



Lake Independence Shoreline Restoration Final Report 2020



Submitted
To



Submitted
By



BACKGROUND

Lake Independence is among one of the most visible and highly valued recreational water bodies in Hennepin County. The lake is a primary destination for outdoor recreational opportunities such as boating, fishing, swimming, and hiking. Three Rivers Park District owns and operates the Baker Park Reserve that provides 4,500 feet of public accessible shoreline on Lake Independence. The Baker Park Reserve has two swimming beaches, a public watercraft access, fishing piers, picnic and playground areas, trails, and a campground area. The YMCA Camp Ihduhapi is also located on the lake shoreline providing a variety of outdoor recreation programs and educational opportunities. Despite being a popular recreational destination, the lake has had degraded and undesirable water quality conditions that inhibit recreational use. During the summer, the lake frequently has severe algae blooms resulting in poor water clarity. These algae blooms are caused by the high phosphorus concentrations within the lake. The lake has subsequently been listed as impaired for excessive nutrients by the MPCA in 2002 due to these poor water quality conditions.

A Lake Independence Total Maximum Daily Load and Implementation Plan was completed in 2007 by Three Rivers Park District in partnership with the Pioneer-Sarah Creek Watershed Management Commission to identify the various sources of nutrient loading impacting the water quality of the lake. The TMDL study identified phosphorus loading from the watershed as the main cause of the impairment, and emphasized phosphorus load reductions from the watershed as the primary means to improve water quality in the lake to meet state water quality standards. Shoreline stabilization on Lake Independence was identified as a potential source of watershed phosphorus loading that needs to be addressed. Shoreline erosion directly deposits sediment and phosphorus into the lake without being treated. Consequently, it becomes critical to identify those areas that are considered high risk for erosion along the lake shoreline.

The City of Medina had a subwatershed assessment analysis completed to identify best management recommendations for phosphorus load reductions flowing into Lake Independence and Lake Ardmere (Ardmore Area Subwatershed Stormwater Retrofit Analysis 2016). A project identified as a top priority in the urbanized portion of the subwatershed assessment was shoreline restoration/stabilization for Lake Independence located near Lakeshore Park on both sides of a residential boat access. The erosion is approximately 160 linear feet in length and is estimated to contribute approximately 2 pounds of phosphorus loading per year to Lake Independence. The project proposes to stabilize the shoreline using a combination of rip rap and native plantings. It is anticipated that the project will protect the Lakeshore Park shoreline from further erosion caused by wind and wave action. Specific details of the project are further described in the following section.

PROJECT

Lake Independence shoreline restoration was proposed at Lakeshore Park in the City of Medina to reduce shoreline erosion. The project addressed significant erosion along 160 linear feet of shoreline located within Lakeshore Park (Figure 1 & 2). The erosion contributes approximately 2 pounds of phosphorus loading per year to Lake Independence. The project protects the shoreline from continuous wind and wave action as well as ice scour by installing a combination of riprap and native plantings.



Figure 1: Lakeshore Park shoreline restoration site location.



Figure 2: Lakeshore Park proposed shoreline restoration/stabilization area.

The riprap was installed to an elevation of active erosion in accordance with the Minnesota Department of Natural Resources permit conditions. There was approximately 50 to 60 cubic yards of 6-inch to 30-inch boulder riprap installed on top of geotextile filter fabric (Figure 3). The riprap and geotextile fabric protected the shoreline from wind and wave action to the Ordinary High Water Level (OHWL) elevation. The riprap extended approximately 6 feet waterward to protect the shoreline from ice scour.

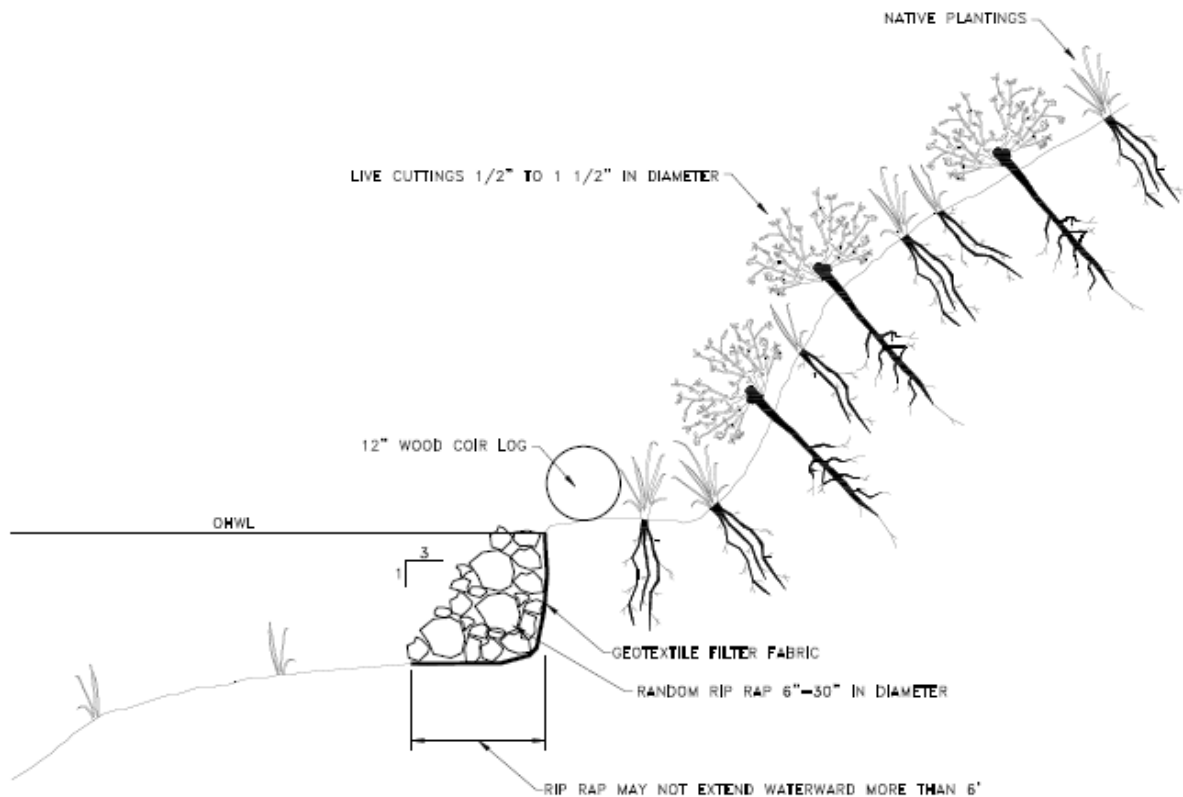


Figure 3: Design for shoreline stabilization.

Site preparation for native plantings included buckthorn and noxious weed management. After removal of buckthorn and noxious weeds, erosion control blanket was installed along the shoreline above the OHWL for preparation of native plantings. Native plantings along the shoreline included live stakes of dogwood and willow as well as native grasses and flowers. The location of plantings for specific native species are detailed in the design plans (Figure 4). Those disturbed areas without native plug plantings were seeded with Minnesota Native Landscape Lakeshore Mix. The established root system from native plantings and seed mix germination will provide soil stabilization and prevent soil erosion.

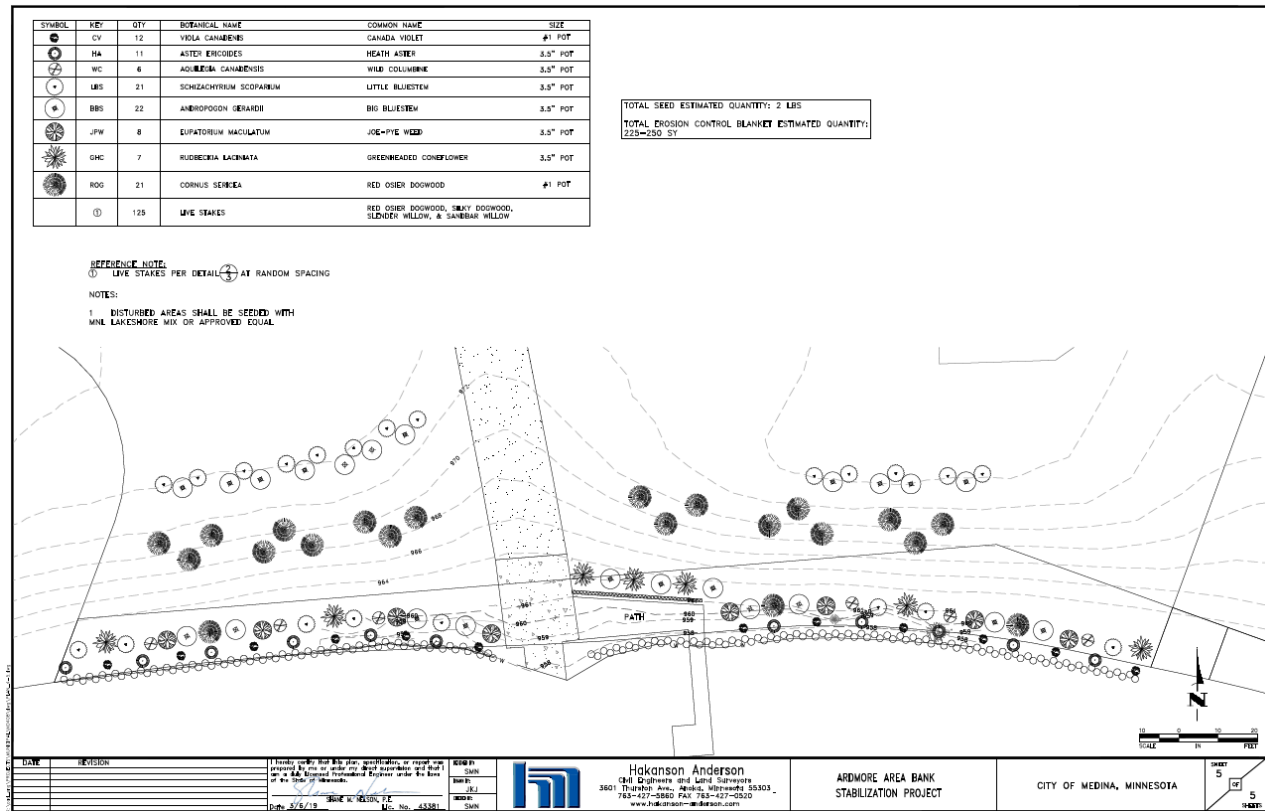


Figure 4: Design drawings for native plantings.

The Lakeshore Park shoreline restoration/stabilization project was completed in the summer of 2020 (Figure 5). It is anticipated that shoreline restoration will reduce future erosion attributed to wind/wave action and ice scour for estimated project life expectancy of 20 years. The project will require annual maintenance to ensure the establishment of a diverse native plant community to stabilize shore bank soils above the armor riprap elevation. It is estimated that the project will reduce phosphorus loading by approximately 2 pounds/year. This is a reduction of 40 pounds for the 20-year estimated life expectancy of the project. The total costs to complete the project was \$35,312.52. The overall cost benefit analysis was approximately \$883 per pound of phosphorus removed each year. The project was a partnership collaborative effort with the City of Medina, Hennepin County, Pioneer-Sarah Creek Watershed Management Commission, and the Board of Water and Soil Resources.



Figure 5: Lakeshore Park shoreline restoration project completed in 2020.



APPENDIX A

DESIGN PLANS

LAKE INDEPENDENCE SHORELINE STABILIZATION PROJECT

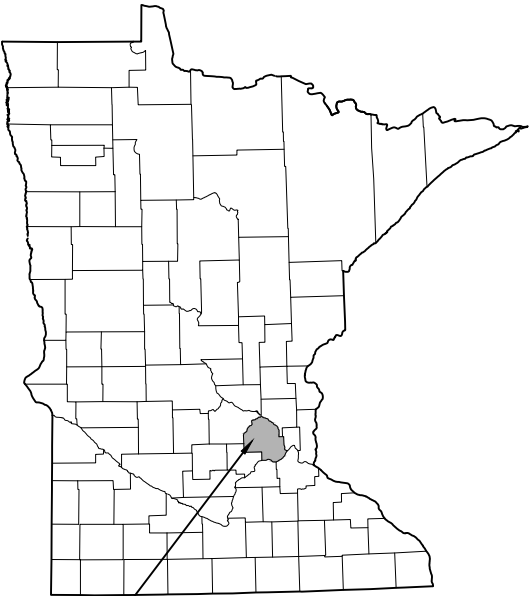
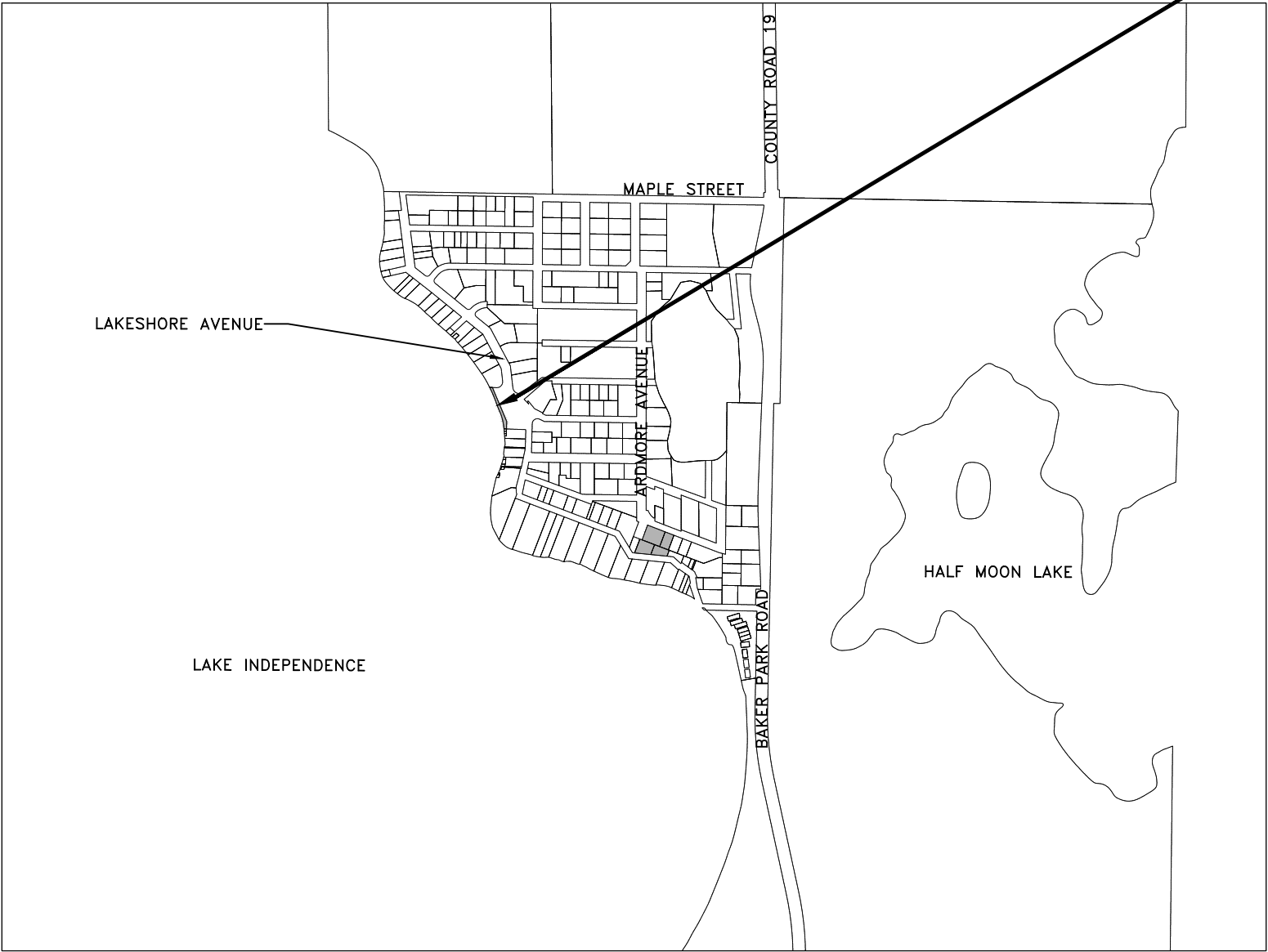
GOVERNING SPECIFICATIONS

ALL FEDERAL, STATE AND LOCAL LAWS, REGULATIONS, AND ORDINANCES SHALL BE COMPLIED WITH IN THE CONSTRUCTION OF THIS PROJECT.

ALL REQUIREMENTS OF THE REQUEST FOR QUOTES FOR LAKE INDEPENDENCE SHORELINE STABILIZATION PROJECT DATED MARCH 12, 2020

CITY OF MEDINA

PROJECT
LOCATION



CITY OF MEDINA
HENNEPIN COUNTY, MINNESOTA

SHEET INDEX

THIS PLAN CONTAINS 8 SHEETS
(INCLUDING CROSS SECTIONS)

SHEET NO.	DESCRIPTION
1	TITLE SHEET
2-3	DETAILS
4	STABILIZATION PLANS
5	LANDSCAPE PLANS

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.

Shane Nelson

SHANE M. NELSON, P.E.
HAKANSON ANDERSON ASSOCIATES, INC.
DESIGN ENGINEER

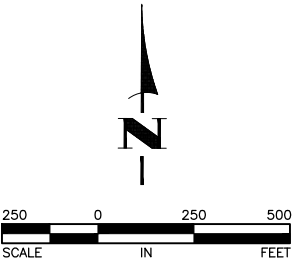
43381 DATE 3/6/2019
LIC. NO.

DATE	REVISION
1-30-2019	PRELIMINARY
3-6-2019	PER CITY COMMENTS
12-27-2019	PER CITY COMMENTS
2-4-2020	QUOTE/PERMIT SET

SHEET 1 OF 5 SHEETS

MD408

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." SEE SPECIFICATIONS.



Civil Engineers and Land Surveyors
3601 Thurston Ave., Anoka, Minnesota 55303
763-427-5860 FAX 763-427-0520

DRIVE PILOT HOLE WITH STEEL ROD

INSERT LIVE CUTTINGS AT LEAST
75% BELOW GROUND

1
2

LIVE HARVEST
AND INSTALLATION

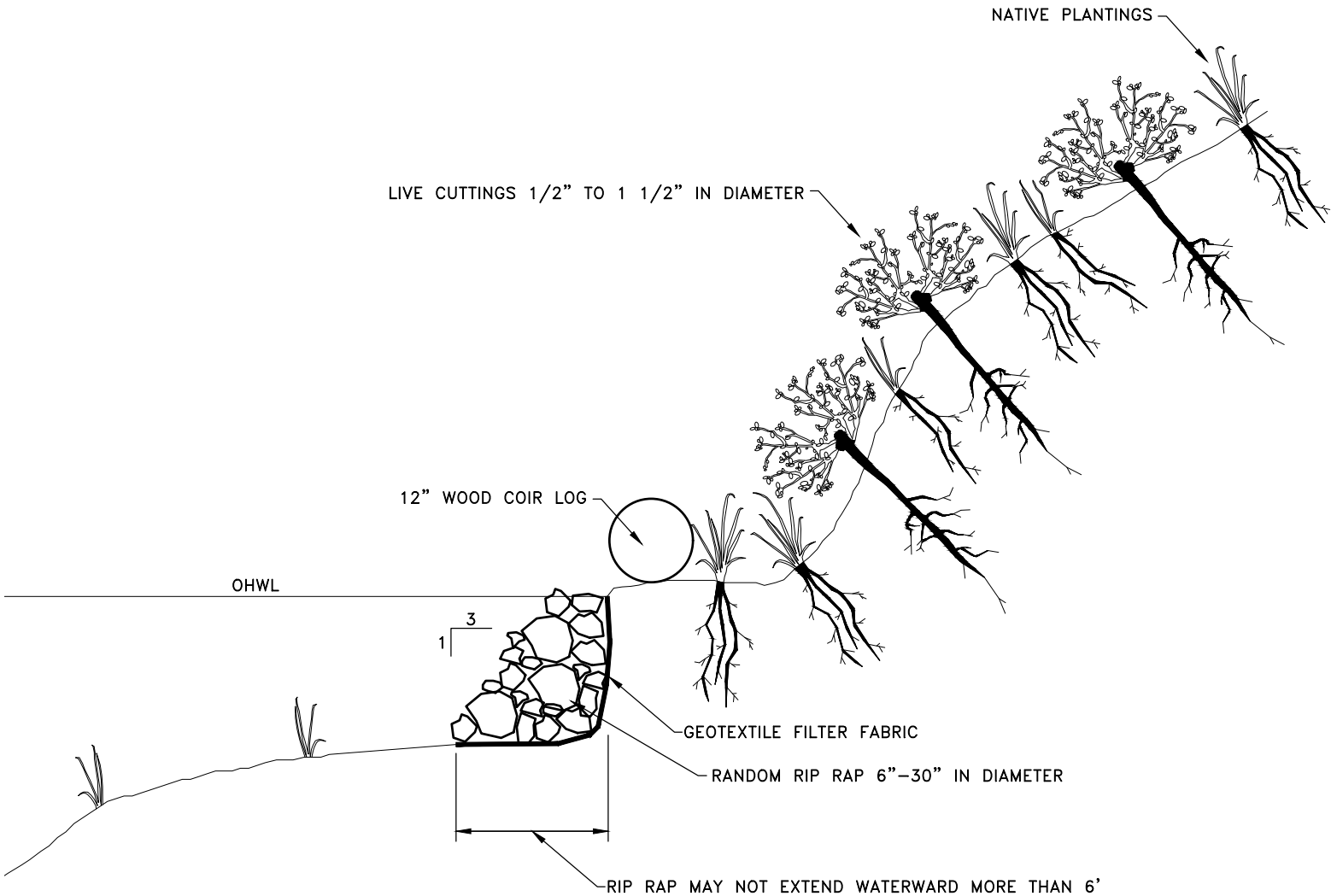
NO SCALE

NOTES:

1. HARVEST AND PLANT STAKES DURING THE DORMANT SEASON.
2. USE HEALTHY, STRAIGHT, LIVE WOOD AT LEAST 1 YEAR OLD.
3. SOAK CUTTINGS IN WATER BETWEEN CUTTING AND INSTALLATION.
4. FILL VOIDS WITH SOIL AND TAMP.

NOTES:

1. ERADICATE ALL BUCKTHORN AND NOXIOUS WEEDS ON THE BANK.
REPLACE VEGETATION WITH NATIVE GRASS PLUGS.



2
2

LAKE INDEPENDENCE
SHORELINE STABILIZATION

NO SCALE

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DATE	REVISION
1-30-19	PRELIMINARY
3-6-19	PER CITY COMMENTS
2-4-20	QUOTE/PERMIT SET

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.

Shane M. Nelson
SHANE M. NELSON, P.E.
Date 3/6/19 Lic. No. 43381

DESIGNED BY:
SMN

DRAWN BY:
JKJ

CHECKED BY:
SMN



Hakanson Anderson
Civil Engineers and Land Surveyors
3601 Thurston Ave., Anoka, Minnesota 55303
763-427-5860 FAX 763-427-0520
www.hakanson-anderson.com

ARDMORE AREA BANK
STABILIZATION PROJECT

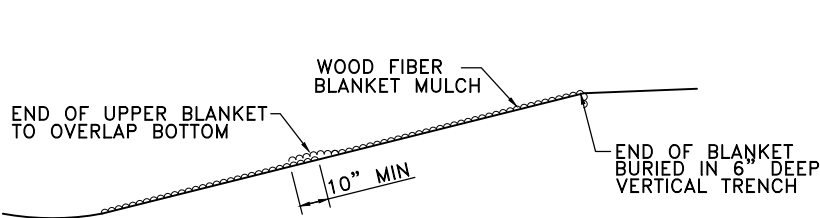
CITY OF MEDINA, MINNESOTA

SHEET
2
OF
5
SHEETS

MD408

NOTES:

1. ERADICATE ALL BUCKTHORN AND NOXIOUS WEEDS ON THE BANK.
REPLACE VEGETATION WITH NATIVE GRASS PLUGS.



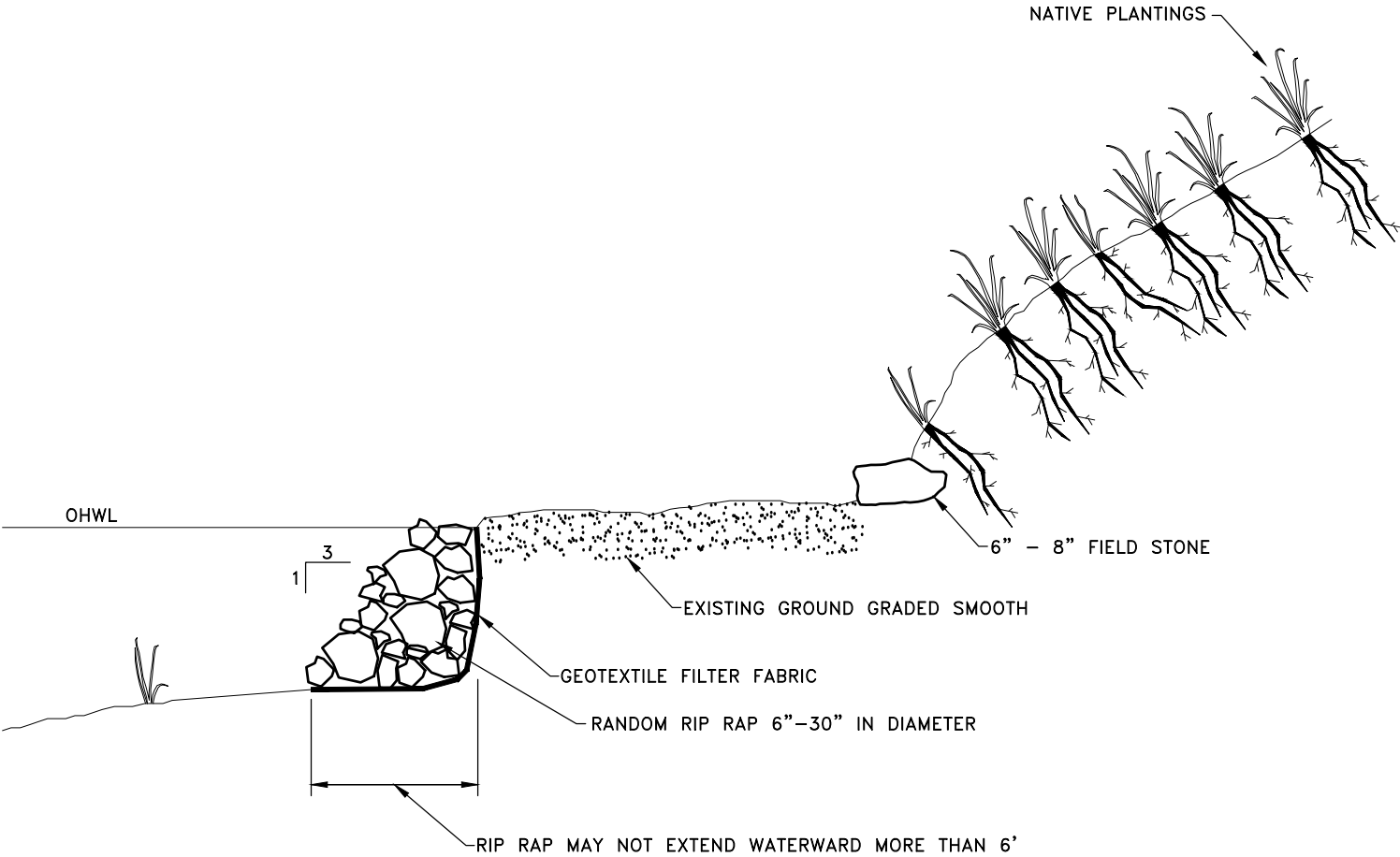
NOTE:
WOOD FIBER BLANKET SHALL BE PLACED AND STAPLED ACCORDING TO Mn/DOT SPECIFICATION 2575.3K2 WITH THE FOLLOWING EXCEPTIONS. ADJACENT STRIP EDGES SHALL BE OVERLAPPED A MINIMUM OF 6".

PLASTIC OR WOOD BIODEGRADABLE STAKES OR STAPLES SHALL BE USED IN PLACE OF METAL WIRE STAPLES.

ECOSTAKES AND BIOSTAKES ARE ACCEPTABLE PRODUCTS FOR USE TO FASTEN WOOD FIBER BLANKET.

EROSION CONTROL BLANKET SHALL BE CATEGORY 0, 100% EXCELSIOR ECO-FRIENDLY. SYNTHETIC NETTING IS NOT ALLOWED.

1
3 WOOD FIBER BLANKET
ON A SLOPE
NO SCALE



2
3 LAKE INDEPENDENCE
DOCK ACCESS PATH
NO SCALE

Mar 13, 2020 - 2:08pm
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DATE	REVISION
1-30-19	PRELIMINARY
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Shane M. Nelson
SHANE M. NELSON, P.E.
Date 3/6/19 Lic. No. 43381

DESIGNED BY:
SMN
DRAWN BY:
JKJ
CHECKED BY:
SMN



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ARDMORE AREA BANK
STABILIZATION PROJECT

CITY OF MEDINA, MINNESOTA

SHEET
3
OF
5
SHEETS

MD408



LAKESHORE AVENUE

2975 LAKESHORE AVE

TOTAL RIPRAP ESTIMATED QUANTITY:
50-60 CY
TOTAL GEOTEXTILE ESTIMATED QUANTITY:
250-275 SY

PLAYGROUND

BEGIN SHORELINE
STABILIZATION PER 2

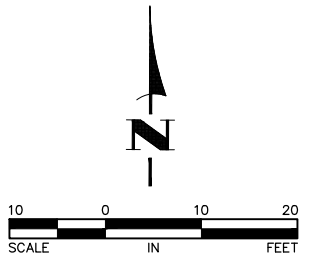
END SHORELINE
STABILIZATION

NOTE: RIPRAP ONLY TO ELEVATION OF ACTIVE
EROSION IN ACCORDANCE WITH DNR PERMIT
CONDITIONS. DO NOT PLACE RIPRAP OVER
AREAS WITH ESTABLISHED VEGETATION

6" - 30" RIPRAP BOULDERS

6" - 8" FIELD STONE RIPRAP

LAKE INDEPENDENCE



DATE	REVISION
1-30-19	PRELIMINARY
3-6-19	PER CITY COMMENTS

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Shane M. Nelson
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Date 3/6/19 Lic. No. 43381

DESIGNED BY:
SMN
DRAWN BY:
JKJ
CHECKED BY:
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ARDMORE AREA BANK
STABILIZATION PROJECT

CITY OF MEDINA, MINNESOTA

SHEET
4
OF
5
SHEETS

MD408

SYMBOL	KEY	QTY	BOTANICAL NAME	COMMON NAME	SIZE
	CV	12	VIOLA CANADENSIS	CANADA VIOLET	#1 POT
	HA	11	ASTER ERICOIDES	HEATH ASTER	3.5" POT
	WC	6	AQUILEGIA CANADENSIS	WILD COLUMBINE	3.5" POT
	LBS	21	SCHIZACHYRIUM SCOPARIUM	LITTLE BLUESTEM	3.5" POT
	BBS	22	ANDROPOGON GERARDII	BIG BLUESTEM	3.5" POT
	JPW	8	EUPATORIUM MACULATUM	JOE-PYE WEED	3.5" POT
	GHC	7	RUDBECKIA LACINIATA	GREENHEADED CONEFLOWER	3.5" POT
	ROG	21	CORNUS SERICEA	RED OSIER DOGWOOD	#1 POT
	①	125	LIVE STAKES	RED OSIER DOGWOOD, SILKY DOGWOOD, SLENDER WILLOW, & SANDBAR WILLOW	

TOTAL SEED ESTIMATED QUANTITY: 2 LBS

TOTAL EROSION CONTROL BLANKET ESTIMATED QUANTITY: 225-250 SY


REFERENCE NOTE:
① LIVE STAKES PER DETAIL ②/③ AT RANDOM SPACING

NOTES:
1 DISTURBED AREAS SHALL BE SEEDED WITH MNL LAKESHORE MIX OR APPROVED EQUAL



DATE	REVISION

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SHANE M. NELSON, P.E.
Date 3/6/19 Lic. No. 43381

DESIGNED BY: SMN
DRAWN BY: JKJ
CHECKED BY: SMN



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**ARDMORE AREA BANK
STABILIZATION PROJECT**

CITY OF MEDINA, MINNESOTA

SHEET 5 OF 5
SHEETS



APPENDIX B

PHOTOS









Ardmore Channel Carp Barrier Final Report 2020



Submitted
To



Submitted
By



BACKGROUND

Ardmore Lake is small 14-acre private lake in the City of Medina that has degraded water quality. The lake was listed on the MPCA's impaired water's list for excessive nutrients in 2016. It has been classified as a "deep lake" with a maximum depth of 24 feet. However, the lake functions more like a "shallow lake" having 75% surface area with depths less than 15-feet. The lake has average annual in-lake phosphorus concentration that ranges from 150 to 350 µg/L. These concentrations are conducive for severe algae blooms that persist throughout the summer. The Ardmore Lake poor water quality potentially impacts the downstream water quality of Lake Independence since the two lakes are directly connected through a channel. Lake Independence was also listed as impaired for excessive nutrients in 2002. The Lake Independence TMDL completed in 2007 indicated that the Ardmore Lake watershed accounts for approximately 6% of the total watershed load. Consequently, management efforts to improve the water quality of Ardmore Lake would subsequently benefit the water quality downstream into Lake Independence.

A Pioneer-Sarah Creek Watershed TMDL completed in 2017 identified potential sources of nutrient loading impacting the water quality for Ardmore Lake. The TMDL indicated that the watershed accounts for approximately 50% of the nutrient load budget for the lake; and internal loading represents approximately 49% of the nutrient load budget. It was recommended that both watershed and internal loading needs to be significantly reduced by approximately 92% to achieve in-lake state water quality standards. The City of Medina has already implemented several watershed projects to reduce phosphorus loading to the lake, but there have not been any projects implemented in the lake that are focused on internal loading sources.

A major internal loading source identified in the TMDL for Ardmore Lake was the abundance of common carp. Carp often root in lake sediments while searching for food and by doing so increasing water turbidity, releasing sediment-bound nutrients, and uprooting aquatic vegetation (Baer et al. 2009, Bajer and Sorensen 2015). Carp are considered damaging to the lake ecosystem and have been known to degrade water quality once their biomass exceeds approximately 100 kg/ha (Bajer et al 2009). Three Rivers Park District assessed the carp biomass and populations for all the tributary lakes draining to Lake Independence in 2015 and 2016 (Wein and Bajer 2017). Ardmore Lake was the only tributary lake that exceeded the threshold (>100 kg/ha) for ecological damage with biomass estimates of 352 kg/ha in 2015 and 205 kg/ha in 2016 (Appendix A).

Ardmore Lake has water quality conditions that are typical for a lake with nuisance carp levels. The lake has turbid water clarity with excessively high in-lake phosphorus concentrations. Aquatic vegetation surveys conducted every year further indicates that the lake does not have a significant rooted aquatic plant community. Recent research indicates that adult carp migrate to lakes that have frequent winterkills to successfully reproduce (Baer et al. 2015). Carp are unable to recruit in lakes dominated by bluegill sunfish (*Lepomis macrochirus*) and other native predators that consume carp eggs and larvae. Ardmore Lake has had periodic fish kills due to poor dissolved oxygen levels during the winter making it a great candidate as a nursery area that supports carp recruitment.

Three Rivers Park District monitored carp movement in the Lake Independence watershed to identify potential migration routes and nursery areas (Appendix A). Radio telemetry was used to monitor movement of 15 adult carp implanted with radio transmitters in Ardmere Lake from 2015 through 2016. In addition, a total of 205 carp were implanted with Passive Integrated Transponders (PIT) tags in both Lake Independence (88 fish in 2018 & 57 fish in 2019) and Lake Ardmere (60 fish in 2018) to monitor carp movement using PIT antennas placed at three locations in 2018 through 2020. The carp movement monitoring stations with PIT antennas were located at Highway 19 crossing over Spurzem Creek, Pagenkopf Road crossing over Pioneer Creek, and the outlet channel of Ardmere Lake. The telemetry and PIT tag studies both indicated that majority of the carp are moving in large numbers during the spring using Pioneer Creek and Ardmere Creek to actively seek shallow lakes to spawn (Wein and Bajer 2017, Wein et al. 2019, Fieldseth et al.2020). Pioneer Creek is connected to several smaller lakes (Ox Yoke and Rice) that are suspected to be potential nursery areas located downstream of Lake Independence. Ardmere Lake was identified as a primary nursery area for carp based on observed movement through the Ardmere channel, previous carp population/biomass estimates, and age structure analysis identifying specific year class recruitment on the lake.

A carp barrier was recommended to block carp movement within the Ardmere Channel as the top priority due to the following reasons:

- The channel is a direct migration route.
 - Carp have been observed using the channel frequently in the spring to migrate from Lake Independence to spawn in Ardmere Lake.
 - Adult carp have been observed migrating back down to Lake Independence after spawning as well as carp leaving the Ardmere nursery area following recruitment to reproductive maturity.
- Ardmere Lake has biomass/population levels of carp above the 100 kg/ha threshold that potentially causes ecological damage.
- Ardmere Lake is identified as a nursery area due to age structure analysis and recruitment success.
- Ardmere Lake frequently winter kills due to low dissolved oxygen levels making it an ideal candidate for a carp nursery area.
- Ardmere Lake is a small lake that is conducive for future carp removal management efforts to effectively reduce biomass below the ecological threshold.
- Potential water quality improvements due to carp management in Ardmere Lake has water quality benefits to Lake Independence.
-

PROJECT

A carp barrier was installed on the Ardmere Channel to prevent carp migration between Ardmere Lake and Lake Independence in November of 2020. The total project costs for the design/permitting and construction installation of the carp barrier was \$58,092.08. This was a collaborative project between Pioneer-Sarah Creek Watershed Management Commission, City of Medina, Hennepin County, Board of Water and Soil Resources, and Three Rivers Park District. The specific details of the project are provided below:

- An Ardmore Channel Carp Barrier Feasibility Study was completed May of 2019 to consider different options that would prevent carp migration between Lake Independence and Ardmore Lake (Appendix B).
 - The study recommended a removable fish grate in the Ardmore channel located downstream of the culvert on Ardmore Avenue.
- An agreement was signed with Emmons & Olivier Resources, Inc. (August 2019) to provide contractual services for the following:
 - Develop project design plans for a carp barrier.
 - Acquire necessary permits for the construction of the carp barrier.
 - Administration the construction of the project.
- A wetland delineation report was completed October 15, 2019.
- A wetland delineation notice of application for review was submitted to the Local Government Unit on October 17, 2019.
- The Local Government Unit issued a WCA Notice of Decision approving the wetland boundary and type with minor boundary adjustment on December 4, 2019.
- A Geotechnical Exploration and Engineering Review of the Ardmore Channel was completed in December of 2019.
- A wetland De Minimus exemption application was submitted to the Local Government Unit regulating the Wetland Conservation Act for the project dated January 20, 2020.
- Concept Design Plans completed January 20, 2020.
- Design Plans 60% completed February 10, 2020.
- The wetland De Minimus exemption application request was revised to requesting a No Loss decision for installation of the carp barrier dated February 24, 2020.
- Final Design Plans completed for permit submission to Pioneer-Sarah Creek Watershed Management Commission dated February 28, 2020 (Appendix B).
- The U.S. Army Corp of Engineers issued a Nationwide General Permit for authorization to proceed with the project dated June 11, 2020.
- The Pioneer-Sarah Creek Watershed Management Commission approved the Ardmore Channel Carp Barrier project at the monthly Commission meeting on June 18, 2020.
- Design Plans for bid documents were completed August 3, 2020.
- Ardmore Channel Carp Barrier Request for Bid packet advertised August 6, 2020.
- Contractors submitted Bid Proposals for construction of the Ardmore Channel Carp Barrier received September 1, 2020.
- Ardmore Channel Carp Barrier Contract was awarded to U.S. SiteWork, Inc. dated September 17, 2020.
- Ardmore Channel Carp Barrier pre-construction meeting November 20, 2020.
- U.S SiteWork, Inc. constructed/installed the carp barrier during the week of November 23 through November 30, 2020.
- Technical Memo with construction photos of project completion was submitted to Pioneer-Sarah Creek Watershed Management Commission meeting (Appendix C).
- Total Costs for Carp Barrier = \$58,092.08 (Appendix D)
 - Consulting Services for Design, Permitting, and Administration = \$18,926.08
 - Ardmore Channel Carp Barrier Construction = \$39,166.00

CARP MANAGEMENT

Carp research and management for the Lake Independence watershed has been ongoing since 2015. This research has included extensive sampling and monitoring efforts for all the tributaries that drain to Lake Independence. Most of this research has recently focused on Ardmore Lake because the lake was identified as a primary nursery area and has had nuisance biomass/populations levels of carp that have impacted water quality. The Ardmore Lake research will eventually be applied to the remaining portion of the Lake Independence watershed when carp biomass/population reach nuisance levels. A carp management plan will need to be developed for long-term management of carp within the Lake Independence watershed. This management plan will include Lake Independence as well as those other tributaries that drain to Lake Independence. The management plan will be developed within the next several years after future management efforts have been implemented for Ardmore Lake. Three Rivers Park District will continue to focus future management efforts on Ardmore Lake as an effort to improve water quality through carp management. The proposed future management efforts for Ardmore Lake include the following:

Barrier Effectiveness:

Management strategies to limit carp recruitment in the Ardmore/Independence system was a top priority and the first step towards improving water quality. The Ardmore Channel Carp barrier limits potential spawning and recruitment success by blocking fish migration between Lake Independence and Ardmore Lake. If no action were taken to limit recruitment, it is very likely that the carp population in Independence and Ardmore Lake would continue to increase with new year classes added to the system. Consequently, monitoring barrier effectiveness becomes critical to ensure that the carp barrier will limit recruitment success. Three Rivers Park District will measure barrier effectiveness in 2021 by monitoring movement of PIT tagged carp on both sides of the fish barrier. These proposed monitoring efforts will determine overall barrier effectiveness to ensure carp migration has been eliminated.

Carp Population/Biomass Estimate and Removal:

Water quality improvements and benefits will not be achieved by installing a carp barrier that limits recruitment success. Management efforts need to focus on implementing carp removal strategies to lower the carp population/biomass below the ecological damaging threshold of 100 kg/ha. Carp removal management efforts will primarily focus on Ardmore Lake since the previous biomass estimates indicated nuisance levels above the ecological threshold. Three Rivers Park District has contracted carp management removal services for Ardmore Lake in 2021. Prior to implementing carp removal efforts, it is critical to have a more accurate/recent baseline estimate of carp population/biomass in Ardmore Lake. The carp population/biomass will be adjusted accordingly following carp removal efforts to compare to the ecological damaging threshold.

Monitoring Metrics:

An adaptive management approach will be implemented for carp removal strategies until population/biomass estimates are below the ecological damaging threshold of 100 kg/ha. Carp removal strategies that will be considered include baited box netting, seining, fishing, and electrofishing. It is anticipated that there will be water quality improvements for Ardmore Lake when carp population/biomass has been reduced. A monitoring plan has been developed to measure the success of the recent management activities implemented on Ardmore Lake. The metrics that will be used to measure and assess carp management success for the next several years will include the following:

- Carp Monitoring
 - Biomass and Population estimates
 - Carp age structure analysis
 - Length Frequency Histograms
 - Length – Age Regression Analysis
- Lake-wide fish community assessment/surveys
 - Bluegill population/abundance
 - Predator population/abundance
- Water Quality Monitoring - yearly from May-September
 - Total Phosphorus
 - Chlorophyll-a
 - Water Clarity – Secchi Depth
- Aquatic Vegetation Surveys - monitor changes in the plant community - spring & fall
 - Percent Frequency for each plant species
 - Maximum plant depth
 - Number of species
 - Diversity Indices
 - Biovolume



APPENDIX A

CARP STUDIES



Estimating the abundance, age-structure, recruitment sites and movement patterns of common carp in the tributary lakes of Lake Independence

Report for Year 1 and 2

Prepared for the Three Rivers Park District

Prepared by: Carp Solutions LLC

Jordan Wein & Przemek Bajer

February, 2017

www.carpsolutionsmn.com

Summary

In this report, we present the results of work conducted during June 2015 – February 2017 to describe key attributes of the common carp metapopulation inhabiting Ardmore Lake, Spurzem Lake and adjacent connected lakes. We determined that carp biomass in Ardmore Lake exceeded the threshold for ecological damage (100 kg/ha) both in 2015 and 2016. Spurzem Lake was estimated to have 92 kg of carp per hectare, which is under the ecological damage threshold. A preliminary estimate for Thomas and Winterhalter (treated as one lake) was also conducted and suggested that carp biomass in these lakes was approximately 72 kg/ha, which is also under the ecological damage threshold. 15 radiotransmitters were implanted into adult carp in summer of 2015 in Ardmore as well as Spurzem to track movement patterns between lakes; Three Rivers staff tracked movements of carp. Trap net surveys were conducted in both 2015 and 2016 targeting young of year (YOY) carp. No YOY carp were caught in any location, indicating very low or no recruitment in 2015 or 2016. The age structure of Ardmore revealed a large 2014 year class, while no evidence of significant recruitment in recent years was noted in Spurzem, in which carp population was dominated by the 2000-2013 year classes.

Introduction

The common carp (*Cyprinus carpio*) is an invasive fish that was introduced to North America in late 1800s. The carp is known for its tendency to root in lake sediments while searching for food and by doing so increasing water turbidity, releasing sediment-bound nutrients and uprooting aquatic vegetation (Bajer et al. 2009, Bajer and Sorensen 2015; Vilizzi et al. 2015). Productive lakes of south-central Minnesota represent a region of extremely high carp abundance, which often exceeds 400 kg/ha. Carp become damaging to lake ecosystems once their biomass exceeds approximately 100 kg/ha (Bajer et al. 2009), which is often recommended as a management goal.

Until recently, management of carp populations in Minnesota was limited because processes that drive carp abundance were not well documented and statistical models that could guide carp management efforts were not developed. Recently, much research has been done to demonstrate that carp populations can indeed be controlled in this region by exploiting a few weaknesses in their life cycle. First, carp are unable to recruit (have young) in lakes dominated by bluegill sunfish (*Lepomis macrochirus*) and other native predators that consume carp eggs and larvae. To overcome these recruitment bottlenecks, adult carp need to migrate to winterkill-prone, bluegill-free marshes to successfully reproduce (Bajer et al. 2012). Second, it takes (typically) approximately 2 years for the juveniles to leave these marshy areas and migrate back to lakes in large numbers (Bajer et al. 2015); migration tendencies in the first and second year of life appear to be very low. Lastly, adult carp form dense winter aggregations that can be located with telemetry and targeted with seine nets for removal. Up to 90% of adult carp can be removed in a single haul in small lakes (Johnsen and Hasler 1977) (Bajer et al. 2011).

Study System and Project Context

Our work was conducted in the tributary lakes connected to Lake Independence (832 acres). These lakes included Ardmore (13 acres), Spurzem (82 acres), Half Moon (33 acres), Winterhalter (16 acres) and Thomas (~10 acres) (Fig. 1). The primary management concerns were for Ardmore and Spurzem lakes. Water quality in Ardmore has been declining and the lake is almost currently completely void of aquatic vegetation. Until recently, when vegetation (notably curly-leaf pondweed) returned after a harsh fish winterkill, Spurzem also had poor water quality. Electrofishing surveys done in Spurzem by the University of Minnesota in 2013 revealed high numbers of carp present. Due to these observations, Three Rivers Park District hired Carp Solutions LLC. to assess the population(s) of carp in this system with the intent to formulate a sustainable management strategy that can curb the development of hyperabundance and ultimately the associated water quality and ecological impacts.

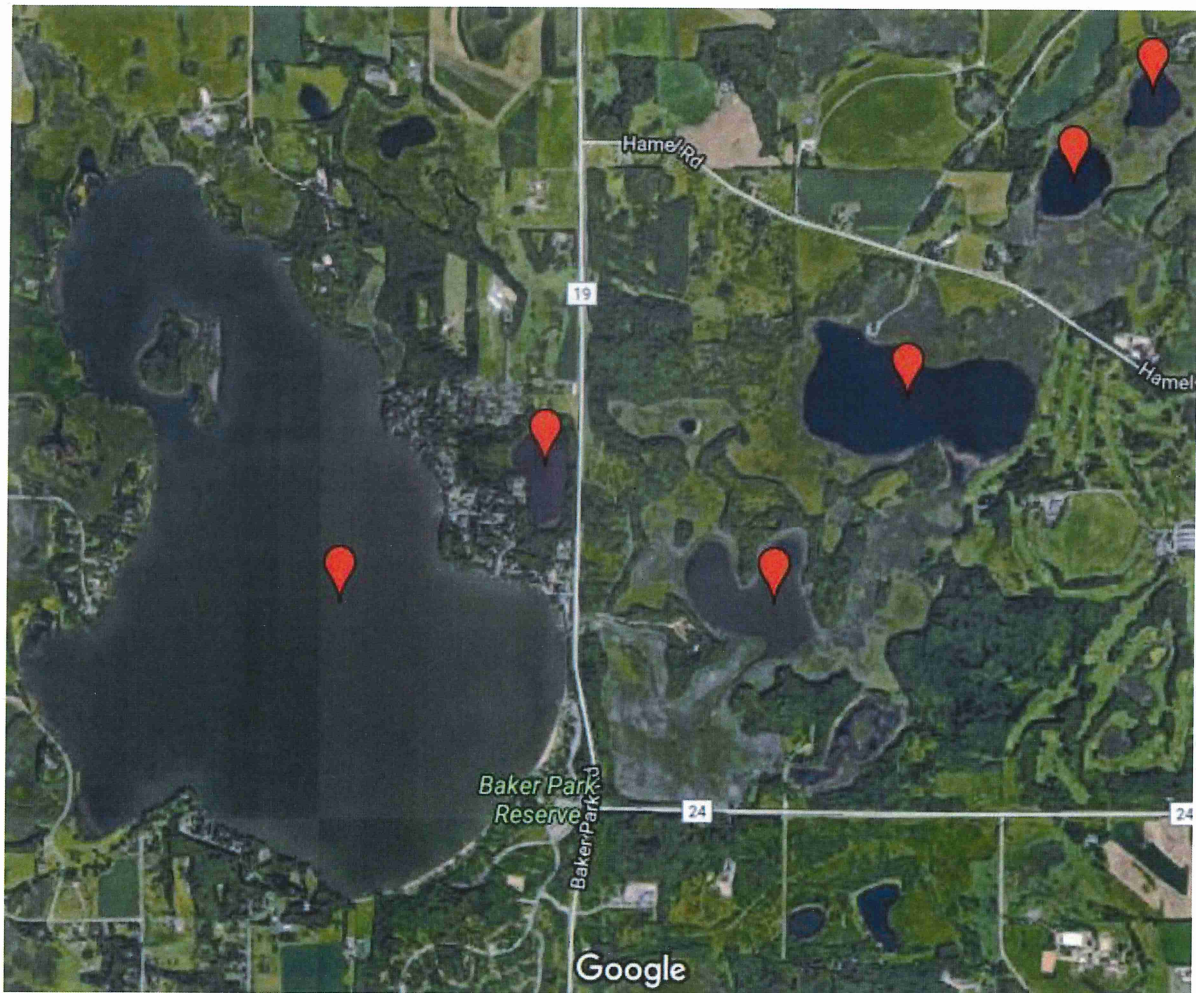


Figure 1: From left to right, Lake Independence, Ardmore, Half Moon, Spurzem, Winterhalter and Thomas.

Year One and Two Work Plan

Our project was broken into four tasks for year one and two: 1) estimate the population and biomass of carp in Ardmore and Spurzem, 2) implant radiotransmitters into 15 adult carp in Ardmore and 15 in Spurzem to assess the movement patterns of carp, 3) survey all lakes using small mesh trapnets targeting young of year (YOY) carp, and 4) construct an age structure of the carp population in Ardmore and Spurzem to determine historical recruitment patterns in each.

Task 1 Methods and Results: Population and Biomass Estimates in lakes Ardmore and Spurzem

A population estimate was conducted in Ardmore in both 2015 and 2016 using a mark/recapture census. In 2015, we conducted a multiple census analysis in which the lake was censused on 17 different occasions each time catching, marking and releasing new carp and examining captured for marks from prior events (Appendix, Table A1). Most surveys were conducted using the box net (Fig. 2) while the last survey was conducted using angling (Appendix; Table A1). Using this approach, we estimated that the lake was inhabited by approximately 3,422 carp (mean weight of 0.36 kg). Using length structure (Fig. 3), we also estimated that there were approximately 170 large carp (5% of population; mean weight 3.9 kg). Altogether, the biomass of carp was estimated at 352 kg/ha. It should be noted that this estimate was challenging because it encompassed a relatively long period of time (6/18 – 9/3/15) and involved relatively small carp, whose mortality rates are often relatively high. Also, the number of large carp in the lake could not be estimated using mark recapture and was estimated using length structure analysis, which is less reliable (Table A1).



Figure 2: A box net (with the walls raised) used to catch carp that are attracted at night to bait placed in the center of the net (photo: Anita Jader).

The 2016 estimate in Ardmore was conducted using slightly different approach. A box net was used to mark and release 466 carp (most were marked on one day), and angling was then used on one day to determine recapture rates. A total of 84 carp were sampled using angling, including 35 recaptures. These numbers allowed us to estimate the population using a single census analysis (Chapman estimator) where N is number in the population, C is the number captured on the second visit, M is the number marked on the initial visits, R is the number recaptured on the angling visit:

$$N = \frac{(C+1) \cdot (M+1)}{(R+1)} - 1$$

Using the numbers of marked (466) and captured (84) and recaptured (35) carp we estimated that Lake Ardmore was inhabited by approximately 11,02 carp in 2016. This number included only carp <500 mm, because only those carp were marked and recaptured. Just like in 2015, we estimated the number of large carp in Ardmore (carp > 500 mm; mean weight 0.78 kg) using length structure, which suggested that additional 61 large carp (mean weight 3.8 kg) were present in the lake. Altogether, the biomass of carp in Ardmore in 2016 was 205 kg/ha.

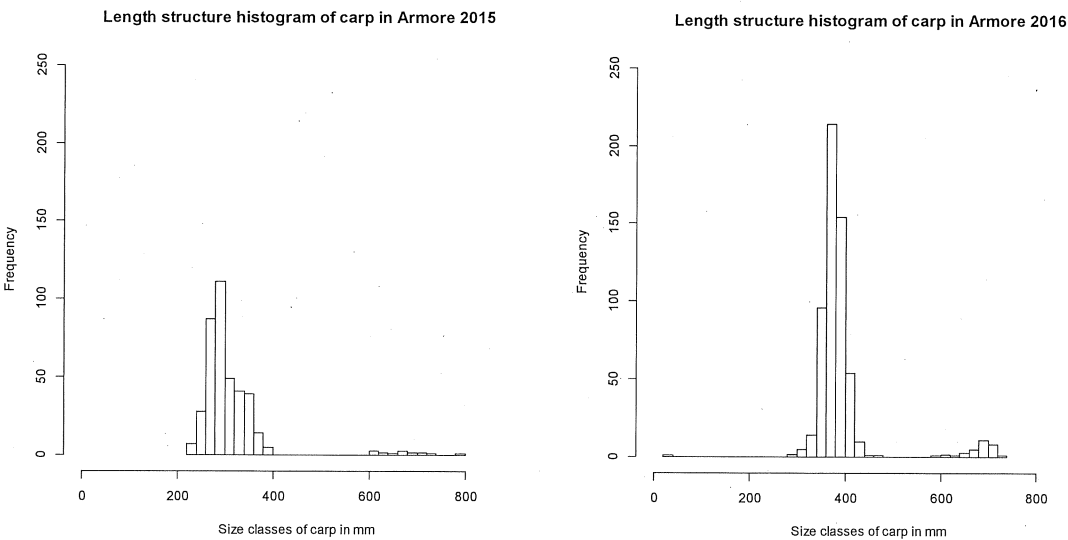


Figure 3: Length structure of carp in Ardmore Lake in 2015 and 2016.

We found that Spurzem lake was not suitable to conduct mark and recapture analysis due to its high density of vegetation and low catch rates using box nets, thus we used boat electrofishing surveys to estimate population of carp in Spurzem based on an equation published by Bajer and Sorensen in 2012: $y = 4.71x + 3.04$; where y is the estimated number of carp per hectare of the lake and x is the number of carp caught per one hour of boat electrofishing. In total, we completed 18 approximately 30 min transects on three separate occasions to determine mean catch per unit of effort (CPUE; carp/h) (Table 1). The mean CPUE was 3.67 (Table 1) and the mean carp weight was 4.55 kg (Fig. 4) suggesting that carp biomass in Spurzem was approximately 92 kg/ha.

Table 1: Results of boat electrofishing surveys in Spurzem in 2016. CPUE is catch per unit of effort (carp/h).

Spurzem 2016		Transect minute	seconds	catch	CPUE
8/1/2016	1	30	1	3	6.00
8/1/2016	2	60	0	2	2.00
8/1/2016	3	17	35	3	10.24
8/1/2016	4	20	35	3	8.74
8/1/2016	5	17	55	1	3.35
8/1/2016	6	14	35	0	0.00
8/1/2016	7	15	5	1	3.98
8/4/2016	8	20	30	0	0.00
8/4/2016	9	16	10	0	0.00
8/4/2016	10	20	0	0	0.00
8/4/2016	11	10	6	3	17.82
8/4/2016	12	16	50	0	0.00
8/4/2016	13	32	23	3	5.56
8/4/2016	14	30	0	2	4.00
8/10/2016	15	30	3	0	0.00
8/10/2016	16	30	0	2	4.00
8/10/2016	17	25	2	4	9.59
8/10/2016	18	35	0	0	0.00
Mean					3.67

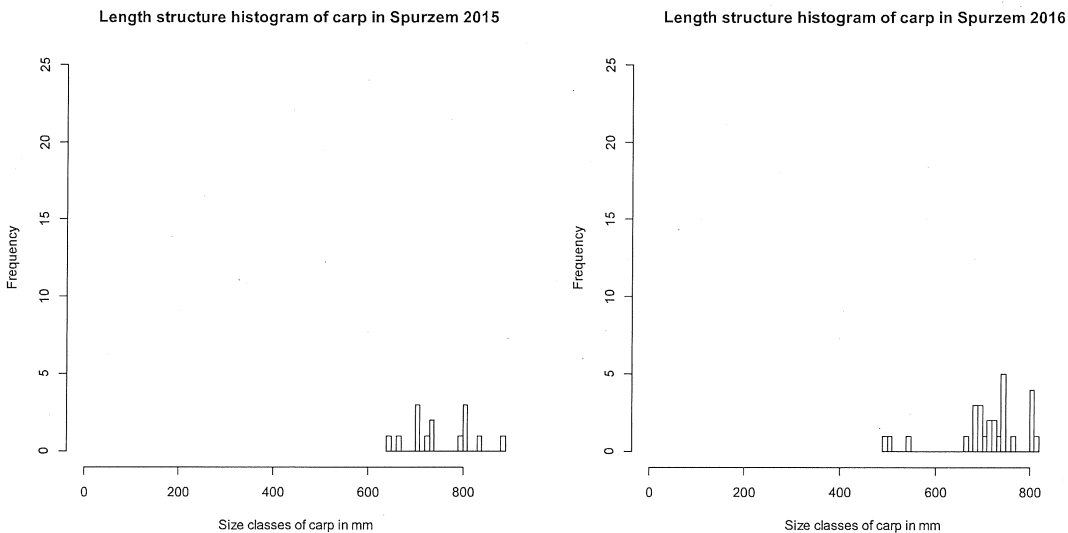


Figure 4: Length structure of carp in Spurzem Lake in 2015 and 2016.

In addition, one day of boat electrofishing was done on Thomas and Winterhalter lakes as well. These two lakes are connected by a boatable channel most of the year. The combined mean CPUE for these lakes was 2.09 carp/hour, mean weight was 5.56 kg, and the biomass estimate was approximately 70 kg/ha.

In summary, carp biomass exceeded the management threshold of 100 kg/ha in Ardmore, both in 2015 and 2016. The biomass did not exceed this threshold in Spurzem, Thomas or Winterhalter.

Task 2 Methods and Results: Document movements patterns of common carp captured in lakes Ardmore and Spurzem to determine the extent of carp migrations throughout the Lake Independence system

In 2015, we captured 15 adult carp in Ardmore using box nets and open commercial seining and implanted them with radiotransmitters (table A2). In Spurzem, we used an electrofishing boat to capture 15 adult carp and also implanted them with radiotransmitters (Table A2). Initial tracking sessions indicated only one mortality after the surgeries. After initial training, TRPD staff conducted all subsequent tracking sessions. These tags will allow TRPD to collect telemetry data for 3+ years. Fish lengths and radiotransmitter frequencies can be found in the

appendices. Initial data indicated that adult carp can and do periodically move between Ardmore and Independence during high water events.

Task 3 Methods and Results: Document recruitment sites (carp nurseries) within Lake Independence system

In both 2015 and 2016, we deployed small mesh trap nets in the fall targeting young of year (YOY). High catch rates of YOY carp identify a lake as a carp nursery. Up to five of these nets were set overnight and checked the following day in each location depending on the size of the waterbody. All fish captured were measured and released. No YOY carp were captured during these surveys, indicating that the recruitment is very low or not at all among these lakes in 2015 and 2016 (Table 2).

Table 2: Results of trap net surveys in 2015 and 2016.

Species	Ardmore		Spurzem		Half Moon		Thomas		Winterhalter	
	2015	2016	2015	2016	2015	2016	2015	2016	2015	2016
Black Bullhead	0	0.2	0.5	0.2	0	0	0	1.8	0	2
Black Crappie	41	9.4	14.5	2.4	1	3.5	3.3	14	3.25	1
Bluegill	78.6	82.6	8	55.2	49	31	25.6	60.4	13.25	43.5
Bowfin	0	0	0	0.4	0	0	0	0	0.5	0
Brown Bullhead	0.2	0	0	0	0	0	0	0	0	0
Bigmouth Buffalo	0.4	0	0	0	0	0	0	0	0	0
Common Carp (adult)	0.8	0	0	0	0	0	0	0	0	0
Common Carp (YOY)	0	0	0	0	0	0	0	0	0	0
Green Sunfish	0.4	0.2	0	0	0	1	0	0.2	0	0.25
Largemouth Bass	0.6	0.6	1.5	0.2	1.5	0	0.3	0	0	0
Northern Pike	0	0	0	0	0	0	0	0.2	0.25	0.25
Pumpkinseed	2.4	7.8	8.5	19	16	20.5	7	19.2	5.5	17.5
Yellow Bullhead	3.4	1.8	14	6.6	0	2.5	0.3	8.2	0	5.5
Yellow Perch	0	0	1.5	0	0	0	0	0	0	0

Task 4 Methods and Results: Age structure of common carp in lakes Ardmore and Spurzem

During the recapture angling event in Ardmore in 2015 and 2016 referenced in task 1, the carp were euthanized and their otoliths were removed. In addition, all carp captured during electrofishing surveys in Spurzem in 2016 were also kept for ageing. When cross-sectioned and observed under a microscope, otoliths show growth checks like tree rings. These checks correspond to each year of growth and their sum indicates the carp's age (Fig. 5).

By plotting the aggregate age structure, we examined recruitment history patterns in each lake. The population of carp in Ardmore was dominated by the 2014 year class (Fig. 6), with several other year classes being present in very low numbers. In Spurzem, no strong recruitment events were detected in recent years and the population was dominated by the 2000-2003 year classes (Fig. 6).



Figure 5: A cross-sectioned otolith under a microscope.

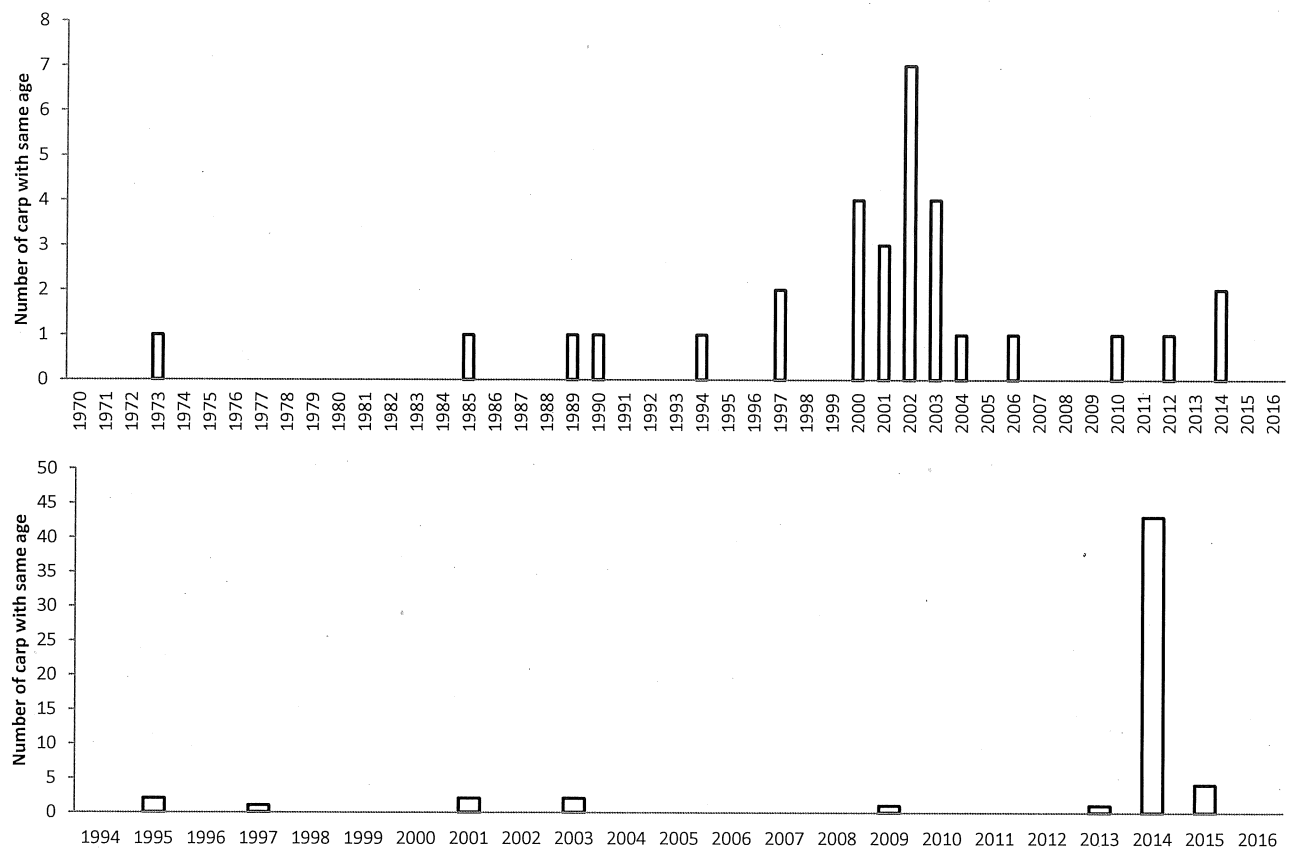


Figure 6: Common carp age structure in lakes Spurzem (top) and Ardmore (bottom). Shown are years in which carp were born.

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Appendices

Table A1. Multiple-census mark-recapture estimate of carp population in Ardmore in 2015. This estimate only includes carp < 500 mm.

Date	Ct- Captured	Ut - Marked and released	Mt - total marked to date	Rt - recaptures	Ct*Mt
6/18/15	16	16	0	0	0
6/20/15	4	4	16	0	64
6/21/15	22	22	20	0	440
6/23/15	14	13	42	1	588
6/24/15	25	24	55	1	1375
6/25/15	21	21	79	0	1659
6/26/15	14	14	100	0	1400
27-Jun	60	58	114	2	6840
6/28/15	28	25	172	3	4816
7/1/15	9	9	197	0	1773
7/2/15	14	14	206	0	2884
7/3/15	25	25	220	0	5500
7/7/15	16	0	245	4	3920
7/16/15	14	0	245	0	3430
8/9/15	52	0	245	3	12740
8/27/15	4	0	245	0	980
9/3/15	96	0	245	6	23520

Schnabel estimate carp < 450 mm = 3425

Length frequency estimate carp > 500 mm (5% population) = 171

biomass of small carp 0.36 kg	1233.068571
biomass of large carp 3.9 kg	627.0364286
overall biomass kg	1860.105
Ardmore (kg/ha); size = 5.2 ha	357.7125

Table A2. Radiotransmitters implanted in lakes Admore and Spurzem.

Date	Lake	Length	Radio Frequency
6/12/2015	Ardmore	630	48101
6/12/2015	Ardmore	650	48111
6/12/2015	Ardmore	710	48151
7/7/2015	Ardmore	694	48031
7/7/2015	Ardmore	602	48071
7/7/2015	Ardmore	682	48121
7/7/2015	Ardmore	665	48091
7/7/2015	Ardmore	616	48041
7/7/2015	Ardmore	738	48131
7/7/2015	Ardmore	635	48051
7/7/2015	Ardmore	608	48191
7/7/2015	Ardmore	800	48082
7/7/2015	Ardmore	678	48201
7/7/2015	Ardmore	670	48171
7/7/2015	Ardmore	711	48011
10/6/2015	Spurzem	805	48421
10/6/2015	Spurzem	840	48351
10/6/2015	Spurzem	642	48261
10/6/2015	Spurzem	733	48270
10/6/2015	Spurzem	794	48371
10/6/2015	Spurzem	740	48301
10/6/2015	Spurzem	730	48221
10/6/2015	Spurzem	802	48451
10/6/2015	Spurzem	886	48411
10/6/2015	Spurzem	705	48361
10/6/2015	Spurzem	705	48211
10/6/2015	Spurzem	662	48281
10/6/2015	Spurzem	810	48051
10/6/2015	Spurzem	708	48237
10/6/2015	Spurzem		48341



Carp abundance estimate in Lake Independence and monitoring of carp movement using PIT antenna systems

Prepared for the Three Rivers Park District
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Prepared by: Carp Solutions LLC
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January 28, 2019

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Summary

In this report, we summarize work conducted during May 7, 2018 - January 28, 2019. Our goals were to estimate carp abundance in Lake Independence and determine major spawning migration routes of carp from Lake Independence into adjacent lakes. We used boat electrofishing surveys to estimate carp abundance and biomass in Lake Independence. These surveys suggested that Lake Independence was inhabited by approximately 9,000 carp whose biomass was 114 kg/ha and slightly exceeded the management threshold of 100 kg/ha. We also conducted a boat electrofishing survey in Ardmore Lake (one of the small interconnected lakes), where carp abundance was ~ 1,000 individuals and biomass was 383 kg/ha. All carp captured during electrofishing surveys in Independence (N=88) and Ardmore (N= 61) were implanted with passive integrated transponder (PIT) tags and released to monitor their movement. We then installed PIT antennas designed to detect the passage of PIT-tagged carp at all major inlets to and outlets from Lake Independence: 2 inlets (from Ardmore Lake and from Spurzem Chain) and one major outlet towards Ox Yoke Lake. The PIT data showed that most of the carp from Lake Independence migrated downstream towards Ox Yoke Lake (33 of 88 carp), some were also moving to Lake Ardmore 4/88. Only one carp moved towards the Spurzem Chain of Lakes.

Background

Lake Independence is a large (surface area 830 acres) and relatively deep (max depth 58 feet) lake located in south west Twin Cities Metro area. Lake Independence has two main inlets: Ardmore Creek from the north and Spurzem Creek from north east, and one major outlet Pioneer Creek which flows south-west towards two shallow lakes/marshes: Ox Yoke and Rice (Figure 1). Although carp have been studied in Lake Ardmore and in the Spurzem Chain of Lakes (lakes Half Moon, Spurzem, Thomas and Winterhalter), little is known about the carp population in Lake Independence. Observations from residents and Three Rivers Park District staff noted aggregations of carp around inlets to and outlets (culverts, for example) from Lake Independence. It was unknown the proportion of the Lake Independence population those aggregations represent or how passages through those creeks and streams compare. The peripheral lakes likely serve at times as nursery habitats, with adult carp using the creeks and streams to gain access to these areas to spawn in the spring. Furthermore, winterkills have been noted in these peripheral lakes making them likely sources of strong year classes of carp recruitment. A better understanding of the movement patterns would help to manage waterways the carp use in during spawning migrations.

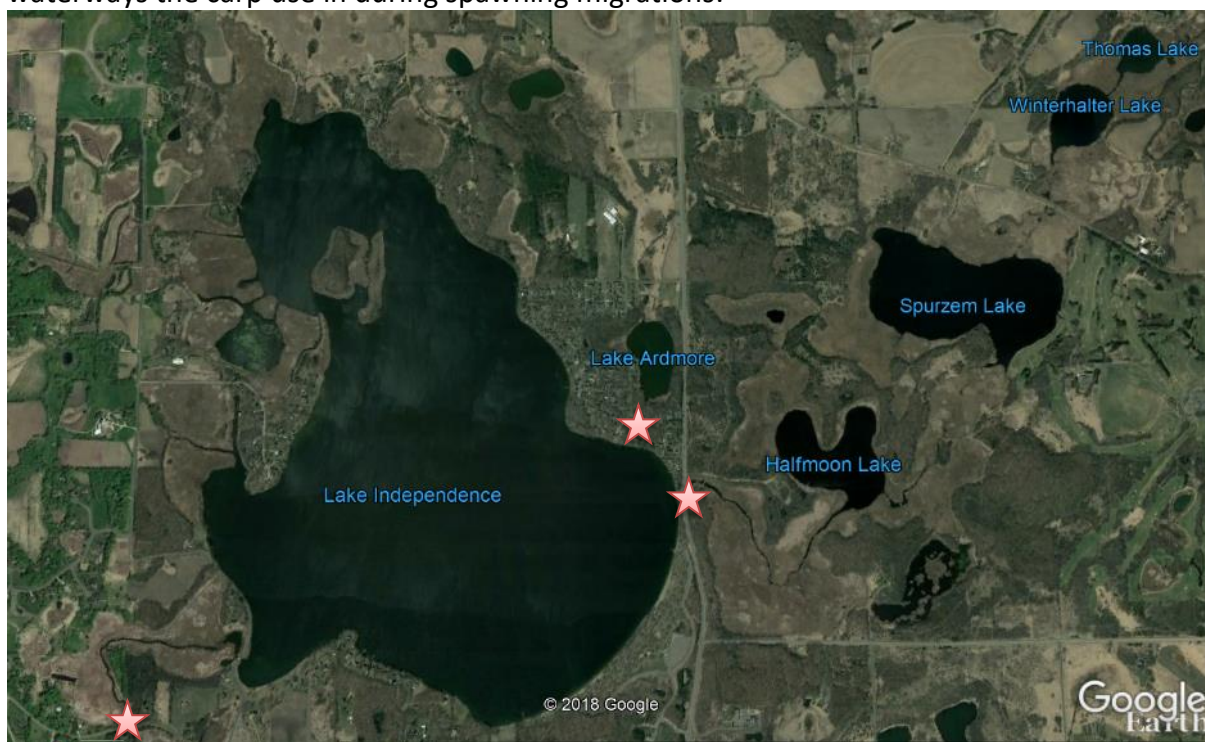


Figure 1: Lake Independence and some of the peripheral lakes that are connected to it at least periodically allowing for open fish passage. Stars indicate locations of PIT antennas in 2018.

Task 1: Carp population and biomass estimate within Lake Independence

Rationale and Methods

We conducted carp population abundance and biomass estimate for Lake Independence to determine if the biomass exceeds the management threshold of 100 kg/h (Bajer et al. 2009). We used boat electrofishing surveys to estimate the catch per unit effort (CPUE), which we then used to estimate carp abundance and biomass using established equations (Bajer et al. 2012; Claus et al. unpublished). Carp captured during those surveys were also implanted with PIT tags to facilitate carp movement analyses (Task 2 below). Overall, we conducted at least four random surveys (transects) on 5 different days (24 transects total) in Lake Independence. Each transect lasted 60 minutes (10 minutes of boat travel to transect location, 20 minutes of active electrofishing, 20 minutes of boat maneuvering, and 10 minutes to measure the carp). It was important that these transects were conducted on separate days as carp catch rates might be influenced by the weather. At the completion of each transect, all captured carp were implanted with a PIT tag and released.

In addition, we conducted one day of electrofishing in Lake Ardmore to generate a follow-up assessment of the population (in relation to our prior carp assessments in that system) as well as implanting carp with PIT tags. This sub-task was added due to the importance of prior work on Ardmore and the potential for a restructuring of the Ardmore Creek in the near future to install a carp barrier.

Results

A total of 88 common carp were captured during the electrofishing surveys in Lake Independence (Table 1). The carp ranged from approximately 400-900 mm in length (Figure 2). The mean weight was 4.4 kg. The mean CPUE was 5.87 carp/hour (we removed one transect from the analysis because a large group of carp were aggregating at an inlet and the catch rate was exceptionally high; 40 per transect; Table 1). The mean CPUE suggests that Lake Independence was inhabited by approximately 9,000 carp whose biomass was 114 kg/ha (Table 2). All 88 captured carp were implanted with PIT tags and released.

A total of 61 carp were captured during the one day of boat electrofishing surveys in Ardmore (Table 1). These fish ranged in length from approximately 400 to 800 mm (Figure 3) and their mean weight was 2.0 kg. The mean CPUE was 45.76 carp/hour, which suggests that Ardmore was inhabited by approximately 1,030 carp whose biomass was 383 kg/ha (Table 2). All of the 61 captured carp were implanted with PIT tags and released.

Table 1: Raw CPUE data for electrofishing surveys on Independence and Ardmore. *omitted from population estimate calculations

LAKE	DATE	TRANSECT NO.	MIN	CATCH	TRANSECT CPUE
INDEPENDENCE	5/7/2018	1	20	0	0.0
INDEPENDENCE	5/7/2018	2	20	5	15.0
INDEPENDENCE	5/7/2018	3	20	0	0.0
INDEPENDENCE	5/7/2018	4	20	0	0.0
INDEPENDENCE	5/15/2018	1	20	2	6.0
INDEPENDENCE	5/15/2018	2	20	0	0.0
INDEPENDENCE	5/15/2018	3	20	1	3.0
INDEPENDENCE	5/15/2018	4	20	0	0.0
INDEPENDENCE	5/15/2018	5	20	2	6.0
INDEPENDENCE	5/15/2018	6	30	1	2.0
INDEPENDENCE	5/16/2018	1	20	2	6.0
INDEPENDENCE	5/16/2018	2	21	3	8.6
INDEPENDENCE	5/16/2018	3	20	0	0.0
INDEPENDENCE	5/16/2018	4	20	1	3.0
INDEPENDENCE	5/16/2018	5	20	1	3.0
INDEPENDENCE	5/18/2018	1	22	1	2.7
INDEPENDENCE	5/18/2018	2	10	40	*240.0
INDEPENDENCE	5/18/2018	3	20	1	3.0
INDEPENDENCE	5/18/2018	4	20	2	6.0
INDEPENDENCE	5/18/2018	5	10	1	6.0
INDEPENDENCE	6/25/2018	1	20	2	6.0
INDEPENDENCE	6/25/2018	2	20	5	15.0
INDEPENDENCE	6/25/2018	3	20	2	6.0
INDEPENDENCE	6/25/2018	4	32	16	30.0
ARDMORE	7/2/2018	1	20	21	63
ARDMORE	7/2/2018	2	20	9	27
ARDMORE	7/2/2018	3	20	20	60
ARDMORE	7/2/2018	4	20	11	33

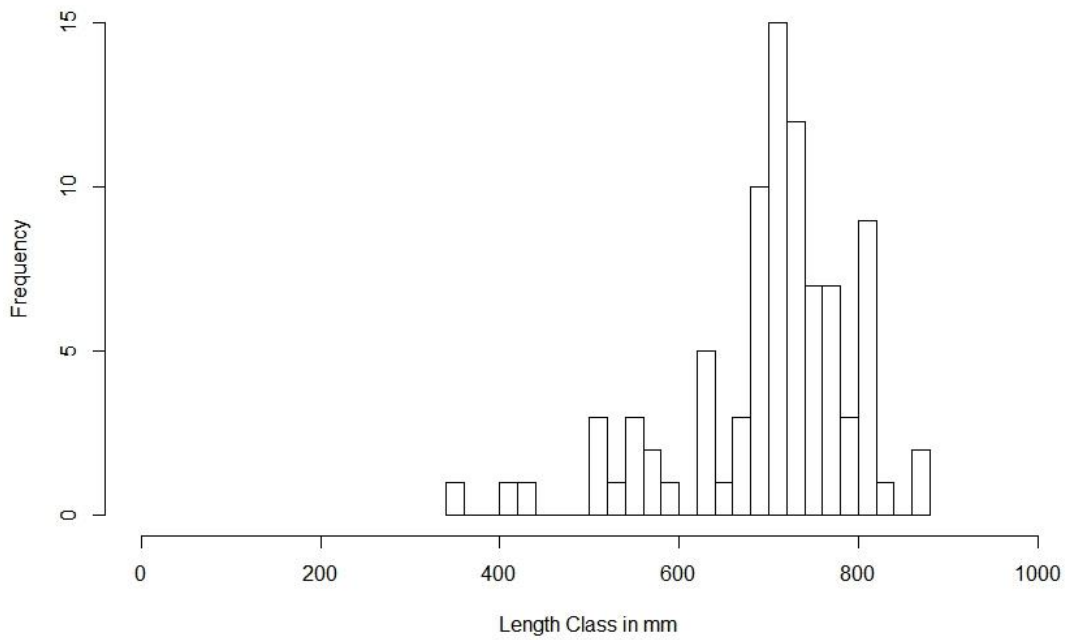


Figure 2. Length distribution of common carp captured during electrofishing surveys on Lake Independence (n=88).

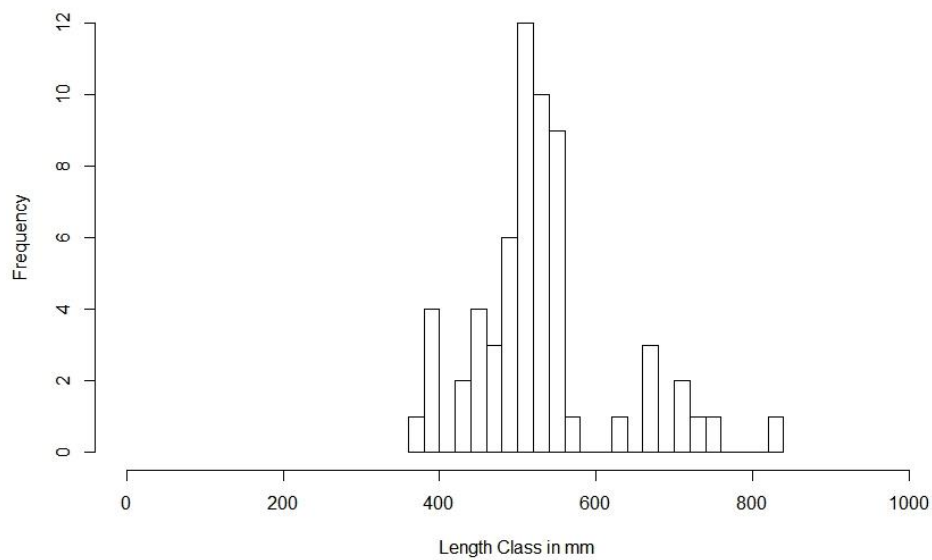


Figure 3. Length distribution of common carp captured during electrofishing surveys on Ardmore Lake (n=61).

Table 2: Summary table for the carp population in Lake Independence and Ardmore.

Lake	Ave. length (mm)	Ave. Weight (kg)	Lake area (ha)	Population	Biomass (kg/ha)
Independence	700	4.4	337	9,032	113.6
Ardmore	529	2.0	5.4	1,030	383.3

Task 2: Construction and installation of PIT antenna system and systems maintenance

Rationale and Methods

Antenna systems, like the one displayed in Figure 4, capable of detecting carp implanted with microtransmitter PIT tags (~ 12 mm in length, 3 mm in diameter) were positioned around culverts in three locations: within Ardmore Creek, at the culvert leading under Highway 19, and near the culvert at Pagenkopf Avenue near the southwest outlet of Independence (Figure 1) in order to monitor carp passage between the lakes. The data gathered by those antennas will determine if future barrier(s) is/are needed to block the movement of carp.



Figure 4: PIT antenna station installed near a potential carp migration route.

Results

Ardmore Creek Site PIT detections as of 1/24/19

There have been 7 tagged common carp detected at this site since installation in spring 2018 (Figure 5). Four of these carp were tagged in Lake Independence and were moving upstream to Ardmore Lake on 5/29 and 5/30/18. Three of these carp were tagged in Ardmore Lake on 7/2/18 and were moving downstream to Lake Independence on the same day.

This site (solar powered) has suffered daily power loss ranging from 4-8 hours late at night through dawn due to poor solar exposure. One week after installation, we doubled the area of solar panels (~\$200) and invested in extra equipment (~\$1000) that allowed the panels to be moved farther away from the PIT system in an attempt to remedy the problem, but this was unsuccessful. This system should be moved to a spot with open southern solar exposure for 2019 season or connected to permanent power from a nearby resident.

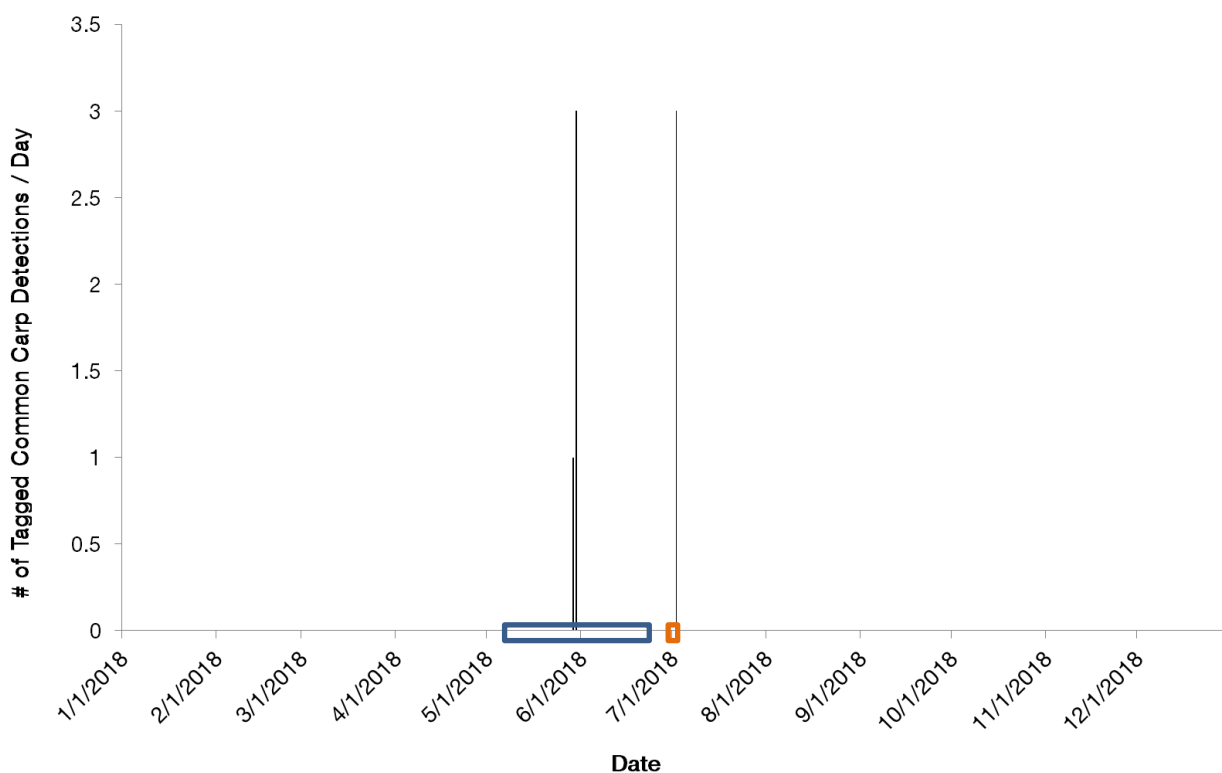


Figure 5. Number of tagged carp detected at Ardmore Creek site. Blue box indicates the tagging period in Independence, and the orange indicates the tagging period in Ardmore

Highway 19 Site PIT Detections as of 1/24/19

There has only been a single common carp detected at this site (tagged in Lake Independence), moving upstream towards Half Moon Lake on 6/21/18. Interestingly, this fish was also the tagged carp that moved upstream to Ardmore Lake on 5/29/18. This site has not suffered power loss since installation.

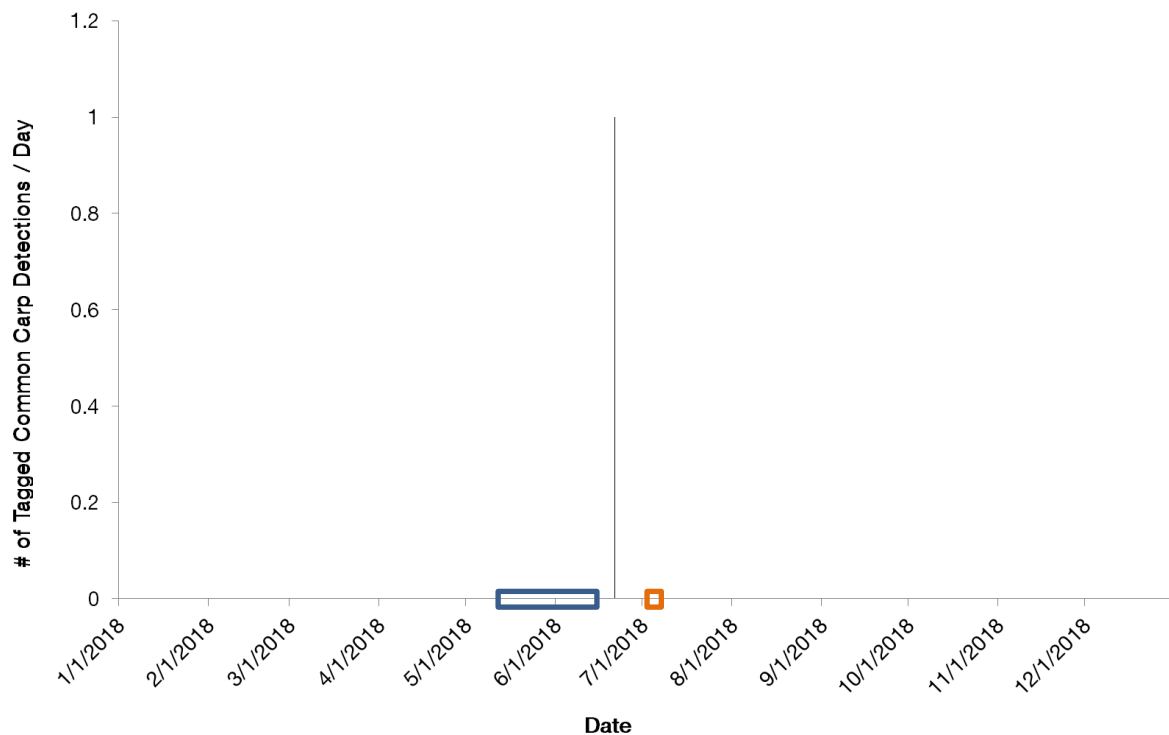


Figure 6. Number of tagged carp detected by day at Highway 19 site. Blue box indicates the tagging period in Independence, and the orange indicates the tagging period in Ardmore

Pagenkopf Ave Site PIT Detections as of 1/24/19

There were 33 tagged carp detected at this site in May and June of 2018, all of which were tagged in Lake Independence (Figure 7). These fish were moving downstream likely to spawn.

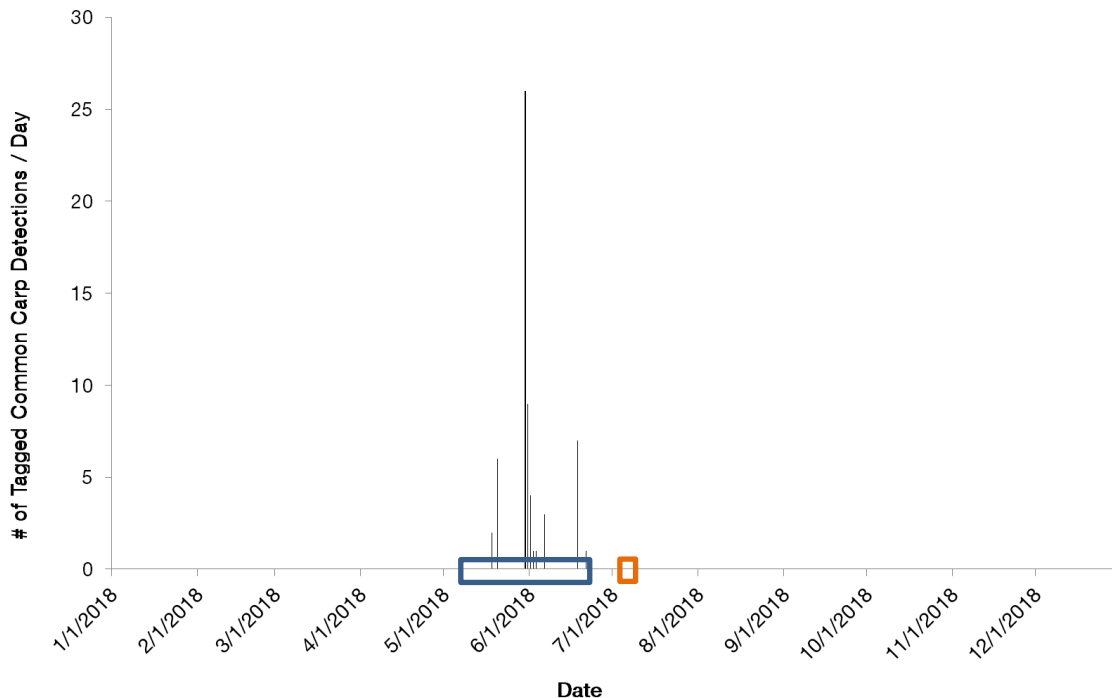


Figure 7. Number of tagged carp detected by day at Pagenkopf Ave site. Blue box indicates the tagging period in Independence, and the orange indicates the tagging period in Ardmore

Conclusions and Management Recommendations

- The biomass of carp in Lake Independence (114 kg/ha) appears to be slightly exceeding the management threshold of 100 kg/ha (Bajer et al. 2009). Our estimates are somewhat tentative because electrofishing surveys occurred during spring when carp were migrating to spawn.
- The biomass of carp in Lake Ardmore (383 kg/ha) exceeds the management threshold by nearly 4 folds. This is probably driven by carp migrations between Lake Independence and Ardmore. A barrier placed between Lake Independence and Ardmore might be needed to sustainably manage carp in Ardmore via physical removal. Notably, there was no evidence of recent recruitment in Ardmore as all collected carp were large.
- Surprisingly, PIT data suggests that the main spawning migration route is downstream, most likely towards lakes Ox Yoke and Rice. The migration to Ardmore also appears to be significant (and may be underestimated due to PIT system shut downs at night).

Currently, it doesn't appear many carp are moving out of Independence into the Spurzem Creek chain via Highway 19 culvert.

- We recommend that PIT antennas are maintained through 2019 to monitor the natural movement of carp (undisturbed by tagging). Also, adding more PIT tags would be beneficial, but even with the current sample size, it is clear that many carp migrate in and out of Lake Independence. Surveys of lakes Ox Yoke and Rice are also recommended (late summer surveys with trapnets) to determine if these systems function as carp nurseries. If YOY are present, some of them should also be implanted with PIT tags.
- Overall, the PIT systems performed very well, except for the Ardmore site. That system needs to be moved to a more exposed spot.
- If data collected by PIT antennas in 2019 verifies that carp move primarily towards Ox Yoke and Ardmore, strategic use of barriers should be considered at those locations to block the carp, or block and remove them.

References

Bajer, P. G. and P. W. Sorensen (2012). "Using Boat Electrofishing to Estimate the Abundance of Invasive Common Carp in Small Midwestern Lakes." *North American Journal of Fisheries Management* 32(5): 817-822.

Bajer, P. G., Sullivan, G., & Sorensen, P. W. (2009). Effects of a rapidly increasing population of common carp on vegetative cover and waterfowl in a recently restored Midwestern shallow lake. *Hydrobiologia*, 632(1), 235-245.



2019 Three Rivers Park District Carp Monitoring Report

Carp Biomass Assessment in Lake Independence

Carp Movement & Nursery Location Monitoring

Prepared for Three Rivers Park District (TRPD)

Prepared by: Carp Solutions LLC

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Summary

This report summarizes carp monitoring work completed by Carp Solutions in 2019. The main objectives in 2019 were to gather an updated carp biomass estimate in Lake Independence using electrofishing surveys, and monitor carp movement to potential nursery locations using PIT antennas setup at three locations in the watershed. Five different electrofishing surveys were completed on Independence between July and September, with average carp biomass density from each survey ranging from 72 kg/ha to 308 kg/ha, and an average of the five surveys of 142 kg/ha. It would appear the carp population in Independence is slightly above the ecologically damaging threshold of 100 kg/ha. There is a strong potential for the population to increase given carp movement to peripheral shallow lakes which could be serving as carp nurseries. To monitor and quantify this carp movement, between work completed in 2018 and additional carp implanted with PIT tags in 2019, a total of 205 carp were implanted with PIT tags in the watershed. Of the 205 PIT tagged carp, 60 were implanted in Ardmore Lake in 2018 (although 15 PIT tagged carp were confirmed dead from a winterkill event during the winter of 2018-2019), 88 were implanted in Independence in 2018 and 57 were implanted in Independence in 2019. PIT antennas were in place at three locations: Hwy 19 crossing over Spurzem Creek, Pagenkopf Road crossing over Pioneer Creek, and Ardmore Creek. Carp movement was minimal at the Hwy 19 Spurzem Creek location, with only one carp detected at this antenna in June 2019. Carp movement was greater at the other two locations, with 18 carp detected at the Ardmore Creek antenna, with most of those being detected in April 2019 moving towards Ardmore. At the Pioneer Creek antenna at Pagenkopf Road, 36 carp were detected moving towards Ox Yoke Lake and Rice Lake, likely to spawn. This carp movement study verifies that carp are moving in large numbers in the spring through Pioneer Creek and Ardmore Creek, likely to shallow lakes to spawn. Carp Solutions recommends a strategic use of barriers at these connections to block carp movement, or block and remove carp. Once carp

movement to these spawning locations is prevented, carp removal may be warranted in Independence to attempt to lower the population below the 100 kg/ha ecologically damaging threshold. Removal at the barriers each spring could be a very cost-effective method to remove carp each year. Removal with Carp Solution's baited box-net trapping system could also be deployed in Independence as another removal technique.

Results

Objective 1: Carp population and biomass estimate within Lake Independence

Carp Solutions completed five boat electrofishing surveys in Lake Independence on separate days between July and September 2019 to estimate the carp population. Surveys were conducted on July 12, July 23, August 30, September 6 and September 13 following standard boat electrofishing methods described in Bajer et al. 2012. During each survey, we completed four 20-minute transects at different locations in the lake. A total of 54 carp were captured during the five surveys, all were measured and implanted with a PIT tag, and released. Table 1 details the results from each transect from each survey and identifies the transect numbers which correspond to Figure 1, which shows locations for all the transects. The number of carp caught varied among the transects and survey dates, although carp did seem to be caught from all areas of the lake. From each survey, a CPUE was determined and converted to a biomass density in kg/ha. Biomass density from each survey date ranged from 72 kg/ha to 308 kg/ha, with an average biomass density of the five surveys of 142 kg/ha. Table 2 provides a summary of carp population data from the surveys.

Table 1: Data from 2019 boat electrofishing surveys. Color coded transect locations correspond to the map in figure 1. Transect CPUE is in carp caught per hour (each transect was 20 minutes long). All fish caught in these surveys were measured and the average weight was estimated from these lengths.

Date	Transect Location	Carp Caught	Transect CPUE	Mean Length (mm)	Mean estimated weight (kg)
7/12/2019	2	1	3	712	4.6
7/12/2019	5	0	0	NA	NA
7/12/2019	9	2	6	491	1.6
7/12/2019	6	6	18	600	2.8
7/23/2019	8	9	27	683	4.1
7/23/2019	9	5	15	625	3.2
7/23/2019	3	8	24	650	3.6
7/23/2019	2	1	3	642	3.4
8/30/2019	1	8	24	712	4.6
8/30/2019	4	0	0	NA	NA
8/30/2019	5	1	3	620	3.1
8/30/2019	9	0	0	NA	NA
9/6/2019	8	5	15	645	3.5
9/6/2019	9	0	0	NA	NA
9/6/2019	9	0	0	NA	NA
9/6/2019	4	2	6	546	2.2
9/13/2019	6	0	0	NA	NA
9/13/2019	9	0	0	NA	NA
9/13/2019	5	0	0	NA	NA
9/13/2019	4	6	18	611	3

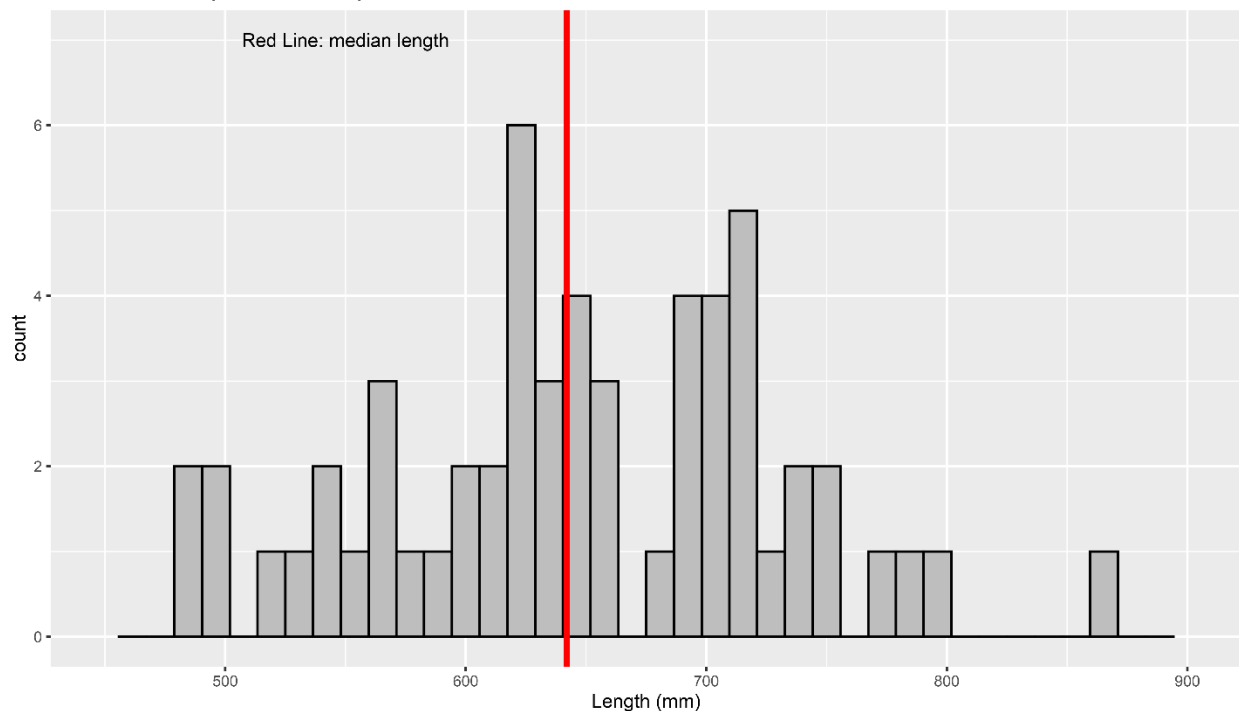
Figure 1: Map of Lake Independence showing the locations of electrofishing transects. The color coded transect numbers correspond to Table 1.



Table 2: Summary of carp population data from electrofishing surveys. Catch per unit effort (CPUE) is in units of carp caught per hour (each transect was 20 minutes long). All carp were measured, and the weight was estimated from that length. The carp population was estimated from the CPUE, along with the biomass density in kg of carp per hectare.

Date	Transects	Catch	CPUE	Average Length (mm)	Est. Weight (kg)	Carp Population Estimate	Biomass Density Estimate (kg/ha)
7/12/2019	4	9	6.75	588	2.7	11728	93.7
7/23/2019	4	23	17.25	657	3.7	28380	308.2
8/30/2019	4	9	6.75	702	4.4	11728	152.8
9/6/2019	4	7	5.25	616	3.1	9349	85.1
9/13/2019	4	6	4.5	611	3	8160	72.5
Total	20	54					
Average	4	10.8	8.1	635	3.4	13869	142.5

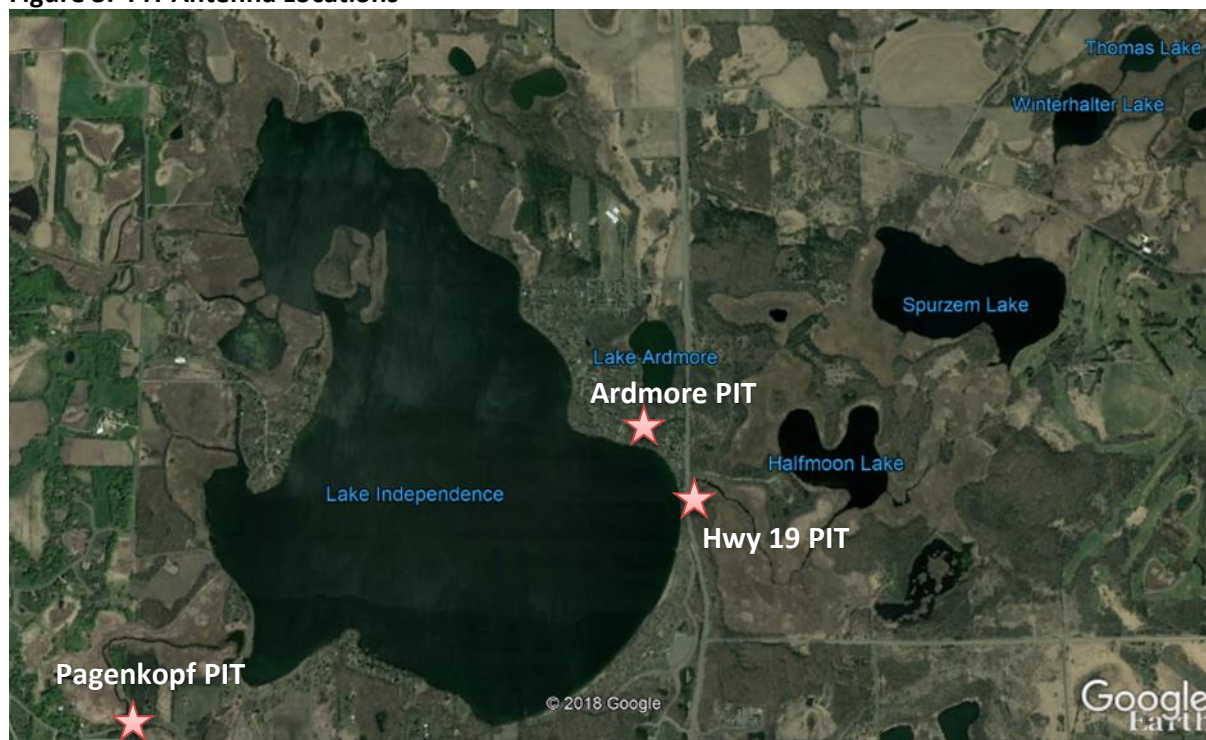
Figure 2: Size distribution of carp caught using boat electrofishing in 2019. Units are in millimeters.
2019 Lake Independence Carp Size Distribution



Objective 2 – Carp Movement Monitoring

Three PIT antennas were installed in the watershed in 2018 to begin tracking carp movement from Independence to connected shallow waterbodies that could be serving as carp nurseries. Carp Solutions maintained these antennas through February 2020, providing monthly data downloads at each site and maintaining the systems to ensure optimum read range of PIT tagged fish in the system. Figure 3 shows the location of the antennas. Antennas were placed in streams connecting Lake Independence to Ardmore Lake (Ardmore PIT), to Spurzem Chain of Lakes (Hwy 19) and a connection to Ox Yoke and Rice Lake (Pagenkopf). To monitor and quantify this carp movement, between work completed in 2018 and additional carp implanted with PIT tags in 2019, a total of 205 carp were implanted with PIT tags in the watershed. Of the 205 PIT tagged carp, 60 were implanted in Ardmore Lake in 2018, 88 were implanted in Independence in 2018 and 57 were implanted in Independence in 2019. During the winter of 2018-2019, TRPD staff observed a winterkill event in Ardmore Lake. TRPD staff proceeded to scan as many dead carp as they could for PIT tags and were able to confirm 15 dead PIT tagged carp. Appendix a provides a table with the PIT tag numbers and date and location of where the carp were captured and implanted with PIT tags. This table also identifies which tagged carp were found dead in Ardmore Lake during the 2018-2019 winter. The 15 dead Ardmore carp were all originally tagged in Ardmore Lake on July 2, 2018. The 15 dead PIT tagged carp represents 25% of the tagged carp in Ardmore, the remaining 45 PIT tagged carp could be alive or it's possible some of them also died. We discuss overall carp movement observations at each antenna location in the following pages. Appendix b also provides a more detailed list of all PIT tagged carp and detection dates at each antenna.

Figure 3. PIT Antenna Locations



Hwy 19 PIT Antenna

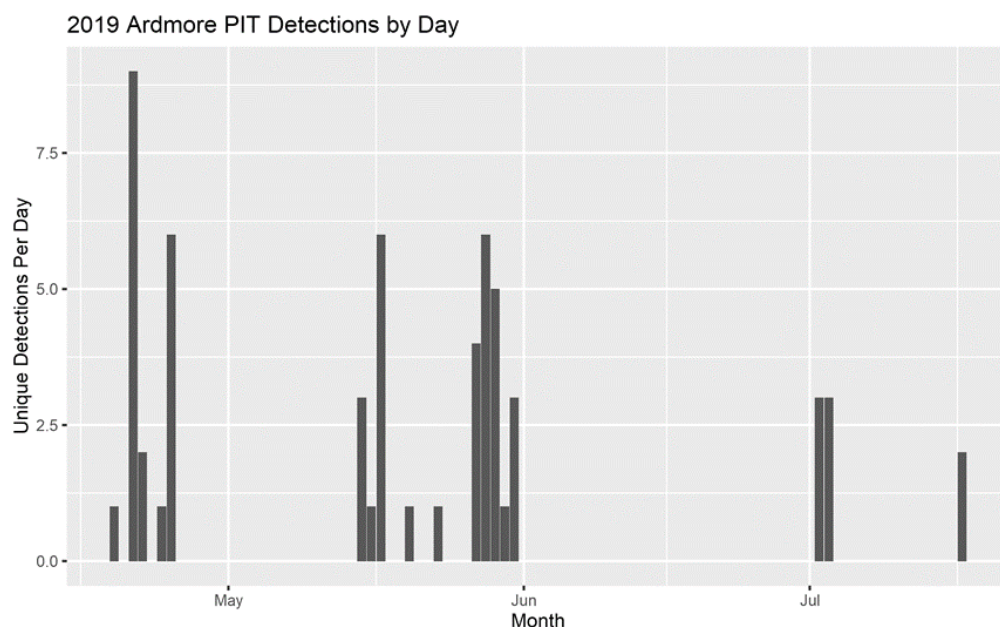
This antenna was located in Spurzem Creek at the Hwy 19 crossing and connects Lake Independence to the Spurzem Chain of Lakes. This site was slightly impacted this season due to high water levels and some power issues early on. It would appear from January 2019 to March 2019, there were power issues of the antenna at this site. These power issues were resolved in March and the site functioned well from March through July 2019. During the monthly check in August, we detected some malfunction with the PIT reader box at this location. The reader box was replaced on September 4, 2019 and the antenna has functioned well since then. These issues occurred sometime between our July 22nd visit to the system, which showed the system fully functional, and our August 30th visit to the system, in which we detected the issue. We are unsure how this malfunction impacted fish detections during that time period, as there was very limited carp movement at this system all year. Only one carp was detected at this antenna in 2019, which is similar to what was observed in 2018 as well. The one detection in 2019 occurred on June 5, 2019. This carp was originally tagged in Lake Independence in 2018. This tagged carp was also detected earlier in the year on May 30, 2019 at the Pagenkopf PIT antenna, suggesting this fish may have moved toward Ox Yoke or Rice Lake to spawn, and was moving back through Independence and through Spurzem Creek towards the Spurzem Chain of Lakes.

Ardmore PIT Antenna

This antenna was located in Ardmore Creek between Lake Independence and Ardmore Lake. There were power issues with this antenna in 2018 when the antenna was originally setup to run off solar power. On March 29, 2019, this antenna was moved to another location on the creek and connected to permanent power from a nearby resident. Since the relocation, this site has been fully functional with no power loss. In 2019, there 18 detections of tagged carp passing through this antenna between April 19, 2019 and July 17, 2019. 14 of those tagged carp were originally tagged in 2018 in Lake Independence. Of those 14 originally tagged in Independence, 13 of them were first detected at the antenna between April 21st and April 25th, 2019 presumably headed toward Ardmore Lake to spawn. In some cases, there were multiple detections during this time period as carp likely swam back and forth in the stream channel prior to heading into the lake. Most of those carp were again detected back at the antenna between May 15th and May 29th, presumably headed back towards Independence. The other 1 carp that was originally tagged in Independence wasn't detected at the antenna until May 20, 2019. A few of those carp were again detected in July, suggesting movement of fish between Independence and Ardmore can occur throughout the summer, however, most of the movement appears to occur in the spring aligning with timing for spawning migration. The other four carp detected at this antenna were originally tagged in Ardmore Lake in 2018. This suggests the winterkill event that occurred in Ardmore the winter of 2018-2019 was only a partial winterkill, and at least some of the PIT tagged carp survived. It's difficult to determine how this winterkill event effected the carp population in Ardmore, as noted in previous years reports, the carp population in Ardmore Lake can change substantially year to year with adult carp migration, juvenile recruitment and mortality. However, we know that at least a portion of the carp population survived the winterkill event, and that 4 of the carp originally tagged in

Ardmore Lake in July 2018 were detected at the Ardmore antenna in 2019. 3 of those carp were first detected at the antenna between April 19th and April 21st, and some returned late May. A couple of those carp were also detected in July, again suggesting there is carp movement between Independence and Ardmore throughout the season. One carp had multiple detections in late May, and then in July this carp was also detected at the Pagenkopf antenna and never returned to Ardmore. This suggests some carp may move between Ardmore, Independence and possibly down towards Ox Yoke and Rice Lake. It would appear the Ardmore Lake connection is an important site of carp recruitment for Lake Independence, and a barrier to block movement and potentially remove carp at the barrier would be warranted.

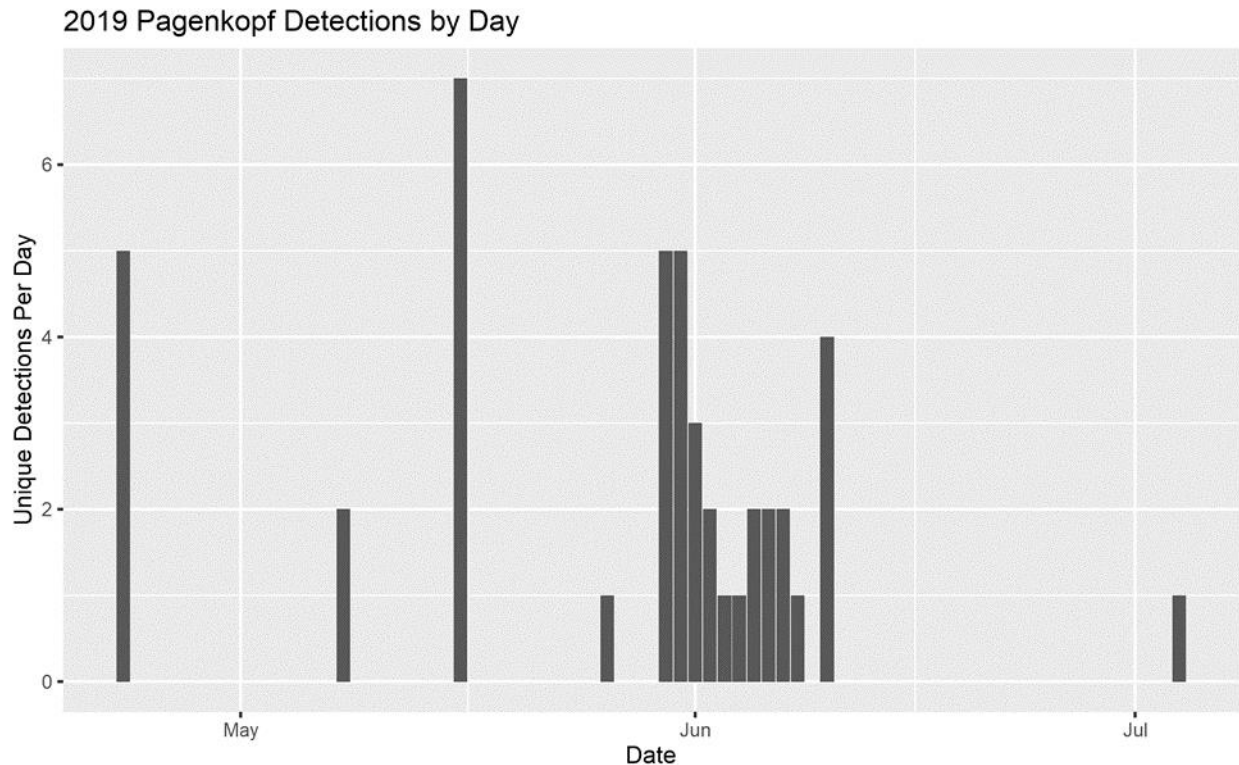
Figure 4. The number of carp detected at the Ardmore Creek site per day.



Pagenkopf PIT Antenna

This antenna was in place in Pioneer Creek, which connects Lake Independence to Ox Yoke and Rice Lake. The antenna located at the culvert at this location was replaced on May 3, 2019 to increase functionality, but this site operated without power loss all season and had good functionality the remainder of the season. There were 36 detections of tagged carp at this location between April 23, 2019 and July 4, 2019. All but one of these fish were originally tagged in Lake Independence. One fish was originally tagged in Ardmore Lake, and this also happened to be the only fish detected at this site in July (Figure 5). Detection dates at the Pagenkopf antenna varied more than the other antennas. Some carp were first detected in late April, others were first detected in May or June. Interestingly, only 8 of these carp were detected a second time at this antenna. It would appear carp from Lake Independence are frequently using this stream to move through Pioneer Creek, likely towards Ox Yoke or Rice Lake. Carp Solutions would recommend a barrier at this connection to prevent movement and limit carp recruitment in the system. This would also provide a good opportunity to remove carp as they move through the creek each spring.

Figure 5. The number of tagged common carp that were detected by day at the Pagenkopf Avenue site.



Carp Movement Study Conclusions:

The 2019 PIT data are similar to 2018. The carp appear to be moving out of Lake Independence in the direction of Ox Yoke and Rice Lakes past the Pagenkopf Avenue site, likely as part of a spawning migration. Similarly, carp are moving from Lake Independence into Ardmore Lake through Ardmore Creek. While the majority of movement occurs in the spring at both these locations, there is movement later in the season as well. The Highway 19 antenna has only detected one carp each year, therefore, it does not appear that there is a significant migration up Spurzem Creek. The data collected by the PIT antennas in 2018 and 2019 seasons verifies that the carp are moving out of Lake Independence into Pioneer Creek and Ardmore Creek. We recommend a strategic use of barriers to be considered at these locations. These barriers can be used to just block carp movement, or to block and remove. Removal in the creek during spawning migrations might be the most cost-effective method for carp management in the system.

Management Recommendations

Carp Solutions would recommend implementing strategies to limit carp recruitment in this system as a top priority. Carp biomass in Independence is likely above the 100 kg/ha threshold where carp can provide ecological damage, with a biomass density estimate for the lake of 142 kg/ha based on the five electrofishing surveys in 2019. Carp are likely providing an impact on the aquatic plant community within the littoral area of Lake Independence and may be a contributing factor towards poor water quality in the lake, however, given the moderate density of carp in the lake, they are probably not the main driver at this time. Lake Independence would appear to be at a high risk of the carp population increasing though due to carp recruitment and addressing this should be a top priority to prevent the carp population from increasing to more damaging levels. Carp movement data suggests that carp are likely using Ardmore Lake as a carp nursery, as well as Ox Yoke and Rice Lake. If no action is taken to limit recruitment, it's very likely that the carp population in Independence would continue to grow with new year classes of carp adding to the system.

Barriers would be recommended to block carp movement to Ardmore Lake and in Pioneer Creek to block movement to Ox Yoke and Rice Lake. Physical barriers can be a good option, although they often require frequent maintenance to clear off debris and vegetation and ensure they are functioning properly. When physical barriers are installed, Carp Solutions recommends effectiveness monitoring of the barrier. This can be done by installing PIT antennas on each side of the barrier to assess if carp are blocked by the barrier. This is a sound method to evaluate the effectiveness of physical barriers if there is enough PIT tagged fish in the system. Periodic electrofishing in the spring in Lake Independence to implant additional PIT tags would also be recommended along with placement of the antennas. Physical barriers, however, may not be able to stop the movement of juvenile carp due to small size of those fish.

Electric barriers are another option. Carp Solutions offers a low-voltage Electric Guidance/Barrier System (EGS) that can be used strategically in the springtime to prevent carp movement, and when paired with our trapping system, could subsequently remove migrating carp. The benefits of this system are it doesn't require ongoing maintenance and cleaning like a physical barrier, and can be used strategically in the springtime during peak carp migration, and then removed from the site, allowing native fish passage the remainder of the year. Also, the EGS would work for all sizes of migrating carp, including juveniles.

Once carp recruitment is addressed, Carp Solutions would recommend implementing carp removal strategies to lower the carp population in Lake Independence below the ecological damaging threshold of 100 kg/ha. Strategies could include springtime trapping in streams as carp migration occurs, or through removals during the summer/fall months using Carp Solution's patented box-net trapping system, or a combination of both. Carp Solutions would welcome exploring these options further and finding a solution that would best fit your needs. Carp Solutions has valued the partnership with Three Rivers Park District over the last several years and is committed to providing a high level of carp management services, supported by years of science and research and development of our methods and offerings. Thank you again for the opportunity to work with you on this project.

Appendix a. PIT tag numbers with date and lake implanted

DATE	LAKE	LENGTH (mm)	PIT	SEX	Confirmed Dead
5/7/2018	INDEPENDENCE	542	226000103358		
5/7/2018	INDEPENDENCE	570	226000103332		
5/7/2018	INDEPENDENCE	732	226000103334		
5/7/2018	INDEPENDENCE	561	226000103365		
5/7/2018	INDEPENDENCE	701	226000103345		
5/15/2018	INDEPENDENCE	532	226000967922		
5/15/2018	INDEPENDENCE	622	226000103313		
5/15/2018	INDEPENDENCE	600	226000103383		
5/15/2018	INDEPENDENCE	439	226000103333		
5/15/2018	INDEPENDENCE	792	226000103310		
5/15/2018	INDEPENDENCE	864	226000103354		
5/16/2018	INDEPENDENCE	107	226000103372		
5/16/2018	INDEPENDENCE	803	226000103389		
5/16/2018	INDEPENDENCE	720	226000103338		
5/16/2018	INDEPENDENCE	782	226000103335		
5/16/2018	INDEPENDENCE	805	226000103385		
5/16/2018	INDEPENDENCE	519	226000103347		
5/16/2018	INDEPENDENCE	782	226000103335		
5/18/2018	INDEPENDENCE	501	226000103317	M	
5/18/2018	INDEPENDENCE	805	226000103373		
5/18/2018	INDEPENDENCE	757	226000103390		
5/18/2018	INDEPENDENCE	701	226000103314		
5/18/2018	INDEPENDENCE	722	226000103360		
5/18/2018	INDEPENDENCE	720	226000103305	M	
5/18/2018	INDEPENDENCE	815	226000103386		
5/18/2018	INDEPENDENCE	772	226000103321		
5/18/2018	INDEPENDENCE	691	226000103387	M	
5/18/2018	INDEPENDENCE	737	226000103384	M	
5/18/2018	INDEPENDENCE	692	226000103306	M	
5/18/2018	INDEPENDENCE	632	226000103328	M	
5/18/2018	INDEPENDENCE	668	226000103325	M	
5/18/2018	INDEPENDENCE	821	226000103331		
5/18/2018	INDEPENDENCE	702	226000103312		
5/18/2018	INDEPENDENCE	737	226000103319		
5/18/2018	INDEPENDENCE	772	226000103380		
5/18/2018	INDEPENDENCE	700	226000103370		
5/18/2018	INDEPENDENCE	815	226000103361		

5/18/2018	INDEPENDENCE	751	226000103367		
5/18/2018	INDEPENDENCE	727	226000103346	M	
5/18/2018	INDEPENDENCE	682	226000103351	M	
5/18/2018	INDEPENDENCE	722	226000103353	M	
5/18/2018	INDEPENDENCE	722	226000103344	M	
5/18/2018	INDEPENDENCE	710	226000103294	M	
5/18/2018	INDEPENDENCE	808	226000103349		
5/18/2018	INDEPENDENCE	710	226000103350	M	
5/18/2018	INDEPENDENCE	690	226000103348		
5/18/2018	INDEPENDENCE	771	226000103320		
5/18/2018	INDEPENDENCE	688	226000103309	M	
5/18/2018	INDEPENDENCE	750	226000103339		KILLED BY BOWFISHERMEN
5/18/2018	INDEPENDENCE	685	226000103375		
5/18/2018	INDEPENDENCE	730	226000103382	M	
5/18/2018	INDEPENDENCE	714	226000103340		
5/18/2018	INDEPENDENCE	710	226000103392		
5/18/2018	INDEPENDENCE	735	226000103369		
5/18/2018	INDEPENDENCE	816	226000103304		
5/18/2018	INDEPENDENCE	688	226000103302	M	
5/18/2018	INDEPENDENCE	715	226000103308	M	
5/18/2018	INDEPENDENCE	774	226000103363		
5/18/2018	INDEPENDENCE	639	226000103371	M	
5/18/2018	INDEPENDENCE	634	226000103301		
5/18/2018	INDEPENDENCE	673	226000103330	M	
5/18/2018	INDEPENDENCE	629	226000103364		
5/18/2018	INDEPENDENCE	752	226000103326		
6/25/2018	INDEPENDENCE	355	226000103318		
6/25/2018	INDEPENDENCE	652	226000103342		
6/25/2018	INDEPENDENCE	729	226000103296		
6/25/2018	INDEPENDENCE	763	226000103298		
6/25/2018	INDEPENDENCE	735	226000103379		
6/25/2018	INDEPENDENCE	812	226000103361		
6/25/2018	INDEPENDENCE	694	226000103391		
6/25/2018	INDEPENDENCE	710	226000103324		
6/25/2018	INDEPENDENCE	557	226000103323		
6/25/2018	INDEPENDENCE	722	226000103359		
6/25/2018	INDEPENDENCE	501	226000103357		
6/25/2018	INDEPENDENCE	707	226000103368		
6/25/2018	INDEPENDENCE	690	226000103356		
6/25/2018	INDEPENDENCE	712	226000103362		
6/25/2018	INDEPENDENCE	748	226000103327		
6/25/2018	INDEPENDENCE	551	226000103343		
6/25/2018	INDEPENDENCE	802	226000103315		

6/25/2018	INDEPENDENCE	779	226000103376		
6/25/2018	INDEPENDENCE	749	226000103337		
6/25/2018	INDEPENDENCE	671	226000103307		
6/25/2018	INDEPENDENCE	407	226000103300		
6/25/2018	INDEPENDENCE	760	226000103374		
6/25/2018	INDEPENDENCE	772	226000103377		
6/25/2018	INDEPENDENCE	711	226000103303		
6/25/2018	INDEPENDENCE	865	226000103299		
7/2/2018	ARDMORE	523	226000103378		Ardmore winterkill 2018-19
7/2/2018	ARDMORE	442	226000103297		
7/2/2018	ARDMORE	450	226000103388		
7/2/2018	ARDMORE	423	226000103336		
7/2/2018	ARDMORE	720	226000103366		Ardmore winterkill 2018-19
7/2/2018	ARDMORE	506	226000103352		
7/2/2018	ARDMORE	540	226000103316		
7/2/2018	ARDMORE	390	226000103341		Ardmore winterkill 2018-19
7/2/2018	ARDMORE	552	226000103381		
7/2/2018	ARDMORE	550	226000103329		
7/2/2018	ARDMORE	665	226000103295		
7/2/2018	ARDMORE	390	226000103311		
7/2/2018	ARDMORE	748	226000103355		
7/2/2018	ARDMORE	446	226000103322		
7/2/2018	ARDMORE	822	226000103690		
7/2/2018	ARDMORE	495	226000103643		
7/2/2018	ARDMORE	469	226000103606		
7/2/2018	ARDMORE	544	226000103596		
7/2/2018	ARDMORE	531	226000103630		
7/2/2018	ARDMORE	400	226000103612		
7/2/2018	ARDMORE	491	226000103659		Ardmore winterkill 2018-19
7/2/2018	ARDMORE	490	226000103651		
7/2/2018	ARDMORE	516	226000103674		Ardmore winterkill 2018-19
7/2/2018	ARDMORE	489	226000103613		
7/2/2018	ARDMORE	362	226000103622		Ardmore winterkill 2018-19
7/2/2018	ARDMORE	550	226000103329		
7/2/2018	ARDMORE	509	226000103683		Ardmore winterkill 2018-19
7/2/2018	ARDMORE	474	226000103644		
7/2/2018	ARDMORE	526	226000103662		
7/2/2018	ARDMORE	520	226000103661		
7/2/2018	ARDMORE	579	226000103686		
7/2/2018	ARDMORE	531	226000103685		
7/2/2018	ARDMORE	510	226000103620		
7/2/2018	ARDMORE	462	226000103679		
7/2/2018	ARDMORE	485	226000103691		

7/2/2018	ARDMORE	510	226000103614		
7/2/2018	ARDMORE	431	226000103598		
7/2/2018	ARDMORE	524	226000103615		Ardmore winterkill 2018-19
7/2/2018	ARDMORE	391	226000103640		
7/2/2018	ARDMORE	511	226000103609		
7/2/2018	ARDMORE	550	226000103682		Ardmore winterkill 2018-19
7/2/2018	ARDMORE	520	226000103676		
7/2/2018	ARDMORE	555	226000103618		Ardmore winterkill 2018-19
7/2/2018	ARDMORE	662	226000103692		
7/2/2018	ARDMORE	515	226000103619		Ardmore winterkill 2018-19
7/2/2018	ARDMORE	457	226000103602		
7/2/2018	ARDMORE	540	226000103636		
7/2/2018	ARDMORE	512	226000103635		Ardmore winterkill 2018-19
7/2/2018	ARDMORE	498	226000103663		
7/2/2018	ARDMORE	730	226000103603		
7/2/2018	ARDMORE	538	226000103646		
7/2/2018	ARDMORE	542	226000103655		Ardmore winterkill 2018-19
7/2/2018	ARDMORE	542	226000103597		
7/2/2018	ARDMORE	665	226000103671		
7/2/2018	ARDMORE	540	226000103677		
7/2/2018	ARDMORE	510	226000103668		
7/2/2018	ARDMORE	556	226000103687		Ardmore winterkill 2018-19
7/2/2018	ARDMORE	705	226000103657		
7/2/2018	ARDMORE	522	226000103629		Ardmore winterkill 2018-19
7/2/2018	ARDMORE	505	226000103633		
7/12/2019	INDEPENDENCE	712	226000497881		
7/12/2019	INDEPENDENCE	497	226000497830		
7/12/2019	INDEPENDENCE	485	226000497844		
7/12/2019	INDEPENDENCE	564	226000497858		
7/12/2019	INDEPENDENCE	533	226000497847		
7/12/2019	INDEPENDENCE	609	226000497894		
7/12/2019	INDEPENDENCE	501	226000497897		
7/12/2019	INDEPENDENCE	643	226000497838		
7/12/2019	INDEPENDENCE	747	226000497836		
7/23/2019	INDEPENDENCE	691	226000497337		
7/23/2019	INDEPENDENCE	626	226000497339		
7/23/2019	INDEPENDENCE	703	226000497346		
7/23/2019	INDEPENDENCE	719	226000497317		
7/23/2019	INDEPENDENCE	598	226000497391		
7/23/2019	INDEPENDENCE	662	226000497369		
7/23/2019	INDEPENDENCE	657	226000497333		
7/23/2019	INDEPENDENCE	788	226000497338		
7/23/2019	INDEPENDENCE	701	226000497303		

7/23/2019	INDEPENDENCE	642	226001036783		
7/23/2019	INDEPENDENCE	613	226001036723		
7/23/2019	INDEPENDENCE	598	226001036768		
7/23/2019	INDEPENDENCE	573	226001036748		
7/23/2019	INDEPENDENCE	698	226001036790		
7/23/2019	INDEPENDENCE	662	226001036784		
7/23/2019	INDEPENDENCE	628	226001036772		
7/23/2019	INDEPENDENCE	722	226001036777		
7/23/2019	INDEPENDENCE	687	226001036758		
7/23/2019	INDEPENDENCE	523	226001036794		
7/23/2019	INDEPENDENCE	561	226001036787		
7/23/2019	INDEPENDENCE	713	226001036724		
7/23/2019	INDEPENDENCE	704	226001036895		
7/23/2019	INDEPENDENCE	642	226001036786		
8/13/2019	INDEPENDENCE	691	226001040691		
8/13/2019	INDEPENDENCE	624	226001040624		
8/13/2019	INDEPENDENCE	740	226001040740		
8/30/2019	INDEPENDENCE	538	226001036803		
8/30/2019	INDEPENDENCE	791	226001036815		
8/30/2019	INDEPENDENCE	751	226001036812		
8/30/2019	INDEPENDENCE	866	226001036851		
8/30/2019	INDEPENDENCE	590	226001036855		
8/30/2019	INDEPENDENCE	738	226001036867		
8/30/2019	INDEPENDENCE	710	226001036845		
8/30/2019	INDEPENDENCE	712	226001036811		
8/30/2019	INDEPENDENCE	620	226001036891		
9/6/2019	INDEPENDENCE	560	226000103560		
9/6/2019	INDEPENDENCE	772	226000103772		
9/6/2019	INDEPENDENCE	621	226000103621		
9/6/2019	INDEPENDENCE	625	226000103625		
9/6/2019	INDEPENDENCE	645	226000103645		
9/6/2019	INDEPENDENCE	540	226000103540		
9/6/2019	INDEPENDENCE	552	226000103552		
9/13/2019	INDEPENDENCE	633	226001040246		
9/13/2019	INDEPENDENCE	528	226001040269		
9/13/2019	INDEPENDENCE	685	226001040260		
9/13/2019	INDEPENDENCE	705	226001040257		
9/13/2019	INDEPENDENCE	480	226001040292		
9/13/2019	INDEPENDENCE	635	226001040242		

Appendix b. PIT detections by location and date

PIT	DATE	LAKE	LENGTH (MM)	Year	Detected at HWY 19	Detected at Pagekopf			Detected at Ardmore				
226000103358	05/07/18	INDEPENDENCE	542	2018									
226000103332	05/07/18	INDEPENDENCE	570	2018					4/22/2019	5/15/2019	5/23/2019	5/27/2019	5/28/2019
226000103334	05/07/18	INDEPENDENCE	732	2018		5/16/2019	5/26/2019						
226000103365	05/07/18	INDEPENDENCE	561	2018					4/25/2019	5/17/2019	5/27/2019		
226000103345	05/07/18	INDEPENDENCE	701	2018									
226000967922	05/15/18	INDEPENDENCE	532	2018									
226000103313	05/15/18	INDEPENDENCE	622	2018		6/7/2019							
226000103383	05/15/18	INDEPENDENCE	600	2018					4/21/2019	5/17/2019			
226000103333	05/15/18	INDEPENDENCE	439	2018									
226000103310	05/15/18	INDEPENDENCE	792	2018									
226000103354	05/15/18	INDEPENDENCE	864	2018									
226000103372	05/16/18	INDEPENDENCE	107	2018		4/23/2019							
226000103389	05/16/18	INDEPENDENCE	803	2018		6/1/2019							
226000103338	05/16/18	INDEPENDENCE	720	2018		6/6/2019							
226000103335	05/16/18	INDEPENDENCE	782	2018									
226000103385	05/16/18	INDEPENDENCE	805	2018									
226000103347	05/16/18	INDEPENDENCE	519	2018		5/31/2019							
226000103335	05/16/18	INDEPENDENCE	782	2018									
226000103317	05/18/18	INDEPENDENCE	501	2018									
226000103373	05/18/18	INDEPENDENCE	805	2018		6/8/2019							
226000103390	05/18/18	INDEPENDENCE	757	2018		5/30/2019							
226000103314	05/18/18	INDEPENDENCE	701	2018					4/24/2019	4/25/2019			
226000103360	05/18/18	INDEPENDENCE	722	2018									
226000103305	05/18/18	INDEPENDENCE	720	2018		6/10/2019							
226000103386	05/18/18	INDEPENDENCE	815	2018					4/25/2019	5/17/2019			
226000103321	05/18/18	INDEPENDENCE	772	2018									
226000103387	05/18/18	INDEPENDENCE	691	2018									
226000103384	05/18/18	INDEPENDENCE	737	2018		6/10/2019							
226000103306	05/18/18	INDEPENDENCE	692	2018		5/31/2019							
226000103328	05/18/18	INDEPENDENCE	632	2018	6/5/2019				5/30/2019				
226000103325	05/18/18	INDEPENDENCE	668	2018		5/16/2019							
226000103331	05/18/18	INDEPENDENCE	821	2018									
226000103312	05/18/18	INDEPENDENCE	702	2018		6/1/2019							
226000103319	05/18/18	INDEPENDENCE	737	2018		5/8/2019							
226000103380	05/18/18	INDEPENDENCE	772	2018		4/23/2019	5/31/2019						
226000103370	05/18/18	INDEPENDENCE	700	2018									
226000103361	05/18/18	INDEPENDENCE	815	2018		5/16/2019	6/4/2019						
226000103367	05/18/18	INDEPENDENCE	751	2018									
226000103346	05/18/18	INDEPENDENCE	727	2018									
226000103351	05/18/18	INDEPENDENCE	682	2018		5/16/2019							
226000103353	05/18/18	INDEPENDENCE	722	2018									
226000103344	05/18/18	INDEPENDENCE	722	2018					4/21/2019	5/15/2019			
226000103294	05/18/18	INDEPENDENCE	710	2018		6/10/2019							
226000103349	05/18/18	INDEPENDENCE	808	2018									
226000103350	05/18/18	INDEPENDENCE	710	2018					4/25/2019	5/17/2019	5/30/2019	5/31/2019	7/3/2019
226000103348	05/18/18	INDEPENDENCE	690	2018		5/16/2019	6/5/2019						
226000103320	05/18/18	INDEPENDENCE	771	2018									
226000103309	05/18/18	INDEPENDENCE	688	2018		5/16/2019							
226000103339	05/18/18	INDEPENDENCE	750	2018									
226000103375	05/18/18	INDEPENDENCE	685	2018		5/30/2019							
226000103382	05/18/18	INDEPENDENCE	730	2018		4/23/2019	5/31/2019	6/1/2019					
226000103340	05/18/18	INDEPENDENCE	714	2018		6/6/2019							
226000103392	05/18/18	INDEPENDENCE	710	2018									
226000103369	05/18/18	INDEPENDENCE	735	2018		4/23/2019	5/16/2019						
226000103304	05/18/18	INDEPENDENCE	816	2018									
226000103302	05/18/18	INDEPENDENCE	688	2018									
226000103308	05/18/18	INDEPENDENCE	715	2018									
226000103363	05/18/18	INDEPENDENCE	774	2018									
226000103371	05/18/18	INDEPENDENCE	639	2018									

226000103301	05/18/18	INDEPENDENCE	634	2018					4/21/2019	5/17/2019	5/28/2019	7/2/2019	7/3/2019
226000103330	05/18/18	INDEPENDENCE	673	2018									
226000103364	05/18/18	INDEPENDENCE	629	2018									
226000103326	05/18/18	INDEPENDENCE	752	2018									
226000103318	6/25/2018	INDEPENDENCE	355	2018									
226000103342	6/25/2018	INDEPENDENCE	652	2018			6/2/2019						
226000103296	6/25/2018	INDEPENDENCE	729	2018			6/10/2019						
226000103298	6/25/2018	INDEPENDENCE	763	2018			5/30/2019						
226000103379	6/25/2018	INDEPENDENCE	735	2018			6/7/2019						
226000103361	6/25/2018	INDEPENDENCE	812	2018			5/16/2019	6/4/2019					
226000103391	6/25/2018	INDEPENDENCE	694	2018					5/20/2019	5/27/2019	5/28/2019	5/29/2019	
226000103324	6/25/2018	INDEPENDENCE	710	2018									
226000103323	6/25/2018	INDEPENDENCE	557	2018					4/21/2019	4/25/2019	5/27/2019	5/28/2019	
226000103359	6/25/2018	INDEPENDENCE	722	2018			6/3/2019						
226000103357	6/25/2018	INDEPENDENCE	501	2018									
226000103368	6/25/2018	INDEPENDENCE	707	2018			5/31/2019						
226000103356	6/25/2018	INDEPENDENCE	690	2018									
226000103362	6/25/2018	INDEPENDENCE	712	2018									
226000103327	6/25/2018	INDEPENDENCE	748	2018			4/23/2019						
226000103343	6/25/2018	INDEPENDENCE	551	2018					4/21/2019	5/29/2019	5/31/2019		
226000103315	6/25/2018	INDEPENDENCE	802	2018			5/30/2019						
226000103376	6/25/2018	INDEPENDENCE	779	2018			5/8/2019	6/2/2019					
226000103337	6/25/2018	INDEPENDENCE	749	2018									
226000103307	6/25/2018	INDEPENDENCE	671	2018			6/5/2019		4/21/2019	4/25/2019			
226000103300	6/25/2018	INDEPENDENCE	407	2018					4/22/2019	5/29/2019	7/2/2019		
226000103374	6/25/2018	INDEPENDENCE	760	2018									
226000103377	6/25/2018	INDEPENDENCE	772	2018					4/21/2019	5/17/2019	7/2/2019	7/17/2019	
226000103303	6/25/2018	INDEPENDENCE	711	2018									
226000103299	6/25/2018	INDEPENDENCE	865	2018									
226000103378	7/2/2018	ARDMORE	523	2018					4/19/2019				
226000103297	7/2/2018	ARDMORE	442	2018									
226000103388	7/2/2018	ARDMORE	450	2018									
226000103336	7/2/2018	ARDMORE	423	2018									
226000103366	7/2/2018	ARDMORE	720	2018									
226000103352	7/2/2018	ARDMORE	506	2018									
226000103316	7/2/2018	ARDMORE	540	2018									
226000103341	7/2/2018	ARDMORE	390	2018									
226000103381	7/2/2018	ARDMORE	552	2018									
226000103329	7/2/2018	ARDMORE	550	2018									
226000103295	7/2/2018	ARDMORE	665	2018									
226000103311	7/2/2018	ARDMORE	390	2018									
226000103355	7/2/2018	ARDMORE	748	2018									
226000103322	7/2/2018	ARDMORE	446	2018									
226000103690	7/2/2018	ARDMORE	822	2018									
226000103643	7/2/2018	ARDMORE	495	2018									
226000103606	7/2/2018	ARDMORE	469	2018									
226000103596	7/2/2018	ARDMORE	544	2018									
226000103630	7/2/2018	ARDMORE	531	2018									
226000103612	7/2/2018	ARDMORE	400	2018									
226000103659	7/2/2018	ARDMORE	491	2018									
226000103651	7/2/2018	ARDMORE	490	2018									
226000103674	7/2/2018	ARDMORE	516	2018									
226000103613	7/2/2018	ARDMORE	489	2018									
226000103622	7/2/2018	ARDMORE	362	2018									
226000103329	7/2/2018	ARDMORE	550	2018									
226000103683	7/2/2018	ARDMORE	509	2018									
226000103644	7/2/2018	ARDMORE	474	2018									
226000103662	7/2/2018	ARDMORE	526	2018									
226000103661	7/2/2018	ARDMORE	520	2018									
226000103686	7/2/2018	ARDMORE	579	2018									
226000103685	7/2/2018	ARDMORE	531	2018									
226000103620	7/2/2018	ARDMORE	510	2018									
226000103679	7/2/2018	ARDMORE	462	2018									
226000103691	7/2/2018	ARDMORE	485	2018									
226000103614	7/2/2018	ARDMORE	510	2018									

226000103598	7/2/2018	ARDMORE	431	2018									
226000103615	7/2/2018	ARDMORE	524	2018									
226000103640	7/2/2018	ARDMORE	391	2018									
226000103609	7/2/2018	ARDMORE	511	2018									
226000103682	7/2/2018	ARDMORE	550	2018									
226000103676	7/2/2018	ARDMORE	520	2018									
226000103618	7/2/2018	ARDMORE	555	2018									
226000103692	7/2/2018	ARDMORE	662	2018					4/21/2019	5/28/2019	5/29/2019	5/31/2019	7/17/2019
226000103619	7/2/2018	ARDMORE	515	2018									
226000103602	7/2/2018	ARDMORE	457	2018		7/4/2019			5/15/2019	5/16/2019	5/28/2019	5/29/2019	
226000103636	7/2/2018	ARDMORE	540	2018									
226000103635	7/2/2018	ARDMORE	512	2018									
226000103663	7/2/2018	ARDMORE	498	2018									
226000103603	7/2/2018	ARDMORE	730	2018					4/21/2019	7/3/2019			
226000103646	7/2/2018	ARDMORE	538	2018									
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226000497881	7/12/2019	INDEPENDENCE	712	2019									
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226000497858	7/12/2019	INDEPENDENCE	564	2019									
226000497847	7/12/2019	INDEPENDENCE	533	2019									
226000497894	7/12/2019	INDEPENDENCE	609	2019									
226000497897	7/12/2019	INDEPENDENCE	501	2019									
226000497838	7/12/2019	INDEPENDENCE	643	2019									
226000497836	7/12/2019	INDEPENDENCE	747	2019									
226000497337	7/23/2019	INDEPENDENCE	691	2019									
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226000497346	7/23/2019	INDEPENDENCE	703	2019									
226000497317	7/23/2019	INDEPENDENCE	719	2019									
226000497391	7/23/2019	INDEPENDENCE	598	2019									
226000497369	7/23/2019	INDEPENDENCE	662	2019									
226000497333	7/23/2019	INDEPENDENCE	657	2019									
226000497338	7/23/2019	INDEPENDENCE	788	2019									
226000497303	7/23/2019	INDEPENDENCE	701	2019									
226001036783	7/23/2019	INDEPENDENCE	642	2019									
226001036723	7/23/2019	INDEPENDENCE	613	2019									
226001036768	7/23/2019	INDEPENDENCE	598	2019									
226001036748	7/23/2019	INDEPENDENCE	573	2019									
226001036790	7/23/2019	INDEPENDENCE	698	2019									
226001036784	7/23/2019	INDEPENDENCE	662	2019									
226001036772	7/23/2019	INDEPENDENCE	628	2019									
226001036777	7/23/2019	INDEPENDENCE	722	2019									
226001036758	7/23/2019	INDEPENDENCE	687	2019									
226001036794	7/23/2019	INDEPENDENCE	523	2019									
226001036787	7/23/2019	INDEPENDENCE	561	2019									
226001036724	7/23/2019	INDEPENDENCE	713	2019									
226001036895	7/23/2019	INDEPENDENCE	704	2019									
226001036786	7/23/2019	INDEPENDENCE	642	2019									
226001040691	8/13/2019	INDEPENDENCE	691	2019									
226001040624	8/13/2019	INDEPENDENCE	624	2019									
226001040740	8/13/2019	INDEPENDENCE	740	2019									
226001036803	8/30/2019	INDEPENDENCE	538	2019									
226001036815	8/30/2019	INDEPENDENCE	791	2019									

226001036812	8/30/2019	INDEPENDENCE	751	2019									
226001036851	8/30/2019	INDEPENDENCE	866	2019									
226001036855	8/30/2019	INDEPENDENCE	590	2019									
226001036867	8/30/2019	INDEPENDENCE	738	2019									
226001036845	8/30/2019	INDEPENDENCE	710	2019									
226001036811	8/30/2019	INDEPENDENCE	712	2019									
226001036891	8/30/2019	INDEPENDENCE	620	2019									
226000103560	9/6/2019	INDEPENDENCE	560	2019									
226000103772	9/6/2019	INDEPENDENCE	772	2019									
226000103621	9/6/2019	INDEPENDENCE	621	2019									
226000103625	9/6/2019	INDEPENDENCE	625	2019									
226000103645	9/6/2019	INDEPENDENCE	645	2019									
226000103540	9/6/2019	INDEPENDENCE	540	2019									
226000103552	9/6/2019	INDEPENDENCE	552	2019									
226001040246	9/13/2019	INDEPENDENCE	633	2019									
226001040269	9/13/2019	INDEPENDENCE	528	2019									
226001040260	9/13/2019	INDEPENDENCE	685	2019									
226001040257	9/13/2019	INDEPENDENCE	705	2019									
226001040292	9/13/2019	INDEPENDENCE	480	2019									
226001040242	9/13/2019	INDEPENDENCE	635	2019									



APPENDIX B

CARP BARRIER FEASIBILITY & DESIGN PLANS

Project Name	Ardmore Carp Barrier Feasibility	Date	05/09/19
To / Contact info	Brian Vlach, TRPD		
Cc / Contact info	Jason Naber, EOR		
From / Contact info	Mike Majeski, EOR Greg Graske P.E., EOR Joe Pallardy, EOR		
Regarding	Ardmore Carp Barrier Feasibility Report		

Ardmore Carp Barrier Feasibility

EOR conducted a feasibility assessment of the Ardmore outlet channel to determine options to limit carp migration from Lake Independence to Ardmore Lake, particularly during the spawning season. Carp research being conducted by TRPD has confirmed that under certain flow regimes, carp are able to migrate into Ardmore Lake to spawn. The goal is to limit carp spawning in areas such as Ardmore Lake where winterkill conditions reduce or eliminate gamefish populations that naturally control carp numbers through predation of carp eggs and fry.

Existing Lake Level & Flow Regime Conditions

Based on MNDNR LakeFinder data, the ordinary high water level (OHWL) of Ardmore Lake is 959.8 feet (NGVD 29 datum) and the OHWL of Lake Independence is 956.8 feet (NGVD 29 datum). The highest recorded lake elevation for Ardmore Lake was 960.15 (December 1985) and the highest recorded lake elevation in Lake Independence was 959.05 feet on May 30, 2011 (period of record from 1935 to 2018). Daily average flow data has been collected by TRPD within the Ardmore outlet channel from 2017 to 2018. Daily average flow rates measured in both years indicate flows less than 1 cfs for the majority of the monitoring season, with a peak daily average flow of 3.9 cfs measured on May 21, 2017 and 4.7 cfs measured on July 2, 2018.

Carp Barrier Options

Based on analysis of lake elevation data and flow regime in the Ardmore channel, three carp barrier options were developed for this feasibility report. Preliminary costs are included to provide an understanding of potential cost ranges. More detailed design and engineer's estimate would be needed once an approach is selected.

Option A: Open Channel Rock Riffle Barrier

There appears to be sufficient gradient within the Ardmore outlet channel between Ardmore Avenue and Lake Shore Avenue to install a shallow rock riffle fish barrier. The concept design would entail construction of a long and shallow rock riffle to dissipate peak flows across a wide channel cross section such that there would be insufficient depth of water for carp to migrate upstream. Based on the outlet channel survey completed by EOR staff, there is approximately 1.0 vertical feet of channel gradient between the two road crossings (Figure 1 & Figure 2). This gradient would allow for construction of a riffle approximately 25 to 50 feet long depending on the riffle location. The width of the riffle would be designed such that peak channel flows would result in a maximum flow depth of 0.25 feet across the entire riffle.

Date: 4/23/2019 Time: 3:22:53 PM Author:
 Document Path: X:\Clients_State\01075_Three_Rivers_Park_District\0012_Ardmore_Carp_Barrier_Feas\09_GIMS_ProjectName\GIS\Basemap_Portrait.mxd



Figure 1. Ardmore Channel Profile and Culvert Elevations (Point Elevations Represent Water Surface Elevations)

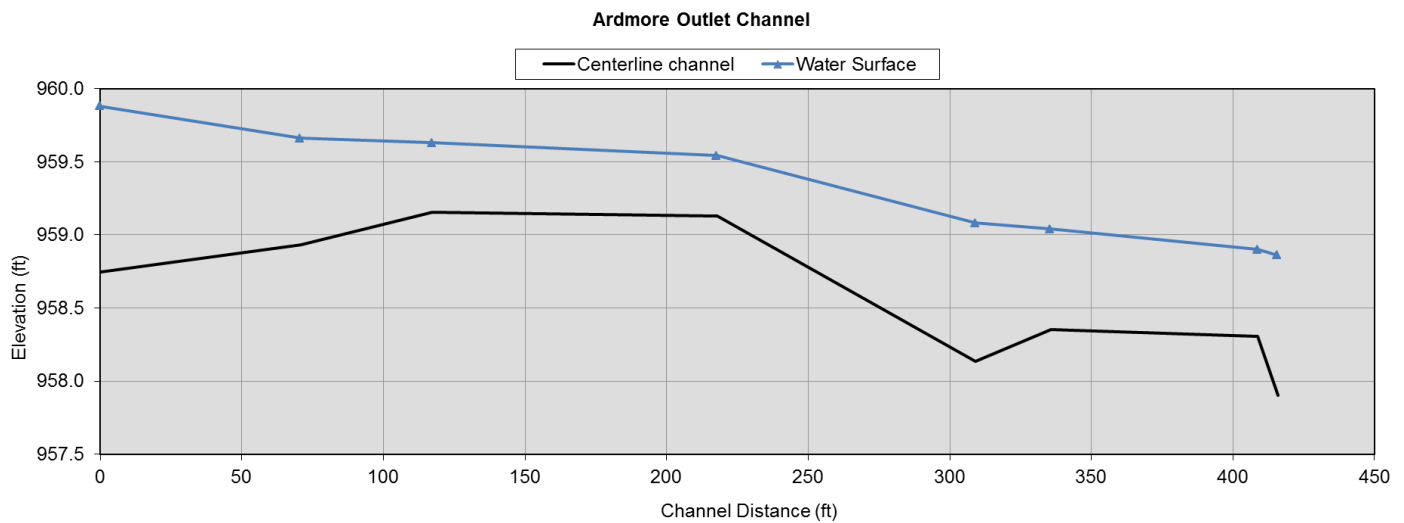


Figure 2. Ardmore Channel Profile between Ardmore Avenue and Lake Shore Avenue

In addition, the riffle would be constructed of large angular rock (likely Class III riprap) to disrupt concentrated flow paths, thereby inhibiting the ability of carp to use burst speed to migrate over the riffle. Ideally the riffle would be designed to effectively control a range of flows up to 10 cfs (or approximately twice the maximum observed daily average flows in the channel). The riffle would have to be strategically located in the channel such it would not affect the elevation of Ardmore Lake, nor be affected by tailwater conditions from Lake Independence during high lake stage events that could flood over the riffle and allow for possible carp migration.

- Pros: Low cost and easy to construct, aesthetic appeal, would increase dissolved oxygen to downstream resource, low maintenance, may increase macroinvertebrate community
- Cons: Possible migration of carp over the riffle during high flow events, may require stream channel excavation to widen the channel cross section, potential barrier to all fish species during low flow periods

Estimated Construction Cost Range: \$5,000 - \$15,000

Option B: Removable Fish Grate in Open Channel

The elevation of the channel banks and existing channel cross section may be conducive for the installation of a removable fish grate similar to the fish barrier shown in Figure 3. The structure would be constructed such that the sides of the barrier would be installed into the channel banks to prevent fish from migrating around the sides of the barrier. The middle section of the barrier would be comprised of narrow-spaced horizontal bars that would allow debris to flow through structure while preventing carp migration upstream. The middle section would be removable for ease in cleaning and would allow for open channel free flow through the structure if needed.

- Pros: Selective carp barrier (especially adults), allows small native species to migrate upstream (minnows, chubs, small panfish), grate can be removed to allow for gamefish migration, relatively easy to clean

- Cons: Higher cost and requires fabrication of metal structure and supports, susceptible to clogging from vegetation clumps and woody debris, possible negative aesthetic

Estimated Construction Cost Range: \$15,000 - \$30,000

Option C: Permanent Fish Barrier



Figure 3. Example of Removable Fish Grate with Horizontal Bars.

A permanent fish barrier could be comprised of either metal or concrete, or may involve an electrified barrier. Similar to the removable fish grate, the sides of the structure would need to be installed into the channel banks to prevent fish from migrating around the barrier.

- Pros: Effective for carp, could be low maintenance depending on design
- Cons: High cost and may be difficult to construct, possible negative aesthetic, complete fish barrier (non-selective), may require maintenance depending on design

Estimated Construction Cost Range: \$20,000 - \$100,000+

Recommendation

Based on the flow regime in the Ardmore channel and landscape setting, EOR recommends advancing Option A. This option would be the most cost effective approach and would provide water quality and natural resource benefits by increasing dissolved oxygen levels in the channel and providing coarse substrates for macroinvertebrates to colonize. This option may also be preferred by permitting agencies since it could allow for migration of small native fish such as minnows and panfish. This option could also be used in conjunction with Option B.

GENERAL SITE WORK NOTES

1. VERIFY HORIZONTAL LOCATION AND ELEVATION WHERE A CONNECTION TO EXISTING PAVEMENT, STRUCTURE, PIPE OR OTHER SITE FEATURE IS TO BE MADE. THE CONTRACTOR SHALL IMMEDIATELY NOTIFY THE ENGINEER OF ANY DISCREPANCIES OR VARIATIONS FROM THE PLANS.
2. REFERENCE TO MN/DOT SPECIFICATIONS SHALL MEAN DIVISIONS II AND III OF THE 2020 SPECIFICATIONS FOR CONSTRUCTION.
3. TOPOGRAPHIC SURVEY CONDUCTED NOVEMBER 25, 2019 BY EOR, INC. SURVEYED COMPLETED IN CARVER COUNTY COORDINATES, US FEET AND NAVD88 VERTICAL DATUM.
4. A CONSTRUCTION STAGING PLAN SHALL BE PREPARED AND SUBMITTED BY THE CONTRACTOR FOR REVIEW BY THE PROJECT ENGINEER, PARK AND COUNTY FOR ANY DELIVERY & TEMPORARY STORAGE OF MATERIALS. CONTRACTOR SHALL ALSO SUBMIT FOR APPROVAL A CONSTRUCTION PHASING AND SCHEDULE OUTLINE.
5. ALL TRAFFIC CONTROL DEVICES AND SIGNING SHALL CONFORM TO THE MINNESOTA MUTCD, INCLUDING FIELD MANUAL FOR TEMPORARY TRAFFIC CONTROL ZONE LAYOUTS, JANUARY 1998. ONE ELEVEN FOOT MINIMUM WIDTH LANE IN EACH DIRECTION SHALL BE PROVIDED AT ALL TIMES.
6. ALL CONSTRUCTION WORK SHALL BE COMPLETED WITHIN CITY APPROVED WORKING HOURS.
7. PROPOSED WORK MUST BE IN COMPLIANCE WITH ANY AND ALL MUNICIPAL, COUNTY, STATE AND PARK RULES AND CONTRACTOR IS EXPECTED TO OBTAIN ANY REQUIRED PERMITS BEYOND DNR PUBLIC WATERS MCWD AND HENNEPIN COUNTY PERMITS.
8. A PRECONSTRUCTION MEETING WILL BE REQUIRED WITH CITY/PARK/COUNTY STAFF PRIOR TO ANY MOBILIZATION OF CONSTRUCTION EQUIPMENT OR MATERIAL.

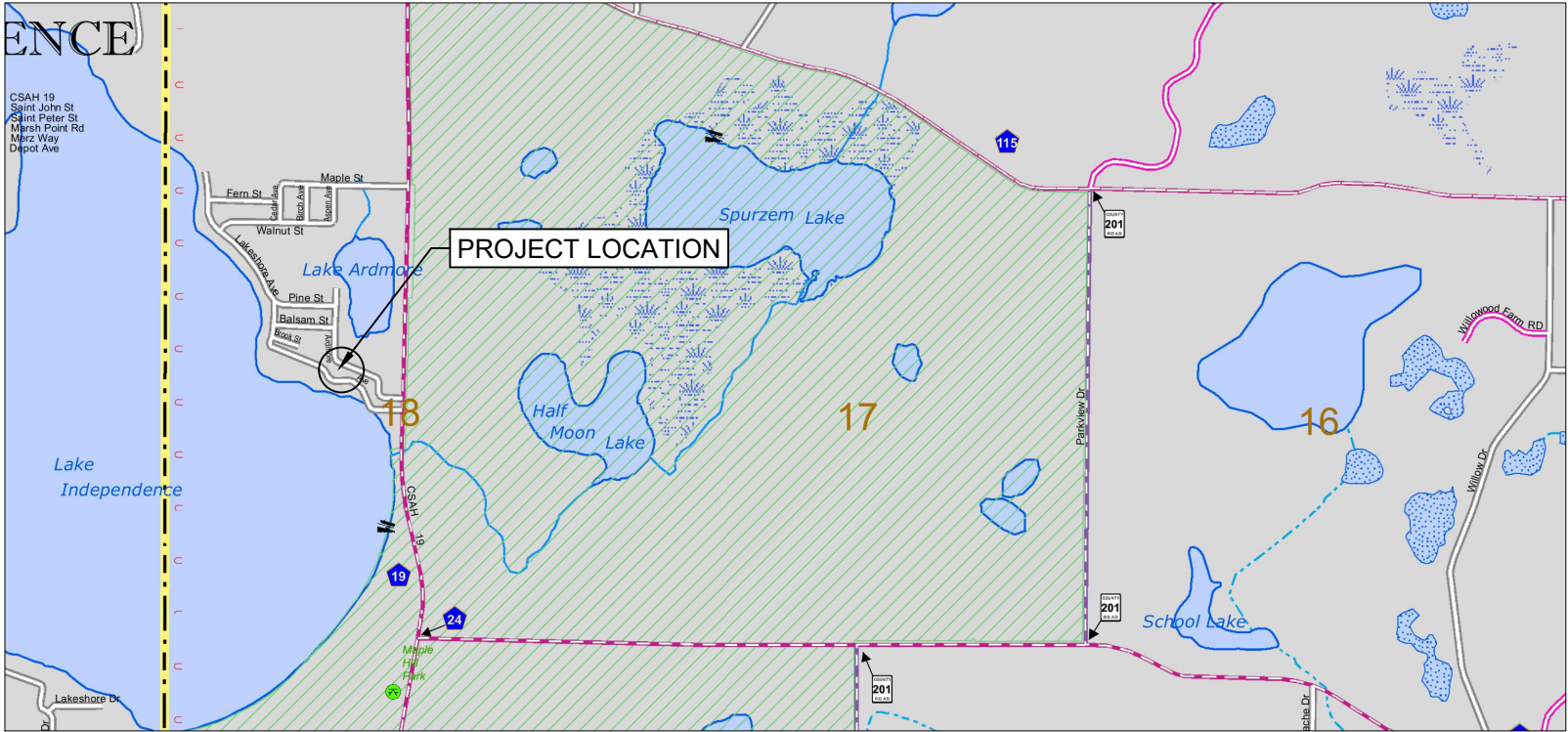
GENERAL LANDSCAPE NOTES

1. CONTRACTOR SHALL INSPECT THE SITE AND BECOME FAMILIAR WITH EXISTING CONDITIONS RELATING TO THE NATURE AND SCOPE OF WORK.
2. CONTRACTOR SHALL VERIFY PLAN LAYOUT AND BRING TO THE ATTENTION OF THE ENGINEER DISCREPANCIES WHICH MAY COMPROMISE THE DESIGN OR INTENT OF THE LAYOUT.
3. CONTRACTOR SHALL ASSURE COMPLIANCE WITH APPLICABLE CODES AND REGULATIONS GOVERNING THE WORK AND MATERIALS SUPPLIED.
4. CONTRACTOR SHALL PROTECT EXISTING ROADS, CURBS/GUTTERS, TRAILS, TREES, LAWNS AND SITE ELEMENTS DURING CONSTRUCTION OPERATIONS. DAMAGE TO SAME SHALL BE REPAIRED AT NO ADDITIONAL COST TO THE OWNER.
5. CONTRACTOR SHALL REVIEW THE SITE FOR DEFICIENCIES IN SITE CONDITIONS WHICH MIGHT NEGATIVELY AFFECT PLANT ESTABLISHMENT, SURVIVAL OR WARRANTY. UNDESIRABLE SITE CONDITIONS SHALL BE BROUGHT TO THE ATTENTION OF THE ENGINEER PRIOR TO BEGINNING OF WORK.
6. CONTRACTOR IS RESPONSIBLE FOR ONGOING MAINTENANCE OF NEWLY INSTALLED MATERIALS THROUGHOUT THE LENGTH OF THE PROJECT. REPAIR OF ACTS OF VANDALISM OR DAMAGE WHICH MAY OCCUR SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR.
7. EXISTING TREES OR SIGNIFICANT SHRUB MASSINGS FOUND ON SITE SHALL BE PROTECTED AND SAVED UNLESS NOTED TO BE REMOVED OR ARE LOCATED IN AN AREA TO BE GRADED. QUESTIONS REGARDING EXISTING PLANT MATERIAL SHALL BE BROUGHT TO THE ATTENTION OF THE ENGINEER PRIOR TO REMOVAL. CONTRACTOR SHALL WALK THE SITE WITH THE ENGINEER AND PARK PRIOR TO SITE REMOVALS AND GRADING TO DETERMINE EXACT CONSTRUCTION LIMITS.

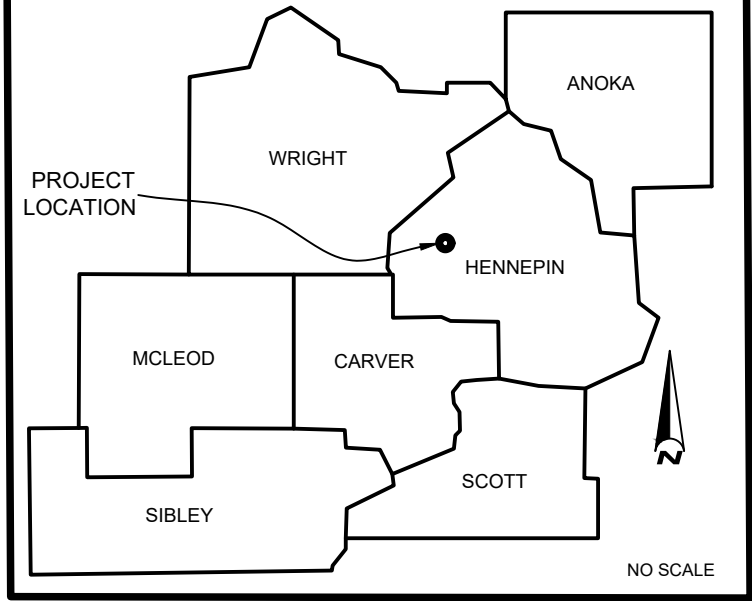
GRADING & EROSION CONTROL NOTES

1. CONTRACTOR TO VERIFY THE LOCATION OF ALL UNDERGROUND UTILITIES PRIOR TO BEGINNING ANY CONSTRUCTION BY CALLING GOPHER STATE ONE CALL AT 1-800-252-1166.
2. CONTRACTOR SHALL FIELD VERIFY THE LOCATIONS AND ELEVATIONS OF EXISTING UTILITIES AND TOPOGRAPHIC FEATURES PRIOR TO START OF SITE GRADING. THE CONTRACTOR SHALL IMMEDIATELY NOTIFY THE PROJECT ENGINEER OF ANY DISCREPANCIES OR VARIATIONS.
3. ENGINEER SHALL PROVIDE VERTICAL CONTROL BENCHMARK AND CONTRACTOR SHALL PROTECT BENCHMARKS. ADDITIONAL BENCHMARKS WILL BE SET AT CONTRACTORS EXPENSE.
4. ACCEPTANCE OF INSTALLED PERIMETER EROSION CONTROL, INLET PROTECTION AND CONSTRUCTION ENTRANCE MUST BE MADE BEFORE BEGINNING SITE GRADING ACTIVITIES. SOME TEMPORARY EROSION CONTROL MEASURES MAY BE INSTALLED AS GRADING OCCURS IN THE SPECIFIC AREA. MAINTAIN EROSION CONTROLS THROUGHOUT THE GRADING PROCESS AND REMOVE UPON APPROVAL OF ENGINEER.
5. CONTRACTOR TO ADHERE TO ALL REQUIREMENTS OF PARK, CITY, COUNTY, WATERSHED DISTRICT, AND STATE PERMITS.
6. ALL EXPOSED SOIL AREAS WITHIN 100 FEET OF A WATER OF THE STATE OR ANY STORMWATER CONVEYANCE SYSTEM WHICH IS CONNECTED TO A WATER OF THE STATE MUST BE STABILIZED WITHIN 24 HOURS.
7. ALL CONSTRUCTION ENTRANCES SHALL BE SURFACED WITH CRUSHED ROCK (OR APPROVED EQUAL) ACROSS FULL WIDTH FROM ENTRANCE POINT INTO THE CONSTRUCTION ZONE.
8. INLET PROTECTION IS TO BE USED DURING CONSTRUCTION. SEE MNDOT SPECIFICATIONS.
9. ALL EROSION CONTROL MEASURES SHALL BE INSTALLED AND MAINTAINED IN ACCORDANCE WITH CITY, COUNTY, AND STATE PERMITS.
10. THE CONTRACTOR SHALL MAINTAIN ALL EROSION CONTROL MEASURES, INCLUDING THE REMOVAL OF ACCUMULATED SILT IN FRONT OF TEMPORARY EROSION CONTROL MEASURES THROUGHOUT CONSTRUCTION. CONTRACTOR SHALL RE-ESTABLISH ANY EXISTING EROSION CONTROL DISTURBED BY CONSTRUCTION.
11. CONTRACTOR SHALL PROVIDE ADDITIONAL TEMPORARY EROSION CONTROL MEASURES AS REQUIRED FOR CONSTRUCTION OR AS REQUIRED BY ENGINEER.
12. REMOVE ALL TEMPORARY EROSION CONTROL MEASURES UPON APPROVAL OF ENGINEER.
13. THE CONTRACTOR SHALL REMOVE ALL SOILS AND SEDIMENT TRACKED ONTO EXISTING STREETS AND PAVED AREAS WITHIN 24 HOURS OF DISCOVERY OR REQUESTED BY ENGINEER.
14. SWEEP ADJACENT STREETS/PARKING LOT WITH SWEEPER AND PICK-UP BROOM IN ACCORDANCE WITH CITY, COUNTY, AND STATE REQUIREMENTS.
15. INSPECT EROSION CONTROL DEVICES AFTER EACH RAINFALL PER MNDOT SPECIFICATION AND SPECIAL PROVISIONS. IMMEDIATELY REPAIR FAILED OR FAILING EROSION CONTROL DEVICES.
16. MINIMIZE DISTURBANCE TO THE EXTENT FEASIBLE. DISTURBANCE OUTSIDE OF CONSTRUCTION LIMITS SHALL BE RESTORED TO PRE CONSTRUCTION CONDITIONS AT THE COST OF THE CONTRACTOR.
13. CONTRACTOR SHALL STOCKPILE AND RE-SPREAD TOPSOIL TO A MINIMUM DEPTH OF 6". CONTRACTOR SHALL SUPPLEMENT EXISTING TOPSOIL WITH IMPORTED AS NEEDED AT NO EXTRA COST TO THE OWNER. ALL GREEN SPACE AREAS TO BE DECOMPACTED TO A MINIMUM 12" DEPTH PRIOR TO RECEIVING TOPSOIL.
14. REVIEW SPECIAL PROVISIONS FOR MODIFICATIONS TO MNDOT SPECIFICATIONS.

THREE RIVERS PARK DISTRICT LAKE ARDMORE FISH BARRIER MEDINA, HENNEPIN COUNTY, MINNESOTA



LOCATION MAP



EXISTING UTILITIES

THE LOCATION OF UNDERGROUND FACILITIES AND/OR STRUCTURES AS SHOWN ON THE PLANS ARE BASED ON AVAILABLE RECORD AT THE TIME THE PLANS WERE PREPARED AND ARE NOT GUARANTEED TO BE COMPLETE OR CORRECT. THE SUBSURFACE UTILITY INFORMATION SHOWN IS UTILITY QUALITY LEVEL D, AS DETERMINED USING THE GUIDELINES OF "CI/ASCE 38-02 STANDARD GUIDELINES FOR THE COLLECTION AND DEPICTION OF EXISTING SUBSURFACE UTILITY DATA." THE CONTRACTOR IS RESPONSIBLE FOR CONTACTING ALL UTILITIES 72 HOURS PRIOR TO CONSTRUCTION TO DETERMINE THE EXACT LOCATION OF ALL FACILITIES AND TO PROVIDE ADEQUATE PROTECTION OF SAID UTILITIES DURING THE COURSE OF WORK.

CONSTRUCTION NOTE

CONTRACTOR SHALL TAKE ALL NECESSARY MEASURES TO MAINTAIN OPERATION OF EXISTING UTILITIES THROUGHOUT THE DURATION OF THE PROJECT. IN THE EVENT THAT AN INTERRUPTION OF SERVICE IS UNAVOIDABLE IN ORDER TO COMPLETE THE WORK, CONTRACTOR SHALL PROVIDE ADEQUATE NOTIFICATION TO ALL AFFECTED BUSINESSES A MINIMUM OF 3 WORKING DAYS IN ADVANCE OF ANY INTERRUPTION.

GOPHER STATE ONE-CALL

IT IS THE LAW THAT ANYONE EXCAVATING AT ANY SITE MUST NOTIFY GOPHER STATE ONE CALL (GSOC) SO THAT UNDERGROUND ELECTRIC, NATURAL GAS, TELEPHONE OR OTHER UTILITY LINES CAN BE MARKED ON OR NEAR YOUR PROPERTY BEFORE ANY DIGGING BEGINS. A 48-HOUR NOTICE, NOT INCLUDING WEEKENDS, IS REQUIRED. CALLS CAN BE MADE TO GSOC AT 1-800-252-1166 OR (651)454-0002, MONDAY THROUGH FRIDAY (EXCEPT HOLIDAYS) FROM 7 A.M. TO 5 P.M.

ALL ELEVATIONS ARE IN
NAVD 88 - DATUM

Item	MnDOT Reference #	Unit	Estimated
Mobilization	2021.501	LS	1.00
Clearing	2101.505	ACRE	0.1
Aggregate Base (CV), Class ____	2211.507	CY	5.00
Furnish and Install Fish Barrier	2452.602	EA	1.00
Hand-placed Riprap	2511.507	CY	10.00
Traffic Control	2565.501	LS	1.00
Stabilized Construction Exit	2573.501	LS	1.00
Silt Fence, Type SD	2573.503	LF	30.00
Erosion Control Blanket, Category 3N	2575.504	SY	50.00
Seeding	2575.505	ACRE	0.05
Seed, Mixture 34-171	2575.508	LB	1.00
Seed, Mixture 36-711	2575.508	LB	4.00

SHEET LIST TABLE

SHEET NUMBER	SHEET TITLE
01	TITLE SHEET
02	SITE PLAN
03	DETAILS SHEET 1
04	DETAILS SHEET 2

* THIS PLAN SET CONTAINS 04 PLAN SHEETS

GOVERNING SPECIFICATIONS

THE 2020 EDITION OF THE MINNESOTA DEPARTMENT OF TRANSPORTATION "STANDARD SPECIFICATIONS FOR CONSTRUCTION" SHALL GOVERN

ALL TRAFFIC CONTROL DEVICES AND SIGNING SHALL CONFORM TO MINNESOTA MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES, INCLUDING FIELD MANUAL FOR TEMPORARY CONTROL ZONE LAYOUTS.

CLIENT

THREE RIVERS PARK DISTRICT
3000 XENIUM LANE NORTH
PLYMOUTH, MN 55441

ENGINEER

EMMONS & OLIVIER RESOURCES, INC.
1919 UNIVERSITY AVENUE WEST, SUITE 300
ST PAUL, MN 55104-3455
TELEPHONE: (651) 770-8448
FAX: (651) 770-2552
eorinc.com

6			
5			
4			
3	02/28/2020	KDC	PERMIT SUBMITTAL - NOT FOR CONSTRUCTION
2	02/10/2020	DEM	60% DRAFT PLANS - NOT FOR CONSTRUCTION
1	01/20/2020	DEM	CONCEPT PLANS - NOT FOR CONSTRUCTION
NO	DATE	BY	REVISION



I HEREBY CERTIFY THAT THIS PLAN, SPECIFICATION, OR PERMIT 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.
NOT FOR CONSTRUCTION
DATE: 02/28/2020 LICENSE # 54906

SUBMISSION DATE: 02/28/2020		
DESIGN BY	DRAWN BY	CHECKED BY
KDC	DEM	DRL
EOR PROJECT NO. 1075-0016		

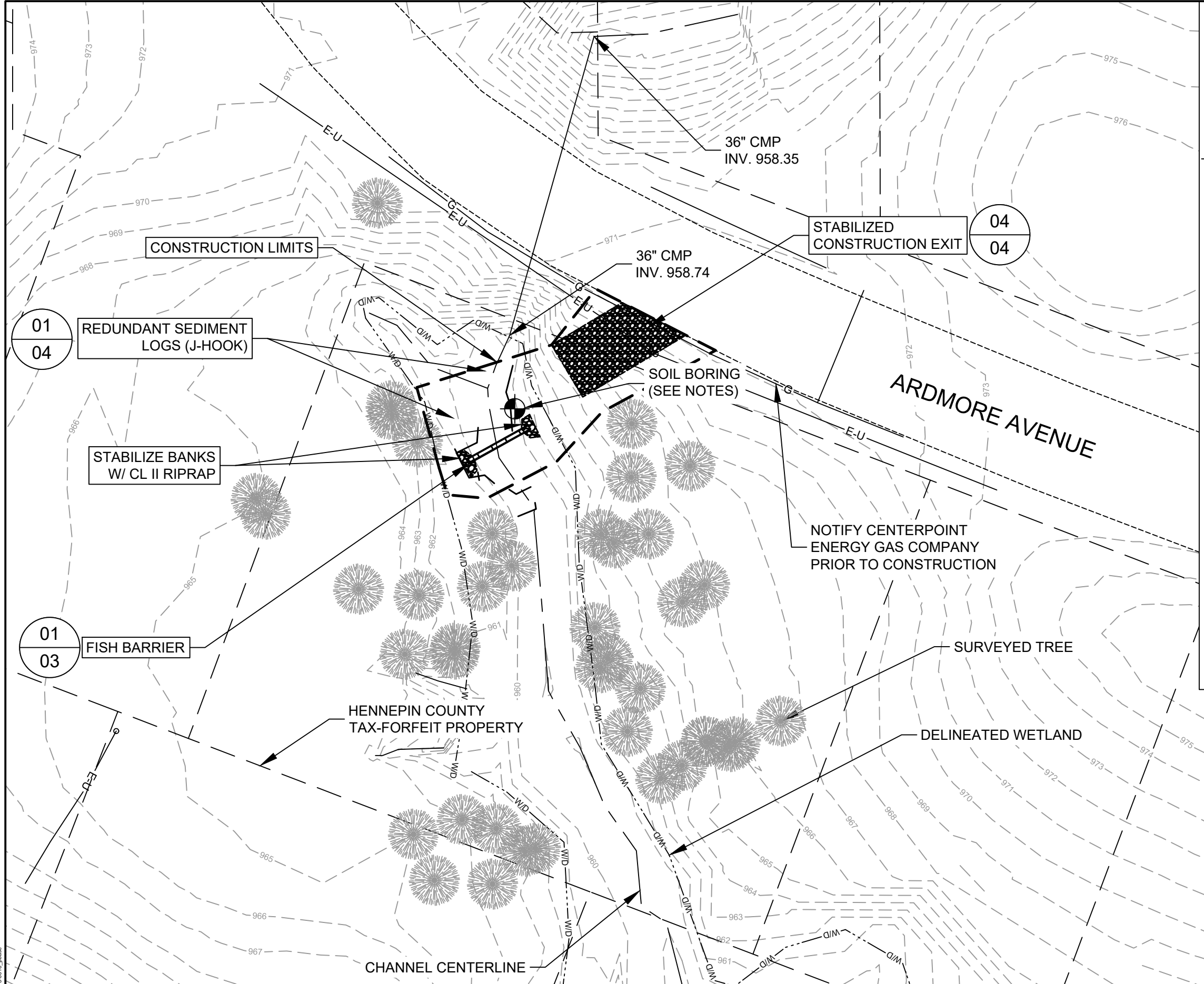
EOR Emmons & Olivier
Resources, Inc.
1919 University Ave W,
Suite 300, St Paul, MN 55104
Tele: 651.770.8448
www.eorinc.com



LAKE ARDMORE FISH BARRIER
MEDINA, HENNEPIN COUNTY,
MINNESOTA

TITLE SHEET

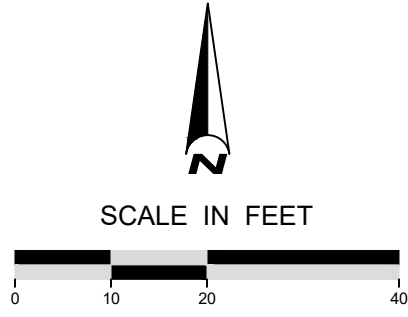
SHEET 01 OF 04 SHEETS







- NOTES:**
1. REFER TO NORTHERN TECHNOLOGIES, LLC. "GEOTECHNICAL EXPLANATION AND ENGINEERING REVIEW" DOCUMENT (NTI PROJECT NO. 19.MSP.09141.000) FOR FURTHER SOILS INFORMATION AND RECOMMENDATIONS.
 2. ALL AREAS ABOVE WETLAND LINE TO BE RESTORED WITH ECB CAT. 3N AND MNDOT SEED MIX 36-711. ALL AREAS BELOW WETLAND SHALL BE RESTORED WITH ECB CAT. 3N AND MNDOT SEED MIX 34-171.
 3. ONLY TREES AND SHRUBS NECESSARY TO ACCESS SITE AND PERMIT THE WORK SHALL BE CLEARED. CONTRACTOR SHALL WALK THE SITE WITH OWNER AND ENGINEER PRIOR TO CLEARING ACTIVITIES.

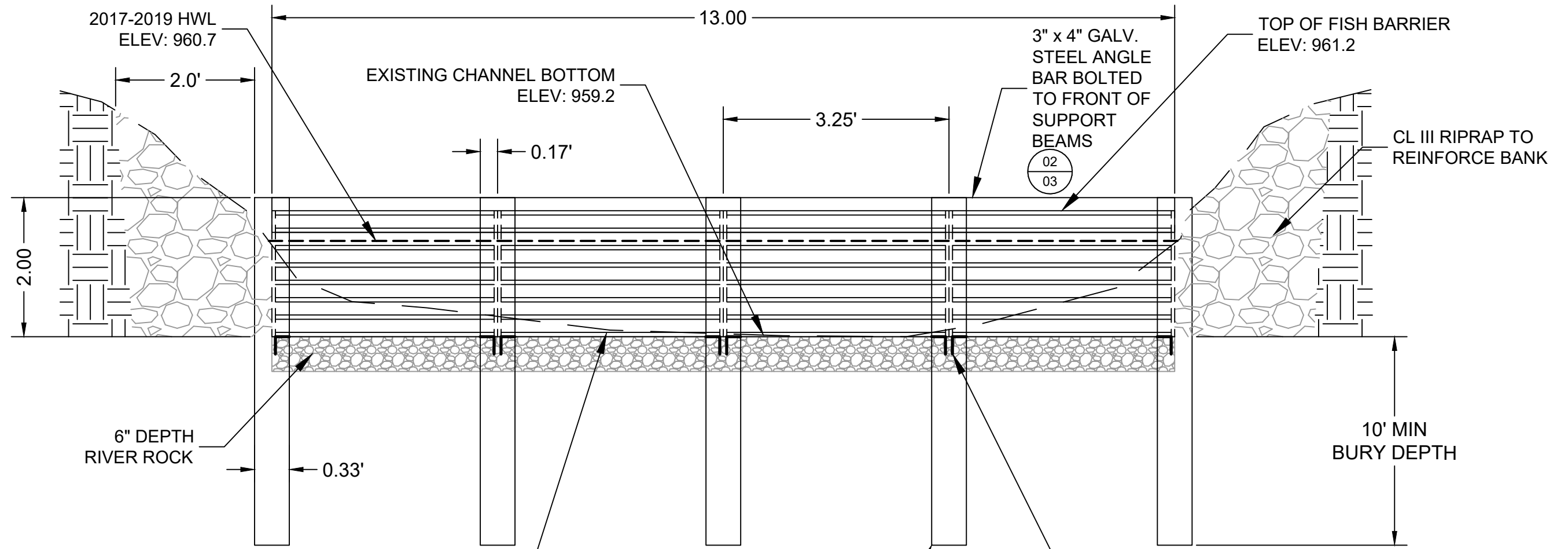
SOIL BORING - 1 - SURFACE ELEVATION: 964.0
964.0 TO 962.5 - TOPSOIL
962.5 TO 957.5 - SANDY LEAN CLAY (CL)
957.5 TO 955.0 - CLAYEY SAND (SC)
955.0 TO 946.0 - SANDY LEAN CLAY (CL)

NO GROUND WATER OBSERVED ON 11/20/19

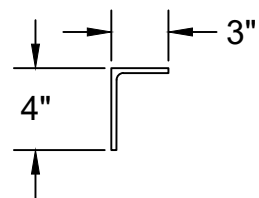


<div><div><div>6</div><div>5</div><div>4</div><div>3</div><div>2</div><div>1</div><div>NO</div></div><div><div>DATE</div><div>02/28/2020</div><div>02/10/2020</div><div>01/20/2020</div><div></div></div><div><div>BY</div><div>KDC</div><div>DEM</div><div>DEM</div><div></div></div><div><div>REVISION</div><div>PERMIT SUBMITTAL - NOT FOR CONSTRUCTION</div><div>60% DRAFT PLANS - NOT FOR CONSTRUCTION</div><div>CONCEPT PLANS - NOT FOR CONSTRUCTION</div><div></div></div></div>				<div></div> <div>1. 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.</div> <div>NOT FOR CONSTRUCTION</div> <div>DATE: 02/28/2020</div> <div>LICENSE # 54906</div>		<div>SUBMISSION DATE: 02/28/2020</div> <div>DESIGN BY: KDC DRAWN BY: DEM CHECKED BY: DRL</div> <div>EOE PROJECT NO. 1075-0016</div>		<div>Emmons & Olivier Resources, Inc.</div> <div>1919 University Ave W, Suite 300, St Paul, MN 55104 Tel: 651.770.8448 www.eorinc.com</div>		<div></div> <div>LAKE ARDMORE FISH BARRIER MEDINA, HENNEPIN COUNTY, MINNESOTA</div> <div>STATE PROJECT NO. --- CITY PROJECT NO. ---</div>		<div>SITE PLAN</div> <div>SHEET 02 OF 04 SHEETS</div>	
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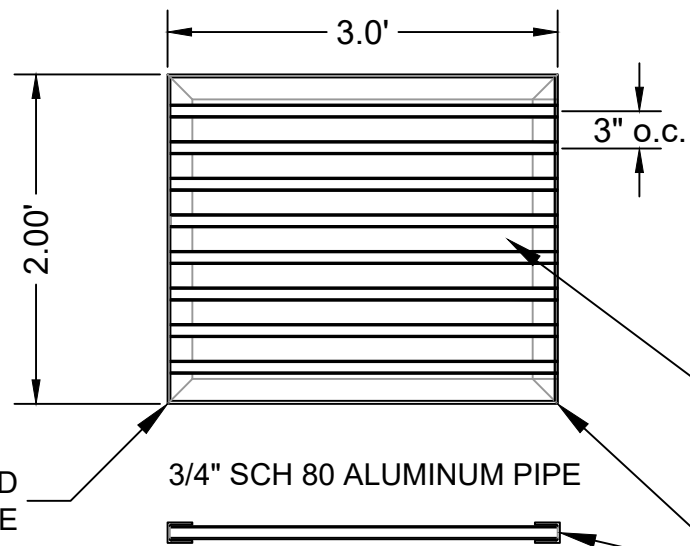
Plot Date: 02/28/2020
C:\Users\State\OneDrive\Three Rivers_Park_District\0016_Ardmore_Camp_Barrier_Design\09_GNIS\dwg\1075-0016_CD.dwg
Xrefs: 1075-0016_xbase2, 1075-0016_xbase



02
03 GALVANIZED STEEL
ANGLE BAR



FRONT GRATE (4)

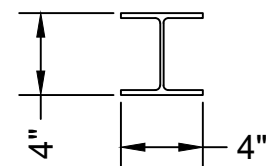


FULL WELD AROUND
END & SIDES OF PIPE

3/4" SCH 80 ALUMINUM PIPE

ALUMINUM
ANGLE
FRAME

GALVANIZED STEEL
SUPPORT RODS (5)



3 1/2" X 3 1/2" X 1/4"
GALVANIZED
STEEL SUPPORT
ANGLE (8) BOLTED
TO SUPPORT RODS

NOTES

1. DRILL 1/4 INCH WEEP HOLES IN BOTTOM CENTER OF ALL ALUMINUM PIPES.
2. DIMENSIONS SHOWN ARE NOMINAL. CONTRACTOR IS RESPONSIBLE FOR FABRICATION AND CONSTRUCTION TO WORKABLE TOLERANCES.
3. FISH BARRIER SHALL NOT IMPEDE FLOWS.
4. BOLTS SHALL BE 3/4" DIA., GALVANIZED AND TIGHTENED MECHANICALLY WITH GALVANIZED NUTS.

01
03 FISH BARRIER DETAIL
NOT TO SCALE

Plot Date: 02/28/2020
 User: KDC\KDC\Projects\State\1075_Three Rivers_Park_District\0016_Ardmore_Camp_Barrier_Detail\0016_CD.dwg
 Xrefs: 1075-0016_Xref.dwg

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3	02/28/2020	KDC	PERMIT SUBMITTAL - NOT FOR CONSTRUCTION
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NO	DATE	BY	REVISION



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NOT FOR CONSTRUCTION
 DATE: 02/28/2020 LICENSE # 54906

SUBMISSION DATE:
 02/28/2020
 DESIGN BY: KDC DRAWN BY: DEM CHECKED BY: KDC
 EOR PROJECT NO.
 1075-0016

EOR Emmons & Olivier
 Resources, Inc.
 1919 University Ave W,
 Suite 300, St Paul, MN 55104
 Tele: 651.770.8448
 www.eorinc.com

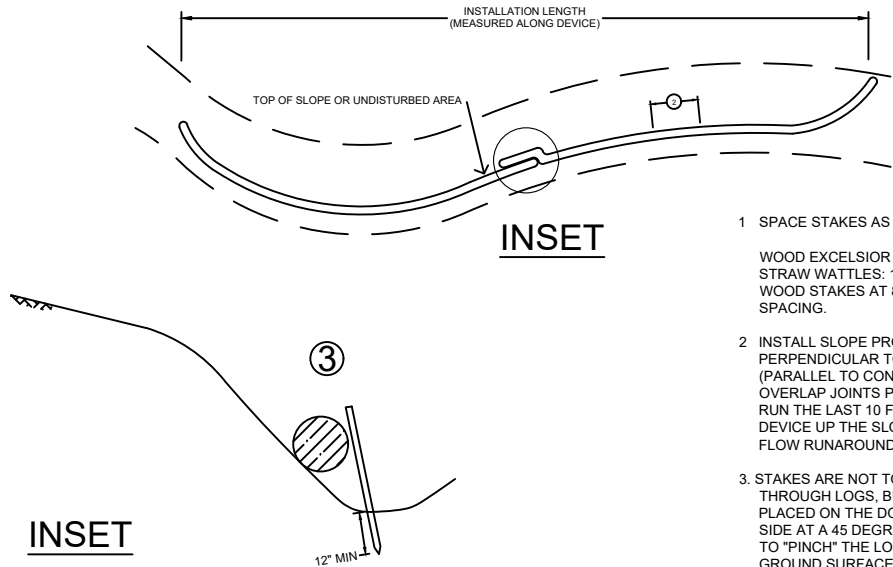


LAKE ARDMORE FISH BARRIER
 MEDINA, HENNEPIN COUNTY,
 MINNESOTA

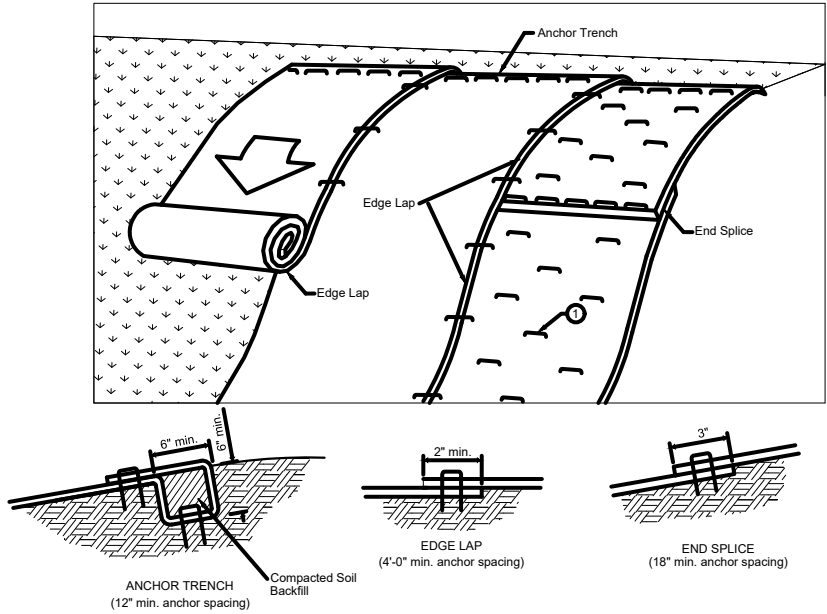
STATE PROJECT NO. --- CITY PROJECT NO. ---

DETAILS SHEET 1

SHEET 03 OF 04 SHEETS



- 1 SPACE STAKES AS FOLLOWS:
- WOOD EXCELSIOR LOGS AND STRAW WATTLES: 1"X1" NOMINAL WOOD STAKES AT 8 FOOT MAXIMUM SPACING.
- 2 INSTALL SLOPE PROTECTION PERPENDICULAR TO SLOPE (PARALLEL TO CONTOURS). OVERLAP JOINTS PER DETAIL 'A'. RUN THE LAST 10 FEET OF EACH DEVICE UP THE SLOPE TO PREVENT FLOW RUNAROUND.
3. STAKES ARE NOT TO PROTRUDE THROUGH LOGS, BUT RATHER PLACED ON THE DOWNSTREAM SIDE AT A 45 DEGREE ANGLE SO AS TO "PINCH" THE LOG TIGHT TO THE GROUND SURFACE



- NOTES:
1. SECURE BLANKET TO GROUND ACCORDING TO MANUFACTURER'S RECOMMENDED ANCHORING PATTERN AND MINIMUM SHOWN IN TABLE 1.
 2. SPACE TOP ROW OF STAPLES AT 18 INCH, BOTTOM ROW AT 36 INCH CENTERS, AND ALL OTHERS AT 24 INCH CENTERS. APPROXIMATELY 30 STAPLES REQUIRED PER SQUARE (100 SQ.-FT.) OF EROSION CONTROL MAT.
 3. WHERE EROSION GULLIES HAVE DEVELOPED IN BACKSLOPE, FILL WITH SOIL AND COMPACT PRIOR TO PLACEMENT OF EROSION CONTROL MAT.
 4. 4 FEET MINIMUM TO 8 FEET MAXIMUM OR AS SPECIFIED. PLACE STAPLES THE SAME AS FOR SPECIAL DITCH CONTROL.
 5. 4 FEET UNLESS SPECIFIED OTHERWISE FOR FORESLOPE PROTECTION.
 6. IF EROSION RILL HAS DEVELOPED ADJACENT TO SHOULDER MATERIAL, FILL WITH SUITABLE SOIL AND COMPACT PRIOR TO PLACEMENT OF MAT.
 7. EROSION CONTROL BLANKET SHALL BE MNDOT CATEGORY 3.

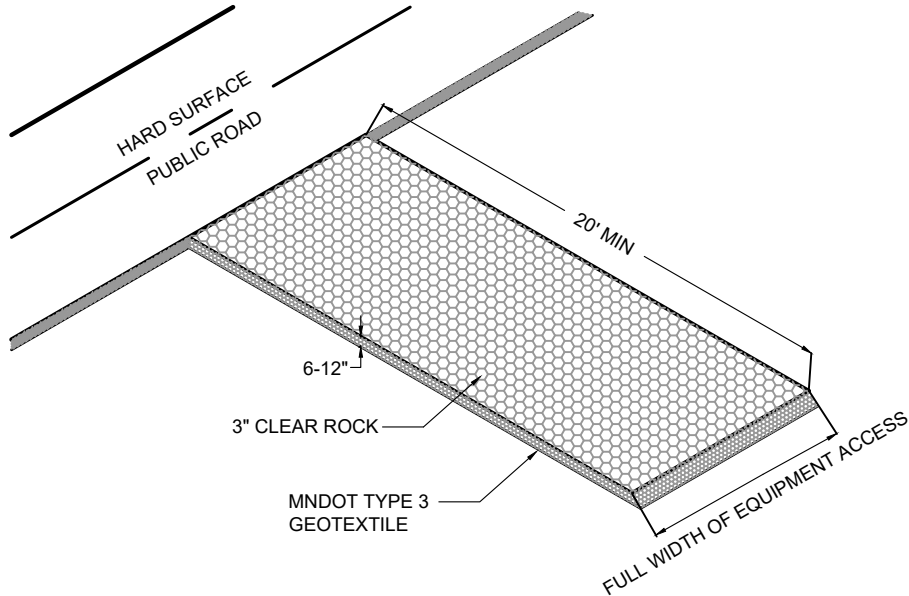
TABLE 1	
Max. slope	Min. anchors
≤ 3:1	1.5/yd²
2:1	2/yd²
1:1	2.5/yd²

01 SEDIMENT LOG

NOT TO SCALE

02 EROSION CONTROL BLANKET

NOT TO SCALE



- NOTE :
- STABILIZED CONSTRUCTION EXIT SHALL BE MAINTAINED FOR THE DURATION OF THE CONSTRUCTION PROCESS.
 - ROCK SHALL BE UNDERLINED WITH MNDOT TYPE 3 GEOTEXTILE FABRIC.
 - CONTRACTOR SHALL EXPECT TO SWEEP/CLEAN THE ADJACENT ROAD AS SITE CONSTRAINTS LIMIT THE CONSTRUCTION EXIT LENGTH.

03 STABILIZED CONSTRUCTION EXIT

NOT TO SCALE

Plot Date: 02/28/2020
Drawn By: KDC
Check By: DEM
Scale: 1/8\"/>

6			
5			
4			
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NOT FOR CONSTRUCTION

DATE: 02/28/2020
LICENSE # 54906

SUBMISSION DATE: 02/28/2020		
DESIGN BY KDC	DRAWN BY DEM	CHECKED BY DRL
EOR PROJECT NO. 1075-0016		

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LAKE ARDMORE FISH BARRIER
MEDINA, HENNEPIN COUNTY,
MINNESOTA

STATE PROJECT NO. --- CITY PROJECT NO. ---

DETAILS SHEET 2

SHEET 04 OF 04 SHEETS



APPENDIX C

CONSTRUCTION PHOTOS



Date: December 10, 2020

To: Pioneer-Sarah Creek Watershed Management Commission

From: Brian Vlach – Three Rivers Park District

Subject: Ardmore Channel Carp Barrier

Three Rivers Park District monitored carp movement in the Lake Independence watershed in 2018 and 2019. A total of 205 carp were implanted with Passive Integrated Tags (PIT) in both Lake Independence and Lake Ardmore. PIT antennas were placed at three locations to monitor carp movement and identify potential carp nursery areas. These carp movement monitoring PIT antennas were placed at Highway 19 crossing over Spurzem Creek, Pagenkopf Road crossing over Pioneer Creek, and the outlet channel of Ardmore Lake. Carp movement was minimal at the Highway 19 Spurzem Creek location with only one carp detected at this location in 2018 and 2019. The data suggests that majority of the carp are moving in large numbers during the spring using Pioneer Creek and Ardmore Creek to actively seek shallow lakes to spawn. Ardmore Lake was identified as a primary nursery area for carp based on a previous carp population/biomass estimate conducted on the lake in 2017. It was recommended that a carp barrier be installed within the Ardmore Channel to prevent carp movement between Lake Independence and Ardmore Lake.

An Ardmore Channel Carp Barrier Feasibility Study was conducted in 2019 to consider different options that would prevent carp migration between Lake Independence and Ardmore Lake. The study recommended a removable fish grate in the open channel located downstream of the Ardmore Lake outlet culvert on Ardmore Avenue. The design plans and permits for the project were completed/acquired in the spring of 2020. The construction of the carp barrier was just recently installed by U.S. SiteWork during the week of November 23rd through 30th, 2020. This was a collaborative project between Pioneer-Sarah Creek Watershed Management Commission, City of Medina, Hennepin County, Board of Water and Soil Resources, and Three Rivers Park District. The final project costs for the design/permitting and construction/installation of the carp barrier was \$58,092. The following photos were taken during the installation of the carp barrier.











APPENDIX D

PROJECT COSTS

Invoice

Emmons & Olivier Resources, Inc.
7030 6th Street N
Oakdale, MN 55128-6146
Phone 651.770.8448
Fax 651.770.2552
www.eorinc.com

**Invoice Total \$2,775.75**

Brian Vlach
Three Rivers Park District
3000 Xenium Lane North
Plymouth, MN 55441

September 18, 2019
Invoice No: 01075-0016 - 1

Job 01075-0016 Ardmore Carp Barrier Design

Summary of Work Performed:

- Coordination with City, Hennepin County and TRPD on barrier design, costs and logistics.
- Initial barrier design work.
- Permitting discussions with DNR and coordination with City.

Professional Services from August 1, 2019 to August 31, 2019

Phase 01 Stakeholder Meetings
Professional Personnel

	Hours	Rate	Amount	
Professional 4	7.50	169.00	1,267.50	
Totals	7.50		1,267.50	
Total Labor				1,267.50
Total this Phase				\$1,267.50

Phase 02 Fish Barrier Design
Professional Personnel

	Hours	Rate	Amount	
Professional 4	7.00	169.00	1,183.00	
Professional 2	.25	125.00	31.25	
Totals	7.25		1,214.25	
Total Labor				1,214.25
Total this Phase				\$1,214.25

Phase 03 Fish Barrier Permitting
Professional Personnel

	Hours	Rate	Amount	
Professional 4	1.00	169.00	169.00	
Professional 2	1.00	125.00	125.00	
Totals	2.00		294.00	
Total Labor				294.00
Total this Phase				\$294.00
Total this Invoice				\$2,775.75

Invoice

Emmons & Olivier Resources, Inc.
7030 6th Street N
Oakdale, MN 55128-6146
Phone 651.770.8448
Fax 651.770.2552
www.eorinc.com

**Invoice Total \$1,071.25**

Brian Vlach
Three Rivers Park District
3000 Xenium Lane North
Plymouth, MN 55441

October 22, 2019
Invoice No: 01075-0016 - 2

Job 01075-0016 Ardmore Carp Barrier Design

Summary of Work Performed:

- Geotechnical consultant solicitation and proposed reviews.
- Wetland delineation discussions and coordination.
- Project management and client correspondence.

Professional Services from September 1, 2019 to September 30, 2019

Phase 02 Fish Barrier Design

Professional Personnel

	Hours	Rate	Amount	
Professional 4	3.75	169.00	633.75	
Professional 2	2.00	125.00	250.00	
Totals	5.75		883.75	
Total Labor				883.75
		Total this Phase		\$883.75

Phase 03 Fish Barrier Permitting

Professional Personnel

	Hours	Rate	Amount	
Professional 2	1.50	125.00	187.50	
Totals	1.50		187.50	
Total Labor				187.50
		Total this Phase		\$187.50

Total this Invoice \$1,071.25

Invoice

Emmons & Olivier Resources, Inc.
7030 6th Street N
Oakdale, MN 55128-6146
Phone 651.770.8448
Fax 651.770.2552
www.eorinc.com

**Invoice Total \$1,687.20**

Brian Vlach
Three Rivers Park District
3000 Xenium Lane North
Plymouth, MN 55441

November 14, 2019
Invoice No: 01075-0016 - 3

Job 01075-0016 Ardmore Carp Barrier Design

Summary of Work Performed:

- Geotechnical consultant discussions.
- Wetland field delineation and report.
- Project management and client correspondence.

Professional Services from October 1, 2019 to October 31, 2019

Phase 02 Fish Barrier Design

Professional Personnel

	Hours	Rate	Amount
Professional 2	.25	125.00	31.25
Totals	.25		31.25
Total Labor			31.25
Total this Phase			\$31.25

Phase 03 Fish Barrier Permitting

Professional Personnel

	Hours	Rate	Amount
Professional 4	3.50	169.00	591.50
Professional 2	8.50	125.00	1,062.50
Totals	12.00		1,654.00
Total Labor			1,654.00

Reimbursable Expenses

Copies, Prints, and Photo - Reimbursable	1.95
Total Reimbursables	1.95

Total this Phase \$1,655.95

Total this Invoice \$1,687.20

Invoice

Emmons & Olivier Resources, Inc.
7030 6th Street N
Oakdale, MN 55128-6146
Phone 651.770.8448
Fax 651.770.2552
www.eorinc.com

**Invoice Total \$1,662.91**

Brian Vlach
Three Rivers Park District
3000 Xenium Lane North
Plymouth, MN 55441

December 7, 2019
Invoice No: 01075-0016 - 4

Job 01075-0016 Ardmore Carp Barrier Design

Summary of Work Performed:

- Site survey and investigation.
- Wetland field delineation and report.
- Project management and client correspondence.

Professional Services from November 1, 2019 to November 30, 2019

Phase 01 Stakeholder Meetings

Unit Billing

Company Vehicle Mileage
Differential GPS Charge
Spatial Station Charge

277.41**Total this Phase****\$277.41**

Phase 02 Fish Barrier Design

Professional Personnel

	Hours	Rate	Amount
Professional 2	1.75	125.00	218.75
Professional 1	11.25	99.00	1,113.75
Technician 3	.50	106.00	53.00
Totals	13.50		1,385.50

Total Labor**1,385.50****Total this Phase****\$1,385.50****Total this Invoice****\$1,662.91**

Invoice

Emmons & Olivier Resources, Inc.
7030 6th Street N
Oakdale, MN 55128-6146
Phone 651.770.8448
Fax 651.770.2552
www.eorinc.com



Invoice Total	\$573.99
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Brian Vlach
Three Rivers Park District
3000 Xenium Lane North
Plymouth, MN 55441

January 9, 2020
Invoice No: 01075-0016 - 5

Job 01075-0016 Ardmore Carp Barrier Design

Summary of Work Performed:

- Drafted basemap and reviewed soil boring information.
- Project management and client correspondence.

Professional Services from December 1, 2019 to December 31, 2019

Phase 02 Fish Barrier Design

Professional Personnel

	Hours	Rate	Amount	
Professional 2	1.00	125.00	125.00	
Professional 1	2.50	99.00	247.50	
Totals	3.50		372.50	
Total Labor				372.50
Total this Phase				\$372.50

Phase 03 Fish Barrier Permitting

Professional Personnel

	Hours	Rate	Amount	
Professional 2	1.25	125.00	156.25	
Totals	1.25		156.25	
Total Labor				156.25

Reimbursable Expenses

Mileage - Reimbursable			45.24	
Total Reimbursables			45.24	45.24
Total this Phase				\$201.49
Total this Invoice				\$573.99

Invoice

Emmons & Olivier Resources, Inc.
7030 6th Street N
Oakdale, MN 55128-6146
Phone 651.770.8448
Fax 651.770.2552
www.eorinc.com

**Invoice Total \$7,256.80**

Brian Vlach
Three Rivers Park District
3000 Xenium Lane North
Plymouth, MN 55441

February 8, 2020
Invoice No: 01075-0016 - 6

Job 01075-0016 Ardmore Carp Barrier Design

Summary of Work Performed:

- Drafted project concept and discussed with TRPD.
- Discussed costs with suppliers.

Professional Services from January 1, 2020 to January 31, 2020

Phase 02 Fish Barrier Design

Professional Personnel

	Hours	Rate	Amount	
Professional 4	.50	169.00	84.50	
Professional 2	12.00	125.00	1,500.00	
Professional 1	12.00	99.00	1,188.00	
Totals	24.50		2,772.50	
Total Labor				2,772.50

Consultants

Northern Technologies, LLC	3,450.00	
Consultants Total	3,450.00	3,450.00

Reimbursable Expenses

Copies, Prints, and Photo - Reimbursable	1.05	
Total Reimbursables	1.05	1.05

Total this Phase \$6,223.55

Phase 03 Fish Barrier Permitting

Professional Personnel

	Hours	Rate	Amount	
Professional 2	2.50	125.00	312.50	
Professional 1	4.25	99.00	420.75	
Totals	6.75		733.25	
Total Labor				733.25

Reimbursable Expenses

Misc Reimbursable Expense	300.00	
Total Reimbursables	300.00	300.00

Total this Phase \$1,033.25

Total this Invoice \$7,256.80

Invoice

Emmons & Olivier Resources, Inc.
1919 University Ave. W, Ste 300
St. Paul, MN 55104-3455
Phone 651.770.8448
Fax 651.770.2552
www.eorinc.com



Invoice Total	\$2,184.90
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Brian Vlach
Three Rivers Park District
3000 Xenium Lane North
Plymouth, MN 55441

March 18, 2020
Invoice No: 01075-0016 - 7

Job 01075-0016 Ardmore Carp Barrier Design

Summary of Work Performed:

- Project management, QA/QC.
- Permitting correspondence and submittals to PSCWMC.
- Finalized draft designs.

Professional Services from February 1, 2020 to February 29, 2020

Phase 01 Stakeholder Meetings

Professional Personnel

	Hours	Rate	Amount	
Professional 2	1.00	125.00	125.00	
Totals	1.00		125.00	
Total Labor				125.00
Total this Phase				\$125.00

Phase 02 Fish Barrier Design

Professional Personnel

	Hours	Rate	Amount	
Professional 4	1.00	169.00	169.00	
Professional 2	5.25	125.00	656.25	
Totals	6.25		825.25	
Total Labor				825.25

Reimbursable Expenses

Copies, Prints, and Photo - Reimbursable			.40	
Total Reimbursables			.40	.40
Total this Phase				\$825.65

Phase 03 Fish Barrier Permitting

Professional Personnel

	Hours	Rate	Amount	
Professional 4	1.50	169.00	253.50	
Professional 2	4.25	125.00	531.25	
Professional 1	.50	99.00	49.50	
Totals	6.25		834.25	
Total Labor				834.25

Job	01075-0016	Ardmore Carp Barrier Design	Invoice	7
Reimbursable Expenses				
	Misc Reimbursable Expense		400.00	
	Total Reimbursables		400.00	400.00
		Total this Phase		\$1,234.25
		Total this Invoice		\$2,184.90

Invoice

Emmons & Olivier Resources, Inc.
1919 University Ave. W, Ste 300
St. Paul, MN 55104-3455
Phone 651.770.8448
Fax 651.770.2552
www.eorinc.com

**Invoice Total \$839.50**

Brian Vlach
Three Rivers Park District
3000 Xenium Lane North
Plymouth, MN 55441

May 14, 2020
Invoice No: 01075-0016 - 8

Job 01075-0016 Ardmore Carp Barrier Design

Summary of Work Performed:

- Project management, QA/QC.
- Permitting correspondence and submittals to PSCWMC.
- Finalized draft designs.

Professional Services from April 1, 2020 to April 30, 2020

Phase 01 Stakeholder Meetings

Professional Personnel

	Hours	Rate	Amount	
Professional 2	3.50	125.00	437.50	
Totals	3.50		437.50	
Total Labor				437.50
Total this Phase				\$437.50

Phase 02 Fish Barrier Design

Professional Personnel

	Hours	Rate	Amount	
Professional 1	1.00	99.00	99.00	
Technician 3	.50	106.00	53.00	
Totals	1.50		152.00	
Total Labor				152.00
Total this Phase				\$152.00

Phase 03 Fish Barrier Permitting

Professional Personnel

	Hours	Rate	Amount	
Professional 2	2.00	125.00	250.00	
Totals	2.00		250.00	
Total Labor				250.00
Total this Phase				\$250.00
Total this Invoice				\$839.50

Invoice

Emmons & Olivier Resources, Inc.
1919 University Ave. W, Ste 300
St. Paul, MN 55104-3455
Phone 651.770.8448
Fax 651.770.2552
www.eorinc.com

**Invoice Total \$873.78**

Brian Vlach
Three Rivers Park District
3000 Xenium Lane North
Plymouth, MN 55441

September 21, 2020
Invoice No: 01075-0016 - 9

Job 01075-0016 Ardmore Carp Barrier Design

Summary of Work Performed:
Design, bidding correspondence, oversight.

Professional Services from August 1, 2020 to August 31, 2020

Phase 01 Stakeholder Meetings

Reimbursable Expenses

Mileage - Reimbursable	27.03	
Total Reimbursables	27.03	27.03
Total this Phase		\$27.03

Phase 02 Fish Barrier Design

Professional Personnel

	Hours	Rate	Amount
Professional 2	6.50	125.00	812.50
Totals	6.50		812.50
Total Labor			812.50

Reimbursable Expenses

Copies, Prints, and Photo - Reimbursable	3.00	
Total Reimbursables	3.00	3.00
Total this Phase		\$815.50

Phase 03 Fish Barrier Permitting

Professional Personnel

	Hours	Rate	Amount
Professional 2	.25	125.00	31.25
Totals	.25		31.25
Total Labor			31.25

Total this Phase \$31.25

Total this Invoice \$873.78

Invoice

Emmons & Olivier Resources, Inc.
1919 University Ave. W, Ste 300
St. Paul, MN 55104-3455
Phone 651.770.8448
Fax 651.770.2552
www.eorinc.com

**Invoice Total \$643.25**

Brian Vlach
Three Rivers Park District
3000 Xenium Lane North
Plymouth, MN 55441

December 28, 2020
Invoice No: 01075-0016 - 10

Job 01075-0016 Ardmore Carp Barrier Design

Summary of Work Performed:

- Construction oversight.
- Correspondence with City, TRPD, Contractor.

Professional Services from November 1, 2020 to November 30, 2020

Phase 04 Bidding Oversight

Professional Personnel

	Hours	Rate	Amount	
Professional 2	4.75	125.00	593.75	
Professional 1	.50	99.00	49.50	
Totals	5.25		643.25	
Total Labor				643.25
		Total this Phase		\$643.25
		Total this Invoice		\$643.25

APPLICATION AND CERTIFICATION FOR PAYMENT

AIA DOCUMENT G702

TO OWNER: Three Rivers Park District
3000 Xenium Lane North
Minneapolis, MN 55441

PROJECT: Ardmore Channel Carp
Barrier Project No. BAK-2003

APPLICATION NO: 1

Distribution to:
☐ OWNER
☐ ARCHITECT
☒ CONTRACTOR
☐
☐

FROM CONTRACTOR: US SiteWork, Inc.
11040 183rd Circle NW Suite B
Elk River, MN 55330

VIA ARCHITECT:

PERIOD TO: 11/30/20

USSW Job #: 201660

CONTRACT FOR:

CONTRACT DATE: September 17, 2020

CONTRACTOR'S APPLICATION FOR PAYMENT

Application is made for payment, as shown below, in connection with the Contract.
Continuation Sheet, AIA Document G703, is attached.

1. ORIGINAL CONTRACT SUM	\$	39,016.00
2. Net change by Change Orders	\$	150.00
3. CONTRACT SUM TO DATE (Line 1 + 2)	\$	39,166.00
4. TOTAL COMPLETED & STORED TO DATE (Column N on G703)	\$	39,166.00
5. RETAINAGE:		
a. 5.00% of Completed Work (Column N on G703)	\$	1,958.30
b. 0% of Stored Material (Column M on G703)	\$	0.00
Total Retainage (Lines 5a + 5b or Total in Column Q of G703)	\$	1,958.30
6. TOTAL EARNED LESS RETAINAGE (Line 4 Less Line 5 Total)	\$	37,207.70
7. LESS PREVIOUS CERTIFICATES FOR PAYMENT (Line 6 from prior Certificate)	\$	
8. CURRENT PAYMENT DUE	\$	37,207.70
9. BALANCE TO FINISH, INCLUDING RETAINAGE (Line 3 less Line 6)	\$	1,958.30

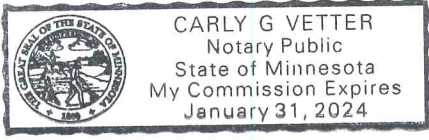
CHANGE ORDER SUMMARY	ADDITIONS	DEDUCTIONS
Total changes approved in previous months by Owner		
Total approved this Month	\$150.00	
TOTALS	\$150.00	\$0.00
NET CHANGES by Change Order	\$150.00	

The undersigned Contractor certifies that to the best of the Contractor's knowledge, information and belief the Work covered by this Application for Payment has been completed in accordance with the Contract Documents, that all amounts have been paid by the Contractor for Work for which previous Certificates for Payment were issued and payments received from the Owner, and that current payment shown herein is now due.

CONTRACTOR:

By: Bart Andrus Date: 11/30/20

State of: MINNESOTA
County of: SHERBURNE
Subscribed and sworn to before me this 30 day of NOV 2020
Notary Public: [Signature]
My Commission expires: January 31, 2024



ARCHITECT'S CERTIFICATE FOR PAYMENT

In accordance with the Contract Documents, based on on-site observations and the data comprising the application, the Architect certifies to the Owner that to the best of the Architect's knowledge, information and belief the Work has progressed as indicated, the quality of the Work is in accordance with the Contract Documents, and the Contractor is entitled to payment of the AMOUNT CERTIFIED.

AMOUNT CERTIFIED \$

(Attach explanation if amount certified differs from the amount applied. Initial all figures on this Application and on the Continuation Sheet that are changed to conform with the amount certified.)
ARCHITECT:

By: _____ Date: _____

This Certificate is not negotiable. The AMOUNT CERTIFIED is payable only to the Contractor named herein. Issuance, payment and acceptance of payment are without prejudice to any rights of the Owner or Contractor under this Contract.



APPENDIX E

LITERATURE CITED

Literature Cited

Baer, P.G., Sullivan, G., & Sorensen, P.W. (2009). Effects of a rapidly increasing population of common carp on vegetative cover and waterfowl in a recently restored Midwestern shallow lake. *Hydrobiologia*, 632(1), 235-245.

Baer, P.G., & Sorensen, P.W. (2015). Effects of common carp on phosphorus concentrations, water clarity, and vegetation density: a whole system experiment in a thermally stratified lake. *Hydrobiologia*, 746(1), 303-311.

Fieldseth, E., Bajer, P., Swanson, C., & Barlow, J. (2020). Carp biomass Assessment in Lake Independence Carp Movement and Nursery Location Monitoring. Report prepared for Three Rivers Park District. Prepared by Carp Solutions LLC. Pages 1-19.

Wein, J., & Bajer, P. (2017). Estimating the abundance, age-structure, recruitment sites and movement patterns of common carp in the tributary lakes of Lake Independence. Report for Three Rivers Park District. Prepared by Carp Solutions LLC. Pages 1-14.

Wein, J., Claus, A., & Bajer, P. (2019). Carp abundance estimate in Lake Independence and monitoring of carp movement using PIT antenna systems. Report for Three Rivers Park District. Prepared by Carp Solutions LLC. Pages 1-10.

Pioneer-Sarah Creek Watershed Management Commission



Baker Campground Ravine Stabilization

Annual Progress Report

2020



Submitted

To



Submitted

By



Baker Campground Ravine Stabilization Project
Annual Progress Report
2020

Background

Lake Independence is among one of the most visible and highly valued recreational water bodies in Hennepin County. The Three Rivers Park District owns and operates the Baker Park Reserve that provides 4,500 feet of public accessible shoreline on Lake Independence. The Baker Park Reserve has two swimming beaches, a public watercraft access, fishing piers, picnic and playground areas, trails, and a campground area. The lake was listed as impaired for excessive nutrients by the MPCA in 2002. The Lake Independence Total Maximum Daily Load and Implementation Plan was completed by Three Rivers Park District in partnership with the Pioneer-Sarah Creek Watershed Management Commission in 2007. The TMDL study identified phosphorus loading from the watershed as the main cause of the impairment, and emphasized phosphorus load reductions from the watershed as the primary means to improve water quality in the lake to meet state water quality standards.

A sub-watershed assessment was completed in 2014 by the City of Independence in partnership with Hennepin County Environmental Services and the Anoka County Conservation District to identify areas within the Lake Sarah and Lake Independence watersheds that were considered significant sources of nutrient loading (Lake Sarah and Lake Independence Stormwater Retrofit Analysis 2014). The sub-watershed assessment identified an eroding ravine within the City of Medina and the Baker Park Reserve as a potentially significant source of phosphorus and sediment loading to Lake Independence. A subsequent joint effort between the Pioneer-Sarah Creek Watershed Commission (PSCWMC), the cities of Medina and Independence, and Three Rivers Park District completed a more detailed feasibility study in 2016 that evaluated the ravine as a source of pollutant loading to Lake Independence, assessed the cost-effectiveness of multiple watershed and in-ravine management options to decrease those loads, and generated recommendations on how to proceed to address the issue (Baker Park Reserve Campground Ravine and Sub-watershed Assessment 2016). The sub-watershed assessment estimated the eroding channel contributes approximately 277 pounds of total phosphorus and 300 tons of sediment loading annually to Lake Independence.

The most cost-effective approach to decrease phosphorus and sediment loading to Lake Independence from the project area is to stabilize 1,800 linear feet of the main channel and an additional 400 feet in two tributary ravines adjacent to the Baker Park Reserve Campground. A series of rock grade control structures would be installed throughout the main ravine and two tributary ravines to control the channel grade. In addition, the channel reaches would be lined with combination of rounded field stone and angular rip-rap up to the expected 10-year flood elevation. It is anticipated that average annual phosphorus loads to Lake Independence would be reduced by an estimated 134 pounds, at a cost per pound of phosphorus load reduction of less than \$130/pound based on an estimated project life of 30 years. This reduction in annual phosphorus load would accomplish 15% of the total watershed phosphorus load reduction that was required in the TMDL to meet state water quality standards.

Three Rivers Park District and the Pioneer-Sarah Creek Watershed Management Commission have taken the initiative to implement the Baker Campground Ravine Stabilization Project. It is estimated that the total costs to complete the project is \$520,000. The TMDL study and the two sub-watershed assessments/feasibility studies were valuable for acquiring grant funding that was necessary to proceed with the project. The Pioneer-Sarah Creek Watershed Management Commission received \$416,000 in Clean Water Legacy Funds from the Board of Water and Soil Resources; and received an additional \$59,500 in grant funding from the Hennepin County Opportunity Grant. The remaining portion of the funding will be cost-shared (\$44,500) between the Pioneer-Sarah Creek Watershed Management Commission, City of Independence, City of Medina, Three Rivers Park District, and Lake Independence Citizens Association. The construction of the project occurred during the winter of 2019 & 2020. The specific details of the annual progress for construction of the project is in the following section.

Project Construction Completion 2019-2020

- October 2019 – Wenck Associates scheduled the pre-construction meeting with Minnesota Native Landscape. Wenck Associates developed an agenda for the meeting. A record of the pre-construction meeting was developed with tasks assigned to work group members to answer questions that came up during the meeting.
 - October 23, 2019 – Pre-construction meeting at 9:00 AM with Minnesota Native Landscape.
 - October 24, 2019 – Wenck Associates developed the record of the pre-construction meeting. Work group members were assigned tasks to answer questions that came up during the pre-construction meeting.
 - October 25, 2019 – Three Rivers Park District verified authenticity for the performance bond and payment bond as well as certificate of liability insurance. Wenck Associates sent the Notice to Proceed to Minnesota Native Landscape.
- November 2019 – Wenck Associates and Three Rivers Park District had an on-site meeting with Minnesota Native Landscape to discuss start date, ravine access, staging locations for mobilization, and general construction questions. Wenck Associates would provide inspection logs (Appendix A) and photos (Appendix B) for the project. A decision was also made to have weekly construction meeting every Thursday at 9:00 AM after project start.
 - November 19, 2019 - Minnesota Native Landscape began site mobilization
 - November 20, 2019 - Wenck Associates provided staking for the construction access, adjacent property boundary, wetland boundary, and constructing limits. There were discussions on tree removal and firewood location.
 - November 21, 2019 – Completed the first weekly construction meeting with Minnesota Native Landscape. The work group completed a site inspection of the construction area. Minnesota Native Landscape began tree removal for site access. The clearing and removal of trees is approximately 1/4th completed for the project.

- November 25, 2019 – Wenck Associates provided staking for construction stabilization practices. Tree clearing has continued and the 2nd access road from the campground has been constructed. The floatation silt curtain has been installed at the bottom of the ravine by the lake. There have been several loads of class 3 riprap delivered to the project site.
- November 26, 2019 - Wenck Associates staked out stabilization practices from the access road to the upstream extents of the project. Piping was placed within the channel to create access for track truck leading upstream from the access road. Submittals have been received from contractor for Geotextiles fabric, Coir Erosion Control Blanket, and Straw Erosion Control Blanket.
- December 2019 - Minnesota Native Landscape continues construction stabilization of the ravine. An area was identified with severe head cutting that was not present during the initial surveys for the project. This new area of erosion was approved and added to the project as change order #1 (Appendix C). There was also an on-site meeting to showcase the project with BWSR, Hennepin County Environmental Services, Pioneer and Sarah Creek Watershed Management Commission, Wenck Associates, and Three Rivers Park District. There has been significant progress made with approximately 33% of the total project completed. Pioneer-Sarah Creek Watershed Management Commission received payment application #1 (Appendix C).
 - December 2, 2019 – Minnesota Native Landscape has been installing rip rap at the head waters of the channel. There have also been construction activities below the gabions and moving of rock to place geotextile fabric.
 - December 4, 2019 – Wenck Associates had discussions with Minnesota Native Landscape about seeding, erosion control blanket and geotextile. Construction activities have been moving and installation of rock into the vegetated riprap area adjacent to the neighbor's driveway. There is concern about an area that has head cutting leading up to the existing settling basin that was not present during the initial surveys for the project. This area should be addressed for erosion control with riprap as change order #1.
 - December 5, 2019 – Weekly construction meeting. The work group completed a site inspection of the construction area. It was decided that straw blanket could be substituted for hydro mulch on the seeded banks of the ravine channel. It was decided that the area experiencing severe head cutting adjacent to the settling basin will be included as part of the project as change order #1. Wenck Associates will provide cost estimates to repair this section of the project. Three Rivers Park District will get approval for change order #1 from Pioneer and Sarah Creek Watershed Management Commission.
 - December 6, 2019 – Hennepin County Environmental Services set up a meeting for a project site visit with the Board of Water and Soil Resources on December 19, 2019 at 10:30 AM. Wenck Associates inspected the first section of vegetated riprap in the upstream section of the side ravine. There was also discussion about installation of cross vanes. Both Class 3 and Class 1 riprap has been delivered to the site.

- December 9, 2019 – Construction on ravine 1 continued with placement of vegetated riprap toe, cross vanes, and erosion control fabric and seeding. Minnesota Native Landscape has completed 3 cross vane sections within the main channel. It is anticipated there might be a couple days of no work due to extreme cold temperatures.
 - December 12, 2019 – Weekly construction meeting. The work group completed a site inspection of the construction area. Construction within the Ravine 1 will be completed. Minnesota Native Landscape will supply rock quantity estimates to Wenck for review. Contractor will submit the first payment application for the project after Wenck reviews quantities.
 - December 19, 2019 – Weekly construction meeting. The work group completed a site inspection of the construction area. The construction for Ravine #1 has been completed and work is now taking place in main channel working downstream toward access road. The payment application has been submitted to Three Rivers Park District who will forward to Pioneer and Sarah Creek Watershed Management Commission for payment. There was a meeting with Board of Water and Soil Resources for video filming and photos of the project. There several project partners that attended the meeting that included Steve Christopher and Ann Wessel (BWSR), Jim Kujawa (Hennepin County Environmental Services), Joe Baker (Chair of Pioneer and Sarah Creek Watershed Management Commission), and Ed Matthiesen (Wenck Associates).
 - December 23, 2019 – Minnesota Native Landscape is working from the end of the ravine and working upstream to the settling basin. The construction is approximately 33% completed. There will be no weekly construction meeting due to the holidays.
 - December 30, 2019 – Three Rivers Park District received approval of change order #1 from Pioneer and Sarah Creek Watershed Management Commission. There was no construction due to poor weather conditions. Construction will resume tomorrow.
- January 2020 – Minnesota Native Landscape continues construction for stabilization of the ravine. The construction for change order #1 has been completed and should eliminate any erosion from the settling basin side channel. There has been another erosion area identified from a side slope adjacent to the campground area. If this area is not addressed, then run-off from this area will compromise and impact the stabilization efforts of the main channel. Wenck Associates provided cost estimates for change order #2 (Appendix C). Three Rivers Park District and Pioneer and Sarah Creek Watershed Management Commission approved change order #2. There has been significant progress made with approximately 75% of the total project completed by the end of January. Pioneer-Sarah Creek Watershed Management Commission received payment application #2 (Appendix C). It is estimated the project will be substantially completed by 2nd week in February.
 - January 2, 2020 – Weekly Construction Meeting. The work group completed a site inspection of the construction area. Construction is proceeding upstream from the wetland area to the settling basin adjacent to change order #1. Three Rivers Park District is still trying to get signatures from Pioneer and Sarah Creek Watershed Management Commission for change order #1. Wenck Associates went through all the

rock delivery slips to the site relative to the construction that has already been completed, and it appears that there is less rock needed for portions of the project in comparison to estimated quantities. The amount in savings due to over estimation of rock are similar to costs for adding change order #1 to the project.

- January 7, 2020 – Spillway construction is complete from the wetland to the outlet at Lake Independence.
- January 9, 2020 – Weekly Construction Meeting. The work group completed a site inspection of the construction area. Wenck Associates requested that additional vegetated riprap be added above the confluence of change order #1 side ravine and the main channel to protect high flow conditions. It was also requested that Minnesota Native Landscape add additional Class III riprap and geotextile fabric to the riprap spillway outlet to Lake Independence.
- January 16, 2020 – Weekly Construction Meeting. The work group completed a site inspection of the construction area. Three Rivers Park District received payment application #2. Wenck Associates requested that additional riprap is added at the ravine outlet to Lake Independence and downstream of the change order #1 ravine. Three Rivers Park District gave a project update on construction and budget at the Pioneer and Sarah Creek Watershed Management Commission Meeting.
- January 22, 2020 – Wenck Associates walked the construction site and reviewed the rock quantity from the trucking tickets.
- January 23, 2020 – Weekly Construction Meeting. Three Rivers Park District confirmed that payment application #1 has been paid to Minnesota Native Landscape. Minnesota Native Landscape is chipping material next week. The work group completed a site inspection of the construction area. A second area of potential erosion was discovered by Minnesota Native Landscape. Three Rivers Park District requested estimated cost for addressing this new erosion site. Wenck Associates will estimate the cost for a potential change order #2. There has been significant progress on the project with approximately 60% of the project completed.
- January 24, 2020 – Three Rivers Park District reviewed the cost estimates for change order #2. Wenck Associates indicated that the project would still be under budget implementing change order #2. Three Rivers Park District and Pioneer and Sarah Creek Watershed Management Commission approved change order #2.
- January 27, 2020 – Wenck visited the site to discuss construction for change order #2 with the contractor. It was decided that overland flow coming from the campground area will be directed and controlled into the center side ravine with check dams and not allowed to enter the smaller side channel.
- January 28, 2020 – Construction is on track to be completed during the first week of February 2020. There is approximately 120 linear feet of main channel and approximately 240 linear feet of access side ravine remaining that needs to be stabilized.
- January 30, 2020 – Weekly Construction meeting. Construction was completed for change order #2 with stabilization of the side ravine. The access side channel will be

stabilized next week. Expected to substantially complete by the end of the first week of February.

- February 2020 – Minnesota Native Landscape substantially completed the project the second week in February of 2020. The contractor finished cleaning up the site and wood chipping brush. The contractor demobilized the site with the removal of equipment. It is anticipated that there will be final site inspection sometime in May after seed germination.
 - February 6, 2020 – Weekly Construction Meeting. The access side channel stabilization is almost completed. The project will be substantially completed by tomorrow. Demobilization of the site will occur next week.
 - February 14, 2020 – The project has been substantially completed. Contractor spent the week chipping brush and cleaning up the site. Contractor was in the process of demobilizing equipment.
- March 2020 – The project was substantially completed in February of 2020. There was no additional construction. Pioneer-Sarah Creek Watershed Commission and Three Rivers Park District received construction payment application #3 from Minnesota Native Landscape (Appendix C) as well as invoices for administrative services from Wenck Associates (Appendix D).
 - March 4, 2020 – Received the Payment Application #3 for the project. Also received a technical memo explaining the change orders for the project.
 - Construction budget approved for the project = \$430,805.00
 - The total quantity of rock to be imported and installed for the project was overestimated. However, the two change orders for the project off-set some of the remaining budget dollars available due to the overestimation of rock quantity.
 - Cost of change order #1 = \$7,502.00
 - Cost of change order #2 = \$14,156.00
 - The total estimated cost projection to finish construction including final cleanup was approximately \$420,000, which is almost \$10,000 below the original construction budget approved by the Commission.
 - March 5, 2020 – Received spreadsheet summary of invoices from Wenck associates for administrative services coordinating the project.
 - Wenck estimated budget for administrative services = \$111,053.00
 - Total Monthly Invoices for actual administrative services = \$71,853.68
 - The total estimated cost projection for administrative services will be under budget = \$39,199.32 remaining in the budget
 - March 17, 2020 - Payment application #3 was paid to contractor by Pioneer-Sarah Creek Watershed Commission
 - March 19, 2020 – Pioneer-Sarah Creek Watershed Management Commission meeting discussed the following:
 - Project substantial completion
 - Payment applications #3

- Budget Technical Memo
 - It is anticipated that final inspection will occur May 29, 2020.
 - Expect Payment application #4 after the final inspection.
- April 2020 – Wenck has coordinated all final cleanup and restoration activities with Minnesota Native Landscapes. Final walk through for the project was scheduled for May 29, 2020. There was no other work completed toward the project due to Covid-19 restrictions.
 - April 7, 2020 – Three Rivers Park District had a phone interview meeting with Ann Wessel from the Board of Water and Soil Resources for a featured article about the Baker Ravine Stabilization Project.
- May 2020 – Final site inspection meeting was scheduled for the end of May. The project was considered final completion after the final site inspection. The final payment application #4 was received by Three Rivers Park District and submitted to the Pioneer-Sarah Creek Watershed Management Commission. Wenck Associates completed project and permit closeout paperwork. As-built survey was completed by Wenck Associates survey staff (Appendix E).
 - May 27, 2020 – Final site inspection meeting. A final walk-through meeting was completed with Wenck Associates, BWSR, Three Rivers Park District, Hennepin County, and Pioneer-Sarah Creek Watershed Management Commission. Wenck Associates also surveyed the channel for development of the final as-built design plans.
 - May 28, 2020 – The construction of the project came in \$9,249.10 under budget.
 - May 29, 2020 – Received final as-built design plans.
- June 2020 – Wenck Associates flew a drone through the Baker Ravine Channel for video of the completed project. Three Rivers Park District and Pioneer-Sarah Creek Watershed Commission received press article about the Baker Campground Ravine project from Board of Water and Soil Resources (Appendix F). The project was also featured as an article in the Minnesota Outdoors News The Sportsman's Weekly (Appendix F). Three Rivers Park District and Pioneer-Sarah Creek Watershed Management Commission also received the final budget numbers that included construction and project administration services from Wenck Associates.
 - June 5, 2020 – Drone Video flights conducted by Wenck Associates.
 - June 8, 2020 – Received BWSR article from Ann Wessel.
 - June 9, 2020 – Received Wenck Watershed New article from Wenck Associates. Also received final invoice and final budget summary from Wenck Associates. The amount remaining in the budget from design/administration was \$33,980.69.
 - June 18, 2020 – Received drone flight video from Wenck Associates.
- July 2020 – There was no work completed on the project.

- August 2020 – Three Rivers Park District worked with Hennepin County and Pioneer-Sarah Creek Watershed Management Commission to identify specific projects within the Lake Independence watershed to use the remaining funds (\$33,980.69).
- September 2020 – Submitted letter to Board of Water and Soil Resources for requesting a grant extension to use the remaining funds.
 - September 2, 2020 – Three Rivers Park District submitted letter to Board of Water and Soil Resources on behalf of Pioneer-Sarah Creek Watershed Commission requesting grant extension to use remaining grant funds.
- October 2020 – Received the grant amendment document from Board of Water and Soil Resources to extend grant funds to December 31, 2021. Three Rivers Park District updated the grant workplan to include additional projects to use the remaining grant dollars.
 - October 20, 2020 – Received unexecuted amendment grant document for the Baker Park Reserve Campground Ravine Stabilization project to use remaining funds on Hennepin County projects within the Lake Independence Watershed.
 - October 22, 2020 – Submitted the signed amendment grant agreement to use remaining grant dollars on Hennepin County projects within the Lake Independence Watershed. Updated the workplan to include the additional projects to use the remaining grant dollars.
- November 2020 – There was no work completed on the project.
- December 2020 – There was no work completed on the project.



APPENDIX A

Construction Logs



Wenck Associates
1800 Pioneer Creek Center
Maple Plain, Minnesota 55359
P: 763-479-4200

Project: 1508-0007 - Baker Ravine
Stabilization
2309 Baker Park Road
Maple Plain, Minnesota 55359

Daily Log: Tuesday 11/19/2019



Daily Log Completed

The Daily Log was completed by Seth Bossert on Wed Nov 20, 2019 at 01:08pm CST.

WEATHER REPORT

Temperature			Precipitation Since			Humidity				Windspeed		
Low	High	Avg	Midnight	2 Days Ago	3 Days Ago	Low	Avg	High	Dew	Avg	Max	Gust
34°F	42°F	38°F	0.09 in.	0.09 in.	0.13 in.	89%	95%	100%	37°F	3.9 mph	7 mph	7 mph

DAILY SNAPSHOT

06:00AM	09:00AM	12:00PM	03:00PM	06:00PM	09:00PM
cloudy 36°F	cloudy 37°F	cloudy 39°F	cloudy 42°F	cloudy 41°F	cloudy 39°F

OBSERVED WEATHER CONDITIONS

No.	Weather Delay	Sky	Temp	Average	Precipitation	Wind	Ground/Sea
1	No						

MANPOWER LOG

Workers | Man Hours

INSPECTION LOG

No.	Start Time	End Time	Inspection Type	Inspecting Entity	Inspector Name	Location	Area
1	09:00AM	10:45PM	Mobilization meeting	Wenck	Seth Bossert		
Comments: Meet with contractor Jeff Reiner and foreman Nate from MNL. Discussion was about access by the lake using the track truck. After reviewing the weight psi for the truck the engineer is comfortable with the contractor using the machine. The access shall be over the curb and along the pervious concrete trail then turning to the west across the turf past the new bathroom building then back onto the bituminous trail. The trail shall be protected during haunting and any resulting damage shall be fit at the contractor's expense. Memorial trees were discussed and the 3 with blue ribbons are to be protected during construction. The 4th memorial tree is able to be removed at the contractor's discretion. The fence was discussed to be removed and disposed of. Staking was discussed to happen on Wednesday by Wenck of the neighboring property line, construction access, wetland line and construction limits. The location for logs for firewood was discussed and located based on the direction of TRPD staff forester. Access off of camp sites E14/E16 was discussed and the removal of the existing Ash tree. Access off of E7 was discussed with the route to go through existing buckthorn while retaining the sumac. Tree removals were discussed and Wenck sent the contractor the removal list again as a pdf for reference.							

By

Date

Copies To



Wenck Associates
1800 Pioneer Creek Center
Maple Plain, Minnesota 55359
P: 763-479-4200

Project: 1508-0007 - Baker Ravine
Stabilization
2309 Baker Park Road
Maple Plain, Minnesota 55359

Daily Log: Wednesday 11/20/2019









Daily Log Completed

The Daily Log was completed by Seth Bossert on Wed Nov 20, 2019 at 01:07pm CST.

WEATHER REPORT

Temperature			Precipitation Since			Humidity				Windspeed		
Low	High	Avg	Midnight	2 Days Ago	3 Days Ago	Low	Avg	High	Dew	Avg	Max	Gust
36°F	45°F	40°F	0.04 in.	0.14 in.	0.14 in.	75%	87%	96%	37°F	6.3 mph	12 mph	24 mph

DAILY SNAPSHOT

06:00AM	09:00AM	12:00PM	03:00PM	06:00PM	09:00PM
					
cloudy 37°F	partly-cloudy-day 39°F	cloudy 41°F	cloudy 46°F	cloudy 43°F	cloudy 42°F

OBSERVED WEATHER CONDITIONS

No.	Weather Delay	Sky	Temp	Average	Precipitation	Wind	Ground/Sea
1	No						

MANPOWER LOG

Workers | Man Hours

NOTES LOG

No.	Issue?	Location	Comments
1	No		Phone call with contractor to discuss tree removals and if a decision has been made about the rootwads and logs to be used at Crow-Hassen dog park. As the tree removals line item had the preparation of the rootwads and logs as part of the base bid the contractor will proceed as if the rootwads will be reused and if not needed the contractor will remove them at no additional cost. Discussion was also had about the specifics of the tree removals and that no trees above the marked trees are to be taken as by-laws for the district prohibit tree removals in excess of 20 percent. The discussion continued that if a tree removal is not needed that has been marked as a removal this should be noted on the appendix B list and if a tree in the future need to be removed that is not on the list it could be discussed as a substitute. Tree tag number 1 was discussed as not needing to be removed for construction by the contractor at this time and noted as such.

Notes Log's Attachments:

By

Date

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Wenck Associates
1800 Pioneer Creek Center
Maple Plain, Minnesota 55359
P: 763-479-4200

Project: 1508-0007 - Baker Ravine
Stabilization
2309 Baker Park Road
Maple Plain, Minnesota 55359

Daily Log: Thursday 11/21/2019



Daily Log Completed

The Daily Log was completed by Seth Bossert on Fri Nov 22, 2019 at 06:56am CST.

WEATHER REPORT

Temperature			Precipitation Since			Humidity				Windspeed		
Low	High	Avg	Midnight	2 Days Ago	3 Days Ago	Low	Avg	High	Dew	Avg	Max	Gust
21°F	42°F	32°F	0.23 in.	0.23 in.	0.32 in.	71%	83%	94%	27°F	12.3 mph	16 mph	24 mph

DAILY SNAPSHOT

06:00AM	09:00AM	12:00PM	03:00PM	06:00PM	09:00PM
rain 36°F	sleet 35°F	cloudy 34°F	cloudy 30°F	partly-cloudy-night 25°F	cloudy 22°F

OBSERVED WEATHER CONDITIONS

No.	Weather Delay	Sky	Temp	Average	Precipitation	Wind	Ground/Sea
1	No						

MANPOWER LOG

Workers | Man Hours

INSPECTION LOG

No.	Start Time	End Time	Inspection Type	Inspecting Entity	Inspector Name	Location	Area
1	09:00AM	10:30AM	Weekly construction meeting	Wenck Associates inc.			

Comments: 1. Recap (Tree removals) - discussed the 20% max removals requirement for TRPD by-laws and no additional trees are to be removed. The contractor will keep a list of each tree NOT being removed.

2. Recap (Firewood sizes) - contractor asked if materials shorter than the 8ft are acceptable for firewood, Matt clarified that materials shorter than 4ft and up to 12ft in length are acceptable. The contractor and supervisor of the splitting station have communicated about staging and area will be made available for additional materials on Friday.

3. Staking - property lines, construction access/construction limits and the wetland were staked yesterday.

4. Staking of Stabilization practices - when would MNL like Wenck to stake out the practices and what sections would you like to start with?

Contractor stated Monday or Tuesday, Wenck will communicate with the contractor on the specifics and start staking on their schedule.

5. Construction Signage - TRPD has the signage made and is ready to post.

Questions/comments?

Rock size - After Reviewing with the designer and Engineer the material on site is acceptable for the Class 3 material. Martin

INSPECTION LOG

No.	Start Time	End Time	Inspection Type	Inspecting Entity	Inspector Name	Location	Area
							<p>Marietta, manufacturer, also has a smaller size that will work for the Class 2 material. The contractor has been notified about the decision.</p> <p>Chipped materials to be used on access routes, does 3 rivers want it for anywhere else, if not using the wood chip trail can it be hauled offsite? - Onsite conversation about the use of chipped material for access paths was approved by TRPD but materials will need to be removed after the access is done being used as additional trails are not desired back by the ravine.</p> <p>Matt stated that if the wood chip trail is not used the material can be hauled offsite. The contractor was informed that if the trail is used the it will need to be fixed and top dressed with new mulched material.</p> <p>Access road construction was discussed off of access point from campsite E7 to be constructed for bringing materials into the ravine. The contractor also discussed utilizing draintile piping to keep the ravine flowing during hauling by burying the pipe in tight areas and driving over the top. Erosion controls were discussed and the temp sediment basin is to be constructed on Friday and the floating silt curtain is to be installed before the end of the week. Tree clearing continues and approximately 1/4 has been accomplished to date. The site is generally muddy and there is no evidence of frost in the soil.</p> <p>Materials on site included: Class 3 Riprap, Class 3 Fieldstone, Class 2 fieldstone has been installed in the hand-placed portion of the ravine.</p> <p>Machinery onsite: 1 Track truck, 1 large excavator, 1 small excavator, 2 track loaders</p>

By

Date

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Wenck Associates
1800 Pioneer Creek Center
Maple Plain, Minnesota 55359
P: 763-479-4200







Project: 1508-0007 - Baker Ravine
Stabilization
2309 Baker Park Road
Maple Plain, Minnesota 55359

Daily Log: Monday 11/25/2019

WEATHER REPORT

Temperature			Precipitation Since			Humidity				Windspeed		
Low	High	Avg	Midnight	2 Days Ago	3 Days Ago	Low	Avg	High	Dew	Avg	Max	Gust
35°F	42°F	39°F	0.00 in.	0.00 in.	0.00 in.	62%	72%	78%	31°F	11.5 mph	15 mph	29 mph

DAILY SNAPSHOT

06:00AM	09:00AM	12:00PM	03:00PM	06:00PM	09:00PM
					
clear-night 39°F	clear-day 39°F	partly-cloudy-day 43°F	cloudy 41°F	cloudy 38°F	cloudy 37°F

OBSERVED WEATHER CONDITIONS

No.	Weather Delay	Sky	Temp	Average	Precipitation	Wind	Ground/Sea
1	No						

MANPOWER LOG

2 Workers | 16.0 Man Hours

No.	Contact/Company	Workers	#	Man	Location
			Hours	Hours	
1		2	8.0	16.0	
Notes: 1 foremen & 1 laborer					
		2		16.0	

Manpower Log's Attachments:

NOTES LOG

No.	Issue?	Location	Comments
1	No		Tree clearing has continued and the access road from E7 has been constructed. Tree 554 was asked to be removed as a substitute for the 4 to 5 trees that have been saved from removal, ok was given as it is at the bottom of the ravine and will need to be removed for access of material. Felled trees have been moved to the spitting station and coordinated with TRPD staff. A list of submittal requirements was sent to the contractor for clarification on what is required. The fence has been removed and is staged at the bottom of the ravine and will be removed once construction continues at the lower end of the project. The temporary sediment basin and floating silt curtain has been installed at the bottom of the ravine by the lake. Stabilization practices will be staked starting on Tuesday morning 11/26 by Wenck staff.
2	No		A discussion was had with the supplier to get move clarification on the riprap being provided. The material on-site will be considered Class 3 riprap even lacking some of the larger end of the gradation the calculations show that the shear stress will hold up. The supplier, Martin Marietta, provided additional

NOTES LOG

No.	Issue?	Location	Comments
			information on the Class 2 riprap that will range from 3" - 9", this material was also approved for use.

Notes Log's Attachments:

EQUIPMENT LOG

No.	Equipment Name	Cost Code	Hrs Operating	Hrs Idle	Inspected?	Inspection Time	Location
1					No	04:35PM	

Notes: 1 large excavator, 1 small excavator, 2 track loaders, 2 pickup trucks, 1 track truck

By _____

Date _____

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Wenck Associates
1800 Pioneer Creek Center
Maple Plain, Minnesota 55359
P: 763-479-4200

Project: 1508-0007 - Baker Ravine
Stabilization
2309 Baker Park Road
Maple Plain, Minnesota 55359

Daily Log: Tuesday 11/26/2019



Daily Log Completed

The Daily Log was completed by Seth Bossert on Tue Nov 26, 2019 at 03:23pm CST.

WEATHER REPORT

Temperature			Precipitation Since			Humidity				Windspeed		
Low	High	Avg	Midnight	2 Days Ago	3 Days Ago	Low	Avg	High	Dew	Avg	Max	Gust
32°F	36°F	34°F	0.12 in.	0.13 in.	0.13 in.	67%	71%	84%	26°F	9.9 mph	19 mph	35 mph

DAILY SNAPSHOT

06:00AM	09:00AM	12:00PM	03:00PM	06:00PM	09:00PM
cloudy 36°F	cloudy 35°F	cloudy 35°F	cloudy 35°F	cloudy 34°F	cloudy 33°F

OBSERVED WEATHER CONDITIONS

No.	Weather Delay	Sky	Temp	Average	Precipitation	Wind	Ground/Sea
1	No						

MANPOWER LOG

Workers | Man Hours

NOTES LOG

No.	Issue?	Location	Comments
1	No		Visited the site with Lucius and staked out stabilization practices from the access road to the upstream extents of the project. Discussed the staking with the contractor. Discussed the plan for construction today: Placing piping within the channel to create access for track truck leading upstream from the access road. Continue tree removals as necessary.
2	No		Submittals have been received from the contractor for Geotextile fabric, Coir Erosion Control blanket, and straw Erosion Control Blanket.
3	No		Inlet protection is needed in the two inlets along the bituminous roadway leading to the project staging areas. I let the contractor know they need to be installed prior to any additional hauling of materials into the site to mitigate tracking runoff.

Notes Log's Attachments:

INSPECTION LOG

No.	Start Time	End Time	Inspection Type	Inspecting Entity	Inspector Name	Location	Area
1	08:00AM	09:45AM			Seth Bossert & Lucius Jonett		
Comments: Staking Stabilization Practices							

By _____

Date _____

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Wenck Associates
1800 Pioneer Creek Center
Maple Plain, Minnesota 55359
P: 763-479-4200

Project: 1508-0007 - Baker Ravine
Stabilization
2309 Baker Park Road
Maple Plain, Minnesota 55359

Daily Log: Monday 12/2/2019



Daily Log Completed

The Daily Log was completed by Seth Bossert on Mon Dec 2, 2019 at 02:39pm CST.

WEATHER REPORT

Temperature			Precipitation Since			Humidity				Windspeed		
Low	High	Avg	Midnight	2 Days Ago	3 Days Ago	Low	Avg	High	Dew	Avg	Max	Gust
6°F	25°F	17°F	0.00 in.	0.02 in.	0.08 in.	61%	74%	87%	10°F	5.2 mph	8 mph	19 mph

DAILY SNAPSHOT

06:00AM	09:00AM	12:00PM	03:00PM	06:00PM	09:00PM
clear-night 8°F	clear-day 12°F	clear-day 22°F	clear-day 26°F	partly-cloudy-night 23°F	partly-cloudy-night 23°F

OBSERVED WEATHER CONDITIONS

No.	Weather Delay	Sky	Temp	Average	Precipitation	Wind	Ground/Sea
1	No						

MANPOWER LOG

Workers | Man Hours

INSPECTION LOG

No.	Start Time	End Time	Inspection Type	Inspecting Entity	Inspector Name	Location	Area
1	12:15PM	02:00PM	Construction inspection	Wenck Associates inc.	Seth Bossert		

Comments: Visited the site to discuss access within the ravine downstream of the access road off of campsite 7. Nate and Seth walked the site to the lake to determine how difficult the access would be with the track truck and excavator considering that the bottom of the ravine is flowing with water and very soft. 3 locations look to pose an issue and will need minor reshaping and reinforcement to cross the channel in the same methods being used upstream of the current access by minor toe reshaping and use of brush and logs to create a mattress to drive on. This method will also use piping when necessary to maintain flow within the channel.

At this time the contractor proposes to bring rock down from access at site 7 to approximately station 11+50 and bring the remainder of the rock in from the lake side where the fence was removed to station 12+50

Current construction activities include work at the base of the gabions and moving of rock to place the geotextile fabric. The large excavator was working in the channel with limited sinking in the upstream area at station 0+90

The floating silt curtain was broken at the lake and needs to be fixed, the inlet protection was noted to have been installed last week and the snow was removed from the main campground road by TRPD staff prior to work beginning today. The contractor also noted that he had compacted the snow on the woodchips trail as they anticipate using it for accessing the downstream portion of the project.

By

Date

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Wenck Associates
1800 Pioneer Creek Center
Maple Plain, Minnesota 55359
P: 763-479-4200

Project: 1508-0007 - Baker Ravine
Stabilization
2309 Baker Park Road
Maple Plain, Minnesota 55359

Daily Log: Wednesday 12/4/2019



Daily Log Completed

The Daily Log was completed by Seth Bossert on Wed Dec 4, 2019 at 03:05pm CST.

WEATHER REPORT

Temperature			Precipitation Since			Humidity				Windspeed		
Low	High	Avg	Midnight	2 Days Ago	3 Days Ago	Low	Avg	High	Dew	Avg	Max	Gust
21°F	36°F	30°F	0.01 in.	0.06 in.	0.06 in.	63%	70%	79%	22°F	6.5 mph	8 mph	11 mph

DAILY SNAPSHOT

06:00AM	09:00AM	12:00PM	03:00PM	06:00PM	09:00PM
clear-night 29°F	clear-day 30°F	clear-day 35°F	clear-day 36°F	clear-night 29°F	partly-cloudy-night 24°F

OBSERVED WEATHER CONDITIONS

No.	Weather Delay	Sky	Temp	Average	Precipitation	Wind	Ground/Sea
1	No						

MANPOWER LOG

Workers | Man Hours

INSPECTION LOG

No.	Start Time	End Time	Inspection Type	Inspecting Entity	Inspector Name	Location	Area
1	02:03PM	02:03PM	Construction Inspection	Wenck Associates Inc.	Seth Bossert		

Comments: Discussed with the contractor the seeding, erosion control blanket and geotextile. Construction activities were: moving of rock into the vegetated riprap area adjacent to the neighbors driveway at station 0+25. Access has been established down from the entry road at campsite 7 to station 12+00.

3 questions came up that will be discussed at tomorrow weekly meeting:

1 - Can the straw blanket be substituted for hydromulch as the access for hydromulch will be removed as the construction backs out of the ravine?

2 - What trees at very edge of the ravine NOT slated for removal should they be worked around or removed?

3 - An area adjacent to station 11+00 has head cutting leading up to the existing settling basin, is this an area that should be addressed while machinery is on site? What is the potential cost implications and is it able to be remedied as part of this grant?

By

Date

Copies To



Wenck Associates
1800 Pioneer Creek Center
Maple Plain, Minnesota 55359
P: 763-479-4200

Project: 1508-0007 - Baker Ravine
Stabilization
2309 Baker Park Road
Maple Plain, Minnesota 55359

Daily Log: Thursday 12/5/2019



Daily Log Completed

The Daily Log was completed by Seth Bossert on Thu Dec 5, 2019 at 10:57am CST.

WEATHER REPORT

Temperature			Precipitation Since			Humidity				Windspeed		
Low	High	Avg	Midnight	2 Days Ago	3 Days Ago	Low	Avg	High	Dew	Avg	Max	Gust
19°F	36°F	28°F	0.00 in.	0.02 in.	0.06 in.	70%	80%	88%	23°F	6.3 mph	12 mph	22 mph

DAILY SNAPSHOT

06:00AM	09:00AM	12:00PM	03:00PM	06:00PM	09:00PM
partly-cloudy-night 22°F	clear-day 27°F	partly-cloudy-day 34°F	partly-cloudy-day 36°F	partly-cloudy-night 32°F	partly-cloudy-night 31°F

OBSERVED WEATHER CONDITIONS

No.	Weather Delay	Sky	Temp	Average	Precipitation	Wind	Ground/Sea
1	No						

MANPOWER LOG

5 Workers | 6.75 Man Hours

No.	Contact/Company	Workers	# Hours	Man Hours	Location
1	Wenck Associates	2	1.5	3.0	
Notes: Seth Bossert & Lucius Jonett					
2		3	1.25	3.75	
Notes: Brian Vlach, Amy Nelson, Siresh					
		5		6.75	

Manpower Log's Attachments:

NOTES LOG

No.	Issue?	Location	Comments
1	No		Weekly Construction Meeting 12/5/2019 8:00 am - 9:30 am Topics for Discussion: 1 - Can the straw blanket be substituted for hydro mulch as the access for hydro mulch will be removed as the construction backs out of the ravine? Note on details 3,4,5/C-801: Areas upslope of erosion control to be hydromulched for bank stabilization No specific bid item was associated with the hydro mulch thus no specific quantity was called out

NOTES LOG

No.	Issue?	Location	Comments
			<p>The contractor may use straw blanket in lieu of hydromulch on steep slope areas and straw mulch, bid item 19, on flatter areas at NO additional cost to the contract.</p> <p>2 - What trees at very edge of the ravine NOT slated for removal should they be worked around or removed?</p> <p>Tree in question is tag number 593 - REMOVE to Mitigate against future issues under detail guidance of Leaners & Sweepers Currently 2 trees have been saved from the original removals list.</p> <p>3 - An area adjacent to station 11+00 has head cutting leading up to the existing settling basin, is this an area that should be addressed while machinery is on site? What is the potential cost implications and is it able to be remedied as part of this grant?</p> <p>Based on field observation and projections from the unit costs given by the contractor the estimated cost for the fix is \$7,700 - (See attached CO1 Estimate) (\$80 / TON) 88 TONS - CLASS 3 RIPRAP (\$4 / SY) 85 SY - GEOTEXTILE FABRIC (\$6 / SY) 67 SY - ROLANKA WOVEN BLANKET (\$3 / SY) 67 SY - STRAW EROSION CONTROL BLANKET</p> <p>At this time we are NOT requesting approval as we will track quantities of the project to see if funds are available to move from other line items. Once we are closer to constructing that portion of the project Wenck will work with the Contractor and Three Rivers Park District to get any necessary approvals for funding.</p> <p>4 - Update on Bid Alternate #3 - Rootwads and Logs to Crow-Hassen - No additional logs sources have been located at this time, but they can be used for another project in the future. - Wenck's recommendation is to stage them at the firewood processing area for use at a later date. * Brian will reach out to Matt for final say. Leave them for a couple of weeks but will finalize once word comes back from Matt.</p> <p>5 - Schedule update from Contractor. Is the anticipated completion date still before Christmas? tentatively end of January</p> <p>6 - Brian will reach out to Matt about what type of gravel is used on the campground site pads and roadway that could also be used for traction at access 7? Limestone class 2 crushed minus ?</p>

Notes Log's Attachments:

By _____	Date _____	Copies To _____
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Wenck Associates
1800 Pioneer Creek Center
Maple Plain, Minnesota 55359
P: 763-479-4200

Project: 1508-0007 - Baker Ravine
Stabilization
2309 Baker Park Road
Maple Plain, Minnesota 55359

Daily Log: Friday 12/6/2019









Daily Log Completed

The Daily Log was completed by Seth Bossert on Fri Dec 6, 2019 at 09:16am CST.

WEATHER REPORT

Temperature			Precipitation Since			Humidity				Windspeed		
Low	High	Avg	Midnight	2 Days Ago	3 Days Ago	Low	Avg	High	Dew	Avg	Max	Gust
12°F	28°F	18°F	0.01 in.	0.02 in.	0.03 in.	71%	80%	85%	13°F	7.3 mph	12 mph	23 mph

DAILY SNAPSHOT

06:00AM	09:00AM	12:00PM	03:00PM	06:00PM	09:00PM
					
clear-night 16°F	clear-day 13°F	clear-day 19°F	partly-cloudy-day 22°F	partly-cloudy-night 17°F	cloudy 17°F

OBSERVED WEATHER CONDITIONS

No.	Weather Delay	Sky	Temp	Average	Precipitation	Wind	Ground/Sea
1	No						

MANPOWER LOG

Workers | Man Hours

INSPECTION LOG

No.	Start Time	End Time	Inspection Type	Inspecting Entity	Inspector Name	Location	Area
1	08:00AM	08:35AM	Construction Inspection	Wenck	Seth Bossert		

Comments: Visited the site to view the first section of vegetated riprap installed per the contractors request. The section was in upstream most side ravine. It was approved as placed with seed verified on top of the soil prior to the installation of erosion controls. We also discussed the installed first cross vane. Both were approved. Discussion of the class 3 riprap in the spillway being carried up slightly higher where the ravine comes into the main channel. The class 1 riprap was delivered to the site yesterday and visually inspected and approved to meet the size requirements.

By

Date

Copies To



Wenck Associates
1800 Pioneer Creek Center
Maple Plain, Minnesota 55359
P: 763-479-4200

Project: 1508-0007 - Baker Ravine
Stabilization
2309 Baker Park Road
Maple Plain, Minnesota 55359

Daily Log: Monday 12/9/2019



Daily Log Completed

The Daily Log was completed by Seth Bossert on Mon Dec 9, 2019 at 03:11pm CST.

WEATHER REPORT

Temperature			Precipitation Since			Humidity				Windspeed		
Low	High	Avg	Midnight	2 Days Ago	3 Days Ago	Low	Avg	High	Dew	Avg	Max	Gust
0°F	31°F	16°F	0.22 in.	0.23 in.	0.25 in.	69%	82%	100%	12°F	12.1 mph	18 mph	29 mph

DAILY SNAPSHOT

06:00AM	09:00AM	12:00PM	03:00PM	06:00PM	09:00PM
fog 27°F	fog 19°F	partly-cloudy-day 14°F	cloudy 12°F	partly-cloudy-night 7°F	clear-night 2°F

OBSERVED WEATHER CONDITIONS

No.	Weather Delay	Sky	Temp	Average	Precipitation	Wind	Ground/Sea
1	No						

MANPOWER LOG

Workers | Man Hours

CALL LOG

No.	From	To	Start Time	End Time
1			01:40PM	01:45PM
Description: Called to see if the contractor was on site working today				

INSPECTION LOG

No.	Start Time	End Time	Inspection Type	Inspecting Entity	Inspector Name	Location	Area
1	01:55PM	02:40PM	Construction	Wenck Associates Inc.	Seth Bossert		
Comments: Work continues on ravine 1 with the placement of vegetated riprap toe, cross vanes, and erosion control fabric + seeding. Contractor has completed 3 cross vanes and is worked up from the main channel to approximately station 22+00. Discussed the contractors plan for working this week, they will continue to work Monday and Tuesday with an anticipated day off on Wednesday due to the cold temperatures. While on site Class 3 Riprap was delivered with a sidedump semi-truck.							

By

Date

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1800 Pioneer Creek Center
Maple Plain, Minnesota 55359
P: 763-479-4200

Project: 1508-0007 - Baker Ravine
Stabilization
2309 Baker Park Road
Maple Plain, Minnesota 55359

Daily Log: Thursday 12/12/2019



Daily Log Completed

The Daily Log was completed by Seth Bossert on Thu Dec 12, 2019 at 10:41am CST.

WEATHER REPORT

Temperature			Precipitation Since			Humidity				Windspeed		
Low	High	Avg	Midnight	2 Days Ago	3 Days Ago	Low	Avg	High	Dew	Avg	Max	Gust
7°F	19°F	13°F	0.09 in.	0.10 in.	0.11 in.	72%	80%	91%	8°F	7.2 mph	10 mph	22 mph

DAILY SNAPSHOT

06:00AM	09:00AM	12:00PM	03:00PM	06:00PM	09:00PM
cloudy 12°F	fog 13°F	partly-cloudy-day 18°F	partly-cloudy-day 20°F	partly-cloudy-night 15°F	partly-cloudy-night 12°F

OBSERVED WEATHER CONDITIONS

No.	Weather Delay	Sky	Temp	Average	Precipitation	Wind	Ground/Sea
1	No						

MANPOWER LOG

Workers | Man Hours

INSPECTION LOG

No.	Start Time	End Time	Inspection Type	Inspecting Entity	Inspector Name	Location	Area
1	09:00AM	10:00AM	Weekly construction meeting	Wenck Associates inc.	Seth Bossert		

Comments:

Meeting topics:

- 1. outstanding items (submittals)
 - Schedule updated
 - Seed tags
 - Erosion control tags
 - Geo-textile tag

Action Item: Contractor to collect tags for project file and deliver to Wenck.

2. Current construction activities since last week

- Ravine 1
- Contractor anticipates completing ravine this week and moving on to the main channel.

3. Bid alternate #3 limb and move rootwads and logs to Crow-Hassen park

- Jeff reviewed the distance to the new location, cost savings of \$200 for a total of \$12,300
- Brian was going to look into TRPD doing the moving
- Brian, Seth and Lucius will discuss design options for

Action Item: Crow-Hassen Dog Park project and a decision will be made to give the contractor direction.

INSPECTION LOG

No.	Start Time	End Time	Inspection Type	Inspecting Entity	Inspector Name	Location	Area
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4. Next week, after our weekly meeting, BWSR will be onsite shooting video and taking photographs.

- Make sure the site is visually presentable
- PPE required by HASP

5. Rock Vane installation quantity's seem to be running long based on the few that have been installed by the contractor. Quantities need to be reviewed against designed calculations. Contractor will send over the estimated numbers to see if quantities need to be shifted from one type to another Field stone Boulders vs Riprap.

Action Item: Contractor to supply rock quantity estimates to Wenck for review and discussion.

6. Contractor will be submitting 1 pay app for 2019. Once received Wenck will review the quantities and relay to TRPD for payment.

By _____

Date _____

Copies To _____



Wenck Associates
1800 Pioneer Creek Center
Maple Plain, Minnesota 55359
P: 763-479-4200

Project: 1508-0007 - Baker Ravine
Stabilization
2309 Baker Park Road
Maple Plain, Minnesota 55359

Daily Log: Thursday 12/19/2019



Daily Log Completed

The Daily Log was completed by Seth Bossert on Fri Dec 20, 2019 at 08:21am CST.

WEATHER REPORT

Temperature			Precipitation Since			Humidity				Windspeed		
Low	High	Avg	Midnight	2 Days Ago	3 Days Ago	Low	Avg	High	Dew	Avg	Max	Gust
7°F	25°F	16°F	0.01 in.	0.03 in.	0.04 in.	74%	87%	100%	13°F	5.0 mph	8 mph	17 mph

DAILY SNAPSHOT

06:00AM	09:00AM	12:00PM	03:00PM	06:00PM	09:00PM
clear-night 10°F	clear-day 10°F	clear-day 21°F	partly-cloudy-day 26°F	partly-cloudy-night 19°F	partly-cloudy-night 18°F

OBSERVED WEATHER CONDITIONS

No.	Weather Delay	Sky	Temp	Average	Precipitation	Wind	Ground/Sea
1	No						

MANPOWER LOG

Workers | Man Hours

INSPECTION LOG

No.	Start Time	End Time	Inspection Type	Inspecting Entity	Inspector Name	Location	Area
1	09:00AM	10:00AM	Weekly Construction meeting	Wenck Associates inc.	Seth Bossert, Lucius Jonett, Ed Matthiesen		

Comments: Weekly Construction Meeting:

1. Construction activity since last meeting: Ravine 1 is complete, work is now taking place in the main channel working down from Ravine 1 toward the access road.

2. Pay App #1 was received and sent on to TRPB. When is the expected payment to be issued? January PSCWMC meeting?

The signed pay app has been sent to Pioneer-Sarah Watershed Management Committee and will be processed soon.

3. Bid Alt #3 Harvest Root wads and Logs - Any word on other potential sources Brian? Would suggest approving. Any word on storage of materials at the Crow-Hassen Dog Park?

Approved. The rootwads and logs can be delivered to the Crow-Hassen dog park on the schedule of the contractor. Coordination is needed for the location of the root wads and logs for storage on site. The contractor shall let the TRPD know when they are delivering them with 48 hours notice so the district can set out cones indicating the desired location.

4. BWSR Video and photos today at 10:30am

INSPECTION LOG

No.	Start Time	End Time	Inspection Type	Inspecting Entity	Inspector Name	Location	Area
5.							
Contractor requested building a fire to keep workers warm during the winter season.							
TRPD, Matt Connor indicated that he is ok if MNL builds a fire to provide warmth. He just requests that the fire is contained with a fire ring or something equivalent.							

By	Date	Copies To
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Wenck Associates
1800 Pioneer Creek Center
Maple Plain, Minnesota 55359
P: 763-479-4200

Project: 1508-0007 - Baker Ravine
Stabilization
2309 Baker Park Road
Maple Plain, Minnesota 55359

Daily Log: Monday 12/23/2019









Daily Log Completed

The Daily Log was completed by Seth Bossert on Mon Dec 23, 2019 at 03:28pm CST.

WEATHER REPORT

Temperature			Precipitation Since			Humidity				Windspeed		
Low	High	Avg	Midnight	2 Days Ago	3 Days Ago	Low	Avg	High	Dew	Avg	Max	Gust
22°F	33°F	28°F	0.00 in.	0.01 in.	0.02 in.	75%	85%	96%	24°F	6.3 mph	9 mph	23 mph

DAILY SNAPSHOT

06:00AM	09:00AM	12:00PM	03:00PM	06:00PM	09:00PM
 cloudy 25°F	 cloudy 27°F	 cloudy 32°F	 cloudy 34°F	 cloudy 31°F	 cloudy 30°F

OBSERVED WEATHER CONDITIONS

No.	Weather Delay	Sky	Temp	Average	Precipitation	Wind	Ground/Sea
1	No						

MANPOWER LOG

Workers | Man Hours

NOTES LOG

No.	Issue?	Location	Comments
1	No		Visited the Site to inspect construction since Last week Thursday 12/19/2019. The contractor has moved down to the end of the ravine and is working back up to the settling basin. Discussed the installation of the riprap and took a photo sequence of the install process. Contractor stated that work will be up to the change order area on Monday and proposed utilizing the existing rock in the channel adjacent to the side ravine head cut to offset the cost by ~10 ton. A decision will be made on Monday and relayed to the contractor.

Notes Log's Attachments:

INSPECTION LOG

No.	Start Time	End Time	Inspection Type	Inspecting Entity	Inspector Name	Location	Area
1	02:00PM	03:10PM	Construction Inspection	Wenck Associates Inc.	Seth Bossert		
Comments:							

By

Date

Copies To



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1800 Pioneer Creek Center
Maple Plain, Minnesota 55359
P: 763-479-4200

Project: 1508-0007 - Baker Ravine
Stabilization
2309 Baker Park Road
Maple Plain, Minnesota 55359

Daily Log: Thursday 1/2/2020



Daily Log Completed

The Daily Log was completed by Seth Bossert on Thu Jan 2, 2020 at 11:18am CST.

WEATHER REPORT

Temperature			Precipitation Since			Humidity				Windspeed		
Low	High	Avg	Midnight	2 Days Ago	3 Days Ago	Low	Avg	High	Dew	Avg	Max	Gust
27°F	33°F	30°F	0.01 in.	0.03 in.	0.04 in.	77%	84%	87%	26°F	8.2 mph	12 mph	22 mph

DAILY SNAPSHOT

06:00AM	09:00AM	12:00PM	03:00PM	06:00PM	09:00PM
cloudy 32°F	cloudy 33°F	cloudy 32°F	partly-cloudy-day 30°F	partly-cloudy-night 28°F	cloudy 28°F

OBSERVED WEATHER CONDITIONS

No.	Weather Delay	Sky	Temp	Average	Precipitation	Wind	Ground/Sea
1	No						

MANPOWER LOG

Workers | Man Hours

INSPECTION LOG

No.	Start Time	End Time	Inspection Type	Inspecting Entity	Inspector Name	Location	Area
1	09:00AM	10:00AM	Weekly construction meeting	Wenck Associates inc.	Seth Bossert		

Comments: Weekly Construction Meeting

1. Change Order 1 - approval by TRPD, waiting on signature from TRPD then MNL. Last week went through all rock divered to the site thus far and we appear to be a bit ahead on amount accomplished vs. amount of rock specified for project. (\$7,500)

Action Item: TRPD to send signed CO#1

2. Work completed since last construction meeting - work has moved down to main channel working up from the wetland to the existing settling basin. Access has been from the lake side moving upstream.

3. Approval was given for Bid Alternate #3 limb and move logs and rootwads to Crow-Hassen park. Coordination is needed to allow time to stake out the staging location by TRPD. contractor to give 2 days notice to allow time for staking. Pay item should be submitted separately as this is coming from a different pot of money paid for directly by TRPD not the grant funding through PSCWMC.

Action Items:

3.1. Question about ash tree transportation with the county?

3.2 Location for staging area to be staked by Matt based on ~40 linear Ft side dump

3.3 Send Seth & LUCius the tree list provided by Stantec.

INSPECTION LOG

No.	Start Time	End Time	Inspection Type	Inspecting Entity	Inspector Name	Location	Area
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4. Construction schedule - Substantial competition is still on track for first week of February.

5. Tree limb to be trimmed by rock staging area by TRPD

Action Item - Accomplished during meeting by TRPD arborist

6. Wood chips trail - Since the compacted snow has not yielded any trail damage does TRPD want a pile of woodchips - matt? If so Where?

Action Item:

Ask Matt if a pile of wood chips is desired? If so where should it be placed?

By

Date

Copies To



Wenck Associates
1800 Pioneer Creek Center
Maple Plain, Minnesota 55359
P: 763-479-4200

Project: 1508-0007 - Baker Ravine
Stabilization
2309 Baker Park Road
Maple Plain, Minnesota 55359

Daily Log: Thursday 1/9/2020



Daily Log Completed

The Daily Log was completed by Seth Bossert on Thu Jan 9, 2020 at 02:07pm CST.

WEATHER REPORT

Temperature			Precipitation Since			Humidity				Windspeed		
Low	High	Avg	Midnight	2 Days Ago	3 Days Ago	Low	Avg	High	Dew	Avg	Max	Gust
15°F	33°F	24°F	0.01 in.	0.02 in.	0.03 in.	77%	84%	93%	20°F	10.1 mph	15 mph	36 mph

DAILY SNAPSHOT

06:00AM	09:00AM	12:00PM	03:00PM	06:00PM	09:00PM
partly-cloudy-night 22°F	partly-cloudy-day 24°F	partly-cloudy-day 31°F	partly-cloudy-day 33°F	partly-cloudy-night 26°F	partly-cloudy-night 20°F

OBSERVED WEATHER CONDITIONS

No.	Weather Delay	Sky	Temp	Average	Precipitation	Wind	Ground/Sea
1	No						

MANPOWER LOG

Workers | Man Hours

INSPECTION LOG

No.	Start Time	End Time	Inspection Type	Inspecting Entity	Inspector Name	Location	Area
1	09:00AM	10:30AM	Construction Inspection	Wenck Associates Inc.	Seth Bossert & Lucius Jonett		

Comments: Weekly Construction Meeting:

1. Work Completed Since last construction meeting: Riprap Spillway from the last cross vane to Lake Independence , Spillway from 11+20 to 12+25, CO#1 Riprap spillway.

Additional Vegetated riprap is to be added above the confluence of CO#1 side ravine and the main channel to protect in high flow conditions. Extra material and time will be tracked for payment.

2. Bid Alt #3 - Locations for storage have been marked at Crow-Hassen & Baker site off of Homestead Trail, Ash trees have been painted and all trees will be moving shortly to the staging areas.

2.1 Action item - MN Native Landscapes needs additional locations to be cleared at Crow-Hassen Dog Park, 3 areas the same size as previously cleared. Brian will talk to Matt about getting this completed.

2.2 Action Item - Contractor requested that Paul or Dan review a couple more logs for transport to see if they are Ash.

Q1. Any update on the Stantec Tree list?

**Might have some additional trees for the Crow-Hassen project from a roundabout project in the City of Dayton that can be reused.

INSPECTION LOG

No.	Start Time	End Time	Inspection Type	Inspecting Entity	Inspector Name	Location	Area
							Survey will be taking place in the next couple of weeks, once that information has been captured a final count for potential trees will be reviewed.
							3. Wood Chip Pile was to be marked along the woodchip trail by Matt - TRPD Forester for placement of any chipped materials.
							3.1 Action Item - Wood chip pile marker locating where the staging of materials was not found. Brian will reach out to Matt to place cones or stakes.
							4. Rock ticket photos will be taken today for tracking of the quantity and budget.
							Action Item - Seth to take photos and input rock delivery quantities into tracking spreadsheet & Send updated estimate of work complete vs. qty to date. Compete see email text.
							5. Questions?
							5.1 Action Item - Brian will check in on pay app 1 with PSCWMC (Judy)
							5.2 Site walk through to review progress + take photos.
							5.2.1 Action Item - Seth to take more photos today and upload to Wenck file transfer site for distribution.
							5.3 MNL to add additional Class III riprap and geotextile fabric to the Riprap spillway before entering into Lake Independence. Riprap is to be placed on the upper edge of the east side only, one foot in elevation above the existing ground surface on the opposite side berm. Discussed with contractor over the phone.
							5.4 Contractor to add rock to the upstream side of the existing culvert crossing along the woodchip trail.
							5.4.1 Action Item: Materials to be tracked for payment of Riprap.

By

Date

Copies To



Wenck Associates
1800 Pioneer Creek Center
Maple Plain, Minnesota 55359
P: 763-479-4200

Project: 1508-0007 - Baker Ravine
Stabilization
2309 Baker Park Road
Maple Plain, Minnesota 55359

Daily Log: Thursday 1/16/2020



Daily Log Completed

The Daily Log was completed by Seth Bossert on Fri Jan 24, 2020 at 08:12am CST.

WEATHER REPORT

Temperature			Precipitation Since			Humidity				Windspeed		
Low	High	Avg	Midnight	2 Days Ago	3 Days Ago	Low	Avg	High	Dew	Avg	Max	Gust
-13°F	1°F	-5°F	0.01 in.	0.06 in.	0.09 in.	61%	69%	77%	-13°F	6.3 mph	12 mph	26 mph

DAILY SNAPSHOT

06:00AM	09:00AM	12:00PM	03:00PM	06:00PM	09:00PM
clear-night -11°F	clear-day -12°F	clear-day -4°F	clear-day 1°F	clear-night -3°F	clear-night -4°F

OBSERVED WEATHER CONDITIONS

No.	Weather Delay	Sky	Temp	Average	Precipitation	Wind	Ground/Sea
1	No						

MANPOWER LOG

Workers | Man Hours

INSPECTION LOG

No.	Start Time	End Time	Inspection Type	Inspecting Entity	Inspector Name	Location	Area
1	09:00AM	09:50AM	Weekly Construction Meeting	Wenck Associates Inc	Seth Bossert		

Comments: Weekly construction meeting

1. Submittal Review: Rolanka Bio-D 40 substitute was approved. Slightly low tensile strength but well within the limits needed for the shear stress for the ravine.

2. Pay App #2 was submitted and will be sent to Brian today.

2.1 Action Item Seth to send completed Pay App #2 to Brian.

3. Follow up from Last Week's meeting:

3.1 Crow-Hassen additional plowed area - Matt responded that he would get it done. Has MNL checked to see if it will work?

3.2 Wood Chip Pile directed to be placed "At the bottom end of the woodchip trail closest to the lake will work out just fine. Dump them at that locaiton"

3.3 Additional riprap at ravine outlet - Has it been placed?

3.4 Additional Riprap to be added just down stream of the CO#1 ravine Veg Riprap. Quantity tracking -

INSPECTION LOG

No.	Start Time	End Time	Inspection Type	Inspecting Entity	Inspector Name	Location	Area
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3.5 Add riprap to woodchip trail culvet status - Complete?

4. questions / walkthrough - Yes

brian out at end of Jan

By

Date _____

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P: 763-479-4200

Project: 1508-0007 - Baker Ravine
Stabilization
2309 Baker Park Road
Maple Plain, Minnesota 55359

Daily Log: Wednesday 1/22/2020









Daily Log Completed

The Daily Log was completed by Seth Bossert on Fri Jan 24, 2020 at 08:15am CST.

WEATHER REPORT

Temperature			Precipitation Since			Humidity				Windspeed		
Low	High	Avg	Midnight	2 Days Ago	3 Days Ago	Low	Avg	High	Dew	Avg	Max	Gust
19°F	34°F	30°F	0.04 in.	0.06 in.	0.08 in.	80%	88%	96%	26°F	10.1 mph	14 mph	37 mph

DAILY SNAPSHOT

06:00AM	09:00AM	12:00PM	03:00PM	06:00PM	09:00PM
					
cloudy 29°F	cloudy 32°F	cloudy 35°F	cloudy 33°F	cloudy 33°F	cloudy 32°F

OBSERVED WEATHER CONDITIONS

No.	Weather Delay	Sky	Temp	Average	Precipitation	Wind	Ground/Sea
1	No						

MANPOWER LOG

Workers | Man Hours

INSPECTION LOG

No.	Start Time	End Time	Inspection Type	Inspecting Entity	Inspector Name	Location	Area
1	01:00PM	02:10PM	Construction Inspection	Wenck Associates Inc.	Seth Bossert		

Comments: Walked the construction site to view the current location of construction. Construction is complete to station 6+00. Photos of rock trucking tickets to tally for Thursday meeting.

By

Date

Copies To



Wenck Associates
1800 Pioneer Creek Center
Maple Plain, Minnesota 55359
P: 763-479-4200

Project: 1508-0007 - Baker Ravine
Stabilization
2309 Baker Park Road
Maple Plain, Minnesota 55359

Daily Log: Thursday 1/23/2020









Daily Log Completed

The Daily Log was completed by Seth Bossert on Fri Jan 24, 2020 at 08:10am CST.

WEATHER REPORT

Temperature			Precipitation Since			Humidity				Windspeed		
Low	High	Avg	Midnight	2 Days Ago	3 Days Ago	Low	Avg	High	Dew	Avg	Max	Gust
28°F	32°F	30°F	0.11 in.	0.15 in.	0.17 in.	88%	92%	100%	28°F	5.0 mph	6 mph	14 mph

DAILY SNAPSHOT

06:00AM	09:00AM	12:00PM	03:00PM	06:00PM	09:00PM
 cloudy 30°F	 cloudy 29°F	 cloudy 31°F	 cloudy 31°F	 cloudy 31°F	 cloudy 30°F

OBSERVED WEATHER CONDITIONS

No.	Weather Delay	Sky	Temp	Average	Precipitation	Wind	Ground/Sea
1	No						

MANPOWER LOG

Workers | Man Hours

INSPECTION LOG

No.	Start Time	End Time	Inspection Type	Inspecting Entity	Inspector Name	Location	Area
1	09:00AM	10:00AM	Weekly Construction Meeting	Wenck Associates Inc.	Seth Bossert & Lucius Jonett		

Comments: Weekly Construction Meeting - 01/23/2020

- PSCWMC meeting update - Brian
 - 1.1- Pay apps 1 & 2
 - 1.2 pay app 1 has been paid, pay app 2 will be within a month
- Construction Update:
 - 2.1 - Yesterday they were complete up to station 6+00
 - 2.2 - Current rock tally is:
Class 3 riprap - 1,466.71 TON
24" - 36" Fieldstone Boulders - 228 TON
 - 2.3 might need one additional load of boulders - approved by Engineer
- Follow up from Last Week's meeting:

INSPECTION LOG

No.	Start Time	End Time	Inspection Type	Inspecting Entity	Inspector Name	Location	Area
							3.1 Brian out at end of Jan & Amy will be the TRPD contact while he is out
							3.2 chipping next week or week after
							3.3 1 load of footer logs at dog park, all hauling to the Baker site for Ash is complete.
							4. Questions / walk through - Yes
							4.1 An second area of potential erosion was discovered by the contractor. Upon inspection TRPD would like to know the projected cost for fixing it via change order.
							Action Item - (Seth) Work up cost estimate for fixing small side ravine below camp site XX with Class 3 Riprap spillway, geotextile and shaping of erosion feature.

By

Date

Copies To



Wenck Associates
1800 Pioneer Creek Center
Maple Plain, Minnesota 55359
P: 763-479-4200







Project: 1508-0007 - Baker Ravine
Stabilization
2309 Baker Park Road
Maple Plain, Minnesota 55359

Daily Log: Monday 1/27/2020

WEATHER REPORT

Temperature			Precipitation Since			Humidity				Windspeed		
Low	High	Avg	Midnight	2 Days Ago	3 Days Ago	Low	Avg	High	Dew	Avg	Max	Gust
18°F	26°F	22°F	0.02 in.	0.03 in.	0.06 in.	84%	93%	100%	20°F	5.1 mph	6 mph	9 mph

DAILY SNAPSHOT

06:00AM	09:00AM	12:00PM	03:00PM	06:00PM	09:00PM
 cloudy 22°F	 cloudy 23°F	 cloudy 26°F	 cloudy 25°F	 partly-cloudy-night 21°F	 partly-cloudy-night 18°F

OBSERVED WEATHER CONDITIONS

No.	Weather Delay	Sky	Temp	Average	Precipitation	Wind	Ground/Sea
1	No						

MANPOWER LOG

Workers | Man Hours

CALL LOG

No.	From	To	Start Time	End Time
1			11:50AM	11:55AM
Description: Call from Nate to visit the site to review Change order #2 side ravine questions.				

INSPECTION LOG

No.	Start Time	End Time	Inspection Type	Inspecting Entity	Inspector Name	Location	Area
1	01:00PM	02:00PM	Construction Inspection	Wenck Associates Inc.	Seth Bossert		

Comments: Received a call from the foremen, Nate, to visit the site to answer a specific construction question about change order #2. Visited the site and reviewed the side ravine, discussed focusing the stabilization on the central ravine and filling the smaller contributing side ravine to the north. Discussed that the overland flow coming from the campground will be directed and controlled into the center side ravine with check dams and not allowed to enter the smaller side.

Construction was complete to station 5+00.

By

Date

Copies To



Wenck Associates
1800 Pioneer Creek Center
Maple Plain, Minnesota 55359
P: 763-479-4200

Project: 1508-0007 - Baker Ravine
Stabilization
2309 Baker Park Road
Maple Plain, Minnesota 55359

Daily Log: Thursday 1/30/2020



Daily Log Completed

The Daily Log was completed by Seth Bossert on Thu Jan 30, 2020 at 11:26am CST.

WEATHER REPORT

Temperature			Precipitation Since			Humidity				Windspeed		
Low	High	Avg	Midnight	2 Days Ago	3 Days Ago	Low	Avg	High	Dew	Avg	Max	Gust
14°F	25°F	20°F	0.03 in.	0.04 in.	0.06 in.	74%	79%	86%	14°F	5.8 mph	7 mph	15 mph

DAILY SNAPSHOT

06:00AM	09:00AM	12:00PM	03:00PM	06:00PM	09:00PM
cloudy 16°F	cloudy 17°F	partly-cloudy-day 22°F	cloudy 26°F	cloudy 25°F	cloudy 25°F

OBSERVED WEATHER CONDITIONS

No.	Weather Delay	Sky	Temp	Average	Precipitation	Wind	Ground/Sea
1	No						

MANPOWER LOG

Workers | Man Hours

INSPECTION LOG

No.	Start Time	End Time	Inspection Type	Inspecting Entity	Inspector Name	Location	Area
1	09:00AM	10:00AM	Weekly Construction Meeting	Wenck Associates Inc	Seth Bossert & Lucius Jonett		

Comments: Weekly Construction Meeting:

- Change order 2 was executed last Friday.
 - The contract total was not correct as written on on change order #2 as was pointed out to me by Jeff at MNL.
- Construction is complete up to station 4+50 and change order #2 additional side ravine has been stabilized. Remaining is side ravine 2 & connection from 4+50 to 4+00. Ravine 2 will be next week.
- Construction timing: Expected to be substantially complete by the end of the first week of Feb but chipping will continue into second week of Feb.
- Rock ticket tally to date: 1,900.15 TON of Class 3 Riprap with a projected 200 additional TON needed to finish the project will put the projected project total at 83.8% of the bid total.

By

Date

Copies To



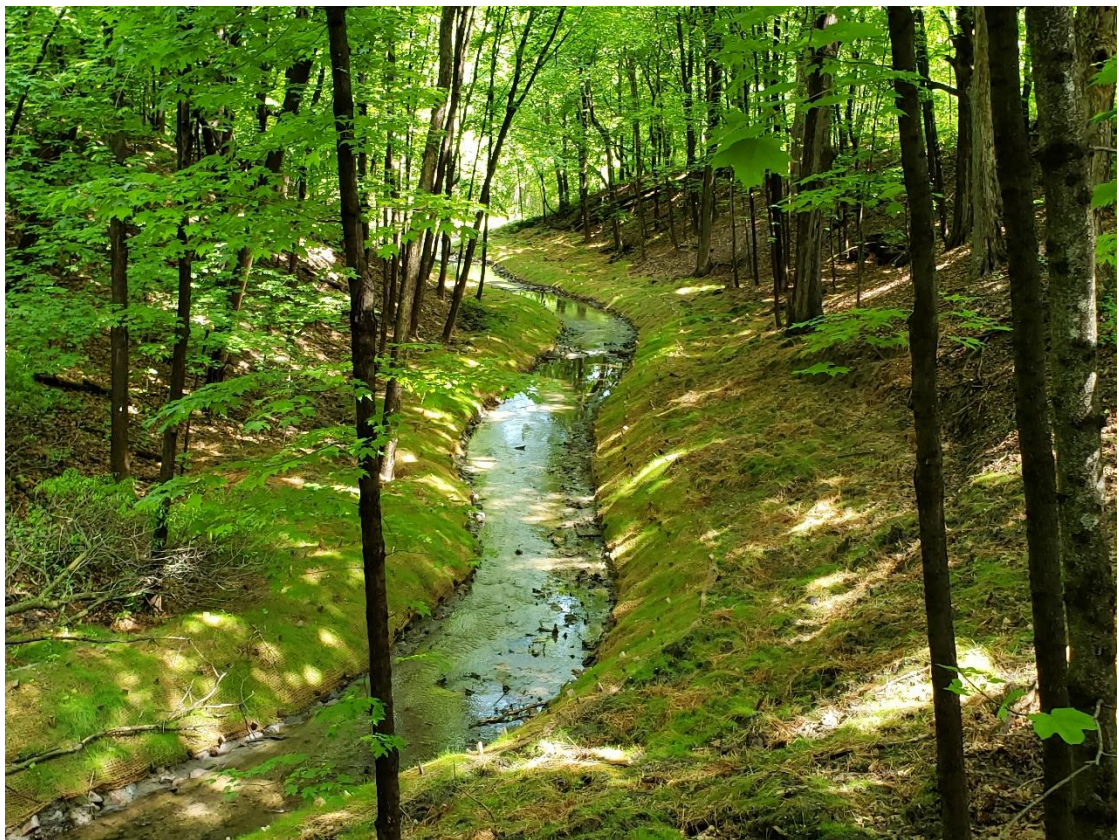
APPENDIX B

Project Completion Photos















APPENDIX C

**Construction
Payment Request Forms
Change Orders**

**01 20 30
PAYMENT REQUEST FORM**

OWNER: Three Rivers Park District & Pioneer-Sarah Creek Watershed
Management Commission
PROJECT: Baker Ravine Stabilization
CONTRACTOR: MN Native Landscape

PAY ESTIMATE NO. 01

Original Contract Amount	\$ <u>430,805.00</u>
Contract Changes approved to Date (List Change Order Numbers)	\$ <u>0.00</u>
Revised Contract Price	\$ <u>430,805.00</u>
Work Completed to Date (attached)	\$ <u>96,437.60</u>
Retainage to Date, 5%	\$ <u>4,821.88</u>
Work Completed to Date Less Retainage to Date	\$ <u>91,615.72</u>
Total Amount Previously Certified	\$ <u>0.00</u>
Payment Request This Estimate	\$ <u>91,615.72</u>

I declare under penalty of perjury that this account, claim, or demand is just and correct and that no part of it has been paid.



CONTRACTOR

CERTIFICATE OF CONTRACTOR

I hereby certify that the work and the materials supplied to date, as shown on the request for payment, represents the actual value of accomplishment under the terms of the contract dated

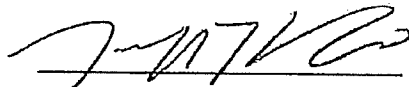
August 15th, 2019 between the Three Rivers Park District (OWNER),
Pioneer-Sarah Creek Watershed Management Commission (OWNER),

and Minnesota Native Landscapes (CONTRACTOR) and all authorized changes thereto.

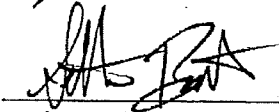
By 
Title Dir. of Construction

Approval:

(CONTRACTOR)

 Date 12/16/2019

WENCK ASSOCIATES, INC.

 Date 12/17/2019
SETH BOSSERT

THREE RIVERS PARK DISTRICT Brian Vlach Date 12/19/2019

PIONEER-SARAH WATERSHED
MANAGEMENT COMMISSION

Date _____

END OF SECTION



Minnesota 8740 77th St NE
Native Otsego, MN 55362
Landscapes

INVOICE

CUSTOMER NAME
Brian Vlach- Senior Manager of Water Reso Three Rivers Park District 12615 Rockford Road Plymouth, MN 55441-1248

PROJECT NAME
Baker Park Ravine

BILLING DATE	INVOICE #
12/13/2019	22522

TERMS	DUE DATE
Net 30	1/12/2020

VENDOR #	P.O. NO.

QTY	UNITS	ITEM	DESCRIPTION	UNIT PRICE	EXTENTION
0.50	LS	Mobilization	Mobilization	17,500.00	8,750.00
0.50	LS	Installation	Construct, Maintain, Restore Site Access/Staging Area	8,000.00	4,000.00
600.00	LF	Installation	Temporary Orange Safety Fence	5.00	3,000.00
70.00	LF	Installation	Flotation Silt Curtain - Moving Water	30.00	2,100.00
400.00	LF	Installation	Sediment Control Logs	4.00	1,600.00
1.00	EA	Installation	Inlet Protection - Maintained	300.00	300.00
1.00	EA	Installation	Culvert Protection - Maintained	500.00	500.00
0.80	LS	Installation	Construct and Maintain Temp Sediment Basin	1,500.00	1,200.00
3.00	HR	Installation	Street Sweeper (p/u broom)	200.00	600.00
0.40	LS	Installation	Tree Clearing & Grubbing	71,000.00	28,400.00
0.40	LS	Installation	Chip & Dispose of All Brush/Logs less than 6"	22,000.00	8,800.00
0.50	LS	Installation	Limb and Move Logs to Splitting Station	10,000.00	5,000.00

Thank you for your business. Please place the invoice number on your check.

Total

Payments/Credits

Balance Due

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Minnesota 8740 77th St NE
Native Otsego, MN 55362
Landscapes

INVOICE

CUSTOMER NAME
Brian Vlach- Senior Manager of Water Reso Three Rivers Park District 12615 Rockford Road Plymouth, MN 55441-1248

BILLING DATE	INVOICE #
12/13/2019	22522

TERMS	DUE DATE
Net 30	1/12/2020

PROJECT NAME
Baker Park Ravine

VENDOR #	P.O. NO.

QTY	UNITS	ITEM	DESCRIPTION	UNIT PRICE	EXTENTION
1.00	CY	Installation	Remove & Dispose CMUs and Geogrid	500.00	500.00
332.00	SY	Installation	Woven ECB, Rolanka BioD-Mat 40	6.00	1,992.00
400.00	SY	Installation	Non-woven ECB Type 3 Cat 2S BN	3.00	1,200.00
0.10	AC	Installation	Seeding	2,000.00	200.00
5.00	LB	Installation	Native Seed Mix	50.00	250.00
20.00	LB	Installation	Fescue Seed Mix	5.00	100.00
140.00	TN	Installation	CL II Rip Rap - Angular (veg rr toe) (3-9")	80.00	11,200.00
36.00	TN	Installation	24"-36" Fieldstone Boulders (Cross vanes)	90.00	3,240.00
565.00	SY	Installation	MnDOT Type V Geotextile	4.00	2,260.00
61.82	TN	Installation	CL III Rip Rap - Angular (Spillways, veg rr in channel) (6-12" w/18")	80.00	4,945.60
70.00	TN	Installation	Bid alternate 1: CL II Rip Rap - Fieldstone	90.00	6,300.00
			MN/Hpn/Hpn Cty Transit	7.525%	0.00

Thank you for your business. Please place the invoice number on your check.

Total \$96,437.60

Any amount unpaid beyond 30 days, will incur a 1.5% per month finance charge.

Payments/Credits \$0.00

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Balance Due \$96,437.60

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Three Rivers Park District & Pioneer Sarah Creek Watershed Management Comission
Baker Ravine Stabilization
12/16/2019

Item No.	Item Description	Units	Contract Quantity	Unit Price	Extension	Total Quantity Complete This Estimate	Total Owed This Estimate	Total Quantity Complete This Estimate	Total Owed This Estimate	Quantity Remaining	Extension
1	Mobilization and Demobilization	LS	1	\$ 17,500.00	\$ 17,500.00	0.5	\$ 8,750.00		\$ -	0.5	\$ 8,750.00
2	Construct, Maintain, & Restore Site Access and Staging Areas	LS	1	\$ 8,000.00	\$ 8,000.00	0.5	\$ 4,000.00		\$ -	0.5	\$ 4,000.00
3	Temporary Orange Safety Fence	LF	1125	\$ 5.00	\$ 5,625.00	600	\$ 3,000.00		\$ -	525	\$ 2,625.00
4	Flotation Silt Curtain Type Moving Water - Maintained	LF	70	\$ 30.00	\$ 2,100.00	70	\$ 2,100.00		\$ -	0	\$ -
5	Sediment Control Log Type Straw (Or Biocor) - Maintained	LF	1095	\$ 4.00	\$ 4,380.00	400	\$ 1,600.00		\$ -	695	\$ 2,780.00
6	Inlet Protection - Maintained	EA	3	\$ 300.00	\$ 900.00	1	\$ 300.00		\$ -	2	\$ 600.00
7	Culvert Protection - Maintained	EA	3	\$ 500.00	\$ 1,500.00	1	\$ 500.00		\$ -	2	\$ 1,000.00
8	Construct and Maintain Temporary Sediment Basin	EA	1	\$ 1,500.00	\$ 1,500.00	0.8	\$ 1,200.00		\$ -	0.2	\$ 300.00
9	Street Sweeper (With Pickup Broom)	HR	10	\$ 200.00	\$ 2,000.00	3	\$ 600.00		\$ -	7	\$ 1,400.00
10	Tree Clearing & Grubbing	LS	1	\$ 71,000.00	\$ 71,000.00	0.4	\$ 28,400.00		\$ -	0.6	\$ 42,600.00
11	Chip and Dispose of all Brush, & Logs less than 6"	LS	1	\$ 22,000.00	\$ 22,000.00	0.4	\$ 8,800.00		\$ -	0.6	\$ 13,200.00
12	Limb and Move Logs to Splitting Station (Logs >6")	LS	1	\$ 10,000.00	\$ 10,000.00	0.5	\$ 5,000.00		\$ -	0.5	\$ 5,000.00
13	Remove & Dispose CUI's and Geogrid	CY	1	\$ 500.00	\$ 500.00	1	\$ 500.00		\$ -	0	\$ -
14	Woven ECB, Rolanka Bio-Mat 40	SY	2180	\$ 6.00	\$ 13,080.00	332	\$ 1,992.00		\$ -	1848	\$ 11,088.00
15	Non-Woven ECB Cat 3 Type Straw 25 (No Poly Netting)	SY	2180	\$ 3.00	\$ 6,540.00	400	\$ 1,200.00		\$ -	1780	\$ 5,340.00
16	Seeding	AC	0.5	\$ 2,000.00	\$ 1,000.00	0.1	\$ 200.00		\$ -	0.4	\$ 800.00
17	Native Seed Mix	LB	20	\$ 50.00	\$ 1,000.00	5	\$ 250.00		\$ -	15	\$ 750.00
18	Fescue Seed Mix	LB	100	\$ 5.00	\$ 500.00	20	\$ 100.00		\$ -	80	\$ 400.00
19	Straw Mulch	TON	2	\$ 700.00	\$ 1,400.00		\$ -		\$ -	2	\$ 1,400.00
20	Class II Riprap Angular, No Limestone (Veg Riprap Toe)	TON	300	\$ 80.00	\$ 24,000.00	140	\$ 11,200.00		\$ -	160	\$ 12,800.00
21	24" to 36" Fieldstone Boulders (Cross Vanes)	TON	110	\$ 90.00	\$ 9,900.00	36	\$ 3,240.00		\$ -	74	\$ 6,660.00
22	MN DOT Type V, Non-Woven Geotextile Fabric	SY	4920	\$ 4.00	\$ 19,680.00	565	\$ 2,260.00		\$ -	4355	\$ 17,420.00
23	Class III Riprap, Angular, No Limestone (Spillways & Veg Riprap in-channel)	TON	705	\$ 80.00	\$ 56,400.00	61.82	\$ 4,945.60		\$ -	643.18	\$ 51,454.40
24	Class III Riprap No Limestone (Veg Riprap & Outside Bend Toe Protection)	TON	1800	\$ 80.00	\$ 144,000.00		\$ -		\$ -	1800	\$ 144,000.00
25	Class II Riprap Fieldstone	TON	70	\$ 90.00	\$ 6,300.00	70	\$ 6,300.00		\$ -	0	\$ -
26	Chip-and-Deliver-all-Brush-&-Logs-less-than-6"-to-Three-Rivers-Park-District-Nursery-Facility (NOT ACCEPTED)	LS	0	\$ 15,000.00	\$ -		\$ -		\$ -	0	\$ -
27	Limb and Move Rootwads and Logs to Crow-Hassen Park Reserve (Paid for by Three Rivers Park separately)	LS	0	\$ 12,500.00	\$ -		\$ -		\$ -	0	\$ -
TOTAL				\$	\$ 430,805.00	\$	\$ 96,437.60	\$	\$ -	\$	\$ 334,367.40

Total Contract Amount	\$ 430,805.00
Total Amount Complete to Date	\$ 96,437.60
Total Amount Completed This Pay App	\$ 96,437.60
Less 5% Retainage This Pay App	\$ 4,821.88
Less 5% Retainage Total Project	\$ 4,821.88
Total Amount Owed This Pay App	\$ 91,615.72

**01 20 30
PAYMENT REQUEST FORM**

OWNER: Three Rivers Park District & Pioneer-Sarah Creek Watershed
Management Commission
PROJECT: Baker Ravine Stabilization
CONTRACTOR: MN Native Landscape

PAY ESTIMATE NO. 02

Original Contract Amount	<u>\$430,805.00</u>
Contract Changes approved to Date (List Change Order Numbers)	\$ <u>0.00</u>
Revised Contract Price	<u>\$430,805.00</u>
Work Completed to Date (attached)	<u>\$205,369.20</u>
Retainage to Date, 5%	\$ <u>10,268.46</u>
Work Completed to Date Less Retainage to Date	<u>\$195,100.74</u>
Total Amount Previously Certified	\$ <u>91,615.72</u>
Payment Request This Estimate	<u>\$103,485.02</u>

I declare under penalty of perjury that this account, claim, or demand is just and correct and that no part of it has been paid.

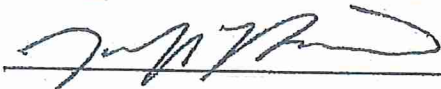

CONTRACTOR

CERTIFICATE OF CONTRACTOR

I hereby certify that the work and the materials supplied to date, as shown on the request for payment, represents the actual value of accomplishment under the terms of the contract dated

August 15th, 2017 between the Three Rivers Park District (OWNER),
Pioneer-Sarah Creek Watershed Management Commission (OWNER),

and Minnesota Native Landscapes (CONTRACTOR) and all authorized changes thereto.



By Jeff Renier
Title Dir. of Construction

Approval:

(CONTRACTOR)

 Date 1/16/20

WENCK ASSOCIATES, INC.


Seth Bossert Date 1/16/2020

THREE RIVERS PARK DISTRICT

Brian Vlach Date 1/20/2020

PIONEER-SARAH WATERSHED
MANAGEMENT COMMISSION

Date _____

END OF SECTION

01 20 30-2

Payment Request Form



Minnesota 8740 77th St NE
Native Otsego, MN 55362
Landscapes

INVOICE

CUSTOMER NAME
Three Rivers Park District 12615 County Road 9 Plymouth, MN 55441-1248

PROJECT NAME
Baker Park Ravine

BILLING DATE	INVOICE #
1/10/2020	22591

TERMS	DUE DATE
Net 30	2/9/2020

VENDOR #	P.O. NO.

QTY	UNITS	ITEM	DESCRIPTION	UNIT PRICE	EXTENTION
0.20	LS	Mobilization	Mobilization	17,500.00	3,500.00
1.00	EA	Labor	Inlet Protection - Maintained	300.00	300.00
3.00	HR	Labor	Street Sweeper (p/u broom)	200.00	600.00
0.40	LS	Tree & Brush Control	Tree Clearing & Grubbing	71,000.00	28,400.00
0.20	LS	Tree & Brush Control	Chip & Dispose of All Brush/Logs less than 6"	22,000.00	4,400.00
0.20	LS	Tree & Brush Control	Limb and Move Logs to Splitting Station	10,000.00	2,000.00
650.00	SY	Erosion Control Pro...	Woven ECB, Rolanka BioD-Mat 40	6.00	3,900.00
800.00	SY	Erosion Control Pro...	Non-woven ECB Type 3 Cat 2S BN	3.00	2,400.00
0.15	AC	Seeding	Seeding	2,000.00	300.00
5.00	LB	Seeding	Native Seed Mix	50.00	250.00
30.00	LB	Seeding	Fescue Seed Mix	5.00	150.00
1.00	TN	Erosion Control Pro...	Straw Mulch	700.00	700.00
51.00	TN	Rock	24"-36" Fieldstone Boulders (Cross vanes)	90.00	4,590.00

Thank you for your business. Please place the invoice number on your check.

Total

Payments/Credits

Balance Due

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Minnesota 8740 77th St NE
Native Otsego, MN 55362
Landscapes

INVOICE

CUSTOMER NAME
Three Rivers Park District 12615 County Road 9 Plymouth, MN 55441-1248

PROJECT NAME
Baker Park Ravine

BILLING DATE	INVOICE #
1/10/2020	22591

TERMS	DUE DATE
Net 30	2/9/2020

VENDOR #	P.O. NO.

QTY	UNITS	ITEM	DESCRIPTION	UNIT PRICE	EXTENTION
1200.00	SY	Erosion Control Pro...	MnDOT Type V Geotextile	4.00	4,800.00
329.01	TN	Rock	CL III Rip Rap - Angular (Spillways, veg rr in channel) (6-12" w/18")	80.00	26,320.80
329.01	TN	Rock	CL III Rip Rap - Angular (Veg rr, outside bend) (6-12" w/18")	80.00	26,320.80
			MN/Hpn/Hpn Cty Transit	7.525%	0.00

Thank you for your business. Please place the invoice number on your check.	Total	\$108,931.60
Any amount unpaid beyond 30 days, will incur a 1.5% per month finance charge.	Payments/Credits	\$0.00
763-295-0010 • www.mnnativelandscapes.com • Mandy@MNLcorp.com	Balance Due	\$108,931.60

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Three Rivers Park District & Pioneer Sarah Creek Watershed Management Commission
Baker Ravine Stabilization
1/15/2020

Item No.	Item Description	Units	Contract Quantity	Unit Price	Extension	Pay App #1		Pay App #2	
						Total Quantity Complete This Estimate	Total Owed This Estimate	Total Quantity Complete This Estimate	Total Owed This Estimate
1	Mobilization and Demobilization	LS	1	\$ 17,500.00	\$ 17,500.00	0.5	\$ 8,750.00	0.2	\$ 3,500.00
2	Construct, Maintain, & Restore Site Access and Staging Areas	LS	1	\$ 8,000.00	\$ 8,000.00	0.5	\$ 4,000.00	-	\$ -
3	Temporary Orange Safety Fence	LF	1125	\$ 5.00	\$ 5,625.00	800	\$ 3,000.00	-	\$ -
4	Flotation Silt Curtain Type Moving Water - Maintained	LF	70	\$ 30.00	\$ 2,100.00	70	\$ 2,100.00	-	\$ -
5	Sediment Control Log Type Straw (Or Biorell) - Maintained	LF	1095	\$ 4.00	\$ 4,380.00	400	\$ 1,600.00	-	\$ -
6	Inlet Protection - Maintained	EA	3	\$ 300.00	\$ 900.00	1	\$ 300.00	1	\$ 300.00
7	Culvert Protection - Maintained	EA	3	\$ 500.00	\$ 1,500.00	1	\$ 500.00	-	\$ -
8	Construct and Maintain Temporary Sediment Basin	EA	1	\$ 1,500.00	\$ 1,500.00	0.8	\$ 1,200.00	-	\$ -
9	Street Sweeper (With Pickup Broom)	HR	10	\$ 200.00	\$ 2,000.00	3	\$ 600.00	-	\$ -
10	Tree Clearing & Grubbing	LS	1	\$ 71,000.00	\$ 71,000.00	0.4	\$ 28,400.00	0.4	\$ 28,400.00
11	Chip and Dispose of all Brush & Logs less than 6"	LS	1	\$ 22,000.00	\$ 22,000.00	0.4	\$ 8,800.00	0.2	\$ 4,400.00
12	Limb and Move Logs to Splitting Station (Logs >6")	LS	1	\$ 10,000.00	\$ 10,000.00	0.5	\$ 5,000.00	0.2	\$ 2,000.00
13	Remove & Dispose CMU's and Geogrid	CY	1	\$ 500.00	\$ 500.00	1	\$ 500.00	-	\$ -
14	Woven ECB, Rolanka BioD-Mat 40	SY	2180	\$ 6.00	\$ 13,080.00	332	\$ 1,992.00	650	\$ 3,900.00
15	Non-Woven ECB Cat 3 Type Straw 25 (No Poly Netting)	SY	2180	\$ 3.00	\$ 6,540.00	400	\$ 1,200.00	800	\$ 2,400.00
16	Seeding	AC	0.5	\$ 2,000.00	\$ 1,000.00	0.1	\$ 200.00	0.15	\$ 300.00
17	Native Seed Mix	LB	20	\$ 50.00	\$ 1,000.00	5	\$ 250.00	5	\$ 250.00
18	Fescue Seed Mix	LB	100	\$ 5.00	\$ 500.00	20	\$ 100.00	30	\$ 150.00
19	Straw Mulch	TON	2	\$ 700.00	\$ 1,400.00	1	\$ 700.00	1	\$ 700.00
20	Class II Riprap Angular, No Limestone (Veg Riprap Toe)	TON	300	\$ 80.00	\$ 24,000.00	140	\$ 11,200.00	-	\$ -
21	24" to 36" Fieldstone Boulders (Cross Vanes)	TON	110	\$ 50.00	\$ 5,500.00	36	\$ 3,240.00	51	\$ 4,590.00
22	MN DOT Type V, Non-Woven Geotextile Fabric	SY	4920	\$ 4.00	\$ 19,680.00	565	\$ 2,260.00	1200	\$ 4,800.00
23	Class III Riprap, Angular, No Limestone (Spillways & Veg Riprap In-channel)	TON	705	\$ 80.00	\$ 56,400.00	61.82	\$ 4,945.60	329.01	\$ 26,320.80
24	Class III Riprap No Limestone (Veg Riprap & Outside Bend Toe Protection)	TON	1820	\$ 80.00	\$ 144,000.00	-	\$ -	329.01	\$ 26,320.80
25	Class II Riprap Fieldstone	TON	70	\$ 90.00	\$ 6,300.00	70	\$ 6,300.00	-	\$ -
26	Chip and Deliver all Brush & Logs less than 6" to Three Rivers Park District Nursery Facility (NOT ACCEPTED)	LS	0	\$ 15,000.00	\$ -	-	\$ -	-	\$ -
27	Limb and Move Rootwads and Logs to Crow-Hassen Park Reserve (Paid for by Three Rivers Park separately)	LS	0	\$ 12,500.00	\$ -	-	\$ -	-	\$ -
TOTAL					\$ 430,805.00	96,437.64	\$ 108,931.64	225,435.80	\$ 225,435.80

Total Contract Amount	\$ 430,805.00
Total Amount Complete to Date	\$ 205,369.20
Total Amount Completed This Pay App	\$ 108,931.60
Less 5% Retainage This Pay App	\$ 5,446.58
Less 5% Retainage Total Project	\$ 10,268.46
Total Amount Owed This Pay App	\$ 103,485.02

**01 20 30
PAYMENT REQUEST FORM**

OWNER: Three Rivers Park District & Pioneer-Sarah Creek Watershed
Management Commission
PROJECT: Baker Ravine Stabilization
CONTRACTOR: MN Native Landscape

PAY ESTIMATE NO. 03

Original Contract Amount	<u>\$430,805.00</u>
Contract Changes approved to Date (CO#1 & CO#2) Change orders 1 & 2 were approved for additional work to offset dollars in the Contract price that would otherwise not have been spent. The intention was <u>not</u> to increase the overall contract price. The approved value was \$21,658.00	<u>\$ 0.00</u>
Revised Contract Price	<u>\$430,805.00</u>
Work Completed to Date (attached)	<u>\$414,805.90</u>
Retainage to Date, 5%	<u>\$ 20,740.30</u>
Work Completed to Date Less Retainage to Date	<u>\$394,065.60</u>
Total Amount Previously Certified	<u>\$195,100.74</u>
Payment Request This Estimate	<u>\$198,964.86</u>


I declare under penalty of perjury that this account, claim, or demand is just and correct
and that no part of it has been paid.


CONTRACTOR

CERTIFICATE OF CONTRACTOR

I hereby certify that the work and the materials supplied to date, as shown on the request for payment, represents the actual value of accomplishment under the terms of the contract dated

August 15th, 2019 between the Three Rivers Park District (OWNER),
Pioneer-Sarah Creek Watershed Management Commission (OWNER),
and Minnesota Native Landscapes (CONTRACTOR) and all authorized changes thereto.

By 
Title Dir. of construction

Approval:

(CONTRACTOR)

 Date 3/4/2020

WENCK ASSOCIATES, INC.

 Date 3/4/2020
Seth Bossett

THREE RIVERS PARK DISTRICT

Brian Vlach Date 3/4/2020

PIONEER-SARAH WATERSHED
MANAGEMENT COMMISSION

Date _____

END OF SECTION



Minnesota 8740 77th St NE
 Native Otsego, MN 55362
 Landscapes

INVOICE

CUSTOMER NAME
Three Rivers Park District 12615 County Road 9 Plymouth, MN 55441-1248

PROJECT NAME
Three Rivers Park District

BILLING DATE	INVOICE #
2/17/2020	22732

TERMS	DUE DATE
Net 30	3/18/2020

VENDOR #	P.O. NO.

QTY	UNITS	ITEM	DESCRIPTION	UNIT PRICE	EXTENTION
0.200	LS	Mobilization	Mobilization	17,500.00	3,500.00
174.000	LF	Installation	Temporary Orange Safety Fence	5.00	870.00
1.000	EA	Installation	Inlet Protection - Maintained	300.00	300.00
1.600	EA	Installation	Culvert Protection - Maintained	500.00	800.00
0.200	LS	Installation	Construct and Maintain Temp Sediment Basin	1,500.00	300.00
0.200	LS	Tree & Brush Control	Tree Clearing & Grubbing	71,000.00	14,200.00
0.400	LS	Tree & Brush Control	Chip & Dispose of All Brush/Logs less than 6"	22,000.00	8,800.00
0.300	LS	Tree & Brush Control	Limb and Move Logs to Splitting Station	10,000.00	3,000.00
*****	SY	Erosion Control Pro...	1198 SY Woven ECB, Rolanka BioD-Mat 40	6.00	7,188.00
980.000	SY	Erosion Control Pro...	Non-woven ECB Type 3 Cat 2S BN	3.00	2,940.00
0.250	AC	Seeding	Seeding	2,000.00	500.00
10.000	LB	Materials	Native Seed Mix	50.00	500.00
50.000	LB	Materials	Fescue Seed Mix	5.00	250.00

Thank you for your business. Please place the invoice number on your check.	Total
	Payments/Credits
	Balance Due

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Minnesota 8740 77th St NE
Native Otsego, MN 55362
Landscapes

INVOICE

CUSTOMER NAME
Three Rivers Park District 12615 County Road 9 Plymouth, MN 55441-1248

PROJECT NAME
Three Rivers Park District

BILLING DATE	INVOICE #
2/17/2020	22732

TERMS	DUE DATE
Net 30	3/18/2020

VENDOR #	P.O. NO.

QTY	UNITS	ITEM	DESCRIPTION	UNIT PRICE	EXTENTION
1.000	TN	Erosion Control Pro...	Straw Mulch	700.00	700.00
81.560	TN	Installation	CL II Rip Rap - Angular (veg rr toe) (3-9")	80.00	6,524.80
141.000	TN	Installation	24"-36" Fieldstone Boulders (Cross vanes)	90.00	12,690.00
*****	SY	Erosion Control Pro...	3155 SY MnDOT Type V Geotextile	4.00	13,068.00
821.865	TN	Installation	CL III Rip Rap - Angular (Spillways, veg rr in channel) (6-12" w/18")	80.00	65,749.20
821.865	TN	Installation	CL III Rip Rap - Angular (Veg rr, outside bend) (6-12" w/18")	80.00	65,749.20
67.000	SY	Erosion Control Pro...	Woven ECB, Rolanka BioD-Mat 40	6.00	402.00
67.000	SY	Erosion Control Pro...	Non-woven ECB Type 3 Cat 2S BN	3.00	201.00
0.020	AC	Seeding	Seeding	2,000.00	40.00
0.020	LB	Materials	Native Seed Mix	50.00	1.00
2.000	LB	Materials	Fescue Seed Mix	5.00	10.00
67.500	SY	Erosion Control Pro...	Non-woven ECB Type 3 Cat 2S BN	3.00	202.50

Thank you for your business. Please place the invoice number on your check.

Total

Payments/Credits

Balance Due

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Minnesota 8740 77th St NE
Native Otsego, MN 55362
Landscapes

INVOICE

CUSTOMER NAME
Three Rivers Park District 12615 County Road 9 Plymouth, MN 55441-1248

PROJECT NAME
Three Rivers Park District

BILLING DATE	INVOICE #
2/17/2020	22732

TERMS	DUE DATE
Net 30	3/18/2020

VENDOR #	P.O. NO.

QTY	UNITS	ITEM	DESCRIPTION	UNIT PRICE	EXTENTION
0.020	AC	Seeding	Seeding	2,000.00	40.00
0.020	LB	Materials	Native Seed Mix	50.00	1.00
2.000	LB	Materials	Fescue Seed Mix	5.00	10.00
225.000	SY	Erosion Control Pro...	MnDOT Type V Geotextile	4.00	900.00
			MN/Hpn/Hpn Cty Transit	7.525%	0.00

Thank you for your business. Please place the invoice number on your check.	Total	\$209,436.70
Any amount unpaid beyond 30 days, will incur a 1.5% per month finance charge.	Payments/Credits	\$0.00
763-295-0010 • www.mnnativelandscapes.com • Mandy@MNLcorp.com	Balance Due	\$209,436.70

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Item No.	Item Description	Units	Contract Quantity	Unit Price	Extension	Total Quantity Completed This Estimate	Total Owed This Estimate	Total Quantity Completed This Estimate	Total Owed This Estimate	Quantity Remaining	Extension
1	Mobilization and Demobilization	LS	1	\$ 17,500.00	\$ 17,500.00	0.5	\$ 8,750.00	0.2	\$ 3,500.00	0.3	\$ 1,750.00
2	Construct, Maintain, & Measure Site Access and Staging Areas	LS	1	\$ 8,000.00	\$ 8,000.00	0.5	\$ 4,000.00	-	\$ -	0.50	\$ 4,000.00
3	Temporary Orange Safety Fence	LF	1125	\$ 5.60	\$ 6,290.00	600	\$ 3,360.00	-	\$ -	525.00	\$ 2,930.00
4	Station Silt Curtain Type Moving Water - Maintained	LF	70	\$ 30.00	\$ 2,100.00	70	\$ 2,100.00	-	\$ -	0.00	\$ -
5	Station Control Log Type Straw (Or Biocroll) - Maintained	LF	1095	\$ 4.00	\$ 4,380.00	400	\$ 1,600.00	-	\$ -	695.00	\$ 2,780.00
6	Inlet Protection - Maintained	EA	3	\$ 300.00	\$ 900.00	1	\$ 300.00	1	\$ 300.00	0.00	\$ -
7	Culvert Protection - Maintained	EA	3	\$ 500.00	\$ 1,500.00	1	\$ 500.00	-	\$ -	2.00	\$ 1,000.00
8	Construct and Maintain Temporary Sediment Basin	EA	1	\$ 1,500.00	\$ 1,500.00	0.8	\$ 1,200.00	-	\$ -	0.20	\$ 300.00
9	Street Sweeper (With Pickup Broom)	HR	10	\$ 300.00	\$ 3,000.00	3	\$ 900.00	3	\$ 900.00	0.00	\$ -
10	Tree Clearing & Grubbing	LS	1	\$ 71,000.00	\$ 71,000.00	0.4	\$ 28,400.00	0.4	\$ 28,400.00	0.00	\$ -
11	Chip and Dispose of all Brush & Logs less than 6"	LS	1	\$ 22,000.00	\$ 22,000.00	0.5	\$ 11,000.00	0.2	\$ 4,400.00	0.30	\$ 6,600.00
12	Limbs and Move Logs to Splitting Station (Logs >6")	LS	1	\$ 10,000.00	\$ 10,000.00	0.5	\$ 5,000.00	0.2	\$ 2,000.00	0.30	\$ 3,000.00
13	Remove & Dispose CMUs and Geogrid	CY	1	\$ 500.00	\$ 500.00	1	\$ 500.00	-	\$ -	0.00	\$ -
14	Woven ECB, Rolanka Bio-Mat 40	SF	2180	\$ 6.00	\$ 13,080.00	332	\$ 1,992.00	659	\$ 3,954.00	1529	\$ 9,126.00
15	Non-Woven ECB Cat 3 Type Straw 25 (No Poly Netting)	SF	2180	\$ 3.00	\$ 6,540.00	409	\$ 1,227.00	809	\$ 2,427.00	1371	\$ 4,113.00
16	Seeding	AC	8.5	\$ 2,200.00	\$ 18,800.00	0.1	\$ 220.00	0.15	\$ 330.00	8.35	\$ 18,470.00
17	Native Seed Mix	LB	20	\$ 50.00	\$ 1,000.00	3	\$ 150.00	3	\$ 150.00	0.00	\$ -
18	Fescue Seed Mix	LB	100	\$ 3.00	\$ 300.00	20	\$ 60.00	30	\$ 90.00	70.00	\$ 210.00
19	Straw Mulch	TON	2	\$ 750.00	\$ 1,500.00	20	\$ 1,500.00	-	\$ -	18.00	\$ 13,500.00
20	Class II Riprap Angular, No Limestone (Veg Riprap Toe)	TON	300	\$ 80.00	\$ 24,000.00	149	\$ 11,920.00	-	\$ -	151.00	\$ 12,080.00
21	24" to 36" Feldstone Boulders (Cross Varies)	TON	110	\$ 90.00	\$ 9,900.00	36	\$ 3,240.00	51	\$ 4,590.00	59.00	\$ 5,310.00
22	Mat DOT Type V, Non-Woven Geotextile Fabric	SF	4970	\$ 4.00	\$ 19,880.00	565	\$ 2,260.00	1200	\$ 4,800.00	3770.00	\$ 15,080.00
23	Class II Riprap, Angular, No Limestone (Spillways & Veg Riprap In-channel)	TON	705	\$ 80.00	\$ 56,400.00	6182	\$ 4,945.60	339.01	\$ 26,320.80	314.17	\$ 25,179.60
24	Class III Riprap No Limestone (Veg Riprap & Outside Bend Toe Protection)	TON	1800	\$ 80.00	\$ 144,000.00	-	\$ -	339.01	\$ 26,320.80	1460.99	\$ 117,679.20
25	Class II Riprap Angular, No Limestone (Veg Riprap)	TON	70	\$ 90.00	\$ 6,300.00	70	\$ 6,300.00	-	\$ -	0.00	\$ -
26	Class II Riprap Angular, No Limestone (Spillways & Veg Riprap In-channel)	LS	0	\$ 15,000.00	\$ -	-	\$ -	-	\$ -	-	\$ -
27	Class II Riprap Angular, No Limestone (Spillways & Veg Riprap In-channel)	LS	1	\$ 12,500.00	\$ 12,500.00	-	\$ -	-	\$ -	-	\$ -
C01	Overflow from settling basin				\$ 32,000.00						
1	Woven ECB, Rolanka Bio-Mat 40	SF	67	\$ 6.00	\$ 402.00	-	\$ -	-	\$ -	-	\$ -
2	Non-Woven ECB Cat 3 Type Straw 25 (No Poly Netting)	SF	67	\$ 3.00	\$ 201.00	-	\$ -	-	\$ -	-	\$ -
3	Seeding	AC	0.02	\$ 2,000.00	\$ 40.00	-	\$ -	-	\$ -	-	\$ -
4	Native Seed Mix	LB	0.02	\$ 50.00	\$ 1.00	-	\$ -	-	\$ -	-	\$ -
5	Fescue Seed Mix	LB	2	\$ 5.00	\$ 10.00	-	\$ -	-	\$ -	-	\$ -
6	Mat DOT Type V, Non-Woven Geotextile Fabric	SF	112	\$ 5.00	\$ 560.00	-	\$ -	-	\$ -	-	\$ -
7	Class III Riprap No Limestone (Veg Riprap & Outside Bend Toe Protection)	TON	80	\$ 80.00	\$ 6,400.00	-	\$ -	-	\$ -	-	\$ -
C02	Additional stable ravine stabilization				\$ 6,400.00						
1	Non-Woven ECB Cat 3 Type Straw 25 (No Poly Netting)	SF	135	\$ 3.00	\$ 405.00	-	\$ -	-	\$ -	-	\$ -
2	Seeding	AC	0.02	\$ 2,000.00	\$ 40.00	-	\$ -	-	\$ -	-	\$ -
3	Native Seed Mix	LB	0.02	\$ 50.00	\$ 1.00	-	\$ -	-	\$ -	-	\$ -
4	Fescue Seed Mix	LB	2	\$ 5.00	\$ 10.00	-	\$ -	-	\$ -	-	\$ -
5	Mat DOT Type V, Non-Woven Geotextile Fabric	SF	225	\$ 4.00	\$ 900.00	-	\$ -	-	\$ -	-	\$ -
6	Class III Riprap No Limestone (Riprap Swale & Check dams)	TON	160	\$ 80.00	\$ 12,800.00	-	\$ -	-	\$ -	-	\$ -
TOTAL						\$ 430,005.00	\$ 96,437.46		\$ 108,931.46	\$ 209,436.76	\$ 33,621.74

Total Contract Amount	\$ 430,805.00
Total Amount Complete to Date	\$ 414,805.90
Total Amount Completed This Pay App	\$ 209,436.70
Less 5% Retainage This Pay App	\$ 10,471.84
Less 5% Retainage Total Project	\$ 20,740.30
Total Amount Owed This Pay App	\$ 198,964.87

**01 20 30
PAYMENT REQUEST FORM**

OWNER: Three Rivers Park District & Pioneer-Sarah Creek Watershed
Management Commission
PROJECT: Baker Ravine Stabilization
CONTRACTOR: MN Native Landscape

PAY ESTIMATE NO. 04 - FINAL

Original Contract Amount	<u>\$430,805.00</u>
Contract Changes approved to Date (CO#1 & CO#2)	\$ <u>0.00</u>
Change orders 1 & 2 were approved for additional work to offset dollars in the Contract price that would otherwise not have been spent. The intention was <u>not</u> to increase the overall contract price. The approved value was \$21,658.00	
Revised Contract Price	<u>\$430,805.00</u>
Work Completed to Date (attached)	<u>\$421,555.90</u>
Retainage to Date, 0%	\$ <u>0.00</u>
Work Completed to Date Less Retainage to Date	<u>\$421,555.90</u>
Total Amount Previously Certified	<u>\$394,065.60</u>
Payment Request This Estimate	\$ <u>27,490.30</u>

I declare under penalty of perjury that this account, claim, or demand is just and correct and that no part of it has been paid.

Minnesota Native Landscapes

CONTRACTOR

CERTIFICATE OF CONTRACTOR

I hereby certify that the work and the materials supplied to date, as shown on the request for payment, represents the actual value of accomplishment under the terms of the contract dated

August 15th, 2019 between the Three Rivers Park District (OWNER),
Pioneer-Sarah Creek Watershed Management Commission (OWNER),

and ~~Minnesota Native Landscapes~~ (CONTRACTOR) and all authorized changes thereto.

Jeff J Renier

By Jeff Renier

Title Director of Construction

Approval:

(CONTRACTOR)

Jeff J Renier

Date 5/27/2020

WENCK ASSOCIATES, INC.

John Burt

Date 5/27/2020

THREE RIVERS PARK DISTRICT

Date _____

PIONEER-SARAH WATERSHED
MANAGEMENT COMMISSION

Date _____

END OF SECTION



Minnesota 8740 77th St NE
Native Otsego, MN 55362
Landscapes

INVOICE

CUSTOMER NAME
Three Rivers Park District 12615 County Road 9 Plymouth, MN 55441-1248

PROJECT NAME
Baker Park Ravine

BILLING DATE	INVOICE #
5/18/2020	23755

TERMS	DUE DATE
Net 30	6/17/2020

VENDOR #	P.O. NO.

QTY	UNITS	ITEM	DESCRIPTION	UNIT PRICE	EXTENTION
0.1	LS	Mobilization	Mobilization	17,500.00	1,750.00
0.5	LS	Site Preparation	Construct, Maintain, Restore Site Access/Staging Area	8,000.00	4,000.00
0.4	Each	Site Preparation	Culvert Protection - Maintained	500.00	200.00
4.0	Hour	Debris Clean-Up	Street Sweeper (p/u broom)	200.00	800.00
			MN/Hpn/Hpn Cty Transit	7.525%	0.00

Thank you for your business. Please place the invoice number on your check.

Total \$6,750.00

Any amount unpaid beyond 30 days, will incur a 1.5% per month finance charge.

Payments/Credits \$0.00

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Balance Due \$6,750.00

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Item No.	Item Description	Units	Contract Quantity	Unit Price	Extension	Total Quantity Complete This Estimate	Total Owed This Estimate	Pay App #1	Total Quantity Complete This Estimate	Total Owed This Estimate	Pay App #2	Total Quantity Complete This Estimate	Total Owed This Estimate	Pay App #3	Total Quantity Complete This Estimate	Total Owed This Estimate	Pay App #4	Quantity Remaining	Extension
1	Mobilization and Demobilization	LS	1	\$ 17,500.00	\$ 17,500.00	0.5	\$ 8,750.00		0.2	\$ 3,500.00			\$ 3,500.00		0.18	\$ 1,750.00		0.00	\$
2	Construct, Maintain, & restore Site Access and Staging Areas	LS	1	\$ 4,000.00	\$ 4,000.00	0.5	\$ 4,000.00			\$ -			\$ -		0.50	\$ 4,000.00		0.00	\$
3	Temporary Orange Safety Fence	LF	1325	\$ 5.00	\$ 6,625.00	600	\$ 3,000.00			\$ -			\$ -			\$ -		352.50	\$ 1,762.50
4	Erection Silt Curtain Type Moving Water - Maintained	LF	70	\$ 30.00	\$ 2,100.00	70	\$ 2,100.00			\$ -			\$ -			\$ -		0.00	\$
5	Sediment Control Log Type Straw (Or Biorell) - Maintained	LF	1055	\$ 4.67	\$ 4,936.00	400	\$ 1,868.00			\$ -			\$ -			\$ -		69.50	\$ 327.50
6	Inst Protection - Maintained	EA	3	\$ 300.00	\$ 900.00	1	\$ 300.00		1	\$ 300.00			\$ 300.00		1.00	\$ 300.00		0.00	\$
7	Culvert Protection - Maintained	EA	3	\$ 500.00	\$ 1,500.00	1	\$ 500.00			\$ -			\$ -		1.00	\$ 500.00		0.00	\$
8	Construct and Maintain Temporary Sediment Basin	EA	1	\$ 1,500.00	\$ 1,500.00	0.8	\$ 1,200.00			\$ -			\$ -		0.30	\$ 450.00		0.00	\$
9	Street Sweeper (With Pickup Broom)	HR	40	\$ 2,000.00	\$ 80,000.00	3	\$ 6,000.00		3	\$ 6,000.00			\$ 6,000.00		4	\$ 8,000.00		0.00	\$
10	Tree Clearing & Gubbing	LS	1	\$ 71,000.00	\$ 71,000.00	0.4	\$ 28,400.00		0.4	\$ 28,400.00			\$ 28,400.00			\$ 28,400.00		0.00	\$
11	Chip and Dispose of all Brush & Logs less than 6"	LS	1	\$ 22,000.00	\$ 22,000.00	0.4	\$ 8,800.00		0.2	\$ 8,800.00			\$ 8,800.00			\$ 8,800.00		0.00	\$
12	Limbs and More Logs to Spilling Station (Logs >6")	LS	1	\$ 10,000.00	\$ 10,000.00	0.5	\$ 5,000.00		0.2	\$ 2,000.00			\$ 2,000.00			\$ 2,000.00		0.00	\$
13	Remove & Dispose CULV and and Seagird	CF	1	\$ 500.00	\$ 500.00	1	\$ 500.00			\$ -			\$ -			\$ -		0.00	\$
14	Non-Woven ECB Cat 3 Type Straw 25 (No Poly Netting)	SY	2180	\$ 4.00	\$ 8,720.00	332	\$ 1,328.00		650	\$ 2,600.00			\$ 2,600.00			\$ 2,600.00		0.00	\$
15	Seeding	AC	0.5	\$ 2,000.00	\$ 1,000.00	0.1	\$ 200.00		800	\$ 1,600.00			\$ 1,600.00		1198	\$ 23,960.00		0.00	\$
16	Native Seed Mix	LS	20	\$ 50.00	\$ 1,000.00	20	\$ 1,000.00		615	\$ 3,075.00			\$ 3,075.00		980	\$ 49,000.00		0.00	\$
17	Fescue Seed Mix	LS	100	\$ 5.00	\$ 500.00	20	\$ 100.00		30	\$ 150.00			\$ 150.00		50	\$ 250.00		0.00	\$
18	Straw Mulch	TON	2	\$ 700.00	\$ 1,400.00	1	\$ 700.00		1	\$ 700.00			\$ 700.00			\$ 700.00		0.00	\$
19	Class II Riprap Angular, No Limestone (Veg Riprap Toe)	TON	300	\$ 40.00	\$ 12,000.00	140	\$ 5,600.00			\$ -			\$ -		81.56	\$ 3,262.40		78.44	\$ 3,136.00
20	24" to 36" Fieldstone Boulders (Cross Vans)	TON	410	\$ 90.00	\$ 36,900.00	51	\$ 4,590.00		51	\$ 4,590.00			\$ 4,590.00		144.00	\$ 12,960.00		13.00	\$ 1,170.00
21	MN DOT Type V, Non-Woven Geotextile Fabric	SY	690	\$ 4.00	\$ 2,760.00	565	\$ 2,260.00		1000	\$ 4,000.00			\$ 4,000.00		3155.00	\$ 12,620.00		0.00	\$
22	Class III Riprap, Angular, No Limestone (Spillways & Veg Riprap In-channel)	TON	705	\$ 80.00	\$ 56,400.00	61.82	\$ 4,945.60		329.01	\$ 26,320.80			\$ 26,320.80		314.17	\$ 25,133.60		0.00	\$
23	Class III Riprap No Limestone (Veg Riprap & Outside Bend Toe Protection)	TON	1800	\$ 80.00	\$ 144,000.00		\$ -		329.01	\$ 26,320.80			\$ 26,320.80		1089.56	\$ 87,164.80		331.43	\$ 30,514.40
24	Class III Riprap No Limestone (Veg Riprap & Outside Bend Toe Protection)	TON	370	\$ 90.00	\$ 33,300.00	70	\$ 6,300.00			\$ -			\$ -			\$ -		0.00	\$
25	Class II Riprap Fieldstone	LS	0	\$ 15,000.00	\$ -		\$ -			\$ -			\$ -			\$ -		0.00	\$
26	Class II Riprap Fieldstone	LS	0	\$ 15,000.00	\$ -		\$ -			\$ -			\$ -			\$ -		0.00	\$
27	Limbs and More Roadways and Logs to Crow-Hazen Park Reserve (Paid to 3rd Party tree park separately)	LS	1	\$ 12,500.00	\$ 12,500.00		\$ -			\$ -			\$ -		0.00	\$ -		1.00	\$
CO1	Overflow from settling basin																		
1	Woven ECB, Rolanka Bio-Mat 40	SY	67	\$ 6.00	\$ 402.00					\$ 402.00			\$ 402.00		67.00	\$ 402.00		0.00	\$
2	Non-Woven ECB Cat 3 Type Straw 25 (No Poly Netting)	SY	67	\$ 3.00	\$ 201.00					\$ 201.00			\$ 201.00		67.00	\$ 201.00		0.00	\$
3	Seeding	AC	0.02	\$ 2,000.00	\$ 40.00					\$ 40.00			\$ 40.00		0.02	\$ 40.00		0.00	\$
4	Native Seed Mix	LS	0.02	\$ 50.00	\$ 1.00					\$ 1.00			\$ 1.00		0.02	\$ 1.00		0.00	\$
5	Fescue Seed Mix	LS	2	\$ 5.00	\$ 10.00					\$ 10.00			\$ 10.00		2.00	\$ 10.00		0.00	\$
6	MN DOT Type V, Non-Woven Geotextile Fabric	SY	112	\$ 4.00	\$ 448.00					\$ 448.00			\$ 448.00		112.00	\$ 448.00		0.00	\$
7	Class III Riprap No Limestone (Veg Riprap & Outside Bend Toe Protection)	TON	80	\$ 60.00	\$ 4,800.00					\$ 4,800.00			\$ 4,800.00		80.00	\$ 4,800.00		0.00	\$
CO2	Additional Side ravine stabilization																		
1	Non-Woven ECB Cat 3 Type Straw 25 (No Poly Netting)	SY	135	\$ 3.00	\$ 405.00					\$ 405.00			\$ 405.00		135.00	\$ 405.00		0.00	\$
2	Seeding	AC	0.02	\$ 2,000.00	\$ 40.00					\$ 40.00			\$ 40.00		0.02	\$ 40.00		0.00	\$
3	Native Seed Mix	LS	0.02	\$ 50.00	\$ 1.00					\$ 1.00			\$ 1.00		0.02	\$ 1.00		0.00	\$
4	Fescue Seed Mix	LS	2	\$ 5.00	\$ 10.00					\$ 10.00			\$ 10.00		2.00	\$ 10.00		0.00	\$
5	MN DOT Type V, Non-Woven Geotextile Fabric	SY	225	\$ 4.00	\$ 900.00					\$ 900.00			\$ 900.00		225.00	\$ 900.00		0.00	\$
6	Class III Riprap No Limestone (Riprap twice & Check dam)	TON	160	\$ 80.00	\$ 12,800.00					\$ 12,800.00			\$ 12,800.00		160.00	\$ 12,800.00		0.00	\$
TOTAL							\$ 96,437.60	\$ 108,831.60		\$ 209,436.70	\$ 209,436.70		\$ 6,750.00		\$ 6,750.00		\$ 30,907.10		
Total Contract Amount							\$ 4,821.88	\$ 10,471.84		\$ 190,964.87									
Total Amount Completed to Date							\$ 421,555.90												
Total Amount Completed This Pay App							\$ 6,750.00												
Less 5% Retainage This Pay App							\$ -												
Less 5% Retainage Total Project							\$ 20,703.30												
Total Amount Owed This Pay App							\$ 27,450.30												

Certificate of Substantial Completion

Project: Baker Ravine Stabilization

Owner: Three Rivers Park District

Owner's Contract No.: BAK-1903

Contract:

Engineer's Project No.: 1508-0007

This [tentative] [definitive] Certificate of Substantial Completion applies to:

☒ All Work under the Contract Documents: ☐ The following specified portions of the Work:

February 14, 2020

Date of Substantial Completion

The Work to which this Certificate applies has been inspected by authorized representatives of Owner, Contractor, and Engineer, and found to be substantially complete. The Date of Substantial Completion of the Project or portion thereof designated above is hereby declared and is also the date of commencement of applicable warranties required by the Contract Documents, except as stated below.

A [tentative] [definitive] list of items to be completed or corrected is attached hereto. This list may not be all-inclusive, and the failure to include any items on such list does not alter the responsibility of the Contractor to complete all Work in accordance with the Contract Documents.

The responsibilities between Owner and Contractor for security, operation, safety, maintenance, heat, utilities, insurance and warranties shall be as provided in the Contract Documents except as amended as follows:

☐ Amended Responsibilities

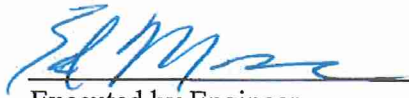
☐ Not Amended

Owner's Amended Responsibilities:

Contractor's Amended Responsibilities:

The following documents are attached to and made part of this Certificate:

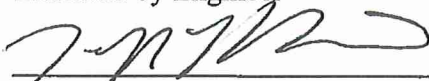
This Certificate does not constitute an acceptance of Work not in accordance with the Contract Documents nor is it a release of Contractor's obligation to complete the Work in accordance with the Contract Documents.



Executed by Engineer

5-24-2020

Date



Accepted by Contractor

5-27-20

Date



Accepted by Owner

5/27/2020

Date

Technical Memo



To: Pioneer Sarah Creek Watershed Management Commission

From: Seth Bossert, Landscape Architect, Wenck Associates, Inc.
Lucius Jonett, Landscape Architect, Wenck Associates, Inc.

Copy: Brian Vlach, Senior Water Resources Manager, Three Rivers Park District

Date: March 3, 2020

Subject: Change order clarification for Baker Ravine Stabilization Project

We are writing this memo to document changes that occurred during construction of the Baker Ravine Stabilization project and the effect those changes had on the construction budget. The construction budget that was approved by the Commission for this project is \$430,805.00.

Quantities were tracked weekly during construction and it became apparent that the total quantity of rock to be imported and installed for the project was overestimated. Not all of the bid quantity was going to be needed for construction. The projected total to complete construction was estimated to be under budget by approximately \$26,000.

As construction continued a new erosion feature was found that was not in the project design, a head cut from the bottom of the Baker ravine to the outlet of an existing stormwater settling basin. The cost to fix this new feature was quantified and reviewed with Brian Vlach to ensure we were justified in completing the additional work and that the cost of the additional work would not put the construction project over the approved budget. We agreed that it made sense to complete the additional work for the long-term stability of the ravine and that it would fit the original budget by utilizing some of the \$26,000 savings in rock that we did not need for the project. The cost for change order 1 was calculated at \$7,502.00 for the additional work. The change order for additional construction work was brought to the Commission for approval, but the intent was not to increase the overall contract price.

During the final weeks of construction, one more new erosion feature was discovered just below the campground along the main ravine. We reviewed this second erosion feature with Brian and agreed that it made sense to complete this additional work too. And that the cost of stabilizing this second erosion feature would still put the overall construction project under the approved budget. A second change order was written quantifying the cost of \$14,156 to fix it. Again, the change order was brought to the Commission for approval, but the intent was not to increase the overall contract price.

March 3, 2020

Throughout the entire construction process the budget was tracked to ensure that the project remained under budget. And as we tracked progress, we discovered that the project would be significantly under budget. As the two new erosion features were identified, we made sure that the additional work would not increase the overall budget over the approved construction budget. The current cost projection to finish construction of the Baker Ravine project, including final cleanup in the spring and change orders 1 and 2, is approximately \$420,000. \$10,000 below the original construction budget approved by the Commission.

**01 20 60
CHANGE ORDER**

Change Order No. 01

Date 12/30/2019

Agreement Date August 15, 2019

Name of Project: Baker Ravine Stabilization Project

Owner: Three Rivers Park District & Pioneer-Sarah Watershed
Management Commission

Contractor: Minnesota Native Landscapes

The following changes are hereby made to the Contract Documents:

Stabilization of side ravine erosion at the outlet of the stormwater settling basin at station 12+00 along the main channel. Stabilization to include: Class III Riprap, Geotextile fabric, woven ECB Rolanka Bio-D 40, non-woven ECB Cat 3 type 2S, fescue seed and native seed.

Justification: During construction an additional area of erosion was discovered at the outlet of the existing settling pond. Heavy flows created a head cut from the outlet to the ravine channel. Stabilization of the erosion will reduce sediment entering the lake thus keeping with the project intent.

Original Contract Price: \$ 430,805.00

Current Contract Price adjusted to previous Change Order: \$ 430,805.00

The Contract Price due to this Change Order will be (increased) by \$ 7,502.00

The new Contract Price including this Change Order will be \$ 438,307.00

Original Contract-Required Completion Date: March 15, 2020

Current Contract Completion Date adjusted to previous Change Order: March 15, 2020

The Contract Time will be (increased) by 0 calendar days.

Approvals Required:

To be effective, this Order must be approved by the Owner and the Contractor if it changes the scope of objective of the Project, or as may otherwise be required by the Supplemental General Conditions.

Requested by:  _____
Wenck Associate Inc.

Ordered by: _____
Three Rivers Park District

Ordered by: _____
Pioneer-Sarah Creek Watershed Management Commission

Accepted by: _____
MN Native Landscape(Contractor)

END OF SECTION

Change Order 01 Estimated Quantities - Pricing as extensions of existing bid items (Pricing pulled from bid form)

ITEM NO	ITEM	UNIT	ESTIMATED QUANTITY	UNIT PRICE	TOTAL ESTIMATED COST
1	Woven ECB, Rolanka BioD-Mat 40	SY	67	\$ 6.00	\$ 402.00
2	Non-Woven ECB Cat 3 Type Straw 2S (No Poly Netting)	SY	67	\$ 3.00	\$ 201.00
3	Seeding	AC	0.02	\$ 2,000.00	\$ 40.00
4	Native Seed Mix	LB	0.02	\$ 50.00	\$ 1.00
5	Fescue Seed Mix	LB	2	\$ 5.00	\$ 10.00
6	MN DOT Type V, Non-Woven Geotextile Fabric	SY	112	\$ 4.00	\$ 448.00
7	Class III Riprap No Limestone (Veg Riprap & Outside Bend Toe Protection)	TON	80	\$ 80.00	\$ 6,400.00
Total				\$ 7,502.00	

**01 20 60
CHANGE ORDER**

Change Order No. 02

Date 01/24/2020

Agreement Date August 15, 2019

Name of Project: Baker Ravine Stabilization Project

Owner: Three Rivers Park District & Pioneer-Sarah Watershed
Management Commission

Contractor: Minnesota Native Landscapes

The following changes are hereby made to the Contract Documents:

Stabilization of side ravine erosion below the campground at station 4+75 along the main channel. Stabilization to include: Class III Riprap, Geotextile fabric, woven ECB, non-woven ECB Cat 3 type 2S, fescue seed and native seed.

Justification: During construction an additional area of erosion was discovered below the campground wall leading to the main ravine channel. Overland flows created a small head cut from the back of the existing boulder wall to the ravine channel. Stabilization of the erosion will reduce sediment entering the lake thus keeping with the project intent.

Original Contract Price: \$ 430,805.00

Current Contract Price adjusted to previous Change Order: \$ 438,307.00

The Contract Price due to this Change Order will be (increased) by \$ 14,156.00

The new Contract Price including this Change Order will be \$ 452,463.00

Original Contract-Required Completion Date: March 15, 2020

Current Contract Completion Date adjusted to previous Change Order: March 15, 2020

The Contract Time will be (increased) by 0 calendar days.

Change Order ^{01 20 60-1}

Approvals Required:

To be effective, this Order must be approved by the Owner and the Contractor if it changes the scope of objective of the Project, or as may otherwise be required by the Supplemental General Conditions.

Requested by: 
Wenck Associate Inc.

Ordered by: _____
Three Rivers Park District

Ordered by: _____
Pioneer-Sarah Creek Watershed Management Commission

Accepted by: _____
MN Native Landscape(Contractor)

END OF SECTION

Change Order 02 Estimated Quantities - Pricing as extensions of existing bid items (Pricing pulled from bid form)

ITEM NO	ITEM	UNIT	ESTIMATED QUANTITY	UNIT PRICE	TOTAL ESTIMATED COST
1	Non-Woven ECB Cat 3 Type Straw 2S (No Poly Netting)	SY	135	\$ 3.00	\$ 405.00
2	Seeding	AC	0.02	\$ 2,000.00	\$ 40.00
3	Native Seed Mix	LB	0.02	\$ 50.00	\$ 1.00
4	Fescue Seed Mix	LB	2	\$ 5.00	\$ 10.00
5	MN DOT Type V, Non-Woven Geotextile Fabric	SY	225	\$ 4.00	\$ 900.00
6	Class III Riprap No Limestone (Riprap swale & Check dams)	TON	160	\$ 80.00	\$ 12,800.00
Total				\$ 14,156.00	\$ 14,156.00



APPENDIX D

Invoice Summary For Project Administration Services

Project Title: Baker Ravine Stabilization Project
 Client: Pioneer-Sarah Creek Watershed Management Commission
 Project Number: B1508-0007
 Project Manager: Lucius Jonett
 Date: 6/9/2020

Task #	Description	Budget	Invoiced #11804318	Invoiced #11804771	Invoiced #11805829	Invoiced #11806816	Invoiced #11807612	Invoiced #11808264	Invoiced #11901429	Invoiced #11903854	Invoiced #11905371	Invoiced #11905493	Invoiced #11907778
			7/6/2018	8/3/2018	9/7/2018	10/5/2018	11/7/2018	12/6/2018	3/8/2019	7/3/2019	8/10/2019	8/30/2019	11/11/2019
1	Topographic/Field/Boundary Survey	\$ 14,074.00	\$ 8,991.93	\$ 1,376.55									
2	Wetland Delineation	\$ 5,832.00	\$ 2,070.60	\$ 136.80	\$ 1,666.50	\$ 825.37							
3	Plans	\$ 26,047.00	\$ 6,426.43	\$ 5,321.40	\$ 1,881.33	\$ 2,183.20	\$ 241.60		\$ 362.40				
4	Obtain Permits	\$ 10,764.00	\$ -		\$ 3,174.60	\$ 3,453.96	\$ 1,661.47	\$ 362.70	\$ 75.50				
5	Specifications and Contract Documents	\$ 6,850.00	\$ -		\$ 861.30		\$ 1,786.50		\$ 198.30	\$ 2,293.70	\$ 1,231.40		
6	Bidding Administration	\$ 3,951.00	\$ -								\$ 2,296.58	\$ 2,820.31	
7	Construction Staking	\$ 10,270.00	\$ -										
8	Construction Observation	\$ 27,291.00	\$ -										\$ 3,075.60
9	As-Built Survey & Drawings	\$ 5,974.00	\$ -										
Total		\$ 111,053.00	\$ 17,488.96	\$ 6,834.75	\$ 7,583.73	\$ 6,462.53	\$ 3,689.57	\$ 362.70	\$ 636.20	\$ 2,293.70	\$ 3,527.98	\$ 2,820.31	\$ 3,075.60

Project Title: Baker Ravine Stabilization Project
Client: Pioneer-Sarah Creek Watershed Management Commission
Project Number: B1508-0007
Project Manager: Lucius Jonett
Date: 6/9/2020

Task # Description		Budget	Invoiced #11908859 12/11/2019	Invoiced #11909313 1/7/2020	Invoiced #12000528 2/11/2020	Invoiced #12001235 3/6/2020	Invoiced #12002021 4/9/2020	Invoiced #12002957 5/11/2020	Final Invoice #12003833 6/9/2020	Total Invoiced	Budget Remaining
1	Topographic/Field/Boundary Survey	\$ 14,074.00								\$ 10,368.48	\$ 3,705.52
2	Wetland Delineation	\$ 5,832.00								\$ 4,699.27	\$ 1,132.73
3	Plans	\$ 26,047.00								\$ 16,416.36	\$ 9,630.64
4	Obtain Permits	\$ 10,764.00								\$ 8,728.23	\$ 2,035.77
5	Specifications and Contract Documents	\$ 6,850.00								\$ 6,371.20	\$ 478.80
6	Bidding Administration	\$ 3,951.00								\$ 5,116.89	\$ (1,165.89)
7	Construction Staking	\$ 10,270.00	\$ 2,131.40	\$ 889.20						\$ 3,020.60	\$ 7,249.40
8	Construction Observation	\$ 27,291.00	\$ 2,125.40	\$ 4,885.80	\$ 5,137.45	\$ 1,908.40	\$ 921.30	\$ 787.60	\$ 1,142.73	\$ 19,984.28	\$ 7,306.72
9	As-Built Survey & Drawings	\$ 5,974.00							\$ 2,367.00	\$ 2,367.00	\$ 3,607.00
Total		\$ 111,053.00	\$ 4,256.80	\$ 5,775.00	\$ 5,137.45	\$ 1,908.40	\$ 921.30	\$ 787.60	\$ 3,509.73	\$ 77,072.31	\$ 33,980.69



APPENDIX E

As-Built Design

CONSTRUCTION PLANS FOR
BAKER RAVINE STABILIZATION
PREPARED FOR
PIONEER-SARAH CREEK WATERSHED MANAGEMENT
COMMISSION
AUGUST 2018



PROJECT VICINITY MAP

- INDEX OF SHEETS:
- G-101 - TITLE SHEET & INDEX
 - G-102 - LEGEND AND NOTES
 - C-100 - SITE ACCESS PLAN
 - C-101 - EXISTING CONDITIONS & REMOVALS
 - C-111 - PLAN AND PROFILE 0+00 TO 7+50
 - C-112 - PLAN AND PROFILE 7+50 TO 16+43
 - C-113 - PLAN AND PROFILE 20+00 TO 23+71 AND 30+00 TO 32+40
 - C-201 - SWPPP
 - C-202 - EROSION CONTROL PLAN
 - C-801 - DETAILS
 - C-802 - DETAILS

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

RECORD PLANS	
CONTRACTOR:	MINNESOTA NATIVE LANDSCAPES
DATE:	05/29/2020
RECORD DRAWINGS ARE BASED ON INFORMATION OBTAINED THROUGH ON SITE OBSERVATION OF CONSTRUCTION AND FIELD SURVEY DATA COLLECTED BY TJK	

BAKER RAVINE STABILIZATION
3800 COUNTY RD 24 MAPLE PLAIN, MN 55359
Prepared For
PIONEER-SARAH CREEK WATERSHED MANAGEMENT
COMMISSION
3235 FERNBROOK LANE N PLYMOUTH, MN 55447

Date	Description	Issue #
07/19/2018	90% DESIGN FOR REVIEW	0
09/19/2018	100% DESIGN FOR REVIEW	1
07/01/2019	FOR R.D.	2
07/31/2019	ADDENDUM 1	3
05/29/2020	RECORD PLANS	4

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.

ED MATTHIENEN
License #: 1680
Date: 07/19
Project #: 1508-0007
Drawn By: SJB
Issue Date: MAY 2020
Issue #: 4
Sheet #:
G-101
Sheet Title:
TITLE SHEET & INDEX



Responsive partner. Exceptional outcomes.

GENERAL NOTES:

- EXISTING CONDITIONS HAVE BEEN PROVIDED BY A COMBINATION OF HISTORIC PLANS FROM THE CITY, SURVEY INFORMATION FROM A SITE VISIT BY WENCK STAFF AND LIDAR. 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.
- ALL QUANTITIES ARE APPROXIMATE AND MAY VARY TO ALLOW COMPLETION OF WORK.
- THE SUBSURFACE UTILITY INFORMATION IN THIS PLAN IS UTILITY QUALITY LEVEL D. THIS QUALITY LEVEL WAS DETERMINED ACCORDING TO THE GUIDELINES OF C/ASCE 38-2 ENTITLED "STANDARD GUIDELINES FOR THE COLLECTION AND DEPICTION OF EXISTING SUBSURFACE UTILITY DATA".
- 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.
- CONTRACTOR SHOULD ANTICIPATE PRIVATE UTILITY CONFLICTS THROUGHOUT THE PROJECT SUB CUT AND TRENCH AREAS AND SHALL COORDINATE WITH PRIVATE UTILITY OWNERS.
- 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.
- INSTALL AND MAINTAIN EROSION CONTROL DEVICES AS SPECIFIED OR AS DIRECTED BY ENGINEER.
- CONTRACTOR SHALL COMPLY WITH ALL STATE, COUNTY, AND CITY PERMITS.
- MAINTAIN MAIL, GARBAGE, AND RECYCLING SERVICES TO PROPERTIES.
- PROTECT EXISTING PAVEMENT AND SITE FEATURES, EXCEPT AS NOTED.
- CONTRACTOR TO COORDINATE AND MAINTAIN ACCESS TO PROPERTIES.
- MAINTAIN DRAINAGE CONVEYANCE DURING CONSTRUCTION (BOTH PIPED AND OVERLAND).
- THE EXISTING PAVEMENT CONDITIONS HAVE BEEN DOCUMENTED, AND ANY DAMAGE TO THE EXISTING PAVEMENT, CURBING, AND STRIPING SHALL BE REPLACED BY THE CONTRACTOR, TO THE OWNERS SATISFACTION, AT NO ADDITIONAL COST TO THE OWNER.

REMOVAL NOTES:

- FEATURES NOT SPECIFICALLY IDENTIFIED ON PLAN FOR SALVAGE OR REMOVAL THAT CONFLICT WITH CONSTRUCTION ARE TO BE REVIEWED WITH ENGINEER.

DEWATERING NOTES:

- NO BID ITEM HAS BEEN PROVIDED FOR DEWATERING AS ALL DEWATERING WORK NECESSARY FOR CONSTRUCTION WILL BE CONSIDERED INCIDENTAL.
- ENERGY DISSIPATION SHALL BE PROVIDED AT ALL DISCHARGE POINTS TO PREVENT SCOUR.
- PROVIDE SILT BAGS FOR DEWATERING.
- 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.
- THE CONTRACTOR MUST DISCHARGE TURBID OR SEDIMENT-LADEN WATER RELATED TO DEWATERING OR BASIN DRAINING (E.G. PUMPED DISCHARGES, TRENCH/DITCH CUTS FOR DRAINAGE) TO A TEMPORARY OR PERMANENT SEDIMENTATION BASIN ON THE PROJECT SITE UNLESS INFEASIBLE. THE CONTRACTOR MAY DISCHARGE FROM THE TEMPORARY OR PERMANENT SEDIMENTATION BASINS TO THE SURFACE WATERS IF THE BASIN WATER HAS BEEN VISUALLY CHECKED TO ENSURE ADEQUATE TREATMENT HAS BEEN OBTAINED IN THE BASIN AND THAT NUISANCE CONDITIONS (SEE MINN. RULES 7050.0210, SUBPART 2) WILL NOT RESULT FROM THE DISCHARGE. IF THE WATER CANNOT BE DISCHARGED TO A SEDIMENTATION BASIN PRIOR TO ENTERING THE SURFACE WATER, IT MUST BE TREATED WITH THE APPROPRIATE BMPs, SUCH THAT THE DISCHARGE DOES NOT ADVERSELY AFFECT THE RECEIVING WATER OR DOWNSTREAM PROPERTIES. IF THE CONTRACTOR MUST DISCHARGE WATER THAT CONTAINS OIL OR GREASE, THE CONTRACTOR MUST USE AN OIL-WATER SEPARATOR OR SUITABLE FILTRATION DEVICE (E.G. CARTRIDGE FILTERS, ABSORBENTS PADS) PRIOR TO DISCHARGING THE WATER. THE CONTRACTOR MUST ENSURE THAT DISCHARGE POINTS ARE ADEQUATELY PROTECTED FROM EROSION AND SCOUR. THE DISCHARGE MUST BE DISPERSED OVER NATURAL ROCK RIPRAP, SAND BAGS, PLASTIC SHEETING, OR OTHER ACCEPTED ENERGY DISSIPATION MEASURES.
- ALL WATER FROM DEWATERING OR BASIN-DRAINING ACTIVITIES MUST BE DISCHARGED IN A MANNER THAT DOES NOT CAUSE NUISANCE CONDITIONS, EROSION IN RECEIVING CHANNELS OR ON DOWNSLOPE PROPERTIES, OR INUNDATION IN WETLANDS CAUSING SIGNIFICANT ADVERSE IMPACT TO THE WETLAND.
- IF THE CONTRACTOR IS USING FILTERS WITH BACKWASH WATER, THE CONTRACTOR MUST HAUL THE BACKWASH WATER AWAY FOR DISPOSAL, RETURN THE BACKWASH WATER TO THE BEGINNING OF THE TREATMENT PROCESS, OR INCORPORATE THE BACKWASH WATER INTO THE SITE IN A MANNER THAT DOES NOT CAUSE EROSION. THE CONTRACTOR MAY DISCHARGE BACKWASH WATER TO THE SANITARY SEWER IF PERMISSION IS GRANTED BY THE SANITARY SEWER AUTHORITY. THE CONTRACTOR MUST REPLACE AND CLEAN THE FILTER MEDIA USED IN DEWATERING DEVICES WHEN REQUIRED TO RETAIN ADEQUATE FUNCTION.

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

GOVERNING SPECIFICATIONS:

- THE MINNESOTA DEPARTMENT OF TRANSPORTATION "STANDARD SPECIFICATIONS FOR CONSTRUCTION" 2016 EDITION & LATEST SUPPLEMENTS.
- CITY ENGINEERS ASSOCIATION OF MINNESOTA (CEAM) STANDARD UTILITIES SPECIFICATIONS (LATEST EDITION)
- CITY OF PLYMOUTH CONSTRUCTION SPECIFICATIONS
- ALL APPLICABLE FEDERAL, STATE AND LOCAL LAWS AND ORDINANCE WILL BE COMPLETED WITH IN THE CONSTRUCTION OF THIS PROJECT.

TRAFFIC CONTROL NOTES:

- 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. A STAGING PLAN SHALL BE SUBMITTED TO THE ENGINEER FOR REVIEW AND APPROVAL PRIOR TO ANY CONSTRUCTION RELATED ACTIVITIES.
- 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. A TRAFFIC CONTROL PLAN SHALL BE SUBMITTED TO THE ENGINEER, CITY, AND COUNTY FOR REVIEW AND APPROVAL PRIOR TO ANY CONSTRUCTION RELATED ACTIVITIES. PLANS SHALL COMPLY WITH ALL APPLICABLE PERMIT REQUIREMENTS.
- TRAFFIC CONTROL SHALL ALSO INCLUDE ALL NECESSARY SIGNAGE AND MARKINGS REQUIRED FOR THE BOARDWALK CLOSURE (SIMILAR TO SIDEWALK CLOSURE). THIS SHALL INCLUDE ADVANCED WARNING SIGNS AND NECESSARY FENCING AND SIGNAGE TO PREVENT PEDESTRIANS FROM ACCESSING THE PROPOSED BOARDWALK CONNECTION AREA.

EROSION CONTROL NOTES:

- SEE SHEETS C-201 AND C-202 FOR EROSION AND SEDIMENT CONTROL MEASURES.
- ADDITIONAL EROSION CONTROL MEASURES MAY BE REQUIRED DEPENDING ON SITE CONDITIONS DURING CONSTRUCTION. COORDINATE WITH ENGINEER.
- ALL EROSION CONTROL DEVICES TO BE INSTALLED PRIOR TO COMMENCEMENT OF WORK, MAINTAINED IN ACCORDANCE WITH THE SWPPP, NPDES, AND SPECIFICATIONS THROUGHOUT DURATION OF PROJECT, AND REMOVED UPON ESTABLISHMENT OF FINAL STABILIZATION AS DIRECTED BY ENGINEER. EROSION CONTROL MEASURES USED FOR CONSTRUCTION SHALL NOT BE REMOVED UNTIL AUTHORIZED BY OWNER OR ENGINEER.
- REMOVE TRACKED SEDIMENT FROM ALL PAVED SURFACES BOTH ON AND OFFSITE ON A DAILY BASIS (INCIDENTAL).
- MINIMIZE DUST FROM CONSTRUCTION OPERATIONS BY PROVIDING WATER OR OTHER APPROVED METHOD ON A DAILY BASIS (INCIDENTAL).

HORIZONTAL AND VERTICAL CONTROL:

- THE HORIZONTAL CONTROL FOR THIS PLAN IS HENNEPIN COUNTY COORDINATE RELATIVE TO SYSTEM NAD83(11).
- THE VERTICAL CONTROL FOR THIS PLAN IS NAVD88.

ABBREVIATIONS

BV	BUTTERFLY VALVE
CL	CENTER LINE
CL	CLASS
CMP	CORRUGATE METAL PIPE
CY	CUBIC YARD
DIP	DUCTILE IRON PIPE
EL./ELEV	ELEVATION
EX	EXISTING
FES	FLARED END SECTION
F/F	FACE TO FACE
FM	FORCEMAIN
GV	GATE VALVE
HDPE	HIGH-DENSITY POLYETHYLENE
HP	HIGH POINT
HWL	HIGH WATER LEVEL
HYD	HYDRANT
INV	INVERT
LF	LINEAL FEET
LP	LOW POINT
MH	MANHOLE
NWL	NORMAL WATER LEVEL
PVC	POLYVINYL CHLORIDE
R	RADIUS
RCP	REINFORCED CONCRETE PIPE
R/W	RIGHT-OF-WAY
SF	SQUARE FEET
STA	STATION
SY	SQUARE YARD
TNH	TOP NUT HYDRANT
TYP	TYPICAL
WM	WATERMAIN

EXISTING SYMBOLS/LINES LEGEND

	STORM SEWER FLARED END SECTION
	STORM SEWER CATCH BASIN/MANHOLE
	STORM SEWER
	HYDRANT
	WATER MAIN
	CONTOUR MINOR
	CONTOUR MAJOR
	PROPERTY LINE
	PROJECT AREA LIMITS
	ACCESS ROUTE BOUNDARY
	RETAINING WALL
	EXISTING FENCE
	EXISTING CHANNEL
	APPROXIMATE TREE LINE
	WETLAND BOUNDARY
	DECIDUOUS TREE
	UTILITY POLE
	LIGHT POLE
	SIGN
	MAILBOX
	GUARD POST
	PROPERTY IRON

PROPOSED SYMBOLS/LINES LEGEND

	STORM SEWER FLARED END SECTION
	RIP RAP
	STORM SEWER CATCH BASIN/MANHOLE
	STORM SEWER
	DRAINTILE
	VEGETATED RIPRAP
	TWO STAGE CHANNEL
	CHANNEL CLEANOUT
	GRADED BANK
	CONTOUR MINOR
	CONTOUR MAJOR
	SPOT ELEVATION
	BITUMINOUS
	CONCRETE
	DECIDUOUS TREE
	EXISTING FENCE
	PROPERTY LINE
	GRADED BANK
	BARE ROOT SHRUB PLANTING
	BOULDERS
	WATER EDGE
	RETAINING WALL
	PROPOSED CHANNEL CENTERLINE
	PROJECT AREA LIMITS
	ROOTWAD WITH LOG TOE
	VEGETATED RIPRAP TOE
	COIR TOE
	SINGLE LANE ACCESS PLOWED FOR WINTER PEDESTRIAN ACTIVITIES BY THREE RIVER PARK DISTRICT
	CONSTRUCTION AND STAGING ACCESS TO BE PLOWED BY CONTRACTOR (GRAVEL AND WOODCHIP)

REMOVAL SYMBOLS/LINES LEGEND

	TREE REMOVAL
	MISCELLANEOUS REMOVALS

EROSION CONTROL SYMBOLS/LINES LEGEND

	EROSION CONTROL BLANKET AND MN SEED MIX 34-262
	HYDROMULCH AND MN SEED MIX 34-262
	TEMPORARY SEED & EROSION CONTROL BLANKET
	SILT FENCE
	FLOTATION SILT CURTAIN
	INLET PROTECTION
	BIOROLL

RECORD PLANS	
CONTRACTOR: <u>MINNESOTA NATIVE LANDSCAPES</u>	
DATE: <u>05/29/2020</u>	
RECORD DRAWINGS ARE BASED ON INFORMATION OBTAINED THROUGH ON SITE OBSERVATION OF CONSTRUCTION AND FIELD SURVEY DATA COLLECTED BY <u>TJK</u>	

WENCK
ASSOCIATES

Responsive partner. Exceptional outcomes.

BAKER RAVINE STABILIZATION

3800 COUNTY RD 24 MAPLE PLAIN, MN 55359

Prepared for
PIONEER-SARAH CREEK WATERSHED MANAGEMENT
COMMISSION

3235 FERNBROOK LANE N PLYMOUTH, MN 55447

Issue #	Date	Description
0	07/10/2018	90% DESIGN FOR REVIEW
1	09/19/2018	100% DESIGN FOR REVIEW
2	07/01/2019	FOR BID
3	07/31/2019	ADDENDUM 1
4	05/29/2020	RECORD PLANS

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ED MATTHIENSEN

License #: 1680

Date: 07/19

Project #: 1508-0007

Drawn By: SJB

Issue Date: MAY 2020

Issue #: 4

Sheet #:

G-102

Sheet Title: LEGEND AND NOTES



Responsive partner. Exceptional outcomes.

BAKER RAVINE STABILIZATION	
3800 COUNTY RD 24 MAPLE PLAIN, MN 55359	
Prepared For: PIONEER-SARAH CREEK WATERSHED MANAGEMENT COMMISSION	
3235 FERNBROOK LANE N PLYMOUTH, MN 55447	
Date	Description
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05/29/2020	RECORD PLANS
Issue #	
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2	
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4	

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ED MATTHIEN
License #: 1680
Date: 07/19

Project #: 1508-0007
Drawn By: SJB
Issue Date: MAY 2020
Issue #: 4
Sheet #: **C-100**
Sheet Title: SITE ACCESS PLAN



RECORD PLANS

CONTRACTOR: MINNESOTA NATIVE LANDSCAPES

DATE: 05/29/2020

RECORD DRAWINGS ARE BASED ON INFORMATION OBTAINED THROUGH ON SITE OBSERVATION OF CONSTRUCTION AND FIELD SURVEY DATA COLLECTED BY TJK

- LEGEND
- BITUMINOUS PAVEMENT

CONCRETE PAVEMENT

SINGLE LANE ACCESS PLOWED FOR WINTER PEDESTRIAN ACTIVITIES BY THREE RIVER PARK DISTRICT

CONSTRUCTION AND STAGING ACCESS TO BE PLOWED BY CONTRACTOR (GRAVEL AND WOODCHIP)

RIPRAP

TREE REMOVAL AREA

TREE

TREE REMOVAL

GRADE CONTROL STRUCTURE

WENCK ASSOCIATES

Responsive partner. Exceptional outcomes.

BAKER RAVINE STABILIZATION

3800 COUNTY RD 24 MAPLE PLAIN, MN 55359

Prepared For
PIONEER-SARAH CREEK WATERSHED MANAGEMENT COMMISSION

3235 FERNBROOK LANE N PLYMOUTH, MN 55447

Issue #	Date	Description
0	07/19/2018	90% DESIGN FOR REVIEW
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3	07/31/2019	ADDENDUM 1
4	05/29/2020	RECORD PLANS

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License #: 1680

Date: 07/19

Project #: 1508-0007

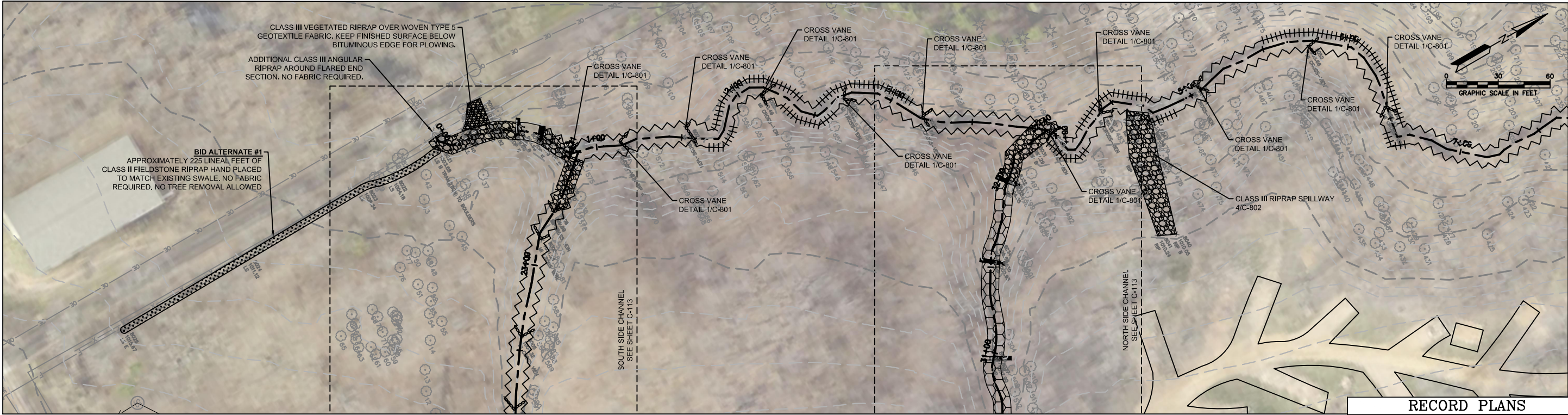
Drawn By: SJB

Issue Date: MAY 2020

Issue #: 4

Sheet #:
C-101

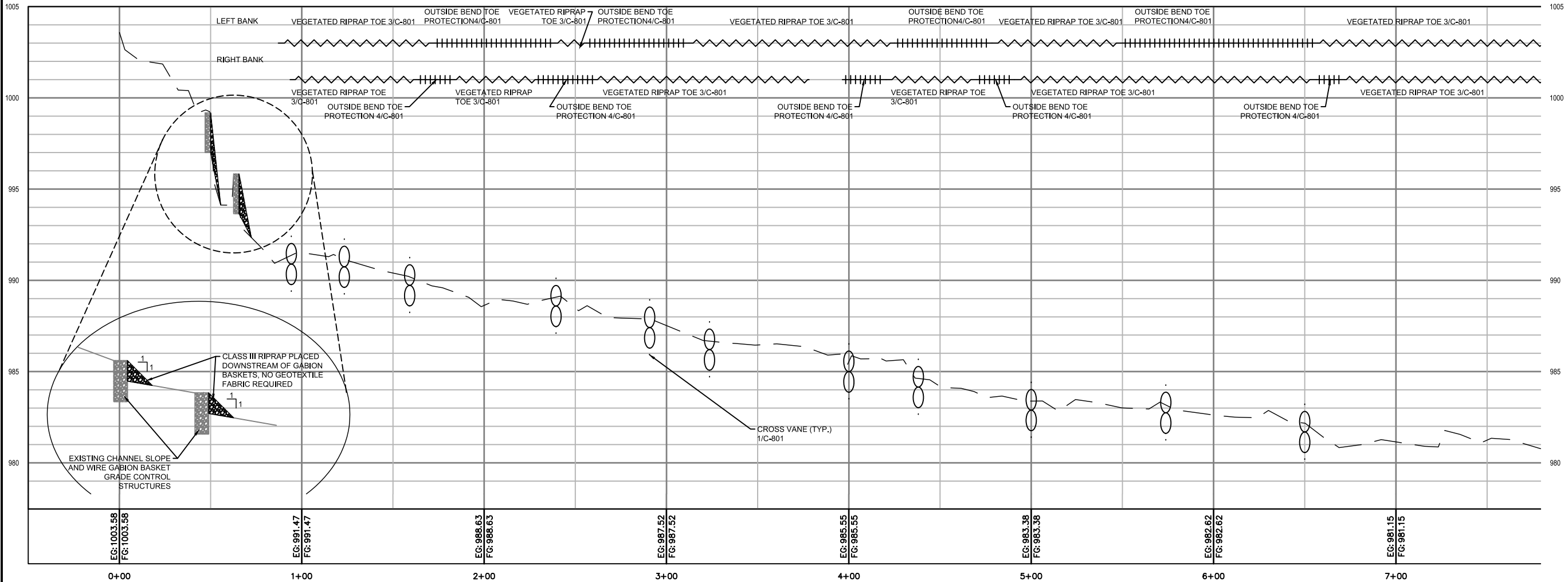
Sheet Title:
EXISTING CONDITION & REMOVALS



RECORD PLANS

CONTRACTOR: MINNESOTA NATIVE LANDSCAPES
DATE: 05/29/2020

RECORD DRAWINGS ARE BASED ON INFORMATION OBTAINED THROUGH ON SITE OBSERVATION OF CONSTRUCTION AND FIELD SURVEY DATA COLLECTED BY TJK



Issue #	Description	Date
0	90% DESIGN FOR REVIEW	07/19/2018
1	100% DESIGN FOR REVIEW	09/19/2018
2	FOR BID	07/01/2019
3	ADDENDUM 1	07/01/2019
4	RECORD PLANS	05/29/2020

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ED MATTHIESEN
License #: 1680
Date: 07/19

Project #: 1508-0007

Drawn By: SJB

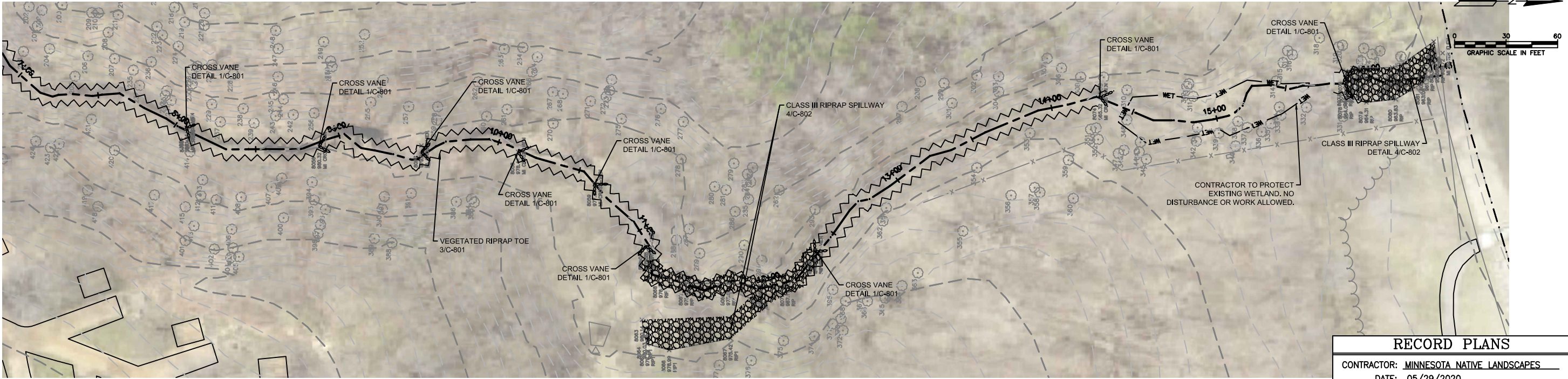
Issue Date: MAY 2020

Issue #: 4

Sheet #:

C-111

Sheet Title:
PLAN AND PROFILE
0+00 TO 7+50

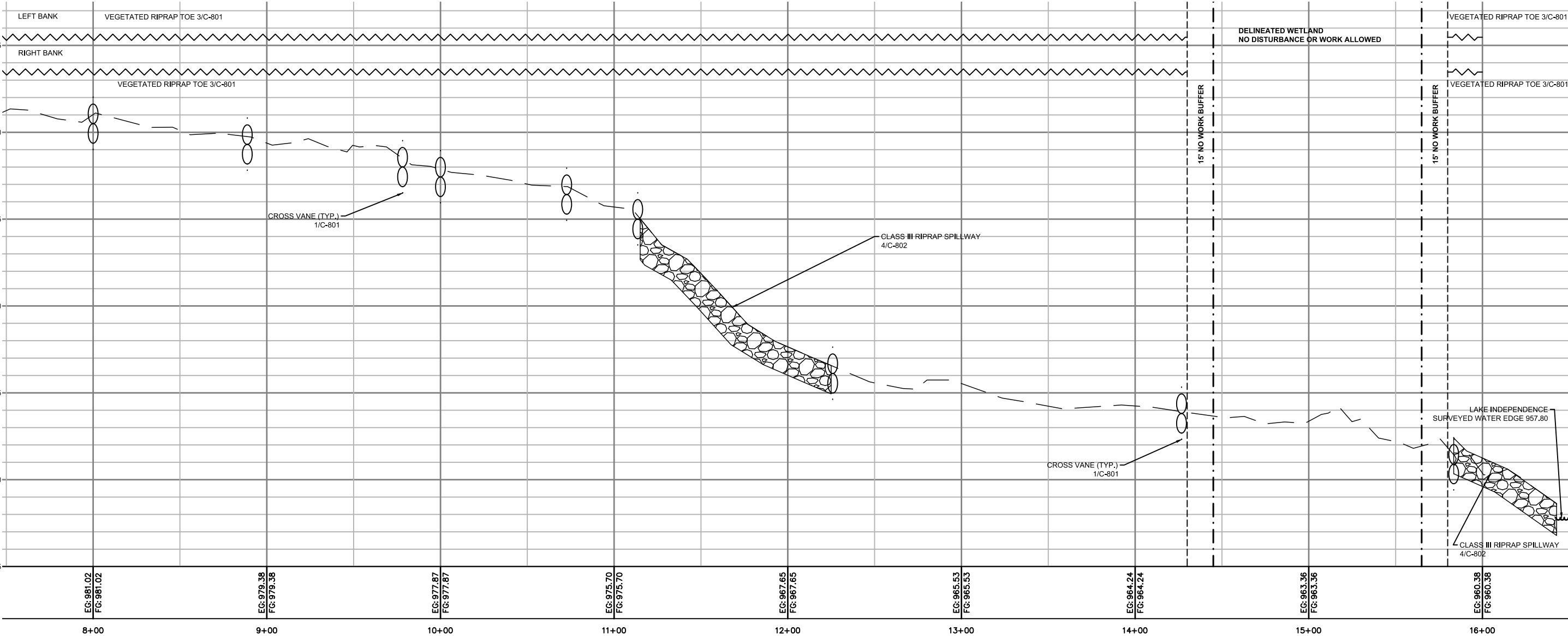


RECORD PLANS

CONTRACTOR: MINNESOTA NATIVE LANDSCAPES

DATE: 05/29/2020

RECORD DRAWINGS ARE BASED ON INFORMATION OBTAINED THROUGH ON SITE OBSERVATION OF CONSTRUCTION AND FIELD SURVEY DATA COLLECTED BY IJK



Responsive partner. Exceptional outcomes.

BAKER RAVINE STABILIZATION

3800 COUNTY RD 24 MAPLE PLAIN, MN 55359

Pioneer-Sarah Creek Watershed Management Commission

3235 Fernbrook Lane N Plymouth, MN 55447

Issue #	Date	Description
0	07/19/2018	90% DESIGN FOR REVIEW
1	09/19/2018	100% DESIGN FOR REVIEW
2	07/01/2019	FOR BID
3	07/01/2019	ADDENDUM 1
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ED MATTHIASEN

License #: 1680

Date: 07/19

Project #: 1508-0007

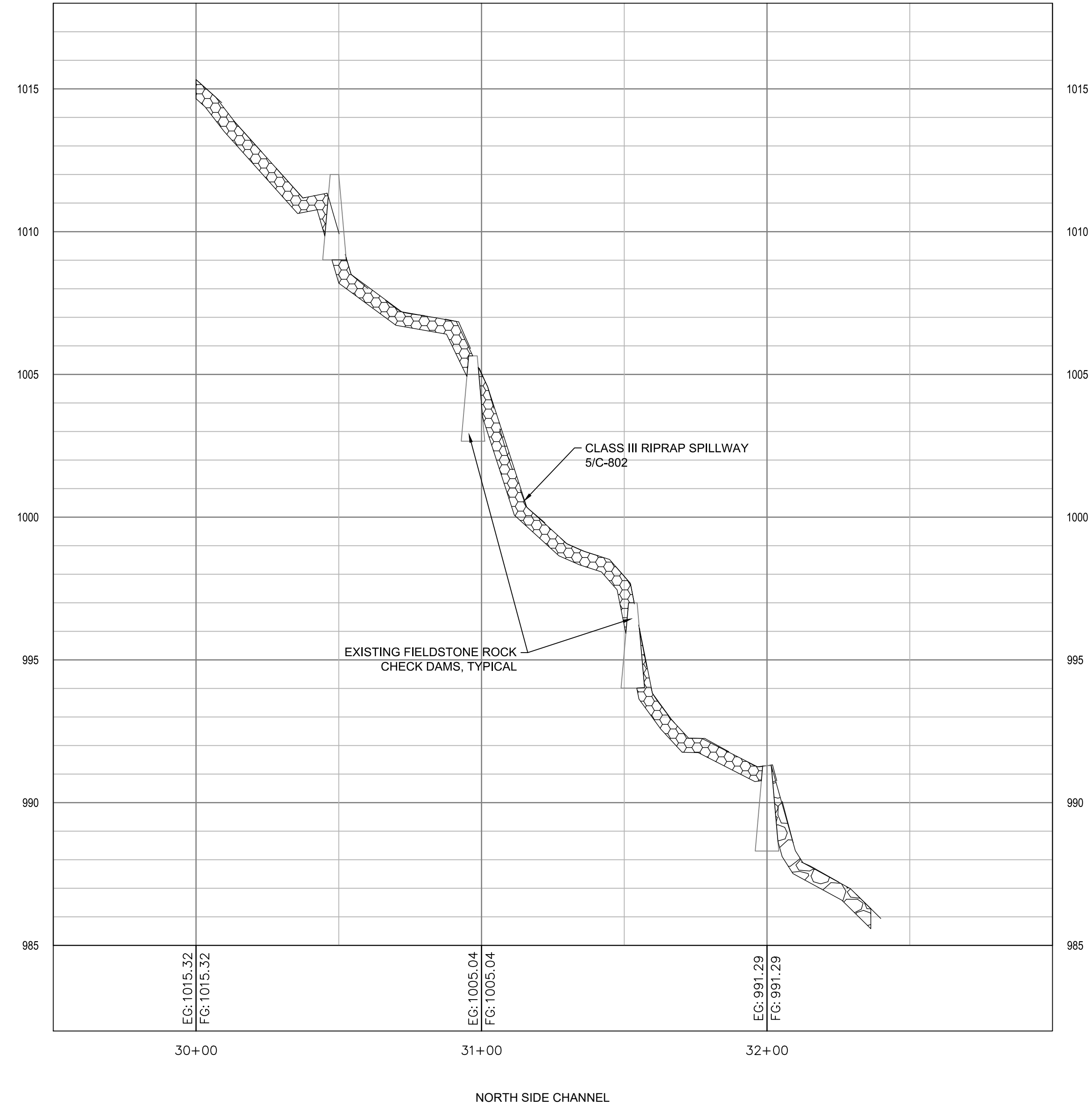
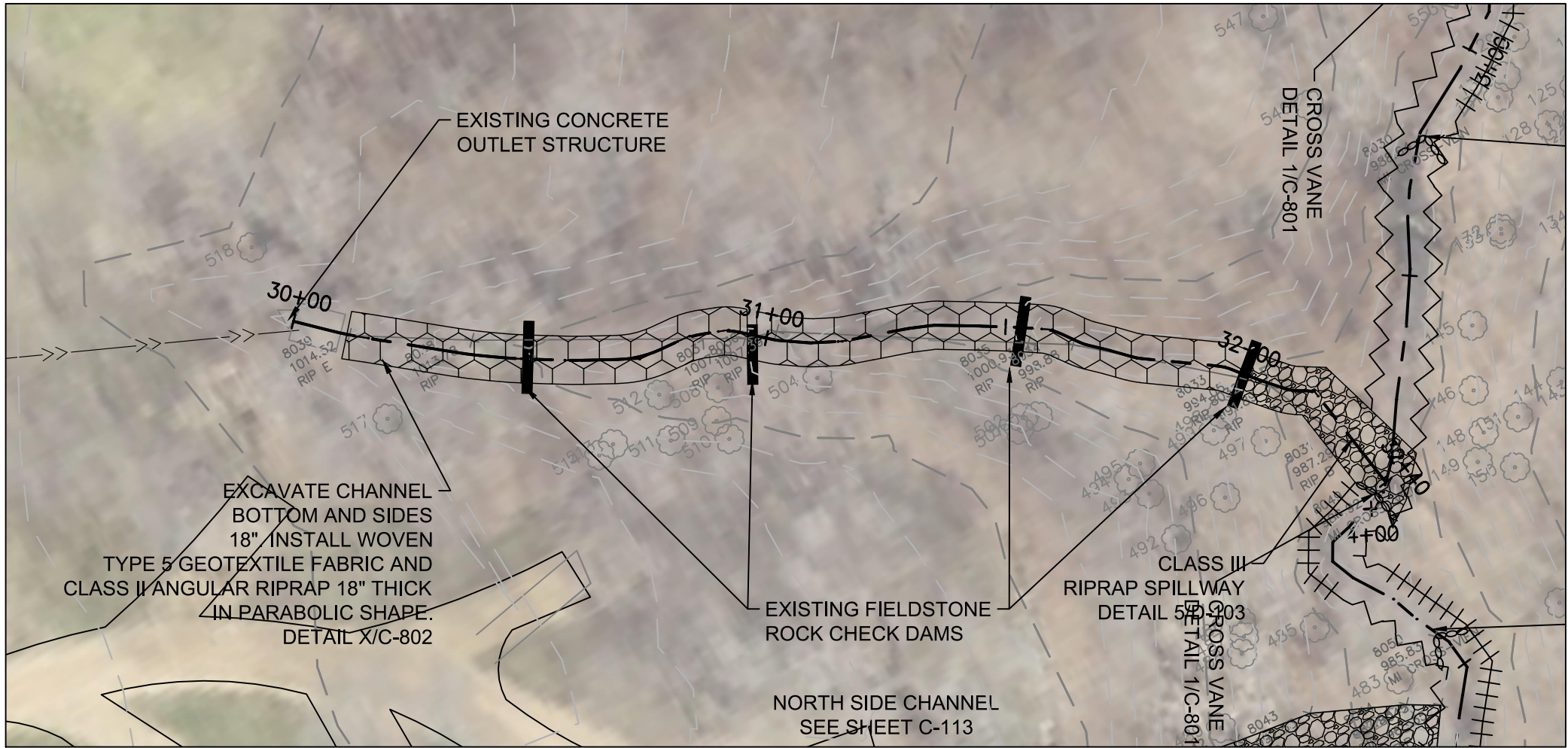
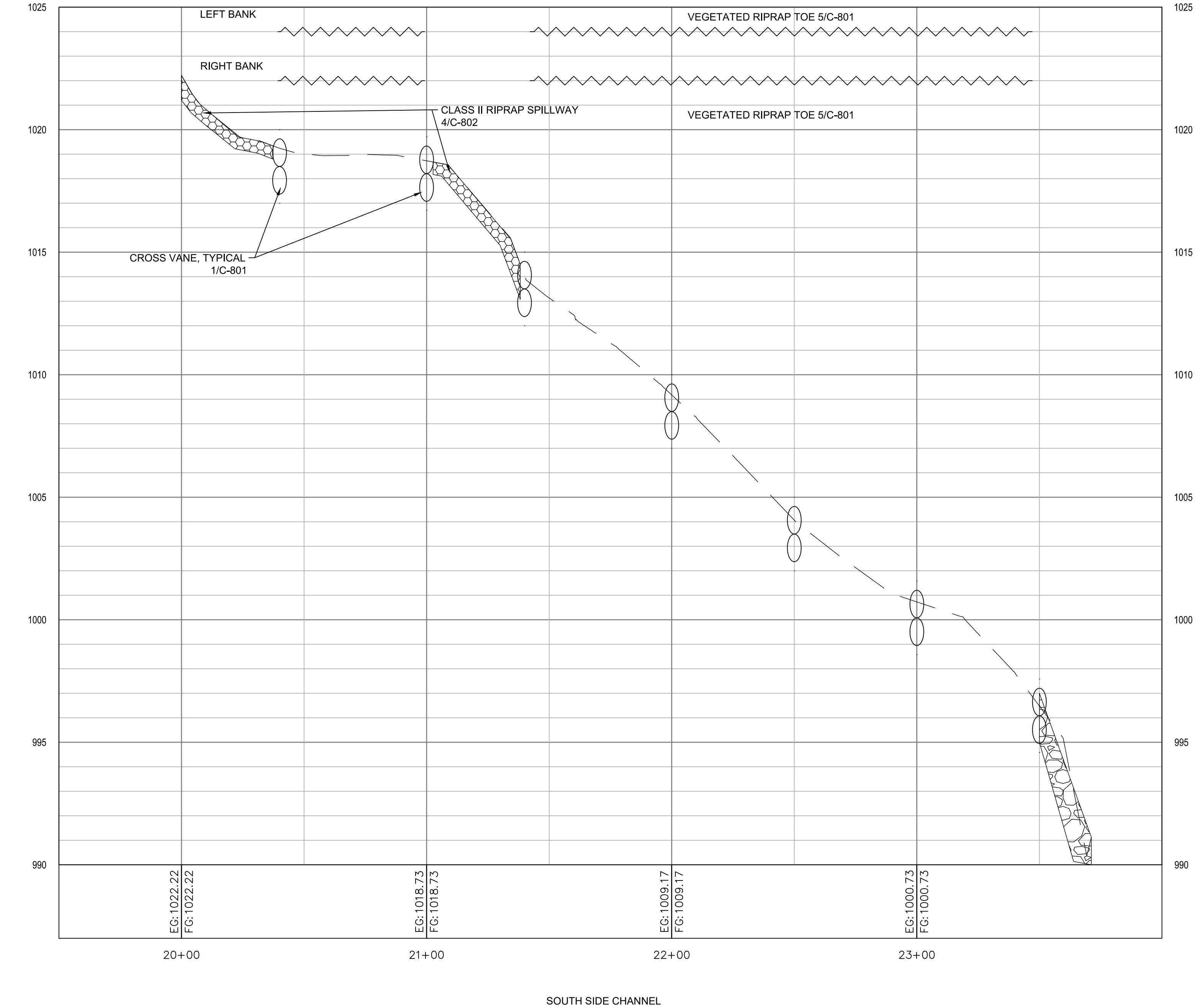
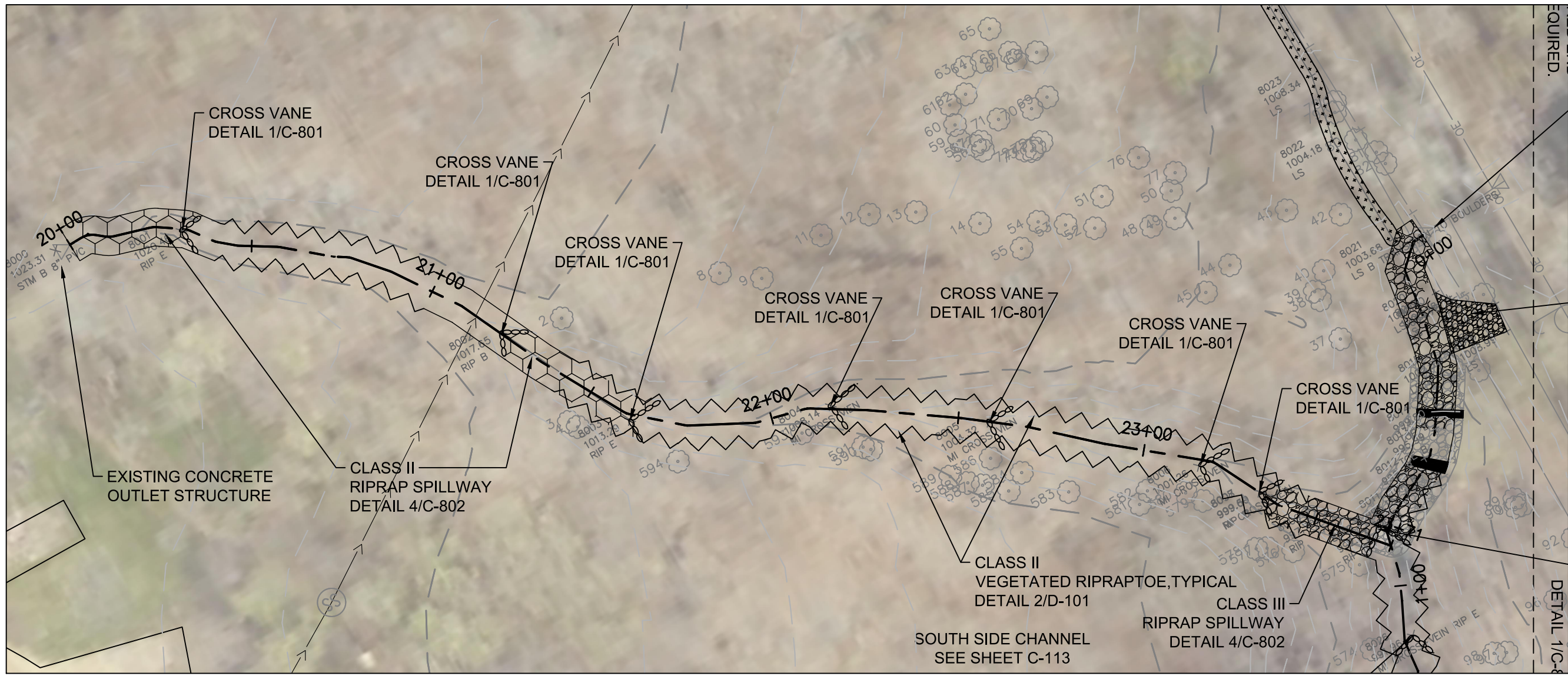
Drawn By: SJB

Issue Date: MAY 2020

Issue #: 4

Sheet #: C-112

Sheet Title: PLAN AND PROFILE 7+50 TO 16+43



RECORD PLANS

CONTRACTOR: MINNESOTA NATIVE LANDSCAPES

DATE: 05/29/2020

RECORD DRAWINGS ARE BASED ON INFORMATION OBTAINED THROUGH ON SITE OBSERVATION OF CONSTRUCTION AND FIELD SURVEY DATA COLLECTED BY TJK

Responsive partner. Exceptional outcomes.

BAKER RAVINE STABILIZATION
3800 COUNTY RD 24 MAPLE PLAIN, MN 55359

Prepared For
PIONEER-SARAH CREEK WATERSHED MANAGEMENT COMMISSION
3235 FERNBROOK LANE N PLYMOUTH, MN 55447

Date	Description	Issue #
07/19/2018	90% DESIGN FOR REVIEW	0
09/19/2018	100% DESIGN FOR REVIEW	1
07/07/2019	FOR E.D.	2
07/31/2019	ADDENDUM 1	3
05/29/2020	RECORD PLANS	4

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ED MATTHIASEN
License #: 1680
Date: 07/19
Project #: 1508-0007
Drawn By: SJB
Issue Date: MAY 2020
Issue #: 4
Sheet #:

C-113

Sheet Title:
PLAN AND PROFILE
20+00 TO 23+71
30+00 TO 32+40

PROJECT INFORMATION

PROJECT NAME: BAKER RAVINE STABILIZATION
PROJECT LOCATION: 3800 COUNTY RD 24, MAPLE PLAIN, MN
PROJECT TYPE: STREAM BANK RESTORATION

TOTAL AREA DISTURBED BY CONSTRUCTION: ±1.5 ACRES.
TOTAL SITE AREA: ±1.5 ACRES.
ESTIMATED CONSTRUCTION DATES: NOVEMBER 2019 - MAY 2020

CUMULATIVE IMPERVIOUS SURFACE/PERMANENT STORMWATER MANAGEMENT REQUIREMENTS:
THERE IS CURRENTLY ±0.0 ACRES OF EXISTING IMPERVIOUS SURFACE IN THE PROJECT AREA.

THE PROPOSED AREA OF IMPERVIOUS IS ±0.0 ACRES RESULTING IN A ±0.0 ACRE NET INCREASE IN IMPERVIOUS SURFACE.

THE SITE ULTIMATELY DRAINS TO LAKE INDEPENDENCE, WHICH IS LISTED AS AN IMPAIRED WATER FOR AQUATIC CONSUMPTION AND AQUATIC RECREATION. THERE ARE CURRENT EPA APPROVED TMDLS FOR THE WATERBODY FOR MERCURY IN FISH TISSUE AND NUTRIENTS.

THE CONSTRUCTION PLANS OUTLINE STABILIZATION PRACTICES INCLUDING RIPRAP, ROCK TOES, SEEDING, AND INSTALLATION OF EROSION CONTROL BLANKET FOR VEGETATIVE RE-ESTABLISHMENT.

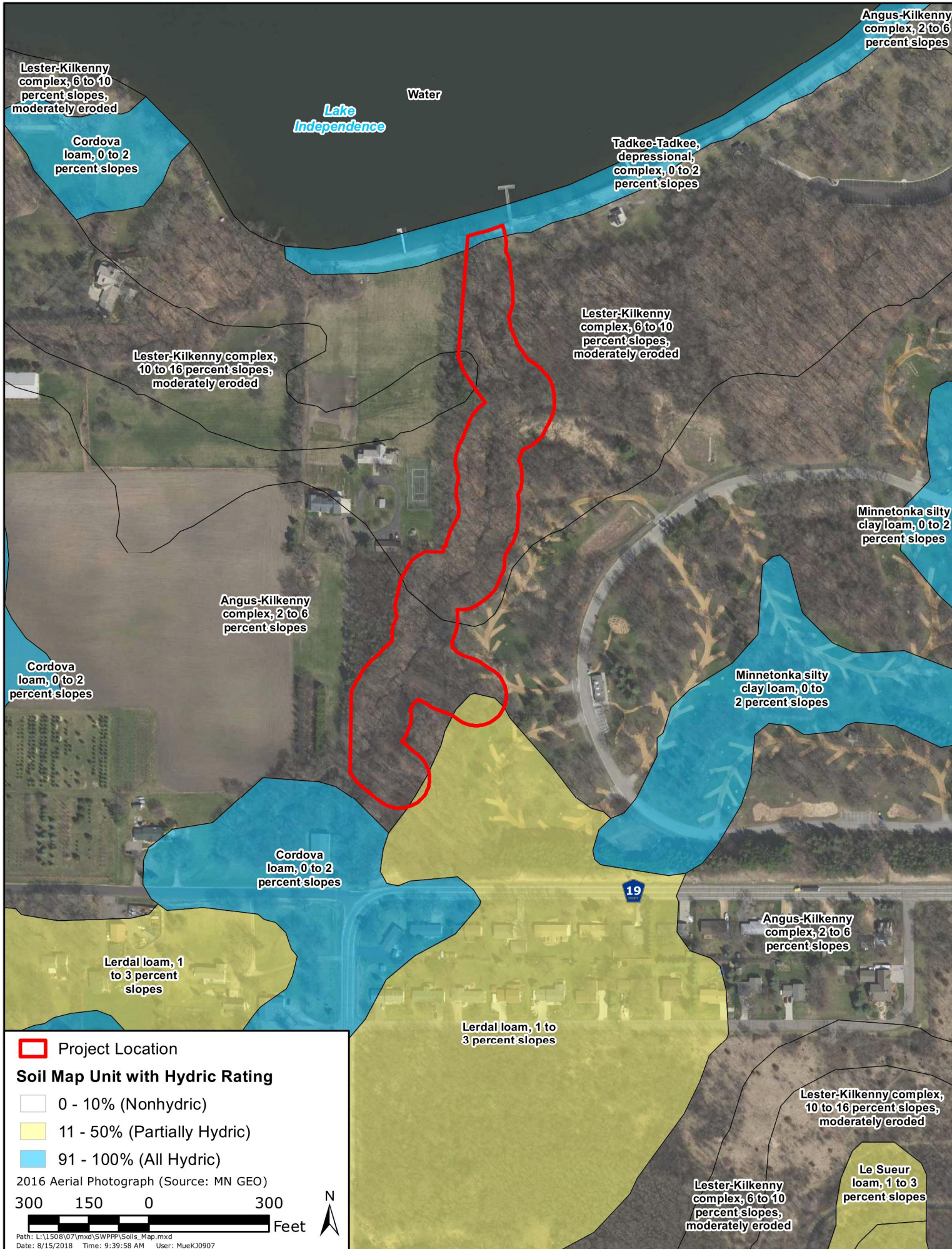
PARTY RESPONSIBLE FOR LONG TERM OPERATION AND MAINTENANCE OF THE SITE (OWNER):

CONTACT NAME:	THREE RIVERS PARK DISTRICT TOM VETSCH	DAMON JOHNSON CREW CHIEF/SUPERVISOR
CONTACT PHONE:	(763) 694-7865	(763) 694-7874
CONTACT EMAIL:	TOM.VETSCH@THREERIVERSPARKS.ORG	DAMON.JOHNSON@THREERIVERSPARKS.ORG

PARTY RESPONSIBLE FOR IMPLEMENTATION OF THE SWPPP (CONTRACTOR):

TBD - CONTRACTOR SHALL PROVIDE A CHAIN OF RESPONSIBILITY WITH ALL OPERATORS ON THE SITE FOR INCORPORATION INTO THIS SWPPP DOCUMENT TO ENSURE THAT THE SWPPP WILL BE IMPLEMENTED AND STAY IN EFFECT UNTIL THE CONSTRUCTION PROJECT IS COMPLETE (THROUGH FINAL STABILIZATION AND NOT SUBMITTAL). CONTRACTOR SHALL ALSO PROVIDE DOCUMENTATION OF PERSONNEL TRAINING IN ACCORDANCE WITH THE PERMIT FOR INCORPORATION INTO THIS SWPPP DOCUMENT AS SOON AS THE PERSONNEL FOR THE PROJECT HAVE BEEN DETERMINED. CONTRACTOR IS RESPONSIBLE FOR KEEPING A FINAL SWPPP DOCUMENT, CONTAINING THE INFORMATION REQUIRED ABOVE, AT THE CONSTRUCTION SITE FOR THE DURATION OF THE PROJECT.

SOIL MAP



CERTIFICATION

IN ACCORDANCE WITH PART III.A.2.A.I. OF THE GENERAL PERMIT AUTHORIZATION TO DISCHARGE STORMWATER ASSOCIATED WITH CONSTRUCTION ACTIVITY UNDER THE NPDES, THE PREPARER OF THIS DOCUMENT WAS TRAINED UNDER THE UNIVERSITY OF MINNESOTA EROSION AND SEDIMENT CONTROL CERTIFICATION PROGRAM. LOUIS SIGTERMANS' CERTIFICATION IN DESIGN OF SWPPP IS VALID THROUGH MAY 31, 2020.

EROSION AND SEDIMENT CONTROL

PRIOR TO ANY SITE DISTURBANCE, AND AS REQUIRED AS CONSTRUCTION PROGRESSES, ANY PERMIT REQUIRED EROSION PREVENTION MEASURES AND THE SEDIMENT CONTROL DEVICES (BIOLOG, FLOATING SILT CURTAIN, INLET PROTECTION, SEDIMENT TRAP/BASIN, EROSION CONTROL BLANKET) SHOWN ON THE CONSTRUCTION DRAWINGS WILL BE INSTALLED AT THE SITE.

ALL EXPOSED SOIL AREAS WITHIN THE CONSTRUCTION LIMITS WILL BE STABILIZED WITHIN 7 DAYS AFTER THE CONSTRUCTION ACTIVITY IN THAT PORTION OF THE SITE HAS TEMPORARILY (WILL NOT RESUME FOR A PERIOD EXCEEDING 7 CALENDAR DAYS) OR PERMANENTLY CEASED. STABILIZATION WILL BE INITIATED IMMEDIATELY. EXPOSED SOIL AREAS MUST HAVE TEMPORARY EROSION PROTECTION (SLASH MULCH, EROSION CONTROL BLANKET, SEED) OR PERMANENT COVER YEAR ROUND.

CONTRACTOR SHALL IMPLEMENT APPROPRIATE CONSTRUCTION PHASING, VEGETATIVE BUFFER STRIPS, HORIZONTAL SLOPE GRADING, AND OTHER CONSTRUCTION PRACTICES THAT MINIMIZE EROSION WHEN PRACTICAL. THE NORMAL WETTED PERIMETER OF ANY TEMPORARY OR PERMANENT DRAINAGE DITCH THAT DRAINS WATER FROM A CONSTRUCTION SITE, OR DIVERTS WATER AROUND A SITE, MUST BE STABILIZED WITHIN 200 LINEAL FEET FROM THE PROPERTY EDGE, OR FROM THE POINT OF DISCHARGE TO ANY SURFACE WATER. STABILIZATION MUST BE COMPLETED WITHIN 24 HOURS OF CONNECTING TO A SURFACE WATER. PIPE OUTLETS MUST BE PROVIDED WITH TEMPORARY OR PERMANENT ENERGY DISSIPATION WITHIN 24 HOURS OF CONNECTION TO A SURFACE WATER.

SWPPP IMPLEMENTATION, PHASING, AND SEQUENCE OF CONSTRUCTION

BMP AND EROSION CONTROL INSTALLATION SEQUENCE SHALL BE AS FOLLOWS:

1. INSTALL PERIMETER CONTROL, FLOATING SILT CURTAIN, INLET PROTECTION.
2. PREPARE TEMPORARY STORAGE, ACCESS, PARKING, AND PHASING AREAS.
3. CONSTRUCT AND STABILIZE DIVERSIONS AND TEMPORARY SEDIMENT TRAP/BASIN IN THE LOCATION SHOWN ON THE PLANS.
4. PERFORM CLEARING AND GRUBBING OF THE SITE, IF APPLICABLE.
5. START CONSTRUCTION OF REPAIRS.
6. PERFORM MASS GRADING, ROUGH GRADE TO ESTABLISH PROPOSED DRAINAGE PATTERNS.
7. TEMPORARILY SEED WITH PURE LIVE SEED THROUGHOUT CONSTRUCTION DISTURBED AREAS THAT WILL BE INACTIVE FOR SEVEN (7 DAYS) OR MORE AS REQUIRED BY NPDES PERMIT.

SEDIMENT CONTROL PRACTICES MUST MINIMIZE SEDIMENT FROM ENTERING SURFACE WATERS, INCLUDING CURB AND GUTTER SYSTEMS AND STORM SEWER INLETS. THE FOLLOWING MEASURES WILL BE TAKEN AS SEDIMENT CONTROL PRACTICES IN ORDER TO MINIMIZE SEDIMENTS FROM ENTERING SURFACE WATERS:

1. INSTALLATION OF SEDIMENT CONTROL PRACTICES ON ALL DOWN GRADIENT PERIMETERS PRIOR TO LAND DISTURBING ACTIVITIES.
2. STREET SWEEPING SHALL BE PERFORMED IF VEHICLE TRACKING BMPS ARE NOT ADEQUATE TO PREVENT SEDIMENT TRACKING. TRACKED SEDIMENT MUST BE REMOVED FROM ALL PAVED SURFACES BOTH ON AND OFFSITE WITHIN 24 HOURS OF DISCOVERY PER THE PERMIT.

THE FOLLOWING GUIDELINES WILL BE USED TO DETERMINE IF POLLUTION CONTROL DEVICES REQUIRE MAINTENANCE, REPAIR, OR REPLACEMENT:

- IF SEDIMENT CONTROL DEVICES SUCH AS SILT FENCE ARE FILLED TO 1/3 THE HEIGHT OF THE FENCE, REMOVE ALL SEDIMENT WITHIN 24 HOURS OF DETECTION OR NOTIFICATION.
- IF INLET PROTECTION DEVICES APPEAR PLUGGED WITH SEDIMENT, ARE FILLED TO 1/3 CAPACITY, OR HAVE STANDING WATER AROUND THEM, REMOVE THE SEDIMENT AND CLEAN OR REPLACE THE FILTER WITHIN 24 HOURS OF DETECTION OR NOTIFICATION.
- IF THE GRAVEL CONSTRUCTION ENTRANCE(S) ARE FILLED WITH SEDIMENT EITHER REPLACE THE ENTRANCE OR ADD ADDITIONAL GRAVEL WITH 24 HOURS OF DETECTION OR NOTIFICATION.
- IF SEDIMENT FROM THE SITE IS OBSERVED ON ADJACENT STREETS OR OTHER PROPERTIES, THE INSPECTOR SHALL IDENTIFY THE SOURCE AND DISCHARGE LOCATION OF THE SEDIMENT AND INSTRUCT TO IMPLEMENT ADDITIONAL EROSION AND SEDIMENT CONTROLS AT THOSE LOCATIONS TO PREVENT FUTURE DISCHARGES.
- IF BUILDING MATERIALS, CHEMICALS, OR GENERAL REFUSE IS BEING USED, STORED, DISPOSED OF, OR OTHERWISE MANAGED INAPPROPRIATELY, CORRECT SUCH DEFECTS WITHIN 24 HOURS OF DETECTION OR NOTIFICATION.
- IF EXCESSIVE SEDIMENTS OR DEBRIS ARE OBSERVED AT THE FLARED END SECTION OUTFALLS, THE INSPECTOR SHALL DETERMINE THE SOURCE AND DISCHARGE LOCATIONS OF SUCH MATERIALS. IF THE DISCHARGE HAS OCCURRED ON THE PROPERTY, REMOVE THE SEDIMENTS AND DEBRIS WITHIN 24 HOURS OF NOTIFICATION AND CORRECT THE SOURCE OF SUCH MATERIALS AS DIRECTED BY THE INSPECTOR

POLLUTION PREVENTION MEASURES

SOLID WASTE

SOLID WASTE, INCLUDING BUT NOT LIMITED TO, COLLECTED ASPHALT AND CONCRETE MILLINGS, FLOATING DEBRIS, PAPER, PLASTIC, FABRIC, CONSTRUCTION AND DEMOLITION DEBRIS AND OTHER WASTE MUST BE DISPOSED OF PROPERLY AND MUST COMPLY WITH MPCA DISPOSAL REQUIREMENTS.

HAZARDOUS MATERIALS

HAZARDOUS MATERIALS, INCLUDING BUT NOT LIMITED TO OIL, GASOLINE, PAINT AND ANY HAZARDOUS SUBSTANCE MUST BE PROPERLY STORED INCLUDING SECONDARY CONTAINMENTS, TO PREVENT SPILLS, LEAKS OR OTHER DISCHARGE. RESTRICTED ACCESS TO STORAGE AREAS MUST BE PROVIDED TO PREVENT VANDALISM. STORAGE AND DISPOSAL OF HAZARDOUS WASTE MUST BE IN COMPLIANCE WITH MPCA REGULATIONS.

CONSTRUCTION EQUIPMENT/VEHICLES

EXTERNAL WASHING OF TRUCKS AND OTHER CONSTRUCTION VEHICLES MUST BE LIMITED TO A DEFINED AREA OF THE SITE. RUNOFF MUST BE CONTAINED AND WASTE PROPERLY DISPOSED OF. NO ENGINE DEGREASING IS ALLOWED ON SITE. REASONABLE STEPS TO PREVENT THE DISCHARGE OF SPILLED OR

LEAKED CHEMICALS SHALL BE TAKEN. ADEQUATE SUPPLIES MUST BE AVAILABLE AT ALL TIMES TO CLEAN UP DISCHARGED MATERIALS; CONDUCT FUELING IN A CONTAINED AREA UNLESS INFEASIBLE.

CONCRETE WASHOUT AREA

CONCRETE WASHOUT WILL BE PERMITTED ON-SITE; CONTRACTOR SHALL FOLLOW ALL PERMIT REQUIREMENTS FOR CONCRETE WASHOUT. THE CONTRACTOR SHALL PROVIDE EFFECTIVE CONTAINMENT FOR ALL LIQUID AND SOLID WASTES GENERATED BY WASHOUT OPERATIONS. LIQUID AND SOLID WASHOUT WASTES MUST NOT CONTACT THE GROUND AND THE CONTAINMENT MUST BE DESIGNED TO PROHIBIT RUNOFF FROM THE WASHOUT OPERATIONS/AREAS. LIQUID AND SOLID WASTES MUST BE DISPOSED OF PROPERLY AND IN COMPLIANCE WITH MPCA RULES. A SIGN MUST BE INSTALLED ADJACENT TO EACH WASHOUT FACILITY THAT REQUIRES SITE PERSONNEL TO UTILIZE THE PROPER FACILITIES FOR CONCRETE WASHOUT AND DISPOSAL OF WASHOUT WASTES. CONTRACTOR SHALL REVISE SWPPP TO INDICATE WASHOUT LOCATION ONCE THE LOCATION HAS BEEN DETERMINED.

FERTILIZERS AND LANDSCAPE MATERIALS MUST BE UNDER COVER TO PREVENT THE DISCHARGE OF POLLUTANTS OR PROTECTED BY SIMILARLY EFFECTIVE MEANS DESIGNED TO MINIMIZE CONTACT WITH STORMWATER.

PORTABLE TOILETS MUST BE POSITIONED SO THAT THEY ARE SECURE AND WILL NOT BE TIPPED OR KNOCKED OVER - SANITARY WASTE MUST BE DISPOSED OF PROPERLY.

GENERAL SWPPP NOTES

DEWATERING IS NOT ANTICIPATED TO BE REQUIRED. IN THE EVENT THAT DEWATERING IS NECESSARY CONTRACTOR SHALL COMPLY WITH PERMIT PART IV.D. REQUIREMENTS FOR DEWATERING.

THIS SWPPP SHALL BE AMENDED BY THE CONTRACTOR IN ACCORDANCE WITH THE PERMIT AS NECESSARY TO INCLUDE ADDITIONAL REQUIREMENTS TO CORRECT PROBLEMS IDENTIFIED OR ADDRESS SITUATIONS PER PART III.B. OF THE PERMIT.

THE PROJECT MAY DISTURB 5 OR MORE ACRES THAT PROMOTE DRAINAGE TO A COMMON LOCATION. THEREFORE A TEMPORARY SEDIMENT BASIN MAY BE REQUIRED. THIS SWPPP SHALL BE AMENDED BY THE CONTRACTOR IN ACCORDANCE WITH THE GENERAL PERMIT TO INCLUDE TEMPORARY SEDIMENTATION BASINS. BASINS SHALL BE DESIGNED TO ACCOMMODATE NO LESS THAN 3,600 CUBIC FEET OF LIVE STORAGE PER ACRE OF CONTRIBUTING DRAINAGE AREA. BASIN OUTLETS SHALL BE DESIGNED TO WITHDRAW WATER FROM THE SURFACE OF THE BASIN. PREVENT SHORT-CIRCUTING AND THE DISCHARGE OF FLOATING DEBRIS. BASINS SHALL HAVE A STABILIZED EMERGENCY OVERFLOW LOCATION AND BE DESIGNED TO PREVENT THE DISCHARGE OF POLLUTANTS TO THE EXTENT PRACTICAL.

FINAL STABILIZATION

ALL PVIOUS AREAS DISTURBED BY CONSTRUCTION AS DESIGNATED WILL RECEIVE VEGETATIVE COVER ACCORDING TO THE PLANS AND SPECIFICATIONS AND WITHIN THE SPECIFIED VEGETATIVE TIME SCHEDULE. FINAL STABILIZATION WILL OCCUR WHEN THE SITE HAS A UNIFORM VEGETATIVE COVER WITH A DENSITY OF 70% OVER THE RESTORED PERVIOUS AREAS. ALL TEMPORARY SYNTHETIC EROSION PREVENTION AND SEDIMENT CONTROL BMPS (SUCH AS SILT FENCE) MUST BE REMOVED AS PART OF THE SITE FINAL STABILIZATION. ALL SEDIMENT MUST BE CLEANED OUT OF CONVEYANCES AND TEMPORARY SEDIMENTATION BASINS IF APPLICABLE. NOTICE OF TERMINATION (NOT) MUST BE SUBMITTED WITHIN 30 DAYS OF FINAL STABILIZATION.

IMPAIRED WATERS, SPECIAL WATERS, AND WETLANDS

THIS PROJECT IS LOCATED WITHIN ONE MILE OF, AND ULTIMATELY DISCHARGES TO, AN IMPAIRED WATER. LAKE INDEPENDENCE IS LOCATED DIRECTLY NORTH OF THE PROJECT LOCATION AND IS LISTED AS IMPAIRED FOR AQUATIC CONSUMPTION AND AQUATIC RECREATION. DISCHARGE TO AN IMPAIRED WATER REQUIRES IMPLEMENTATION OF PARTS C.1 AND C.2 OF APPENDIX A OF THE PERMIT AS INCORPORATED INTO THIS SWPPP DOCUMENT.

THE PROJECT WILL NOT TEMPORARILY IMPACT WETLANDS.

SITE SOILS - SITE SOILS ARE SHOWN ON THIS SHEET. THIS PROJECT IS NOT LOCATED IN A KARST AREA.

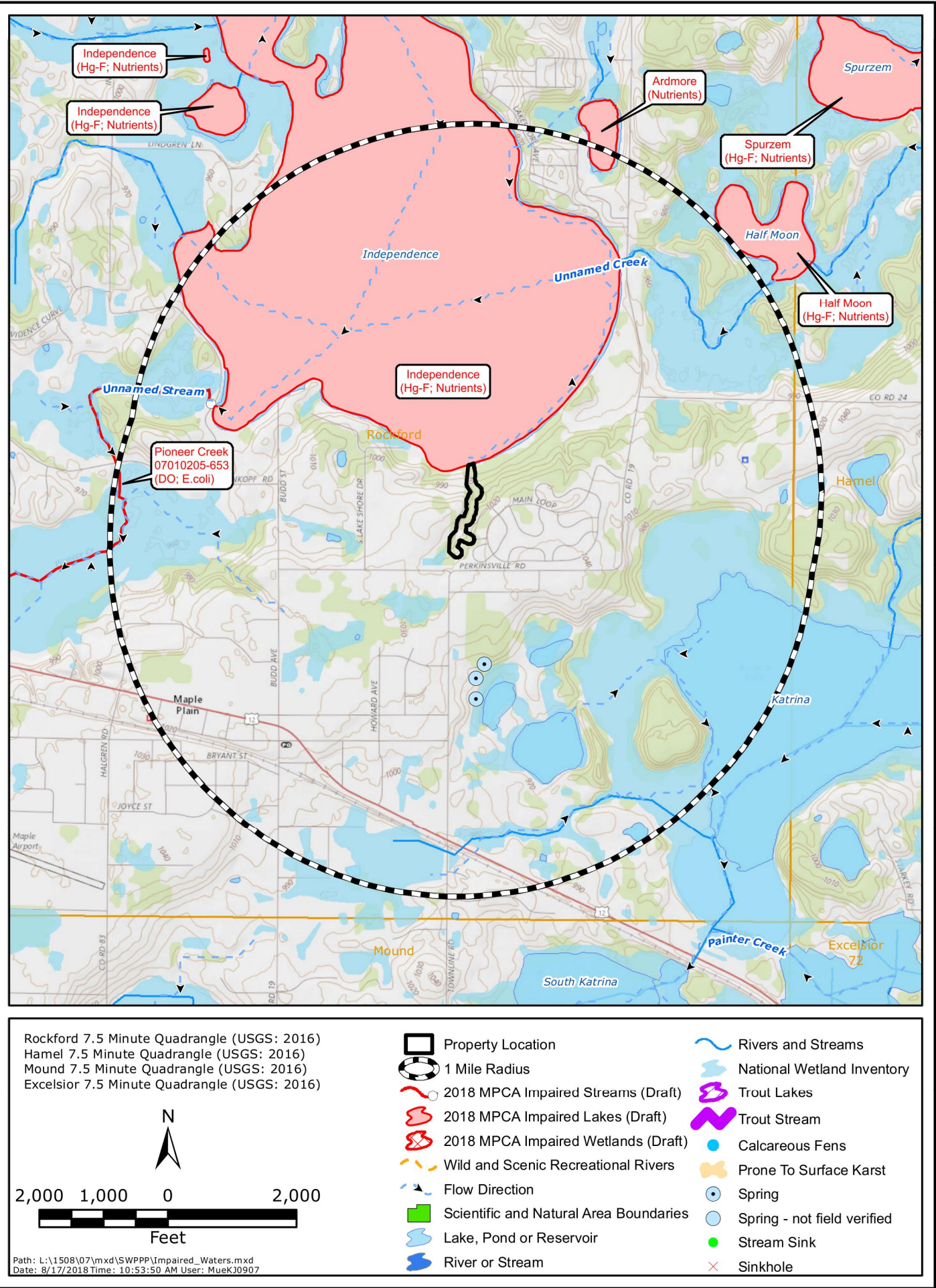
SWPPP DOCUMENTS

THE SWPPP IS COMPOSED OF, BUT NOT LIMITED TO, THE BELOW PROJECT DOCUMENTS. THESE DOCUMENTS SHALL BE KEPT ON THE PROJECT SITE AT ALL TIMES THROUGHOUT CONSTRUCTION. THE SWPPP SHALL BE AMENDED BY THE PERSON RESPONSIBLE TO INCLUDE ANY DOCUMENTS NECESSARY TO ENSURE ADHERENCE TO THE GENERAL PERMIT.

BAKER RAVINE STABILIZATION CIVIL CONSTRUCTION DRAWINGS BY WENCK ASSOCIATES DATED AUGUST 2018

RECORD RETENTION - THE SWPPP, ALL CHANGES TO IT, AND INSPECTION AND MAINTENANCE RECORDS MUST BE KEPT ON-SITE DURING CONSTRUCTION; THE CONSTRUCTION DRAWINGS ARE INCORPORATED HEREIN BY REFERENCE, AND A COPY OF THE PLAN SET SHOULD BE KEPT ON-SITE WITH THE SWPPP RECORDS. THE OWNER MUST RETAIN A COPY OF THE SWPPP ALONG WITH THE FOLLOWING RECORDS FOR THREE (3) YEARS AFTER SUBMITTAL OF THE NOTICE OF TERMINATION:

1. ANY OTHER PERMITS REQUIRED FOR THE PROJECT;
2. RECORDS OF ALL INSPECTION AND MAINTENANCE CONDUCTED DURING CONSTRUCTION;
3. ALL PERMANENT OPERATIONS AND MAINTENANCE AGREEMENTS THAT HAVE BEEN IMPLEMENTED, INCLUDING ALL RIGHT OF WAY, CONTRACT, COVENANTS AND OTHER BINDING REQUIREMENTS REGARDING PERPETUAL MAINTENANCE; AND
4. ALL REQUIRED CALCULATIONS FOR DESIGN OF THE TEMPORARY AND PERMANENT STORMWATER MANAGEMENT SYSTEMS.



INSPECTIONS

THE INSPECTION LOG WILL BE COMPLETED BY THE CONTRACTOR FOR THE CONSTRUCTION SITE. INSPECTOR(S): TBD - TRAINING DOCUMENTATION (PER PART IV.E OF THE PERMIT) WILL BE INCORPORATED INTO THIS SWPPP AS SOON AS THE PERSONNEL FOR THE PROJECT HAVE BEEN DETERMINED. THE CONTRACTOR WILL MAKE CORRECTIONS OR REPAIRS REQUIRED TO COMPLY WITH THE PERMIT.

INSPECTIONS AT THE SITE WILL BE COMPLETED IN ACCORDANCE WITH THE PERMIT AS FOLLOWS: ONCE EVERY SEVEN (7) DAYS DURING ACTIVE CONSTRUCTION AND, WITHIN 24 HOURS AFTER A RAINFALL EVENT GREATER THAN 0.5 INCHES IN 24 HOURS.

1. THE INDIVIDUAL PERFORMING INSPECTIONS MUST BE TRAINED AS REQUIRED BY PART IV.E OF THE PERMIT. TRAINING DOCUMENTATION SHALL BE PROVIDED BY THE CONTRACTOR FOR INCORPORATION INTO THE SWPPP. INSPECTIONS MUST INCLUDE STABILIZED AREAS, EROSION PREVENTION AND SEDIMENT CONTROL BMPS, AND INFILTRATION AREAS. CORRECTIVE ACTIONS MUST BE IDENTIFIED AND DATE OF CORRECTION MUST BE NOTED AS IDENTIFIED IN SECTION IV.E. OF THE PERMIT. ANY OFFSITE DISCHARGE MUST BE DOCUMENTED AS IDENTIFIED IN SECTION IV.E.2.F OF THE PERMIT. ANY AMENDMENTS TO THE SWPPP PROPOSED AS A RESULT OF THE INSPECTION MUST BE DOCUMENTED WITHIN SEVEN (7) CALENDAR DAYS. AN INSPECTION LOG IS ALSO ATTACHED; THE INSPECTION LOG AND SWPPP MUST BE KEPT ON-SITE FOR THE DURATION OF THE CONSTRUCTION PROJECT.

AT A MINIMUM, THE FOLLOWING SHALL BE COMPLETED DURING EACH INSPECTION:

- RECORD DATE AND TIME OF INSPECTION.
- RECORD RAINFALL RECORDS SINCE THE MOST RECENT INSPECTION.
- INSPECT THE SITE FOR EXCESS EROSION AND SEDIMENTATION.
- INSPECT THE SITE FOR DEBRIS, TRASH, AND SPILLS.
- INSPECT TEMPORARY EROSION AND SEDIMENTATION CONTROL DEVICES.
- INSPECT CONSTRUCTION ENTRANCES FOR SEDIMENT TRACKING ONTO PUBLIC STREETS.
- RECORD RECOMMENDED REPAIRS AND MODIFICATIONS TO EROSION AND SEDIMENT CONTROLS.
- RECOMMEND ANY NECESSARY CHANGES TO THIS SWPPP.
- RECORD REPAIRS AND MODIFICATIONS IMPLEMENTED SINCE PREVIOUS INSPECTIONS.
- INSPECT THE ADJACENT STREETS AND CURB AND GUTTER FOR SEDIMENT, LITTER, AND CONSTRUCTION DEBRIS.

THE GC MUST UPDATE THE SWPPP, INCLUDING THE JOBSITE BINDER AND SITE MAPS, TO REFLECT THE PROGRESS OF CONSTRUCTION ACTIVITIES AND GENERAL CHANGES TO THE PROJECT SITE. UPDATES SHALL BE MADE DAILY TO TRACK PROGRESS WHEN ANY OF THE FOLLOWING ACTIVITIES OCCUR: BMP INSTALLATION, MODIFICATION OR REMOVAL, CONSTRUCTION ACTIVITIES (E.G. PAVING, SEWER INSTALLATION, ETC), CLEARING, GRUBBING, GRADING, OR TEMPORARY AND PERMANENT STABILIZATION.

THE CONTRACTOR MAY UPDATE OR MODIFY THE SWPPP WITHOUT ENGINEER APPROVAL IN AN EMERGENCY SITUATION TO PREVENT SEDIMENT DISCHARGE OR PROTECT WATER QUALITY. THE CONTRACTOR IS ULTIMATELY RESPONSIBLE TO ENSURE COMPLIANCE WITH THE PERMIT AND PROTECTION OF DOWNSTREAM WATER QUALITY.

RECORD PLANS

CONTRACTOR: MINNESOTA NATIVE LANDSCAPES

DATE: 05/29/2020

RECORD DRAWINGS ARE BASED ON INFORMATION OBTAINED THROUGH ON SITE OBSERVATION OF CONSTRUCTION AND FIELD SURVEY DATA COLLECTED BY IJK

WENCK ASSOCIATES

Responsive partner. Exceptional outcomes.

BAKER RAVINE STABILIZATION

3800 COUNTY RD 24 MAPLE PLAIN, MN 55359

Prepared For

PIONEER-SARAH CREEK WATERSHED MANAGEMENT COMMISSION

3235 FERNBROOK LANE N PLYMOUTH, MN 55447

Issue #	0	1	2	3	4				
Date	07/19/2018	09/19/2018	07/01/2019	07/31/2019	05/29/2020				
Description	90% DESIGN FOR REVIEW	100% DESIGN FOR REVIEW	FOR BID	ADDENDUM 1	RECORD PLANS				
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.									
ED MATTHESEN									
License #: 1680									
Date: 07/19									
Project #: 1508-0007									
Drawn By: SJB									
Issue Date: MAY 2020									
Issue #: 4									
Sheet #:									
C-201									
Sheet Title: SWPPP									



RECORD PLANS

CONTRACTOR: MINNESOTA NATIVE LANDSCAPES

DATE: 05/29/2020

RECORD DRAWINGS ARE BASED ON INFORMATION OBTAINED THROUGH ON SITE OBSERVATION OF CONSTRUCTION AND FIELD SURVEY DATA COLLECTED BY TJK

- BITUMINOUS PAVEMENT
- CONCRETE PAVEMENT
- SINGLE LANE ACCESS PLOWED FOR WINTER PEDESTRIAN ACTIVITIES BY THREE RIVER PARK DISTRICT
- CONSTRUCTION AND STAGING ACCESS TO BE PLOWED BY CONTRACTOR (GRAVEL AND WOODCHIP)
- BIOLOGS
- FLOATING SILT CURTAIN
- ORANGE SAFETY FENCE
- INLET PROTECTION
- CULVERT PROTECTION
- NOTE: TREES MARKED FOR REMOVAL ARE NOT SHOWN FOR CLARITY.

WENCK

ASSOCIATES

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BAKER RAVINE STABILIZATION

3800 COUNTY RD 24 MAPLE PLAIN, MN 55359

Prepared For

PIONEER-SARAH CREEK WATERSHED MANAGEMENT COMMISSION

3235 FERNBROOK LANE N PLYMOUTH, MN 55447

Issue #	Date	Description
0	07/19/2018	90% DESIGN FOR REVIEW
1	09/19/2018	100% DESIGN FOR REVIEW
2	07/07/2019	FOR R.D.
3	07/31/2019	ADDENDUM 1
4	05/29/2020	RECORD PLANS

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ED MATTHIEN

License #: 1680

Date: 07/19

Project #: 1508-0007

Drawn By: SJB

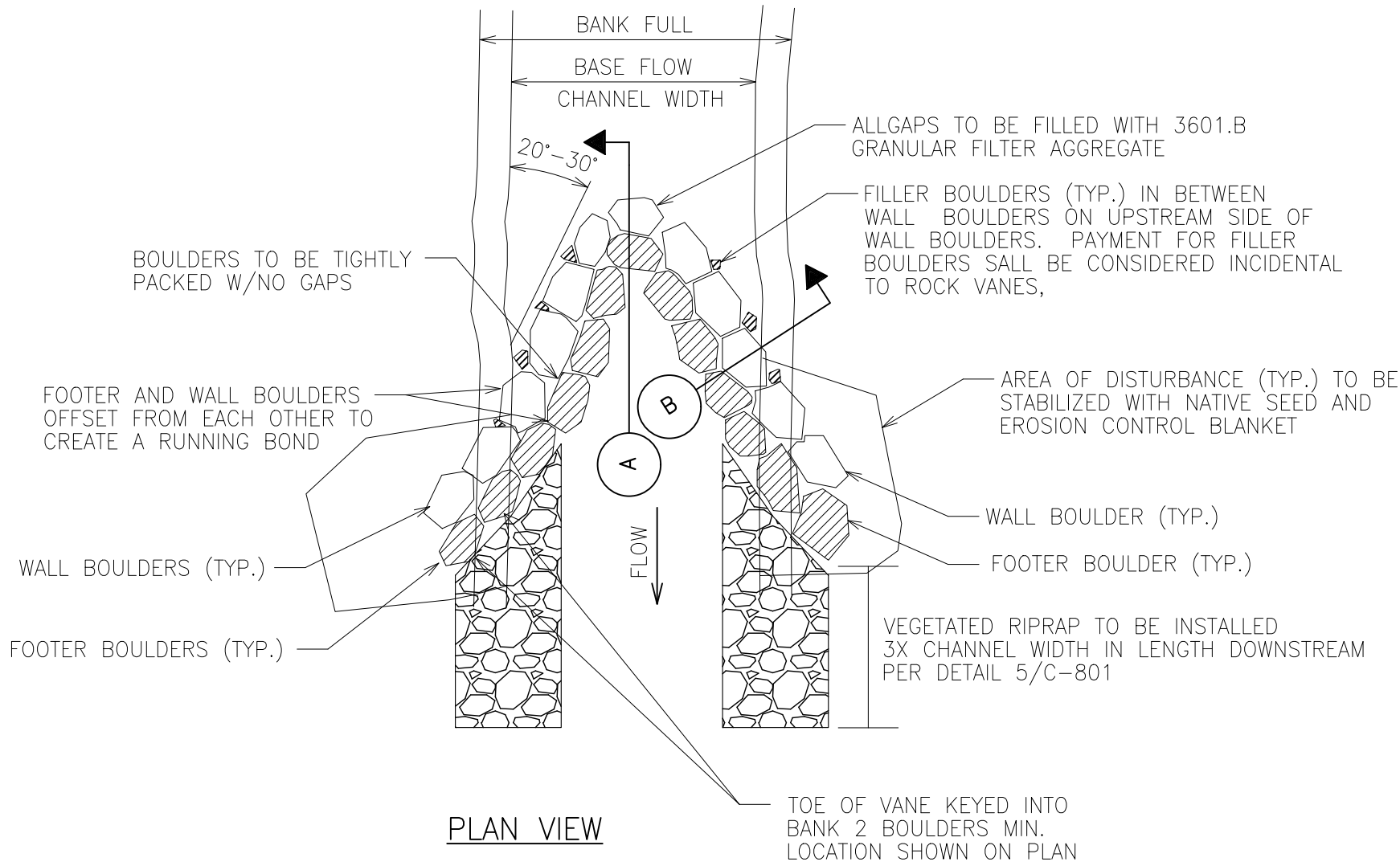
Issue Date: MAY 2020

Issue #: 4

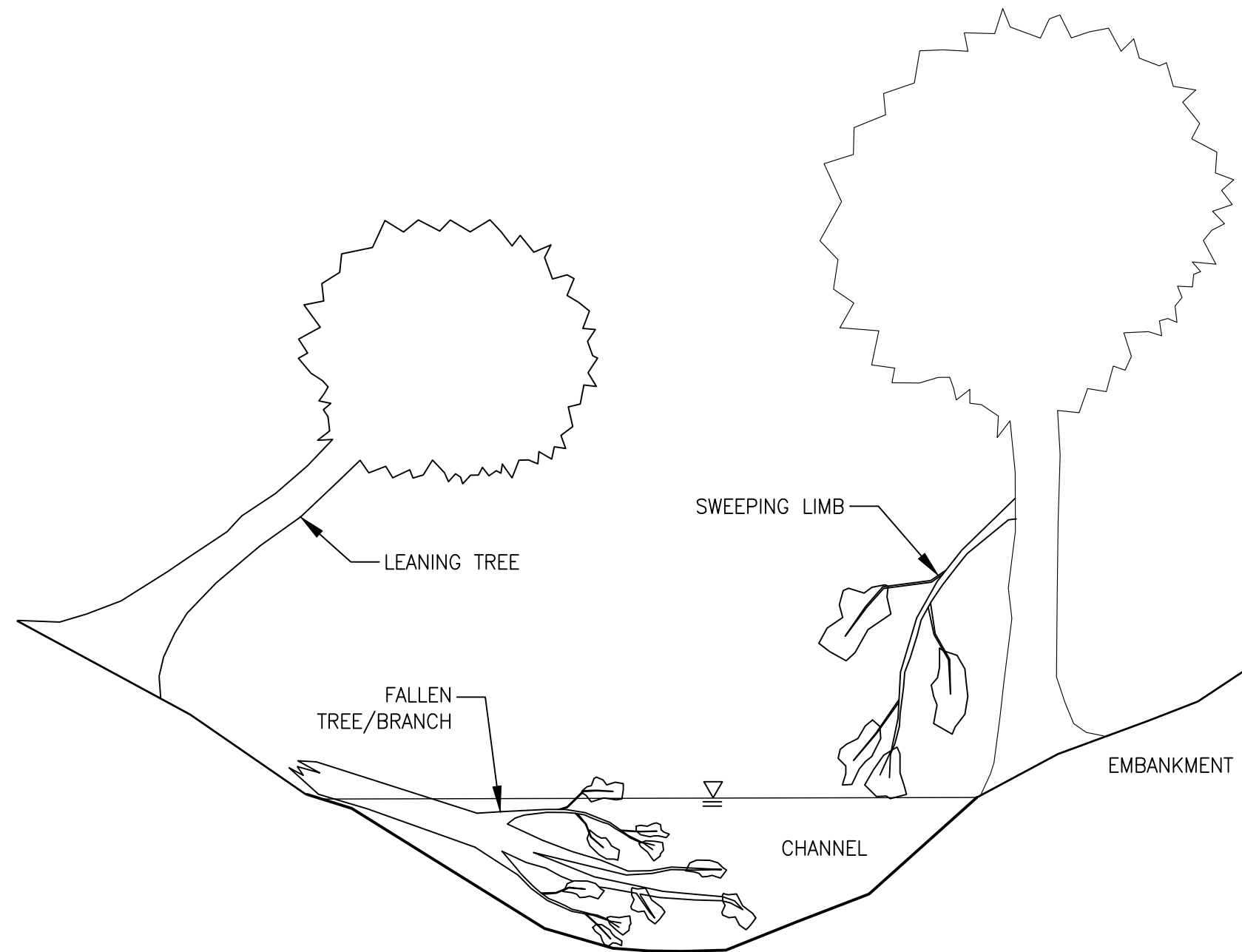
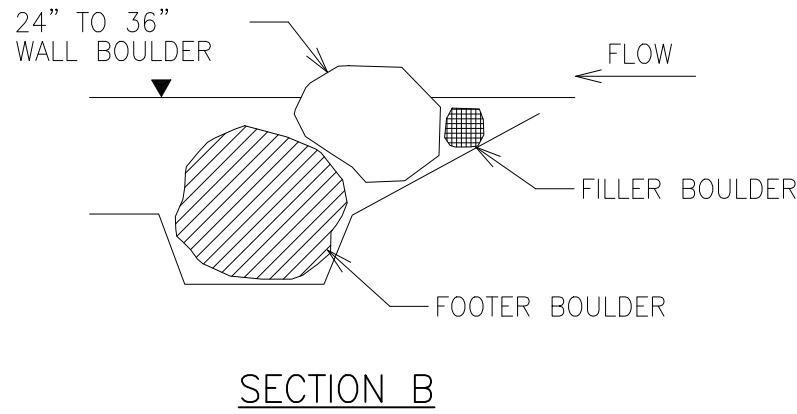
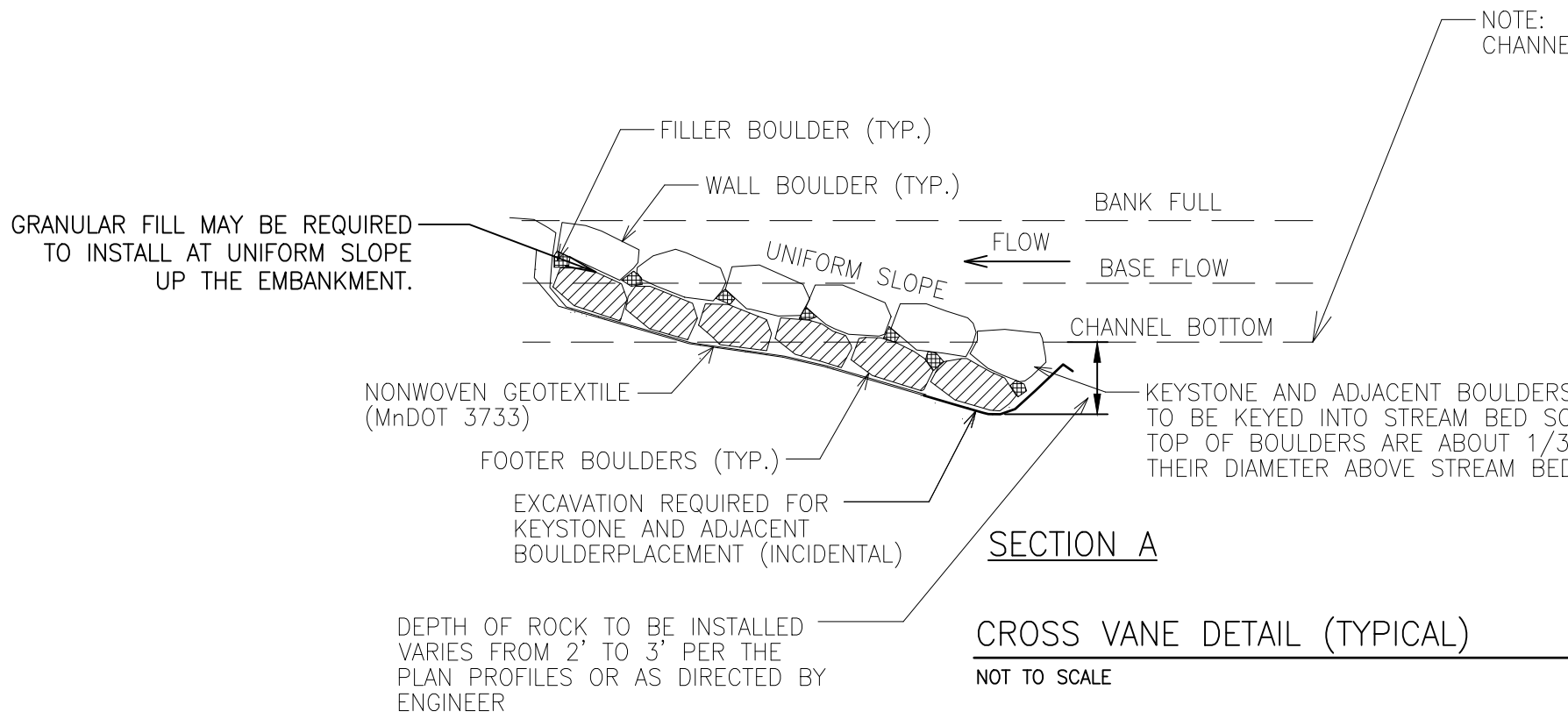
Sheet #:

C-202

Sheet Title: EROSION CONTROL PLAN

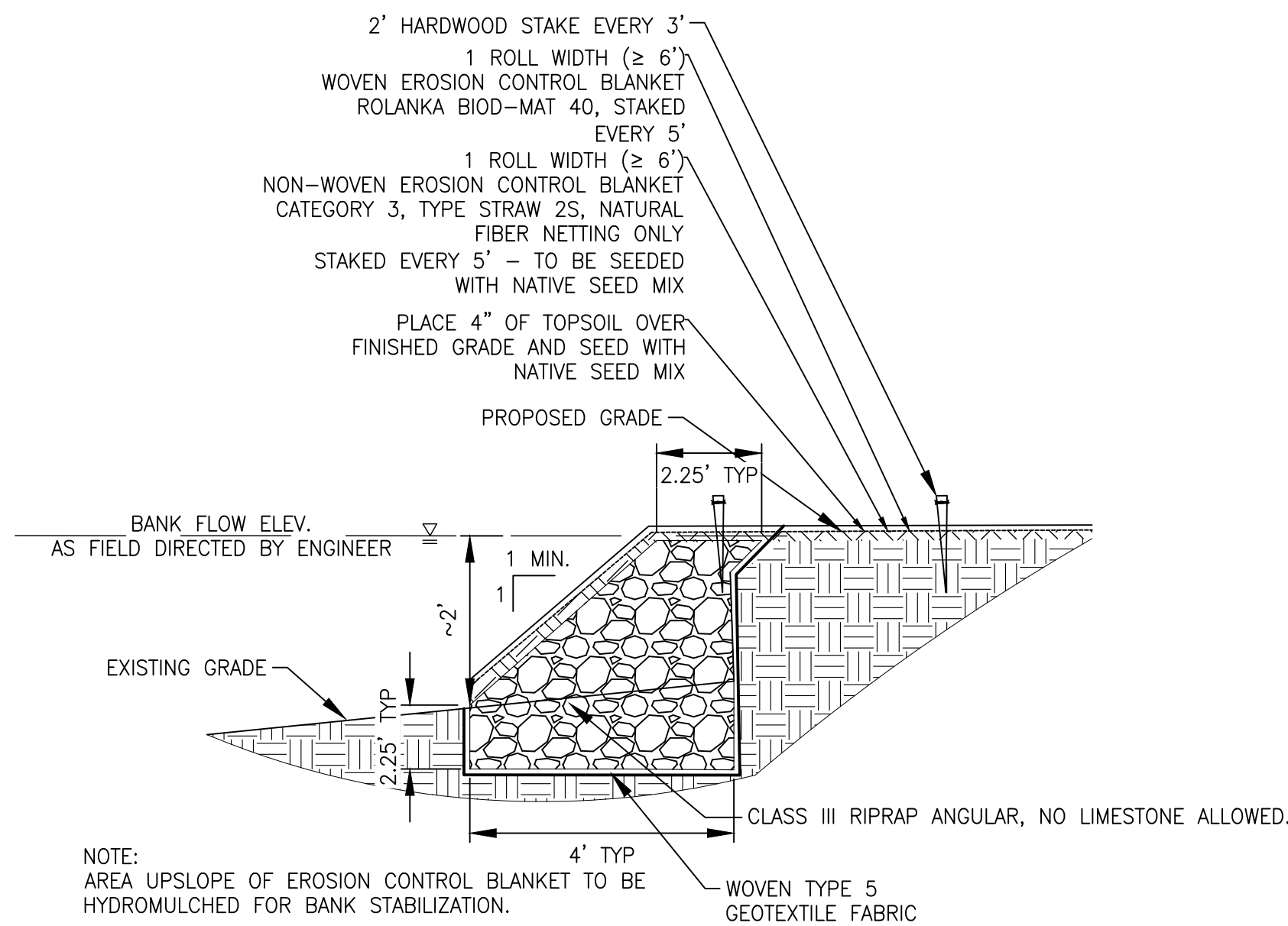


- LEGEND
- SUBMERGED OR FOOTER 18" TO 24" FIELDSTONE BOULDER MEETING MnDOT 3601.2A. AT LEAST 20% OF THE BOULDERS SHALL HAVE A DIAMETER OF 24" OR LARGER.
 - PROTRUDING OR WALL 24" TO 30" BOULDERS MEETING MnDOT 3601.2A. AT LEAST 20% OF THE BOULDERS SHALL HAVE A DIAMETER OF 30" OR LARGER.
 - FILLER BOULDER 6" TO 18" DIA.;
- NOTES:
1. FIELD STONE BOULDERS SHALL HAVE NO CUT, BLAST, OR SHEAR MARKS.
 2. FINAL PLACEMENT OF ROCK VANE AND BOULDERS TO BE FIELD VERIFIED BY ENGINEER.
 3. ALL VANES EXTEND UPSTREAM INTO FLOW OF CHANNEL.
 4. CLASS V RIPRAP ACCEPTABLE ROCK ALTERNATIVE STILL REQUIRED TO FILL GAPS AND VOIDS.

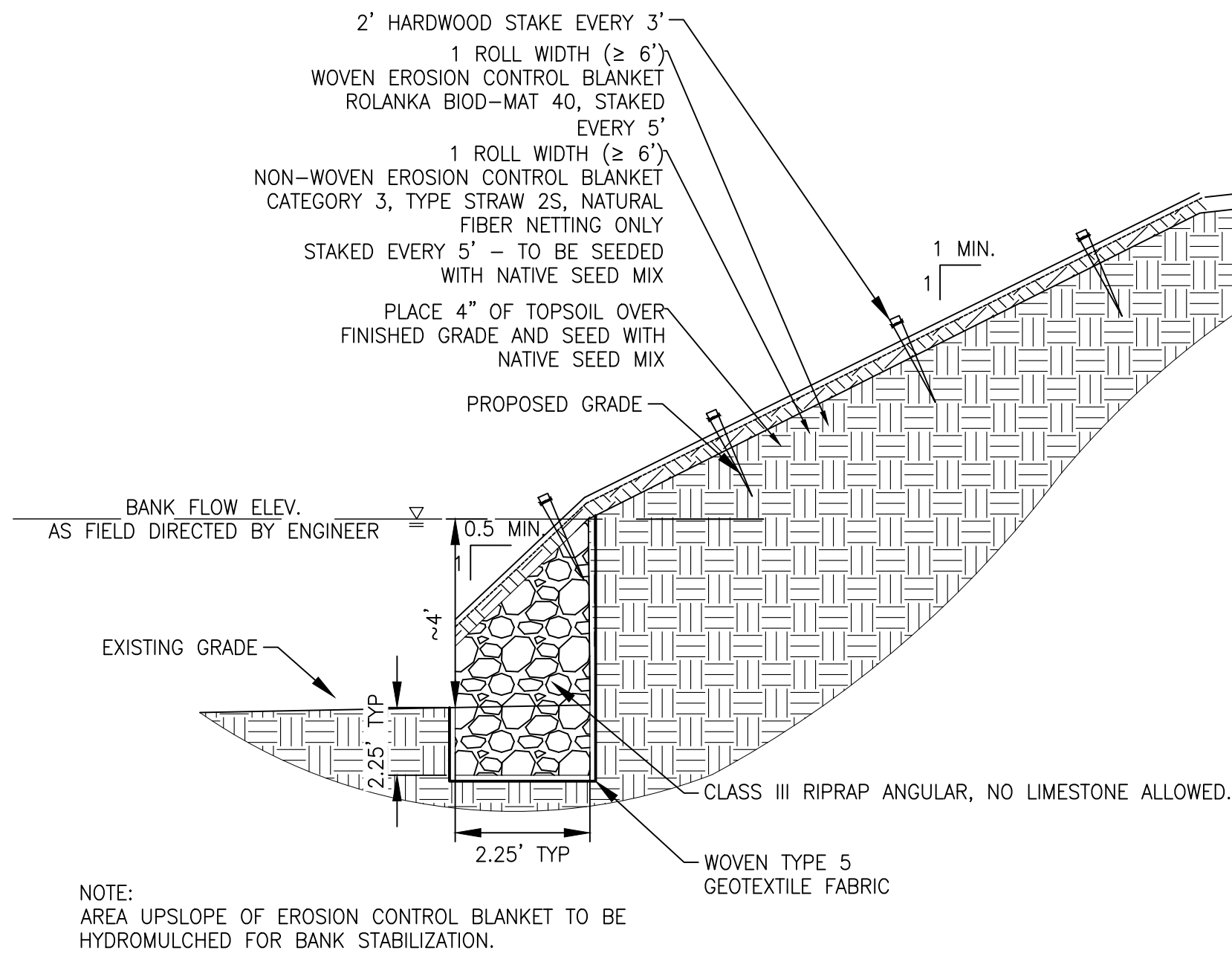


NOTE: REMOVE ALL LEANING, SWEEPING LIMBS, AND FALLEN TREE/BRANCHES AS DEPICTED ABOVE AND AS DIRECTED BY ENGINEER.

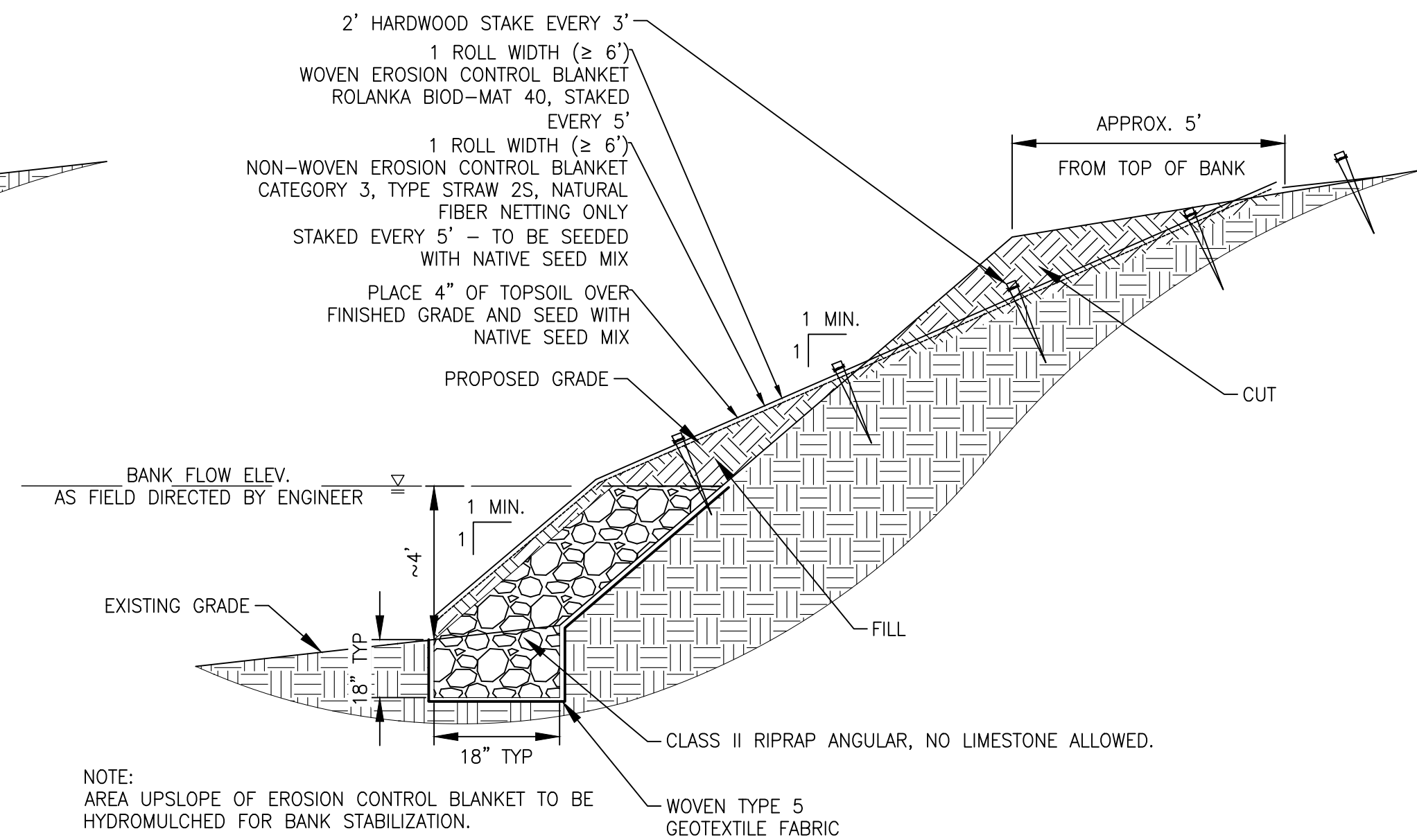
FALLEN, LEANING, AND SWEEPING TREES/LIMBS 2 C-801
NOT TO SCALE



CLASS III VEGETATED RIPRAP TOE DETAIL 3 C-801
NOT TO SCALE



CLASS III OUTSIDE BEND TOE PROTECTION DETAIL 4 C-801
NOT TO SCALE



CLASS II VEGETATED RIPRAP TOE DETAIL 5 C-801
NOT TO SCALE

RECORD PLANS

CONTRACTOR: MINNESOTA NATIVE LANDSCAPES
DATE: 05/29/2020

RECORD DRAWINGS ARE BASED ON INFORMATION OBTAINED THROUGH ON SITE OBSERVATION OF CONSTRUCTION AND FIELD SURVEY DATA COLLECTED BY IJK

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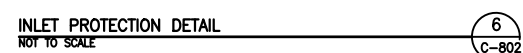
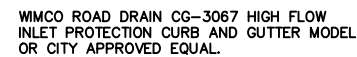
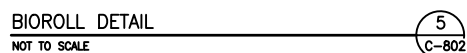
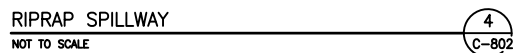
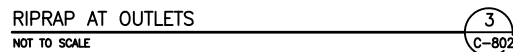
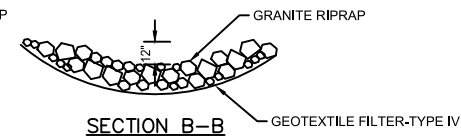
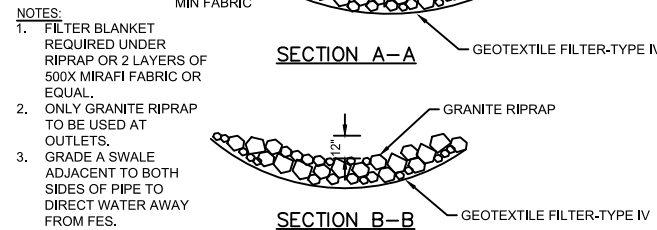
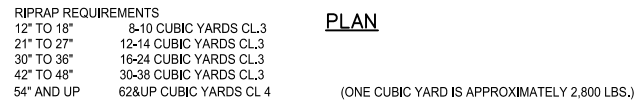
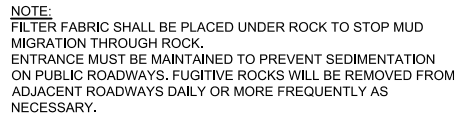
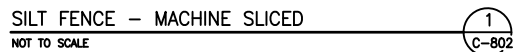
BAKER RAVINE STABILIZATION
3800 COUNTY RD 24 MAPLE PLAIN, MN 55359

Prepared For:
PIONEER-SARAH CREEK WATERSHED MANAGEMENT COMMISSION
3235 FERNBROOK LANE N PLYMOUTH, MN 55447

Issue #	Description	Date
0	90% DESIGN FOR REVIEW	07/19/2018
1	100% DESIGN FOR REVIEW	09/19/2018
2	FOR BID	07/07/2019
3	ADDENDUM 1	07/31/2019
4	RECORD PLANS	05/29/2020

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License #: 1680
Date: 07/19
Project #: 1508-0007
Drawn By: SJB
Issue Date: MAY 2020
Issue #: 4
Sheet #: **C-801**
Sheet Title: DETAILS



RECORD PLANS	
CONTRACTOR: <u>MINNESOTA NATIVE LANDSCAPES</u>	
DATE: <u>05/29/2020</u>	
RECORD DRAWINGS ARE BASED ON INFORMATION OBTAINED THROUGH ON SITE OBSERVATION OF CONSTRUCTION AND FIELD SURVEY DATA COLLECTED BY <u>TJK</u>	

BAKER RAVINE STABILIZATION

33800 COUNTY RD 24 MAPLE PLAIN, MN 55359

Prepared For: **BIONEER SABAH CREEK WATERSHED MANAGEMENT**

PIONEER-SARAI GREEN WATERFLOODED MANAGEMENT COMMISSION

Date:	Description:	Issue #
07/19/2018	90% DESIGN FOR REVIEW	0
08/19/2018	100% DESIGN FOR REVIEW	1
07/01/2019	FOR BID	2
07/31/2019	ADDENDUM 1	3
05/29/2020	RECORD PLANS	4

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ED MATTHIESEN
License #: 1680
Date: 07/19

Project #:	1508-0007
Drawn By:	SJEB
Issue Date:	MAY 2020

Issue #: 4

Sheet #: **C-802**

Sheet Title:

DETAILS



APPENDIX F

Press Articles

Pioneer-Sarah Creek Water Management Commission



Three Rivers' Baker Park ravine work aids Lake Independence water quality



The project taps a \$416,000 Clean Water Fund grant from BWSR.

A project finishing up this spring in Three Rivers Park District's Baker Park Reserve is designed to improve the water quality of Lake Independence. One of Hennepin County's most heavily used lakes, it is impaired for excessive nutrients.

A 2014 subwatershed analysis identified channel erosion in a ravine leading to the lake as a top sediment and phosphorus

contributor. It carried an estimated 277 pounds of phosphorus and 300 tons of sediment — the equivalent of 23 dump truck loads — to Lake Independence annually. Phosphorus feeds the algae that can turn lakes green.

"The lake has always had severe algal blooms," said Brian Vlach, senior water resources manager for Three Rivers Park District.



Baker



Bauerly



Vlach



Top: By late May, the re-sloped ravine stabilization in Baker Park Reserve was greening up. Seven species of wildflowers and nine grasses were planted in the dirt covering rock riprap and topped by an erosion control blanket. **Photo Credit:** Wenck Associates
Right: Eric Stay of Minnesota Native Landscapes ran the excavator on Dec. 19, 2019. The project aims to reduce phosphorus-loading to nutrient-impaired Lake Independence by 134 pounds a year at a cost of \$130 per pound. **Photo Credit:** Ann Wessel, BWSR



“The lake is pea-green through portions of the summer due to algal blooms,” Vlach said.

The \$520,000 Pioneer-Sarah Creek Watershed Management Commission ravine stabilization, which came in \$34,000 under budget, will accomplish an estimated 15% of the phosphorus reduction needed to meet Minnesota Pollution Control Agency water-quality standards.

Despite the algae, 832-acre Lake Independence remains a primary attraction in the metro park that saw well over a half-million visitors in 2018. The WMC deemed Lake Independence a high-priority sentinel lake, based partly on its high visibility and recreational use.

“The reduction of phosphorus in Lake Independence will clearly lead towards improved water quality and most notably water clarity,” said

Joe Baker, chairman of the Pioneer-Sarah Creek WMC.

The stabilization is a first step to reduce external phosphorus loading. To accomplish its long-term goal of increasing the lake’s clarity to 8 to 12 feet, the WMC is considering a future alum treatment to address internal phosphorus loading.

Lake Independence attracted more than 27,100 swimmers to the park’s two beaches, launched nearly 15,600 boaters from its public access and drew more than 3,400 anglers to its shore in 2018, the most recent year for which Metropolitan Council data are available.

“It has been a very good fishing lake,” Vlach said. A community of fish houses pops up during the winter. Anglers target crappies in early spring, walleye in the summer, and muskies well into the fall.



The Minnesota Board of Water and Soil Resources’ mission is to improve and protect Minnesota’s water and soil resources by working in partnership with local organizations and private landowners.
www.bwsr.state.mn.us

“It’s been a good muskie fishery in the past. There’s some big muskies in there. A lot of people have had success,” Vlach said.

A technical adviser to the WMC, Three Rivers coordinated the project. Minnesota Native Landscapes of Otsego was the contractor. Wenck Associates of Maple

Landscape architect Seth Bossart, left, of Wenck Associates, discussed the Baker Park Reserve ravine stabilization with project foreman Nate Bauerly of Minnesota Native Landscapes. At bottom left is one of the rock grade-control structures installed in the main channel and two tributaries.

Photo Credit: Ann Wessel, BWSR

Plain handled project design and construction administration.

Work was made possible by a \$416,000 Clean Water Fund grant from the Minnesota Board of Water and Soil Resources. A \$59,500 Hennepin County Opportunity Grant from the county’s Environment and Energy Department, plus \$44,500 cost-share among the WMC, park district, Lake Independence Citizens Association and the cities of Independence and Medina covered the balance.

“Clean Water Funds by all

means enable a project like this,” Baker said “The cities of Independence, Medina and a small part of Maple Plain as the cities of benefit just really would not have the funds for that. We’ve had great support from BWSR as well as Hennepin County and Three Rivers Park District to ultimately pull the funding together.”

Construction finished in mid-February.

Touch-up seeding is planned in a few spots, and the park district will plant shrubs to discourage people from entering the ravine. But little evidence of construction remained this spring, as native wildflowers and grasses emerged from erosion control blankets covering the dirt-topped structures and re-sloped banks.

“The site looks very good,” Seth Bossert, a landscape architect and project inspector with Wenck, said after a late-May visit. “We had good germination rates of the seed. It was probably 4 to 6 inches tall, so it’s starting to look more emerald-colored.”

Native plants — seven species of wildflowers and nine grasses — were planted in the dirt covering rock riprap and topped by an erosion control blanket. In mid-December, the



The project will curb how much phosphorus enters Lake Independence by about 15% of the reduction needed to meet Minnesota Pollution Control Agency water-quality standards. Photo Credit: Wenck Associates

Minnesota Native Landscapes crew was installing riprap and re-sloping the ravine’s banks, moving downstream toward the lake. Newly constructed rock cross-vanes, which serve as grade-control structures, stood out against the snow.

The project was designed so park visitors won’t see a trace of construction.

Originally slated for the previous winter, the 2,200-foot channel stabilization was delayed in order to obtain a U.S. Army Corps of Engineers permit, required because of the project’s scope. Vlach said the delay resulted in more lead time and therefore lower bids.

Pending BWSR approval, the projected surplus could be used to fund smaller

projects within the 7,632-acre watershed. Those might include native plantings in Baker Park rain gardens, Lake Independence shoreline restorations, a carp barrier on the Ardmore Channel or erosion control projects elsewhere in the watershed.

The grant expires in December 2020.

The Hennepin County Environment and Energy Department is developing other cost-share and locally funded projects within the watershed. Department staff provide technical assistance and support to Pioneer-Sarah Creek WMC, operate a grant program, and conduct landowner outreach.

“We want to be able to demonstrate that we

can deliver projects and there’s a lot of interest from landowners in this area,” said Karen Galles, Land and Water Unit supervisor.

This season, staff is developing a project to stabilize and curb ice-related erosion affecting 65 feet of a 400-foot Lake Independence shoreline property. Two more projects affecting Lake Independence could be installed next year.

Conversations with landowners about potential conservation projects continue.

Nearly 500 private landowners’ properties drain directly to Lake Independence or to Lake Ardmore, which are connected by a channel. About half are lakeshore or suburban; half are rural residential or agricultural.

“The two staff added thanks to capacity funds have been the first boots-on-the-ground landowner assistance staff that (Hennepin County) has had in many years,” Galles said of the rural conservationists hired within the past three years.

Three Rivers’ continued water-quality monitoring and a re-evaluation of the TMDL will help to determine where in the watershed to focus next.



From left: Bluestem grass was used in the erosion control blanket. After a Dec. 19, 2019, construction meeting, a group from Wenck Associates, contractor Minnesota Native Landscapes, the Pioneer-Sarah Creek Watershed Management Commission, the park district and BWSR toured the site. Devan Maruska of Minnesota Native Landscapes staked an erosion control blanket. The ravine stabilization involved 1,800 feet in the main channel, plus 400 feet in two tributary ravines. Photo Credits: Ann Wessel, BWSR

Commission taps \$416,000 Clean Water Fund grant from BWSR for Lake Independence project

By Ann Wessel
Board of Water and Soil Resources

A project completed earlier this year in the Three Rivers Park District's Baker Park Reserve is designed to improve the water quality of Lake Independence. One of Hennepin County's most heavily used lakes, Independence is impaired by excessive nutrients.

A 2014 subwatershed analysis identified channel erosion in a ravine leading to the lake as a top sediment and phosphorus contributor. It carried an estimated 277 pounds of phosphorus and 300 tons of sediment – the equivalent of 23 dump truck loads – to Independence annually. Phosphorus feeds the algae that can turn lakes green.

On, gully:

Fix at Three Rivers park to improve waters



The ravine stabilization in Baker Park Reserve is designed to improve the water quality of Lake Independence. Seven species of wildflowers and nine grasses were planted in the dirt covering rock riprap and topped by an erosion-control blanket.

"The lake has always had severe algal blooms," said Brian Vlach, senior water resources manager for Three Rivers Park District. "The

lake is pea-green through portions of the summer due to algal blooms."

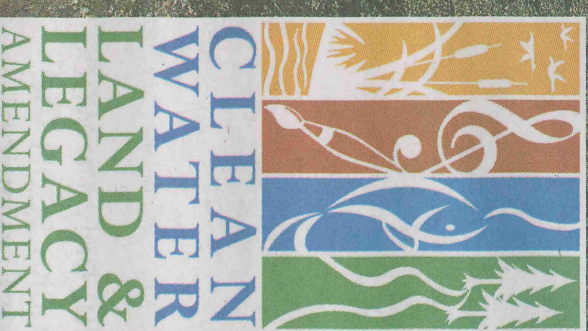
The \$520,000 Pioneer-Sarah Creek Watershed Management Commission ravine stabilization project, which came in \$34,000 under budget, will accomplish an estimated 15% of the phosphorus reduction needed to meet Minnesota Pollution Control Agency water-quality standards.

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"The reduction of phosphorus in Lake Independence will clearly lead toward improved water quality and most notably water clarity," said Joe Baker, chairman of the Pioneer-Sarah Creek WMC.

The stabilization is a first step to reduce external phosphorus loading. To accomplish its long-term goal of increasing the lake's clarity to 8 to 12 feet, the commission is considering a future alum treatment to address internal phosphorus loading.

Lake Independence attracted more than 27,100 swimmers to the park's two beaches, launched nearly



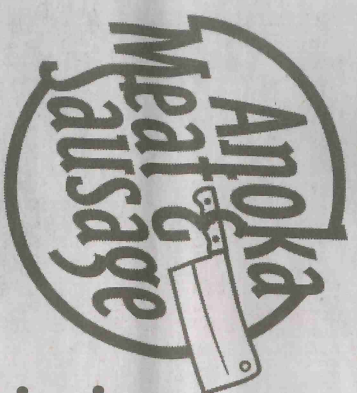
early spring, walleyes in the summer, and muskies well into the fall.

"It's been a good muskie fishery in the past. There are some big muskies in there. A lot of people have had success," Vlach said.

A technical advisor to the commission, Three Rivers Park District coordinated the project. Minnesota Native Landscapes of Otsego was the

(See Lake Independence Page 31)

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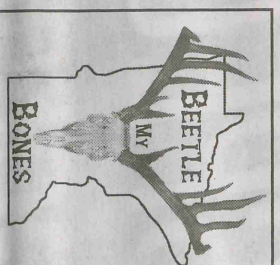
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Lake Independence

(From Page 30)

contractor. Wenck Associates of Maple Plain handled project design and construction administration.

Work was made possible by a \$416,000 Clean Water Fund grant from the Minnesota Board of Water and Soil Resources. A \$59,500 Hennepin County Opportunity Grant from the county's Environment and Energy Department, plus \$44,500 cost-share among the commission, park district, Lake Independence Citizens Association, and the cities of Independence and Medina covered the balance.

"Clean Water Funds by all means enable a project like this," Baker said. "The cities of Independence, Medina, and a small part of Maple Plain as the cities of benefit just really would not have the funds for that. We've had great support from BWSR as well as Hennepin County and Three Rivers Park District to ultimately pull the funding together."

Construction finished in mid-February. Touch-up seeding is planned in a few spots, and the park district will plant shrubs to discourage people from entering the ravine. But little evidence of construction remained this spring, as native wildflowers and grasses emerged from erosion-control blankets covering the dirt-topped structures and re-sloped banks.

"The site looks very good," Seth Bossert, a landscape architect and project inspector with Wenck, said after a late-May visit. "We had good germination rates of the seed. It was probably 4 to 6 inches tall, so it's starting to look more emerald-colored."

Native plants – seven species of wildflower and nine grasses – were planted in the dirt covering rock riprap and topped by an erosion-control blanket. In mid-December, the Minnesota Native Landscapes crew was installing riprap and re-sloping the ravine's banks,

moving downstream toward the lake. Newly constructed rock cross-ways, which serve as grade-control structures, stood out against the snow.

The project was designed so park visitors won't see a trace of construction.

Originally slated for the previous winter, the 2,200-foot channel stabilization was delayed in order to obtain a U.S. Army Corps of Engineers permit, required because of the project's scope. Vlach said the delay resulted in more lead time and therefore lower bids.

Pending BWSR approval, the projected surplus could be used to fund smaller projects within the 7,632-acre watershed. Those might include native plantings in Baker Park rain gardens, Lake Independence shoreline restorations, a cap barrier on the Ardmore Channel, or erosion-control projects elsewhere in the watershed.

The grant expires in December 2020. The Hennepin County Environment and Energy Department is developing

other cost-share and locally funded projects within the watershed. Department staff provide technical assistance and support to Pioneer-Sarah Creek WMC, operate a grant program, and conduct land-owner outreach.

"We want to be able to demonstrate that we can deliver projects and there's a lot of interest from landowners in this area," said Karen Galle, Land and Water Unit supervisor.

This season, staff are developing a project to stabilize

and curb ice-related erosion affecting 65 feet of a 400-foot Lake Independence shoreline property. Two more projects affecting Lake Independence could be installed next year. Conversations with landowners about potential conservation projects continue.

Nearly 500 private landowners' properties drain directly to Lake Independence or to Lake Ardmore, which are connected by a channel. About half are lakeshore or suburban; half are rural-residential or agricultural.

Deer Processing



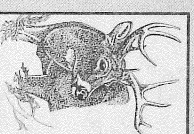
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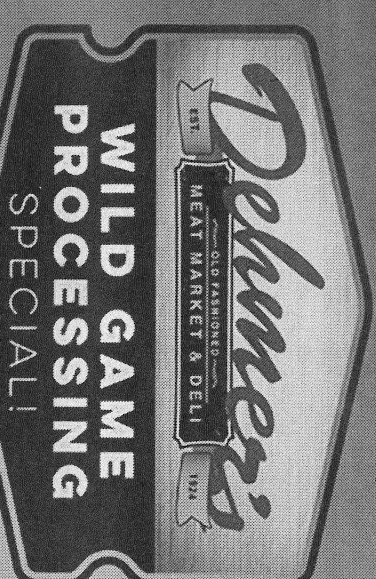
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