

REYNOLDS CREEK WETLAND MITIGATION PLAN

**Line 6B 2012 Maintenance and Rehabilitation Program
and Line 6B Phase 2 Replacement Project
PORTER COUNTY, INDIANA**

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WETLAND MITIGATION PLAN
ENBRIDGE
LINE 6B 2012 MAINTENANCE AND REHABILITATION PROGRAM AND
LINE 6B PHASE 2 REPLACEMENT PROJECT

1.0 MITIGATION GOALS AND OBJECTIVES

1.1 Project Background and Impacts

Enbridge Energy, Limited Partnership (“Enbridge”) is proposing to replace its 30-inch-diameter hydrocarbon pipeline (referred to herein as “Line 6B”) in Indiana and Michigan. Replacement of Line 6B will occur in two construction phases or projects; the Line 6B 2012 Maintenance and Rehabilitation Project and the Line 6B Phase 2 Replacement Project.

Enbridge is submitting applications to the Indiana Department of Environmental Management (IDEM) and U.S. Army Corps of Engineers (USACE) for approximately 3.24 acres of unavoidable permanent impacts to wetlands and waterbodies in Lake, Porter, LaPorte, and St. Joseph Counties, Indiana. Enbridge is submitting this Wetland Mitigation Plan (“Plan”) to compensate for unavoidable wetland impacts related to the conversion of forested wetland to emergent and scrub-shrub wetland.

1.2 Mitigation Goals

The goal of the mitigation is the restoration and creation of wetland habitat to compensate for the conversion of forested wetland to emergent wetland on the subject Line 6B projects. In addition, existing uplands on the mitigation site will be enhanced by restoring native vegetation and creating a wetland buffer. This mitigation plan therefore proposes to include a wetland/upland mosaic habitat that is critical to several species of conservation concern.

Compensatory mitigation for the unavoidable permanent impact to 3.24 acres of wetlands along the project corridor includes the restoration of an approximately 70-acre site known as the Reynolds Creek Mitigation Area in Pine Township, Porter County, Indiana (Figure 1). Mitigation efforts will include the restoration of approximately 12.3 acres of forested wetlands, 1.5 acres of scrub-shrub wetlands, 17.7 acres of emergent/inundated wetlands, and 34.7 acres of an herbaceous dry to mesic prairie grassland buffer community on the site, which is currently a drained agricultural field. Monitoring of vegetation and hydrology at the site will take place for ten years to document the attainment of ecologically-based performance standards. Periodic maintenance of the site may be necessary to encourage the successful establishment of native vegetation, keep exotic and invasive species below acceptable coverage limits, and address other site conditions that may impede the attainment of other mitigation performance standards.

1.3 Watershed Improvements

Wetland functions will change as a result of the Line 6B 2012 Maintenance and Rehabilitation Program and Line 6B Phase 2 Replacement Project, but overall regional wetland functions can be improved through the implementation of the mitigation plan. In the proposed Line 6B wetland impact areas, functions provided by forested and shrub-scrub wetlands, such as

providing habitat for migrating songbirds, will decrease as the impacted wetlands will change in structure from forested to non-forested.

However, the proposed mitigation will compensate for impacted wetland acreage by restoring wetland functions at the mitigation site. Currently, the site is used for agriculture and provides minimal hydrological function, wildlife habitat, or ecosystem services. The proposed wetland restoration on the site will provide emergent/inundated, scrub-shrub, and forested wetland habitat similar to what is found elsewhere in northwest Indiana, and also provide habitat for numerous plant species of conservation concern. Functions and values that will be improved on the mitigation site include flood and stormwater storage, water quality through filtration, soil retention and stability through the cessation of farming and tilling activities, recreational opportunities by improving and creating public access, biological productivity, and wildlife habitat through the establishment of the proposed wetland and upland community mosaic.

2.0 IMPACT AND MITIGATION SITE BASELINE INFORMATION

2.1 Impact Site

The wetland impact sites are located in Lake, Porter, LaPorte, and St. Joseph Counties, Indiana. Appendix A summarizes the jurisdictional wetlands and associated wetland acreage that will be impacted throughout the project area.

Information on the vegetation, hydrology, and soils of the different impacted wetlands is available on the wetland delineation data sheets that are enclosed with the permit application package.

Current Applicant:

Enbridge Energy, Limited Partnership
1409 Hammond Avenue, 2nd Floor
Superior, Wisconsin 54880
Contact: Rachel Shetka
715-398-4699

2.2 Mitigation Site

The proposed mitigation site is located in Township 37 North, Range 5 West, Section 13 in Porter County, Indiana. The site is centrally located in the Little Calumet – Galien watershed, which encompasses the area of proposed impacts along Line 6B. The land is currently used for agriculture and is drained by a tile system. The site is bounded to the north by Interstate 94, to the east by County Line Road, and to the south and west by agricultural land. A managed wetland occurs adjacent to the southwest edge of the site.

Several sources of information were consulted to identify potential or historic streams, wetlands, and hydric soil units on or near the proposed mitigation area prior to the site visit. These include the USGS Topographic Map Series, USGS National Hydrography Dataset (NHD), USFWS National Wetland Inventory (NWI), and the USDA Natural Resources Conservation Service (USDA NRCS) Soil Survey of Porter County, Indiana (Figures 2, 3, and 4, respectively).

Wetland (approximately 1 acre on site)

A site survey by Cardno JFNew biologists identified one wetland on the north end of the site (Figure 5). The vegetation has been significantly disturbed by agricultural activities and is dominated by corn (*Zea mays*, UPL), straw-colored flat sedge (*Cyperus strigosus*, FACW), and annual ragweed (*Ambrosia artemesiifolia*, FACU). Hydrology indicators within the wetland include saturation, presence of reduced iron, and recent iron reduction in tilled soils. Soils were high in clay content and met the thick dark surface indicator for hydric soils. Analysis of aerial imagery indicates this wetland was likely part of a complex of several small wetlands that historically occurred on the site prior to drainage. Wetland data forms and photos can be found in Appendix B.

Upland (approximately 69 acres on site)

The remainder of the site is agricultural upland and was planted with corn at the time of the site survey. An upland berm on the northwest edge of the site contains a mix of old field and invasive wetland species including tall goldenrod (*Solidago altissima*, FACU), staghorn sumac (*Rhus typhina*, UPL), common milkweed (*Asclepias syriaca*, UPL), and common reed (*Phragmites australis*, FACW).

No federally- or state-listed plant species were observed in the wetland or upland areas at the time of the survey.

Current Owners:

Indiana Department of Natural Resources
402 West Washington Street
Indianapolis, Indiana 46204

3.0 MITIGATION SITE SELECTION AND JUSTIFICATION

The mitigation site was selected based on proximity to impacted wetlands, the feasibility of restoring wetland hydrology, and availability to be used for such purpose. The site is owned by the Indiana Department of Natural Resources (IDNR), which intends to convert the site into a mixed-use area for wildlife habitat and public access. The applicant will create both the IDNR-desired inundated emergent wetland pools and wetland buffer as well as the target forested wetland mitigation acreage. The proposed habitat mitigation will create a mosaic of different wetland community types including forested, scrub-shrub, emergent/inundated, and open water wetlands.

4.0 MITIGATION WORK PLAN

4.1 Habitat Restoration

The applicant proposes to restore 17.7 acres of emergent/inundated wetland, 1.5 acres of scrub-shrub wetland, 12.3 acres of forested wetland, and 34.7 acres of upland dry to mesic prairie buffer on the mitigation site.

4.2 Grading Plan

Elevations on site range roughly between 654.5 and 655.5. A 1-foot topographic survey of the 70-acre Reynolds Creek mitigation site was completed in June 2012. Currently, some

emergent/scrub-shrub wetlands occur on the adjacent property to the southwest at approximately 653.0 to 654.0 elevations. Water elevations found in hand borings on the mitigation site indicated water approximately 36 inches below the ground surface (approximately 652.5 elevation). This depth to groundwater was found both on the east side of the site that is drained by tile and on the west side where there appears to be no tile (Figure 5). Water levels in the ditch on the east side of the site (the outlet for the drain tile) were approximately 1 - 2 feet lower than water level in the borings.

The existence of the wetland on the southwest side of the site and these water levels seem somewhat at odds. It could be the wetland is perched or that the drain tile is effectively draining the entire site down to 36-inches. Soils appear to range from silty clay loam to pockets of clay. It is recommended that the final design elevations for the target wetlands be refined with the collection of groundwater level data and analysis of that data with a water balance model calibrated to the collected groundwater levels. At least three groundwater monitoring wells with continuous-recording water level loggers are proposed for installation on the site. The DRAINMOD model will then be used to simulate both existing and proposed conditions (http://www.bae.ncsu.edu/soil_water/drainmod/).

DRAINMOD is a computer simulation model developed at North Carolina State University. The model simulates the continuous hydrology of poorly drained, high water tables for long periods (multiple decades) of climatological record. The model predicts the effects of drainage and associated water management practices on groundwater depths and soil water regime. The model has been successfully tested and applied in a wide variety of geographical and soils conditions.

For this evaluation, USGS real-time well data was reviewed to gauge the possible fluctuation in groundwater levels on an annual basis. (http://groundwaterwatch.usgs.gov/countymaps/IN_127.html). The limited well data suggested a "bounce" between high and low groundwater levels in Porter County of 2 - 3 feet. The data collection period for the wells closest to our site was fairly limited, with only a few observations over a 10 to 15 year period. In our experience, looking at continuous groundwater data in the Midwest over several decades shows maximum groundwater fluctuations can lower the groundwater to more than 5 feet below the surface.

Given the observations and data collected to date, the initial target elevations for forested wetland would be 0.5 to 1.5 feet below the current ground level. Scrub-shrub wetland would extend from there down another ± 1.0 foot, and below that, the emergent/inundated wetlands would be 2.5 to 4.5 feet below the surface, where it is currently assumed the working water level in the pond/continuously inundated areas would be located. The bottom of these inundated areas (assuming an average water depth of 24 inches) would then be between 4.5 to 6.5 feet below the existing ground surface. These initially proposed wetland elevations are somewhat lower than the elevations at the wetland to the southwest, but setting conservative elevations is proposed for long-term, sustainable, wetland ecosystems. The additionally recommended site and model evaluation will allow more reliable and robust target elevations to be set. The proposed modeling evaluation will account for at least a 20-year period of continuous simulation. Cumulative histograms of water surface elevations over the entire period will be developed and target wetland elevations will be based on appropriate hydroperiod thresholds for each wetland type.

Final grades will also specify microtopographic variation in order to provide a variety of habitat within the range of each specific wetland type. Some areas will likely be left untouched. Other areas will likely require approximately 6 inches to 1 foot of soil on average to be scraped from higher portions of the site. In order to have areas of continuous inundation of up to 24-inches, excavation depths could be as much as 6.5-feet. On site soil quantities will attempt to be balanced. All excavated soil will remain on site and be used to re-grade upland and/or public-access areas to the maximum extent possible.

4.3 Hydrologic Modification

The drain tiles beneath the surface will be broken to allow a seasonally high water table to reestablish on the site. The proposed elevations will support seasonally saturated to ponded conditions, with the areas of deeper ponding (1-2 feet) supporting emergent/inundated wetland vegetation and the saturated (i.e., not ponded) portions supporting forested wetland vegetation.

It appears unlikely that any kind of ditch plug could be implemented in the adjacent ditches. Even with broken tile on the site, the ditches can still exert a “pull” on the groundwater level. A reasonable buffer width between the edge of the proposed wetland areas and the ditches has been maintained in the current design. Again, the model analysis will provide a reasonable estimate of the ditches’ effects on groundwater levels in the proposed wetland areas and will provide reasonable hydroperiod estimates for proposed conditions over the entire site.

The proposed design (Figures 6, 7, and 8) links the emergent/inundated wetland areas with a naturalized overflow channel. These areas are all linked in parallel with this overflow channel. For this initial design, the bottom of the channel has been set approximately 2 - 3 feet below the ground surface. The channel itself ends in a water level control structure with boards that allow control of the water level in 6-inch depth increments.

This overflow channel will be graded with relatively shallow 1:4 side slopes and will connect with the restored wetland areas. In this way, the water level control structure can be set to keep the forested wetland areas from being continuously inundated or inundated too deeply. Or the boards can be set higher in order to contain as much water on site as possible during dry periods.

Because it appears that most of the field is drained by the existing tile system, it is not anticipated that the recommended drainage adjustments for wetland restoration will release more water seasonally or annually through the ditch system around the site. In fact, during the growing season, the creation of more open water area in combination with a greater diversity and density of deep-rooted native plants will result in higher evaporation and transpiration losses. These increases in on-site water losses will result in less water running off or draining off into the ditch system than under currently existing conditions. With the calibrated DRAINMOD model, an estimate of the amount of water leaving the site via the ditch system under current conditions and under proposed conditions will be obtained to verify or nullify our hypothesis.

4.4 Planting Plan

The planting regimen proposed for the wetland mitigation area has been selected to utilize species and planting rates best able to establish the desired wetland vegetative communities.

Utilizing this approach, species selected will not only replace those impacted, but will greatly increase the diversity and functional value of newly-created wetland communities. While some non-native species will be used for stabilization purposes in all of the mitigation areas, only native plant species will be used for establishing the permanent vegetative community. No exotic or hybrid nursery species will be utilized.

Due to inundated conditions, it is anticipated that only plant plugs will be installed in the emergent/inundated wetland zones (17.7 acres). Although the emergent/inundated wetland pools are expected to revegetate through natural recruitment, native wetland plugs will be utilized to encourage rapid establishment of several key desired species. A total of 13,450 supplemental plugs will be installed across the emergent/inundated wetland zones (approximate density of 760 plants/acre).

The forested wetland mitigation zones (12.3 acres) will be planted with a forested wetland native seed mix, with the addition of bare root trees and shrubs and balled-and-burlapped trees. The seed mix includes only forested wetland species that will also thrive in open conditions prior to development of the tree canopy. Trees in the forested zone will be planted in a random pattern at an approximate density of 60 balled-and-burlapped (2-3" dbh) trees/acre and 360 bare root trees/acre). Shrubs will be planted at an approximate density of 300 bare root shrubs/acre. A total of 740 balled-and-burlapped trees, 4,430 bare root trees, and 3,690 bare root shrubs will be planted in the forested wetland zones.

Bare root shrubs and an appropriate wetland native seed mix will be planted to create a zone of shrub-scrub wetland (1.5 acres) in the transition zones between emergent/inundated and forested wetland areas. A total of 1,050 shrubs will be planted in the shrub-scrub zone at an approximate density of 700 shrubs/acre.

The upland prairie buffer areas will be planted with a native seed mix that includes species typical of northwest Indiana dry to mesic prairies. The vegetated berm in the northwest corner of the site will be treated with glyphosate herbicide to remove exotic and undesirable vegetation prior to planting. Proposed species lists for wetland and upland buffer areas are presented in Figure 7.

4.5 Construction Methods

Haul roads will be laid out along the perimeter of the site as necessary and staging will take place in the southeast corner of the property at the direction of IDNR staff. The site will be accessed from the driveway off County Line Road. All excavated material will remain on site and be stabilized in accordance with any soil erosion and sedimentation control permits. Due to the fact that all material will remain on site, no concerns are expected in regards to damage to or tracking of dirt onto adjacent roadways.

4.6 Construction Timing and Schedule

Mitigation construction is currently proposed to start in the spring of 2013 as the site is currently under contract with a tenant to raise corn through 2012. Earth work, tile breaks, and final grading will be completed so that seeding and the majority of planting of the site can be completed in the spring of 2013. Tree planting may be delayed until the fall of 2013 or the

spring of 2014 while site hydrology is monitored and determined to be favorable for woody species establishment and survival.

Once mitigation earth-moving activities begin, at least 12 inches of topsoil consisting of clay loam, silty clay loam, or other suitable topsoil will be scraped off the surface and stockpiled for use as final topdressing across the site if required. Prior to topsoil placement, a rough grade inspection should be conducted to document that suitable wetland grades, soil conditions, and overall site slopes have been completed to encourage the successful creation of the wetland mitigation area. The grading of the mitigation areas will be irregular with as little compaction as possible. Minor variability in elevation is desirable for diversity in vegetation due to varying soil moisture levels. Flat, evenly graded slopes are undesirable and unacceptable. An uneven rolling grade with variations of ± 4 inches from indicated bottom grade is desired.

Excess soil from the mitigation site construction will be stockpiled in a suitable upland area or utilized to create upland trail systems at the direction of the IDNR. All proper soil erosion control measures will be implemented. A soil erosion control permit will be in place for the mitigation construction prior to the initiation of any earthwork.

Monitoring of the site will begin one growing season after construction is complete.

4.7 Soil Management and Erosion Control

All excavated soil will remain on site and be used to re-grade upland and/or public-access areas, including a parking area and foot trail. No erosion control blanket is currently proposed due to gradual grades and generally low topographic relief. However, all soil erosion and sediment control best management practices, including the installation and maintenance of silt fencing, will be implemented as necessary throughout the construction process to prevent the transfer of sediment off the site. All required ground disturbance permits will be acquired prior to the initiation of site work.

4.8 Construction Monitoring

The applicant will submit a report including complete as-built construction documents to the USACE and IDEM within 6 weeks of the completion of the site construction and planting. The as-built description will include a topographic map and planting plan which shows as-built contours and installed plant species, respectively.

5.0 PERFORMANCE STANDARDS

The following is a description of the predetermined goals set forth for the wetland restoration and enhancement zones. A failure to meet these goals will result in the need for remedial actions which may include supplemental planting or seeding, replanting or reseeding, additional excavation or site management, and/or removal of aggressive or invasive species. In order to be considered successful, the mitigation wetland must meet all of the following success criteria within a 10-year monitoring period.

- The planted trees and shrubs in the forested wetland zone will experience at least 60% average survivorship across the site, and native tree and shrub densities at the end of the 10-year monitoring period will be at least 432 trees or shrubs/acre.

- The planted shrubs in the scrub-shrub zone will experience at least 60% average survivorship across the site, and native shrub densities at the end of the 10-year monitoring period will be at least 420 shrubs/acre.
- Greater than 50% of the dominant vegetation species must have an indicator of FAC (i.e. facultative) or wetter.
- None of the three most dominant plant species may be non-native species or weedy species, including but not limited to *Typha angustifolia*, *Typha X glauca*, *Phragmites australis*, *Salix interior*, or *Phalaris arundinacea*. These species shall not cumulatively comprise more than 5% of the total percent cover (not relative cover) for each community.
- The mitigation wetland shall be free of the following invasive/exotic species: *Lythrum salicaria* (purple loosestrife), *Phragmites australis* (common reed), *Myriophyllum spicatum* (Eurasian water milfoil), and *Cirsium arvense* (creeping thistle).
- Native plant species, excluding *Typha* spp. (cattail), must have an aerial cover of at least 70% except in areas designed to be inundated.
- A minimum of 35 native perennial species, including volunteers, will be present in the mitigation wetlands.
- A minimum of 25 native perennial species, including volunteers, will be present in the dry to mesic prairie buffer.
- At least 50% of the required minimum number of species shall occur at a 10% frequency or greater, within each plant community zone or area. Multiple transects within a given plant community may be combined for this frequency analysis.
- A native mean coefficient of conservatism value (native mean C value) of greater than or equal to 3.5 shall be achieved each vegetative community type within the mitigation area and as measured over the entire mitigation site.
- The native floristic quality index value (native FQI) shall be greater than or equal to 20 in each vegetative community and as measured over the entire mitigation site.
- No area over the entire mitigation site greater than 1 square meter shall be devoid of vegetation, as measured by aerial coverage. However, this standard does not apply to emergent/inundated or open water aquatic communities.
- The native perennial species within each wetland plant community shall represent at least 80% of the total dominance measure. A lower percent native perennial species of the total dominance measure may be acceptable if it is demonstrated with transect data that the remaining dominance percentage is by native annual and biennial wetland plant species and the FQI and mean C standards are exceeded.
- The hydrology at the mitigation wetland site must meet the wetland hydrology criteria contained in the United States Army Corps of Engineers Wetland Delineation Manual, Technical Report Y-87-1 (January, 1987) and/or the appropriate regional supplements.
- The mitigation wetland, including forested, scrub-shrub, and emergent/inundated wetland, shall consist of 31.5 acres by the end of the monitoring period.

6.0 MONITORING PLAN

A qualified wetland scientist will monitor the mitigation wetlands twice annually (May/June and August/September) for a period of 10 years or until released by the USACE or IDEM. Monitoring will be conducted in years 1–5, 7, and 10 unless conditions or adaptive management measures warrant additional monitoring. A monitoring summary report will be submitted to the USACE and IDEM by December 31 of the calendar year.

The monitoring inspections will observe the following guidelines:

- Estimation of percent vegetative cover for all species present and for the wetland mitigation site as a whole, as determined based on transect/plot sampling.
- Documentation of planted tree survival.
- Sample of test pits to note evidence of wetland hydrology and/or hydric soils.
- Establishment of permanent photographic stations to provide visual documentation of wetland and upland development. The photographic stations will be representative of the mitigation site and sampling points.
- Notation of wildlife use through informal surveys.
- Completion of a botanical inventory of only the restoration wetlands in order to note species that are present but that were missed by the quantitative sampling efforts. Also, a floristic quality assessment (FQA) will be provided to measure the trend in level of conservatism (mean C value) and the floristic quality index (FQI).
- Completion of a wetland field delineation during years 3, 5, and 10 to document the extent of wetland present at the mitigation site. The on-site delineation will be conducted using the hydrology and vegetation parameters from the United States Army Corps of Engineers Wetland Delineation Manual, Technical Report Y-87-1 (January 1987) and applicable regional supplement. The acreages of the mitigation wetland will be assessed and results provided in the monitoring reports.

Yearly monitoring reports will provide a discussion of plant community development based on percent cover of plant species and other success criteria. Plots to measure plant cover will be established in the wetland, and thus will indicate the extent to which the wetland mitigation is meeting the performance standards. The first several monitoring reports will not include a delineation of the wetlands and will not provide acreages. Mitigation monitoring reports will include a table detailing the progress of the mitigation wetland development based on the above success criteria. The report will also include location and site maps, representative site photographs, and a general species inventories by vegetative community. Delineated wetland acreages will be determined and presented in the monitoring reports for years 3, 5, and 10, or when a mitigation area release request is submitted to the USACE and IDEM.

In order to be released from monitoring, the mitigation wetland must meet the performance standards within the 10-year monitoring period. A final monitoring report will be submitted after year 10 or once it has been demonstrated that the mitigation wetland consistently meets these requirements. Monitoring may then be discontinued with USACE and IDEM approval. If the USACE and IDEM determine that the performance standards have not been met, then remedial actions will be assessed and potential adaptive management options will be evaluated if applicable.