

Draft Environmental Impact Statement Sandpiper Pipeline and Line 3 Replacement Projects

Douglas County, Wisconsin



February 2016

Volume II Appendices

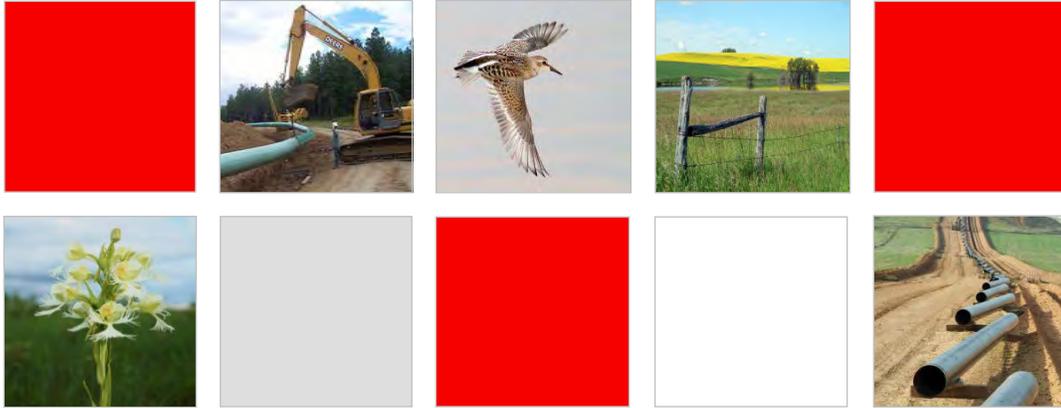


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Enbridge (U.S.) Inc.

AGRICULTURAL PROTECTION PLAN

October 2013

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DEFINITIONS

Agricultural Inspector	On-site inspector retained by Enbridge to verify compliance with requirements of this Plan during construction.
Agricultural Land	Land that is actively managed for agricultural purposes, including: cropland, hayland, or pasture; silvicultural activities (i.e., tree farms); and land in government set-aside programs such as Conservation Reserve Program and Conservation Reserve Enhancement Program. Agricultural Land may also include land that is otherwise fallow but would likely be cultivated within 5 years of construction completion.
Agricultural Monitor	On-site third-party monitor retained and funded by Enbridge, but providing direct reports to the Minnesota Department of Agriculture and/or Wisconsin Department of Agricultural, Trade, and Consumer Protection and responsible for auditing Enbridge's compliance with provisions of this Plan.
APP	Agricultural Protection Plan.
ATWS	Additional Temporary Workspace.
BMP	Best Management Practices.
CFR	Code of Federal Regulations.
Cropland	Land actively managed for growing row crops, small grains, or hay.
Easement	The agreement(s) and/or interest in privately owned Agricultural Land held by Enbridge by virtue of which it has the right to construct and operate together with such other rights and obligations as may be set forth in such agreement.
Enbridge	Enbridge (U.S.) Inc.
EPP	Environmental Protection Plan
Final Cleanup	Pipeline construction activity that occurs after backfill but before restoration of fences and required reseeding. Final Cleanup activities include: replacing Topsoil, removal of construction debris, removal of excess rock, decompaction of soil as required, final grading, and installation of permanent erosion control structures.
Landowner	Person(s) holding legal title to Agricultural Land from whom Enbridge is seeking, or has obtained, a temporary or permanent Easement. The term "Landowner" shall include any person(s) authorized in writing by the actual Landowner to make decisions

regarding the mitigation or restoration of agricultural impacts to such Landowner's property.

MDA	Minnesota Department of Agriculture
MOC	Management of Change procedure.
MN PUC	Minnesota Public Utilities Commission
Non-Agricultural Land	Any land that is not "Agricultural Land" as defined above.
NDA	North Dakota Department of Agriculture
ND PSC	North Dakota Public Service Commission
Person	An individual or entity, including any partnership, corporation, association, joint stock company, trust, joint venture, limited liability company, unincorporated organization, or governmental entity (or any department, agency, or political subdivision thereof).
Planned Tile	Locations where the proposed Tile installation is made known in writing to Enbridge by the Landowner either: 1) within 60 days after the signing of an Easement; or 2) before the issuance of a Routing Permit to Enbridge; whichever is sooner.
PSCW	Wisconsin Public Service Commission
Right-of-way	The land included in permanent and temporary Easements that Enbridge possess for the purpose of construction and operation.
Routing Permits	Routing permits issued by the ND PSC, MN PUC, and PSCW.
Spoil Storage Side	Non-working side of the construction Right-of-way where ditch spoil and temporary Topsoil are stored (as needed).
Tenant	Any person, other than the Landowner, lawfully residing on or in possession or control of the land that makes up the "right-of-way" as defined in this Plan.
Tile	Subsurface drainage systems and their aboveground appurtenances.
Topsoil	The uppermost horizon (layer) of the soil, typically with the darkest color and highest content of organic matter and nutrients.
Trench Crown	The placement of subsoil and Topsoil in the trench to a finished elevation somewhat above the surrounding ground surface to account for post-construction settling of soil returned to the trench.
TWS	Temporary Workspace
USC	United States Code

USDA	United States Department of Agriculture
USDOT	United States Department of Transportation
WDATCP	Wisconsin Department of Agricultural, Trade, and Consumer Protection

PURPOSE AND APPLICABILITY

This Agricultural Protection Plan ("Plan") was developed by Enbridge (U.S.) Inc. ("Enbridge") in consultation with the Minnesota Department of Agriculture ("MDA") and the Wisconsin Department of Agricultural, Trade, and Consumer Protection ("WDATCP")¹. Enbridge will include the Plan as part of applications for a Pipeline Routing Permit ("PRP") from the Minnesota Public Utilities Commission ("MN PUC") and a Public Interest Determination ("PID") from the Wisconsin Public Service Commission ("PSCW"). Through the MN PUC and PSCW public notice and review processes associated with the applications, other agencies (including the MDA and WDATCP), local authorities, Landowners, Tenants, and other stakeholders are able to review and provide comments on the Plan. This Plan will be incorporated by reference into the Routing Permits issued by the MN PUC and the Public Interest Determination issued by the PSCW. Once finalized, this Plan may also be incorporated by reference into other federal, state, and local permits.

The objective of the Plan is to identify measures that Enbridge will implement to avoid, mitigate, or provide compensation for negative agricultural impacts that may result from pipeline construction. The construction standards described in this document apply only to construction activities occurring partially or wholly on privately owned Agricultural Land. Furthermore, Best Management Practices ("BMPs") identified in the Enbridge's Environmental Protection Plan ("EPP") may be installed on Agricultural Land in conjunction with mitigation measures outlined in this Plan.

Unless the easement or other agreement, regardless of nature, between Enbridge and the Landowner specifically requires the contrary, the mitigation measures specified in this Plan will be implemented in accordance with the conditions discussed below.

Appendix A sets forth the specific additional mitigation measures that will be applied specifically to Organic Agricultural Lands, such as Organic Certified farms or farms that are in active transition to become Organic Certified. Organic Agricultural Land is defined as farms or portions thereof, as described in the National Organic Program Rules, Title 7 Code of Federal Regulations ("C.F.R.") Parts 205.100, 205.101, and 205.202.

GENERAL PROVISIONS

All mitigation measures are subject to change by Landowners, provided such changes are negotiated in advance of construction and acceptable to Enbridge. If any provision of this Plan is held to be unenforceable, no other provision will be affected by that holding, and the remainder of the Plan will be interpreted as if it did not contain the unenforceable provision.

Enbridge will consider any federal, state, and local permit, including Routing Permits, to be the controlling authority. To the extent a mitigation measure contemplated by this Plan is determined to be unenforceable in the future due to requirements of other permits issued, Enbridge will inform the regulatory authority and will develop reasonable alternative measures. Enbridge will implement the mitigation measures and BMPs described in this Plan to the extent

¹ Enbridge also attempted to engage the North Dakota Department of Agriculture ("NDA") for purposes of Plan development. The NDA has not replied to-date. Nonetheless, Enbridge will apply this Plan to the entire project (including North Dakota Agricultural Lands). State-specific requirements may be referenced within this Plan.

they do not conflict with the requirements of federal and state rules and regulations, and permits and approvals obtained by Enbridge. Certain provisions of this Plan require Enbridge to consult and/or reach agreement with the Landowner of a property. Enbridge will engage in a good faith effort to secure the agreement. Tenants will not be consulted except where a Landowner has designated in writing that a Tenant has decision making authority on their behalf.

Enbridge will retain qualified contractors to perform mitigation measures; however, Enbridge may negotiate with Landowners to implement the mitigation measures that Landowners wish to perform themselves.

Enbridge will employ an Agricultural Inspector whose role is to verify compliance with the requirements of this Plan during construction of the pipeline. The Agricultural Inspector will be employed by and report to Enbridge, and will be a part of Enbridge's environmental inspection team.

The Agricultural Inspector will:

- Be a full-time member of Enbridge's environmental inspection team
- Provide construction personnel with training on provisions of this Plan before construction begins;
- Provide construction personnel with field training on specific topics, such as protocols for Topsoil stripping;
- Observe construction activities on Agricultural Land on a continual basis;
- Be responsible for verifying Enbridge's compliance with provisions of this Plan during construction;
- Work collaboratively with other Enbridge inspectors, right-of-way agents, and the Agricultural Monitor in achieving compliance with this Plan;
- Document instances of noncompliance and work with construction personnel to identify and implement appropriate corrective actions as needed; and
- Have the authority to stop construction activities that are determined to be out of compliance with the provisions of this Plan.

In addition to the Agricultural Inspector, an Agricultural Monitor will also inspect construction work on Agricultural Lands in Minnesota and Wisconsin. The Agricultural Monitor will be retained and funded by Enbridge, but will function as an independent third-party inspector providing direct reports to the MDA and WDATCP, and will be responsible for auditing Enbridge's compliance with the provisions of this Plan in Minnesota and Wisconsin, respectively. Enbridge will provide resumes of candidates who meet the qualifications of an Agricultural Monitor for review and final selection by the MDA and WDATCP.

The Agricultural Monitor will not be a member of Enbridge's environmental inspection team. The Agricultural Monitor will not have the authority to direct construction activities or manage Enbridge employees or contractors. The Agricultural Monitor will work through Enbridge's Agricultural Inspector and the MDA and WDATCP if compliance issues are identified. The Agricultural Monitor will have full access to Agricultural Land crossed in Minnesota and Wisconsin and will have the option to attend meetings where construction on Agricultural Land is discussed. Specific duties of the Agricultural Monitor will include:

- Participate in preconstruction training activities sponsored by Enbridge;
- Monitor construction and restoration activities on Agricultural Land for compliance with provisions of this Plan;

- Review Management of Change (“MOC”) requests;
- Approve MOC Level 1 requests as appropriate;
- Report instances of noncompliance to Enbridge’s Agricultural Inspector;
- Prepare regular compliance reports and submit them to the MDA and WDATCP;
- Act as a liaison between Landowners and the MDA and WDATCP when necessary and requested by the Landowner;
- Serve as a resource to investigate complaints at the direction of the MDA and WDATCP and to explain any proposed changes to this Plan during construction; and
- Maintain a written log of communications from Landowners regarding compliance with this Plan as well as report Landowner complaints to Enbridge’s Agricultural Inspector or right-of-way representative.

Both the Agricultural Inspector and Monitor will have a bachelor’s degree in agronomy, soil science, or equivalent work experience. In addition, the Agricultural inspectors and Agricultural Monitors will have demonstrated practical experience with pipeline construction and restoration on Agricultural Land.

Enbridge will provide each Landowner with a telephone number and address that can be used to contact Enbridge, during and following the completion of construction, regarding the agricultural mitigation work that is performed on their property or other construction-related matters. If the contact information changes following construction, Enbridge will provide the Landowner with updated contact information. Enbridge will respond to Landowner telephone calls and correspondence within a reasonable time.

Mitigation measures identified by Enbridge pursuant to this Plan, unless otherwise specified in this Plan or in an Easement or other agreement with an individual Landowner, will be initiated within forty-five (45) days following completion of Final Cleanup on an affected property, weather permitting or unless otherwise delayed at the request of the Landowner. If implementation of mitigation measures requires additional time, Enbridge will make temporary repairs, as needed, to minimize the risk of additional property damage or interference with the Landowner’s access to or use of the property.

MITIGATION MEASURES

1. Right-of-Way Width

Prior to construction, Enbridge will establish the right-of-way width for construction and temporary workspace (“TWS”) in Agricultural Lands based on prior project experience, engineering and construction requirements or best practices, and safety needs. The construction limits will be shown on alignment sheet drawings provided to the construction contractor, Environmental Inspector, Agricultural Inspector, Agricultural Monitor, and regulatory authorities.

- A. The typical construction workspace will be governed by the Routing Permits and other permits, but will typically be 120 feet wide in uplands, of which 50-55 feet will typically be retained in a permanent Easement, and 70-65 feet, respectively, will typically be TWS. The TWS will be used during construction for soil storage and operation of equipment and vehicles along the entire length of the pipeline. At certain select areas where the pipeline crosses natural geographic or larger man-made features such as roads, railroads, streams, or wetland crossings, a defined

- area of additional temporary workspace (“ATWS”) will be required on each side of the feature.
- B. The construction boundaries of ATWS will be staked prior to the work at each location.
 - C. If the area of the ATWS is not sufficient to perform the work and implement BMPs, Enbridge will refrain from construction in that area until an adequate work area is available and approved. Enbridge will discuss the need for ATWS with the construction contractor, construction inspection team, Agricultural Inspector, Agricultural Monitor, and the Landowner, and will not use any additional workspace until approved by the Landowner, Agricultural Monitor, and regulatory authorities, as applicable.

2. Pipeline Depth of Cover

- A. Except for aboveground facilities, such as mainline block valves, and except as otherwise stated in this Plan, the pipeline will be buried with the following depths of cover on Agricultural Land:
 - 1) The pipeline will be constructed with a minimum depth of cover of 30 inches as required by U.S. Department of Transportation (“USDOT”) regulations in 49 CFR Part 195.248. Section 216G.07 of the Minnesota Statutes further requires a minimum depth of cover of 54 inches unless waived by the Landowner. However, Enbridge will ask Landowners to waive the 54-inch-deep minimum cover requirement, as allowed by Minn. Stat. § 216G.07 and consistent with Enbridge’s expansion projects in 1994, 1998, 2002, 2008, and 2009-2010.
 - 2) Where existing or planned Tile systems are present, the pipeline will be installed at a depth that will achieve at least a 12-inch-wide separation between the pipeline and overlying Tiles as described in Section 2.C. of this Plan.
- B. Enbridge will construct the pipeline under existing non-abandoned Tile and Planned Tile within six (6) feet of the surface, unless the Landowner determines otherwise in writing. Enbridge may install the pipeline over Tile buried deeper than six (6) feet. If the Landowner plans to install a new Tile system, the Landowner must provide to Enbridge plans drawn by a qualified professional with experience in Tile design and installation. In determining the proper depth of the pipeline, Enbridge will accommodate the depth and grade needed for both existing and Planned Tile to function properly. Enbridge will not change the grade of existing Tile to accommodate the pipeline without the Landowner’s advance written consent.
- C. A minimum of twelve (12) inches of separation will be maintained between the pipeline and Tile unless the Landowner agrees in writing to a lesser separation. If unforeseen physical conditions are discovered during construction that prevents minimum separation, the Landowner will be informed of the situation prior to the installation of the pipeline over the Tile. If a good faith effort is made and the Landowner is unavailable, the Agricultural Monitor will be informed and construction will continue.

3. Winter Construction

Enbridge intends on avoiding construction in Agricultural Lands in the winter season. However, to protect the productivity of Agricultural Lands in the event that winter construction is unavoidable as a result of weather, permit acquisition, or any other unforeseen delays, the following mitigation measures are proposed:

- A. *Minimize Topsoil Stripping in frozen conditions.* Frozen conditions can preclude effective Topsoil stripping. When soil is frozen to a depth greater than the depth of the Topsoil, Topsoil cannot be efficiently stripped from the subsoil. If Topsoil stripping must proceed under these conditions, it will only be removed from the area of the trench. A ripper will be used to break up the frozen Topsoil over the trenchline and a backhoe will remove the Topsoil layer and store the material in a separate pile. The ripper will extend to the depth of Topsoil or to a maximum depth of eighteen (18) inches in the Red River Valley (In Minnesota) and twelve (12) inches elsewhere, whichever is less.
- B. *Minimize Final Clean-up activities in frozen conditions.* Frozen conditions can preclude effective Topsoil replacement, removal of construction debris, removal of excess rock, decompaction of soil as required, final grading, and installation of permanent erosion control structures. If seasonal or other weather conditions preclude Final Clean-up activities, the trench and temporary workspace areas will be backfilled, stabilized, and temporary erosion control measures will be installed until restoration can be completed. If Topsoil/spoil piles remain throughout the winter, the Topsoil/spoil piles will be stabilized by an application of mulch and a tackifier or other methods approved by the regulatory authority. To prevent subsidence, backfill operations will resume when the ground is thawed and the subsoil will be compacted (as needed) prior to Final Clean-up activities. The construction contractor must monitor these areas until final restoration is complete.
- C. Topsoil Stripping and Final Clean-up activities proposed in Agricultural Lands in frozen conditions in Minnesota and Wisconsin will be discussed with the MDA and WDATCP, respectively prior to commencement of these activities.

4. Temporary Erosion and Sediment Control

Temporary erosion and sediment controls will be implemented as required and are described in the EPP.

5. Topsoil Stripping, Trenching, Soil Storage, and Replacement

- A. Full and partial Topsoil stripping methods are similar except for the area where the Topsoil is removed. With full Topsoil stripping, the Topsoil is removed from the entire working side (traffic lane, trench spoil storage, and trench area) of the right-of-way. Under partial Topsoil stripping, the Topsoil will not be removed from under the Topsoil storage piles. Topsoil will also be removed and segregated in other areas, such as bore pits at road and railroad crossings, where the footprint may be larger and/or irregularly shaped. Topsoil is typically stored on the outer most edge of the working side of the construction right-of-way, however, Enbridge may also store Topsoil on the spoil storage side of the construction workspace where there

are workspace constraints. Typical details for each Topsoil stripping method are presented in the EPP.

Enbridge will use the following Topsoil segregation methods during construction on Agricultural lands. The method selected will be dependent on specific Landowner approvals or agreements, field conditions, regulatory authority or permit requirements and/or other factors.

- Modified Ditch-Plus-Spoil-Side Method – This method involves stripping Topsoil horizon from the spoil storage area, the pipeline trench, and the primary portion of the travel lane. The modified ditch-plus-spoil-side method would typically be used in active cropland in the Red River Valley (in Minnesota).
 - Full Right-of-Way Method – This method involves stripping Topsoil from the entire width of the construction right-of-way. On most Agricultural Land located outside of the Red River Valley (in Minnesota), Topsoil will be removed from the full right-of-way because this method typically results in less soil mixing between Topsoil and subsoil caused by equipment rutting over areas where Topsoil was not stripped. A larger volume of Topsoil will be generated using this method and, consequently, may warrant the need for Topsoil to also be stored on both sides of the construction right-of-way.
 - Trenchline-Only Method – This method involves removing Topsoil from over the proposed trench only, and may be used where Enbridge determines that the width of the construction right-of-way is insufficient for storing Topsoil and maintaining a sufficient width to perform construction activities and allow equipment to pass.
- B. The maximum depth of Topsoil stripping will be twelve (12) inches, except in the Red River Valley in Minnesota from the Red River to the Red Lake River where up to eighteen (18) inches of Topsoil may be stripped when present, unless otherwise agreed to with MDA. In the Red River Valley, Enbridge will work with MDA to identify a suitable protocol for communicating the appropriate depth of Topsoil stripping to construction personnel. The Agricultural Inspector or the designated Enbridge inspector will observe Topsoil operations so that appropriate depths are removed.
- C. Equipment operators will be trained to discriminate between Topsoil and subsoil based on obvious color changes. In locations where the Topsoil/subsoil color changes are not easily distinguishable or variable, the Agricultural Inspector will determine the depth.
- D. Before removing Topsoil during wet soil conditions, the Agricultural Inspector will assess whether the moisture content in the surface horizon is suitable for grading. If the soil is considered too wet to segregate, stripping may be postponed. Based on the Agricultural Inspector's recommendation, Enbridge may allow Topsoil removal in areas where soils are persistently wet.
- E. Enbridge may also remove Topsoil from ATWS as dictated by site-specific conditions and Landowner agreements. Topsoil will be removed in all "cut and fill" areas prior to grading.

- F. In specific areas of deep Topsoil and as determined in consultation with the Agricultural Inspector and/or the Agricultural Monitor, the modified ditch-plus-spoil method will be used. However, the area requiring Topsoil stripping may be adjusted from the modified ditch-plus-spoil method where the Agricultural Inspector determines that such modification is necessary for safety or would be more protective of the soil resource. The adjusted method may include trenchline-only Topsoil segregation, such as in instances where Topsoil is removed under frozen conditions (i.e., winter construction). In all cases where modifications are proposed, approval from Enbridge, the MDA, the WDATCP, or other regulatory authority is required.
- G. If the Agricultural Monitor and the Agricultural Inspector cannot agree on the proposed adjustment in the Topsoil segregation method, the Agricultural Monitor will document the objection and provide documentation to the MDA and/or WDATCP and Enbridge.
- H. Trench spoil will be placed in a stockpile that is separate from Topsoil. Enbridge will maintain a minimum one (1)-foot-wide separation or place a barrier between Topsoil and subsoil piles to avoid mixing. In areas where the Topsoil has not been stripped from the subsoil storage area, subsoil can be stored on a thick layer of mulch or another physical barrier that identifies and protects the unstripped Topsoil.
- J. Backfilling will follow lowering the pipe into the trench. During trench backfilling, subsoil material will be replaced first, followed by Topsoil. To prevent subsidence, subsoil will be backfilled and compacted. Compaction by operating construction equipment along the trench is acceptable.
- K. Rock excavated from the trench may be included with backfill provided the rock content of the pre-construction soils is not significantly increased. In the event excess rock cannot be returned to the trench without substantially increasing pre-existing rock content, rocks will be considered construction debris and removed (see Section 8 of this Plan).
- L. Replacing Topsoil will be initiated within fourteen (14) days after backfilling the trench. If seasonal or other weather conditions prevent compliance with this timeframe, temporary erosion control measures must be implemented and maintained until conditions allow completion of cleanup. Topsoil will be replaced across the stripped area as near as practicable to its original depth. A Trench Crown over the trenchline is permissible to offset potential settling. Following placement of the subsoil crown, Topsoil would be uniformly returned across the stripped area. The height of the crown will generally be equal to, or less than, twelve (12) inches at the center. Breaks in the crown may be cut to accommodate overland water flow across the right-of-way.

6. Repair of Damaged and Adversely Affected Tile

If Tile is damaged during installation of the pipeline, the Tile will be repaired in a manner that restores operating condition. If Tile lines immediately adjacent to the construction area are adversely affected by the pipeline installation, Enbridge will restore the Tile, including the relocation, reconfiguration, or replacement of the Tile. The affected Landowner may settle with Enbridge for payment to repair, relocate, reconfigure, or

replace the damaged Tile. In the event the Landowner chooses to perform the repair, relocation, reconfiguration, or replacement of the damaged Tile, Enbridge will not be responsible for correcting Tile repairs after completion of the pipeline and the Landowner's repairs. Enbridge is only responsible for correcting Tile repairs if the repairs were made by Enbridge or its agents or designees.

Prior to pipeline installation, Enbridge will contact Landowners to determine if Tile systems will be affected. Tile systems that will be damaged, cut, or removed during construction will be marked by placing a highly visible flag at the edge of the construction right-of-way directly over the Tile lines. These markers will not be removed until the Tile has been permanently repaired and approved and accepted by the Landowner, or the Agricultural Monitor.

The pipeline trench shall provide a minimum of twelve (12) inches of clearance, where practicable, between the pipe and drainage Tiles. In most situations, the pipe will be installed under the drainage Tile; however, where drain Tiles are deeper than six (6) feet Enbridge may elect to install the pipe above the Tile lines.

Enbridge will ensure that the construction contractor repairs damaged Tile in a manner consistent with industry-accepted methods. At the Landowner's request and with Enbridge's approval, local contractors may perform the repair, replacement, or reconfiguration of the Tiles damaged or cut during pipeline construction.

Where damaged Tile is repaired by Enbridge, the following procedures will apply:

- A. Before completing permanent repairs, Tiles will be examined on both sides of the trench for their entire length within the work area to check for damage by construction equipment. If Tiles are found to be damaged, they will be repaired to preconstruction conditions.
- B. Tiles will be repaired with material of the same or better quality as that which was damaged.
- C. Filter-covered drain Tiles will be replaced with filter-covered drain Tiles.
- D. If the Tile is clay, ceramic, or concrete, any connection made with new material must be made with commercially available connectors, wrapped in plastic, or sealed with Sakrete to prevent soil intrusion.
- E. If water is flowing through a damaged Tile, temporary repairs will be promptly completed and maintained until permanent repairs can be made.
- F. Where Tiles are damaged or severed by the pipeline trench, repairs will be made according to the following procedures:
 - 1) Where Tiles are severed by the pipeline trench, double-walled drain Tile pipe, or its equivalent material, will be used for Tile repairs.
 - 2) Within the trench, one and one-half (1.5) inch river gravel, four (4) inch crushed stone, sandbags, bags of Sakrete (or an equivalent), or poured concrete will be backfilled under Tiles, as needed, to provide support and prevent settling.

Concrete blocks are also acceptable forms of support as are protective pads on the pipeline.

- 3) The support member will be of sufficient strength to support loads expected from normal farming practices (i.e., loads up to a ten (10) ton point load) on the surface directly above the repaired Tile.
 - 4) The support member will extend a minimum of two (2) feet into the soil on both sides of the trench and will be installed in a manner that will prevent it from overturning. If the repairs involve clay Tile, the support member will extend to the first Tile joint beyond the minimum two (2) -foot-wide distance.
 - 5) There will be a minimum clearance as required by Section 2.C. of this APP.
 - 6) The grade of the Tile will not be changed.
- G. Enbridge will initiate efforts to complete permanent Tile repairs within a reasonable timeframe after Final Cleanup, weather and soil conditions permitting.
- H. Following completion of the Final Cleanup, Enbridge will be responsible for correcting repairs to Tile that fail, but only if Enbridge or its agents or designees made the initial repairs. Enbridge will not be responsible for Tile repairs that Enbridge has paid the Landowner to perform.
- I. Any necessary modifications to the configuration of existing Tile systems must be consistent with the U.S. Department of Agriculture ("USDA"), Natural Resources Conservation Service, and Minnesota Wetland Conservation Act restrictions, and other regulatory authorities on wetland drainage.

7. Agricultural Drainage Ditches

Where the pipeline route crosses agricultural drainage ditches that are operated by the Landowner, pipeline will be installed at a depth that is sufficient to allow for ongoing maintenance of the ditch. After the pipeline is installed, the ditch will be restored to its preconstruction contours with erosion controls as needed. Ditches that are operated and maintained by a public entity will be crossed in accordance with applicable permits.

8. Rock Removal

The following conditions will apply on Agricultural Land:

- A. If trenching, blasting, or boring operations are required in bedrock, suitable precautions will be taken to minimize the potential for rocks to become mixed with the backfill.
- B. After the construction right-of-way has been decompacted as required in Section 10 of this Plan and the Topsoil replaced, Enbridge will remove rocks from the surface of the entire construction area so that the size, density, and distribution of rock on the right-of-way is similar to that on adjacent off-right-of-way areas. Enbridge will consult with the Landowner to identify suitable rock disposal locations on the construction right-of-way, or the rocks will be removed for disposal at another

approved disposal location. Written authorization from the Landowner is required for disposal on the Landowner's property. Rock disposal will comply with any federal, state, or local regulations involving fill and disposal of construction debris.

9. Removal of Construction Debris

Construction-related debris, material, and litter will be removed from the Landowner's property at Enbridge's expense. The Landowner or land-managing agency may approve leaving specific materials onsite that may provide for beneficial uses for stabilization or habitat restoration.

10. Compaction, Rutting, and Soil Restoration

- A. In an effort to minimize soil compaction prior to trenching activities, Enbridge will, where practical, transport pipe joints (i.e., "stringing trucks") as closely as possible along the pipeline centerline.
- B. After construction, compaction of the subsoil will be alleviated on Cropland using deep-tillage equipment, as needed. Decompaction of the topsoil, if necessary, will be performed during favorable soil conditions. If the Agricultural Inspector and/or Agricultural Monitor determine that the soil is too wet, decompaction will be delayed until the subsoil is friable/tillable in the top eighteen (18) inches.
- C. Deep subsoil ripping in cropland will occur in all traffic and work areas of the pipeline right-of-way where there was full right-of-way Topsoil stripping, unless the Agricultural Inspector determines compaction has not occurred. This includes ATWS.
- D. Subsoil ripping equipment may include v-rippers, chisel plows, or equivalents.
- E. If the Landowner makes a written claim for damages related to soil compaction greater than that of immediately adjacent Agricultural Land owned by the Landowner but unaffected by pipeline construction, Enbridge will retain a Professional Licensed Soil Scientist, or an appropriately qualified professional engineer. The Professional Soil Scientist or engineer will perform a survey of the construction right-of-way, ATWS, and adjacent unaffected land owned by the Landowner for soil compaction using field equipment such as a soil penetrometer. In addition, where there are row crops, samples will be taken in the middle of the row, but not in rows where the drive wheels of farm equipment normally travel. Copies of the results of the survey will be provided to the Landowners making such claim within thirty (30) days of completion of the soil survey. These surveys for soil compaction will be completed at Enbridge's expense.
- F. Enbridge will restore rutted land as near as practical to its preconstruction condition.
- G. Enbridge will compensate Landowners, as appropriate, for damages caused by Enbridge during construction. Damages will be paid for the cost of soil restoration on the construction right-of-way and ATWS to the extent such restoration work is not performed by Enbridge.

H. In the event of a dispute between the Landowner and Enbridge regarding what areas need to be deep tilled (i.e., “ripped”) or chiseled, or the depth at which compacted areas should be ripped or chiseled, Enbridge will determine the appropriate actions based on the Agricultural Monitor’s opinion.

11. Fertilization and Liming

Fertilizers and lime will be applied based on Landowner requirements.

12. Land Leveling

Following completion of the construction, Enbridge will restore the construction work areas as practicable to the original preconstruction contours. If uneven settling occurs or surface drainage problems develop as a result of pipeline construction, Enbridge will provide additional land leveling services within forty-five (45) days of receiving a Landowner's written notice, weather and soil conditions permitting. Alternatively, Enbridge will negotiate with the Landowner for reasonable compensation in lieu of restoration.

13. Prevention of Soil Erosion

Enbridge will install permanent erosion control devices during restoration to prevent erosion as described in Enbridge’s EPP.

14. Repair of Damaged Soil Conservation Practices

Soil conservation practices (e.g., terraces, grassed waterways) that are damaged by pipeline construction will be restored to their preconstruction condition.

15. Interference with Irrigation Systems

- A. If it is feasible and mutually acceptable to Enbridge and the Landowner, temporary measures will be implemented to allow an irrigation system to continue to operate across land on which the pipeline is being constructed.
- B. If the pipeline right-of-way and/or ATWS interfere with an operational (or soon-to-be operational) spray irrigation system, Enbridge will inform the Landowner of the need to take the Irrigation system out of service. Enbridge and the Landowner will agree upon an acceptable amount of time the irrigation system may be out of service. If Enbridge and the Landowner are unable to agree on the amount of time within ten (10) days of Enbridge informing the Landowner of the need to take the irrigation system out of service, construction will proceed and the Landowner will be asked to take the irrigation system out of service.
- C. If, as a result of pipeline construction, interruption of an irrigation system results in crop damages, either on the right-of-way or off-right-of-way, compensation of Landowners will be determined as described in Section 21 of this Plan.

16. Ingress and Egress

Prior to pipeline construction, Enbridge will identify the means of entering and exiting the right-of-way should access to the right-of-way not be practical or feasible from adjacent tracts or from public highway or railroad rights-of-way, consistent with Enbridge's Easement rights. Temporary access ramps may be constructed using locally obtained Topsoil as needed to facilitate the movement of equipment between public highways and the right-of-way.

17. Temporary Roads

- A. If public roads do not provide sufficient access, Enbridge will attempt to use existing farms roads for access to and from the right-of-way, subject to approval from the Landowner or Enbridge's Easement rights. If Enbridge needs to construct a new temporary access road across Agricultural Land, the location will be made in collaboration with the Landowner. Temporary roads that are needed during construction will be located to minimize impacts on the landowner's or tenant's use of the agricultural land. If temporary roads in Agricultural Lands require gravel stabilization, geotextile construction fabric will be placed beneath the rock to add stability and to provide a distinctive barrier between the rock and soil surface. During restoration of the right-of-way, temporary access roads will be removed or restored to preconstruction conditions, except as described in Section 17C of this Plan.
- B. Temporary roads will be designed so as not to impede drainage and will be constructed to minimize soil erosion.
- C. Following construction, new temporary roads may be left intact through mutual agreement of the Landowner and Enbridge unless otherwise restricted by federal, state, or local regulations.
- D. If the temporary roads are to be removed, the Agricultural Land on which the temporary roads are constructed will be returned to its previous use and restored to a condition equivalent to what existed prior to construction. Restoration techniques for temporary roads will be similar to those used in restoring the construction right-of-way (e.g., decompaction).

18. Weed Control

Enbridge has identified and will implement weed control measures as described in the EPP.

Enbridge will provide weed control at its aboveground facility sites (e.g., mainline block valve sites, pump stations) to avoid the spread of weeds onto adjacent Agricultural Land during operation activities. Weed control spraying, will be conducted in accordance with applicable regulatory authorities.

19. Pumping of Water from Open Trenches

- A. Enbridge will identify locations for discharging water pumped out of trenches in consultation with the Agricultural Inspector and Landowner, to the extent practicable.

- B. When dewatering trenches, Enbridge will discharge the water in a manner that will minimize damaging adjacent Agricultural Land, crops, and/or pasture. Such damages may include, but are not limited to, inundation of crops for more than twenty-four (24) hours and deposition of sediment in cropland and drainage ditches. If water-related damage during discharge from trenches results in a loss of yield, compensation of Landowners will be determined as described in Section 21 of this Plan.
- C. Discharge of water will be conducted in accordance with the EPP, federal and state regulations, and permit conditions.

20. Construction in Wet Conditions

- A. Should the Agricultural Monitor determine that continued construction in wet conditions could result in damage to soil structure and compromise future cropland productivity, the Agricultural Monitor may request Enbridge's Agricultural Inspector to temporarily halt the activity on a Landowner's property until the Agricultural Monitor consults with Enbridge's Environmental Inspector and Construction Manager. Should Enbridge elect to continue construction activities over the objection of the Agricultural Monitor, Enbridge will retain a Professional Licensed Soil Scientist or an appropriately qualified professional engineer, at its own expense, to perform a survey of the construction right-of-way, ATWS, and adjacent unaffected land owned by the Landowner for soil compaction, prior to final restoration and using the procedures described above.

21. Procedures for Determining Construction-Related Damages

- A. Enbridge will negotiate in good faith with Landowners who assert claims for construction-related damages. The procedure for resolution of these claims will be in accordance with the terms of the Easements.
- B. Negotiations between Enbridge and any affected Landowner will be voluntary in nature and no party is obligated to follow a specific procedure or method for computing the amount of loss for which compensation is sought or paid, except as otherwise specifically provided in the Easements. In the event a Landowner should decide not to accept compensation offered by Enbridge, the compensation offered is only an offer to settle, and the offer shall not be introduced in any proceeding brought by the Landowner to establish the amount of damages Enbridge must pay. In the event that Enbridge and a Landowner are unable to reach an agreement on the amount of compensation, any such Landowner may seek further recourse as provided in the Easement.

22. Advance Notice of Access to Private Property

- A. Enbridge or its agents will provide the Landowner with a minimum of twenty-four (24) hours' notice before accessing his/her property for construction, in addition to any regulatory notifications.
- B. Prior notice will consist of a personal or telephone contact, whereby the Landowner is informed of Enbridge's intent to access the land. If the Landowner cannot be reached in person or by telephone, Enbridge will mail or hand-deliver to the

Landowner's home a dated, written notice of Enbridge's intent. The Landowner need not acknowledge receipt of the written notice before Enbridge enters the property.

23. Indemnification

Indemnification obligations relating to the pipeline installation covered by this Plan shall be determined in accordance with the terms of the Easements and applicable law.

24. Tile Repair Following Pipeline Installation

A. If, after pipeline installation, the Landowner must make repairs to the Tile system within the right-of-way, or plans to install a new Tile system, the Landowner must obtain Enbridge approval of the work plan prior to commencing any activities within the right-of-way. Enbridge may impose such requirements and limitations on the work as necessary to protect the safety and integrity of Enbridge's facilities. The Landowner will be responsible for contacting 811 or the local one call center prior to any excavation near the pipeline and complying with all necessary requirements imposed by Enbridge to protect the safety and integrity of Enbridge's facilities.

Enbridge will, at its own expense, follow the procedures below.

B. An Enbridge representative will be present while the excavation work is being performed, but will not perform the excavation work. If the pipeline is above the Tile system, Enbridge will be responsible for reasonable extra costs incurred by the Landowner to excavate and expose the pipeline in accordance with Enbridge's requirements for protection of the pipeline.

MANAGEMENT OF CHANGE PROCEDURE

As a result of variable field conditions during construction, Enbridge established a MOC procedure to allow this Plan to be modified as needed during construction. The MOC procedure allows for modifications to mitigation measures, construction alignments, plans, designs, methods, and construction work areas governed by this Plan. These modifications will involve representatives of Enbridge, the Agricultural Inspector, the Agricultural Monitor, and the MDA and/or WDATCP, or other regulatory authorities. Some authority for approval/denial may be delegated to the Agricultural Monitor by the MDA and/or WDATCP, or other regulatory authorities. The MOC process can also be used to clarify discrepancies discovered in project documents and/or to distribute information to team members. Three MOC levels (Levels 1, 2, and 3) will be used to categorize and process requests. Enbridge will not conduct activities that deviate from approved activities without prior authorization by the MDA and/or WDATCP, or other regulatory authorities.

Enbridge anticipates that two types of minor route field realignments/modifications may be required after issuance of the routing permits that would not require approval of the Agricultural Monitor, the MDA and/or WDATCP, or other regulatory authorities: 1) minor realignments that are requested by the Landowner; and 2) minor realignments required due to site-specific conditions (e.g., steep slopes and other constructability concerns).

When these modifications are requested by Landowners or determined necessary for constructability and they do not affect other Landowners or sensitive environmental areas, such as wetlands, Enbridge will review all of the preconstruction surveys, documentation/collection,

and mitigation, but will not request written approval of the Agricultural Monitor, MDA and/or WDATCP, or other regulatory authorities unless required by the terms of applicable permit(s). However, the Agricultural Inspector will inform the Agricultural Monitor of these minor adjustments.

Enbridge will request written approval from the Agricultural Monitor for all other modifications that would affect additional Landowners, or change construction procedures or methods, before commencing construction in or near any of these areas.

Level 1 Modification

Level 1 modifications are site-specific, minor changes to project specifications or mitigation measures that provide equal or better protection to environmental and agricultural resources. These minor modification requests can be reviewed and either approved or denied by the Agricultural Monitor in the field during normal construction operations.

Examples of Level 1 modifications include:

- Modifying the Topsoil segregation methods based on site-specific conditions;
- Using alternative soil stockpile locations (i.e., along the non-working (spoil) side of the right-of-way);
- Allowing the use of existing access roads that have not been previously approved, provided adequate cultural, wetland, and biological survey coverage is documented, if the use would be considered “like-use;” and
- Shifting extra workspace along the right-of-way a short distance where the overall disturbance remains the same, surveys have been completed, no sensitive resources would be affected, the workspace remains within the area permitted by the routing permits, and property access is available.

A Level 1 modification may also be used to document and disseminate agency-directed changes to mitigation measures. To initiate a Level 1 modification request, the Agricultural Inspector or other designated Enbridge representative will complete a modification request form (see Appendix B) and obtain the appropriate signatures (to be determined by Enbridge). Landowner approval will be obtained by Enbridge for those modifications requiring such approval. The Agricultural Inspector will contact the Agricultural Monitor to review the proposed change. The Agricultural Inspector and the Agricultural Monitor will collaborate to evaluate the site-specific situation and determine if the modification is appropriate, feasible, and justified.

The Agricultural Monitor may approve a reasonable Level 1 modification request if, in the Agricultural Monitor’s opinion, the results of implementing the change will provide equal or better protection for the resource than the original mitigation measure or if the original mitigation measure is not applicable to that specific site. If a Level 1 modification request is approved in the field, the Agricultural Monitor will sign the modification form.

The Agricultural Monitor will document the modification approval and transmit the approved form to the MDA and/or WDATCP, or other regulatory authority. If the modification exceeds the Agricultural Monitor’s authority level, the Agricultural Monitor will inform the Agricultural Inspector that a Level 2 or Level 3 modification request is required.

Level 2 Modification

A Level 2 modification request exceeds the field decision authority of the Agricultural Monitor and requires review and final approval by the MDA and/or WDATCP, or other regulatory authority. Level 2 modification requests generally involve project changes that would affect an area outside of the previously approved work area, but are still within the corridor previously surveyed for cultural, wetland, and biological resources. Level 2 modification requests typically require the review of supplemental documents, correspondence, and records, and may require applicable agency approval.

Examples of Level 2 modifications include:

- Reducing the width or depth of Topsoil segregation in agricultural fields;
- Reducing the area to be decompacted or using an alternative method to decompact subsoil;
- Use of ATWS outside of the previously approved work area but within the previously surveyed corridor;
- The use of existing access roads that have not been previously approved if the use would not be considered “like-use” that could be approved as a Level 1 modification;
- Modifying a previously approved access road in ways not previously identified; and
- Increasing the width of the construction right-of-way at locations other than those allowed by Routing Permits, Enbridge Construction Alignment Sheets, and Enbridge’s EPP.

To initiate a Level 2 modification request with the MDA and/or WDATCP, and other regulatory authority, the Agricultural Inspector or other designated Enbridge representative will fill out a modification request form, prepare the appropriate supporting documentation, and obtain the required signatures. The designated Enbridge representative will complete and submit the modification request form and supporting documentation by e-mail (scanned copy) or fax to the regulatory authority. The regulatory authority will review the request and supporting documentation. Landowner approval will be obtained by Enbridge for those modifications requiring approval. The regulatory authority will also discuss the request with the Agricultural Monitor.

If the Level 2 modification request is approved, the regulatory authority will sign the modification request and e-mail the approved form (scanned copy) to the designated Enbridge representatives and the Agricultural Monitor. The modification may be implemented in the field as soon as the regulatory authority and all other applicable agencies have approved the modification.

Level 3 Modification

Level 3 modification requests generally involve project changes that would affect an area outside of the previously approved work area, and that are outside the corridor previously surveyed for cultural resources, wetlands, and biological resources.

Examples of Level 3 modifications include:

- Extra workspaces, access roads, or route realignments for which landowner approval has not been obtained (i.e., condemnation tracks);
- Certain changes to mitigation measures or construction/restoration procedures; and
- Extra workspaces, access roads, or route realignments outside the previously surveyed corridor that require additional surveys and agency approvals that affect resources of sufficient sensitivity to require a formal letter approval from other regulatory authorities.

To initiate a Level 3 modification request, the Agricultural Inspector or other designated Enbridge representative will fill out a modification request form, prepare the appropriate supporting documentation, ensure the required environmental surveys have been completed, and obtain the required signatures. The designated Enbridge representative will submit the modification request form and supporting documentation by e-mail (scanned copy) or fax to the all applicable regulatory authorities. The regulatory authorities will review the request and supporting documentation and consult with other agencies as necessary. The MDA and/or WDATCP may also discuss the request with the Agricultural Monitor. If sensitive biological species and/or habitat are encountered during the additional surveys, documentation of consultation with applicable agencies will be provided with the modification request. The MDA and/or WDATCP will consult with the regulatory authorities and receive appropriate agency approvals before authorizing the modification.

If the Level 3 modification request is approved, the MDA and/or WDATCP will sign the modification request and e-mail the approved form (scanned copy) to the designated Enbridge representatives and the Agricultural Monitor. The modification may be implemented in the field as soon as the approved modification is received. All agency-approved mitigation measures will adhere to the modification if it is approved by the MDA and/or WDATCP.

Appendix A
Mitigation Measures for Organic Agricultural Land

INTRODUCTION

This appendix identifies mitigation measures that apply specifically to farms that are Certified Organic or farms in Minnesota that are in active transition to become Certified Organic, and is intended to address the unique management and certification requirements of these operations. All protections provided in the Plan must also be applied to Organic Agricultural Land in addition to the provisions of this appendix.

The provisions of this appendix will apply to Organic Agricultural Land for which the Landowner has provided to Enbridge a true, correct, and current version of the Organic System Plan within sixty (60) days after the signing of the Easement for such land or sixty (60) days after the issuance of a PRP to Enbridge by the MN PUC, whichever is sooner. In the event the Easement is signed later than sixty (60) days after the issuance of the PRP, the provisions of this appendix are applicable when the Organic System Plan is provided to Enbridge at the time of the signing of the Easement. In instances where Enbridge is in possession of the Easement prior to submitting its MN PUC application, the Landowner must provide the Organic System Plan to Enbridge no later than sixty (60) days after the issuance of the PRP. Enbridge recognizes that Organic Agricultural Land is a unique feature of the landscape and will treat this land with the same level of care as other sensitive environmental features.

DEFINITIONS

Unless otherwise provided to the contrary in this appendix, capitalized terms used in this appendix shall have the meanings provided below and in the Plan. In the event of a conflict between this appendix and the Plan with respect to definitions, the definition provided in this appendix will prevail but only to the extent such conflicting terms are used in this appendix. The definition provided for the defined words used herein shall apply to all forms of the words.

Apply	To intentionally or inadvertently spread or distribute any substance onto the exposed surface of the soil.
Certifying Agent	As defined by the National Organic Program Standards, 7 C.F.R. Part 205.2.
Decertified or Decertification	Loss of Organic Certification.
Organic Agricultural Land	Farms or portions thereof described in 7 C.F.R. Parts 205.100, 205.101, and 205.202.
Certified Organic	As defined by the National Organic Program Standards, 7 C.F.R. Part 205.100 and 7 C.F.R. Part 205.101.
Organic System Plan	As defined by the National Organic Program Standards, 7 C.F.R. Part 205.2.
Prohibited Substance	As defined by the National Organic Program Standards, 7 C.F.R. Parts 205.600 through 205.605 using the criteria provided in 7 United States Code (“U.S.C.”) 6517 and 7 USC 6518.

ORGANIC SYSTEM PLAN

Enbridge recognizes the importance of the individualized Organic System Plan to the Organic Certification process. Enbridge will work with the Landowner, the Landowner's Certifying Agent, and/or a USDA-approved organic consultant to identify site-specific construction practices and develop an organic construction plan that will minimize the potential for Decertification as a result of construction activities. Enbridge also recognizes that Organic System Plans are proprietary in nature and confidentiality will be respected.

PROHIBITED SUBSTANCES

Enbridge will avoid the application of Prohibited Substances onto Organic Agricultural Land. No herbicides, pesticides, fertilizers, or seed will be applied unless requested and approved by the Landowner. Likewise, no refueling, fuel, or lubricant storage or routine equipment maintenance will be allowed on Organic Agricultural Land. Equipment will be checked prior to entry to make sure that fuel, hydraulic, and lubrication systems are in good working order before working on Organic Agricultural Land. If Prohibited Substances are used on land adjacent to Organic Agricultural Land, these substances will be used in such a way as to prevent them from entering Organic Agricultural Land.

SOIL HANDLING

Topsoil and subsoil layers that are removed during construction will be stored separately and replaced in the proper sequence after the pipeline is installed. Unless otherwise specified in the site-specific plan described above, Enbridge will not use this soil for other purposes, including creating access ramps at road crossings. No Topsoil or subsoil (other than incidental amounts) may be removed from Organic Agricultural Land. Likewise, Organic Agricultural Land will not be used for storage of soil from non-Organic Agricultural Land.

EROSION CONTROL

On Organic Agricultural Land, Enbridge will, to the extent feasible, implement erosion control methods consistent with the Landowner's Organic System Plan. On land adjacent to Organic Agricultural Land, Enbridge's erosion control procedures will be designed so that sediment from adjacent non-Organic Agricultural Land will not flow along the right-of-way and be deposited on Organic Agricultural Land. Treated lumber will not be used in erosion control measures on Organic Agricultural Land.

WATER IN TRENCHES

During construction, Enbridge will leave an earthen plug in the trench at the boundary of Organic Agricultural Land to prevent trench water from adjacent land from flowing into the trench on Organic Agricultural Land. Likewise, Enbridge will not allow trench water from adjacent land to be pumped onto Organic Agricultural Land.

WEED CONTROL

On Organic Agricultural Land, Enbridge will, to the extent feasible, implement weed control methods consistent with the Landowner's Organic System Plan. Prohibited Substances will not be used for weed control on Organic Agricultural Land. In addition, Enbridge will not use

Prohibited Substances for weed control on land adjacent to Organic Agricultural Land in such a way as to allow these materials to drift onto Organic Agricultural Land.

MITIGATION OF NATURAL RESOURCE IMPACTS

Enbridge will not use Organic Agricultural Land for the purpose of required compensatory mitigation of impacts on natural resources such as wetlands or woodlands unless approved by the Landowner.

MONITORING

In addition to the responsibilities of the Agricultural Monitor described in the Plan, the following will apply:

- The Agricultural Monitor or a trained Organic Inspector (trained through a USDA-approved Organic Inspection Program and retained by Enbridge) will routinely monitor construction and restoration activities on Organic Agricultural Land for compliance with the provisions of this appendix and will document activities that could result in Decertification; and
- Instances of noncompliance will be documented according to International Organic Inspectors Association protocol consistent with the Landowner's Organic System Plan, and will be made available to the MDA, the Landowner, the Landowner's Certifying Agent, and to Enbridge.

If the Agricultural Monitor is responsible for routinely monitoring activities on Organic Agricultural Land, he or she will have been trained in such activities by the International Organic Inspectors Association, at Enbridge's expense if necessary.

COMPENSATION FOR CONSTRUCTION DAMAGES

The settlement of damages will be based on crop yield and/or crop quality determination and the need for additional restoration measures, and will proceed in accordance with the terms of the Easement. Unless the Landowner of Organic Agricultural Land and Enbridge agree otherwise, at Enbridge's expense, a mutually agreed upon professional agronomist will make crop yield determinations, and the MDA Fruit and Vegetable Inspection Unit will make crop quality determinations. If the crop yield and/or crop quality determinations indicate the need for soil testing, the testing will be conducted by a commercial laboratory that is properly certified to conduct the necessary tests and is mutually agreeable to Enbridge and the Landowner. Fieldwork for soil testing will be conducted by a Professional Soil Scientist or Professional Engineer licensed by the State of Minnesota. Enbridge will be responsible for the cost of sampling, testing, and additional restoration activities, if needed. Landowners may elect to settle damages with Enbridge in advance of construction on a mutually acceptable basis or to settle after construction based on a mutually agreeable determination of actual damages.

COMPENSATION FOR DAMAGES DUE TO DECERTIFICATION

Should any portion of Organic Agricultural Land be Decertified as a result of construction activities, the settlement of damages will be based on the difference between revenue generated from the land affected before Decertification and after Decertification, for the entire

period of time the land is Decertified, so long as a good faith effort is made by the Landowner to regain certification.

Appendix B
Environmental Protection Plan

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Enbridge (U.S.) Inc.

ENVIRONMENTAL PROTECTION PLAN

October 2013





ENVIRONMENTAL PROTECTION PLAN

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

INTRODUCTION

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

This document includes the following sections:

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

Alternative construction procedures implemented in lieu of this EPP will provide an equal or greater level of protection to the environment, and will be approved in writing by Enbridge. Modifications for the construction of dual pipelines are highlighted below in the appropriate sections.

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

Enbridge will provide appropriate construction oversight to confirm and document compliance with the measures of this EPP and requirements of applicable federal, state, tribal, and local permits. Enbridge's Environmental Inspectors (EIs) will assist the Contractor in interpreting and implementing the requirements of the EPP, and verify compliance with these procedures for

Enbridge. Enbridge will employ experienced EIs to manage unforeseen situations that are not directly addressed by the Project documents. Enbridge relies on the experience and judgment of the EIs, through coordination and consultations with Project management staff, to address unforeseen situations should they occur in the field. The EIs will be expected to use judgment in the field to interpret environmental conditions and requirements, but will not be authorized to make major modifications or changes without the prior written approval of Enbridge. The EI, in consultation with Enbridge Environment staff, will have the authority to stop activities and order corrective mitigation for actions that are not in compliance with the measures in this EPP, landowner agreements, or environmental permit requirements. The EI will maintain appropriate records to document compliance with these and other applicable environmental permit conditions.

1.0 GENERAL MITIGATION MEASURES

1.1 IDENTIFICATION OF AVOIDANCE AREAS

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

1.2 CONSTRUCTION LINE LIST AND PERMITS

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

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

1.3 WET WEATHER SHUTDOWN

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

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

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

1.4 RIGHT-OF-WAY ACCESS

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

1.5 RIGHT-OF-WAY REQUIREMENTS

All construction equipment and vehicles will be confined to the approved construction ROW and additional temporary workspace. Prior to commencement of clearing operations, the outer limits of the construction ROW and additional temporary workspace areas will be marked with distinctive stakes and flagging by Enbridge. Construction activities are restricted to the approved designated areas.

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

(a) ROW (Permanent)

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

(b) Temporary Workspace

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

(c) Additional Temporary Workspace

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

1.6 CONTROLLING SPREAD OF UNDESIRABLE SPECIES

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

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

1.6.1 Prevention and Control Measures

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

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

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

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

To prevent the spread of noxious weeds and invasive species during construction, mulch used on the Project will be composed of weed-free material. Certified weed-free mulch may also be required at site-specific locations. The Contractor(s) will be responsible for identifying and acquiring sources of weed-free and certified weed-free mulch. Sources will be approved by Enbridge prior to purchase.

1.7 POTHOLING/HYDROVAC SLURRY

Hydrovac excavation is used to positively identify pipelines and other buried utilities. The Contractor will construct an unlined but bermed containment area or identify comparable containment (e.g., open top tank) to hold the hydrovac slurry in an Enbridge and landowner-approved upland area within the construction workspace or dispose of the material off-site at a licensed disposal facility. Once the slurry is drained and dry, it may be incorporated with the subsoil in an Enbridge and landowner-approved upland area within the construction workspace. Discharging hydrovac slurry on to topsoil is not permitted as the material will degrade the quality of the topsoil and potentially affect revegetation.

1.8 UPLAND CLEARING

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

1.8.1 Disposal of Non-Merchantable Timber

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

1.8.2 Disposal of Merchantable Timber

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

1.8.3 Upland Grading and Stump Removal

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

1.9 TEMPORARY EROSION AND SEDIMENT CONTROLS

Temporary erosion and sediment controls (ECDs) include, but are not limited to, slope breakers, sediment barriers (i.e. silt fence, straw bales, bio-logs, etc.), stormwater diversions, trench breakers, mulch, and revegetation subsequent to seeding of exposed soils (refer to Figures 4 through 11). The Contractor will maintain erosion and sediment control structures as required in Project construction documents and as required by all applicable permits. Non-functional

erosion and sediment controls will be repaired, replaced, or supplemented with functional materials within 24 hours after discovery, or as otherwise specified in the Project permits. ECDs will be installed after initial clearing but before grading activities, and will be replaced by permanent erosion controls as restoration is completed.

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

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

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

1.9.1 Temporary Stabilization

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

1.9.2 Erosion Control Blanket

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

1.9.3 Mulch

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

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

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

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

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

1.9.4 Cat Tracking

Cat tracking, also known as horizontal slope grading, may be implemented based on site conditions (sandy or silt soils) to reduce erosion potential. Cat tracking is achieved by driving a bulldozer vertically up and down the slope which results in the tracks being oriented horizontally; creating small speed bumps for water (refer to Figure 11).

1.9.5 Temporary Slope Breakers

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

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

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

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

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

1.10 UPLAND TOPSOIL SEGREGATION

Upland areas where topsoil will be stripped includes cropland, hay fields, pasture, residential areas, and other areas as requested by the Landowner or as specified in the Project plans, commitments, and/or permits. Topsoil will not be used to construct berms, trench breakers, temporary slope breakers, improving or maintaining roads, or to pad the pipe. Berms used for stacking pipe in pipe yards may be constructed using topsoil if landowner permission and necessary approvals are obtained. Gaps will be left and ECDs installed where stockpiled topsoil and spoil piles intersect with water conveyances (i.e., ditches, swales, and waterways) to maintain natural drainage.

Topsoil Segregation Methods

The following topsoil segregation methods may be employed during construction:

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

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

Depth of Upland Topsoil Stripping

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

are segregated. If less than 12 inches of topsoil are present, the Contractor will attempt to segregate to the depth that is present.

1.11 UPLAND TRENCHING

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

1.11.1 Timing

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

1.12 FOAM PILLOW INSTALLATION

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

1.13 TRENCH BREAKERS

Trench breakers will be installed as deemed necessary by Enbridge in sloped areas after the pipe has been lowered into the trench. Trench breakers protect against subsurface water flow along the pipe after the trench is backfilled. Trench breakers will be constructed with bags filled with rock-free subsoil or sand. Use of foam trench breakers will be approved by Enbridge in advance and installed in accordance with applicable Project permits, local/state/federal regulations, and manufacturer's recommendations. Trench breakers will be placed from the bottom of the trench to near the top of the trench, completely surrounding the pipe and will be properly keyed into the undisturbed trench walls (refer to Figures 12 and 13). The location for trench breakers will be based on field conditions including the degree and length of slope, presence of down slope sensitive resource areas such as wetland and waterbodies, and proximity to other features such as roads and/or railroads. The following conditions apply to the placement and installation of trench breakers unless otherwise directed by Enbridge:

- Trench breakers will be installed on slopes greater than 5 percent adjacent to streams, wetlands, or other waterbodies.
- Topsoil cannot be used to construct trench breakers.

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

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

1.14 DRAIN TILE INLET PROTECTION AND TILE REPAIRS

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

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

1.15 UPLAND BACKFILLING

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

1.16 CLEANUP AND ROUGH/FINAL GRADING

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

1.16.1 Timing

The Contractor will begin cleanup and rough grading (including installation of temporary erosion and sediment control measures) within 72 hours after backfilling the trench. The Contractor will

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

1.17 PERMANENT EROSION AND SEDIMENT CONTROLS

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

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

Permanent berms will be constructed according to the following specifications:

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

1.18 SOIL COMPACTION TREATMENT

Cultivated fields and compacted or rutted areas will be tilled prior to topsoil replacement with a deep tillage device or chisel plowed to loosen compacted subsoils. If subsequent construction and cleanup activities result in further compaction, additional measures will be undertaken to alleviate the soil compaction.

1.19 STONE REMOVAL

A diligent effort will be made to remove excess stones equal to or larger than 4 inches in diameter from the upper 8 inches of subsoil or as specified in permit conditions, contract documents, or landowner agreements. After the topsoil is replaced, stone removal efforts will cease when the size and density of stones on the construction ROW are similar to undisturbed areas adjacent to the construction ROW as determined by the EI. Excess rock will be piled in upland areas where landowner permission has been obtained, or will be hauled off-site to an Enbridge approved disposal site.

1.20 REPAIR OF DAMAGED CONSERVATION PRACTICES

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

1.21 LAND LEVELING FOLLOWING CONSTRUCTION

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

2.0 STREAM AND RIVER CROSSING GENERAL REQUIREMENTS

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

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

2.1 TIME WINDOW FOR CONSTRUCTION

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

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

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

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

2.2 CLEARING AND GRADING

The construction ROW width will consist of a 15-foot-wide neck down beginning 50 feet from the ordinary high water mark (OHWM) / ordinary high water level on the working side of the right-of-way. A 25-foot-wide neck down will be implemented on the spoil side of the construction ROW beginning 20 feet from the OHWM/OHWL (refer to Figures 15 through 17).

2.2.1 Impaired Waters

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

2.3 ADDITIONAL TEMPORARY WORKSPACE

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

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

2.4 BRIDGES

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

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

2.4.1 Types of Bridges

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

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

2.4.2 Bridge Design and Maintenance

Bridges will be designed as close to perpendicular to the axis of the stream channel, creating the shortest crossing length and will be built and maintained in accordance with applicable permits. Equipment bridges will be designed to withstand the maximum foreseeable flow of the stream with headers and support structures being placed above the ordinary high water mark (OHWM) of the feature. Local jurisdictions may require stricter guidelines associated with bridge placement. Bridges will not restrict flow or pool water while the bridge is in place, and will be constructed with clean materials. Bridges will be designed and maintained to prevent soil from entering the waterbody. Soil that accumulates on the bridge decking will be removed as needed, or as deemed necessary by the EI.

2.5 STREAM AND RIVER CROSSING CONSTRUCTION METHODS

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

2.5.1 Wet Trench Method

Installation

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

- Sediment control measures will be installed before grading from the 20-foot vegetative buffer left on each stream bank. Spoil containment structures will be installed back from the stream bank so that spoil does not migrate into the stream.
- Grading will be directed away from the waterbody to minimize the potential for sediment to enter the stream. Grading of stream banks will be restricted to the trench line and areas necessary for safe bridge installation.
- After grading, backhoes or draglines will be used to excavate the trench. Where possible, excavating equipment will operate from one or both banks, without entering the stream. If equipment must encroach into the stream, it will operate on clean construction mats. Streambed material will be segregated (e.g., upper one foot and the remaining trench spoil will be stored separately) and placed within a spoil containment structure in approved construction work area limits. Storage of streambed spoil within the stream will only be allowed if expressly approved in the applicable permits.
- Earthen trench plugs (hard plugs) between the stream and the upland trench will be left undisturbed during excavation of the in-stream trench to prevent diversion of the stream flow into the open trench and to prevent water that may have accumulated in the adjacent upland trench from entering the waterbody. Trench plugs will be removed immediately prior to pipe placement, and then replaced when the pipe is in place. Trench water accumulated upslope of trench plugs will be dewatered appropriately prior to trench plug removal.
- Water within the trench will be managed in accordance with Section 5.0

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

Temporary Stabilization

The Contractor will restore the stream banks as near as practicable to pre-construction conditions unless that slope is determined to be unstable. If Enbridge determines the slope is considered unstable, the Contractor will reshape the banks to prevent slumping. Once the banks have been reshaped, ECDs will be installed within 24 hours of backfilling the crossing. Temporary slope breakers will be installed on all sloped approaches to streams in accordance with the spacing requirements previously specified.

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

2.5.2 Dam and Pump Method

Installation

The dam and pump method is a dry crossing technique that is suitable for low flow streams and is generally preferred for crossing meandering channels. The dam and pump method involves damming of the stream upstream and downstream of the proposed trench before excavation (refer to Figure 16) and pumping water around the construction area. The following procedures will be used for dam and pump crossings:

- Dams may be constructed of sandbags, inflatable dams, aqua-dams, sheet piling, and/or steel plates. The dams will prevent the stream from flowing into the construction area. The dams will be continuously monitored for a proper seal. Additional sandbags, plastic sheeting, steel plating, or similar materials will be used where necessary to minimize the amount of water seeping around the dams and into the construction work area. The dam will not be removed until after the pipeline has been installed, the trench has been backfilled, and the banks have been stabilized.
- Pumping of the stream across the ROW will commence simultaneously with dam construction to prevent interruption of downstream flow. Stream flow will be pumped across the construction area through a hose and will be discharged to an energy-dissipation device, such as plywood boards, to prevent scouring of the streambed.
- The pumps and fuel containers will be located on the upstream side of the crossing and will be placed in impermeable, sided structures which will act as containment units (refer to Section 10.0). The pumps used for this crossing method will not be placed directly in the stream or on the streambed. Pumps will have a capacity greater than the anticipated stream flow. The pumping operation will be staffed 24 hours a day and pumping will be monitored and adjusted as necessary to maintain an even flow of water across the work area and near-normal water levels upstream and downstream from the crossing. .

The pump intake will be suspended to prevent sediment from being sucked from the bottom of stream and will be equipped with a screen, or equivalent device, to prevent fish uptake.

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

Temporary Stabilization

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

2.5.3 Flume Method

Installation

The flume method is a dry crossing technique that is suitable for crossing relatively narrow streams that have straight channels and are relatively free of large rocks and bedrock at the point of crossing (refer to Figure 17). This method involves placement of flume pipe(s) in the stream bed to convey stream flow across the construction area without introducing sediment to the water. The procedures for using the flume method are described below.

- The flume(s) will be of sufficient diameter to transport the maximum flows anticipated to be generated from the watershed. The flume(s), typically 40 to 60 feet in length, will be installed before trenching and will be aligned so as not to impound water upstream of the flume(s) or cause downstream bank erosion. The flumes will not be removed until after the pipeline has been installed, trench has been backfilled, and the stream banks have been stabilized.

- The upstream and downstream ends of the flume(s) will be incorporated into dams made of sand bags and plastic sheeting (or equivalent). The upstream dam will be constructed first and will funnel stream flow into the flume(s). The downstream dam will prevent backwash of water into the trench and construction work area. The dams will be continuously monitored for a proper seal. Adjustments to the dams will be made where necessary to prevent large volumes of water from seeping around the dams and into the trench and construction work area.
- Where possible, excavating equipment will operate from one or both banks, without entering the stream. If equipment must encroach into the stream, it will operate on clean construction mats. Streambed material will be segregated and placed within a spoil containment structure in approved construction work area limits. Storage of streambed spoil within the stream will only be allowed if expressly approved in the applicable permits.
- Earthen trench plugs (hard plugs) between the stream and the upland trench will be left undisturbed during excavation of the in-stream trench to prevent diversion of the stream flow into the open trench and to prevent water that may have accumulated in the adjacent upland trench from entering the waterbody. Trench plugs will be removed immediately prior to pipe placement, and then replaced when the pipe is in place. Trench water accumulated upslope of trench plugs will be dewatered appropriately prior to trench plug removal.
- If additional trench dewatering is necessary to complete the installation of the pipe, the discharge will be managed in accordance with Section 5.0.
- Backfilling will begin after the pipe is positioned in the trench to the desired depth. Backfill material will consist of the spoil material excavated from the trench and parent streambed unless otherwise specified in state or federal permits. The in-stream trench will be backfilled so that the stream bottom is similar to its pre-construction condition, with no impediments to normal water flow.

Temporary Stabilization

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

2.5.4 Directional Drill and/or Guided Bore Method

Installation

Installing the pipe underneath a stream will involve placing a drill unit on one side of the stream (refer to Figure 18). A small-diameter pilot hole will be drilled under the stream along a prescribed profile. After the pilot hole has been completed, barrel reams will be used to enlarge the pilot hole to accommodate the desired pipeline diameter. Drilling mud will be necessary to remove cuttings and maintain the integrity of the hole. Water from an Enbridge-approved source will be used to prepare the slurry of drilling mud, and will be appropriated according to

applicable permits. The pipe section will be pulled through the hole by the drilling rig and welded to the adjoining sections of pipe on each side of the river.

Drilling Mud

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

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

Temporary Stabilization

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

2.6 PERMANENT RESTORATION

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

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

2.6.1 Vegetative Bank Restoration

Typically, waterbody banks will be restored as near as practicable to preconstruction conditions after backfilling is complete and will be seeded with an appropriate seed mix as specified in Section 7.0 and covered with an erosion control blanket. Erosion controls, (e.g. straw bales, bio-logs, silt fences, etc.) will be installed as necessary based on site-specific conditions.

2.6.2 Supplemental Bank Stabilization

Unstable soils and/or site-specific factors such as stream velocity and flow direction may require additional restoration efforts, such as installation of rock rip-rap, to stabilize disturbed stream banks. Rock rip-rap will be used only where site-specific conditions require and where applicable permits or approvals have been acquired. Geotextile fabric and rock riprap will be

placed according to site and permit conditions (refer to Figure 23). Disturbed soils upslope and on either side of the riprap will be prepared for seeding according to Section 7.0 and other stream bank protection requirements. Bioengineering techniques may also be implemented as determined by Enbridge (refer to Figures 26 through 28).

2.6.3 Bridge Removal

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

2.6.4 Swales

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

3.0 WETLAND CROSSING GENERAL REQUIREMENTS

The procedures in this section apply to all wetlands that will be affected by the Project. These procedures require that judgment be applied in the field and will be implemented under the supervision of Enbridge and the EI. The intent of these procedures is to minimize construction-related disturbance and sedimentation of wetlands and to restore wetlands as nearly as possible to pre-existing conditions.

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

3.1 WETLAND ACCESS

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

3.2 CLEARING

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

3.3 ADDITIONAL TEMPORARY WORKSPACE IN WETLANDS

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

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

3.4 GRADING IN A WETLAND

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

ECDs will be installed:

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

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

3.5 RIGHT-OF-WAY STABILIZATION

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

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

3.6 TRENCHING

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

3.6.1 Topsoil Segregation

When constructing in wetland areas without standing water, up to one foot of topsoil (organic layer) will be stripped from the trench line and stockpiled separate from trench spoil to preserve the native seed stock. In standing water wetlands, organic soil segregation is not typically practical; however, the Contractor will attempt to segregate as much of the organic layer as possible based on site/saturation conditions. If normally unsaturated wetlands are saturated at the time of construction, topsoil segregation will be attempted according to Figure 3 and based on recommendations from the EI and appropriate regulatory agencies.

3.6.2 Trench Breakers

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

3.7 PIPELINE INSTALLATION

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

3.7.1 Push/Pull Method

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

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

3.7.2 Temporary Erosion and Sediment Controls

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

3.7.3 Concrete Coating

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

3.8 BACKFILLING

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

approved disposal site. After the trench has been backfilled with subsoil, previously segregated topsoil will be spread over the trench area and mounded.

3.9 ROUGH GRADING, CLEANUP, AND TEMPORARY RESTORATION

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

3.9.1 Timing

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

3.9.2 Temporary Stabilization

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

4.0 HIGHWAY, ROAD AND RAIL CROSSINGS

4.1 ADDITIONAL WORKSPACE

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

4.2 MAINTENANCE

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

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

4.3 TEMPORARY EROSION AND SEDIMENT CONTROLS

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

5.0 CONSTRUCTION DEWATERING

5.1 TRENCH DEWATERING

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

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

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

5.1.1 Flow Measurement and Water Sampling

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

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

5.1.2 Regulatory Notification and Reporting

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

5.2 HYDROSTATIC TEST DISCHARGES

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

5.2.1 Refueling

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

5.2.2 Siting of Test Manifolds

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

5.2.3 Water Sampling

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

5.2.4 Best Management Practices

Prior to hydrostatic testing the pipeline, Enbridge will prepare the pipe by removing accumulated construction debris, mill scale, dirt, and dust using a cleaning pig. The debris will be collected in

a temporary receiver and will be properly disposed off-site of by the Contractor. Upon completion of the cleaning operation, the pipeline will be sealed with the test headers.

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

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

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

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

5.2.5 Flow Measurement

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

6.0 WATER APPROPRIATION

6.1 GENERAL

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

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

6.2 WATER SOURCES

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

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

6.3 FLOW MEASUREMENT

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

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

6.4 WATER SAMPLING

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

6.5 REGULATORY NOTIFICATION AND REPORTING

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

7.0 REVEGETATION & MONITORING

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

7.1 PROJECT SEED SPECIFICATIONS

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

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

Seed will be used within 12 months of testing as required by applicable state rules and regulations. The seed tags on the seed sacks will also certify that the seed is “Noxious Weed Free”. Seed rates used on the Project will be based on PLS rate, not actual weight basis. Therefore, to determine the correct application rate if not indicated on the seed tag, a correction calculation will be performed based the purity and germination. For example, a seed mix that has a specified 10 pounds PLS per acre, 95 percent germination rate, and is 80 percent pure needs to be applied at the following rate:

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

The species components of individual mixes are subject to availability at the time of purchase. Grass species may be substituted with alternative native or non-invasive species that are included in the NRCS guidelines and subject to approval by Enbridge.

Seed tags will be collected by the contractor and provided to Enbridge during seeding activities. The tags will be reviewed by the EI prior to installation to ensure that the seed mix complies with Enbridge’s specifications and that it is being applied to the correct location. If bulk delivery of seed is made, the above information will still be made available to Enbridge. Off-loading/on-loading of seed will not be performed in a designated wetland area.

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

7.2 TEMPORARY REVEGETATION

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

7.3 TIMING FOR TEMPORARY VEGETATION

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

- the installation of the first pipeline and the second line where two pipelines will be co-constructed and active construction is ongoing;
- the completion of final grading at a site and the establishment of permanent vegetation; and/or,
- where there is a high risk of erosion due to site-specific soil conditions and topography.

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

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

7.4 MULCH

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

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

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

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

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

7.5 PERMANENT REVEGETATION

Permanent vegetation will be established in areas disturbed within the construction work area (permanent easement, TWS, and ATWS) except in actively cultivated areas and standing water wetlands. The seed mixes for permanent seeding include native seed varieties commonly found and/or available from local seed distributors. Enbridge's seed mixes (refer to Appendix C)

were selected to augment revegetation via natural recruitment from native seed stock in the topsoil and are not intended to change the natural species composition. Rates provided are assumed for a drill application and will be adjusted as discussed in Section 7.1.

7.6 UPLAND CONSTRUCTION AREAS

In consulting with the NRCS and other agencies, Enbridge developed a standard upland seed mix for restoring disturbed areas affected by the Project (Appendix C, Table 2). The mix includes species that will provide for effective erosion control and revegetation of the Project area. This seed mix will be used by Enbridge as the standard upland mix unless an alternate seed mix is specified by landowners or land managing agencies.

7.7 PERMANENT SEEDING OF WETLAND AREAS

7.7.1 Unsaturated Wetland Areas

Non-standing water wetlands will be seeded with the mix provided in Appendix C, Table 3 to provide temporary cover and allowed to revegetate naturally. The natural revegetation process will be encouraged by the seeds and rhizomes in the topsoil spread back over the right-of-way after pipe installation. No fertilizer, lime, or mulch will be applied in wetlands.

7.7.2 Saturated/Standing Water Wetlands

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

7.7.3 Forested Wetland Restoration

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

7.8 PERMANENT SEEDING OF WATERBODY BANKS

Enbridge will reestablish stream bank vegetation using the Upland seed mix listed in Appendix C, Table 2, unless an alternate seed mix is requested by applicable agencies. Additional vegetation requirements may also be contained within Project specific permits. Where a waterbody is located within a wetland, the Contractor will re-seed the banks with the applicable wetland seed mix.

7.9 SPECIALIZED SEED MIXES

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

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

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

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

7.10 CONSERVATION RESERVE PROGRAM (CRP) PROPERTIES

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

7.11 SEED BED PREPARATION AND SEEDING PROCEDURES

After final grading, deep tillage will be performed in actively cultivated areas and in non-agricultural areas (as directed by Enbridge) to relieve soil compaction and promote root penetration. Deep tillage will not be conducted in non-farmed wetlands. The soil will then be tilled with a disc, field cultivator, or chisel plow (or equivalent) to prepare a seedbed, breaking up large clods and firm the soil surface. Tillage and equipment operations related to seeding and mulching will be performed parallel to ground contours as much as practicable. Fertilizer and other soil amendments will be incorporated into the soil during seedbed preparation as specified by Enbridge in the Project-specific CLL requirements and permits. No soil amendments will be applied in wetlands unless directed by the appropriate agencies.

7.12 SEEDING METHODS

Seed will be applied uniformly at specified rates across the prepared construction ROW by drilling, broadcasting, or hydroseeding. The EI will suspend seeding activities if conditions are such that equipment will cause rutting of the surface in the designated seeding areas. Enbridge will continue to monitor ROW conditions to resume seeding activities as site conditions improve and according to the general seeding timing restrictions listed in Section 7.14.

7.12.1 Drill Seeding

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

7.12.2 Broadcast Seeding

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

7.12.3 Hydroseeding

Hydroseeding rate will be double the drill seeding rate, or the same as broadcast seeding rate. Seed will be applied alone or in a seed, fertilizer, and/or hydromulch slurry. If seeding is applied

alone, the amount of hydromulch material will be adjusted to the seed slurry to show where seeding has taken place, providing a means to identify uniform cover of the construction ROW. Hydroseeders will provide continuous agitation and be capable of supplying a continuous, non-fluctuating flow of slurry. Enbridge will pre-approve all hydromulch products, which must be on the applicable state DOT product list.

7.13 SOIL AMENDMENTS

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

7.14 SEEDING PERIODS

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

Seeding Periods

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

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

7.15 TIMING OF FINAL SEEDING

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

7.16 EROSION & SEDIMENT CONTROL

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

7.17 DORMANT SEEDING

Dormant seeding is a method used after soil temperatures have cooled to 55 degrees Fahrenheit or cooler to prevent seed germination. Dormant seeding is only practicable if the soil is not frozen and snow is not present. Procedures for applying soil amendments, seedbed

preparation, seeding, and mulching are the same as outlined for permanent revegetation in this section.

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

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

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

7.18 MONITORING

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

8.0 WINTER CONSTRUCTION

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

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

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

9.0 WASTE MANAGEMENT

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

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

9.1 HAZARDOUS WASTES

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

9.2 ABRASIVE BLAST DEBRIS

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

10.0 SPILL PREVENTION, CONTAINMENT, AND CONTROL MEASURES

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

10.1 PLANNING AND PREVENTION

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

10.2 ROLES AND RESPONSIBILITIES

10.2.1 Spill Coordinator

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

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

10.2.2 Environmental Inspector

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

10.2.3 Authorized Personnel

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

10.2.4 Construction Superintendent

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

10.2.5 Construction Personnel

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

10.3 TRAINING

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

10.4 EQUIPMENT

- Each construction crew will have adequate absorbent materials and containment booms on hand, to enable the rapid cleanup of any spill which may occur.
- The Contractor will maintain spill kits containing a sufficient quantity of absorbent and barrier materials to adequately contain and recover foreseeable spills. These kits may include, but are not limited to absorbent pads, straw bales, absorbent clay, sawdust, floor-drying agents, spill containment barriers, plastic sheeting, skimmer pumps, and holding tanks. This equipment will be located near fuel storage areas and other locations as necessary to be readily available to control foreseeable spills.
- Suitable plastic lining materials will be available for placement below and on top of temporarily-stored contaminated soils and materials.
- All fueling vehicles, and where necessary, service vehicles, will carry materials adequate to control foreseeable spills. Such material may include but not be limited to absorbent pads, commercial absorbent material, plastic bags with ties, and shovels.
- The Spill Coordinator will inform the Authorized Personnel, Construction Personnel, and the EIs of the locations of spill control equipment and materials, and have them readily accessible during construction activity. Spill kits should be clearly labeled for quick and easy identification in the field.
- All fuel nozzles will be equipped with functional automatic shut-offs.
- Fuel trucks transporting fuel to on-site construction equipment will travel only on approved access roads.

10.5 SUPERVISION AND INSPECTION

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

10.6 STORAGE AND HANDLING OF FUELS/HAZARDOUS LIQUIDS

10.6.1 Fuel Storage - General

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

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

10.6.2 Refueling

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

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

Enbridge requires that the storage of petroleum products, refueling, maintenance, and lubricating operations take place in upland areas that are more than 100 feet from wetlands, streams, and waterbodies (including drainage ditches), and water supply wells. In addition, the

Contractor will store hazardous materials, chemicals, fuel and lubricating oils, and perform concrete coating activities outside these areas.

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

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

10.6.4 Overnight parking

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

10.6.5 Concrete Washout Handling

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

10.7 INITIAL SPILL MANAGEMENT

10.7.1 Immediate Response

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

- Initiate actions to contain the fluid that has spilled or is about to spill, and initiate action to eliminate the source of the spill to the maximum extent that is safely possible.
- Notify the crew foreman and/or the Spill Coordinator and provide them with the following information:
 - Location and cause of the spill;
 - The type of material that has spilled; and

- Whether the spill has reached or is likely to reach any surface water.

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

- Assess the situation and determine the need for further action;
- Direct subsequent activities and/or further assign responsibilities to other personnel; and
- Notify the EI.

10.7.2 Mobilization

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

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

10.8 SPILL NOTIFICATION RESPONSIBILITIES

10.8.1 Notification Volumes

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

10.8.2 Spill Report Form

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

10.8.3 Agency Notification

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

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

10.9 SPILL CONTAINMENT AND CLEANUP

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

10.9.1 Spill Control - Upland Areas

- If a spill should occur during refueling operations, **STOP** the operation until the spill can be controlled and the situation corrected.
- The source of the spill will be identified and contained immediately.
- For large spills on land, the spill will be contained and pumped immediately into tank trucks. The Contractor or, if necessary, an Emergency Response Contractor, will excavate contaminated soil.
- The spilled material and the contaminated soil will be treated and/or disposed of in accordance with all applicable federal, state, and local agency requirements.
- Smaller spills on land will be cleaned up with absorbent materials. Contaminated soil or other materials associated with these releases will also be collected and disposed of in accordance with applicable regulations.
- Flowing spills will be contained and/or absorbed before reaching surface waters or wetlands.
- Absorbent material(s) will be placed over spills to minimize spreading and to reduce its penetration into the soil.
- The Spill Coordinator, in consultation with the EI and appropriate agencies, determine when spill sites will be evacuated as necessary to safeguard human health. Evacuation parameters will include consideration for the potential of fire, explosion, and hazardous gases.

10.10 SPILL CONTROL - WETLANDS AND WATERBODIES

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

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

Contaminated soils will be covered with plastic sheeting while being stored temporarily and properly disposed of as soon as possible, in accordance with Section 10.11.

10.11 STORAGE AND DISPOSAL OF CONTAMINATED MATERIALS

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

11.0 DRILLING FLUID RESPONSE, CONTAINMENT, AND NOTIFICATION PROCEDURES

Construction of a pipeline may include the use of trenchless methods known as the horizontal directional drilling (HDD) and guided/road bore methods. Throughout this section, both methods are referred to collectively as “drilling”. While the HDD method always includes the use of drilling fluid, the guided or road bore method might use drilling fluid or only use water to power and lubricate the bore. The HDD drilling fluids/mud consists primarily of water mixed with inert bentonite clay. Under certain conditions an additive may need to be mixed with the drilling fluids/mud for viscosity or lubricating reasons. Only non-hazardous additives will be used and a Material Safety Data Sheet (MSDS) for the drilling fluid will be maintained on-site.

This section elaborates on measures to be implemented by the Contractor if an inadvertent release of drilling fluid occurs despite prevention efforts. Prior to the commencement of drilling operations, the Contractor will inform construction personnel involved in as to the responsible party(ies) for release containment and response. The Contractor will ensure that the appropriate response personnel and containment equipment are on site for each drill/bore.

11.1 ON-SITE OBSERVATION DURING CONSTRUCTION

During construction of a drilled crossing, Contractor personnel will monitor the pipeline route throughout the process, as follows:

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

- Construction observers will have appropriate, operational communication equipment (e.g., radio and cell phones) available at all times during installation of the directionally drilled crossing, with the ability to communicate directly with the HDD operator.
- The HDD operator will monitor the annular drilling fluid pressures during pilot hole operations.
- If the HDD operator realizes a sustained loss in fluid pressure or loss of circulation:
 - The operator will immediately notify the construction observers of the assumed position of the drill tool; and
 - The Contractor will visually monitor the appropriate portion of the drill path where the drill tool is located to determine if an inadvertent return occurred. The Contractor may perform this monitoring by walking or by using a boat, as appropriate.
- Construction observers, EI(s), or the Enbridge HDD craft inspector have the authority to order installation of containment structures, if needed, and to require additional response measures if deemed appropriate.

11.2 CONTAINMENT, RESPONSE, AND CLEAN-UP EQUIPMENT

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

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

11.3 RESPONSE

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

11.3.1 Upland Locations

Response measures include:

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

11.3.2 Wetland and Waterbody Locations

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

- In the event of a drilling fluid release in wetlands, waterbodies, or adjacent areas:
 - The EI will evaluate the release, and the Contractor will implement appropriate containment measures.

- The EI and the Contractor will evaluate the recovery measures to determine the most effective collection method.
- Enbridge Engineering and the Contractor will review and adjust drill pressures, pump volume rates, and drill profile to minimize the extent of the release.
- Enbridge will suspend drilling operations if containment measures do not effectively control the release.
- If the amount of the surface release exceeds that which can be contained with hand-placed barriers, small collection sumps (less than 5 cubic yards) may be excavated to collect released drilling fluid for removal by the use of portable pumps and hoses.
- If the amount of the surface release is not great enough to allow the practical physical collection from the affected area without causing additional impacts, with approval from both Enbridge Environmental and Construction Management, it may be diluted with clean water and/or the fluid will be allowed to dry and dissipate naturally.
- Excess fluid will be held within the containment area and removed using pumps or other appropriate measures at a rate sufficient to maintain secure containment.
- Recovered fluid will be stored in a temporary holding tank or other suitable structure out of the floodplain and/or wetland for reuse or eventual disposal in an approved disposal facility
- Enbridge will consult with the appropriate regulatory agencies to evaluate the circumstances of the release, discuss additional containment or cleanup requirements, and determine whether and under what conditions the HDD may proceed.

11.4 NOTIFICATION AND RESUMPTION OF SUSPENDED HDD OPERATIONS

The Contractor will immediately notify the EI of all drilling fluid releases. If the EI determines the release affects wetland or waterbody areas, he or she will immediately notify Enbridge Environment and Construction Management and the appropriate regulatory agencies.

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

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

11.5 CLEAN-UP

The following measures are to be considered as appropriate:

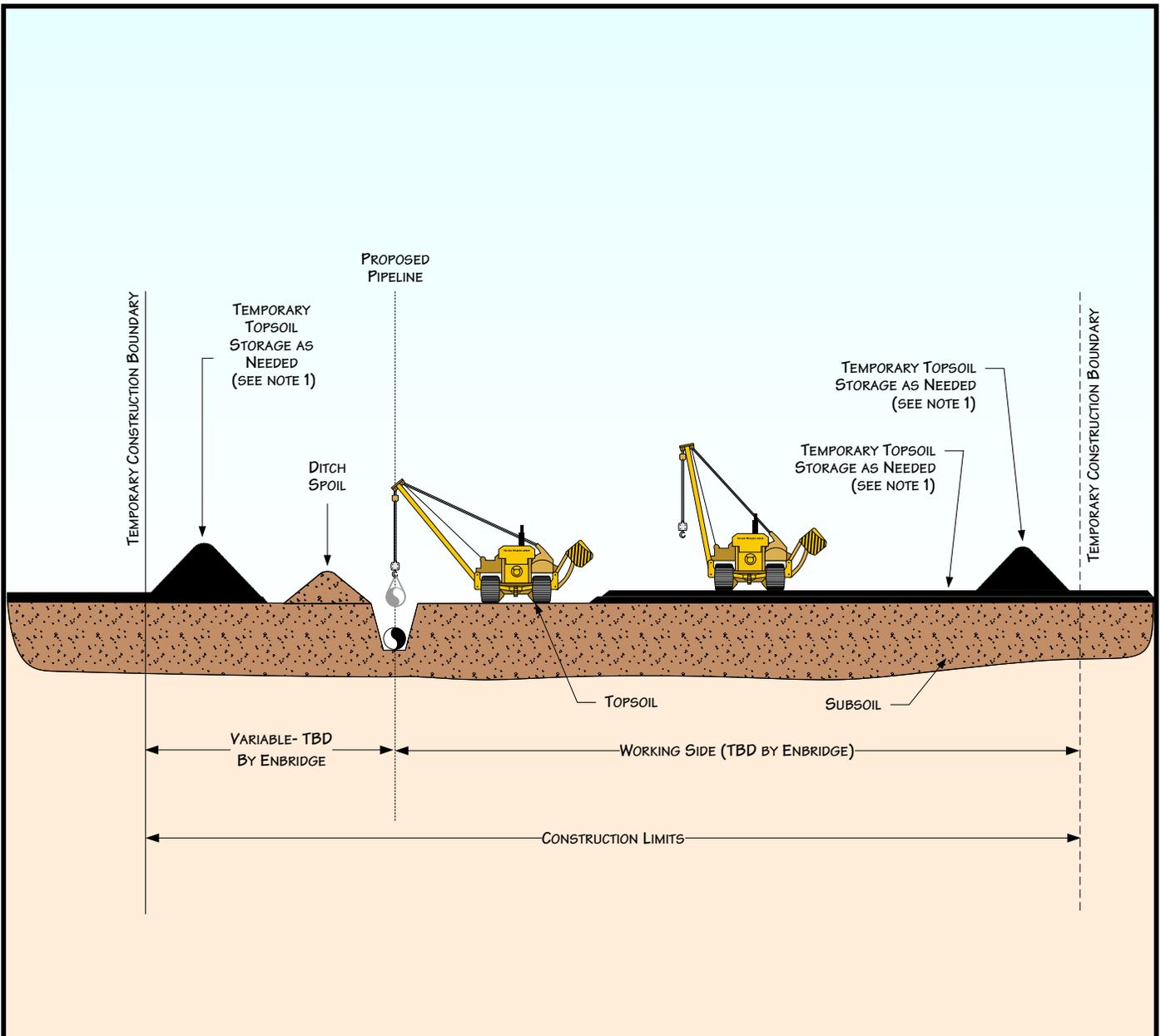
- Drilling fluid will be cleaned up by hand using hand shovels, buckets and soft-bristled brooms as possible without causing extensive ancillary damage to existing vegetation. Clean water washes may also be employed if deemed beneficial and feasible.
- Containment structures will be pumped out and the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

- Material will be collected in containers for temporary storage prior to removal from the site.
- The EI will regularly evaluate the potential for secondary impact from the clean-up process and clean-up activities terminated if physical damage to the site is deemed to exceed the benefits of removal activities. This decision will be made in consultation with the appropriate regulatory agencies and/or Enbridge.

11.6 RESTORATION AND POST-CONSTRUCTION MONITORING

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

Figures



PROFILE

NOTES:

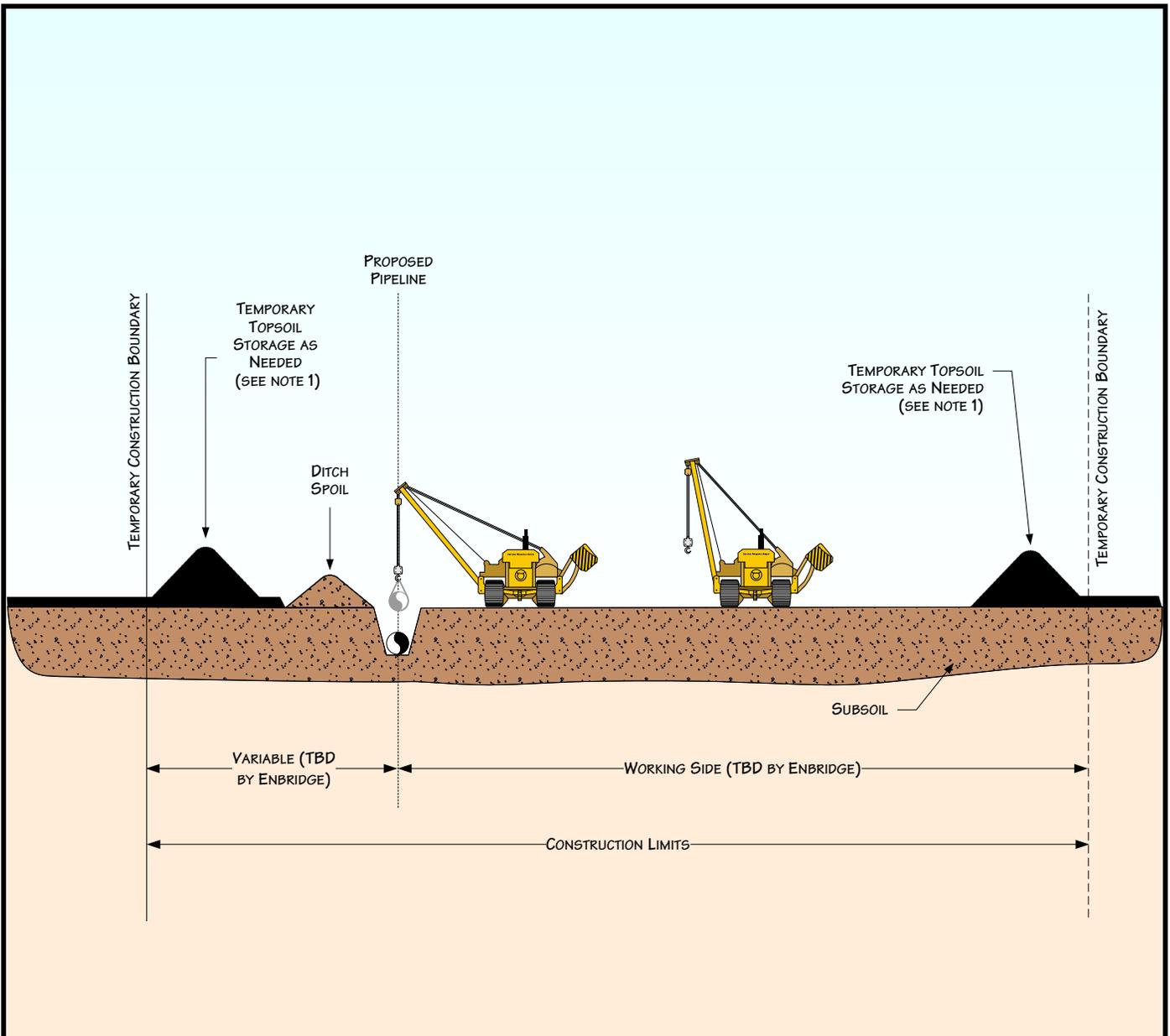
1. STOCKPILE TOPSOIL SEPARATELY FROM DITCH SPOIL AS SHOWN OR IN OTHER CONFIGURATIONS APPROVED BY THE COMPANY.

Environmental Protection Plan



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

DATE: 7/9/2001	
REVISED: 3/11/2011	
SCALE: NTS	
DRAWN BY: JPBOENTJE	
<small>K:_CLIENT_PROJECTS\ID-FIEEL\2011-019\FIG 1-3_TYPICAL_TOPSOIL_SEGREGATION.VSD</small>	



PROFILE

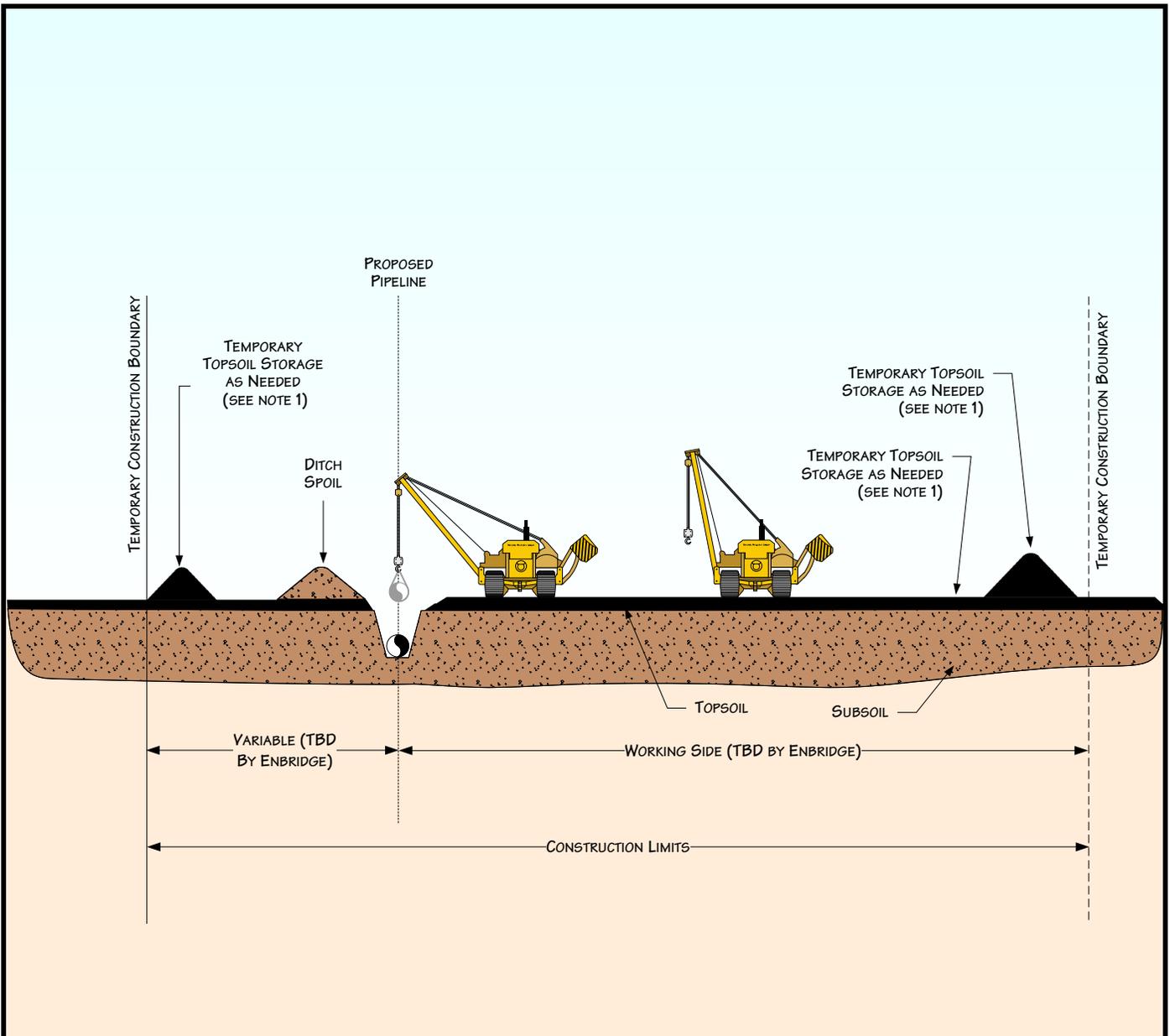
NOTES:

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



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

DATE: 7/9/2001	
REVISED: 3/11/2011	
SCALE: NTS	
DRAWN BY: JPBOENTJE	
K:\CLIENT_PROJECTS\ID-FIEEL\2011-019\FIG 1-3_TYPICAL_TOPSOIL_SEGREGATION.VSD	



PROFILE

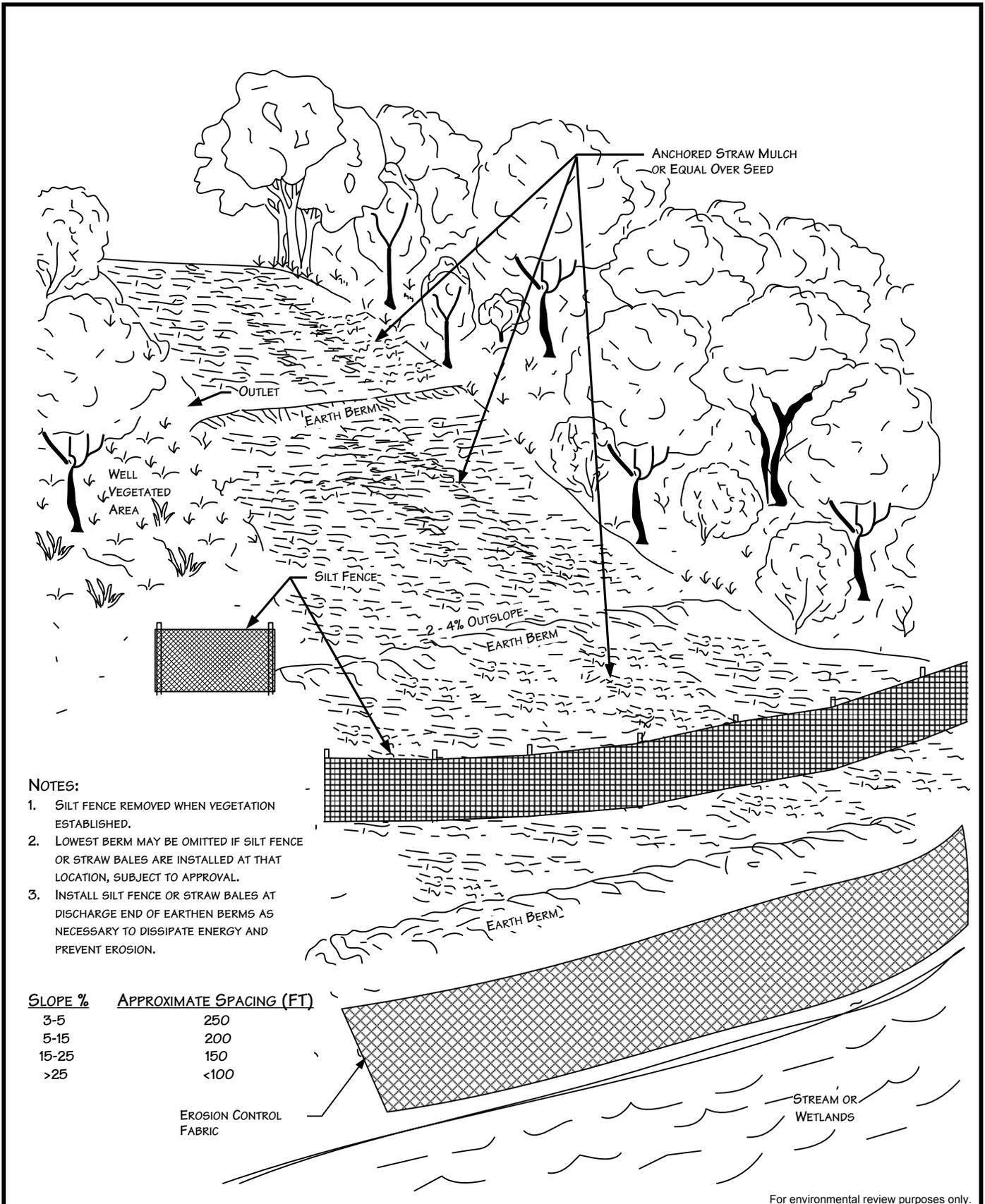
NOTES:

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



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

DATE: 7/9/2001	
REVISED: 3/11/2011	
SCALE: NTS	
DRAWN BY: JPBOENTJE	
<small> K:\CLIENT_PROJECTS\ID-FIEEL\2011-019\FIG 1-3_TYPICAL_TOPSOIL_SEGREGATION.VSD </small>	

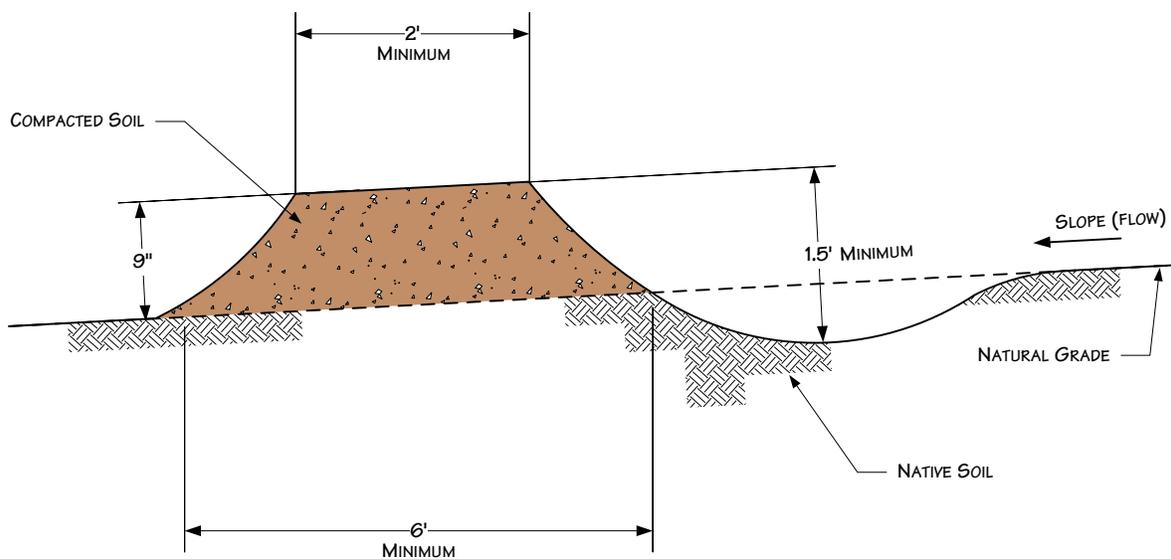


For environmental review purposes only.



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\ID-PEEL\2011-019\ FIG_4_BERMS_PERSPECTIVE_VIEW.VSD	



NOTES

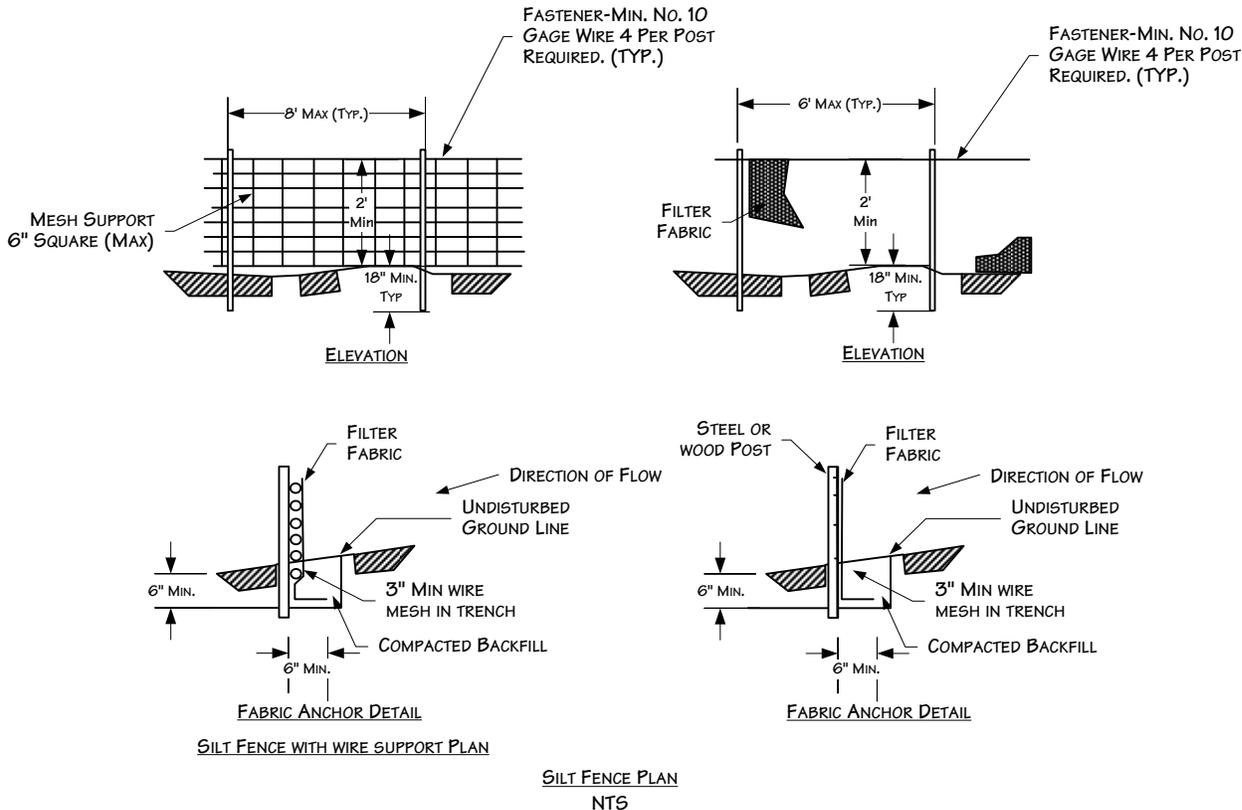
1. BERMS SHALL BE CONSTRUCTED WITH 2 TO 4 PERCENT OUTSLOPE.
2. BERMS SHALL BE OUTLETED TO WELL VEGETATED STABLE AREAS, SILT FENCES, STRAW BALES OR ROCK APRONS.
3. BERMS SHALL BE SPACED AS DESCRIBED IN CONSTRUCTION SPECIFICATIONS.
4. ADDITIONAL INFORMATION INCLUDED ON OTHER DRAWINGS.

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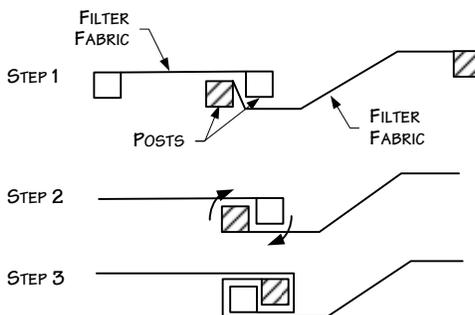
Figure 5
Environmental Protection Plan
 Typical Temporary or Permanent Berms
 Elevation View

DATE: 5/25/2001	
REVISED: 3/11/2011	
SCALE: NTS	
DRAWN BY: KMKENDALL	
<small>K:\ CLIENT PROJECTS\ID-PEEL\2011-019\ FIG_5_BERMS_ELEVATION_VIEW.VSD</small>	



NOTES:

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



ATTACHING TWO SILT FENCES

NOTES:

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

For environmental review purposes only.



Figure 6
Environmental Protection Plan
Typical Silt Fence Installation

DATE: 5/25/2001

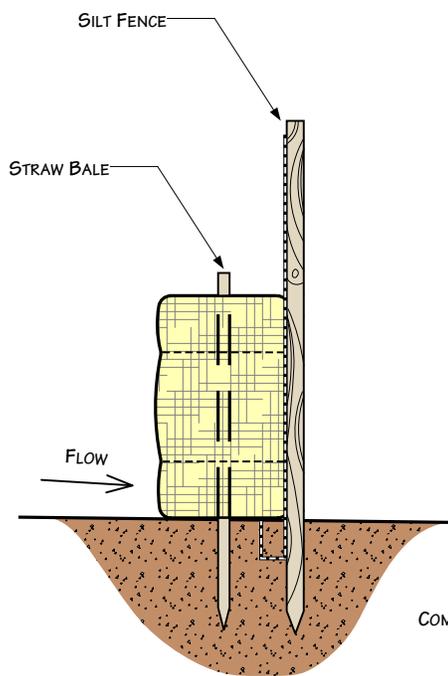
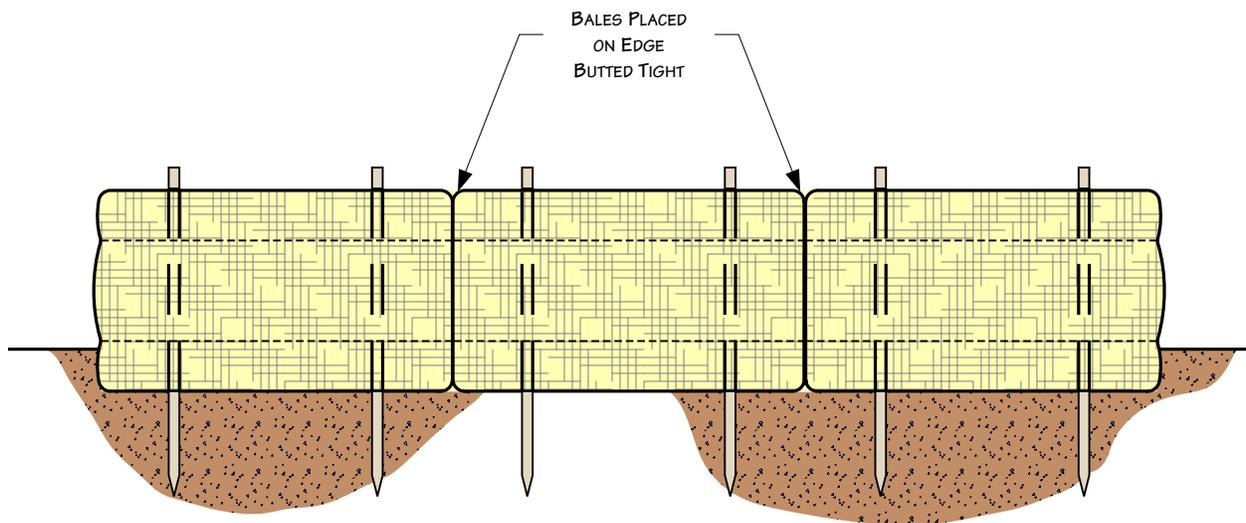
REVISED: 3/23/2011

SCALE: NTS

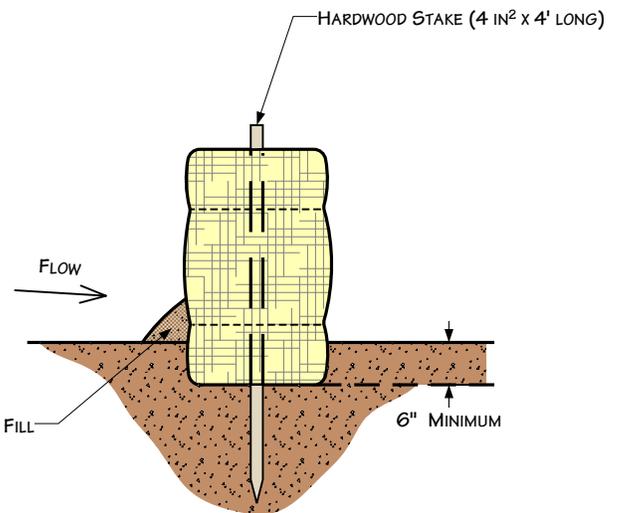
DRAWN BY: KMKENDALL

K:\CLIENT PROJECTS\ID-PEEL\2011-019\FIG_6_SILT_FENCE_INSTALL.VSD





STRAW BALES & SILT FENCE



STRAW BALES ONLY

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Figure 7
Environmental Protection Plan
 Typical Straw Bale Installation

DATE: 5/25/01

REVISED: 3/11/11

SCALE: Not to Scale

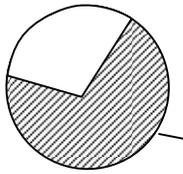
DRAWN BY: KMKENDALL

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

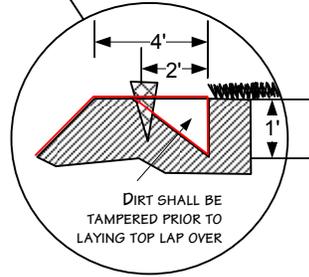
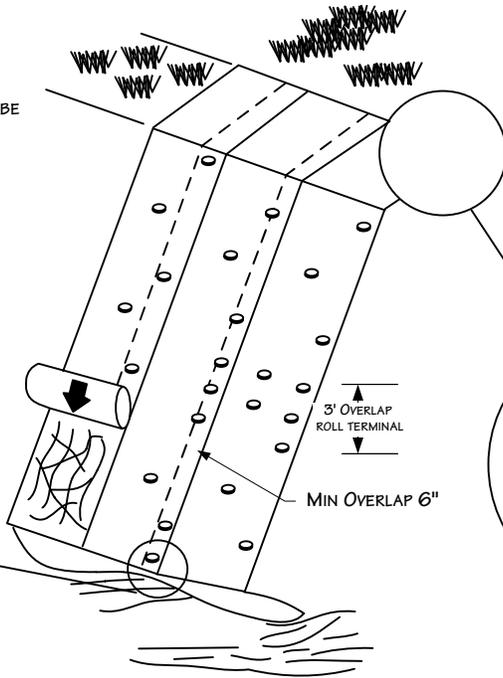


FILL SLOPE SECTION
 EROSION CONTROL BLANKETS SHOULD BE
 INSTALLED VERTICALLY DOWNSLOPE.

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.

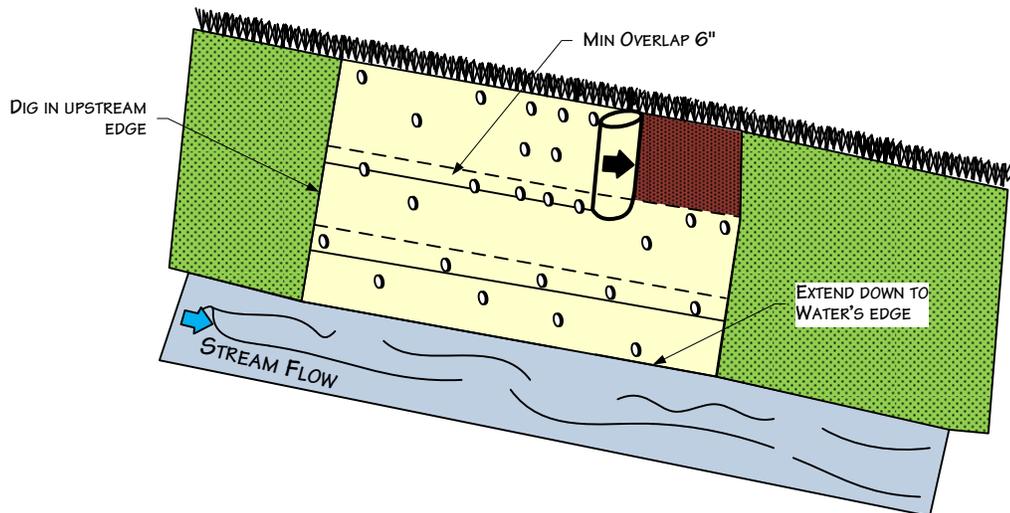


TOE
 MAINTAIN SLOPE ANGLE



BERM
 TRENCH INTO BERM AND
 PROGRESS DOWNSLOPE

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



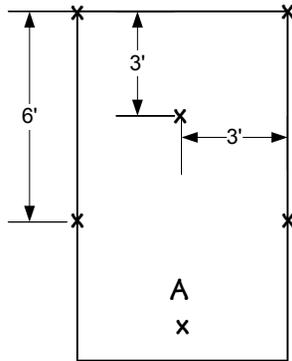
For environmental review purposes only.



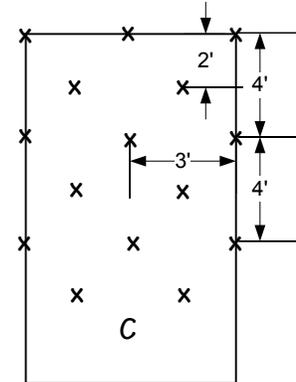
Figure 8
 Environmental Protection Plan
 Typical Erosion Control Blanket Installation

DATE: 5/25/2001
 REVISED: 3/23/2011
 SCALE: NTS
 DRAWN BY: KMKENDALL
 K:\CLIENT PROJECTS\ID-FIEEL\2011-019\FIG 8 EROSION_CONTROL_BLANKET_INS TALL.VSD

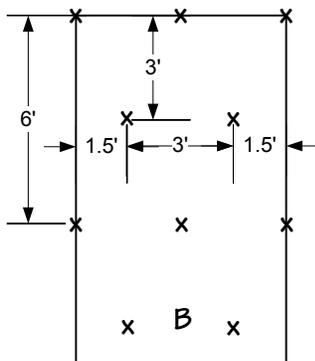
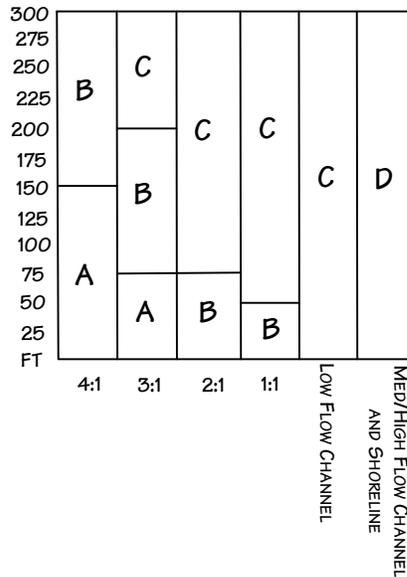




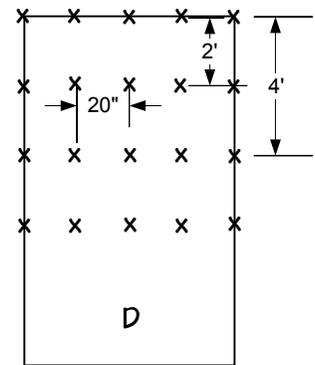
1 STAPLE PER SQ. YD



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 Protection Plan
Typical Staple Pattern for
Erosion Control Fabric

DATE: 5/25/2001

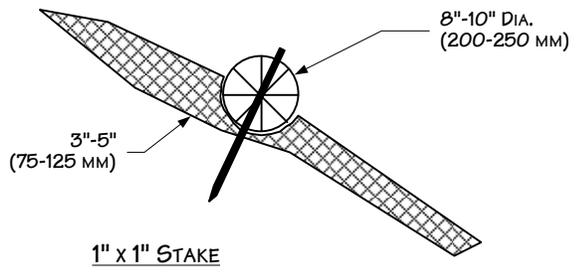
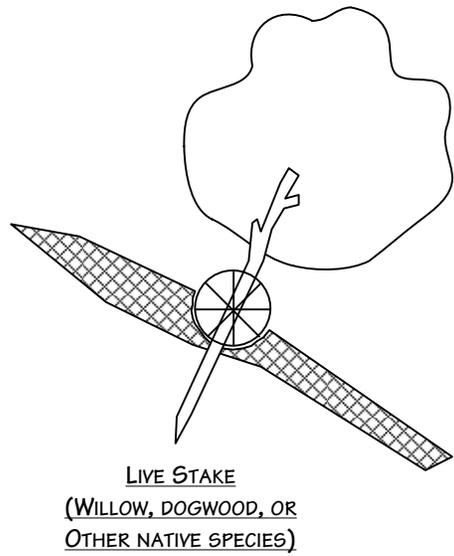
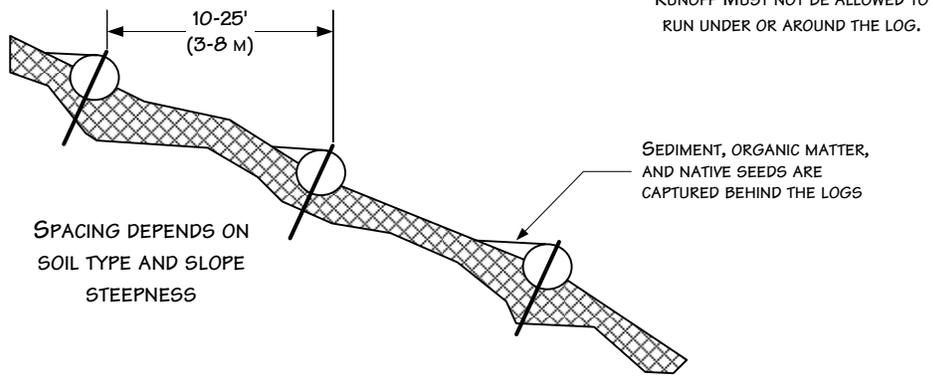
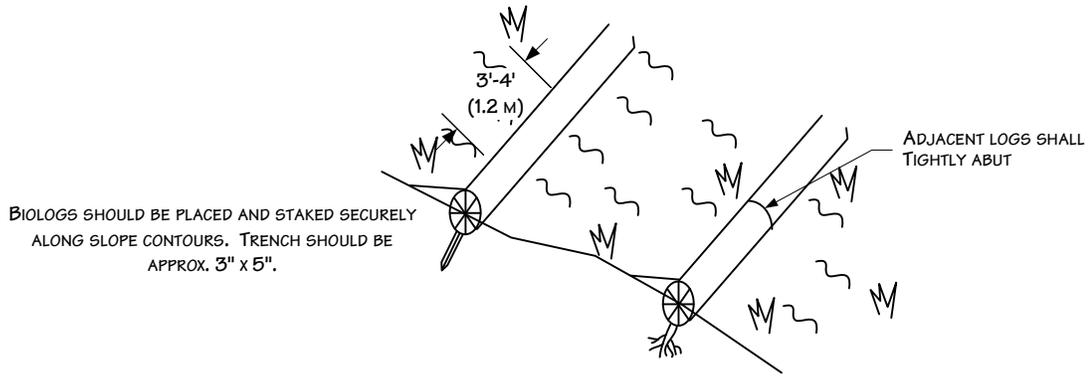
REVISED: 3/24/2011

SCALE: NTS

DRAWN BY: KMKENDALL

K:\CLIENT PROJECTS\ID-FEEL\2011-019\FIG 9_STAPLE_PATTERN_EROSION_CON TROL_FABRIC.VSD



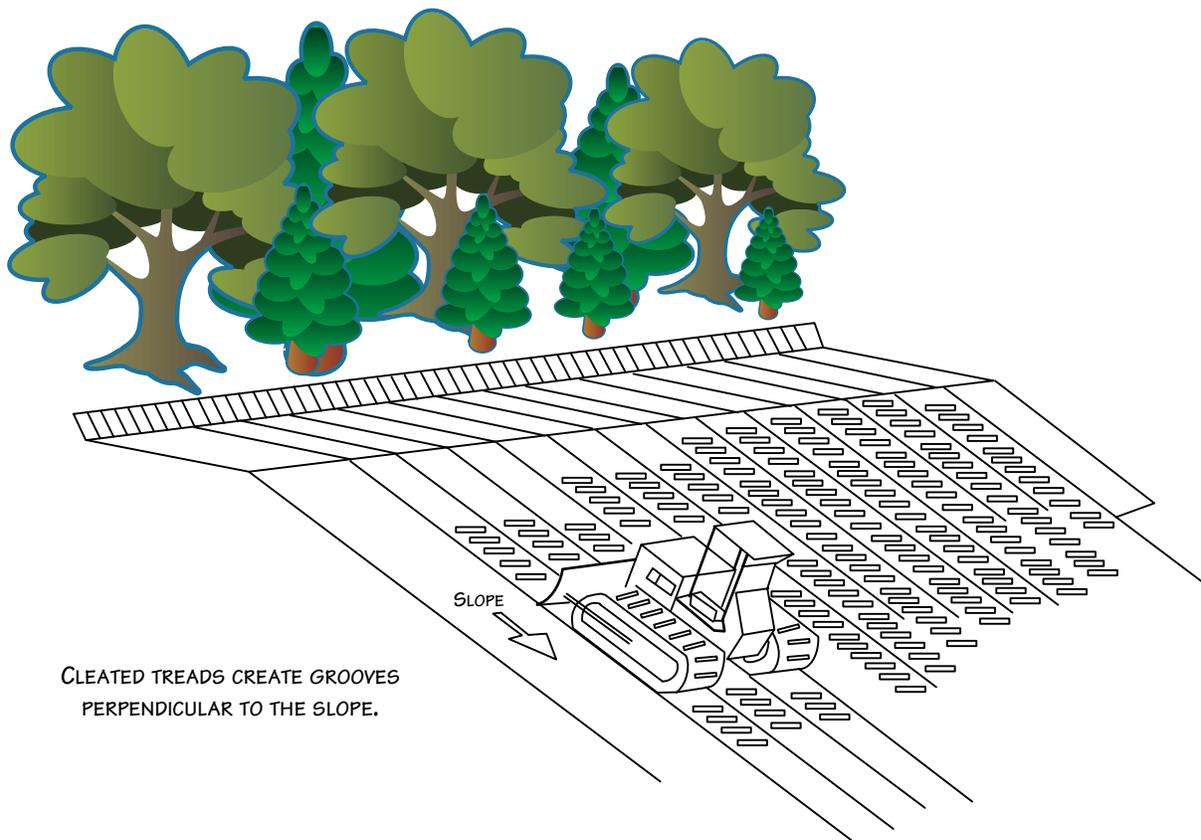


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Figure 10
Environmental Protection Plan
Typical Biolog Installation

DATE: 5/25/2001	
REVISED: 3/24/2011	
SCALE: NTS	
DRAWN BY: KMKENDALL	
K:\ CLIENT PROJECTS\ID-PEEL\2011-019\ FIG_10_BIOLOG INSTALL.VSD	



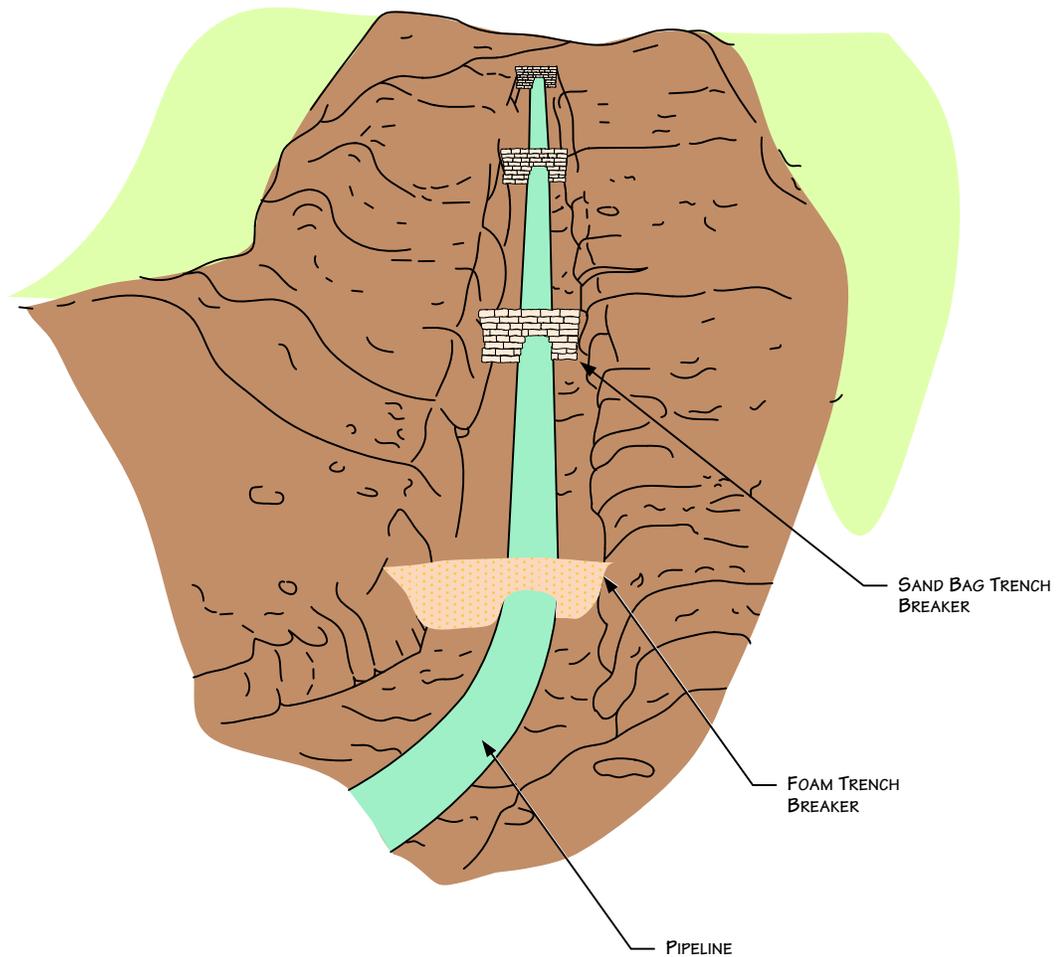
CLEATED TREADS CREATE GROOVES
PERPENDICULAR TO THE SLOPE.

For environmental review purposes only.



Figure 11
Environmental Protection Plan
Typical Cat Tracking

DATE: 5/25/2001	
REVISED: 3/24/2011	
SCALE: NTS	
DRAWN BY: KMKENDALL	
<small>K:\CLIENT_PROJECTS\ID-FEEL\2011-019\FIG_11_CAT_TRACKING.VSD</small>	



NOTES

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

For environmental review purposes only.



Figure 12
Environmental Protection Plan
 Typical Trench Breakers - Perspective View

DATE: 5/25/2001

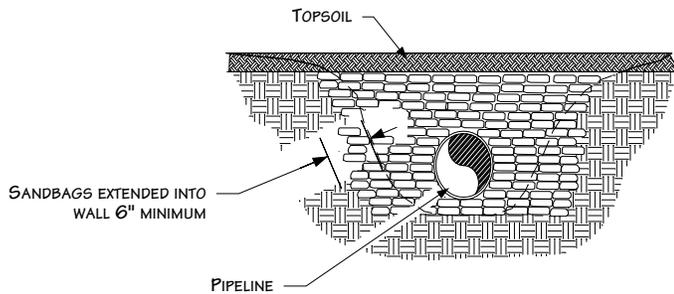
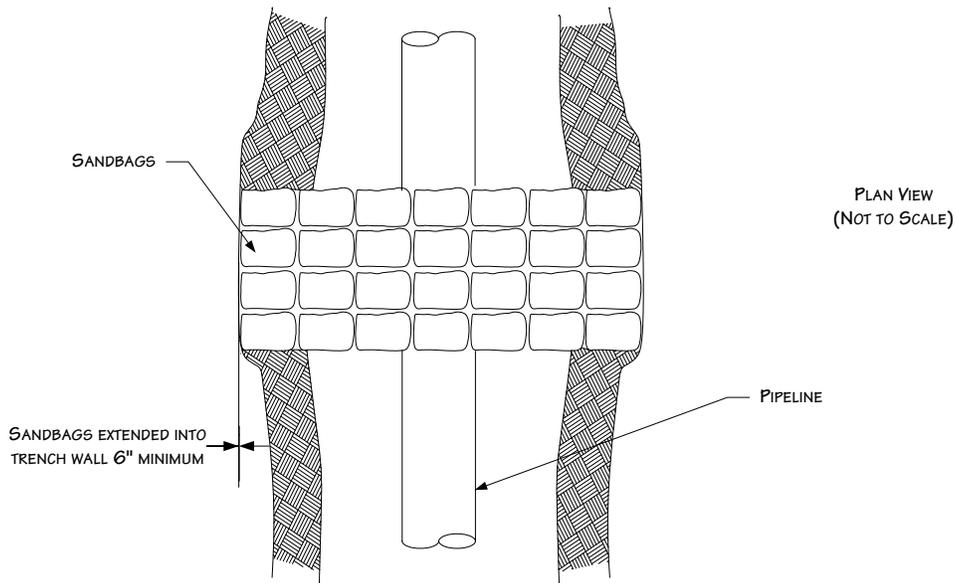
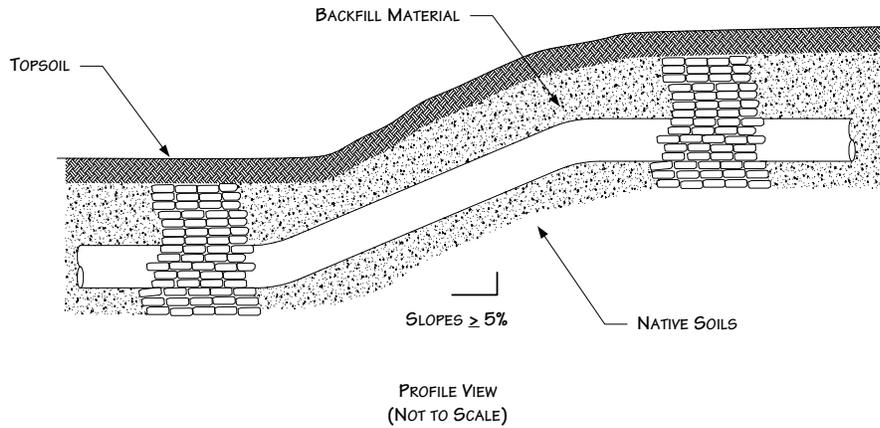
REVISED: 3/11/11

SCALE: NTS

DRAWN BY: KMKENDALL

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





NOTES

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

For environmental review purposes only.



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

DATE: 11/15/2000

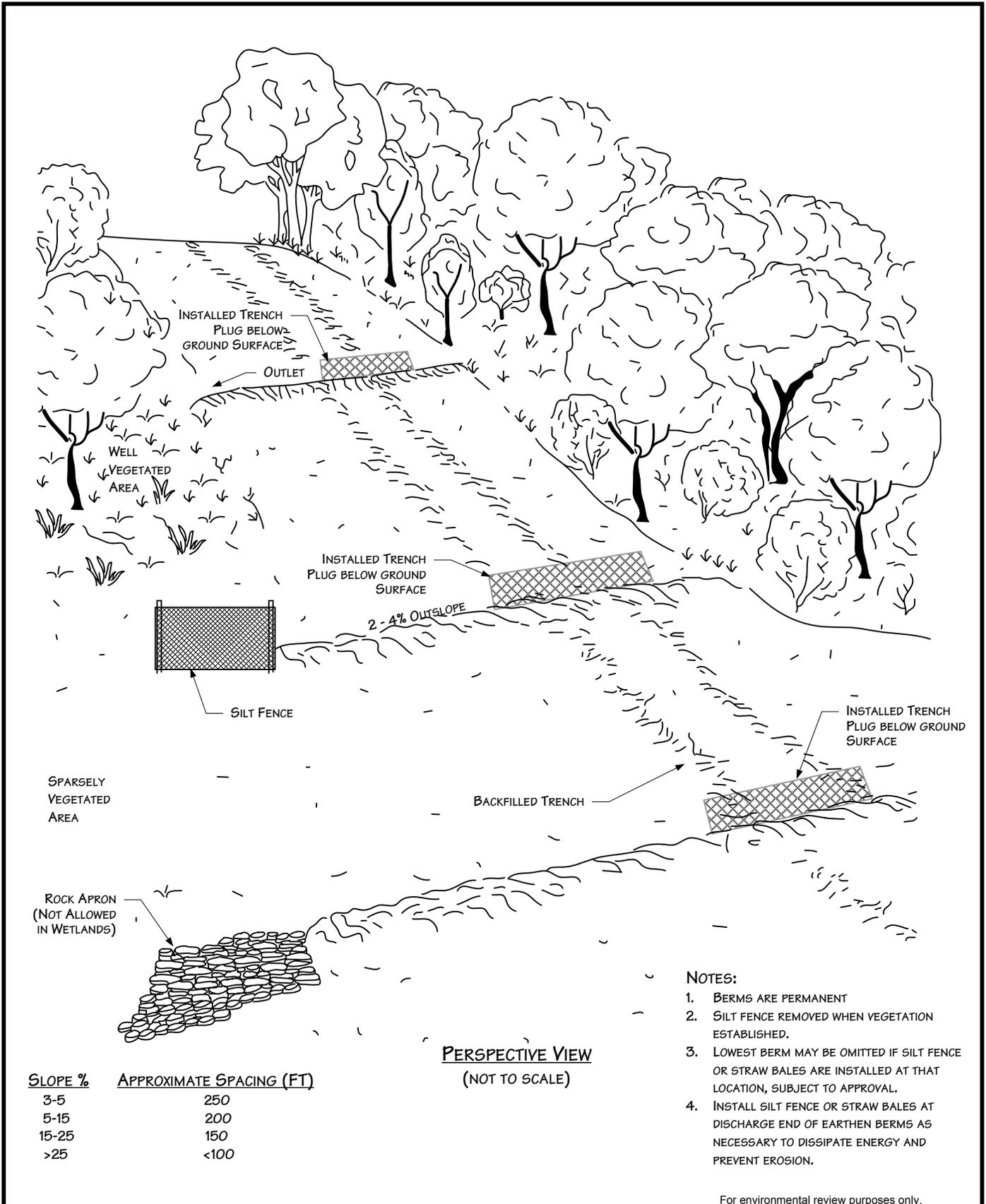
REVISED: 3/11/11

SCALE: NTS

DRAWN BY: KMKENDALL

K:\CLIENT PROJECTS\ID-FEEL\2011-019\FIG_13_TRENCH_BREAKER_PLAN_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.

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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

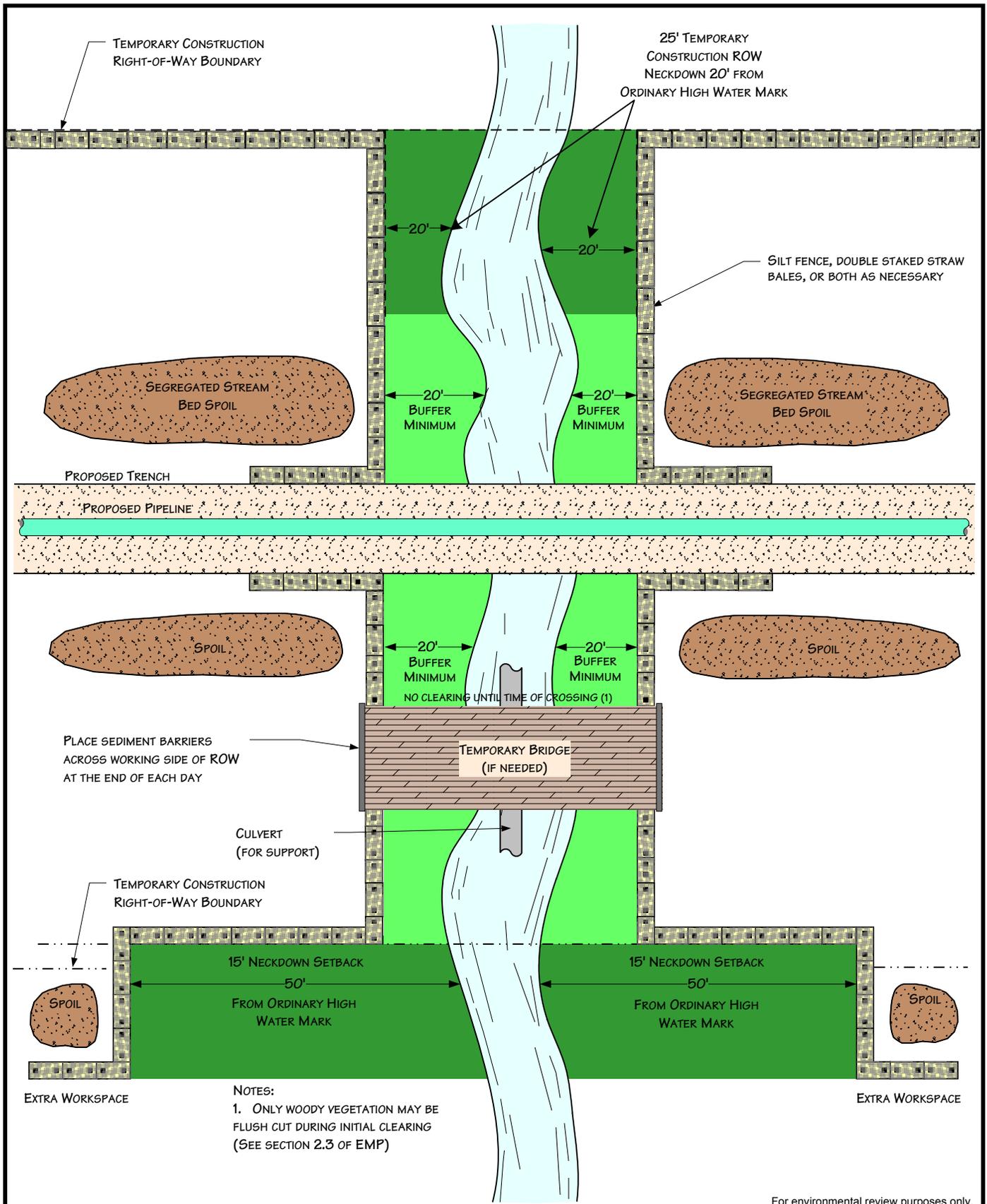


Figure 15
Environmental Protection Plan
 Typical Waterbody Crossing
 Open Cut - Wet Trench Method

DATE: 11/29/2005

REVISED: 3/11/11

SCALE: NTS

DRAWN BY: JPB

K:\CLIENT_PROJECTS\0-FIEEL\2011-019\FIG_15_WATERBODY_OPENCUT_WETTRENCH.VSD



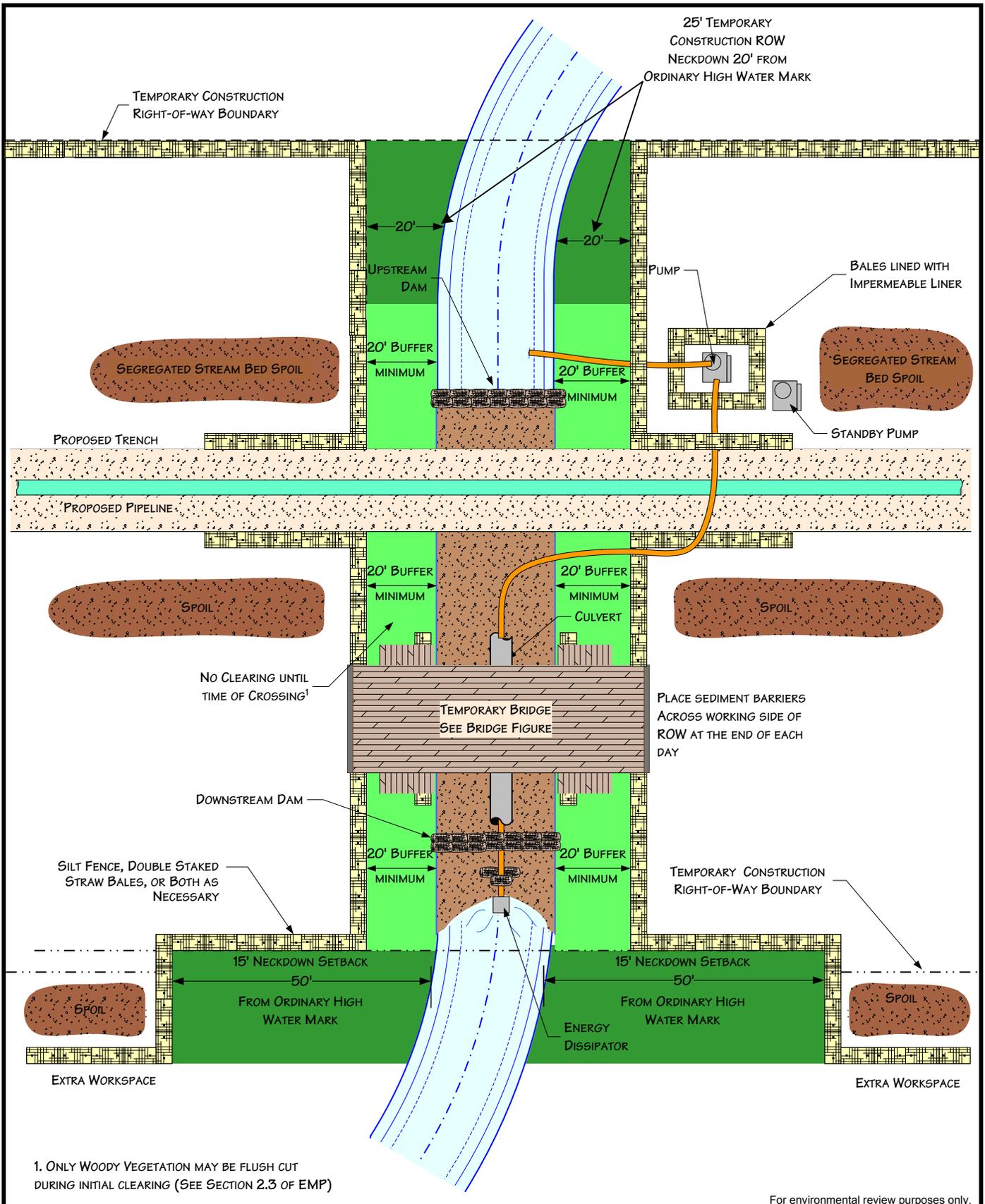
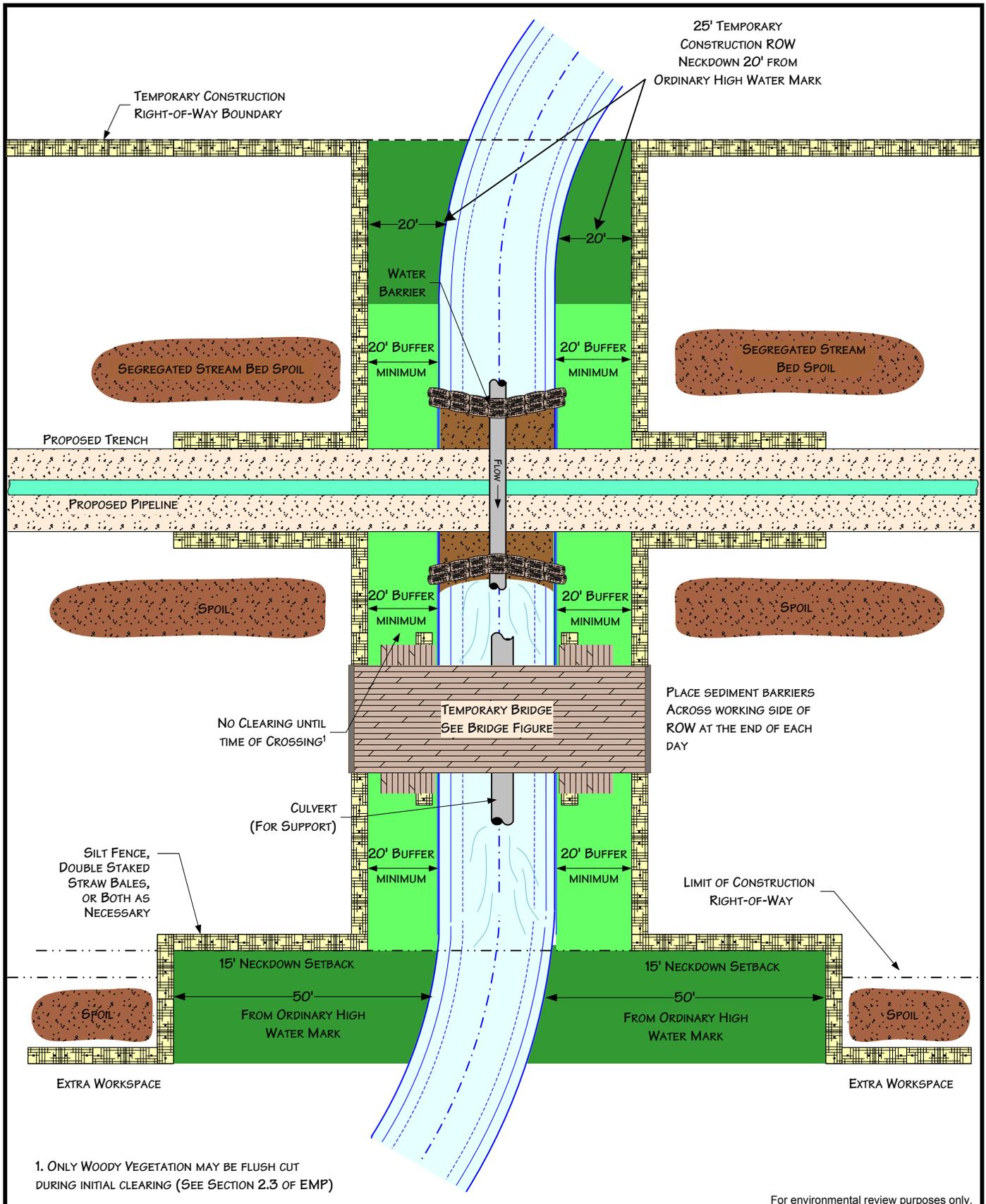


Figure 16
Environmental Protection Plan
 Typical Waterbody Crossing
 Dam and Pump Method

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



1. ONLY WOODY VEGETATION MAY BE FLUSH CUT DURING INITIAL CLEARING (SEE SECTION 2.3 OF EMP)

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Figure 17
Environmental Protection Plan
 Typical Waterbody Crossing
 Flume Method

DATE: 11/29/2005

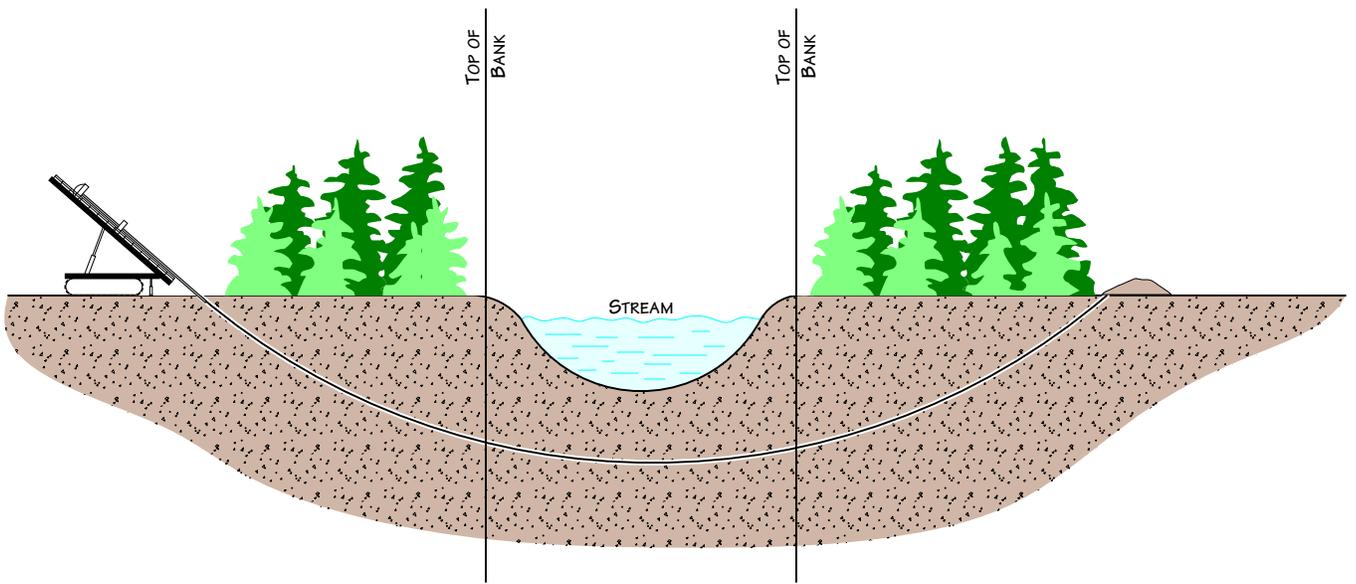
REVISED: 3/11/11

SCALE: NTS

DRAWN BY: JPB

K:\CLIENT_PROJECTS\ID-PEEL\2011-019\FIG_17_WATERBODY_FLUME.VSD





For environmental review purposes only.



Figure 18
Environmental Protection Plan
 Typical Waterbody Crossing
 Directional Drill Method

DATE: 7/14/2000

REVISED: 3/11/11

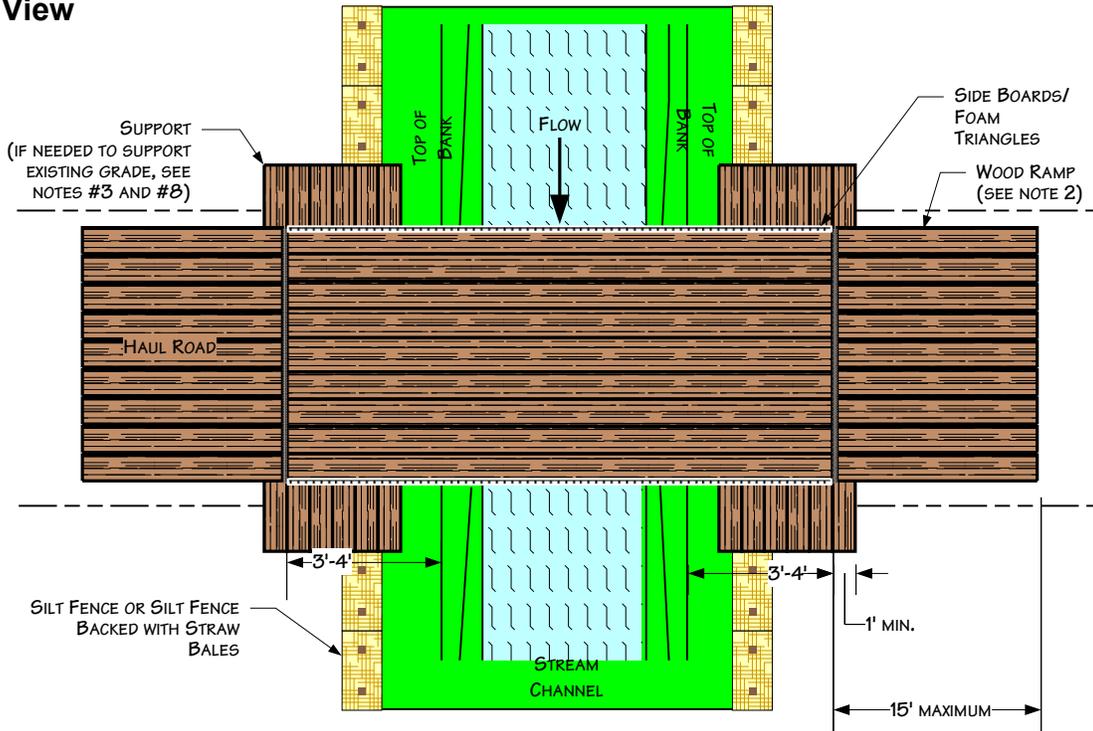
SCALE: NTS

DRAWN BY: KMKENDALL

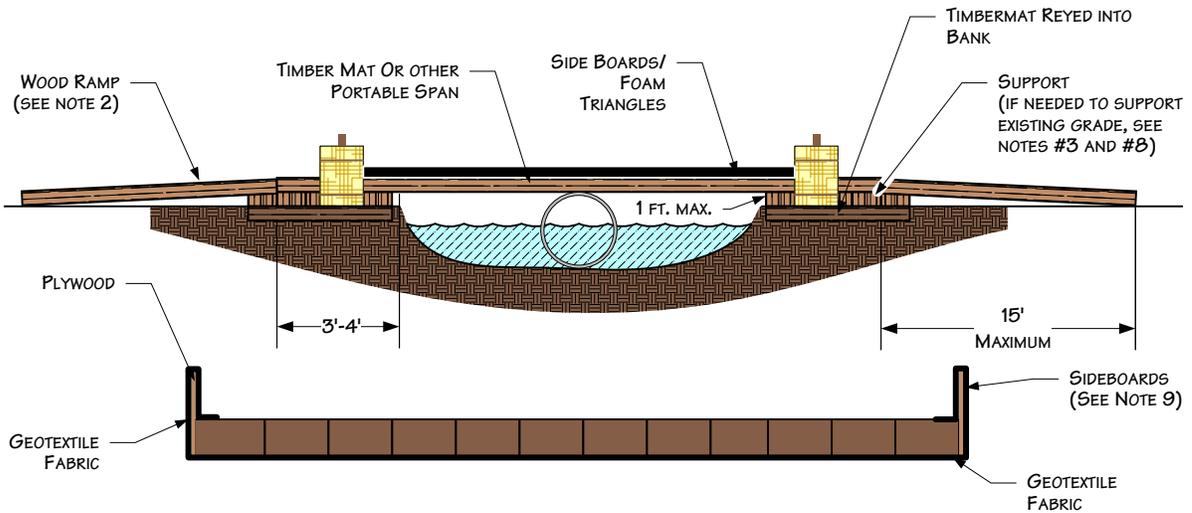
K:\CLIENT PROJECTS\ID-FEEL\2011-019\FIG_18_WATERBODY_DIRECTIONAL_DRILL.VSD



Plan View



Profile View



NOTES:

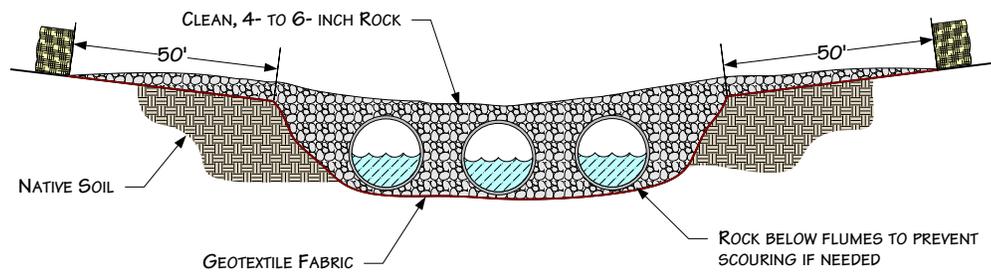
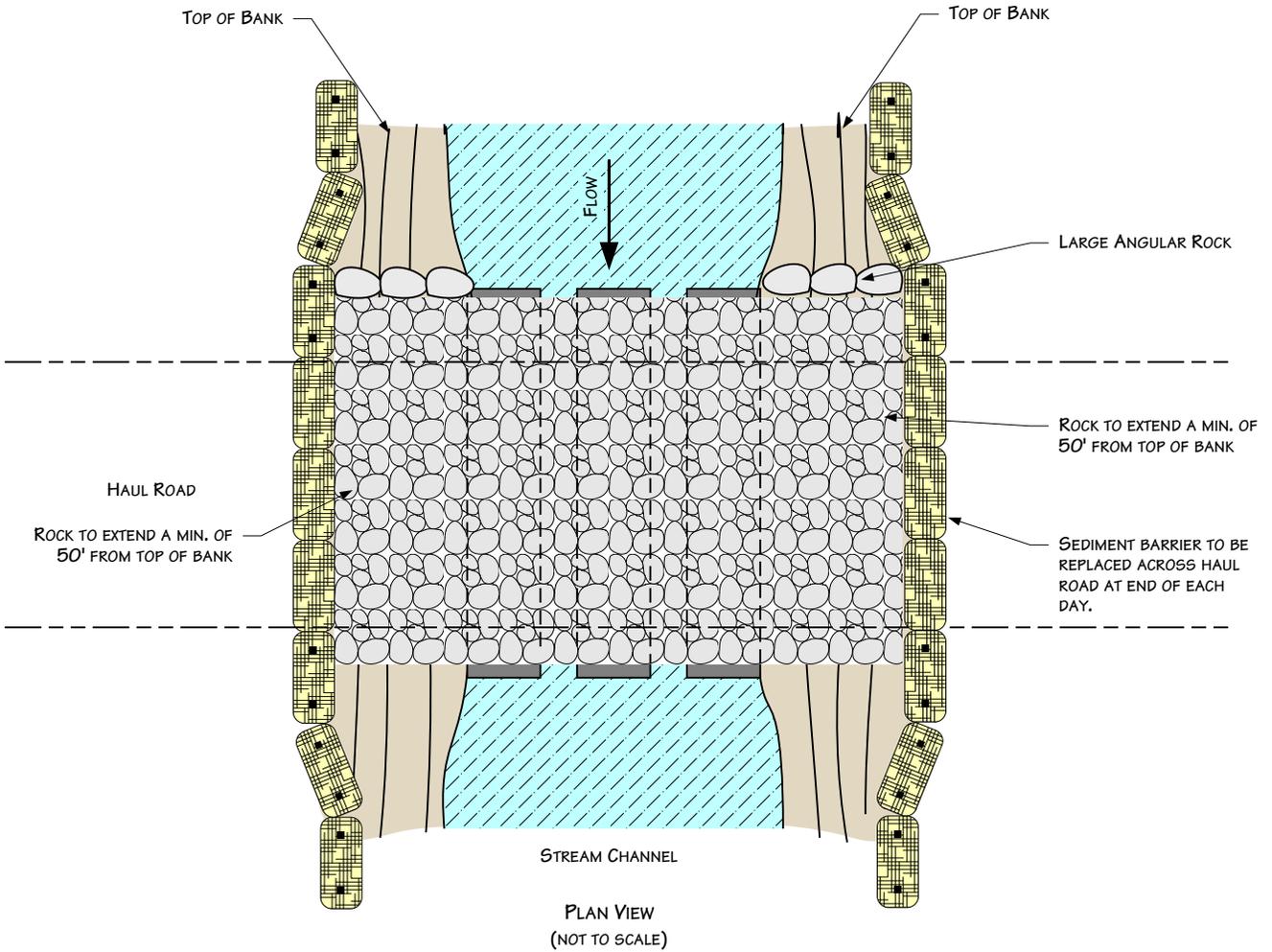
1. INSPECT BRIDGE OPENING PERIODICALLY AND FOLLOWING RAINFALLS OF OVER 1/2". REMOVE ANY DEBRIS RESTRICTING FLOW AND DEPOSIT IT AT AN UPLAND SITE OUTSIDE OF FLOODPLAIN.
2. IF PHYSICAL CIRCUMSTANCES PROHIBIT WOOD OR METAL RAMPS, EARTHEN RAMPS MAY BE USED AS APPROVED.
3. INSPECT BRIDGE ELEVATION SO BRIDGE 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.

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

DATE: 3/11/2003	
REVISED: 3/25/2011	
SCALE: NTS	
DRAWN BY: KMK6792	
K:\ CLIENT PROJECTS\ID-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 Protection Plan
Typical Rock Flume Bridge

DATE: 5/25/2001

REVISED: 3/15/11

SCALE: NTS

DRAWN BY: KMKENDALL

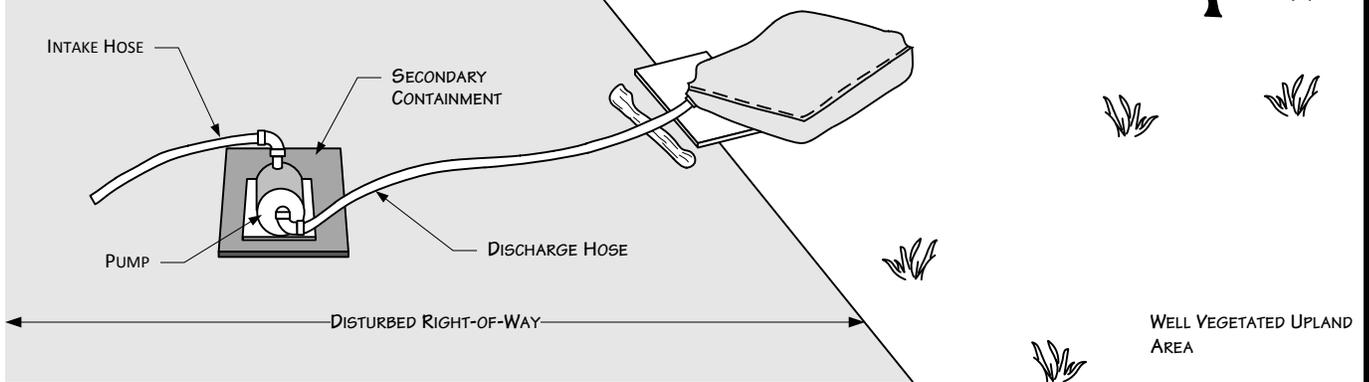
K:\CLIENT PROJECTS\ID-PEEL\2011-019\FIG_20_ROCK_FLUME_BRIDGE.VSD



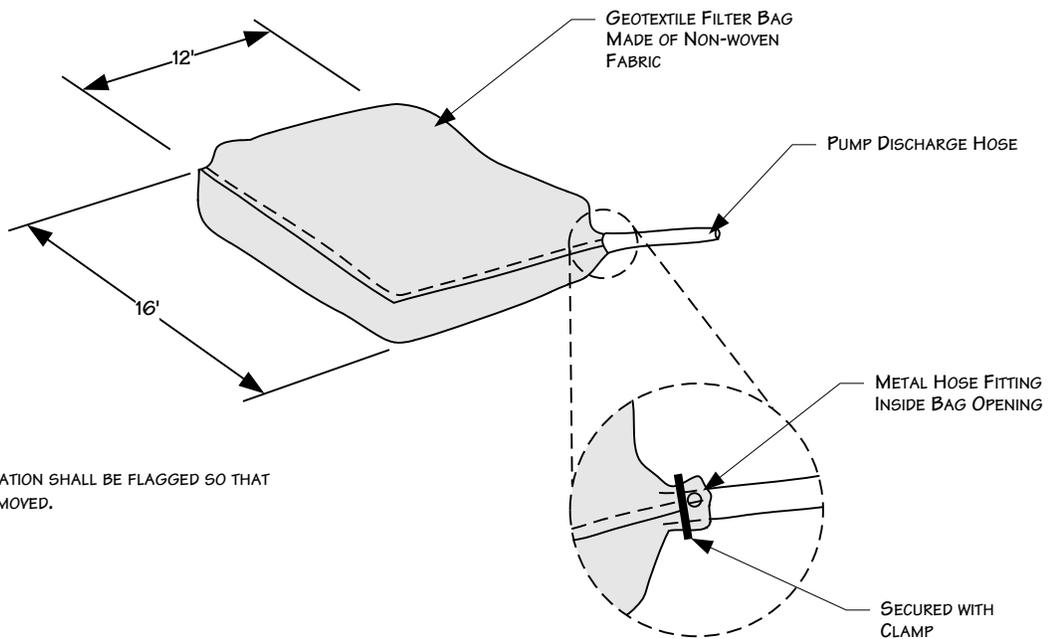
DEWATERING DISCHARGE IN WELL VEGETATED UPLANDS

NOTES:

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



GEOTEXTILE FILTER BAG



NOTE:

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

For environmental review purposes only.



Figure 21
Environmental Protection Plan
Typical Dewatering Measures

DATE: 5/25/2001

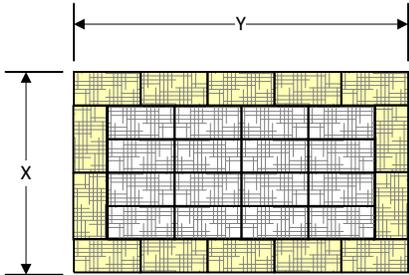
REVISED: 3/15/11

SCALE: NTS

DRAWN BY: KMKENDALL

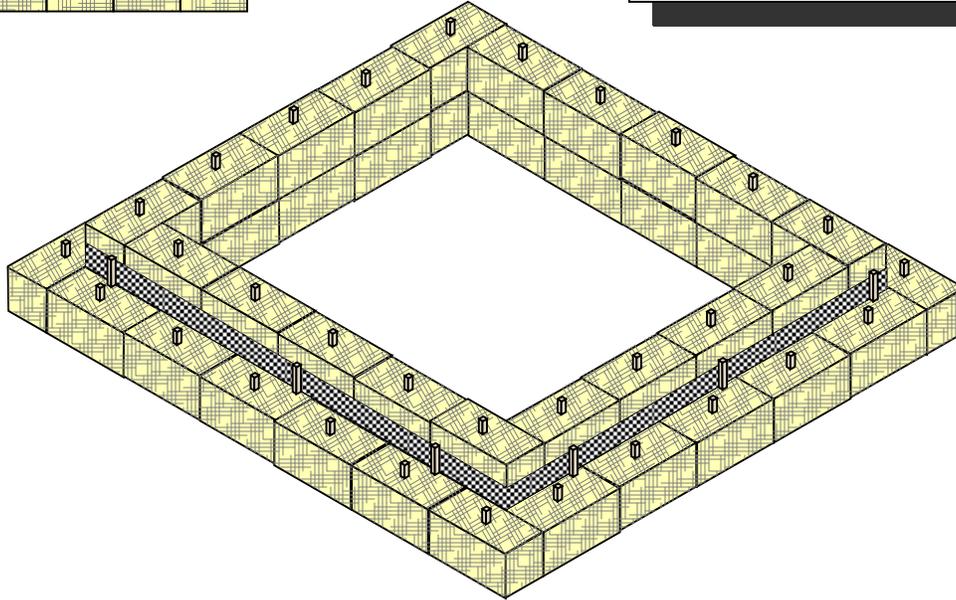
K:\CLIENT_PROJECTS\SD-FEEL\2011-019\FIG_21_DEWATERING_MEASURES.VSD



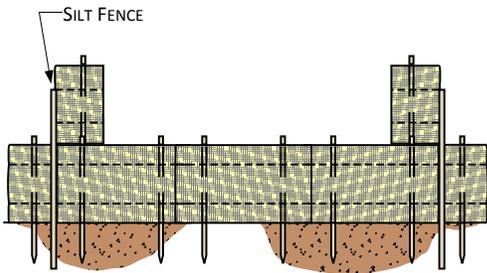


NOTES

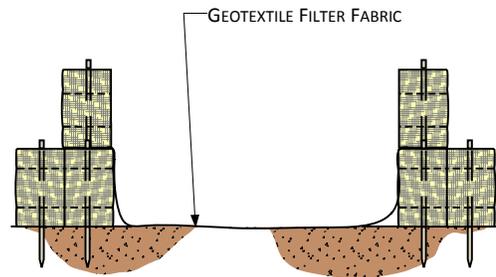
1. ARRANGE THE STRAW BALES TO THE X AND Y DIMENSIONS AS SPECIFIED BELOW.
2. IF BOTTOM OF STRUCTURE IS NOT LINED WITH STRAW BALES (OPTION 1), LINE ENTIRE STRUCTURE WITH GEOTEXTILE FILTER FABRIC.



PERSPECTIVE VIEW



OPTION 1



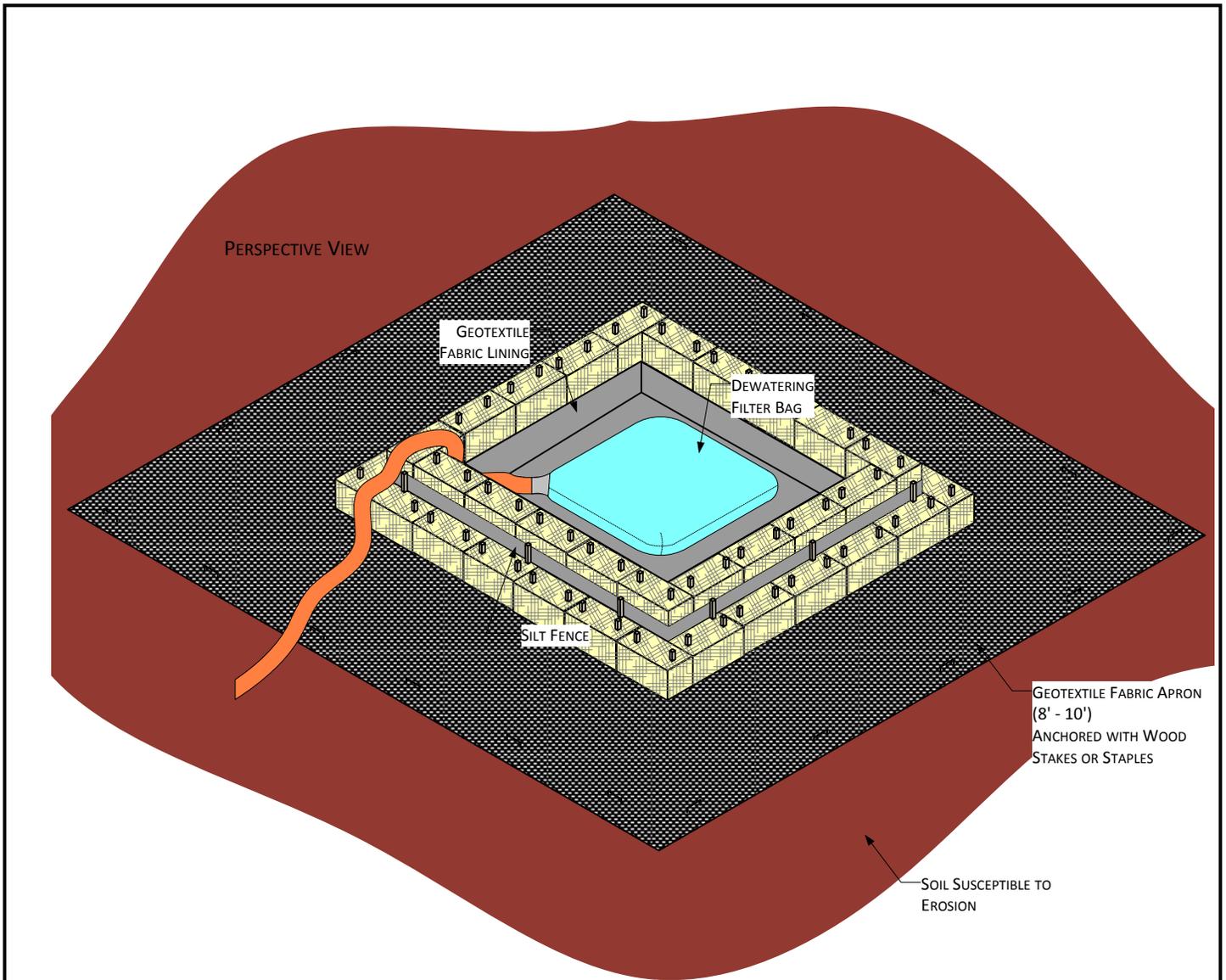
OPTION 2

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 Protection 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:

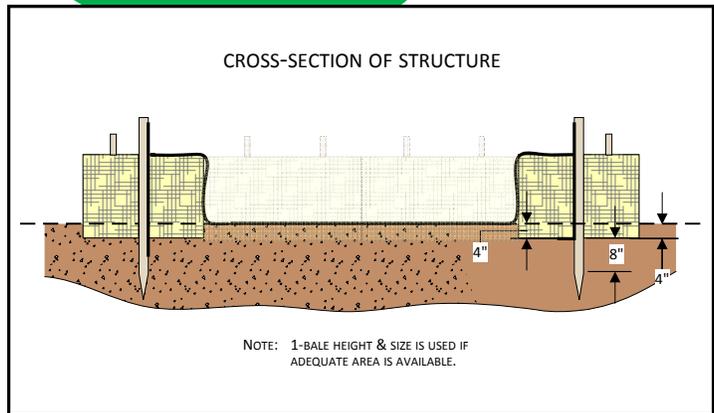
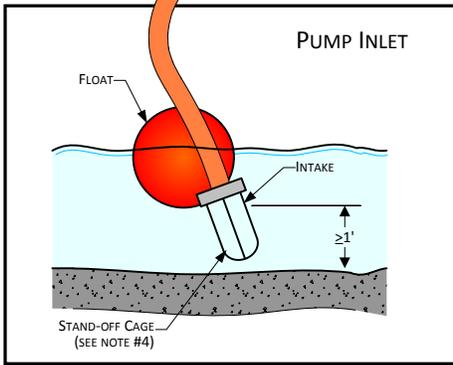
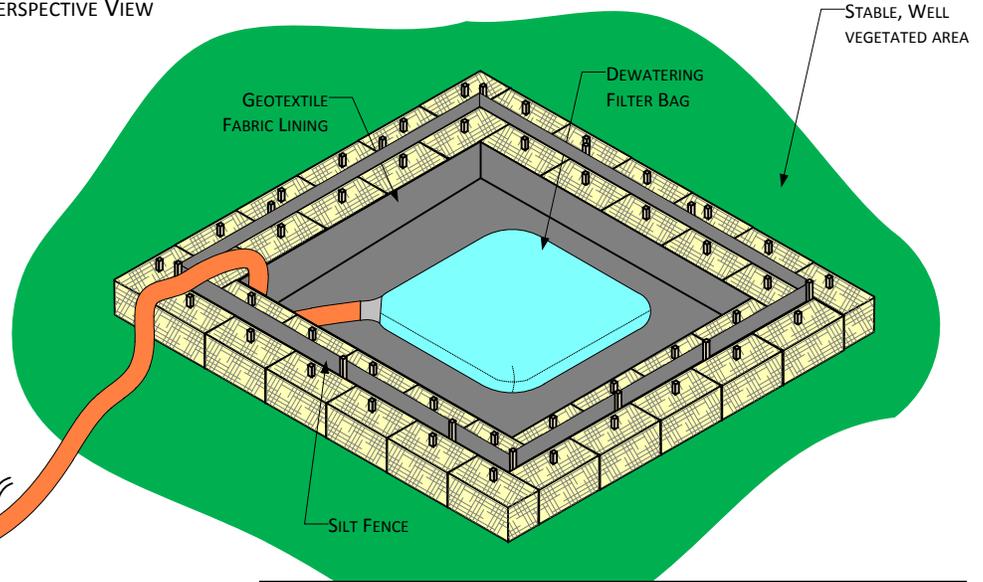
1. SILT FENCE ENDS MUST BE WRAPPED TO JOIN TWO SECTIONS.
2. INSTALL SILT FENCE 2 INCHES ABOVE TOP OF STRAW BALES, AND ANCHOR A MINIMUM OF 8 INCHES STRAIGHT DOWN.
3. SILT FENCE POST STAKING MUST BE 4 FEET OR LESS.
4. DEWATERING INTAKE HOSE SUPPORTED AT LEAST 1 FOOT FROM BOTTOM OF TRENCH BEING DEWATERED.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

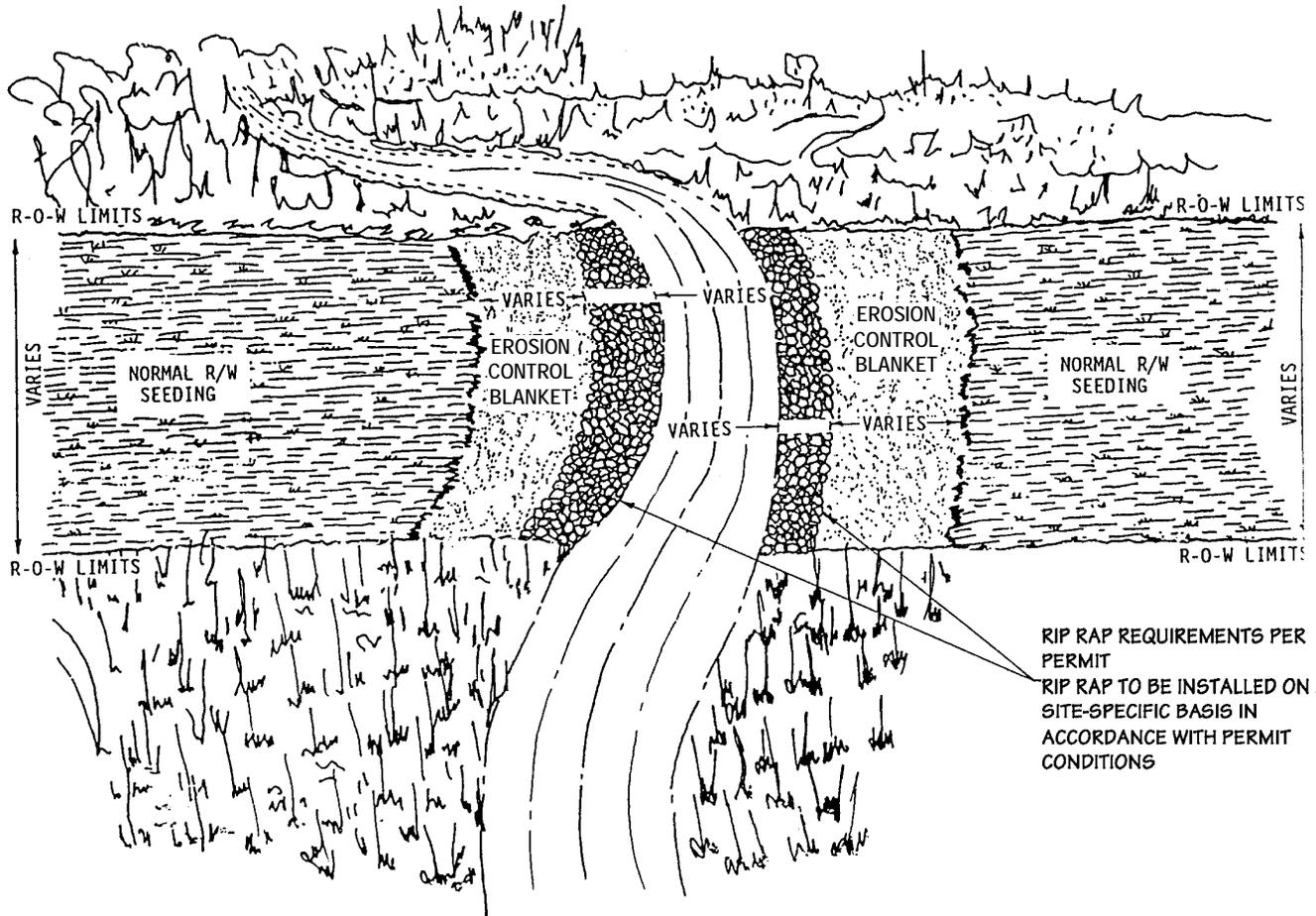
1. SILT FENCE ENDS MUST BE WRAPPED TO JOIN TWO SECTIONS.
2. INSTALL SILT FENCE 2 INCHES ABOVE TOP OF STRAW BALE, AND ANCHOR A MINIMUM OF 8 INCHES STRAIGHT DOWN.
3. SILT FENCE POST STAKING MUST BE 4 FEET OR LESS.
4. DEWATERING INTAKE HOSE SUPPORTED AT LEAST 1 FOOT FROM BOTTOM OF TRENCH BEING DEWATERED.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

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Figure 22C
Environmental Protection Plan
Straw Bale Dewatering Structure



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

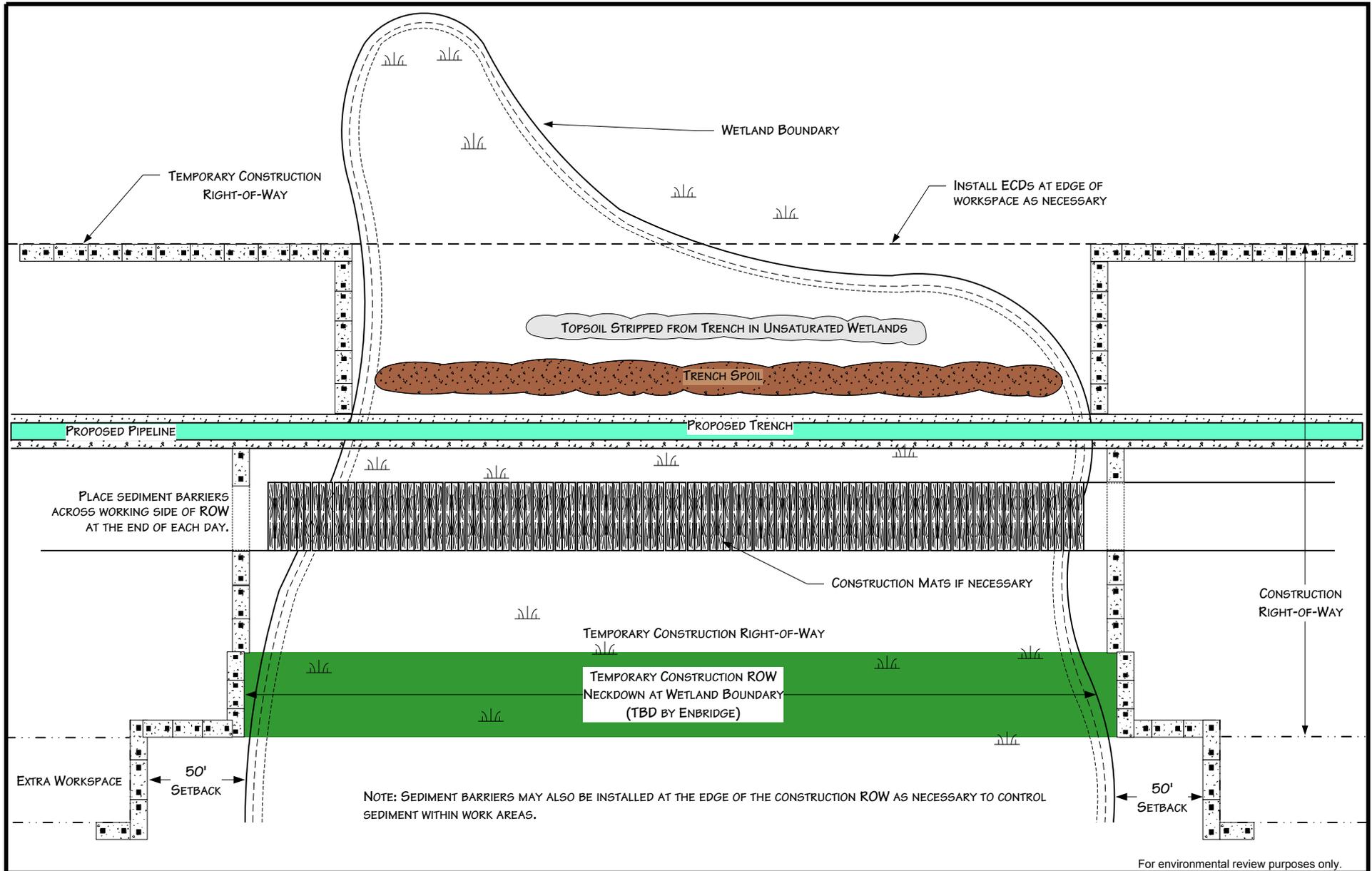


For environmental review purposes only.



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

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



For environmental review purposes only.



Figure 24
Environmental Protection Plan
 Typical Wetland Crossing Method

DATE: 5/25/2001

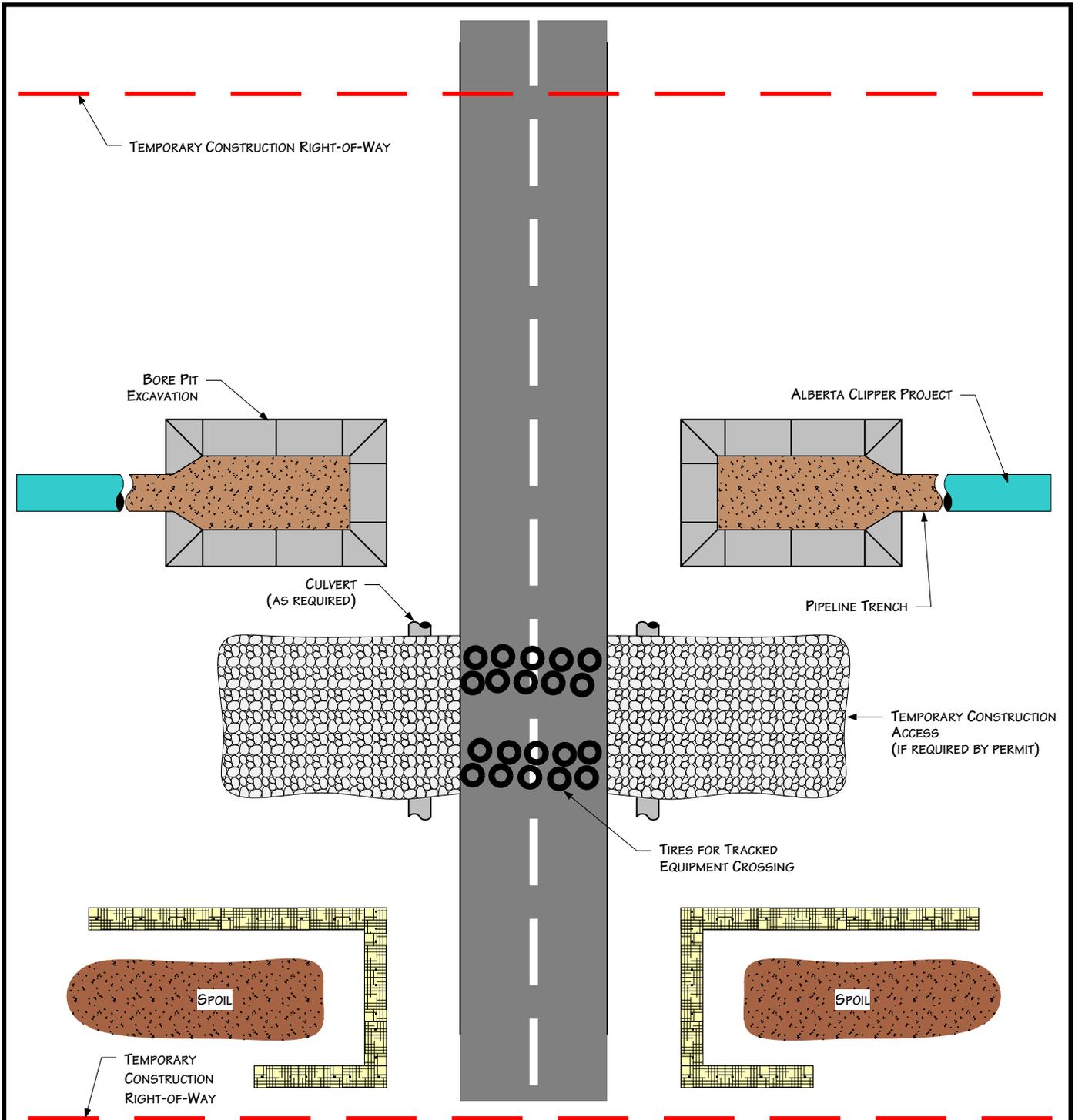
REVISED: 3/14/11

SCALE: NTS

DRAWN BY: KMKENDALL

K:\CLIENT PROJECTS\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.

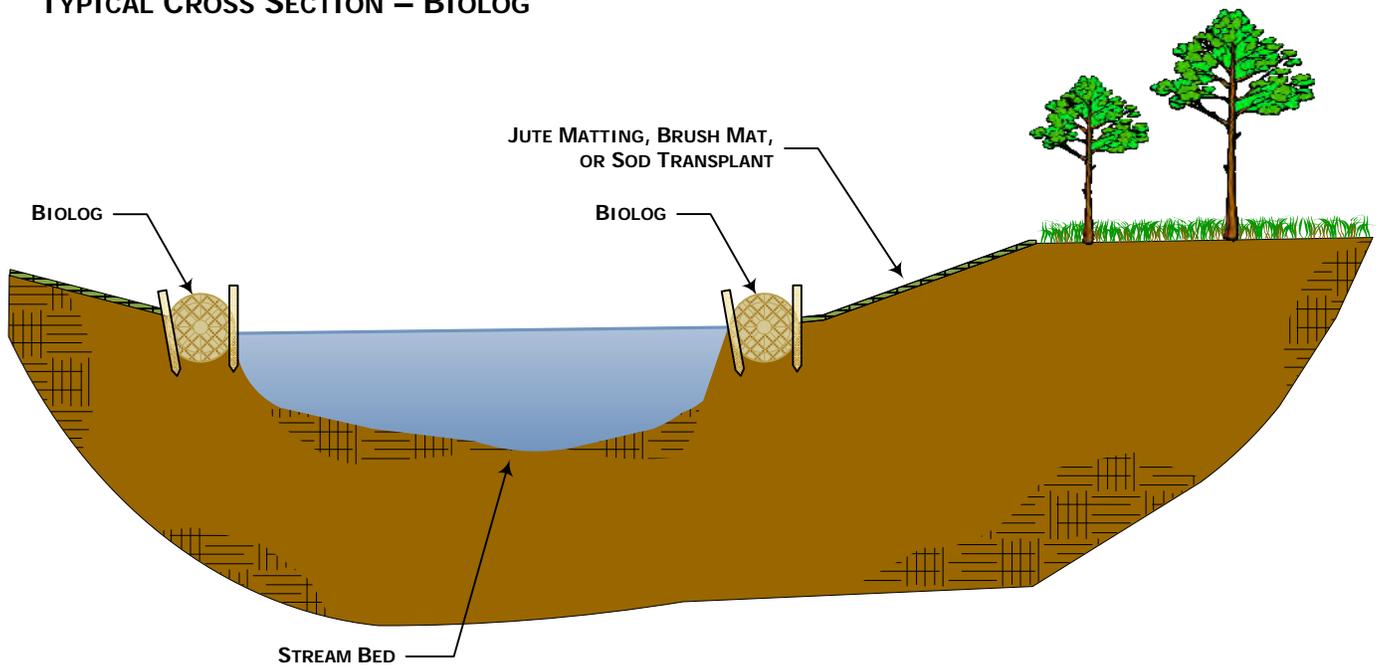
For environmental review purposes only.



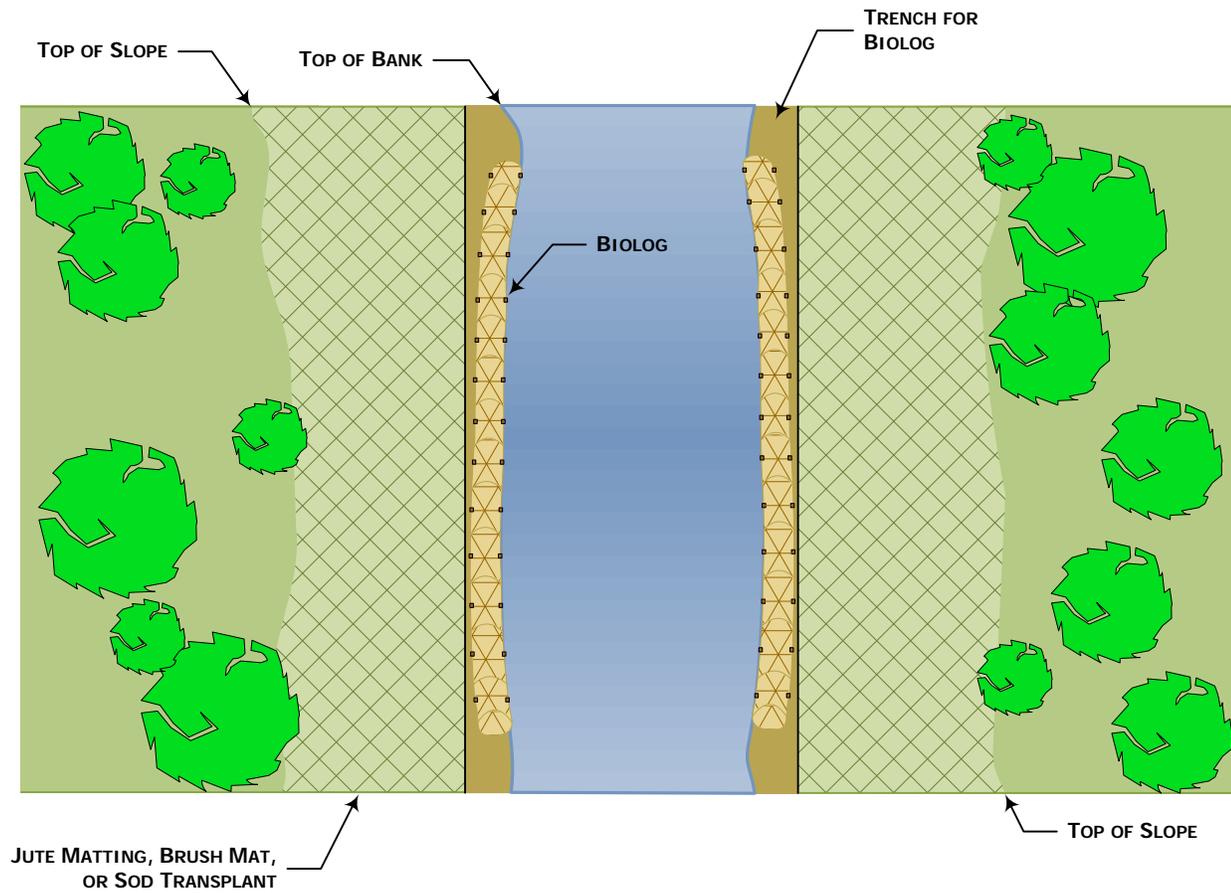
Figure 25
Environmental Protection Plan
 Typical Improved Road Crossing
 Directional Bore Method

DATE: 7/13/1999	
REVISED: 3/14/11	
SCALE: NTS	
DRAWN BY: KMKENDALL	
<small>K:\CLIENT_PROJECTS\0-PIEEL\2011-019\FIG_25_IMPROVED_ROAD_BORE_CROSSING.VSD</small>	

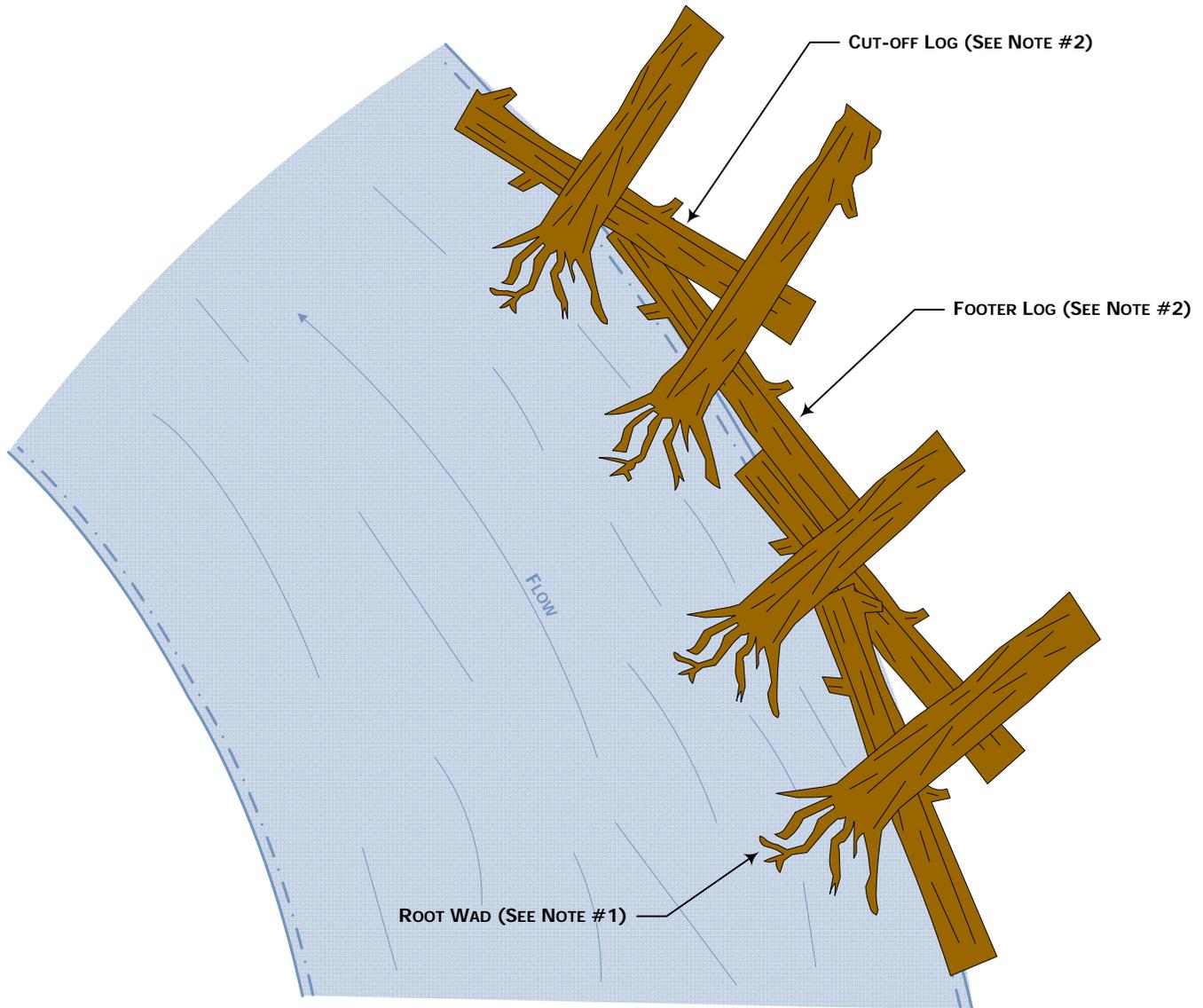
TYPICAL CROSS SECTION – BIOLOG



TYPICAL PLAN VIEW – BIOLOG



TYPICAL PLAN VIEW – NATURAL MATERIAL REVETMENT

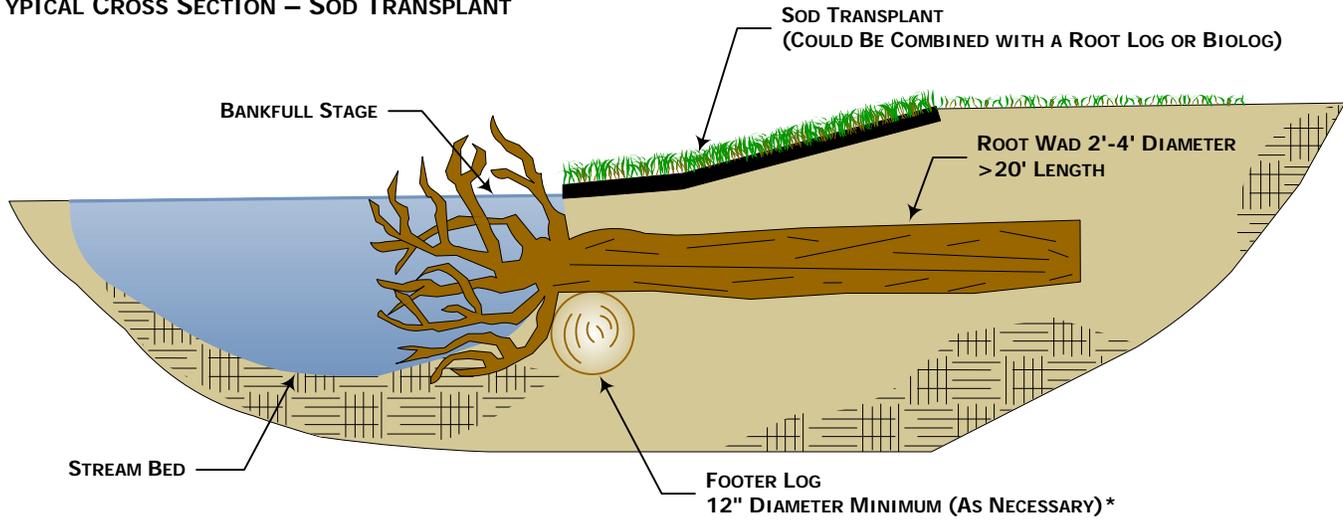


Notes:

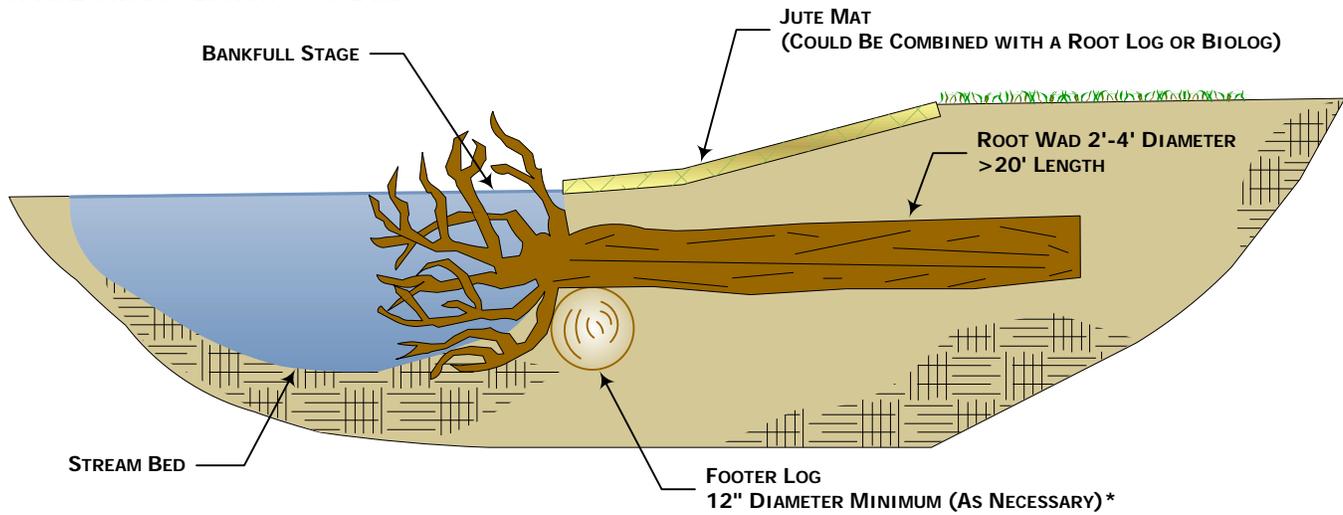
#1 – Root wad logs to be used on steep banks or based on agency recommendations.

#2 - Root wad logs to be anchored appropriately based on site-specific conditions or agency recommendations.

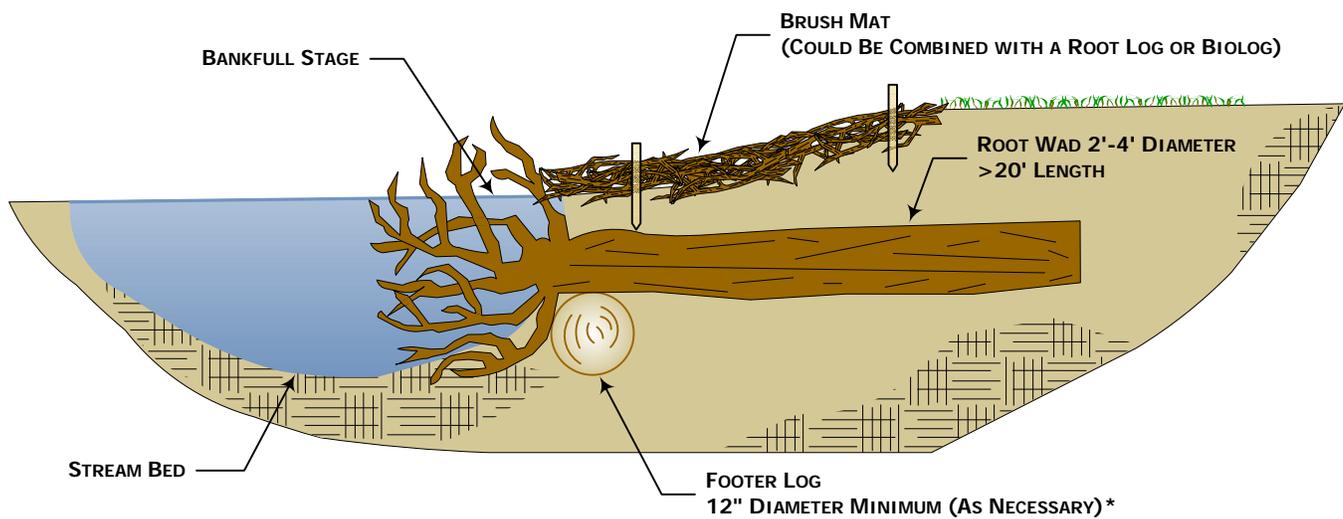
TYPICAL CROSS SECTION – SOD TRANSPLANT



TYPICAL CROSS SECTION – JUTE MAT



TYPICAL CROSS SECTION – BRUSH MAT



Appendix A

Noxious and Invasive Weed Species

Appendix A

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

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

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

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

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

Sandpiper Pipeline Project			
Noxious and Invasive Weed Species			
State/Weed Type	Common Name	Scientific Name	Regulatory Classification
	Water flea	<i>Daphnia lumholtzi</i>	Prohibited
	Zebra mussel	<i>Dreissena polymorpha</i>	Restricted
<p>North Dakota:</p> <p style="padding-left: 20px;">a Listed Regulated Species</p> <p>Minnesota Control Status:</p> <p style="padding-left: 20px;">b Eradicate</p> <p style="padding-left: 20px;">c Control</p> <p style="padding-left: 20px;">d Restricted</p> <p>Abbreviations:</p> <p style="padding-left: 20px;">NW = Noxious Weed</p> <p style="padding-left: 20px;">CONW = County Noxious Weed</p> <p style="padding-left: 20px;">SN = State noxious weed (Minnesota Department of Agriculture)</p> <p style="padding-left: 20px;">PS = State prohibited weed seed (Minnesota Department of Agriculture)</p> <p style="padding-left: 20px;">RN = Restricted noxious weed (Minnesota Department of Agriculture)</p> <p style="padding-left: 20px;">FN = Federal noxious weed (USDA-Animal Plant Health Inspection Service)</p> <p style="padding-left: 20px;">PI = Prohibited exotic species (Minnesota Department of Natural Resources)</p>			

Appendix B
Equipment Cleaning Log



Equipment Cleaning Log

Form Completed By: _____

Date: _____ Time: _____

Location of Equipment (tract & milepost): _____

Equipment Type: _____

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

Cleaning Method: (check all that apply)

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

Comments: _____

Appendix C

Seed Mixes

**Sandpiper Pipeline Project
Seed Mixes**

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

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

Table 2 – North Dakota Construction Area Standard Upland Seed Mix

Seed Name	Pure Live Seed (Pounds Per Acre)	% of Seed
Western Wheatgrass (<i>Pascopyrum smithii</i>)	3.2	20%
Slender Wheatgrass (<i>Elymus trachycaulus</i>)	1	10%
NewHy bluebunch-quackgrass hybrid	6	30%
Pubescent Wheatgrass (<i>Elytrigia intermedia</i>)	5.2	30%
Alfalfa	1.2	10%
<i>Total</i>	16.6	100%
Associated Companion 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>Companion/Cover Crop Total</i>	20	100%
GRAND TOTAL	36.6 pounds	100%

**Sandpiper Pipeline Project
Seed Mixes**

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

Seed Name	Pure Live Seed (Pounds Per Acre)	% of Seed
Perennial Ryegrass <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	100%
Associated Companion Crop Mix		
Oats <i>if summer seeding (Avena sativa)</i> or Winter Wheat <i>if late fall (dormant) or spring seeding (Triticum 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 4- North Dakota, Minnesota, and Wisconsin Unsaturated Wetland Seed Mix – General Restoration Mix

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

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

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

**Sandpiper Pipeline Project
Seed Mixes**

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

Seed Name	Pure Live Seed (Pounds Per Acre)	% of Seed
Western Wheatgrass (<i>Pascopyrum smithii</i>)	3.2	20%
Slender Wheatgrass (<i>Elymus trachycaulus</i>)	1	10%
NewHy bluebunch-quackgrass hybrid	6	30%
Pubescent Wheatgrass (<i>Elytrigia intermedia</i>)	5.2	30%
Alfalfa	1.2	10%
<i>Total</i>	16.6	100%
Associated Companion 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%
Companion/Cover Crop Total	20	100%
GRAND TOTAL	36.6 pounds	100%

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

Seed Name	Pure Live Seed (Pounds Per Acre)	% of Seed
Orchard Grass (<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%
Cover Crop Total	20	100%
GRAND TOTAL	40 pounds	100%

**Sandpiper Pipeline Project
Seed Mixes**

Table 8 – North Dakota Wildlife Area Upland Seed Mix

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

Table 9 – Minnesota and Wisconsin Wildlife Area Upland Seed Mix

Seed Name	Pure Live Seed (Pounds Per Acre)	% of Seed
Red Clover (<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 if summer seeding (<i>Avena sativa</i>) or Winter Wheat if spring seeding (<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 pounds	100%

**Sandpiper Pipeline Project
Seed Mixes**

Table 10 – North Dakota Native Area Seed Mix

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

Table 11 – Minnesota and Wisconsin Native Area Seed Mix ^{1/}

Seed Name	Pure Live Seed (Pounds Per Acre)	% of Seed
Big Bluestem (<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 15 to June 30 or after soil temperatures are below 55 degrees Fahrenheit.		

**Sandpiper Pipeline Project
Seed Mixes**

Table 12 – North Dakota Roadside Seed Mix

Seed Name	Pure Live Seed (Pounds Per Acre)	% of Seed
Western Wheatgrass (<i>Pascopyrum smithii</i>)	3.2	20%
Slender Wheatgrass (<i>Elymus trachycaulus</i>)	1	10%
NewHy bluebunch-quackgrass hybrid	6	30%
Pubescent Wheatgrass (<i>Elytrigia intermedia</i>)	5.2	30%
Alfalfa	1.2	10%
<i>Total</i>	16.6	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 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	36.6 pounds	100%

**Sandpiper Pipeline Project
Seed Mixes**

Table 13 – Minnesota and Wisconsin Roadside Seed Mix

Seed Name	Pure Live Seed (Pounds Per Acre)	% of Seed
Kentucky Bluegrass – Certified Park (<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 if summer seeding (<i>Avena sativa</i>) or Winter Wheat if spring seeding (<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	90 pounds	100%

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

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

**Sandpiper Pipeline Project
Seed Mixes**

Table 15 – Minnesota Protected Waters Seed Mix¹

Seed Name	Pure Live Seed (Pounds Per Acre)	% of Seed
American slough grass (<i>Beckmannia syzigachne</i>)	1.5	18.63%
Blue-joint grass (<i>Calamagrostis Canadensis</i>)	0.06	0.75%
Reed manna grass (<i>Glyceria grandis</i>)	0.18	2.24%
Fowl manna grass (<i>Glyceria grandis</i>)	0.12	1.49%
Rice Cut-grass (<i>Leersia oryzoides</i>)	0.24	2.98%
Annual ryegrass (<i>Lolium italicum</i>)	0.9	11.18%
Fowl bluegrass (<i>Poa palustris</i>)	1.8	22.36%
Tussock sedge (<i>Carex stricta</i>)	0.06	0.75%
Fox sedge (<i>Carex vulpinoidea</i>)	0.3	3.37%
Green bulrush (<i>Scirpus atrovirens</i>)	0.06	0.75%
Wool grass (<i>Scirpus cyperinus</i>)	0.006	0.07%
River bulrush (<i>Scirpus fluviatilis</i>)	0.24	2.98%
Soft-stem bulrush (<i>Scirpus validus</i>)	0.12	1.49%
Marsh milkweed (<i>Asclepias incarnate</i>)	0.12	1.49%
Flat-topped aster (<i>Aster umbellatus</i>)	0.3	3.73%
Joe-pye weed (<i>Eupatorium maculatum</i>)	0.3	3.73%
Boneset (<i>Eupatorium perfoliatum</i>)	0.24	2.98%
Sneezeweed (<i>Helenium autumnale</i>)	0.24	2.98%
Spotted Touch-me-not (<i>Impatiens capensis</i>)	0.06	0.75%
Great-blue lobelia (<i>Lobelia siphilitica</i>)	0.12	1.49%
Monkey flower (<i>Mimulus ringens</i>)	0.006	0.07%
Mountain mint (<i>Pycnanthemum virginianum</i>)	0.12	1.49%
Giant goldenrod (<i>Solidago gigantean</i>)	0.24	2.98%
Blue vervain (<i>Verbena hastate</i>)	0.36	4.47%
Ironweed (<i>Veronia fasciculata</i>)	0.36	4.47%
<i>Total</i>	6.0	100%
Associated Cover Crop Mix		
Slender Wheat Grass (<i>Elymus trachycaulus</i>)	2	100%
<i>Cover Crop Total</i>	2	100%
GRAND TOTAL	8 pounds	100%
¹ Applicable seeding dates: May 15 to June 30 or after soil temperatures are below 55 degrees Fahrenheit. ² Quantities and availability may be limited.		

**Sandpiper Pipeline Project
Seed Mixes**

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

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

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

*Indicates dominates within this plant community.

Regarding: Wet-Mesic Tallgrass Prairie

Community Description

Andropogon gerardii - (*Panicum virgatum*) - *Muhlenbergia richardsonis* Herbaceous Vegetation

Translated Name: Big Bluestem - (Switchgrass) - Mat Muhly Herbaceous Vegetation

Common Name: Northern Wet-Mesic Tallgrass Prairie

Unique Identifier: CEG002199

Classification Approach: International Vegetation Classification (IVC)

Summary: This big bluestem wet-mesic prairie type is found in the northern tallgrass prairie region of the United States and Canada. In South Dakota, soils are moist loams and poorly drained silt loams derived from glacial drift. The vegetation is dominated by a dense layer of tall grasses, such as *Andropogon gerardii* and *Panicum virgatum*, with associates of *Calamagrostis canadensis*, *Calamagrostis stricta*, and *Spartina pectinata*. *Muhlenbergia richardsonis* may be a diagnostic, less dominant species of the northern tallgrass prairie. In the Sheyenne Delta, this type may form a distinctive wet-mesic sand prairie type.

Appendix D

Enbridge Environment Hydrotest Discharge Authorization and Documentation

The purpose of this form is to document and insure that appropriate planning occurs prior to hydrostatic test discharge activities as well as the proper recording of necessary information during the actual discharge event. If the discharge permit specifies the need for a Certified Operator, he/she is responsible for the final section of the form. Otherwise, an Environmental Inspector will be responsible for completion of this form.

Part 1: Basic Discharge Information: All information must be completed. Coordination with Enbridge Engineering is necessary to obtain the exact test section length and volume of water to be discharged. The estimated duration of the discharge must be calculated using the maximum permitted rate (or the anticipated rate, if lower than the permitted rate) and the total volume of water to be discharged. This is critical information and will ensure that any required sampling is conducted at the appropriate frequency specified in the permit.

Part 2: Pre-Discharge Planning Checklist: A pre-discharge planning meeting must be held with the Certified Operator (if required), Contractor, Craft Inspection, Environmental Inspection, and Construction Management staff to review items included in the checklist and any other pertinent information deemed necessary. A full copy of the permit and discharge plan must be provided to all participants. Upon completion of this meeting, all participants must sign the form to indicate that they understand all steps of the discharge process. **Note: In order to proceed with discharge activities, the Enbridge Construction Manager and Environment Staff assigned to the project, or their designees, must review the information and provide their authorization by signing and dating the form.**

Part 3: Discharge Monitoring: A copy of the permit, discharge plan, and parts one and two of the form must be on-site at all times during the discharge event. In addition to the items specified on the form, the following photographs are required:

- Receiving water before, during, and after the discharge (minimum 3 photos/day)
- Discharge structure/device before and during the discharge (minimum 3 photos/day)

As noted, upon completion of the discharge event, the Certified Operator or Environmental Inspector, Craft Inspector, Contractor Foreman, and Enbridge Construction Manager must sign and date the form. **The completed form, along with the supplemental photographs, and a copy of the chain of custody for any samples submitted for laboratory analysis must be submitted to the Enbridge Environment Project Manager/Lead within 12 hours of ending the discharge.** Any permit violations will be reported to the applicable agencies by the Enbridge Environment Project Manager/Lead within the timeframes specified in the discharge permit.



Part 1: Basic Discharge Information

Date: _____
 Project Name: _____ Spread: _____ Tract #: _____
 Test Section Identification: _____
 Pipe Diameter (inches): _____ Test Section Length (feet): _____
 Volume to be discharged (gallons): _____
 Permitted Discharge Rate (gpm): _____ Est. Duration of Discharge (hours): _____
 Receiving Waterbody Name/Nearest Surface Waterbody: _____
 Certified Operator Name and Number (if applicable): _____

Part 2: Pre-Discharge Planning Checklist

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

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

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

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

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

Name (print and sign):

Certified Operator or Environmental Inspector Signature: _____

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

Enbridge Environment Staff Signature and Date: _____

Enbridge Construction Manager Signature and Date: _____

Appendix E

Emergency Response Contractors/Disposal and Treatment Facilities

The Contractor will dispose of all wastes according to applicable federal, state, and local requirements. A listing of potential Emergency Spill Response Contractors and waste disposal facilities is provided below. This list was developed from state-wide data bases. This list represents firms operating at the time the data base was produced. The Contractor is responsible for verifying if a contractor or facility is currently operating under appropriate permits or licenses. The Contractor is responsible for ensuring wastes are disposed of properly.

Spill Response Contractors

Company	City/State	Phone Number
North Dakota		
Clean Harbors Environmental	Williston, ND	(701) 774-2201 (800) 645-8265
Garner Environmental Services	Williston, ND	(701) 577-1200 (855) 774-1200
Absorbent & Safety Solutions	Watford City, ND	(701) 838-4558
Minnesota Limited	Berthold, ND	(701) 453-3700
Bobs Oilfield Service Inc	Belfield, ND	(701) 575-4666
Keitu Engineers & Consultants, Inc.	Mandan, ND	(701) 667-1800
Minnesota		
Bay West Environmental	St. Paul, MN	(800) 279-0456 (651) 291-0456
West Central Environmental Consultants Inc.	Morris, MN	(800) 422-8356 (888) 923-2778
Minnesota Limited	Bemidji, MN	(218) 755-9595
OSI Environmental	Bemidji, MN	(800) 585-8838
OSI Environmental	Eveleth, MN	(800) 777-8542
Bay West Environmental	Duluth, MN	(800) 279-0456 (218) 740-0110
Wisconsin - The Contractor should consult with the WDNR Northern Regional Spill Coordinator (John Sager: phone (715) 365-8959) for assistance when selecting a spill response contractor.		

Waste Disposal/Treatment Facilities

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

Please note: Some facilities may have limitations on amounts, types of materials, etc.

*May accept crude oil-impacted soils and/or wastes from oil field exploration and production activities.

Appendix F
Spill Report Form



Spill Report Form

(The Contractor Spill Coordinator must complete this for any spill, regardless of size, and submit the form to the Enbridge Representative within 24 hours of the occurrence)

Date of Spill: _____ Date of Spill Discovery: _____

Time of Spill: _____ Time of Spill Discovery: _____

Name and Title of Discoverer: _____

Type of material spilled and manufacturer's name: _____

Legal Description of spill location to the quarter section: _____

Directions from nearest community: _____

Estimated volume of spill: _____

Weather conditions: _____

Topography and surface conditions of spill site: _____

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

Proximity of spill to surface waters: _____

Did the spill reach a waterbody? _____ Yes _____ No

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

Describe the causes and circumstances resulting in the spill: _____

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

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

Current status of cleanup actions: _____

Name and Company for the following:

Construction Superintendent: _____

Spill Coordinator: _____

Enbridge Representative: _____

Person Who Reported the Spill: _____

Environmental Inspector: _____

Form completed by: _____ Date: _____

Appendix G

Spill Reporting-Agency Contacts

**Sandpiper Pipeline Project
Spill Reporting Contacts**

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

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

**Sandpiper Pipeline Project
Spill Reporting Contacts**

Agency	Reporting Criteria	When	Phone Number
Red Lake County Emergency Management	As Needed		Mitch Bernstein (218) 253-2996
Clearwater County Emergency Management	As Needed	8:00 a.m.–4:30 p.m. Monday- Friday	(218) 694-6183
Hubbard County Emergency Management	As Needed		Brian Halbasch (218) 732-2588
Cass County Emergency Management	As Needed		Kerry Swenson, Dispatcher (218) 547-7437
Crow Wing County Emergency Management	As Needed		John Bowen, Director (218) 829-4749
Aitkin County Emergency Management	As Needed		Dispatch (non- emergency) (218) 927- 7400
Carlton County Emergency Management	As Needed		Brian Belich, Manager (218) 384-3236
County Contacts – Wisconsin			
Douglas County Emergency Management	As Needed	8:00 a.m.-4:30 p.m. Monday- Friday	Keith Kesler, Director (715) 395-1636

Appendix C

Wetland and Waterbody Delineation Report, Forms, and Representative Photos

INCLUDED IN ELECTRONIC COPY

Appendix D
Waterbody Crossing Table

Appendix C

Enbridge Public Awareness Brochures

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Pipeline safety and emergency information

for our Neighbors.

Important safety information enclosed.

Pipeline safety: A shared responsibility

This brochure is provided specifically for landowners, residents, business owners and management of places of congregation near Enbridge's crude oil pipeline systems throughout the United States. Your address indicates that you may live, work or own property or a business near a crude oil transmission or gathering pipeline system operated by Enbridge. It is important that you read and share this safety information with others in your home, place of business or facility.

If you would like more information about Enbridge pipelines in your area—including pipeline size, contents transported, or pipeline location—please contact us.

To have pipelines and utilities located prior to excavation, call 811.

If you experience a pipeline emergency, first call 911, then call Enbridge's toll-free 24-hour emergency number for your area.

24-hour emergency numbers for your area

☎ **800.858.5253**

If located in Mississippi, call:

☎ **888.650.8099**

How you can reach us (non-emergencies only):

Public Awareness Hotline
877.799.2650

Land Services Hotline
866.331.3493

Email
USpublicawareness@enbridge.com

Mail
**Public Awareness
Program Coordinator
1100 Louisiana, Suite 3300
Houston, TX 77002**

Website
enbridge.com/USpublicawareness

Facebook
facebook.com/enbridge

**Important safety information enclosed.
Se adjunta información de seguridad importante en la página 7.**



Brad Shamla
VP US Operations,
Liquids Pipelines

Hello,

My name is Brad Shamla. I am the vice president of operations for Enbridge's liquids pipelines business in the United States. You are receiving this brochure because you live, work or own property near one of our pipelines. Enbridge exists to connect people to the energy they need to have a good quality of life, and that makes the safe and reliable transportation of energy our number one priority. Because you live, work or own property near one of our pipelines, you too have a role in pipeline safety. This includes calling 811 in advance of every digging project, understanding the signs of a pipeline emergency and knowing how to react to a pipeline emergency in a way that will keep you and others safe.

Please read and share this important safety information with others who live or work at this address, including family members, employees, renters and tenants.

After reading this brochure, you should know the following:

- How to contact Enbridge
- How to recognize a pipeline leak
- How to respond in an emergency situation
- How to find out where pipelines are located in proximity to your home or business
- How to excavate safely

It is critical that you keep and share the information in this brochure. Visit enbridge.com/resources or contact us at USpublicawareness@enbridge.com for:

- Additional copies of this brochure
- PDF versions you can forward by email
- Posters featuring pipeline safety information and emergency numbers

Enbridge North American assets



Pipeline maps are available online through:

Enbridge Pipelines
(North American assets)

enbridge.com/map

National Pipeline Mapping System
(U.S. transmission pipelines)

npms.phmsa.dot.gov

Pipeline safety: There's a pipeline near you

Life takes energy: to heat our homes, to feed our families, to fuel our vehicles. Enbridge connects people to the energy they need to help fuel their quality of life. Roofing shingles, shampoos and even artificial heart valves are made from products transported through more than two million miles of pipelines that crisscross the United States.

According to government studies, pipelines are the safest, most efficient and most reliable way to transport energy resources like crude oil, petroleum products and natural gas, and every year we invest in the latest technology and training to meet the high environmental and safety standards expected by those who live and work near our pipelines and facilities. Visit enbridge.com/safety to read our Operational Reliability Review, an overview of Enbridge's efforts to make our operations as safe and reliable as possible.

Enbridge owns and operates crude oil pipelines, as well as other petroleum product and gas pipelines, in the United States, and your address indicates that you may work or own property or a business near one or more of our crude oil pipelines or a related facility. We transport more than 80 different commodities on our crude oil pipeline systems, from various grades of crude oil to other petroleum products. Additional information is included in this brochure if an Enbridge pipeline near you transports products other than, or in addition to, crude oil.

Gathering lines transport crude oil and other petroleum products from production areas to a connection with a larger pipeline. From there, they are transported through higher volume transmission lines to refineries where they are turned into gasoline, diesel fuel and other products we use every day.

Enbridge supplements its comprehensive maintenance procedures with Integrity Management Plans. These programs provide greater protection in high consequence areas.

Pipeline location

You can determine the approximate location of an Enbridge pipeline by identifying the pipeline markers. Markers should never be used as a reference for the exact location of a pipeline.

For information on gathering lines that may be present in your area, call **877.799.2650** or contact us at USpublicawareness@enbridge.com. Do



not rely on word-of-mouth, maps, memory or pipeline markers when planning a digging project. A call to 811, the national "Call Before You Dig" telephone number, is necessary to properly locate pipelines and other buried utilities before excavation.



- All pipeline markers provide the name of the pipeline operator, product being transported and a telephone number for reporting pipeline emergencies.

Given our thorough maintenance, testing, training, monitoring and safety programs, a pipeline leak is unlikely. In the event of an incident, Enbridge will work with local emergency responders to secure the area and get you the information you need to stay safe. If you operate a business or place of congregation, consider pipelines in your emergency response plans and procedures.

Safety in processes, people and technologies

Safety is, and always will be, our number one priority. That's why we invest heavily, and why our team devotes hundreds of thousands of hours every year, to keep our systems running smoothly and without incident. Enbridge's program of preventive measures to promote the safe, reliable operations of our pipelines and related facilities includes:

- High-quality pipeline material, anti-corrosion coatings and cathodic protection (a low-level direct current to inhibit corrosion)
- Pressure testing of new and existing pipelines
- Inspection and preventative maintenance programs
- Monitoring of pipelines and related facilities
- Frequent aerial and periodic ground surveys of the right-of-way
- Automatic shut-off valves and remote control valves
- Emergency response preparedness training and drills for employees and third-party emergency responders

The warning signs

Be observant of unusual sights, sounds and odors along the right-of-way and immediately report anything out of the ordinary by calling Enbridge's 24-hour emergency number for your area.



You might see:

- Liquid on the ground
- Discolored snow or vegetation
- Oily sheen on water surfaces



You might hear:

- A roaring, blowing or hissing sound



You might smell:

- An unusual sulfur or rotten egg odor

A safe response

Take the following actions if you have caused damage to the pipeline, have observed or suspect a leak or are in immediate danger.

- If you can do so safely, turn off any mechanized equipment. Move as far away from the leak as possible in an upwind direction, avoiding contact with escaping liquids and gases
- Call **911**
- Call the toll-free, 24-hour Enbridge emergency number for your area:
 - ▶ **800.858.5253**
- If located in Mississippi, call:
 - ▶ **888.650.8099**
- Follow instructions provided to you by Enbridge and local emergency responders

What not to do in an emergency situation:



- Do not touch any liquid or vapor that may have come from the pipeline



- Do not drive into the area or start your car



- Do not light a match



- Do not turn on or off anything that may create a spark—including cell phones, telephones, light switches, vehicle alarms, vehicle keyless entry and flashlights—until you are in a safe location



- Do not operate pipeline valves



- Do not remain in a building if the smell is stronger inside than outside

Local public safety officials will determine whether residents should evacuate or shelter-in-place. Residents may be asked to evacuate if it is no longer safe to be in the area or to shelter-in-place if there is something unsafe in the environment. If you do not know the location of the pipeline leak, shelter-in-place until you are provided with additional instructions from

emergency responders or Enbridge.

How to shelter-in-place:

- Immediately go indoors and close all windows and outside doors
- Take shelter in the room with the least amount of windows and vents
- Keep phone lines open so that you can be contacted by emergency response personnel
- Stay tuned to local radio and television (battery-operated) for possible information updates
- Turn off any appliances or equipment that circulate air, such as exhaust fans, gas fireplaces, gas stoves, and heating ventilation and air conditioning (HVAC) systems
- Turn down thermostats to the minimum setting
- Even if you see people outside, do not leave until told to do so

What happens next?

- Enbridge, contractors and local emergency responders will work together to assess the situation and respond as needed; public safety will be the top priority
- Enbridge personnel may shut down or isolate sections of the pipeline
- Local emergency responders will oversee public safety measures, such as securing the scene, disseminating information, determining and implementing evacuation procedures, and providing medical aid and other lifesaving services as needed
- Enbridge will work with applicable agencies to remediate any impacts caused by the leak



—
Please share this important safety information with others.

The pipeline right-of-way

The pipeline follows a narrow, clear stretch of land called a right-of-way. This right-of-way provides Enbridge employees and contractors access to the pipeline for inspections, maintenance, testing and in an emergency. Enbridge will notify affected neighbors when we are planning to conduct maintenance on a nearby pipeline.

Pipelines that traverse waterways can often be identified by looking to the banks of the waterway for pipeline markers or signs warning against anchoring and dredging. Take care with boat recreation near pipelines that traverse waterways. Anchoring or dredging near pipelines can expose them or damage the pipeline or its coating.

When you are developing emergency response plans for your home, facility or place of business, do not choose the right-of-way as the identified muster point or meeting place. For your safety and to protect the pipeline, permanent or temporary structures and deep-rooted shrubs and trees are prohibited within the pipeline right-of-way. More information about Enbridge right-of-way standards is available by calling our Land Services Department at **866.331.3493**.



Aboveground facilities

Enbridge owns and operates several aboveground facilities along its crude oil pipeline systems, including crude oil storage facilities, pump stations and valve sites. It is important that you are also aware of these facilities and what you can expect as part of normal operations.

If you notice any suspicious activity or abnormal odor near the right-of-way or aboveground facilities, call 911 immediately, then call Enbridge's 24-hour emergency number for your area. Even if you are uncertain of the severity, it's important that you notify Enbridge so a representative can investigate. The Enbridge toll-free emergency number can be found in this brochure, at enbridge.com/emergency or on any pipeline marker or facility sign.

Facility	Purpose	Normal Operations
Lease Automatic Custody Transfer Units (LACT Units)	At certain facilities, tanker trucks deliver producers' crude oil to LACT units, where it is metered and piped into crude oil storage facilities	During normal operations, a slight odor may be noticed during oil transfers or maintenance activities. Higher truck traffic is common near LACT units.
Crude Oil Storage Facilities	Enbridge storage facilities are used to safely store and transport crude oil to refineries and other market destinations via pipeline	During normal operations, a slight odor may be noticed during oil transfers or maintenance activities
Pump Stations	Pump stations increase pressure in the pipeline to maintain flow and are monitored 24/7 by Enbridge's control centers	During normal operations, no significant odors should be detected
Valve Sites	Valve sites are located along the pipeline right-of-way and may be used to control the flow of products in the pipeline	During normal operations, no significant odors should be detected



Protect yourself, protect your property – Call 811 Before You Dig!

811 is a free, nationwide, service designed to keep you safe when digging or excavating. Calling 811 is a simple process and is always the safest option anytime you are moving dirt. Two to three business days before excavating (depending on state laws), simply make a call to 811 with important details about your project, including:

- The type of work you will be doing and a description of the area
- The date and time when excavation will begin
- Your worksite's street address, the road on which it is located and the nearest intersection
- Driving directions or GPS coordinates

Within two to three business days professional locators will mark underground utilities. Pipelines will be marked with yellow flags or paint so that you can conduct your work around them, saving yourself from potential injury or property damage.

Click before you dig! Many states now offer online “811” options, including states in our operational areas listed below:

Illinois	illinois1call.com
Indiana	indiana811.org/811now
Kansas	kansasonecall.com
Michigan	elocate.missdig.org
Minnesota	gopherstateonecall.org
Missouri	mo1call.com/itic/index_gen
Montana	montana811.org
Mississippi	ms1call.org/locate-requests
New York	digsafelynewyork.com
North Dakota	ndonecall.com
Ohio	oups.org
Oklahoma	callokie.com
Wisconsin	diggershotline.com/file-online

Excavating safely goes beyond the call. Always dig with “CARE.”

- C** all 811 Before You Dig
- A** llow required time for markings
- R** espect the marks
- E** xcavate carefully

If you see someone digging or conducting other soil-disturbing activities and there are no flags or marks on the ground, stop the activity and ask them to call 811 before continuing.

Additional Resources

npms.phmsa.dot.gov

api.org

aopl.org

pipeline101.org

call811.com



4½ minutes
The approximate time
it takes to call 811

OR

4½ days
The average work delay
due to hitting a pipeline
while digging



The cost of calling 811
before digging



The percentage of time
work is completed without
damage when the one
call system is used prior
to digging



A nationwide number that
can save money and lives

Did you know?

811 is a free service

- 811 is a free, nationwide service for locating underground utilities
- It's paid for by pipeline and other utility operators to protect you

It's never safe to assume the depth of pipelines

- Pipeline depth can change due to erosion, previous digging projects and other factors
- Some pipelines and related facilities may be located above the ground

811 isn't just for digging projects

- Call 811 before any soil-disturbing activities, which include but **are not limited to** planting trees, installing fence posts or constructing sidewalks, steps, roads, parking lots, driveways, ditches, utilities or buildings

Striking a pipeline while digging can harm more than your bank account

- If a product is released from the pipeline, it could damage your property
- You may also be eligible for fines and repair costs
- If the product released comes into contact with you or ignites, it could cause injuries or even death



**Know what's below.
Call before you dig.**

La vida necesita energía: para calentar nuestros hogares, alimentar a nuestra familia y abastecer nuestros vehículos. Enbridge conecta a la gente con la energía que necesita para tener una buena calidad de vida. Las tejas de los tejados, los champús e incluso las válvulas cardíacas artificiales están elaborados con productos transportados por más de dos millones de millas de tuberías que atraviesan los Estados Unidos.

Conforme a los estudios gubernamentales, las tuberías son el medio más seguro, eficiente y fiable para transportar recursos energéticos como el petróleo crudo, los productos de petróleo y el gas natural. Todos los años invertimos en la tecnología más moderna y en la capacitación para cumplir las normas más rigurosas en materia ambiental y de seguridad, tal como lo exigen aquellos que viven y trabajan cerca de nuestras tuberías e instalaciones. Visite enbridge.com/safety para leer la Reseña de Fiabilidad Operacional, que es una síntesis de las gestiones de Enbridge para que nuestras operaciones sean lo más seguras y confiables posible.

Enbridge es dueña y opera oleoductos de transporte de crudo así como otras tuberías de productos petroleros y gas, en los Estados Unidos. Su dirección indica que usted posiblemente trabaje o sea dueño de una propiedad o negocio cerca de uno o más de nuestros oleoductos de crudo o instalaciones afines. Transportamos más de 80 productos básicos distintos en nuestros sistemas de oleoductos de crudo, desde distintos grados de crudo hasta otros productos petroleros. Si una tubería de Enbridge cerca de usted transporta otros productos en lugar del crudo o además de éste, encontrará más información en este folleto. Las tuberías de recolección transportan petróleo crudo y otros productos petroleros desde las áreas de producción hasta una conexión con un oleoducto más grande. Desde allí, se los transporta por tuberías de transporte de mayor volumen hasta las refinerías, donde se convierten en gasolina, combustible diesel y otros productos que utilizamos todos los días.

Enbridge suplementa sus detallados procedimientos de mantenimiento con Planes de Gestión de la Integridad. Esos programas ofrecen mayor protección en áreas de altas consecuencias.

Ubicación de las tuberías

Se podrá determinar la ubicación aproximada de una tubería de Enbridge al identificar los letreros señalizadores de tuberías. Jamás deben usarse los letreros señalizadores como referencia para la ubicación exacta de la tubería.

Los mapas de tuberías se encuentran en estos sitios de Internet:

Tuberías de Enbridge
(Instalaciones en Norteamérica)
enbridge.com/map

Sistema nacional de mapas de tuberías
(Tuberías de transporte de EE.UU.)
npms.phmsa.dot.gov

Para más información sobre las tuberías de recolección que puede haber en su zona, comuníquese con nosotros a USpublicawareness@enbridge.com o llámenos al **877.799.2650**. Cuando planee



cavar, no confíe en la información de otras personas, en la memoria, en los mapas ni en los letreros señalizadores de tuberías. Es imprescindible llamar al 811, el número telefónico nacional "Llame antes de excavar", para ubicar correctamente las tuberías y otras líneas subterráneas de servicio antes de excavar.



- Todos los letreros señalizadores de tuberías tienen el nombre del operador, el producto transportado y un número de teléfono para notificar emergencias en las tuberías.

Es muy poco probable que ocurra una fuga en nuestro sistema de tuberías considerando lo detallados que son nuestros programas de mantenimiento, prueba, capacitación, monitoreo y seguridad. En caso de un incidente, Enbridge trabajará con el personal de emergencia local para controlar el área y comunicarle la información que usted necesita para no correr riesgos. Si usted opera un negocio o lugar de congregación, tenga en cuenta las tuberías en sus planes y procedimientos de respuesta a emergencias.

Seguridad en los procesos, las personas y la tecnología

La seguridad es y siempre será nuestra prioridad número uno. Es por eso que invertimos intensamente y la razón por la que nuestro equipo dedica cientos de miles de horas por año para mantener nuestros sistemas funcionando bien y sin incidentes. Enbridge cuenta con un programa de medidas preventivas para promover las operaciones seguras y fiables de nuestras tuberías e instalaciones afines, que incluye:

- Materiales de tuberías de alta calidad, revestimientos anticorrosivos y protección catódica (una corriente directa de bajo nivel que inhibe la corrosión)
- Pruebas de presión de tuberías nuevas y existentes
- Programas de inspección y mantenimiento preventivo
- Monitoreo de tuberías e instalaciones afines
- Reconocimientos aéreos frecuentes y terrestres periódicos del derecho de vía
- Válvulas automáticas de cierre total y válvulas de control remoto
- Capacitación y simulacros de preparación en caso de emergencia para empleados y personal de emergencia de terceros

Los signos de advertencia

Esté atento a condiciones, sonidos y olores inusuales a lo largo del derecho de vía y reporte de inmediato todo aquello que le parezca fuera de lo común, llamando al 911 y luego al número de emergencia de Enbridge de su área, que atiende las 24 horas.



Es posible que vea:

- Líquido en la tierra
- Nieve o vegetación decolorada
- Brillo o película aceitosa sobre la superficie del agua



Es posible que oiga:

- Sonido rugiente, sibilante o de soplido



Es posible que huela:

- Un olor inusual a azufre o huevo podrido

Una respuesta segura

Haga lo siguiente si causó daño a la tubería, observó o sospecha que hay una fuga o se encuentra en peligro inmediato.

- Si puede hacerlo sin correr riesgo, apague los equipos mecanizados. Aléjese lo más posible de la fuga en dirección contraria al viento (a barlovento), y evite contacto con líquidos y gases de escape
- Llame al **911**
- Llame al número de emergencia gratuito de Enbridge, para su área, que atiende las 24 horas:
 - ▶ **800.858.5253**
- Mississippi:
 - ▶ **888.650.8099**
- Siga las instrucciones que le den Enbridge y el personal de emergencia local

Lo que no debe hacer en caso de emergencia: ¿Qué sucederá después?



- No toque los líquidos o vapores que salgan de la tubería.



- No conduzca su vehículo hacia el área ni arranque el motor.



- No encienda un cerillo.



- No encienda ni apague aquello que pueda generar una chispa, como teléfonos celulares, teléfonos, interruptores de luz, alarmas de vehículos, mecanismo de acceso a vehículos sin llave y linternas, hasta que se encuentre en un lugar seguro.



- No opere las válvulas de la tubería.



- No se quede adentro de un edificio si el olor es más fuerte adentro que afuera.



- No se quede adentro de un edificio si el olor es más fuerte adentro que afuera.

Las autoridades públicas de seguridad de la zona determinarán si los residentes deben evacuar o refugiarse en el lugar donde están. Es posible que se les pida a los residentes evacuar si ya no es seguro quedarse en el área o que se les pida refugiarse en el lugar donde están si existe algún peligro en el medio ambiente. Si no sabe dónde está la fuga de la tubería, refúgiense en el lugar donde está hasta que el personal de emergencia o Enbridge le dé más instrucciones.

Cómo refugiarse en el lugar donde está:

- Vaya inmediatamente adentro y cierre todas las ventanas y puertas exteriores.
- Refúgiense en la sala que tenga la menor cantidad de ventanas y ventilaciones.
- No use las líneas telefónicas para que el personal de respuesta a emergencias pueda comunicarse con usted.
- Sintonice una estación local de radio o televisión (operada a batería) para enterarse de las últimas noticias.
- Apague los electrodomésticos o equipos que circulan aire como los ventiladores extractores, hogares de leños a gas, estufas/ cocinas de gas y sistemas de calefacción, ventilación y acondicionador de aire (HVAC).
- Baje la temperatura al mínimo posible en el termostato de la caldera.
- Aunque vea gente afuera, no salga hasta que se le avise.

- Enbridge, los contratistas y el personal de emergencia local colaborarán para evaluar la situación y responder según sea necesario; la prioridad principal será la seguridad pública.

- El personal de Enbridge puede cerrar totalmente o aislar secciones de la tubería.

- Enbridge trabajará con las agencias correspondientes para remediar los impactos causados por la fuga.



Se ruega leer y compartir esta información de seguridad importante con otras personas.

El derecho de vía de la tubería

La tubería sigue un trayecto angosto y despejado de tierra llamado "derecho de vía". Este derecho de vía proporciona a los empleados y contratistas de Enbridge acceso a la tubería para su inspección, mantenimiento, prueba y en caso de emergencia. Enbridge avisará a los vecinos afectados cuando estemos planeando realizar el mantenimiento de una tubería cercana.

Las tuberías que atraviesan vías fluviales suelen identificarse observando las orillas del agua para ver si hay letreros señalizadores o de advertencia contra el anclaje y el dragado. Tenga cuidado con el uso de embarcaciones recreativas cerca de tuberías que atraviesan vías fluviales. El anclaje o el dragado cerca de las tuberías pueden exponerlas o causar daño a la tubería o a su revestimiento.

Cuando esté preparando los planes de respuesta a emergencia para su hogar, establecimiento o lugar de negocios, no escoja el derecho de vía como el punto de congregación o reunión identificado. Para su seguridad y para proteger la tubería, se prohíbe instalar estructuras permanentes o temporarias, arbustos de raíz profunda y árboles dentro del terreno de derecho de vía de la tubería. Si desea más información sobre las normas del derecho de vía de Enbridge, llame a nuestro Departamento de Servicios de Tierras (Land Services Department) al **866.331.3493**.

Instalaciones en superficie

Enbridge es dueña y opera varias instalaciones en superficie a lo largo de sus sistemas de oleoductos de crudo, incluidas instalaciones de almacenamiento de crudo, estaciones de bombeo y sitios de válvulas. Es importante que también esté conciente de esas instalaciones y lo que son las operaciones normales previstas.

Si nota alguna actividad sospechosa u olor anormal cerca del derecho de vía o de las instalaciones en superficie, llame de inmediato al 911 y luego llame al número de emergencia de Enbridge, de su área que atiende las 24 horas. Aunque no esté seguro de la gravedad, es importante que avise a Enbridge para que un representante pueda investigar. Encontrará el número de emergencia gratuito de Enbridge en este folleto, en **enbridge.com/emergency**, o en los letreros señalizadores o en los carteles de las instalaciones.

Instalación	Objetivo	Operaciones normales
Unidades Automáticas de Medición para Transferencia de Custodia (Unidades LACT)	En ciertas instalaciones, los camiones tanque entregan el crudo de los productores a las unidades LACT, donde se mide y se transfiere a las instalaciones de almacenamiento de crudo de Enbridge.	Durante las operaciones normales, puede notarse un olor leve cuando se transfiere el petróleo o se realizan actividades de mantenimiento. Cerca de las unidades LACT comúnmente hay más tráfico de camiones.
Instalaciones de almacenamiento de petróleo crudo	Estas instalaciones de Enbridge se emplean para almacenar y transportar sin riesgo el petróleo crudo a las refinerías y otros destinos del mercado a través del oleoducto.	Durante las operaciones normales, puede notarse un olor leve cuando se transfiere el petróleo o se realizan actividades de mantenimiento.
Estaciones de bombeo	Las estaciones de bombeo aumentan la presión del oleoducto para mantener la circulación. Los centros de control de Enbridge monitorean las estaciones 24 horas al día, 7 días por semana.	Durante las operaciones normales, no deberían detectarse olores considerables.
Sitios de válvulas	Hay sitios de válvulas a lo largo del derecho de vía del oleoducto y pueden emplearse para controlar la circulación de productos en la tubería.	Durante las operaciones normales, no deberían detectarse olores considerables.



¡Haga clic antes de cavar!
Muchos estados ahora ofrecen opciones “811” en línea, como estos estados en áreas donde operamos:

Illinois	illinois1call.com
Indiana	indiana811.org/811now
Kansas	kansasonecall.com
Michigan	elocate.missdig.org
Minnesota	gopherstateonecall.org
Missouri	mo1call.com/itic/index_gen
Montana	montana811.org
Mississippi	ms1call.org/locate-requests
New York	digsafelynewyork.com
North Dakota	ndonecall.com
Ohio	oups.org
Oklahoma	callok.com
Wisconsin	diggershotline.com/file-online

Protéjase, proteja su propiedad – ¡Llame al 811 antes de excavar!

El servicio nacional gratuito 811 fue creado para que usted no corra peligros al cavar o excavar. Llamar al 811 es un proceso simple y es siempre la opción más segura cada vez que deba mover tierra. Dos o tres días hábiles antes de excavar (dependiendo en la ley estatal), simplemente llame al 811 con los detalles importantes de su proyecto, incluyendo:

- El tipo de trabajo que hará y una descripción del área
- La fecha y hora en que comenzará la excavación
- La dirección del lugar de la excavación, la calle en la que está ubicada y la intersección más cercana
- Instrucciones de manejo o coordenadas de GPS

Dentro de dos o tres días hábiles, los localizadores profesionales marcarán los servicios públicos subterráneos. Se marcarán las tuberías con banderillas o pintura amarilla para que usted pueda trabajar alrededor de ellas, evitando así que usted u otras personas sufran lesiones físicas o daños a la propiedad.

Excavar con precaución no significa solo llamar. Cave siempre con cuidado.

Llame al 811 antes de excavar

Espere a que se marquen las líneas subterráneas

Respete las marcas

Excave con cuidado

Si ve a alguien cavando o realizando otras tareas de movimiento de tierra, y no hay banderillas ni marcadores en la tierra, detenga la actividad y pida al excavador que llame al 811 antes de continuar.

Otros recursos

npms.phmsa.dot.gov

api.org

aopl.org

pipeline101.org

call811.com



4½ minutos
El tiempo aproximado que tarda llamar al 811



4½ días
El retraso de trabajo, en promedio, por golpear una tubería al cavar



El costo de llamar al 811 antes de cavar



Porcentaje del tiempo en el que se completa el trabajo sin daños cuando se llama al sistema "One Call" antes de cavar



Número nacional que puede ahorrar dinero y salvar vidas

¿Sabía usted?

El 811 es un servicio gratuito

- El 811 es un servicio nacional gratuito para ubicar servicios públicos subterráneos.
- Los operadores de tuberías y otros servicios públicos pagan este servicio para protegerle a usted.

No corra riesgos al adivinar la profundidad de las tuberías

- La profundidad de las tuberías puede cambiar debido a la erosión, a otras obras de excavación anteriores y a otros factores.
- Algunas tuberías pueden estar ubicadas en superficie.

El servicio 811 no es solo para obras de excavación

- Llame al 811 antes de realizar actividades que alteren la tierra, que incluyen, entre otros, construir una terraza de madera ("deck") o cercado, plantar árboles o arbustos e instalar un sistema de riego de jardín, aceras o peldaños de concreto.

Golpear una tubería al cavar puede perjudicar más que su cuenta bancaria

- Si hay una fuga de producto de la tubería, se podría producir daño a su propiedad.
- También es posible que le impongan multas y deba pagar costos de reparación.
- Si el producto liberado entra en contacto con usted o se enciende, podría causar lesiones o incluso la muerte.



**Determina lo que está bajo tierra.
Llama antes de excavar.**



U.S. Public Awareness
Administrative Team
1100 Louisiana St., Suite 3300
Houston, TX 77002-5217

**24-hour emergency numbers
for your area:**

◆ **800.858.5253**

If located in Mississippi, call

◆ **888.650.8099**



**Know what's below.
Call before you dig.**

Pipeline safety and emergency information

for Excavators.

Important safety information enclosed.



**Important safety information enclosed.
Se adjunta información de seguridad importante en la página 7.**

Pipeline safety: A shared responsibility

This brochure is provided specifically for you or anyone in your company who is involved in ground disturbing or excavation related activities such as construction or construction planning, utility installation, oil and natural gas production, logging, railroad maintenance, land development or anchoring or dredging operations. Please read and share this important safety information.

If you would like more information about Enbridge pipelines in your area—including pipeline size, contents transported or pipeline location—please contact us.

To have pipelines and utilities located prior to excavation, call 811.

If you experience a pipeline emergency, first call 911, then call Enbridge's toll-free 24-hour emergency number for your area.

24-hour emergency numbers for your area

800.858.5253

If located in Mississippi, call:

888.650.8099

How you can reach us (non-emergencies only):

Public Awareness Hotline
877.799.2650

Land Services Hotline
866.331.3493

Email
USpublicawareness@enbridge.com

Mail
**Public Awareness
Program Coordinator
1100 Louisiana, Suite 3300
Houston, TX 77002**

Website
enbridge.com/USpublicawareness

Facebook
facebook.com/enbridge



Brad Shamla
VP US Operations,
Liquids Pipelines

Hello,

My name is Brad Shamla. I am the vice president of operations for Enbridge's liquids pipelines business in the United States. You are receiving this brochure because you have been identified as an individual or company that may be directly—or indirectly—involved in excavation-related work, land development or anchoring or dredging operations.

Safety is a core value at Enbridge, and I am hopeful that safety is an area of common ground. According to government studies, pipelines are the safest way to transport energy products, but proper precautions must be taken while working around them to avoid harmful and sometimes even deadly consequences.

Striking a pipeline can result in fines, repair costs and harm to you and others, which makes excavating without first calling 811 a risky business. We want to see you and your employees go home safe at the end of every day. I urge you to please use your state one call system by calling 811 for every job, no matter how large or small.

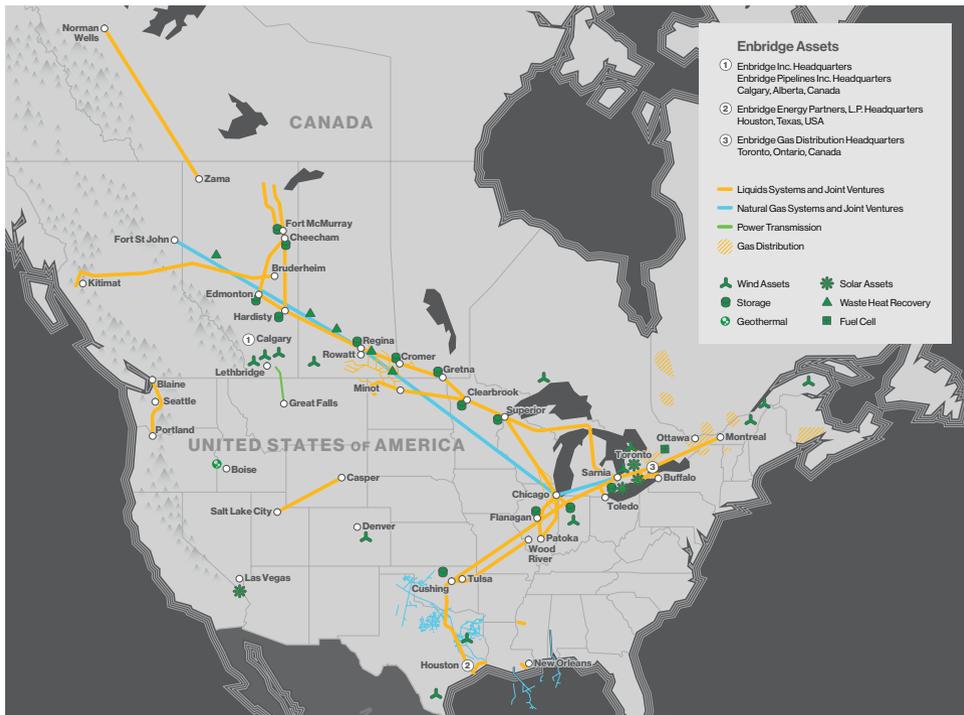
After reading this brochure, you should know the following:

- How to excavate safely around pipelines
- How to find out where pipelines are located
- How to contact Enbridge
- How to recognize a pipeline leak
- How to respond in an emergency situation

It is critical that you keep and share the information in this brochure. Visit enbridge.com/resources or contact us at USpublicawareness@enbridge.com for:

- Additional copies of this brochure
- PDF versions you can forward by email
- Posters featuring pipeline safety information and emergency numbers
- 811 magnets or uniform color code pocket cards
- Excavation safety DVDs

Enbridge North American assets



Important information for developers

We look forward to being your neighbor and helping you develop property near our pipelines in a way that will lead to safe and satisfied tenants in the future. Verifying the location of pipelines is the first step in that process. Please use the checklist below during the planning process:

- Check for pipelines and underground utilities by looking for pipeline markers and consulting with your local planning and zoning department
- Call 811 prior to any soil-disturbing activity and wait the required amount of time for utilities to be properly marked
- If there is an Enbridge pipeline on the property, consult with us to answer these key questions:
 - Is there adequate right-of-way access for maintenance or in an emergency?
 - What are the evacuation routes in the unlikely event of an emergency?

- How can excavation damage to the pipeline be prevented?
- Are there alternative uses for the pipeline right-of-way, such as green spaces, parks, golf courses, hiking and biking trails, horse trails and other recreational spaces?

We also encourage you to review recommended practices by the Pipelines and Informed Planning Alliance (PIPA), available online at phmsa.dot.gov.

Important information for marine operators

Account for underwater pipelines when conducting soil-disturbing activity in or on water. Dredging or anchoring near pipelines can expose them or damage the pipeline or its coating. Pipelines that traverse waterways can often be identified by looking to the banks of the waterway for pipeline markers or signs warning against anchoring and dredging.

Pipeline safety: There's a pipeline near you

Life takes energy: to heat our homes, to feed our families, to fuel our vehicles. Enbridge connects people to the energy they need to help fuel their quality of life. Tires, tool kits and even ice chests are made from products transported through more than two million miles of pipelines that crisscross the United States.

According to government studies, pipelines are the safest, most efficient and most reliable way to transport energy resources like crude oil, petroleum products and natural gas, and every year we invest in the latest technology and training to meet the high environmental and safety standards expected by those who live and work near our pipelines and facilities. Visit [enbridge.com/safety](https://www.enbridge.com/safety) to read our Operational Reliability Review, an overview of Enbridge's efforts to make our operations as safe and reliable as possible.

Pipeline location

You can determine the approximate location of an Enbridge pipeline by identifying the pipeline markers. Markers should never be used as a reference for the exact location of a pipeline.

Pipeline maps are available online through:

Enbridge Pipelines
(North American assets)
[enbridge.com/map](https://www.enbridge.com/map)

National Pipeline Mapping System
(U.S. transmission pipelines)
npipe.phmsa.dot.gov

For information on gathering lines that may be present in your area, call **877.799.2650** or contact us at USpublicawareness@enbridge.com. Do not rely on word-of-mouth, maps, memory or pipeline markers when planning a digging project. A call to 811, the national "Call Before You Dig" telephone number, must be used to properly locate all pipelines and other utilities before excavating or developing in a new area.



- › All pipeline markers provide the name of the pipeline operator, product being transported and a telephone number for reporting pipeline emergencies.



Call before you dig! Many states now offer online “811” options, including states in our operational areas listed below:

Illinois	illinois1call.com
Indiana	indiana811.org/811now
Kansas	kansasonecall.com
Michigan	elocate.missdig.org
Minnesota	gopherstateonecall.org
Missouri	mo1call.com/itic/index_gen
Montana	montana811.org
Mississippi	ms1call.org/locate-requests
New York	digsafelynewyork.com
North Dakota	ndonecall.com
Ohio	oups.org
Oklahoma	callokie.com
Wisconsin	diggershotline.com/file-online

An Enbridge representative may be required to monitor your excavation when working on the Enbridge right-of-way or near Enbridge facilities. For your safety and the safety of others, always confirm with Enbridge prior to beginning your work.

Calling 811 every time is just good business

811 is a free, nationwide service designed to keep you safe when digging, excavating or engaging in any other ground-disturbing activity. Calling 811 is a simple process and is always the safest option anytime you are moving dirt. Two to three business days before excavating (depending on state laws), simply make a call to 811 with important details about your project, including:

- The type of work you will be doing and a description of the area
- The street address, the road and nearest intersection for all sites where excavation will take place
- Both GPS coordinates and driving directions
- The date and time when the excavation will begin
- Whether you have white-lined or pre-marked the excavation area

Within two to three business days, professional locators will mark underground utilities. Pipelines will be marked with yellow flags or paint so that you can conduct your work around them, saving yourself from potential injury or property damage.

If you see someone digging or conducting other soil-disturbing activities and there are no flags or marks on the ground, stop the activity and ask them to call 811 before continuing.

Excavating safely goes beyond the call. Always dig with “CARE.”

- C** all 811 Before You Dig
- A** llow required time for markings
- R** espect the marks
- E** xcavate carefully

Additional Resources

- npms.phmsa.dot.gov
- api.org
- aopl.org
- pipeline101.org
- call811.com
- theglhc.org



4½ minutes
The approximate time it takes to call 811

OR

4½ days
The average work delay due to hitting a pipeline while digging



The cost of calling 811 before digging



The percentage of time work is completed without damage when the one call system is used prior to digging



A nationwide number that can save money and lives

Did you know?

811 is a free service

- 811 is a free, nationwide service for locating underground utilities
- It's paid for by pipeline and other utility operators to protect you

It's never safe to assume the depth of pipelines

- Pipeline depth can change due to erosion, previous digging projects and other factors
- Some pipelines and related facilities may be located above the ground

811 isn't just for digging projects

- Call 811 before any soil-disturbing activities, which include but are not limited to planting trees, installing fence posts or constructing sidewalks, steps, roads, parking lots, driveways, ditches, utilities or buildings

Striking a pipeline while digging can harm more than your bank account

- If a product is released from the pipeline, it could damage your property
- You may also be eligible for fines and repair costs
- If the product released comes into contact with you or ignites, it could cause injuries or even death



**Know what's below.
Call before you dig.**

Given our thorough maintenance, testing, training, monitoring and safety programs, a pipeline leak is unlikely. However, it's important to know the warning signs and how to respond in the event of an emergency if one were to occur.

Safety in processes, people and technologies

Safety is, and always will be, our number one priority. That's why we invest heavily, and why our team devotes hundreds of thousands of hours every year, to keep our systems running smoothly and without incident. Enbridge's program of preventive measures to promote the safe, reliable operations of our pipelines and related facilities includes:

- High-quality pipeline material, anti-corrosion coatings and cathodic protection (a low-level direct current to inhibit corrosion)
- Pressure testing of new and existing pipelines
- Inspection and preventative maintenance programs
- Monitoring of pipelines and related facilities
- Frequent aerial and periodic ground surveys of the right-of-way
- Automatic shut-off valves and remote control valves
- Emergency response preparedness training and drills for employees and third-party emergency responders

The warning signs

Be observant of unusual sights, sounds and odors along the right-of-way and immediately report anything out of the ordinary by calling Enbridge's 24-hour emergency number for your area.



You might see:

- Liquid on the ground
- Discolored snow or vegetation
- Oily sheen on water surfaces



You might hear:

- A roaring, blowing or hissing sound



You might smell:

- An unusual sulfur or rotten egg odor
-

A safe response

Take the following actions if you have caused damage to the pipeline, have observed or suspect a leak or are in immediate danger.

- If you can do so safely, turn off any mechanized equipment. Move as far away from the leak as possible in an upwind direction, avoiding contact with escaping liquids and gases
- Call **911**
- Call the toll-free, 24-hour Enbridge emergency number for your area:
▶ **800.858.5253**
- If located in Mississippi, call:
▶ **888.650.8099**
- Follow instructions provided to you by Enbridge and local emergency responders

What not to do in an emergency situation:



- Do not touch any liquid or vapor that may have come from the pipeline



- Do not drive into the area or start your car



- Do not light a match



- Do not turn on or off anything that may create a spark—including cell phones, telephones, light switches, vehicle alarms, vehicle keyless entry and flashlights—until you are in a safe location



- Do not operate pipeline valves



- Do not remain in a building if the smell is stronger inside than outside

Local public safety officials will determine whether residents should evacuate or shelter-in-place. Residents may be asked to evacuate if it is no longer safe to be in the area or to shelter-in-place if there is something unsafe in the environment. If you do not know the location of the pipeline leak, shelter-in-place until you are provided with additional instructions from

emergency responders or Enbridge.

How to shelter-in-place:

- Immediately go indoors and close all windows and outside doors
- Take shelter in the room with the least amount of windows and vents
- Keep phone lines open so that you can be contacted by emergency response personnel
- Stay tuned to local radio and television (battery-operated) for possible information updates
- Turn off any appliances or equipment that circulate air, such as exhaust fans, gas fireplaces, gas stoves, and heating ventilation and air conditioning (HVAC) systems
- Turn down thermostats to the minimum setting
- Even if you see people outside, do not leave until told to do so

What happens next?

- Enbridge, contractors and local emergency responders will work together to assess the situation and respond as needed; public safety will be the top priority
- Enbridge personnel may shut down or isolate sections of the pipeline
- Local emergency responders will oversee public safety measures, such as securing the scene, disseminating information, determining and implementing evacuation procedures, and providing medical aid and other lifesaving services as needed
- Enbridge will work with applicable agencies to remediate any impacts caused by the leak



—
Please share this important safety information with others.

The pipeline right-of-way— excavators and loggers, please read!

The pipeline follows a narrow, clear stretch of land called a right-of-way. This right-of-way provides Enbridge employees and contractors access to the pipeline for inspections, maintenance, testing and in an emergency and should be kept clear of equipment and stockpiles. Enbridge will notify affected neighbors when we are planning to conduct maintenance on a nearby pipeline.

Pipeline rights-of-way are not designed as roads, and heavy vehicles and equipment can damage the pipelines below. Before crossing our pipeline right-of-way with heavy machinery, call Enbridge at the 24-hour telephone number for your area and we will work with you to establish safe crossing. If you realize you have moved heavy equipment across an Enbridge pipeline without calling, report it to Enbridge immediately. Even if damage is not apparent, we must be notified so that we can assess the pipeline.

When you are developing site safety plans for your excavation project, do not choose the right-of-way as the identified muster point. For your safety and to protect the pipeline, permanent or temporary structures and deep-rooted shrubs and trees are prohibited within the pipeline right-of-way.

More information about Enbridge right-of-way standards is available by calling our Land Services Department toll-free at **866.331.3493**.

Aboveground facilities

Enbridge owns and operates several aboveground facilities along its crude oil pipeline systems, including crude oil storage facilities, pump stations and valve sites. It is important that you are also aware of these facilities and what you can expect as part of normal operations .

If you notice any suspicious activity or abnormal odor near the right-of-way or aboveground facilities, call 911 immediately, then call Enbridge's 24-hour emergency number for your area. Even if you are uncertain of the severity, it's important that you notify Enbridge so a representative can investigate. The Enbridge toll-free emergency number can be found in this brochure, at enbridge.com/emergency or on any pipeline marker or facility sign.

Facility	Purpose	Normal Operations
Lease Automatic Custody Transfer Units (LACT Units)	At certain facilities, tanker trucks deliver producers' crude oil to LACT units, where it is metered and piped into crude oil storage facilities	During normal operations, a slight odor may be noticed during oil transfers or maintenance activities. Higher truck traffic is common near LACT units.
Crude Oil Storage Facilities	Enbridge storage facilities are used to safely store and transport crude oil to refineries and other market destinations via pipeline	During normal operations, a slight odor may be noticed during oil transfers or maintenance activities
Pump Stations	Pump stations increase pressure in the pipeline to maintain flow and are monitored 24/7 by Enbridge's control centers	During normal operations, no significant odors should be detected
Valve Sites	Valve sites are located along the pipeline right-of-way and may be used to control the flow of products in the pipeline	During normal operations, no significant odors should be detected

La vida necesita energía: para calentar nuestros hogares, alimentar a nuestra familia y abastecer nuestros vehículos. Enbridge conecta a la gente con la energía que necesita para tener una buena calidad de vida. Los neumáticos, las herramientas e incluso las neveras portátiles están elaborados con productos transportados por más de dos millones de millas de tuberías que atraviesan los Estados Unidos.

Conforme a los estudios gubernamentales, las tuberías son el medio más seguro, eficiente y fiable para transportar recursos energéticos como el petróleo crudo, los productos de petróleo y el gas natural. Todos los años invertimos en la tecnología más moderna y en la capacitación para cumplir las normas más rigurosas en materia ambiental y de seguridad, tal como lo exigen aquellos que viven y trabajan cerca de nuestras tuberías e instalaciones. Visite enbridge.com/safety para leer la Reseña de Fiabilidad Operacional, que es una síntesis de las gestiones de Enbridge para que nuestras operaciones sean lo más seguras y confiables posible.

Ubicación de las tuberías

Se podrá determinar la ubicación aproximada de una tubería de Enbridge al identificar los letreros señalizadores de tuberías. Jamás deben usarse los letreros señalizadores como referencia para la ubicación exacta de la tubería.

Los mapas de tuberías se encuentran en estos sitios de Internet:

Tuberías de Enbridge
(Instalaciones en Norteamérica)
enbridge.com/map

Sistema nacional de mapas de tuberías
(Tuberías de transporte de EE.UU.)
npms.phmsa.dot.gov



Para más información sobre las líneas de recolección que pueden estar presentes en su área, contáctenos en

USpublicawareness@enbridge.com o llame al **877.799.2650**. Cuando planee cavar, no confíe en la información de otras personas, en la memoria, en los mapas ni en los letreros señalizadores de tuberías. Debe llamar al 811, el número telefónico nacional "Llame antes de excavar", para ubicar correctamente todas las tuberías y otras líneas subterráneas de servicio antes de excavar o construir en un área nueva.



- Todos los letreros señalizadores de tuberías tienen el nombre del operador, el producto transportado y un número de teléfono para notificar emergencias en las tuberías.



Llamar al 811 todas las veces tiene sentido comercial

El servicio nacional gratuito 811 fue creado para que usted no corra peligros al cavar, excavar o realizar otras actividades de movimiento de tierra. Llamar al 811 es un proceso simple y es siempre la opción más segura cada vez que deba mover tierra. Dos o tres días hábiles antes de excavar (dependiendo en la ley estatal), simplemente llame al 811 con los detalles importantes de su proyecto, incluyendo:

- El tipo de trabajo que hará y una descripción del área
- La dirección exacta, la calle y la intersección más cercana de todos los sitios donde se realizará la excavación
- Las coordenadas de GPS y las instrucciones de manejo
- La fecha y hora en que comenzará la excavación
- Si usted ya ha marcado previamente o delineado en color blanco el área de excavación

Dentro de dos o tres días hábiles, los localizadores profesionales marcarán los servicios públicos subterráneos. Se marcarán las tuberías con banderillas o pintura amarilla para que usted pueda trabajar alrededor de ellas, evitando así que usted u otras personas sufran lesiones físicas o daños a la propiedad.

Si ve a alguien cavando o realizando otras tareas de movimiento de tierra, y no hay banderillas ni marcadores en la tierra, detenga la actividad y pida al excavador que llame al 811 antes de continuar.

¡Haga clic antes de cavar! Muchos estados ahora ofrecen opciones "811" en línea, como estos estados en áreas donde operamos:

Illinois	illinois1call.com
Indiana	indiana811.org/811now
Kansas	kansasonecall.com
Michigan	elocate.missdig.org
Minnesota	gopherstateonecall.org
Missouri	mo1call.com/itic/index_gen
Montana	montana811.org
Mississippi	ms1call.org/locate-requests
New York	digsafelynewyork.com
North Dakota	ndonecall.com
Ohio	oups.org
Oklahoma	callokie.com
Wisconsin	diggershotline.com/file-online

Es posible que un representante de Enbridge deba monitorear su excavación cuando trabaje sobre el derecho de vía de Enbridge o cerca de sus instalaciones. Por su seguridad y la de otras personas, confirme siempre con Enbridge antes de comenzar sus trabajos.

Excavar con precaución no significa solo llamar. Cave siempre con cuidado.

Llame al 811 antes de excavar

Espere a que se marquen las líneas subterráneas

Respete las marcas

Excave con cuidado

Otros recursos

npms.phmsa.dot.gov

api.org

aopl.org

pipeline101.org

call811.com

theglhc.org

Información importante para urbanizadores

Esperamos con agrado ser su vecino y ayudarlo a desarrollar sus propiedades cerca de nuestras tuberías de manera que conduzca a la seguridad y satisfacción de los arrendadores en el futuro. El primer paso de ese proceso es verificar la ubicación de las tuberías. Utilice esta lista de verificación durante el proceso de planificación:

- Verifique si hay tuberías y líneas de servicios públicos subterráneas buscando los letreros señalizadores de tuberías y consultando al departamento local de planificación y zonificación
- Llame al 811 antes de realizar actividades de movimiento de tierra y espere el período obligatorio hasta que se marquen correctamente las líneas de servicios públicos
- Si hay una tubería de Enbridge en la propiedad, consúltenos para contestar estas preguntas clave:
 - ¿Existe un acceso adecuado al derecho de vía para mantenimiento o en caso de emergencia?
 - ¿Cuáles son las rutas de evacuación en el caso improbable de emergencia?

¿Sabía usted?

El 811 es un servicio gratuito

- El 811 es un servicio nacional gratuito para ubicar servicios públicos subterráneos.
- Los operadores de tuberías y otros servicios públicos pagan este servicio para protegerle a usted.

No corra riesgos al adivinar la profundidad de las tuberías

- La profundidad de las tuberías puede cambiar debido a la erosión, a otras obras de excavación anteriores y a otros factores.
- Algunas tuberías pueden estar ubicadas en superficie.

El servicio 811 no es solo para obras de excavación

- Llame al 811 antes de realizar actividades que alteren la tierra, que incluyen, entre otros, construir una terraza de madera ("deck") o cercado, plantar árboles o arbustos e instalar un sistema de riego de jardín, aceras o peldaños de concreto.

–¿Cómo puede prevenirse el daño de la tubería por la excavación?

–¿Hay usos alternativos del derecho de vía de la tubería, como espacios verdes, parques, campos de golf, senderos para caminatas y ciclismo, senderos ecuestres y otros espacios recreativos?

También les aconsejamos leer las prácticas recomendadas por la Alianza de Tuberías y Planificación Informada (PIPA), que se encuentran en Internet en phmsa.dot.gov.

Información importante para los operadores marinos

Cuando realice actividades de movimiento de tierra en el agua o sobre ésta, tenga en cuenta las tuberías submarinas. El dragado o el anclaje cerca de las tuberías puede exponerlas o causar daño a la tubería o a su revestimiento. Las tuberías que atraviesan vías fluviales suelen identificarse observando las orillas del agua para ver si hay letreros señalizadores o de advertencia contra el anclaje y el dragado.

Golpear una tubería al cavar puede perjudicar más que su cuenta bancaria

- Si hay una fuga de producto de la tubería, se podría producir daño a su propiedad.
- También es posible que le impongan multas y deba pagar costos de reparación.
- Si el producto liberado entra en contacto con usted o se enciende, podría causar lesiones o incluso la muerte.



**Determina lo que está bajo tierra.
Llama antes de excavar.**

Es muy poco probable que ocurra una fuga en nuestro sistema de tuberías considerando lo detallados que son nuestros programas de mantenimiento, prueba, capacitación, monitoreo y seguridad. Sin embargo, es importante conocer los signos de advertencia y cómo responder en caso de emergencia si ocurriera uno de ellos.

Seguridad en los procesos, las personas y la tecnología

La seguridad es y siempre será nuestra prioridad número uno. Es por eso que invertimos intensamente y la razón por la que nuestro equipo dedica cientos de miles de horas por año para mantener nuestros sistemas funcionando bien y sin incidentes. Enbridge cuenta con un programa de medidas preventivas para promover las operaciones seguras y fiables de nuestras tuberías e instalaciones afines, que incluye:

- Materiales de tuberías de alta calidad, revestimientos anticorrosivos y protección catódica (una corriente directa de bajo nivel que inhibe la corrosión)
- Pruebas de presión de tuberías nuevas y existentes
- Programas de inspección y mantenimiento preventivo
- Monitoreo de tuberías e instalaciones afines
- Reconocimientos aéreos frecuentes y terrestres periódicos del derecho de vía
- Válvulas automáticas de cierre total y válvulas de control remoto
- Capacitación y simulacros de preparación en caso de emergencia para empleados y personal de emergencia de terceros

Los signos de advertencia

Esté atento a condiciones, sonidos y olores inusuales a lo largo del derecho de vía y reporte de inmediato todo aquello que le parezca fuera de lo común, llamando al 911 y luego al número de emergencia de Enbridge de su área, que atiende las 24 horas.



Es posible que vea:

- Líquido en la tierra
- Nieve o vegetación decolorada
- Brillo o película aceitosa sobre la superficie del agua



Es posible que oiga:

- Sonido rugiente, sibilante o de soplido



Es posible que huela:

- Un olor inusual a azufre o a huevo podrido

Una respuesta segura

Haga lo siguiente si causó daño a la tubería, observó o sospecha que hay una fuga o se encuentra en peligro inmediato.

- Si puede hacerlo sin correr riesgo, apague los equipos mecanizados. Aléjese lo más posible de la fuga en dirección contraria al viento (a barlovento), y evite contacto con líquidos y gases de escape
- Llame al **911**
- Llame al número de emergencia gratuito de Enbridge, para su área, que atiende las 24 horas:
 - **800.858.5253**
- Mississippi:
 - **888.650.8099**
- Siga las instrucciones que le den Enbridge y el personal de emergencia local

Lo que no debe hacer en caso de emergencia: ¿Qué sucederá después?



- No toque los líquidos o vapores que salgan de la tubería.



- No conduzca su vehículo hacia el área ni arranque el motor.



- No encienda un cerillo.



- No encienda ni apague aquello que pueda generar una chispa, como teléfonos celulares, teléfonos, interruptores de luz, alarmas de vehículos, mecanismo de acceso a vehículos sin llave y linternas, hasta que se encuentre en un lugar seguro.



- No opere las válvulas de la tubería.



- No se quede adentro de un edificio si el olor de es más fuerte adentro que afuera.

Las autoridades públicas de seguridad de la zona determinarán si los residentes deben evacuar o refugiarse en el lugar donde están. Es posible que se les pida a los residentes evacuar si ya no es seguro quedarse en el área o que se les pida refugiarse en el lugar donde están si existe algún peligro en el medio ambiente. Si no sabe dónde está la fuga de la tubería, refúgiense en el lugar donde está hasta que el personal de emergencia o Enbridge le dé más instrucciones.

Cómo refugiarse en el lugar donde está:

- Vaya inmediatamente adentro y cierre todas las ventanas y puertas exteriores.
- Refúgiense en la sala que tenga la menor cantidad de ventanas y ventilaciones.
- No use las líneas telefónicas para que el personal de respuesta a emergencias pueda comunicarse con usted.
- Sintonice una estación local de radio o televisión (operada a batería) para enterarse de las últimas noticias.
- Apague los electrodomésticos o equipos que circulan aire como los ventiladores extractores, hogares de leños a gas, estufas/ cocinas de gas y sistemas de calefacción, ventilación y acondicionador de aire (HVAC).
- Baje la temperatura al mínimo posible en el termostato de la caldera.
- Aunque vea gente afuera, no salga hasta que se le avise.

- Enbridge, los contratistas y el personal de emergencia local colaborarán para evaluar la situación y responder según sea necesario; la prioridad principal será la seguridad pública.

- El personal de Enbridge puede cerrar totalmente o aislar secciones de la tubería.

- Enbridge trabajará con las agencias correspondientes para remediar los impactos causados por la fuga.



Se ruega leer y compartir esta información de seguridad importante con otras personas.

El derecho de vía de la tubería — ¡Se ruega a los excavadores y explotadores forestales leer esto

La tubería sigue un trayecto angosto y despejado de tierra llamado "derecho de vía". Este derecho de vía proporciona a los empleados y contratistas de Enbridge acceso a la tubería para su inspección, mantenimiento, prueba y en caso de emergencia. Además, debe mantenerse libre de equipos y acopio de materiales. Enbridge avisará a los vecinos afectados cuando estemos planeando realizar el mantenimiento de una tubería cercana.

Los derechos de vía de las tuberías no están designados como caminos, y los vehículos y equipos pesados pueden dañar las tuberías subterráneas. Antes de cruzar el derecho de vía de nuestras tuberías con maquinarias pesadas, llame a Enbridge al teléfono que atiende las 24 horas para su área y colaboraremos con usted para designar un cruce seguro. Si se da cuenta que ha movido equipos pesados por una tubería de Enbridge sin llamar, avise de inmediato a Enbridge. Si no hay daño aparente, nos debe informar de todos modos para que podamos evaluar la condición de la tubería.

Cuando esté preparando los planes de seguridad de obra para su proyecto de excavación, no escoja el derecho de vía como punto de congregación identificado. Para su seguridad y para proteger la tubería, se prohíbe instalar estructuras permanentes o temporarias,

arbustos de raíz profunda y árboles dentro del terreno de derecho de vía de la tubería. Si desea más información sobre las normas del derecho de vía de Enbridge, llame sin cargo a nuestro Departamento de Servicios de Tierras (Land Services Department) al **866.331.3493**.

Instalaciones en superficie

Enbridge es dueña y opera varias instalaciones en superficie a lo largo de sus sistemas de oleoductos de crudo, incluidas instalaciones de almacenamiento de crudo, estaciones de bombeo y sitios de válvulas. Es importante que también esté conciente de esas instalaciones y lo que son las operaciones normales previstas.

Si nota alguna actividad sospechosa u olor anormal cerca del derecho de vía o de las instalaciones en superficie, llame de inmediato al 911 y luego llame al número de emergencia de Enbridge, de su área que atiende las 24 horas. Aunque no esté seguro de la gravedad, es importante que avise a Enbridge para que un representante pueda investigar. Encontrará el número de emergencia gratuito de Enbridge en este folleto, en enbridge.com/emergency, o en los letreros señalizadores o en los carteles de las instalaciones.

Instalación	Objetivo	Operaciones normales
Unidades Automáticas de Medición para Transferencia de Custodia (Unidades LACT)	En ciertas instalaciones, los camiones tanque entregan el crudo de los productores a las unidades LACT, donde se mide y se transfiere a las instalaciones de almacenamiento de crudo de Enbridge.	Durante las operaciones normales, puede notarse un olor leve cuando se transfiere el petróleo o se realizan actividades de mantenimiento. Cerca de las unidades LACT comúnmente hay más tráfico de camiones.
Instalaciones de almacenamiento de petróleo crudo	Estas instalaciones de Enbridge se emplean para almacenar y transportar sin riesgo el petróleo crudo a las refinerías y otros destinos del mercado a través del oleoducto.	Durante las operaciones normales, puede notarse un olor leve cuando se transfiere el petróleo o se realizan actividades de mantenimiento.
Estaciones de bombeo	Las estaciones de bombeo aumentan la presión del oleoducto para mantener la circulación. Los centros de control de Enbridge monitorean las estaciones 24 horas al día, 7 días por semana.	Durante las operaciones normales, no deberían detectarse olores considerables.
Sitios de válvulas	Hay sitios de válvulas a lo largo del derecho de vía del oleoducto y pueden emplearse para controlar la circulación de productos en la tubería.	Durante las operaciones normales, no deberían detectarse olores considerables.



U.S. Public Awareness
Administrative Team
1100 Louisiana St., Suite 3300
Houston, TX 77002-5217

**24-hour emergency numbers
for your area:**

◊ **800.858.5253**

If located in Mississippi, call

◊ **888.650.8099**



**Know what's below.
Call before you dig.**

Pipeline safety and emergency information

for Emergency Responders
and Public Officials.

Important safety information enclosed.

Pipelines in your community

Important safety information enclosed.

It is important that public safety personnel and public officials near Enbridge's pipelines are aware of our pipeline system in their area and how to respond safely and effectively to a pipeline emergency. Enbridge offers free, online training for public safety and local public officials, including the disciplines of firefighting, law enforcement, 911 dispatch, emergency medical services and emergency management, at **mypipelinetraining.com**.

Upon request, we can provide additional resources and information including pipeline size, contents transported or the location of pipelines in your area. If you are interested in additional resources, information to share, details on emergency response drills in your area or would like to talk to an Enbridge representative, please contact us.

TIP: We recommend saving the emergency phone number for your area in your list of contacts or cell phone for quick reference in an emergency.

In some cases local emergency response organizations, including 911 dispatch centers, receive initial notification. If you receive a call, dispatch the appropriate response, then immediately contact us through our 24-hour emergency number for your area.

24-hour emergency numbers for your area

☎ **800.858.5253**

If located in Mississippi, call:

☎ **888.650.8099**

How you can reach us (non-emergencies only):

Public Awareness Hotline
877.799.2650

Land Services Hotline
866.331.3493

Email
USpublicawareness@enbridge.com

Mail
**Public Awareness
Program Coordinator
1100 Louisiana, Suite 3300
Houston, TX 77002**

Website
enbridge.com/USpublicawareness

Facebook
facebook.com/enbridge

Pipeline safety: A shared responsibility

This brochure is provided specifically for public safety and local public officials, including the disciplines of firefighting, law enforcement, 911 dispatch, emergency medical services, emergency management, local government, and land planning, zoning and permitting. You have a unique role in pipeline safety, which includes:

- Coordinating a community emergency response plan
- Advocating for safe development near pipelines and use of 811 in your community
- Activating the response and contacting the pipeline operator if your entity receives the initial notification of a potential pipeline emergency
- Keeping the public safe in a pipeline emergency (e.g., disseminating information, providing search and rescue or medical aid, determining and implementing evacuation procedures)

After reading this brochure, you should know the following:

- How to respond in an emergency situation and protect the public
- How to contact Enbridge
- How to recognize a pipeline leak
- How to find out where pipelines are located in your jurisdiction
- How to excavate safely
- How to safely develop land near pipelines in your community

It is critical that you keep and share the information in this brochure. Visit enbridge.com/resources or contact us at USpublicawareness@enbridge.com for:

- Additional copies of this brochure
- PDF versions you can forward by email
- Posters featuring pipeline safety information and emergency numbers
- 811 magnets or uniform color code pocket cards
- A visit from an Enbridge representative

Similar pipeline safety information is also mailed to those who live and work near our pipeline systems, as well as schools, farmers and professional excavators in our areas of operations. If you have pipelines transporting natural gas liquids (NGLs) or diluent in your jurisdiction, you have also received a copy of the materials mailed to those who live or work in close proximity to those types of lines. Please contact us at USpublicawareness@enbridge.com if you would like additional copies of any of these materials.

Enbridge North American assets



Pipeline maps are available online through:

- ▶ Enbridge Pipelines (North American assets)
enbridge.com/map
- ▶ National Pipeline Mapping System (U.S. transmission pipelines)
npms.phmsa.dot.gov

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npms.phmsa.dot.gov

Learn more about the resources available to you as an emergency or public official.

Free pipeline emergencies training opportunity

Emergency responders and others responsible for public safety in our counties of operation can access our free "Emergency Responder Education Program" at mypipelinetraining.com.

The content is based on "Pipeline Emergencies," an industry-leading pipeline emergency response training program developed by the National Association of State Fire Marshals. The program covers the basics of natural gas and liquids pipeline operations; the hazards of the products transported by Enbridge; pipeline emergency response tactics and ways to apply the information to real-life situations.

The program can be completed in one session or in multiple sessions. A wallet card and certificate are provided upon completion. This program may qualify for the following:

- Continuing education credits
- OSHA HAZMAT compliance
- Emergency Medical Services Training
- Insurance Service Office Fire Suppression Rating Schedule Program

911 dispatch module

911 dispatchers can access role-specific training at mypipelinetraining.com. The program was developed in partnership with the National Emergency Number Association and provides information on how to identify a pipeline emergency, relay appropriate information to callers and dispatch a safe response.

If you have questions about this pipeline emergency response education program or would like additional information, please contact us at **877.799.2650** or ERinfo@enbridge.com.

Safe Community Grant Program

Enbridge offers annual grants to emergency response agencies in communities where we operate. Grants can be used to fund equipment or training that will help organizations effectively respond to pipeline-related emergencies. If your agency would respond in the unlikely event of an emergency on an Enbridge pipeline system, you can visit enbridge.com/safecommunity to apply. If representatives from your agency complete the "Emergency Responder Education Program," please note the participant names and estimated completion dates on your application.

Emergency Response Action Plans

Enbridge's Emergency Response Action Plans are available to emergency response organizations in our counties of operation. These action plans provide information on how Enbridge will work with emergency responders during the initial stages of a pipeline incident. To request the action plan for your area, visit emergencyresponderinfo.com to register. Your request for access will be reviewed within 10 business days.

Additional Resources

mypipelinetraining.com

emergencyresponderinfo.com

phmsa.dot.gov/hazmat/library/erg

npms.phmsa.dot.gov

api.org

aopl.org

pipeline101.org

call811.com

Life takes energy: to heat our homes, to feed our families, to help fuel our vehicles. Enbridge connects people to the energy they need to fuel their quality of life. Safety products, bandages and even medicines are made from products transported through more than two million miles of pipelines that crisscross the United States.

According to government studies, pipelines are the safest, most efficient and most reliable way to transport energy resources like crude oil, petroleum products and natural gas, and every year we invest in the latest technology and training to meet the high environmental and safety standards expected by those who live and work near our pipelines and facilities. Visit enbridge.com/safety to read our Operational Reliability Review, an overview of Enbridge's efforts to make our operations as safe and reliable as possible.

Enbridge owns and operates crude oil pipelines in your area. We transport more than 80 different commodities on our crude oil pipeline systems, from various grades of crude oil to other petroleum products. Additional information is included in this brochure if an Enbridge pipeline near you transports products other than, or in addition to, crude oil. Gathering lines transport crude oil and other petroleum products from production areas to a connection with a larger pipeline. From there, they are transported through higher volume transmission lines to refineries where they are turned into gasoline, diesel fuel and other products we rely on every day.



Enbridge is here to connect people to the energy they need, and to meet that responsibility, safety always comes first.

Safety in processes, people and technologies

Safety is, and always will be, our number one priority. That's why we invest heavily, and why our team devotes hundreds of thousands of hours every year, to keep our systems running smoothly and without incident. Enbridge's program of preventive measures to promote the safe, reliable operations of our pipelines and related facilities includes:

- High-quality pipeline material, anti-corrosion coatings and cathodic protection (a low-level direct current to inhibit corrosion)
- Pressure testing of new and existing pipelines
- Inspection and preventative maintenance programs
- Monitoring of pipelines and related facilities
- Frequent aerial and periodic ground surveys of the right-of-way
- Remote control valves
- Emergency response preparedness training and drills for employees and third-party emergency responders

Enbridge supplements its comprehensive maintenance procedures with Integrity Management Plans. These programs provide greater protection in "high consequence areas" such as densely populated areas, areas where people gather frequently, places with people with impaired mobility who would be difficult to evacuate in an emergency, navigable waterways and environmentally-sensitive areas.

For more information on our integrity management plans, please visit us online at enbridge.com or call 877.799.2650.



Emergency information

In an emergency, protecting the public is your top priority, and it's our top priority as well. We value your expertise as public safety officials, and we're committed to providing you with the information and training needed to respond in the unlikely event of an emergency involving pipelines or aboveground facilities.

The report

Although our emergency response teams are immediately dispatched upon notification, in many cases local 911 dispatch centers or other public safety officials will receive the initial notification. The following could be indicators of a potential pipeline emergency and may be reported by callers or emergency responders.



They might see:

- Liquid on the ground
- Discolored snow or vegetation
- Oily sheen on water surfaces



They might hear:

- A roaring, blowing or hissing sound



They might smell:

- An unusual sulfur or rotten egg odor

Please share the following information with your 911 dispatch center.



911 dispatchers— please read!

Initiating the response

After identifying a potential pipeline emergency and dispatching local responders, the following actions will facilitate a safe and effective response:

1. Reassure the caller that emergency response crews and Enbridge will be contacted and will arrive as soon as possible.
2. Advise the caller of the following at your discretion:
 - Move as far away from the leak as possible (upwind if possible)
 - Do not touch any liquid or vapor that may have come from the pipeline
 - Do not drive into the area or start your car
 - Do not light a match
 - Do not turn on or off anything that may create a spark—including cell phones, telephones, light switches, vehicle alarms, vehicle keyless entry and flashlights—until you are in a safe location
 - Do not operate pipeline valves
 - Do not remain in a building if the smell is stronger inside than outside
 - If an evacuation center has been designated, advise the caller of the location
3. Call Enbridge's toll-free, 24-hour emergency number for your area. Contacting the pipeline operator as soon as possible is important so that we can stop product flow and make notifications as needed.

Enbridge Control Center:

📞 **800.858.5253**

If located in Mississippi, call:

📞 **888.650.8099**

A safe response

1. If an emergency is suspected on an Enbridge pipeline, immediately phone the Enbridge 24-hour emergency toll-free number for your area, from a safe location. The pipeline operator's name and emergency contact information will be present on any pipeline marker. Our monitoring system may have already alerted us to the disruption, but always call to verify.
2. Once on-site, Enbridge representatives will work with you to establish safe procedures for securing the area or other emergency measures.
3. If an Enbridge representative has not arrived, there are some important steps emergency responders can take:
 - If it is safe to do so, turn off any mechanized equipment and ignition sources in the vicinity of the suspected leak
 - Secure the site and determine a plan to evacuate or shelter-in-place
 - Monitor for hazardous atmospheres
 - Control and redirect traffic
 - Provide immediate access to Enbridge representatives
 - Implement your local emergency plan

We will work with emergency responders in the event of a pipeline emergency to resolve the situation safely and effectively. We value the knowledge and skills of emergency responders. These guidelines are in place to keep emergency responders, employees and the public safe.

What not to do during an emergency response

- Do not operate pipeline valves or extinguish any pipeline fires. Doing so may prolong or worsen an incident—or even cause another leak in the pipeline. Enbridge control center personnel can shut some valves automatically, while trained Enbridge personnel are required to manually close other valves.

- Do not create a spark. Potential ignition sources include smoking materials, open flames, light switches, telephones, cell phones, pagers, flashlights, keyless entry remotes, motor vehicles and other electrical devices.
- Do not enter an Enbridge facility without permission from Enbridge unless there is an immediate risk to public safety. If a fire occurs at an Enbridge facility, unless lives are at risk, we ask that fire crews stay outside of the property until Enbridge representatives arrive.

Potential product hazards

Because crude oil pipelines generally operate under high pressure and can transport large volumes, accidents involving these pipelines can be hazardous. In the event of an incident on our pipeline, Enbridge representatives will provide emergency responders with the safety data sheets for the product in the pipeline.

The chart below provides general information about products shipped in Enbridge pipelines. Additionally, reference the Pipeline and Hazardous Material Safety Administration’s “Emergency Response Guidebook.” Request a free copy or download the mobile app at phmsa.dot.gov/hazmat/library/erg.

Product	Appearance	Odor	Special Behavior	Hazards
Crude Oil	Color ranges from yellow to black	Similar to gasoline or diesel fuel	Flows with the profile of the land Flow depends on temperature and viscosity; can be thick and slow-moving or light and able to move quickly	Flammable and explosive under certain conditions Suffocation can occur if vapors displace the oxygen in an enclosed area
Natural Gas Liquids (NGLs)	Steam-like cloud or frost-like appearance on the ground	Similar to gasoline	Heavier than air Stays close to the ground in low-lying areas	Flammable and explosive under certain conditions Suffocation can occur if vapors displace the oxygen in an enclosed area
Diluents*	Clear to black liquid	Extremely strong odor similar to crude oil	Very light and fluid, similar to gasoline	Flammable and explosive under certain conditions Suffocation can occur if vapors displace the oxygen in an enclosed area
Condensate*	Clear to dark brown	Similar to gasoline or diesel fuel	Very light and fluid, similar to gasoline	Flammable and explosive under certain conditions

* Many compounds of crude oil, diluents and condensate are volatile and toxic and may enter the human body through inhalation, ingestion and skin absorption to cause irritation, dizziness, headache or even loss of consciousness. Benzene levels in condensate vary greatly and prolonged and repeated exposure to certain levels may cause severe health effects.

Responding to a crude oil incident

Should a pipeline emergency occur, contact Enbridge immediately so we can stop the flow of oil and immediately start containment. Do not operate pipeline valves!

Of the hundreds of components in crude oil, benzene has the potential to be the most toxic and volatile. Benzene content in crude oils varies greatly. Firefighters should use standard protective equipment and approved supplied air breathing equipment in enclosed spaces.

Responding to an NGL or diluent (petroleum distillate) incident

In the event of a pipeline emergency involving natural gas liquids or diluent (petroleum distillate), evacuate all unnecessary personnel and use approved supplied air breathing equipment. Keep surrounding surfaces, including exposed equipment and containers, cool with a water fog or spray.

Responding to an incident involving hydrogen sulfide (H₂S)

Some crudes and condensates contain hydrogen sulfide (H₂S), which has a rotten egg smell and is toxic in high concentrations. The accepted industry practice is to wear approved supplied air breathing equipment when concentrations exceed 10 ppm.

For detailed information on product hazards and appropriate response to a pipeline emergency, register for our free online education program for emergency responders at mypipelinetraining.com.

The Incident Command System

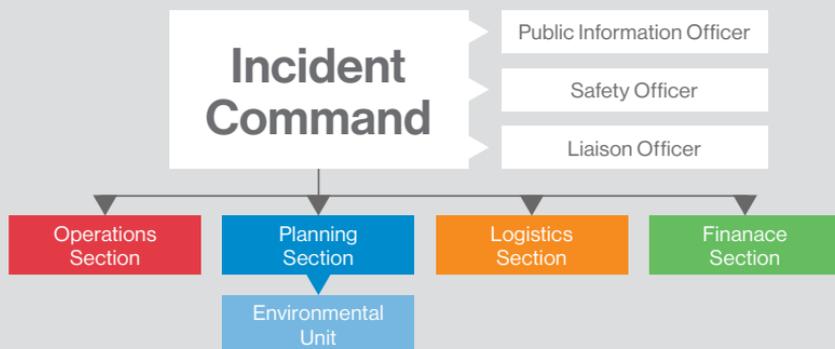
When responding to an incident, Enbridge will work with emergency responders and any other assisting agencies under the Incident Command System. ICS establishes a coordinated approach to managing facilities, equipment, personnel and procedures.

The role of the local responder

In addition to handling traffic control and evacuation, securing the site and firefighting, local responders often assist by:

- Making appropriate contacts if it appears other agencies, facilities or local authorities are impacted by the pipeline incident
- Handling search and rescue
- Providing medical aid
- Coordinating a community emergency response plan, determining whether evacuation is warranted and designating an evacuation center

Incident Command System structure





The pipeline right-of-way

The pipeline follows a narrow, clear stretch of land called a right-of-way. This right-of-way provides Enbridge employees and contractors access to the pipeline for inspections, maintenance, testing and in an emergency and should be kept clear of equipment and stockpiles. Enbridge will notify affected neighbors and local public officials when we are planning to conduct significant maintenance on a nearby pipeline.

Pipeline rights-of-way are not designed as roads, and heavy vehicles and equipment can damage the pipelines below. Before crossing our pipeline right-of-way with heavy machinery, call Enbridge at the 24-hour telephone number for your area and we will work with you to establish safe crossing. If you realize you have moved heavy equipment across an Enbridge pipeline without calling, report it to Enbridge immediately. Even if damage is not apparent, we must be notified so that we can assess the pipeline.

Pipelines that traverse waterways can often be identified by looking to the banks of the waterway for pipeline markers or signs warning against anchoring and dredging. Take care with boat recreation or underwater excavation activities near pipelines that traverse waterways. Anchoring or dredging near pipelines can expose them or damage the pipeline or its coating.

If, as a public safety or local public official, you have an opportunity to advise local businesses or facilities along the pipeline right-of-way on their emergency response plans, encourage them not to choose the right-of-way as the identified muster point. To protect the pipeline and public safety, permanent or temporary structures and deep-rooted shrubs and trees are prohibited within the pipeline right-of-way. More information about Enbridge right-of-way standards is available by calling our Land Services Department at **866.331.3493**.

Aboveground facilities

Enbridge owns and operates several aboveground facilities along its crude oil pipeline systems, including crude oil storage facilities, pump stations and valve sites. It is important that you are also aware of these facilities and what you can expect as part of normal operations.

If you notice any suspicious activity or abnormal odor near the right-of-way or aboveground facilities, call 911 immediately, then call Enbridge's 24-hour emergency number for your area. Even if you are uncertain of the severity, it's important that you notify Enbridge so a representative can investigate. The Enbridge toll-free emergency number can be found in this brochure, at enbridge.com/emergency or on any pipeline marker or facility sign.

Facility	Purpose	Normal Operations
Lease Automatic Custody Transfer Units (LACT Units)	At certain facilities, tanker trucks deliver producers' crude oil to LACT units, where it is metered and piped into crude oil storage facilities	During normal operations, a slight odor may be noticed during oil transfers or maintenance activities. Higher truck traffic is common near LACT units.
Crude Oil Storage Facilities	Enbridge storage facilities are used to safely store and transport crude oil to refineries and other market destinations via pipeline	During normal operations, a slight odor may be noticed during oil transfers or maintenance activities
Pump Stations	Pump stations increase pressure in the pipeline to maintain flow and are monitored 24/7 by Enbridge's control centers	During normal operations, no significant odors should be detected
Valve Sites	Valve sites are located along the pipeline right-of-way and may be used to control the flow of products in the pipeline	During normal operations, no significant odors should be detected

Pipeline location

You can determine the approximate location of an Enbridge pipeline in your community by identifying the pipeline markers. The placement of these markers indicates the relative position of the buried pipeline but should never be used as a reference for the exact location of a pipeline.

Pipeline operators are required to submit transmission pipeline maps to the National Pipeline Mapping System, which can be accessed online at npms.phmsa.dot.gov. Public officials and emergency responders may request special NPMS access that provides greater detail on pipeline locations than the information available to the general public.

For information on gathering lines that might be present in your area, contact us at USpublicawareness@enbridge.com or **877.799.2650**.

Do not rely on word-of-mouth, maps, memory or pipeline markers when planning a digging project. A call to 811, the national "Call Before You Dig" telephone number, must be used to properly locate all pipelines and other utilities before excavating or developing in a new area.



- All pipeline markers provide the name of the pipeline operator, product being transported and a telephone number for reporting pipeline emergencies.

Planning and Zoning Departments – Please Read!

Land development near pipelines

As rural areas become more urbanized, housing and commercial developments are being built near pipelines and related facilities like pump stations.

Public officials, in particular planning and zoning departments, can help by verifying that land developers have consulted with pipeline operators. More information about our pipelines in your community is available from our Land Services Department at **866.331.3493**.

The Pipelines and Informed Planning Alliance (PIPA) has developed recommended practices for land development near existing pipeline infrastructure. Information is available online at phmsa.dot.gov.

Before approving new developments, ask the developer whether a request has been made to have pipelines and underground utilities located, which will reveal the full extent of existing pipelines. If there are pipelines in the areas, ask:

- Have you consulted with the pipeline operator?
- Have you, in conjunction with the pipeline operator, considered the need for right-of-way access for maintenance or in an emergency?
- Have you considered evacuation routes in the unlikely event of an emergency?
- How will you prevent excavation damage to the pipeline?
- Are there alternative uses for the pipeline right-of-way such as green spaces, parks, golf courses, hiking and biking trails, horse trails and other recreational spaces?

Protect yourself, protect your property – Call 811 Before You Dig!

811 is a free, nationwide service designed to keep you safe when digging or excavating. Calling 811 is a simple process and is always the safest option anytime you are moving dirt. Two to three business days before excavating (depending on state laws), simply make a call to 811 with important details about your project, including:

- The type of work you will be doing and a description of the area
- The date and time when excavation will begin
- Your work site's street address, the road on which it is located and the nearest intersection
- Driving directions or GPS coordinates

Within two to three business days professional locators will mark underground utilities. Pipelines will be marked with yellow flags or paint so that you can conduct your work around them, saving you from potential injury or property damage.



Click before you dig! Many states now offer online “811” options, including states in our operational areas listed below:

Illinois	illinois1call.com
Indiana	indiana811.org/811now
Kansas	kansasonecall.com
Michigan	elocate.missdig.org
Minnesota	gopherstateonecall.org
Missouri	mo1call.com/itic/index_gen
Montana	montana811.org
Mississippi	ms1call.org/locate-requests
New York	digsafelynewyork.com
North Dakota	ndonecall.com
Ohio	oups.org
Oklahoma	callok.com
Wisconsin	diggershotline.com/file-online

Excavating safely goes beyond the call. Always dig with “CARE.”

- C** all 811 Before You Dig
- A** llow required time for markings
- R** espect the marks
- E** xcavate carefully

If you see someone digging or conducting other soil-disturbing activities and there are no flags or marks on the ground, stop the activity and ask them to call 811 before continuing.



4½ minutes
The approximate time
it takes to call 811

OR

4½ days
The average work delay
due to hitting a pipeline
while digging



The cost of calling 811
before digging



The percentage of time
work is completed without
damage when the one
call system is used prior
to digging



A nationwide number that
can save money and lives

Did you know?

811 is a free service

- 811 is a free, nationwide service for locating underground utilities
- It's paid for by pipeline and other utility operators to protect you

It's never safe to assume the depth of pipelines

- Pipeline depth can change due to erosion, previous digging projects and other factors
- Some pipelines and related facilities may be located above the ground

811 isn't just for digging projects

- Call 811 before any soil-disturbing activities, which include but **are not limited to** constructing roads, driveways, ditches, railways, overhead or underground utilities and other facilities; and installing fence posts, deep tilling, installing drain tile or building a berm

811 could help you in an emergency

- In an emergency situation, a call to 811 could help emergency responders, including 911 dispatchers, identify the pipeline operators in the area. We encourage you to contact your state one call center for more information.

Striking a pipeline while digging can harm more than your bank account

- If a product is released from the pipeline, it could damage your property
- You may also be eligible for fines and repair costs
- If the product released comes into contact with you or ignites, it could cause injuries or even death



Know what's below.
Call before you dig.



U.S. Public Awareness
Administrative Team
1100 Louisiana St., Suite 3300
Houston, TX 77002-5217

**24-hour emergency numbers
for your area:**

◆ **800.858.5253**

If located in Mississippi, call

◆ **888.650.8099**



**Know what's below.
Call before you dig.**

Pipeline safety for your school

for School Officials,
Faculty and Staff.



Important safety information enclosed.

Pipeline safety: A shared responsibility

This brochure is provided specifically for school officials near Enbridge's natural gas pipeline systems throughout the United States. It is important that you read and share this safety information with other school officials, faculty and staff, bus drivers, maintenance workers and anyone who may dig or supervise digging on school property.

If you would like more information about Enbridge pipelines in your area—including pipeline size, contents transported or pipeline location—please contact us.

To have pipelines and utilities located prior to excavation, call 811.

If you experience a pipeline emergency, first call 911, then call Enbridge's toll-free 24-hour emergency number for your area.

School emergency response plans

If you haven't already done so, we recommend that you include pipeline incidents in your school's emergency response plan. An Enbridge representative is available to assist or provide more information as needed. Contact information is listed above.

24-hour emergency numbers for your area

☎ **800.858.5253**

If located in Mississippi, call:

☎ **888.650.8099**

How you can reach us (non-emergencies only):

Public Awareness Hotline
877.799.2650

Land Services Hotline
866.331.3493

Email
USpublicawareness@enbridge.com

Mail
**Public Awareness
Program Coordinator
1100 Louisiana, Suite 3300
Houston, TX 77002**

Website
enbridge.com/USpublicawareness

Facebook
facebook.com/enbridge

Important safety information enclosed.





Brad Shamla
VP US Operations,
Liquids Pipelines

Hello,

My name is Brad Shamla. I am the vice president of operations for Enbridge's liquids pipelines business in the United States. You are receiving this brochure because your school is near one of our pipelines. Enbridge exists to connect people to the energy they need to have a good quality of life, and that makes the safe and reliable transportation of energy our number one priority. Because your school is located near one of our pipelines, you too have a role in pipeline safety.

Please read and share this important safety information with faculty and staff, including maintenance workers and bus drivers.

After reading this brochure, you should know the following:

- How to contact Enbridge
- How to recognize a pipeline leak
- How to respond in an emergency situation
- How to find out where pipelines are located in proximity to your school and bus routes
- How to excavate safely

It is critical that you keep and share the information in this brochure. Visit [enbridge.com/resources](https://www.enbridge.com/resources) or contact us at USpublicawareness@enbridge.com for:

- Additional copies of this brochure
- PDF versions you can forward by email
- Posters featuring pipeline safety information and emergency numbers
- A visit from an Enbridge representative

Enbridge North American assets



Pipeline maps are available online through:

➤ Enbridge Pipelines
(North American assets)
enbridge.com/map

➤ National Pipeline Mapping System
(U.S. transmission pipelines)
npms.phmsa.dot.gov

Pipeline safety: There's a pipeline near you

Life takes energy: to heat our homes, to feed our families, to fuel our vehicles. Enbridge connects people to the energy they need to help fuel their quality of life. Computers, rulers and even crayons are made from products transported through more than two million miles of pipelines that crisscross the United States.

According to government studies, pipelines are the safest, most efficient and most reliable way to transport energy resources like crude oil, petroleum products and natural gas, and every year we invest in the latest technology and training to meet the high environmental and safety standards expected by those who live and work near our pipelines and facilities. Visit enbridge.com/safety to read our Operational Reliability Review, an overview of Enbridge's efforts to make our operations as safe and reliable as possible.

Enbridge owns and operates both crude oil transmission and gathering pipelines, as well as other petroleum product and gas pipelines, in the United States. Your school's address indicates it is located near one or more of our crude oil pipelines or a related facility. We transport more than 80 different commodities on our crude oil pipeline systems, from various grades of crude oil to other petroleum products. Additional information is included in this brochure if an Enbridge pipeline near you transports products other than, or in addition to, crude oil.

Please visit schoolpipelinesafety.org to learn more about pipelines located near your school. Administrators of schools within approximately 1,200 feet of an Enbridge pipeline can access detailed information about the pipeline via a school-specific webpage provided through this site.



Enbridge is here to connect people to the energy they need, and to meet that responsibility, safety always comes first.

Pipeline safety: There's a pipeline near you (continued)

Pipeline location

You can determine the approximate location of an Enbridge pipeline by identifying the pipeline markers. Markers should never be used as a reference for the exact location of a pipeline.

Pipeline maps are available online through:

Enbridge Pipelines
(North American assets)
enbridge.com/map

National Pipeline Mapping System
(U.S. transmission pipelines)
npms.phmsa.dot.gov

For information on gathering lines that may be present in your area, call **877.799.2650** or contact us at USpublicawareness@enbridge.com. Do

 not rely on word-of-mouth, maps, memory or pipeline markers when planning a digging project. A call to 811, the national "Call Before You Dig" telephone number, is necessary to properly locate pipelines and other buried utilities before excavation.



-
- All pipeline markers provide the name of the pipeline operator, product being transported and a telephone number for reporting pipeline emergencies.

Given our thorough maintenance, testing, training, monitoring and safety programs, a pipeline leak is unlikely. In the event of an incident, Enbridge will work with local emergency responders to secure the area and get you the information you need to keep your students safe and communicate clearly and quickly with their parents or guardians.



> If you would like to meet with an Enbridge representative for information on our pipelines for your emergency response plan, please contact us at 877.799.2650 or USpublicawareness@enbridge.com.

The warning signs

Be observant of unusual sights, sounds and odors along the right-of-way and immediately report anything out of the ordinary by calling 911, then calling Enbridge's 24-hour emergency number for your area.



You might see:

- Liquid on the ground
- Discolored snow or vegetation
- Oily sheen on water surfaces



You might hear:

- A roaring, blowing or hissing sound



You might smell:

- An unusual sulfur or rotten egg odor

A safe response

Take the following actions if you have caused damage to the pipeline, have observed or suspect a leak or are in immediate danger.

- If you can do so safely, turn off any mechanized equipment. Move as far away from the leak as possible in an upwind direction, avoiding contact with escaping liquids and gases. (This may mean the evacuation of your students; do not use the right-of-way as your evacuation location or muster point.)
- Call **911**
- Call the toll-free, 24-hour Enbridge emergency number for your area:
 - 📞 **800.858.5253**
- If located in Mississippi, call:
 - 📞 **888.650.8099**
- Follow instructions provided to you by Enbridge and local emergency responders

What not to do in an emergency situation:

-  Do not touch any liquid or vapor that may have come from the pipeline
-  Do not drive into the area or start your car
-  Do not light a match
-  Do not turn on or off anything that may create a spark—including cell phones, telephones, light switches, vehicle alarms, vehicle keyless entry and flashlights—until you are in a safe location
-  Do not operate pipeline valves
-  Do not remain in a building if the smell is stronger inside than outside

Local public safety officials will determine whether residents should evacuate or shelter-in-place. Residents may be asked to evacuate if it is no longer safe to be in the area or to shelter-in-place if there is something unsafe in the environment. If you do not know the location of the pipeline leak, shelter-in-place until you are provided with additional instructions from emergency responders or Enbridge.



How to shelter-in-place:

- Immediately go indoors and close all windows and outside doors
- Take shelter in the room with the least amount of windows and vents
- Keep phone lines open so that you can be contacted by emergency response personnel
- Stay tuned to local radio and television (battery-operated) for possible information updates
- Turn off any appliances or equipment that circulate air, such as exhaust fans, gas fireplaces, gas stoves, and heating ventilation and air conditioning (HVAC) systems
- Turn down thermostats to the minimum setting
- Even if you see people outside, do not leave until told to do so

What happens next?

- Enbridge and local emergency responders will work as a team to control the situation; public safety will be the top priority
- Enbridge personnel may shut down or isolate sections of the pipeline
- Local emergency responders will oversee public safety measures, such as securing the scene, disseminating information, determining and implementing evacuation procedures, and providing medical aid and search and rescue as needed
- Enbridge will work with applicable agencies to remediate any impacts caused by the leak

The pipeline right-of-way

The pipeline follows a narrow, clear stretch of land called a right-of-way. This right-of-way provides Enbridge employees and contractors access to the pipeline for inspections, maintenance, testing and in an emergency. Enbridge will notify affected neighbors when we are planning to conduct maintenance on our pipeline.

Pipelines that traverse waterways can often be identified by looking to the banks of the waterway for pipeline markers or signs warning against anchoring and dredging. If your school is located near a waterway, take care with boat or underwater maintenance activity near pipelines that may traverse the channel. Anchoring or dredging near pipelines can expose them or damage the pipeline or its coating.

When you are developing emergency response plans for your school, do not choose the right-of-way as the identified muster point. For your safety and to protect the pipeline, permanent or temporary structures and deep-rooted shrubs and trees are prohibited within the pipeline right-of-way. More information about Enbridge right-of-way standards is available by calling our Land Services Department at **866.331.3493**.



Aboveground facilities

If you notice any suspicious activity or abnormal odor near the right-of-way or aboveground facilities, call 911 immediately, then call Enbridge's 24-hour emergency number for your area. Even if you are uncertain of the severity, it's important that you notify Enbridge so a representative can investigate. The Enbridge toll-free emergency number can be found in this brochure, at enbridge.com/emergency or on any pipeline marker or facility sign.

Facility	Purpose	Normal Operations
Lease Automatic Custody Transfer Units (LACT Units)	At certain facilities, tanker trucks deliver producers' crude oil to LACT units, where it is metered and piped into crude oil storage facilities	During normal operations, a slight odor may be noticed during oil transfers or maintenance activities. Higher truck traffic is common near LACT units.
Crude Oil Storage Facilities	Enbridge storage facilities are used to safely store and transport crude oil to refineries and other market destinations via pipeline	During normal operations, a slight odor may be noticed during oil transfers or maintenance activities
Pump Stations	Pump stations increase pressure in the pipeline to maintain flow and are monitored 24/7 by Enbridge's control centers	During normal operations, no significant odors should be detected
Valve Sites	Valve sites are located along the pipeline right-of-way and may be used to control the flow of products in the pipeline	During normal operations, no significant odors should be detected

Protect your students – Call 811 Before You Dig!

For your safety and to prevent devastating impacts to your school and property, always have underground utilities located by calling 811 (the national “Call Before You Dig” telephone number) or visiting your local one call center online where available, prior to every excavation. If you see someone digging or conducting other soil-disturbing activities and there are no flags or marks on the ground, stop the activity and ask the excavator to call 811 before continuing.

811 is a free, nationwide service designed to keep you safe when digging or excavating. Calling 811 is a simple process and is always the safest option anytime you are moving dirt. Two to three business days before excavating (depending on state laws), simply make a call to 811 with important details about your project, including:

- The type of work you will be doing and a description of the area
- The date and time when excavation will begin
- Your work site’s street address, the road on which it is located and the nearest intersection
- Driving directions or GPS coordinates

Within two to three business days professional locators will mark underground utilities. Pipelines will be marked with yellow flags or paint so that you can conduct your work around them, saving you and others from potential injury or property damage.

Click before you dig! Many states now offer online “811” options, including states in our operational areas listed below:

Illinois	illinois1call.com
Indiana	indiana811.org/811now
Kansas	kansasonecall.com
Michigan	elocate.missdig.org
Minnesota	gopherstateonecall.org
Missouri	mo1call.com/itic/index_gen
Montana	montana811.org
Mississippi	ms1call.org/locate-requests
New York	digsafelynewyork.com
North Dakota	ndonecall.com
Ohio	oups.org
Oklahoma	callokie.com
Wisconsin	diggershotline.com/file-online

**Excavating safely goes beyond the call.
Always dig with “CARE.”**

- C** all 811 Before You Dig
- A** llow required time for markings
- R** espect the marks
- E** xcavate carefully

Additional Resources

schoolpipelinesafety.org

npms.phmsa.dot.gov

api.org

aopl.org

call811.com



4½ minutes
The approximate time
it takes to call 811

OR

4½ days
The average work delay
due to hitting a pipeline
while digging



\$0

The cost of calling 811
before digging

99%

The percentage of time
work is completed without
damage when the one
call system is used prior
to digging



A nationwide number that
can save money and lives

Did you know?

811 is a free service

- 811 is a free, nationwide service for locating underground utilities
- It's paid for by pipeline and other utility operators to protect you

It's never safe to assume the depth of pipelines

- Pipeline depth can change due to erosion, previous digging projects and other factors
- Some pipelines and related facilities may be located above the ground

811 isn't just for digging projects

- Call 811 before any soil-disturbing activities, which include but **are not limited to** planting trees, installing fence posts or constructing sidewalks, steps, roads, parking lots, driveways, ditches, utilities or buildings

Striking a pipeline while digging can harm more than your bank account

- If a product is released from the pipeline, it could damage your property
- You may also be eligible for fines and repair costs
- If the product released comes into contact with you or ignites, it could cause injuries or even death



**Know what's below.
Call before you dig.**

Safety in processes, people and technologies

Safety is, and always will be, our number one priority. That's why we invest heavily, and why our team devotes hundreds of thousands of hours every year, to keep our systems running smoothly and without incident. Enbridge's program of preventive measures to promote the safe, reliable operations of our pipelines and related facilities includes:

- High-quality pipeline material, anti-corrosion coatings and cathodic protection (a low-level direct current to inhibit corrosion)
- Pressure testing of new and existing pipelines
- Inspection and preventative maintenance programs
- Monitoring of pipelines and related facilities
- Frequent aerial and periodic ground surveys of the right-of-way
- Automatic shut-off valves and remote control valves
- Emergency response preparedness training and drills for employees and third-party emergency responders

Enbridge supplements its comprehensive maintenance procedures with Integrity Management Plans. These programs provide greater protection in high consequence areas.

For more information on our integrity management plans, please visit us online at enbridge.com/integrity or call **877.799.2650**.





U.S. Public Awareness
Administrative Team
1100 Louisiana St., Suite 3300
Houston, TX 77002-5217

**24-hour emergency numbers
for your area:**

◊ **800.858.5253**

If located in Mississippi, call

◊ **888.650.8099**



811[®]

Know what's below.
Call before you dig.

Pipeline safety and emergency information

for Farmers and Ranchers.

Important safety information enclosed.

Important safety information enclosed.

Se adjunta información de seguridad importante en la página 7.

Pipeline safety: A shared responsibility

This brochure is provided specifically for farm or ranch operators, renters, tenants or anyone else who may conduct agricultural activities near Enbridge's crude oil pipeline systems throughout the United States. Your address indicates that you may work or own property near a crude oil pipeline system operated by Enbridge. It is important that you read and share this safety information with your renters, tenants, workers or anyone who may engage in soil-disturbing activities.

If you would like more information about Enbridge pipelines in your area—including pipeline size, contents transported or pipeline location—please contact us.

To have pipelines and utilities located prior to excavation, call 811.

If you experience a pipeline emergency, first call 911, then call Enbridge's toll-free 24-hour emergency number for your area.

24-hour emergency numbers for your area

☎ 800.858.5253

If located in Mississippi, call:

☎ 888.650.8099

How you can reach us (non-emergencies only):

Public Awareness Hotline
877.799.2650

Land Services Hotline
866.331.3493

Email
USpublicawareness@enbridge.com

Mail
**Public Awareness
Program Coordinator
1100 Louisiana, Suite 3300
Houston, TX 77002**

Website
enbridge.com/USpublicawareness

Facebook
facebook.com/enbridge



Brad Shamla
VP US Operations,
Liquids Pipelines

Hello,

My name is Brad Shamla. I am the vice president of operations for Enbridge's liquids pipelines business in the United States. You are receiving this brochure because you have been identified as an individual or company who may be involved in farming, ranching or other agricultural activities.

Safety is a core value at Enbridge, and I am hopeful that safety is an area of common ground. According to government studies, pipelines are the safest way to transport energy products, but proper precautions must be taken while working around them to avoid harmful and sometimes even deadly consequences.

Striking a pipeline can result in fines, repair costs and harm to you and others, which makes excavating without first calling 811 a risky business. Even if you believe you know where pipelines traverse your property, soil erosion and farm activities such as tilling and plowing can lessen the depth of a pipeline over time.

We want to see your farm or ranch thrive and, more importantly, we want you and your employees and family members to go home safe at the end of every day. I urge you to please use your state one call system by calling 811 when you are planning activities such as deep tilling, ditching, soil ripping and drain tile installation, even if you believe you may be exempt under state one call laws. As with choosing not to not text while driving, making a one call may not always be required by law—but it is always the safest option.

After reading this brochure, you should know the following:

- How to perform excavation-related farm and ranch activities safely
- How to find out where pipelines are located on your land
- How to recognize a pipeline leak
- How to respond or react should a pipeline emergency occur
- How to contact Enbridge

It is critical that you keep and share the information in this brochure. Visit [enbridge.com/resources](https://www.enbridge.com/resources) or contact us at USpublicawareness@enbridge.com for:

- Additional copies of this brochure
- PDF versions you can forward by email
- Posters featuring pipeline safety information and emergency numbers
- 811 magnets or uniform color code pocket cards

Enbridge North American assets



Pipeline maps are available online through:

Enbridge Pipelines
(North American assets)

enbridge.com/map

National Pipeline Mapping System
(U.S. transmission pipelines)

npms.phmsa.dot.gov

Pipeline safety: There's a pipeline near you

Life takes energy: to heat our homes, to feed our families, to fuel our vehicles. Enbridge connects people to the energy they need to help fuel their quality of life. Nylon rope, fishing boots and even tool boxes are made from products transported through more than two million miles of pipelines that crisscross the United States.

According to government studies, pipelines are the safest, most efficient and most reliable way to transport energy resources like crude oil, petroleum products and natural gas, and every year we invest in the latest technology and training to meet the high environmental and safety standards expected by those who live and work near our pipelines and facilities. Visit enbridge.com/safety to read our Operational Reliability Review, an overview of Enbridge's efforts to make our operations as safe and reliable as possible.

Enbridge owns and operates crude oil pipelines, as well as other petroleum product and gas pipelines, in the United States, and your address indicates that you may work or own property near one or more of our crude oil pipelines or a related facility. We transport more than 80 different commodities on our crude oil pipeline systems, from various grades of crude oil to other petroleum products. Additional information is included in this brochure if an Enbridge pipeline near you transports products other than, or in addition to, crude oil. Gathering lines transport crude oil and other petroleum products from production areas to a connection with a larger pipeline. From there, they are transported through higher volume transmission lines to refineries where they are turned into gasoline, diesel fuel and other products we rely on every day.

Enbridge supplements its comprehensive maintenance procedures with Integrity Management Plans. These programs provide greater protection in high consequence areas.

Pipeline location

You can determine the approximate location of an Enbridge pipeline by identifying the pipeline markers. Markers should never be used as a reference for the exact location of a pipeline.

Pipeline maps are available online through:

Enbridge Pipelines
(North American assets)
enbridge.com/map

National Pipeline Mapping System
(U.S. transmission pipelines)
npms.phmsa.dot.gov

For information on gathering lines that may be present in your area, call **877.799.2650** or contact us at USpublicawareness@enbridge.com. Do not rely on word-of-mouth, maps, memory or pipeline markers when planning a digging project. A call to 811, the national "Call Before You Dig" telephone number, must be used to properly locate all pipelines and other utilities before excavating or developing in a new area.



- ▶ All pipeline markers provide the name of the pipeline operator, product being transported and a telephone number for reporting pipeline emergencies.



Call before you dig! Many states now offer online “811” options, including states in our operational areas listed below:

Illinois	illinois1call.com
Indiana	indiana811.org/811now
Kansas	kansasonecall.com
Michigan	elocate.missdig.org
Minnesota	gopherstateonecall.org
Missouri	mo1call.com/itic/index_gen
Montana	montana811.org
Mississippi	ms1call.org/locate-requests
New York	digsafelynewyork.com
North Dakota	ndonecall.com
Ohio	oups.org
Oklahoma	callokie.com
Wisconsin	diggershotline.com/file-online

An Enbridge representative may be required to monitor your excavation when working on the Enbridge right-of-way or near Enbridge facilities. For your safety and the safety of others, always confirm with Enbridge prior to beginning your work.

Protect yourself, protect your property— Call 811 Before You Dig!

811 is a free, nationwide service designed to keep you safe when digging or excavating. Calling 811 is a simple process and is always the safest option anytime you are moving dirt. Two to three business days before excavating (depending on state laws), simply make a call to 811 with important details about your project, including:

- The type of work you will be doing and a description of the area
- The date and time when excavation will begin
- Your work site’s street address, the road on which it is located and the nearest intersection
- Driving directions or GPS coordinates

Within two to three business days professional locators will mark underground utilities. Pipelines will be marked with yellow flags or paint so that you can conduct your work around them, saving you and others from potential injury or property damage.

Excavating safely goes beyond the call. Always dig with “CARE.”

- C** all 811 Before You Dig
- A** llow required time for markings
- R** espect the marks
- E** xcavate carefully

Additional Resources

npms.phmsa.dot.gov
api.org
aopl.org
pipeline101.org
call811.com



4½ minutes
The approximate time it takes to call 811

OR

4½ days
The average work delay due to hitting a pipeline while digging



The cost of calling 811 before digging



The percentage of time work is completed without damage when the one call system is used prior to digging



A nationwide number that can save money and lives

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If you see someone digging or conducting other soil-disturbing activities and there are no flags or marks on the ground, stop the activity and ask them to call 811 before continuing.

Given our thorough maintenance, testing, training, monitoring and safety programs, a pipeline leak is unlikely; however, if one were to occur, it's important that you know the warning signs and how to respond in the event of an emergency.

Safety in processes, people and technologies

Safety is, and always will be, our number one priority. That's why we invest heavily, and why our team devotes hundreds of thousands of hours every year, to keep our systems running smoothly and without incident. Enbridge's program of preventive measures to promote the safe, reliable operations of our pipelines and related facilities includes:

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The warning signs

Be observant of unusual sights, sounds and odors along the right-of-way and immediately report anything out of the ordinary by calling Enbridge's 24-hour emergency number for your area.



You might see:

- Liquid on the ground
- Discolored snow or vegetation
- Oily sheen on water surfaces



You might hear:

- A roaring, blowing or hissing sound



You might smell:

- An unusual sulfur or rotten egg odor

A safe response

Take the following actions if you have caused damage to the pipeline, have observed or suspect a leak or are in immediate danger.

- If you can do so safely, turn off any mechanized equipment. Move as far away from the leak as possible in an upwind direction, avoiding contact with escaping liquids and gases
- Call **911**
- Call the toll-free, 24-hour Enbridge emergency number for your area:
▶ **800.858.5253**
If located in Mississippi, call:
▶ **888.650.8099**
- Follow instructions provided to you by Enbridge and local emergency responders

What not to do in an emergency situation:

- Do not touch any liquid or vapor that may have come from the pipeline



- Do not drive into the area or start your car



- Do not light a match



- Do not turn on or off anything that may create a spark—including cell phones, telephones, light switches, vehicle alarms, vehicle keyless entry and flashlights—until you are in a safe location



- Do not operate pipeline valves



- Do not remain in a building if the smell is stronger inside than outside

Local public safety officials will determine whether residents should evacuate or shelter-in-place. Residents may be asked to evacuate if it is no longer safe to be in the area or to shelter-in-place if there is something unsafe in the environment. If you do not know the location of the pipeline leak, shelter-in-place until you are provided with additional instructions from emergency responders or Enbridge.

How to shelter-in-place:

- Immediately go indoors and close all windows and outside doors
- Take shelter in the room with the least amount of windows and vents
- Keep phone lines open so that you can be contacted by emergency response personnel
- Stay tuned to local radio and television (battery-operated) for possible information updates
- Turn off any appliances or equipment that circulate air, such as exhaust fans, gas fireplaces, gas stoves, and heating ventilation and air conditioning (HVAC) systems
- Turn down furnace thermostats to the minimum setting
- Even if you see people outside, do not leave until told to do so

What happens next?

- Enbridge, contractors and local emergency responders will work together to assess the situation and respond as needed; public safety will be the top priority
- Enbridge personnel may shut down or isolate sections of the pipeline
- Enbridge will work with applicable agencies to remediate any impacts caused by the leak



Please share this important safety information with others.

The pipeline right-of-way

The pipeline follows a narrow, clear stretch of land called a right-of-way. This right-of-way provides Enbridge employees and contractors access to the pipeline for inspections, maintenance, testing and in an emergency, and should be kept clear of equipment and stockpiles. Enbridge will notify affected neighbors when we are planning to conduct maintenance on a nearby pipeline.

Pipeline rights-of-way are not designed as roads, and heavy vehicles and equipment can damage the pipelines below. Before crossing our pipeline right-of-way with heavy machinery, call Enbridge at the 24-hour telephone number for your area and we will work with you to establish safe crossing. If you realize you have moved heavy equipment across an Enbridge pipeline without calling, report it to Enbridge immediately. Even if damage is not apparent, we must be notified so that we can assess the pipeline.

Pipelines that traverse waterways can often be identified by looking to the banks of the waterway for pipeline markers or signs warning against anchoring and dredging. Take care with boat recreation or soil-disturbing activities in waterways traversed by pipelines. Anchoring or dredging near pipelines can expose them or damage the pipeline or its coating.

Some farming activities, such as animal grazing and the planting of certain crops, may be permitted in some areas along the right-of-way. More information about Enbridge right-of-way standards is available by calling our Land Services Department at **866.331.3493**.

Aboveground facilities

Enbridge owns and operates several aboveground facilities along its crude oil pipeline systems, including crude oil storage facilities, pump stations and valve sites. It is important that you are also aware of these facilities and what you can expect as part of normal operations.

If you notice any suspicious activity or abnormal odor near the right-of-way or aboveground facilities, call 911 immediately, then call Enbridge's 24-hour emergency number for your area. Even if you are uncertain of the severity, it's important that you notify Enbridge so a representative can investigate. The Enbridge toll-free emergency number can be found in this brochure, at enbridge.com/emergency or on any pipeline marker or facility sign.

Facility	Purpose	Normal Operations
Lease Automatic Custody Transfer Units (LACT Units)	At certain facilities, tanker trucks deliver producers' crude oil to LACT units, where it is metered and piped into crude oil storage facilities	During normal operations, a slight odor may be noticed during oil transfers or maintenance activities. Higher truck traffic is common near LACT units.
Crude Oil Storage Facilities	Enbridge storage facilities are used to safely store and transport crude oil to refineries and other market destinations via pipeline	During normal operations, a slight odor may be noticed during oil transfers or maintenance activities
Pump Stations	Pump stations increase pressure in the pipeline to maintain flow and are monitored 24/7 by Enbridge's control centers	During normal operations, no significant odors should be detected
Valve Sites	Valve sites are located along the pipeline right-of-way and may be used to control the flow of products in the pipeline	During normal operations, no significant odors should be detected

La vida necesita energía: para calentar nuestros hogares, alimentar a nuestra familia y abastecer nuestros vehículos. Enbridge conecta a la gente con la energía que necesita para tener una buena calidad de vida. Las sogas de nylon, las botas de pesca e incluso las cajas de herramientas están elaboradas con productos transportados por más de dos millones de millas de tuberías que atraviesan los Estados Unidos.

Conforme a los estudios gubernamentales, las tuberías son el medio más seguro, eficiente y fiable para transportar recursos energéticos como el petróleo crudo, los productos de petróleo y el gas natural. Todos los años invertimos en la tecnología más moderna y en la capacitación para cumplir las normas más rigurosas en materia ambiental y de seguridad, tal como lo exigen aquellos que viven y trabajan cerca de nuestras tuberías e instalaciones. Visite enbridge.com/safety para leer la Reseña de Fiabilidad Operacional, que es una síntesis de las gestiones de Enbridge para que nuestras operaciones sean lo más seguras y confiables posible.

Enbridge es dueña y opera oleoductos de transporte de crudo así como otras tuberías de productos petroleros y gas, en los Estados Unidos. Su dirección indica que usted posiblemente trabaje o sea dueño de una propiedad cerca de uno o más de nuestros oleoductos de crudo o instalaciones afines. Transportamos más de 80 productos básicos distintos en nuestros sistemas de oleoductos de crudo, desde distintos grados de crudo hasta otros productos petroleros. Si una tubería de Enbridge cerca de usted transporta otros productos en lugar del crudo o además de éste, encontrará más información en este folleto. Las tuberías de recolección transportan petróleo crudo y otros productos petroleros desde las áreas de producción hasta una conexión con un oleoducto más grande. Desde allí, se los transporta por tuberías de transporte de mayor volumen hasta las refinerías, donde se convierten en gasolina, combustible diesel y otros productos de los que dependemos todos los días.

Enbridge suplementa sus detallados procedimientos de mantenimiento con Planes de Gestión de la Integridad. Esos programas ofrecen mayor protección en áreas de altas consecuencias.

Ubicación de las tuberías

Se podrá determinar la ubicación aproximada de una tubería de Enbridge al identificar los letreros señalizadores de tuberías. Jamás deben usarse los letreros señalizadores como referencia para la ubicación exacta de la tubería.

Los mapas de tuberías se encuentran en estos sitios de Internet:

Tuberías de Enbridge
(Instalaciones en Norteamérica)
enbridge.com/map

Sistema nacional de mapas de tuberías
(Tuberías de transporte de EE.UU.)
npms.phmsa.dot.gov

Para más información sobre las tuberías de recolección que puede haber en su zona, comuníquese con nosotros a USpublicawareness@enbridge.com o



llámenos al **877.799.2650**. Cuando planee un proyecto de cavado o arado profundo, no confíe en la información de otras personas, en la memoria, en los mapas ni en los letreros señalizadores de tuberías. Es imprescindible llamar al 811, el número telefónico nacional “Llame antes de excavar”, para ubicar correctamente las tuberías y otras líneas subterráneas de servicio antes de excavar.



➤ Todos los letreros señalizadores de tuberías tienen el nombre del operador, el producto transportado y un número de teléfono para notificar emergencias en las tuberías.



¡Haga clic antes de cavar! Muchos estados ahora ofrecen opciones “811” en línea, como estos estados en áreas donde operamos:

Illinois	illinois1call.com
Indiana	indiana811.org/811now
Kansas	kansasonecall.com
Michigan	elocate.missdig.org
Minnesota	gopherstateonecall.org
Missouri	mo1call.com/itic/index_gen
Montana	montana811.org
Mississippi	ms1call.org/locate-requests
New York	digsafelynewyork.com
North Dakota	ndonecall.com
Ohio	oups.org
Oklahoma	callokie.com
Wisconsin	diggershotline.com/file-online

Es posible que un representante de Enbridge deba monitorear su excavación cuando trabaje sobre el derecho de vía de Enbridge o cerca de sus instalaciones. Por su seguridad y la de otras personas, confirme siempre con Enbridge antes de comenzar sus trabajos.

Excavar con precaución no significa solo llamar. Cave siempre con cuidado.

Llame al 811 antes de excavar

Espere a que se marquen las líneas subterráneas

Respete las marcas

Excave con cuidado

Otros recursos

npms.phmsa.dot.gov

api.org

aopl.org

pipeline101.org

call811.com

Protéjase, proteja su propiedad – ¡Llame al 811 antes de excavar!

El servicio nacional gratuito 811 fue creado para que usted no corra peligros al cavar o excavar. Llamar al 811 es un proceso simple y es siempre la opción más segura cada vez que deba mover tierra. Dos o tres días hábiles antes de excavar (dependiendo en la ley estatal), simplemente llame al 811 con los detalles importantes de su proyecto, incluyendo:

- El tipo de trabajo que hará y una descripción del área
- La fecha y hora en que comenzará la excavación
- La dirección del lugar de la excavación, la calle en la que está ubicada y la intersección más cercana
- Instrucciones de manejo o coordenadas de GPS

Dentro de dos o tres días hábiles, los localizadores profesionales marcarán los servicios públicos subterráneos. Se marcarán las tuberías con banderillas o pintura amarilla para que usted pueda trabajar alrededor de ellas, evitando así que usted u otras personas sufran lesiones físicas o daños a la propiedad.



4½ minutos
El tiempo aproximado
que tarda llamar al 811



4½ días
El retraso de trabajo,
en promedio, por golpear
una tubería al cavar



El costo de llamar
al 811 antes de cavar



Porcentaje del tiempo
en el que se completa el
trabajo sin daños cuando se
llama al sistema "One Call"
antes de cavar



Número nacional que puede
ahorrar dinero y salvar vidas

¿Sabía usted?

El 811 es un servicio gratuito

- El 811 es un servicio nacional gratuito para ubicar servicios públicos subterráneos.
- Los operadores de tuberías y otros servicios públicos pagan este servicio para protegerle a usted.

No corra riesgos al adivinar la profundidad de las tuberías

- La profundidad de las tuberías puede cambiar debido a la erosión, a otras obras de excavación anteriores y a otros factores.
- Algunas tuberías pueden estar ubicadas en superficie.

El servicio 811 no es solo para obras de excavación

- Llame al 811 antes de realizar actividades que alteren la tierra, que incluyen, entre otros, construir una terraza de madera ("deck") o cercado, plantar árboles o arbustos e instalar un sistema de riego de jardín, aceras o peldaños de concreto.

Golpear una tubería al cavar puede perjudicar más que su cuenta bancaria

- Si hay una fuga de producto de la tubería, se podría producir daño a su propiedad.
- También es posible que le impongan multas y deba pagar costos de reparación.
- Si el producto liberado entra en contacto con usted o se enciende, podría causar lesiones o incluso la muerte.

Si ve a alguien cavando o realizando otras tareas de movimiento de tierra, y no hay banderillas ni marcadores en la tierra, detenga la actividad y pida al excavador que llame al 811 antes de continuar.

Es muy poco probable que ocurra una fuga en nuestro sistema de tuberías considerando lo detallados que son nuestros programas de mantenimiento, prueba, capacitación, monitoreo y seguridad; sin embargo, en caso de suceder, es importante que usted conozca los signos de advertencia y cómo responder en caso de emergencia.

Seguridad en los procesos, las personas y la tecnología

La seguridad es y siempre será nuestra prioridad número uno. Es por eso que invertimos intensamente y la razón por la que nuestro equipo dedica cientos de miles de horas por año para mantener nuestros sistemas funcionando bien y sin incidentes. Enbridge cuenta con un programa de medidas preventivas para promover las operaciones seguras y fiables de nuestras tuberías e instalaciones afines, que incluye:

- Materiales de tuberías de alta calidad, revestimientos anticorrosivos y protección catódica (una corriente directa de bajo nivel que inhibe la corrosión)
- Pruebas de presión de tuberías nuevas y existentes
- Programas de inspección y mantenimiento preventivo
- Monitoreo de tuberías e instalaciones afines
- Reconocimientos aéreos frecuentes y terrestres periódicos del derecho de vía
- Válvulas automáticas de cierre total y válvulas de control remoto
- Capacitación y simulacros de preparación en caso de emergencia para empleados y personal de emergencia de terceros

Los signos de advertencia

Esté atento a condiciones, sonidos y olores inusuales a lo largo del derecho de vía y reporte de inmediato todo aquello que le parezca fuera de lo común, llamando al 911 y luego al número de emergencia de Enbridge de su área, que atiende las 24 horas.



Es posible que vea:

- Líquido en la tierra
- Nieve o vegetación decolorada
- Brillo o película aceitosa sobre la superficie del agua



Es posible que oiga:

- Sonido rugiente, sibilante o de soplido



Es posible que huela:

- Un olor inusual a azufre o a huevo podrido

Una respuesta segura

Haga lo siguiente si causó daño a la tubería, observó o sospecha que hay una fuga o se encuentra en peligro inmediato.

- Si puede hacerlo sin correr riesgo, apague los equipos mecanizados. Aléjese lo más posible de la fuga en dirección contraria al viento (a barlovento), y evite contacto con líquidos y gases de escape
- Llame al **911**
- Llame al número de emergencia gratuito de Enbridge, para su área, que atiende las 24 horas:
 - ➔ **800.858.5253**
- Mississippi:
 - ➔ **888.650.8099**
- Siga las instrucciones que le den Enbridge y el personal de emergencia local

Lo que no debe hacer en caso de emergencia: ¿Qué sucederá después?



- No toque los líquidos o vapores que salgan de la tubería.



- No conduzca su vehículo hacia el área ni arranque el motor.



- No encienda un cerillo.



- No encienda ni apague aquello que pueda generar una chispa, como teléfonos celulares, teléfonos, interruptores de luz, alarmas de vehículos, mecanismo de acceso a vehículos sin llave y linternas, hasta que se encuentre en un lugar seguro.



- No opere las válvulas de la tubería.



- No se quede adentro de un edificio si el olor es más fuerte adentro que afuera.

Las autoridades públicas de seguridad de la zona determinarán si los residentes deben evacuar o refugiarse en el lugar donde están. Es posible que se les pida a los residentes evacuar si ya no es seguro quedarse en el área o que se les pida refugiarse en el lugar donde están si existe algún peligro en el medio ambiente. Si no sabe dónde está la fuga de la tubería, refúgiense en el lugar donde está hasta que el personal de emergencia o Enbridge le dé más instrucciones.

Cómo refugiarse en el lugar donde está:

- Vaya inmediatamente adentro y cierre todas las ventanas y puertas exteriores.
- Refúgiense en la sala que tenga la menor cantidad de ventanas y ventilaciones.
- No use las líneas telefónicas para que el personal de respuesta a emergencias pueda comunicarse con usted.
- Sintonice una estación local de radio o televisión (operada a batería) para enterarse de las últimas noticias.
- Apague los electrodomésticos o equipos que circulan aire como los ventiladores extractores, hogares de leños a gas, estufas/ cocinas de gas y sistemas de calefacción, ventilación y acondicionador de aire (HVAC).
- Baje la temperatura al mínimo posible en el termostato de la caldera.
- Aunque vea gente afuera, no salga hasta que se le avise.

- Enbridge, los contratistas y el personal de emergencia local colaborarán para evaluar la situación y responder según sea necesario; la prioridad principal será la seguridad pública.

- El personal de Enbridge puede cerrar totalmente o aislar secciones de la tubería.

- Enbridge trabajará con las agencias correspondientes para remediar los impactos causados por la fuga.



Se ruega leer y compartir esta información de seguridad importante con otras personas.

El derecho de vía de la tubería — ¡Se ruega a los excavadores y explotadores forestales leer esto

La tubería sigue un trayecto angosto y despejado de tierra llamado “derecho de vía”. Este derecho de vía proporciona a los empleados y contratistas de Enbridge acceso a la tubería para su inspección, mantenimiento, prueba y en caso de emergencia. Además, debe mantenerse libre de equipos y acopio de materiales. Enbridge avisará a los vecinos afectados cuando estemos planeando realizar el mantenimiento de una tubería cercana.

Los derechos de vía de las tuberías no están designados como caminos, y los vehículos y equipos pesados pueden dañar las tuberías subterráneas. Antes de cruzar el derecho de vía de nuestras tuberías con maquinarias pesadas, llame a Enbridge al teléfono que atiende las 24 horas para su área y colaboraremos con usted para designar un cruce seguro. Si se da cuenta que ha movido equipos pesados por una tubería de Enbridge sin llamar, avise de inmediato a Enbridge. Si no hay daño aparente, nos debe informar de todos modos para que podamos evaluar la condición de la tubería.

Las tuberías que atraviesan vías fluviales suelen identificarse observando las orillas del agua para ver si hay letreros señalizadores o de advertencia contra el anclaje y el dragado. Tenga cuidado con el uso de embarcaciones recreativas o actividades de movimiento de tierra en vías

fluviales atravesadas por tuberías. El anclaje o el dragado cerca de las tuberías puede exponerlas o causar daño a la tubería o a su revestimiento.

Es posible que se permitan algunas actividades agrícolas, como el pastoreo de animales y la plantación de ciertos cultivos, en algunas áreas a lo largo del derecho de vía. Si desea más información sobre las normas del derecho de vía de Enbridge, llame a nuestro Departamento de Servicios de Tierras (Land Services Department) al **866.331.3493**.

Instalaciones en superficie

Enbridge es dueña y opera varias instalaciones en superficie a lo largo de sus sistemas de oleoductos de crudo, incluidas instalaciones de almacenamiento de crudo, estaciones de bombeo y sitios de válvulas. Es importante que también esté conciente de esas instalaciones y lo que son las operaciones normales previstas.

Si nota alguna actividad sospechosa u olor anormal cerca del derecho de vía o de las instalaciones en superficie, llame de inmediato al 911 y luego llame al número de emergencia de Enbridge, de su área que atiende las 24 horas. Aunque no esté seguro de la gravedad, es importante que avise a Enbridge para que un representante pueda investigar. Encontrará el número de emergencia gratuito de Enbridge en este folleto, en enbridge.com/emergency, o en los letreros señalizadores o en los carteles de las instalaciones.

Instalación	Objetivo	Operaciones normales
Unidades Automáticas de Medición para Transferencia de Custodia (Unidades LACT)	En ciertas instalaciones, los camiones tanque entregan el crudo de los productores a las unidades LACT, donde se mide y se transfiere a las instalaciones de almacenamiento de crudo de Enbridge.	Durante las operaciones normales, puede notarse un olor leve cuando se transfiere el petróleo o se realizan actividades de mantenimiento. Cerca de las unidades LACT comúnmente hay más tráfico de camiones.
Instalaciones de almacenamiento de petróleo crudo	Estas instalaciones de Enbridge se emplean para almacenar y transportar sin riesgo el petróleo crudo a las refinerías y otros destinos del mercado a través del oleoducto.	Durante las operaciones normales, puede notarse un olor leve cuando se transfiere el petróleo o se realizan actividades de mantenimiento.
Estaciones de bombeo	Las estaciones de bombeo aumentan la presión del oleoducto para mantener la circulación. Los centros de control de Enbridge monitorean las estaciones 24 horas al día, 7 días por semana.	Durante las operaciones normales, no deberían detectarse olores considerables.
Sitios de válvulas	Hay sitios de válvulas a lo largo del derecho de vía del oleoducto y pueden emplearse para controlar la circulación de productos en la tubería.	Durante las operaciones normales, no deberían detectarse olores considerables.



U.S. Public Awareness
Administrative Team
1100 Louisiana St., Suite 3300
Houston, TX 77002-5217

**24-hour emergency numbers
for your area:**

◆ **800.858.5253**

If located in Mississippi, call

◆ **888.650.8099**



811

Know what's below.
Call before you dig.

Appendix D
Unanticipated Discovery Plan

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Enbridge (U.S.) Inc.

UNANTICIPATED DISCOVERIES PLAN

October 2013



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1.0 INTRODUCTION

This Unanticipated Discoveries Plan (“UDP”) sets forth the guidelines to be used in the event archaeological resources or human skeletal remains are discovered during construction activities. These measures were developed by Enbridge (U.S.) Inc. (“Enbridge”) in accordance with applicable state and federal guidelines. Early and frequent communications are essential in meeting both the spirit and law of those guidelines; therefore, Appendix A shows the most current list of relevant contacts in the event of an unanticipated discovery during construction.

2.0 UNANTICIPATED DISCOVERY CONDITIONS

Pipeline construction excavations have potential to uncover previously unknown archaeological sites and human skeletal remains, as well as many other cultural and natural elements such as modern refuse and faunal remains. While extensive environmental surveys can effectively eliminate most discoveries during construction, Enbridge is aware that project planning should anticipate even the remote possibility of a discovery.

Enbridge will have the primary responsibility of distinguishing discoveries of significant archaeological sites or human skeletal remains from those that are neither. The former would require ceasing construction activities at the find location followed by a coordinated consultation effort among Enbridge, permitting agencies, landowners, and other interested parties. Identification of the latter (neither significant archaeological sites nor human skeletal remains) would not mean initiation of the consultation process; however documentation of the event must be made.

When possible archaeological materials or suspected human skeletal remains are identified during ground disturbing activities within the construction corridor, the construction contractor (“Contractor”) will immediately notify Enbridge’s lead onsite Environmental Inspector (“EI”) of the discovery.

1. Immediately following notification of the discovery, the lead EI shall:
 - (a) Establish and delineate a 25 foot buffer around the edge of the discovery (using flagging and/or fencing), advise the on-site construction manager to halt all ground-disturbing activities within the buffered area until otherwise notified by Enbridge Environment, and implement measures to protect the discovery from looting and vandalism, including a 24-hour watch, if necessary; and
 - (b) Contact a qualified Professional Archaeologist (possible archaeological materials) and/or Physical Anthropologist (suspected human skeletal remains) to conduct an assessment of the discovery. The Professional Archaeologist should meet the qualification standards outlined in 36 Code of Federal Regulations (“CFR”) Part 61 in order to conduct the assessment. The Physical Anthropologist must be acknowledged as competent to positively identify human skeletal remains.

2. When contacted by the lead EI, the Professional Archaeologist shall gather additional information from the discovery area and assess the potential significance and condition and integrity of the discovery according to the guidelines established by the National Park Service (“NPS”) in Bulletin 15 and its amendments:
 - (a) The Professional Archaeologist will determine whether or not the discovery is an archaeological site or cultural resource over 45 years of age. If the discovery is an archaeological site or cultural resource greater than 45 years of age, the Professional Archaeologist will record as much information as possible to secure a Smithsonian Trinomial Number from the appropriate state agency. The lead EI would then notify Enbridge Environment to initiate the process outlined in *3.0 Discovery of Historic Properties* below.
 - (b) If the discovery is not an archaeological site or cultural resource greater than forty-five years of age, the Professional Archaeologist will document the discovery for the record and Enbridge’s lead EI will advise the on-site construction manager to restart ground-disturbing activities.
3. When contacted by the lead EI, the Physical Anthropologist shall investigate the site to make an assessment of the likely nature of the remains:
 - (a) If the remains are likely human then the lead EI would notify Enbridge Environment to initiate the process outlined in *4.0 Discovery of Human Skeletal Remains* below.
 - (b) If the discovery does not represent human skeletal remains, the Physical Anthropologist will document the discovery for the record and Enbridge’s lead EI will advise the on-site construction manager to restart ground-disturbing activities.

3.0 DISCOVERY OF HISTORIC PROPERTIES

Upon the discovery of an archaeological site or cultural resource greater than 45 years of age, the Professional Archaeologist will advise Enbridge Environment of the proper agency notification procedure and recommend a plan of action for the discovery area.

- (a) If the discovery area is under the jurisdiction of a federal permit and/or approval, or otherwise subject to federally-mandated conditions, Enbridge Environment will advise the Responsible Federal Agency (“RFA”) of the resource and provide information regarding its significance and condition and integrity (see *3.1 Federal Agency Jurisdiction* below).
- (b) If the discovery is on state land, Enbridge Environment will first advise the land-managing agency of the resource and provide information regarding its significance and condition and integrity and, if directed by the land-managing agency, advise the appropriate State Archaeologist (see *3.2 State Lands* below).
- (c) If the discovery is on private land, its disposition will still be subject to the authority of the appropriate state routing agency. Enbridge Environment will advise the state routing agency of the resource and provide information regarding its significance and condition and integrity (see *3.3 Public Lands Subject to State Routing Authority* below).

3.1 FEDERAL AGENCY JURISDICTION

- (a) Enbridge Environment will notify the RFA of the resource and provide information regarding its significance and condition and integrity.
- (b) Within 24 hours of notification, the RFA shall provide notice of the discovery to other parties who may wish to participate in consultation, including but not limited to the appropriate State Historic Preservation Office (“SHPO”), Native American tribal officials (as applicable), and private landowner(s).
- (c) The RFA shall have 5 calendar days following notification to determine the discovery’s eligibility for listing on the National Register of Historic Places (“NRHP”) in consultation with the appropriate SHPO and other consulting parties. The RFA may extend the review period by an additional 7 calendar days by providing written notice to consulting parties prior to the expiration of the 5 day calendar period.
- (d) For properties determined eligible for listing on the NRHP pursuant to (c) above, Enbridge Environment shall notify the RFA and other consulting parties of Enbridge’s proposed treatment measures to resolve adverse effects to the discovered resource. The consulting parties shall comment on the proposed treatment measures within 48 hours. The RFA shall ensure that the recommendations of the consulting parties are considered prior to granting approval of Enbridge-proposed treatment measures. Once approval has been granted by the RFA, Enbridge Environment shall carry out the approved treatment measures and, after doing so, Enbridge may resume construction.
- (e) In the event of any disagreements between the consulting parties regarding the NRHP eligibility of the newly discovered property or the treatment measures proposed to mitigate adverse effects to the property, the RFA shall seek and take into account the recommendations of the Advisory Council on Historic Preservation (“ACHP”). Within 48 hours of receipt of a request, ACHP shall provide the RFA with recommendations on how to resolve the dispute.
- (f) If, after consultation, the RFA determines that the discovery does not represent an NRHP-eligible resource, the RFA will direct Enbridge Environment to resume ground-disturbing activities at the discovery location at its discretion.

3.2 STATE LANDS

- (a) Enbridge Environment will notify the land-managing agency of the resource and provide information regarding its significance and integrity. If directed by the land-managing agency to do so, Enbridge Environment will advise the appropriate State Archaeologist.
- (b) The land-managing agency will have 5 calendar days following notification to consult with the appropriate state archaeologist and other consulting parties, as necessary, about the assessment of the discovery. NPS criteria of eligibility for listing on the NRHP may be considered as a guideline to determine the significance of the find and SHPO may be consulted during the assessment, but the state agency is not obliged to apply NPS standards in making its decision. The land-managing agency may assume the resource is eligible for listing on the NRHP while consultation occurs and may require avoidance, impact minimization, or mitigation.

- (c) For properties determined eligible for listing on the NRHP, Enbridge Environment shall notify the land-managing agency and other consulting parties of the treatment measures it proposes for resolving adverse effects to the resource. The consulting parties shall provide their views on the proposed treatment measures to Enbridge Environment, the land-managing agency and other consulting parties within 48 hours. The land-managing agency shall ensure that the recommendations of the consulting parties are considered prior to granting approval of Enbridge's proposed treatment measures. Once approval has been granted by the land-managing agency, Enbridge Environment shall carry out the approved treatment measures and, after doing so, Enbridge may resume construction.
- (d) If, after consultation, the land-managing agency determines that the discovery does not represent an NRHP-eligible or otherwise important resource, the land-managing agency will direct Enbridge Environment to resume ground-disturbing activities, at its discretion, at the discovery location.

3.3 PRIVATE LANDS SUBJECT TO STATE ROUTING AUTHORITY JURISDICTION

- (a) Enbridge Environment will notify the state routing authority of the resource and provide information regarding its significance and integrity.
- (b) Within 24 hours of notification, the state routing authority shall provide notice of the resource to other parties, including, but not limited to, the appropriate SHPO, the appropriate State Archaeologist, Native American tribal officials (as applicable), and private landowner(s).
- (c) The state routing authority will have 5 calendar days following notification to consult with the appropriate SHPO and other consulting parties, as necessary, about assessing the discovery. Criteria for eligibility for listing on the NRHP may be considered as a guideline to determine the significance of the find and SHPO may be consulted during the assessment, but the state routing authority is not obliged to apply the standards in making its decision. The state routing authority may assume the resource is eligible for listing on the NRHP while consultation occurs and may require avoidance, impact minimization, or mitigation.
- (d) For properties eligible for listing on the NRHP, Enbridge Environment shall notify the state routing authority and other consulting parties of the treatment measures it proposes to resolve impacts to the resource. The consulting parties shall provide their views on the proposed treatment measures within 48 hours. The state routing authority shall ensure that the recommendations of the consulting parties are considered prior to granting approval of Enbridge's proposed treatment measures. Once approval has been granted by the state routing authority, Enbridge Environment shall carry out the approved treatment measures and, after doing so, Enbridge may resume construction.
- (e) If, after consultation, the state routing authority determines that the discovery does not represent an NRHP-eligible or otherwise important resource, the state routing authority will direct Enbridge Environment to resume ground-disturbing activities, at its discretion, at the discovery location.

4.0 DISCOVERY OF HUMAN SKELETAL REMAINS

1. When unmarked human burial or skeletal remains are encountered during construction activities, Enbridge will comply with all applicable laws, specifically:
 - a) North Dakota's "Protection of human remains and burial goods – Unlawful acts – Penalties – Exceptions" law (North Dakota Century Code ["NDCC"] §23-06-27) and its accompanying administrative rules (North Dakota Administrative Code ["NDAC"] §40-02-03);
 - b) Minnesota's "Private Cemeteries Act" (Minnesota Statute ["MS"] §307.08); and
 - c) Wisconsin Statute §157.70. In Wisconsin, in the case of accidental discoveries, state law does not distinguish between historic or prehistoric burials in the requirements for initial notifications or disinterment.
2. In the event a human burial or skeletal remains are encountered during ground-disturbing construction activity, Enbridge Environment will implement the following notification procedures:
 - a) North Dakota – notify the local law enforcement agency (county sheriff) and the State Historical Society of North Dakota as required by NDCC §23-06-27. Pursuant to NDAC §40-02-03-03, upon receiving notification of the discovery of human skeletal remains, a human burial, or burial goods, the local law enforcement agency shall, as soon as practicable, report the receipt of such notification to State Historical Society of North Dakota and the North Dakota State Department of Health and Consolidated Laboratories. These two state agencies shall commence the initial examination of the discovery within 24 hours of notification.
 - b) Minnesota – notify the local law enforcement agency (county sheriff). As required by MS §307.08 Enbridge Environment will also notify the Office of the State Archaeologist of the find.
 - c) Wisconsin – notify the local law enforcement agency (county sheriff) and SHPO as stipulated by Wisconsin Statute §157.70.
3. Enbridge Environment also shall promptly notify the RFA, land-managing agency, or state routing authority of the find and consult regarding the appropriate measures to handle the discovery.

After permission to resume construction has been issued by the RFA, land-managing agency, or state routing authority, Enbridge's lead EI will advise the on-site construction manager to restart ground-disturbing activities.

Appendix A
Contact Lists – North Dakota, Minnesota, and Wisconsin

Contact Lists North Dakota, Minnesota, and Wisconsin		
State/County	Contact	Address/Telephone
NORTH DAKOTA	TBD, Lead Environmental Inspector	Cellphone: TBD E-mail: TBD
	Merlan E. Paaverud, Jr., Director/SHPO	State Historical Society of North Dakota 612 East Boulevard Avenue Bismarck, ND 58505-0830 Telephone: (701) 328-2672 Fax: (701) 328-3710 E-mail: mpaaverud@nd.gov
	Edward C. Murphy, State Geologist	North Dakota Industrial Commission, Department of Mineral Resources, North Dakota Geological Survey 1016 East Calgary Ave. Bismarck, ND 58503 Telephone: (701) 328-8000
Williams County	Scott Busching, County Sheriff	223 East Broadway, Suite 301 Williston, ND 58801 Telephone: (701) 577-7700
Mountrail County	Kenneth Halvorson, County Sheriff	101 N Main St Stanley, ND 58784 Telephone: (701) 628-2975
Ward County	Steve Kukowski, County Sheriff	315 SE 3rd Street PO Box 907 Minot, ND 58702 Telephone: (701) 857-6500
McHenry County	Marvin Sola, County Sheriff	407 Main Street South, Room 303 Towner, ND 58788 Telephone: (701) 537-5633
Pierce County	Matt Lunde, County Sheriff	110 Industrial Park Road Rugby, ND 58368-0226 Telephone: (701) 776-5245
Towner County	Vaughn Klier, County Sheriff	315 2nd Street PO Box 366 Cando, ND 58324-0603 Telephone: (701) 968-4350
Ramsey County	Steve Nelson, County Sheriff	222 W Walnut Devils Lake, ND 58301-3596 Telephone: (701) 662-0708
Nelson County	Kelly Janke, County Sheriff	210 B Ave W Ste 102 Lakota, ND 58344-7410 Telephone: (701) 247-2475
Grand Forks County	Bob Rost, County Sheriff	122 South 5th Street Suite 210 PO Box 12608 Grand Forks, ND 58208-2608 Telephone: (701) 780-8280

Contact Lists North Dakota, Minnesota, and Wisconsin		
State/County	Contact	Address/Telephone
MINNESOTA	TBD, Lead Environmental Inspector	Cellphone: TBD E-mail: TBD
	TBD, SHPO	Minnesota State Historic Preservation Office Minnesota Historical Society 345 Kellogg Boulevard West St. Paul, MN 55102-1903 Telephone: TBD E-mail: TBD
	Scott Anfinson, Minnesota State Archaeologist	Office of the State Archaeologist Fort Snelling History Center 200 Tower Avenue St. Paul, MN 55111 Telephone: (612) 725-2411 E-mail: scott.anfinson@state.mn.us
	Jim L. Jones, Jr., Cultural Resource Director	Minnesota Indian Affairs Council 3801 Bemidji Avenue, Suite 5 Bemidji, MN 56601 Telephone: (218) 755-3825
	Harvey Thorleifson, Director	Minnesota Geological Survey 2642 University Ave. St. Paul, MN 55114-1057 Telephone: (612) 627-4780, ext. 224
Polk County	Barb Erdman, County Sheriff	600 Bruce Street P.O. Box 416 Crookston, MN 56716 Telephone: (218) 281-0431
Red Lake County	Mitch Bernstein, County Sheriff	124 Langevin Avenue, PO Box 367 Red Lake Falls, MN 56750 Telephone: (218) 253-2996
Clearwater County	Mike Erickson, County Sheriff	213 Main Avenue North Bagley, MN 56621 Telephone: (218) 694-6226
Hubbard County	Cory Aukes, County Sheriff	301 Court Ave. Park Rapids, MN 56470 Telephone: (218) 737-3331
Becker County	Kelly Shannon, County Sheriff	925 Lake Ave. Detroit Lakes, MN 56501 Telephone: (218) 847-2661
Wadena County	Mike Carr, County Sheriff	415 So Jefferson St Wadena, MN 56482 Telephone: (218) 631-7600
Cass County	Tom Burch, County Sheriff	303 Minnesota Avenue Walker, MN 56484 Telephone: (218) 547-1424, ext. 309
Crow Wing County	Todd Dahl, County Sheriff	304 Laurel St. Brainerd, MN 56401 Telephone: (218) 829-4749
Aitkin County	Scott Turner, County Sheriff	217 2nd St. NW, Room 185 Aitkin, MN 56431 Telephone: (218) 927-7435
Carlton County	Kelly Lake, County Sheriff	317 Walnut Avenue Carlton, MN 55718 Telephone: (218) 384-3236

Contact Lists North Dakota, Minnesota, and Wisconsin		
State/County	Contact	Address/Telephone
WISCONSIN	TBD, Lead Environmental Inspector	Cellphone: TBD E-mail: TBD
	Sherman Banker, SHPO	Wisconsin Historical Society, Division of Historic Preservation 816 State Street Madison, WI 53706-1488 Telephone: (608) 264-6500
	James M. Robertson, State Geologist	Wisconsin Geological and Natural History Survey 3817 Mineral Point Road Madison, WI 53705-5100 Telephone: (608) 262-1705
Douglas County	Tom Dalbec, County Sheriff	1316 North 14th Street Superior, WI 54880 Telephone: (715) 395-1371

Appendix E
Submerged Oil Recovery Plan

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Submerged Oil Recovery Plan

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LIST OF ACRONYMS

GIS	Geographic Information System
GPS	Global Positioning System
HASP	Health and Safety Plan
NPDES	National Pollution Discharge Elimination System
SOP	Standard Operating Procedure

1.0 SCOPE AND APPLICATION

A petroleum pipeline release into a water body has the potential for the product to become submerged, particularly if it is a heavier crude oil. This general plan provides guidance on management strategies, initial environmental site response, and containment and recovery operations.

2.0 PRIORITIZATION OF SITES FOR SUBMERGED OIL RECOVERY

The presence, location, concentration and prioritization of submerged oil sites can be completed using fluvial geomorphology principles and field verification. This typically includes desktop and field analysis, poling assessments and sediment sampling.

To begin, an experienced fluvial geomorphologist should review aerial photography to quickly ascertain primary depositional areas and identify downstream barriers that could limit downstream mobility. For additional detail, see Section 2.1.

Following the identification of primary depositional areas, the extent and degree of submerged oil should be delineated using poling techniques. Less critical depositional areas should be investigated via poling once the primary depositional areas have been confirmed. Primary depositional areas are then selected for submerged oil recovery and the process of recovering free oil can begin. The poling method and the delineation process are provided in Section 2.2. Additional submerged oil analysis is conducted by collecting sediment cores for logging and collection of analytical samples. The sediment sampling and logging methods are described in Section 2.3.

2.1 Geomorphic Process

The checklist for gathering information on the initial response to a submerged oil spill includes:

- Obtain the most recent aerial photographs.
- Identify downstream barriers such as dams that can be used to limit the downstream extent.
- Use the aerial photographs to identify primary depositional areas.
- Obtain plat (cadastral survey) maps to determine the location of residential areas and public access points.
- Determine if the spill occurred during a flood event.
 - If the spill occurred during a flood event obtain National Wetland Inventory wetland maps (U.S only).
- Obtain gage (depth) information on all water bodies impacted.

The geomorphology of the water body can be used to determine the primary deposition areas and determine the outcome if the downstream extent is limited.

A number of lines of evidence are used to determine and confirm the primary and other deposition areas. The lines of evidence include the fate and transport characteristics of the contaminant, channel gradient, water depth, water velocity, sinuosity, channel width, oxbows, cutoff channels, sediment type, and anthropogenic influences. This information allows the field program to be focused on where the contaminant is located and not spending time in the areas of the water body that are erosional in nature.

2.2 Poling Assessment

To determine the amount of submerged oil at each location a Poling Assessment can be performed. A long pole with a 6-inch diameter disk attached at the base should be used to agitate the top 6 inches of the sediment. The degree of oil observed at the water surface after agitation should be described using the established classification process (heavy, moderate, slight, or none). The poling process agitates the top 6 inches of the sediment to determine the amount of submerged oil present in the sediment. The amount of oil sheen and globules that rise to the water surface are evaluated to determine the degree of submerged oil. The Submerged Oil Field Observation Flowchart is provided on Page 3 of this document.

The poling locations should be surveyed using a global positioning system (GPS) capable of sub-meter accuracy. The delineation will be conducted by working away from significant submerged oil until a light sheen or no sheen is found. The GPS data is an input for a Geographic Information System (GIS) database.

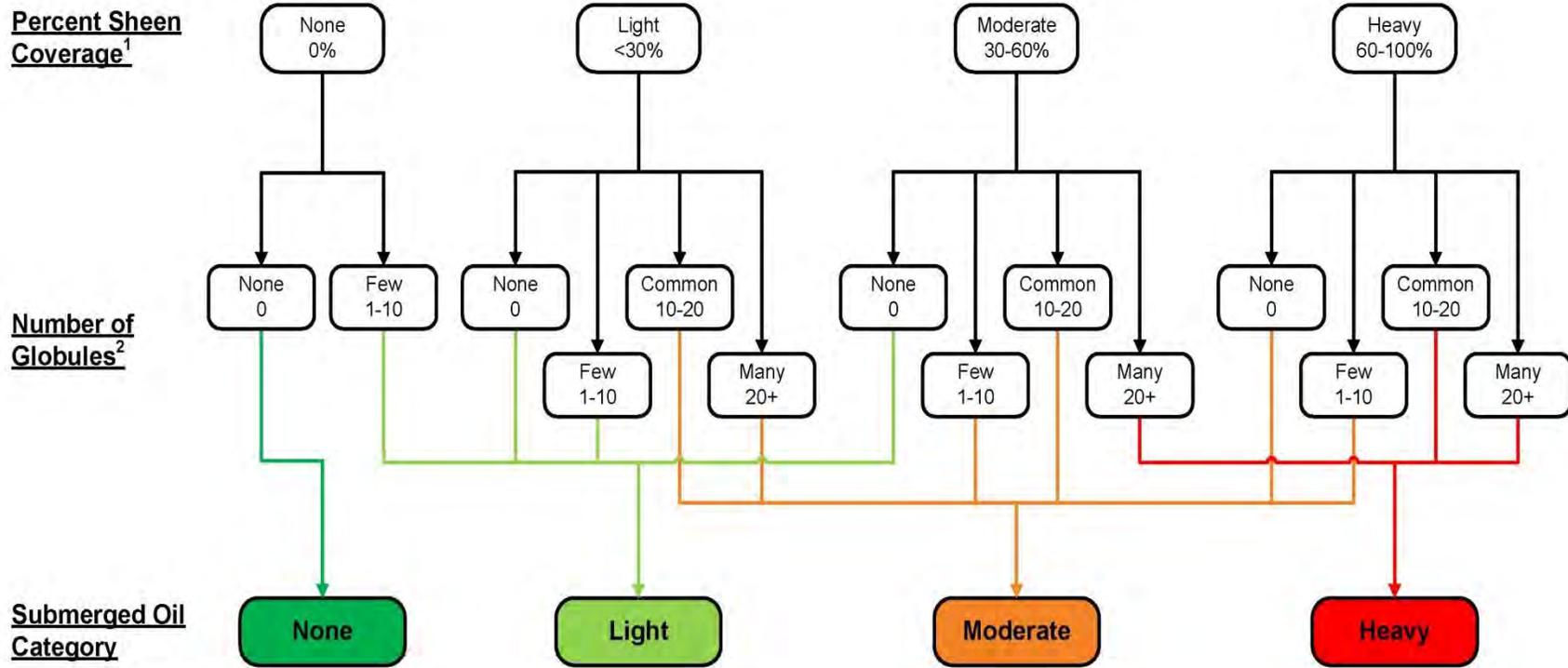
The extent of submerged oil will be delineated when moderate or heavy sheen is observed in a depositional area. The delineation will extend until none or slight sheen is observed. The field crew will use the following criteria to determine the number of poling locations to sufficiently describe the area:

- Geomorphic river setting
- Size of area
- Amount of observed sheen

Electronic field data forms should serve as a daily record of events, observations, and measurements during all field activities for the poling assessment. All information relevant to poling activities can be recorded electronically on these forms. See Appendix A for typical field data recorded electronically.

Paper copies of the output data can be printed and filed for hard copy backup of all data collected. With the electronic data that has been stored in a GIS database, a series of maps can be developed to show recovery area delineations and approximate sizes. A color code should be used based on the degree of submerged oil present (e.g. heavy – red; moderate – orange; light – light green; none – dark green). Maps provide a visual representation of the depositional pattern that will allow for comparison of the depositional patterns over time.

Submerged Oil Field Observation Flowchart



Notes:
 1. Percent coverage per square yard
 2. Number of globules per square yard

2.3 Sediment Sampling and Core Logging

The poling assessment is a subjective way to quickly determine the horizontal extent of submerged oil in a water body. The poling effort is a screening tool used to identify submerged oil, direct the recovery teams, and provide a measure of the success of the recovery activities. To obtain regulatory approval on the recovery process, analytical data should be collected to confirm the recovery activities were successful.

Sediment core collection and logging is a way to objectively evaluate the amount of contaminant in the sediment profile, the depth of the impact, and determine if historic spills have occurred that could complicate the approval process. Sediment cores are collected in depositional areas upstream of the impacted area to obtain background values. The background samples are the most direct way to determine if the water body has been impacted prior to the spill.

Sediment core collection prior to recovery activities is important to have a baseline of impact and determine the depth of impact. A recent spill will be located at the top of the sediment profile and not buried in the sediment. Post recovery sediment cores collected from the same location provide a comparison of the pre and post-recovery condition and provide a measurement of the effectiveness of the recovery techniques.

Sediment core logging is conducted to separate the sediment core into distinct layers that represent changes in the depositional environment. Layer thickness varies based on the depositional area so a standard interval sampling approach (0 – 6”, 6 – 12”) conservatively overestimates the depth of the contaminant. The sediment core logging should be conducted by a fluvial geomorphologist or soil scientist because their training is based on identification of soil and sediment layers. The layers are logged, sampled, and sent to a lab for contaminant analysis. If the spill is recent, only the top one or two layers should need to be submitted to the lab because those layers will most likely include the full vertical extent (top layer) and the second layer will bound the contaminant.

3.0 SITE PREPARATION

Preparation for submerged oil recovery activities includes the following steps:

1. Develop a prioritized schedule identifying the sites for submerged oil recovery.
2. Conduct site preparation poling. Compare data to earlier prioritization poling data to confirm and further delineate contaminated area locations.
3. Install containment structures (e.g. hard boom, GeoTextile curtain) and establish collection points (*see Recovery of Product* below) prior to implementation of the submerged oil mobilization and recovery techniques.
4. Deploy sorbent boom along the perimeter of each work area, ensuring that vegetated areas are protected. The perimeter may include shoreline as well as open-water areas. Sorbent boom may be installed along-side containment structures to minimize product escape.

5. As necessary, and once required regulatory approvals are in place, remove trees and debris in the work areas to allow for safe and efficient operation of the mobilization recovery techniques.

4.0 EQUIPMENT AND PERSONNEL

Appropriate equipment and personnel will be deployed to the site based on the mobilization and recovery techniques selected for use, see Sections 5.0 and 6.0. Mobilization and recovery will be started using the tool with the best chance for success based on site-specific conditions. Additional tools should be made available if conditions warrant.

The submerged oil mobilization and recovery crews will typically need to be 4 to 6 members in size. On larger focus areas, crews can be merged together to form a team consisting of 8 to 12 members. Each team should be led by an inspector who is responsible for the team's location, execution, production, documentation, photo documentation, as well as in-process poling and post-recovery poling to determine effectiveness of the selected technique. The rest of the team will consist of technicians responsible for the use of the mobilization tools and recovery equipment. Additional supporting equipment and personnel should be available as needed.

5.0 METHODS FOR SUBMERGED OIL MOBILIZATION

There are various methods that can be used to mobilize submerged oil so that it may be contained and recovered on the surface of the water. Site characteristics such as the size of the recovery area, the water depth, the presence of vegetation, and the composition of the bottom of the water body will determine which method should be selected. This work should be conducted within each depositional area by moving from upstream to downstream. Floating oil will then be carried downstream for recovery.

Methods used to agitate sediment to release and mobilize submerged oil include:

5.1 Raking

- Use a hand held rake to agitate the sediment to the bottom to release submerged oil.
- The rake is a steel tine garden rake with a three inch depth penetration.
- The rake is best used in non and light vegetated areas in shallow water.
- Sorbent materials will then be used for the collection and removal of recovered oil.
- Direct any floating oil to the collection area and sorbent boom lining the work area.
- This process will be repeated until there is no oil visibly released from the cell.



Raking



Raking

5.2 Hand Held Tiller

- Use a hand held, gas powered tiller to agitate the top 6 to 8-inches of the sediment.
- The hand-held garden tiller has two blades measuring approximately 8-inches in diameter and set approximately 8-inches apart.
- The tiller’s engine must remain above the water surface at all times.
- The tiller works best in areas with little to no bottom debris.
- The tiller is best applied in non and light vegetated areas. It can be used in both soft sediment and sand bed areas.
- Each pass of the tiller will make contact to ensure complete coverage of the area.
- Allow the released oil to float to the surface to enable surface recovery at a collection point within the contained area. Sorbent materials will then be used for the collection and removal of recovered oil.
- This process will be repeated until there is no oil visibly released from the cell.



Hand Held Tiller



Hand Held Tiller

5.3 Hand Held Stinger (Air or Water)

- A stinger consists of a hand held discharge wand equipped with river water or air supply.
- The water or air injecting/flushing device is constructed using an 8-foot long (1 ½-inch diameter) vertical pole with a 45-degree elbow fitting and a short nozzle of 1 ½-inch pipe that has been flattened to create a fan-like water discharge.
- The water supply used will be high volume/low pressure supplied by a submersible, trash or water pump.
- The air supply used will be high volume/low pressure supplied by an air compressor.
- This tool can be modified to include three or four vertical pipes welded together on 6-inch to 8-inch centers with 90-degree (or greater) fittings.
- The entire area will be flushed using an overlapping sweeping motion to ensure complete coverage of the area.
- Allow the released oil to float to the surface to enable surface recovery at a collection point within the contained area. Sorbent materials will then be used for the collection and removal of recovered oil.
- This process will be repeated until there is no oil visibly released from the cell.



Hand Held Stinger (water) – from land



Hand Held Stinger (water) – from boat

5.4 Vessel Mounted Water or Air Injector (Flush Boat)

- The vessel mounted subsurface deluge system consists of a spreader bar (6 to 8-feet in length) mounted to the front or rear of the vessel.
- The spreader bar will be lowered to the desired depth prior to activation.
- Water or air will be pushed through the spreader bar and discharged through ports located along the width of the bar, at 45 and 90-degree angles to the bar.
- The vessel will then move along a grid layout to ensure complete coverage of the area.
- Allow the released water to float to the surface to enable surface recovery at a collection point within the contained area. Sorbent materials will then be used for the collection and removal of recovered oil.
- This process will be repeated until there is no oil visibly released from the cell.



Vessel Mounted Injector (Flush Boat)



Vessel Mounted Water Injector (Flush Boat)

5.5 Marsh Buggy

- A Marsh Buggy is a track vehicle with a backhoe arm.
- Includes a saw and a thumb attachment for cutting and removing wood and debris.
- Buggy has a tiller attachment to agitate the channel bed.
- Buggy has a flush bar which can use river water or air to force air or water through holes in the bar directed at the channel bed to agitate the sediment.
- Each Marsh Buggy is accompanied by a support boat to hold the water pump or air compressor and attachments not in use at the time.
- Collection boat/person needed for oil sheen clean-up during recovery operations.



Marsh Buggy



Marsh Buggy with Flushbar



Marsh Buggy



Marsh Buggy with Flushbar

5.6 Chain Drag

- The chain drag apparatus consists of a 5-foot long, 2-inch diameter round metal spreader bar with ¼-inch grade 8 metal chains attached at approximately 6-inch centers. A second spreader bar of the same size is attached to the chains to minimize tangling.
- The chain drag will be pulled by either a shore mounted system or by a boat following a grid layout to ensure complete coverage of the area.
- The chain drag is an effective oil recovery tool in submerged environments with minimal debris (fallen trees or submerged stumps). It is an effective tool at releasing tar balls and tar patties.
- Allow the released oil to float to the surface to enable surface recovery at a collection point within the contained area. Sorbent materials will then be used for the collection and removal of recovered oil.
- This process will be repeated until there is no oil visibly released from the cell.



Chain for chain drag



Chain drag from boat

5.7 Vessel Mounted Pipe Drag

- The vessel mounted bottom drag device consists of an 8-foot long (2-inch diameter) steel horizontal tube with wheels attached on both ends.
- A boat mounted trash pump injects river water through a threaded fitting near the center of the horizontal tube and the water is released from a series of holes drilled into the horizontal tube.
- The bottom drag discharges water through holes in the steel pipe.
- The device is lowered to the sediment surface and then pulled horizontally over the sediment.
- The bottom drag works best in open water areas or areas with minimal vegetation and without submerged debris. It is best used in larger areas with moderate water depths.
- Allow the released oil to float to the surface to enable surface recovery at a collection point within the contained area. Sorbent materials will then be used for the collection and removal of recovered oil.
- This process will be repeated until there is no oil visibly released from the cell.

5.8 Rotating Stingers

- A set of stingers consists of hand held discharge wands equipped with water supply.
- The rotating stinger device is constructed using an 8-foot long (1 ½- inch diameter) steel vertical pole with two 6-foot long horizontal steel pipes attached approximately 1-foot from the bottom at 90-degrees to the vertical pole and 180-degrees from each other.
- The drilled holes are angled toward the bottom where it will agitate and release submerged oil from the sediment.
- The water supply used will be high volume/low pressure supplied by a submersible, trash or water pump.
- The rotating stinger is recommended for large non-vegetated areas with sand or hard river bottoms and shallow or moderate water depths.
- The rotating stinger works best in areas with submerged oil limited to the upper couple inches of sediment. Spreading the flow across 12-feet of pipe through several small holes (increased energy losses) reduces the effective force of the water jets and limits the depth of penetration into the sediment.
- Allow the released oil to float to the surface to enable surface recovery at a collection point within the contained area. Sorbent materials will then be used for the collection and removal of recovered oil.
- This process will be repeated until there is no oil visibly released from the cell.

6.0 RECOVERY OF PRODUCT ON WATER

Surface collection points should be established at the downstream end of each work area. Previously established containment structures (e.g. hard boom or curtains) will divert sheen and globules released by mobilization efforts to the collection points for recovery. Recovery may be accomplished using a variety of techniques including skimmers, sorbents and pom-poms.

For more information related to recovery of product on water, See *Book 7: Emergency Response, Section 04-02-04 In Rivers*.

When peat is applied the following Best Management Practices should be used:

- All appropriate personal protective equipment should be used including:
 - Chemical proof gloves
 - Safety glasses
 - Personal flotation device
- Broadcast the peat over the impacted area. Allow 15-20 minutes for sheen to adhere to the peat amendment.
- Utilize air diversion (airboat or leaf blower) to mobilize the commingled peat amendment and sheen to a collection point. The collection point should be downstream or downwind depending on which is stronger at the given location.
- Utilize pool nets to recover the commingled peat amendment and sheen. The impacted debris should be placed into a clear plastic bag and taken for disposal at the end of the operational period.
- The number of bags of debris should be recorded by site and reported to operations in your daily field notes.

Note: To broadcast peat on water, ensure regulatory approval for the jurisdiction in question.

7.0 DREDGING

Dredging is an aggressive recovery technique that can remove large volumes of contaminated sediment from the aquatic environment. The use of this technique disrupts and destroys the existing habitat; as a result, dredging requires careful consideration of both short and long term impacts and regulatory approval. It is most applicable in areas with low or minimal habitat value, where there are significant quantities of submerged oil, where oil is at deeper depths within the sediment, and/or where oil is deposited at deeper water depths that limit or restrict other techniques. Should dredging be identified as the preferred methodology, site conditions will influence the type of dredging equipment (e.g., mechanical, hydraulic, specialty/combination mechanical and hydraulic) and dewatering methods (e.g. gravity on barge, geotubes) that will be most appropriate for use.

7.1 Regulatory Note

Dredging has a high risk of impact on the environment, so regulatory approval is mandatory. One approach that may be considered is conducting a coordinated pre-dredging site evaluation process with the approving resource agencies for sensitive and/or critical habitat environments. This approach was followed during the Line 6B incident in 2010 and dredging was approved for a number of sites. For other sites that were cooperatively evaluated, less aggressive action was jointly recommended and then undertaken by Enbridge.

7.2 Pre-Dredging Activities

Various pre-dredging activities are critical to ensuring minimal impact to the environment and surrounding community. The following may need to take place prior to project startup:

- Evaluation of sensitive and/or critical habitat
- Ecological Risk Assessment
- Cultural Resources Assessment
- Conducting Landowner and Public Notification of Activities

7.3 Dredging Operations

Dredging operations are similar to, but are more complex than, other recovery techniques. Operational considerations include:

- Mobilization and site preparation generally requires establishment of on-site facilities to house day-to-day operation, establishment of material transfer areas, dewatering areas and development of transportation plans to accommodate dewatering and disposal activities.
- Materials that may be mobilized or used for operations may include containment devices [e.g., hard boom, soft boom], and dewatering and treatment system components [e.g., geotubes, tanks, pumps, pipes, control panels, etc.]

- Equipment may include the Dredge unit(s), earth moving equipment and other support items. Depending on the type of dredge selected, equipment will vary. For mechanical type dredges, an excavator or crane mounted on a barge is common and the dredge bucket can vary as well (e.g., use of an environmental (closed) bucket versus a clam shell bucket with or without teeth). In addition, mechanical dredging typically requires a haul barge for the dredged material. The barge may also need a tugboat or support vessel to position and move the haul barge. For hydraulic dredges, typical equipment needs beyond the dredge itself would include hydraulic pumps, floating or submersible pipelines, booster pumps, support vessels, anchors and positioning systems. Hybrid dredges (those that may mechanically remove sediment but transport it hydraulically) would typically require equipment similar to those described above.
- Manpower may or may not be increased for dredging operations compared to other techniques. Staffing may be less than highly labor-intensive techniques (e.g., raking); however, staffing likely includes a variety of operators, laborers, engineers, scientists, health and safety professionals, sampling personnel and specialists.
- The dredging footprint should be contained through the installation of near-term containment measures. Sections may be bolstered by installing reinforced silt curtains, as necessary. Offsets can be installed to minimize the potential contact of the dredge with the boom or wall. A turbidity curtain is one type of containment that can be used to keep sediment that is disturbed in the dredging process from impacting the surrounding area. Monitoring equipment should be installed as necessary (e.g. Manta sediment monitors).
- The dredging footprint should be limited by establishing maximum dredge depths where oil is present and needs to be removed, and by closely monitoring dredge operations for compliance with tolerance levels.
- An air quality monitoring program should be in place prior to beginning dredging operations. Air quality can be a major concern of the agencies and the public.
- Development of a Field Sampling and Analysis Plan is required and will include, at a minimum, confirmation sampling of sediments in the dredged area, verification sampling of contaminated sediment prior to disposal and sampling of influent and effluent water prior to release to ensure compliance with permit requirements.
- Other considerations will be influenced by site-specific characteristics (e.g., issues with water depths, bottom slopes, amount of debris). Debris can be a major factor in selection of dredging equipment. If using a hydraulic dredge, a debris removal operation may need to be performed prior to the dredging, whereas a mechanical dredge is less affected by debris.

7.4 Dewatering of Dredged Sediment

Sediment dredged from the water body can be pumped through hosing to the dewatering area for dewatering. In some cases polymers are used to enhance settling of suspended solids. Typically a pad is built for this purpose and various equipment is used to dewater the sediments. Dewatering pads are often constructed by compaction of the existing soil base, installation of an impermeable liner, and placing a layer of drainage aggregate as a working

surface. Geotubes can be placed on the pad and the dredge material is transferred through the tubes. A geocomposite may potentially be substituted for the aggregate and used as the working surface.

Within the dewatering and treatment area, weep water should be captured. This can be in a sump or by other means. This weep water is often treated onsite and then discharged following a formal permitting and approval process. It is also possible to containerize the weep water and have it transported offsite for treatment and/or disposal. Storage and/or treatment activities should all be done in accordance with local/state National Pollution Discharge Elimination System (NPDES) Permit or equivalent.

Dewatered dredge material should be sampled to determine proper disposal procedures. Dredge material may need to be sampled for any or all of the following, or other constituents based on site specific conditions: TCLP metals, TCLP VOC, TCLP Semi-VOC, Paint filter test for free liquids, pH, Flashpoint, TPH (DRO-GRO), Oil & Grease, PCBs, Percent solids, Analyte criteria for solidification versus disposal at landfill and Total Petroleum Hydrocarbon/Oil & Grease

7.5 Water Treatment and Discharge

Water collected in the dewatering process can be treated on-site using a variety of treatment techniques as appropriate. The following types of equipment may be necessary for water treatment:

- Bag filters with oil grabbing bags
- Oil absorbing pressure vessels (i.e., organoclay cans)
- Granular Activated Carbon (GAC)

The treatment system should be sized to meet the discharge requirements of the permits in place. The water treatment system should be operated by a licensed Wastewater Treatment Operator to assure that the discharge requirements are met as per the permit as follows:

Discharge pipes should be monitored as well. In the event that allowable levels in the permit are exceeded, the dredging, dewatering, and filtration systems will be turned off while the cause of the exceedances is investigated and corrective actions are taken.

An odor masking agent may need to be procured and used on-site to ameliorate potential odor issues associated with materials handling.

7.6 Post-Dredging Activities

- Post Dredge Conditions Assessment
- Waste Management
- Completion Report
 - Summary of the work performed, pre and post-dredge condition assessment information, daily field reports, and photographic documentation.

7.7 Transfer of Dredged Material

A dredge material transfer pipe is often used to move the dredge material from the water body to the dewatering location. Adequate piping attachments should be delivered to the staging area to support the dredging project. Booster pumps may be installed and staged on dry land at the near shore area, to be used as necessary.

7.8 Demobilization and Decontamination

Following completion of dredging/dewatering activities, temporary facilities and utilities, personnel, equipment and materials will be removed from the site. Construction equipment will be decontaminated before leaving the site. Cleaning methods for equipment may include brushing and pressure washing to remove potentially contaminated material, as necessary. As part of decontamination efforts, all non-porous surfaces (e.g., pipes, fittings, appurtenances, pumps, vessels) that have come into contact with sediment and/or filtrate will be cleaned as follows:

Wastes generated during decontamination will be managed in accordance with the approved Waste Transportation and Disposal Plan.

7.9 Release/Spill Reporting

Any releases or spills outside the contained boomed area will be immediately communicated to the appropriate personnel.

8.0 DECOMMISSIONING OF EQUIPMENT AND WASTE DISPOSAL

Oiled debris including the sorbent booms, pads, and other material used to collect the recovered oil must be disposed of in accordance with the Enbridge Waste Management Plan.

All equipment impacted as a result of the recovery operations should be decontaminated by either “dry” decontamination onsite or transported to a designated location for a thorough cleaning.

All waste generated during the recovery operations including dredging and dewatering activities shall be handled in accordance with a Site Specific Waste Management Plan.

9.0 FINAL SITE INSPECTION

Following the recovery activities, the area(s) will need to be poled. The poling locations and associated data should be surveyed using sub-meter GPS and input into the GIS database.

10.0 RECORDS

The following records are generally generated during a submerged oil spill response:

- Aerial Photographs
- National Wetland Inventory maps
- Gage data
- Electronic data base
- GIS data and maps
- Task results shown on maps and tables
- Daily Field Reports
- Daily Team Assignments
- Submerged Oil Standard Operating Procedures
- Photos

11.0 SAFETY CONSIDERATIONS

All activities must adhere to the project Incident Action Plan and all applicable Enbridge Health & Safety plans, procedures and policies. If more aggressive techniques such as Dredging are implemented, specialized safety training may be necessary. Health and Safety oversight of activities should ensure conformance with all applicable state, local, federal and Enbridge safety requirements. An evaluation of proper personal protective equipment should be made and Activity Hazard Assessments may need to be conducted.

APPENDIX A
TYPICAL FIELD DATA (RECORDED ELECTRONICALLY)

TYPICAL FIELD DATA (RECORDED ELECTRONICALLY)

 Poling

Type	Type of poling being done: Pre-recovery, Mid-recovery, Post-recovery, LSR, LSR Pre-recovery, LSR mid-recovery, LSR post-recovery, Other.
W_Depth	Water depth, in tenths of feet, at the poling location.
OnePush	One-hand push depth with poling rod, measured from top of water, but calculated to reflect depth below top of sediment.
TwoPush	Two-hand push depth with poling rod, measured from top of water but calculated to reflect depth below top of sediment.
SubOilCat	Submerged oil category: none, light, moderate, heavy.
Sheen	Sheen category: none, light, moderate, heavy.
Globules	Globules category: none, few, common, many.
Bank	
Velocity	Estimate of surface water velocity: No flow, <1 ft/sec, 1-3 ft/sec, or >3 ft/sec.
Bed_Veloc	Estimate of bed velocity: same categories as surface velocity.
Riv_Set	River setting at poling location.
Aq_Veg	Estimate of the percentage of aquatic vegetation at the poling location.
BedType	Estimate of bed type at the poling location.
SubComm1	Comments related to submerged oil.
SubComm2	Comments related to submerged oil.
LocComm1	Location comments.
LocComm2	Location comments.
LocComm3	Location comments.

TYPICAL FIELD DATA (RECORDED ELECTRONICALLY)

 **Coring**

W_Depth	Water depth, in tenths of feet, at the coring location.
Device	Coring device
Liner_Type	Type of liner used
Liner_Length	Length of liner used.
Target_Depth	Target depth for coring
Target_Length	Target length of core
Start_Depth	Starting depth of core interval
End_Depth	Ending depth of core interval
FieldRecovery	Recovery measured in the field, in tenths of feet.
Refusal	Refusal during coring: yes or no.
Ref_Reason	If yes, reason for refusal.
DriveHmr	Whether or not a drive hammer was used during coring.
NumberAtts	Number of coring attempts at location.
LocComm1	Location comments.

 **Boom**

LocComm1	Location comments.
LocComm2	Location comments.
LocComm3	Location comments.

 **Stake**

Lath	Whether or not a lath stake was placed at the location (alternative is flägging tape)
LocComm1	Location comments.

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