Permit Application No.: **16-022**

Rules: **Erosion Control, Floodplain Alteration, and Waterbody Crossings & Structures**

Applicant: **Minnehaha Creek Watershed District (on behalf of Dale & Jonmari Olsen; and Kevin & Lori Bjork)**

Project: **Painter Creek Culvert Replacement**

Location: **4680 & 4650 Creekwood Tr., Orono**

Received: **1-13-16**
Complete: **1-15-16**
Noticed: **1-19-16**

**Recommendation:**
Approval with conditions:

- Submission of a draft Declaration for maintenance of Waterbody Crossings & Structures for MCWD approval, then signing by the relevant property owner(s) and recordation;

**Background:**
The Minnehaha Creek Watershed District, on behalf of Dale & Jonmari Olsen and Kevin & Lori Bjork, has applied for a Minnehaha Creek Watershed District permit for Erosion Control, Floodplain Alteration, and Waterbody Crossings & Structures for the redesign and replacement of two culverts within Painter Creek, located at 4680 & 4650 Creekwood Trail in the City of Orono. The project will result in no change in floodplain storage capacity.

In June 2014, flooding and inundation around South Katrina Marsh prompted several property owners to approach the District, seeking relief from possible future flooding. The District was requested to investigate the cause of the flooding along the Painter Creek and South Katrina Marsh corridor (Corridor). Upon analysis of the area, four culverts were identified as relevant to the analysis of flooding in the Corridor (Table 1). Of the four culverts present, two culverts underlying private driveways were identified as potential flow constricting points within the Corridor (Attachment 2, Survey Points 3-6). Initial investigation revealed that the culverts in place beneath the private drives had been installed in the late 1980's to early 1990's, by an unknown party, with no record of authorization from the District, the Department of Natural Resources, or the City of Orono.

The District Engineer conducted a modeling analysis, concluding that the 18-inch diameter culverts currently in place underneath the private driveways were significantly undersized. In effort to re-establish the natural hydraulic condition of Painter Creek, the District Engineer recommended the inclusion of larger culverts, properly sized on the basis of hydraulic analysis. The District is pursuing the redesign and replacement of these culverts in collaboration with the property owners as part of a Land Conservation initiative, in which the District will replace the culverts in exchange for conservation easements over proximate land interests.

**Erosion Control:**
The District exercises regulatory authority for erosion control in the City of Orono.

The District's Erosion Control rule is applicable for any project exceeding 5,000 square feet of land disturbance or 50 cubic yards of excavation. Because the proposed project involves approximately 6,904 square feet of disturbance and 50 cubic yards of excavation within the City of Orono, the rule is triggered. The erosion and sediment control practices proposed for the project meet District standards. Erosion and sediment control best management practices (BMPs) provided include: floating silt curtain, construction entrance, seeding, and vegetation protection, where applicable.

The proposed erosion control plan includes detail consistent with requirements for such plans in Section 5 of the District's Erosion Control rule, including: identification of onsite water features; location of trees and vegetation on-site; location of all structures; existing and proposed grading; erosion control measures; existing and proposed stormwater management features; and conforms to all criteria outlined in Section 5(b). The proposed erosion control plan meets the District's Erosion Control rule.

**Floodplain Alteration:**
The District exercises regulatory authority for Floodplain Alteration in the City or Orono.

The District's Floodplain Alteration rule is triggered for any project proposing disturbance or fill below the projected 100-year high water elevation of a waterbody. The proposed project involves disturbance below the 100-year high water elevation of Painter Creek within the City of Orono, therefore, the rule is triggered. The applicant has provided all the information necessary to evaluate conformance with the District's rule criteria.

All disturbance and grade stabilization occurring within the floodplain of Painter Creek is undertaken to restore previously existing floodplain, lost as a result of scour damage, to pre-2014 flood conditions. Therefore, no net increase of fill below the 100-year flood elevation of Painter Creek will occur, and the restoration to pre-flood conditions will not cause a decrease in flood-storage capacity for the 100-year flood elevation.

All bituminous surface to be removed during the replacement of the culverts will be replaced in kind. Therefore, District Staff & Engineer have concluded that no new impervious surface will be created within the 10-year floodplain, nor within 25 feet of the centerline of Painter Creek.

The proposed project conforms to all applicable criteria of the District's Floodplain Alteration rule.

**Waterbody Crossings & Structures:**
The District exercises regulatory authority for Waterbody Crossings & Structures in the City of Orono.

The District's Waterbody Crossings & Structures rule is applicable for any project proposing a road, highway, utility, or associated structure in contact with the bed or bank of a waterbody. The proposed project involves resizing and replacing two culvert conveyances in contact with the bed of Painter Creek, therefore, the rule is triggered.

On request of MCWD project staff, MCWD regulatory staff have determined that evaluation of the proposed work under the waterbody-crossings-specific exception in section 4 is appropriate. MCWD project staff have provided all the information necessary to evaluate conformance with the exception. Section 4 requires that an applicant show that the waterbody in question has been significantly altered from its natural condition and degraded, and that the proposed work will provide ecological restoration and a greater degree of resource protection than would be achieved from strict compliance with the otherwise-applicable criteria in section 3 of the rule.

The District Engineer analyzed the applicant's XPSWMM hydrologic and hydraulic modeling. The goal of the review was to verify the modeling utilized by the applicant to support modification of the culvert sizes beneath the private driveways; and, to assess the effects the proposed larger culvert sizes would have on future flooding events. The XPSWMM model that was used for the applicant's analysis and the Engineer's review was taken from the Watershed District's FEMA approved XPSWMM model, and was refined with data collected during an October 2014 survey of the driveway culverts and culvert associated with County Road 6 (Attachment 2).

Table 1 below shows the sizes and elevations of the four culverts described above, which were analyzed in the applicants' modeling and the Engineer's review. The culvert at PC-8 is upstream of the culverts proposed to be replaced. The culverts at PC-9 PD2 (north driveway) and PC-9 PD1 (south driveway) are those proposed to be replaced.

| Existing | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Culvert** | **Description** | **Type** | **Dia. (in)** | **Length** | **US Elev.** | **DS Elev.** | **Driveway Elev.** |
| PC-8 Bike | Bike path culvert, N. of US 12 | RCP-Arch | 30* | 48* | 959.2* | 959.14* | N/A |
| PC-9 PD2 | North Driveway culvert | RCP | 18^ | 26* | 956.721^ | 956.427^ | 964.7* |
| PC-9 PD1 | South Driveway Culvert | RCP | 18^ | 62* | 956.064^ | 955.655^ | 967.04^ |
| PC-10 CR6 | CR 6 Culvert | RCP-Arch | 54-A* | 191* | 955.536^ | 955.429^ | N/A |

*From FEMA XPSWMM Model

^From Survey

*Table 1: XPSWMM Inputs for Culverts along Painter Creek*

Based on this analysis, and the size of culverts upstream and downstream of the private drives, District Staff & the Engineer have concluded that the culverts underneath the private drives, are undersized (Table 2). As noted above, the 18-inch culverts were installed without record of authorization from the City of Orono, the DNR, or the MCWD sometime during the late 1980s and early 1990s. The 18-inch culverts act as a flow constricting point, and have diminished the natural hydraulic capacity of Painter Creek, which is shown in the 'Various Scenarios' in Table 2, below. Therefore, Painter Creek has been significantly altered from its natural, hydraulic state.

As noted, the driveway culverts restrict the flow through Painter's Creek, causing impoundment of water in the Corridor. High water events have led to extensive public and private infrastructure damage upstream, and restricted access to nearby homes during flood events. Flood events, particularly in the spring and summer of 2014, have led to unstable streambanks, and erosion near the outfall of the private drive culverts. Under flood conditions, the flow through the 18-private drive culverts is restricted, causing eddies to form near inlets and outlets. The swirling action of the streamflow has caused streambank erosion both upstream and downstream of the driveway culverts. If left unaddressed, the 18-inch private drive culverts will continue to impound water upstream, possibly causing property damage, and erode the streambanks upstream and downstream of the culverts. If left unaddressed, the streambank will continue to degrade under the current condition.

To restore hydraulic capacity to Painter Creek, the applicant has proposed to replace the 18" reinforced concrete pipe (RCP) culverts with, in each case, a 36" RCP, which is the hydraulic equivalent to the upstream 30" arch culvert. Table 1 shows the modeled water levels upstream and downstream of the driveway culverts, the various sizes of culverts within the Painter Creek system, culvert lengths, and driveway elevations. The driveway culverts to be replaced are located immediately downstream of the Katrina Marsh complex, and ultimately drain to wetlands southwest of County Road 6 and County Road 19 (PC-11 & PC-12, Table 2). Table 2 shows that by increasing the driveway culverts from 18 inches in diameter to 36 inches in diameter, the high water level upstream of the culverts drops approximately 8 inches, from an elevation of 963.2 to 962.5. The applicant also provided modeling analysis showing that replacing the driveway culverts with 42-inch culverts produces a drop in the upstream high water level from 963.2 to 962.3, while eliminating the culverts would produce a drop in the upstream HWL from 963.2 to 961.5 (and of course would leave the property owners without access to their homes). The no-culvert option significantly increases the downstream HWL at CR 6, raising it by roughly 18 inches. Thus the alternatives to replacement with 36-inch culverts would greatly increase the downstream flood stage, beyond the hydraulic capacity of the channel. Under the no-build scenario, the regional flooding issues would persist under high water conditions.

| Culvert | Atlas 14, 100-yr Results for Various Scenarios | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | Natural (No Driveway Culverts) | | | 18" Driveway Culverts | | | 36" Driveway Culverts | | |
| | HWL (ft) | Flow (cfs) | Inundation (d) | HWL (ft) | Flow (cfs) | Inundation (d) | HWL (ft) | Flow (cfs) | Inundation (d) |
| *Bike Trail (PC-8 Bike)* | 963.3 | 62.5 | 9 | 963.5 | 24.8 | 33 | 963.4 | 57.8 | 15 |
| *Driveway 1 (PC-9 PD2)* | 961.5 | 196.5 | 2 | 963.2 | 16.6 | >40 | 962.5 | 59.7 | 12 |
| *Driveway 2 (PC-9 PD1)* | | | | 960.8 | 16.6 | >40 | 960.8 | 59.7 | 13 |
| *CR 6 (PC-10 CR6)* | 960.9 | 208.9 | 2 | 959.4 | 142.5 | 1 | 959.7 | 159.9 | 10 |
| *Wetland (PC-11)* | 953.6 | 320.7 | 2 | 953.0 | 288.7 | 1 | 953.1 | 296.4 | 1 |
| *PC-12 (DS of CR 19)* | 952.2 | 334.3 | 2 | 951.8 | 327.5 | 1 | 951.9 | 331.9 | 1 |

** All flows represent the crossing and all HWLs are the nodes upstream*

*Table 2: XPSWMM Modeling Results for Various Size Driveway Culverts*

Per the District Engineer's review, the installation of the 36" RCP culverts will result in a decrease in the upstream flood stage. Additionally, the Engineer has concluded that the upstream and downstream culvert sizes, combined with the analysis performed by the applicant show the current 18" culverts are undersized. The downstream flood stage will increase when the 18" culverts are replaced by the 36" RCP culverts. However, the installation of the 36" RCP culverts will be restoring the natural hydraulic capacity of the channel. The increases noted in Table 2 for PC-11 and PC-12 from the 18" culvert scenario to the 36" culvert scenario are within modeling error and not considered statistically significant. Therefore, the downstream flood stage will not increase beyond the hydraulic capacity of the channel under the no-culvert or natural scenario, which contained no private drives or culverts.

Thus, all additional flow moving through the proposed 36" RCP culverts will be contained within the banks of the ditch under the Atlas-14 100-year scenario. With the 100-year flow contained within the channel under the 36" RCP culvert condition, no change in water quality or aquatic habitat will occur. The flow result of the change in culvert diameter will be contained within drainage-way, and ditch authority controlled and administered by the District, and will not adversely impact privately owned property outside these easements or authority. The engineer and staff concluded that replacing the existing driveway culverts with 36-inch RCP decreases flooding upstream without increasing downstream flood stages beyond the capacity of the downstream system. This benefit could not be obtained through strict application of the section 3 criteria, paragraph (b)(1) of which would require that existing upstream and downstream flood stages be maintained.

The culvert replacement project will result in: no change to navigational capacity of the channel; impacts or changes to water quality; nor will it impact aquatic and upland wildlife passage along the banks of the waterbody.

The engineer and staff's analysis of the ecological benefit of the proposed replacement of the driveway culverts with properly sized the project also focused on the need to reduce upstream flooding and associated degradation of the Painter Creek system. Under existing conditions, the 18-inch culverts currently in place beneath the private drives are significantly undersized, and contribute to the impoundment of water upstream in the Katrina Marsh area, beyond the natural conditions of the system. High water events in the spring and summer of 2014 led to major flooding on Starkey Road and along Hunt Farm Rd., and resulted in large-scale road repairs/replacements, and loss of access to homes. In consideration of the regional nature of these impacts, Staff & the Engineer conclude that the redesign and replacement project provides flood relief that constitutes an ecological benefit.

It is Staff and the District Engineer's recommendation that this waterbody be considered altered and degraded from the natural state, per Section 4 of the Waterbody Crossing & Structures rule. The proposed project will restore the natural hydraulic condition, reduce upstream flood stage, and minimize bank erosion due to flow constriction. Thus, the proposed project offers a greater degree of natural resource protection and ecological restoration than would strict adherence to this rule.

**Summary:**
Minnehaha Creek Watershed District, on behalf of Dale & Jonmari Olsen; and Kevin & Lori Bjork, have proposed a culvert replacement project that will trigger the District's Erosion Control, Floodplain Alteration, and Waterbody Crossings & Structures rules. The project as proposed meets applicable requirements under each of these District rules. Staff recommends approval of this application with the conditions provided above.

Attachments:
1. Permit Application
2. Painter Creek Survey
3. Site Plan

_____

Tom Dietrich Date: 1/28/2016

RECEIVED
JAN 14 2016
By

16-022

# WATER RESOURCE PERMIT APPLICATION FORM

Use this form to notify/apply to the Minnehaha Creek Watershed District (MCWD) of a proposed project or work which may fall within their jurisdiction. Fill out this form completely and submit with your site plan, maps, etc. to the MCWD at:
15320 Minnetonka Blvd. Minnetonka, MN 55345.
Keep a copy for your records.

YOU MUST OBTAIN ALL REQUIRED AUTHORIZATIONS BEFORE BEGINNING WORK.

1. Name of each property owner: Dale & Jonmari Olsen; Kevin & Lori Bjork
Mailing Address: 4680 & 4650 Creekwood Trail City: Orono State: MN Zip: 55359
**Email Address**: _____ Phone: _____ Fax: _____

2. Property Owner Representative Information (not required) (licensed contractor, architect, engineer, etc…)
Business Name: MCWD Representative Name: Tiffany Schaufler
Business Address: 15320 Minnetonka Blvd City: Minnetonka State: MN Zip: 55345
**Email Address**: tschaufler@minnehahacreek.org Phone: 952-641-4513 Fax: 952-471-0682

3. Project Address: 4680 & 4650 Creekwood Trail City: Orono
State: MN Zip: 55359 Qtr Section(s): _____ Section(s): _____ Township(s): _____ Range(s): _____
Lot: 003 & 004 Block: 001 Subdivision: Painters Woods PID: 3011823330005 & 3011823330006

4. Size of project parcel (square feet or acres): 10.41 acres
Area of disturbance (square feet): 6904 sf Volume of excavation/fill (cubic yards): 50 cy
Area of existing impervious surface: _____ Area of proposed impervious surface: _____
Length of shoreline affected (feet): _____ Waterbody (& bay if applicable): _____

5. Type of permit being applied for (Check all that apply):
- ■ EROSION CONTROL
- ☒ FLOODPLAIN ALTERATION
- ☐ WETLAND PROTECTION
- ☐ DREDGING
- ☐ SHORELINE/STREAMBANK STABILIZATION
- ■ WATERBODY CROSSINGS/STRUCTURES
- ☐ STORMWATER MANAGEMENT
- ☐ APPROPRIATIONS
- ☐ ILLICIT DISCHARGE

6. Project purpose (Check all that apply):
- ☐ SINGLE FAMILY HOME
- ☐ ROAD CONSTRUCTION
- ■ UTILITIES
- ☐ DREDGING
- ☐ SHORELINE/STREAMBANK STABILIZATION
- ☐ MULTI FAMILY RESIDENTIAL (apartments)
- ☐ COMMERCIAL or INSTITUTIONAL
- ☐ SUBDIVISIONS (include number of lots)
- ☐ LANDSCAPING (pools, berms, etc.)
- ☐ OTHER (DESCRIBE):

7. NPDES/SDS General Stormwater Permit Number (if applicable): _____

8. Waterbody receiving runoff from site: Painter Creek then Jennings Bay

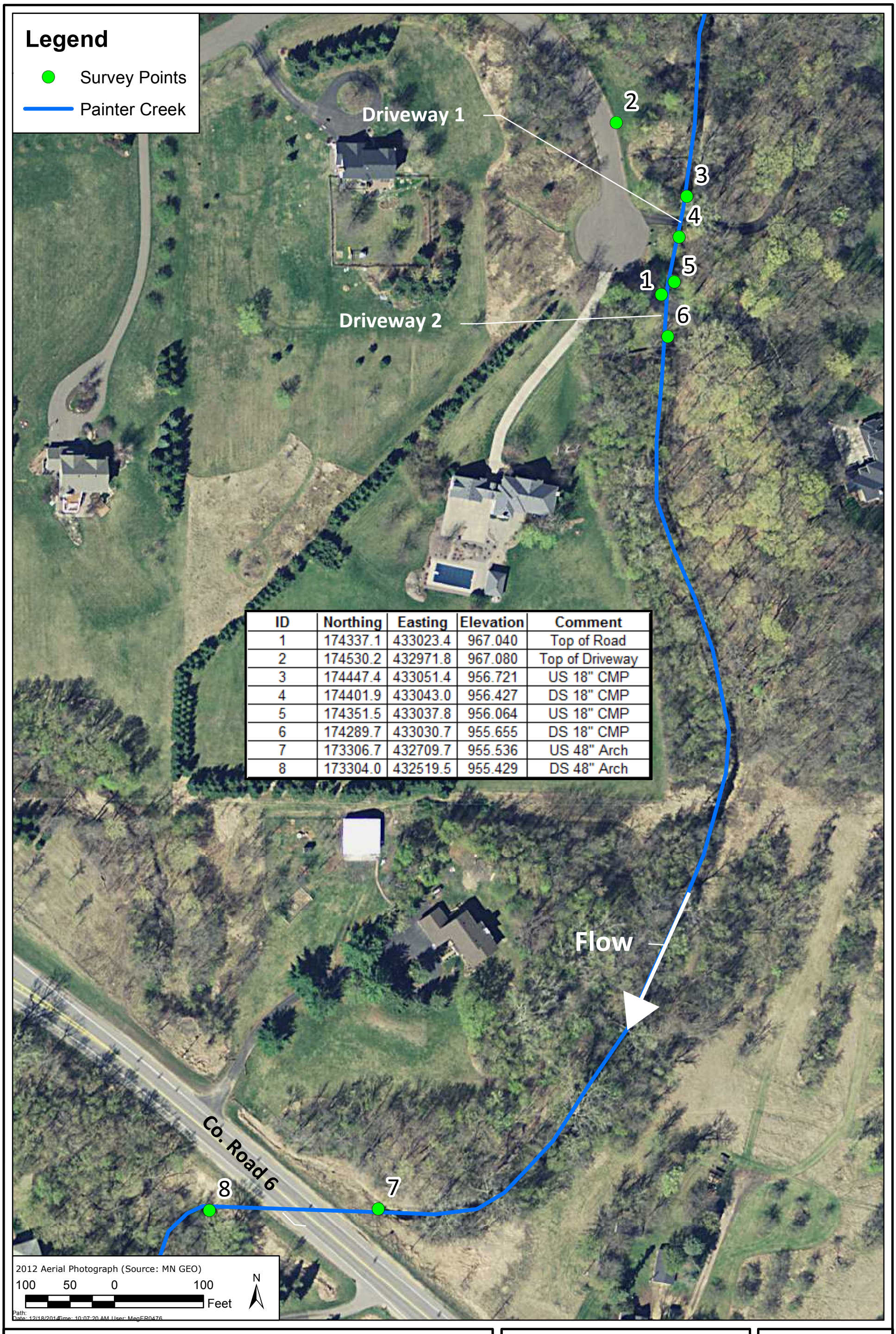
9. Project Timeline: Start Date: February 15, 2016 Completion Date: March 31, 2016

Permits have been applied for: City ____ County ____ MN Pollution Control Agency ____ DNR ____ COE x
Permits have been received: City ____ County ____ MN Pollution Control Agency ____ DNR ____ COE ____

By signing below, I hereby request a permit to authorize the activities described herein. I certify that I am familiar with MCWD Rules and that the proposed activity will be conducted in compliance with these Rules. I am familiar with the information contained in this application and, to the best of my knowledge and belief, all information is true, complete and accurate. I understand that proceeding with work before all required authorizations are obtained may be subject to federal, state and/or local administrative, civil and/or criminal penalties.

Tiffany Schaufler
Signature of Each Property Owner

1/13/16
Date




| ID | Northing | Easting | Elevation | Comment |
|---|---|---|---|---|
| 1 | 174337.1 | 433023.4 | 967.040 | Top of Road |
| 2 | 174530.2 | 432971.8 | 967.080 | Top of Driveway |
| 3 | 174447.4 | 433051.4 | 956.721 | US 18" CMP |
| 4 | 174401.9 | 433043.0 | 956.427 | DS 18" CMP |
| 5 | 174351.5 | 433037.8 | 956.064 | US 18" CMP |
| 6 | 174289.7 | 433030.7 | 955.655 | DS 18" CMP |
| 7 | 173306.7 | 432709.7 | 955.536 | US 48" Arch |
| 8 | 173304.0 | 432519.5 | 955.429 | DS 48" Arch |

MINNEHAHA CREEK WATERSHED DISTRICT

Painter Creek Survey

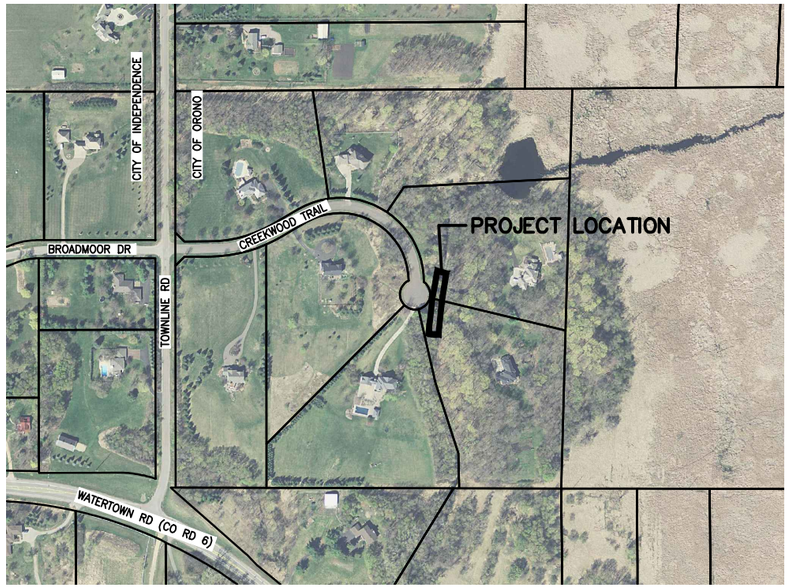
WENCK ASSOCIATES

Responsive partner. Exceptional outcomes.

DEC 2015

Figure 1

# MINNEHAHA CREEK WATERSHED DISTRICT
# PAINTER CREEK CULVERT REPLACEMENT
## JANUARY 2016




PROJECT LOCATION MAP

0 250 500
GRAPHIC SCALE IN FEET

| SHEET INDEX | |
|---|---|
| SHEET | TITLE |
| G-101 | TITLE AND INDEX SHEET |
| G-102 | GENERAL NOTES |
| C-101 | EXISTING CONDITIONS AND REMOVAL PLAN |
| C-301 | GRADING AND DRAINAGE PLAN |
| C-801 | DETAILS |
| THIS PLAN CONTAINS 5 SHEETS | |

**WARNING:**

THE CONTRACTOR SHALL BE RESPONSIBLE FOR CALLING FOR LOCATIONS OF ALL EXISTNG UTILITIES. THEY SHALL COOPERATE WITH ALL UTILITY COMPANIES IN MAINTAINING THEIR SERVICE AND/OR RELOCATION OF LINES.

THE CONTRACTOR SHALL CONTACT GOPHER STATE ONE CALL AT 651-454-0002 AT LEAST 48 HOURS IN ADVANCE FOR THE LOCATIONS OF ALL UNDERGROUND WIRES, CABLES, CONDUITS, PIPES, MANHOLES, VALVES OR OTHER BURIED STRUCTURES BEFORE DIGGING. THE CONTRACTOR SHALL REPAIR OR REPLACE THE ABOVE WHEN DAMAGED DURING CONSTRUCTION AT NO COST TO THE OWNER.

CALL BEFORE YOU DIG
GOPHER STATE ONE CALL
TWIN CITY AREA: 651-454-0002
TOLL FREE 1-800-252-1166

| REV | REVISION DESCRIPTION | DWN | APP | REV DATE |
|---|---|---|---|---|
| 0 | ISSUED FOR QUOTES | MJS | CJM | 01/15/16 |

SEAL

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.

PRINT NAME CHRISTOPHER J. MEEHAN
SIGNATURE
DATE 01/15/2016 LICENSE # 43066

PRIME CONSULTANT
WENCK ASSOCIATES
Responsive partner. Exceptional outcomes.

PROJECT TITLE
PAINTER CREEK
CULVERT REPLACEMENT

MINNEHAHA CREEK
WATERSHED DISTRICT
QUALITY OF WATER, QUALITY OF LIFE

SHEET TITLE
TITLE AND INDEX SHEET

| DWN BY | CHK'D | APP'D | DWG DATE | JAN 2016 |
|---|---|---|---|---|
| MJS | | | SCALE | AS SHOWN |

| PROJECT NO. | SHEET NO. | REV NO. |
|---|---|---|
| 0185-5091 | G-101 | 0 |

## GENERAL NOTES:

1. EXISTING CONDITIONS HAVE BEEN PROVIDED BY A COMBINATION OF LIDAR DATA AND LIMITED SURVEY DATA BY WENCK ASSOCIATES. EXISTING FEATURES MAY NOT BE EXACT TO THEIR LOCATION. THE CONTRACTOR IS RESPONSIBLE FOR VERIFYING THE CONDITIONS OF THE SITE AND SHALL NOTIFY THE ENGINEER OF ANY DISCREPANCIES OR VARIATIONS FROM THE DRAWINGS.
2. ALL QUANTITIES ARE APPROXIMATE AND MAY VARY TO ALLOW COMPLETION OF WORK.
3. THE SUBSURFACE UTILITY INFORMATION IN THIS PLAN IS UTILITY QUALITY LEVEL D. THIS QUALITY LEVEL WAS DETERMINED ACCORDING TO THE GUIDELINES OF CI/ASCE 38-2 ENTITLED "STANDARD GUIDELINES FOR THE COLLECTION AND DEPICTION OF EXISTING SUBSURFACE UTILITY DATA".
4. EXACT LOCATION OF UNDERGROUND UTILITIES SUCH AS GAS, TELEPHONE, FIBER OPTIC, PIPELINES, ELECTRICAL, AND CABLE TV ARE UNKNOWN. CONTRACTOR RESPONSIBLE FOR LOCATING PRIOR TO STARTING WORK.
5. CONTRACTOR SHOULD ANTICIPATE PRIVATE UTILITY CONFLICTS THROUGHOUT THE PROJECT SUB CUT AND TRENCH AREAS AND SHALL COORDINATE WITH PRIVATE UTILITY OWNERS.
6. THE RELOCATION AND OR PROTECTION OF ALL EXISTING UTILITIES MUST BE COORDINATED BY THE CONTRACTOR AND ANY COSTS FOR SUCH WORK SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR. NO ADDITIONAL COMPENSATION WILL BE ALLOWED FOR EXTRA TIME AND EFFORT OF PROVISIONS NECESSARY TO WORK AROUND OR UNDER ANY UTILITIES.
7. REVIEW ALL TREE REMOVALS AND OTHER SURFACE CONFLICTS WITH ENGINEER AND OWNER.
8. INSTALL AND MAINTAIN EROSION CONTROL DEVICES AS SPECIFIED OR AS DIRECTED BY ENGINEER.
9. CONTRACTOR SHALL COMPLY WITH ALL STATE, COUNTY, AND CITY PERMITS.
10. MAINTAIN MAIL, GARBAGE, AND RECYCLING SERVICES TO PROPERTIES.
11. PROTECT EXISTING PAVEMENT AND SITE FEATURES, EXCEPT AS NOTED. DAMAGE TO EXISTING PAVEMENT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO CORRECT AS TO THE OWNERS SATISFACTION, AT NO ADDITIONAL COST TO THE OWNER.
12. CONTRACTOR TO COORDINATE AND MAINTAIN ACCESS TO PROPERTIES. CONTRACTOR TO PROVIDE MINIMUM 72 HOURS NOTICE PRIOR TO STARTING REMOVAL WORK. CONTRACTOR SHALL PROVIDE ACCESS TO EACH HOME AT END OF WORKING DAY.
13. MAINTAIN DRAINAGE CONVEYANCE DURING CONSTRUCTION (BOTH PIPED AND OVERLAND).
14. CONTRACTOR SHALL STRIP, STOCKPILE, AND RESPREAD EXISTING TOPSOIL
15. BY ORDINANCE, WORK MUST BE LIMITED TO CITY OF ORONO WORK HOURS OF 7:00 AM TO 8:00 PM MONDAY TO FRIDAY AND 8:00 AM TO 8:00 PM WEEKENDS AND HOLIDAYS. WORK OUTSIDE THESE HOURS, INCLUDING OPERATION OF DEWATERING PUMPS, IS ALLOWABLE ONLY THROUGH WRITTEN AUTHORIZATION OF THE PUBLIC WORKS DEPARTMENT.
16. WETLAND AREAS DISTURBED DURING CONSTRUCTION SHALL BE RESTORED TO MATCH PRE-CONSTRUCTION GROUND CONTOURS AND CONDITIONS.

## REMOVAL NOTES:

1. FEATURES NOT SPECIFICALLY IDENTIFIED ON PLAN FOR SALVAGE OR REMOVAL THAT CONFLICT WITH CONSTRUCTION ARE TO BE REVIEWED WITH ENGINEER.
2. SAWCUT ALL PAVEMENTS AT REMOVAL LIMITS.
3. EROSION CONTROL MEASURES MUST BE IN PLACE PRIOR TO ANY REMOVALS.
4. CONTRACTOR SHALL CONTAIN DEMOLITION MATERIAL AND PREVENT DISCHARGE AND DEBRIS FROM ENTERING WATERS.

## DEWATERING NOTES:

1. NO BID ITEM HAS BEEN PROVIDED FOR DEWATERING AS ALL DEWATERING WORK NECESSARY FOR CONSTRUCTION WILL BE CONSIDERED INCIDENTAL.
2. ENERGY DISSIPATION SHALL BE PROVIDED AT ALL DISCHARGE POINTS TO PREVENT SCOUR.
3. DEWATERING DISCHARGE MUST BE FILTERED PRIOR TO FINAL DISCHARGE.
4. PROVIDE SILT BAGS FOR DEWATERING.
5. CONTRACTOR RESPONSIBLE TO SUBMIT DEWATERING PLAN TO ENGINEER FOR REVIEW. DEWATERING SHALL MEET ALL PERMIT REQUIREMENTS AND BE APPROVED PRIOR TO STARTING ANY CONSTRUCTION ACTIVITIES.

## CONSTRUCTION STAKING NOTES:

1. OWNER WILL PROVIDE CONSTRUCTION STAKING. CONTRACT SHALL NOTIFY OWNER A MINIMUM OF 48 HOURS IN ADVANCED WHEN REQUESTING SURVEY WORK.

## GOVERNING SPECIFICATIONS:

1. THE MINNESOTA DEPARTMENT OF TRANSPORTATION "STANDARD SPECIFICATIONS FOR CONSTRUCTION" 2014 EDITION & LATEST SUPPLEMENTS.
2. CITY ENGINEERS ASSOCIATION OF MINNESOTA (CEAM) STANDARD UTILITIES SPECIFICATIONS (LATEST EDITION)
3. ALL APPLICABLE FEDERAL, STATE AND LOCAL LAWS AND ORDINANCE WILL BE COMPLETED WITH IN THE CONSTRUCTION OF THIS PROJECT.

## TRAFFIC CONTROL NOTES:

1. THE CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATING ALL CONSTRUCTION STAGING, ON OR OFFSITE, AS NECESSARY TO COMPLETE THE WORK AS SPECIFIED IN THE PROJECT DOCUMENTS.
2. CONTRACTOR SHALL BE RESPONSIBLE FOR ALL TRAFFIC CONTROL. ALL TRAFFIC CONTROL SHALL CONFORM TO THE LATEST EDITION OF THE MMUTCD, INCLUDING THE LATEST FIELD MANUAL FOR TEMPORARY TRAFFIC CONTROL ZONE LAYOUTS. IF REQUESTED, A TRAFFIC CONTROL PLAN SHALL BE SUBMITTED TO THE CITY FOR REVIEW AND APPROVAL PRIOR TO ANY CONSTRUCTION RELATED ACTIVITIES. PLANS SHALL COMPLY WITH ALL APPLICABLE PERMIT REQUIREMENTS.

## TREE PRESERVATION NOTES:

1. PROTECT EXISTING TREES THAT ARE NOT TO BE REMOVED. INSTALL ORANGE MESH FENCING, 4' HIGH, WITH STAKES EVERY 10 FEET, 5' OUTSIDE OF THE DRIP LINE OF ALL PRESERVED TREES, OR AT THE CONSTRUCTION LIMITS AS SHOWN ON THE PLAN. DO NOT PERFORM ACTIONS WITHIN THE PROTECTED AREA THAT MAY HARM THE TREE AND COMPACT THE SOIL, INCLUDING, BUT NOT LIMITED TO EXCAVATION, STORING MATERIALS, PARKING AND TRAFFIC DURING CONSTRUCTION. WHERE CONSTRUCTION REQUIRES DISTURBANCE WITHIN THE PROTECTED AREAS, DISTURB THE ROOT ZONE AS LITTLE AS POSSIBLE. TREE PROTECTION MEASURES SHALL BE CONFIRMED BY OWNER AND ENGINEER PRIOR TO STARTING CONSTRUCTION.
2. ALL TREE PROTECTION FENCING MUST BE IN PLACE PRIOR TO BEGINNING CONSTRUCTION.
3. WHEN TREE ROOTS ARE ENCOUNTERED THAT MUST BE REMOVED, CUT ROOTS CLEANLY AS FAR FROM THE TREE AS POSSIBLE AND IMMEDIATELY WATER AND BACKFILL OVER THE ROOTS TO PREVENT DRYING.

## EROSION CONTROL NOTES:

1. ADDITIONAL EROSION CONTROL MEASURES MAY BE REQUIRED DEPENDING ON SITE CONDITIONS DURING CONSTRUCTION. COORDINATE WITH ENGINEER.
2. ALL EROSION CONTROL DEVICES TO BE INSTALLED PRIOR TO COMMENCEMENT OF WORK, MAINTAINED IN ACCORDANCE WITH SPECIFICATIONS THROUGHOUT DURATION OF PROJECT, AND REMOVED UPON ESTABLISHMENT OF FINAL STABILIZATION AS DIRECTED BY ENGINEER.
3. REMOVE TRACKED SEDIMENT FROM ALL PAVED SURFACES BOTH ON AND OFFSITE AS DIRECTED BY ENGINEER (INCIDENTAL).
4. DISTURBANCE OF AREAS IDENTIFIED AS WETLANDS SHOULD BE AVOIDED IF POSSIBLE. DISTURBANCE OF WETLAND TO BE RESTORED TO A SATISFACTORY LEVEL AT CONTRACTOR'S EXPENSE.
5. RESTORE DISTURBED AREAS WITH MIN. 4 INCHES TOPSOIL, NATIVE SEED MIX, AND EROSION CONTROL BLANKET OR TURF REINFORCEMENT MAT WHERE NOTED.
   - 5.1. EROSION CONTROL BLANKET: MNDOT CATEGORY 3, STRAW 2S (NO POLY NETTING ALLOWED – NATURAL-FIBER, BIODEGRADABLE NETTING ONLY). INSTALL PER STANDARD DETAIL PLATE ERO-2A.
   - 5.2. NATIVE SEED MIXTURE: MN STATE SEED MIX 36-211 (WOODLAND EDGE SOUTH AND WEST) AT PLS RATE OF 34.5 LBS/AC WITH WINTER WHEAT COVER CROP

## STORM SEWER NOTES:

1. PIPE BEDDING FOR RC PIPE SHALL CONFORM TO STANDARD DETAIL PLATE GEN-4 (INCIDENTAL).
2. INSTALL RIPRAP AT EACH PROPOSED OUTLET PER STANDARD DETAIL PLATE STO-7.
3. TRENCHES SHALL BE COMPACTED TO A MINIMUM OF 95 PERCENT, EXCEPT TO 100 PERCENT IN THE UPPER 3 FEET.
4. PIPE LENGTHS AND ELEVATIONS ARE TO CENTER OF STRUCTURE.

| REV | REVISION DESCRIPTION | DWN | APP | REV DATE |
|---|---|---|---|---|
| 0 | ISSUED FOR QUOTES | MJS | CJM | 01/15/16 |

SEAL

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.

PRINT NAME CHRISTOPHER J. MEEHAN

SIGNATURE

DATE 01/15/2016 LICENSE # 43066

PRIME CONSULTANT

WENCK ASSOCIATES

Responsive partner. Exceptional outcomes.

PROJECT TITLE

PAINTER CREEK
CULVERT REPLACEMENT

MINNEHAHA CREEK WATERSHED DISTRICT
QUALITY OF WATER, QUALITY OF LIFE

SHEET TITLE

GENERAL NOTES

| DWN BY | CHK'D | APP'D | DWG DATE | JAN 2016 |
|---|---|---|---|---|
| MJS | | | SCALE | AS SHOWN |

| PROJECT NO. | SHEET NO. | REV NO. |
|---|---|---|
| 0185-5091 | G-102 | 0 |

Plot Date & Time: 15 January 2016 2:44 PM

## WARNING:

THE CONTRACTOR SHALL BE RESPONSIBLE FOR CALLING FOR LOCATIONS OF ALL EXISTING UTILITIES. THEY SHALL COOPERATE WITH ALL UTILITY COMPANIES IN MAINTAINING THEIR SERVICE AND/OR RELOCATION OF LINES.

THE CONTRACTOR SHALL CONTACT GOPHER STATE ONE CALL AT 651-454-0002 AT LEAST 48 HOURS IN ADVANCE FOR THE LOCATIONS OF ALL UNDERGROUND WIRES, CABLES, CONDUITS, PIPES, MANHOLES, VALVES OR OTHER BURIED STRUCTURES BEFORE DIGGING. THE CONTRACTOR SHALL REPAIR OR REPLACE THE ABOVE WHEN DAMAGED DURING CONSTRUCTION AT NO COST TO THE OWNER.

CALL BEFORE YOU DIG
GOPHER STATE ONE CALL
TWIN CITY AREA: 651-454-0002
TOLL FREE 1-800-252-1166

NOTES:
1. NOT ALL EXISTING TREE LOCATIONS SHOWN IN AREA. IF ADDITIONAL TREES ARE LOCATED NEAR CONSTRUCTION AREAS AND MAY IMPACT OPERATIONS, NOTIFY ENGINEER FOR REVIEW.
2. DRIVEWAY REMOVAL LIMITS ARE APPROXIMATE. CONTRACTOR TO ADJUST IN FIELD AS REQUIRED FOR CONSTRUCTION.
3. ALL BRUSH REMOVAL IS CONSIDERED INCIDENTAL. ANY COMPENSATION SHALL BE INCLUDED IN APPROPRIATE BID ITEMS.
4. A LOCATE REQUEST WAS MADE AND HAS GOPHER STATE ONE CALL TICKET NO. 160060192. LIMITED INFORMATION HAS BEEN PROVIDED. HOWEVER, ADDITIONAL UTILITIES (ELECTRICAL, COMMUNICATION, FIBER OPTIC, ETC.) ARE ANTICIPATED IN THE DRIVEWAY SECTIONS AND CONTRACTOR SHALL PLAN ACCORDINGLY.
5. FOR SAFETY CONCERNS, ONLY ONE DRIVEWAY/CULVERT SHALL BE REMOVED AND RESTORED AT A TIME.
6. SEE ADDITIONAL NOTES ON SHEET G-102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DATE 01/15/2016 LICENSE # 43066

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WENCK ASSOCIATES
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PROJECT TITLE
PAINTER CREEK CULVERT REPLACEMENT

MINNEHAHA CREEK WATERSHED DISTRICT
QUALITY OF WATER, QUALITY OF LIFE

SHEET TITLE
EXISTING CONDITIONS AND REMOVAL PLAN

| DWN BY | CHK'D | APP'D | DWG DATE | JAN 2016 |
|---|---|---|---|---|
| MJS | | | SCALE | AS SHOWN |

| PROJECT NO. | SHEET NO. | REV NO. |
|---|---|---|
| 0185-5091 | C-101 | 0 |

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Plot Date & Time: 15 January 2016 2:57 PM

**WARNING:**

THE CONTRACTOR SHALL BE RESPONSIBLE FOR CALLING FOR LOCATIONS OF ALL EXISTING UTILITIES. THEY SHALL COOPERATE WITH ALL UTILITY COMPANIES IN MAINTAINING THEIR SERVICE AND/OR RELOCATION OF LINES.

THE CONTRACTOR SHALL CONTACT GOPHER STATE ONE CALL AT 651-454-0002 AT LEAST 48 HOURS IN ADVANCE FOR THE LOCATIONS OF ALL UNDERGROUND WIRES, CABLES, CONDUITS, PIPES, MANHOLES, VALVES OR OTHER BURIED STRUCTURES BEFORE DIGGING. THE CONTRACTOR SHALL REPAIR OR REPLACE THE ABOVE WHEN DAMAGED DURING CONSTRUCTION AT NO COST TO THE OWNER.

CALL BEFORE YOU DIG
GOPHER STATE ONE CALL
TWIN CITY AREA: 651-454-0002
TOLL FREE 1-800-252-1166

NOTES:
1. DRIVEWAY REPLACEMENT EXTENTS ARE APPROXIMATE. MATCH EXISTING DRIVEWAY GRADES, ALIGNMENT, AND SECTION W/ MINIMUM 3" BITUMINOUS AND 8" CLASS 5 PER DETAIL 1/C-801.
2. PROTECT DRIVEWAY PAVEMENT NOT IDENTIFIED FOR REMOVAL. DAMAGED PAVEMENT TO BE REPAIRED BY CONTRACTOR AT NO ADDITIONAL COST TO OWNER.
3. CONTRACTOR SHALL PROVIDE TEMPORARY ACCESS TO HOMEOWNERS AT THE END OF EACH WORKING DAY.
4. CONTRACTOR RESPONSIBLE TO NOTIFY RESIDENTS OF ACCESS DISRUPTION A MINIMUM OF 48 HOURS IN ADVANCED.
5. FOR SAFETY CONCERNS, ONLY ONE DRIVEWAY/CULVERT SHALL BE REMOVED AND RESTORED AT A TIME.
6. CONTRACTOR SHALL TEMPORARILY RESTORE DRIVEWAY SURFACES WITH CLASS 5. UPON BITUMINOUS PLANT OPENINGS AND ROAD RESTRICTIONS LIFTED, THE DRIVEWAYS SHALL BE RESTORED WITH BITUMINOUS PER DETAIL 1/C-801. TEMPORARY DRIVEWAY BID ITEM PROVIDED AND REMOVAL OF TEMPORARY CLASS 5 IN SPRING IS INCIDENTAL TO BID ITEM.
7. DRIVEWAYS TO BE CLEARED OF ANY DEBRIS AND SWEPT IMMEDIATELY AT SUSPENSION OF WORK ACTIVITIES OR UPON COMPLETION OF CULVERT INSTALLATION AND ASSOCIATED RESTORATION.
8. RESTORE ALL DISTURBED PERVIOUS AREAS WITH EROSION CONTROL BLANKET AND NATIVE SEED AS NOTED ON SHEET G-102.
9. IN THE EVENT THE WORK IS NOT COMPLETED DURING WINTER CONDITIONS AND/OR MOVING WATER MAY RESULT IN WATER CONTAINING SEDIMENT FROM THE WORK, CONTRACTOR SHALL INSTALL FLOTATION SILT CURTAIN TYPE MOVING WATER PER MNDOT SPEC 2573 REQUIREMENTS.
10. SEE ADDITIONAL NOTES ON SHEET G-102


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WENCK ASSOCIATES
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PROJECT TITLE
PAINTER CREEK CULVERT REPLACEMENT

MINNEHAHA CREEK WATERSHED DISTRICT
QUALITY OF WATER, QUALITY OF LIFE

SHEET TITLE
GRADING AND DRAINAGE PLAN

| DWN BY | CHK'D | APP'D | DWG DATE | JAN 2016 |
|---|---|---|---|---|
| MJS | | | SCALE | AS SHOWN |

| PROJECT NO. | SHEET NO. | REV NO. |
|---|---|---|
| 0185-5091 | C-301 | 0 |

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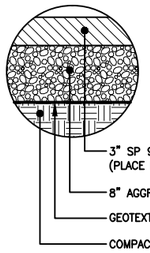


NOTES:
1. MATCH EXISTING DRIVEWAY SECTION
2. MINIMUM DIMENSIONS SHOWN.

3" SP 9.5 WEARING COURSE MIXTURE (SPWEA240B) (PLACE IN 2 EQUAL LIFTS)

8" AGGREGATE BASE CLASS 5, 100% CRUSHED

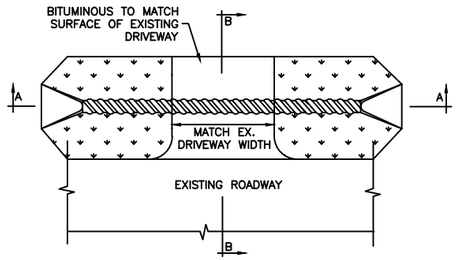
GEOTEXTILE FABRIC, TYPE V NON-WOVEN

COMPACTED SUBGRADE

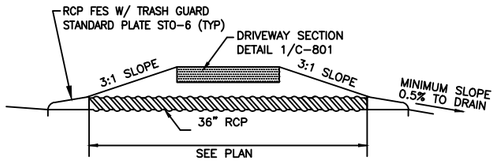
## TYPICAL PAVING SECTION – DRIVEWAY

NOT TO SCALE

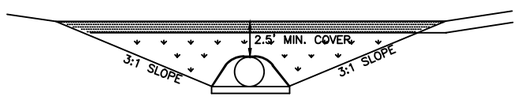
1 / C-801




## PLAN




## SECTION A-A

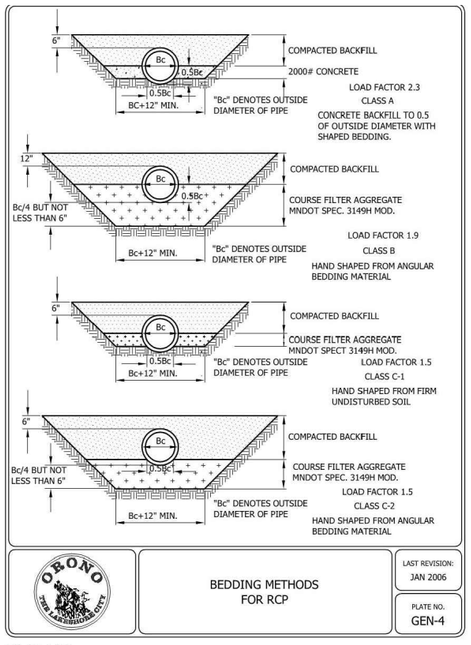



## SECTION B-B

## TYPICAL CULVERT DETAIL

NOT TO SCALE

2 / C-801



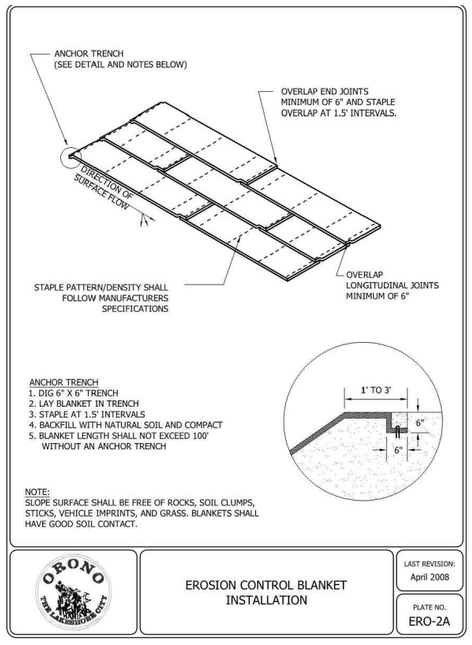

ORONO THE LANDSCAPED CITY

BEDDING METHODS FOR RCP

LAST REVISION: JAN 2006

PLATE NO. GEN-4

139_GEN-4.DWG

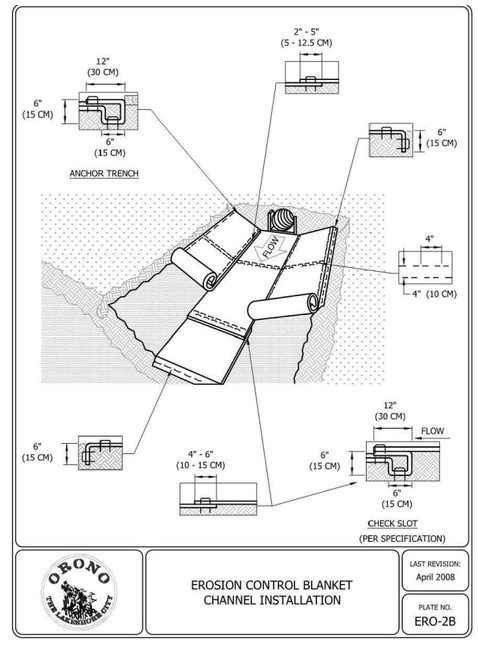



ORONO THE LANDSCAPED CITY

EROSION CONTROL BLANKET INSTALLATION

LAST REVISION: April 2008

PLATE NO. ERO-2A

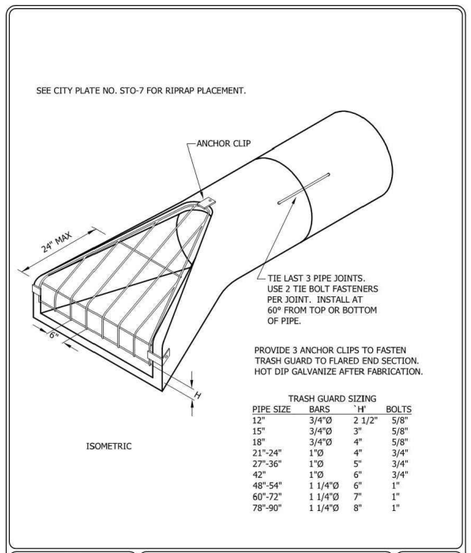



ORONO THE LANDSCAPED CITY

EROSION CONTROL BLANKET CHANNEL INSTALLATION

LAST REVISION: April 2008

PLATE NO. ERO-2B



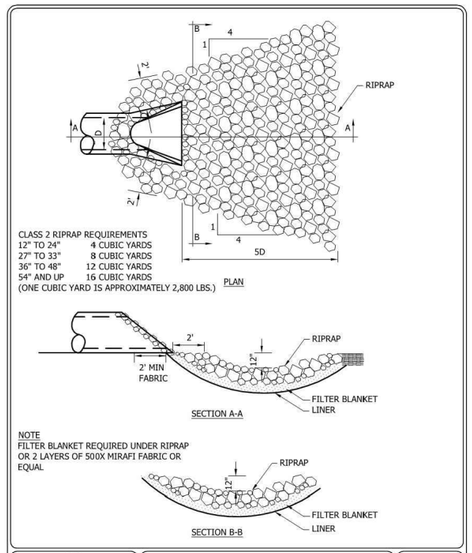

ORONO THE LANDSCAPED CITY

FLARED END SECTION AND TRASH GUARD

LAST REVISION: JAN 2006

PLATE NO. STO-6

139_STO-6.DWG




ORONO THE LANDSCAPED CITY

RIPRAP AT OUTLETS

LAST REVISION: JAN 2011

PLATE NO. STO-7

139_STO-7.DWG


## PHOTOS 1 AND 2 – LANDSCAPE RIPRAP

NOT TO SCALE

3 / C-801

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MINNEHAHA CREEK WATERSHED DISTRICT QUALITY OF WATER, QUALITY OF LIFE

SHEET TITLE

DETAILS

| DWN BY | CHK'D | APP'D | DWG DATE | JAN 2016 |
|---|---|---|---|---|
| MJS | | | SCALE | AS SHOWN |

| PROJECT NO. | SHEET NO. | REV NO. |
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| 0185-5091 | C-801 | 0 |