



## Individual NPDES/SDS Permit Supplement

Enbridge Energy, Limited Partnership • Line 3 Replacement Project

May 2019

wq-wwprm1-52f



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## ACRONYMS AND ABBREVIATIONS

BMPs	best management practices
Enbridge	Enbridge Energy, Limited Partnership
EPP	Environmental Protection Plan
existing Line 3	A 282-mile, 34-inch-diameter pipeline that enters Minnesota at the North Dakota border in Kittson County, and exits Minnesota at the Wisconsin border in Carlton County.
FdL	Fond du Lac Band of Lake Superior Chippewa
HDD	horizontal directional drill
hydrotest	hydrostatic test
Individual Permit	National Pollutant Discharge Elimination System/State Disposal System Individual Permit
L3R	Line 3 Replacement Project
MDNR	Minnesota Department of Natural Resources
MPARS	Minnesota Department of Natural Resources Permitting and Reporting System
MPCA	Minnesota Pollution Control Agency
NPDES	National Pollutant Discharge Elimination System
NPDES/SDS Antidegradation Assessment	Individual NPDES/SDS Permit application antidegradation assessment
POC	parameter of concern
Project	Line 3 Replacement Project
ROW	right-of-way
SDS	State Disposal System
TSS	Total Suspended Solids

## 1.0 PROJECT DESCRIPTION

Enbridge Energy, Limited Partnership (“Enbridge”) submits this Supplement to an Individual National Pollutant Discharge Elimination System (“NPDES”)/State Disposal System (“SDS”) Permit (“Individual Permit”) to the Minnesota Pollution Control Agency (“MPCA”) to conduct discharge of waters used to test the structural integrity of the Line 3 Replacement Project (“L3R” or “Project”) pipeline through hydrostatic testing (also referred to as “hydrotests”). The following sections, tables, figures, and attachments provide information in response to the MPCA NPDES/SDS application forms and reflect information discussed in meetings and written correspondence between Enbridge and MPCA regarding the content of this application.

The existing Line 3 in Minnesota is a 282-mile, 34-inch-diameter pipeline that enters Minnesota at the North Dakota border in Kittson County, and exits Minnesota at the Wisconsin border in Carlton County (“existing Line 3”). It was constructed in the 1960s, and it has been operating in Minnesota since that time. Over the years, known integrity issues and safety risks have caused Enbridge to reduce the amount and change the type of oil being transported through the existing Line 3 in an effort to relieve pressure on the aging line. These pressure restrictions are now also reflected in a Consent Decree entered into by Enbridge and the Department of Justice in 2017.<sup>1</sup>

Enbridge proposes to construct the L3R using modern pipeline design, manufacturing, coating, and installation techniques, as well as wider, thicker pipe. Enbridge proposes to use 36-inch-diameter-pipe with a wall thickness of 0.515 inch (as opposed to existing Line 3’s 34-inch-diameter-pipe with 0.281-inch wall thickness). The wider, thicker pipe has a yield strength 35 percent greater than existing Line 3. A new pipeline is expected to result in: 1) an increase in safety and reliability attributable to the use of new equipment and modern-day technologies, manufacturing, and coating processes; and 2) a reduction in the number of integrity digs required for ongoing maintenance.

L3R consists of approximately 355 miles of new 36-inch-diameter pipeline traversing the states of North Dakota, Minnesota, and Wisconsin, and terminating at the existing Enbridge Superior terminal facility near Superior, Wisconsin. The section of L3R which is the subject of this application, includes the replacement of approximately 282 miles of the existing 34-inch-diameter Line 3 pipeline with 330 miles of 36-inch<sup>2</sup>-diameter pipeline and associated facilities from North Dakota / Minnesota border to the Minnesota/Wisconsin border (refer to Figure 1.0-1). Enbridge’s Designated Route generally follows the existing Line 3 pipeline along the Enbridge Mainline System right-of-way (“ROW”) from the North Dakota/Minnesota border in Kittson County to the Clearbrook Terminal in Clearwater County. Next, L3R turns south from Clearbrook to generally follow an existing third-party crude oil pipeline ROW to Hubbard County. The route then turns east to generally follow other existing electric transmission lines until it rejoins with the Enbridge Mainline System right-of-way in St. Louis County through the Fond du Lac Band of Lake Superior Chippewa (“FdL”) Reservation to the Minnesota/Wisconsin border in Carlton County.

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<sup>1</sup> Final Consent Decree, *United States v. Enbridge Energy, Ltd. Partnership*, No. 1:16-cv-914 (W.D. Mich. May 23, 2017).

<sup>2</sup> 36-inch-diameter steel pipeline is a more standard pipeline than 34-inch in the industry and among the Enbridge Mainline System. The decision to replace with 36-inch-diameter pipeline makes pipe, pipefitting, valves, and maintenance equipment more readily available. A 36-inch pipeline is more energy efficient than a 34-inch pipeline.





The Project is linear, and as such, a street address is not available or applicable. Table 1.0-1 identifies the townships, ranges, and sections crossed by the Project in Minnesota.

Table 1.0-1 Legal Description of the Project in Minnesota		
Township	Range	Section
48	15	31
48	16	19, 27, 28, 29, 30, 34, 35, 36
		6, 7, 8, 9, 13, 14, 15, 16, 17, 22, 23, 24
48	17	24
48	18	1
49	18	6, 7, 8, 16, 17, 21, 22, 26, 27, 35, 36
49	19	1
50	19	7, 8, 16, 17, 21, 22, 26, 27, 35, 36
50	20	1, 2, 12
51	20	19, 20, 21, 27, 28, 34, 35
51	21	19, 20, 21, 22, 23, 24
51	22	19, 20, 21, 22, 23, 24
51	23	22, 23, 24, 27, 28, 29, 30
51	24	25, 26, 27, 28, 29, 31, 32
51	25	31, 32, 33, 34, 35, 36
51	26	31, 32, 33, 34, 35, 36
51	27	25, 26, 27, 28, 36
138	28	6
138	29	1, 7, 8, 9, 10, 11, 12, 14, 15
138	30	7, 8, 9, 10, 11, 12
138	31	5, 6, 8, 9, 10, 11, 12
138	32	1, 2, 3, 4, 5, 6
138	33	1, 2, 3, 4, 5, 6
138	34	1
139	25	1, 2, 3, 4, 7, 8, 9
139	26	11, 12, 14, 15, 19, 20, 21, 22
139	27	13, 14, 15, 19, 20, 21, 22, 24
139	28	24, 25, 26, 27, 28, 29, 31, 32
139	34	31, 32, 33, 34, 35, 36
		5, 6, 7, 18, 19, 30, 31, 32, 33, 34, 35, 36
139	35	35, 36
140	35	6, 7, 18, 19, 20, 29, 32
141	35	5, 8, 17, 20, 29, 31, 32
142	35	5, 8, 17, 20, 29, 32

Table 1.0-1 Legal Description of the Project in Minnesota		
Township	Range	Section
143	35	5, 8, 17, 20, 21, 29, 32, 33
144	35	19, 29, 30, 32
144	36	2, 11, 12, 13, 24
145	36	2, 11, 14, 23, 26, 35, 36
146	36	7, 8, 9, 10, 14, 15, 23, 26, 35
146	37	2, 3, 11, 12
147	37	5, 8, 16, 17, 21, 27, 28, 34
148	37	6, 7, 8, 17, 20, 29, 32
149	37	29, 30, 32
149	38	6, 7, 8, 9, 15, 16, 22, 23, 24, 25
149	39	1, 2, 3
150	39	19, 28, 29, 30, 33, 34
150	40	6, 7, 8, 9, 14, 15, 16, 23, 24
150	41	1, 2
151	41	19, 28, 29, 30, 33, 34, 35
151	42	4, 5, 9, 10, 14, 15, 23, 24
152	42	30, 31, 32
152	43	4, 5, 9, 10, 14, 15, 23, 24, 25
153	43	18, 19, 20, 29, 32, 33
153	44	2, 3, 11, 12, 13
154	44	18, 19, 20, 28, 29, 33, 34
154	45	2, 11, 12, 13
155	45	7, 17, 18, 20, 21, 28, 33, 34, 35
155	46	1, 2, 3, 4, 12
156	46	7, 17, 18, 20, 21, 28, 33
156	47	1, 2, 12
157	47	6, 7, 8, 16, 17, 21, 22, 26, 27, 35, 36
157	48	1
158	48	5, 6, 8, 9, 15, 16, 22, 23, 26, 35, 36
159	48	31
159	49	4, 5, 9, 10, 14, 15, 23, 25, 26, 36
160	49	30, 31, 32
160	50	4, 9, 10, 14, 15, 23, 24, 25

Enbridge is requesting authorization under an Individual Permit to conduct discharge of waters used to test the structural integrity of a new pipeline through hydrostatic testing.

Authorization of this Individual Permit requires an NPDES/SDS antidegradation assessment under Minnesota Rules parts 7050.0250 through 7050.0325. The Individual NPDES/SDS Permit application antidegradation assessment ("NPDES/SDS Antidegradation Assessment") is included as Attachment A. A separate antidegradation assessment has been developed for Section 401 Water Quality Certification of a federal Section 404 Permit for impacts on waters of the United States and was submitted to the MPCA concurrent with this application.

A permit table with the list of all environmental permits and authorizations required for the Project is found in Attachment B.

## 2.0 HYDROSTATIC TESTING

Hydrostatic testing is done to test the integrity of the pipeline. Hydrostatic testing is done after construction is complete and prior to commissioning to verify that there are no flaws in the pipe or welds. Hydrostatic tests would be conducted along the Project for each mainline pipeline segment and for each horizontal direction drill (“HDD”) crossing. Construction of the Project would occur concurrently over five spreads using multiple contractors. The number of mainline spread segments are governed by the U.S. Department of Transportation’s Pipeline and Hazardous Materials Safety Administration specifications as well as internal specifications (e.g., elevation differences between segments require that test sections be broken up in certain areas). It is anticipated that L3R would require hydrostatic testing of 17 mainline segments (referred to as “mainline hydrotests”) (see Figure 2.0-1) and 17 pre-built HDD segments (referred to as “HDD hydrotests”) in Minnesota. Hydrostatic test water appropriation and discharge locations are included in Attachment C.

Hydrostatic testing involves filling the new pipeline segments with water appropriated in accordance with applicable permits, raising the internal pressure level, and holding that pressure for a specific period of time per U.S. Department of Transportation specifications. After mainline pipeline sections are welded, lowered into the trench, and backfilled the contractor would install a temporary launcher or receiver on each end of the pipeline test section (see pig launcher/receiver apparatus photograph). Open bell holes (excavations) at tie-in points and facility piping may still be exposed during testing. Cleaning pig<sup>3</sup> runs are performed on the section to be tested to clear the pipeline of any debris remaining in the pipe (e.g., water, soil, trash).



The cleaning pigs, propelled by compressed air, would flush the debris from the launcher to the receiver at the end of the test section (see photograph of a typical cleaning pig). The received debris would be removed and properly disposed of offsite at an approved waste facility. Next, hydrostatic test manifolds would be welded to each end of the pipeline test section after the cleaning runs are complete and the temporary launcher/receiver has been removed.



The pipeline is then filled with test water via the use of large high capacity/high pressure pumps from an approved and designated source. All testing would be completed with water as the test medium adhering to Pipeline & Hazardous Materials Safety Administration requirements and would be conducted in such a way to meet all local agency requirements for water appropriation and discharge.

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<sup>3</sup> A pipeline “pig” is the acronym for pipeline inspection gauge. Pipeline inspection gauges have a variety of applications including but not limited to cleaning the pipeline, dewatering and drying post hydrostatic testing to prepare the pipeline to accept product, and working as an in-line inspection tool to identify pipeline anomalies prior to and during in-service use.

Once the test water is filled into the pipe, the pipeline is pressurized (by compressors connected to the test headers; see photograph of test header) to a specific pressure that is the lesser of 1.5 times the lowest rating of any valve or flange in the section or 110 percent of the Specified Minimum Yield Strength at the critical low point of the test section. The pressure is maintained for a minimum of 8 hours. During the time the pipeline is hydrostatically pressurized, conditions are closely monitored, and any abnormalities are immediately investigated.



Once the testing procedure is complete, the hydrostatic test water is drained from the pipeline through a pipe/hose connected to the test header. The hose transports test water to water containment tanks known as “frac tanks” located adjacent to the previously set up filtration system. Two frac tanks are typically installed as part of the ProAct (or equivalent) filtration configuration. The frac tanks are needed so that if pressurization issues occur during discharge the filtration system would not be adversely impacted. They also provide for the settling of residual fines that may still be present in the test water. The test water is temporarily stored in these tanks until it is drawn through the filtration system and subsequently discharged at the approved location. After dewatering the pipe, a minimum of two drying runs are required to remove all the free (residual) water from the pipeline as practical. The incidental volume of water collected from the drying runs would be collected in a frac tank, treated, and disposed of in accordance with applicable permit conditions. Each run shall use one or more foam pig(s) with a high-density crisscross foam pig or solid cup type pig behind it. Finally, following the dewatering and drying of the line, a caliper tool (pig) is used to identify any anomalies. Any anomalies found would be exposed via excavation and visually inspected prior to placing the pipeline in-service. Test water would be treated and disposed of in accordance with applicable permit conditions. Refer to Section 3.0 for a more detailed discussion of the best management practices (“BMPs”) that would be implemented for mainline and HDD hydrotest activities.

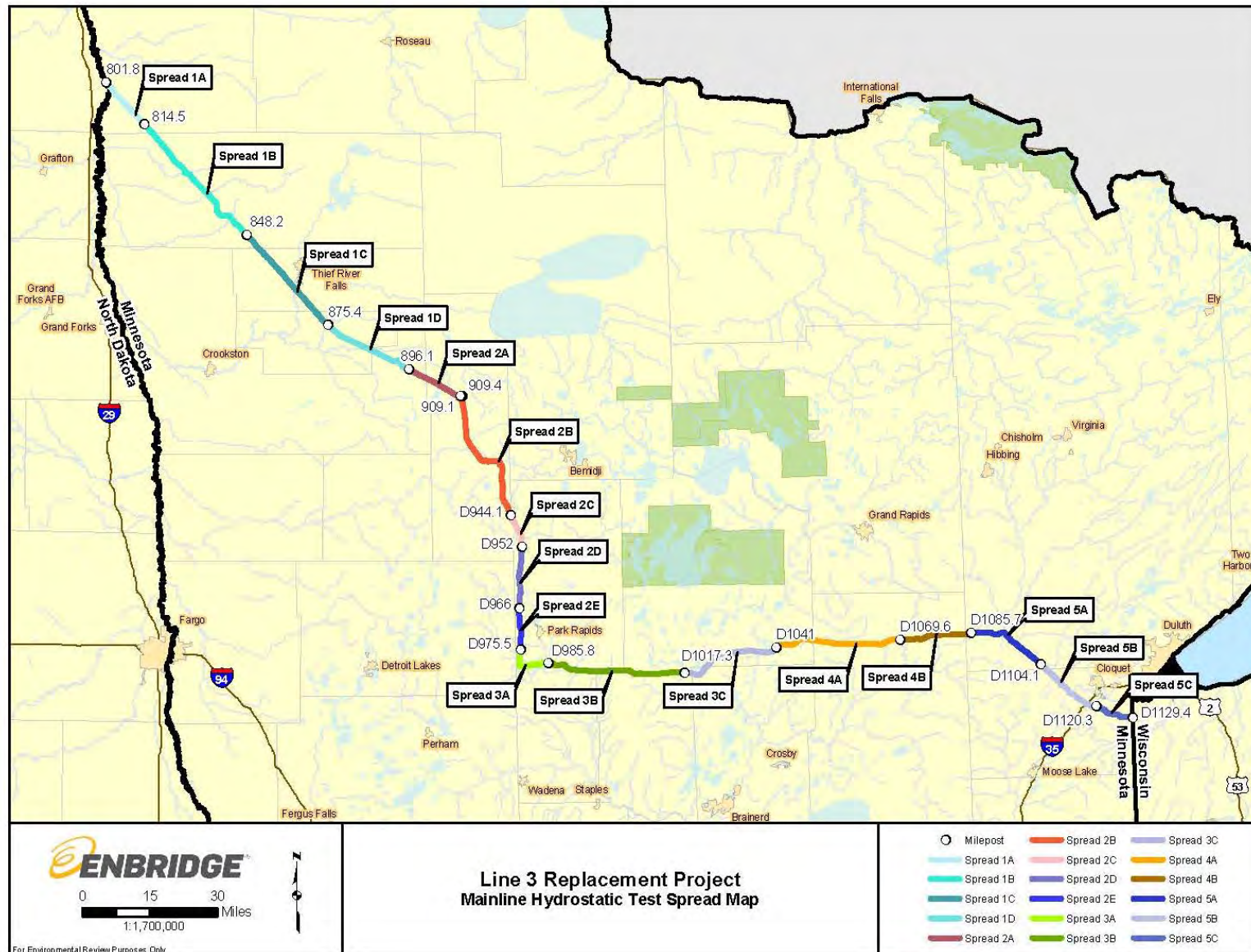
Enbridge anticipates that only one mainline segment test would occur per mainline spread at any given time. The contractor assigned to each spread would plan appropriately so as to have the necessary testing equipment (e.g., frac tanks, sand filtration unit[s], and optional carbon pod[s]) available when needed. Enbridge's internal policy related to hydrotest discharges requires that staff from Enbridge's Environment department be notified in advance of any mainline testing, and that the necessary equipment is available and that delivery is verified.

HDD test sections are hydrotested in much the same manner as detailed above. The primary difference between the procedures is that HDD test sections are hydrotested prior to the installation or pullback of the pipe and then test again with the mainline once they are tied-in. Caliper tools (pigs) are run through HDD sections subsequent to installation to verify that anomalies and/or damage to the pipe did not occur during the pullback process (see photograph of a typical caliper tool). Refer to Sections 3.3 and 3.4 for a more detailed discussion of the BMPs that would be implemented for HDD hydrotest activities. Frac tanks may or may not be used for HDD discharges depending on water volumes and whether or not discharge rates need to be reduced.





Figure 2.0-1 Revised Mainline Hydrostatic Test Spread Map



## 2.1 SOURCE WATERS

Enbridge submitted an online application through the Minnesota Department of Natural Resources (“MDNR”) Permitting and Reporting System (“MPARS”) for coverage under an Individual Permit for the temporary appropriation of source waters for hydrostatic testing in September 2018. Enbridge has coordinated with the MDNR on its proposed appropriation sources since the initial submittal of this Application. The current list of proposed water sources provided in Attachment D reflects these conversations with the MDNR. Two of the proposed appropriation sources are groundwater wells located in the Straight River Groundwater Management Area. All other proposed appropriation sources are surface waterbodies. Enbridge’s revised water appropriation Permit Application for Pipeline and Tank Testing Activities is available on the MDNR L3R website.<sup>4</sup>

Enbridge recognizes that the MDNR may prohibit or curtail the use of some of these water appropriation sources due to low flow conditions. Therefore, Enbridge has proactively identified contingency sources so that hydrostatic testing activities would not be impacted. Contingency sources are identified in Attachment D and are discussed as applicable throughout this Application, including the Antidegradation Assessment (refer to Attachment A).

Water appropriation volumes range from approximately 80,000 to 10 million gallons per segment, depending on the length of the test segment. Chlorinated water sources are not proposed. Chemical additives are not currently proposed to be added to the hydrotest water (e.g., to clean the pipe, in the preparation of weld sites, or for winter conditions). No chemical or compounds containing sulfur would be used or added to hydrotest water. Any additives potentially proposed at a later date would be approved by the MPCA prior to use. Section 6.0 of the Enbridge’s Environmental Protection Plan (“EPP”) (see Attachment E) includes BMPs associated with water appropriation.

Enbridge is currently proposing to re-use water at four locations if practicable at the time of construction (refer to Section 6.2.2 of Attachment A). Generally, pushing water to adjacent mainline segments requires that the adjacent segment construction be completed concurrently and requires the use of large pumps to move the water from one segment to the next.

Attachment D also presents available water quality data for source surface waters, including beneficial use classifications and impairment status as identified on the Section 303d list prepared by the MPCA in 2018, and aquatic invasive species infested waters.<sup>5</sup> All surface waters are Minnesota Public Waters that meet the criteria set forth in Minnesota Statutes, Section 103G.005, subd. 15 and are identified on Public Water Inventory maps authorized by Minnesota Statutes, Section 103G.201. None of the source waters are trout waters. One source water, the Mississippi River, is listed as an Outstanding Resource Value Water.

Enbridge understands that the MDNR water appropriation permit issuance is required before the MPCA Individual NPDES/SDS Permit would be issued. A copy of the issued individual surface water appropriation permit would be provided upon receipt; a placeholder for the permit is included as Attachment F.

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<sup>4</sup> MDNR L3R website: <https://www.dnr.state.mn.us/line3/index.html>.

<sup>5</sup> Based on MDNR infested waters list last updated December 7, 2018 (<https://www.dnr.state.mn.us/invasives/ais/infested.html>).

## 2.2 PARAMETERS OF CONCERN AND WATER QUALITY TESTING

The potential water quality effects of hydrotest discharges include temporary increases in turbidity (i.e., total suspended solids ["TSS"]), and rust coloration the water picks up from the inside of the pipe. The state of Minnesota has adopted water quality standards for TSS and has abandoned turbidity-based assessments (Minnesota Rules part 7050.0220 through 7050.0227); therefore, turbidity is not carried forward as a parameter of concern. Receiving waters may have other impairments (e.g., fecal coliform, dissolved oxygen); however, hydrostatic testing activities would not contribute to these impairments. Nothing would be added to the water and no additives would be used, so TSS and color are the only parameters of concern ("POCs") assessed in the NPDES/SDS Antidegradation Assessment (see Section 4.0 of Attachment A).

Enbridge is proposing to sample the baseline water quality of the hydrostatic test source water for POCs except where discharged water would infiltrate and there is no receiving water (see Sections 3.2 and 3.3, and Attachment D). Enbridge would test for TSS and document the water quality color results of the source water prior to initiating hydrostatic testing. After the hydrostatic test is completed, Enbridge would run the mainline test water through an appropriate filtration system with turbidity monitoring to achieve the receiving-water-specific discharge quality specified in Section 7.2 and Table 7.1-1 of the NPDES/SDS Antidegradation Assessment provided in Attachment A. Discharges would be managed with the BMPs further described in Section 3.0 to avoid and mitigate erosion and scour.

Water appropriated and discharged for hydrostatic tests would be sampled in accordance with the issued discharge permit.

## 2.3 DISCHARGE METHODS

Enbridge's proposed method to discharge hydrotest water is dependent on the volume of the water used for the hydrotest, the source of the water, and the characteristics of the surrounding landscape. Enbridge conducted a detailed alternatives analysis to determine the least degrading prudent and feasible discharge method (Section 6 of Attachment A). Enbridge is proposing to discharge hydrotest waters as follows:

- Discharge back to the source water for large volume discharges associated with mainline hydrotests (see Section 3.1).
- Discharge to a location where the water would infiltrate for moderate volume discharges associated with HDD hydrotests and for three mainline hydrotest locations where the source is groundwater (see Sections 3.2 and 3.3, and Enbridge's Infiltration Plan in Attachment H).

Enbridge's proposed discharge type for each source water and associated activity (mainline or HDD hydrotest) is identified in Attachment D and discharge locations are presented in the site plans in Attachment C.

Water appropriation contingency sources are also identified in Attachment D (see discussion in Section 2.1). Should these contingencies need to be used, mainline hydrotests would be discharged back to the contingency source water, and HDD hydrotests would be discharged back to a well-vegetated upland area where feasible. Specific locations for upland discharges associated with HDD contingency sources have not been identified at this time. Enbridge would



work with the MPCA to identify suitable locations for HDD hydrotest discharges for contingency sources should they need to be used.

## **2.4 RECEIVING WATERS**

Attachment I lists the primary and contingency receiving waters associated with hydrotest discharges back to the source water, their beneficial use classifications, and the estimated discharge volume that these waters would receive. Hydrostatic test discharges to upland locations would infiltrate, and thus there are no receiving waters associated with these discharges.

A detailed assessment of receiving waters, including contingency receiving waters, is included in Section 5.0 of the NPDES/SDS Antidegradation Assessment (see Attachment A).

## **3.0 BEST MANAGEMENT PRACTICES**

### **3.1 MAINLINE HYDROSTATIC TESTS – DISCHARGE BACK TO SOURCE**

Discharge back to the source water is Enbridge's proposed method for large volume discharges associated with mainline hydrostatic tests (Attachment D identifies these locations). As described in Section 2.2, Enbridge would test the baseline water quality of the hydrostatic test water for POCs. After the hydrostatic test is completed, Enbridge would discharge a water sample of the hydrostatic test water into a frac tank and would test the frac tank water for POCs. Based on these results, Enbridge would run the water through a filtration system with turbidity monitoring and the option to activate or bypass a carbon pod as needed to remove color nuisance concerns to achieve the receiving-water-specific discharge quality specified in Table 7.1-1 of the NPDES/SDS Antidegradation Assessment (see Attachment A). A schematic of the proposed filtration system is provided in Attachment K.

Once the water has been appropriately treated, the discharge would be routed via a pipe to a splash pup or other energy dissipating device elevated off the bottom of the waterbody for scour prevention and to provide re-oxygenation. The splash pup would be secured to floats to dissipate energy and prevent erosion around the base of the splash pup (see Attachment L and the hydrostatic test process flow diagram in Attachment J). An excavator would be used to carefully lower-in and remove the splash pup to avoid disruption to the bottom of the waterbody.

Water volumes for mainline hydrotests range from approximately 2 to 10 million gallons and test water discharges are expected to last 1 to 5 days. Hydrotest discharge would occur 24 hours a day until completed with a minimum of two people on-site monitoring the discharge. The maximum rate of discharge is estimated to be 1,500 gallons per minute. At no time would the discharge rate exceed that rate or the applicable discharge rates specified in the Project's Individual Permit. Discharges would be monitored and adjusted as necessary to avoid scouring, erosion, or sediment transport from the discharge location. Visual observations would be performed for all hydrostatic test discharge events (refer to Section 4.0 for monitoring documentation procedures).

Water appropriated and discharged for hydrostatic tests would be sampled as required by state-issued discharge permits. Water volumes and flow rates would be recorded.

## **3.2 MAINLINE HYDROSTATIC TESTS – UPLAND DISCHARGE LOCATIONS**

Enbridge proposes to infiltrate discharges from three mainline hydrotests where the source water is groundwater (identified in Attachment D). Per guidance provided by the MDNR on February 15, 2019, the MDNR has requested that groundwater not be discharged directly to a surface water source as groundwater chemistry could differ from that of the surface water and could also create artificial highwater conditions, which could potentially impact aquatic organisms. On March 6, 2019, the MDNR confirmed that it will condition the water appropriation permit to require that all groundwater be discharged into an upland location and will prohibit direct discharges of groundwater into surface waters.

Following testing, the mainline test segments would be depressurized and Enbridge would run the water through a filtration system with turbidity monitoring and the option to activate or bypass a carbon pod as needed to remove color nuisance concerns. A schematic of the proposed filtration system is provided in Attachment K. From the filtration system, water would be discharged, via a pipe and defuser, to a well-vegetated, upland area and an appropriate dewatering structure such as a hay bale structure lined with geotextile fabric (refer to EPP Figures 22A, 22B, and 22C in Attachment E, and the hydrostatic test process flow diagram in Attachment J).

Mainline hydrotest volumes to be infiltrated would range from approximately 2.4 million to 3.9 million gallons and test durations are expected to last 2 to 10 days (refer to Table 3.3-1 in Enbridge's Infiltration Plan in Attachment H). Discharge to upland areas would infiltrate and would not discharge to a receiving water; therefore, Enbridge would not conduct post-discharge water quality testing of POCs at these locations. Enbridge has screened the soil conditions, topography, and other factors to determine that they are suitable for infiltration (refer to Enbridge's Infiltration Plan in Attachment H). Discharges would be monitored and adjusted as necessary to avoid scouring, erosion, sediment transport from the discharge location, and runoff into a waterbody. Visual observations would be performed for all hydrostatic test discharge events (refer to Section 4.0 for monitoring documentation procedures).

Water appropriated and discharged for hydrostatic tests would be sampled as required by state-issued permits. Water volumes and flow rates would be recorded.

## **3.3 HDD HYDROSTATIC TESTS – UPLAND DISCHARGE**

Discharge to an upland is the proposed method for moderate volume discharges associated with HDD hydrotests (Attachment D identifies these locations). The hydrostatic test process flow diagram that would be implemented at each HDD (upland discharge) is provided in Attachment J. Following testing, the HDD segment test sections would be depressurized and the water would be discharged, via a pipe and defuser, to a well-vegetated, upland area and an appropriate dewatering structure such as a geotextile filter bag and/or a hay bale structure lined with geotextile fabric (refer to EPP Figures 21, 22A, 22B, and 22C in Attachment E).

Water volumes for these HDD hydrotests range from approximately 80,800 to 233,000 gallons and discharges are expected to last 2 to 27 hours (refer to Table 3.1-1 of Enbridge's Infiltration Plan in Attachment H). Discharge to upland areas would infiltrate and would not discharge to a receiving water; therefore, Enbridge would not conduct post-discharge water quality testing of POCs at these locations. Enbridge has screened the soil conditions, topography, and other factors to determine that they are suitable for infiltration (refer to Enbridge's Infiltration Plan in Attachment

H). Discharges would be monitored and adjusted as necessary to avoid scouring, erosion, sediment transport from the discharge location, and runoff into a waterbody. Visual observations would be performed for all hydrostatic test discharge events (refer to Section 4.0 for monitoring documentation procedures).

Water appropriated and discharged for hydrostatic tests would be sampled as required by state-issued permits. Water volumes and flow rates would be recorded.

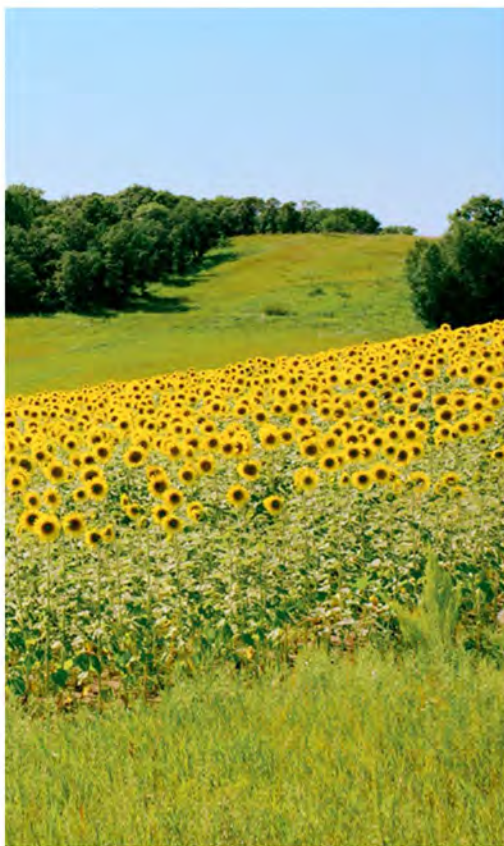
#### **4.0 MONITORING DOCUMENTATION PROCEDURES**

Enbridge would provide the MPCA with the results of hydrostatic test discharge observations and the technologies employed to reduce pollutant levels, and would control or otherwise dissipate discharge velocity as directed in the Individual Permit. Observations would be documented on the Enbridge Environment Hydrotest Discharge Authorization and Documentation Form (see Appendix D of the EPP [in Attachment E]).



**Attachment A**

**Individual NPDES/SDS Permit Antidegradation  
Assessment**



# Antidegradation Assessment Individual NPDES/SDS Permit Supplement

Enbridge Energy, Limited Partnership • Line 3 Replacement Project

May 2019



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## APPENDICES

Appendix A	Hydrotest Discharge Water Quality Results
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Appendix C	Alternatives Assessment
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## ACRONYMS AND ABBREVIATIONS

°F	Degrees Fahrenheit
401 WQC	Section 401 Water Quality Certification
BMPs	best management practices
CFR	Code of Federal Regulations
CN	Certificate of Need
CWA	Clean Water Act
EIS	Environmental Impact Statement
Enbridge	Enbridge Energy, Limited Partnership
EPA	U.S. Environmental Protection Agency
EPP	Environmental Protection Plan
existing Line 3	A 282-mile, 34-inch-diameter pipeline that enters Minnesota at the North Dakota border in Kittson County, and exits Minnesota at the Wisconsin border in Carlton County.
FdL	Fond du Lac Band of Lake Superior Chippewa
gpm	gallons per minute
HDD	horizontal directional drill
hydrotest	hydrostatic test
Individual Permit	National Pollutant Discharge Elimination System/State Disposal System Individual Permit
L3R	Line 3 Replacement Project
MDNR	Minnesota Department of Natural Resources
mg/l	milligrams per liter
MPARS	Minnesota Department of Natural Resources Permitting and Reporting System
MPCA	Minnesota Pollution Control Agency
MPUC	Minnesota Public Utilities Commission
NPDES	National Pollutant Discharge Elimination System
ORVW	Outstanding Resource Value Water
POC	parameters of concern
Project	Line 3 Replacement Project
RNR	River Nutrient Regions
RSA	Route Segment Alternative
SDS	State Disposal System
SONAR	Statement of Need and Reasonableness
TSS	Total Suspended Solids
UCL	upper confidence limit



## 1.0 INTRODUCTION

Enbridge Energy, Limited Partnership (“Enbridge”) submits this Antidegradation Assessment for the Individual National Pollutant Discharge Elimination System (“NPDES”)/State Disposal System (“SDS”) Permit (“Individual Permit”) to the Minnesota Pollution Control Agency (“MPCA”) to conduct discharge of waters used to test the structural integrity of the pipeline associated with the Line 3 Replacement Project (“L3R” or “Project”) through hydrostatic testing. The following sections, tables, and attachments provide information to satisfy the NPDES/SDS antidegradation assessment standard in Minnesota Rules part 7050.0265 and reflect information discussed in meetings and written correspondence between Enbridge and MPCA regarding the content of this assessment. Refer to Section 1.0 of the Individual Permit Supplement for a Project description and overview map.

## 2.0 REGULATORY FRAMEWORK

Authorization of an Individual Permit requires an NPDES/SDS antidegradation assessment under Minnesota Rules parts 7050.0250 through 7050.0325. The purpose of the antidegradation rules are to:

- Maintain and protect the existing uses and the level of water quality necessary to protect existing uses;
- Minimize the degradation of water quality that exceeds the levels necessary to support the protection and propagation of aquatic life and recreation (Class 2 water quality standards); and
- Maintain and protect the water quality necessary to preserve the exceptional characteristics of outstanding resource value waters (Minn. R. part 7050.0250).

This NPDES/SDS antidegradation assessment covers discharges of water from mainline and horizontal directional drill (“HDD”) hydrostatic tests (also referred to as “hydrotests”) to waterbodies. Discharges would be temporary, lasting hours to days. While the antidegradation rules contain special procedures for temporary discharges (part 7050.0275), Enbridge plans to satisfy Minnesota Rules part 7050.0265, the standard that applies to Individual Permits. Therefore, this NPDES/SDS antidegradation assessment provides the information required in Minnesota Rules part 7050.0280 subpart 2.

The Lake Superior Basin Antidegradation Standards (Minnesota Rules parts 7052.0300 to 7052.0380) contain antidegradation requirements for discharges of certain bioaccumulative chemicals to waters in the Lake Superior Basin. The hydrostatic test discharges would not contain any bioaccumulative chemicals, so the antidegradation standards of Chapter 7052 do not apply to these discharges.

Enbridge has submitted an application to the MPCA for a Clean Water Act (“CWA”) Section 401 Water Quality Certification (“401 WQC”) of the CWA Section 404 individual permit for the Project, which includes a separate antidegradation assessment. Every 401 WQC of a new, reissued or modified individual federal permit requires an antidegradation review under Minnesota Rules, part 7050.0285 to determine whether the requested 401 WQC would satisfy the antidegradation standards in part 7050.0265.

### 3.0 HYDROSTATIC TESTING DESCRIPTION

Hydrostatic testing is done to test the integrity of the pipeline as construction progresses. Hydrostatic testing is done after construction is complete and prior to commissioning to verify that there are no flaws in the pipe or welds. Hydrostatic tests would be conducted along the Project for each mainline pipeline segment and for each HDD crossing. L3R would require hydrostatic testing of 17 spread segments and 17 pre-built HDD segments<sup>1</sup> in Minnesota. Proposed hydrotest appropriation and discharge locations are included as Attachment C of the Individual Permit Supplement. Contingency sources and receiving waters are identified in Attachments C, D and I of the Individual Permit Supplement, respectively, and would only be considered if the Minnesota Department of Natural Resources ("MDNR") prohibits or curtails the use of primary water appropriation sources due to conditions at the time of proposed use. Enbridge has proactively identified contingency sources so that hydrostatic testing would not be delayed. A description of the hydrostatic testing process is included in Section 2.0 of the Individual Permit Supplement.

### 3.1 PROPOSED HYDROTEST DISCHARGE METHODS

Enbridge's proposed method to discharge hydrotest water is dependent on the volume of the water used for the hydrotest, the source of the water, and the characteristics of the surrounding landscape.

- Discharge to an upland for infiltration is the proposed method for moderate volume discharges associated with HDD hydrotests and for three mainline hydrotest locations where the source is groundwater. On March 6, 2019, the MDNR confirmed that they would condition the water appropriation permit to require that all groundwater be discharged to an upland location and would prohibit direct discharges of groundwater into surface waters (see Section 3.2 of the Individual Permit Supplement). Best Management Practices ("BMPs") would be used for upland discharges, as described in Sections 3.2 and 3.3 of the Individual Permit Supplement and Section 5.0 of the Environmental Protection Plan ("EPP") and Figures 21, 22A, 22B, and 22C (see Attachment E of the Individual Permit Supplement). Upland discharges would infiltrate and would not flow to a surface water, as demonstrated by Enbridge's Infiltration Plan (see Attachment H of the Individual Permit Supplement). As the hydrotest discharge water infiltrates there would be physical, biological, and chemical processes that would provide additional natural treatment of the discharge water before it reaches groundwater, so no groundwater degradation is anticipated. Because there would be no loading to surface water associated with infiltration, these discharges are not subject to antidegradation rules and will not be discussed further in this antidegradation assessment.

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<sup>1</sup> HDD test sections are hydrotested *prior to installation* of pipe. Caliper tools are run through HDD sections subsequent to installation to verify that anomalies and/or damage to the pipe did not occur during the installation process.

- Discharge back to the source water is the proposed method for large volume discharges associated with mainline hydrotests. For these tests, the proposed discharge location is the same as the appropriation location: water would be returned to the same reach of the river from which it was withdrawn. Refer to Section 3.1 of the Individual Permit Supplement for BMPs proposed for mainline hydrotest discharges.

Attachment D of the Individual Permit Supplement identifies the proposed discharge type associated with each source water.

### **3.2 MANAGEMENT AND TREATMENT OF HYDROTEST DISCHARGE WATER**

The potential water quality effects of hydrostatic test discharges to waterbodies are temporary increases in turbidity and total suspended solids (“TSS”) associated with the sediments that become suspended during the processes of appropriating the test water or discharging it back to the source, and rust coloration and associated parameters that the water may pick up from the inside of the pipe. Enbridge does not propose the use of chemical additives at this time. Any additives would be approved by the MPCA prior to use.

To avoid and minimize loading of TSS and turbidity, Enbridge would use BMPs to avoid and mitigate sedimentation during appropriation, and erosion and sedimentation of the waterbody, and/or scour of the waterbody bed during discharge. Further, Enbridge would run all water from mainline hydrotests through a filtration system in order to control the TSS concentration in the discharge. Section 3.1 of the Individual Permit Supplement provides a detailed description of BMPs proposed for these hydrostatic discharges.

To avoid introduction of parameters due to contact with the interior of the pipe, Enbridge would use several management and treatment methods. First, only unused pipe would be used. Second, prior to conducting each hydrotest, Enbridge would clean the interior of the pipe to remove construction debris, mill scale, dirt, dust, and rust. The debris would be collected and properly disposed of off-site (see Section 2.0 of the Individual Permit Supplement). Finally, Enbridge would run all water from mainline hydrotests through a filtration system with the option to activate a carbon pod to remove color nuisance concerns. Refer to Section 3.1 of the Individual Permit Supplement for a detailed description of BMPs proposed for these hydrostatic discharges.

Enbridge conducted several water quality analyses that demonstrate the anticipated effectiveness of these measures. Laboratory analyses of hydrotest discharge water from other Enbridge hydrotests show that hydrotesting causes little or no change to the quality of the water used for the testing (see Appendix A).

### **4.0 PARAMETERS OF CONCERN**

Antidegradation assessment and review is limited to parameters of concern (“POCs”), as defined in the Statement of Need and Reasonableness (“SONAR”) for the Antidegradation Rules (SONAR at p 88). POCs are pollutants which:

- are reasonably expected in a discharge or as a result of a proposed activity,

- are anticipated to cause degradation (a measurable change to existing water quality made or induced by human activity resulting in diminished conditions of surface waters),
- have numeric or narrative standards, and
- present the greatest risk of degradation.

Based on the management and treatment methods planned for hydrotest discharges (see Section 3.2), Enbridge proposes that TSS and color are the POCs for discharges to receiving waters. The state of Minnesota has adopted water quality standards for TSS and has abandoned turbidity-based assessments (Minnesota Rules part 7050.0220 through 7050.0227); therefore, turbidity is not carried forward as a parameter of concern. Iron is not considered a POC, because it does not present the greatest risk of degradation and color would serve as an indicator parameter for iron. When color is mitigated, iron would also be mitigated.

## 5.0 RECEIVING WATERS

Attachment I of the Individual Permit Supplement identifies the proposed receiving waters for the hydrostatic test discharges. Sixteen primary and contingency receiving water discharge locations are listed. Contingency receiving waters would be used if the MDNR prohibits or curtails the use of primary water appropriation sources due to conditions at the time of proposed use. Attachment I of the Individual Permit Supplement lists the beneficial use classifications and the estimated discharge volume associated with each receiving water. It also includes information on their impairment status as listed on the 2018 Section 303d list prepared by the MPCA and approved by the U.S. Environmental Protection Agency (“EPA”), and their known aquatic invasive species infestations.<sup>2</sup> Given that TSS is a parameter of concern, relevant impairments are TSS/turbidity and also fish and macroinvertebrates because TSS is one of the parameters that can affect fish and macroinvertebrate habitat.

All receiving waterbodies are Public Waters: waterbasins and watercourses that meet the criteria set forth in Minnesota Statutes, Section 103G.005, subd. 15 that are identified on Public Water Inventory maps authorized by Minnesota Statutes, Section 103G.201. None of the receiving waters are a designated trout stream. One receiving water, the Mississippi River, is identified as a restricted Outstanding Resource Value Water (“ORVW”) in part 7050.0335, subpart 1.

Most of the hydrostatic test discharges would be to receiving waterbodies that are not impaired for TSS/turbidity, fish, or macroinvertebrates. Of the 17 potential hydrostatic test discharges to a receiving waterbody, 5 have relevant impairments according to the MPCA’s Final 2018 Impaired Water List: the Red River (09020311-560) is impaired for turbidity; the Tamarac River (09020311-503) is impaired for fish/macroinvertebrates; the Middle River (09020309-540) is impaired for dissolved oxygen, macroinvertebrates, and turbidity; the Clearwater River (09020305-517) is impaired for turbidity; and the Mississippi River (07010103-708) is impaired for TSS (refer to Attachment I of the Individual Permit Supplement).

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<sup>2</sup> Based on MDNR infested waters list last updated December 7, 2018 (<https://www.dnr.state.mn.us/invasives/ais/infested.html>).

The MPCA recently revised its River Nutrient Region (“RNR”) boundaries. These RNRs correspond loosely to the EPA aggregated Level III Nutrient ecoregions. Table 5-1 presents proposed L3R hydrostatic test discharge locations within each RNR. The MPCA established TSS standards for Class 2A, 2Bd, 2B, 2C, and 2D waters by RNR. The Project crosses Class 2B and Class 2Bd waters in the Red River, Northern, Central, and Southern RNRs. Table 5-1 presents TSS standards for each potential hydrotest discharge receiving water, and relevant existing 303(d) impairments. Hydrotest appropriation and discharge locations are presented in Attachment C of the Individual Permit Supplement.

<b>Table 5-1</b> <b>Relevant 303(d) Impairments and</b> <b>TSS Standards for Class 2B and Class 2Bd Hydrostatic Test Discharge Receiving Waters</b> <b>by River Nutrient Region</b>				
<b>Receiving Water (WID)</b>	<b>Milepost (“MP”)</b>	<b>Hydrostatic Test Description (Discharge ID)</b>	<b>Relevant Impairment(s)</b>	<b>RNR/ TSS Standards (mg/l)</b>
Red River of the North (09020311-560)	801.8	Mainline Hydrostatic Test (SD001)	Turbidity	Red River/ 100
Tamarac River (09020311-503)	828.4	Mainline Hydrostatic Test (SD002)	Aquatic macroinvertebrate bioassessments; Fishes bioassessments	South/ 65
Middle River (09020309-540)	836.0	Mainline Hydrostatic Test – Contingency (SD003)	Aquatic macroinvertebrate bioassessments; Dissolved oxygen; Turbidity	
Red Lake River (09020311-513)	864.3	Mainline Hydrostatic Test (SD004)	N/A	Central/ 30
Clearwater River (09020305-648)	875.4	Mainline Hydrostatic Test (SD005)	Turbidity	
Lost River (09020305-512)	904.0	Mainline Hydrostatic Test – Contingency (SD006)	N/A	
Shell River (07010106-679)	985.3	Mainline Hydrostatic Test (SD010)	N/A	
Clearwater River (09020305-517)	922.3	Mainline Hydrostatic Test (SD007)	N/A	North/ 15
Island Lake (Lake ID: 29025400)	967.1	Mainline Hydrostatic Test - Contingency (SD009)	N/A	
Crow Wing River (07010106-516)	993.3	Mainline Hydrostatic Test - Contingency (SD011)	N/A	
Clear (Eagle) Lake (Lake ID: 29025600-201)	1013.4	Mainline Hydrostatic Test - Contingency (SD012)	N/A	
Pine River (07010105-669) – 2 locations	1017.3	Mainline Hydrostatic Test (SD013/SD014)	N/A	
Willow River (07010103-748)	1066.4	Mainline Hydrostatic Test - Contingency (SD015)	N/A	North/ 15
Mississippi River (07010103-708) <sup>a</sup>	1069.6	Mainline Hydrostatic Test (SD017)	TSS	
East Savanna River (04010201-561)	1085.8	Mainline Hydrostatic Test (SD018)	N/A	
Chub Lake (Lake ID: 09000800)	1120.3	Mainline Hydrostatic Test (SD020)	N/A	



<b>Table 5-1</b> <b>Relevant 303(d) Impairments and</b> <b>TSS Standards for Class 2B and Class 2Bd Hydrostatic Test Discharge Receiving Waters</b> <b>by River Nutrient Region</b>				
Receiving Water (WID)	Milepost ("MP")	Hydrostatic Test Description (Discharge ID)	Relevant Impairment(s)	RNR/ TSS Standards (mg/l)
<sup>a</sup> ORVW <i>Contingency receiving waters are identified in italics.</i> mg/l = milligrams per liter				

## 6.0 ALTERNATIVES TO AVOID AND MINIMIZE LOADING

Project and route alternatives were evaluated during the environmental review and Minnesota Public Utilities Commission ("MPUC") proceedings. Appendix B describes the MPUC Certificate of Need ("CN") and Route Permit Proceedings, Environmental Impact Statement ("EIS"), and Findings and Conclusions from September 5, 2018 MPUC Order Granting a CN for the Project. In granting the CN for the Project, the MPUC considered the no action alternative (denial of the certificate), which would result in continued use of the existing Line 3, System Alternative SA-04, and various rail and truck alternatives.

On June 28, 2018 the MPUC also granted a route permit for Enbridge's Preferred Project Route, including Route Segment Alternative ("RSA")-05 and RSA-22 through the Fond du Lac Band of Lake Superior Chippewa ("Fdl") Reservation with permission of the FdL. On August 31, 2018, Enbridge and FdL reached an agreement that allows Enbridge to construct the Project along RSA-22 through the FdL Reservation in northern Minnesota. The MPUC issued a written Order on October 26, 2018 for Enbridge's Route Permit identifying the Preferred Project Route inclusive of RSA-05 and RSA-22 as the MPUC Designated Route (hereafter referred to as the "Designated Route"). The Designated Route approved by the MPUC is a 750-foot-wide corridor, which allows for minor adjustments to the pipeline alignment and permanent right-of-way within the Designated Route.

In granting the Route Permit for the Designated Route the MPUC relied in part on the EIS to comparatively evaluate impacts of Enbridge's Preferred Project Route, four (4) route alternatives and twenty-four (24) route segment alternatives, all of which would require discharges to surface waters for hydrostatic testing. This action represents a finding that the Designated Route is the least environmentally damaging, feasible and prudent (see Minn. Stat. section 116 D.04, subd. 6).

The antidegradation rules require the MPCA to consider prudent and feasible alternatives to avoid and minimize loading (Minn. R. part 7050.0265 subpart 5):

A feasible alternative is defined as "a pollution control alternative that is consistent with sound engineering and environmental practices, affordable, and legal, and that has supportive governance that can be successfully put into place to accomplish the task." (Minn. R. part 7050.0255 subpart 17)

A prudent alternative is defined as “a pollution control alternative selected with care and sound judgement” (Minn. R. part 7050.0255 subpart 34)

This section describes alternatives to avoid and minimize loading. The descriptions include discussion of factors related to whether the alternative is prudent and feasible. Specifically, three criteria are presented for evaluation of whether alternatives are prudent and feasible:

- **Technical Feasibility** – Technical constraints on implementation. For example, an infiltration site must be well-vegetated, with topography and soils that allow for infiltration of the volume of water being discharged prior to the start of commissioning, and as agreed upon by the landowner.
- **Environmental Impacts** (other than to surface water quality) – Examples include air emissions caused by additional equipment use, additional land disturbance (i.e., clearing, grading), and consumptive use of appropriated water that could be returned to its source.
- **Impacts to Human Environment** – For example, wear and tear on highways from increased truck traffic, and additional duration of community disruption due to longer implementation timeframes.

Appendix C provides site-specific alternatives matrices for each proposed discharge that compares these criteria for each avoidance and minimization alternative carried forward for analysis. An overview of each of these avoidance and minimization alternatives is presented below.

## 6.1 ALTERNATIVES TO AVOID LOADING

For each HDD and mainline discharge currently proposed back to the source water, Enbridge assessed the following alternatives to avoid loading:

- Alternative testing fluids
- Infiltration
- Trucking water to off-site disposal
- Spray irrigation

An overview of each of these avoidance alternatives carried forward for further analysis is described below. A site-specific matrix comparing each of these alternatives for each hydrotest discharge location is presented in Appendix C.

### 6.1.1 Alternatives Considered but Not Carried Forward

#### Alternative Testing Fluids

In certain circumstances, a gas, such as air or nitrogen can be used for hydrostatic testing. However, for petroleum pipelines, federal regulations (49 CFR [“Code of Federal Regulations”] Part 195.306) require that the test medium be water. Therefore, this alternative was eliminated from further consideration.

## 6.1.2 Infiltration

For this alternative, the hydrotest water would be discharged to a dewatering structure at an upland location, where it would infiltrate to groundwater. This alternative would be conducted using procedures similar to those Enbridge plans for infiltration of HDD discharges as described in Attachment H of the Individual Permit Supplement. BMPs would be implemented to prevent erosion and runoff to surface waters. Similar to other mainline tests, hydrotest water would be run through a filtration system prior to infiltration. Successful infiltration requires a site that has low slope, sufficient area, and favorable soil characteristics.

Enbridge assessed the potential for infiltration at all proposed mainline hydrotest discharge locations as described in Attachment G of the Individual Permit Supplement. At each location that is the end/beginning of a mainline spread section, Enbridge identified a potential infiltration area, selected as a low slope area with favorable soil characteristics and sufficient setback from surface waters and infrastructure. Results of the analysis indicate that depending on soil characteristics, infiltration of mainline hydrotest discharges is estimated to take from less than 1 day to over 8 years.

At locations where the soil characteristics are such that infiltration would take over 7 days, water storage would be needed to free up equipment necessary to test additional pipe segments and to allow for tie-ins. Hydrotest water would be removed from the pipeline via water piping or hoses and stored in water containment tanks known as frac tanks<sup>3</sup> or within temporarily constructed water storage tanks,<sup>4</sup> until it could be infiltrated. Workspace requirements for water storage would be proportional to the volume of water that requires storage. For example, one of the smaller mainline discharges of approximately 2.6 million gallons ("Mgal") would require approximately 124 frac tanks which would require a minimum of an additional 3 acres of workspace for tanks, piping, pumps, and truck access (refer to Figure 2.1.1-1 in Appendix C). For the largest mainline discharge of 10.1 Mgal, storing the entire volume of water in 480 frac tanks would require a minimum workspace of approximately 13 acres for tanks, piping, pumps, and truck access (refer to Figure 2.1.1-1 in Appendix C).

At all water storage workspaces, topsoil would be stripped and stored along the edge of the workspace. Gravel would be added to allow safe operation of equipment and/or to construct the storage tank. Travel lanes within the workspace would be required to position frac tanks and move frac tanks to and from the site. Additional workspace would be required for water hoses, equipment and pump storage, and other BMPs and contingency equipment as required by permit conditions. When infiltration is complete, water storage work areas would be restored to preconstruction conditions.

The factors that would need to be considered to determine whether infiltration would be a prudent and feasible alternative for each proposed discharge include:

### 1. Technical Feasibility

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<sup>3</sup> The typical large volume frac tank holds 21,000 gallons of water and is 8 feet wide and 45 feet long. Refer to <https://www.fracvac.com/Frac-Tanks.html#> for descriptions and specifications of example frac tanks.

<sup>4</sup> Refer to <https://www.mustangextreme.com/our-services/above-ground-storage-tanks/> for descriptions and specifications of water storage structures that could be used for the Project.

- a. Requires a vegetated upland area with topography and soils suitable for infiltration.
- b. The potential infiltration area must be accessible from the construction workspace and located such that infiltration activities would not impact public infrastructure or surface water.
- c. The discharge volume must be such that it would not overwhelm the soils' infiltration capacity.
- d. Sufficient workspace for additional equipment (infiltration area, water tanks, piping).
- e. To avoid additional workspace for water storage, water can be bled directly from the pipe after hydrotesting is complete to the infiltration area; however, discharge would need to be completed within 7 days of the end of hydrotest to free up equipment necessary to test additional segments and to allow for tie-in.
- f. Infiltration would not be conducted in frozen conditions.

## 2. Environmental Impacts

- a. Consumptive Use: As defined in Minn. S. 103G.005 Subd. 8b., consumptive use means water that is withdrawn from its source for immediate further use in the area of the source and is not directly returned to the source. By this definition, infiltration would be considered a consumptive use. Minnesota Statutes impose limitations on consumptive use (Minn. S. section 103G.265) and encourage the treatment and reuse of water for non-consumptive uses (Minn. S. section 103G.261 subd. [e]).
- b. Aquatic Resources: Consumptive use has the potential to cause impacts to stream hydrology or aquatic biota if the withdrawal exceeds 10% of the streamflow (MDNR, 2016).
- c. Land Requirements: Additional construction workspace for the infiltration area, potential water storage, and to transport the water from the hydrotest area and/or storage area to the infiltration area (e.g., water piping or hoses). As described in Attachment G of the Individual Permit Supplement, an infiltration area of 0.5 acres is assumed. Additional workspace may also be required to store water as the larger volume hydrotests that would not infiltrate within 7 days and could not be introduced to the infiltration structures all at one time. In addition, some sites would also require piping of water from the hydrotest area to the storage and infiltration areas.
- d. Increases in Air Emissions: Additional vehicles and equipment would be required to bring in and set-up the storage tanks, and pumps to transport water from the hydrotest area to the storage and/or infiltration area, which would result in additional air emissions.

### 3. Impacts to Human Environment

- a. Impacts to Land Use: Infiltration has the potential to result in temporary impacts to existing land use over the infiltration area. For example, if the infiltration area is located in an adjacent agricultural area, the landowner would be unable to use that portion of the field for cultivation/haying until infiltration is complete. Additional workspace required for storage and/or piping of the water would have additional land use impacts.
- b. Impacts to Roads/Traffic: In some instances, water piping would be required to transport water from the hydrotest area to the storage and/or infiltration areas. Enbridge would try to avoid placing the temporary piping or hosing across existing roads; however, due to limitations temporary road crossings may be unavoidable.

Additional workspace requirements would require additional negotiations with landowners (adjacent to and/or off the right-of-way) and may require additional permits or permit amendments. Environmental surveys of these areas would be conducted to identify potential sensitive resources and Enbridge would avoid sensitive resources when siting these areas.

#### 6.1.3 Truck Water to Off-Site Disposal

For this alternative, hydrostatic test water would be transported to off-site wastewater disposal facilities for treatment and discharge. Hydrotest water would be removed from the pipeline, then stored in frac tanks or within temporarily constructed water storage tanks until it could be transported to a suitable disposal facility. The workspace requirements for these tanks are the same as those described in Section 6.1.2.

The number of trucks required to transport water would be proportionate to the volume of water. Each truck can transport approximately 6,000 gallons of water. The smallest mainline discharge of approximately 2.4 Mgal would require approximately 400 truckloads, and the largest mainline discharge of 10.1 Mgal would require approximately 1,600 truckloads. Road conditions and weight limit restrictions would influence the route that is taken between the discharge location and wastewater facility. Due to the weight of a loaded truck,<sup>5</sup> roads could be damaged by repeated truck travel.

Factors for evaluation of whether trucking to off-site disposal would be a prudent and feasible alternative are described below.

#### 1. Technical Feasibility

- a. Location of the nearest wastewater treatment facility willing to accept clean water, and the volume of water they are willing to accept. The rate at which a treatment plant could accept hydrotest discharge water would be limited by its design capacity, its normal operating inflows, and any additional inflows due

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<sup>5</sup> 6,000 gallons of water weighs 50,071 pounds. A fully loaded tanker truck can weigh 80,000 pounds.



to precipitation. Table 6.1-1 below lists wastewater treatment facilities along the Project route, their capacity, and notes as to the volumes of freshwater they can accept.

- b. If discharges are hauled off-site, it may be feasible to conduct hydrotest activities during frozen conditions. However, this alternative would be limited by road restrictions and weather conditions that may lead to water freezing in storage tanks.

<b>Table 6.1-1</b> <b>Wastewater Treatment Facilities along the Line 3 Replacement Project</b>		
<b>Facility</b>	<b>Daily Fresh Water Capacity Notes</b>	<b>Continuous Wet Flow<sup>1</sup></b>
Aitkin WWTP	Does not accept water hauled in for treatment.	0.69
Grand Rapids WWTP	Can accommodate 100,000 gallons or more per day.	15.2
Crookston WWTP	Does not accept large volumes of water (millions of gallons).	1.4
Hibbing WWTP South Plant	Unknown	4.5
Virginia WWTP	Unknown	4.3
Western Lake Superior Sanitary District (WLSSD) Administrative Office	18,000 gallons can be accepted per day; weather dependent. Rain events can affect if the facility is able to receive additional wastewater	48.4
<sup>1</sup> MPCA Wastewater data browser ( <a href="https://www.pca.state.mn.us/data/wastewater-data-browser">https://www.pca.state.mn.us/data/wastewater-data-browser</a> )		

## 2. Environmental Impacts

- a. Consumptive Use: Treated water would not be returned to the same waterbody it was withdrawn from, so it would be a consumptive use of appropriated water, compared to returning the appropriated water to its source, which is a non-consumptive use. Minnesota Statutes impose limitations on consumptive use (Minn S. section 103G.265) and encourage non-consumptive uses (Minn. S. section 103G.261 subd. 5[e]).
- b. Aquatic Resources: Consumptive use has the potential to cause impacts to stream hydrology or aquatic biota if the withdrawal exceeds 10% of the streamflow (MDNR, 2016).
- c. Land Requirements: Additional land disturbance to create space for water storage.
- d. Increases in Air Emissions: Associated with clearing workspace for water storage, transportation and setup of tanks, and transportation of water to the off-site disposal facilities.

## 3. Impacts to Human Environment

- a. Impacts to Land Use: The additional workspace required for the storage tank would impact existing land use in that area until all water has been hauled off-site.
- b. Increased Traffic: Disruption to local communities caused by increased truck traffic to haul water to off-site disposal sites.

- c. Impacts to Road Conditions: The additional truck traffic may cause additional wear and tear to roads due to the weight of a loaded water truck.<sup>6</sup>

Additional workspace requirements would require additional negotiations with landowners (adjacent to and/or off the right-of-way) and may require additional permits or permit amendments. Environmental surveys of these areas would be conducted to identify potential sensitive resources, and Enbridge would avoid sensitive resources when siting these areas.

### 6.1.4 Spray Irrigation

For this alternative, hydrostatic test water would be discharged by spray irrigation to agricultural land. Hydrotest water would be removed from the pipeline, then stored as described above for the off-site disposal alternative. Water would then be routed to the irrigation system via piping or trucking. The rate at which water could be applied would depend on the crop and the soil water deficit. The University of Minnesota extension service lists typical irrigation pumping rates between 4 gpm/acre and 9 gpm/acre.<sup>7</sup> A typical center pivot irrigation system covers approximately 130 acres. Spray irrigation of the smallest mainline spread discharge of 2.4 Mgal, over 130 acres, would take approximately 2 to 4 days, and of the largest mainline spread discharge of 10.1 Mgal would take approximately 6 to 14 days.

Factors for evaluation of whether spray irrigation would be a prudent and feasible alternative are described below.

#### 1. Technical Feasibility

- a. Accessibility of irrigation systems and agreement by the landowner.
- b. Season of year and current weather conditions. This alternative would not be feasible during the winter months and would most likely be limited by landowners to the growing season.
- c. Type of crops being grown.
- d. Soil water deficit.

#### 2. Environmental Impacts

- a. Consumptive Use: Irrigation would be a consumptive use of appropriated water, compared to returning the appropriated water to its source, which is a non-consumptive use. Minnesota Statutes impose limitations on consumptive use (Minn S. section 103G.265) and encourage non-consumptive uses (Minn. S. section 103G.261 subd. 5 [e]).

<sup>6</sup> A fully loaded tanker truck can weigh 80,000 pounds.

<sup>7</sup> University of Minnesota Extension Service. Irrigation Management Strategies. <https://extension.umn.edu/irrigation/irrigation-management-strategies#pumping-capacity-1703413>. Accessed April 30, 2019.

- b. Aquatic Resources: Consumptive use has the potential to cause impacts to stream hydrology or aquatic biota if the withdrawal exceeds 10% of the streamflow (MDNR, 2016). Spray irrigation of water from an infested source could spread the infestation, therefore, this alternative was eliminated from consideration for discharges associated with source waters listed as infested with aquatic invasive species.
- c. Land Requirements: Additional land disturbance to create space for water storage and potential piping to the irrigation system.
- d. Increases in Air Emissions: Associated with clearing workspace for water storage, pumps, and set-up of tanks.

### 3. Impacts to Human Environment

- a. Impacts to Land Use: The additional workspace required for the storage tank would impact existing land use in that area. However, providing an additional water source to the local agricultural community may have a beneficial impact.

Additional workspace requirements and the irrigation of agricultural areas would require additional negotiations with landowners (adjacent to and/or off the right-of-way) and may require additional permits or permit amendments. Environmental surveys of potential workspace areas would be conducted to identify potential sensitive resources, and Enbridge would avoid sensitive resources when siting these areas.

## 6.2 ALTERNATIVES TO MINIMIZE LOADING

For each mainline spread hydrotest discharge, Enbridge evaluated three alternatives to minimize loading to surface waters:

1. Shorter Mainline Test Segments
2. Water Reuse
3. BMPs and Treatment Methods

An overview of each of these minimization alternatives is described below. A site-specific matrix comparing the alternatives carried forward for further analysis by each hydrotest discharge location is presented in Appendix C.

### 6.2.1 Alternatives Considered but Not Carried Forward

#### Shorter Mainline Segments

It is conceptually possible that the length of the pipeline segments being hydrostatically tested could be reduced. The benefit of this alternative would be that a smaller volume of water would be discharged to a receiving water, which would reduce loading, or that the smaller volume of water could be managed with one of the alternatives to avoid loading.

The length of mainline spread hydrotest segments is determined by two primary factors: the availability of water appropriation sources and the topography of the route. When planning for hydrostatic testing, the materials strength, wall thickness, and diameter of the pipeline are used to determine how much pressure the pipeline can hold during a hydrotest. The hydrotest is then required to be held between 100% and 110% of this determined pressure in order to pass the test, as required by 49 CFR 195.1, Subpart C and 195.3, Subpart E. Test segments of pipe are also dependent on the elevation profile of the section due to pressure decreasing as elevation rises and increases and elevation lowers. In order to ensure the entire sections stays within the specified pressure band, the elevation rise and decrease from the test point cannot be too drastic or the test would not be feasible. Lastly, hydrostatic test sections are also driven by water sources for appropriation, additional temporary workspace for the test headers/test locations, and topography.

Enbridge has evaluated these factors and selected mainline spread segment lengths that achieves the regulatory testing requirements over the given elevation profiles. Therefore, this alternative was eliminated from further consideration.

### **6.2.1 Water Reuse**

For this alternative, when the hydrotest is completed, all or part of the hydrotest water would be reused for a hydrotest in another spread. The overall, Project-wide volume of both appropriation and discharge would be reduced. The potential for water reuse depends on the following factors:

- Timing of the hydrotesting of adjacent test segments and separate spreads; construction of adjacent test segments spreads would need to be completed within the same timeframe so that the hydrotest water could be jumped from one hydrotest segment to the next.
- Elevation and topography; the most energy efficient manner to hydrotest would be to appropriate at the highest elevation and push the water to a lower elevation relying on gravity to assist with pushing the water from one end to the next. Moving water from a lower to a higher elevation requires additional energy in the form of pumps to move the water, which may also require additional workspace.
- Lengths of the spread; reuse of hydrotest water between spreads of comparable length to minimize additional appropriation and/or discharge.

Reuse of water for a mainline hydrotest further than an immediately adjacent test segment is possible but would require significant engineering effort. Pushing a single column (slug) of water from one section to a more distant section would require keeping the water as a single column as it moves down the line to prevent air from getting trapped into the water column. This can be done using air compressors or nitrogen pumps to build up pressure on both the front and back end of the column to move the slug as one. The elevation profile along the test sections would determine the energy expenditure needed to move the slug.

At a given discharge location, reuse of hydrotest water could either result in an increase or decrease in the currently proposed hydrotest volume. This minimization alternative could be



used in conjunction with any of the avoidance alternatives described in Section 6.1 and with the minimization alternative described in Section 6.2.3 for the mainline spreads. This would not be feasible for HDD hydrotesting. Refer to the alternatives matrices in Appendix C for more site-specific information.

Factors for evaluation of whether water reuse would be a prudent and feasible alternative are described below.

### **1. Technical Feasibility**

- a. Timing of hydrostatic testing between adjacent test segments and spreads would need to be coordinated.
- b. Elevation along the hydrotest section and between adjacent sections which would determine energy needs (i.e., pumps) and potential additional workspace needs.

### **2. Environmental Impacts**

- a. Aquatic Resources: Reuse of hydrotest water would ultimately reduce total amount of water utilized for this activity and have a beneficial effect by reducing water appropriations.
- b. Increases in Air Emissions: Reuse of water in subsequent hydrotests could result in additional air emissions because additional equipment (air compressors or pumps) would be required to push the water through the pipes. In addition, depending on the discharge method, water may need to be transported a longer distance.

### **3. Impacts to Human Environment**

- a. Land use outside the construction workspace would not be affected, unless additional workspace would be required for equipment.
- b. No additional impacts to roads and traffic beyond those required for hydrostatic testing.

## **6.2.2 Discharge to Surface Water with BMPs and Treatment**

For this alternative, loading associated with discharge back to the source water would be avoided and minimized using BMPs and treatment methods as described below, in Section 3.1 of the Individual Permit Supplement, and Section 5.0 of the EPP [see Attachment E of the Individual Permit Supplement]).

BMPs and treatment methods for discharges to receiving waters are summarized in Table 6.2-1.

Table 6.2-1 Surface Water Discharge BMPs and Treatment Methods		
Discharge Location	Alternative	Description and Benefit
Source water	POC Treatment - Filtration System	A filtration system with turbidity monitoring and the option to activate or bypass a carbon pod is proposed to remove TSS and color nuisance concerns.
Source water	Turbidity and Scour Prevention – Splash Pup	Once the water has been appropriately treated, the discharge would be routed via a pipe to a dissipation device such as a splash pup elevated off the bottom of the waterbody for scour prevention and re-oxygenation.
Source water	Turbidity and Scour Prevention – Discharge Rate and Duration	The hydrostatic test discharge rate and duration would be monitored and adjusted as necessary to avoid scouring, erosion, or sediment transport from the discharge location.

Factors for evaluation of whether discharge to a surface water with BMPs and treatment methods would be a prudent and feasible alternative are described below.

### 1. Technical Feasibility

- a. Discharge back to a source water could be conducted year-round if discharged below ice during frozen conditions.
- b. Minimizes amount of workspace needed for water storage, parking, equipment, and transportation of water.

### 2. Environmental Impacts

- a. Return back to the source water would avoid consumptive use and potential impacts to aquatic resources.
- b. Implementation of the BMPs and treatment methods proposed would minimize water quality effects and potential impacts to aquatic resources.
- c. No additional workspace would be required for infiltration, storage, etc., and therefore minimizes vegetation disturbance.
- d. Minimal additional air emissions beyond those required for the hydrostatic testing (e.g., pumping).

### 3. Impacts to Human Environment

- a. No additional workspace would be required for infiltration, storage, etc., and therefore minimizes impacts to land use.
- b. No trucking of water and therefore no additional impacts to roads and traffic beyond those required for hydrostatic testing.

### **6.3 SUMMARY OF ALTERNATIVES ANALYSIS**

It is important to note this alternative analysis was conducted based on the best available information and no coordination with agencies, landowners, facilities, or other stakeholders has occurred to determine the feasibility of site-specific implementation. For any of these alternatives, additional workspace requirements would require additional negotiations with landowners (adjacent to and/or off the right-of-way) and may require additional permits or permit amendments. Environmental surveys of these areas would be conducted to identify potential sensitive resources, and Enbridge would avoid sensitive resources when siting these areas.

The spray irrigation or off-site disposal alternatives would also require additional coordination with landowners and facilities for these options to be feasible. The infiltration alternative is dependent on weather conditions; precipitation may decrease the ability to infiltrate at the time of hydrotesting and an alternative option may need to be explored.

Based on this analysis presented in Appendix C, the Discharge to Surface Water with BMPs and Treatment (back to source water) is the least degrading, prudent, and feasible alternative for the following Discharge IDs as it results in the least additional disturbance to vegetation and land use, minimizes air emissions, minimizes the duration of disturbance, and minimizes impacts to local roads and traffic. Loading would be minimized by the implementation the BMPs and treatment methods described in Section 6.2.3.

- Spread 1A Mainline Hydrotest (SD001)
- Spread 1B Mainline Hydrotest (SD002)
- Spread 1C Mainline Hydrotest (SD004)
- Spread 1D Mainline Hydrotest (SD0005)
- Spread 2A Mainline Hydrotest (SD007)
- Spread 2B Mainline Hydrotest (SD007)
- Spread 3A Mainline Hydrotest (SD010)
- Spread 3B Mainline Hydrotest (SD013)
- Spread 3C Mainline Hydrotest (SD014)
- Spread 4A Mainline Hydrotest (SD017)
- Spread 4B Mainline Hydrotest (SD017)
- Spread 5A Mainline Hydrotest (SD018)
- Spread 5B Mainline Hydrotest (SD020)
- Spread 5C Mainline Hydrotest (SD020)

Based on the analysis provided in Appendix C, Infiltration is the least degrading, prudent, and feasible alternative for the following Discharge IDs as it results in the least additional disturbance to vegetation and land use, minimizes air emissions, and minimizes impacts to local roads and traffic for the following Discharge IDs:

- Spread 2C Mainline Hydrotest (LA009)
- Spread 2D Mainline Hydrotest (LA009)
- Spread 2E Mainline Hydrotest (LA010)

## **7.0 COMPARISON OF EXISTING WATER QUALITY AND ANTICIPATED WATER QUALITY**

### **7.1 EXISTING WATER QUALITY**

Existing water quality was determined using MPCA-approved monitoring data (see Appendix D), in accordance with Minnesota Rules part 7050.0260, subpart 1A. Enbridge characterized existing water quality using the central tendency, more specifically the 95% upper confidence limit<sup>8</sup> (“UCL”) of that central tendency. Enbridge used this approach because the 95% UCL is a method previously used by the MPCA to characterize high quality waters, but also recognizes that alternate approaches could be used in order to take into account the variability of flow rates and seasonal variability factors.

The MPCA approved monitoring data is not available for 4 of the 16 receiving waterbodies (Chub Lake, Clear [Eagle] Lake, Long Lake, and Island Lake). For these waters, Enbridge has assumed that if the waterbody does not have a relevant impairment according to the MPCA's Final 2018 Impaired Waters List, then it is, on average, currently achieving the applicable TSS standard (see Table 7.1-1).

Existing TSS concentrations in the receiving waterbodies, characterized as the 95% UCL of the monitoring data, are listed on Table 7.1-1. To provide the information required by Minnesota Rules part 7050.0280 subpart 2(C)(3)(b), Table 7.1-1 also compares the anticipated TSS concentrations to the existing water quality. It should be noted that while the TSS water quality standard may be 100 milligrams per liter (“mg/L”) or 65 mg/L, depending on the region, Minn. R. 7053.0225 includes a state TSS discharge requirement limitation of 30 mg/L.

Aquatic invasive species are another component of existing water quality. Aquatic invasive species are present in three receiving waterbodies as identified in Attachment I of the Individual Permit Supplement.

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<sup>8</sup> Confidence limits are indicative of the accuracy of the mean. In statistics, a confidence interval is a type of interval estimate, computed from the statistics of the observed data, that might contain the true value of an unknown population parameter. If repeated samples were taken and the 95% confidence interval was computed for each sample, 95% of the intervals would contain the population mean. A 95% confidence interval has a 0.95 probability of containing the population mean. 95% of the population distribution is contained in the confidence interval.

**Table 7.1-1**  
**Existing TSS Concentrations: Hydrostatic Test Discharge Receiving Waterbodies by River Nutrient Region**

River Nutrient Region	RNR TSS Standards (mg/l)	Approximate Milepost	Receiving Water (WID) - Hydrostatic Test Description	Existing TSS (95% UCL) (mg/l)	Existing Use Attained? (High quality for TSS) <sup>f</sup>	Anticipated Discharge TSS (mg/l)
Red River (Headwaters to Border)	100	801.8	Red River (09020311-560) - Mainline Hydrostatic Test (SD001) <sup>a</sup>	543.4	No	≤ 30 mg/l or ≤ Pre-Test Sample (whichever is less)
South	65	828.6	Tamarac River (09020311-503) - Mainline Hydrostatic Test (SD002) <sup>b</sup>	54.5	Yes	≤ 30 mg/l or ≤ Pre-Test Sample (whichever is less)
		836.0	Middle River (09020309-540) - Mainline Hydrostatic Test – Contingency (SD003) <sup>c</sup>	230	No	≤ 30 mg/l or ≤ Pre-Test Sample (whichever is less)
Central	30	864.3	Red Lake River (09020303-513) - Mainline Hydrostatic Test (SD004)	33.6	No	≤ 30 mg/l or ≤ Pre-Test Sample (whichever is less)
		875.4	Clearwater River (09020305-648) - Mainline Hydrostatic Test (SD005)	114.5	No	≤ 30 mg/l or ≤ Pre-Test Sample (whichever is less)
		904	Lost River (09020305-512) - Mainline Hydrostatic Test – Contingency (SD006)	60.8	No	≤ 30 mg/l or ≤ Pre-Test Sample (whichever is less)
		985.3	Shell River (07010106-679) - Mainline Hydrostatic Test (SD010)	12.3	Yes	≤ 30 mg/l or ≤ Pre-Test Sample (whichever is less)
North	15	922.3	Clearwater River (09020305-517) - Mainline Hydrostatic Test (SD007) <sup>a</sup>	21.7	No	≤ 15 mg/l or ≤ Pre-Test Sample (whichever is less)
		961.7	Island Lake (Lake ID: 29025400) - Mainline Hydrostatic Test - Contingency (SD009)	Assume 15	Assume Yes	≤ 15 mg/l or ≤ Pre-Test Sample (whichever is less)
		993.3	Crow Wing River (07010106-516) - Mainline Hydrostatic Test - Contingency (SD011)	7.7 16.4	Upstream – Yes Downstream - No	≤ 15 mg/l or ≤ Pre-Test Sample (whichever is less)
		1013.4	Clear (Eagle) Lake (Lake ID: 29025600-201) - Mainline Hydrostatic Test - Contingency (SD012)	Assume 15	Assume Yes	≤ 15 mg/l or ≤ Pre-Test Sample (whichever is less)
		1017.3	Pine River (07010105-669) - Mainline Hydrostatic Test (SD013/SD014)	13.6	Yes	≤ 15 mg/l or ≤ Pre-Test Sample (whichever is less)
		1066.4	Willow River (07010103-748) - Mainline Hydrostatic Test - Contingency (SD015)	20.6	No	≤ 15 mg/l or ≤ Pre-Test Sample (whichever is less)
		1069.7	Mississippi River (07010103-708) - Mainline Hydrostatic Test (SD017) <sup>d,e</sup>	40.7	No	≤ 15 mg/l or ≤ Seasonal Baseline or ≤ Pre-Test Sample (whichever is less)
		1085.8	East Savanna River (04010201-561) - Mainline Hydrostatic Test (SD018)	11.2	Yes	≤ 15 mg/l or ≤ Pre-Test Sample (whichever is less)
		1120.3	Chub Lake - Mainline Hydrostatic Test (SD020)	Assume 15	Assume Yes	≤ 15 mg/l or ≤ Pre-Test Sample (whichever is less)

Table 7.1-1 Existing TSS Concentrations: Hydrostatic Test Discharge Receiving Waterbodies by River Nutrient Region						
River Nutrient Region	RNR TSS Standards (mg/l)	Approximate Milepost	Receiving Water (WID) - Hydrostatic Test Description	Existing TSS (95% UCL) (mg/l)	Existing Use Attained? (High quality for TSS) <sup>f</sup>	Anticipated Discharge TSS (mg/l)
<p><i>Receiving waters in italics would only be used as a contingency should primary sources and associated receiving waters be unavailable.</i></p> <p><sup>a</sup> Impaired for Turbidity</p> <p><sup>b</sup> Impaired for Fish/Macroinvertebrates</p> <p><sup>c</sup> Impaired for Dissolved Oxygen/Macroinvertebrates/Turbidity</p> <p><sup>d</sup> ORVW</p> <p><sup>e</sup> Impaired for TSS</p> <p><sup>f</sup> Evaluation is based on comparison with the 95% UCL. Evaluation may differ if an alternate method of assessing existing water quality is used.</p> <p>mg/l = milligrams per liter.</p>						

## 7.2 ANTICIPATED WATER QUALITY

Enbridge would determine the baseline TSS of each receiving water by sampling shortly before the planned discharge and implement BMPs and treatment such that the TSS of the discharge is no higher than the measured baseline value, the applicable TSS standard, or the effluent limit in the permit, whichever is lower.

However, discharges may result in minor TSS loading associated with the physical return of the test water to the receiving water. This potential loading, which would be minimized by use of BMPs as described in Section 6.2.3, is not quantifiable.

In addition, the discharge would meet the narrative nuisance standard for color as described below. In all instances, any minor degradation is expected to be temporary. Mainline hydrotest water discharges are expected to last 1 to 5 days. Discharges would be monitored and adjusted as necessary to avoid scouring, erosion, or sediment transport from the discharge location. Visual observations would be performed for all hydrostatic test discharge events (refer to Section 4.0 of the Individual Permit Supplement for monitoring documentation procedures).

Per guidance received from the MPCA on September 10, 2018, the narrative water quality standard does not define a quantifiable threshold at which a discharge to a surface water results in a material discoloration. MPCA staff recommend presuming that any discharge of hydrostatic test waters that results in a discernible change to the existing/ambient color of a receiving water would constitute material discoloration and referred to guidance in Sections 6.4, 10.2, and 15.2 of the Construction Stormwater General Permit (MNR100001) issued August 1, 2018. Enbridge would utilize a filtration system with the option to activate a carbon pod to remove color nuisance concerns (refer to Section 3.1 of the Individual Permit Supplement for a detailed description of BMPs proposed for mainline hydrostatic discharges).

Discharges to waters impaired for TSS/turbidity, fish, or macroinvertebrates would not contribute to the impairment. Enbridge is committing to ensure this by:

- complying with the RNR TSS standard, the pre-test sample concentration, the TSS discharge limitation of 30 mg/L from Minn. R. 7053.0225, or an effluent limit in the permit (whichever is less [refer to Table 7.1-1]);
- complying with the narrative color standard as described above; and
- monitoring the discharge rate to ensure turbid conditions are not increased and erosion and scour do not occur.

Discharge to the Mississippi River, which is a restricted ORVW, would be managed to maintain and protect the exceptional characteristics for which the Swan River to Sandy River reach of the Mississippi River was designated. Existing water quality data was obtained from the MPCA on September 3, 2018. Data collected between 1996 and 2017 is presented in Appendix D. The minimum, maximum, and 95% UCL values are presented in Table 7.2-1.



Table 7.2-1 Existing TSS Concentrations for the Mississippi River (07010103-708)											
Waterbody/WID/Quarter	TSS (mg/l)										
	2008	2009	2010	2013	2014	2015	2016	2017	Existing TSS (95% UCL)	Min	Max
Mississippi River/07010103-708											
Qtr1 Average	-	24.0	-	-	-				40.7	4.0	52.0
Qtr2 Average	22.1	16.8	-	29.3	32.0						
Qtr3 Average	13.0	14.2	-	29.9	21.0						
Qtr4 Average	7.0	-	-	-	-						

In addition to consideration of the data in Appendix D and Table 7.2-1, Enbridge proposes to establish a seasonal baseline prior to the commencement of hydrotest discharge activities. Enbridge would ensure the protection and preservation of the existing water quality and special characteristics by:

- complying with the RNR TSS standard of 15 mg/l, pre-test sample concentration, or the seasonal baseline concentration (whichever is less [refer to Table 7.2-1]);
- complying with the narrative color standard as described above; and
- monitoring the discharge rate to ensure turbid conditions are not increased and erosion and scour do not occur.

Per guidance provided by the MDNR on January 18, 2019, hydrostatic test water sourced from infested waters must be discharged back to the same source water or infiltrated at least 300 feet from another waterbody and there cannot be a direct connection to any other waterbody. Attachment D identifies five source waters with known aquatic invasive species; the hydrotest discharge associated with three of those sources would go back to the source water (Red River, Crow Wing River [contingency], and Chub Lake). Discharge associated with the other infested sources would be infiltrated at locations that conform with the MDNR guidance, as shown in the Infiltration Plan (see Attachment H of the Individual Permit Supplement). Long Lake is also an infested water that has been identified as a contingency source to support HDD hydrotesting; however, the exact location of discharge has not been identified. Enbridge would commit to MDNR guidance to locate the Long Lake discharge at least 300 feet from any waterbody if this contingency source is required.

## 8.0 ANTIDEGRADATION ASSESSMENT SUMMARY

### 8.1 EXISTING USES WOULD BE MAINTAINED AND PROTECTED

Minnesota Rules, part 7050.0255, subpart 15, defines “existing uses” as “those uses actually attained in the surface water on or after November 28, 1975.” Existing uses identify uses that have actually occurred in or on the waterbody, regardless of whether they are designated, as well as the corresponding water quality that has allowed the uses to occur.

The POCs for this antidegradation assessment, TSS and color, are associated with Class 2 uses, which are aquatic life and recreation. Receiving waters which currently attain the TSS standard associated with Class 2 uses are noted on Table 7.1-1. For these waters, the existing use would be maintained and protected because the discharge TSS concentration would be no higher than the baseline TSS concentration, and minor temporary loading of TSS due to the physical return of the water would be avoided and minimized with BMPs. Color is a numeric standard only for Class 2A uses, and none of the receiving waters are designated as Class 2A waters. Existing Class 2 uses protected by the narrative color standard would be maintained and protected because the discharge would meet the narrative nuisance standard for color.

## **8.2 THE HYDROSTATIC TEST DISCHARGES WOULD NOT PERMANENTLY PRECLUDE ATTAINMENT OF WATER QUALITY STANDARDS**

Minnesota Rules, part 7050.0265, subpart 4, prohibits the MPCA commissioner from approving activities that would “permanently preclude attainment of water quality standards”. Enbridge’s proposed discharges would not permanently preclude attainment of water quality standards in the receiving and downstream waters because the discharge would be temporary and limited.

## **8.3 THE PROJECT WOULD MINIMIZE DEGRADATION OF HIGH-QUALITY WATERS**

Minnesota Rules, part 7050.0255, subpart 21 defines a water body as “high quality”<sup>9</sup> if it “exceeds, on a parameter-by parameter basis, levels necessary to support the protection and propagation of aquatic life and recreation in and on the water.” Several of the receiving waters are known or assumed to be high quality for TSS, as shown in Table 7.1-1.

The term “degradation” is defined as a “measurable change to existing water quality made or induced by human activity resulting in diminished chemical, physical, biological, or radiological qualities of surface water” (Minnesota Rules, part 7050.0255, subpart 11). In turn, “measurable change” is defined as “the practical ability to detect a variation in water quality, taking into account limitations in analytical technique and sampling variability” (Minnesota Rules, part 7050.0255, subpart 24).

The Project is anticipated to result in temporary degradation of several high quality waters, as shown in Table 7.1-1.

Antidegradation procedures require “an analysis of alternatives that avoid net increases in loading or other causes of degradation through prudent and feasible prevention, treatment, or loading offsets” (emphasis added). Minnesota Rules, part 7050.0280, subpart 2(A). When there are no prudent and feasible alternatives to avoid net increases in loading, an analysis of prudent

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<sup>9</sup> The definition of water “of high quality” only applies to Class 2 water quality standards. Minn. R., part 7050.0255, subpart 21. The receiving and downstream waters of the Project all qualify as “high quality water” for one or more of the parameters. The only way the Project could eliminate degradation of these waters would be to not discharge any water at all. In order to not discharge any water, Enbridge would have to use imprudent and infeasible testing fluids, such as air or nitrogen that are inconsistent with federal regulations for petroleum pipelines. (49 CFR part 195.306).

and feasible alternatives to minimize degradation is required (Minnesota Rules, part 7050.0280 subpart [C][1]), as well as identification of the least degrading prudent and feasible alternatives. As explained in Section 6.0 and detailed in Appendix C, Enbridge has thoroughly analyzed alternatives to avoid or minimize degradation of high-quality waters. As a result of this process, Enbridge determined that although there are no prudent and feasible alternatives to completely avoid degradation of all high-quality waters, there are prudent and feasible measures available to minimize degradation, as summarized in Section 6.3. By implementing these prevention and treatment alternatives, Enbridge would minimize degradation of high-quality waters.

## **8.4 THE PROJECT WOULD RESULT IN IMPORTANT SOCIAL AND ECONOMIC DEVELOPMENT**

Appendix B provides an overview of the MPUC CN and Route Permit proceedings, the EIS, and Findings and Conclusions from the September 5, 2018 MPUC Order Granting a CN for the Project. This document highlights the findings and conclusions which describes the important economic and social changes resulting from the Project.

## **8.5 OUTSTANDING RESOURCE VALUE WATERS WOULD BE PROTECTED**

There are no prohibited ORVWs downstream of the Project.

The Project would discharge to a reach (Swan River to Sandy River) of the Mississippi River that is a restricted ORVW. Minnesota Rules, part 7050.0265 subpart 6, state that discharge to a restricted ORVW must be controlled as necessary to preserve the existing water quality as necessary to maintain and protect the exceptional characteristics for which the restricted ORVW was designated. The SONAR accompanying the rule which designated this reach of the Mississippi River a restricted ORVW states that the river was so designated because it "...possesses outstanding and unique natural, scientific, historical recreational and cultural values..." (SONAR at p 18). The SONAR also references the purpose and goals of the Wild and Scenic Rivers Act, which focuses on maintaining free-flowing conditions. However, the SONAR does not specify the water quality associated with the river's exceptional characteristics.

The reach of the Mississippi River that would receive the discharge is listed as impaired for TSS, and MPCA monitoring data show the 95% UCL of TSS is approximately 40 mg/l. Enbridge would control the discharge to the Mississippi River such that it meets the applicable TSS/turbidity standard, which is 15 mg/l, the pre-test sample concentration, or the seasonal baseline concentration (whichever is less [refer to Table 7.2-1]) using the measures outlined in Section 7.2. This reduction in TSS loading would protect the exceptional characteristics for which this reach of the Mississippi River was designated a restricted ORVW.

## **8.6 WATERS WOULD BE PROTECTED FROM THERMAL DISCHARGES**

Thermal discharges are regulated by Minnesota Rules, part 7050.0265, subpart 8, which states that "when there is potential for water quality impairment associated with thermal discharges, the commissioner's allowance for existing water quality degradation shall be consistent with

Section 316 of the CWA,” which states that effluent temperature must be controlled to “assure the protection and propagation of a balanced, indigenous population of shellfish, fish, and wildlife in and on the body of water into which the discharge is to be made” (33 United States Code section 1326).

The Class 2B and 2Bd standard for temperature is 5 degrees Fahrenheit (“°F”) above natural in streams and 3°F above natural lakes. The water used for hydrostatic testing may be slightly warmed or cooled as a result of passing through the pipe, however because the discharges are temporary and at a controlled rate they present no reasonable potential for water quality impairment associated with thermal discharge. Therefore, there would be no degradation of receiving waters due to temperature.

## **Appendix A**

### **Hydrotest Discharge Water Quality Testing**

Enbridge conducted water quality testing on discharges from hydrotests at its Superior Terminal and of Segment 18 in Wisconsin. These hydrotests were conducted using procedures comparable to those that would be used during hydrotesting for L3R: the interior of the pipe was cleaned prior to the test and the debris was collected and properly disposed of as described in Section 2.0 of the Individual Permit Supplement. Results, shown in Table A-1, indicate that the concentrations of volatile and semivolatile compounds in the discharge were below laboratory detection or quantification limits. Results from testing at the Superior Terminal, where “before” and “after” testing was conducted on the water used for the hydrotesting, indicate that the hydrotesting process increased the pH of the water from 7.17 to 7.62 and increased the TSS from non-detect to 2.4 mg/L.

Table A-1 Hydrotest Discharge Water Quality Results					
Location		Superior Terminal		Segment 18	
		Superior Terminal hydrotest source water <sup>a</sup>	Discharge from hydrotest of Low Stress Tank <sup>b</sup>	Discharge from hydrotest of pipe segment T13/14 to M213 <sup>b</sup>	Hydrotest discharge water <sup>c</sup>
Date		11/16/2018	11/27/2018	12/10/2018	1/11/2018
Parameter	Units				
<b>General Parameters</b>					
Biochemical Oxygen Demand (5-day)	mg/l	--	< 2.0 *	< 2.0	7.8
Nitrogen, ammonia, as N	mg/l	--	< 0.036	<b>0.043 j</b>	<b>0.35</b>
Oil and Grease	mg/l	< 0.77	< 0.78	< 0.74	< 5.3
pH, field	pH	7.17	7.62	8.54	6.8
Phosphorus, total, as P	mg/l	--	0.43	0.39	< 0.050
Solids, total suspended	mg/l	< 1.0	2.4	6.8	< 10.0
<b>Semivolatile Organic Compounds</b>					
1-Methylnaphthalene	ug/l	< 0.0079	--	--	--
2-Methylnaphthalene	ug/l	< 0.011	--	--	--
Acenaphthene	ug/l	< 0.013	--	--	< 0.046
Acenaphthylene	ug/l	< 0.0050	--	--	< 0.046
Anthracene	ug/l	< 0.0053	--	--	< 0.046
Benz(a)anthracene	ug/l	< 0.0093	< 0.0093	< 0.0093	< 0.046
Benzo(a)pyrene	ug/l	< 0.0081	< 0.0081	0.013 jb	< 0.046
Benzo(b)fluoranthene	ug/l	< 0.0081	< 0.0081	< 0.0081	< 0.046
Benzo(g,h,i)perylene	ug/l	< 0.0076	< 0.0076	0.011 jb	< 0.046
Benzo(k)fluoranthene	ug/l	< 0.0057	< 0.0057	< 0.0057	< 0.046
Chrysene	ug/l	< 0.0033	< 0.0033	< 0.0033	< 0.046
Dibenz(a,h)anthracene	ug/l	< 0.013	< 0.013	0.015 jb	< 0.046
Fluoranthene	ug/l	0.024 j	0.015 j	0.017 j	< 0.046
Fluorene	ug/l	< 0.010	--	--	< 0.046
Indeno(1,2,3-cd)pyrene)	ug/l	< 0.012	< 0.012	< 0.012	< 0.046
Naphthalene	ug/l	< 0.023	--	--	< 0.046
Phenanthrene	ug/l	0.060	0.039 j	0.041	< 0.046
Pyrene	ug/l	< 0.0059	< 0.0059	< 0.0059	< 0.046
<b>Volatile Organic Compounds</b>					
Benzene	ug/l	< 0.42	< 0.42	< 0.42	< 1.0
Ethyl benzene	ug/l	< 0.29	< 0.29	< 0.29	< 1.0
Toluene	ug/l	< 0.32	< 0.32	< 0.32	< 1.0
Xylene, m & p	ug/l	< 0.53	< 0.53	< 0.53	--
Xylene, o	ug/l	< 0.19	< 0.19	0.22 jb	--
Xylene, total	ug/l	< 0.74	< 0.74	< 0.74	< 1.0
Total Petroleum Hydrocarbons					
Diesel Range Organics, C10-28	mg/l	--	0.053 j	0.13	--

**Table A-1**  
**Hydrotest Discharge Water Quality Results**

Location	Superior Terminal		Segment 18	
	Superior Terminal hydrotest source water <sup>a</sup>	Discharge from hydrotest of Low Stress Tank <sup>b</sup>	Discharge from hydrotest of pipe segment T13/14 to M213 <sup>b</sup>	Hydrotest discharge water <sup>c</sup>
Date	11/16/2018	11/27/2018	12/10/2018	1/11/2018

<sup>a</sup> Sample ML H#C1N collected from hydrotest source water prior to entering Enbridge fire suppression hydrant system

<sup>b</sup> Hydrotests on new tank and new pipe. ProAct filtration system not used for these discharges

<sup>c</sup> Hydrotest on new pipe. Sample collected downstream of ProAct filtration system

**Data Qualifiers**

-- Not analyzed/Not available

\* Estimated value, QA/QC criteria not met.

b Potential false positive value based on blank data validation procedures. Concentrations identified as potential false positive are excluded from calculations.

j Estimated detected value. The reported value is less than the stated laboratory quantitation limit but greater than the laboratory method detection limit.



## **Appendix B**

**Overview of the MPUC CN and Route Permit proceedings,  
the EIS, and Findings and Conclusions from the  
September 5, 2018 MPUC Order Granting a Certificate of  
Need for the Project**

## **APPENDIX B**

### **Minnesota Public Utilities Commission Certificate of Need and Route Permit Proceedings, Environmental Impact Statement and Findings and Conclusions from September 5, 2018 Order Granting a Certificate of Need for the Project**

On April 24, 2015, Enbridge applied to the Minnesota Public Utilities Commission (“MPUC”) for a Certificate of Need (“CN”) and a Route Permit (“RP”) for the Line 3 Replacement Project (“L3R” or “Project”). The MPUC asked the Minnesota Department of Commerce Energy Environmental Review and Analysis (“DOC-EERA”) staff to prepare an Environmental Impact Statement (“EIS”) for the Project with the assistance of the Minnesota Department of Natural Resources and the Minnesota Pollution Control Agency in accordance with Minnesota Rules, Chapter 4410. DOC-EERA issued a draft EIS on May 15, 2017 and a final EIS (“FEIS”) on August 17, 2017. On December 7, 2017, the MPUC deemed the FEIS inadequate solely on the basis of four specific and narrow issues, and a revised FEIS (“Revised FEIS”) was published on February 12, 2018. On May 1, 2018, the MPUC issued a written order finding the Revised FEIS adequate.

At the conclusion of contested case proceedings on the MPUC Applications presided over by an administrative law judge (“ALJ”), which included sixteen (16) public hearings resulting in over 2,600 pages of public hearing transcripts, the MPUC heard oral arguments and deliberated on the merits of the MPUC Applications on June 18, 19, 26, 27, and 28.

On June 28, 2018 the MPUC granted a Certificate of Need for the Project subject to Certificate of Need modifications. On September 5, 2018, the MPUC issued a written Order granting the Certificate of Need as modified and requiring filings (“MPUC CN Order”). On June 28, 2018, the MPUC also granted a Route Permit for Enbridge’s Preferred Project Route, including Route Segment Alternative (“RSA”)-05; RSA-22 with permission of the Fond du Lac Band of Lake Superior Chippewa (“FdL”) or RSA-21 in the event FdL does not grant permission for RSA-22. On August 31, 2018, Enbridge and FdL came to an agreement to proceed with the RSA-22 route. The MPUC issued a written Order on October 26, 2018 granting Enbridge’s Route Permit identifying the Preferred Project Route inclusive of RSA-05 and RSA-22 as the MPUC Designated Route (hereafter referred to as the “Designated Route”). The Designated Route approved by the MPUC is a 750-foot-wide corridor, which allows for minor adjustments to the pipeline alignment and permanent right-of-way within the Designated Route.

The MPUC CN Order considered factors set forth in statute (Minn. Stat., Sect. 216B.243, subd. 3) and rule (Minn. Rules, Chapter 7853) to evaluate the need for the Project. In particular, Minn. Rules, part 7853.0130 directs the MPUC to issue a CN for a proposed large petroleum pipeline such as the Project when the applicant satisfies the following four factors: (1) the probable result of denial would adversely affect the future adequacy, reliability, or efficiency of energy supply to the applicant, to the applicant’s customers, or to the people of Minnesota and neighboring states, considering five enumerated sub-factors; (2) a more reasonable and prudent alternative to the proposed facility has not been demonstrated by a preponderance of the evidence on the record by parties or persons other than the applicant, considering four enumerated sub-factors; (3) the consequences to society of granting the CN are more favorable than the consequences of denying the certificate, considering four enumerated sub-factors; and (4) it has not been demonstrated on the record that the design, construction, or operation of the proposed facility will fail to comply with those relevant policies, rules, and regulations of other state and federal agencies and local governments.

The following paragraphs highlight findings and conclusions from the MPUC CN Order [including page citations] that describe those “**important economic or social changes**” (Minn. Rules, part 7050.0265, subp. 5B) resulting from the Project that the MPUC relied on in part in approving the CN for the Project, contingent on suitable modifications including: (i) a parental guaranty for environmental damages; (ii) implementation of Enbridge’s Landowner Choice Program for existing Line 3; (iii) the creation and funding of a trust fund for decommissioning of the Project, including the costs of removal of the Project; (iv) implementation of a neutral footprint program that provides for Enbridge to acquire renewable energy credits to offset the incremental increase in nonrenewable energy consumed by the Project and carries out a tree replacement program; and (v) acquiring and maintaining General Liability and Environmental Impairment Liability Insurance:

- ***The Future Adequacy, Reliability, or Efficiency of Energy Supply***

- \* The forecasts in the MPUC record, together with the evidence of significant, persistent apportionment, show that denial of the Project would adversely impact the adequacy, reliability, and efficiency of delivery of crude oil to all of Enbridge’s customers by continuing and possibly exacerbating the significant levels of apportionment of heavy crude oil on Enbridge’s Mainline System. According to the ALJ, “without any changes to the Mainline System, ... the existing facilities will...not be able to meet future demand.” Even if Enbridge’s Minnesota and regional refinery customers are able, despite apportionment, to obtain adequate supplies of crude oil through other means, such as rail and truck, those means are more costly and uncertain. (p.15).
- \* The MPUC agrees with the ALJ that Enbridge has shown that current facilities are insufficient to meet future demand in a reliable or efficient manner. (p. 16).
- \* The MPUC agrees with the ALJ that the Project would make efficient use of resources by reducing required maintenance and running mixed service by carrying both light and heavy crude oil. (p.17).
- \* Increasing the pipeline diameter as proposed from 34 inches to 36 inches would result in 22 percent greater energy savings and reduce greenhouse gas emissions from the Project by 33 percent. The MPUC finds that these concrete energy savings outweigh the possible risk that a slightly higher volume of oil could spill from a 36-inch pipeline. (p. 18).

- ***Reasonable and Prudent Alternatives***

- \* The MPUC considered each alternative to the Project presented by a party or person other than Enbridge and finds that none of the proposed alternatives is more reasonable and prudent than the Project. (p. 19):
  - Based on the number of trucks and trains needed, the cost, and the increased risk of accidents and spills, the MPUC agrees with the ALJ that rail and truck are not reasonable or prudent alternatives to the Project. (p. 20).
  - SA-04 was proposed during the EIS scoping process “as an alternative that would completely avoid northern and central Minnesota, and would interconnect with the

regional pipeline system closer to the major refineries in central Illinois.” The MPUC agrees with the ALJ’s assessment that SA-04 lacks the efficiency benefits of the Project because it is separate from the Mainline System, and would not reduce apportionment, make use of existing infrastructure, provide system benefits to the Mainline System, or directly serve Minnesota or Wisconsin refineries. Therefore, SA-04 would not directly benefit Minnesotans, but it would be twice as long as the Project, significantly more expensive, have twice the greenhouse gas emissions to transport the same amount of crude oil, and would require permitting in three other states. For these reasons, the MPUC agrees with the ALJ’s assessment that SA-04 would not be a more reasonable and prudent alternative to the Project. (p. 21).

- The Minnesota Department of Commerce Division of Energy Resources (“DER”) proposed Keystone XL (“Keystone”) as an alternative to the Project. Keystone is a pipeline in development by TransCanada Corporation that would transport approximately 800 thousand barrels per day (“kbpd”) of crude oil from Alberta to Cushing, Oklahoma or Wood River, Illinois via Montana, South Dakota, Nebraska, and Kansas. The ALJ found that Keystone would not directly serve Minnesota or Wisconsin refineries nor refineries in the broader 15-state Midwest Region of the Petroleum Administration for Defense Districts or PADD II. The ALJ also found that shippers that use the Mainline System and do not execute long-term contracts for Keystone would pay significantly more per barrel to ship on Keystone than they would for the Project. And though Keystone would not have environmental or socioeconomic impacts in Minnesota, it would have impacts elsewhere in the Midwest. For these reasons, the MPUC agrees with the ALJ’s assessment that Keystone would not be a more reasonable and prudent alternative to the Project. (p. 21).
  - DER also proposed construction of a new 760 kbpd or 370 kbpd pipeline along the existing right-of-way of the Spectra Energy pipeline (“Spectra”), which was recently purchased by Enbridge. The ALJ found that construction costs for the larger Spectra pipeline would be over \$4 billion higher than for the Project and construction costs for the smaller Spectra pipeline would be over \$1 billion higher than for the Project. The Spectra alternative would not serve Minnesota refiners and would cause underutilization of the Mainline System. For these reasons, the MPUC agreed with the ALJ that neither Spectra alternative would be a more reasonable and prudent alternative to the Project. (p. 22).
- ***Consequences to Society of Granting vs. Denying the Certificate of Need for the Project.***
    - \* In accordance with rule, the MPUC analyzed the consequences of the Project as proposed by Enbridge and modified by the MPUC and compared those to the consequences of the continued use of existing Line 3, which would result from denial of the CN. In doing so, the MPUC finds that the consequences of granting the CN with suitable modifications enumerated in the MPUC CN Order are more favorable than the consequences of denying the CN:
      - ***Overall State Energy Needs***

The MPUC agrees with the ALJ that the Project would result in a net benefit to overall state energy needs by reducing apportionment on the Mainline System and increasing access for Minnesota refiners to different types of crude oil. Minnesota is one of 19 states that does not produce any oil and therefore relies exclusively on imports to meet its crude oil and refined product needs. In contrast, denying the CN would exacerbate apportionment of heavy crude oil on the Mainline System, potentially forcing shippers and refiners to transport more crude oil by rail, which is less reliable and has greater environmental risks. The extensive maintenance required to keep existing Line 3 in operation would require temporary shutdowns, decreasing the reliability and efficiency of crude oil supply to Minnesota refiners. Continuing to operate existing Line 3 also increases the risk of an accidental release. (p. 26).

- ***Effect on the Natural and Socioeconomic Environments***

The MPUC finds that either granting or denying the CN would have significant consequences for the natural and socioeconomic environments of northern Minnesota.

(i) *Construction Impacts.* Denial of the certificate would require approximately 6,250 integrity digs over the next 15 years to maintain and replace the badly corroded existing Line 3 pipeline. Enbridge estimates that these integrity digs would impact approximately 270,000 acres of land in a manner comparable to new pipeline construction. While the opening of a new pipeline corridor [significantly reduced by the Enbridge-FdL agreement allowing the Project to be constructed through the FdL Reservation along an expanded right-of-way adjacent to the existing Enbridge pipelines] presents the risk of environmental impacts related to construction, continued operation of existing Line 3 presents similar impacts. Also, the MPUC finds that the permanent clearing of trees required in the Project right-of-way is mitigated somewhat by Enbridge's implementation of the required tree replacement program. (pp. 26-27).

(ii) *Risk of Accidental Release.* A new pipeline will be built with better materials such as thicker, stronger steel and superior coating, and better welding technology and engineering, and would be subject to more effective monitoring and testing. The increased capacity of the Project will also likely reduce the volume of oil shipped by rail, by as much as 510 kbpd, further reducing the risk of an accidental release. (pp. 27-28).

(iii) *Climate Change.* While the lifecycle Project greenhouse gas emissions are a significant consequence, they include emissions from ultimate consumption of the oil transported by the Project. These costs do not result directly from the Project, but instead result from the continued demand for crude oil to produce refined products used by consumers. The MPUC finds that the record evidence does not support a conclusion that denial of the certificate would likely significantly reduce crude oil demand. Instead, the evidence establishes that the most likely result would be increased transport by more dangerous means such as rail and continued use of the deteriorating existing Line 3. The MPUC will, however, mitigate climate change impacts by modifying the proposed Project to require Enbridge to purchase renewable energy credits to offset the incremental increase

in nonrenewable energy consumed by the Project, and to implement a tree replacement program (pp. 28-29).

(iv) *Impacts to Indigenous Populations.* While the MPUC recognizes the Project's significant impacts on indigenous populations as described in the revised FEIS, denial of the certificate would also have disproportionate adverse impacts on indigenous populations because it would result in continuing operation of the deteriorating existing Line 3 through the Leech Lake and FdL Reservations. Ultimately, granting the CN would avoid frequent, necessary repairs of existing Line 3 and allow the decommissioning of existing Line 3 through Reservation lands. (pp.29-30).

(v) *Socioeconomic Impacts.* The potential for positive economic impacts on the communities along the Project route is a major benefit of the Project, especially because these communities generally have a lower household income than the state median. The revised FEIS estimates that the Project will generate 4,200 construction jobs, while Enbridge estimates approximately 7,200 direct jobs would result. Due to Minnesota labor agreement requirements, at least 50 percent of those employed by the Project would come from local union halls. While the specific amount of tax benefits to communities along the Project route is less clear, the MPUC finds that these communities would realize minor to major tax benefits in the form of higher income and property tax revenue resulting from the Project. (pp. 30-31).

(vi) *Abandonment of Existing Line 3.* The MPUC finds that the consequences of granting the certificate are more favorable than the consequences of denying the certificate if the proposed Project is modified to include removal of existing Line 3 as provided in Enbridge's Landowner Choice Program. (p. 31).

- ***Inducing Future Development***

The jobs created by the Project have the potential to cause indirect and induced economic benefits in the communities along the Project route. For example, a construction worker who spends money on basic goods and services in the local community is causing indirect economic benefits, and a worker who is able to spend more on discretionary items, like entertainment, is causing induced economic benefits in the community. Enbridge presented evidence that the Project would create over 2,400 jobs indirectly and induce the creation of 3,800 jobs. Increased property tax payments to counties along the Project route have the potential to provide long-term support to local governments. (pp. 31-32).

- ***Socially Beneficial Uses of Output***

The MPUC agrees with the ALJ that the Project output, crude oil, is ultimately refined into numerous products that "are used to meet basic human needs, such as the production of food and the transportation of people and products." Minnesotans depend on a variety of petroleum products every day, including gasoline, tires, asphalt for roads, jet fuel, medical equipment and products, plastics, furniture, flooring, shingles, insulation, heating fuel, appliances, carpet and clothing. The MPUC acknowledges that the crude oil output from the Project is not used to protect or enhance environmental quality and that governments and

businesses, and citizens in Minnesota and around the world are making efforts to reduce fossil fuel consumption in order to mitigate climate change. But the MPUC finds that for this factor, the consequences of granting the CN are more favorable than the consequences of denial, because "...the fact remains that petroleum products derived from crude oil currently and into the foreseeable future have socially beneficial uses." (p. 32).

- ***Compliance with Existing Law and Policy***

- \* The MPUC agrees with the ALJ's finding that "there has been no evidence presented that the Project's design, construction, or operation will be in violation of any applicable laws, rules or regulations." (pp. 32-33).



**Appendix C**  
**Alternatives Assessment**



## Alternatives Assessment

Enbridge Energy, Limited Partnership • Line 3 Replacement Project

May 2019



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## **ACRONYMS AND ABBREVIATIONS**

Enbridge	Enbridge Energy, Limited Partnership
HDD	horizontal directional drill
L3R	Line 3 Replacement Project
MPCA	Minnesota Pollution Control Agency
NPDES	National Pollutant Discharge Elimination System
Project	Line 3 Replacement Project
SDS	State Disposal System

## INTRODUCTION

Enbridge Energy, Limited Partnership (“Enbridge”) has applied for an Individual National Pollutant Discharge Elimination System (“NPDES”) / State Disposal System (“SDS”) Individual Permit (“Individual Permit”) to discharge waters used to hydrostatically test the structural integrity of the Line 3 Replacement Project (“L3R” or “Project”) pipeline. These waters are referred to as “hydrotest water(s)”. Hydrotest water is produced either through testing segments of the pipeline used for horizontal directional drill (“HDD”) crossings or for large segments of the welded pipeline, referred to as “mainline hydrotests.”

Enbridge proposes to discharge hydrotest water from most mainline hydrotests back to the same surface water from which it was originally drawn. Minnesota Pollution Control Agency (“MPCA”) staff requested that Enbridge assess a range of alternates to avoid or minimize loading to surface waters. Enbridge assessed a range of alternatives, as described in Section 6.0 of the Antidegradation Assessment, and carried five alternatives forward for site-specific assessment at every proposed discharge location. The antidegradation assessment provides descriptions of each of these alternatives:

- Infiltration described in Section 6.1.2 of the NPDES/SDS antidegradation assessment.
- Trucking Water to Off-Site Disposal described in Section 6.1.3 of the NPDES/SDS antidegradation assessment.
- Spray Irrigation described in Section 6.1.4 of the NPDES/SDS antidegradation assessment.
- Water Reuse described in Section 6.2.2 of the NPDES/SDS antidegradation assessment.
- Discharge to Source Water with BMPs and Treatment described in Section 6.2.3 of the antidegradation assessment.

The NPDES/SDS antidegradation assessment also presents three criteria to evaluate whether alternates are prudent and feasible:

- **Technical Feasibility** – Technical constraints on implementation. For example, an infiltration site must be well-vegetated, with topography and soils that allow for infiltration.
- **Environmental Impacts** (other than to surface water quality) – Examples include air emissions caused by additional equipment use, additional land disturbance (i.e., clearing, grading), and consumptive use of appropriated water that could be returned to its source.
- **Impacts to Human Environment** – For example, wear and tear on highways from increased truck traffic, and additional duration of community disruption due to longer implementation timeframes.

This alternatives assessment describes potential implementation of each alternative at each location where Enbridge currently proposes discharging hydrotest water back to a surface water, and describes the technical feasibility and impacts associated with each alternative.

## **1.0 METHODS AND ASSUMPTIONS**

This alternatives analysis used site-specific information where possible and made assumptions based on best professional judgment. Methods and assumptions associated with each alternative are described below. Assumptions and calculations are intended to illustrate the potential impacts of each alternative. Actual impacts would depend of specifics of implementation.

Note that additional workspace requirements would require additional negotiations with landowners (adjacent to and/or off the right-of-way) and may require additional permits or permit amendments. Environmental surveys of potential workspace areas would be conducted to identify potential sensitive resources, and Enbridge would avoid sensitive resources when siting these areas.

## **2.1 GENERAL ASSUMPTIONS**

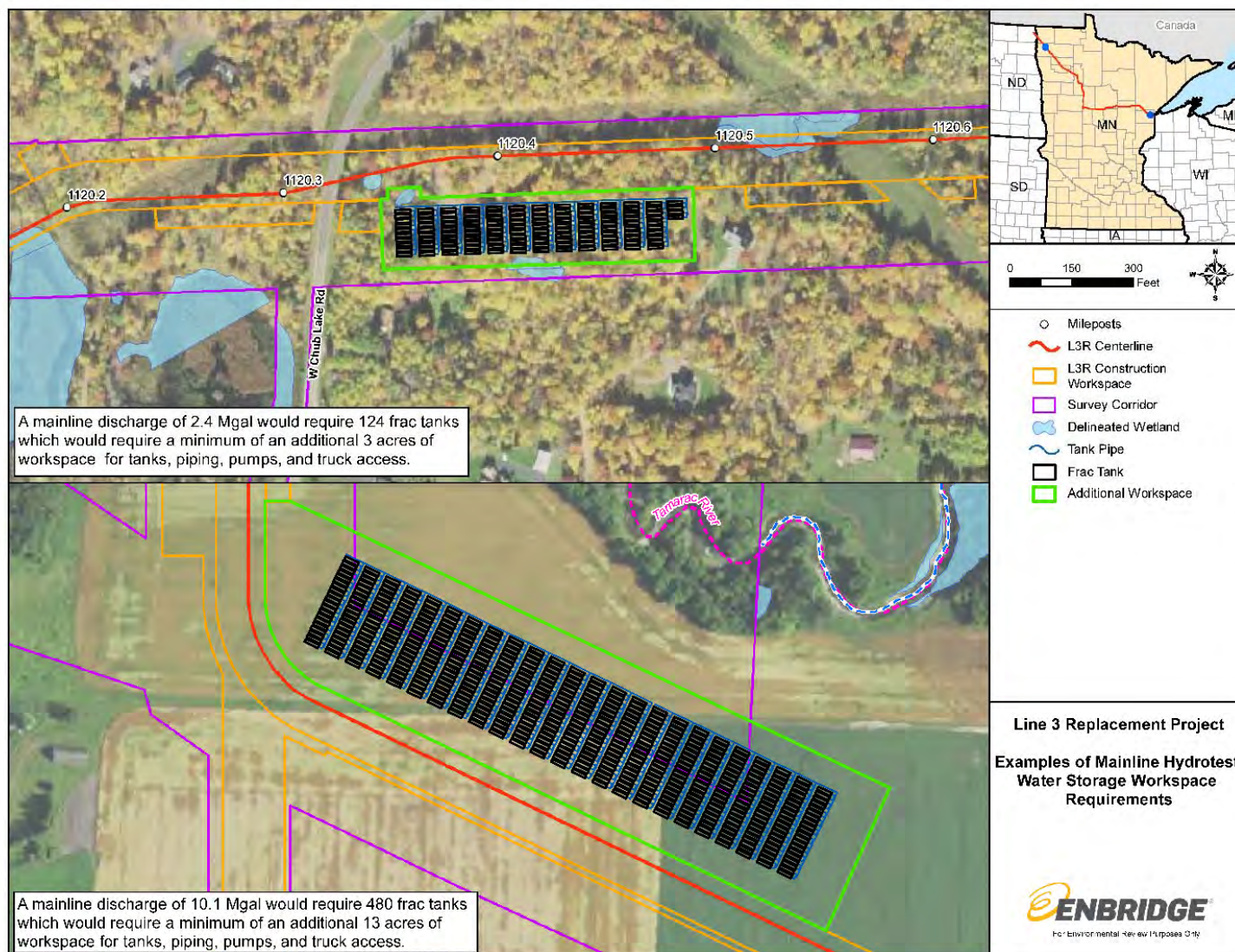
### **2.1.1 WATER STORAGE**

Water storage could be necessary for the infiltration, trucking water to off-site disposal, and spray irrigation alternatives. Assumptions and considerations associated with water storage include:

- Water would be stored in water containment tanks known as “frac tanks”. Each 45-foot by 8-foot frac tank holds 21,000 gallons.
- Enbridge did not identify the exact location of additional workspace; however, calculated the additional workspace requirements based on the volume of the test. One of the smaller mainline discharge of 2.4 million gallons (“Mgal”) would require 124 frac tanks, which would require a minimum of an additional 3 acres of workspace for tanks, piping, pumps, and truck access (refer to Figure 2.1.1-1). Whereas, the largest mainline discharge of 10.1 Mgal would require 480 frac tanks, which would require a minimum of an additional 13 acres of workspace for tanks, piping, pumps, and truck access (refer to Figure 2.1.1-1).
- For infiltration, water storage would not be needed if the infiltration duration is approximately the same as the time needed to discharge to surface water.



Figure 2.1.1-1 Examples of Mainline Hydrotest Water Storage Workspace Requirements



## **2.1.2 CONSUMPTIVE USE**

The infiltration, trucking water to off-site disposal, and spray irrigation alternatives would constitute consumptive use of the appropriated surface water, as defined in Minn. S. 103G.005 Subd. 8b. Minnesota Statutes impose limitations on consumptive use (Minn. S. section 103G.265) and encourage the treatment and reuse of water for non-consumptive uses (Minn. S. section 103G.261 subd. [e]). Consumptive use would be an environmental impact for the infiltration, trucking water to off-site disposal, and spray irrigation alternatives for every proposed surface water discharge in this alternatives analysis.

## **2.2 ALTERNATIVES TO AVOID LOADING**

### **2.2.1 INFILTRATION**

Enbridge conducted a screening analysis at the start and end mileposts of each mainline spread and in proximity to the HDD hydrotest locations to assess the potential for infiltration near each proposed discharge location. The methodology and results are presented in the Hydrotest Discharge Screening Analysis (see Attachment G of the Individual Permit Supplement).

### **2.2.2 TRUCKING WATER TO OFF-SITE DISPOSAL**

Trucking water off-site for each location included the following considerations and assumptions:

- Each truck can transport approximately 6,000 gallons of water.
- Wastewater treatment plant locations, and their capacity to accept clean water, are as shown in Table 6.1-1 of the NPDES/SDS Antidegradation Assessment.
- The time and mileage required to transport the total discharge volume assumed the treatment facility accepted the maximum possible volume every day, and the transport occurred 7 days a week.

### **2.2.3 SPRAY IRRIGATION**

Spray irrigation for each location included the following considerations and assumptions:

- The nearest irrigation location to each discharge location was identified by querying the Minnesota Well Index<sup>1</sup> to identify registered irrigation wells. Aerial imagery was then used to identify if a point irrigation system was being utilized at the irrigation well points.
- An irrigation rate of 9 gallons per minute per acre was assumed. This is the highest irrigation rate provided on the University of Minnesota Extension Irrigation management website.<sup>2</sup>
- The assumed irrigation area was 130 acres, which is typical for a midwestern center-pivot irrigation system.

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<sup>1</sup> <https://mnwellindex.web.health.state.mn.us/>

<sup>2</sup> University of Minnesota Extension Service. Irrigation Management Strategies. <https://extension.umn.edu/irrigation/irrigation-management-strategies#pumping-capacity-1703413>. Accessed April 30, 2019.



## **2.3 ALTERNATIVES TO MINIMIZE LOADING**

### **2.3.1 WATER REUSE**

The following considerations and assumptions associated with water reuse include:

- Water reuse is possible when two adjacent spreads are constructed and ready for back-to-back hydrostatic testing.
- The elevation between adjacent spreads must be considered to determine energy efficiency; greater elevation difference means greater energy output.
- This minimization alternative could be used in conjunction with any of the avoidance alternatives and with discharge back to surface water.

### **2.3.2 DISCHARGE TO SURFACE WATER WITH BMPS AND TREATMENT METHODS**

The following considerations and assumptions associated with the discharge back to surface water include:

- The baseline water quality of the hydrostatic test water will be tested for parameters of concern ("POCs") and after the test is completed, a water sample will be tested for the POCs, and the water will be run the water through a filtration system with turbidity monitoring and the option to activate or bypass a carbon pod as needed to remove color nuisance concerns to achieve the receiving-water-specific discharge permit requirements.
- Once the water has been appropriately treated, the discharge will be routed via a pipe to a splash pup or other energy dissipating device floating on the surface of the waterbody for scour prevention and to provide re-oxygenation. The rate of discharge will be monitored to achieve receiving-water-specific discharge permit requirements.

Proposed Hydrotest Segment (Discharge ID)	Start MP	End MP	Discharge Volume	Primary Source	MDNR Estimated Flow Rate	Secondary Source	MDNR Estimated Flow Rate
Spread 1A (SD001)	801.8	814.5	7.3 Mgal	Red River (MP 801.8)	Seasonally Variable: > 448,833 GPM	Tamarac River (MP 828.6)	Spring: 22,442 - 35,907 GPM; Summer: 898 - 2,244 GPM

Alternative	Technical Feasibility			Environmental and Human Environment Impacts		
	Site-Specific Description	Timing	Additional Equipment	Impacts to Roads / Traffic	Additional Land Disturbance	Air Emissions
<b>Infiltration</b>	See Attachment G of the Individual Permit Supplement for description of potential infiltration areas  Water would need to be pushed back to MP 801.8 after completion of hydrotest if not reused	Approximately 30 days at MP 801.8  Not feasible at MP 814.5	<ul style="list-style-type: none"> <li>Up to 347 tanks (21,000 gal/tank) and associated piping</li> <li>Approximately 1,070 feet of piping to infiltration area</li> <li>BMPs (see Section 3.2 of Supplement)</li> </ul>	Trucking associated with the transport of the frac tanks and equipment.	Up to approximately 10 acres for storage and infiltration	Minimal – associated with set-up of equipment, pumps, etc., and trucking required for transport of the frac tanks
<b>Trucking Water to Off-Site Disposal</b>	Grand Rapids WWTP	73 days to complete transport	347 tanks (21,000 gal/tank) and associated piping	<ul style="list-style-type: none"> <li>Trucking associated with the transport of the frac tanks and equipment.</li> <li>1,215 trucks for transport over 480 miles round-trip.</li> </ul>	Approximately 9 acres for storage	Emissions associated with over 583,342 miles of trucking over 73 days
<b>Spray Irrigation</b>	The Red River is listed as an infested water for zebra mussels, therefore this alternative was eliminated.					
<b>Discharge to Surface Water with BMPs and Treatment</b>	Appropriate from and discharge to Red River (currently proposed alternative)  Water would need to be pushed back to MP 801.8 after completion of hydrotest if not reused	3.4 days to discharge	BMPs (see Section 3.1 of Supplement)	None	No additional workspace required	Minimal – associated with set-up of equipment, pumps, etc.
<b>Reuse</b>	Reuse Spread 1A hydrotest water for subsequent hydrotest. Enbridge indicates that timing and elevation considerations make reuse of water from Spread 1A to Spread 1B less efficient. Discharge would either need to be pushed back to the Red River, or discharged via infiltration at end of Spread 1B (MP 848.2), trucking, or irrigation	Would require additional time	Would require air compressors or nitrogen pumps to push water through Spread 1B.	No additional impacts	Minimal additional workspace may be required to accommodate extra equipment	Minimal – associated with use of compressors or nitrogen pumps

Proposed Hydrotest Segment (Discharge ID)	Start MP	End MP	Discharge Volume	Primary Source	MDNR Estimated Flow Rate	Secondary Source	MDNR Estimated Flow Rate
Spread 1B (SD0002)	814.5	848.2	10.1 Mgal	Tamarac River (MP 828.4)	Spring: 22,442-35,907 GPM; Summer: 898-2,244 GPM	<ul style="list-style-type: none"> <li>Red River (MP 801.8)</li> <li>Middle River (MP 836.0)</li> </ul>	<ul style="list-style-type: none"> <li>Seasonally Variable: &gt; 448,833 GPM</li> <li>Spring: 44,883- 807,899 GPM; Summer: 898-11,221 GPM</li> </ul>

Alternative	Technical Feasibility			Environmental and Human Environment Impacts		
	Site-Specific Description	Timing	Additional Equipment	Impacts to Roads / Traffic	Additional Land Disturbance	Air Emissions
<b>Infiltration</b>	See Attachment G of the Individual Permit Supplement for a description of potential infiltration areas	Not feasible at MP 814.5  Approximately 5 days at MP 848.2	<ul style="list-style-type: none"> <li>Approximately 660 feet of piping to infiltration area</li> <li>BMPs (see Section 3.2 of Supplement)</li> </ul>	One highway would be crossed by piping to infiltration area.	Approximately 1 acre for infiltration	Minimal – associated with set-up of equipment, pumps, etc.
<b>Trucking Water to Off-Site Disposal</b>	Grand Rapids WWTP	102 days to complete transport	485 tanks (21,000 gal/tank) and associated piping	Trucking associated with the transport of the frac tanks and equipment.  1,698 trucks for transport over 400 miles round-trip	Approximately 13 acres for storage	Emissions associated with over 679,047 miles of trucking over 102 days
<b>Spray Irrigation</b>	17 miles to nearest potential irrigation system	6 days per 130 acres	<ul style="list-style-type: none"> <li>485 tanks (21,000 gal/tank)</li> <li>Would require trucking or piping water to nearest irrigation system</li> </ul>	Trucking associated with the transport of the frac tanks and equipment.  17 miles to nearest potential irrigation system	Approximately 13 acres	Minimal – associated with set-up of equipment, pumps, etc.
<b>Discharge to Surface Water with BMPs and Treatment</b>	Appropriate from and discharge to Tamarac River (currently proposed alternative)  Water would need to be pushed back to MP 814.5 after completion of hydrotest if not reused	4.7 days to discharge	BMPs (see Section 3.1 of Supplement)	None	No additional workspace required	Minimal – associated with set-up of equipment, pumps, etc.

Alternative	Technical Feasibility			Environmental and Human Environment Impacts		
	Site-Specific Description	Timing	Additional Equipment	Impacts to Roads / Traffic	Additional Land Disturbance	Air Emissions
<b>Reuse</b>	Reuse Spread 1B hydrotest water for subsequent hydrotest. Enbridge indicates that timing and elevation considerations make reuse of water from Spread 1B to Spread 1C less efficient. Discharge would either need to be pushed back to the Tamarac River, or discharged via infiltration at Spread 1C (MP 848.2), trucking, or irrigation	Would require additional time	Would require air compressors or nitrogen pumps	No additional impacts	Minimal additional workspace may be required to accommodate extra equipment	Minimal – associated with use of compressors or nitrogen pumps

Proposed Hydrotest Segment (Discharge ID)	Start MP	End MP	Discharge Volume	Primary Source	MDNR Estimated Flow Rate	Secondary Source	MDNR Estimated Flow Rate
Spread 1C (SD0004)	848.2	875.4	7.9 Mgal	Red Lake River (MP 864.3)	Spring: 89,767 GPM; Summer: 44,883 GPM	Clearwater River (MP 875.4)	Spring: 179,533 GPM; Summer: 22,442 GPM

Alternative	Technical Feasibility			Environmental and Human Environment Impacts		
	Site-Specific Description	Timing	Additional Equipment	Impacts to Roads / Traffic	Additional Land Disturbance	Air Emissions
<b>Infiltration</b>	See Attachment G of the Individual Permit Supplement for a description of potential infiltration areas	Approximately 4-5 days at MPs 848.2 and 875.4	<ul style="list-style-type: none"> <li>Approximately 660-730 feet of piping to infiltration area</li> <li>BMPs (see Section 3.2 of Supplement)</li> </ul>	One highway would be crossed by piping to infiltration area	Approximately 1 acre for infiltration	Minimal – associated with set-up of equipment, pumps, etc.
<b>Truck to Off-Site Disposal</b>	Grand Rapids WWTP	79 days to complete transport	376 tanks (21,000 gal/tank) and associated piping	Trucking associated with the transport of the frac tanks and equipment.  1,316 trucks for transport over 320 miles round-trip	Approximately 10 acres for storage	Emissions associated with over 421,214 miles of trucking over 79 days
<b>Spray Irrigation</b>	16 miles to nearest potential irrigation system	4.7 days per 130 acres	<ul style="list-style-type: none"> <li>376 tanks (21,000 gal/tank)</li> <li>Would require trucking or piping water to nearest irrigation system</li> </ul>	Trucking associated with the transport of the frac tanks and equipment.  16 miles to nearest potential irrigation system	Approximately 10 acres	Minimal – associated with set-up of equipment, pumps, etc.
<b>Discharge to Surface Water with BMPs and Treatment</b>	Appropriate from and discharge to Red Lake River (currently proposed alternative)	3.7 days to discharge	BMPs (see Section 3.1 of Supplement)	None	No additional workspace required	Minimal – associated with set-up of equipment, pumps, etc.

Alternative	Technical Feasibility			Environmental and Human Environment Impacts		
	Site-Specific Description	Timing	Additional Equipment	Impacts to Roads / Traffic	Additional Land Disturbance	Air Emissions
<b>Reuse</b>	Reuse Spread 1C hydrotest water for subsequent hydrotest. Enbridge indicates that timing and elevation considerations make reuse of water from Spread 1C to Spread 1D less efficient. Discharge would either need to be pushed back to the Red Lake River, or discharged via infiltration at Spread 1D (MP 875.4), trucking, or irrigation	Would require additional time	Would require air compressors or nitrogen pumps	No additional impacts	Minimal additional workspace may be required to accommodate extra equipment	Minimal – associated with use of compressors or nitrogen pump

Proposed Hydrotest Segment (Discharge ID)	Start MP	End MP	Discharge Volume	Primary Source	MDNR Estimated Flow Rate	Secondary Source	MDNR Estimated Flow Rate
Spread 1D (SD005)	875.4	896.1	6.2 Mgal	Clearwater River (MP 875.4)	Spring: 179,533 GPM; Summer: 22,442 GPM	Red Lake River	Spring / Fall: 89,767 GPM; Summer: 44,883 GPM

Alternative	Technical Feasibility			Environmental and Human Environment Impacts		
	Site-Specific Description	Timing	Additional Equipment	Impacts to Roads / Traffic	Additional Land Disturbance	Air Emissions
<b>Infiltration</b>	See Attachment G of the Individual Permit Supplement for a description of potential infiltration areas	Approximately 4 days at MP 875.4  Approximately 2 days at MP 896.1	<ul style="list-style-type: none"> <li>Approximately 730-1380 feet of piping to infiltration area</li> <li>BMPs (see Section 3.2 of Supplement)</li> </ul>	None	Approximately 1 acre for infiltration	Minimal – associated with set-up of equipment, pumps, etc.
<b>Truck to Off-Site Disposal</b>	Grand Rapids WWTP	62 days to complete transport	294 tanks (21,000 gal/tank) and associated piping	Trucking associated with the transport of the frac tanks and equipment.  1,028 trucks for transport over 288 miles round-trip	Approximately 8 acres for storage	Emissions associated with over 296,061 miles of trucking over 62 days
<b>Spray Irrigation</b>	15 miles to nearest potential irrigation system	3.7 days per 130 acres	<ul style="list-style-type: none"> <li>294 tanks (21,000 gal/tank)</li> <li>Would require trucking or piping water to nearest irrigation system</li> </ul>	Trucking associated with the transport of the frac tanks and equipment.  15 miles to nearest potential irrigation system	Approximately 8 acres	Minimal – associated with set-up of equipment, pumps, etc.
<b>Discharge to Surface Water with BMPs and Treatment</b>	Appropriate from and discharge to Clearwater River (currently proposed alternative)  Water would need to be pushed back to MP 875.4 after completion of hydrotest if not reused	2.9 days to discharge	BMPs (see Section 3.1 of Supplement)	None	No additional workspace required	Minimal – associated with set-up of equipment, pumps, etc.

Alternative	Technical Feasibility			Environmental and Human Environment Impacts		
	Site-Specific Description	Timing	Additional Equipment	Impacts to Roads / Traffic	Additional Land Disturbance	Air Emissions
Reuse	Reuse Spread 1D hydrotest water for subsequent hydrotest. Enbridge indicates that timing and elevation considerations make reuse of water from Spread 1D to Spread 2A less efficient. Discharge would either need to be pushed back to the Clearwater River, or discharged via infiltration to Spread 2A (MP 909.1), trucking, or irrigation	Would require additional time	Would require air compressors or nitrogen pumps	No additional impacts	Minimal additional workspace may be required to accommodate extra equipment	Minimal – associated with use of compressors or nitrogen pump



Proposed Hydrotest Segment (Discharge ID)	Start MP	End MP	Discharge Volume	Primary Source	MDNR Estimated Flow Rate	Secondary Source	MDNR Estimated Flow Rate
Spread 2A (SD007)	896.1	909.1	3.8 Mgal	Clearwater River (MP 922.3)	Spring: 179,533 GPM; Summer: 22,442 GPM	<ul style="list-style-type: none"> <li>Lost River (MP 904.0)</li> <li>Well 763795 (MP 966.3)</li> </ul>	<ul style="list-style-type: none"> <li>Seasonally Variable: ~61,395 GPM</li> <li>N/A</li> </ul>

Alternative	Technical Feasibility			Environmental and Human Environment Impacts		
	Site-Specific Description	Timing	Additional Equipment	Impacts to Roads / Traffic	Additional Land Disturbance	Air Emissions
<b>Infiltration</b>	See Attachment G of the Individual Permit Supplement for a description of potential infiltration areas	<p>Approximately 1 day at MP 896.1</p> <p>Approximately 5 days at MP 909.1</p>	<ul style="list-style-type: none"> <li>Approximately 1,380-1,490 feet of piping to infiltration area</li> <li>BMPs (see Section 3.2 of Supplement)</li> </ul>	None	Approximately 1 acre for infiltration	Minimal – associated with set-up of equipment, pumps, etc.
<b>Truck to Off-Site Disposal</b>	Grand Rapids WWTP	38 days to complete transport	182 tanks (21,000 gal/tank) and associated piping	<p>Trucking associated with the transport of the frac tanks and equipment.</p> <p>638 trucks for transport over 200 miles round-trip</p>	Approximately 5 acres for storage	Emissions associated with over 127,528 miles of trucking over 38 days
<b>Spray Irrigation</b>	25 miles to nearest potential irrigation system	2.3 days per 130 acres	<ul style="list-style-type: none"> <li>182 tanks (21,000 gal/tank)</li> <li>Would require trucking or piping water to nearest irrigation system</li> </ul>	<p>Trucking associated with the transport of the frac tanks and equipment.</p> <p>25 miles to nearest potential irrigation system</p>	Approximately 5 acres	Minimal – associated with set-up of equipment, pumps, etc.
<b>Discharge to Surface Water with BMPs and Treatment</b>	Appropriate from and discharge to Clearwater River (currently proposed alternative)	1.8 days to discharge	BMPs (see Section 3.1 of Supplement)	None	No additional workspace required	Minimal – associated with set-up of equipment, pumps, etc.

Alternative	Technical Feasibility			Environmental and Human Environment Impacts		
	Site-Specific Description	Timing	Additional Equipment	Impacts to Roads / Traffic	Additional Land Disturbance	Air Emissions
<b>Reuse</b>	Enbridge is proposing reuse of 3.8 Mgal of Spread 2A water for Spread 2B, appropriate additional volume needed for Spread 2B hydrotest from Clearwater River at MP 922.3 (6.2 Mgal), then discharge the full 10 Mgal back to Clearwater River at MP 922.3, or discharged via infiltration at end of Spread 2B (MP 944.1), trucking, or irrigation	Would require additional time	Would require air compressors or nitrogen pumps	No additional impacts	Minimal additional workspace may be required to accommodate extra equipment	Minimal – associated with use of compressors or nitrogen pump

Proposed Hydrotest Segment (Discharge ID)	Start MP	End MP	Discharge Volume	Primary Source	MDNR Estimated Flow Rate	Secondary Source	MDNR Estimated Flow Rate
Spread 2B (SD007)	909.4	944.1	10 Mgal	Clearwater River (MP 922.3)	Spring: 179,533 GPM; Summer: 22,442 GPM	<ul style="list-style-type: none"> <li>Lost River (MP 904.0)</li> <li>Well 763795 (MP966.3)</li> </ul>	<ul style="list-style-type: none"> <li>Seasonally Variable: ~61,395 GPM</li> <li>N/A</li> </ul>

Alternative	Technical Feasibility			Environmental and Human Environment Impacts		
	Site-Specific Description	Timing	Additional Equipment	Impacts to Roads / Traffic	Additional Land Disturbance	Air Emissions
<b>Infiltration</b>	See Attachment G of the Individual Permit Supplement for a description of the potential infiltration areas	Approximately 14 days at MP 909.4  Approximately 5 days at MP 944.1	<ul style="list-style-type: none"> <li>Up to 480 tanks (21,000 gal/tank) and associated piping</li> <li>Approximately 400 -1,490 feet of piping to infiltration area</li> <li>BMPs (see Section 3.2 of Supplement)</li> </ul>	Trucking associated with the transport of the frac tanks and equipment.	Up to approximately 13 acres for storage and infiltration at MP 909.4  Approximately 1 acre for infiltration at MP 944.1	Minimal – associated with set-up of equipment, pumps, etc., and trucking required for transport of the frac tanks.
<b>Truck to Off-Site Disposal</b>	Grand Rapids WWTP	101 days to complete transport	480 tanks (21,000 gal/tank) and associated piping	Trucking associated with the transport of the frac tanks and equipment.  1,678 trucks for transport over 200 miles round-trip	Approximately 13 acres for storage	Emissions associated with over 335,658 miles of trucking over 101 days
<b>Spray Irrigation</b>	25 miles to nearest potential irrigation system	6.0 days per 130 acres	<ul style="list-style-type: none"> <li>480 tanks (21,000 gal/tank)</li> <li>Would require trucking or piping water to nearest irrigation system</li> </ul>	Trucking associated with the transport of the frac tanks and equipment.  25 miles to nearest potential irrigation system	Approximately 13 acres	Minimal – associated with set-up of equipment, pumps, etc.

Alternative	Technical Feasibility			Environmental and Human Environment Impacts		
	Site-Specific Description	Timing	Additional Equipment	Impacts to Roads / Traffic	Additional Land Disturbance	Air Emissions
<b>Discharge to Surface Water with BMPs and Treatment</b>	Appropriate from and discharge to Clearwater River (currently proposed alternative)	4.6 days to discharge	BMPs (see Section 3.1 of Supplement)	None	No additional workspace required	Minimal – associated with set-up of equipment, pumps, etc.
<b>Reuse</b>	Enbridge has proposed reuse of 3.8 Mgal of Spread 2A water for Spread 2B, appropriate additional volume from Clearwater River at MP 922.3 (6.2 Mgal), then discharge the full 10 Mgal back to Clearwater River (MP 922.3), or discharged via infiltration at end of Spread 2B (MP 944.1), trucking, or irrigation.	Would require additional time	Would require air compressors or nitrogen pumps	No additional impacts	Minimal additional workspace may be required to accommodate extra equipment	Minimal – associated with use of compressors or nitrogen pump

Proposed Hydrotest Segment (Discharge ID)	Start MP	End MP	Discharge Volume	Primary Source	MDNR Estimated Flow Rate	Secondary Source	MDNR Estimated Flow Rate
Spread 2C (LA009)	944.1	952.0	2.4 Mgal	Well 718159 (MP 952.6)	N/A	<ul style="list-style-type: none"> <li>Clearwater River (MP 922.3)</li> <li>Well 763975 (MP 966.3)</li> </ul>	<ul style="list-style-type: none"> <li>Spring: 179,533 GPM; Summer: 22,442 GPM</li> <li>N/A</li> </ul>

Technical Feasibility				Environmental and Human Environment Impacts		
Alternative	Site-Specific Description	Timing	Additional Equipment	Impacts to Roads / Traffic	Additional Land Disturbance	Air Emissions
Infiltration	See Attachment H of the Individual Permit Supplement for description of the proposed infiltration area (currently proposed alternative)	Approximately 2.2 days	<ul style="list-style-type: none"> <li>Approximately 400 feet of piping</li> <li>BMPs (see Section 3.2 of Supplement)</li> </ul>	None	Approximately 1 acre for infiltration	Minimal – associated with set-up of equipment, pumps, etc.
Truck to Off-Site Disposal	Grand Rapids WWTP	24 days to complete transport	116 tanks (21,000 gal/tank) and associated piping	Trucking associated with the transport of the frac tanks and equipment.  406 trucks for transport over 190 miles round-trip	Approximately 3 acres for storage	Emissions associated with over 77,161 miles of trucking over 24 days
Spray Irrigation	25 miles to nearest potential irrigation system	1.4 days per 130 acres	<ul style="list-style-type: none"> <li>116 tanks (21,000 gal/tank)</li> <li>Would require trucking or piping water to nearest irrigation system</li> </ul>	Trucking associated with the transport of the frac tanks and equipment.  25 miles to nearest potential irrigation system	Approximately 3 acres for storage	Minimal – associated with set-up of equipment, pumps, etc.
Discharge to Surface Water with BMPs and Infiltration	The MDNR water appropriation permit will prohibit discharge of groundwater to surface water, so this alternative was eliminated.					
Reuse	Enbridge proposes reuse of 2.4 Mgal of spread 2C water for spread 2D. After 2D hydrotest is complete discharge via infiltration at end of Spread 2D (MP 966.0), trucking, or irrigation	Would require additional time	Would require air compressors or nitrogen pumps	No additional impacts	Minimal additional workspace may be required to accommodate extra	Minimal – associated with use of compressors or nitrogen pump

Proposed Hydrotest Segment (Discharge ID)	Start MP	End MP	Discharge Volume	Primary Source	MDNR Estimated Flow Rate	Secondary Source	MDNR Estimated Flow Rate
Spread 2D (LA009)	952.0	966.0	3.9 Mgal	Well 718159 (MP 952.6)	N/A	<ul style="list-style-type: none"> <li>Clearwater River (MP 922.3)</li> <li>Well 763975 (MP 966.3)</li> </ul>	<ul style="list-style-type: none"> <li>Spring: 179,533 GPM; Summer: 22,442 GPM</li> <li>N/A</li> </ul>

Alternative	Technical Feasibility			Environmental and Human Environment Impacts		
	Site-Specific Description	Timing	Additional Equipment	Impacts to Roads / Traffic	Additional Land Disturbance	Air Emissions
<b>Infiltration</b>	See Attachment H of the Individual Permit Supplement for description of the proposed infiltration area (currently proposed alternative)	Approximately 2-3 days	Approximately 400 feet of piping BMPs (see Section 3.2 of Supplement)	None	Approximately 1 acre for infiltration	Minimal – associated with set-up of equipment, pumps, etc.
<b>Truck to Off-Site Disposal</b>	Grand Rapids WWTP	39 days to complete transport	187 tanks (21,000 gal/tank) and associated piping	Trucking associated with the transport of the frac tanks and equipment.  653 trucks for transport over 190 miles round-trip	Approximately 5 acres for storage	Emissions associated with over 124,083 miles of trucking over 39 days
<b>Spray Irrigation</b>	25 miles to nearest potential irrigation system	2.3 days per 130 acres	<ul style="list-style-type: none"> <li>187 tanks (21,000 gal/tank)</li> <li>Would require trucking or piping water to nearest irrigation system</li> </ul>	Trucking associated with the transport of the frac tanks and equipment.  25 miles to nearest potential irrigation system	Approximately 5 acres for storage	At least 2.3 days - associated with set-up of equipment, pumps, etc.
<b>Discharge to Surface Water with BMPs and Infiltration</b>	The MDNR water appropriation permit will prohibit discharge of groundwater to surface water, so this alternative was eliminated.					

	Technical Feasibility			Environmental and Human Environment Impacts		
Alternative	Site-Specific Description	Timing	Additional Equipment	Impacts to Roads / Traffic	Additional Land Disturbance	Air Emissions
<b>Reuse</b>	Enbridge proposes reuse of 2.4 Mgal of Spread 2C water for Spread 2D. After 2D hydrotest is complete discharge via infiltration at end of Spread 2D (MP 966.0), trucking, or irrigation	Would require additional time	Would require air compressors or nitrogen pumps	No additional impacts	Minimal additional workspace may be required to accommodate extra	Minimal – associated with use of compressors or nitrogen pump

Proposed Hydrotest Segment (Discharge ID)	Start MP	End MP	Discharge Volume	Primary Source	MDNR Estimated Flow Rate	Secondary Source	MDNR Estimated Flow Rate
Spread 2E (LA010)	966.0	975.5	2.8 Mgal	Well 763975 (MP 966.3)	N/A	<ul style="list-style-type: none"> <li>Island Lake (MP 961.7)</li> <li>Well 718159 (MP 952.6)</li> </ul>	<ul style="list-style-type: none"> <li>N/A</li> <li>N/A</li> </ul>

Alternative	Technical Feasibility			Environmental and Human Environment Impacts		
	Site-Specific Description	Timing	Additional Equipment	Impacts to Roads / Traffic	Additional Land Disturbance	Air Emissions
<b>Infiltration</b>	See Attachment H of the Individual Permit Supplement for description of the proposed infiltration area (currently proposed alternative)	Approximately 5.8 days	<ul style="list-style-type: none"> <li>Approximately 200 feet of piping</li> <li>BMPs (see Section 3.2 of Supplement)</li> </ul>	Trucking associated with the transport of the frac tanks and equipment.	Approximately 1 acre for storage and infiltration	Minimal – associated with set-up of equipment, pumps, etc., and trucking required for transport of the frac tanks.
<b>Truck to Off-Site Disposal</b>	Grand Rapids WWTP	28 days to complete transport	132 tanks (21,000 gal/tank) and associated piping	<ul style="list-style-type: none"> <li>Trucking associated with the transport of the frac tanks and equipment.</li> <li>461 trucks for transport over 190 miles round-trip</li> </ul>	Approximately 4 acres for storage	Emissions associated with over 87,588 miles of trucking over 28 days
<b>Spray Irrigation</b>	<1 mile to nearest potential irrigation system	1.6 days per 130 acres	<ul style="list-style-type: none"> <li>132 tanks (21,000 gal/tank)</li> <li>Would require trucking or piping water to nearest irrigation system</li> </ul>	<ul style="list-style-type: none"> <li>Trucking associated with the transport of the frac tanks and equipment.</li> <li>&lt;1 mile to nearest potential irrigation system</li> </ul>	Approximately 4 acres for storage	Minimal – associated with set-up of equipment, pumps, etc.
<b>Discharge to Surface Water with BMPs and Infiltration</b>	The MDNR water appropriation permit will prohibit discharge of groundwater to surface water, so this alternative was eliminated.					



Alternative	Technical Feasibility			Environmental and Human Environment Impacts		
	Site-Specific Description	Timing	Additional Equipment	Impacts to Roads / Traffic	Additional Land Disturbance	Air Emissions
Reuse	Reuse Spread 2E hydrotest water for subsequent hydrotest. Enbridge indicates that timing and elevation considerations make reuse of water from Spread 2E to Spread 3A less efficient. Discharge would either need to be pushed back to the discharged via infiltration to Spread 3A (MP 985.8), trucking, or irrigation	Would require additional time	Would require air compressors or nitrogen pumps	No additional impacts	Minimal additional workspace may be required to accommodate extra	Minimal – associated with use of compressors or nitrogen pump

Proposed Hydrotest Segment (Discharge ID)	Start MP	End MP	Discharge Volume	Primary Source	MDNR Estimated Flow Rate	Secondary Source	MDNR Estimated Flow Rate
Spread 3A (SD010)	975.5	985.8	2.9 Mgal	Shell River (MP 985.3)	Spring: 538,599 GPM; Summer: 67,475 GPM	Crow Wing River (MP 993.3)	Spring: 359,866 GPM; Summer: 98,963 GPM

	Technical Feasibility			Environmental and Human Environment Impacts		
Alternative	Site-Specific Description	Timing	Additional Equipment	Impacts to Roads / Traffic	Additional Land Disturbance	Air Emissions
Infiltration	See Attachment G of the Individual Permit Supplement for a description of potential infiltration areas	Approximately 6 days at MP 975.5  Approximately 1 day at MP 985.8	<ul style="list-style-type: none"> <li>Minimal piping required, adjacent to infiltration site</li> <li>BMPs (see Section 3.2 of Supplement)</li> </ul>	None	Approximately 1 acre for infiltration	Minimal – associated with set-up of equipment, pumps, etc.
Truck to Off-Site Disposal	Grand Rapids WWTP	29 days to complete transport	140 tanks (21,000 gal/tank) and associated piping	<ul style="list-style-type: none"> <li>Trucking associated with the transport of the frac tanks and equipment.</li> <li>491 trucks for transport over 180 miles round-trip</li> </ul>	Approximately 4 acres for storage	Emissions associated with over 88,411 miles of trucking over 29 days
Spray Irrigation	The Shell River is listed as an infested water for faucet snail, therefore this alternative is eliminated					
Discharge to Surface with BMPs and Infiltration	Appropriate from and discharge to Shell River (currently proposed alternative)	1.3 days to discharge	BMPs (see Section 3.1 of Supplement)	None	No additional workspace required	Minimal – associated with set-up of equipment, pumps, etc.
Reuse	Reuse Spread 3A hydrotest water for subsequent hydrotest. Enbridge indicates that timing and elevation considerations make reuse of water from Spread 3A to Spread 3B less efficient. Discharge would either need to be pushed back to the Shell River, or discharged via infiltration at the end of Spread 3B (MP 1017.3), trucking, or irrigation.	Would require additional time	Would require air compressors or nitrogen pumps	No additional impacts	Minimal additional workspace may be required to accommodate extra	Minimal – associated with use of compressors or nitrogen pump

Proposed Hydrotest Segment (Discharge ID)	Start MP	End MP	Discharge Volume	Primary Source	MDNR Estimated Flow Rate	Secondary Source	MDNR Estimated Flow Rate
Spread 3B (SD013)	985.8	1017.3	9.1 Mgal	Pine River (MP 1017.3)	Seasonally Variable: ~134,674 GPM	Clear (Eagle) Lake (MP 1013.4)	N/A

	Technical Feasibility			Environmental and Human Environment Impacts		
Alternative	Site-Specific Description	Timing	Additional Equipment	Impacts to Roads / Traffic	Additional Land Disturbance	Air Emissions
<b>Infiltration</b>	See Attachment G of the Individual Permit Supplement for a description of potential infiltration areas	Approximately 2 days at MP 985.8 or MP 1017.3	<ul style="list-style-type: none"> <li>Approximately 250 feet of piping to infiltration area</li> <li>BMPs (see Section 3.2 of Supplement)</li> </ul>	None	Approximately 1 acre for infiltration	Minimal – associated with set-up of equipment, pumps, etc.
<b>Truck to Off-Site Disposal</b>	Grand Rapids WWTP	91 days to complete transport	435 tanks (21,000 gal/tank) and associated piping	Trucking associated with the transport of the frac tanks and equipment.  1,522 trucks for transport over 160 miles round-trip	Approximately 12 acres for storage	Emissions associated with over 243,520 miles of trucking over 91 days
<b>Spray Irrigation</b>	3 miles to nearest potential irrigation system	5.4 days per 130 acres	<ul style="list-style-type: none"> <li>435 tanks (21,000 gal/tank)</li> <li>Would require trucking or piping water to nearest irrigation system</li> </ul>	Trucking associated with the transport of the frac tanks and equipment.  3 miles to nearest potential irrigation system	Approximately 12 acres for storage	Minimal – associated with set-up of equipment, pumps, etc.
<b>Discharge to Surface Water with BMPs and Treatment</b>	Appropriate from and discharge to Pine River (currently proposed alternative)  Water would need to be pushed back to MP 1017.3 after completion of hydrotest if not reused	4.2 days to discharge	BMPs (see Section 3.1 of Supplement)	None	No additional workspace required	Minimal – associated with set-up of equipment, pumps, etc.
<b>Reuse</b>	Enbridge proposes to reuse 6.9 Mgal of Spread 3C water for Spread 3B, appropriate additional volume from Pine River at MP 1017.3 (2.2 Mgal), then discharge the total 9.1 Mgal back to Pine River at MP 1017.3, or discharge via infiltration at Spread 3B, trucking, or irrigation	Would require additional time	Would require air compressors or nitrogen pumps	No additional impacts	Minimal additional workspace may be required to accommodate extra	Minimal – associated with use of compressors or nitrogen pump

Proposed Hydrotest Segment (Discharge ID)	Start MP	End MP	Discharge Volume	Primary Source	MDNR Estimated Flow Rate	Secondary Source	MDNR Estimated Flow Rate
Spread 3C (SD014)	1017.3	1041.0	6.9 Mgal	Pine River (MP 1017.3)	Seasonally Variable: ~134,674 GPM	Clear (Eagle) Lake (MP 1013.4)	N/A

	Technical Feasibility			Environmental and Human Environment Impacts		
Alternative	Site-Specific Description	Timing	Additional Equipment	Impacts to Roads / Traffic	Additional Land Disturbance	Air Emissions
<b>Infiltration</b>	See Attachment G of the Individual Permit Supplement for a description of potential infiltration areas	Approximately 2 days at MP 1017.3 or MP 1041.0	<ul style="list-style-type: none"> <li>Approximately 250-480 feet of piping to infiltration area</li> <li>BMPs (see Section 3.2 of Supplement)</li> </ul>	None	Approximately 1 acre for infiltration	Minimal – associated with set-up of equipment, pumps, etc.
<b>Truck to Off-Site Disposal</b>	Grand Rapids WWTP	69 days to complete transport	327 tanks (21,000 gal/tank) and associated piping	Trucking associated with the transport of the frac tanks and equipment.  1,144 trucks for transport over 160 miles round-trip	Approximately 9 acres for storage	Emissions associated with over 183,079 miles of trucking over 69 days
<b>Spray Irrigation</b>	3 miles to nearest potential irrigation system	4.1 days per 130 acres	<ul style="list-style-type: none"> <li>327 tanks (21,000 gal/tank)</li> <li>Would require trucking or piping water to nearest irrigation system</li> </ul>	Trucking associated with the transport of the frac tanks and equipment.  3 miles to nearest potential irrigation system	Approximately 9 acres for storage	Minimal – associated with set-up of equipment, pumps, etc.
<b>Discharge to Surface Water with BMPs and Treatment</b>	Appropriate from and discharge to Pine River (currently proposed alternative)  Water would need to be pushed back to MP 1017.3 after completion of hydrotest if not reused	3.2 days to discharge	BMPs (see Section 3.1 of Supplement)	None	No additional workspace required	Minimal – associated with set-up of equipment, pumps, etc.
<b>Reuse</b>	Enbridge proposes to reuse 6.9 Mgal of Spread 3C water for Spread 3B, appropriate additional volume from Pine River at MP 1017.3 (2.2 Mgal), then discharge the total 9.1 Mgal back to Pine River at MP 1017.3, or discharge via infiltration at Spread 3B, trucking, or irrigation	Would require additional time	Would require air compressors or nitrogen pumps	No additional impacts	Minimal additional workspace may be required to accommodate	Minimal – associated with use of compressors or nitrogen pump

Proposed Hydrotest Segment (Discharge ID)	Start MP	End MP	Discharge Volume	Primary Source	MDNR Estimated Flow Rate	Secondary Source	MDNR Estimated Flow Rate
Spread 4A (SD017)	1041.0	1069.6	8.3 Mgal	Mississippi River (MP 1069.6)	Seasonally Variable: >224,916 GPM	Willow River (MP 1066.4)	Spring: 449,833 GPM; Summer: 44,883 GPM

Alternative	Technical Feasibility			Environmental and Human Environment Impacts		
	Site-Specific Description	Timing	Additional Equipment	Impacts to Roads / Traffic	Additional Land Disturbance	Air Emissions
<b>Infiltration</b>	See Attachment G of the Individual Permit Supplement for a description of potential infiltration areas	Approximately 2 days at MP 1041.0  Approximately 30 days at MP 1069.6	<ul style="list-style-type: none"> <li>Up to 396 tanks (21,000 gal/tank) and associated piping</li> <li>Approximately 480-980 feet of piping to infiltration area</li> <li>BMPs (see Section 3.2 of Supplement)</li> </ul>	One highway would be crossed by piping to infiltration area  Trucking associated with the transport of the frac tanks and equipment.	Up to Approximately 12 acres for storage and infiltration	Minimal – associated with set-up of equipment, pumps, etc., and trucking required for transport of the frac tanks.
<b>Truck to Off-Site Disposal</b>	Duluth (WLSSD)	461 days to complete transport	396 tanks (21,000 gal/tank) and associated piping	Trucking associated with the transport of the frac tanks and equipment.  1,384 trucks for transport over 70 miles round-trip	Approximately 11 acres for storage	Emissions associated with over 96,904 miles of trucking over 461 days
<b>Spray Irrigation</b>	Nearest point irrigation system located approximately 47 miles from discharge location. This alternative was eliminated due to the distance.					
<b>Discharge to Surface Water with BMPs and Treatment</b>	Appropriate from and discharge to Mississippi River (ORVW) (currently proposed alternative)  Water would need to be pushed back to MP 1069.6 after completion of hydrotest if not reused	3.8 days to discharge	BMPs (see Section 3.1 of Supplement)	None	No additional workspace required	Minimal – associated with set-up of equipment, pumps, etc.
<b>Reuse</b>	Enbridge proposes reuse of 4.6 Mgal of Spread 4A water for Spread 4B. Discharge the full 8.3 Mgal back to Mississippi River or discharge via infiltration at end of Spread 4B (MP 1085.7) or trucking	Would require additional time	Would require air compressors or nitrogen pumps	No additional impacts	Minimal additional workspace may be required to accommodate	Minimal – associated with use of compressors or nitrogen pump

Proposed Hydrotest Segment (Discharge ID)	Start MP	End MP	Discharge Volume	Primary Source	MDNR Estimated Flow Rate	Secondary Source	MDNR Estimated Flow Rate
Spread 4B (SD017)	1069.6	1085.7	4.6 Mgal	Mississippi River (MP 1069.6)	Seasonally Variable: >224,916 GPM	Willow River (MP 1066.4)	Spring: 449,833 GPM; Summer: 44,883 GPM

Alternative	Technical Feasibility			Environmental and Human Environment Impacts		
	Site-Specific Description	Timing	Additional Equipment	Impacts to Roads / Traffic	Additional Land Disturbance	Air Emissions
<b>Infiltration</b>	See Attachment G of the Individual Permit Supplement for a potential infiltration areas	Approximately 17 days at MP 1069.6  Approximately 5 days at MP 1085.7	<ul style="list-style-type: none"> <li>Up to 220 tanks (21,000 gal/tank) and associated piping</li> <li>Approximately 980-2,050 feet of piping to infiltration area</li> <li>BMPs (see Section 3.2 of Supplement)</li> </ul>	<p>Piping to one infiltration area would cross a highway</p> <p>Trucking associated with the transport of the frac tanks and equipment.</p>	<p>Up to approximately 7 acres for storage and infiltration</p> <p>Piping to one infiltration area would cross wetlands</p>	Minimal – associated with set-up of equipment, pumps, etc., and trucking required for transport of the frac tanks.
<b>Truck to Off-Site Disposal</b>	Duluth (WLSSD)	257 days to complete transport	220 tanks (21,000 gal/tank) and associated piping	<p>Trucking associated with the transport of the frac tanks and equipment.</p> <p>770 trucks for transport over 70 miles round-trip</p>	Approximately 6 acres for storage	Emissions associated with over 53,878 miles of trucking over 257 days
<b>Spray Irrigation</b>	Nearest point irrigation system located approximately 47 miles from discharge location. This alternative was eliminated due to the distance.					
<b>Discharge to Surface Water with BMPs and Treatment</b>	<p>Appropriate from and discharge to Mississippi River (ORVW) (currently proposed alternative)</p> <p>Water would need to be pushed back to MP 1069.6 after completion of hydrotest if not reused</p>	2.1 days to discharge	BMPs (see Section 3.1 of Supplement)	None	No additional workspace required	Minimal – associated with set-up of equipment, pumps, etc.
<b>Reuse</b>	Reuse 4.6 Mgal of Spread 4A water for Spread 4B. Discharge the full 8.3 Mgal back to Mississippi River or discharge via infiltration at end of Spread 4B (MP 1085.7) or trucking	Would require additional time	Would require air compressors or nitrogen pumps	No additional impacts	Minimal additional workspace may be required to accommodate	Minimal – associated with use of compressors or nitrogen pump

Proposed Hydrotest Segment (Discharge ID)	Start MP	End MP	Discharge Volume	Primary Source	MDNR Estimated Flow Rate	Secondary Source	MDNR Estimated Flow Rate
Spread 5A (SD018)	1085.7	1104.1	7.0 Mgal	East Savanna River (MP 1085.8)	N/A; Rosgen Survey: 16,057 GPM at bankful	Mississippi River (MP 1069.6)	Seasonally Variable: >224,916 GPM

	Technical Feasibility			Environmental and Human Environment Impacts		
Alternative	Site-Specific Description	Timing	Additional Equipment	Impacts to Roads / Traffic	Additional Land Disturbance	Air Emissions
<b>Infiltration</b>	See Attachment G of the Individual Permit Supplement for a description of potential infiltration areas	Approximately 4 days at MP 1085.7  12 days at MP 1104.1	<ul style="list-style-type: none"> <li>Up to 333 tanks (21,000 gal/tank) and associated piping</li> <li>Approximately 780-2050 feet of piping to infiltration area</li> <li>BMPs (see Section 3.2 of Supplement)</li> </ul>	Piping to one infiltration area would cross a highway.  Trucking associated with the transport of the frac tanks and equipment.	Up to approximately 10 acres for storage and infiltration  Piping to one infiltration area would cross wetlands	Minimal – associated with set-up of equipment, pumps, etc., and trucking required for transport of the frac tanks.
<b>Truck to Off-Site Disposal</b>	Duluth (WLSSD)	388 days to complete transport	333 tanks (21,000 gal/tank) and associated piping	Trucking associated with the transport of the frac tanks and equipment.  1,164 trucks for transport over 90 miles round-trip	Approximately 9 acres for storage	Emissions associated with over 104,750 miles of trucking over 388 days
<b>Spray Irrigation</b>	Nearest point irrigation system located approximately 65 miles from discharge location. This alternative was eliminated due to the distance.					
<b>Discharge to Surface Water with BMPs and Treatment</b>	Appropriation from and discharge to East Savanna River (currently proposed alternative)  Water would need to be pushed back to MP 1085.7 after completion of hydrotest if not reused	3.2 days to discharge	BMPs (see Section 3.1 of Supplement)	None	No additional workspace required	Minimal – associated with set-up of equipment, pumps, etc.
<b>Reuse</b>	Reuse Spread 5A hydrotest water for subsequent hydrotest. Enbridge indicates that timing and elevation considerations make reuse of water from Spread 5A to Spread 5B less efficient. Discharge would either need to be pushed back to the East Savanna River, or discharged via infiltration at end of Spread 5B (MP 1120.3), trucking, or irrigation	Would require additional time	Would require air compressors or nitrogen pumps	No additional impacts	Minimal additional workspace may be required to accommodate	Minimal – associated with use of compressors or nitrogen pump

Proposed Hydrotest Segment (Discharge ID)	Start MP	End MP	Discharge Volume	Primary Source	MDNR Estimated Flow Rate	Secondary Source	MDNR Estimated Flow Rate
Spread 5B (SD020)	1104.1	1120.3	4.7 Mgal	Chub Lake (MP 1120.3)	N/A	<ul style="list-style-type: none"> <li>Mississippi River (MP 1069.6)</li> <li>East Savanna River (MP 1085.5)</li> </ul>	<ul style="list-style-type: none"> <li>Seasonably Variable: &gt;224,916 GPM</li> <li>N/A; Rosgen Survey: 16,057 GPM at bankful</li> </ul>

Alternative	Technical Feasibility			Environmental and Human Environment Impacts		
	Site-Specific Description	Timing	Additional Equipment	Impacts to Roads / Traffic	Additional Land Disturbance	Air Emissions
<b>Infiltration</b>	See Attachment G of the Individual Permit Supplement for a description of potential infiltration areas	<p>Approximately 11 days at MP 1104.1</p> <p>Approximately 1 day at MP 1120.3</p>	<ul style="list-style-type: none"> <li>Up to 224 tanks (21,000 gal/tank) and associated piping</li> <li>Approximately 780 – 3,720 feet of piping to infiltration area</li> <li>BMPs (see Section 3.2 of Supplement)</li> </ul>	<p>Piping to one infiltration area would cross at least two roads.</p> <p>Trucking associated with the transport of the frac tanks and equipment.</p>	Up to approximately 7 acres for storage and infiltration	Minimal – associated with set-up of equipment, pumps, etc., and trucking required for transport of the frac tanks.
<b>Truck to Off-Site Disposal</b>	Duluth (WLSSD)	261 days to complete transport	224 tanks (21,000 gal/tank) and associated piping	<p>Trucking associated with the transport of the frac tanks and equipment.</p> <p>784 trucks for transport over 40 miles round-trip</p>	Approximately 6 acres for storage	Emissions associated with over 31,355 miles of trucking over 261 days
<b>Spray Irrigation</b>	Chub Lake is listed as an infested water for Eurasian milfoil, therefore this alternative is eliminated.					
<b>Discharge to Surface Water with BMPs and Treatment</b>	Appropriate from and discharge to Chub Lake (currently proposed alternative)	2.2 days to discharge	BMPs (see Section 3.1 of Supplement)	None	No additional workspace required	Minimal – associated with set-up of equipment, pumps, etc.
<b>Reuse</b>	Reuse 2.6 Mgal of Spread 5B water for Spread 5C. Discharge 4.7 Mgal back to Chub Lake or discharge via infiltration at end of Spread 5B/beginning of Spread 5C (MP 1120.3), trucking, or irrigation.	Would require additional time	Would require air compressors or nitrogen pumps	No additional impacts	Minimal additional workspace may be required to accommodate	Minimal – associated with use of compressors or nitrogen pump



Proposed Hydrotest Segment (Discharge ID)	Start MP	End MP	Discharge Volume	Primary Source	MDNR Estimated Flow Rate	Secondary Source	MDNR Estimated Flow Rate
Spread 5C (SD020)	1120.3	1129.4	2.6 Mgal	Chub Lake	N/A	<ul style="list-style-type: none"> <li>Mississippi River (MP 1069.6)</li> <li>East Savanna River (MP 1085.5)</li> </ul>	<ul style="list-style-type: none"> <li>Seasonably Variable: &gt;224,916 GPM</li> <li>N/A; Rosgen Survey: 16,057 GPM at bankful</li> </ul>

Alternative	Technical Feasibility			Environmental and Human Environment Impacts		
	Site-Specific Description	Timing	Additional Equipment	Impacts to Roads / Traffic	Additional Land Disturbance	Air Emissions
<b>Infiltration</b>	See Attachment G of the Individual Permit Supplement for a description of potential infiltration areas	Approximately 1 day at MP 1120.3  Infiltration not feasible at MP 1129.4	<ul style="list-style-type: none"> <li>Approximately 3,720 feet of piping to infiltration area</li> <li>BMPs (see Section 3.2 of Supplement)</li> </ul>	Piping to one infiltration area would cross at least two roads	Approximately 1 acre for infiltration	Minimal – associated with set-up of equipment, pumps, etc.
<b>Truck to Off-Site Disposal</b>	Duluth (WLSSD)	147 days to complete transport	126 tanks (21,000 gal/tank) and associated piping	Trucking associated with the transport of the frac tanks and equipment.  440 trucks for transport over 40 miles round-trip	Approximately 3 acres for storage	Emissions associated with over 17,596 miles of trucking over 147 days
<b>Spray Irrigation</b>	Chub Lake is listed as an infested water for Eurasian milfoil, therefore this alternative is eliminated.					
<b>Discharge to Surface Water with BMPs and Treatment</b>	Appropriate from and discharge to Chub Lake (currently proposed alternative)	1.2 days to discharge	BMPs (see Section 3.1 of Supplement)	None	No additional workspace required	Minimal – associated with set-up of equipment, pumps, etc.
<b>Reuse</b>	Reuse 2.6 Mgal of Spread 5B water for Spread 5C. Discharge 4.7 Mgal back to Chub Lake or discharge via infiltration at end of Spread 5B/beginning of Spread 5C (MP 1120.3), trucking, or irrigation.	Would require additional time	May require air compressors or nitrogen pumps	No additional impacts	No additional impacts	Minimal – associated with set-up of equipment, pumps, etc.

**Appendix D**

**Water Quality Data Received From the MPCA**

## MPCA Total Suspended Solids and Turbidity Data

Parameter/Waterbody/ WID/Quarter	Average Total Suspended Solids (mg/l) and Turbidity (NTU)													
	1996	1997	1998	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
<b>Clearwater River</b>														
<b>09020305-517</b>														
Total suspended solids														
Qtr2				2.5	16.0	5.5	3.0	2.5	3.8	2.7	6.7	3.5	4.4	
Qtr3					1.0	3.0	1.5	2.5	2.0	1.3	1.5	1.7	1.0	
Qtr4				1.0		1.0		1.5	1.0		1.0		2.0	
Turbidity														
Qtr2				2.0	2.1	4.6	3.0	3.8	2.6	1.9	4.9	5.7	6.6	
Qtr3				1.9	3.4	9.1	4.8	4.6	6.4	2.7	3.4	2.0	1.8	
Qtr4				1.1	2.9	2.5	5.3	4.5	3.6		2.7		1.3	
<b>09020305-647</b>														
Total suspended solids														
Qtr2				17.0	11.0	25.3	20.0	7.5	24.5	23.0	22.3	11.8	5.0	
Qtr3				25.8	20.2	18.0	13.3	9.0	14.3	7.2	8.1	18.0	16.5	
Qtr4				10.0	10.0	9.0	2.0	3.0	12.0	3.0	6.5		5.0	
Turbidity														
Qtr1					3.1									
Qtr2				17.4	7.7	14.7	14.4	5.7	15.4	15.5	8.7	7.0	12.8	
Qtr3				22.1	21.0	14.1	11.3	10.6	10.9	6.0	6.1	15.8	12.3	
Qtr4				7.1	9.4	9.3	3.7	5.1	6.9	3.6	5.4	2.3	9.7	
<b>09020305-648</b>														
Total suspended solids														
Qtr1											3.0	3.0	11.0	
Qtr2				25.8	16.5	16.8	18.5	7.5	376.0	35.1	22.6	9.2	15.6	
Qtr3				10.5	17.6	21.0	16.4	1.0	18.0	12.0	11.4	24.5	6.3	
Qtr4						3.0		1.0	1.0	1.0	2.0	1.0	1.0	
Turbidity														
Qtr1					4.9						3.4			
Qtr2				22.1	16.1	15.0	13.4	6.9	15.1	19.8	15.1	7.1	5.1	
Qtr3				12.0	17.9	21.8	13.9	4.2	12.4	6.1	6.9	6.9	2.5	
Qtr4				17.4	6.1	9.2	3.0	3.0	0.9	1.7	1.7	1.1	2.1	
<b>East Savanna River</b>														
<b>04010201-561</b>														
Total suspended solids														
Qtr2					6.3									
Qtr3					4.1									
Turbidity														
Qtr2					5.2									
Qtr3					5.0									
<b>Middle River</b>														
<b>09020309-539</b>														
Total suspended solids														
Qtr2									2.8					
Qtr3									4.2					
Turbidity														
Qtr2					1.1	3.9	2.2			3.5				
Qtr3					10.3	3.3	3.8							
Qtr4				1.5		2.3	3.2							
<b>09020309-540</b>														
Total suspended solids														
Qtr1											14.0	67.2	94.5	
Qtr2					8.5	44.0				60.0	56.3	62.3	54.3	

Parameter/Waterbody/ WID/Quarter	Average Total Suspended Solids (mg/l) and Turbidity (NTU)													
	1996	1997	1998	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Qtr3					7.2	44.0				55.5	82.3	59.3	26.8	
Qtr4										7.0	6.0	2.5	2.0	
Turbidity														
Qtr1											12.3			
Qtr2				8.2	6.9	16.4	2.5			40.5	38.1			
Qtr3				14.3	8.0	16.7	2.9			35.3	57.8			
Qtr4				4.7		5.0	3.3			6.6	5.5			
<b>09020309-541</b>														
Total suspended solids														
Qtr2									49.3					
Qtr3									44.3	60.5				
Turbidity														
Qtr2				188.5	61.5									
Qtr3				44.2	48.8	56.5								
Qtr4				62.1										
<b>Mississippi River</b>														
<b>07010101-753</b>														
Total suspended solids														
Qtr1						2.2						7.7	6.0	
Qtr2						5.9			2.5	5.6	13.0	8.9	5.3	
Qtr3						2.9			2.1	2.0	2.5	2.5	1.5	
Qtr4					1.2						2.7	1.7	1.5	
Turbidity														
Qtr1						2.4								
Qtr2						9.3					6.0			
Qtr3						8.7					1.8			
Qtr4					5.4						2.1			
<b>07010103-708</b>														
Total suspended solids														
Qtr1					24.0									
Qtr2				22.1	16.8				29.3	32.0				
Qtr3				13.0	14.2				29.9	21.0				
Qtr4				7.0										
Turbidity														
Qtr1					13.4									
Qtr2				12.2	11.5									
Qtr3				8.0	7.2									
Qtr4				4.8										
<b>Prairie River</b>														
<b>07010103-516</b>														
Total suspended solids														
Qtr2				9.8	2.6	3.2								
Qtr3				2.8	2.0	2.8								
Qtr4				4.0	3.0	1.0								
Turbidity														
Qtr2				3.9	2.4	2.5								
Qtr3				4.2	3.9	1.3								
Qtr4				4.1	2.8	1.2								
<b>Red Lake River</b>														
<b>09020303-513</b>														
Total suspended solids														
Qtr2				3.5	10.5	15.3	12.3	17.3	4.5	15.3	7.0	13.5	16.0	

Parameter/Waterbody/ WID/Quarter	Average Total Suspended Solids (mg/l) and Turbidity (NTU)													
	1996	1997	1998	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Qtr3				2.3	8.0	13.5	13.5	2.8	2.8	15.0	9.0	15.8	14.0	
Qtr4				47.0	7.0	11.5	3.0	1.5	4.7	6.0	10.5		9.0	
Turbidity														
Qtr1								4.5						
Qtr2				4.5	7.5	15.3	12.5	12.0	6.4	18.7	7.0	11.7	8.8	
Qtr3				3.1	9.6	14.3	12.6	4.8	6.1	13.4	8.7	13.0	6.8	
Qtr4				8.2		13.7	4.5	4.8	10.3	5.7	9.0		10.5	
<b>Red River</b>														
<b>09020311-560</b>														
Total suspended solids														
Qtr1								266.5						
Qtr2							156.8	99.0			155.7	390.0		
Qtr3							111.8	45.0			210.6	150.0		
Qtr4							25.0							
Turbidity														
Qtr1								152.9						
Qtr2							102.8	67.1						
Qtr3							91.6	58.6						
Qtr4							16.5							
<b>Shell River</b>														
<b>07010106-536</b>														
Total suspended solids														
Qtr2				4.3										
Qtr3				13.7										
Turbidity														
Qtr1						2.6		4.7			5.9	3.1		
Qtr2				2.9		4.8	4.3	4.8	4.9	4.0	2.9	6.5		
Qtr3				17.9		5.7	8.1	7.4	11.6	7.4	11.1	10.3		
Qtr4						4.5	3.8	5.5	14.3	2.9	5.6	5.0		
<b>07010106-679</b>														
Total suspended solids														
Qtr2				5.0										
Turbidity														
Qtr2				3.9										
Qtr3				1.7										
<b>07010106-681</b>														
Total suspended solids														
Qtr1											3.5	3.7	4.0	3.2
Qtr2				3.7	1.8	2.8					6.4	4.3	3.5	
Qtr3				2.0	1.3	2.7					2.4	2.0	1.6	
Qtr4											7.2	2.2	4.4	
Turbidity														
Qtr1											2.9			
Qtr2				3.1							3.0			
Qtr3				1.1							1.2			
<b>Snake River</b>														
<b>09020309-543</b>														
Total suspended solids														
Qtr2					3.0									
Qtr3						3.0								
Turbidity														
Qtr2				4.7	5.1									

Parameter/Waterbody/ WID/Quarter	Average Total Suspended Solids (mg/l) and Turbidity (NTU)													
	1996	1997	1998	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Qtr3				4.1	4.9	4.7								
Qtr4				3.4										
<b>Tamarac River</b>														
<b>09020311-503</b>														
Total suspended solids														
Qtr2					18.8	25.6								
Qtr3					10.4	10.5								
Qtr4					5.5	8.5								
Turbidity														
Qtr2					15.5	21.2								
Qtr3					13.4	11.5								
Qtr4					8.5	10.4								
<b>Tamarack River</b>														
<b>07010103-757</b>														
Total suspended solids														
Qtr2	10.0	4.0												
Qtr3			2.0											
Qtr4			2.0											
<b>07010103-758</b>														
Total suspended solids														
Qtr2											4.8			
Qtr3											3.9			
<b>Willow River</b>														
<b>07010103-748</b>														
Total suspended solids														
Qtr1					3.2							3.8		
Qtr2				7.7	6.5						6.3	6.0	4.4	
Qtr3				2.0	8.0						6.6	12.9	9.5	
Qtr4				2.4	4.7						3.0	3.5	2.3	
Turbidity														
Qtr1					8.4									
Qtr2				6.6	7.1						5.8			
Qtr3				4.8	2.6						10.1			
Qtr4				5.2	5.6						6.6			
<b>PINE RIVER</b>														
<b>07010105-669</b>														
Total suspended solids														
Qtr2						2.9	5.8							
Qtr3						2.9	1.8							
Qtr4						1.3	1.7							
<b>LOST RIVER 2</b>														
<b>09020305-512</b>														
Total suspended solids														
Qtr1							130.5							
Qtr2				3.5	4.5	1.5	6.3	3.0	10.5	8.0	3.0	1.6	2.0	
Qtr3				1.0	4.0	2.0	4.0		3.3	2.6	4.0	2.3	1.8	
Qtr4				1.0		2.3		2.4	2.5	4.0	7.5		1.5	
Turbidity														
Qtr1							42.8							
Qtr2				3.3	2.1	2.0	4.1	7.4	5.4	2.2	3.5	2.0	2.2	
Qtr3				2.2	4.7	2.2	6.2	18.0	4.3	2.5	4.9	2.2	2.3	
Qtr4				1.2		1.6		2.3	3.0	3.4	11.5	9.3	2.2	

Parameter/Waterbody/ WID/Quarter	Average Total Suspended Solids (mg/l) and Turbidity (NTU)													
	1996	1997	1998	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
<b>Crow Wing River (07010106-516)</b>														
<b>07010106-515</b>														
Total suspended solids														
Qtr2							6.9				6.9			
Qtr3							4.7				4.7			
Turbidity														
Qtr3							3.5				3.5			
Qtr4							5.0				5.0			
<b>07010106-523</b>														
Total suspended solids														
Qtr4							3.9				3.9			
Turbidity														
Qtr4							2.2				2.2			

**Attachment B**  
**Permit Table**



LINE 3 REPLACEMENT PROJECT  
INDIVIDUAL NPDES/SDS PERMIT SUPPLEMENT  
MAY 2019

Permits and Approvals Required			
Unit of Government	Type of Application	Status	Reason Required
USACE – St. Paul District	Section 10/404 Individual Permit	Application Submitted	Authorizes discharge of dredged and fill material into waters of the United States, including wetlands, and crossing of navigable waters of the United States
USACE – St. Paul District	Section 408 Authorization for Lost River	Review Request Submitted	Authorizes alterations, occupation, or use of USACE civil works projects
U.S. Fish and Wildlife Service	Section 7 Endangered Species Act Consultation (Federal endangered species)	Consultation Ongoing	Establishes conservation measures and authorizes, as needed, take of federally protected species
	Migratory Bird Treaty Act	Consultation Ongoing	Established conservation measures to protect migratory birds
	Non-Purposeful Take (Bald Eagle Nest Disturbance) Permit	Permit Issued	Allows for removal of a known bald eagle nest in proximity to construction activities
U.S. Bureau of Indian Affairs	Right-of-Way Grant	Application Submitted	Required to cross BIA trust, allotted, of fee lands. Requires National Environmental Policy Act ("NEPA") Review
FdL Resource Department	Section 401 Water Quality Certification ("WQC")	Permit Issued	Section 401 WQC required to issue the USACE Section 404/10 Permit; required for all waters of the FdL Reservation
	Standard Wetland Activity Permit	Permit Issued	Authorizes impacts to wetlands (and adjacent uplands affecting wetlands) within the exterior boundaries of the FdL Reservation, regardless of land ownership
	Land Use Permit	Pending Submittal	Required for crossing FdL land use districts
MPUC	Certificate of Need	Order Issued	Determines need for the pipeline, including questions of size, type, and timing
	Route Permit	Order Issued	Authorizes construction of the pipeline along a specific route, subject to certain conditions
MDNR	License to Cross Public Waters	Application Submitted	50-year license that allows for crossing of public waters with proposed utility
	Work in Public Waters Permit – Wetlands on Private Lands	Application Submitted	Authorizes in-water activities in public water wetlands located on private lands
	Work in Public Waters Permit – Willow River Bridge	Application Submitted	Authorizes in-water activities to construct a bridge over a public water
	License to Cross Public Lands	Application Submitted	50-year license that allows for crossing of public lands with proposed utility
	Leases – Access Roads	Applications Submitted	Authorizes use of MDNR-managed access roads during construction and/or operation

LINE 3 REPLACEMENT PROJECT  
INDIVIDUAL NPDES/SDS PERMIT SUPPLEMENT  
MAY 2019

Permits and Approvals Required			
Unit of Government	Type of Application	Status	Reason Required
	Individual Water Appropriation Permit – HDD/Hydrostatic Test	Application Submitted	Authorizes appropriation of water from surface water and groundwater sources
	Individual Water Appropriation Permit – Dust Control	Application Submitted	Authorizes appropriation of water from surface water sources
	Individual Water Appropriation Permit – Construction Dewatering	Application Submitted	Authorizes appropriation of groundwater associated with trench/excavation dewatering activities
	Endangered Species Permit	Application Submitted	Outlines plans for avoidance, minimization, and mitigation of take of state-listed species and authorizes take of individuals
	Gully 30 Fen Management Plan Authorization	Application Submitted	Outlines the construction, restoration, and monitoring procedures to be implemented and authorizes construction across the Gully 30 Fen
	Individual Water Appropriation Permit – Gully 30 Fen	Application Submitted	Authorizes withdrawal of groundwater associated with trench dewatering at the Gully 30 calcareous fen in accordance with the Fen Management Plan
MPCA	Section 401 Water Quality Certification and Antidegradation Assessment	Application Submitted	Section 401 Water Quality Certification is required to issue the USACE Section 404/10 Permit; antidegradation assessment supports the Industrial Hydrostatic Test Discharge and Construction Stormwater Permitting processes
	Clearbrook Terminal Air Quality Permit – Capped Emissions Permit	Application Submitted	Authorizes construction and operation at the modified Clearbrook Terminal
	NPDES Industrial Hydrostatic Test Discharge Permit	Application Submitted	Authorizes discharge of water from hydrostatic testing activities
	NPDES General Construction Stormwater Coverage – Pipeline and Facilities	Pending Submittal	Authorizes ground disturbance with approved protection measures to manage soil erosion and stormwater discharge on construction site, and removal of water that may accumulate in pipeline trench or within facility excavations
	NPDES General Construction Stormwater Coverage – Pipeyards	Permits Received; Stormwater Monitoring Ongoing	Authorizes ground disturbance with approved protection measures to manage soil erosion and stormwater discharge on construction site
Minnesota SHPO and Tribal Historic Preservation Offices	National Historic Preservation Act Section 106 Clearance, Minnesota Field Archaeology Act, and Minnesota Historic Sites Act	Consultation Ongoing	Ensures adequate consideration of impacts to significant cultural resources but especially National Register of Historical Properties eligible; Minnesota SHPO and Tribal Historic Preservation Offices are engaged through federal and state permitting processes

Permits and Approvals Required			
Unit of Government	Type of Application	Status	Reason Required
Minnesota Department of Agriculture	Agricultural Protection Plan	Plan Approved	Establishes measures for agricultural protection
Minnesota Department of Transportation	Road Crossing Permits	Submittals Ongoing	Authorizes crossings of state-jurisdictional roadways
	Temporary access/entrance permits	Submittals Ongoing	Authorizes access to private lands during construction from state highway right-of-way
Mississippi Headwaters Board	Local Land Use Review	Consultation Ongoing	Ensures compatibility with land use plan
Red Lake, Two Rivers, and Middle-Snake-Tamarac Watershed Districts	Watershed District Permit	Permits Received	Authorizes crossing of legal drains and ditches within watershed
Minnesota Department of Health and Drinking Water Supply Management Areas	Drinking Water Supply Management Area /Wellhead Protection Area Consultation	Notifications Submitted	Ensures pipeline construction and operation are compatible with goals of relevant plans
Minnesota Board of Water and Soil Resources / Wetland Conservation Act Local Government Units	Notice of Intent to Utilize Federal Approvals for Utilities Project Exemption	Notices Submitted	Notice of use of exemption required
Local/County	Permits pertaining to off-right-of-way yard use	Submittals Ongoing	Ensures compatibility with relevant land use plans
	Road crossing permits	Submittals Ongoing	Authorizes crossing of local and county jurisdictional roadways
	Construction haul road agreements	Submittals Ongoing	Authorizes use of local and county roads to haul oversized loads
	Temporary access/entrance permits	Submittals Ongoing	Authorizes access to private lands from local and county road right-of-way
	Short- to long-term leases – Access Roads	Submittals Ongoing	Authorizes use of temporary roads on local and county owned lands

## **Attachment C**

### **Water Appropriations and Discharge Table and Site Plans**

**Table C-1. Hydrostatic Test Discharge Locations**

<b>Discharge ID</b>	<b>Milepost (MP) <sup>1</sup></b>	<b>Legal Description</b>	<b>Latitude <sup>1</sup></b>	<b>Longitude <sup>1</sup></b>	<b>Proposed Hydrostatic Test</b>	<b>Source Water</b>	<b>Discharge Type</b>	<b>Maximum Discharge Volume (gallons)</b>
SD001	801.8	T160N R50W S4	48.70490	-97.11554	Mainline	Red River	Source Water	17,501,185
LA001	802.1	T160N R50W S9	48.70134	-97.11205	HDD (Red River and I-29)	Red River	Upland <sup>2</sup>	207,334
SD002	828.4	T157N R47W S16	48.414353	-96.735901	Mainline	Tamarac River	Source Water <sub>3</sub>	17,501,185
LA002	828.7	T157N R47W S16	48.41346	-96.73233	HDD	Tamarac River	Upland <sup>3</sup>	80,800
LA003	836.2	T156N R46W S18	48.33867	-96.61574	HDD	Middle River	Upland	93,743
SD003	836	T156 R46W S7	48.340697	-96.616977	Mainline (contingency)	Middle River	Source Water	10,185,701
LA004	843.2	T155N R46W S12	48.26478	-96.50879	HDD	Snake River	Upland	84,128
SD004	864.3	T153N R43W S32	48.03468	-96.20115	Mainline	Red Lake River	Source Water	14,065,707
LA005	864.8	T153N R43W S32	48.03462	-96.19953	HDD	Red Lake River	Upland	169,912
SD005	875.4	T151N R42W S9	47.91968	-96.04828	Mainline	Clearwater River	Source Water	14,065,707
LA006	875.8	T151N R42W S9	47.91706	-96.03966	HDD	Clearwater River	Upland	149,347
SD006	904	T149N R38W S15	47.72155	-95.51341	Mainline (contingency)	Lost River	Source Water	13,896,437
LA007	922.1	T147N R37W S21	47.53422	-95.37504	HDD	Clearwater River	Upland	150,469
SD007	922.3	T147N R37W S21	47.53358	-95.37488	Mainline	Clearwater River	Source Water	20,251,102
SD008	941	T145N R36W S35	47.33833	-95.21005	Mainline (contingency)	Mississippi River	Source Water <sub>9</sub>	13,896,437
LA008	941.2	T145N R36W S35	47.33633	-95.20698	HDD	Mississippi River	Upland	119,595
LA009	952.5	T143N R35W S20	47.18948	-95.13266	Mainline	Well #718159	Upland <sup>4, 11</sup>	9,120,665
LA010	964.4	T141N R35W S20	47.02164	-95.14758	HDD (Hay Creek)	Well #763975	Upland <sup>4</sup>	153,140
-	966.1	T141N R35W S29	46.99645	-95.14790	HDD (Hay Creek and Straight River)	Sloan Lake	Upland <sup>4</sup>	-
-	966.2	T141N R35W S29	46.99415	-95.14620	Spread	Sloan Lake	Source Water <sub>4</sub>	-
SD009	967.1	T141N R35W S5	47.05905	-95.13720	Mainline (contingency)	Island Lake	Source Water	9,120,665

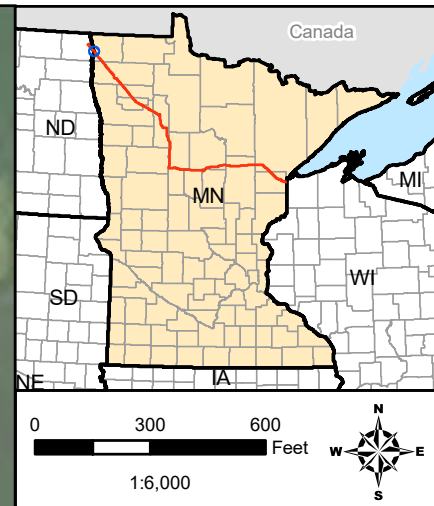
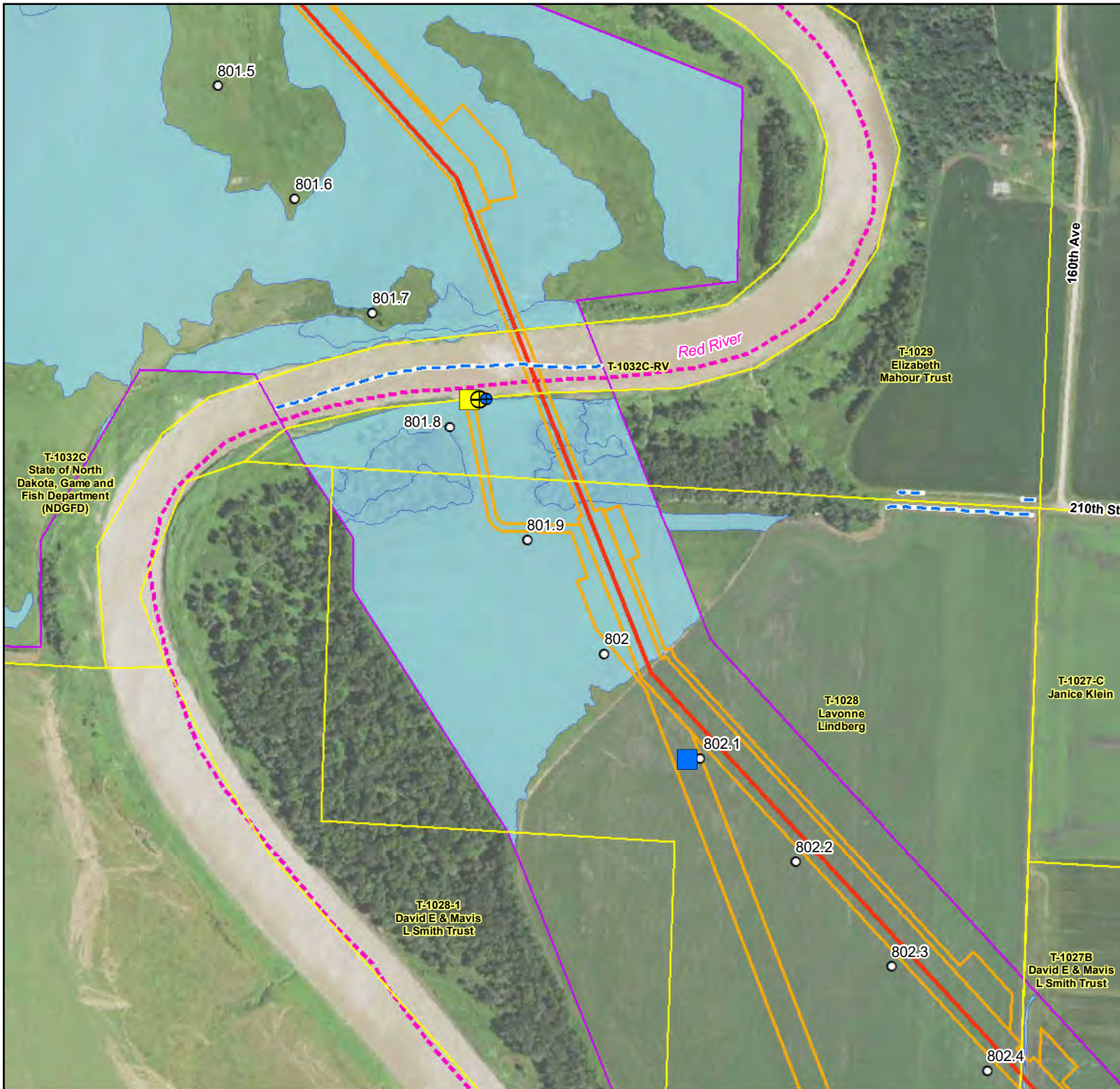
**Table C-1. Hydrostatic Test Discharge Locations**

Discharge ID	Milepost (MP) <sup>1</sup>	Legal Description	Latitude <sup>1</sup>	Longitude <sup>1</sup>	Proposed Hydrostatic Test	Source Water	Discharge Type	Maximum Discharge Volume (gallons)
LA011	973.2	T140N R35W S32	46.89679	-95.14089	HDD (Straight River)	Well #763975	Upland <sup>4, 12</sup>	202,000
LA012	966.1	T141N R35W S29	46.99563	-95.14598	Mainline	Well #763975	Upland <sup>4, 11</sup>	9,120,665
LA013	983.4	T139N R35W S35	46.81461	-95.06210	HDD	Shell River	Upland	125,845
SD010	985.3	T139N R34W S31	46.81971	-95.02465	Mainline	Shell River	Source Water <sub>5</sub>	12,080,000
LA014	986.0	T139N R34W S32	46.81924	-95.01115	HDD	Shell River	Upland <sup>13</sup>	233,422
LA015	991.0	T138N R34W S1	46.79990	-94.92117	HDD	Shell River	Upland	94,544
LA016	993.1	T138N R33W S5	46.79437	-94.87918	HDD	Crow Wing River	Upland	95,354
SD011	993.3	T138N R33W S5	46.79476	-94.87569	Mainline (contingency)	Crow Wing River	Source Water	2,937,000
-	<del>1013.4</del>	<del>T138N R30W S10</del>	<del>46.77897</del>	<del>-94.46018</del>	Spread	<del>Clear Lake</del>	<del>Source Water <sub>5</sub></del>	-
SD012	1013.4	T138N R30W S10	46.77897	-94.46008	Mainline (contingency)	Clear (Eagle) Lake	Source Water	6,893,000
SD013	1017.3	T138N R29W S8	46.78155	-94.37765	Mainline	Pine River	Source Water <sub>6</sub>	9,143,000
SD014	1017.3	T138N R29W S8	46.78147	-94.37731	Mainline	Pine River	Source Water <sub>6</sub>	6,893,000
-	<del>1037.6</del>	<del>T139N R26W S20</del>	<del>46.83924</del>	<del>-94.00374</del>	Spread	<del>Andrus Lake</del>	<del>Source Water <sub>6</sub></del>	-
-	<del>1066.4</del>	<del>T51N R24W S34</del>	<del>46.86498</del>	<del>-93.43067</del>	Spread	<del>Willow River</del>	<del>Source Water</del>	-
SD015	1066.4	T51N R24W S31	46.865043	-93.430623	Mainline (contingency)	Willow River	Source Water	20,047,913 <sup>14</sup>
SD016	<del>1066.6</del>	<del>T51N R24W S34</del>	<del>46.86600</del>	<del>-93.42620</del>	HDD	<del>Willow River</del>	<del>Wetland <sup>-10</sup></del>	<del>282,030</del>
LA018	1066.6	T51N R24W S31	46.86465	-93.42778	HDD	Willow River	Upland	141,015
LA017	1069.3	T51N R24W S27	46.87417	-93.37158	HDD	Mississippi River	Upland <sup>7</sup>	132,554
SD017	1069.6	T51N R24W S27	46.87332	-93.36462	Mainline	Mississippi River	Source Water	27,250,398
SD018	1085.8	T51N R21W S20	46.88879	-93.03025	Mainline	East Savanna River	Source Water	14,496,068 <sup>14</sup>
SD019	<del>1086.0</del>	<del>T51N R21W S20</del>	<del>46.88917</del>	<del>-93.02743</del>	HDD	<del>East Savanna River</del>	<del>Wetland <sup>-10</sup></del>	<del>338,434</del>

**Table C-1. Hydrostatic Test Discharge Locations**

Discharge ID	Milepost (MP) <sup>1</sup>	Legal Description	Latitude <sup>1</sup>	Longitude <sup>1</sup>	Proposed Hydrostatic Test	Source Water	Discharge Type	Maximum Discharge Volume (gallons)
LA019	1085.7	T51N R21W S20	46.89527	-93.03340	HDD	East Savanna River	Upland	169,217
SD020	1120.3	T48N R17W S23	46.63153	-92.45697	Mainline	Chub Lake	Source Water <sub>8</sub>	7,343,500
-	<del>1121.0</del>	<del>T48N R17W S24</del>	<del>46.62313</del>	<del>-92.43608</del>	<del>Spread</del>	<del>Venoah Lake</del>	<del>Source Water <sub>8</sub></del>	-
<p>Contingency discharge locations are shaded and would only be used should a primary discharge location be unavailable. The maximum discharge volume for mainline discharges includes contingencies because total discharge volumes may vary depending on the source water. Actual test volumes are included for HDD discharges.</p> <p>1 Micro re-alignments presented in red were done to ensure this application is consistent with the MDNR Individual Water Appropriation Application for HDD and hydrostatic testing activities. Latitude and longitude coordinates are approximate; source water discharge locations may need to be shifted depending on water levels at the time of hydrostatic test activities. Projection is NAD 83, State Plane Minnesota North.</p> <p>2 Enbridge updated the discharge location as Enbridge's NPDES/SDS infiltration analysis identified a more suitable location.</p> <p>3 Enbridge updated the appropriation and discharge locations for the Tamarac River crossing and Tamarac HDD as part of route revisions to avoid a culturally sensitive site.</p> <p>4 As requested by the MDNR, Enbridge eliminated Sloan Lake as a surface water source and discharge location and has replaced this source with Well #718159 and Well #763975 with four corresponding upland discharge locations.</p> <p>5 As requested by MDNR, Enbridge eliminated Clear (Eagle) Lake as a surface water source and discharge location and has replaced this source and discharge location with Shell River.</p> <p>6 As requested by MDNR, Enbridge eliminated Andrus Lake as a surface water source and discharge location and has replaced this source and discharge location with Pine River (2 locations).</p> <p>7 Enbridge updated the discharge location for this installation as Enbridge's NPDES/SDS infiltration analysis identified a more suitable location.</p> <p>8 As requested by MDNR, Enbridge eliminated Venoah Lake as a surface water source and discharge location and has replaced this source and discharge location with Chub Lake.</p> <p>9 Enbridge eliminated Mississippi River MP 941.0 as a mainline contingency surface water source and discharge location.</p> <p>10 As requested by MPCA, Enbridge identified upland discharge locations for the Willow River and East Savanna River HDDs and eliminated the option to discharge to a wetland.</p> <p>11 Enbridge updated the discharge location due to landowner not allowing dewatering on their property.</p> <p>12 Enbridge lengthened the HDD which required a longer pull string and revised discharge location.</p> <p>13 Enbridge updated the discharge location to minimize impacts to traffic on Highway 6. The HDD pull string and discharge were moved east of the highway.</p> <p>14 Enbridge added a source water discharge contingency for the HDD and increased the maximum volume accordingly.</p>								





- Mileposts
  - ⊕ HDD Appropriation
  - ⊕ Spread Appropriation
  - HDD Discharge
  - Spread Discharge
  - L3R Centerline
  - L3R Construction Workspace
  - Survey Corridor
  - - - Delineated Waterbody
  - - - Delineated Wetland
  - - - PWI Watercourse
  - Tract Boundary
- Data source: 2017 NAIP Aerial, MDNR, MNDOT, Enbridge

## Red River - MN

### Water Appropriations and Discharge Site Plan

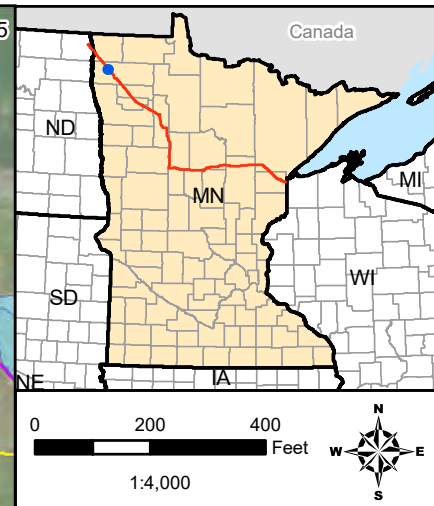
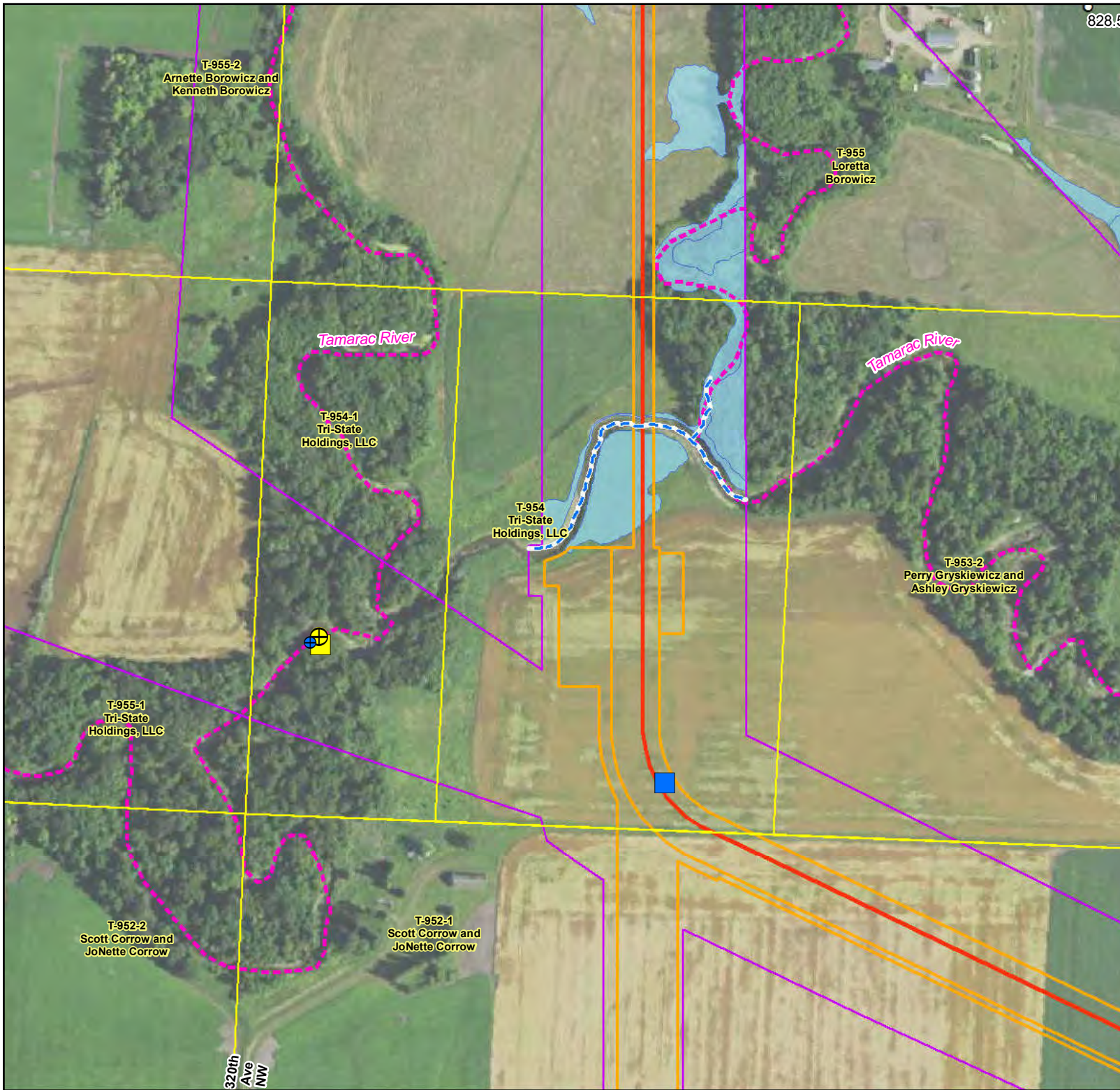
#### Line 3 Replacement Project

#### Kittson County, Minnesota



For Environmental Review Purposes Only





- Mileposts
- ⊕ HDD Appropriation
- ⊕ Spread Appropriation
- HDD Discharge
- Spread Discharge
- L3R Centerline
- L3R Construction Workspace
- Survey Corridor
- Delineated Waterbody
- Delineated Wetland
- PWI Watercourse
- Tract Boundary

Data source: 2017 NAIP Aerial, MDNR, MNDOT, Enbridge

**Tamarac River**

**Water Appropriations  
and Discharge Site Plan**

**Line 3 Replacement Project**

**Marshall County, Minnesota**

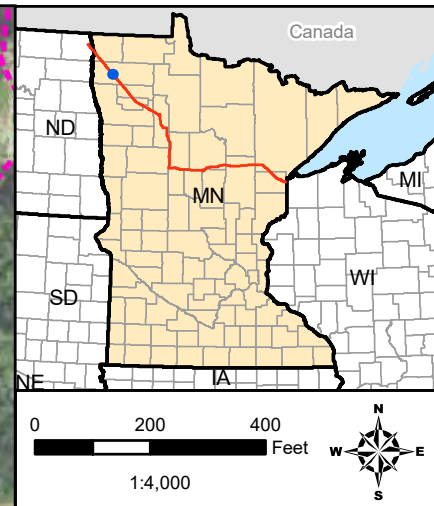
**ENBRIDGE**

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Date: (5/22/2019)





- Mileposts
  - HDD Appropriation
  - HDD Discharge
  - L3R Centerline
  - ▭ L3R Construction Workspace
  - ▭ Survey Corridor
  - - - Delineated Waterbody
  - Delineated Wetland
  - - - PWI Watercourse
  - ▭ Tract Boundary
- Data source: 2017 NAIP Aerial, MDNR, MNDOT, Enbridge

**Middle River**

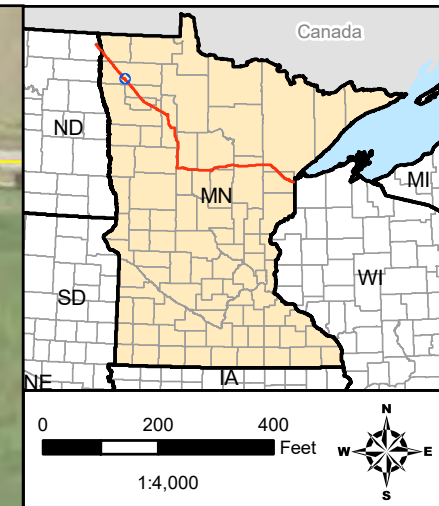
**Water Appropriations and Discharge Site Plan**

**Line 3 Replacement Project**

**Marshall County, Minnesota**

  
For Environmental Review Purposes Only





- Mileposts
  - HDD Appropriation
  - HDD Discharge
  - L3R Centerline
  - L3R Construction Workspace
  - Survey Corridor
  - - - Delineated Waterbody
  - - - Delineated Wetland
  - - - PWI Watercourse
  - Tract Boundary
- Data source: 2017 NAIP Aerial, MDNR, MNDOT, Enbridge

## Snake River

### Water Appropriations and Discharge Site Plan

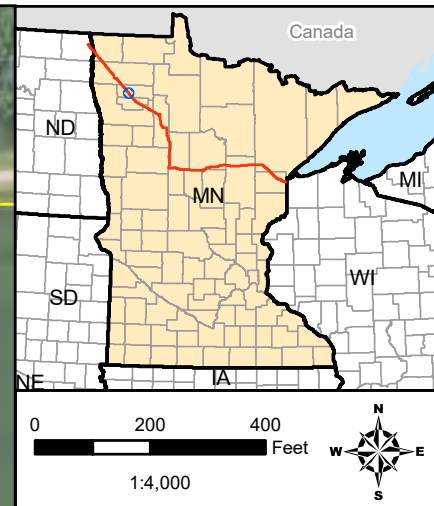
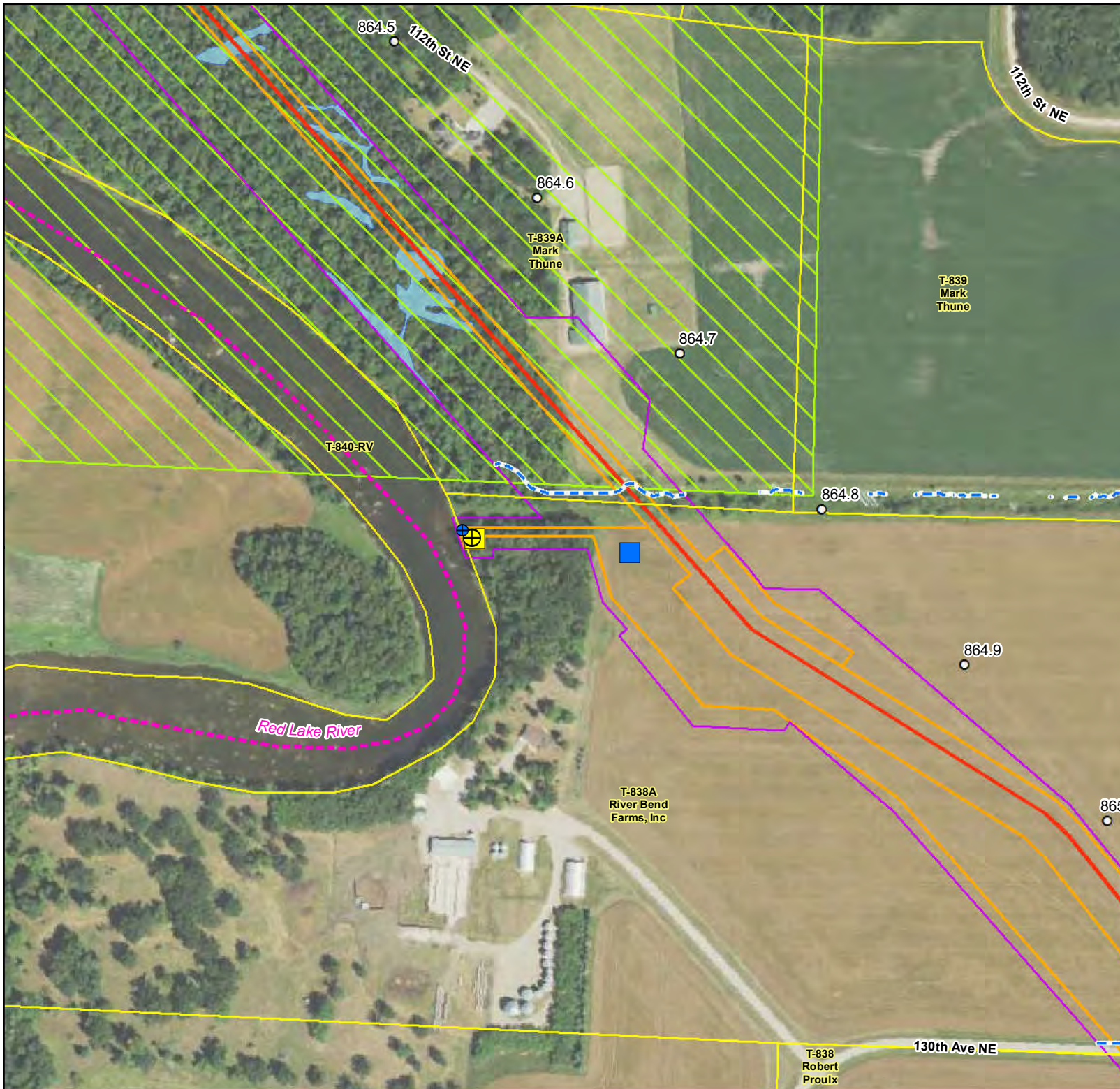
#### Line 3 Replacement Project

#### Marshall County, Minnesota



For Environmental Review Purposes Only






- Mileposts
  - ⊕ HDD Appropriation
  - ⊕ Spread Appropriation
  - HDD Discharge
  - Spread Discharge
  - L3R Centerline
  - L3R Construction Workspace
  - Survey Corridor
  - Delineated Waterbody
  - Delineated Wetland
  - PWI Watercourse
  - MDNR Admin Land
  - Tract Boundary
- Data source: 2017 NAIP Aerial, MDNR, MNDOT, Enbridge

## Red Lake River

### Water Appropriations and Discharge Site Plan

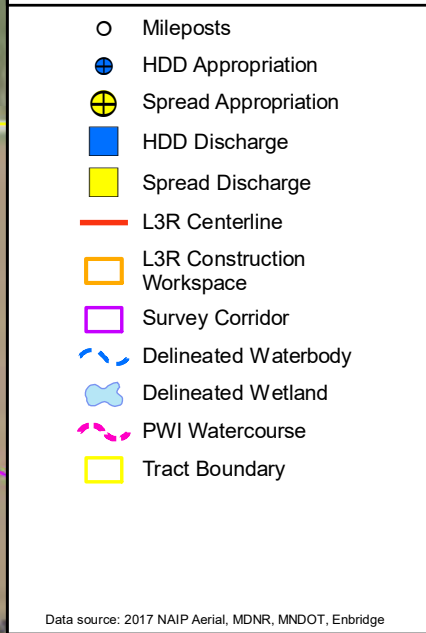
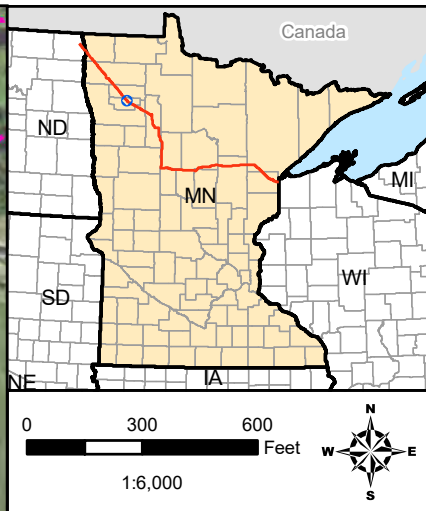
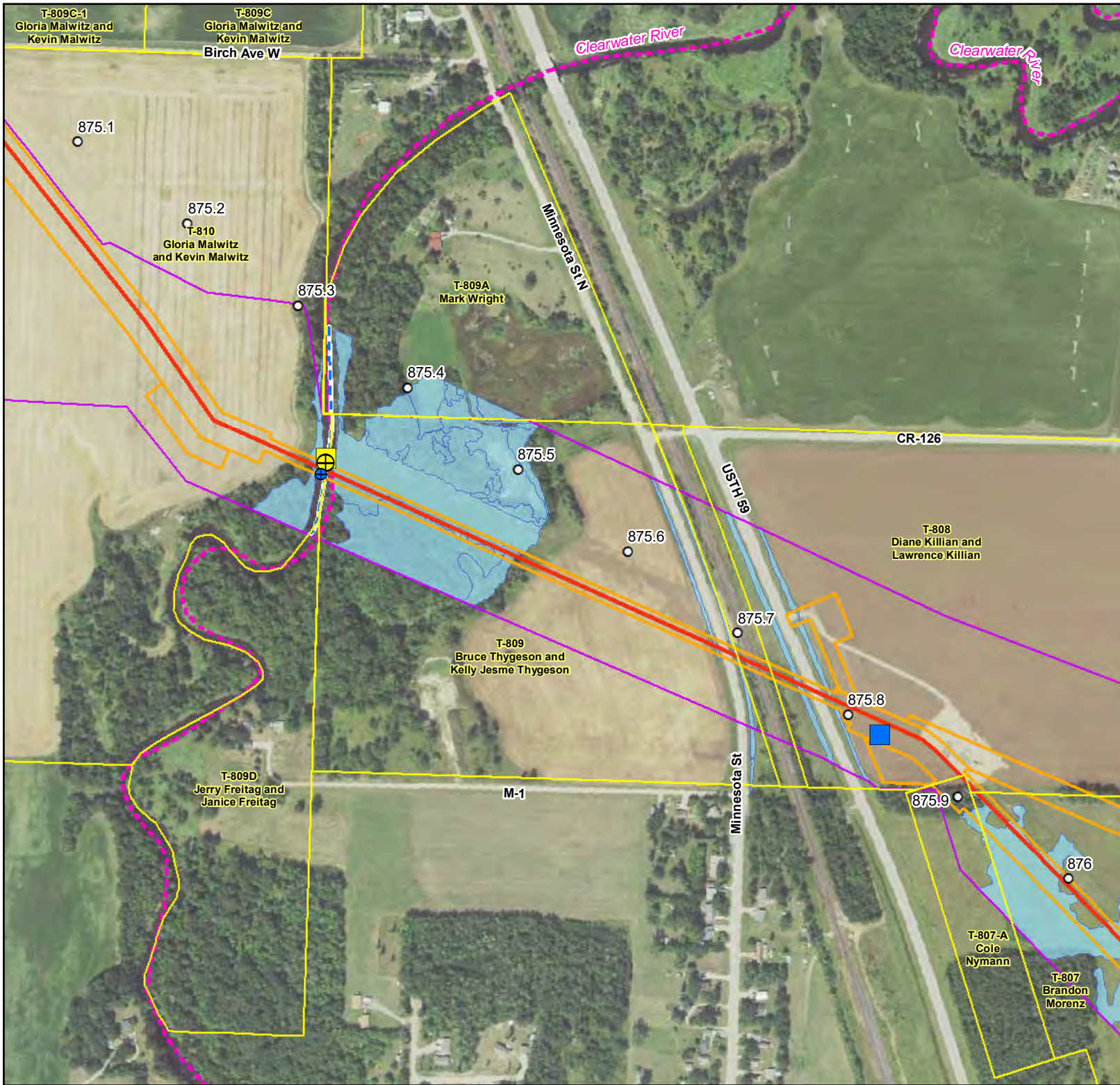
#### Line 3 Replacement Project

#### Pennington County, Minnesota



For Environmental Review Purposes Only





## Clearwater River

### Water Appropriations and Discharge Site Plan

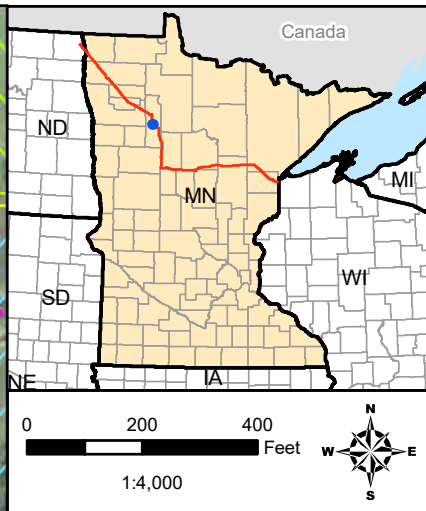
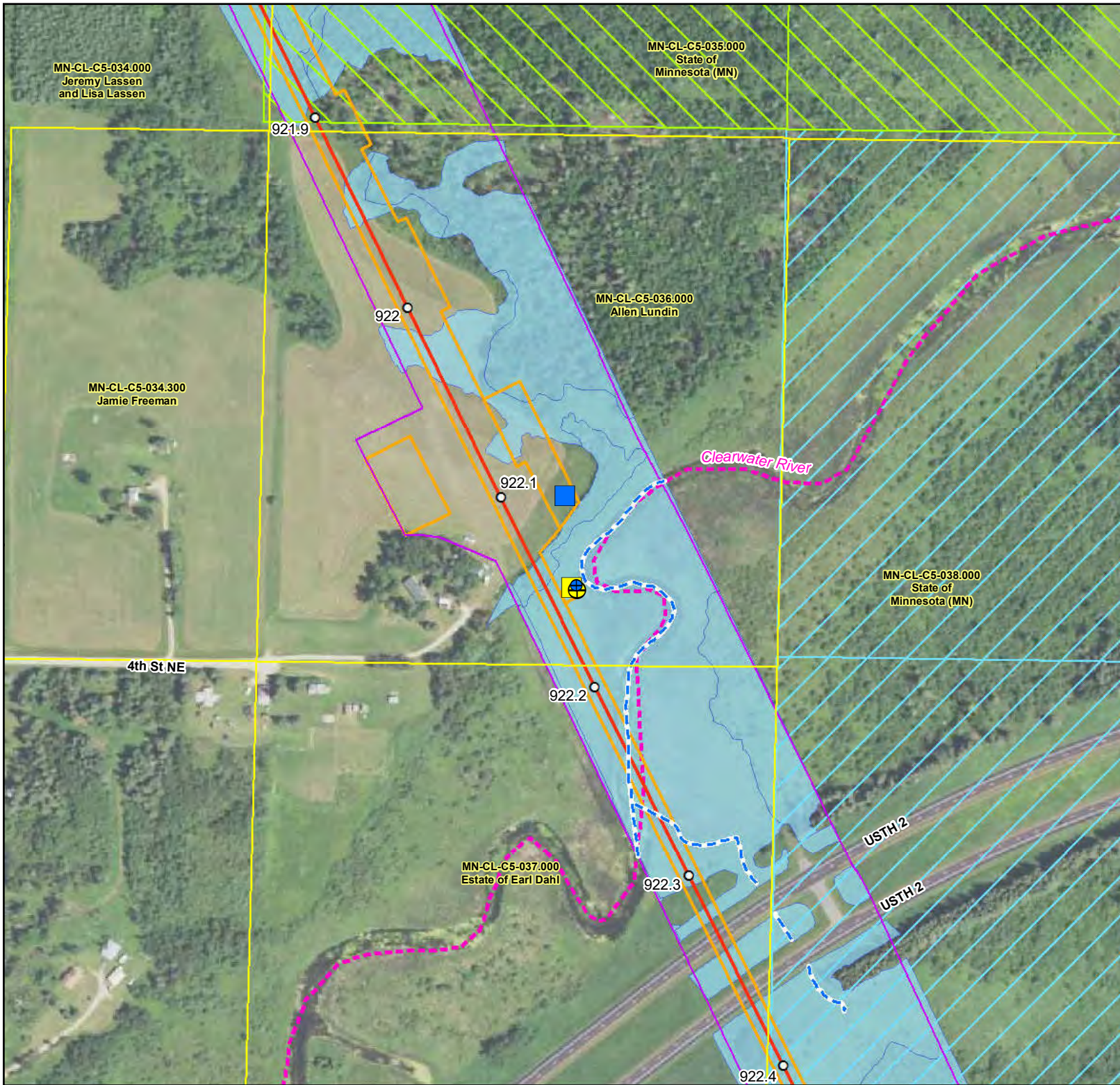
#### Line 3 Replacement Project

#### Red Lake County, Minnesota



For Environmental Review Purposes Only





- Mileposts
  - ⊕ HDD Appropriation
  - ⊕ Spread Appropriation
  - HDD Discharge
  - Spread Discharge
  - L3R Centerline
  - L3R Construction Workspace
  - Survey Corridor
  - - - Delineated Waterbody
  - - - Delineated Wetland
  - - - PWI Watercourse
  - ▨ MDNR Admin Land
  - ▨ County Tax Forfeit Land
  - ▨ Tract Boundary
- Data source: 2017 NAIP Aerial, MDNR, MNDOT, Enbridge

**Clearwater River**

**Water Appropriations and Discharge Site Plan**

**Line 3 Replacement Project**

**Clearwater County, Minnesota**

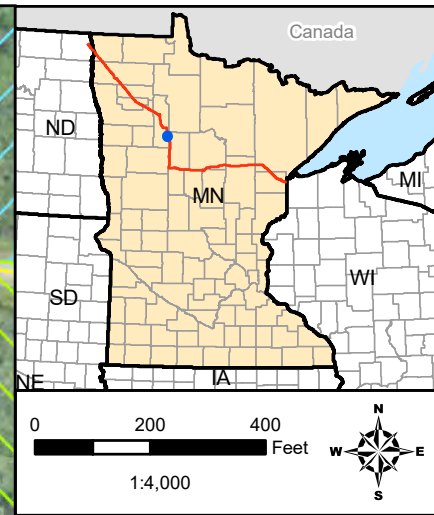
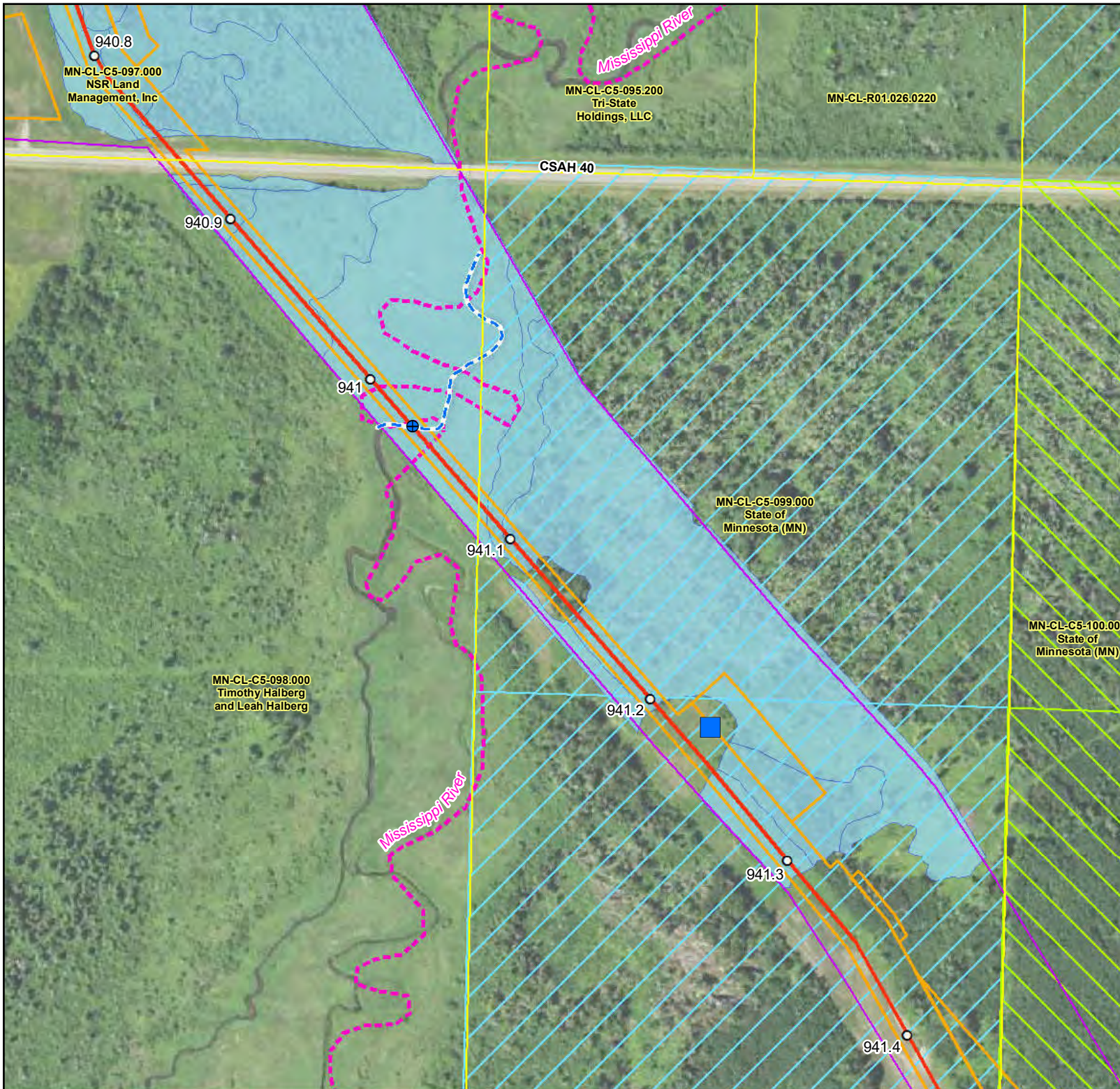
**ENBRIDGE**

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Date: (5/22/2019)





- Mileposts
  - HDD Appropriation
  - HDD Discharge
  - L3R Centerline
  - L3R Construction Workspace
  - Survey Corridor
  - - - Delineated Waterbody
  - - - Delineated Wetland
  - - - PWI Watercourse
  - ▨ MDNR Admin Land
  - ▨ County Tax Forfeit Land
  - ▨ Tract Boundary
- Data source: 2017 NAIP Aerial, MDNR, MNDOT, Enbridge

**Mississippi River**

**Water Appropriations and Discharge Site Plan**

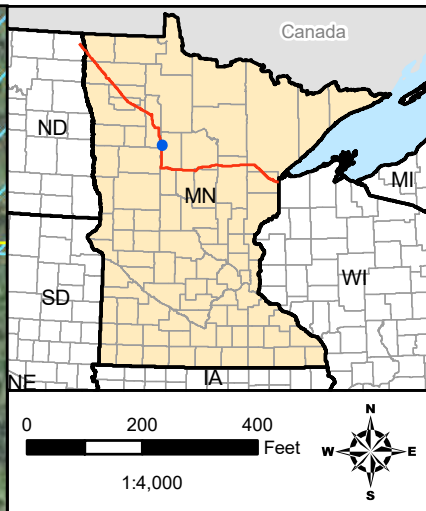
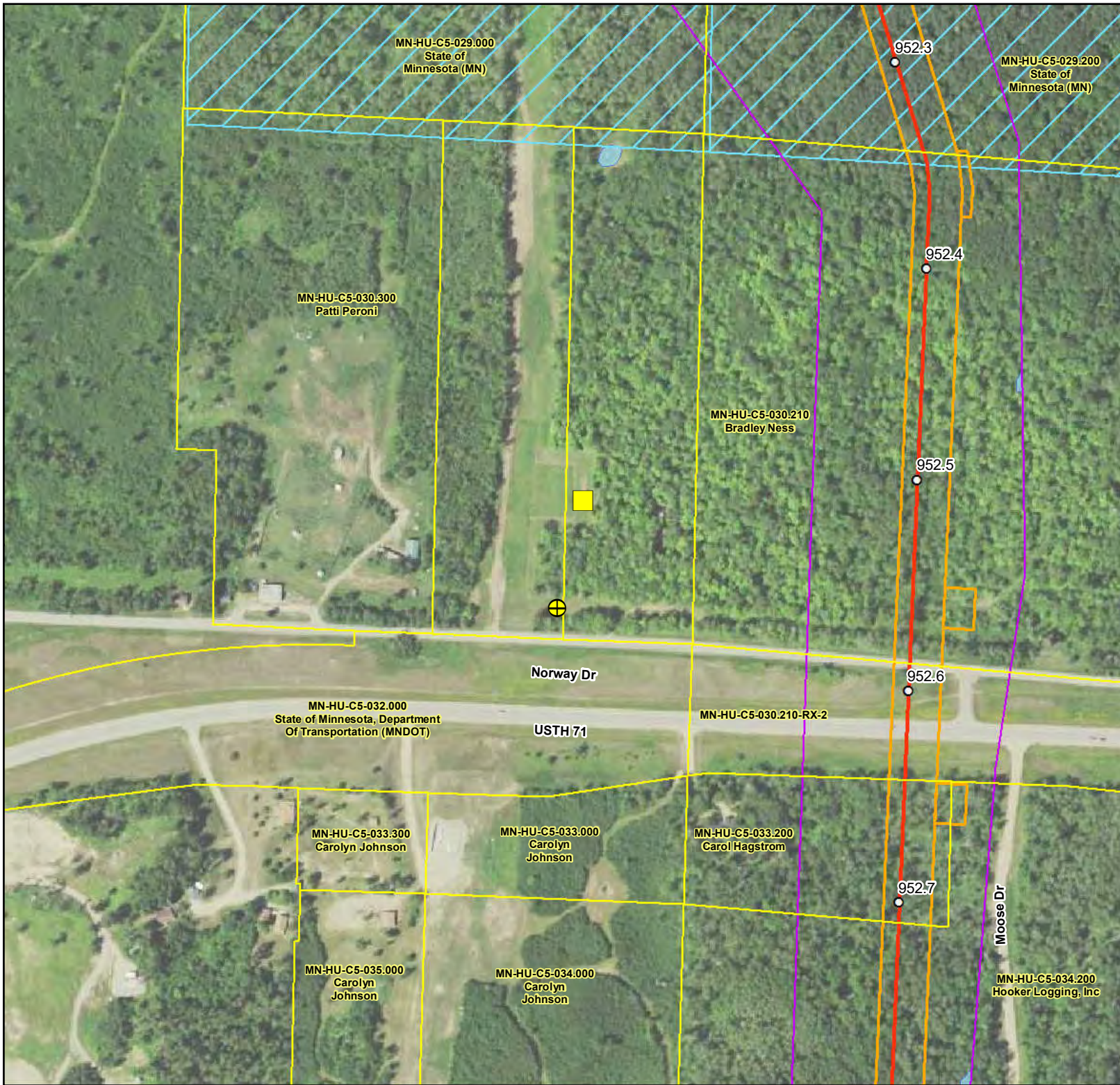
**Line 3 Replacement Project**

**Clearwater County, Minnesota**

  
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Date: (5/22/2019) Source: Z:\Clients\E\_H\Enbridge\Line\_3\_Full\_Replacement\Permitting\State\Water\Appropriations\2019\_01\Surface\_Water\NPDES\_Permit\_Figures\L3R\_NPDES\_Appropriations.mxd





- Mileposts
- ⊕ Spread Appropriation
- Spread Discharge
- L3R Centerline
- L3R Construction Workspace
- Survey Corridor
- ▨ Delineated Wetland
- ▨ County Tax Forfeit Land
- Tract Boundary

Data source: 2017 NAIP Aerial, MDNR, MNDOT, Enbridge

**Well ID 718159**

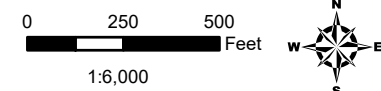
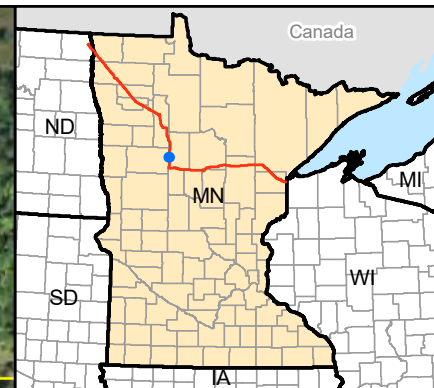
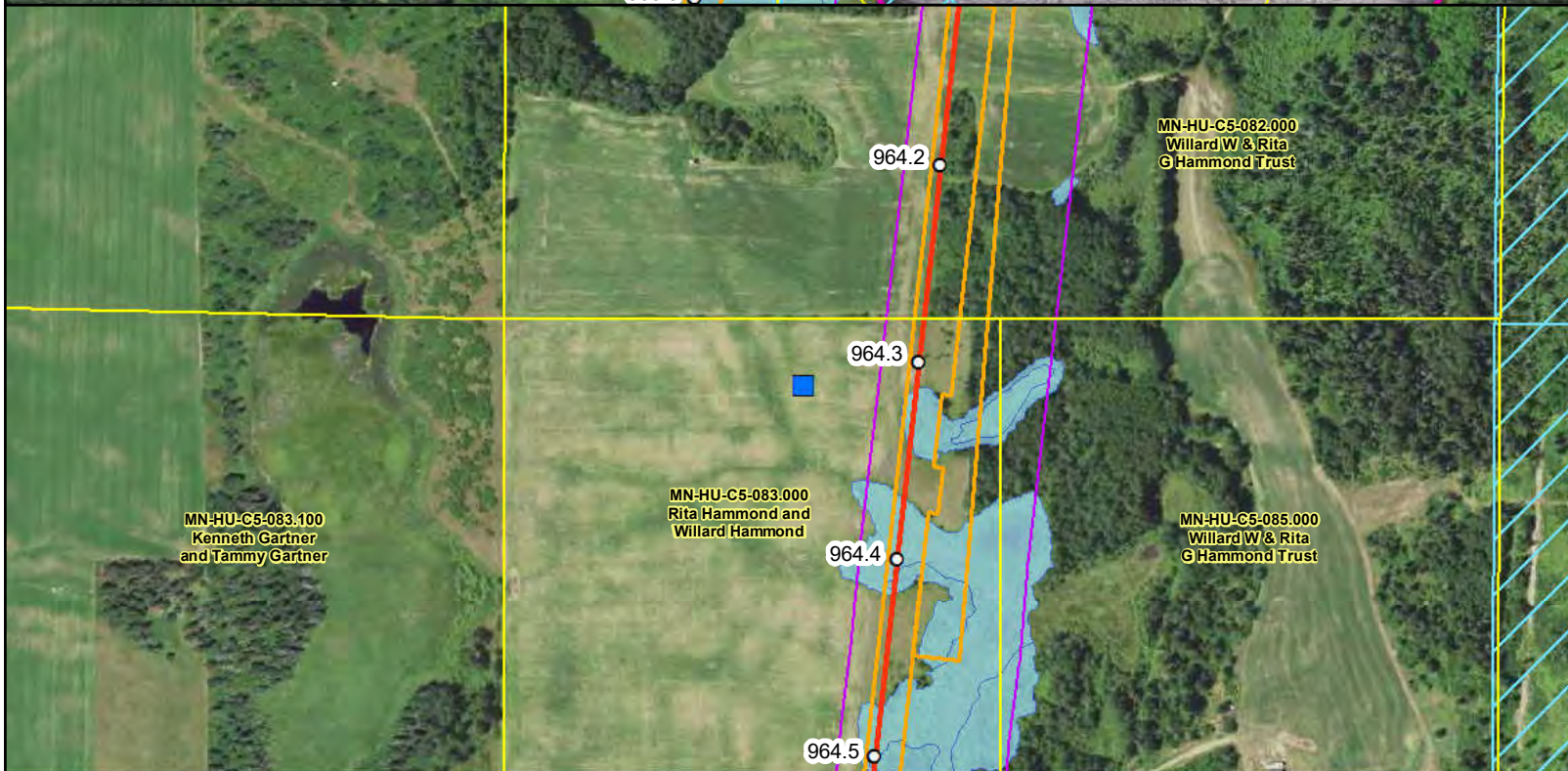
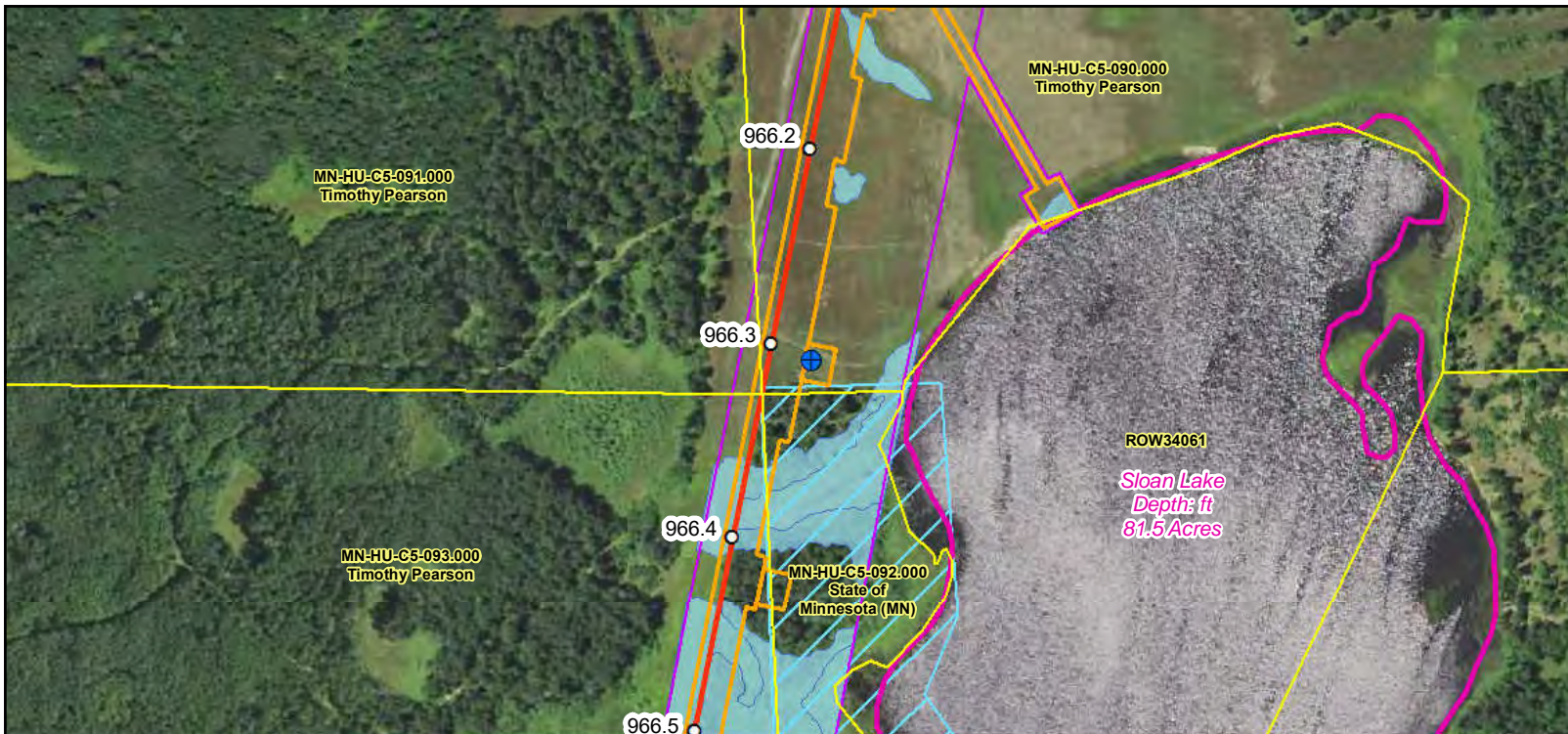
**Water Appropriations  
and Discharge Site Plan**

**Line 3 Replacement Project**

**Hubbard County, Minnesota**







- Milepost
- ⊕ HDD Appropriation
- HDD Discharge
- L3R Centerline
- ▭ L3R Construction Workspace
- ▭ Survey Corridor
- - - Delineated Waterbody
- ▭ Delineated Wetland
- - - PWI Watercourse
- ▭ PWI Basin
- ▭ Tract Boundary
- ▭ County Tax Forfeit Land

Data source: 2017 NAIP Aerial, MDNR, MNDOT, Enbridge

**Well ID 763975**

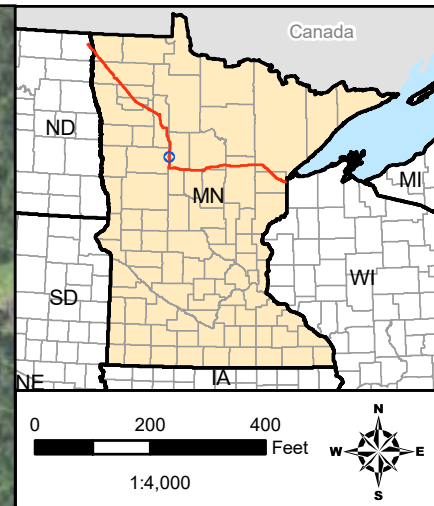
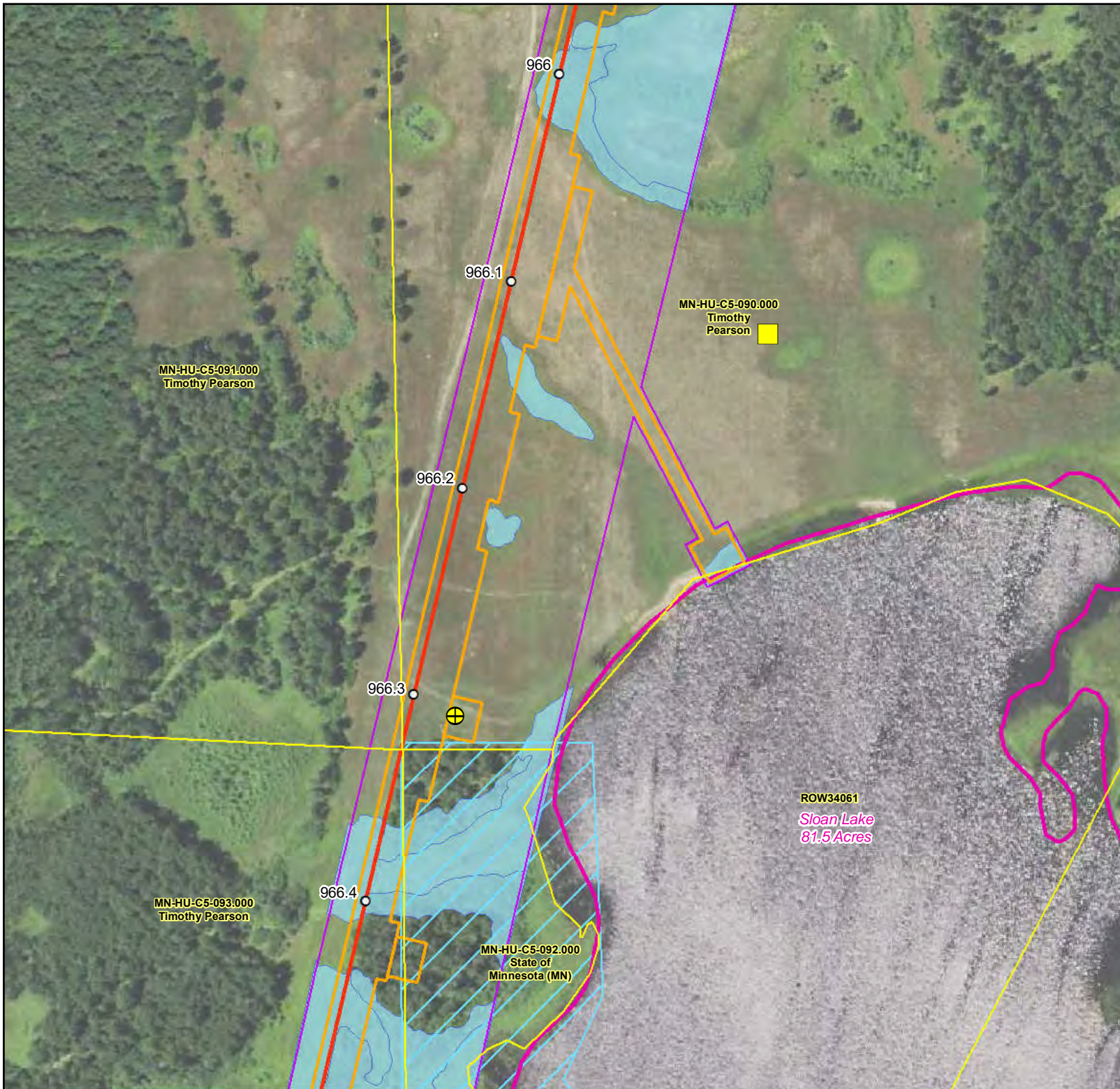
**Water Appropriations  
and Discharge Site Plan**

**Line 3 Replacement Project  
Hubbard County, Minnesota**



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Date: (5/22/2019)





- Mileposts
- ⊕ Spread Appropriation
- Spread Discharge
- L3R Centerline
- L3R Construction Workspace
- Survey Corridor
- ⬡ Delineated Wetland
- ⬡ PWI Basin
- ⬡ County Tax Forfeit Land
- Tract Boundary

Data source: 2017 NAIP Aerial, MDNR, MNDOT, Enbridge

**Well ID 763975**

**Water Appropriations  
and Discharge Site Plan**

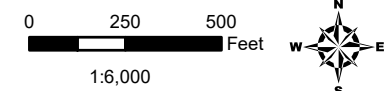
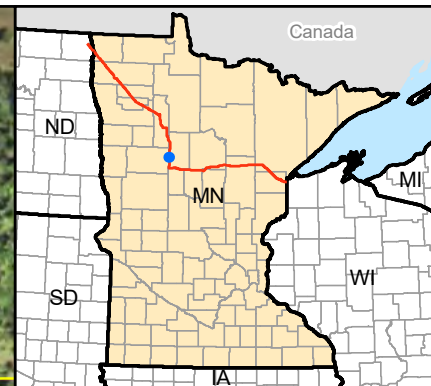
**Line 3 Replacement Project**

**Hubbard County, Minnesota**



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Date: (5/22/2019)





- Milepost
- ⊕ HDD Appropriation
- HDD Discharge
- L3R Centerline
- L3R Construction Workspace
- Survey Corridor
- - - Delineated Waterbody
- Delineated Wetland
- - - PWI Watercourse
- PWI Basin
- Tract Boundary
- County Tax Forfeit Land

Data source: 2017 NAIP Aerial, MDNR, MNDOT, Enbridge

**Well ID 763975**

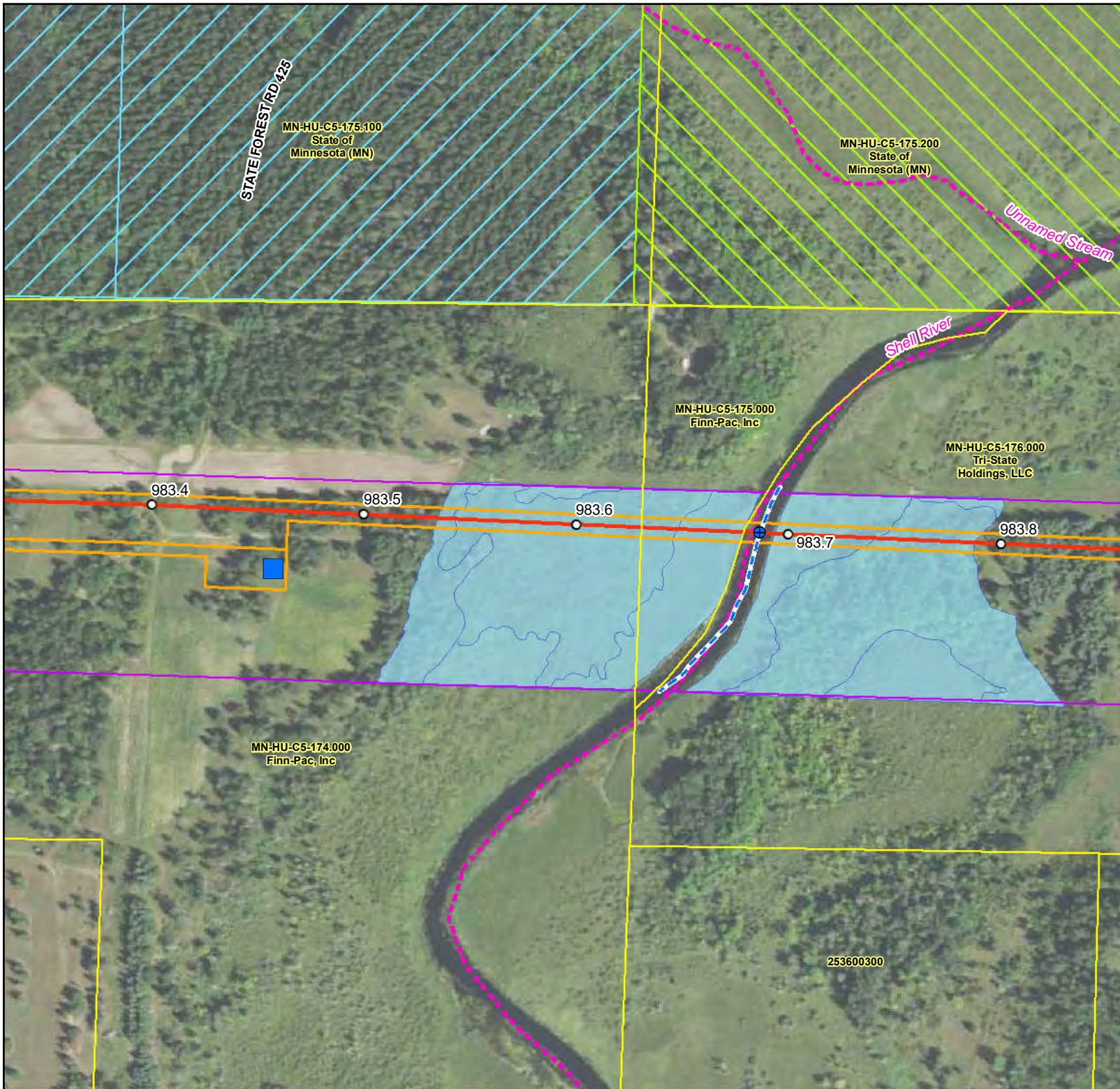
**Water Appropriations  
and Discharge Site Plan**

**Line 3 Replacement Project**

**Hubbard County, Minnesota**








- Mileposts
  - ⊕ HDD Appropriation
  - HDD Discharge
  - L3R Centerline
  - L3R Construction Workspace
  - Survey Corridor
  - - - Delineated Waterbody
  - ☁ Delineated Wetland
  - - - PWI Watercourse
  - ▨ MDNR Admin Land
  - ▨ County Tax Forfeit Land
  - Tract Boundary
- Data source: 2017 NAIP Aerial, MDNR, MNDOT, Enbridge

## Shell River

### Water Appropriations and Discharge Site Plan

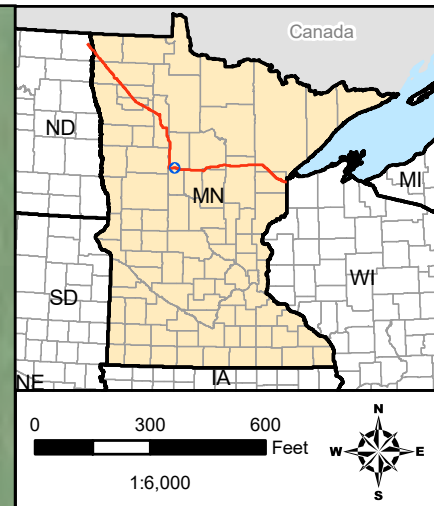
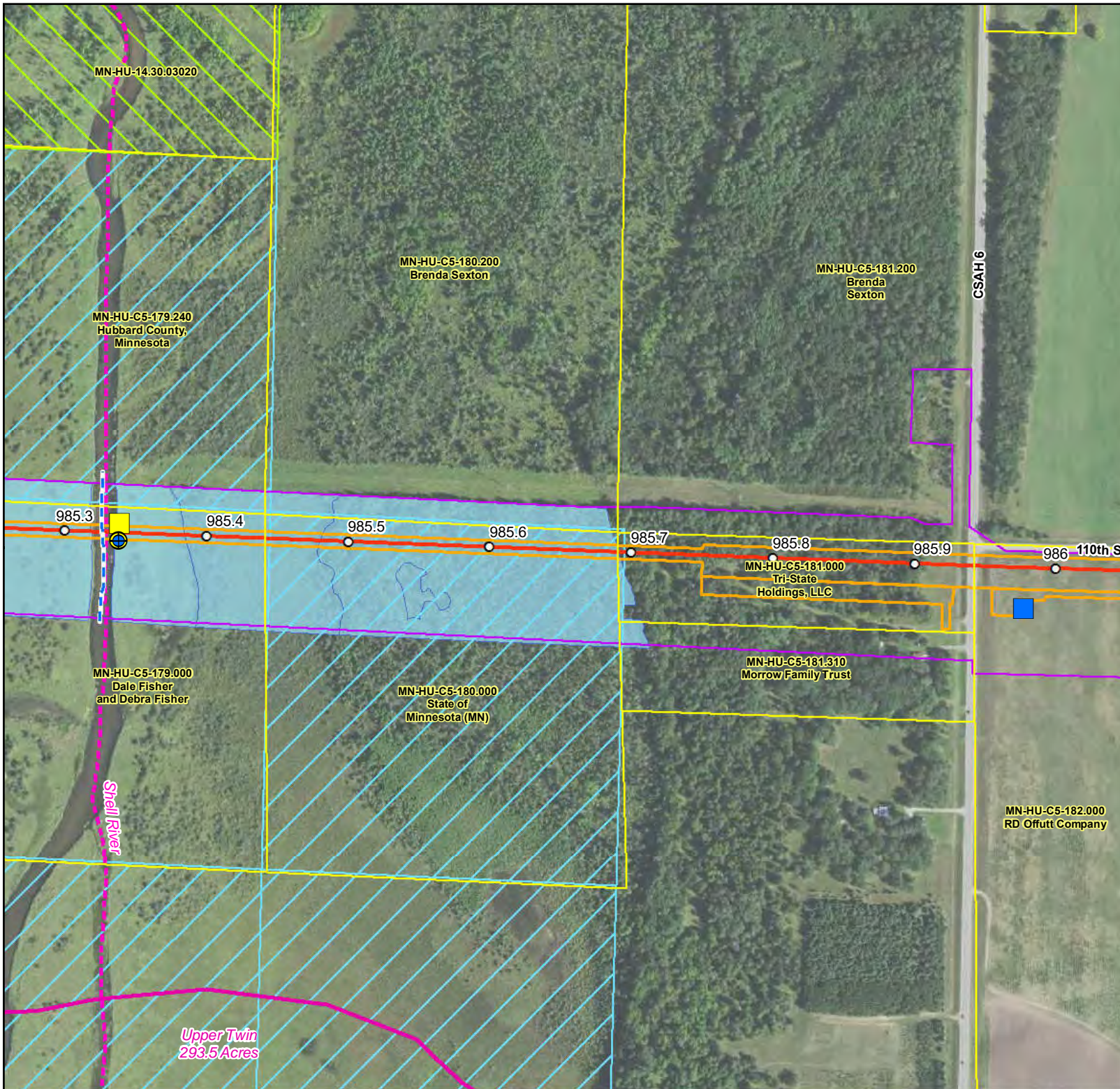
#### Line 3 Replacement Project

#### Hubbard County, Minnesota



For Environmental Review Purposes Only





- Mileposts
  - ⊕ HDD Appropriation
  - ⊕ Spread Appropriation
  - HDD Discharge
  - Spread Discharge
  - L3R Centerline
  - L3R Construction Workspace
  - Survey Corridor
  - - - Delineated Waterbody
  - - - Delineated Wetland
  - - - PWI Watercourse
  - ⊕ PWI Basin
  - ▨ MDNR Admin Land
  - ▨ County Tax Forfeit Land
  - ▨ Tract Boundary
- Data source: 2017 NAIP Aerial, MDNR, MNDOT, Enbridge

**Shell River**

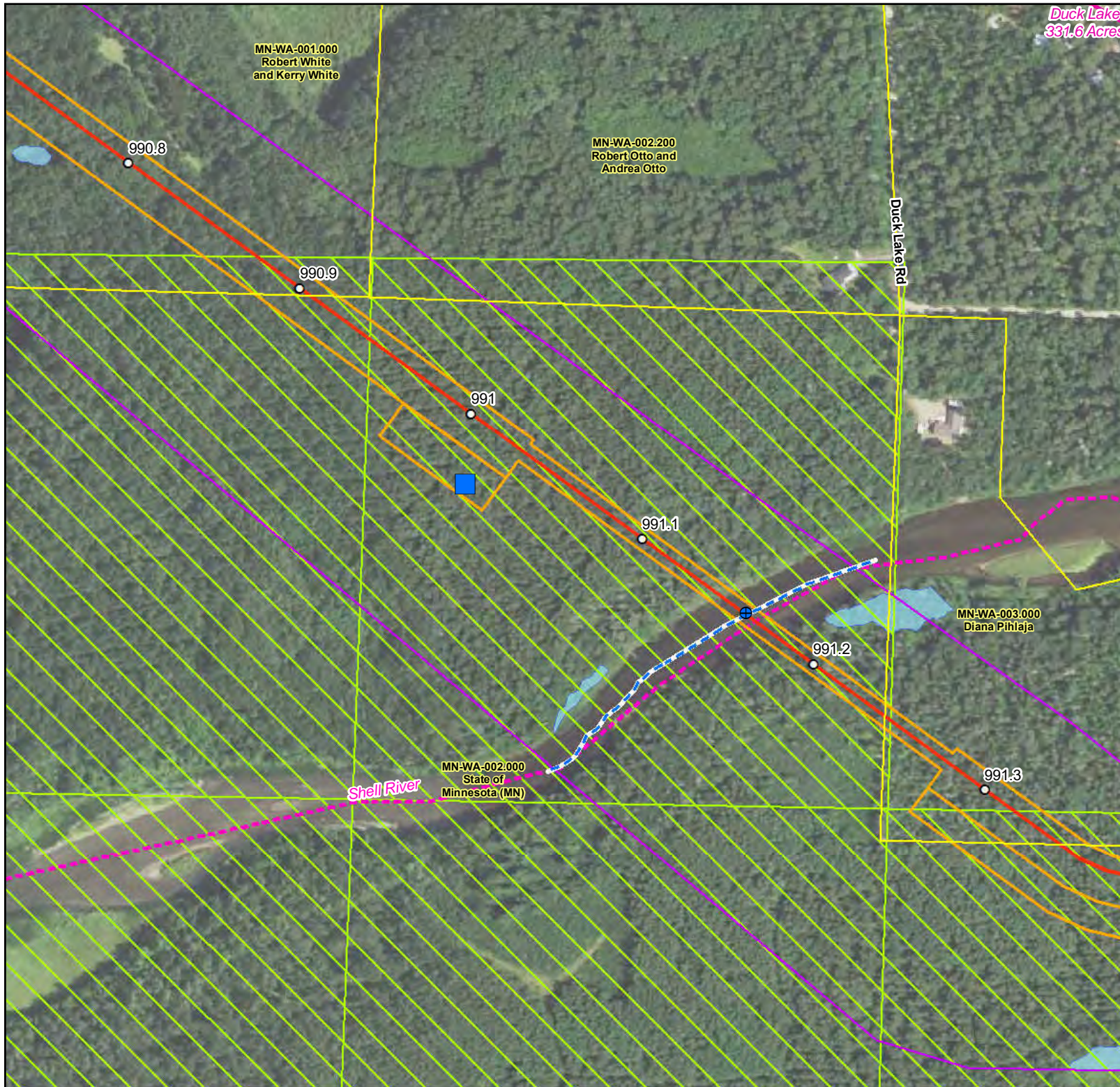
**Water Appropriations  
and Discharge Site Plan**

**Line 3 Replacement Project**

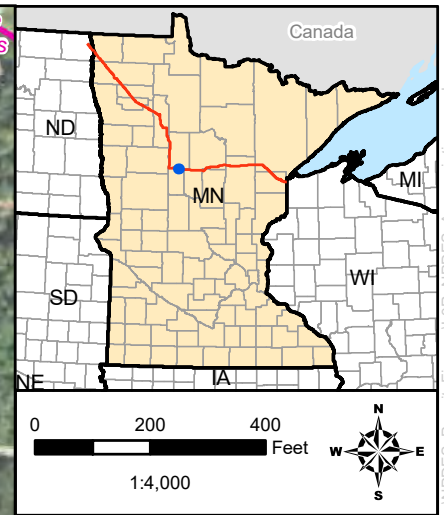
**Hubbard County, Minnesota**

**ENBRIDGE**  
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Duck Lake  
331.6 Acres



- Mileposts
- ⊕ HDD Appropriation
- HDD Discharge
- L3R Centerline
- L3R Construction Workspace
- ▭ Survey Corridor
- - - Delineated Waterbody
- ☁ Delineated Wetland
- - - PWI Watercourse
- ⬭ PWI Basin
- ▭ MDNR Admin Land
- ▭ Tract Boundary


Data source: 2017 NAIP Aerial, MDNR, MNDOT, Enbridge

## Shell River

### Water Appropriations and Discharge Site Plan

### Line 3 Replacement Project

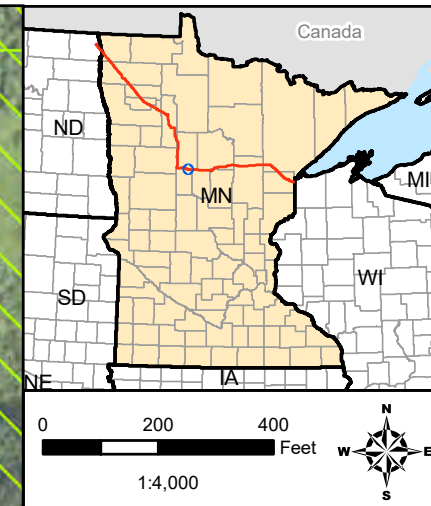
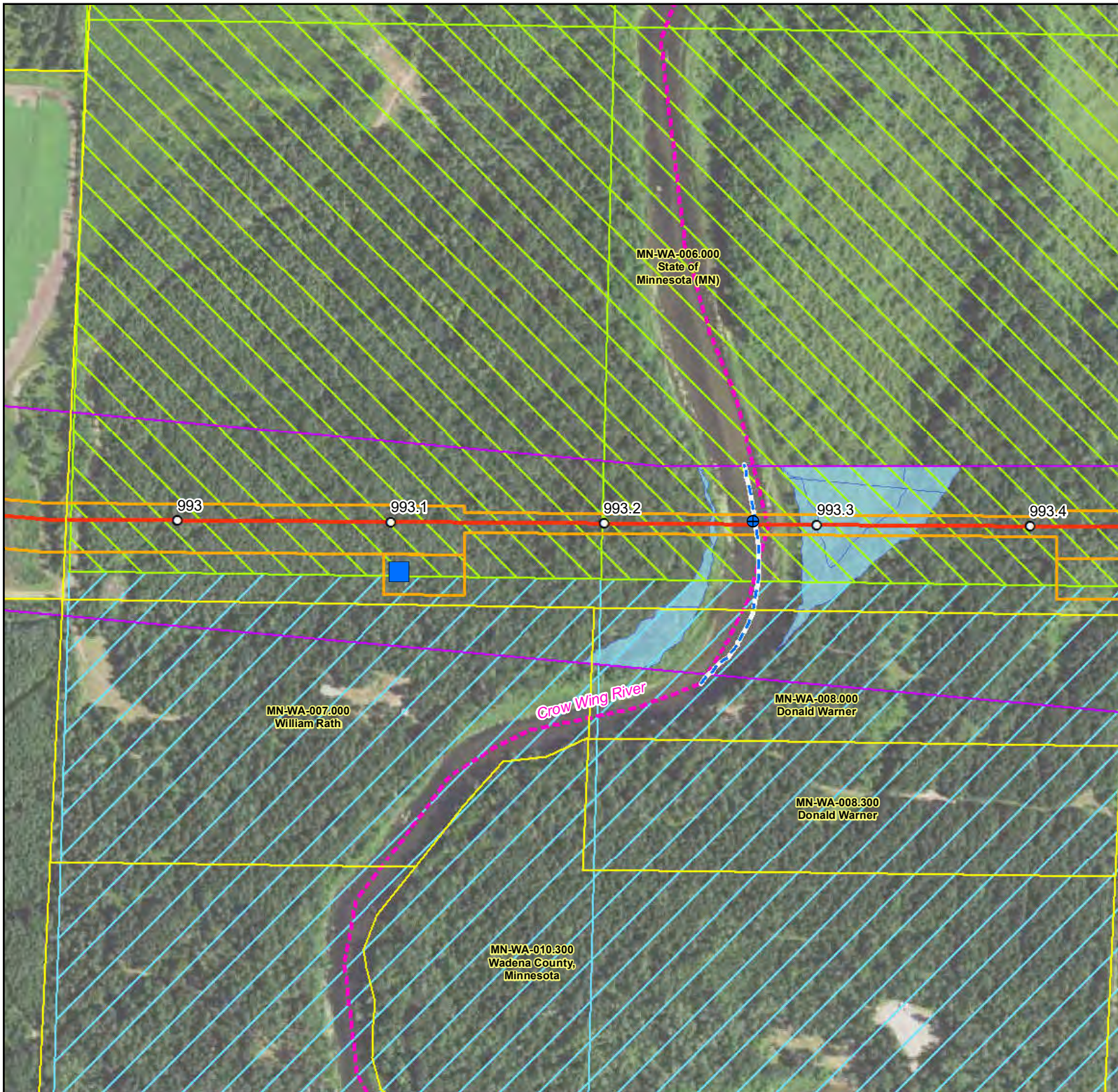
### Wadena County, Minnesota



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Date: (5/22/2019)





- Mileposts
  - ⊕ HDD Appropriation
  - HDD Discharge
  - L3R Centerline
  - L3R Construction Workspace
  - Survey Corridor
  - - - Delineated Waterbody
  - ⬭ Delineated Wetland
  - - - PWI Watercourse
  - ▨ MDNR Admin Land
  - ▨ County Tax Forfeit Land
  - ▨ Tract Boundary
- Data source: 2017 NAIP Aerial, MDNR, MNDOT, Enbridge

**Crow Wing River**

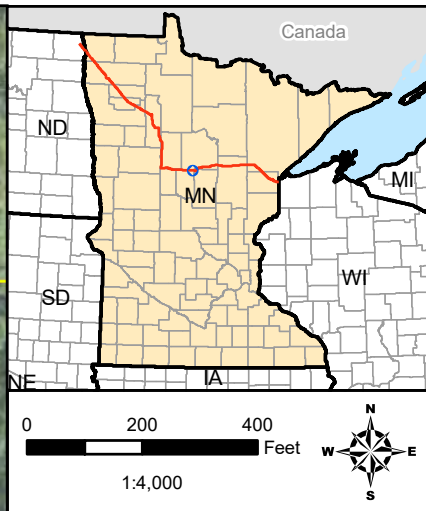
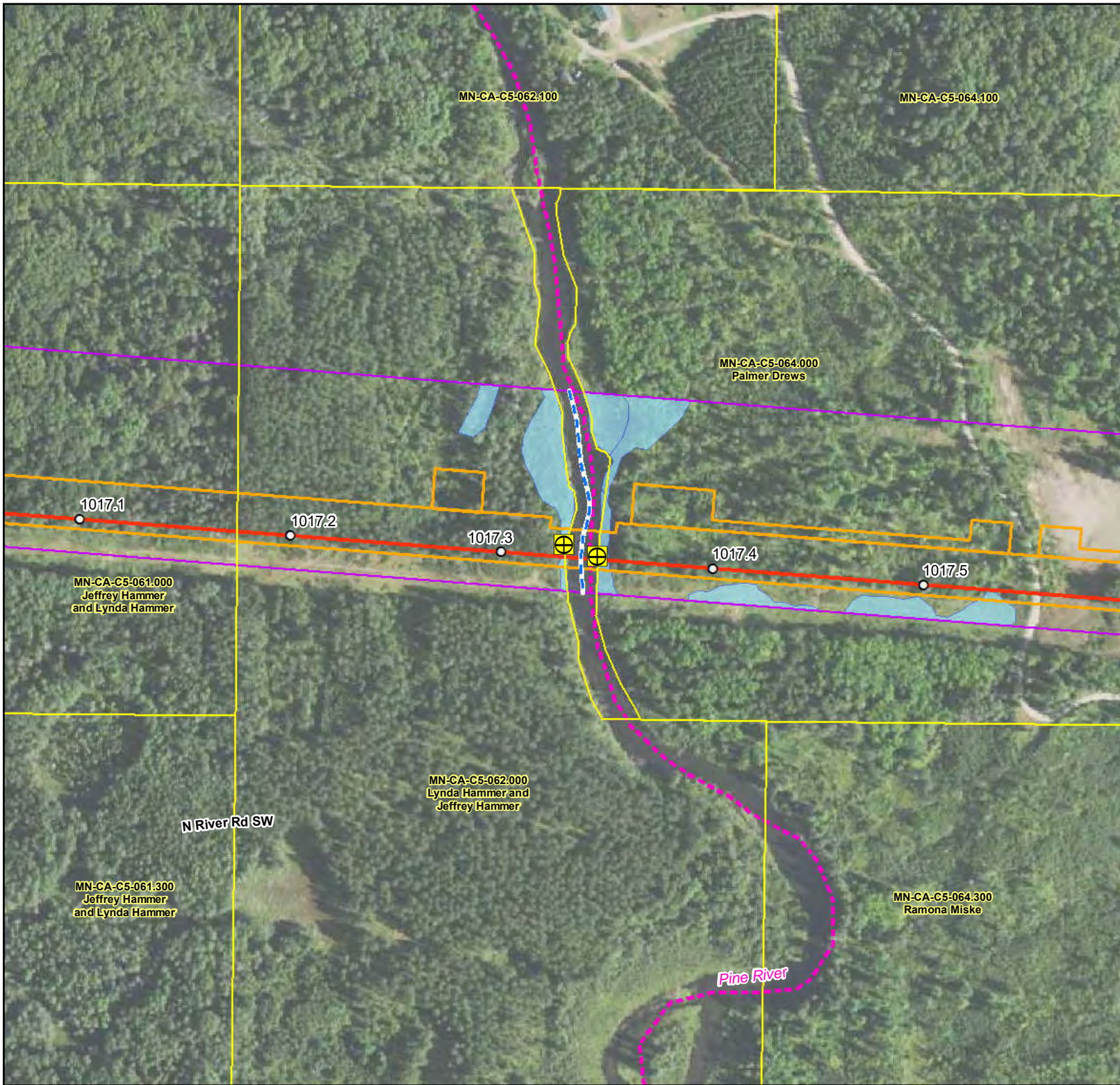
**Water Appropriations  
and Discharge Site Plan**

**Line 3 Replacement Project**

**Wadena County, Minnesota**

  
For Environmental Review Purposes Only





- Mileposts
- ⊕ Spread Appropriation
- Spread Discharge
- L3R Centerline
- L3R Construction Workspace
- Survey Corridor
- - - Delineated Waterbody
- Delineated Wetland
- - - PWI Watercourse
- Tract Boundary

Data source: 2017 NAIP Aerial, MDNR, MNDOT, Enbridge

## Pine River

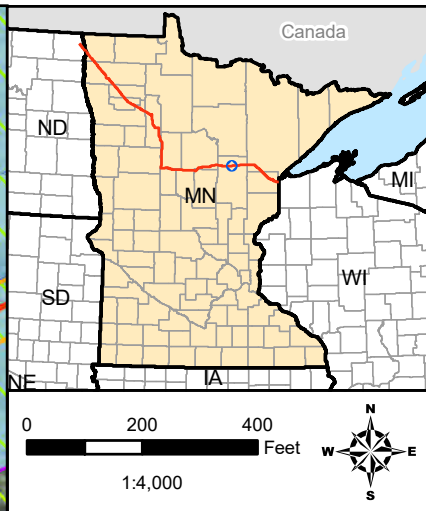
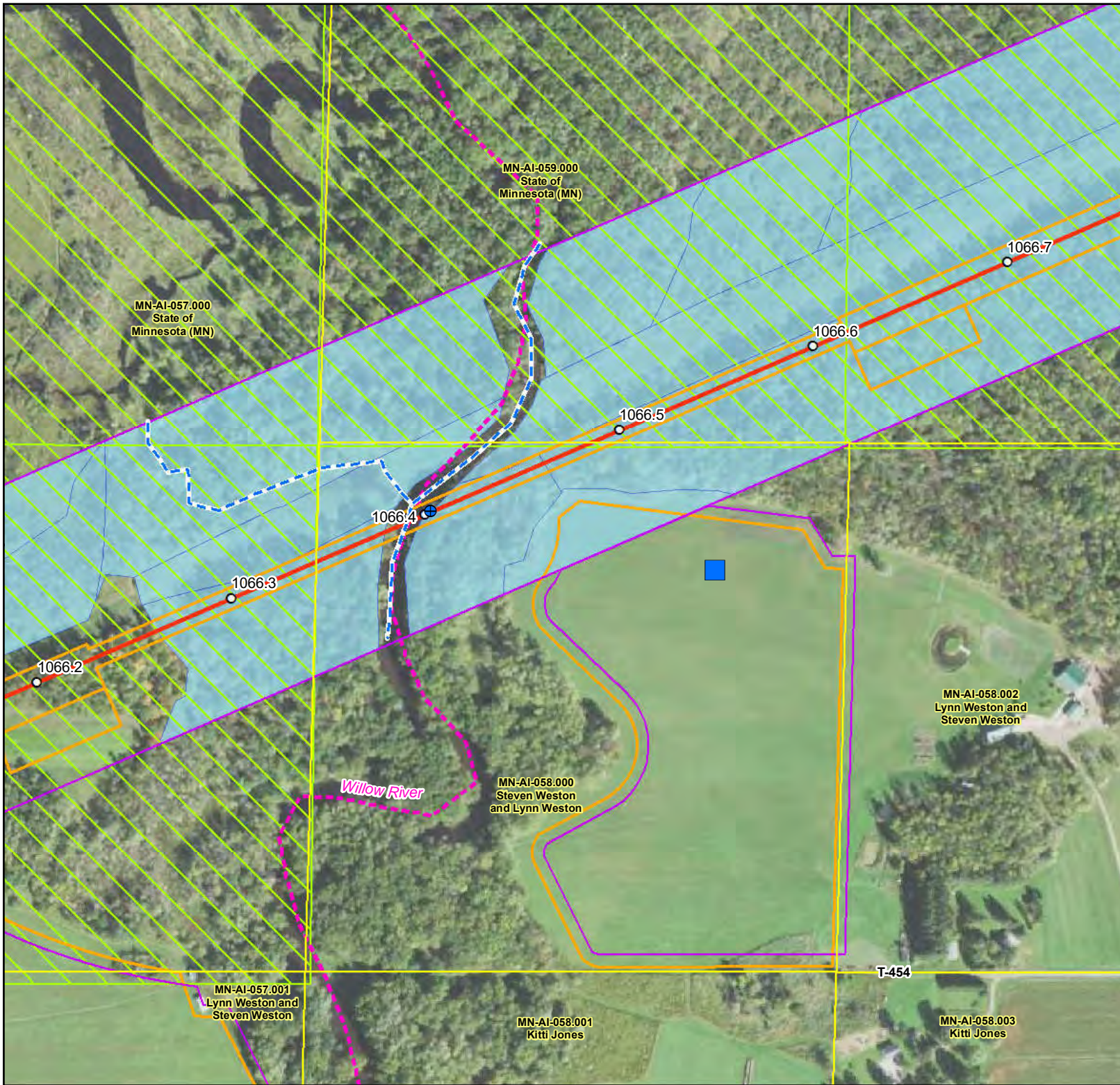
### Water Appropriations and Discharge Site Plan

#### Line 3 Replacement Project

#### Cass County, Minnesota







- Mileposts
- ⊕ HDD Appropriation
- HDD Discharge
- L3R Centerline
- L3R Construction Workspace
- Survey Corridor
- - - Delineated Waterbody
- - - Delineated Wetland
- - - PWI Watercourse
- MDNR Admin Land
- Tract Boundary

Data source: 2017 NAIP Aerial, MDNR, MNDOT, Enbridge

## Willow River

### Water Appropriations and Discharge Site Plan

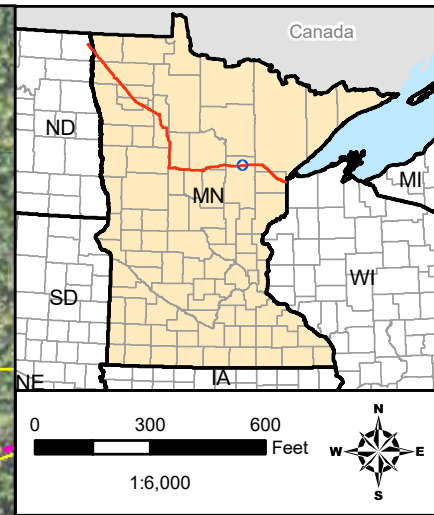
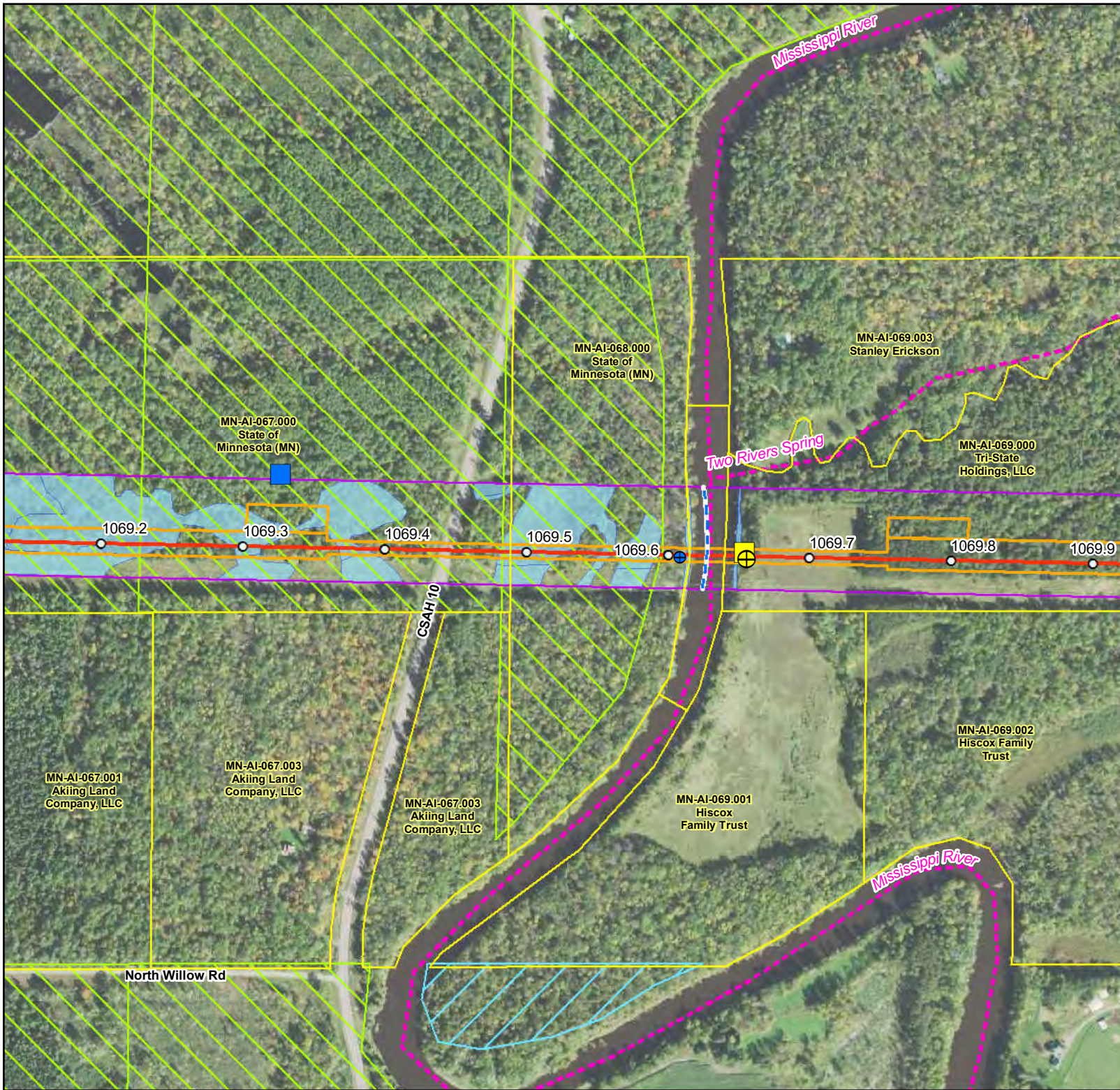
#### Line 3 Replacement Project

#### Aitkin County, Minnesota



For Environmental Review Purposes Only





- Mileposts
  - ⊕ HDD Appropriation
  - ⊕ Spread Appropriation
  - HDD Discharge
  - Spread Discharge
  - L3R Centerline
  - L3R Construction Workspace
  - Survey Corridor
  - Delineated Waterbody
  - Delineated Wetland
  - PWI Watercourse
  - ▨ MDNR Admin Land
  - ▨ County Tax Forfeit Land
  - ▨ Tract Boundary
- Data source: 2017 NAIP Aerial, MDNR, MNDOT, Enbridge

## Mississippi River

### Water Appropriations and Discharge Site Plan

#### Line 3 Replacement Project

#### Aitkin County, Minnesota

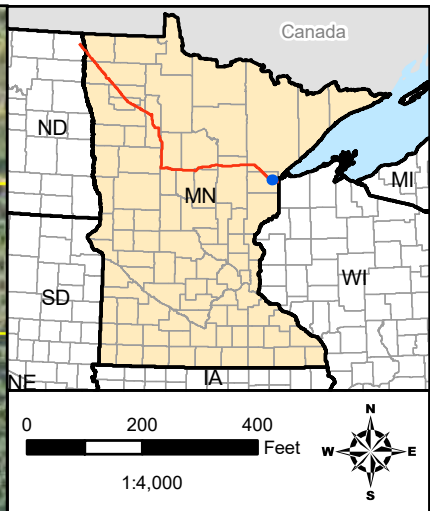


For Environmental Review Purposes Only









- ⊕ Spread Appropriation
- Spread Discharge
- Survey Corridor
- ⬭ Delineated Wetland
- ⬭ PWI Basin
- ▨ MDNR Admin Land
- Tract Boundary

Data source: 2017 NAIP Aerial, MDNR, MNDOT, Enbridge

## Chub Lake

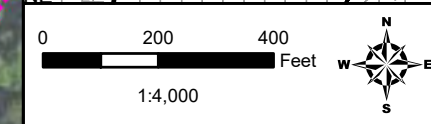
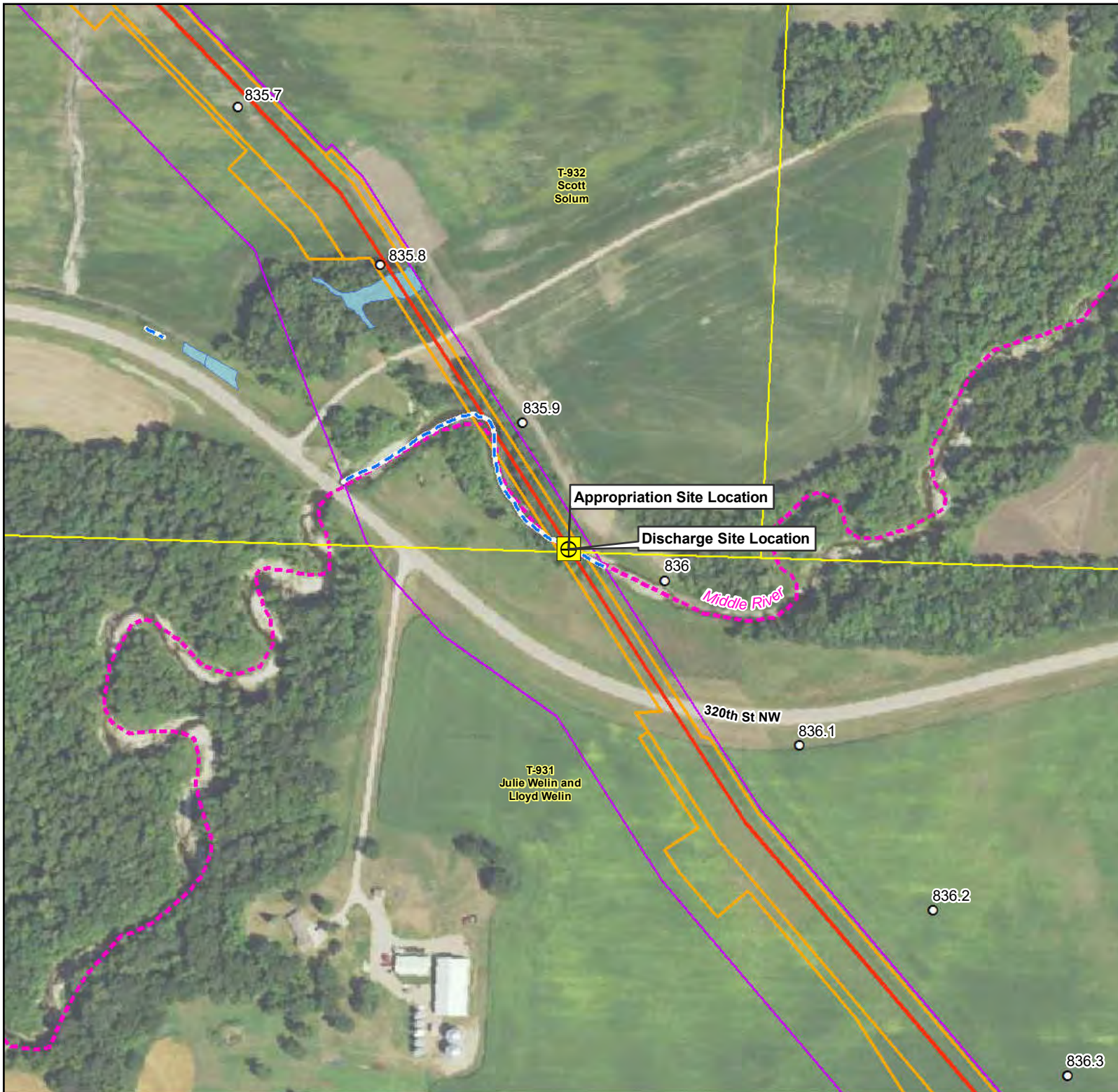
### Water Appropriations and Discharge Site Plan

Line 3 Replacement Project  
Carlton County, Minnesota



## **Contingency Locations**





- Milepost
- ⊕ Spread Appropriation (Contingency)
- Spread Discharge (Contingency)
- L3R Centerline
- L3R Construction Workspace
- Survey Corridor
- - - Delineated Waterbody
- ~ Delineated Wetland
- - - PWI Watercourse
- Tract Boundary


Data source: 2017 NAIP Aerial, MDNR, MNDOT, Enbridge

## Middle River

### Water Appropriations and Discharge Site Plan - Contingency Locations

**Line 3 Replacement Project**

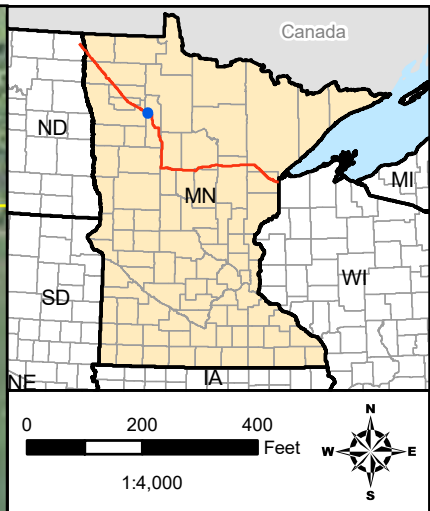
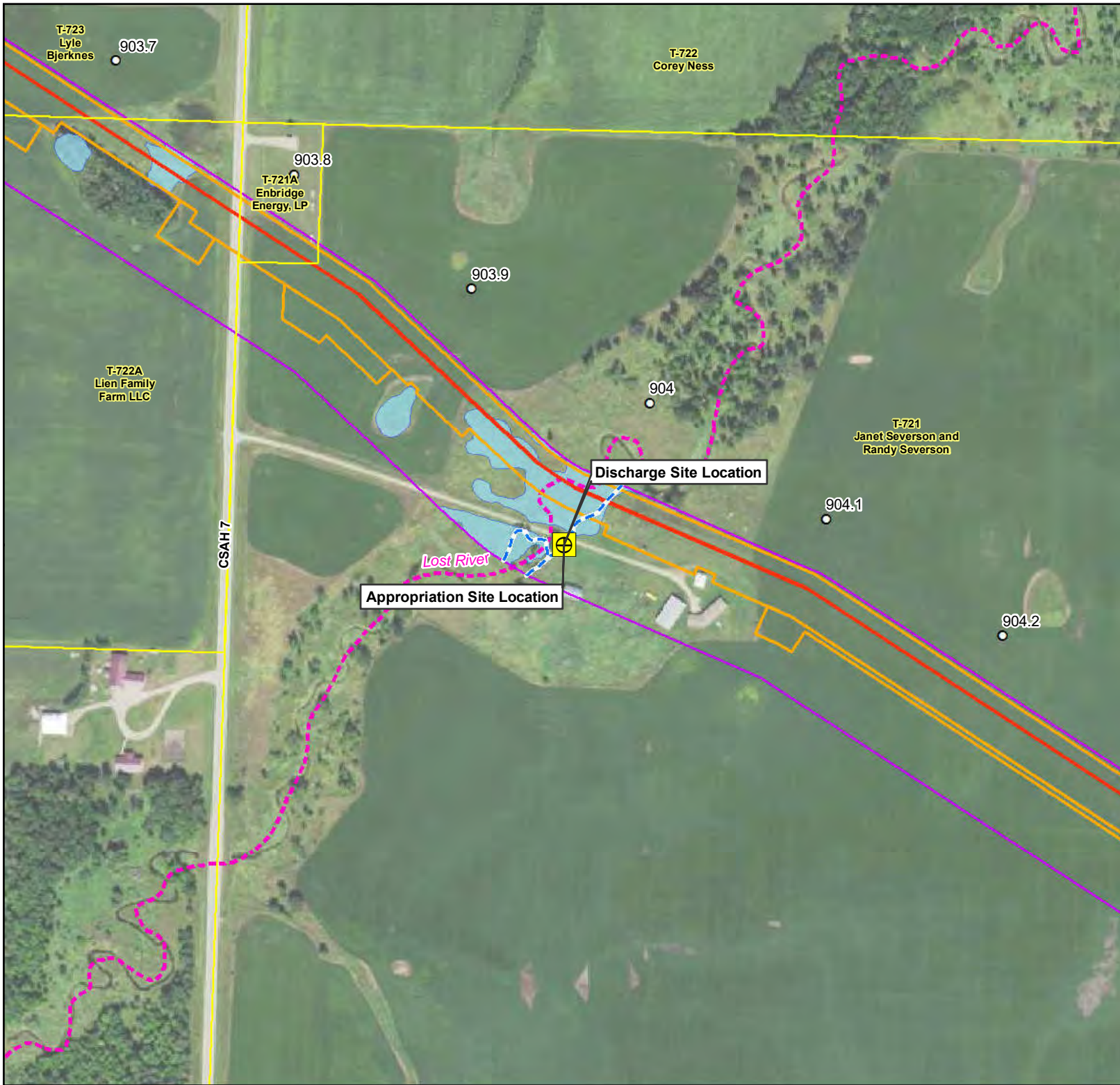
**Marshall County, Minnesota**



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- Milepost
- ⊕ Spread Appropriation (Contingency)
- Spread Discharge (Contingency)
- L3R Centerline
- L3R Construction Workspace
- Survey Corridor
- - - Delineated Waterbody
- ☁ Delineated Wetland
- - - PWI Watercourse
- Tract Boundary

Data source: 2017 NAIP Aerial, MDNR, MNDOT, Enbridge

## Lost River

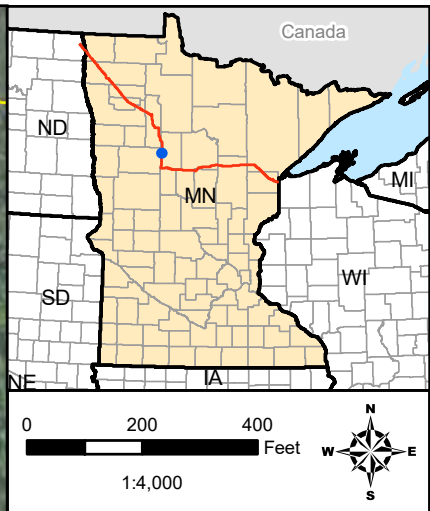
### Water Appropriations and Discharge Site Plan - Contingency Locations

#### Line 3 Replacement Project

#### Clearwater County, Minnesota







- Milepost
- ⊕ Spread Appropriation (Contingency)
- Spread Discharge (Contingency)
- L3R Centerline
- L3R Construction Workspace
- Survey Corridor
- - - Delineated Waterbody
- Delineated Wetland
- PWI Basin
- MDNR Admin Land
- County Tax Forfeit Land
- Tract Boundary

Data source: 2017 NAIP Aerial, MDNR, MNDOT, Enbridge

## Island Lake

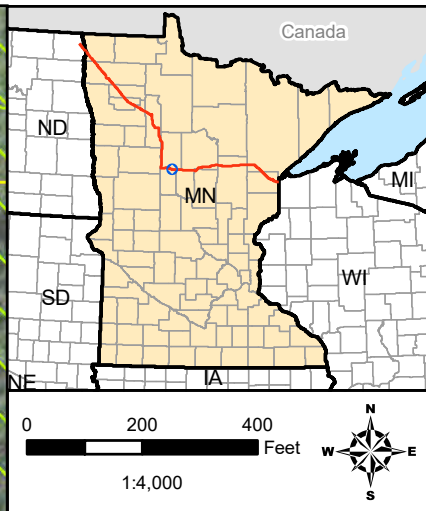
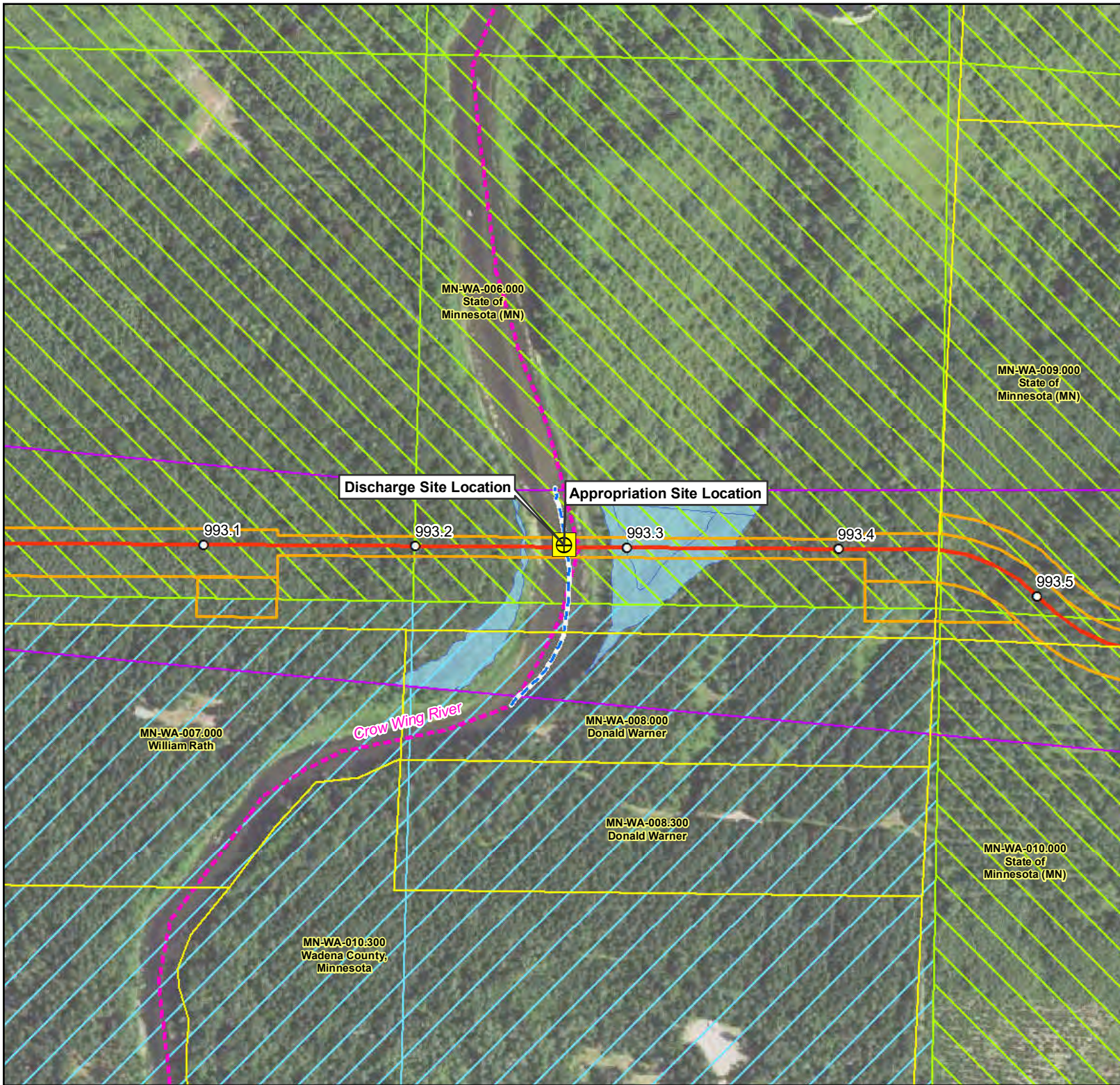
### Water Appropriations and Discharge Site Plan - Contingency Locations

Line 3 Replacement Project

Hubbard County, Minnesota







- Milepost
- ⊕ Spread Appropriation (Contingency)
- Spread Discharge (Contingency)
- L3R Centerline
- L3R Construction Workspace
- Survey Corridor
- - - Delineated Waterbody
- ☁ Delineated Wetland
- - - PWI Watercourse
- ▨ MDNR Admin Land
- ▨ County Tax Forfeit Land
- ▨ Tract Boundary

Data source: 2017 NAIP Aerial, MDNR, MNDOT, Enbridge

## Crow Wing River

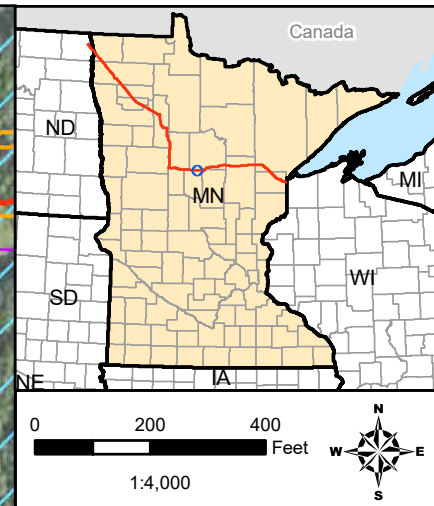
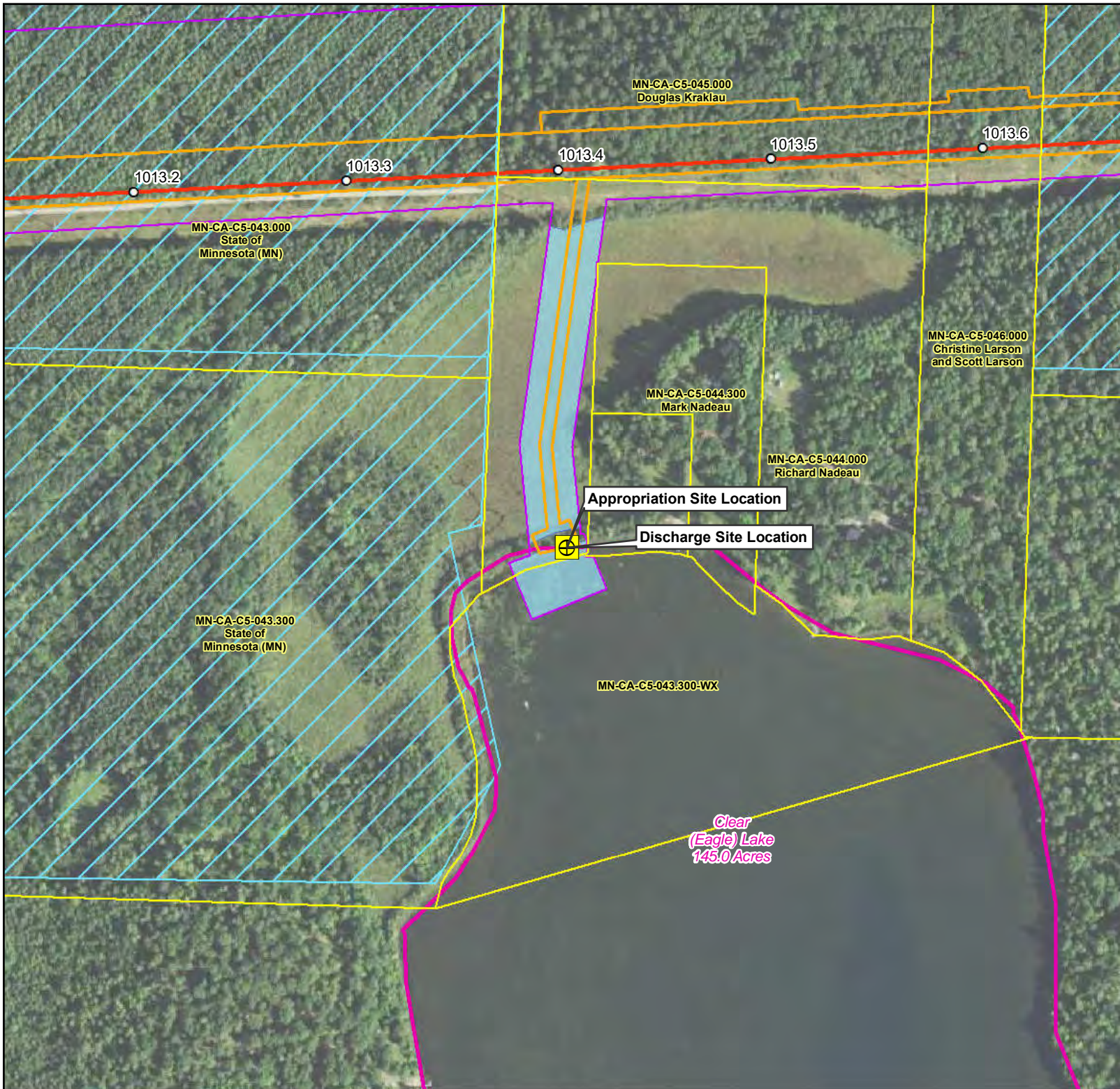
### Water Appropriations and Discharge Site Plan - Contingency Locations

Line 3 Replacement Project

Wadena County, Minnesota







- Milepost
- ⊕ Spread Appropriation (Contingency)
- Spread Discharge (Contingency)
- L3R Centerline
- L3R Construction Workspace
- Survey Corridor
- Delineated Wetland
- PWI Basin
- County Tax Forfeit Land
- Tract Boundary

Data source: 2017 NAIP Aerial, MDNR, MNDOT, Enbridge

## Clear (Eagle) Lake

### Water Appropriations and Discharge Site Plan - Contingency Locations

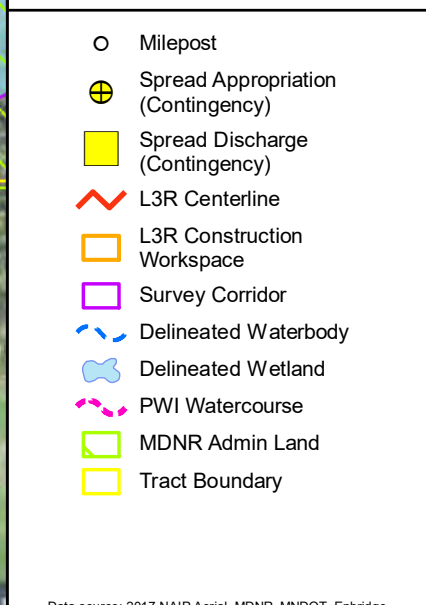
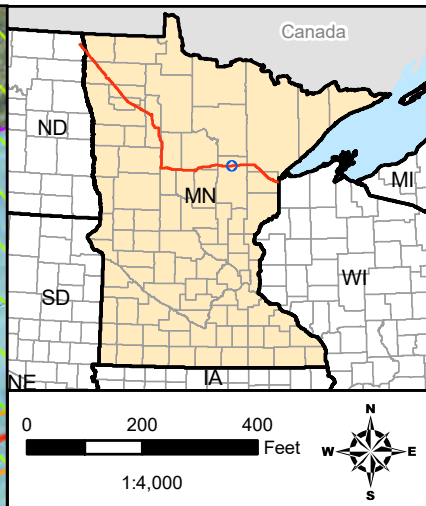
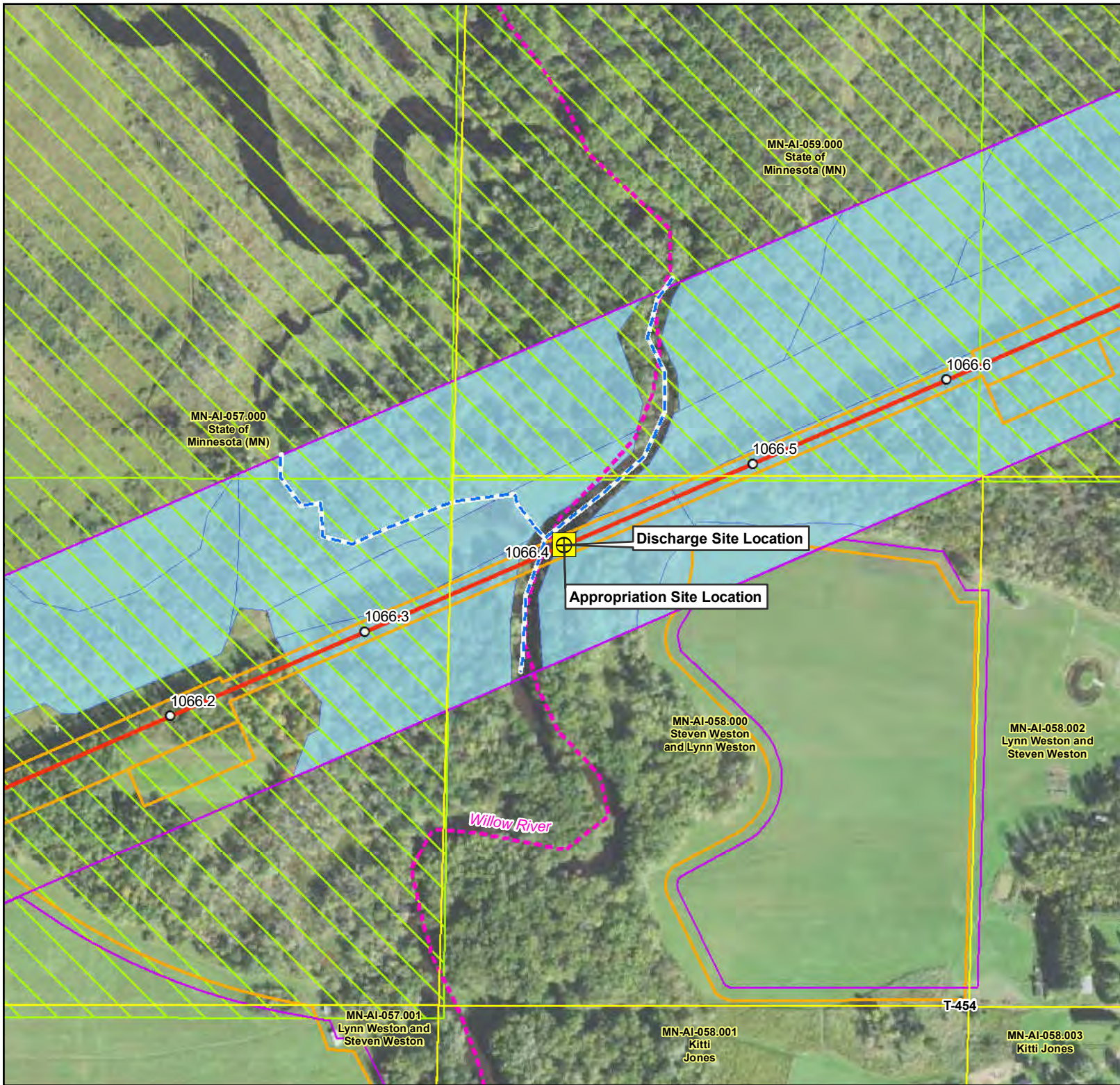
#### Line 3 Replacement Project

#### Cass County, Minnesota



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Date: (3/20/2019)





Data source: 2017 NAIP Aerial, MDNR, MNDOT, Enbridge

## Willow River

### Water Appropriations and Discharge Site Plan - Contingency Locations

#### Line 3 Replacement Project

#### Aitkin County, Minnesota

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**Attachment D**

**Table of Hydrostatic Test Source Waters and Discharge  
Types and Volumes**



Line 3 Replacement Project  
Table of Hydrostatic Test Source Waters and Discharge Types and Volumes

Basin	Source MP	Source Waterbody Name	WID	Watershed	Source Water MPCA Listed Classification (7050.0470)	River Nutrient Region	Impairment 2018 <sup>a</sup>	Infestation <sup>b</sup>	PWI <sup>c</sup>	Trout Waters	ORVW (Restricted or Prohibited) <sup>d</sup>	Mainline Hydrotest Discharge Volume (gallons) <sup>e</sup>	Mainline Hydrotest Discharge Type	Discharge ID	HDD Hydrotest Discharge Volume (gallons) <sup>e</sup>	HDD Hydrotest Discharge Type (Discharge MP)	Discharge ID	Contingency Source (Activity) <sup>e</sup>
Red River of the North	801.8	Red River	09020311-560	Red River of the North - Tamarac River	1C, 2Bdg, 3C, 4A, 4B, 5, 6	Border Water	As; Hg-F; Hg-W; Turbidity	zebra mussel	Yes	No	-	7,315,484	Source Water	SD001	207,334	Upland (802.1)	LA001	Tamarac River (Mainline & HDD)
Red River of the North	828.4	Tamarac River	09020311-503	Red River of the North - Tamarac River	1C, 2Bdg, 3C, 4A, 4B, 5, 6	South	F-IBI, M-IBI	No	Yes	No	-	7,315,484	Source Water	SD002	207,334	Upland (802.1)	LA001	
Red River of the North	828.4	Tamarac River	09020311-503	Red River of the North - Tamarac River	1C, 2Bdg, 3C, 4A, 4B, 5, 6	South	F-IBI, M-IBI	No	Yes	No	-	10,185,701	Source Water	SD002	80,800	Upland (828.7)	LA002	Red River (Mainline & HDD) Middle River (Mainline)
Red River of the North	801.8	Red River	09020311-560	Red River of the North - Tamarac River	1C, 2Bdg, 3C, 4A, 4B, 5, 6	Border Water	As; Hg-F; Hg-W; Turbidity	zebra mussel	Yes	No	-	10,185,701	Source Water	SD001	80,800	Upland (828.7)	LA002	
Red River of the North	836	Middle River	09020309-540	Snake River	2Bg, 3C, 4A, 4B, 5, 6	South	DO; M-IBI; Turbidity	No	Yes	No	-	10,185,701	Source Water	SD003			-	
Red River of the North	836	Middle River	09020309-540	Snake River	2Bg, 3C, 4A, 4B, 5, 6	South	DO; M-IBI; Turbidity	No	Yes	No	-	-	-	-	93,743	Upland (836.2)	LA003	Tamarac River (HDD)
Red River of the North	828.4	Tamarac River	09020311-503	Red River of the North - Tamarac River	1C, 2Bdg, 3C, 4A, 4B, 5, 6	South	F-IBI, M-IBI	No	Yes	No	-	-	-	-	93,743	Upland (836.2)	LA003	
Red River of the North	843.2	Snake River	09020309-543	Snake River	2Bg, 3C, 4A, 4B, 5, 6	South	DO; E.coli; F-IBI, M-IBI	No	Yes	No	-	-	-	-	84,128	Upland (843.2)	LA004	Tamarac River (HDD)
Red River of the North	828.4	Tamarac River	09020311-503	Red River of the North - Tamarac River	1C, 2Bdg, 3C, 4A, 4B, 5, 6	South	F-IBI, M-IBI	No	Yes	No	-	-	-	-	84,128	Upland (843.2)	LA004	
Red River of the North	864.3	Red Lake River	09020303-513	Red Lake River	1C, 2Bdg, 3C, 4A, 4B, 5, 6	South	HgF	No	Yes	No	-	7,897,760	Source Water	SD004	169,912	Upland (864.8)	LA005	Clearwater River (875.4) (Mainline &HDD)
Red River of the North	875.4	Clearwater River	09020305-648	Clearwater River	2Bg, 3C, 4A, 4B, 5, 6	South	Hg-F; Turbidity	No	Yes	No	-	7,897,760	Source Water	SD005	169,912	Upland (864.8)	LA005	
Red River of the North	875.4	Clearwater River	09020305-648	Clearwater River	2Bg, 3C, 4A, 4B, 5, 6	South	Hg-F; Turbidity	No	Yes	No	-	6,167,947	Source Water	SD005	149,347	Upland (875.8)	LA006	Red Lake River (Mainline) Lost River #2 (HDD)
Red River of the North	864.3	Red Lake River	09020303-513	Red Lake River	1C, 2Bdg, 3C, 4A, 4B, 5, 6	South	HgF	No	Yes	No	-	6,167,947	Source Water	SD004	-	-	-	
Red River of the North	904	Lost River #2	09020305-512	Clearwater River	2Bg, 3C, 4A, 4B, 5, 6	South	E. Coli	No	Yes	No	-	-	-	-	149,347	Upland (875.8)	LA006	-
Red River of the North	922.3	Clearwater River	09020305-517	Clearwater River	2Bg, 3C, 4A, 4B, 5, 6	North	No	No	Yes	No	-	13,896,437	Source Water	SD007	150,469	Upland (922.1)	LA007	Lost River #1 (Mainline) Mississippi River (MP 941) (HDD) Well #763975 (Mainline & HDD)
Red River of the North	904	Lost River #1	09020305-512	Clearwater River	2Bg, 3C, 4A, 4B, 5, 6	South	E. Coli	No	Yes	No	-	13,896,437	Source Water	SD006	-	-	-	
Upper Mississippi River, Upper Portion	941	Mississippi River	07010101-753	Mississippi River - Headwaters	2Bg, 3C, 4A, 4B, 5, 6	North	Hg-F	No	Yes	No	Restricted	<del>13,896,437</del>	Source Water	<del>SD008</del>	150,469	Upland (922.1)	LA007	
Upper Mississippi River, Upper Portion	966.3	Well #763975	-	-	-	-	-	-	-	-	-	13,896,437	Upland (966.1)	LA012	150,469	Upland (922.1)	LA007	
Upper Mississippi River, Upper Portion	941	Mississippi River	07010101-753	Mississippi River - Headwaters	2Bg, 3C, 4A, 4B, 5, 6	North	Hg-F	No	Yes	No	Restricted	-	-	-	119,595	Upland (941.2)	LA008	Clearwater River (MP 922.3) (HDD) Well #718159 (HDD)
Red River of the North	922.3	Clearwater River	09020305-517	Clearwater River	2Bg, 3C, 4A, 4B, 5, 6	North	No	No	Yes	No	-	-	-	-	119,595	Upland (941.2)	LA008	
Upper Mississippi River, Upper Portion	952.6	Well #718159	-	-	-	-	-	-	-	-	-	-	-	-	119,595	Upland (941.2)	LA008	
Upper Mississippi River, Upper Portion	952.6	Well #718159	-	-	-	-	-	-	-	-	-	6,354,665	Upland (952.5)	LA009	-	-	-	Clearwater River (MP 922.3) (Mainline) Island Lake (Mainline) Well # 763975 (Mainline)
Red River of the North	922.3	Clearwater River	09020305-517	Clearwater River	2Bg, 3C, 4A, 4B, 5, 6	North	No	No	Yes	No	-	6,354,665	Upland (952.5)	LA009	-	-	-	
Upper Mississippi River, Upper Portion	961.7	Island Lake	Lake ID: 29025400	Crow Wing River	2B, 3C	North	Hg	No	Yes	No	-	6,354,665	Source Water	SD009	-	-	-	

Line 3 Replacement Project  
Table of Hydrostatic Test Source Waters and Discharge Types and Volumes

Basin	Source MP	Source Waterbody Name	WID	Watershed	Source Water MPCA Listed Classification (7050.0470)	River Nutrient Region	Impairment 2018 <sup>a</sup>	Infestation <sup>b</sup>	PWI <sup>c</sup>	Trout Waters	ORVW (Restricted or Prohibited) <sup>d</sup>	Mainline Hydrotest Discharge Volume (gallons) <sup>e</sup>	Mainline Hydrotest Discharge Type	Discharge ID	HDD Hydrotest Discharge Volume (gallons) <sup>e</sup>	HDD Hydrotest Discharge Type (Discharge MP)	Discharge ID	Contingency Source (Activity) <sup>e</sup>
Upper Mississippi River, Upper Portion	966.3	Well #763975	-	-	-	-	-	-	-	-	-	6,354,665	Upland (966.1)	LA012	-	-	-	
Upper Mississippi River, Upper Portion	966.3	Well #763975	-	-	-	-	-	-	-	-	-	2,766,000	Upland (966.1)	LA012	153,140 202,000	Upland (964.4) Upland (973.2)	LA010 LA011	Island Lake (Mainline & HDD) Well # 718159 (Mainline & HDD)
Upper Mississippi River, Upper Portion	961.7	Island Lake	Lake ID: 29025400	Crow Wing River	2B, 3C	North	Hg	No	Yes	No	-	2,766,000	Source Water	SD009	153,140 202,000	Upland (964.4) Upland (973.2)	LA010 LA011	
Upper Mississippi River, Upper Portion	952.6	Well #718159	-	-	-	-	-	-	-	-	-	2,766,000	Upland (952.5)	LA009	153,140 202,000	Upland (964.4) Upland (973.2)	LA010 LA011	
Upper Mississippi River, Upper Portion	983.7	Shell River	07010106-536	Crow Wing River	2Bg, 3C, 4A, 4B, 5, 6	Central	No	No	Yes	No	-	-	-	-	125,845	Upland (983.4)	LA013	Long Lake (HDD)
Upper Mississippi River, Upper Portion	985.9	Long Lake	Lake ID: 29016100	Crow Wing River	2B, 3C	Central	Hg	faucet snail	Yes	No	-	-	-	-	125,845	Upland (983.4)	LA013	
Upper Mississippi River, Upper Portion	985.3	Shell River	07010106-679	Crow Wing River	2Bg, 3C, 4A, 4B, 5, 6	Central	No	No	Yes	No	-	2,937,000	Source Water	SD010	233,422	Upland (985.9)	LA014	Long Lake (HDD) Crow Wing River (Mainline)
Upper Mississippi River, Upper Portion	985.9	Long Lake	Lake ID: 29016100	Crow Wing River	2B, 3C	Central	Hg	faucet snail	Yes	No	-	-	-	-	233,422	Upland (985.9)	LA014	
Upper Mississippi River, Upper Portion	993.3	Crow Wing River	07010106-516	Crow Wing River	2Bg, 3C, 4A, 4B, 5, 6	Central	Hg-F	faucet snail	Yes	No	-	2,937,000	Source Water	SD011	-	-	-	
Upper Mississippi River, Upper Portion	991.2	Shell River	07010106-681	Crow Wing River	2Bg, 3C, 4A, 4B, 5, 6	Central	DO	faucet snail	Yes	No	-	-	-	-	94,544	Upland (991.0)	LA015	Long Lake (HDD)
Upper Mississippi River, Upper Portion	985.9	Long Lake	Lake ID: 29016100	Crow Wing River	2B, 3C	Central	Hg	faucet snail	Yes	No	-	-	-	-	94,544	Upland (991.0)	LA015	
Upper Mississippi River, Upper Portion	993.3	Crow Wing River	07010106-516	Crow Wing River	2Bg, 3C, 4A, 4B, 5, 6	Central	Hg-F	faucet snail	Yes	No	-	-	-	-	92,354	Upland (993.1)	LA016	Shell River (MP 985.3) (HDD)
Upper Mississippi River, Upper Portion	985.3	Shell River	07010106-679	Crow Wing River	2Bg, 3C, 4A, 4B, 5, 6	Central	No	No	Yes	No	-	-	-	-	92,354	Upland (993.1)	LA016	
Upper Mississippi River, Upper Portion	1017.3	Pine River	07010105-669	Pine River	2Bg, 3C, 4A, 4B, 5, 6	North	No	No	Yes	No	-	16,036,000	Source Water	SD013 SD014	-	-	-	Shell River (MP 985.3) (Mainline) Clear (Eagle) Lake (Mainline)
Upper Mississippi River, Upper Portion	985.3	Shell River	07010106-679	Crow Wing River	2Bg, 3C, 4A, 4B, 5, 6	Central	No	No	Yes	No	-	9,143,000	Source Water	SD010	-	-	-	
Upper Mississippi River, Upper Portion	1013.4	Clear (Eagle) Lake	Lake ID: 29025600-201	Crow Wing River	2B, 3C	North	No	No	Yes	No	-	6,893,000	Source Water	SD012	-	-	-	
Upper Mississippi River, Upper Portion	1066.6	Willow River	07010103-748	Mississippi River - Grand Rapids	2Bg, 3C, 4A, 4B, 5, 6	North	No	No	Yes	No	-	-	-	-	141,015	Upland (1066.4)	LA018	Willow River (SD015) Mississippi River (MP 1069) (HDD)
Upper Mississippi River, Upper Portion	1066.6	Willow River	07010103-748	Mississippi River - Grand Rapids	2Bg, 3C, 4A, 4B, 5, 6	North	No	No	Yes	No	-	-	-	-	141,015	Source Water	SD015	
Upper Mississippi River, Upper Portion	1069.6	Mississippi River	07010103-708	Mississippi River - Grand Rapids	2Bg, 3C, 4A, 4B, 5, 6	North	Hg-F; TSS	No	Yes	No	Restricted	-	-	-	141,015	Upland (1066.4)	LA018	
Upper Mississippi River, Upper Portion	1069.6	Mississippi River	07010103-708	Mississippi River - Grand Rapids	2Bg, 3C, 4A, 4B, 5, 6	North	Hg-F; TSS	No	Yes	No	Restricted	12,923,547	Source Water	SD017	132,554	Upland (1069.3)	LA017	Willow River (Mainline & HDD)
Upper Mississippi River, Upper Portion	1066.6	Willow River	07010103-748	Mississippi River - Grand Rapids	2Bg, 3C, 4A, 4B, 5, 6	North	No	No	Yes	No	-	12,923,547	Source Water	SD015	132,554	Upland (1069.3)	LA017	
Lake Superior	1085.8	East Savanna River	04010201-561	St. Louis River	2Bg, 3C, 4A, 4B, 5, 6	North	No	No	Yes	No	-	6,983,351	Source Water	SD018	169,217	Upland (1086.0)	LA019	East Savanna River (SD018) Mississippi River (1069) (Mainline & HDD) Willow River (Mainline)
Lake Superior	1085.8	East Savanna River	04010201-561	St. Louis River	2Bg, 3C, 4A, 4B, 5, 6	North	No	No	Yes	No	-	-	-	-	169,217	Source Water	SD018	
Upper Mississippi River, Upper Portion	1069.6	Mississippi River	07010103-708	Mississippi River - Grand Rapids	2Bg, 3C, 4A, 4B, 5, 6	North	Hg-F; TSS	No	Yes	No	Restricted	6,983,351	Source Water	SD017	169,217	Upland (1086.0)	LA019	

Line 3 Replacement Project Table of Hydrostatic Test Source Waters and Discharge Types and Volumes																		
Basin	Source MP	Source Waterbody Name	WID	Watershed	Source Water MPCA Listed Classification (7050.0470)	River Nutrient Region	Impairment 2018 <sup>a</sup>	Infestation <sup>b</sup>	PWI <sup>c</sup>	Trout Waters	ORVW (Restricted or Prohibited) <sup>d</sup>	Mainline Hydrotest Discharge Volume (gallons) <sup>e</sup>	Mainline Hydrotest Discharge Type	Discharge ID	HDD Hydrotest Discharge Volume (gallons) <sup>e</sup>	HDD Hydrotest Discharge Type (Discharge MP)	Discharge ID	Contingency Source (Activity) <sup>e</sup>
Upper Mississippi River, Upper Portion	1066.6	Willow River	07010103-748	Mississippi River - Grand Rapids	2Bg, 3C, 4A, 4B, 5, 6	North	No	No	Yes	No	-	6,983,351	Source Water	SD015	-	-	-	
Lake Superior	1120.3	Chub Lake	Lake ID: 09000800	Nemadji River	2B, 3C	North	Hg	Eurasian watermilfoil	Yes	No	-	7,343,500	Source Water	SD020	-	-	-	Mississippi River (1069) (Mainline) East Savanna River (Mainline)
Upper Mississippi River, Upper Portion	1069.6	Mississippi River	07010103-708	Mississippi River - Grand Rapids	2Bg, 3C, 4A, 4B, 5, 6	North	Hg-F; TSS	No	Yes	No	Restricted	7,343,500	Source Water	SD017	-	-	-	
Lake Superior	1085.8	East Savanna River	04010201-561	St. Louis River	2Bg, 3C, 4A, 4B, 5, 6	North	No	No	Yes	No	-	7,343,500	Source Water	SD018	-	-	-	

a Impairments based on MPCA’s 2018 EPA-approved Inventory of Impaired Waters per CWA Section 303(d).

b Based on MDNR infested waters list last updated April 2, 2019 (<https://www.dnr.state.mn.us/invasives/ais/infested.html>). Per guidance provided by the MDNR on January 18, 2019, discharges from infested waters need to be to the same source water or at least 300 feet from another waterbody and there cannot be a direct connection to any other waterbody. The hydrotest discharge associated with two of these sources would go back to the source water (Red River and Chub Lake). HDD hydrotest water associated with the Red River, Shell River, and Crow Wing River would be discharged to an well-vegetated upland location to allow for infiltration. As presented in the Attachment C site maps, these HDD hydrotest discharge locations are more than 300 feet from any waterbody. Long Lake is also an infested water that has been identified as a contingency source to support HDD hydrotesting; however, the exact location of discharge has not been identified. Enbridge would commit to MDNR guidance to locate the Long Lake discharge at least 300 feet from any waterbody if this contingency source is required.

c Minnesota Public Waters that meet the criteria set forth in Minnesota Statutes, Section 103G.005, subd. 15 and are identified on Public Water Inventory maps authorized by Minnesota Statutes, Section 103G.201.

d Outstanding Resource Value Water (“ORVW”) as defined by Minn. R. 7050.0335 have an extra level of protection associated with them to protect their unique nature.

e Contingency source that would be utilized to supplement water needs for mainline or HDD hydrotests (as indicated in parenthesis) should another primary source water be unavailable. Shaded rows are contingency water sources only.

f Enbridge eliminated Mississippi River MP 941.0 as a mainline contingency surface water source and discharge location.

**Attachment E**  
**Environmental Protection Plan**





# Environmental Protection Plan

Enbridge Energy, Limited Partnership • Line 3 Replacement Project

April 2019



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## ACRONYMS AND ABBREVIATIONS

ATWS	additional temporary workspace
BMP	best management practices
CLL	Construction Line List
Contactora	construction Contractor
CRP	Conservation Reserve Program
DOT	Department of Transportation
ECD	erosion and sediment control device
EI	environmental inspector
Enbridge	Enbridge Energy, Limited Partnership
EPP	Environmental Protection Plan
HDD	horizontal directional drilling
NFPA	National Fire Protection Association
NRCS	Natural Resources Conservation Service
OHWL	ordinary high water level
OHWM	ordinary high water mark
PLS	Pure Live Seed
ROW	right-of-way
TWS	temporary workspace
UFC	Unified Facilities Criteria

## INTRODUCTION

This Environmental Protection Plan (“EPP”) outlines construction-related environmental policies, procedures, and protection measures Enbridge Energy, Limited Partnership (“Enbridge”) developed as a baseline for construction. This EPP was developed based on Enbridge’s experience implementing Best Management Practices (“BMPs”) during construction as well as the Federal Energy Regulatory Commission’s Upland Erosion Control, Revegetation, and Maintenance Plan (May 2013 Version) and Wetland and Waterbody Construction and Mitigation Procedures (May 2013 Version). It is intended to meet or exceed federal, state, tribal, and local environmental protection and erosion control requirements, specifications and practices. The EPP is designed to address typical circumstances that may be encountered along the Project. Project-specific permit conditions and/or landowner agreements may supersede the general practices described in this document.

This document includes the following sections:

- Section 1.0 describes general mitigation measures, including soil erosion and sedimentation control procedures, to be implemented during upland construction and upland restoration;
- Section 2.0 describes stream and river construction, crossing, and restoration;
- Section 3.0 describes practices for wetland construction, crossings, and restoration;
- Section 4.0 describes highway, road, and rail crossings;
- Section 5.0 describes construction dewatering;
- Section 6.0 outlines water appropriation practices;
- Section 7.0 addresses revegetation measures;
- Section 8.0 addresses winter construction issues;
- Section 9.0 addresses waste management issues;
- Section 10.0 addresses construction equipment-related spill prevention, containment and controls; and
- Section 11.0 addresses containment, response, and notification procedures for inadvertent releases of drilling fluid.

Alternative construction procedures implemented in lieu of this EPP will provide an equal or greater level of protection to the environment and will be approved in writing by Enbridge.

Unless otherwise specified, the construction Contractor (“Contractor”) is responsible for implementing the requirements of this EPP.

Enbridge has developed an Environmental Monitor Control Plan (“EMCP”) to ensure that appropriate systems are in place to achieve compliance with the various permits and plans that have been developed for the project. The EMCP includes:

- Definitions of the roles and responsibilities of the personnel involved with implementing the various environmental requirements;



- Describes the reporting structure that will be employed to document compliance during construction; and
- Presents a series of training events to communicate the environmental requirements to the construction personnel.

Enbridge will provide appropriate construction oversight to confirm and document compliance with the measures of this EPP and requirements of applicable federal, state, Tribal, and local permits. Enbridge's Environmental Inspectors ("EIs") will assist the Contractor in interpreting and implementing the requirements of the EPP and verify compliance with these procedures for Enbridge. Enbridge will employ experienced EIs to manage unforeseen situations that are not directly addressed by project documents. Enbridge relies on the experience and judgment of the EIs, through coordination and consultations with project management staff, to address unforeseen situations should they occur in the field. The EIs will be expected to use judgment in the field to interpret environmental conditions and requirements but will not be authorized to make major modifications or changes without the prior written approval of Enbridge (refer to Section 6.0 of the EMCP for a description of the Modifications to Permit Requirements). The EI, in consultation with Enbridge Environment staff, will have the authority to stop activities and order corrective mitigation for actions that are not in compliance with the measures in this EPP, landowner agreements, or environmental permit requirements. The EI will maintain appropriate records to document compliance with these and other applicable environmental permit conditions. The roles and responsibilities of the EI are described in more detail in Section 2.4 of the EMCP.

Enbridge has also committed to applicable agencies to fund a comprehensive third-party monitoring program to be deployed during Project construction. Enbridge has constructed numerous projects with the oversight of independent environmental monitors ("IEMs") and accepts the recommendation by state agencies regarding their use. Enbridge will work with the agencies to define the role and qualifications of proposed IEMs to ensure they are experienced in the type of construction they will be observing and knowledgeable regarding the resources that may be impacted. The roles and responsibilities of the IEMs, including Tribal Monitors, are described in more detail in Section 3.0 of the EMCP.

## **1.0 GENERAL MITIGATION MEASURES**

### **1.1 IDENTIFICATION OF AVOIDANCE AREAS**

The EI will post signs for the following environmental features as described in corresponding permit applications:

- U.S. Army Corps of Engineers jurisdictional wetlands boundaries and waterbodies crossing locations;
- buffer zones, and erosion-prone or steep slopes as described in Enbridge's Stormwater Pollution Prevention Plan ("SWPPP");
- drainages/drain tiles as identified by Counties and landowners;
- canoe routes or other recreational areas as required by permit conditions;
- buffer zones for environmentally sensitive features, including archaeological sites, bald eagle nests, and other sensitive wildlife species and/or habitat per the U.S. Fish and Wildlife Service and state agency consultations;
- rare plant or ecological community sites as identified through federal and state agency consultations; and
- invasive and noxious species locations per Enbridge's Invasive and Noxious Species Management Plan.

### **1.2 CONSTRUCTION LINE LIST AND PERMITS**

Enbridge will provide the Contractor with a Construction Line List ("CLL") that describes special requirements (e.g., timber salvage, topsoil segregation, restoration measures, herbicide use, fencing requirements, water well sampling) as agreed upon with landowners provided the special requirements conform to project permits. The Contractor will comply with these special requirements and/or permit conditions.

The CLL identifies requirements and comments provided by landowners; however, it is not a comprehensive list of construction requirements. The CLL will be considered in conjunction with other project documents and permits.

### **1.3 WET WEATHER SHUTDOWN**

During construction, certain activities may be suspended in wet soil conditions, based on consideration of the following factors:

- extent of surface ponding;
- potential for rutting and mixing of soil horizons;

- areal extent and location of potential rutting and compaction (i.e., can traffic be rerouted around wet area); and
- type of equipment and nature of the construction operations proposed for that day.

The Contractor will cease work in the applicable area until Enbridge determines that site conditions are such that work may continue. The EIs, in collaboration with Enbridge construction management, will ultimately decide if wet weather shutdown is necessary in a given location.

#### **1.4 RIGHT-OF-WAY ACCESS**

Access to the right-of-way (“ROW”) will be from public roadways and Enbridge-approved private access roads only. Existing roads are generally in a condition that can accommodate construction traffic without modification or improvement. Some roads will require improvements such as:

- Grading of existing roadway
- Placement of gravel in existing roadway
- Widening of the roadway and placement of additional gravel in upland areas, or placement of timber mats in wetland areas;
- Installation of bridges or culverts over wetlands or waterbodies.

Gravel would not be placed in wetland areas; timber mats would be used and removed once construction is complete. Ice roads may be used during frozen conditions as described in Enbridge’s Winter Construction Plan.

Enbridge is responsible for posting signs or other methods to identify approved access roads in the field and to ensure that access is confined to only the approved roads. Vehicle tracking of soil from the construction site will be minimized by installation and implementation of BMPs such as stone pads, timber mats, reducing equipment/vehicle access to the construction ROW where practicable (off-ROW parking), or equivalent. Installation of stone or timber mat access pads will be in accordance with applicable permits and state/federal specifications. If such BMPs are not adequately preventing sediment from being tracked onto public roads, street sweeping, or other equivalent means of collecting sediment, will be used. If soil is tracked onto a roadway, the contractor will remove accumulated material from the road and return it to the construction ROW within an upland area as soon as possible, but in no circumstances more than 24 hours after discovery. In addition, soil on roadways cannot be broomed, washed, and/or graded into the road ditch or onto the shoulder.

After construction, Enbridge will return improved roads to their pre-construction condition unless the landowner or land-managing agency requests that the improvements be left in place. Enbridge will maintain permanent access roads to aboveground facilities (e.g. pump stations, mainline valves) throughout Project operation.

## **1.5 RIGHT-OF-WAY REQUIREMENTS**

All construction equipment and vehicles will be confined to the approved construction ROW and additional temporary workspace ("ATWS"), except where landowners have given permission for construction dewatering activities outside of the construction ROW (see Section 5.0). Prior to commencement of clearing operations, the outer limits of the construction ROW and ATWS areas will be marked with distinctive stakes and flagging by Enbridge. Construction activities are restricted to the approved designated areas.

The construction ROW (i.e., construction workspace) for the Project will vary and may include a portion of Enbridge's existing corridor, new permanent corridor, permitted temporary workspace ("TWS"), and site-specific extra workspaces as defined below and shown in Figures 1 through 3. The construction ROW width will be reduced in selected locations (e.g., wetlands, waterbodies, and forested shelterbelts), in accordance with applicable permit conditions, as indicated on the Project construction alignment sheets and in the field by the use of staking.

### **(a) ROW (Permanent)**

Enbridge's existing permanent ROW varies in width. Additional footage may be added, depending on the location of the new pipeline(s) in relation to the existing pipelines. The permanent ROW is maintained to facilitate access and aerial inspection of the pipeline system.

### **(b) TWS**

In addition to the ROW/permanent corridor, construction will require TWS. The TWS will be located adjacent to and contiguous with the proposed ROW/permanent corridor and will be identified on the construction alignment sheets and by distinctive staking of construction limits prior to clearing.

### **(c) ATWS**

Site-specific ATWS locations, (construction work areas beyond the permanent corridor and TWS previously described), will be required at select locations such as steep slopes, road, waterbody, railroad, some wetland crossings, and where it is necessary to cross under the existing pipelines or foreign utilities. ATWS will typically be located in uplands adjacent to the construction ROW and set at least 50-feet back from sensitive resource boundaries where site-specific field conditions allow. However, to complete work safely, Enbridge may need to locate ATWS within a wetland or within the 50-foot setback from a wetland or waterbody based on site-specific conditions. ATWS adjacent to waterbodies and/or wetlands is addressed further in Sections 2.0 and 3.0, respectively.

## **1.6 CONTROLLING SPREAD OF UNDESIRABLE SPECIES**

It is Enbridge's intent to minimize the potential introduction and/or spread of undesirable species (i.e., invasive species, noxious weeds, or crop diseases) along the construction ROW due to pipeline construction activities. However, it is not practicable for Enbridge to eradicate undesirable species that are adjacent to the construction ROW. Enbridge will minimize the



potential for the establishment of undesirable species by minimizing the time duration between final grading and permanent seeding.

The following sections summarize the BMPs that Enbridge will implement to avoid the introduction and control the spread of terrestrial and aquatic invasive and noxious species. These BMPs are described in more detail in Enbridge's Invasive and Noxious Species Management Plan provided in Appendix A. The Invasive and Noxious Species Management Plan (in preparation) includes the following:

- results of terrestrial invasive and noxious plant surveys conducted along the Project;
- locations of infested waters as identified by state agencies;
- describes applicable state laws and land-administering agency requirements applicable to the Project;
- describes Enbridge's BMPs for handling pest-infested trees;
- describes Enbridge's BMPs for avoiding the introduction and controlling the spread of invasive and noxious species;
- describes buffers for herbicide application related to wetland, waterbodies, and other sensitive resources (e.g., protected plant species); and
- identifies the locations of cleaning stations along the Project route.

### **1.6.1 Oak Wilt**

In the case that a healthy oak tree adjacent to the construction ROW is damaged or wounded during construction activities in counties where the oak wilt fungus is present, Enbridge will treat the cut surface with water-based paint, a pruning/wound sealer, or shellac to prevent further spread of the disease. Treated trees will be inspected by the EI.

### **1.6.2 Pesticide Use and Application**

Enbridge does not typically authorize use of pesticides on the construction or permanent ROW or at Enbridge facilities. However, should pesticide use be required to control the spread of undesirable pests and/or at the request of an agency, Enbridge will only utilize those pesticides and methods of application approved by the Minnesota Department of Agriculture, Minnesota Department of Natural Resources, and the U.S. Environmental Protection Agency in the state of Minnesota. Selective foliage or basal application will be used when practicable. All pesticides will be applied in a safe and cautious manner so as not to damage adjacent properties including crops, orchards, tree farms, apiaries, or gardens. Enbridge will contact the landowner or designee to obtain approval for the use of pesticide at least 14 days prior to any application on their property. The landowner may request that there be no application of pesticides on any part of the site within the landowner's property. Enbridge will provide notice of pesticide application to affected landowners and known beekeepers operating apiaries within three miles of the site at least 14 days prior to such application.

## **1.7 POTHOLING/HYDROVAC SLURRY**

Appropriate safety measures would be implemented before excavation begins, including notification through the One-Call system to ensure third-party utilities and adjacent pipelines are properly marked. Two independent four-way sweeps<sup>1</sup> would also be conducted to positively locate any existing underground utilities.

Potholing is the act of using pressurized water to excavate the soil over pipelines and utilities identified through the One-Call and four-way sweep process. Hydrovac slurry is made up of clean water and subsoil excavated from the ROW during efforts to daylight or expose existing utility lines to prevent line strike during construction. The Contractor will construct an unlined but bermed containment area or identify comparable containment (e.g., open top tank) to hold the hydrovac slurry in an Enbridge and landowner-approved upland area within the construction workspace or dispose of the material off-site at a licensed disposal facility. Once the slurry is drained and dry, it may be incorporated with the subsoil in an Enbridge and landowner-approved upland area within the construction workspace. Discharging hydrovac slurry on to topsoil is not permitted as the material will degrade the quality of the topsoil and potentially affect revegetation.

Should soil contamination be identified, Enbridge would implement the procedures outlined in its Contaminated Sites Management Plan.

## **1.8 UPLAND CLEARING**

The initial stage of construction involves the clearing of brush, trees, and tall herbaceous vegetation from the ROW. Clearing may be accomplished with chain saws, mowers, and hydraulic tree-cutting equipment.

### **1.8.1 Disposal of Non-Merchantable Timber**

Unless otherwise directed by Enbridge, non-merchantable timber and slash will be disposed of by mowing, chipping, grinding, and/or hauling off site to an approved disposal facility or used in stabilizing erodible slopes or construction entrances. In non-agricultural, non-wetland areas, chips, mulch, or mechanically cut woody debris may be uniformly broadcast across the ROW where the material would ultimately be incorporated into the topsoil layer during grading activities, with landowner approval (coordinated through Enbridge ROW agents). Burning of non-merchantable wood may be allowed only where the Contractor has acquired all applicable permits and approvals (e.g. agency, tribal, and landowner) and in accordance with all tribal, state, and local regulations. The Contractor will provide Enbridge with copies of these permits and/or approvals prior to initiating burning.

Considerations for pest-infested trees are described in Section 1.6 and the Invasive and Noxious Species Management Plan (Appendix A).

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<sup>1</sup> Four-way sweep: Four-way sweep is a method of locating underground utilities. A four-way sweep involves scanning the ground with electromagnetic induction or ground-penetrating radar equipment to detect the presence of buried features; it does not involve digging or other ground-disturbing activities. The term “four-way sweep” comes from the fact that an area typically is scanned (or swept) in at least four directions.

### **1.8.2 Disposal of Merchantable Timber**

All merchantable timber will be managed in accordance with Enbridge contract specifications and applicable permits.

### **1.8.3 Upland Grading and Stump Removal**

To facilitate proper cleanup and restoration in upland areas, tree stumps outside the ditch line will be ground below normal ground surface or completely removed and hauled off to an approved disposal facility. Stumps in the ditch line will be completely removed, ground, and/or hauled off to an approved disposal facility.

## **1.9 TEMPORARY EROSION AND SEDIMENT CONTROLS**

Temporary erosion and sediment control devices ("ECDs") include, but are not limited to, slope breakers, sediment barriers (silt fence, straw bales, bio-logs, etc.), stormwater diversions, trench breakers, mulch, and revegetation subsequent to seeding of exposed soils (refer to Figures 4 through 11). The Contractor will maintain erosion and sediment control structures as required in the Project construction documents and as required by all applicable permits, including SWPPPs. The Minnesota General Construction Stormwater Permit requires that EIs perform and record inspections of temporary ECDs at least once every 7 calendar days and within 24 hours after a rainfall event of 0.5 inch or greater. A "rainfall event" is the total amount of rainfall recorded in any continuous 24-hour period. Non-functional erosion and sediment controls will be repaired, replaced, or supplemented with functional materials within 24 hours after discovery, or as otherwise specified in project permits. ECDs will be installed after initial clearing but before grading activities and will be replaced by permanent erosion controls as restoration is completed.

Temporary ECDs will be installed after clearing and prior to grubbing and grading activities at the base of sloped approaches to streams, wetlands, and roads. Temporary ECDs will also be installed at the edge of the construction ROW as needed, and/or in other areas determined by the EI to slow water leaving the site and prevent siltation of waterbodies and wetlands down slope or outside of the construction ROW (e.g., swales and side slopes). Temporary ECDs will be placed across the entire construction ROW at the base of slopes greater than 5 percent where the base of the slope is less than 50 feet from tile line inlets, drainage ways, wetlands, and/or waterbodies until the area is revegetated and there is no potential scouring or sediment transport to surface waters. Adequate room will be available between the base of the slope and the sediment barrier to accommodate ponding of water and sediment deposition.

If silt fence is used, when the depth of sediment reaches about one-third of the height, the sediment will be removed. Non-functional ECDs will be repaired, replaced, or supplemented with functional structures within 24 hours after discovery, or as otherwise specified in project permits.

Temporary ECDs installed across the travel lane may be removed during active daytime construction; however, ECDs will be properly reinstalled after equipment passage, or activities in the area are completed for the day. These ECDs will also be repaired and/or replaced prior to inclement weather when forecasted.

### **1.9.1 Temporary Stabilization**

Installation of temporary seeding, mulch (straw or hydromulch), and erosion control mats may be required by Enbridge in certain locations (including topsoil piles) if there are construction delays within a spread of at least 14 days. The Contractor may be required by Enbridge to install temporary stabilization materials sooner based on site conditions, or as required in project permits.

### **1.9.2 Erosion Control Blanket**

The appropriate class of erosion control blanket will be installed in accordance with manufacture recommendations and/or state Department of Transportation ("DOT") specifications on slopes greater than 5 percent that would be exposed over the winter and drain to surface waters (refer to Figures 8 and 9). The Contractor will attempt to install erosion control blankets on the exposed slopes prior to snowfall; however, construction progress and/or seasonal weather variations may prevent installation prior to the first snowfall. Installation of erosion control blankets and additional BMPs, as applicable based on site conditions, is required after the first snowfall to protect slopes prior to spring melt and runoff. Erosion control blankets will be installed running parallel (up and down) with the direction of the slope (not perpendicular).

### **1.9.3 Mulch**

Mulch (weed-free straw, wood fiber hydromulch, or a functional equivalent) will be applied to disturbed areas (except for actively cultivated land and wetlands) if requested by the landowner or land managing agency, if specified by the applicable permits or licenses, or as required by Enbridge. Mulch will specifically be required on:

- slopes greater than 5 percent; and
- dry, sandy areas that can blow or wash away (field decision).

Mulch will be free of noxious weeds as listed in applicable state laws. Certified weed-free mulch may also be required at site-specific locations. The Contractor will be responsible for identifying and acquiring sources of weed-free and certified weed-free mulch. Sources will be approved by Enbridge prior to purchase.

Mulch will be applied at a rate of 2 tons per acre to cover at least 75 percent of the ground surface unless otherwise stipulated by permit conditions. Mulch will be uniformly distributed by a mechanical mulch blower, or by hand in areas not accessible to the mulch blower. Mulch will be anchored/crimped using a mulch-anchoring tool or disc set in the straight position to minimize loss by wind and water, as site conditions allow. In areas not accessible to a mulch-anchoring tool or too steep for safe operation, the mulch may be anchored by liquid tackifiers, with advance written approval from Enbridge. The manufacturer's recommended method and rate of application will be followed.

Hydro-mulch and liquid tackifier can be used in place of straw or weed-free hay mulch with prior approval from Enbridge. All hydromulch and liquid tackifier products used will be on the applicable state DOT product list. Application rates will be at the manufacturer's recommended rate, equal to or greater than 2 tons per acre of straw mulch.



#### 1.9.4 Cat Tracking

Cat tracking, also known as horizontal slope grading, may be implemented based on site conditions (sandy or silt soils) to reduce erosion potential. Cat tracking is achieved by driving a bulldozer vertically up and down the slope which results in the tracks being oriented horizontally; creating small speed bumps for water (refer to Figure 11). Cat tracking will not be utilized in U.S. Army Corps of Engineers jurisdictional wetlands, unless approved by the agency.

#### 1.9.5 Temporary Slope Breakers

Temporary slope breakers will be installed to minimize concentrated or sheet flow runoff in disturbed areas in accordance with the following maximum allowable spacing unless otherwise specified in permit conditions.

<u>Slope (%)</u>	<u>Approximate Spacing (ft)</u>
3-5	250
5-15	200
15-25	150
>25	<100

If the length of the slope is less than the distance of the required spacing, slope breakers are not required unless a sensitive resource area (e.g., wetland or public roadway) is located immediately down slope, or as requested by the EI. Temporary slope breakers may be constructed using earthen subsoil material, silt fence, straw bales, or in non-agricultural land, rock-filled trenches may be used. On highly erodible slopes, slope breakers in the form of earthen berms will be used whenever possible.

Temporary slope breakers will be constructed according to the following specifications (refer to Figures 4 and 5):

- straw bales used as slope breakers will be trenched in and staked so as to not allow spacing between bales or allow flow underneath the bales;
- the outfall of temporary slope breakers will be directed off the construction ROW into a stable well-vegetated upland area or into an appropriate energy-dissipating sediment control device (e.g., silt fence, straw bales, rock aprons) to prevent the discharge of sediments (refer to Figure 4);
- proper slope breaker outfalls will be established where topsoil segregation and/or grading has created a barrier at the edge of the construction workspace; and
- gaps will be created through spoil piles where necessary to allow proper out letting of temporary berms.

#### 1.10 UPLAND TOPSOIL SEGREGATION

Upland areas where topsoil will be stripped includes cropland, hay fields, pasture, residential areas, and other areas as requested by the landowner or as specified in the project plans, commitments, and/or permits. Topsoil will not be used to construct berms, trench breakers, temporary slope breakers, improving or maintaining roads, or to pad the pipe. Berms used for

stacking pipe in pipe yards may be constructed using topsoil if landowner permission and necessary approvals are obtained. Gaps will be left and ECDs installed where stockpiled topsoil and spoil piles intersect with water conveyances (i.e., ditches, swales, and waterways) to maintain natural drainage.

### **Topsoil Segregation Methods**

The following topsoil segregation methods may be employed during construction:

- Full Construction ROW (refer to Figure 1)
- Trench-Line-Only (refer to Figure 2)
- Modified Ditch-Plus-Spoil Side (refer to Figure 3)

The Full Construction ROW topsoil segregation technique will typically be used in active cropland, which will consist of stripping topsoil from the spoil storage area, ditch line, and the primary travel lane. The Trench-Line-Only topsoil segregation method may be used where Enbridge determines that the width of the construction ROW is insufficient for other methods to be used. Enbridge may also use the Trench-Line-Only topsoil segregation method in areas where there is a thick sod layer such as in hay fields, pastures, golf courses, and residential areas, unless otherwise requested by the landowner. Alternative topsoil segregation methods, such as Modified Ditch-Plus-Spoil Side, may be used on a site-specific basis or as requested by the landowner. Topsoil is not typically segregated in standing water wetlands unless specifically requested by the landowner and/or managing land agency in accordance with applicable permit conditions.

### **Depth of Upland Topsoil Stripping**

In deep soils (more than 12 inches of topsoil), topsoil will be stripped to a minimum depth of 12 inches, unless otherwise specified/requested by other plans, permit conditions, or the landowner. Additional space may be needed for spoil storage if more than 12 inches of topsoil are segregated. If less than 12 inches of topsoil are present, the Contractor will attempt to segregate to the depth that is present.

## **1.11 UPLAND TRENCHING**

Trenching in uplands is typically accomplished with a backhoe excavator or a rotary wheel ditching machine. Excavated material will be side cast (stockpiled) within the approved construction ROW separate from topsoil and stored such that the area subject to erosion is minimized. Enbridge will coordinate with landowners to minimize disruption of access caused by the trench during construction. Where deemed appropriate by Enbridge, the Contractor will leave plugs of subsoil in the ditch or will construct temporary access bridges across the trench for the landowner to move livestock or equipment. Trenches may also be sloped where started and ended to allow ramps for wildlife to escape. Spacing of plugs and ramps will be determined in the field.

### **1.11.1 Timing**

The length of time a trench is left open will be minimized to ensure that installation of the pipe and restoration of the construction ROW occurs in a timely fashion. Therefore, unless otherwise specified by project permits or Enbridge, the Contractor will limit the amount of excavated open trench to a maximum of 3 days of anticipated welding production per spread. This timeframe may be decreased at the discretion of Enbridge based on site conditions. Site-specific activities such as horizontal directional drilling (“HDD”), horizontal bores, tie-in points, and valve work may be performed independent of a spread.

### **1.12 FOAM PILLOW INSTALLATION**

Foam pillows are rectangular blocks measuring approximately 3 feet by 2 feet made of rigid polyurethane foam and placed under and around the pipe in trenches where needed to take stress off the pipe as a result of incidental variabilities in trench depth. For this same reason, the foam pillows are left in the trench. Use of foam pillows for pipe protection in the trench will be approved by Enbridge and the appropriate agencies in advance and installed in accordance with applicable project permits, local/state/federal regulations, and manufacturer’s recommendations. If the use of rigid polyurethane foam is not approved by the appropriate agencies, Enbridge will utilize sand bars/piles or sand bags (refer to Appendix B for polyurethane rigid foam MSDS).

### **1.13 TRENCH BREAKERS**

Trench breakers will be installed as deemed necessary by Enbridge in sloped areas after the pipe has been lowered into the trench. Trench breakers protect against subsurface water flow along the pipe after the trench is backfilled. Trench breakers will be constructed with bags filled with rock-free subsoil or sand or rigid polyurethane foam. Topsoil will not be used to construct trench breakers. Use of foam trench breakers will be approved by Enbridge and the appropriate agencies in advance and installed in accordance with applicable project permits, local/state/federal regulations, and manufacturer’s recommendations.

Trench breakers will be placed from the bottom of the trench to near the top of the trench, completely surrounding the pipe and will be properly keyed into the undisturbed trench walls (refer to Figures 12 and 13). The location for trench breakers will be based on field conditions including the degree and length of slope, presence of down slope sensitive resource areas such as wetland and waterbodies, and proximity to other features such as roads and/or railroads. The following conditions apply to the placement and installation of trench breakers unless otherwise directed by Enbridge:

- Trench breakers will be installed on slopes greater than 5 percent adjacent to streams, wetlands, or other waterbodies.
- Where the pipeline exits a wetland towards areas of lower relief, trench breakers will be installed (within the upland) where there is a potential for underground drainage along the pipe in order to prevent wetland or waterbody drainage.
- At all waterbody crossings, as necessary, to prevent diversion of water into upland portions of the pipeline trench and to keep accumulated trench water out of the waterbody.

The actual location of each trench breaker will be selected through coordination between Enbridge's EIs, Enbridge's Craft Inspectors, and the Contractor's Foreman for backfilling activities.

## **1.14 DRAIN TILE INLET PROTECTION AND TILE REPAIRS**

Enbridge will attempt to locate existing drain tile inlets that are located near the construction work area prior to construction. Drain tile inlets will be marked using flags. The Contractor will protect located drain tile inlets with the potential to receive stormwater from construction of the Project using the appropriate ECDs until sources with the potential to discharge have been stabilized. The determination of the specific ECD will be made based on the location of an inlet with respect to the project area, drainage area from the construction work area to the inlet, topography, vegetation, soils, and accessibility to the inlet. Where drain tile inlets are located off of Enbridge's construction ROW, Enbridge may not have authorization to install ECDs at the inlet site. In these cases, sediment control measures (typically silt fence) will be installed along the edge of the construction work area that drains to the inlet structure to minimize sedimentation.

If underground drainage tile is damaged by pipeline construction, it will be repaired in a manner that assures proper tile line operation at the point of repair in accordance with the Agricultural Protection Plan.

## **1.15 UPLAND BACKFILLING**

Backfilling follows pipe installation and consists of replacing the material excavated from the trench. In areas where topsoil has been segregated, the subsoil will be replaced first, and the topsoil will be spread uniformly over the area from which it was removed. Prior to backfilling, the trench will be dewatered in accordance with the methods discussed in Section 5.0 if water obscures the trench bottom.

## **1.16 CLEANUP AND ROUGH/FINAL GRADING**

All waste materials, including litter generated by construction crews, will be disposed of daily by the Contractor. Initial cleanup and rough grading activities may take place simultaneously. Cleanup involves removing construction debris (including litter generated by construction crews and excess rock) and large woody debris. Rough and final grading includes restoring disturbed areas as near as practicable to preconstruction conditions, returning the topsoil where topsoil has been stripped, preparing a seedbed and de-compacting subsoil (where applicable) for permanent seeding, installing or repairing temporary erosion control measures, repairing/replacing fences, and installing permanent erosion controls.

### **1.16.1 Timing**

The Contractor will begin cleanup and rough grading (including installation of temporary erosion and sediment control measures) within 72 hours after backfilling the trench. The Contractor will attempt to complete this rough cleanup within one week. The Contractor will initiate final grading, topsoil replacement, seeding, and installation of permanent erosion control structures within 14 days after backfilling the trench. If seasonal or other weather conditions prevent compliance with these timeframes, temporary erosion controls will be maintained until conditions allow completion of cleanup.



## 1.17 PERMANENT EROSION AND SEDIMENT CONTROLS

During final grading, slopes in areas other than cropland will be stabilized with erosion control structures. With exception for actively cultivated areas, permanent berms (diversion dikes or slope breakers) will be installed on all slopes, according to the following maximum spacing requirements unless otherwise specified in permit conditions:

<u>Slope (%)</u>	<u>Approximate Spacing (ft)</u>
3-5	250
5-15	200
15-25	150
>25	<100

Permanent berms will be constructed according to the following specifications:

- Permanent berms will be constructed of compacted earth, stone, or functional equivalent as approved in advance by Enbridge.
- The outfall of berms will be directed toward appropriate energy-dissipating devices, and off the construction ROW if possible.
- Permanent berms will be inspected and repaired as deemed necessary by Enbridge to maintain function and prevent erosion.
- Erosion control blankets (curlex, jute, or equivalent) will be placed on slopes over 30 percent or that are a continuous slope to a sensitive resource area (e.g., wetland or waterway).

## 1.18 SOIL COMPACTION TREATMENT

Enbridge will reduce the potential for soil compaction by avoiding and minimizing operation of equipment in wet conditions (see Section 1.3), use of low ground pressure equipment and / or timber mats in saturated and wetland areas (see Section 3.0), and / or minimize passes of vehicles and equipment and utilize the same wheel tracks (controlled traffic lanes) in certain areas.

Cultivated fields and compacted or rutted areas will be tilled prior to topsoil replacement with a deep tillage device or chisel plowed to loosen compacted subsoils. Soil conditions must be dry enough to shatter the compacted soil between the points of a subsoiler or chisel plow to lower the bulk density of soil and reduce compaction. Soil at the compacted depth must not be wet and plastic at the time of tilling, otherwise it will not reduce compaction.

If subsequent construction and cleanup activities result in further compaction, the measures described above will be undertaken to alleviate the soil compaction. Additional details on soil decompaction in agricultural areas is described in Enbridge's Agricultural Protection Plan.

## 1.19 STONE REMOVAL

A diligent effort will be made to remove excess stones equal to or larger than 4 inches in diameter from the upper 8 inches of subsoil or as specified in permit conditions, contract

documents, or landowner agreements. After the topsoil is replaced, stone removal efforts will cease when the size and density of stones on the construction ROW are similar to undisturbed areas adjacent to the construction ROW as determined by the EI. Excess rock will be piled in upland areas where landowner permission has been obtained or will be hauled off-site to an Enbridge approved disposal site.

## **1.20 REPAIR OF DAMAGED CONSERVATION PRACTICES**

The Contractor will restore all soil conservation practices (such as terraces, grassed waterways, etc.) that are damaged by the pipeline construction to preconstruction conditions to the extent practicable.

## **1.21 LAND LEVELING FOLLOWING CONSTRUCTION**

Following the completion of the pipeline, the construction ROW will be restored to its pre-construction conditions as practical. Should uneven settling or documented surface drainage problems occur following the completion of pipeline construction and restoration, Enbridge will take appropriate steps to remedy the issue.

## **2.0 STREAM AND RIVER CROSSING GENERAL REQUIREMENTS**

The procedures in this section apply to streams, rivers, and other waterbodies such as jurisdictional ditches, ponds, and lakes. These procedures require that judgment be applied in the field and will be implemented under the supervision of Enbridge.

Stream crossing requirements, including construction methods, timing, erosion control, and restoration are described in this section and in the stream crossing permits issued by state and federal agencies and by tribal authorities (as applicable). If the contractor considers certain parts of these procedures to be technically impractical due to site-specific engineering constraints, they may submit an on-site modification request to Enbridge for consideration of alternative measures that would provide an equal or greater level of protection to the stream and river ecosystems. Enbridge will review the contractor's alternatives and consult with appropriate regulatory agencies and tribal resource specialists (as applicable). The contractor will receive written approval from Enbridge prior to implementing the alternatives. During wet and high runoff conditions, the EI will determine whether conditions warrant additional considerations for construction activities.

### **2.1 TIME WINDOW FOR CONSTRUCTION**

All in-stream work activities (installation of dams, sheet piling, etc.) will be minimized to the extent practicable on an area and time duration basis. In-stream trenching will be conducted during periods permitted by the appropriate regulatory agencies and applicable permits. Unless otherwise specified in applicable permits and with exception to blasting and other rock breaking measures and directional drill, in-stream construction activities (specifically trenching, pipeline installation, backfill, and restoration of the streambed contours) for open cut (non-isolated) crossing methods will occur within the following timeframes:

- Minor Waterbodies (all waterbodies less than or equal to 10 feet wide at the water's edge at the time of crossing): 24 hours
- Intermediate Waterbodies (all waterbodies greater than 10 feet wide but less than 100 feet wide at the water's edge at the time of crossing): 48 hours
- Major Waterbodies (all waterbodies greater than 100 feet wide at the time of crossing): As specified by Enbridge or in the applicable permits.

These timeframes apply regardless of the presence or absence of flow. These timeframes also apply to dry (isolated) crossing methods as a guideline and can be extended based on site-specific conditions with approval from Enbridge Environment staff, Construction Management, and the EI.

Stream crossings will be designed as close to perpendicular to the axis of the stream channel as engineering and routing constraints allow, creating the shortest crossing length.

### **2.2 CLEARING AND GRADING**

The construction ROW width will consist of a 25-foot-wide neck down beginning 20 feet from the ordinary high water mark ("OHWM") / ordinary high water level ("OHWL") on the working side of the ROW (refer to Figures 15 through 17). Enbridge would either maintain a vegetative buffer

until the time of crossing or install redundant ECDs on both sides of the waterbody according to the requirements of the SWPPP.

### **2.2.1 Beaver Dam Removal and Prevention of Dam Rebuilding**

With landowner approval and in accordance with necessary permits obtained, the Contractor may trap beavers, alter or remove beaver dams in order to attempt to lower the water level prior to construction. For alterations, the Contractor will insert a 12-inch minimum diameter, 20-foot long minimum perforated steel culvert, or an equivalent device, through the dam to allow the water to continually drain. The perforations should be a minimum of 1.5-inch diameter, encompassing the entire circumference and extend for the full length of the culvert.

### **2.2.2 Impaired Waters**

Where discharges of stormwater may occur to waters designated under Section 303(d) of the Clean Water Act as Impaired Waters, additional BMPs will be implemented as specified in the SWPPP and other applicable project permits.

## **2.3 ADDITIONAL TEMPORARY WORKSPACE**

ATWS includes work areas outside the boundary of the typical construction ROW. These spaces are typically used to assemble pipe segments and for temporary spoil storage. Clearing of forested and brushy areas for ATWS will be avoided as much as possible. Woody vegetation in wetlands and riparian areas will typically not be cleared for the purpose of ATWS unless approved by appropriate regulatory agencies as stipulated in permits issued for the Project. ATWS will be constructed as follows:

- ATWS will be located at least 50 feet away from the OHWM/OHWL if topographic or other physical conditions such as stream channel meanders allow, except where the adjacent upland consists of cultivated or rotated cropland or other disturbed land (refer to Figures 15 through 17).
- If safe work practices or site conditions do not allow for a 50-foot setback, ATWS should be located no closer than 20 feet from the OHWM/OHWL, subject to site-specific approval by Enbridge.
- ATWS will be limited to the minimum size needed to construct the stream crossing.

## **2.4 BRIDGES**

Bridge crossing methods are described in more detail in Enbridge's Summary of Construction Methods and Procedures for Wetland and Waterbody Crossings. Procedures during frozen conditions are discussed in Enbridge's Winter Construction Plan.

Temporary equipment bridges will be used on most waterways (upon approval by the appropriate agency), including small waterways such as ditches and intermittent streams, where there is a potential for stormwater runoff or rain events to transport sediment downstream from equipment crossing the waterway. Bridges will be constructed as described below and will be removed as soon as possible during final restoration. Bridges will not typically be installed at directionally drilled waterbodies, unless there is no reasonable alternative that provides an



efficient, economical way to transport heavy construction equipment around the waterbody by truck.

With exception to clearing-related equipment, fording of waterways is prohibited (i.e. civil survey, potholing, or other equipment are not permitted to ford waterways prior to bridge placement). Clearing equipment and equipment necessary for installation of equipment bridges will be allowed a single pass across waterbodies prior to bridge installation, unless restricted by applicable permits.

### **2.4.1 Types of Bridges**

Equipment bridges will be constructed using one of the following techniques:

- Typical Span Type Bridge (flume or timber mats) (refer to Figures 19A and 19B)
- Rock Flume (refer to Figure 20)
- Railroad flat cars
- Flexi-float or other pre-fabricated portable bridges
- Other methods as approved by Enbridge and appropriate agencies

### **2.4.2 Bridge Design and Maintenance**

Bridges will be designed as close to perpendicular to the axis of the stream channel, creating the shortest crossing length and will be built and maintained in accordance with applicable permits. Equipment bridges will be designed to withstand the maximum foreseeable flow of the stream with headers and support structures being placed above the OHWM of the feature. In the event that local jurisdictions require stricter guidelines associated with bridge placement, Enbridge will design the bridge to comply with these requirements.

Enbridge has implemented safety specifications to require in-stream supports be installed for certain bridge structures. In-stream supports will not be installed in or removed from waterbodies during agency-timing restrictions unless approved by the agency. Bridges will not restrict flow or pool water while the bridge is in place and will be constructed with clean materials. Bridges will be designed and maintained to prevent soil from entering the waterbody. Soil that accumulates on the bridge decking will be removed as needed, or as deemed necessary by the EI.

## **2.5 STREAM AND RIVER CROSSING CONSTRUCTION METHODS**

Waterbody crossing methods are described in more detail in Enbridge's Summary of Construction Methods and Procedures for Wetland and Waterbody Crossings. Procedures for frozen conditions are discussed in Enbridge's Winter Construction Plan.

The following stream and river crossing methods are typically used, subject to further restrictions by Enbridge and applicable permits and subject to modifications as approved by appropriate regulatory agencies and tribal resource specialists (as applicable) during construction.

Enbridge's construction contractor(s) and EIs will monitor upcoming weather forecasts to determine if significant rainfall is anticipated during construction. To the extent practicable, Enbridge will avoid installing the pipeline across waterbodies during these periods. In the event that rainfall is not expected to be significant (e.g., less than 0.5 inch) and Enbridge determines that construction should proceed, environmental crews will be notified of the location of planned crossings and would be available to respond quickly if additional erosion control devices are needed.

### **2.5.1 Open Cut (Non-Isolated) Trench Method**

Crossing of waterbodies when they are dry or frozen to the bottom and not flowing may proceed using the open cut (non-isolated) trench crossing technique described below, provided that the EI verifies that water is unlikely to flow between initial disturbance and final stabilization of the feature. This applies to features that have been identified as waterbodies, but field delineations determined were wetlands based on conditions at the time of survey. If unanticipated flow conditions develop during construction of a given waterbody, Enbridge's EIs would be notified immediately to determine the extent of the flow and Enbridge would install additional erosion control devices, as necessary. If flows are significant, and sedimentation is likely to occur, work would be stopped, or Enbridge will follow the procedures outlined in Section 6.0 of the EMCP to switch to a dry (isolated) crossing technique (see Sections 2.5.2 and 2.5.3), with Enbridge and agency approval.

There are also a limited number of locations where due to surrounding saturated wetlands, it is not feasible to isolate the flow and the open cut trench method (see Section 3.7.1) may be used.

#### **Installation**

The following procedures will be used during open cut trench crossings:

- Sediment control measures will be installed before grading from the 20-foot vegetative buffer left on each stream bank. Spoil containment structures will be installed back from the stream bank so that spoil does not migrate into the stream.
- Grading will be directed away from the waterbody to minimize the potential for sediment to enter the stream. Grading of stream banks will be restricted to the trench line and areas necessary for safe bridge installation.
- After grading, backhoes or draglines will be used to excavate the trench. Where possible, excavating equipment will operate from one or both banks, without entering the stream. If equipment must encroach into the stream, it will operate on clean construction mats. Streambed material will be segregated (e.g., upper one foot and the remaining trench spoil will be stored separately) and placed within a spoil containment structure in approved construction work area limits. Storage of streambed spoil within the stream will only be allowed if expressly approved in the applicable permits.
- Earthen trench plugs (hard plugs) between the stream and the upland trench will be left undisturbed during excavation of the in-stream trench to prevent diversion of the stream flow into the open trench and to prevent water that may have accumulated in the adjacent upland trench from entering the waterbody. Trench plugs will be removed

immediately prior to pipe placement, and then replaced when the pipe is in place. Trench water accumulated upslope of trench plugs will be dewatered appropriately prior to trench plug removal.

- Water within the trench will be managed in accordance with Section 5.0.
- Backfilling will begin after the pipe is positioned in the trench at the desired depth. Backfill material will consist of the spoil material excavated from the trench and parent streambed unless otherwise specified in state or federal permits. The in-stream trench will be backfilled so that the stream bottom is as near as practicable to its pre-construction condition, with no impediments to normal water flow.

### **In-Water Best Management Practices**

To minimize downstream sedimentation effects, Enbridge would install in-water BMPs (e.g., silt curtains, bladder dams, or water gates) downstream of all open cut crossing locations (including push-pull) where there is water prior to the initiation of crossing. The type of in-water BMP utilized would depend on waterbody conditions (flow velocity, water depth, and the width of the waterbody) and would be selected by the Contractor depending upon the site-specific conditions at the time of crossing.

Turbidity (silt) curtains are one of the most common in-water BMPs utilized to further minimize TSS loading to protect downstream resources. Silt curtains are impermeable materials with a flotation carrier on top and weighted bottom, and are appropriate for still water (lakes, ponds, or other large bodies of water with little or no current) or moving water with current less than 7 feet per second. Turbidity curtains would be installed according to the manufacturers specifications as appropriate for the waterbody conditions, and according to the following BMPs (Minnesota Department of Transportation, 2006):

- Depth of the curtain would be a minimum of 2 feet and a maximum of 10 feet;
- Both ends of the curtain would be anchored to land for still water, and one end would be anchored in flowing water; and
- The curtain would be carefully removed to avoid re-suspension of the sediment in water;
- Curtains would not be installed across the total length of any flowing waterbody channel; and curtains would not be installed near any outlet (culvert, lake/pond discharge).

The exact location of turbidity curtains will be determined on-site prior to initiating the crossing by Enbridge's EIs in accordance with the BMPs described above, and the typical provided in Figure 29 of the EPP.

### **Temporary Stabilization**

The Contractor will restore the stream banks as near as practicable to pre-construction conditions unless that slope is determined to be unstable. If Enbridge determines the slope is considered unstable, the Contractor will reshape the banks to prevent slumping. Once the banks have been reshaped, ECDs will be installed within 24 hours of backfilling the crossing.

Temporary slope breakers will be installed on all sloped approaches to streams in accordance with the spacing requirements previously specified.

A temporary seed mix (e.g., annual rye or annual oats) and mulch and/or erosion control blankets will be installed within a 50-foot buffer on either side of the stream, with exception to actively cultivated land. Silt fence or functional equivalent as approved in advance by Enbridge will be installed upslope of the temporary seeding area.

## **2.5.2 Isolated Trench: Dam and Pump Method**

### **Installation**

The dam and pump method is an isolated dry crossing technique that is suitable for low flow streams and is generally preferred for crossing meandering channels. The dam and pump method involves damming of the stream upstream and downstream of the proposed trench before excavation (refer to Figure 16) and pumping water around the construction area. Procedures for conducting dry crossing techniques in frozen conditions are described in Enbridge's Winter Construction Plan. The following procedures will be used for dam and pump crossings:

- Dams may be constructed of sandbags, inflatable dams, aqua-dams, sheet piling, and/or steel plates. The dams will prevent the stream from flowing into the construction area. The dams will be continuously monitored for a proper seal. Additional sandbags, plastic sheeting, steel plating, or similar materials will be used where necessary to minimize the amount of water seeping around the dams and into the construction work area. The dam will not be removed until after the pipeline has been installed, the trench has been backfilled, and the banks have been stabilized.
- Pumping of the stream across the ROW will commence simultaneously with dam construction to prevent interruption of downstream flow. Stream flow will be pumped across the construction area through a hose and will be discharged to an energy-dissipation device, such as plywood boards, filter bags, large rock or bricks, or any other material that reduces the concentrated flow of a water pump such that stream bed or banks scouring will not occur. These devices are placed within the channel or on the banks of waterbodies to ensure that stream water being pumped around a crossing will not cause erosion or scouring and that the water will not be inadvertently discharged outside of the feature.
- The pumps and fuel containers will be located on the upstream side of the crossing and will be placed in impermeable, sided structures which will act as containment units (refer to Section 10.0). The pumps used for this crossing method will not be placed directly in the stream or on the streambed. Pumps will have a capacity greater than the anticipated stream flow. The pumping operation will be staffed 24 hours a day and pumping will be monitored and adjusted as necessary to maintain an even flow of water across the work area and near-normal water levels upstream and downstream from the crossing.
- The pump intake will be suspended to prevent sediment from being sucked from the bottom of stream and will be equipped with a screen, or equivalent device, to prevent fish uptake.



- Where possible, excavating equipment will operate from one or both banks, without entering the stream. If equipment must encroach into the stream, it will operate on clean construction mats (free of soil and plant material prior to being transported onto the construction ROW). Streambed material will be segregated as stated in the open cut trench method and will be placed within a spoil containment structure in approved construction work area limits. Storage of streambed spoil within the stream will only be allowed if expressly approved in the applicable permits.
- Earthen trench plugs (hard plugs) between the stream and the upland trench will be left undisturbed during excavation of the in-stream trench to prevent diversion of the stream flow into the open trench and to prevent water that may have accumulated in the adjacent upland trench from entering the waterbody. Trench plugs will be removed immediately prior to pipe placement, and then replaced when the pipe is in place. Trench water accumulated upslope of trench plugs will be dewatered appropriately prior to trench plug removal.
- Standing water that is isolated in the construction area by the dams will be managed in accordance with Section 5.0.
- Backfilling will begin after the pipe is positioned in the trench to the desired depth. Backfill material will consist of the spoil material and parent streambed excavated from the trench unless otherwise specified in state or federal permits. The in-stream trench will be backfilled so that the stream bottom is similar to its pre-construction condition, with no impediments to normal water flow.

### **2.5.2.1 Isolated Trench: Modified Dam and Pump Method**

In situations where the stream banks are stable, but conditions are too saturated to effectively dewater from the construction workspace, Enbridge would conduct a modified dam and pump crossing. The only difference from standard dam and pump method and this modified technique is that Enbridge would not dewater the trench and would utilize buoyancy control methods (refer to Section 3.7.3) as appropriate to sink the pipe to the bottom of the trench. Enbridge would install in-water BMPs downstream of these crossing locations prior to initiating the crossing to mitigate the potential for elevated sedimentation (refer to the discussion in In-Water BMPs under Section 2.5.1). The exact location of in-water BMPs will be determined on-site prior to initiating the crossing by Enbridge's EIs.

#### **Temporary Stabilization**

Restoration of the stream banks and the installation of temporary erosion controls will be similar to that described for the open cut trench method above but will occur immediately following installation of the pipeline. Once the stream banks have been stabilized, the dams and pump will be removed.

### **2.5.3 Isolated Trench: Flume Method**

#### **Installation**

The flume method is an isolated dry crossing technique that is suitable for crossing relatively narrow streams that have straight channels and are relatively free of large rocks and bedrock at

the point of crossing (refer to Figure 17). This method involves placement of flume pipe(s) in the stream bed to convey stream flow across the construction area without introducing sediment to the water. Procedures for conducting dry crossing techniques in frozen conditions are described in Enbridge's Winter Construction Plan. The procedures for using the flume method are described below.

- The flume(s) will be of sufficient diameter to transport the maximum flows anticipated to be generated from the watershed. The flume(s), typically 40 to 60 feet in length, will be installed before trenching and will be aligned so as not to impound water upstream of the flume(s) or cause downstream bank erosion. EIs will evaluate flume discharges; if excessive flows are observed and may cause scouring, then energy dissipation devices plywood, steel plate, etc. can be placed within the waterbody to deflect/absorb heavy water flows. The flumes will not be removed until after the pipeline has been installed, trench has been backfilled, and the stream banks have been stabilized.
- The upstream and downstream ends of the flume(s) will be incorporated into dams made of sand bags and plastic sheeting (or equivalent). The upstream dam will be constructed first and will funnel stream flow into the flume(s). The downstream dam will prevent backwash of water into the trench and construction work area. The dams will be continuously monitored for a proper seal. Adjustments to the dams will be made where necessary to prevent large volumes of water from seeping around the dams and into the trench and construction work area.
- Where possible, excavating equipment will operate from one or both banks, without entering the stream. If equipment must encroach into the stream, it will operate on clean construction mats. Streambed material will be segregated and placed within a spoil containment structure in approved construction work area limits. Storage of streambed spoil within the stream will only be allowed if expressly approved in the applicable permits.
- Earthen trench plugs (hard plugs) between the stream and the upland trench will be left undisturbed during excavation of the in-stream trench to prevent diversion of the stream flow into the open trench and to prevent water that may have accumulated in the adjacent upland trench from entering the waterbody. Trench plugs will be removed immediately prior to pipe placement, and then replaced when the pipe is in place. Trench water accumulated upslope of trench plugs will be dewatered appropriately prior to trench plug removal.
- If additional trench dewatering is necessary to complete the installation of the pipe, the discharge will be managed in accordance with Section 5.0.
- Backfilling will begin after the pipe is positioned in the trench to the desired depth. Backfill material will consist of the spoil material excavated from the trench and parent streambed unless otherwise specified in state or federal permits. The in-stream trench will be backfilled so that the stream bottom is similar to its pre-construction condition, with no impediments to normal water flow.

## **Temporary Stabilization**

Restoration of the ROW and the installation of temporary erosion controls will be similar to that described for the open cut trench method above but will occur immediately following installation of the pipeline. After the stream banks have been stabilized, the dams and flume will be removed from the stream bed allowing water to resume its flow in the channel.

### **2.5.4 Trenchless Methods: Horizontal Directional Drill Method (Pressurized)**

#### **Installation**

HDD is a trenchless crossing method that involves no direct excavation of the features being crossed; for this reason, it is often used to cross sensitive resources such as waterbodies (refer to Figure 18). An HDD occurs in multiple phases. In the first phase, a small-diameter pilot hole will be drilled under the feature along a prescribed profile. After the pilot hole has been completed, barrel reams will be used to enlarge the pilot hole to accommodate the desired pipeline diameter. Drilling mud will be necessary to remove cuttings and maintain the integrity of the hole. Water from an Enbridge-approved source will be used to prepare the slurry of drilling mud and will be appropriated according to applicable permits. In the final phase, the pipe section will be pulled through the hole by the drilling rig (called “pullback”) and welded to the adjoining sections of pipe on each side of the feature. During the pilot hole drilling, reaming, and swabbing, substantial pressure is applied to the borehole as drilling fluids are pumped in. A surveying system is utilized to guide the drill path from entry to exit point.

#### **Drilling Mud**

Drilling mud (potentially with the addition of additives) are used to provide hydrostatic pressure to prevent fluids from entering the bore hole, to lubricate and cool the drill bit, and return cuttings from the bore hole to the surface to clear the hole and maintain drilling operations. Maintaining drilling fluid circulation to the extent possible is the key to reducing the risk of inadvertent drilling fluid returns (also referred to as an “inadvertent release”). Chemical drilling additives help control sand content and flow, water hardness, keep the bore hole open and stable, prevent groundwater inundation and allow the bentonite to yield properly. Only Enbridge and agency-approved drilling mud additives will be used on this Project.

During drilling operations, drilling mud and slurry will be stored on top of timber mats if within wetlands and back from the waterbody in an earthen berm sediment control structure, in tanks, or by other methods so that it does not flow into the waterbody, adjacent wetlands or off the workspace (refer to Section 11.0 for additional details).

After the pipe is in place, excess drilling mud will be hauled off-site to an Enbridge-approved disposal location or licensed disposal facility.

#### **Temporary Stabilization**

The directional drilling method normally does not result in the disturbance of the stream banks (with exception of clearing of woody vegetation required to facilitate guide wire placement and for operations), which reduces the potential for erosion and sedimentation at the stream crossing. Consequently, temporary erosion control measures that are installed at open-cut crossings typically are not necessary for drilled crossings.

## **2.6 PERMANENT RESTORATION**

Stream/channel banks disturbed during installation of the pipelines will be stabilized with erosion control materials such as an erosion control blanket and seeded in accordance with Section 7.0. Permanent stabilization will be initiated within 24 hours after installation of the crossing using the open cut trench method and prior to restoring flow using the dam and pump or flume method, unless site and permit conditions delay permanent installation. Where the banks have been disturbed, the Contractor will restore the slopes as near as practicable to pre-construction conditions unless that slope is determined by Enbridge to be unstable. Where the slope of the banks is determined to be unstable or has the potential to erode or fail, the banks will be reshaped to transition the disturbed areas into the natural stream bank with the intent to stabilize the bank and create a blended, natural appearance.

Berms or other sediment filter devices will be installed at the base of sloped approaches to streams greater than five percent and the outlet of the berm will be directed away from the stream into a well vegetated area. Temporary sediment control devices will remain in place until the area has stabilized and adequate revegetation has established.

### **2.6.1 Vegetative Bank Restoration**

Typically, waterbody banks will be restored as near as practicable to preconstruction conditions after backfilling is complete and will be seeded with an appropriate seed mix as specified in Section 7.0 and covered with an erosion control blanket. Erosion controls, (e.g. straw bales, bio-logs, silt fences, etc.) will be installed as necessary based on site-specific conditions. Enbridge will work with the agencies to identify riparian areas that may require specialized seed mixes, woody saplings, or other specialized restoration techniques and will develop site-specific restoration plans for those sites in coordination with the appropriate agencies.

### **2.6.2 Supplemental Bank Stabilization**

Unstable soils and/or site-specific factors such as stream velocity and flow direction may require additional restoration efforts, such as installation of rock rip-rap, to stabilize disturbed stream banks. Rock rip-rap will be used only where site-specific conditions require and where applicable permits or approvals have been acquired. Geotextile fabric and rock riprap will be placed according to site and permit conditions (refer to Figure 23). Disturbed soils upslope and on either side of the riprap will be prepared for seeding according to Section 7.0 and other stream bank protection requirements. Bioengineering techniques may also be implemented as determined by Enbridge (refer to Figures 26 through 28) in coordination with the appropriate agencies.

### **2.6.3 Bridge Removal**

Equipment bridges will be removed during final cleanup or, if access is needed, after final cleanup and permanent seeding. Restoration of the bridge area will be completed upon bridge removal.



#### **2.6.4 Swales**

Swales will be restored as near as practicable to original conditions. Swales will be seeded and either mulched with straw or erosion control blankets will be installed to the perceivable top of bank for the width of the construction ROW.

### **3.0 WETLAND CROSSING GENERAL REQUIREMENTS**

Wetland crossing methods are described in more detail in Enbridge's Summary of Construction Methods and Procedures for Wetland and Waterbody Crossings. Procedures for frozen conditions are discussed in Enbridge's Winter Construction Plan.

The procedures in this section apply to all wetlands that will be affected by the Project. These procedures require that judgment be applied in the field and will be implemented under the supervision of Enbridge and the EI. The intent of these procedures is to minimize construction-related disturbance and sedimentation of wetlands and to restore wetlands as nearly as possible to pre-existing conditions. Additionally, in wetlands that are being actively cultivated or hayed at the time of construction, Enbridge will construct the pipeline using standard upland methods. Most seasonally saturated farmed wetlands are used for crop production and topsoil will be segregated in the same manner as topsoil in upland agricultural lands. Pipe stringing and fabrication may occur within the farmed wetland adjacent to the trench, or adjacent to the farmed wetland in a designated ATWS.

Wetland crossing requirements, including construction methods, timing, erosion control, and restoration, are described in this section and in the wetland crossing permits issued by state, federal and/or tribal agencies as applicable. If the contractor considers certain parts of these procedures to be technically impractical due to site-specific engineering constraints, they may submit an on-site modification request to Enbridge for approval of alternative measures. Enbridge will review the contractor's alternatives and consult with appropriate regulatory agencies. The contractor must receive approval from Enbridge prior to implementing the alternatives.

#### **3.1 WETLAND ACCESS**

The Contractor will use the construction ROW and only approved roads to access wetland areas. Timber mats will be placed over all delineated wetlands with the construction workspace or along access roads.

#### **3.2 CLEARING**

Clearing the construction ROW in wetlands will be similar to clearing in uplands. For construction to proceed, obstructions (e.g., trees, brush, and logs) need to be removed. Typically, low ground pressure equipment will be used, limiting disturbance to the wetland. Vegetation and trees within wetlands will be cut off at ground level, leaving existing root systems intact; clearing debris will generally be removed from the wetland for disposal. Hydro-axe debris, or similar can be left in the wetland if spread evenly in the construction ROW to a depth which will allow for normal revegetation, as determined by the EI.

#### **3.3 ADDITIONAL TEMPORARY WORKSPACE IN WETLANDS**

In general, Enbridge attempts to locate ATWS outside of wetlands wherever practicable; however, ATWS may be sited in select wetlands where the wetland is adjacent to a waterbody, road, railroads, foreign utility crossings, and/or pipeline cross-over with prior approval from the applicable regulatory agencies. Clearing of forested wetlands for ATWS will be avoided as much as possible.

- Staging areas, additional spoil storage areas, and other ATWS will be located in upland areas at least 50 feet away from wetland boundaries (refer to Figures 24), where safe work practices or site conditions permit, except where the adjacent upland consists of cultivated or rotated cropland or other disturbed land. If site conditions do not permit a 50-foot setback, then these areas will be located as far away from the wetland as is practicable. Vegetation will not be cleared between these areas and the wetland in any event. No construction activities including vegetation clearing or earthwork will occur between the ATWS and the wetland.
- The size of the ATWS areas will be limited to the minimum needed to construct the wetland crossing.

### **3.4 GRADING IN A WETLAND**

Grading activities will be confined to the area of the trench and will be minimized to the extent practicable. Grading outside the trench will only be allowed where required to ensure safety and restore the construction ROW after backfilling the trench with prior approval from Enbridge.

ECDs will be installed:

1. across the entire construction ROW upslope of the wetland boundary, where necessary, to prevent sediment flow into the wetland;
2. along the edge of the construction ROW as necessary to prevent sediment flow into off-ROW wetlands; and
3. along the edge of the construction ROW as necessary to contain spoil and sediment within the construction ROW through wetlands.

ECDs will be maintained in proper working order to prevent the flow of sediment into wetlands from spoil piles or sloped approaches that are adjacent to the wetlands. .

### **3.5 RIGHT-OF-WAY STABILIZATION**

Tree stumps, brush riprap, imported soil, and rock fill will not be brought in to stabilize the ROW in wetlands. Where low ground pressure equipment is not used, construction equipment will operate from timber construction mats or equivalent means with prior approval from Enbridge (refer to Figure 24). To prevent the spread of noxious and invasive plant species, timber mats will be free of soil and plant material prior to being transported onto the construction ROW and/or moved from one area of the construction ROW to another area. Timber riprap (also known as corduroy road) will not be used without prior written approval from Enbridge and the appropriate regulatory agencies. Pre-existing corduroy roads in wetlands may be used but may not be improved, maintained, restored, or replaced without site-specific authorization from applicable agencies.

Subsoil from the pipeline trench within the immediate wetland may be placed on top of equipment mats for additional stabilization. Timber mats may be placed over the ditch line or on the working side to facilitate trench excavation. All timber mats, construction debris, and larger woody vegetative debris will be removed during cleanup of wetlands.

### **3.6 TRENCHING**

Excavation of the pipeline trench in wetlands typically will be accomplished using backhoe excavators. The Contractor will take reasonable steps to ensure that the duration of open trench in wetlands, including tie-ins, is minimized to the fullest extent possible.

#### **3.6.1 Topsoil Segregation**

When constructing in wetland areas without standing water, up to one foot of topsoil (organic layer) will be stripped from the trench line and stockpiled separate from trench spoil to preserve the native seed stock. In standing water wetlands, organic soil segregation is not typically practical; however, the Contractor will attempt to segregate as much of the organic layer as possible based on site/saturation conditions. If normally unsaturated wetlands are saturated at the time of construction, topsoil segregation will be attempted according to Figure 2 and based on recommendations from the EI and appropriate regulatory agencies.

#### **3.6.2 Trench Breakers**

Where the EI determines that the pipeline trench has the potential to drain or partially drain a wetland, trench breakers will be installed as necessary to maintain the original wetland hydrology.

### **3.7 PIPELINE INSTALLATION**

The following procedures are intended to minimize siltation and disturbance to wetlands during installation.

#### **3.7.1 Push/Pull Method**

Large wetlands with standing water can generally not be crossed with typical crossing methods. In these areas, the pipeline will be assembled in an upland area and positioned in the trench using the "push-pull" and/or "float" techniques.

Usually this fabrication requires use of ATWS adjacent to the construction ROW. A backhoe (or equivalent) supported on timber mats or equivalent low ground pressure equipment will be used to dig the trench. The prefabricated section of pipeline will then be pushed-pulled into position or floated across the wetland. When the pipeline is in position, floats, if used, will be removed and the pipeline will sink into position. The trench will then be backfilled and a backhoe or similar equipment working from construction mats or by low ground pressure equipment will be used restore the wetland.

#### **3.7.2 Temporary Erosion and Sediment Controls**

ECDs at approaches to wetlands will be installed as previously described and in accordance with Section 1.0.

#### **3.7.3 Buoyancy Control**

Buoyancy control of the pipe in saturated environments can be achieved by utilizing one or more of the following methods:



- Concrete coated pipe
- Bag weights (also referred to as concrete weights and/or saddlebag weights)
- Sand bags

Contractors will select the appropriate method(s) depending on site-specific conditions at the time of crossing. Concrete will generally be mixed off-site, and concrete coated pipe will be transported to the construction ROW on trucks. If required, pre-fabricated concrete weights and/or saddlebag weights will also be used to provide negative buoyancy. Concrete weights will be manufactured off-site and transported to the ROW. Weights will be strung along the construction ROW, where necessary, until they are placed over the pipe within the excavated ditch. Limited mixing and coating activities may occur on the construction ROW for coating pipe joints and concrete weight repairs according to the concrete usage specifications in Section 10.0. Washing equipment used for mixing, pouring, casting, or coating will not be within 100 feet of any wetland and will be conducted and contained in a leak-proof containment facility or impermeable liner. The EI will determine where ECDs will be installed down slope of equipment wash areas to capture sediments and minimize erosion from runoff.

### **3.8 BACKFILLING**

Subsequent to pipe installation, backfilling of wetland trenches will take place immediately, or as approved by EI. The Contractor will restore wetlands as near as practicable to pre-construction conditions and will make a reasonable attempt to return the subsoil to its pre-construction density. During backfilling of wetland areas, subsoil material removed from the trench during construction will be replaced so that the material is not mounded above the adjacent ground surface (undisturbed trench wall). Subsoil that exceeds the elevation of the ground adjacent to the trench will be removed from the wetland and disposed of in an upland area or an Enbridge-approved disposal site. After the trench has been backfilled with subsoil, previously segregated topsoil will be spread over the trench area and mounded.

### **3.9 ROUGH GRADING, CLEANUP, AND TEMPORARY RESTORATION**

Cleanup and rough grading activities may take place simultaneously. Cleanup typically involves removing construction debris and replacing fences removed during construction. Rough grading includes restoring original conditions within the disturbed areas (i.e., ditch line, spoil storage areas, and equipment travel lane) and installing or repairing temporary ECDs. Temporary slope breakers will be installed near the boundary between the wetland and adjacent sloped approaches, to prevent sediment flow into the wetland.

#### **3.9.1 Timing**

Cleanup and rough grading (including installation of temporary erosion control measures) will begin as soon as practical after the trench is backfilled, weather permitting.

#### **3.9.2 Temporary Stabilization**

Where necessary, disturbed wetland areas will be seeded with oats (40 lbs/acre) and/or a temporary seed mix, unless standing water is prevalent or unless permanent planting or seeding with native wetland vegetation is required by applicable permits. No fertilizer, lime, or mulch will be applied in wetlands.

## **4.0 HIGHWAY, ROAD AND RAIL CROSSINGS**

### **4.1 BORES (NON-PRESSURIZED)**

Conventional bore methods are typically used to cross highway, road, and rail crossing features. Because watercourses, such as ditches, often occur parallel to these features, bores may be extended to bore under multiple features. Bore methods involve construction of a bore pit on each side of the feature (highway, road, railroad, watercourse) and thumping or boring a casing underneath the feature(s) without use of pressurized drilling fluid. The specific equipment utilized to execute the bore is dictated by the length of the bore and soil conditions. Water and bentonites can be introduced if soil conditions dictate in order to lubricate the drilling head and allow it to move through the ground more freely. With this construction practice at no time is pressurized water or drill mud being used to hold the hole open as it would during an HDD or a guided bore, and therefore there is no risk for an inadvertent release at these locations. If drilling mud is needed at these locations, any release would travel back along the path of the pipe and into the bore pit, where it would be collected and removed. Typically, the length of these crossings is limited, and the bore holes must be set up relatively close to the edge of the feature, and the depth maintained just below the depth of scour for watercourses.

### **4.2 ADDITIONAL WORKSPACE**

Additional workspaces for bored road and railroad crossings and open-cut road crossings will be determined on a site-specific basis. These workspaces will be adjacent to the road or railroad and limited to the size needed to contain spoil, stage equipment, and store supplies for the crossing.

### **4.3 MAINTENANCE**

Roadway crossings will be maintained in a condition that will prevent tracking of mud onto the roadway.

Rock tracking pads, constructed of stone as required by the applicable permits, will be installed adjacent to paved public roads to prevent or minimize the tracking of soil onto the roadway. If the roadside ditch is part of a jurisdictional waterway, a permit will be obtained prior to installing the tracking pad or culvert. If permitted in wetlands, tracking pads will be limited in size to reduce impacts. Tracking pads installed in wetlands will be constructed with clean rock placed on geotextile fabric, as approved by an EI and with approval from applicable regulatory agencies. All rock and fabric will be removed from the wetland during cleanup.

### **4.4 TEMPORARY EROSION AND SEDIMENT CONTROLS**

Temporary ECDs (e.g., silt fence and/or double-staked straw bales) will be installed on sloped approaches to road crossings where vegetation has been disturbed (refer to Figure 25).

## 5.0 CONSTRUCTION DEWATERING

### 5.1 TRENCH DEWATERING

Prior to initiating dewatering activities, the EI will approve the water discharge plan to ensure that the BMPs are applied in such a way as to minimize the potential for scour and water containing sediment from reaching a wetland or waterbody. Furthermore, landowner approval is required in advance of placement of dewatering structures outside of the approved construction ROW. The Contractor will assess each water discharge situation to include:

1. **Water Discharge Setting** - This includes:
  - a. Soil Type - The soil type the discharged water would flow over. The management of discharged water traveling over sandy soil is more likely to soak into the ground as compared to clay soils.
  - b. Ground Surface - The topography in the area that would influence the surface flow of the discharged water.
  - c. Adjustable Discharge rate - The flow rate of the discharged water (which may need to vary) can be managed based on the site conditions to minimize instances of water from reaching a sensitive resource area such as a wetland or waterbody. (Example - Water discharged at 500 gallons per minute may soak into the ground while if discharged at a higher flow rate would cause water to flow via overland runoff into a sensitive resource area)
  - d. Discharge Outfall - The amount of hose and number/size of pumps needed to attempt to discharge water at a location which drains away from waterbodies or wetlands.
2. **Pump Intake** - Use floating suction hose or other similar measures to prevent sediment from being sucked from bottom of trench.
3. **Overwhelming Existing Drainage** - If the discharge (assumed to be clean) enters a stream, the flow added to the stream will not exceed 50 percent of the peak storm event flow (to prevent adding high water volumes to a small stream channel that causes erosion due to imposing high flow conditions on the stream).
4. **Filtering Mechanism** – All dewatering discharges will be directed through a filtering device as indicated below.
  - a. Well-Vegetated Upland Area – Water can be directed to a well-vegetated upland area through a geotextile filter bag. Geotextile bags need to be sized appropriately for the discharge flow and suspended sediment particle size.
  - b. Straw Bale Dewatering Structure – Where the dewatering discharge point cannot be located in an upland area due to site conditions and/or distance, the discharge should be directed into a straw bale dewatering structure. The size of the straw bale dewatering structure is dependent on the maximum water discharge rate (refer to

Figure 21). A straw bale dewatering structure should be used in conjunction with a geotextile filter bag to provide additional filtration near sensitive resource areas.

- c. Alternative dewatering methods - Alternative methods may be approved by Enbridge on a site-specific basis.

### **5.1.1 Flow Measurement and Water Sampling**

The volume of water discharged from the trench will be recorded as required by the applicable permits. The volume may be determined using a flow meter, or equivalent method, as approved by Enbridge or specified by applicable permit conditions.

Samples of the water discharged will be sampled if required by Tribal permits and/or state-issued discharge permits.

### **5.1.2 Regulatory Notification and Reporting**

Enbridge will notify and submit reports to appropriate tribal, state and federal agencies as required by all permits/authorizations.

## **5.2 HYDROSTATIC TEST DISCHARGES**

Hydrostatic testing involves filling the new pipeline segments with water acquired in accordance with applicable permits (refer to Section 6.0), raising the internal pressure level, and holding that pressure for a specific period of time per federal DOT specifications. Hydrostatic testing will be done to verify that there are no flaws in the pipe or welds. Pre-built sections may be hydrostatically tested prior to installation using HDD and/or guided bore techniques. Hydrostatic testing will be conducted in accordance with applicable appropriation and discharge permits obtained by Enbridge. Hydrostatic test waters will not be transferred from one waterbody to another. Chlorinated source water will not be used on this Project. After the hydrostatic test is complete, the line will be depressurized and the water discharged.

### **5.2.1 Refueling**

The operation and refueling of hydrostatic test equipment will be in accordance with the conditions outlined in Section 10.0.

### **5.2.2 Siting of Test Manifolds**

Hydrostatic test manifolds will be installed where necessary to ensure proper test pressures and incorporates changes due to topography. Where feasible, Enbridge will incorporate minor adjustments to the test manifold locations to avoid placement in wetlands and riparian areas. However, completely avoiding the placement of a test manifold in a wetland may not always be possible. The Contractor will install appropriate erosion control measures where the EI determines they are necessary.



### **5.2.3 Water Sampling**

Water discharged from hydrostatic tests will be sampled as required by federal- and state-issued appropriation or discharge permits. Water volumes and flow rates will be recorded using the form provided in Appendix D.

### **5.2.4 Best Management Practices**

Prior to hydrostatic testing the pipeline, Enbridge will prepare the pipe by removing accumulated construction debris, mill scale, dirt, and dust using a cleaning pig. The debris will be collected in a temporary receiver and will be properly disposed off-site of by the Contractor. Upon completion of the cleaning operation, the pipeline will be sealed with the test headers.

Test headers and pigs will be arranged to allow for rinse water to be installed ahead of the fill pigs. Rinse water will be treated and disposed of in accordance with applicable permit conditions.

Following testing, the test section will be depressurized and the water will be discharged to a well-vegetated, upland area with an appropriate dewatering structure such as a geotextile filter bag and/or a hay bale structure that will be lined with geotextile fabric. Direct discharges to surface waters, if allowed by permit, will be directed into an energy dissipation device such as a splash pup.

At no time will the discharge rate exceed the applicable discharge rates specified in state-issued or other discharge permits. In the event no maximum discharge rate is identified, discharges will be monitored and adjusted as necessary to avoid scouring, erosion, or sediment transport from the discharge location.

To minimize the potential for introduction and/or spread of invasive species due to hydrostatic testing activities, Enbridge will discharge water to the same source location from which it was appropriated. If water is used to test multiple test sections, it will be relayed back to the source water through the pipeline for final discharge. Test water will not be discharged to a waterbody other than the appropriation source, unless coordinated and permitted through the applicable agencies.

### **5.2.5 Flow Measurement**

The total volume of water discharged will be determined with a flow meter (or equivalent), or as required by the applicable state permit. The total volume of water discharged will not exceed the volume specified in the applicable permit.

## **6.0 WATER APPROPRIATION**

### **6.1 GENERAL**

Water may be drawn from local sources, such as lakes, streams, and private or municipal wells for construction activities such as dust control, HDD/guided boring, trench dewatering, and hydrostatic testing. The Project will follow applicable permit conditions for the appropriation of water.

The intake hose will be suspended off of the stream or lake bottom and equipped with a screen, or equivalent device, to prevent fish uptake. During withdrawal, adequate waterbody flow rates and volumes will be maintained to protect aquatic life and allow for downstream uses. The volume and rate of withdrawal will be monitored to comply with applicable permit conditions.

### **6.2 WATER SOURCES**

Water will only be withdrawn from sources approved by Enbridge and in accordance with applicable permits. No additives to the water are permitted unless written approval is received from Enbridge and applicable permits authorize such additives.

If appropriation is scheduled to occur during possible periods of low flow, including frozen conditions, a backup source will be identified.

### **6.3 FLOW MEASUREMENT**

At no time will the withdrawal rate for the water source exceed the rate specified in the applicable permits.

The Contractor will measure the withdrawal rate and total volumes of water appropriated with a flow meter (or equivalent) and provide the data to Enbridge, as required by the applicable permits.

### **6.4 WATER SAMPLING**

Where required by permit conditions, Enbridge will sample the water during appropriation. The Contractor will assist Enbridge in obtaining these samples.

### **6.5 REGULATORY NOTIFICATION AND REPORTING**

Enbridge will notify appropriate agencies of the time of appropriations if required by the state appropriations permits. Enbridge will submit reports regarding the volume and quality of the water withdrawn if required by the applicable permits.

## 7.0 REVEGETATION & MONITORING

This section was developed in conjunction with Natural Resources Conservation Service (“NRCS”) guidelines. Project-specific permit conditions and landowner requests (with exception to wetlands) for specific seed mixes (as indicated in the Project CLL) take precedence over this section.

### 7.1 PROJECT SEED SPECIFICATIONS

Seed used will be purchased on a “Pure Live Seed” (“PLS”) basis for seeding (both temporary and permanent) revegetation areas. Seed tags will identify:

- name of mixture;
- lot number;
- weed seed percentage;
- other crop percentage;
- inert matter percentage;
- noxious weeds by name and number per pound;
- net weight; and
- labeler’s name and address.

In addition, for each component in the mix the following information must be included on the label:

- kind;
- variety;
- pure seed percentage;
- germination percentage;
- hard seed percentage;
- dormant seed percentage;
- total viable percentage;
- origin; and
- test date.

Seed will be used within 5, 12, or 15 months of testing as required by applicable federal and state laws and regulations. The seed tags on the seed sacks will also certify that the seed is “Noxious Weed None Found”. The label must show any noxious weed seed by name and number per pound. If none were found in testing, then the label should state Noxious weeds: None Found. Any *Amaranthus* seeds found in the purity and/or noxious exam must be tested using a genetic test to determine if Palmer amaranth is present. If Palmer amaranth is identified in testing, the seed is not legal for sale in Minnesota. Seed rates used on the Project will be based on PLS rate, not actual weight basis. Therefore, to determine the correct application rate if not indicated on the seed tag, a correction calculation will be performed based the purity and total germination.<sup>2</sup> For example, a seed mix that has a specified 10 pounds PLS per acre, 95 percent total germination rate, and is 80 percent pure needs to be applied at the following rate:

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<sup>2</sup> Percent total germination = (germination + hard seed + dormant)

$(95\% \text{ total germination} \times 80\% \text{ purity})/100 = 76\% \text{ PLS}$   
10 pounds PLS per acre/.76% PLS = 13.2 pounds per acre actual seeding rate

The species components of individual mixes are subject to availability at the time of purchase. Grass species may be substituted with alternative native or non-invasive species that are included in the NRCS guidelines and subject to approval by Enbridge. Any seed substitution must meet all the Project requirements as outlined. The seed tag must always reflect the species in the container and reflect any substitutions.

Seed tags will be collected by the contractor and provided to Enbridge during seeding activities. The tags will be reviewed by the EI prior to installation to ensure that the seed mix complies with Enbridge's specifications and that it is being applied to the correct location. Seed tags will be maintained for a minimum of two years after seeding along with planting records for each specific project. If bulk delivery of seed is made, the above information will still be made available to Enbridge. Off-loading/on-loading of seed will not be performed in a designated wetland area. Enbridge will notify the Minnesota Department of Agriculture Minnesota Seed Regulatory Program Coordinator so that seed lots may be sampled and tested to confirm compliance with Minnesota Seed Law, as necessary.

Legume seed (if used) will be treated with an inoculant specific to the species and in accordance with the manufacturer's recommended rate of inoculant appropriate for the seeding method (broadcast, drill, or hydroseeding). When hydroseeding, four times the manufacturer's recommended rate of inoculant will be used.

## 7.2 TEMPORARY REVEGETATION

Enbridge's temporary seed mix (refer to Appendix C) was developed based on recommendations from the NRCS. Unless specifically requested by landowners or land managing agencies, Enbridge does not intend to establish temporary vegetation in actively cultivated land, standing water wetlands, and/or other standing water areas.

## 7.3 TIMING FOR TEMPORARY VEGETATION

Temporary revegetation will be established in construction work areas where 14 days or more will elapse between:

- the completion of final grading at a site and the establishment of permanent vegetation; and/or,
- where there is a high risk of erosion due to site-specific soil conditions and topography.

Enbridge may require the Contractor(s) to conduct temporary seeding sooner than 14 days at site-specific locations near sensitive resource areas and/or areas prone to wind/water erosion.

Temporary vegetation should be established at any time between **April 1 and September 1**. Attempts at temporary revegetation after this date should be assessed on a site-specific basis and with approval from Enbridge.



## **7.4 MULCH**

Mulch (weed-free straw, wood fiber hydromulch, or a functional equivalent) will be applied to disturbed areas (except for actively cultivated land and wetlands) if requested by the landowner or land managing agency, if specified by the applicable permits or licenses, or as required by Enbridge. Mulch will specifically be required on:

- slopes greater than 5 percent; and
- dry, sandy areas that can blow or wash away (field decision).

Mulch will be free of noxious weeds as listed in applicable federal and state laws. Certified weed-free mulch may also be required at site-specific locations. The Contractor will be responsible for identifying and acquiring sources of weed-free and certified weed-free mulch. Sources will be approved by Enbridge prior to purchase.

Mulch will be applied at a rate of 2 tons per acre to cover at least 75 percent of the ground surface unless otherwise stipulated by permit conditions. Mulch will be uniformly distributed by a mechanical mulch blower, or by hand in areas not accessible to the mulch blower. Mulch will be anchored/crimped using a mulch-anchoring tool or disc set in the straight position to minimize loss by wind and water, as site conditions allow. In areas not accessible to a mulch-anchoring tool or too steep for safe operation, the mulch may be anchored by liquid tackifiers, with advance written approval from Enbridge. The manufacturer's recommended method and rate of application will be followed.

Hydro-mulch and liquid tackifier can be used in place of straw or weed-free hay mulch with prior approval from Enbridge. All hydromulch and liquid tackifier products used will be on the applicable state DOT product list. Application rates will be at the manufacturer's recommended rate, equal to or greater than 2 tons per acre of straw mulch.

## **7.5 PERMANENT REVEGETATION**

Permanent vegetation will be established in areas disturbed within the construction work area (permanent easement, TWS, and ATWS) except in actively cultivated areas and standing water wetlands. The seed mixes for permanent seeding include native seed varieties commonly found and/or available from local seed distributors. Enbridge's seed mixes (refer to Appendix C) were selected to augment revegetation via natural recruitment from native seed stock in the topsoil and are not intended to change the natural species composition. Rates provided are assumed for a drill application and will be adjusted as discussed in Section 7.1.

## **7.6 UPLAND CONSTRUCTION AREAS**

In consulting with the NRCS and other agencies, Enbridge developed standard upland seed mixes for restoring disturbed areas affected by the Project (Appendix C, Tables 1-23). These mixes include species that will provide for effective erosion control and revegetation of the project area. These seed mixes will be used by Enbridge as the standard upland mixes unless an alternate seed mix is specified by a landowner or land managing agency.

## **7.7 PERMANENT SEEDING OF WETLAND AREAS**

### **7.7.1 Unsaturated Wetland Areas**

Non-standing water wetlands in Minnesota will be seeded with the mix provided in Appendix C, Table 17 (MN Seed Mix 3) to provide temporary cover and allowed to revegetate naturally. No unsaturated wetlands will be seeded in North Dakota. The natural revegetation process will be encouraged by the seeds and rhizomes in the topsoil spread back over the ROW after pipe installation. No fertilizer, lime, or mulch will be applied in wetlands.

### **7.7.2 Saturated/Standing Water Wetlands**

Enbridge does not propose to seed saturated or standing water wetland areas. It is widely accepted that the reestablishment of vegetation within standing water wetlands occurs best through natural process without supplemental seeding.

### **7.7.3 Forested Wetland Restoration**

Enbridge proposes to allow natural reforestation of the TWS area within forested wetlands via stump sprouting, root sprouting, and natural recruitment. Specific forested wetland restoration provisions will be followed as indicated in applicable permits issued for the Project.

## **7.8 PERMANENT SEEDING OF WATERBODY BANKS**

Enbridge will reestablish stream bank vegetation in North Dakota using ND Seed Mix 2 (Table 2, Appendix C), and in Minnesota using MN Seed Mix 2 (Table 16 Appendix C) unless an alternate seed mix is requested by applicable agencies. Additional vegetation requirements may also be contained within project-specific permits. Where a waterbody is located within a wetland, the Contractor will re-seed the banks with the applicable wetland seed mix.

## **7.9 SPECIALIZED SEED MIXES**

Enbridge developed specialized seed mixes for restoring these areas:

1. Native prairie in North Dakota and Minnesota;
2. Openings in forested areas in Minnesota;
3. Mixed native prairie/tamed hayland areas and road ditches in North Dakota, and Minnesota;
4. Tame pasture and Conservation Reserve Program (“CRP”) lands;
5. North Dakota State School land; and
6. Protected waterbody banks and wetland fringes in Minnesota.

Enbridge will provide other specialized seed mixes upon landowner request on a site-specific basis for:

- Residential Areas: This seed mix will be used to reestablish residential lawns or other types of “turf-type” land cover.
- Wildlife Areas: This seed mix will be used to provide a desirable food source for wildlife, specifically deer.

## **7.10 CONSERVATION RESERVE PROGRAM PROPERTIES**

Enbridge’s Land Agents will contact landowners where the construction ROW crosses land enrolled in CRP. Enbridge will work with the respective landowners to identify the parcel-specific CRP seed mixes. CRP lands will be seeded at the direction of the landowner per the site-specific landowner CRP requirements for that parcel and no non-CRP approved seed mix will be planted on CRP lands. CRP parcels will also be seeded with Enbridge’s temporary cover seed mix. Seed for CRP seeding will meet the same criteria as other seed described in Section 7.1

## **7.11 SEED BED PREPARATION AND SEEDING PROCEDURES**

After final grading, deep tillage will be performed in actively cultivated areas and in non-agricultural areas (as directed by Enbridge) to relieve soil compaction and promote root penetration. Deep tillage will not be conducted in non-farmed wetlands. The soil will then be tilled with a disc, field cultivator, or chisel plow (or equivalent) to prepare a seedbed, breaking up large clods and firm the soil surface.

Tillage and equipment operations related to seeding and mulching will be performed parallel to ground contours as much as practicable. Fertilizer and other soil amendments will be incorporated into the soil during seedbed preparation as specified by Enbridge in the project-specific CLL requirements and permits. No soil amendments will be applied in wetlands unless directed by the appropriate agencies.

## **7.12 SEEDING METHODS**

Seed will be applied uniformly at specified rates across the prepared construction ROW by drilling, broadcasting, hydroseeding, or air seeding. The EI will suspend seeding activities if conditions are such that equipment will cause rutting of the surface in the designated seeding areas. Enbridge will continue to monitor ROW conditions to resume seeding activities as site conditions improve and according to the general seeding timing restrictions listed in Section 7.15.

### **7.12.1 Drill Seeding**

Seeding equipment will be capable of uniformly distributing the seed and sowing it at the required depth. Drills will be equipped with a feeding mechanism that will provide a uniform flow of seed at the desired application rate. Double-disc furrow openers equipped with depth bands and packer wheels to firm the soil over the seed will be used where practicable.

### 7.12.2 Broadcast Seeding

Broadcast seeding rate will be double the drill-seeding rate. Seed will be uniformly distributed by a mechanical or hand operated seeder. Following seeding, a cultipacker, harrow, or hand rake will be used to cover the seeds and firm the seedbed as is appropriate for the area.

### 7.12.3 Hydroseeding

Hydroseeding rate will be double the drill seeding rate, or the same as broadcast seeding rate. Seed will be applied alone or in a seed, fertilizer, and/or hydromulch slurry. If seeding is applied alone, the amount of hydromulch material will be adjusted to the seed slurry to show where seeding has taken place, providing a means to identify uniform cover of the construction ROW. Hydroseeders will provide continuous agitation and be capable of supplying a continuous, non-fluctuating flow of slurry. Enbridge will pre-approve all hydromulch products, which must be on the applicable state DOT product list.

## 7.13 COMPANION CROPS

A companion crop is an annual that can be planted with the perennial species where soil erosion is a severe hazard. A companion crop may be used for all seed mixes.

Seeding rates for companion crops are lower than normal seeding rates for those crops to reduce competition with the seeded perennial species.

Table 7.13-1 Companion Crops	
Seed	Planting Rate
Barley	10 lbs/acre
Oats	10 lbs/acre
Spring wheat	15 lbs/acre
Flax	7 lbs/acre

## 7.14 SOIL AMENDMENTS

Enbridge will consult with NRCS representatives and review county soil survey information to assess where soil amendments, specifically the application of fertilizer or lime are needed to promote successful revegetation. No fertilizer or lime will be added with native seed mixes. When using non-native species on dry, dry-mesic and mesic sites for permanent seeding a minimum of 150 pounds of 20-10-10, and 2 tons of 80-85 lime or equivalent will be applied, unless otherwise specified or restricted by the landowner, NRCS, or land-managing agency. Soil amendments may be applied to agricultural, pasture, and/or residential lands if requested by landowners and/or land managing agencies. Enbridge will apply phosphate free fertilizers to areas within 100 feet of a waterway if soil amendments are required.



## 7.15 SEEDING PERIODS

Recommended seeding dates in Table 7.15-1 are based on climatic records, research, and experience; and they also represent optimum periods for the germination of grass and legumes. The dates below provide adequate development of adventurous roots prior to stressful periods.

Table 7.15-1 Recommended Seeding Dates	
Species Type and Season of Planting	Recommended Dates
<u>Cool Season Species</u> Spring Late Summer Late fall dormant seeding	Prior to May 20 August 10 to September 1 Typically, November 1 and later
<u>Warm Season Species</u> Spring	May 10 to June 25
<u>Warm/Cool Season Mix</u> Spring	May 1 to June 14

Enbridge will delay seeding during frozen ground conditions until the applicable spring seeding period or will complete dormant seeding where conditions allow (i.e., no snow cover). Enbridge will install temporary erosion controls during frozen conditions.

## 7.16 TIMING OF FINAL SEEDING

Upon final grading of the construction ROW, and upon the restoration of wetland and waterways, seeding and restoration/stabilization will occur within 48 hours if weather and soils conditionals allow. Other methods of stabilization will be used if temporary seeding is not appropriate due to seasonal conditions (e.g., mulch, erosion control matting).

## 7.17 EROSION AND SEDIMENT CONTROL

Erosion control blankets, such as sewn straw mats, jute mats, coconut erosion control blankets, or biodegradable synthetic erosion control blankets, as approved by Enbridge, will be used on slopes over 30 percent, on stream banks and ditch banks and as directed by Enbridge.

## 7.18 DORMANT SEEDING

Dormant seeding is a method used after soil temperatures have cooled to 55 degrees Fahrenheit or cooler to prevent seed germination. Dormant seeding is only practicable if the soil is not frozen and snow is not present. Procedures for applying soil amendments, seedbed preparation, seeding, and mulching are the same as outlined for permanent revegetation in this section.

Where dormant seeding is conducted, one or more of the following temporary erosion and sediment controls will be put in place over the freshly seeded area unless the local soil conservation authority, landowner, or land managing agency specifies otherwise. The temporary measures will be in place within 48 hours of seeding, and are as follows:

- noxious weed-free straw mulch, at not more than 2 tons/acre, anchored;
- hydromulch, at 2 tons/acre, anchored; and/or
- erosion control blanket.

Additional erosion control measures will be applied as requested by the EI.

## **7.19 MANAGEMENT AND MONITORING**

Enbridge will monitor and address all areas where stabilization techniques have been implemented in accordance with conditions identified in the applicable project permits and/or licenses, Enbridge's Invasive and Noxious Species Management Plan (Appendix A) and Post-Construction Monitoring Plan.

As described in Section 1.6 and in Enbridge's Invasive and Noxious Species Management Plan (Appendix A), Enbridge will take all necessary steps to ensure that invasive and noxious species and their propagating parts are not transferred from one location to another.

## **8.0 WINTER CONSTRUCTION**

Enbridge has prepared a Winter Construction Plan that describes the construction procedures that would differ from the procedures outlined in this EPP during frozen conditions. The Winter Construction Plan describes procedures for the following:

- Snow removal;
- Construction of frost/ice roads;
- Bridges;
- ROW Clearing;
- Pipeline Stringing and Assembly;
- Trench Excavation, Lowering-In, and Backfill;
- Waterbody Crossing Techniques (open cut, dry crossings, and HDDs);
- Hydrostatic Testing; and
- Site Stabilization and Restoration.

## **9.0 WASTE MANAGEMENT**

The Contractor will properly handle, store, and dispose of all solid and hazardous materials and wastes that are used or generated by the Contractor as a result of the Project. The Contractor will determine if the materials and wastes associated with the Project classify as hazardous materials and/or wastes in accordance with applicable federal and/or state criteria. Upon request by Enbridge, the Contractor will provide documentation to Enbridge to substantiate findings of the regulatory status of materials and/or wastes used and/or generated as a result of the Project.

The Contractor will collect all waste materials, including oil or other waste liquids generated as a result of equipment maintenance, daily in suitable or approved containers (i.e., labeled and meeting any relevant regulatory requirements). On a routine basis, the Contractor will remove the containers of waste from the site and properly dispose of them. Throughout the duration of the Project, the Contractor will cleanup areas to the satisfaction of Enbridge. The Contractor is responsible for proper off-site disposal of all wastes generated during the Project. No wastes are to be left on Enbridge property, along the ROW, or buried in an excavation or otherwise disposed of on Enbridge property or ROW.

### **9.1 HAZARDOUS WASTES**

If a Contractor generates a hazardous waste from materials they have brought on-site (e.g., paint clean-up solvents, waste paints), then the Contractor is responsible for proper waste collection, storage and disposal in accordance with all applicable regulations. The Contractor remains responsible for the proper handling, storage and disposal of the hazardous waste. Any release of the hazardous waste as a result of the improper handling, storage or disposal by the Contractor in this instance is the responsibility of the Contractor to rectify to the satisfaction of Enbridge and all applicable regulatory agencies.

### **9.2 ABRASIVE BLAST DEBRIS**

The Contractor will contain and collect spent abrasive blast materials and place it into appropriate containers. The Contractor is responsible for covering the containers with appropriate means of rainwater and stormwater control to prevent said waters from entering or exiting the container. The Contractor is responsible for disposal of the spent abrasive in accordance with applicable federal, state and local regulatory requirements. The Contractor is responsible for determining if the spent abrasive is classified as a “hazardous” or “special” waste as defined by applicable federal and state regulations. If the spent abrasive is determined to be hazardous waste as a direct result of constituents of an Enbridge facility or equipment, Enbridge will coordinate proper disposal with the Contractor as previously discussed.

## **10.0 SPILL PREVENTION, CONTAINMENT, AND CONTROL MEASURES**

This section describes planning, prevention and control measures to minimize impacts resulting from spills of fuels, petroleum products, or other regulated substances as a result of construction. These measures will be implemented by the Contractor, unless otherwise indicated by Enbridge.

### **10.1 PLANNING AND PREVENTION**

Enbridge requires its Contractors to implement proper planning and preventative measures to minimize the likelihood of spills, and to quickly and successfully clean up a spill should one occur. This section sets forth minimum standards for handling and storing regulated substances and cleaning up spills. Potential sources of construction-related spills include machinery and equipment failure, fuel handling, transfer accidents and storage tank leaks. The Contractor will be responsible for implementing, at a minimum, the following planning and prevention measures.

### **10.2 ROLES AND RESPONSIBILITIES**

#### **10.2.1 Spill Coordinator**

A Spill Coordinator will be designated by the Contractor, subject to approval by Enbridge. For all construction related spills, the Spill Coordinator will:

- report all spills to the Enbridge Representative immediately;
- report spills to appropriate federal, state and local agencies as soon as possible (subject to EI verification);
- mobilize on-site personnel, equipment, and materials for containment and/or cleanup commensurate with the extent of the spill;
- assist the Emergency Response Contractor (refer to a list of potential contractors provided in Appendix E) and monitor containment procedures to ensure that the actions are consistent with the requirements of this section;
- in consultation with Enbridge and appropriate agencies, determine when it is necessary to evacuate spill sites to safeguard human health;
- in consultation with Enbridge, coordinate with appropriate agencies the need to contact additional parties or agencies; and
- complete a Spill Report Form (refer to Appendix F) within 24-hours of the occurrence of a spill, regardless of the size of the spill.



### **10.2.2 Environmental Inspector**

The EI will monitor the Contractor's compliance with the provisions of this section to ensure that appropriate agency notifications are made, spill resources are allocated, and clean-up is accomplished in accordance with applicable agency requirements

### **10.2.3 Authorized Personnel**

Authorized Personnel are representatives of the Contractor who are designated to handle fuel, lubricants or other regulated substances. Authorized Personnel will be familiar with the requirements of this section and the consequences of non-compliance.

### **10.2.4 Construction Superintendent**

The Contractor's Construction Superintendent or representative will notify the EI immediately of any spill of a petroleum product or hazardous liquid, regardless of volume.

### **10.2.5 Construction Personnel**

Construction Personnel are representatives of the Contractor involved with the installation of the pipeline. Construction Personnel will notify the crew foreman or Spill Coordinator immediately of any spill of a petroleum product or hazardous liquid, regardless of volume.

## **10.3 TRAINING**

The Contractor will train all employees handling fuels and other regulated substances to follow spill prevention procedures. The Contractor will train all employees who handle fuels and other regulated substances to prevent spills and to quickly and effectively contain and clean up spills that may occur in accordance with applicable regulations. .

## **10.4 EQUIPMENT**

- Each construction crew will have adequate absorbent materials and containment booms on hand, to enable the rapid cleanup of any spill which may occur.
- The Contractor will maintain spill kits containing a sufficient quantity of absorbent and barrier materials to adequately contain and recover foreseeable spills. These kits may include, but are not limited to absorbent pads, straw bales, absorbent clay, sawdust, floor-drying agents, spill containment barriers, plastic sheeting, skimmer pumps, and holding tanks. This equipment will be located near fuel storage areas and other locations as necessary to be readily available to control foreseeable spills.
- Suitable plastic lining materials will be available for placement below and on top of temporarily-stored contaminated soils and materials.
- All fueling vehicles, and where necessary, service vehicles, will carry materials adequate to control foreseeable spills. Such material may include but not be limited to absorbent pads, commercial absorbent material, plastic bags with ties, and shovels.

- The Spill Coordinator will inform the Authorized Personnel, Construction Personnel, and the EIs of the locations of spill control equipment and materials, and have them readily accessible during construction activity. Spill kits should be clearly labeled for quick and easy identification in the field.
- All fuel nozzles will be equipped with functional automatic shut-offs.
- Fuel trucks transporting fuel to on-site construction equipment will travel only on approved access roads.

## **10.5 SUPERVISION AND INSPECTION**

The Contractor will perform a pre-construction inspection and test of all equipment to ensure that it is in good repair. During construction, the Contractor will regularly inspect hoses, pipes, valves, and tanks to ensure equipment is free of leaks. Any equipment that found to be is leaking or in need of repair will be immediately removed from service by Contractor and repaired, prior to resuming work.

## **10.6 STORAGE AND HANDLING OF FUELS/HAZARDOUS LIQUIDS**

### **10.6.1 Fuel Storage - General**

The Contractor will follow proper fuel storage practices, including, but not limited to the following:

- Fuel storage will be at Contractor yards only or as approved by Enbridge.
- Proper signage at and adjacent to fuel storage areas to include "Fuel Storage Area – No smoking within 50 feet."
- Tools and materials to stop the flow of leaking will be kept on-site. Such equipment may include, but not be limited to, plugs of various sizes, 3M tank patches, a hammer, assorted sizes of metal screws with rubber washers, a screwdriver, and plastic tape.
- Fuels, lubricants, waste oil, and any other regulated substances will be stored in aboveground tanks only.
- Storage tanks and containers will conform to all applicable industry codes (e.g., National Fire Protection Association [NFPA], Unified Facilities Criteria [UFC]).
- A suitable secondary containment structure will be utilized at each fuel storage site. These structures will be lined with suitable plastic sheeting; provide a minimum containment volume equal to 150 percent of the volume of the largest storage vessel.
- Secondary containment areas will not have drains. Precipitation may be drawn off as necessary. If visual inspection indicates that no spillage has occurred in the secondary containment structure, accumulated water may be drawn off and discharged in accordance with Section 5.0. If spillage has occurred in the structure, accumulated waste will be drawn off and pumped into drum storage for disposal.

### **10.6.2 Refueling**

Contractor will make all efforts to dispense fuel by Authorized Personnel during daylight hours. Fuel dispensing operations will be attended by Authorized Personnel at all times. Personnel will be stationed at both ends of the hose during fueling unless both ends are visible and are readily accessible by one person.

### **10.6.3 Refueling, Maintenance, and Fuel Storage Near Wetlands and Waterbodies**

Enbridge requires that the storage of petroleum products, refueling, maintenance, and lubricating operations take place in upland areas that are more than 100 feet from wetlands, streams, and waterbodies (including drainage ditches), and water supply wells. In addition, the Contractor will store hazardous materials, chemicals, fuel and lubricating oils, and perform concrete coating activities outside these areas.

In certain instances, refueling or fuel storage may be unavoidable due to site-specific conditions or unique construction requirements (e.g., continuously operating pumps or equipment on barges). These locations will be approved in advance by the EI. Site-specific precautions, in addition to those practices described above, will be taken when refueling or maintenance activities are required within 100 feet of streams, wetlands or other waterbodies. These precautions include, but are not limited to:

- adequate amounts of absorbent materials and containment booms will be kept on hand by each construction crew to enable the rapid cleanup of any spill which may occur;
- if fuel will be stored within wetlands or near streams for refueling of continuously operating pumps, secondary containment will be used;
- secondary containment structures will be lined with suitable plastic sheeting, provide a containment volume of at least 150 percent of the storage vessel, and allow for at least one foot of freeboard; and
- provide adequate lighting for these locations and activities.

### **10.6.4 Overnight parking**

Overnight parking of equipment (including but not limited to light plants, generators, pumps, and machinery) is not allowed within 100 feet of a wetland or waterbody unless special containment provisions have been implemented and approved by the EI in advance.

### **10.6.5 Concrete Washout Handling**

Concrete wash water, grindings and slurry, will not be discharged to wetlands, waterbodies, and storm sewer systems or allowed to drain onto adjacent properties. Wash water disposal will be limited to a defined area of the site or to an area designated for cement washout. The area(s) will be sufficient to contain the wash water and residual cement. Contractors hired to provide concrete products will provide equipment capable of reclaiming wash water during wash out.

## **10.7 INITIAL SPILL MANAGEMENT**

### **10.7.1 Immediate Response**

Immediately upon learning of any fuel, oil, hazardous material or other regulated substance spill, or upon learning of conditions that will lead to an imminent spill, the person discovering the situation will:

- initiate actions to contain the fluid that has spilled or is about to spill, and initiate action to eliminate the source of the spill to the maximum extent that is safely possible; and
- notify the crew foreman and/or the Spill Coordinator and provide them with the following information:
  - location and cause of the spill;
  - the type of material that has spilled; and
  - whether the spill has reached or is likely to reach any surface water.

Upon learning of a spill or a potential spill the Spill Coordinator will:

- assess the situation and determine the need for further action;
- direct subsequent activities and/or further assign responsibilities to other personnel; and
- notify the EI.

### **10.7.2 Mobilization**

The Spill Coordinator will mobilize on-site personnel, equipment, and materials for containment and/or cleanup commensurate with the extent of the spill. If the Spill Coordinator feels that a spill is beyond the scope of on-site equipment and personnel, the Spill Coordinator will immediately notify the Construction Superintendent that an Emergency Response Contractor is needed to contain and/or clean up the spill. Appendix E contains a list of potential Emergency Response Contractors. The Spill Coordinator will assist the Emergency Response Contractor and monitor containment procedures to ensure that the actions are consistent with the requirements of this Section.

**In the event of a suspected Enbridge pipeline spill (or from an adjacent pipeline), Enbridge's Emergency Pipeline Control Center will be notified at 1-800-858-5253 (24-hours/day), as well as the Enbridge EI. Actions requiring emergency response will be coordinated by Enbridge.**

## **10.8 SPILL NOTIFICATION RESPONSIBILITIES**

### **10.8.1 Notification Volumes**

The Contractor's Construction Superintendent or representative will notify the Enbridge Representative and the EI immediately of any spill of a petroleum product or hazardous liquid, regardless of volume.

### **10.8.2 Spill Report Form**

The Spill Coordinator will complete a Spill Report Form (Appendix F) for each release of a regulated substance, regardless of volume. The Spill Report Form will be submitted to the EI within 24 hours of the occurrence of a spill. Follow-up written reports, associated laboratory analyses, and other documentation may also be required separately on a site-specific basis as directed by the EI. Documentation is the responsibility of the Contractor.

### **10.8.3 Agency Notification**

The Contractor will report spills to appropriate federal, state and local agencies as soon as possible. A listing of federal, state, and local agencies including reporting thresholds and timeframes is provided in Appendix G.

The Contractor, in coordination with Enbridge and the appropriate federal, state and local agencies will ensure that additional parties or agencies are properly notified. Additionally, the Contractor is responsible for ensuring that all cleanup activities required by a jurisdictional agency are satisfactorily met and provide documentation to Enbridge demonstrating this compliance.

## **10.9 SPILL CONTAINMENT AND CLEANUP**

In the event of a spill, the Contractor will abide by all applicable federal, state and local regulations with respect to cleaning up the spill. All clean-up and other construction related spill activities will be completed by, and costs assumed by the Contractor. Specific cleanup measures for both upland and wetland/waterbody spills are described below.

### **10.9.1 Spill Control - Upland Areas**

- If a spill should occur during refueling operations, STOP the operation until the spill can be controlled and the situation corrected.
- The source of the spill will be identified and contained immediately.
- For large spills on land, the spill will be contained and pumped immediately into tank trucks. The Contractor or, if necessary, an Emergency Response Contractor, will excavate contaminated soil.
- The spilled material and the contaminated soil will be treated and/or disposed of in accordance with all applicable federal, state, and local agency requirements.



- Smaller spills on land will be cleaned up with absorbent materials. Contaminated soil or other materials associated with these releases will also be collected and disposed of in accordance with applicable regulations.
- Flowing spills will be contained and/or absorbed before reaching surface waters or wetlands.
- Absorbent material(s) will be placed over spills to minimize spreading and to reduce its penetration into the soil.
- The Spill Coordinator, in consultation with the EI and appropriate agencies, determine when spill sites will be evacuated as necessary to safeguard human health. Evacuation parameters will include consideration for the potential of fire, explosion, and hazardous gases.

## **10.10 SPILL CONTROL - WETLANDS AND WATERBODIES**

In addition to the above measures, the following conditions apply if a spill occurs near or into a wetland or waterbody, regardless of size:

- If a spill occurs during refueling operations, **STOP** the operation until the spill can be controlled and the situation corrected.
- The Contractor will use absorbent booms and pads to contain and recover released materials in standing water.
- If necessary, for large spills in waterbodies, The Contractor will secure an Emergency Response Contractor to further contain and clean up the spill.
- The Contractor will excavate contaminated soils in wetlands and temporarily place them on plastic sheeting in a bermed area, a minimum of 100 feet away from the wetland. Contaminated soils will be covered with plastic sheeting while being stored temporarily and properly disposed of as soon as possible, in accordance with Section 10.11.

## **10.11 STORAGE AND DISPOSAL OF CONTAMINATED MATERIALS**

- Appendix E lists potential treatment and disposal facilities for contaminated materials, petroleum products, and other construction-related wastes. The Contractor should recycle those wastes, such as motor oil, where there is an established recycling program available. Wastes such as grease or oily rags shall be disposed of in accordance with state requirements.
- The Contractor will store and dispose of all contaminated soils, absorbent materials, and other wastes in accordance with all applicable state and federal regulations.
- Only licensed carriers may be used to transport contaminated material from the site to a disposal facility.

- If it is necessary to temporarily store excavated soils on site, these materials will be placed on, and covered by, plastic sheeting, and the storage area bermed to prevent and contain runoff.

## **11.0 DRILLING FLUID RESPONSE, CONTAINMENT, AND NOTIFICATION PROCEDURES**

Construction of a pipeline may include the use of trenchless pressurized methods known as the HDD method. Throughout this section, this method is also referred to as “drilling”. The HDD method always includes the use of drilling fluid. The drilling fluid or water is pumped directly to the jets in the drill bit to help excavate the hole and minimize friction between the surrounding soils, creating a pressurized system. This differs from the horizontal bores described in Section 4.1 that may introduce drilling fluids but are non-pressurized and therefore would not have the potential for an inadvertent release outside of the bore pits. The HDD drilling fluids/mud consists primarily of water mixed with inert bentonite clay. Under certain conditions an additive may need to be mixed with the drilling fluids/mud for viscosity or lubricating reasons. Only agency-approved non-hazardous additives will be used and a Safety Data Sheet for the drilling fluid will be maintained on-site.

This section elaborates on measures to be implemented if an inadvertent release of drilling fluid occurs despite prevention efforts. Prior to the commencement of drilling operations, the Contractor will inform construction personnel involved as to the responsible party(ies) for release containment and response. The Contractor will ensure that the appropriate response personnel and containment equipment are on site for each drill. Enbridge will implement agency-approved site-specific HDD Contingency at each HDD location that describe specific monitoring, containment, and recovery plans based on site-specific conditions.

Procedures for HDD monitoring, containment, and recovery during frozen conditions are described in Enbridge’s Winter Construction Plan.

### **11.1 ON-SITE OBSERVATION DURING CONSTRUCTION**

Early detection is key to minimizing the area of potential impact from an inadvertent release. During construction of a drilled crossing, Contractor personnel will monitor the pipeline route throughout the process, as follows:

The Contractor will inform construction observers on what to watch for and will make them aware of the importance of timely detection and response actions to any release of drilling fluid.

- At least one full-time personnel will monitor the drill path by observing land surfaces and the waterbodies for surface migration during drilling, reaming, and pipe installation procedures. The observer will also walk the drill path to monitor for surface seepage, sinkholes, and settlement. In addition, a flowing stream shall be monitored both upstream and downstream of the drill path. If an observer notices inadvertent return conditions, shutdown would occur immediately.
- Construction observers will have appropriate, operational communication equipment (e.g., radio and cell phones) available at all times during installation of the directionally drilled crossing, with the ability to communicate directly with the HDD operator.
- The HDD operator will monitor the annular drilling fluid pressures during pilot hole operations.

- If the HDD operator identifies a sustained loss in fluid pressure or loss of circulation:
  - If an operator notices lowered pressure readings on the drilling equipment, or there is a reduction of drilling mud returns to the bore pit, shutdown would occur immediately;
  - The operator will immediately notify the construction observers of the assumed position of the drill tool; and
  - The Contractor will visually monitor the appropriate portion of the drill path where the drill tool is located to determine if an inadvertent return occurred. The Contractor may perform this monitoring by walking or by using a boat, as appropriate.
- Construction observers, EI(s), or the Enbridge HDD craft inspector have the authority to order installation of containment structures, if needed, and to require additional response measures if deemed appropriate.
- Enbridge will contact the appropriate agencies and the Minnesota State Duty Officer immediately of a surface inadvertent release (refer to Appendix G).

## **11.2 CONTAINMENT, RESPONSE, AND CLEAN-UP EQUIPMENT**

Containment, response and clean-up equipment will be available at both sides of an HDD crossing location and one side of a guided bore prior to the commencement to assure a timely response in the event of an inadvertent release of drilling fluid. Containment and response equipment includes but is not limited to:

- A. straw bales and staking
- B. pre-filled sandbags
- C. turbidity curtain (type to be specified in HDD Contingency Plans)
- D. silt fence
- E. plastic sheeting and/or geotextile fabric
- F. shovels, brooms, buckets, and other appropriate hand tools
- G. pumps and sufficient hose
- H. fluid storage tanks
- I. vacuum truck on-site prior to and throughout the drill execution
- J. one small boat (type / motorization to be specified in HDD Contingency Plans)
- K. light plant/generator (only necessary where operations are conducted outside of daylight hours)
- L. Any other equipment specified by Enbridge or Contractor based on site visit

## **11.3 RESPONSE**

In the event an inadvertent drilling fluid release is observed, the EI and the Contractor will assess to determine the amount of fluid being released and potential for the release to reach sensitive resource areas (e.g., wetlands and waterbodies). Response measures will vary based on location of inadvertent release as discussed below.

If a release were to occur outside of the authorized construction workspace, Enbridge would mobilize lightweight containment materials (e.g., straw bales, silt fence, sand bags) on foot to the release location to isolate the drilling fluid immediately. Once drilling fluid has been contained, Enbridge would determine if equipment access is necessary to aid in the response, and initiate agency consultations for developing alternate access, as necessary.

### **11.3.1 Upland Locations**

Response measures include the following:

- The EI will evaluate the release to determine if containment structures are warranted and if they will effectively contain the release.
- If the amount of the surface release is not great enough to allow the practical physical collection from the affected area, it will be diluted with clean water and/or the fluid will be allowed to dry and dissipate naturally.
- Earthen or sandbag berms, silt fence, and/or hay bales will be installed to contain small releases and prevent migration of drilling fluid.
- The Contractor will remove excess fluid at a rate sufficient to prevent an uncontrolled release.
- If the amount of the surface release exceeds that which can be completely contained with hand-placed barriers, small collection sumps (less than 5 cubic yards) may be used (with approval from Enbridge) to remove released drilling fluid by the use of portable pumps and hoses.

### **11.3.2 Wetland Locations**

This section also applies to areas immediately adjacent to wetlands and waterbodies, such as stream banks or steep slopes, where drilling fluid releases could quickly reach surface waters.

- In the event of a drilling fluid release in wetlands or adjacent areas:
  1. The EI will evaluate the release, and the Contractor will implement appropriate containment measures.
  2. The EI and the Contractor will evaluate the recovery measures to determine the most effective collection method.
- If the amount of the surface release exceeds that which can be contained with hand-placed barriers, small collection sumps (less than 5 cubic yards) may be utilized to collect released drilling fluid for removal by the use of portable pumps and hoses.
- Low ground pressure equipment (e.g., UTV, argo, morooka) will conduct limited passes to assist personnel carrying containment materials to the release location.
- Temporary access will be supported by construction matting installed during clearing within the wetland areas.



- If the amount of the surface release is not great enough to allow the practical physical collection from the affected area without causing additional impacts, with approval from both Enbridge Environmental and Construction Management, the drilling fluid may be diluted with clean water and/or the fluid will be allowed to dry and dissipate naturally.
- Excess fluid will be held within the containment area and removed using pumps or other appropriate measures at a rate sufficient to maintain secure containment.
- Recovered fluid will be stored in a temporary holding tank or other suitable structure out of the floodplain and/or wetland for reuse or eventual disposal in an approved disposal facility
- Enbridge will consult with the appropriate regulatory agencies to evaluate the circumstances of the release, discuss additional containment or cleanup requirements, and determine whether and under what conditions the HDD may proceed.

### **11.3.3 Waterbody Locations**

- In the event of a drilling fluid release in waterbodies:
  1. The EI will evaluate the release, and the Contractor will implement appropriate containment measures.
  2. The EI and the Contractor will evaluate the recovery measures to determine the most effective collection method.

The containment methods utilized will depend on the size of release, water depth, flow velocity, and location of the release. In aquatic environments bentonite may harden, effectively sealing the inadvertent release location. In this event, response activities would be limited or unnecessary. However, if drilling mud were to enter the water column, the typical response tactic would be to erect an isolation containment environment using the materials identified in Table 11.3-1, or their equivalent, to facilitate a spill response team's ability to contain and collect excess drilling mud. Containment is not always feasible for in-water releases, especially in waterways with significant currents.

TABLE 11.3-1 Inadvertent Return Containment Methods for Variable In-Water Conditions				
Water Conditions		Width of Waterbody		
Flow Velocity	Water Depth	0 - 10 Feet	10 - 20 Feet	Greater Than 20 Feet
Still/Slow (Less Than 1 ft/sec)	0 - 2 feet	Sand bag isolation structure; vertical culvert	Sand bag isolation structure; vertical culvert	Sand bag isolation and structure; vertical culvert
	2 - 5 feet	Turbidity curtain; Geotextile pipeline weights cofferdam; vertical culvert; bladder dams; jersey barriers and plastic sheeting	Turbidity curtain; Geotextile pipeline weights cofferdam; vertical culvert; bladder dams; jersey barriers and plastic sheeting	Turbidity curtain; vertical culvert; bladder dams
	Greater than 5 feet	Turbidity curtain; Geotextile pipeline weights cofferdam; vertical culvert; bladder dams; jersey barriers and plastic sheeting	Turbidity curtain; Geotextile pipeline weights cofferdam; vertical culvert; bladder dams; jersey barriers and plastic sheeting	Turbidity curtain; vertical culvert; bladder dams
Slow/Moderate (1 - 3 ft/sec)	0 - 2 feet	Sandbag cofferdam; vertical culvert	Sandbag cofferdam; vertical culvert; geotextile pipeline weights cofferdam; jersey barriers with plastic sheeting	Sandbag cofferdam; vertical culvert; geotextile pipeline weights; bladder dams
	2 - 5 feet	Turbidity curtain; Geotextile pipeline weights cofferdam; vertical culvert; bladder dams; jersey barriers and plastic sheeting	Turbidity curtain; geotextile pipeline weights cofferdam; vertical culvert; bladder dams; water gates (as upstream diversion aid)	Turbidity curtain; bladder dams; water gates (as upstream diversion aid)
	Greater than 5 feet	Turbidity curtain; Geotextile pipeline weights cofferdam; vertical culvert; bladder dams; water gates (as upstream diversion aid)	Turbidity curtain; geotextile pipeline weights; bladder dams; water gates (as upstream diversion aid)	Turbidity curtain; bladder dams; water gates (as upstream diversion aid)
Moderate/Rapid (Greater Than 3 ft/sec)	0 - 2 feet	Sandbag cofferdam; geotextile pipeline weights cofferdam; vertical culvert; jersey barriers and plastic sheeting	Sandbag cofferdam; geotextile pipeline weights cofferdam; vertical culvert; jersey barriers and plastic sheeting	Turbidity curtain; sand bags; bladder dams; water gates (as upstream diversion aid)
	2 - 5 feet	Turbidity curtain; Geotextile pipeline weights cofferdam; vertical culvert; bladder dams; jersey barriers and plastic sheeting	Turbidity curtain; geotextile pipeline weights; bladder dams; water gates (as upstream diversion aid)	Turbidity curtain; bladder dams; water gates (as upstream diversion aid)
	Greater than 5 feet	Turbidity curtain; Geotextile pipeline weights cofferdam; vertical culvert; bladder dams; water gates (as upstream diversion aid)	Turbidity curtain; geotextile pipeline weights; bladder dams; water gates (as upstream diversion aid)	Turbidity curtain; geotextile pipeline weights; bladder dams; water gates (as upstream diversion aid)

Enbridge would implement agency-approved HDD Contingency Plans that provide site-specific information regarding features crossed by each HDD and containment and recovery response tailored to site-specific conditions. Enbridge will complete a pre-construction visit at the site at least 2 weeks prior to initiating HDD setup and operations to determine if additional materials and equipment will be needed.

Drilling fluid recovery methodology in waterbodies is not as variable as containment measures. When such measures effectively isolate the release from the stream flow, pumps or other appropriate measures are used to recover drilling fluid. When the release location cannot be isolated after initial in-water containment installation, drilling fluid that has settled from the water column typically collects in the acute upstream angle of the containment tool, and recovery efforts will be localized to that location.

#### **11.4 NOTIFICATION AND RESUMPTION OF SUSPENDED HDD OPERATIONS**

The Contractor will immediately notify the EI of all drilling fluid releases. If the EI determines the release affects wetland or waterbody areas, he or she will immediately notify Enbridge Environment and Construction Management and the appropriate regulatory agencies, including the Minnesota State Duty Officer (refer to Appendix G).

If notifications are necessary during non-business hours they will be done according to prior arrangements made between Enbridge and the regulatory agencies. Follow-up notifications will be made as necessary and practicable.

The conditions under which drilling operations can resume will be discussed with appropriate regulatory agencies and/or field representatives. If containment measures are functioning, and the circumstances and potential impacts of the release are understood, drilling/boring operations will resume.

#### **11.5 CLEAN-UP**

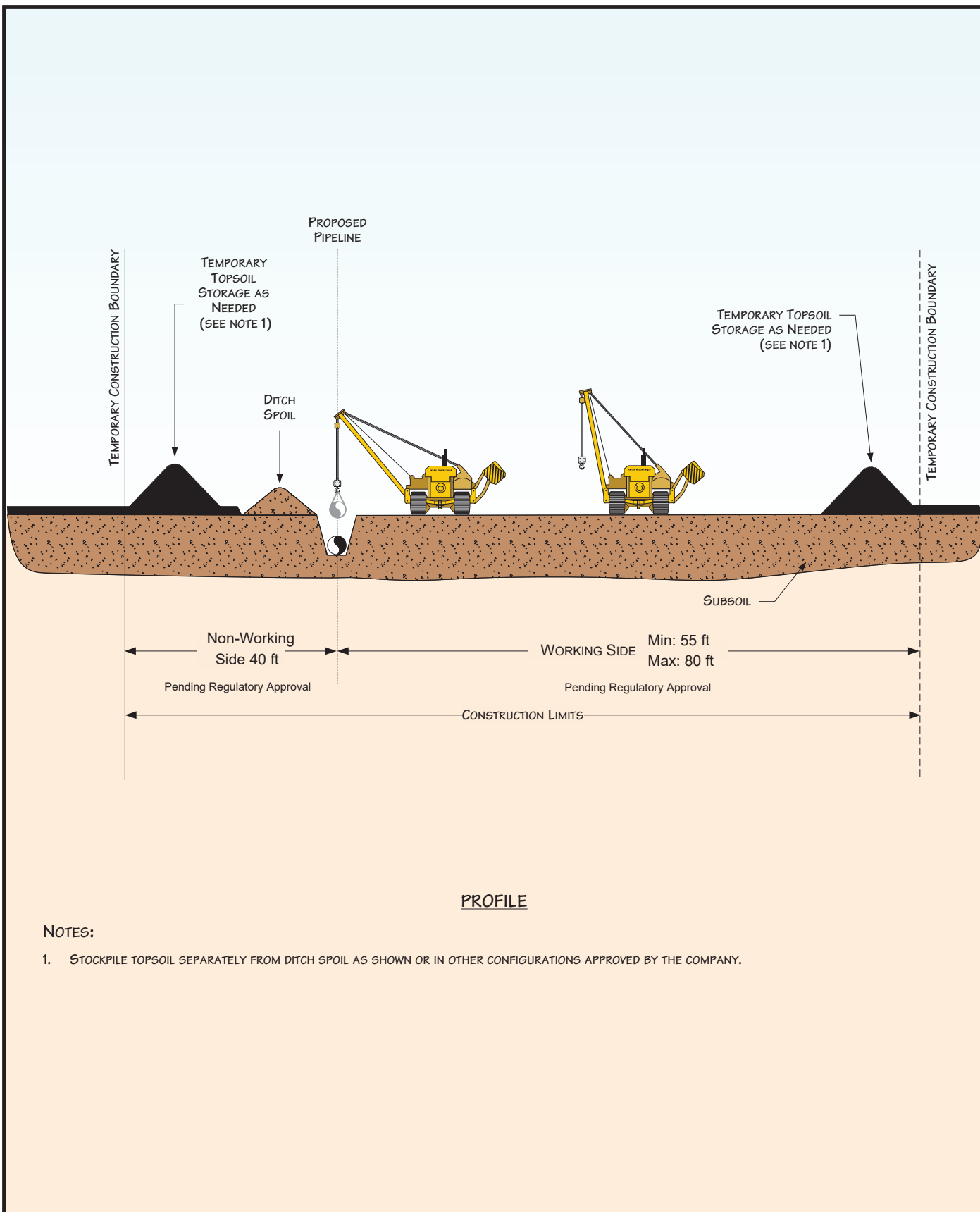
The following measures are to be considered as appropriate:

- Drilling fluid will be cleaned up by hand using hand shovels, buckets and soft-bristled brooms as possible without causing extensive ancillary damage to existing vegetation. Clean water washes may also be employed if deemed beneficial and feasible.
- Containment structures will be pumped out and the ground surface scraped to bare topsoil without causing undue loss of topsoil or ancillary damage to existing and adjacent vegetation.
- Material will be collected in containers for temporary storage prior to removal from the site.
- The EI will regularly evaluate the potential for secondary impact from the clean-up process and clean-up activities terminated if physical damage to the site is deemed to exceed the benefits of removal activities. This decision will be made in consultation with the appropriate regulatory agencies and/or Enbridge.

#### **11.6 RESTORATION AND POST-CONSTRUCTION MONITORING**

Following cleanup activities, restoration and revegetation of affected areas will be completed in accordance with all applicable local, state, and federal permits in addition to Enbridge's EPP. Enbridge will monitor the release site as appropriate to assure adequate restoration.

## Figures



**Figure 1**  
**Environmental Protection Plan**  
 Typical Topsoil Segregation - Full Right-of-Way

DATE: 7/9/2001

REVISED: 3/11/2011

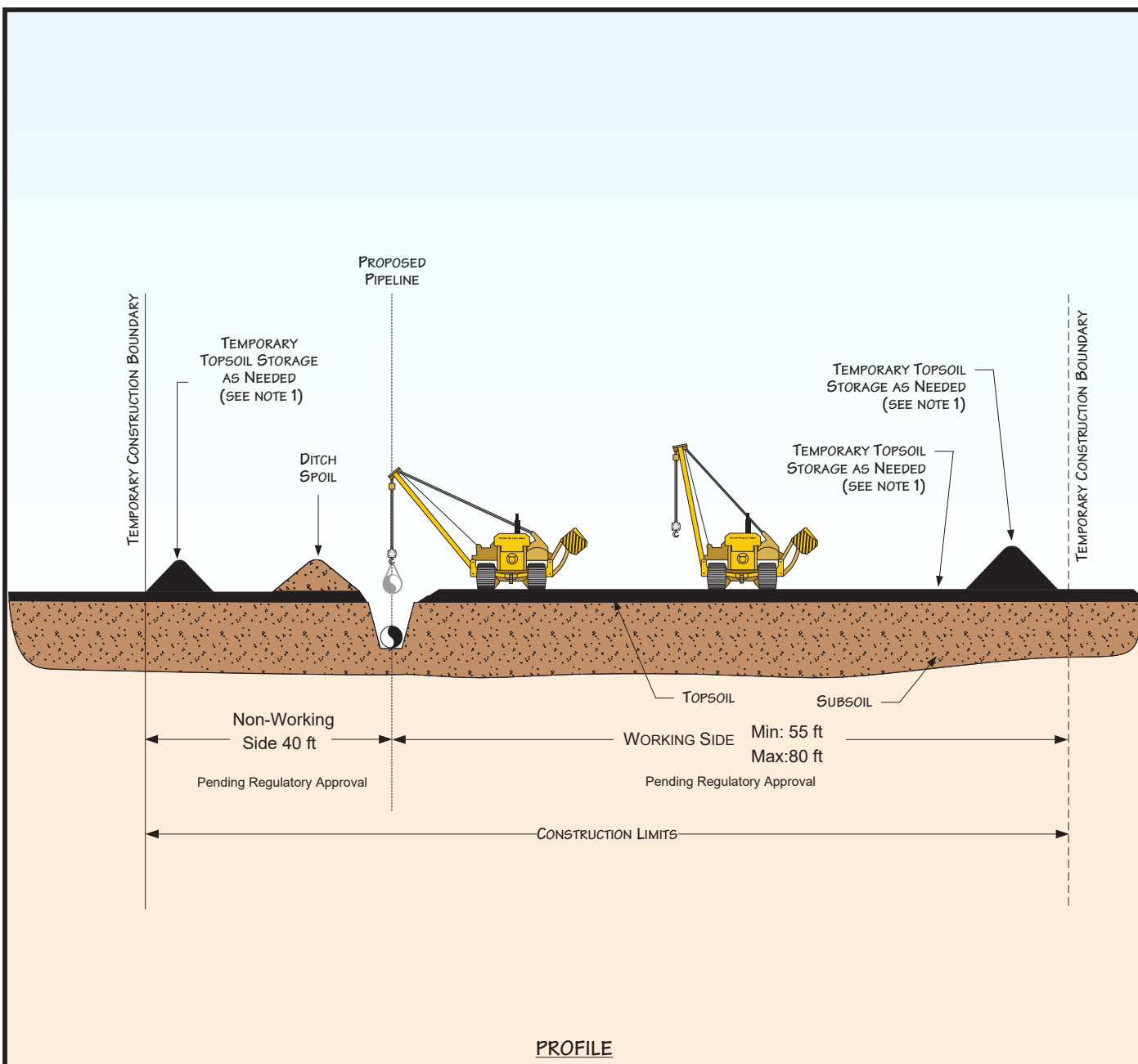
SCALE: NTS

DRAWN BY: JPBOENTJE

K:\CLIENT\_PROJECTS\ID-FEEL\2011-019\FIG 1-3\_TYPICAL\_TOPSOIL\_SEGREGATION.VSD







### PROFILE

#### NOTES:

1. STOCKPILE TOPSOIL SEPARATELY FROM DITCH SPOIL AS SHOWN OR IN OTHER CONFIGURATIONS APPROVED BY THE COMPANY.



**Figure 2**  
**Environmental Protection Plan**  
 Typical Topsoil Segregation –  
 Trench Line Only

DATE: 7/9/2001

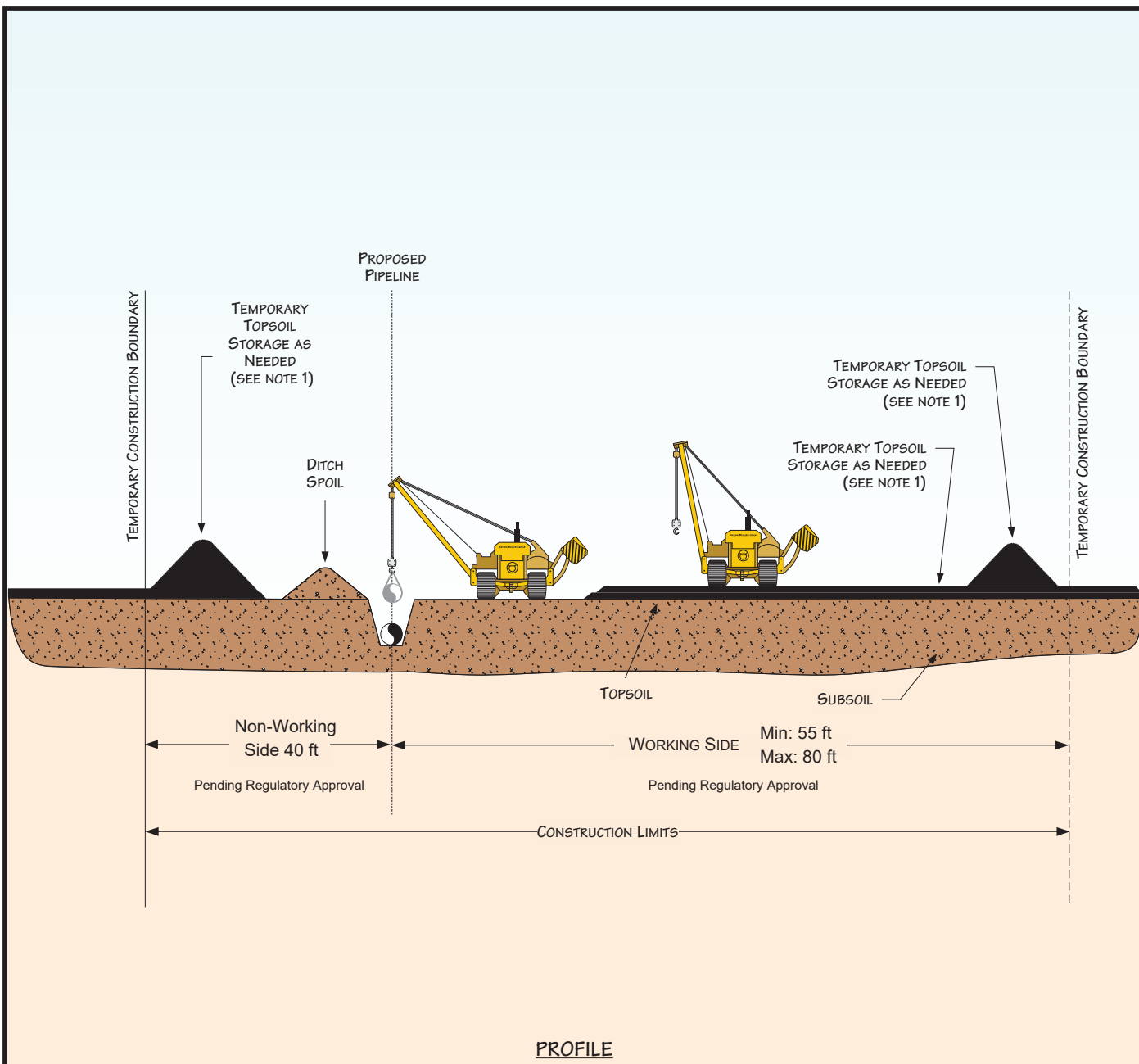
REVISED: 3/11/2011

SCALE: NTS

DRAWN BY: JPBOENTJE

K:\CLIENT\_PROJECTS\ID-FIEEL\2011-019\  
 FIG 1-  
 3\_TYPICAL\_TOPSOIL\_SEGREGATION.VSD





### PROFILE

#### NOTES:

1. STOCKPILE TOPSOIL SEPARATELY FROM DITCH SPOIL AS SHOWN OR IN OTHER CONFIGURATIONS APPROVED BY THE COMPANY.



**Figure 3**  
**Environmental Protection Plan**  
 Typical Topsoil Segregation –  
 Modified Ditch Plus Spoil Side

DATE: 7/9/2001

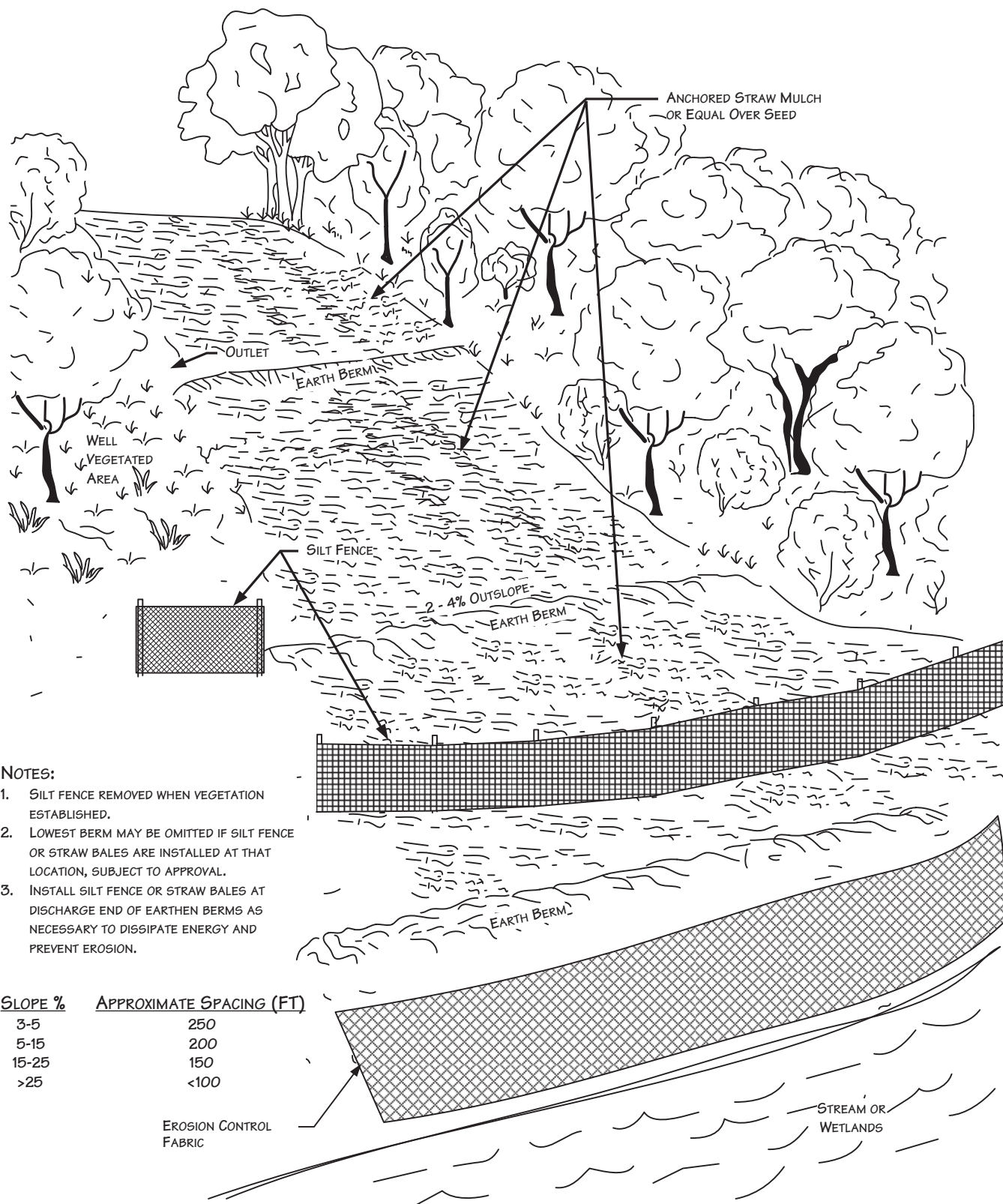
REVISED: 3/11/2011

SCALE: NTS

DRAWN BY: JPBOENTJE

K:\CLIENT\_PROJECTS\ID-FEEL\2011-019\  
 FIG 1-  
 3\_TYPICAL\_TOPSOIL\_SEGREGATION.VSD





**NOTES:**

1. SILT FENCE REMOVED WHEN VEGETATION ESTABLISHED.
2. LOWEST BERM MAY BE OMITTED IF SILT FENCE OR STRAW BALES ARE INSTALLED AT THAT LOCATION, SUBJECT TO APPROVAL.
3. INSTALL SILT FENCE OR STRAW BALES AT DISCHARGE END OF EARTHEN BERMS AS NECESSARY TO DISSIPATE ENERGY AND PREVENT EROSION.

SLOPE %	APPROXIMATE SPACING (FT)
3-5	250
5-15	200
15-25	150
>25	<100

For environmental review purposes only.



**Figure 4**  
**Environmental Protection Plan**  
Typical Temporary or Permanent Berms  
Perspective View

DATE: 11/14/2000

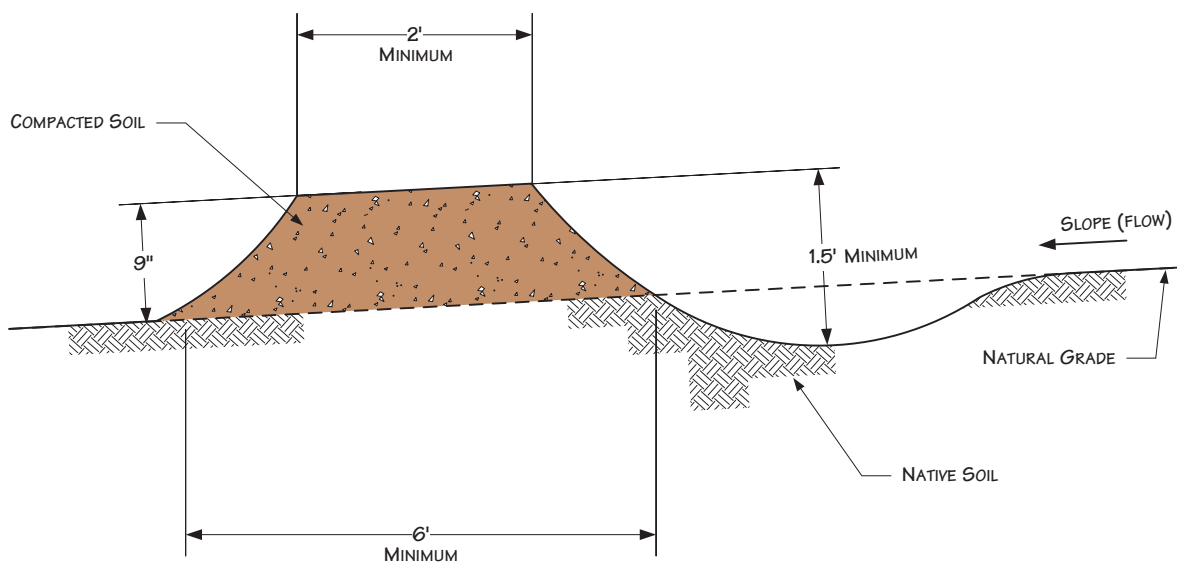
REVISED: 3/11/2011

SCALE: NTS

DRAWN BY: KMKENDALL

K:\ CLIENT PROJECTS\SD-FEEL\2011-019\  
FIG\_4\_BERMS\_PERSPECTIVE\_VIEW.VSD





#### NOTES

1. BERMS SHALL BE CONSTRUCTED WITH 2 TO 4 PERCENT OUTSLOPE.
2. BERMS SHALL BE OUTLETED TO WELL VEGETATED STABLE AREAS, SILT FENCES, STRAW BALES OR ROCK APRONS.
3. BERMS SHALL BE SPACED AS DESCRIBED IN CONSTRUCTION SPECIFICATIONS.
4. ADDITIONAL INFORMATION INCLUDED ON OTHER DRAWINGS.

For environmental review purposes only.



**Figure 5**  
**Environmental Protection Plan**  
 Typical Temporary or Permanent Berms  
 Elevation View

DATE: 5/25/2001

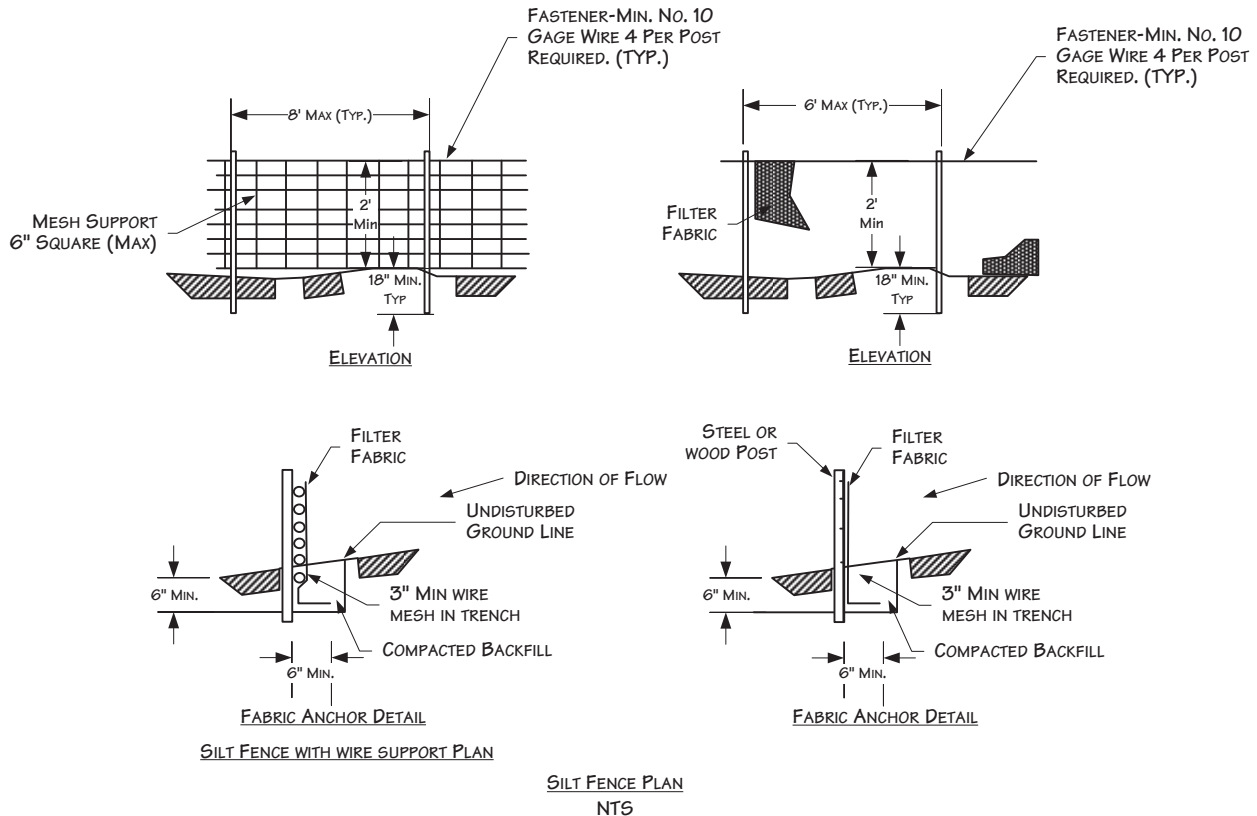
REVISED: 3/11/2011

SCALE: NTS

DRAWN BY: KMKENDALL

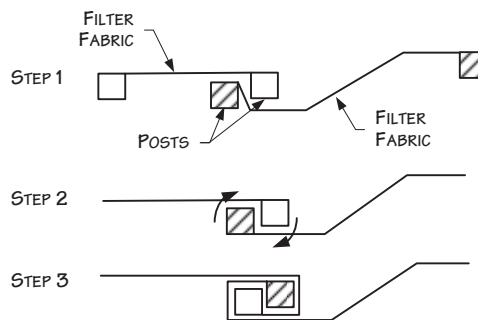
K:\CLIENT PROJECTS\ID-FEEL\2011-019\FIG\_5\_BERMS\_ELEVATION\_VIEW.VSD





**NOTES:**

1. WIRES OF MESH SUPPORT SHALL BE MIN. GAGE NO. 12.
2. FILTER FABRIC SHALL MEET THE REQUIREMENTS OF THE SPECIFICATION WITH EQUIVALENT OPENING SIZE OF AT LEAST 30 FOR NONWOVEN AND 50 FOR WOVEN. (SIEVE NO.)
3. THE POSTS USED TO SUPPORT THE SILT FENCE SHOULD BE HARDWOOD MATERIAL WITH A MINIMUM CROSS SECTIONAL AREA OF 4 INCHES SQUARE AND 4 FEET LONG. METAL POSTS SHOULD BE USED IN AREAS THAT POND WATER.



**ATTACHING TWO SILT FENCES**

**NOTES:**

1. PLACE THE END POST OF THE SECOND FENCE INSIDE THE END POST OF THE FIRST FENCE.
2. ROTATE BOTH POSTS AT LEAST 180 DEGREES IN A CLOCKWISE DIRECTION TO CREATE A TIGHT SEAL WITH THE FABRIC MATERIAL.
3. DRIVE BOTH POSTS A MINIMUM OF 18 INCHES IN THE GROUND AND BURY THE FLAP.

For environmental review purposes only.



**Figure 6**  
**Environmental Protection Plan**  
**Typical Silt Fence Installation**

DATE: 5/25/2001

REVISED: 3/23/2011

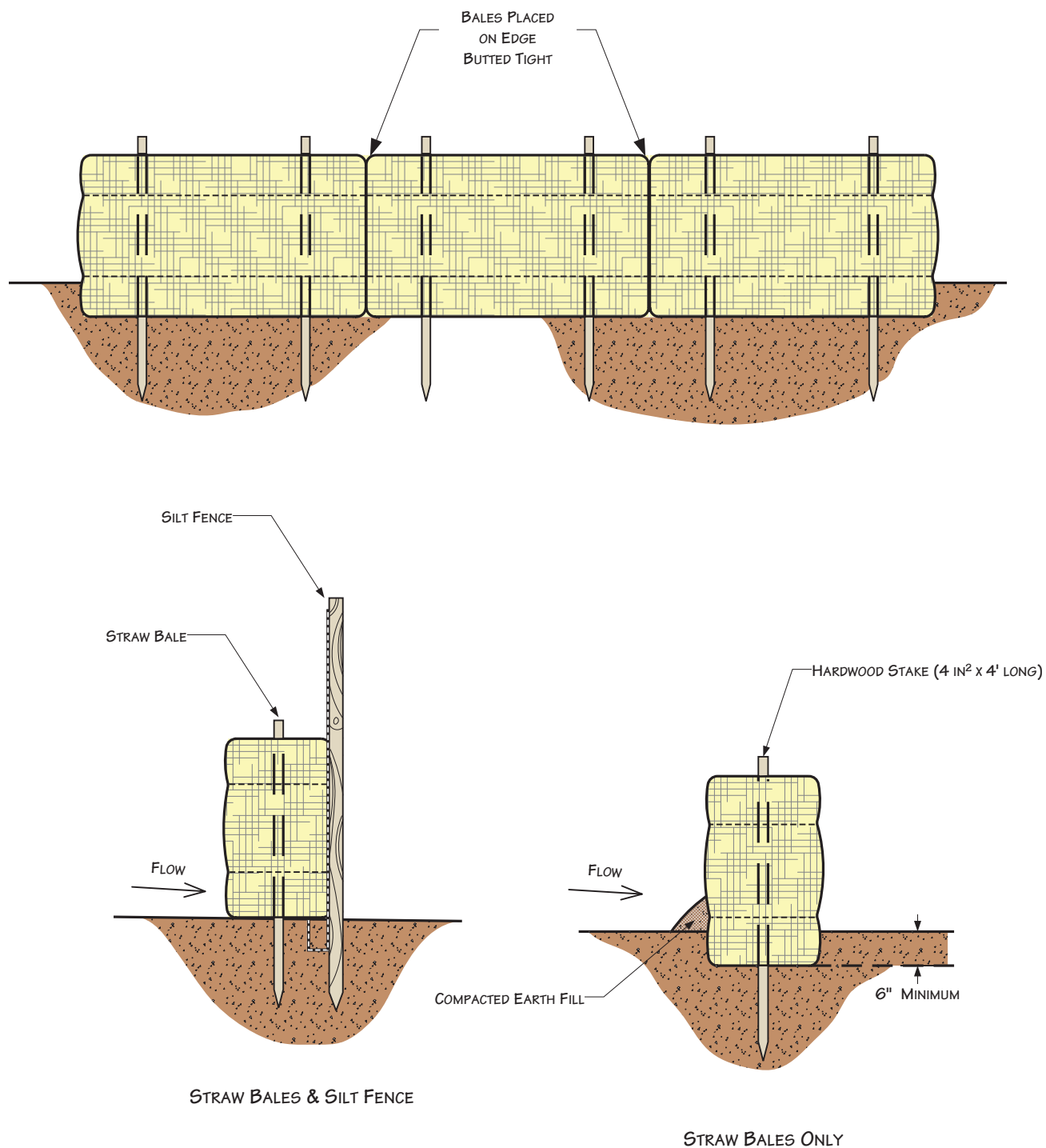
SCALE: NTS

DRAWN BY: KMKENDALL

K:\CLIENT PROJECTS\SD-FEEL\2011-019\FIG\_6\_SILT\_FENCE\_INSTALL.VSD







For environmental review purposes only.



**Figure 7**  
**Environmental Protection Plan**  
**Typical Straw Bale Installation**

DATE: 5/25/01

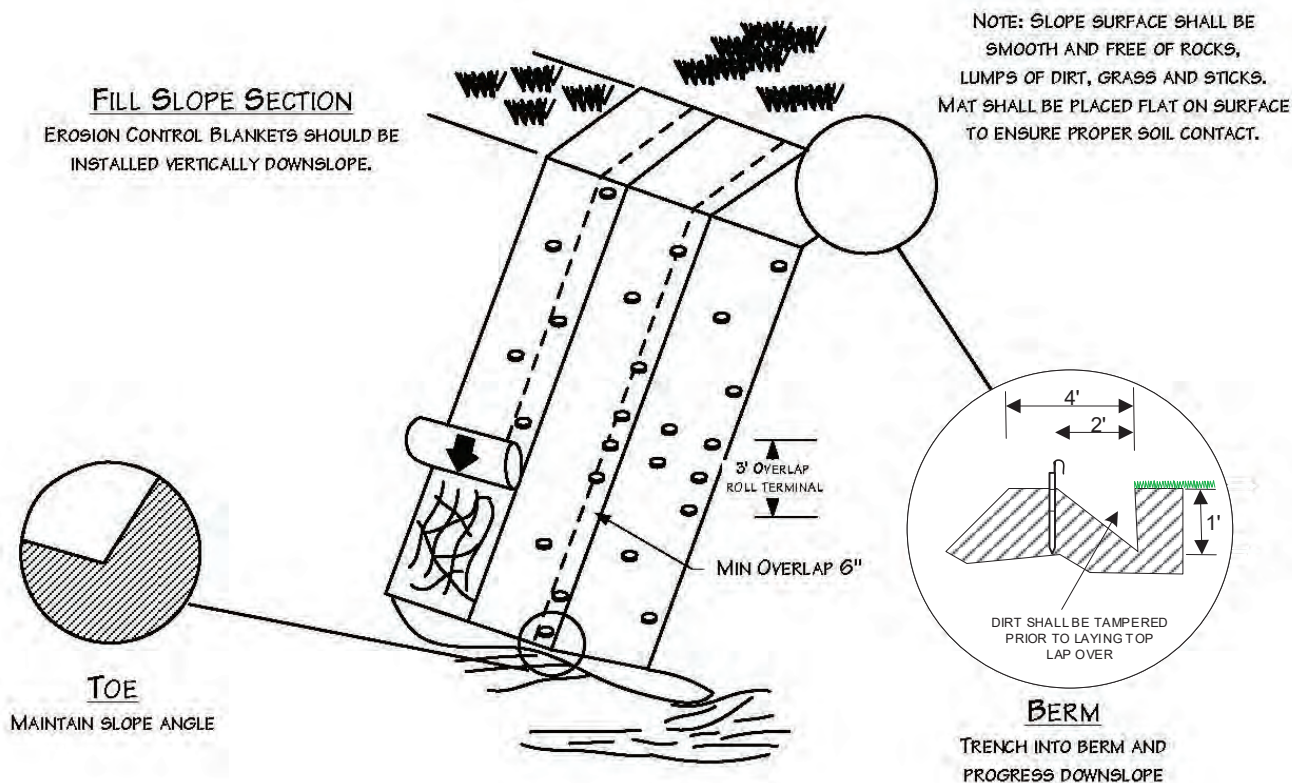
REVISED: 3/11/11

SCALE: Not to Scale

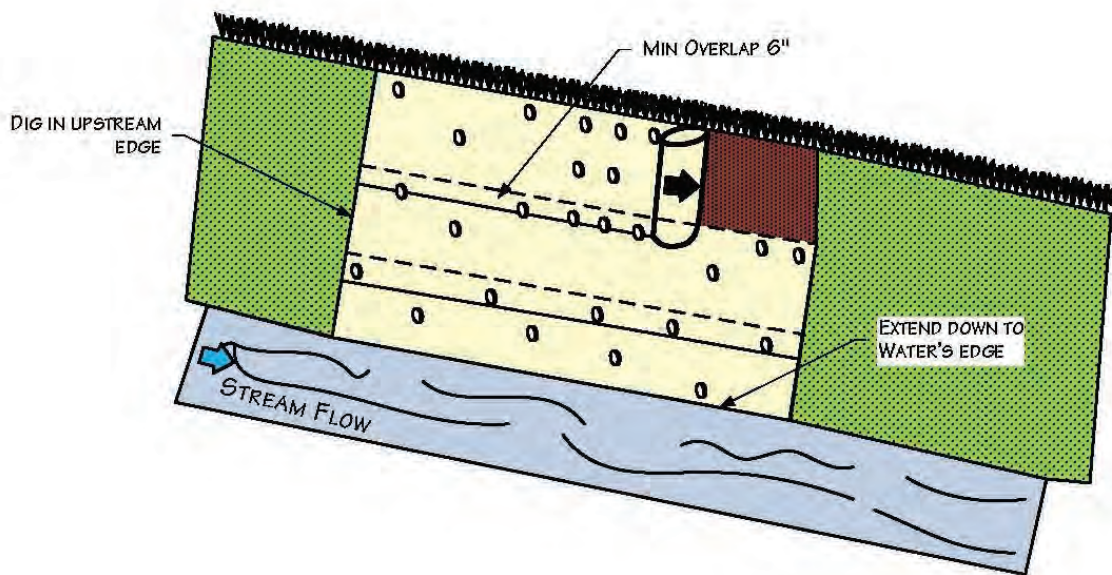
DRAWN BY: KMKENDALL

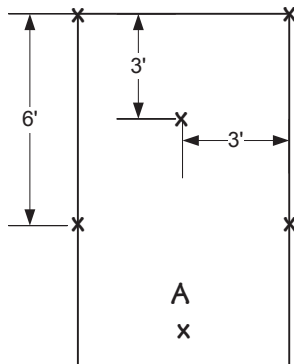
K:\CLIENT PROJECTS\ID-FEEL\2011-019\FIG\_7\_STRAW\_BALE\_INSTALL.VSD



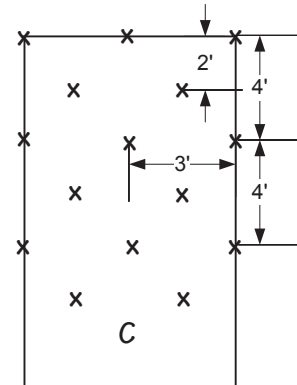


**STREAM CHANNEL**  
EROSION CONTROL BLANKETS SHOULD BE INSTALLED HORIZONTALLY WITH STREAM FLOW.

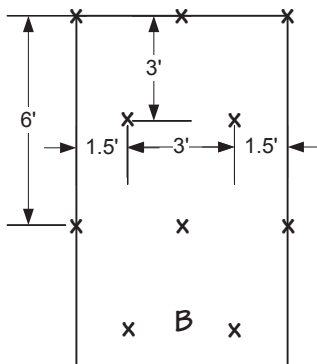
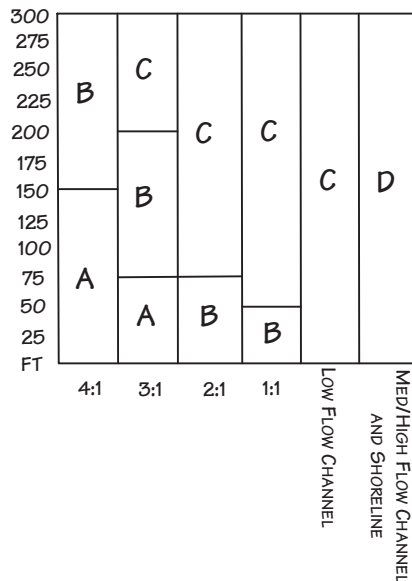




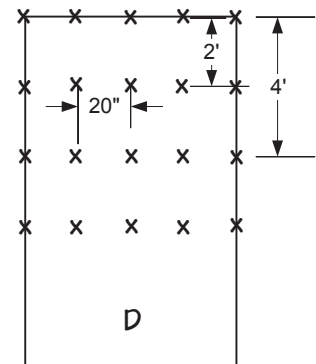
1 STAPLE PER SQ. YD



2 STAPLES PER SQ. YD



1 1/2 STAPLES PER SQ. YD



3 1/2 STAPLES PER SQ. YD

FOR OPTIMUM RESULTS, THESE  
RECOMMENDED STAPLE PATTERN GUIDES  
MUST BE FOLLOWED. SUGGESTED  
ANCHORING METHODS VARY ACCORDING TO  
THE MANUFACTURER. THIS CHART SHOWS  
HOW TO SLOPE LENGTHS AND HOW  
GRADIENTS AFFECT SAMPLING PATTERNS.

For environmental review purposes only.



Figure 9  
Environmental Protection Plan  
Typical Staple Pattern for  
Erosion Control Fabric

DATE: 5/25/2001

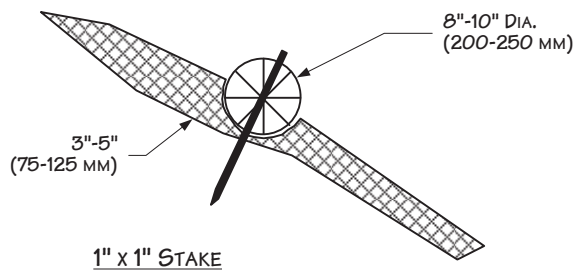
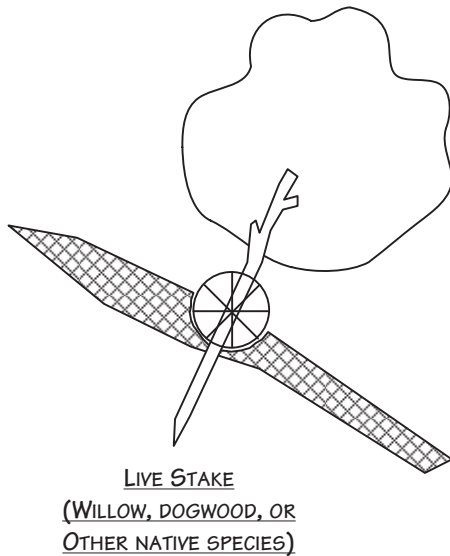
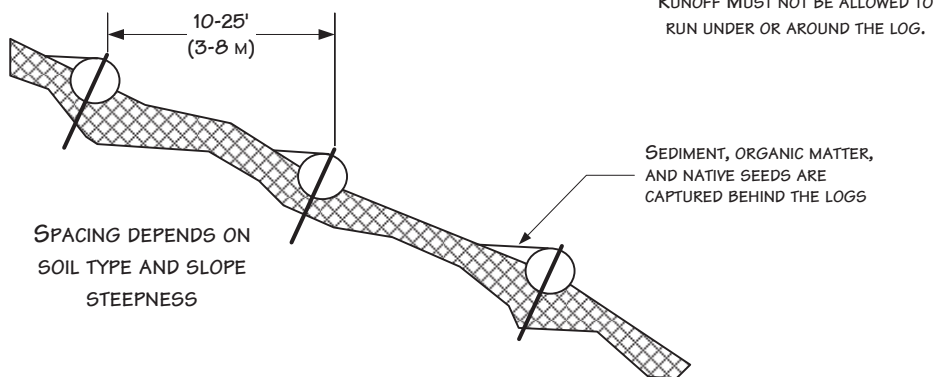
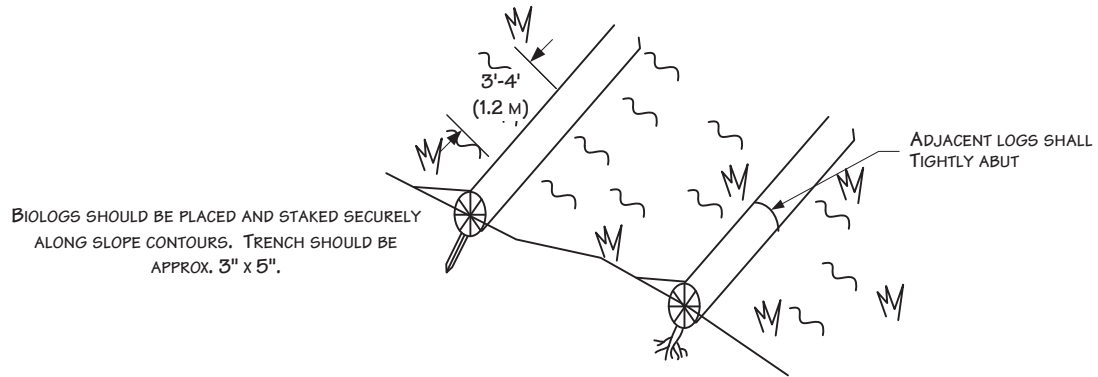
REVISED: 3/24/2011

SCALE: NTS

DRAWN BY: KMKENDALL

K:\CLIENT PROJECTS\ID-FEEL\2011-019\FIG 9\_STAPLE\_PATTERN\_EROSION\_CONTR\ROL\_FABRIC.VSD





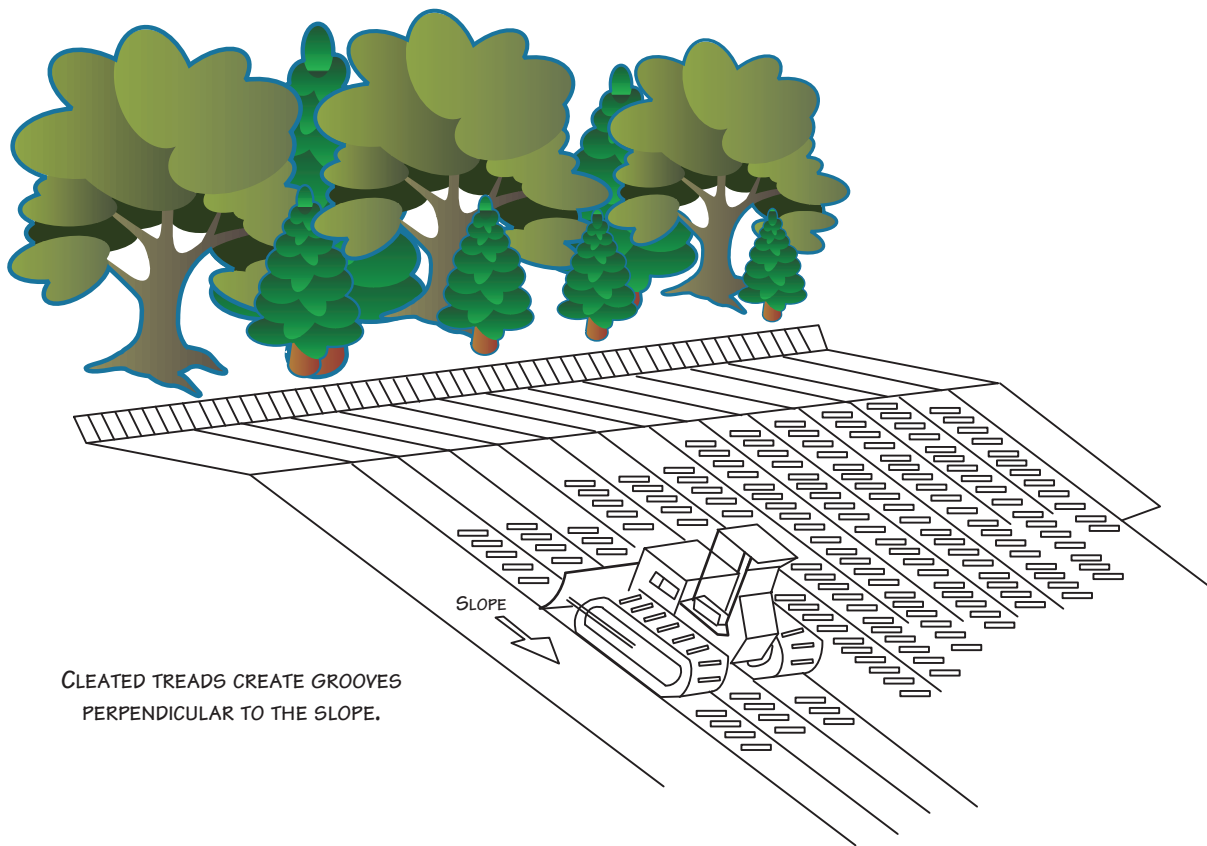
For environmental review purposes only.



Figure 10  
Environmental Protection Plan  
Typical Biolog Installation

DATE: 5/25/2001
REVISED: 3/24/2011
SCALE: NTS
DRAWN BY: KMKENDALL
K:\CLIENT_PROJECTS\SD-FEEL\2011-019\FIG_10_BIOLOG INSTALL.VSD





CLEATED TREADS CREATE GROOVES  
PERPENDICULAR TO THE SLOPE.

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Figure 11  
Environmental Protection Plan  
Typical Cat Tracking

DATE: 5/25/2001

REVISED: 3/24/2011

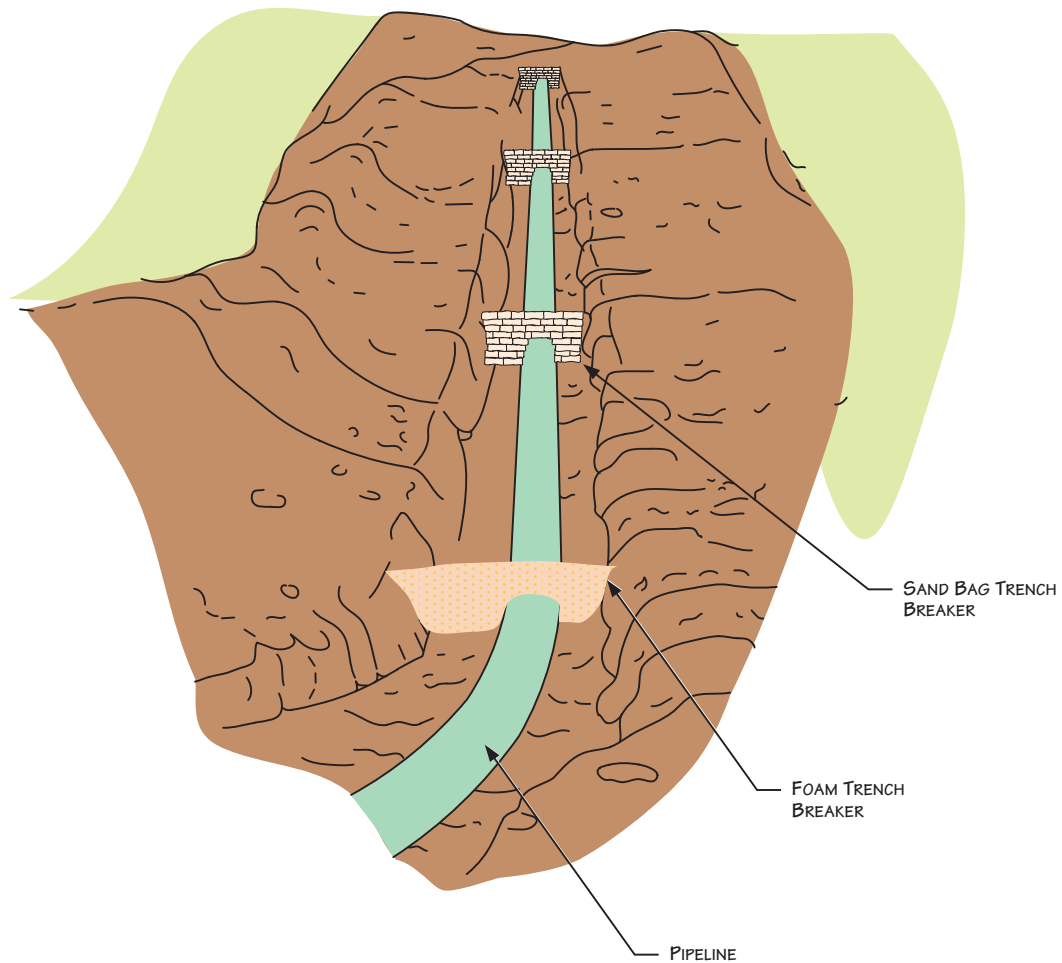
SCALE: NTS

DRAWN BY: KMKENDALL

K:\CLIENT\_PROJECTS\ID-FEEL\2011-019\  
FIG\_11\_CAT\_TRACKING.VSD







#### NOTES

1. BAGS WILL NOT BE FILLED WITH TOPSOIL.
2. ADDITIONAL INFORMATION INCLUDED ON OTHER DRAWINGS.

For environmental review purposes only.



**Figure 12**  
**Environmental Protection Plan**  
 Typical Trench Breakers - Perspective View

DATE: 5/25/2001

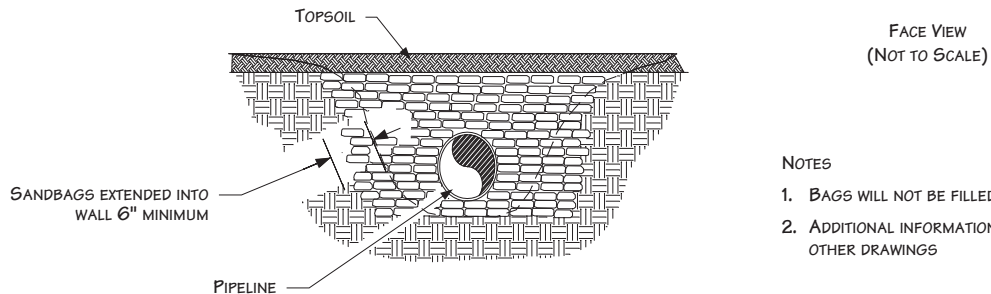
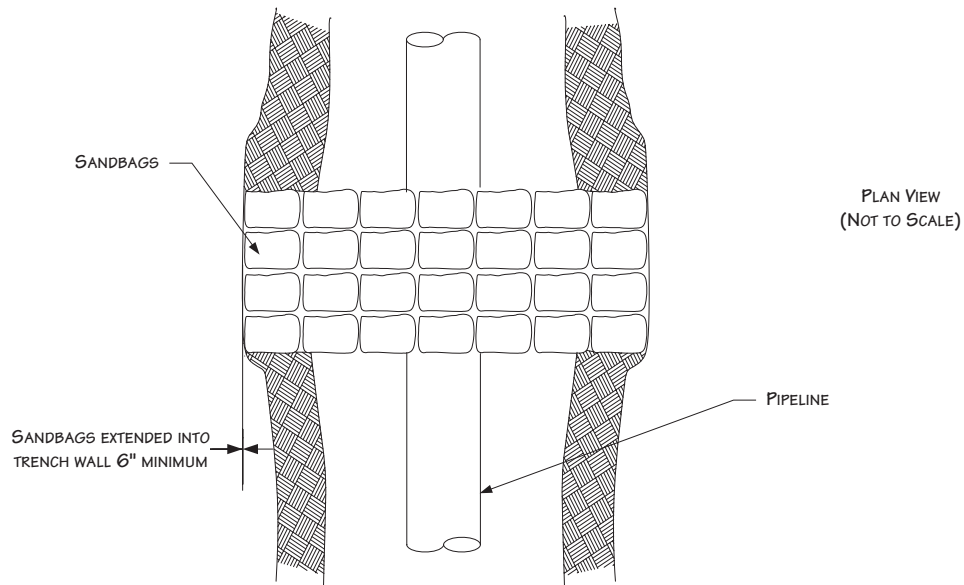
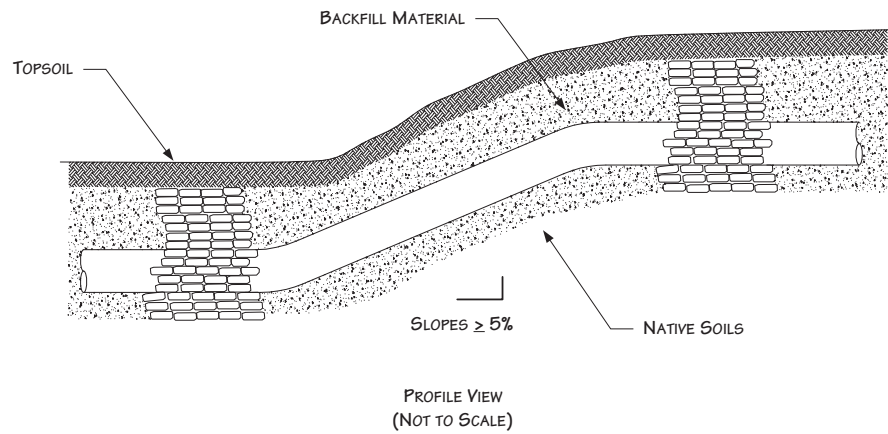
REVISED: 3/11/11

SCALE: NTS

DRAWN BY: KMKENDALL

K:\CLIENT PROJECTS\ID-FEEL\2011-019\  
 FIG 12 TRENCH\_BREAKER\_PERSPECTIV  
 E\_VIEW.VSD





#### NOTES

1. BAGS WILL NOT BE FILLED WITH TOPSOIL
2. ADDITIONAL INFORMATION INCLUDED ON OTHER DRAWINGS

For environmental review purposes only.



**Figure 13**  
**Environmental Protection Plan**  
**Typical Trench Breakers – Plan & Profile View**

DATE: 11/15/2000

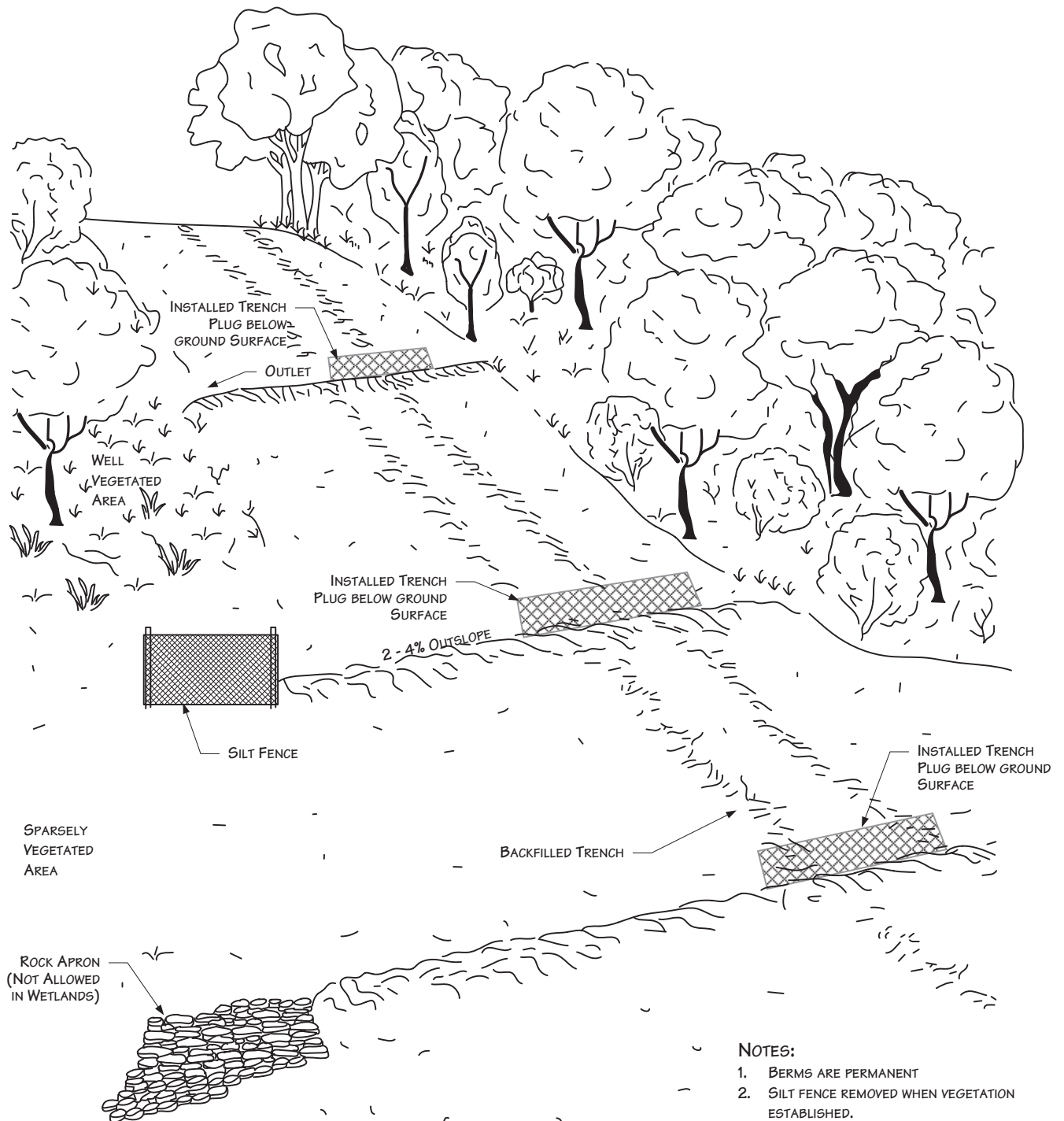
REVISED: 3/11/11

SCALE: NTS

DRAWN BY: KMKENDALL

K:\CLIENT PROJECTS\ID-FEEL\2011-019\FIG\_13\_TRENCH\_BREAKER\_PLAN\_PROFILE\_VIEW.VSD





**PERSPECTIVE VIEW**  
(NOT TO SCALE)

SLOPE %	APPROXIMATE SPACING (FT)
3-5	250
5-15	200
15-25	150
>25	<100

**NOTES:**

1. BERMS ARE PERMANENT
2. SILT FENCE REMOVED WHEN VEGETATION ESTABLISHED.
3. LOWEST BERM MAY BE OMITTED IF SILT FENCE OR STRAW BALES ARE INSTALLED AT THAT LOCATION, SUBJECT TO APPROVAL.
4. INSTALL SILT FENCE OR STRAW BALES AT DISCHARGE END OF EARTHEN BERMS AS NECESSARY TO DISSIPATE ENERGY AND PREVENT EROSION.

For environmental review purposes only.



**Figure 14**  
**Environmental Protection Plan**  
**Permanent Slope Breakers - Perspective View**

DATE: 5/25/2001

REVISED: 3/11/11

SCALE: NTS

DRAWN BY: KMKENDALL

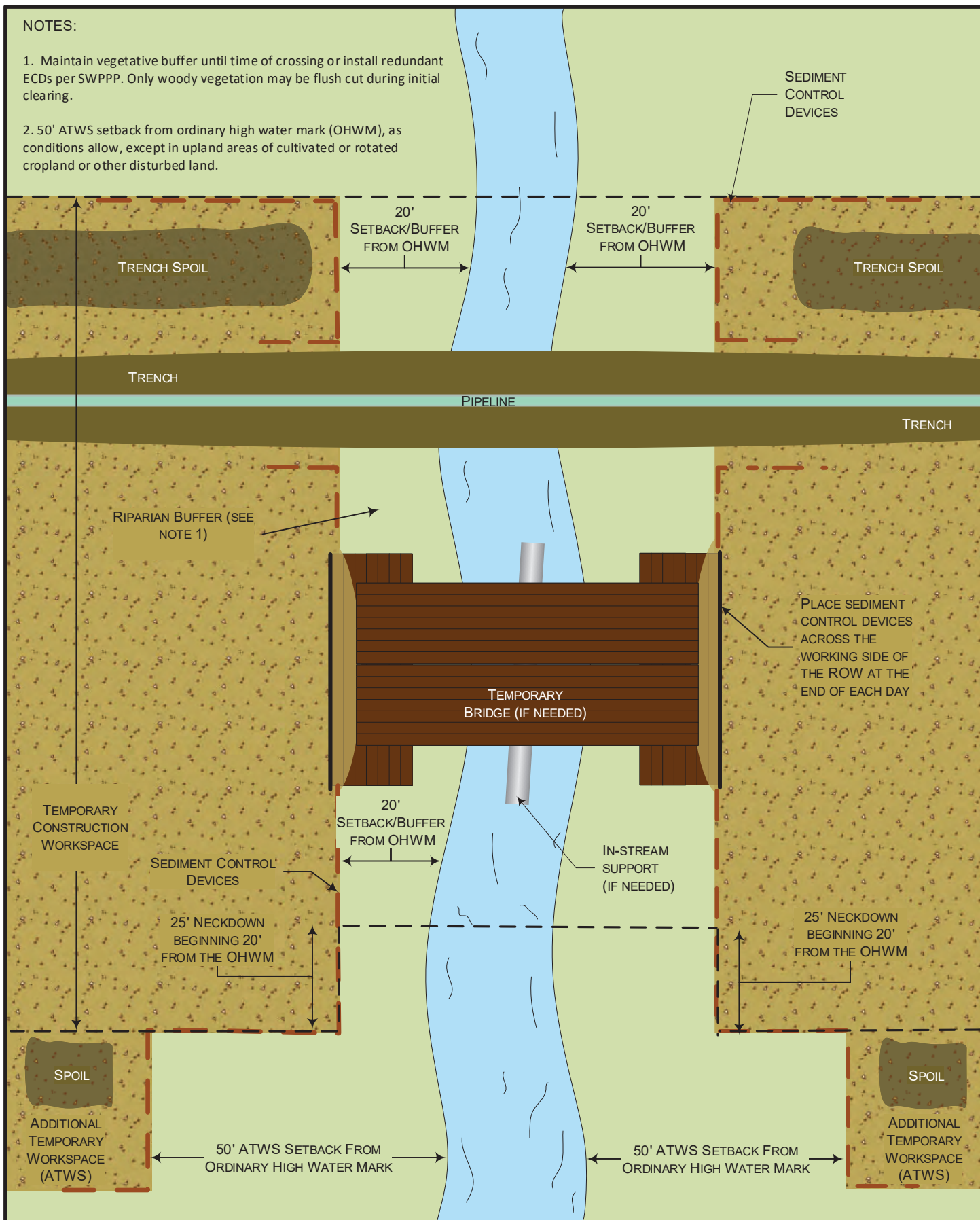
K:\CLIENT PROJECTS\ID-FEEL\2011-019\FIG 14\_SLOPE\_BREAKERS\_PERSPECTIVE\_VIEW.VSD



**NOTES:**

1. Maintain vegetative buffer until time of crossing or install redundant ECDs per SWPPP. Only woody vegetation may be flush cut during initial clearing.

2. 50' ATWS setback from ordinary high water mark (OHWM), as conditions allow, except in upland areas of cultivated or rotated cropland or other disturbed land.

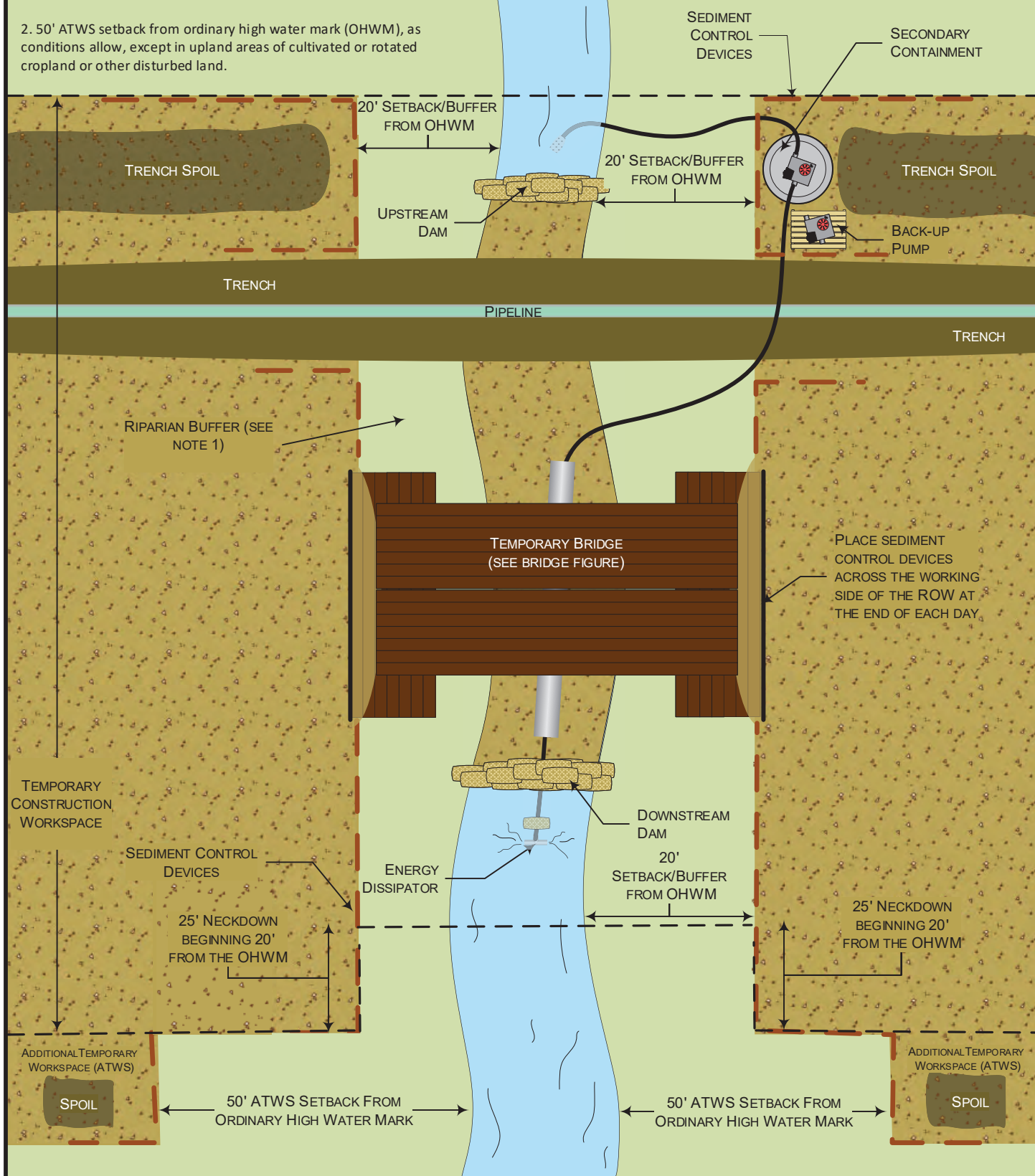




# NOTES:

1. Maintain vegetative buffer until time of crossing or install redundant ECDs per SWPPP. Only woody vegetation may be flush cut during initial clearing.

2. 50' ATWS setback from ordinary high water mark (OHWM), as conditions allow, except in upland areas of cultivated or rotated cropland or other disturbed land.

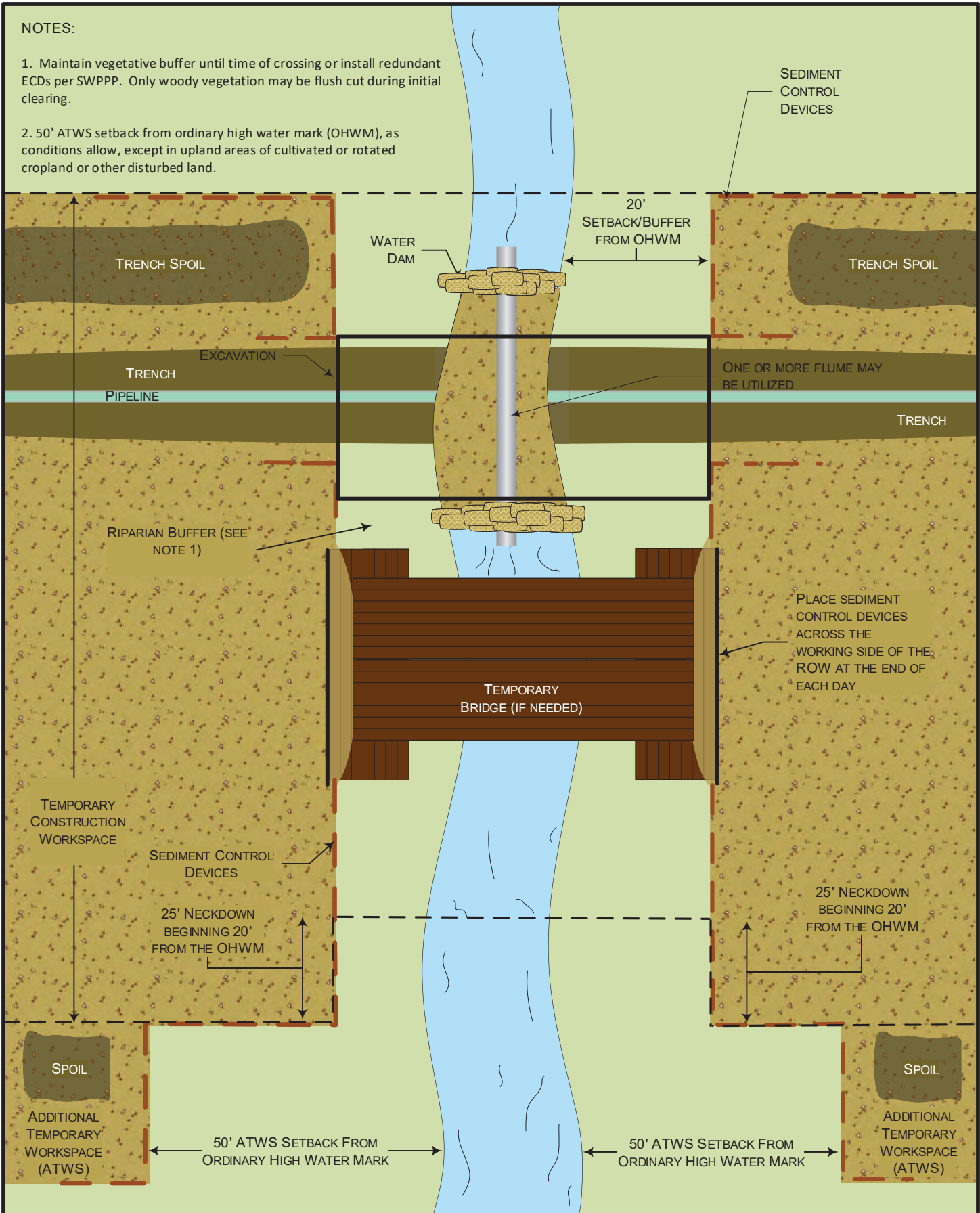


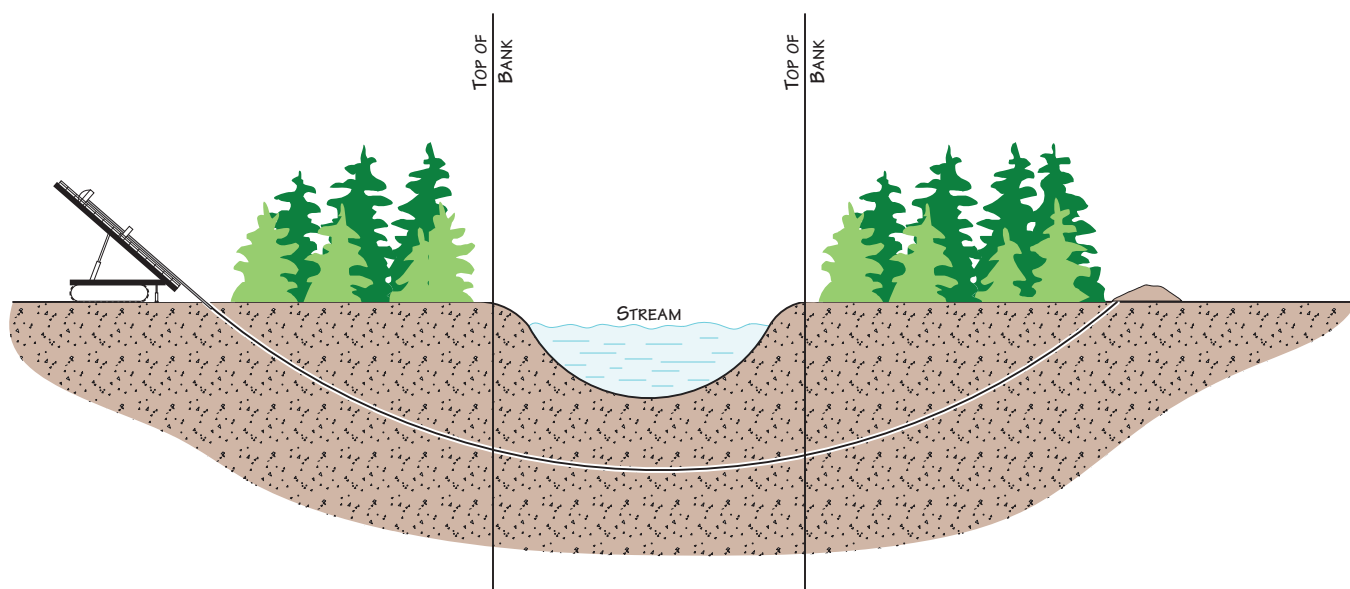
**Figure 16**  
Typical Waterbody Crossing  
Dry Crossing - Dam and Pump  
Method



**NOTES:**

1. Maintain vegetative buffer until time of crossing or install redundant ECDs per SWPPP. Only woody vegetation may be flush cut during initial clearing.
2. 50' ATWS setback from ordinary high water mark (OHWM), as conditions allow, except in upland areas of cultivated or rotated cropland or other disturbed land.





For environmental review purposes only.



**Figure 18**  
**Environmental Protection Plan**  
 Typical Waterbody Crossing  
 Directional Drill Method

DATE: 7/14/2000

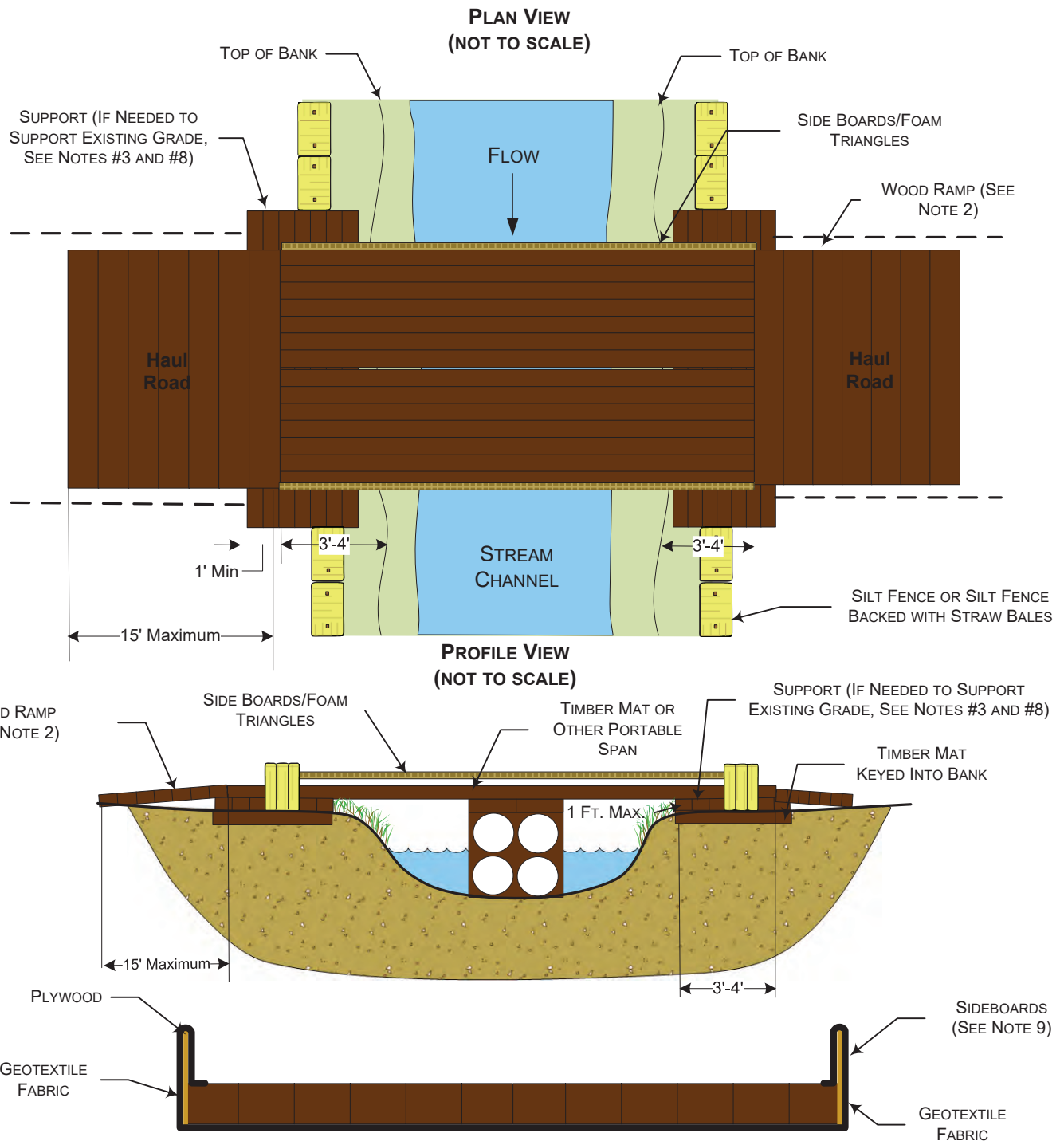
REVISED: 3/11/11

SCALE: NTS

DRAWN BY: KMKENDALL

K:\CLIENT PROJECTS\ID-FEEL\2011-019\FIG\_18\_WATERBODY\_DIRECTIONAL\_DRILL\_VSD





**NOTES:**

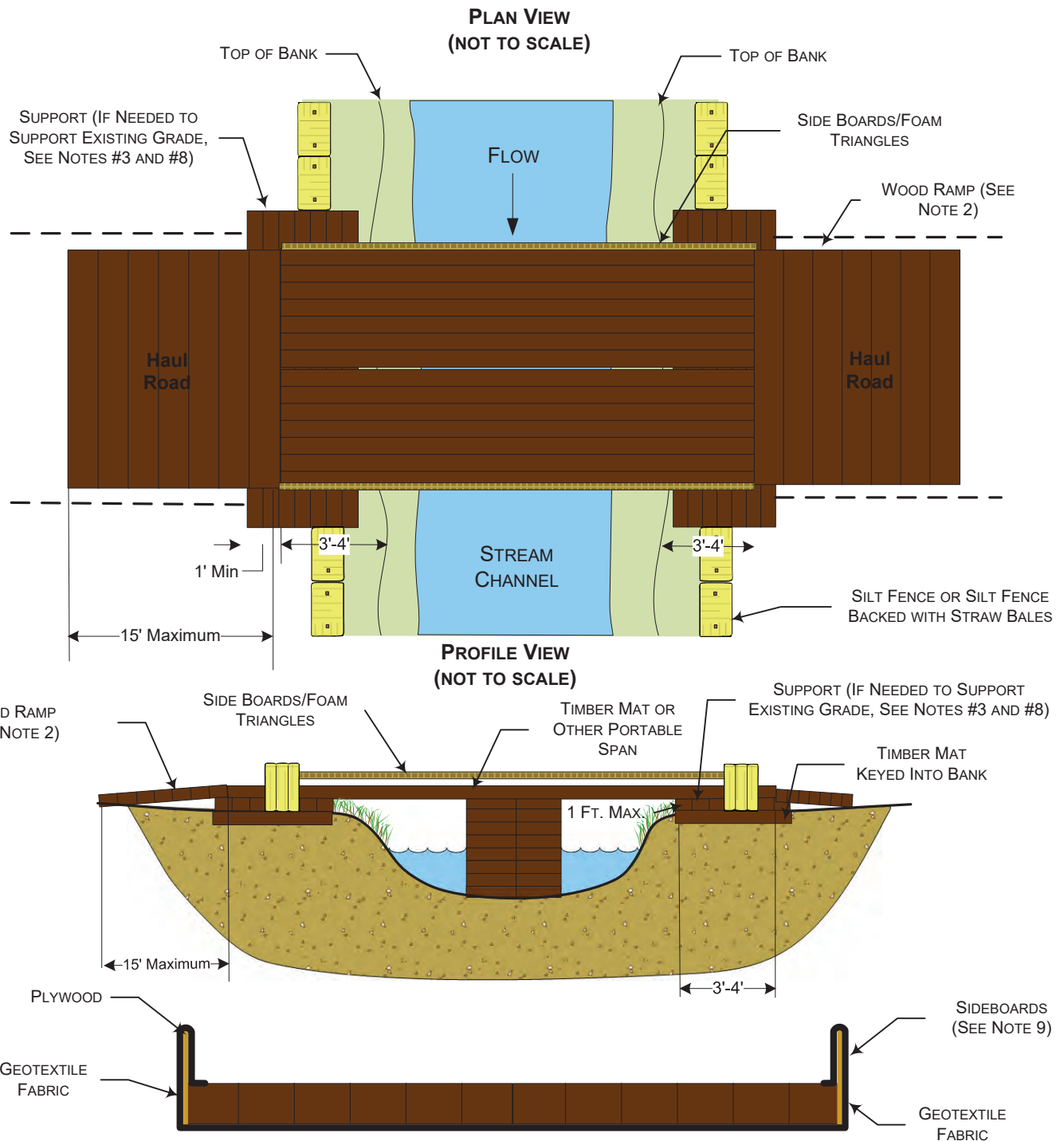
1. INSPECT BRIDGE OPENING PERIODICALLY AND FOLLOWING RAINFALLS OF OVER ½". REMOVE ANY DEBRIS RESTRICTING FLOW AND DEPOSIT IT AT AN UPLAND SITE OUTSIDE OF FLOODPLAIN.
2. IF PHYSICAL CIRCUMSTANCES PROHIBIT WOOD OR METAL RAMPS, EARTHEN RAMPS MAY BE USED AS APPROVED.
3. INSPECT BRIDGE ELEVATION SO BRIDGE REMAINS SUPPORTED ABOVE OHWM.
4. THE CULVERT SUPPORT MUST BE ANCHORED TO THE STREAM BOTTOM AND MAY NOT BE SUPPORTED WITH FILL.
5. EARTHEN RAMP CANNOT BE TALLER THAN 1' AND CANNOT EXTEND FOR MORE THAN 15' ON EITHER SIDE OF THE CROSSING.
6. THE BRIDGE MUST SPAN ABOVE OHWM TO OHWM.
7. ADDITIONAL SUPPORT MUST BE ADDED ON TOP OF BANK AND UNDER SPAN IF THE SPAN IS 12' WIDE OR GREATER, OR IF INITIAL SUPPORT STARTS TO SETTLE.
8. EROSION AND SEDIMENTATION CONTROL MEASURES SHALL BE INSPECTED AND MAINTAINED IN ACCORDANCE WITH THE COMPANY'S ENVIRONMENTAL PROTECTION PLAN.
9. SIDEBARDS WILL BE INSTALLED ON TEMPORARY BRIDGES TO MINIMIZE THE POTENTIAL FOR SEDIMENT TRANSPORT. SIDEBARDS MAY BE CONSTRUCTED OUT OF PLYWOOD, OR EQUIVALENT, AND AFFIXED TO THE OUTER SIDES OF THE BRIDGE. GEO-TEXTILE FABRIC, OR EQUIVALENT, MUST ALSO BE ADEQUATELY SECURED TO THE UNDERSIDE OF THE BRIDGE TO PREVENT MATERIAL FROM FALLING THROUGH THE BRIDGE DECK. THE GEO-TEXTILE FABRIC OR AN EQUIVALENT SHOULD BE SECURED TO THE BOTTOM OF THE BRIDGE AND WRAPPED AROUND THE SIDEBARDS IN A CONTINUOUS FASHION.



**Figure 19A**  
Environmental Protection Plan  
Typical Span Type Bridge  
With or Without Instream Support (Flume Support)

Environmental Protection Plan

Drawn by: **merjent**



**NOTES:**

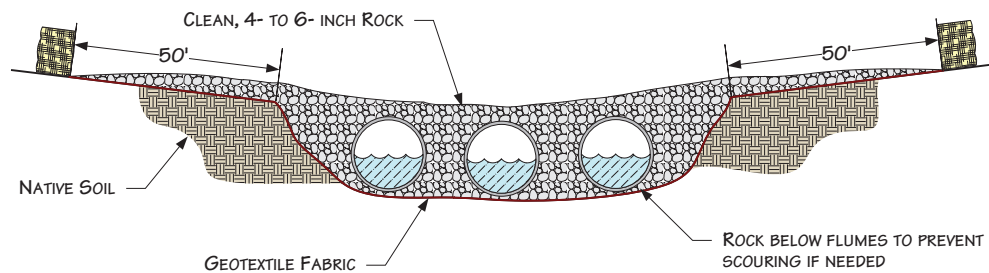
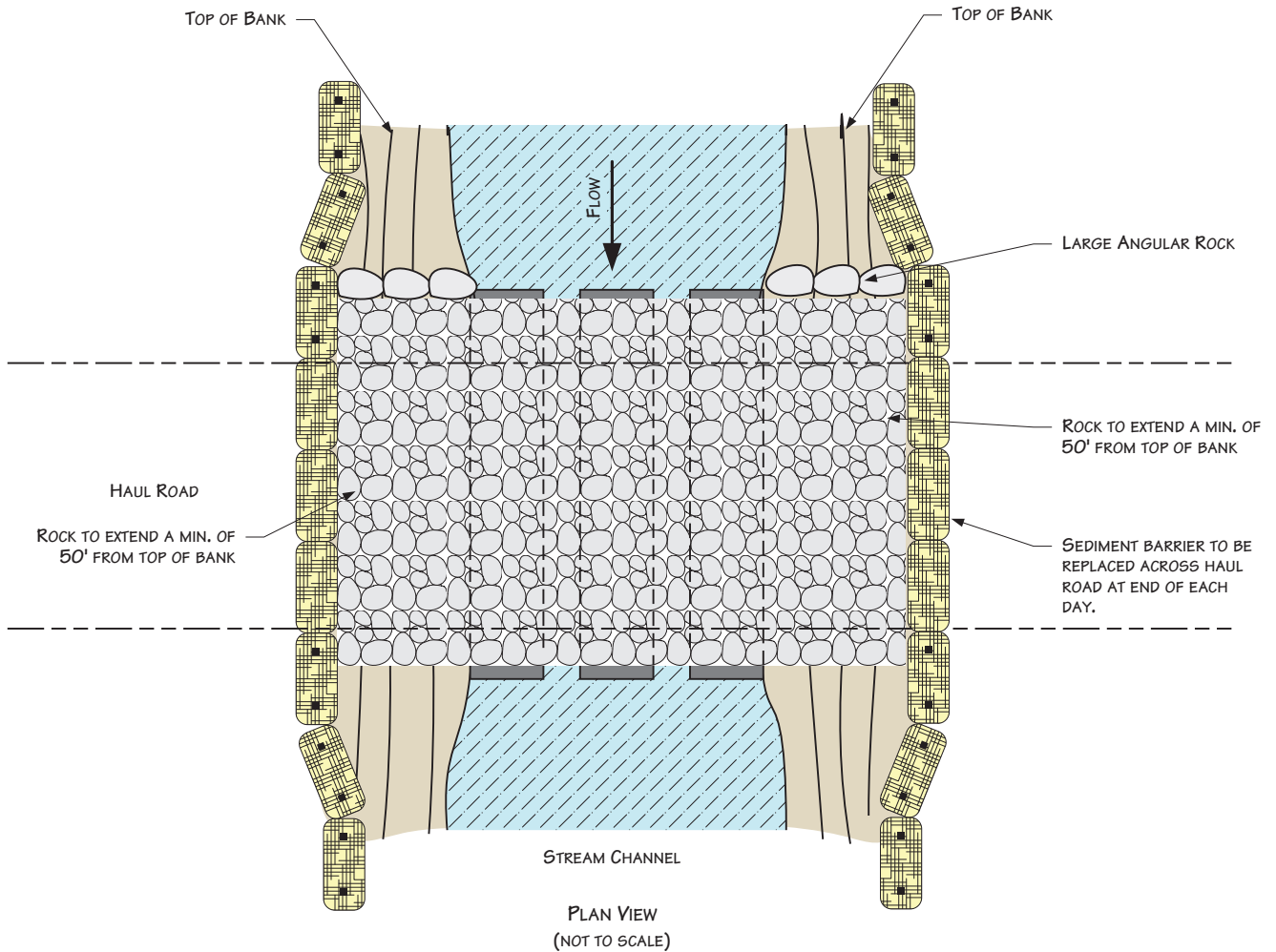
1. INSPECT BRIDGE OPENING PERIODICALLY AND FOLLOWING RAINFALLS OF OVER ½". REMOVE ANY DEBRIS RESTRICTING FLOW AND DEPOSIT IT AT AN UPLAND SITE OUTSIDE OF FLOODPLAIN.
2. IF PHYSICAL CIRCUMSTANCES PROHIBIT WOOD OR METAL RAMPS, EARTHEN RAMPS MAY BE USED AS APPROVED.
3. INSPECT BRIDGE ELEVATION SO BRIDGE REMAINS SUPPORTED ABOVE OHWM.
4. THE CULVERT SUPPORT MUST BE ANCHORED TO THE STREAM BOTTOM AND MAY NOT BE SUPPORTED WITH FILL.
5. EARTHEN RAMP CANNOT BE TALLER THAN 1' AND CANNOT EXTEND FOR MORE THAN 15' ON EITHER SIDE OF THE CROSSING.
6. THE BRIDGE MUST SPAN ABOVE OHWM TO OHWM.
7. ADDITIONAL SUPPORT MUST BE ADDED ON TOP OF BANK AND UNDER SPAN IF THE SPAN IS 12' WIDE OR GREATER, OR IF INITIAL SUPPORT STARTS TO SETTLE.
8. EROSION AND SEDIMENTATION CONTROL MEASURES SHALL BE INSPECTED AND MAINTAINED IN ACCORDANCE WITH THE COMPANY'S ENVIRONMENTAL PROTECTION PLAN.
9. SIDEBOARDS WILL BE INSTALLED ON TEMPORARY BRIDGES TO MINIMIZE THE POTENTIAL FOR SEDIMENT TRANSPORT. SIDEBOARDS MAY BE CONSTRUCTED OUT OF PLYWOOD, OR EQUIVALENT, AND AFFIXED TO THE OUTER SIDES OF THE BRIDGE. GEO-TEXTILE FABRIC, OR EQUIVALENT, MUST ALSO BE ADEQUATELY SECURED TO THE UNDERSIDE OF THE BRIDGE TO PREVENT MATERIAL FROM FALLING THROUGH THE BRIDGE DECK. THE GEO-TEXTILE FABRIC OR AN EQUIVALENT SHOULD BE SECURED TO THE BOTTOM OF THE BRIDGE AND WRAPPED AROUND THE SIDEBOARDS IN A CONTINUOUS FASHION.



**Figure 19B**  
Environmental Protection Plan  
Typical Span Type Bridge  
With or Without Instream Support (Timber Matted Support)

Environmental Protection Plan

Drawn by: **merjent**



**NOTES:**

1. STEEL FLUME PIPE(S) SIZED TO ALLOW FOR STREAM FLOW AND EQUIPMENT LOAD.
2. STRAW BALES SHALL BE PLACED ACROSS BRIDGE ENTRANCE EVERY NIGHT.
3. ADDITIONAL INFORMATION INCLUDED ON OTHER DRAWINGS.

For environmental review purposes only.



**Figure 20**  
**Environmental Protection Plan**  
**Typical Rock Flume Bridge**

DATE: 5/25/2001

REVISED: 3/15/11

SCALE: NTS

DRAWN BY: KMKENDALL

K:\CLIENT PROJECTS\ID-PEEL\2011-019\FIG\_20\_ROCK\_FLUME\_BRIDGE.VSD

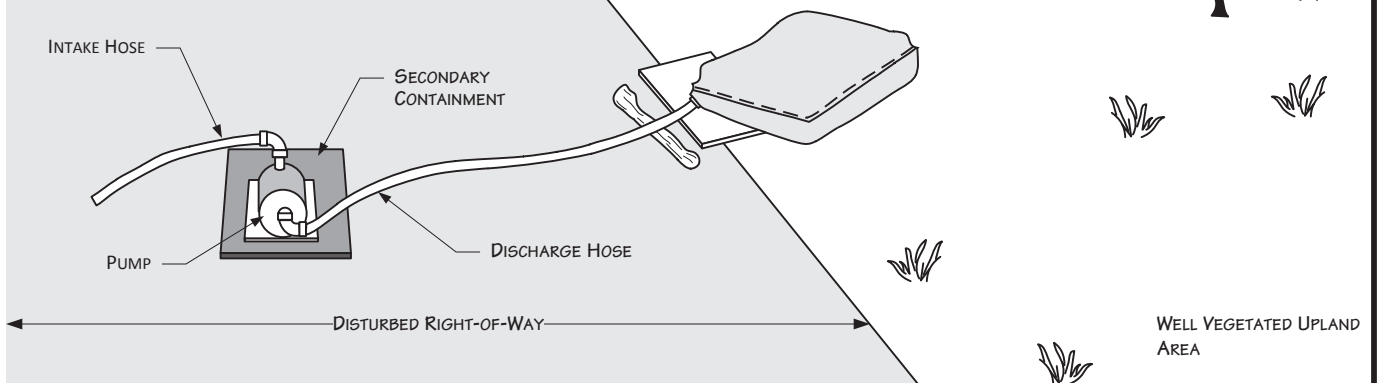




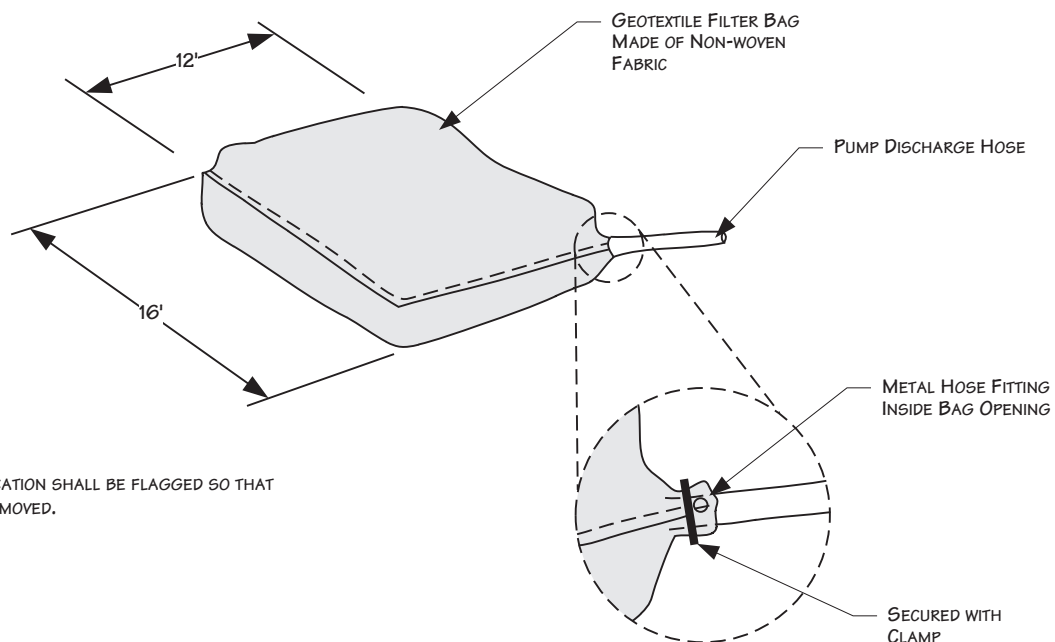
## DEWATERING DISCHARGE IN WELL VEGETATED UPLANDS

### NOTES:

1. PUMP INTAKE HOSE MUST BE SECURED AT LEAST ONE FOOT ABOVE THE TRENCH BOTTOM.
2. DEWATER INTO GEOTEXTILE FILTER BAG OR STRAW BALE DEWATERING STRUCTURE.



## GEOTEXTILE FILTER BAG



### NOTE:

1. FILTER BAG LOCATION SHALL BE FLAGGED SO THAT BAG CAN BE REMOVED.

For environmental review purposes only.



**Figure 21**  
**Environmental Protection Plan**  
**Typical Dewatering Measures**

DATE: 5/25/2001

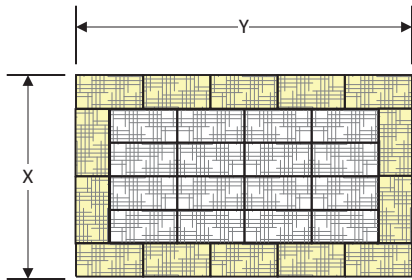
REVISED: 3/15/11

SCALE: NTS

DRAWN BY: KMKENDALL

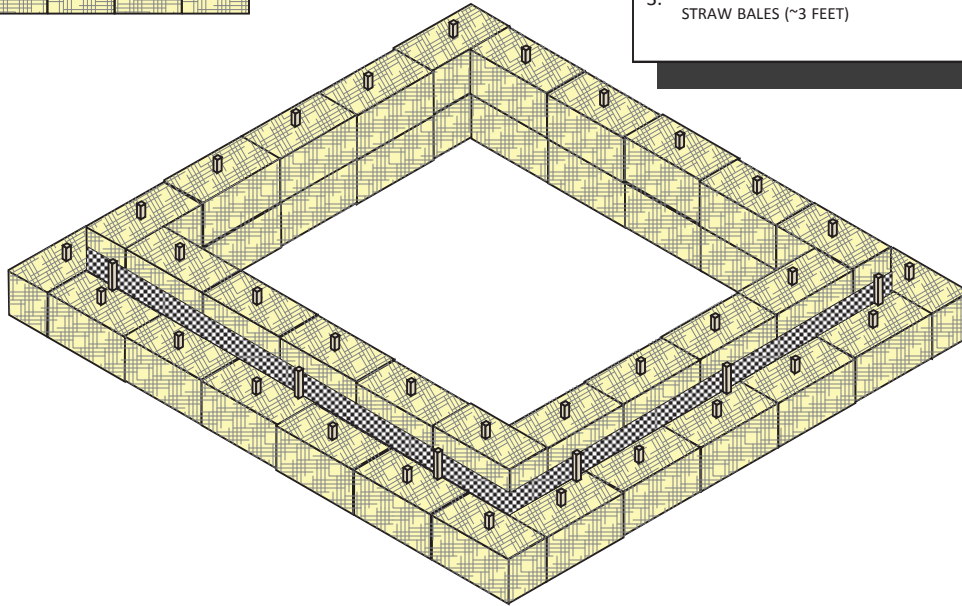
K:\CLIENT\_PROJECTS\SD-FEEL\2011-019\FIG\_21\_DEWATERING\_MEASURES.VSD



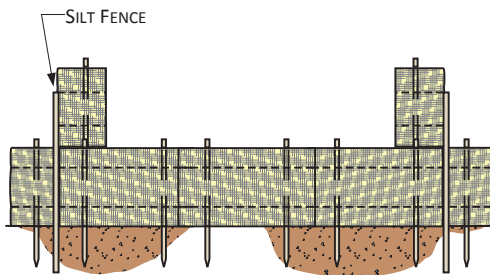


#### NOTES

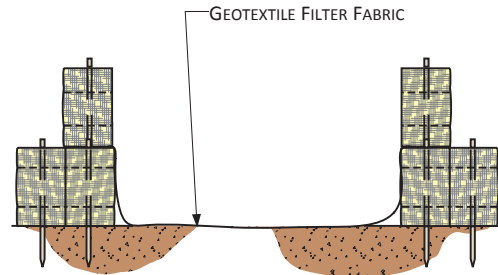
1. ARRANGE THE STRAW BALES TO THE X AND Y DIMENSIONS AS SPECIFIED BELOW.
2. IF BOTTOM OF STRUCTURE IS NOT LINED WITH STRAW BALES (OPTION 1), LINE ENTIRE STRUCTURE WITH GEOTEXTILE FILTER FABRIC.
3. THE HEIGHT OF THE STRUCTURE SHOULD BE 2 STRAW BALES (~3 FEET)



PERSPECTIVE VIEW



OPTION 1



OPTION 2

NOTE: TYPICAL DIMENSIONS AND MAXIMUM PUMPING RATES ARE BASED ON INDUSTRY EXPERIENCE, BEST MANAGEMENT PRACTICES, AND PUMP SIZE (4" - 8").

#### TYPICAL MINIMUM SUMP DIMENSIONS (FEET)

X	Y
10	20
15	20
20	20
20	25
25	25
25	30
30	30

#### MAXIMUM PUMPING RATE GALLONS PER MINUTE

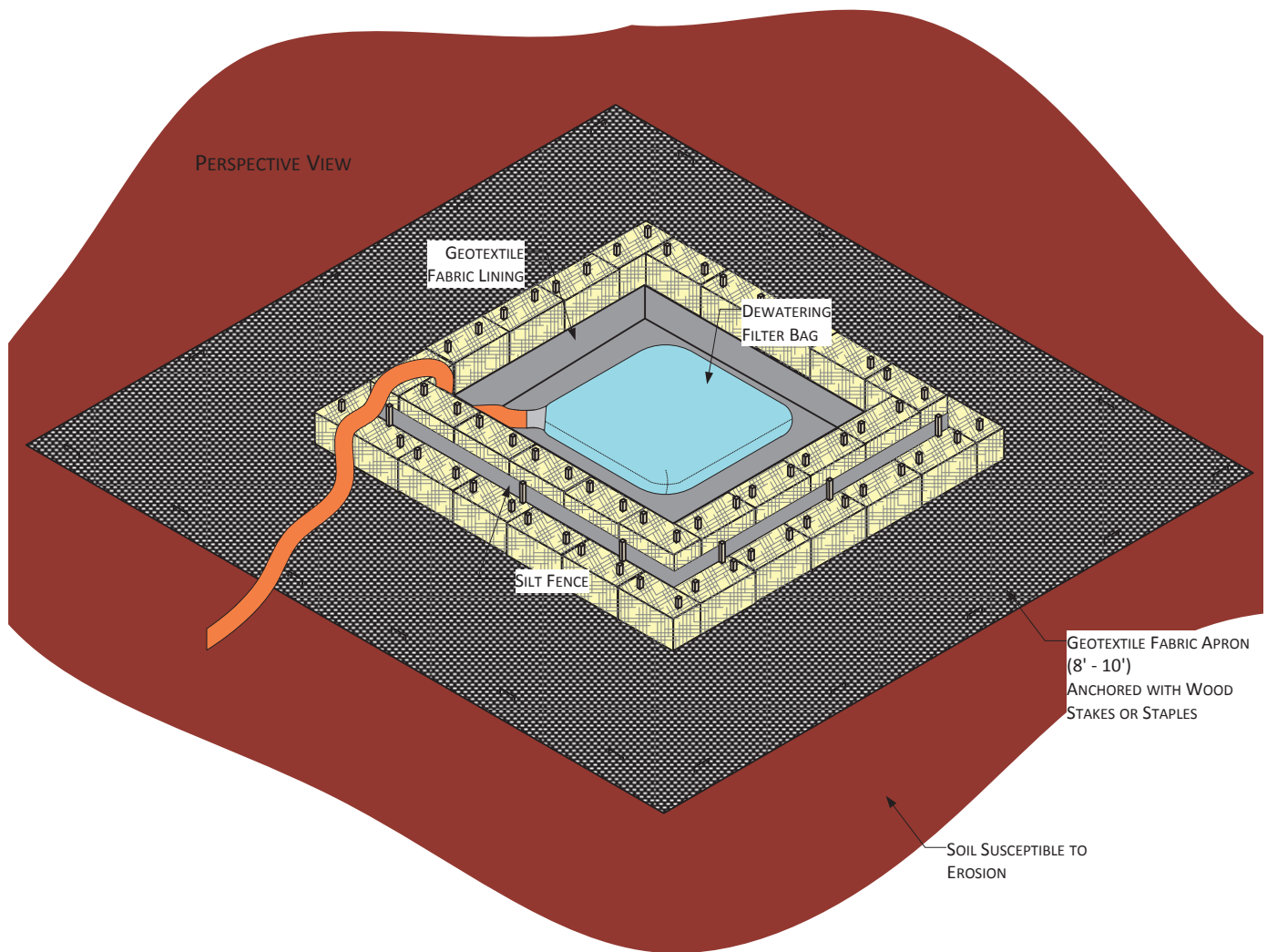
300
350
400
450
500
550
660

For environmental review purposes only.



## Figure 22A Environmental Protection Plan Straw Bale Dewatering Structure





NOTES:

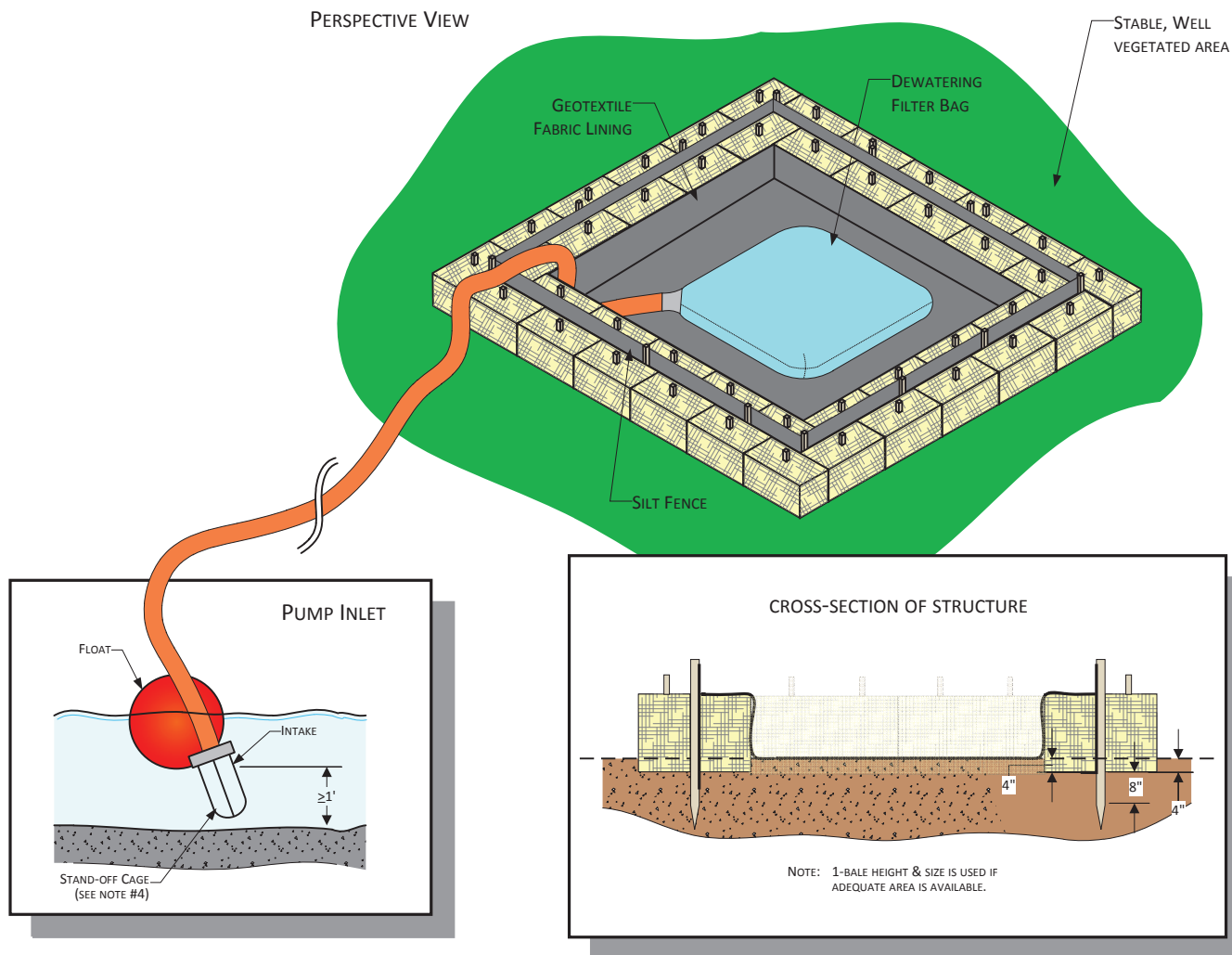
1. SILT FENCE ENDS MUST BE WRAPPED TO JOIN TWO SECTIONS.
2. INSTALL SILT FENCE 2 INCHES ABOVE TOP OF STRAW BALES, AND ANCHOR A MINIMUM OF 8 INCHES STRAIGHT DOWN.
3. SILT FENCE POST STAKING MUST BE 4 FEET OR LESS.
4. DEWATERING INTAKE HOSE SUPPORTED AT LEAST 1 FOOT FROM BOTTOM OF TRENCH BEING DEWATERED.
5. EROSION AND SEDIMENTATION CONTROL MEASURES SHALL BE INSPECTED AND MAINTAINED AS NEEDED TO MAINTAIN EFFICACY PER INDUSTRY STANDARDS.
6. MAINLINE HYDROSTATIC TEST DEWATERING STRUCTURES WILL BE REINFORCED USING INDUSTRY STANDARD OPTIONS TO PREVENT BALE MOVEMENT DURING DISCHARGE (e.g., CINCH STRAPS, WIRE, CATTLE GUARD FENCING).

For environmental review purposes only.



**Figure 22B**  
**Environmental Protection Plan**  
**Straw Bale Dewatering Structure**





NOTES:

1. SILT FENCE ENDS MUST BE WRAPPED TO JOIN TWO SECTIONS.
2. INSTALL SILT FENCE 2 INCHES ABOVE TOP OF STRAW BALE, AND ANCHOR A MINIMUM OF 8 INCHES STRAIGHT DOWN.
3. SILT FENCE POST STAKING MUST BE 4 FEET OR LESS.
4. DEWATERING INTAKE HOSE SUPPORTED AT LEAST 1 FOOT FROM BOTTOM OF TRENCH BEING DEWATERED.
5. USE A FILTER BAG AT THE DISCHARGE HOSE END.
6. EROSION AND SEDIMENTATION CONTROL MEASURES SHALL BE INSPECTED AND MAINTAINED AS NEEDED TO MAINTAIN EFFICACY PER INDUSTRY STANDARDS.
7. MAINLINE HYDROSTATIC TEST DEWATERING STRUCTURES WILL BE REINFORCED USING INDUSTRY STANDARD OPTIONS TO PREVENT BALE MOVEMENT DURING DISCHARGE (e.g., CINCH STRAPS, WIRE, CATTLE GUARD FENCING).

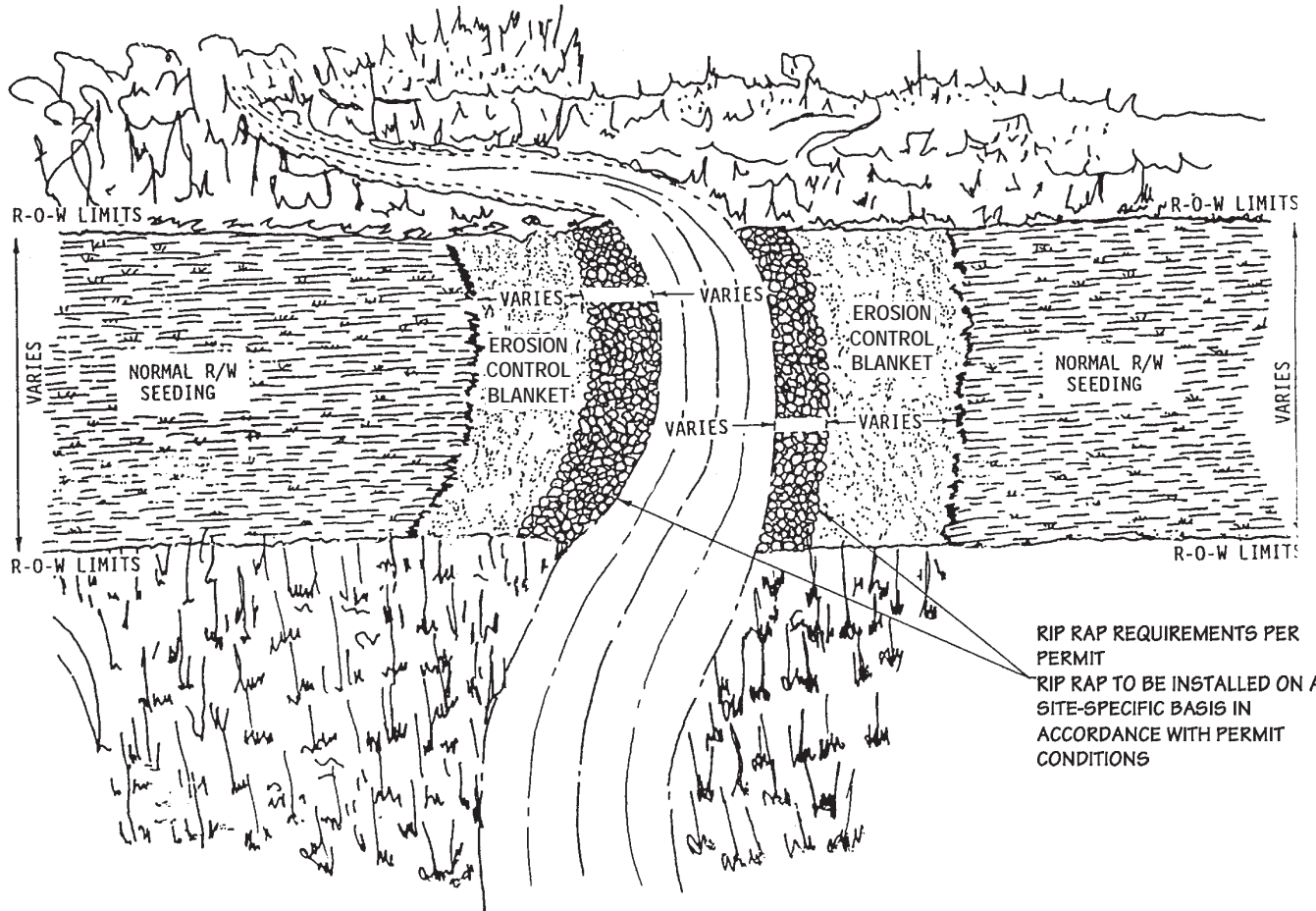
For environmental review purposes only.



**Figure 22C**  
**Environmental Protection Plan**  
**Straw Bale Dewatering Structure**



NOTE: PLACE JUTE BLANKET A MINIMUM OF ONE (1) FOOT UNDER RIP RAP. EXTEND JUTE BLANKET FROM MEAN HIGH WATER LEVEL TO SEVERAL FEET BEHIND HIGH BANK.



For environmental review purposes only.



**Figure 23**  
**Environmental Protection Plan**  
 Typical Final Stream Bank Stabilization  
 Rip Rap & Erosion Control

DATE: 7/19/2000

REVISED: 3/14/11

SCALE: NTS

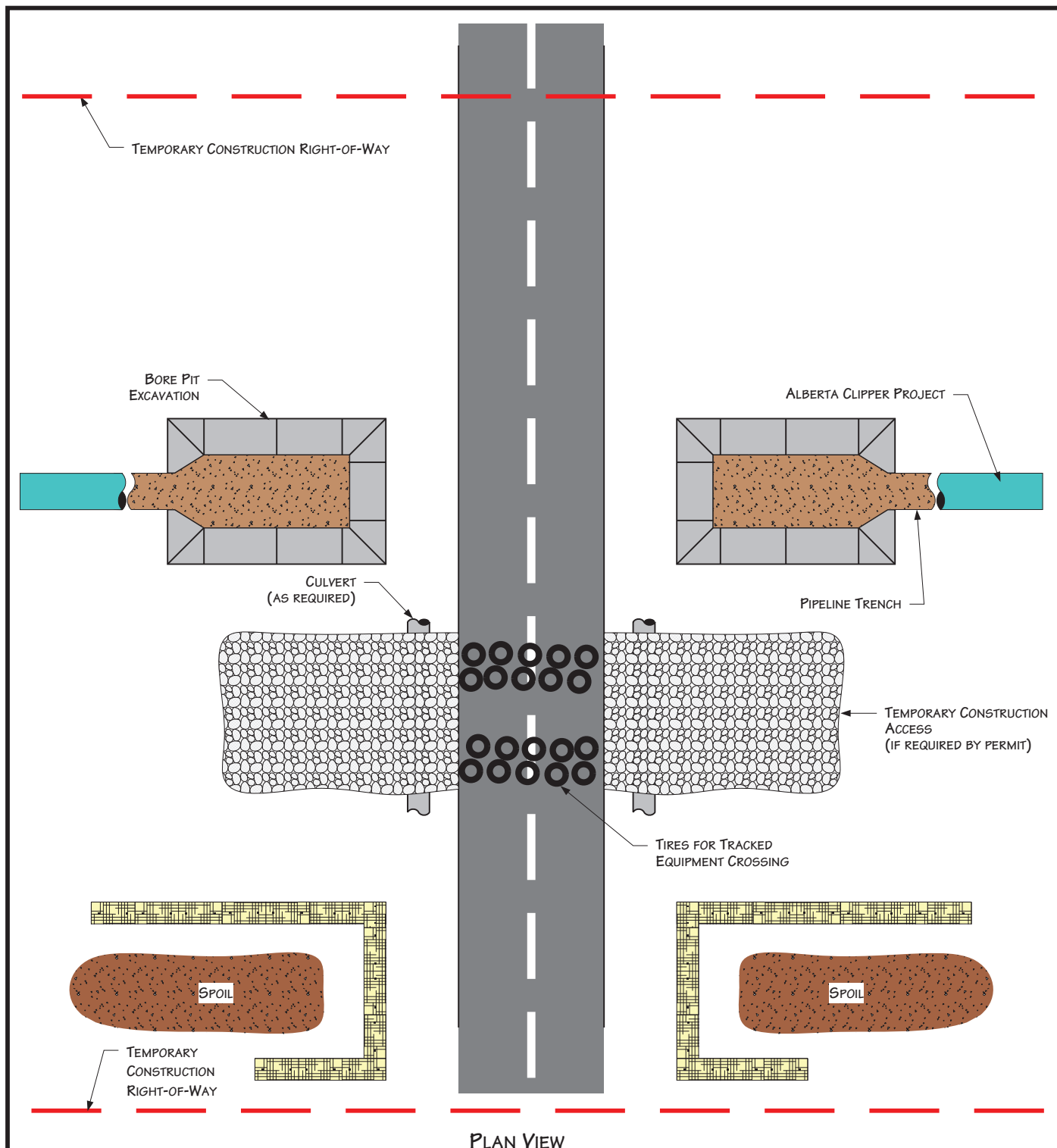
DRAWN BY: KMKENDALL

K:\CLIENT PROJECTS\SD-FEEL\2011-019\FIG\_23\_STREAM\_BANK\_STABILIZATION.VSD









#### NOTES

1. PROCEDURES SHOWN IN THIS DRAWING APPLY TO IMPROVED ROADS.
2. ROADS MUST BE CLEANED AFTER EQUIPMENT CROSSES AND DIRT PLACED IN SPOIL CONTAINMENT AREAS.
3. TEMPORARY ACCESS MATERIALS MUST BE REMOVED UPON PROJECT COMPLETION.
4. ADDITIONAL INFORMATION INCLUDED ON OTHER DRAWINGS OR PERMITS.
5. CONSTRUCTION AREAS LOCATED OUTSIDE ROAD ROW.

For environmental review purposes only.



**Figure 25**  
**Environmental Protection Plan**  
 Typical Improved Road Crossing  
 Directional Bore Method

DATE: 7/13/1999

REVISED: 3/14/11

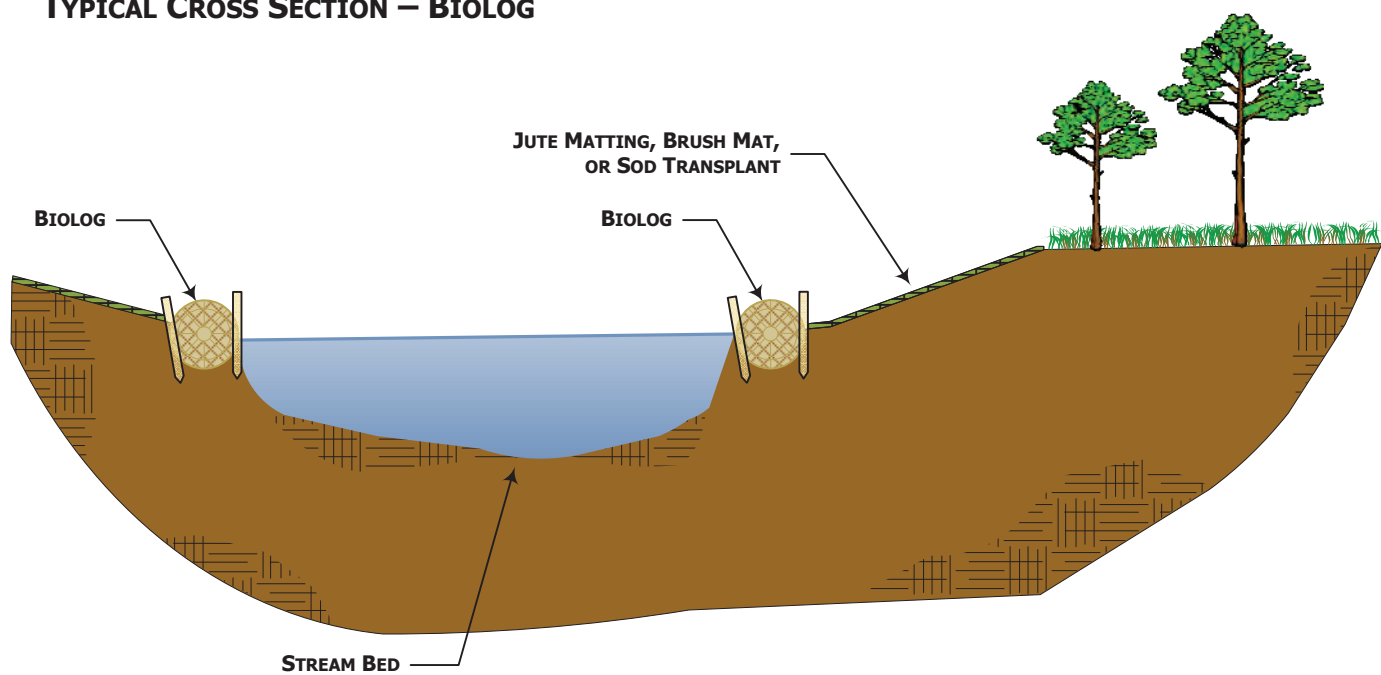
SCALE: NTS

DRAWN BY: KMKENDALL

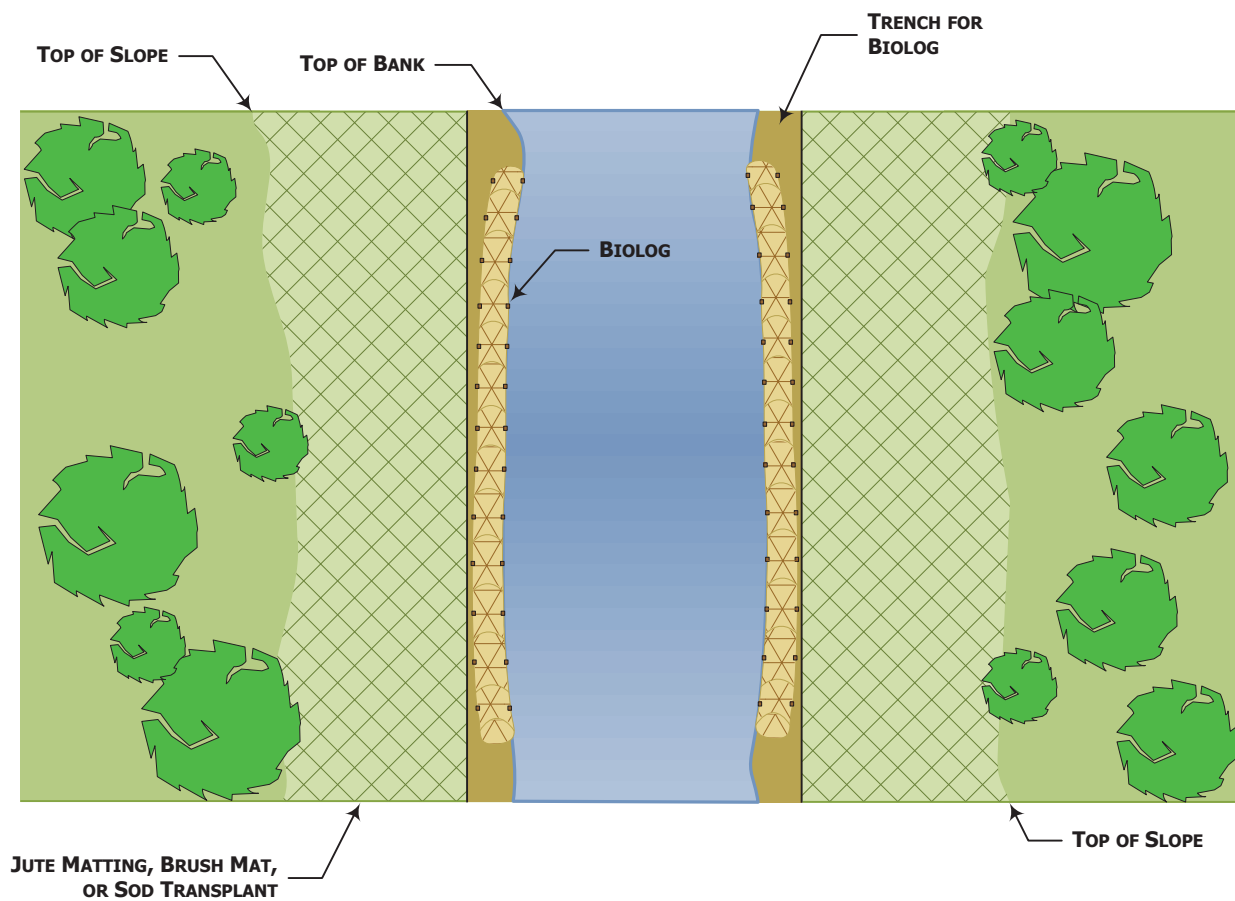
K:\CLIENT\_PROJECTS\0-FIEEL\2011-019\FIG\_25\_IMPROVED\_ROAD\_BORE\_CROSSING.VSD



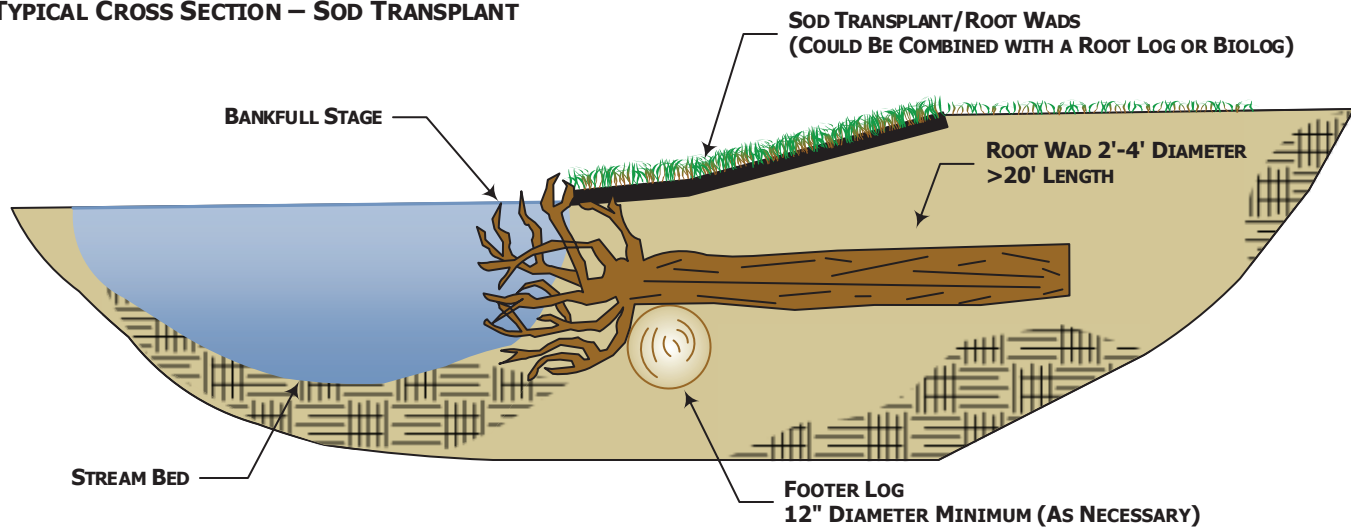
## TYPICAL CROSS SECTION – BIOLOG



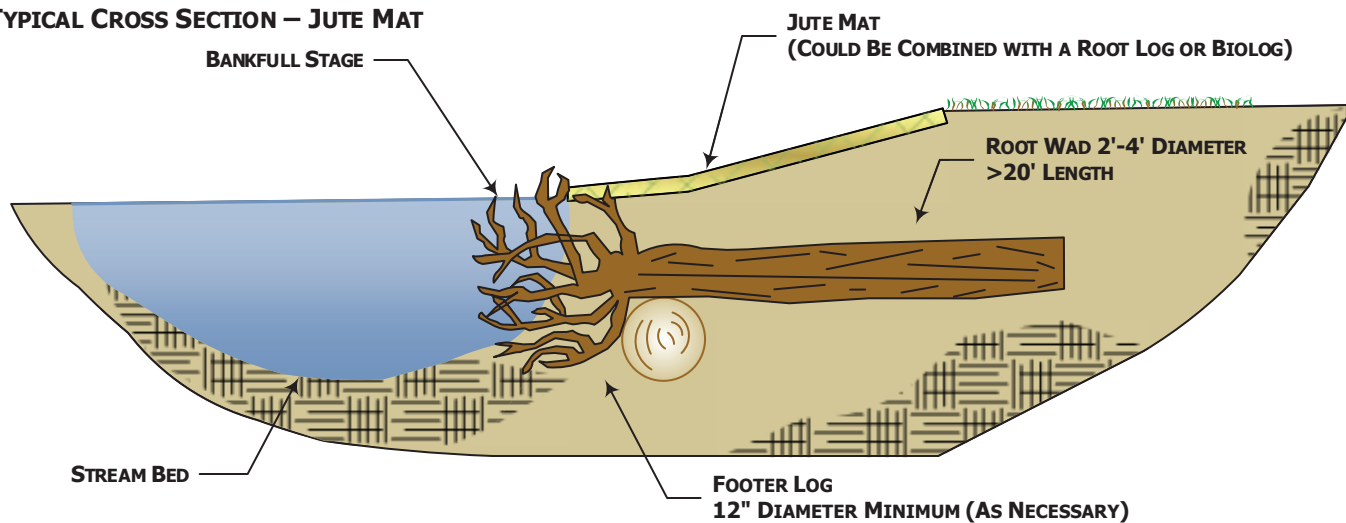
## TYPICAL PLAN VIEW – BIOLOG



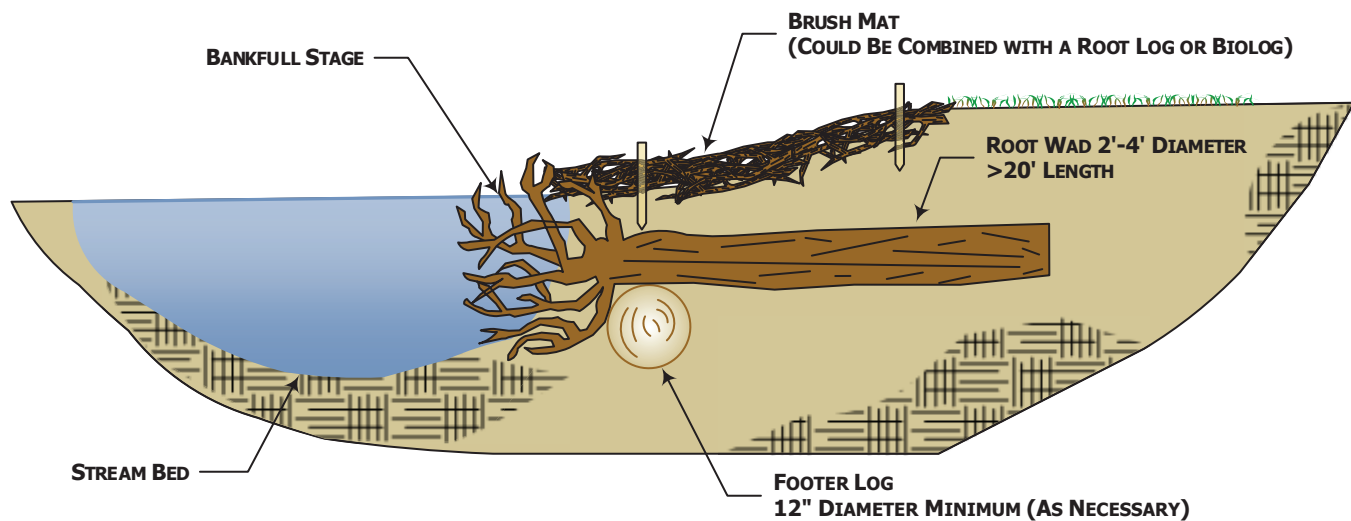
### TYPICAL CROSS SECTION – SOD TRANSPLANT



### TYPICAL CROSS SECTION – JUTE MAT

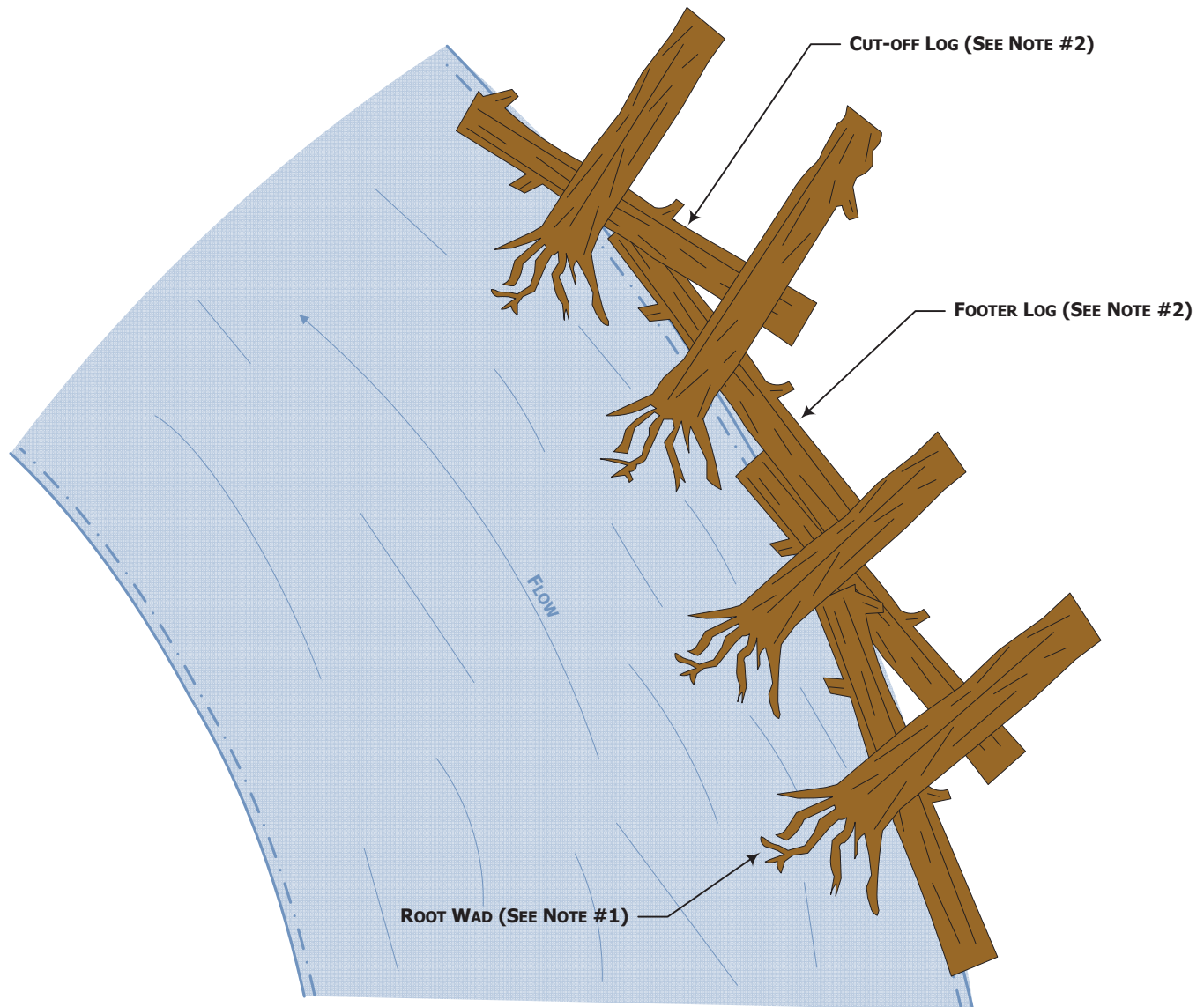


### TYPICAL CROSS SECTION – BRUSH MAT



**Figure 27**  
**Typical Root Wad**

## TYPICAL PLAN VIEW – NATURAL MATERIAL REVETMENT

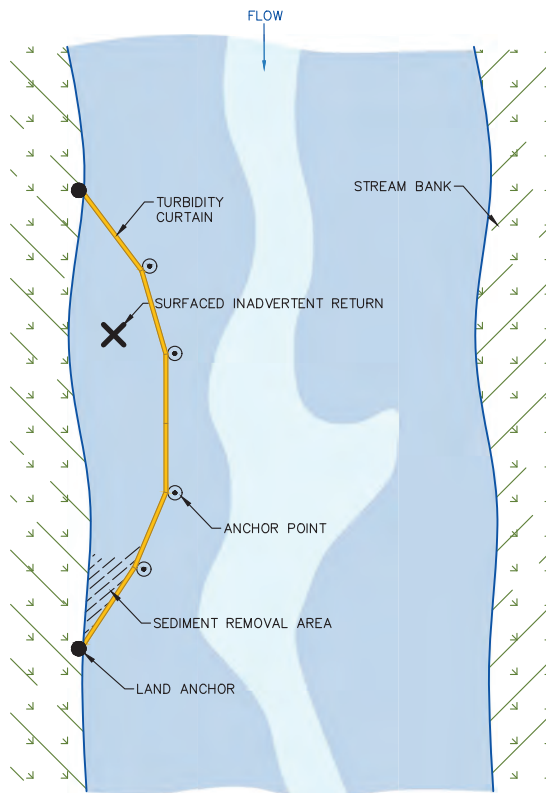


### Notes:

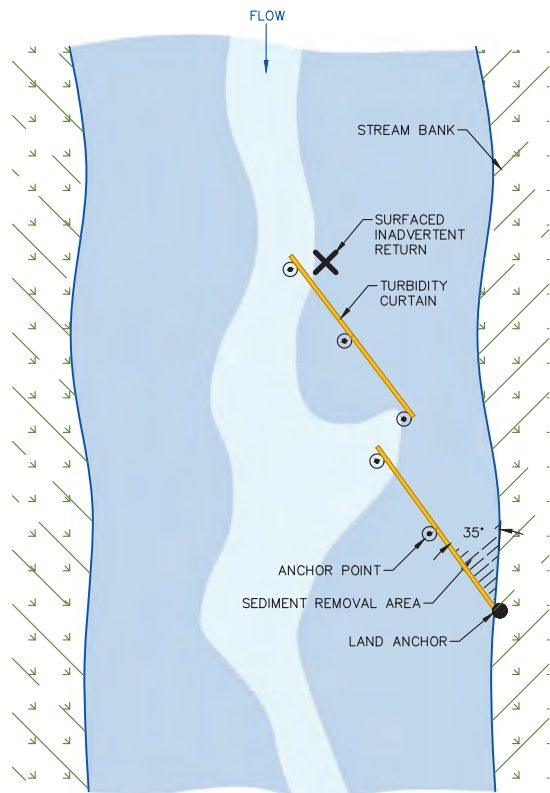
#1 – Root wad logs to be used on steep banks or based on agency recommendations.

#2 - Root wad logs to be anchored appropriately based on site-specific conditions or agency recommendations.

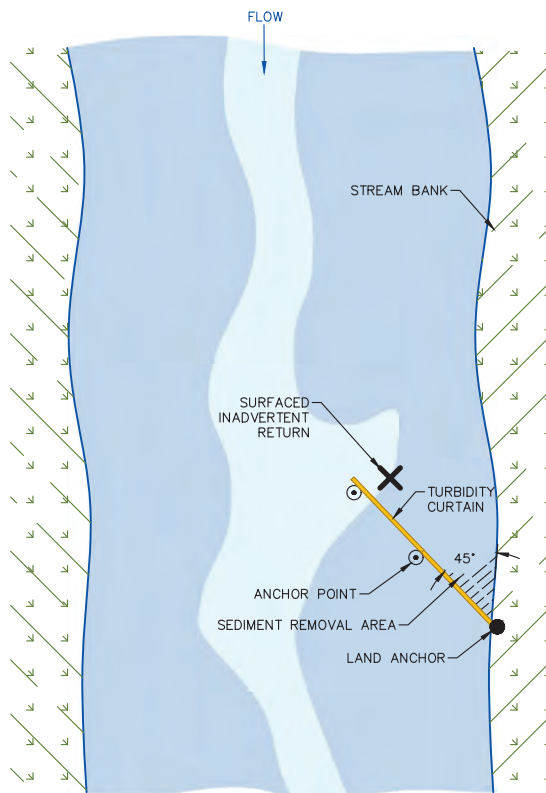




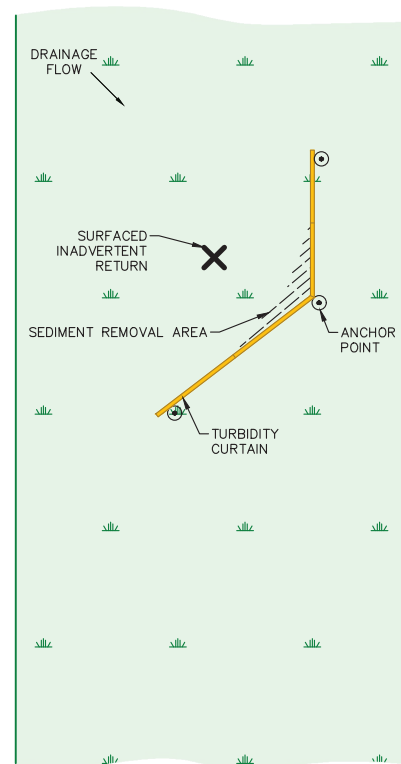
1 NEAR-SHORE  
PLAN VIEW



2 RAPID FLOW / MID-CHANNEL  
PLAN VIEW



3 MODERATE FLOW / SIDE-CHANNEL  
PLAN VIEW



4 STANDING / STILL WATER  
PLAN VIEW

**Appendix A**  
**Noxious and Invasive Species Management Plan**  
***(In Preparation)***

**Appendix B**  
**Rigid Polyurethane Foam Material Safety Data Sheet**



**URETHANE  
TECHNOLOGY  
COMPANY, INC.**

## **MATERIAL SAFETY DATA SHEET**

**EMERGENCY CONTACT: Call 845 -561-5500**  
**During normal business hours M-F**

**Issue Date: 12/08/06**

**Revised Date: 12/08/08**

### **SECTION 1: PRODUCT AND COMPANY IDENTIFICATION**

Material name: **UTC – Solid Foam**

Product Usage: Molded foam and void fill foam applications

Company Info: URETHANE TECHNOLOGY CO  
59-77 TEMPLE AVENUE  
NEWBURGH NY 12550  
(845) 561-5500

### **SECTION 2: HAZARDS IDENTIFICATION**

#### **Emergency Overview –**

**A beige-yellow solid that if involved in a building and/or structure fire may give off vapors that are toxic.**

#### **Potential Acute Health Effects**

Eyes – Like many solids such as sand or dirt, particles may irritate eyes.

Skin – Could be an irritant if handled with hands due to abrasive nature of foam.

Inhalation – Like many solids such as sand or dirt, inhalation of foam particles may cause irritation.

Ingestion – Not an anticipated route of entry. Foam is not considered toxic.

#### **Phys Appearance – Solid**

**Color** – Beige to pale yellow.

**General** - Foam is considered inert and not toxic. However, please read the entire MSDS for a more thorough evaluation of hazards.

### **SECTION 3: INFORMATION ON INGREDIENTS (COMPOSITION)**

<u>INGREDIENT(S)</u>	<u>CAS#</u>	<u>Weight</u>
Cured foam	not applicable	100%

**SECTION 4: FIRST AID MEASURES**

- Eye Contact** - Immediately flush eyes with plenty of water, occasionally lifting the upper and lower eyelids. Remove any contact lenses. Continue washing for up to 15 minutes. If needed seek medical attention.
- Skin Contact** - Wash with soap and water.
- Inhalation** - Get to fresh air.
- Ingestion** - Not an anticipated route of entry. Product should not present a toxic hazard.

**SECTION 5: FIRE FIGHTING MEASURES**

- Autoignition Temp** - Not determined
- Flash Point** - Solid material.
- Flammable Limits** - Not determined.
- OSHA Flame Class** - Not applicable.

**Unusual Hazards** - Toxic and irritating vapors can be released from fire and burning foam.

- Extinguishing Media** - Use any standard fire extinguishing agent suitable for surrounding and containing structural fire.
- Protective Clothing** - Wear self contained breathing apparatus. Avoid skin and eye contact with vapors.

**SECTION 6: ACCIDENTAL RELEASE MEASURES**

**In case of Spill/Release** - Wear work gloves. Pick up and shovel solids and place into container for re-use or disposal.

**SECTION 7: HANDLING AND STORAGE**

- Handling** - Use work gloves if handling foam blocks or particles. Avoid breathing dust.
- Storage** - No special handling required.



**SECTION 8: EXPOSURE CONTROLS/PROTECTION**

**Exposure Guidelines** – None for foam product. There are no established exposure guidelines for ACGIH, OSHA PEL, or Other Limits.

**Personal Protective Equipment**

**Eyes** – Wear safety goggles.

**Skin** – Wear work gloves and coveralls.

**Respiratory** - Not normally required. Wear a dust mask if such conditions exist.

**SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES**

**Appearance/Physical State** – Beige to pale yellow solid foam

**Odor** – None

**pH** – Not applicable

**Vapor Pressure** – Not applicable

**Vapor Density** – Not applicable

**VOC Content** - Not applicable

**Boiling Point** - Not applicable

**Melting/freezing pt** – Not determined

**Viscosity**- Solid

**% Volatiles** - None

**SECTION 10: STABILITY AND REACTIVITY**

**Normally Stable** – This product is stable under foreseeable circumstances.

**Incompatibility** – None

**Hazardous Decomposition**

**Products** – Toxic vapors and oxides of carbon and nitrogen on combustion.

**Hazardous Polymerization** – Hazardous polymerization will not occur.

**SECTION 11: TOXICOLOGICAL INFORMATION**

**Acute Toxicity** - This product has not been tested but when burned it will produce a toxic vapor.

**Potential acute health effects**

**Inhalation** - Solid particles can be irritating like any solid dust.

**Eyes** - Solid particles can be irritating like any solid dust.

**Skin** - Solid particles can be irritating like any solid dust.

**Potential chronic health effects**

**Target organs** - None known.

**Carcinogenicity** - No known significant effects or hazards.

**Mutagenicity** – No known significant effects or hazards.

**Teratogenecity** – No known significant effects or hazards.

**Developmental effects** – No known significant effects or hazards.

**Fertility effects** - No known significant effects or hazards.

**SECTION 12: ECOLOGICAL INFORMATION**

**Ecotoxicity** - Not considered hazardous.

**Environmental fate** – It is unlikely that significant environmental exposure in the air or water will arise based on consideration of the production and use of the substance.

**SECTION 13: DISPOSAL CONSIDERATIONS**

**Waste** – The generation of waste should be avoided or minimized wherever possible. This material is not a hazardous waste under RCRA 40 CFR 261.

Solid insulation should be disposed as a construction waste

*URETHANE TECHNOLOGY COMPANY HAS NO CONTROL OVER THE MANAGEMENT PRACTICES OR MANUFACTURING PROCESSES OF PARTIES HANDLING OR USING THIS MATERIAL. THE INFORMATION IN SECTION 13 IS FOR THE PRODUCT AS SHIPPED.*

**SECTION 14: TRANSPORT INFORMATION**

**Transportation Emergency Number (CHEMTREC) 1-800-424-9300**

**DOT Classification** – Not regulated

**TDG Classification** – Not regulated

**IMO/IMDG Classification** – Not regulated (sea)

**ICAO/IATA Classification** – Not regulated (air)

**Placards required** - None

**SECTION 15: REGULATORY INFORMATION****U.S. Federal Regulations:****HCS Classification** - None**TSAC 8(b) inventory** - Foam is exempted from PMN rules and is manufactured from components that are listed or exempted.**RCRA Hazardous Waste #** - None**CERCLA: Hazardous Substances** – None**SARA Title III (section 313)** – No ingredients listed.

THIS PRODUCT DOES NOT CONTAIN NOR IS IT MANUFACTURED WITH OZONE DEPLETING SUBSTANCES

**State Regulations** – California prop. 65: No ingredients listed. Pennsylvania: No ingredients listed

**Canadian Regulations** – Not a controlled product. *This product has been classified in accordance with the hazard criteria of the CPR (Controlled Products Regulations) and this MSDS (Material Safety Data Sheet) contains all the information required by the CPR.*

**WHMIS (Canada)** – Not a controlled product.**Other Chemical** - Solid foam material.**SECTION 16: OTHER INFORMATION****Label requirements** - None**Hazardous Material  
Information System -**

Health = 0

Fire Hazard = 1

Reactivity = 0

**National Fire Protection -**

Health = 0

Flammability = 1

Instability = 0

*The information herein is provided in good faith but no warranty, express or otherwise, is made or implied. In all cases, it is the responsibility of the user to determine the applicability of such information and recommendations and the suitability of any product for its own particular purpose. Hazards, toxicity, and behavior of the product may differ when used with other materials and are not dependent upon the manufacturing circumstances or other processes. Such hazards, toxicity and behavior should be determined by the user and made known to handlers, processors, and end users.*

Prepared by: Urethane Technology Company Telephone: (845) 561-5500

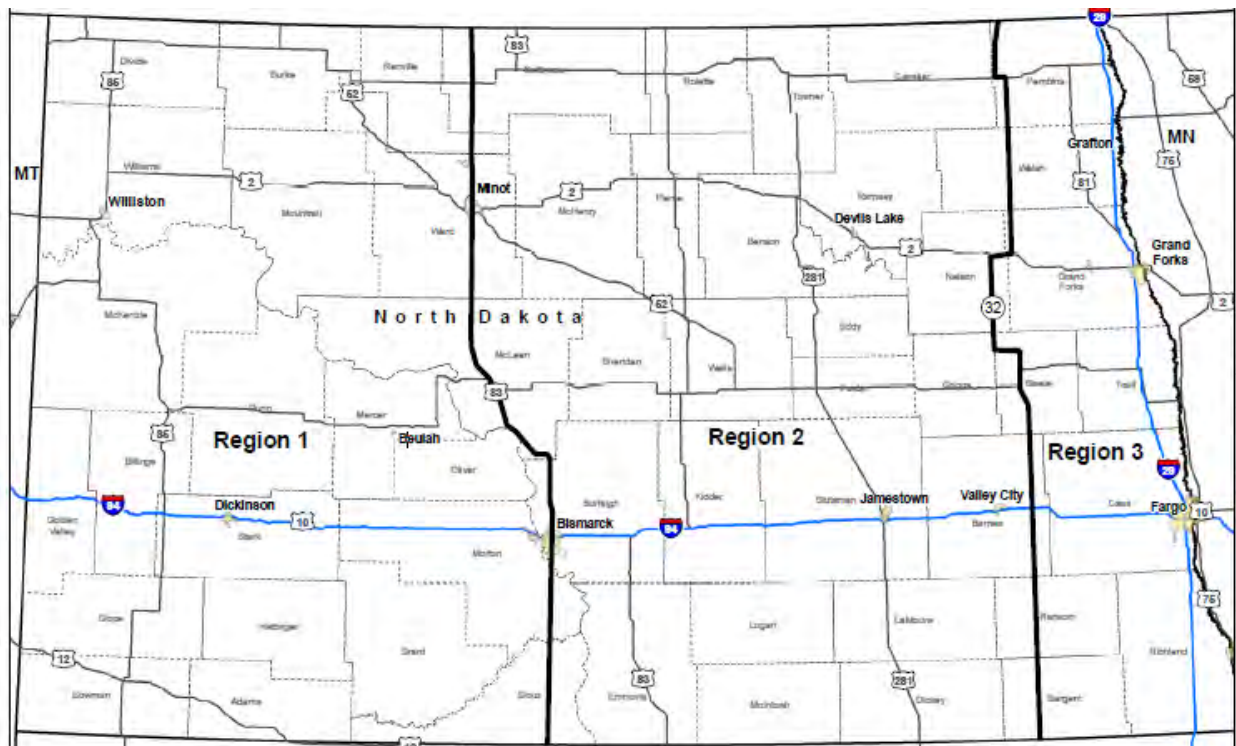
## **Appendix C**

### **Seed Mixes**

## NORTH DAKOTA SEED MIXES

Upon recommendations of the North Dakota Natural Resources Conservation Service, Enbridge divided regional seeding in North Dakota into three regions based on precipitation and general soil types as follows:

- Region 1 is between the Montana state line and Highway 83;
- Region 2 is between Highway 83 and Highway 32; and
- Region 3 is between Highway 32 and the Minnesota state line.





## NORTH DAKOTA STATE-WIDE SEED MIXES

<p><b>Table 1</b>  <b>ND Seed Mix 1 – State-Wide Temporary Cover Crop</b></p> <p><u>Use:</u> Where agency, landowner, or Enbridge requests a cover crop  <u>Seeding rate:</u> 80.0 pounds/acre Pure Live Seed (“PLS”) drilled or 160.0 pounds /acre PLS broadcast  <u>Notes:</u> No species substitutions allowed</p>		
<b>Species: Preferred Varieties (if available)</b>	<b>Pounds/Acre Pure Live Seed (PLS)</b>	<b>Percent of Mix</b>
Oats <i>if spring or summer seeding</i> , <b>OR</b> Winter Wheat <i>if dormant (late fall) seeding</i>	40.0	50.0
Annual Ryegrass or Slender Wheat Grass	40.0	50.0
<b>Total Seed</b>	<b>80.0</b>	<b>100.0</b>

**Table 2**  
**ND Seed Mix 2 – North Dakota State-Wide State School Lands Seed Mix**

Use: School Trust Lands and reestablishing stream bank vegetation where the waterbodies are open cut  
Seeding Rate: 19.0 pounds/acre PLS drilled or 38.0 pounds/acre PLS broadcast without the companion crop. Double the rate of the companion crop when broadcast seeding

Notes: *No species substitutions allowed*

<b>Species: Preferred Variety (if available)</b>	<b>Pounds/Acre PLS</b>	<b>Percent of Mix</b>
Western wheatgrass: Rodan, Walsh, Flintlock, Rosana, Recovery	8.0	42.1
Slender wheatgrass: Adanac, Pryor, Revenue, Primar, First Strike	5.0	26.3
Green needlegrass: Lodorn, AC Mallard, Fowler	4.0	21.1
Side-oats grama: Killdeer, Pierre, Butte	2.0	10.5
<b>Total</b>	<b>19.0</b>	<b>100.0<sup>1</sup></b>
<b>Companion Crop</b>		
Oats (or see Table 4 in Seed Standards and Specifications)	10.0	100.0
<b>Total Seed</b>	<b>29.0</b>	<b>100.0<sup>1</sup></b>
<sup>1</sup> May not equal 100 percent due to rounding		

## NORTH DAKOTA REGION 1 SEED MIXES

**Table 3**  
**ND Seed Mix 3 – Region 1 Native Prairie Seed Mix**

Use: North Dakota Region 1 on private and state lands (non-school trust) where native and degraded prairie are currently managed as range or hay land

Seeding rate: 11.90 pounds/acre PLS drilled or 23.80 pounds/acre PLS broadcast without the companion crop

Double the rate of the companion crop when broadcast seeding

Notes: *Enbridge Environment must approve substitutions in advance*

<b>Species: Preferred Varieties (if available)</b>	<b>Pounds/Acre PLS</b>	<b>Percent of Mix</b>
Western wheatgrass: Rodan, Walsh, Flintlock, Rosana, Recovery	2.50	21.0
Green needlegrass: Lodorn, AC Mallard, Fowler	2.00	16.8
Slender wheatgrass: Adanac, Pryor, Revenue, Primar, First Strike	1.50	12.6
Little bluestem: Badlands, Itasca	1.00	8.4
Prairie sandreed: Goshen, Bowman, Koch	1.00	8.4
Side oats grama: Killdeer, Pierre, Butte	2.00	16.8
Blue grama: Bad River	0.50	4.2
Prairie cordgrass: Red River	0.50	4.2
Purple prairieclover: Common	0.10	0.8
White prairieclover: Antelope	0.10	0.8
Maximilian sunflower: Medicine Creek	0.10	0.8
Blanket flower: Common	0.20	1.7
Black-eyed Susan: Common	0.05	0.4
Stiff sunflower: Common	0.10	0.8
Canada goldenrod or Missouri goldenrod: Common	0.05	0.4
Lewis flax: Appar, Maple Grove	0.10	0.8
Prairie coneflower: Stillwater	0.10	0.8
<b>Total</b>	<b>11.90</b>	<b>100.0<sup>1</sup></b>
<b>Companion Crop</b>		
Oats (or see Table 4 in Seed Standards and Specifications)	10.00	100.0
<b>Total Seed</b>	<b>21.90</b>	<b>100.0<sup>1</sup></b>

<sup>1</sup> May not equal 100 percent due to rounding

**Table 4**  
**ND Seed Mix 4 – Mixed Hay Land (Converted Prairie) and Open-Cut Road Ditch Seed Mix**

Use: North Dakota Region 1 for private land hay land planting and re-establishing road bank/ditch vegetation

Seeding Rate: 11.4 pounds/acre PLS drilled or 22.8 pounds/acre PLS broadcast without the companion crop

Double the rate of the companion crop when broadcast seeding

Notes: *Enbridge Environment must approve substitutions in advance*

<b>Species/Preferred Varieties (if available)</b>	<b>Pounds/ Acre PLS</b>	<b>Percent of Mix</b>
Crested wheatgrass: Nordan, RoadCrest, Summit	3.0	26.3
Pubescent: Manska, Greenleaf; <b>OR</b> Intermediate wheatgrass: Reliant, Clarke, Slate, Chief, Oahe, Haymaker, Beefmaker, Manifest	4.0	35.1
Alfalfa: Vernal, Ladak	4.0	35.1
Purple prairieclover: Bismarck	0.1	0.9
White prairieclover: Antelope	0.1	0.9
Narrow leaf purple coneflower: Bismarck	0.1	0.9
Stiff sunflower: Bismarck	0.1	0.9
<b>Total</b>	<b>11.4</b>	<b>100.0<sup>1</sup></b>
<b>Companion Crop</b>		
Oats (or see Table 4 in Seed Standards and Specifications)	10.0	100.0
<b>Total Seed</b>	<b>21.4</b>	<b>100.0<sup>1</sup></b>

<sup>1</sup> May not equal 100 percent due to rounding

**Table 5**  
**ND Seed Mix 5 – Tame Pasture Reclamation Seed Mix**

Use: North Dakota Region 1 on private tame (improved) pasture planting

Seeding Rate: 14.0 pounds/acre PLS drilled or 28.0 pounds/acre PLS broadcast without the companion crop

Double the rate of the companion crop when broadcast seeding

Notes: *Enbridge Environment must approve substitutions in advance*

<b>Species: Preferred Varieties (if available)</b>	<b>Pounds/Acre PLS</b>	<b>Percent of Mix</b>
Crested wheatgrass: Nordan, RoadCrest, Summit	4.0	28.6
Pubescent: Manska, Greenleaf; <b>OR</b> Intermediate wheatgrass: Reliant, Clarke, Slate, Chief, Oahe, Haymaker, Beefmaker, Manifest	5.0	35.7
Western wheatgrass: Rodan, Walsh, Flintlock, Rosana, Recovery	5.0	35.7
<b>Total</b>	<b>14.0</b>	<b>100.0<sup>1</sup></b>
<b>Companion Crop</b>		
Oats (or see Table 4 in Seed Standards and Specifications)	10.0	100.0
<b>Total Seed</b>	<b>24.0</b>	<b>100.0<sup>1</sup></b>
<sup>1</sup> May not equal 100 percent due to rounding		



**Table 6**  
**ND Seed Mix 6– North Dakota Default Conservation Reserve Program (CRP) Seed Mix**

Use: North Dakota Region 1 on tracts enrolled in CRP  
Seeding Rate: 8.0 pounds/acre PLS drilled or 16.0 pounds/acre PLS broadcast without the companion crop  
 Double the rate of the companion crop when broadcast seeding  
Notes: *No species substitutions allowed*

<b>Species: Preferred Variety (if available)</b>	<b>Pounds/Acre PLS</b>	<b>Percent of Mix</b>
Tall Wheatgrass: Platt, Orbit	4.4	55.0
Intermediate Wheatgrass: Reliant, Clarke, Slate, Chief, Oahe, Haymaker, Beefmaker, Manifest	1.7	21.3
Slender Wheatgrass: Adanac, Pryor, Revenue, Primar, First Strike	0.5	6.3
Alfalfa: Vernal, Ladak or any with Zone 2 winter hardiness	1.1	13.8
Sweetclover: Common	0.3	3.8
<b>Total</b>	<b>8.0</b>	<b>100.0<sup>1</sup></b>
<b>Companion Crop</b>		
Oats (or see Table 4 in Seed Standards and Specifications)	10.0	100.0
<b>Total Seed</b>	<b>18.0</b>	<b>100.0<sup>1</sup></b>

<sup>1</sup> May not equal 100 percent due to rounding

## NORTH DAKOTA REGION 2 SEED MIXES

<b>Table 7</b> <b>ND Seed Mix 7 – Native Prairie Seed Mix</b>		
<u>Use:</u> North Dakota Region 2 on private and state lands (non-school trust) where native and degraded prairie are currently managed as range or hay land <u>Seeding Rate:</u> 11.9 pounds/acre PLS drilled or 23.8 pounds/acre PLS broadcast without the companion crop Double the rate of the companion crop when broadcast seeding <u>Notes:</u> <i>Enbridge Environment must approve substitutions in advance</i>		
<b>Species: Preferred Varieties (if available)</b>	<b>Pounds/Acre PLS</b>	<b>Percent of Mix</b>
Western wheatgrass: Rodan, Walsh, Flintlock, Rosana, Recovery	2.50	21.0
Green needlegrass: Lodorn, AC Mallard, Fowler	1.50	12.6
Slender wheatgrass: Adanac, Pryor, Revenue, Primar, First Strike	1.50	12.6
Little bluestem: Badlands, Itasca	1.00	8.4
Big Bluestem: Sunnyview, Bison, Bonilla, Bounty	1.00	8.4
Prairie sandreed: Goshen, Bowman, Koch	1.00	8.4
Side oats grama: Killdeer, Pierre, Butte	2.00	16.8
Blue grama: Bad River	0.25	2.1
Switch grass: Dacotah, Forestburg, Sunburst, Summer	0.25	2.1
Purple prairieclover: Common	0.10	0.8
White prairieclover: Antelope	0.10	0.8
Maximilian sunflower: Medicine Creek	0.10	0.8
Blanket flower: Common	0.20	1.7
Black-eyed Susan: Common	0.05	0.4
Stiff sunflower: Common	0.10	0.8
Canada goldenrod or Missouri goldenrod: Common	0.05	0.4
Lewis flax: Appar, Maple Grove	0.10	0.8
Prairie coneflower: Stillwater	0.10	0.8
<b>Total</b>	<b>11.90</b>	<b>100.0<sup>1</sup></b>
<b>Companion Crop</b>		
Oats (or see Table 4 in Seed Standards and Specifications)	10.00	100.0
<b>Total Seed</b>	<b>21.90</b>	<b>100.0<sup>1</sup></b>
<sup>1</sup> May not equal 100 percent due to rounding		

**Table 8**  
**ND Seed Mix 8 – Mixed Hay Land (Converted Prairie) and Open-Cut Road Ditch Seed Mix**

Use: North Dakota Region 2 on private land mixed hay land planting and re-establishing road bank/ditch vegetation

Seeding Rate: 13.4 pounds/acre PLS drilled or 26.8 pounds/acre PLS broadcast without the companion crop

Double the rate of the companion crop when broadcast seeding

Notes: *Enbridge Environment must approve substitutions in advance*

<b>Species: Preferred Varieties (if available)</b>	<b>Pounds/Acre PLS</b>	<b>Percent of Mix</b>
Pubescent: Maska, Greenleaf; <b>OR</b> Intermediate wheatgrass: Reliant, Clarke, Slate, Chief, Oahe, Haymaker, Beefmaker, Manifest	3.0	22.4
Meadow Bromegrass: Fleet, Paddock, Regar, Montana, MacBeth, Cache	7.0	52.2
Alfalfa: Vernal, Ladak	3.0	22.4
Purple prairieclover: Bismarck	0.1	0.7
White prairieclover: Antelope	0.1	0.7
Narrow leaf purple coneflower: Bismarck	0.1	0.7
Stiff sunflower: Bismarck	0.1	0.7
<b>Total</b>	<b>13.4</b>	<b>100.0<sup>1</sup></b>
<b>Companion Crop</b>		
Oats (or see Table 4 in Seed Standards and Specifications)	10.0	100.0
<b>Total Seed</b>	<b>23.4</b>	<b>100.0<sup>1</sup></b>

<sup>1</sup> May not equal 100 percent due to rounding

**Table 9**  
**ND Seed Mix 9 – Tame Pasture Reclamation Seed Mix**

Use: North Dakota Region 2 on private tame (improved) pasture planting  
Seeding Rate: 21.0 pounds/acre PLS drilled or 42.0 pounds/acre PLS broadcast without the companion crop  
 Double the rate of the companion crop when broadcast seeding  
Notes: *Enbridge Environment must approve substitutions in advance*

<b>Species: Preferred Varieties (if available)</b>	<b>Pounds/Acre PLS</b>	<b>Percent of Mix</b>
Pubescent: Maska, Greenleaf; <b>OR</b> Intermediate wheatgrass: Reliant, Clarke, Slate, Chief, Oahe, Haymaker, Beefmaker, Manifest	6.0	28.6
Meadow brome grass: Fleet, Paddock, Regar, Montana, MacBeth, Cache	15.0	71.4
<b>Total</b>	<b>21.0</b>	<b>100.0<sup>1</sup></b>
<b>Companion Crop</b>		
Oats (or see Table 4 in Seed Standards and Specifications)	10.0	100.0
<b>Total Seed</b>	<b>31.0</b>	<b>100.0<sup>1</sup></b>
<sup>1</sup> May not equal 100 percent due to rounding		

**Table 10**  
**ND Seed Mix 10– North Dakota Default Conservation Reserve Program (CRP) Seed Mix**

Use: North Dakota Region 2 on tracts enrolled in CRP  
Seeding Rate: 8.0 pounds/acre PLS drilled or 16.0 pounds/acre PLS broadcast without the companion crop  
 Double the rate of the companion crop when broadcast seeding  
Notes: *No species substitutions allowed*

<b>Species: Preferred Variety (if available)</b>	<b>Pounds/Acre PLS</b>	<b>Percent of Mix</b>
Tall Wheatgrass: Platt, Orbit	4.4	55.0
Intermediate Wheatgrass: Reliant, Clarke, Slate, Chief, Oahe, Haymaker, Beefmaker, Manifest	1.7	21.3
Slender Wheatgrass: Adanac, Pryor, Revenue, Primar, First Strike	0.5	6.3
Alfalfa: Vernal, Ladak or any with Zone 2 winter hardiness	1.1	13.8
Sweetclover: Common	0.3	3.8
<b>Total</b>	<b>8.0</b>	<b>100.0<sup>1</sup></b>
<b>Companion Crop</b>		
Oats (or see Table 4 in Seed Standards and Specifications)	10.0	100.0
<b>Total Seed</b>	<b>18.0</b>	<b>100.0<sup>1</sup></b>

<sup>1</sup> May not equal 100 percent due to rounding



## NORTH DAKOTA REGION 3 SEED MIXES

**Table 11**  
**ND Seed Mix 11 – Native Prairie Seed Mix**

Use: North Dakota Region 3 on private and state lands (non-school trust) where native or degraded prairie currently managed as range or hay land

Seeding Rate: 12.15 pounds/acre PLS drilled or 24.30 pounds/acre PLS broadcast without the companion crop

Double the rate of the companion crop when broadcast seeding

Notes: *Enbridge Environment must approve substitutions in advance*

<b>Species: Preferred Varieties</b>	<b>Pounds/Acre PLS</b>	<b>Percent of Mix</b>
Western wheatgrass: Rodan, Walsh, Flintlock, Rosana, Recovery	2.00	16.5
Green needlegrass: Lodorn, AC Mallard, Fowler	2.00	16.5
Slender wheatgrass: Adanac, Pryor, Revenue, Primar, First Strike	1.00	8.2
Canada wildrye: Mandan	1.00	8.2
Big Bluestem: Sunnyview, Bison, Bonilla, Bounty	1.50	12.3
Side oats grama: Killdeer, Pierre, Butte	2.00	16.5
Blue grama: Bad River	0.25	2.1
Switch grass: Dacotah, Forestburg, Sunburst, Summer	0.50	4.1
Indiangrass: Tomahawk	1.00	8.2
Purple prairieclover: Common	0.10	0.8
White prairieclover: Antelope	0.10	0.8
Maximilian sunflower: Medicine Creek	0.10	0.8
Blanket flower: Common	0.20	1.6
Black-eyed Susan: Common	0.05	0.4
Stiff sunflower: Common	0.10	0.8
Canada goldenrod or Missouri goldenrod: Common	0.05	0.4
Lewis flax: Appar, Maple Grove	0.10	0.8
Prairie coneflower: Stillwater	0.10	0.8
<b>Total</b>	<b>12.15</b>	<b>100.0<sup>1</sup></b>
<b>Companion Crop</b>		
Oats (or see Table 4 in Seed Standards and Specifications)	10.00	100.0
<b>Total Seed</b>	<b>22.15</b>	<b>100.0<sup>1</sup></b>
<sup>1</sup> May not equal 100 percent due to rounding		

<b>Table 12</b> <b>ND Seed Mix 12 –Mixed Hay Land (Converted Prairie) and Open-Cut Road Ditch Seed Mix</b>		
<u>Use:</u> North Dakota Region 3 on private land mixed hay land planting and re-establishing road bank/ditch vegetation <u>Seeding Rate:</u> 15.3 pounds/acre PLS drilled or 30.6 pounds/acre PLS broadcast without the companion crop Double the rate of the companion crop when broadcast seeding <u>Notes:</u> <i>Enbridge Environment must approve substitutions in advance</i>		
<b>Species: Preferred Varieties (if available)</b>	<b>Pounds/Acre PLS</b>	<b>Percent of Mix</b>
Meadow Bromegrass: Fleet, Paddock, Regar, Montana, MacBeth, Cache	10.0	65.4
Alfalfa: Vernal, Ladak	5.0	32.7
Purple prairieclover: Bismarck	0.1	0.7
White prairieclover: Antelope	0.1	0.7
Narrow leaf purple coneflower: Bismarck	0.1	0.7
<b>Total</b>	<b>15.3</b>	<b>100.0<sup>1</sup></b>
<b>Companion Crop</b>		
Oats (or see Table 4 in Seed Standards and Specifications)	10.0	100.0
<b>Total Seed</b>	<b>25.3</b>	<b>100.0<sup>1</sup></b>
<sup>1</sup> May not equal 100 percent due to rounding		

<b>Table 13</b> <b>ND Seed Mix 13 – Tame Pasture Reclamation Seed Mix</b>		
Use: North Dakota Region 3 on private tame (improved) pasture planting <u>Seeding Rate:</u> 21.0 pounds/acre PLS drilled or 42.0 pounds/acre PLS broadcast without the companion crop Double the rate of the companion crop when broadcast seeding <u>Notes:</u> <i>Enbridge Environment must approve substitutions in advance</i>		
<b>Species: Preferred Varieties (if available)</b>	<b>Pounds/Acre PLS</b>	<b>Percent of Mix</b>
Pubescent: Manska, Greenleaf; <b>OR</b> Intermediate wheatgrass: Reliant, Clarke, Slate, Chief, Oahe, Haymaker, Beefmaker, Manifest	6.0	28.6
Meadow brome grass: Fleet, Paddock, Regar, Montana, MacBeth, Cache	15.0	71.4
<b>Total</b>	<b>21.0</b>	<b>100.0<sup>1</sup></b>
<b>Companion Crop</b>		
Oats (or see Table 4 in Seed Standards and Specifications)	10.0	100.0
<b>Total Seed</b>	<b>31.0</b>	<b>100.0<sup>1</sup></b>
<sup>1</sup> May not equal 100 percent due to rounding		

**Table 14**  
**ND Seed Mix 14 – North Dakota Default CRP Seed Mix**

Use: North Dakota Region 3 on tracts enrolled in CRP  
Seeding Rate: 10.0 pounds/acre PLS drilled or 20.0 pounds/acre PLS broadcast without the companion crop  
 Double the rate of the companion crop when broadcast seeding  
Notes: *No species substitutions allowed*

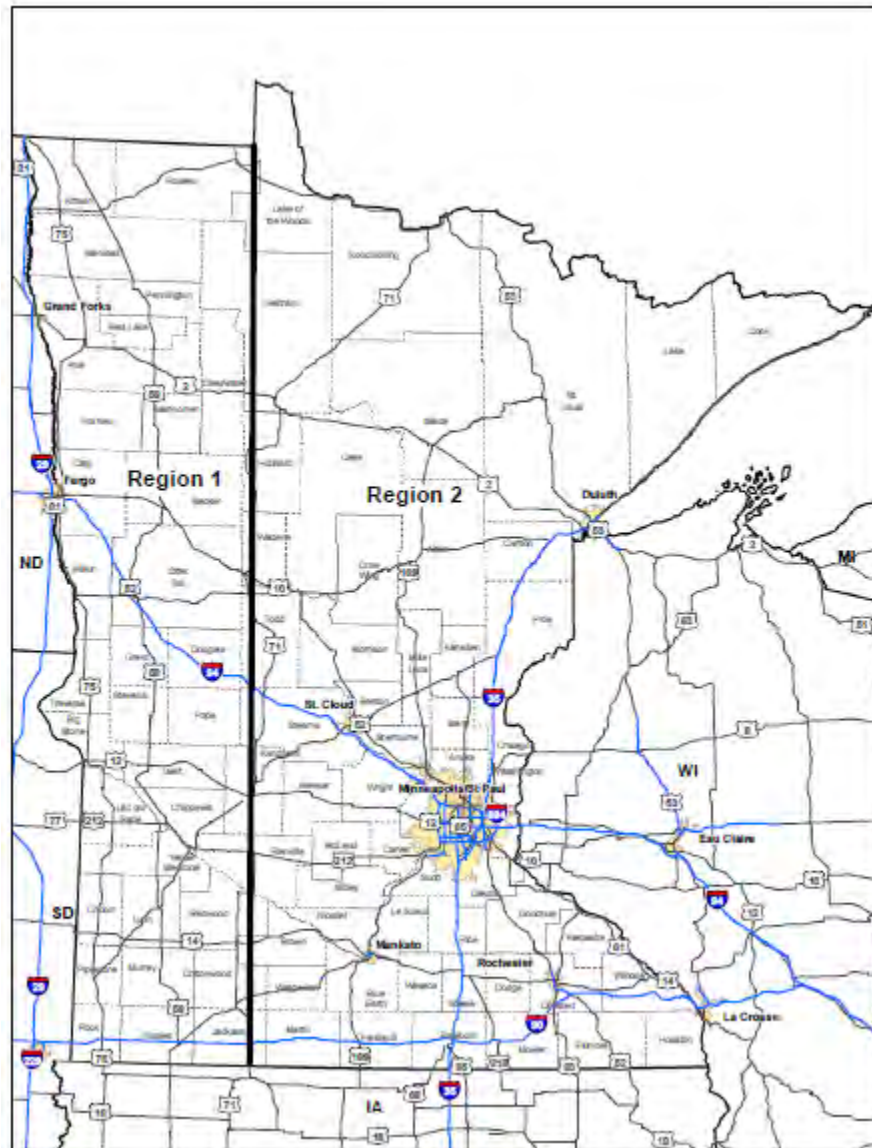
<b>Species: Preferred Variety (if available)</b>	<b>Pounds/Acre PLS</b>	<b>Percent of Mix</b>
Western Wheatgrass: Rodan, Walsh, Flintlock, Rosana, Recovery	2.0	20.0
Intermediate Wheatgrass: Reliant, Clarke, Slate, Chief, Oahe, Haymaker, Beefmaker, Manifest	5.0	50.0
Alfalfa: Any with Zone 2 winter hardiness	2.0	20.0
Sweetclover: Common	1.0	10.0
<b>Total</b>	<b>10.0</b>	<b>100.0<sup>1</sup></b>
<b>Companion Crop</b>		
Oats (or see Table 4 in Seed Standards and Specifications)	10.0	100.0
<b>Total Seed</b>	<b>20.0</b>	<b>100.0<sup>1</sup></b>

<sup>1</sup> May not equal 100 percent due to rounding

## MINNESOTA SEED MIXES

Based on average annual precipitation and temperatures and soil types, Enbridge divided seeding in Minnesota into two regions. These regions have different seed mixes for specific areas.

- Region 1 is between the North Dakota state line and approximately Highway 71; and
- Region 2 is between Highway 71 and the Wisconsin state line.





## MINNESOTA STATEWIDE SEED MIXES

<b>Table 15</b> <b>MN Seed Mix 1 – Minnesota Default CRP Seed Mix</b>		
<u>Use:</u> Minnesota state-wide on tracts enrolled in the CRP <u>Seeding Rate:</u> 12.0 pounds/acre PLS drilled or 24.0 PLS pounds/acre broadcast without the companion crop Double the rate of the companion crop when broadcast seeding <u>Notes:</u> No species substitutions allowed		
<b>Species: Preferred Variety (if available)</b>	<b>Pounds/Acre PLS</b>	<b>Percent of Mix</b>
Big Bluestem: Bison, Bonilla	4.0	33.3
Western Wheatgrass: Rodan	0.5	4.2
Slender Wheatgrass; Revenue	0.9	7.5
Sideoats Grama: Bad River	1.6	13.3
Switchgrass:Dacotah, Forestburg, Sunburst, Nebraska	0.2	1.7
Indiangrass: Tomahawk, Holte	0.5	4.2
Rough Dropseed: Common	0.3	2.5
Yarrow: Common	0.1	0.8
Purple Prairie Clover: Common	2.0	16.7
Ox-eye Sunflower: Common	1.0	8.3
Prairie Cinquefoil: Common	0.1	0.8
Black-eyed Susan Common	0.8	6.7
<b>Total</b>	<b>12.0</b>	<b>100.0<sup>1</sup></b>
<b>Companion Crop</b>		
Oats (or see Table 4 in Seed Standards and Specifications)	10.0	100.0
<b>Total Seed</b>	<b>22.0</b>	<b>100.0<sup>1</sup></b>
<sup>1</sup> May not equal 100 percent due to rounding		

**Table 16**  
**MN Seed Mix 2 – Minnesota Protected and Other Waters Seed Mix**

Use: Minnesota state-wide on the outer fringe of Public Water Inventory ("PWI") waterbodies and wetlands  
and all other waterbody banks

Seeding Rate: 8.255 pounds/acre PLS drilled or 16.510 pounds/acre PLS broadcast without the companion crop  
Double the rate of the companion crop when broadcast seeding

Notes: Enbridge Environment must approve substitutions in advance

Species: Preferred Varieties (if available)	Pounds/Acre PLS	Percent of Mix
American slough grass: Common	1.500	18.2
Blue-joint grass: Common	0.100	1.2
Reed manna grass: Common	0.200	2.4
Fowl manna grass: Common	0.100	1.2
Fowl bluegrass: Common	1.800	21.8
Rice cut-grass: Common	0.250	3.0
Annual ryegrass: Common	0.900	10.9
Tussock sedge: Common	0.100	1.2
Fox sedge: Common	0.300	3.6
Green bulrush: Common	0.100	1.2
Wool grass: Common	0.005	0.1
River bulrush: Common	0.250	3.0
Soft-stem bulrush: Common	0.100	1.2
March milkweed: Common	0.100	1.2
Flat-topped aster: Common	0.300	3.6
Joe-pye weed: Common	0.300	3.6
Boneset: Common	0.250	3.0
Sneezeweed: Common	0.250	3.0
Spotted touch-me-not: Common	0.100	1.2
Great blue lobelia: Common	0.100	1.2
Monkey flower: Common	0.100	1.2
Mountain mint: Common	0.100	1.2
Giant goldenrod: Common	0.250	3.0
Blue vervain: Common	0.350	4.2
Ironweed: Common	0.350	4.2
<b>Total</b>	<b>8.255</b>	<b>100.0<sup>1</sup></b>
<b>Companion Crop</b>		
Slender wheatgrass: Adanac, Pryor, Revenue, Primar, First Strike	3.000	100.0
<b>Total Seed</b>	<b>11.255</b>	<b>100.0<sup>1</sup></b>
<sup>1</sup> May not equal 100 percent due to rounding		

<b>Table 17</b> <b>MN Seed Mix 3 – Minnesota Unsaturated Wetlands Seed Mix</b>  Use: Minnesota state-wide in unsaturated wetland areas Seeding Rate: 17.0 pounds/acre PLS drilled or 34.0 pounds/acre PLS broadcast Notes: No species substitutions allowed		
<b>Species: Preferred Variety (if available)</b>	<b>Pounds/Acre PLS</b>	<b>Percent of Mix</b>
American slough grass: Common	6.0	35.3
Annual ryegrass: Common	8.0	47.1
Flow bluegrass: Common	3.0	17.6
<b>Total Seed</b>	<b>17.0</b>	<b>100.0<sup>1</sup></b>
<sup>1</sup> May not equal 100 percent due to rounding		

## MINNESOTA REGION 1 SEED MIXES

<b>Table 18</b> <b>MN Seed Mix 4 – Native Prairie Seed Mix</b>		
<u>Use:</u> Minnesota Region 1 on private and public land where native or degraded prairie are currently managed as range or hay land <u>Seeding Rate:</u> 13.0 pounds/acre PLS drilled or 26.0 pounds/acre PLS broadcast without the companion crop Double the rate of the companion crop when broadcast seeding <u>Notes:</u> <i>Enbridge Environment must approve substitutions in advance</i>		
<b>Species: Preferred Varieties (if available)</b>	<b>Pounds/Acre PLS</b>	<b>Percent of Mix</b>
Big bluestem: Sunnyview, Bison, Bonilla, Bounty	1.25	9.6
Side-oats grama: Killdeer, Pierre, Butte	1.00	7.7
Fringed brome grass: Common	1.40	10.8
Canadian wild rye: Mandan	2.00	15.4
Slender wheatgrass: Adanac, Pryor, Revenue, Primar, First Strike	2.50	19.2
Virginia wild rye: Common	2.00	15.4
Switchgrass: Dacotah, Forestburg, Sunburst, Summer	0.75	5.8
Fowl bluegrass: Common	0.60	4.6
Indian grass: Tomahawk	1.00	7.7
Black-eyed Susan: Common	0.10	0.8
Wild bergamont: Common	0.05	0.4
Hoary vervain: Common	0.05	0.4
Partridge pea: Common	0.30	2.3
<b>Total</b>	<b>13.00</b>	<b>100.0<sup>1</sup></b>
<b>Companion Crop</b>		
Oats (or see Table 4 in Seed Standards and Specifications)	10.00	100.0
<b>Total Seed</b>	<b>23.00</b>	<b>100.0<sup>1</sup></b>
<sup>1</sup> May not equal 100 percent due to rounding		

<b>Table 19</b> <b>MN Seed Mix 5 – Mixed Hay Land (Converted Prairie) and Open-Cut Road Ditches Seed Mix</b>		
<p><u>Use:</u> Minnesota Region 1 on private mixed hay land and for re-establishing road bank/ditch vegetation</p> <p><u>Seeding Rate:</u> 15.0 pounds/acre PLS drilled or 30.0 pounds/acre PLS broadcast without the companion crop</p> <p>Double the rate of the companion crop when broadcast seeding</p> <p><u>Notes:</u> <i>Enbridge Environment must approve substitutions in advance</i></p>		
<b>Species: Preferred Varieties (if available)</b>	<b>Pounds/Acre PLS</b>	<b>Percent of Mix</b>
Meadow brome grass: Fleet, Paddock, Regar, Montana, MacBeth, Cache	3.75	25.0
Intermediate wheatgrass: Reliant, Clarke, Slate, Chief, Oahe, Haymaker, Beefmaker, Manifest	3.75	25.0
Crested wheatgrass: Nordan, RoadCrest, Summit	3.75	25.0
Tetraploid ryegrass: Common	1.50	10.0
Alfalfa: Any with Zone 2 hardiness	2.25	15.0
<b>Total</b>	<b>15.00</b>	<b>100.0<sup>1</sup></b>
<b>Companion Crop</b>		
Oats (or see Table 4 in Seed Standards and Specifications)	10.00	100.0
<b>Total Seed</b>	<b>25.00</b>	<b>100.0<sup>1</sup></b>
<sup>1</sup> May not equal 100 percent due to rounding		



**Table 20**  
**MN Seed Mix 6 – Tame Pasture Reclamation Seed Mix**

Use: Minnesota Region 1 on private land tame (improved) pasture planting  
Seeding Rate: 20.0 pounds/acre PLS drilled or 40.0 pounds/acre PLS broadcast without the companion crop  
 Double the rate of the companion crop when broadcast seeding  
Notes: *Enbridge Environment must approve substitutions in advance*

<b>Species: Preferred Varieties (if available)</b>	<b>Pounds/Acre PLS</b>	<b>Percent of Mix</b>
Alfalfa: Any with Zone 2 hardiness	6.0	30.0
Red clover: Arlington, Astred, Cinnamon , Concord or Marathon	4.0	20.0
Timothy: Climax or Claire	2.0	10.0
Orchard grass: Orion, Hawkeye, Duke, Condor, Albert	3.0	15.0
Smooth brome grass: Alpha, Badger, Bounty , York	5.0	25.0
<b>Total</b>	<b>20.0</b>	<b>100.0<sup>1</sup></b>
<b>Companion Crop</b>		
Oats (or see Table 4 in Seed Standards and Specifications)	10.0	100.0
<b>Total Seed</b>	<b>30.0</b>	<b>100.0<sup>1</sup></b>
<sup>1</sup> May not equal 100 percent due to rounding		

## MINNESOTA REGION 2 SEED MIXES

<b>Table 21</b> <b>MN Seed Mix 7 – Native Prairie Seed Mix</b>		
<u>Use:</u> Minnesota Region 2 on private and public land where native or degraded prairie are currently managed as range or hay land <u>Seeding Rate:</u> 8.20 pounds/acre PLS drilled or 16.40 pounds/acre PLS broadcast without the companion crop Double the rate of the companion crop when broadcast seeding <u>Notes:</u> Enbridge Environment must approve substitutions in advance		
Species: Preferred Varieties (if available)	Pounds/Acre PLS	Percent of Mix
Fringed brome grass: Common	2.00	24.4
Bluejoint grass: Common	0.15	1.8
Poverty grass: Common	0.50	6.1
Canadian (Nodding) wild rye: Manda	1.25	15.2
Slender wheatgrass: Adanac, Pryor, Revenue, Primar, First Strike	2.00	24.4
Fowl Bluegrass: Common	0.85	10.4
False melic grass: Common	0.25	3.0
Stiff golden rod: Common	0.15	1.8
Smooth wild rose: Common	0.15	1.8
Black-eyed susan: Common	0.25	3.0
Smooth aster: Common	0.15	1.8
American vetch: Common	0.50	6.1
<b>Total</b>	<b>8.20</b>	<b>100.0<sup>1</sup></b>
<b>Companion Crop</b>		
Oats (or see Table 4 in Seed Standards and Specifications)	10.00	100.0
<b>Total Seed</b>	<b>18.20</b>	<b>100.0<sup>1</sup></b>
<sup>1</sup> May not equal 100 percent due to rounding		

**Table 22**  
**MN Seed Mix 8 – Mixed Hay Land and Open-Cut Road Ditches Seed Mix**

Use: Minnesota Region 2 on private mixed hay land and for re-establishing road bank/ditch vegetation  
Seeding Rate: 45.00 pounds/acre PLS drilled or 90.00 pounds/acre PLS broadcast without the companion crop

Double the rate of the companion crop when broadcast seeding

Notes: *Enbridge Environment must approve substitutions in advance*

<b>Species: Preferred Varieties (if available)</b>	<b>Pounds/Acre PLS</b>	<b>Percent of Mix</b>
Fowl Bluegrass: Common	6.00	13.3
Smooth Bromegrass: Alpha, Badger, Bounty , York	7.75	17.2
Slender Wheatgrass: Adanac, Pryor, Revenue, Primar, First Strike	2.00	4.4
Perennial Rye: Citadel, Mongita, Madera, Pagent, Achiever, SR-4000, Vivid, Linn Perennial Ryegrass, Windstar, and Festulolium hybrid	13.50	30.0
Switchgrass: Kanlow, Blackwell, Shelter, Carthage	1.50	3.3
Timothy: Climax or Claire	1.75	3.9
Alfalfa: Any with Zone 2 hardiness	12.50	27.8
<b>Total</b>	<b>45.00</b>	<b>100.0<sup>1</sup></b>
<b>Companion Crop</b>		
Oats (or see Table 4 in Seed Standards and Specifications)	10.00	100.0
<b>Total Seed</b>	<b>55.00</b>	<b>100.0<sup>1</sup></b>
<sup>1</sup> May not equal 100 percent due to rounding		

**Table 23**  
**MN Seed Mix 9 – Tame Pasture Reclamation Seed Mix**

Use: Minnesota Region 2 on private land tame (improved) pasture planting  
Seeding Rate: 20.0 pounds/acre PLS drilled or 40.0 pounds/acre PLS broadcast without the companion crop  
 Double the rate of the companion crop when broadcast seeding  
Notes: *Enbridge Environment must approve substitutions in advance*

<b>Species: Preferred Varieties (if available)</b>	<b>Pounds/Acre PLS</b>	<b>Percent of Mix</b>
Alfalfa: Any with Zone 2 hardiness	6.0	30.0
Red clover: Arlington, Astred, Cinnamon , Concord or Marathon	4.0	20.0
Timothy: Climax or Claire	2.0	10.0
Orchard grass: Orion, Hawkeye, Duke, Condor, Albert	3.0	15.0
Smooth brome grass: Alpha, Badger, Bounty , York	5.0	25.0
<b>Total</b>	<b>20.0</b>	<b>100.0<sup>1</sup></b>
<b>Companion Crop</b>		
Oats (or see Table 4 in Seed Standards and Specifications)	10.0	100.0
<b>Total Seed</b>	<b>30.0</b>	<b>100.0<sup>1</sup></b>
<sup>1</sup> May not equal 100 percent due to rounding		

## WISCONSIN SEED MIXES

Based on precipitation and general soil types the following seed mixes will be used in Wisconsin:

<b>Table 24</b> <b>WI Seed Mix 1 – Standard Upland Seed Mix</b>		
<u>Use:</u> Wisconsin state-wide in upland areas <u>Seeding Rate:</u> 15.0 pounds/acre PLS drilled or 30.0 pounds/acre PLS broadcast without the companion crop Double the rate of the companion crop when broadcast seeding <u>Notes:</u> <i>Enbridge Environment must approve substitutions in advance</i>		
<b>Species: Preferred Varieties (if available)</b>	<b>Pounds/Acre PLS</b>	<b>Percent of Mix</b>
Perennial Ryegrass	2	17.0
Canada Wild-rye	4	33.0
Switchgrass: unimproved native variety	4	33.0
Timothy	2	17.0
Subtotal	12	100.0 <sup>1</sup>
<b>Associated Companion Crop Mix</b>		
Oats for summer seeding; or Winter Wheat for seeding in late fall (dormant) or spring	16	80.0
Annual Ryegrass or Slender Wheat Grass	4	20.0
Companion/Cover Crop Subtotal	20	100.0
<b>GRAND TOTAL (pounds)</b>	<b>32</b>	<b>100.0<sup>1</sup></b>
<sup>1</sup> May not equal 100 percent due to rounding		

**Table 25**  
**WI Seed Mix 2 – Native Sedge/Wet Meadow Mixture (W2)**

Use: Wisconsin state-wide in unsaturated Wet Meadow wetland areas

Seeding Rate: See below summary.

Notes: Enbridge Environment must approve substitutions in advance

Common Name	Botanical Name	Indicator Status	Seeds/oz.	Seeds/ft <sup>2</sup>	% of Mix
Brome, fringed	<i>Bromus ciliata</i>	FACW	10,000	1.5	8.1
Blue-joint grass	<i>Calamagrostis canadensis</i>	OBL	280,000	8.2	1.6
Wild-rye, Virginia	<i>Elymus virginicus</i>	FACW-	4,200	3.2	42.3
Manna grass, reed	<i>Glyceria grandis</i>	OBL	80,000	4.7	3.2
Manna grass, fowl	<i>Glyceria striata</i>	OBL	160,000	4.7	1.6
Bluegrass, fowl	<i>Poa palustris</i>	FACW+	118,000	16.7	7.1
Sedge, bottlebrush	<i>Carex comosa</i>	OBL	30,000	2.2	4.3
Sedge, pointed- broom	<i>Carex scoparia</i>	FACW	84,000	1.5	1.0
Sedge, tussock	<i>Carex stricta</i>	OBL	53,000	0.8	0.8
Sedge, Common fox	<i>Carex stipata</i>	OBL	34,000	2.0	3.2
Sedge, fox	<i>Carex vulpinoidea</i>	OBL	100,000	5.9	3.2
Rush, slender	<i>Juncus tenuis</i>	FAC	1,000,000	11.0	0.2
Torry's Rush	<i>Juncus toryi</i>	OBL	1,600,000	5.9	0.6
Bulrush, green	<i>Scirpus atrovirens</i>	OBL	460,000	16.9	2.0
Wool grass	<i>Scirpus cyperinus</i>	OBL	1,700,000	6.2	0.2
Milkweed, marsh	<i>Asclepias incarnata</i>	OBL	4,800	0.4	5.0
Aster, swamp	<i>Aster puniceus</i>	OBL	80,000	5.9	4.0
Aster, flat-topped	<i>Aster umbellatus</i>	FACW	67,000	1.5	1.2
Joe-pye weed	<i>Eupatorium maculatum</i>	OBL	95,000	0.7	0.4
Boneset	<i>Eupatorium perfoliatum</i>	FACW+	160,000	1.2	0.4
Goldenrod, grass- leaved	<i>Euthamia graminifolia</i>	FACW-	350,000	1.0	0.2
Sneezeweed	<i>Helenium autumnale</i>	FACW+	130,000	0.8	0.3
Sunflower, serrated	<i>Helianthus grosseserratus</i>	FACW-	15,000	0.2	0.6
Lobelia, great-blue	<i>Lobelia siphilitica</i>	FACW+	500,000	2.9	0.3
Monkey flower	<i>Mimulus ringens</i>	OBL	2,300,000	6.8	0.2
Mint, mountain	<i>Pycnanthemum virginianum</i>	FACW+	220,000	1.3	0.3
Meadow-rue, purple	<i>Thalictrum dasycarpum</i>	FACW	11,000	0.1	0.4
Vervain, blue	<i>Verbena hastata</i>	FACW+	93,000	2.2	1.3
Alexanders, Golden	<i>Zizia aurea</i>	FACW	11,000	1.0	5.0

**Recommended Rate: 5.0 (PLS lbs/acre)**

**SUMMARY**

Mix Seeds Per Square Foot	Mix Seeds Per Square Yard	Mix Seeds Per Acre
121	1,093	5,290,320
<b>% by wt. Grasses</b>	<b>% by wt. Graminoids</b>	<b>% by wt. Forbs</b>
64.0	15.0	21.0
<b>% by Seed Count Grasses</b>	<b>% by Seed Count Graminoids</b>	<b>% by Seed Count Forbs</b>
32.1	43.2	24.7



**Table 26**  
**WI Seed Mix 3 –Native Wet Prairie Mixture (W3)**

Use: Wisconsin state-wide in unsaturated Wet Prairie wetland areas

Seeding Rate: See below summary.

Notes: Enbridge Environment must approve substitutions in advance

Common Name	Botanical Name	Indicator Status	Seeds/oz.	Seeds/ft <sup>2</sup>	% of Mix
Bluestem, big	<i>Andropogon gerardi</i>	FAC-	10,000	3.7	15.3
Brome, fringed	<i>Bromus ciliata</i>	FACW	10,000	1.8	7.7
Blue-joint grass	<i>Calamagrostis canadensis</i>	OBL	280,000	6.2	0.9
Wild-rye, Virginia	<i>Elymus virginicus</i>	FACW-	4,200	2.0	19.9
Manna grass, reed	<i>Glyceria grandis</i>	OBL	80,000	2.9	1.5
Manna grass, fowl	<i>Glyceria striata</i>	OBL	160,000	3.5	0.9
Switchgrass	<i>Panicum virgatum</i>	FAC+	14,000	3.1	9.2
Bluegrass, fowl	<i>Poa palustris</i>	FACW+	118,000	9.6	3.0
Indian grass	<i>Sorghastrum nutans</i>	FACU+	12,000	2.0	6.7
Cord grass, prairie	<i>Spartina pecinata</i>	FACW+	6,600	1.1	6.9
Sedge, tussock	<i>Carex stricta</i>	OBL	53,000	0.7	0.5
Sedge, fox	<i>Carex vulpinoidea</i>	OBL	100,000	3.7	1.5
Bulrush, green	<i>Scirpus atrovirens</i>	OBL	460,000	7.7	0.7
Wool grass	<i>Scirpus cyperinus</i>	OBL	1,700,000	18.7	0.5
Anemone, Canada	<i>Anemone canadensis</i>	FACW	8,000	0.09	0.5
Milkweed, marsh	<i>Asclepias incarnata</i>	OBL	4,800	0.1	1.4
Aster, swamp	<i>Aster puniceus</i>	OBL	80,000	2.4	1.2
Aster, flat-topped	<i>Aster umbellatus</i>	FACW	67,000	1.5	0.9
Tic-trefoil, showy	<i>Desmodium canadense</i>	FAC-	5,500	0.8	6.1
Joe-pye weed	<i>Eupatorium maculatum</i>	OBL	95,000	1.7	0.8
Boneset	<i>Eupatorium perfoliatum</i>	FACW+	160,000	2.4	0.6
Goldenrod, grass- leaved	<i>Euthamia graminifolia</i>	FACW-	350,000	2.0	0.3
Sneezeweed	<i>Helenium autumnale</i>	FACW+	130,000	2.39	0.8
Sunflower, serrated	<i>Helianthus grosseserratus</i>	FACW-	15,000	0.3	0.7
Blazingstar, tall	<i>Liatris pycnostachya</i>	FAC-	11,000	0.1	0.5
Lobelia, great-blue	<i>Lobelia siphilitica</i>	FACW+	500,000	1.4	0.1
Monkey flower	<i>Mimulus ringens</i>	OBL	2,300,000	6.4	0.1
Mint, mountain	<i>Pycnanthemum virginianum</i>	FACW+	220,000	1.2	0.3
Vervain, blue	<i>Verbena hastate</i>	FACW+	93,000	1.0	0.5
Ironweed	<i>Veronia fasciculata</i>	FACW	24,000	0.1	0.3
Culver's root	<i>Veronicastrum virginicum</i>	FAC	800,000	8.8	0.5
Alexander's, golden	<i>Zizia aurea</i>	FAC+	11,000	2.4	9.2

**Recommended Rate: 5.0 (PLS lbs/acre)**

**SUMMARY**

Mix Seeds Per Square Foot	Mix Seeds Per Square Yard	Mix Seeds Per Acre
102	884	4,436,283
% by wt. Grasses	% by wt. Graminoids	% by wt. Forbs
72.0	3.0	24.0
% by Seed Count Grasses	% by Seed Count Graminoids	% by Seed Count Forbs
35.0	30.0	35.0

**Appendix D**  
**Enbridge Environment Hydrotest Discharge**  
**Authorization and Documentation**

## Enbridge Environment Hydrotest Discharge Authorization & Documentation - *Instructions*

The purpose of this form is to document and insure that appropriate planning occurs prior to hydrostatic test discharge activities as well as the proper recording of necessary information during the actual discharge event. If the discharge permit specifies the need for a Certified Operator, he/she is responsible for the final section of the form. Otherwise, an Environmental Inspector will be responsible for completion of this form.

**Part 1: Basic Discharge Information:** All information must be completed. Coordination with Enbridge Engineering is necessary to obtain the exact test section length and volume of water to be discharged. The estimated duration of the discharge must be calculated using the maximum permitted rate (or the anticipated rate, if lower than the permitted rate) and the total volume of water to be discharged. This is critical information and will ensure that any required sampling is conducted at the appropriate frequency specified in the permit.

**Part 2: Pre-Discharge Planning Checklist:** A pre-discharge planning meeting must be held with the Certified Operator (if required), Contractor, Craft Inspection, Environmental Inspection, and Construction Management staff to review items included in the checklist and any other pertinent information deemed necessary. A full copy of the permit and discharge plan must be provided to all participants. Upon completion of this meeting, all participants must sign the form to indicate that they understand all steps of the discharge process. ***Note: In order to proceed with discharge activities, the Enbridge Construction Manager and Environment Staff assigned to the project, or their designees, must review the information and provide their authorization by signing and dating the form.***

**Part 3: Discharge Monitoring:** A copy of the permit, discharge plan, and parts one and two of the form must be on-site at all times during the discharge event. In addition to the items specified on the form, the following photographs are required:

- Receiving water before, during, and after the discharge (minimum 3 photos/day)
- Discharge structure/device before and during the discharge (minimum 3 photos/day)

As noted, upon completion of the discharge event, the Certified Operator or Environmental Inspector, Craft Inspector, Contractor Foreman, and Enbridge Construction Manager must sign and date the form. **The completed form, along with the supplemental photographs, and a copy of the chain of custody for any samples submitted for laboratory analysis must be submitted to the Enbridge Environment Project Manager/Lead within 12 hours of ending the discharge. Any permit violations will be reported to the applicable agencies by the Enbridge Environment Project Manager/Lead within the timeframes specified in the discharge permit.**



Enbridge Construction Manager Signature and Date: \_\_\_\_\_

[illegible]


Flow meter manufacturer and model:

Flow meter date of last calibration :

pH/Dissolved Oxygen instrument manufacturer and model:

pH/Dissolved Oxygen instrument date of last calibration:

Date and Time discharge start: \_\_\_\_\_ Date and Time discharge complete: \_\_\_\_\_

Equipment, Discharge, and Receiving Water Inspection Notes (minimum 3 enteries per day):


Outfall Observations & Photo Documentation Notes (note presence or absence of any unusual characteristics such as unnatural turbidity, color, oil film, floating solids, foams, settleable solids, suspended solids, or deposits - minimum 3 enteries per day) :


Certified Operator or Environmental Inspector Signature: \_\_\_\_\_

Enbridge Craft Inspector Signature: \_\_\_\_\_

Contractor Foreman Signature: \_\_\_\_\_

Enbridge Construction Manager Signature: \_\_\_\_\_



**Appendix E**  
**Emergency Response Contractors/Disposal and**  
**Treatment Facilities**

## Emergency Response Contractors

The Contractor will dispose of all wastes according to applicable federal, state, and local requirements. A listing of potential Emergency Spill Response Contractors and is provided below, and waste disposal facilities by state are provided in the pages that follow. This list was developed from state-wide databases. This list represents firms operating at the time the database was produced. The Contractor is responsible for verifying if a contractor or facility is currently operating under appropriate permits or licenses. The Contractor is responsible for ensuring wastes are disposed of properly.

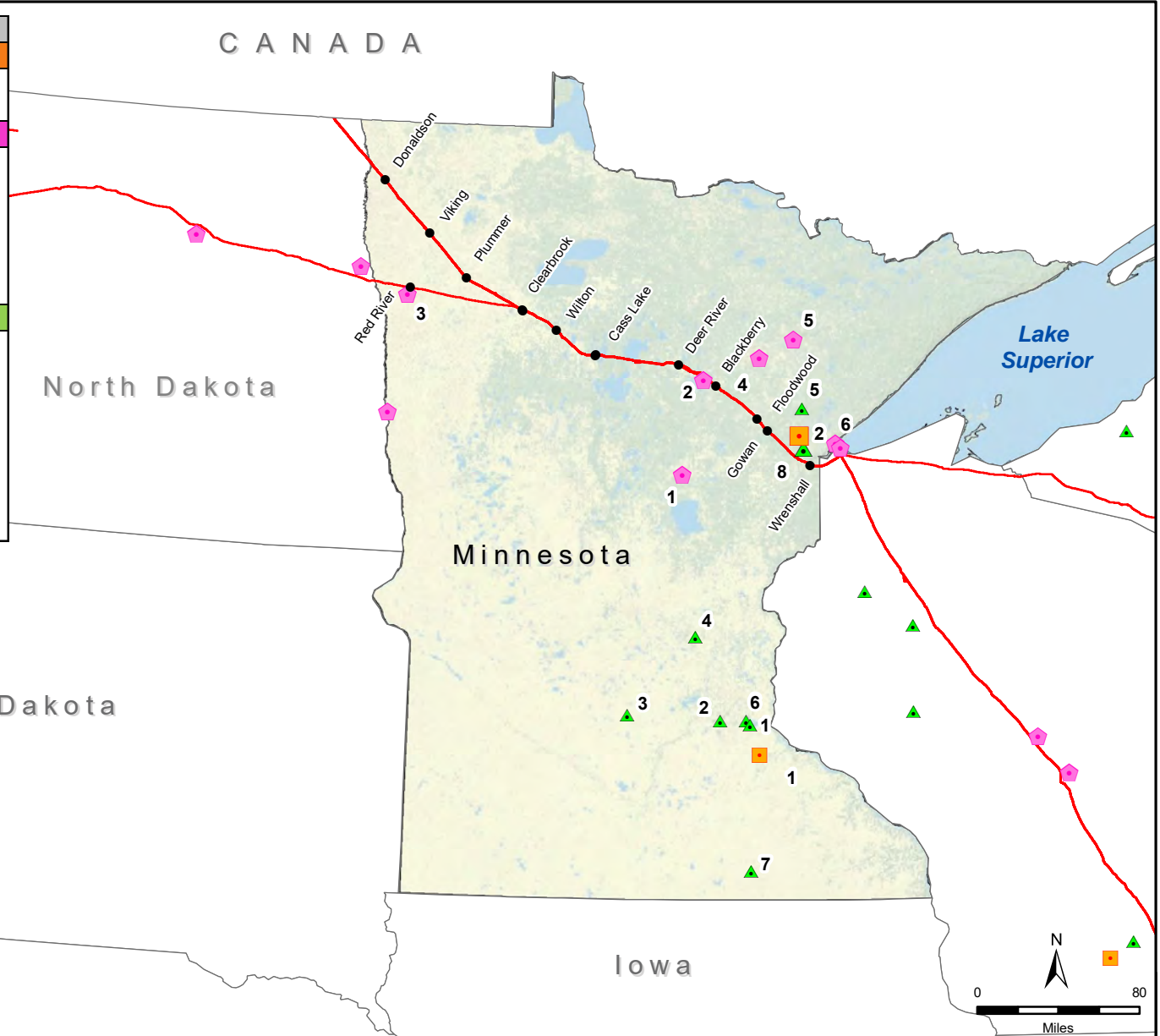
Spill Response Contractors		
Company	City/State	Phone Number
<b>North Dakota</b>		
Clean Harbors Environmental	Williston, ND	(701) 774-2201 (800) 645-8265
Garner Environmental Services	Williston, ND	(701) 577-1200 (855) 774-1200
Absorbent & Safety Solutions	Watford City, ND	(701) 838-4558
Minnesota Limited	Berthold, ND	(701) 453-3700
Bobs Oilfield Service Inc	Belfield, ND	(701) 575-4666
Keitu Engineers & Consultants, Inc.	Mandan, ND	(701) 667-1800
<b>Minnesota</b>		
Bay West Environmental	St. Paul, MN	(800) 279-0456 (651) 291-0456
West Central Environmental Consultants Inc.	Morris, MN	(800) 422-8356 (888) 923-2778
Minnesota Limited	Bemidji, MN	(218) 755-9595
OSI Environmental	Bemidji, MN	(800) 585-8838
OSI Environmental	Eveleth, MN	(800) 777-8542
Bay West Environmental	Duluth, MN	(800) 279-0456 (218) 740-0110
<b>Wisconsin</b> - The Contractor should consult with the WDNR Northern Regional Spill Coordinator (John Sager: phone (715) 365-8959) for assistance when selecting a spill response contractor.		



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Facility ID	Facility (Minnesota)
<b>Hazardous Waste Facilities</b>	
1	Clean Harbors, Cannon Falls
2	Safety-Kleen, Inc.
<b>Waste Water Treatment Plant Facilities (WWTP)</b>	
1	Aitkin Sewage Treatment Plant
2	GRPUC Wastewater Treatment Facility
3	Crookston Wastewater Treatment Facility
4	Hibbing Waste Treatment Plant
5	Virginia Wastewater Treatment
6	WLSSD
<b>Non-Hazardous Waste Facilities</b>	
1	Pinebend Landfill (Republic Services)
2	Burnsville Sanitary Landfill (WM)
3	Spruce Ridge Landfill (WM)
4	Elk River Landfill (WM)
5	Canyon (Voyageur) (WM)
6	SKB - Rosemount
7	SKB - Environmental Landfill
8	SKB - Shamrock Landfill

\*For North Dakota and Wisconsin - see state map for facility information



Drawn: LBG 5/13/2016  
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**Legend**

- Hazardous Waste Facility
- Waste Water Treatment Plant (WWTP)
- Non-Hazardous Waste Facility
- Enbridge Pipeline

**WASTE  
FACILITIES -  
MINNESOTA**

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## Waste Facilities – Minnesota

Facility ID	Facility (Minnesota)	Waste Type	Address	City	State	Zip	County	Contact Phone
<b>Hazardous Waste Facilities</b>								
1	Clean Harbors, Cannon Falls	Solid & Liquid - Haz	211 Holiday Avenue	Cannon Falls	MN	55009	Goodhue	(507) 263-0252
2	Safety-Kleen, Inc.	Solid & Liquid - Haz	1302 18th Street	Cloquet	MN	55720	Goodhue	(218) 879-2164
<b>Waste Water Treatment Plant Facilities (WWTP)</b>								
1	Aitkin Sewage Treatment Plant	Liquid - WWTP	120 1st Street Northwest	Aitkin	MN	56431	Aitkin	(218) 927-3406
2	GRPUC Wastewater Treatment Facility	Liquid - WWTP	1105 SE 23rd Avenue	Grand Rapids	MN	55744	Itasca	(218) 326-7024
3	Crookston Wastewater Treatment Facility	Liquid - WWTP	County Road 233	Crookston	MN	56716	Polk	(218) 281-5711
4	Hibbing Waste Treatment Plant	Liquid - WWTP	11669 Town Line Road	Hibbing	MN	55746	St. Louis	(218) 362-5999
5	Virginia Wastewater Treatment	Liquid - WWTP	1204 Southern Drive	Virginia	MN	55792	St. Louis	(218) 748-7519
6	WLSSD	Liquid - WWTP	2626 Courtland Street	Duluth	MN	55806	St. Louis	(218) 722-3336
<b>Non-Hazardous Waste Facilities</b>								
1	Pinebend Landfill (Republic Services)	Solid - NonHaz	2495 East 117th Street	Inver Grove Heights	MN	55077	Dakota	(651) 450-2155
2	Burnsville Sanitary Landfill (WM)	Solid - NonHaz	2650 West Cliff Road	Burnsville	MN	55337	Dakota	(952) 890-3248
3	Spruce Ridge Landfill (WM)	Solid - NonHaz	12755 137th Street	Glencoe	MN	55336	McLeod	(320) 864-5503
4	Elk River Landfill (WM)	Solid - NonHaz	22460 Highway 169	Elk River	MN	55330	Sherburne	(763) 441-2464
5	Canyon (Voyageur) (WM)	Solid - NonHaz	6830 Highway 53	Canyon	MN	55717	St. Louis	(218) 345-6302
6	SKB - Rosemount	Solid - NonHaz	13425 Courthouse Blvd	Rosemount	MN	55060	Dakota	(651) 438-1500
7	SKB - Environmental Landfill	Solid - NonHaz	52563 243rd Street	Austin	MN	55912	Mower	(507) 433-8131
8	SKB - Shamrock Landfill	Solid - NonHaz	761 MN Highway 45	Cloquet	MN	55720	Carlton	(218) 878-0112

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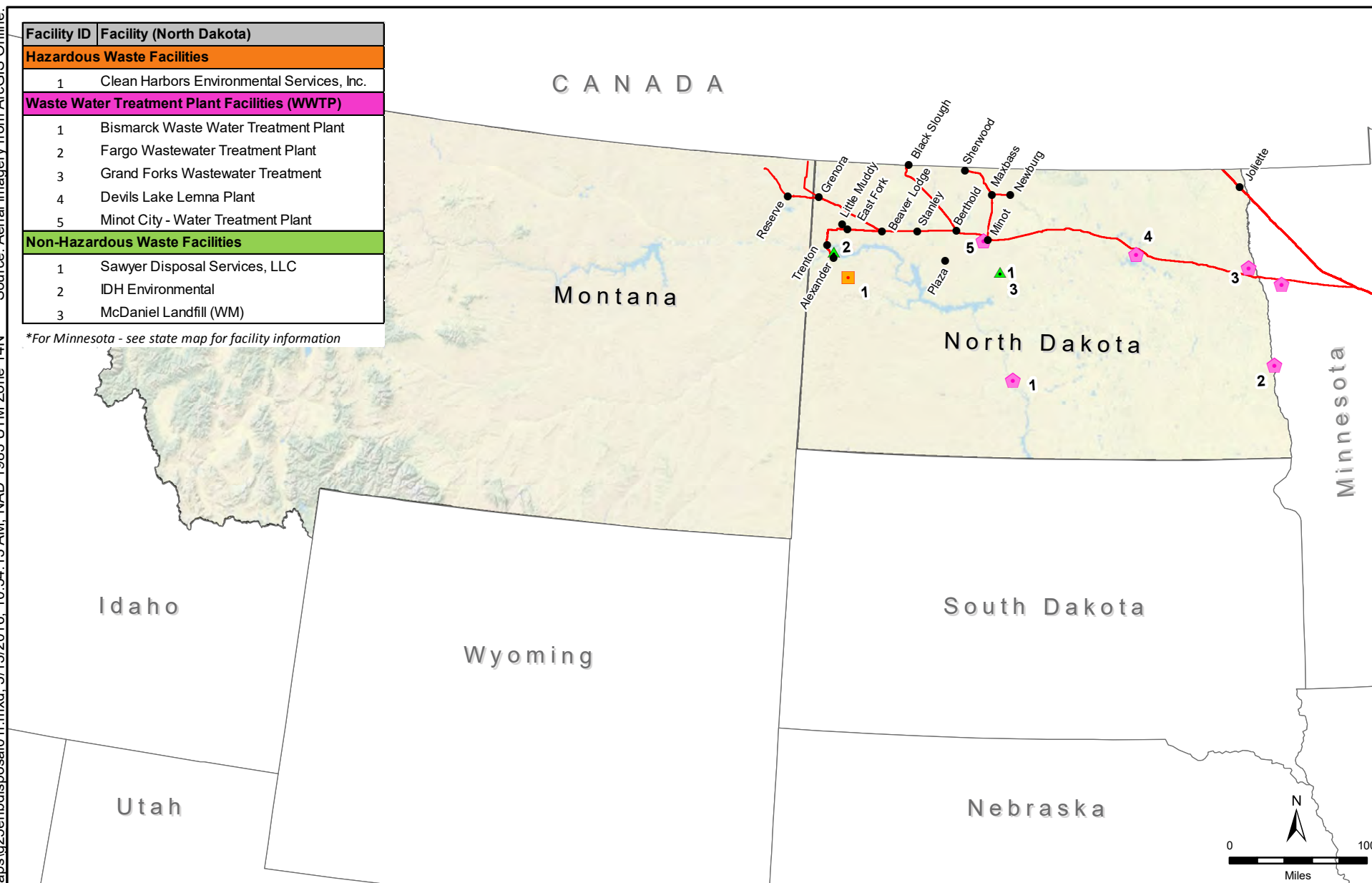
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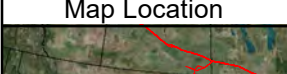
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Facility ID	Facility (North Dakota)
<b>Hazardous Waste Facilities</b>	
1	Clean Harbors Environmental Services, Inc.
<b>Waste Water Treatment Plant Facilities (WWTP)</b>	
1	Bismarck Waste Water Treatment Plant
2	Fargo Wastewater Treatment Plant
3	Grand Forks Wastewater Treatment
4	Devils Lake Lemna Plant
5	Minot City - Water Treatment Plant
<b>Non-Hazardous Waste Facilities</b>	
1	Sawyer Disposal Services, LLC
2	IDH Environmental
3	McDaniel Landfill (WM)

\*For Minnesota - see state map for facility information



	Map Location		<b>Legend</b>  Hazardous Waste Facility  Waste Water Treatment Plant (WWTP)  Non-Hazardous Waste Facility  Enbridge Pipeline	<b>WASTE FACILITIES -  NORTH DAKOTA AND MONTANA</b>
				
	Drawn: LBG 5/13/2016			
	Approved: LBG 5/13/2016			
Project #: Disposal				

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## Waste Facilities – North Dakota and Montana

Facility ID	Facility (North Dakota)	Waste Type	Address	City	State	Zip	County	Contact Phone
<b>Hazardous Waste Facilities</b>								
1	Clean Harbors Environmental Services, Inc.	Solid & Liquid - Haz	2541 132nd C Avenue NW	Arnegard	ND	58835	McKenzie	(701) 586-3170
<b>Waste Water Treatment Plant Facilities (WWTP)</b>								
1	Bismarck Waste Water Treatment Plant	Liquid - WWTP	601 London Avenue	Bismarck	ND	58504	Burleigh	(701) 222-6618
2	Fargo Wastewater Treatment Plant	Liquid - WWTP	3400 Broadway North	Fargo	ND	58102	Cass	(701) 241-1454
3	Grand Forks Wastewater Treatment	Liquid - WWTP	3251 North 69th Street	Grand Forks	ND	58203	Grand Forks	(701) 787-9131
4	Devils Lake Lemna Plant	Liquid - WWTP	2815 North Dakota 19	Devils Lake	ND	58301	Ramsey	(701) 662-7623
5	Minot City - Water Treatment Plant	Liquid - WWTP	900 16th Street Southwest	Minot	ND	58701	Ward	(701) 857-4760
<b>Non-Hazardous Waste Facilities</b>								
1	Sawyer Disposal Services, LLC	Solid & Liquid - NonHaz	12400 247th Ave Southeast	Sawyer	ND	58781	Ward	(701) 624-5622
2	IDH Environmental	Solid - NonHaz	14070 43rd Street Northwest	Williston	ND	58801	Williams	(701) 774-8514
3	McDaniel Landfill (WM)	Solid - NonHaz	12300 247th Avenue Southeast	Sawyer	ND	58781	Ward	(701) 624-5250

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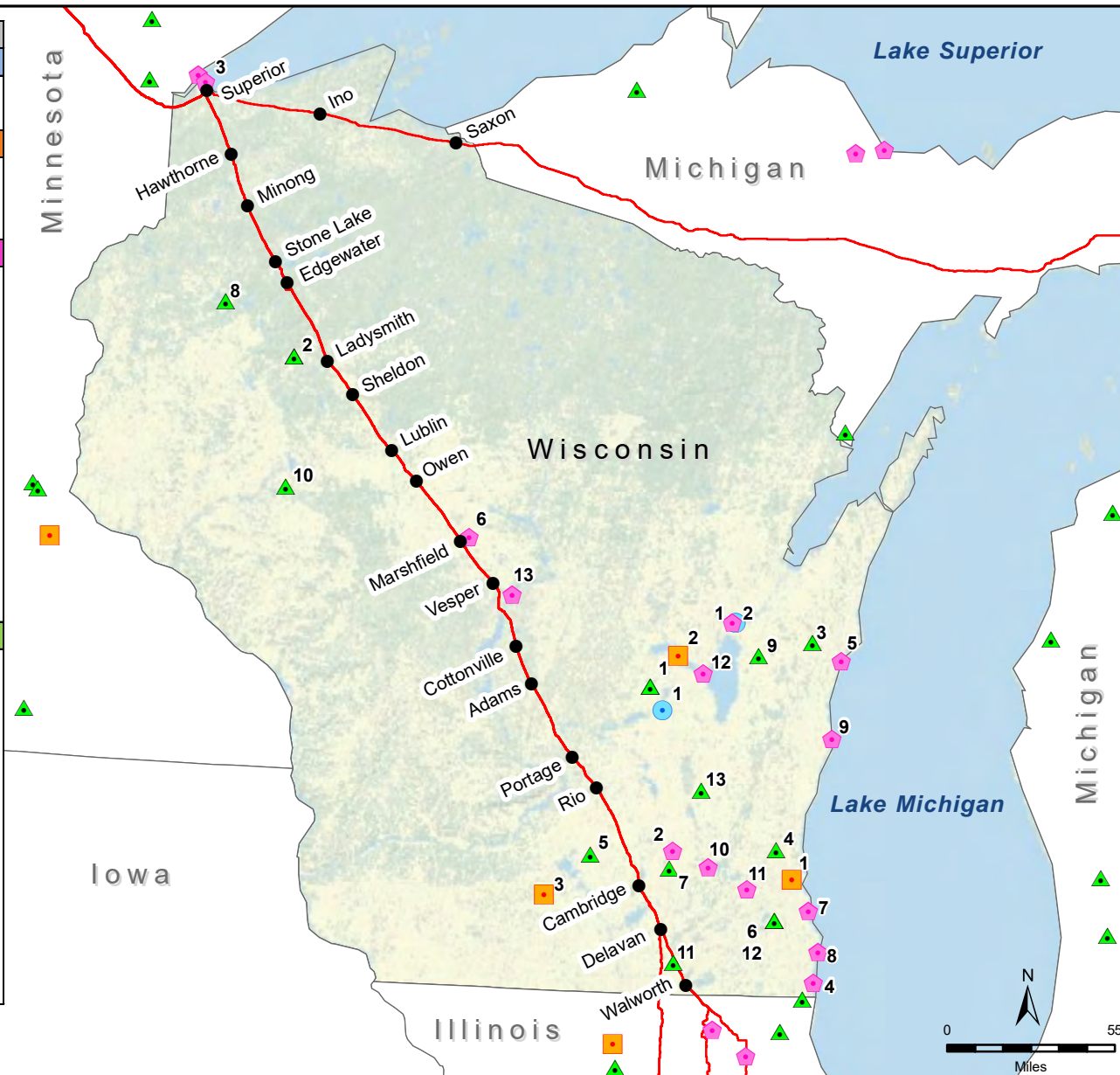
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Facility ID	Facility (Wisconsin)
<b>Liquid Waste Facilities</b>	
1	Covanta Environmental Solutions
2	Covanta Environmental Solutions
<b>Hazardous Waste Facilities</b>	
1	Advanced Waste Services of WI
2	Covanta Environmental Solutions
3	Safety-Kleen, Inc.
<b>Waste Water Treatment Plant Facilities (WWTP)</b>	
1	Appleton Wastewater Treatment Facility
2	Watertown Wastewater Treatment Facility
3	Superior Wastewater Division of Public Works
4	Kenosha Wastewater Treatment Plant
5	Manitowoc Wastewater Treatment Facility
6	Marshfield Wastewater Treatment Facility
7	South Milwaukee Wastewater Treatment Facility
8	Racine Utilities - Wastewater Utility
9	Sheboygan Regional Wastewater Treatment Facility
10	Oconomowoc Wastewater Treatment Facility
11	Waukesha Wastewater Treatment Plant
12	Oshkosh Wastewater Treatment Plant
13	Wisconsin Rapids Wastewater Treatment Plant
<b>Non-Hazardous Waste Facilities</b>	
1	Valley Trail Landfill (WM)
2	Timberline Trail Landfill (WM)
3	Ridgeview (WM)
4	Orchard Ridge (WM)
5	Madison Prairie (WM)
6	Metro (WM)
7	Deer Track Park (WM)
8	Lake Area Landfill (Republic Services)
9	Hickory Meadows Landfill (Advanced Disposal)
10	Seven Mile Creek Landfill (Advanced Disposal)
11	Mallard Ridge Landfill (Advanced Disposal)
12	Emerald Park Landfill (Advanced Disposal)
13	Glacier Ridge Landfill (Advanced Disposal)

\*For Minnesota, Illinois, and Michigan - see state map for facility information



## Map Location



Drawn: LBG 5/13/2016

Approved: LBG 5/13/2016

Project #: Disposal

## Legend

- Liquid Waste Facility
- Hazardous Waste Facility
- Waste Water Treatment Plant (WWTP)
- Non-Hazardous Waste Facility
- Enbridge Pipeline

WASTE  
FACILITIES -  
  
WISCONSIN

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## Waste Facilities – Wisconsin

Facility ID	Facility (Wisconsin)	Waste Type	Address	City	State	Zip	County	Contact Phone
<b>Liquid Waste Facilities</b>								
1	Covanta Environmental Solutions	Liquid	625 Douglas Street	Ripon	WI	54971	Fond du Lac	(920) 582-7596
2	Covanta Environmental Solutions	Liquid	552 Carter Court	Kimberly	WI	54136	Outagamie	(920) 582-7596
<b>Hazardous Waste Facilities</b>								
1	Advanced Waste Services of WI	Solid & Liquid - Haz	3801 West McKinley Avenue	Milwaukee	WI	53208	Milwaukee	(414) 397-6301
2	Covanta Environmental Solutions	Liquid - Haz	210 Tower Road	Winneconne	WI	54986	Winnebago	(920) 582-7596
3	Safety-Kleen, Inc.	Solid & Liquid - Haz	3715 Lexington Avenue	Madison	WI	53714	Dane	(608) 221-0714
<b>Waste Water Treatment Plant Facilities (WWTP)</b>								
1	Appleton Wastewater Treatment Facility	Liquid -WWTP	2006 East Newberry Street	Appleton	WI	54914	Calumet	(920) 832-5945
2	Watertown Wastewater Treatment Facility	Liquid -WWTP	800 Hoffmann Road	Watertown	WI	53094	Jefferson	(920) 262-4085
3	Superior Wastewater Div. Of Public Works	Liquid -WWTP	51 East First Street	Superior	WI	54880	Douglas	(715) 394-0392
4	Kenosha Wastewater Treatment Plant	Liquid -WWTP	7834 3rd Avenue	Kenosha	WI	53143	Kenosha	(262) 653-4335
5	Manitowoc Wastewater Treatment Facility	Liquid -WWTP	1015 South Lakeview Drive	Manitowoc	WI	54220	Manitowoc	(920) 686-3550
6	Marshfield Wastewater Treatment Facility	Liquid -WWTP	2601 East 34th Street	Marshfield	WI	54449	Marathon	(715) 486-2007
7	South Milwaukee Wastewater Treatment Facility	Liquid -WWTP	3003 5th Avenue	South Milwaukee	WI	53172	Milwaukee	(414) 768-8180
8	Racine Utilities - Wastewater Utility	Liquid -WWTP	2101 S. Wisconsin Avenue	Racine	WI	53403	Racine	(262) 636-9520
9	Sheboygan Regional Wastewater Treatment Facility	Liquid -WWTP	3333 Lakeshore Drive	Sheboygan	WI	53081	Sheboygan	(920) 459-3464
10	Oconomowoc Wastewater Treatment Facility	Liquid -WWTP	900 South Worthington Street	Oconomowoc	WI	53066	Waukesha	(262) 569-2192
11	Waukesha Wastewater Treatment Plant	Liquid -WWTP	600 Sentry Drive	Waukesha	WI	53186	Waukesha	(262) 524-3625
12	Oshkosh Wastewater Treatment Plant	Liquid -WWTP	233 North Campbell Road	Oshkosh	WI	54902	Winnebago	(920) 232-5365
13	Wisconsin Rapids Wastewater Treatment Plant	Liquid -WWTP	2540 1st Street South	Wisconsin Rapids	WI	54494	Wood	(715) 421-8287
<b>Non-Hazardous Waste Facilities</b>								
1	Valley Trail Landfill (WM)	Solid - NonHaz	N9101 Willard Road	Berlin	WI	54923	Green Lake	(920) 361-4995
2	Timberline Trail Landfill (WM)	Solid - NonHaz	N4581 Hutchinson Road	Weyerhaeuser	WI	54895	Rusk	(715) 868-7000
3	Ridgeview (WM)	Solid - NonHaz	6207 Hempton Lake Road	Whitelaw	WI	54247	Manitowoc	(920) 796-6007
4	Orchard Ridge (WM)	Solid - NonHaz	W124 N9355 Boundary Road	Menomonee Falls	WI	53051	Waukesha	(262) 509-5629
5	Madison Prairie (WM)	Solid - NonHaz	6002 Nelson Road	Sun Prairie	WI	53590	Dane	(608) 837-9031
6	Metro (WM)	Solid - NonHaz	10712 South 124th Street	Franklin	WI	53132	Milwaukee	(414) 529-6180
7	Deer Track Park (WM)	Solid - NonHaz	N6756 Waldmann Lane	Watertown	WI	53094	Jefferson	(920) 699-3475
8	Lake Area Landfill (Republic Services)	Solid - NonHaz	W5987 County Road D	Sarona	WI	54870	Washburn	(715) 469-3356
9	Hickory Meadows Landfill (Advanced Disposal)	Solid - NonHaz	W3105 Schneider Road	Hilbert	WI	54129	Calumet	(920) 853-8553
10	Seven Mile Creek Landfill (Advanced Disposal)	Solid - NonHaz	8001 Olson Drive	Eau Claire	WI	54703	Eau Claire	(715) 830-0284
11	Mallard Ridge Landfill (Advanced Disposal)	Solid - NonHaz	W8470 State Road 11	Delavan	WI	53115	Walworth	(262) 724-3257
12	Emerald Park Landfill (Advanced Disposal)	Solid - NonHaz	W124 S10629 South 124th Street	Muskego	WI	53150	Waukesha	(414) 529-1360
13	Glacier Ridge Landfill (Advanced Disposal)	Solid - NonHaz	N7296 County Road V	Horicon	WI	53032	Dodge	(920) 387-0987

Uncontrolled Copy if Printed

**Appendix F**  
**Spill Report Form**



## Spill Report Form

(The Contractor Spill Coordinator must complete this for any spill, regardless of size, and submit the form to the Enbridge Representative within 24 hours of the occurrence)

Date of Spill: \_\_\_\_\_ Date of Spill Discovery: \_\_\_\_\_

Time of Spill: \_\_\_\_\_ Time of Spill Discovery: \_\_\_\_\_

Name and Title of Discoverer: \_\_\_\_\_

Type of material spilled and manufacturer's name: \_\_\_\_\_

Legal Description of spill location to the quarter section: \_\_\_\_\_

Directions from nearest community: \_\_\_\_\_

Estimated volume of spill: \_\_\_\_\_

Weather conditions: \_\_\_\_\_

Topography and surface conditions of spill site: \_\_\_\_\_

Spill medium (pavement, sandy soil, water, etc.): \_\_\_\_\_

Proximity of spill to surface waters: \_\_\_\_\_

Did the spill reach a waterbody? \_\_\_\_\_ Yes \_\_\_\_\_ No

If so, was a sheen present? \_\_\_\_\_ Yes \_\_\_\_\_ No

Describe the causes and circumstances resulting in the spill: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Describe the extent of observed contamination, both horizontal and vertical (i.e., spill-stained soil in a 5-foot radius to a depth of 1 inch): \_\_\_\_\_

\_\_\_\_\_

Describe immediate spill control and/or cleanup methods used and implementation schedule: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Current status of cleanup actions: \_\_\_\_\_

Name and Company for the following:

Construction Superintendent: \_\_\_\_\_

Spill Coordinator: \_\_\_\_\_

Enbridge Representative: \_\_\_\_\_

Person Who Reported the Spill: \_\_\_\_\_

Environmental Inspector: \_\_\_\_\_

Form completed by: \_\_\_\_\_ Date: \_\_\_\_\_



## Spill Report Form

(The Contractor Spill Coordinator must complete this for any spill, regardless of size, and submit the form to the Enbridge Representative within 24 hours of the occurrence)

Date of Spill: \_\_\_\_\_ Date of Spill Discovery: \_\_\_\_\_

Time of Spill: \_\_\_\_\_ Time of Spill Discovery: \_\_\_\_\_

Name and Title of Discoverer: \_\_\_\_\_

Type of material spilled and manufacturer's name: \_\_\_\_\_

Legal Description of spill location to the quarter section: \_\_\_\_\_

Directions from nearest community: \_\_\_\_\_

Estimated volume of spill: \_\_\_\_\_

Weather conditions: \_\_\_\_\_

Topography and surface conditions of spill site: \_\_\_\_\_

Spill medium (pavement, sandy soil, water, etc.): \_\_\_\_\_

Proximity of spill to surface waters: \_\_\_\_\_

Did the spill reach a waterbody? \_\_\_\_\_ Yes \_\_\_\_\_ No

If so, was a sheen present? \_\_\_\_\_ Yes \_\_\_\_\_ No

Describe the causes and circumstances resulting in the spill: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Describe the extent of observed contamination, both horizontal and vertical (i.e., spill-stained soil in a 5-foot radius to a depth of 1 inch): \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Describe immediate spill control and/or cleanup methods used and implementation schedule: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Current status of cleanup actions: \_\_\_\_\_

Name and Company for the following:

Construction Superintendent: \_\_\_\_\_

Spill Coordinator: \_\_\_\_\_

Enbridge Representative: \_\_\_\_\_

Person Who Reported the Spill: \_\_\_\_\_

Environmental Inspector: \_\_\_\_\_

Form completed by: \_\_\_\_\_ Date: \_\_\_\_\_



**Appendix G**  
**Spill Reporting-Agency Contacts**

Spill Reporting Contacts						
Agency	Water	Soil	Notification Period	24-Hour Reporting Hotline	Regulation/Code	Comments
<b>Federal Contacts</b>						
National Response Center	Any quantity of discharged oil that violates state water quality standards, causes a film or sheen on water's surface or leaves sludge or emulsion beneath the surface	Release of a hazardous substance in an amount equal to or greater than its reportable quantity under CERCLA	Immediately	1-800-424-8802	40 CFR 302 – Designation, Reportable Quantities, and Notification	
Environmental Protection Agency Region V (MN / WI)	Any quantity of discharged oil that violates state water quality standards, causes a film or sheen on water's surface or leaves sludge or emulsion beneath the surface		Immediately	1-312-353-2000	40 CFR 117 – Determination of Reportable Quantities for Hazardous Substances  Clean Water Act § 311 – Oil and Hazardous Substance Liability	

Spill Reporting Contacts						
Agency	Water	Soil	Notification Period	24-Hour Reporting Hotline	Regulation/Code	Comments
Environmental Protection Agency Region VIII (ND)	Any quantity of discharged oil that violates state water quality standards, causes a film or sheen on water's surface or leaves sludge or emulsion beneath the surface		Immediately	1-303-312-6312	40 CFR 117 – Determination of Reportable Quantities for Hazardous Substances  Clean Water Act § 311 – Oil and Hazardous Substance Liability	
<b>Tribal Contacts</b>						
Bois Forte	Any quantity of discharged oil that violates state water quality standards, causes a film or sheen on water's surface or leaves sludge or emulsion beneath the surface		Immediately	1-218-742-9825	40 CFR 117 – Determination of Reportable Quantities for Hazardous Substances Clean Water Act § 311 – Oil and Hazardous Substance Liability	Number for St. Louis County dispatch

Spill Reporting Contacts						
Agency	Water	Soil	Notification Period	24-Hour Reporting Hotline	Regulation/Code	Comments
Fond du Lac	Any quantity of discharged oil that violates state water quality standards, causes a film or sheen on water's surface or leaves sludge or emulsion beneath the surface	Release of a hazardous substance in an amount equal to or greater than its reportable quantity under CERCLA	Immediately	1-800-424-8802	Wetlands Protection and Management Ordinance #03/06  Fond Du Lac Band of Lake Superior Chippewa Ordinance #04/06 Brownfield Oversight And Enforcement	
Grand Portage	Any quantity of discharged oil that violates state water quality standards, causes a film or sheen on water's surface or leaves sludge or emulsion beneath the surface		Immediately	1-218-387-3030	40 CFR 117 – Determination of Reportable Quantities for Hazardous Substances Clean Water Act § 311 – Oil and Hazardous Substance Liability	Cook County Dispatch
Leech Lake	Any quantity of discharged oil that violates state water quality standards, causes a film or sheen on water's surface or leaves sludge or emulsion beneath the surface	Release of a hazardous substance in an amount equal to or greater than its reportable quantity under CERCLA	Immediately	1-888- 622-9225  1-218-335-7400	40 CFR 117 – Determination of Reportable Quantities for Hazardous Substances Clean Water Act § 311 – Oil and Hazardous Substance Liability	

Spill Reporting Contacts						
Agency	Water	Soil	Notification Period	24-Hour Reporting Hotline	Regulation/Code	Comments
Lower Sioux	Any quantity of discharged oil that violates state water quality standards, causes a film or sheen on water's surface or leaves sludge or emulsion beneath the surface		Immediately	1-507-637-4036	40 CFR 117 – Determination of Reportable Quantities for Hazardous Substances Clean Water Act § 311 – Oil and Hazardous Substance Liability  Water quality for Lower Sioux Jurisdictional Waters	Lower Sioux Police Dispatch
Mille Lacs	Any quantity of discharged oil that violates state water quality standards, causes a film or sheen on water's surface or leaves sludge or emulsion beneath the surface		Immediately	1-888-860-8250	40 CFR 117 – Determination of Reportable Quantities for Hazardous Substances Clean Water Act § 311 – Oil and Hazardous Substance Liability	Mille Lacs County Dispatch

Spill Reporting Contacts						
Agency	Water	Soil	Notification Period	24-Hour Reporting Hotline	Regulation/Code	Comments
Prairie Island	Any quantity of discharged oil that violates state water quality standards, causes a film or sheen on water's surface or leaves sludge or emulsion beneath the surface		Immediately	(651) 267-4000	40 CFR 117 – Determination of Reportable Quantities for Hazardous Substances Clean Water Act § 311 – Oil and Hazardous Substance Liability	
Red Lake	Any quantity of discharged oil that violates state water quality standards, causes a film or sheen on water's surface or leaves sludge or emulsion beneath the surface		Immediately	1-218-679-3313	40 CFR 117 – Determination of Reportable Quantities for Hazardous Substances Clean Water Act § 311 – Oil and Hazardous Substance Liability	
Shakopee	Any quantity of discharged oil that violates state water quality standards, causes a film or sheen on water's surface or leaves sludge or emulsion beneath the surface		Immediately	1-952-445-1411	40 CFR 117 – Determination of Reportable Quantities for Hazardous Substances Clean Water Act § 311 – Oil and Hazardous Substance Liability	Scott County Emergency dispatch



Spill Reporting Contacts						
Agency	Water	Soil	Notification Period	24-Hour Reporting Hotline	Regulation/Code	Comments
Upper Sioux	Any quantity of discharged oil that violates state water quality standards, causes a film or sheen on water's surface or leaves sludge or emulsion beneath the surface		Immediately	1-800-422-0798 (In State) or (651) 649-5451	40 CFR 117 – Determination of Reportable Quantities for Hazardous Substances Clean Water Act § 311 – Oil and Hazardous Substance Liability	MN State Duty Officer hotline
White Earth	Any quantity of discharged oil that violates state water quality standards, causes a film or sheen on water's surface or leaves sludge or emulsion beneath the surface		Immediately	1-218- 983-3281	W.E.E.C. 200.00 Wetlands Code	

Spill Reporting Contacts						
Agency	Water	Soil	Notification Period	24-Hour Reporting Hotline	Regulation/Code	Comments
<b>State Contacts</b>						
Minnesota Pollution Control Agency	Visible Sheen or Emulsion	No minimum quantity for crude oil. Any spill >5 gallons of refined petroleum product. Spills of any quantity of all other chemicals or materials should be reported.	Immediately upon discovery.	Minnesota State Duty Officer 1-800-422-0798 (In State) or (651) 649-5451	Minnesota Statute 115.061	Follow up report established after initial response.
North Dakota Department of Health	Visible Sheen or Emulsion	No minimum requirement. All spills that impact or threaten groundwater or surface water or may potentially have adverse effects on human health or the environment are reportable.	Immediately upon discovery.	North Dakota Department of Health 1-701-328-5210  North Dakota Hazardous Materials Emergency Assistance and Spill Reporting  1-800-472-2121 (In State)  1-701-328-5210 (Out of State)	North Dakota Administrative Code NDAC 33-16-02.1-1	Follow up report established after initial response.

Spill Reporting Contacts						
Agency	Water	Soil	Notification Period	24-Hour Reporting Hotline	Regulation/Code	Comments
Wisconsin Department of Natural Resources	Visible Sheen or Emulsion	All spills are reportable unless they meet the following criteria: 1) spill is contained on an impervious surface; 2) <5 gallons of petroleum products on a pervious surface; 3) <1 gallon of gasoline on a pervious surface.	Immediately of any discharge not exempted by the statute.	24-hour WI DNR reporting number 1-800-943-0003	Chapter 292.11 of the Wisconsin Statutes, Chapter NR 706 Wisconsin Administrative Code	Follow up report established after initial response.
<b>County Contacts – Minnesota</b>						
Kittson County Emergency Management	As Needed			Scot Olson (218) 843-2113	Kittson County 2015 Hazard Management Plan	
Marshall County Emergency Services	As Needed			Josh Johnston (218) 745-5841	Marshall County, MN Hazard Mitigation Plan 2016 Update	
Pennington County Emergency Management	As Needed			Erik Beitel (218) 683-7087		
Wadena County Emergency Management	As Needed			Tyler Wheeler (218) 631-7795		

<b>Spill Reporting Contacts</b>						
<b>Agency</b>	<b>Water</b>	<b>Soil</b>	<b>Notification Period</b>	<b>24-Hour Reporting Hotline</b>	<b>Regulation/Code</b>	<b>Comments</b>
Polk County Emergency Management	As Needed			Jody Beauchane, Director (218) 470-8263	Polk County, MN Hazard Mitigation Plan (July 2015)	
Red Lake County Emergency Management	As Needed			Mitch Bernstein (218) 253-2996		
Clearwater County Emergency Management	As Needed		8:00 AM – 4:30 PM Monday – Friday	(218) 694-6226		
Hubbard County Emergency Management	As Needed			Brian Halbasch (218) 732-2588		
Cass County Emergency Management	As Needed			Chad Emery (218) 547-7437	Cass County Hazard Mitigation Plan	
Crow Wing County Emergency Management	As Needed			John Bowen, Director (218) 829-4749		
Aitkin County Emergency Management	As Needed			Dispatch (non-emergency) (218) 927-7400		
Carlton County Emergency Management	As Needed			Steve VanKekerix, Director (218) 384-9539		

Spill Reporting Contacts						
Agency	Water	Soil	Notification Period	24-Hour Reporting Hotline	Regulation/Code	Comments
St Louis County Emergency Management	As Needed			Sheriff's Office Emergency Management Division (218) 336-4340		
<b>County Contacts – North Dakota</b>						
Pembina County Emergency Management	As Needed			Andrew Kirking (701) 265-4849		
<b>County Contacts – Wisconsin</b>						
Douglas County Emergency Management	As Needed		8:00 AM – 4:30 PM Monday – Friday	Keith Kesler, Director (715) 395-1636		

**Attachment F**  
**MDNR Water Appropriation Permit**



**Attachment G**

**Infiltration of Hydrotest Discharges Screening Analysis**



# Infiltration of Hydrotest Discharges Screening Analysis

Enbridge Energy, Limited Partnership • Line 3 Replacement Project

May 2019



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**ACRONYMS AND ABBREVIATIONS**

Enbridge	Enbridge Energy, Limited Partnership
EPP	Environmental Protection Plan
gpm	Gallons per minute
HDD	horizontal directional drill
MP	milepost
MPCA	Minnesota Pollution Control Agency
NPDES	National Pollutant Discharge Elimination System
SDS	State Disposal System
SSURGO	Soil Survey Geographic Database

## 1.0 INTRODUCTION

Enbridge Energy, Limited Partnership (“Enbridge”) has applied for an Individual National Pollutant Discharge Elimination System (“NPDES”) / State Disposal System (“SDS”) Individual Permit (“Individual Permit”) to discharge waters used to hydrostatically test the structural integrity of the Line 3 Replacement Project pipeline. These waters are referred to as “hydrotest water(s)” in this Memo. Hydrotest water is produced either through testing segments of the pipeline used for horizontal directional drill (“HDD”) crossings or for large segments of the welded pipeline, referred to as “mainline hydrotests.”

Enbridge proposes to discharge hydrotest water from most mainline hydrotests back to the same surface water from which it was originally drawn. Minnesota Pollution Control Agency (“MPCA”) staff requested that Enbridge assess the alternative of discharging mainline hydrotest water to an upland location where it would infiltrate. Enbridge conducted this Screening Analysis to:

- identify a potential infiltration location near each proposed mainline discharge to surface water;
- estimate the time needed to infiltrate each mainline hydrotest discharge at the potential infiltration location; and
- identify site-specific factors for evaluation of whether infiltration is a feasible and prudent alternative for each mainline hydrotest discharge.

Enbridge proposes to infiltrate hydrotest water for three mainline hydrotest locations where the source is groundwater (Mainline spreads 2C, 2D, and 2E). Information about infiltration at those locations is included in the Infiltration Plan (Attachment H). Therefore, discharges from these spreads are not included in this alternatives screening analysis.

## 2.0 METHODS

The Screening Analysis consisted of three steps:

1. At each location that is the end/beginning of a mainline spread section, Enbridge identified a potential infiltration area, selected as a low slope area with favorable soil characteristics and sufficient setback from surface water and infrastructure.
2. For each potential infiltration area, Enbridge estimated the maximum discharge rate and the time needed to infiltrate the hydrotest volumes (infiltration duration) of the mainline spreads that begin and end at that location.
3. Where the estimated maximum discharge rate exceeded 660 gpm, Enbridge also calculated the infiltration duration for a discharge rate of 660 gpm.

For the two mainline spreads that are proposed to discharge to the Mississippi River at MP 1069.6 (Spreads 4A and 4B), two potential infiltration locations are provided. The area with the most favorable soil characteristics (Option A) is across the river from the spread ends, presenting implementation difficulties. Therefore, Option B was identified, which is the area with the most favorable soils available on the same side of the river as the spread ends.

The estimated duration of infiltration and associated discharge rate were estimated based on the following:

- Discharge/infiltration volumes were provided by Enbridge engineering staff;
- The mainline hydrotest discharge analyses needed to make an assumption about the size of the infiltration area. For the purpose of these analyses, the infiltration area was set as 0.5 acre;
- The maximum potential discharge rate was estimated by multiplying the saturated hydraulic conductivity by the infiltration area; and
- The duration of infiltration was calculated by dividing the infiltration volume by the estimated maximum discharge rate.

### 3.0 RESULTS

Potential infiltration areas for mainline spread discharges are shown on Large Figures 1 through 13. The results of the Screening Analysis are presented in Table 3.0-1. Infiltration of mainline spread hydrotest volumes at the screening locations is estimated to take from approximately 1 day to over 8 years, depending on the soil characteristics at the potential infiltration location. Estimated infiltration durations are less than 2 days at 8 locations, between 2 and 10 days at 13 locations, and greater than 10 days at 6 locations. At one location no suitable potential infiltration location was identified.

At potential infiltration locations with soil characteristics that are favorable for infiltration, determining whether infiltration is a feasible and prudent alternative would depend on the factors listed below.

**Environmental impacts other than to surface water quality** – Environmental impacts of infiltration are as follows:

- Infiltration is a consumptive use of appropriated water, compared to returning the appropriated water to its source, which is a nonconsumptive use. Minnesota Statutes impose limitations on consumptive use (Minn S. section 103G.265) and encourage nonconsumptive uses (Minn. S. section 103G.261 subd. 5(e)).
- Consumptive use has the potential to cause impacts to stream hydrology or aquatic biota if the withdrawal exceeds 10% of the streamflow (MDNR, 2016).
- Land disturbance, and possible wetland impacts, to run piping from the discharge location to the infiltration area.
- Land disturbance to set up infiltration structures and create space for water storage, if needed.
- Air emissions associated with setting up infiltration structures, pumping water, clearing workspace for water storage and transporting and setting up water storage facilities.

**Impacts to Human Environment** – Infiltration has the potential to result in temporary impacts to land uses over the infiltration area.

**Access Constraints** – Access to potential infiltration locations would need to be negotiated with landowners.



Table 3.0-1 Estimated Infiltration Duration and Maximum Discharge Rate										
Spread end milepost	Hydrotest ID	Mainline test volume (million gallons)	Saturated hydraulic conductivity <sup>a</sup> (ft/d)	Assumed infiltration area <sup>b</sup> (acres)	Estimated maximum discharge rate <sup>c,d</sup> (gpm)	Estimated infiltration duration at maximum discharge rate <sup>e</sup> (d)	Estimated infiltration duration at 660 gpm (d)	Potential infiltration area distance from end of spread (ft)	Notes on potential infiltration area	Large Figure Number
801.8	Mainline Spread_1A	7.3	1.5	0.5	170	29.8	N/A	1068	The potential infiltration area adjoins the construction workspace and piping from the spread end to the potential infiltration area could run primarily in the construction workspace.	Large Figure 1
814.5	Mainline Spread_1A	7.3	0.02	0.5	2.2	2258	N/A	220	Due to the estimated infiltration duration, infiltration is not a feasible and prudent alternative at this location	Large Figure 2
	Mainline Spread_1B	10.2	0.02	0.5	2.2	3155	N/A			
848.2	Mainline Spread_1B	10.2	11.5	0.5	1,300	5.4	10.7	658	The potential infiltration area adjoins the construction workspace and piping from the spread end to the potential infiltration area could run primarily in the construction workspace. Piping to the infiltration area would cross a highway.	Large Figure 3
	Mainline Spread_1C	7.9	11.5	0.5	1,300	4.2	8.3			
875.4	Mainline Spread_1C	7.9	10.1	0.5	1,140	4.8	8.3	730	The potential infiltration area adjoins the construction workspace and piping from the spread end to the potential infiltration area could run primarily in the construction workspace.	Large Figure 4
	Mainline Spread_1D	6.2	10.1	0.5	1,140	3.8	6.5			
896.1	Mainline Spread_1D	6.2	26	0.5	2,940	1.5	6.5	1379	The potential infiltration area does not adjoin the construction workspace.	Large Figure 5
	Mainline Spread_2A	3.8	26	0.5	2,940	0.9	4			
909.1	Mainline Spread_2A	3.8	4.3	0.5	490	5.4	N/A	1492	The potential infiltration area does not adjoin the construction workspace. Piping to the infiltration area would cross a highway.	Large Figure 6
	Mainline Spread_2B	10.1	4.3	0.5	490	14.3	N/A			
944.1	Mainline Spread_2B	10.1	12.4	0.5	1,400	5	10.6	Adjacent	The potential infiltration area adjoins the construction workspace	See Large Figure 16 of Infiltration Plan (Attachment H)
975.5	Mainline Spread_3A	2.9	3	0.5	340	6	N/A	Adjacent	The potential infiltration area adjoins the construction workspace	See Large Figure 17 of Infiltration Plan (Attachment H)
985.8	Mainline Spread_3A	2.9	24.2	0.5	2,740	0.7	3.1	Adjacent	The potential infiltration area adjoins the construction workspace	Large Figure 7
	Mainline Spread_3B	9.1	24.2	0.5	2,740	2.3	9.6			
1017.3	Mainline Spread_3B	9.1	26.1	0.5	2,950	2.1	9.6	245	The potential infiltration area adjoins the construction workspace	Large Figure 8
	Mainline Spread_3C	6.9	26.1	0.5	2,950	1.6	7.3			
1041	Mainline Spread_3C	6.9	26.1	0.5	2,950	1.6	7.3	482	The potential infiltration area does not adjoin the construction workspace.	Large Figure 9
	Mainline Spread_4A	8.3	26.1	0.5	2,950	2	8.7			
1069.6 Option A	Mainline Spread_4A	8.3	26.1	0.5	2,950	2.0	8.7	898	The potential infiltration area adjoins the construction workspace, but is across the river from the spread end. Piping for infiltration would have to cross the Mississippi River.	Large Figure 10
	Mainline Spread_4B	4.6	26.1	0.5	2,950	1.1	4.8			
1069.6 Option B	Mainline Spread_4A	8.3	1.7	0.5	190	30.2	N/A	975	The potential infiltration area does not adjoin the construction workspace. Piping to the infiltration area would cross a highway.	See Large Figure 15 of Infiltration Plan (Attachment H)
	Mainline Spread_4B	4.6	1.7	0.5	190	16.8	N/A			
1085.7	Mainline Spread_4B	4.6	7.8	0.5	880	5.3	4.8	2046	The potential infiltration area does not adjoin the construction workspace. Piping would have to be run through wetlands to reach potential infiltration area	Large Figure 11
	Mainline Spread_5A	5.3	7.8	0.5	880	4.2	5.6			
1104.1	Mainline Spread_5A	5.3	2.7	0.5	300	12.1	N/A	775	The potential infiltration area does not adjoin the construction workspace. Piping would have to be run through wetlands to reach potential infiltration area	Large Figure 12
	Mainline Spread_5B	4.7	2.7	0.5	300	10.8	N/A			
1120.3	Mainline Spread_5B	4.7	31.2	0.5	3,530	0.9	4.9	3722	The potential infiltration area does not adjoin the construction workspace.Piping to the infiltration area would cross at least two roads.	Large Figure 13
	Mainline Spread_5C	2.6	31.2	0.5	3,530	0.5	2.7			
1129.4	Mainline Spread_5C	2.6	Due to topography, low soil saturated conductivity, and nearby surface waters, no potential infiltration area was identified						N/A	N/A

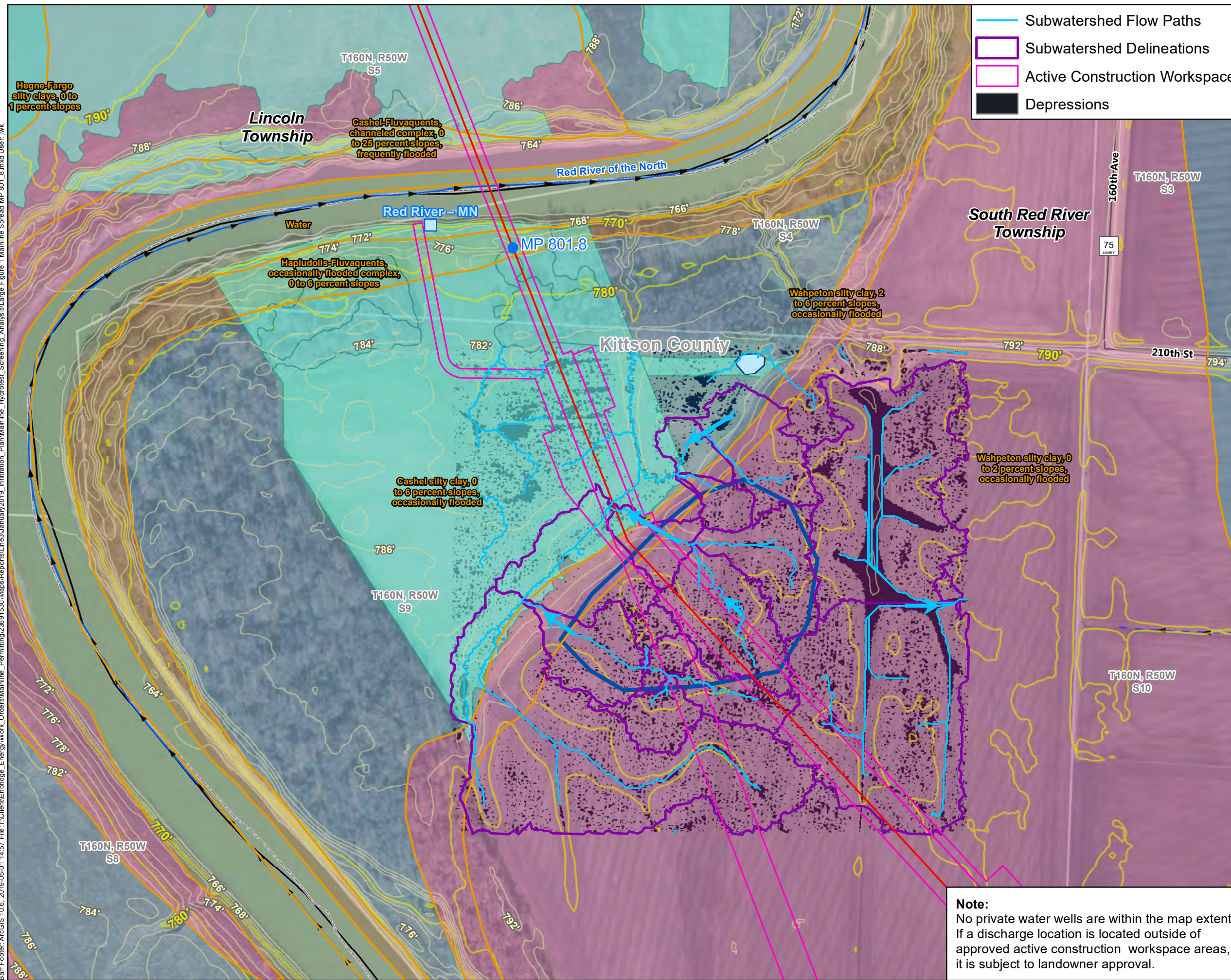
Table 3.0-1 Estimated Infiltration Duration and Maximum Discharge Rate										
Spread end milepost	Hydrotest ID	Mainline test volume (million gallons)	Saturated hydraulic conductivity <sup>a</sup> (ft/d)	Assumed infiltration area <sup>b</sup> (acres)	Estimated maximum discharge rate <sup>c,d</sup> (gpm)	Estimated infiltration duration at maximum discharge rate <sup>e</sup> (d)	Estimated infiltration duration at 660 gpm (d)	Potential infiltration area distance from end of spread (ft)	Notes on potential infiltration area	Large Figure Number
<div><div><sup>a</sup> From Soil Survey Geographic Database (SSURGO) (Soil Survey Staff, 2018).</div><div><sup>b</sup> In practice, a larger infiltration area could be used if suitable space is available.</div><div><sup>c</sup> The maximum rate that could be discharged while limiting the infiltration area to 0.5 acres. For discharge rates above 660 gpm, which is the maximum rate listed in Figure 22A of the Enbridge EPP (Enbridge, 2018), multiple discharge structures would be needed to prevent erosion and control overland flow. Discharge at a lower rate would require more time.</div><div><sup>d</sup> The discharge rate estimate is a function of the SSURGO saturated hydraulic conductivity data, and may also be affected by vegetation, precipitation, and other physical factors.</div><div><sup>e</sup> The infiltration duration estimate assumes that the SSURGO saturated hydraulic conductivity represents the entire unsaturated zone and that it will be constant over the entire discharge period. The saturated hydraulic conductivity of the soil in the unsaturated zone may decrease during the discharge, depending on the depth to the water table and the transmissivity of the water table aquifer. If the saturated hydraulic conductivity decreases during the discharge, the discharge rate might need to be reduced and the infiltration duration would be longer.</div><div><sup>f</sup> 660 gpm is the maximum rate listed for a dewatering discharge in Figure 22A of the Enbridge EPP (Enbridge, 2018).</div></div>										

## **Appendix A**

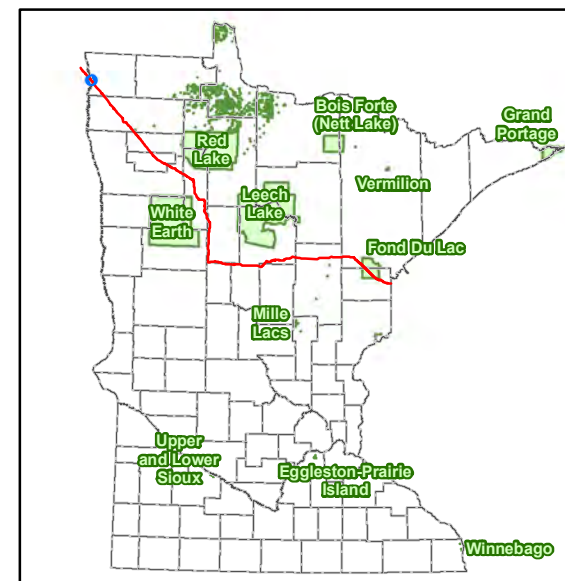
### **Large Figures**



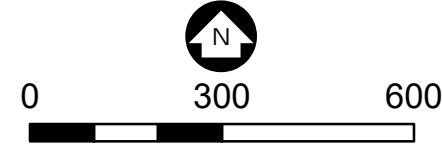
Barr Footer: ArcGIS 10.6, 2019-05-01 14:57 File: I:\Client\Enbridge\_Energy\Work\_Orders\Mainline\_Permiting\23691530\Map\Reports\Line3\January2019\_Infiltration\_Plan\Mainline\_Hydrotest\_Screening\_Analysis\Large Figure 1 Mainline Spread MP 801.8.mxd User: jwk



**Note:**  
No private water wells are within the map extent.  
If a discharge location is located outside of  
approved active construction workspace areas,  
it is subject to landowner approval.



- Mainline Spread End Milepost
- Line 3 Replacement Project
- ⊕ Well - County Well Index
- Water Appropriation Site
- Potential Upland Discharge Area - 8.55 acres
- Soil Map Unit
- Hydrologic Soil Group**
  - A
  - B
  - C
  - D (A/D, B/D, C/D)
- Lidar Contours**
  - Index (10-Foot)
  - Intermediate (2-Foot)
  - Surficial Flow Direction
  - ▶ Flow Direction
  - Perennial Stream
  - - Intermittent Stream
  - Waterbodies
  - Field Delineated Wetlands
  - County Boundaries
  - Minor Roads

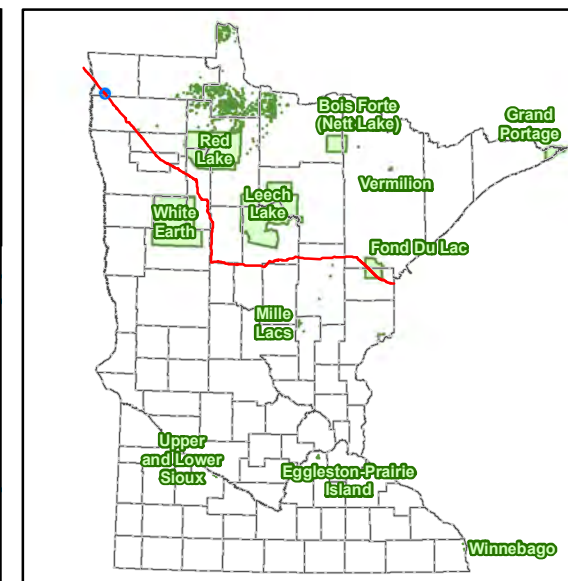
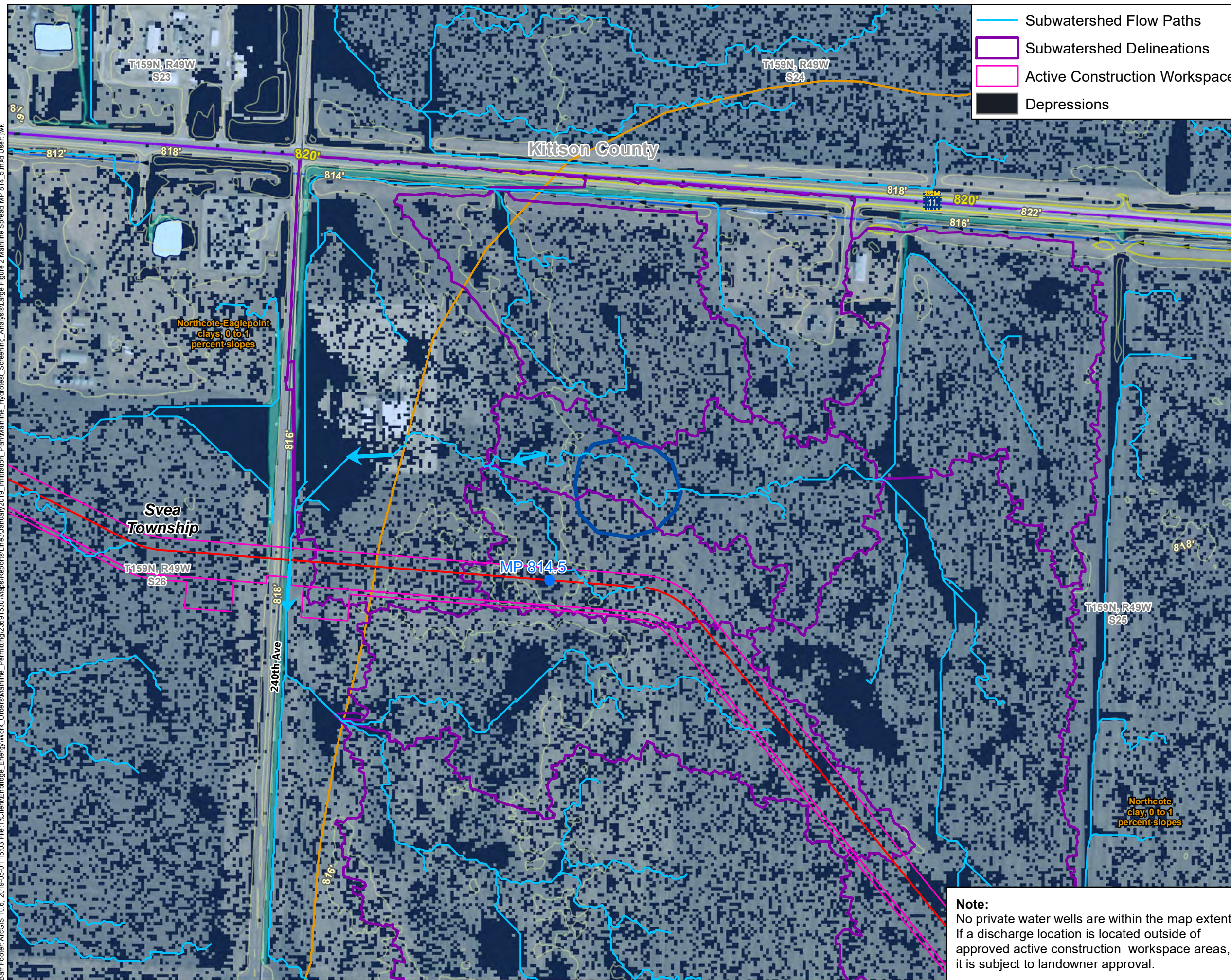


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Mainline Spread 1A: MP 801.8  
Mainline Hydrotest Screening Analysis  
Line 3 Replacement Project

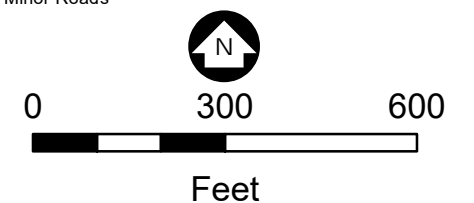




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- Mainline Spread End Milepost
- Line 3 Replacement Project
- ⊕ Well - County Well Index
- Water Appropriation Site
- Potential Upland Discharge Area - 1.93 acres
- Soil Map Unit
- Hydrologic Soil Group**
  - A
  - B
  - C
  - D (A/D, B/D, C/D)
- Lidar Contours**
  - Index (10-Foot)
  - Intermediate (2-Foot)
  - ➡ Surficial Flow Direction
  - ▶ Flow Direction
  - Perennial Stream
  - - Intermittent Stream
  - Waterbodies
  - Field Delineated Wetlands
  - County Boundaries
  - State Trunk Highway
  - Minor Roads



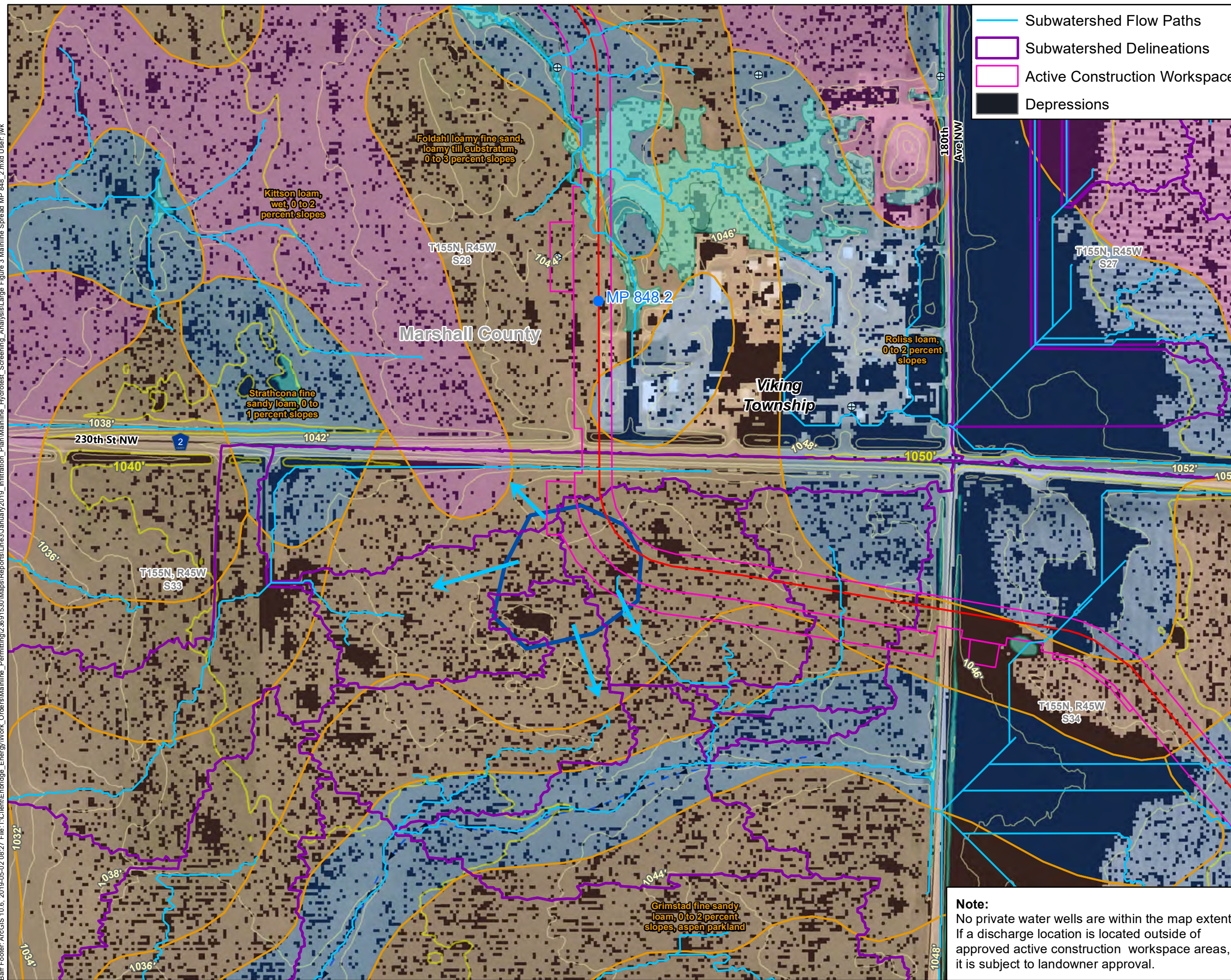
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Mainline Spread 1A, 1B: MP 814.5  
Mainline Hydrotest Screening Analysis  
Line 3 Replacement Project

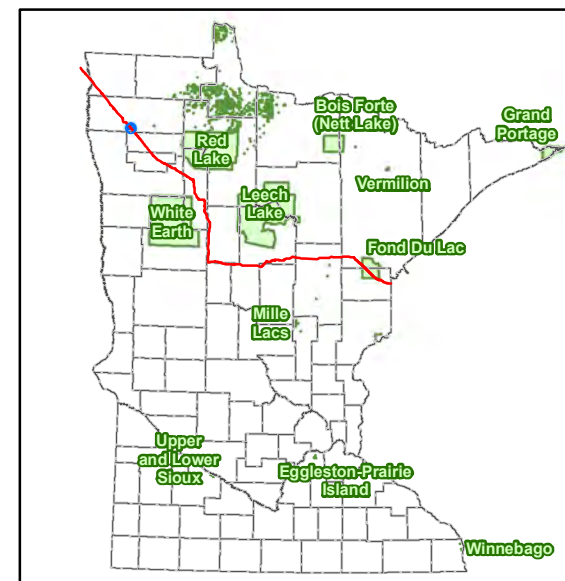




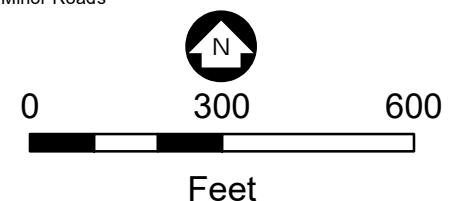
Barr Footer: ArcGIS 10.6, 2019-05-02 08:27 File: I:\Client\Enbridge\_Energy\Work\_Orders\Mainline\_Hydrotest\_Screening\_Analysis\Large Figure 3 Mainline Spread MP 848.2.mxd User: jwk



- Subwatershed Flow Paths
- Subwatershed Delineations
- Active Construction Workspace
- Depressions



- Mainline Spread End Milepost
- Line 3 Replacement Project
- Well - County Well Index
- Water Appropriation Site
- Potential Upland Discharge Area - 3.64 acres
- Soil Map Unit
- Hydrologic Soil Group
  - A
  - B
  - C
  - D (A/D, B/D, C/D)
- Lidar Contours
  - Index (10-Foot)
  - Intermediate (2-Foot)
- Surficial Flow Direction
- Flow Direction
- Perennial Stream
- Intermittent Stream
- Waterbodies
- Field Delineated Wetlands
- County Boundaries
- County State-Aid Highway
- Minor Roads



Large Figure 3

Mainline Spread 1B: MP 848.2

Mainline Hydrotest Screening Analysis

Line 3 Replacement Project

**Note:**

No private water wells are within the map extent. If a discharge location is located outside of approved active construction workspace areas, it is subject to landowner approval.

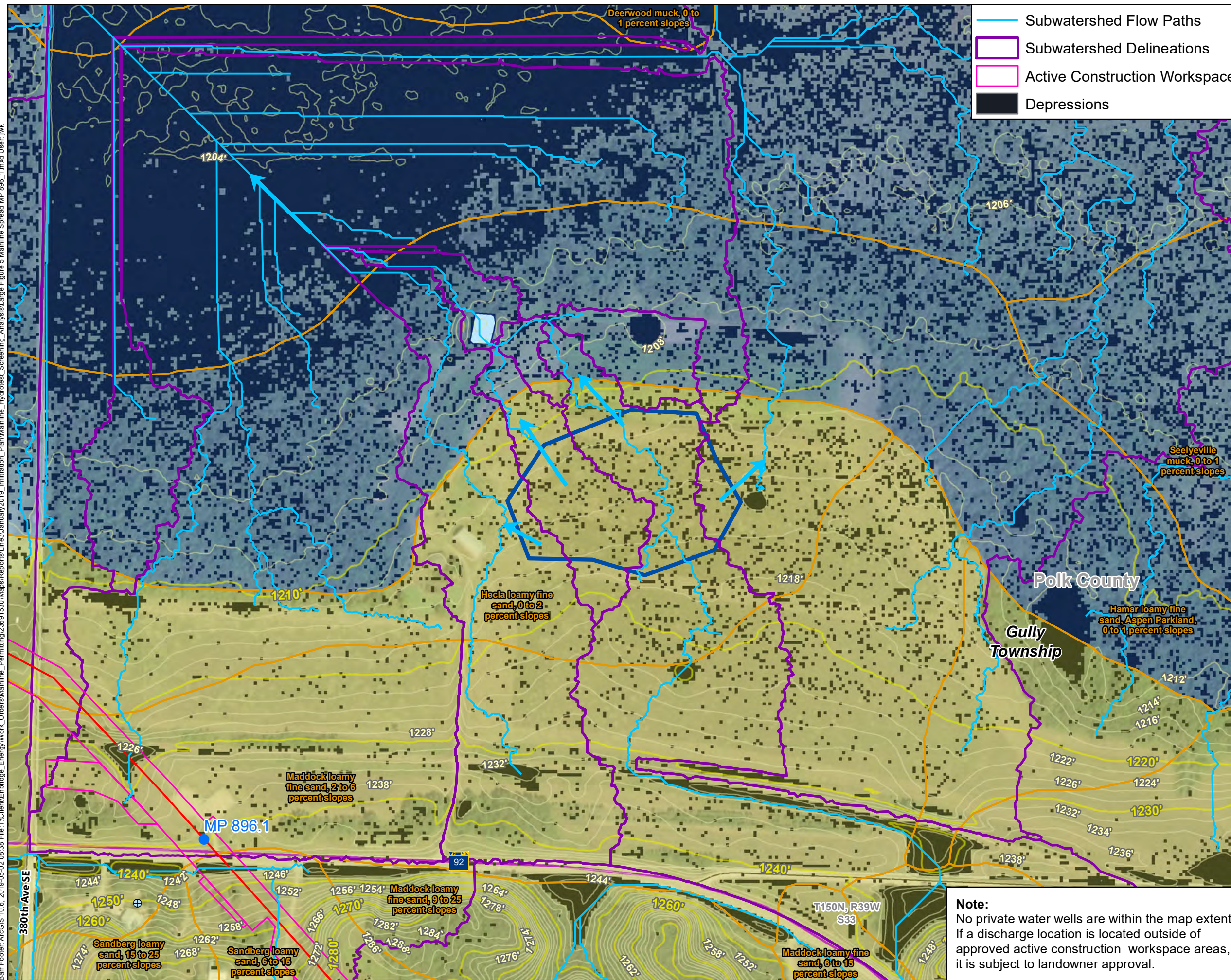




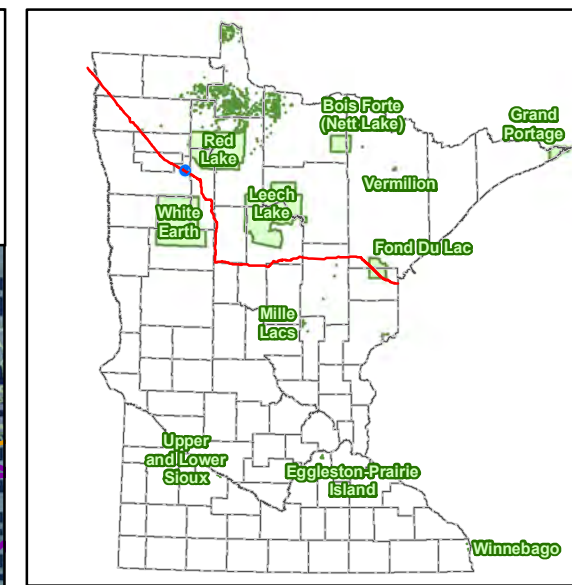




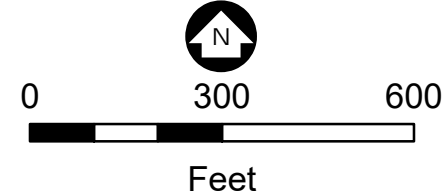
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- Subwatershed Flow Paths
- Subwatershed Delineations
- Active Construction Workspace
- Depressions



- Mainline Spread End Milepost
- Line 3 Replacement Project
- Well - County Well Index
- Water Appropriation Site
- Potential Upland Discharge Area - 6.59 acres
- Soil Map Unit
- Hydrologic Soil Group**
  - A
  - B
  - C
  - D (A/D, B/D, C/D)
- Lidar Contours**
  - Index (10-Foot)
  - Intermediate (2-Foot)
  - Surficial Flow Direction
  - Flow Direction
  - Perennial Stream
  - Intermittent Stream
  - Waterbodies
  - Field Delineated Wetlands
  - County Boundaries
  - State Trunk Highway
  - Minor Roads



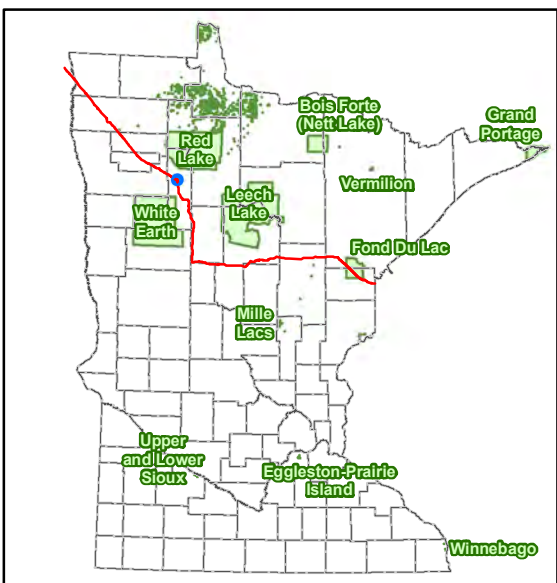
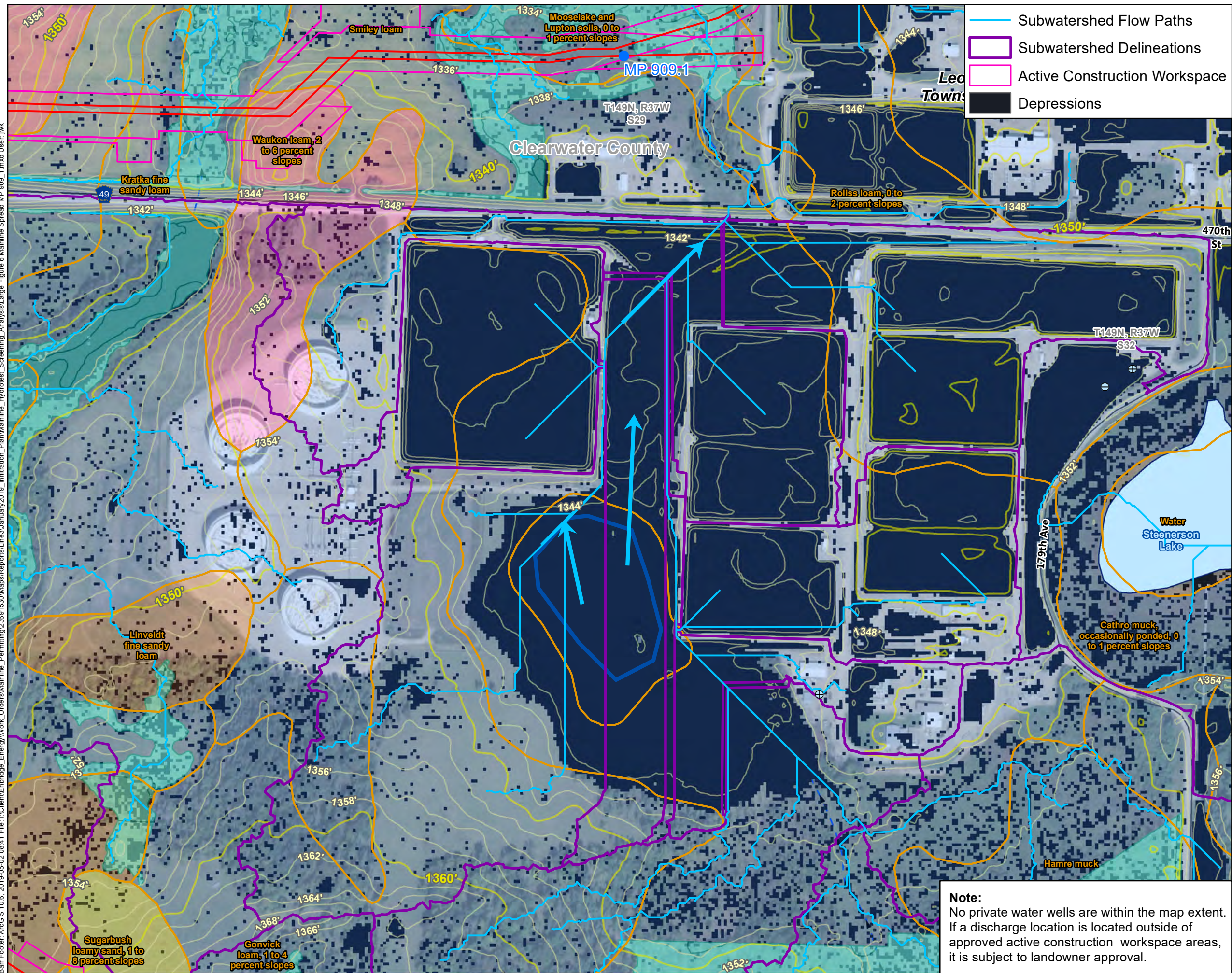
Large Figure 5  
Mainline Spread 1D, 2A: MP 896.1  
Mainline Hydrotest Screening Analysis  
Line 3 Replacement Project

**Note:**  
No private water wells are within the map extent. If a discharge location is located outside of approved active construction workspace areas, it is subject to landowner approval.

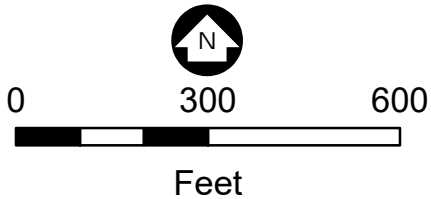




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- Mainline Spread End Milepost
- Line 3 Replacement Project
- Well - County Well Index
- Water Appropriation Site
- Potential Upland Discharge Area - 3.26 acres
- Soil Map Unit
- Hydrologic Soil Group
  - A
  - B
  - C
  - D (A/D, B/D, C/D)
- Lidar Contours
  - Index (10-Foot)
  - Intermediate (2-Foot)
- Surficial Flow Direction
- Flow Direction
- Perennial Stream
- Intermittent Stream
- Waterbodies
- Field Delineated Wetlands
- County Boundaries
- County State-Aid Highway
- Minor Roads



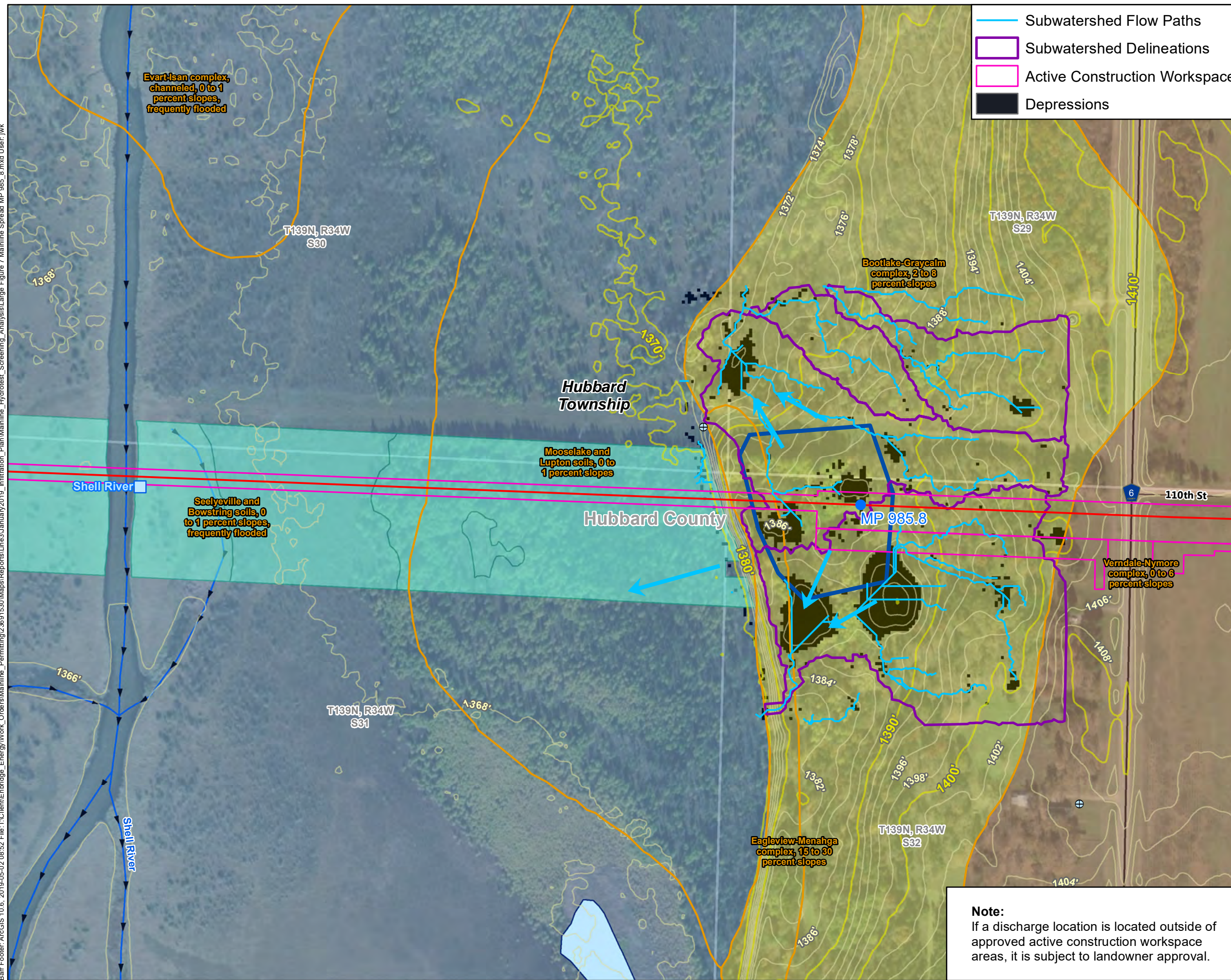
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Mainline Spread 2A, 2B: MP 909.1  
Mainline Hydrotest Screening Analysis  
Line 3 Replacement Project

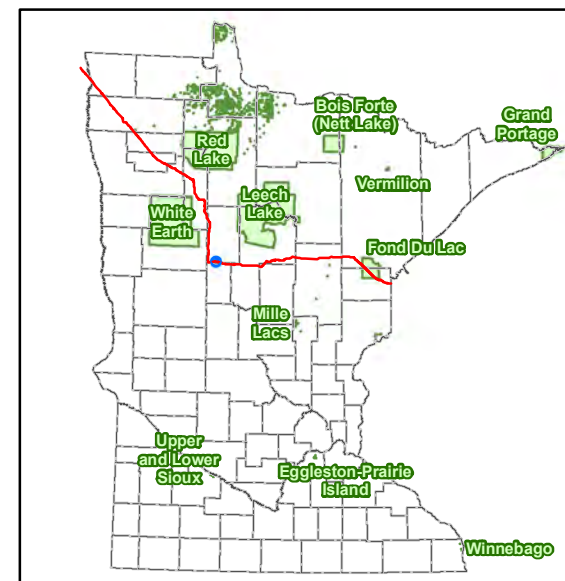




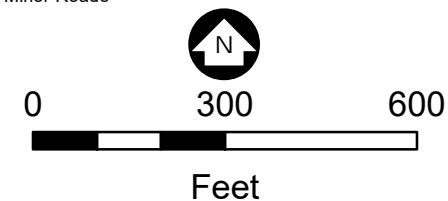
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**Note:**  
If a discharge location is located outside of approved active construction workspace areas, it is subject to landowner approval.



- Mainline Spread End Milepost
- Line 3 Replacement Project
- ⊕ Well - County Well Index
- Water Appropriation Site
- Potential Upland Discharge Area - 3.26 acres
- Soil Map Unit
- Hydrologic Soil Group**
  - A
  - B
  - C
  - D (A/D, B/D, C/D)
- Lidar Contours**
  - Index (10-Foot)
  - Intermediate (2-Foot)
- ➡ Surficial Flow Direction
- ▶ Flow Direction
- Perennial Stream
- - Intermittent Stream
- Waterbodies
- Field Delineated Wetlands
- County Boundaries
- County State-Aid Highway
- Minor Roads



Large Figure 7

Mainline Spread 3A, 3B: MP 985.8  
Mainline Hydrotest Screening Analysis  
Line 3 Replacement Project

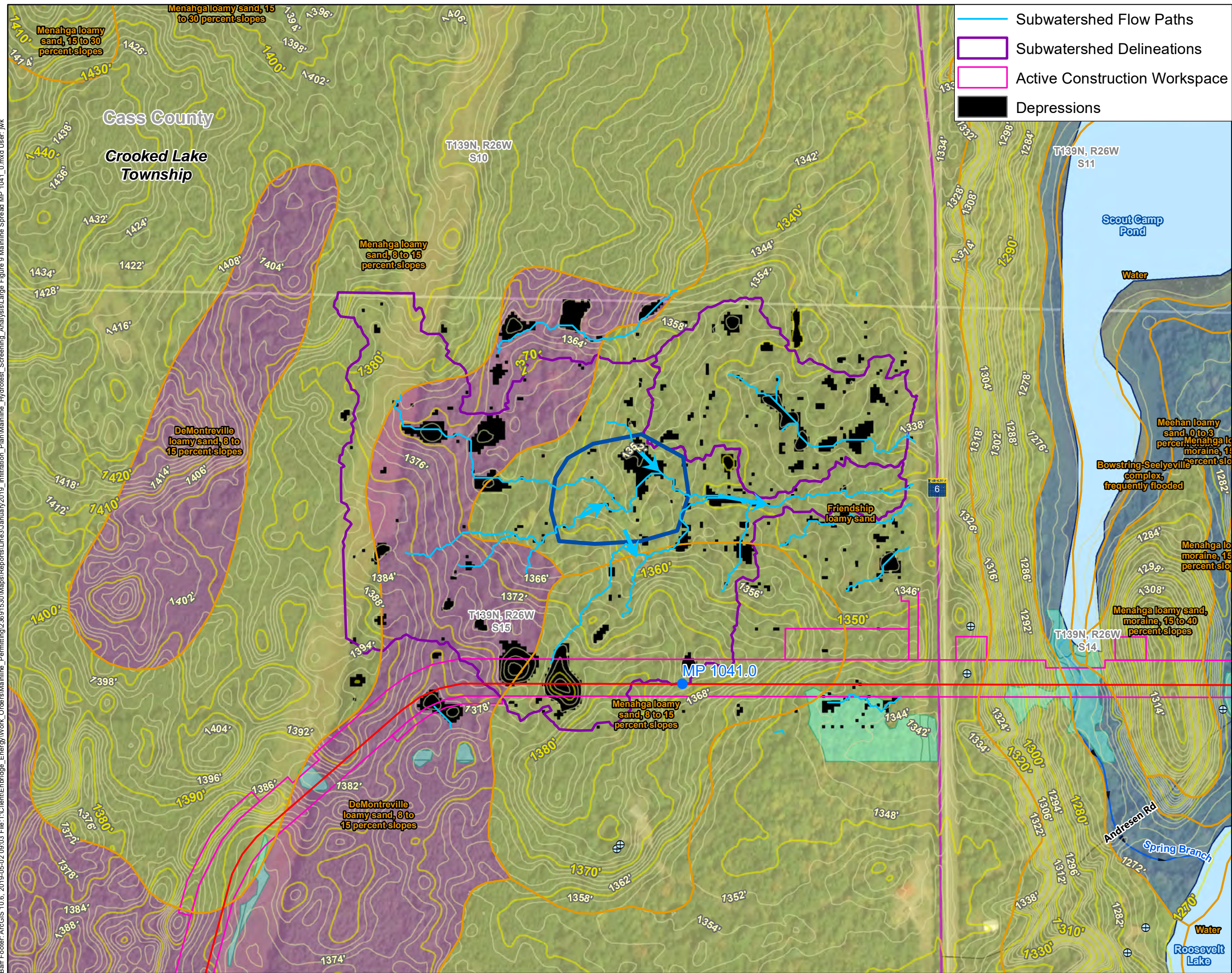




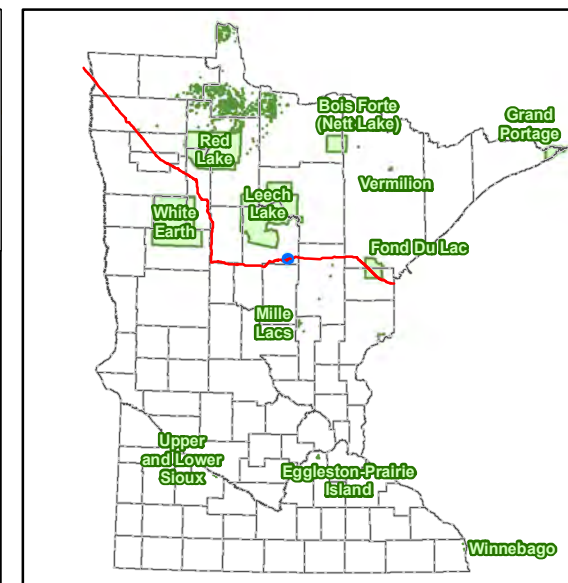




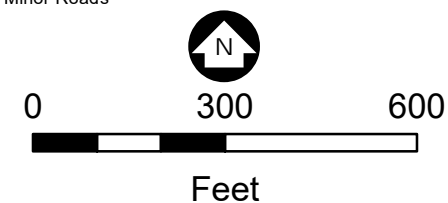
Barr Footer: ArcGIS 10.6, 2019-05-02 09:03 File: I:\Client\Enbridge\_Energy\Work\_Orders\Mainline\_Permits\23691530\Map\Mainline\_Hydrotest\_Screening\_Analysis\Large Figure 9 Mainline Spread MP 1041.0.mxd User: jwk



- Subwatershed Flow Paths
- Subwatershed Delineations
- Active Construction Workspace
- Depressions



- Mainline Spread End Milepost
- Line 3 Replacement Project
- Well - County Well Index
- Water Appropriation Site
- Potential Upland Discharge Area - 2.92 acres
- Soil Map Unit
- Hydrologic Soil Group**
  - A
  - B
  - C
  - D (A/D, B/D, C/D)
- Lidar Contours**
  - Index (10-Foot)
  - Intermediate (2-Foot)
- Surficial Flow Direction
- Flow Direction
- Perennial Stream
- Intermittent Stream
- Waterbodies
- Field Delineated Wetlands
- County Boundaries
- State Trunk Highway
- Minor Roads



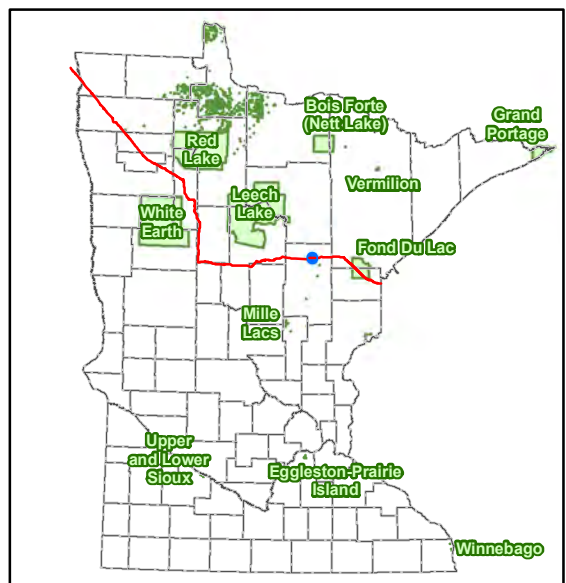
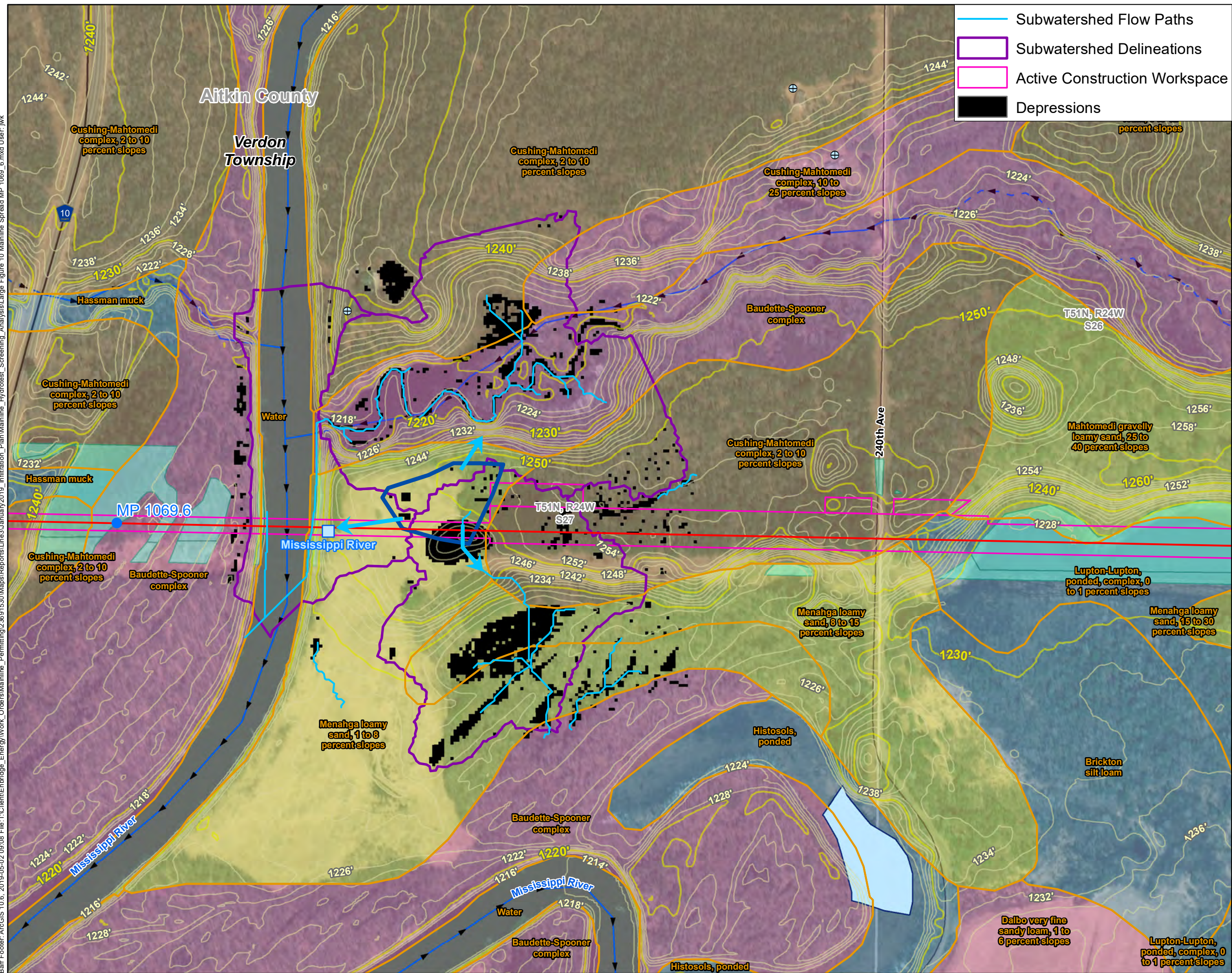
Large Figure 9

Mainline Spread 3C, 4A: MP 1041.0  
Mainline Hydrotest Screening Analysis  
Line 3 Replacement Project

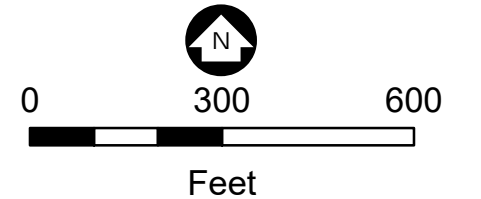




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- Mainline Spread End Milepost
- Line 3 Replacement Project
- ⊕ Well - County Well Index
- Water Appropriation Site
- Potential Upland Discharge Area - 1.52 acres
- Soil Map Unit
- Hydrologic Soil Group**
  - A
  - B
  - C
  - D (A/D, B/D, C/D)
- Lidar Contours**
  - Index (10-Foot)
  - Intermediate (2-Foot)
  - ➡ Surficial Flow Direction
  - ▶ Flow Direction
  - Perennial Stream
  - - Intermittent Stream
  - Waterbodies
  - Field Delineated Wetlands
  - County Boundaries
  - County State-Aid Highway
  - Minor Roads



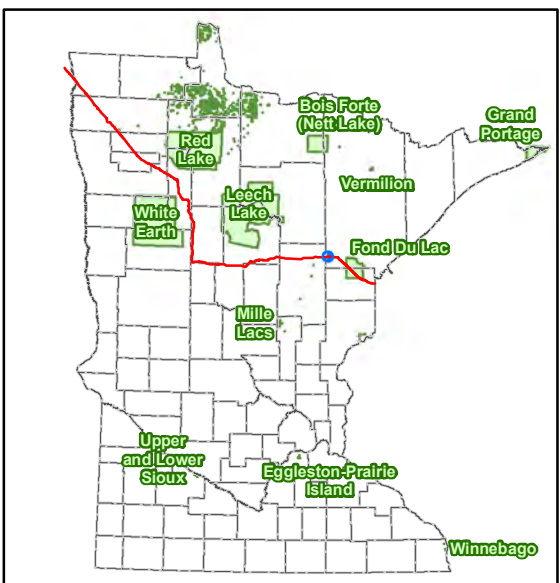
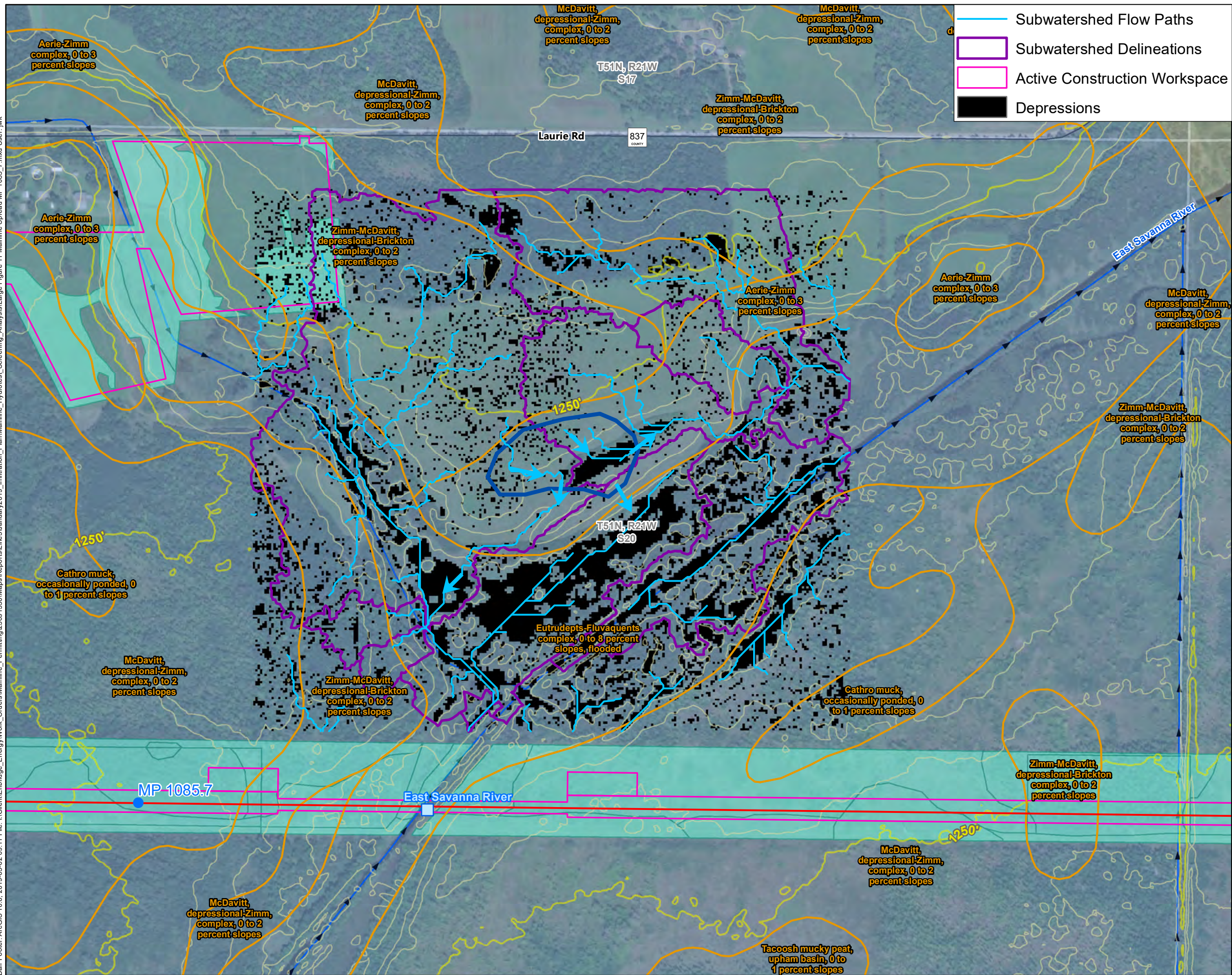
Large Figure 10

Mainline Spread 4B: MP 1069.6  
Mainline Hydrotest Screening Analysis  
Line 3 Replacement Project

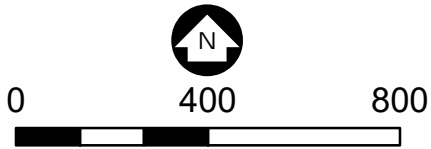




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- Mainline Spread End Milepost
- Line 3 Replacement Project
- ⊕ Well - County Well Index
- Water Appropriation Site
- Potential Upland Discharge Area - 3.89 acres
- Soil Map Unit
- Hydrologic Soil Group**
  - A
  - B
  - C
  - D (A/D, B/D, C/D)
- Lidar Contours**
  - Index (10-Foot)
  - Intermediate (2-Foot)
  - ➔ Surficial Flow Direction
  - Flow Direction
  - Perennial Stream
  - - Intermittent Stream
  - Waterbodies
  - Field Delineated Wetlands
  - County Boundaries
  - Minor Roads



Feet

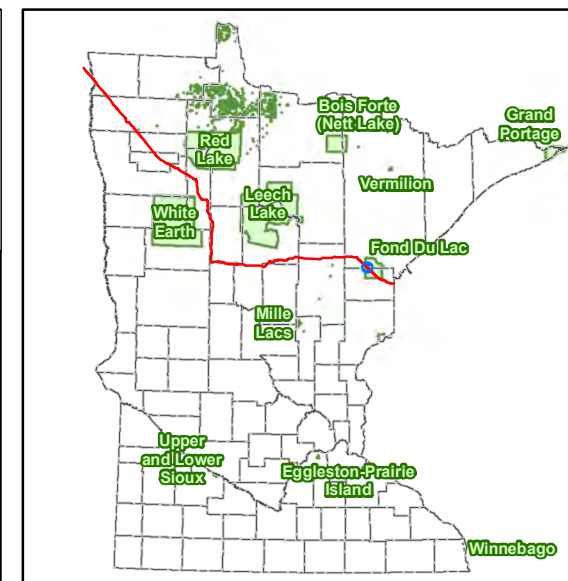
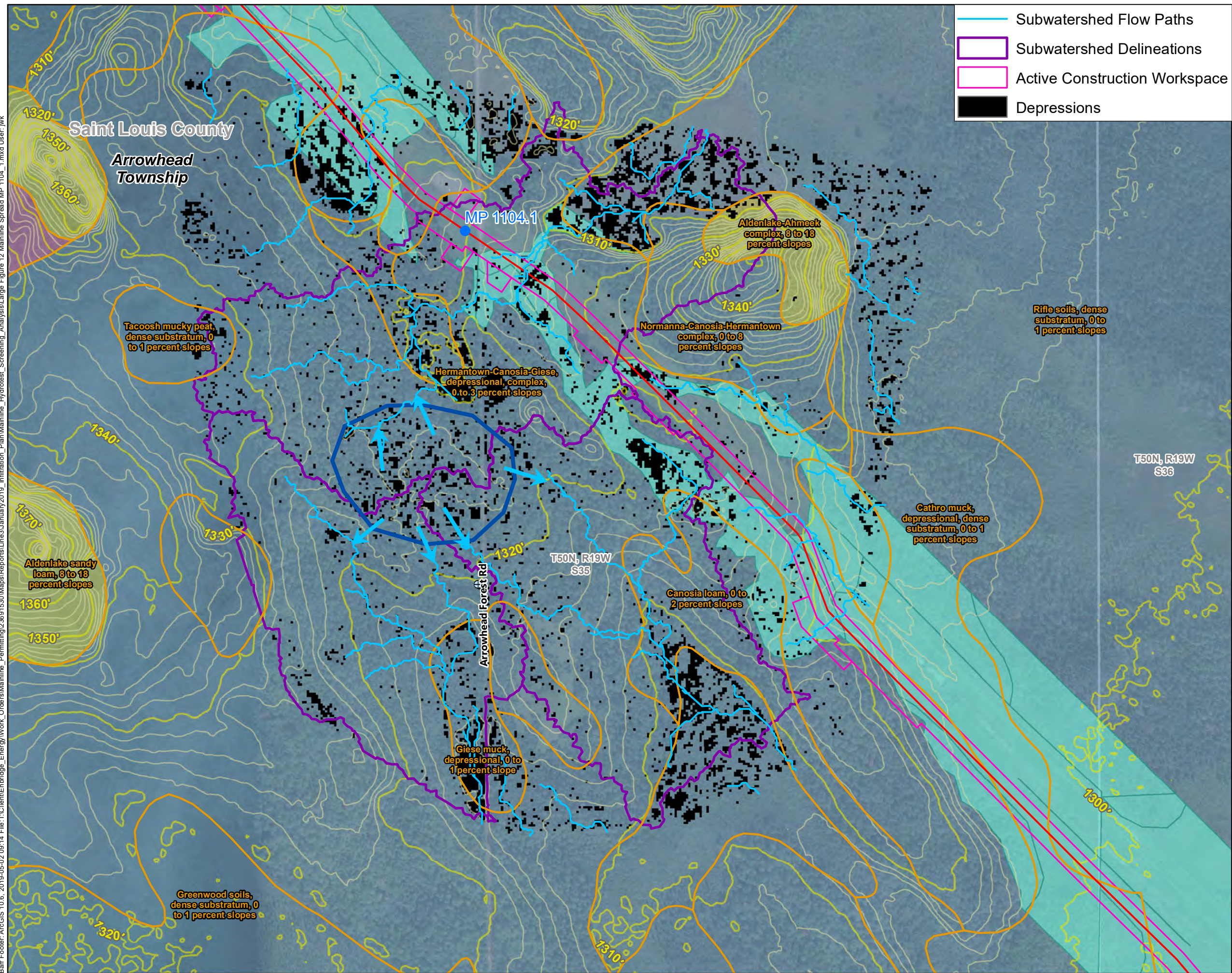
Large Figure 11

Mainline Spread 5A: MP 1085.7  
Mainline Hydrotest Screening Analysis  
Line 3 Replacement Project

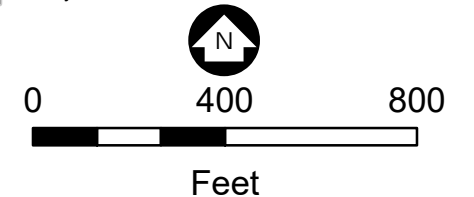




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- Mainline Spread End Milepost
- Line 3 Replacement Project
- ⊕ Well - County Well Index
- Water Appropriation Site
- Potential Upland Discharge Area - 8.37 acres
- Soil Map Unit
- Hydrologic Soil Group**
  - A
  - B
  - C
  - D (A/D, B/D, C/D)
- Lidar Contours**
  - Index (10-Foot)
  - Intermediate (2-Foot)
  - ➡ Surficial Flow Direction
  - ▶ Flow Direction
  - Perennial Stream
  - - Intermittent Stream
  - Waterbodies
  - Field Delineated Wetlands
  - County Boundaries



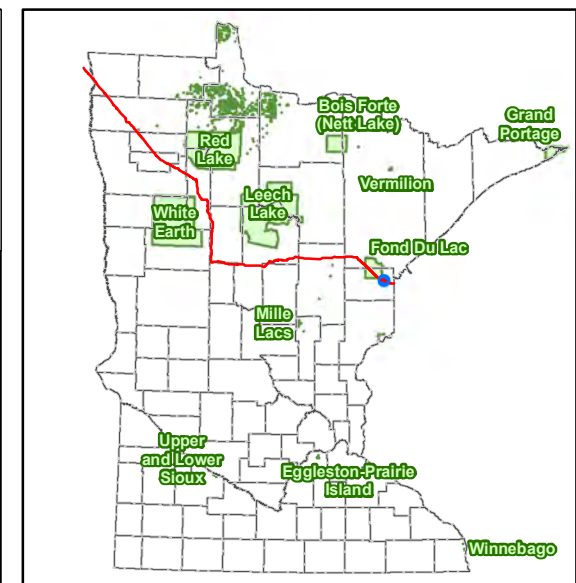
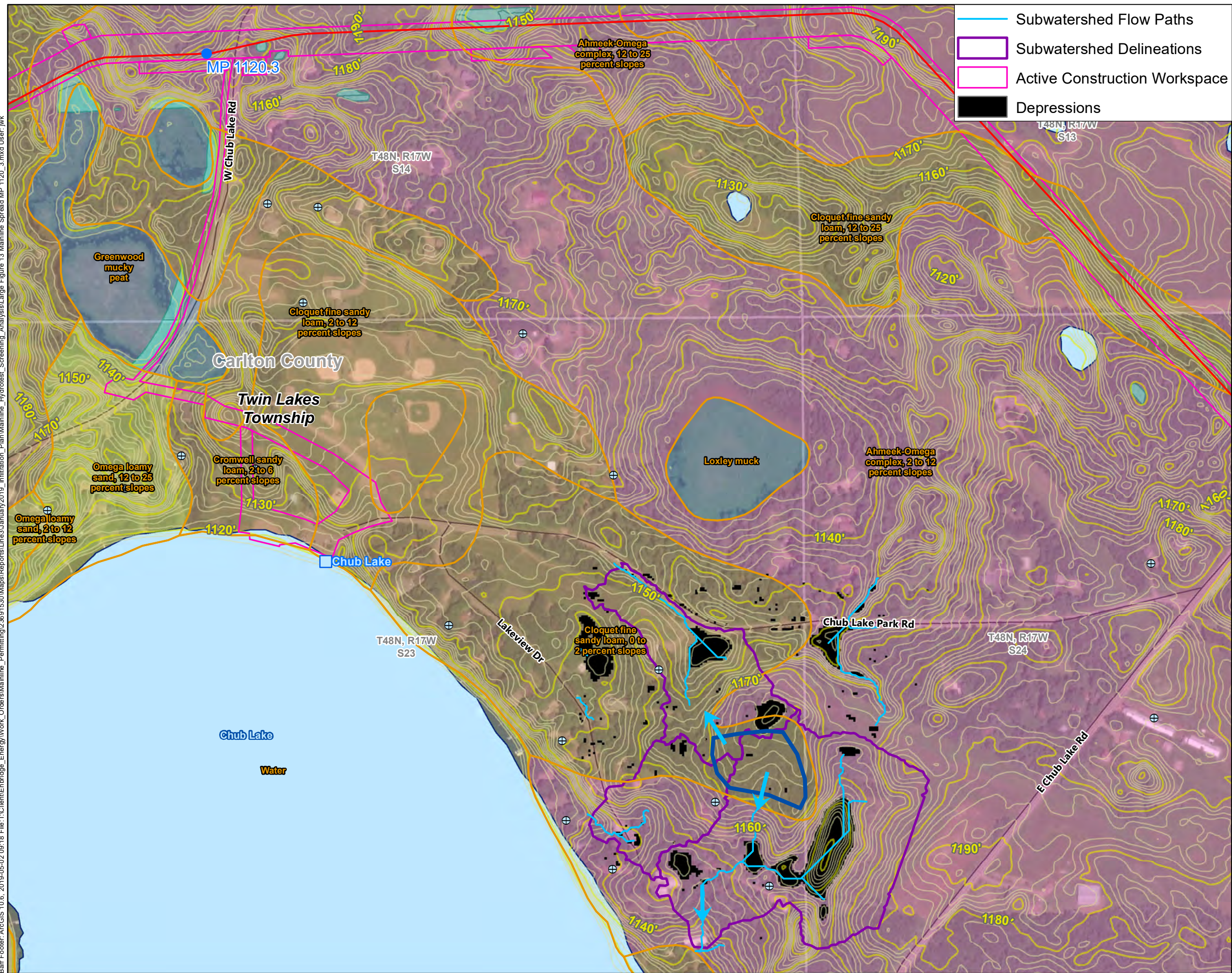
Large Figure 12

Mainline Spread 5A, 5B: MP 1104.1  
Mainline Hydrotest Screening Analysis  
Line 3 Replacement Project

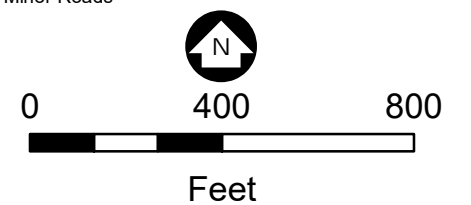




Barr Footer: ArcGIS 10.6, 2019-05-02 09:18 File: I:\Client\Enbridge\_Energy\Work\_Orders\Mainline\_Hydrotest\_Screening\_Analysis\Large Figure 13 Mainline Spread MP 1120.3.mxd User: jwk



- Mainline Spread End Milepost
- Line 3 Replacement Project
- ⊕ Well - County Well Index
- Water Appropriation Site
- Potential Upland Discharge Area - 2.17 acres
- Soil Map Unit
- Hydrologic Soil Group**
  - A
  - B
  - C
  - D (A/D, B/D, C/D)
- Lidar Contours**
  - Index (10-Foot)
  - Intermediate (2-Foot)
  - Surficial Flow Direction
  - ▶ Flow Direction
  - Perennial Stream
  - - Intermittent Stream
  - Waterbodies
  - Field Delineated Wetlands
  - County Boundaries
  - Minor Roads



Large Figure 13

Mainline Spread 5B, 5C: MP 1120.3  
Mainline Hydrotest Screening Analysis  
Line 3 Replacement Project





**Attachment H**  
**Infiltration Plan**



## Infiltration Plan

Enbridge Energy, Limited Partnership • Line 3 Replacement Project

May 2019





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Appendix D	Field Conditions Inspection Sheet

## **ACRONYMS AND ABBREVIATIONS**

BMPs	best management practices
EI	environmental inspector
Enbridge	Enbridge Energy, Limited Partnership
gpm	gallons per minute
HDD	horizontal directional drill
L3R	Line 3 Replacement Project
LiDAR	Light Detection and Ranging
MP	Milepost
MPCA	Minnesota Pollution Control Agency
NPDES	National Pollutant Discharge Elimination System
Plan	Infiltration Plan
Project	Line 3 Replacement Project
ROW	right-of-way
SDS	State Disposal System
SSURGO	Soil Survey Geographic Database

## 1.0 INTRODUCTION

Enbridge Energy, Limited Partnership (“Enbridge”) has applied for a National Pollutant Discharge Elimination System (“NPDES”) / State Disposal System (“SDS”) Individual Permit from the Minnesota Pollution Control Agency (“MPCA”) to conduct discharge of waters used to hydrostatically test the structural integrity of the Line 3 Replacement Project (“L3R” or “Project”) pipeline (“hydrotest waters”). Hydrotest water is produced either through testing segments of the pipeline used for horizontal directional drill (“HDD”) crossings (referred to as “HDD hydrotests”) or for large segments of the welded pipeline (referred to as “mainline hydrotests”).

L3R consists of approximately 355 miles of new 36-inch-diameter pipeline traversing the states of North Dakota, Minnesota, and Wisconsin, and terminating at the existing Enbridge Superior terminal facility near Superior, Wisconsin. The section of L3R that is the subject of this application includes the replacement of approximately 282 miles of the existing 34-inch-diameter Line 3 pipeline with 330 miles of 36-inch-diameter pipeline and associated facilities from the North Dakota/Minnesota border to the Minnesota/Wisconsin border (see Figure 1). Enbridge’s Designated Route generally follows the existing Line 3 pipeline along the Enbridge Mainline System right-of-way (“ROW”) from the North Dakota/Minnesota border in Kittson County to the Clearbrook Terminal in Clearwater County. Next, L3R turns south from Clearbrook to generally follow an existing third-party crude oil pipeline ROW to Hubbard County. The route then turns east to generally follow other existing electric transmission lines until it rejoins with the Enbridge Mainline System ROW in St. Louis County through the Fond du Lac Reservation to the Minnesota/Wisconsin border in Carlton County.

Enbridge’s preferred discharge method for HDD hydrostatic test water is discharge to an upland area where the water would infiltrate. Enbridge is also proposing to use infiltration for a limited number of mainline hydrotest discharges. This Infiltration Plan (“Plan”) describes Enbridge’s proposal to manage hydrotest water discharge that would be infiltrated at upland locations.

Enbridge proposes to infiltrate discharges from 17 HDD hydrotests and 3 mainline hydrotests along the Project in Minnesota, as shown on Figure 1. Details on proposed infiltration locations and discharge volumes are provided in Table 1.0-1. The purpose of this Plan is to establish the suitability of the proposed infiltration locations for one-time discharge of hydrotest water; to describe the estimated infiltration area, estimated discharge rate and estimated infiltration duration for each hydrotest discharge; and to document Enbridge’s plans to prevent hydrotest discharge from entering surface waters.

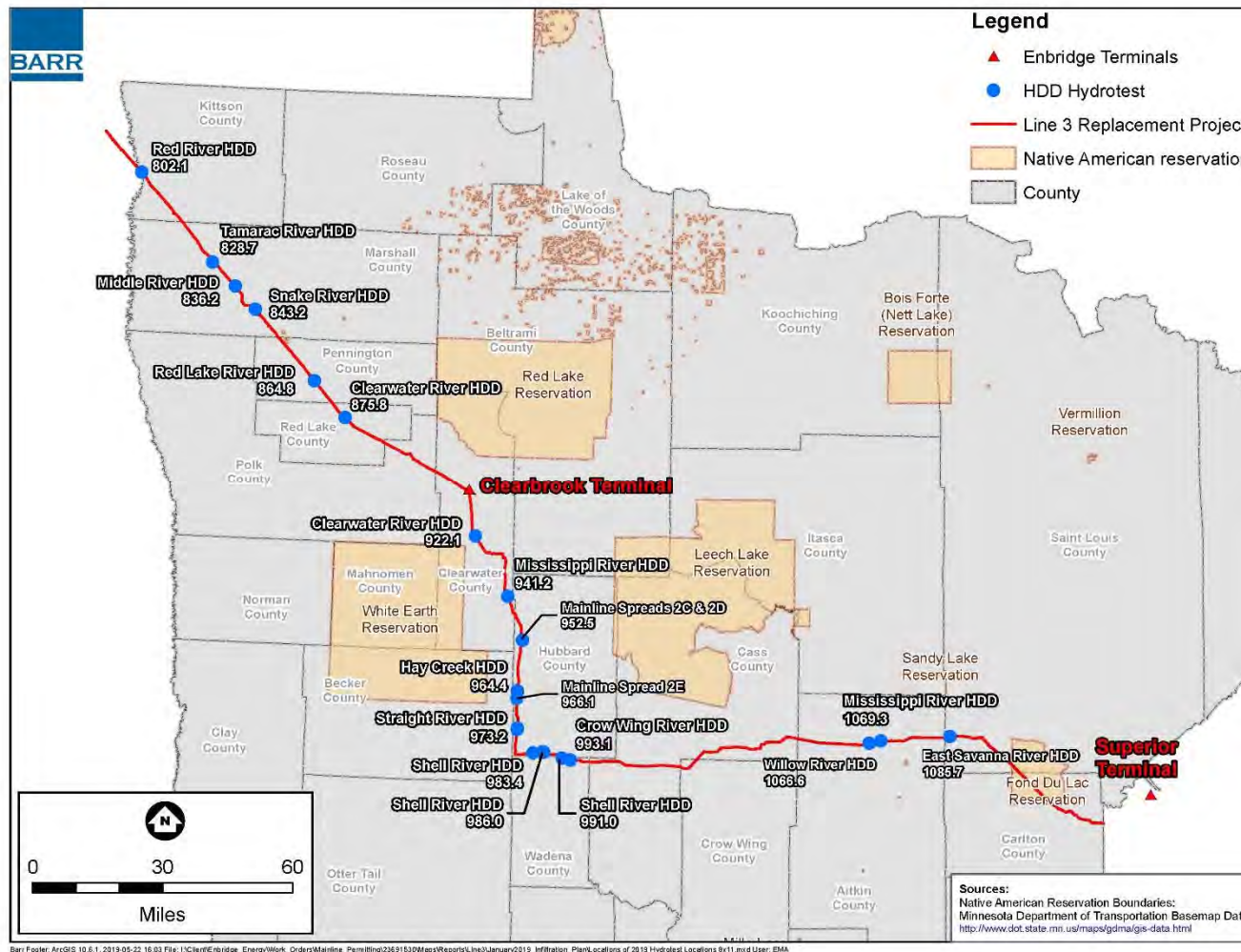


Figure 1 Hydrotest Discharge Infiltration Locations

ENBRIDGE ENERGY, LIMITED PARTNERSHIP  
 LINE 3 REPLACEMENT PROJECT  
 INFILTRATION PLAN  
 INDIVIDUAL NPDES / SDS PERMIT APPLICATION  
 MAY 2019

<b>Table 1.0-1</b> <b>Hydrotest Discharge Infiltration Locations</b>							
Hydrotest	Source Water	Infiltration Location			Pipe Length (feet)	Discharge Volume (gallons)	Discharge Volume (acre-feet)
		Approximate Milepost	County	Township, Range, Section			
Red River HDD	Red River	802.1	Kittson County	T160N, R50W, S9	2,100	207,000 <sup>a</sup>	0.27
Tamarac River HDD	Tamarac River	828.7	Marshall County	T157N, R47W, S16	1,500	80,800	0.34
Middle River HDD	Middle River	836.2	Marshall County	T156N, R46W, S18	1,800	93,700	0.29
Snake River HDD	Snake River	843.2	Marshall County	T155N, R46W, S12	1,600	84,100	0.26
Red Lake River HDD	Red Lake River	864.8	Pennington County	T153N, R43W, S32	3,200	170,000	0.52
Clearwater River HDD	Clearwater River	875.8	Red Lake County	T151N, R42W, S9	2,800	149,000	0.46
Clearwater River HDD	Clearwater River	922.1	Clearwater County	T147N, R37W, S21	2,800	150,000	0.46
Mississippi River HDD	Mississippi River	941.2	Clearwater County	T145N, R36W, S35	2,200	120,000	0.37
Hay Creek HDD	Well #763975	964.4	Hubbard County	T141N, R35W, S20	2,900	153,000	0.47
Straight River HDD	Well #763975	973.2	Hubbard County	T140N, R35W, S32	3,600	202,000	0.40
Shell River HDD	Shell River	983.4	Hubbard County	T139N, R35W, S35	2,400	126,000	0.39
Shell River HDD	Shell River	986.0	Hubbard County	T139N, R34W, S32	4,400	233,000	0.72
Shell River HDD	Shell River	991.0	Wadena County	T138N, R34W, S1	1,600	94,500	0.29
Crow Wing River HDD	Crow Wing River	993.1	Wadena County	T138N, R33W, S5	1,700	92,400	0.28
Willow River HDD	Willow River	1066.6	Aitkin County	T51N, R24W, S31	1400	141,000	0.43
Mississippi River HDD	Mississippi River	1069.3	Aitkin County	T51N, R24W, S27	2,200	133,000	0.41
East Savanna River HDD	East Savannah River	1085.7	St. Louis County	T51N, R21W, S20	1500	138,000	0.42
Mainline - Spread 2C	Well #718159	952.5	Hubbard County	T143N, R35W, S20	44,400	2,440,000	7.48
Mainline - Spread 2D	Well #718159	952.5	Hubbard County	T143N, R35W, S20	72,300	3,900,000	11.97
Mainline - Spread 2E	Well #763975	966.1	Hubbard County	T141N, R35W, S29	49,100	2,700,000	8.29
<sup>a</sup> This discharge volume includes water from two HDD hydrotests: the I-29 HDD hydrotest (88,000 gallons) and the Red River-MN HDD hydrotest (119,000 gallons). The total volume would be discharged at the Red River HDD infiltration location, resulting in a total discharge of 207,000 gallons. The I-29 HDD water appropriation volumes would be permitted with the state of North Dakota.							

## **2.0 HYDROTEST DISCHARGE DESCRIPTION**

This section describes Enbridge's hydrotest procedures, the discharge infiltration procedures, and the characteristics of the hydrotest discharge.

### **2.1 HYDROTEST PROCEDURES**

During construction of the pipeline, Enbridge would conduct hydrostatic testing to evaluate pipeline integrity. Prior to conducting each hydrostatic test, the new pipeline segment that would be tested would be cleaned by removing accumulated construction debris, mill scale, dirt, and dust that may have collected in the pipe by using a tool that travels inside the pipe, referred to as a cleaning pig. The debris removed from the inside of the pipe would be collected and properly disposed of off-site. Next, test headers and pigs would be arranged in the new pipeline segment ahead of the fill pig, and the pipeline would be filled with water acquired in accordance with applicable water appropriation permits, capped, and tested by pressurizing the segment and "holding" the elevated pressure for a specific period of time per U.S. Department of Transportation specifications. After successful testing, a reinserted cleaning pig would push the water through the pipe for discharge in accordance with permit conditions.

### **2.2 DISCHARGE INFILTRATION PROCEDURES**

After each hydrotest is complete, water would be pumped from the pipeline to a dewatering structure located in a well vegetated upland location adjacent to the hydrotest. For mainline spread discharges, the water would be run through an appropriate filtration system before being pumped to a dewatering structure. The dewatering structure would include a geotextile filter bag and/or straw bale structure that would be lined with geotextile fabric; refer to the best management practices ("BMP") Typical Figure 22 (see Appendix C) for additional details regarding the dewatering structure. At some locations and if determined necessary in the field, Enbridge may use larger dewatering structures or multiple dewatering structures to reduce infiltration time. Water would flow out from the dewatering structure(s) and spread across the infiltration area before infiltrating. The estimated size of the infiltration area for each HDD discharge location is presented in Table 1.0-1. For mainline spread discharges, the size of the infiltration area would be based on site-specific conditions and limited to prevent flow to surface water. Enbridge would use a discharge rate for each hydrotest that is based on site-specific infiltration characteristics of the soils at the infiltration location, as described in Section 3.2.

Enbridge would use BMPs to manage the infiltration such that no flow reaches surface waters, and such that channelized flow and erosion do not occur. Enbridge would monitor the discharge as described in Section 4.0 of the Plan, and if excessive ponding or unanticipated flow is observed would reduce the discharge rate to prevent hydrotest water from flowing to surface water or causing erosion. Section 5.0 of the Plan provides additional details regarding the procedures Enbridge would use to prevent hydrotest water from reaching surface waters.

### **2.3 HYDROTEST DISCHARGE WATER CHARACTERISTICS**

The hydrotest discharge water quality would reflect the water quality of its source water because the tests would be conducted on new pipe. As described in Section 2.1, the interior of the pipe would be cleaned prior to the test and no chemical additives are proposed for use at this time.



Any future additives considered by Enbridge would need to be approved by the MPCA prior to use. Based on laboratory analyses of hydrotest discharge water from other pipeline projects where new pipe was used, the process of hydrostatic testing causes little or no change to the quality of the water used for the test (see Appendix B).

The source waters to be used for hydrostatic testing are listed in Table 1.0-1. The source waters would be surface waters or groundwater; no municipal water sources are planned. Withdrawal of source water would be permitted under a water appropriation permit from the Minnesota Department of Natural Resources.

### **3.0 HYDROTEST DISCHARGE INFILTRATION ANALYSIS**

Enbridge analyzed potential upland discharge locations to confirm their suitability for infiltration and to estimate the discharge rate and the size of the area over which water would spread (the infiltration area). Section 3.1 describes the hydrotest infiltration analysis method. The analysis was applied to each proposed HDD hydrotest discharge infiltration location (see Section 3.2) and each proposed mainline hydrotest discharge infiltration location (see Section 3.3).

#### **3.1 HYDROTEST DISCHARGE INFILTRATION ANALYSIS METHOD**

The purpose of the infiltration analysis was to estimate: 1) the discharge rate; 2) the size of the area over which water would spread before infiltrating (the infiltration area); and 3) the time that would be needed to infiltrate the hydrotest discharge water (the infiltration duration). To complete the analysis, Enbridge first identified a suitable area for placement of the dewatering structure (the potential upland discharge area) and then gathered information about each potential upland discharge area. Enbridge's methods and results are outlined in the following sections.

##### **3.1.1. Identify Upland Discharge Areas**

For each discharge, Enbridge first identified an upland discharge area that is adjacent to the ROW and near the hydrotest discharge location, and that exhibits favorable characteristics for infiltration, such as being well-vegetated, having low slope, and being located away from surface waters and existing infrastructure. Upland discharge areas are shown with a blue outline on Large Figure 1 through Large Figure 19 (see Appendix A).

The potential location(s) of the dewatering structures within the upland discharge areas are shown in Large Figure 1 through Large Figure 19 (see Appendix A); however, the final location(s) within each upland discharge area would be selected in the field by Enbridge's environmental inspector ("EI"). Prior to final selection of each discharge location and before the discharge event, the Field Conditions Inspection Sheet (see Appendix D) would be completed by an Environmental Engineer, soils scientist, or a Professional Geologist who has reviewed the site-specific conditions present at the time of construction. The EI would consider procedures in Section 5.0, BMP Typical Figure 22 (see Appendix C), the information provided in the Field Conditions Inspection Sheet (see Appendix D), and the applicable figures in Appendix A when selecting the final discharge location(s).

### **3.1.2. Gather Information About Upland Discharge Areas**

Enbridge gathered the following site-specific information about each upland discharge area from regional datasets of topography, soils, surficial geology, and water table information:

1. Topographic slope data (2-foot Light Detection and Ranging (“LiDAR”) data) was used to identify potential flow paths from the infiltration analysis area to the nearest surface water.
2. Soils data taken from the Soil Survey Geographic Database (“SSURGO”) (Soil Survey Staff, 2018) were used to check various properties related to soil infiltration ability. Data taken from SSURGO included the following:
  - Hydrologic Soil Group – The hydrologic soil group designations are based on estimates of runoff potential. Soils are assigned to one of four groups according to the estimated rate of water infiltration. Group A soils have a high infiltration rate, group B soils have a moderate infiltration rate, group C soils have a slow infiltration rate, and group D soils have a very slow infiltration rate (Soil Survey Staff, 2018). Soil hydrologic group infiltration was used for qualitative screening.
  - Saturated Hydraulic Conductivity – Saturated hydraulic conductivity refers to the ease with which pores in saturated soil can transmit water. This estimate is based on soil characteristics observed in the field, particularly structure, porosity, and texture (Soil Survey Staff, 2018). Saturated hydraulic conductivity values were used for the quantitative analyses.
  - Depth to Soil Restrictive Layer – The depth to soil restrictive layer denotes the average depth below ground surface to any layer which impedes the movement of water (Soil Survey Staff, 2018).
3. Depth to groundwater data was used to identify areas where continuous infiltration may be impeded by a shallow water table. Infiltration over a shallow water table may result in mounding of the water table and could cause surface ponding.

### **3.1.3. Estimate Discharge Rate, Infiltration Area, and Infiltration Duration**

Enbridge anticipates that infiltration would not occur over the entire extent of the upland discharge area, but would be confined to a smaller area, referred to as the “anticipated infiltration area” in Large Figure 1 through Large Figure 19 (see Appendix A). The size of the infiltration area would be equal to the area of the dewatering structure (or filter bag) plus the additional area that water flows beyond the dewatering structure before infiltrating. The analysis estimated the size of the infiltration area for each discharge location based on discharge rate and site-specific soil characteristics as provided in Table 3.1-1. The anticipated infiltration areas shown in Large Figure 1 through Large Figure 19 (see Appendix A) are sized according to the calculations provided in Table 3.1-1; however, they are subject to change pending field conditions at the time of the discharge.

Table 3.1-1 HDD Hydrotest Discharge Rate and Estimated Infiltration Area											
Hydrotest	Infiltration Location (Milepost)	Discharge Volume (gallons)	Saturated Hydraulic Conductivity <sup>a</sup> (ft/d)	Average Slope <sup>b</sup> (°)	Average Depth to Water <sup>a</sup> (ft below ground surface)	Average Depth to Restrictive Feature <sup>a</sup> (ft below ground surface)	Downslope distance to nearest surface water <sup>c</sup> (ft)	Discharge Rate <sup>d</sup> (gpm)	Estimated Infiltration Area <sup>e</sup> (acres)	Estimated Infiltration Duration <sup>f</sup> (hours)	Large Figure
Red River HDD	802.1	207,000	0.37 - 1.5	0.65	0-10	>6.6	60	40 - 170 <sup>g</sup>	0.50 <sup>i</sup>	20 - 86	Large Figure 1
Tamarac River HDD	828.7	80,800	7.1	0.34	0-10	>6.6	385	660	0.41	3.0	Large Figure 2
Middle River HDD	836.2	93,700	10 - 11	1.07	0-10	4.2	780	660	0.26 - 0.29	2.5	Large Figure 3
Snake River HDD	843.2	84,100	19 - 37	0.75	0-10	>6.6	155	660	0.08 - 0.16	2.5	Large Figure 4
Red Lake River HDD	864.8	170,000	1.8	0.40	0-10	>6.6	65	200 <sup>h</sup>	0.50 <sup>i</sup>	15	Large Figure 5
Clearwater River HDD	875.8	149,000	2.6 - 3.1	0.49	0-10	>6.6	60	290 - 350 <sup>i</sup>	0.50 <sup>i</sup>	7.5 - 8.5	Large Figure 6
Clearwater River HDD	922.1	150,000	20 - 42	0.65	0-10	>6.6	63	660	0.07 - 0.15	4.0	Large Figure 7
Mississippi River HDD	941.2	120,000	1.8 - 26	2.03	0-10	>6.6	25	200 <sup>j</sup>	0.11 - 0.50	10.0	Large Figure 8
Hay Creek HDD	964.4	153,000	24 - 25	0.52	0-10	>6.6	77	660	0.12	4.0	Large Figure 9
Straight River HDD	973.2	202,000	21	1.72	40-50	>6.6	4,570	660	0.14	3.5	Large Figure 10
Shell River HDD	983.4	126,000	24	4.13	20-30	>6.6	271	660	0.12	3.5	Large Figure 11
Shell River HDD	986.0	233,000	21	1.72	40-50	>6.6	3,385	660	0.14	6.0	Large Figure 12
Shell River HDD	991.0	94,500	21 - 26	0.76	20-30	>6.6	374	660	0.11 - 0.14	2.5	Large Figure 13
Crow Wing River HDD	993.1	92,400	26	0.23	40-50	>6.6	283	660	0.11	2.5	Large Figure 14
Willow River HDD	1066.6	141,000	2.8	1.95	10-20	>6.6	132	90 <sup>k</sup>	0.50 <sup>i</sup>	26.5	Large Figure 15
Mississippi River HDD	1069.3	133,000	0.92 - 1.7	0.45	0-10	>6.6	66	100 - 190 <sup>m</sup>	0.50 <sup>i</sup>	12	Large Figure 16
East Savanna River HDD	1085.7	138,000	6.2	0.86	30-40	>6.6	227	660	0.47	3.5	Large Figure 17
<sup>a</sup> From SSURGO (Soil Survey Staff, 2018). Saturated hydraulic conductivity values are converted from cm/s to ft/d. <sup>b</sup> From statewide topographic dataset (U.S. Geological Survey, 2016). <sup>c</sup> The distance from the downslope edge of the potential upland discharge area (shown on Large Figure 1 through Large Figure 17) to the nearest surface water body or delineated wetland. <sup>d</sup> The analysis assumed that where feasible, Enbridge would discharge at a rate of 660 gpm, which is the rate associated with a 30-foot by 30-foot dewatering structure in BMP Typical Figure 22A (Appendix C). For locations where discharge at 660 gpm resulted in an estimated infiltration area larger than 0.5 acre, the analysis scaled back the discharge rate to determine the maximum discharge rate for which infiltration can be accomplished within 0.5 acre. <sup>e</sup> The accuracy of the infiltration area estimate is a function of the SSURGO saturated hydraulic conductivity data, and may also be affected by vegetation, precipitation, and other physical factors. <sup>f</sup> The infiltration duration estimate assumes that the SSURGO saturated hydraulic conductivity represents the entire unsaturated zone and that it would be constant during the entire discharge period. The saturated hydraulic conductivity of the soil in the unsaturated zone may decrease during the discharge, depending on the depth to the water table and the transmissivity of the water table aquifer. If the saturated hydraulic conductivity decreases during the discharge, the discharge rate might need to be reduced and the infiltration duration would be longer. <sup>g</sup> For the Red River HDD discharge, at 660 gpm the estimated infiltration area would be 1.9 to 8.0 acres. <sup>h</sup> For the Red Lake River HDD discharge, at 660 gpm the estimated infiltration area would be 1.7 acres. <sup>i</sup> For the Clearwater River (milepost ["MP"] 875.8) HDD discharge, at 660 gpm the estimated infiltration area would be 1.0 to 1.1 acres. <sup>j</sup> For the Mississippi River (MP 941.2) HDD discharge, at 660 gpm the estimated infiltration area would be 1.6 acres. <sup>k</sup> For the Willow River HDD discharge, at 660 gpm the estimated infiltration area would be 3.7 acres. <sup>m</sup> For the Mississippi River (MP1069.3) HDD discharge, at 660 gpm the estimated infiltration area would be 1.7 to 3.2 acres. <sup>l</sup> In practice, a larger infiltration area could be used if suitable space is available, with monitoring as described in Section 4.0 to prevent flow from reaching surface water.											

The analysis of each upland discharge area was based on the saturated hydraulic conductivity of the soils at that location, as provided by SSURGO. Regarding discharge rates, the analysis of HDD hydrotest discharge infiltration locations assumed that where feasible, Enbridge would discharge at a rate of 660 gallons per minute ("gpm"), which is the rate listed for a 30-foot by 30-foot dewatering structure in BMP Typical Figure 22A (see Appendix C). For locations where discharge at 660 gpm resulted in an estimated infiltration area larger than 0.5 acre, the analysis scaled back the discharge rate to determine the maximum discharge rate for which infiltration can be accomplished within 0.5 acre. For mainline hydrotest discharge infiltration locations, the analysis assumed an infiltration area of 0.5 acre.

Estimates of the discharge rate, infiltration area, and infiltration duration were calculated based on the following:

- Discharge/infiltration water volumes calculated by Enbridge's engineering staff.
- For each HDD hydrotest discharge location, the discharge rate was initially specified as 660 gpm. The discharge rate was reduced, as noted below, for locations where the estimated infiltration area at 660 gpm was greater than 0.5 acre.
- The infiltration area was estimated by dividing the discharge rate (660 gpm) by the saturated hydraulic conductivity of the soils at the site.
- For HDD hydrotest discharge locations where the estimated infiltration area at 660 gpm was greater than 0.5 acre, a reduced discharge rate was calculated by setting the infiltration area at 0.5 acre. The reduced discharge rates were calculated by multiplying the saturated hydraulic conductivity of the soils at the site by 0.5 acre.
- For the purpose of these analyses, Enbridge assumed 0.5-acre infiltration area for the mainline hydrotest discharge.
- For mainline hydrotests, the maximum potential discharge rate was estimated by multiplying the saturated hydraulic conductivity of the soils at the site by the assumed infiltration area (0.5 acre).
- The infiltration duration is equal to the infiltration volume divided by the discharge rate.

### **3.2 HDD HYDROTEST ESTIMATED DISCHARGE RATES AND INFILTRATION AREAS**

The upland discharge areas for the HDD hydrotest discharges are shown on Large Figure 1 through Large Figure 17 (see Appendix A). Results of the HDD hydrotest discharge infiltration analyses are provided in Table 3.1-1.

Using a discharge rate of 660 gpm, the infiltration area was estimated to be less than 0.5 acre at all locations where the soil saturated hydraulic conductivity is more than 6 feet/day. Where the soil saturated hydraulic conductivity is less than 6 feet/day, to limit the discharge area to 0.5 acre, the discharge rate must be reduced as shown on Table 3.1-1.

Enbridge may use larger dewatering structures or multiple dewatering structures and discharge rates higher than listed in Table 3.1-1 to reduce infiltration duration if site-specific conditions and field observations indicate that such an approach can successfully infiltrate the discharge, prevent



channelized flow and erosion, and prevent flow from reaching surface waters. Further, infiltration areas larger than listed in Table 3.1-1 may be used if suitable space is available, with monitoring as described in Section 4.0 to prevent flow from reaching surface water. For all hydrotest discharge infiltrations, discharge rates may need to be adjusted, based on site-specific conditions and monitoring results, as discussed in Sections 4.0 and 5.0.

### **3.3 MAINLINE HYDROTEST ESTIMATED DISCHARGE RATES AND INFILTRATION DURATIONS**

The potential upland discharge areas for the mainline hydrotest discharges are shown on Large Figure 18 and Large Figure 19 (see Appendix A). Results of the mainline hydrotest discharge infiltration analyses are provided in Table 3.3-1.

Using an assumed infiltration area of 0.5 acre, the maximum discharge rate was estimated to be 1,400 gpm at the location for the Mainline - Spread 2C and Mainline - Spread 2D discharges, and 340 gpm at the location for the Mainline - Spread 2E discharge. In practice, a larger infiltration area could be used if suitable space is available, with monitoring as described in Section 4.0 to prevent flow from reaching surface water.

In areas able to support discharge rates above 660 gpm, the rate listed for an individual 30-foot by 30-foot dewatering structure in BMP Typical Figure 22A (see Appendix C), larger or multiple discharge structures could be used to accommodate the higher discharge rate. For all hydrotest discharge infiltrations, discharge rates may need to be adjusted, based on site-specific conditions and monitoring results, as discussed in Sections 4.0 and 5.0.

The infiltration durations at the estimated maximum discharge rates are estimated to be from approximately 1 to 6 days. Discharge at lower rates would require more time, as shown in Table 3.3-1.

Table 3.3-1 Mainline Hydrotest Discharge Rate and Infiltration Duration											
Hydrotest	Infiltration Location (Mile-post)	Discharge Volume (million gallons)	Saturated Hydraulic Conductivity <sup>a</sup> (ft/d)	Average Slope <sup>b</sup> (°)	Average Depth to Water <sup>a</sup> (ft below ground surface)	Average Depth to Restrictive Feature <sup>a</sup> (ft below ground surface)	Downslope distance to nearest surface water <sup>c</sup> (ft)	Assumed infiltration area <sup>d</sup> (acre)	Estimated maximum discharge rate <sup>e, f</sup> (gpm)	Estimated infiltration duration at maximum discharge rate <sup>g</sup> (days)	Large Figure
Mainline - Spread 2C	952.5	2.4	2.5	1.43	0-10	>6.6	3,015	0.5	280	5.9 <sup>h</sup>	Large Figure 18
Mainline - Spread 2D	952.5	3.9	2.5	1.43	0-10	>6.6	3,015	0.5	280	9.5 <sup>i</sup>	Large Figure 18
Mainline - Spread 2E	966.1	2.7	2.6	0.57	10-20	>6.6	477	0.5	290	6.4 <sup>j</sup>	Large Figure 19
<div><div><sup>a</sup> From SSURGO (Soil Survey Staff, 2018).</div><div><sup>b</sup> From statewide topographic dataset (U.S. Geological Survey, 2016).</div><div><sup>c</sup> The distance from the downslope edge of the potential upland discharge area (shown on Large Figure 18 and Large Figure 19) to the nearest surface water body or delineated wetland.</div><div><sup>d</sup> In practice, a larger infiltration area could be used if suitable space is available, with monitoring as described in Section 4 to prevent flow from reaching surface water.</div><div><sup>e</sup> The estimated maximum rate that could be discharged while limiting the infiltration area to 0.5 acres. For discharge rates above 660 gpm, which is the rate associated with a 30-foot by 30-foot dewatering structure in BMP Typical Figure 22A (Appendix C), a larger dewatering structure or multiple dewatering structures could be used to accommodate the higher discharge rate and to prevent erosion and control overland flow. Discharge at a lower rate would require more time.</div><div><sup>f</sup> The accuracy of the estimate is a function of the SSURGO saturated hydraulic conductivity data, and may also be affected by vegetation, precipitation, and other physical factors.</div><div><sup>g</sup> The infiltration duration estimate assumes that the SSURGO saturated hydraulic conductivity represents the entire unsaturated zone and that it would be constant during the entire discharge period. The saturated hydraulic conductivity of the soil in the unsaturated zone may decrease during the discharge, depending on the depth to the water table and the transmissivity of the water table aquifer. If the saturated hydraulic conductivity decreases during the discharge, the discharge rate might need to be reduced and the infiltration duration would be longer. If the water table aquifer transmissivity is low, there is the potential for infiltration to cause seepage in nearby low-lying areas.</div><div><sup>h</sup> The discharge from the mainline spread 2C test could be infiltrated more rapidly if a larger infiltration area were used. At 660 gpm the estimated infiltration area is 1.16 acres and duration is 2.5 days. At 1200 gpm the estimated infiltration area is 2.11 acres and duration is 1.4 days.</div><div><sup>i</sup> The discharge from the mainline spread 2D test could be infiltrated more rapidly if a larger infiltration area were used. At 660 gpm the estimated infiltration area is 1.16 acres and duration is 4.1 days. At 1200 gpm the estimated infiltration area is 2.11 acres and duration is 2.3 days.</div><div><sup>j</sup> The discharge from the mainline spread 2E test could be infiltrated more rapidly if a larger infiltration area were used. At 660 gpm the estimated infiltration area is 1.12 acres and duration is 2.8 days. At 1200 gpm the estimated infiltration area is 2.04 acres and duration is 1.6 days.</div></div>											

## **4.0 INFILTRATION MONITORING PLAN**

This section describes the actions that Enbridge would take regarding monitoring of the hydrotest discharge associated with this Plan.

### **4.1 DISCHARGE MONITORING PLAN**

Enbridge would monitor the water level within the dewatering structure to avoid overfilling. Enbridge would also monitor the discharge from the dewatering structure and associated infiltration area for excessive ponding, erosion, channelized flow, and off-site discharge of sediment. Enbridge would install BMPs (see BMP Typical Figures 4, 7, and 10, and Appendix C) as necessary and adjust discharge rates to avoid off-site discharge of sediment or channelization of flow. An Upland Hydrotest Discharge BMP Selection Guide is included in Appendix C. BMPs may include perimeter controls (e.g., straw bales or biologs) or temporary slope breakers constructed of straw bales, rocklogs, or biologs. Minimal ground disturbance would occur for installation of slope breakers. Sloped areas may require the use of redundant BMPs. BMP locations would be selected in the field and potential BMP locations are shown in Large Figure 1 through Large Figure 17 (see Appendix A).

### **4.2 GROUNDWATER MONITORING PLAN**

Hydrotest discharge water is unlikely to affect groundwater quality because the infiltration locations are located in the same groundwater watershed as the source water from which Enbridge is proposing to appropriate. Under existing conditions, the source water and the groundwater that would receive the infiltration are already interconnected. In addition, the process of infiltration through the unsaturated zone would have a filtering effect, improving the hydrotest discharge water quality relative to the source water quality before it reaches the water table.

Enbridge screened each infiltration location to confirm that groundwater near the infiltration location is connected to surface waters. Generally, groundwater at the water table is connected to adjacent surface waters unless there is a perched water table. To screen for perched conditions, the depth to water estimates from SSURGO data were compared with the topographic relief (county 2-foot contours) between the infiltration locations and the adjacent surface water bodies. The water level at all but six infiltration locations is approximately the same (up to 5 feet higher) than the adjacent surface waterbody. Enbridge reviewed the Quaternary hydrogeology at the six locations where the estimated water level at the infiltration location is greater than 5 feet higher than the adjacent surface water. All six locations are within areas classified as outwash, alluvium, or lacustrine sand. These classifications would not be expected to support perched conditions. Another factor that explains the greater water level difference at these infiltration locations is that they are located at least 200 feet from the closest surface waterbody, which is farther than the other locations. The water table elevation typically increases with distance away from a surfacewater body.

There are no drinking water wells located downgradient from infiltration locations and between the infiltration location and the adjacent surface water. The location of wells from the Minnesota Department of Health database are shown on Large Figure 1 through Large Figure 17. For infiltration locations where no wells are present within the extent of the figure, this is noted on the figure.

## 5.0 CONTINGENCY ACTION PLAN

Enbridge has developed a Contingency Action Plan to describe:

- actions Enbridge would take to address a structural failure of the filter bag or dewatering structure; and
- actions Enbridge would take to address excessive ponding or unanticipated overland flow.

To address a structural failure of the filter bag or dewatering structure, the Enbridge EI would direct the contractor to decrease the discharge rate or stop the discharge until repairs are completed.

To address excessive ponding or unanticipated overland flow, Enbridge has developed a two-part contingency plan.

- First, Enbridge would attempt to reduce ponding and/or unanticipated overland flow by decreasing the discharge rate and, if needed, deploy additional BMPs (see BMP Selection Process in Appendix C). Enbridge's EI would direct the contractor to decrease the discharge rate if Enbridge's EI observes conditions during construction that limit infiltration as compared to what was estimated by the infiltration analysis. Such conditions could include frozen ground conditions or periods of heavy rain, or site-specific variability in soil characteristics. Enbridge's EI would then monitor the infiltration area under the decreased discharge rate to observe ponding and flow patterns, and further decrease the discharge rate if needed.
- If reduction of the discharge rate does not address ponding or flow conditions, Enbridge would stop the discharge until such time soil conditions improve or truck the discharge water to an approved off-site disposal facility.

In some circumstances Enbridge might choose to stop discharges to the infiltration area and truck water off-site without attempting to reduce discharge rates.

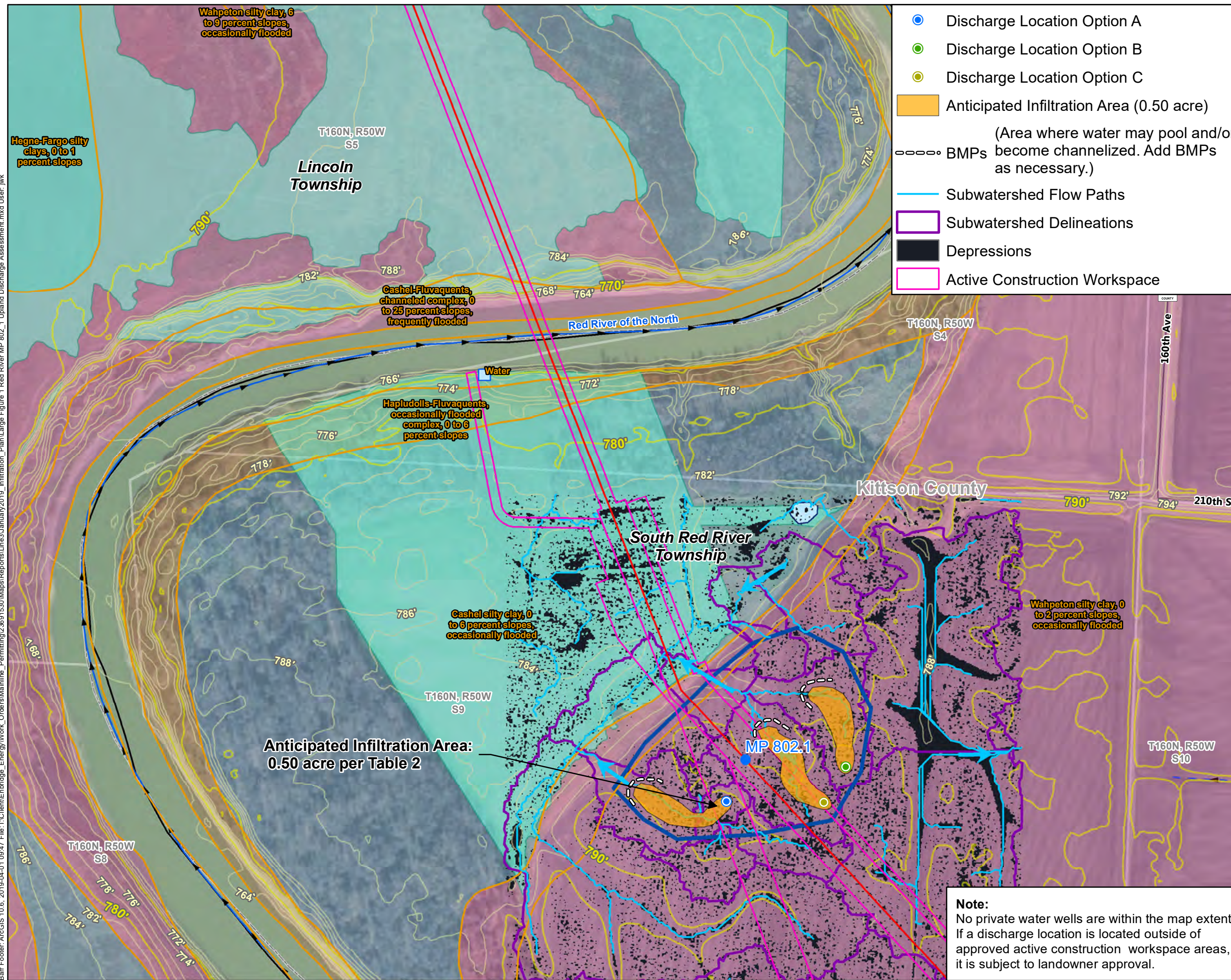


## **Appendix A**

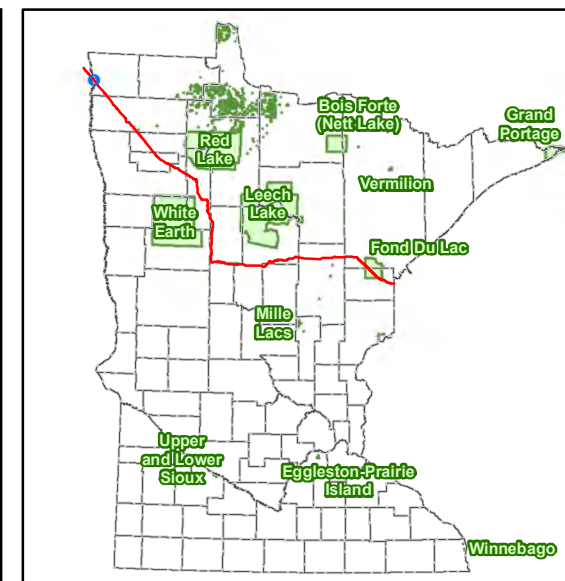
### **Large Figures**



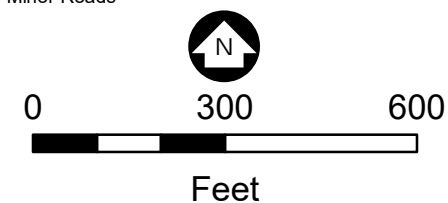
Barr Footer: ArcGIS 10.6, 2019-04-01 09:47 File: I:\Client\Enbridge\_Energy\Work\_Orders\Mainline\_Permitting\23691530\Maps\Reports\Line3\January2019\_Infiltration\_Plan\Large Figure 1 Red River MP 802.1 Upland Discharge Assessment.mxd User: jwk



- Discharge Location Option A
- Discharge Location Option B
- Discharge Location Option C
- Anticipated Infiltration Area (0.50 acre)  
(Area where water may pool and/or become channelized. Add BMPs as necessary.)
- BMPs
- Subwatershed Flow Paths
- Subwatershed Delineations
- Depressions
- Active Construction Workspace



- Approximate Infiltration Mile-post
- Line 3 Replacement Project
- ⊕ Well - County Well Index
- Water Appropriation Site
- Potential Upland Discharge Area - 8.55 acres
- Soil Map Unit
- Hydrologic Soil Group**
  - A
  - B
  - C
  - D (A/D, B/D, C/D)
- Lidar Contours**
  - Index (10-Foot)
  - Intermediate (2-Foot)
  - Surficial Flow Direction
  - Flow Direction
  - Perennial Stream
  - Intermittent Stream
  - Waterbodies
  - Field Delineated Wetlands
  - County Boundaries
  - Minor Roads

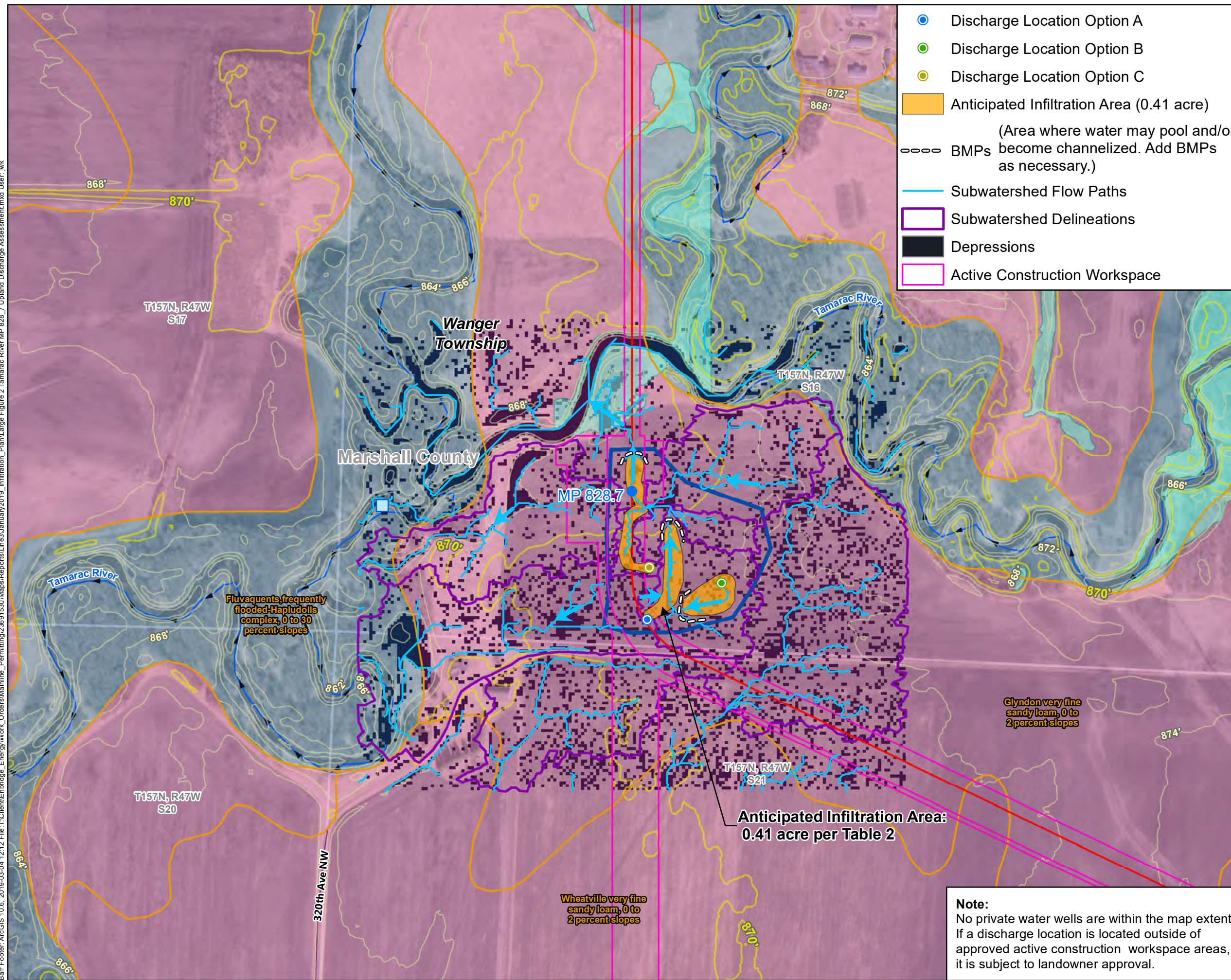


Large Figure 1

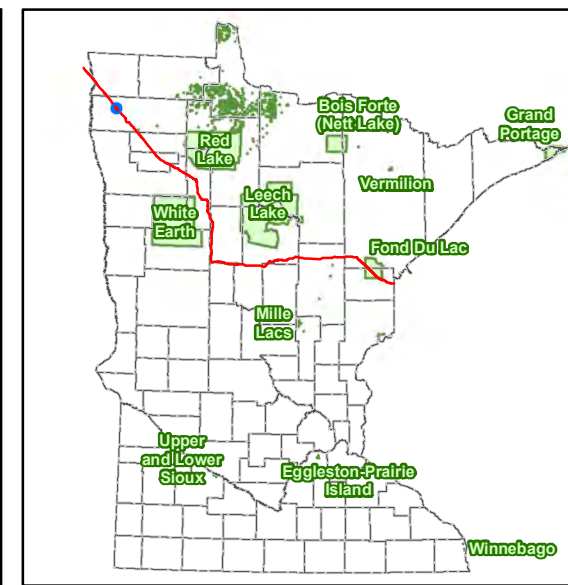
Red River HDD: MP 802.1  
Upland Discharge Area  
Line 3 Replacement Project



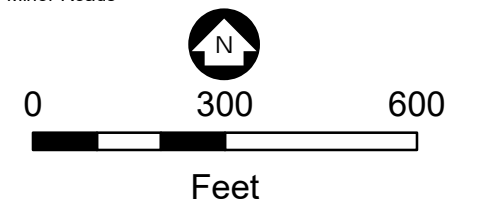




- Discharge Location Option A
- Discharge Location Option B
- Discharge Location Option C
- Anticipated Infiltration Area (0.41 acre)  
(Area where water may pool and/or BMPs become channelized. Add BMPs as necessary.)
- Subwatershed Flow Paths
- Subwatershed Delineations
- Depressions
- Active Construction Workspace



- Approximate Infiltration Mile-post
- Line 3 Replacement Project
- ⊕ Well - County Well Index
- Water Appropriation Site
- Potential Upland Discharge Area - 5.42 acres
- Soil Map Unit
- Hydrologic Soil Group**
  - A
  - B
  - C
  - D (A/D, B/D, C/D)
- Lidar Contours**
  - Index (10-Foot)
  - Intermediate (2-Foot)
  - Surficial Flow Direction
  - Flow Direction
  - Perennial Stream
  - Intermittent Stream
  - Waterbodies
  - Field Delineated Wetlands
  - County Boundaries
  - Minor Roads



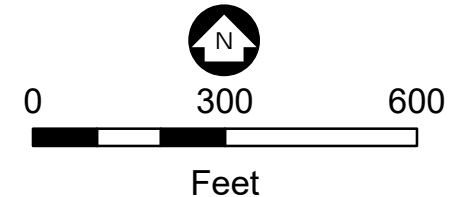
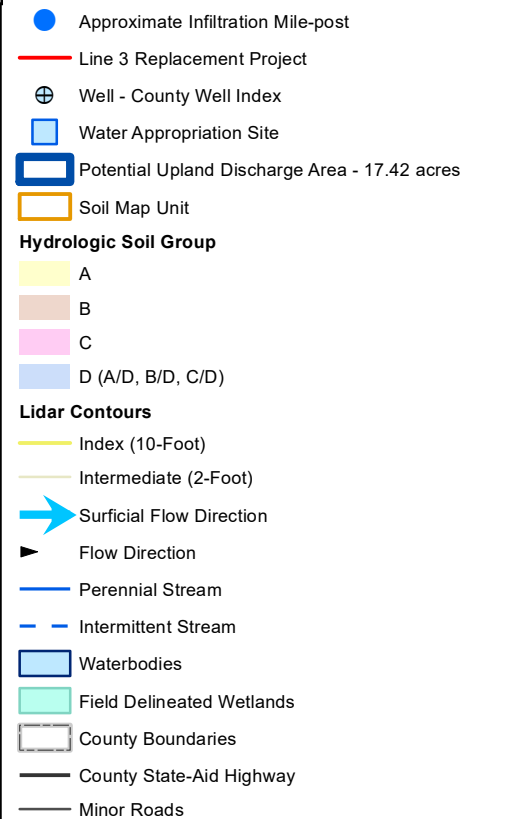
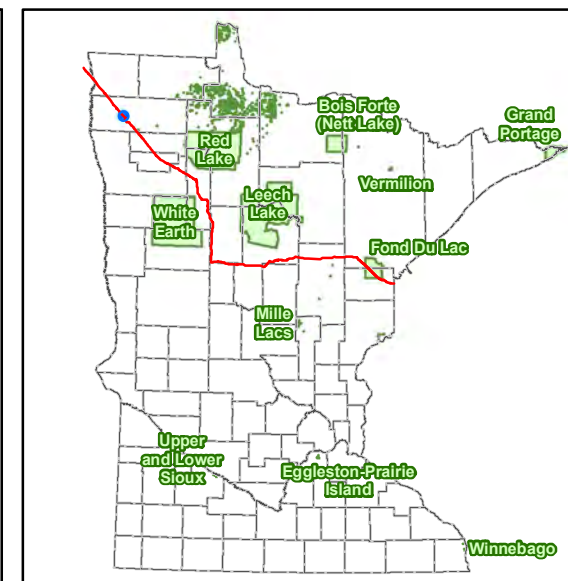
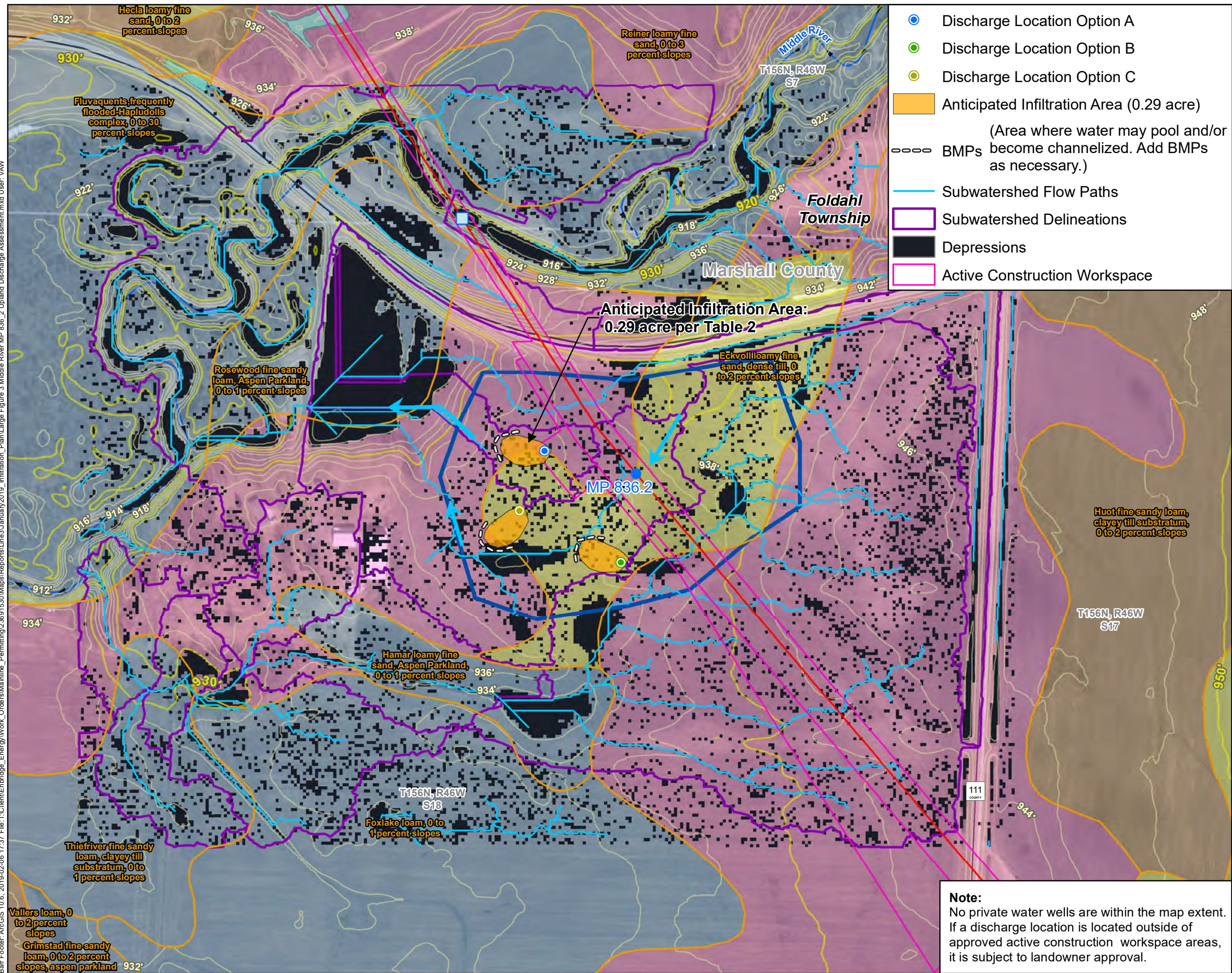
Large Figure 2

Tamarac River HDD: MP 828.7  
Upland Discharge Area  
Line 3 Replacement Project



**Note:**  
No private water wells are within the map extent. If a discharge location is located outside of approved active construction workspace areas, it is subject to landowner approval.





Large Figure 3

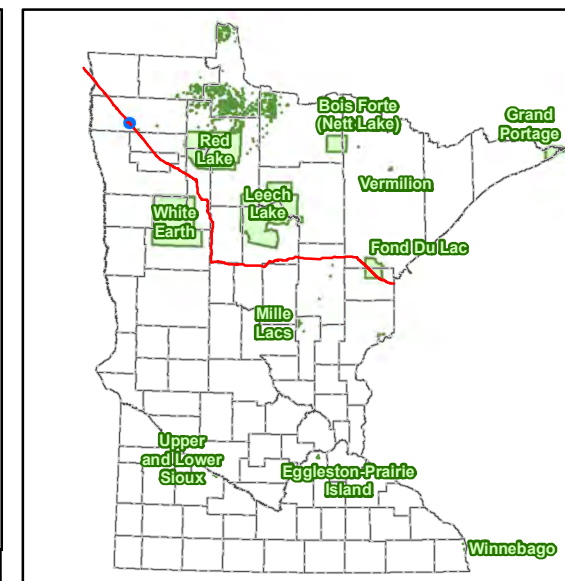
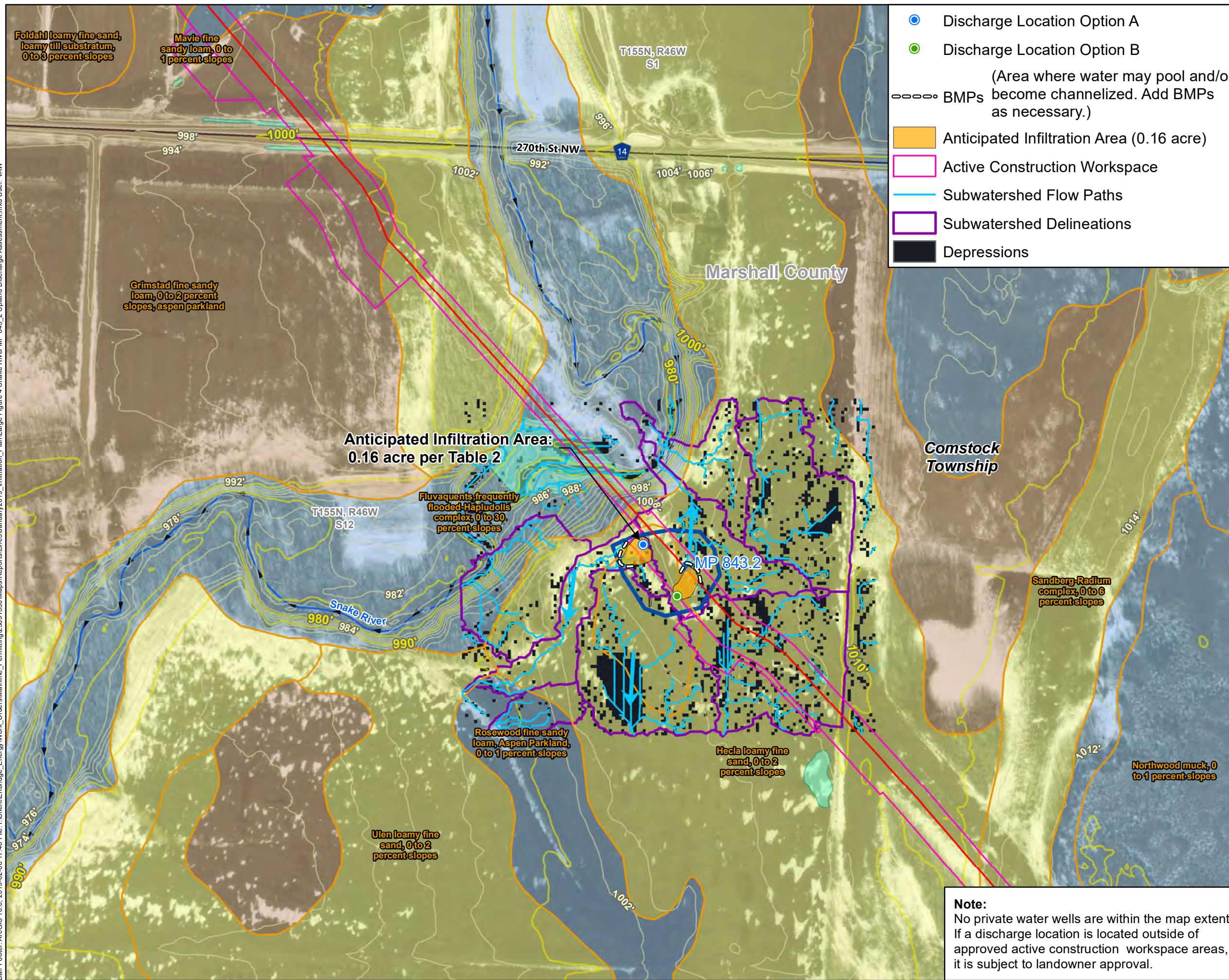
Middle River HDD: MP 836.2  
Upland Discharge Area  
Line 3 Replacement Project



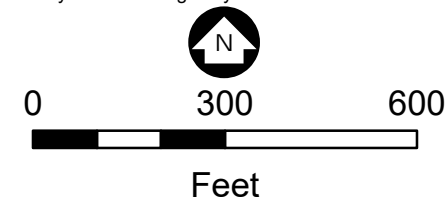
**Note:**  
No private water wells are within the map extent. If a discharge location is located outside of approved active construction workspace areas, it is subject to landowner approval.



Barr Footer: ArcGIS 10.6, 2019-02-06 17:46 File: I:\Client\Enbridge\_Energy\Work\_Orders\Mainline\_Permits\23691530\Maps\Reports\Line3\January2019\_Infiltration\_Plan\Large Figure 4 Snake River MP 843.2 Upland Discharge Assessment.mxd User: VAW



- Approximate Infiltration Mile-post
- Line 3 Replacement Project
- ⊕ Well - County Well Index
- Water Appropriation Site
- Potential Upland Discharge Area - 1.59 acres
- Soil Map Unit
- Hydrologic Soil Group**
  - A
  - B
  - C
  - D (A/D, B/D, C/D)
- Lidar Contours**
  - Index (10-Foot)
  - Intermediate (2-Foot)
  - ➔ Surficial Flow Direction
  - Flow Direction
  - Perennial Stream
  - - Intermittent Stream
  - Waterbodies
  - Field Delineated Wetlands
  - County Boundaries
  - County State-Aid Highway



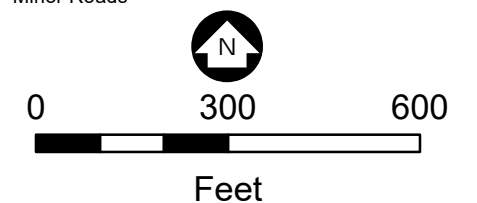
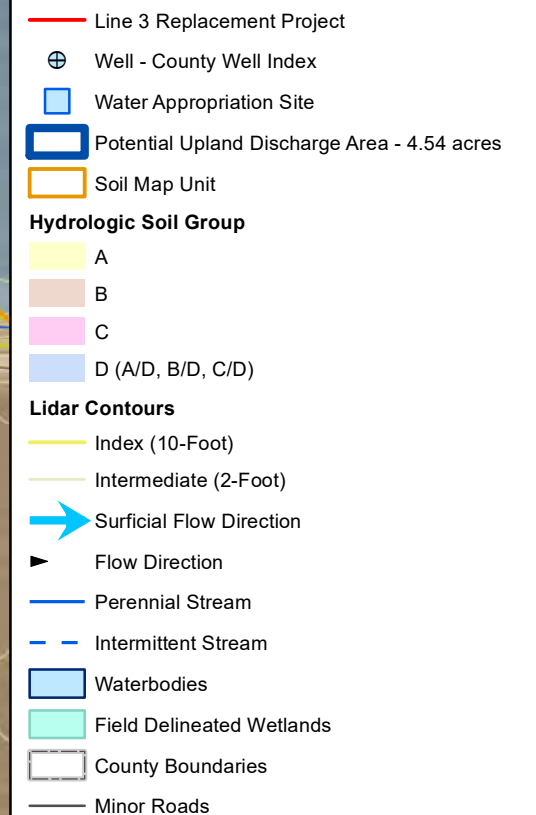
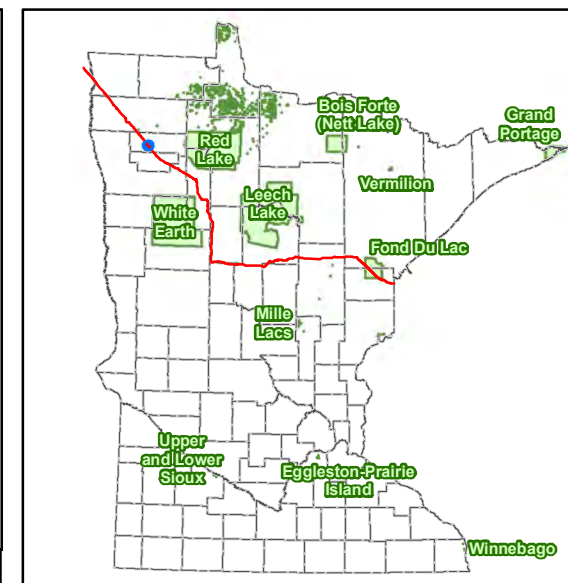
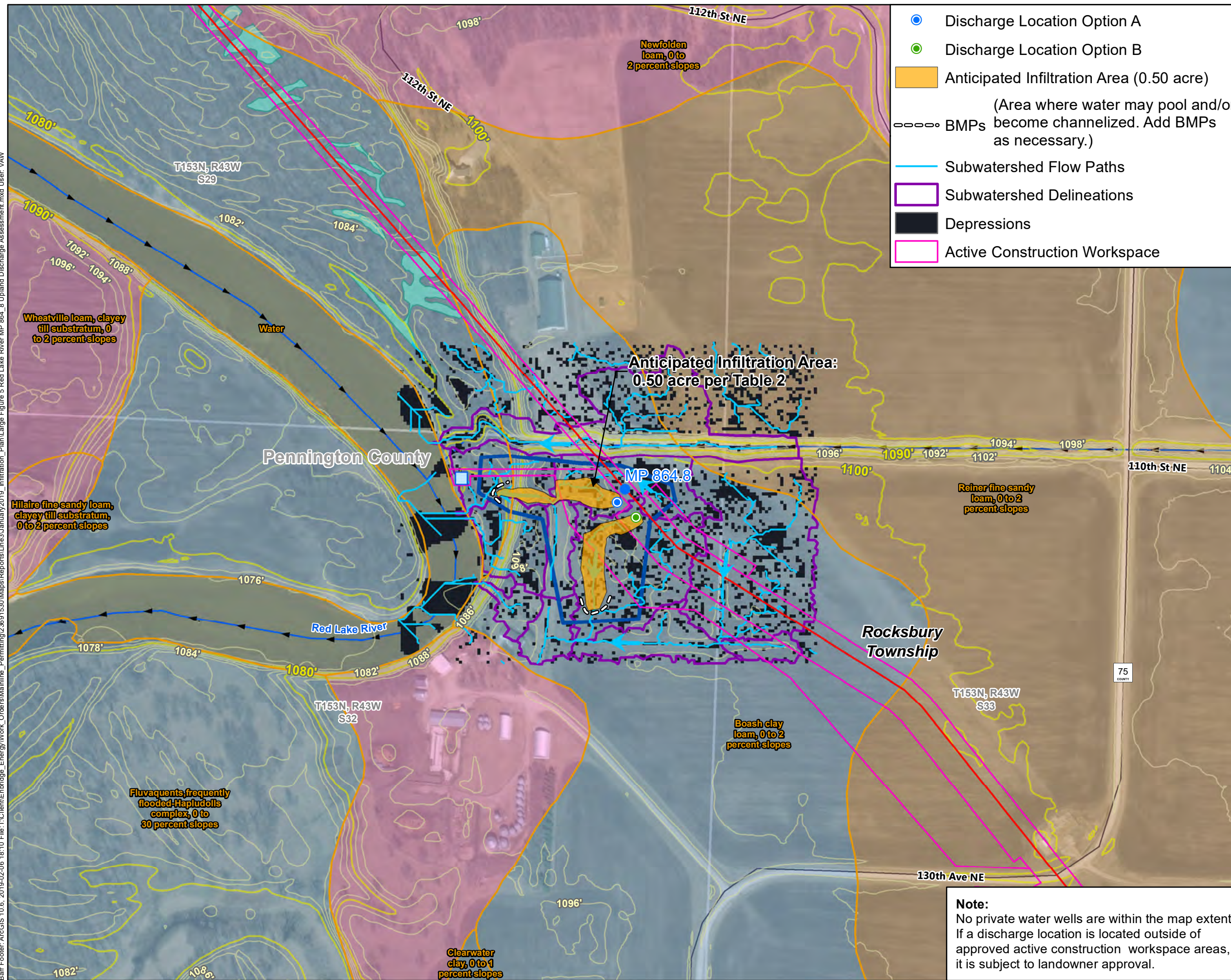
Large Figure 4

Snake River HDD: MP 843.2  
Upland Discharge Area  
Line 3 Replacement Project





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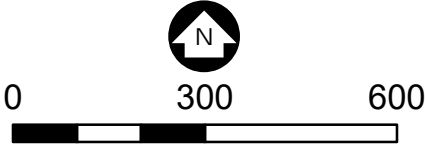
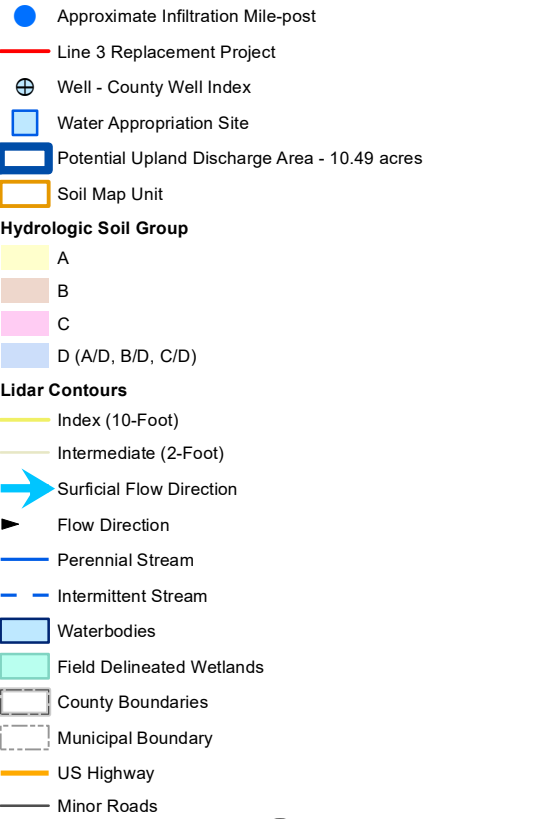
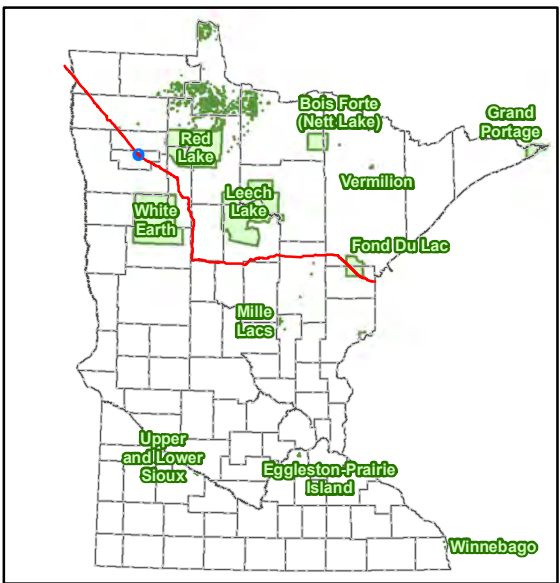
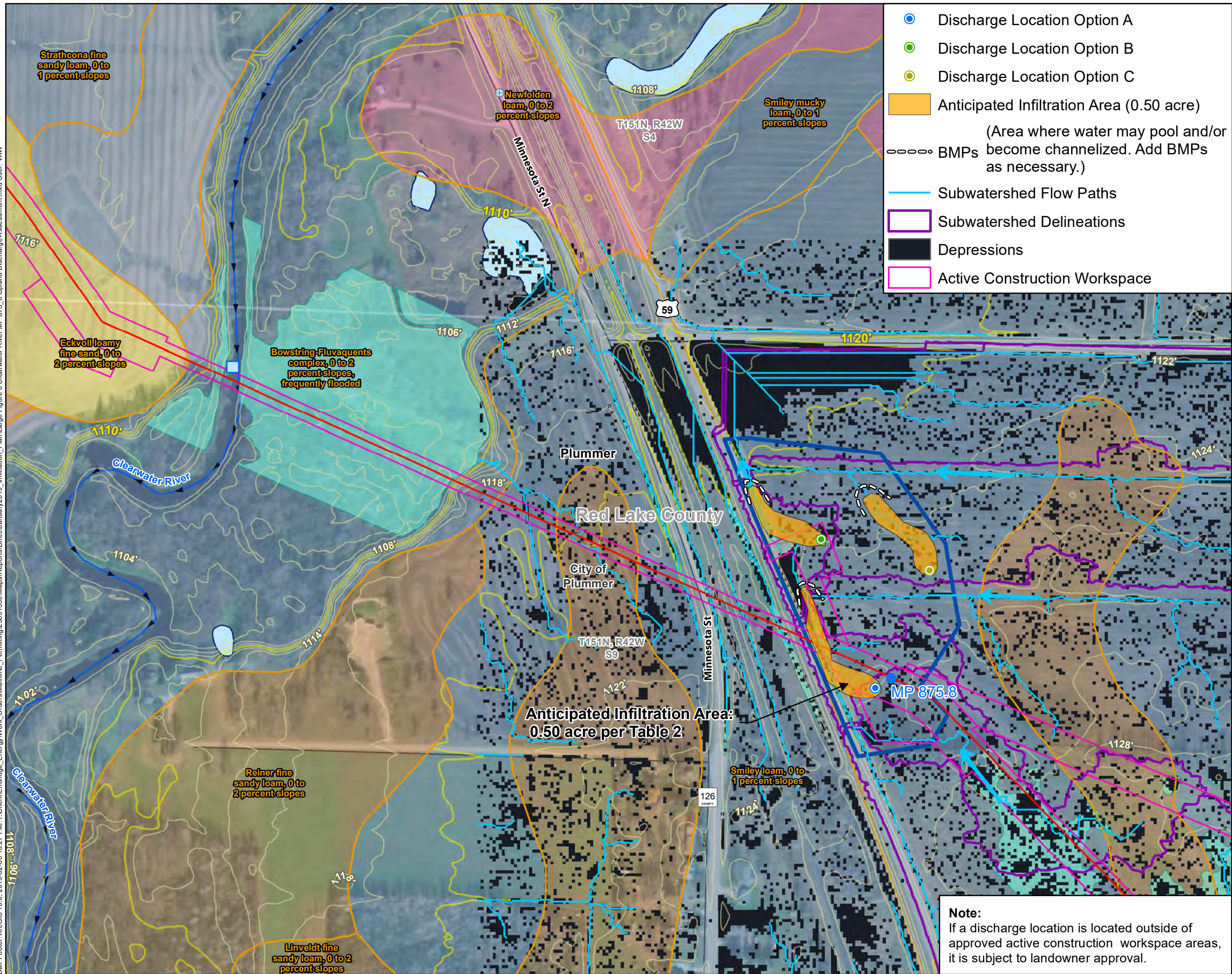
Large Figure 5

Red Lake River HDD: MP 864.8  
Upland Discharge Area  
Line 3 Replacement Project



**Note:**  
No private water wells are within the map extent.  
If a discharge location is located outside of approved active construction workspace areas, it is subject to landowner approval.





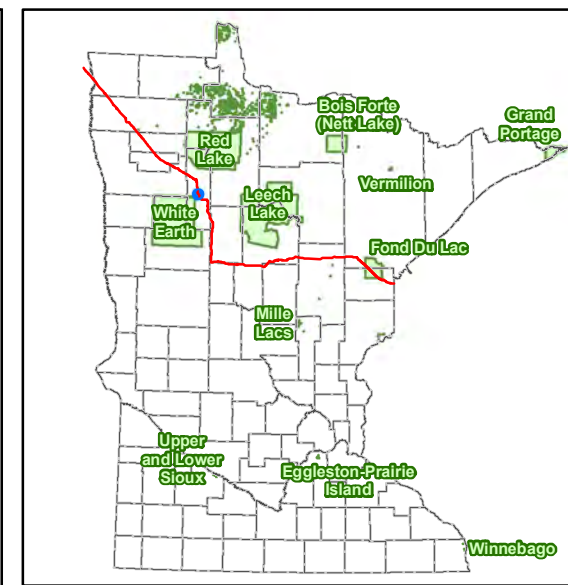
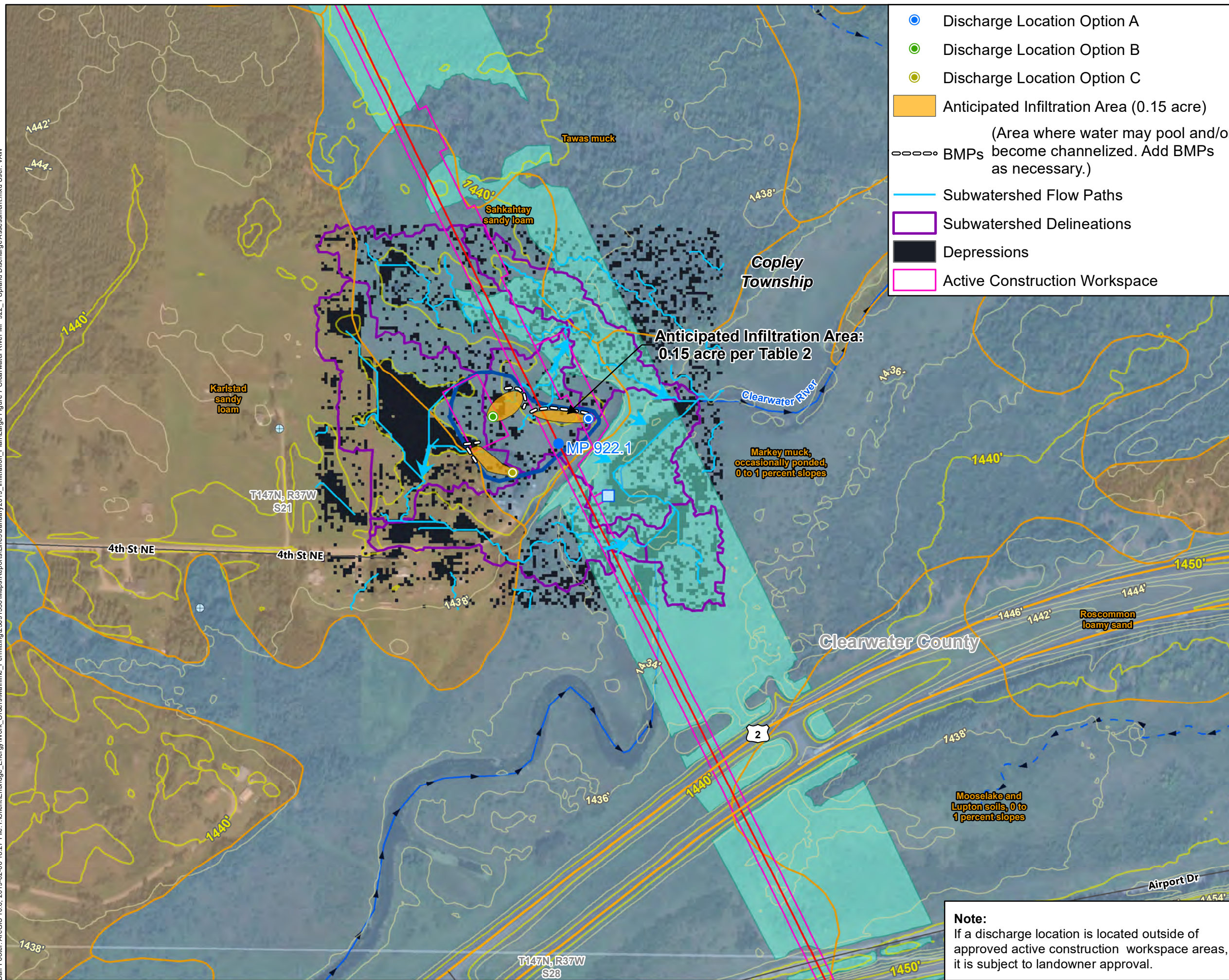
Large Figure 6

Clearwater River HDD: MP 875.8  
Upland Discharge Area  
Line 3 Replacement Project

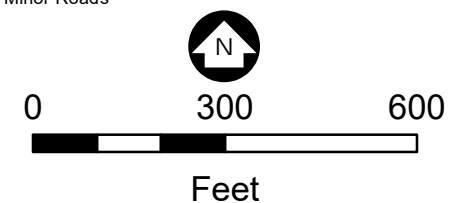




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- Approximate Infiltration Mile-post
- Line 3 Replacement Project
- ⊕ Well - County Well Index
- Water Appropriation Site
- Potential Upland Discharge Area - 2.33 acres
- Soil Map Unit
- Hydrologic Soil Group**
  - A
  - B
  - C
  - D (A/D, B/D, C/D)
- Lidar Contours**
  - Index (10-Foot)
  - Intermediate (2-Foot)
  - ➔ Surficial Flow Direction
  - Flow Direction
  - Perennial Stream
  - - Intermittent Stream
  - Waterbodies
  - Field Delineated Wetlands
  - County Boundaries
  - US Highway
  - Minor Roads



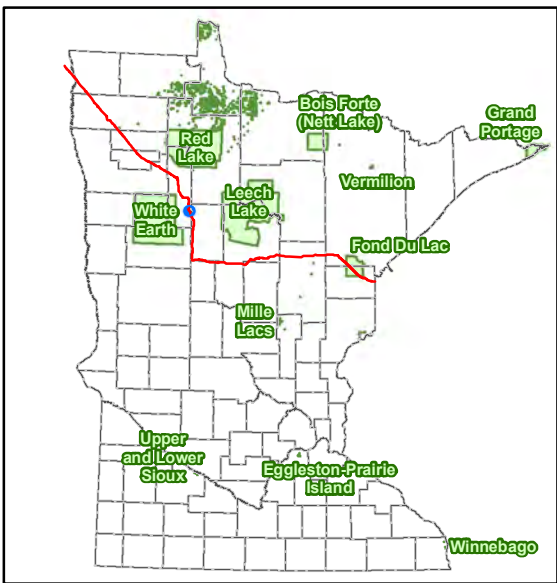
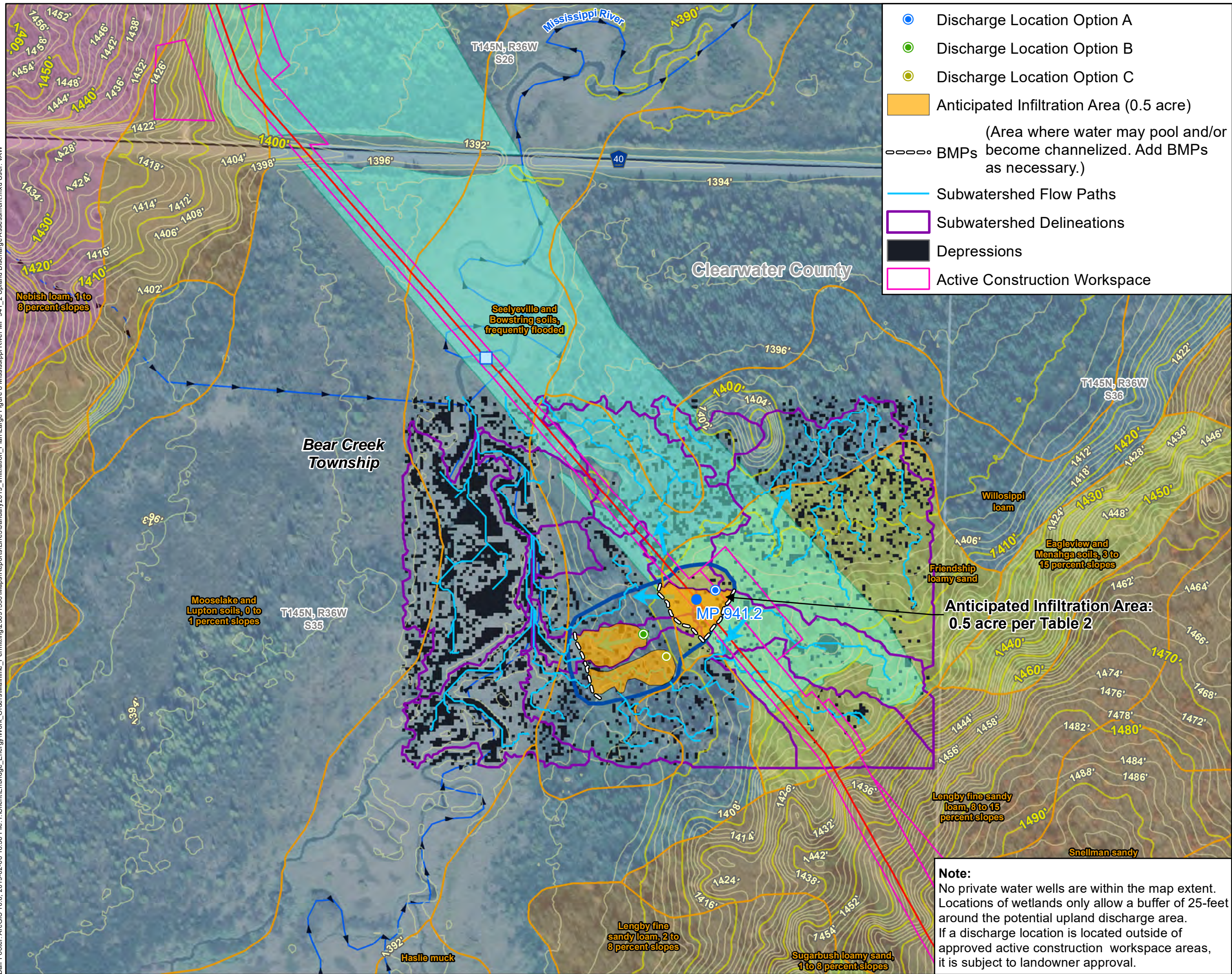
Large Figure 7

Clearwater River HDD: MP 922.1  
Upland Discharge Area  
Line 3 Replacement Project

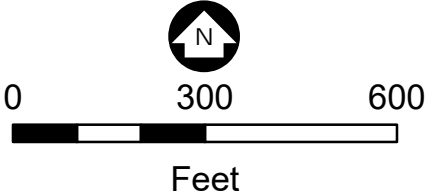




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- Approximate Infiltration Mile-post
- Line 3 Replacement Project
- ⊕ Well - County Well Index
- Water Appropriation Site
- Potential Upland Discharge Area - 3.48 acres
- Soil Map Unit
- Hydrologic Soil Group**
  - A
  - B
  - C
  - D (A/D, B/D, C/D)
- Lidar Contours**
  - Index (10-Foot)
  - Intermediate (2-Foot)
- ➔ Surficial Flow Direction
- Flow Direction
- Perennial Stream
- - - Intermittent Stream
- Waterbodies
- Field Delineated Wetlands
- County Boundaries
- County State-Aid Highway



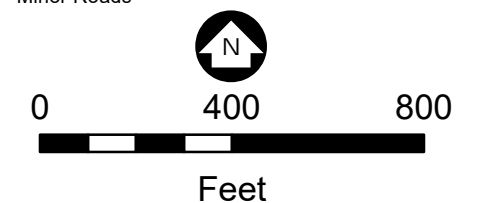
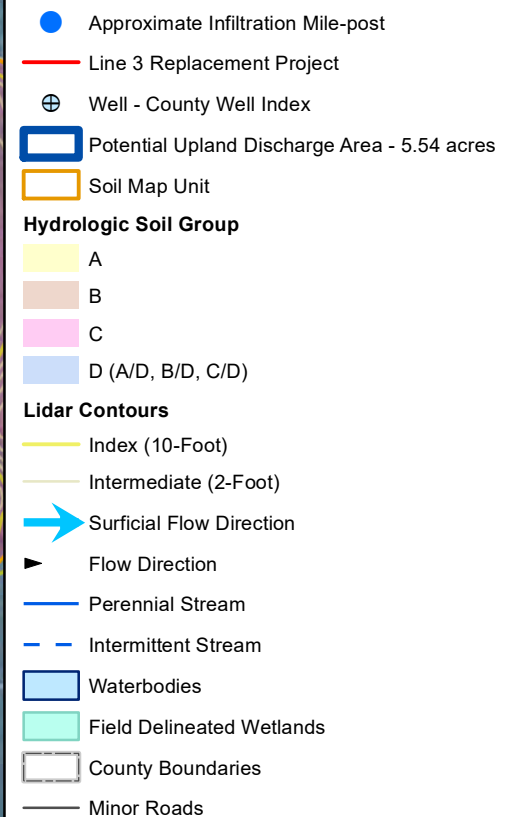
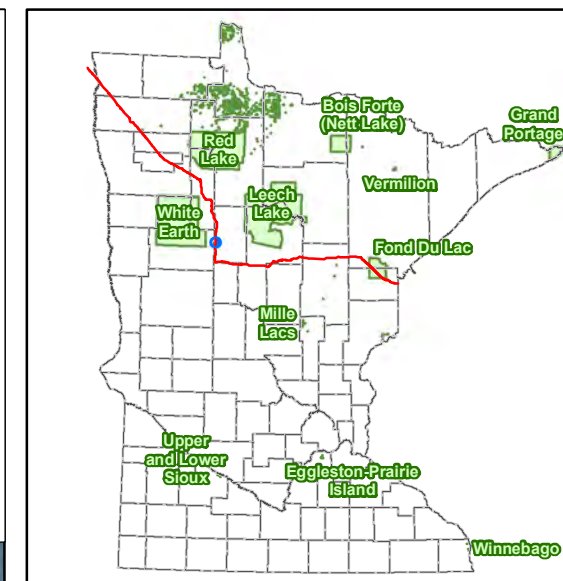
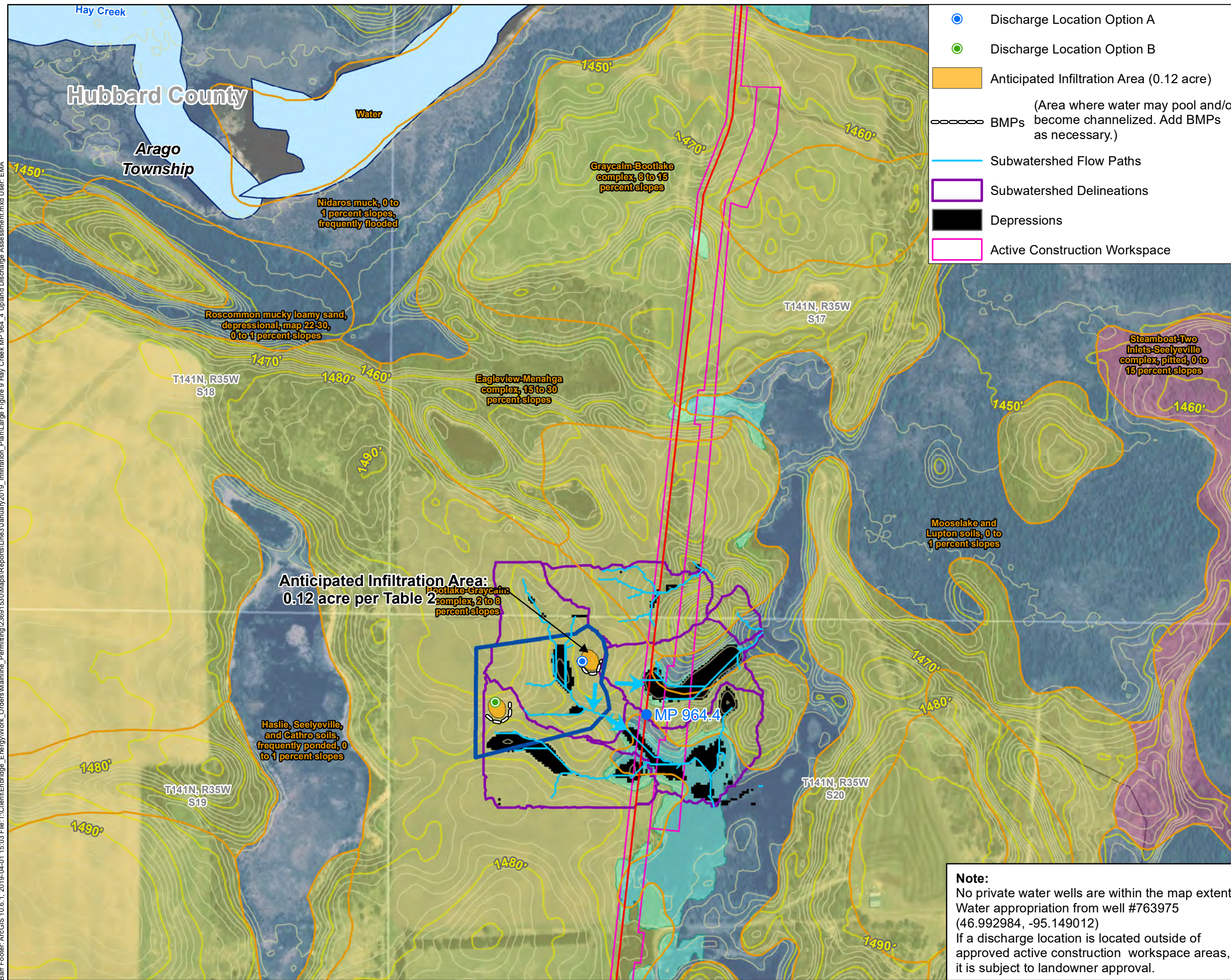
Large Figure 8

Mississippi River HDD: MP 941.2  
Upland Discharge Area  
Line 3 Replacement Project





Barr Footer: ArcGIS 10.6.1, 2019-04-01 15:03 File: I:\Client\Enbridge\_EnergyWork\_Orders\Mainline\_Permitting\23691530\Maps\Reports\Line3\January2019\_Infiltration\_Plan\Large Figure 9 Hay Creek MP 964.4 Upland Discharge Assessment.mxd User: EMA



Large Figure 9

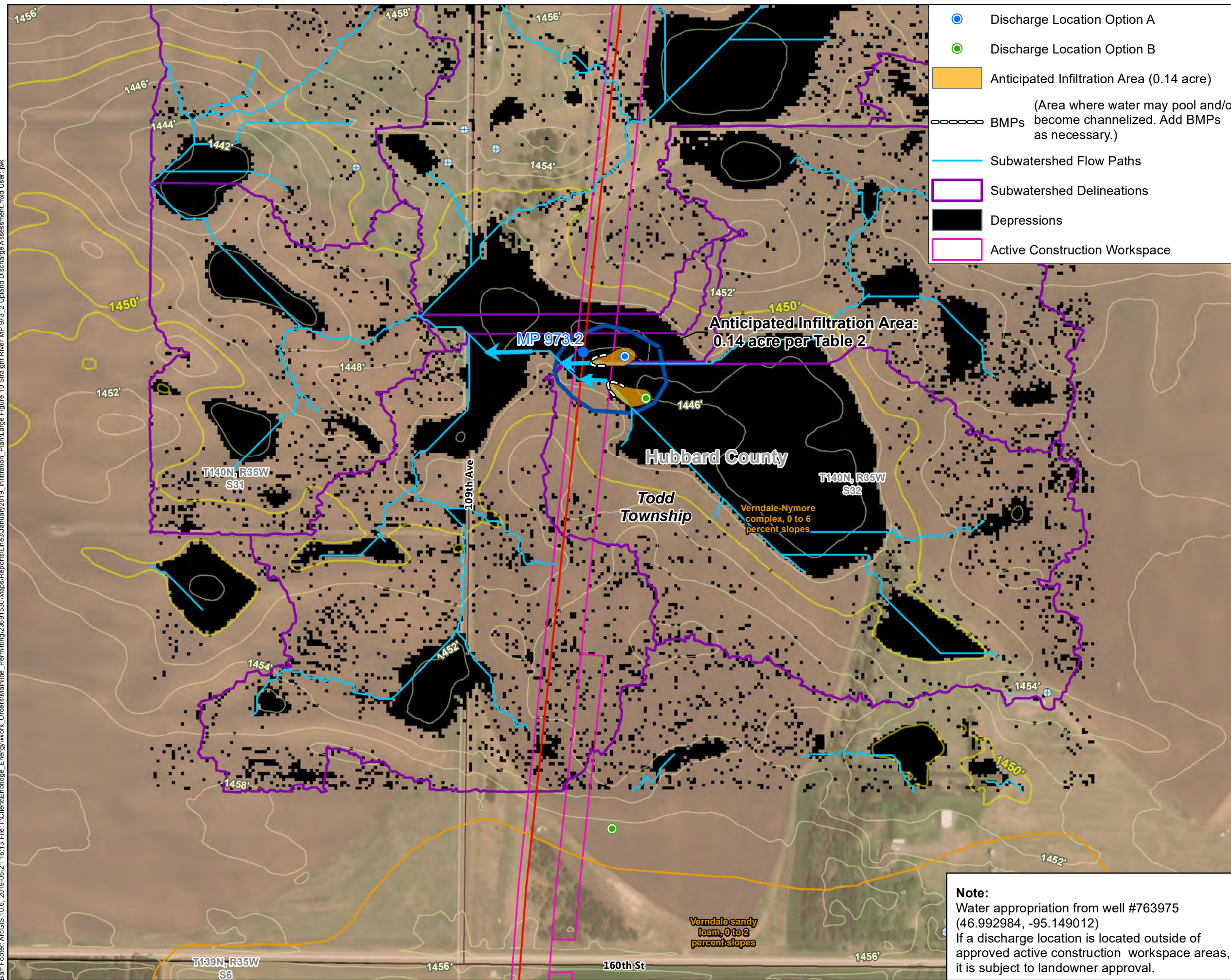
Hay Creek HDD: MP 964.4  
Upland Discharge Area  
Line 3 Replacement Project



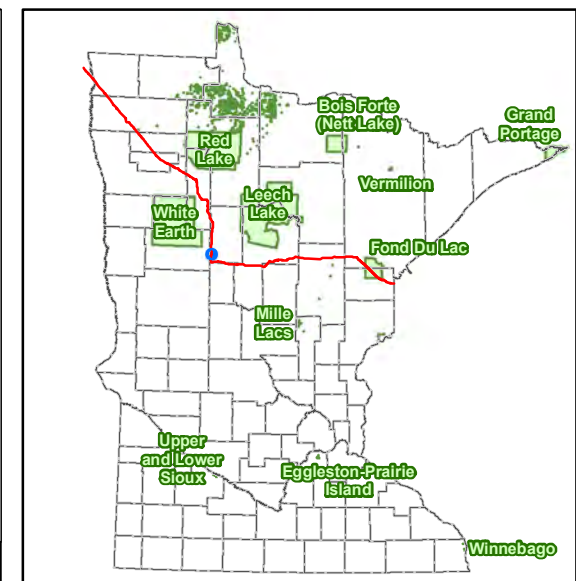
**Note:**  
No private water wells are within the map extent  
Water appropriation from well #763975  
(46.992984, -95.149012)  
If a discharge location is located outside of  
approved active construction workspace areas,  
it is subject to landowner approval.



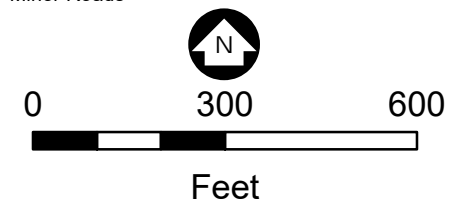
Barr Footer: ArcGIS 10.6, 2019-05-21 16:13 File: I:\Client\Enbridge\_Energy\Work\_Orders\Mainline\_Permitting\23691530\Maps\Reports\Line3\January2019\_Infiltration\_Plan\Large Figure 10 Straight River MP 973.2 Upland Discharge Assessment.mxd User: jvk



- Discharge Location Option A
- Discharge Location Option B
- Anticipated Infiltration Area (0.14 acre)  
(Area where water may pool and/or become channelized. Add BMPs as necessary.)
- BMPs
- Subwatershed Flow Paths
- Subwatershed Delineations
- Depressions
- Active Construction Workspace



- Approximate Infiltration Mile-post
- Line 3 Replacement Project
- Well - County Well Index
- Potential Upland Discharge Area - 1.75 acres
- Soil Map Unit
- Hydrologic Soil Group
  - A
  - B
  - C
  - D (A/D, B/D, C/D)
- Lidar Contours
  - Index (10-Foot)
  - Intermediate (2-Foot)
- Surficial Flow Direction
- Flow Direction
- Perennial Stream
- Intermittent Stream
- Waterbodies
- Field Delineated Wetlands
- County Boundaries
- Minor Roads



Large Figure 10

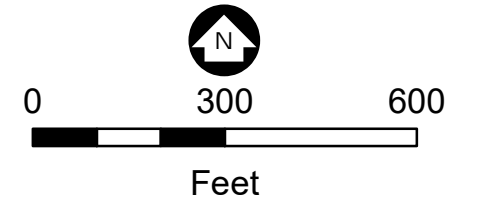
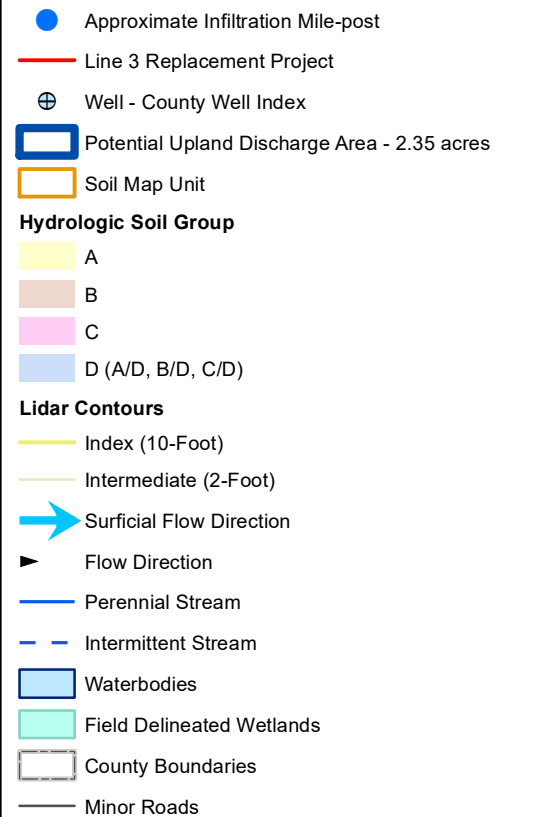
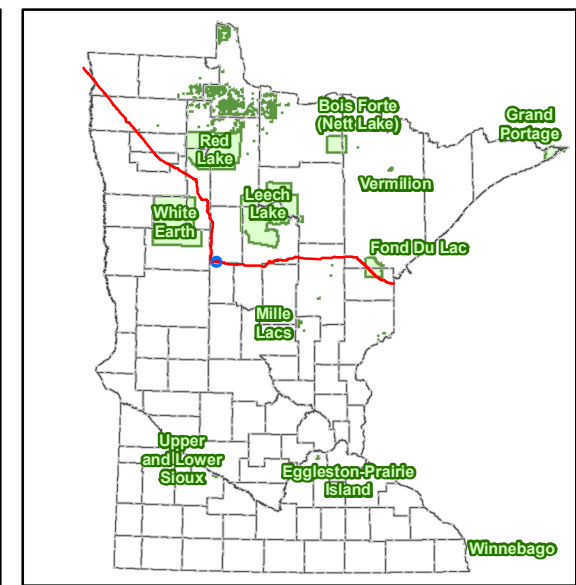
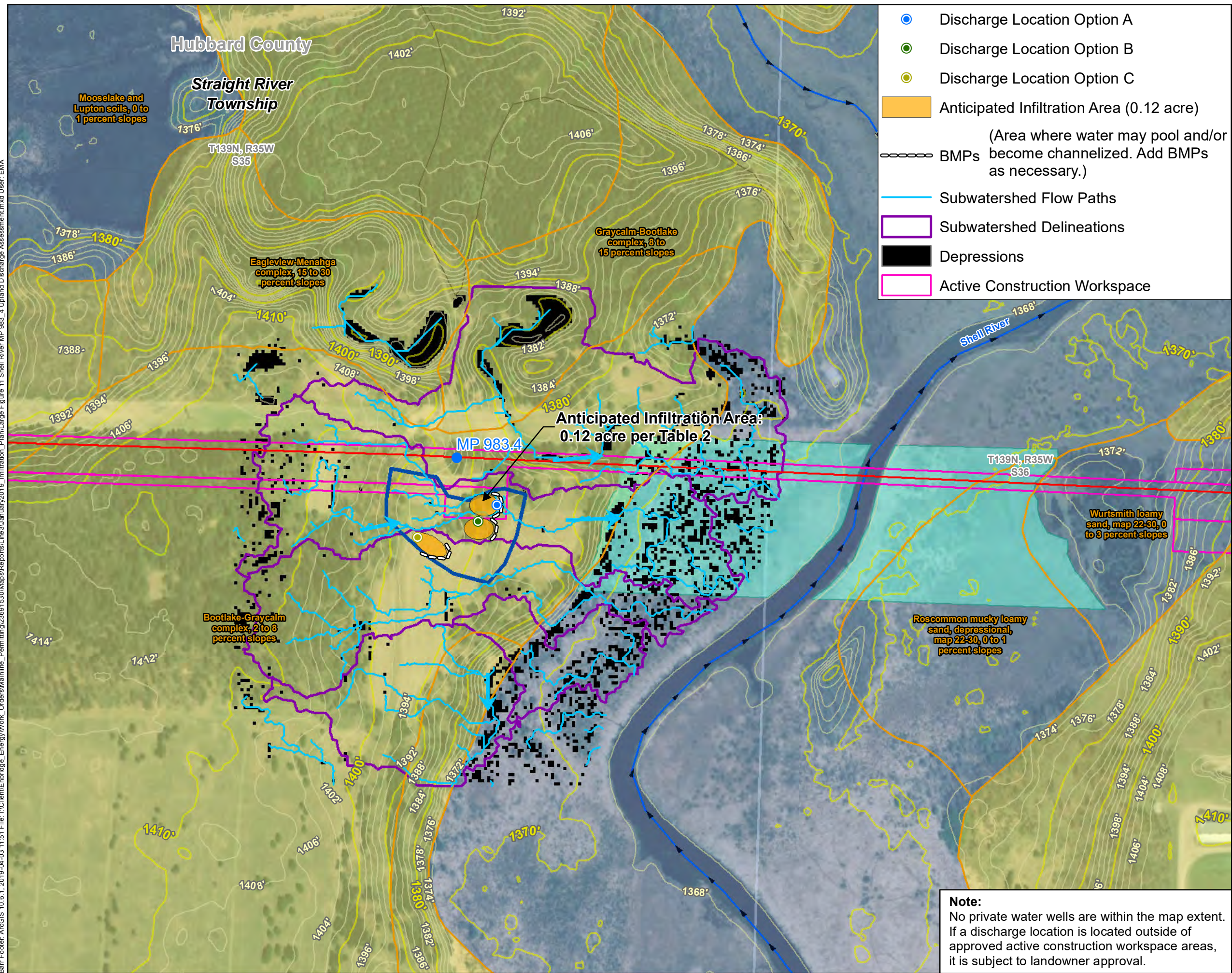
Straight River HDD: MP 973.2  
Upland Discharge Area  
Line 3 Replacement Project

**Note:**  
Water appropriation from well #763975 (46.992984, -95.149012)  
If a discharge location is located outside of approved active construction workspace areas, it is subject to landowner approval.





Barr Footer: ArcGIS 10.6.1, 2019-04-03 11:51 File: I:\Client\Enbridge\_Energy\Work\_Orders\Mainline\_Permitting\23691530\Maps\Reports\Line3\January2019\_Infiltration\_Plant\Large Figure 11 Shell River MP 983\_4 Upland Discharge Assessment.mxd User: EMA



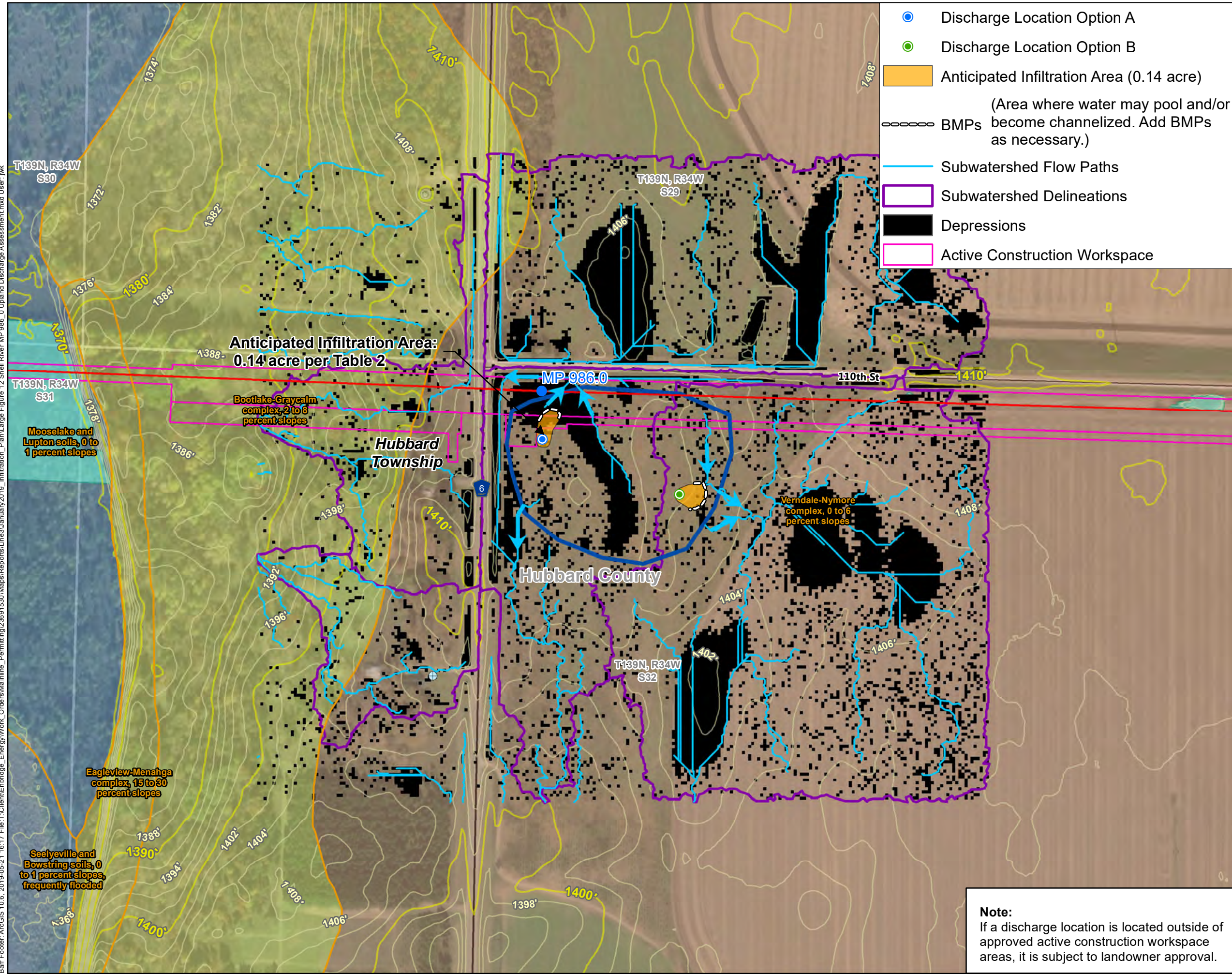
Large Figure 11

Shell River HDD: MP 983.4  
Upland Discharge Area  
Line 3 Replacement Project

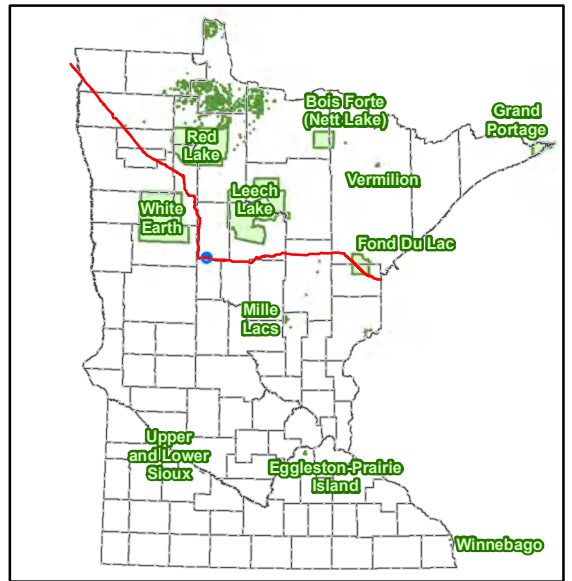




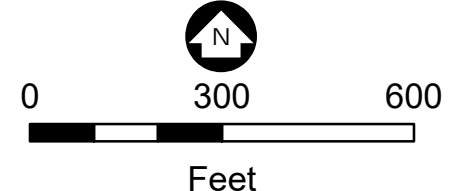
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- Discharge Location Option A
- Discharge Location Option B
- Anticipated Infiltration Area (0.14 acre)  
(Area where water may pool and/or become channelized. Add BMPs as necessary.)
- BMPs
- Subwatershed Flow Paths
- Subwatershed Delineations
- Depressions
- Active Construction Workspace



- Approximate Infiltration Mile-post
- Line 3 Replacement Project
- Well - County Well Index
- Water Appropriation Site
- Potential Upland Discharge Area - 7.50 acres
- Soil Map Unit
- Hydrologic Soil Group
  - A
  - B
  - C
  - D (A/D, B/D, C/D)
- Lidar Contours
  - Index (10-Foot)
  - Intermediate (2-Foot)
- Surficial Flow Direction
- Flow Direction
- Perennial Stream
- Intermittent Stream
- Waterbodies
- Field Delineated Wetlands
- County Boundaries
- County State-Aid Highway
- Minor Roads



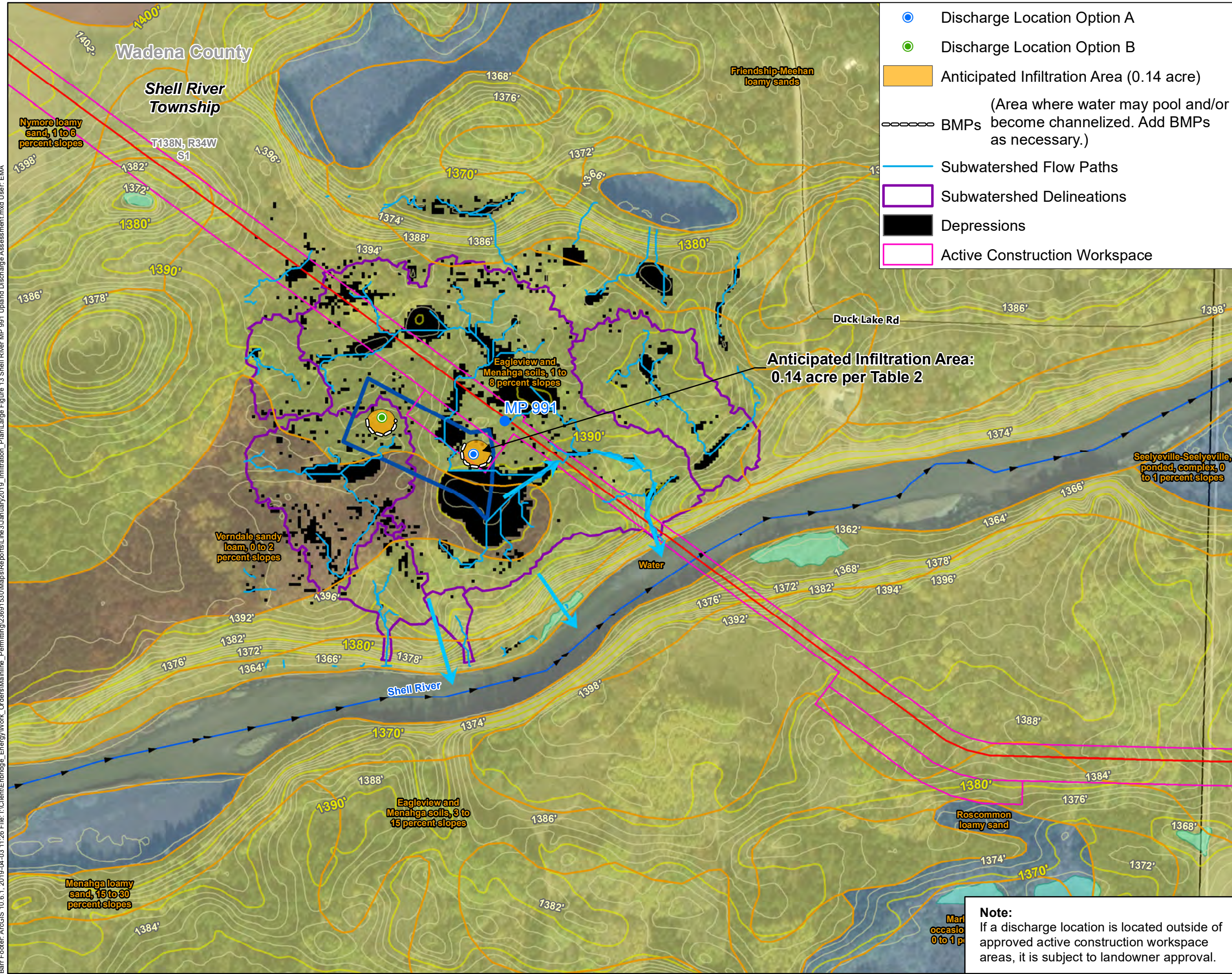
Large Figure 12  
Shell River HDD: MP 986.0  
Upland Discharge Area  
Line 3 Replacement Project

**Note:**  
If a discharge location is located outside of approved active construction workspace areas, it is subject to landowner approval.

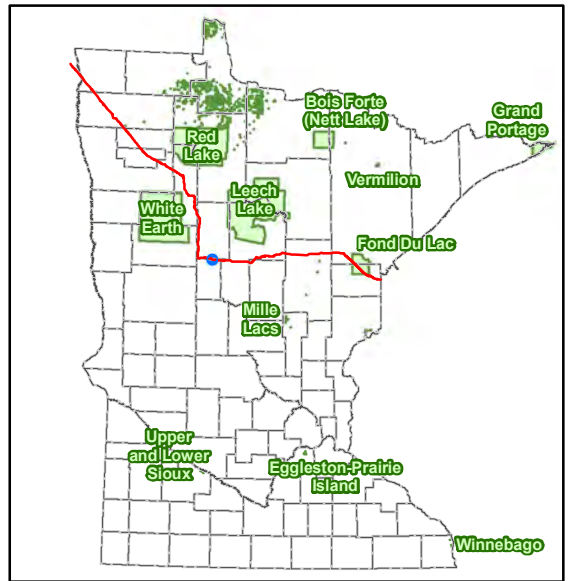




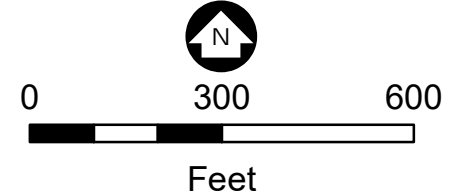
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- Discharge Location Option A
- Discharge Location Option B
- Anticipated Infiltration Area (0.14 acre)  
(Area where water may pool and/or become channelized. Add BMPs as necessary.)
- BMPs
- Subwatershed Flow Paths
- Subwatershed Delineations
- Depressions
- Active Construction Workspace



- Approximate Infiltration Mile-post
- Line 3 Replacement Project
- ⊕ Well - County Well Index
- Water Appropriation Site
- Potential Upland Discharge Area - 2.35 acres
- Soil Map Unit
- Hydrologic Soil Group**
  - A
  - B
  - C
  - D (A/D, B/D, C/D)
- Lidar Contours**
  - Index (10-Foot)
  - Intermediate (2-Foot)
- Surficial Flow Direction
- Flow Direction
- Perennial Stream
- Intermittent Stream
- Waterbodies
- Field Delineated Wetlands
- County Boundaries
- Minor Roads

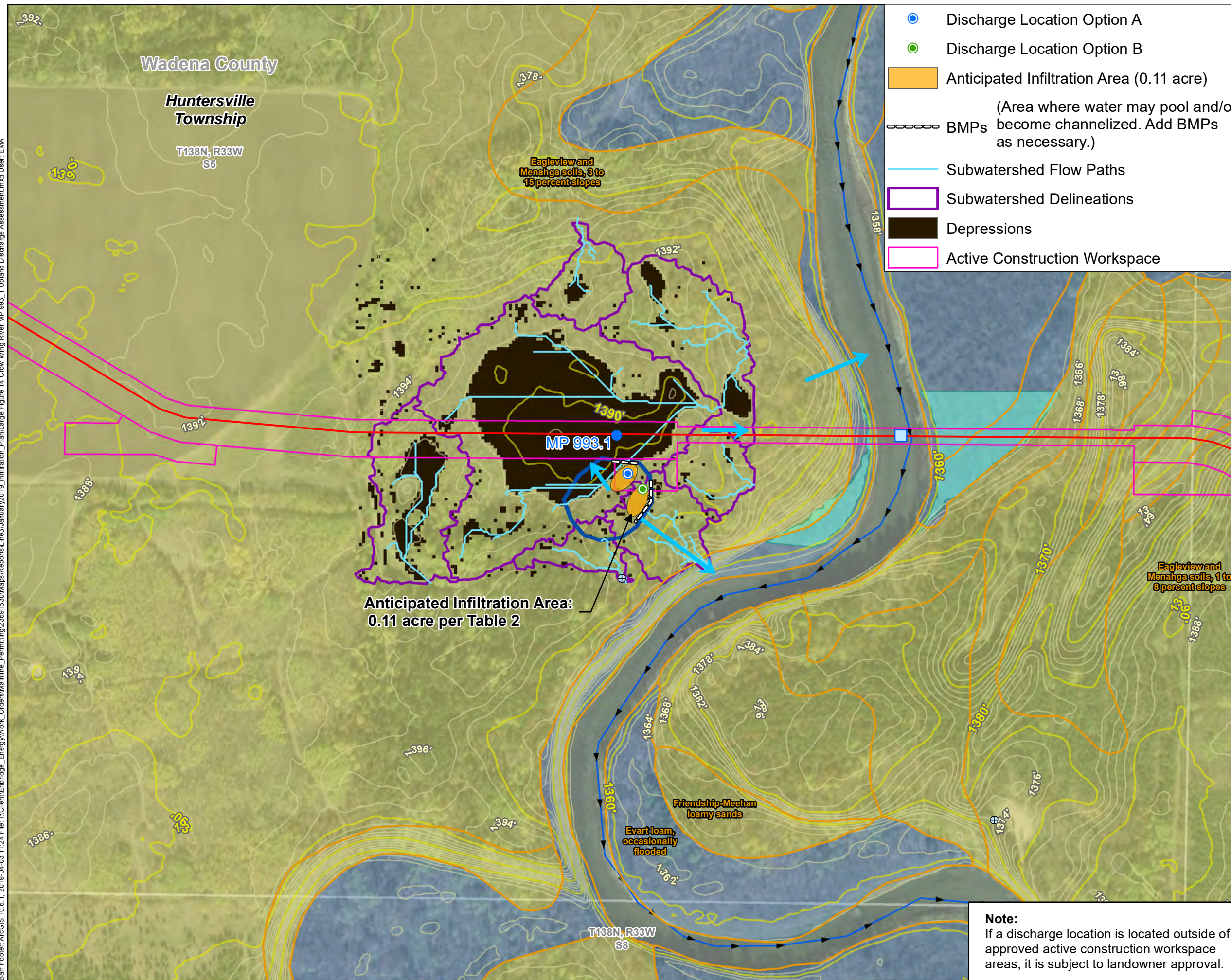


Large Figure 13  
Shell River HDD: MP 991  
Upland Discharge Area  
Line 3 Replacement Project

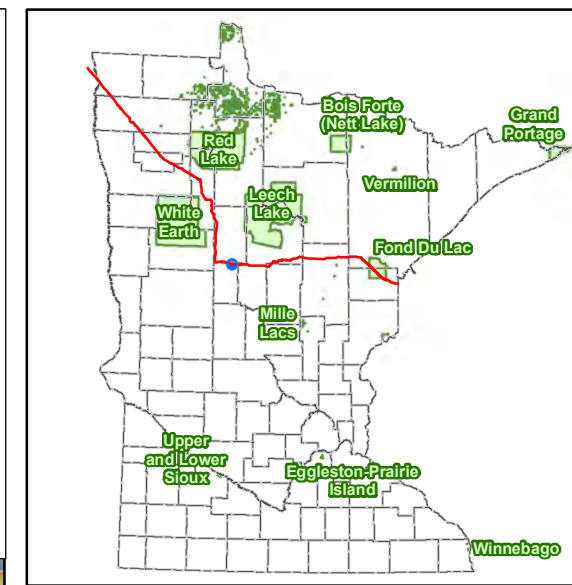




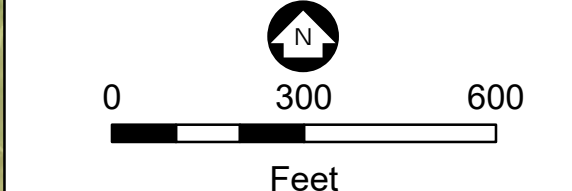
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- Discharge Location Option A
- Discharge Location Option B
- Anticipated Infiltration Area (0.11 acre)  
(Area where water may pool and/or become channelized. Add BMPs as necessary.)
- BMPs
- Subwatershed Flow Paths
- Subwatershed Delineations
- Depressions
- Active Construction Workspace



- Approximate Infiltration Mile-post
- Line 3 Replacement Project
- ⊕ Well - County Well Index
- Water Appropriation Site
- Potential Upland Discharge Area - 1.26 acres
- Soil Map Unit
- Hydrologic Soil Group**
  - A
  - B
  - C
  - D (A/D, B/D, C/D)
- Lidar Contours**
  - Index (10-Foot)
  - Intermediate (2-Foot)
- Surficial Flow Direction
- Flow Direction
- Perennial Stream
- Intermittent Stream
- Waterbodies
- Field Delineated Wetlands
- County Boundaries
- Minor Roads

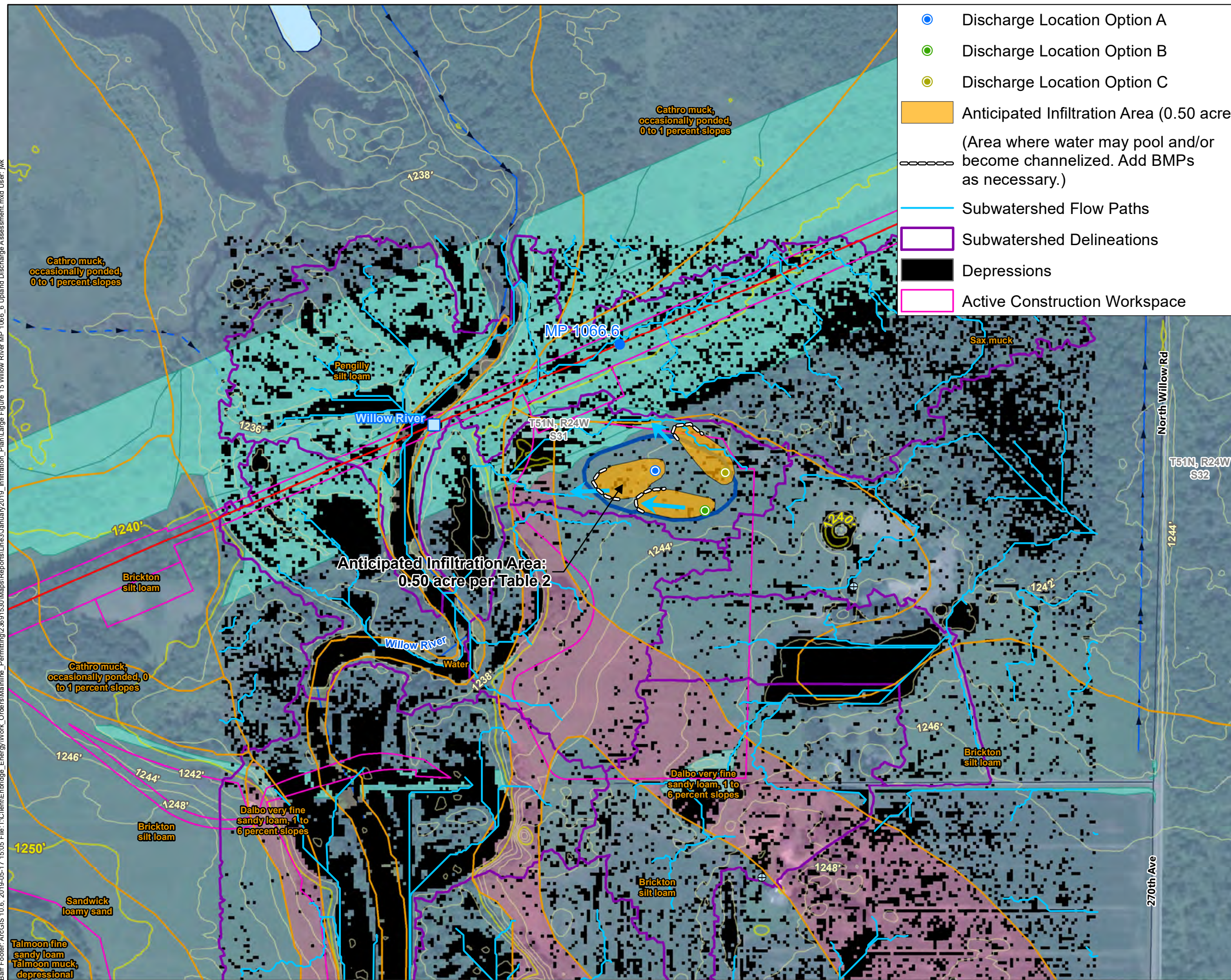


Large Figure 14

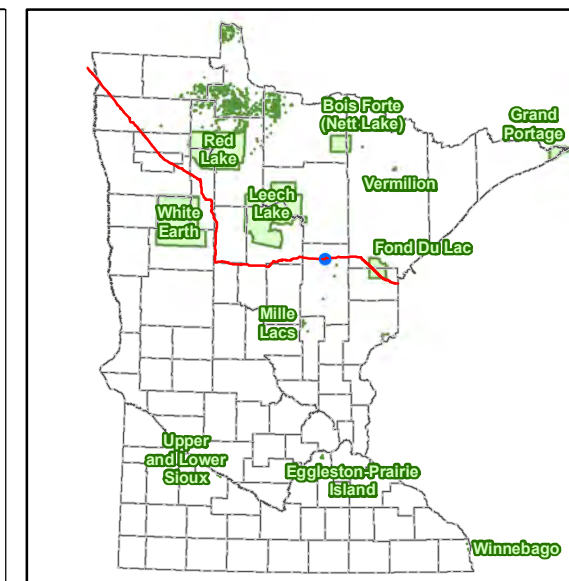
Crow Wing River HDD: MP 993.1  
Upland Discharge Area  
Line 3 Replacement Project



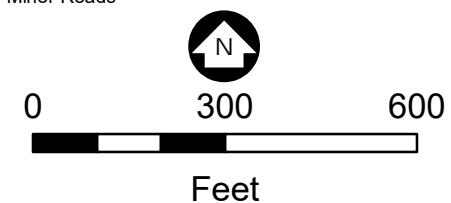
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- Discharge Location Option A
- Discharge Location Option B
- Discharge Location Option C
- Anticipated Infiltration Area (0.50 acre)  
(Area where water may pool and/or become channelized. Add BMPs as necessary.)
- Subwatershed Flow Paths
- Subwatershed Delineations
- Depressions
- Active Construction Workspace



- Mainline Spread End Milepost
- Line 3 Replacement Project
- Well - County Well Index
- Water Appropriation Site
- Potential Upland Discharge Area - 2.24 acres
- Soil Map Unit
- Hydrologic Soil Group**
  - A
  - B
  - C
  - D (A/D, B/D, C/D)
- Lidar Contours**
  - Index (10-Foot)
  - Intermediate (2-Foot)
  - Surficial Flow Direction
  - Flow Direction
  - Perennial Stream
  - Intermittent Stream
  - Waterbodies
  - Field Delineated Wetlands
  - County Boundaries
  - Minor Roads



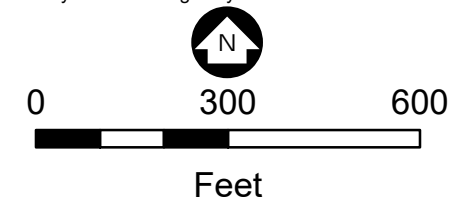
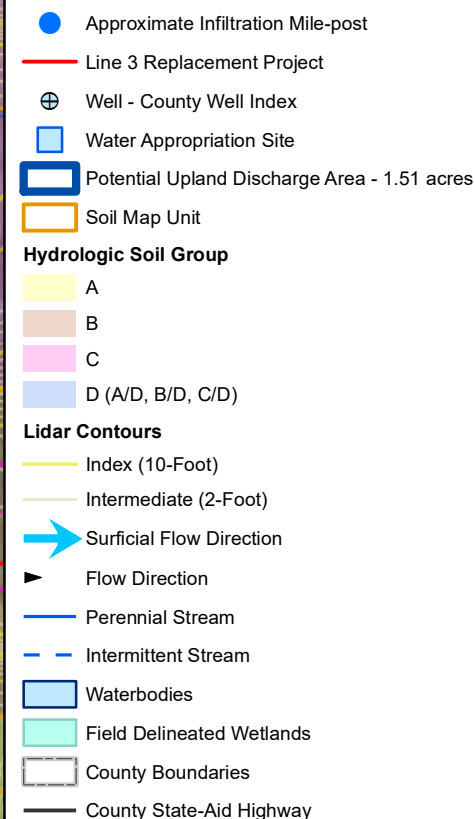
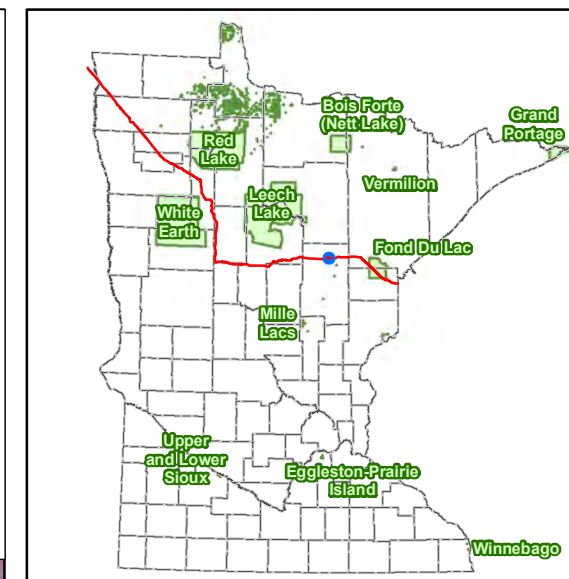
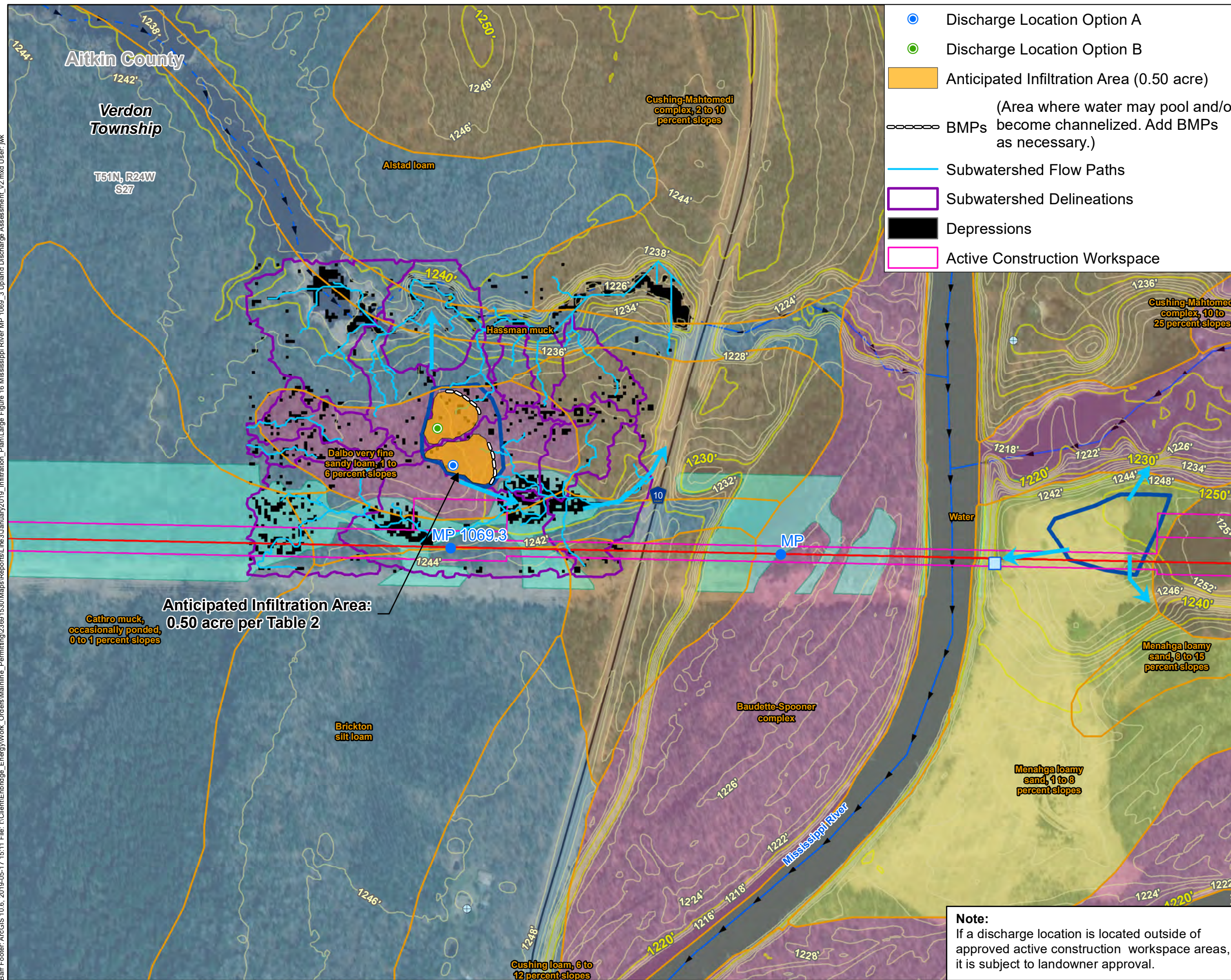
Large Figure 15

Willow River HDD: MP 1066.6  
Upland Discharge Area  
Line 3 Replacement Project





Barr Footer: ArcGIS 10.6, 2019-05-17 15:11 File: I:\Client\Enbridge\_Energy\Work\_Orders\Mainline\_Permitting\2369 1530\Maps\Reports\Line3\January2019\_Infiltration\_Plan\Large Figure 16 Mississippi River MP 1069.3 Upland Discharge Assessment\_v2.mxd User: jwk



Large Figure 16

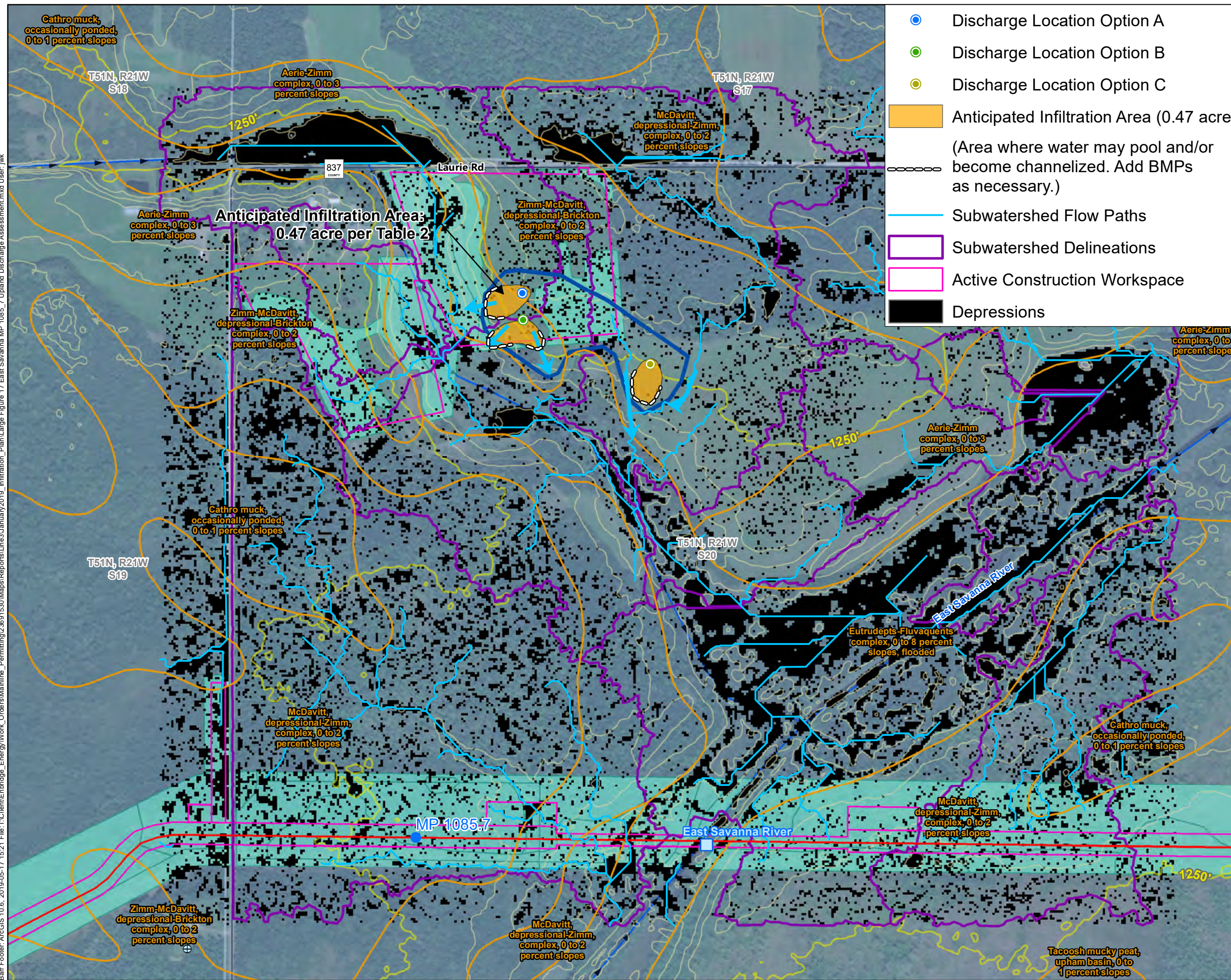
Mississippi River HDD: MP 1069.3  
Upland Discharge Area  
Line 3 Replacement Project



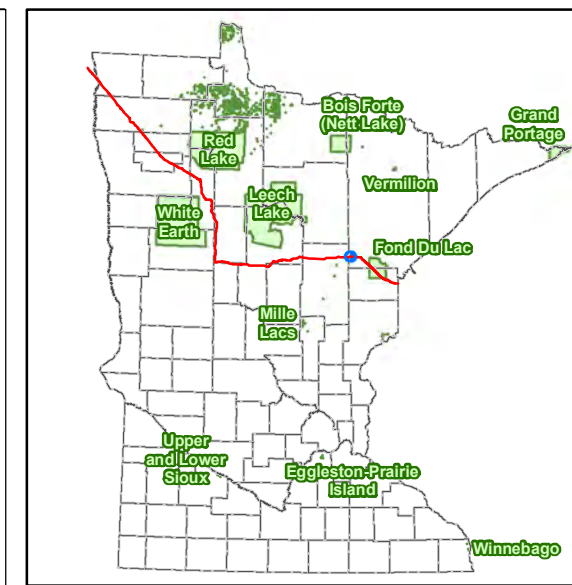
**Note:**  
If a discharge location is located outside of approved active construction workspace areas, it is subject to landowner approval.



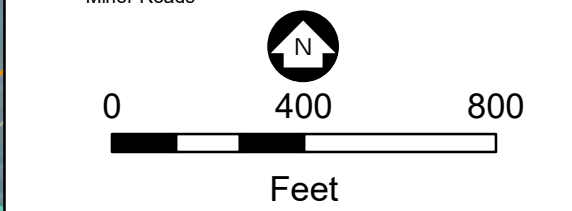
Barr Footer: ArcGIS 10.6, 2019-05-17 15:21 File: I:\Client\Enbridge\_Energy\Work\_Orders\Mainline\_Permitting\23691530\Map\Reports\Line3\January2019\_Infiltration\_Plan\Large Figure 17 East Savanna MP 1085.7 Upland Discharge Assessment.mxd User: jwk



- Discharge Location Option A
- Discharge Location Option B
- Discharge Location Option C
- Anticipated Infiltration Area (0.47 acre)  
(Area where water may pool and/or become channelized. Add BMPs as necessary.)
- Subwatershed Flow Paths
- Subwatershed Delineations
- Active Construction Workspace
- Depressions



- Mainline Spread End Milepost
- Line 3 Replacement Project
- ⊕ Well - County Well Index
- Water Appropriation Site
- Potential Upland Discharge Area - 6.03 acres
- Soil Map Unit
- Hydrologic Soil Group**
  - A
  - B
  - C
  - D (A/D, B/D, C/D)
- Lidar Contours**
  - Index (10-Foot)
  - Intermediate (2-Foot)
- Surficial Flow Direction
- Flow Direction
- Perennial Stream
- Intermittent Stream
- Waterbodies
- Field Delineated Wetlands
- County Boundaries
- Minor Roads

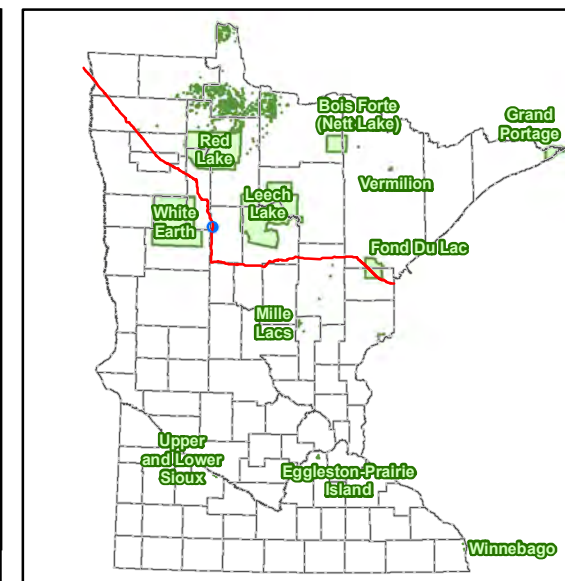
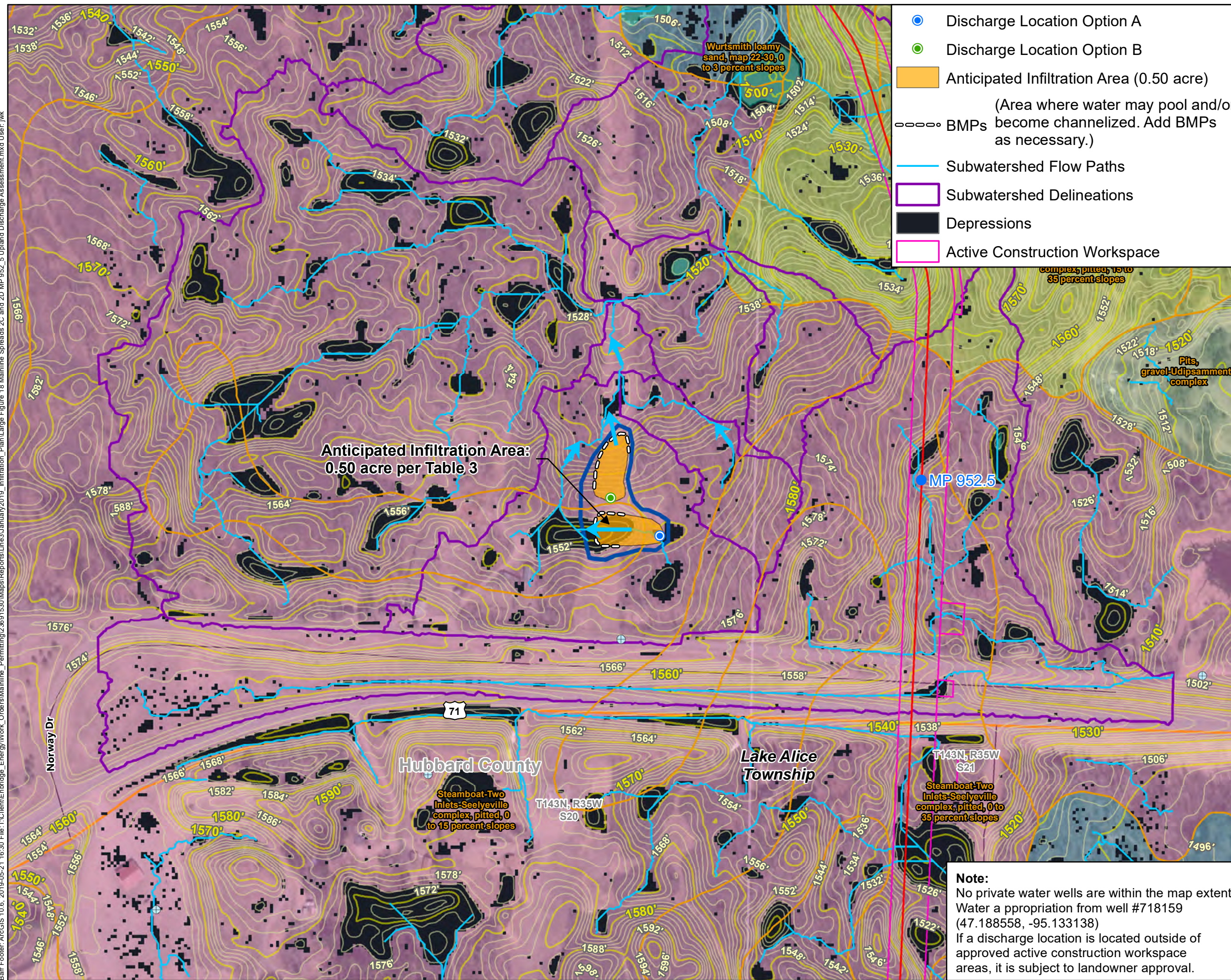


Large Figure 17  
East Savanna River HDD: MP 1085.7  
Upland Discharge Area  
Line 3 Replacement Project

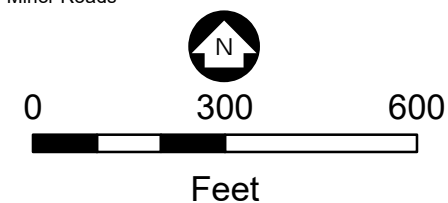




Barr Footer: ArcGIS 10.6, 2019-05-21 16:30 File: I:\Client\Enbridge\_Energy\Work\_Orders\Mainline\_Permits\23691530\Map\Reports\Line3\January2019\_Infiltration\_Plan\Large Figure 18 Mainline Spreads 2C and 2D MP 952.5 Upland Discharge Assessment.mxd User: jvk



- Approximate Infiltration Mile-post
- Line 3 Replacement Project
- ⊕ Well - County Well Index
- ▭ Potential Upland Discharge Area - 1.63 acres
- ▭ Soil Map Unit
- Hydrologic Soil Group**
  - A
  - B
  - C
  - D (A/D, B/D, C/D)
- Lidar Contours**
  - Index (10-Foot)
  - Intermediate (2-Foot)
  - ➔ Surficial Flow Direction
  - ➔ Flow Direction
  - Perennial Stream
  - - - Intermittent Stream
  - ▭ Waterbodies
  - ▭ Field Delineated Wetlands
  - ▭ County Boundaries
  - US Highway
  - Minor Roads



Large Figure 18

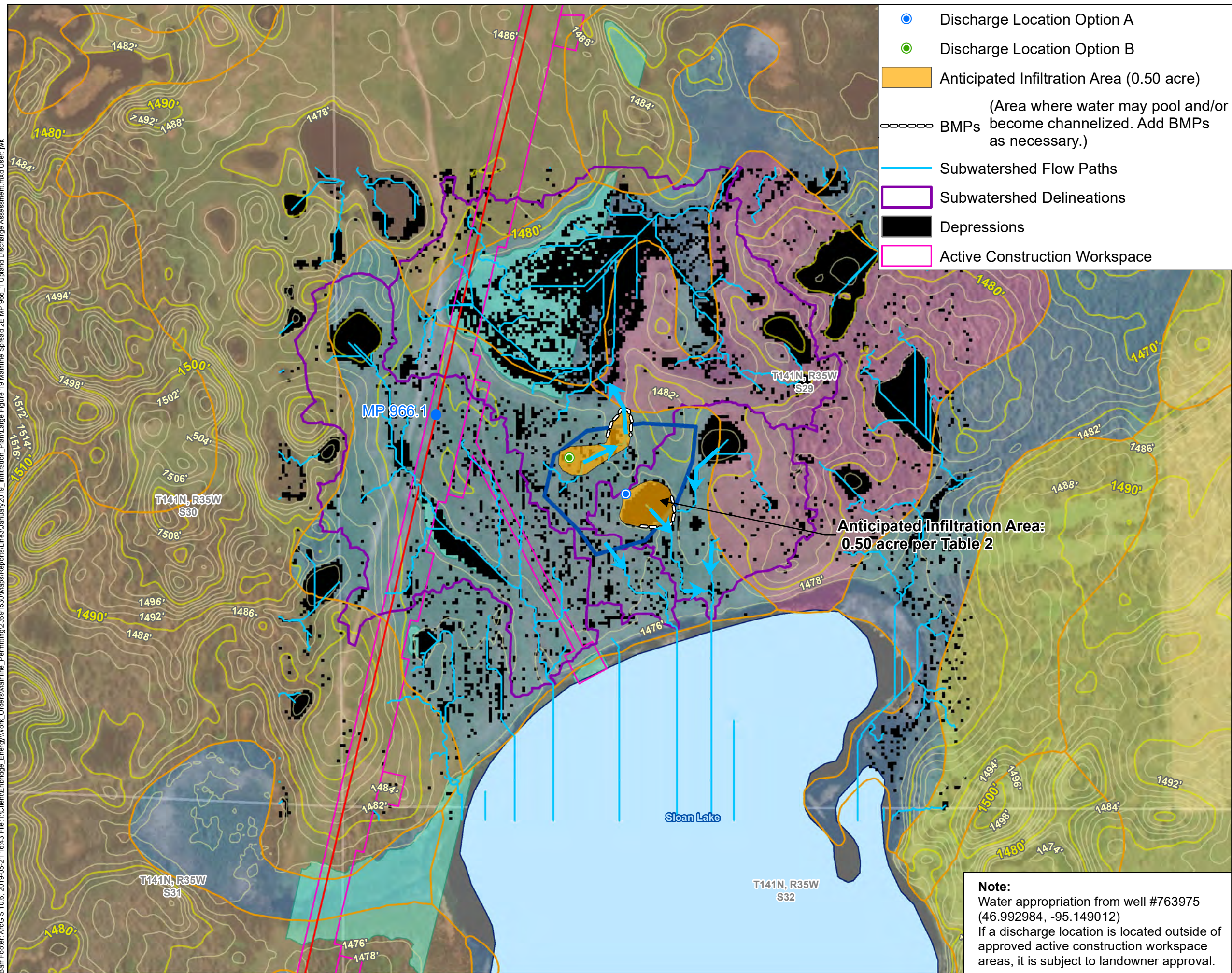
Mainline Spreads 2C & 2D: MP 952.5  
Upland Discharge Area  
Line 3 Replacement Project



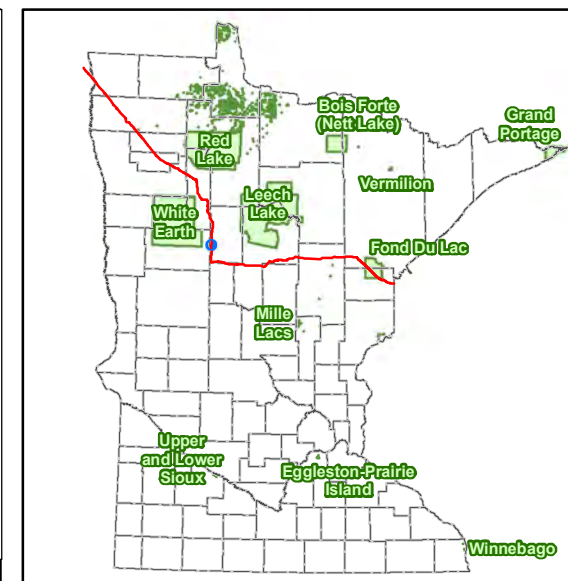
**Note:**  
No private water wells are within the map extent  
Water a appropriation from well #718159  
(47.188558, -95.133138)  
If a discharge location is located outside of  
approved active construction workspace  
areas, it is subject to landowner approval.



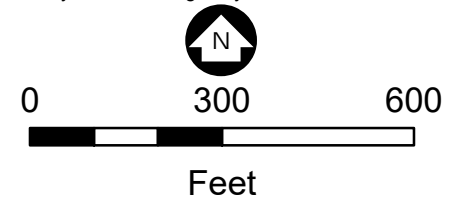
Barr Footer: ArcGIS 10.6, 2019-05-21 16:43 File: I:\Client\Enbridge\_Energy\Work\_Orders\Mainline\_Permits\23691530\Map\Reports\Line3\January2019\_Infiltration\_Plan\Large Figure 19 Mainline Spread 2E MP 966.1 Upland Discharge Assessment.mxd User: jwk



- Discharge Location Option A
- Discharge Location Option B
- Anticipated Infiltration Area (0.50 acre)  
(Area where water may pool and/or become channelized. Add BMPs as necessary.)
- BMPs
- Subwatershed Flow Paths
- Subwatershed Delineations
- Depressions
- Active Construction Workspace



- Approximate Infiltration Mile-post
- Line 3 Replacement Project
- ⊕ Well - County Well Index
- Potential Upland Discharge Area - 3.35 acres
- Soil Map Unit
- Hydrologic Soil Group**
  - A
  - B
  - C
  - D (A/D, B/D, C/D)
- Lidar Contours**
  - Index (10-Foot)
  - Intermediate (2-Foot)
- Surficial Flow Direction
- Flow Direction
- Perennial Stream
- Intermittent Stream
- Waterbodies
- Field Delineated Wetlands
- County Boundaries
- County State-Aid Highway



Large Figure 19

Mainline Spread 2E: MP 966.1  
Upland Discharge Area  
Line 3 Replacement Project





**Appendix B**

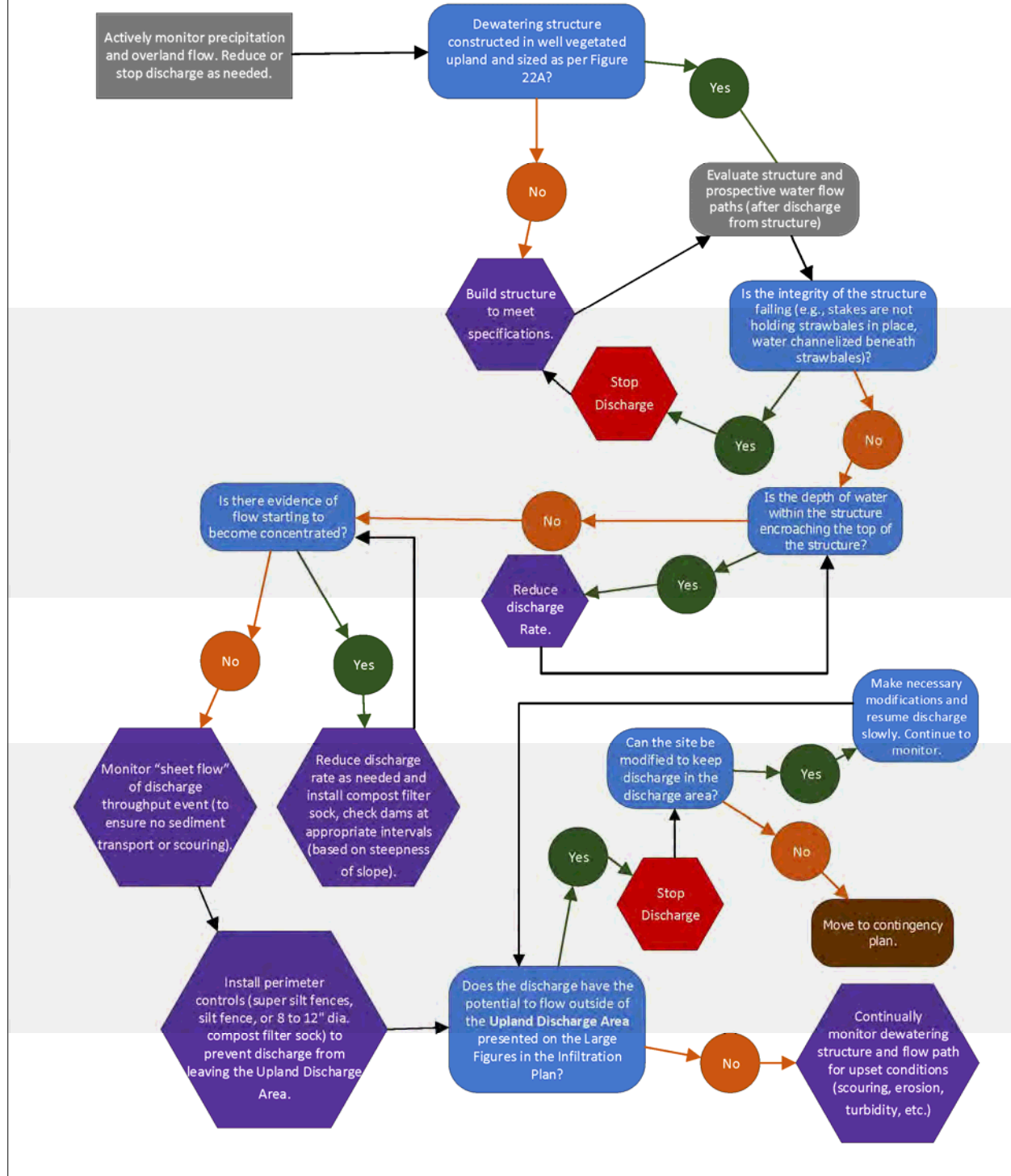
**Hydrotest Discharge Water Quality Results**

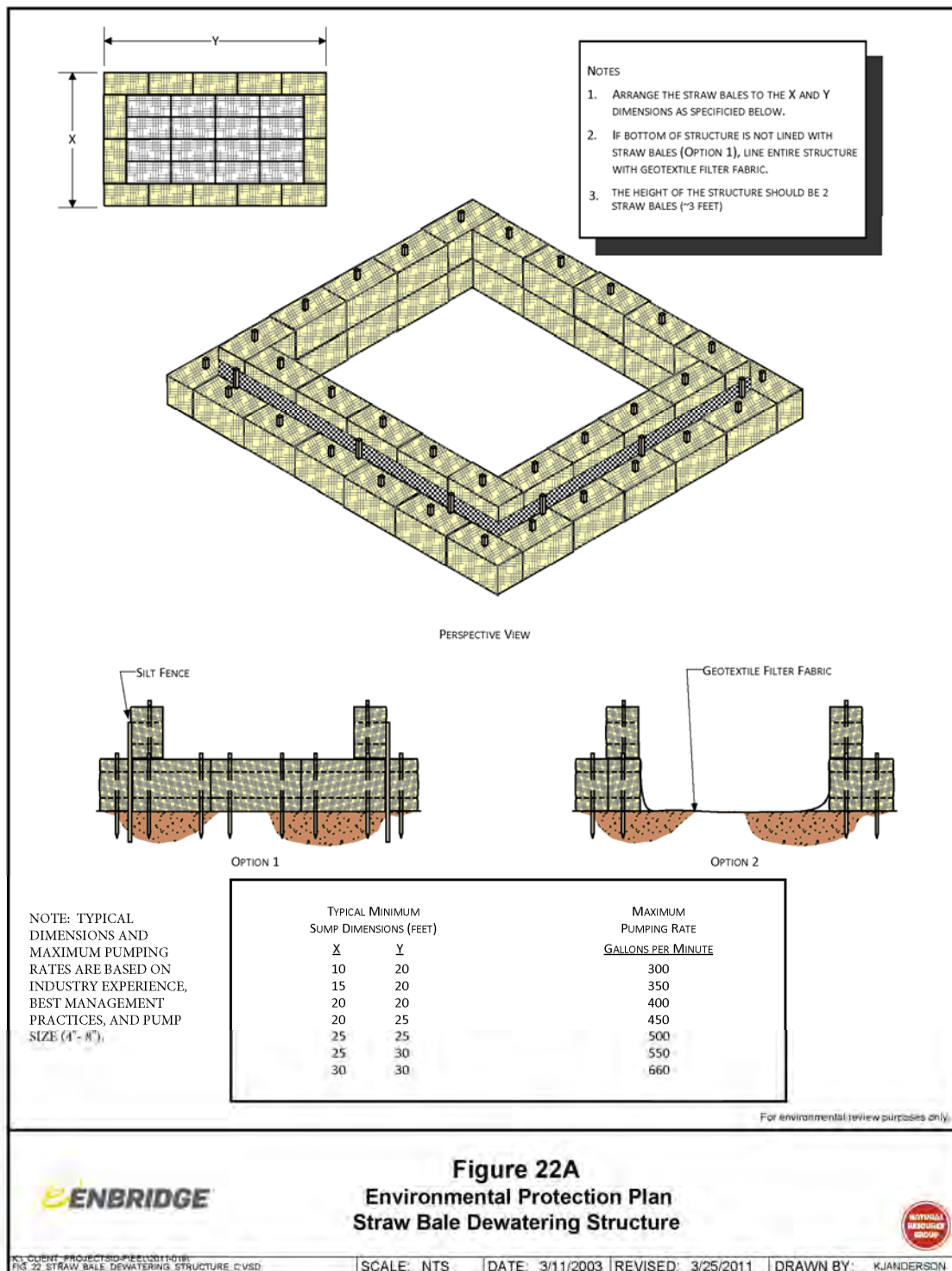
		Superior Terminal		Segment 18	
Location Date		Superior Terminal hydrotest source water <sup>a</sup> 11/16/2018	Discharge from hydrotest of Low Stress Tank <sup>b</sup> 11/27/2018	Discharge from hydrotest of pipe segment T13/14 to M213 <sup>b</sup> 12/10/2018	Hydrotest discharge water <sup>c</sup> 1/11/2018
Parameter	Units				
<b>General Parameters</b>					
Biochemical Oxygen Demand (5-day)	mg/l	--	< 2.0 *	< 2.0	7.8
Nitrogen, ammonia, as N	mg/l	--	< 0.036	<b>0.043 j</b>	<b>0.35</b>
Oil and Grease	mg/l	< 0.77	< 0.78	< 0.74	< 5.3
pH, field	pH units	7.17	7.62	8.54	6.8
Phosphorus, total, as P	mg/l	--	0.43	0.39	< 0.050
Solids, total suspended	mg/l	< 1.0	2.4	6.8	< 10.0
<b>Semivolatile Organic Compounds</b>					
1-Methylnaphthalene	ug/l	< 0.0079	--	--	--
2-Methylnaphthalene	ug/l	< 0.011	--	--	--
Acenaphthene	ug/l	< 0.013	--	--	< 0.046
Acenaphthylene	ug/l	< 0.0050	--	--	< 0.046
Anthracene	ug/l	< 0.0053	--	--	< 0.046
Benz(a)anthracene	ug/l	< 0.0093	< 0.0093	< 0.0093	< 0.046
Benzo(a)pyrene	ug/l	< 0.0081	< 0.0081	0.013 jb	< 0.046
Benzo(b)fluoranthene	ug/l	< 0.0081	< 0.0081	< 0.0081	< 0.046
Benzo(g,h,i)perylene	ug/l	< 0.0076	< 0.0076	0.011 jb	< 0.046
Benzo(k)fluoranthene	ug/l	< 0.0057	< 0.0057	< 0.0057	< 0.046
Chrysene	ug/l	< 0.0033	< 0.0033	< 0.0033	< 0.046
Dibenz(a,h)anthracene	ug/l	< 0.013	< 0.013	0.015 jb	< 0.046
Fluoranthene	ug/l	0.024 j	0.015 j	0.017 j	< 0.046
Fluorene	ug/l	< 0.010	--	--	< 0.046
Indeno(1,2,3-cd)pyrene	ug/l	< 0.012	< 0.012	< 0.012	< 0.046
Naphthalene	ug/l	< 0.023	--	--	< 0.046
Phenanthrene	ug/l	0.060	0.039 j	0.041	< 0.046
Pyrene	ug/l	< 0.0059	< 0.0059	< 0.0059	< 0.046
<b>Volatile Organic Compounds</b>					
Benzene	ug/l	< 0.42	< 0.42	< 0.42	< 1.0
Ethyl benzene	ug/l	< 0.29	< 0.29	< 0.29	< 1.0
Toluene	ug/l	< 0.32	< 0.32	< 0.32	< 1.0
Xylene, m & p	ug/l	< 0.53	< 0.53	< 0.53	--
Xylene, o	ug/l	< 0.19	< 0.19	0.22 jb	--
Xylene, total	ug/l	< 0.74	< 0.74	< 0.74	< 1.0
Total Petroleum Hydrocarbons					
Diesel Range Organics, C10-C28	mg/l	--	0.053 j	0.13	--
<sup>a</sup> Sample ML H#C1N collected from hydrotest source water prior to entering Enbridge fire suppression hydrant system. <sup>b</sup> Hydrotests on new tank and new pipe. ProAct filtration system not used for these discharges. <sup>c</sup> Hydrotest on new pipe. Sample collected downstream of ProAct filtration system. <b>Data Qualifiers</b> -- Not analyzed/Not available * Estimated value, QA/QC criteria not met. b Potential false positive value based on blank data validation procedures. Concentrations identified as potential false positive are excluded from calculations. j Estimated detected value. The reported value is less than the stated laboratory quantitation limit but greater than the laboratory method detection limit.					

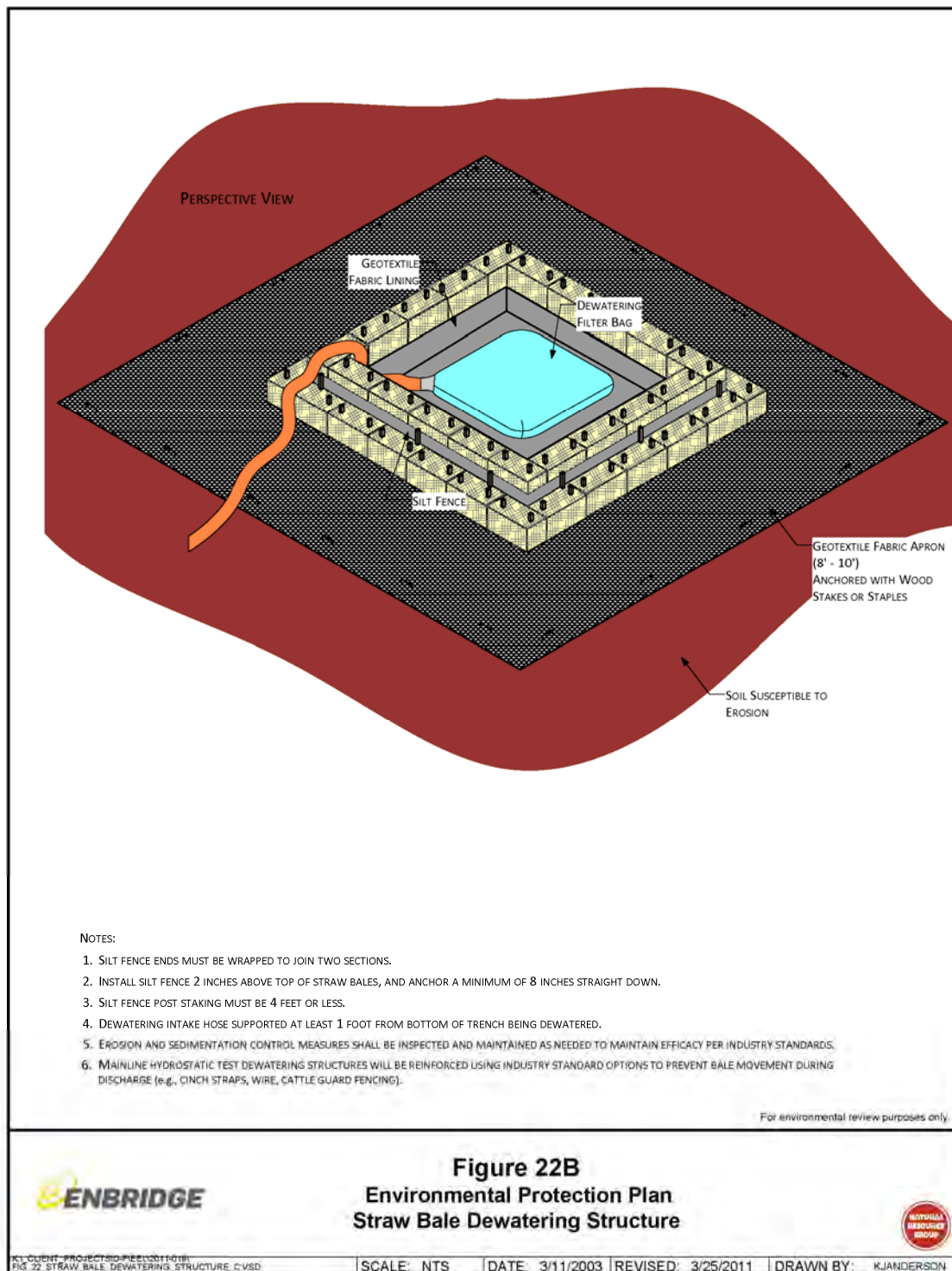
**Appendix C**  
**BMP Selection Process;**  
**BMP Typical Figures**



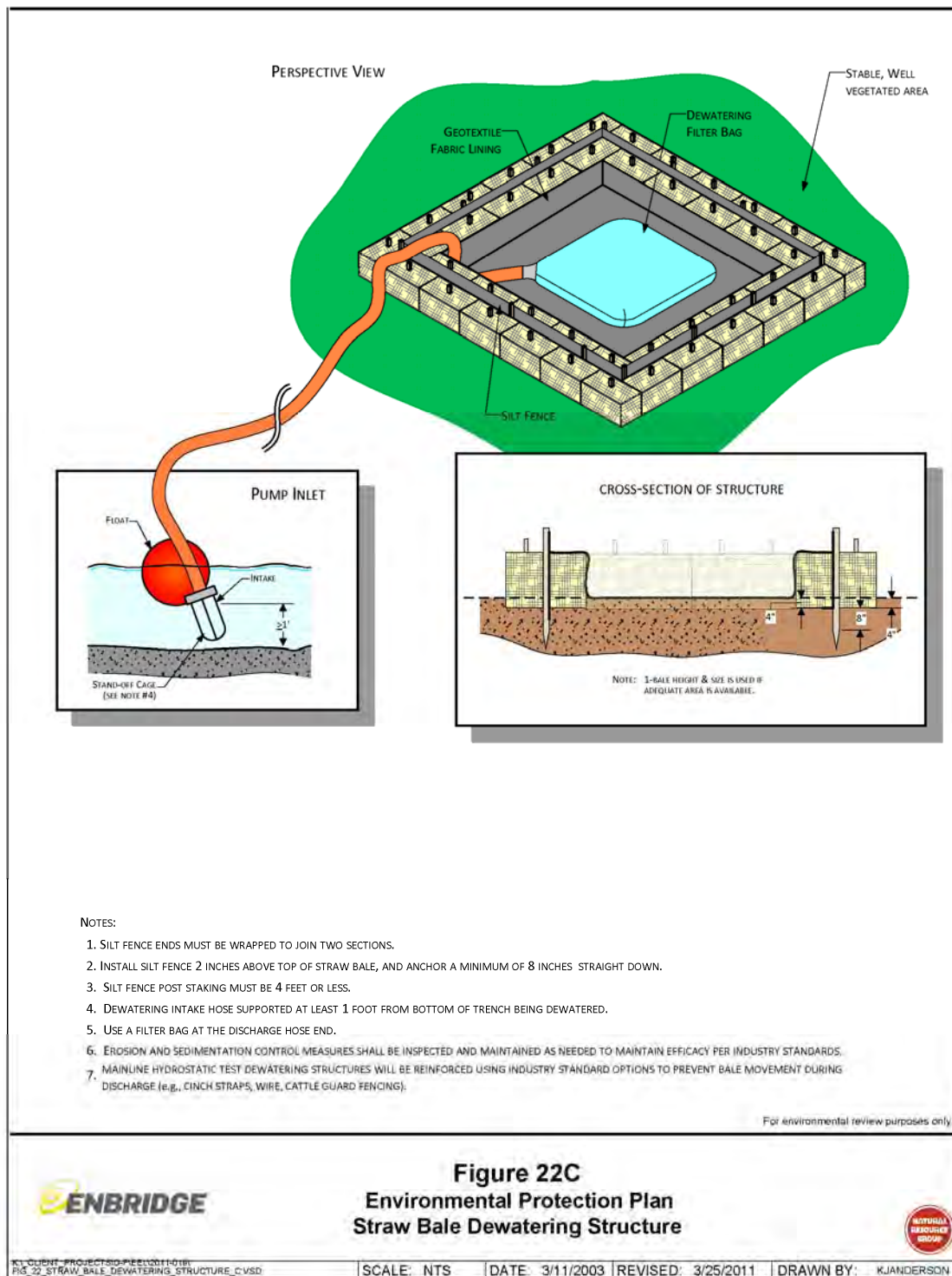
## Upland Hydrotest Discharge BMP Selection Process

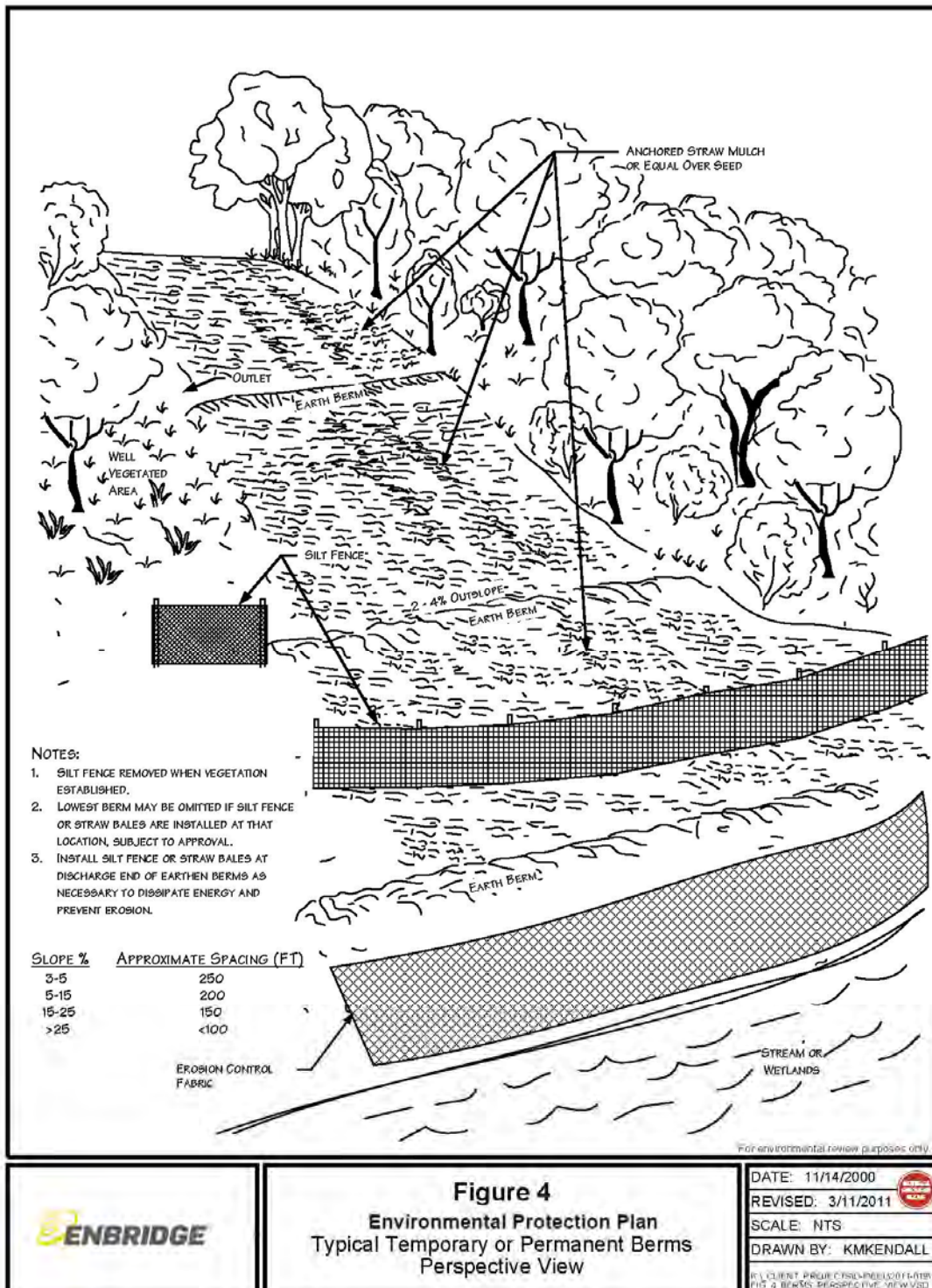


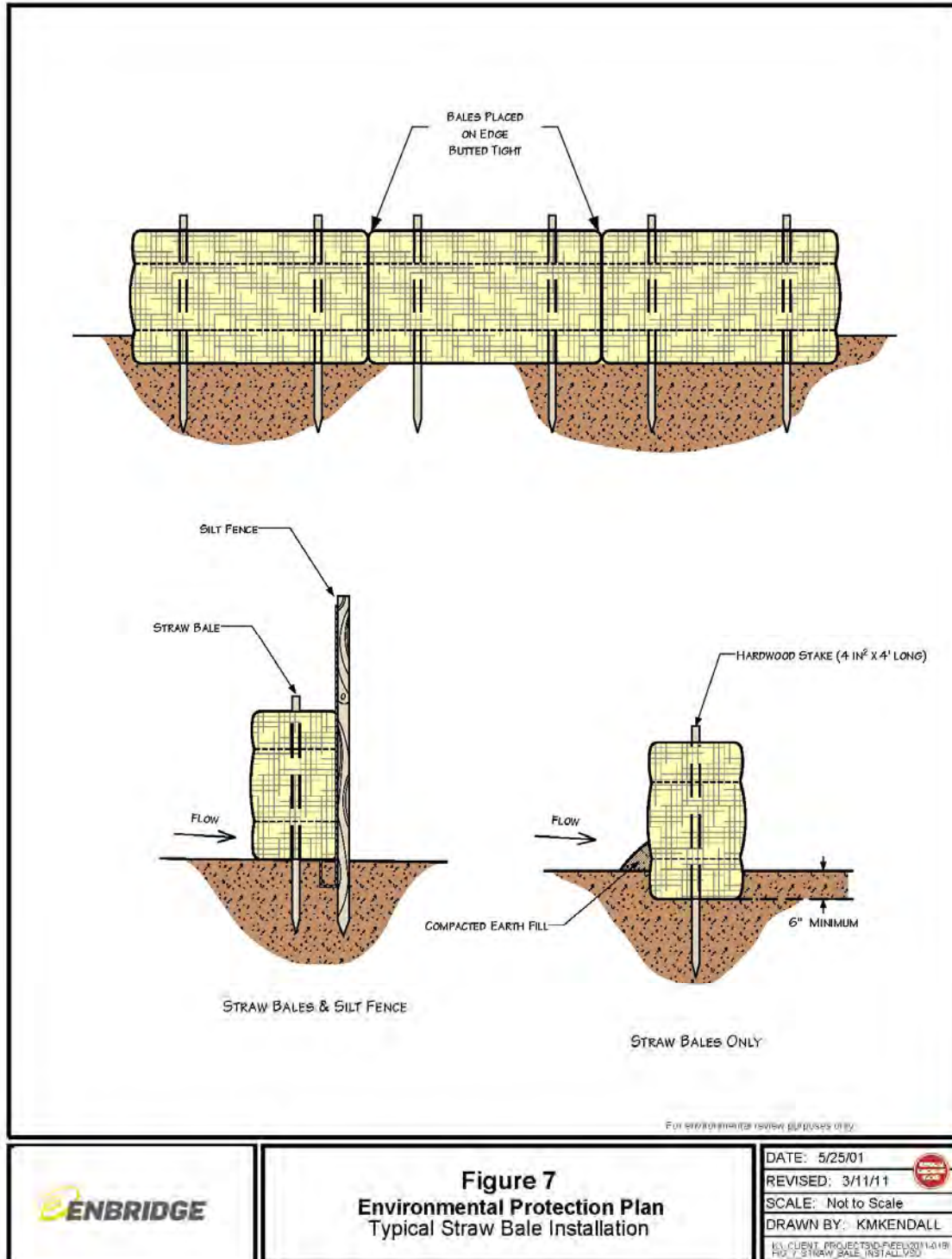




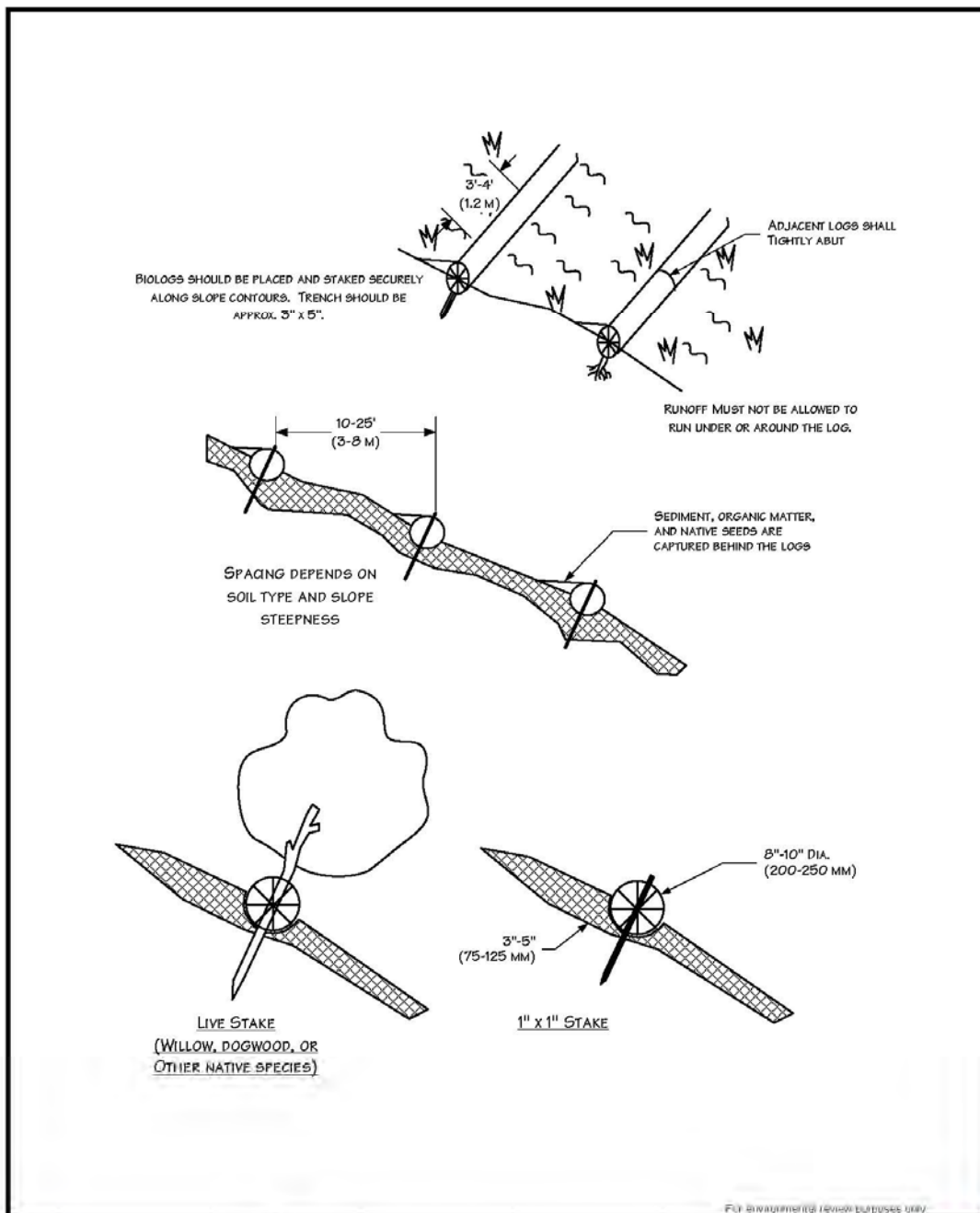












	<p align="center"><b>Figure 10</b> Environmental Protection Plan Typical Biolog Installation</p>	DATE: 5/25/2001
		REVISED: 3/24/2011
		SCALE: NTS
		DRAWN BY: KMKENDALL
		<small>           V:\CLIENT PROJECTS\PEB\2011\018            FIG_10_BIOLOGS INSTALL.VSD         </small>

**Appendix D**  
**Field Conditions Inspection Sheet**

### Field Conditions Inspection Sheet

Milepost: \_\_\_\_\_ Latitude/Longitude of observed area: \_\_\_\_\_

Date/Time: \_\_\_\_\_ Weather/Notes: \_\_\_\_\_

Form Completed by: \_\_\_\_\_

#### Topography

Review the topography and identify areas of potential ponding or channelized flow. Compare to the applicable large figure and note findings below:

---

---

#### Soil Type

Indicate on the applicable large figure where core samples were obtained. No less than two core samples (one high and one low spot) should be completed to a depth of 3 feet.

Indicate soil type for each core sample:

A      B      C      D      Combination (specify) \_\_\_\_\_

Review the soil type(s) and compare to the soil type reflected in the regional data used in this plan. Note findings below:

---

---

Note saturated soils found within the first 3 feet below ground surface. Note findings below:

---

---

Note whether restrictive layers within the first 3 feet below ground surface were observed. Note findings below:

---

---

#### Field Photographs

Add minimum two photographs of area at time of inspection.



**Attachment I**

**Hydrostatic Test Receiving Water Table**

Line 3 Replacement Project  
Hydrostatic Test Receiving Water Table

Discharge ID	Receiving Water	MP	WID	Receiving Water MPCA Listed Classification (7050.0470)	River Nutrient Region	TSS Standard (by River Nutrient Region) (mg/l)	Impairment 2018 <sup>a</sup>	Infestation <sup>b</sup>	ORVW (Restricted or Prohibited) <sup>c</sup>	Hydrotest Description	Source Waterbody Name	Maximum Discharge Quantity (gallons) <sup>d</sup>	Maximum Discharge Rate (gallons)
SD001	Red River	801.8	09020311-560	1C, 2Bdg, 3C, 4A, 4B, 5, 6	Border Water	100	As; Hg-F; Hg-W; Turbidity	zebra mussel	No	Mainline Hydrotest	Red River	17,501,185	1,500
SD002	Tamarac River	828.6	09020311-503	1C, 2Bdg, 3C, 4A, 4B, 5, 6	South	65	F-IBI, M-IBI	No	No	Mainline Hydrotest	Tamarac River	17,501,185	1,500
SD003	Middle River	836	09020309-540	2Bg, 3C, 4A, 4B, 5, 6	South	65	DO; M-IBI; Turbidity	No	No	Mainline Hydrotest	Middle River	10,185,701	1,500
SD004	Red Lake River	864.7	09020303-513	1C, 2Bdg, 3C, 4A, 4B, 5, 6	South	65	HgF	No	No	Mainline Hydrotest	Red Lake River	14,065,707	1,500
SD005	Clearwater River	875.4	09020305-648	2Bg, 3C, 4A, 4B, 5, 6	South	65	Hg-F; Turbidity	No	No	Mainline Hydrotest	Clearwater River	14,065,707	1,500
SD006	Lost River	904	09020305-512	2Bg, 3C, 4A, 4B, 5, 6	South	65	E. Coli	No	No	Mainline Hydrotest	Lost River	13,896,437	1,500
SD007	Clearwater River	922.3	09020305-517	2Bg, 3C, 4A, 4B, 5, 6	North	15	No	No	No	Mainline Hydrotest	Clearwater River	13,896,437	1,500
<del>SD008<sup>e</sup></del>	<del>Mississippi River</del>	<del>941</del>	<del>07010101-753</del>	<del>2Bg, 3C, 4A, 4B, 5, 6</del>	<del>North</del>	<del>15</del>	<del>Hg-F</del>	<del>No</del>	<del>Restricted</del>	<del>Mainline Hydrotest</del>	<del>Mississippi River</del>	<del>13,896,437</del>	<del>1,500</del>
SD009	Island Lake	961.7	Lake ID: 29025400	2B, 3C	North	15	Hg	No	No	Mainline Hydrotest	Island Lake	9,120,665	1,500
SD010	Shell River	985.3	07010106-679	2Bg, 3C, 4A, 4B, 5, 6	Central	30	No	No	No	Mainline Hydrotest	Shell River	12,080,000	1,500
SD011	Crow Wing River	993.3	07010106-516	2Bg, 3C, 4A, 4B, 5, 6	Central	30	Hg-F	faucet snail	No	Mainline Hydrotest	Crow Wing River	2,937,000	1,500
SD012	Clear (Eagle) Lake	1013.4	Lake ID: 29025600-201	2B, 3C	North	15	No	No	No	Mainline Hydrotest	Clear (Eagle) Lake	6,893,000	1,500
SD013/SD014	Pine River	1017.3	07010105-669	2Bg, 3C, 4A, 4B, 5, 6	North	15	No	No	No	Mainline Hydrotest	Pine River	16,036,000	1,500
SD015	Willow River	1066.4	07010103-748	2Bg, 3C, 4A, 4B, 5, 6	North	15	No	No	No	Mainline Hydrotest	Willow River	20,047,913	1,500
<del>SD016<sup>e</sup></del>	<del>Unnamed Wetland</del>	<del>1066.6</del>	<del>NA</del>	<del>2D, 3D, 4C, 5, 6</del>	<del>North</del>	<del>15</del>	<del>No</del>	<del>No</del>	<del>No</del>	<del>HDD Hydrotest</del>	<del>Willow River</del>	<del>141,015</del>	<del>660</del>
SD017	Mississippi River	1069.6	07010103-708	2B, 3C, 4A, 4B, 5, 6	North	15	Hg-F; TSS	No	Restricted	Mainline Hydrotest	Mississippi River	27,250,398	1,500
SD018	East Savanna River	1085.8	04010201-561	2Bg, 3C, 4A, 4B, 5, 6	North	15	No	No	No	Mainline Hydrotest	East Savanna River	14,496,068	1,500
<del>SD019<sup>e</sup></del>	<del>Unnamed Wetland</del>	<del>1086</del>	<del>NA</del>	<del>2D, 3D, 4C, 5, 6</del>	<del>North</del>	<del>15</del>	<del>No</del>	<del>No</del>	<del>No</del>	<del>HDD Hydrotest</del>	<del>East Savanna River</del>	<del>169,217</del>	<del>660</del>
SD020	Chub Lake	1120.3	Lake ID: 09000800	2B, 3C	North	15	Hg	Eurasian watermilfoil	No	Mainline Hydrotest	Chub Lake	7,343,500	1,500

a Impairments based on MPCA’s 2018 EPA-approved Inventory of Impaired Waters per CWA Section 303(d).

b Based on MDNR infested waters list last updated April 2, 2019 (<https://www.dnr.state.mn.us/invasives/ais/infested.html>). Per guidance provided by the MDNR on January 18, 2019, discharges from infested waters need to be to the same source water or at least 300 feet from another waterbody and there cannot be a direct connection to any other waterbody. The hydrotest discharge associated with two of these sources would go back to the source water (i.e., receiving waters Red River and Chub Lake). Long Lake is also an infested water that has been identified as a contingency source to support HDD hydrotesting; however, the exact location of discharge has not been identified. Enbridge would commit to MDNR guidance to locate the Long Lake discharge at least 300 feet from any waterbody if this contingency source is required.

c Outstanding Resource Value Water (“ORVW”) as defined by Minn. R. 7050.0335 have an extra level of protection associated with them to protect their unique nature.

d Contingency volumes for sources that would be utilized to supplement water needs for mainline hydrotests should another primary source water be unavailable are included. Shaded rows are contingency source/receiving waters only. The contingency source for SD016 and SD019 is the Mississippi River (MP 1069.6).

e Enbridge eliminated Mississippi River MP 941.0 as a mainline contingency surface water source and discharge location, and eliminated two unnamed wetlands are discharge locations.

## **Attachment J**

### **Hydrostatic Test Process Flow Diagrams by Discharge Type**

Mainline Hydrotest – Discharge Back to Source Water

Mainline Hydrotest – Upland Discharge

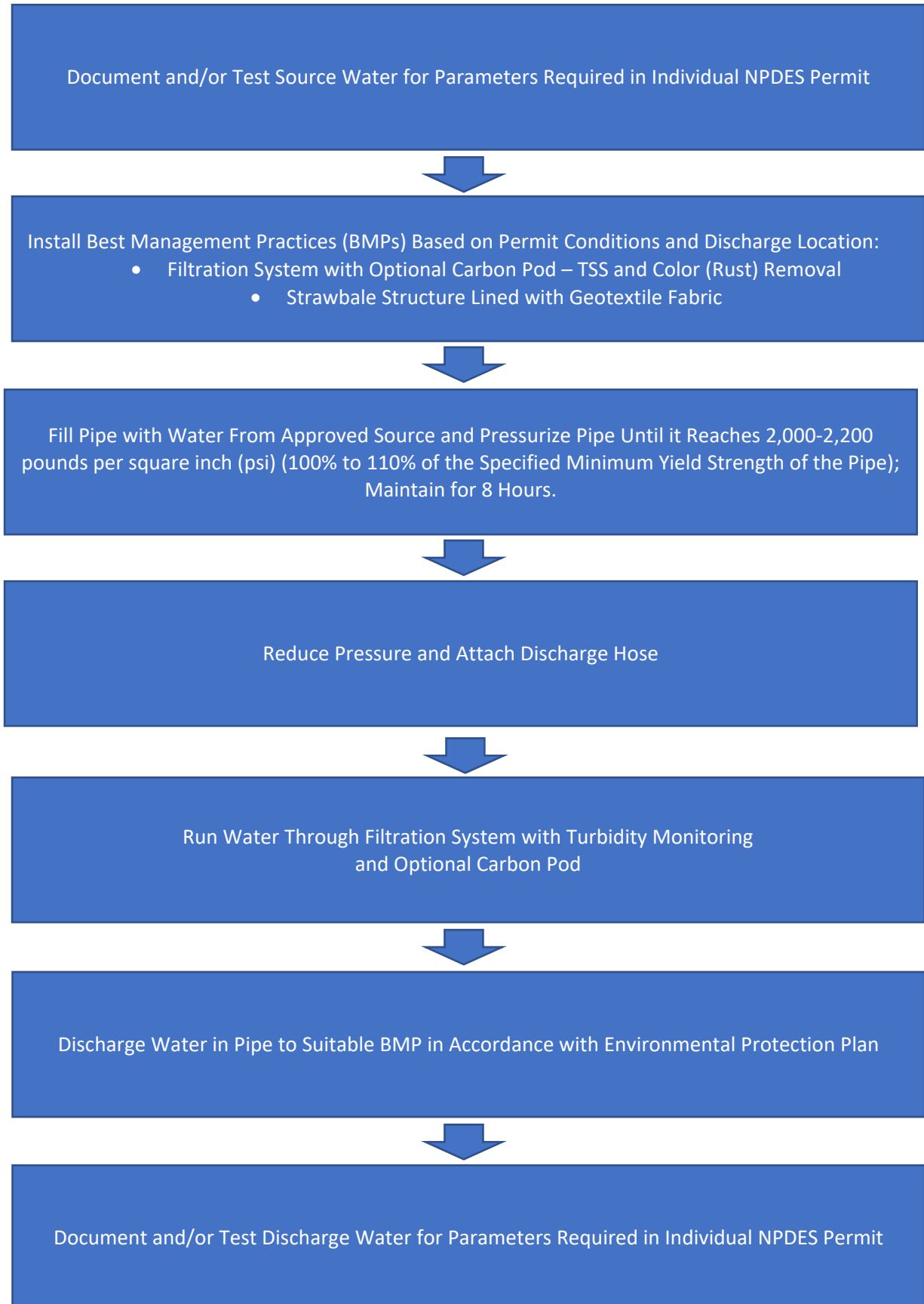
HDD Hydrotest – Upland Discharge



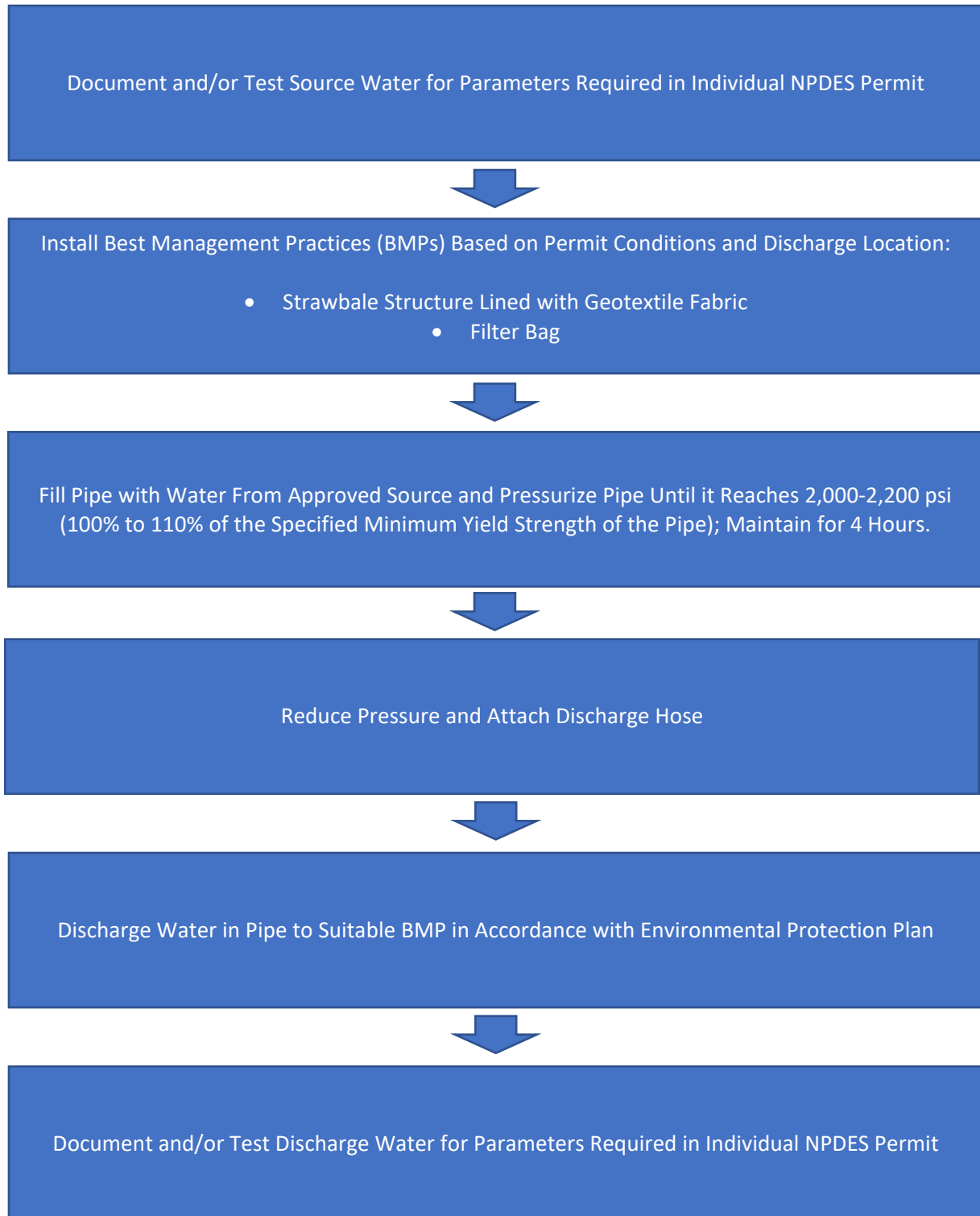
**Line 3 Replacement Project**  
**Hydrostatic Test Process Flow Diagram**  
**Mainline Hydrotest – Discharge Back to Source Water**



**Line 3 Replacement Project**  
**Hydrostatic Test Process Flow Diagram**  
**Mainline Hydrotest – Upland Discharge**

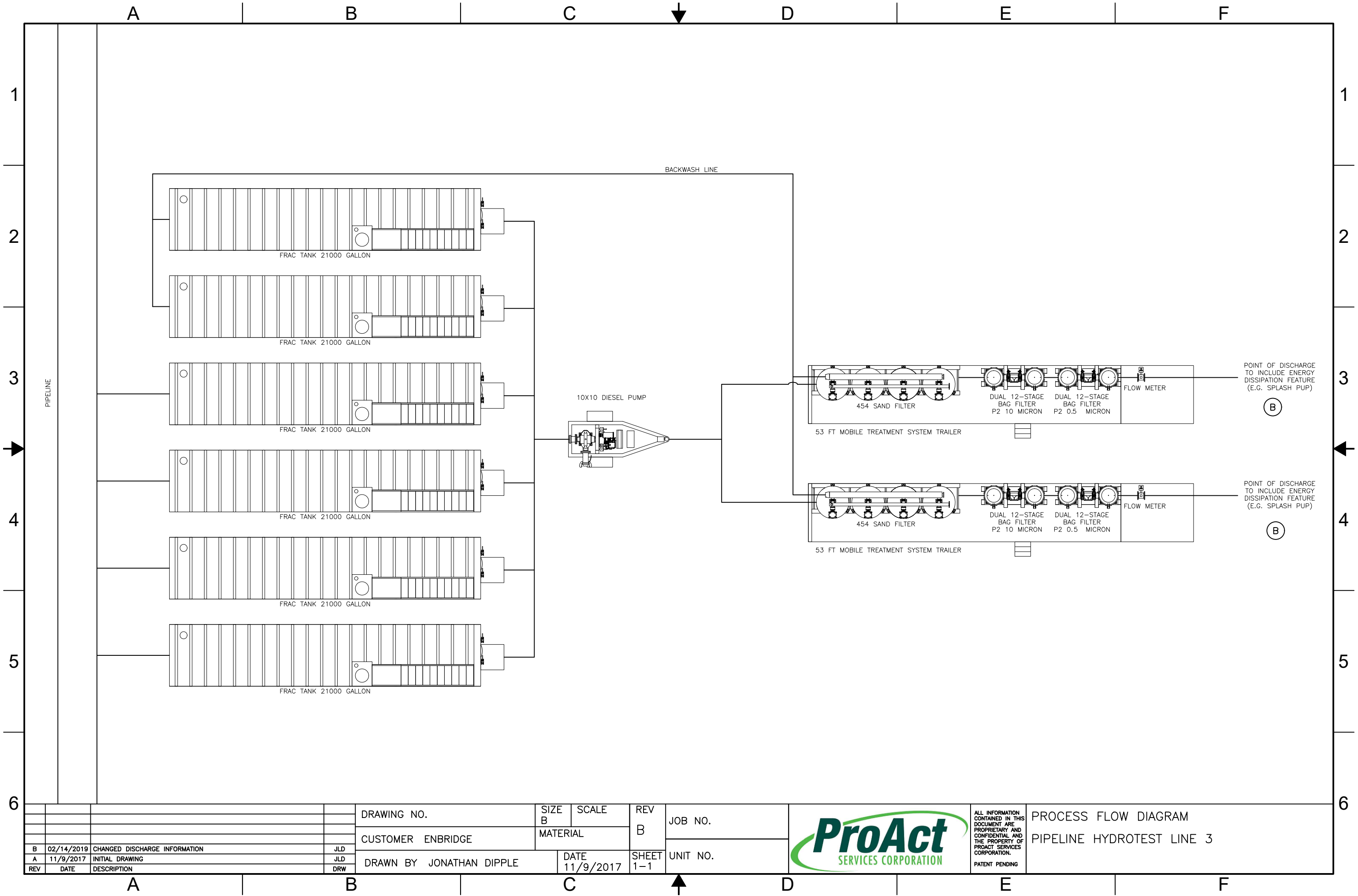


**Line 3 Replacement Project**  
**Hydrostatic Test Process Flow Diagram**  
**Horizontal Directional Drill Hydrotest – Upland Discharge**





**Attachment K**  
**Filtration System Schematic**



REV	DATE	DESCRIPTION	DRW
B	02/14/2019	CHANGED DISCHARGE INFORMATION	JLD
A	11/9/2017	INITIAL DRAWING	JLD

DRAWING NO.	SIZE B	SCALE	REV B	JOB NO.
CUSTOMER ENBRIDGE	MATERIAL			
DRAWN BY JONATHAN DIPPLE	DATE 11/9/2017	SHEET 1-1	UNIT NO.	

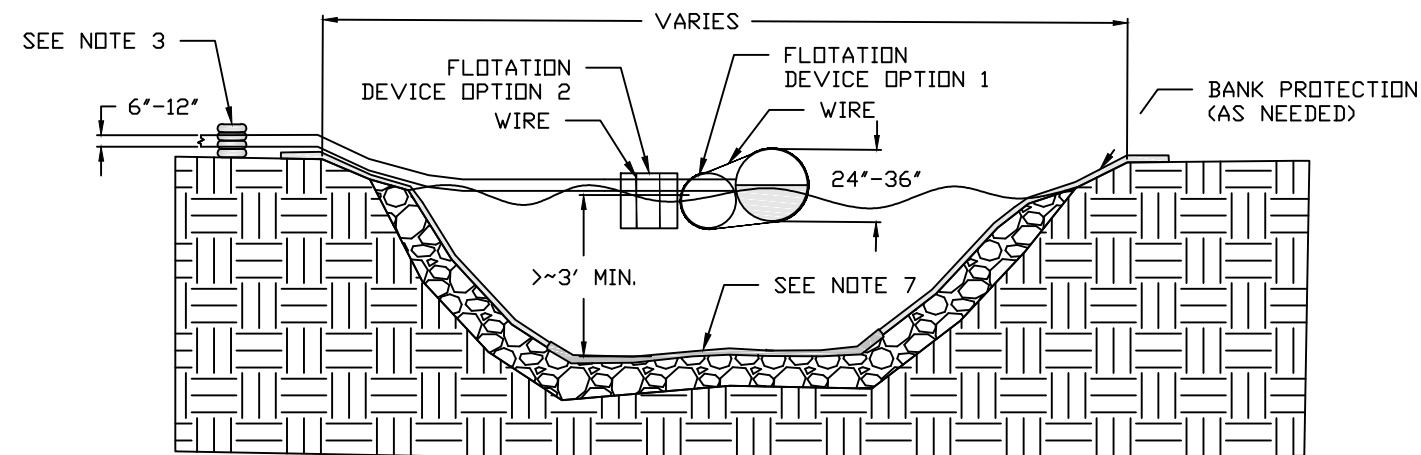
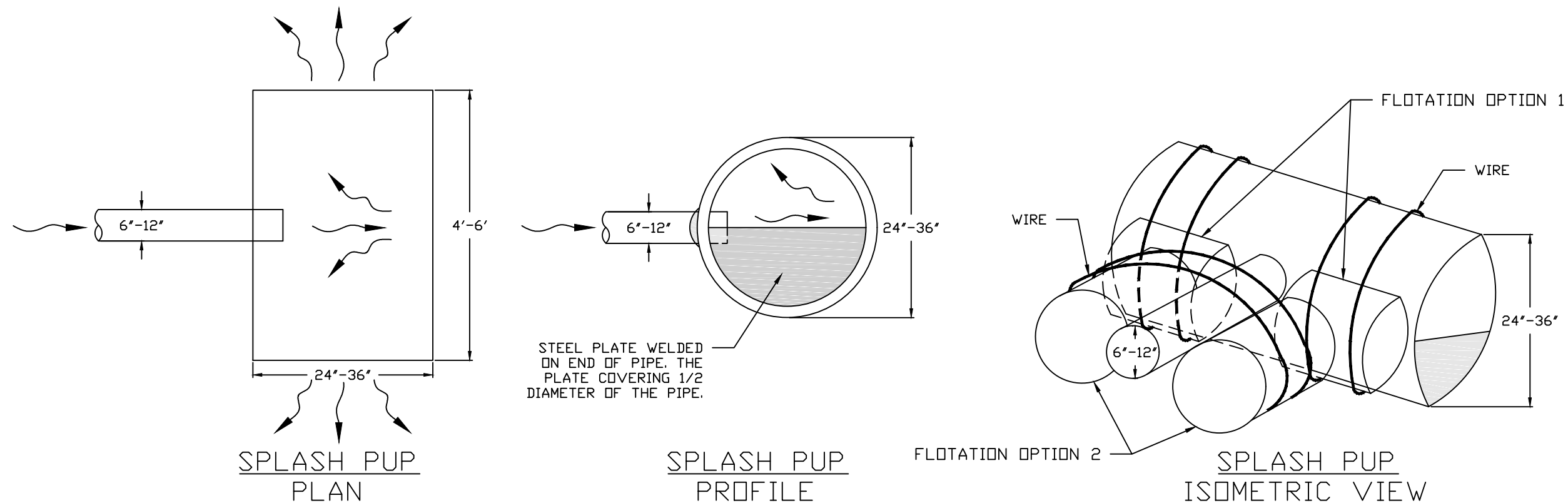


ALL INFORMATION CONTAINED IN THIS DOCUMENT ARE PROPRIETARY AND CONFIDENTIAL AND THE PROPERTY OF PROACT SERVICES CORPORATION. PATENT PENDING

PROCESS FLOW DIAGRAM  
PIPELINE HYDROTEST LINE 3

**Attachment L**  
**Splash Pup Typical**



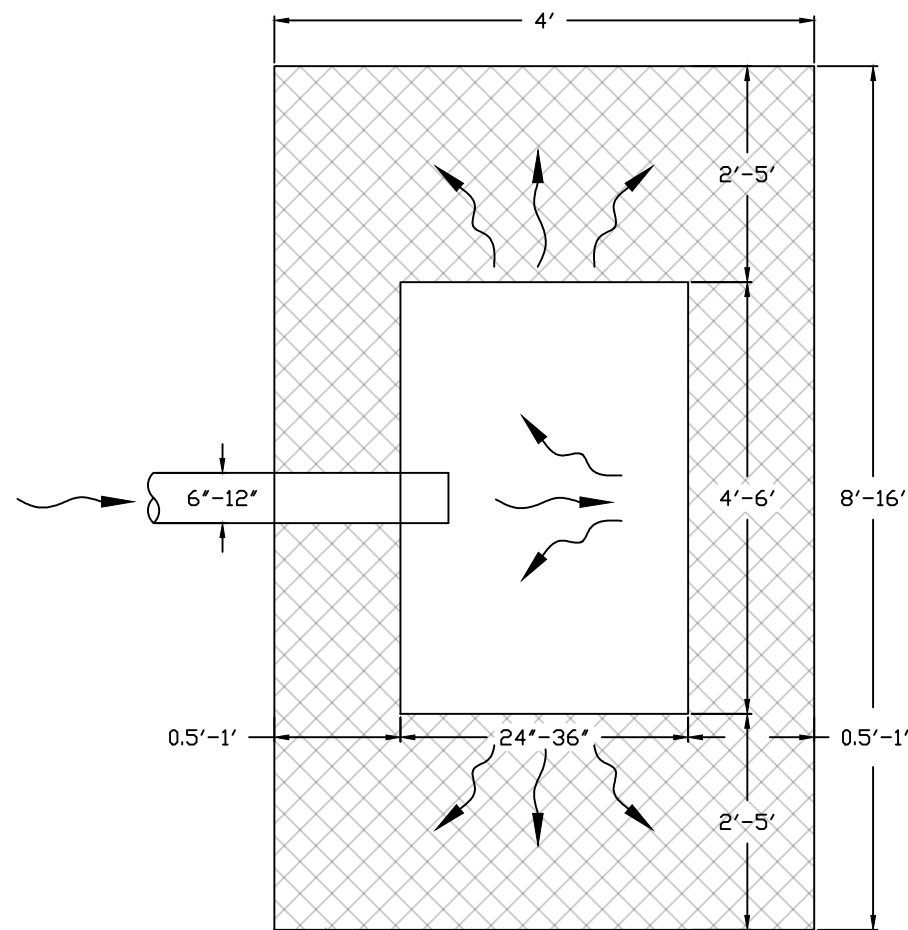


#### NOTES:

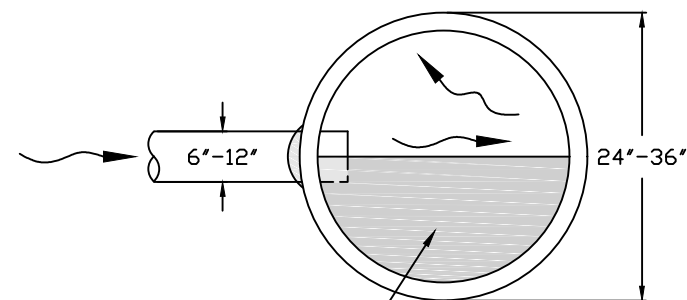
1. AN ENERGY DISSIPATER SHALL BE UTILIZED FOR ALL DISCHARGES (OR THE LIKE).
2. ENERGY DISSIPATERS ARE UTILIZED IN CONJUNCTION WITH PERMIT REQUIRED TREATMENT.
3. DISCHARGE PIPING WILL BE WEIGHTED TO PREVENT MOVEMENT WITH SAND BAGS ON SURFACE APPROACHING WATERBODY AS NEEDED.
4. FLOTATION DEVICE AND SPACING DEVICE TBD IN FIELD USING INDUSTRY STANDARD MATERIALS (eg. CLEAN PLASTIC BARREL).
5. BANK PROTECTION TBD (eg. PLASTIC SHEETING, TARP, OR PLYWOOD) AS NEEDED.
6. IF OPTIONAL PLYWOOD PROTECTION IS USED AND COMES INTO CONTACT WITH INFESTED WATERS, IT WILL BE DISPOSED OF AFTER DISCHARGE IS COMPLETED. OTHER MATERIALS WOULD BE DECONTAMINATED PER APPLICABLE PERMIT REQUIREMENTS IF PLANNED FOR REUSE.
7. INDUSTRY STANDARD MATERIAL (eg. PLYWOOD, GEOTEXTILE, ETC.) AS NEEDED TBD AT PRE DISCHARGE SITE MEETING.

**ISSUED  
FOR PERMIT**  
05/14/19

						DWN. BY:	DATE	
						CHK.		
						PROJ. ENGR.		
						PROJ. MGR.		
C	ISSUED FOR PERMIT	JDW	05/14/19	KEH	KD	KEH	04/30/19	LINE 3 REPLACEMENT TYPICAL SPLASH PUP FLOTATION
B	ISSUED FOR PERMIT	JDW	04/30/19	KEH	KD	DG	04/30/19	
A	ISSUED FOR REVIEW	JDW	04/25/19	KEH	KD	KD	04/30/19	
NO.	REVISION-DESCRIPTION	BY	DATE	CHK'D	APP'D	CLIENT APP.		
						SCALE	NTS	DWG. NO. B-TYP-SPLASH PUP-F

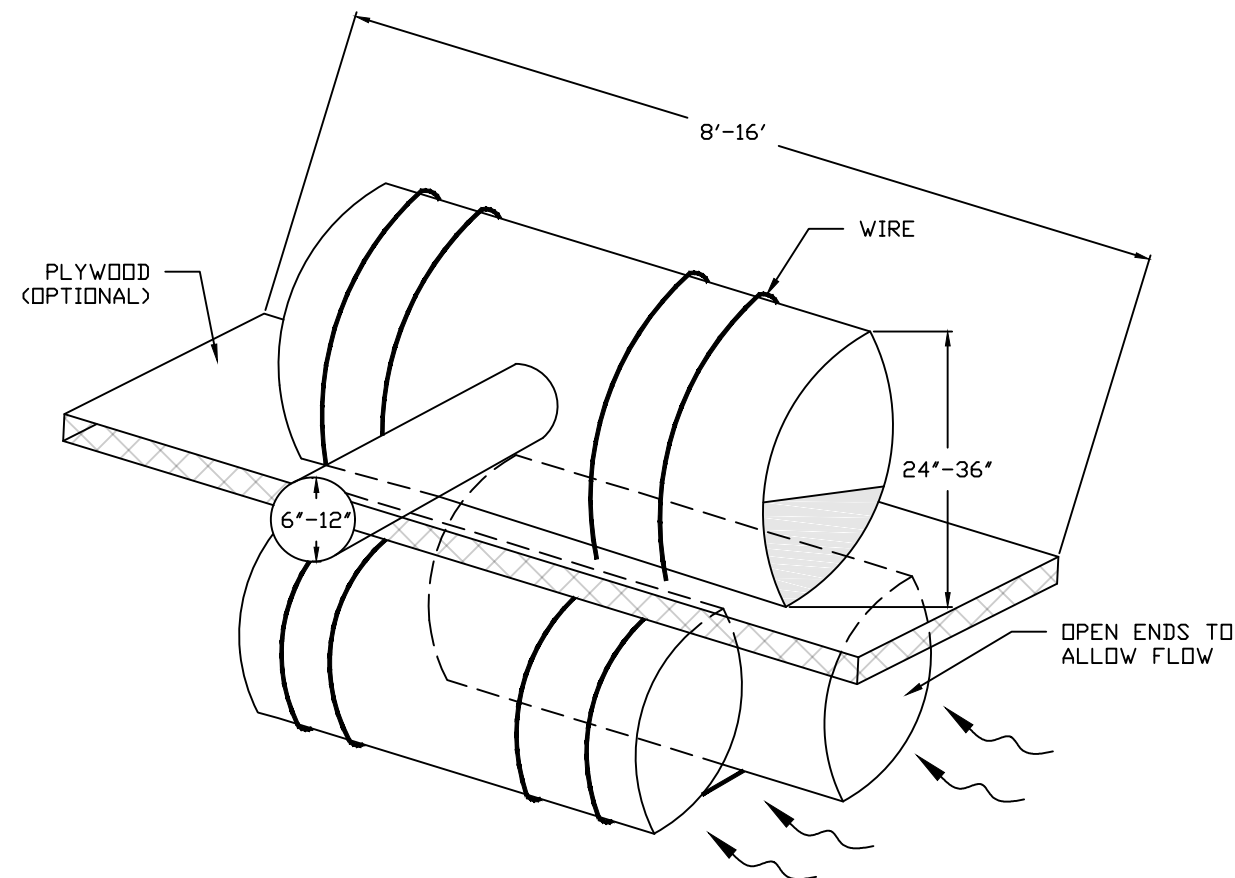


SPLASH PUP  
PLAN

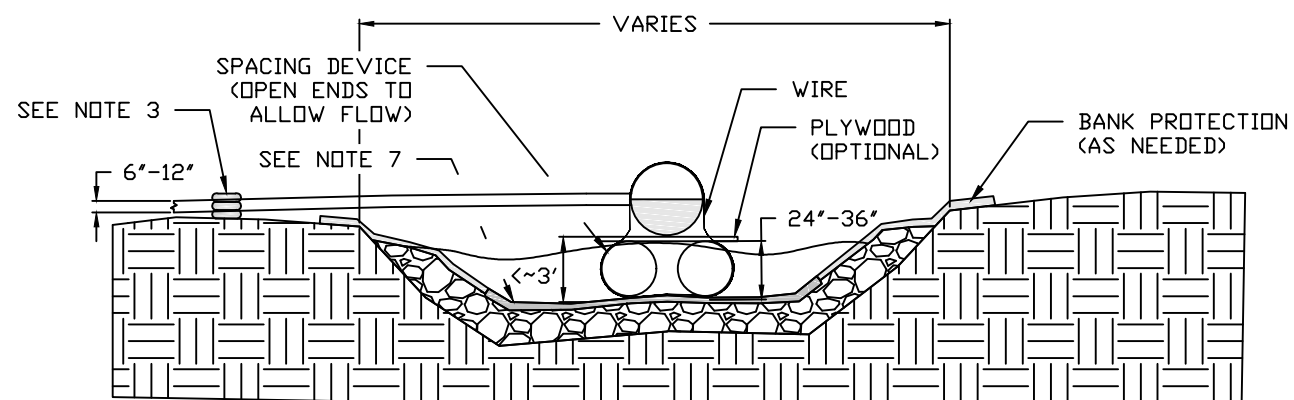


STEEL PLATE WELDED  
ON END OF PIPE. THE  
PLATE COVERING 1/2  
DIAMETER OF THE PIPE.

SPLASH PUP  
PROFILE



SPLASH PUP  
ISOMETRIC VIEW




SPLASH PUP  
SCOUR PREVENTION

NOTES:

1. AN ENERGY DISSIPATER SHALL BE UTILIZED FOR ALL DISCHARGES (OR THE LIKE).
  2. ENERGY DISSIPATERS ARE UTILIZED IN CONJUNCTION WITH PERMIT REQUIRED TREATMENT.
  3. DISCHARGE PIPING WILL BE WEIGHTED TO PREVENT MOVEMENT WITH SAND BAGS ON SURFACE APPROACHING WATERBODY AS NEEDED.
  4. FLOTATION DEVICE AND SPACING DEVICE TBD IN FIELD USING INDUSTRY STANDARD MATERIALS (eg. CLEAN PLASTIC BARREL).
  5. BANK PROTECTION TBD (eg. PLASTIC SHEETING, TARP, OR PLYWOOD) AS NEEDED.
  6. IF OPTIONAL PLYWOOD PROTECTION IS USED AND COMES INTO CONTACT WITH INFESTED WATERS, IT WILL BE DISPOSED OF AFTER DISCHARGE IS COMPLETED. OTHER MATERIALS WOULD BE DECONTAMINATED PER APPLICABLE PERMIT REQUIREMENTS IF PLANNED FOR REUSE.
  7. INDUSTRY STANDARD MATERIAL (eg. PLYWOOD, GEOTEXTILE, ETC.) AS NEEDED TBD AT PRE DISCHARGE SITE MEETING.
- \* USE 1 OR 2 4'X8' PLYWOOD SHEETS AS NEEDED TBD AT PRE DISCHARGE SITE MEETING.

ISSUED  
FOR PERMIT  
05/14/19

									
								LINE 3 REPLACEMENT TYPICAL SPLASH PUP SCOUR PREVENTION	
						DWN. BY: JDW	DATE 04/25/19		
C	ISSUED FOR PERMIT	JDW	05/14/19	KEH	KD	CHK. KEH	04/30/19		
B	ISSUED FOR PERMIT	JDW	04/30/19	KEH	KD	PROJ. ENGR. DG	04/30/19		
A	ISSUED FOR REVIEW	JDW	04/25/19	KEH	KD	PROJ. MGR. KD	04/30/19		
NO.	REVISION—DESCRIPTION	BY	DATE	CHK'D	APP'D	CLIENT APP.		SCALE NTS	DWG. NO. B—TYP—SPLASH PUP—SP