

**MEETING DATE:** October 11, 2018

**TITLE:** Authorizing impoundment of Judicial Ditch 2 – Six Mile Creek

**RES. NUMBER:** 18-107

**PREPARED BY:** Anna Brown

**E-MAIL:** abrown@minnehahacreek.org

**TELEPHONE:** (952) 641-4522

**REVIEWED BY:**  Administrator  Counsel  Program Mgr. (Name): \_\_\_\_\_  
 Board Committee  Engineer  Other

**WORKSHOP ACTION:**

<input type="checkbox"/> Advance to Board mtg. Consent Agenda.	<input type="checkbox"/> Advance to Board meeting for discussion prior to action.
<input type="checkbox"/> Refer to a future workshop (date): _____	<input type="checkbox"/> Refer to taskforce or committee (date): _____
<input type="checkbox"/> Return to staff for additional work.	<input type="checkbox"/> No further action requested.
<input checked="" type="checkbox"/> Other (specify): Approval at the October 11 Board Meeting	

**PURPOSE or ACTION REQUESTED:**

In order to facilitate the installation of a carp barrier at Highland Road in Minnetrista/Carver County, staff are requesting that the Board of Managers authorize installation of the carp barrier in Judicial Ditch 2 (JD 2) – Six Mile Creek pursuant to the Minnesota drainage code.

**PROJECT/PROGRAM LOCATION:**

Six Mile Creek at Highland Road in Minnetrista, Carver County

**PROJECT TIMELINE:**

October 11, 2018: Review of engineer’s report, public hearing and authorize barrier as impoundment.

October 25, 2018: Award contracts for carp barrier construction

March 15, 2018: Substantial completion, Six Mile carp barriers

**PROJECT/PROGRAM COST:**

N/A

**PAST BOARD ACTION:**

May 11, 2017 Authorization to request funding from Lessard Sams Outdoor Heritage Council (17-036)

March 8, 2018 Authorization to award design contract for carp barriers (18-021)

Sept.13, 2018 Acceptance of a petition to Impound JD 2 and ordering a hydrologic report (18-096)

## **SUMMARY:**

In September of 2017, the Lessard Sams Outdoor Heritage Council recommended the Six Mile Creek-Halsted Bay (SMCHB) Habitat Restoration Project for \$567,000 to the Minnesota State Legislature. The funding bill was approved by the legislature and the grant period began on July 1, 2018.

The SMCHB Habitat Restoration project will restore 2,488 acres of deep and shallow lake habitat through the management of invasive common carp. The strategy for reducing carp concentrations below the threshold where they damage ecosystems is three-fold:

- Adult biomass removal
- Aeration of shallow lakes to prevent successful carp reproduction
- Barriers to prevent carp movement between waterbodies and assist with removal

In March of 2018, the Board awarded a contract with Wenck Associates to design the four barrier facilities proposed in the Lessard Sams work plan. The Board will be briefed on the design at the September 13 meeting. One of the proposed barriers is located in the portion of Six Mile Creek that runs through Six Mile Marsh, between Mud Lake and Halsted Bay. That barrier is herein referred to as the "Highland Road carp barrier".

Between North Lundsten Lake and Halsted Bay, Six Mile Creek has the status of a public drainage system designated as JD 2. The MCWD is the drainage authority for JD2 and responsible to manage the system according to the drainage code (Minnesota Statutes Chapter 103E) to provide drainage for the benefit of upstream lands. Section 103E.227 allows a landowner over which a drainage ditch passes or a public authority to realign a drainage channel, do work in the channel or place a structure in it, provided the work does not impair the drainage function of the system. The Highland Road carp barrier, as an in-channel structure, will have a small but perceptible effect on upstream water level and therefore is subject to Board approval under 103E.227. As directed in 103E.227, the following procedures must be adhered to in order to place an impoundment in a drainage ditch:

1. A petition must be filed with the drainage authority including the location of installation and concept plans;
2. If the petition meets the statutory requirements, the drainage authority accepts it and directs its engineer to prepare a report to assess the hydraulic effect of the proposal;
3. Notice is given and a public hearing is held;
4. If after hearing the drainage authority finds that the proposal is of public or private benefit and will not impair the utility of the drainage system or deprive affected landowners of its benefit, it authorizes the work.

At the September 13 Board Meeting, the first two steps were complete under resolution 18-096.

Wenck prepared a hydrologic report, attached, evaluating the impacts of the barrier structure at Highland Road. The barrier will create a small increase in the 100 year flood elevation of .25 ft in the area between Highway 7 and Highland Road. The four properties within this impact area have been noticed of the public hearing, which will be held at the October 11, 2018 Board Meeting. Wenck concludes that the barrier will not impair the utility of the drainage system or deprive affected landowners of its benefit.

## **Recommendation:**

Staff is recommending that absent information presented at the public hearing contrary to Wenck's conclusion, the MCWD Board of Managers accept the hydrologic report and authorize the carp barrier construction.

## **Attachments:**

- Engineer's Report: Judicial Ditch 2 – Six Mile Creek Impoundment

## RESOLUTION

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**RESOLUTION NUMBER:**    18-107

**TITLE:**            **Authorizing Impoundment on Judicial Ditch 2 – Six Mile Creek Drainage System Waters**

WHEREAS, pursuant to Resolution 14-047 the MCWD Board of Managers has identified the Six Mile Creek-Halsted Bay (SMCHB) subwatershed as a priority area for focusing District planning activities and coordination efforts with subwatershed partners; and

WHEREAS, in September of 2017, the Lessard Sams Outdoor Heritage Council recommended the SMCHB Habitat Restoration project for \$567,000 in funding, and prepared a bill for legislative approval reflecting the same;

WHEREAS, in March of 2018, the Board approved a scope of work with Wenck Associates to design barrier facilities at four locations in the SMCHB subwatershed, including one to be located adjacent to Highland Road in Minnetrista between Mud Lake and Halsted Bay (Highland Road Barrier);

WHEREAS, a portion of Six Mile Creek, including the portion in which the Highland Road Barrier will be located, is a Judicial Ditch (JD 2), and the MCWD is the drainage authority for JD 2;

WHEREAS, the MCWD Board of Managers as drainage authority has followed the procedures outlined in Minnesota Statutes §103E.227 to ensure that the Highland Road Barrier does not deprive any lands served by JD 2 of the benefits of the public drainage system;

WHEREAS, on September 13, 2018, the MCWD Board of Managers submitted and accepted a petition to impound JD 2, and directed the District engineer, Wenck Associates, to prepare a report assessing the impact of the proposed impoundment;

WHEREAS, the District engineer filed its report, and the District provided notice of a public hearing pursuant to Minnesota Statutes §§103E.227 and 103E.261;

WHEREAS, on October 11, 2018, a public hearing was held, at which time all interested parties had the opportunity to speak to the proposed barrier and its impact on the utility of JD 2, and no parties elected to do so;

WHEREAS, the Board of Managers finds that the proposed barrier will serve the public interest of facilitating fish management within the SMCHB subwatershed for water quality and ecological benefit;

WHEREAS, the District engineer finds that the barrier will not impair the utility of the drainage system or deprive affected landowners of its benefit, and the Board of Managers finds the engineer's conclusion to be sound, and adopts it;

**NOW, THEREFORE, BE IT RESOLVED** that pursuant to Minnesota Statutes §103E.227, the Minnehaha Creek Watershed District Board of Managers authorizes the impoundment of Judicial Ditch 2 – Six Mile Creek and finds that this authorization requires no modification of the drainage system or use of funds from the JD 2 or any other drainage system account;

**BE IT FURTHER RESOLVED** that before constructing the impoundment, the District shall obtain all required permits and all necessary rights-of-way and flowage easements from owners of land to be affected by it; and

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**DRAFT for discussion purposes only and subject to Board approval and the availability of funds.  
Resolutions are not final until approved by the Board and signed by the Board Secretary.**

BE IT FINALLY RESOLVED that the District shall be responsible for construction, operation and maintenance of the impoundment.

Resolution Number 18-107 was moved by Manager \_\_\_\_\_, seconded by Manager \_\_\_\_\_.  
Motion to adopt the resolution \_\_\_ ayes, \_\_\_ nays, \_\_\_ abstentions. Date: \_\_\_\_\_.

\_\_\_\_\_  
Secretary Date: \_\_\_\_\_

# Technical Memo



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**To:** Minnehaha Creek Watershed District Board of Managers

**CC:** Anna Brown, Planner-Project Manager, Minnehaha Creek Watershed District

**From:** Rena Weis, Wenck Associates, Inc.  
Erik Megow, Wenck Associates, Inc.

**Date:** October 8, 2018

**Subject:** Judicial Ditch 2 (Six Mile Creek) Impoundment – Engineer’s Report

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A fish barrier is proposed along Judicial Ditch 2 (Six Mile Creek) in the Minnehaha Creek Watershed District (MCWD). The location for the proposed fish barrier is downstream of Highway 7 at Highland Road. This location is shown on sheet C-100 of the attached plans. On September 13, 2018, the MCWD Board of Managers directed Wenck Associates to prepare a hydrologic report regarding the proposed barrier. This technical memo describes the methods used to model the barrier in XP-SWMM and documents changes in up- and down-stream high-water levels as a result of the barrier.

## **Updated Existing XP-SWMM Model**

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Wenck used the DNR’s FEMA-approved XP-SWMM model to size the fish barrier and calculate the high-water level impacts they would have along Judicial Ditch 2. Wenck updated the existing FEMA model with survey data collected by Wenck in June of 2018. The survey information was used to confirm the geometry and cross-sections near Highland Road so updates could be made to the existing XP-SWMM model.

## **Proposed XP-SWMM Model**

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Wenck modeled the proposed fish barriers in XP-SWMM as a user-defined orifice device. Since the barrier consists of 1.5” aluminum bars spaced 1.5” apart and 2” x 2” chain link fence, one orifice was defined for the vertical bars and one orifice was defined for the chain link fence. The height and length of the barrier was determined from the cross section provided in the plans, which are attached to this memo on sheet C-101A. The effective flow length was determined by subtracting flow blockages (vertical bars, piles, or chain link wires).

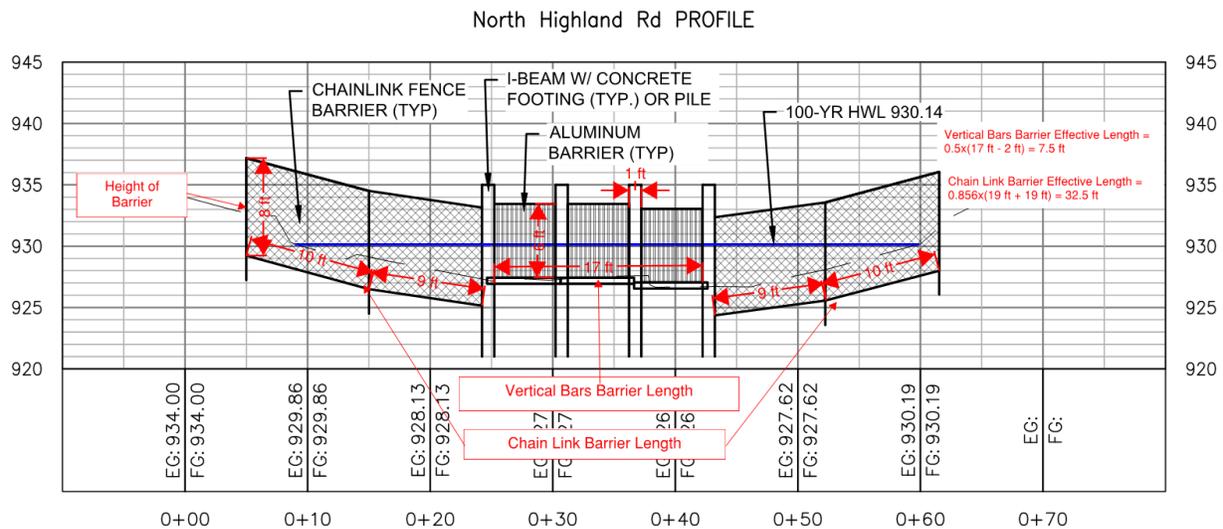
For the vertical bars, the effective flow length was taken to be one-half of the measured barrier length, since for every 1.5” of open space, there is 1.5” of aluminum bar. All vertical bars used to support the barriers are 1 ft long and were also subtracted.

For the chain link fence, the effective flow length was taken to be 85.6% of the measured barrier length, since 85.6% of the area covered by the chain link fence is open area. Table 1 lists the inputs used for the orifice calculations at each crossing.

**Table 1.** Effective flow lengths and areas used for orifice devices in proposed model

Location	Vertical Bars				Chain Link			
	Barrier Height (ft)	Barrier Length (ft)	Barrier Effective Length (ft)	Effective Area (sf)	Barrier Height (ft)	Barrier Length (ft)	Barrier Effective Length (ft)	Effective Area (sf)
Highland Road (upstream)	6	35	14.5	87	6	40	34.2	205.4
Highland Road (downstream)	6	17	7.5	45	8	38	32.5	260.2

The dimensions referenced in Table 1 are defined below in Figure 1, and sample geometry calculations for the fish barrier downstream of Highland Road barrier are provided.



**Figure 1.** Highland Road (downstream) carp barrier cross sections with labeled dimensions and sample calculations.

The updated existing model 100-yr, 10-day high water levels (100-yr HWLs) were compared to the proposed model results at locations up- and downstream of the fish barrier. Table 2 lists the change in the 100-yr HWLs for locations up- and downstream of the Highland Road fish barrier.

**Table 2.** 100-year HWLs as calculated by the FEMA-approved XP-SWMM model.

Site Location	Description	Node ID	Updated Existing (ft)	Proposed (ft)	Change (ft)
<b>Highland Road</b>	Mud Lake, US of barrier	SMC-61	930.71	930.70	-0.004
	US of barrier, DS of HWY 7	SMC-61b	929.89	930.06	<b>0.167</b>
	DS of Highland Road	SMC-66	929.83	929.82	-0.011

### Conclusions

All of the nodes show a decrease in maximum stage when subjected to the 100-year flood except for one. Node SMC-61b shows an increase in maximum stage of 0.17 ft; this node represents a 275 ft long stretch of stream between Highway 7 and Highland Road. The flood extent for the updated existing and proposed high water levels are shown in Figure 2, attached to this memo. The proposed increase in the high water level does not further impound or effect any upstream structures. Additionally, the proposed barriers will not impair the utility of the drainage system or deprive affected landowners of its benefit.





ISSUE NO.:	DESCRIPTION:	DATE:
0	100% DESIGN	09/21/2018

CERTIFICATION:  
 I HEREBY CERTIFY THAT THIS PLAN, SPECIFICATION, OR REPORT WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY REGISTERED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA.

NAME: \_\_\_\_\_  
 DATE: \_\_\_\_\_

PROJECT NO.:	0185-0100	
DWN BY:	CHK'D BY:	APP'D BY:
SJB	MJS	CM
ISSUE DATE:	09/21/2018	
ISSUE NO.:	0	

SHEET TITLE:  
**C-100**

SHEET NO.:

OVERALL SITE PLAN

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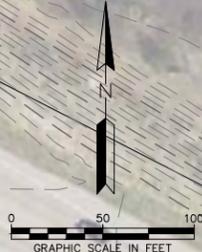


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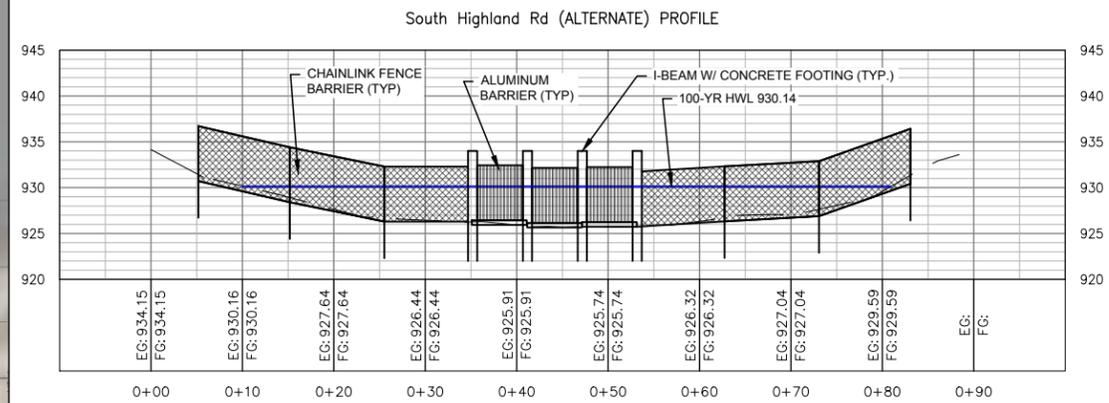
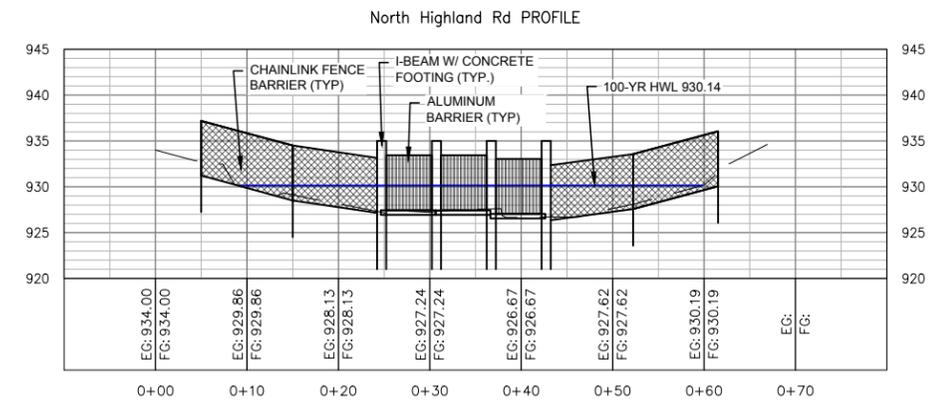
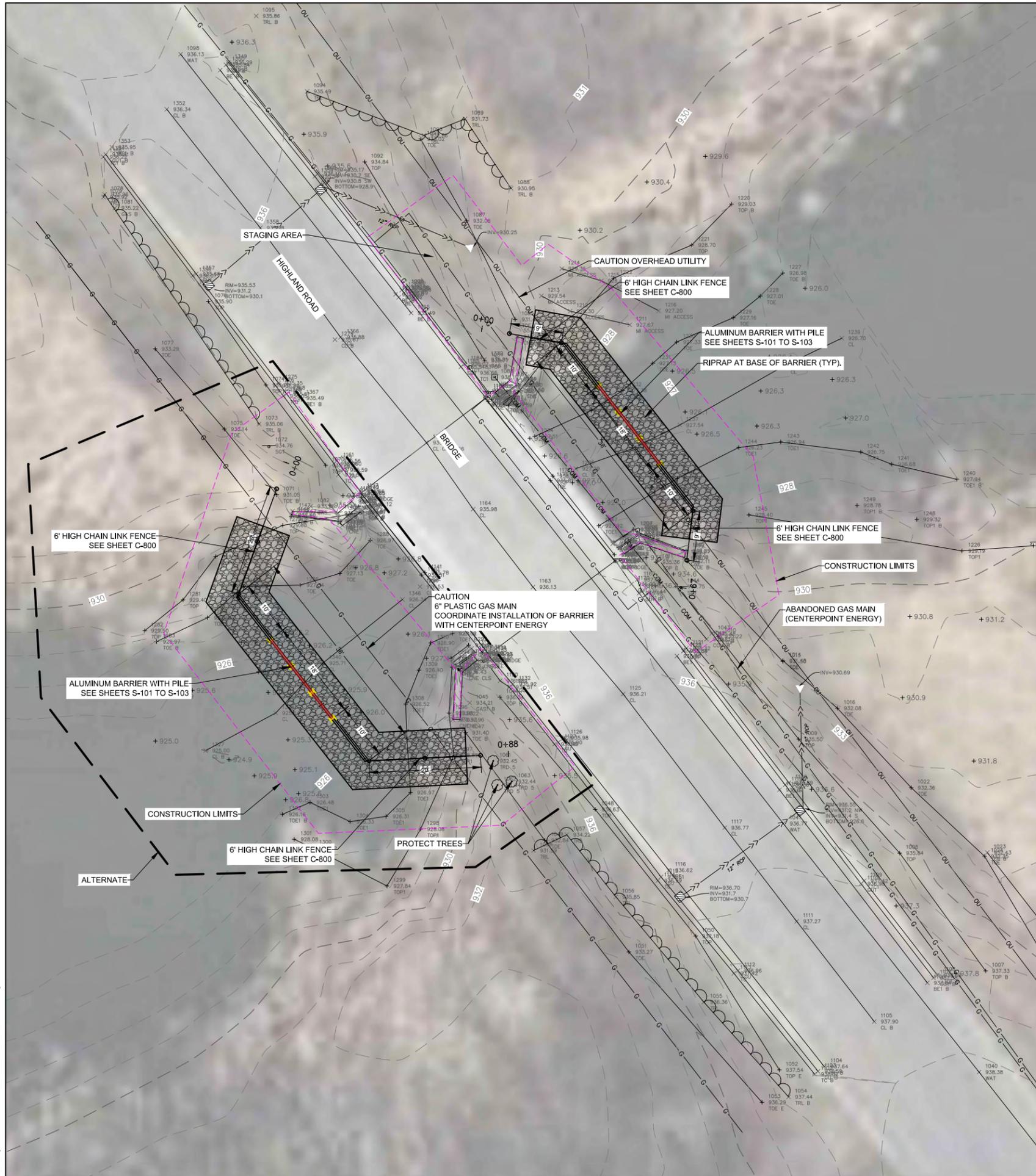
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SJB	MJS	CM
ISSUE DATE:	09/21/2018	
ISSUE NO.:	0	
SHEET TITLE:	<b>C-101</b>	
SHEET NO.:	SIX MILE BRIDGE SITE PLAN	

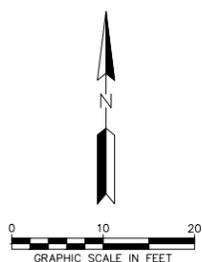


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- SITE PLAN NOTES**
- CLEAR AND GRUB BRUSH AS REQUIRED. COORDINATE ANY TREE REMOVAL WITH ENGINEER/OWNER PRIOR TO REMOVAL.
  - PROTECT ALL EXISTING SIGNS OR SALVAGE AND REINSTALL (INCIDENTAL)



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



**SIX MILE CREEK  
 CARP BARRIERS**  
 VICTORIA, MN

PROJECT TITLE: **SIX MILE CREEK CARP BARRIERS**

ISSUE NO.:	0
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SJB	MJS	CM

DATE: **09/21/2018**

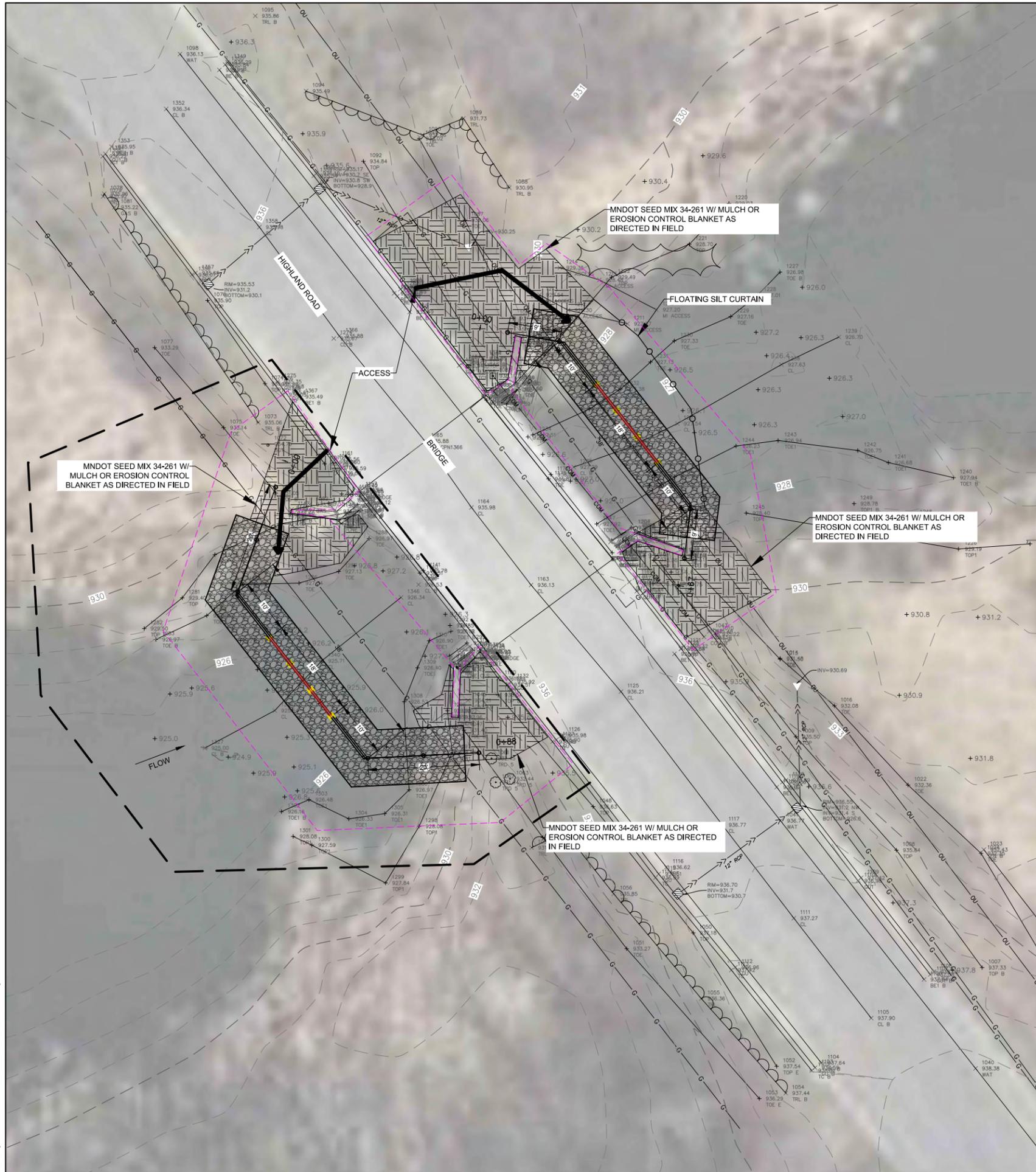
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SHEET TITLE:  
**C-101A**

SHEET NO.:  
 SIX MILE BRIDGE  
 SITE PLAN

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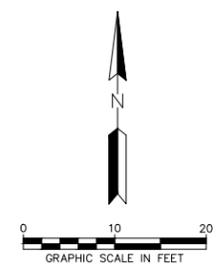
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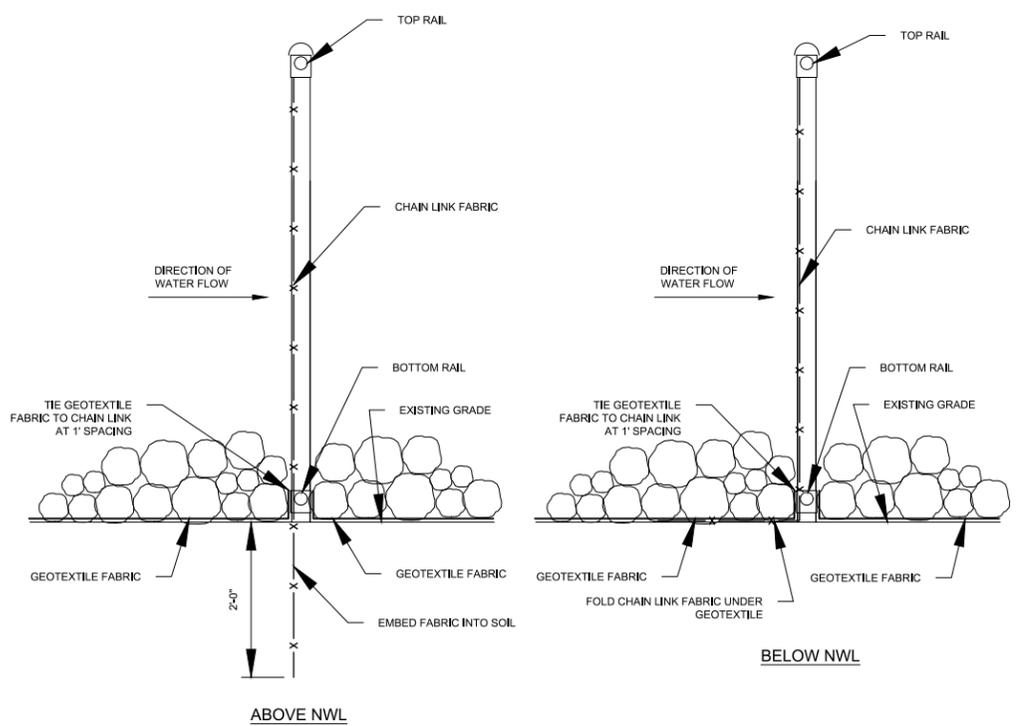
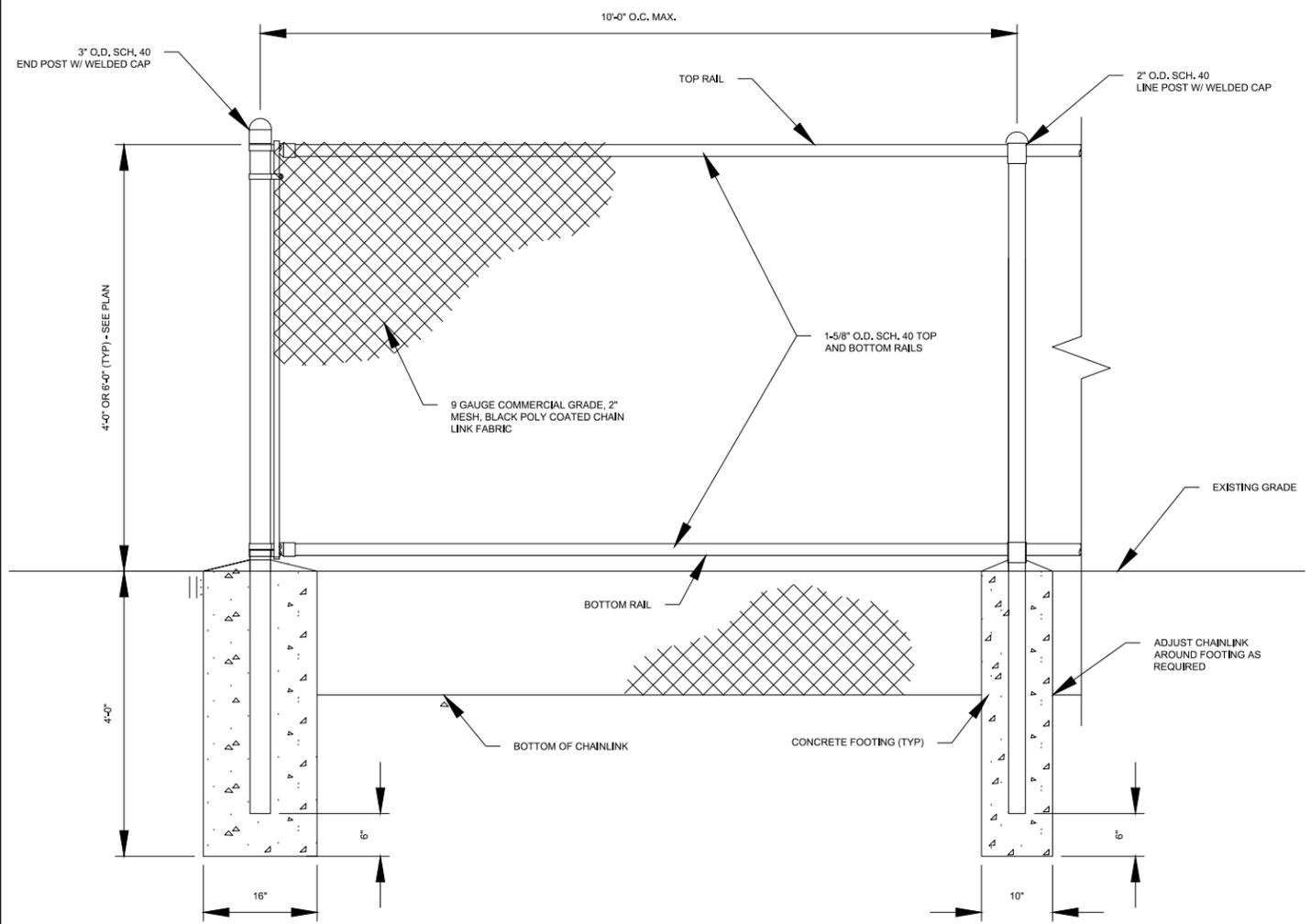
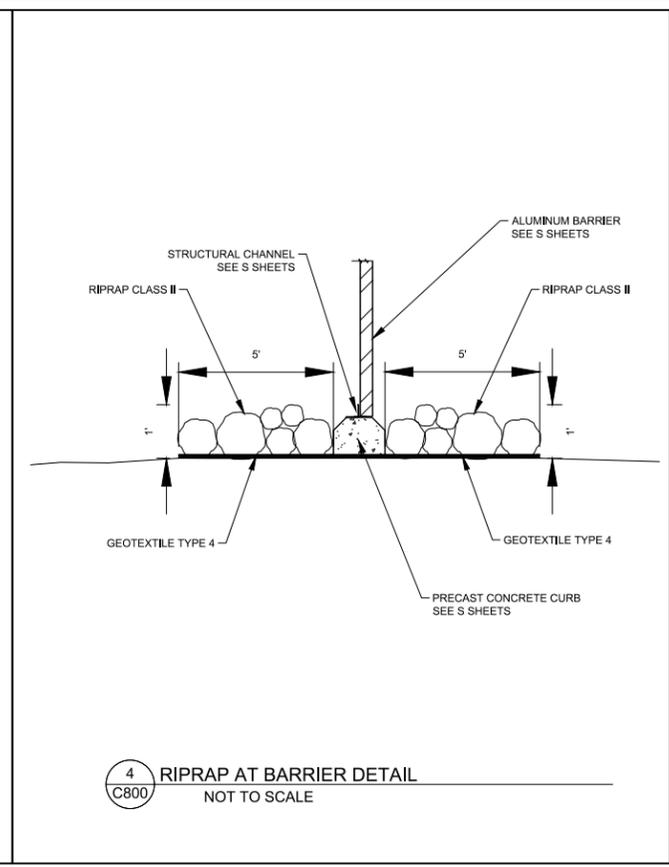
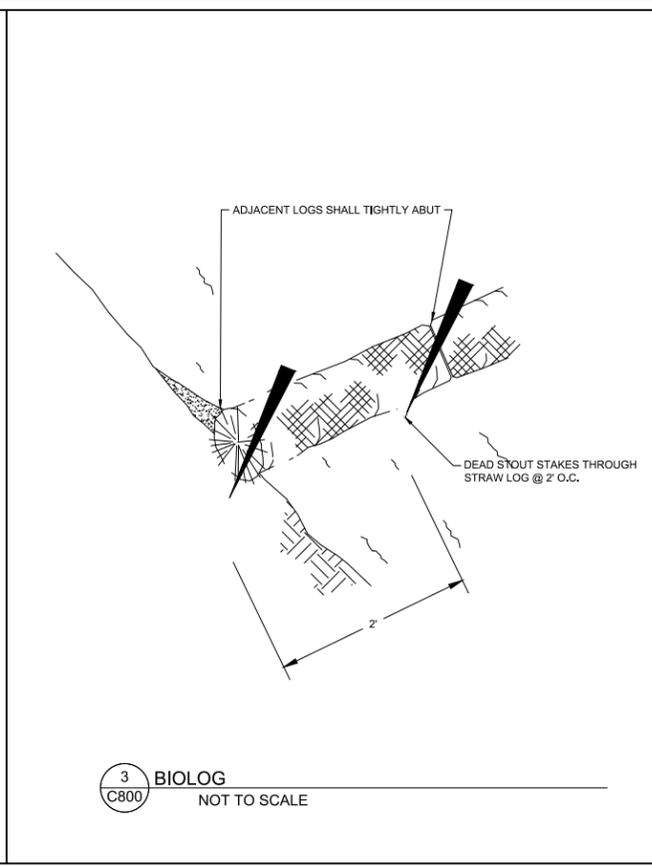
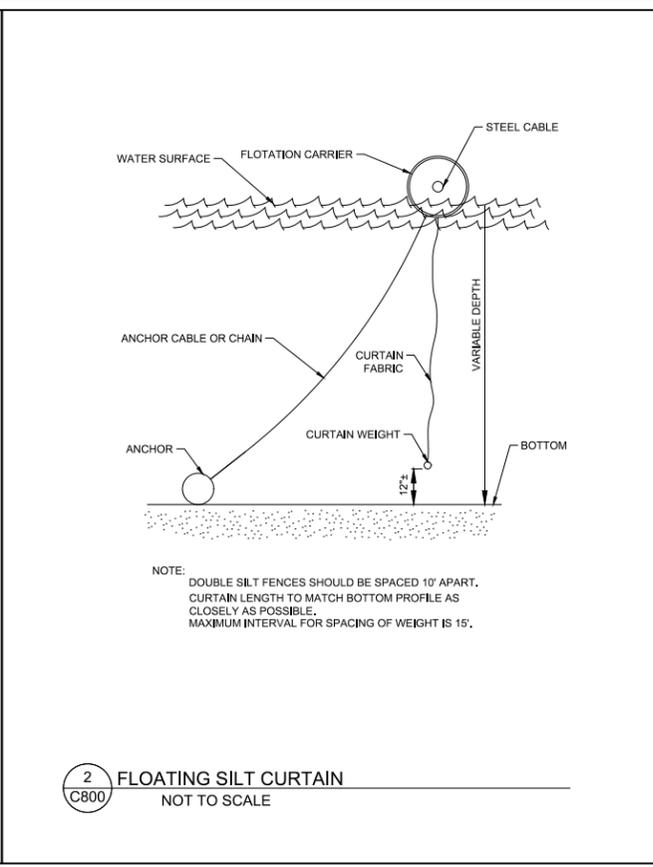
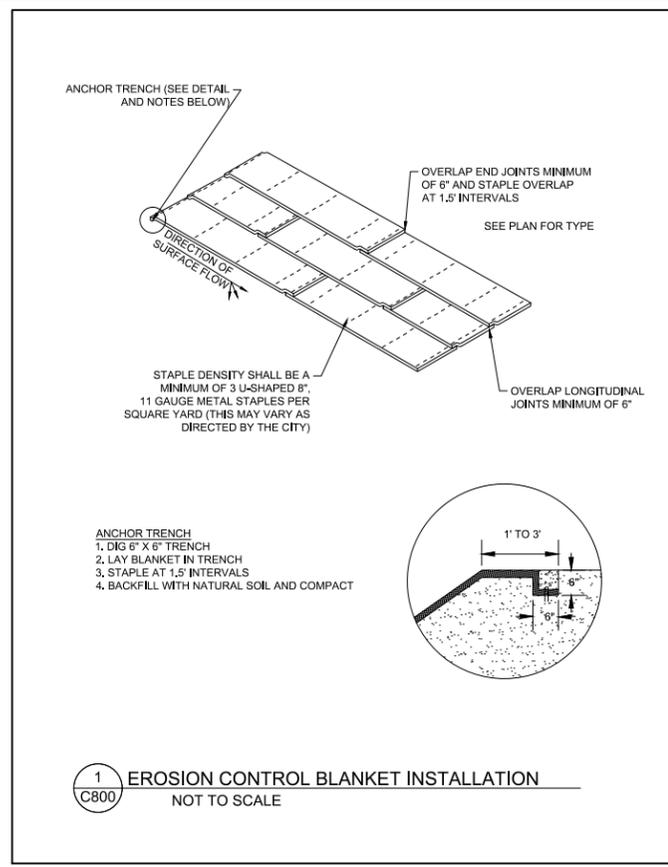
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 Date:

PROJECT NO.:	0185-0100	
DWN BY:	CHK'D BY:	APP'D BY:
SJB	MJS	CM
ISSUE DATE:	09/21/2018	
ISSUE NO.:	0	

SHEET TITLE:  
**C-101B**  
 SHEET NO.:  
 SIX MILE BRIDGE RESTORATION PLAN





NOTES:  
 1. EMBED CHAIN LINK FABRIC MINIMUM 2 FOOT INTO SOIL AS DETAILED.  
 2. PROVIDE END POSTS AT ALL TERMINATION POINTS AND CHANGES IN DIRECTION.  
 3. FENCE AND POSTS SHALL BE BLACK POLY COATED AS SPECIFIED.

ISSUE NO.: 0

DESCRIPTION: 100% DESIGN

DATE: 09/21/2018

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PROJECT NO.: 0185-0100

DWN BY: SJB    CHK'D BY: MJS    APP'D BY: CM

ISSUE DATE: 09/21/2018

ISSUE NO.: 0

SHEET TITLE:  
**C-800**  
 STANDARD DETAILS

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APPROXIMATE WEIGHTS - 6' LONG w/ TUBES

- 2-6' LONG CHORDS = 12' x 3.5 LBS/FT = 42 LBS
- 23-3' LONG SPINDALS = 69' x 0.63 LBS/FT = 44 LBS
- TOTAL WEIGHT = 86 LBS PER BARRIER

CONCRETE:

- $f_c = 4,000$  PSI
- AIR CONTENT = 5% - 7%

REINFORCEMENT:

- ASTM A615 GRADE 60
- $f_y = 60,000$  PSI
- CLEAR COVER = 3"

ALUMINUM SECTIONS:

- 6061-T6

STEEL SECTIONS:

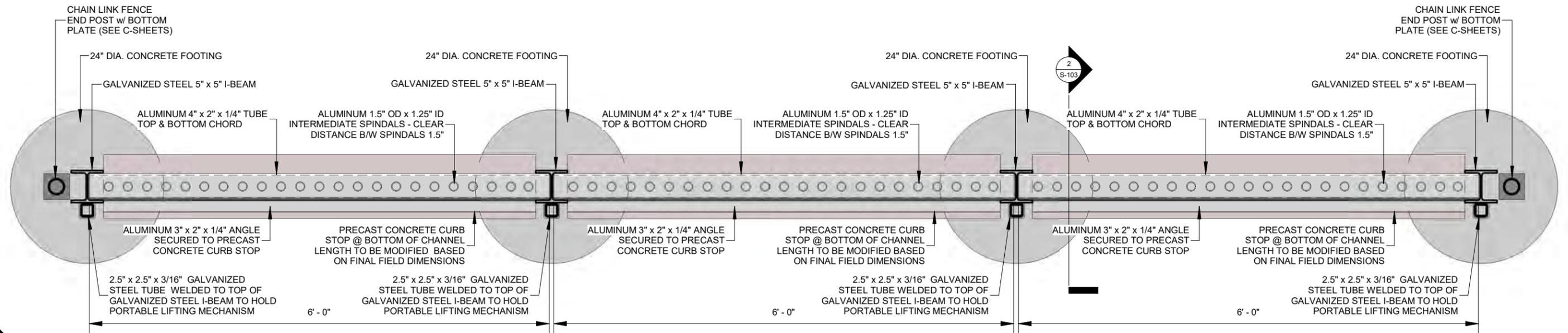
- HOT DIPPED GALVANIZED

LIFTING MECHANISM:

- MECHANISM IS TO CONSIST OF A PULLEY SYSTEM
- MECHANISM IS TO HAVE A 200 LB LIFTING WEIGHT CAPACITY
- MECHANISM IS TO BE CAPABLE OF
- MECHANISM IS TO BE ABLE TO LOCK IN PLACE AT VARIOUS LIFTING HEIGHTS

BARRIER & LIFTING MECHANISM SECURITY:

- BARRIERS ARE TO HAVE THE CAPABILITY TO BE SECURELY LOCKED IN-PLACE TO PREVENT STEALING AND VANDALISM IF OWNER DEEMS NECESSARY
- LIFTING MECHANISM IS TO HAVE THE CAPABILITY TO BE SECURELY LOCKED IN-PLACE TO PREVENT STEALING AND VANDALISM IF OWNER DEEMS NECESSARY



PLAN VIEW - HIGHLAND ROAD BRIDGE

BARRIER

3/4" = 1'-0"

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REV	REVISION DESCRIPTION	DWN	APP	REV DATE



1012 5th AVE., Suite 1B  
WINDOM, MN 56101  
507-831-2703  
507-831-5271

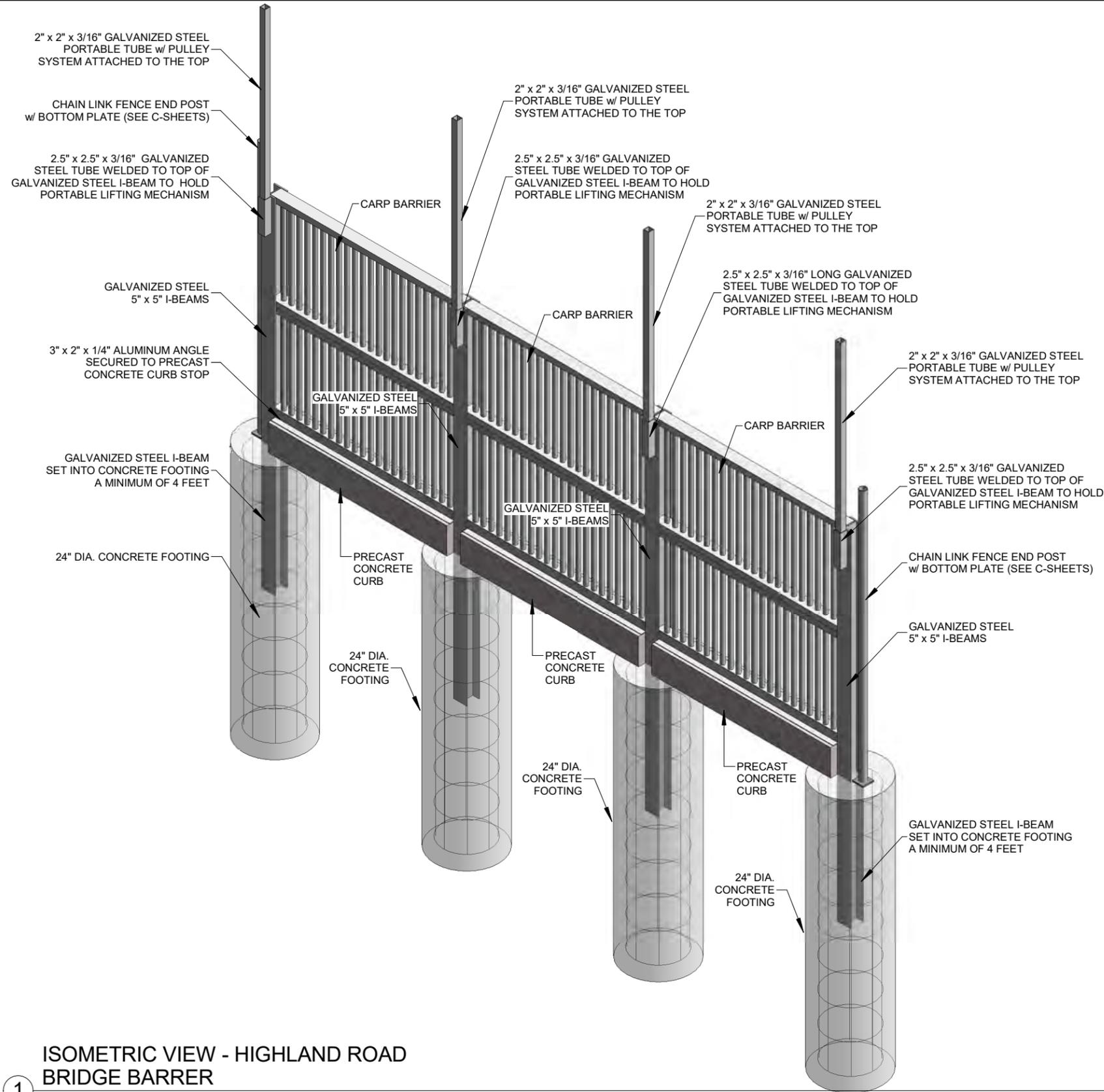
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DWG DATE 9/20/2018		SCALE 3/4" = 1'-0"

PROJECT SIX MILE CREEK CARP BARRIERS	CLIENT Minnehaha Creek Watershed District 15320 Minnetonka Blvd Minnetonka, MN 55345
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SHEET TITLE Plan View - Highland Road Barrier		
PROJECT NO. 0185-0100	SHEET NO. S-101	REV NO.

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1 ISOMETRIC VIEW - HIGHLAND ROAD BRIDGE BARRER

REV	REVISION DESCRIPTION	DWN	APP	REV DATE



1012 5th AVE., Suite 1B  
 WINDOM, MN 56101  
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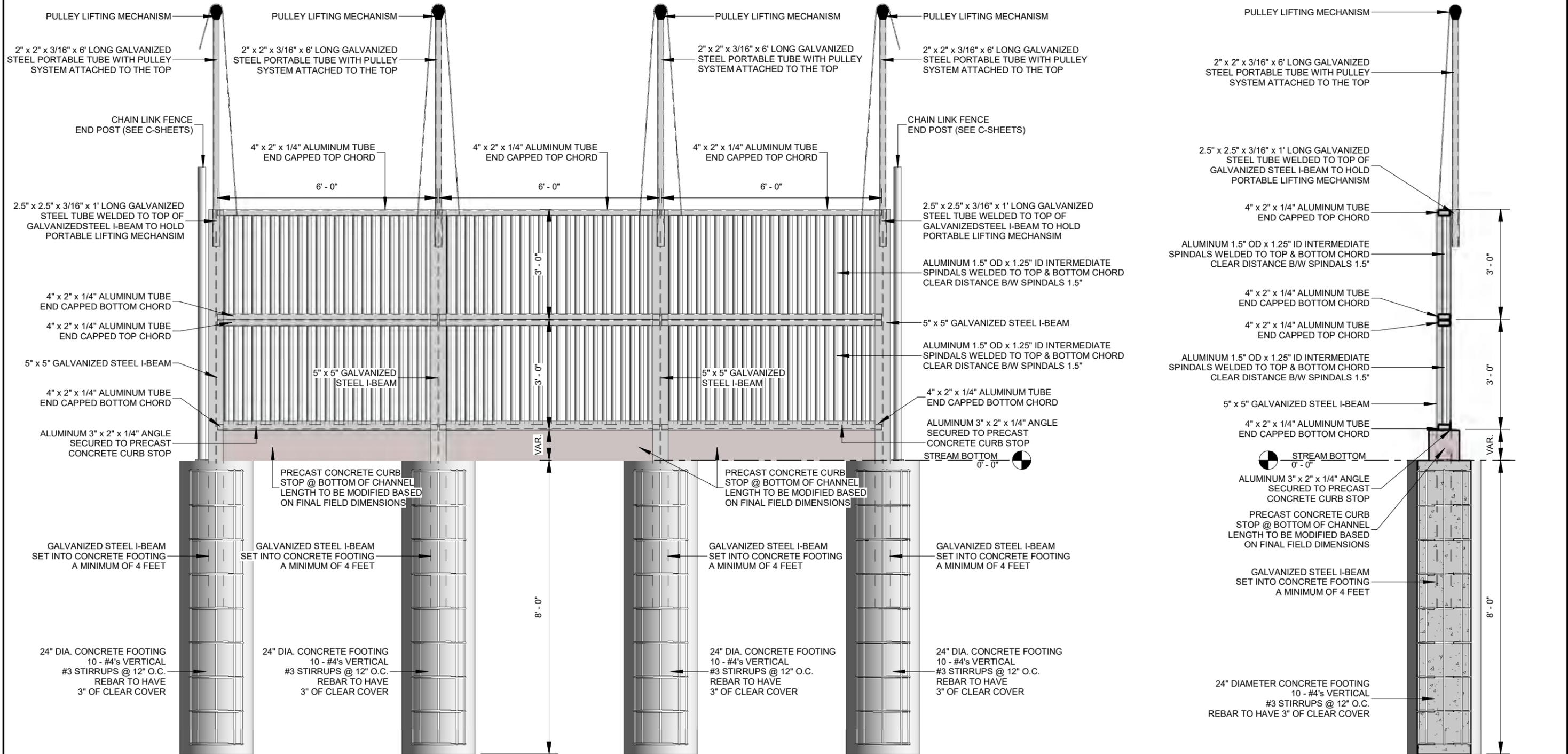
DWN BY MPJ	CHK'D DJJ	APP'D DJJ
DWG DATE 9/20/2018		SCALE

PROJECT SIX MILE CREEK CARP BARRIERS	CLIENT Minnehaha Creek Watershed District 15320 Minnetonka Blvd Minnetonka, MN 55345
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SHEET TITLE ISO View - Highland Road Barrier		
PROJECT NO. 0185-0100	SHEET NO. S-102	REV NO.

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**ELEVATION - HIGHLAND ROAD BRIDGE BARRIER**

①  
3/8" = 1'-0"

**SECTION - HIGHLAND ROAD BRIDGE BARRIER**

②  
3/8" = 1'-0"

REV	REVISION DESCRIPTION	DWN	APP	REV DATE



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Responsive partner. Exceptional outcomes.

DWN BY MPJ	CHK'D DJJ	APP'D DJJ
DWG DATE 9/20/2018		CLIENT Minnehaha Creek Watershed District 15320 Minnetonka Blvd Minnetonka, MN 55345
SCALE 3/8" = 1'-0"		

PROJECT SIX MILE CREEK CARP BARRIERS
CLIENT Minnehaha Creek Watershed District 15320 Minnetonka Blvd Minnetonka, MN 55345

SHEET TITLE Highland Road Barrier Details		
PROJECT NO. 0185-0100	SHEET NO. S-103	REV NO.