Enbridge (U.S.) Inc. and Enbridge Energy, Limited Partnership
Sandpiper Pipeline and Line 3 Replacement Projects
Douglas County, Wisconsin

Water Resources Application for Project Permits

Supplemental Information

February 24, 2014

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ENCLOSURE

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1.0 INTRODUCTION

Enbridge (U.S.) Inc. and Enbridge Energy, Limited Partnership (collectively referred to as "Enbridge") own and operate a pipeline system that transports crude petroleum to serve refineries in the Midwestern states. Currently, Enbridge plans to construct a new crude oil pipeline and replace an existing pipeline in Douglas County, Wisconsin.

The proposed Sandpiper Pipeline will span approximately 616 miles from Tioga, North Dakota to Superior, Wisconsin. From the existing Beaver Lodge station south of Tioga, North Dakota border to a new Enbridge Clearbrook Terminal, Sandpiper will consist of a 24-inch-diameter crude oil pipeline and associated facilities. Exiting Clearbrook to the south, Sandpiper will consist of a 30-inch-diameter crude oil pipeline and associated facilities to Enbridge's Superior Terminal in Superior, Wisconsin.

In addition, Enbridge plans to replace its existing 34-inch-diameter Line 3 with new 36-inch-diameter pipe as part of an on-going maintenance program. The Line 3 pipeline replacement will be collocated and co-constructed with the proposed Sandpiper Pipeline from the Wisconsin state border to the Superior Terminal.

1.1 PIPELINE FACILITIES

In Wisconsin, the Projects include construction and operation of the following:

- new 30- and 36-inch-diameter, underground crude oil pipelines from the Minnesota/Wisconsin border to Enbridge's terminal in Superior, Wisconsin;
- four mainline valves (two on each new pipeline);
- receiving traps and pressure relief within the fenced property of the Superior Terminal;
- a densitometer for batch detection on Line 3; and
- custody transfer metering, a meter prover, pressure control valves, and a sampling facility for the Sandpiper Project within the fenced property of the Superior Terminal.

Enbridge prepared this document as a supplement to its Wisconsin Department of Natural Resources (WDNR) Water Resources Application for Project Permits. Enbridge also enclosed a document containing additional environmental data in support of all WDNR permit application submittals for construction and operation of the Projects in Wisconsin (refer to enclosed).

1.2 PROJECT PURPOSE AND NEED

1.2.1 Sandpiper Pipeline Project

The Sandpiper Pipeline Project is a new crude oil pipeline and associated facilities to increase crude oil transportation services from North Dakota to refineries in the Midwest and the East Coast.

The pipeline will deliver an annual capacity of:

- 250,000 barrels per day (bpd) from the existing Beaver Lodge station to Berthold, North Dakota;
- 225,000 bpd of crude oil from Berthold into Clearbrook, Minnesota: and

- 375,000 bpd of crude oil from Clearbrook, Minnesota to Superior, Wisconsin.

The pipeline's purpose is to transport the growing production of domestic crude oil from the Bakken and Three Forks formations in the Williston Basin[1] of eastern Montana and western North Dakota to meet the increased demands of refineries and markets in the Midwest and the East Coast. Shippers will use the pipeline to transport crude oil to an Enbridge terminal in Superior, Wisconsin. From there, the crude oil can be delivered to various other pipelines and refineries. The pipeline is a positive step toward North American energy security and independence that will increase access to a growing, long-term, and reliable domestic source of energy and decrease reliance on crude oil imports from countries that are often unstable to the United States' interests.

1.2.2 Line 3 Replacement Project

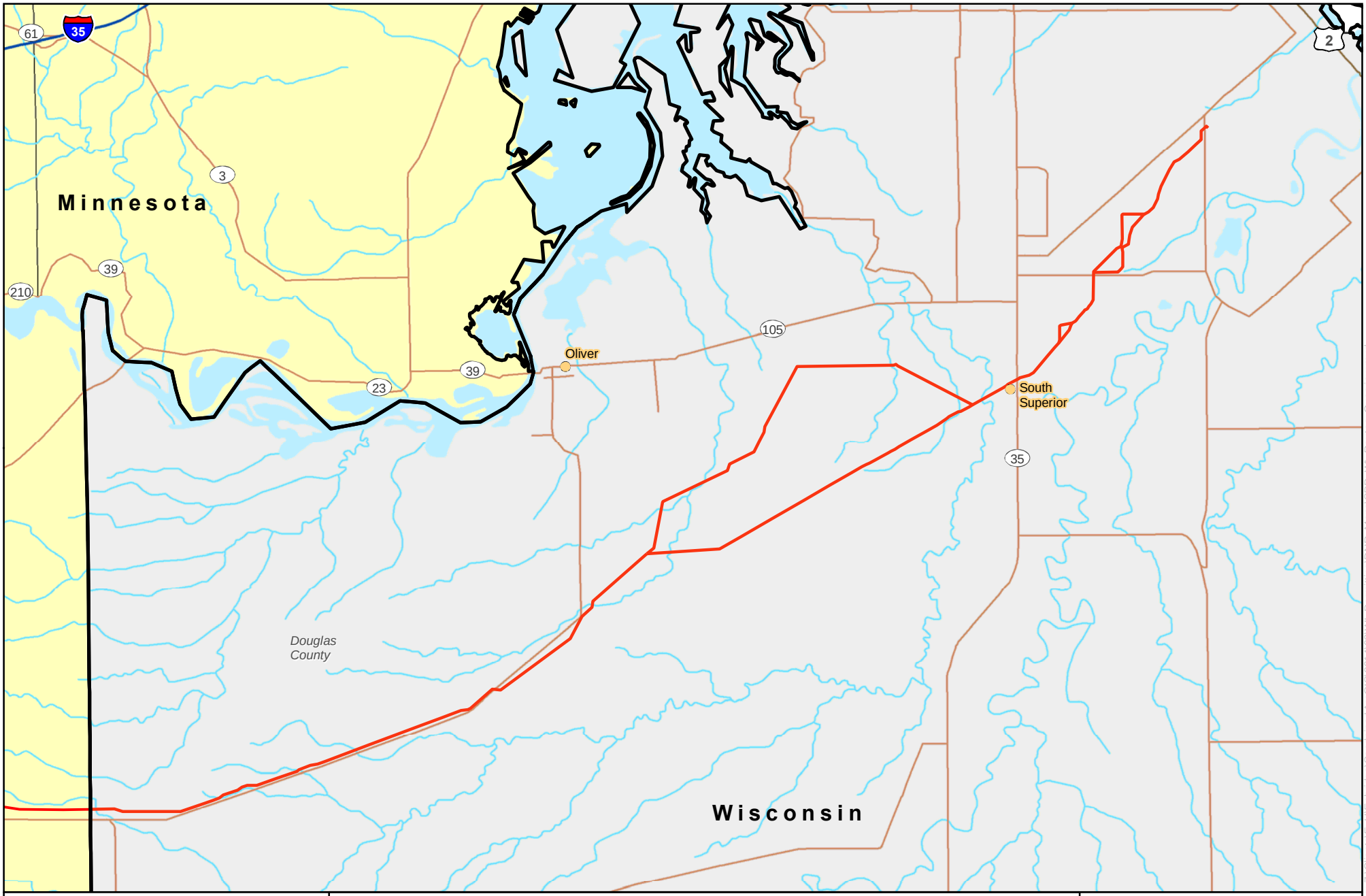
Enbridge owns and operates the 324-mile-long Line 3, originally installed in 1968, as part of its U.S. mainline system. Enbridge conducted thorough internal inspections of Line 3 as part of its ongoing system-wide pipeline integrity program and is electing to replace all of Line 3 in Wisconsin. Replacing the pipe will increase its service life and will reduce the frequency and magnitude of the ongoing maintenance activities that would otherwise occur in order to maintain the safe operation of Line 3; thus providing significant benefits to landowners, local communities, and the environment. The existing pipeline will be purged of crude oil, filled with nitrogen, capped, cathodically protected, maintained and rendered inactive in accordance with 49 CFR 195.

Enbridge plans to replace the existing 34-inch-diameter Line 3 pipeline with new 36-inch-diameter pipe. The 36-inch is a more current industry standard size and also will be a more energy efficient pipeline.

1.3 PROJECT LOCATION AND LAND REQUIREMENTS

The Sandpiper Pipeline and Line 3 Replacement Projects (collectively referred to herein as the "Project" or "Projects") are located in Douglas County, Wisconsin, as shown on Figure 1.3-1 and on the Detailed Route Maps (refer to Appendix A). Table 1.3-1 includes a list of township, range, and sections the Project crosses.

[1] The Bakken formation is currently the largest contributor to the total crude oil production in the Williston Basin, the oil industry refers to all of the crude oil production in the Williston Basin as "Bakken crude oil." The Williston Basin spans parts of western North Dakota, eastern Montana, and parts of Saskatchewan and Manitoba.



0 0.5 1 Miles

1 inch = 1.3 miles

N W E S

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Figure 1.3-1
Sandpiper Pipeline and Line 3 Replacement Projects
Route Overview Map

Route Overview Map

Source: Z:\Clients\E_H\Enbridge\Sandpiper\ArcGIS\2014\02\WI_Permitting\DNR_Maps\SPP_WI_Routes_Overview.mxd

Date: (2/19/2014)

TABLE 1.3-1

Township, Range, and Sections Crossed

Township	Range	Sections
T48N	R14W	2, 8, 9, 10, 11, 16, 17, 18, 19, 20
T48N	R15W	24, 25, 26, 27, 31, 32, 33, 34
T49N	R15W	35, 36

1.3.1 Construction Right-of-Way

Enbridge generally proposes to use a combined 110-foot-wide construction right-of-way for the new 30- and 36-inch-diameter pipelines, which will allow for temporary storage of topsoil and spoil as well as accommodate safe operation of construction equipment. The construction corridor is generally comprised of existing permanently maintained rights-of-way and temporary workspaces. The construction right-of-way is divided between the spoil side (area used to store topsoil and excavated materials) and the working side (equipment work area and travel lane).

Enbridge proposes a 120-foot-wide construction right-of-way for the portions of Route Alternatives A1 and A2 between Irondale Road and the railroad tracks/facility (refer to Section 2.0). Regardless of the selected route in this location, no feasible access road exists to allow for construction traffic to exit the right-of-way at the railroad tracks/facility or to cross the tracks/railyard. Therefore, all traffic must turn around at this point and travel back to the west. In order to facilitate efficient access in the event of an emergency during construction, Enbridge designed the additional 10 feet of workspace to include two lanes of traffic.

When collocated with Enbridge's existing right-of-way, the spoil side is located within the current permanently maintained right-of-way and the working side is generally located outside of Enbridge's existing maintained right-of-way. An additional 35 feet of temporary workspace will be required outside of the edge of the new permanent right-of-way (refer to Figures 1.3-2 and 1.3-3).

1.3.2 Additional Temporary Workspace Areas

Additional temporary workspace (ATWS) areas are generally necessary where the proposed route crosses features such as waterbodies, wetlands, roads, railroads, and existing pipelines and utilities. These ATWS areas are construction areas that are temporarily needed outside of the typical construction right-of-way to stage equipment, stockpile spoil material, and conduct material fabrication and assembly. Enbridge identified known ATWS areas on its Detailed Route Maps (Appendix A). In some cases, due to site-specific conditions, ATWS may be sited within wetland boundaries.

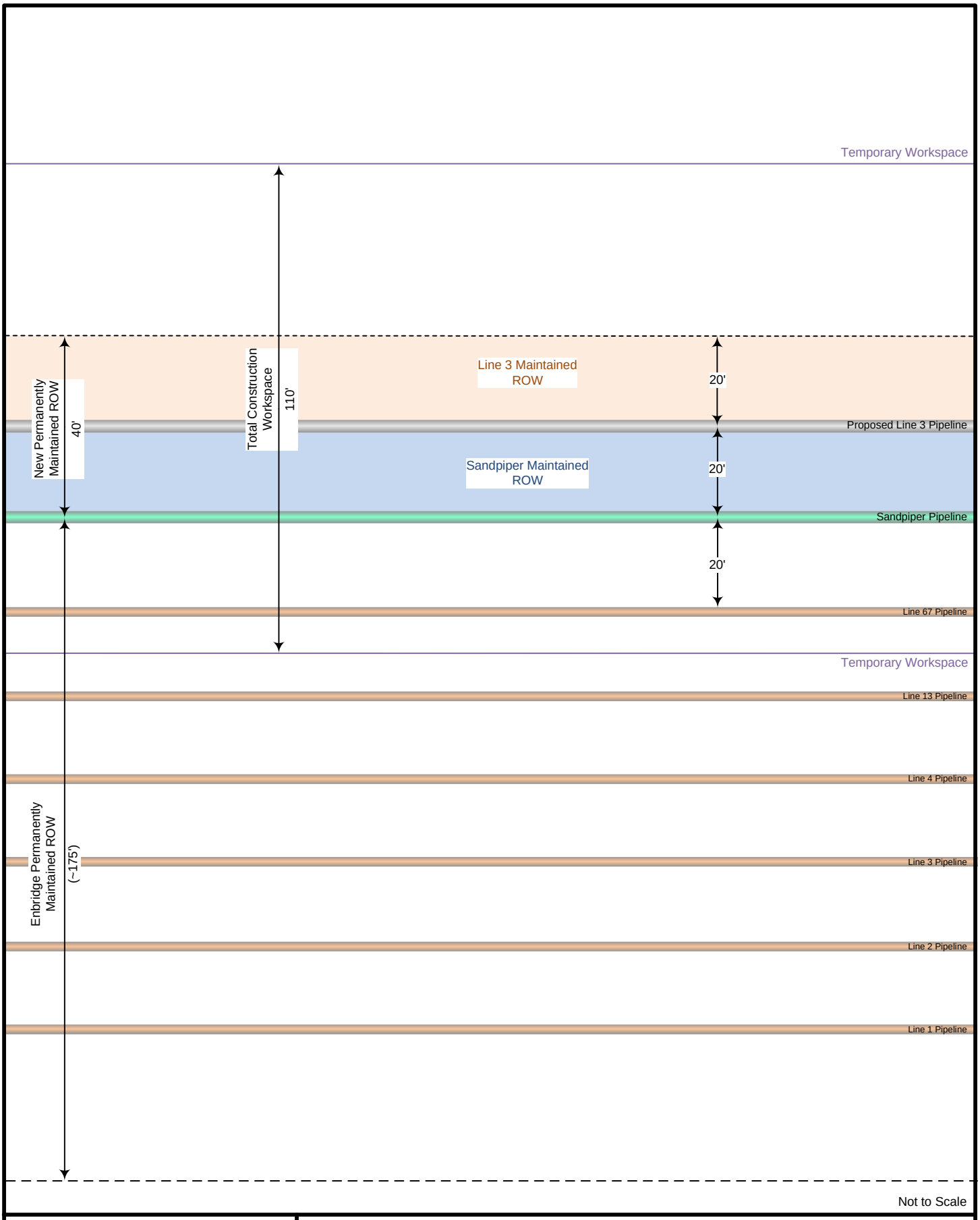
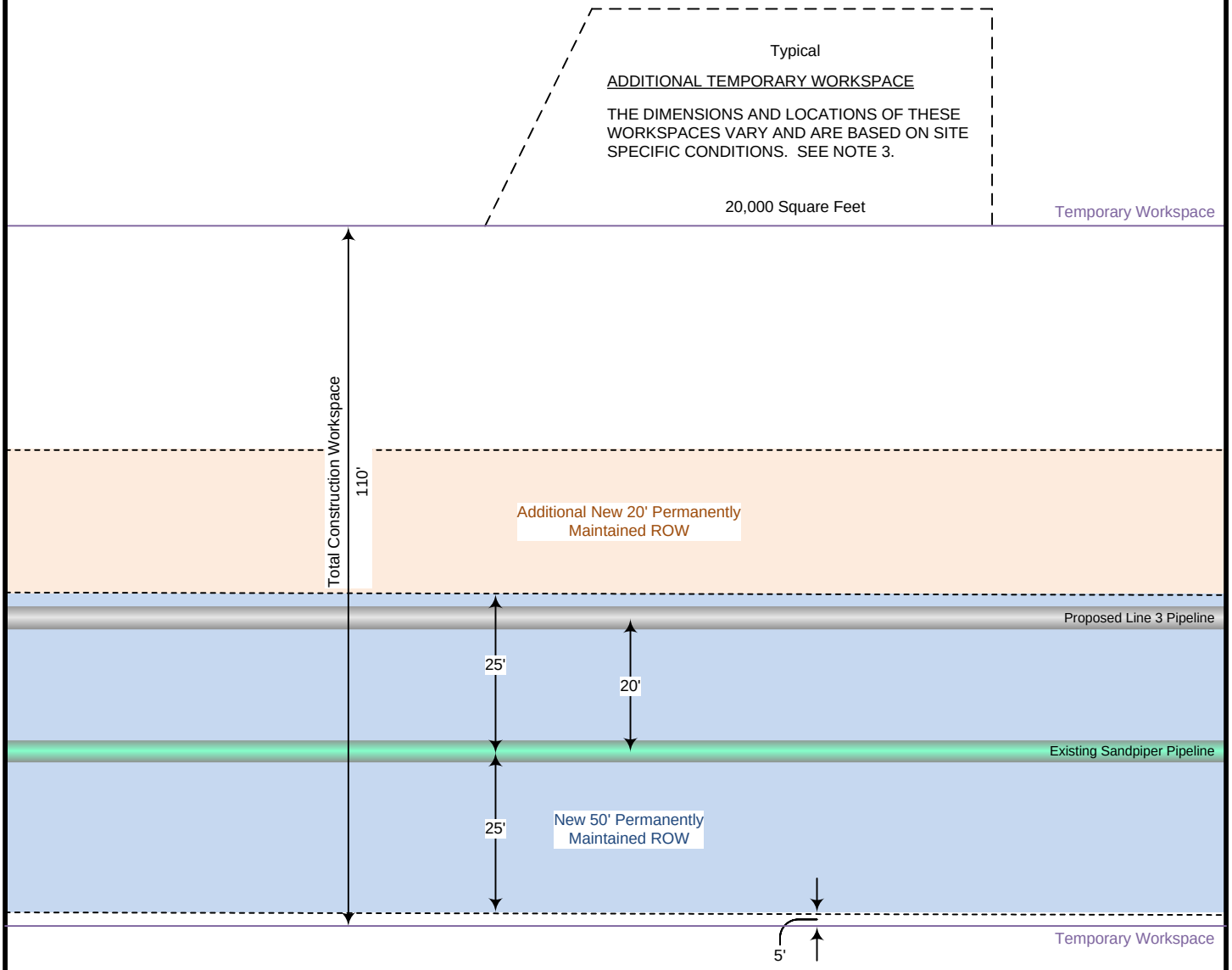


Figure 1.3-2
Line 3 Replacement and Sandpiper Pipeline Projects
Typical Right-of-Way Configuration Co-Located with Existing Right-of-Way
(Wisconsin Only)



NOTES:

1. ENBRIDGE WILL TYPICALLY UTILIZE A 110-FOOT-WIDE CONSTRUCTION WORKSPACE TO INSTALL THE PIPELINES AND WILL HAVE A 20-FOOT OFFSET FROM EXISTING PIPELINE.

2. OF THE 110-FOOT-WIDE CONSTRUCTION FOOTPRINT, THE SANDPIPER PIPELINE WILL HAVE A NEW 50-FOOT-WIDE PERMANENTLY MAINTAINED RIGHT-OF-WAY AND THE LINE 3 REPLACEMENT PIPELINE WILL HAVE A NEW 20-FOOT-WIDE PERMANENTLY MAINTAINED RIGHT-OF-WAY. THE REMAINING 40 FEET WILL BE USED AS TEMPORARY WORKSPACE.

3. ADDITIONAL TEMPORARY WORKSPACE MAY BE REQUIRED AT CIVIL AND ENVIRONMENTAL CROSSINGS OF UP TO 20,000 SQUARE FEET ON EACH SIDE OF THE CROSSING. THESE ADDITIONAL TEMPORARY WORKSPACES ARE GENERALLY USED AT ROAD, RAILROAD, WATERBODY, WETLAND CROSSING, AND UTILITY CROSSINGS. ADDITIONAL TEMPORARY WORKSPACE REQUIREMENTS WILL VARY PENDING TYPE OF CROSSING AND ANY SPECIAL CONDITIONS OR ENVIRONMENTAL FEATURES.

Not to Scale

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Figure 1.3-3
Line 3 Replacement and Sandpiper Pipeline Projects
Typical Greenfield Right-of-Way Configuration
(Wisconsin Only)

1.3.3 Access Roads

Enbridge proposes to use existing public and private roads to access the right-of-way and facilities to the extent practicable. Enbridge will limit access to either the construction right-of-way, or existing roads that require no modifications or impacts on wetlands. In the event a new temporary road is necessary, Enbridge will obtain applicable regulatory approvals prior to using the new access. A list of currently proposed access roads is included in Table 1.3.3-1.

TABLE 1.3.3-1

Proposed Access Roads for the Project

Access Road ID	Approximate Milepost (Intersects with Pipeline)	Public/Private Road
A-456	601.12	Private
A-457	602.03	Private
A-458	602.30	Private
A-459	602.63	Private
A-460	603.07	Private
A-461	603.34	Private
A-462	603.60	Private
A-463	604.61	Private
A-464	604.76	Private
A-465	605.89	Private
A-466	606.32	Private
A-466.1	607.53	Private
A-467	610.61	Private
A-468	610.91	Public

Newly constructed temporary roads may be left intact through mutual agreement with the landowner unless otherwise restricted by federal, state, or local regulations. If temporary roads are to be removed, Enbridge will restore the land used for access to the original conditions, as practicable, and seed and stabilize pursuant to the Project-specific Environmental Protection Plan (EPP) (refer to Appendix B).

Enbridge will coordinate the use of public roads with the appropriate county or state road authority. Enbridge will coordinate the use of existing private roads with the landowner.

1.3.4 Pipe Storage and Contractor Yards

During construction, Enbridge will temporarily use off-right-of-way areas for pipe and materials storage. In addition, construction contractors will require off-right-of-way contractor yards to park equipment and stage construction activities.

Although subject to change, Enbridge tentatively identified one pipeyard necessary for construction near South Range, Wisconsin. Enbridge may identify additional pipeyards and contractor yards as Project planning and engineering progresses. Enbridge considers sensitive environmental features when planning the placement and use of these pipeyards to ensure no impacts. The yards are leased sites and will be restored upon the completion of the Project unless otherwise permitted or authorized by the landowner and applicable agencies.

1.3.5 Aboveground Facilities

Enbridge proposes to install four mainline valves (two on each pipeline) in Wisconsin. The Line 3 replacement pipeline will require installation of a densitometer for batch detection.

In addition, within the fenced property of Enbridge's existing Superior Terminal, each Project requires pressure relief and a receiving trap. The Sandpiper Project requires installation of custody transfer metering, a meter prover, pressure control valves, and a sampling facility.

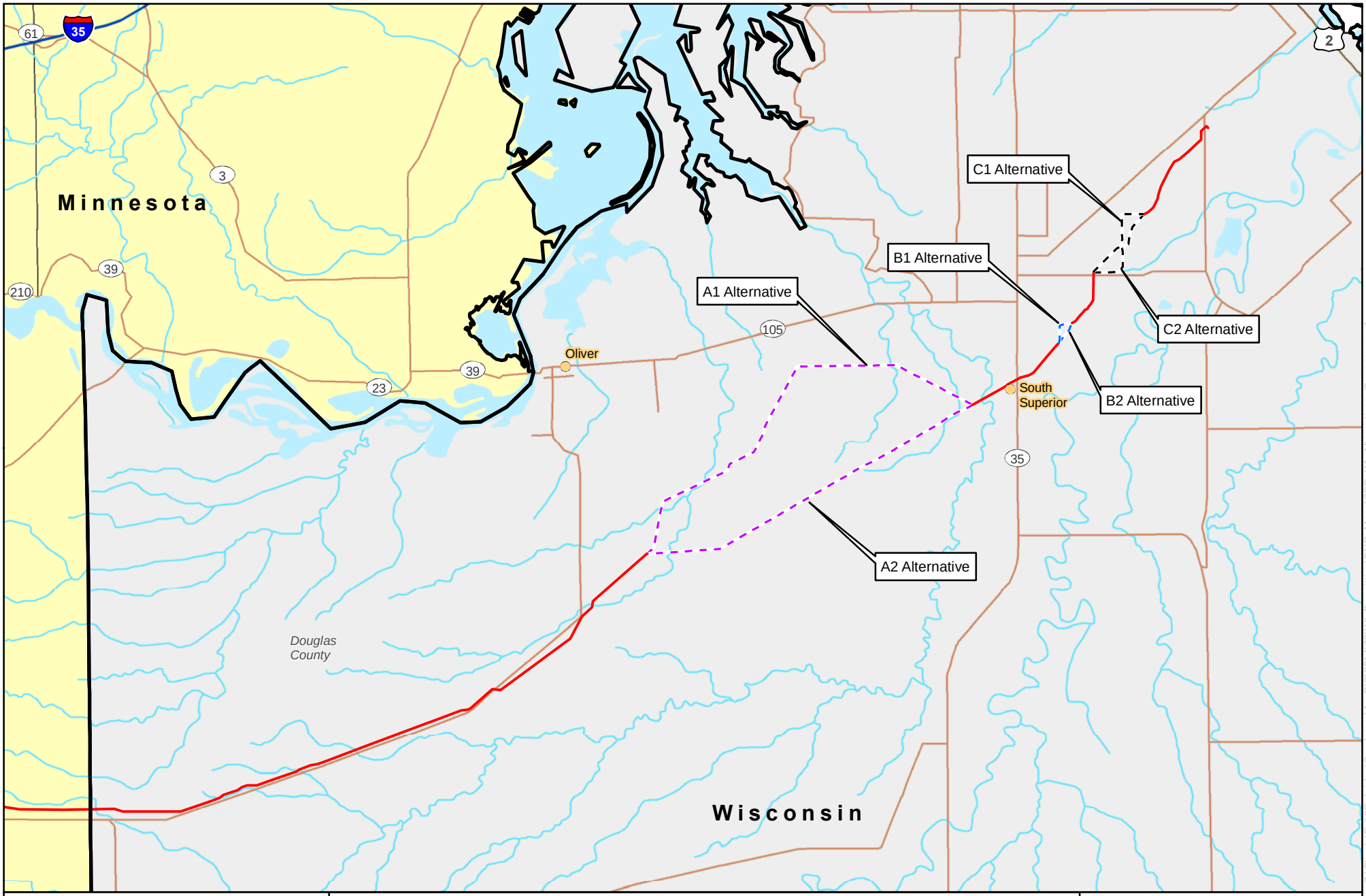
2.0 ALTERNATIVES

Enbridge identified and evaluated alternatives to the Project to determine whether the alternatives would be reasonable and environmentally preferable, including the no-action alternative, system alternatives, and route alternatives.

A "practicable alternative" is defined as one "available and capable of being implemented after taking into consideration cost, available technology and logistics in light of overall project purpose." Enbridge completed a "Practicable Alternatives Analysis" (Wis. Admin. Code § NR 103.07(2)) to determine whether the Projects would avoid or minimize impacts on natural resources, reduce or eliminate engineering and constructability concerns, and avoid or minimize conflicts with existing or proposed residential and agricultural land uses.

Refer to Sections 2.0 and 3.0 of the enclosed Supporting Environmental Data document for detailed information on Enbridge's alternatives analysis.

Enbridge considered the corridor for which it received authorization to construct its most recent projects (Alberta Clipper and Southern Lights pipelines) as the baseline for this analysis. Therefore, Enbridge conducted a detailed quantitative analysis of environmental impacts for only those areas that may deviate from the previously permitted construction right-of-way (refer to Figure 2-1).



0 0.5 1 Miles

1 inch = 1.3 miles

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Figure 2-1
Sandpiper Pipeline and Line 3 Replacement Projects
Overview of Alternatives

Proposed Project Route
A1/A2 Route Alternative
B1/B2 Route Alternative
C1/C2 Route Alternative

Source: Z:\Clients\E_H\Enbridge\Sandpiper\ArcGIS\2014\02\WI_Permitting\DNR_Maps\SPP_WI_Alternatives_Overview.mxd
Date: (2/19/2014)

The analysis uses actual field survey/delineation data were available as well as sources of publicly available environmental data to compare a variety of factors, including:

- adjacency to existing rights-of-way;
- wetlands (including extensive saturated wetlands);
- highly wind erodible soils;
- bedrock outcrops;
- prime farmland soils;
- perennial waterbodies;
- state, county, or municipal forest land;
- State Natural Areas;
- Lake Superior National Estuarine Research Reserve properties;
- Priority Wetlands as identified by the March 2000 Data Compilation and Assessment of Coastal Wetlands of Wisconsin's Great Lakes, Pub. ## ER-002-00;
- Priority Navigable Waterway;
- Area of Special Natural Resource Interest;
- Wild Rice production area drainages as identified by the WDNR and Great Lakes Indian Fish and Wildlife Commission;
- roads and railroads crossed;
- residences or schools within 300 feet; and
- other site-specific issues that may occur.

Enbridge completed a detailed evaluation of each alternative corridor based on the above-referenced factors. Enbridge considered field delineated wetlands, WWI-mapped wetlands, wetlands within the City of Superior that are indicated as "Protected" in the SAMP, and Priority Wetlands as identified by the March 2000 Data Compilation and Assessment of Coastal Wetlands of Wisconsin's Great Lakes, Pub. ## ER-002-0 to conduct its alternative analysis in accordance with Wis. Admin. Code § NR 103.07(2). The remaining factors have been considered as part of the overall environmental review required for the Project per Wis. Admin. Code § NR 150.

Most impacts are reported as a linear measurement in lieu of an area measurement; with the exception of temporary and permanent impacts on wetlands. Enbridge calculated permanent wetland impacts using the footprint of what will constitute the new permanently maintained right-of-way.

Because Enbridge will not allow trees and shrubs to fully regenerate within the permanent maintained right-of-way to facilitate aerial inspections, impacts on forested wetlands will be long-term and impacts within the permanent right-of-way will represent a conversion of forested wetlands to scrub-shrub or emergent wetlands.

2.1 ROUTE ALTERNATIVES A1 AND A2

Due to the proximity to existing residences and the Pokegama-Carnegie State Natural Area (SNA), Enbridge prepared an evaluation of Route Alternatives A1 and A2 between approximately MPs 607.0 and 611.2 (refer to Figure 2.1-1). Table 2.1-1 provides a comparison of the prominent land use features of these alternatives.

Alternative A2 follows the existing Enbridge corridor through the Pokegama-Carnegie SNA. Although Alternative A1 has a greater wetland impact and contributes to additional forested fragmentation in the area it avoids the SNA. For this reason, Enbridge prefers Alternative A1; however, final routing is subject to WDNR review.

TABLE 2.1-1

Environmental Features Comparison –Route Alternatives A1 and A2

Environmental Features	Unit	Route Alternative A1	Route Alternative A2
Length	miles	4.3	3.5
Adjacent to Existing Right-of-Way	miles	0.0	2.8
Greenfield Route [a]	miles	0.5	0.0
Wetland Crossing Length [b, c]	miles	2.6	2.8
Wetland Impact - Construction [b, d]			
PEM	acres	4.2	8.6
PSS	acres	22.9	26.3
PFO	acres	10.8	5.0
Wetland Impact - Operation [b, e]			
PEM	acres	0.0	0.0
PSS	acres	14.3	10.7
PFO	acres	6.4	2.1
Rare Plant Occurrences [b]	number	161	267
Hydric Soils	acres	51.4	48.3
Highly Wind Erodible Soils	acres	0.0	0.0
Agricultural Land	acres	0.0	0.0
Herbaceous Land	acres	0.3	0.3
Forest	acres	23.4	12.5
Prime Farmland Soils	acres	0.0	0.0
Intermittent Waterbodies Crossed [b]	number	0	0
Ephemeral Waterbodies Crossed [b]	number	8	0
Perennial Waterbodies Crossed [b]	number	7	2
Lake Superior National Estuarine Research Reserve Properties	number	0	0
Priority Wetlands [f]	miles	1.4	0.0
Priority Navigable Waterways Crossed	number	4	2
Areas of Special Natural Resource Interest	miles	1.4	0.0
Wild Rice Production Area Drainages [g]	miles	0.0	0.0
DNR Managed Lands	miles	0.0	0.0
State, County or Municipal Forest Land	miles	1.6	2.6
Railroads Crossed	number	1	1
Roads Crossed	number	2	1
Residences within 300 feet	number	0	1

TABLE 2.1-1

Environmental Features Comparison –Route Alternatives A1 and A2

Environmental Features	Unit	Route Alternative A1	Route Alternative A2

[a] Greenfield locations include, for purposes of the alternatives analysis, as areas where the route is not within 200 feet of an existing right-of-way.

[b] Based on field delineated data from Fall 2013 surveys. Where 2013 survey was not completed, Enbridge utilized recent (2008 / 2009) wetland and waterbody field data from a previous project and WWI data.

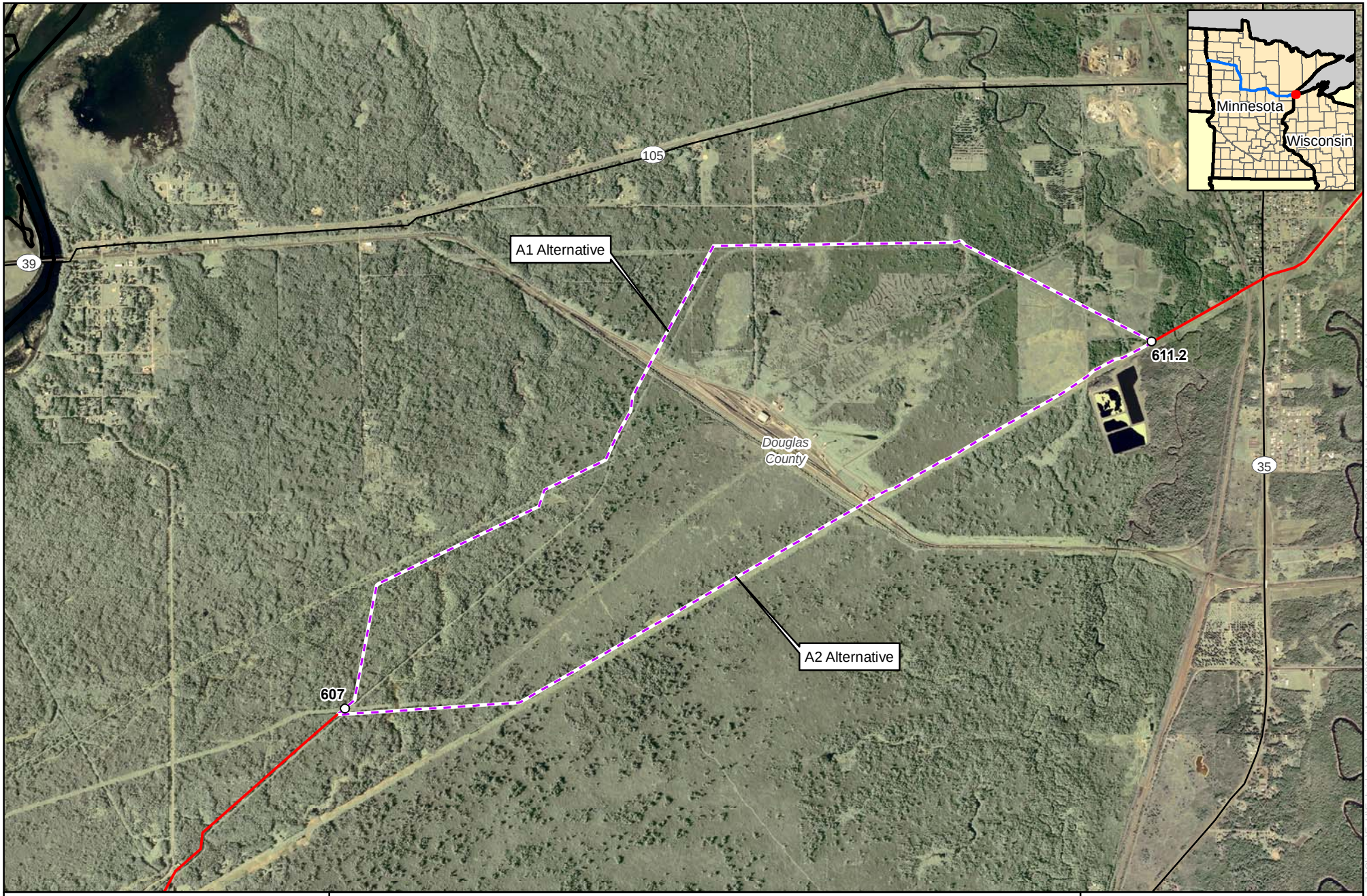
[c] Crossing length of proposed pipeline centerline across wetlands.

[d] Area of wetland impact within the construction workspace based typically on a 110-foot-wide workspace, including temporary dredge and fill areas, travel lanes, and staging areas.

[e] Permanent conversion impacts include the area within the new permanent easement where the pipeline corridor will be maintained by periodic clearing activities.

[f] Identified by the March 2000 Data Compilation and Assessment of Coastal Wetlands of Wisconsin's Great Lakes, Pub. ## ER-002-00.

[g] Identified by the WDNR and Great Lakes Indian Fish and Wildlife Commission.



Milepost

Proposed Project Route

A1/A2 Route Alternative

0 0.25 0.5 Miles

N

Figure 2.1-1
Sandpiper Pipeline and Line 3 Replacement Projects
Route Alternatives A1 and A2

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Date: (2/19/2014)

2.2 ROUTE ALTERNATIVES B1 AND B2

Enbridge prepared an evaluation of Route Alternatives B1 and B2 between MPs 612.2 and 612.5 (refer to Figure 2.2-1) due to outstanding legal issues with a landowner. The legal issues include the rights and interests involved in particular real property and have ascended to the Wisconsin State Supreme Court and are now on remand to the Circuit Court of Douglas County. Enbridge developed these route alternatives because the final resolution of the legal issues is indeterminable at this time. Therefore, Enbridge prefers Route Alternative B1 even though it deviates from the existing corridor and results in additional greenfield land crossed. Table 2.2-1 provides a comparison of the prominent land use features of these alternatives.

TABLE 2.2-1

Environmental Features Comparison –Route Alternatives B1 and B2

Environmental Features	Unit	Route Alternative B1	Route Alternative B2
Length	miles	0.3	0.2
Adjacent to Existing Right-of-Way	miles	0.0	0.2
Greenfield Route [a]	miles	0.2	0.0
Wetland Crossing Length [b, c]	miles	0.3	0.2
Wetland Impact - Construction [b, d]			
PEM	acres	1.0	0.8
PSS	acres	2.7	1.8
PFO	acres	0.7	0.0
Wetland Impact - Operation [b, e]			
PEM	acres	0.0	0.0
PSS	acres	0.0	0.9
PFO	acres	0.5	0.0
Rare Plant Occurrences [b]	number	0	0
Hydric Soils	acres	4.4	2.6
Highly Wind Erodible Soils	acres	0.0	0.0
Agricultural Land	acres	0.0	0.0
Herbaceous Land	acres	0.0	0.0
Forest	acres	2.9	2.6
Prime Farmland Soils	acres	0.0	0.0
Intermittent Waterbodies Crossed [b]	number	0	0
Ephemeral Waterbodies Crossed [b]	number	0	0
Perennial Waterbodies Crossed [b]	number	0	0
Lake Superior National Estuarine Research Reserve Properties	number	0	0
Priority Wetlands [e]	miles	0.0	0.0
Priority Navigable Waterway	number	0	0
Areas of Special Natural Resource Interest	miles	0.0	0.0
Wild Rice Production Area Drainages [f]	miles	0.0	0.0
DNR Managed Lands	miles	0.0	0.0
State, County or Municipal Forest Land	miles	0.0	0.0
Railroads Crossed	number	0	0
Roads Crossed	number	0	0
Residences within 300 feet	number	0	0

[a] Greenfield locations include, for purposes of the alternatives analysis, as areas where the route is not within 200 feet of an existing right-of-way.

TABLE 2.2-1

Environmental Features Comparison –Route Alternatives B1 and B2

Environmental Features	Unit	Route Alternative B1	Route Alternative B2

[b] Based on field delineated data from Fall 2013 surveys. Where 2013 survey was not completed, Enbridge utilized recent (2008 / 2009) wetland and waterbody field data from a previous project and WWI data.

[c] Crossing length of proposed pipeline centerline across wetlands.

[d] Area of wetland impact within the construction workspace based typically on a 110-foot-wide workspace, including temporary dredge and fill areas, travel lanes, and staging areas.

[e] Permanent conversion impacts include the area within the new permanent easement where the pipeline corridor will be maintained by periodic clearing activities.

[f] Identified by the March 2000 Data Compilation and Assessment of Coastal Wetlands of Wisconsin's Great Lakes, Pub. ## ER-002-00.

[g] Identified by the WDNR and Great Lakes Indian Fish and Wildlife Commission.

Milepost

Proposed Project Route

B1/B2 Route Alternative

0 0.05 0.1 Miles

N

Figure 2.2-1
Sandpiper Pipeline and Line 3 Replacement Projects
Route Alternatives B1 and B2

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Source: Z:\Clients\E_H\Enbridge\Sandpiper\ArcGIS\2014\02\WI_Permitting\DNR_Maps\SPP_WI_Alternatives_B1_B2.mxd

Date: (2/19/2014)

2.3 ROUTE ALTERNATIVES C1 AND C2

Enbridge prepared an evaluation of Route Alternatives C1 and C2 located at approximately MPs 613.1 to 614.0 (refer to Figure 2.3-1) due to the Nemadji Golf Course. Table 2.3-1 provides a comparison of the prominent land use features of these alternatives.

Alternative C2 shorter than Alternative C1, and would cross less greenfield land, forest land, and wetlands. However, Alternative C2 would impact the operation of the Nemadji Golf Course during construction and restoration. For this reason, Enbridge prefers Alternative C1; however, final routing is subject to WDNR review.

TABLE 2.3-1

Environmental Features Comparison –Route Alternatives C1 and C2

Environmental Features	Unit	Route Alternative C1	Route Alternative C2
Length	miles	0.9	0.9
Adjacent to Existing Right-of-Way	miles	0.0	0.4
Greenfield Route [a]	miles	0.4	0.0
Wetland Crossing Length [b, c]	miles	0.8	0.3
Wetland Impact - Construction [b, d]			
PEM	acres	3.5	2.9
PSS	acres	8.0	2.4
PFO	acres	0.6	0.0
Wetland Impact - Operation [b, e]			
PEM	acres	0.0	0.0
PSS	acres	6.0	0.0
PFO	acres	0.6	0.0
Rare Plant Occurrences [b]	number	56	20
Hydric Soils	acres	13.2	11.9
Highly Wind Erodible Soils	acres	0.0	0.0
Agricultural Land	acres	0.0	0.0
Herbaceous Land	acres	1.2	0.5
Upland Forest	acres	7.5	0.4
Prime Farmland Soils	acres	0.0	0.0
Intermittent Waterbodies Crossed [b]	number	7	4
Ephemeral Waterbodies Crossed [b]	number	0	0
Perennial Waterbodies Crossed [b]	number	0	0
Lake Superior National Estuarine Research Reserve Properties	number	0	0
Priority Wetlands [e]	miles	0.0	0.0
Priority Navigable Waterway	number	0	0
Areas of Special Natural Resource Interest	miles	0.0	0.0
Wild Rice Production Area Drainages [f]	miles		
DNR Managed Lands	miles	0.0	0.0
State, County or Municipal Forest Land	miles	0.0	0.0
Railroads Crossed	number	1	1
Roads Crossed	number	0	0
Residences within 300 feet	number	0	0

[a] Greenfield locations include, for purposes of the alternatives analysis, as areas where the route is not within 200 feet of an existing right-of-way.

TABLE 2.3-1

Environmental Features Comparison –Route Alternatives C1 and C2

Environmental Features	Unit	Route Alternative C1	Route Alternative C2

[b] Based on field delineated data from Fall 2013 surveys. Where 2013 survey was not completed, Enbridge utilized recent (2008 / 2009) wetland and waterbody field data from a previous project and WWI data.

[c] Crossing length of proposed pipeline centerline across wetlands.

[d] Area of wetland impact within the construction workspace based typically on a 110-foot-wide workspace, including temporary dredge and fill areas, travel lanes, and staging areas.

[e] Permanent conversion impacts include the area within the new permanent easement where the pipeline corridor will be maintained by periodic clearing activities.

[f] Identified by the March 2000 Data Compilation and Assessment of Coastal Wetlands of Wisconsin's Great Lakes, Pub. ## ER-002-00.

[g] Identified by the WDNR and Great Lakes Indian Fish and Wildlife Commission.

Milepost

Proposed Project Route

C1/C2 Route Alternative

0 0.05 0.1 Miles

N

Figure 2.3-1
Sandpiper Pipeline and Line 3 Replacement Projects
Route Alternatives C1 and C2

ENBRIDGE

Source: Z:\Clients\E_H\Enbridge\Sandpiper\ArcGIS\2014\02\WI_Permitting\DNR_Maps\SPP_WI_Alternatives_C1_C2.mxd

Date: (2/19/2014)

3.0 WATERBODIES AND WETLANDS

Project activities within waterbodies include the installation of temporary bridge crossings over waterbodies for the purpose of moving construction equipment across the feature and the installation of the two pipelines beneath the bed of the waterbody. Project activities also include the installation of the two pipelines along approximately 11.7 miles of wetlands.

Enbridge requests the following permits and approvals for the Project:

- Temporary Bridges (Wis. Stat.§30.123);
- Grading (Wis. Stat. §30.19);
- Utility Crossing (Wis. Stat. § 30.20 and 30.12);
- Individual Wetland Permit (Wis. Stat. § 281.36); and
- Water Quality Certifications (NR 103 and 299).

Enbridge collected wetland and waterbody data during late summer and early fall of 2013 on all accessible tracts along Project route and alternatives. Enbridge used WWI and NHD data in areas to be surveyed in the spring of 2014. The waterbody and wetland delineation report for the 2013 surveys is provided as Appendix C.

3.1 WATERBODY CROSSINGS

Field investigators classified each waterbody (perennial, intermittent, or ephemeral) on-site, including a review of topographic maps, and other published data.

Appendix D includes a waterbody crossing table with the specific crossing methods Enbridge proposes to implement.

3.1.1 General Impacts and Mitigation

Pipeline construction across waterbodies could result in short-term or long-term impacts. Installation of a pipeline across a stream or river can temporarily displace stream bottom sediments and increase erosion of soils adjacent to the waterbody. The magnitude and duration of these effects depends on the soils and topography of the site, and the proposed crossing method. Construction could also change the stream bottom profile, resulting in increased siltation or erosion at the site or further downstream. Enbridge developed the measures outlined in the EPP to minimize short- and long-term impacts on the waterbodies during and following pipeline construction.

Long-term impacts on water quality could result from alteration of stream banks and removal of riparian vegetation. Soil erosion associated with surface runoff and stream bank sloughing could also result in the deposition of sediments in waterbodies. Removal of riparian vegetation could lead to increased light penetration into the waterbody, causing increased water temperature which could potentially impact fisheries.

Enbridge would avoid and minimize impacts on waterbodies by implementing measures described in its EPP. Enbridge would also limit the duration of construction equipment operation within waterbodies to the area necessary to complete the crossing. Enbridge will restore and stabilize disturbed areas at crossings as soon as practical after pipeline installation.

Operation and maintenance of the Project would not be expected to result in long-term effects on water quality. Enbridge would periodically inspect the pipeline right-of-way and perform routine removal of brush and trees; however, little disturbance is expected within the permanent right-of-way.

3.2 WETLAND CROSSINGS

Enbridge based the wetland delineations on the criteria and methods outlined in:

- the *United States Army Corps of Engineers Wetlands Delineation Manual,* Technical Report Y-87-1 (1987) and subsequent guidance documents (COE 1991, 1992);
- Guidelines for Submitting Wetland Delineations in Wisconsin to the St. Paul District Corps of Engineers (COE 1996);
- the *Basic Guide to Wisconsin's Wetlands and their Boundaries* (Wisconsin Department of Administration Coastal Management Program 1995); and,
- Applicable Regional Supplements to the Corps of Engineers Wetland Delineation Manual.

Enbridge included a delineation report including representative photos, data sheets, and maps as Appendix C.

Palustrine Emergent (PEM) wetlands consist of: sedge- and rush-dominated wetlands adjacent to waterbodies, sedge meadows along existing pipeline right-of-way, and shallow marsh communities dominated by cattails and reed canary grass. Much of the emergent wetland is along existing utility rights-of-way, which is maintained free of woody vegetation.

Palustrine Scrub-scrub (PSS) wetlands are primarily comprised of shrub-carr communities dominated primarily by alders *(Alnus* spp.) and willows *(Salix* spp.). Herbaceous vegetation consists of a mix of sedges, cattails, or other hydrophytic species common to emergent wetlands.

Palustrine Forested (PFO) wetlands are primarily black ash *(Fraxinus nigra)* dominated depressions within the hardwood uplands. Black ash also occurs as a fringe or minor component to larger wetland complexes.

Appendix E includes a wetland crossing table identifying Project impacts.

3.2.1 General Impacts and Mitigation

The primary impact of pipeline construction and right-of-way maintenance activities on wetlands will be the temporary removal of wetland vegetation. Construction also will temporarily diminish the recreational and aesthetic value of the wetlands crossed. These effects will be greatest during and immediately following construction. In emergent wetlands, the impact of construction will be relatively brief, since herbaceous vegetation will regenerate within one or two seasons. In forested and shrub-dominated wetlands, the impact will last longer due to the longer recovery period of these vegetation types. Forested wetlands may not regenerate due to specific circumstances like altered conditions since the forest began or the competition of invasive species, among others. Clearing of wetland vegetation also will also temporarily remove or alter wetland wildlife habitat.

Typical pipeline construction in most wetlands will be similar to construction in uplands and will consist of clearing, trenching, dewatering, installation, backfilling, cleanup, and revegetation. However, due to the unstable nature of some wetland soils, construction activities may differ somewhat from standard upland procedures (refer to Section 3.0 the EPP in Appendix B for additional details).

3.2.2 Wetland Mitigation

Enbridge proposes to mitigate for wetland impacts through a Project-specific consolidated wetland mitigation site located in the Nemadji River watershed. Appendix F includes the Wetland Mitigation Compensation Site Plan.

In Wisconsin, the Project will cross the following five fifth level hydrologic unit codes (HUC 10) in the Lake Superior Bank Service Area (BSA) in Douglas County:

- HUC 10 – 0401020116; Saint Louis River
- HUC 10 – 0401020115; Thompson Reservoir-Saint Louis River
- HUC 10 – 0401030105; Lower Nemadji River-Frontal Lake Superior
- HUC 10 – 0401030102; Upper Nemadji River
- HUC 10 – 0401030104; Middle Nemadji River

By providing compensatory mitigation within the same county and BSA, the Project will meet the goal of providing mitigation "in-place".

The Crawford Creek mitigation site (HUC 10 – 0401030105; Lower Nemadji River-Frontal Lake Superior) includes proposed preservation, enhancement, and restoration of wetlands.

The site is located in northern Douglas County, Lake Superior Basin; Nemadji River Watershed; in the NE 1/4 of Section 23, Township 48 North, Range 14 West in the Town of Superior on the east side of Darrow Road, south of the intersection of Darrow Road and County Highway C. The approximately 48.4-acre site includes two portions: a 29.4-acre ditched hayfield and an eastern 19.0-acre wooded area adjacent to Crawford Creek.

Enbridge will restore hydrology and wetland characteristics by blocking the man-made ditches in the hayfield and preventing channelized flow of water through the site into Crawford Creek. The plan includes placing 16 ditch plugs covering approximately 11,000 square feet. Enbridge will use the existing surrounding vegetation as a guide in developing the planting plan; vegetation design will also consider replacing impacted habitat types as closely as practicable. The primary goal of the wetland restoration is the re-development of more natural wetland hydrology and development of a diverse assemblage of wetland communities.

4.0 LAND OWNERSHIP

The Project route predominantly crosses private lands located outside of municipal areas. The Project will not cross federal or Native American Reservation land. The Project crosses land owned by the City and Village of Superior, and Douglas County Forest.

The Project will cross approximately 0.2-mile of Douglas County Forest, as well as either an additional 1.6 or 2.6 miles depending on which Route Alternative (A1 or A2) is selected (refer to Section 2.1). The

woodlands crossed are primarily residential property, recreation, and/or domestic wood products. Also, 0.3-mile of state WDNR-managed land will be crossed.

Enbridge is committed to working with and providing information to landowners about the Project and keeping them informed throughout all phases of the Project. Enbridge notified affected landowners of the Project by mail. In addition, Enbridge's Land Agents are contacting affected landowners to discuss the Project and document specific concerns they may have. Enbridge will maintain close contact with the landowners along the route before, during, and after construction.

A listing of the landowners along the Project route and alternatives is provided as Appendix G.

5.0 PERMITTING REQUIREMENTS

The required local, state, and federal permits for the Project work in Wisconsin are provided in Table 5.1-1.

TABLE 5.1-1

Agency Permits/Approvals in Wisconsin

Name of Agency	Title of Permit/Approval	Date of Application [a]	Date of Decision [b]	Status
United States Army Corps of Engineers – St. Paul District	Clean Water Act Section 404	February 2014	January 2015	Application submitted
United States Fish and Wildlife Service (Section 7)	Section 7 Endangered Species Act Consultation	December 2013	January 2015	Initial consultation in December 2013.
Wisconsin Public Utilities Commission	Public Interest Determination	February 2014	December 2014	Pending Submittal
Wisconsin Department of Natural Resources	Chapter 30 Permit and NR 103 Water Quality Certification	February 2014	January 2015	Application submitted
	State Endangered Resources Review	February 2014	January 2015	Pending submittal
	Temporary Water Use Permit	August 2015	September 2015	Pending submittal
	Superior Terminal Air Permit	May 2014	March 2015	Pending submittal
	Hydrostatic Test Discharge Permit	August 2015	September 2015	Pending submittal
	WPDES Construction Stormwater General Permit – Pipeyards and Contractor Yards	April 2014	June 2014	Pending submittal
	WPDES Individual Construction Stormwater Permit – Pipeline Construction	December 2014	March 2015	Pending submittal
Wisconsin State Historic Preservation Office (Section 106)	Cultural Resources Consultation, NHPA Section 106 Clearance	November 2013	November 2014	Initial consultation with COE November 2013.
Wisconsin Department of Agriculture	Agricultural Protection Plan	April 2013	September 2014	Consultation initiated
Wisconsin Department of Transportation	Road Crossing Permits	TBD	TBD	Pending submittal
City of Superior	Erosion Control/Grading Permit	December 2014	February 2015	Pending submittal

TABLE 5.1-1

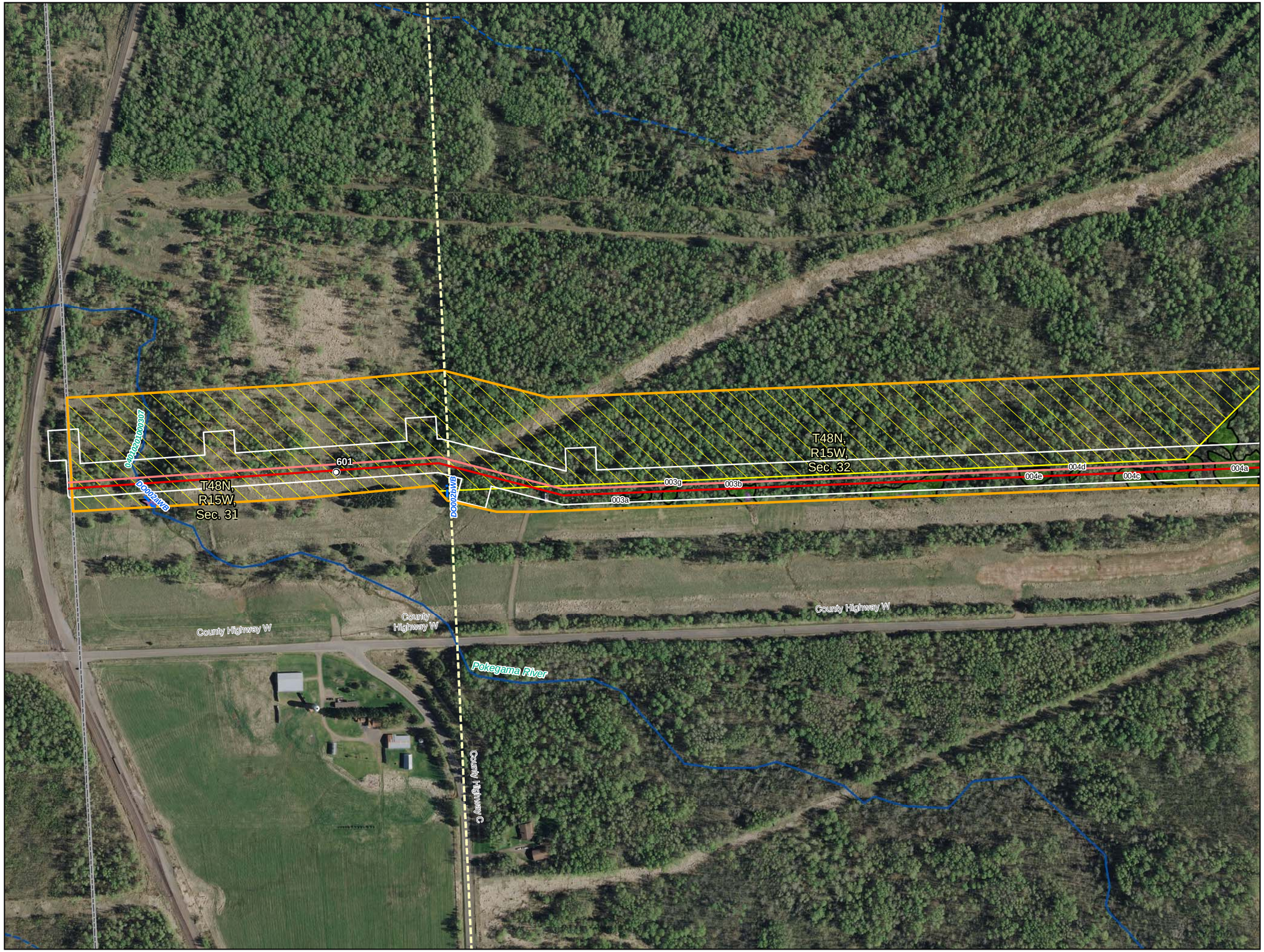
Agency Permits/Approvals in Wisconsin

Name of Agency	Title of Permit/Approval	Date of Application [a]	Date of Decision [b]	Status

[a] Actual date of initial consultation/anticipated dates for submission.
[b] Projected dates of action.

Appendix A

Detailed Route Maps



0 150 300 Feet

1 inch = 300 feet

- Milepost
- Sandpiper Centerline
- Sandpiper Alternative
- Line 3 Centerline
- Line 3 Alternative
- Construction Workspace
- Survey Area
- 2013 Field Survey Not Complete
- Field Delineated Waterbody
- Section Boundary

Wetlands

2013 Field Delineated Wetlands, Alberta Clipper Wetlands and WWI

- PEM
- PFO
- PSS
- PUB

National Hydrography Dataset

- Perennial Stream
- Intermittent Stream
- Canal/Ditch
- Waterbody

Appendix A
Exhibit A-1

Detailed Route Map

Sandpiper Pipeline Project and Line 3 Replacement Project

(Field Delineated and WWI Wetlands and Waterbodies)

Douglas County, Wisconsin

ENBRIDGE

2/24/2014

Source: Z:\Clients\E_H\Enbridge\Sandpiper\Arcgis\2014\02\WI_Permitting\COE_Maps\WI_COE_Wetland_Strip_Maps_Combined.mxd

Date: (2/24/2014)

0 150 300 Feet

1 inch = 300 feet

- Milepost
- Sandpiper Centerline
- Sandpiper Alternative
- Line 3 Centerline
- Line 3 Alternative
- Construction Workspace
- Survey Area
- 2013 Field Survey Not Complete
- Field Delineated Waterbody
- Section Boundary

Wetlands

2013 Field Delineated Wetlands, Alberta Clipper Wetlands and WWI

- PEM
- PFO
- PSS
- PUB

National Hydrography Dataset

- Perennial Stream
- Intermittent Stream
- Canal/Ditch
- Waterbody

Appendix A
Exhibit A-2

Detailed Route Map

Sandpiper Pipeline Project and Line 3 Replacement Project

(Field Delineated and WWI Wetlands and Waterbodies)

Douglas County, Wisconsin

ENBRIDGE

2/24/2014

Source: Z:\Clients\E_H\Enbridge\Sandpiper\ArcGIS\2014\02\WI_Permitting\COE_Maps\WI_COE_Wetland_Strip_Maps_Combined.mxd

Date: (2/24/2014)

0 150 300 Feet

1 inch = 300 feet

- Milepost
- Sandpiper Centerline
- Sandpiper Alternative
- Line 3 Centerline
- Line 3 Alternative
- Construction Workspace
- Survey Area
- 2013 Field Survey Not Complete
- Field Delineated Waterbody
- Section Boundary

Wetlands

2013 Field Delineated Wetlands, Alberta Clipper Wetlands and WWI

- PEM
- PFO
- PSS
- PUB

National Hydrography Dataset

- Perennial Stream
- Intermittent Stream
- Canal/Ditch
- Waterbody

Appendix A
Exhibit A-3

Detailed Route Map

Sandpiper Pipeline Project and Line 3 Replacement Project

(Field Delineated and WWI Wetlands and Waterbodies)

Douglas County, Wisconsin

ENBRIDGE

2/24/2014

Source: Z:\Clients\E_H\Enbridge\Sandpiper\ArcGIS\2014\02\WI_Permitting\COE_Maps\WI_COE_Wetland_Strip_Maps_Combined.mxd

Date: (2/24/2014)

0 150 300 Feet

1 inch = 300 feet

- Milepost
- Sandpiper Centerline
- Sandpiper Alternative
- Line 3 Centerline
- Line 3 Alternative
- Construction Workspace
- Survey Area
- 2013 Field Survey Not Complete
- Field Delineated Waterbody
- Section Boundary

Wetlands

2013 Field Delineated Wetlands, Alberta Clipper Wetlands and WWI

- PEM
- PFO
- PSS
- PUB

National Hydrography Dataset

- Perennial Stream
- Intermittent Stream
- Canal/Ditch
- Waterbody

Appendix A
Exhibit A-4

Detailed Route Map

Sandpiper Pipeline Project and Line 3 Replacement Project

(Field Delineated and WWI Wetlands and Waterbodies)

Douglas County, Wisconsin

ENBRIDGE

2/24/2014

Date: (2/24/2014) Source: Z:\Clients\E_H\Enbridge\Sandpiper\ArcGIS\2014\02\WI_Permitting\COE_Maps\WI_COE_Wetland_Strip_Maps_Combined.mxd

0 150 300 Feet

1 inch = 300 feet

- Milepost
- Sandpiper Centerline
- Sandpiper Alternative
- Line 3 Centerline
- Line 3 Alternative
- Construction Workspace
- Survey Area
- 2013 Field Survey Not Complete
- Field Delineated Waterbody
- Section Boundary

Wetlands

2013 Field Delineated Wetlands, Alberta Clipper Wetlands and WWI

- PEM
- PFO
- PSS
- PUB

National Hydrography Dataset

- Perennial Stream
- Intermittent Stream
- Canal/Ditch
- Waterbody

Appendix A
Exhibit A-5

Detailed Route Map

Sandpiper Pipeline Project and Line 3 Replacement Project

(Field Delineated and WWI Wetlands and Waterbodies)

Douglas County, Wisconsin

ENBRIDGE

2/24/2014

Date: (2/24/2014) Source: Z:\Clients\E_P\Enbridge\Sandpiper\ArcGIS\2014\02\WI_Permitting\COE_Maps\WI_COE_Wetland_Strip_Maps_Combined.mxd

0 150 300 Feet

1 inch = 300 feet

- Milepost
- Sandpiper Centerline
- Sandpiper Alternative
- Line 3 Centerline
- Line 3 Alternative
- Construction Workspace
- Survey Area
- 2013 Field Survey Not Complete
- Field Delineated Waterbody
- Section Boundary

Wetlands

2013 Field Delineated Wetlands, Alberta Clipper Wetlands and WWI

- PEM
- PFO
- PSS
- PUB

National Hydrography Dataset

- Perennial Stream
- Intermittent Stream
- Canal/Ditch
- Waterbody

Appendix A
Exhibit A-6

Detailed Route Map

Sandpiper Pipeline Project and Line 3 Replacement Project

(Field Delineated and WWI Wetlands and Waterbodies)

Douglas County, Wisconsin

ENBRIDGE

2/24/2014

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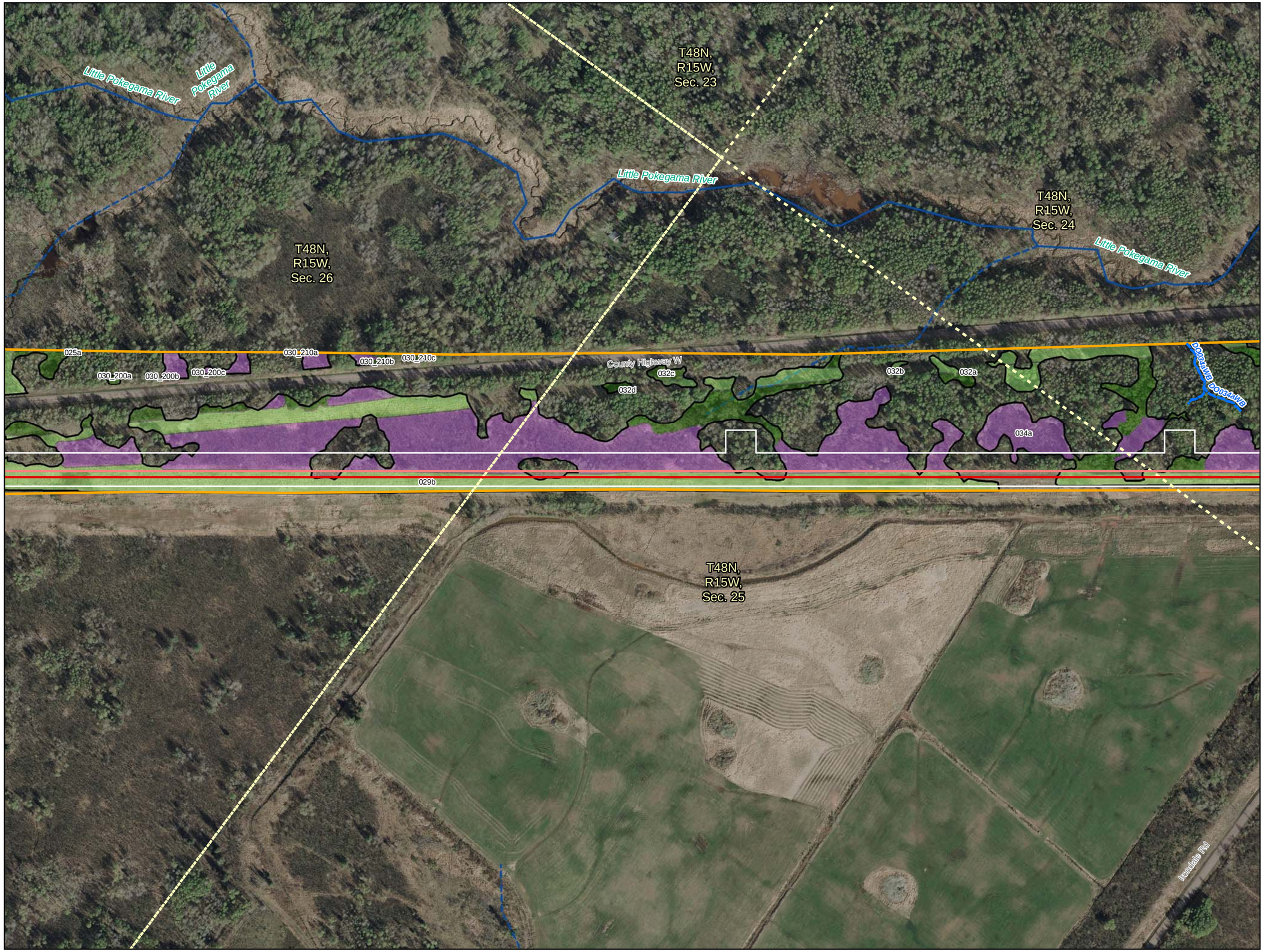


0 150 300 Feet

1 inch = 300 feet

- Milepost
- Sandpiper Centerline
- Sandpiper Alternative
- Line 3 Centerline
- Line 3 Alternative
- Construction Workspace
- Survey Area
- 2013 Field Survey Not Complete
- Field Delineated Waterbody
- Section Boundary

Wetlands

2013 Field Delineated Wetlands, Alberta Clipper Wetlands and WWI

- PEM
- PFO
- PSS
- PUB

National Hydrography Dataset

- Perennial Stream
- Intermittent Stream
- Canal/Ditch
- Waterbody

Appendix A
Exhibit A-7

Detailed Route Map

Sandpiper Pipeline Project and Line 3 Replacement Project

(Field Delineated and WWI Wetlands and Waterbodies)

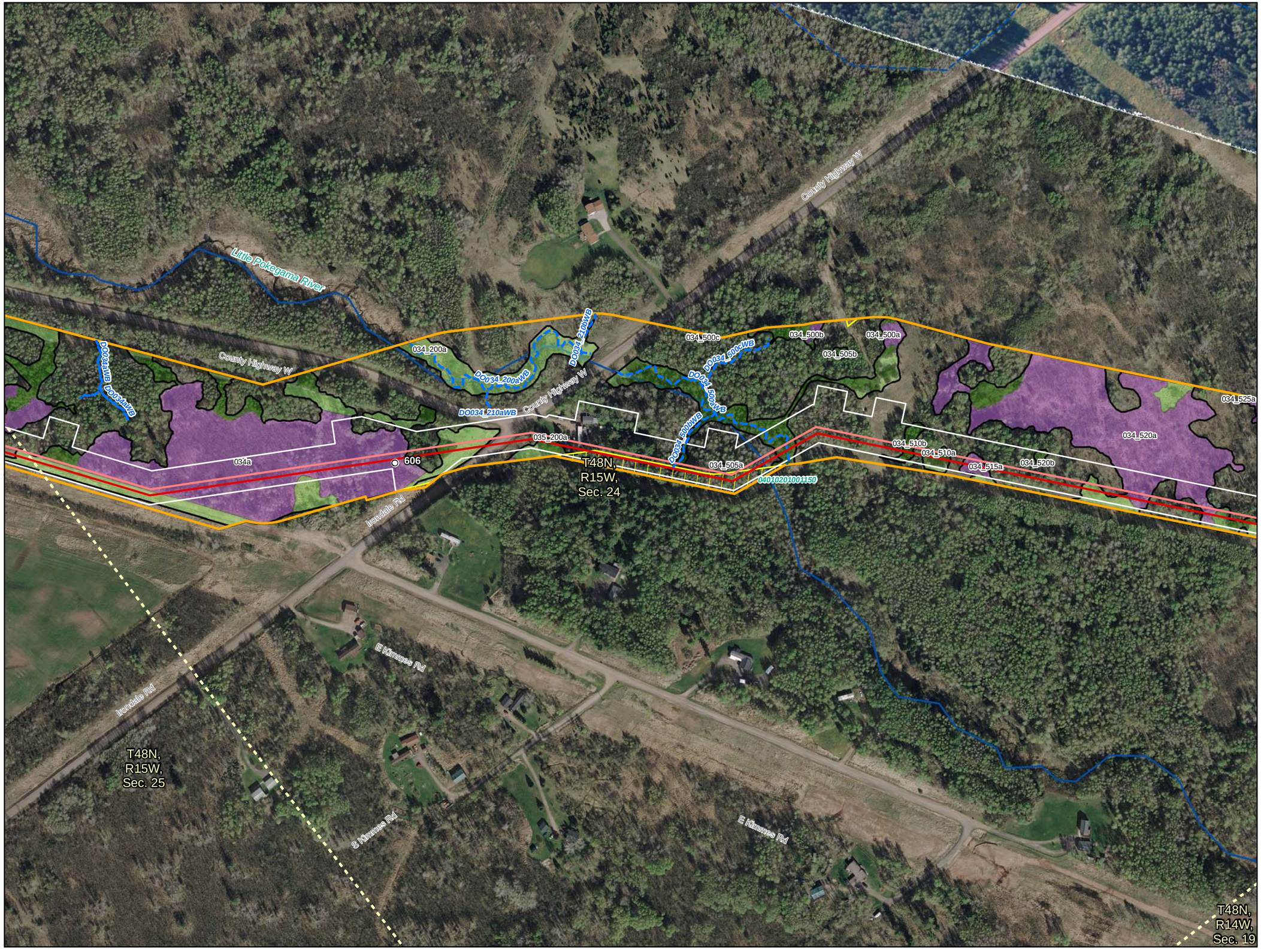
Douglas County, Wisconsin

ENBRIDGE

2/24/2014

Source: Z:\Clients\E_H\Enbridge\Sandpiper\ArcGIS\2014\02\WI_Permitting\COE_Maps\WI_COE_Wetland_Strip_Maps_Combined.mxd

Date: (2/24/2014)



0 150 300 Feet

1 inch = 300 feet

- Milepost
- Sandpiper Centerline
- Sandpiper Alternative
- Line 3 Centerline
- Line 3 Alternative
- Construction Workspace
- Survey Area
- 2013 Field Survey Not Complete
- Field Delineated Waterbody
- Section Boundary

Wetlands

2013 Field Delineated Wetlands, Alberta Clipper Wetlands and WWI

- PEM
- PFO
- PSS
- PUB

National Hydrography Dataset

- Perennial Stream
- Intermittent Stream
- Canal/Ditch
- Waterbody

Appendix A
Exhibit A-8

Detailed Route Map

Sandpiper Pipeline Project and Line 3 Replacement Project

(Field Delineated and WWI Wetlands and Waterbodies)

Douglas County, Wisconsin

ENBRIDGE

2/24/2014

Source: Z:\Clients\E_H\Enbridge\Sandpiper\ArcGIS\2014\02\WI_Permitting\COE_Maps\WI_COE_Wetland_Strip_Maps_Combined.mxd

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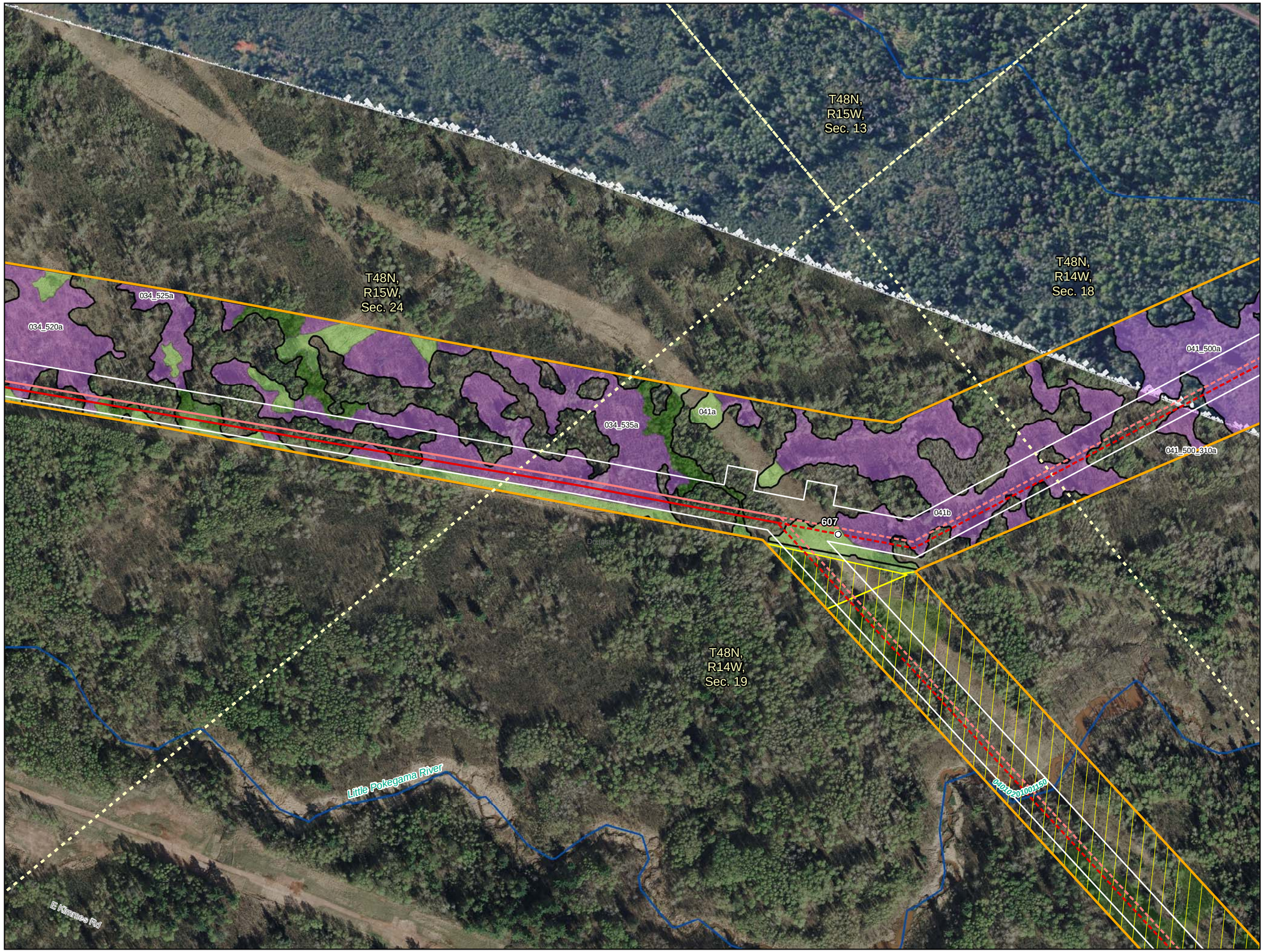

0 150 300 Feet

1 inch = 300 feet

- Milepost
- Sandpiper Centerline
- Sandpiper Alternative
- Line 3 Centerline
- Line 3 Alternative
- Construction Workspace
- Survey Area
- 2013 Field Survey Not Complete
- Field Delineated Waterbody
- Section Boundary

Wetlands

2013 Field Delineated Wetlands, Alberta Clipper Wetlands and WWI

- PEM
- PFO
- PSS
- PUB

National Hydrography Dataset

- Perennial Stream
- Intermittent Stream
- Canal/Ditch
- Waterbody

Appendix A
Exhibit A-9

Detailed Route Map

Sandpiper Pipeline Project and Line 3 Replacement Project

(Field Delineated and WWI Wetlands and Waterbodies)

Douglas County, Wisconsin

ENBRIDGE

2/24/2014

Source: Z:\Clients\E_P\Enbridge\Sandpiper\ArcGIS\2014\02\WI_Permitting\COE_Maps\WI_COE_Wetland_Strip_Maps_Combined.mxd

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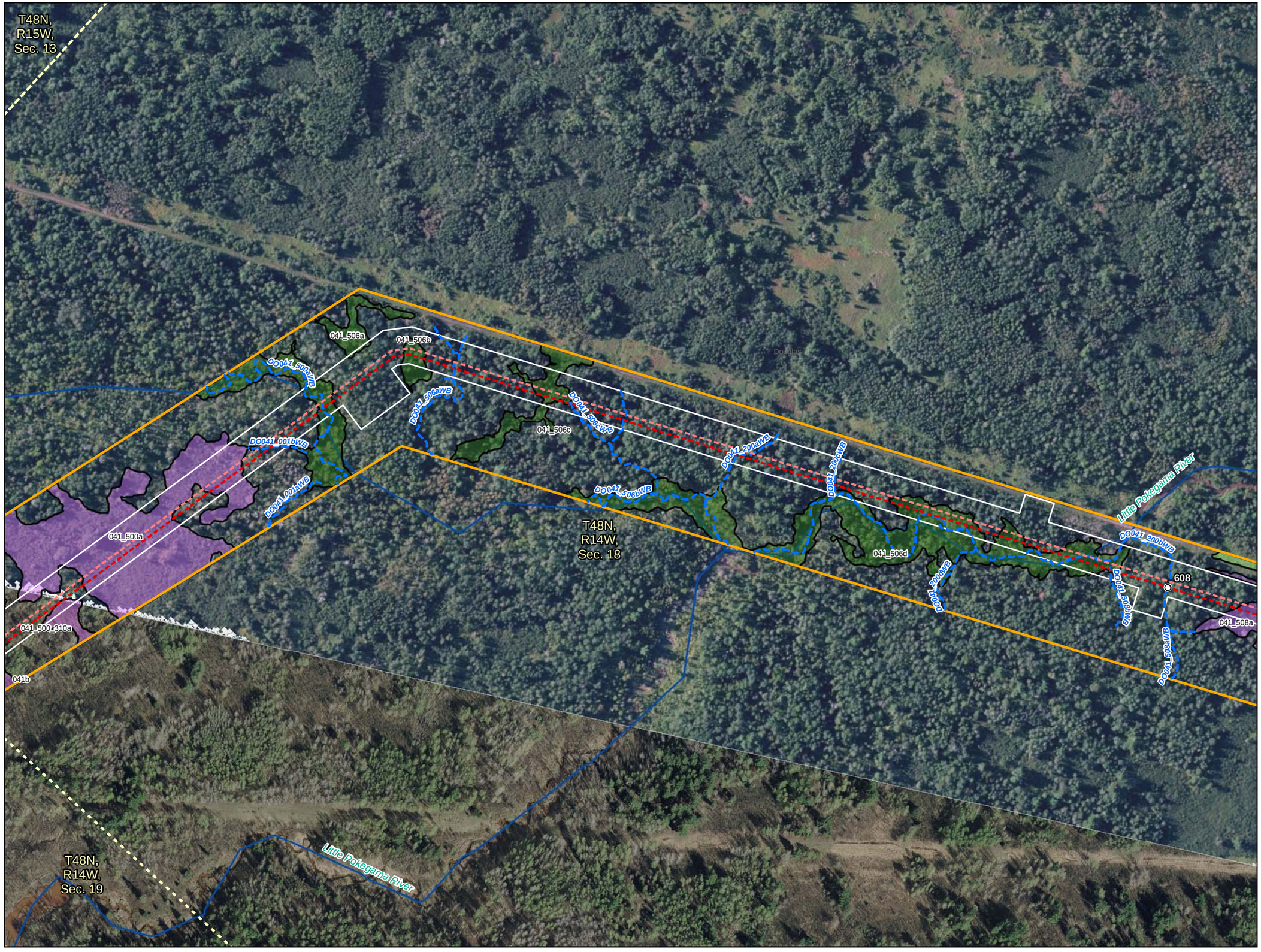

0 150 300 Feet

1 inch = 300 feet

- Milepost
- Sandpiper Centerline
- Sandpiper Alternative
- Line 3 Centerline
- Line 3 Alternative
- Construction Workspace
- Survey Area
- 2013 Field Survey Not Complete
- Field Delineated Waterbody
- Section Boundary

Wetlands

2013 Field Delineated Wetlands, Alberta Clipper Wetlands and WWI

- PEM
- PFO
- PSS
- PUB

National Hydrography Dataset

- Perennial Stream
- Intermittent Stream
- Canal/Ditch
- Waterbody

Appendix A
Exhibit A-10

Detailed Route Map

Sandpiper Pipeline Project and Line 3 Replacement Project

(Field Delineated and WWI Wetlands and Waterbodies)

Douglas County, Wisconsin

ENBRIDGE

2/24/2014

Source: Z:\Clients\E_H\Enbridge\Sandpiper\ArcGIS\2014\02\WI_Permitting\COE_Maps\WI_COE_Wetland_Strip_Maps_Combined.mxd
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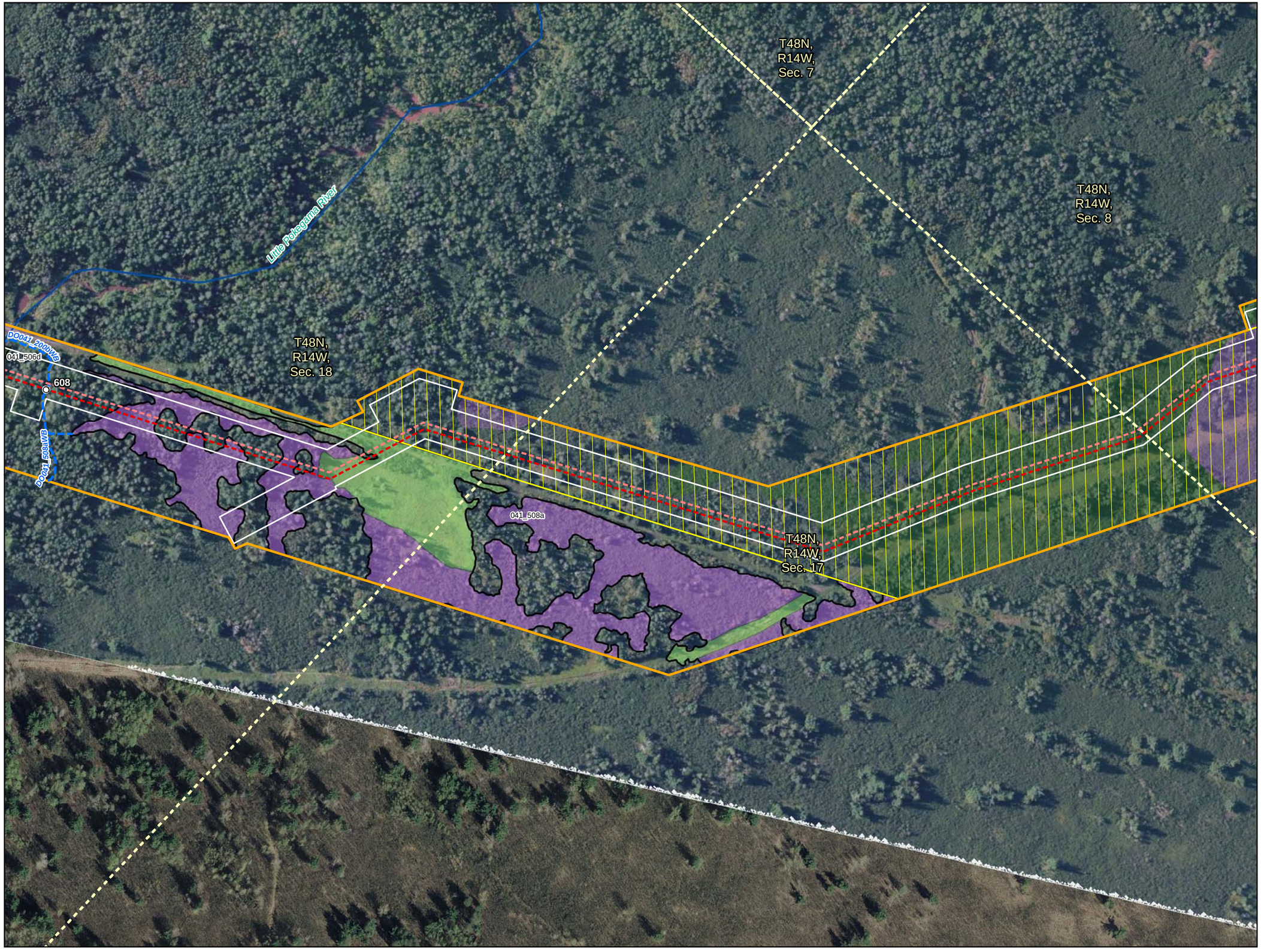


0 150 300 Feet

1 inch = 300 feet

- Milepost
- Sandpiper Centerline
- Sandpiper Alternative
- Line 3 Centerline
- Line 3 Alternative
- Construction Workspace
- Survey Area
- 2013 Field Survey Not Complete
- Field Delineated Waterbody
- Section Boundary

Wetlands

2013 Field Delineated Wetlands, Alberta Clipper Wetlands and WWI

- PEM
- PFO
- PSS
- PUB

National Hydrography Dataset

- Perennial Stream
- Intermittent Stream
- Canal/Ditch
- Waterbody

Appendix A
Exhibit A-11

Detailed Route Map

Sandpiper Pipeline Project and Line 3 Replacement Project

(Field Delineated and WWI Wetlands and Waterbodies)

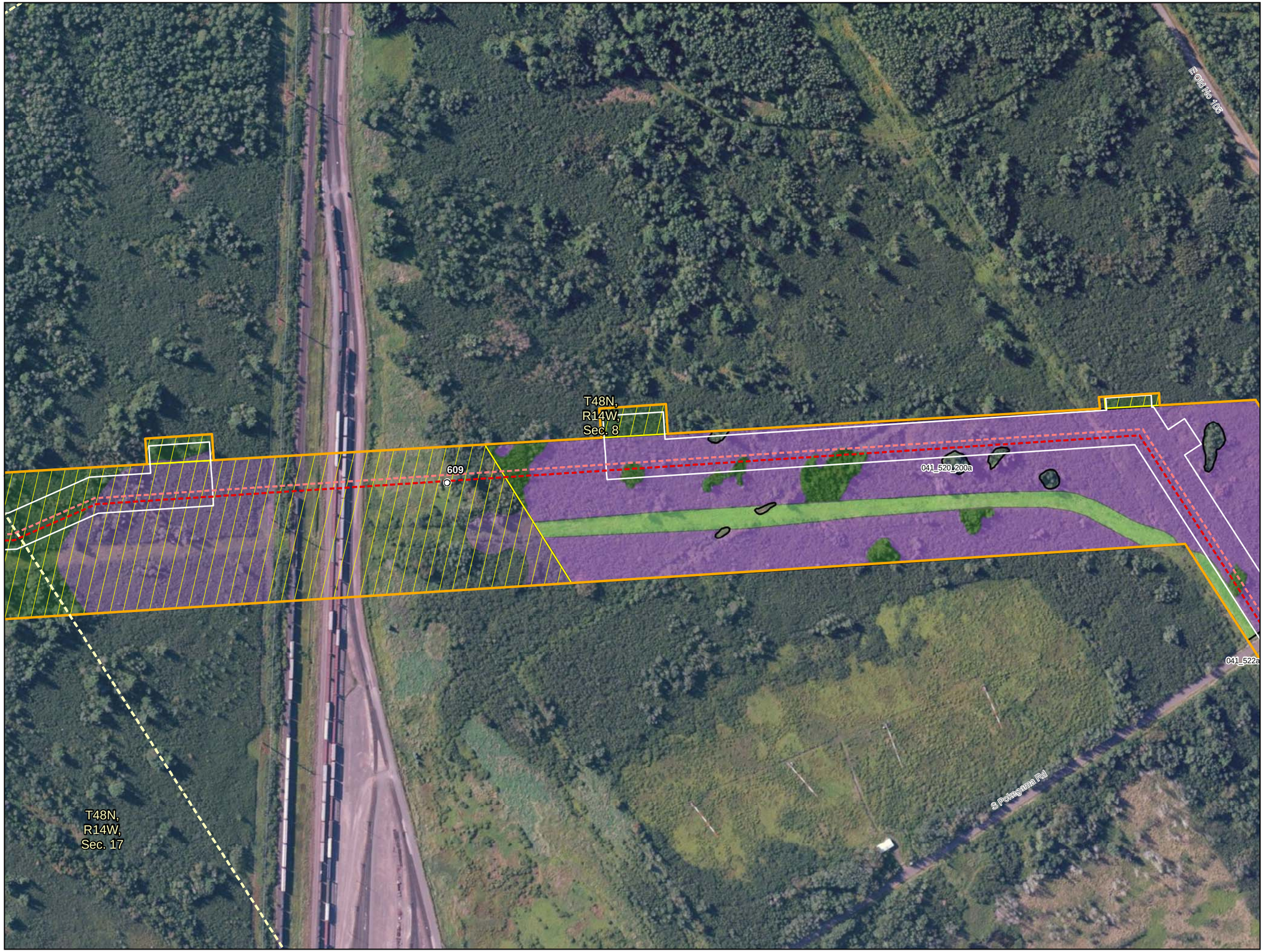
Douglas County, Wisconsin

ENBRIDGE

2/24/2014

Source: Z:\Clients\E_H\Enbridge\Sandpiper\ArcGIS\2014\02\WI_Permitting\COE_Maps\WI_COE_Wetland_Strip_Maps_Combined.mxd

Date: (2/24/2014)



0 150 300 Feet

1 inch = 300 feet

- Milepost
- Sandpiper Centerline
- Sandpiper Alternative
- Line 3 Centerline
- Line 3 Alternative
- Construction Workspace
- Survey Area
- 2013 Field Survey Not Complete
- Field Delineated Waterbody
- Section Boundary

Wetlands

2013 Field Delineated Wetlands, Alberta Clipper Wetlands and WWI

- PEM
- PFO
- PSS
- PUB

National Hydrography Dataset

- Perennial Stream
- Intermittent Stream
- Canal/Ditch
- Waterbody

Appendix A
Exhibit A-12

Detailed Route Map

Sandpiper Pipeline Project and Line 3 Replacement Project

(Field Delineated and WWI Wetlands and Waterbodies)

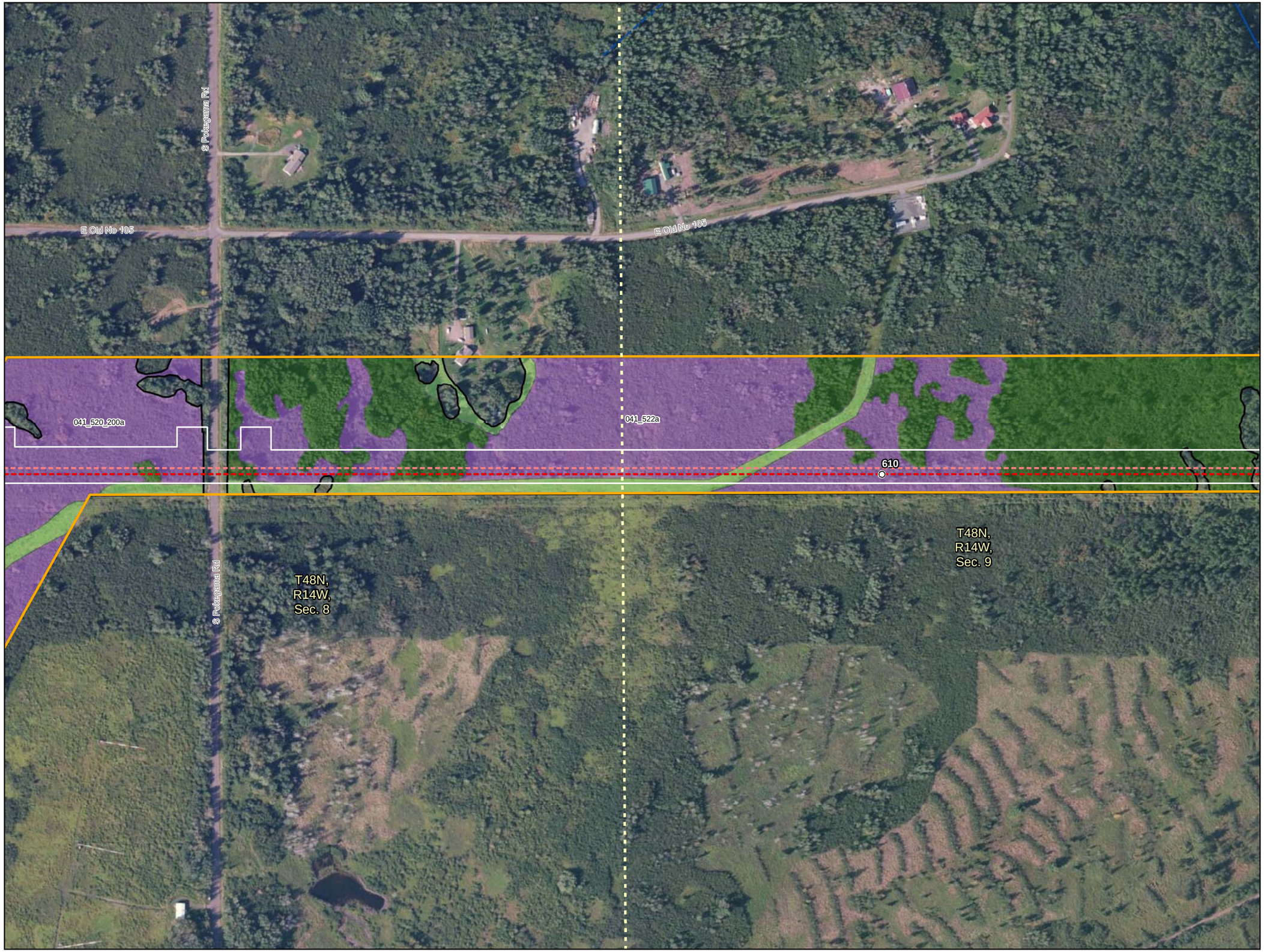
Douglas County, Wisconsin

ENBRIDGE

2/24/2014

Source: Z:\Clients\E_H\Enbridge\Sandpiper\ArcGIS\2014\02\WI_Permitting\COE_Maps\WI_COE_Wetland_Strip_Maps_Combined.mxd

Date: (2/24/2014)



0 150 300 Feet

1 inch = 300 feet

- Milepost
- Sandpiper Centerline
- Sandpiper Alternative
- Line 3 Centerline
- Line 3 Alternative
- Construction Workspace
- Survey Area
- 2013 Field Survey Not Complete
- Field Delineated Waterbody
- Section Boundary

Wetlands

2013 Field Delineated Wetlands, Alberta Clipper Wetlands and WWI

- PEM
- PFO
- PSS
- PUB

National Hydrography Dataset

- Perennial Stream
- Intermittent Stream
- Canal/Ditch
- Waterbody

Appendix A
Exhibit A-13

Detailed Route Map

Sandpiper Pipeline Project and Line 3 Replacement Project

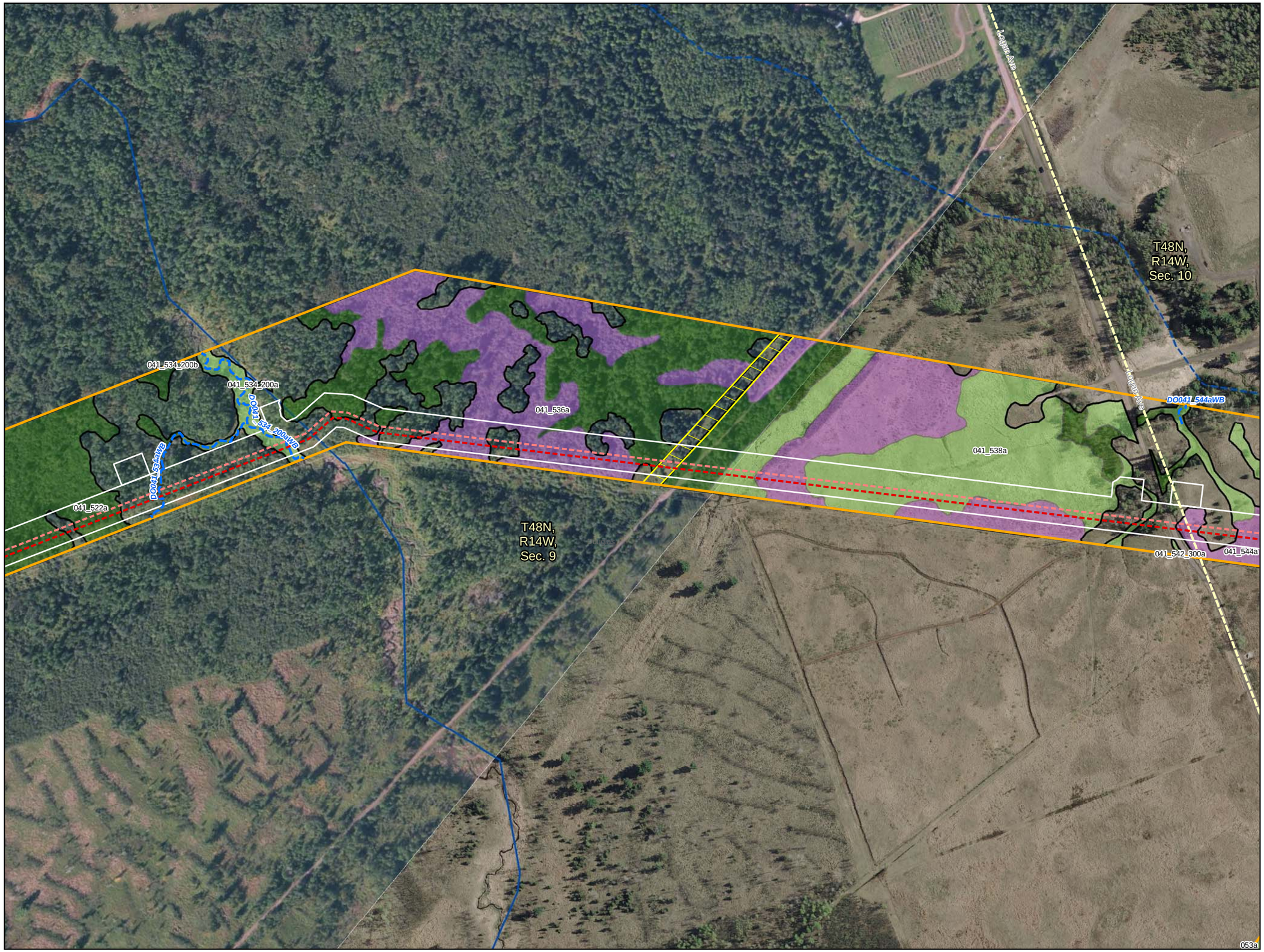
(Field Delineated and WWI Wetlands and Waterbodies)

Douglas County, Wisconsin

ENBRIDGE

2/24/2014

Source: Z:\Clients\E_P\Enbridge\Sandpiper\ArcGIS\2014\02\WI_Permitting\COE_Maps\WI_COE_Wetland_Strip_Maps_Combined.mxd
Date: (2/24/2014)



0 150 300 Feet

1 inch = 300 feet

- Milepost
- Sandpiper Centerline
- Sandpiper Alternative
- Line 3 Centerline
- Line 3 Alternative
- Construction Workspace
- Survey Area
- 2013 Field Survey Not Complete
- Field Delineated Waterbody
- Section Boundary

Wetlands

2013 Field Delineated Wetlands, Alberta Clipper Wetlands and WWI

- PEM
- PFO
- PSS
- PUB

National Hydrography Dataset

- Perennial Stream
- Intermittent Stream
- Canal/Ditch
- Waterbody

Appendix A
Exhibit A-14

Detailed Route Map

Sandpiper Pipeline Project and Line 3 Replacement Project

(Field Delineated and WWI Wetlands and Waterbodies)

Douglas County, Wisconsin

ENBRIDGE

2/24/2014

Source: Z:\Clients\E_P\Enbridge\Sandpiper\Arcgis\2014\02\WI_Permitting\COE_Maps\WI_COE_Wetland_Strip_Maps_Combined.mxd
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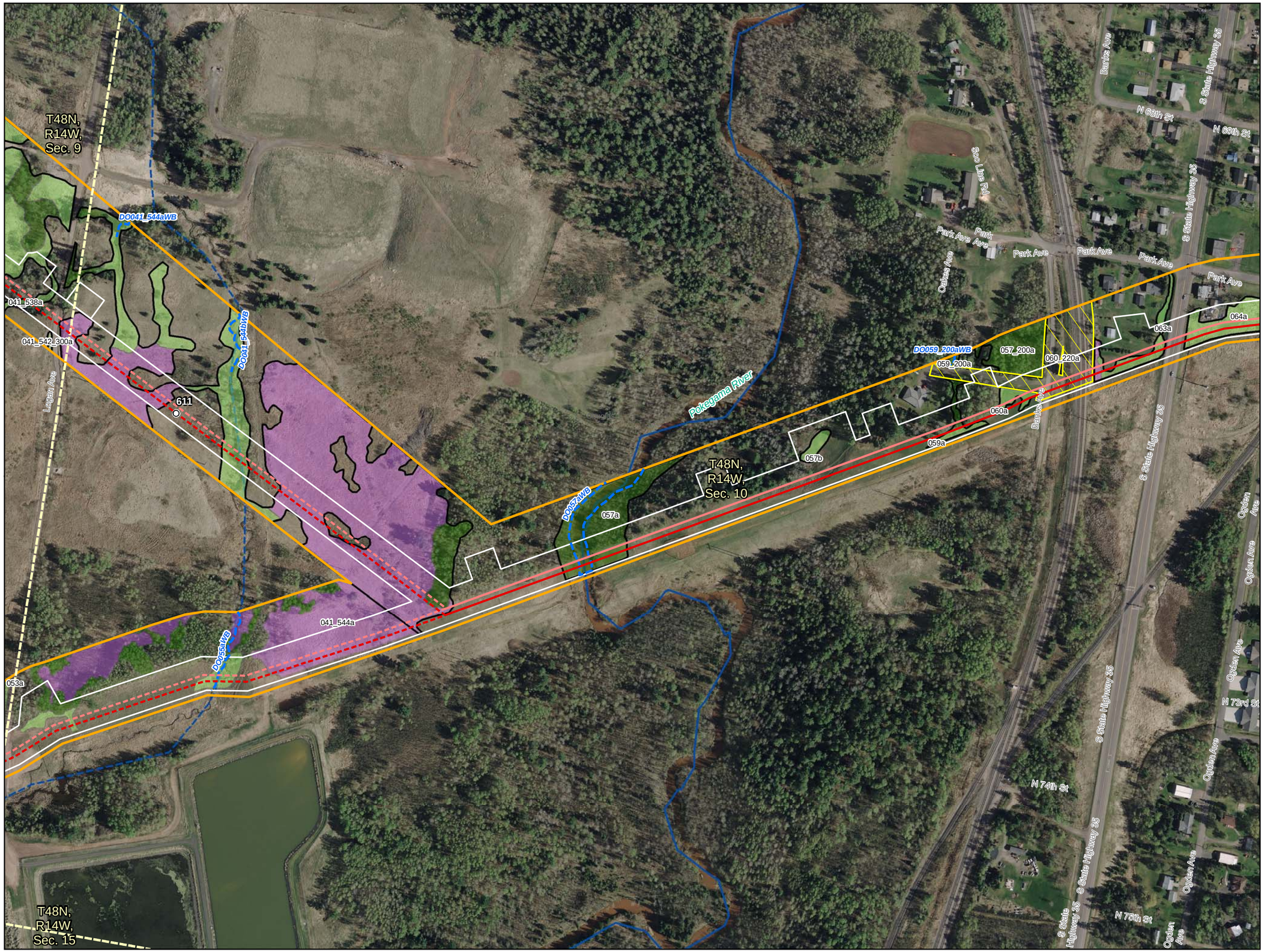

0 150 300 Feet

1 inch = 300 feet

- Milepost
- Sandpiper Centerline
- Sandpiper Alternative
- Line 3 Centerline
- Line 3 Alternative
- Construction Workspace
- Survey Area
- 2013 Field Survey Not Complete
- Field Delineated Waterbody
- Section Boundary

Wetlands

2013 Field Delineated Wetlands, Alberta Clipper Wetlands and WWI

- PEM
- PFO
- PSS
- PUB

National Hydrography Dataset

- Perennial Stream
- Intermittent Stream
- Canal/Ditch
- Waterbody

Appendix A
Exhibit A-15

Detailed Route Map

Sandpiper Pipeline Project and Line 3 Replacement Project

(Field Delineated and WWI Wetlands and Waterbodies)

Douglas County, Wisconsin

ENBRIDGE

2/24/2014

Source: Z:\Clients\E_P\Enbridge\Sandpiper\ArcGIS\2014\02\WI_Permitting\COE_Maps\WI_COE_Wetland_Strip_Maps_Combined.mxd

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Wetlands

2013 Field Delineated Wetlands, Alberta Clipper Wetlands and WWI

- PEM
- PFO
- PSS
- PUB

National Hydrography Dataset

- Perennial Stream
- Intermittent Stream
- Canal/Ditch
- Waterbody

Appendix A
Exhibit A-16

Detailed Route Map

Sandpiper Pipeline Project and Line 3 Replacement Project

(Field Delineated and WWI Wetlands and Waterbodies)

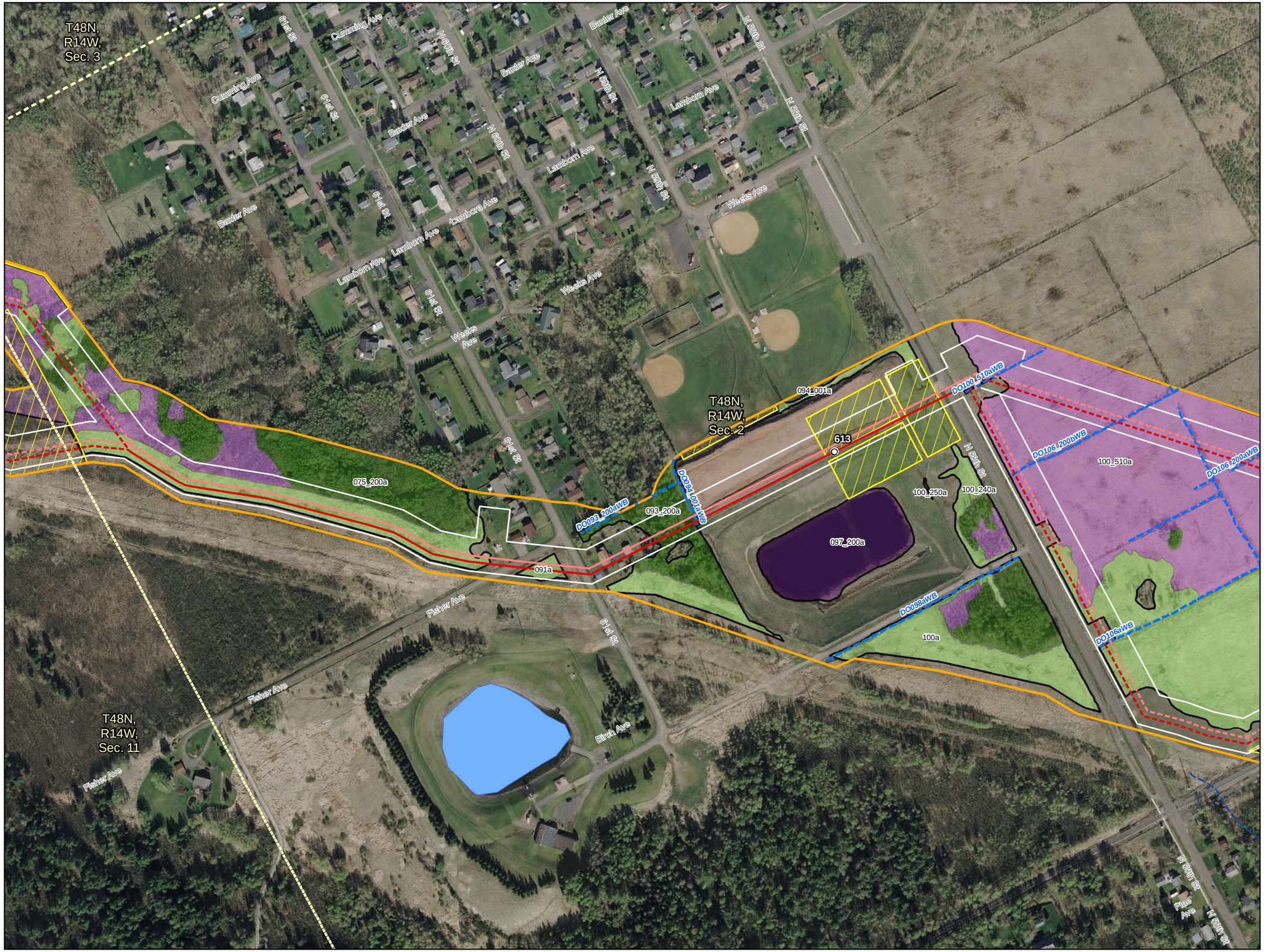
Douglas County, Wisconsin

ENBRIDGE

2/24/2014

Source: Z:\Clients\E_P\Enbridge\Sandpiper\ArcGIS\2014\02\WI_Permitting\COE_Maps\WI_COE_Wetland_Strip_Maps_Combined.mxd

Date: (2/24/2014)



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- Construction Workspace
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- Section Boundary

Wetlands

2013 Field Delineated Wetlands, Alberta Clipper Wetlands and WWI

- PEM
- PFO
- PSS
- PUB

National Hydrography Dataset

- Perennial Stream
- Intermittent Stream
- Canal/Ditch
- Waterbody

Appendix A
Exhibit A-17

Detailed Route Map

Sandpiper Pipeline Project and Line 3 Replacement Project

(Field Delineated and WWI Wetlands and Waterbodies)

Douglas County, Wisconsin

ENBRIDGE

2/24/2014

Source: Z:\Clients\E_H\Enbridge\Sandpiper\ArcGIS\2014\02\WI_Permitting\COE_Maps\WI_COE_Wetland_Strip_Maps_Combined.mxd
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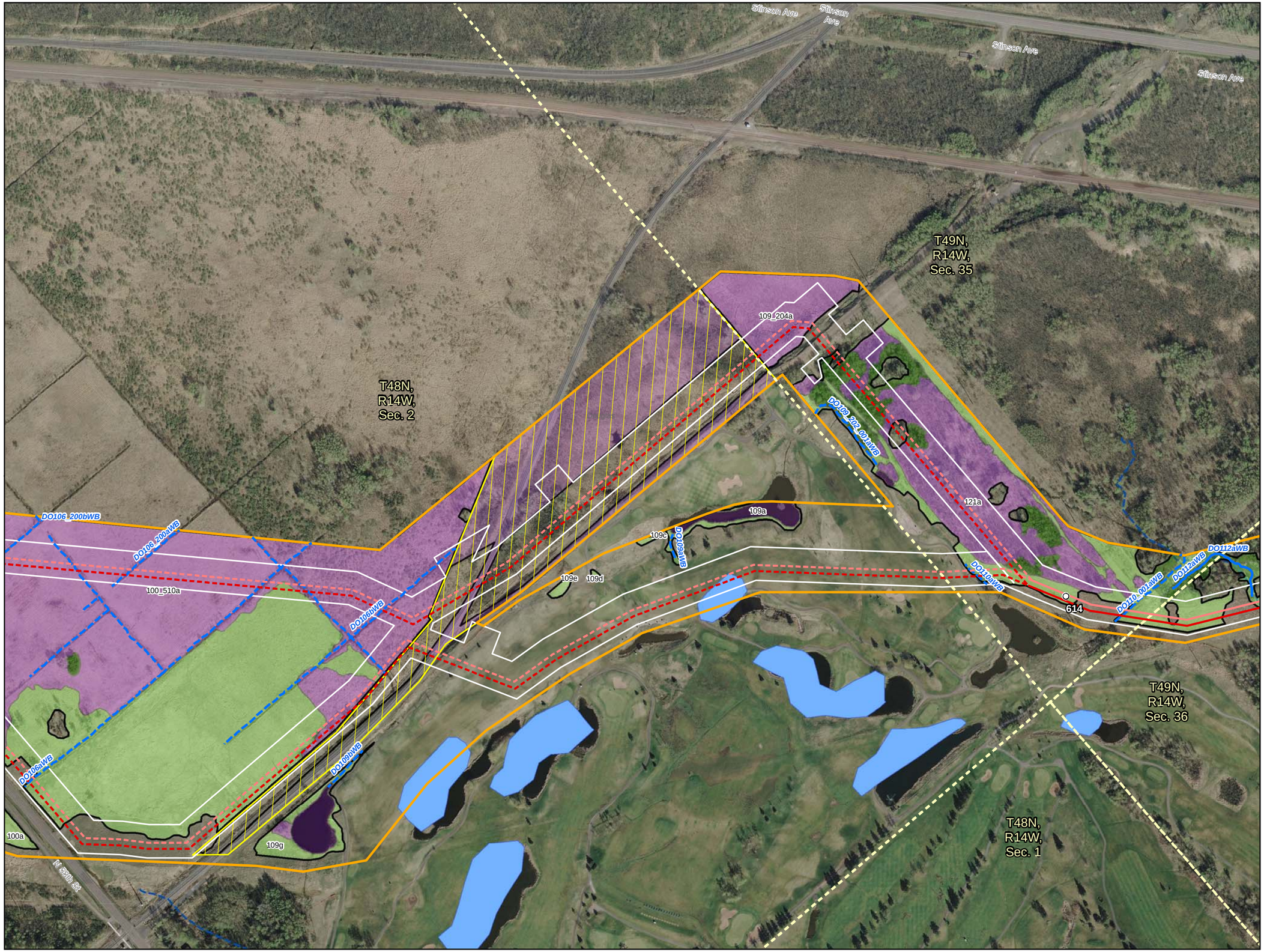

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- Section Boundary

Wetlands

2013 Field Delineated Wetlands, Alberta Clipper Wetlands and WWI

- PEM
- PFO
- PSS
- PUB

National Hydrography Dataset

- Perennial Stream
- Intermittent Stream
- Canal/Ditch
- Waterbody

Appendix A
Exhibit A-18

Detailed Route Map

Sandpiper Pipeline Project and Line 3 Replacement Project

(Field Delineated and WWI Wetlands and Waterbodies)

Douglas County, Wisconsin

ENBRIDGE

2/24/2014

Source: Z:\Clients\E_H\Enbridge\Sandpiper\ArcGIS\2014\02\WI_Permitting\COE_Maps\WI_COE_Wetland_Strip_Maps_Combined.mxd

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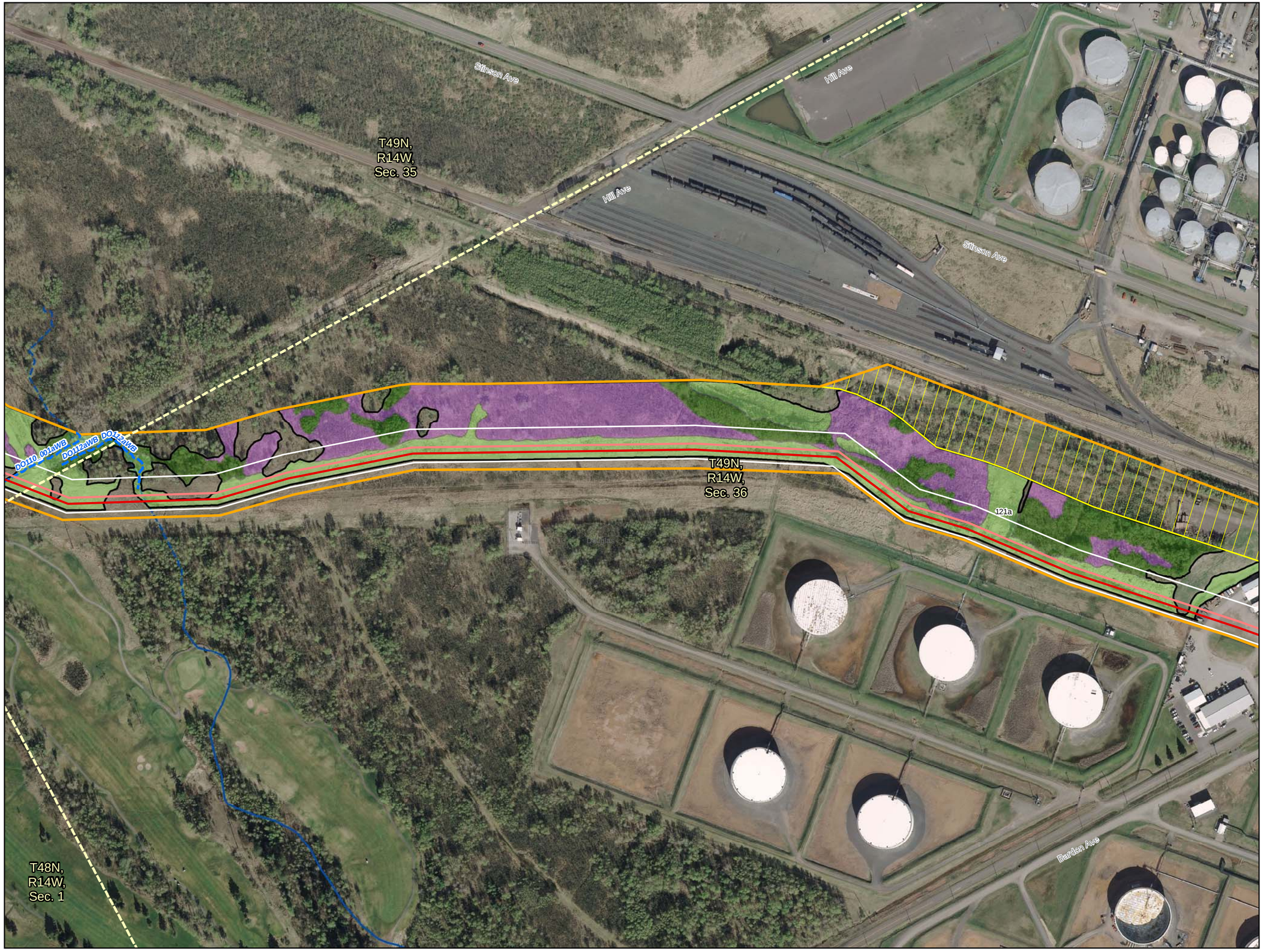

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- Sandpiper Alternative
- Line 3 Centerline
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- Section Boundary

Wetlands

2013 Field Delineated Wetlands, Alberta Clipper Wetlands and WWI

- PEM
- PFO
- PSS
- PUB

National Hydrography Dataset

- Perennial Stream
- Intermittent Stream
- Canal/Ditch
- Waterbody

Appendix A
Exhibit A-19

Detailed Route Map

Sandpiper Pipeline Project and Line 3 Replacement Project

(Field Delineated and WWI Wetlands and Waterbodies)

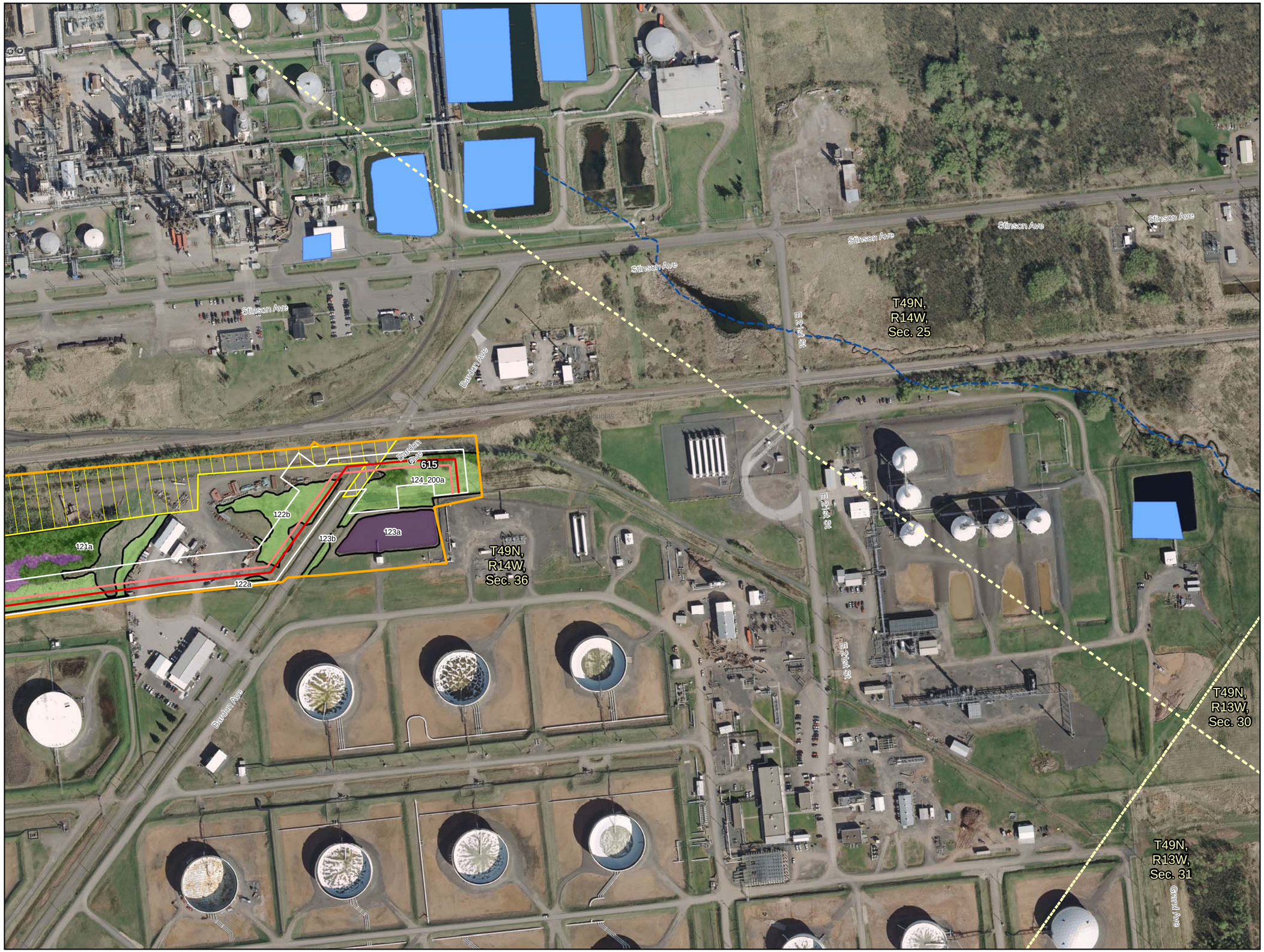
Douglas County, Wisconsin

ENBRIDGE

2/24/2014

Source: Z:\Clients\E_H\Enbridge\Sandpiper\ArcGIS\2014\02\WI_Permitting\COE_Maps\WI_COE_Wetland_Strip_Maps_Combined.mxd

Date: (2/24/2014)



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- Section Boundary

Wetlands

2013 Field Delineated Wetlands, Alberta Clipper Wetlands and WWI

- PEM
- PFO
- PSS
- PUB

National Hydrography Dataset

- Perennial Stream
- Intermittent Stream
- Canal/Ditch
- Waterbody

Appendix A
Exhibit A-20

Detailed Route Map

Sandpiper Pipeline Project and Line 3 Replacement Project

(Field Delineated and WWI Wetlands and Waterbodies)

Douglas County, Wisconsin

ENBRIDGE

2/24/2014

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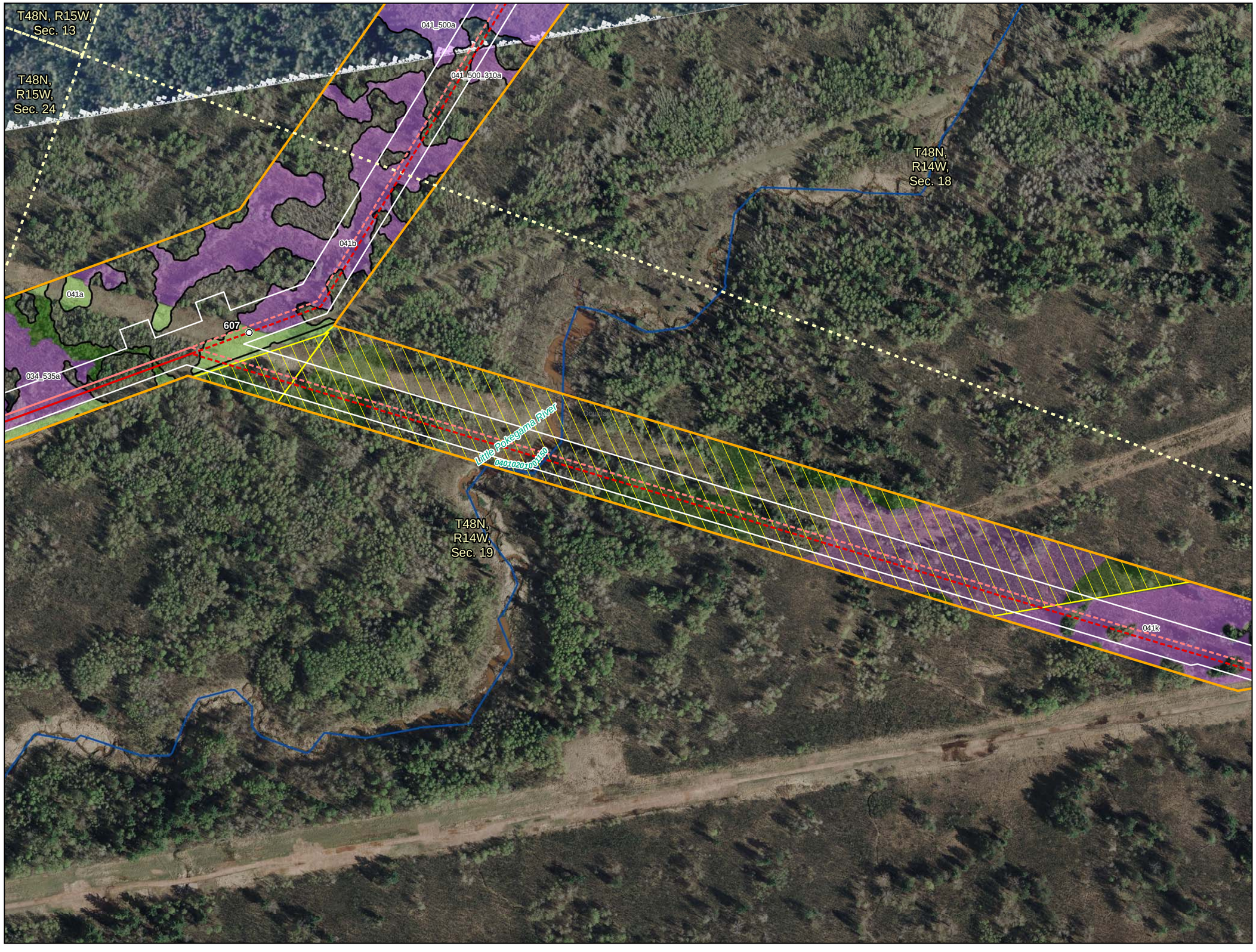

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Wetlands

2013 Field Delineated Wetlands, Alberta Clipper Wetlands and WWI

- PEM
- PFO
- PSS
- PUB

National Hydrography Dataset

- Perennial Stream
- Intermittent Stream
- Canal/Ditch
- Waterbody

Appendix A
Exhibit A-21

Detailed Route Map

Sandpiper Pipeline Project and Line 3 Replacement Project

(Field Delineated and WWI Wetlands and Waterbodies)

Douglas County, Wisconsin

ENBRIDGE

2/24/2014

Source: Z:\Clients\E_P\Enbridge\Sandpiper\ArcGIS\2014\02\WI_Permitting\COE_Maps\WI_COE_Wetland_Strip_Maps_Combined.mxd

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Wetlands

2013 Field Delineated Wetlands, Alberta Clipper Wetlands and WWI

- PEM
- PFO
- PSS
- PUB

National Hydrography Dataset

- Perennial Stream
- Intermittent Stream
- Canal/Ditch
- Waterbody

Appendix A
Exhibit A-22

Detailed Route Map

Sandpiper Pipeline Project and Line 3 Replacement Project

(Field Delineated and WWI Wetlands and Waterbodies)

Douglas County, Wisconsin

ENBRIDGE

2/24/2014

Source: Z:\Clients\E_H\Enbridge\Sandpiper\ArcGIS\2014\02\WI_Permitting\COE_Maps\WI_COE_Wetland_Strip_Maps_Combined.mxd

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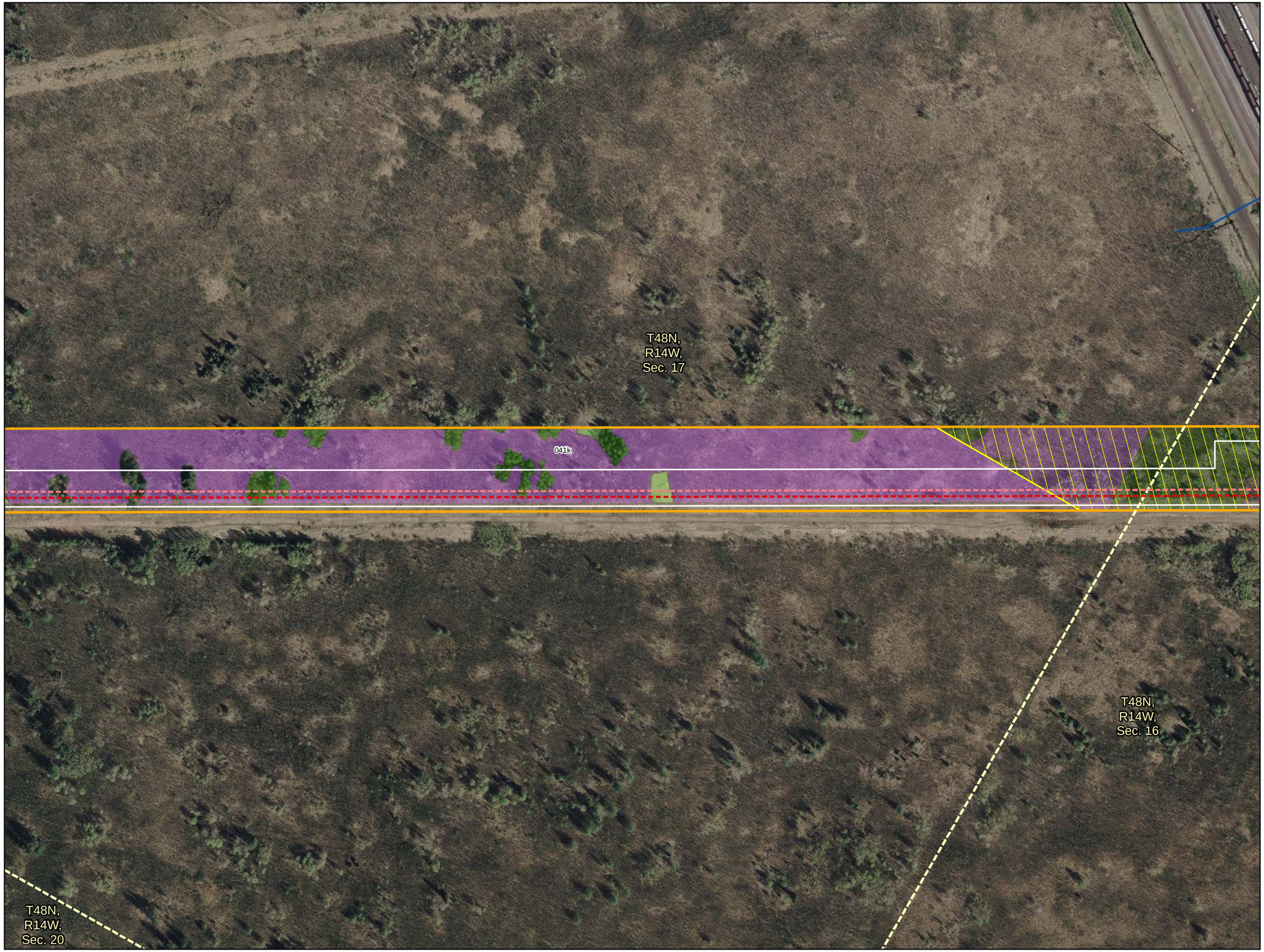

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Wetlands

2013 Field Delineated Wetlands, Alberta Clipper Wetlands and WWI

- PEM
- PFO
- PSS
- PUB

National Hydrography Dataset

- Perennial Stream
- Intermittent Stream
- Canal/Ditch
- Waterbody

Appendix A
Exhibit A-23

Detailed Route Map

Sandpiper Pipeline Project and Line 3 Replacement Project

(Field Delineated and WWI Wetlands and Waterbodies)

Douglas County, Wisconsin

ENBRIDGE

2/24/2014

Source: Z:\Clients\E_H\Enbridge\Sandpiper\ArcGIS\2014\02\WI_Permitting\COE_Maps\WI_COE_Wetland_Strip_Maps_Combined.mxd

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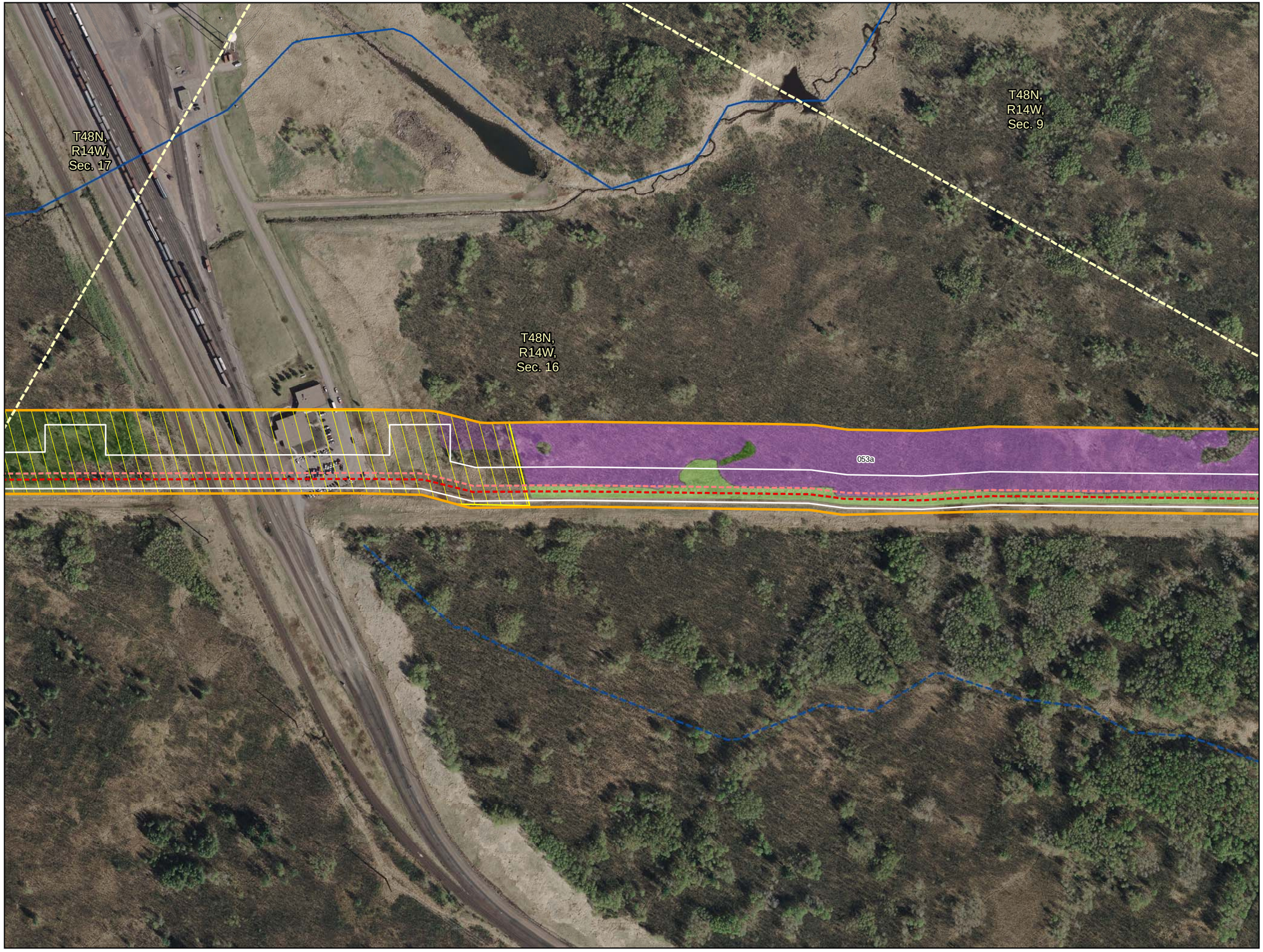

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- Sandpiper Alternative
- Line 3 Centerline
- Line 3 Alternative
- Construction Workspace
- Survey Area
- 2013 Field Survey Not Complete
- Field Delineated Waterbody
- Section Boundary

Wetlands

2013 Field Delineated Wetlands, Alberta Clipper Wetlands and WWI

- PEM
- PFO
- PSS
- PUB

National Hydrography Dataset

- Perennial Stream
- Intermittent Stream
- Canal/Ditch
- Waterbody

Appendix A
Exhibit A-24

Detailed Route Map

Sandpiper Pipeline Project and Line 3 Replacement Project

(Field Delineated and WWI Wetlands and Waterbodies)

Douglas County, Wisconsin

ENBRIDGE

2/24/2014

Source: Z:\Clients\E_H\Enbridge\Sandpiper\ArcGIS\2014\02\WI_Permitting\COE_Maps\WI_COE_Wetland_Strip_Maps_Combined.mxd

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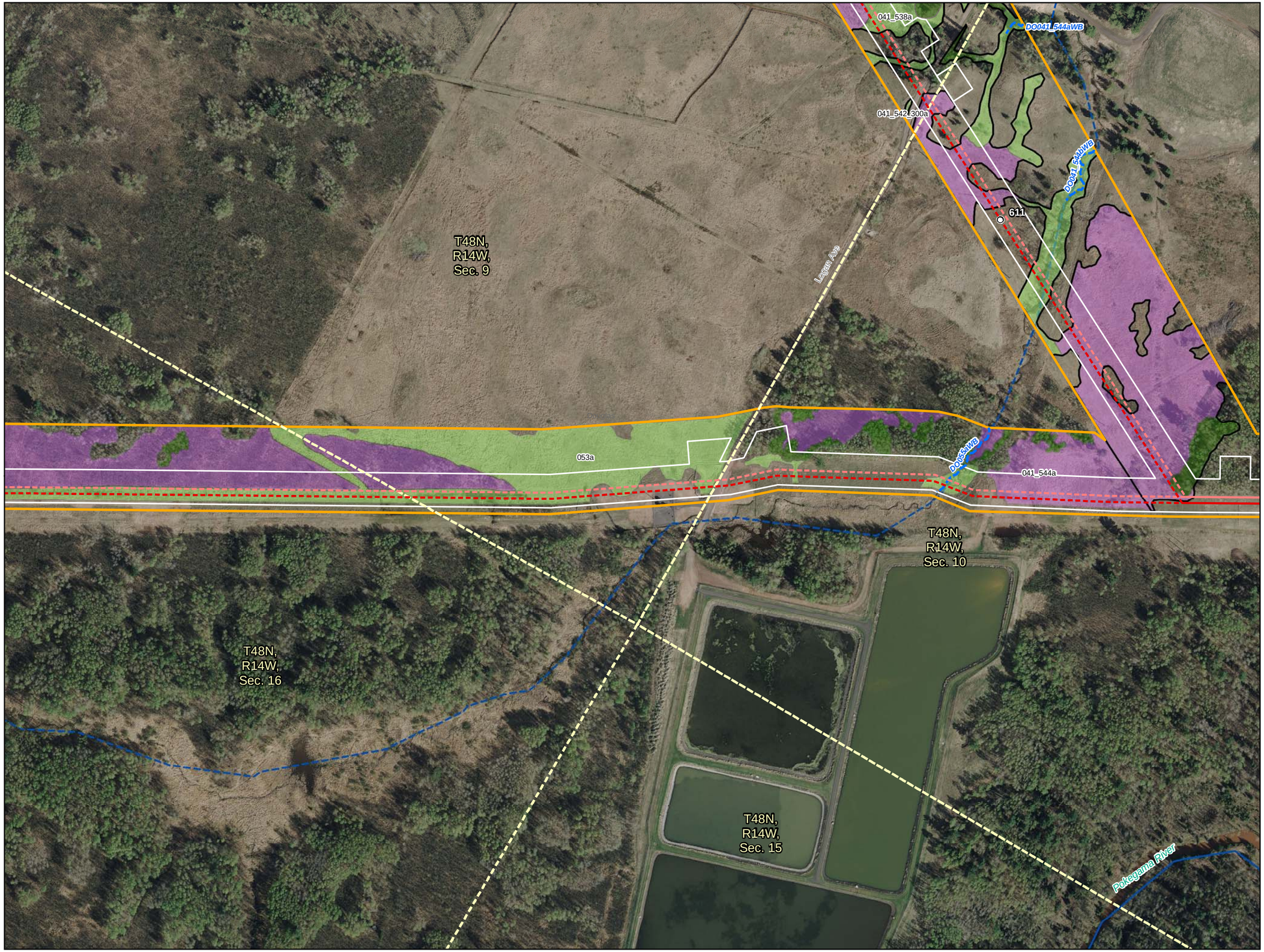

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1 inch = 300 feet

- Milepost
- Sandpiper Centerline
- Sandpiper Alternative
- Line 3 Centerline
- Line 3 Alternative
- Construction Workspace
- Survey Area
- 2013 Field Survey Not Complete
- Field Delineated Waterbody
- Section Boundary

Wetlands

2013 Field Delineated Wetlands, Alberta Clipper Wetlands and WWI

- PEM
- PFO
- PSS
- PUB

National Hydrography Dataset

- Perennial Stream
- Intermittent Stream
- Canal/Ditch
- Waterbody

Appendix A
Exhibit A-25

Detailed Route Map

Sandpiper Pipeline Project and Line 3 Replacement Project

(Field Delineated and WWI Wetlands and Waterbodies)

Douglas County, Wisconsin

ENBRIDGE

2/24/2014

Source: Z:\Clients\E_H\Enbridge\Sandpiper\ArcGIS\2014\02\WI_Permitting\COE_Maps\WI_COE_Wetland_Strip_Maps_Combined.mxd
Date: (2/24/2014)

Appendix B

Environmental Protection Plan

Enbridge (U.S.) Inc.

ENVIRONMENTAL PROTECTION PLAN

October 2013

ENVIRONMENTAL PROTECTION PLAN

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[1] **Site-specific plans supersede any design presented in the typical details.**

INTRODUCTION

This Environmental Protection Plan (EPP) outlines construction-related environmental policies, procedures, and protection measures developed by Enbridge Pipelines (North Dakota) LLC (Enbridge) as a baseline for construction of the Sandpiper Pipeline Project (Sandpiper or Project). 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 (FERC'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 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. Modifications for the construction of dual pipelines are highlighted below in the appropriate sections.

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

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 the 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. 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.

1.0 GENERAL MITIGATION MEASURES

1.1 IDENTIFICATION OF AVOIDANCE AREAS

The EI will post signs for environmental features such as wetlands, waterbodies, drainages/drain tiles, buffer zones, rare plant or ecological community sites, invasive species and noxious weed locations, regulated wildlife habitat, cultural resources, and erosion-prone or steep slopes.

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, fencing requirements, etc.) as agreed upon with landowners provided the conditions conform to the 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;
- extent and depth of 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. 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 best management practices (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 returned 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.

1.5 RIGHT-OF-WAY REQUIREMENTS

All construction equipment and vehicles will be confined to the approved construction ROW and additional temporary workspace. Prior to commencement of clearing operations, the outer limits of the construction ROW and additional temporary workspace 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, 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 ROW is maintained to facilitate access and aerial inspection of the pipeline system.

(b) Temporary Workspace

In addition to the ROW/permanent corridor, construction will require Temporary Workspaces (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) Additional Temporary Workspace

Site-specific additional temporary workspace (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.

In consultation with the applicable agencies, Enbridge will identify plant species that are consider noxious weeds and/or invasive plants that may occur within the counties being crossed by the pipeline corridor (refer to Appendix A).

1.6.1 Prevention and Control Measures

To prevent the introduction of the noxious weeds and invasive species identified into the Project area from other construction sites, construction equipment will be cleaned prior to arriving at the Project site. This cleaning consists of removing visible dirt from the equipment and blowing loose material from equipment using compressed air. Equipment designated for use within waterbodies will be washed and dried prior to use. Purge and clean all pumps before proceeding from one location to the next if designated noxious weeds or invasive species (e.g. zebra mussels, Eurasian milfoil, etc.) are known to be present in the area. The Contractor(s) will keep logs documenting the cleaning history of each piece of equipment and make the logs available to the EI upon request. Contractors may use the equipment cleaning log provided in Appendix A or an equivalent form approved by Enbridge. Equipment found to be in non-compliance with the cleaning requirement will not be allowed on the Project site until it has been adequately cleaned.

Prior to clearing and grading of the construction right-of-way and pending landowner permission, major infestation areas identified during surveys or by Enbridge's EIs may be treated with the recommended herbicides or their equivalents as identified through consultation with local authorities. All proposed herbicides will be reviewed and approved by Enbridge's Environment Department prior to use. Alternatively, full construction ROW topsoil segregation may be implemented for weed control to allow equipment to work through the area after topsoil has been stripped, as long as equipment stays on the subsoil (clearing, grading, and restoration equipment will still be cleaned). The Contractor(s) will obtain necessary permits and/or certifications for the use of the applicable herbicides, is responsible to limit off-ROW overspray, and will comply with state laws regarding the use of those herbicides. Contractor(s) will keep proper documentation of the locations where the herbicides have been used and provide such documentation to Enbridge within 3 days of completing the work. Weed control spraying will be restricted near certified organic farms and prohibited on certified organic farms.

Treatment of known infestation areas will be completed in accordance with applicable chemical contact times (as specified by the manufacturer) in advance of clearing and grading within the construction ROW. Treatment may be restricted in areas that are not readily accessible, such as areas where access is limited by topography or other site conditions such as saturated/inundated soils. In the event that an area is determined to be inaccessible, the EI will be notified and a site-specific alternative treatment method will be developed.

If additional noxious weed infestations are identified subsequent to herbicide applications, mechanical means (scrape down/blow down) may be used to remove weeds from tracked equipment prior to leaving the infested area. High pressure water wash stations may be established in select areas if the above measures do not adequately remove soil and vegetation debris from construction equipment. Enbridge will determine where this practice will be implemented. The Contractor(s) will keep logs documenting the cleaning history of each piece of equipment and make the logs available to the EI or other Enbridge Representative upon request. Any equipment found to be in noncompliance with the cleaning requirement will be removed from the Project site until it has been adequately cleaned.

To prevent the spread of noxious weeds and invasive species during construction, mulch used on the Project will be composed of weed-free material. Certified weed-free mulch may also be required at site-specific locations. The Contractor(s) 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.

1.7 POTHOLING/HYDROVAC SLURRY

Hydrovac excavation is used to positively identify pipelines and other buried utilities. 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.

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.

1.8.2 Disposal of Merchantable Timber

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

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 controls (ECDs) include, but are not limited to, slope breakers, sediment barriers (i.e. 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 Project construction documents and as required by all applicable permits. 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 the 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 the 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).

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.

Slope (%)	Approximate Spacing (ft)
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, rocked 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:

- Modified Ditch-Plus-Spoil Side (refer to Figure 1)

- Full Construction ROW (refer to Figure 2)

- Trench-Line-Only (refer to Figure 3)

A Modified Ditch-Plus-Spoil 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 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, per pipe. This timeframe may be decreased at the discretion of Enbridge based on site conditions. Site-specific activities such as horizontal directional drilling, guided bores, road bores, tie-in points, and valve work may be performed independent of a spread.

1.12 FOAM PILLOW INSTALLATION

Use of foam pillows for pipe protection in the trench will be approved by Enbridge in advance and installed in accordance with applicable Project permits, local/state/federal regulations, and manufacturer's recommendations.

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. Use of foam trench breakers will be approved by Enbridge 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.

- Topsoil cannot be used to construct trench breakers.

- 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 the construction 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 to 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:

Slope (%)	Approximate Spacing (ft)
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

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. If subsequent construction and cleanup activities result in further compaction, additional measures will be undertaken to alleviate the soil compaction.

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 a request to Enbridge for approval of alternative measures that would provide an equal or greater level of protection to 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 wet 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 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 15-foot-wide neck down beginning 50 feet from the ordinary high water mark (OHWM) / ordinary high water level on the working side of the right-of-way. A 25-foot-wide neck down will be implemented on the spoil side of the construction ROW beginning 20 feet from the OHWM/OHWL (refer to Figures 15 through 17).

2.2.1 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 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 (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

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 (timber mats - refer to Figure 19)
- 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 ordinary high water mark (OHWM) of the feature. Local jurisdictions may require stricter guidelines associated with bridge placement. 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

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.

2.5.1 Wet Trench Method

Installation

The wet trench method will be used to cross streams and rivers not permitted to be flumed, dam and pumped, or directionally drilled. The following procedures will be used during wet 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.

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 Dam and Pump Method

Installation

The dam and pump method is a 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. 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, to prevent scouring of the streambed.

- 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 wet 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.

Temporary Stabilization

Restoration of the stream banks and the installation of temporary erosion controls will be similar to that described for the wet 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 Flume Method

Installation

The flume method is a 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. 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. 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 wet 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 Directional Drill and/or Guided Bore Method

Installation

Installing the pipe underneath a stream will involve placing a drill unit on one side of the stream (refer to Figure 18). A small-diameter pilot hole will be drilled under the stream 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. The pipe section will be pulled through the hole by the drilling rig and welded to the adjoining sections of pipe on each side of the river.

Drilling Mud

During drilling operations, drilling mud and slurry will be stored 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/guided bore method normally does not result in the disturbance of the stream banks or riparian vegetation (with exception to extremely limited hand clearing of woody required to facilitate guide wire placement), 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/bored 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 wet 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.

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).

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

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.

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 a 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.

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. 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:

- across the entire construction ROW upslope of the wetland boundary, where necessary, to prevent sediment flow into the wetland;
- along the edge of the construction ROW as necessary to prevent sediment flow into off-ROW wetlands; and

- 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 right-of-way 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 insure 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 3 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 Concrete Coating

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 conducted 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 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 from the crossing.

4.2 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.

4.3 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 situation to ensure that the best management practices 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:

- **Water Discharge Setting** - This includes:
  - 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.
  - Ground Surface - The topography in the area that would influence the surface flow of the discharged water.
  - 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)
  - 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.

- **Pump Intake** - Use floating suction hose or other similar measures to prevent sediment from being sucked from bottom of trench.

- **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.

- **Filtering Mechanism –** All dewatering discharges will be directed through a filtering device as indicated below.
  - 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.
  - 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.

- 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 be used and treated as specified in applicable permits. 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 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, horizontal directional drilling/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 monitoring 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:

- purity;
- germination;
- date tested;
- total weight and PLS weight;
- weed seed content; and
- seed supplier's name and business information.

Seed will be used within 12 months of testing as required by applicable state rules and regulations. The seed tags on the seed sacks will also certify that the seed is "Noxious Weed Free". 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 germination. For example, a seed mix that has a specified 10 pounds PLS per acre, 95 percent germination rate, and is 80 percent pure needs to be applied at the following rate:

(95% germination × 80% purity)/100 = 76% 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.

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. 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.

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 installation of the first pipeline and the second line where two pipelines will be co-constructed and active construction is ongoing;
- 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 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 a standard upland seed mix for restoring disturbed areas affected by the Project (Appendix C, Table 2). The mix includes species that will provide for effective erosion control and revegetation of the Project area. This seed mix will be used by Enbridge as the standard upland mix unless an alternate seed mix is specified by landowners or land managing agencies.

7.7 PERMANENT SEEDING OF WETLAND AREAS

7.7.1 Unsaturated Wetland Areas

Non-standing water wetlands will be seeded with the mix provided in Appendix C, Table 3 to provide temporary cover and allowed to revegetate naturally. The natural revegetation process will be encouraged by the seeds and rhizomes in the topsoil spread back over the right-of-way 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 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 temporary workspace 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 using the Upland seed mix listed in Appendix C, Table 2, 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

The following specialized seed mixes are available upon landowner request on a site-specific basis.

- Residential Areas: This seed mix will be used to reestablish residential lawns or other types of “turf-type” land cover.
- Pasture Areas: This seed mix will be used to reestablish active pastures and hayfields.
- Wildlife Areas: This seed mix will be used to provide a desirable food source for wildlife, specifically deer.
- Native Areas: In consultation with the NRCS, a native seed mix was also developed for restoring areas currently dominated by native plant species. The mix includes naturally

occurring species and provide for effective erosion control and revegetation of the Project area. This seed mix will be used by Enbridge at locations identified as high quality vegetation areas unless an alternate seed mix is specified by landowners or regulatory agencies.

- Roadways: This seed mix will be used to reestablish vegetation within upland areas of roadway easements.

7.10 CONSERVATION RESERVE PROGRAM (CRP) 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, or hydroseeding. 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 7.14.

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 <u>double</u> 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 <u>double</u> 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 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.

7.14 SEEDING PERIODS

These seeding windows have been developed in consultation with the NRCS and local/regional seed suppliers for normal average growing seasons, in conjunction with normal climate and soils conditions for maximum seed germination.

Seeding Periods

Native Mixes	
Spring Permanent Seeding	Fall Dormant Seeding
April 1 to June 15	Soil temperature below 55 degrees Fahrenheit

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.

7.15 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. Other methods of stabilization will be used if temporary seeding is not appropriate due to seasonal conditions (e.g., mulch, erosion control matting).

7.16 EROSION & 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.

7.17 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.

7.18 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.

8.0 WINTER CONSTRUCTION

Frozen conditions can preclude effective topsoil segregation. When soil is frozen to a depth greater than the depth of topsoil, the soil will come off in thick slabs that contain both topsoil and subsoil, and mixing can result. If top soiling will proceed under these conditions, it should be done at the excavation only. A ripper should be used to break up the frozen topsoil over the trench line only. Care should be taken to only rip to the actual depth of topsoil or to a maximum depth of 12 inches, whichever is less. Topsoil in the spoil storage area should be graded smooth to minimize mixing during backfilling. Sufficient time is needed to allow the newly graded topsoil to freeze in place prior to trenching.

Summer construction of large diameter pipelines in saturated/standing water wetlands with unconsolidated soils can be difficult and potentially result in greater wetland disturbance including wider trench widths and extensive rutting/surface disturbance. Constructing across these types of wetlands in the winter can result in fewer impacts. Heavy construction equipment use and travel along the construction ROW, which may not be possible in summer conditions due to saturated, unstable soil conditions, can be accomplished in the winter by establishing temporary winter frost/ice roads. These frost/ice roads protect underlying vegetation and upper layers of wetland surfaces from disturbance potentially created during summer construction.

The area of open excavation will be minimized during winter construction to reduce amount of frozen backfill, and facilitate restoration to pre-construction contours. If winter conditions preclude final grading and cleanup, the Contractor will stabilize the area and temporary erosion control measures will remain in place until permanent erosion control measures are installed. Depending on site and weather conditions, Enbridge may require the Contractor to install dormant seeding, mulching, and/or installation of erosion control blanket on stream banks or other sensitive locations.

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, etc.), 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 (NFPA, UFC, etc.).
- 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.
- 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 (to 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 sorbent 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 methods known as the horizontal directional drilling (HDD) and guided/road bore methods. Throughout this section, both methods are referred to collectively as "drilling". While the HDD method always includes the use of drilling fluid, the guided or road bore method might use drilling fluid or only use water to power and lubricate the bore. 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 non-hazardous additives will be used and a Material Safety Data Sheet (MSDS) for the drilling fluid will be maintained on-site.

This section elaborates on measures to be implemented by the Contractor 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 in 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/bore.

11.1 ON-SITE OBSERVATION DURING CONSTRUCTION

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.

- 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 realizes a sustained loss in fluid pressure or loss of circulation:
  - 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.

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 or road 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:

- straw bales and staking
- pre-filled sandbags
- turbidity curtain (not necessary for guided or road bores that do not involve a waterbody)
- silt fence
- plastic sheeting and/or geotextile fabric
- shovels, brooms, buckets, and other appropriate hand tools
- pumps and sufficient hose
- fluid storage tanks (may not be necessary for guided or road bores)
- vacuum truck on 24-hour call
- one small boat (for larger rivers and open water wetlands)
- light plant/generator (only necessary where operations are conducted outside of daylight hours)

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.

11.3.1 Upland Locations

Response measures include:

- 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.
- The EI will inform the Contractor to initiate immediate suspension of drilling operations if the fluid release cannot be effectively contained.

11.3.2 Wetland and Waterbody 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, waterbodies, or adjacent areas:
    - The EI will evaluate the release, and the Contractor will implement appropriate containment measures.

  - The EI and the Contractor will evaluate the recovery measures to determine the most effective collection method.
  - Enbridge Engineering and the Contractor will review and adjust drill pressures, pump volume rates, and drill profile to minimize the extent of the release.
  - Enbridge will suspend drilling operations if containment measures do not effectively control the release.

- 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 excavated to collect released drilling fluid for removal by the use of portable pumps and hoses.
- 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, it 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.

11.4 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.

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/boring 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:

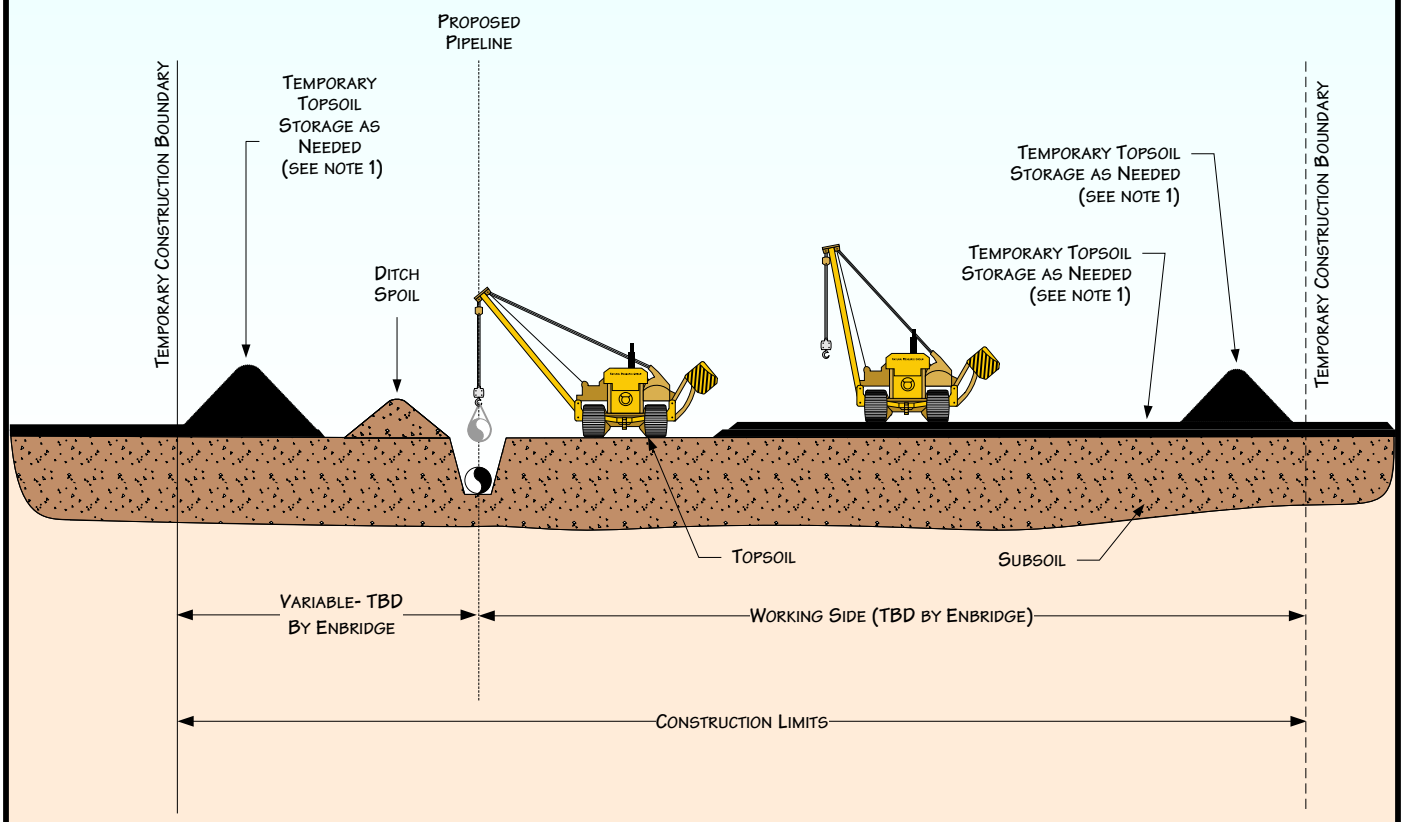
- Drilling fluid will be cleaned up by hand using hand shovels, buckets and soft-bristled brooms as possible without causing extensive ancillary damage to existing vegetation. Clean water washes may also be employed if deemed beneficial and feasible.
- Containment structures will be pumped out and the 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



PROFILE

NOTES:

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

Environmental Protection Plan

ENBRIDGE

Figure 1

Environmental Protection Plan

Typical Topsoil Segregation – Modified Ditch Plus Spoil Side

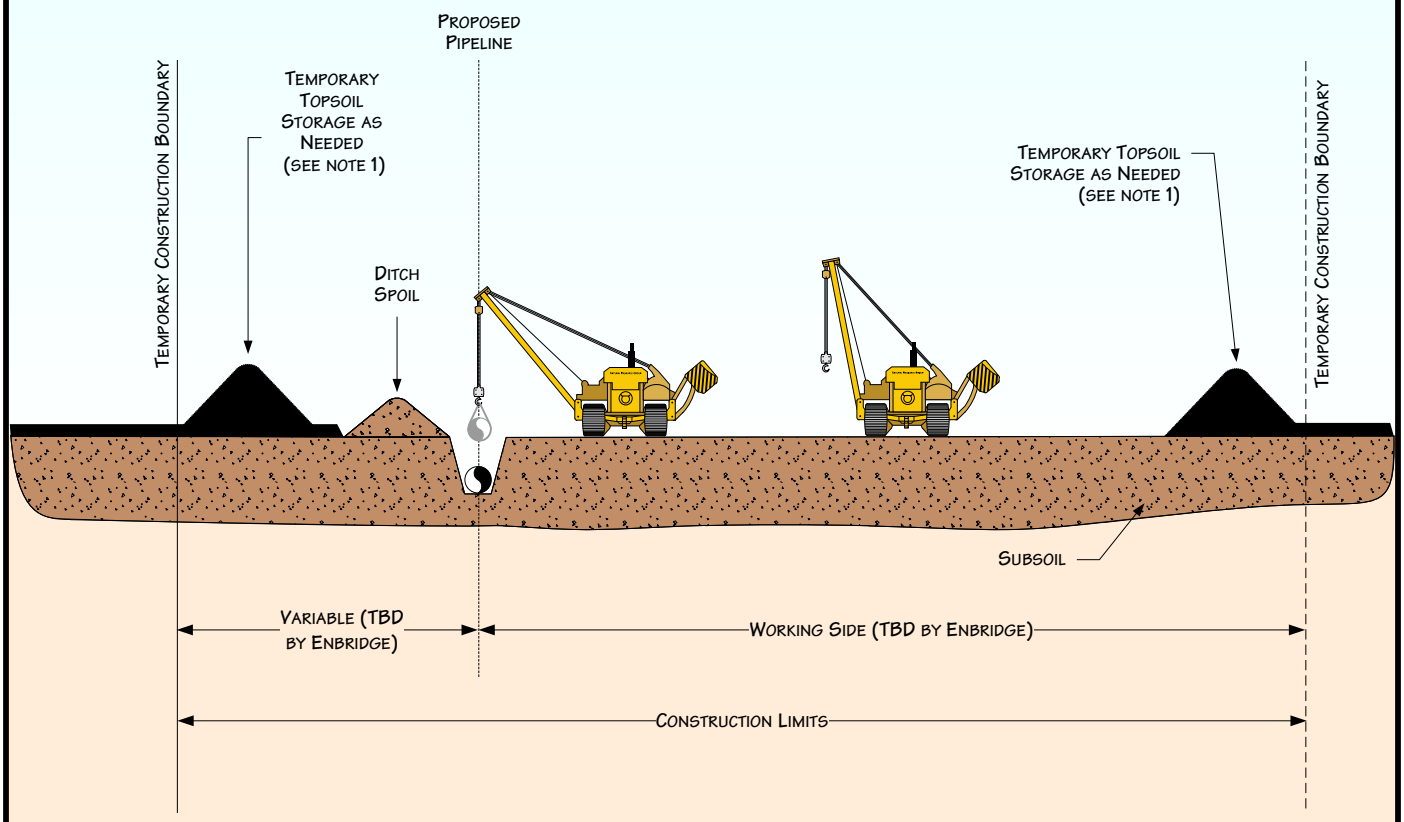
DATE: 7/9/2001

REVISED: 3/11/2011

SCALE: NTS

DRAWN BY: JPBOENTJE

K:_CLIENT_PROJECTS\D-F\EEL\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.

ENBRIDGE

Figure 2

Environmental Protection Plan

Typical Topsoil Segregation - Full Right-of-Way

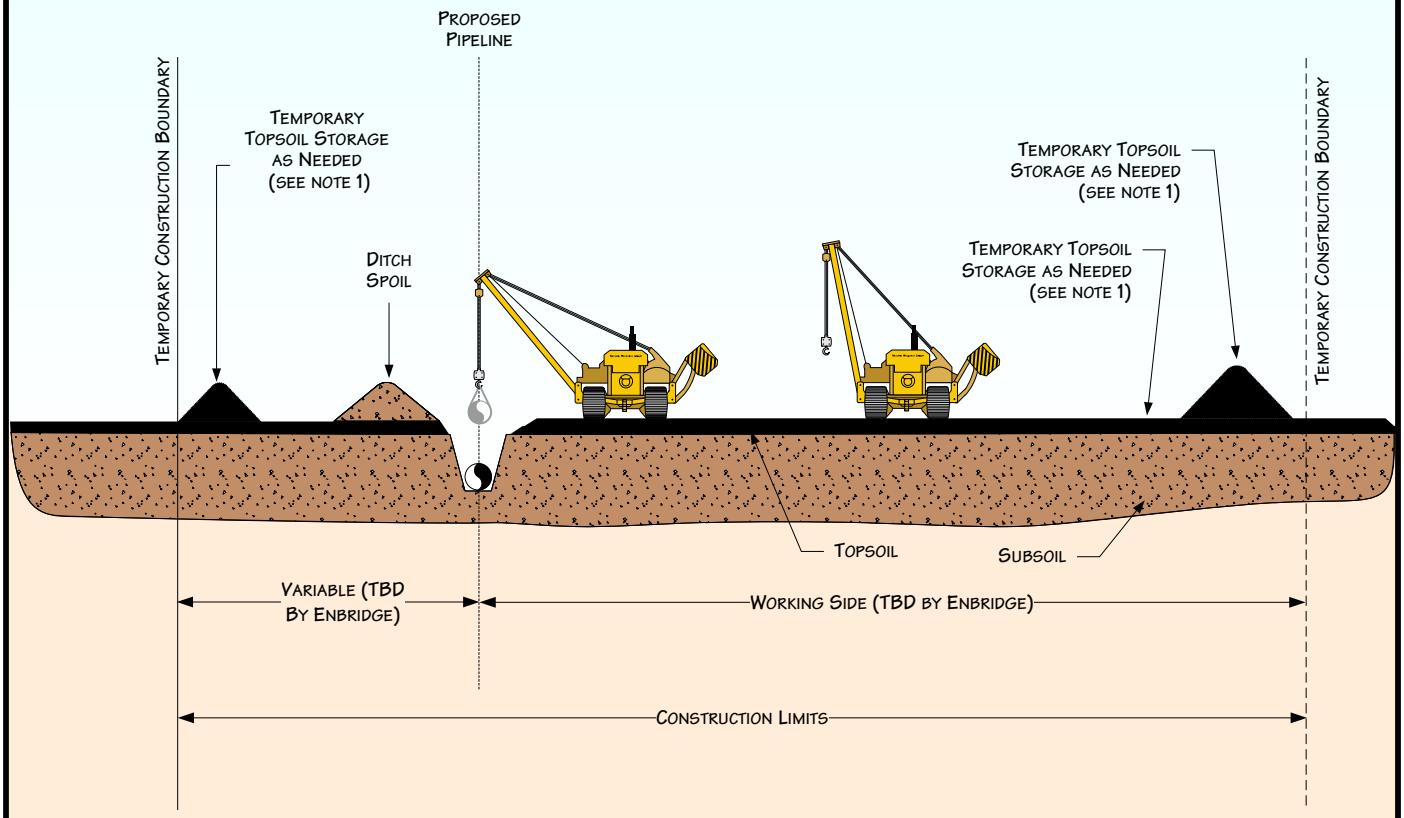
DATE: 7/9/2001

REVISED: 3/11/2011

SCALE: NTS

DRAWN BY: JPBOENTJE

K:_CLIENT_PROJECTS\D-F\EEL\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.

ENBRIDGE

Figure 3

Environmental Protection Plan

Typical Topsoil Segregation – Trench Line Only

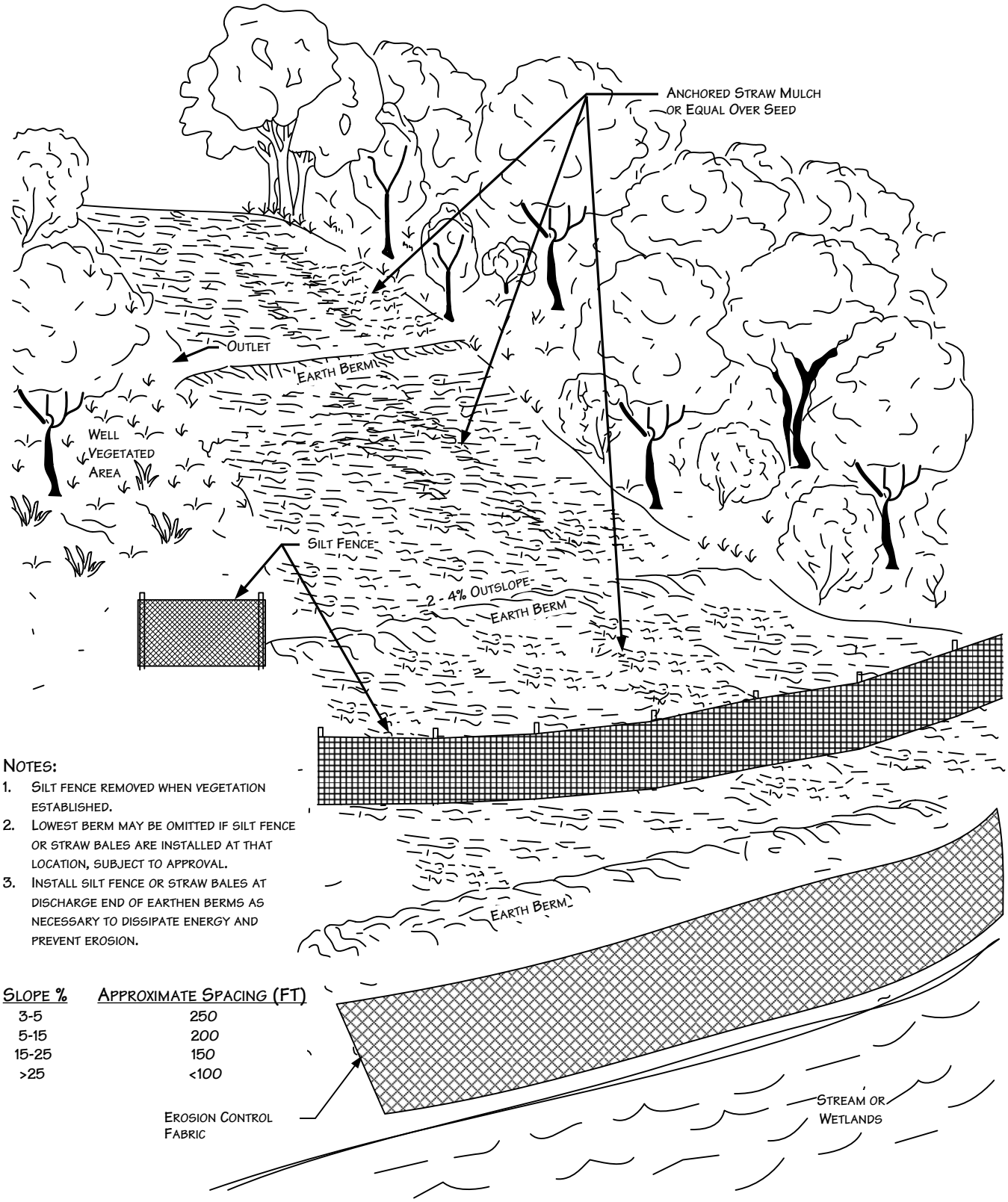
DATE: 7/9/2001

REVISED: 3/11/2011

SCALE: NTS

DRAWN BY: JPBOENTJE

K:_CLIENT_PROJECTS\D-F\EEL\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

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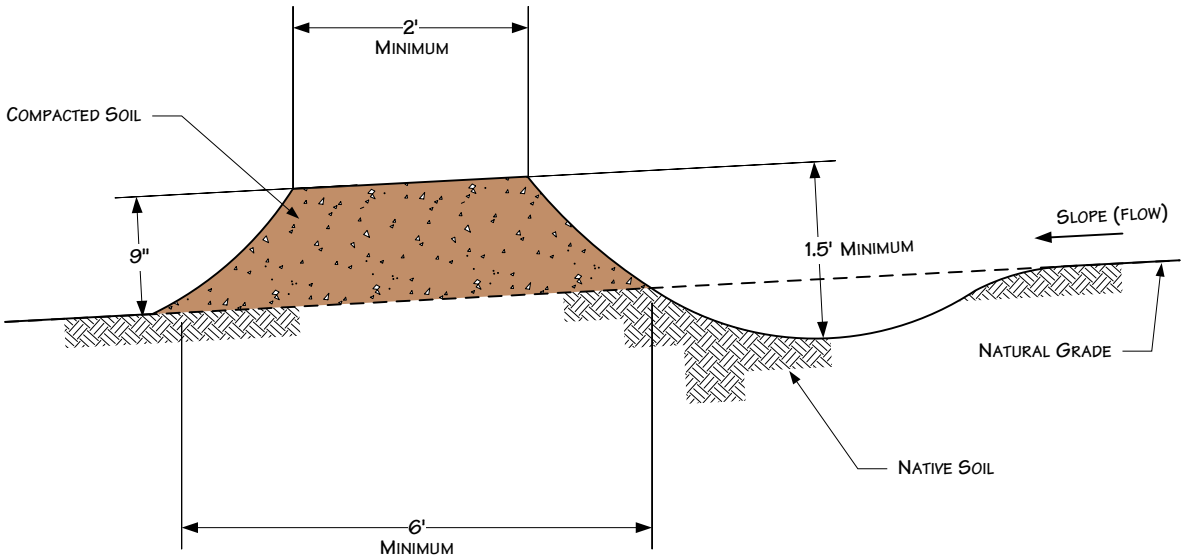
Figure 4

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\D-F\EEL\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.

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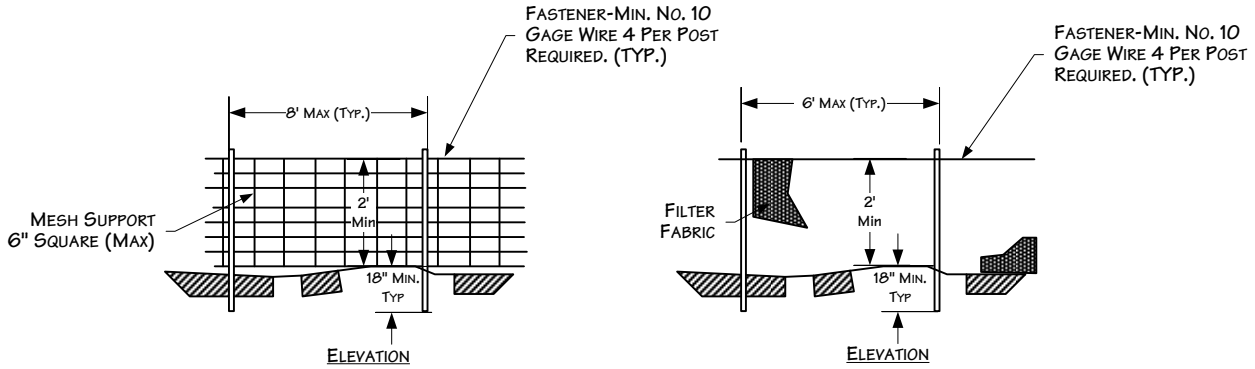
Figure 5

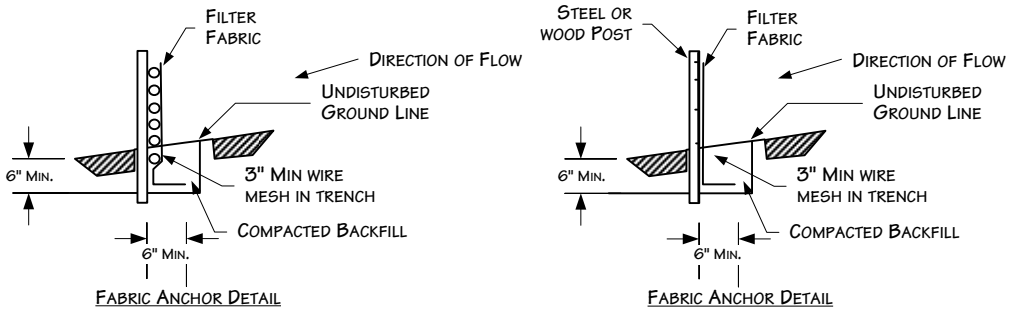
Environmental Protection Plan

Typical Temporary or Permanent Berms
Elevation View

DATE:	5/25/2001
REVISED:	3/11/2011
SCALE:	NTS
DRAWN BY:	KMKENDALL

K:_CLIENT_PROJECTS\D-F\EEL\2011-019\FIG_5_BERMS_ELEVATION_VIEW.VSD

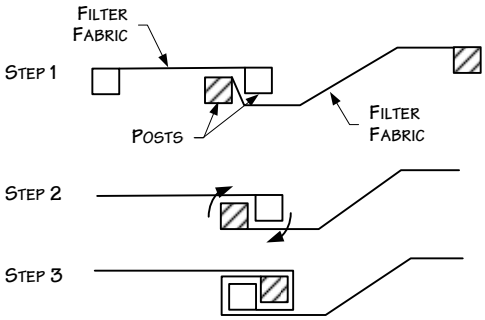




Silt Fence with wire support Plan

Silt Fence Plan
NTS

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.

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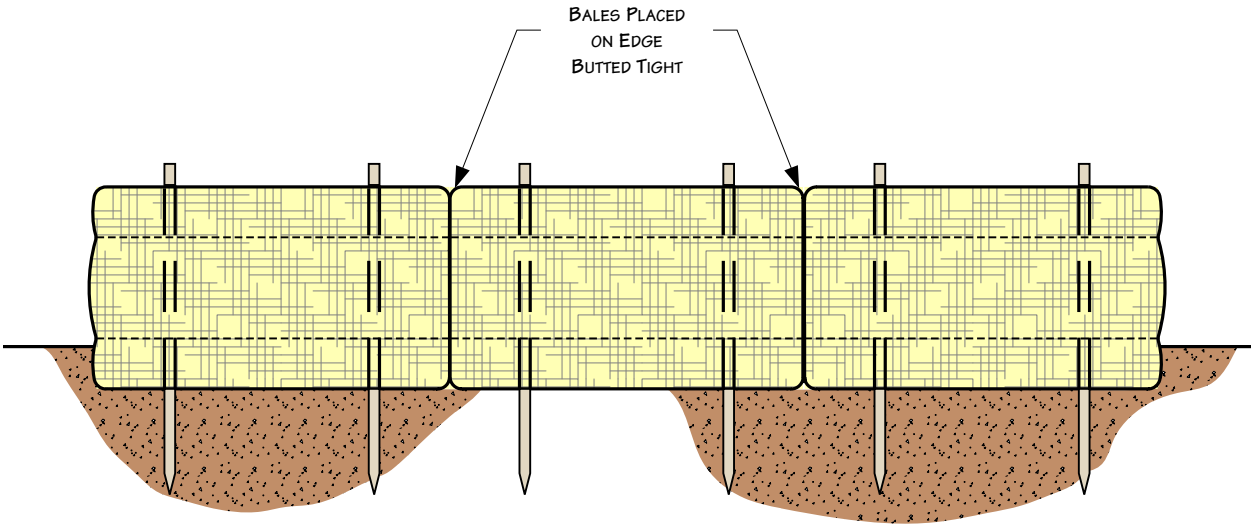
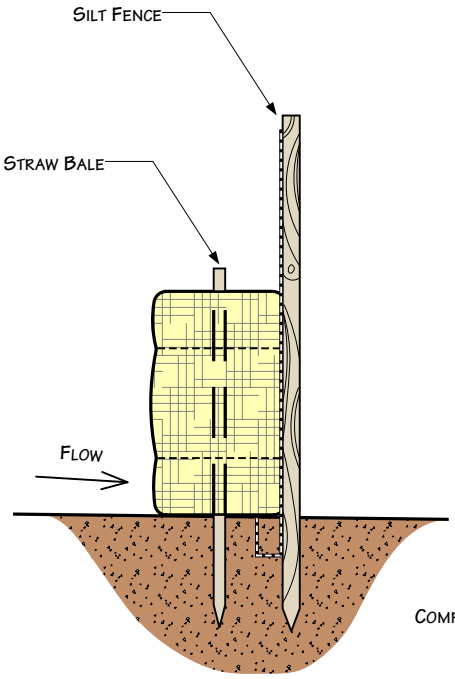
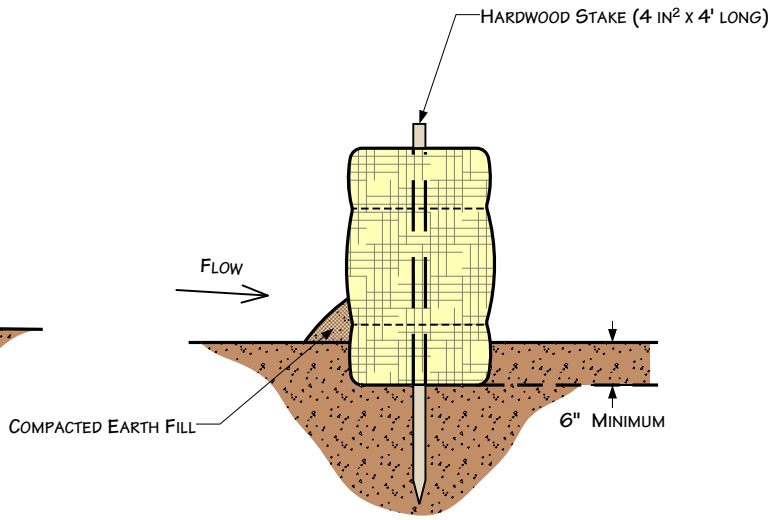
Figure 6
Environmental Protection Plan
Typical Silt Fence Installation

DATE: 5/25/2001
REVISED: 3/23/2011
SCALE: NTS
DRAWN BY: KMKENDALL
K:_CLIENT_PROJECTS\D-F\EEL\2011-019\FIG_6_SILT_FENCE_INSTALL.VSD





Straw Bales & Silt Fence



Straw Bales Only

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Figure 7
Environmental Protection Plan
Typical Straw Bale Installation

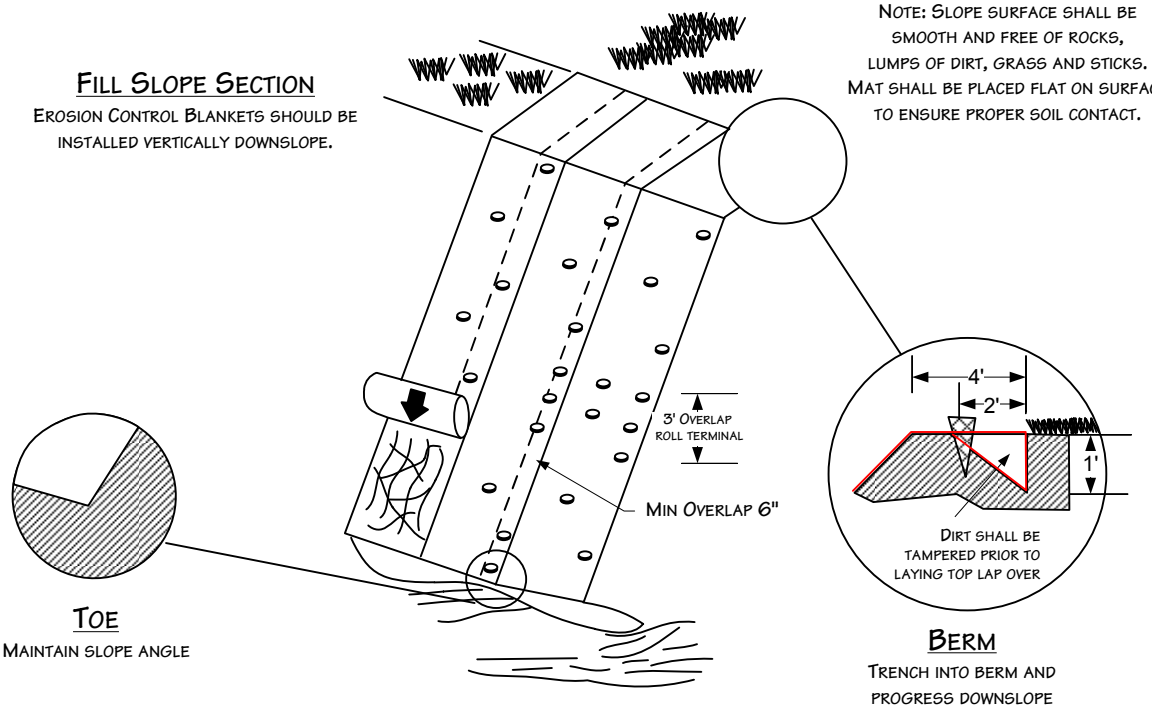
DATE:	5/25/01
REVISED:	3/11/11
SCALE:	Not to Scale
DRAWN BY:	KMKENDALL

K:\ CLIENT_PROJECTS\D-F\EEL\2011-019\ FIG_7_STRAW_BALE_INSTALL.VSD

Fill Slope Section

Erosion Control Blankets should be installed vertically downslope.

Note: Slope surface shall be smooth and free of rocks, lumps of dirt, grass and sticks. Mat shall be placed flat on surface to ensure proper soil contact.



Toe

Maintain slope angle

Berm

Trench into berm and progress downslope

Stream Channel

Erosion Control Blankets should be installed Horizontally with Stream Flow.

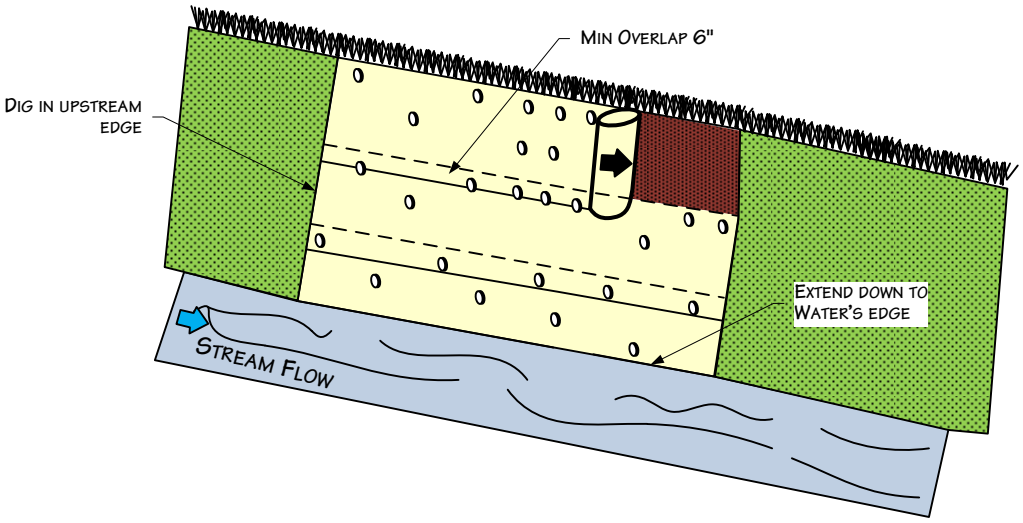


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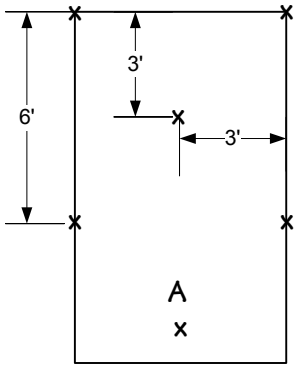
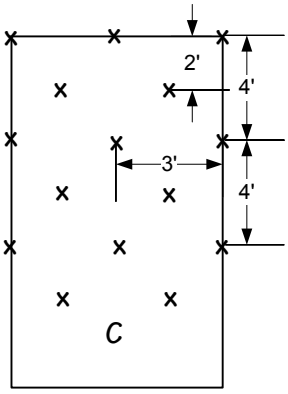
Figure 8
Environmental Protection Plan
Typical Erosion Control Blanket Installation

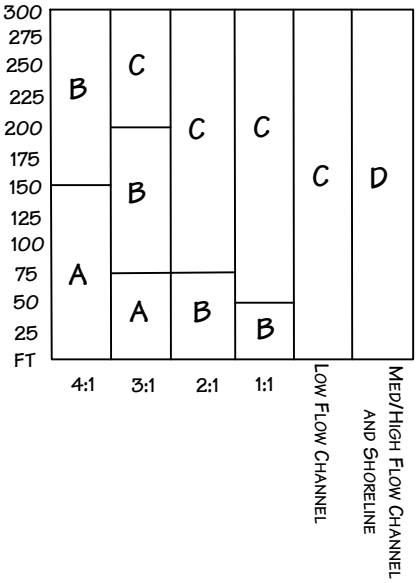
DATE: 5/25/2001
REVISED: 3/23/2011
SCALE: NTS
DRAWN BY: KMKENDALL
K:_CLIENT_PROJECTS\D-F\EEL\2011-019\FIG_8_EROSION_CONTROL_BLANKET_INSTALL.VSD

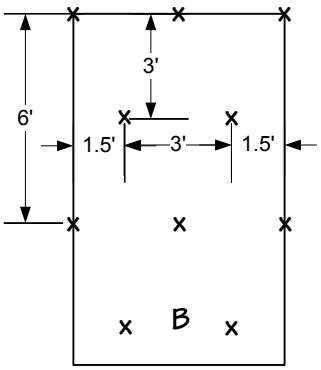


1 Staple Per Sq. Yd



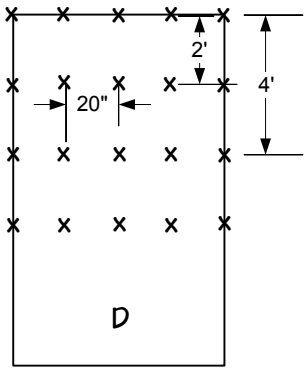
2 Staples Per Sq. Yd





1 ½ 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.



3 1/2 Staples Per Sq. Yd

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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\D-F\EEL\2011-019\FIG_9_STAPLE_PATTERN_EROSION_CONTROL_FABRIC.VSD

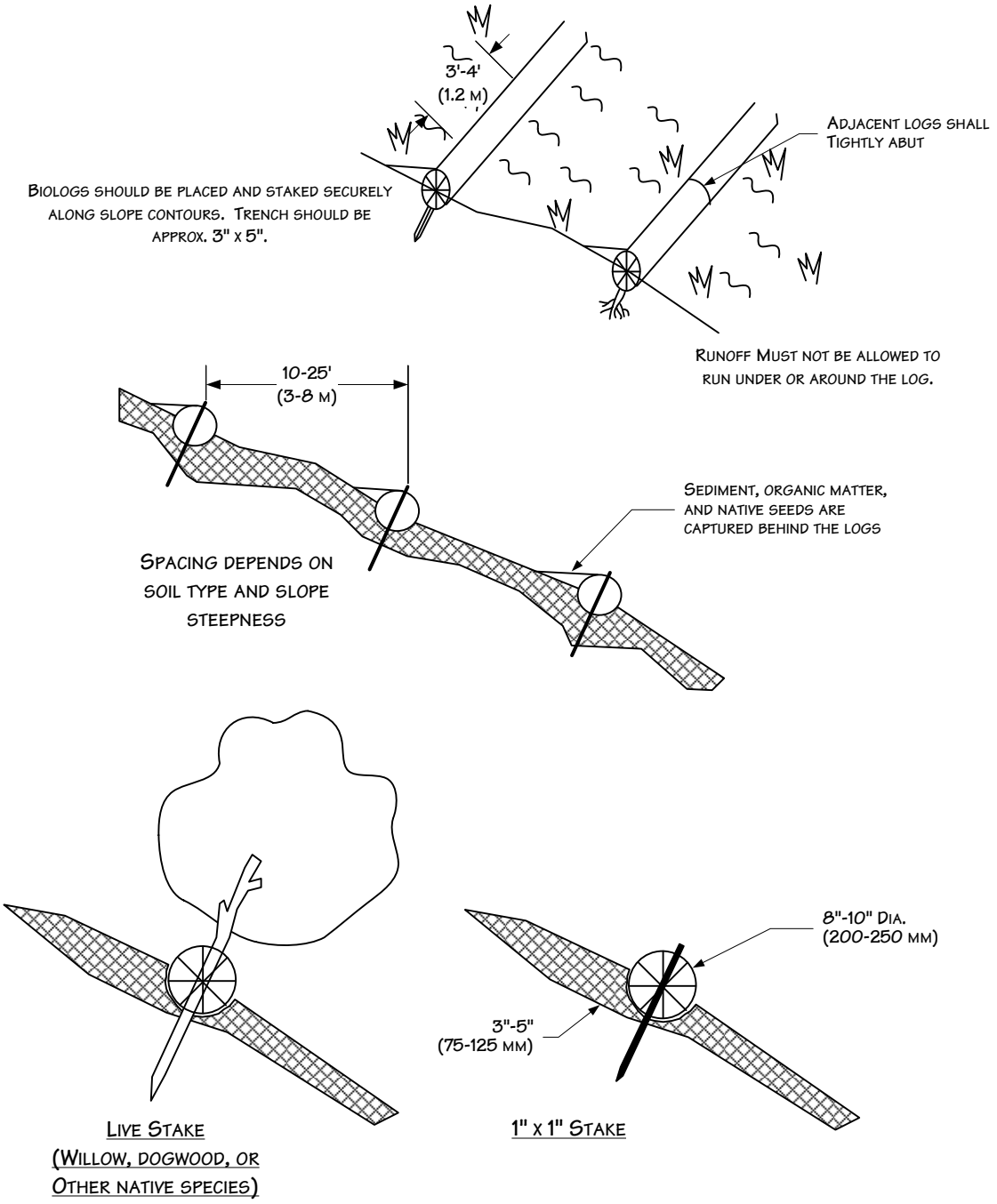

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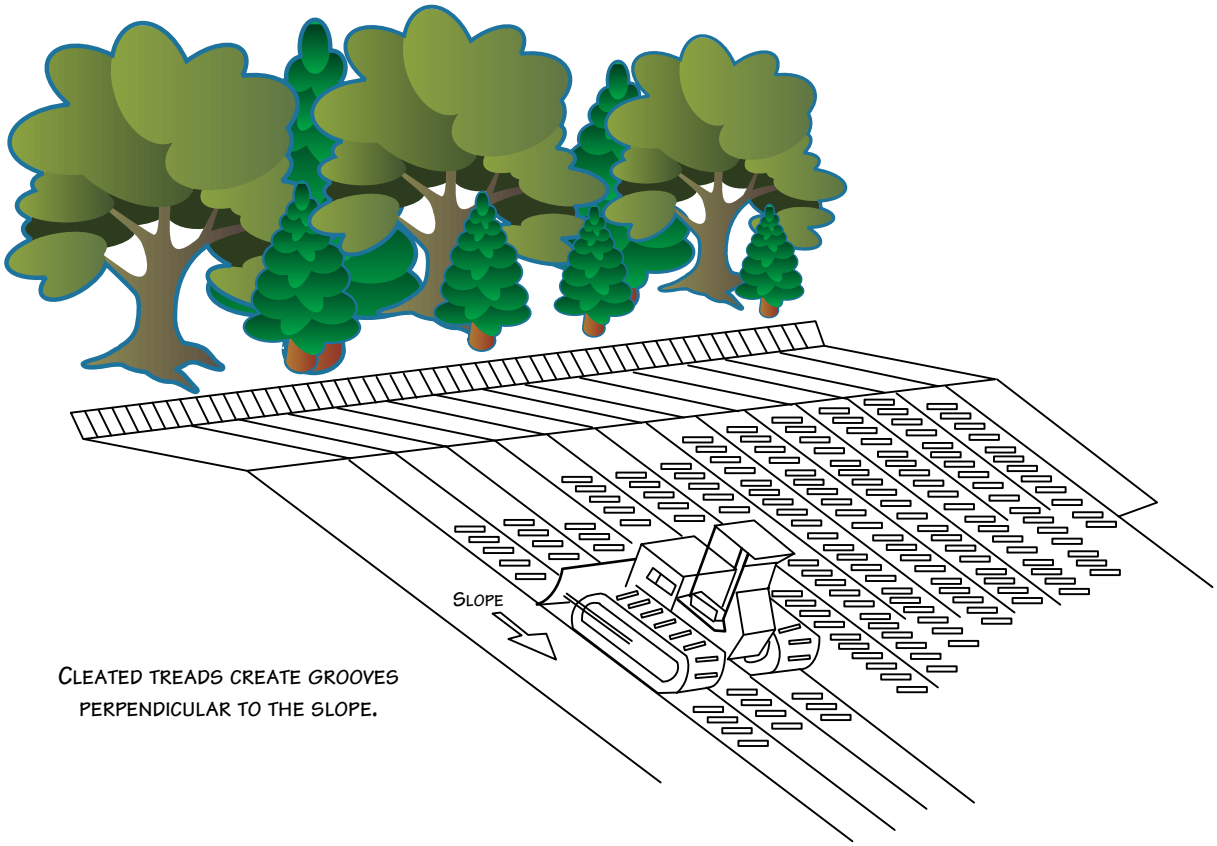
Figure 10
Environmental Protection Plan
Typical Biolog Installation

DATE: 5/25/2001
REVISED: 3/24/2011
SCALE: NTS
DRAWN BY: KMKENDALL
K:_CLIENT_PROJECTS\D-F\EEL\2011-019\FIG_10_BIOLOG INSTALL.VSD



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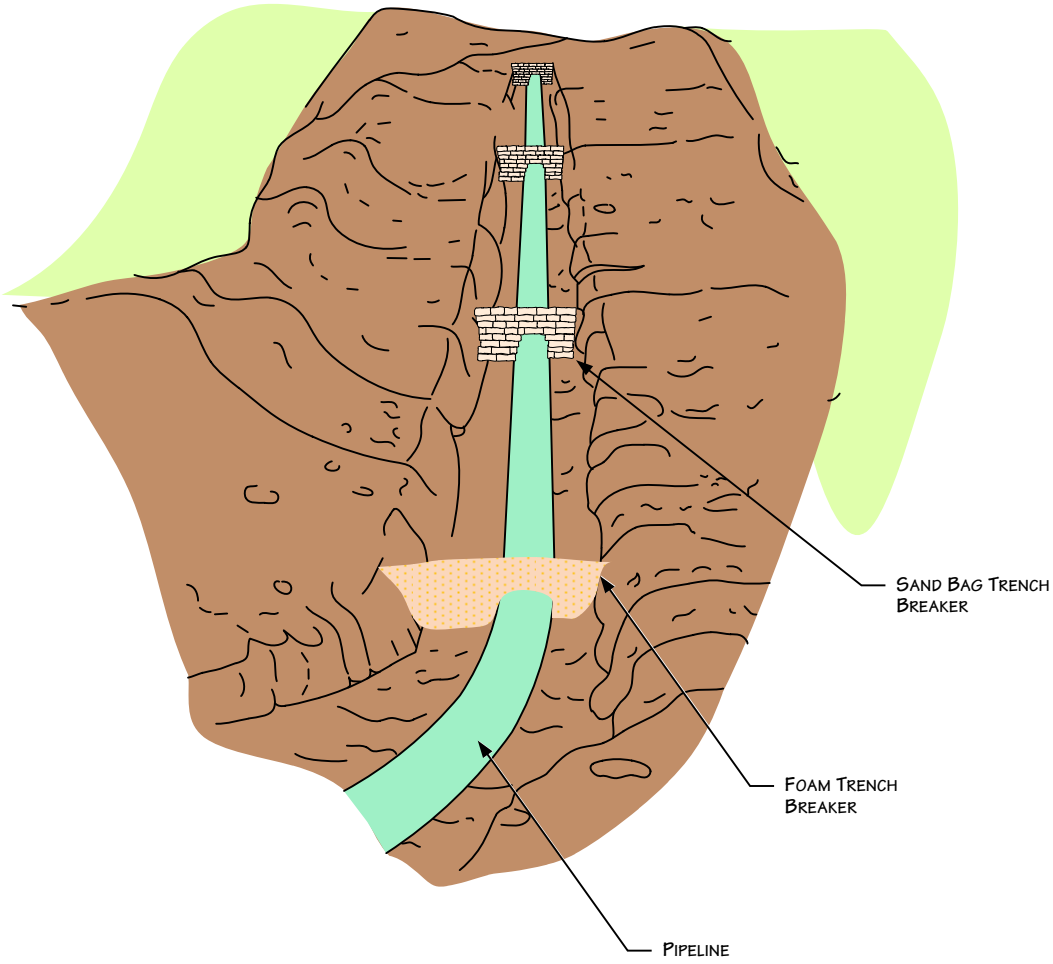
ENBRIDGE

Figure 11
Environmental Protection Plan
Typical Cat Tracking

DATE: 5/25/2001
REVISED: 3/24/2011
SCALE: NTS
DRAWN BY: KMKENDALL
K:_CLIENT_PROJECTS\D-F\EEL\2011-019\FIG_11_CAT_TRACKING.VSD



Notes

1. Bags will not be filled with topsoil.
2. Additional information included on other drawings.

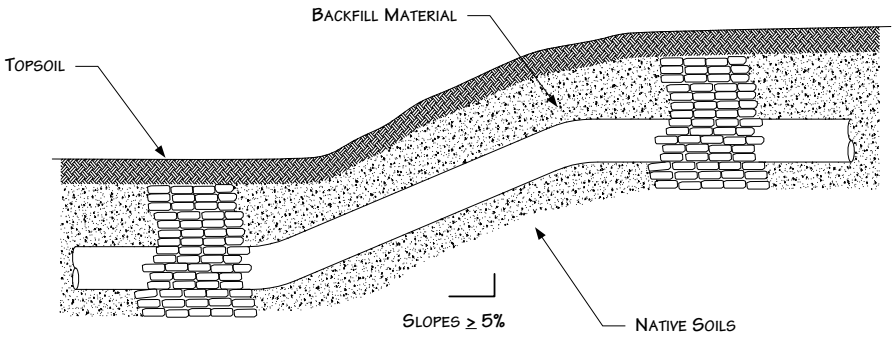
For environmental review purposes only.

ENBRIDGE

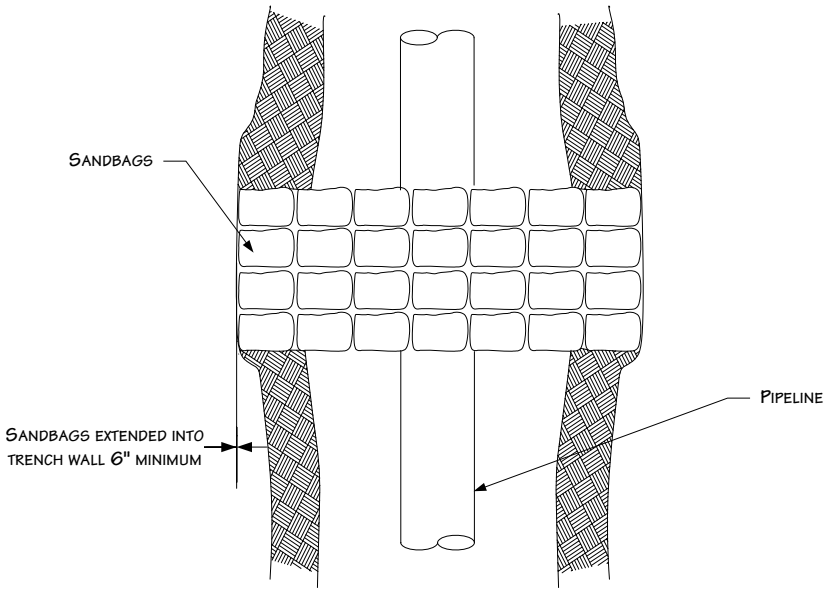
Figure 12
Environmental Protection Plan
Typical Trench Breakers - Perspective View

DATE:	5/25/2001
REVISED:	3/11/11
SCALE:	NTS
DRAWN BY:	KMKENDALL

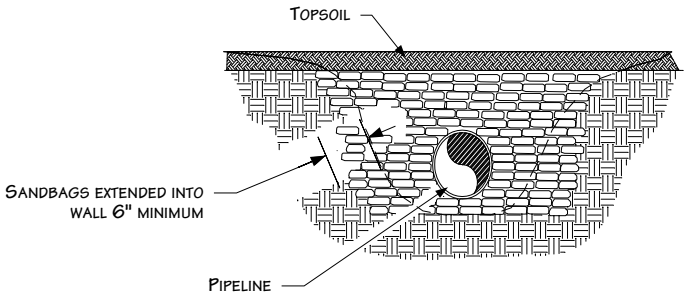
K:_CLIENT_PROJECTS\D-F\EEL\2011-019\FIG_12_TRENCH_BREAKER_PERSPECTIVE_VIEW.VSD



Profile View
(Not to Scale)



Plan View
(Not to Scale)



Face View
(Not to Scale)

Notes

1. Bags will not be filled with topsoil
2. Additional information included on other drawings

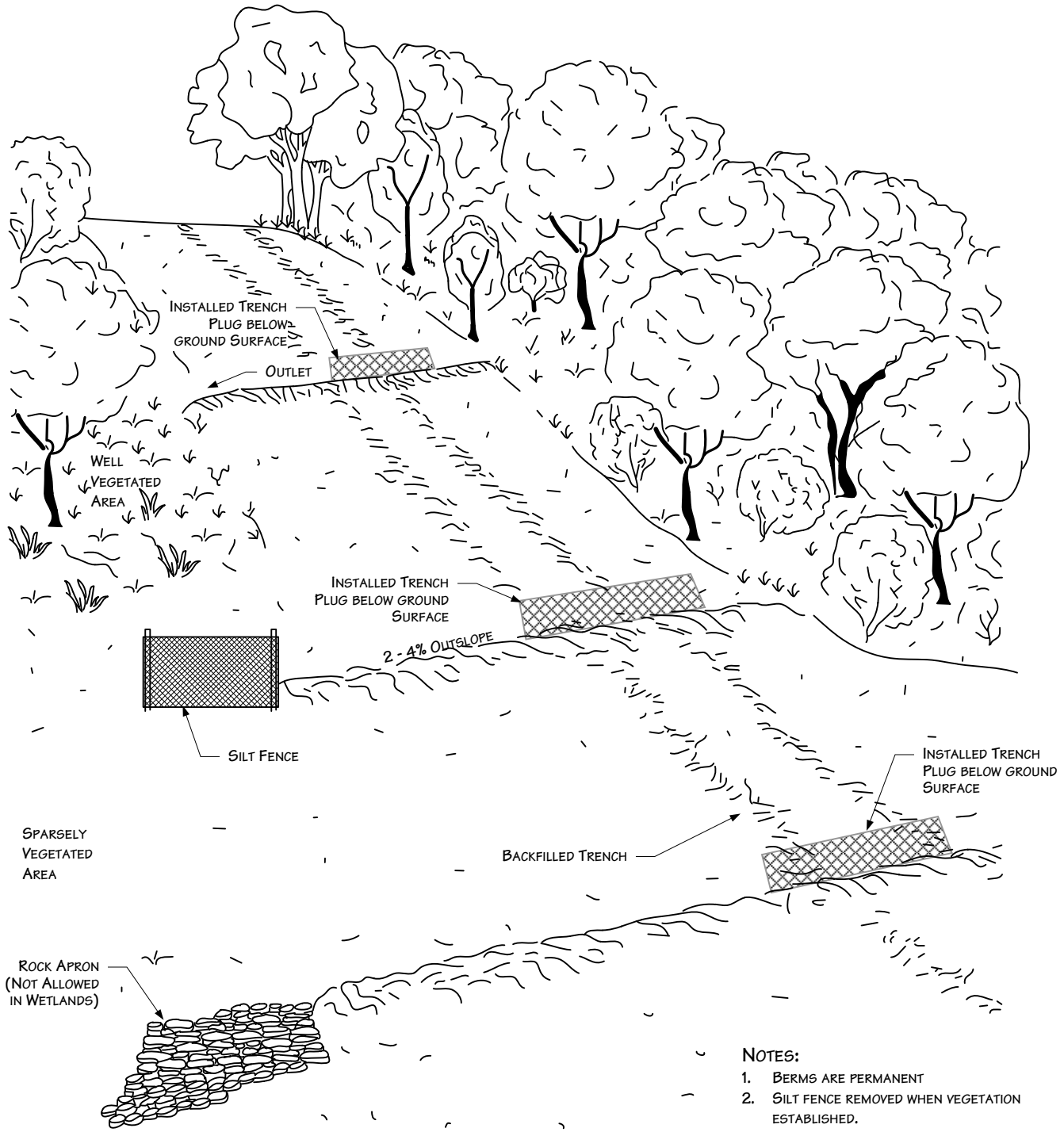
For environmental review purposes only.

ENBRIDGE

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\D-F\EEL\2011-019\FIG_13_TRENCH_BREAKER_PLAN_PROFILE_VIEW.VSD

NATURAL RESOURCE GROUP



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.

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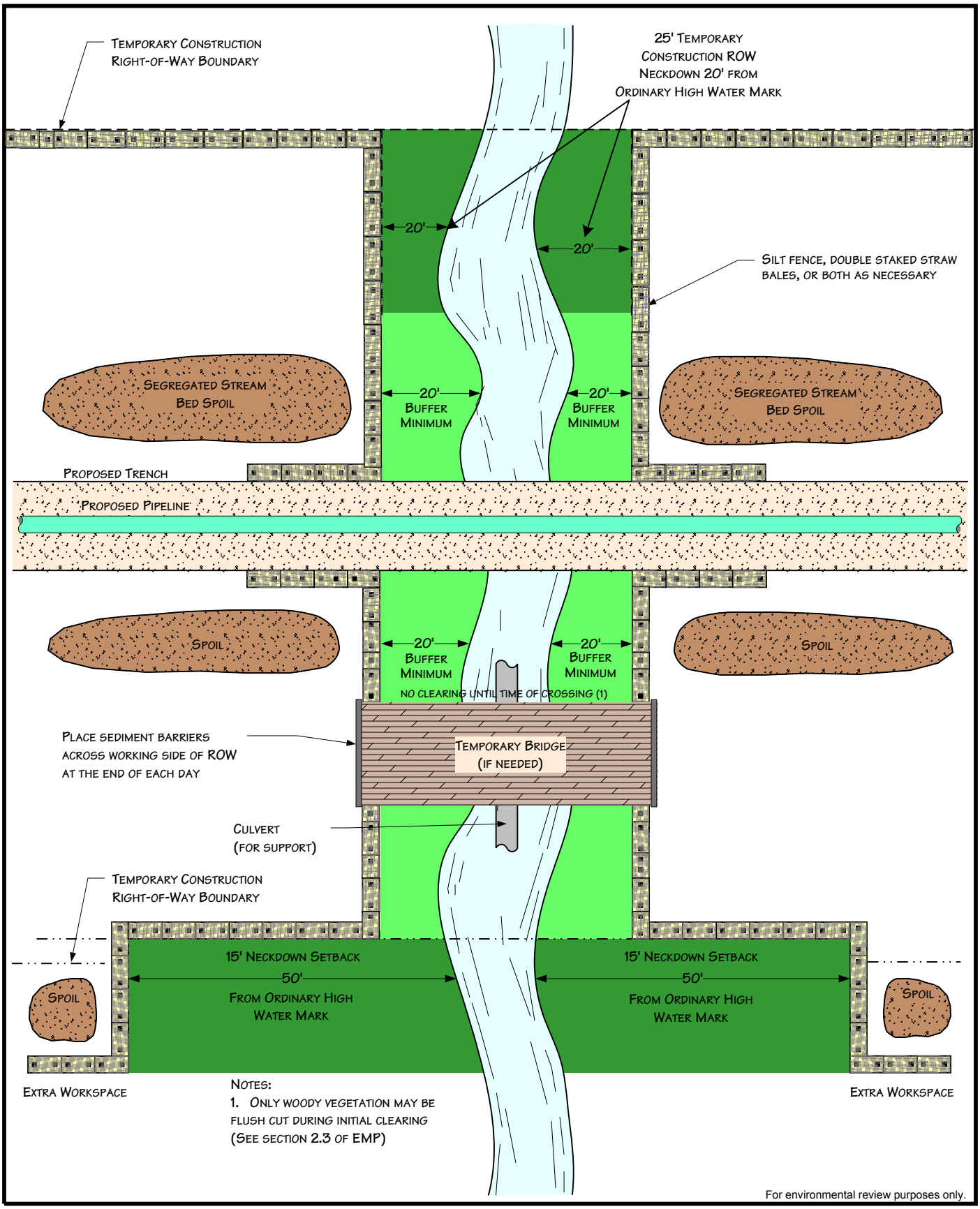
ENBRIDGE

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\D-F\EEL\2011-019\FIG_14_SLOPE_BREAKERS_PERSPECTIVE_VIEW.VSD

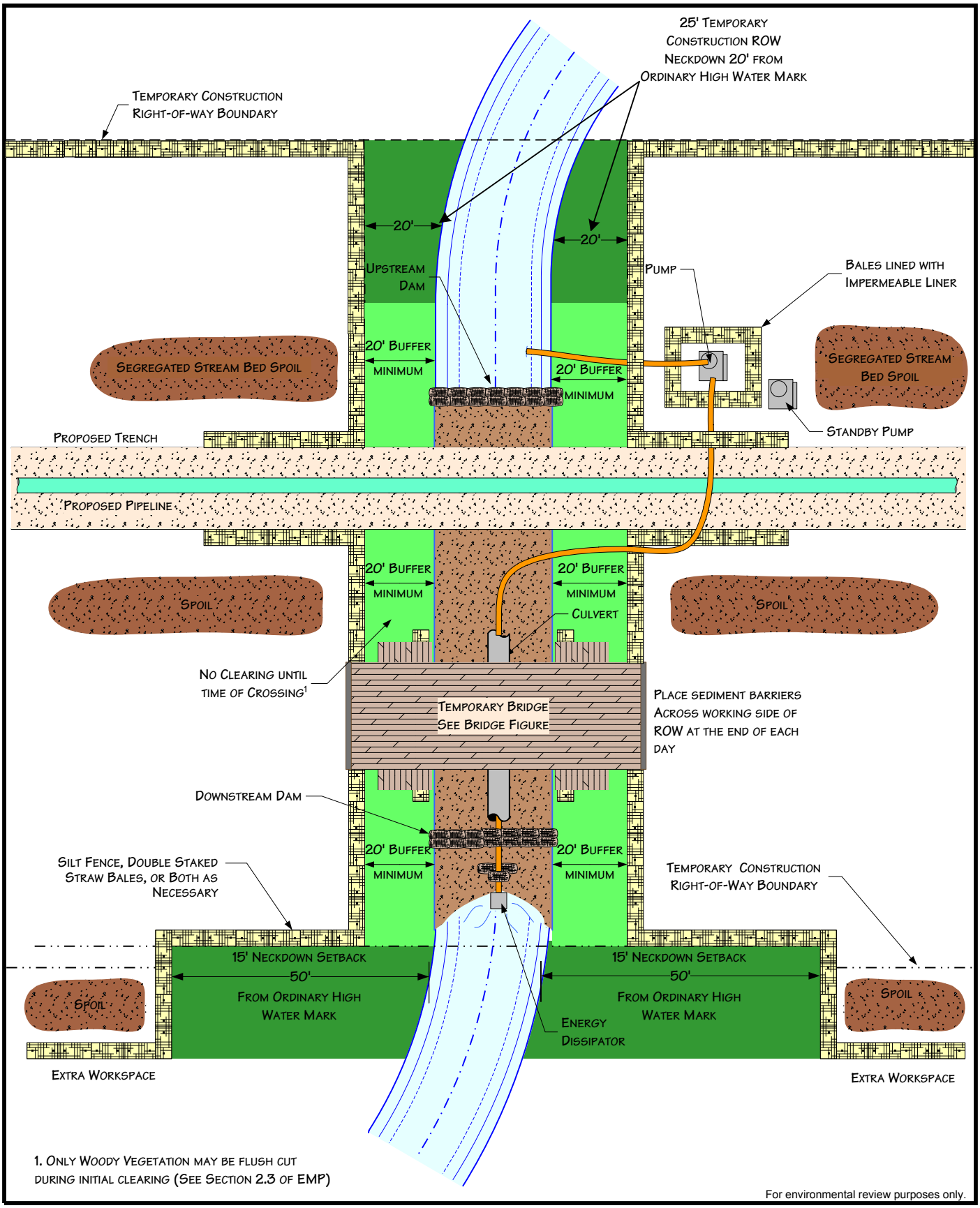


ENBRIDGE

Figure 15
Environmental Protection Plan
Typical Waterbody Crossing
Open Cut - Wet Trench Method

DATE: 11/29/2005
REVISED: 3/11/11
SCALE: NTS
DRAWN BY: JPB

K:\ CLIENT_PROJECTS\D-F\EEL\2011-019\ FIG_15_WATERBODY_OPENCUT_WETTRENCH.VSD



1. Only woody vegetation may be flush cut during initial clearing (See Section 2.3 of EMP)

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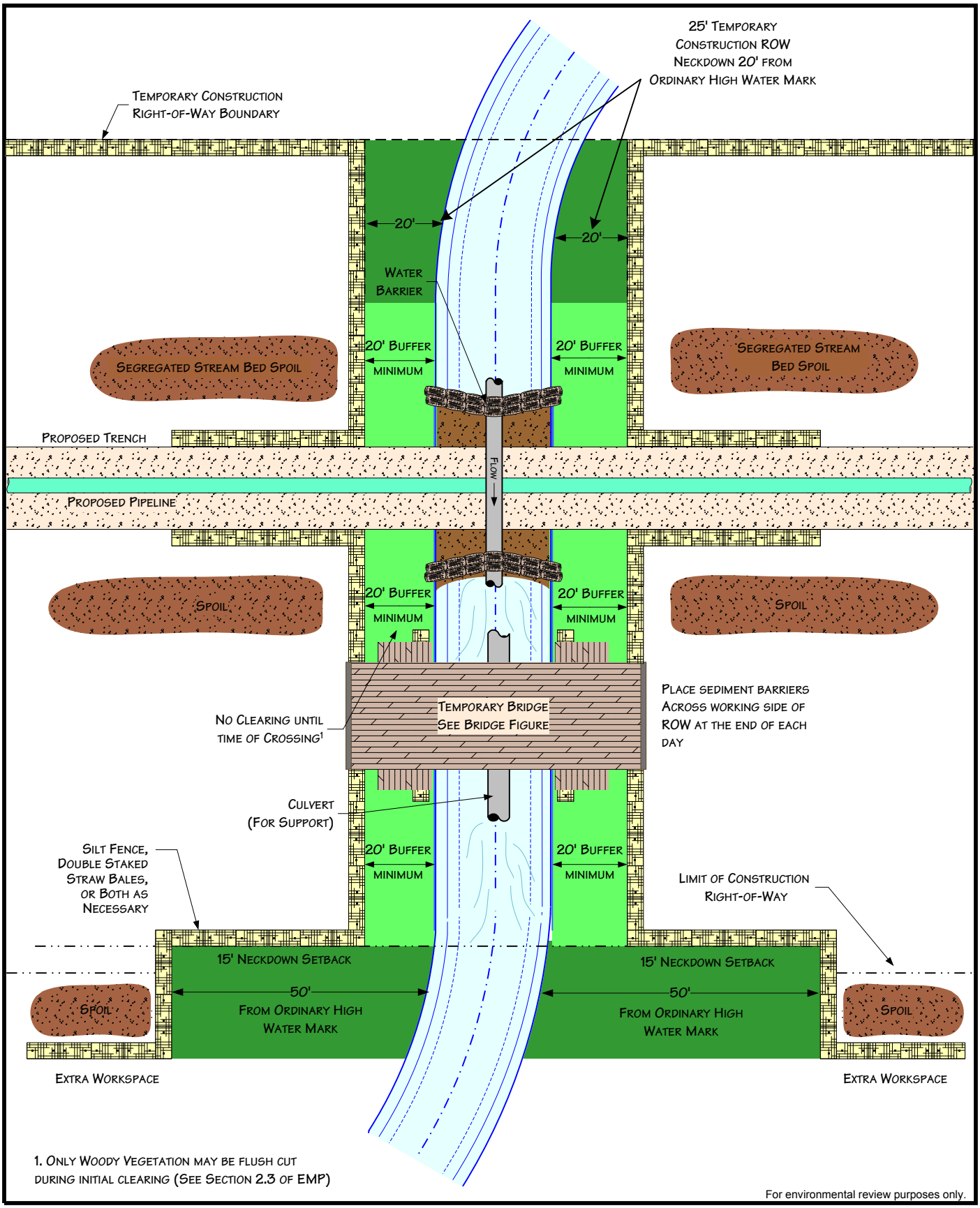
ENBRIDGE

Figure 16
Environmental Protection Plan
Typical Waterbody Crossing
Dam and Pump Method

DATE: 11/29/2005
REVISED: 4/20/09
SCALE: NTS
DRAWN BY: JPB

K:_CLIENT_PROJECTS\D-F\EEL\2011-019\FIG_16_WATERBODY_DAM_AND_PUMP.VSD



1. Only Woody Vegetation may be flush cut during initial clearing (See Section 2.3 of EMP)

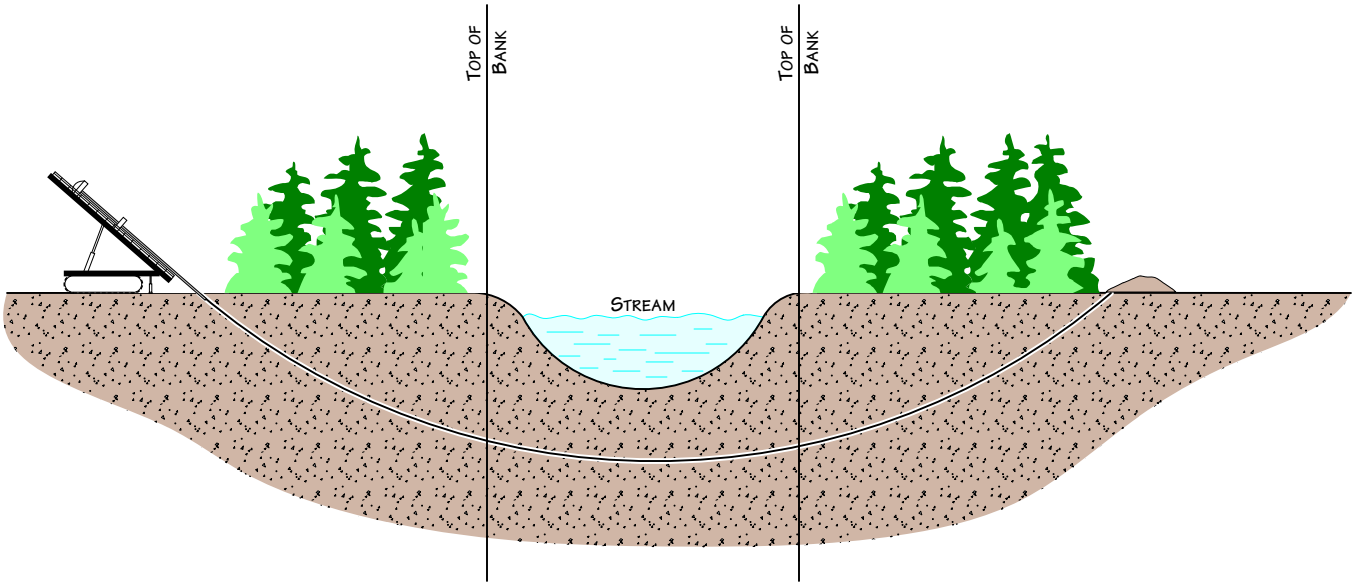
For environmental review purposes only.

ENBRIDGE

Figure 17
Environmental Protection Plan
Typical Waterbody Crossing
Flume Method

DATE: 11/29/2005
REVISED: 3/11/11
SCALE: NTS
DRAWN BY: JPB

K:_CLIENT_PROJECTS\D-F\EEL\2011-019\FIG_17_WATERBODY_FLUME.VSD



For environmental review purposes only.

ENBRIDGE

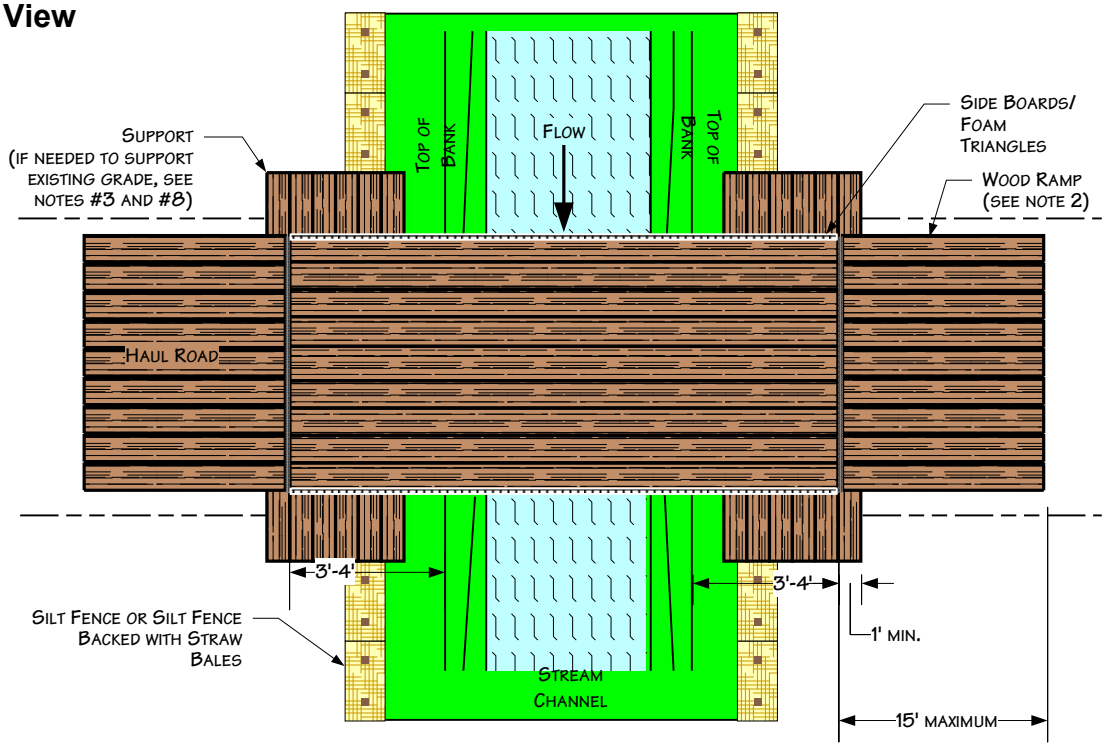
Figure 18

Environmental Protection Plan

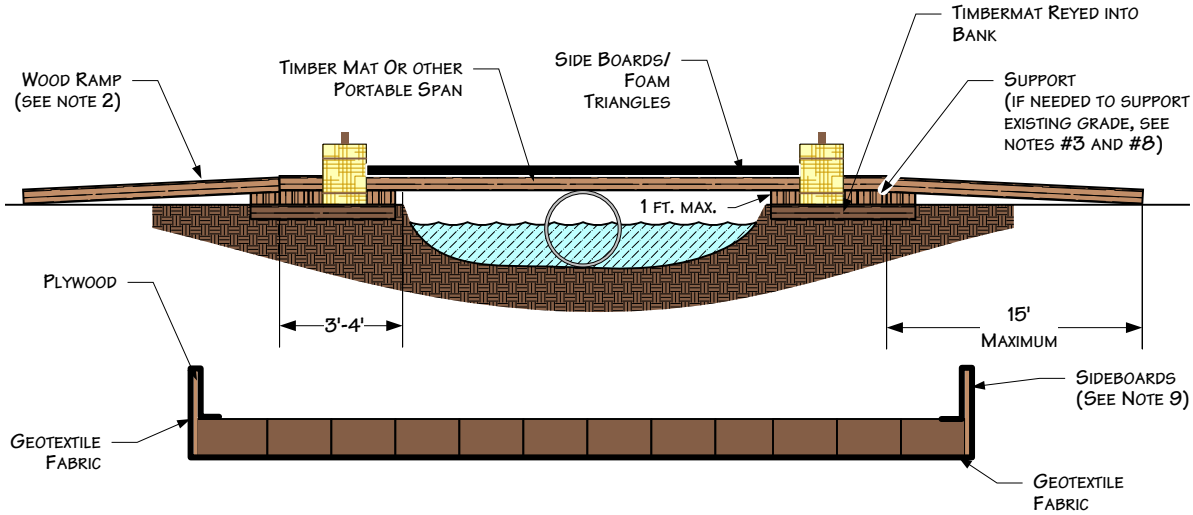
Typical Waterbody Crossing
Directional Drill Method

DATE: 7/14/2000
REVISED: 3/11/11
SCALE: NTS
DRAWN BY: KMKENDALL
K:_CLIENT_PROJECTS\D-F\EEL\2011-019\FIG_18_WATERBODY_DIRECTIONAL_DRILL.VSD

Plan View



Profile View



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 high bank and does not sink into bank.
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 from top of bank to top of bank.
7. Additional support must be added on top of bank and under span if initial support starts to settle.
8. Erosion and sedimentation control measures shall be inspected and maintained in accordance with the company's Environmental Mitigation 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.

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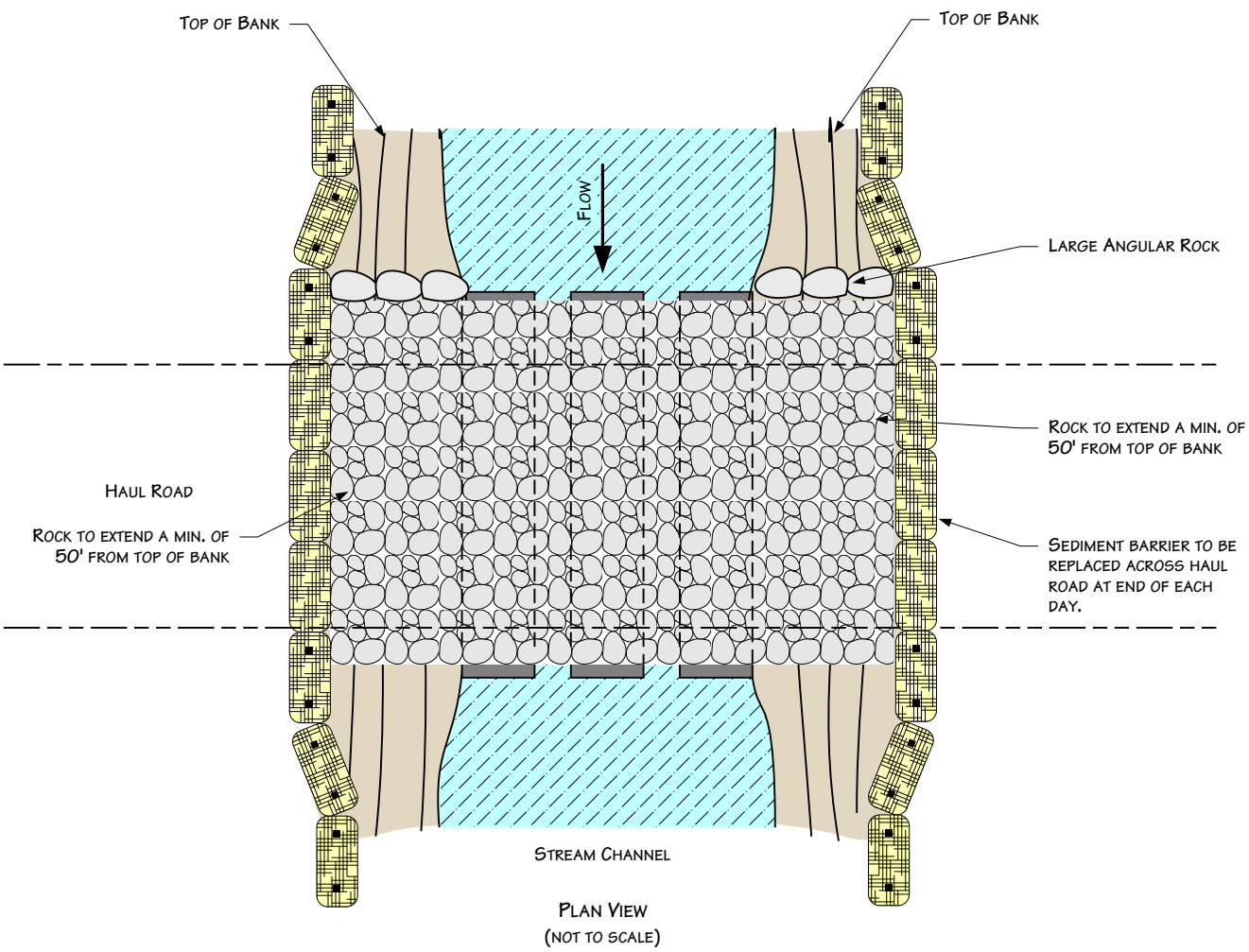
Figure 19

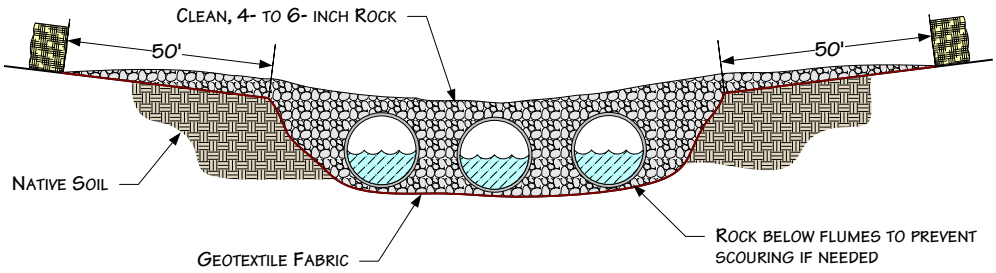
Environmental Protection Plan

Typical Span Type Bridge
With or Without Instream Support

DATE:	3/11/2003
REVISED:	3/25/2011
SCALE:	NTS
DRAWN BY:	KMK6792

K:_CLIENT_PROJECTS\D-F\EEL\2011-019\FIG_19_BRIDGE_SPAN.VSD





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.

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ENBRIDGE

Figure 20

Environmental Protection Plan

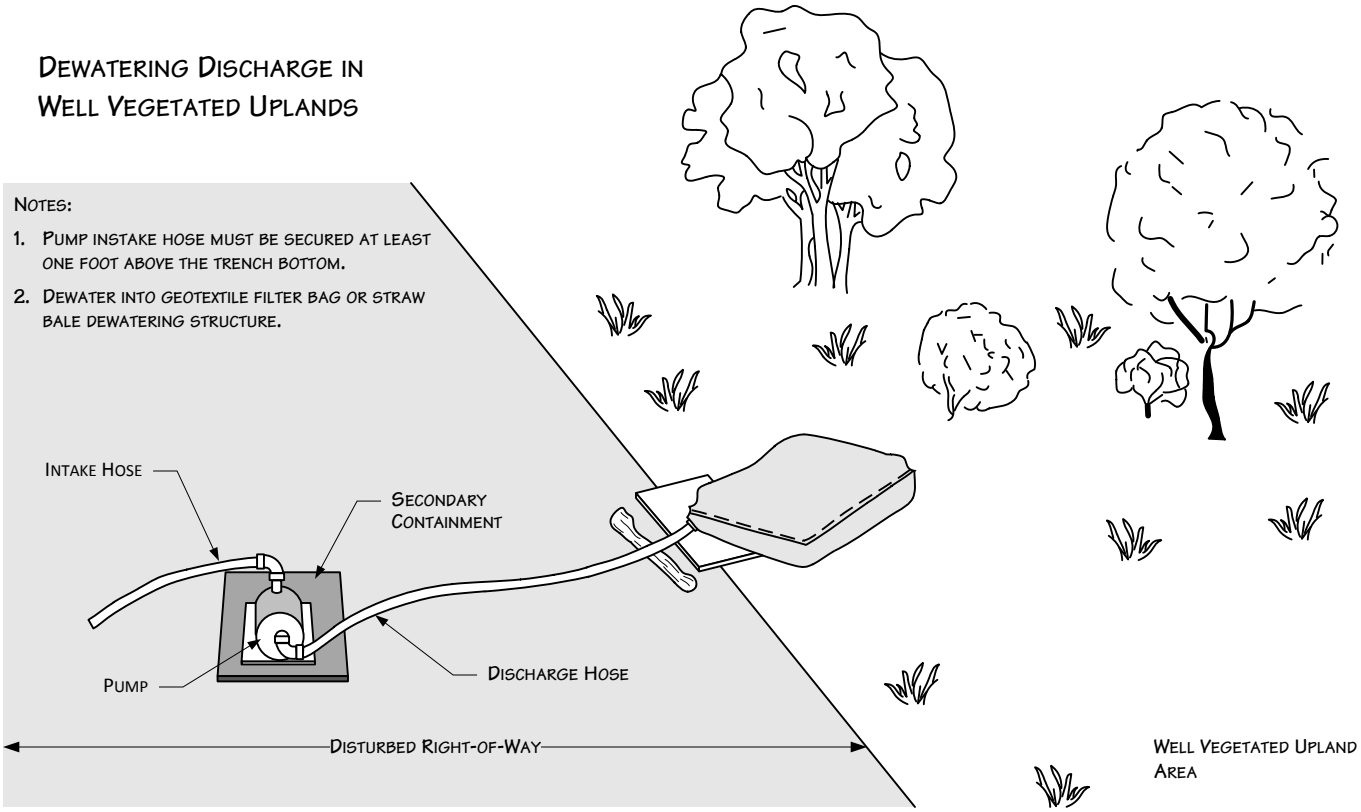
Typical Rock Flume Bridge

DATE:	5/25/2001
REVISED:	3/15/11
SCALE:	NTS
DRAWN BY:	KMKENDALL

NATURAL RESOURCE GROUP

K:_CLIENT_PROJECTS\D-F\EEL\2011-019\FIG_20_ROCK_FLUME_BRIDGE.VSD

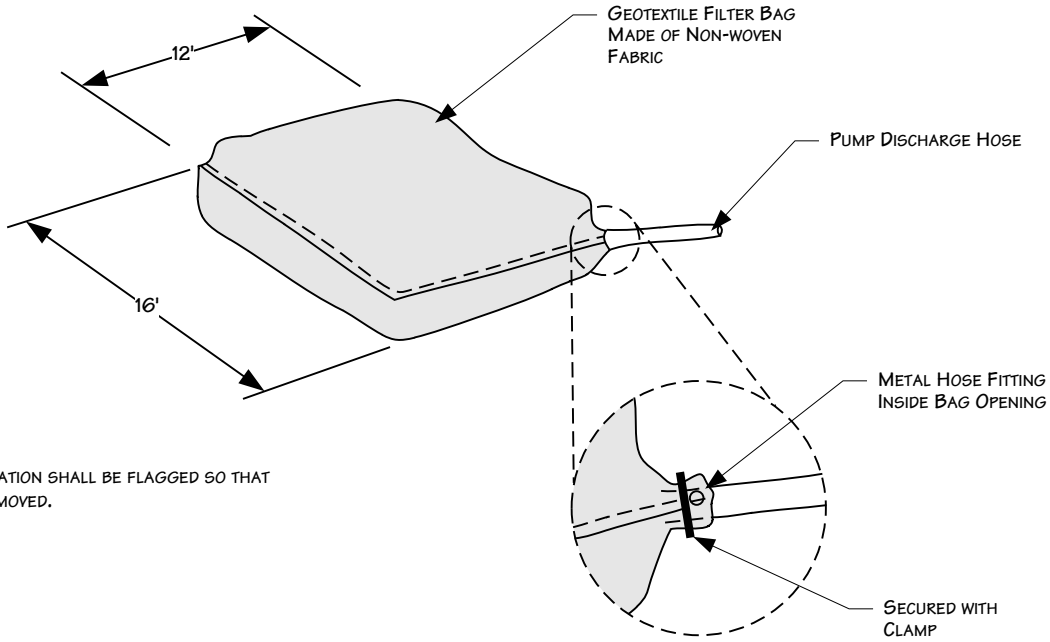
Dewatering Discharge in Well Vegetated Uplands



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.

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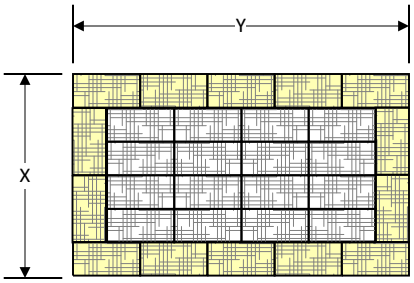
ENBRIDGE

Figure 21
Environmental Protection Plan
Typical Dewatering Measures

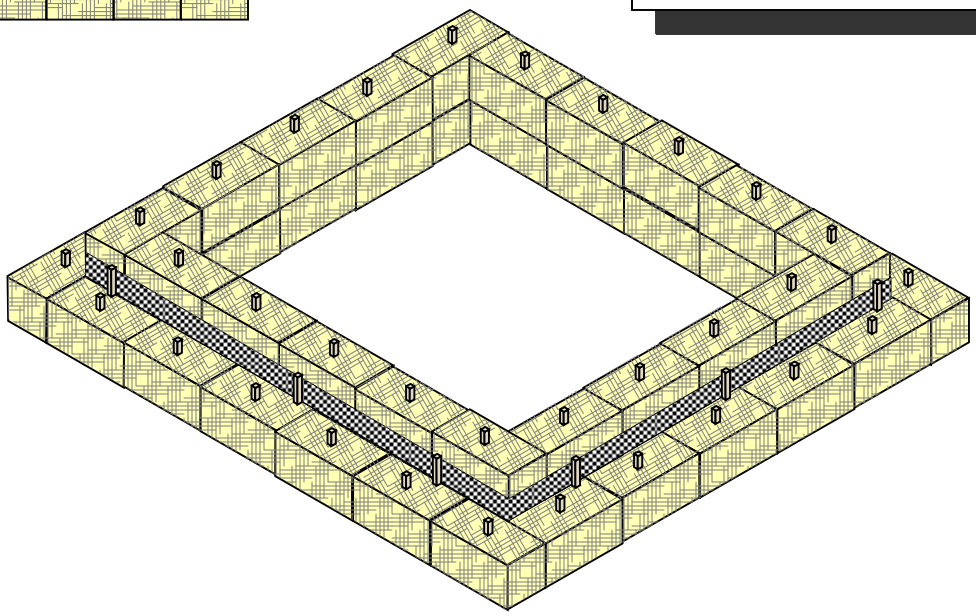
DATE:	5/25/2001
REVISED:	3/15/11
SCALE:	NTS
DRAWN BY:	KMKENDALL

K:_CLIENT_PROJECTS\D-F\EEL\2011-019\FIG_21_DEWATERING_MEASURES.VSD

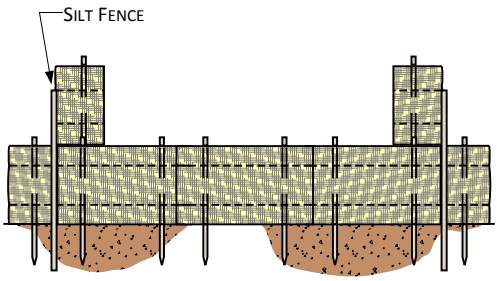


NOTES

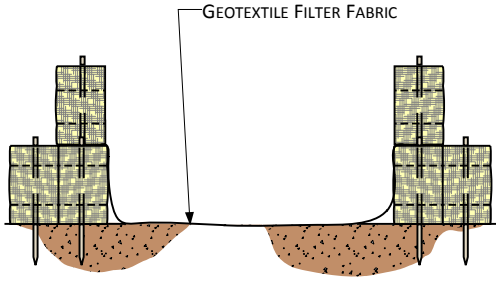
1. ARRANGE THE STRAW BALES TO THE X AND Y DIMENSIONS AS SPECIFICIED BELOW.
2. IF BOTTOM OF STRUCTURE IS NOT LINED WITH STRAW BALES (OPTION 1), LINE ENTIRE STRUCTURE WITH GEOTEXTILE FILTER FABRIC.



PERSPECTIVE VIEW



OPTION 1



OPTION 2

TYPICAL MINIMUM SUMP DIMENSIONS (FEET)		MAXIMUM PUMPING RATE
X	Y	GALLONS PER MINUTE
10	20	300
15	20	350
20	20	400
20	25	450
25	25	500
25	30	550
30	30	660

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Figure 22A
Environmental Protection Plan
Straw Bale Dewatering Structure

ENBRIDGE

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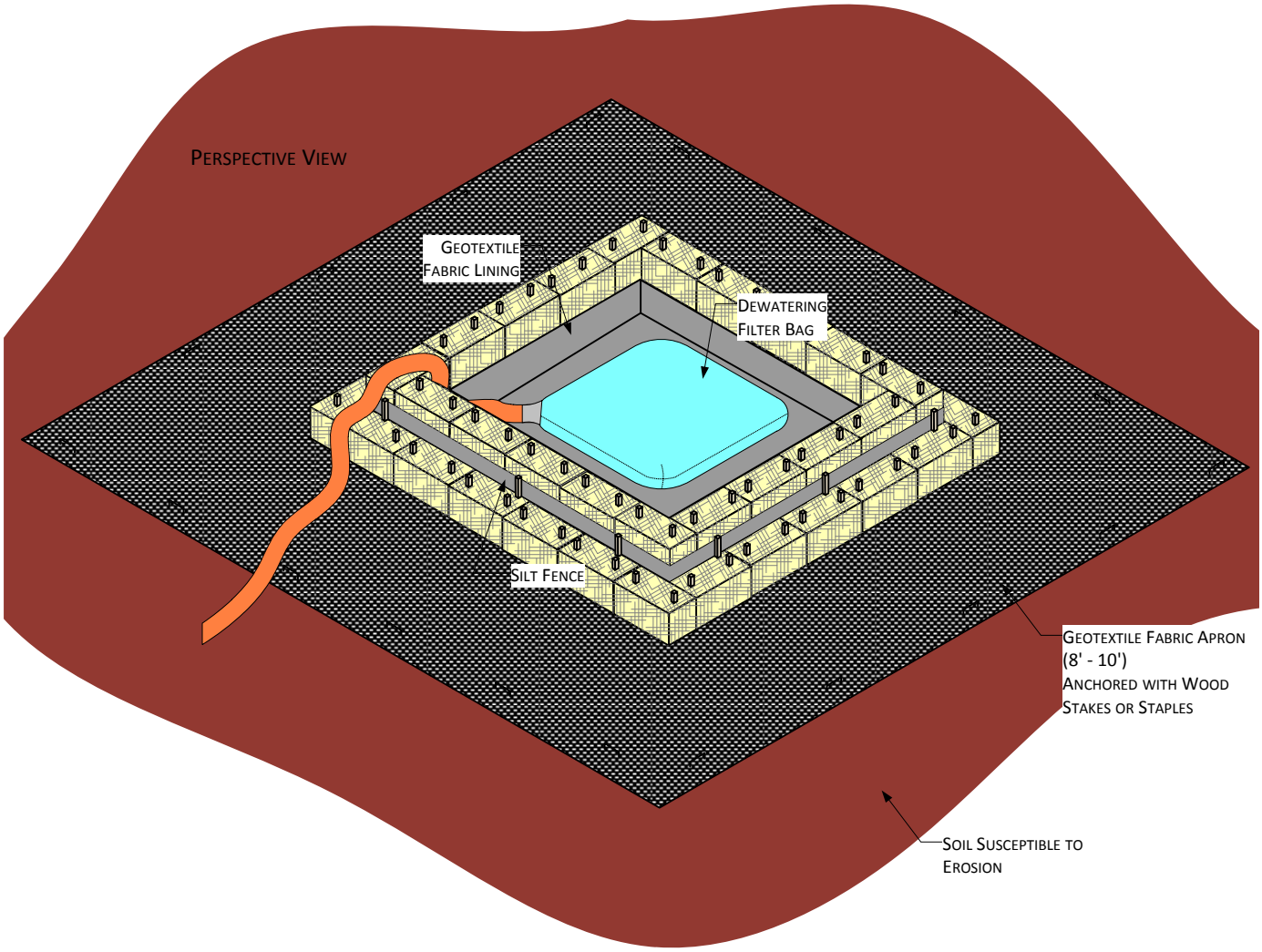
K:_CLIENT_PROJECTS\D-FEEL\2011-019\
FIG_22_STRAW_BALE_DEWATERING_STRUCTURE_C.VSD

SCALE: NTS	DATE: 3/11/2003	REVISED: 3/25/2011	DRAWN BY: KJANDERSON



Construct Dewatering Structure to accommodate anticipated pumping rates. See example below.

Example Pumping rate = 200 g.p.m.
Storage volume (c.f.) = 16 x 200 g.p.m. = 3200 c.f.
Height of straw bale structure = 3 feet (2 bales stacked) (based on height of bales, not silt fence)
Inside dimensions of structure = 33 x 33 feet square

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 in accordance with the company's upland erosion control, revegetation, and maintenance plan.

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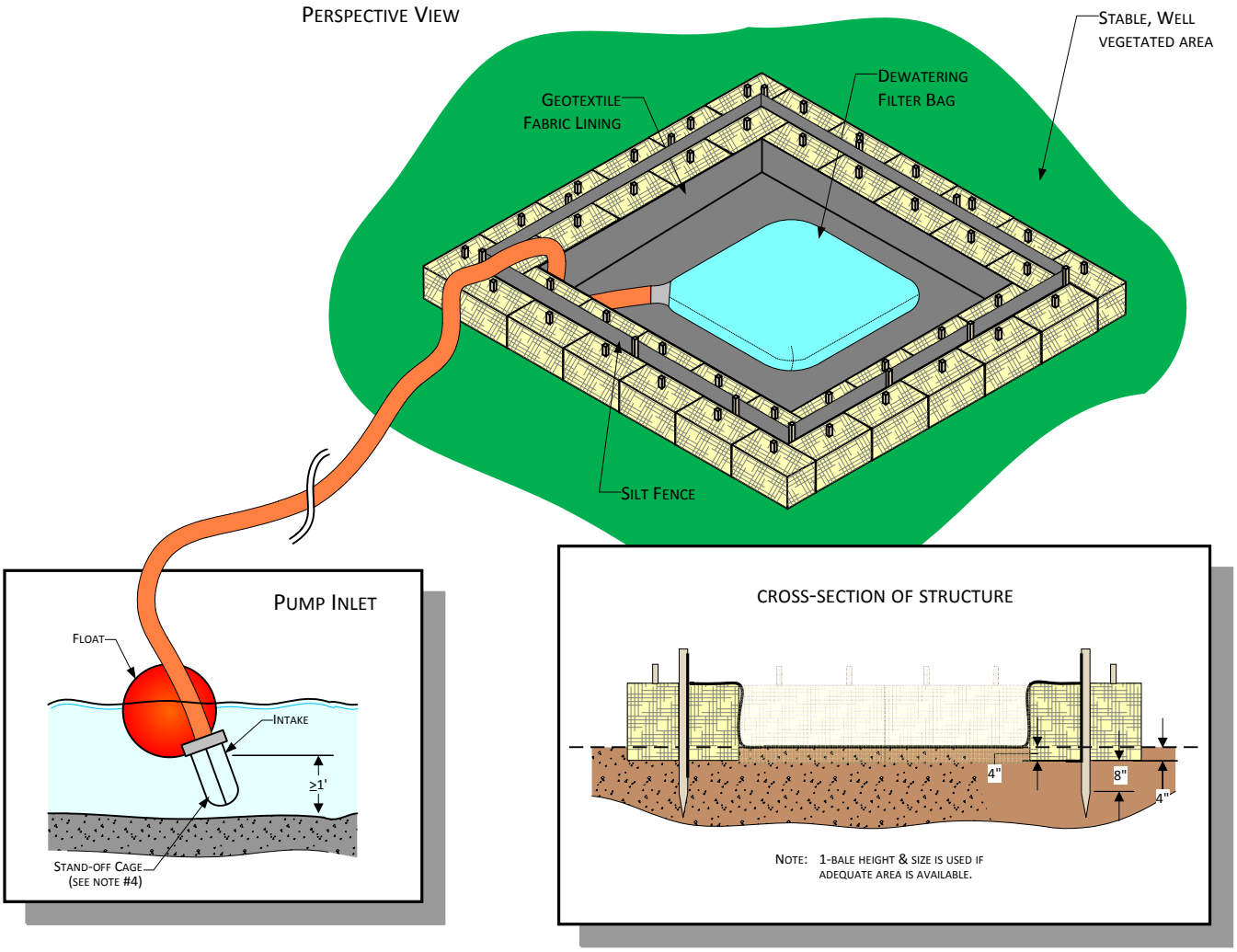
Figure 22B
Environmental Protection Plan
Straw Bale Dewatering Structure

ENBRIDGE

NATURAL RESOURCE GROUP

K:_CLIENT_PROJECTS\D-FIELL\2011-019\ FIG_22_STRAW_BALE_DEWATERING_STRUCTURE_C.VSD	SCALE: NTS	DATE: 3/11/2003	REVISED: 3/25/2011	DRAWN BY: KJANDERSON



CONSTRUCT DEWATERING STRUCTURE TO ACCOMMODATE ANTICIPATED PUMPING RATES. SEE EXAMPLE BELOW.

EXAMPLE PUMPING RATE = 200 G.P.M.
STORAGE VOLUME (C.F.) = 16 X 200 G.P.M. = 3200 C.F.
HEIGHT OF STRAW BALE STRUCTURE = 1.5 FEET (1 BALE) (BASED ON HEIGHT OF BALES, NOT SILT FENCE)
INSIDE DIMENSIONS OF STRUCTURE = 46 X 46 FEET SQUARE

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 IN ACCORDANCE WITH THE COMPANY'S UPLAND EROSION CONTROL, REVEGETATION, AND MAINTENANCE PLAN.

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Figure 22C
Environmental Protection Plan
Straw Bale Dewatering Structure

ENBRIDGE

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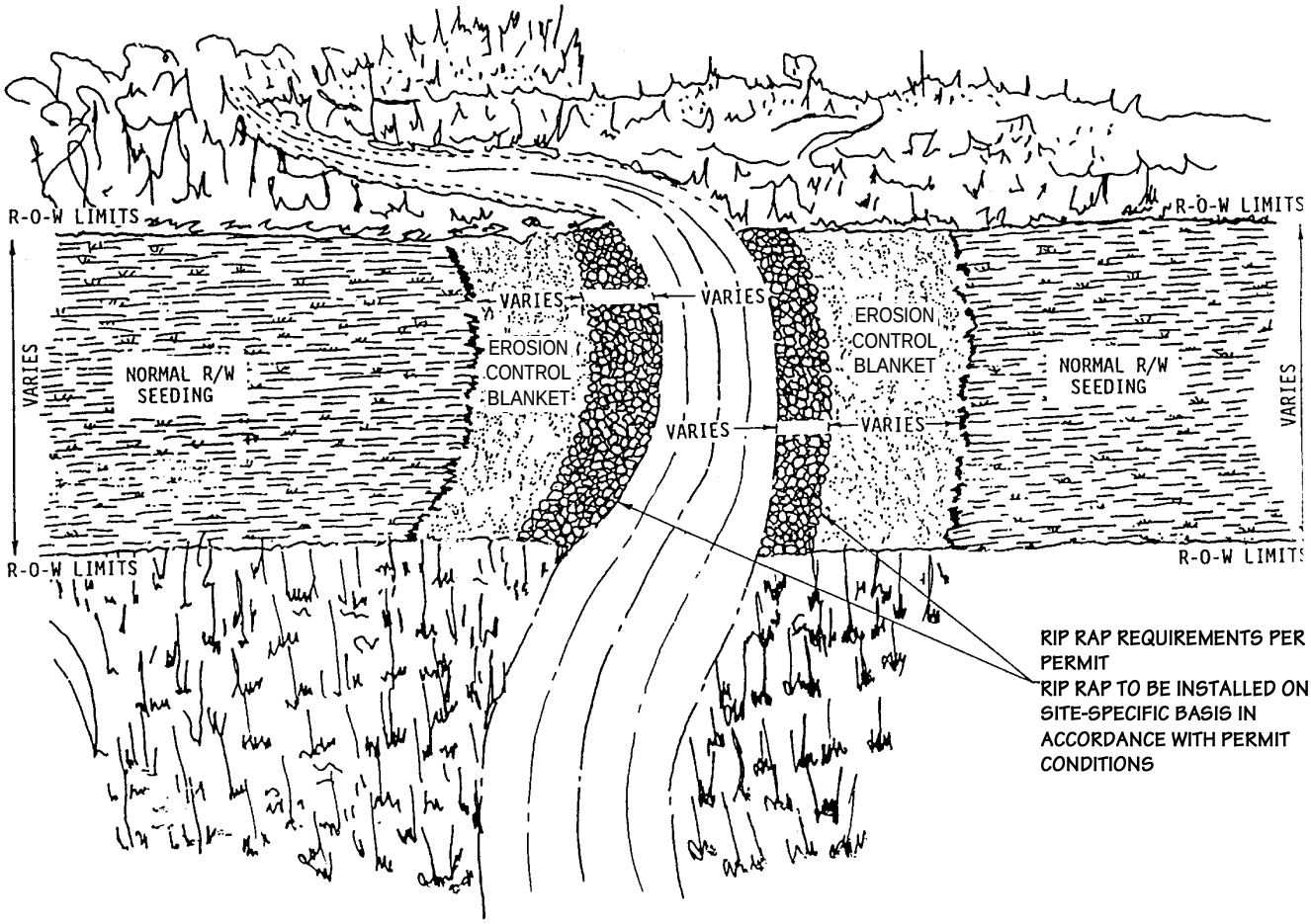
K:_CLIENT_PROJECTS\D-FIELL\2011-019\
FIG_22_STRAW_BALE_DEWATERING_STRUCTURE_C.VSD

SCALE: NTS	DATE: 3/11/2003	REVISED: 3/25/2011	DRAWN BY: KJANDERSON

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.



RIP RAP REQUIREMENTS PER PERMIT
RIP RAP TO BE INSTALLED ON A SITE-SPECIFIC BASIS IN ACCORDANCE WITH PERMIT CONDITIONS

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ENBRIDGE

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\D-F\EEL\2011-019\FIG_23_STREAM_BANK_STABILIZATION.VSD

NATURAL RESOURCE GROUP

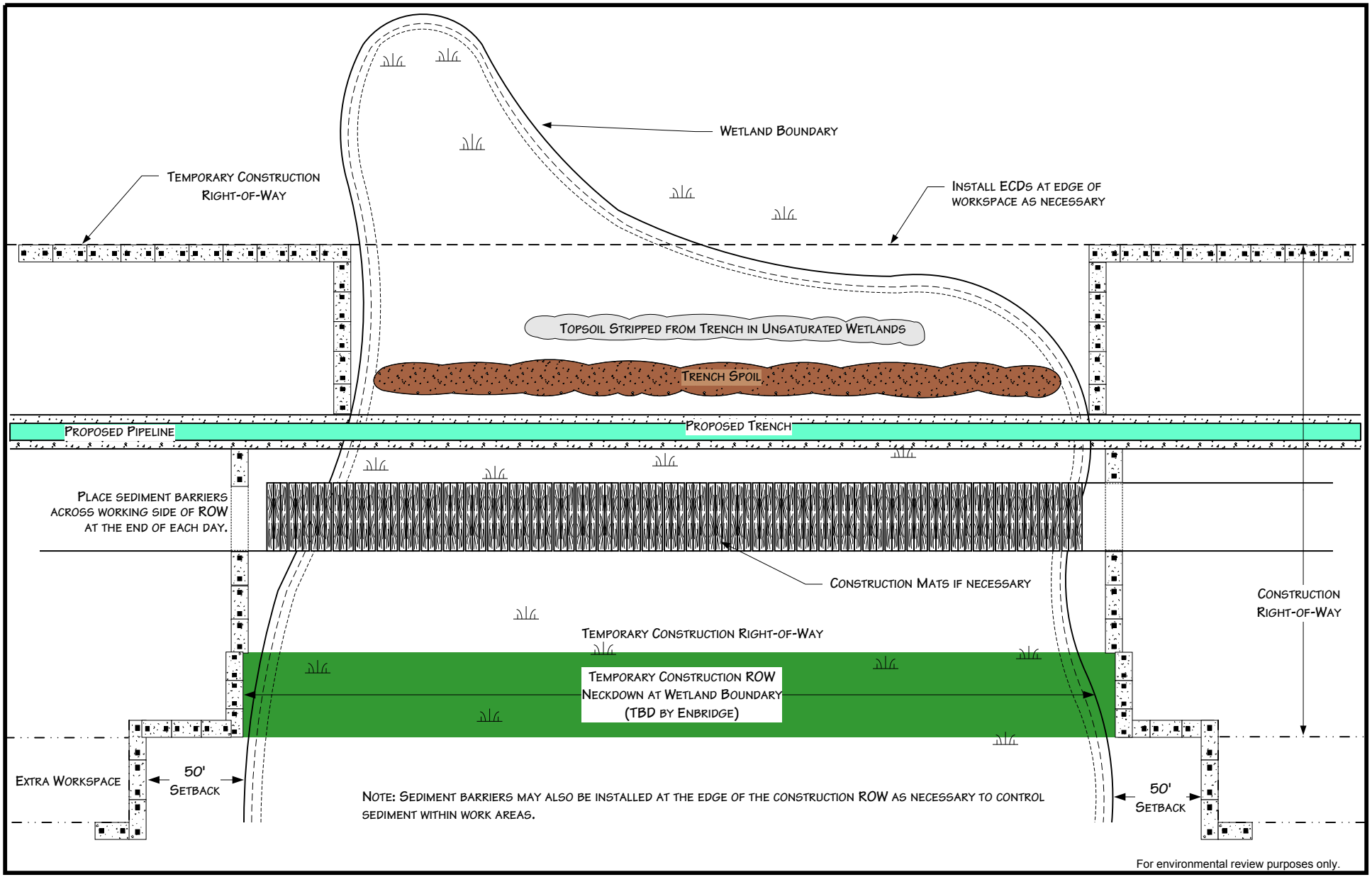

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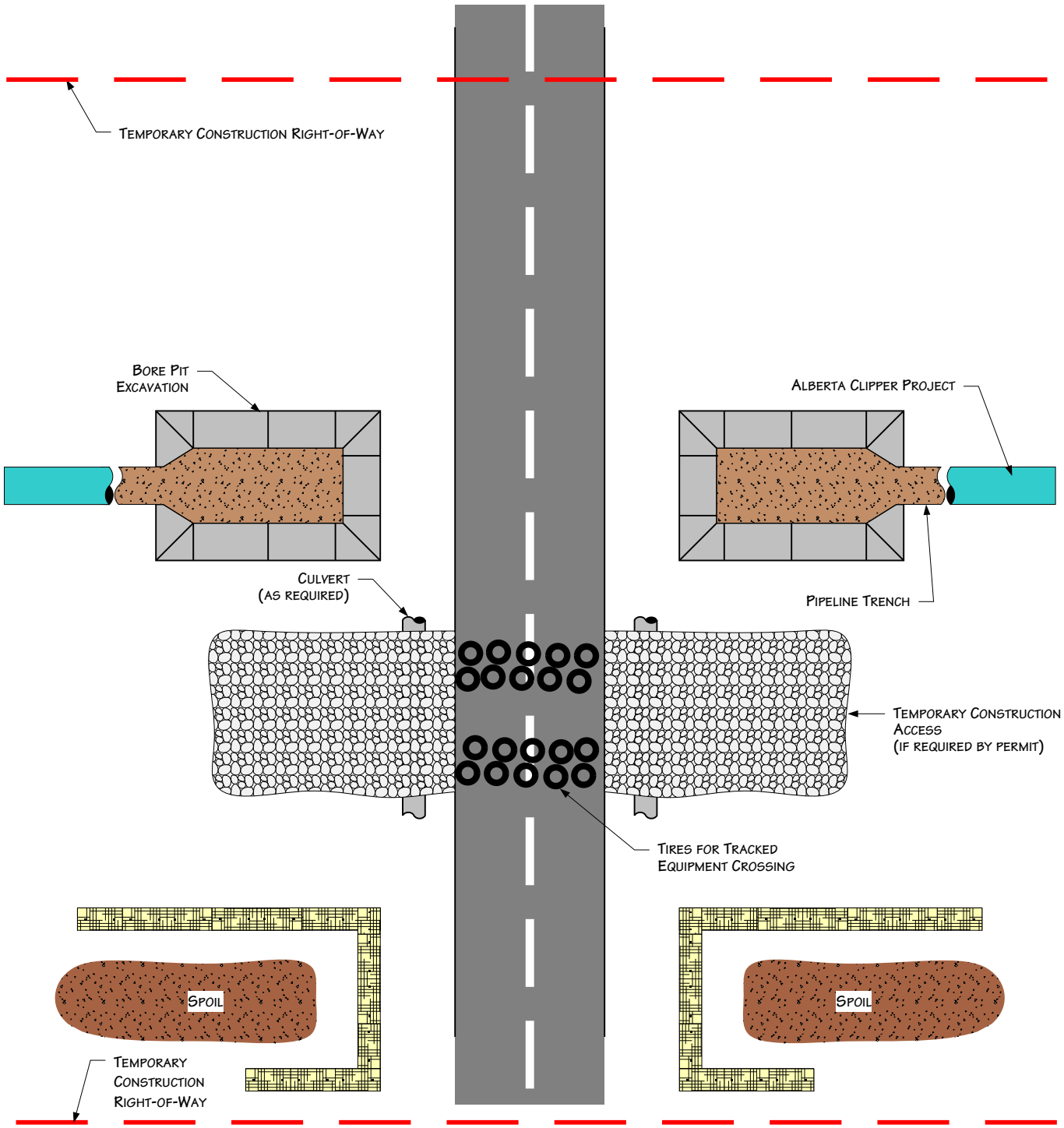
Figure 24
Environmental Protection Plan
Typical Wetland Crossing Method

DATE: 5/25/2001
REVISED: 3/14/11
SCALE: NTS
DRAWN BY: KMKENDALL
K:_CLIENT_PROJECTS\D-F\EEL\2011-019\FIG_24_WETLAND_CROSSING_METHOD.VSD



Plan View

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.

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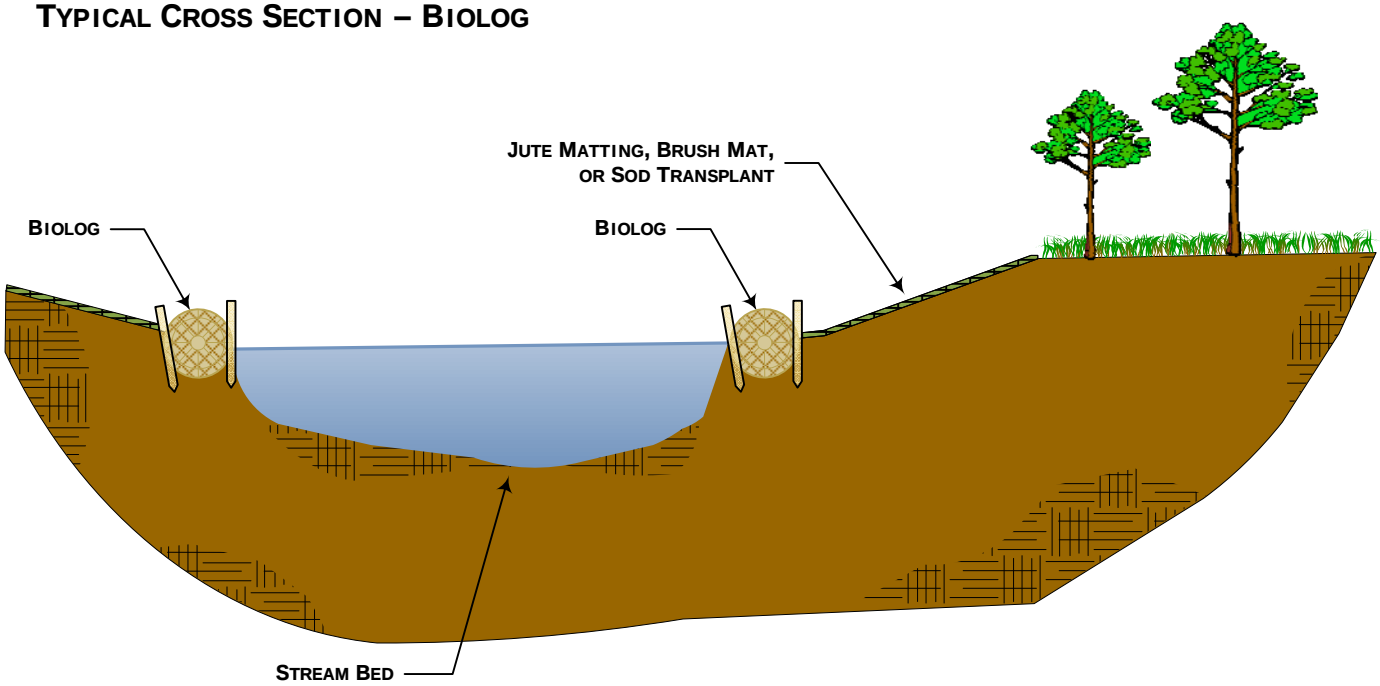
Figure 25
Environmental Protection Plan
Typical Improved Road Crossing
Directional Bore Method

DATE: 7/13/1999
REVISED: 3/14/11
SCALE: NTS
DRAWN BY: KMKENDALL

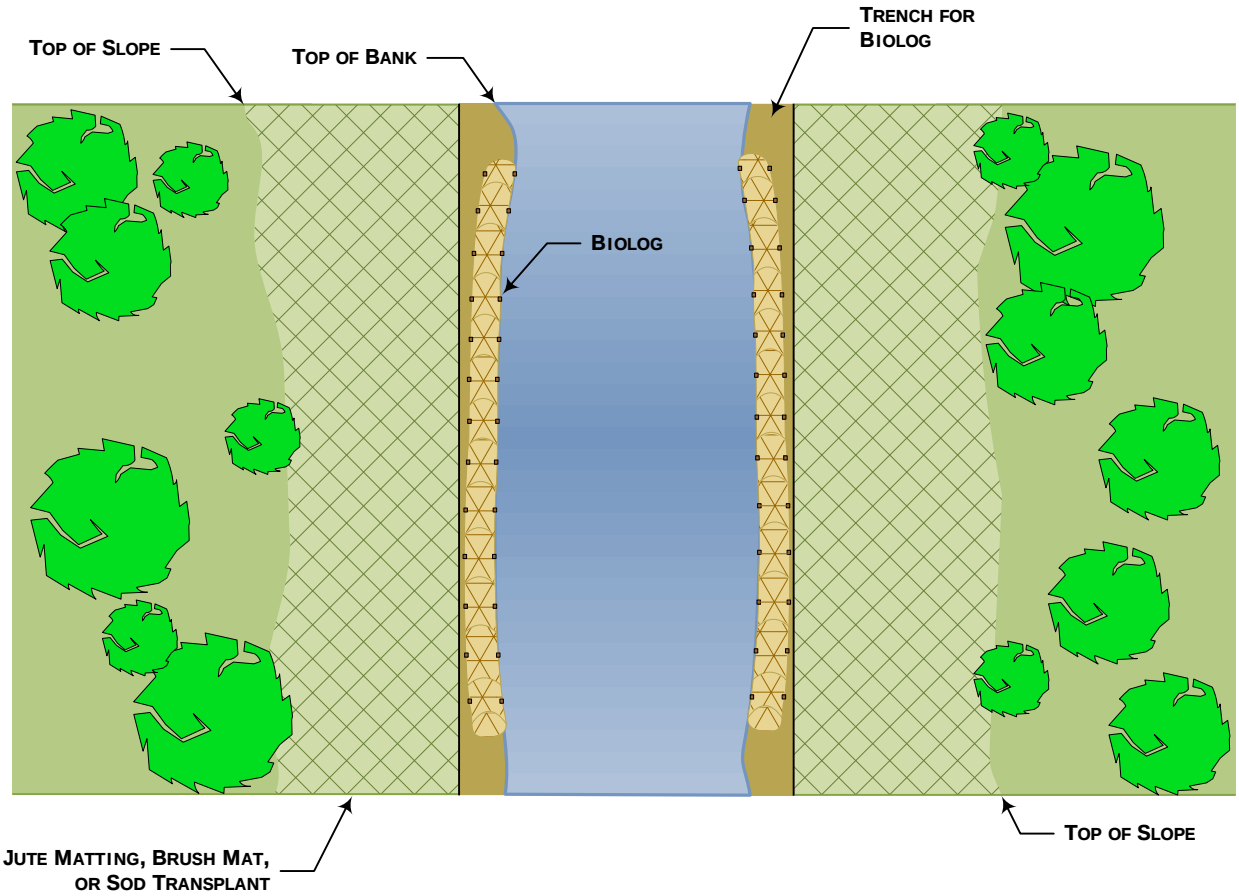
NATURAL RESOURCE GROUP

K:\ CLIENT_PROJECTS\D-F\EEL\2011-019\ FIG_25_IMPROVED_ROAD_BORE_CROSSING.VSD

Typical Cross Section – Biolog



Typical Plan View – Biolog

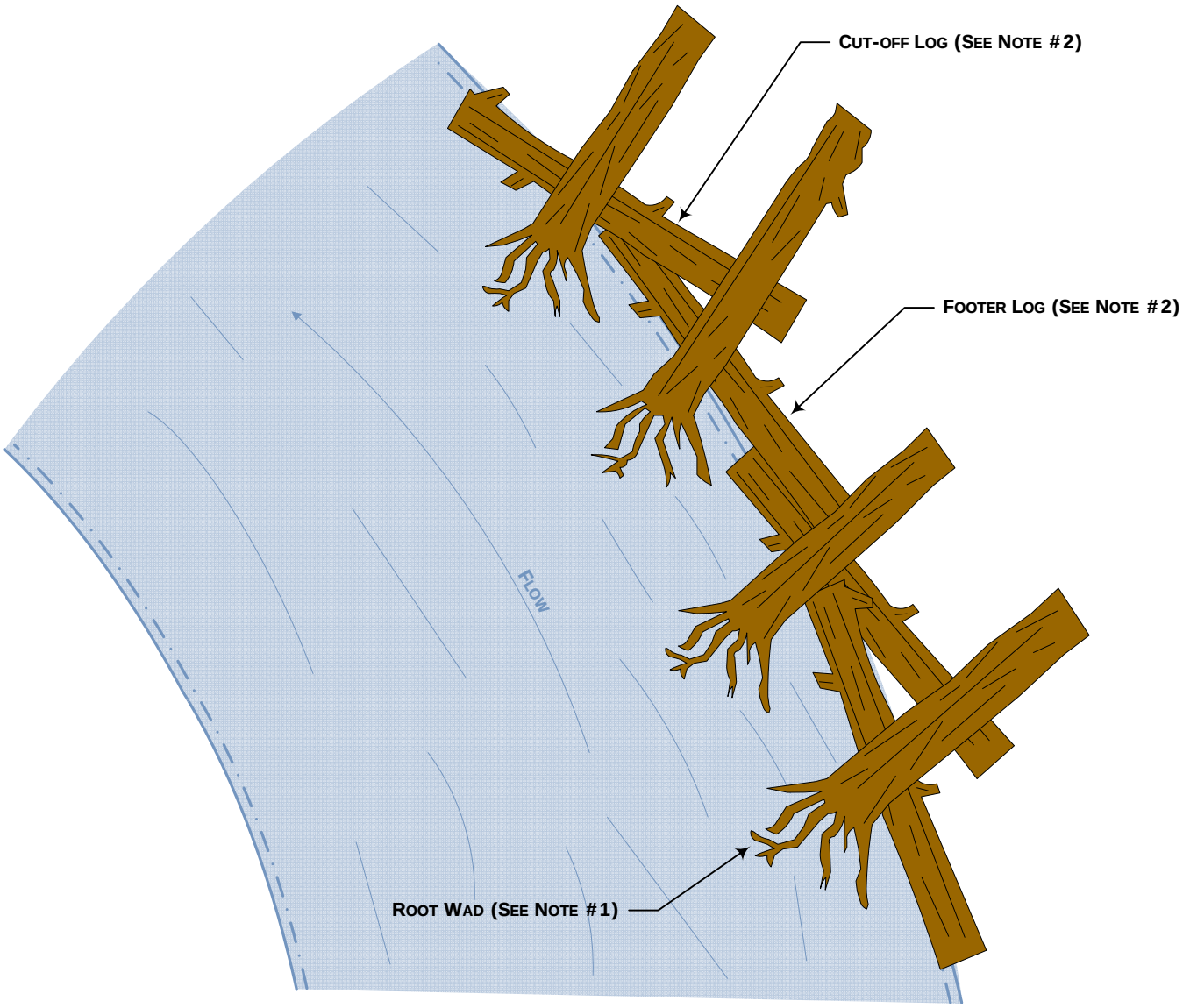


ENBRIDGE

Figure 26
Typical Stream Bank Stabilization
Biolog

04/17/2013

Typical Plan View – Natural Material Revetment



Notes:

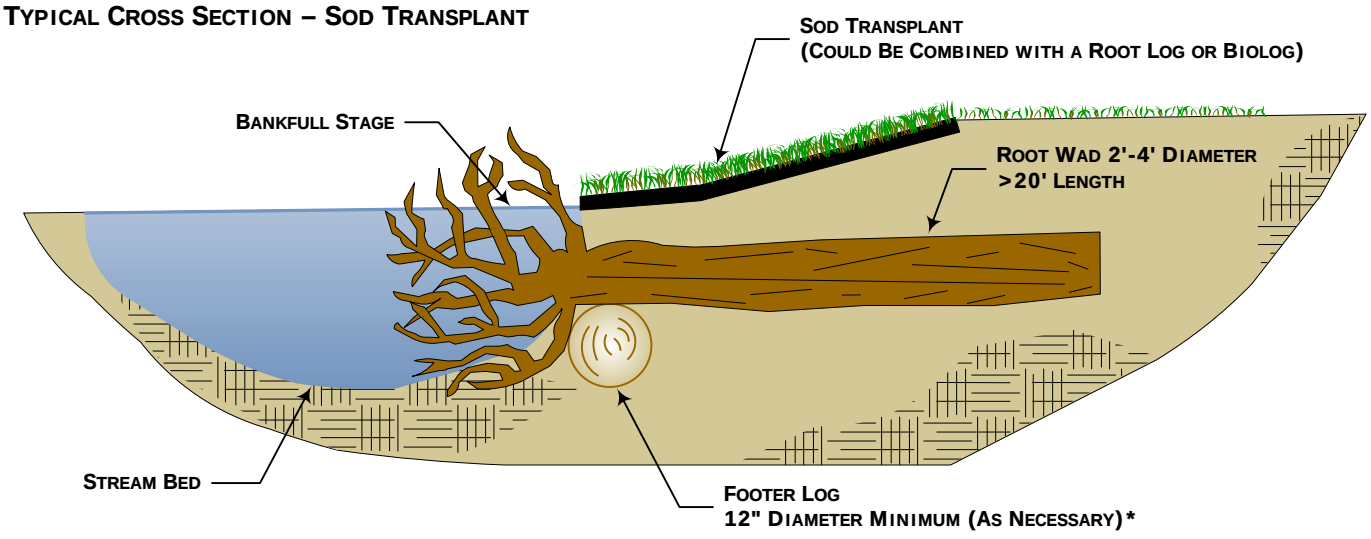
#1 – Root wad logs to be used on steep banks or based on agency recommendations.
#2 - Root wad logs to be anchored appropriately based on site-specific conditions or agency recommendations.

ENBRIDGE

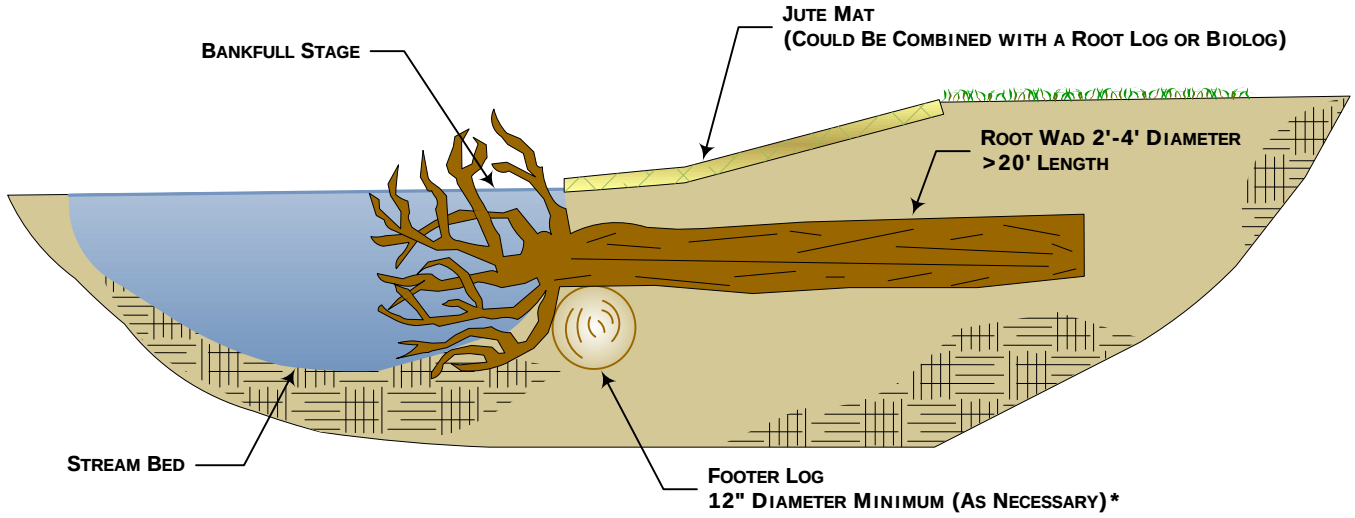
Figure 28
Typical Natural Material Revetment

04/17/2013

Typical Cross Section – Sod Transplant



Typical Cross Section – Jute Mat



Typical Cross Section – Brush Mat

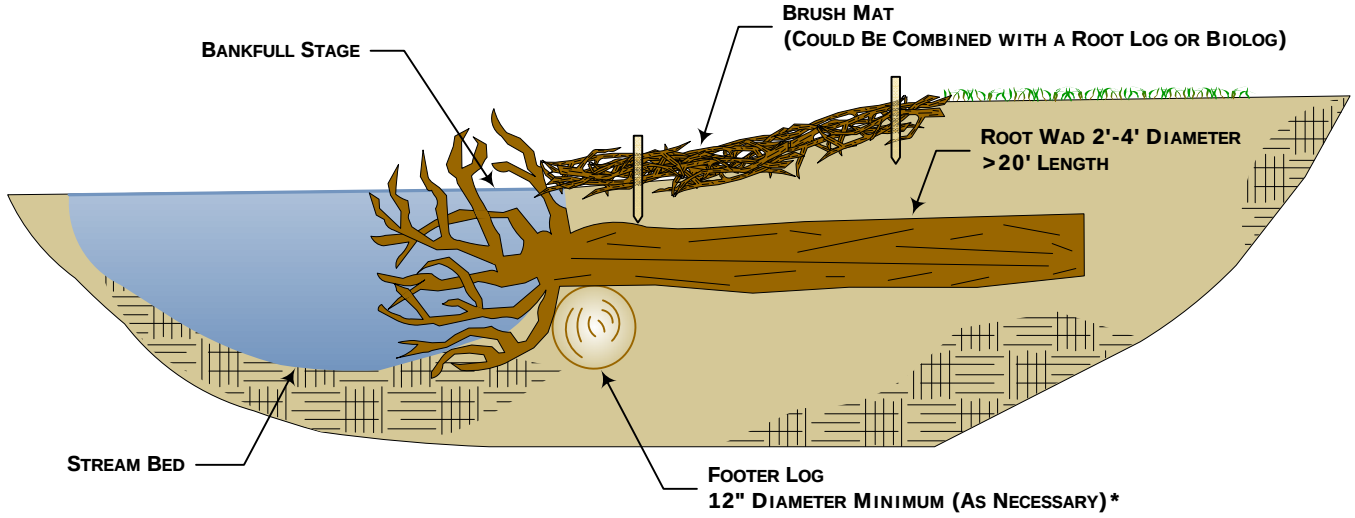


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Figure 27
Typical Root Wad

04/17/2013

Appendix A

Noxious and Invasive Weed Species

Appendix A

Sandpiper Pipeline Project Noxious and Invasive Weed Species			
State/Weed Type	Common Name	Scientific Name	Regulatory Classification
NORTH DAKOTA			
Terrestrial Weeds	Russian knapweed	*Acroptilon repens*	NW [a]
	absinth wormwood	*Artemisia absinthium*	NW [a]
	musk thistle	*Carduus nutans*	NW [a]
	diffuse knapweed	*Centaurea diffusa*	NW [a]
	yellow starthistle	*Centaurea solstitialis*	NW [a]
	spotted knapweed	*Centaurea stoebe; Centaurea maculosa*	NW [a]
	Canada thistle	*Cirsium arvense*	NW [a]
	field bindweed	*Convolvulus arvensis*	NW [a]
	leafy spurge	*Euphorbia esula*	NW [a]
	Dalmatian toadflax	*Linaria dalmatica; Linaria genistifolia*	NW [a]
	purple loosestrife	*Lythrum salicaria; Lythrum virgatum*	NW [a]
	saltcedar	*Tamarix chinensis; Tamarix parviflora; Tamarix ramosissima*	NW [a]
Mountrail County	common tansy	*Tanacetum vulgare*	CONW [a]
	houndstounge	*Cynoglossum officinale*	CONW [a]
Ward County	scentless chamomile	*Anthemis arvensis*	CONW [a]
	yellow toadflax	*Linaria vulgaris*	CONW [a]
	houndstounge	*Cynoglossum officinale*	CONW [a]
Ramsey County	annual sowthistle	*Sonchus oleraceus*	CONW [a]
	scentless chamomile	*Anthemis arvensis*	CONW [a]
	common milkeed	*Asclepias syriaca*	CONW [a]
Nelson County	perennial sowthistle	*Sonchus arvensis*	CONW [a]
Grand Forks County	kochia	*Bassia scoparia*	CONW [a]
Aquatic Weeds	curly leaf pondweed	*Potamogeton crispus*	Regulated
	Eurasian watermilfoil	*Myriophyllum spicatum*	Regulated
	didymo or rock snot	*Didymosphenia geminata*	Prohibited
Aquatic Invertebrate Invasives (Bivalves)	Asian clam	*Corbicula fluminea*	Prohibited
	Zebra mussel	*Dreissena polymorpha*	Prohibited
	Quagga mussel	*Dreissena bugensis*	Prohibited
	New Zealand mudsnail	*Potamopyrgus antipodarum*	Prohibited
Aquatic Invertebrate Invasives	Rusty crayfish	*Orconectes rusticus*	Prohibited
	Scud	*Echinogammarus ischnus*	Prohibited
	Fishhook water flea	*Cercopagis pengoi*	Prohibited
	Spiny water flea	*Bythotrephes cederstroemi*	Prohibited
MINNESOTA			
Terrestrial Weeds	black swallow-wort	*Cynanchum louiseae*	SN [b]
	brown knapweed	*Centaurea jacea*	SN [b]
	Canada thistle	*Cirsium arvense*	SN, PS [c]
	common or European buckthorn	*Rhamnus cathartica*	RN [d]
	common reed – non-native subspecies	*Phragmites australis*	RN [d]

Sandpiper Pipeline Project Noxious and Invasive Weed Species			
State/Weed Type	Common Name	Scientific Name	Regulatory Classification
	common teasel	*Dipsacus fullonum*	SN [b]
	Cut-leaved teasel	*Dipsacus laciniatus*	SN [b]
	Dalmatian toadflax	*Linaria dalmatica*	SN [b]
	garlic mustard	*Alliaria petiolata*	SN [c]
	giant hogweed	*Heracleum mantegazzianum*	FN [b]
	glossy buckthorn, including all cultivars	*Frangula alnus*	RN [d]
	Grecian foxglove	*Digitalis lanata*	PS [b]
	Japanese hops	*Humulus japnicus*	SN [b]
	leafy spurge	*Euphorbia esula*	SN, PS [c]
	meadow knapweed	*Centaurea x moncktonii*	FN [b]
	multiflora rose	*Rosa multiflora*	RN [d]
	musk thistle	*Carduus nutans*	SN, PS [c]
	narrowleaf bittercress	*Cardamine impatiens*	SN [c]
	Oriental bittersweet	*Celastrus orbiculatus*	SN [b]
	plumeless thistle	*Carduus acanthoides*	SN, PS [c]
	purple loosestrife	*Lythrum salicaria, virgatum*	SN [c]
	spotted knapweed	*Centaurea stoebe*	SN [c]
	common tansy	*Tanacetum vulgare*	SN [c]
	wild parsnip	*Pastinaca sativa*	SN [c]
	yellow starthistle	*Centaurea solstitialis*	PI [b]
Aquatic Weeds	African oxygen weed	*Lagarosiphon major*	FN, PI; Prohibited Species
	ambulia	*Limnophila sessiliflora*	FN
	anchored or rooted water hyacinth	*Eichornia azurea*	FN
	aquarium watermoss, giant salvinia	*Salvinia molesta*	FN; Prohibited Species
	arrowhead	*Sagittaria sagittifolia*	FN
	arrowleaf false pickerelweed	*Monochoria hastata*	FN
	Australian stonecrop	*Crassula helmsii*	PI; Prohibited Species
	brittle naiad	*Najas minor*	PI; Prohibited Species
	broadleaf paper bark tree	*Melaleuca quenquinervia*	FN
	curly-leaf pondweed	*Potamogeton crispus*	PI; Prohibited Species
	European frog-bit	*Hydrocharis morsus-ranae*	PI; Prohibited Species
	Eurasian watermilfoil	*Myriophyllum spicatum*	PI; Prohibited Species
	exotic bur-reed	*Sparganium erectum*	FN
	ducklettuce	*Ottelia alismoides*	FN
	flowering rush	*Butomus umbellatus*	PE; Prohibited Species
	giant salvinia	*Salvinia auriculata*	FN
	giant salvinia	*Salvinia biloba*	FN
	giant salvinia	*Salvinia herzogii*	FN
	heart-shaped false pickerelweed	*Monochoria vaginalis*	FN
	hydrilla	*Hydrilla verticillata*	FN, PI; Prohibited Species
	Indian swampweed, Miramar weed	*Hygrophila polysperma*	FN; Prohibited Species

Sandpiper Pipeline Project Noxious and Invasive Weed Species			
State/Weed Type	Common Name	Scientific Name	Regulatory Classification
	Mediterranean strain (killer algae)	*Caulerpa taxifolia*	FN
	mosquito fern, water velvet	*Azolla pinnata*	FN
	purple loosestrife	*Lythrum salicaria, Lythrum virgatum*	PI, SN; Prohibited Species
	water aloe or water soldiers	*Stratioles aloides*	PI; Prohibited Species
	water chestnut	*Trapa natans*	PI; Prohibited Species
	water-spinach, swamp morning-glory	*Ipomoea aquatica*	FN
	wetland nightshade	*Solanum tampicense*	FN
	Brazilian waterweed	*Egeria densa*	Regulated Species
	Carolina fanwort or fanwort	*Cabomba caroliniana*	Regulated Species
	Chinese water spinach	*Ipomoea aquatica*	Regulated Species
	nonnative waterlilies	*Nymphaea spp.*	Regulated Species
	parrot's feather	*Myriophyllum aquaticum*	Regulated Species
	yellow iris or yellow flag	*Iris pseudacoris*	Regulated Species
Aquatic Invertibrate Invasives	faucet snail	*Bithynia tentaculata*	Prohibited Species
	New Zealand mud snail	*Potamopyrgus antipodarum*	Prohibited Species
	quagga mussel	*Dreissena bugensis*	Prohibited Species
	red swamp crayfish	*Procambarus clarkii*	Prohibited Species
	zebra mussel	*Dreissena spp.*	Prohibited Species
	Banded mystery snail	*Viviparus georgianus*	Regulated Species
	Chinese mystery snail, Japanese trap door snail	*Cipangopaludina spp.*	Regulated Species
	rusty crayfish	*Orconectes rusticus*	Regulated Species
	spiny water flea	*Bythotrephes longimanus*	Regulated Species
WISCONSIN			
Terrestrial Weeds	Amur honeysuckle	*Lonicera maackii*	Prohibited/Restricted
	Autumn olive	*Elaeagnus umbellata*	Restricted
	Bells honeysuckle	*Lonicera x bella*	Restricted
	Black swallow-wort	*Vincetoxicum nigrum*	Prohibited/Restricted
	Canada thistle	*Cirsium arvense*	Restricted
	Cattail hybrid	*Typha x glauca*	Restricted
	Celandine	*Chelidonium majus*	Prohibited/Restricted
	Chinese yam	*Dioscorea oppositifolia*	Prohibited
	Common buckthorn	*Rhamnus cathartica*	Restricted
	Common teasel	*Dipsacus fullonum subsp. sylvestris*	Restricted
	Creeping bellflower	*Campanula rapunculoides*	Restricted
	Cut-leaved teasel	*Dipsacus laciniatus*	Restricted
	Cypress spurge	*Euphorbia cyparissias*	Restricted
	Cypress spurge	*Euphorbia cyparissias*	Restricted
	European marsh thistle	*Cirsium palustre*	Prohibited/Restricted

Sandpiper Pipeline Project Noxious and Invasive Weed Species			
State/Weed Type	Common Name	Scientific Name	Regulatory Classification
	Garlic mustard	*Alliaria petiolata*	Restricted
	Giant hogweed	*Heracleum mantegazzianum*	Prohibited
	Giant knotweed	*Polygonum sachalinense*	Prohibited
	Glossy buckthorn	*Frangula alnus*	Restricted
	Hairy willow herb	*Epilobium hirsutum*	Prohibited/Restricted
	Helleborine orchid	*Epipactis helleborine*	Restricted
	Hemp nettle, brittlestem hemp nettle	*Galeopsis tetrahit*	Restricted
	Hill mustard	*Bunias orientalis*	Prohibited/Restricted
	Hound's tongue	*Cynoglossum officinale*	Restricted
	Japanese hedge-parsley	*Torilis japonica*	Prohibited/Restricted
	Japanese honeysuckle	*Lonicera japonica*	Prohibited
	Japanese hops	*Humulus japonicus*	Prohibited/Restricted
	Japanese knotweed	*Polygonum cuspidatum*	Restricted
	Japanese stilt grass	*Microstegium vimineum*	Prohibited
	Kudzu	*Pueraria lobata*	Prohibited
	Leafy spurge	*Euphorbia esula*	Restricted
	Lyme grass or sand ryegrass	*Leymus arenarius*	Prohibited/Restricted
	Mile-a-minute vine	*Polygonum perfoliatum*	Prohibited
	Morrow's honeysuckle	*Lonicera morrowii*	Restricted
	Multiflora rose	*Rosa multiflora*	Restricted
	Musk thistle	*Carduus nutans*	Restricted
	Narrow-leaf cattail	*Typha angustifolia*	Restricted
	Oriental bittersweet	*Celastrus orbiculatus*	Restricted
	Pale swallow-wort	*Vincetoxicum rossicum*	Prohibited
	Perennial pepperweed	*Lepidium latifolium*	Prohibited
	Phragmites, Common reed	*Phragmites australis*	Restricted
	Plumeless thistle	*Carduus acanthoides*	Restricted
	Poison hemlock	*Conium maculatum*	Prohibited/Restricted
	Porcelain berry	*Ampelopsis brevipedunculata*	Prohibited
	Princess tree	*Paulownia tomentosa*	Prohibited
	Purple loosestrife	*Lythrum salicaria*	Restricted
	Russian olive	*Elaeagnus angustifolia*	Restricted
	Sawtooth oak	*Quercus acutissima*	Prohibited
	Scotch broom	*Cytisus scoparius*	Prohibited
	Sericea lespedeza	*Lespedeza cuneata*	Prohibited
	Spotted knapweed	*Centaurea biebersteinii, c. stoebe*	Restricted
	Spreading hedge parsley	*Torilis arvensis*	Prohibited
	Tall or Reed manna grass	*Glyceria maxima*	Prohibited/Restricted
	Tansy	*Tanacetum vulgare*	Restricted

Sandpiper Pipeline Project Noxious and Invasive Weed Species			
State/Weed Type	Common Name	Scientific Name	Regulatory Classification
	Tartarian honeysuckle	*Lonicera tatarica*	Restricted
	Tree-of-heaven	*Ailanthus altissima*	Restricted
	Wild chervil	*Anthriscus sylvestris*	Prohibited/Restricted
	Wild parsnip	*Pastinaca sativa*	Restricted
	Wineberry	*Rubus phoenicolasius*	Prohibited
	Yellow star thistle	*Centaurea solstitialis*	Prohibited
Wetland Weeds	Dame's rocket	*Hesperis matronalis*	Restricted
	European marsh thistle	*Cirsium palustre*	Prohibited/Restricted
	Flowering rush	*Butomus umbellatus*	Restricted
Aquatic Weeds	Australian swamp crop	*Crassula helmsii*	Prohibited
	Brazilian waterweed	*Egeria densa*	Prohibited
	Brittle waternymph	*Najas minor*	Prohibited
	Curly-leaf pondweed	*Potamogeton crispus*	Restricted
	Eurasian water milfoil	*Myriophyllum spicatum*	Restricted
	European frog-bit	*Hydrocharis morsus-ranae*	Prohibited
	Fanwort, Carolina Fanwort	*Cabomba caroliniana*	Prohibited
	Flowering rush	*Butomus umbellatus*	Restricted
	Hydrilla	*Hydrilla verticillata*	Prohibited
	Oxygen-weed, African elodea	*Lagarosiphon major*	Prohibited
	Parrot feather	*Myriophyllum aquaticum*	Prohibited
	Water chestnut	*Trapa natans*	Prohibited
	Yellow floating heart	*Nymphoides peltata*	Prohibited
	N/A	*Ulva (Enteromorpha) spp.*	Prohibited
Aquatic Fish and Invertebrate Invasives	Asian clam	*Corbicula fluminea*	Prohibited
	Bloody shrimp	*Hemimysis anomala*	Prohibited
	Chinese mitten crabs	*Eriocheir sinensi*	Prohibited
	Chinese mystery snail	*Cipangopaludina chinensis*	Restricted
	Cylindro (cyanobacteria)	*Cylindrospermopsis raciborskii*	Prohibited
	Didymo or rock snot	*Didymoshpenia geminata*	Prohibited
	Faucet snail	*Bithynia tentaculata*	Prohibited
	Fishhook waterflea	*Cercopagis pengoi*	Prohibited
	Golden alga	*Prymneisum parvum*	Prohibited
	New Zealand mudsnail	*Potamopyrgus antipodarum*	Prohibited
	Novel cyanobacterial epiphyte of order Stigonematales	*Stigonematales spp.*	Prohibited
	Quagga mussels	*Dreissena bugensis*	Prohibited
	Red swamp crayfish	*Procambarus clarkii*	Prohibited
	Rusty crayfish	*Orconectes rusticus*	Restricted
	Spiny waterflea	*Bythotrephes cederstroemi*	Prohibited
	Starry stonewort (alga)	*Nitellopsis obtusa*	Prohibited

Sandpiper Pipeline Project Noxious and Invasive Weed Species			
State/Weed Type	Common Name	Scientific Name	Regulatory Classification
	Water flea	*Daphnia lumholtzi*	Prohibited
	Zebra mussel	*Dreissena polymorpha*	Restricted

North Dakota:

[a] Listed Regulated Species

Minnesota Control Status:

[b] Eradicate

[c] Control

[d] Restricted

Abbreviations:

NW = Noxious Weed

CONW = County Noxious Weed

SN = State noxious weed (Minnesota Department of Agriculture)

PS = State prohibited weed seed (Minnesota Department of Agriculture)

RN = Restricted noxious weed (Minnesota Department of Agriculture)

FN = Federal noxious weed (USDA-Animal Plant Health Inspection Service)

PI = Prohibited exotic species (Minnesota Department of Natural Resources)

Appendix B

Equipment Cleaning Log

Equipment Cleaning Log

Form Completed By: _____

Date: _____ Time: _____

Location of Equipment (tract & milepost): _____

Equipment Type: _____

Equipment ID (e.g., company, unique ID number): _____

Cleaning Method: (check all that apply)

- ☐ Scrape Down
- ☐ Steam Wash Blow Down (compressed air)
- ☐ Power/Pressure Wash (water)
- ☐ Other (Describe): _____

Comments: _____

_____

_____

_____

_____

Appendix C

Seed Mixes

Sandpiper Pipeline Project
Seed Mixes

Table 1 – North Dakota, Minnesota, and Wisconsin Temporary Cover Crop Seed Mix

Seed Name	Pure Live Seed (Pounds Per Acre)	% of Seed
Oats *if summer seeding* (*Avena sativa)* or Winter Wheat *if dormant (late fall) or spring seeding (Triticum aestivum)*	40	50%
Annual Ryegrass *(Lolium italicum)*, Annual Alfalfa (*Medicago sativa*), or Slender Wheat Grass (*Elymus trachycaulus)*	40	50%
GRAND TOTAL	**80 pounds**	**100%**

Table 2 – North Dakota Construction Area Standard Upland Seed Mix

Seed Name	Pure Live Seed (Pounds Per Acre)	% of Seed
Western Wheatgrass (*Pascophyrum smithii*)	3.2	20%
Slender Wheatgrass (*Elymus trachycaulus)*	1	10%
NewHy bluebunch-quackgrass hybrid	6	30%
Pubescent Wheatgrass (*Elytrigia intermedia*)	5.2	30%
Alfalfa	1.2	10%
Total	16.6	100%
Associated Companion Crop Mix		
Oats *if summer seeding* (*Avena sativa)* or Winter Wheat *if late fall (dormant) or spring seeding (Triticum aestivum)*	16	80%
Annual Ryegrass *(Lolium italicum)*, or Slender Wheat Grass (*Elymus trachycaulus)*	4	20%
Companion/Cover Crop Total	20	100%
GRAND TOTAL	**36.6 pounds**	**100%**

Sandpiper Pipeline Project
Seed Mixes

Table 3 – Minnesota and Wisconsin Construction Area Standard Upland Seed Mix

Seed Name	Pure Live Seed (Pounds Per Acre)	% of Seed
Perennial Ryegrass (*Lolium perenne*)	2	17%
Canada Wild-rye (*Elymus canadensis*)	4	33%
Switchgrass (*Panicum virgatum*) (unimproved native variety)	4	33%
Timothy (*Phleum pratense*)	2	17%
Total	12	100%
Associated Companion Crop Mix		
Oats *if summer seeding* (*Avena sativa*) or Winter Wheat *if late fall (dormant) or spring seeding* (*Triticum aestivum*)	16	80%
Annual Ryegrass (*Lolium italicum*), or Slender Wheat Grass (*Elymus trachycaulus*)	4	20%
Companion/Cover Crop Total	20	100%
GRAND TOTAL	**32 pounds**	**100%**

Table 4- North Dakota, Minnesota, and Wisconsin Unsaturated Wetland Seed Mix – General Restoration Mix

Seed Name	Pure Live Seed (Pounds Per Acre)	Percent (%) of Seed
American Slough Grass (*Beckmannia syzigachne*)	6	30%
Annual Rye Grass (*Lolium perene*)	8	40%
Fowl Bluegrass (*Poa palustris*)	6	30%
GRAND TOTAL	**20.0 pounds**	**100%**

Table 5 – North Dakota, Minnesota, and Wisconsin Residential Area Upland Seed Mix

Seed Name	Pure Live Seed (Pounds Per Acre)	% of Seed
Kentucky Bluegrass (*Poa pratensis*)	82.5	52%
Perennial Ryegrass (*Lolium perenne*)	30	19%
Creeping Red Fescue (*Festuca rubra*)	37.5	23%
Annual Rye Grass (*Lolium italicum*)	10	6%
GRAND TOTAL	**160 pounds**	**100%**

Sandpiper Pipeline Project
Seed Mixes

Table 6 – North Dakota Livestock Grazing and Hay Production Areas Upland Seed Mix

Seed Name	Pure Live Seed (Pounds Per Acre)	% of Seed
Western Wheatgrass (*Pascophyrum smithii*)	3.2	20%
Slender Wheatgrass (*Elymus trachycaulus)*	1	10%
NewHy bluebunch-quackgrass hybrid	6	30%
Pubescent Wheatgrass (*Elytrigia intermedia*)	5.2	30%
Alfalfa	1.2	10%
Total	16.6	100%
Associated Companion Crop Mix		
Oats ***if summer seeding*** (*Avena sativa)* or Winter Wheat *if late fall (dormant) or spring seeding (Triticum aestivum)*	16	80%
Annual Ryegrass *(Lolium italicum)*, or Slender Wheat Grass (*Elymus trachycaulus)*	4	20%
Companion/Cover Crop Total	20	100%
GRAND TOTAL	**36.6 pounds**	**100%**

Table 7 – Minnesota and Wisconsin Livestock Grazing and Hay Production Areas Upland Seed Mix

Seed Name	Pure Live Seed (Pounds Per Acre)	% of Seed
Orchard Grass *(Dactylis glomerata)*	6	30%
Vernal Alfalfa (*Medicago sativa)*	2	10%
Climax Timothy *(Phleum pretense)*	3	15%
Tetraploid Perennial Ryegrass *(Lolium perenne)*	4	20%
Alsike Clover *(Trifolium hybridum)*	2	10%
Medium Red Clover *(Trifolium pretense)*	3	15%
Total	20	100%
Associated Cover Crop Mix		
Oats *if summer seeding* (*Avena sativa)* or Winter Wheat *if late fall (dormant) or spring seeding (Triticum aestivum)*	16	80%
Annual Ryegrass *(Lolium italicum)*, or Slender Wheat Grass (*Elymus trachycaulus)*	4	20%
Cover Crop Total	20	100%
GRAND TOTAL	**40 pounds**	**100%**

Sandpiper Pipeline Project
Seed Mixes

Table 8 – North Dakota Wildlife Area Upland Seed Mix

Seed Name	Pure Live Seed (Pounds Per Acre)	% of Seed
Western Wheatgrass (*Pascophyrum smithii*)	4.0	34.5%
Slender Wheatgrass (*Elymus trachycaulus)*	1.0	8.6%
Green needlegrass (*Stipa viridula*)	2.4	20.7%
Sideoats grama (*Bouteloua curtipendula*)	2.4	20.7%
Blue grama (*Bouteloua gracilis*)	0.4	3.4%
Canada wildrye (*Elymus Canadensis*)	0.6	5.2%
Switchgrass (*Panicum virgatum*)	0.8	6.9%
GRAND TOTAL	**11.6 pounds**	**100%**

Table 9 – Minnesota and Wisconsin Wildlife Area Upland Seed Mix

Seed Name	Pure Live Seed (Pounds Per Acre)	% of Seed
Red Clover *(Trifolium pretense)*	4.5	30%
Alsike Clover *(Trifolium hybridum)*	4.5	30%
White Clover (*Trifolium repens)*	4.5	30%
Creeping Red Fescue *(Festuca rubra)*	1.5	10%
Total	15	100%
Associated Cover Crop Mix		
Oats *if summer seeding* (*Avena sativa)* or Winter Wheat *if spring seeding (Triticum aestivum)*	16	80%
Annual Ryegrass *(Lolium italicum)*, Annual Alfalfa (*Medicago sativa*), or Slender Wheat Grass (*Elymus trachycaulus)*	4	20%
Cover Crop Total	20	100%
GRAND TOTAL	**35 pounds**	**100%**

Sandpiper Pipeline Project
Seed Mixes

Table 10 – North Dakota Native Area Seed Mix

Seed Name	Pure Live Seed (Pounds Per Acre)	% of Seed
Western Wheatgrass (*Pascophyrum smithii*)	4.0	34.5%
Slender Wheatgrass (*Elymus trachycaulus)*	1.0	8.6%
Green needlegrass (*Stipa viridula*)	2.4	20.7%
Sideoats grama (*Bouteloua curtipendula*)	2.4	20.7%
Blue grama (*Bouteloua gracilis*)	0.4	3.4%
Canada wildrye (*Elymus Canadensis*)	0.6	5.2%
Switchgrass (*Panicum virgatum*)	0.8	6.9%
GRAND TOTAL	**11.6**	**100%**

Table 11 – Minnesota and Wisconsin Native Area Seed Mix [1/]

Seed Name	Pure Live Seed (Pounds Per Acre)	% of Seed
Big Bluestem *(Andropogon gerardi)*	4	44%
Western Wheatgrass ***(Pascopyrum smithii)***	4	29%
Switchgrass *(Panicum virgatum)*	0.5	12%
Canada Wildrye *(Elymus canadensis)*	2	15%
Purple Prairie Clover *(Dalea purpureum)*	2 (ounces)	
Total	10.5 pounds	100%
Associated Cover Crop Mix		
Oats *if summer seeding* (*Avena sativa)* or Winter Wheat *if spring seeding* *(Triticum aestivum)*	16	80%
Slender Wheat Grass (*Elymus trachycaulus)*	4	20%
Cover Crop Total	20	100%
GRAND TOTAL	**30.5 pounds**	**100%**
1/ Applicable seeding dates: May 15 to June 30 or after soil temperatures are below 55 degrees Fahrenheit.		

Sandpiper Pipeline Project
Seed Mixes

Table 12 – North Dakota Roadside Seed Mix

Seed Name	Pure Live Seed (Pounds Per Acre)	% of Seed
Western Wheatgrass (*Pascophyrum smithii*)	3.2	20%
Slender Wheatgrass (*Elymus trachycaulus)*	1	10%
NewHy bluebunch-quackgrass hybrid	6	30%
Pubescent Wheatgrass (*Elytrigia intermedia*)	5.2	30%
Alfalfa	1.2	10%
Total	16.6	100%
Associated Companion Crop Mix		
Oats *if summer seeding* (*Avena sativa)* or Winter Wheat *if late fall (dormant) or spring seeding (Triticum aestivum)*	16	80%
Annual Ryegrass *(Lolium italicum)*, or Slender Wheat Grass (*Elymus trachycaulus)*	4	20%
Companion/Cover Crop Total	20	100%
GRAND TOTAL	**36.6 pounds**	**100%**

Sandpiper Pipeline Project
Seed Mixes

Table 13 – Minnesota and Wisconsin Roadside Seed Mix

Seed Name	Pure Live Seed (Pounds Per Acre)	% of Seed
Kentucky Bluegrass – Certified Park (*Poa pratensis*)	22.3	32%
Canada Bluegrass (*Poa compressa*)	9.8	14%
Switch grass (*Panicum virgatum*)	2.1	3%
Slender Wheatgrass (*Elymus trachycaulus*)	2.8	4%
Perennial Rye-grass (*Lolium perenne*)	14.7	21%
Timothy (*Phleum pratense*)	2.1	3%
Redtop (*Agrostis gigantea*)	2.1	3%
Creeping Alfalfa (*Medicago sativa*)	4.2	6%
White clover (*Trifolium repens*)	2.1	3%
Hairy Vetch (*Vicia villosa)*	7.8	11%
Total	70 pounds	100%
Associated Cover Crop Mix		
Oats *if summer seeding* (*Avena sativa)* or Winter Wheat *if spring seeding (Triticum aestivum)*	16	80%
Annual Ryegrass *(Lolium italicum)*, Annual Alfalfa (*Medicago sativa*), or Slender Wheat Grass (*Elymus trachycaulus)*	4	20%
Cover Crop Total	20	100%
GRAND TOTAL	**90 pounds**	**100%**

Table 14 – North Dakota Conservation Reserve Program (CRP) Seed Mix

Seed Name	Pure Live Seed (Pounds Per Acre)	% of Seed
Tall wheat grass (*Thinopyrum ponticum*)	2.2	27.5
Intermediate or pubescent wheat grass (*Thinopyrum intermedium*)	4.3	53.75
Alfalfa (*Medicago sativa*)	1.1	13.75
Sweet clover (*Melilotus officinalis*)	0.4	5
GRAND TOTAL	**8 pounds**	**100%**

Table 15 – Minnesota Protected Waters Seed Mix[1]

Seed Name	Pure Live Seed (Pounds Per Acre)	% of Seed
American slough grass (*Beckmannia syzigachne*)	1.5	18.63%
Blue-joint grass (*Calamagrostis Canadensis)*	0.06	0.75%
Reed manna grass *(Glyceria grandis)*	0.18	2.24%
Fowl manna grass (*Glyceria grandis*)	0.12	1.49%
Rice Cut-grass *(Leersia oryzoides)*	0.24	2.98%
Annual ryegrass (*Lolium italicum*)	0.9	11.18%
Fowl bluegrass (*Poa palustris*)	1.8	22.36%
Tussock sedge (*Carex stricta*)	0.06	0.75%
Fox sedge (*Carex vulpinoidea*)	0.3	3.37%
Green bulrush (*Scirpus atrovirens*)	0.06	0.75%
Wool grass (*Scirpus cyperinus*)	0.006	0.07%
River bulrush (*Scirpus fluviatilis*)	0.24	2.98%
Soft-stem bulrush (*Scirpus validus*)	0.12	1.49%
Marsh milkweed (*Asclepias incarnate*)	0.12	1.49%
Flat-topped aster (*Aster umbellatus*)	0.3	3.73%
Joe-pye weed (*Eupatorium maculatum*)	0.3	3.73%
Boneset (*Eupatorium perfoliatum*)	0.24	2.98%
Sneezeweed (*Helenium autumnale*)	0.24	2.98%
Spotted Touch-me-not (*Impatiens capensis*)	0.06	0.75%
Great-blue lobelia (*Lobelia siphilitica*)	0.12	1.49%
Monkey flower (*Mimulus ringens*)	0.006	0.07%
Mountain mint (*Pycnanthemum virginianum*)	0.12	1.49%
Giant goldenrod (*Solidago gigantean*)	0.24	2.98%
Blue vervain (*Verbena hastate*)	0.36	4.47%
Ironweed (*Veronia fasciculate*)	0.36	4.47%
Total	6.0	100%
Associated Cover Crop Mix		
Slender Wheat Grass (*Elymus trachycaulus)*	2	100%
Cover Crop Total	2	100%
GRAND TOTAL	**8 pounds**	**100%**

[1] Applicable seeding dates: May 15 to June 30 or after soil temperatures are below 55 degrees Fahrenheit.
[2] Quantities and availability may be limited.

Table 16 – North Dakota Park and Recreation Department - Suggested grass/forb mix for Restoration of the Northern Tallgrass Prairie

The following is a suggested mix for the restoration project. This mix matches the typical plant species found within the Northern Tallgrass Prairie plant community.

Grass Species	**Common Name**
**Andropogon gerardii*	Big bluestem
**Panicum virgatum*	Switchgrass
**Calamagrostis canadensis*	Bluejoint
**Calamagrostis stricta*	Slimsteam reedgrass
**Spartina pectinata*	Prairie cordgrass
Koeleria macrantha	Prairie junegrass
Bouteloua curtipendula	Sideoats grama
Nassella viridula	Green needlegrass
Pascopyrum smithii	Western wheatgrass
Forb Species	**Common Name**
Achillea millefolium	Common yarrow
Anemone Canadensis	Canadian anemone
Artemisia ludoviciana	White sagebrush
Pediomelum argophyllum	Silvery scurfpea
Rudbeckia hirta	Blackeyed susan
Polygala verticillata	Milkwort
Ratibida columnifera	Prairie coneflower
Solidago Canadensis	Canada goldenrod
Symphyotrichum ericoides	White heath aster
Vicia americana	American vetch
Dalea purpurea	Purple prairie clover

*****Indicates dominates within this plant community.

Regarding: Wet-Mesic Tallgrass Prairie

Community Description

Andropogon gerardii - (Panicum virgatum) - Muhlenbergia richardsonis Herbaceous Vegetation
Translated Name: Big Bluestem - (Switchgrass) - Mat Muhly Herbaceous Vegetation
Common Name: Northern Wet-Mesic Tallgrass Prairie
Unique Identifier: CEGL002199
Classification Approach: International Vegetation Classification (IVC)
Summary: This big bluestem wet-mesic prairie type is found in the northern tallgrass prairie region of the United States and Canada. In South Dakota, soils are moist loams and poorly drained silt loams derived from glacial drift. The vegetation is dominated by a dense layer of tall grasses, such as *Andropogon gerardii* and *Panicum virgatum*, with associates of *Calamagrostis canadensis, Calamagrostis stricta*, and *Spartina pectinata*. *Muhlenbergia richardsonis* may be a diagnostic, less dominant species of the northern tallgrass prairie. In the Sheyenne Delta, this type may form a distinctive wet-mesic sand prairie type.

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 Environment Hydrotest Discharge Authorization & Documentation

Part 1: Basic Discharge Information

Date: _____

Project Name: _____ Spread: _____ Tract #: _____

Test Section Identification: _____

Pipe Diameter (inches): _____ Test Section Length (feet): _____

Volume to be discharged (gallons): _____

Permitted Discharge Rate (gpm): _____ Est. Duration of Discharge (hours): _____

Receiving Waterbody Name/Nearest Surface Waterbody: _____

Certified Operator Name and Number (if applicable): _____

Part 2: Pre-Discharge Planning Checklist

Note: All items must be complete prior to initiating discharge activities

- ☐ Notification to agency(ies) provided (if applicable - attach copy of notification documentation)
- ☐ Flow meter installed and functional in accordance with manufacturers recommendations
- ☐ Sample collection port/tap installed or other positive means of direct sampline of discharge water (only necessary if sampling is required)
- ☐ Review of discharge permit and site-specific plan complete (attach a copy of the permit and approved site specific plan)
- ☐ Discharge structure/BMPs installed according to approved plan
- ☐ Complete the table below, including quantity of samples required in accordance with the permit based on anticipated discharge duration. Add other parameters as specified in the permit:

Parameter	Analytical Method Number	Container type	Container Volume	Preservation	Maximum Holding Times	Permit Limit	Sample Type	Frequency of Analysis Specified in Permit	Number of Samples Required
pH	NA	Polyethylene / Glass	NA	None required	Analyze immediately		Field measurement		
Dissolved Oxygen	NA	Glass bottle and top	NA	None required	Analyze immediately		Field measurement		
TSS	106.2	Polyethylene	500 ml	Cool to 4° C	7 days				
Oil & Grease	1664	Amber Glass	1 liter	Cool to 4° C, HCL or H_2SO_4 to pH <2	28 days				

- ☐ Indicate responsible party for emergency/upset/spill notifications in accordance with the permit:_____
- ☐ Indicate responsible party for to begin flow diversion when change in coloration observed: _____

All staff involved in hydrostatic test discharge activities must review the above information and print and sign their name below indicating their participation in a pre-job planning meeting and that they understand the discharge plan, permit, and procedures and are prepared to properly implement them. Attach additional sheets as necessary.

Name (print and sign):

Certified Operator or Environmental Inspector Signature: _____

Enbridge Environment and Construction Management staff reviewed the pre-planning information provided and approve the initiation of discharge activities.

Enbridge Environment Staff Signature and Date: _____

Enbridge Construction Manager Signature and Date: _____

Part 3: Discharge Monitoring - attach additional sheets as necessary

Note: Flow rate must be recorded hourly, sample frequency must be in accordance with the permit specifications

Date	Time	Recorded/Sampled By	Flow Rate (gpm)	pH	Dissolved Oxygen (mg/l)	TSS Sample Collected?	Oil & Grease Sample Collected?	Other (indicate)

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

The Contractor will dispose of all wastes according to applicable federal, state, and local requirements. A listing of potential Emergency Spill Response Contractors and waste disposal facilities is provided below. This list was developed from state-wide data bases. This list represents firms operating at the time the data base 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
North Dakota		
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
Minnesota		
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
Wisconsin - *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.*		

Waste Disposal/Treatment Facilities

Facility	City/State	Telephone
North Dakota		
Gascoyne Materials Handling & Recycling LLC	Dickinson, ND	701.225.0061
Sawyer Disposal Services LLC*	Sawyer, ND	701.624.5622
Dishon Disposal Inc*	Williston, ND	701.572.3223
Prairie Disposal Inc*	Tioga, ND	800.490.2106
Minnesota		
Pope-Douglas Solid Waste	Alexandria, MN	(320) 762-2381
Northstar Reclamation	Fosston, MN	(800) 422-0817
Polk County Incinerator	Fosston, MN	(218) 435-6501
Wisconsin		
Lake Area Landfill (BFI)	Sarona, WI	(612) 457-2778
Timberline Trail (Waste Mgmt.)	Weyerhaueser, WI	(800) 504-1067 ext. 7

Please note: Some facilities may have limitations on amounts, types of materials, etc.
*May accept crude oil-impacted soils and/or wastes from oil field exploration and production activities.

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:_____

Appendix G

Spill Reporting-Agency Contacts

Sandpiper Pipeline Project Spill Reporting Contacts			
Agency	**Reporting Criteria**	**When**	**Phone Number**
Federal Contacts			
National Response Center	Release of a hazardous substance in an amount equal to or greater than its reportable quantity under CERCLA Any quantity of discharged oil that violates state water quality standards, causes a film or sheen on the water's surface, or leaves sludge or emulsion beneath the surface	Immediately	(800) 424-8802
Environmental Protection Agency (EPA) Region V (MN&WI)	Any quantity of discharged oil that violates state water quality standards, causes a film or sheen on the water's surface, or leaves sludge or emulsion beneath the surface	Immediately	1 (312) 353-2000
Environmental Protection Agency (EPA) Region VIII (ND)	Any quantity of discharged oil that violates state water quality standards, causes a film or sheen on the water's surface, or leaves sludge or emulsion beneath the surface	Immediately	1 (303) 312-6312
State Contacts			
North Dakota Industrial Commission, Oil and Gas Division	Must be a leak, spill or other release of fluid that is less than one barrel total volume and remains onsite of a facility.	Immediately	(701) 328-8020
North Dakota Department of Health	Any Amount	Immediately	(701) 328-5210 or 5166
North Dakota Department of Emergency Services (NDDES)	As Needed	Immediately	NDDES Duty Officer System (701) 328-9921 (24 hour, request the Duty Officer be paged) ND Regional Hazardous Materials Teams (800) 472-2121 (Teams requested through State Radio)

Sandpiper Pipeline Project Spill Reporting Contacts			
Agency	**Reporting Criteria**	**When**	**Phone Number**
Minnesota Duty Officer Program	Minnesota has a reporting threshold of greater than five-gallons for petroleum spills. Spills of any quantity of all other chemicals or materials should be reported. If in doubt, report.	Immediately	Duty Officer (651) 649-5451 1 (800) 422-0798
Wisconsin Department of Natural Resources	>one gallon of gasoline on a pervious surface	Immediately	24-hour Toll Free Hotline for Reporting Spills 1 (800) 943-0003
County Contacts – North Dakota			
Williams County Emergency Services County Law Enforcement Center	As Needed		Mike Hallesy (701) 577-7707
Mountrail County Emergency Management Resources	As Needed		Don Longmuir (701) 628-2909
Ward County Emergency Management	As Needed	8:00 a.m.–4:30 p.m. Monday-Friday	Amanda Schooling, Director (701) 857 6560
McHenry County Emergency Management	As Needed		Marvin Sola (815) 338-6400
Pierce County Emergency Management	As Needed	7:30 a.m.-4:30 p.m. Monday-Friday	Kelsey Siegler (253) 798-6595
Benson County Emergency Management	As Needed		Scott Todahl (701) 473-5320
Ramsey County Emergency Management	As Needed		Kristen Nelsen, Local Emergency Manager (701) 662-7001
Nelson County Emergency Management	As Needed		Sharon Young, Local Emergency Manager (701) 247-2472
Grand Forks County Emergency Services	As Needed		Jim Campbell (701) 780-8213
City of Grand Forks Emergency Services	As Needed		John Bernstrom (701) 746-4636
County Contacts – Minnesota			
Polk County Emergency Management	As Needed		Barb Erdman, Director (218) 281-0437

Sandpiper Pipeline Project Spill Reporting Contacts			
Agency	**Reporting Criteria**	**When**	**Phone Number**
Red Lake County Emergency Management	As Needed		Mitch Bernstein (218) 253-2996
Clearwater County Emergency Management	As Needed	8:00 a.m.–4:30 p.m. Monday-Friday	(218) 694-6183
Hubbard County Emergency Management	As Needed		Brian Halbasch (218) 732-2588
Cass County Emergency Management	As Needed		Kerry Swenson, Dispatcher (218) 547-7437
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		Brian Belich, Manager (218) 384-3236
County Contacts – Wisconsin			
Douglas County Emergency Management	As Needed	8:00 a.m.-4:30 p.m. Monday-Friday	Keith Kesler, Director (715) 395-1636

Appendix C

Wetland and Waterbody Delineation Report, Forms, and Representative Photos

INCLUDED IN ELECTRONIC COPY

Appendix D

Waterbody Crossing Table

Sandpiper Pipeline Project and Line 3 Replacement Project
Wisconsin Waterbody Table

Milepost	Feature Unique ID Number	Flow Regime [a]	Waterbody	Waterbody Type	Crossing Width[b]	Crossing Depth[c]	Agency Designation	Impairment	Proposed Crossing Method[d]	Alternative Crossing Method [d]	Construction Timing Restriction [e]	Bridge Type [f]	Legal Description	Site-Specific Plan	Comments
600.88	04010201000307 [g]	P	Unnamed Stream	River/Stream	0.0	0.0	None	None	Dry Crossing	Open Cut	April 1-June 1	Span	T48N, R15W, Sec. 31	No	
601.89	DO007aWB	E	Unnamed Stream	River/Stream	3.0	0.0	None	None	Open Cut	Open Cut	April 1-June 1	Span	T48N, R15W, Sec. 32	No	
601.97	DO007bWB	E	Unnamed Stream	River/Stream	2.0	0.0	None	None	Open Cut	Open Cut	April 1-June 1	Span	T48N, R15W, Sec. 32	No	
602.06	DO007bWB	E	Unnamed Stream	River/Stream	2.0	0.0	None	None	Open Cut	Open Cut	April 1-June 1	Span	T48N, R15W, Sec. 32	No	
602.34	DO008aWB	E	Unnamed Stream	River/Stream	2.0	1.0	None	None	Open Cut	Open Cut	April 1-June 1	Span	T48N, R15W, Sec. 33	No	The stream splits into 2 parts north of the maintained utility corridor.
602.84	DO012aWB	P	Unnamed Stream	River/Stream	NA	NA		None	NA	NA	NA	NA	T48N, R15W, Sec. 33	NA	Beaver impounded
603.50	DO020aWB	P	Unnamed Stream	River/Stream	20.0	0.0	None	None	Dry Crossing	Open Cut	April 1-June 1	Span	T48N, R15W, Sec. 27	No	River bed currently dry due to upstream beaver dam
604.39	DO025aWB	I	Unnamed Stream	River/Stream	3.0	0.0	None	None	Open Cut	Open Cut	April 1-June 1	Span	T48N, R15W, Sec. 26	No	
606.18	DO034_500bWB	E	Little Pokegema River	River/Stream	2.0	0.0	ASNRI Endangered, Threatened or Special Conern Water	None	Open Cut	Open Cut	April 1-June 1	Span	T48N, R15W, Sec. 24	Yes	
606.25	DO034_500aWB	P	Little Pokegema River	River/Stream	7.0	0.1	ASNRI Endangered, Threatened or Special Conern Water	None	Dry Crossing	Open Cut	April 1-June 1	Span	T48N, R15W, Sec. 24	Yes	
607.40	DO041_001bWB	E	Unnamed Stream	River/Stream	1.0	0.0	ASNRI Quality Wetland Stream (T48R14W)	None	Open Cut	Open Cut	April 1-June 1	Span	T48N, R14W, Sec. 18	No	Very small ephemeral stream. Dry.
607.44	DO041_500aWB	P	Unnamed Stream	River/Stream	15.0	6.0	ASNRI Quality Wetland Stream (T48R14W)	None	Dry Crossing	Open Cut	April 1-June 1	Span	T48N, R14W, Sec. 18	No	Bank full. Beaver impounded.
607.53	DO041_506aWB	E	Unnamed Stream	River/Stream	3.0	0.0	None	None	Open Cut	Open Cut	April 1-June 1	Span	T48N, R14W, Sec. 18	No	Small ephemeral stream. Dry. Some pools from recent rain.
607.61	DO041_506cWB	E	Little Pokegema River	River/Stream	2.0	0.0	ASNRI Quality Wetland Stream (T48R14W)	None	Open Cut	Open Cut	April 1-June 1	Span	T48N, R14W, Sec. 18	Yes	Small ephemeral stream. Dry with small pools from recent rain.
607.64	DO041_506cWB	E	Little Pokegema River	River/Stream	2.0	0.0	ASNRI Quality Wetland Stream (T48R14W)	None	Open Cut	Open Cut	April 1-June 1	Span	T48N, R14W, Sec. 18	Yes	Small ephemeral stream. Dry with small pools from recent rain.
607.72	DO041_200aWB	E	Little Pokegema River	River/Stream	1.0	0.0	ASNRI Quality Wetland Stream (T48R14W)	None	Open Cut	Open Cut	April 1-June 1	Span	T48N, R14W, Sec. 18	Yes	Very small ephemeral stream. Dry.
607.78	DO041_200cWB	E	Little Pokegema River	River/Stream	2.0	0.0	ASNRI Quality Wetland Stream (T48R14W)	None	Open Cut	Open Cut	April 1-June 1	Span	T48N, R14W, Sec. 18	Yes	Small ephemeral stream. Dry.
607.79	DO041_200bWB	P	Little Pokegema River	River/Stream	NA	NA	ASNRI Quality Wetland Stream (T48R14W)	None	NA	NA	NA	NA	T48N, R14W, Sec. 18	NA	
607.85	DO041_200bWB	P	Little Pokegema River	River/Stream	NA	NA	ASNRI Quality Wetland Stream (T48R14W)	None	NA	NA	NA	NA	T48N, R14W, Sec. 18	NA	
607.87	DO041_200bWB	P	Little Pokegema River	River/Stream	NA	NA	ASNRI Quality Wetland Stream (T48R14W)	None	NA	NA	NA	NA	T48N, R14W, Sec. 18	NA	
607.91	DO041_200bWB	P	Little Pokegema River	River/Stream	NA	NA	ASNRI Quality Wetland Stream (T48R14W)	None	NA	NA	NA	NA	T48N, R14W, Sec. 18	NA	
607.94	DO041_200bWB	P	Little Pokegema River	River/Stream	15.0	2.0	ASNRI Quality Wetland Stream (T48R14W)	None	Dry Crossing	Open Cut	April 1-June 1	Span	T48N, R14W, Sec. 18	Yes	Lower perennial stream.
607.96	DO041_508bWB	E	Little Pokegema River	River/Stream	2.0	0.5	None	None	Open Cut	Open Cut	April 1-June 1	Span	T48N, R14W, Sec. 18	No	Very small ephemeral stream. Dry.
608.00	DO041_200bWB	P	Little Pokegema River	River/Stream	15.0	2.0	ASNRI Quality Wetland Stream (T48R14W)	None	Dry Crossing	Open Cut	April 1-June 1	Span	T48N, R14W, Sec. 18	Yes	Lower perrenial stream.
610.26	DO041_534aWB	E	Unnamed Tributary: Pokegema River	River/Stream	3.0	0.0	ASNRI Quality Wetland Stream (T48R14W), ASNRI Endangered, Threatened or Special Concern Water	None	Open Cut	Open Cut	April 1-June 1	Span	T48N, R14W, Sec. 9	Yes	The waterbody feeds into a larger perennial waterbody that is impacted by beaver activity
610.34	DO041_534_200aWB	P	Unnamed Tributary: Pokegema River	River/Stream	6.0	1.0	ASNRI Quality Wetland Stream (T48R14W), ASNRI Endangered, Threatened or Special Concern Water	None	Dry Crossing	Open Cut	April 1-June 1	Span	T48N, R14W, Sec. 9	Yes	Perennial waterbody influenced by beaver activity

Sandpiper Pipeline Project and Line 3 Replacement Project
Wisconsin Waterbody Table

Milepost	Feature Unique ID Number	Flow Regime [a]	Waterbody	Waterbody Type	Crossing Width[b]	Crossing Depth[c]	Agency Designation	Impairment	Proposed Crossing Method[d]	Alternative Crossing Method [d]	Construction Timing Restriction [e]	Bridge Type [f]	Legal Description	Site-Specific Plan	Comments
611.30	DO057aWB	P	Pokegema River	River/Stream	25.0	2.5	ASNRI Quality Wetland Stream (T48R14W), ASNRI Endangered, Threatened or Special Concern Water	None	Dry Crossing	Open Cut	April 1-June 1	Span	T48N, R14W, Sec. 10	Yes	
611.77	DO065_900RDcWB	I	Unnamed	Ditch	1.0	0.0	None	None	Open Cut	Open Cut	April 1-June 1	Span	T48N, R14W, Sec. 10	No	
612.11	DO074aWB	I	Unnamed Ditch	Ditch	2.5	0.3	None	None	Open Cut	Open Cut	April 1-June 1	Span	T48N, R14W, Sec. 10	No	
612.13	DO075aWB	E	Unnamed Stream	River/Stream	0.0	0.0	None	None	Open Cut	Open Cut	April 1-June 1	Span	T48N, R14W, Sec. 11	No	No water low at time of sampling.
612.90	DO094_001aWB	P	Unnamed Stream	River/Stream	4.5	0.5	None	None	Dry Crossing	Open Cut	April 1-June 1	Span	T48N, R14W, Sec. 2	No	
613.10	DO100_510aWB	I	Unnamed Ditch	Ditch	1.5	0.0	None	None	Open Cut	Open Cut	April 1-June 1	Span	T48N, R14W, Sec. 2	No	
613.19	DO106_200bWB	I	Unnamed Ditch	Ditch	3.0	0.0	None	None	Open Cut	Open Cut	April 1-June 1	Span	T48N, R14W, Sec. 2	No	
613.24	DO106aWB	I	Unnamed Ditch	Ditch	4.0	0.3	None	None	Open Cut	Open Cut	April 1-June 1	Span	T48N, R14W, Sec. 2	No	
613.27	DO106_200aWB	I	Unnamed Ditch	Ditch	3.5	0.0	None	None	Open Cut	Open Cut	April 1-June 1	Span	T48N, R14W, Sec. 2	No	
613.35	DO106bWB	I	Unnamed Ditch	Ditch	6.0	0.5	None	None	Open Cut	Open Cut	April 1-June 1	Span	T48N, R14W, Sec. 2	No	
613.38	DO106bWB	I	Unnamed Ditch	Ditch	6.0	0.5	None	None	Open Cut	Open Cut	April 1-June 1	Span	T48N, R14W, Sec. 2	No	
613.43	DO106bWB	I	Unnamed Ditch	Ditch	6.0	0.5	None	None	Open Cut	Open Cut	April 1-June 1	Span	T48N, R14W, Sec. 2	No	
614.03	DO110_001aWB	I	Unnamed Ditch	Ditch	2.0	0.0	None	None	Open Cut	Open Cut	April 1-June 1	Span	T49N, R14W, Sec. 35	No	
614.11	DO112aWB	E	Unnamed Stream	River/Stream	NA	NA	None	None	NA	NA	NA	NA	T49N, R14W, Sec. 36	NA	
				TOTAL	**173.0 (0.04 Miles)**										
Route Alternative A2															
NA	04010201001150 [g]	P	Little Pokegema River	River/Stream	0.0	0.0	ASNRI Endangered, Threatened or Special Conern Water	None	Dry Crossing	Open Cut	April 1-June 1	Span	T48N, R14W, Sec. 10	Yes	
NA	DO055aWB	P	Unnamed River/Stream	River/Stream	6.0	3.0	ASNRI Quality Wetland Stream	None	Dry Crossing	Open Cut	April 1-June 1	Span	T48N, R14W, Sec. 19	No	Stream appears to be flooded due to recent rainfall.
Route Alternative C2															
NA	DO100_510aWB	I	Unnamed Ditch	Ditch	1.5	0.0	None	None	Open Cut	Open Cut	April 1-June 1	Span	T48N, R14W, Sec. 2	No	
NA	DO106_200bWB	I	Unnamed Ditch	Ditch	3.0	0.0	None	None	Open Cut	Open Cut	April 1-June 1	Span	T48N, R14W, Sec. 2	No	
NA	DO106aWB	I	Unnamed Ditch	Ditch	4.0	0.3	None	None	Open Cut	Open Cut	April 1-June 1	Span	T48N, R14W, Sec. 2	No	
NA	DO106bWB	I	Unnamed Ditch	Ditch	6.0	0.5	None	None	Open Cut	Open Cut	April 1-June 1	Span	T48N, R14W, Sec.2	No	
NA	DO110aWB	I	Unnamed Ditch	Ditch	3.0	0.0	None	None	Open Cut	Open Cut	April 1-June 1	Span	T49N, 14W, Sec. 35	No	

NA Not available

[a] P = Perennial flow, I = Intermittent flow, E = Ephemeral flow based on field observations.

[b] Width of the channel in feet between the Ordinary High Water Mark (OHWM) on both channel banks.

[c] Estimated or measured channel depth in feet from the OHWM to the water level or channel bed.

[d] Proposed waterbody crossing methods are based on engineering investigations, constructability, and environmental constraints. Open Cut: Open trench method used in conditions of no flow, sometimes referred to as the "wet trench" method.
Dry Crossing: Open trench method used in conditions where a discernible water flow is present in the waterbody; referred to as the "dry trench" method, water is routed around the excavation area using either a dam and pump or flume pipe.

[e] Timing restrictions are based on anticipated WDNR permit conditions.

[f] Span bridges may consist of timber construction mats, rail car decks, other bridge decking and may or may not be supported by flumes, clean rock or other supports in the water column. Sediment control for bridging is described in the EPP.

[g] Designates a segment of the pipeline route that was realigned after the field season ended in the fall 2013; therefore, waterbodies were identified using the National Hydrography Dataset. Crossing widths and depths are estimated. Field surveys will be conducted in the spring 2014 to verify and characterize waterbodies crossed.

Appendix E

Wetland Crossing Table

Sandpiper Pipeline and Line 3 Replacement Projects
Wisconsin Wetland Crossing Table

Feature Unique ID	Approximate Milepost	Milepost In [a]	Milepost Out [a]	Crossing Length (feet) [a]	Cowardin [b]	Eggers and Reed [c]	Circular 39 [d]	Wetland Impact - Construction (acres) [e]	Wetland Impact - Operation (acres) [f]	Permanent Conversion (acres) [g]
DO003a1W	601.2	601.2	601.2	26	PFO	Hardwood Swamp	Type 7	0.05	0.04	0.04
DO003g1W	601.2	601.2	601.2	48	PFO	Hardwood Swamp	Type 7	0.06	0.06	0.06
DO003b1W	601.3	601.2	601.3	94	PFO	Hardwood Swamp	Type 7	0.08	0.08	0.08
DO003b1W	601.3	-	-	-	PSS	Shrub Carr	Type 6	0.01	0.00	0.00
DO004a1W	601.4	601.4	601.4	379	PFO	Hardwood Swamp	Type 7	0.64	0.54	0.54
DO004a1W	601.4	-	-	-	PEM	Hardwood Swamp	Type 7	0.02	0.01	-
DO004e1W	601.4	601.4	601.4	101	PFO	Hardwood Swamp	Type 7	0.11	0.11	0.11
DO004d1W	601.5	601.5	601.5	26	PFO	Hardwood Swamp	Type 7	0.02	0.02	0.02
DO004c1W	601.5	601.5	601.5	95	PFO	Hardwood Swamp	Type 7	0.10	0.09	0.09
DO005a1W	601.6	-	-	-	PSS	Shrub Carr	Type 6	0.03	0.02	0.02
DO005a1W	601.7	601.6	601.7	303	PEM	Fresh (Wet) Meadow	Type 2	0.56	0.39	-
DO005b1W	601.7	601.7	601.7	29	PEM	Fresh (Wet) Meadow	Type 2	0.15	0.04	-
DO005c1W	601.8	-	-	-	PFO	Hardwood Swamp	Type 7	0.06	-	-
DO005c1W	601.8	601.8	601.8	45	PEM	Fresh (Wet) Meadow	Type 2	0.29	0.16	-
DO006a1W	601.8	-	-	-	PEM	Fresh (Wet) Meadow	Type 2	0.01	-	-
DO007a1W	601.9	601.9	601.9	67	PEM	Fresh (Wet) Meadow	Type 2	0.11	0.04	-
DO007b1W	602.0	602.0	602.0	52	PSS	Shrub Carr	Type 6	0.05	0.01	0.01
DO007b1W	602.0	602.1	602.1	63	PEM	Fresh (Wet) Meadow	Type 2	0.36	0.16	-
w-1086jj	602.0	-	-	-	PFO	TBD	TBD	0.01	-	-
DO007c1W	602.0	602.0	602.0	6	PEM	Fresh (Wet) Meadow	Type 2	0.04	0.04	-
DO007b1W	602.1	602.1	602.1	90	PUB	Shallow, Open Water	Type 5	0.10	0.04	-
DO008a1W	602.1	-	-	-	PSS	Alder Thicket	Type 6	0.13	-	-
DO008a1W	602.1	-	-	-	PFO	Hardwood Swamp	Type 7	0.27	-	-
DO008a1W	602.2	602.1	602.1	320	PEM	Fresh (Wet) Meadow	Type 2	1.37	0.78	-
DO008b1W	602.3	-	-	-	PSS	Shrub Carr	Type 6	0.01	-	-
DO008b1W	602.3	602.3	602.3	19	PEM	Fresh (Wet) Meadow	Type 2	0.02	0.01	-
DO008d1W	602.4	-	-	-	PFO	Hardwood Swamp	Type 7	0.06	-	-
DO008d1W	602.4	602.4	602.4	107	PEM	Fresh (Wet) Meadow	Type 2	0.43	0.20	-
DO009a1W	602.5	-	-	-	PFO	Hardwood Swamp	Type 7	0.22	0.00	0.00
DO009a1W	602.5	-	-	-	PSS	Alder Thicket	Type 6	0.15	0.00	0.00
DO009a1W	602.7	602.5	602.6	1,538	PEM	Fresh (Wet) Meadow	Type 2	3.50	1.57	-
DO012a1W	602.8	602.9	602.9	113	PEM	Fresh (Wet) Meadow	Type 2	0.31	0.10	-

Sandpiper Pipeline and Line 3 Replacement Projects
Wisconsin Wetland Crossing Table

Feature Unique ID	Approximate Milepost	Milepost In [a]	Milepost Out [a]	Crossing Length (feet) [a]	Cowardin [b]	Eggers and Reed [c]	Circular 39 [d]	Wetland Impact - Construction (acres) [e]	Wetland Impact - Operation (acres) [f]	Permanent Conversion (acres) [g]
DO012a1W	602.8	-	-	-	PFO	Hardwood Swamp	Type 7	0.12	0.00	0.00
DO012a1W	602.9	-	-	-	PUB	Shallow, Open Water	Type 5	0.01	-	-
DO018b1W	603.0	603.0	603.0	68	PFO	Hardwood Swamp	Type 7	0.83	0.23	0.23
DO018b1W	603.0	-	-	-	PSS	Hardwood Swamp	Type 7	0.39	0.01	0.01
DO018b1W	603.1	603.0	603.0	1,252	PEM	Sedge Meadow	Type 2	2.42	1.54	-
DO018a1W	603.4	603.4	603.4	41	PEM	Sedge Meadow	Type 2	0.07	0.02	-
DO020d1W	603.4	603.4	603.4	110	PEM	Sedge Meadow	Type 2	0.19	0.08	-
DO020c1W	603.5	-	-	-	PFO	Hardwood Swamp	Type 7	0.03	-	-
DO020c1W	603.5	603.5	603.5	111	PEM	Fresh (Wet) Meadow	Type 2	0.31	0.12	-
DO020b1W	603.5	603.5	603.5	79	PEM	Sedge Meadow	Type 2	0.36	0.14	-
w-1087ws3	603.5	-	-	-	PEM	TBD	TBD	0.00	-	-
DO020a1W	603.6	603.6	603.6	34	PEM	Fresh (Wet) Meadow	Type 2	0.04	0.00	-
DO021a1W	603.6	603.6	603.6	282	PEM	Sedge Meadow	Type 2	0.81	0.34	-
DO021a1W	603.7	-	-	-	PSS	Alder Thicket	Type 6	0.25	0.00	0.00
DO022a1W	603.7	-	-	-	PSS	Alder Thicket	Type 6	0.16	-	-
DO022a1W	603.8	-	-	-	PFO	Hardwood Swamp	Type 7	0.29	0.00	0.00
DO022a1W	603.8	603.7	603.8	1,050	PEM	Sedge Meadow	Type 2	2.27	1.05	-
DO025c1W	604.0	-	-	-	PFO	Hardwood Swamp	Type 7	0.67	0.02	0.02
DO025c1W	604.1	604.1	604.2	1,007	PEM	Fresh (Wet) Meadow	Type 2	2.08	1.05	-
DO025b1W	604.4	604.4	604.4	43	PEM	Sedge Meadow	Type 2	0.09	0.03	-
DO025a1W	604.4	604.7	604.7	418	PSS	Alder Thicket	Type 7	1.90	0.70	0.70
DO025a1W	604.4	604.4	604.4	782	PEM	Fresh (Wet) Meadow	Type 2	1.57	0.91	-
DO025a1W	604.6	604.8	604.8	45	PFO	Hardwood Swamp	Type 7	0.67	0.08	0.08
WWI-3	604.7	-	-	-	PFO	TBD	TBD	0.00	-	-
WWI-4	604.8	-	-	-	PFO	TBD	TBD	0.11	0.05	0.05
DO029a1W	604.9	604.9	604.9	111	PEM	Fresh (Wet) Meadow	Type 2	0.13	0.12	-
WWI-5	605.0	-	-	-	PFO	TBD	TBD	0.36	-	-
w-1088ws4	605.0	-	-	-	PEM	TBD	TBD	0.00	-	-
w-1088ws4	605.0	-	-	-	PSS	TBD	TBD	0.06	-	-
DO029b1W	605.0	605.0	605.0	137	PSS	Alder Thicket		3.54	1.47	1.47
DO029b1W	605.0	605.0	605.0	3,235	PEM	Fresh (Wet) Meadow	Type 2	4.17	1.41	-
w-1088ws3	605.0	-	-	-	PEM	TBD	TBD	0.00	-	-

Sandpiper Pipeline and Line 3 Replacement Projects
Wisconsin Wetland Crossing Table

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DO029b1W	605.5	-	-	-	PFO	Hardwood Swamp	Type 7	0.01	0.01	0.01
DO034a1W	605.7	605.9	606.0	811	PSS	Alder Thicket	Type 6	2.82	1.48	1.48
DO034a1W	605.7	606.0	606.0	48	PFO	Hardwood Swamp	Type 7	0.39	0.24	0.24
DO034a1W	605.7	605.7	605.7	834	PEM	Fresh (Wet) Meadow	Type 2	1.18	0.44	-
WWI-44	606.0	-	-	-	PSS	TBD	TBD	0.00	-	-
DO035_200a1W	606.1	-	-	-	PEM	Fresh (Wet) Meadow	Type 2	0.02	0.01	-
DO035_200a1W	606.1	606.1	606.1	79	PFO	Hardwood Swamp	Type 7	0.09	0.08	0.08
DO034_500a1W	606.2	606.2	606.2	97	PFO	Floodplain Forest	Type 7	0.28	0.15	0.15
DO034_505a1W	606.2	-	-	-	PFO	Hardwood Swamp	Type 7	0.01	0.01	0.01
DO034_510b1W	606.3	-	-	-	PEM	Fresh (Wet) Meadow	Type 2	0.01	0.00	-
DO034_510b1W	606.3	606.3	606.3	36	PFO	Hardwood Swamp	Type 7	0.11	0.06	0.06
DO034_510a1W	606.4	606.3	606.4	86	PFO	Alder Thicket	Type 6	0.09	0.08	0.08
DO034_510a1W	606.4	-	-	-	PEM	Sedge Meadow	Type 2	0.02	0.01	-
DO034_515a1W	606.4	606.4	606.4	86	PSS	Alder Thicket	Type 6	0.12	0.11	0.11
DO034_515a1W	606.4	-	-	-	PEM	Fresh (Wet) Meadow	Type 2	0.00	0.00	-
DO034_520b1W	606.4	-	-	-	PFO	Hardwood Swamp	Type 7	0.03	-	-
DO034_520a1W	606.5	606.4	606.5	198	PEM	Fresh (Wet) Meadow	Type 2	0.27	0.24	-
DO034_520a1W	606.5	606.5	606.5	99	PSS	Shrub Carr	Type 6	0.48	0.22	0.22
DO034_520a1W	606.5	606.5	606.5	65	PFO	Hardwood Swamp	Type 7	0.06	0.06	0.06
DO034_525a1W	606.6	606.6	606.6	53	PSS	Alder Thicket	Type 6	0.04	0.03	0.03
DO034_525a1W	606.6	606.6	606.6	89	PFO	Hardwood Swamp	Type 7	0.19	0.12	0.12
DO034_525a1W	606.6	606.6	606.6	74	PEM	Sedge Meadow	Type 2	0.19	0.15	-
DO034_535a1W	606.6	606.7	606.7	924	PSS	Alder Thicket	Type 6	2.40	1.39	1.39
DO034_535a1W	606.6	-	-	-	PEM	Fresh (Wet) Meadow	Type 2	0.08	0.01	-
DO034_535a1W	606.7	606.9	606.9	25	PFO	Hardwood Swamp	Type 7	0.14	0.04	0.04
DO041b1W	607.0	607.0	607.0	287	PEM	Sedge Meadow	Type 2	0.50	0.37	-
DO041b1W	607.0	607.0	607.0	696	PSS	Alder Thicket	Type 6	2.11	1.19	1.19
DO041_500a1W	607.2	607.3	607.3	500	PSS	Alder Thicket	Type 6	1.75	0.90	0.90
DO041_500_310a1W	607.2	607.2	607.2	35	PSS	Alder Thicket	Type 6	0.07	0.06	0.06
DO041_001a1W	607.4	607.4	607.4	64	PFO	Floodplain Forest	Type 7	0.20	0.11	0.11
DO041_506a1W	607.5	-	-	-	PFO	Hardwood Swamp	Type 7	0.02	-	-
DO041_506b1W	607.5	607.5	607.5	67	PFO	Hardwood Swamp	Type 7	0.13	0.11	0.11

Sandpiper Pipeline and Line 3 Replacement Projects
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DO041_506c1W	607.6	607.6	607.6	98	PFO	Hardwood Swamp	Type 7	0.25	0.17	0.17
DO041_506d1W	607.8	607.8	607.9	606	PFO	Floodplain Forest	Type 7	1.08	0.90	0.90
DO041_508a1W	608.1	608.0	608.1	395	PSS	Alder Thicket	Type 6	1.51	0.58	0.58
DO041_508a1W	608.2	608.2	608.2	265	PEM	Sedge Meadow	Type 2	0.54	0.39	-
WWI-8	608.3	-	-	-	PSS	TBD	TBD	0.12	0.00	0.00
WWI-9	608.4	-	-	-	PFO	TBD	TBD	0.12	0.02	0.02
WWI-10	608.6	608.5	608.7	997	PFO	TBD	TBD	2.84	1.62	1.62
WWI-12	608.7	608.7	608.7	338	PFO	TBD	TBD	0.95	0.55	0.55
WWI-14	608.8	608.8	608.9	409	PSS	TBD	TBD	1.18	0.97	0.97
WWI-11	608.8	-	-	-	PFO	TBD	TBD	0.20	-	-
WWI-13	608.8	-	-	-	PSS	TBD	TBD	0.08	-	-
DO041_520_200a1W	609.1	609.1	609.1	323	PFO	Hardwood Swamp	Type 7	0.37	0.47	0.47
DO041_520_200a1W	609.1	609.1	609.1	2,196	PSS	Alder Thicket	Type 6	6.97	4.11	4.11
WWI-15	609.1	-	-	-	PFO	TBD	TBD	0.33	-	-
WWI-17	609.4	-	-	-	PFO	TBD	TBD	0.12	-	-
DO041_520_200a1W	609.5	-	-	-	PEM	Fresh (Wet) Meadow	Type 2	0.02	0.00	-
DO041_522a1W	609.6	609.9	609.9	99	PEM	Alder Thicket	Type 6	0.63	0.40	-
DO041_522a1W	609.6	609.6	609.6	1,195	PFO	Alder Thicket	Type 6	3.15	1.92	1.92
DO041_522a1W	609.6	609.6	609.7	2,053	PSS	Alder Thicket	Type 6	4.80	3.03	3.03
DO041_534_200a1W	610.3	610.3	610.3	58	PEM	Fresh (Wet) Meadow	Type 2	0.15	0.10	-
DO041_536a1W	610.4	610.4	610.4	55	PFO	Hardwood Swamp	Type 7	0.59	0.24	0.24
DO041_536a1W	610.4	610.4	610.4	642	PSS	Alder Thicket	Type 6	1.36	0.92	0.92
WWI-22	610.6	-	-	-	PSS	TBD	TBD	0.01	-	-
DO041_538a1W	610.6	610.6	610.6	154	PFO	Hardwood Swamp	Type 7	0.39	0.25	0.25
DO041_538a1W	610.6	610.6	610.6	748	PEM	Fresh (Wet) Meadow	Type 2	2.43	1.36	-
DO041_538a1W	610.7	610.6	610.7	537	PSS	Shrub Carr	Type 6	0.88	0.71	0.71
DO041_542_300a1W	610.9	-	-	-	PEM	Fresh (Wet) Meadow	Type 2	0.00	-	-
DO041_544a1W	610.9	610.9	610.9	1,248	PSS	Shrub Carr	Type 6	3.41	1.87	1.87
DO041_544a1W	610.9	611.0	611.1	265	PEM	Sedge Meadow	Type 2	0.65	0.29	-
DO041_544a1W	611.2	611.2	611.2	7	PFO	Hardwood Swamp	Type 7	0.29	0.07	0.07
DO057a1W	611.3	611.3	611.3	221	PFO	Sedge Meadow	Type 2	0.56	0.21	0.21
DO057b1W	611.5	-	-	-	PEM	Fresh (Wet) Meadow	Type 2	0.11	-	-

Sandpiper Pipeline and Line 3 Replacement Projects
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DO059a1W	611.5	611.5	611.6	65	PEM	Fresh (Wet) Meadow	Type 2	0.08	0.00	-
DO059a1W	611.6	-	-	-	PFO	Hardwood Swamp	Type 7	0.04	0.02	0.02
DO060a1W	611.6	611.6	611.6	59	PEM	Fresh (Wet) Meadow	Type 2	0.13	0.08	-
DO057_200a1W	611.6	-	-	-	PFO	Hardwood Swamp	Type 7	0.02	-	-
DO060_220a1W	611.6	-	-	-	PSS	Alder Thicket	Type 6	0.01	0.00	0.00
DO063a1W	611.6	611.6	611.6	25	PSS	Shrub Carr	Type 6	0.05	0.02	0.02
DO063a1W	611.7	611.6	611.6	191	PEM	Fresh (Wet) Meadow	Type 2	0.20	0.06	-
DO064a1W	611.7	611.7	611.8	352	PEM	Fresh (Wet) Meadow	Type 2	0.69	0.31	-
DO066_001a1W	611.8	611.8	611.8	108	PEM	Fresh (Wet) Meadow	Type 2	0.30	0.12	-
DO066_001a1W	611.8	-	-	-	PFO	Hardwood Swamp	Type 7	0.03	0.00	0.00
w-1094ws5	611.8	611.8	611.8	7	PEM	TBD	TBD	0.02	0.01	-
WWI-30	611.8	611.8	611.8	61	PFO	TBD	TBD	0.17	0.07	0.07
w-1094ws4	611.8	611.8	611.8	0	PEM	TBD	TBD	0.00	0.00	-
DO071a1W	611.9	-	-	-	PSS	Alder Thicket	Type 6	0.57	0.00	0.00
DO071a1W	611.9	611.8	612.0	1,014	PEM	Fresh (Wet) Meadow	Type 2	1.71	0.89	-
DO071a1W	611.9	-	-	-	PFO	Hardwood Swamp	Type 7	0.72	-	-
DO071_001a2W	612.1	612.0	612.1	87	PEM	Fresh (Wet) Meadow	Type 2	0.13	0.08	-
DO075_200a1W	612.1	612.1	612.1	2,412	PEM	Fresh (Wet) Meadow	Type 2	4.47	2.33	-
DO075_200a1W	612.1	612.1	612.1	736	PSS	Alder Thicket	Type 6	3.25	1.38	1.38
DO075_200a1W	612.2	612.3	612.3	313	PFO	Hardwood Swamp	Type 7	1.10	0.46	0.46
WWI-45	612.4	-	-	-	PSS	TBD	TBD	0.05	-	-
WWI-31	612.4	-	-	-	PSS	TBD	TBD	0.00	0.00	0.00
DO091a1W	612.8	612.8	612.8	124	PEM	Fresh (Wet) Meadow	Type 2	0.17	0.07	-
DO093_200a1W	612.9	612.9	612.9	166	PFO	Hardwood Swamp	Type 7	0.43	0.26	0.26
WWI-32	613.0	613.0	613.0	16	PFO	TBD	TBD	0.49	0.27	0.27
WWI-34	613.0	-	-	-	PFO	TBD	TBD	0.08	0.05	0.05
WWI-33	613.1	613.0	613.1	121	PFO	TBD	TBD	0.46	0.20	0.20
DO094_001a1W	613.1	-	-	-	PEM	Sedge Meadow	Type 2	0.00	-	-
DO100_510a1W	613.1	613.1	613.1	2,475	PSS	Shrub Carr	Type 6	7.38	4.32	4.32
DO100_510a1W	613.4	613.4	613.4	846	PEM	Fresh (Wet) Meadow	Type 2	2.40	1.49	-
w-8r1096a	613.5	613.5	613.5	291	PEM	TBD	TBD	0.91	0.47	-
WWI-39	613.5	613.5	613.5	47	PSS	TBD	TBD	0.46	0.10	0.10

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w-8r1096c	613.6	613.5	613.7	1,163	PEM	TBD	TBD	2.88	1.87	-
DO109_204a1W	613.7	613.7	613.8	203	PSS	Shrub Carr	Type 6	0.74	0.35	0.35
DO121a1W	613.8	613.8	613.8	590	PSS	Alder Thicket	Type 6	3.44	1.21	1.21
DO121a1W	613.8	613.8	613.8	232	PFO	Hardwood Swamp	Type 7	1.62	0.60	0.60
DO121a1W	614.0	614.0	614.0	4,178	PEM	Fresh (Wet) Meadow	Type 2	6.48	3.36	-
DO122a1W	614.8	-	-	-	PEM	Fresh (Wet) Meadow	Type 2	0.04	-	-
DO122b1W	614.9	614.9	614.9	261	PEM	Fresh (Wet) Meadow	Type 2	0.61	0.37	-
DO124_200a1W	615.0	615.0	615.0	273	PEM	Fresh (Wet) Meadow	Type 2	0.78	0.38	-
DO124_200a1W	615.0	615.0	615.0	84	PFO	Hardwood Swamp	Type 7	0.19	0.12	0.12
			TOTAL	**46,992**				**126.45**	**64.01**	**38.02**
				(9 miles)						
Route Alternative A2										
DO041k1W	0.0	-	-	86	PFO	Hardwood Swamp	Type 7	0.81	0.32	0.32
DO041k1W	0.0	-	-	476	PEM	Fresh (Wet) Meadow	Type 2	1.28	0.51	-
DO041k1W	0.0	-	-	6,300	PSS	Alder Thicket	Type 6	16.31	6.50	6.50
WWI-20	0.0	-	-	436	PFO	TBD	TBD	1.71	0.44	0.44
WWI-19	0.0	-	-	186	PSS	TBD	TBD	0.76	0.26	0.26
w-1092ws5	0.0	-	-	175	PSS	TBD	TBD	0.62	0.40	0.40
WWI-21	0.0	-	-	-	PSS	TBD	TBD	0.07	-	-
w-1093ws1	0.0	-	-	518	PEM	TBD	TBD	1.12	0.40	-
w-1093ws1	0.0	-	-	-	PSS	TBD	TBD	0.38	0.17	0.17
ar1093.3	0.0	-	-	-	PEM	TBD	TBD	0.04	-	-
DO053a1W	0.0	-	-	3,977	PEM	Fresh (Wet) Meadow	Type 2	5.23	2.08	-
DO053a1W	0.0	-	-	-	PSS	Alder Thicket	Type 6	4.48	2.11	2.11
w-1092ws5	0.0	-	-	223	PEM	TBD	TBD	0.31	0.02	-
WWI-43	0.0	-	-	-	PFO	TBD	TBD	0.05	0.00	0.00
WWI-40	0.0	-	-	551	PFO	TBD	TBD	1.26	0.85	0.85
WWI-42	0.0	-	-	756	PSS	TBD	TBD	2.31	1.24	1.24
WWI-7	0.0	-	-	318	PFO	TBD	TBD	0.89	0.47	0.47
Route Alternative B2										
w-1095ws2	0.0	-	-	191	PEM	TBD	TBD	0.49	-	-
w-1095ws2	0.0	-	-	736	PSS	TBD	TBD	1.73	0.93	0.93

Sandpiper Pipeline and Line 3 Replacement Projects
Wisconsin Wetland Crossing Table

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[a] Crossing length of proposed pipeline centerline across wetlands. No milepost or crossing length indicates the wetland is within the construction workspace, but is not crossed by the proposed pipeline.

[b] PEM = Palustrine Emergent; PSS=Palustrine Scrub Shrub; PFO = Palustrine Forested (Cowardin et al, 1979).

[c] Eggers, Steve D., and Donald M. Reed. 1997. Wetland plants and communities of Minnesota and Wisconsin. U.S. Army Corps of Engineers, St. Paul District. Jamestown, ND: Northern Prairie Wildlife Research Center Online. http://www.npwrc.usgs.gov/resource/plants/mnplant/index.htm (Version 03SEP1998).

[d] Type 1 = Seasonally flooded basin or flat; Type 2 = Inland fresh meadow; Type 3 = Inland shallow marsh; Type 4 =Inland deep marsh; Type 5 = Inland open fresh water; Type 6 = Shrub swamp; Type 7 = Wooded swamp; Type 8 = Bog (Circular 39 Classification, 1956)

[e] Area of wetland impact within the construction workspace based typically on a 85-foot-wide workspace, including temporary dredge and fill areas, travel lanes, and staging areas.

[f] Area affected by operation include the area within the new permanent easement where the pipeline corridor will be maintained by periodic clearing activities.

[g] Permanent conversion impacts include the area within the new permanent easement where the pipeline corridor will be maintained by periodic clearing activities.

Appendix F

Wetland Mitigation Plan

Wetland Mitigation Compensation Site Plan

Crawford Creek Mitigation Site

SEH No. ENBRI 126976

February 2014

Crawford Creek Mitigation Site
Wetland Mitigation Compensation Site Plan

Prepared for:
Enbridge

SEH No. ENBRI 126976

February 2014

I hereby certify that this report was prepared by me or under my direct supervision.

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Compensatory Mitigation Site Plan Executive Summary

Site Name: Crawford Creek Compensatory Wetland Mitigation Site

Location of Compensatory Mitigation Site: The site is located in northern Douglas County, Lake Superior Basin (WMU); Nemadji River Watershed; 10-digit Hydrologic Unit Code (HUC) 0401030105 (Lower Nemadji); 12-digit HUC 040103010503; in the NE 1/4 of Section 23, Township 48 North, Range 14 West in the Town of Superior. The site is located on the east side of Darrow Road, south of the intersection of Darrow Road and County Highway C. The site is immediately north of the existing Superior Terminal Enhancement Project (STEP) Wetland Mitigation Site.

Project-Specific Mitigation: The Crawford Creek Compensatory Wetland Mitigation Site is proposed as project-specific mitigation for wetland impacts associated with Enbridge's Line 3 Replacement and Sandpiper Pipeline Projects in Wisconsin.

General Description of Design Concept for the Compensatory Mitigation Site: The wetland mitigation site plan includes restoration and enhancement of forested wetland, shrub-carr, and fresh (wet) meadow habitats, as well as preservation of wetlands adjacent to Crawford Creek. Hydrology and wetland characteristics will be restored by blocking the man-made ditches and preventing channelized flow of water through the site into Crawford Creek. Minimal earthwork is planned and the only ground disturbance is proposed for placing 16 ditch plugs covering approximately 11,000 square feet (0.25 acres) and removal of existing soil stockpiles. Using the existing surrounding vegetation as a guide, as well as replacing impacted habitat types as closely as practicable, the vegetation planting plan includes clusters of shrubs and trees within a native wet meadow matrix. The primary goal of the wetland restoration is the reestablishment of more natural wetland hydrology and development of a diverse assemblage of wetland communities. The primary goal of preservation of land adjacent to Crawford Creek is prevention of fragmentation of habitat and clearing of natural vegetation that contributes to erosion and sedimentation in the Crawford Creek and Nemadji River watersheds.

Surrounding land uses: The site is bounded by Darrow Road on the west, rural residential property on the north, undeveloped forested wetland adjacent to Crawford Creek to the east, and an existing Enbridge wetland mitigation site (STEP Wetland Mitigation Site) on the south.

Planned hydrology (expected water depth): Hydrologic depths will vary throughout the site and include temporarily/seasonally inundated areas and saturated soil areas. The hydrologic source is surface water/sheet flow. Average water depth in proposed wetland areas is between saturation at one (1) foot below the soil surface and one (1) foot of temporary inundation above the ground surface. Other areas are planned to remain upland with saturation below one (1) foot below ground surface.

Planned construction date: 2014/2015.

Executive Summary (Continued)

Table ES-1 is a summary of wetland impacts by Project.

Table ES-1 Summary of Wetland Types Affected		
Line 3 Project		
Wetland Type	**Wetland Impacts – Temporary Construction Impacts (acres)**	**Wetland Impacts – Permanent Type Conversion (acres)**
PFO – Floodplain Forest/Forested Swamp	5.94	3.31
PEM – Fresh (Wet) Meadow/Sedge Meadow/Marsh	4.30	-
PSS – Shrub Swamp	11.69	8.99
PUB – Deep Marsh/Shallow Open Water	0.00	-
Project Total	**21.93**	**12.30**
Sandpiper Project		
Wetland Type	**Wetland Impacts – Temporary Construction Impacts (acres)**	**Wetland Impacts – Permanent Type Conversion (acres)**
PFO – Floodplain Forest/Forested Swamp	17.18	7.54
PEM – Fresh (Wet) Meadow/Sedge Meadow/Marsh	46.18	-
PSS – Shrub Swamp	41.21	18.18
PUB – Deep Marsh/Shallow Open Water	0.11	-
Project Total	**104.68**	**25.72**
Totals, Both Projects	**126.61**	**38.02**

Executive Summary (Continued)

Table ES-2 is a summary of proposed mitigation credits by wetland type.

Table ES-2 Proposed Compensation Technique and Proposed Credits				
Compensation Technique			**Proposed Credits**	
Preservation by Wetland Type			**Preservation Area (acres)**	**Proposed Credit Value (0.125:1 ratio)**
PFO – Floodplain Forest			3.70	0.46
PEM – Fresh (Wet) Meadow			0.02	0.00
PSS – Shrub Swamp			1.70	0.21
PFO – Hardwood Swamp			3.50	0.44
Subtotal			**8.92**	**1.11**
Upland			**Area (Acres)**	**Proposed Credit Value**
Upland Buffer Preservation (0.1:1 ratio)			**10.08**	**1.01**
Upland Buffer Enhancement (0.25:1 ratio)			**6.42**	**1.61**
Restoration by Wetland Type			**Compensation Area (acres)**	**Proposed Credit Value (1:1 ratio)**
PEM – Fresh (Wet) Meadow			9.50	9.50
PSS – Shrub Swamp			7.00	7.00
PFO – Hardwood/Conifer Swamp			3.00	3.00
Enhancement by Wetland Type			**Compensation Area (acres)**	**Proposed Credit Value (1:1 ratio)**
Type 2 – Fresh (Wet) Meadow			3.50	3.50
Totals	**Permanent Wetland Type Conversion Impacts (Line 3 and Sandpiper, acres)**	**Needed Credits (0.25:1 ratio for permanent type conversion)**	**Site Acreage**	**Proposed Credits**
	38.02	**9.51**	**48.42**	**26.73**

Table ES-3 describes the estimated credits that would be established for project-specific wetland mitigation needed for Enbridge's Line 3 Replacement and Sandpiper Pipeline Projects in Wisconsin.

Table ES-3
Estimated Credits by Compensation Technique

Compensation Technique	Acres	Credit Ratio	Estimated Credits
Wetland Restoration	19.50	1:1	19.50
Wetland Enhancement	3.50	1:1	3.50
Wetland Preservation	8.92	0.125:1	1.11
Upland Buffer Enhancement	6.42	0.25:1	1.61
Upland Buffer Preservation	10.08	0.1:1	1.01
Total Crawford Creek	**48.42**	**-**	**26.73**

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Wetland Mitigation Compensation Site Plan

Crawford Creek Mitigation Site

1.0 Introduction and Purpose

This Wetland Mitigation Compensation Site Plan describes the mitigation plan required for unavoidable wetland impacts resulting from the proposed construction of the Enbridge Line 3 Replacement and Sandpiper Pipeline Projects (referred to herein as the "Projects") in the Lake Superior Watershed in Wisconsin. The mitigation site is located in 10-digit Hydrologic Unit Code (HUC) 0401030105 (Lower Nemadji) and 12-digit HUC 040103010503.

The purpose of this site plan is:

- To identify the expertise and qualifications of Enbridge and its consultants in designing and managing the proposed compensation project work;
- To outline the construction plan, project goals and objectives, monitoring plan, success criteria, and management plan; and,
- To provide evidence that the compensation site in its entirety will be maintained and preserved in perpetuity.

Enbridge is the landowner of the proposed mitigation site. Enbridge acquired the site at the same time as the property immediately to the south, where the existing Superior Terminal Enhancement Project (STEP) Wetland Mitigation Site was constructed. Both the STEP site and the proposed site described in this application have similar design considerations and expectations of success. **Figure 1** provides a project location map showing the boundary of the proposed Crawford Creek site, as well as the STEP Wetland Mitigation Site and the nearby Nemadji Wetland Mitigation Site. **Figure 2** provides an aerial photograph of the Crawford Creek Wetland Mitigation Site.

2.0 Plan Developers and Expertise

Enbridge developed this compensation site plan with assistance from Short Elliott Hendrickson Inc. (SEH®). The team for plan development, construction management, and ongoing monitoring and maintenance includes Enbridge staff and contracted engineers and scientists:

Paul Lehman – Environmental Analyst, Enbridge Major Projects
Paul is the Enbridge Environmental Analyst overseeing the project for Enbridge.

Allyz Kramer, MS, PWS – Scientist | SEH Project Manager
Allyz is a Professional Wetland Scientist (#1886) and Minnesota Certified Wetland Delineator (#1023) with 16 years of experience in natural resources. Allyz brings expertise in wetland delineation, permitting, and mitigation design; restoration ecology; plant community

inventories and rare plant surveys; natural resources management and planning; surface and subsurface water quality monitoring; and natural resources inventories. Allyz will be the SEH project manager for the site.

April Ryan, PE – SEH Water Resources Engineer
April is a Sr. Water Resources Engineer (MN #47121) with over nine years experience in a wide range of hydrology/hydraulic (H/H) analysis, design, and modeling for private, non-profit, municipal, state and federal entities. April is well versed in a number of H/H modeling software including: XP-SWMM, HydroCAD, WinSLAMM, P8, RUSELL, HY8, and HEC-RAS. April is often involved in the preparation of reports, plans, specification documents, and site inspections. April has extensive experience implementing stormwater utilities and addressing NPDES permitting requirements (MS4, industrial, and construction). April will be involved with the hydrological analysis and modeling of the existing and proposed site conditions.

Emily Erdahl, EI – SEH Water Resources Graduate Engineer
Emily is a Water Resources Graduate Engineer with experience in water resources engineering. Emily graduated from the University of Minnesota Duluth with a bachelor's degree in Civil Engineering with a focus in Water Resources. Her responsibilities include water resources design and environmental inspections of construction sites. Emily will be involved with the hydrological analysis and modeling of the existing and proposed site conditions.

Natalie White, MS – SEH Scientist
Natalie is a Biologist with six years of experience in wetland delineation, wetland functional assessments, threatened and endangered species survey, water regulatory permitting, and mitigation site monitoring. Natalie will be involved in site layout and site plan development for the project, as well as development of the monitoring protocol. Natalie is a qualified wetland delineator with formal training in wetland delineation according to the U.S. Army Corps of Engineers (USACE) 1987 *Manual*, and is a Minnesota Certified Wetland Delineator (#1226).

Joel Asp, BS – SEH Scientist
Joel is a Restoration Ecologist with SEH. Prior to SEH, Joel worked for Prairie Restorations, Inc. as a Restoration Specialist. Joel has 18 years of experience in site preparation, vegetation planning, habitat development, mitigation bank site planning, habitat evaluation, and invasive plant species control. Joel has been involved in the site design, vegetation planning, and development of the monitoring and contingency plans for the existing Nemadji River Compensatory Wetland Mitigation project site on the west side of Darrow Road. Joel will also be involved in vegetation planning activities. Joel is a qualified wetland delineator and has had formal initial and follow-up training in wetland delineation according to the U.S. Army Corps of Engineers (USACE) 1987 *Manual*. Joel is a Minnesota Certified Wetland Delineator – In Training (#5087).

3.0 General Description of Site Plan

The total site area is approximately 48.42 acres. About 19.00 acres on the east side of the site are undeveloped land adjacent to Crawford Creek. The remaining 29.40 acres are a hayfield with man-made ditches, adjacent to Darrow Road. A 2008 wetland delineation (included as **Appendix A**) classified 12.42 acres of the Crawford Creek site as wetland, 3.50 acres of which are located within the ditched hay field. In addition, approximately 25.90 acres in the hay field that have been drained by man-made ditches had neither adequate hydrology nor

hydrophytic vegetation necessary to meet wetland criteria. The total acreage of wetland anticipated once the site is complete is 31.92 acres (23.00 acres in the hayfield and 8.92 acres in the preservation area).

The wetland types **currently** found on the site are:

Type 1: Floodplain Forest
Type 2: Fresh (Wet) Meadow
Type 6: Shrub-Carr
Type 7: Hardwood Swamp

Restoration goals for the site are the following wetland types **expected** to develop when the mitigation is complete:

Type 1: Floodplain Forest
Type 2: Fresh (Wet) Meadow
Type 6: Shrub-Carr
Type 7: Hardwood Swamp

Enbridge proposes the following wetland compensation techniques:

- **Wetland restoration**, at a rate of 1:1, which includes restoring hydrology to former wetland areas through blocking of man-made ditches in order to capture precipitation and overland flow. Vegetation establishment includes planting and seeding of native wetland herbaceous vegetation, shrubs, and trees.
- **Wetland enhancement**, at a rate of 1:1, which includes the termination of agricultural activities, restoring more natural hydrology through blocking of man-made ditches, and vegetation enhancement through planting and seeding of native wetland herbaceous vegetation, shrubs, and trees.
- **Wetland preservation**, at a rate of 0.125:1, in the wooded area near Crawford Creek, will protect hardwood swamp, shrub-carr, and fresh (wet) meadow above steep slopes along the creek, and forested floodplain habitat along the creek.
- **Upland buffer**, at a rate of 0.25:1 to preserve upland vegetation adjacent to restored wetlands and on steep slopes adjacent to Crawford Creek.

Expected functions of the proposed site:

- Restore wetland characteristics to the area not meeting wetland criteria;
- Restore native vegetation and habitat types previously fragmented due to farming activity;
- Provide enhanced and diverse habitats for plants, mammals, birds, amphibians, reptiles, and insects; and,
- Provide refuge to state/federal threatened and endangered plants.

4.0 Location of Site

The site is located in northern Douglas County, Lake Superior Basin Water Management Unit (WMU); 10-digit Hydrologic Unit Code (HUC) basin 0401030105 (Lower Nemadji); 12-digit HUC basin 040103010503; in the NE 1/4 of Section 23, Township 48N, Range 14W in the Town of Superior (**Figure 1**). The site is within the Lake Superior Coastal Plain Ecological Landscape. The site is located on the east side of Darrow Road, south of the intersection of Darrow Road and County Trunk Highway C. The site is approximately 2,000 feet as measured directly from the Carlson Airport (a small facility with one landing strip).

5.0 Detailed Baseline Conditions

5.1 Site Survey

SEH completed a topographic and boundary survey of the property in August 2008 using one-foot contours (refer to Exhibit A in **Appendix B**).

5.2 On Site Land Use

Historic and Current Land Use

The field was ditched to drain surface water sometime prior to the 1970s, and has been used for hay production since the 1970s. The field is still in hay production to date. At the time of construction of the Nemadji River Wetland Mitigation Site in 2010, soil removed for excavation of wetland basins was stockpiled in upland areas within the proposed Crawford Creek Wetland Mitigation Site. These stockpiles were then stabilized and seeded, and are still present on site. A portion of one stockpile was used as a source of material for constructing ditch plugs on the STEP Phase I Wetland Mitigation Site.

Adjacent Land Use

The area surrounding the proposed compensatory mitigation site consists of active hayfield, an existing wetland mitigation site, and existing forested wetlands. Two residential homes, associated buildings and barns, and a horse pasture are located nearby. Darrow Road forms the west boundary of the site.

There are two existing Enbridge wetland mitigation sites (the Nemadji Mitigation Site and STEP Mitigation Site) located across Darrow Road to the west, and south of the proposed restoration area, respectively. The Nemadji Mitigation Site consists of approximately 113 acres of wetland and upland with natural overland flow toward the Nemadji River. The STEP Mitigation Site consists of approximately 19 acres of mostly wetland habitat with a topographical gradient and surficial flow path towards Crawford Creek.

5.3 Zoning Designations

The site is zoned agricultural (A1) by Douglas County. The site is not within mapped floodplain of the Nemadji River or Crawford Creek (**Figure 3**). All areas proposed for mitigation construction activities lie greater than 300 feet from Crawford Creek, and are therefore outside the shoreland zone. Only areas proposed for preservation are located within 300 feet of the creek.

5.4 Nearby Land Use

Land use near the site is agricultural, rural residential, and forested.

5.5 Historical or Archaeological Resources

Enbridge's consultant, The 106 Group Ltd, conducted a historical and archaeological investigation that encompassed the properties on both the east and west sides of Darrow Road in the summer of 2008. The 106 Group Ltd. prepared a separate report, which described the findings of the historical and archaeological investigation. The 106 Group Ltd. Submitted the report to the Department of State. The Department of State then forwarded the document to the State Historical Preservation Office (SHPO) for SHPO review. The 106 Group Ltd found no new or previously identified archaeological sites and no properties deemed eligible for listing on the National Register of Historic Places.

5.6 Geomorphic and Soils Assessment

The soils on-site include one consociation and one soil sub-order as mapped by the Web Soil Survey (2013). The predominant soil type is an Amnicon-Cuttre complex (262B), which is classified as a moderately-well to somewhat-poorly drained, clayey till soil with hydric inclusions. The east side of the site along Crawford Creek is mapped as Udorthents – ravines and escarpments on 25 to 60 percent slopes (92F), which is a recently eroded, non-hydric soil found on steep slopes. This soil type is found on steep upland slopes between wetland habitat higher in the landscape and floodplain forest along Crawford Creek below. **Figure 4** is a copy of the soil survey map.

The soils in the hay field area have been disturbed by decades of agricultural practices such as discing and plowing. SEH recorded buried A horizons in some areas during the 2008 field delineation of wetlands. SEH classified the hay field as a problem area during the wetland delineation due to mixed soil horizons and red clay parent material. Using methodology according to the NRCS publication Field Indicators of Hydric Soils version 4.0 (1998), SEH obeserved the TF2 (Red Parent Material) hydric soil indicator for problematic soils in sample test pits.

Wetlands exist to the south and east of the site. Test pits from 2008 field work, mapped soils, and adjacent wetlands identified by the Wisconsin Wetlands Inventory (**Figure 5**) provide evidence that upland areas of the ditched field were historically wetland prior to drainage activities. A typical soil profile taken within the site was comprised of:

- 0-2 inches of an organic/duff layer;
- underlain by a surface horizon from 2-5 inches of blocky clay with a Munsell (Gretag-Macbeth 1994) matrix color of 10YR 3/2;
- underlain by clay from 5-6 inches with a matrix color of 10YR 5/1 with 15% redox concentrations with a color of 10YR 5/6;
- underlain by blocky clay from 6-7 inches with a matrix color of 10YR 3/1 with 15% redox concentrations with a color of 10YR 5/6;
- underlain by clay from 7-11 inches with a matrix color of 10YR 5/1 with 20% redox concentrations with a color of 10YR 5/4; and
- the final 11-24 inches sampled consisted of red clay with a matrix color of 7.5YR 4/3 with 10% redox concentrations with a color of 7.5YR 5/4.

This soil profile was taken from an upland area with a hydric listed soil, and meets the technical hydric soil indicator TF2: Red Parent Material. Data sheets for this and other test pits are contained in the wetland delineation report (refer to **Appendix A**).

5.7 Hydrological Assessment

Hydrology for the site is currently supported through overland flow. The amount of surface water entering the site once construction is complete should be the same as existing, as the watershed area and conditions will unchanged. SEH expects the construction of plugs to disable the function of the ditches, and to retain surface water that currently passes through the site. Currently, water flows into the site from the STEP Mitigation Site on the south site boundary. This flow discharges into man-made ditches that ultimately drain north and east into Crawford Creek. By slowing and capturing the surface water that currently passes through the site in the ditch channels, additional hydrology will be present to support the wetland restoration.

5.8 Floristic Assessment

Fresh (wet) meadow wetland plant communities are present in the man-made ditches on site. These include a relatively diverse assembly of species including fowl meadow grass (*Poa palustris*), lake sedge *(Carex lacustris)*, dark green bulrush *(Scripus atrovirens)*, water horehound *(Lycopus sp.)*, common rush *(Juncus effusus)*, Torrey's rush *(Juncus torreyi)*, common beggars tick (*Bidens frondosa)*, Canadian rush *(Juncus canadensis)*, path rush *(Juncus tenuis)*, saplings of slender willow *(Salix petiolaris)*, blue joint grass *(Calamagrostis canadensis)*, and graceful sedge *(Carex gracillima).* SEH documented multiple occurrences of Vasey's rush (*Juncus vaseyi*) and slender spike rush (*Eleocharis nitida*) in these fresh (wet) meadow communities in a 2008 survey of the site. They also documented the dominant tree species in the forested wetlands just outside the site to the south and east. These included American elm (*Ulmus americana*), tamarack (*Larix laricina*), black spruce (*Picea mariana*), and balsam fir (*Abies balsamea*). Historic vegetation on-site was likely more similar to the adjacent forested wetlands. Fresh (wet) meadow and shrub-carr wetland plant communities are also common in the area, and may have comprised part of the historic site vegetation. SEH had not observed changes in the plant communities on site during subsequent site visits (2012 and 2013).

In the preservation area, dominant tree species in the upland forest on slopes consists of white pine (*Pinus strobus*), balsam fir, and white spruce (*Picea glauca*). This area is mostly dominated by native species, but non-native invasive valerian (*Valeriana officinalis*) is present in the floodplain forest along Crawford Creek.

Plant species observed in the upland portions of the site during the 2008 wetland delineation included Canada thistle (*Cirsium arvense*), field horsetail (*Equisetum arvense*), red clover (*Trifolium pratense*), common dandelion (*Taraxacum officinale*), graceful sedge, bird's foot trefoil (*Lotus corniculatus*), smooth brome (*Bromus inermis*), timothy (*Phleum pratense*), woodland strawberry (*Fragaria virginiana*), white clover (*Trifolium repens*), and ragweed (*Ambrosia artemisiifolia*).

The non-native invasive species reed canary grass (*Phalaris arundinacea*) is present in the area. It is present in scattered patches at a relatively low abundance between the man-made ditches, and at higher cover on the soil stockpiles present on site (**Figure 6**). Reed canary grass has been treated with herbicide on site in the past, and continued management activities will be necessary to ensure ongoing control. Methodologies for invasive species management are discussed in more detail in **Section 7.3** below.

5.9 Faunal Assessment

In discussion prior to the construction of the Nemadji River Wetland Mitigation Site, the previous landowner reported anecdotal observations of deer, coyotes, eagles, bears, and rabbits within the project site. During SEH's wetland mitigation monitoring visits at the west side of Darrow Road, wildlife sightings included northern harriers, killdeer, Canada geese, and various other songbirds and waterfowl (SEH 2011, 2012, 2013). SEH observed deer and bear tracks and scat in the area as well.

5.10 Web Soil Survey and WWI Mapping of the Site

The Douglas County Soil Survey Map (refer to **Figure 4**) shows the Amnicon-Cuttre complex as the predominant mapped soil unit in the site. The complex is a clayey till soil with hydric inclusions. This mapped soil unit extends out of the site into adjacent wetland areas that have not been ditched for agricultural purposes.

The Wisconsin Wetlands Inventory (WWI) (refer to **Figure 5**) shows shrub-carr and forested wetlands to the east of the area. The mapped WWI wetlands end sharply at the borders of the ditched and hayed area, further indicating that these wetlands likely extended across the site prior to the construction of the man-made ditches.

5.11 Wetland Delineation

SEH completed a wetland delineation was completed on the site in August 2008 in accordance with the 1987 *Corps of Engineers Wetlands Delineation Manual*. The USACE representative (Jason Berkner) and WDNR representative (Steve LaValley) for the site reviewed the delineation in August 2008. Steve LaValley conducted an on-site wetland boundary review on September 29, 2008. At that time, Mr. LaValley verbally concurred with the flagged wetland boundaries. The wetland delineation data sheets indicate the dominant species of vegetation and the soil and hydrologic characteristics at representative locations within and adjacent to each basin. **Appendix A** contains the wetland delineation report. A summary of existing wetland areas by classification is included in **Table 1** below. **Table 2** summarizes proposed wetland areas.

Table 1
Existing Wetland Areas by Classification

Wetland Classification – Hayfield	Acres
PEM: Fresh (Wet) Meadow	3.50
Subtotal – Hayfield Area	**3.50**
Wetland Classification – Preservation Area	**Acres**
PFO: Floodplain Forest	3.70
PEM: Fresh (Wet) Meadow	0.02
PSS: Shrub-Carr	1.70
PFO: Hardwood Swamp	3.50
Subtotal – Preservation Area	**8.92**
Total All Classifications	**12.42**

Table 2
Proposed Wetland Areas by Classification

Wetland Classification – Hayfield	Acres
PEM: Fresh (Wet) Meadow	13.00
PSS: Shrub-Carr	7.00
PFO: Hardwood/Conifer Swamp	3.00
Subtotal – Hayfield Area	**23.00**
Wetland Classification – Preservation Area	**Acres**
PFO: Floodplain Forest	3.70
PEM: Fresh (Wet) Meadow	0.02
PSS: Shrub-Carr	1.70
PFO: Hardwood Swamp	3.50
Subtotal – Preservation Area	**8.92**
Total All Classifications	**31.92**

5.12 Rare Plant Survey

SEH conducted a rare plant survey on site on October 1 and 6, 2008, according to the Wisconsin Department of Natural Resources – Bureau of Endangered Resources (WDNR-BER), *Guidelines for Conducting Rare Plant Surveys* (WDNR 2005). The rare plant survey included species on the WDNR-BER list of rare plants known to occur in the City of Superior, as provided by Craig Anderson, Botanist, WDNR-BER. Species not included on the list were not targeted in the survey. The referenced information indicated that target species thought to occur within the site included Vasey's rush *(Juncus vaseyi)*, arrowhead sweet coltsfoot *(Petasites sagittatus)*, and slender spike rush (*Eleocharis nitida)*.

Prior to conducting the rare plant surveys, SEH contacted Steve LaValley, WDNR Water Management Specialist, and Ryan Magana, WDNR Northern Region Ecologist, to verify that the results of conducting a survey the first week of October would be acceptable to the WDNR – BER. Both Steve LaValley and Ryan Magana felt that this would be acceptable since it had been a warm fall and there had been no recorded hard frosts in Douglas County. SEH Natural Resource Scientists Pamela Rice and Lindsay Hogfeldt met with Steve LaValley the afternoon of September 29, 2008 at the site. They determined at that time that individual plant species were readily identifiable and that there had been no damage due to frost. In addition, during the course of the on-site meeting several clumps of Vasey's rush were identified and their condition assessed. Their overall condition was good with fruiting structures present and readily identifiable.

Table 3 below lists target plant species for the rare plant survey.

Table 3
Target Plant Species

Species	State and/or Federal Status and Rank	Habitat	Optimum ID Dates
Rare species very dependent on the Superior area			
Carex nigra	State SC-S1	Wet fields, pastures, disturbed	July to Mid September
Eleocharis nitida	State END-S2	Bogs, pools, disturbed places	July to Early September
Juncus vaseyi	State SC- S3	Meadows, bogs	July to Late August
Ranunculus cymbalaria	State THR-S2	Disturbed, shallow water	June to Late August
Rare Species moderately dependent on the Superior area			
Ophioglossum pusillum	State SC-S3	Open fens, marsh edges, pastures, grassy shores, ditches	Mid spring to Early Summer
Petasites sagittatus	State THR-S3	Wet meadows, marshes, sedge meadows, open swamps	Mid May (flowers) to Sept. (leaves)
Rare species occurring in the Superior area with a primary state distribution elsewhere in Wisconsin			
Calamagrostis stricta	State SC-S3	Wet meadows, shallow marshes, shores, streambanks	Early July to mid Sept.
Deschampsia flexuosa	State SC- S3	Dry woods, fields, sandhills	Early June to Late August
Platanthera orbiculata	State SC-S3	Mesic to wet coniferous and deciduous forest, fen forest	Mid June to Mid August
Salix planifolia	State THR-S2	Shrub-carr and Alder Thickets, edges	Early June to Mid Sept.
Ranunculus gmelinii	State END-S2	Shallow water, meadows/marshes	Late June to Early Sept.

Species list, occurrence information, and state rank provided in tabular form by WDNR-BER, Craig Anderson, 2005. Optimum ID determined based on information presented in Diagnostic Characteristics and simplified keys, including habitat descriptions, for rare plants found in the vicinity of the City of Superior, Wisconsin; WDNR-BER

SEH conducted the rare plant survey using a combination of random meander and systematic survey (transects) techniques. The systematic survey was conducted in the wetland habitat within the man-made ditches, and random meander survey was conducted elsewhere on site. SEH searched each wetland area within the subject property, including any potentially different wetland habitat types occurring within an individual wetland, for target rare plant species known to occur in each habitat type. SEH thoroughly searched all target species habitats within the subject property.

Wetland habitat types observed within the project site included wet meadow wetlands (primarily ditches) and a small fringe of shrub-carr. The wet meadows were located within

the open hay field. The areas of shrub-carr were located along the southern and eastern edge of the site.

At the time of the survey, leaves of arrowhead sweet coltsfoot, target willows (*Salix* species), and leaves and stems of the Vasey's rush and slender spike rush were still expected to be identifiable. The investigator flagged any late season suspect occurrences that could not be positively identified in the field for verification during the next field season. SEH did not conduct an evaluation of species lying dormant or contained within the seed bank.

SEH conservatively search shrub habitats for arrowhead sweet coltsfoot and tea leaf or diamond leaf willow (*Salix planifolia*). Surveys in shrub habitats included habitat transition areas such as forested edges, since arrowhead sweet coltsfoot has been observed at the interface between shrub habitats and meadows, marshes, or forests. Tea leaf willow is also expected to be found more along the outer perimeter or edge of a habitat than in dense shrub thickets.

The wet meadow areas, which were primarily wet ditches located within the hay field, were being actively cut/mowed for grass hay during the 2008 growing season. SEH surveyed these areas for Vasey's rush, arrowhead sweet coltsfoot, slender spike rush, seaside crowfoot (*Ranunculus cymbalaria*) and small yellow water crowfoot (*Ranunculus gmelinii*). They also surveyed the adjacent road side ditches intensely for Vasey's rush, slender spike rush, arrowhead sweet coltsfoot, seaside crowfoot and small yellow water crowfoot.

Search intensity was based on the habitat conditions and dominant vegetation associations present in each of the areas. Through the course of the survey, SEH took notes to document specific vegetation encountered within the different habitat types and/or locations within the subject property, as well as any other notable features or conditions that could warrant further investigation.

Rare Plant Survey Results – Eastern Field Area

SEH observed one target species within the Crawford Creek site: Vasey's rush, found in the ditches [linear fresh (wet) meadow wetlands] and in the adjacent fresh (wet) meadow wetland areas. SEH marked each occurrence in the field with a pink pin flag that was identified with a species abbreviation and an element occurrence number. SEH used a start and end flag to mark populations where larger areas of scattered individuals or clumps of rare plants were present. **Table 4** below includes the element occurrence number, the rare plant species, date of observation, and occurrence notes. SEH also recorded the occurrence locations using a hand-held global positioning system (GPS) unit. **Figure 7** shows occurrence locations. In addition, SEH photographed the occurrences and collected three voucher specimens.

The majority of the rare plant occurrences were located within the wet ditches. At the time of the survey, all of the occurrences were located in areas with saturated soils, and a majority of the locations were also inundated with surface water.

Table 4
Rare Plant Occurrences

Occurrence No.	Species	Occurrence Notes
1	*Juncus vaseyi*	Located in E/W Ditch 9; saturated soils with standing water; 12 fruiting stems in 5 square foot area.
2	*Juncus vaseyi*	Located in E/W Ditch 9; saturated soils with standing water; 2 clumps no fruiting stems.
3	*Juncus vaseyi*	Located in E/W Ditch 9; saturated soils with standing water; 2 clumps with 23 fruiting stems.
4	*Juncus vaseyi*	Located in E/W Ditch 9; saturated soils with standing water; scattered individual plants with 48 fruiting stems within a 12’ long by 5’ wide area.
5	*Juncus vaseyi*	Located in E/W Ditch 9; saturated soils with standing water; individual plants with 7 fruiting stems within a 3 square foot area.
6	*Juncus vaseyi*	Located in E/W Ditch 9; saturated soils with standing water; ten clumps with approx. 80 fruiting stems within a 32’ long by 3’ wide area.
1	*Eleocharis nitida*	Intersection of E/W Ditch 9 and 6; saturated soils and large area of standing water; one individual plant.
7	*Juncus vaseyi*	Located in southern wet field area between the N/S Ditch 5 and 6; saturated soils and large area of standing water; 24 identifiable individual plants in a 10’ by 5’ area, but area was recently cut potential for other individuals.
2	*Eleocharis nitida*	Located in N/S Ditch 5; saturated soils, standing water in a deeper depressional area; 12 identified individuals in a 90’ by 10’ area.
8	*Juncus vaseyi*	Located in N/S Ditch 5; saturated soils, standing water; 2 clumps with 12 fruiting stems.
9	*Juncus vaseyi*	Located in N/S Ditch 5; saturated soils, standing water; 3 clumps with 22 fruiting stems in a 12’ by 6’ area.
10	*Juncus vaseyi*	Located in N/S Ditch 5; saturated soils, standing water; 13 clumps with 130 fruiting stems in a 10’ by 6’ area.
11	*Juncus vaseyi*	Located in N/S Ditch 5; saturated soils, standing water; 3 clumps with 35 fruiting stems.
12	*Juncus vaseyi*	Located in N/S Ditch 5; saturated soils, standing water; 1 clump with 9 fruiting stems.
3	*Eleocharis nitida*	Located in N/S Ditch 4; 3 individual plants along edge of ditch.
4	*Eleocharis nitida*	Located in N/S Ditch 4; four large clumps and 3 individual plants in a 12’ by 3’ area along edge of ditch.
13	*Juncus vaseyi*	Located in N/S Ditch 4; saturated soils, standing water; 1 clump with 8 fruiting stems.
14	*Juncus vaseyi*	Located in N/S Ditch 4; saturated soils, standing water; 1 clump with 8 fruiting stems.
5	*Eleocharis nitida*	Located in N/S Ditch 4; 8 individual plants within 25’ along the edge of ditch.

Table 4
Rare Plant Occurrences

Occurrence No.	Species	Occurrence Notes
15	*Juncus vaseyi*	Located in N/S Ditch 2; saturated soils, 2 clumps with 25 fruiting stems.
16	*Juncus vaseyi*	Located in N/S Ditch 2; saturated soils, standing water; 1 clump with 28 fruiting stems.
17	*Juncus vaseyi*	Located in N/S Ditch 2; saturated soils, standing water; 10 clumps with 82 fruiting stems within a 10' by 3' area.
18	*Juncus vaseyi*	Located in N/S Ditch 2; saturated soils, standing water; 2 clumps with 26 fruiting stems in a 3' by 3' area.
19	*Juncus vaseyi*	Located in N/S Ditch 2; saturated soils, standing water; 1 clump with 15 fruiting stems.
20	*Juncus vaseyi*	Located in N/S Ditch 2; saturated soils, standing water; 2 clumps with 39 fruiting stems.
21	*Juncus vaseyi*	Located in N/S Ditch 1; saturated soils, standing water; 1 clump with 26 fruiting stems.
22	*Juncus vaseyi*	Located in N/S Ditch 1; saturated soils, standing water; 2 clumps with 55 fruiting stems in a 5' by 3' area.
23	*Juncus vaseyi*	Located in N/S Ditch 1; saturated soils, standing water; 2 clumps with 57 fruiting stems in a 3' by 3' area.
24	*Juncus vaseyi*	Located in N/S Ditch 1; saturated soils, standing water; 2 clumps with 12 fruiting stems in a 3' X 1' area.
25	*Juncus vaseyi*	Located in N/S Ditch 1; saturated soils, standing water; 1 clump with 5 fruiting stems.
26	*Juncus vaseyi*	Located in N/S Ditch 1; saturated soils, standing water; 4 clumps with 40 fruiting stems in a 3' by 2' area.
27	*Juncus vaseyi*	Located in N/S Ditch 1; saturated soils, standing water; 2 clumps with 22 fruiting stems in a 1' by 1' area.
28	*Juncus vaseyi*	Located in N/S Ditch 1; saturated soils, standing water; 1 clump with 13 fruiting stems.
29	*Juncus vaseyi*	Located in N/S Ditch 6 between E/W Ditch 7 and 8; standing water; 2 clumps with 7 fruiting stems.
30	*Juncus vaseyi*	Located in N/S Ditch 6 between E/W Ditch 7 and 8; standing water; 1 clump with 4 fruiting stems.
31	*Juncus vaseyi*	Located at the intersection of N/S Ditch 6 and E/W Ditch 6; standing water; 2 clumps with 124 fruiting stems.
32	*Juncus vaseyi*	Located in E/W Ditch 7, which had been mowed; saturated soils; 5 clumps with no fruiting stems.
33	*Juncus vaseyi*	Located in E/W Ditch 7, which had been mowed; saturated soils; 1 clumps with 20 fruiting stems in a 2' by 2' area.
34	*Juncus vaseyi*	Located in E/W Ditch 7, which had been mowed; saturated soils; 4 clumps with 48 fruiting stems in a 5' by 3' area.

Table 4
Rare Plant Occurrences

Occurrence No.	Species	Occurrence Notes
35	*Juncus vaseyi*	Located in E/W Ditch 6, which had been mowed; saturated soils; positive identification of 2 clumps, but could be up to 8 clumps; identification was completed using the red coloration at the base of the stems.
36	*Juncus vaseyi*	Located in E/W Ditch 5, which had been mowed; saturated soils; 2 clumps with 22 fruiting stems in a 2' by 2' area.
37	*Juncus vaseyi*	Located in N/S Ditch 6 between E/W Ditch 5 and 6; saturated soils and standing water; 1 clump with 28 fruiting stems in a 2' by 2' area.
38	*Juncus vaseyi*	Located in N/S Ditch 6 between E/W Ditch 5 and 6; saturated soils and standing water; 1 clump with 9 fruiting stems in a 1' by 1' area.
39	*Juncus vaseyi*	Located in N/S Ditch 6 between E/W Ditch 5 and 6; saturated soils and standing water; 1 clump with 1 fruiting stems in a 1' by 1' area.
40	*Juncus vaseyi*	Located in N/S Ditch 6 between E/W Ditch 5 and 6; saturated soils and standing water; 1 clump with 4 fruiting stems in a 2' by 1' area.
41	*Juncus vaseyi*	Located in N/S Ditch 6 between E/W Ditch 4 and 5; saturated soils and standing water; 1 clump with 9 fruiting stems in a 2' by 2' area.
42	*Juncus vaseyi*	Located at the intersection of N/S Ditch 6 and E/W Ditch 4; saturated soils and standing water; 1 clump with 3 fruiting stems in a 1' by 1' area.
43	*Juncus vaseyi*	Located at the intersection of E/W Ditch 2; saturated soils; 2 clumps with 40 fruiting stems in a 3' by 3' area.
44	*Juncus vaseyi*	Located at the intersection of N/S Ditch 6; saturated soils; 1 clump with 3 fruiting stems in a 1' by 1' area.

SEH did not identify other rare plant species on the portions of the property east of Darrow Road.

Rare Plant Survey Documentation

SEH completed official documentation of the occurrences of these state listed species at the time of observation in accordance with the WDNR – BER guidelines and based on recommendations from Craig Anderson, WDNR Botanist. Mr. Anderson determined that it was not necessary to complete individual Element of Occurrence and Natural Heritage Inventory data sheets on each population observed, but requested that the coordinates of each surveyed occurrence be placed in a spreadsheet and provided to WDNR – BER electronically. In addition, SEH sent collected specimens to WDNR – BER for final verification and recording.

Based on the random nature of the survey, the general size of appropriate habitats, and the intensity of the search in appropriate habitats there is a low probability that occurrences were missed. Occurrences that may have been missed include species such as seaside crowfoot and

small yellow water crowfoot, which are best surveyed from June through early September when the plants are in flower and the vegetative structures have not started to senesce. However, it did not appear that the site conditions and habitat were best suited for the occurrence of seaside or small yellow water crowfoot.

5.13 Wetland Functional Assessment

SEH conducted a functional assessment using the Superior Routine Assessment Methodology (RAM) in spring 2009 using both field observations and Geographical Information System (GIS) information available from Douglas County.

The wetlands (ditches) within the field scored low to medium for plant community integrity due to a small amount of reed canary grass. The remaining functions scored low due to the man-made ditching, hay production, and very low impervious surface and developed areas surrounding the wetlands.

Appendix C-1 contains the Superior RAM functional assessment sheets used to conduct the functional assessments.

5.14 Floodplain

There are no Federal Emergency Management Agency (FEMA) mapped floodplains within the site (**Figure 3**).

5.15 State Navigable Waters

Crawford Creek, a state navigable water, flows through the eastern portion of the mitigation site proposed for preservation credit.

5.16 Ecological Importance

The site is located within the Nemadji River watershed, which contains many streams, creeks, and wetlands. Agricultural practices, including man-made ditches, altered the natural landscape in the area and contribute to erosion and sedimentation in the watershed.

The site drains to Crawford Creek, which is a tributary of the Nemadji River just south of the City of Superior. Crawford Creek is a total of eight miles in length. The stream has been identified as impaired under Section 303d of the Clean Water Act for chronic aquatic toxicity related to polycyclic aromatic hydrocarbons (PAHs) and creosote, from contaminated sediment and an industrial point source discharge (WDNR 2012). Furthermore, Crawford Creek is designated an Area of Special Natural Resource Interest (ANSRI due to its flow path through wetlands in the City of Superior's Special Area Management Plan (SAMP), downstream of the site.

The site is located within the St. Louis River Area of Concern (AOC), designated under the Great Lakes Water Quality Agreement of 1987. Locations designated as AOCs are environmentally degraded areas with defined goals for remediation and restoration, eventually leading to removal of the impairments that prompted the AOC designation. The Nemadji River watershed basin, within the St. Louis River AOC, covers a total of 433 square miles (277,400 acres). Within the basin, 69% of the land cover is forest lands, 18% is croplands and pasture, 11% is wetlands and lakes, and 2% is other land cover categories (Carlton County Water Plan Advisory Committee 2000[1]). The Nemadji River flows north to Superior Bay and ultimately to Lake Superior through the Superior Entry Navigational

[1] The Carlton County land cover data includes the portion of the Nemadji River watershed within Douglas County.

Channel. The Nemadji River is listed as impaired for sediment and total suspended solids (WDNR 2012). The factors causing the impairment include highly erodible clay soils in the basin, combined with soil erosion accelerated by human alterations such as clearing of natural vegetation and increases in impervious surfaces. This impairment of the Nemadji River contributes to the St. Louis River AOC Beneficial Use Impairment (BUI): Excessive Loading of Sediment and Nutrients. Strategies for removing this BUI focus on the turbidity and sediment carried by the Nemadji River and tributaries including Crawford Creek. Sediment transport from these waterways carries contaminants and nutrients to Lake Superior, as well as smothering spawning bed habitat for many warm water fish species at the mouth of the Nemadji River. In 2009 monitoring of Crawford Creek, turbidity and total suspended solids were high, and transparency tube readings were low (WDNR 2010). Strategic forest management and wetland protection are identified as preferred approaches for long term sediment and nutrient management in the *2010 Water Quality Management Plan Update* (WDNR 2010) to the St. Louis and Lower Nemadji River Watershed Plan.

Crawford Creek has been identified in management planning, including the *2010 Water Quality Management Plan Update* (WDNR 2010), as requiring remediation for contaminated sediment, and has been identified as potentially impaired by erosion and sediment loading. Preservation of wetlands adjacent to Crawford Creek could benefit planned downstream remediation projects by preventing further erosion and sediment mobilization into the stream.

Figure 5 illustrates the existing shrub-carr and forested wetland to the south and east of the site. The proposed wetland mitigation would enhance existing wetlands and restore hydrology to ditched wetlands, providing additional stormwater runoff retention before the site drains to Crawford Creek. Mitigation activities on site would also improve wildlife habitat and provide habitat suitable for state listed rare plant species. The site location immediately across Darrow Road from the previously established Nemadji River Compensatory Mitigation Site provides a greater opportunity for both of these sites to integrate into the surrounding landscape, and provide more benefit than possible at an isolated site of similar size.

6.0 Project Plan Sheets

Appendix B includes the proposed hydrology plan, preliminary grading plan, and planting plan (Exhibits A, B, and C, respectively).

7.0 Design Features

The design includes restoration of ditched areas not meeting wetland characteristics, enhancement of existing hayed wetlands, and preservation of wetlands near Crawford Creek. Design objectives include low maintenance measures which minimize the need for engineered structures requiring active upkeep and management. The design allows a state listed plant species (Vasey's rush, previously documented in the man-made ditches on-site) to serve as a potential seed source for the restored wetland areas. The goals also include design to fit with the natural landscape by restoring ditched areas using minimal grading and earthwork.

Enbridge will avoid impacts to existing wetlands and threatened and endangered plants to the greatest extent practicable. **Section 7.7** addresses temporary impacts to wetlands within the site.

In the 19 acres of less-disturbed area adjacent to Crawford Creek, Enbridge proposes to preserve native, perennial vegetation on steep slopes and in the floodplain of Crawford Creek,

as well as treat non-native invasive species. Preserving this area that lies between restored wetlands and Crawford Creek prevents fragmentation of habitat in the landscape. Nearby land use includes rural residential lots with lawns and out-buildings, grazing/haying, and logging. These land uses include clearing of woody vegetation within 150-200 feet of the creek, including in some parcels adjacent to the mitigation site. The *2010 Water Management Plan Update* (WDNR 2010) identified clearing of natural vegetation in the Nemadji River watershed (including tributaries such as Crawford Creek) as a key contributor to the BUI for Excessive Loading of Sediment and Nutrients (refer to **Section 0**). If not preserved as part of the Crawford Creek mitigation site, tree clearing for lawn, agriculture, or logging is a potential future land use in the proposed preservation area.

7.1 Proposed Construction Activities

The plan for the Crawford Creek Wetland Mitigation Site includes wetland communities that fit the existing natural landscape surrounding the site. Enbridge proposes minimal earthwork in order to maintain the natural topographic variation and to decrease the potential for introducing invasive plant species. Enbridge will remove the existing soil stockpiles currently located on site. Material from the soil stockpiles will be used to construct the ditch plugs. Enbridge will dispose of excess material of in accordance with all applicable state and local requirements.

7.2 Proposed Hydrology

Overland flow from the STEP Wetland Mitigation Site will provide hydrology to the Crawford Creek site. Blocking the drainage capabilities of the man-made ditches will re-establish hydrology in the field. Restoration of more natural hydrology resulting from the ditch plugs will enhance existing wetlands.

Existing wetlands to the south of the site are anticipated to provide hydrology necessary for upland areas of the site to redevelop wetland characteristics. Water is proposed to flow across the site to the north and east, and eventually into Crawford Creek. Because water leaving the restored wetlands will re-enter the existing flow path into swales and eventually into Crawford Creek outside the restoration area, the proposed work is not anticipated to cause flooding impacts to residences and other land uses outside of Enbridge property.

The average depth of water proposed for the site is saturation within the top 12 inches of the ground surface, with up to one (1) foot of inundation immediately upstream of ditch plugs (refer to Exhibit A included in **Appendix B**).

7.3 Wetland Vegetation Establishment Plan

The first step in the planting plan is conducting a normal cut and bale of the hay field. Vegetation on the soil stockpiles can be prepared by mowing or burning. The first crop of hay (vegetation biomass) should be removed by approximately July 4, 2014. Prior to the harvest, areas of reed canary grass will be marked on a map for an application of a non-selective herbicide. The herbicide application should occur when the re-growth of reed canary grass (after the cut and bale, or after mowing/burning on the soil stockpiles) is between 12-18 inches tall. The expected timeframe for this herbicide application would be mid- to late-July, depending on local growing conditions and the actual date the first crop of hay was cut. The herbicide application should only be completed in the areas where reed canary grass is present. Some desirable native plant species are already present in areas of the site. Targeting the herbicide application to the areas of invasive weed species will give the native species present the potential to persist and spread following the installation of the ditch plugs and the

resulting increased hydrology. A complete site overspray is not currently proposed since the upland species present (i.e., timothy grass and red clover) are less tolerant of the increased hydrology and decrease in cover over time.

Invasive valerian in the preservation area will be treated using spot sprays with glyphosate or other non-specific herbicide.

A native wet meadow mix will be seeded in areas disturbed for removal of soil stockpiles and placement of ditch plugs. The mix will be seeded at the recommended rate (refer to **Appendix D** for mix and rates) in the designated areas as shown on Exhibit C in **Appendix B**.

Ditch plugs will be constructed in early- to mid-September to capture fall hydrology. The contractor will conduct construction activities in dry conditions to the greatest extent practicable in order to minimize the impacts of compaction and rutting of the site soils. Weed-free straw mulch or other erosion control best management practices (BMPs) will be applied to areas disturbed during construction of the plugs to provide temporary erosion and sediment control.

Locally collected shrub live stakes will be installed in early spring 2015. The live stakes should be approximately 3 to 5 feet long and ¾ to 1-½ inch in diameter. The stakes will be cut so the top of the stake is flat and the bottom angled. The angled cut end will then be driven into the ground so the lower 12 inches of the stake are located within a saturated soil zone.

Trees will be planted in spring 2015 using WDNR tree planting guidelines. Some smaller tree stock (10-18 inches in height) will be interspersed with more mature stock (12-24 inches in height for conifers and 24-72 inches for deciduous trees). Larger trees will be planted along the roadside for improved aesthetics when viewed from the roadway. Density and species composition of the clusters is listed below.

Proposed Tree Cluster Planting:

1,400 trees/acre = cluster sizes and approximate locations shown on Exhibit C of Appendix B.

<u>T-1 Cluster:</u>

1. Black spruce (*Picea mariana*) = 400 trees/acre
2. Balsam fir (*Abies balsamea*) = 600 trees/acre
3. Red maple (*Acer rubrum*) = 400 trees/acre

<u>T-2 Cluster:</u>

1. Tamarack (*Larix laricina*) = 600 trees/acre
2. Yellow birch (*Betula alleghaniensis*) = 400 trees/acre
3. Red maple (*Acer rubrum*) = 400 trees/acre

Proposed Shrub Cluster Planting (SS):

420 shrubs/acre = cluster sizes and approximate locations shown on Exhibit C of Appendix B.

1. Meadow willow (*Salix petiolaris*) = 140 stakes/acre
2. Pussy willow (*Salix discolor*) or Bebb's willow (*Salix bebbiana*) = 140 stakes/acre
3. Red osier dogwood (*Cornus sericea*) = 140 stakes/acre

7.4 Site Constraints

Natural ecological succession is expected beyond the standard monitoring period. Enbridge does not intend to control changes in the vegetation structure within each designed habitat type due to natural succession over time. Wet meadow areas may naturally colonize with trees and shrubs, and shrub-carr areas may colonize with trees.

While enhancement of hydrologic, stormwater-flood attenuation, and water quality functions of the site are intended based on an expected increase in development in the surrounding area, Enbridge does not hold any liability in the event of extreme failures or changes in the design standards of this site due to developments permitted within the same subwatershed.

7.5 Site Preparation

SEH noted areas of reed canary grass at site visits and at the adjacent STEP and Nemadji River Mitigation Sites (refer to **Figure 6** for approximate area of occurrences on the Crawford Creek site). Prior to construction of the proposed wetland restoration, Enbridge plans to control reed canary grass on the east and west sides of Darrow Road using spot herbicide application (refer to **Section 7.3** for more details on control methods). Herbicide application, as well as additional management activities such as mowing, will take place as needed during the subsequent monitoring years.

Contractors will be required to clean all equipment before entering the site to avoid bringing invasive plant propagules/seeds onto the site.

7.6 Erosion and Sedimentation Control

Erosion control methods planned for the site include minimizing disturbed areas. Seeding preparation will be achieved using methods described in **Section 7.3**, to minimize areas of open soil. Silt fence or coir logs will be installed around disturbed soil areas at the soil stockpiles to be removed. Removal of the soil stockpiles will require a WDNR construction stormwater permit. A stormwater notice of intent (NOI) will be submitted and approval obtained prior to the beginning of this activity.

Any straw, hay, mulch, coir logs, or erosion control blankets used on-site will be clean of weed seeds or other invasive plant species propagules.

7.7 Impacts to Existing Jurisdictional Wetlands

Any incidental impacts to existing wetlands within the project site are subject to the requirements of Section 281.36, Wis. Statutes, and NR 299 and NR 103, Wisconsin Administrative Code. Enbridge avoided impacts to existing wetlands to the maximum extent practicable while maintaining the integrity of the site plan. The total area of ditch plugs to be placed within existing wetlands is 11,000 ft^2 (0.25 acres); the 0.25 acres of wetland impacts are expected to be temporary, as these areas are proposed to redevelop wetland characteristics.

8.0 Goals and Objectives for the Site

The overarching goal for the site is to restore drained wetland habitat and enhance ditched and degraded wetland communities so that these areas may become effectively integrated into the surrounding natural wetlands and the nearby STEP Wetland Mitigation Site. The site is designed to have high value for wildlife and plant habitat integrity. The site may also help reduce peak flows and soil erosion and contribute to improved water quality in the Nemadji River watershed.

Functional goals for each of the habitat types are based on the Superior Rapid Assessment Methodology (RAM). Wetland functions used in the Superior RAM include plant and wildlife habitat, water quality and hydrologic integrity, and public values (aesthetics, recreational, cultural, scientific, and educational).

8.1 Goal: Establish Wetland Area

Wetlands should develop in areas currently drained by man-made ditches.

Objectives:

- **Wetland delineation in Year 5 of monitoring should demonstrate establishment of wetlands as described in the site plans.** All wetland habitats within the site should successfully meet the criteria for being classified as a wetland according to the 1987 *Corps of Engineers Wetlands Delineation Manual* and *Regional Supplement: Northcentral and Northeast Region* (USACE 2012). Enbridge will perform a wetland delineation during the 5th year of monitoring.
- **Site should be constructed to specifications in the site plan.** The site plan includes blocking of man-made ditches to restore sufficient hydrology to meet the restoration goals and technical criteria for wetland habitat. Minimal excavation and grading of the site will preserve natural topography outside the ditches.
- **Site should reflect habitat diversity as described in this plan.** At the end of the monitoring period, the restored wetland areas should be established or establishing as fresh (wet) meadow, shrub-carr, and forested habitats. In accordance with the *Guidelines for Compensatory Wetland Mitigation in Wisconsin* (WNDR 2013) and Chapter NR 350.09 of Wisconsin Administrative Code, a minimum five (5) year monitoring period is proposed.
- **Hydrologic establishment.** Due to the nature of the native lacustrine clay soils at the site, hydrological characteristics will not be measured using shallow groundwater monitoring wells or piezometers, but will be observed in pits dug with a tile spade at regular monitoring visits. The development of wetland hydrology may also be inferred based on the establishment of hydrophytic vegetation during monitoring. Hydrophytic vegetation [indicator status FAC or wetter, as designated by the *National Wetland Plant List* (USACE 2012)] should comprise approximately 80% of the total vegetation in wetland habitats as a result of a wetland delineation performed during the 5th year of monitoring.

8.2 Goal: Establish Plant and Wildlife Habitat

Successful native vegetation should establish through use of plantings and seeding, encouragement of the natural seed bank, and protection of the site from disturbance.

Objectives:

- **The site should be comprised of no less than 85% native plant species at the end of the monitoring period.** Native species must constitute greater than or equal to 85% areal cover. Only native permanent vegetation will be used on-site. Only temporary seed mixes with easily succeeded, early successional species will be used to provide rapid cover and discourage expansion or establishment of reed canary grass. Invasive species will comprise no more than 15% of areal cover on-site at the end of the monitoring period.
- **Reed canary grass should comprise no more than 10% of the total herbaceous cover at the end of the monitoring period.** Removal and control of reed canary grass is expected to improve plant habitat integrity. Populations of reed canary grass will be assessed prior to site plan implementation. The areal extent of each population of reed canary grass will be calculated and mapped. At each monitoring interval the populations

will be reassessed and percent change calculated. The total reduction in reed canary grass cover area will be included in the monitoring report.

- **The site should provide suitable habitat for appropriate state listed plant species**, should a need arise that would allow for the transplantation or natural introduction of target species to the site. Additional fresh (wet) meadow and shrub-carr wetlands are expected to provide suitable habitat for the one species already documented on-site, Vasey's rush. Restoration of shrub-carr wetland should provide potential habitat for arrowhead sweet coltsfoot (*Petasites sagittatus*), a listed species dependent on the Superior area and adapted to the target habitat.
- **The site should provide wildlife habitat for birds, mammals, and reptiles/amphibians**. Overall, the site is expected to provide wildlife forage, nesting, resting, and hibernating habitat for resident animals as well as those just passing through. The site is also expected to provide significant nesting, resting, and cover sites for resident and migratory songbirds and small mammals. Wildlife sightings will be documented at all monitoring visits, including observations of animal signs and audible calls.

8.3 Goal: Protect Water Quality and Improve Hydrologic Integrity

Wetland restoration on-site is expected to contribute to improving water quality in the Nemadji River watershed through increasing runoff detention time in the restored wetland, allowing particles to settle, and reducing erosion potential downstream from the site.

Objectives

- **Cessation of Agricultural Land Use.** Cessation of use of the property for agricultural production will be attained immediately upon implementation of this plan. Removal of remnant pasture/upland grassland plants for weed control or site preparation shall not be considered "agricultural land use."
- **Improvement of soil stabilization through native wetland vegetation establishment.** This objective will be achieved by establishing a permanent vegetation cover and eliminating vegetation removal, except in the case of invasive species control activities.

9.0 Performance Standards

Performance standards will be measured during site development, during each regular monitoring event, and at any opportunity throughout establishment and subsequent maturation of the site.

The following performance standards are a subset of the goals and objectives outlined in **Section 8.0** above and are intended to be quantitative assessments to determine the success and the applicable credit award for mitigation site implementation.

9.1 Wetland Establishment

The site should reflect habitat diversity as described in this plan. Fresh (wet) meadow communities shall be established at the end of the monitoring period. Shrub-carr and forested communities shall be established, or trending to these wetland types, at the end of the monitoring period.

Due to the presence of clay soils, Enbridge does not propose measurement of hydrological characteristics using shallow subsurface monitoring wells, but rather through investigation in pits dug with a tile spade at annual monitoring visits. In accordance with criteria in the 1987 *Corps of Engineers Wetlands Delineation Manual* and *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Northcentral and Northeast Region* (USACE 2012),

observations in pits should demonstrate indicators of wetland hydrology within 12-inches of the ground surface for at least 14 days within the growing season. Development of wetland hydrology may also be inferred based on establishment of hydrophytic vegetation. During the 5th year of monitoring, hydrophytic vegetation (indicator status FAC or wetter) shall comprise greater than 75% absolute areal cover of the site.

9.2 Vegetation Establishment

In Year 1, site preparation, seeding, planting and mulching must be accomplished according to the Compensatory Mitigation Site Plan. Interim (Year 2 to Year 4 or greater) performance standards will be assessed at monitoring visits. These interim standards are:

- Year 2: No more than 20% of total site area can be bare soil. If necessary, additional erosion control measures must be implemented.

- Year 3:

    - Shrub species must be present in densities of at least 270 stems per acre within shrub-carr planting clusters, and densities of at least 200 stems per acre within shrub-carr planting clusters at Year 5. Survival rates below these criteria must require replanting(s) until this standard is met. This target will achieve the adequate shrub density to qualify as a shrub-carr wetland.

    - There must be an average stand density of 840 tree seedlings/acre with at least 3/4-inch basal caliper and 3-foot height within forested wetland planting clusters after three full growing seasons. Tree species stem densities below these criteria require replanting(s) until this standard is met. This target will achieve the adequate tree density to qualify as a forested wetland.

    - A Floristic Quality Assessment (FQA) will be conducted with Floristic Quality Index (*FQI*) and mean coefficient of conservatism (mean *C*) calculated for each plant community. These *FQI* and mean *C* values will provide a baseline, and subsequent years of monitoring should record an increase in *FQI* and mean *C* values. This data will be collected and included in the respective monitoring reports; however, these values are not proposed to be used as performance standards to determine final success of the site.

    - Percent areal cover by invasive and/or non-native species must decrease as monitoring progresses. Control of invasive and/or non-native plant species must be implemented as necessary

- Year 3 and beyond:
    - Wetland areas must have 85% or greater areal cover by native, non-invasive, species. Any areas not meeting the above targets must be reseeded/replanted as necessary.

    - Removal and control of non-native invasive wetland plants is expected to improve plant habitat integrity on-site. Non-native, invasive populations of wetland plant species will be assessed prior to site plan implementation. The areal extent of each population will be calculated and mapped. At each monitoring interval the populations of all non-native invasive species on site

will be reassessed and percent change calculated. The total reduction in invasive species areal cover will be included in each monitoring report.

Final Vegetation Performance Standards: At the final year of monitoring (Year 5, or later should the USACE and WDNR determine that additional monitoring is necessary),

- Wetland areas should have 85% or greater areal cover by native, non-invasive, species. Reed canary grass shall not comprise more than 10% areal cover over the entire site.
- At final monitoring, the forested communities must attain an average stand density of 588 tree seedlings/acre with 1-inch basal caliper and 4-foot or greater height within forested wetland planting clusters. Tree species stem densities below these criteria require replanting(s) until this standard is met. This target will achieve the adequate tree density to qualify as trending towards a forested wetland.
- At final monitoring, the site must have densities of at least 200 stems per acre within shrub-carr planting clusters. This target will achieve the adequate tree or shrub density to demonstrate that the communities are trending towards shrub-carr wetland. Any areas not meeting the above targets must be reseeded and/or replanted as necessary.
- The site will be evaluated using the Superior Routine Assessment Method (RAM) for evaluating wetland functions. At final monitoring, the site will achieve a rating of High for Plant Community Integrity, Medium for Hydrologic Integrity, Wildlife Habitat Integrity, Flood and Stormwater Attenuation, Protection of Water Quality, and Low for Aesthetics /Recreation /Education /Cultural /Science functions. The anticipated "Low" score is largely due to the site being in private, rather than public, ownership. The site must meet minimum numerical scores that correspond with the High, Medium, or Low ratings – these numerical scores are shown, with scores for this site in its existing condition for comparison, in **Appendix C-2**.

9.3 Wildlife Use

During the monitoring period, wildlife sightings will be recorded and habitat condition documented to verify that the conditions established are favorable to integrating this site into the surrounding landscape.

10.0 Site Monitoring Plan

10.1 Construction Inspection

Enbridge will retain a qualified inspector to ensure that the plans are implemented as designed, or that contingency plans, where necessary, are developed and implemented in accordance with the site's mitigation goals and objectives.

10.2 As-Built Report

Within 60 days of the completion of construction, Enbridge will provide an as-built report to the USACE and WDNR. This report will summarize the construction activities and note any changes to the construction plan. Enbridge will identify immediate corrective actions along with a timeline for when the work will be completed. This as-built report will serve as the basis for construction inspection and subsequent years of monitoring and reporting. The outline for the As-Built Report is as follows:

1. Identify site, designer, and owner.
2. Identify the construction contractor.
3. Dates of construction including completion date.

4. Describe any changes to the original plan.
5. Describe problems encountered during construction and what was done to correct the problem.
6. List any follow-up corrective actions needed, provide a schedule and list who is responsible.
7. Provide the as-built plan sheets.
8. Provide site photographs and establish photo reference points to be used at all subsequent years of monitoring.

10.3 Post-Construction Monitoring

Enbridge will monitor the mitigation site during at least four (4) separate growing seasons beginning with the first full growing season after completion of the majority of the construction and planting. The first year of monitoring is anticipated in 2015. Enbridge will submit monitoring reports to the WDNR and the USACE at the end of the 1st, 2nd, 3rd, and 5th growing seasons after submittal of the as-built report. Enbridge may reduce or increase the frequency, intensity and/or duration of monitoring should the WDNR or the USACE determine that the site is either successfully established or stabilized, or if additional time is necessary to achieve success.

Monitoring activities and reporting shall include the following:

1. A restatement of the compensation site plan goals, objectives, and performance standards.
2. Identification of any structural failures or external disturbances on-site.
3. A description of management activities and corrective actions implemented during the past year.
4. A summary of and full presentation of the data collected during the past year.
5. Photographs from fixed points during the growing season to illustrate changes in plant establishment and coverage.
6. A site map showing the location of data collections.
7. An assessment of the presence and level of occurrence of invasive species.
8. List of observed animals or animal signs.
9. An assessment of the degree to which performance standards are being met.
10. Proposed corrective actions to improve attainment of performance standards.
11. A narrative summary of the results and conclusions of the monitoring.

10.4 Specific Assessment Methods

At the first monitoring visit after construction, various observation locations will be established throughout the site and marked using a global positioning system (GPS) unit. This will allow the same locations to be revisited at all subsequent monitoring events. Additional observation sites may be added as necessary. Standard monitoring will consist of evaluation of site characteristics and photographing the site at each documented observation location.

At each monitoring point, wetland characteristics will be assessed according to the procedure described in the 1987 *Corps of Engineers Wetlands Delineation Manual* and *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Northcentral and Northeast Region* (USACE 2012). Additionally, a functional assessment (Superior RAM) will be completed for the site. Data sheets for wetland characteristic observations and functional assessment observations will be included in the monitoring report.

10.5 Vegetation

Vegetation will be observed in accordance with methodology in the 1987 *Corps of Engineers Wetlands Delineation Manual*:

- Identify each tree occurring within a 30-ft radius of the observation point;
- Identify each sapling/shrub occurring within a 15-ft radius of the observation point; and,
- Herbaceous species will be measured inside a 5-ft by 5-ft quadrat placed with one corner touching the observation point.

Each tree and sapling/shrub is recorded based on the number of stems of each species. Only individuals rooted in the 15-ft radius plot will be included. Herbaceous species with foliage extending into the quadrat will be identified and percent cover estimated.

A timed-meander vegetation sampling method will be employed across the site, including all wetland plant community types and upland areas. All vegetation layers will be observed and all identifiable species recorded. Absolute cover percentages will be estimated for vegetation as a whole, and for individual species.

An assessment of floristic quality will be calculated from data gathered at each sampling point. The Wisconsin Floristic Quality Assessment method will be used to determine Floristic Quality Index (*FQI*) and the mean coefficient of conservatism (mean *C*) at each sampling point which will be reported on the vegetative sampling data sheets. Vegetation sampling will be conducted twice in the first two monitoring years, once in late spring and again in late summer/early fall. In subsequent monitoring years, vegetation sampling will occur once in each scheduled monitoring year, between late June and the end of August. All vegetative sampling sheets will be included as an attachment in the monitoring report.

10.6 Hydrology

One test pit not less than 16 inches deep will be sampled at each observation point to document establishment of hydrology characteristics. Hydrologic conditions such as depth of water or saturated soils will be documented at each vegetation sample point. Due to the presence of clay soils throughout the site, continuous surficial hydrology monitoring using electronic instrumentation or use of shallow groundwater monitoring wells/piezometers is not necessary and is not proposed. Rather, observations of water or saturation in soil pits will be documented, as well as the depth and location of any surface water observed on-site.

10.7 Soil

One test pit, not less than 16 inches deep will be sampled at each of the established observation locations to document establishment of soil characteristics. Each soil profile will be characterized, including soil texture and Munsell color for each layer within the sample.

10.8 Interim Wetland Delineation and Final Monitoring

Year 3 monitoring activities will include a wetland delineation conducted in accordance with the 1987 *Corps of Engineers Wetlands Delineation Manual* and *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Northcentral and Northeast Region* (USACE 2012) in order to evaluate whether the needed acreage of restored and enhanced wetland has been achieved. Final monitoring will be completed in order to assess the success of the project based on the final performance standards in **Section 9.0**. This final monitoring is anticipated to take place in Year 5, but may be later if the USACE and WDNR determine that the site needs more time to successfully establish.

11.0 Management Plan for the Site

An adaptive management plan will be implemented to assist in the establishment of the seeded and planted native plant species. Management for invasive species is further described in **Section 11.1**, below.

Regular monitoring events will be conducted in accordance with the monitoring plan outlined in **Section 10.0**. In addition to specific observation points, the monitors will walk the entire site to identify problems or additional areas of interest beyond the established observation points. If data collected at observation points or at any point along the observation path indicate that the area is not progressing toward meeting site goals, then contingency plans or alternative management methods will be implemented.

The site will be maintained as a wildlife habitat and for natural resource function. The site will not be logged or otherwise harvested. Motorized and non-motorized vehicular travel will be prohibited within the mitigation site.

11.1 Contingency for Control of Exotic-Invasive Plants

For invasive plant species management, the appropriate control method will be selected based on the invasive species type and abundance. An integrated plant maintenance plan is the combined implementation of timed mowing, herbicide application and/or prescribed burn activities. These tasks will be implemented as appropriate to enhance the establishment of native vegetation and suppress the establishment of invasive species, consistent with the goals defined in this site plan.

Weedy plant species that will be controlled include reed canary grass and purple loosestrife (*Lythrum salicaria*). Other non-native species will be monitored and evaluated for control as needed. Control methods include mowing, application of herbicide and/or prescribed burning. Enbridge will consult the methods for invasive plant control according to Jacobson (2006) as well as native land management professionals.

Annual and biennial weed species that threaten the establishment of the native vegetation will be controlled using mowing or other approved invasive control measures. Perennial weed species may be controlled by a combination of mowing and herbicide application as appropriate. Herbicide applications will be conducted via broadcast overspray, wicking, or spot application.

11.2 Contingency for Failure to Establish Wetland Hydrologic Regimes

Areas that fail to establish primary or secondary wetland hydrology indicators due to excess elevation will be graded and reseeded and/or replanted to ensure successful integration into the surrounding wetland. Enbridge will develop and implement a maintenance plan based on an evaluation of the extent of any failure to develop wetland hydrology. The WDNR and USACE will review and approve any contingency work deemed necessary prior to implementation. Design alterations implemented to correct for hydrologic failures will be included in regular monitoring reports.

12.0 Long-Term Protection of Site

Enbridge is responsible for the long-term protection of the site. This will ensure the site will not be intentionally degraded or filled. Enbridge intends to extend the conservation easement covering the STEP Mitigation Site to the south, to also protect the Crawford Creek Mitigation Site.

13.0 Implementation Schedule

The implementation schedule for planting and construction activities described in **Section 7.3** is displayed in **Table 5** below. The majority of construction is proposed for fall 2014, with tree and shrub installation planned for 2015.

Table 5
Implementation Schedule

Phase	Task	Timeline
Pre-Construction		
	Agency Coordination	Ongoing
	Plan Approval	Spring 2014
Construction		
	Cut and bale hay (1st cut)	June 2014
	Herbicide application for reed canary grass	July 2014
	Cut and bale hay (2nd cut)	August 2014
	Stake ditch plug locations	August 2014
	Install silt fence/other erosion control	September 2014
	Install ditch plugs, remove soil stockpiles	September 2014
	Broadcast seed native mixes	September 2014
Shrub & Tree Plantings		
	Stake planting clusters	Early spring 2015
	Shrub live-stake harvest and planting	Early spring 2015
	Tree planting	Late spring 2015
Maintenance Activities (As Needed)		
	Year 2	2016
	Year 3	2017
	Year 4	2018
	Year 5	2019
	(additional years may apply)	
Monitoring		
	Year 1: Vegetation, Hydrology, Soil	2015
	Year 2: Vegetation	2016
	Year 3: Vegetation, Hydrology, Soil	2017
	Year 5: Vegetation, Hydrology, Soil, Wetland Delineation	2019
	Year 7 (if necessary): Vegetation	2021
	Year 10 (if necessary): Vegetation, Hydrology, Soil, Wetland Delineation	2024

14.0 Financial Assurances

Enbridge is financially responsible for the site. Details of required financial assurance are currently in process between Enbridge and the WDNR and USACE.

The USACE and WDNR will conduct a final construction inspection following Enbridge's submission of the as-built report. If corrective actions are required, the USACE and WDNR will provide Enbridge with a list of those activities and deadlines for completion. Once the construction and all corrective actions are complete, the USACE and WDNR will issue a letter of compliance.

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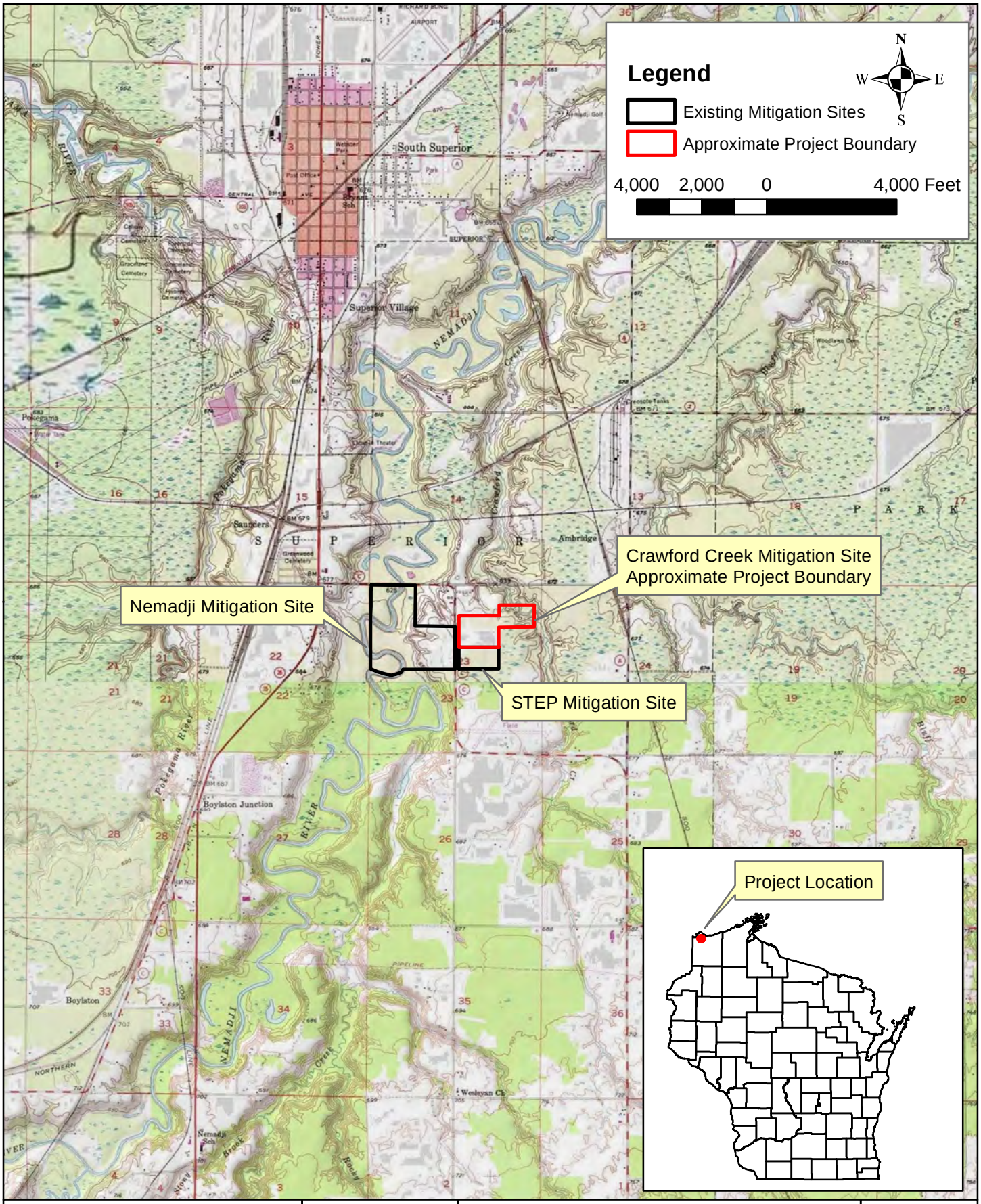
Figures

Figure 1 – Project Location Map
Figure 2 – Aerial Photograph
Figure 3 – Floodplain Map
Figure 4 – Web Soil Survey Map
Figure 5 – Wisconsin Wetlands Inventory Map
Figure 6 – Invasive Plant Occurrences
Figure 7 – Rare Plant Occurrences



Path: S:\AE\E\ENBRI\126976\GIS\Fig 1 Project Location.mxd

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Print Date: 1/20/2014

Map by: nwhite
Projection: NAD83, UTM 15N
Source: ESRI, SEH

PROJECT LOCATION MAP

CRAWFORD CREEK
WETLAND MITIGATION SITE
Douglas County, Wisconsin

Figure 1

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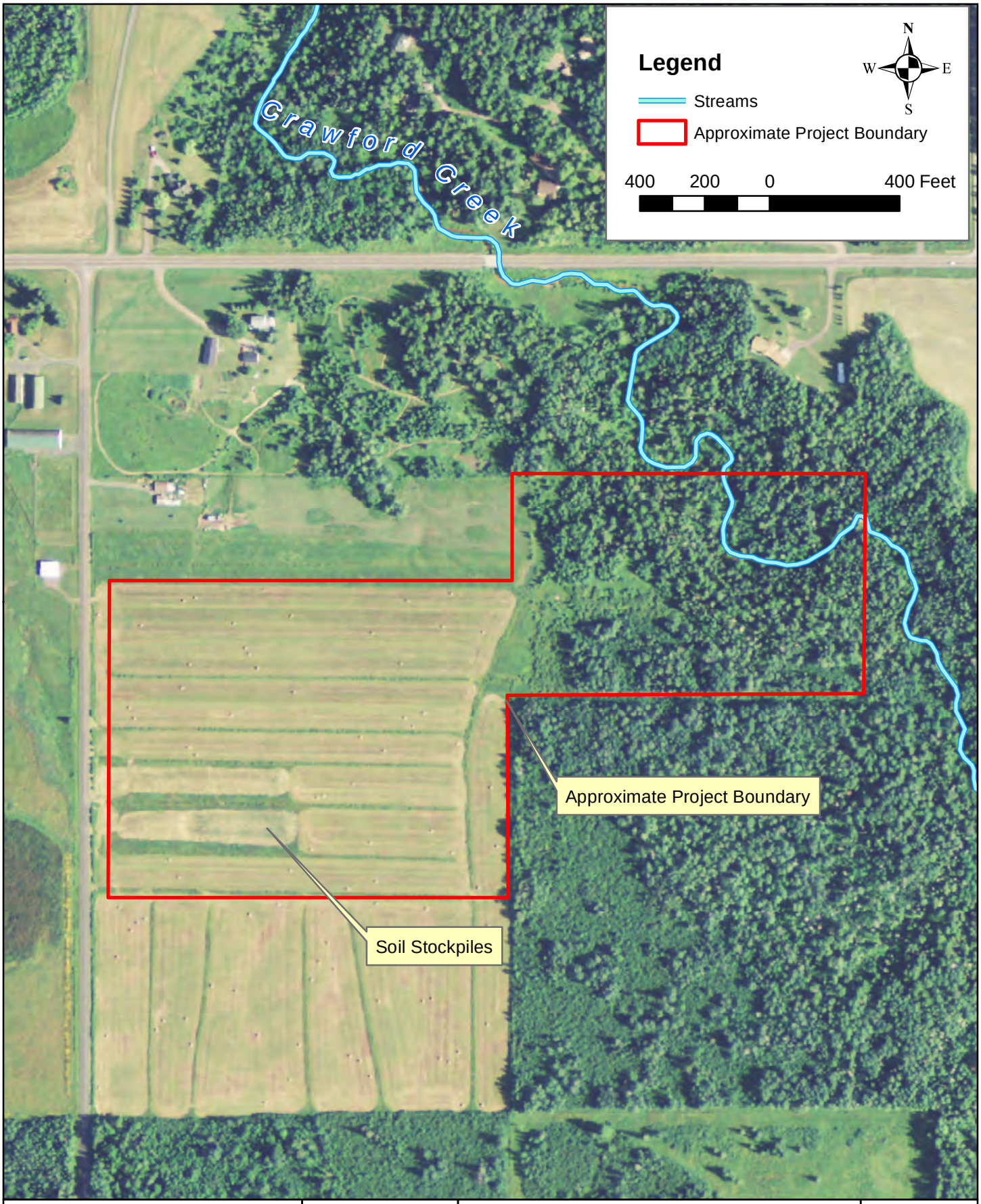

Path: S:\AE\E\ENBRI\126976\GIS\Fig 2 Aerial Photo.mxd

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2013 AERIAL PHOTOGRAPH

CRAWFORD CREEK
WETLAND MITIGATION SITE
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Figure 2

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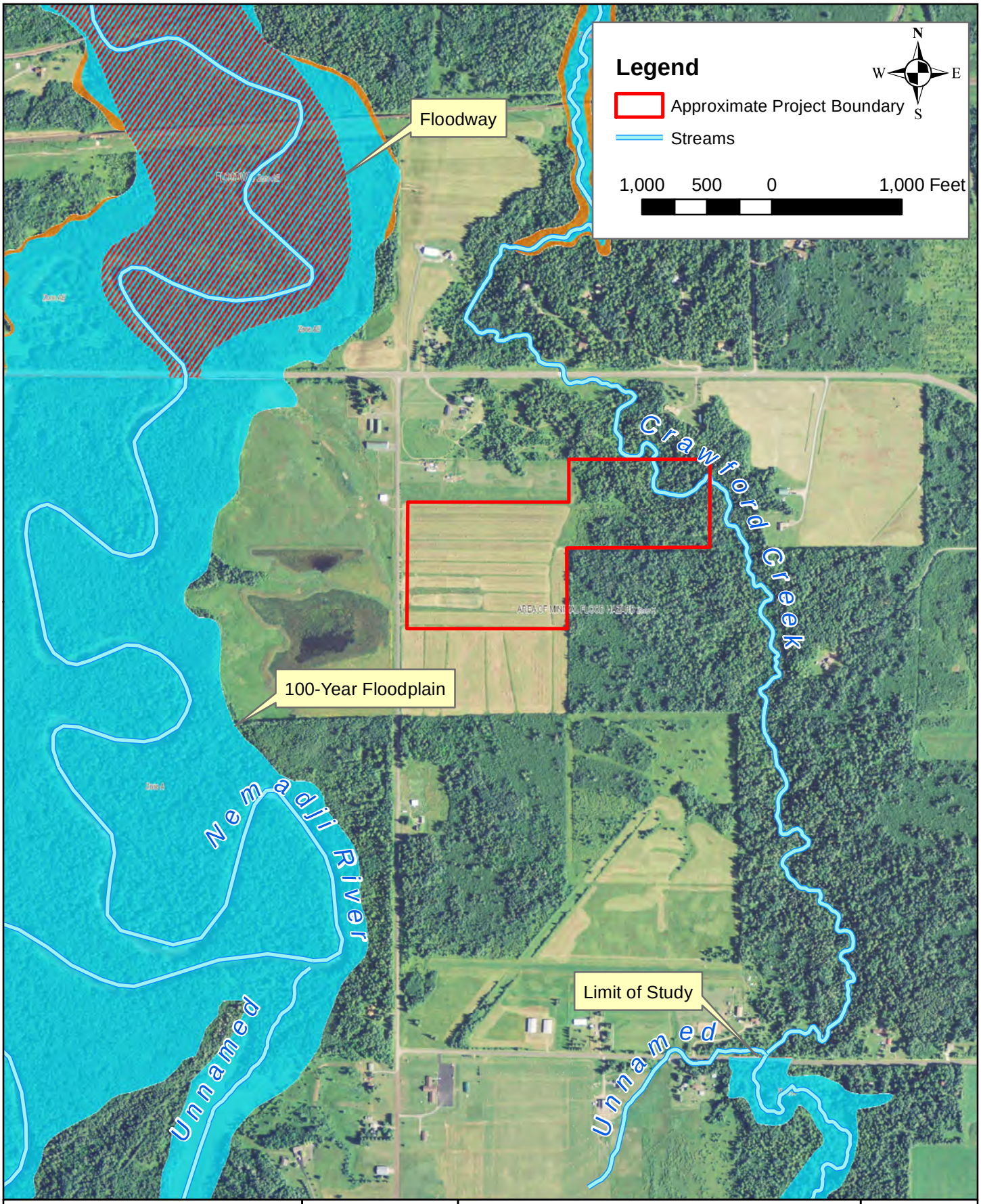

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FLOODPLAIN MAP

CRAWFORD CREEK
WETLAND MITIGATION SITE
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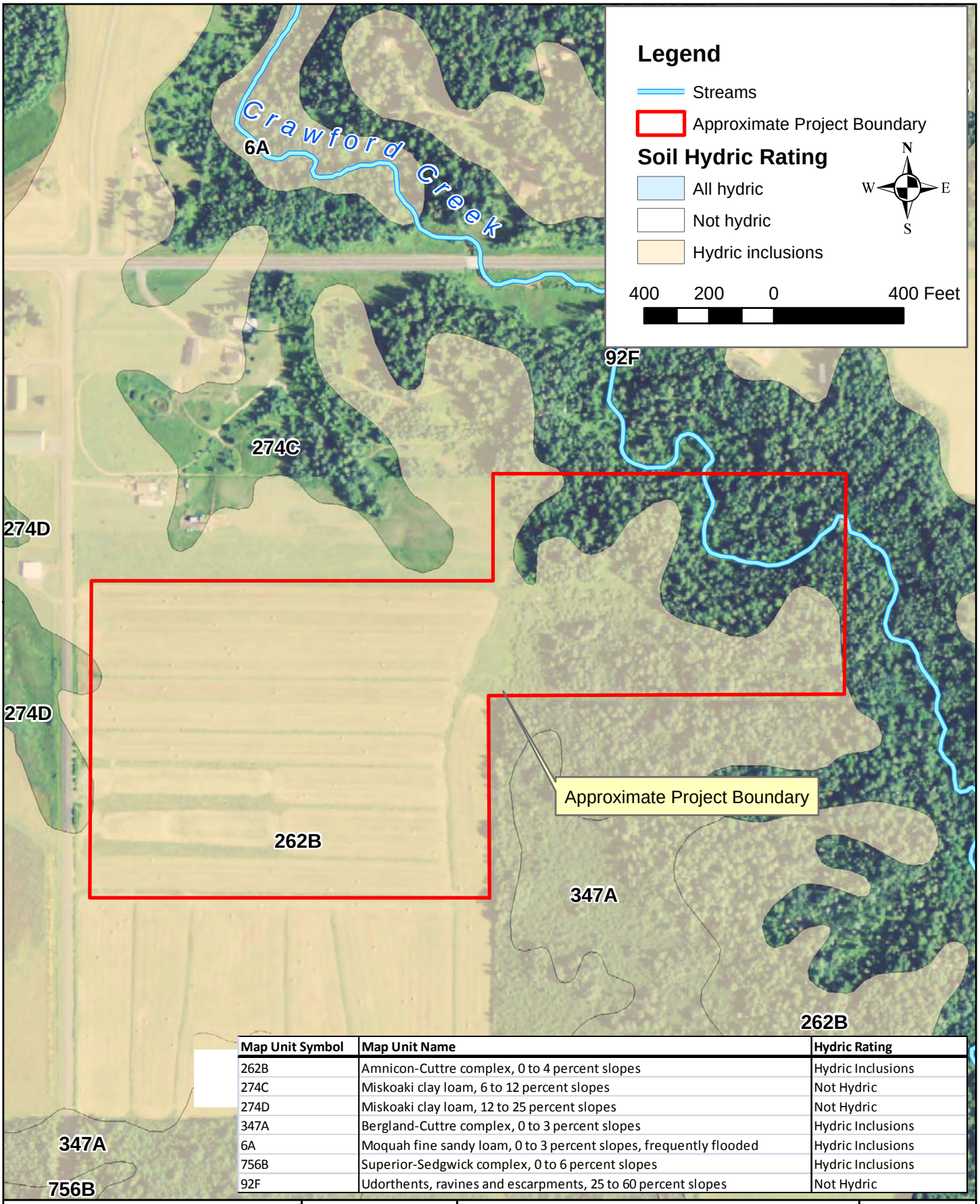

Map Unit Symbol	Map Unit Name	Hydric Rating
262B	Amnicon-Cuttre complex, 0 to 4 percent slopes	Hydric Inclusions
274C	Miskoaki clay loam, 6 to 12 percent slopes	Not Hydric
274D	Miskoaki clay loam, 12 to 25 percent slopes	Not Hydric
347A	Bergland-Cuttre complex, 0 to 3 percent slopes	Hydric Inclusions
6A	Moquah fine sandy loam, 0 to 3 percent slopes, frequently flooded	Hydric Inclusions
756B	Superior-Sedgwick complex, 0 to 6 percent slopes	Hydric Inclusions
92F	Udorthents, ravines and escarpments, 25 to 60 percent slopes	Not Hydric

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WEB SOIL SURVEY MAP

CRAWFORD CREEK
WETLAND MITIGATION SITE
Douglas County, Wisconsin

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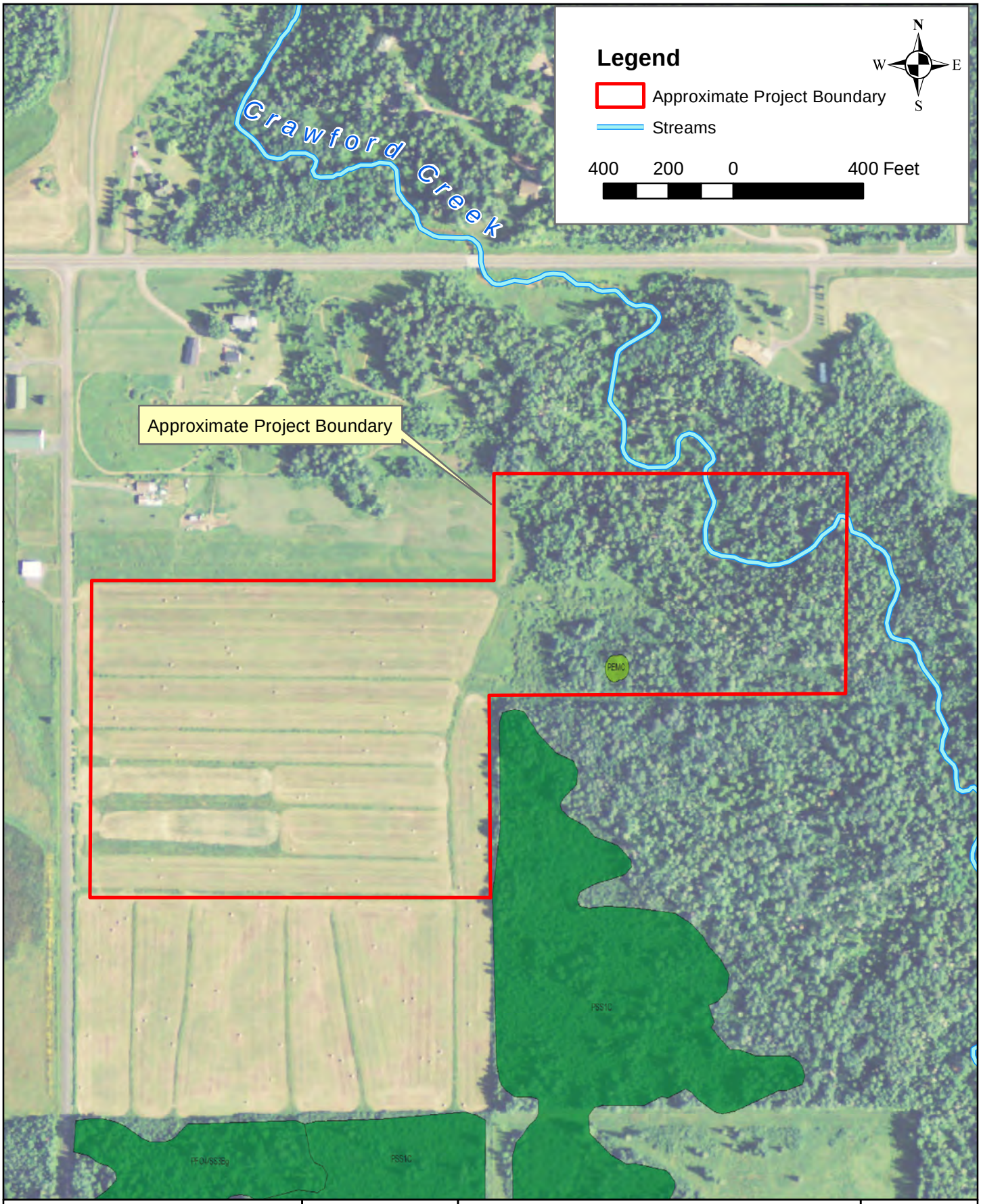

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WISCONSIN WETLANDS INVENTORY
CRAWFORD CREEK
WETLAND MITIGATION SITE
Douglas County, Wisconsin

Figure 5

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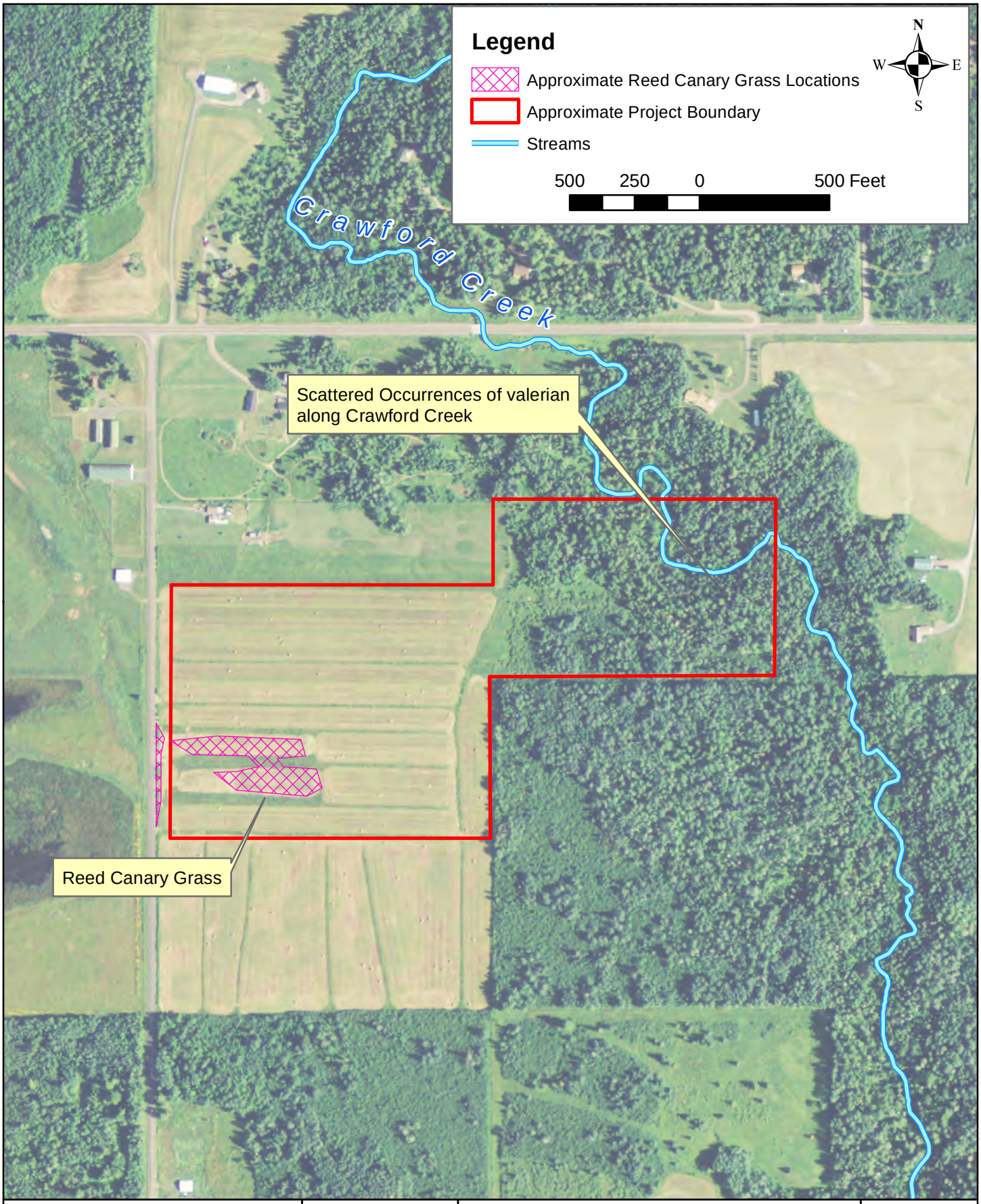

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INVASIVE PLANT OCCURRENCES
CRAWFORD CREEK
WETLAND MITIGATION SITE
Douglas County, Wisconsin

Figure 6

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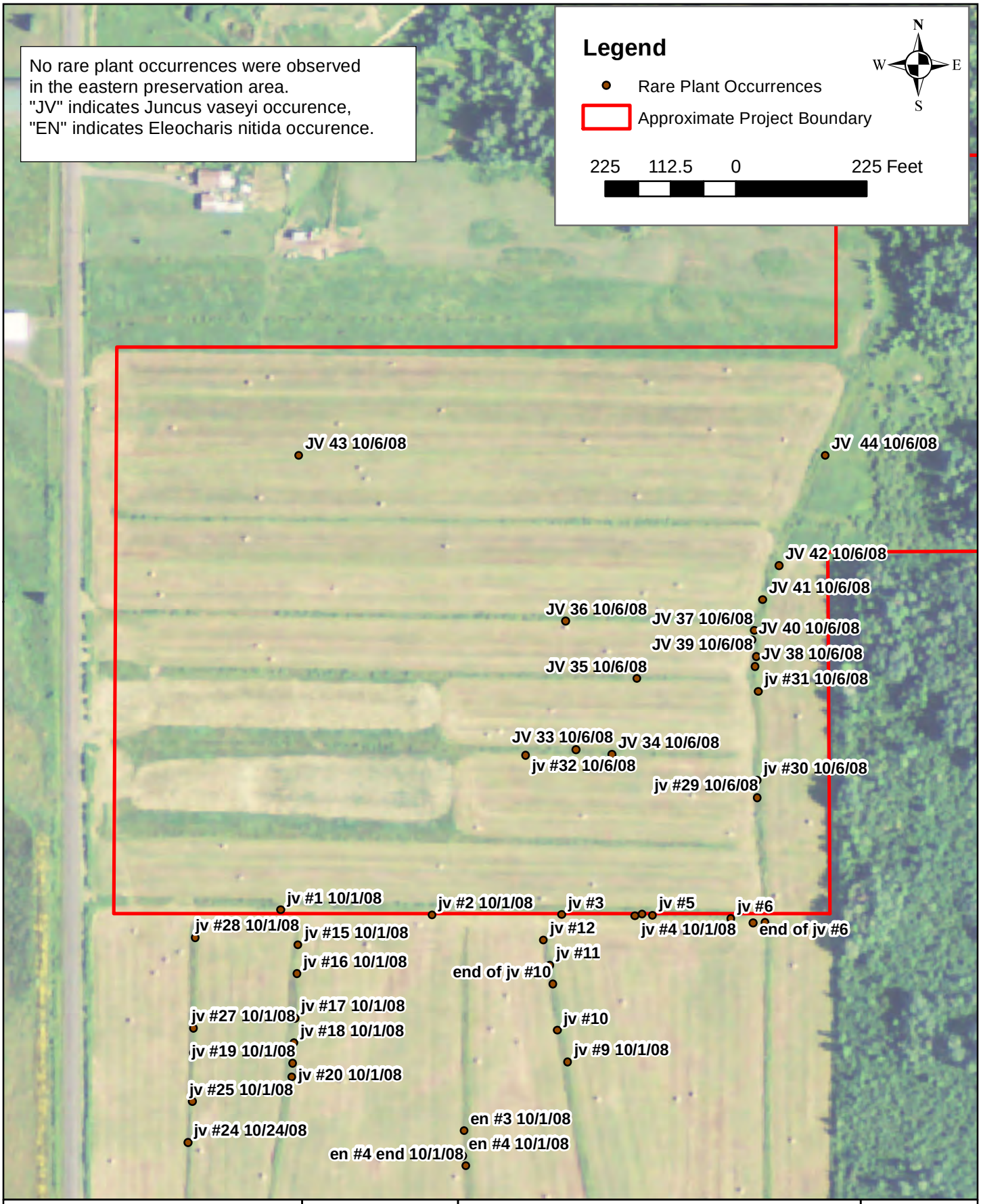

Path: S:\AE\E\ENBRI\126976\GIS\Fig 7 Rare Plants.mxd

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RARE PLANT OCCURRENCES
CRAWFORD CREEK
WETLAND MITIGATION SITE
Douglas County, Wisconsin

Figure 7

This map is neither a legally recorded map nor a survey map and is not intended to be used as one. This map is a compilation of records, information, and data gathered from various sources listed on this map and is to be used for reference purposes only. SEH does not warrant that the Geographic Information System (GIS) Data used to prepare this map are error free, and SEH does not represent that the GIS Data can be used for navigational, tracking, or any other purpose requiring exacting measurement of distance or direction or precision in the depiction of geographic features. The user of this map acknowledges that SEH shall not be liable for any damages which arise out of the user's access or use of data provided.

Appendix A

Wetland Delineation Report

Wetland Delineation Report

Nemadji River Compensatory Wetland Mitigation Site

Superior, Wisconsin

SEH No. ENBRI0804.00

February, 2009

SEH

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Nemadji River Compensatory Wetland Mitigation Site
Wetland Delineation Report
Superior, Wisconsin

SEH No. ENBRI0804.00

Prepared for:
Enbridge Energy, Limited Partnership

February 2009

The procedures described in this report and the field methods used constitute an official wetland delineation in accordance with the 1987 U.S. Army Corps of Engineers *Wetlands Delineation Manual*.

The field delineation was completed by Lindsay Hogfeldt, Whitney Horky and Troy Schultz. The methodology meets the standards and criteria described in the manual, and conforms to the applicable standards and regulations in force at the time the fieldwork was completed. The results reflect conditions present at the time of the delineation.

I hereby certify that this report was prepared by me or under my direct supervision

Prepared by: Lindsay Hogfeldt

Lindsay Hogfeldt, Graduate Scientist

Reviewed by: Scott Weyandt

Scott Weyandt, Professional Engineer

Short Elliott Hendrickson Inc.
1409 Hammond Avenue, Suite 315
Superior, WI 54880

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Wetland Delineation Report

for Nemadji River Compensatory Wetland Mitigation Site

Enbridge Energy, Limited Partnership

Introduction

The purpose of this study was to investigate the project area, identify areas meeting the technical criteria for wetlands, delineate the jurisdictional extent of the wetland basins, and classify the wetland habitat. This field delineation will be the basis on which wetland impacts from the proposed project will be determined.

This report describes the methodology and results of the field delineation performed on August 20, 2008 and August 26, 2008. Figures referred to in the text are included at the end of the report.

Site Description

The Nemadji River Compensatory Wetland Mitigation Site is approximately 180 acres in size and is located in Section 23 in Township 48 North, Range 14 West in the Town of Superior, Douglas County, Wisconsin. Approximately 69 acres are on the east side of Darrow Road while approximately 113.6 acres are on the west side of Darrow Road and are bounded on the north by County Hwy C, on the east by residential and undeveloped property, on the south by forested undeveloped property, and on the west by the Nemadji River and undeveloped property.

The entire site is predominately open field but contains forested areas on both sides of Darrow Road. The open field on the east side of Darrow Road is used for hay production while the west side is primarily used for horse pasture.

It appears the open field area on the east side of Darrow Road was historically wetland. Many man-made ditches were dug to drain the field for agricultural purposes. Today the open field is bounded by wetland on the south and east side.

The west side of Darrow Road consists of field, horse pasture, natural drainage channels, and the Nemadji River forested floodplain. The Nemadji

River forested floodplain, to the south of the project site, is owned by Douglas County as a County Forest Special Use Area and was designated as a State Natural Area in 1997.

Upland species observed during the on-site evaluation include *Aster macrophyllus* (large leaf aster), *Solidago canadensis* (Canada goldenrod), *Rubus ideas* (wild red raspberry), *Cirsium arvense* (Canada thistle), *Equisetum arvense* (field horsetail), *Trifolium pretense* (red clover), *Taraxacum officinale* (common dandelion), *Carex gracillima* (graceful sedge), *Lotus corniculatus* (bird's foot trefoil), *Bromus inermis* (smooth brome), *Phleum pretense* (timothy), *Fragaria virginiana* (woodland strawberry) and *Ambrosia artemisiifolia* (ragweed).

Wetland Delineation

Wetlands Definition

Wetlands are defined jointly by the U.S. Army Corps of Engineers (USACE) and the U.S. Environmental Protection Agency (EPA) as follows:

> *"Those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas."*

According to USACE, one positive indicator (except in certain situations) from each of three elements must be in order to make a positive wetland determination, which are as follows:

- Greater than 50 percent dominance of hydrophytic plant species.
- Presence of hydric soil.
- The area is either permanently or periodically inundated, or soil is saturated to the surface during the growing season of the dominant vegetation.

Methodology

Resource Review

Aerial photographs, topographic maps, the Wisconsin Wetlands Inventory (WWI) map, and the USDA Soil Survey for Douglas County were reviewed prior to visiting the site to locate potential wetland habitats. These sources showed two wetland areas within the project site and wetland areas surrounding the project site. The WDNR indicates the entire field portion of the project site has wetland potential.

Field Procedures

The project site was examined on August 20, 2008 and August 26, 2008 for areas meeting wetland criteria in accordance with the *Corps of Engineers Wetlands Delineation Manual* (USACE, 1987). The 1987 Manual requires that soil inundation or saturation occur within a major portion of the root zone (typically within 12 inches of the root zone), and that all three wetland parameters (as discussed above) be present.

The Routine Onsite Determination Method (RODM) was applied for this delineation. Field notes, samples, and photographs were taken at representative locations in each wetland basin. Collected information was transferred to RODM data sheets, which are included in Appendix A. Photographs of the site and representative sample locations will be retained on file at SEH. Each data sheet is referenced to a sample location along the identified wetland boundary by the plot ID number. Numbers ending in "W" identify data collected within the wetland boundary. Numbers ending in "U" identify data collected outside the wetland boundary in an upland area.

Wetland boundaries were located and marked with pink pin flags and pink "WETLAND BOUNDARY" flagging tape to allow for surveying and mapping. The wetland boundary is considered the highest extent of the wetland; areas above the boundary fail to meet the three required wetland parameters while areas below the flagged boundary meet the wetland parameters required by the USACE field delineation methodology. The location of the delineated wetland boundaries were surveyed and mapped. The results of the delineation are shown on the surveyed wetland boundary maps, following the regulatory considerations portion of this report. Numerous transects were completed during the field evaluation to assist in determining the wetland boundary. Additional transects were completed throughout the site to assist in locating the wetland boundary, but were not recorded. In total, 52 sample point locations were recorded.

Hydrophytic/Wetland Vegetation

Hydrophyic or wetland plant species nomenclature follows the *National List of Plant Species that Occur in Wetlands* (U.S. Department of the Interior, 1988). Identification was aided when necessary with field guides for the region. Wetland types and observed hydrophytic/wetland plant species are discussed in the results portion of this report.

Hydric/Wetland Soils

Soils were observed for hydric soil characteristics. Soils were examined in pits dug with a spade shovel. Pits were dug to a depth necessary to confirm hydric soil characteristics, up to a maximum depth of 24 inches. Soil color determinations were made using MUNSELL Soil Color Charts (Gretag-Macbeth, 1994). Site soil characteristics were compared to those mapped and described in the USDA Soil Survey Map for Douglas County. Six mapped soil types are mapped within the project area. The Amnicon-Cuttre complex (262B) is classified as a moderately well drained, partially hydric, clayey till soil and is the most predominate soil on the east side of Darrow Road. The Udorthents, ravines and escarpments (92F) soil does not have a classification for drainage or a hydric rating. The Bergland-Cuttre complex (347A) is classified as a poorly drained, partially hydric soil, with a clayed lacustrine deposit parent material. Miskoaki clay loam (274D) is classified as a well drained, non hydric soil. Arnheim mucky silt loam (5A) is classified as poorly drained, partially hydric, and occurs in floodplains. Udifluvents, loamy to clayey (292B) does not have a drainage classification and is partially hydric.

Hydrology
Subsurface wetland hydrology indicators were examined using the soil pits and/or cores as deep as 18 inches to confirm soil saturation in the upper 12 inches of the soil surface. Site specific wetland hydrological indicators are discussed in the results portion of the report.

Wetland Classification

Classification of each wetland basin is included on the RODM data sheets in Appendix A. Wetland classification follows the methods described in *Wetlands and Deepwater Habitats of the United States* (Cowardin, et al., 1979) that is used by the USFWS NWI. The Circular 39 classification (Shaw and Fredine, 1956) is also provided.

Results

During the on-site evaluations, the temperature ranged from 75 to 90 degrees and was sunny everyday. The field delineation was conducted under temperature and precipitation conditions that were normal as compared to the historical average for the region according to the Midwestern Regional Climate Center (MRCC). Most of the vegetation was identifiable, including all dominant species.

Four wetland areas were identified, delineated and classified within the project site area. The RODM data sheets indicate the dominant species of vegetation and the soil and hydrologic characteristics at representative locations around each basin. Table 1 is a summary of the size and classification of each wetland basin.

Eastern Field Area

The eastern field area is a total of 48.61 acres and contains 8.32 acres of wetland. All wetland areas are classified as a Type 2 – Inland Fresh Wet Meadow (PEM). This area consists of man-made ditches and has been subject to years of plowing, disking, seeding, and hay production.

Dominant wetland vegetation in the herbaceous layer consisted of soft stem green bulrush (*Scirpus atrovirens*), emerging meadow willow (*Salix petiolaris*), tall buttercup (*Ranunculus acris*), wild mint (*Mentha arvensis*), lake sedge (*Carex lacustris*), woolgrass (*Scirpus cyperinus*), Canada bluejoint grass (*Calamagrostis Canadensis*), uptight sedge (*Carex stricta*), Canada anemone (*Anemone Canadensis*), white turtlehead (*Chelone glabra*), cow parsnip (*Heracleum maximum*), black willow (*Salix nigra*), reed canary grass (*Phalaris arundinacea*), common rush (*Juncus effusus*), flat-top aster (Aster umbellata), and flag iris (*Iris germanica*).

Dominant wetland vegetation in the shrub layer consisted of speckled alder (*Alnus incana*).

Dominant wetland vegetation in the tree layer, southeast of the field (outside the project area), consisted of American elm (*Ulmus Americana*), tamarack, black spruce (*Picea mariana*), and balsam fir (*Abies balsamea*).

While completing the wetland delineation, the following indicators of wetland hydrology were observed throughout the eastern field wetland areas:

drainage patterns, saturation in the upper 12 inches, multiple trunks, and FAC neutral vegetation test.

Crawford Creek Area

The Crawford Creek area is a total of 19.03 acres and contains 8.95 acres of wetland.

Dominant wetland vegetation in the herbaceous layer consisted of Canada bluejoint grass, American red raspberry, giant goldenrod, woodland horsetail (*Equisetum sylvaticum*), sedge species (*Carex spp.*), water horsetail (*Equisetum fluviatile*), ostrich fern (*Matteuccia struthiopteris*), and Canada anemone.

Dominant wetland vegetation in the shrub layer consisted of speckled alder and meadow willow.

Dominant wetland vegetation in the tree layer consisted of balsam fir, black spruce, and black ash (*Fraxinus nigra*).

While completing the wetland delineation, the following indicators of wetland hydrology were observed throughout the Crawford Creek wetland areas: drainage patterns, drift lines, multiple trunks, and buttressing.

Western Field Area

The western field area is west of Darrow Road and is a total of 62.22 acres and contains 0.63 acres of existing wetland. These wetland areas are located in the low areas of the abandoned horse track.

Dominant wetland vegetation in the herbaceous layer consisted of reed canary grass, meadow willow, moss species, tall buttercup, uptight sedge, and soft stem green bulrush.

While completing the wetland delineation, the primary wetland indicator drainage patterns in wetland was observed the western field wetland area.

Nemadji River Forested Floodplain Area

The Nemadji River forested floodplain area is west of Darrow Road and is a total of 71.24 acres which surrounds the Nemadji River.

Dominant wetland vegetation in the herbaceous layer consisted of lake sedge, soft stem green bulrush, narrow-leaf cattail (*Typha angustifolia*), flat-top aster, Canada bluejoint grass, and cow parsnip.

Dominant wetland vegetation in the shrub layer consisted of red osier dogwood (*Cornus sericea*).

Dominant wetland vegetation in the tree layer consisted of silver maple (*Acer saccharinum*), black ash, and American elm.

While completing the wetland delineation, the following indicators of wetland hydrology were observed throughout the Nemadji River forested floodplain wetland area: drainage patterns, saturation in the upper twelve inches, water marks, multiple trunks, and buttressing.

Table 1
Wetland Characteristics

Wetland Area	Size (acres)	Cowardin Classification	Circular 39 Classification
Eastern Field Area	8.32	Type 2	PEM
Crawford Creek Area	8.95	Type 1, 2, 6, 7	PEM, PSS, PFO
Western Field Area	0.63	Type 2	PEM
Nemadji River Forested Floodplain Area	71.24	Type 1	PFO

Regulatory Considerations

The local U.S. Army Corps of Engineers (Jason Berkner) and Wisconsin DNR (Steve LaValley) representatives reviewed the delineation in August 2008 during the delineation and an on-site wetland boundary concurrence was completed by Steve LaValley on September 29, 2008, at which time Mr. LaValley verbally agreed to the flagged wetland boundaries.

In our professional opinion, the wetlands in the project area are regulated by agencies at the state, and federal levels including the USACE and the EPA at the federal level and the Wisconsin Department of Natural Resources at the state level.

Construction plans that propose any direct alteration or indirect impact to wetlands or watercourses within the project area will require permits from the appropriate regulatory agencies. Violation of wetland regulations can result in substantial civil and/or criminal penalties.

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List of Figures

Figure 1 – Wetland Boundary Maps

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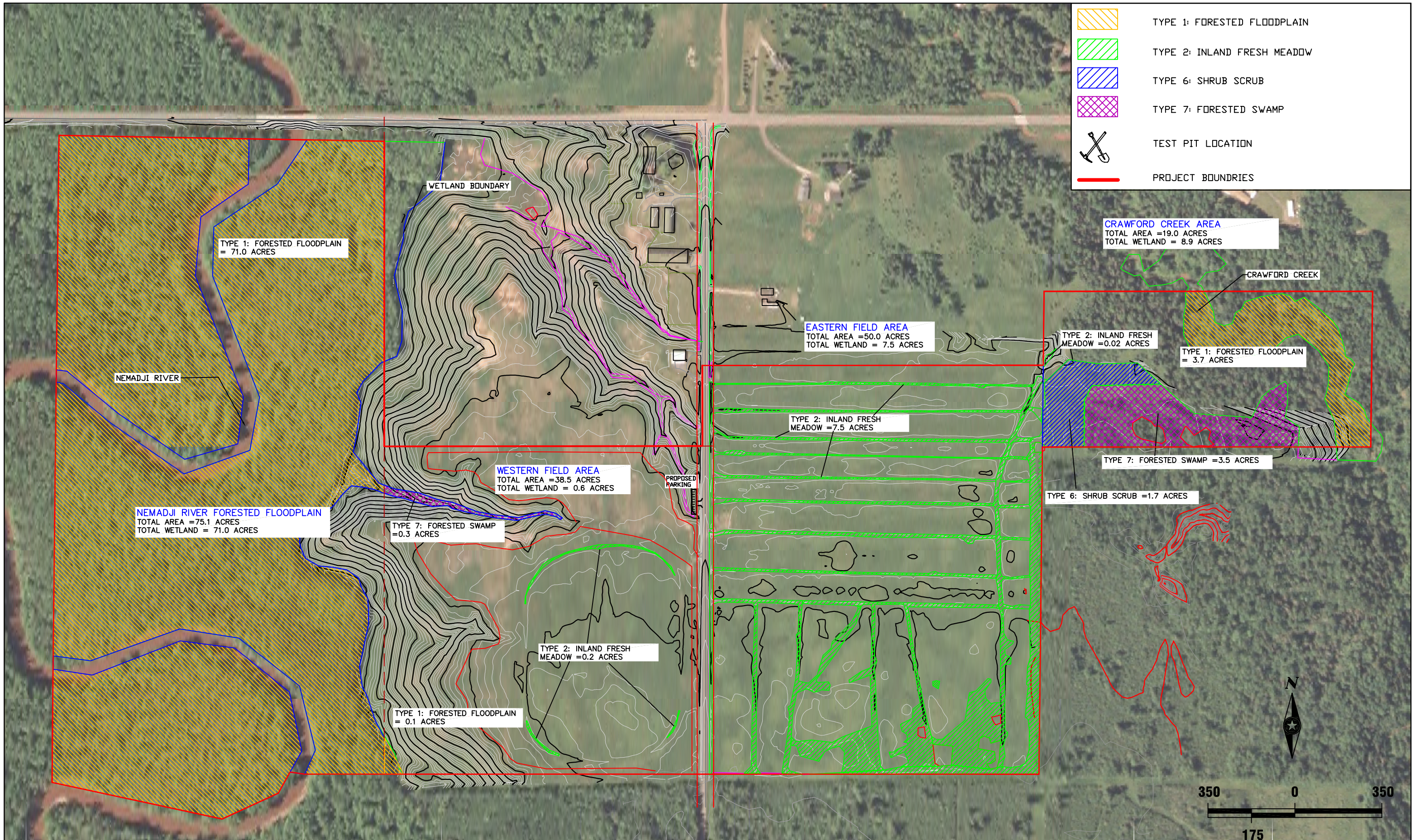

DESIGN TEAM				
DRAWN BY: TG	1			
DESIGNER:	2			
CHECKED BY:	3			
	4			
	NO.	BY	DATE	REVISIONS

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

Signature: Date:

Printed Name: SCOTT WEYANDT Reg. No. E-27245

SEH
218-279-3000
418 W. Superior St
Duluth, MN 55802-1512

ENBRI0804.00
EXISTING WETLANDS

WETLAND BOUNDARY MAP

FILE NO. ENBRI0804

DATE 09/24/08

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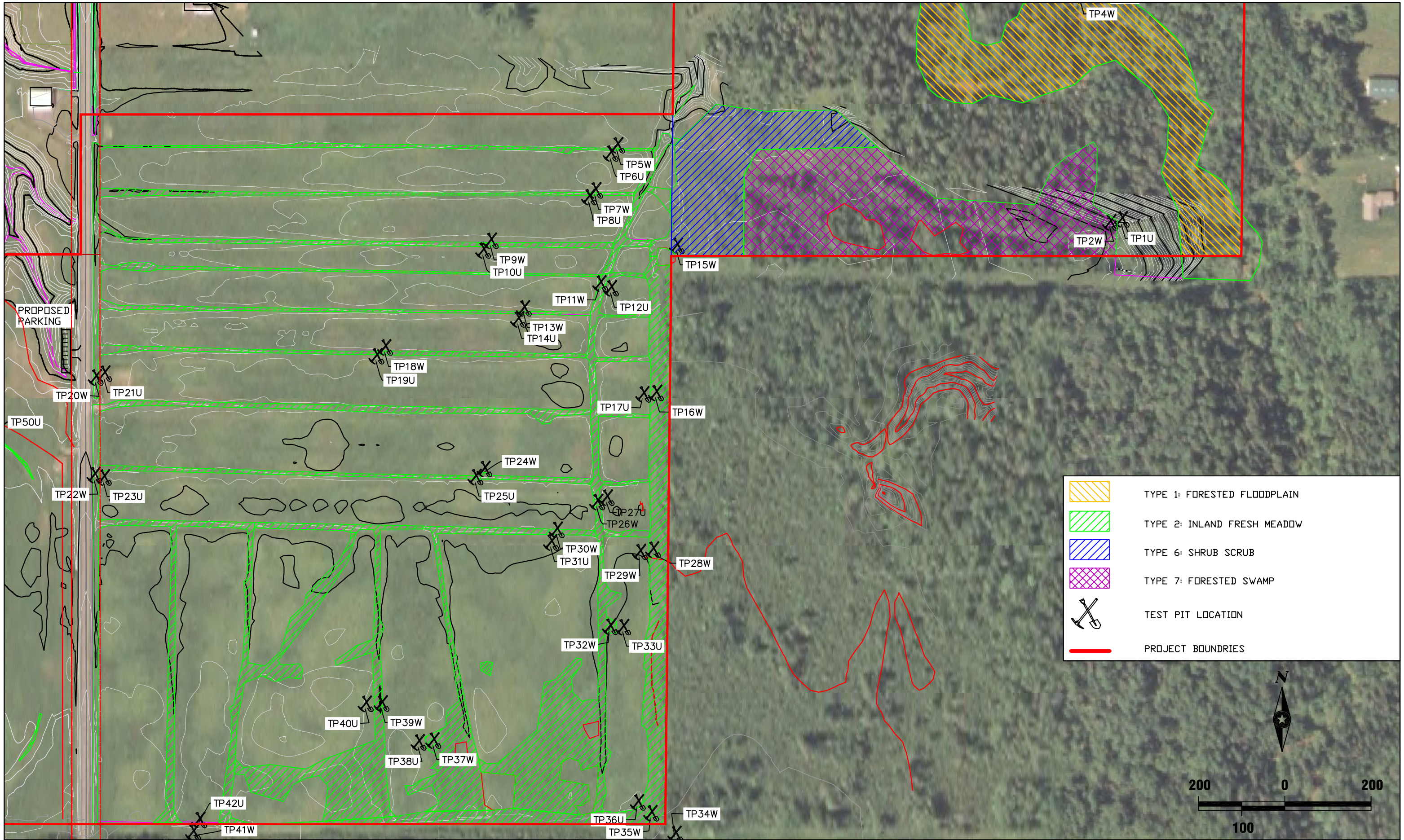

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Signature: Date:

Printed Name: SCOTT WEYANDT Reg. No. E-27245

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418 W. Superior St
Duluth, MN 55802-1512

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EXISTING WETLANDS

WETLAND BOUNDARY MAP

FILE NO. ENBRI0804

DATE 09/24/08

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Appendix A

RODM Data Sheets

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DATA FORM
ROUTINE ONSITE DETERMINATION METHOD

			Yes	No	Is the Area (Circle):		
Project/Site:	Nemadji River Wetland Mitigation Site						
Applicant/Owner:	Enbridge Energy, Limited Partnership	**Abnormal conditions?**	☐	☒	Filled	Floodplain	Ditched
Field Investigator:	Lindsay H., Whitney H., Troy S.	**Site disturbed (Atypical)?**	☐	☒	Seasonal	Permanent	Tiled
Investigation Date:	8-20-2008	**Problem area?**	☒	☐			
County	Douglas	**State: WI**					
Wetland or Upland Sample Point (Circle) and ID No.	TP1U				**Transect No.**	1	

VEGETATION

Dominant Plant Species	Stratum	%	Indicator
1. Aster macrophyllus (large leaf aster)	H	50	UPL
2. Solidago canadensis (Canada goldenrod)	H	20	UPL
3. Rubus idaeus (wild red raspberry)	H	10	FACU+
4. Cirsium arvense (Canada thistle)	H	10	FACU-
5. Equisetum arvense (field horsetail)	H	10	FAC
6. Alnus rugosa (speckled alder)	S	10	OBL
7. Salix petiolaris (meadow willow)	S	10	FACW+
8. Abies balsamea (balsam fir)	T	50	FACW
9. Populus tremuloides (quaking aspen)	T	20	FAC
10.			
11.			
12.			
13.			
14.			
15.			

Percent of dominant species that are OBL, FACW and/or FAC = 55%

HYDROLOGY

- ☐ Stream, Lake or Well Data
- ☐ Precipitation Data
- ☒ Aerial Photographs
- ☐ Other (Explain in remarks)
- ☐ No recorded data used

Field Observations

Depth of Surface Water: None
Depth to Water in Pit: None
Depth to Saturated Soil: None

Primary Wetland Hydrology Indicators

- ☐ Inundated
- ☐ Saturated in upper 12"
- ☐ Water Marks
- ☐ Drift Lines
- ☐ Sediment Deposits
- ☐ Drainage Patterns in Wetlands

Secondary Wetland Hydrology Indicators
(If no primary indicator, 2 or more required)

- ☐ Oxidized Root Channels in upper 12"
- ☐ Water Stained Leaves
- ☐ Local Soil Survey Data
- ☐ FAC Neutral Vegetation Test
- ☐ Multiple Trunks
- ☐ Buttressing
- ☐ Other (Explain in remarks)

SOILS

Map Unit Name: 262B - Amnicon-Cuttre complex
Natural Drainage Class: SPD - partially hydric
Soil Suborder: Bergland
Whole unit hydric soil? Y ☐ N ☒
Field Observations Confirmed Mapped Type? Y ☒ N ☐

Soil Profile Description

Depth (In)	Horizon Name	Matrix Color (Munsell Moist)	Mottle Color (Munsell Moist)	Mottle %	Soil Texture and Comments
0-1	1				Topsoil
1-16	2	10R 3/4			Clay, 3mm peds

DATA FORM
ROUTINE ONSITE DETERMINATION METHOD

Hydric Soil Indicators

☐ Histosol	☐ Chroma ≤ 3 in Entisol	☐ Listed on Local Hydric Soils List
☐ Histic Epipedon	☐ Mottled with Chroma ≤ 2	☒ Listed on National Hydric Soils List
☐ Sulfidic Odor	☐ Chroma of 1 without Mottles	☐ Spodic Horizon at 12"
☐ Aquic/Peraquic Moisture Regime	☐ Iron/Manganese Concretions	☐ Aquatic Invertebrate Remains
☐ Reducing Conditions	☐ Dark Organic Vertical Streaking in Sandy Soils	☐ Inclusionary Hydric Soil
☐ Gleying	☐ High Organic Content at Surface Layer in Sandy Soils	☐ Other (Explain in remarks)

WETLAND DETERMINATION

	Yes	No		Yes	No
Hydrophytic vegetation present?	☒	☐	Is this sampling site within a wetland?	☐	☒
Wetland hydrology present?	☐	☒	Wetland Circular 39 Basin Type Classification:		
Hydric soils present?	☒	☐	NWI or WWI Basin Type Classification		

Remarks

No significant amounts of rain for 2-3 weeks. Test pit located on a approximately 20% slope area where hydrology flows towards Crawford Creek. Problem area due to clay soils.

DATA FORM
ROUTINE ONSITE DETERMINATION METHOD

			Yes	No	Is the Area (Circle):
Project/Site:	Nemadji River Wetland Mitigation Site				
Applicant/Owner:	Enbridge Energy, Limited Partnership	**Abnormal conditions?**	☐	☒	Filled Floodplain Ditched
Field Investigator:	Lindsay H., Whitney H., Troy S.	**Site disturbed (Atypical)?**	☐	☒	(Seasonal) Permanent Tiled
Investigation Date:	8-20-2008	**Problem area?**	☒	☐	
County	Douglas	**State: WI**			

Wetland or Upland Sample Point (Circle) and ID No. TP2W **Transect No.** 1

VEGETATION

Dominant Plant Species	Stratum	%	Indicator
1. Cirsium arvense (Canada thistle)	H	50	FACU
2. Calamagrostis canadensis (Canada bluejoint grass)	H	20	OBL
3. Rubus strigosus (American red raspberry)	H	20	FACW-
4. Solidago gigantea (giant goldenrod)	H	10	FACW
5. Salix petiolaris (meadow willow)	S	60	FACW+
6. Alnus rugosa (speckled alder)	S	40	OBL
7. Abies balsamea (balsam fir)	T	20	FACW
8.			
9.			
10.			
11.			
12.			
13.			
14.			
15.			

Percent of dominant species that are OBL, FACW and/or FAC = 86%

HYDROLOGY

- ☐ Stream, Lake or Well Data
- ☐ Precipitation Data
- ☒ Aerial Photographs
- ☐ Other (Explain in remarks)
- ☐ No recorded data used

Field Observations

Depth of Surface Water: None
Depth to Water in Pit: None
Depth to Saturated Soil: None

Primary Wetland Hydrology Indicators

- ☐ Inundated
- ☐ Saturated in upper 12"
- ☐ Water Marks
- ☐ Drift Lines
- ☐ Sediment Deposits
- ☐ Drainage Patterns in Wetlands

Secondary Wetland Hydrology Indicators
(If no primary indicator, 2 or more required)

- ☐ Oxidized Root Channels in upper 12"
- ☐ Water Stained Leaves
- ☐ Local Soil Survey Data
- ☐ FAC Neutral Vegetation Test
- ☒ Multiple Trunks
- ☒ Buttressing
- ☐ Other (Explain in remarks)

SOILS

Map Unit Name: 262B – Amnicon-Cuttre complex
Natural Drainage Class: SPD – partially hydric
Soil Suborder: Bergland
Whole unit hydric soil? Y ☐ N ☒
Field Observations Confirmed Mapped Type? Y ☒ N ☐

Soil Profile Description

Depth (In)	Horizon Name	Matrix Color (Munsell Moist)	Mottle Color (Munsell Moist)	Mottle %	Soil Texture and Comments
0-1	1				Topsoil
1-8	2	10R 3/4	10R 6/2	10	Clay
8-16	3	7.5YR 4/4			Clay

DATA FORM
ROUTINE ONSITE DETERMINATION METHOD

Hydric Soil Indicators

☐ Histosol	☐ Chroma ≤ 3 in Entisol	☐ Listed on Local Hydric Soils List
☐ Histic Epipedon	☐ Mottled with Chroma ≤ 2	☒ Listed on National Hydric Soils List
☐ Sulfidic Odor	☐ Chroma of 1 without Mottles	☐ Spodic Horizon at 12"
☐ Aquic/Peraquic Moisture Regime	☐ Iron/Manganese Concretions	☐ Aquatic Invertebrate Remains
☐ Reducing Conditions	☐ Dark Organic Vertical Streaking in Sandy Soils	☐ Inclusionary Hydric Soil
☐ Gleying	☐ High Organic Content at Surface Layer in Sandy Soils	☐ Other (Explain in remarks)

WETLAND DETERMINATION

	Yes	No		Yes	No
Hydrophytic vegetation present?	☒	☐	Is this sampling site within a wetland?	☒	☐
Wetland hydrology present?	☒	☐	Wetland Circular 39 Basin Type Classification:	Type 7 – Forested Swamp	
Hydric soils present?	☒	☐	NWI or WWI Basin Type Classification	T1Kr	

Remarks

Problem area due to clay soils.

DATA FORM
ROUTINE ONSITE DETERMINATION METHOD

			Yes	No	Is the Area (Circle):		
Project/Site:	Nemadji River Wetland Mitigation Site						
Applicant/Owner:	Enbridge Energy, Limited Partnership	**Abnormal conditions?**	☐	☒	Filled	Floodplain	Ditched
Field Investigator:	Lindsay H., Whitney H., Troy S.	**Site disturbed (Atypical)?**	☐	☒	Seasonal	Permanent	Tiled
Investigation Date:	8-20-2008	**Problem area?**	☒	☐			
County	Douglas	**State: WI**					

Wetland or Upland Sample Point (Circle) and ID No. TP3U **Transect No.** 2

VEGETATION

Dominant Plant Species	Stratum	%	Indicator
1. Aster macrophyllus (large leaf aster)	H	75	UPL
2. Cornus canadensis (bunchberry)	H	20	FAC
3. Equisetum sylvaticum (woodland horsetail)	H	5	FACW
4. Picea mariana (black spruce)	T	50	FACW
5. Abies balsamea (balsam fir)	T	30	FACW
6.			
7.			
8.			
9.			
10.			
11.			
12.			
13.			
14.			
15.			

Percent of dominant species that are OBL, FACW and/or FAC = 80%

HYDROLOGY

- ☐ Stream, Lake or Well Data
- ☐ Precipitation Data
- ☒ Aerial Photographs
- ☐ Other (Explain in remarks)
- ☐ No recorded data used

Field Observations

Depth of Surface Water: None
Depth to Water in Pit: None
Depth to Saturated Soil: None

Primary Wetland Hydrology Indicators

- ☐ Inundated
- ☐ Saturated in upper 12"
- ☐ Water Marks
- ☐ Drift Lines
- ☐ Sediment Deposits
- ☐ Drainage Patterns in Wetlands

Secondary Wetland Hydrology Indicators
(If no primary indicator, 2 or more required)

- ☐ Oxidized Root Channels in upper 12"
- ☐ Water Stained Leaves
- ☐ Local Soil Survey Data
- ☐ FAC Neutral Vegetation Test
- ☐ Multiple Trunks
- ☐ Buttressing
- ☐ Other (Explain in remarks)

SOILS

Map Unit Name: 92F - Udorthents, ravines and escarpments
Natural Drainage Class N/A - not hydric
Soil Suborder:
Whole unit hydric soil? Y ☐ N ☒
Field Observations Confirmed Mapped Type? Y ☒ N ☐

Soil Profile Description

Depth (In)	Horizon Name	Matrix Color (Munsell Moist)	Mottle Color (Munsell Moist)	Mottle %	Soil Texture and Comments
0-3	1				Organic topsoil
3-7	2	7.5YR 3/2			Clay
7-12	3	7.5YR 4/4			Clay

DATA FORM
ROUTINE ONSITE DETERMINATION METHOD

Hydric Soil Indicators

☐ Histosol	☐ Chroma ≤ 3 in Entisol	☐ Listed on Local Hydric Soils List
☐ Histic Epipedon	☐ Mottled with Chroma ≤ 2	☐ Listed on National Hydric Soils List
☐ Sulfidic Odor	☐ Chroma of 1 without Mottles	☐ Spodic Horizon at 12"
☐ Aquic/Peraquic Moisture Regime	☐ Iron/Manganese Concretions	☐ Aquatic Invertebrate Remains
☐ Reducing Conditions	☐ Dark Organic Vertical Streaking in Sandy Soils	☐ Inclusionary Hydric Soil
☐ Gleying	☐ High Organic Content at Surface Layer in Sandy Soils	☐ Other (Explain in remarks)

WETLAND DETERMINATION

	Yes	No		Yes	No
Hydrophytic vegetation present?	☒	☐	Is this sampling site within a wetland?	☐	☒
Wetland hydrology present?	☐	☒	Wetland Circular 39 Basin Type Classification:		
Hydric soils present?	☐	☒	NWI or WWI Basin Type Classification		

Remarks

Hydrology drains down slope to Crawford Creek. Problem area due to clay soils. Sample point located near Crawford Creek floodplain.

DATA FORM
ROUTINE ONSITE DETERMINATION METHOD

			Yes	No	Is the Area (Circle):
Project/Site:	Nemadji River Wetland Mitigation Site				
Applicant/Owner:	Enbridge Energy, Limited Partnership	**Abnormal conditions?**	☐	☒	Filled (Floodplain) Ditched
Field Investigator:	Lindsay H., Whitney H., Troy S.	**Site disturbed (Atypical)?**	☐	☒	Seasonal Permanent Tiled
Investigation Date:	8-20-2008	**Problem area?**	☒	☐	
County	Douglas	**State: WI**			

Wetland or Upland Sample Point (Circle) and ID No. TP4W **Transect No.** 2

VEGETATION

Dominant Plant Species	Stratum	%	Indicator
1. Carex sp. (sedge)	H	30	NI
2. Equisetum fluviatile (water horsetail)	H	20	FACW
3. Matteuccia struthiopteris (ostrich fern)	H	20	FACW
4. Anemone Canadensis (anemone)	H	10	OBL
5. Alnus rugosa (speckled alder)	S	30	OBL
6. Fraxinus nigra (black ash)	T	10	FACW+
7. Abies balsamea (balsam fir)	T	20	FACW
8. Picea mariana (black spruce)	T	10	FACW
9.			
10.			
11.			
12.			
13.			
14.			
15.			

Percent of dominant species that are OBL, FACW and/or FAC = 86%

HYDROLOGY

- ☐ Stream, Lake or Well Data
- ☐ Precipitation Data
- ☒ Aerial Photographs
- ☐ Other (Explain in remarks)
- ☐ No recorded data used

Field Observations

Depth of Surface Water: None
Depth to Water in Pit: None
Depth to Saturated Soil: 8"

Primary Wetland Hydrology Indicators

- ☐ Inundated
- ☐ Saturated in upper 12"
- ☐ Water Marks
- ☒ Drift Lines
- ☐ Sediment Deposits
- ☒ Drainage Patterns in Wetlands

Secondary Wetland Hydrology Indicators
(If no primary indicator, 2 or more required)

- ☐ Oxidized Root Channels in upper 12"
- ☐ Water Stained Leaves
- ☐ Local Soil Survey Data
- ☐ FAC Neutral Vegetation Test
- ☐ Multiple Trunks
- ☐ Buttressing
- ☐ Other (Explain in remarks)

SOILS

Map Unit Name: 92F – Udorthents, ravines and escarpments
Natural Drainage Class: N/A – not hydric
Soil Suborder:
Whole unit hydric soil? Y ☐ N ☒
Field Observations Confirmed Mapped Type? Y ☒ N ☐

Soil Profile Description

Depth (In)	Horizon Name	Matrix Color (Munsell Moist)	Mottle Color (Munsell Moist)	Mottle %	Soil Texture and Comments
0-3	1				Organic material, moss
3-6	2	7.5YR 2.5/1	7.5YR 4/4	15	Clay
6-12	3	5YR 3/4	5YR 4/6	20	Red clay

DATA FORM
ROUTINE ONSITE DETERMINATION METHOD

Hydric Soil Indicators

☐ Histosol	☐ Chroma ≤ 3 in Entisol	☐ Listed on Local Hydric Soils List
☐ Histic Epipedon	☒ Mottled with Chroma ≤ 2	☐ Listed on National Hydric Soils List
☐ Sulfidic Odor	☐ Chroma of 1 without Mottles	☐ Spodic Horizon at 12"
☐ Aquic/Peraquic Moisture Regime	☐ Iron/Manganese Concretions	☐ Aquatic Invertebrate Remains
☐ Reducing Conditions	☐ Dark Organic Vertical Streaking in Sandy Soils	☐ Inclusionary Hydric Soil
☐ Gleying	☐ High Organic Content at Surface Layer in Sandy Soils	☐ Other (Explain in remarks)

WETLAND DETERMINATION

	Yes	No		Yes	No
Hydrophytic vegetation present?	☒	☐	Is this sampling site within a wetland?	☒	☐
Wetland hydrology present?	☒	☐	Wetland Circular 39 Basin Type Classification:	Type 7 – Forested Swamp	
Hydric soils present?	☒	☐	NWI or WWI Basin Type Classification	T1Kr	

Remarks

Sample point located in Crawford Creek floodplain on slope to Crawford Creek. Hydrology drains down slope. Dry clay soil. Problem area due to clay soils. Soils meet TF2 hydric soil indicator.

DATA FORM
ROUTINE ONSITE DETERMINATION METHOD

			Yes	No	Is the Area (Circle):
Project/Site:	Nemadji River Wetland Mitigation Site				
Applicant/Owner:	Enbridge Energy, Limited Partnership	**Abnormal conditions?**	☐	☒	Filled Floodplain (Ditched)
Field Investigator:	Lindsay H., Whitney H., Troy S.	**Site disturbed (Atypical)?**	☒	☐	Seasonal Permanent Tiled
Investigation Date:	8-25-2008	**Problem area?**	☒	☐	
County	Douglas	**State: WI**			

Wetland or Upland Sample Point (Circle) and ID No. TP5W **Transect No.** 3

VEGETATION

Dominant Plant Species	Stratum	%	Indicator
1. Phalaris arundinacea (reed canary grass)	H	20	FACW+
2. Carex gracillima (graceful sedge)	H	15	FACU
3. Salix petiolaris (meadow willow) (emerging)	H	5	FACW+
4. Scirpus atrovirens (green bulrush)	H	10	OBL
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
13.			
14.			
15.			

Percent of dominant species that are OBL, FACW and/or FAC = 75%

HYDROLOGY

- ☐ Stream, Lake or Well Data
- ☐ Precipitation Data
- ☒ Aerial Photographs
- ☐ Other (Explain in remarks)
- ☐ No recorded data used

Field Observations

Depth of Surface Water: None
Depth to Water in Pit: None
Depth to Saturated Soil: None

Primary Wetland Hydrology Indicators

- ☐ Inundated
- ☐ Saturated in upper 12"
- ☐ Water Marks
- ☐ Drift Lines
- ☐ Sediment Deposits
- ☒ Drainage Patterns in Wetlands

Secondary Wetland Hydrology Indicators
(If no primary indicator, 2 or more required)

- ☐ Oxidized Root Channels in upper 12"
- ☐ Water Stained Leaves
- ☐ Local Soil Survey Data
- ☐ FAC Neutral Vegetation Test
- ☐ Multiple Trunks
- ☐ Buttressing
- ☐ Other (Explain in remarks)

SOILS

Map Unit Name: 262B – Amnicon-Cuttre complex
Natural Drainage Class: SPD- partially hydric
Soil Suborder: Bergland
Whole unit hydric soil? Y ☐ N ☒
Field Observations Confirmed Mapped Type? Y ☒ N ☐

Soil Profile Description

Depth (In)	Horizon Name	Matrix Color (Munsell Moist)	Mottle Color (Munsell Moist)	Mottle %	Soil Texture and Comments
0-1	1				Topsoil
1-3	2	7.5YR 3/2	7.5YR 5/6	20	Red clay
3-16	3	5YR 4/4			Blocky red clay

DATA FORM
ROUTINE ONSITE DETERMINATION METHOD

Hydric Soil Indicators

☐ Histosol	☐ Chroma ≤ 3 in Entisol	☐ Listed on Local Hydric Soils List
☐ Histic Epipedon	☒ Mottled with Chroma ≤ 2	☒ Listed on National Hydric Soils List
☐ Sulfidic Odor	☐ Chroma of 1 without Mottles	☐ Spodic Horizon at 12"
☐ Aquic/Peraquic Moisture Regime	☐ Iron/Manganese Concretions	☐ Aquatic Invertebrate Remains
☐ Reducing Conditions	☐ Dark Organic Vertical Streaking in Sandy Soils	☐ Inclusionary Hydric Soil
☐ Gleying	☐ High Organic Content at Surface Layer in Sandy Soils	☐ Other (Explain in remarks)

WETLAND DETERMINATION

	Yes	No		Yes	No
Hydrophytic vegetation present?	☒	☐	Is this sampling site within a wetland?	☒	☐
Wetland hydrology present?	☒	☐	Wetland Circular 39 Basin Type Classification:	Type 2 - Inland Fresh Meadow	
Hydric soils present?	☒	☐	NWI or WWI Basin Type Classification	E2Kfr	

Remarks

Ditched agricultural hay field which was hayed this summer. Hummocks in ditch. Problem area due to clay soils. Soils meet TF2 hydric soil indicator.

DATA FORM
ROUTINE ONSITE DETERMINATION METHOD

			Yes	No	Is the Area (Circle):		
Project/Site:	Nemadji River Wetland Mitigation Site						
Applicant/Owner:	Enbridge Energy, Limited Partnership	**Abnormal conditions?**	☐	☒	Filled	Floodplain	Ditched
Field Investigator:	Lindsay H., Whitney H., Troy S.	**Site disturbed (Atypical)?**	☒	☐	Seasonal	Permanent	Tiled
Investigation Date:	8-25-2008	**Problem area?**	☒	☐			
County	Douglas	**State: WI**					
Wetland or Upland Sample Point (Circle) and ID No.	TP6U	**Transect No.**	3				

VEGETATION

Dominant Plant Species	Stratum	%	Indicator
1. Phleum pretense (timothy)	H	40	FACU
2. Trifolium pratense (red clover)	H	20	FACU+
3. Ranunculus acrius (tall buttercup)	H	15	FACW-
4. Daucus carota (queen anne's lace)	H	15	FACU
5. Taraxacum officinale (common dandelion)	H	10	FACU
6.			
7.			
8.			
9.			
10.			
11.			
12.			
13.			
14.			
15.			

Percent of dominant species that are OBL, FACW and/or FAC = 20%

HYDROLOGY

- ☐ Stream, Lake or Well Data
- ☐ Precipitation Data
- ☒ Aerial Photographs
- ☐ Other (Explain in remarks)
- ☐ No recorded data used

Field Observations

Depth of Surface Water: None
Depth to Water in Pit: None
Depth to Saturated Soil: None

Primary Wetland Hydrology Indicators

- ☐ Inundated
- ☐ Saturated in upper 12"
- ☐ Water Marks
- ☐ Drift Lines
- ☐ Sediment Deposits
- ☐ Drainage Patterns in Wetlands

Secondary Wetland Hydrology Indicators
(If no primary indicator, 2 or more required)

- ☐ Oxidized Root Channels in upper 12"
- ☐ Water Stained Leaves
- ☐ Local Soil Survey Data
- ☐ FAC Neutral Vegetation Test
- ☐ Multiple Trunks
- ☐ Buttressing
- ☐ Other (Explain in remarks)

SOILS

Map Unit Name: 262B - Amnicon-Cuttre complex
Natural Drainage Class: SPD- partially hydric
Soil Suborder: Bergland
Whole unit hydric soil? Y ☐ N ☒
Field Observations Confirmed Mapped Type? Y ☒ N ☐

Soil Profile Description

Depth (In)	Horizon Name	Matrix Color (Munsell Moist)	Mottle Color (Munsell Moist)	Mottle %	Soil Texture and Comments
0-2	1				Topsoil, roots
2-6	2	10YR 3/2			Crumbly clay
6-12	3	10YR 3/1			Blocky clay
12-18	4	5YR 4/4			Red clay

DATA FORM
ROUTINE ONSITE DETERMINATION METHOD

Hydric Soil Indicators

☐ Histosol	☐ Chroma ≤ 3 in Entisol	☐ Listed on Local Hydric Soils List
☐ Histic Epipedon	☐ Mottled with Chroma ≤ 2	☒ Listed on National Hydric Soils List
☐ Sulfidic Odor	☒ Chroma of 1 without Mottles	☐ Spodic Horizon at 12"
☐ Aquic/Peraquic Moisture Regime	☐ Iron/Manganese Concretions	☐ Aquatic Invertebrate Remains
☐ Reducing Conditions	☐ Dark Organic Vertical Streaking in Sandy Soils	☐ Inclusionary Hydric Soil
☐ Gleying	☐ High Organic Content at Surface Layer in Sandy Soils	☐ Other (Explain in remarks)

WETLAND DETERMINATION

	Yes	No		Yes	No
Hydrophytic vegetation present?	☐	☒	Is this sampling site within a wetland?	☐	☒
Wetland hydrology present?	☐	☒	Wetland Circular 39 Basin Type Classification:		
Hydric soils present?	☒	☐	NWI or WWI Basin Type Classification		

Remarks

Ditched agricultural field which was hayed this summer. Upland drains via sheet flow into man-made ditches. Problem area with clay soils.

DATA FORM
ROUTINE ONSITE DETERMINATION METHOD

			Yes	No	Is the Area (Circle):		
Project/Site:	Nemadji River Wetland Mitigation Site						
Applicant/Owner:	Enbridge Energy, Limited Partnership	**Abnormal conditions?**	☐	☒	Filled	Floodplain	(Ditched)
Field Investigator:	Lindsay H., Whitney H., Troy S.	**Site disturbed (Atypical)?**	☒	☐	Seasonal	Permanent	Tiled
Investigation Date:	8-25-2008	**Problem area?**	☒	☐			
County	Douglas	**State: WI**					

Wetland or Upland Sample Point (Circle) and ID No. TP7W **Transect No.** 4

VEGETATION

Dominant Plant Species	Stratum	%	Indicator
1. Phalaris arundinacea (reed canary grass)	H	30	FACW+
2. Salix petiolaris (meadow willow) (emerging)	H	5	FACW+
3. Carex gracillima (graceful sedge)	H	10	FACU
4. Scirpus atrovirens (green bulrush)	H	10	OBL
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
13.			
14.			
15.			

Percent of dominant species that are OBL, FACW and/or FAC = 75%

HYDROLOGY

- ☐ Stream, Lake or Well Data
- ☐ Precipitation Data
- ☒ Aerial Photographs
- ☐ Other (Explain in remarks)
- ☐ No recorded data used

Field Observations

Depth of Surface Water: None
Depth to Water in Pit: None
Depth to Saturated Soil: None

Primary Wetland Hydrology Indicators

- ☐ Inundated
- ☐ Saturated in upper 12"
- ☐ Water Marks
- ☐ Drift Lines
- ☐ Sediment Deposits
- ☒ Drainage Patterns in Wetlands

Secondary Wetland Hydrology Indicators
(If no primary indicator, 2 or more required)

- ☐ Oxidized Root Channels in upper 12"
- ☐ Water Stained Leaves
- ☐ Local Soil Survey Data
- ☐ FAC Neutral Vegetation Test
- ☐ Multiple Trunks
- ☐ Buttressing
- ☐ Other (Explain in remarks)

SOILS

Map Unit Name: 262B- Amnicon-Cuttre complex
Natural Drainage Class: SPD – partially hydric
Soil Suborder: Bergland
Whole unit hydric soil? Y ☐ N ☒
Field Observations Confirmed Mapped Type? Y ☒ N ☐

Soil Profile Description

Depth (In)	Horizon Name	Matrix Color (Munsell Moist)	Mottle Color (Munsell Moist)	Mottle %	Soil Texture and Comments
0-1	1				Topsoil
1-6	2	7.5YR 3/3	7.5YR 5/6	15	Clay, roots
6-18	3	5YR 4/4			Red clay

DATA FORM
ROUTINE ONSITE DETERMINATION METHOD

Hydric Soil Indicators

☐ Histosol	☐ Chroma ≤ 3 in Entisol	☐ Listed on Local Hydric Soils List
☐ Histic Epipedon	☐ Mottled with Chroma ≤ 2	☒ Listed on National Hydric Soils List
☐ Sulfidic Odor	☐ Chroma of 1 without Mottles	☐ Spodic Horizon at 12"
☐ Aquic/Peraquic Moisture Regime	☐ Iron/Manganese Concretions	☐ Aquatic Invertebrate Remains
☐ Reducing Conditions	☐ Dark Organic Vertical Streaking in Sandy Soils	☐ Inclusionary Hydric Soil
☐ Gleying	☐ High Organic Content at Surface Layer in Sandy Soils	☐ Other (Explain in remarks)

WETLAND DETERMINATION

	Yes	No		Yes	No
Hydrophytic vegetation present?	☒	☐	Is this sampling site within a wetland?	☒	☐
Wetland hydrology present?	☒	☐	Wetland Circular 39 Basin Type Classification:	Type 2 - Inland Fresh Meadow	
Hydric soils present?	☒	☐	NWI or WWI Basin Type Classification	E2Kfr	

Remarks

Ditched agricultural field which was hayed this summer. Problem area due to clay soils. Hummocks present in ditch. Soil meets TF2 hydric soil indicator.

DATA FORM
ROUTINE ONSITE DETERMINATION METHOD

			Yes	No	Is the Area (Circle):		
Project/Site:	Nemadji River Wetland Mitigation Site						
Applicant/Owner:	Enbridge Energy, Limited Partnership	**Abnormal conditions?**	☐	☒	Filled	Floodplain	Ditched
Field Investigator:	Lindsay H., Whitney H., Troy S.	**Site disturbed (Atypical)?**	☒	☐	Seasonal	Permanent	Tiled
Investigation Date:	8-25-2008	**Problem area?**	☒	☐			
County	Douglas	**State: WI**					

Wetland or Upland Sample Point (Circle) and ID No. TP8U **Transect No.** 4

VEGETATION

Dominant Plant Species	Stratum	%	Indicator
1. Carex gracillima (graceful sedge)	H	60	FACU
2. Trifolium pratense (red clover)	H	20	FACU
3. Daucus carota (queen anne's lace)	H	5	NI
4. Phalaris arundinacea (reed canary grass)	H	5	FACW+
5. Ranunculus acris (tall buttercup)	H	5	FACW-
6.			
7.			
8.			
9.			
10.			
11.			
12.			
13.			
14.			
15.			

Percent of dominant species that are OBL, FACW and/or FAC = 40%

HYDROLOGY

- ☐ Stream, Lake or Well Data
- ☐ Precipitation Data
- ☒ Aerial Photographs
- ☐ Other (Explain in remarks)
- ☐ No recorded data used

Field Observations

Depth of Surface Water: None
Depth to Water in Pit: None
Depth to Saturated Soil: None

Primary Wetland Hydrology Indicators

- ☐ Inundated
- ☐ Saturated in upper 12"
- ☐ Water Marks
- ☐ Drift Lines
- ☐ Sediment Deposits
- ☐ Drainage Patterns in Wetlands

Secondary Wetland Hydrology Indicators
(If no primary indicator, 2 or more required)

- ☐ Oxidized Root Channels in upper 12"
- ☐ Water Stained Leaves
- ☐ Local Soil Survey Data
- ☐ FAC Neutral Vegetation Test
- ☐ Multiple Trunks
- ☐ Buttressing
- ☐ Other (Explain in remarks)

SOILS

Map Unit Name: 262B- Amnicon-Cuttre complex
Natural Drainage Class: SPD – partially hydric
Soil Suborder: Bergland
Whole unit hydric soil? Y ☐ N ☒
Field Observations Confirmed Mapped Type? Y ☒ N ☐

Soil Profile Description

Depth (In)	Horizon Name	Matrix Color (Munsell Moist)	Mottle Color (Munsell Moist)	Mottle %	Soil Texture and Comments
0-3	1				Topsoil
3-8	2	10YR 3/2	10YR 5/6	10	Clay
8-12	3	10YR 3/2	10YR 5/6	20	Clay
12-16	4	10YR 3/2			Clay

DATA FORM
ROUTINE ONSITE DETERMINATION METHOD

Hydric Soil Indicators

☐ Histosol	☐ Chroma ≤ 3 in Entisol	☐ Listed on Local Hydric Soils List
☐ Histic Epipedon	☒ Mottled with Chroma ≤ 2	☒ Listed on National Hydric Soils List
☐ Sulfidic Odor	☐ Chroma of 1 without Mottles	☐ Spodic Horizon at 12"
☐ Aquic/Peraquic Moisture Regime	☐ Iron/Manganese Concretions	☐ Aquatic Invertebrate Remains
☐ Reducing Conditions	☐ Dark Organic Vertical Streaking in Sandy Soils	☐ Inclusionary Hydric Soil
☐ Gleying	☐ High Organic Content at Surface Layer in Sandy Soils	☐ Other (Explain in remarks)

WETLAND DETERMINATION

	Yes	No		Yes	No
Hydrophytic vegetation present?	☐	☒	Is this sampling site within a wetland?	☐	☒
Wetland hydrology present?	☐	☒	Wetland Circular 39 Basin Type Classification:		
Hydric soils present?	☒	☐	NWI or WWI Basin Type Classification		

Remarks

Ditched agricultural hay field which was hayed this summer. Upland drains via sheet flow into man-made ditches. Problem area due to clay soils.

DATA FORM
ROUTINE ONSITE DETERMINATION METHOD

			Yes	No	Is the Area (Circle):		
Project/Site:	Nemadji River Wetland Mitigation Site						
Applicant/Owner:	Enbridge Energy, Limited Partnership	**Abnormal conditions?**	☐	☒	Filled	Floodplain	(Ditched)
Field Investigator:	Lindsay H., Whitney H., Troy S.	**Site disturbed (Atypical)?**	☒	☐	Seasonal	Permanent	Tiled
Investigation Date:	8-25-2008	**Problem area?**	☒	☐			
County	Douglas	**State: WI**					

Wetland or Upland Sample Point (Circle) and ID No. TP9W **Transect No.** 5

VEGETATION

Dominant Plant Species	Stratum	%	Indicator
1. Carex gracillima (graceful sedge)	H	60	FACU
2. Salix petiolaris (meadow willow) (emerging)	H	20	FACW+
3. Mentha arvensis (wild mint)	H	20	FACW
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
13.			
14.			
15.			

Percent of dominant species that are OBL, FACW and/or FAC = 67%

HYDROLOGY

- ☐ Stream, Lake or Well Data
- ☐ Precipitation Data
- ☒ Aerial Photographs
- ☐ Other (Explain in remarks)
- ☐ No recorded data used

Field Observations

Depth of Surface Water: None
Depth to Water in Pit: None
Depth to Saturated Soil: None

Primary Wetland Hydrology Indicators

- ☐ Inundated
- ☐ Saturated in upper 12"
- ☐ Water Marks
- ☐ Drift Lines
- ☐ Sediment Deposits
- ☒ Drainage Patterns in Wetlands

Secondary Wetland Hydrology Indicators
(If no primary indicator, 2 or more required)

- ☐ Oxidized Root Channels in upper 12"
- ☐ Water Stained Leaves
- ☐ Local Soil Survey Data
- ☐ FAC Neutral Vegetation Test
- ☐ Multiple Trunks
- ☐ Buttressing
- ☐ Other (Explain in remarks)

SOILS

Map Unit Name: 262B- Amnicon-Cuttre complex
Soil Suborder: Bergland
Natural Drainage Class: SPD- partially hydric
Whole unit hydric soil? Y ☐ N ☒
Field Observations Confirmed Mapped Type? Y ☒ N ☐

Soil Profile Description

Depth (In)	Horizon Name	Matrix Color (Munsell Moist)	Mottle Color (Munsell Moist)	Mottle %	Soil Texture and Comments
0-1	1				Topsoil
1-6	2	7.5YR 3/3	7.5YR 5/6	15	Clay, roots
6-18	3	5YR 4/4			Red clay

DATA FORM
ROUTINE ONSITE DETERMINATION METHOD

Hydric Soil Indicators

☐ Histosol	☐ Chroma ≤ 3 in Entisol	☐ Listed on Local Hydric Soils List
☐ Histic Epipedon	☐ Mottled with Chroma ≤ 2	☒ Listed on National Hydric Soils List
☐ Sulfidic Odor	☐ Chroma of 1 without Mottles	☐ Spodic Horizon at 12"
☐ Aquic/Peraquic Moisture Regime	☐ Iron/Manganese Concretions	☐ Aquatic Invertebrate Remains
☐ Reducing Conditions	☐ Dark Organic Vertical Streaking in Sandy Soils	☐ Inclusionary Hydric Soil
☐ Gleying	☐ High Organic Content at Surface Layer in Sandy Soils	☐ Other (Explain in remarks)

WETLAND DETERMINATION

	Yes	No		Yes	No
Hydrophytic vegetation present?	☒	☐	Is this sampling site within a wetland?	☒	☐
Wetland hydrology present?	☒	☐	Wetland Circular 39 Basin Type Classification:	Type 2- Inland Fresh Meadow	
Hydric soils present?	☒	☐	NWI or WWI Basin Type Classification	E2Kfr	

Remarks

Ditched agricultural field which was hayed this summer. Hummocks present in ditch. Problem area due to clay soils. Soils meet TF2 hydric soil indicator.

DATA FORM
ROUTINE ONSITE DETERMINATION METHOD

			Yes	No	Is the Area (Circle):		
Project/Site:	Nemadji River Wetland Mitigation Site						
Applicant/Owner:	Enbridge Energy, Limited Partnership	**Abnormal conditions?**	☐	☒	Filled	Floodplain	Ditched
Field Investigator:	Lindsay H., Whitney H., Troy S.	**Site disturbed (Atypical)?**	☒	☐	Seasonal	Permanent	Tiled
Investigation Date:	8-25-2008	**Problem area?**	☒	☐			
County	Douglas	**State: WI**					
Wetland or Upland Sample Point (Circle) and ID No.	TP10U				**Transect No.**	5	

VEGETATION

Dominant Plant Species	Stratum	%	Indicator
1. Carex gracillima (graceful sedge)	H	60	FACU
2. Trifolium pratense (red clover)	H	25	FACU
3. Ranunculus acrius (tall buttercup)	H	10	FACW-
4. Taraxacum officinale (common dandelion)	H	5	FACU
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
13.			
14.			
15.			

Percent of dominant species that are OBL, FACW and/or FAC = 25%

HYDROLOGY

- ☐ Stream, Lake or Well Data
- ☐ Precipitation Data
- ☒ Aerial Photographs
- ☐ Other (Explain in remarks)
- ☐ No recorded data used

Field Observations

Depth of Surface Water: None
Depth to Water in Pit: None
Depth to Saturated Soil: None

Primary Wetland Hydrology Indicators

- ☐ Inundated
- ☐ Saturated in upper 12"
- ☐ Water Marks
- ☐ Drift Lines
- ☐ Sediment Deposits
- ☐ Drainage Patterns in Wetlands

Secondary Wetland Hydrology Indicators
(If no primary indicator, 2 or more required)

- ☐ Oxidized Root Channels in upper 12"
- ☐ Water Stained Leaves
- ☐ Local Soil Survey Data
- ☐ FAC Neutral Vegetation Test
- ☐ Multiple Trunks
- ☐ Buttressing
- ☐ Other (Explain in remarks)

SOILS

Map Unit Name: 262B- Amnicon-Cuttre complex
Natural Drainage Class: SPD- partially hydric
Soil Suborder: Bergland
Whole unit hydric soil? Y ☐ N ☒
Field Observations Confirmed Mapped Type? Y ☒ N ☐

Soil Profile Description

Depth (In)	Horizon Name	Matrix Color (Munsell Moist)	Mottle Color (Munsell Moist)	Mottle %	Soil Texture and Comments
0-1	1				Topsoil
1-7	2	10YR 3/2	10YR 5/6	10	Clay
7-12	3	10YR 3/2	10YR 5/6	20	Clay
12-18	4	10YR 3/3			Clay

DATA FORM
ROUTINE ONSITE DETERMINATION METHOD

Hydric Soil Indicators

☐ Histosol	☐ Chroma ≤ 3 in Entisol	☐ Listed on Local Hydric Soils List
☐ Histic Epipedon	☒ Mottled with Chroma ≤ 2	☒ Listed on National Hydric Soils List
☐ Sulfidic Odor	☐ Chroma of 1 without Mottles	☐ Spodic Horizon at 12"
☐ Aquic/Peraquic Moisture Regime	☐ Iron/Manganese Concretions	☐ Aquatic Invertebrate Remains
☐ Reducing Conditions	☐ Dark Organic Vertical Streaking in Sandy Soils	☐ Inclusionary Hydric Soil
☐ Gleying	☐ High Organic Content at Surface Layer in Sandy Soils	☐ Other (Explain in remarks)

WETLAND DETERMINATION

	Yes	No		Yes	No
Hydrophytic vegetation present?	☐	☒	Is this sampling site within a wetland?	☐	☒
Wetland hydrology present?	☐	☒	Wetland Circular 39 Basin Type Classification:		
Hydric soils present?	☒	☐	NWI or WWI Basin Type Classification		

Remarks

Ditched agricultural hay field which was hayed this summer. Upland drains via sheet flow into man-made ditches. Problem area due to clay soils.

DATA FORM
ROUTINE ONSITE DETERMINATION METHOD

			Yes	No	Is the Area (Circle):
Project/Site:	Nemadji River Wetland Mitigation Site				
Applicant/Owner:	Enbridge Energy, Limited Partnership	**Abnormal conditions?**	☐	☒	Filled Floodplain (Ditched)
Field Investigator:	Lindsay H., Whitney H., Troy S.	**Site disturbed (Atypical)?**	☒	☐	Seasonal Permanent Tiled
Investigation Date:	8-25-2008	**Problem area?**	☒	☐	
County	Douglas	**State: WI**			

Wetland or Upland Sample Point (Circle) and ID No. TP11W **Transect No.** 6

VEGETATION

Dominant Plant Species	Stratum	%	Indicator
1. Carex lacustris (lake sedge)	H	80	OBL
2. Poa pratensis (Kentucky blue grass)	H	10	FAC-
3. Scirpus atrovirens (green bulrush)	H	5	OBL
4. Salix petiolaris (meadow willow) (emerging)	H	5	FACW+
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
13.			
14.			
15.			

Percent of dominant species that are OBL, FACW and/or FAC = 100%

HYDROLOGY

- ☐ Stream, Lake or Well Data
- ☐ Precipitation Data
- ☒ Aerial Photographs
- ☐ Other (Explain in remarks)
- ☐ No recorded data used

Field Observations

Depth of Surface Water: None
Depth to Water in Pit: None
Depth to Saturated Soil: None

Primary Wetland Hydrology Indicators

- ☐ Inundated
- ☐ Saturated in upper 12"
- ☐ Water Marks
- ☐ Drift Lines
- ☐ Sediment Deposits
- ☒ Drainage Patterns in Wetlands

Secondary Wetland Hydrology Indicators
(If no primary indicator, 2 or more required)

- ☐ Oxidized Root Channels in upper 12"
- ☐ Water Stained Leaves
- ☐ Local Soil Survey Data
- ☐ FAC Neutral Vegetation Test
- ☐ Multiple Trunks
- ☐ Buttressing
- ☐ Other (Explain in remarks)

SOILS

Map Unit Name: 262B- Amnicon-Cuttre complex
Natural Drainage Class: SPD- partially hydric
Soil Suborder: Bergland
Whole unit hydric soil? Y ☐ N ☒
Field Observations Confirmed Mapped Type? Y ☒ N ☐

Soil Profile Description

Depth (In)	Horizon Name	Matrix Color (Munsell Moist)	Mottle Color (Munsell Moist)	Mottle %	Soil Texture and Comments
0-2	1				Topsoil, roots
2-8	2	7.5YR 4/4	7.5YR 5/6	20	Clay
8-18	3	5YR 4/4	7.5YR 5/6	25	Red clay

DATA FORM
ROUTINE ONSITE DETERMINATION METHOD

Hydric Soil Indicators

☐ Histosol	☐ Chroma ≤ 3 in Entisol	☐ Listed on Local Hydric Soils List
☐ Histic Epipedon	☐ Mottled with Chroma ≤ 2	☒ Listed on National Hydric Soils List
☐ Sulfidic Odor	☐ Chroma of 1 without Mottles	☐ Spodic Horizon at 12"
☐ Aquic/Peraquic Moisture Regime	☐ Iron/Manganese Concretions	☐ Aquatic Invertebrate Remains
☐ Reducing Conditions	☐ Dark Organic Vertical Streaking in Sandy Soils	☐ Inclusionary Hydric Soil
☐ Gleying	☐ High Organic Content at Surface Layer in Sandy Soils	☐ Other (Explain in remarks)

WETLAND DETERMINATION

	Yes	No		Yes	No
Hydrophytic vegetation present?	☒	☐	Is this sampling site within a wetland?	☒	☐
Wetland hydrology present?	☒	☐	Wetland Circular 39 Basin Type Classification:	Type 2- Inland Fresh Meadow	
Hydric soils present?	☒	☐	NWI or WWI Basin Type Classification	E2Kfr	

Remarks

Ditched agricultural hay field which was hayed this summer. Problem area due to clay soils. Soils meet TF2 hydric soil indicator.

DATA FORM
ROUTINE ONSITE DETERMINATION METHOD

			Yes	No	Is the Area (Circle):		
Project/Site:	Nemadji River Wetland Mitigation Site						
Applicant/Owner:	Enbridge Energy, Limited Partnership	**Abnormal conditions?**	☐	☒	Filled	Floodplain	Ditched
Field Investigator:	Lindsay H., Whitney H., Troy S.	**Site disturbed (Atypical)?**	☒	☐	Seasonal	Permanent	Tiled
Investigation Date:	8-25-2008	**Problem area?**	☒	☐			
County	Douglas	**State: WI**					

Wetland or Upland Sample Point (Circle) and ID No. TP12U **Transect No.** 6

VEGETATION

Dominant Plant Species	Stratum	%	Indicator
1. Bromus inermis (smooth brome)	H	40	NI
2. Phleum pratense (timothy)	H	20	FACU
3. Fragaria virginiana (woodland strawberry)	H	20	FAC-
4. Lotus corniculatus (bird's-foot trefoil)	H	10	FAC-
5. Solidago canadensis (Canada goldenrod)	H	10	FACU
6.			
7.			
8.			
9.			
10.			
11.			
12.			
13.			
14.			
15.			

Percent of dominant species that are OBL, FACW and/or FAC = 0%

HYDROLOGY

- ☐ Stream, Lake or Well Data
- ☐ Precipitation Data
- ☒ Aerial Photographs
- ☐ Other (Explain in remarks)
- ☐ No recorded data used

Field Observations

Depth of Surface Water: None
Depth to Water in Pit: None
Depth to Saturated Soil: None

Primary Wetland Hydrology Indicators

- ☐ Inundated
- ☐ Saturated in upper 12"
- ☐ Water Marks
- ☐ Drift Lines
- ☐ Sediment Deposits
- ☐ Drainage Patterns in Wetlands

Secondary Wetland Hydrology Indicators
(If no primary indicator, 2 or more required)

- ☐ Oxidized Root Channels in upper 12"
- ☐ Water Stained Leaves
- ☐ Local Soil Survey Data
- ☐ FAC Neutral Vegetation Test
- ☐ Multiple Trunks
- ☐ Buttressing
- ☐ Other (Explain in remarks)

SOILS

Map Unit Name: 262B- Amnicon-Cuttre complex
Natural Drainage Class: SPD- partially hydric
Soil Suborder: Bergland
Whole unit hydric soil? Y ☐ N ☒
Field Observations Confirmed Mapped Type? Y ☒ N ☐

Soil Profile Description

Depth (In)	Horizon Name	Matrix Color (Munsell Moist)	Mottle Color (Munsell Moist)	Mottle %	Soil Texture and Comments
0-2	1				Topsoil
2-6	2	5YR 3/2			Crumbly clay
6-16	3	5YR 4/4	7.5YR 5/6	10	Blocky red clay

DATA FORM
ROUTINE ONSITE DETERMINATION METHOD

Hydric Soil Indicators

☐ Histosol	☐ Chroma ≤ 3 in Entisol	☐ Listed on Local Hydric Soils List
☐ Histic Epipedon	☐ Mottled with Chroma ≤ 2	☒ Listed on National Hydric Soils List
☐ Sulfidic Odor	☐ Chroma of 1 without Mottles	☐ Spodic Horizon at 12"
☐ Aquic/Peraquic Moisture Regime	☐ Iron/Manganese Concretions	☐ Aquatic Invertebrate Remains
☐ Reducing Conditions	☐ Dark Organic Vertical Streaking in Sandy Soils	☐ Inclusionary Hydric Soil
☐ Gleying	☐ High Organic Content at Surface Layer in Sandy Soils	☐ Other (Explain in remarks)

WETLAND DETERMINATION

	Yes	No		Yes	No
Hydrophytic vegetation present?	☐	☒	Is this sampling site within a wetland?	☐	☒
Wetland hydrology present?	☐	☒	Wetland Circular 39 Basin Type Classification:		
Hydric soils present?	☒	☐	NWI or WWI Basin Type Classification		

Remarks

Ditched agricultural hay field which was hayed this summer. Upland drains via sheet flow into man-made ditches. Problem area due to clay soils. Soils meets TF2 hydric soil indicator.

DATA FORM
ROUTINE ONSITE DETERMINATION METHOD

			Yes	No	Is the Area (Circle):
Project/Site:	Nemadji River Wetland Mitigation Site				
Applicant/Owner:	Enbridge Energy, Limited Partnership	**Abnormal conditions?**	☐	☒	Filled Floodplain (Ditched)
Field Investigator:	Lindsay H., Whitney H., Troy S.	**Site disturbed (Atypical)?**	☒	☐	Seasonal Permanent Tiled
Investigation Date:	8-25-2008	**Problem area?**	☒	☐	
County	Douglas	**State: WI**			

Wetland or Upland Sample Point (Circle) and ID No. TP13W **Transect No.** 7

VEGETATION

Dominant Plant Species	Stratum	%	Indicator
1. Carex gracillima (graceful sedge)	H	45	FACU
2. Phleum pretense (timothy)	H	40	FACU
3. Salix petiolaris (meadow willow) (emerging)	H	10	FACW+
4. Mentha arvensis (wild mint)	H	5	FACW
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
13.			
14.			
15.			

Percent of dominant species that are OBL, FACW and/or FAC = 50%

HYDROLOGY

- ☐ Stream, Lake or Well Data
- ☐ Precipitation Data
- ☒ Aerial Photographs
- ☐ Other (Explain in remarks)
- ☐ No recorded data used

Field Observations

Depth of Surface Water: None
Depth to Water in Pit: None
Depth to Saturated Soil: None

Primary Wetland Hydrology Indicators

- ☐ Inundated
- ☐ Saturated in upper 12"
- ☐ Water Marks
- ☐ Drift Lines
- ☐ Sediment Deposits
- ☒ Drainage Patterns in Wetlands

Secondary Wetland Hydrology Indicators
(If no primary indicator, 2 or more required)

- ☐ Oxidized Root Channels in upper 12"
- ☐ Water Stained Leaves
- ☐ Local Soil Survey Data
- ☐ FAC Neutral Vegetation Test
- ☐ Multiple Trunks
- ☐ Buttressing
- ☐ Other (Explain in remarks)

SOILS

Map Unit Name: 262B- Amnicon-Cuttre complex
Natural Drainage Class: SPD- partially hydric
Soil Suborder: Bergland
Whole unit hydric soil? Y ☐ N ☒
Field Observations Confirmed Mapped Type? Y ☒ N ☐

Soil Profile Description

Depth (In)	Horizon Name	Matrix Color (Munsell Moist)	Mottle Color (Munsell Moist)	Mottle %	Soil Texture and Comments
0-2	1				Topsoil, roots
2-9	2	7.5YR 4/4	7.5YR 5/6	25	Clay
9-18	3	5YR 4/4	7.5YR 5/6	25	Red clay

DATA FORM
ROUTINE ONSITE DETERMINATION METHOD

Hydric Soil Indicators

☐ Histosol	☐ Chroma ≤ 3 in Entisol	☐ Listed on Local Hydric Soils List
☐ Histic Epipedon	☐ Mottled with Chroma ≤ 2	☒ Listed on National Hydric Soils List
☐ Sulfidic Odor	☐ Chroma of 1 without Mottles	☐ Spodic Horizon at 12"
☐ Aquic/Peraquic Moisture Regime	☐ Iron/Manganese Concretions	☐ Aquatic Invertebrate Remains
☐ Reducing Conditions	☐ Dark Organic Vertical Streaking in Sandy Soils	☐ Inclusionary Hydric Soil
☐ Gleying	☐ High Organic Content at Surface Layer in Sandy Soils	☐ Other (Explain in remarks)

WETLAND DETERMINATION

	Yes	No		Yes	No
Hydrophytic vegetation present?	☒	☐	Is this sampling site within a wetland?	☒	☐
Wetland hydrology present?	☒	☐	Wetland Circular 39 Basin Type Classification:	Type 2- Inland Fresh Meadow	
Hydric soils present?	☒	☐	NWI or WWI Basin Type Classification	E2Kfr	

Remarks

Ditched agricultural field which was hayed this summer. Hummocks present in ditch. Problem area due to clay soils. Soils meet TF2 hydric soil indicator.

DATA FORM
ROUTINE ONSITE DETERMINATION METHOD

			Yes	No	Is the Area (Circle):		
Project/Site:	Nemadji River Wetland Mitigation Site						
Applicant/Owner:	Enbridge Energy, Limited Partnership	**Abnormal conditions?**	☐	☒	Filled	Floodplain	Ditched
Field Investigator:	Lindsay H., Whitney H., Troy S.	**Site disturbed (Atypical)?**	☒	☐	Seasonal	Permanent	Tiled
Investigation Date:	8-25-2008	**Problem area?**	☒	☐			
County	Douglas	**State: WI**					

Wetland or Upland Sample Point (Circle) and ID No. TP14U **Transect No.** 7

VEGETATION

Dominant Plant Species	Stratum	%	Indicator
1. Phleum pratense (timothy)	H	40	FACU
2. Solidago canadensis (giant goldenrod)	H	30	FACU
3. Fragaria virginiana (woodland strawberry)	H	20	FAC-
4. Bromus inermis (smooth brome)	H	5	NI
5. Hieracium aurantiacum (orange hawkweed)	H	5	NI
6.			
7.			
8.			
9.			
10.			
11.			
12.			
13.			
14.			
15.			

Percent of dominant species that are OBL, FACW and/or FAC = 20%

HYDROLOGY

- ☐ Stream, Lake or Well Data
- ☐ Precipitation Data
- ☒ Aerial Photographs
- ☐ Other (Explain in remarks)
- ☐ No recorded data used

Field Observations

Depth of Surface Water: None
Depth to Water in Pit: None
Depth to Saturated Soil: None

Primary Wetland Hydrology Indicators

- ☐ Inundated
- ☐ Saturated in upper 12"
- ☐ Water Marks
- ☐ Drift Lines
- ☐ Sediment Deposits
- ☐ Drainage Patterns in Wetlands

Secondary Wetland Hydrology Indicators
(If no primary indicator, 2 or more required)

- ☐ Oxidized Root Channels in upper 12"
- ☐ Water Stained Leaves
- ☐ Local Soil Survey Data
- ☐ FAC Neutral Vegetation Test
- ☐ Multiple Trunks
- ☐ Buttressing
- ☐ Other (Explain in remarks)

SOILS

Map Unit Name: 262B- Amnicon-Cuttre complex
Natural Drainage Class: SPD- partially hydric
Soil Suborder: Bergland
Whole unit hydric soil? Y ☐ N ☒
Field Observations Confirmed Mapped Type? Y ☒ N ☐

Soil Profile Description

Depth (In)	Horizon Name	Matrix Color (Munsell Moist)	Mottle Color (Munsell Moist)	Mottle %	Soil Texture and Comments
0-2	1				Topsoil
2-7	2	10YR 3/2	10YR 5/6	10	Clay
7-12	3	10YR 3/2	10YR 5/6	15	Clay
12-18	4	10YR 3/3			Clay

DATA FORM
ROUTINE ONSITE DETERMINATION METHOD

Hydric Soil Indicators

☐ Histosol	☐ Chroma ≤ 3 in Entisol	☐ Listed on Local Hydric Soils List
☐ Histic Epipedon	☒ Mottled with Chroma ≤ 2	☒ Listed on National Hydric Soils List
☐ Sulfidic Odor	☐ Chroma of 1 without Mottles	☐ Spodic Horizon at 12"
☐ Aquic/Peraquic Moisture Regime	☐ Iron/Manganese Concretions	☐ Aquatic Invertebrate Remains
☐ Reducing Conditions	☐ Dark Organic Vertical Streaking in Sandy Soils	☐ Inclusionary Hydric Soil
☐ Gleying	☐ High Organic Content at Surface Layer in Sandy Soils	☐ Other (Explain in remarks)

WETLAND DETERMINATION

	Yes	No		Yes	No
Hydrophytic vegetation present?	☐	☒	Is this sampling site within a wetland?	☐	☒
Wetland hydrology present?	☐	☒	Wetland Circular 39 Basin Type Classification:		
Hydric soils present?	☒	☐	NWI or WWI Basin Type Classification		

Remarks

Ditched agricultural hay field which was hayed this summer. Upland drains via sheet flow into man-made ditches. Problem area due to clay soils.

DATA FORM
ROUTINE ONSITE DETERMINATION METHOD

			Yes	No	Is the Area (Circle):		
Project/Site:	AENBRI0803.00/0804.00						
Applicant/Owner:	Enbridge Energy, Limited Partnership	**Abnormal conditions?**	☐	☒	Filled	Floodplain	Ditched
Field Investigator:	Lindsay H., Whitney H., Troy S.	**Site disturbed (Atypical)?**	☐	☒	(Seasonal)	Permanent	Tiled
Investigation Date:	8-25-2008	**Problem area?**	☒	☐			
County	Douglas	**State: WI**					

Wetland or Upland Sample Point (Circle) and ID No. TP15W **Transect No.** 8

VEGETATION

Dominant Plant Species	Stratum	%	Indicator
1. Calamagrostis canadensis (Canada bluejoint grass)	H	80	OBL
2. Carex lacustris (lake sedge)	H	10	OBL
3. Scirpus cyperinus (woolgrass)	H	5	OBL
4. Phalaris arundinacea (reed canary grass)	H	5	FACW+
5. Salix petiolaris (meadow willow) (emerging)	S	50	FACW+
6. Alnus incana (speckled alder)	S	50	OBL
7.			
8.			
9.			
10.			
11.			
12.			
13.			
14.			
15.			

Percent of dominant species that are OBL, FACW and/or FAC = 100%

HYDROLOGY

- ☐ Stream, Lake or Well Data
- ☐ Precipitation Data
- ☒ Aerial Photographs
- ☐ Other (Explain in remarks)
- ☐ No recorded data used

Field Observations

Depth of Surface Water: None
Depth to Water in Pit: None
Depth to Saturated Soil: None

Primary Wetland Hydrology Indicators

- ☐ Inundated
- ☐ Saturated in upper 12"
- ☐ Water Marks
- ☐ Drift Lines
- ☐ Sediment Deposits
- ☒ Drainage Patterns in Wetlands

Secondary Wetland Hydrology Indicators
(If no primary indicator, 2 or more required)

- ☐ Oxidized Root Channels in upper 12"
- ☐ Water Stained Leaves
- ☐ Local Soil Survey Data
- ☐ FAC Neutral Vegetation Test
- ☐ Multiple Trunks
- ☐ Buttressing
- ☐ Other (Explain in remarks)

SOILS

Map Unit Name: 262B- Amnicon-Cuttre complex
Natural Drainage Class: SPD – partially hydric
Soil Suborder: Bergland
Whole unit hydric soil? Y ☐ N ☒
Field Observations Confirmed Mapped Type? Y ☒ N ☐

Soil Profile Description

Depth (In)	Horizon Name	Matrix Color (Munsell Moist)	Mottle Color (Munsell Moist)	Mottle %	Soil Texture and Comments
0-1	1				Topsoil
1-7	2	10YR 3/4	10R 6/2	10	Clay
7-18	3	7.5YR 4/4			Clay

DATA FORM
ROUTINE ONSITE DETERMINATION METHOD

Hydric Soil Indicators

☐ Histosol	☐ Chroma ≤ 3 in Entisol	☐ Listed on Local Hydric Soils List
☐ Histic Epipedon	☐ Mottled with Chroma ≤ 2	☒ Listed on National Hydric Soils List
☐ Sulfidic Odor	☐ Chroma of 1 without Mottles	☐ Spodic Horizon at 12"
☐ Aquic/Peraquic Moisture Regime	☐ Iron/Manganese Concretions	☐ Aquatic Invertebrate Remains
☐ Reducing Conditions	☐ Dark Organic Vertical Streaking in Sandy Soils	☐ Inclusionary Hydric Soil
☐ Gleying	☐ High Organic Content at Surface Layer in Sandy Soils	☐ Other (Explain in remarks)

WETLAND DETERMINATION

	Yes	No		Yes	No
Hydrophytic vegetation present?	☒	☐	Is this sampling site within a wetland?	☒	☐
Wetland hydrology present?	☒	☐	Wetland Circular 39 Basin Type Classification:	Type 6- Shrub scrub	
Hydric soils present?	☒	☐	NWI or WWI Basin Type Classification	PSS1	

Remarks

Problem area due to clay soils. Sample point taken on eastern boundary. Soils meet TF2 hydric soil indicator.

DATA FORM
ROUTINE ONSITE DETERMINATION METHOD

			Yes	No	Is the Area (Circle):		
Project/Site:	Nemadji River Wetland Mitigation Site						
Applicant/Owner:	Enbridge Energy, Limited Partnership	**Abnormal conditions?**	☐	☒	Filled	Floodplain	Ditched
Field Investigator:	Lindsay H., Whitney H., Troy S.	**Site disturbed (Atypical)?**	☐	☒	(Seasonal)	Permanent	Tiled
Investigation Date:	8-25-2008	**Problem area?**	☒	☐			
County	Douglas	**State: WI**					

Wetland or Upland Sample Point (Circle) and ID No. TP16W **Transect No.** 9

VEGETATION

Dominant Plant Species	Stratum	%	Indicator
1. Carex stricta (uptight sedge)	H	30	OBL
2. Fragaria virginiana (woodland strawberry)	H	20	FAC-
3. Scirpus atrovirens (green bulrush)	H	10	OBL
4. Salix petiolaris (meadow willow)	S	60	FACW+
5. Alnus rugosa (speckled alder)	S	40	OBL
6.			
7.			
8.			
9.			
10.			
11.			
12.			
13.			
14.			
15.			

Percent of dominant species that are OBL, FACW and/or FAC = 100%

HYDROLOGY

- ☐ Stream, Lake or Well Data
- ☐ Precipitation Data
- ☒ Aerial Photographs
- ☐ Other (Explain in remarks)
- ☐ No recorded data used

Field Observations

Depth of Surface Water: None
Depth to Water in Pit: None
Depth to Saturated Soil: None

Primary Wetland Hydrology Indicators

- ☐ Inundated
- ☐ Saturated in upper 12"
- ☐ Water Marks
- ☐ Drift Lines
- ☐ Sediment Deposits
- ☐ Drainage Patterns in Wetlands

Secondary Wetland Hydrology Indicators
(If no primary indicator, 2 or more required)

- ☐ Oxidized Root Channels in upper 12"
- ☐ Water Stained Leaves
- ☐ Local Soil Survey Data
- ☒ FAC Neutral Vegetation Test
- ☒ Multiple Trunks
- ☐ Buttressing
- ☐ Other (Explain in remarks)

SOILS

Map Unit Name: 347A- Bergland-Cuttre complex
Natural Drainage Class: Poorly drained- partially hydric
Soil Suborder: Bergland
Whole unit hydric soil? Y ☐ N ☒
Field Observations Confirmed Mapped Type? Y ☒ N ☐

Soil Profile Description

Depth (In)	Horizon Name	Matrix Color (Munsell Moist)	Mottle Color (Munsell Moist)	Mottle %	Soil Texture and Comments
0-2	1				Topsoil
2-8	2	10R 3/4	10R 6/2	10	Clay
8-18	3	7.5YR 4/4			Clay

DATA FORM
ROUTINE ONSITE DETERMINATION METHOD

Hydric Soil Indicators

☐ Histosol	☐ Chroma ≤ 3 in Entisol	☐ Listed on Local Hydric Soils List
☐ Histic Epipedon	☐ Mottled with Chroma ≤ 2	☒ Listed on National Hydric Soils List
☐ Sulfidic Odor	☐ Chroma of 1 without Mottles	☐ Spodic Horizon at 12"
☐ Aquic/Peraquic Moisture Regime	☐ Iron/Manganese Concretions	☐ Aquatic Invertebrate Remains
☐ Reducing Conditions	☐ Dark Organic Vertical Streaking in Sandy Soils	☐ Inclusionary Hydric Soil
☐ Gleying	☐ High Organic Content at Surface Layer in Sandy Soils	☐ Other (Explain in remarks)

WETLAND DETERMINATION

	Yes	No		Yes	No
Hydrophytic vegetation present?	☒	☐	Is this sampling site within a wetland?	☒	☐
Wetland hydrology present?	☒	☐	Wetland Circular 39 Basin Type Classification:	Type 6- shrub scrub	
Hydric soils present?	☒	☐	NWI or WWI Basin Type Classification	PSS1	

Remarks

Problem area due to clay soils. Soils meet TF2 hydric soil indicator.

DATA FORM
ROUTINE ONSITE DETERMINATION METHOD

			Yes	No	Is the Area (Circle):		
Project/Site:	Nemadji River Wetland Mitigation Site						
Applicant/Owner:	Enbridge Energy, Limited Partnership	**Abnormal conditions?**	☐	☒	Filled	Floodplain	Ditched
Field Investigator:	Lindsay H., Whitney H., Troy S.	**Site disturbed (Atypical)?**	☐	☒	Seasonal	Permanent	Tiled
Investigation Date:	8-26-2008	**Problem area?**	☒	☐			
County	Douglas	**State: WI**					

Wetland or Upland Sample Point (Circle) and ID No. TP17U **Transect No.** 9

VEGETATION

Dominant Plant Species	Stratum	%	Indicator
1. Carex gracillima (graceful sedge)	H	40	FACU
2. Ranunculus acrius (tall buttercup)	H	20	FACW-
3. Fragaria virginiana (woodland strawberry)	H	20	FAC-
4. Taraxacum officinale (common dandelion)	H	10	FACU
5. Lotus corniculata (bird's-foot trefoil)	H	5	FAC-
6. Trifolium pratense (red clover)	H	5	FACU
7.			
8.			
9.			
10.			
11.			
12.			
13.			
14.			
15.			

Percent of dominant species that are OBL, FACW and/or FAC = 17%

HYDROLOGY

- ☐ Stream, Lake or Well Data
- ☐ Precipitation Data
- ☒ Aerial Photographs
- ☐ Other (Explain in remarks)
- ☐ No recorded data used

Field Observations

Depth of Surface Water: None
Depth to Water in Pit: None
Depth to Saturated Soil: None

Primary Wetland Hydrology Indicators

- ☐ Inundated
- ☐ Saturated in upper 12"
- ☐ Water Marks
- ☐ Drift Lines
- ☐ Sediment Deposits
- ☐ Drainage Patterns in Wetlands

Secondary Wetland Hydrology Indicators
(If no primary indicator, 2 or more required)

- ☐ Oxidized Root Channels in upper 12"
- ☐ Water Stained Leaves
- ☐ Local Soil Survey Data
- ☐ FAC Neutral Vegetation Test
- ☐ Multiple Trunks
- ☐ Buttressing
- ☐ Other (Explain in remarks)

SOILS

Map Unit Name: 262B- Amnicon-Cuttre complex
Natural Drainage Class: SPD - partially hydric
Soil Suborder: Bergland
Whole unit hydric soil? Y ☐ N ☒
Field Observations Confirmed Mapped Type? Y ☒ N ☐

Soil Profile Description

Depth (In)	Horizon Name	Matrix Color (Munsell Moist)	Mottle Color (Munsell Moist)	Mottle %	Soil Texture and Comments
0-2	1				Topsoil
2-7	2	5YR 3/2			Clay
7-18	3	5YR 4/4	7.5YR 5/6	15	Blocky red clay

DATA FORM
ROUTINE ONSITE DETERMINATION METHOD

Hydric Soil Indicators

☐ Histosol	☐ Chroma ≤ 3 in Entisol	☐ Listed on Local Hydric Soils List
☐ Histic Epipedon	☐ Mottled with Chroma ≤ 2	☒ Listed on National Hydric Soils List
☐ Sulfidic Odor	☐ Chroma of 1 without Mottles	☐ Spodic Horizon at 12"
☐ Aquic/Peraquic Moisture Regime	☐ Iron/Manganese Concretions	☐ Aquatic Invertebrate Remains
☐ Reducing Conditions	☐ Dark Organic Vertical Streaking in Sandy Soils	☐ Inclusionary Hydric Soil
☐ Gleying	☐ High Organic Content at Surface Layer in Sandy Soils	☐ Other (Explain in remarks)

WETLAND DETERMINATION

	Yes	No		Yes	No
Hydrophytic vegetation present?	☐	☒	Is this sampling site within a wetland?	☐	☒
Wetland hydrology present?	☐	☒	Wetland Circular 39 Basin Type Classification:		
Hydric soils present?	☒	☐	NWI or WWI Basin Type Classification		

Remarks

Ditched agricultural hay field which was hayed this summer. Upland drains via sheet flow into man-made ditches. Problem area due to clay soils. Soils meet TF2 hydric soil indicator.

DATA FORM
ROUTINE ONSITE DETERMINATION METHOD

			Yes	No	Is the Area (Circle):		
Project/Site:	Nemadji River Wetland Mitigation Site						
Applicant/Owner:	Enbridge Energy, Limited Partnership	**Abnormal conditions?**	☐	☒	Filled	Floodplain	(Ditched)
Field Investigator:	Lindsay H., Whitney H., Troy S.	**Site disturbed (Atypical)?**	☒	☐	Seasonal	Permanent	Tiled
Investigation Date:	8-26-2008	**Problem area?**	☒	☐			
County	Douglas	**State: WI**					
Wetland or Upland Sample Point (Circle) and ID No.	TP18W	**Transect No.**	10				

VEGETATION

Dominant Plant Species	Stratum	%	Indicator
1. Carex stricta (uptight sedge)	H	40	OBL
2. Trifolium pratense (red clover)	H	20	FACU
3. Anemone canadensis (Canadian anemone)	H	20	FACW
4. Taraxacum officinale (common dandelion)	H	10	FACU
5. Salix petiolaris (meadow willow) (emerging)	S	20	FACW+
6.			
7.			
8.			
9.			
10.			
11.			
12.			
13.			
14.			
15.			

Percent of dominant species that are OBL, FACW and/or FAC = 60%

HYDROLOGY

- ☐ Stream, Lake or Well Data
- ☐ Precipitation Data
- ☒ Aerial Photographs
- ☐ Other (Explain in remarks)
- ☐ No recorded data used

Field Observations

Depth of Surface Water: None
Depth to Water in Pit: None
Depth to Saturated Soil: None

Primary Wetland Hydrology Indicators

- ☐ Inundated
- ☐ Saturated in upper 12"
- ☐ Water Marks
- ☐ Drift Lines
- ☐ Sediment Deposits
- ☒ Drainage Patterns in Wetlands

Secondary Wetland Hydrology Indicators
(If no primary indicator, 2 or more required)

- ☐ Oxidized Root Channels in upper 12"
- ☐ Water Stained Leaves
- ☐ Local Soil Survey Data
- ☐ FAC Neutral Vegetation Test
- ☐ Multiple Trunks
- ☐ Buttressing
- ☐ Other (Explain in remarks)

SOILS

Map Unit Name: 262B- Amnicon-Cuttre complex
Natural Drainage Class: SPD – partially hydric
Soil Suborder: Bergland
Whole unit hydric soil? Y ☐ N ☒
Field Observations Confirmed Mapped Type? Y ☒ N ☐

Soil Profile Description

Depth (In)	Horizon Name	Matrix Color (Munsell Moist)	Mottle Color (Munsell Moist)	Mottle %	Soil Texture and Comments
0-2	1				Topsoil
2-9	2	7.5YR 4/4	7.5YR 5/6	25	Clay
9-18	3	5YR 4/4	7.5YR 5/6	25	Red clay

DATA FORM
ROUTINE ONSITE DETERMINATION METHOD

Hydric Soil Indicators

☐ Histosol	☐ Chroma ≤ 3 in Entisol	☐ Listed on Local Hydric Soils List
☐ Histic Epipedon	☐ Mottled with Chroma ≤ 2	☒ Listed on National Hydric Soils List
☐ Sulfidic Odor	☐ Chroma of 1 without Mottles	☐ Spodic Horizon at 12"
☐ Aquic/Peraquic Moisture Regime	☐ Iron/Manganese Concretions	☐ Aquatic Invertebrate Remains
☐ Reducing Conditions	☐ Dark Organic Vertical Streaking in Sandy Soils	☐ Inclusionary Hydric Soil
☐ Gleying	☐ High Organic Content at Surface Layer in Sandy Soils	☐ Other (Explain in remarks)

WETLAND DETERMINATION

	Yes	No		Yes	No
Hydrophytic vegetation present?	☒	☐	Is this sampling site within a wetland?	☒	☐
Wetland hydrology present?	☒	☐	Wetland Circular 39 Basin Type Classification:	Type 2- Inland Fresh Meadow	
Hydric soils present?	☒	☐	NWI or WWI Basin Type Classification	E2Kfr	

Remarks

Ditched agricultural hay field which was hayed this summer. Problem area due to clay soils. Soils meet TF2 hydric soil indicator.

DATA FORM
ROUTINE ONSITE DETERMINATION METHOD

			Yes	No	Is the Area (Circle):		
Project/Site:	Nemadji River Wetland Mitigation Site						
Applicant/Owner:	Enbridge Energy, Limited Partnership	**Abnormal conditions?**	☐	☒	Filled	Floodplain	Ditched
Field Investigator:	Lindsay H., Whitney H., Troy S.	**Site disturbed (Atypical)?**	☒	☐	Seasonal	Permanent	Tiled
Investigation Date:	8-26-2008	**Problem area?**	☒	☐			
County	Douglas	**State: WI**					
Wetland or Upland Sample Point (Circle) and ID No.	TP19U				**Transect No.**	10	

VEGETATION

Dominant Plant Species	Stratum	%	Indicator
1. Trifolium pratense (red clover)	H	60	FACU
2. Phleum pratense (timothy)	H	30	FACU
3. Carex gracillima (graceful sedge)	H	15	FACU
4. Ranunculus acrius (tall buttercup)	H	5	FACW-
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
13.			
14.			
15.			

Percent of dominant species that are OBL, FACW and/or FAC = 25%

HYDROLOGY

- ☐ Stream, Lake or Well Data
- ☐ Precipitation Data
- ☒ Aerial Photographs
- ☐ Other (Explain in remarks)
- ☐ No recorded data used

Field Observations

Depth of Surface Water: None
Depth to Water in Pit: None
Depth to Saturated Soil: None

Primary Wetland Hydrology Indicators

- ☐ Inundated
- ☐ Saturated in upper 12"
- ☐ Water Marks
- ☐ Drift Lines
- ☐ Sediment Deposits
- ☐ Drainage Patterns in Wetlands

Secondary Wetland Hydrology Indicators
(If no primary indicator, 2 or more required)

- ☐ Oxidized Root Channels in upper 12"
- ☐ Water Stained Leaves
- ☐ Local Soil Survey Data
- ☐ FAC Neutral Vegetation Test
- ☐ Multiple Trunks
- ☐ Buttressing
- ☐ Other (Explain in remarks)

SOILS

Map Unit Name: 262B- Amnicon-Cuttre complex
Natural Drainage Class: SPD - partially hydric
Soil Suborder: Bergland
Whole unit hydric soil? Y ☐ N ☒
Field Observations Confirmed Mapped Type? Y ☒ N ☐

Soil Profile Description

Depth (In)	Horizon Name	Matrix Color (Munsell Moist)	Mottle Color (Munsell Moist)	Mottle %	Soil Texture and Comments
0-2	1				Topsoil
2-6	2	10YR 3/2	10YR 5/6	10	Clay
6-11	3	10YR 3/2	10YR 5/6	15	Clay
11-18	4	10YR 3/3			Clay

DATA FORM
ROUTINE ONSITE DETERMINATION METHOD

Hydric Soil Indicators

☐ Histosol	☐ Chroma ≤ 3 in Entisol	☐ Listed on Local Hydric Soils List
☐ Histic Epipedon	☒ Mottled with Chroma ≤ 2	☒ Listed on National Hydric Soils List
☐ Sulfidic Odor	☐ Chroma of 1 without Mottles	☐ Spodic Horizon at 12"
☐ Aquic/Peraquic Moisture Regime	☐ Iron/Manganese Concretions	☐ Aquatic Invertebrate Remains
☐ Reducing Conditions	☐ Dark Organic Vertical Streaking in Sandy Soils	☐ Inclusionary Hydric Soil
☐ Gleying	☐ High Organic Content at Surface Layer in Sandy Soils	☐ Other (Explain in remarks)

WETLAND DETERMINATION

	Yes	No		Yes	No
Hydrophytic vegetation present?	☐	☒	Is this sampling site within a wetland?	☐	☒
Wetland hydrology present?	☐	☒	Wetland Circular 39 Basin Type Classification:		
Hydric soils present?	☒	☐	NWI or WWI Basin Type Classification		

Remarks

Ditched agricultural hay field which was hayed this summer. Upland drains via sheet flow into man-made ditches. Problem area due to clay soils.

DATA FORM
ROUTINE ONSITE DETERMINATION METHOD

			Yes	No	Is the Area (Circle):		
Project/Site:	Nemadji River Wetland Mitigation Site						
Applicant/Owner:	Enbridge Energy, Limited Partnership	**Abnormal conditions?**	☐	☒	Filled	Floodplain	(Ditched)
Field Investigator:	Lindsay H., Whitney H., Troy S.	**Site disturbed (Atypical)?**	☒	☐	Seasonal	Permanent	Tiled
Investigation Date:	8-26-2008	**Problem area?**	☒	☐			
County	Douglas	**State: WI**					

Wetland or Upland Sample Point (Circle) and ID No. TP20W **Transect No.** 11

VEGETATION

Dominant Plant Species	Stratum	%	Indicator
1. 1Phalaris arundinacea (reed canary grass)	H	50	FACW+
2. Poa pratensis (Kentucky blue grass)	H	20	FAC-
3. Carex lacustris (lake sedge)	H	15	OBL
4. Salix petiolaris (meadow willow) (emerging)	H	10	FACW+
5. Chelone glabra (white turtlehead)	H	5	OBL
6. Heracleum maximum (cowparsnip)	H	5	FACW
7.			
8.			
9.			
10.			
11.			
12.			
13.			
14.			
15.			

Percent of dominant species that are OBL, FACW and/or FAC = 100%

HYDROLOGY

- ☐ Stream, Lake or Well Data
- ☐ Precipitation Data
- ☒ Aerial Photographs
- ☐ Other (Explain in remarks)
- ☐ No recorded data used

Field Observations

Depth of Surface Water: None
Depth to Water in Pit: None
Depth to Saturated Soil: None

Primary Wetland Hydrology Indicators

- ☐ Inundated
- ☐ Saturated in upper 12"
- ☐ Water Marks
- ☐ Drift Lines
- ☐ Sediment Deposits
- ☒ Drainage Patterns in Wetlands

Secondary Wetland Hydrology Indicators
(If no primary indicator, 2 or more required)

- ☐ Oxidized Root Channels in upper 12"
- ☐ Water Stained Leaves
- ☐ Local Soil Survey Data
- ☐ FAC Neutral Vegetation Test
- ☐ Multiple Trunks
- ☐ Buttressing
- ☐ Other (Explain in remarks)

SOILS

Map Unit Name: 262B- Amnicon-Cuttre complex
Natural Drainage Class: SPD – partially hydric
Soil Suborder: Bergland
Whole unit hydric soil? Y ☐ N ☒
Field Observations Confirmed Mapped Type? Y ☒ N ☐

Soil Profile Description

Depth (In)	Horizon Name	Matrix Color (Munsell Moist)	Mottle Color (Munsell Moist)	Mottle %	Soil Texture and Comments
0-2	1				Topsoil, roots
2-6	2	10YR 3/1	10YR 5/8	20	Loam
6-8	3	10YR 3/2	10YR 5/8	20	Clay
8-18	4				Gravel fill

DATA FORM
ROUTINE ONSITE DETERMINATION METHOD

Hydric Soil Indicators

☐ Histosol	☐ Chroma ≤ 3 in Entisol	☐ Listed on Local Hydric Soils List
☐ Histic Epipedon	☒ Mottled with Chroma ≤ 2	☒ Listed on National Hydric Soils List
☐ Sulfidic Odor	☐ Chroma of 1 without Mottles	☐ Spodic Horizon at 12"
☐ Aquic/Peraquic Moisture Regime	☐ Iron/Manganese Concretions	☐ Aquatic Invertebrate Remains
☐ Reducing Conditions	☐ Dark Organic Vertical Streaking in Sandy Soils	☐ Inclusionary Hydric Soil
☐ Gleying	☐ High Organic Content at Surface Layer in Sandy Soils	☐ Other (Explain in remarks)

WETLAND DETERMINATION

	Yes	No		Yes	No
Hydrophytic vegetation present?	☒	☐	Is this sampling site within a wetland?	☒	☐
Wetland hydrology present?	☒	☐	Wetland Circular 39 Basin Type Classification:	Type 2- Inland Fresh Meadow	
Hydric soils present?	☒	☐	NWI or WWI Basin Type Classification	E2Kfr	

Remarks

Man-made ditch along Darrow Road. Problem area due to clay soils.

DATA FORM
ROUTINE ONSITE DETERMINATION METHOD

			Yes	No	Is the Area (Circle):		
Project/Site:	Nemadji River Wetland Mitigation Site						
Applicant/Owner:	Enbridge Energy, Limited Partnership	**Abnormal conditions?**	☐	☒	Filled	Floodplain	Ditched
Field Investigator:	Lindsay H., Whitney H., Troy S.	**Site disturbed (Atypical)?**	☐	☒	Seasonal	Permanent	Tiled
Investigation Date:	8-26-2008	**Problem area?**	☒	☐			
County	Douglas	**State: WI**					
Wetland or Upland Sample Point (Circle) and ID No.	TP21U				**Transect No.**	11	

VEGETATION

Dominant Plant Species	Stratum	%	Indicator
1. Phleum pratense (timothy)	H	25	FACU
2. Phalaris arundinacea (reed canary grass)	H	25	FACW+
3. Trifolium pratense (red clover)	H	20	FACU
4. Lotus corniculata (bird's-foot trefoil)	H	20	FAC-
5. Taraxacum officinale (common dandelion)	H	10	FACU
6.			
7.			
8.			
9.			
10.			
11.			
12.			
13.			
14.			
15.			

Percent of dominant species that are OBL, FACW and/or FAC = 20%

HYDROLOGY

- ☐ Stream, Lake or Well Data
- ☐ Precipitation Data
- ☒ Aerial Photographs
- ☐ Other (Explain in remarks)
- ☐ No recorded data used

Field Observations

Depth of Surface Water: None
Depth to Water in Pit: None
Depth to Saturated Soil: None

Primary Wetland Hydrology Indicators

- ☐ Inundated
- ☐ Saturated in upper 12"
- ☐ Water Marks
- ☐ Drift Lines
- ☐ Sediment Deposits
- ☐ Drainage Patterns in Wetlands

Secondary Wetland Hydrology Indicators
(If no primary indicator, 2 or more required)

- ☐ Oxidized Root Channels in upper 12"
- ☐ Water Stained Leaves
- ☐ Local Soil Survey Data
- ☐ FAC Neutral Vegetation Test
- ☐ Multiple Trunks
- ☐ Buttressing
- ☐ Other (Explain in remarks)

SOILS

Map Unit Name: 262B- Amnicon-Cuttre complex
Soil Suborder: Bergland
Natural Drainage Class: SPD - partially hydric
Whole unit hydric soil? Y ☐ N ☒
Field Observations Confirmed Mapped Type? Y ☒ N ☐

Soil Profile Description

Depth (In)	Horizon Name	Matrix Color (Munsell Moist)	Mottle Color (Munsell Moist)	Mottle %	Soil Texture and Comments
0-2	1				Topsoil
2-6	2	10YR 3/3	10YR 5/6		Blocky clay
6-12	3	10YR 4/3	10YR 5/1		White mixing with clay
12-18	4	10YR 4/3			Blocky clay

DATA FORM
ROUTINE ONSITE DETERMINATION METHOD

Hydric Soil Indicators

☐ Histosol	☐ Chroma ≤ 3 in Entisol	☐ Listed on Local Hydric Soils List
☐ Histic Epipedon	☐ Mottled with Chroma ≤ 2	☒ Listed on National Hydric Soils List
☐ Sulfidic Odor	☐ Chroma of 1 without Mottles	☐ Spodic Horizon at 12"
☐ Aquic/Peraquic Moisture Regime	☐ Iron/Manganese Concretions	☐ Aquatic Invertebrate Remains
☐ Reducing Conditions	☐ Dark Organic Vertical Streaking in Sandy Soils	☐ Inclusionary Hydric Soil
☐ Gleying	☐ High Organic Content at Surface Layer in Sandy Soils	☐ Other (Explain in remarks)

WETLAND DETERMINATION

	Yes	No
Hydrophytic vegetation present?	☐	☒
Wetland hydrology present?	☐	☒
Hydric soils present?	☒	☐

	Yes	No
Is this sampling site within a wetland?	☐	☒
Wetland Circular 39 Basin Type Classification:		
NWI or WWI Basin Type Classification		

Remarks

Sample point taken along Darrow Road between hay bales and ditch.

DATA FORM
ROUTINE ONSITE DETERMINATION METHOD

			Yes	No	Is the Area (Circle):
Project/Site:	Nemadji River Wetland Mitigation Site				
Applicant/Owner:	Enbridge Energy, Limited Partnership	**Abnormal conditions?**	☐	☒	Filled Floodplain (Ditched)
Field Investigator:	Lindsay H., Whitney H., Troy S.	**Site disturbed (Atypical)?**	☒	☐	Seasonal Permanent Tiled
Investigation Date:	8-26-2008	**Problem area?**	☒	☐	
County	Douglas	**State: WI**			

Wetland or Upland Sample Point (Circle) and ID No. TP22W **Transect No.** 12

VEGETATION

Dominant Plant Species	Stratum	%	Indicator
1. Carex stricta (uptight sedge)	H	60	OBL
2. Salix petiolaris (meadow willow)	H	20	FACW+
3. Phalaris arundinacea (reed canary grass)	H	10	FACW+
4. Chelone glabra (white turtlehead)	H	5	OBL
5. Heracleum maximum (cowparsnip)	H	5	FACW
6.			
7.			
8.			
9.			
10.			
11.			
12.			
13.			
14.			
15.			

Percent of dominant species that are OBL, FACW and/or FAC = 100%

HYDROLOGY

- ☐ Stream, Lake or Well Data
- ☐ Precipitation Data
- ☒ Aerial Photographs
- ☐ Other (Explain in remarks)
- ☐ No recorded data used

Field Observations

Depth of Surface Water: None
Depth to Water in Pit: None
Depth to Saturated Soil: None

Primary Wetland Hydrology Indicators

- ☐ Inundated
- ☐ Saturated in upper 12"
- ☐ Water Marks
- ☐ Drift Lines
- ☐ Sediment Deposits
- ☒ Drainage Patterns in Wetlands

Secondary Wetland Hydrology Indicators
(If no primary indicator, 2 or more required)

- ☐ Oxidized Root Channels in upper 12"
- ☐ Water Stained Leaves
- ☐ Local Soil Survey Data
- ☐ FAC Neutral Vegetation Test
- ☐ Multiple Trunks
- ☐ Buttressing
- ☐ Other (Explain in remarks)

SOILS

Map Unit Name: 262B- Amnicon-Cuttre complex
Natural Drainage Class: SPD – partially hydric
Soil Suborder: Bergland
Whole unit hydric soil? Y ☐ N ☒
Field Observations Confirmed Mapped Type? Y ☒ N ☐

Soil Profile Description

Depth (In)	Horizon Name	Matrix Color (Munsell Moist)	Mottle Color (Munsell Moist)	Mottle %	Soil Texture and Comments
0-2	1				Topsoil
2-6	2	10YR 3/1	10YR 5/8	20	Loam
6-8	3	10YR 3/1	10YR 5/8	20	Clay
8-18	4				Gravel fill

DATA FORM
ROUTINE ONSITE DETERMINATION METHOD

Hydric Soil Indicators

☐ Histosol	☐ Chroma ≤ 3 in Entisol	☐ Listed on Local Hydric Soils List
☐ Histic Epipedon	☒ Mottled with Chroma ≤ 2	☒ Listed on National Hydric Soils List
☐ Sulfidic Odor	☐ Chroma of 1 without Mottles	☐ Spodic Horizon at 12"
☐ Aquic/Peraquic Moisture Regime	☐ Iron/Manganese Concretions	☐ Aquatic Invertebrate Remains
☐ Reducing Conditions	☐ Dark Organic Vertical Streaking in Sandy Soils	☐ Inclusionary Hydric Soil
☐ Gleying	☐ High Organic Content at Surface Layer in Sandy Soils	☐ Other (Explain in remarks)

WETLAND DETERMINATION

	Yes	No		Yes	No
Hydrophytic vegetation present?	☒	☐	Is this sampling site within a wetland?	☒	☐
Wetland hydrology present?	☒	☐	Wetland Circular 39 Basin Type Classification:	Type 2- Inland Fresh Meadow	
Hydric soils present?	☒	☐	NWI or WWI Basin Type Classification	E2Kfr	

Remarks

Man-made ditch along Darrow Road. Problem area due to clay soils.

DATA FORM
ROUTINE ONSITE DETERMINATION METHOD

			Yes	No	Is the Area (Circle):		
Project/Site:	Nemadji River Wetland Mitigation Site						
Applicant/Owner:	Enbridge Energy, Limited Partnership	**Abnormal conditions?**	☐	☒	Filled	Floodplain	Ditched
Field Investigator:	Lindsay H., Whitney H., Troy S.	**Site disturbed (Atypical)?**	☒	☐	Seasonal	Permanent	Tiled
Investigation Date:	8-26-2008	**Problem area?**	☒	☐			
County	Douglas	**State: WI**					
Wetland or Upland Sample Point (Circle) and ID No.	TP23U				**Transect No.**	12	

VEGETATION

Dominant Plant Species	Stratum	%	Indicator
1. Trifolium pratense (red clover)	H	80	FACU
2. Lotus corniculata (bird's-foot trefoil)	H	20	FAC-
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
13.			
14.			
15.			

Percent of dominant species that are OBL, FACW and/or FAC = 0%

HYDROLOGY

- ☐ Stream, Lake or Well Data
- ☐ Precipitation Data
- ☒ Aerial Photographs
- ☐ Other (Explain in remarks)
- ☐ No recorded data used

Field Observations

Depth of Surface Water: None
Depth to Water in Pit: None
Depth to Saturated Soil: None

Primary Wetland Hydrology Indicators

- ☐ Inundated
- ☐ Saturated in upper 12"
- ☐ Water Marks
- ☐ Drift Lines
- ☐ Sediment Deposits
- ☐ Drainage Patterns in Wetlands

Secondary Wetland Hydrology Indicators
(If no primary indicator, 2 or more required)

- ☐ Oxidized Root Channels in upper 12"
- ☐ Water Stained Leaves
- ☐ Local Soil Survey Data
- ☐ FAC Neutral Vegetation Test
- ☐ Multiple Trunks
- ☐ Buttressing
- ☐ Other (Explain in remarks)

SOILS

Map Unit Name: 262B- Amnicon-Cuttre complex
Natural Drainage Class: SPD - partially hydric
Soil Suborder: Bergland
Whole unit hydric soil? Y ☐ N ☒
Field Observations Confirmed Mapped Type? Y ☒ N ☐

Soil Profile Description

Depth (In)	Horizon Name	Matrix Color (Munsell Moist)	Mottle Color (Munsell Moist)	Mottle %	Soil Texture and Comments
0-2	1				Topsoil
2-6	2	10YR 3/3	10YR 5/6		Blocky clay
6-12	3	10YR 4/3	10YR 5/1		White mixing with clay
12-18	4	10YR 4/3			Blocky clay

DATA FORM
ROUTINE ONSITE DETERMINATION METHOD

Hydric Soil Indicators

☐ Histosol	☐ Chroma ≤ 3 in Entisol	☐ Listed on Local Hydric Soils List
☐ Histic Epipedon	☐ Mottled with Chroma ≤ 2	☒ Listed on National Hydric Soils List
☐ Sulfidic Odor	☐ Chroma of 1 without Mottles	☐ Spodic Horizon at 12"
☐ Aquic/Peraquic Moisture Regime	☐ Iron/Manganese Concretions	☐ Aquatic Invertebrate Remains
☐ Reducing Conditions	☐ Dark Organic Vertical Streaking in Sandy Soils	☐ Inclusionary Hydric Soil
☐ Gleying	☐ High Organic Content at Surface Layer in Sandy Soils	☐ Other (Explain in remarks)

WETLAND DETERMINATION

	Yes	No
Hydrophytic vegetation present?	☐	☒
Wetland hydrology present?	☐	☒
Hydric soils present?	☒	☐

	Yes	No
Is this sampling site within a wetland?	☐	☒
Wetland Circular 39 Basin Type Classification:		
NWI or WWI Basin Type Classification		

Remarks

Man-made ditched agricultural hay field which was hayed this summer.

DATA FORM
ROUTINE ONSITE DETERMINATION METHOD

			Yes	No	Is the Area (Circle):		
Project/Site:	Nemadji River Wetland Mitigation Site						
Applicant/Owner:	Enbridge Energy, Limited Partnership	**Abnormal conditions?**	☐	☒	Filled	Floodplain	(Ditched)
Field Investigator:	Lindsay H., Whitney H., Troy S.	**Site disturbed (Atypical)?**	☒	☐	Seasonal	Permanent	Tiled
Investigation Date:	8-26-2008	**Problem area?**	☒	☒			
County	Douglas	**State: WI**					

Wetland or Upland Sample Point (Circle) and ID No. TP24W **Transect No.** 13

VEGETATION

Dominant Plant Species	Stratum	%	Indicator
1. Carex gracillima (graceful sedge)	H	40	FACU
2. Phleum pratense (timothy)	H	30	FACU
3. Salix petiolaris (meadow willow) (emerging)	H	20	FACW
4. Scirpus atrovirens (green bulrush)	H	10	OBL
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
13.			
14.			
15.			

Percent of dominant species that are OBL, FACW and/or FAC = 50%

HYDROLOGY

- ☐ Stream, Lake or Well Data
- ☐ Precipitation Data
- ☒ Aerial Photographs
- ☐ Other (Explain in remarks)
- ☐ No recorded data used

Field Observations

Depth of Surface Water: None
Depth to Water in Pit: None
Depth to Saturated Soil: None

Primary Wetland Hydrology Indicators

- ☐ Inundated
- ☐ Saturated in upper 12"
- ☐ Water Marks
- ☐ Drift Lines
- ☐ Sediment Deposits
- ☒ Drainage Patterns in Wetlands

Secondary Wetland Hydrology Indicators
(If no primary indicator, 2 or more required)

- ☐ Oxidized Root Channels in upper 12"
- ☐ Water Stained Leaves
- ☐ Local Soil Survey Data
- ☐ FAC Neutral Vegetation Test
- ☐ Multiple Trunks
- ☐ Buttressing
- ☐ Other (Explain in remarks)

SOILS

Map Unit Name: 262B- Amnicon-Cuttre complex
Natural Drainage Class: SPD – partially hydric
Soil Suborder: Bergland
Whole unit hydric soil? Y ☐ N ☒
Field Observations Confirmed Mapped Type? Y ☒ N ☐

Soil Profile Description

Depth (In)	Horizon Name	Matrix Color (Munsell Moist)	Mottle Color (Munsell Moist)	Mottle %	Soil Texture and Comments
0-2	1				Topsoil
2-9	2	7.5YR 4/4	7.5YR 5/6	25	Clay
9-18	3	5YR 4/4	7.5YR 5/6	25	Red clay

DATA FORM
ROUTINE ONSITE DETERMINATION METHOD

Hydric Soil Indicators

☐ Histosol	☐ Chroma ≤ 3 in Entisol	☐ Listed on Local Hydric Soils List
☐ Histic Epipedon	☐ Mottled with Chroma ≤ 2	☒ Listed on National Hydric Soils List
☐ Sulfidic Odor	☐ Chroma of 1 without Mottles	☐ Spodic Horizon at 12"
☐ Aquic/Peraquic Moisture Regime	☐ Iron/Manganese Concretions	☐ Aquatic Invertebrate Remains
☐ Reducing Conditions	☐ Dark Organic Vertical Streaking in Sandy Soils	☐ Inclusionary Hydric Soil
☐ Gleying	☐ High Organic Content at Surface Layer in Sandy Soils	☐ Other (Explain in remarks)

WETLAND DETERMINATION

	Yes	No		Yes	No
Hydrophytic vegetation present?	☒	☐	Is this sampling site within a wetland?	☒	☐
Wetland hydrology present?	☒	☐	Wetland Circular 39 Basin Type Classification:	Type 2- Inland Fresh Meadow	
Hydric soils present?	☒	☐	NWI or WWI Basin Type Classification	E2Kfr	

Remarks

Ditched agricultural hay field which was hayed this summer. Problem area due to clay soils. Soils meet TF2 hydric soil indicator.

DATA FORM
ROUTINE ONSITE DETERMINATION METHOD

			Yes	No	Is the Area (Circle):		
Project/Site:	Nemadji River Wetland Mitigation Site						
Applicant/Owner:	Enbridge Energy, Limited Partnership	**Abnormal conditions?**	☐	☒	Filled	Floodplain	Ditched
Field Investigator:	Lindsay H., Whitney H., Troy S.	**Site disturbed (Atypical)?**	☒	☐	Seasonal	Permanent	Tiled
Investigation Date:	8-26-2008	**Problem area?**	☒	☐			
County	Douglas	**State: WI**					
Wetland or Upland Sample Point (Circle) and ID No.	TP25U				**Transect No.**	13	

VEGETATION

Dominant Plant Species	Stratum	%	Indicator
1. Trifolium pratense (red clover)	H	40	FACU
2. Taraxacum officinale (common dandelion)	H	20	FACU
3. Carex gracillima (graceful sedge)	H	20	FACU
4. Phleum pratense (timothy)	H	20	FACU
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
13.			
14.			
15.			

Percent of dominant species that are OBL, FACW and/or FAC = 0%

HYDROLOGY

- ☐ Stream, Lake or Well Data
- ☐ Precipitation Data
- ☒ Aerial Photographs
- ☐ Other (Explain in remarks)
- ☐ No recorded data used

Field Observations

Depth of Surface Water: None
Depth to Water in Pit: None
Depth to Saturated Soil: None

Primary Wetland Hydrology Indicators

- ☐ Inundated
- ☐ Saturated in upper 12"
- ☐ Water Marks
- ☐ Drift Lines
- ☐ Sediment Deposits
- ☐ Drainage Patterns in Wetlands

Secondary Wetland Hydrology Indicators
(If no primary indicator, 2 or more required)

- ☐ Oxidized Root Channels in upper 12"
- ☐ Water Stained Leaves
- ☐ Local Soil Survey Data
- ☐ FAC Neutral Vegetation Test
- ☐ Multiple Trunks
- ☐ Buttressing
- ☐ Other (Explain in remarks)

SOILS

Map Unit Name: 262B- Amnicon-Cuttre complex
Natural Drainage Class: SPD - partially hydric
Soil Suborder: Bergland
Whole unit hydric soil? Y ☐ N ☒
Field Observations Confirmed Mapped Type? Y ☒ N ☐

Soil Profile Description

Depth (In)	Horizon Name	Matrix Color (Munsell Moist)	Mottle Color (Munsell Moist)	Mottle %	Soil Texture and Comments
0-2	1				Topsoil
2-8	2	10YR 3/2	10YR 5/6	15	Clay
8-12	3	10YR 3/2	10YR 5/6	20	Clay
12-18	4	10YR 3/3			Clay

DATA FORM
ROUTINE ONSITE DETERMINATION METHOD

Hydric Soil Indicators

☐ Histosol	☐ Chroma ≤ 3 in Entisol	☐ Listed on Local Hydric Soils List
☐ Histic Epipedon	☒ Mottled with Chroma ≤ 2	☒ Listed on National Hydric Soils List
☐ Sulfidic Odor	☐ Chroma of 1 without Mottles	☐ Spodic Horizon at 12"
☐ Aquic/Peraquic Moisture Regime	☐ Iron/Manganese Concretions	☐ Aquatic Invertebrate Remains
☐ Reducing Conditions	☐ Dark Organic Vertical Streaking in Sandy Soils	☐ Inclusionary Hydric Soil
☐ Gleying	☐ High Organic Content at Surface Layer in Sandy Soils	☐ Other (Explain in remarks)

WETLAND DETERMINATION

	Yes	No		Yes	No
Hydrophytic vegetation present?	☐	☒	Is this sampling site within a wetland?	☐	☒
Wetland hydrology present?	☐	☒	Wetland Circular 39 Basin Type Classification:		
Hydric soils present?	☒	☐	NWI or WWI Basin Type Classification		

Remarks

Ditched agricultural hay field which was hayed this summer. Upland drains via sheet flow into man-made ditches. Problem area due to clay soils.

DATA FORM
ROUTINE ONSITE DETERMINATION METHOD

			Yes	No	Is the Area (Circle):
Project/Site:	Nemadji River Wetland Mitigation Site				
Applicant/Owner:	Enbridge Energy, Limited Partnership	**Abnormal conditions?**	☐	☒	Filled Floodplain (Ditched)
Field Investigator:	Lindsay H., Whitney H., Troy S.	**Site disturbed (Atypical)?**	☒	☐	Seasonal Permanent Tiled
Investigation Date:	8-26-2008	**Problem area?**	☒	☐	
County	Douglas	**State: WI**			

Wetland or Upland Sample Point (Circle) and ID No. TP26W **Transect No.** 14

VEGETATION

Dominant Plant Species	Stratum	%	Indicator
1. Carex stricta (uptight sedge)	H	40	OBL
2. Scirpus atrovirens (green bulrush)	H	30	OBL
3. Phleum pratense (timothy)	H	20	FACU
4. Mentha arvensis (wild mint)	H	15	FACW
5. Salix nigra (black willow)	H	10	OBL
6.			
7.			
8.			
9.			
10.			
11.			
12.			
13.			
14.			
15.			

Percent of dominant species that are OBL, FACW and/or FAC = 80%

HYDROLOGY

- ☐ Stream, Lake or Well Data
- ☐ Precipitation Data
- ☒ Aerial Photographs
- ☐ Other (Explain in remarks)
- ☐ No recorded data used

Field Observations

Depth of Surface Water: None
Depth to Water in Pit: None
Depth to Saturated Soil: None

Primary Wetland Hydrology Indicators

- ☐ Inundated
- ☐ Saturated in upper 12"
- ☐ Water Marks
- ☐ Drift Lines
- ☐ Sediment Deposits
- ☒ Drainage Patterns in Wetlands

Secondary Wetland Hydrology Indicators
(If no primary indicator, 2 or more required)

- ☐ Oxidized Root Channels in upper 12"
- ☐ Water Stained Leaves
- ☐ Local Soil Survey Data
- ☐ FAC Neutral Vegetation Test
- ☐ Multiple Trunks
- ☐ Buttressing
- ☐ Other (Explain in remarks)

SOILS

Map Unit Name: 262B- Amnicon-Cuttre complex
Natural Drainage Class: SPD - partially hydric
Soil Suborder: Bergland
Whole unit hydric soil? Y ☐ N ☐
Field Observations Confirmed Mapped Type? Y ☐ N ☐

Soil Profile Description

Depth (In)	Horizon Name	Matrix Color (Munsell Moist)	Mottle Color (Munsell Moist)	Mottle %	Soil Texture and Comments
0-2	1				Topsoil
2-8	2	7.5YR 4/4	7.5YR 4/4	20	Clay
8-18	3	5YR 4/4	7.5YR 5/6	25	Red clay

DATA FORM
ROUTINE ONSITE DETERMINATION METHOD

Hydric Soil Indicators

☐ Histosol	☐ Chroma ≤ 3 in Entisol	☐ Listed on Local Hydric Soils List
☐ Histic Epipedon	☐ Mottled with Chroma ≤ 2	☒ Listed on National Hydric Soils List
☐ Sulfidic Odor	☐ Chroma of 1 without Mottles	☐ Spodic Horizon at 12"
☐ Aquic/Peraquic Moisture Regime	☐ Iron/Manganese Concretions	☐ Aquatic Invertebrate Remains
☐ Reducing Conditions	☐ Dark Organic Vertical Streaking in Sandy Soils	☐ Inclusionary Hydric Soil
☐ Gleying	☐ High Organic Content at Surface Layer in Sandy Soils	☐ Other (Explain in remarks)

WETLAND DETERMINATION

	Yes	No		Yes	No
Hydrophytic vegetation present?	☒	☐	Is this sampling site within a wetland?	☒	☐
Wetland hydrology present?	☒	☐	Wetland Circular 39 Basin Type Classification:	Type 2- Inland Fresh Meadow	
Hydric soils present?	☒	☐	NWI or WWI Basin Type Classification	E2Kfr	

Remarks

Ditched agricultural hay field which was hayed this summer. Problem area due to clay soils. Soils meet TF2 hydric soil indicator.

DATA FORM
ROUTINE ONSITE DETERMINATION METHOD

			Yes	No	Is the Area (Circle):		
Project/Site:	Nemadji River Wetland Mitigation Site						
Applicant/Owner:	Enbridge Energy, Limited Partnership	**Abnormal conditions?**	☐	☒	Filled	Floodplain	Ditched
Field Investigator:	Lindsay H., Whitney H., Troy S.	**Site disturbed (Atypical)?**	☒	☐	Seasonal	Permanent	Tiled
Investigation Date:	8-26-2008	**Problem area?**	☒	☐			
County	Douglas	**State: WI**					
Wetland or Upland Sample Point (Circle) and ID No.	TP27U	**Transect No.**	14				

VEGETATION

Dominant Plant Species	Stratum	%	Indicator
1. Phleum pratense (timothy)	H	40	FACU
2. Carex gracillima (graceful sedge)	H	30	FACU
3. Trifolium pratense (red clover)	H	20	FACU
4. Medicago sativa (alfalfa)	H	15	FACU
5. Taraxacum officinale (common dandelion)	H	10	FACU
6.			
7.			
8.			
9.			
10.			
11.			
12.			
13.			
14.			
15.			

Percent of dominant species that are OBL, FACW and/or FAC = 0%

HYDROLOGY

- ☐ Stream, Lake or Well Data
- ☐ Precipitation Data
- ☒ Aerial Photographs
- ☐ Other (Explain in remarks)
- ☐ No recorded data used

Field Observations

Depth of Surface Water: None
Depth to Water in Pit: None
Depth to Saturated Soil: None

Primary Wetland Hydrology Indicators

- ☐ Inundated
- ☐ Saturated in upper 12"
- ☐ Water Marks
- ☐ Drift Lines
- ☐ Sediment Deposits
- ☐ Drainage Patterns in Wetlands

Secondary Wetland Hydrology Indicators
(If no primary indicator, 2 or more required)

- ☐ Oxidized Root Channels in upper 12"
- ☐ Water Stained Leaves
- ☐ Local Soil Survey Data
- ☐ FAC Neutral Vegetation Test
- ☐ Multiple Trunks
- ☐ Buttressing
- ☐ Other (Explain in remarks)

SOILS

Map Unit Name: 262B- Amnicon-Cuttre complex
Natural Drainage Class: SPD - partially hydric
Soil Suborder: Bergland
Whole unit hydric soil? Y ☐ N ☒
Field Observations Confirmed Mapped Type? Y ☒ N ☐

Soil Profile Description

Depth (In)	Horizon Name	Matrix Color (Munsell Moist)	Mottle Color (Munsell Moist)	Mottle %	Soil Texture and Comments
0-2	1				Topsoil
2-7	2	5YR 3/2			Clay
7-18	3	5YR 4/4	7.5YR 5/6	10	Blocky red clay

DATA FORM
ROUTINE ONSITE DETERMINATION METHOD

Hydric Soil Indicators

☐ Histosol	☐ Chroma ≤ 3 in Entisol	☐ Listed on Local Hydric Soils List
☐ Histic Epipedon	☐ Mottled with Chroma ≤ 2	☒ Listed on National Hydric Soils List
☐ Sulfidic Odor	☐ Chroma of 1 without Mottles	☐ Spodic Horizon at 12"
☐ Aquic/Peraquic Moisture Regime	☐ Iron/Manganese Concretions	☐ Aquatic Invertebrate Remains
☐ Reducing Conditions	☐ Dark Organic Vertical Streaking in Sandy Soils	☐ Inclusionary Hydric Soil
☐ Gleying	☐ High Organic Content at Surface Layer in Sandy Soils	☐ Other (Explain in remarks)

WETLAND DETERMINATION

	Yes	No		Yes	No
Hydrophytic vegetation present?	☐	☒	Is this sampling site within a wetland?	☐	☒
Wetland hydrology present?	☐	☒	Wetland Circular 39 Basin Type Classification:		
Hydric soils present?	☒	☐	NWI or WWI Basin Type Classification		

Remarks

Ditched agricultural hay field which was hayed this summer. Upland drains via sheet flow into man-made ditches. Problem area due to clay soils. Soils meet TF2 hydric soil indicator.

DATA FORM
ROUTINE ONSITE DETERMINATION METHOD

			Yes	No	Is the Area (Circle):		
Project/Site:	Nemadji River Wetland Mitigation Site						
Applicant/Owner:	Enbridge Energy, Limited Partnership	**Abnormal conditions?**	☐	☒	Filled	Floodplain	Ditched
Field Investigator:	Lindsay H., Whitney H., Troy S.	**Site disturbed (Atypical)?**	☒	☐	(Seasonal)	Permanent	Tiled
Investigation Date:	8-26-2008	**Problem area?**	☒	☐			
County	Douglas	**State: WI**					

Wetland or Upland Sample Point (Circle) and ID No. TP28W **Transect No.** 15

VEGETATION

Dominant Plant Species	Stratum	%	Indicator
1. Carex lacustris (lake sedge)	H	30	OBL
2. Scirpus cyperinus (woolgrass)	H	30	OBL
3. Calamagrostis canadensis (bluejoint)	H	20	OBL
4. Phalaris arundinacea (reed canary grass)	H	20	FACW+
5. Salix petiolaris (meadow willow)	S	30	FACW+
6. Alnus incana (speckled alder)	S	20	OBL
7. Populus tremuloides (quaking aspen)	T	40	FAC
8.			
9.			
10.			
11.			
12.			
13.			
14.			
15.			

Percent of dominant species that are OBL, FACW and/or FAC = 100%

HYDROLOGY

- ☐ Stream, Lake or Well Data
- ☐ Precipitation Data
- ☒ Aerial Photographs
- ☐ Other (Explain in remarks)
- ☐ No recorded data used

Field Observations

Depth of Surface Water: None
Depth to Water in Pit: None
Depth to Saturated Soil: None

Primary Wetland Hydrology Indicators

- ☐ Inundated
- ☐ Saturated in upper 12"
- ☐ Water Marks
- ☐ Drift Lines
- ☐ Sediment Deposits
- ☒ Drainage Patterns in Wetlands

Secondary Wetland Hydrology Indicators
(If no primary indicator, 2 or more required)

- ☐ Oxidized Root Channels in upper 12"
- ☐ Water Stained Leaves
- ☐ Local Soil Survey Data
- ☐ FAC Neutral Vegetation Test
- ☐ Multiple Trunks
- ☒ Buttressing
- ☐ Other (Explain in remarks)

SOILS

Map Unit Name: 262B- Amnicon-Cuttre complex
Natural Drainage Class: SPD – partially hydric
Soil Suborder: Bergland
Whole unit hydric soil? Y ☐ N ☒
Field Observations Confirmed Mapped Type? Y ☒ N ☐

Soil Profile Description

Depth (In)	Horizon Name	Matrix Color (Munsell Moist)	Mottle Color (Munsell Moist)	Mottle %	Soil Texture and Comments
0-2	1				Topsoil
2-8	2	10R3/4	10R 6/2	10	Clay
8-18	3	7.5YR 4/4	7.5YR 5/6	10	Clay

DATA FORM
ROUTINE ONSITE DETERMINATION METHOD

Hydric Soil Indicators

☐ Histosol	☐ Chroma ≤ 3 in Entisol	☐ Listed on Local Hydric Soils List
☐ Histic Epipedon	☐ Mottled with Chroma ≤ 2	☒ Listed on National Hydric Soils List
☐ Sulfidic Odor	☐ Chroma of 1 without Mottles	☐ Spodic Horizon at 12"
☐ Aquic/Peraquic Moisture Regime	☐ Iron/Manganese Concretions	☐ Aquatic Invertebrate Remains
☐ Reducing Conditions	☐ Dark Organic Vertical Streaking in Sandy Soils	☐ Inclusionary Hydric Soil
☐ Gleying	☐ High Organic Content at Surface Layer in Sandy Soils	☐ Other (Explain in remarks)

WETLAND DETERMINATION

	Yes	No		Yes	No
Hydrophytic vegetation present?	☒	☐	Is this sampling site within a wetland?	☒	☐
Wetland hydrology present?	☒	☐	Wetland Circular 39 Basin Type Classification:	Type 2- Inland Fresh Meadow	
Hydric soils present?	☒	☐	NWI or WWI Basin Type Classification	E2Kfr	

Remarks

Ditched agricultural hay field which was hayed this summer. Problem area due to clay soils. Soils meet TF2 hydric soil indicator.

DATA FORM
ROUTINE ONSITE DETERMINATION METHOD

			Yes	No	Is the Area (Circle):		
Project/Site:	Nemadji River Wetland Mitigation Site						
Applicant/Owner:	Enbridge Energy, Limited Partnership	**Abnormal conditions?**	☐	☒	Filled	Floodplain	Ditched
Field Investigator:	Lindsay H., Whitney H., Troy S.	**Site disturbed (Atypical)?**	☒	☐	Seasonal	Permanent	Tiled
Investigation Date:	8-26-2008	**Problem area?**	☒	☐			
County	Douglas	**State: WI**					
Wetland or Upland Sample Point (Circle) and ID No.	TP29U				**Transect No.**	15	

VEGETATION

Dominant Plant Species	Stratum	%	Indicator
1. Phleum pratense (timothy)	H	25	FACU
2. Trifolium pratense (red clover)	H	25	FACU
3. Fragaria virginiana (woodland strawberry)	H	20	FAC-
4. Taraxacum officinale (common dandelion)	H	15	FACU
5. Anemone canadensis (Canadian anemone)	H	10	FACW
6. Ranunculus acris (tall buttercup)	H	5	FACW-
7.			
8.			
9.			
10.			
11.			
12.			
13.			
14.			
15.			

Percent of dominant species that are OBL, FACW and/or FAC = 33%

HYDROLOGY

- ☐ Stream, Lake or Well Data
- ☐ Precipitation Data
- ☒ Aerial Photographs
- ☐ Other (Explain in remarks)
- ☐ No recorded data used

Field Observations

Depth of Surface Water: None
Depth to Water in Pit: None
Depth to Saturated Soil: None

Primary Wetland Hydrology Indicators

- ☐ Inundated
- ☐ Saturated in upper 12"
- ☐ Water Marks
- ☐ Drift Lines
- ☐ Sediment Deposits
- ☐ Drainage Patterns in Wetlands

Secondary Wetland Hydrology Indicators
(If no primary indicator, 2 or more required)

- ☐ Oxidized Root Channels in upper 12"
- ☐ Water Stained Leaves
- ☐ Local Soil Survey Data
- ☐ FAC Neutral Vegetation Test
- ☐ Multiple Trunks
- ☐ Buttressing
- ☐ Other (Explain in remarks)

SOILS

Map Unit Name: 262B- Amnicon-Cuttre complex
Natural Drainage Class: SPD - partially hydric
Soil Suborder: Bergland
Whole unit hydric soil? Y ☐ N ☒
Field Observations Confirmed Mapped Type? Y ☒ N ☐

Soil Profile Description

Depth (In)	Horizon Name	Matrix Color (Munsell Moist)	Mottle Color (Munsell Moist)	Mottle %	Soil Texture and Comments
0-2	1				Topsoil
2-8	2	5YR 3/2			Clay
8-18	3	5YR 4/4	7.5YR 5/6	15	Red clay

DATA FORM
ROUTINE ONSITE DETERMINATION METHOD

Hydric Soil Indicators

☐ Histosol	☐ Chroma ≤ 3 in Entisol	☐ Listed on Local Hydric Soils List
☐ Histic Epipedon	☐ Mottled with Chroma ≤ 2	☒ Listed on National Hydric Soils List
☐ Sulfidic Odor	☐ Chroma of 1 without Mottles	☐ Spodic Horizon at 12"
☐ Aquic/Peraquic Moisture Regime	☐ Iron/Manganese Concretions	☐ Aquatic Invertebrate Remains
☐ Reducing Conditions	☐ Dark Organic Vertical Streaking in Sandy Soils	☐ Inclusionary Hydric Soil
☐ Gleying	☐ High Organic Content at Surface Layer in Sandy Soils	☐ Other (Explain in remarks)

WETLAND DETERMINATION

	Yes	No		Yes	No
Hydrophytic vegetation present?	☐	☒	Is this sampling site within a wetland?	☐	☒
Wetland hydrology present?	☐	☒	Wetland Circular 39 Basin Type Classification:		
Hydric soils present?	☒	☐	NWI or WWI Basin Type Classification		

Remarks

Ditched agricultural hay field which was hayed this summer. Upland drains via sheet flow into man-made ditches. Problem area due to clay soils.

DATA FORM
ROUTINE ONSITE DETERMINATION METHOD

			Yes	No	Is the Area (Circle):		
Project/Site:	Nemadji River Wetland Mitigation Site						
Applicant/Owner:	Enbridge Energy, Limited Partnership	**Abnormal conditions?**	☐	☒	Filled	Floodplain	(Ditched)
Field Investigator:	Lindsay H., Whitney H., Troy S.	**Site disturbed (Atypical)?**	☒	☐	Seasonal	Permanent	Tiled
Investigation Date:	8-26-2008	**Problem area?**	☒	☐			
County	Douglas	**State: WI**					

Wetland or Upland Sample Point (Circle) and ID No. TP30W **Transect No.** 16

VEGETATION

Dominant Plant Species	Stratum	%	Indicator
1. Carex stricta (uptight sedge)	H	30	OBL
2. Scirpus atrovirens (green bulrush)	H	20	OBL
3. Salix petiolaris (meadow willow)	H	20	FACW+
4. Juncus effusus (common rush)	H	15	OBL
5. Phleum pratense (timothy)	H	10	FACU
6.			
7.			
8.			
9.			
10.			
11.			
12.			
13.			
14.			
15.			

Percent of dominant species that are OBL, FACW and/or FAC = 80%

HYDROLOGY

- ☐ Stream, Lake or Well Data
- ☐ Precipitation Data
- ☒ Aerial Photographs
- ☐ Other (Explain in remarks)
- ☐ No recorded data used

Field Observations

Depth of Surface Water: None
Depth to Water in Pit: None
Depth to Saturated Soil: None

Primary Wetland Hydrology Indicators

- ☐ Inundated
- ☐ Saturated in upper 12"
- ☐ Water Marks
- ☐ Drift Lines
- ☐ Sediment Deposits
- ☒ Drainage Patterns in Wetlands

Secondary Wetland Hydrology Indicators
(If no primary indicator, 2 or more required)

- ☐ Oxidized Root Channels in upper 12"
- ☐ Water Stained Leaves
- ☐ Local Soil Survey Data
- ☐ FAC Neutral Vegetation Test
- ☐ Multiple Trunks
- ☐ Buttressing
- ☐ Other (Explain in remarks)

SOILS

Map Unit Name: 262B- Amnicon-Cuttre complex
Natural Drainage Class: SPD - partially hydric
Soil Suborder: Bergland
Whole unit hydric soil? Y ☐ N ☒
Field Observations Confirmed Mapped Type? Y ☒ N ☐

Soil Profile Description

Depth (In)	Horizon Name	Matrix Color (Munsell Moist)	Mottle Color (Munsell Moist)	Mottle %	Soil Texture and Comments
0-2	1				Topsoil
2-9	2	7.5YR 4/4	7.5YR 5/6	25	Clay
9-18	3	5YR 4/4	7.5YR 5/6	25	Red clay

DATA FORM
ROUTINE ONSITE DETERMINATION METHOD

Hydric Soil Indicators

☐ Histosol	☐ Chroma ≤ 3 in Entisol	☐ Listed on Local Hydric Soils List
☐ Histic Epipedon	☐ Mottled with Chroma ≤ 2	☒ Listed on National Hydric Soils List
☐ Sulfidic Odor	☐ Chroma of 1 without Mottles	☐ Spodic Horizon at 12"
☐ Aquic/Peraquic Moisture Regime	☐ Iron/Manganese Concretions	☐ Aquatic Invertebrate Remains
☐ Reducing Conditions	☐ Dark Organic Vertical Streaking in Sandy Soils	☐ Inclusionary Hydric Soil
☐ Gleying	☐ High Organic Content at Surface Layer in Sandy Soils	☐ Other (Explain in remarks)

WETLAND DETERMINATION

	Yes	No		Yes	No
Hydrophytic vegetation present?	☒	☐	Is this sampling site within a wetland?	☒	☐
Wetland hydrology present?	☒	☐	Wetland Circular 39 Basin Type Classification:	Type 2- Inland Fresh Meadow	
Hydric soils present?	☒	☐	NWI or WWI Basin Type Classification	E2Kfr	

Remarks

Ditched agricultural hay field which was hayed this summer. Problem area due to clay soils. Soils meet TF2 hydric soil indicator.

DATA FORM
ROUTINE ONSITE DETERMINATION METHOD

			Yes	No	Is the Area (Circle):		
Project/Site:	Nemadji River Wetland Mitigation Site						
Applicant/Owner:	Enbridge Energy, Limited Partnership	**Abnormal conditions?**	☐	☒	Filled	Floodplain	Ditched
Field Investigator:	Lindsay H., Whitney H., Troy S.	**Site disturbed (Atypical)?**	☒	☐	Seasonal	Permanent	Tiled
Investigation Date:	8-26-2008	**Problem area?**	☒	☐			
County	Douglas	**State: WI**					
Wetland or Upland Sample Point (Circle) and ID No.	TP31U				**Transect No.**	16	

VEGETATION

Dominant Plant Species	Stratum	%	Indicator
1. Carex gracillima (graceful sedge)	H	30	FACU
2. Trifolium pratense (red clover)	H	30	FACU
3. Taraxacum officinale (common dandelion)	H	20	FACU
4. Ranunculus acrius (tall buttercup)	H	10	FACW-
5. Fragaria virginiana (woodland strawberry)	H	10	FAC-
6.			
7.			
8.			
9.			
10.			
11.			
12.			
13.			
14.			
15.			

Percent of dominant species that are OBL, FACW and/or FAC = 20%

HYDROLOGY

- ☐ Stream, Lake or Well Data
- ☐ Precipitation Data
- ☒ Aerial Photographs
- ☐ Other (Explain in remarks)
- ☐ No recorded data used

Field Observations

Depth of Surface Water: None
Depth to Water in Pit: None
Depth to Saturated Soil: None

Primary Wetland Hydrology Indicators

- ☐ Inundated
- ☐ Saturated in upper 12"
- ☐ Water Marks
- ☐ Drift Lines
- ☐ Sediment Deposits
- ☐ Drainage Patterns in Wetlands

Secondary Wetland Hydrology Indicators
(If no primary indicator, 2 or more required)

- ☐ Oxidized Root Channels in upper 12"
- ☐ Water Stained Leaves
- ☐ Local Soil Survey Data
- ☐ FAC Neutral Vegetation Test
- ☐ Multiple Trunks
- ☐ Buttressing
- ☐ Other (Explain in remarks)

SOILS

Map Unit Name: 262B- Amnicon-Cuttre complex
Natural Drainage Class: SPD - partially hydric
Soil Suborder: Bergland
Whole unit hydric soil? Y ☐ N ☒
Field Observations Confirmed Mapped Type? Y ☒ N ☐

Soil Profile Description

Depth (In)	Horizon Name	Matrix Color (Munsell Moist)	Mottle Color (Munsell Moist)	Mottle %	Soil Texture and Comments
0-2	1				Topsoil
2-8	2	10YR 3/2	10YR 5/6	10	Clay
8-15	3	10YR 3/2	10YR 5/6	15	Clay
15-18	4	10YR 3/3			Clay

DATA FORM
ROUTINE ONSITE DETERMINATION METHOD

Hydric Soil Indicators

☐ Histosol	☐ Chroma ≤ 3 in Entisol	☐ Listed on Local Hydric Soils List
☐ Histic Epipedon	☐ Mottled with Chroma ≤ 2	☒ Listed on National Hydric Soils List
☐ Sulfidic Odor	☐ Chroma of 1 without Mottles	☐ Spodic Horizon at 12"
☐ Aquic/Peraquic Moisture Regime	☐ Iron/Manganese Concretions	☐ Aquatic Invertebrate Remains
☐ Reducing Conditions	☐ Dark Organic Vertical Streaking in Sandy Soils	☐ Inclusionary Hydric Soil
☐ Gleying	☐ High Organic Content at Surface Layer in Sandy Soils	☐ Other (Explain in remarks)

WETLAND DETERMINATION

	Yes	No		Yes	No
Hydrophytic vegetation present?	☐	☒	Is this sampling site within a wetland?	☐	☒
Wetland hydrology present?	☐	☒	Wetland Circular 39 Basin Type Classification:		
Hydric soils present?	☒	☐	NWI or WWI Basin Type Classification		

Remarks

Ditched agricultural hay field which was hayed this summer. Upland drains via sheet flow into man-made ditches. Problem area due to clay soils.

DATA FORM
ROUTINE ONSITE DETERMINATION METHOD

			Yes	No	Is the Area (Circle):
Project/Site:	Nemadji River Wetland Mitigation Site				
Applicant/Owner:	Enbridge Energy, Limited Partnership	**Abnormal conditions?**	☐	☒	Filled Floodplain (Ditched)
Field Investigator:	Lindsay H., Whitney H., Troy S.	**Site disturbed (Atypical)?**	☒	☐	Seasonal Permanent Tiled
Investigation Date:	8-26-2008	**Problem area?**	☒	☐	
County	Douglas	**State: WI**			

Wetland or Upland Sample Point (Circle) and ID No. TP32W **Transect No.** 17

VEGETATION

Dominant Plant Species	Stratum	%	Indicator
1. Phleum pratense (timothy)	H	70	FACU
2. Anemone canadensis (Canadian anemone)	H	15	FACW
3. Ranunculus acris (tall buttercup)	H	5	FACW-
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
13.			
14.			
15.			

Percent of dominant species that are OBL, FACW and/or FAC = 20%

HYDROLOGY

- ☐ Stream, Lake or Well Data
- ☐ Precipitation Data
- ☒ Aerial Photographs
- ☐ Other (Explain in remarks)
- ☐ No recorded data used

Field Observations

Depth of Surface Water: None
Depth to Water in Pit: None
Depth to Saturated Soil: None

Primary Wetland Hydrology Indicators

- ☐ Inundated
- ☐ Saturated in upper 12"
- ☐ Water Marks
- ☐ Drift Lines
- ☐ Sediment Deposits
- ☒ Drainage Patterns in Wetlands

Secondary Wetland Hydrology Indicators
(If no primary indicator, 2 or more required)

- ☐ Oxidized Root Channels in upper 12"
- ☐ Water Stained Leaves
- ☐ Local Soil Survey Data
- ☐ FAC Neutral Vegetation Test
- ☐ Multiple Trunks
- ☐ Buttressing
- ☐ Other (Explain in remarks)

SOILS

Map Unit Name: 262B- Amnicon-Cuttre complex
Soil Suborder: Bergland
Natural Drainage Class: SPD – partially hydric
Whole unit hydric soil? Y ☐ N ☒
Field Observations Confirmed Mapped Type? Y ☒ N ☐

Soil Profile Description

Depth (In)	Horizon Name	Matrix Color (Munsell Moist)	Mottle Color (Munsell Moist)	Mottle %	Soil Texture and Comments
0-2	1				Topsoil
2-9	2	7.5YR 4/4	7.5YR 5/6	20	Clay
9-18	3	5YR 4/4	7.5YR 5/6	25	Red clay

DATA FORM
ROUTINE ONSITE DETERMINATION METHOD

Hydric Soil Indicators

☐ Histosol	☐ Chroma ≤ 3 in Entisol	☐ Listed on Local Hydric Soils List
☐ Histic Epipedon	☐ Mottled with Chroma ≤ 2	☒ Listed on National Hydric Soils List
☐ Sulfidic Odor	☐ Chroma of 1 without Mottles	☐ Spodic Horizon at 12"
☐ Aquic/Peraquic Moisture Regime	☐ Iron/Manganese Concretions	☐ Aquatic Invertebrate Remains
☐ Reducing Conditions	☐ Dark Organic Vertical Streaking in Sandy Soils	☐ Inclusionary Hydric Soil
☐ Gleying	☐ High Organic Content at Surface Layer in Sandy Soils	☐ Other (Explain in remarks)

WETLAND DETERMINATION

	Yes	No		Yes	No
Hydrophytic vegetation present?	☒	☐	Is this sampling site within a wetland?	☒	☐
Wetland hydrology present?	☒	☐	Wetland Circular 39 Basin Type Classification:	Type 2- Inland Fresh Meadow	
Hydric soils present?	☒	☐	NWI or WWI Basin Type Classification	E2Kfr	

Remarks

Ditched agricultural hay field which was hayed this summer. Ditch contains hummocks. Problem area due to clay soils.

DATA FORM
ROUTINE ONSITE DETERMINATION METHOD

			Yes	No	Is the Area (Circle):		
Project/Site:	Nemadji River Wetland Mitigation Site						
Applicant/Owner:	Enbridge Energy, Limited Partnership	**Abnormal conditions?**	☐	☒	Filled	Floodplain	Ditched
Field Investigator:	Lindsay H., Whitney H., Troy S.	**Site disturbed (Atypical)?**	☒	☐	Seasonal	Permanent	Tiled
Investigation Date:	8-26-2008	**Problem area?**	☒	☐			
County	Douglas	**State: WI**					

Wetland or Upland Sample Point (Circle) and ID No. TP33U **Transect No.** 17

VEGETATION

Dominant Plant Species	Stratum	%	Indicator
1. Ranunculus acrius (tall buttercup)	H	40	FACW-
2. Fragaria virginiana (woodland strawberry)	H	25	FAC-
3. Phleum pratense (timothy)	H	20	FACU
4. Trifolium pratense (red clover)	H	15	FACU
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
13.			
14.			
15.			

Percent of dominant species that are OBL, FACW and/or FAC = 25%

HYDROLOGY

- ☐ Stream, Lake or Well Data
- ☐ Precipitation Data
- ☒ Aerial Photographs
- ☐ Other (Explain in remarks)
- ☐ No recorded data used

Field Observations

Depth of Surface Water: None
Depth to Water in Pit: None
Depth to Saturated Soil: None

Primary Wetland Hydrology Indicators

- ☐ Inundated
- ☐ Saturated in upper 12"
- ☐ Water Marks
- ☐ Drift Lines
- ☐ Sediment Deposits
- ☐ Drainage Patterns in Wetlands

Secondary Wetland Hydrology Indicators
(If no primary indicator, 2 or more required)

- ☐ Oxidized Root Channels in upper 12"
- ☐ Water Stained Leaves
- ☐ Local Soil Survey Data
- ☐ FAC Neutral Vegetation Test
- ☐ Multiple Trunks
- ☐ Buttressing
- ☐ Other (Explain in remarks)

SOILS

Map Unit Name: 262B- Amnicon-Cuttre complex
Natural Drainage Class: SPD - partially hydric
Soil Suborder: Bergland
Whole unit hydric soil? Y ☐ N ☒
Field Observations Confirmed Mapped Type? Y ☒ N ☐

Soil Profile Description

Depth (In)	Horizon Name	Matrix Color (Munsell Moist)	Mottle Color (Munsell Moist)	Mottle %	Soil Texture and Comments
0-2	1				Topsoil
2-7	2	5YR 3/2			Clay
7-18	3	5YR 4/4	7.5YR 5/6	15	Blocky red clay

DATA FORM
ROUTINE ONSITE DETERMINATION METHOD

Hydric Soil Indicators

☐ Histosol	☐ Chroma ≤ 3 in Entisol	☐ Listed on Local Hydric Soils List
☐ Histic Epipedon	☐ Mottled with Chroma ≤ 2	☒ Listed on National Hydric Soils List
☐ Sulfidic Odor	☐ Chroma of 1 without Mottles	☐ Spodic Horizon at 12"
☐ Aquic/Peraquic Moisture Regime	☐ Iron/Manganese Concretions	☐ Aquatic Invertebrate Remains
☐ Reducing Conditions	☐ Dark Organic Vertical Streaking in Sandy Soils	☐ Inclusionary Hydric Soil
☐ Gleying	☐ High Organic Content at Surface Layer in Sandy Soils	☐ Other (Explain in remarks)

WETLAND DETERMINATION

	Yes	No		Yes	No
Hydrophytic vegetation present?	☐	☒	Is this sampling site within a wetland?	☐	☒
Wetland hydrology present?	☐	☒	Wetland Circular 39 Basin Type Classification:		
Hydric soils present?	☒	☐	NWI or WWI Basin Type Classification		

Remarks

Upland between ditches. Ditched agricultural hay field which was hayed this summer. Drains via sheet flow into man-made ditches. Problem area due to clay soils.

DATA FORM
ROUTINE ONSITE DETERMINATION METHOD

			Yes	No	Is the Area (Circle):		
Project/Site:	Nemadji River Wetland Mitigation Site						
Applicant/Owner:	Enbridge Energy, Limited Partnership	**Abnormal conditions?**	☐	☒	Filled	Floodplain	Ditched
Field Investigator:	Lindsay H., Whitney H., Troy S.	**Site disturbed (Atypical)?**	☐	☒	(Seasonal)	Permanent	Tiled
Investigation Date:	8-26-2008	**Problem area?**	☒	☐			
County	Douglas	**State: WI**					

Wetland or Upland Sample Point (Circle) and ID No. TP34W **Transect No.** 18

VEGETATION

Dominant Plant Species	Stratum	%	Indicator
1. Carex stricta (upright sedge)	H	30	OBL
2. Calamagrostis canadensis (bluejoint)	H	30	OBL
3. Fragaria virginiana (woodland strawberry)	H	15	FAC-
4. Rubus idaeus (American red raspberry)	H	15	FACU+
5. Scirpus atrovirens (green bulrush)	H	15	OBL
6. Doellingeria umbellata (parasol whitetop)	H	10	FACW
7. Iris germanica (flag iris)	H	5	FACW
8. Alnus incana (speckled alder)	S	70	OBL
9. Ulmus americana (American elm)	T	20	FACW-
10. Tamarack	T	10	FACW
11. Picea mariana (black spruce)	T	5	FACW
12.			
13.			
14.			
15.			

Percent of dominant species that are OBL, FACW and/or FAC = 82%

HYDROLOGY

- ☐ Stream, Lake or Well Data
- ☐ Precipitation Data
- ☒ Aerial Photographs
- ☐ Other (Explain in remarks)
- ☐ No recorded data used

Field Observations

Depth of Surface Water: None
Depth to Water in Pit: None
Depth to Saturated Soil: 10"

Primary Wetland Hydrology Indicators

- ☐ Inundated
- ☒ Saturated in upper 12"
- ☐ Water Marks
- ☐ Drift Lines
- ☐ Sediment Deposits
- ☐ Drainage Patterns in Wetlands

Secondary Wetland Hydrology Indicators
(If no primary indicator, 2 or more required)

- ☐ Oxidized Root Channels in upper 12"
- ☐ Water Stained Leaves
- ☐ Local Soil Survey Data
- ☐ FAC Neutral Vegetation Test
- ☒ Multiple Trunks
- ☒ Buttressing
- ☐ Other (Explain in remarks)

SOILS

Map Unit Name: 262B- Amnicon-Cuttre complex
Natural Drainage Class: SPD - partially hydric
Soil Suborder: Bergland
Whole unit hydric soil? Y ☐ N ☐
Field Observations Confirmed Mapped Type? Y ☐ N ☐

Soil Profile Description

Depth (In)	Horizon Name	Matrix Color (Munsell Moist)	Mottle Color (Munsell Moist)	Mottle %	Soil Texture and Comments
0-2	1				Topsoil
2-5	2	7.5YR 6/1	7.5YR 6/6	25	Gley clay
5-9	3	7.5YR 4/3	7.5YR 6/6	30	Clay
9-18	4	5YR 4/4	5YR 5/6	25	Red clay

DATA FORM
ROUTINE ONSITE DETERMINATION METHOD

Hydric Soil Indicators

☐ Histosol	☐ Chroma ≤ 3 in Entisol	☐ Listed on Local Hydric Soils List
☐ Histic Epipedon	☒ Mottled with Chroma ≤ 2	☒ Listed on National Hydric Soils List
☐ Sulfidic Odor	☐ Chroma of 1 without Mottles	☐ Spodic Horizon at 12"
☐ Aquic/Peraquic Moisture Regime	☐ Iron/Manganese Concretions	☐ Aquatic Invertebrate Remains
☐ Reducing Conditions	☐ Dark Organic Vertical Streaking in Sandy Soils	☐ Inclusionary Hydric Soil
☒ Gleying	☐ High Organic Content at Surface Layer in Sandy Soils	☐ Other (Explain in remarks)

WETLAND DETERMINATION

	Yes	No		Yes	No
Hydrophytic vegetation present?	☒	☐	Is this sampling site within a wetland?	☒	☐
Wetland hydrology present?	☒	☐	Wetland Circular 39 Basin Type Classification:	Type 7 - Forested	
Hydric soils present?	☒	☐	NWI or WWI Basin Type Classification	PFO1	

Remarks

Problem area due to clay soils. Soils meet TF2 hydric soil indicator.

DATA FORM
ROUTINE ONSITE DETERMINATION METHOD

			Yes	No	Is the Area (Circle):		
Project/Site:	Nemadji River Wetland Mitigation Site						
Applicant/Owner:	Enbridge Energy, Limited Partnership	**Abnormal conditions?**	☐	☒	Filled	Floodplain	Ditched
Field Investigator:	Lindsay H., Whitney H., Troy S.	**Site disturbed (Atypical)?**	☐	☒	(Seasonal)	Permanent	Tiled
Investigation Date:	8-26-2008	**Problem area?**	☒	☐			
County	Douglas	**State: WI**					

Wetland or Upland Sample Point (Circle) and ID No. TP35W **Transect No.** 18

VEGETATION

Dominant Plant Species	Stratum	%	Indicator
1. Carex stricta (uptight sedge)	H	45	OBL
2. Calamagrostis canadensis (Canada bluejoint grass)	H	35	OBL
3. Doellingeria umbellata (parasol whitetop)	H	10	FACW
4. Rubus idaeus (American red raspberry)	H	10	FACU
5. Alnus incana (speckled alder)	S	60	OBL
6. Salix petiolaris (meadow willow)	S	40	FACW+
7. Populus tremuloides (quaking aspen)	T	20	FAC
8.			
9.			
10.			
11.			
12.			
13.			
14.			
15.			

Percent of dominant species that are OBL, FACW and/or FAC = 86%

HYDROLOGY

- ☐ Stream, Lake or Well Data
- ☐ Precipitation Data
- ☒ Aerial Photographs
- ☐ Other (Explain in remarks)
- ☐ No recorded data used

Field Observations

Depth of Surface Water: None
Depth to Water in Pit: None
Depth to Saturated Soil: 5"

Primary Wetland Hydrology Indicators

- ☐ Inundated
- ☒ Saturated in upper 12"
- ☐ Water Marks
- ☐ Drift Lines
- ☐ Sediment Deposits
- ☐ Drainage Patterns in Wetlands

Secondary Wetland Hydrology Indicators
(If no primary indicator, 2 or more required)

- ☒ Oxidized Root Channels in upper 12"
- ☐ Water Stained Leaves
- ☐ Local Soil Survey Data
- ☐ FAC Neutral Vegetation Test
- ☒ Multiple Trunks
- ☒ Buttressing
- ☐ Other (Explain in remarks)

SOILS

Map Unit Name: 262B- Amnicon-Cuttre complex
Natural Drainage Class: SPD - partially hydric
Soil Suborder: Bergland
Whole unit hydric soil? Y ☐ N ☒
Field Observations Confirmed Mapped Type? Y ☒ N ☐

Soil Profile Description

Depth (In)	Horizon Name	Matrix Color (Munsell Moist)	Mottle Color (Munsell Moist)	Mottle %	Soil Texture and Comments
0-3	1				Topsoil
3-5	2	10YR 2/1			Blocky clay
5-8	3	10YR 2/1	10YR 5/6	15	Clay
8-18	4	7.5YR 4/4	7.5YR 5/8	30	Red clay

DATA FORM
ROUTINE ONSITE DETERMINATION METHOD

Hydric Soil Indicators

☐ Histosol	☐ Chroma ≤ 3 in Entisol	☐ Listed on Local Hydric Soils List
☐ Histic Epipedon	☒ Mottled with Chroma ≤ 2	☒ Listed on National Hydric Soils List
☐ Sulfidic Odor	☐ Chroma of 1 without Mottles	☐ Spodic Horizon at 12"
☐ Aquic/Peraquic Moisture Regime	☐ Iron/Manganese Concretions	☐ Aquatic Invertebrate Remains
☐ Reducing Conditions	☐ Dark Organic Vertical Streaking in Sandy Soils	☐ Inclusionary Hydric Soil
☒ Gleying	☐ High Organic Content at Surface Layer in Sandy Soils	☐ Other (Explain in remarks)

WETLAND DETERMINATION

	Yes	No		Yes	No
Hydrophytic vegetation present?	☒	☐	Is this sampling site within a wetland?	☒	☐
Wetland hydrology present?	☒	☐	Wetland Circular 39 Basin Type Classification:	Type 6- Shrub scrub	
Hydric soils present?	☒	☐	NWI or WWI Basin Type Classification	PSS1	

Remarks

Problem area due to clay soils. Sample point taken between upland field and forested wetland.

DATA FORM
ROUTINE ONSITE DETERMINATION METHOD

			Yes	No	Is the Area (Circle):		
Project/Site:	Nemadji River Wetland Mitigation Site						
Applicant/Owner:	Enbridge Energy, Limited Partnership	**Abnormal conditions?**	☐	☒	Filled	Floodplain	Ditched
Field Investigator:	Lindsay H., Whitney H., Troy S.	**Site disturbed (Atypical)?**	☒	☐	Seasonal	Permanent	Tiled
Investigation Date:	8-26-2008	**Problem area?**	☒	☐			
County	Douglas	**State: WI**					
Wetland or Upland Sample Point (Circle) and ID No.	TP36U				**Transect No.**	18	

VEGETATION

Dominant Plant Species	Stratum	%	Indicator
1. Trifolium pratense (red clover)	H	35	FACU
2. Fragaria virginiana (woodland strawberry)	H	20	FAC-
3. Phleum pratense (timothy)	H	25	FACU
4. Phalaris arundinacea (reed canary grass)	H	10	FACW+
5. Anemone canadensis (Canadian anemone)	H	15	FACW
6. Taraxacum officinale (common dandelion)	H	15	FACU
7. Ranunculus acris (tall buttercup)	H	5	FACW-
8.			
9.			
10.			
11.			
12.			
13.			
14.			
15.			

Percent of dominant species that are OBL, FACW and/or FAC = 43%

HYDROLOGY

- ☐ Stream, Lake or Well Data
- ☐ Precipitation Data
- ☒ Aerial Photographs
- ☐ Other (Explain in remarks)
- ☐ No recorded data used

Field Observations

Depth of Surface Water: None
Depth to Water in Pit: None
Depth to Saturated Soil: 11"

Primary Wetland Hydrology Indicators

- ☐ Inundated
- ☒ Saturated in upper 12"
- ☐ Water Marks
- ☐ Drift Lines
- ☐ Sediment Deposits
- ☐ Drainage Patterns in Wetlands

Secondary Wetland Hydrology Indicators
(If no primary indicator, 2 or more required)

- ☐ Oxidized Root Channels in upper 12"
- ☐ Water Stained Leaves
- ☐ Local Soil Survey Data
- ☐ FAC Neutral Vegetation Test
- ☐ Multiple Trunks
- ☐ Buttressing
- ☐ Other (Explain in remarks)

SOILS

Map Unit Name: 262B- Amnicon-Cuttre complex
Natural Drainage Class: SPD - partially hydric
Soil Suborder: Bergland
Whole unit hydric soil? Y ☐ N ☒
Field Observations Confirmed Mapped Type? Y ☒ N ☐

Soil Profile Description

Depth (In)	Horizon Name	Matrix Color (Munsell Moist)	Mottle Color (Munsell Moist)	Mottle %	Soil Texture and Comments
2-5	2	10YR 3/2			Black blocky clay
5-6	3	10YR 5/1	10YR 5/6	15	Gleyed clay
6-7	4	10YR 3/1	10YR 5/6	15	Black blocky clay
7-11	5	10YR 5/1	10YR 5/4	20	Gleyed clay
11-18	6	7.5YR 4/3	7.5YR 5/4	10	Red clay

DATA FORM
ROUTINE ONSITE DETERMINATION METHOD

Hydric Soil Indicators

☐ Histosol	☐ Chroma ≤ 3 in Entisol	☐ Listed on Local Hydric Soils List
☐ Histic Epipedon	☐ Mottled with Chroma ≤ 2	☒ Listed on National Hydric Soils List
☐ Sulfidic Odor	☐ Chroma of 1 without Mottles	☐ Spodic Horizon at 12"
☐ Aquic/Peraquic Moisture Regime	☐ Iron/Manganese Concretions	☐ Aquatic Invertebrate Remains
☐ Reducing Conditions	☐ Dark Organic Vertical Streaking in Sandy Soils	☐ Inclusionary Hydric Soil
☒ Gleying	☐ High Organic Content at Surface Layer in Sandy Soils	☐ Other (Explain in remarks)

WETLAND DETERMINATION

	Yes	No		Yes	No
Hydrophytic vegetation present?	☐	☒	Is this sampling site within a wetland?	☐	☒
Wetland hydrology present?	☒	☐	Wetland Circular 39 Basin Type Classification:	Type 2- Inland Fresh Meadow	
Hydric soils present?	☒	☐	NWI or WWI Basin Type Classification	E2Kfr	

Remarks

Man-made ditched agricultural hay field which was hayed this summer. Upland drains via sheet flow. Problem area due to clay soils. Appears as if this upland field was historically wet. Agricultural field surrounded by wetland.

DATA FORM
ROUTINE ONSITE DETERMINATION METHOD

			Yes	No	Is the Area (Circle):		
Project/Site:	Nemadji River Wetland Mitigation Site						
Applicant/Owner:	Enbridge Energy, Limited Partnership	**Abnormal conditions?**	☐	☒	Filled	Floodplain	(Ditched)
Field Investigator:	Lindsay H., Whitney H., Troy S.	**Site disturbed (Atypical)?**	☒	☐	Seasonal	Permanent	Tiled
Investigation Date:	8-26-2008	**Problem area?**	☒	☐			
County	Douglas	**State: WI**					

Wetland or Upland Sample Point (Circle) and ID No. TP37W **Transect No.** 19

VEGETATION

Dominant Plant Species	Stratum	%	Indicator
1. Carex stricta (uptight sedge)	H	40	OBL
2. Phleum pratense (timothy)	H	30	FACU
3. Taraxacum officinale (common dandelion)	H	10	FACU
4. Anemone canadensis (Canadian anemone)	H	10	FACW
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
13.			
14.			
15.			

Percent of dominant species that are OBL, FACW and/or FAC = 50%

HYDROLOGY

- ☐ Stream, Lake or Well Data
- ☐ Precipitation Data
- ☒ Aerial Photographs
- ☐ Other (Explain in remarks)
- ☐ No recorded data used

Field Observations

Depth of Surface Water: None
Depth to Water in Pit: None
Depth to Saturated Soil: 11"

Primary Wetland Hydrology Indicators

- ☐ Inundated
- ☒ Saturated in upper 12"
- ☐ Water Marks
- ☐ Drift Lines
- ☐ Sediment Deposits
- ☐ Drainage Patterns in Wetlands

Secondary Wetland Hydrology Indicators
(If no primary indicator, 2 or more required)

- ☐ Oxidized Root Channels in upper 12"
- ☐ Water Stained Leaves
- ☐ Local Soil Survey Data
- ☐ FAC Neutral Vegetation Test
- ☐ Multiple Trunks
- ☐ Buttressing
- ☐ Other (Explain in remarks)

SOILS

Map Unit Name: 262B- Amnicon-Cuttre complex
Natural Drainage Class: SPD – partially hydric
Soil Suborder: Bergland
Whole unit hydric soil? Y ☐ N ☒
Field Observations Confirmed Mapped Type? Y ☒ N ☐

Soil Profile Description

Depth (In)	Horizon Name	Matrix Color (Munsell Moist)	Mottle Color (Munsell Moist)	Mottle %	Soil Texture and Comments
2-5	2	10YR 3/2			Blocky clay
5-7	3	10YR 5/1 & 10YR 3/1	10YR 5/6	15	Clay with gleying
7-12	4	10YR 5/1	10YR 5/4	20	Clay
12-18	5	7.5YR 4/3	7.5YR 5/4	10	Red clay

DATA FORM
ROUTINE ONSITE DETERMINATION METHOD

Hydric Soil Indicators

☐ Histosol	☐ Chroma ≤ 3 in Entisol	☐ Listed on Local Hydric Soils List
☐ Histic Epipedon	☒ Mottled with Chroma ≤ 2	☒ Listed on National Hydric Soils List
☐ Sulfidic Odor	☐ Chroma of 1 without Mottles	☐ Spodic Horizon at 12"
☐ Aquic/Peraquic Moisture Regime	☐ Iron/Manganese Concretions	☐ Aquatic Invertebrate Remains
☐ Reducing Conditions	☐ Dark Organic Vertical Streaking in Sandy Soils	☐ Inclusionary Hydric Soil
☒ Gleying	☐ High Organic Content at Surface Layer in Sandy Soils	☐ Other (Explain in remarks)

WETLAND DETERMINATION

	Yes	No		Yes	No
Hydrophytic vegetation present?	☒	☐	Is this sampling site within a wetland?	☒	☐
Wetland hydrology present?	☒	☐	Wetland Circular 39 Basin Type Classification:	Type 2- Inland Fresh Meadow	
Hydric soils present?	☒	☐	NWI or WWI Basin Type Classification	E2Kfr	

Remarks

Ditched agricultural hay field which was hayed this summer. Problem area due to clay soils.

DATA FORM
ROUTINE ONSITE DETERMINATION METHOD

			Yes	No	Is the Area (Circle):		
Project/Site:	Nemadji River Wetland Mitigation Site						
Applicant/Owner:	Enbridge Energy, Limited Partnership	**Abnormal conditions?**	☐	☒	Filled	Floodplain	Ditched
Field Investigator:	Lindsay H., Whitney H., Troy S.	**Site disturbed (Atypical)?**	☒	☐	Seasonal	Permanent	Tiled
Investigation Date:	8-26-2008	**Problem area?**	☒	☐			
County	Douglas	**State: WI**					

Wetland or Upland Sample Point (Circle) and ID No. TP38U **Transect No.** 19

VEGETATION

Dominant Plant Species	Stratum	%	Indicator
1. Carex gracillima (graceful sedge)	H	30	FACU
2. Trifolium pratense (red clover)	H	30	FACU
3. Anemone canadensis (Canadian anemone)	H	20	FACW
4. Fragaria virginiana (woodland strawberry)	H	10	FAC-
5. Bellis perennis (common daisy)	H	5	FACU
6. Ranunculus acris (tall buttercup)	H	5	FACW-
7.			
8.			
9.			
10.			
11.			
12.			
13.			
14.			
15.			

Percent of dominant species that are OBL, FACW and/or FAC = 25%

HYDROLOGY

- ☐ Stream, Lake or Well Data
- ☐ Precipitation Data
- ☒ Aerial Photographs
- ☐ Other (Explain in remarks)
- ☐ No recorded data used

Field Observations

Depth of Surface Water: None
Depth to Water in Pit: None
Depth to Saturated Soil: None

Primary Wetland Hydrology Indicators

- ☐ Inundated
- ☐ Saturated in upper 12"
- ☐ Water Marks
- ☐ Drift Lines
- ☐ Sediment Deposits
- ☐ Drainage Patterns in Wetlands

Secondary Wetland Hydrology Indicators
(If no primary indicator, 2 or more required)

- ☐ Oxidized Root Channels in upper 12"
- ☐ Water Stained Leaves
- ☐ Local Soil Survey Data
- ☐ FAC Neutral Vegetation Test
- ☐ Multiple Trunks
- ☐ Buttressing
- ☐ Other (Explain in remarks)

SOILS

Map Unit Name: 262B- Amnicon-Cuttre complex
Natural Drainage Class: SPD - partially hydric
Soil Suborder: Bergland
Whole unit hydric soil? Y ☐ N ☒
Field Observations Confirmed Mapped Type? Y ☒ N ☐

Soil Profile Description

Depth (In)	Horizon Name	Matrix Color (Munsell Moist)	Mottle Color (Munsell Moist)	Mottle %	Soil Texture and Comments
0-2	1				Topsoil
2-8	2	5YR 3/2			Clay
8-18	3	5YR 4/4	7.5YR 5/6	15	Blocky red clay

DATA FORM
ROUTINE ONSITE DETERMINATION METHOD

Hydric Soil Indicators

☐ Histosol	☐ Chroma ≤ 3 in Entisol	☐ Listed on Local Hydric Soils List
☐ Histic Epipedon	☐ Mottled with Chroma ≤ 2	☒ Listed on National Hydric Soils List
☐ Sulfidic Odor	☐ Chroma of 1 without Mottles	☐ Spodic Horizon at 12"
☐ Aquic/Peraquic Moisture Regime	☐ Iron/Manganese Concretions	☐ Aquatic Invertebrate Remains
☐ Reducing Conditions	☐ Dark Organic Vertical Streaking in Sandy Soils	☐ Inclusionary Hydric Soil
☒ Gleying	☐ High Organic Content at Surface Layer in Sandy Soils	☐ Other (Explain in remarks)

WETLAND DETERMINATION

	Yes	No		Yes	No
Hydrophytic vegetation present?	☐	☒	Is this sampling site within a wetland?	☐	☒
Wetland hydrology present?	☐	☒	Wetland Circular 39 Basin Type Classification:		
Hydric soils present?	☒	☐	NWI or WWI Basin Type Classification		

Remarks

Ditched agricultural hay field which was hayed this summer. Upland drains via sheet flow into man-made ditches. Problem area due to clay soils. Soils meet TF2 hydric soil indicator.

DATA FORM
ROUTINE ONSITE DETERMINATION METHOD

			Yes	No	Is the Area (Circle):
Project/Site:	Nemadji River Wetland Mitigation Site				
Applicant/Owner:	Enbridge Energy, Limited Partnership	**Abnormal conditions?**	☐	☒	Filled Floodplain (Ditched)
Field Investigator:	Lindsay H., Whitney H., Troy S.	**Site disturbed (Atypical)?**	☒	☐	Seasonal Permanent Tiled
Investigation Date:	8-26-2008	**Problem area?**	☒	☒	
County	Douglas	**State: WI**			

Wetland or Upland Sample Point (Circle) and ID No. TP39W **Transect No.** 20

VEGETATION

Dominant Plant Species	Stratum	%	Indicator
1. Carex gracillima (graceful sedge)	H	40	FACU
2. Phleum pratense (timothy)	H	30	FACU
3. Salix petiolaris (meadow willow) (emerging)	H	20	FACW
4. Scirpus atrovirens (green bulrush)	H	10	OBL
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
13.			
14.			
15.			

Percent of dominant species that are OBL, FACW and/or FAC = 50%

HYDROLOGY

- ☐ Stream, Lake or Well Data
- ☐ Precipitation Data
- ☒ Aerial Photographs
- ☐ Other (Explain in remarks)
- ☐ No recorded data used

Field Observations

Depth of Surface Water: None
Depth to Water in Pit: None
Depth to Saturated Soil: None

Primary Wetland Hydrology Indicators

- ☐ Inundated
- ☐ Saturated in upper 12"
- ☐ Water Marks
- ☐ Drift Lines
- ☐ Sediment Deposits
- ☒ Drainage Patterns in Wetlands

Secondary Wetland Hydrology Indicators
(If no primary indicator, 2 or more required)

- ☐ Oxidized Root Channels in upper 12"
- ☐ Water Stained Leaves
- ☐ Local Soil Survey Data
- ☐ FAC Neutral Vegetation Test
- ☐ Multiple Trunks
- ☐ Buttressing
- ☐ Other (Explain in remarks)

SOILS

Map Unit Name: 262B- Amnicon-Cuttre complex
Natural Drainage Class: SPD – partially hydric
Soil Suborder: Bergland
Whole unit hydric soil? Y ☐ N ☒
Field Observations Confirmed Mapped Type? Y ☒ N ☐

Soil Profile Description

Depth (In)	Horizon Name	Matrix Color (Munsell Moist)	Mottle Color (Munsell Moist)	Mottle %	Soil Texture and Comments
0-2	1				Topsoil
2-9	2	7.5YR 4/4	7.5YR 5/6	25	Clay
9-18	3	5YR 4/4	7.5YR 5/6	25	Red clay

DATA FORM
ROUTINE ONSITE DETERMINATION METHOD

Hydric Soil Indicators

☐ Histosol	☐ Chroma ≤ 3 in Entisol	☐ Listed on Local Hydric Soils List
☐ Histic Epipedon	☐ Mottled with Chroma ≤ 2	☒ Listed on National Hydric Soils List
☐ Sulfidic Odor	☐ Chroma of 1 without Mottles	☐ Spodic Horizon at 12"
☐ Aquic/Peraquic Moisture Regime	☐ Iron/Manganese Concretions	☐ Aquatic Invertebrate Remains
☐ Reducing Conditions	☐ Dark Organic Vertical Streaking in Sandy Soils	☐ Inclusionary Hydric Soil
☐ Gleying	☐ High Organic Content at Surface Layer in Sandy Soils	☐ Other (Explain in remarks)

WETLAND DETERMINATION

	Yes	No		Yes	No
Hydrophytic vegetation present?	☒	☐	Is this sampling site within a wetland?	☒	☐
Wetland hydrology present?	☒	☐	Wetland Circular 39 Basin Type Classification:	Type 2- Inland Fresh Meadow	
Hydric soils present?	☒	☐	NWI or WWI Basin Type Classification	E2Kfr	

Remarks

Ditched agricultural hay field which was hayed this summer. Problem area due to clay soils. Soils meet TF2 hydric soil indicator.

DATA FORM
ROUTINE ONSITE DETERMINATION METHOD

			Yes	No	Is the Area (Circle):		
Project/Site:	Nemadji River Wetland Mitigation Site						
Applicant/Owner:	Enbridge Mitigation Site	**Abnormal conditions?**	☐	☒	Filled	Floodplain	Ditched
Field Investigator:	Lindsay H., Whitney H., Troy S.	**Site disturbed (Atypical)?**	☐	☒	Seasonal	Permanent	Tiled
Investigation Date:	8-26-2008	**Problem area?**	☒	☐			
County	Douglas	**State: WI**					

Wetland or Upland Sample Point (Circle) and ID No. TP40U **Transect No.** 20

VEGETATION

Dominant Plant Species	Stratum	%	Indicator
1. Trifolium pratense (red clover)	H	60	FACU
2. Carex gracillima (graceful sedge)	H	30	FACU
3. Taraxacum officinale (common dandelion)	H	10	FACU
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
13.			
14.			
15.			

Percent of dominant species that are OBL, FACW and/or FAC = 0%

HYDROLOGY

- ☐ Stream, Lake or Well Data
- ☐ Precipitation Data
- ☒ Aerial Photographs
- ☐ Other (Explain in remarks)
- ☐ No recorded data used

Field Observations

Depth of Surface Water: None
Depth to Water in Pit: None
Depth to Saturated Soil: 10"

Primary Wetland Hydrology Indicators

- ☐ Inundated
- ☒ Saturated in upper 12"
- ☐ Water Marks
- ☐ Drift Lines
- ☐ Sediment Deposits
- ☐ Drainage Patterns in Wetlands

Secondary Wetland Hydrology Indicators
(If no primary indicator, 2 or more required)

- ☐ Oxidized Root Channels in upper 12"
- ☐ Water Stained Leaves
- ☐ Local Soil Survey Data
- ☐ FAC Neutral Vegetation Test
- ☐ Multiple Trunks
- ☐ Buttressing
- ☐ Other (Explain in remarks)

SOILS

Map Unit Name: 262B- Amnicon-Cuttre complex
Natural Drainage Class: SPD- partially hydric
Soil Suborder: Bergland
Whole unit hydric soil? Y ☐ N ☒
Field Observations Confirmed Mapped Type? Y ☒ N ☐

Soil Profile Description

Depth (In)	Horizon Name	Matrix Color (Munsell Moist)	Mottle Color (Munsell Moist)	Mottle %	Soil Texture and Comments
0-2	1				Topsoil
2-8	2	5YR 3/2			Clay
8-18	3	5YR 4/4	7.5YR 5/6	20	Clay

DATA FORM
ROUTINE ONSITE DETERMINATION METHOD

Hydric Soil Indicators

☐ Histosol	☐ Chroma ≤ 3 in Entisol	☐ Listed on Local Hydric Soils List
☐ Histic Epipedon	☐ Mottled with Chroma ≤ 2	☒ Listed on National Hydric Soils List
☐ Sulfidic Odor	☐ Chroma of 1 without Mottles	☐ Spodic Horizon at 12"
☐ Aquic/Peraquic Moisture Regime	☐ Iron/Manganese Concretions	☐ Aquatic Invertebrate Remains
☐ Reducing Conditions	☐ Dark Organic Vertical Streaking in Sandy Soils	☐ Inclusionary Hydric Soil
☒ Gleying	☐ High Organic Content at Surface Layer in Sandy Soils	☐ Other (Explain in remarks)

WETLAND DETERMINATION

	Yes	No
Hydrophytic vegetation present?	☐	☒
Wetland hydrology present?	☒	☐
Hydric soils present?	☒	☐

	Yes	No
Is this sampling site within a wetland?	☐	☒
Wetland Circular 39 Basin Type Classification:		
NWI or WWI Basin Type Classification		

Remarks

Ditched agricultural hay field which was hayed this summer. Upland drains via sheet flow into man-made ditches. Problem area due to clay soils.

DATA FORM
ROUTINE ONSITE DETERMINATION METHOD

			Yes	No	Is the Area (Circle):
Project/Site:	Nemadji River Wetland Mitigation Site				
Applicant/Owner:	Enbridge Energy, Limited Partnership	**Abnormal conditions?**	☐	☒	Filled Floodplain Ditched
Field Investigator:	Lindsay H., Whitney H., Troy S.	**Site disturbed (Atypical)?**	☐	☒	(Seasonal) Permanent Tiled
Investigation Date:	8-26-2008	**Problem area?**	☒	☐	
County	Douglas	**State: WI**			

Wetland or Upland Sample Point (Circle) and ID No. TP41W **Transect No.** 21

VEGETATION

Dominant Plant Species	Stratum	%	Indicator
1. Calamagrostis canadensis (Canada bluejoint grass)	H	60	OBL
2. Carex stricta (uptight sedge)	H	30	OBL
3. Rubus idaeus (American red raspberry)	H	10	FACU
4. Scirpus cyperinus (woolgrass)	H	10	OBL
5. Alnus incana (speckled alder)	S	100	OBL
6. Abies balsamea (balsam fir)	T	10	FACW
7.			
8.			
9.			
10.			
11.			
12.			
13.			
14.			
15.			

Percent of dominant species that are OBL, FACW and/or FAC = 83%

HYDROLOGY

- ☐ Stream, Lake or Well Data
- ☐ Precipitation Data
- ☒ Aerial Photographs
- ☐ Other (Explain in remarks)
- ☐ No recorded data used

Field Observations

Depth of Surface Water: None
Depth to Water in Pit: None
Depth to Saturated Soil: 7"

Primary Wetland Hydrology Indicators

- ☐ Inundated
- ☒ Saturated in upper 12"
- ☐ Water Marks
- ☐ Drift Lines
- ☐ Sediment Deposits
- ☐ Drainage Patterns in Wetlands

Secondary Wetland Hydrology Indicators
(If no primary indicator, 2 or more required)

- ☐ Oxidized Root Channels in upper 12"
- ☐ Water Stained Leaves
- ☐ Local Soil Survey Data
- ☐ FAC Neutral Vegetation Test
- ☐ Multiple Trunks
- ☐ Buttressing
- ☐ Other (Explain in remarks)

SOILS

Map Unit Name: 262B- Amnicon-Cuttre complex
Natural Drainage Class: SPD- partially hydric
Soil Suborder: Bergland
Whole unit hydric soil? Y ☐ N ☒
Field Observations Confirmed Mapped Type? Y ☒ N ☐

Soil Profile Description

Depth (In)	Horizon Name	Matrix Color (Munsell Moist)	Mottle Color (Munsell Moist)	Mottle %	Soil Texture and Comments
0-2	1				Topsoil
2-9	2	7.5YR 4/4	7.5YR 5/6	15	Clay
9-18	3	5YR 4/4	7.5YR 5/6	20	Clay

DATA FORM
ROUTINE ONSITE DETERMINATION METHOD

Hydric Soil Indicators

☐ Histosol	☐ Chroma ≤ 3 in Entisol	☐ Listed on Local Hydric Soils List
☐ Histic Epipedon	☐ Mottled with Chroma ≤ 2	☒ Listed on National Hydric Soils List
☐ Sulfidic Odor	☐ Chroma of 1 without Mottles	☐ Spodic Horizon at 12"
☐ Aquic/Peraquic Moisture Regime	☐ Iron/Manganese Concretions	☐ Aquatic Invertebrate Remains
☐ Reducing Conditions	☐ Dark Organic Vertical Streaking in Sandy Soils	☐ Inclusionary Hydric Soil
☒ Gleying	☐ High Organic Content at Surface Layer in Sandy Soils	☐ Other (Explain in remarks)

WETLAND DETERMINATION

	Yes	No		Yes	No
Hydrophytic vegetation present?	☒	☐	Is this sampling site within a wetland?	☒	☐
Wetland hydrology present?	☒	☐	Wetland Circular 39 Basin Type Classification:	Type 6- Shrub scrub	
Hydric soils present?	☒	☐	NWI or WWI Basin Type Classification	PSS1	

Remarks

Shrub scrub area to south of hay field.

DATA FORM
ROUTINE ONSITE DETERMINATION METHOD

			Yes	No	Is the Area (Circle):		
Project/Site:	Nemadji River Wetland Mitigation Site						
Applicant/Owner:	Enbridge Energy, Limited Partnership	**Abnormal conditions?**	☐	☒	Filled	Floodplain	Ditched
Field Investigator:	Lindsay H., Whitney H., Troy S.	**Site disturbed (Atypical)?**	☒	☐	Seasonal	Permanent	Tiled
Investigation Date:	8-26-2008	**Problem area?**	☒	☐			
County	Douglas	**State: WI**					
Wetland or Upland Sample Point (Circle) and ID No.	TP42U				**Transect No.**	21	

VEGETATION

Dominant Plant Species	Stratum	%	Indicator
1. Trifolium pratense (red clover)	H	60	FACU
2. Carex gracillima (graceful sedge)	H	20	FACU
3. Ranunculus acris (tall buttercup)	H	10	FACW-
4. Anemone canadensis (Canadian anemone)	H	5	FACW
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
13.			
14.			
15.			

Percent of dominant species that are OBL, FACW and/or FAC = 50%

HYDROLOGY

- ☐ Stream, Lake or Well Data
- ☐ Precipitation Data
- ☒ Aerial Photographs
- ☐ Other (Explain in remarks)
- ☐ No recorded data used

Field Observations

Depth of Surface Water: None
Depth to Water in Pit: None
Depth to Saturated Soil: 10"

Primary Wetland Hydrology Indicators

- ☐ Inundated
- ☐ Saturated in upper 12"
- ☐ Water Marks
- ☐ Drift Lines
- ☐ Sediment Deposits
- ☐ Drainage Patterns in Wetlands

Secondary Wetland Hydrology Indicators
(If no primary indicator, 2 or more required)

- ☐ Oxidized Root Channels in upper 12"
- ☐ Water Stained Leaves
- ☐ Local Soil Survey Data
- ☐ FAC Neutral Vegetation Test
- ☐ Multiple Trunks
- ☐ Buttressing
- ☐ Other (Explain in remarks)

SOILS

Map Unit Name: 262B- Amnicon-Cuttre complex
Natural Drainage Class: SPD- partially hydric
Soil Suborder: Bergland
Whole unit hydric soil? Y ☐ N ☒
Field Observations Confirmed Mapped Type? Y ☒ N ☐

Soil Profile Description

Depth (In)	Horizon Name	Matrix Color (Munsell Moist)	Mottle Color (Munsell Moist)	Mottle %	Soil Texture and Comments
0-2	1				Topsoil
2-8	2	5YR 3/2			Clay
8-18	3	5YR 4/4	7.5YR 5/6	20	Clay

DATA FORM
ROUTINE ONSITE DETERMINATION METHOD

Hydric Soil Indicators

☐ Histosol	☐ Chroma ≤ 3 in Entisol	☐ Listed on Local Hydric Soils List
☐ Histic Epipedon	☐ Mottled with Chroma ≤ 2	☒ Listed on National Hydric Soils List
☐ Sulfidic Odor	☐ Chroma of 1 without Mottles	☐ Spodic Horizon at 12"
☐ Aquic/Peraquic Moisture Regime	☐ Iron/Manganese Concretions	☐ Aquatic Invertebrate Remains
☐ Reducing Conditions	☐ Dark Organic Vertical Streaking in Sandy Soils	☐ Inclusionary Hydric Soil
☐ Gleying	☐ High Organic Content at Surface Layer in Sandy Soils	☐ Other (Explain in remarks)

WETLAND DETERMINATION

	Yes	No
Hydrophytic vegetation present?	☐	☒
Wetland hydrology present?	☒	☐
Hydric soils present?	☒	☐

	Yes	No
Is this sampling site within a wetland?	☐	☒
Wetland Circular 39 Basin Type Classification:		
NWI or WWI Basin Type Classification		

Remarks

Disturbed/problem area due to man-made ditched agricultural field with clay soils. Soils meet TF2 hydric soil indicator.

DATA FORM
ROUTINE ONSITE DETERMINATION METHOD

			Yes	No	Is the Area (Circle):
Project/Site:	Nemadji River Wetland Mitigation Site				
Applicant/Owner:	Enbridge Energy, Limited Partnership	**Abnormal conditions?**	☐	☒	Filled (Floodplain) Ditched
Field Investigator:	Lindsay H., Whitney H., Troy S.	**Site disturbed (Atypical)?**	☐	☒	Seasonal Permanent Tiled
Investigation Date:	8-27-2008	**Problem area?**	☒	☐	
County	Douglas	**State: WI**			

Wetland or Upland Sample Point (Circle) and ID No. TP43W **Transect No.** 22

VEGETATION

Dominant Plant Species	Stratum	%	Indicator
1. Acer saccharinum (silver maple)	T	50	FACW
2. Fraxinus nigra (black ash)	T	30	FACW+
3. Ulmus americana (American elm)	T	20	FACW
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
13.			
14.			
15.			

Percent of dominant species that are OBL, FACW and/or FAC = 100%

HYDROLOGY

- ☐ Stream, Lake or Well Data
- ☐ Precipitation Data
- ☒ Aerial Photographs
- ☐ Other (Explain in remarks)
- ☐ No recorded data used

Field Observations

Depth of Surface Water: None
Depth to Water in Pit: None
Depth to Saturated Soil: None

Primary Wetland Hydrology Indicators

- ☐ Inundated
- ☐ Saturated in upper 12"
- ☒ Water Marks
- ☐ Drift Lines
- ☐ Sediment Deposits
- ☐ Drainage Patterns in Wetlands

Secondary Wetland Hydrology Indicators
(If no primary indicator, 2 or more required)

- ☐ Oxidized Root Channels in upper 12"
- ☐ Water Stained Leaves
- ☐ Local Soil Survey Data
- ☐ FAC Neutral Vegetation Test
- ☒ Multiple Trunks
- ☒ Buttressing
- ☐ Other (Explain in remarks)

SOILS

Map Unit Name: 92F- Udorthents, ravines and escarpments
Natural Drainage Class NA- not hydric
Soil Suborder:
Whole unit hydric soil? Y ☐ N ☒
Field Observations Confirmed Mapped Type? Y ☒ N ☐

Soil Profile Description

Depth (In)	Horizon Name	Matrix Color (Munsell Moist)	Mottle Color (Munsell Moist)	Mottle %	Soil Texture and Comments
0-3	1	10YR 3/1			Clay
3-8	2	10YR 3/2	10YR 5/6	15	Clay
8-10	3	10YR 3/2	10YR 5/2	20	Clay
10-18	4	10YR 3/2	10YR 5/6	20	Clay

DATA FORM
ROUTINE ONSITE DETERMINATION METHOD

Hydric Soil Indicators

☐ Histosol	☐ Chroma ≤ 3 in Entisol	☐ Listed on Local Hydric Soils List
☐ Histic Epipedon	☒ Mottled with Chroma ≤ 2	☐ Listed on National Hydric Soils List
☐ Sulfidic Odor	☐ Chroma of 1 without Mottles	☐ Spodic Horizon at 12"
☐ Aquic/Peraquic Moisture Regime	☐ Iron/Manganese Concretions	☐ Aquatic Invertebrate Remains
☐ Reducing Conditions	☐ Dark Organic Vertical Streaking in Sandy Soils	☐ Inclusionary Hydric Soil
☐ Gleying	☐ High Organic Content at Surface Layer in Sandy Soils	☐ Other (Explain in remarks)

WETLAND DETERMINATION

	Yes	No		Yes	No
Hydrophytic vegetation present?	☒	☐	Is this sampling site within a wetland?	☒	☐
Wetland hydrology present?	☒	☐	Wetland Circular 39 Basin Type Classification:	Type 1- Seasonally Flooded Floodplain	
Hydric soils present?	☒	☐	NWI or WWI Basin Type Classification	PFO1J	

Remarks

Sample point located in Nemadji River forested floodplain. Problem area due to clay soils.

DATA FORM
ROUTINE ONSITE DETERMINATION METHOD

			Yes	No	Is the Area (Circle):		
Project/Site:	Nemadji River Wetland Mitigation Site						
Applicant/Owner:	Enbridge Energy, Limited Partnership	**Abnormal conditions?**	☐	☒	Filled	Floodplain	Ditched
Field Investigator:	Lindsay H., Whitney H., Troy S.	**Site disturbed (Atypical)?**	☒	☐	Seasonal	Permanent	Tiled
Investigation Date:	8-27-2008	**Problem area?**	☒	☐			
County	Douglas	**State: WI**					
Wetland or Upland Sample Point (Circle) and ID No.	TP44U				**Transect No.**	22	

VEGETATION

Dominant Plant Species	Stratum	%	Indicator
1. Phleum pratense (timothy)	H	40	FACU
2. Trifolium pratense (red clover)	H	30	FACU
3. Cirsium arvense (Canada thistle)	H	15	FACU
4. Helianthus occidentalis (few-leaved sunflower)	H	15	FACU-
5. Solidago canadensis (Canada goldenrod)	H	30	FACU
6.			
7.			
8.			
9.			
10.			
11.			
12.			
13.			
14.			
15.			

Percent of dominant species that are OBL, FACW and/or FAC = 0%

HYDROLOGY

- ☐ Stream, Lake or Well Data
- ☐ Precipitation Data
- ☒ Aerial Photographs
- ☐ Other (Explain in remarks)
- ☐ No recorded data used

Field Observations

Depth of Surface Water: None
Depth to Water in Pit: None
Depth to Saturated Soil: None

Primary Wetland Hydrology Indicators

- ☐ Inundated
- ☐ Saturated in upper 12"
- ☐ Water Marks
- ☐ Drift Lines
- ☐ Sediment Deposits
- ☐ Drainage Patterns in Wetlands

Secondary Wetland Hydrology Indicators
(If no primary indicator, 2 or more required)

- ☐ Oxidized Root Channels in upper 12"
- ☐ Water Stained Leaves
- ☐ Local Soil Survey Data
- ☐ FAC Neutral Vegetation Test
- ☒ Multiple Trunks
- ☒ Buttressing
- ☐ Other (Explain in remarks)

SOILS

Map Unit Name: 92F- Udorthents, ravines and escarpments
Natural Drainage Class: NA- not hydric
Soil Suborder:
Whole unit hydric soil? Y ☐ N ☒
Field Observations Confirmed Mapped Type? Y ☒ N ☐

Soil Profile Description

Depth (In)	Horizon Name	Matrix Color (Munsell Moist)	Mottle Color (Munsell Moist)	Mottle %	Soil Texture and Comments
0-2	1				Topsoil, roots
2-8	2	7.5YR 3/4			Hard compacted clay
8-18	3	7.5YR 3/2			Hard compacted clay

DATA FORM
ROUTINE ONSITE DETERMINATION METHOD

Hydric Soil Indicators

☐ Histosol	☐ Chroma ≤ 3 in Entisol	☐ Listed on Local Hydric Soils List
☐ Histic Epipedon	☐ Mottled with Chroma ≤ 2	☐ Listed on National Hydric Soils List
☐ Sulfidic Odor	☐ Chroma of 1 without Mottles	☐ Spodic Horizon at 12"
☐ Aquic/Peraquic Moisture Regime	☐ Iron/Manganese Concretions	☐ Aquatic Invertebrate Remains
☐ Reducing Conditions	☐ Dark Organic Vertical Streaking in Sandy Soils	☐ Inclusionary Hydric Soil
☐ Gleying	☐ High Organic Content at Surface Layer in Sandy Soils	☐ Other (Explain in remarks)

WETLAND DETERMINATION

	Yes	No		Yes	No
Hydrophytic vegetation present?	☐	☒	Is this sampling site within a wetland?	☐	☒
Wetland hydrology present?	☐	☒	Wetland Circular 39 Basin Type Classification:		
Hydric soils present?	☐	☒	NWI or WWI Basin Type Classification		

Remarks

Horse pasture, grazed vegetation. Slope is too steep for water to saturate. Test point on slope draining to Nemadji River floodplain. Problem area due to clay soils.

DATA FORM
ROUTINE ONSITE DETERMINATION METHOD

			Yes	No	Is the Area (Circle):
Project/Site:	Nemadji River Wetland Mitigation Site				
Applicant/Owner:	Enbridge Energy, Limited Partnership	**Abnormal conditions?**	☐	☒	Filled (Floodplain) Ditched
Field Investigator:	Lindsay H., Whitney H., Troy S.	**Site disturbed (Atypical)?**	☒	☐	Seasonal Permanent Tiled
Investigation Date:	8-27-2008	**Problem area?**	☒	☐	
County	Douglas	**State: WI**			

Wetland or Upland Sample Point (Circle) and ID No. TP45W **Transect No.** 23

VEGETATION

Dominant Plant Species	Stratum	%	Indicator
1. Agrostis gigantea (red top)	H	30	NI
2. Carex lacustris (lake sedge)	H	25	OBL
3. Scirpus atrovirens (green bulrush)	H	20	OBL
4. Typha angustifolia (narrow-leaf cattail)	H	10	OBL
5. Doellingeria umbellata (parasol whitetop)	H	10	FACW
6. Prunella vulgaris (heal-all)	H	5	FAC
7. Fraxinus nigra (black ash)	T	30	FACW+
8.			
9.			
10.			
11.			
12.			
13.			
14.			
15.			

Percent of dominant species that are OBL, FACW and/or FAC = 71%

HYDROLOGY

- ☐ Stream, Lake or Well Data
- ☐ Precipitation Data
- ☒ Aerial Photographs
- ☐ Other (Explain in remarks)
- ☐ No recorded data used

Field Observations

Depth of Surface Water: None
Depth to Water in Pit: None
Depth to Saturated Soil: 0"

Primary Wetland Hydrology Indicators

- ☐ Inundated
- ☒ Saturated in upper 12"
- ☐ Water Marks
- ☐ Drift Lines
- ☐ Sediment Deposits
- ☒ Drainage Patterns in Wetlands

Secondary Wetland Hydrology Indicators
(If no primary indicator, 2 or more required)

- ☐ Oxidized Root Channels in upper 12"
- ☐ Water Stained Leaves
- ☐ Local Soil Survey Data
- ☐ FAC Neutral Vegetation Test
- ☐ Multiple Trunks
- ☐ Buttressing
- ☐ Other (Explain in remarks)

SOILS

Map Unit Name: 92F- Udorthents, ravines and escarpments
Natural Drainage Class NA- not hydric
Soil Suborder:
Whole unit hydric soil? Y ☐ N ☒
Field Observations Confirmed Mapped Type? Y ☒ N ☐

Soil Profile Description

Depth (In)	Horizon Name	Matrix Color (Munsell Moist)	Mottle Color (Munsell Moist)	Mottle %	Soil Texture and Comments
0-1	1				Topsoil
1-18	2	5YR 4/4			Red clay

DATA FORM
ROUTINE ONSITE DETERMINATION METHOD

Hydric Soil Indicators

☐ Histosol	☐ Chroma ≤ 3 in Entisol	☐ Listed on Local Hydric Soils List
☐ Histic Epipedon	☐ Mottled with Chroma ≤ 2	☐ Listed on National Hydric Soils List
☐ Sulfidic Odor	☐ Chroma of 1 without Mottles	☐ Spodic Horizon at 12"
☐ Aquic/Peraquic Moisture Regime	☐ Iron/Manganese Concretions	☐ Aquatic Invertebrate Remains
☐ Reducing Conditions	☐ Dark Organic Vertical Streaking in Sandy Soils	☐ Inclusionary Hydric Soil
☐ Gleying	☐ High Organic Content at Surface Layer in Sandy Soils	☐ Other (Explain in remarks)

WETLAND DETERMINATION

	Yes	No		Yes	No
Hydrophytic vegetation present?	☒	☐	Is this sampling site within a wetland?	☒	☐
Wetland hydrology present?	☒	☐	Wetland Circular 39 Basin Type Classification:	Type 1- Seasonally Flooded Floodplain	
Hydric soils present?	☒	☐	NWI or WWI Basin Type Classification	PFO1J	

Remarks

Bottom of steep slope near drainage. Problem area due to clay soils. Area disturbed due to horses compacting clay soils.

DATA FORM
ROUTINE ONSITE DETERMINATION METHOD

			Yes	No	Is the Area (Circle):		
Project/Site:	Nemadji River Wetland Mitigation Site						
Applicant/Owner:	Enbridge Energy, Limited Partnership	**Abnormal conditions?**	☐	☒	Filled	Floodplain	Ditched
Field Investigator:	Lindsay H., Whitney H., Troy S.	**Site disturbed (Atypical)?**	☒	☐	Seasonal	Permanent	Tiled
Investigation Date:	8-27-2008	**Problem area?**	☒	☐			
County	Douglas	**State: WI**					
Wetland or Upland Sample Point (Circle) and ID No.	TP46U				**Transect No.**	23	

VEGETATION

Dominant Plant Species	Stratum	%	Indicator
1. Phleum pratense (timothy)	H	30	FACU
2. Poa pratensis (Kentucky blue grass)	H	20	FAC-
3. Trifolium pratense (red clover)	H	20	FACU
4. Plantago rugelii (American plantain)	H	15	FAC
5. Ambrosia artemisiifolia (ragweed)	H	10	FACU
6.			
7.			
8.			
9.			
10.			
11.			
12.			
13.			
14.			
15.			

Percent of dominant species that are OBL, FACW and/or FAC = 20%

HYDROLOGY

- ☐ Stream, Lake or Well Data
- ☐ Precipitation Data
- ☒ Aerial Photographs
- ☐ Other (Explain in remarks)
- ☐ No recorded data used

Field Observations

Depth of Surface Water: None
Depth to Water in Pit: None
Depth to Saturated Soil: None

Primary Wetland Hydrology Indicators

- ☐ Inundated
- ☐ Saturated in upper 12"
- ☐ Water Marks
- ☐ Drift Lines
- ☐ Sediment Deposits
- ☒ Drainage Patterns in Wetlands

Secondary Wetland Hydrology Indicators
(If no primary indicator, 2 or more required)

- ☐ Oxidized Root Channels in upper 12"
- ☐ Water Stained Leaves
- ☐ Local Soil Survey Data
- ☐ FAC Neutral Vegetation Test
- ☐ Multiple Trunks
- ☐ Buttressing
- ☐ Other (Explain in remarks)

SOILS

Map Unit Name: 92F- Udorthents, ravines and escarpments
Natural Drainage Class: NA- not hydric
Soil Suborder:
Whole unit hydric soil? Y ☐ N ☒
Field Observations Confirmed Mapped Type? Y ☒ N ☐

Soil Profile Description

Depth (In)	Horizon Name	Matrix Color (Munsell Moist)	Mottle Color (Munsell Moist)	Mottle %	Soil Texture and Comments
0-1	1				Topsoil
1-18	2	5YR 4/4			Hard compacted red clay

DATA FORM
ROUTINE ONSITE DETERMINATION METHOD

Hydric Soil Indicators

☐ Histosol	☐ Chroma ≤ 3 in Entisol	☐ Listed on Local Hydric Soils List
☐ Histic Epipedon	☐ Mottled with Chroma ≤ 2	☐ Listed on National Hydric Soils List
☐ Sulfidic Odor	☐ Chroma of 1 without Mottles	☐ Spodic Horizon at 12"
☐ Aquic/Peraquic Moisture Regime	☐ Iron/Manganese Concretions	☐ Aquatic Invertebrate Remains
☐ Reducing Conditions	☐ Dark Organic Vertical Streaking in Sandy Soils	☐ Inclusionary Hydric Soil
☐ Gleying	☐ High Organic Content at Surface Layer in Sandy Soils	☐ Other (Explain in remarks)

WETLAND DETERMINATION

	Yes	No		Yes	No
Hydrophytic vegetation present?	☐	☒	Is this sampling site within a wetland?	☐	☒
Wetland hydrology present?	☐	☒	Wetland Circular 39 Basin Type Classification:		
Hydric soils present?	☐	☒	NWI or WWI Basin Type Classification		

Remarks

Sample point located on steep slope draining to floodplain. Hydrology does not sit here. Hard compacted clay from horses.

DATA FORM
ROUTINE ONSITE DETERMINATION METHOD

			Yes	No	Is the Area (Circle):
Project/Site:	Nemadji River Wetland Mitigation Site				
Applicant/Owner:	Enbridge Energy, Limited Partnership	**Abnormal conditions?**	☐	☒	Filled (Floodplain) Ditched
Field Investigator:	Lindsay H., Whitney H., Troy S.	**Site disturbed (Atypical)?**	☐	☒	Seasonal Permanent Tiled
Investigation Date:	8-27-2008	**Problem area?**	☒	☐	
County	Douglas	**State: WI**			

Wetland or Upland Sample Point (Circle) and ID No. TP47W **Transect No.** 24

VEGETATION

Dominant Plant Species	Stratum	%	Indicator
1. Calamagrostis canadensis (Canada bluejoint grass)	H	60	OBL
2. Scirpus atrovirens (green bulrush)	H	10	OBL
3. Heracleum maximum (cowparsnip)	H	10	FACW
4. Helianthus occidentalis (sunflower)	H	10	FACU
5. Cornus sericea (redosier dogwood)	S	20	FACW
6. Ulnus americana (American elm)	T	40	FACW-
7.			
8.			
9.			
10.			
11.			
12.			
13.			
14.			
15.			

Percent of dominant species that are OBL, FACW and/or FAC = 83%

HYDROLOGY

- ☐ Stream, Lake or Well Data
- ☐ Precipitation Data
- ☒ Aerial Photographs
- ☐ Other (Explain in remarks)
- ☐ No recorded data used

Field Observations

Depth of Surface Water: None
Depth to Water in Pit: None
Depth to Saturated Soil: 2"

Primary Wetland Hydrology Indicators

- ☐ Inundated
- ☒ Saturated in upper 12"
- ☐ Water Marks
- ☐ Drift Lines
- ☐ Sediment Deposits
- ☐ Drainage Patterns in Wetlands

Secondary Wetland Hydrology Indicators
(If no primary indicator, 2 or more required)

- ☐ Oxidized Root Channels in upper 12"
- ☐ Water Stained Leaves
- ☐ Local Soil Survey Data
- ☐ FAC Neutral Vegetation Test
- ☒ Multiple Trunks
- ☒ Buttressing
- ☐ Other (Explain in remarks)

SOILS

Map Unit Name: 92F- Udorthents, ravines and escarpments
Natural Drainage Class NA- not hydric
Soil Suborder:
Whole unit hydric soil? Y ☐ N ☒
Field Observations Confirmed Mapped Type? Y ☒ N ☐

Soil Profile Description

Depth (In)	Horizon Name	Matrix Color (Munsell Moist)	Mottle Color (Munsell Moist)	Mottle %	Soil Texture and Comments
0-3	1	10YR 3/1			Clay
3-9	2	10YR 3/2	10YR 5/6	10	Clay
9-11	3	10YR 3/2	10YR 5/2	15	Clay
11-18	4	10YR 3/2	10YR 5/6	15	Clay

DATA FORM
ROUTINE ONSITE DETERMINATION METHOD

Hydric Soil Indicators

☐ Histosol	☐ Chroma ≤ 3 in Entisol	☐ Listed on Local Hydric Soils List
☐ Histic Epipedon	☒ Mottled with Chroma ≤ 2	☐ Listed on National Hydric Soils List
☐ Sulfidic Odor	☐ Chroma of 1 without Mottles	☐ Spodic Horizon at 12"
☐ Aquic/Peraquic Moisture Regime	☐ Iron/Manganese Concretions	☐ Aquatic Invertebrate Remains
☐ Reducing Conditions	☐ Dark Organic Vertical Streaking in Sandy Soils	☐ Inclusionary Hydric Soil
☐ Gleying	☐ High Organic Content at Surface Layer in Sandy Soils	☐ Other (Explain in remarks)

WETLAND DETERMINATION

	Yes	No		Yes	No
Hydrophytic vegetation present?	☒	☐	Is this sampling site within a wetland?	☒	☐
Wetland hydrology present?	☒	☐	Wetland Circular 39 Basin Type Classification:	Type 1- Seasonally Flooded Floodplain	
Hydric soils present?	☒	☐	NWI or WWI Basin Type Classification	PFO1J	

Remarks

Sample point taken in Nemadji River Floodplain.

DATA FORM
ROUTINE ONSITE DETERMINATION METHOD

			Yes	No	Is the Area (Circle):		
Project/Site:	Nemadji River Wetland Mitigation Site						
Applicant/Owner:	Enbridge Energy, Limited Partnership	**Abnormal conditions?**	☐	☒	Filled	Floodplain	Ditched
Field Investigator:	Lindsay H., Whitney H., Troy S.	**Site disturbed (Atypical)?**	☐	☒	Seasonal	Permanent	Tiled
Investigation Date:	8-27-2008	**Problem area?**	☒	☐			
County	Douglas	**State: WI**					
Wetland or Upland Sample Point (Circle) and ID No.	TP48U				**Transect No.**	24	

VEGETATION

Dominant Plant Species	Stratum	%	Indicator
1. Cirsium arvense (Canada thistle)	H	60	FACU
2. Anemone canadensis (Canadian anemone)	H	30	FACW
3. Phalaris arundinacea (reed canary grass)	H	15	FACW+
4. Heracleum maximum (cowparsnip)	H	15	FACW
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
13.			
14.			
15.			

Percent of dominant species that are OBL, FACW and/or FAC = 75%

HYDROLOGY

- ☐ Stream, Lake or Well Data
- ☐ Precipitation Data
- ☒ Aerial Photographs
- ☐ Other (Explain in remarks)
- ☐ No recorded data used

Field Observations

Depth of Surface Water: None
Depth to Water in Pit: None
Depth to Saturated Soil: None

Primary Wetland Hydrology Indicators

- ☐ Inundated
- ☐ Saturated in upper 12"
- ☐ Water Marks
- ☐ Drift Lines
- ☐ Sediment Deposits
- ☐ Drainage Patterns in Wetlands

Secondary Wetland Hydrology Indicators
(If no primary indicator, 2 or more required)

- ☐ Oxidized Root Channels in upper 12"
- ☐ Water Stained Leaves
- ☐ Local Soil Survey Data
- ☐ FAC Neutral Vegetation Test
- ☐ Multiple Trunks
- ☐ Buttressing
- ☐ Other (Explain in remarks)

SOILS

Map Unit Name: 92F- Udorthents, ravines and escarpments
Natural Drainage Class: NA- not hydric
Soil Suborder:
Whole unit hydric soil? Y ☐ N ☒
Field Observations Confirmed Mapped Type? Y ☒ N ☐

Soil Profile Description

Depth (In)	Horizon Name	Matrix Color (Munsell Moist)	Mottle Color (Munsell Moist)	Mottle %	Soil Texture and Comments
0-2	1				Topsoil
2-8	2	7.5YR 3/4			Hard compacted clay
8-18	3	7.5YR 3/2			Hard compacted clay

DATA FORM
ROUTINE ONSITE DETERMINATION METHOD

Hydric Soil Indicators

☐ Histosol	☐ Chroma ≤ 3 in Entisol	☐ Listed on Local Hydric Soils List
☐ Histic Epipedon	☐ Mottled with Chroma ≤ 2	☐ Listed on National Hydric Soils List
☐ Sulfidic Odor	☐ Chroma of 1 without Mottles	☐ Spodic Horizon at 12"
☐ Aquic/Peraquic Moisture Regime	☐ Iron/Manganese Concretions	☐ Aquatic Invertebrate Remains
☐ Reducing Conditions	☐ Dark Organic Vertical Streaking in Sandy Soils	☐ Inclusionary Hydric Soil
☐ Gleying	☐ High Organic Content at Surface Layer in Sandy Soils	☐ Other (Explain in remarks)

WETLAND DETERMINATION

	Yes	No		Yes	No
Hydrophytic vegetation present?	☒	☐	Is this sampling site within a wetland?	☐	☒
Wetland hydrology present?	☐	☒	Wetland Circular 39 Basin Type Classification:		
Hydric soils present?	☐	☒	NWI or WWI Basin Type Classification		

Remarks

On slope to Nemadji River floodplain.

DATA FORM
ROUTINE ONSITE DETERMINATION METHOD

			Yes	No	Is the Area (Circle):		
Project/Site:	Nemadji River Wetland Mitigation Site						
Applicant/Owner:	Enbridge Energy, Limited Partnership	**Abnormal conditions?**	☐	☒	Filled	Floodplain	Ditched
Field Investigator:	Lindsay H., Whitney H., Troy S.	**Site disturbed (Atypical)?**	☒	☐	(Seasonal)	Permanent	Tiled
Investigation Date:	8-27-2008	**Problem area?**	☒	☐			
County	Douglas	**State: WI**					

Wetland or Upland Sample Point (Circle) and ID No. TP49W **Transect No.** 25

VEGETATION

Dominant Plant Species	Stratum	%	Indicator
1. Phleum pratense (timothy)	H	40	FACU
2. Phalaris arundinacea (reed canary grass)	H	20	FACW+
3. Trifolium pratense (red clover)	H	20	FACU
4. Moss spp.	H	20	NI
5. Carex gracillima (graceful sedge)	H	10	FACU
6. Salix petiolaris (meadow willow) (emerging)	H	5	FACW+
7.			
8.			
9.			
10.			
11.			
12.			
13.			
14.			
15.			

Percent of dominant species that are OBL, FACW and/or FAC = 50%

HYDROLOGY

- ☐ Stream, Lake or Well Data
- ☐ Precipitation Data
- ☒ Aerial Photographs
- ☐ Other (Explain in remarks)
- ☐ No recorded data used

Field Observations

Depth of Surface Water: None
Depth to Water in Pit: None
Depth to Saturated Soil: None

Primary Wetland Hydrology Indicators

- ☐ Inundated
- ☐ Saturated in upper 12"
- ☐ Water Marks
- ☐ Drift Lines
- ☐ Sediment Deposits
- ☒ Drainage Patterns in Wetlands

Secondary Wetland Hydrology Indicators
(If no primary indicator, 2 or more required)

- ☐ Oxidized Root Channels in upper 12"
- ☐ Water Stained Leaves
- ☐ Local Soil Survey Data
- ☐ FAC Neutral Vegetation Test
- ☐ Multiple Trunks
- ☐ Buttressing
- ☐ Other (Explain in remarks)

SOILS

Map Unit Name: 262B- Amnicon-Cuttre complex
Natural Drainage Class: SPD- partially hydric
Soil Suborder: Bergland
Whole unit hydric soil? Y ☐ N ☒
Field Observations Confirmed Mapped Type? Y ☒ N ☐

Soil Profile Description

Depth (In)	Horizon Name	Matrix Color (Munsell Moist)	Mottle Color (Munsell Moist)	Mottle %	Soil Texture and Comments
0-2	1				Topsoil
2-6	2	10YR 4/1	10YR 5/6	25	Gleyed clay
6-12	3	10YR 2/1	10YR 5/6	15	Blocky clay
12-18	4	5YR 4/4	5YR 5/8	10	Blocky clay

DATA FORM
ROUTINE ONSITE DETERMINATION METHOD

Hydric Soil Indicators

☐ Histosol	☐ Chroma ≤ 3 in Entisol	☐ Listed on Local Hydric Soils List
☐ Histic Epipedon	☒ Mottled with Chroma ≤ 2	☒ Listed on National Hydric Soils List
☐ Sulfidic Odor	☐ Chroma of 1 without Mottles	☐ Spodic Horizon at 12"
☐ Aquic/Peraquic Moisture Regime	☐ Iron/Manganese Concretions	☐ Aquatic Invertebrate Remains
☐ Reducing Conditions	☐ Dark Organic Vertical Streaking in Sandy Soils	☐ Inclusionary Hydric Soil
☒ Gleying	☐ High Organic Content at Surface Layer in Sandy Soils	☐ Other (Explain in remarks)

WETLAND DETERMINATION

	Yes	No		Yes	No
Hydrophytic vegetation present?	☒	☐	Is this sampling site within a wetland?	☒	☐
Wetland hydrology present?	☒	☐	Wetland Circular 39 Basin Type Classification:	Type 2- Inland Fresh Meadow	
Hydric soils present?	☒	☐	NWI or WWI Basin Type Classification	E2Kfr	

Remarks

Sample point located on what appears to be an old horse track/ring.

DATA FORM
ROUTINE ONSITE DETERMINATION METHOD

			Yes	No	Is the Area (Circle):		
Project/Site:	Nemadji River Wetland Mitigation Site						
Applicant/Owner:	Enbridge Energy, Limited Partnership	**Abnormal conditions?**	☐	☒	Filled	Floodplain	Ditched
Field Investigator:	Lindsay H., Whitney H., Troy S.	**Site disturbed (Atypical)?**	☒	☐	Seasonal	Permanent	Tiled
Investigation Date:	8-27-2008	**Problem area?**	☒	☐			
County	Douglas	**State: WI**					
Wetland or Upland Sample Point (Circle) and ID No.	TP50U				**Transect No.**	25	

VEGETATION

Dominant Plant Species	Stratum	%	Indicator
1. Phleum pratense (timothy)	H	70	FACU
2. Taraxacum officinale (common dandelion)	H	10	FACU
3. Trifolium pratense (red clover)	H	10	FACU
4. Ranunculus acris (tall buttercup)	H	10	FACW-
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
13.			
14.			
15.			

Percent of dominant species that are OBL, FACW and/or FAC = 25%

HYDROLOGY

- ☐ Stream, Lake or Well Data
- ☐ Precipitation Data
- ☒ Aerial Photographs
- ☐ Other (Explain in remarks)
- ☐ No recorded data used

Field Observations

Depth of Surface Water: None
Depth to Water in Pit: None
Depth to Saturated Soil: None

Primary Wetland Hydrology Indicators

- ☐ Inundated
- ☐ Saturated in upper 12"
- ☐ Water Marks
- ☐ Drift Lines
- ☐ Sediment Deposits
- ☐ Drainage Patterns in Wetlands

Secondary Wetland Hydrology Indicators
(If no primary indicator, 2 or more required)

- ☐ Oxidized Root Channels in upper 12"
- ☐ Water Stained Leaves
- ☐ Local Soil Survey Data
- ☐ FAC Neutral Vegetation Test
- ☐ Multiple Trunks
- ☐ Buttressing
- ☐ Other (Explain in remarks)

SOILS

Map Unit Name: 262B- Amnicon-Cuttre complex
Natural Drainage Class: SPD- partially hydric
Soil Suborder: Bergland
Whole unit hydric soil? Y ☐ N ☒
Field Observations Confirmed Mapped Type? Y ☒ N ☐

Soil Profile Description

Depth (In)	Horizon Name	Matrix Color (Munsell Moist)	Mottle Color (Munsell Moist)	Mottle %	Soil Texture and Comments
0-2	1				Topsoil
2-8	2	10YR 2/1	10YR 5/6	20	Clay
8-18	3	10YR 3/2	10YR 5/6	20	Clay

DATA FORM
ROUTINE ONSITE DETERMINATION METHOD

Hydric Soil Indicators

☐ Histosol	☐ Chroma ≤ 3 in Entisol	☐ Listed on Local Hydric Soils List
☐ Histic Epipedon	☒ Mottled with Chroma ≤ 2	☒ Listed on National Hydric Soils List
☐ Sulfidic Odor	☐ Chroma of 1 without Mottles	☐ Spodic Horizon at 12"
☐ Aquic/Peraquic Moisture Regime	☐ Iron/Manganese Concretions	☐ Aquatic Invertebrate Remains
☐ Reducing Conditions	☐ Dark Organic Vertical Streaking in Sandy Soils	☐ Inclusionary Hydric Soil
☐ Gleying	☐ High Organic Content at Surface Layer in Sandy Soils	☐ Other (Explain in remarks)

WETLAND DETERMINATION

	Yes	No		Yes	No
Hydrophytic vegetation present?	☐	☒	Is this sampling site within a wetland?	☐	☒
Wetland hydrology present?	☐	☒	Wetland Circular 39 Basin Type Classification:		
Hydric soils present?	☒	☐	NWI or WWI Basin Type Classification		

Remarks

Upland area in center of old horse track/ring.

DATA FORM
ROUTINE ONSITE DETERMINATION METHOD

			Yes	No	Is the Area (Circle):		
Project/Site:	Nemadji River Wetland Mitigation Site						
Applicant/Owner:	Enbridge Energy, Limited Partnership	**Abnormal conditions?**	☐	☒	Filled	Floodplain	Ditched
Field Investigator:	Lindsay H., Whitney H., Troy S.	**Site disturbed (Atypical)?**	☒	☐	(Seasonal)	Permanent	Tiled
Investigation Date:	8-27-2008	**Problem area?**	☒	☐			
County	Douglas	**State: WI**					

Wetland or Upland Sample Point (Circle) and ID No. TP51W **Transect No.** 26

VEGETATION

Dominant Plant Species	Stratum	%	Indicator
1. Carex stricta (uptight sedge)	H	30	OBL
2. Ambrosia atermisiifolia (ragweed)	H	30	FACU
3. Phleum pratense (timothy)	H	20	FACU
4. Phalaris arundinacea (reed canary grass)	H	10	FACW+
5. Scirpus atrovirens (green bulrush)	H	5	OBL
6.			
7.			
8.			
9.			
10.			
11.			
12.			
13.			
14.			
15.			

Percent of dominant species that are OBL, FACW and/or FAC = 60%

HYDROLOGY

- ☐ Stream, Lake or Well Data
- ☐ Precipitation Data
- ☒ Aerial Photographs
- ☐ Other (Explain in remarks)
- ☐ No recorded data used

Field Observations

Depth of Surface Water: None
Depth to Water in Pit: None
Depth to Saturated Soil: None

Primary Wetland Hydrology Indicators

- ☐ Inundated
- ☐ Saturated in upper 12"
- ☐ Water Marks
- ☐ Drift Lines
- ☐ Sediment Deposits
- ☒ Drainage Patterns in Wetlands

Secondary Wetland Hydrology Indicators
(If no primary indicator, 2 or more required)

- ☐ Oxidized Root Channels in upper 12"
- ☐ Water Stained Leaves
- ☐ Local Soil Survey Data
- ☐ FAC Neutral Vegetation Test
- ☐ Multiple Trunks
- ☐ Buttressing
- ☐ Other (Explain in remarks)

SOILS

Map Unit Name: 274D- Miskoaki clay loam
Natural Drainage Class: Well drained- not hydric
Soil Suborder:
Whole unit hydric soil? Y ☐ N ☒
Field Observations Confirmed Mapped Type? Y ☒ N ☐

Soil Profile Description

Depth (In)	Horizon Name	Matrix Color (Munsell Moist)	Mottle Color (Munsell Moist)	Mottle %	Soil Texture and Comments
0-3	1				Topsoil
3-12	2	7.5YR 3/3	5YR 5/8	30	Clay
12-16	3	7.5YR 3/2	5YR 5/8	30	Clay
16-18	4	7.5YR 3/4	7.5YR 4/6	20	Red clay

DATA FORM
ROUTINE ONSITE DETERMINATION METHOD

Hydric Soil Indicators

☐ Histosol	☐ Chroma ≤ 3 in Entisol	☐ Listed on Local Hydric Soils List
☐ Histic Epipedon	☒ Mottled with Chroma ≤ 2	☐ Listed on National Hydric Soils List
☐ Sulfidic Odor	☐ Chroma of 1 without Mottles	☐ Spodic Horizon at 12"
☐ Aquic/Peraquic Moisture Regime	☐ Iron/Manganese Concretions	☐ Aquatic Invertebrate Remains
☐ Reducing Conditions	☐ Dark Organic Vertical Streaking in Sandy Soils	☐ Inclusionary Hydric Soil
☐ Gleying	☐ High Organic Content at Surface Layer in Sandy Soils	☐ Other (Explain in remarks)

WETLAND DETERMINATION

	Yes	No		Yes	No
Hydrophytic vegetation present?	☒	☐	Is this sampling site within a wetland?	☒	☐
Wetland hydrology present?	☒	☐	Wetland Circular 39 Basin Type Classification:	Type 2- Inland Fresh Meadow	
Hydric soils present?	☒	☐	NWI or WWI Basin Type Classification	E2Kfr	

Remarks

Drainage to Nemadji River Floodplain. Hard, compacted soils due to horses. Soils meet TF2 hydric soil indicator.

DATA FORM
ROUTINE ONSITE DETERMINATION METHOD

			Yes	No	Is the Area (Circle):		
Project/Site:	Nemadji River Wetland Mitigation Site						
Applicant/Owner:	Enbridge Energy, Limited Partnership	**Abnormal conditions?**	☐	☒	Filled	Floodplain	Ditched
Field Investigator:	Lindsay H., Whitney H., Troy S.	**Site disturbed (Atypical)?**	☒	☐	Seasonal	Permanent	Tiled
Investigation Date:	8-27-2008	**Problem area?**	☒	☐			
County	Douglas	**State: WI**					
Wetland or Upland Sample Point (Circle) and ID No.	TP52U				**Transect No.**	26	

VEGETATION

Dominant Plant Species	Stratum	%	Indicator
1. Phleum pratense (timothy)	H	35	FACU
2. Trifolium pratense (red clover)	H	25	FACU
3. Taraxacum officinale (common dandelion)	H	20	FACU
4. Poa pratensis (Kentucky blue grass)	H	20	FAC-
5.			
6.			
7.			
8.			
9.			
10.			
11.			
12.			
13.			
14.			
15.			

Percent of dominant species that are OBL, FACW and/or FAC = 0%

HYDROLOGY

- ☐ Stream, Lake or Well Data
- ☐ Precipitation Data
- ☒ Aerial Photographs
- ☐ Other (Explain in remarks)
- ☐ No recorded data used

Field Observations

Depth of Surface Water: None
Depth to Water in Pit: None
Depth to Saturated Soil: None

Primary Wetland Hydrology Indicators

- ☐ Inundated
- ☐ Saturated in upper 12"
- ☐ Water Marks
- ☐ Drift Lines
- ☐ Sediment Deposits
- ☐ Drainage Patterns in Wetlands

Secondary Wetland Hydrology Indicators
(If no primary indicator, 2 or more required)

- ☐ Oxidized Root Channels in upper 12"
- ☐ Water Stained Leaves
- ☐ Local Soil Survey Data
- ☐ FAC Neutral Vegetation Test
- ☐ Multiple Trunks
- ☐ Buttressing
- ☐ Other (Explain in remarks)

SOILS

Map Unit Name: 274D- Miskoaki clay loam
Natural Drainage Class: Well drained- not hydric
Soil Suborder:
Whole unit hydric soil? Y ☐ N ☒
Field Observations Confirmed Mapped Type? Y ☒ N ☐

Soil Profile Description

Depth (In)	Horizon Name	Matrix Color (Munsell Moist)	Mottle Color (Munsell Moist)	Mottle %	Soil Texture and Comments
0-2	1				Topsoil
2-18	2	5YR 4/3			Red clay

DATA FORM
ROUTINE ONSITE DETERMINATION METHOD

Hydric Soil Indicators

- ☐ Histosol
- ☐ Histic Epipedon
- ☐ Sulfidic Odor
- ☐ Aquic/Peraquic Moisture Regime
- ☐ Reducing Conditions
- ☐ Gleying
- ☐ Chroma ≤ 3 in Entisol
- ☐ Mottled with Chroma ≤ 2
- ☐ Chroma of 1 without Mottles
- ☐ Iron/Manganese Concretions
- ☐ Dark Organic Vertical Streaking in Sandy Soils
- ☐ High Organic Content at Surface Layer in Sandy Soils
- ☐ Listed on Local Hydric Soils List
- ☐ Listed on National Hydric Soils List
- ☐ Spodic Horizon at 12"
- ☐ Aquatic Invertebrate Remains
- ☐ Inclusionary Hydric Soil
- ☐ Other (Explain in remarks)

WETLAND DETERMINATION

	Yes	No
Hydrophytic vegetation present?	☐	☒
Wetland hydrology present?	☐	☒
Hydric soils present?	☐	☒

	Yes	No
Is this sampling site within a wetland?	☐	☒
Wetland Circular 39 Basin Type Classification:		
NWI or WWI Basin Type Classification		

Remarks

On slope to drainage ditch. Too steep for water to saturate. Very hard, dry compacted red clay.

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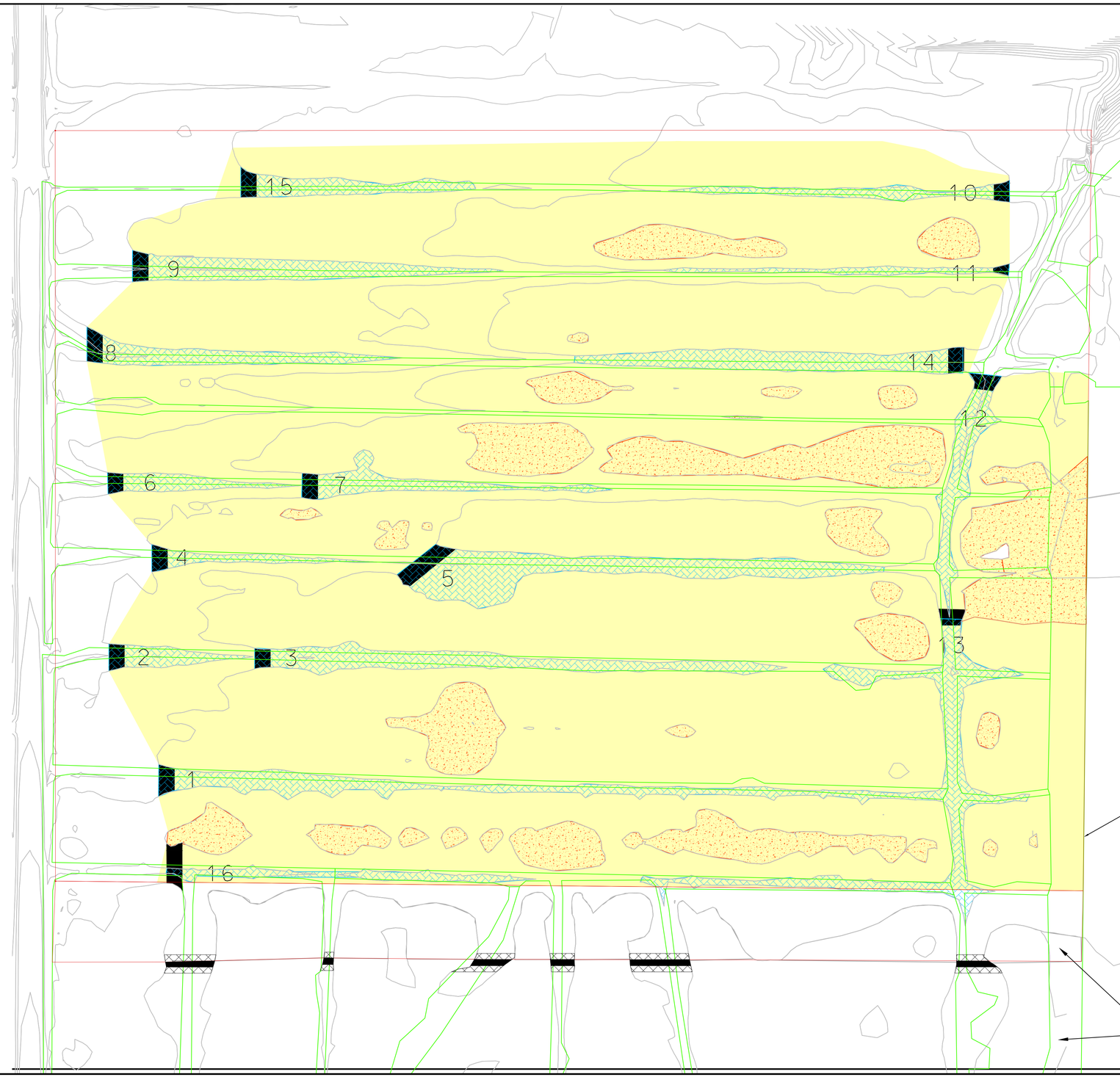
Appendix B

Project Plan Sheets



	CRAWFORD CREEK
TOTAL AREA	29.4 AC
TOTAL EXISTING WETLAND	3.5 AC
TOTAL PROPOSED WETLAND	23.0 AC
WATER DEPTH 0 TO 1 FT	3.0 AC
WATER DEPTH -1 TO 0 FT	20.0 AC
UPLAND	6.4 AC

WATER DEPTH 0 TO 1 FEET (3.0 ACRES)

WATER DEPTH -1 TO 0 FEET (20.0 ACRES)

WATER DEPTH -2 TO -1 FEET (2.9 ACRES)

EXISTING WETLAND BOUNDARY
WETLAND ENHANCEMENT = 3.5 ACRES
WETLAND RESTORATION = 20.8 ACRES
(0 TO -1 DEPTH)

PROPOSED DITCH PLUG

EXISTING DITCH PLUG

N

0 75 150

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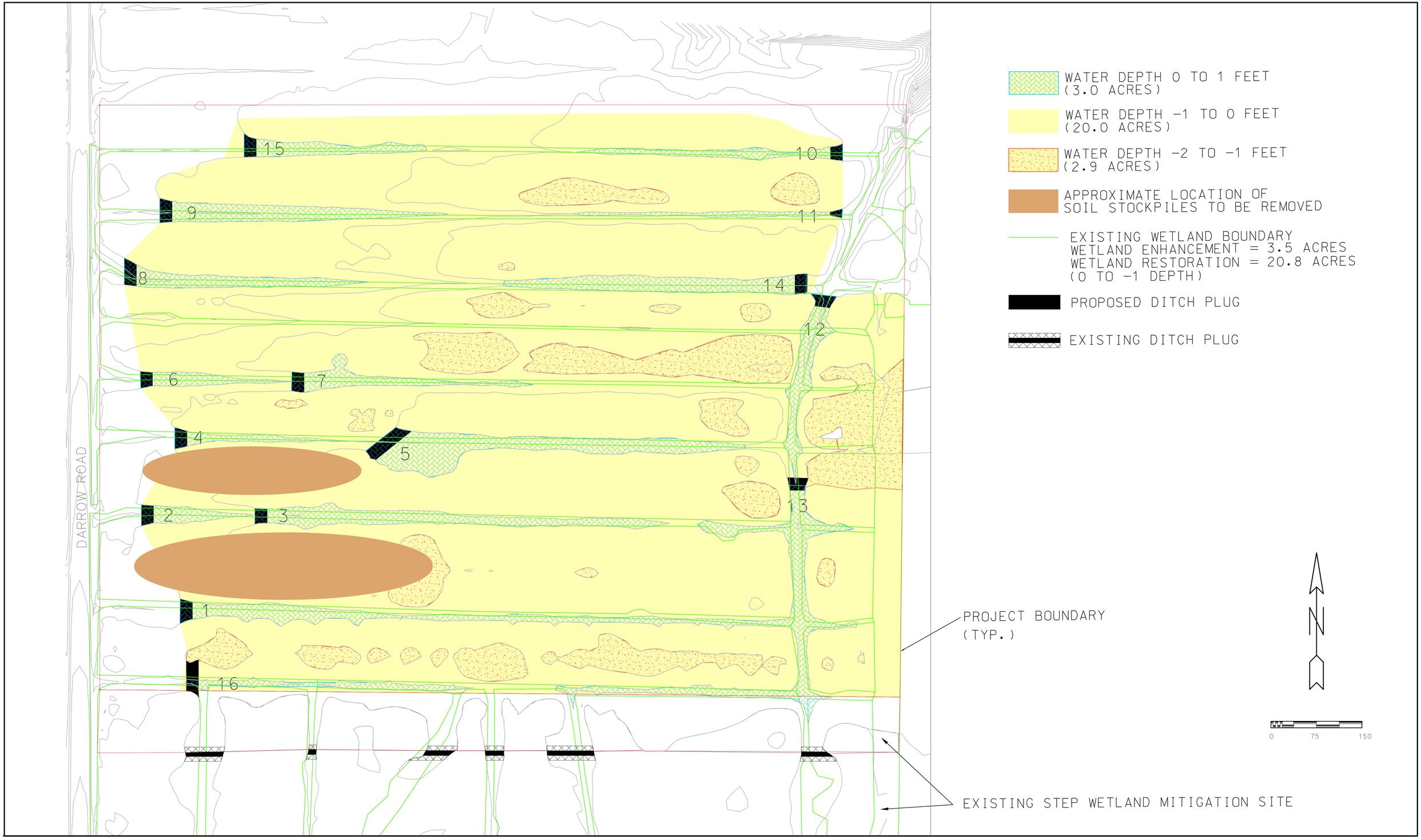
SEH

NOT FOR CONSTRUCTION

EXHIBIT A: PROPOSED HYDROLOGY
ENBRIDGE ENERGY CRAWFORD CREEK WETLAND MITIGATION SITE PLAN
DOUGLAS COUNTY, WISCONSIN



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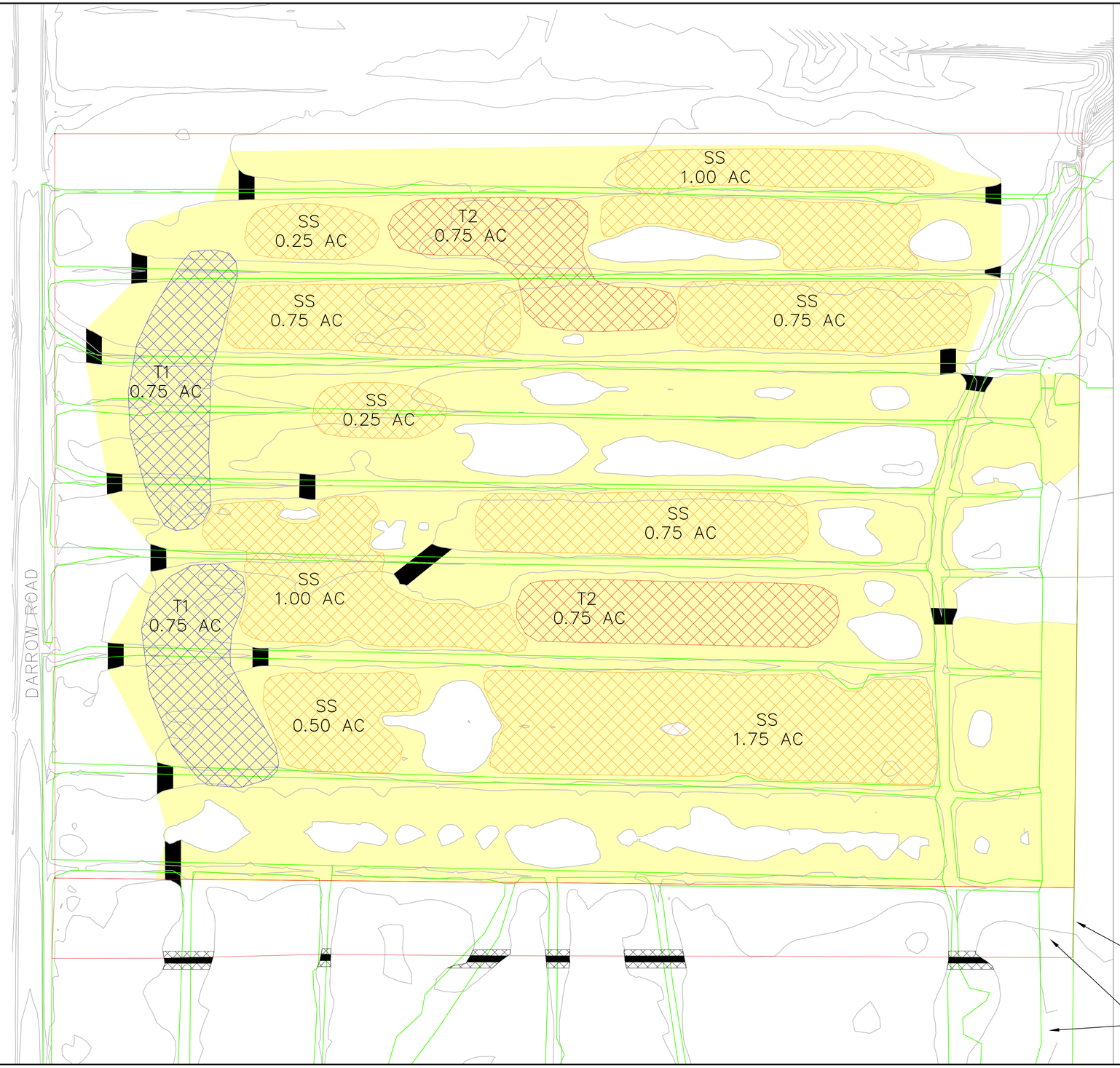
SEH

NOT FOR CONSTRUCTION

EXHIBIT B: PRELIMINARY GRADING PLAN
ENBRIDGE ENERGY CRAWFORD CREEK WETLAND MITIGATION SITE PLAN
DOUGLAS COUNTY, WISCONSIN



PLANTING CLUSTERS			
ZONE	TYPE	AREA	ESTIMATED # OF TREES/SCHRUBS
SS		7.00 AC	2940
	MEADOW WILLOW (140/AC)		980
	RED OSIER DOGWOOD (140/AC)		980
	PUSSY WILLLOW (140/AC)		980
T1		1.50 AC	2100
	BLACK SPRUCE (400/AC)		600
	BALSAM FIR (600/AC)		900
	RED MAPLE (400/AC)		600
T2		1.50 AC	2100
	YELLOW BIRCH (400/AC)		600
	RED MAPLE (400 AC)		600
	TAMARACK (600/AC)		900

FRESH WET MEADOW 13.00 ACRES

T1 FORESTED WETLAND 1.50 ACRES

T2 FORESTED WETLAND 1.50 ACRES

SS SHRUB-CARR WETLAND 7.00 ACRES

TOTAL WETLANDS 23.00 ACRES

EXISTING WETLAND BOUNDARY

PROPOSED DITCH PLUG

EXISTING DITCH PLUG

NOTE: NATIVE WET MEADOW SEED MIX TO BE BROADCAST IN ALL WETLAND (23.00 ACRES TOTAL)

DISTURBED AREAS ON DITCH PLUGS ARE TO BE SEEDED WITH NATIVE WET MEADOW MIX AND COVERED WITH STRAW MULCH (11,000 SF TOTAL)

N

0 75 150

SEH

NOT FOR CONSTRUCTION

EXHIBIT C: PROPOSED PLANTING PLAN
ENBRIDGE ENERGY CRAWFORD CREEK WETLAND MITIGATION SITE PLAN
DOUGLAS COUNTY, WISCONSIN

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Appendix C

C-1: Superior RAM Functional Assessment

C-2: Superior RAM Performance Standards

GENERAL INFORMATION

WETLAND ID NO.	Storm Basin (subwatershed)	Reed Map Type(s) & Size (acres)	Location 1/4	1/4	Sec	Town	Range	Climate norm/wet/dry	Wetland Size approx. acres
Wetlands in Fields	Nemadji River	N/A			23	48N	14W	Normal	N/A

Evaluator(s)	Date(s) of Visit	Wetland Type(s)	Photo File No.s	Other Assoc. Maps/Files/Sheets
L. Hogfeldt	8/1/2008	PEM		Aerial Photograph
	2/1/2009	Type 2		WWI Map
				Douglas County Zoning
				USGS Topographic Map

SUMMARY

FUNCTIONS (and Related Values)		Functional Index Score	Functional Index Rating (High, Medium, Low)	Comments
1. Special Features Identified?				Yes, T & E Plants
2. Plant Community Integrity				
Plant Comm. 1	100%	5.0	Medium	
Plant Comm. 2	0%			
Plant Comm. 3	0%			
Plant Comm. 4	0%			
Average Weighted Score/Rating		5.0	Medium	
3. Hydrologic Integrity		1.8	Low	Haying, ditches, no impervious
4. Wildlife Habitat Integrity/Quality		3.0	Low	Ditches
5. Flood & Stormwater Attenutation		1.7	Low	Low development
6. Water Quality Protection		1.0	Low	Low development
7. Aesthetics/Rec./Edu./Cultural		1.0	Low	Privately owned

II. OVERALL PLANT COMMUNITY INTEGRITY

	ID Community Types using Key A	% of Wetland Area	Community Quality (Key B)
Community Type	**Wet Meadow**	100%	Medium
Dominants	*Ranunculus acris (Tall buttercup), Trifolium pratense (Red clover), Fragaria virginiana (Woodland strawberry),*		
	Salix petiolaris (Meadow willow), Carex gracillima (Graceful sedge)		
Non-Dominants	*Scirpus atrovirens (Green bulrush), Mentha arvensis (Wild mint), Carex lacustris (Lake sedge),*		
	Solidago canadensis (Canada goldenrod), Carex stricta (Uptight sedge)		
Invasive/Exotic	*Phalaris arundinacea (Reed canary grass)*		
Community Type			
Dominants			
Non-Dominants			
Invasive/Exotic			
Community Type			
Dominants			
Non-Dominants			
Invasive/Exotic			
Community Type			
Dominants			
Non-Dominants			

Invasive/Exotic	

WETLAND ID:

QUES. NO.	FUNCTIONAL INDEX SCORE (L=1.0; M=5.0; H=9.0)	FUNCTIONAL INDEX RATING (L=1.0-3.0; M=3.1-6.9; H=7.0-9.0)	COMMENTS
I. SPECIAL FEATURES			
1			No
A			
1)			No, not within the City of Superior
2)			No
B			No
C			
1)			Yes
2)			No
D			
1)			Yes
2)			No
E			
1)			No
2)			No
II. OVERALL PLANT COMMUNITY INTEGRITY			
Comm. 1	5.0	Medium	
Comm. 2			
Comm. 3			
Comm. 4			
Avg. Score	5.0	Medium	Invasives 20-50%
III. HYDROLOGIC INTEGRITY EVALUATION			
4	1.0	Low	
5	3.5	Medium	Haying, low impervious
6	1.0	Low	All man-made ditches
Avg. Score	1.8	Low	Index Score =(4+5+6)/3
IV. WILDLIFE HABITAT INTEGRITY / QUALITY			
7	5.0	Medium	
8	1.8	Low	
9	1.0	Low	
10	3.1	Medium	Haying, man-made ditches
11	2.0	Low	
12	7.0	High	
13	1.0	Low	Narrow ditches
14	3.1	Medium	Upland between ditches
Avg. Score	3.0	Low	Index Score=(7+8+(9+10+11+12+13+14)/6
V. FLOOD & STORMWATER ATTENUATION EVALUATION			
15	3.1	Medium	Ditching
16	3.1	Medium	
17	1.0	Low	Haying, no development
18	1.0	Low	
19	1.0	Low	
20	1.0	Low	
Avg. Score	1.7	Low	Index score= (15+16+17+18+19+20)/6
VI. PROTECTION OF WATER QUALITY			
21	1.0	Low	Haying, no development
22	1.0	Low	
23	1.0	Low	

24	1.0	Low	Man-made ditches
25	1.0	Low	
26	1.0	Low	
Avg. Score	1.0	Low	Index score= (21+22+23+24+25+26)/6
V. AESTHETICS/ RECREATION/ EDUCATION/ CULTURAL/ SCIENCE			
27	1.0	Low	Privately owned
28	1.0	Low	No access allowed
29	1.0	Low	
Avg. Score	1.0	p	

NOTES:

Y / N	Does the wetland have the portatial for hydrologic or vegetative restoration without negatively affecting surrounding properties? If yes to Special Features No. 1.B., describe conditions.

Identify any noteworthy wildlife species observed or in envidence in the wetland or on adjacent lands:
(refer to species listed in Special Features No. 1. E. 2)

Additional Notes/Sketch

Limiting Conditions:

Note: Refer to routine assessment (10 Pages, dated 06/03/02) for complete text and rating criteria.

Appendix C-2. Superior RAM Performance Standards for Crawford Creek Mitigation Site

Wetland ID	Habitat Type(s), WWI Classification	Wetland Acreage	Special Features	Overall Plant Community integrity		Hydrologic Integrity		Wildlife Habitat Integrity		Flood and Stormwater Attenuation		Protection of Water Quality		Aesthetics/ Recreation/ Education/ Cultural/ Science		Comments
S4-30-23 (Reference)*	S3, T3	16.0	Y	M	4.2	M	6.0	M	5.3	M	4.7	M	5.8	L	1.1	Potential for hydrologic restoration, ditches along road
Mitigation Site (Existing Condition)**	E2K, upl	12.4	Y	M	5.0	L	1.8	L	3.0	L	1.7	L	1.0	L	1.0	T&E plants present, potential for hydrologic restoration
Mitigation Site (Target Values)	E2K, S3K, TK	31.9	Y	H	≥7.0	M	≥5.0	M	≥6.0	M	≥3.1	M	≥5.0	L	≥1.0	Anticipate T&E plants

* Reference wetland in Nemadji River watershed, evaluated for City of Superior Special Area Management Plan (SAMP)

** Functional assessment worksheets available in Appendix C-1 of the 2014 CSP

Appendix D

Seed Mix and Seeding Rates

STATE SEED MIXES

Standard seed mixtures used by Mn/DOT, BWSR, and some divisions of the DNR have been revised and consolidated into one list of State Seed Mixes. Standards for the mixes have also been combined, with both BWSR and Mn/DOT requiring that mixes be sold as pure live seed (PLS), Source Identified (Yellow Tag) when available, and specific labeling requirements. Standards for local origin seed will vary depending on program requirements. Native VegetationEstablishment and Enhancment guidelines have been developed for BWSR funded programs and can be found at: http://www.bwsr.state.mn.us/native_vegetation/index.html

Note: Cover crops are included as a component of State Seed Mixes with the xception of some wetland mixes where cover species are not necessary. For State Seed Mixes, oats and winter wheat should be selected based on the time of year that the mix is being used. Oats should be included in mixes if a mix is used between October 15 th and August 1st. Winter wheat should be used for seeding between August 1st and October 15 th. The seeding rate is the same for oats and winter wheat.

List of State Seed Mixes

21-111 **Oats Cover Crop**

Common Name	Scientific Name	Rate (kg/ha)	Rate (lb/ac)	% of Mix (% by wt)	Seeds/ sq ft
Oats	*Avena sativa*	112.08	100.00	100.00%	44.54
	Totals:	**112.08**	**100.00**	**100.00%**	**44.54**
Purpose:	Temporary cover crop for spring and summer plantings				
Planting Area:	Statewide				

21-112 **Winter Wheat Cover Crop**

Common Name	Scientific Name	Rate (kg/ha)	Rate (lb/ac)	% of Mix (% by wt)	Seeds/ sq ft
Winter Wheat	*Triticum aestivum*	112.09	100.00	100.00%	26.08
	Totals:	**112.09**	**100.00**	**100.00%**	**26.08**
Purpose:	Temporary cover crop for fall plantings				
Planting Area:	Statewide				

21-113 **Soil Building Cover Crop**

Common Name	Scientific Name	Rate (kg/ha)	Rate (lb/ac)	% of Mix (% by wt)	Seeds/ sq ft
Field Pea	*Pisum sativum*	56.04	50.00	45.46%	3.44
	Total Forbs	**56.04**	**50.00**	**45.46%**	**3.44**
Oats	*Avena sativa*	67.25	60.00	54.54%	26.72
	Total Cover Crop	**67.25**	**60.00**	**54.54%**	**26.72**
	Totals:	**123.29**	**110.00**	**100.00%**	**30.16**
Purpose:	Temporary cover crop with soil building function.				
Planting Area:	Statewide				

34-371 **Wet Meadow Northeast**

Common Name	Scientific Name	Rate (kg/ha)	Rate (lb/ac)	% of Mix (% by wt)	Seeds/ sq ft
fringed brome	*Bromus ciliatus*	2.24	2.00	16.04%	8.10
bluejoint	*Calamagrostis canadensis*	0.11	0.10	0.78%	10.00
Virginia wild rye	*Elymus virginicus*	1.68	1.50	11.99%	2.31
tall manna grass	*Glyceria grandis*	0.28	0.25	1.96%	6.30
fowl bluegrass	*Poa palustris*	0.73	0.65	5.19%	31.00
	Total Grasses	**5.04**	**4.50**	**35.96%**	**57.71**
tussock sedge	*Carex stricta*	0.04	0.04	0.35%	0.85
pointed broom sedge	*Carex scoparia*	0.06	0.05	0.39%	1.50
dark green bulrush	*Scirpus atrovirens*	0.22	0.20	1.56%	33.00
woolgrass	*Scirpus cyperinus*	0.07	0.06	0.51%	40.00
	Total Sedges and Rushes	**0.39**	**0.35**	**2.81%**	**75.35**
Canada anemone	*Anemone canadensis*	0.11	0.10	0.82%	0.30
marsh milkweed	*Asclepias incarnata*	0.27	0.24	1.95%	0.43
flat-topped aster	*Doellingeria umbellata*	0.11	0.10	0.81%	2.50
common boneset	*Eupatorium perfoliatum*	0.10	0.09	0.68%	5.00
grass-leaved goldenrod	*Euthamia graminifolia*	0.04	0.04	0.31%	5.00
spotted Joe pye weed	*Eutrochium maculatum*	0.16	0.14	1.15%	5.00
blue monkey flower	*Mimulus ringens*	0.03	0.03	0.24%	25.00
giant goldenrod	*Solidago gigantea*	0.03	0.03	0.20%	2.30
eastern panicled aster	*Symphyotrichum lanceolatum*	0.03	0.03	0.28%	2.00
	Total Forbs	**0.90**	**0.80**	**6.44%**	**47.53**
Oats or winter wheat (see note at beginning of list for recommended dates)		7.68	6.85	54.79%	3.05
	Total Cover Crop	**7.68**	**6.85**	**54.79%**	**3.05**
	Totals:	**14.01**	**12.50**	**100.00%**	**183.64**
Purpose:	Wet meadow / Sedge meadow reconstruction for wetland mitigation or ecological restoration.				
Planting Area:	Laurentian Mixed Forest Province. Mn/DOT Districts 1, 2(east) and 3A.				

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Appendix G

Landowner List

Sandpiper Pipeline and Line 3 Replacement Projects
Property Owners Crossed by the Project and Alternatives

Milepost	Tract Number	Owner Name	Address	City	State	Zip Code
600.83	WI-DO-002.000	Jerome P. Timmer	68 E COUNTY ROAD C	SUPERIOR	WI	54880
600.93	WI-DO-002.200	JEROME P & ANNA F TIMMER	68 E COUNTY ROAD C	SUPERIOR	WI	54880
601.07	WI-DO-003.000	JOSEPH E & MARY M GOHLIKE	12585 OTCHIPWE AVE N	STILLWATER	MN	55082
601.45	WI-DO-004.000	State of Wisconsin Department of Natural Resources	PO BOX 7921	MADISON	WI	53707
601.69	WI-DO-005.000	Mitchell A. Bauer	2915 18-3/4 ST	RICE LAKE	WI	54868
601.82	WI-DO-005.210	Mark J. Radzak	5395 W PIXLEY DR	MINONG	WI	54859
601.84	WI-DO-006.000	Bradley D. Burling	2589 S 5 1/2 ST	CUMBERLAND	WI	54829
601.84	WI-DO-007.000	Bradley D. Burling	2589 S 5 1/2 ST	CUMBERLAND	WI	54829
602.09	WI-DO-008.000	Tri-State Holdings, LLC	119 N 25TH ST E	SUPERIOR	WI	54880
602.48	WI-DO-009.000	Cowett Wisconsin, a New York partnership	1040 FIFTH AVE	NEW YORK	NY	10028
602.61	WI-DO-009.200	Cowett Wisconsin, a New York partnership	1040 FIFTH AVE	NEW YORK	NY	10028
602.62	WI-DO-010.000	Cowett Wisconsin, a New York partnership	1040 FIFTH AVENUE	NEW YORK	NY	10028
602.71	WI-DO-011.000	Cowett Wisconsin, a New York partnership	1040 FIFTH AVENUE	NEW YORK	NY	10028
602.81	WI-DO-012.000	George Smilanich	3019 3RD AVE W	HIBBING	MN	55746
602.91	WI-DO-013.000	Cowett Wisconsin, a New York partnership	1040 FIFTH AVENUE	NEW YORK	NY	10028
602.96	WI-DO-014.000	Tri-State Holdings, LLC	119 N 25TH ST E	SUPERIOR	WI	54880
603.04	WI-DO-016.000	Enbridge Energy, LP	1100 3400 LOUISIANA ST	HOUSTON	TX	77002
603.04	WI-DO-015.000	Tri-State Holdings, LLC	119 N 25TH ST E	SUPERIOR	WI	54880
603.10	WI-DO-017.000	Cowett Wisconsin, a New York partnership	1040 FIFTH AVENUE	NEW YORK	NY	10028
603.26	WI-DO-018.000	Lynn Taipale	1406 109TH AVE W	DULUTH	MN	55808
603.32	WI-DO-019.000	Lynn Taipale	1406 109TH AVE W	DULUTH	MN	55808
603.41	WI-DO-020.000	Cowett Wisconsin, a New York partnership	1040 FIFTH AVENUE	NEW YORK	NY	10028
603.80	WI-DO-021.000	Cowett Wisconsin, a New York partnership	1040 FIFTH AVENUE	NEW YORK	NY	10028
603.94	WI-DO-022.000	Cowett Wisconsin, a New York partnership	1040 FIFTH AVENUE	NEW YORK	NY	10028
604.19	WI-DO-023.000	Cowett Wisconsin, a New York partnership	1040 FIFTH AVENUE	NEW YORK	NY	10028

604.20	WI-DO-025.000	Cowett Wisconsin, a New York partnership	1040 FIFTH AVENUE	NEW YORK	NY	10028
604.21	WI-DO-024.000	Cowett Wisconsin, a New York partnership	1040 FIFTH AVENUE	NEW YORK	NY	10028
604.60	WI-DO-026.000	Gary J. Carr	2095 E BROOKLYN ST	SUPERIOR	WI	54880
604.79	WI-DO-028.000	Rubies34,LLC	W7659 STATE RD 35	RIVER FALLS	WI	54022
604.88	WI-DO-029.000	Terry L. Schumacher	2970 80TH AVE	WILSON	WI	54027
605.19	WI-DO-030.000	Rubies34,LLC	W7659 STATE RD 35	HAGER CITY	WI	54014
605.34	WI-DO-030.210	Thomas Dolney	9643 COLUMBUS AVE S	BLOOMINGTON	MN	55420
605.35	WI-DO-031.000	Christian F. Litchke	4870 IRONDALE RD	SUPERIOR	WI	54880
605.36	WI-DO-032.000	Julie Litchke	4870 IRONDALE RD	SUPERIOR	WI	54880
605.72	WI-DO-033.000	Julie Litchke	4870 IRONDALE RD	SUPERIOR	WI	54880
605.78	WI-DO-034.000	Julie Litchke	4870 IRONDALE RD	SUPERIOR	WI	54880
606.08	WI-DO-034.210	Daniel G. Pendergast	3835 S CTY RD W	SUPERIOR	WI	54880
606.10	WI-DO-034.500	Michael Merlin Severson	3898 S IRONDALE RD	SUPERIOR	WI	54880
606.19	WI-DO-034.505	Charles J. Kotera Jr.	2255 E KIMMES RD	SUPERIOR	WI	54880
606.34	WI-DO-034.510	J. Kimmes Construction, Inc.	2626 CENTRAL AVE	SUPERIOR	WI	54880
606.36	WI-DO-034.515	J. Kimmes Construction, Inc.	2626 CENTRAL AVE	SUPERIOR	WI	54880
606.48	WI-DO-034.520	J. Kimmes Construction, Inc.	2626 CENTRAL AVE	SUPERIOR	WI	54880
606.59	WI-DO-034.525	J. Kimmes Construction, Inc.	2626 CENTRAL AVE	SUPERIOR	WI	54880
606.65	WI-DO-034.530	J. Kimmes Construction, Inc.	2626 CENTRAL AVE	SUPERIOR	WI	54880
606.70	WI-DO-034.535	J. Kimmes Construction, Inc.	2626 CENTRAL AVE	SUPERIOR	WI	54880
606.78	WI-DO-034.540	J. Kimmes Construction, Inc.	2626 CENTRAL AVE	SUPERIOR	WI	54880
606.86	WI-DO-041.000	Douglas County Forest Department	1313 BELKNAP ST	SUPERIOR	WI	54880
607.15	WI-DO-041.500	Douglas County	1313 BELKNAP ST	SUPERIOR	WI	54880
607.26	WI-DO-041.500.310	Douglas County	1313 BELKNAP ST	SUPERIOR	WI	54880
607.30	WI-DO-041.500.320	Douglas County	1313 BELKNAP ST	SUPERIOR	WI	54880
607.32	WI-DO-041.001	City of Superior	1316 N 14TH ST	SUPERIOR	WI	54880
607.35	WI-DO-041.502	Douglas County	1313 BELKNAP ST	SUPERIOR	WI	54880
607.39	WI-DO-041.504	Douglas County	1313 BELKNAP ST	SUPERIOR	WI	54880
607.47	WI-DO-041.506	Douglas County	1313 BELKNAP ST	SUPERIOR	WI	54880
607.72	WI-DO-041.200	Douglas County	1313 BELKNAP ST	SUPERIOR	WI	54880
607.87	WI-DO-041.508	Douglas County	1313 BELKNAP ST	SUPERIOR	WI	54880

608.22	WI-DO-041.508.910FC	Northern Power Company	TBD	TBD	TBD	TBD
608.36	WI-DO-041.510	Douglas County	1313 BELKNAP ST	SUPERIOR	WI	54880
608.78	WI-DO-041.512	Douglas County	1313 BELKNAP ST	SUPERIOR	WI	54880
609.28	WI-DO-041.516	Midwest Communications Inc.	3081 S POKEGAMA RD	SUPERIOR	WI	54880
609.36	WI-DO-041.518	Shimon Shaked	TBD	TBD	TBD	TBD
609.45	WI-DO-041.518.200	Shimon Shaked	TBD	TBD	TBD	TBD
609.46	WI-DO-041.520	David A. Goldberg	TBD	TBD	TBD	TBD
609.46	WI-DO-041.520.200	David A. Goldberg	TBD	TBD	TBD	TBD
609.61	WI-DO-041.522	Thomas A. Harris	TBD	TBD	TBD	TBD
609.61	WI-DO-041.522.200	Patricia K. Harris	TBD	TBD	TBD	TBD
609.71	Wi-DO-041.522.001	City of Superior	1316 N 14TH ST	SUPERIOR	WI	54880
609.77	WI-DO-041.524	Mary A. Thomson	TBD	TBD	TBD	TBD
609.95	WI-DO-041.526	Douglas County	1313 BELKNAP ST	SUPERIOR	WI	54880
610.08	WI-DO-041.528	Douglas County	1313 BELKNAP ST	SUPERIOR	WI	54880
610.12	WI-DO-041.530	Douglas County	1313 BELKNAP ST	SUPERIOR	WI	54880
610.21	WI-DO-041.532	Douglas County	1313 BELKNAP ST	SUPERIOR	WI	54880
610.22	WI-DO-041.532.200	Douglas County	1313 BELKNAP ST	SUPERIOR	WI	54880
610.29	WI-DO-041.534	Douglas County	1313 BELKNAP ST	SUPERIOR	WI	54880
610.30	WI-DO-041.534.200	Douglas County	1313 BELKNAP ST	SUPERIOR	WI	54880
610.35	WI-DO-041.536	Douglas County	1313 BELKNAP ST	SUPERIOR	WI	54880
610.59	WI-DO-041.536.900FC	Northern Power Company	TBD	TBD	TBD	TBD
610.65	WI-DO-041.538	Duluth Landfill Superior, LLC	2626 CENTRAL AVE	SUPERIOR	WI	54880
610.70	WI-DO-041.538.001	City of Superior	1316 N 14TH ST	SUPERIOR	WI	54880
610.72	WI-DO-041.540	Duluth Landfill Superior, LLC	2626 CENTRAL AVE	SUPERIOR	WI	54880
610.77	WI-DO-041.540.001	City of Superior	1316 N 14TH ST	SUPERIOR	WI	54880
610.83	WI-DO-041.542	Duluth Landfill Superior, LLC	2626 CENTRAL AVE	SUPERIOR	WI	54880
610.92	WI-DO-041.544	Demolition Landfill Saari Properties, LLC	2626 CENTRAL AVE	SUPERIOR	WI	54880
610.93	WI-DO-041.542.310	Village of Superior	PO BOX 3065	SUPERIOR	WI	54880
611.06	WI-DO-055.200	Demolition Landfill Saari Properties, LLC	2626 CENTRAL AVE	SUPERIOR	WI	54880
611.19	WI-DO-057.000	Mary Podgorak	W8805 LITTLE SAND RD	MINONG	WI	54859
611.21	WI-DO-056.000	Village of Superior	PO BOX 3065	SUPERIOR	WI	54880
611.48	WI-DO-058.300	Village of Superior	PO BOX 3065	SUPERIOR	WI	54880
611.48	WI-DO-057.001	City of Superior	1316 N 14TH ST	SUPERIOR	WI	54880
611.50	WI-DO-058.000	William A. Cich	3816 E 70TH ST	SUPERIOR	WI	54880
611.55	WI-DO-059.000	Village of Superior	PO BOX 3065	SUPERIOR	WI	54880
611.57	WI-DO-059.001	City of Superior	1316 N 14TH ST	SUPERIOR	WI	54880
611.59	WI-DO-060.000	William A. Cich	3816 E 70TH ST	SUPERIOR	WI	54880
611.62	WI-DO-059.310	GREAT NORTHERN RAILROAD	TBD	TBD	TBD	TBD
611.62	WI-DO-060.220	Village of Superior	PO BOX 3065	SUPERIOR	WI	54880

611.64	WI-DO-061.001	City of Superior	1316 N 14TH ST	SUPERIOR	WI	54880
611.64	WI-DO-061.000	Richard Dedominces	1814 N 69TH ST	SUPERIOR	WI	54880
611.66	WI-DO-062.000	Village of Superior	PO BOX 3065	SUPERIOR	WI	54880
611.67	WI-DO-061.200	Richard Dedominces	1814 N 69TH ST	SUPERIOR	WI	54880
611.67	WI-DO-063.200	Jimmy O. Hegg	1804 N 69TH ST	SUPERIOR	WI	54880
611.67	WI-DO-063.000	Jimmy O. Hegg	1804 N 69TH ST	SUPERIOR	WI	54880
611.69	WI-DO-063.001	City of Superior	1316 N 14TH ST	SUPERIOR	WI	54880
611.70	WI-DO-064.300	Douglas County	1313 BELKNAP ST	SUPERIOR	WI	54880
611.71	WI-DO-064.001	City of Superior	1316 N 14TH ST	SUPERIOR	WI	54880
611.71	WI-DO-064.000	Christopher A. Shatto	6902 TOWER AVE	SUPERIOR	WI	54880
611.73	WI-DO-065.000	Christopher A. Shatto	6902 TOWER AVE	SUPERIOR	WI	54880
611.78	WI-DO-066.000	Village of Superior	PO BOX 3065	SUPERIOR	WI	54880
611.78	WI-DO-066.001	City of Superior	1316 N 14TH ST	SUPERIOR	WI	54880
611.81	WI-DO-067.000RR	Soo Line Railroad Company	501 1525 MARQUETTE AVE S	MINNEAPOLIS	MN	55402
611.81	WI-DO-068.000	Village of Superior	PO BOX 3065	SUPERIOR	WI	54880
611.82	WI-DO-068.001	City of Superior	1316 N 14TH ST	SUPERIOR	WI	54880
611.84	WI-DO-066.200	Boguslaw W. Wnuk	6824 OGDEN AVE	SUPERIOR	WI	54880
611.90	WI-DO-069.000	Village of Superior	PO BOX 3065	SUPERIOR	WI	54880
611.96	WI-DO-070.000	Village of Superior	PO BOX 3065	SUPERIOR	WI	54880
612.01	WI-DO-071.000	Village of Superior	PO BOX 3065	SUPERIOR	WI	54880
612.06	WI-DO-071.001	City of Superior	1316 N 14TH ST	SUPERIOR	WI	54880
612.07	WI-DO-072.000	Udeen Trucking, Inc.	6521 TOWER AVE	SUPERIOR	WI	54880
612.10	WI-DO-073.000	Joseph W. Podgorak	1407 N 67TH ST	SUPERIOR	WI	54880
612.10	WI-DO-073.001	City of Superior	1316 N 14TH ST	SUPERIOR	WI	54880
612.11	WI-DO-074.000	Fredolph A. and Janice Tunell, Life Estate	6700 HAMMOND AVE	SUPERIOR	WI	54880
612.11	WI-DO-075.200	Village of Superior	PO BOX 3065	SUPERIOR	WI	54880
612.12	WI-DO-075.000	Joseph W. Podgorak	1407 N 67TH ST	SUPERIOR	WI	54880
612.16	WI-DO-074.001	City of Superior	1316 N 14TH ST	SUPERIOR	WI	54880
612.31	WI-DO-075.001	City of Superior	1316 N 14TH ST	SUPERIOR	WI	54880
612.35	WI-DO-076.200	Douglas County	1313 BELKNAP ST	SUPERIOR	WI	54880
612.39	WI-DO-076.200.001	City of Superior	1316 N 14TH ST	SUPERIOR	WI	54880
612.40	WI-DO-079.230	Douglas County	1313 BELKNAP ST	SUPERIOR	WI	54880
612.41	WI-DO-076.001RD	JEREMY D ENGELKING	7618 OGDEN AVE	SUPERIOR	WI	54880
612.42	WI-DO-079.504	Alan L. Rode	1626 NEVADA AVE S	ST. LOUIS PARK	MN	55426
612.42	WI-DO-079.320.001	City of Superior	1316 N 14TH ST	SUPERIOR	WI	54880
612.43	WI-DO-079.210	Douglas County	1313 BELKNAP ST	SUPERIOR	WI	54880
612.46	WI-DO-079.210.001	City of Superior	1316 N 14TH ST	SUPERIOR	WI	54880
612.47	WI-DO-079.200	Douglas County	1313 BELKNAP ST	SUPERIOR	WI	54880
612.50	WI-DO-079.200.001	City of Superior	1316 N 14TH ST	SUPERIOR	WI	54880
612.51	WI-DO-079.000	Douglas County	1313 BELKNAP ST	SUPERIOR	WI	54880
612.53	WI-DO-080.000	Douglas County	1313 BELKNAP ST	SUPERIOR	WI	54880
612.55	WI-DO-078.000	Enbridge Energy, LP	1100 3300 LOUISIANA	SUPERIOR	WI	54880

612.56	WI-DO-081.000	Russell P. Johnson	4841 S IRONDALE RD	SUPERIOR	WI	54880
612.58	WI-DO-082.000	Douglas County	1313 BELKNAP ST	SUPERIOR	WI	54880
612.59	WI-DO-083.000	Enbridge Energy, LP	1100 3300 LOUISIANA	SUPERIOR	WI	54880
612.63	WI-DO-085.000	Douglas County	1313 BELKNAP ST	SUPERIOR	WI	54880
612.64	WI-DO-084.000	Enbridge Energy, LP	1100 3300 LOUISIANA	SUPERIOR	WI	54880
612.67	WI-DO-085.210	Douglas County	1313 BELKNAP ST	SUPERIOR	WI	54880
612.68	WI-DO-086.000	Douglas County	1313 BELKNAP ST	SUPERIOR	WI	54880
612.69	WI-DO-087.000	Enbridge Energy, LP	1100 3300 LOUISIANA	SUPERIOR	WI	54880
612.73	WI-DO-089.200	Douglas County	1313 BELKNAP ST	SUPERIOR	WI	54880
612.73	WI-DO-088.000	Enbridge Energy, LP	1100 3300 LOUISIANA	SUPERIOR	WI	54880
612.75	WI-DO-089.000	Tri-State Holdings, LLC	119 N 25TH ST E	SUPERIOR	WI	54880
612.76	WI-DO-090.200	Scott Campbell	802 CENTRAL AVE	SUPERIOR	WI	54880
612.76	WI-DO-090.000	Scott Campbell	802 CENTRAL AVE	SUPERIOR	WI	54880
612.76	WI-DO-090.230	Kenneth King	816 CENTRAL AVE	SUPERIOR	WI	54880
612.77	WI-DO-090.220	The Trust Agreement of Jerald and Jean Stewart	3730 E 8TH ST	SUPERIOR	WI	54880
612.77	WI-DO-090.210	Scott Campbell	802 CENTRAL AVE	SUPERIOR	WI	54880
612.78	WI-DO-090.300	Douglas County	1313 BELKNAP ST	SUPERIOR	WI	54880
612.79	WI-DO-090.001	City of Superior	1316 N 14TH ST	SUPERIOR	WI	54880
612.79	WI-DO-091.000	Enbridge Energy, LP	1100 3300 LOUISIANA	SUPERIOR	WI	54880
612.81	WI-DO-092.000	City of Superior	1316 N 14TH ST	SUPERIOR	WI	54880
612.84	WI-DO-093.000	Peter J. Fredman	717 CENTRAL AVE	SUPERIOR	WI	54880
612.86	WI-DO-094.001	City of Superior	1316 N 14TH ST	SUPERIOR	WI	54880
612.89	WI-DO-094.200	Douglas County	1313 BELKNAP ST	SUPERIOR	WI	54880
612.95	WI-DO-097.210	City of Superior	1316 N 14TH ST	SUPERIOR	WI	54880
613.03	WI-DO-100.260	City of Superior	1316 N 14TH ST	SUPERIOR	WI	54880
613.09	WI-DO-100.500	Douglas County	1313 BELKNAP ST	SUPERIOR	WI	54880
613.10	WI-DO-100.510	J. Kimmes Construction, Inc.	2626 CENTRAL AVE	SUPERIOR	WI	54880
613.18	WI-DO-106.200	J. Kimmes Construction, Inc.	2626 CENTRAL AVE	SUPERIOR	WI	54880
613.40	WI-DO-106.000	J. Kimmes Construction, Inc.	2626 CENTRAL AVE	SUPERIOR	WI	54880
613.45	WI-DO-107.000	Tri-State Holdings, LLC	119 N 25TH ST E	SUPERIOR	WI	54880
613.46	WI-DO-108.220	Calumet Superior, LLC	2780 STE 200 WATERFRONT PKY E	INDIANAPOLIS	IN	46214
613.51	WI-DO-108.210	Claire Cunningham	501 1525 MARQUETTE AVE S	MINNEAPOLIS	MN	55402
613.72	WI-DO-109.210.010	City of Superior	1316 N 14TH ST	SUPERIOR	WI	54880
613.72	WI-DO-109.210	Jim Carter	1100 3300 LOUISIANA	SUPERIOR	WI	54880
613.75	WI-DO-109.206	Jim Carter	1100 3300 LOUISIANA	SUPERIOR	WI	54880

613.76	WI-DO-109.210.001	City of Superior	1316 N 14TH ST	SUPERIOR	WI	54880
613.76	WI-DO-109.224	Douglas County	1313 BELKNAP ST	SUPERIOR	WI	54880
613.76	WI-DO-109.208	Douglas County	1313 BELKNAP ST	SUPERIOR	WI	54880
613.76	WI-DO-109.204	Jim Carter	1316 N 14TH ST	SUPERIOR	WI	54880
613.78	WI-DO-109.202.001	City of Superior	1316 N 14TH ST	SUPERIOR	WI	54880
613.78	WI-DO-109.202	Jim Carter	1316 N 14TH ST	SUPERIOR	WI	54880
613.79	WI-DO-109.232	Calumet Superior, LLC	2780 STE 200 WATERFRONT PKY E	INDIANAPOLIS	IN	46214
613.84	WI-DO-109.200	City of Superior	1316 N 14TH ST	SUPERIOR	WI	54880
613.93	WI-DO-110.000	City of Superior	1316 N 14TH ST	SUPERIOR	WI	54880
614.00	WI-DO-111.000	Calumet Superior, LLC	2780 STE 200 WATERFRONT PKY E	INDIANAPOLIS	IN	46214
614.04	WI-DO-110.001	City of Superior	1316 N 14TH ST	SUPERIOR	WI	54880
614.09	WI-DO-112.000	City of Superior	1316 N 14TH ST	SUPERIOR	WI	54880
614.30	WI-DO-113.000	Lakehead Pipeline Co., LTD	1100 3400 LOUISIANA	SUPERIOR	WI	54880
614.47	WI-DO-115.000	Lakehead Pipeline Co., LTD	1100 3400 LOUISIANA	HOUSTON	TX	77002
614.51	WI-DO-116.000	Lakehead Pipeline Co., LTD	1100 3400 LOUISIANA	HOUSTON	TX	77002
614.55	WI-DO-117.000	Lakehead Pipeline Co., LTD	1100 3400 LOUISIANA	HOUSTON	TX	77002
614.61	WI-DO-118.000	Lakehead Pipeline Co., LTD	1100 3400 LOUISIANA	HOUSTON	TX	77002
614.67	WI-DO-119.000	Lakehead Pipeline Co., LTD	1100 3400 LOUISIANA	HOUSTON	TX	77002
614.74	WI-DO-120.000	Lakehead Pipeline Co., LTD	1100 3400 LOUISIANA	HOUSTON	TX	77002
614.80	WI-DO-121.000	Lakehead Pipeline Co., LTD	1100 3400 LOUISIANA	HOUSTON	TX	77002
614.86	WI-DO-122.000	Lakehead Pipeline Co., LTD	1100 3400 LOUISIANA	HOUSTON	TX	77002
614.94	WI-DO-123.000	Lakehead Pipeline Co., LTD	1100 3400 LOUISIANA	HOUSTON	TX	77002
614.99	WI-DO-124.000	Lakehead Pipeline Co., LTD	1100 3400 LOUISIANA	HOUSTON	TX	77002