, rights, and interest.
12. The permit is transferable only with the approval of the NMCWD (see NMCWD Rule 1.0). The permittee shall make no changes, without written permission previously obtained from the NMCWD, in the dimensions, capacity, or location of any items of work authorized by this permit.
13. The permittee shall grant access to the site at all reasonable times during and after construction to authorized representatives of the NMCWD for inspection of the work authorized by this permit.
14. This permit may be terminated by the NMCWD at any time deemed necessary in the interest of public health and welfare, or for violation of any of the provisions of this permit.
15. Construction work authorized under this permit shall be completed on or before date specified above. The permittee may, in writing, request that the NMCWD extend the time to complete the project in accordance with NMCWD Rule 1.0.



Permit No.2018-129

Is hereby issued to Julie Long, City of Bloomington, subject to the conditions specified in the attached form:

For the stabilization of the erosion problem along the bank of the South Fork of Nine Mile Creek upstream of Creekridge Circle in Bloomington.

Steve Kloiber, Chair
Nine Mile Creek Watershed District

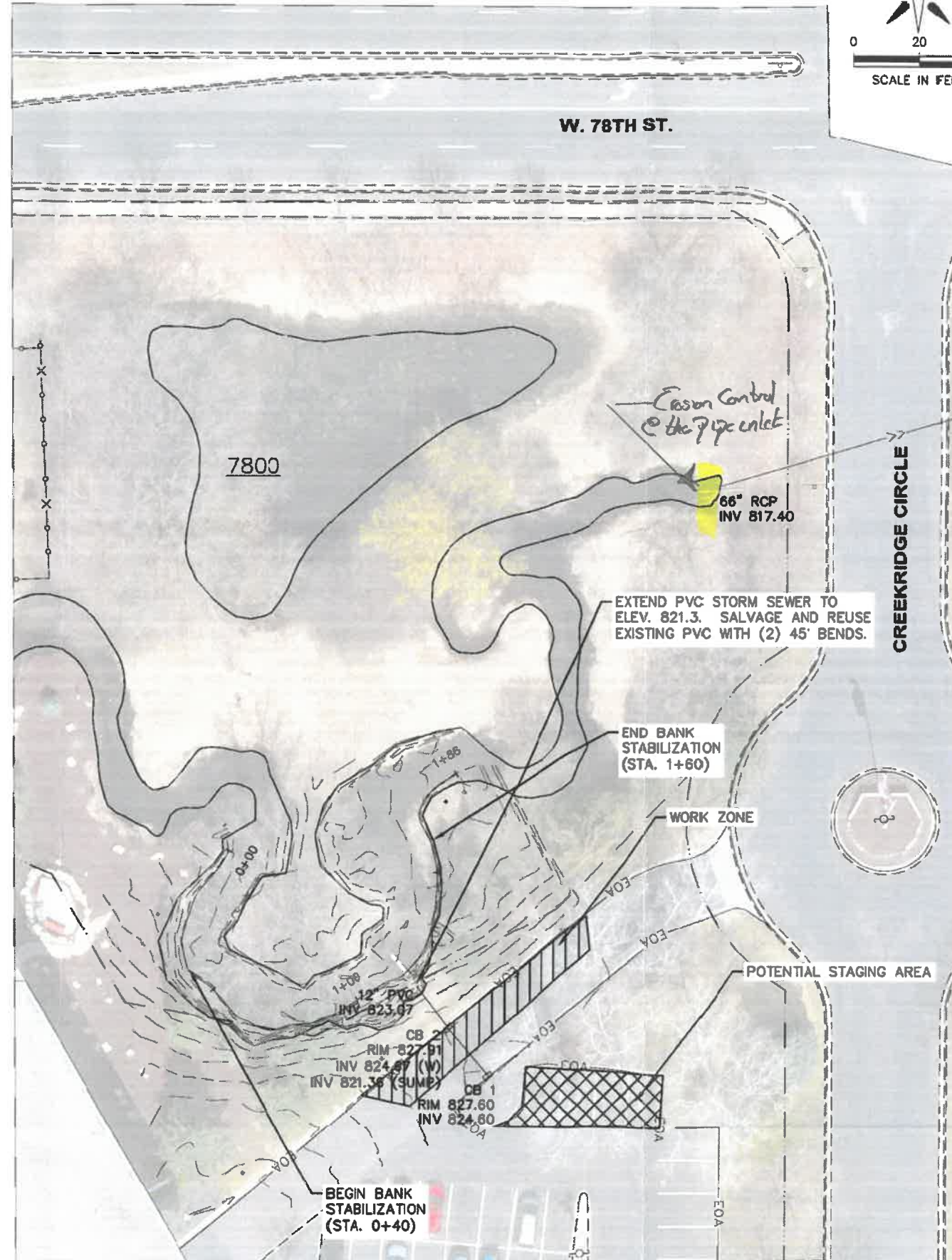
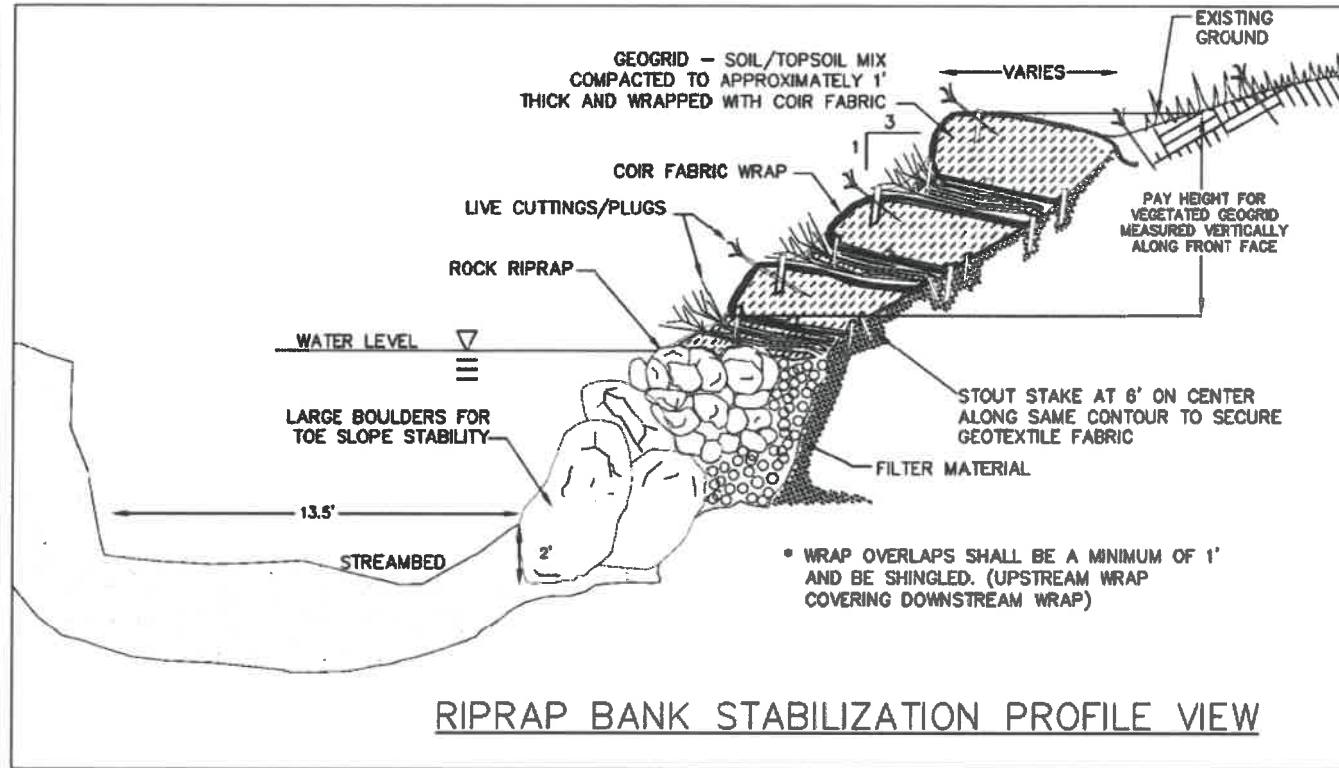
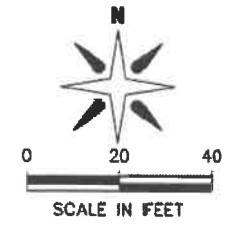
This permit expires on: January 1, 2020

CONSTRUCTION NOTES

1. CONTRACTOR MUST PROVIDE 48 HOUR NOTICE PRIOR TO BEGINNING ANY WORK ON SITE.
2. DRIVEWAY CLOSURES MUST BE LIMITED TO 5 MINUTE INTERVALS OR LESS.
3. TRAFFIC CONTROL TO COMPLY WITH MN MUTCD LAYOUT 6K-4.
4. PROTECT DRIVEWAY, CURB, AND PARKING LOT FROM DAMAGE.

SITE A - 7808 CREEKRIDGE CIRCLE

BANK RESTORATION



SITE A - 7808 CREEKRIDGE CIRCLE

BANK RESTORATION

CITY OF BLOOMINGTON MINNESOTA
 ENGINEERING DIVISION
 PUBLIC WORKS DEPARTMENT
 2018-902 POND AND STORM SEWER MAINTENANCE PROJECT

DATE	REVISIONS	DESCRIPTION	BY

I HEREBY CERTIFY THAT THIS PLAN 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.
 Steven W. Sogor
 Steven W. Sogor
 L.C. # 25072 11/5/18
 DATE

DRAWN: SGG
 CHECKED: SWS
 APPROVED: SWS
 SHEET: 4 OF 8

Drawing name: H:\PROJECTS\2018\2018-902_Pond and Storm Sewer Maintenance Project\CAD Files\Plan - Slope.dwg -- Printed: Nov 19, 2018 - 11:48am

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