

***Hine's Emerald Dragonfly
Habitat Conservation Plan***

***Enbridge Line 5 Pipeline Inspection and Repair
Mileposts 1430.2797, 1430.2857, 1430.2918***

***Prepared for
Enbridge Pipelines (Lakehead), L.L.C.***

***Prepared by
Barr Engineering Company***

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February 2013

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Executive Summary

Pipeline maintenance work is planned by Enbridge Pipelines (Lakehead) L.L.C. (Enbridge) in the SE ¼ of Section 16, T43N, R10W, Garfield Township, Mackinac County, Michigan. The purpose of this planned work is to inspect, and if necessary, repair three sections of pipeline. The maintenance of the pipeline at the identified locations is being completed as required by Department of Transportation (DOT) regulations 49 CFR Part 195.452 on Integrity Management. The proposed project may incidentally take the Hine's Emerald Dragonfly (*Somatochlora hineana*), a federally endangered and state endangered species.

The area around the pipeline will be excavated, visually and physically inspected, and repaired as needed. Repair routinely consists of welding a metal sleeve around and re-coating the existing pipeline. Work at the site will take place in consecutive excavations; the total area excavated is estimated to be 140 feet long by 30 feet wide (4,200 feet²), and up to 10 feet deep. The associated workspace and access route through wetlands is approximately 38,200 feet² for a total of 42,400 feet² (0.97 acres) for anticipated impacts to the dragonfly's habitat. Trench boxes will be used to minimize the construction footprint. The excavation and related workspace will take place in a Tributary to O'Niel Creek and associated wetlands. Erosion and sediment control measures, such as silt fencing and straw bales will be installed as needed prior to soil disturbance in accordance with Enbridge's Environmental Mitigation Plan (EMP). Timber mats will also be used as necessary to prevent compaction and soil disturbance in wetlands. A dam and pump structure will be used to maintain flow, if present, in the waterway. It is anticipated that the planned maintenance work will take fourteen to twenty-one days to complete. The project is proposed to occur during winter months in early 2013.

Surveys have not been conducted for Hine's Emerald Dragonfly at the project site. An Incidental Take Permit is being sought because potential habitat is present and will be impacted by the proposed project. Temporary impacts will result from winter excavation, dewatering, and backfilling, which may destroy overwintering dragonfly larvae. No impacts to adults, or adult foraging and breeding habitat, are anticipated.

Based on population estimates of known populations within Michigan, the number of larvae within the 4,200 ft² (390 m²) excavation footprint could be within the range of 156 – 328 larvae. Assuming the worst-case impact using highest larval densities reported for Michigan, direct impact could be mortality of 328 larvae from winter-time excavation.

The impact area of the excavation represents approximately 3.5 percent of the potential habitat at this site. If number of larvae in the habitat is proportional to the habitat area, the density estimate of 0.84 larvae/m² yields an overall population estimate of over 9,300 larvae. The maximum estimated impact of 328 larvae represents 3.5 percent of this total. The site is within a large complex of native plant communities, including wetlands and stabilized dune uplands, and is likely not the only potential breeding/oviposition habitat within the complex. Most of this land is managed as a state forest or private sportsman club. Although not all of this area is potential habitat for Hine's emerald dragonfly, the larger complex acreage is in range of 6,000+ acres. The area of direct impact of 4,200 ft² is an extremely small portion of the larger site. The recovery plan lists 10 sites within Mackinac County where Hine's emerald dragonfly has been documented, with two additional sites where possible transient flights have been observed. The proposed project temporarily affects an extremely small portion of potential habitat at a time adults are absent and takes a small portion of the potential local larval population. If a take occurs, it is not expected to threaten the long-term viability of the species at the site, in Mackinac County, state-wide, nationally, or globally.

Biological goals for this Habitat Conservation Plan are to (1) minimize impacts to potential habitat and (2) restore potential habitat after excavation to maintain pre-existing habitat attributes.

After pipeline maintenance, the site will be revegetated with native wetland species to partially offset alteration of dragonfly habitat. Monitoring will be conducted during the proposed project to document impacts. Additional monitoring will occur during the 2013 growing season to observe site restoration.

Two alternatives to the proposed project are discussed, no-action, and summer construction. The no-action alternative would not allow full use of the existing pipeline and may risk eventual pipeline failure. The summer alternative would have greater potential impacts to Hine's Emerald Dragonfly, because adult foraging and breeding could be disrupted.

1.0 Introduction and Background

1.1 Overview/Background

Pipeline maintenance work is planned by Enbridge Pipelines (Lakehead) L.L.C. (Enbridge) in the SE ¼ of Section 16, T43N, R10W, Garfield Township, Mackinac County, Michigan (Figure 1). The purpose of this planned work is to inspect, and if necessary, repair three sections of pipeline. The maintenance of the pipeline at the identified locations is being completed as required by Department of Transportation (DOT) regulations 49 CFR Part 195.452 on Integrity Management. The proposed project may incidentally take the Hine's Emerald Dragonfly (*Somatochlora hineana*), a federally endangered and state endangered species.

The area around the pipeline will be excavated, visually and physically inspected, and repaired as needed. Repair routinely consists of welding a metal sleeve around and re-coating the existing pipeline. Work at the site will take place in consecutive excavations; the total area excavated is estimated to be 140 feet long, 30 feet wide, and up to 10 feet deep (4,200 ft²). The associated workspace and access route through wetlands is approximately 38,200 ft² for a total of 42,400 square feet (0.97 acres) for anticipated impacts to the dragonfly's habitat (Figures 2-4). Trench boxes will be used to minimize the construction footprint (Figures 5-6). The excavation and related workspace will take place in a Tributary to O'Neil Creek and associated wetlands (Photographs in Appendix A). Erosion and sediment control measures, such as silt fencing and straw bales will be installed as needed prior to soil disturbance in accordance with Enbridge's Environmental Mitigation Plan (EMP) which is attached to this Habitat Conservation Plan (HCP) in Appendix B (Enbridge 2011). Timber mats will also be used as necessary to prevent compaction in wetlands. A dam and pump structure will be used to maintain flow, if present, in the waterway (Figures 5-6).

It is anticipated that the planned maintenance work will take fourteen to twenty-one days to complete. The work is proposed to occur in winter months in early 2013.

1.2 Permit Holder/Permit Duration

Enbridge Pipelines (Lakehead), L.L.C. is requesting the permit for the duration of one year. Work is expected to take fourteen to twenty-one days. The permit duration of one year will provide sufficient time for proper restoration activities to take place.

1.3 Permit Boundary/Covered Lands

The proposed project is located approximately one mile east of the City of Engadine, Michigan. It is located in Garfield Township, Mackinac County, Michigan in the southeast quarter of Section 16, Township 43 North, Range 10 West (Figures 1-3). The site is located along the Enbridge Right-of-Way (ROW) and will be accessed from Hiawatha Trail Road south through private property to the ROW, traversing east along the ROW to the project location. The proposed permit boundary, and area covered by this HCP, encompasses the existing pipeline ROW from the western wetland boundary and extends just east of the proposed work area (Figure 3). The area included is 2.64 acres. The extent of direct impact by the project is 0.97 acres within the HCP boundary (Section 2.1, Table 1).

1.4 Species to be Covered by Permit

This HCP covers a single species, Hine's Emerald Dragonfly (*Somatochlora hineana*) which is Federally Endangered and State Endangered.

1.5 Regulatory Framework

A summary of applicable regulations and required permits for the proposed project is provided below.

1.5.1 Federal Endangered Species Act

Section 9 of the Endangered Species Act (Act) and Federal regulation pursuant to section 4(d) of the Act prohibit the take of endangered and threatened species, respectively, without special exemption. Take is defined as to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or to attempt to engage in any such conduct. Harm is further defined by the U.S. Fish and Wildlife Service (Service) to include significant habitat modification or degradation that results in death or injury to listed species by significantly impairing essential behavioral patterns, including breeding, feeding, or sheltering. Harass is defined by the Service as intentional or negligent actions that create the likelihood of injury to listed species by annoying them to such an extent as to significantly disrupt normal behavioral patterns which include, but are not limited to, breeding, feeding, or sheltering. Incidental take is defined as take that is incidental to, and not the purpose of, the carrying out of an otherwise lawful activity.

Pursuant to section 11(a) and (b) of the Act, any person who knowingly violates this section 9 of the Act or any permit, certificate, or regulation related to section 9, may be subject to civil penalties of

up to \$25,000 for each violation or criminal penalties up to \$50,000 and/or imprisonment of up to one year.

Individuals and State and local agencies proposing an action that is expected to result in the take of federally listed species are encouraged to apply for an incidental take permit under section 10(a)(1)(B) of the Act to be in compliance with the law. Such permits are issued by the Service when take is not the intention of and is incidental to otherwise legal activities. An application for an incidental take permit must be accompanied by a habitat conservation plan, commonly referred to as an HCP. The regulatory standard under section 10(a)(1)(B) of the Act is that the effects of authorized incidental take must be minimized and mitigated to the maximum extent practicable. Under section 10(a)(1)(B) of the Act, a proposed project also must not appreciably reduce the likelihood of the survival and recovery of the species in the wild, and adequate funding for a plan to minimize and mitigate impacts must be ensured.

Section 7 of the Act requires Federal agencies to ensure that their actions, including issuing permits, do not jeopardize the continued existence of listed species or destroy or adversely modify listed species' critical habitat. "Jeopardize the continued existence of..." pursuant to 50 CFR 402.2, means to engage in an action that reasonably would be expected, directly or indirectly, to reduce appreciably the likelihood of both the survival and recovery of a listed species in the wild by reducing the reproduction, numbers, or distribution of that species. Issuance of an incidental take permit under section 10(a)(1)(B) of the Act by the Service is a Federal action subject to section 7 of the Act. As a Federal agency issuing a discretionary permit, the Service is required to consult with itself (i.e., conduct an internal consultation). Delivery of the HCP and a section 10(a)(1)(B) permit application initiates the section 7 consultation process within the Service.

The requirements of section 7 and section 10 substantially overlap. Elements unique to section 7 include analyses of impacts on designated critical habitat, analyses of impacts on listed plant species, if any, and analyses of indirect and cumulative impacts on listed species. Cumulative effects are effects of future State, tribal, local or private actions that are reasonably certain to occur in the action area, pursuant to section 7(a)(2) of the Act. The action area is defined by the influence of direct and indirect impacts of covered activities. The action area may or may not be solely contained within the HCP boundary. These additional analyses are included in this HCP to meet the requirements of section 7 and to assist the Service with its internal consultation.

1.5.2 The Section 10(a)(1)(B) Process – Habitat Conservation Plan Requirements and Guidelines

The Section 10(a)(1)(B) process for obtaining an incidental take permit has three primary phases: (1) the HCP development phase; (2) the formal permit processing phase; and (3) the post-issuance phase.

During the HCP development phase, the project applicant prepares a plan that integrates the proposed project or activity with the protection of listed species. An HCP submitted in support of an incidental take permit application must include the following information:

- Impacts likely to result from the proposed taking of the species for which permit coverage is requested;
- Measures that will be implemented to monitor, minimize, and mitigate impacts; funding that will be made available to undertake such measures; and procedures to deal with unforeseen circumstances;
- Alternative actions considered that would not result in take; and
- Additional measures Service may require as necessary or appropriate for purposes of the plan.

The HCP development phase concludes and the permit processing phase begins when a complete application package is submitted to the appropriate permit-issuing office. A complete application package consists of 1) an HCP, 2) an Implementing Agreement (IA) if applicable, 3) a permit application, and 4) a \$100 fee from the applicant. The Service must also publish a Notice of Availability of the HCP package in the Federal Register to allow for public comment. The Service also prepares an Intra-Service Section 7 Biological Opinion; and prepare a Set of Findings, which evaluates the Section 10(a)(1)(B) permit application as in the context of permit issuance criteria (see below). An Environmental Action Statement, Environmental Assessment, or Environmental Impact Statement serves as the Service's record of compliance with the National Environmental Policy Act (NEPA), which has gone out for a 30-day, 60-day, or 90-day public comment period. An implementing agreement is required for HCPs unless the HCP qualifies as a low-effect HCP. A Section 10(a)(1)(B) incidental take permit is granted upon a determination by the Service that all requirements for permit issuance have been met. Statutory criteria for issuance of the permit specify that:

- The taking will be incidental;

- The impacts of incidental take will be minimized and mitigated to the maximum extent practicable;
- Adequate funding for the HCP and procedures to handle unforeseen circumstances will be provided;
- The taking will not appreciably reduce the likelihood of survival and recovery of the species in the wild;
- The applicant will provide additional measures that the Service requires as being necessary or appropriate; and
- The Service has received assurances, as may be required, that the HCP will be implemented.

During the post-issuance phase, the Permittee and other responsible entities implement the HCP, and the Service monitors the Permittee's compliance with the HCP as well as the long-term progress and success of the HCP. The public is notified of permit issuance by means of the Federal Register.

1.5.3 National Environmental Policy Act

The purpose of the National Environmental Policy Act (NEPA) is two-fold: to ensure that Federal agencies examine environmental impacts of their actions (in this case deciding whether to issue an incidental take permit) and to utilize public participation. NEPA serves as an analytical tool on direct, indirect, and cumulative impacts of the proposed project alternatives to help the Service decide whether to issue an incidental take permit (ITP or section 10(a)(1)(B) permit). Cumulative impacts are defined as:

“The impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonable foreseeable future actions regardless of what agency (Federal or non-federal) or person undertakes such other actions.” 40 CFR1508.7.

Formal NEPA analysis must be done by the USFWS for each HCP as part of the incidental take permit application process. An HCP qualifies for a categorical exclusion under NEPA if it satisfies “low-effect” criteria and does not fit any category of exceptions from categorical exclusions. Low-effect criteria are defined in the U.S. Fish and Wildlife Service Habitat Conservation Planning Handbook (USFWS NMFS 1996) and are based on having minor or negligible direct or cumulative impacts on federally protected species or other environmental values or resources.

1.5.4 National Historic Preservation Act

All Federal agencies are required to examine the cultural impacts of their actions (e.g. issuance of a permit). This may require consultation with the State Historic Preservation Office (SHPO) and

appropriate American Indian tribes. All incidental take permit applicants are requested to submit a Request for Cultural Resources Compliance form to the Service. To complete compliance, the applicants may be required to contract for cultural resource surveys and possibly mitigation. The online search tool on the State Historic Preservation Office (SHPO) website shows that the Manitou Lodge and the Northernmost Point of Lake Michigan are two historic sites are found within Garfield Township in Mackinac County. Neither of these locations will be impacted by the proposed project. An Application for Section 106 Review has been sent to the Michigan SHPO.

1.4.5 Other Relevant Laws and Regulations

1.4.5.1 Clean Water Act Section 404 Permit

The US Army Corps of Engineers has delegated authority to administer Section 404 permits to the Michigan Department of Environmental Quality (MDEQ). The appropriate MDEQ permits for work within wetlands are described below.

1.4.5.2 Michigan DNR Threatened/Endangered Species Permit

Impacts to state listed threatened or endangered species are regulated under Part 365, Endangered Species Protection of the Natural Resource and Environmental Protection Act 451 of 1994. Taking of a state listed species must be authorized by a permit from the Michigan Department of Natural Resources. However, in instances where impacts are considered only potential, because the presence of a protected species has not been confirmed, the DNR does not review permit applications and will not issue take permits. For the proposed project, the presence of Hine's Emerald Dragonfly has not been confirmed, but potential habitat is documented from the project site. Consequently, a take permit is not being requested from the DNR.

1.4.5.3 Michigan DEQ Water Resources Division Permit

Work will take place in a tributary to the O'Niel Creek. Work in the waterway requires a permit from the MDEQ. The application was submitted on November 8, 2012.

1.4.5.4 Michigan DEQ General Permit Category for the Repair of Oil and Gas Pipelines

Access to the site, and the site itself, is found within a wetland complex, therefore, work is done under the MDEQ General Permit Category for the Repair of Oil and Gas Pipelines. Work will be done in accordance with the Best Management Practices listed in the permit.

1.4.5.5 LMAS (Luce, Mackinac, Alger, Schoolcraft) Soil Erosion and Sedimentation Control Permit

A Soil Erosion and Sediment Control permit (permit number SESC12-058) was issued on July 27, 2012 by LMAS for the work. The permit expires July 27, 2014.

2.0 Project Description/Activities Covered by Permit

2.1 Project Description

Pipeline maintenance work is planned by Enbridge Pipelines (Lakehead) L.L.C. (Enbridge) in Garfield Township, Mackinac County, Michigan. The purpose of this planned work is to inspect, and if necessary, repair three sections of Enbridge's Line 5 (30-inch diameter) pipeline located in and adjacent to a tributary to O'Neil Creek and associated wetlands. The maintenance of the pipeline at the identified locations is being completed as required by the Department of Transportation (DOT) regulations 49 CFR Part 195.452 on Integrity Management. The proposed work is expected to take approximately fourteen to twenty-one days to complete during winter months in early 2013 and will be initiated after the required permits are obtained.

Access to the site will be via timber mats placed on a frost road. The access route from the west that will extend approximately 1,700 ft into wetland area and the timber mats are approximately 20 ft-wide. The frost road consists of packed snow and ice to prevent rutting and soil compaction from construction and maintenance activities. It will be constructed by snowmobiles, snowmachines, and/or bombardiers packing the snow by running over it continuously prior to laying timber mats. Using a frost road will also avoid impacts to dragonfly larvae because they will be in refugia below the frost line. The frost road provides a firm foundation for timber mats to prevent soil compaction or crushing larvae. Only essential equipment and vehicles will enter the work site.

The project scope requires excavation in order to inspect the pipeline and make any necessary repairs. To accomplish this it will be necessary to construct a dam or pump bypass structure to maintain the flow of the tributary around the work area if water exists. A site plan is attached showing the location of work with relation to the Tributary to O'Neil Creek. The proposed excavation is estimated to be 30 ft wide, 140 ft long, and up to 10 ft deep. Trench boxes will be used to ensure safety for crews and provide trench stability. A dam and bypass structure is proposed to allow work in the streambed.

During the project it will be necessary to excavate and temporarily stockpile soil. The stock pile will be placed on timber mats on the north of the excavations. Soil will be segregated into three separate stockpiles: (1) 12 inches of topsoil; (2) organic subsoil; and (3) mineral subsoil found below upper organic layers. The excavated soil will be stockpiled next to the excavation on the existing right of way where feasible to provide for quick restoration. During stockpiling, topsoil will be covered by

plastic or tarps. Upon completion of the maintenance work, soil will be returned in reverse order that it was removed to restore topsoil to the surface.

The timber mat access route is expected to cover 34,000 ft². An additional mat area around the excavations for work area, stockpiles and staging is expected to cover 4,200 ft². The excavation is expected to also cover 4,200 ft². Soil disturbance will be limited to the excavation area. Table 1 summarizes the extent of project activities.

Table 1 Temporary Impacts to Potential Hine’s Emerald Dragonfly Habitat.

Activity	Construction Mats	Soil Disturbance
Access	34,000 ft ² (0.78 acre)	0.0
Excavation	0.0	4,200 ft ² (0.1 acre)
Temporary Stockpiles, Workspace, Staging	4,200 ft ² (0.1 acre)	0.0
Temporary Impact Area Subtotals	38,200 ft² (0.88 acre)	4,200 ft² (0.1 acre)
Temporary Impact Area Total	42,400 ft² (0.97 acre)	

Equipment used will include a backhoe or similar excavator for the excavation. Front end loader and trucks will transport soil if necessary. Enbridge will follow Federal Energy Regulatory Commission (FERC) best management practices (BMPs) to control sediment onsite. BMPs such as silt fence and timber mats will be installed as needed prior to soil disturbance in accordance with Enbridge’s Environmental Mitigation Plan (Appendix B; Enbridge 2011). The soil erosion control structures will be maintained by Enbridge pipeline maintenance personnel and removed after backfilling and final restoration of disturbed sites and spoil storage areas. Figures showing typical installation of erosion control structures are attached.

Dewatering will be necessary; however, no direct discharge will occur into Tributary to O’Niel Creek. Dewatering of clean water will be directed to a straw bale dewatering structure (see attached typical figure) located east of the excavated area along the ROW. The straw bale dewatering structure will be used in conjunction with a geotextile filter bag to provide additional filtration.

Upon completion of the work, the site will be restored and mulched. The stream bank will be reinforced with a biolog consisting of coconut fibers that have been compressed and stuffed into a netting. Biolog anchorage shall be in accordance with the manufacturer’s recommendations. The excavation will be mulched with weed-free mulch or an erosion control mat. The excavation area will be revegetated after soil thaw (May 1-June 1) with a wet meadow seed mixture comprised of regionally appropriate native species. Seeding will be done by hand or with a hand-held seeder.

2.2 Activities Covered by Permit

The proposed project requires excavation in order to inspect the pipeline and make any necessary repairs. The excavation will take place in a tributary to O’Niel Creek and associated wetlands. The permit will cover all activities associated with accessing the work site during winter including excavation, pipeline inspection and repair, dewatering, temporary work area and spoil pile stock, backfilling excavation, and site restoration. The proposed work is expect to take approximately fourteen to twenty-one days to complete and will be initiated during winter 2013 after the required permits are obtained. To the extent possible, site restoration will occur during the winter immediately after pipeline repair is completed. Reseeding the site will be conducted in spring 2013 after soil thaws. Maintenance of erosion control structures will continue through the 2013 growing season as needed.

3.0 Environmental Setting and Biological Resources

3.1 Environmental Settings

The project site is located within Major Land Resource Area (MLRA) 94B – Michigan Eastern Upper Peninsula Sandy Drift) which is within the Land Resource Region (LRR) K – Northern Lake States Forest and Forage Region (USDA, NRCS 2006). It is also within the Regional Landscape Ecosystem Subsection VIII.1.1. St. Ignace (Albert 1995). The project location is between 630 and 640 ft elevation.

3.1.1 Climate

For Regional Landscape Ecosystem Subsection VIII.1.1. St. Ignace (Albert 1995):

“Growing season ranges from 130 to 140 days, longest along the Lake Michigan and Lake Huron shorelines. Extreme minimum temperatures are coldest inland, where they can be as low as -46½F, and warmest along the Lake Michigan shoreline, where they are as high as -30½F. Average annual precipitation is 30 to 32 inches across the entire sub-subsection. Annual snowfall averages 60 to 80 inches, uniform across the sub-subsection.”

3.1.2 Topography and Geology

For Regional Landscape Ecosystem Subsection VIII.1.1. St. Ignace (Albert 1995):

“The entire sub-subsection is underlain by Silurian- and Ordovician-age sedimentary bedrocks, principally limestone and dolomite, but also including less resistant shale and gypsum...The underlying bedrock is typically less than 50 feet below the surface of the glacial drift.”

“Various landforms of glacial lacustrine origin characterize the sub-subsection, including flat lake bed, deltaic deposits of sand, parabolic dune fields, and shallow embayments containing transverse dunes. Large areas consist of lacustrine sand deposits that have flat to gently undulating surfaces. On this topography, only a few inches of elevation change can greatly alter drainage conditions. Drainage conditions also depend on depth to underlying bedrock or fine-textured substrate.”

Soils at the project site are histosols, mapped as Markey and Carbondale mucks, which formed in saturated conditions with 0-2 percent slopes. The project area borders the western portion of a stabilized dune and swale complex with soils mapped as Spot-Finch complex (USDA 2009).

3.1.3 Hydrology/Streams, Rivers, Drainages

The pipeline runs through a cedar swamp with evidence of groundwater seepage, forming small rivulets and stream channels, which give rise to O’Niel Creek. This stream runs across and along the ROW before flowing southeast towards Lake Michigan.

3.1.4 Existing Land Use

Access to the project area will be along the pipeline ROW from a lumber mill to the west. Near the mill, the ROW land cover is with old field upland vegetation. Approximately 1,700 ft west of the excavation site, land cover on the ROW becomes wet meadow and shallow marsh vegetation, which continues eastward to the work area. Land cover on either side of the ROW throughout this wetland area is conifer swamp dominated by white cedar.

3.2 Covered Wildlife and Fish Species

3.2.1 Species Name

This HCP covers a single species, Hine’s Emerald Dragonfly (*Somatochlora hineana*).

3.2.2 Status and Distribution

Hine’s Emerald Dragonfly is a State and Federal endangered species. It is known from northern Michigan, Door County Wisconsin, northeast Illinois, Missouri, and southern Ontario. Historic collections are known from Indiana and Ohio, but no extant populations exist in those states. A single individual has been collected in Alabama. Within the Upper Peninsula, Hine’s Emerald Dragonfly is known from Mackinac and Menominee Counties.

3.2.3 Habitat Characteristics and Use

Hine’s Emerald Dragonfly is found in wetlands with calcareous groundwater seepages with slow flowing water through sedge meadows, marshes, calcareous fens, northern fens, and with adjacent forest edges (USFWS 2001). Primary constituent elements of Hine’s critical habitat are (USFWS 2010):

“1) For egg deposition and larval growth and development:

(a) Organic soils (histosols, or with organic surface horizon) overlying calcareous substrate (predominantly dolomite and limestone bedrock);

(b) Calcareous water from intermittent seeps and springs and associated shallow, small, slow flowing streamlet channels, rivulets, and/or sheet flow within fens;

(c) Emergent herbaceous and woody vegetation for emergence facilitation and refugia;

(d) Occupied burrows maintained by crayfish for refugia; and

(e) Prey base of aquatic macroinvertebrates, including mayflies, aquatic isopods, caddisflies, midge larvae, and aquatic worms.

(2) For adult foraging; reproduction; dispersal; and refugia necessary for roosting, resting, refuge for adult females to escape from male harassment, and predator avoidance (especially during the vulnerable teneral stage):

(a) Natural plant communities near the breeding/larval habitat which may include fen, marsh, sedge meadow, dolomite prairie, and the fringe (up to 328 ft (100m)) of bordering shrubby and forested areas with open corridors for movement and dispersal; and

(b) Prey base of small flying insect species (e.g., dipterans).”

In Mackinac County, known sites of Hine’s Emerald Dragonfly that were designated as critical habitat include sites with spring-fed cedar swamp, northern fen, dune and swale complex, sedge meadows, and shallow pools. Breeding areas have seepage fens and meadows, marl pools, and often crayfish burrows (USFWS 2010).

Adults emerge from aquatic larval habitats in summer and live for 2-6 weeks. Adults forage in areas of open vegetation, such as shallow marshes, sedge meadows and northern fens. Nearby shrub or forested areas are important as protected sites for adult perching and roosting. Foraging flights may extend more than a mile away from wetland habitats over old fields, meadows, roads, and the Lake Michigan shoreline. Within wetlands, adults establish territories for mating and ovipositing. Males patrol territories within wetlands, remaining close to emergent shallow marsh or wet meadow vegetation. Adult females oviposit in small pools, streamlets, and in muck in seepage sedge meadows, seepage shallow marshes and among sedge hummocks. One female may lay more than 500 eggs. Adults may disperse among sites with appropriate habitat, and dispersal distances of several miles have been documented.

Larvae may live 2-4 years in wetland habitats, in particular slow-moving channels and wet meadows and shallow marshes with groundwater seepage. They overwinter in refugia which may include crayfish burrows. Larvae may be able to withstand drought conditions having been found in dry

stream channels or among moist hummocks when no surface water was present. (Cuthrell 1999; NatureServe 2012; O'Brien 2002; USFWS 2001).

Where Hine's Emerald Dragonfly has been found, population sizes vary widely as summarized in the recovery plan (USFWS 2001). At some locations in Wisconsin and Illinois, adult surveys documented average daily adult abundance ranging from a few dozen to hundreds of individuals. Larval surveys in those states found zero or a few individuals at many sites, but at other sites, as many as 264 larvae have been documented from a single site (1998 survey; Mud Lake "North," WI). At that site, 264 larvae were found in 159 samples, averaging 1.66 larvae per sample, although the size of the site is not given in the recovery plan. Many samples in sites known to support the species find no larvae, but as many as 21 larvae have been found in a single crayfish burrow. Newly hatched larvae can occur in dense aggregations, likely resulting from the large number of eggs that are laid in a single location. As many as 28 hatchlings have been found in 1 square foot, but samples frequently find none or very few indicating highly variable population distributions (USFWS 2001). The density of larvae is likely lower for large size classes.

In Michigan, surveyors generally observed only a few individuals at occupied sites, but 15 adults were found at one site (USFWS 2001). Larval surveys of occupied sites in the Upper Peninsula have found mean crayfish burrow densities of 0.32 – 0.96 burrows/m² and mean larval densities of 0.40 – 0.84 larvae/m² (B. Hosler, personal communication).

3.2.4 Occurrence in the Project Area

The occurrence of Hine's Emerald Dragonfly has not been confirmed in the project area. The project area was identified as potential habitat with many of the attributes of sites with known occurrences of this species. The species has been documented, and critical habitat designated, in Mackinac County approximately 35 miles east of the project location. The Hine's Emerald Dragonfly recovery plan (USFWS 2001) notes that many sites have been searched for Hine's Emerald Dragonfly within Mackinac County. At least two of the sites (Carnegie Trail – Hiawatha Sportsmen Club and East Naubinway Swales) are in the vicinity of the project site, but the species was not found. It should be noted the sites were only briefly surveyed so negative findings may not provide definitive evidence that the species is not present.

3.2.4.1 Project Area Vegetation

The work and access route in the pipeline ROW include seepage sedge meadow and shallow marsh with scattered wetland shrubs (Photographs in Appendix A). The most common plant community is a

seepage sedge meadow in which small rivulets coalesce into a tributary to O’Niel Creek. Scattered small pools create shallow marshes. Vegetation is comprised of dominant species typical for such plant communities including a diversity of sedges and spikerushes (*Carex* spp. and *Eleocharis* spp.) and cattails (*Typha* spp.). Scattered shrubs in the ROW include speckled alder (*Alnus incana*) and willows (*Salix bebbiana*, *S. discolor*, *S. lucida*, and *S. petiolaris*) The ROW is bordered by conifer swamp dominated by white cedar (*Thuja occidentalis*) with lower abundance of tamarack (*Larix laricina*) and black spruce (*Picea mariana*). Many of the plant species in the ROW are calciphiles indicating some level of calcareous conditions. Calciphile species observed include white cedar, false asphodel (*Triantha glutinosa*), yellow lady-slipper (*Cypripedium parviflorum*), species of *Carex* sections Ceratocystis and Stellulatae (identified only to section, not species; most species in these sections are at least somewhat calciphilic). Several additional plant species were observed that may occur in calcareous wetlands as well as other wetlands and may be considered somewhat calciphilic. Examples of these species include porcupine sedge (*Carex hystericina*), elk sedge (*Carex garberi*), narrow-leaved cottongrass (*Eriophorum angustifolium*), sweetgrass (*Hierochloa hirta*), and purple avens (*Geum rivale*).

Invasive species are relatively uncommon in the project area. A few isolated individuals of purple loosestrife (*Lythrum salicaria*) were observed. Shallow marshes include limited areas of cattail that are likely the invasive hybrid cattail (*Typha* x. *glauca*). Native wetland species are abundant. Although a complete floristic inventory was not conducted, several species with high Floristic Quality Coefficients of Conservatism (CoC) were observed. These include species with a CoC of 8, 9, or 10 (narrow-leaved cottongrass, false asphodel, and false mayflower (*Maianthemum trifolium*), sweetgrass, elksedge (*Carex garberi*) or a CoC of 5, 6, or 7 (yellow lady-slipper, Lake Huron green orchid (*Platanthera huronensis*), purple avens, and cypress-like sedge (*Carex pseudo-cyperus*)).

3.2.4.2 Project Area Habitat Characteristics

Hine’s Emerald Dragonfly habitat descriptions (Cuthrell 1999; NatureServe 2012; O’Brien 2002; USFWS 2001, 2010) mention northern fen or calcareous wetlands. While the site is not a northern fen, it fits within the broader category of “calcareous wetland.” Numerous marsh and seepage areas were observed at the work sites and along the access route. All appear to have at least some flow and give rise to small channels and rivulets that culminate in a cold water stream that meanders in and out of the pipeline ROW. Many of the plant species in the ROW are indicative of calcareous seepage wetland.

The site is within a rich cedar swamp on histosol soils, which ordinarily would be insufficient alone to provide habitat for Hine's Emerald Dragonfly unless openings are present. The pipeline ROW provides open wetlands, in proximity to forested wetlands, and other ecosystems that can provide appropriate habitat. West of the dig sites, the ROW is bordered for approximately 1,700 ft by rich cedar swamp. The ROW provides a potential dispersal corridor to a larger dune and swale complex, just east of the sites, which could provide additional potential habitat. The ROW also provides relatively open, herbaceous wetlands that are potential habitat. If not for the presence of the ROW, the specific project site would be densely forested and unlikely habitat.

Habitat descriptions, implicitly or explicitly, suggest that Hine's Emerald Dragonfly habitat is primarily open wetland habitat, with a suite of particular environmental conditions, bordered by woody vegetation including shrub wetlands and rich swamps. This implies that that overall landscape matrix is open wetland with a minority of area forested. The proposed project area represents an inverse of that situation, a primarily forested (swamp) landscape matrix with an inclusion of open marsh and seepage wet meadow. This distinction, however, does not exclude the possibility that the site may provide habitat for Hine's Emerald Dragonfly. In fact, many essential habitat attributes are present, and the site is connected to larger potential habitat by a dispersal corridor (the open ROW). The site is consistent with one or more designated Critical Habitat areas in Mackinac County in several ways:

- Forested and open wetlands on histosols;
- Spring fed rich cedar swamp;
- Sedge-dominated seeps and pools;
- In close proximity to a mixture of ecosystem types including calcareous wetlands, forested dune and swale complex, forested wetlands, and uplands;
- Dispersal corridors to other potential breeding and/or foraging sites (via the ROW to dune and swale complex to the east).

3.3 Covered Plant Species

No State or Federal listed threatened or endangered plant species are known in the project area.

4.0 Potential Biological Impacts/Take Assessment

4.1 Potential Impacts

4.1.1 Direct and Indirect Impacts

Potential habitat for adult or larval Hine's Emerald Dragonfly is present and will be impacted by the proposed project. The proposed excavation will occur in seepage wet meadow, shallow marsh, and a short reach of the tributary to O'Neil Creek. Timber mats will be placed on the same wetland types, and will span sections of the tributary to O'Neil Creek. Table 1 summarizes the extent of area affected by project activities. Assuming the species is present at the project site, likely impacts are evaluated and summarized in Table 2 and compared to threats enumerated by USFWS (USFWS 2001) and Michigan Natural Features Inventory (Cuthrell 1999).

Surveys for the species at the site have not been conducted, and the presence of the species has not been confirmed. Consequently, direct and indirect impacts cannot be determined with certainty but potential impacts can be estimated. Impacts to the dragonfly are through temporary habitat alteration. The greatest potential for direct impact is to larvae within the excavation footprint. No permanent habitat loss, degradation, or fragmentation will occur. Habitat alteration should be limited to the 2013 growing season when the excavation site will be revegetated.

Conducting the project during the winter ensures there will be no impact to adults of the dragonfly and will not significantly interfere with summer time foraging or breeding. Wetland habitats may harbor overwintering larvae. The project will temporarily excavate 4,200 ft² of wetland habitat. The excavation will be backfilled to original contours with no net loss of wetlands. Excavation and backfilling may destroy microtopography of hummocks and shallow pools that are part of the structure of dragonfly habitat. Microtopography is expected to gradually be reestablished as backfilled soil settles to create low spots and native tussock sedges create hummocks as occurred after the original pipeline construction.

Larval surveys of occupied sites in the Upper Peninsula have found mean crayfish burrow densities of 0.32 – 0.96 burrows/m² and mean larval densities of 0.40 – 0.84 larvae/m² (B. Hosler, personal communication). Based on these observations, the number of larvae within the 4,200 ft² (390 m²) excavation footprint could be within the range of 156 – 328 larvae. Population distributions are highly variable, and most area within a potential habitat likely has few individuals. However,

assuming the worst-case impact using highest larval densities reported for Michigan, direct impact could be mortality of 328 larvae from winter-time excavation.

Timber construction mats will be used to displace the weight of equipment in work and access areas. While work will be in wetlands that are potential habitat for larval dragonflies, the use of mats over frozen soil are not considered to be a significant direct or indirect impact to Hine's Emerald Dragonfly. No soil disturbance will occur under the timber mats. An estimated 38,200 ft² of timber mats will be used for temporary work areas and site access. A frost road will be formed to create a solid foundation for the timber mats.

No direct or indirect impacts to adult summer breeding or foraging behaviors are anticipated. Equipment and mats will be removed and the excavation will be backfilled and reseeded prior to emergence of adult dragonflies. The excavation area will not be fully revegetated until the end of the 2013 growing season. The reduced vegetative cover during that season is an alteration of what could potentially be adult forage and breeding habitat. The loss of hummock and pool microsites could reduce ovipositing sites. However, the area affected by excavation, revegetation and alteration of microsites is limited to an estimated 4,200 ft² of wetland.

The proposed project has potential to introduce or increase the abundance of invasive plant species by bringing in equipment and mats and through soil disturbance. Best management practices will be used to minimize this risk (See Section 5.3).

Temporary dewatering will be required to create a safe work environment within the excavation. Dewatering will result in a localized temporary drawdown of groundwater, which may affect overwintering refugia of dragonfly larvae. This may be a direct or indirect impact, but the significance cannot be determined. Anecdotal reports note that larvae of Hine's Emerald Dragonfly can withstand temporary drought (cited in USFWS 2001). The impact of wintertime dewatering is not known. Any affected larvae will be in refugia under the wetland soil surface, which will be frozen at the surface and will help provide insulation against freezing and desiccation of larvae in subterranean refugia. Because larvae within the drawdown area will be protected from direct exposure to the atmosphere, they are not considered in the take estimate.

Use of heavy equipment in wetlands presents potential for release of contaminants during refueling and equipment use. Best management practices will be used to minimize this risk. The objective of the proposed project is to ensure continued safe operation of the pipeline and to prevent release of petroleum into the environment including potential dragonfly habitat.

The proposed project will not adversely affect Hine’s Emerald Dragonfly through many of the threats identified by USFWS (USFWS 2001) and Michigan Natural Features Inventory (Cuthrell 1999) including inadequate regulatory protection, environmental extremes, transportation, stochasticity, disease, predation, and over-collection.

Table 2 Threats to Existence of Hine’s Emerald Dragonfly and Evaluation of Project and Cumulative Impacts

General Threat¹	Specific Threat¹	Explanation	Project Impact	Cumulative Impacts
Significant Threats²				
Habitat Alteration or Destruction	Habitat Loss	Conversion of wetland habitat to non-wetland use due to development, agriculture, etc.	No long term loss of potential habitat. Affected wetlands will be restored.	Not significant.
	Habitat Degradation	Reduction of suitability of habitat for life cycle of dragonfly.	Temporary, localized impact during winter and altered vegetation composition and structure during 2013 growing season.	Not significant.
	Habitat Fragmentation	Creation of smaller and isolated patches of habitat from larger, contiguous habitat.	No impact.	Not significant.
	Larval Habitat Impact	Loss or degradation of habitat for larval foraging and overwintering.	Alteration of potential larval habitat and mortality of existing larvae by excavation and backfilling.	Not anticipated to be significant.
	Larval Impact	Direct mortality of larvae.	Estimated take of up to 328 larvae.	Not anticipated to be significant.
	Adult Habitat Impact	Loss or degradation of adult habitat necessary for emergence, foraging, breeding, and ovipositing.	Potential to alter structure of small area of adult habitat during 2013 growing season while site revegetates. Potential for small scale loss of breeding and ovipositing microsites.	Not significant.
	Adult Impact	Direct mortality of adults.	No impact.	Not significant.
	Invasive Species	Degradation of wetland habitat due to invasive plant or animal species.	Potential introduction or increase of invasive plants into project site.	Not significant.
	Surface Water Hydrology Alteration	Impoundment, ditching, drainage.	Temporary, localized impact during winter.	Not significant.
	Ground Water Hydrology	Ground water withdrawal from pumping.	Temporary, localized impact during winter.	Not significant.
Contamination	Nonpoint Source Pollution	Runoff from urban, industrial or agricultural sites.	Soil erosion and sedimentation will be controlled through use of Best Management Practices.	Not significant.

General Threat ¹	Specific Threat ¹	Explanation	Project Impact	Cumulative Impacts
	Leaching From Contaminated Sites	Site contamination is greatest concern in industrial and urban areas or near landfills.	Contamination from equipment will be controlled through use of Best Management Practices. The objective of the project is ensure safe long-term pipeline operation and prevent contamination.	Not significant.
	Pesticides	Drift from agriculture.	No impact.	Not significant.
Inadequate Regulatory Protection		Inadequate regulations may allow habitat loss or take of individuals	No impact.	Not significant.
Potential Concerns²				
Environmental Extremes	Natural Catastrophes	Small population sizes and closely located subpopulations may render the species vulnerable to regional extinction from extreme events or conditions.	No impact.	Not significant.
Transportation	Road kill	Close proximity to railroads or highways may create mortality hazard for adults.	No impact.	Not significant.
Demographic and Genetic Stochasticity	Inviabile populations unable to persist	Small populations sizes and isolated populations are prone to low reproduction or local site extinction.	No impact.	Not significant.
Disease or Predation	Increase threats from predators or pathogens	Habitat fragmentation may increase vulnerability to predation. Disease risk is unknown.	No impact.	Not significant.
Overutilization	Human collection	Overutilization for scientific, recreational, commercial or educational purposes poses little or no threat.	No impact.	Not significant.
¹ Threats as identified by US Fish and Wildlife Service (USFWS 2001) and Michigan Natural Features Inventory (Cuthrell 1999). ² Categorization of significant threats or potential concerns follows US Fish and Wildlife Service (USFWS 2001)				

4.1.2 Cumulative Impacts

Cumulative impacts result from incremental actions that may affect the environment “*when added to other past, present, and reasonable foreseeable future actions regardless of what agency (Federal or non-federal) or person undertakes such other actions*” (40 CFR1508.7). The project site is located in the northwest portion of a large wetland complex and dune and swale complex that may include habitat for, and unknown populations of, Hine’s Emerald Dragonfly. This area is the geographic region considered for analysis of cumulative effects. The area is 4-5 miles across, east to west, and extends inland from Lake Michigan 2-3 miles. Most of the area is privately owned, with a large portion in a private sportsmen club, but a large parcel of Lake Superior State Forest is within the

area. Land cover consists largely of undeveloped native plant communities including a mosaic of uplands and wetlands. One major road passes through the southern portion of the area, Highway 2. The Hiawatha Trail traverses a small section of the north part of the area. A few gravel roads, forest roads, and ATV are present. Two pipeline corridors cross the area. Land use consists largely of activities with minimal impact on dragonfly habitat and includes forestry and recreation.

The large area of native vegetation and undeveloped land within the project vicinity suggests that past actions have not contributed to significant adverse impacts to populations or habitat of Hine's Emerald Dragonfly. In the regional context, an extremely small portion of potential habitat has been lost or degraded. No plans are known that would change present conditions. Most of the land is either a private sportsmen club or state forest, neither of which is expected to contribute to loss or degradation of potential habitat. Highways may pose local road kill hazards for the dragonfly, but no changes to present conditions are expected.

In light of existing land use, the proposed project is not expected to contribute to significant cumulative impacts that might threaten the existence of Hine's Emerald Dragonfly. Threats to the species are summarized in Table 2. For none of the threats, are significant cumulative impacts anticipated.

4.2 Anticipated Take of each Covered Wildlife or Fish Species

No take of adult dragonflies will occur. Larvae within the 4,200 ft² excavation may be taken. As described in Section 4.1, potential take could be of 328 larvae. This estimate assumes the highest density of larvae observed at a Michigan site is present throughout the entire excavation area.

4.3 Anticipated Take of Each Covered Plant Species

No listed plant species are known in the project area, and no take will occur to listed plant species.

4.4 Effects on Critical Habitat

The project does not occur in or near critical habitat. Therefore, there will be no effects on critical habitat.

4.5 Anticipated Impacts of the Taking

Seepage sedge meadows, shallow pools, and small channels are present from the western edge of the wetland to the proposed excavation site and further beyond to the east. The distance to the excavation through wetland is approximately 1,700 ft. Based on aerial photo interpretation, it is estimated the seepage wetland extends approximately 2,000 ft. on the ROW before merging into the larger dune

and swale complex (roughly corresponding to the HCP area shown on Figure 5). If it is assumed that appropriate habitat for the dragonfly exists all along the pipeline ROW in the affected wetland, and it is assumed that the pipeline ROW is 60 ft. wide through the otherwise forested wetland, then the area of potential habitat in the immediate vicinity is 120,000 ft². The impact area of the excavation is 4,200 ft², or 3.5 percent of the potential habitat. If number of larvae in the habitat is proportional to the habitat area, the density estimate of 0.84 larvae/m² yields an overall population estimate of over 9,300 larvae. The maximum estimated impact of 328 larvae represents 3.5 percent of this total.

As noted above, the site is within a large complex of native plant communities including wetlands and stabilized dune uplands and is likely not the only potential breeding/oviposition habitat within the complex. Most of this land is managed as a state forest or private sportsman club. Although not all of this area is potential habitat for Hine's emerald dragonfly, the larger complex acreage is in range of 6,000+ acres. The area of direct impact of 4,200 ft² is an extremely small portion of the larger site.

The recovery plan (USFWS 2001) lists 10 sites within Mackinac County where Hine's emerald dragonfly has been documented, with two additional sites where possible transient flights have been observed. While some of these sites may not be considered separate populations, the recovery plan demonstrates that there are numerous locations for the species throughout the region, beyond the potential location under consideration in this HCP.

In consideration of the temporal scale of the proposed project, construction activities will be of short duration during the winter, and direct impacts to larvae will be a one-time occurrence. Revegetation for site restoration will occur in a single growing season. The project does not propose a change in land management or other activity that would create a long-term hazard to the species.

The anticipated impacts of the taking can be evaluated by considering varying spatial and temporal scales. In this context, the proposed project temporarily affects an extremely small portion of potential habitat at a time adults are absent and takes a small portion of the potential local larval population. If a take occurs, it is not expected to threaten the long-term viability of the species at the site, in Mackinac County, state-wide, nationally, or globally.

4.6 Low-Effect HCP

An HCP qualifies for a categorical exclusion under NEPA if it satisfies "low-effect" criteria and does not fit any category of exceptions from categorical exclusions. Low-effect criteria are defined in the U.S. Fish and Wildlife Service Habitat Conservation Planning Handbook (USFWS 1996) and are

based on having minor or negligible direct or cumulative impacts on federally protected species or other environmental values or resources. Appendix C itemizes “low-effect” criteria and shows that the proposed project meets all the criteria.

5.0 Conservation Program

5.1 Biological Goals

Section 10(a)(2)(A) of the Act requires that an HCP specify the measures that the permittee will take to minimize and mitigate to the maximum extent practicable the impacts of the taking of any federally listed animal species as a result of activities addressed by the plan.

As part of the “Five Point” Policy adopted by the Services in 2000, HCPs must establish biological goals and objectives (65 Federal Register 35242, June 1, 2000). The purpose of the biological goals is to ensure that the operating conservation program in the HCP is consistent with the conservation and recovery goals established for the species. Biological goals for this HCP are:

- Minimize impacts to potential habitat and dragonfly larvae;
- Restore potential habitat after excavation to maintain pre-existing habitat attributes.

5.2 Biological Objectives

To achieve the biological goals of minimizing habitat impacts and restoring habitat, the following biological objectives will be met:

- Restored wetland soil is flat and consistent with surrounding terrain;
- Organic soil at surface is saturated during growing season;
- The streambank and stream bed are restored and reinforced;
- Disturbed soil is revegetated with regionally appropriate, native wetland plants;
- Invasive plants are managed;
- Sedimentation and erosion are controlled.

5.3 Avoidance, Minimization, and Mitigation Measures

Impacting the potential Hine’s Emerald Dragonfly habitat during the proposed project is unavoidable. Although the work may result in an incidental take, the work will be executed in a manner to protect and maintain the overall integrity of the pipeline and minimize impacts to natural resources.

5.3.1 Avoidance

5.3.1.1 Spatial and Temporal Avoidance

Staging, laydown and parking areas will be offsite in uplands to the extent possible. Work will be conducted during the winter to avoid periods when adults emerge, forage and breed.

5.3.1.2 Management of Potential Contaminants

To the extent possible, Enbridge requires that the storage of petroleum products, refueling, lubricating and maintenance 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, hazardous materials, chemicals, fuel, and lubricating oils must be stored outside these areas.

Auxiliary fuel tanks solidly attached to construction equipment or pumps are not considered storage and are acceptable. In certain instances, refueling or fuel storage within the 100-foot buffer may be unavoidable due to site-specific conditions or unique construction requirements (e.g. continuously operating pumps or equipment). These locations will be identified and approved by an on-site environmental inspector. Site-specific precautions 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 maintained onsite to enable the rapid cleanup of any spill.
- Secondary containment will be provided around any refueling operations that cannot be done in uplands or continuously operating stationary equipment (e.g., pumps).
- Secondary containment will be lined with suitable plastic sheeting, will provide a containment volume of at least 150 percent of the storage vessel, and will allow for at least one foot of freeboard.
- Overnight parking of equipment is not allowed within 100 feet of a wetland or waterbody unless special containment provisions have been implemented, such as lined secondary containment around continuously operating pumps.

5.3.2 Minimization

Several measures and best management practices will be used to reduce impacts to Hine's emerald dragonfly and minimize habitat alteration and degradation.

5.3.2.1 Excavation

A trench box will be used to limit the footprint of the excavation. The trench box reinforces the sides of the excavation and prevents soil collapse onto workers. Without the trench box, a much larger excavation would be required to allow for safely sloped side walls. For example, the underlying sands would require 2:1 or shallower slopes for trench walls. That slope would require an excavation footprint three times larger than the anticipated 4,200 ft² with a correspondingly larger impact to larvae and larval habitat.

5.3.2.2 Soil Management and Erosion Control

Best management practices for erosion and sediment control will be used in accordance with Enbridge's EMP. Such BMPs may include, but are not limited to: timber mats, silt fence, hay/straw bales, temporary straw bale dewatering structures, flocculents, erosion control blankets, seed and mulch, topsoil and subsoil segregation, and restoration procedures.

Timber mats are used to support equipment and reduce soil compaction and displacement while crossing and working in wetlands. Silt fence and straw bales are used to contain stockpiles and minimize sediment runoff and erosion. Temporary straw bale dewatering structures are composed of a three filter system; a sediment filter bag placed inside a geo-textile-lined straw bale basin, to contain and filter suspended sediment during dewatering procedures. Flocculents are used to augment the filtering of suspended sediment during the dewatering process and may significantly reduce the turbidity of the discharge and allow sediment to quickly settle within the temporary dewatering basin. Erosion control blankets are used to stabilize seed and prevent erosion.

5.3.2.3 Invasive Species

The following measures will be implemented to minimize the introduction and spread of noxious weeds and invasive species along the access route and at the project site:

- Minimize the time duration between final disturbance and permanent seeding. Hand broadcast of seed will occur in April or May, as soon as conditions are appropriate after spring thaw.
- Construction equipment and timber mats will be cleaned prior to arriving at the project site. This cleaning must consist of removing visible dirt from the equipment and blowing loose material from equipment using compressed air. 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. An environmental inspector will be on-site when equipment is mobilizing to the site to ensure the equipment and timber mats are clean.

- Timber mats will be used to support equipment and reduce soil compaction while crossing and working in wetlands. A frost road will be created by compacting snow and ice to create a foundation for the timber mats.

5.3.2.4 Site Restoration

Layers of soil will be segregated when excavated and backfilled in the appropriate stratigraphic positions. A 12-inch thick sod layer will be excavated first and stockpiled separately, followed by subsurface organic soils and underlying mineral subsoil. After completion of pipeline repairs, soil stockpiles will be replaced in the same profile positions as they were removed. No off-site fill will be added, with the possible exception of minimal clean, rock fill that may be needed at the bottom of the excavation to create a stable work surface. Topsoil will be replaced in the upper 12 inches to allow regeneration of vegetation from roots and rhizomes. A wet meadow or sedge meadow seed mixture will be hand broadcast in the spring to facilitate revegetation. Seed will consist of regionally sourced, native species appropriate for Upper Peninsula_sedge meadows. Erosion control structures will be removed after new growth has been established.

5.3.3 Mitigation of Unavoidable Impacts

Compensatory mitigation will consist of a one-time payment of \$12,000 to the National Fish and Wildlife Foundation (NFWF). The payment will be made at the time the incidental take permit is issued and will be earmarked for conservation programs to benefit Hine's emerald dragonfly.

5.4 Monitoring

Monitoring will be conducted during and after pipeline maintenance to document the extent of actual excavation and site restoration. No surveys are proposed for adult or larval dragonflies.

5.4.1 Impact Monitoring

During the course of pipeline maintenance, impacts will be monitored by documenting the location and extent of timber mats, excavation, dewatering discharge structure, silt fences, and other elements of the work area. Documentation will consist of field notes, photographs, and GPS point locations. A GPS unit with sub-meter accuracy will be used.

5.4.2 Restoration Monitoring

Reseeding will occur in the spring, most likely in April or May depending on the spring thaw.

Pedestrian surveys will be conducted throughout the growing season to ensure successful

revegetation. Surveys are proposed for late June and late August. During these surveys, vegetative cover will be estimated, photographed, and described in the area of soil disturbance and the surrounding area for reference. The abundance of invasive plant species will be documented. If invasive species abundance is greater than 5 percent cover, it will be removed by hand. Additional site visits may be necessary to monitor and control invasives.

5.5 Performance and Success Criteria

Performance and success criteria for habitat restoration are as follows:

- ≥ 75 percent cover by native wetland plant species by the end of summer 2013;
- ≤ 5 percent cover by invasive plant species throughout the 2013 growing season.

5.6 Adaptive Management Strategy

Adaptive management will be used to respond to restoration problems, such as inadequate cover of wetland species or unacceptable abundance of invasives. Should such problems arise, remedial measures will be implemented, which may include additional seeding or hand control of invasives. Before the site is revegetated, erosion control BMPs will be inspected and maintained.

5.7 Reporting

A 2013 Annual Report will be submitted to the USFWS. The report will include:

1. Brief summary or list of project activities accomplished during the reporting year (e.g. this includes development/construction activities, and other covered activities);
2. Project impacts (e.g. number of acres graded, number of buildings constructed, etc.);
3. Monitoring results (compliance, effects and effectiveness monitoring) and
4. Description of circumstances that made adaptive management necessary and how it was implemented;
5. Description of any changed or unforeseen circumstances that occurred and how they were dealt with;
6. Description of any minor or major amendments.

It is anticipated that restoration goals and performance and success criteria will be attained in 2013. Consequently, no monitoring or reporting are proposed for 2014 or later. If goals are not achieved in 2013, additional restoration measures may be required. In those circumstances, a 2014 monitoring report will be submitted.

6.0 Plan Implementation

6.1 Plan Implementation

Enbridge is responsible for completing the proposed project utilizing all BMPs specified in applicable permits and Enbridge's EMP. Pipeline maintenance will occur in winter 2013, and reseeded will be completed in spring 2013. Successful revegetation is anticipated to be complete by the end of the 2013 growing season.

6.2 Changed Circumstances

Section 10 regulations [(69 Federal Register 71723, December 10, 2004 as codified in 50 Code of Federal Regulations (C.F.R.), Sections 17.22(b)(2) and 17.32(b)(2))] require that an HCP specify the procedures to be used for dealing with changed and unforeseen circumstances that may arise during the implementation of the HCP. In addition, the HCP No Surprises Rule [50 CFR 17.22 (b)(5) and 17.32 (b)(5)] describes the obligations of the permittee and the Service. The purpose of the No Surprises Rule is to provide assurance to the non-Federal landowners participating in habitat conservation planning under the Act that no additional land restrictions or financial compensation will be required for species adequately covered by a properly implemented HCP.

Changed circumstances are defined in 50 CFR 17.3 as changes in circumstances affecting a species or geographic area covered by an HCP that can reasonably be anticipated by plan developers and the Service and for which contingency plans can be prepared (e.g., the new listing of species, a fire, or other natural catastrophic event in areas prone to such event). If additional conservation and mitigation measures are deemed necessary to respond to changed circumstances and these additional measures were already provided for in the plan's operating conservation program (e.g., the conservation management activities or mitigation measures expressly agreed to in the HCP or IA), then the permittee will implement those measures as specified in the plan. However, if additional conservation management and mitigation measures are deemed necessary to respond to changed circumstances and such measures were not provided for in the plan's operating conservation program, the Service will not require these additional measures absent the consent of the permittee, provided that the HCP is being "properly implemented" (properly implemented means the commitments and the provisions of the HCP and the IA have been or are fully implemented).

Reasonably foreseeable circumstances that could affect HCP implementation include the following:

- Drought
- Fire
- ATV traffic.

Any of these could impede successful revegetation and restoration of wetland habitat. Should any occur, the site will be monitored, and remedial measures may be necessary. Such measures could include reseeding or installation of temporary fencing.

6.3 Unforeseen Circumstances

Unforeseen circumstances are defined in 50 CFR 17.3 as changes in circumstances that affect a species or geographic area covered by the HCP that could not reasonably be anticipated by plan developers and the Service at the time of the HCP's negotiation and development and that result in a substantial and adverse change in status of the covered species. The purpose of the No Surprises Rule is to provide assurances to non-Federal landowners participating in habitat conservation planning under the Act that no additional land restrictions or financial compensation will be required for species adequately covered by a properly implemented HCP, in light of unforeseen circumstances, without the consent of the permittee.

In case of an unforeseen event, the permittee shall immediately notify the Service staff who have functioned as the principal contacts for the proposed action. In determining whether such an event constitutes an unforeseen circumstance, the Service shall consider, but not be limited to, the following factors: size of the current range of the affected species; percentage of range adversely affected by the HCP; percentage of range conserved by the HCP; ecological significance of that portion of the range affected by the HCP; level of knowledge about the affected species and the degree of specificity of the species' conservation program under the HCP; and whether failure to adopt additional conservation measures would appreciably reduce the likelihood of survival and recovery of the affected species in the wild.

If the Service determines that additional conservation and mitigation measures are necessary to respond to the unforeseen circumstances where the HCP is being properly implemented, the additional measures required of the permittee must be as close as possible to the terms of the original HCP and must be limited to modifications within any conserved habitat area or to adjustments within lands or waters that are already set-aside in the HCP's operating conservation program. Additional conservation and mitigation measures shall involve the commitment of additional land or financial

compensation or restrictions on the use of land or other natural resources otherwise available for development or use under original terms of the HCP only with the consent of the permittee.

6.4 Amendments

6.4.1 Minor Amendments

Minor amendments are changes that do not affect the scope of the HCP's impact and conservation strategy, change amount of take, add new species, and change significantly the boundaries of the HCP. Examples of minor amendments include correction of spelling errors or minor corrections in boundary descriptions. The minor amendment process is accomplished through an exchange of letters between the permit holder and the Service's Field Office.

6.4.2 Major Amendments

Major amendments to the HCP and permit are changes that do affect the scope of the HCP and conservation strategy, increase the amount of take, add new species, and change significantly the boundaries of the HCP. Major amendments often require amendments to the Service's decision documents, including the NEPA document, the biological opinion, and findings and recommendations document. Major amendments will often require additional public review and comment.

6.5 Suspension/Revocation

The Service may suspend or revoke their respective permits if a permittee fails to implement the HCP in accordance with the terms and conditions of the permits or if suspension or revocation is otherwise required by law. Suspension or revocation of the Section 10(a)(1)(B) permit, in whole or in part, by the Service shall be in accordance with 50 CFR 13.27-29, 17.32 (b)(8).

6.6 Renewal of the Section 10(a)(1)(B) Permit

Upon expiration, the Section 10(a)(1)(B) permit may be renewed without the issuance of a new permit, provided that the permit is renewable, and that biological circumstances and other pertinent factors affecting covered species are not significantly different than those described in the original HCP. To renew the permit, Enbridge shall submit to the Service, in writing:

- A request to renew the permit; reference to the original permit number;
- Certification that all statements and information provided in the original HCP and permit application, together with any approved HCP amendments, are still true and correct, and inclusion of a list of changes;

- A description of any take that has occurred under the existing permit; and
- A description of any portions of the project still to be completed, if applicable, or what activities under the original permit the renewal is intended to cover.

If the Service concurs with the information provided in the request, it shall renew the permit consistent with permit renewal procedures required by Federal regulation (50 CFR 13.22). If Enbridge files a renewal request and the request is on file with the issuing Service office at least 30 days prior to the permit's expiration, the permit shall remain valid while the renewal is being processed, provided the existing permit is renewable. However, Enbridge may not take listed species beyond the quantity authorized by the original permit or change the scope of the HCP. If Enbridge fails to file a renewal request within 30 days prior to permit expiration, the permit shall become invalid upon expiration.

Because this is a one-time project for pipeline inspection and maintenance at a site of an identified anomaly, Enbridge does not anticipate the need for permit renewal.

7.0 Funding

Enbridge Energy L.L.C. will fund the costs associated with implementing the HCP including use of BMPs, site restoration, mitigation, and monitoring. Best management practices will be implemented during project activities and will be funded as part of construction costs. A mitigation payment will be made at the time the incidental take permit is issued. Site restoration and monitoring will be accomplished by existing subcontractors to Enbridge, who will be paid directly by Enbridge. To assure that site restoration and monitoring are successfully accomplished, Enbridge will place \$5,000 in escrow: \$2,500 for restoration and \$2,500 for monitoring. These funds will remain in escrow until restoration and monitoring are successfully completed. If USFWS feels that restoration and monitoring are not successfully completed, they will be able to access the funds and use them to complete restoration and monitoring. If restoration and monitoring are considered successful, the escrow funds will be released and returned to Enbridge. Table 3 summarizes expenditures for HCP implementation and how those funds will be assured.

Table 3 Funds for HCP Implementation.

Activity	Estimated Cost	Funding Assurance
Best Management Practices for Minimization and Avoidance	Not estimated	Included in construction cost to be paid to contractors and suppliers.
Site Restoration (reseeding; invasive species control)	\$2,500	Activity will be conducted by contractors directly paid by Enbridge; \$2,500 will be placed in escrow until site restoration is satisfactorily completed.
Site Restoration Monitoring	\$2,500	Activity will be conducted by contractors directly paid by Enbridge; \$2,500 will be placed in escrow until site restoration is satisfactorily completed.
Mitigation – in lieu payment to National Fish and Wildlife Foundation	\$12,000	Payment will be made prior to or at the time of issuance of Incidental Take Permit.

8.0 Alternatives

8.1 Alternative #1: No Action Alternative

The No Action Alternative means that an HCP and incidental take permit would not be issued. This also means current conditions and activities that will not cause take of federally listed species could continue.

In order to ensure safe operation of its crude oil pipeline, Enbridge conducts integrity inspections to identify anomaly locations in its pipelines. Certain anomalies identified through integrity inspections must be evaluated and addressed per federal pipeline safety regulations (49 C.F.R. Part 195). Enbridge detected anomalies in the pipeline at the proposed project location. The pipeline cannot maintain long-term operations without repairing the anomalies. The no-action alternative is not a viable option. Repairing the anomalies is critical to ensure safe operation of the pipeline. If anomalies are not repaired there is the risk of eventual pipe failure and release of petroleum.

8.2 Alternative #2: Summer Construction

An alternative to completing the proposed project during the winter is to complete it during the growing season. Such an approach would have the same project footprint for excavation and timber mats. Construction activities could interfere with emergence of adult dragonflies and their foraging and breeding. Timber mats would be a temporary impact to wetland vegetation and would reduce photosynthesis and wetland productivity. The growing season alternative would not lessen impacts to dragonflies or their habitat compared to the proposed winter construction.

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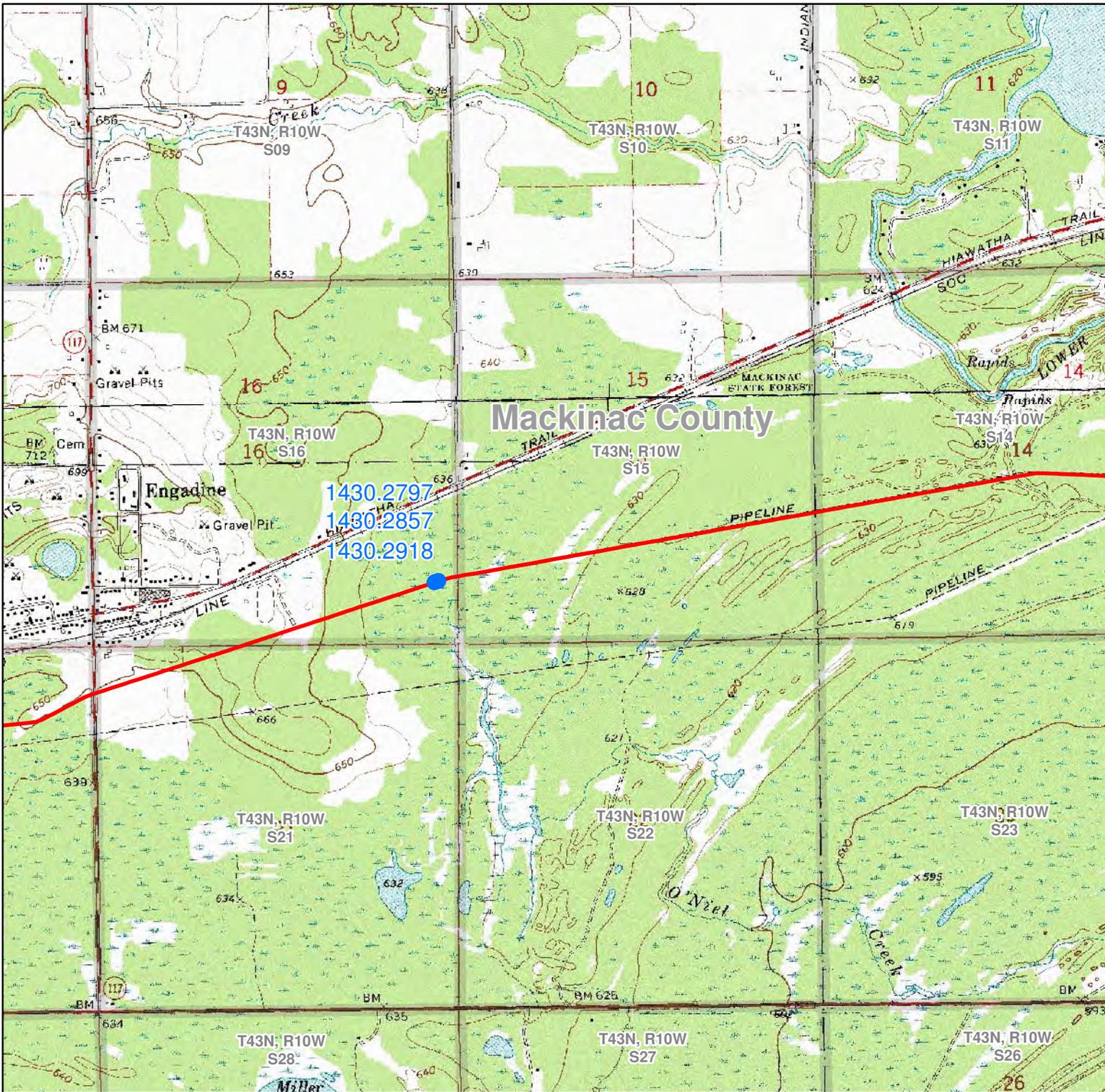
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Figures



● Dig Sites

FIGURE 1



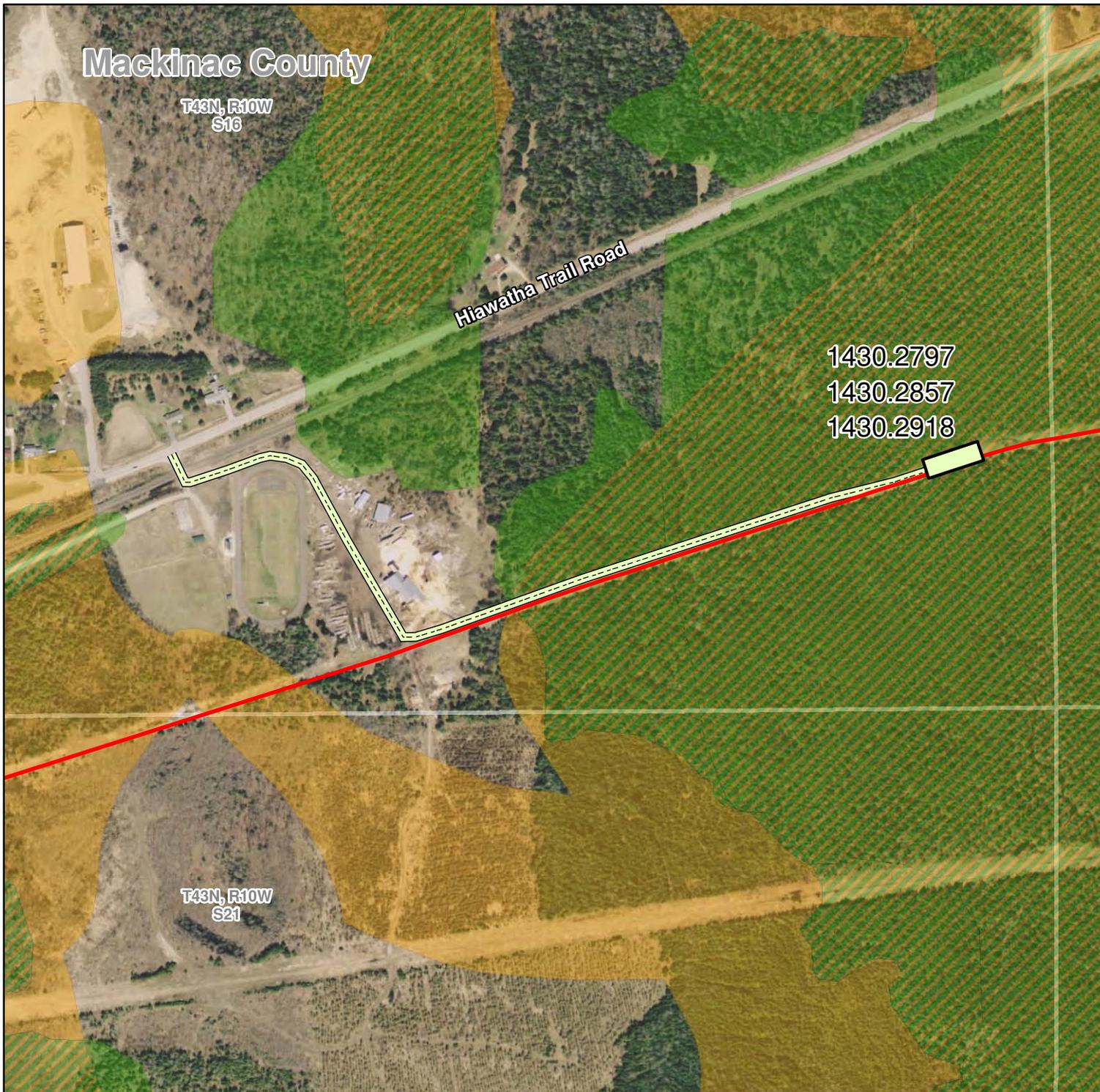
Feet

1 Inch = 2,000 Feet

EXCAVATION SITE LOCATION

Line 5
 Mileposts 1430.2797 through 1430.2918





-  Area of Disturbance
-  Access Route
-  Line 5
- DEQ Final Wetlands Inventory**
-  Hydric Soils
-  NWI or MIRIS Wetland
-  NWI or MIRIS Wetland, with hydric soils

FIGURE 2



Feet

1 Inch = 500 Feet

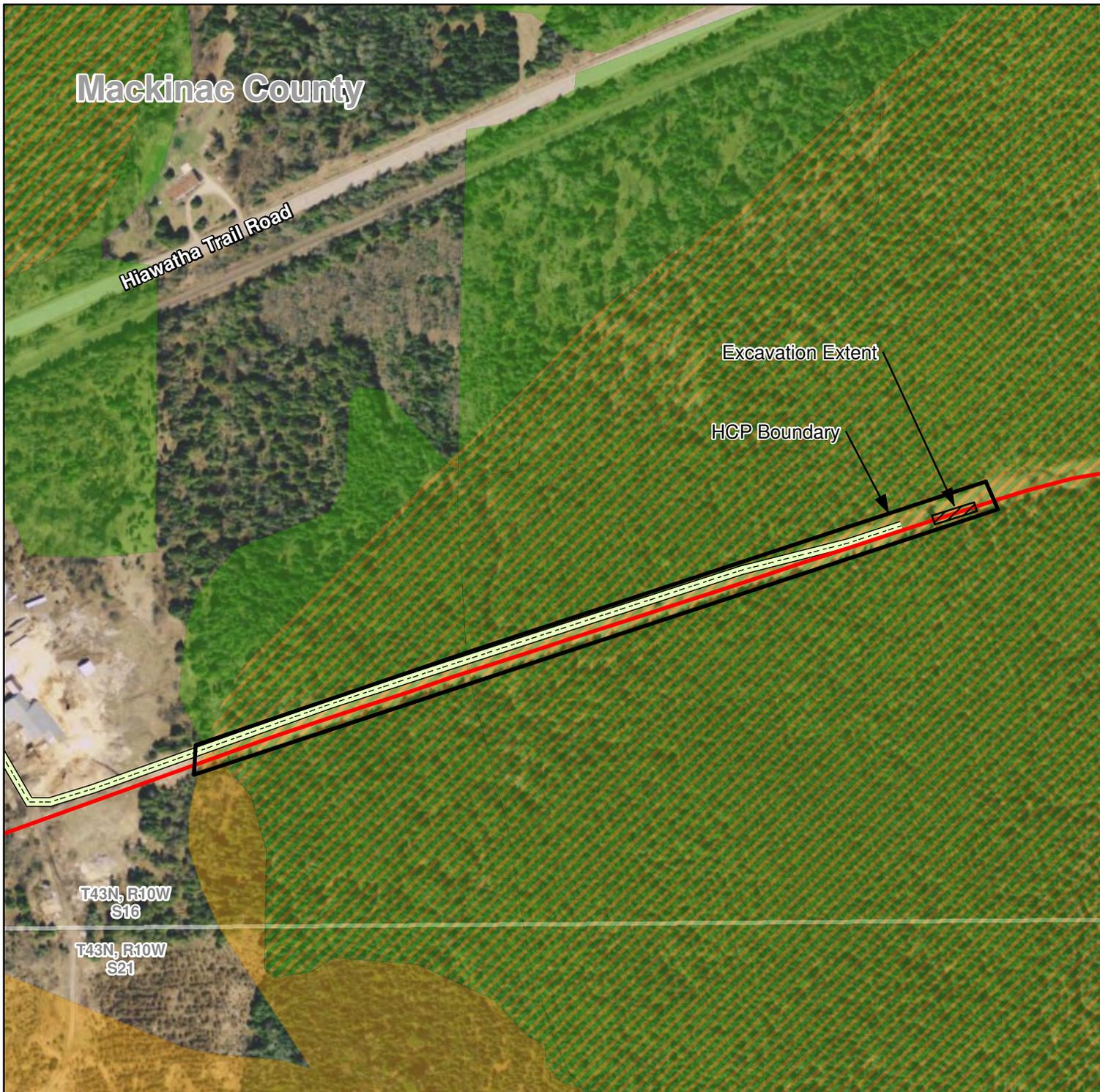
Bing Imagery Circa 2010

EXCAVATION SITE LOCATION

Line 5

Mileposts 1430.2797 through 1430.2918





- HCP Boundary
 - Excavation Extent
 - Access Route
 - Line 5
- DEQ Final Wetlands Inventory**
- Hydric Soils
 - NWI or MIRIS Wetland
 - NWI or MIRIS Wetland, with hydric soils

FIGURE 3



Feet

1 Inch = 300 Feet

Bing Imagery Circa 2010

EXCAVATION SITE LOCATION

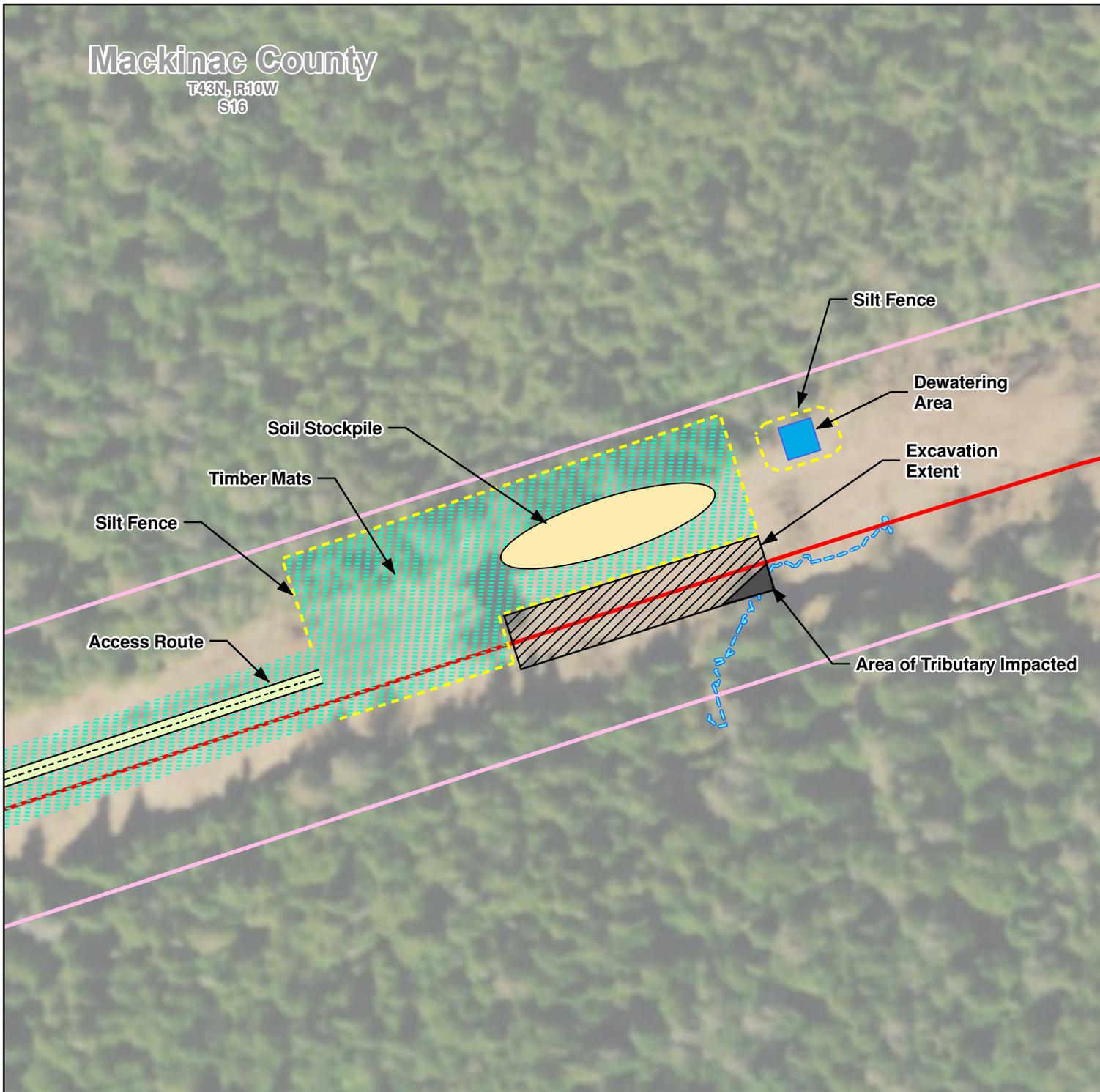
Line 5

Mileposts 1430.2797 through 1430.2918



Mackinac County

T43N, R10W
S16



-  Excavation Extent
-  Area of Tributary Impacted
-  Soil Stockpile
-  Dewatering Area
-  Timber Mats
-  Approximate Silt Fence Locations
-  Access Route
-  Approximate Pipeline Easement
-  Line 5
-  Tributary to O'Neil Creek



Feet

1 Inch = 50 Feet

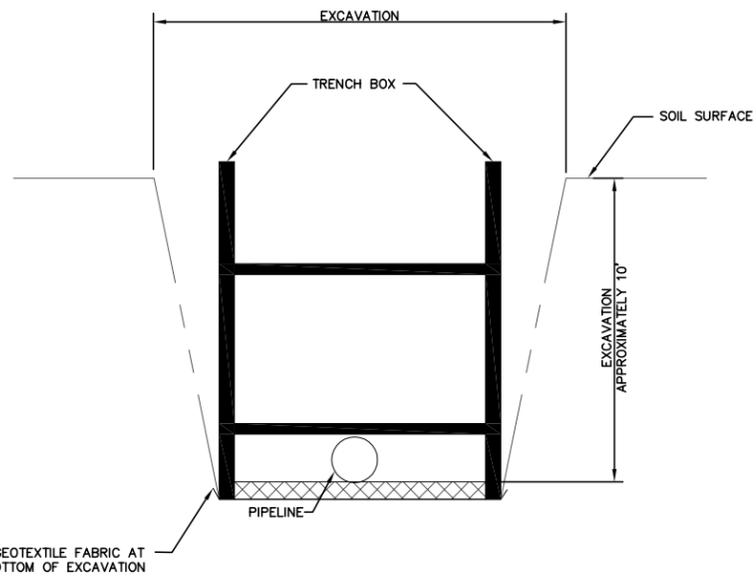
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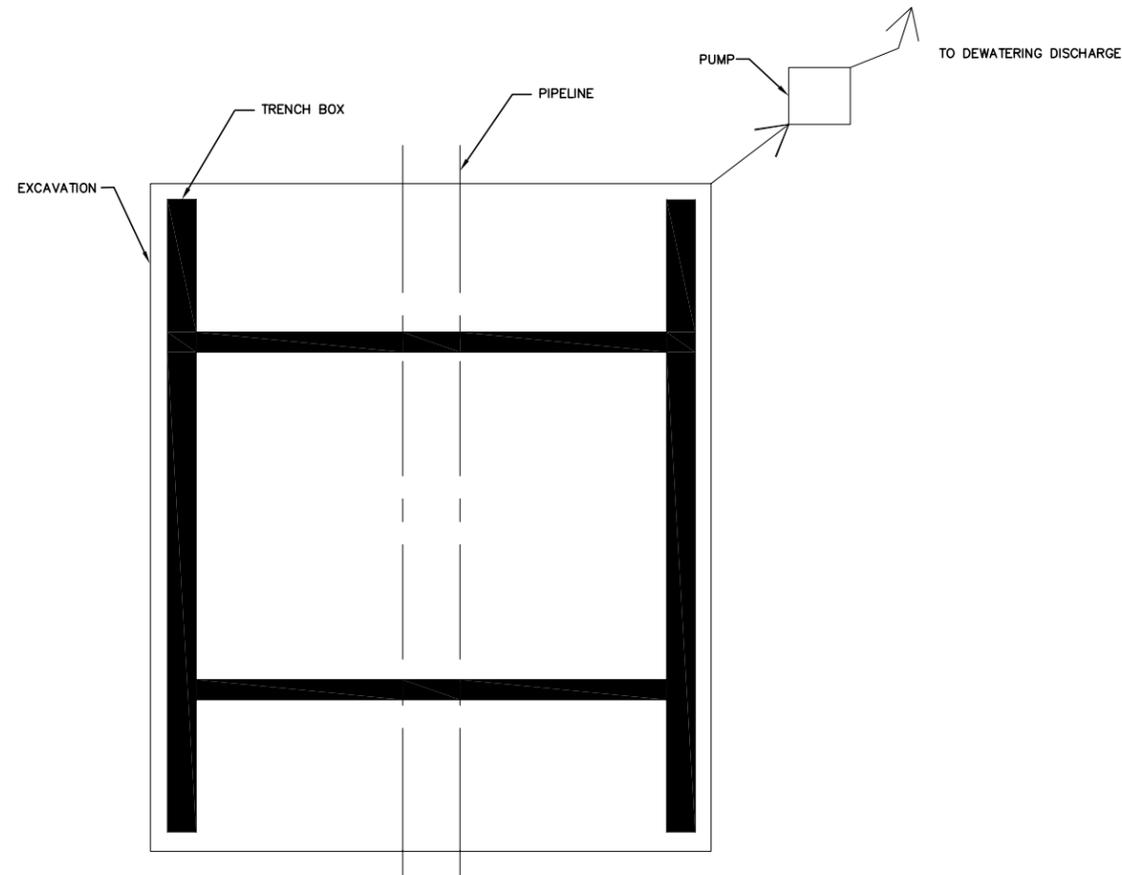
Line 5

Mileposts 1430.2797 through 1430.2918

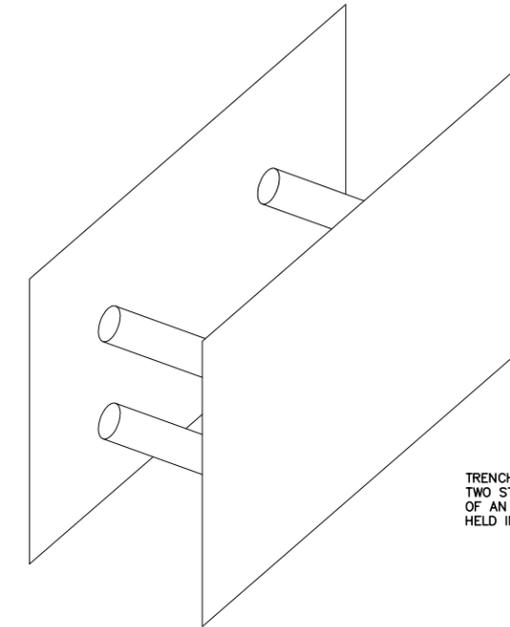




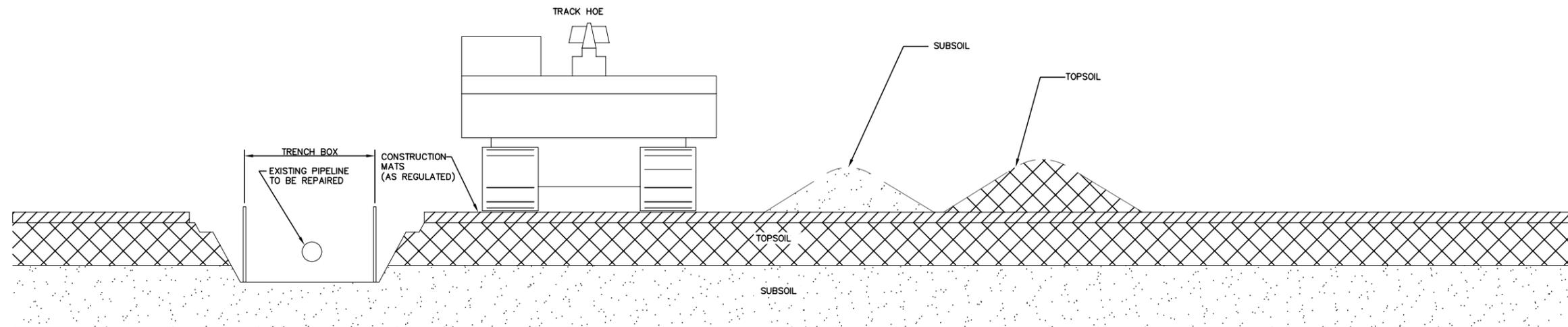
SECTION: TRENCHBOX



PLAN: TRENCHBOX



TRENCH BOXES CONSIST OF TWO STEEL PLATES THAT HOLD UP THE SIDES OF AN EXCAVATION. THE PLATES ARE HELD IN PLACE BY STEEL BRACES.



SECTION: TRENCHBOX

NO	REVISION	BY DATE	APPR	APPR



FOR ENVIRONMENTAL PERMITTING

49/16-0146
TRENCHBOX TYPICAL

PROJECT:		
SCALE: N.T.S.	DATE: 11/06/12	DRAWN: CFN
CHECK: BARR/EJW	APPR: BARR/EJW	DATE: 11/06/12
APPR:	TRENCHBOX TYPICAL	

Appendix A
Site Photographs

**Enbridge Pipelines (Lakehead) L.L.C.
Line 5, MPs 1430.2797, 1430.2857, 1430.2918**



Photo 1. West end of excavation area, facing west. June 6, 2012



Photo 2. Shallow marsh and sedge meadow at west end of excavation, facing west. June 6, 2012

Enbridge Pipelines (Lakehead) L.L.C.
Line 5, MPs 1430.2797, 1430.2857, 1430.2918



Photo 3. Sedge meadow in excavation area, facing east. June 6, 2012



Photo 4. Wet meadow and stream in east and southeast portion of excavation area, facing east. October 30, 2012

**Enbridge Pipelines (Lakehead) L.L.C.
Line 5, MPs 1430.2797, 1430.2857, 1430.2918**



Photo 5. Wet meadow and stream in east and southeast portion of excavation area, facing east. October 30, 2012

Appendix B

Enbridge Environmental Mitigation Plan



**Enbridge Energy Partners, Inc. &
Enbridge (U.S.) Inc.**

**Environmental Mitigation Plan
Pipeline Maintenance Projects**

April 2011



ENVIRONMENTAL MITIGATION PLAN

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

INTRODUCTION

This Environmental Mitigation Plan (EMP) outlines construction-related environmental policies, procedures, and mitigation measures developed by Enbridge Energy Company, Inc., Enbridge (U.S.) Inc. and their subsidiaries (collectively referred to herein as “Enbridge”) as a baseline for pipeline maintenance projects. This EMP was developed based on Enbridge’s experience implementing best management practices during maintenance. It is intended to meet or exceed applicable federal, state, tribal, and local environmental protection and erosion control specifications and practices. The EMP is designed to address typical circumstances that may be encountered during a pipeline maintenance 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 of the EMP describes general mitigation measures, including soil erosion and sedimentation control procedures, to be implemented during upland maintenance work and upland restoration;
- Section 2.0 discusses stream and river construction, crossing, and restoration;
- Section 3.0 describes practices for maintenance work in wetland areas, crossings, and restoration;
- Section 4.0 discusses highway, road, and rail crossings;
- Section 5.0 discusses dewatering;
- Section 6.0 addresses revegetation measures;
- Section 7.0 addresses winter maintenance work issues;
- Section 8.0 addresses waste management; and
- Section 9.0 addresses spill prevention, containment, and control procedures.

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

Unless otherwise specified, the Contractor (Contractor) is responsible for implementing the requirements of this EMP. Enbridge will make the requirements of the EMP and applicable environmental permits known to the Contractor. If the Contractor has questions concerning these environmental requirements, the Contractor will contact an Enbridge representative.

Enbridge will provide appropriate construction oversight to confirm Company and Contractor compliance with the measures of this EMP and requirements of applicable federal, state, tribal, and local permits. In certain instances, Enbridge’s Environmental Inspectors (EIs) will assist the Contractor in interpreting and implementing the requirements of the EMP, and verify compliance with these procedures for the company. Enbridge employs 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 those unforeseen situations should they occur in the field. EIs and/or craft inspectors 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 will have the authority to stop activities and order corrective mitigation for actions that are not in compliance with the measures in this EMP 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 TEMPORARY EROSION AND SEDIMENT CONTROLS

Temporary erosion and sediment controls (ECDs) include, but are not limited to, slope breakers, sediment barriers, stormwater diversions, trench breakers, mulch, and revegetation. The goal of ECDs is to minimize erosion onsite, and prevent construction-related sediment from migrating offsite into sensitive resource areas such as streams, wetlands, lakes, or drainage ditches (dry or flowing). The Contractor must, at all times, maintain erosion and sediment control structures as required by all applicable permits. Non-functional erosion and sediment control features must be repaired, replaced, or supplemented with functional materials within 24 hours after discovery, or as otherwise specified in the project permits.

ECDs must be installed before disturbance of the soil, and must be replaced by permanent erosion controls as restoration is completed. ECDs should be inspected weekly and/or after each ½ hour rain event by the EI and/or the craft inspectors. Craft inspectors should include these inspections in their daily reports. Additional information on ECDs is provided in the upland, waterbody, and wetland sections.

1.2 RIGHT-OF-WAY ACCESS

Access to the right-of-way (ROW) will be from public roadways and Enbridge-approved private access roads only. Vehicle tracking of soil from the 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 ROW where practicable (off-ROW parking), or equivalent. Installation of stone or timber mat access pads must be in accordance with applicable permits and state/federal specifications. If such BMPs are not adequate to prevent sediment from being tracked onto public roads, street sweeping, or other equivalent means of collecting sediment, must be used. If soil is tracked onto a roadway, the Contractor must 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 and/or graded into the road ditch or onto the shoulder.

1.3 ROAD REPAIR

The Contractor must repair private roads, lanes, and public roads damaged when moving equipment or obtaining access to the ROW.

1.4 RIGHT-OF-WAY REQUIREMENTS

All construction equipment and vehicles will be confined to the approved ROW and extra workspace. Construction activities are restricted to the approved designated areas. If additional temporary work space is required, it must be obtained with prior approvals and work shall be conducted in accordance with applicable permit conditions.

(a) ROW (Permanent)

Enbridge's existing permanent ROW varies in width. The ROW is maintained to facilitate access and aerial inspection of the pipeline system.

(b) Temporary Workspace

In addition to the ROW/permanent corridor, maintenance work will sometimes require Temporary Workspaces (TWS). The TWS will be located adjacent to and contiguous with the ROW/permanent corridor.

(c) Extra Workspace

Site-specific extra workspace (EWS) locations (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. EWS will typically be located in uplands adjacent to the 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 EWS within a wetland or within the 50-foot setback from a wetland or waterbody based on site-specific conditions. EWS adjacent to waterbodies and/or wetlands is addressed further in Sections 2.4 and 3.2.1, respectively.

Enbridge will acquire EWS from the landowner where necessary; use of unauthorized workspace is prohibited without Enbridge's approval. In all cases, the size of EWS will be kept to the minimum necessary to safely conduct work.

1.5 PERMITS

Unless otherwise noted within this EMP, Enbridge will obtain the necessary permits for the maintenance of the pipeline. Permit requirements may be more stringent than the requirements of this EMP. In all cases, the more restrictive requirements will apply.

1.6 UPLAND CLEARING

The initial stage of maintenance may involve 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. Prior to clearing of trees, notification to the Environment Department is necessary.

1.6.1 Drain Tile Inlets

Enbridge will attempt to locate existing drain tile inlets that are located near the maintenance work area prior to construction. Drain tile inlets must be marked using flags. The Contractor must 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 has 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 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 work area that drains to the inlet structure to minimize sedimentation.

1.6.2 Upland Topsoil Segregation

Topsoil generally has physical and chemical properties that are conducive to good plant growth. To prevent the mixing of topsoil with less productive subsoil during work, topsoil will be segregated. A

minimum one foot of separation must be maintained between the topsoil and subsoil piles to prevent mixing. Where the one foot separation cannot be maintained, a physical barrier, such as a thick layer of straw mulch, may be used between the spoil and topsoil piles to prevent mixing. Use of the physical barrier must be reviewed and approved by Enbridge on a site-specific basis.

Topsoil will not be used to repair trench breakers (see Section 1.8) or to pad the pipe. Gaps must 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.

Depth of Upland Topsoil Stripping

Topsoil must be stripped to a maximum depth of 12 inches in active crop lands, unless otherwise requested by 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 shall attempt to segregate to the depth that is present.

1.6.3 Temporary Erosion and Sediment Controls

ECDs are intended to slow the velocity of water off-site to minimize erosion, stop the movement of sediments off the construction ROW, and prevent the deposition of sediments into sensitive resources that may be on or adjacent to the ROW. ECDs typically used are silt fence and/or trenched-in and staked straw bales/biologs and other barriers such as compacted earth (e.g., drivable berms across travel ways), sand bags, rubber conveyor belt barriers, or other appropriate materials (refer to Figures 6 through 10). If temporary ECDs are removed during the day to allow equipment access, they must be reinstalled at the end of the day.

Temporary ECDs must 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 ROW as needed, and/or in other areas to slow water leaving the site and prevent siltation of waterbodies and wetlands downslope 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.

If silt fence is in use, when the depth of sediment reaches about one-third of the height, the sediment must 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 work; however, ECDs must be properly reinstalled after equipment passage, or activities in the area are completed for the day. These ECDs must also be repaired and/or replaced prior to forecasted inclement weather. The Contractor is responsible for monitoring weather conditions and adjusting resources as needed to address pending and/or existing weather conditions.

Temporary Stabilization

Installation of temporary seeding, mulch (straw or hydromulch), and erosion control mats may be required by Enbridge in certain locations if there are maintenance delays 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. Temporary stabilization measures as outlined in Section 6.0 must be implemented to minimize erosion and for sediment control.

The Contractor must install the appropriate class of erosion control blanket in accordance with manufacture recommendations and/or state Department of Transportation 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 must attempt to install erosion control blankets on the exposed slopes prior to snowfall; however, work 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, would continue after the first snowfall to protect slopes prior to spring melt and runoff.

Mulch

Mulch will be applied as indicated in Section 6.4 in accordance with applicable regulations and permit conditions. If exposed soils have not been stabilized prior to freezing of the ground, and soil conditions are such that disking is still effective, crimp in straw mulch to help stabilize these areas, but on steeper slopes erosion controls blankets are still preferable.

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).

1.6.4 Temporary Slope Breakers

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

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

If the length of the slope is less than the distance of the required spacing, slope breakers are not required unless a sensitive resource area (e.g., wetland) is located immediately down slope. 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 either earthen berms or rocked trenches must be used whenever possible.

Temporary slope breakers must be constructed according to the following specifications:

- earthen berms must be installed with a 2 to 4 percent outslope, with a minimum 4 foot base and a minimum height of 1.5 feet (refer to Figures 4 and 5);
- straw bales used as slope breakers must 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 must 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 14);
- proper slope breaker outfalls must be established where topsoil segregation and/or grading has created a barrier at the edge of the construction workspace;
- gaps must be created through spoil piles where necessary to allow proper out letting of temporary berms;
- temporary slope breakers must be inspected daily and repaired as necessary, but no more than 24 hours after discovery or as soon otherwise specified in the project permits, to maintain operational integrity and prevent erosion in active construction areas.

1.6.5 Noise and Dust Control

The Contractor must take all reasonable steps to control construction-related noise and dust near residential areas and other areas as directed by Enbridge. Control practices may include wetting the ROW and access roads, limiting working hours in residential areas, reestablishment of vegetation and/or additional measures as appropriate based on site-specific conditions.

1.7 UPLAND MAINTENANCE DIG EXCAVATION

At each dig site the scope of work is to locate the anomaly indication, excavate soil to expose the pipeline, perform visual and physical inspections, and then repair if needed. A trench approximately 8 feet deep by 8 feet wide across the bottom will be excavated to expose the pipeline. Length of the trench excavation varies, but typically will be approximately 45-60 feet long. Excavations are typically accomplished with a backhoe excavator. Excavated material will be sidecast (stockpiled) within the approved construction ROW separate from topsoil (see Section 1.6.2), and stored such that the area subject to erosion is minimized. Enbridge will coordinate with landowners to minimize disruption of access during maintenance work.

1.7.1 Timing

The length of time an excavation is left open must be minimized to ensure that inspection/repair of the pipe and restoration of the ROW occurs in a timely fashion. Typically, inspection/repair is completed within seven to ten days, weather permitting.

1.8 TRENCH BREAKERS

Trench breakers protect against subsurface water flow along the pipe after the trench is backfilled. All trench breakers that are disturbed as a result of maintenance work will be repaired and restored to pre-maintenance conditions.

1.9 DRAIN TILE REPAIR

If underground drainage tile is damaged by the pipeline's maintenance, it will be repaired in a manner that assures the tile line's proper operation at the point of repair. The following standards and polices shall apply to the tile line repair:

- If the location of the tile lines is known precisely, those tile lines will be staked or flagged prior to construction to alert construction crews to the possible need for tile line repairs. If previously unidentified tile lines are encountered and cut during grading or trenching activities, they will be flagged at that time.
- Tile lines that are damaged, cut, or removed must be staked and/or flagged by the Contractor in such a manner that they will remain visible until permanent repairs are made prior to final backfilling of the trench. The location of damaged, cut, or removed tile lines will also be recorded using GPS technology or equivalent.
- All damaged lines must be screened or otherwise protected to prevent the entry of foreign materials, small mammals, etc. into the tile lines.
- If water is flowing through any damaged tile line, the tile will be immediately temporarily repaired until such time that permanent repairs can be made. If the tile lines are dry and water is not flowing, temporary repairs are not required if the permanent repairs can be made within 24 hours of the time the damage occurred.
- Permanent repairs must be conducted in accordance with the contract specifications and must utilize double-walled drain tile and have rock shield installed between the drain tile and newly installed pipeline.
- The original tile alignment and gradient shall be maintained. A laser transit shall be utilized to ensure the proper gradient is maintained for repairs, regardless of length.
- Before completing permanent repairs, the Contractor will probe the tile lines or examine by other suitable means on both sides of the trench for their entire length within the work areas to check for tile that might have been damaged by vehicular traffic or construction equipment. If tile lines are found to be damaged, they must be repaired so that they function as intended.
- Permanent tile line repairs must be made within 24 hours of the pipeline being installed within the trench, weather and soil conditions permitting.

1.10 UPLAND BACKFILLING

Backfilling follows maintenance work 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 must be dewatered in accordance with the methods discussed in Section 5.0.

1.11 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.

If the above factors cannot be achieved to the satisfaction of Enbridge, the Contractor must cease work in the applicable area until Enbridge determines that site conditions are such that work may continue.

The Contractor is responsible for appropriately planning for work, considering for the potential for wet conditions, and being prepared to implement mitigative measures in the event of wet weather conditions. This is particularly important when conducting work in unsaturated wetlands. The Contractor is responsible for implementing any and all such corrective measures should conditions subsequently worsen where the above described criteria cannot be met.

1.12 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 and noxious weeds) along its ROW due to pipeline maintenance activities. However, it is not practicable for Enbridge to eradicate undesirable species that are adjacent to its ROW. Enbridge will minimize the potential for the establishment of undesirable species by minimizing the time duration between final disturbance and permanent seeding.

1.12.1 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 must be cleaned prior to arriving at the project site. This cleaning must consist of removing visible dirt from the equipment and blowing loose material from equipment using compressed air. 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 may be treated with the recommended herbicides or their equivalents as identified through consultation with local authorities. All proposed herbicides must be reviewed and approved by Enbridge's Environment Department prior to use. The Contractor(s) must obtain necessary permits and/or certifications for the use of the applicable herbicides and must comply with state laws regarding the use of those herbicides. Contractor(s) must keep proper documentation of

the locations where the herbicides have been used and provide such documentation to Enbridge if requested.

1.13 CLEANUP AND ROUGH/FINAL GRADING

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 (greater than 1.5 inch diameter and/or 12 inches in length). 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 (where applicable) for permanent seeding, installing or repairing temporary erosion control measures, repairing/replacing fences, and installing permanent erosion controls.

1.14 TIMING

The Contractor must begin cleanup and rough grading (including installation of temporary erosion and sediment control measures) within 24 hours after backfilling. The Contractor must attempt to complete this cleanup within 72 hours week, weather and soil conditions permitting.

1.15 PERMANENT EROSION AND SEDIMENT CONTROLS

During final grading, slopes in areas other than cropland will be stabilized with erosion control structures. Erosion control treatments of specific physical land features are described below.

Slopes

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:

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

Permanent berms must be constructed according to the following specifications (refer to Figure 14).

- Permanent berms must be installed with a 2 to 4 percent outslope.
- Permanent berms must be constructed of compacted earth.
- 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 (refer to Figure 14) or that are a continuous slope to a sensitive resource area (e.g., wetland or waterway).

1.16 SOIL COMPACTION TREATMENT

Cultivated fields and compacted or rutted areas may require being tilled with a deep tillage device or chisel plowed to loosen compacted soils, depending upon traffic levels. If subsequent construction and cleanup activities result in further compaction, additional measures will be undertaken to alleviate the soil compaction.

1.17 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 soil or as specified in permit conditions or landowner agreements. Stone removal efforts will cease when the size and density of stones on the ROW are similar to undisturbed areas adjacent to the ROW. 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.

1.18 REPAIR OF DAMAGED CONSERVATION PRACTICES

All soil conservation practices (such as terraces, grassed waterways, etc.) that are damaged by the pipeline maintenance will be restored to preconstruction conditions to the extent practicable.

1.19 LAND LEVELING FOLLOWING CONSTRUCTION

Following the completion of the pipeline maintenance, the 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, Enbridge will take appropriate steps to remedy the issue.

2.0 STREAM AND RIVER GENERAL REQUIREMENTS

Careful planning prior to initiating maintenance work is an essential part of working in and near waterbodies. Specific requirements for working in a waterbody, including construction methods, timing, erosion control, and restoration are described in this section and in the permits issued by local, 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. Prior to maintenance work, the Contractor must identify alternative provisions 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 must receive written approval from Enbridge prior to implementing the alternatives. During wet and high runoff conditions, it may be necessary in consultation with Enbridge Environment to determine whether conditions warrant additional considerations for construction activities.

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. The intent of the mitigation procedures is to minimize construction-related disturbance to streams and waterbodies by limiting the duration of construction in these areas and by minimizing erosion and sedimentation.

2.1 TIME WINDOW FOR CONSTRUCTION

In-stream trenching will be conducted during periods permitted by the appropriate regulatory agencies and applicable permits.

2.2 PRE-CONSTRUCTION CONSIDERATIONS – HAZARDOUS MATERIALS

Hazardous materials, chemicals, fuels, lubricating oils, will not be stored within 100 feet of streams and waterbodies. Refer to Section 9.0 for additional information on handling hazardous materials, refueling construction equipment, washing equipment, overnight parking, and maintenance.

2.3 CLEARING AND GRADING

The Contractor will leave a 10-foot buffer (from the ordinary high water mark OHWM / OHWL of undisturbed herbaceous vegetation on all stream banks during initial clearing, except where grading is needed for bridge installation, or where restricted by applicable regulations and/or permit conditions (such as impaired waterways).

Woody vegetation within the 10-foot buffer may be cut and removed during clearing, leaving the stumps and root structure intact. Non-woody vegetation and the soil profile will be left intact until the Contractor is ready to begin trenching the stream crossing. The Contractor must properly install and maintain sediment control measures at the 10-foot buffer line adjacent to streams immediately after clearing and prior to initial ground disturbance. This buffer should not be confused with the 50-foot setback required for extra workspace.

2.3.1 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.

2.4 EXTRA WORKSPACE

Extra workspaces, as defined in Section 1.4, include work areas outside the boundary of the typical construction ROW. These spaces are typically used for temporary spoil storage. Clearing of forested and brushy areas for EWS will be avoided as much as possible. Woody vegetation in wetlands and riparian areas will typically not be cleared for the purpose of EWS unless approved by appropriate regulatory agencies as stipulated in permits issued for the project. Extra workspaces will be constructed as follows:

- Extra workspaces 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, extra workspaces should be located no closer than 10 feet from the OHWM/OHWL, subject to site-specific approval by Enbridge.
- Extra workspaces must be limited to the minimum size needed to perform the maintenance work.

2.5 BRIDGES

Temporary equipment bridges will be used where necessary to transport equipment across 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.

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. Permits may be required for bridge installation.

2.5.1 Types of Bridges

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

- 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

2.5.2 Bridge Design and Maintenance

Bridges must be designed as close to perpendicular to the axis of the stream channel, creating the shortest crossing length and must be built and maintained in accordance with applicable permits. Equipment bridges must be designed to withstand the maximum foreseeable flow of the stream. Bridges must not restrict flow or pool water while the bridge is in place, and must be constructed with clean materials. Bridges must be designed and maintained to prevent soil from entering the waterbody. Soil that accumulates on the bridge decking must be removed as needed.

2.6 IN STREAM MAINTENANCE PROCEDURES

For inspection/repair work within existing stream and river crossings, in-stream work methods are dictated by site-specific conditions. The following 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 maintenance work.

2.6.1 Dam and Pump Method

Installation

The dam and pump method is a dry method that is suitable for low flow streams and is a preferred alternative to fluming for work in meandering channels. The dam and pump method involves damming of the stream with sandbags, inflatable/portable dams, sheet piling, and/or steel plates upstream and downstream of the proposed trench before excavation (see Figure 16) and pumping water around the construction area. The following procedures will be used for dam and pump crossings:

- Pumping of the stream across the ROW will commence simultaneously with dam construction to prevent interruption of downstream flow. Stream flow must 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 must be located on the upstream side and must be placed in impermeable, sided structures which will act as containment units for the pumps and fuel containers (refer to Section 9 for sizing specifications of secondary containment structures). The pumps used for the Dam and Pump method must not be placed directly in the stream or on the streambed. Pumps must have a capacity greater than the anticipated stream flow. The pumping operation must be staffed 24 hours a day and pumping must 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 maintenance work. A backup pump of equal or greater capacity must be on-site at all times in the event that the primary pump fails.
- The pump intake must be suspended to prevent sediment from being sucked from the bottom of stream and must be equipped with a screen with less than one-inch diameter openings, or equivalent device, to prevent fish uptake.
- Dams may be constructed of sandbags, inflatable dams, aqua-dams, sheet piling, and/or steel plates. The dams must prevent the stream from flowing into the work 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 work area.

- Backhoes located on one or both stream banks will excavate a trench along the stream bed. Streambed material will be segregated and placed within a spoil containment structure in approved work area limits.
- Standing water that is isolated in the area by the dams will be pumped into a sediment filter bag and/or a straw bale dewatering structure located in such a manner that no heavily silt-laden water flows into streams or wetlands (refer to Section 5.0). Only non-woven fabric will be used for filter bags.
- Backfilling will begin after inspection/repair is complete. 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

The Contractor must restore the stream banks as near as practicable to pre-construction conditions unless that slope is determined to be unstable (refer to Section 2.8). Once the banks have been reshaped, ECDs must be installed within 24 hours of backfilling. Temporary slope breakers will be installed on all sloped approaches to streams in accordance with the spacing requirements outlined in Section 1.6.4.

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 will be installed upslope of the temporary seeding area.

2.6.2 Flume Method

Installation

The flume method is a dry method that is suitable for work in sensitive, relatively narrow streams that have straight channels and are relatively free of large rocks and bedrock at the point of maintenance work. 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) must 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, must 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 must not be removed until after the pipeline has been inspected/repared, trench has been backfilled, and the stream banks have been stabilized.

- The upstream and downstream ends of the flume(s) must be incorporated into dams made of sand bags and plastic sheeting (or equivalent). The upstream dam must be constructed first and will funnel stream flow into the flume(s). The downstream dam must prevent backwash of water into the trench and work area. The dams must 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 work area.
- After the isolated section of stream bed is dewatered, backhoes located on one or both stream banks will excavate a trench along the stream bed. Spoil generated during trenching will be stored in a straw bale/silt fence containment area located away from the stream banks within approved work areas.
- If additional trench dewatering is necessary to complete the inspection/repair, the discharge will be pumped into a sediment filter bag or a straw bale dewatering structure in such a manner that no heavily silt-laden water flows into streams or wetlands (refer to Section 5.0). Non-woven fabric must be used for filter bags.
- Backfilling will begin after the inspection/repair is complete. 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

The Contractor must restore the stream banks as near as practicable to pre-construction conditions unless that slope is determined to be unstable (refer to Section 2.8). Once the banks have been reshaped, ECDs must be installed within 24 hours of backfilling. Temporary slope breakers will be installed on all sloped approaches to streams in accordance with the spacing requirements outlined in Section 1.6.4.

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 will be installed upslope of the temporary seeding area.

2.7 DRAINAGE DITCHES AND INTERMITTENT STREAMS

Maintenance work in intermittent streams and agricultural ditches will typically employ the wet trench method (refer to Figure 15), unless otherwise specified in the applicable permits. For small, dry intermittent streams and agricultural drainage ditches, standard upland procedures may be used, which involve excavating the trench with backhoes, performing inspection/repair in the trench, and backfilling the trench with native material. The banks will be reshaped, mulched (or erosion control blanket), and, if required, seeded in accordance with Section 6.0 for stabilization until permanent erosion control is implemented. No refueling, fuel storage, or equipment maintenance is allowed within 100 feet of a drainage ditch or intermittent stream without approval from Enbridge Environment with additional

special provisions for containment. Where dry swales cross the ROW, silt fence or straw bales will be installed at the edge of the ROW to prevent the flow of sediment from the ROW.

2.8 PERMANENT RESTORATION

Stream banks disturbed during maintenance work will be stabilized with erosion control materials such as jute or equivalent and seeded in accordance with Section 6.0. Permanent stabilization will be initiated 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 must restore the slopes as near as practicable to pre-construction conditions unless that slope is determined 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.

2.8.1.1 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 6.0 and covered with an erosion control blanket. Erosion controls, (e.g. straw bales, biologs, silt fences, etc.) will be installed as necessary based on site-specific conditions.

2.8.1.2 Rock Riprap Restoration

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 6.0 and other stream bank protection requirements.

2.8.1.3 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. Bridges installed for winter construction (if applicable) will be removed before spring break up unless otherwise approved by Enbridge.

2.8.1.4 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 ROW.

2.8.1.5 Drainage Ditches and Intermittent Streams

Drainage ditches and intermittent streams will be permanently restored and stabilized with erosion control blanket, permanent seeding, or other appropriate measures.

3.0 WETLAND CROSSING GENERAL REQUIREMENTS

Typical pipeline maintenance in wetlands consists of excavation, dewatering, repair/inspection, backfilling, final grading, cleanup, and revegetation. However, due to the unstable nature of some wetland soils, construction activities may differ somewhat from those described for upland areas. Work must be minimized in wetlands to the extent practicable. The Contractor will also use special techniques to minimize the disturbance to plants and soils and to protect wetland hydrology.

Careful planning prior to maintenance work is an essential part of working in wetlands. Wetland requirements, including construction methods, timing, erosion control, and restoration, are described in this section and in the wetland permits issued by state and federal agencies and applicable tribes. 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. Prior to work, the Contractor must identify alternative provisions that would provide an equal or greater level of protection to wetland ecosystems. 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.

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 Enbridge Environment. 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.

3.1 WETLAND ACCESS

The Contractor must use the construction ROW and only approved roads to access wetland areas.

3.2 CLEARING

Clearing the ROW in wetlands will be similar to clearing in uplands. For maintenance work 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 (less than 1.5 inch diameter and/or 12 inches in length) can be left in the wetland if spread evenly in the ROW to a depth not to exceed 1 inch in thickness and in a manner, as determined by Enbridge Environment, which will allow for normal revegetation.

3.2.1 Extra Workspace in Wetlands

In general, Enbridge attempts to locate EWS outside of wetlands wherever practicable; however, EWS 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 and Enbridge Environment. Clearing of forested wetlands for EWS will be avoided. Woody vegetation in wetlands will not be cleared for the purpose of EWS unless approved by appropriate regulatory agency and Enbridge Environment.

- Staging areas, additional spoil storage areas, and other additional work areas (EWS) will be located in upland areas at least 50 feet away from wetland boundaries (refer to

Figure 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 EWS and sensitive resource areas (wetlands or waterways).

- The size of the additional workspace areas will be limited to the minimum needed to perform the maintenance work.

3.3 GRADING IN A WETLAND

Grading in a wetland, if required, must be conducted in a manner consistent with applicable federal, state, and local permits. Grading activities must 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 ROW after backfilling the trench with prior approval from Enbridge.

ECDs (e.g., silt fence) must be installed across the entire ROW upslope of the wetland boundary, where necessary, to prevent sediment flow into the wetland. Where wetlands are adjacent to the ROW and the ROW slopes toward the wetlands, ECDs must be installed along the edge of the ROW as necessary to prevent sediment flow into the wetlands. ECDs must be installed along the edge of the construction ROW as necessary to contain spoil and sediment within the construction ROW through wetlands.

ECDs must 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. When the depth of sediment reaches one-third of the height of a sediment barrier, the barrier will be replaced and/or the sediment removed. Non-functional sediment-control measures will be repaired, replaced, or supplemented with functional features as soon as field conditions allow, but no later than 24 hours after discovery.

3.4 RIGHT-OF-WAY STABILIZATION

Tree stumps, brush riprap, imported soil, and rock fill cannot be brought in to stabilize the ROW in wetlands. Where low-ground-weight equipment is not used, work activities will be accomplished from timber construction mats or equivalent means (refer to Figure 24). The contractor is responsible for having a sufficient number of construction mats to perform the work. To prevent the spread of noxious and invasive plant species, timber mats must be free of soil and plant material prior to being transported onto the ROW and/or moved from one area of the ROW to another area. Timber riprap (also known as corduroy road) cannot 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. The contractor will remove any portion of a corduroy road damaged during construction activities.

Subsoil from the pipeline trench within the immediate wetland may be placed on top of equipment mats for additional stabilization. All timber mats, construction debris, and larger woody vegetative debris (greater than 1.5 inch diameter and/or 12 inches in length) will be removed during cleanup of wetlands.

3.5 TRENCHING

Excavation of the pipeline in wetlands typically will be accomplished using backhoe excavators. The duration of open trench must be minimized to the extent possible.

3.5.1 Topsoil Segregation

Typically, when working 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 as described in Section 1.6.2 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 24 and based on recommendations from the EI and appropriate regulatory agencies.

3.5.2 Trench Breakers

Where it is determined 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. All trench breakers that are disturbed as a result of maintenance work will be repaired and restored to pre-maintenance conditions.

3.5.3 Concrete Coating

Concrete will generally be mixed off-site and will be transported to the ROW on trucks. Limited mixing and coating activities may occur on the permanent ROW for coating pipe joints and concrete weight repairs according to the concrete usage specifications determined in conjunction with Enbridge Environment. 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. Erosion and sediment controls will be installed downslope of equipment wash areas where needed to capture sediments and minimize erosion from runoff.

3.6 BACKFILLING

The Contractor shall restore wetlands as near as practicable to pre-construction conditions and must 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 maintenance work will be replaced so that the material is not mounded above the adjacent ground surface. 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 no more than 12 inches above the adjacent, undisturbed soil.

3.7 ROUGH GRADING, CLEANUP, AND TEMPORARY RESTORATION

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

3.7.1 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.

3.7.2 Temporary Stabilization

Where necessary, disturbed wetland areas will be revegetated with annual ryegrass (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. It has been Enbridge's experience that the natural seed bank within the wetland provides the most effective revegetation.

4.0 HIGHWAY, ROAD AND RAIL AREAS

4.1 ADDITIONAL WORKSPACE

Additional workspaces for maintenance work with a road right-of-way 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 roadway.

4.2 MAINTENANCE

Roadway crossings will be maintained in a condition that will prevent tracking of mud onto the roadway (refer to Section 1.2).

Rock tracking pads, constructed of stone no smaller than 4-inch or 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 must 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 must be constructed with clean rock placed on geotextile fabric, as approved by Enbridge Environment and with approval from applicable regulatory agencies. All rock and fabric must 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) as discussed in Section 1.6.3.

5.0 CONSTRUCTION DEWATERING

5.1 TRENCH DEWATERING

At each location where dewatering is to be conducted, the contractor must consider the following conditions in planning the dewatering event. Prior to initiating dewatering activities, the contractor must check the water discharge situation to ensure that the best management practices are applied in such a way as to minimize the potential for water containing sediment from reaching a waterbody. Furthermore, landowner approval is required in advance of placement of dewatering structures outside of the approved construction ROW. The contractor shall attempt to dewater to an upland location whenever possible.

1. **Water Discharge Setting** – The contractor shall assess each water discharge situation to include:
 - a. Soil Type - The soil type the discharged water would flow over. The management of discharged water traveling over sandy soil is more likely to soak into the ground as compared to clay soils.
 - b. Ground Surface - The topography in the area that would influence the surface flow of the discharged water.
 - c. Adjustable Discharge rate - The flow rate of the discharged water (which may need to vary) can be managed based on the site conditions to minimize instances of water from reaching a sensitive resource area such as a wetland or waterbody. (Example - Water discharged at 500 gallons per minute may soak into the ground while if discharged at a higher flow rate would cause water to flow via overland runoff into a sensitive resource area)
 - d. Discharge Outfall - The amount of hose (utilizing up to 300 feet) needed to attempt to discharge water at a location which drains away from waterbodies or wetlands.
2. **Pump Intake** - Use floating suction hose or other similar measures to prevent sediment from being sucked from bottom of trench.
3. **Overwhelming Existing Drainage** - If the discharge (assumed to be clean) does enter a stream, the flow added to the stream cannot exceed 50 percent of the peak storm event flow (to prevent adding high water volumes to a small stream channel that causes erosion due to imposing high flow conditions on the stream).
4. **Filtering Mechanism** – All dewatering discharges will be directed through a filtering device as indicated below.
 - a. Well-Vegetated Upland Area – Water can be directed to a well-vegetated upland area through a geotextile filter bag. Geotextile bags need to be sized appropriately for the discharge flow and suspended sediment particle size.
 - b. Straw Bale Dewatering Structure – Where the dewatering discharge point cannot be located in an upland area due to site conditions and/or distance, the discharge should be directed into a straw bale dewatering structure. The size of the straw bale dewatering structure is dependent on the maximum water discharge rate (refer to Figure 21). A straw bale dewatering structure should be used in conjunction with a geotextile filter bag to provide additional filtration near sensitive resource areas.

- c. Alternative dewatering methods (e.g., use of water canons) may be approved by Enbridge on a site-specific basis.

5.1.1 Regulatory Notification and Reporting

Enbridge will notify appropriate tribal, state and federal agencies as required by all permits/authorizations. The contractor is responsible for notifying Enbridge Environment of all dewatering activities.

Reports regarding the volume and quality of the water withdrawn and discharged will be submitted by Enbridge, as required by the applicable state and/or tribal permits. The Contractor will provide Enbridge with the appropriate data to determine volumes of water appropriated.

5.1.2 Flow Measurement

The volume of water discharged from the trench must be recorded as required by the applicable permits. The volume may be determined using a flow meter, or equivalent method as dictated by permit stipulations.

5.1.3 Water Sampling

Water discharged from trench dewatering locations may need to be sampled as required by tribal permits and/or state-issued discharge permits. If required, the Contractor will assist Enbridge in obtaining these samples and will be responsible for complying with the permit limitations.

6.0 REVEGETATION & MONITORING

This section was developed in conjunction with Natural Resources Conservation Service (NRCS) guidelines. If it is found that any conditions or requirements of this section or any other supporting documents are not in compliance with any governmental law or ordinance, the applicable law or ordinance will take precedent, but will not nullify other portions of this section or supporting documentation. In addition, project-specific permit conditions and Landowner requests (with exception to wetlands) for specific seed mixes take precedence over this section.

6.1 Project Seed Specifications

Seed 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.

The seed tags on the seed sacks will certify that the seed is “Noxious Weed Free. The Contractor’s proposed seed sources must be submitted to Enbridge for review and approval prior to construction. Following seeding, seed tags will be provided to Enbridge for tracking purposes.

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.

The Contractor must arrange for appropriate storage of the seed. Seed will be used within 12 months of testing as required by applicable state rules and regulations.

6.2 Temporary Revegetation

The primary focus of Enbridge’s temporary revegetation measures is to quickly establish ground cover vegetation, minimize potential soil erosion, and minimize noxious weed establishment. Contractors will utilize appropriate species for use as a temporary cover crop at an appropriate rate, as shown in the table below; other species can be utilized with prior approval from Enbridge. 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.

6.3 Timing for Temporary Vegetation

Temporary vegetation should be established between **April 1 and September 30** in work areas where 30 days or more will elapse between:

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

Enbridge may require the Contractor(s) to conduct temporary seeding in areas that will have bare soil for less than 30 days at site-specific locations near sensitive resource areas and/or areas prone to wind/water erosion. Attempts at temporary revegetation outside the above dates should be assessed on a site-specific basis and with approval from Enbridge.

Cover crop species should be selected based on availability and timing of the scheduled planting. Cool-season species should be selected for use in spring and late summer or fall planting windows; whereas warm-season species should be utilized for late spring and summer plantings. Mixes can be created to utilize warm-season and cool-season species and ensure successful establishment of temporary cover.

6.4 Temporary Use of Mulch

Straw mulch may be used to help stabilize areas during the establishment of temporary vegetation. The contractor(s) will apply mulch during the establishment of temporary vegetation in areas:

- requested by the Landowner or land managing agency;
- specified by the applicable permits or licenses; and/or
- as requested by Enbridge.

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 must be approved by Enbridge prior to purchase and copies of the applicable documentation must be provided to Enbridge.

Mulch used in conjunction with temporary revegetation efforts will be applied at a rate of 2 tons per acre unless otherwise stipulated. Mulch will be uniformly distributed by a mechanical mulch blower, or by hand in areas not accessible to the mulch blower. Strands of mulch will be a minimum of 8 inches in length to allow proper anchoring. Mulch will be anchored/crimped to a depth of 2-3 inches using a mulch-anchoring tool or disc set in the straight position to minimize loss by wind and water, as site conditions allow. Additional erosion control measures (e.g., silt fence, erosion control blankets, hydromulch) may also be applied as previously outlined.

6.5 Permanent Revegetation

Permanent vegetation will be established in areas where grading has occurred or where there is bare soil 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 A) are 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 must be adjusted as discussed in Section 6.12.

6.6 Upland Areas

Enbridge has a standard upland seed mix for restoring disturbed areas affected by the project (Appendix A, Table 1). 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.

6.7 Permanent Seeding of Wetland Areas

6.7.1 Unsaturated Wetland Areas

Non-standing water wetlands will be seeded with the annual ryegrass mix 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.

6.7.2 Saturated/Standing Water Wetlands

Enbridge does not propose to seed standing water wetland areas. It has been Enbridge's experience that the reestablishment of vegetation within standing water wetlands occurs without supplemental seeding.

6.7.3 Forested Wetland Restoration

Enbridge proposes to allow natural reforestation of the temporary workspace areas outside the permanent pipeline easement 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.

6.8 Permanent Seeding of Waterbody Banks

Enbridge will reestablish stream bank vegetation using the Upland seed mix listed in Appendix A, 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, Enbridge will reseed the banks with the applicable wetland seed mix.

6.9 Specialized Seed Mixes

The following specialized seed mixes (Appendix A, Tables 3 through 7) 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.
- High-quality Vegetation 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.

6.10 Conservation Reserve Program (CRP) properties

Enbridge's Land Agents will contact landowners where work areas may occur in 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 must meet the same criteria as other seed described in Section 6.1.

6.11 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 to a minimum depth of 4 inches with a disc, field cultivator, or chisel plow (or equivalent) to prepare a seedbed, breaking up large clods and firm the soil surface. The resulting seedbed must be soft enough to permit seed to be covered and mulch to be anchored, yet firm enough to support the weight of an adult without sinking into the soil more than about 1/2 inch. 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 in the project-specific Line List requirements and permits. No soil amendments will be applied in wetlands unless directed by the appropriate agencies.

6.12 Seeding methods

Seed will be applied uniformly at specified rates across the prepared ROW by drilling, broadcasting, or hydroseeding. Seeding activities will be suspended if conditions are such that equipment will cause rutting of the surface in the designated seeding areas. Enbridge will continue to monitor conditions to resume seeding activities as site conditions improve and according to the general seeding timing restrictions listed in Section 6.14.

6.12.1 Drill Seeding

Seeding equipment will be capable of uniformly distributing the seed and sowing it at the appropriate 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.

6.12.2 Broadcast Seeding

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

6.12.3 Hydroseeding

Hydroseeding rate will be double the drill seeding rate, or the same as broadcast seeding rate. Seed will be applied alone or in a seed, fertilizer and/or hydromulch slurry. If seeding is applied alone, the amount of hydromulch material will be adjusted to the seed slurry to show where seeding has taken place, providing a means to identify uniform cover of the ROW. Hydroseeders must provide continuous agitation and be capable of supplying a continuous, non-fluctuating flow of slurry. Hydroseed slurry will

not be held in the tank more than 1 hour before use. All hydromulch products used must be pre-approved by Enbridge and be on the applicable state Department of Transportation product list.

6.13 Soil Amendments

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 restricted by the landowner 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.

6.14 Seeding Periods

Seeding periods have been established in consultation with local and state agencies that have knowledge of the best times to establish vegetation in the work area. Date of seeding is a critical factor to determine the success of the revegetation effort. Seed should be applied as early as possible within the given seeding periods once favorable soil conditions have been attained.

Seeding Periods

Native Mixes with warm-season grasses	
Spring Permanent Seeding	May 1 to June 30 (for Northern tier states); April 15 to June 15 (elsewhere)
Dormant Seeding	Nov. 1 through April 1 unless ground is frozen or covered in snow
Non-native Mixes with cool-season grasses	
Temporary seeding	April 1 to September 1 (for Northern tier states) March 15 to September 15 (elsewhere)
Spring permanent seeding	April 1 to June 15 (for Northern tier states); March 15 to June 1 (elsewhere)
Summer permanent seeding	August 1 to September 15 (for northern tier states) August 20 to September 30 (elsewhere)

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.

6.15 Timing of Final Seeding

Upon final grading of the 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 (e.g., mulch, erosion control matting).

6.16 Mulch

Straw mulch 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 requested 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 must be approved by Enbridge prior to purchase and copies of the applicable documentation must be provided to Enbridge.

Mulch will be applied at a rate of 2 tons per acre 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. Strands of mulch will be a minimum of 8 inches in length to allow proper anchoring. Mulch will be anchored/crimped to a depth of 2 to 3 inches using a mulch-anchoring tool or disc set in the straight position to minimize loss by wind and water. In areas not accessible to a mulch-anchoring tool, 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. Mulch will not be applied in wetlands or actively cultivated farmland.

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 must be on the applicable state Department of Transportation product list. Application rates will be at the manufacturer's recommended rate, equal to or greater than 2 tons per acre of straw mulch.

6.17 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 streambanks and ditchbanks and as directed by Enbridge. Erosion control blankets will be used according to the manufacturer's recommendations as to weight and material for the specific application. Erosion control blankets will be anchored according to the manufacturer's recommendations.

6.18 Dormant Seeding

Dormant seeding is conducted 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 Plan.

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:

- 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 Enbridge.

6.19 Monitoring

Enbridge will monitor and address all areas where stabilization techniques have been implemented in accordance with conditions identified in the applicable permits and/or licenses.

7.0 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. A ripper should be used to break up the frozen topsoil. 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.

Heavy construction equipment use and travel along the 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 must 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 must stabilize the area and temporary erosion control measures must 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. The Contractor must monitor areas until final restoration is complete.

Other than those issues discussed above, most environmental requirements can be successfully implemented by the Contractor during winter construction.

8.0 WASTE MANAGEMENT AND CONTAMINATED SOIL

Solid and hazardous materials and wastes that are used or generated as a result of the maintenance activities will be handled and stored in accordance with applicable federal and/or state criteria. All waste materials are to be collected daily in approved containers. At the end of the maintenance project the containers of waste from the site shall be removed and disposed of in accordance with all federal, state and local regulations, licenses and ordinances. The Contractor and Enbridge will determine if the materials and wastes classify as hazardous materials and/or wastes in accordance with applicable federal and/or state criteria. All wastes determined to be hazardous will be handled and disposed of in accordance with federal and state regulations including but not limited to assurances that waste contain proper labeling, are handled safely by trained personnel, and disposal received proper documentation. All free standing hazardous materials containers and secondary containment structures shall be placed on asphalt, concrete or competent ground at least 100 feet away from environmentally sensitive receptors or conveyances to such receptors (e.g., ditches).

8.1 Abrasive Blast

The Contractor is responsible for containing all abrasive blast at maintenance locations and placing all spent abrasive into appropriate containers as provided by Enbridge. The containers shall be covered with appropriate means of rainwater and stormwater control to prevent waters from entering or exiting the container. Enbridge will be responsible for disposal of the spent abrasive in accordance with applicable federal, state and local regulatory requirements.

8.2 Contaminated Soil

While unlikely, oily soil may be encountered during maintenance excavations as result of past (old) contamination or from an ongoing source. The Contractor shall report all occurrences of oily soil to Enbridge immediately. The Contractor is not to report externally. Enbridge will coordinate proper response including storage and disposal if necessary. Excavated contaminated soil must be contained so contamination is not spread to other soils or to water through infiltration, run-on, or runoff. Enbridge will assist in the identification of a suitable location for containment or disposal of contaminated soils where it will not interfere with the project or other activities that may be occurring on site. Containment shall be accomplished through the construction of a containment cell consisting of an earthen berm with a plastic liner. Contaminated soil shall be placed in the containment cell and covered with plastic extending outside the bermed area and anchored with clean soil or other material. Contaminated soil shall not be used for backfill without prior written approval.

9.0 SPILL PREVENTION, CONTAINMENT, AND CONTROL PROCEDURES

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 maintenance work. These measures will be implemented by the Contractor working on Enbridge maintenance digs, unless otherwise indicated by Enbridge.

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. 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.

In the event of a spill, the Contractor will abide by all applicable federal, tribal, state and local regulations with respect to cleaning up the spill. All cleanup and other construction related spill activities must be completed by, and costs assumed by the Contractor.

9.1 PLANNING

9.1.1 Equipment

- The Contractor must 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 shall be located near fuel storage areas and other locations as necessary to be readily available to control foreseeable spills.
- All fuel, and where necessary, service vehicles, shall carry spill containment 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 a shovel.
- Construction equipment shall be removed from wetlands and parked a minimum of 100 feet away from streams, wetlands, ditches, and other waterbodies at the end of each work day.
- In large wetlands where no upland site is available for refueling, auxiliary fuel tanks on construction equipment are recommended.
- All fuel nozzles shall be equipped with functional automatic shut-offs and over-flow alarms.

9.1.2 Supervision and Inspection

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

9.2 HANDLING OF FUELS/HAZARDOUS LIQUIDS

9.2.1 Refueling

- Fuels shall be dispensed during daylight hours only.
- Fuel dispensing operations shall be attended at all times. Personnel must be stationed at both ends of the hose during fueling unless both ends are visible and are readily accessible by one person.
- Fuel dispensing equipment (i.e., portable gas cans, nozzles, hoses, etc.) shall be of the appropriate type. Consult with the Contractor Safety Program (CSP) for details.

9.2.2 Refueling and Fuel Storage near Wetlands and Waterbodies

Enbridge requires that the storage of petroleum products, refueling, lubricating and maintenance 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 must store hazardous materials, chemicals, fuel, and lubricating oils outside these areas. Auxiliary fuel tanks solidly attached to construction equipment or pumps are not considered storage and are acceptable.

In certain instances, refueling or fuel storage within the 100-foot buffer may be unavoidable due to site-specific conditions or unique construction requirements (e.g. continuously operating pumps or equipment on barges). These locations must be identified by the Contractor and approved in advance by Enbridge Environment. 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 must be kept on hand by each construction crew to enable the rapid cleanup of any spill which may occur.
- If fuel must be stored within wetlands or near streams for refueling of continuously operating pumps, secondary containment must be provided.
- Secondary containment structures must 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.
- Overnight parking of equipment is not allowed within 100 feet of a wetland or waterbody unless special containment provisions have been implemented

9.3 INITIAL SPILL MANAGEMENT, NOTIFICATION, CONTAINMENT AND CLEANUP

9.3.1 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 Contractor discovering the situation shall do the following, regardless of volume:

- 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 Construction Manager and Enbridge Environment and provide them with the following information:
 - Location and cause of the spill
 - The type of material that has spilled
 - Whether the spill has reached or is likely to reach any surface water
 - Whether the spill is beyond the scope of on-site equipment and personnel
- In the event of a pipeline spill (to an adjacent pipeline), Enbridge's Emergency Pipeline Control Center must be notified at 1-800-858-5253 (24-hours/day), as well as the Construction Manager and Enbridge Environment. Actions requiring emergency response employees and contractors will be coordinated by the Construction Manager.

9.3.2 Reporting

The Contractor shall complete a Spill Report Form (Appendix B) for each release of a regulated substance, regardless of volume. The Spill Report Form must be submitted to the Construction Manager and Enbridge Environment within 24 hours of the occurrence of a spill.

Enbridge Environment will report spills to the appropriate federal, tribal, state and local agencies as soon as possible.

Follow-up written reports, associated laboratory analyses, confirmatory field sampling and other documentation may also be required separately on a site-specific basis as directed by Enbridge Environment. Documentation is the responsibility of the Contractor. 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.

9.3.3 Spill Control

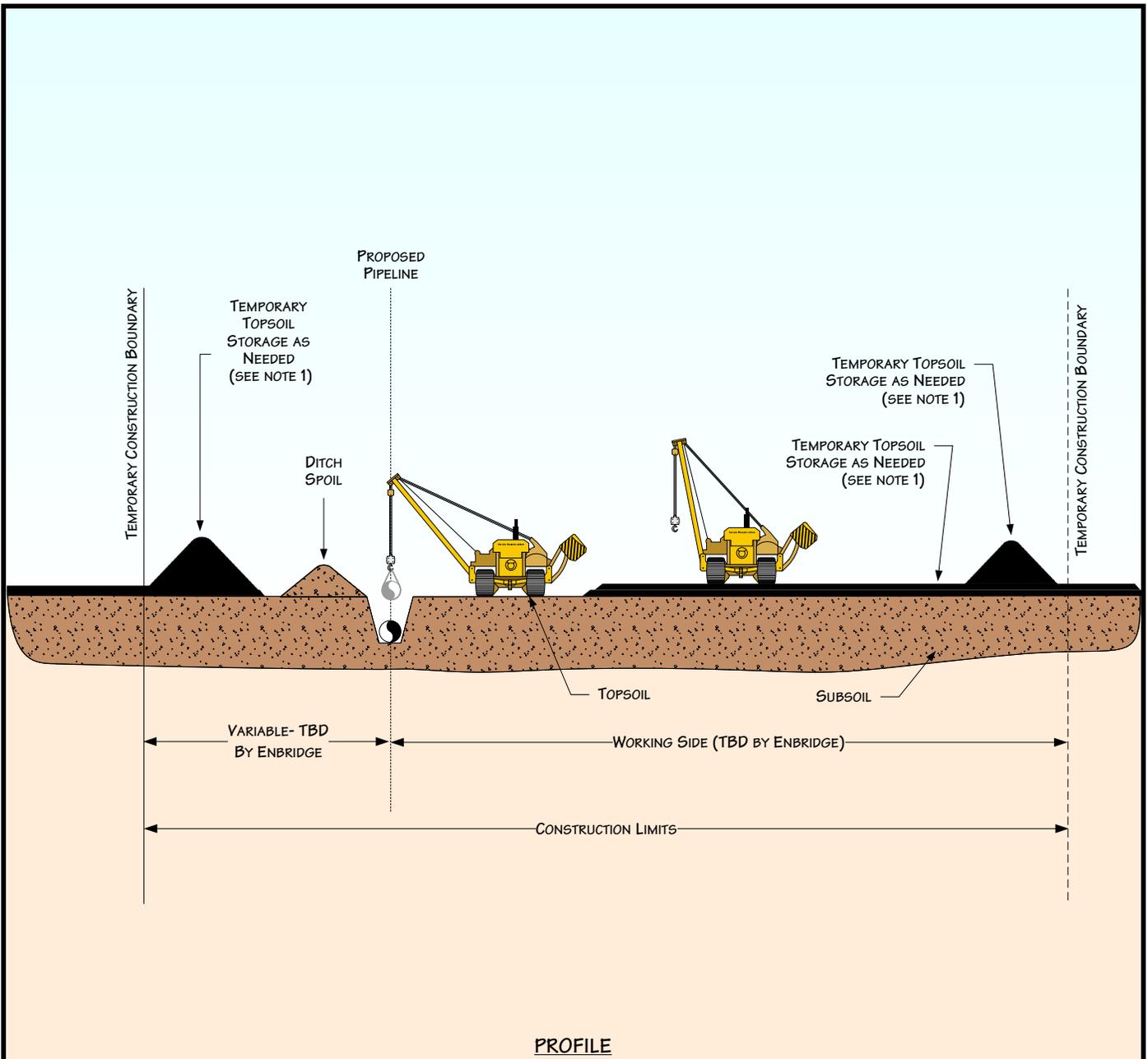
- If a spill should occur during refueling operations, STOP the refueling operation until the spill can be controlled and the situation corrected.
- The source of the spill must be identified and contained immediately.
- For large spills on land, the spill must be contained and pumped immediately into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

- Smaller spills on land shall be cleaned up with absorbent materials. Contaminated soil or other materials associated with these releases shall also be collected and disposed of in accordance with applicable regulations.
- Flowing spills must be contained and/or absorbed before reaching surface waters or wetlands.
- Absorbent material(s) shall be placed over spills to minimize spreading and to reduce its penetration into the soil.
- The Construction Manager, in consultation with appropriate agencies, determine when spill sites will be evacuated as necessary to safeguard human health. Evacuation parameters shall include consideration for the potential of fire, explosion, and hazardous gases.
- If a spill occurs near or into a stream, wetland or other waterbody, regardless of size, the following apply:
 - Contractor Representative must notify the National Response Center immediately.
 - For spills in standing water, sorbent booms and pads shall be on hand and used by the Contractor to contain and recover released materials. In addition, other spill response materials and equipment shall be on hand as appropriate for each waterbody and used to contain and recover foreseeable spills. This may include containment booms, skimmer pumps, holding tanks, boats, and other equipment.
 - If necessary, for large spills in waterbodies, an Emergency Response Contractor must be secured to further contain and clean up the spill.
 - Contaminated soils in wetlands must be excavated and temporarily placed on plastic sheeting in a bermed area, a minimum of 100 feet away from the wetland. Contaminated soils shall be covered with plastic sheeting while being stored temporarily and properly disposed of as soon as possible.

9.4 STORAGE AND DISPOSAL OF CONTAMINATED MATERIALS

- All contaminated soils, absorbent materials, and other wastes shall be labeled, stored, transported, and disposed of by the Contractor in accordance with all applicable state and federal regulations.

Figures



PROFILE

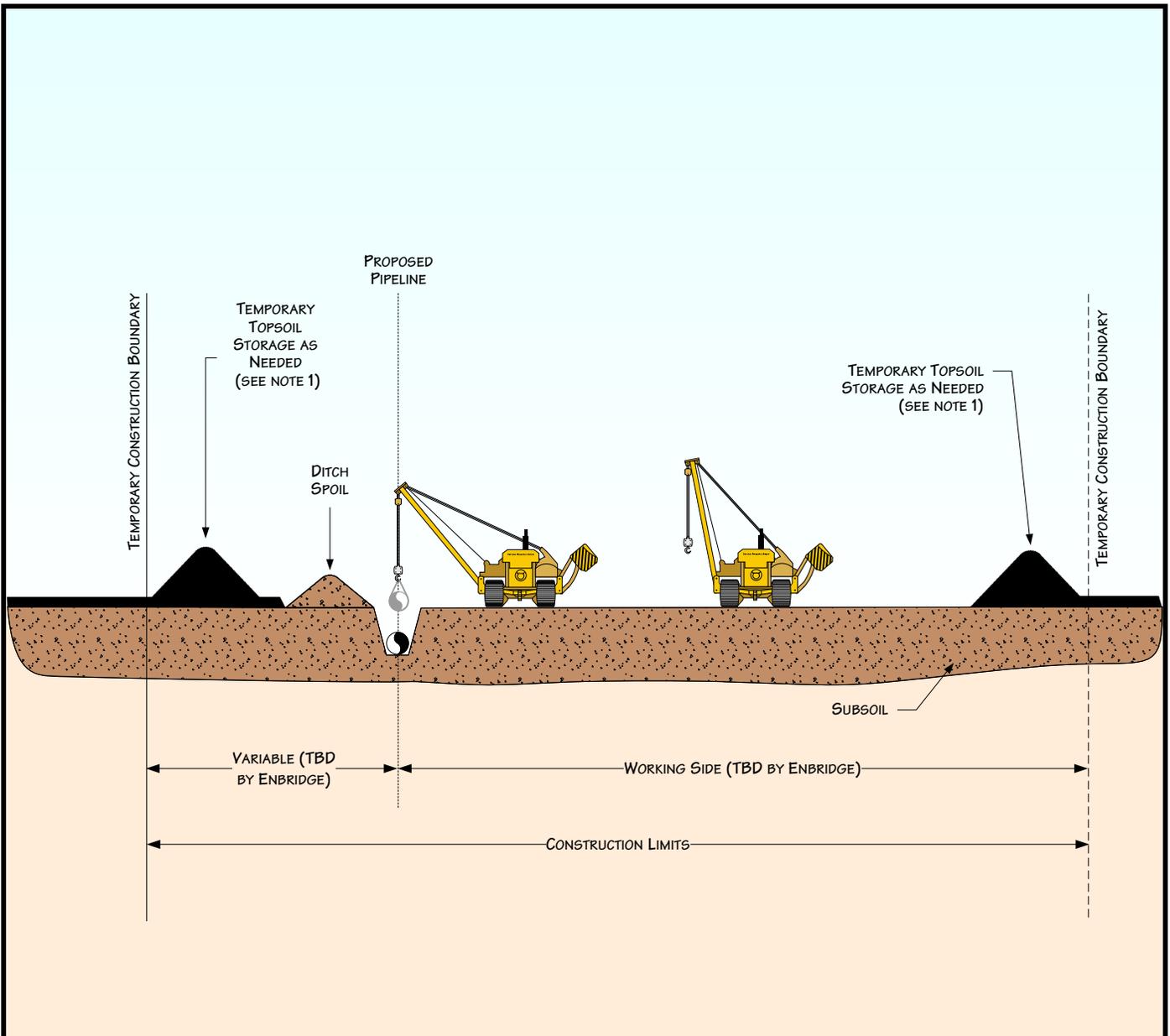
NOTES:

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



Figure 1
Environmental Mitigation Plan
 Typical Topsoil Segregation –
 Modified Ditch Plus Spoil Side

DATE: 7/9/2001	
REVISED: 3/11/2011	
SCALE: NTS	
DRAWN BY: JPBOENTJE	
<small> K:\CLIENT_PROJECTS\ID-FEEL\2011-019\ FIG_1- 3_TYPICAL_TOPSOIL_SEGREGATION.VSD </small>	



PROFILE

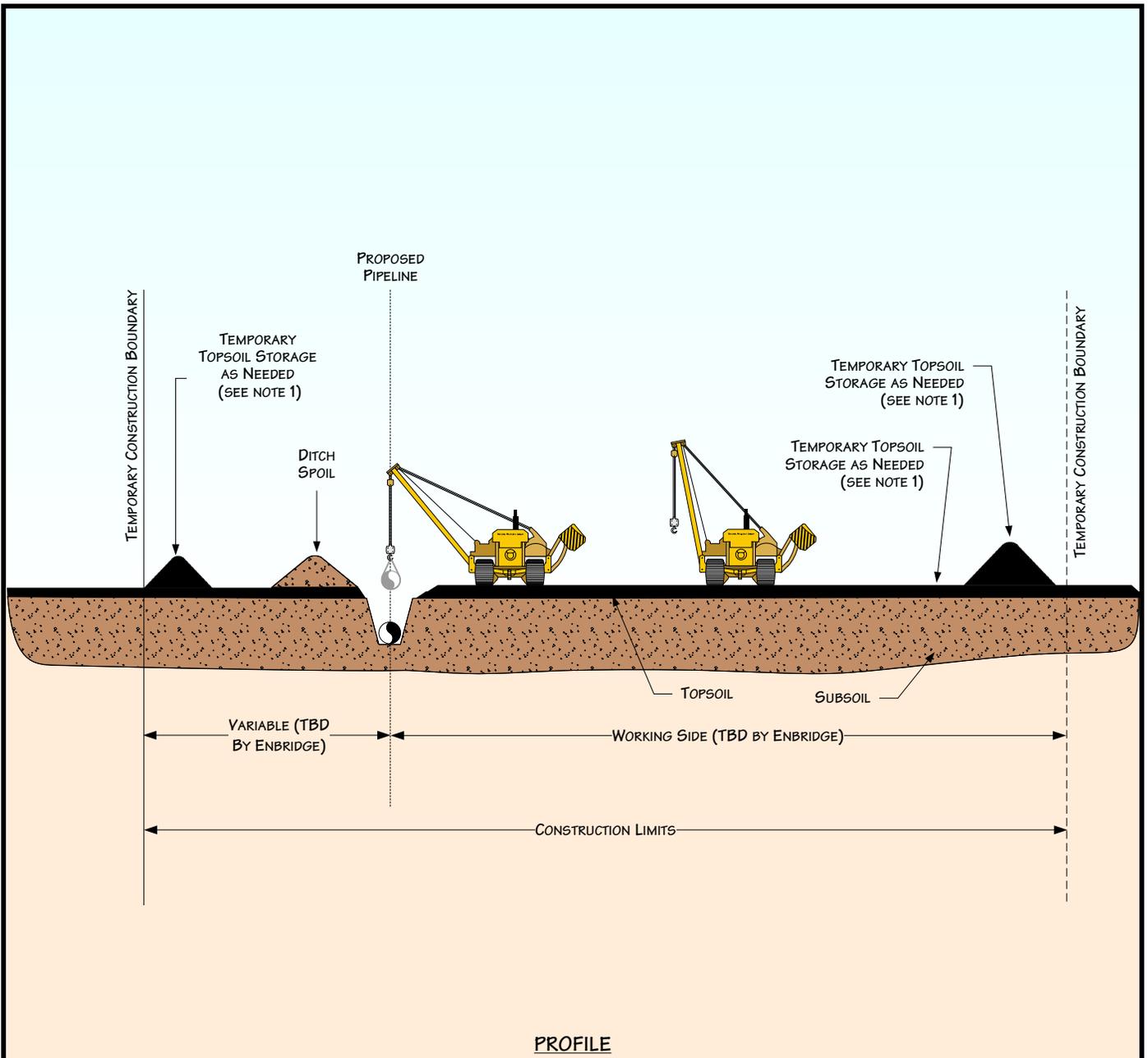
NOTES:

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



Figure 2
Environmental Mitigation Plan
 Typical Topsoil Segregation - Full Right-of-Way

DATE: 7/9/2001	
REVISED: 3/11/2011	
SCALE: NTS	
DRAWN BY: JPBOENTJE	
K:\CLIENT_PROJECTS\ID-FIEEL\2011-019\FIG_1-3_TYPICAL_TOPSOIL_SEGREGATION.VSD	



PROFILE

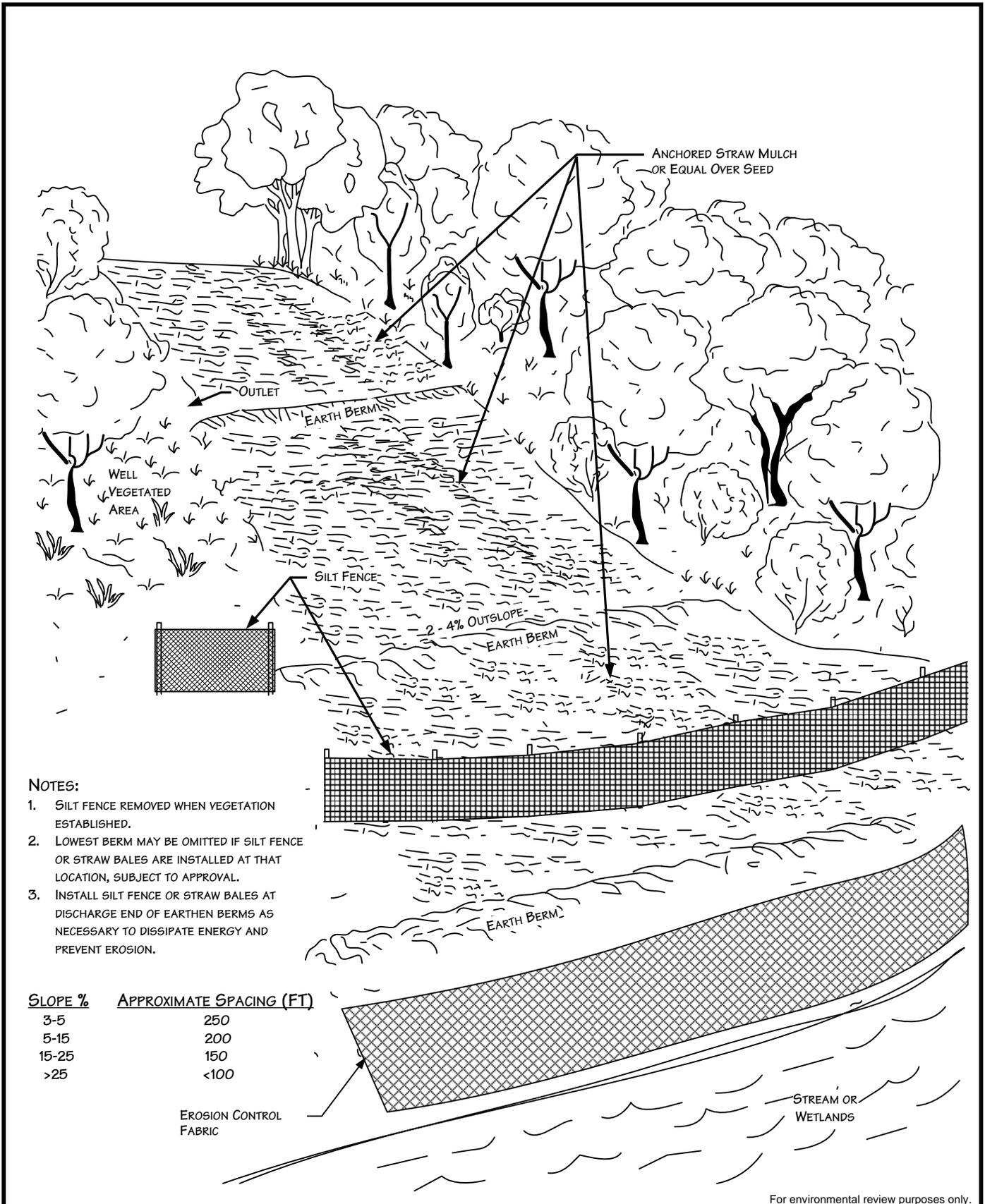
NOTES:

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



Figure 3
Environmental Mitigation Plan
 Typical Topsoil Segregation –
 Trench Line Only

DATE: 7/9/2001	
REVISED: 3/11/2011	
SCALE: NTS	
DRAWN BY: JPBOENTJE	
<small> K:\CLIENT_PROJECTS\ID-FEEL\2011-019\ FIG_1- 3_TYPICAL_TOPSOIL_SEGREGATION.VSD </small>	



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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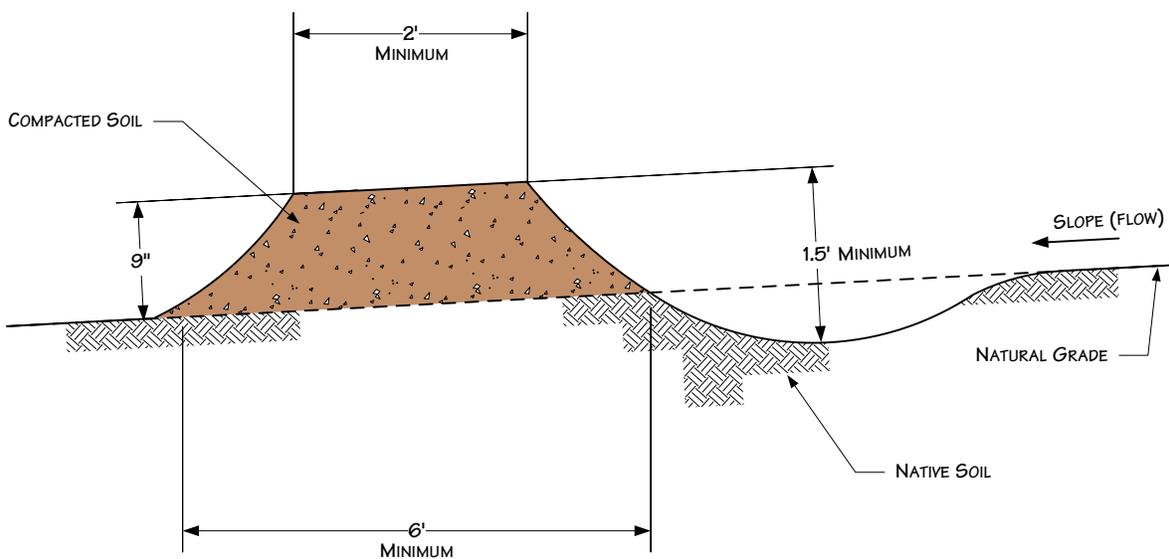


Figure 4
Environmental Mitigation Plan
 Typical Temporary or Permanent Berms
 Perspective View

DATE: 11/14/2000
 REVISED: 3/11/2011
 SCALE: NTS
 DRAWN BY: KMKENDALL

K:_CLIENT_PROJECTS\SD-FEEL\2011-019\FIG_4_BERMS_PERSPECTIVE_VIEW.VSD





NOTES

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

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Figure 5
Environmental Mitigation Plan
 Typical Temporary or Permanent Berms
 Elevation View

DATE: 5/25/2001

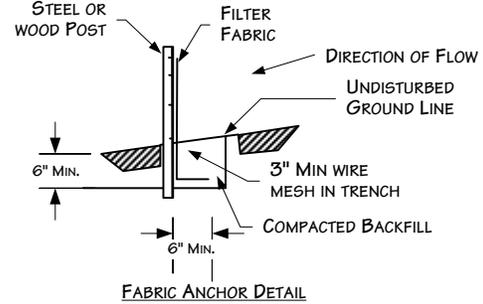
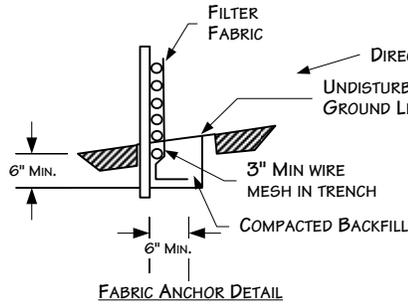
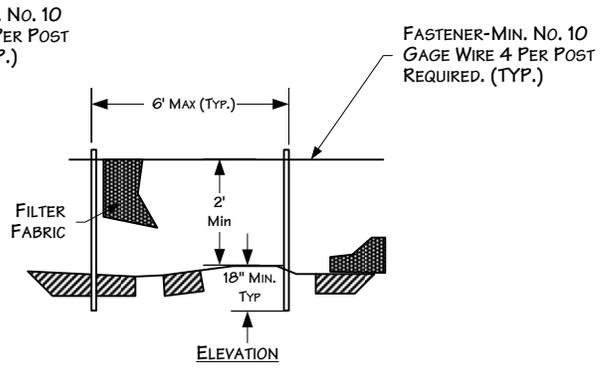
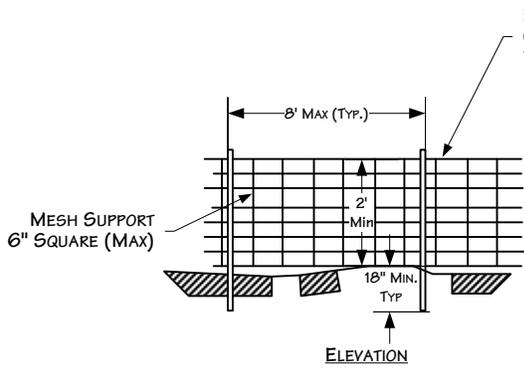
REVISED: 3/11/2011

SCALE: NTS

DRAWN BY: KMKENDALL

K:\CLIENT_PROJECTS\SD-PEEL\2011-019\FIG_5_BERMS_ELEVATION_VIEW.VSD



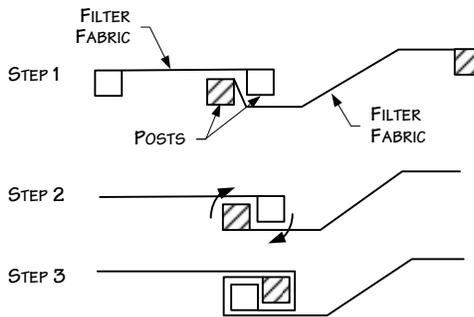


SILT FENCE WITH WIRE SUPPORT PLAN

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.

For environmental review purposes only.



Figure 6
Environmental Mitigation Plan
Typical Silt Fence Installation

DATE: 5/25/2001

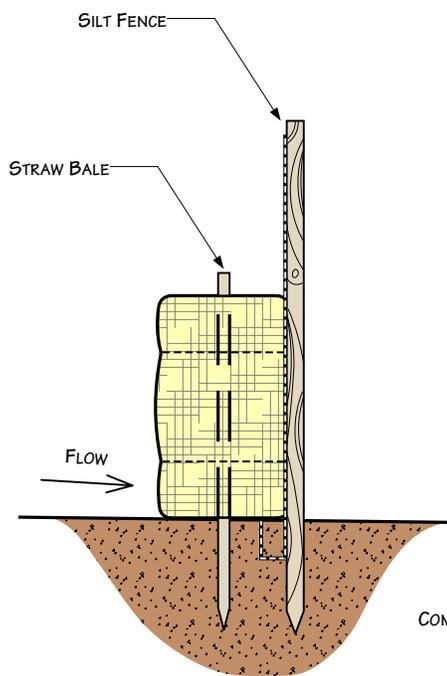
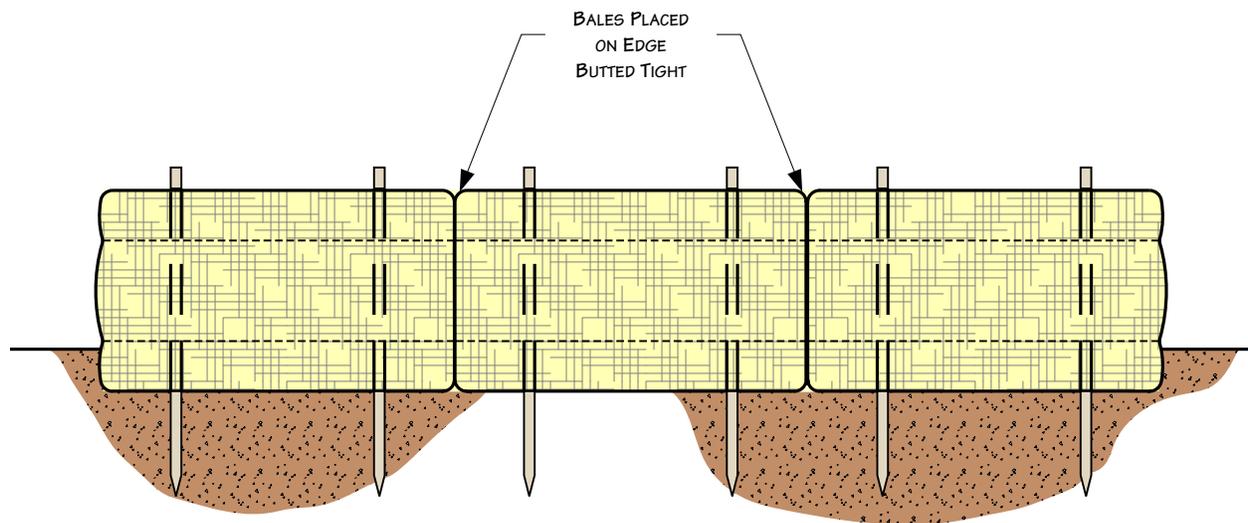
REVISED: 3/23/2011

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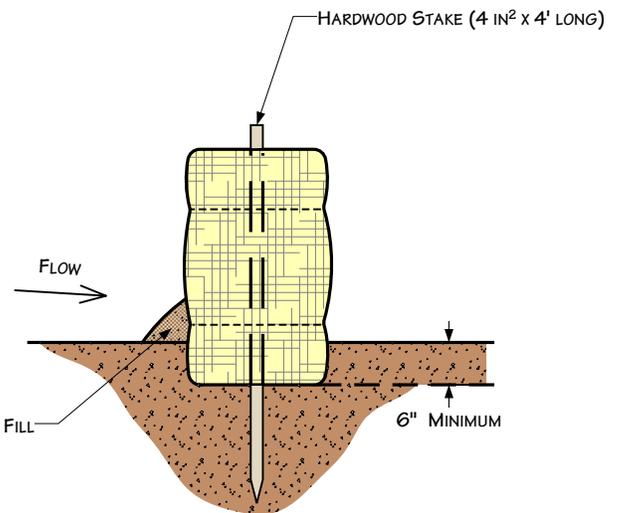
DRAWN BY: KMKENDALL

K:\CLIENT_PROJECTS\SD-PEEL\2011-019\FIG_6_SILT_FENCE_INSTALL.VSD





STRAW BALES & SILT FENCE



STRAW BALES ONLY

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Figure 7
Environmental Mitigation Plan
 Typical Straw Bale Installation

DATE: 5/25/01

REVISED: 3/11/11

SCALE: Not to Scale

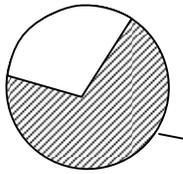
DRAWN BY: KMKENDALL

K:\CLIENT PROJECTS\ID-FEEL\2011-019\FIG_7_STRAW_BALE_INSTALL.VSD

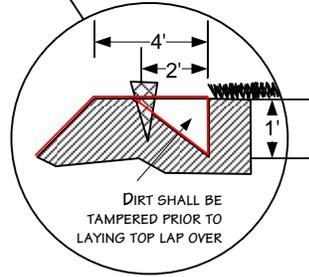
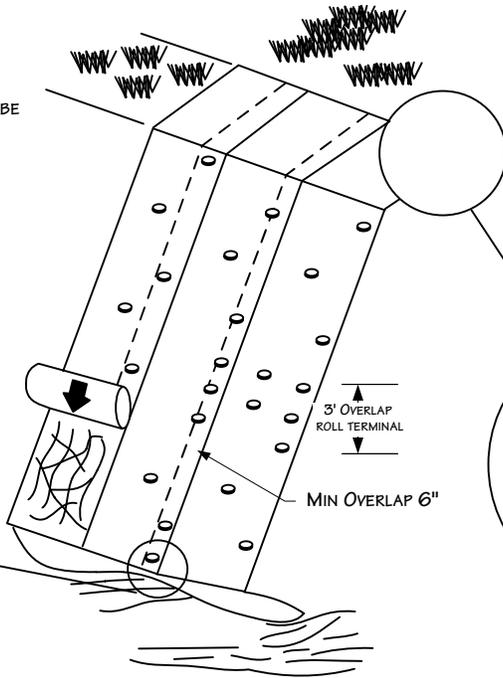


FILL SLOPE SECTION
 EROSION CONTROL BLANKETS SHOULD BE
 INSTALLED VERTICALLY DOWNSLOPE.

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.

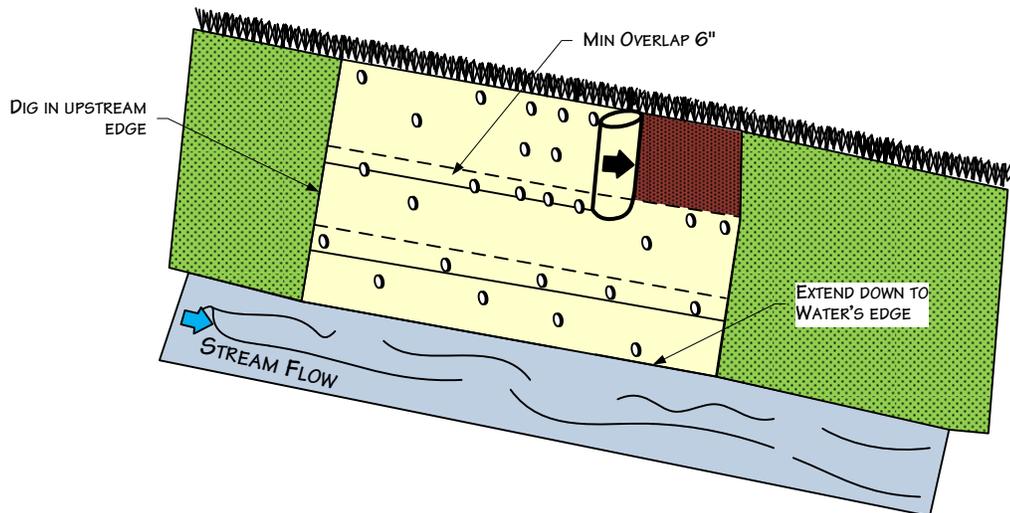


TOE
 MAINTAIN SLOPE ANGLE



BERM
 TRENCH INTO BERM AND
 PROGRESS DOWNSLOPE

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



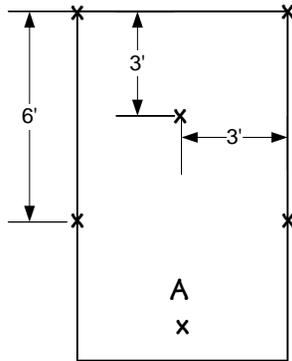
For environmental review purposes only.



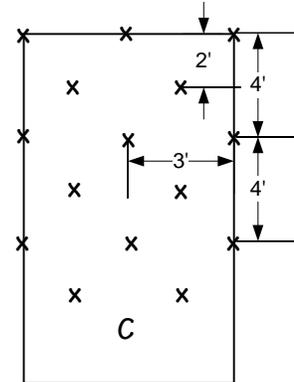
Figure 8
 Environmental Mitigation Plan
 Typical Erosion Control Blanket Installation

DATE: 5/25/2001
 REVISED: 3/23/2011
 SCALE: NTS
 DRAWN BY: KMKENDALL
K:\CLIENT_PROJECTS\ID-FEEL\2011-019\FIG 8 EROSION CONTROL BLANKET_INSTALL.VSD

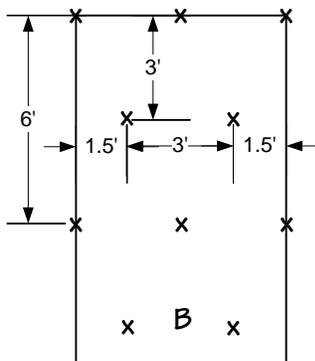
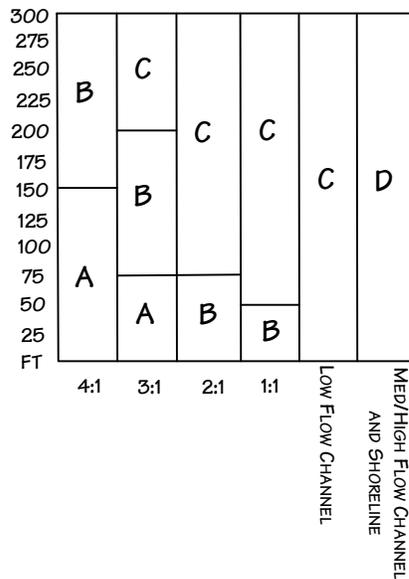




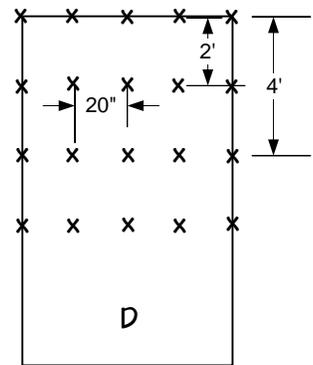
1 STAPLE PER SQ. YD



2 STAPLES PER SQ. YD



1 1/2 STAPLES PER SQ. YD



3 1/2 STAPLES PER SQ. YD

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

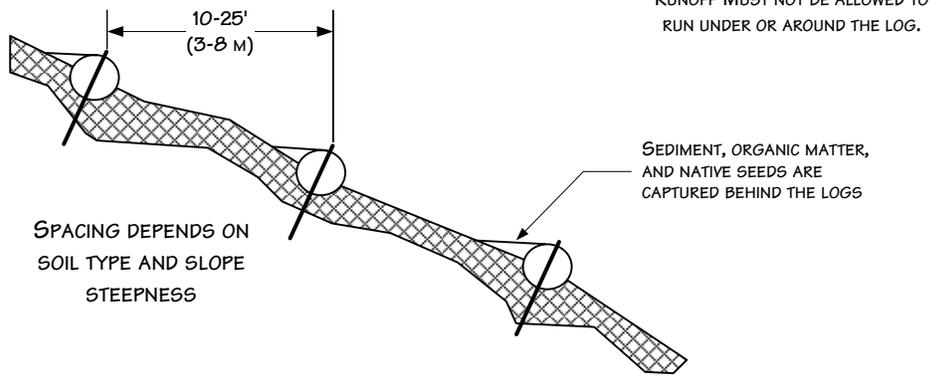
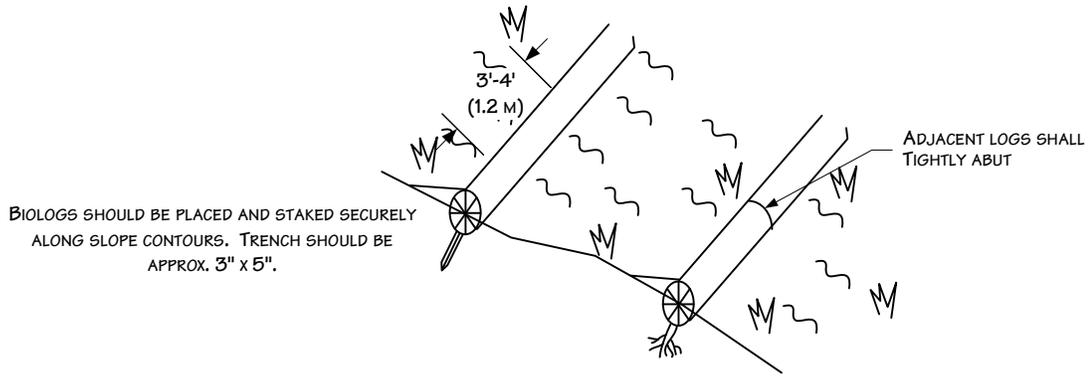
For environmental review purposes only.



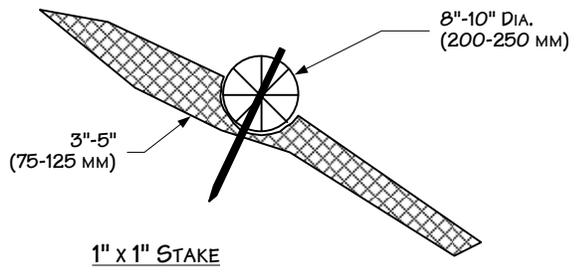
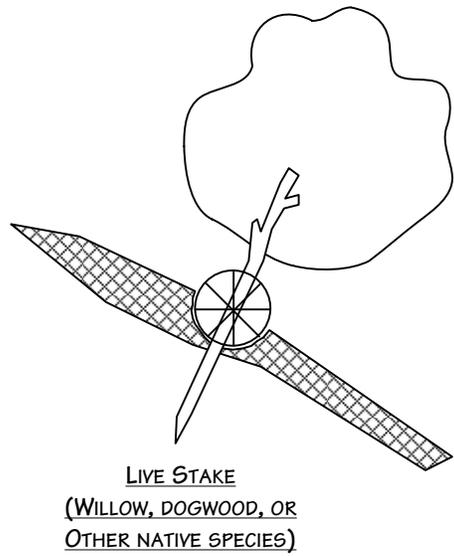
Figure 9
Environmental Mitigation Plan
Typical Staple Pattern for
Erosion Control Fabric

DATE: 5/25/2001
REVISED: 3/24/2011
SCALE: NTS
DRAWN BY: KMKENDALL
K:\CLIENT_PROJECTS\ID-FEEL\2011-019\FIG 9_STAPLE_PATTERN_EROSION_CON TROL_FABRIC.VSD





RUNOFF MUST NOT BE ALLOWED TO RUN UNDER OR AROUND THE LOG.

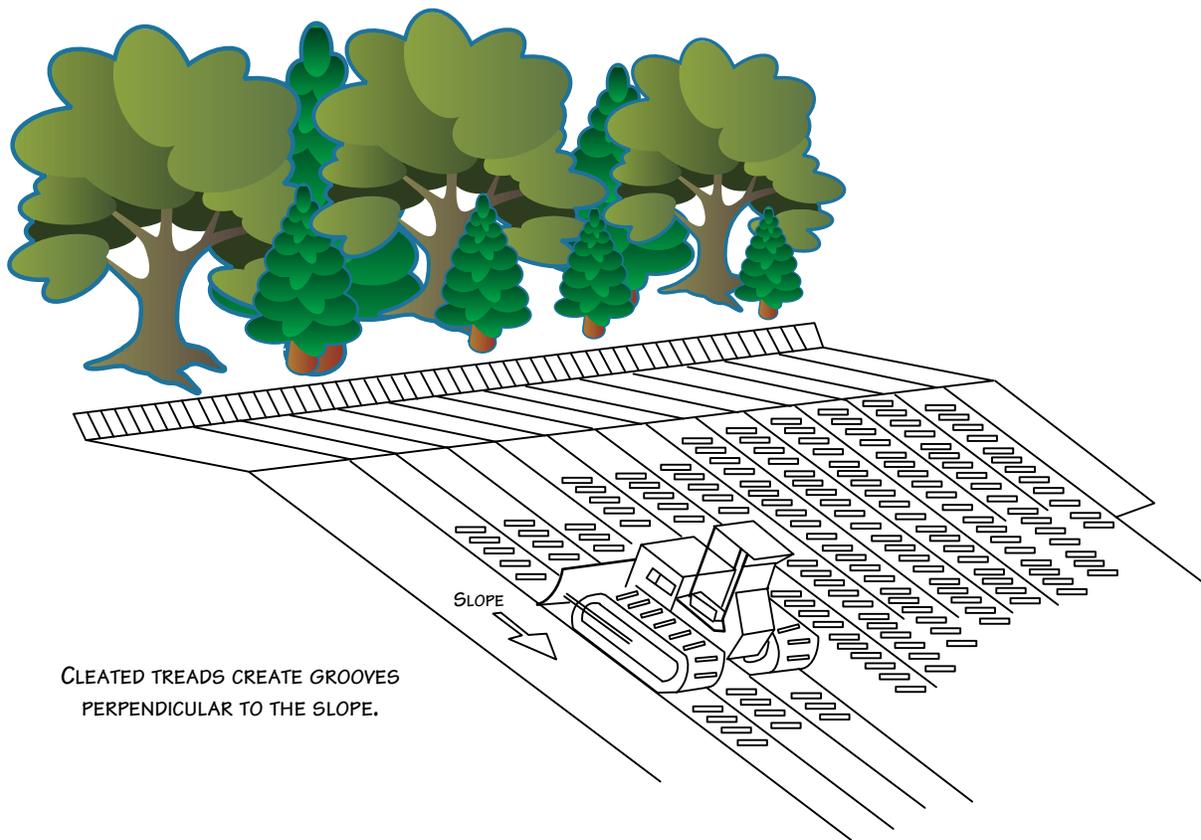


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Figure 10
Environmental Mitigation Plan
Typical Biolog Installation

DATE: 5/25/2001	
REVISED: 3/24/2011	
SCALE: NTS	
DRAWN BY: KMKENDALL	
K:_CLIENT_PROJECTS\SD-FEEL\2011-019\FIG_10_BIOLOG_INSTALL.VSD	



CLEATED TREADS CREATE GROOVES
PERPENDICULAR TO THE SLOPE.

For environmental review purposes only.



Figure 11
Environmental Mitigation Plan
Typical Cat Tracking

DATE: 5/25/2001

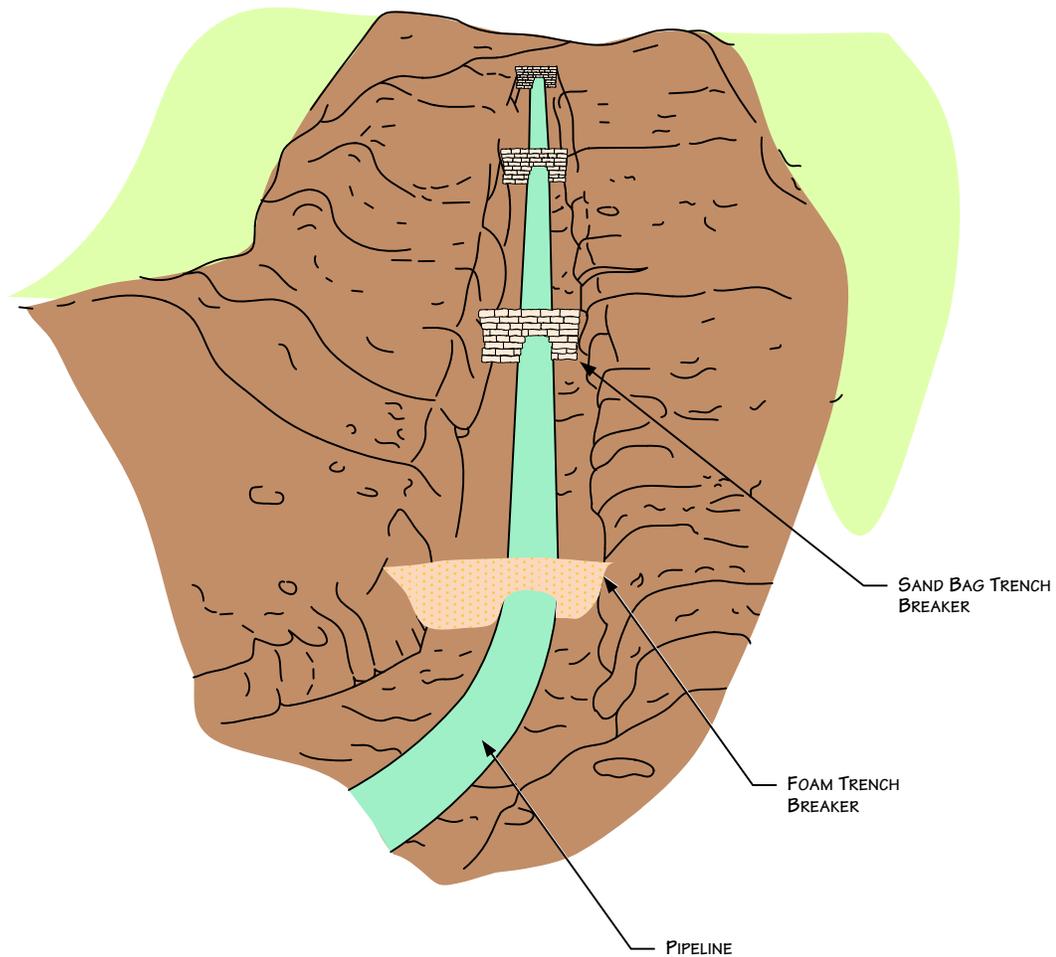
REVISED: 3/24/2011

SCALE: NTS

DRAWN BY: KMKENDALL

K:_CLIENT_PROJECTS\ID-FEEL\2011-019\
FIG_11_CAT_TRACKING.VSD





NOTES

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

For environmental review purposes only.



Figure 12
Environmental Mitigation Plan
 Typical Trench Breakers - Perspective View

DATE: 5/25/2001

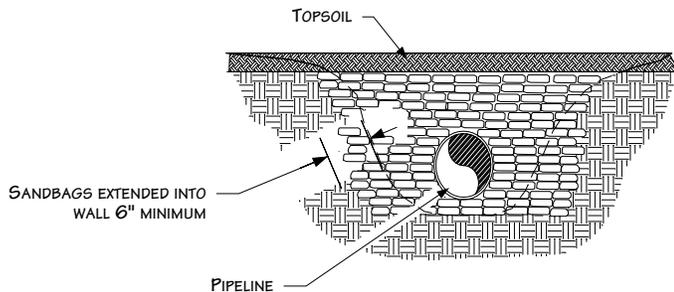
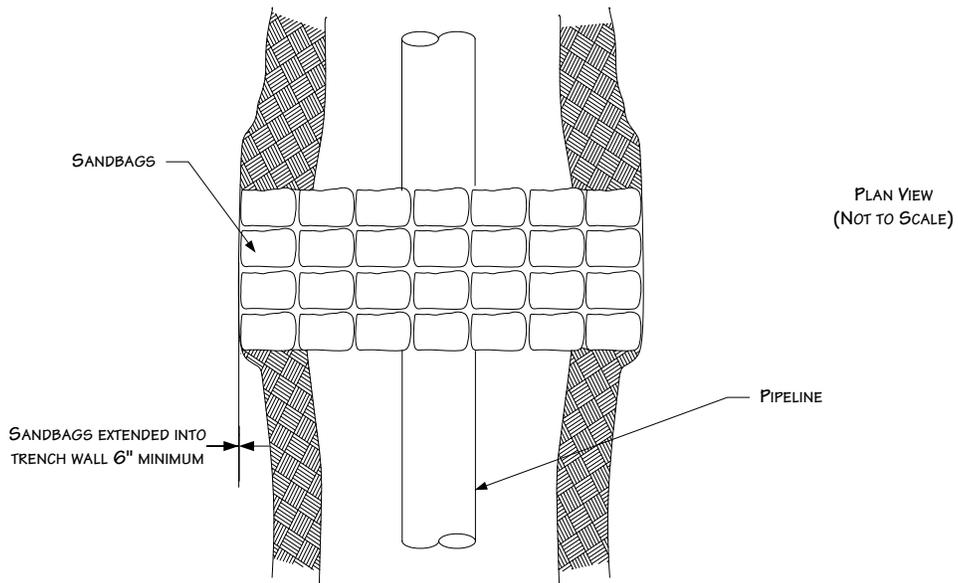
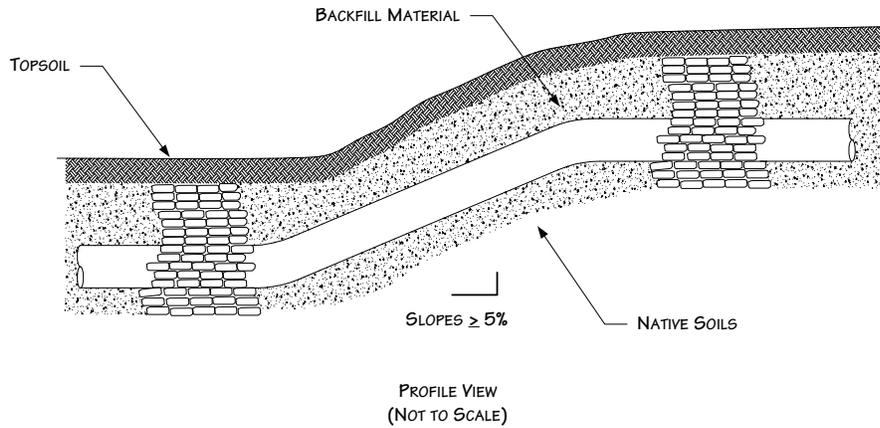
REVISED: 3/11/11

SCALE: NTS

DRAWN BY: KMKENDALL

K:\CLIENT_PROJECTS\ID-FEEL\2011-019\FIG_12_TRENCH_BREAKER_PERSPECTIV E_VIEW.VSD





NOTES

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

For environmental review purposes only.



Figure 13
Environmental Mitigation Plan
 Typical Trench Breakers – Plan & Profile View

DATE: 11/15/2000

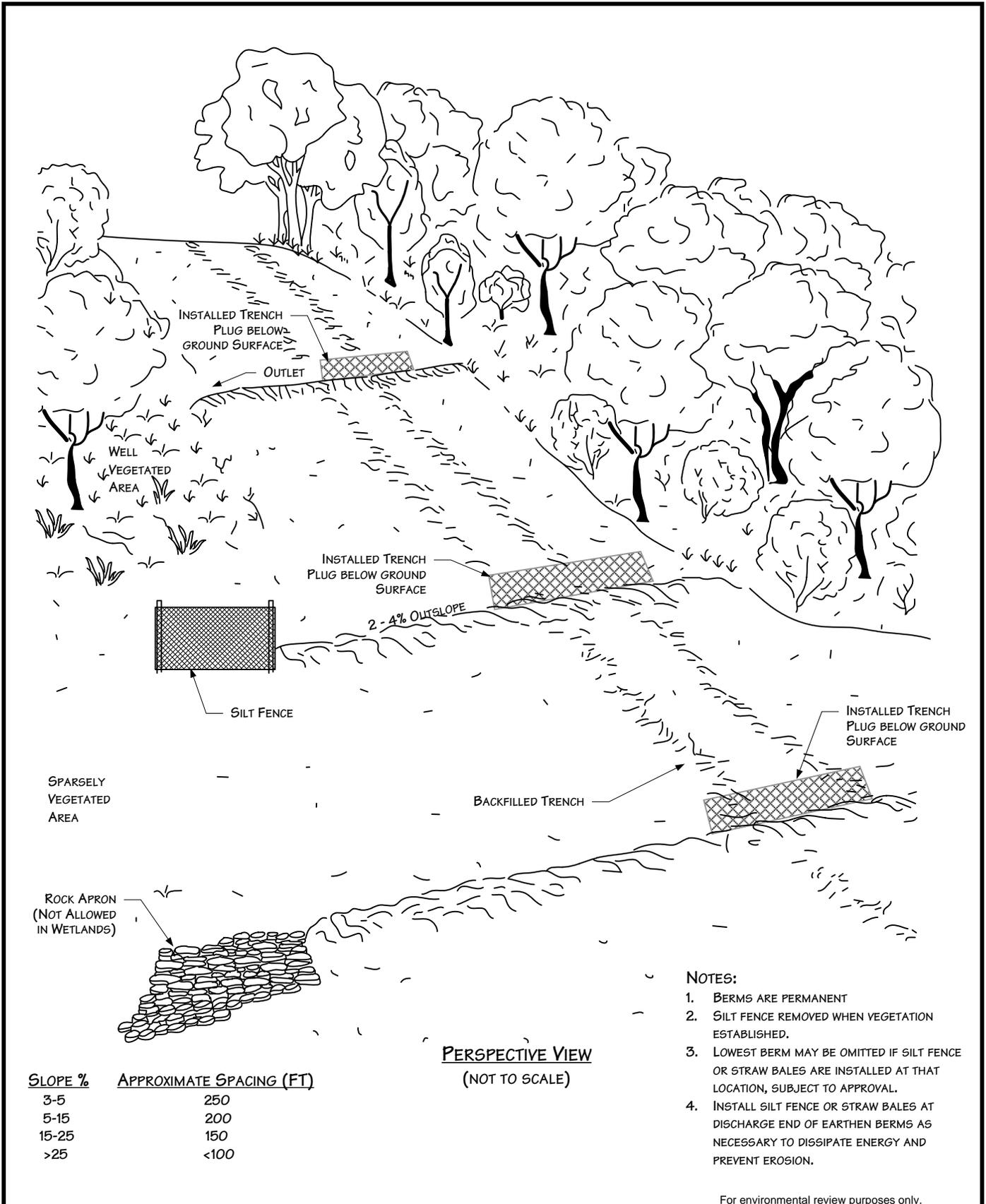
REVISED: 3/11/11

SCALE: NTS

DRAWN BY: KMKENDALL

K:\CLIENT PROJECTS\ID-FEEL\2011-019\FIG_13_TRENCH_BREAKER_PLAN_PROFIL_E_VIEW.VSD





PERSPECTIVE VIEW
(NOT TO SCALE)

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

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

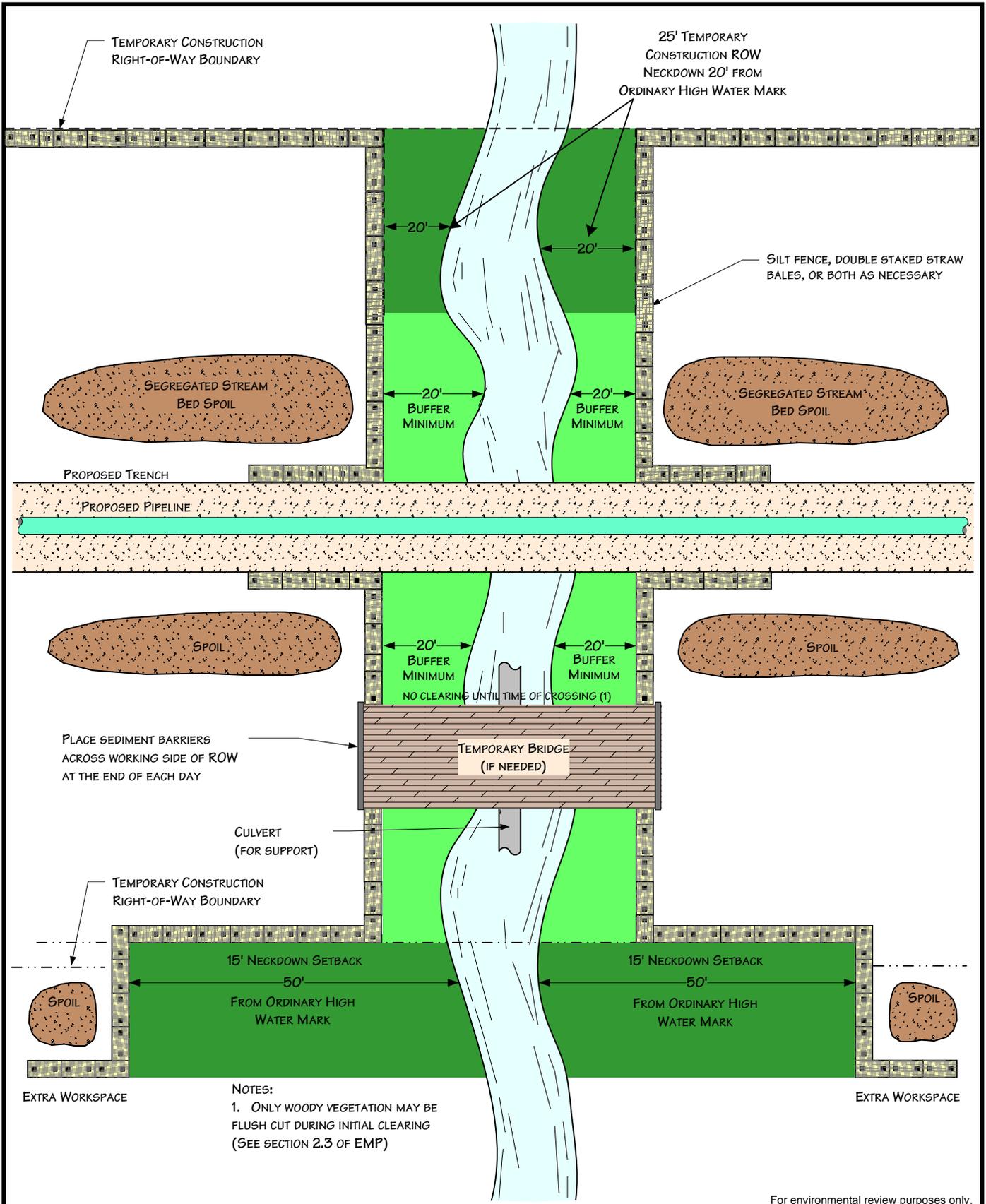
For environmental review purposes only.



Figure 14
Environmental Mitigation Plan
Permanent Slope Breakers - Perspective View

DATE: 5/25/2001
 REVISED: 3/11/11
 SCALE: NTS
 DRAWN BY: KMKENDALL
 K:\CLIENT_PROJECTS\ID-FEEL\2011-019\FIG_14_SLOPE_BREAKERS_PERSPECTIVE_VIEW.VSD





For environmental review purposes only.



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

DATE: 11/29/2005

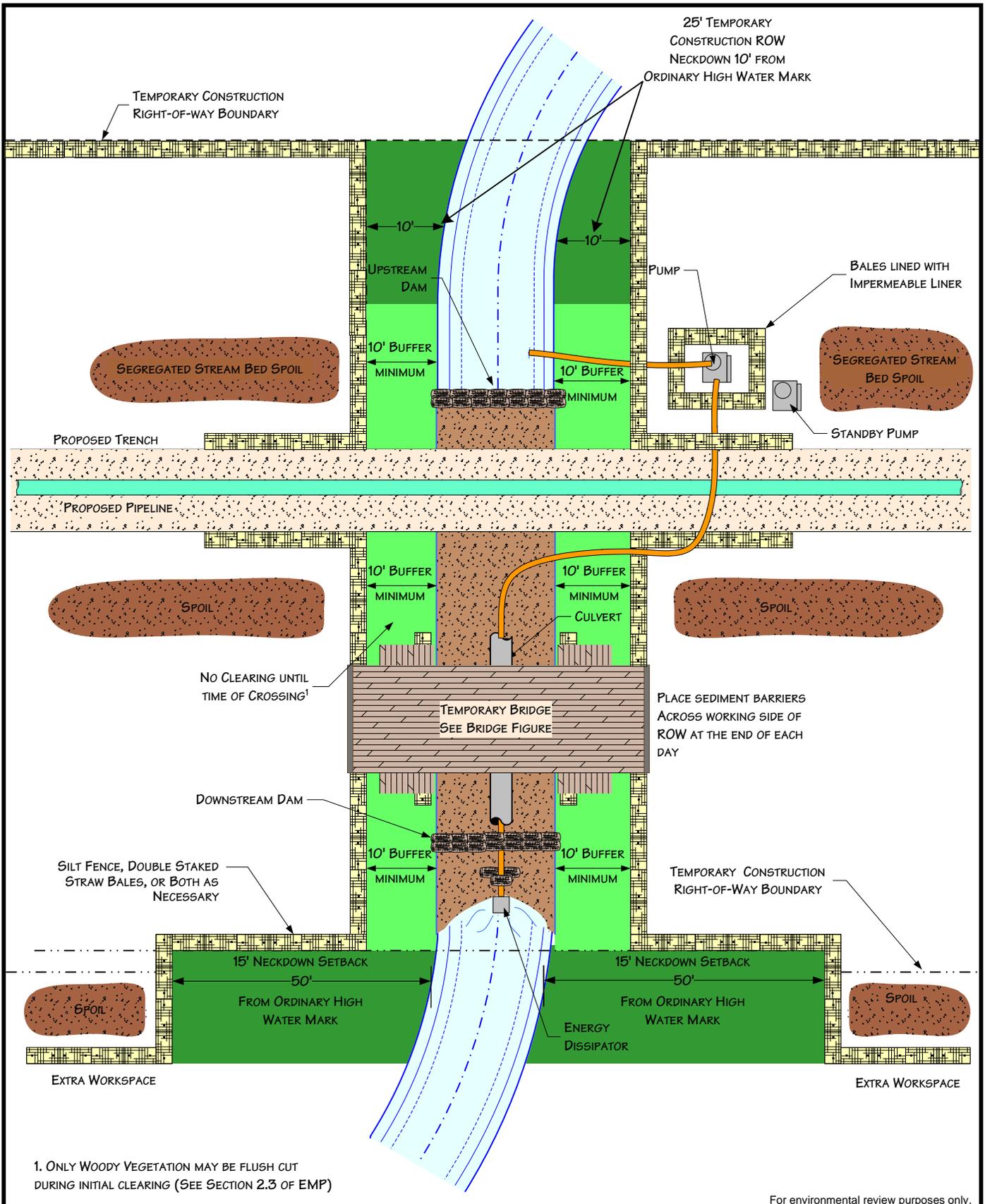
REVISED: 3/11/11

SCALE: NTS

DRAWN BY: JPB

K:\CLIENT PROJECTS\D-PEEL\2011-019\FIG_15_WATERBODY_OPENCUT_WETTRENCH.VSD





For environmental review purposes only.



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

DATE: 11/29/2005	
REVISED: 4/20/09	
SCALE: NTS	
DRAWN BY: JPB	
<small>K:\CLIENT_PROJECTS\ID-PEEL\2011-019\FIG_16_WATERBODY_DAM_AND_PUMP_VSD</small>	

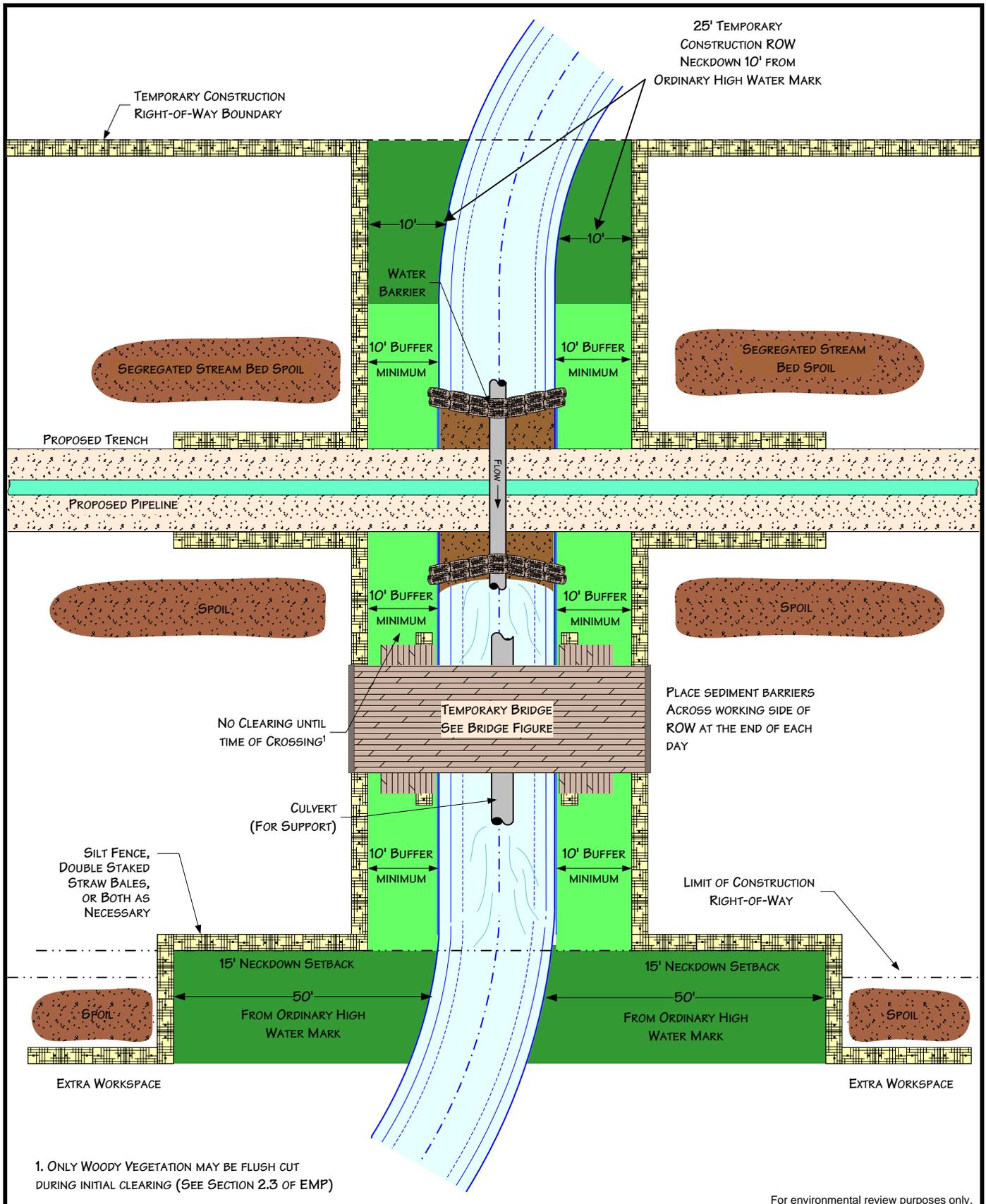
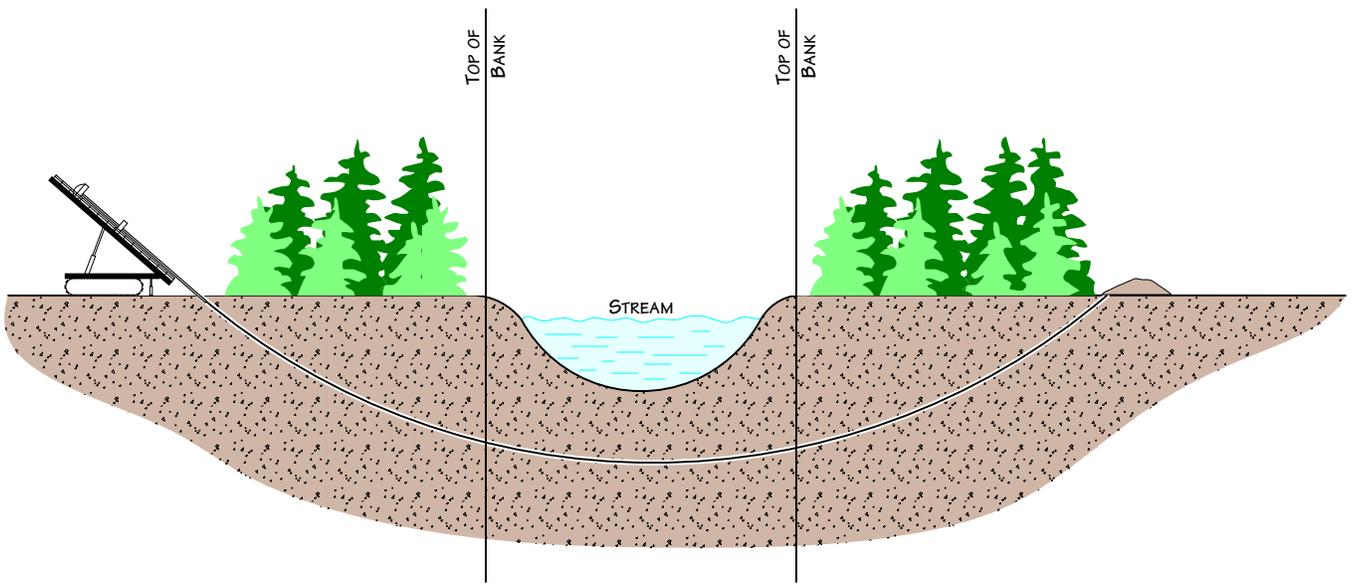


Figure 17
Environmental Mitigation Plan
 Typical Waterbody Crossing
 Flume Method

DATE: 11/29/2005	
REVISED: 3/11/11	
SCALE: NTS	
DRAWN BY: JPB	
<small>K:\CLIENT_PROJECTS\ID-PEEL\2011-019\FIG_17_WATERBODY_FLUME.VSD</small>	



For environmental review purposes only.



Figure 18
Environmental Mitigation Plan
 Typical Waterbody Crossing
 Directional Drill Method

DATE: 7/14/2000

REVISED: 3/11/11

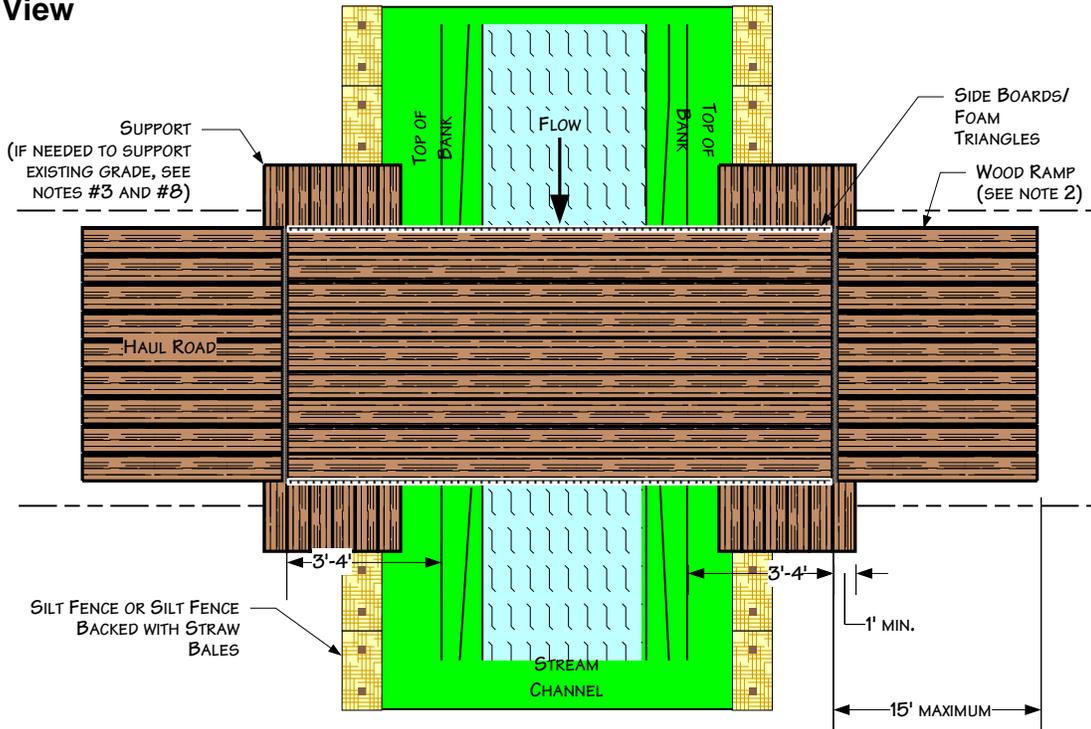
SCALE: NTS

DRAWN BY: KMKENDALL

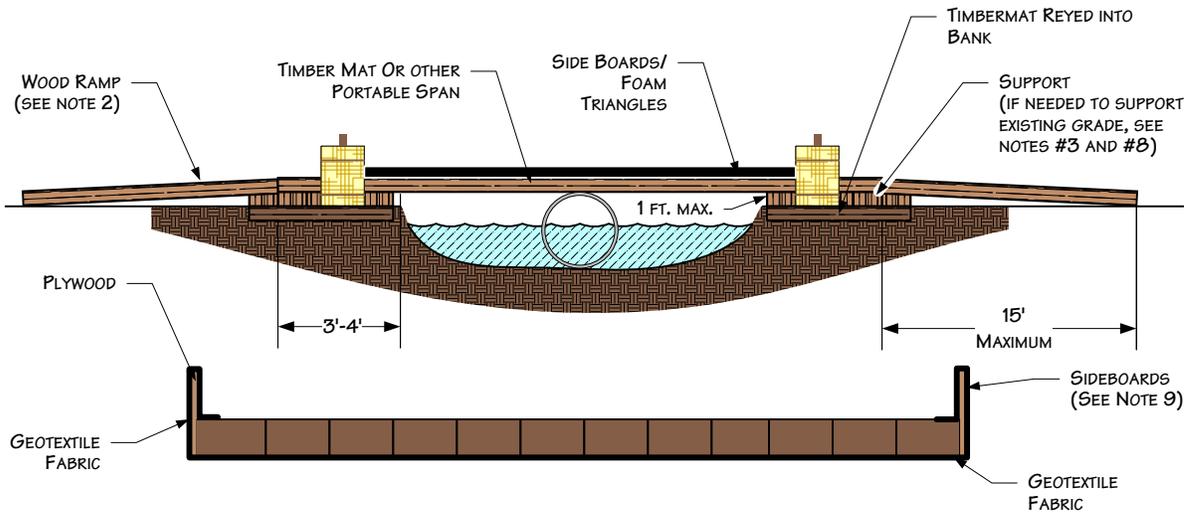
K:\CLIENT_PROJECTS\ID-FEEL\2011-019\
 FIG_18_WATERBODY_DIRECTIONAL_DRILL
 LVSD



Plan View



Profile View



NOTES:

1. INSPECT BRIDGE OPENING PERIODICALLY AND FOLLOWING RAINFALLS OF OVER 1/2". 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.

For environmental review purposes only.



Figure 19
Environmental Mitigation Plan
 Typical Span Type Bridge
 With or Without Instream Support

DATE: 3/11/2003

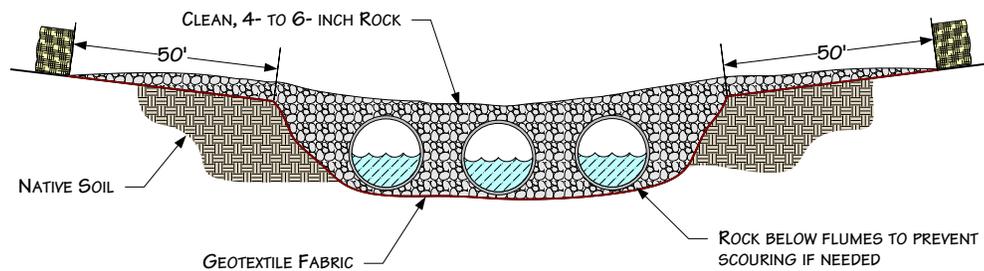
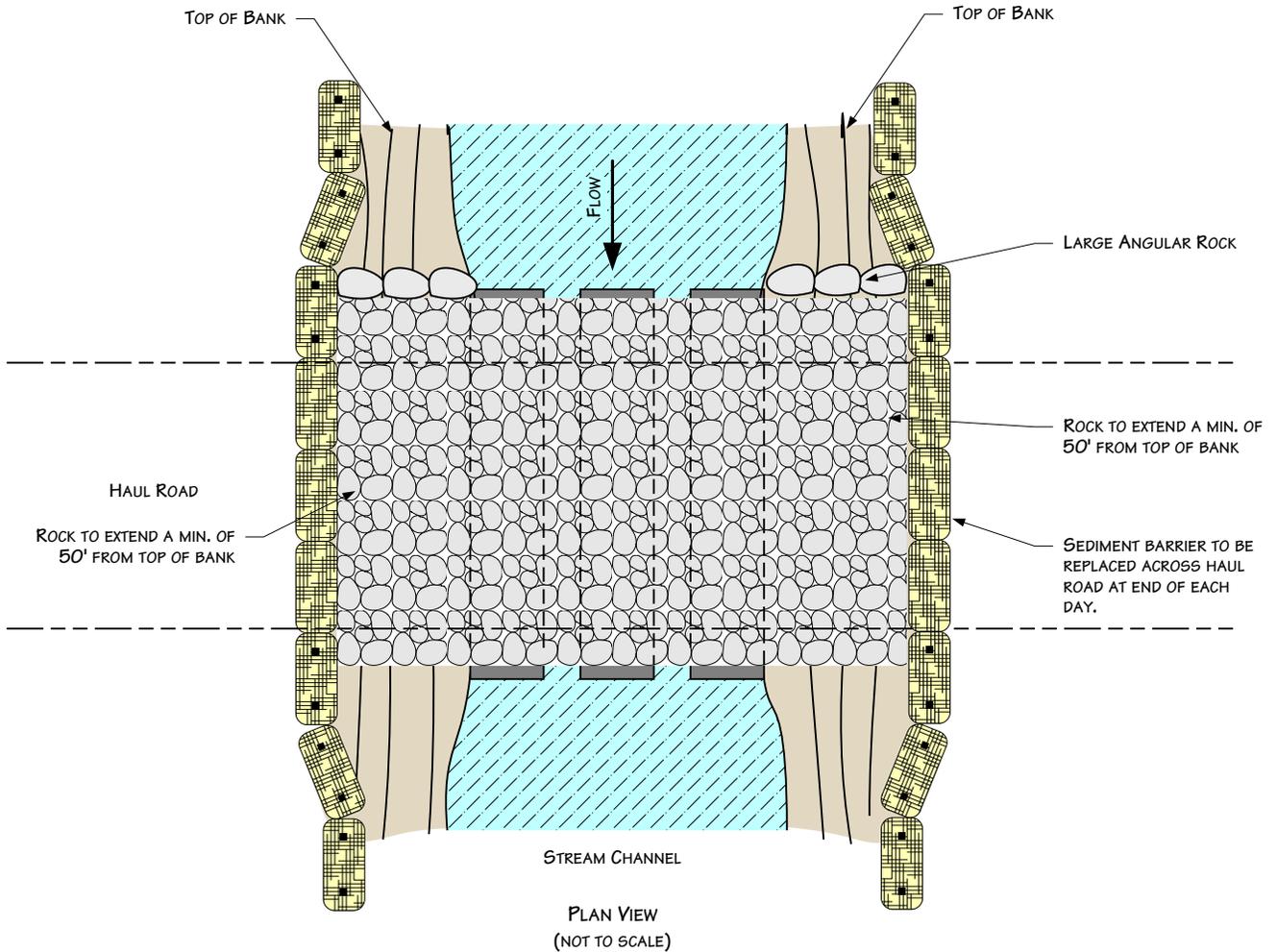
REVISED: 3/25/2011

SCALE: NTS

DRAWN BY: KMK6792

K:_CLIENT_PROJECTS\SD-FEEL\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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Figure 20
Environmental Mitigation Plan
 Typical Rock Flume Bridge

DATE: 5/25/2001

REVISED: 3/15/11

SCALE: NTS

DRAWN BY: KMKENDALL

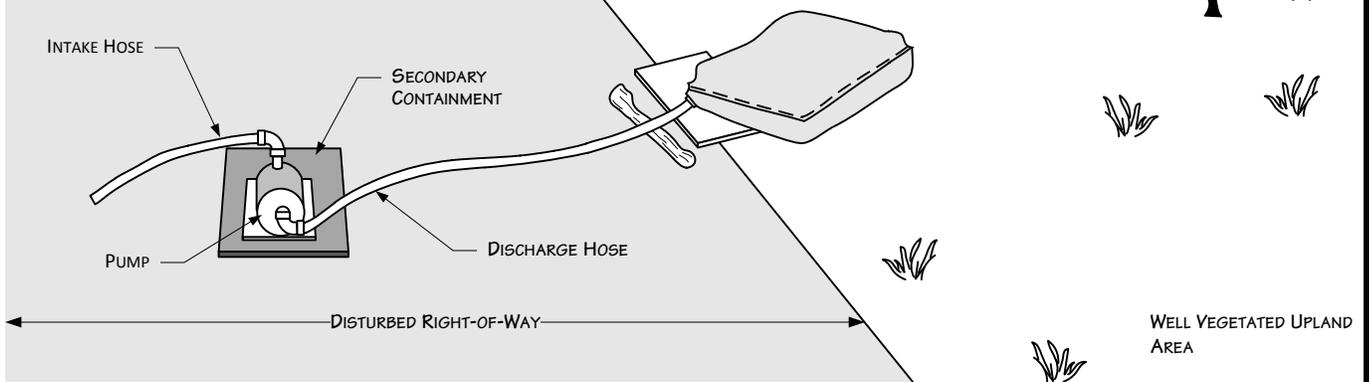
K:\CLIENT_PROJECTS\ID-PEEL\2011-019\FIG_20_ROCK_FLUME_BRIDGE.VSD



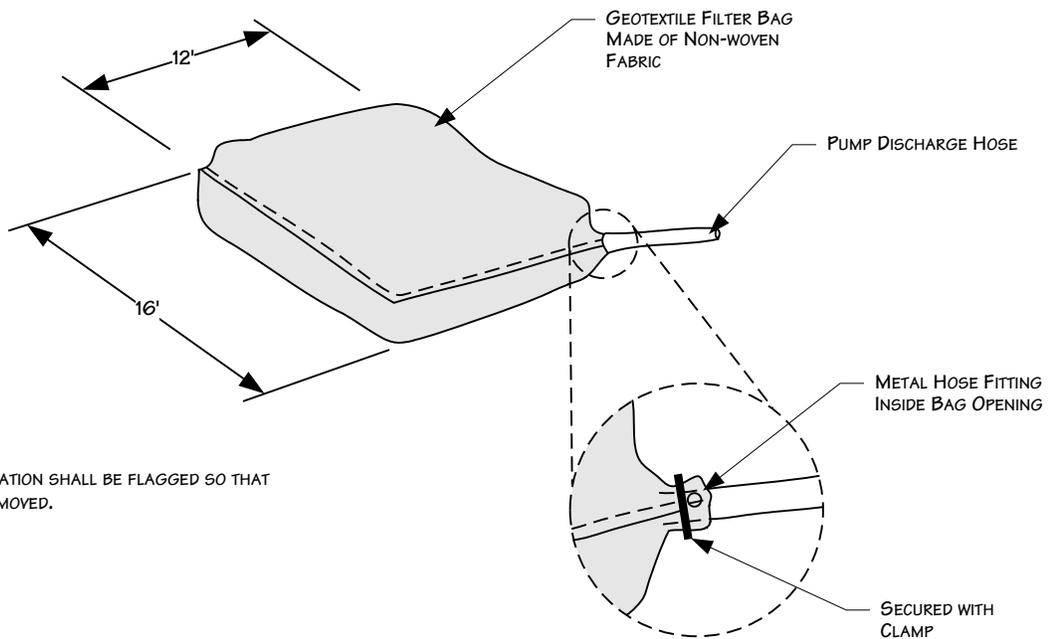
DEWATERING DISCHARGE IN WELL VEGETATED UPLANDS

NOTES:

1. PUMP INTAKE HOSE MUST BE SECURED AT LEAST ONE FOOT ABOVE THE TRENCH BOTTOM.
2. DEWATER INTO GEOTEXTILE FILTER BAG OR STRAW BALE DEWATERING STRUCTURE.



GEOTEXTILE FILTER BAG



NOTE:

1. FILTER BAG LOCATION SHALL BE FLAGGED SO THAT BAG CAN BE REMOVED.

For environmental review purposes only.



Figure 21
Environmental Mitigation Plan
Typical Dewatering Measures

DATE: 5/25/2001

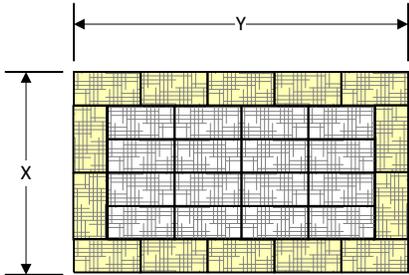
REVISED: 3/15/11

SCALE: NTS

DRAWN BY: KMKENDALL

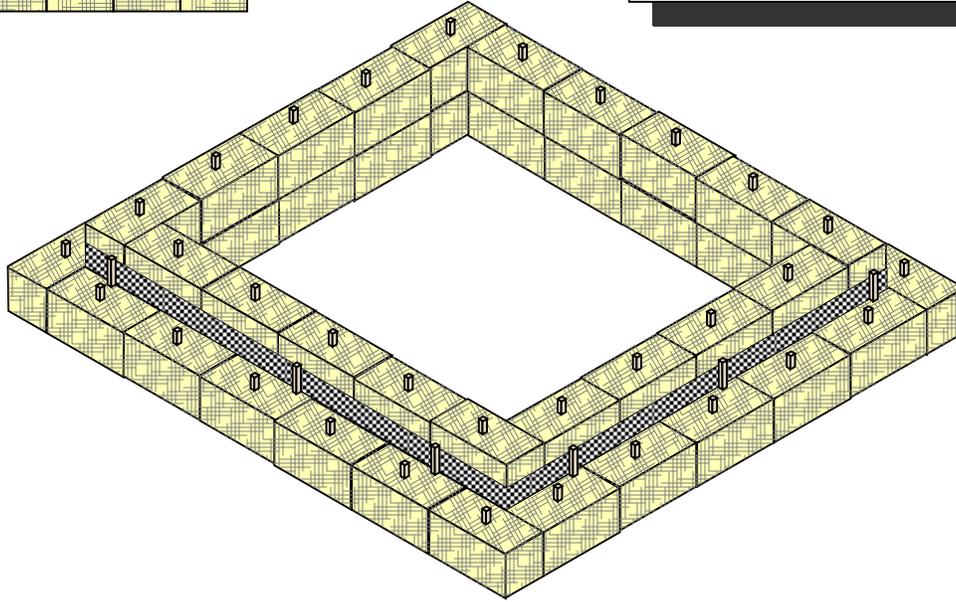
K:\CLIENT_PROJECTS\SD-FEEL\2011-019\FIG_21_DEWATERING_MEASURES.VSD



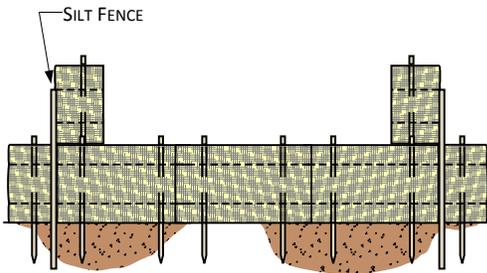


NOTES

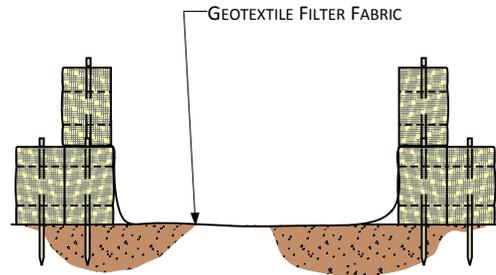
1. ARRANGE THE STRAW BALES TO THE X AND Y DIMENSIONS AS SPECIFIED BELOW.
2. IF BOTTOM OF STRUCTURE IS NOT LINED WITH STRAW BALES (OPTION 1), LINE ENTIRE STRUCTURE WITH GEOTEXTILE FILTER FABRIC.



PERSPECTIVE VIEW



OPTION 1



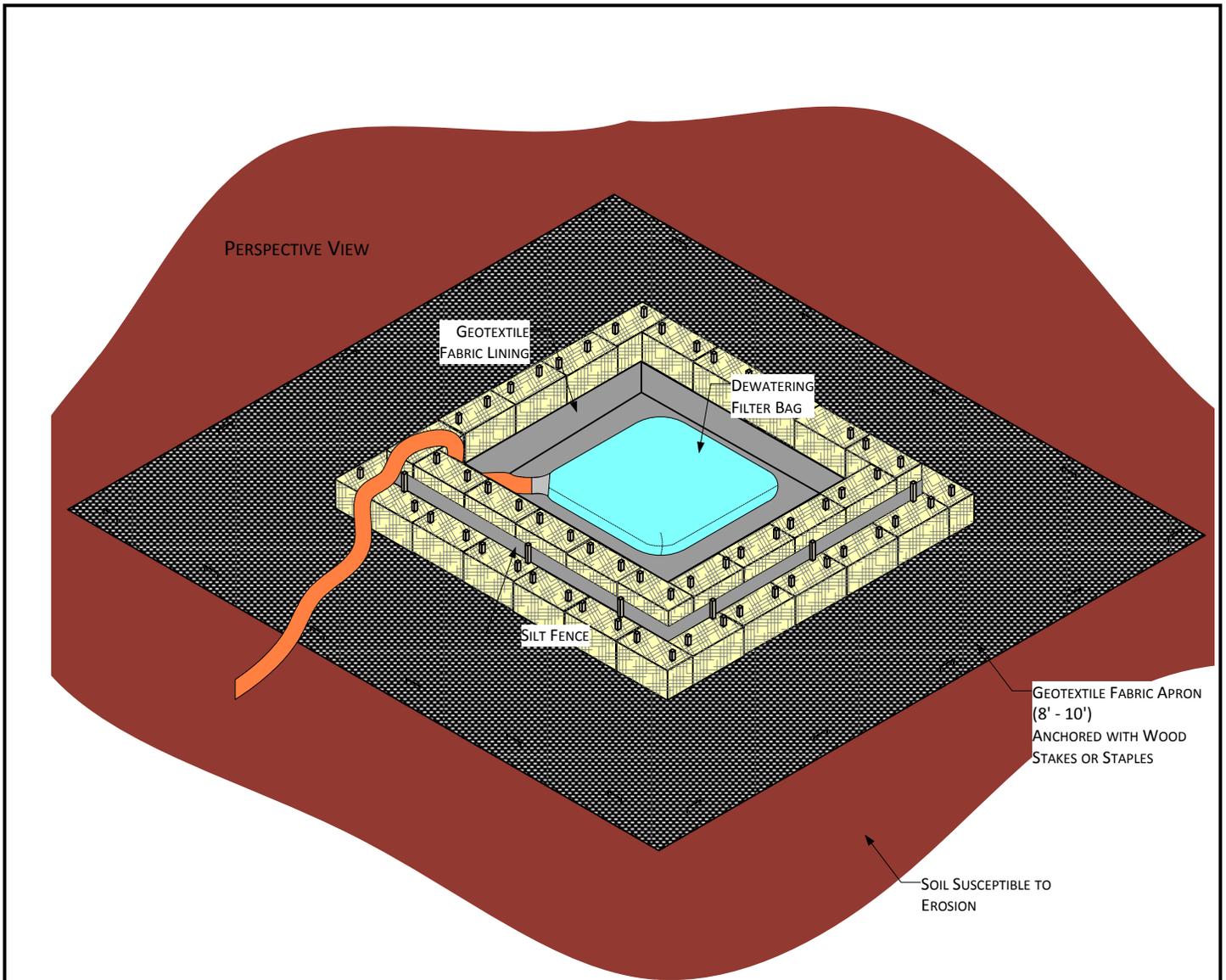
OPTION 2

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

For environmental review purposes only.

Figure 22A
Environmental Mitigation Plan
Straw Bale Dewatering Structure





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:

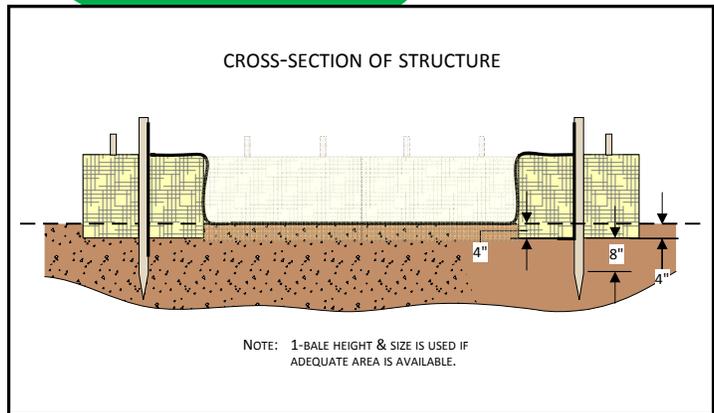
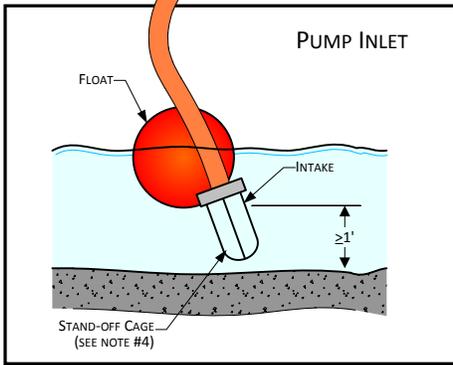
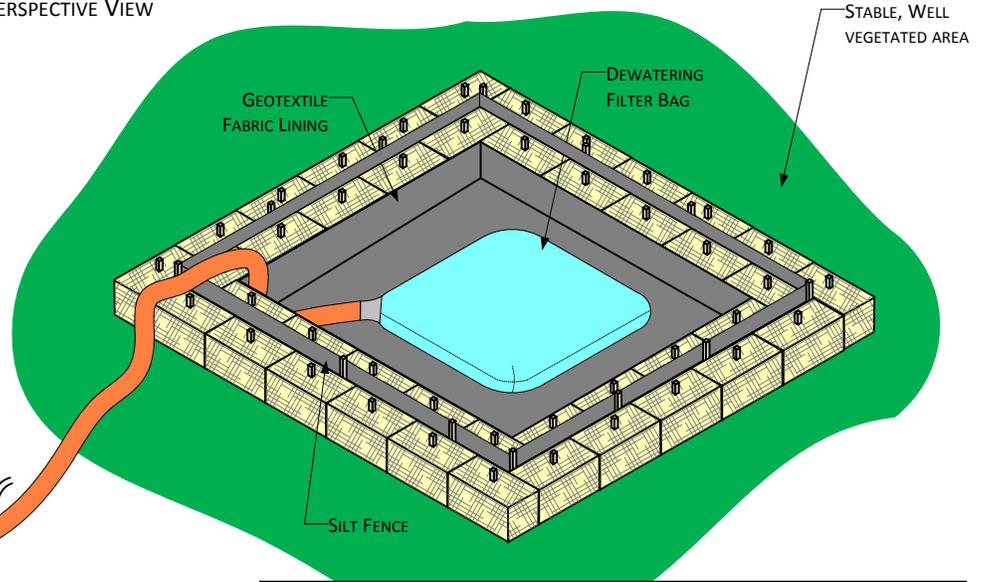
1. SILT FENCE ENDS MUST BE WRAPPED TO JOIN TWO SECTIONS.
2. INSTALL SILT FENCE 2 INCHES ABOVE TOP OF STRAW BALES, AND ANCHOR A MINIMUM OF 8 INCHES STRAIGHT DOWN.
3. SILT FENCE POST STAKING MUST BE 4 FEET OR LESS.
4. DEWATERING INTAKE HOSE SUPPORTED AT LEAST 1 FOOT FROM BOTTOM OF TRENCH BEING DEWATERED.
5. EROSION AND SEDIMENTATION CONTROL MEASURES SHALL BE INSPECTED AND MAINTAINED IN ACCORDANCE WITH THE COMPANY'S UPLAND EROSION CONTROL, REVEGETATION, AND MAINTENANCE PLAN.

For environmental review purposes only.

Figure 22B
Environmental Mitigation Plan
Straw Bale Dewatering Structure



PERSPECTIVE VIEW



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:

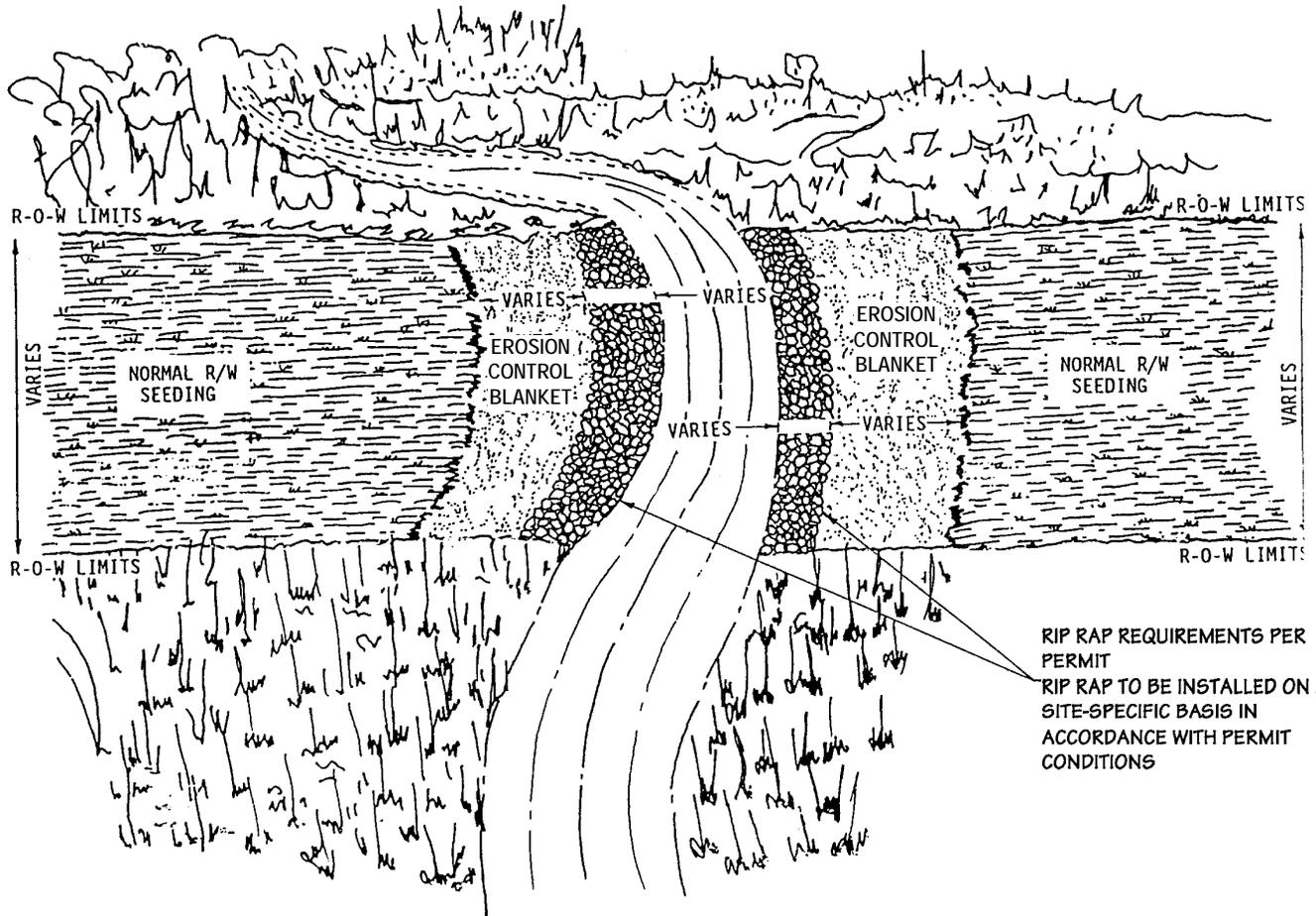
1. SILT FENCE ENDS MUST BE WRAPPED TO JOIN TWO SECTIONS.
2. INSTALL SILT FENCE 2 INCHES ABOVE TOP OF STRAW BALE, AND ANCHOR A MINIMUM OF 8 INCHES STRAIGHT DOWN.
3. SILT FENCE POST STAKING MUST BE 4 FEET OR LESS.
4. DEWATERING INTAKE HOSE SUPPORTED AT LEAST 1 FOOT FROM BOTTOM OF TRENCH BEING DEWATERED.
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.

For environmental review purposes only.

Figure 22C
Environmental Mitigation Plan
Straw Bale Dewatering Structure



NOTE: PLACE JUTE BLANKET A MINIMUM OF ONE (1) FOOT UNDER RIP RAP. EXTEND JUTE BLANKET FROM MEAN HIGH WATER LEVEL TO SEVERAL FEET BEHIND HIGH BANK.



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

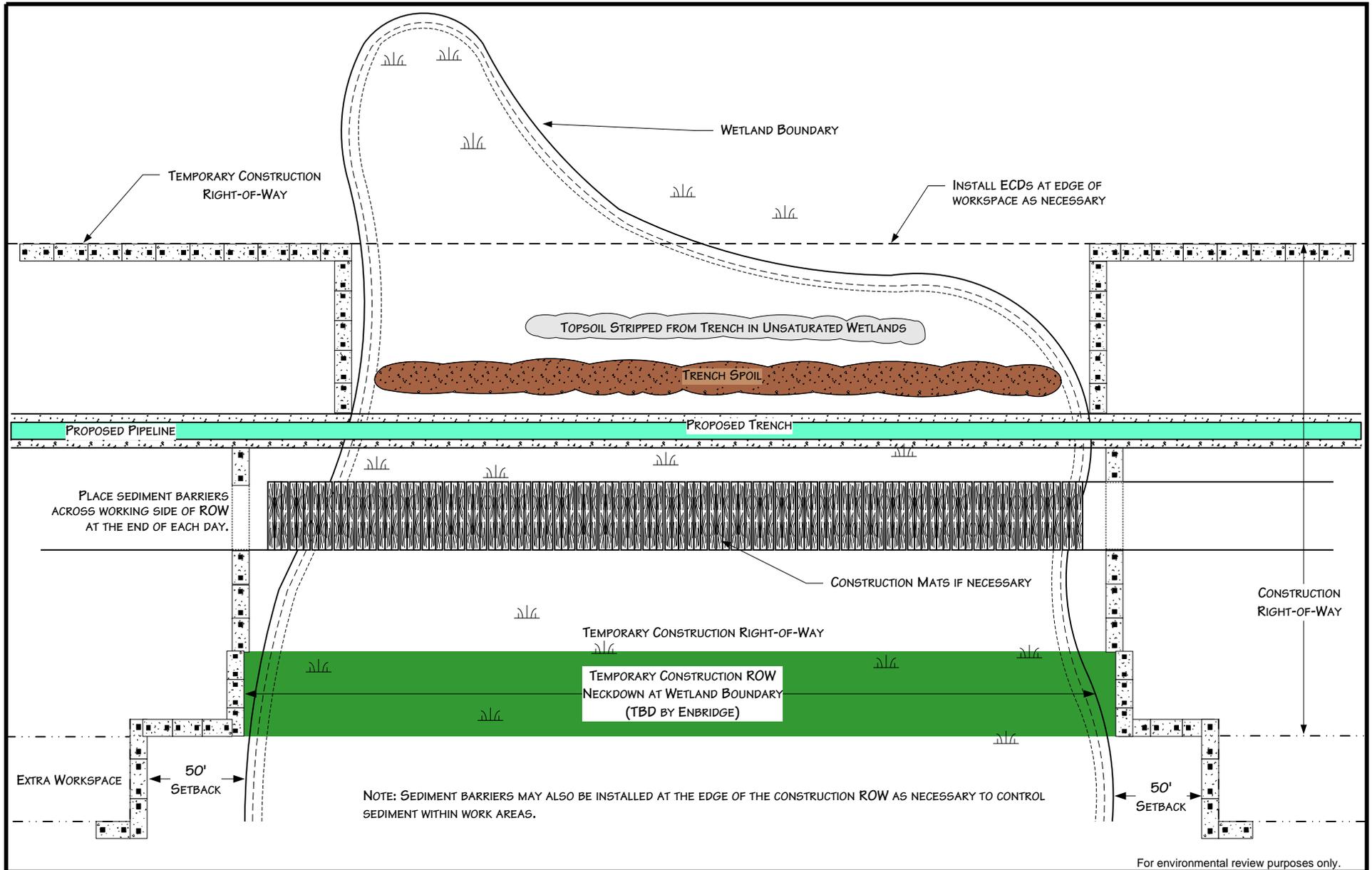
For environmental review purposes only.



Figure 23
Environmental Mitigation Plan
Typical Final Stream Bank Stabilization
Rip Rap & Erosion Control

DATE: 7/19/2000
REVISED: 3/14/11
SCALE: NTS
DRAWN BY: KMKENDALL
K:\CLIENT_PROJECTS\SD-FEEL\2011-019\FIG_23_STREAM_BANK_STABILIZATION.VSD





For environmental review purposes only.



Figure 24
Environmental Mitigation Plan
 Typical Wetland Crossing Method

DATE: 5/25/2001

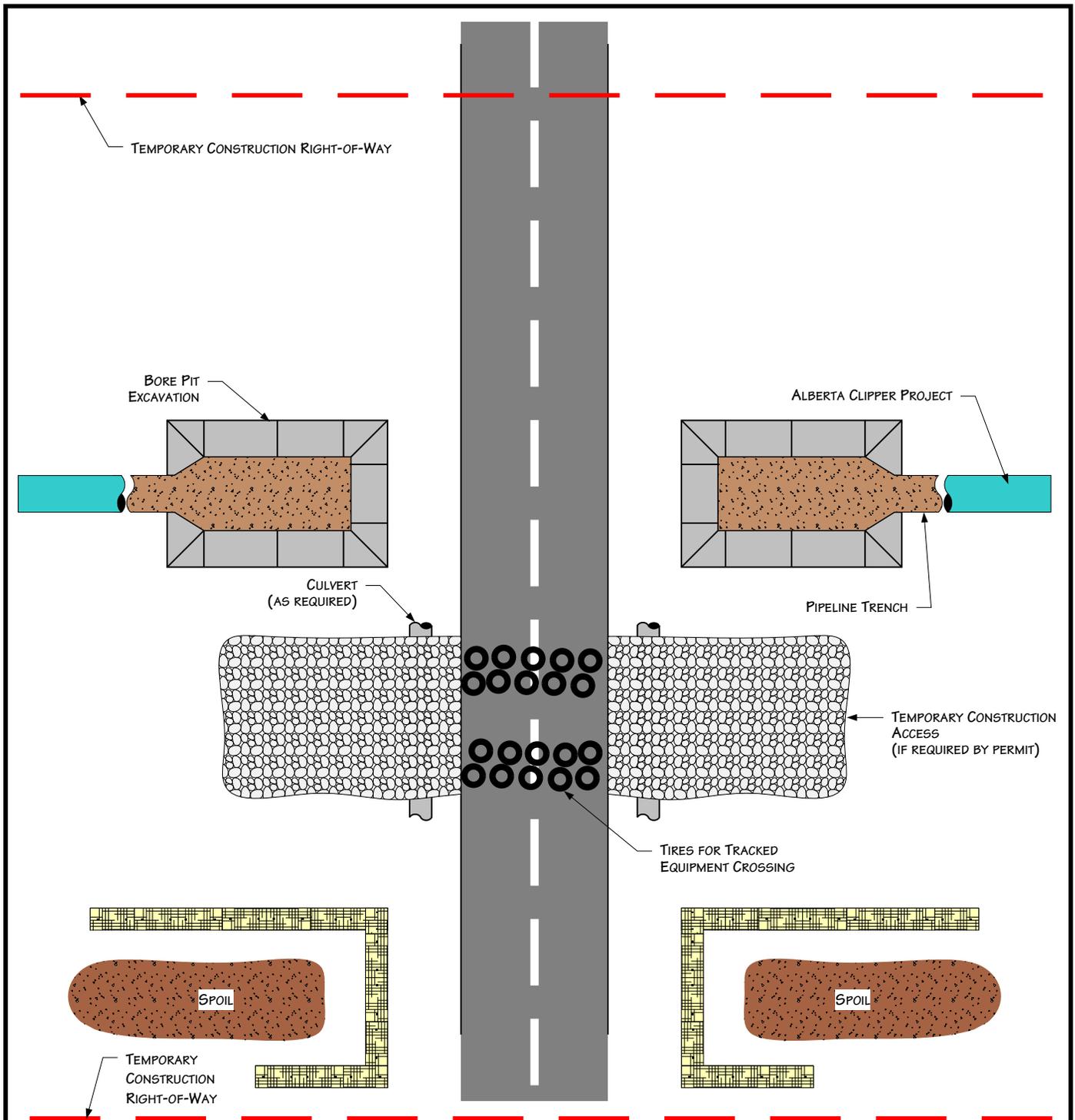
REVISED: 3/14/11

SCALE: NTS

DRAWN BY: KMKENDALL

K:\CLIENT_PROJECTS\ID-FEEL\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.

For environmental review purposes only.



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

DATE: 7/13/1999	
REVISED: 3/14/11	
SCALE: NTS	
DRAWN BY: KMKENDALL	
<small>K:\CLIENT_PROJECTS\D-PIEEL\2011-019\FIG_25_IMPROVED_ROAD_BORE_CROSSING.VSD</small>	

Environmental Mitigation Plan

Appendix A

Seed Mixes

Table 1 – Temporary Cover Crop Species and their recommended rates

Species Name	Pure Live Seed (Pounds Per Acre)
Oats (cool-season)	80
Annual ryegrass (cool-season)	20
Winter wheat (cool-season)	60
Sudangrass (warm-season)	30
Millet (warm-season)	30
¹ Species can be mixed together and individual rates reduced proportionally to the amount in the mix.	

Table 2 – Construction Area Standard Upland Seed Mix

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

Table 3 – Residential Area Upland Seed Mix

Seed Name	Pure Live Seed (Pounds Per Acre)	% of Seed
Kentucky Bluegrass (<i>Poa pratensis</i>)	80	53%
Perennial Ryegrass (<i>Lolium perenne</i>)	30	20%
Creeping Red Fescue (<i>Festuca rubra</i>)	35	23%
Annual Rye Grass (<i>Lolium italicum</i>)	5	3%
GRAND TOTAL	150	100%

Table 4 – Livestock Grazing and Hay Production Areas Upland Seed Mix

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

Table 5 – Wildlife Area Upland Seed Mix

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

Table 6 – Native Area Seed Mix ^{1/}

Seed Name	Pure Live Seed (Pounds Per Acre)	% of Seed
Big Bluestem (<i>Andropogon gerardi</i>)	4	44%
Western Wheatgrass (<i>Pascopyrum smithii</i>)	4	29%
Switchgrass (<i>Panicum virgatum</i>)	0.5	12%
Canada Wildrye (<i>Elymus canadensis</i>)	2	15%
Purple Prairie Clover (<i>Dalea purpureum</i>)	2 (ounces)	
<i>Total</i>	10.5 pounds	100%
Associated Cover Crop Mix		
Oats <i>if summer seeding</i> (<i>Avena sativa</i>) or Winter Wheat <i>if spring seeding</i> (<i>Triticum aestivum</i>)	16	80%
Slender Wheat Grass (<i>Elymus trachycaulus</i>)	4	20%
<i>Cover Crop Total</i>	20	100%
GRAND TOTAL	30.5 pounds	100%
1/ Applicable seeding dates: May 1 to June 30 or dormant seeding after soil temperatures are below 55 degrees Fahrenheit, but the ground is not frozen.		

Table 7 – Roadside Seed Mix

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

Environmental Mitigation Plan

Appendix B

Spill Report Form

**Enbridge Energy, Limited Partnership
Enbridge Pipelines (Southern Lights) L.L.C.
Spill Report Form**

Date of Spill: _____

Date of Spill Discovery: _____

Time of Spill: _____

Time of Spill Discovery: _____

Name and Title of Discoverer: _____

Type of material spilled and manufacturer's name: _____

Legal Description of spill location to the quarter section: _____

Directions from nearest community: _____

Estimated volume of spill: _____

Weather conditions: _____

Topography and surface conditions of spill site: _____

Spill medium (pavement, sandy soil, water, etc.): _____

Proximity of spill to surface waters: _____

Did the spill reach a waterbody? _____ Yes _____ No

If so, was a sheen present? _____ Yes _____ No

Describe the causes and circumstances resulting in the spill: _____

Describe the extent of observed contamination, both horizontal and vertical (i.e., spill-stained soil in a 5-foot radius to a depth of 1 inch): _____

Describe immediate spill control and/or cleanup methods used and implementation schedule: _____

Current status of cleanup actions: _____

Name and Company for the following:

Construction Superintendent: _____

Spill Coordinator: _____

Enbridge Representative: _____

Person Who Reported the Spill: _____

Environmental Inspector: _____

Form completed by: _____ Date: _____

Spill Coordinator must complete this for any spill, regardless of size, and submit the form to the Enbridge Representative within 24 hrs of the occurrence.

Appendix C

Screening Form for “Low-Effect” HCP

SCREENING FORM FOR DETERMINING LOW-EFFECT HABITAT CONSERVATION PLANS

I. Project Information

A. Project name:

B. Affected species: Hine's Emerald Dragonfly (*Somatochlora hineana*)

C. Project size (preferably in acres):

D. Brief project description including minimization and mitigation plans:

II. Does the HCP fit the low-effect criteria in the HCP Handbook?

[The answer must be yes to all three questions below in order to be considered a low-effect HCP. If the answer is no to any question, then the project should not be considered a low-effect HCP. Each "yes" must be accompanied with an explanation.]

A. Are the effects of the HCP minor or negligible on federally listed, proposed, or candidate species and their habitats covered under the HCP? (Handbook pg. 1-8 and 1-9)

B. Are the effects of the HCP minor or negligible on other environmental values or resources (e.g. air quality, geology and soils, water quality and quantity, socio-economic, cultural resources, recreation, visual resources, etc.) prior to implementation of the mitigation plan? (Handbook pg. 1-8 and 1-9) [In making this determination, actions undertaken by the applicant to avoid "take" are not considered mitigation.]

C. Would the impacts of this HCP, considered together with the impacts of other past, present and reasonably foreseeable similarly projects not result, over time, in cumulative effects to environmental values or resources which would be considered significant? (Handbook pg. 5-3).

III. Do any of the exceptions to categorical exclusions apply to this HCP?

[If the answer is yes to any of the questions below, the project cannot be categorically excluded from NEPA.] Each "No" must be accompanied by an explanation. Would implementation of the HCP (refer to 516 DM 2.3, Appendix 2):

A. Have significant adverse effects on public health or safety?

B. Have adverse effects on such unique geographic characteristics as historic or cultural resources, park, recreation or refuge lands, wilderness areas, wild or scenic rivers, sole or principal drinking water aquifers, prime farmlands, wetlands, floodplains, or ecologically significant or critical areas, including those listed on the Department's National Register of Natural Landmarks?

C. Have highly controversial environmental effects?

D. Have highly uncertain and potentially significant environmental effects or involve unique or unknown environmental risks?

E. Establish a precedent for future action or represent a decision in principle about future actions with potentially significant environmental effects?

F. Be directly related to other actions with individually insignificant but cumulatively significant environmental effects?

G. Have adverse effects on properties listed or eligible for listing on the National Register of Historic Places?

H. Have adverse effects on listed or proposed species, or have adverse effects on designated Critical Habitat for these species?

I. Have adverse effects on wetlands, floodplains or be considered a water development project thus requiring compliance with either Executive Order 11988 (Floodplain Management), Executive Order 11990 (Protection of Wetlands), or the Fish and Wildlife Coordination Act?

J. Threaten to violate a Federal, State, local or tribal law or requirement imposed for the protection of the environment?

IV. ENVIRONMENTAL ACTION STATEMENT (EAS)

If the proposal fits the above criteria for a low-effect HCP, the proposal can be categorically excluded from the NEPA documentation in accordance with 516 DM 6, Appendix 1.4C (1) and (2). The following EAS should be prepared to provide an administrative record of the decision to categorically exclude the proposal in accordance with 550 FW 3.3C.

Within the spirit and intent of the Council on Environmental Quality's regulations for implementing the National Environmental Policy Act (NEPA), and other statutes, orders, and policies that protect fish and wildlife resources, I have established the following administrative record. Based on the analysis above, the Enbridge Line 5 Pipeline Inspection and Repair: Mileposts 1430.2797, 1430.2857, 1430.2918 HCP qualifies as a "Low Effect" HCP as defined in the U.S. Fish and Wildlife Service Habitat Conservation Planning Handbook (November 1996). Therefore this action is a categorical exclusion as provided by 516 DM 2, Appendix 1 and 516 DM 6, Appendix 1 and no further NEPA documentation will be made.

Other supporting documents (list):

Habitat Conservation Plan

Signature Approval:

(1) Field Supervisor

Date