APPENDIX S

Superior Terminal
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APPENDIX S1

Superior Terminal Alternatives Analysis
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Purpose and Need
The proposed breakout tank expansion at the Superior Terminal will accommodate the temporary breakout storage of incremental volumes of crude oil that will arrive at the terminal via the proposed Alberta Clipper pipeline. Breakout tanks are used to relieve surges in the pipeline system and/or to receive and store crude oil for re-injection and continued transportation by pipeline. As a common carrier pipeline Enbridge transports various grades of crude for shippers. These crudes have varying densities and vapor pressures and the crude must be segregated so that the quality of the crude delivered to downstream refineries meets the appropriate specifications. In addition, as explained below in more detail, it is important to maintain a relatively consistent pressure in the pipeline for efficient operations. Due to differences in flow rates between the inbound and outbound mainline pipelines and the necessity to segregate different types of crude oil, all crude oil is placed into tankage at the Superior Terminal prior to being redirected to its downstream target destination. This ability to temporary place crude in tankage directly affects the proposed capacity of the Alberta Clipper pipeline and the existing Enbridge pipelines. The ‘bottleneck’ within any pipeline system is typically at terminals where product must be removed from pipelines, temporarily stored in breakout tanks and then re-injected for further shipment downstream. The Superior Terminal expansion is designed to prevent this “bottleneck,” and, thus allow the increased capacity from the Alberta Clipper pipeline to reach downstream users.

1.0 Introduction
Enbridge, in consultation with the St. Paul District Office of the U.S. Army Corps of Engineers (USACE) and the Wisconsin Department of Natural Resources (Wisconsin DNR) identified and evaluated a range of alternatives. Six categories of alternatives were analyzed in detail and include: no-build; upstream alternatives along the existing pipeline corridor; off-site locations within the City of Superior and greater than one mile from the Superior Terminal; off-site locations within a one mile radius of the Superior Terminal; on-site alternatives; and increasing the size of the proposed breakout tanks to reduce the number of tanks required. Enbridge’s analysis of various alternatives within each category is discussed below.

1.1 No-build Alternative
The no-build alternative assumed that no additional breakout tanks would be constructed as part of the Alberta Clipper project. This alternative would reduce the overall capacity of the Alberta Clipper pipeline since existing breakout tanks at the Enbridge Superior Terminal would be used to service incoming product from the Alberta Clipper pipeline and these tanks are already at capacity. Because inbound and outbound mainline pipelines have different flow rates and because batches must be segregated by physical characteristics (density, vapor pressure, etc.) to prevent degradation from mixing, all crude oil coming into the Superior Terminal is placed into tankage upon arrival. Since existing tanks currently are at maximum capacity attempting to use them for the additional incoming crude oil from the Alberta Clipper pipeline would result in capacity constraints to the proposed Alberta Clipper pipeline and to existing pipelines into and out of the Superior Terminal. The no-build alternative would not meet the purpose and need of the project.
1.2 Off-site Alternatives

1.2.1 Introduction
Enbridge considered certain off-site alternatives. An analysis of off-site alternatives requires an understanding of the importance of the Superior Terminal central manifold to the downstream distribution of the crude oil. Currently four existing incoming pipelines terminate at the Superior central manifold and five outgoing pipelines initiate at the Superior central manifold. Connecting the proposed tanks to the Superior central manifold enables access to all incoming and outgoing batches in Superior, making it a strategic location for crude oil breakout tanks. If the tanks are constructed off-site, certain existing resources at the Superior Terminal would have to be replicated at an offsite location. In addition, an off-site location would reduce the ability of Enbridge’s customers to directly access the Enbridge pipeline system for delivery to their target markets.

The key factors that must be taken into account when considering locating the new tanks off-site of the existing Superior terminal are: (1) additional pipeline construction and associated environmental impacts and economic costs; (2) pipeline pressure cycling; (3) pipeline system optimization; and, (4) product quality. Each of these is discussed in more detail below.

1.2.1.1 Additional Pipeline Construction and Associate Environmental Impacts and Economic Costs
The existing Superior Terminal is the main crude oil pipeline hub in the area, and the ability to connect to all incoming and outgoing pipelines contributes to the efficiency of the crude oil transportation system. Building the project off-site would require large amounts of additional piping and pumping capacity to connect the remote facility into the existing Superior Terminal. There would be associated environmental impacts of the pipeline construction as well as significant economic costs associated with the additional constructions. The current cost to install a 36-inch diameter pipeline is approximately $2.7 million per mile.

1.2.1.2 Pipeline Pressure Cycling
Directly receiving or injecting crude oil into or out of the proposed tanks into the connecting pipelines without using the existing Superior Terminal would cause the pipeline to be shut down upstream of the location. This occurs because the flow of crude in the pipeline is being interrupted as it is delivered into the breakout tanks. As an example, if the project were 20 miles upstream of Superior and crude oil is being delivered into the tanks, the pipeline system immediately downstream of the delivery location shuts down and has reduced pressure as the upstream portion of the pipeline pushes the crude oil into the tanks. As the delivery is completed and the normal operation of the pipeline resumes, there would be an increase in the pressure downstream of the delivery location. The opposite would hold for an injection of crude oil out of the breakout tanks into the pipeline, with the pipeline upstream of the location being shut down and corresponding pressure decrease. This revolving high-low pressure cycling on the pipeline limits capacity of the pipeline system and impacts the overall integrity of the pipeline, reducing its operating life.

1.2.1.3 Pipeline System Optimization
As described above, locating the project off-site of the existing Superior terminal results in pipeline shutdowns as receipts and deliveries of crude oil are made into and out of the tanks. The resulting shutdowns of the pipeline not only impact the integrity of the pipeline system, it also impacts the ability of the pipeline to optimize its operation. These shutdowns of the connecting pipeline system affect the overall capacity and efficiency of the pipeline system. The loss in
capacity is partly as a result of the inability to ensure that receipts and deliveries into and out of the tanks coincide, such that shutdowns on the connecting pipeline system are minimized.

1.2.1.4 Product Quality

Locating the additional tanks off-site from the existing Superior terminal will impact the quality of the crude oil. Locating the breakout tanks more than a mile from the distribution manifold at the Superior Terminal could result in product degradation due to batch mixing and capacity restrictions on the existing mainline pipelines. Because the Enbridge pipelines are regulated by the Federal Energy Regulator Commission (FERC) under United States tariffs, Enbridge is required to meet strict industry standards for product quality. There are currently four incoming pipelines that terminate at the Superior Terminal central manifold, the Alberta Clipper pipeline will be the fifth, and the five outgoing pipelines (four mainline pipelines and a delivery line to the Murphy Oil Refinery) initiate at the Superior Terminal. Connecting the proposed five breakout tanks to the Superior central manifold enables access to all incoming and outgoing batches in Superior, making it the most logical and strategic location for crude oil breakout storage.

Enbridge currently transports approximately 75 crude oil types with different characteristics. All crude oil that is transported through the various pipelines is segregated based on the characteristics of the product to maintain quality. Batches of crude oil types (a typical batch is approximately 60,000 barrels) are carefully lined up for transportation in order based on crude oil characteristics such as density and vapor pressure. Since each pipeline does not always run the same type of crude oil, the batches must be matched up similarly as they are injected into the downstream pipelines. Because of the batching procedures required to protect quality, all products moving through the pipelines must be staged in breakout tanks at the Superior Terminal.

Capacity interruptions resulting from material being moved from off-site tanks causes an idle pipeline. Every foot of pipeline not in use while off-site batches are being injected into the pipeline significantly degrades the crude oil product due to mixing and costs the pipeline lost time and revenue.

1.2.2 Upstream Alternatives

Key criteria for upstream alternatives along the existing Enbridge pipeline corridor were parcels owned by Enbridge or available for purchase that were 25 acres or larger in size. Based on these criteria, the following three sites were selected for review at the request of the USACE and Wisconsin DNR: the Enbridge terminal located in Clearbrook, Minnesota; a mainline pump station located near Floodwood, Minnesota; and expansion of an existing tank facility located near Wrenshall, Minnesota not owned by Enbridge. Refer to Figures 1 through 3 for the locations of the upstream alternatives. The three upstream alternatives are described below.

1.2.2.1 Clearbrook Terminal

Construction of the five proposed breakout tanks at the Clearbrook Terminal would also require the construction of a new manifold area, five booster pumps, two new mainline pumps at Clearbrook and Deer River Pump Station, and the installation of two 36-diameter pipelines from Clearbrook to Superior (approximately 188 miles) in addition to the proposed Alberta Clipper pipeline and facilities. Enbridge Engineering has determined that construction of the additional two pipelines would allow the tanks to be constructed at an off-site location and eliminate the need for additional tanks at the Superior Terminal. This would require the permanent impact of 7.69 acres of wetland at Clearbrook based on available information from the U.S. Fish and Wildlife Service’s National Wetland Inventory (NWI), additional permanent wetland impacts at the Deer River Pump Station as the facility would need to expand to accommodate the additional
mainline pumps, and approximately triple the temporary wetland impacts resulting from the construction of the Alberta Clipper pipeline between Clearbrook, Minnesota and Superior, Wisconsin. Moreover there would be significant cost increases due to the additional pipeline construction. As noted above, the current cost to install a single 36-inch diameter pipeline is $2.7 million per mile. Therefore, the two additional pipelines would cost approximately $1.015 billion.

1.2.2.2 Floodwood Pump Station
Construction of the five proposed breakout tanks at the Floodwood Pump Station also would require a new manifold area, five new booster pumps, two new mainline pumps, and two additional 36-diameter pipelines from Floodwood to Superior, which is approximately 52 miles at a cost of $280 million. This alternative would require the permanent impact of 5.86 acres of wetland, based on available information from the NWI, and the temporary wetland impacts from the construction of the Alberta Clipper pipeline would be roughly tripled between Floodwood, and Superior, Wisconsin.

1.2.2.3 Wrenshall Tank Site
Enbridge does not own or operate this facility, which currently includes one storage tank. In order to construct the five proposed breakout tanks at this location Enbridge would be required to purchase this facility. At this point, the facility is not for sale. Additional construction at this facility would include a new manifold area, five new booster pumps, two mainline pumps, and two additional 36-inch pipelines from Wrenshall to Superior, which is approximately 17 miles at a cost of $45.9 million. There is currently no bi-directional flow pipeline loop between Wrenshall and Superior. The temporary wetland impacts resulting from the construction of the Alberta Clipper pipeline would be roughly tripled between Wrenshall, Minnesota and Superior, Wisconsin.

All three upstream locations would have increased environmental impacts due to construction of additional pipelines. Moreover there would be both increased construction cost and operating costs as additional manpower would be required to operate and provide security at the off-site locations. Existing Enbridge staff at the Superior Terminal would be able to accommodate the increased workload if the breakout tanks were constructed on-site. Furthermore, Enbridge has emergency response equipment and personnel trained to handle such emergencies located in Superior at the Terminal. Additional staff and equipment would most likely be required for all upstream locations to minimize response times.

In summary, all three upstream alternatives would have significantly larger environmental impacts due to construction of additional pipelines. In addition, these upstream alternatives have issues with pipeline pressure cycling, pipeline system optimization, and product quality. Finally, the upstream alternatives have increased construction costs and increased operating costs as compared to the proposed alternative.

1.2.3 Off-Site Alternatives in Superior Greater Than One Mile from Central Manifold
Pursuant to the request of the USACE and Wisconsin DNR, two sites were evaluated as alternative locations in Superior for the construction of the five breakout tanks and associated infrastructure greater than one mile from the existing infrastructure.
1.2.3.1 Old Amoco Tank Farm

This site is approximately 22 acres in size and is bounded on the north by Winter Street, on the south by Halvor Lane, on the west by Susquehanna Avenue, and on the east by Maryland Avenue. (Refer to Figure 4). There is an out-parcel located in the south central portion of the property that has recently been developed by UPS as their administrative offices and distribution center and an area in the northeast corner of the parcel that is currently used by Murphy Oil and contains a portion of the an existing Murphy Oil pipeline.

The site is the former location of the Amoco tank farm. Our understanding is that this facility was shut down in the late 1990’s and that the tanks were physically removed in 1999. In addition, we understand that while no wetlands are present within the subject property, there are open environmental repair files at the Wisconsin DNR that would need to be resolved prior to development of this site. A comprehensive Environmental Assessment would be required and based on the previous use of the property there is a high likelihood that contamination is present. Therefore, remediation would be required prior to constructing the tanks.

Construction of the five proposed breakout tanks at this location would require a new manifold area, five new booster pumps, and five 36-inch pipelines to connect to the Superior Terminal, which is approximately 5.5 miles from the site. The pipelines would need to be constructed through the City of Superior, which would require the acquisition of numerous right-of-ways and impact City streets, sidewalks, and private residences. Wetlands and watercourses also would be impacted by the pipeline construction. The cost of the five additional pipelines would be approximately $74.3 million.

Therefore, due to potential historic contamination, wetland and watercourse impacts, increased costs, and impacts to the City of Superior infrastructure from pipeline construction, Enbridge eliminated this alternative from further evaluation.

1.2.3.2 Old Unical and Murphy Tank Farm

This site is located north of Winter Street, east of Douglas Street and west of Banks Street and was the former location of a Unical and Murphy Oil tank farm (refer to Figure 5). Enbridge’s research indicates that the Unical tank farm, which was located in the western portion of the site, was torn down in the early 1990’s and the bio-piles were created in 1995. The old Murphy Oil tank farm, which was located in the eastern portion of the site, was torn down in 1994. The former Unical tank farm consists of three parcels totaling 44.87 acres and is separated from the old Murphy Oil tank farm, which consists of two parcels totaling 13.06 acres, by an existing railroad. Enbridge’s research indicates that there are contamination issues with both sites, but that some clean-up work has been done on the former Unical tank farm site. However, the Wisconsin DNR was uncertain if any clean-up or remediation work had been done on the Murphy Oil tank farm site.

While completing the search for preliminary site information, Enbridge found no ownership information was available for the 12.33 acre parcel. In addition, this parcel is encumbered with an unnamed stream and associated riparian wetlands that diagonally cross the north central portion of this parcel. In order to avoid and minimize the wetland impacts to this parcel approximately a third of the parcel becomes un-useable, thus making the site too small to accommodate the proposed breakout tanks, containment berms, manifold, and associated infrastructure.

The largest of the five parcels, 43 acres, is owned by Burlington Northern. Given the proximity of this parcel to their existing rail line, Burlington Northern may have future development plans for this site and would be unwilling to sell. Given these outstanding issues and the fact that several parcels would need to be assembled (if the current owners were interested in selling) to have the
acreage required to construct the breakout tanks, containment berms, and manifold Enbridge eliminated this alternative from further analysis.

1.2.4 Off-Site Alternatives in Superior within One Mile from Central Manifold

Off-site alternative site locations within the City of Superior considered for this project included industrially zoned parcels 25 acres or larger in size located within a one mile radius of the existing Superior Terminal (refer to Figure 6). Properties considered included parcels currently owned by Enbridge or properties currently available for acquisition. When assessing available parcels, Enbridge took into account wetland and other environmental considerations, adjacent land use, and public concerns. In reviewing Figure 6 it is apparent that all available parcels located within the target search area are: part of the existing Superior Terminal; part of the Murphy Oil Refinery and tank farm; residential developments; areas that have been previously identified as wetland when the SAMP and/or Enbridge Energy’s comprehensive wetland assessment was completed; or regulated 100-year floodplain associated with the Nemadji River. Therefore, no practicable off-site location within the City of Superior exists that meets the search criteria.

1.2.4.1 Hill Avenue

This alternative is located on the east side of Hill Avenue, across from the Murphy Oil U.S.A. Superior Refinery (refer to Figure 7). The 107.44-acre site is located in the NE ¼ of Section 35 in Township 49 North, Range 14 West.

The landform in the project area is natural, with minimal prior disturbance directly to the site. The historic wetland complex appears to be extensive, but has been fragmented by railroads, two-lane paved roads, stormwater conveyance ditches, one-lane dirt access roads, and industrial development, particularly to the east.

Wetland evaluations conducted by SEH, Inc. in 2007 found extensive wetlands on site, the presence of state-listed rare plants, and special designation of this site as a “Priority Wetland Area” by the Wisconsin DNR. Functionally, this wetland was found to be of high to medium quality in the six wetland functions evaluated according to the Superior Routine Assessment Method employed.

One portion, in the southeast region of this property, is vegetatively degraded by a dense invasion of reed canary grass. A compressed tank configuration could be situated in this area, but would still impact up to 15 acres of wetland. Impacts to this degraded wetland area, however could result in indirect or secondary degradation of the adjacent, higher quality wetlands.

If built on this site, additional infrastructure would have to be constructed to link the tanks to the existing pipeline, crossing additional wetlands to the south and/or southwest, and resulting in temporary wetland disturbance and permanent wetland conversion (shrub-carr to wet meadow).

Arranged in the most compressed configuration and utilizing the greatest available upland area, the total footprint of the project would be 17.62 acres, including 15.33 acres of permanent wetland impact and 2.29 acres of temporary wetland impact from the installation of new piping to connect the site to the existing mainline. This alternative was eliminated by Enbridge from further consideration because of the high impact to wetlands.
1.2.4.2 Nemadji Golf Course Alternative
The Nemadji Golf Course is owned by the City of Superior and operated by a private management company and is currently not for sale. The purchase of 25 acres by Enbridge for the construction of the proposed breakout tanks would reduce the size of the course from the existing 36-holes to a smaller course. Furthermore, there are wetlands within the golf course that would be impacted by construction of the tanks. This alternative was eliminated from further consideration by Enbridge because of the impact to wetlands and to community resources site.

1.3 On-site Alternatives

1.3.1 Alternative A – 10th Street
Alternative A is 59.34 acres currently owned by Enbridge and is located in Sections 31, 25, and 31 in Township 49 North, Range 14 West.

This area had historically been developed as residential housing, but structures have since been removed, allowing some re-establishment of wetlands to occur. Trash and household debris, including electronics and furniture, are occasionally dumped within this site. Some remnants of structural foundations, sidewalks, alleys, and inactive streets remain. Active streets include portions of 10th and 11th Streets from 24th Avenue East to 34th Avenue East and 27th Avenue East from East 11th Street through the adjoining neighborhood to the north.

A portion of the existing terminal is located on this parcel, west of East 10th Street where six tanks currently operate. Additionally, foundations for eleven tanks were constructed in the early 1970s, though the tanks were not erected. Many of these foundation rings have established wetlands characteristics. Wetland areas within this site are highly disturbed, low in plant diversity, and degraded from previous land uses. Several uplands areas exist within this site and would be utilized to the greatest extent possible in order to minimize and reduce proposed wetland impacts.

Several historic and recently observed occurrences of state listed rare plants have been documented in this area including Vasey’s rush, arrowhead sweet coltsfoot, blunt spike rush, and black sedge. We believe that the recent observation of Vasey’s rush and blunt spike rush is due to the high level of disturbance, which is a requirement for their establishment. Details of these occurrences are included in the comprehensive evaluation report, which will be included as part of the application to the USACE and Wisconsin DNR.

This alternative is located near a residential neighborhood; however, between 500 and 1000 feet of undeveloped land would be left between proposed and existing tank projects and the residential neighborhood.

Based on the above analysis and pre-project consultations with the USACE and the Wisconsin DNR Enbridge believes that this area is the preferred alternative. Locating the project in this area would meet the purpose and need of the tank expansion. All properties are currently in Enbridge’s ownership. The site is adjacent to the existing terminal, thus minimizing impacts by limiting the amount of additional pipeline construction. In addition, construction on this site will allow use of the existing infrastructure limiting impact from infrastructure construction.

Alternative configurations within the 59.34 acre property are discussed further, below.
1.3.1.1 Alternative A-1: Standard Configuration Aligned with Tanks 32 & 33

Arranged in a standard configuration and utilizing the greatest available upland area, the total footprint of the project if located here would be 18.12 acres, which includes 15.83 acres of permanent wetland impact within the footprint and 3.20 acres of temporary wetland impact outside of the footprint for the installation of five new 36-inch pipes to connect the site to the existing central manifold (refer to Figure 8).

This alternative would result in the loss of several extant occurrences of Vasey’s rush and potentially one occurrence of arrowhead sweet coltsfoot. This configuration utilizes the greatest area of property already historically disturbed and is in close proximity to existing infrastructure to feed product from the breakout tanks to the main transport pipelines. This configuration also allows the total terminal footprint to be compressed (keeping proposed tanks closely arranged with existing tanks) and would allow for shared use of two existing berms (Tank 32/33 and Tank 35).

The alternative was eliminated from further consideration by Enbridge because of the larger footprint and larger wetland impact area, compared to Alternative A-2 and A-3, below.

1.3.1.2 Alternative A-2: Compressed Configuration Aligned with Tanks 34 & 35

Arranged in the most compressed configuration and utilizing the greatest available upland area, the total footprint of the project if located here would be 15.56 acres, including 14.44 acres of permanent wetland impact within the footprint and 5.01 acres of temporary wetland impact from the installation of new piping to connect the site to the existing central manifold (refer to Figure 9).

It would also result in the loss of six extant occurrences of arrowhead sweet coltsfoot. This configuration utilizes property which has been previously disturbed and is in close proximity to existing infrastructure to feed product from the breakout tanks to the main transport pipelines, but would be approximately 300 feet from existing residential structures west of East 9th Street (a railroad). This configuration also allows the total terminal footprint to be compressed (keeping proposed tanks closely arranged with existing tanks), further minimizing impacts. However, this alternative was only able to share one existing berm with Tanks 34 and 35. Therefore additional containment structures would be required.

This alternative was eliminated from further consideration by Enbridge because the permanent and temporary wetland impacts exceeded other proposed alternatives by as much as 2.48 acres of permanent impact and 1.81 acres of temporary impact. In addition, Enbridge was concerned about the proximity of this configuration to a residential neighborhood.

1.3.1.3 Alternative A-3: Compressed Configuration Aligned with Tanks 32 & 33

This alternative is arranged in the most compressed configuration and utilizes the greatest available upland area. The footprint for the tanks, manifold, and pumps is 14.10 acres if placed in this location. Whereas, the entire project footprint is 18.87 acres, which includes the new piping corridor, tanks, manifold, pumps, and the stormwater pond. The proposed permanent wetland impacts would be 11.26 acres within the footprint and 3.19 acres of temporary wetland impact outside of the footprint though an existing pipeline corridor for the installation of new piping to connect the site to the existing mainline (refer to Figure 10).

This alternative would result in the loss of several extant occurrences of Vasey’s rush and potentially one occurrence of arrowhead sweet coltsfoot. This configuration utilizes the greatest area of property previously disturbed and is in close proximity to existing infrastructure to feed product from the breakout tanks to the main transport pipelines. This configuration also allows
the total terminal footprint to be compressed (keeping proposed tanks closely arranged with existing tanks) and would allow for shared use of two existing berms (Tank 32/33 and Tank 35), further minimizing impacts.

This is the Enbridge preferred alternative because it minimizes the wetland impacts and utilizes the upland areas to the greatest extent possible.

### 1.3.2 Alternative B – Stinson Avenue

This 106.86-acre site is currently owned by Enbridge and is located, in the west ½ of Section 36 in Township 49 North, Range 14 West, along Stinson Avenue. This site includes several disturbed areas. A pipeline corridor, approximately 100 feet wide, runs through the project area, from north to south. A raised utility corridor runs along the eastern edge of the project area, outside the project boundaries. Two railroad grades, one abandoned and one active, run east-west along the northern boundary of the project area, both within and outside the project boundaries. A snowmobile trail runs east-west through the middle of the property from the pipeline corridor, east to Bardon Avenue.

Given the size and configuration of this parcel, three different site configurations were considered as part of the alternatives analysis (refer to Figures 11, 12, and 13) for this site. The parcel is made up of a narrow strip, south of Stinson Avenue that is approximately 18.7 acres. In addition, there are approximately 57 acres of land east of the existing pipeline corridor and 45 acres of land west of the existing pipeline corridor. The east and west portions of this area are divided by an existing pipeline corridor which cannot be practically relocated or impacted for the construction of the proposed project.

#### 1.3.2.1 Alternative B-1

Alternative B-1 is a narrow piece of property, between Stinson Avenue and the railroad track, which is almost entirely wetland (refer to Figure 11). Alder shrub-carr, aspen dominated seasonally wet forest, and sedge meadow wetland habitat types are present in this area, in addition to eight documented occurrences of arrowhead sweet coltsfoot in 2007. This site has been subject to a direct and indirect disturbance, including fragmentation by the construction of roads and railroads on all four sides and deposition of fill material in the southwest corner. Culverts located at the northeast corner connect this system to drainage ditches. Construction of containment berms and other infrastructure features would be required as they do not currently exist on the tract. This area was eliminated from, further consideration by Enbridge because of the lack of existing infrastructure from the main terminal to the tank site and inability to use the minimum-impact layout in a site dominated by wetlands. The site is too small to situate the tanks in without being close to Stinson Avenue or the active railroad.

#### 1.3.2.2 Alternative B-2

Alternative B-2 assessed the land on the east side of the pipeline, which is a large contiguous parcel. This portion of the parcel is comprised of minimally disturbed alder shrub-carr, aspen dominated seasonally wet forest, and wet meadow. Five occurrences of arrowhead sweet coltsfoot were documented in 2007. Arranged in the most compressed configuration and utilizing the greatest available upland area, the total footprint of the project would be 20.87 acres, including 17.37 acres of permanent wetland impact and 1.07 acres of temporary wetland impact from the installation of new piping to connect the site to the existing mainline.

This parcel borders the Nemadji Golf Course, to the south and includes portions of the golf course fairway and paved trail. A snowmobile trail also runs through a portion of this project area from Bardon Avenue west to the pipeline corridor. Uplands in this portion of the property include
some fairly steep slopes to a creek that drains to the Nemadji River and thus are not practicable for tank placement. This alternative was eliminated from further consideration by Enbridge due to the inability to compress the project configuration to avoid wetland impacts and the close proximity of this location to a public recreation facility.

1.3.2.3 Alternative B-3
Alternative B-3 is an area on the west/northwest side of the pipeline which is irregularly shaped. The most potential for development is on the north side, which is elongated and significantly disturbed. There is some upland in this area (north end); however, the upland was constructed for a railroad bed (abandoned) and perched seasonally wet forests have formed in the center of the raised area. The tank configuration practicable to fit within this area would not allow for minimization of wetland impacts, as tanks would have to be placed side by side rather than the more compact configuration that could be used on other parcels. This alternative is shown in Figure 13 with generic placement of the most compressed configuration possible. In the southern half of this area, habitats have been minimally disturbed, and six occurrences of arrowhead sweet coltsfoot were documented in 2007. Apart from a few, isolated upland islands, this area is over 90 percent wetland. Tanks constructed in this area would have the ability to directly connect to the main pipeline which exists through this parcel. This alternative was eliminate from further consideration by Enbridge because the area with the most available upland was not feasible for placement of the tanks without extensive earthwork and resulting impacts to adjacent wetlands. Other areas of the property have more extensive occurrence of high quality wetlands that have not been significantly disturbed.

1.4 Reduce the Number of Tanks Required
Pursuant to the request of the USACE and Wisconsin DNR., Enbridge evaluated the possibility of reducing the number of tanks required, which could minimize wetland impacts, by increasing the holding capacity or volume of the tanks. The number and volume of tanks required to accommodate the incremental volume of crude oil is determined by two factors: product segregation and batch sizes. As discussed previously, Enbridge transports over 75 different crude types and is required to maintain quality specifications in accordance with our tariffs. Decreasing the number of tanks limits the ability to segregate the various crude types.

In addition, the nominal batch size is 60,000 barrels. The shippers typically require Enbridge to group batches in three (i.e. 180,000 barrels - the working volume of the tanks is approximately 204,000 barrels). Therefore, with the current capacity, Enbridge will be able to utilize the entire working capacity of the tanks.

Reducing the number of tanks would not meet the purpose and need of the project due to the reduced ability to segregate crude types and efficiently group batches. Therefore this alternative was eliminated from further consideration by Enbridge.

2.0 Proposed Alternative: Alternative A-3
Alternative A-3 would impacts previously disturbed lands where uplands are present and Enbridge owns the property. The site is in close proximity to existing infrastructure, minimizing additional temporary or permanent wetland impacts. Expansion of the existing facility prevents the need for construction of a new terminal facility and minimizes the footprint of the terminal overall by compressing the proposed construction and designing it into the existing facility and structures.
Permanent impacts have been compressed in the configuration design to allow sharing of berms and containment facilities, practical in projects involving the construction of multiple tanks concurrently. The total proposed acreage for this alternative is 18.87 (final construction), and proposes 11.26 acres of permanent wetland impacts (refer to Figure 10). This configuration includes use of two existing berms, adjacent to Tanks 32, 33, and 35 minimizing the same configuration at another location by 2.32 to 5.25 acres. Permanent wetland impacts with a standard configuration would have equaled over 19 acres.

Temporary wetland impacts include construction buffers, equipment staging, construction trailers, material storage, and access. Where practical, operation of equipment will be done using available equipment that will minimize rutting, tracking, or other unnecessary soil disturbance in areas permitted for temporary wetland impacts.

Areas permitted for temporary wetland impacts, which result in ground disturbance will be restored to their original elevation and surface form, including preserving topsoil for replacement as topsoil when all temporary impacts are completed. All restored areas will be seeded with a native wetland seed mix provided by a regional vendor. Areas of temporary wetland impacts that will result in ground disturbance include where underground pipes will be installed.

Impacts to adjacent wetland areas will be avoided through use of silt fencing installed prior to the commencement of earthwork in the permitted project area.

This is Enbridge’s preferred alternative because it minimizes the wetland impacts, utilizes the upland areas to the greatest extent possible, maximizes the use of existing infrastructure such as containment structures and is economically feasible.

2.1 Environmental Justice Considerations of the Preferred Alternative

Executive Order 12898 on Environmental Justice requires that each federal agency address disproportionately high and adverse health or environmental effects of its programs, policies, and activities on minority populations and low-income populations. As part of the preparation of the EIS, the NEPA review process must provide opportunities for effective community participation and involve consultation with affected communities. If the proposed action would result in significant adverse effects to minority or low-income population or Native American tribes, the NEPA analysis should address those impacts as part of the alternative analysis and identify appropriate mitigation measures to address the effects.

Populations considered affected for the environmental justice analysis for the Superior Terminal include the City of Superior, WI and surrounding communities. Tables 1 and 2 describe both the ethnic and racial composition and income distribution of these communities, respectively. Within these areas, there are no predominantly low-income or minority communities and the population of Native Americans is less than 2.5 percent of the total population. About 94.3 percent of the population of the city of Superior is white non-Hispanic and 13.9 percent live below federal standards defining poverty. This is only slightly higher than Douglas County’s average of 13.6 percent living in poverty. In smaller neighboring communities, 96.8 percent of the population of Superior Village is white non-Hispanic and 3.4 percent live below the poverty line. Similarly, 91.6 percent of the population of Allouez Village is white non-Hispanic and 3.9 percent live below the poverty line. This is a drastically lower percentage than Wisconsin state poverty estimates of 10.9 percent. As well, the median household incomes for these smaller communities, $50,147 for Superior Village and $65,471 for Allouez Village, are higher than both the state and county averages of $46,142 and $38,694, respectively. Alternatively, the city of Superior has a slightly lower median household income of $37,420 when compared to state and county averages. In general, minorities comprise a smaller percentage of the population in these communities than
Wisconsin state averages. One exception is a slightly higher population ratio of Native Americans in the city of Superior by 1.3 percent when compared to Wisconsin’s average of 0.9 percent. However, based on the rural setting of the Enbridge Superior Terminal, and the fact that expansion projects would remain solely within existing Terminal boundaries, neither low-income nor minority groups would be disproportionately affected by the proposed project.

Table 1

Demographics on the Ethnic and Racial Composition in the Vicinity of the Enbridge Superior Terminal

<table>
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<tr>
<th>State/County/Community</th>
<th>Total Population</th>
<th>Percent White</th>
<th>Percent Black or African American</th>
<th>Percent American Indian &amp; Alaska Native</th>
<th>Percent Native Hawaiian &amp; Other Pacific Islander</th>
<th>Percent Other Race</th>
<th>Percent Reporting Two or More Races</th>
<th>Percent Hispanic or Latino Race</th>
<th>Percent Minority</th>
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<td>Wisconsin</td>
<td>5,556,506</td>
<td>85.7</td>
<td>6.0</td>
<td>2.0</td>
<td>0.0</td>
<td>0.0</td>
<td>1.1</td>
<td>4.7</td>
<td>14.3</td>
</tr>
<tr>
<td>Douglas County</td>
<td>44,061</td>
<td>94.1</td>
<td>0.7</td>
<td>1.9</td>
<td>0.9</td>
<td>0.0</td>
<td>0.0</td>
<td>1.4</td>
<td>5.9</td>
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<tr>
<td>City of Superiorb</td>
<td>26,960</td>
<td>94.3</td>
<td>0.7</td>
<td>2.2</td>
<td>0.8</td>
<td>0.0</td>
<td>0.3</td>
<td>1.7</td>
<td>0.8</td>
</tr>
<tr>
<td>Superior Villageb</td>
<td>531</td>
<td>96.8</td>
<td>0.6</td>
<td>n/a</td>
<td>n/a</td>
<td>n/a</td>
<td>2.4</td>
<td>n/a</td>
<td>0.2</td>
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<tr>
<td>Allouez Villageb</td>
<td>15,159</td>
<td>91.6</td>
<td>4.6</td>
<td>n/a</td>
<td>n/a</td>
<td>n/a</td>
<td>2.6</td>
<td>n/a</td>
<td>1.3</td>
</tr>
</tbody>
</table>

a Populations considered potentially affected for the environmental justice analysis for the Superior Terminal include Superior, WI and surrounding communities.

Data obtained using 2006 Census data, unless otherwise noted.

b Data obtained using 2000 Census data.

c 2003 estimate.


Table 2

Demographics on Income Distribution in the Vicinity of the Enbridge Superior Terminal

<table>
<thead>
<tr>
<th>State/County/Community</th>
<th>Total Population</th>
<th>Median Household Income ($)</th>
<th>Percent Below Poverty Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wisconsin</td>
<td>5,556,506</td>
<td>46,142</td>
<td>10.9</td>
</tr>
<tr>
<td>Douglas County</td>
<td>44,061</td>
<td>38,694</td>
<td>13.6</td>
</tr>
<tr>
<td>City of Superior</td>
<td>26,960</td>
<td>37,420</td>
<td>13.9</td>
</tr>
<tr>
<td>Superior Village</td>
<td>531</td>
<td>50,147</td>
<td>3.4</td>
</tr>
<tr>
<td>Allouez Village</td>
<td>15,159</td>
<td>65,471</td>
<td>3.9</td>
</tr>
</tbody>
</table>

a Populations considered potentially affected for the environmental justice analysis for the Superior Terminal include Superior, WI and surrounding communities. Data obtained using 2006 Census data, unless otherwise noted.

b Calculated in 2005 dollars.

c 2003 estimate.

Resources


MINNESOTA - CLEARWATER COUNTY
T-149-N, R-37-W
Section 28

FIGURE 1

Footprint Area: 14.10 Acres
Wetland Impacts: 7.69 Acres

ALBERTA CLIPPER LOCATIONS
CLEARBROOK TERMINAL ALTERNATIVE
ALBERTA CLIPPER LOCATIONS

WRENSHALL TANK SITE ALTERNATIVE
WISCONSIN - DOUGLAS COUNTY
T-49-N, R-14-W
Section 16

FIGURE 4

Footprint Area: 14.10 Acres
Wetland Impacts: 0.00 Acres

Approximately 5.5 mile pipeline required to reach Enbridge Terminal.

Non-Eligible Wetlands for SAMP Permits
Eligible Wetlands for SAMP Permits
Other Water Features

ALBERTA CLIPPER LOCTIONS
OLD AMOCO TANK FARM ALTERNATIVE
Approximately 5.5 mile pipeline required to reach Enbridge Terminal.
FIGURE 6

1 MILE RADIUS MAP

1 MILE RADIUS FROM
ENBRIDGE SUPERIOR TERMINAL

NEW BREAKOUT TANKS

WISCONSIN - DOUGLAS COUNTY
T-49-N, R-14-W  Sections 25 & 35
T-49-N, R-13-W  Sections 30 & 31

ENBRIDGE ENERGY, LP

100 Yr Flood Plain/Protected Wetland Boundary
Approximate Facility Boundaries
New Breakout Tanks
1 Mile Proximity

NEMADJI GOLF COURSE
NEMADJI RIVER
MURPHY REFINERY
ENBRIDGE SUPERIOR TERMINAL
CENTRAL MANIFOLD AREA
RESIDENTIAL
NEMADJI RIVER

Wetlands Eligible for SAMP Permits
Wetlands Not Eligible for SAMP Permits
WISCONSIN - DOUGLAS COUNTY
T-49-N, R-14-W
Section 35
FIGURE 7

Total Site Area: 107.44 Acres
Total Footprint: 15.33 Acres
Total Wetland (Permanent): 15.33 Acres
Total Wetland (Temporary): 2.29 Acres

ALBERTA CLIPPER LOCATIONS
HILL AVENUE ALTERNATIVE

Hill Avenue Alternative
STORMWATER POND
NEW PIPING
FIGURE 8

Total Site Area: 59.34 Acres
Total Footprint: 18.12 Acres
Total Wetland (Permanent): 15.83 Acres
Total Wetland (Temporary): 3.20 Acres

ALBERTA CLIPPER LOCATIONS
ALTERNATIVE A1

STORMWATER POND

NEW PIPING

Wetland
FIGURE 9

Total Site Area: 59.34 Acres
Total Footprint: 15.56 Acres
Total Wetland (Permanent): 14.44 Acres
Total Wetland (Temporary): 5.01 Acres

ALBERTA CLIPPER LOCATIONS
ALTERNATIVE A2

NEW PIPING
STORMWATER POND

Wetland
ALBERTA CLIPPER LOCATIONS

FIGURE 10

Total Site Area: 59.34 Acres
Total Project Area: 18.87 Acres
Total Footprint: 14.10 Acres
Total Wetland (Permanent): 11.26 Acres
- Type 1 (Shrub Carr): 4.87 Acres
- Type 2 (Wet Meadow): 6.39 Acres
Total Wetland (Temporary): 3.19 Acres

WISCONSIN - DOUGLAS COUNTY
T-49- N, R-13- W
Section 30

STORMWATER POND

NEW PIPING

Alternative A3
Total Site Area: 15.03 Acres
Total Footprint: 15.03 Acres
Total Wetland (Permanent): 14.92 Acres
Total Wetland (Temporary): 3.19 Acres
**WISCONSIN - DOUGLAS COUNTY**

**T-49- N, R-14-W**

**Section 36**

**FIGURE 12**

Total Site Area: 61.26 Acres
Total Footprint: 14.31 Acres
Total Wetland (Permanent): 12.61 Acres
Total Wetland (Temporary): 3.19 Acres

**ALBERTA CLIPPER LOCATIONS**

**ALTERNATIVE B2**
Total Site Area: 45.60 Acres
Total Footprint: 20.10 Acres
Total Wetland (Permanent): 17.45 Acres
Total Wetland (Temporary): 3.19 Acres
APPENDIX S2

Superior Terminal Wetland Delineation Report
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Wetland Delineation

Methodology

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

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

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

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

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

The Routine Onsite Determination Method (RODM) was applied for this delineation. The field evaluations were conducted under temperature conditions that were normal and precipitation conditions that were below normal as compared to the historical average for the region according to the National Oceanic and Atmospheric Administration, Superior, Wisconsin Weather Station. Most of the vegetation was identifiable, including all dominant species.

Field notes, samples, and photographs were taken at representative locations in each wetland basin. Collected information was transferred to RODM data sheets, which are included in the appendices of this report. Each data sheet is referenced to a sample location along the identified wetland boundary by the plot ID number. Numbers ending in “W” identify data collected within the wetland boundary. Numbers ending in “U” identify data collected outside the wetland basin.

Wetland plant species nomenclature follows the PLANTS Database (U.S. Department of Agriculture, 2007). Identification was aided when necessary with field guides for the region.

Soils were observed for hydric soil characteristics. Soils were examined in cores taken with a soil probe. Cores were taken to a depth necessary to confirm hydric soil characteristics, up to a maximum depth of 24 inches. Soil color determinations were made using MUNSELL Soil Color Charts (Gretag-Macbeth, 1994). Site soil characteristics were compared to those mapped and described in the Soil Survey for Douglas County.

Subsurface wetland hydrology indicators were examined using the soil cores and/or soil pits as deep as 16 inches to confirm soil saturation in the upper 12 inches of the soil profile.

Wetland boundaries were located and marked with, pink “WETLAND BOUNDARY” flagging tape to allow for surveying and field verification by the USACE and the Wisconsin Department of Natural Resources (DNR). The wetland edge is considered the highest extent of the wetland basin; areas above the boundary fail to meet the three required wetland parameters while areas below the edge meet the wetland conditions.
parameters required by the field delineation methodology. The location of the delineated wetland boundaries were surveyed and mapped.

Wetland classification follows the methods described in *Wisconsin Wetlands Inventory Classification Guide*, (DNR publication WZ-WZ023, February 1992). Classifications defined in *Wetlands and Deepwater Habitats of the United States* (Cowardin, et al., 1979), and used by the U.S. Fish and Wildlife Service National Wetland Inventory (USFWS NWI) are also included. Classification of each wetland basin is included on the RODM data sheets in the appendices.

**Results**

The proposed project area is primarily wetland (see Figure 2 and Appendix A) with some upland areas where filling has occurred. The proposed project area includes several habitat types including, in order of abundance, alder thicket, wet meadow, and shrub carr (Appendix A).

Wetlands occurring within the proposed project area include S4-25-24 and S4-30-22, as defined by the City of Superior SAMP II and shown on the City of Superior SAMP II Wetland Map (Figure 4). These two wetland basins were identified, delineated and classified between September 25 and October 3, 2007. The RODM data sheets in Appendix B indicate the dominant species of vegetation and the soil and hydrologic characteristics at representative locations around each basin. **Table 1** is a summary of the size and classification of wetland habitats within the project area.

**Table 1**

*Project Area 3 Wetland Characteristics*

<table>
<thead>
<tr>
<th>WWI Classification</th>
<th>Size (acres, combined)</th>
<th>Cowardin Classification</th>
<th>Circular 39 Classification</th>
</tr>
</thead>
<tbody>
<tr>
<td>S3Kr</td>
<td>41.45 acres</td>
<td>PSS1Y</td>
<td>Type 6A&amp;B</td>
</tr>
<tr>
<td>E2Kr</td>
<td>33.53 acres</td>
<td>PEMB</td>
<td>Type 2A&amp;B</td>
</tr>
<tr>
<td>Upland</td>
<td>14.68 acres</td>
<td>Upland</td>
<td>Upland</td>
</tr>
<tr>
<td>TOTAL</td>
<td>109.42 acres</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Wetland S4-25-24**

Wetland S4-25-24 (subpart B, SAMP II eligible) is a wetland matrix comprised primarily of wet meadow and some alder thicket and seasonally wet forest. Only the western most portion of the project area is included in this wetland. A wetland delineation and rare plant survey was completed by Natural Resources Group, Inc. in 2005. The result of the current delineation was consistent with their findings with only minor variations. Sample point TP16U was taken in this wetland area.

This wetland area has been historically disturbed by the construction of three tank foundations, none of which were erected, and containment berms. Only a portion of this wetland remains due to tank construction and development in recent years. This wetland is hydrologically connected via sheet flow directly to Newton Creek in the middle of Subpart A and also via ditches along 11th Street East from 27th Avenue East, which flow into Newton Creek at approximately 11th Street East and 25th Avenue East (platted).

Wet meadows are predominant throughout the proposed project areas. Alder thicket and willow shrub carr occur scattered in the eastern portion of the project area. Uplands occur where berms and tank foundations were constructed, historically.
Wetland S4-30-22

Wetland S4-30-22 is a wetland matrix comprised primarily of seasonally wet forest, alder thicket, and wet meadow. Only the northern half of this wetland is involved in the proposed project area. A wetland delineation and rare plant survey was completed by Natural Resources Group, Inc. in 2005 in this wetland area. The result of the current evaluation was consistent with their findings with only minor variations. Sample points TP14W, TP15U, were taken in this wetland area.

Several natural and artificial drainageways exist through this wetland, all directing water to an unnamed stream that eventually connects to Newton Creek.

Wet meadow and alder thicket comprise the majority of this wetland area. No upland areas were identified in this wetland, which, functionally, is directly connected to Wetland S4-25-24. Wetland areas within the proposed project area were significantly disturbed, historically, but have since been allowed to restore, vegetatively, without maintenance.

Functional Assessment

Methodology

A wetland functional assessment was conducted on wetlands in the City of Superior in June 2002 in association with the Superior SAMP II. The assessment was updated with more site specific data in 2007.

Wetland assessments evaluate the quality of six primary wetland functions, including plant habitat integrity, wildlife habitat integrity, hydrologic integrity, flood and stormwater attenuation, water quality protection, and aesthetics/recreation/education/cultural/science. The process was modified from the Minnesota Routine Assessment Method (Version 2.0) by the City of Superior, USEPA, Wisconsin DNR, USACE, and the USFWS. The specific methods are described in the City of Superior Routine Assessment Method for Evaluating Wetland Function, Superior Wisconsin (February 2003).

The 2002 functional assessment was completed by observing the habitat types and vegetation from within the railroad and public rights-of-way on lands adjacent to the project areas. The assessment was based on randomly selected and accessible observation points located at the edge of the properties. The 2007 assessment incorporated data gathered from all habitats occurring at the edges and within the core of the properties.

Plant and wildlife habitat integrity data was gathered based on field observations made while meandering randomly, throughout the entire project area and comprehensively through all habitat types, as described in the methodology for the threatened and endangered plant survey. Data on stormwater and flood attenuation, hydrologic integrity, water quality, and public values were similarly assessed based on Geographic Information Systems (GIS) data, as well as with field observations.

Results

The proposed project area lies east of a highly developed, industrially zoned area where an oil refinery and a storage/pipeline company operate and south and west of a highly developed residential area. Wetlands throughout the property have many ditches running through their core, likely dug to facilitate drainage by prior landowners. The functional assessments for these wetlands is summarized in Table 2 and Appendix B.

Wetland S4-25-24 is significantly disturbed. The wetland is dominated by reed canary grass, but with scattered shallow depressions which house rare plant species including *Juncus vaseyi*. Several ditches run through this property, east of the proposed project area and at least one ATV trail was observed being actively used. S4-25-24 is the site of several historically constructed tank foundations, none of which, in this particular area, were ever completed. Rare plant assessments in 2005 resulted in documented occurrences of blunt spike rush, and Vasey’s rush. During the current survey, several of these occurrences were reconfirmed, as well as additional occurrences of Vasey’s Rush, black sedge, and arrowhead sweet colt’s foot.
Wetland S4-30-22 is also highly disturbed. This area contains former residential home sites and streets and alleys are still present between the wetlands and subparts, though not in the proposed project area. Reed canary grass and thistles are dominant in most habitats, but several occurrences of arrowhead sweet coltsfoot, a state listed threatened (Thr-S3) species were found scattered occasionally throughout alder thicket and hardwood forest habitats.

An overview of these wetlands indicates that they were all likely integrated into one or more larger wetland complexes, at least grouped as they are by the Superior SAMP assessments. Wetlands are connected by ditches directly flowing to Newton Creek.

The landforms within the project area are not natural due to the extensive historic and current land use modifications. The historic wetland complex appears to be extensive, but has been fragmented by railroads, two-lane paved roads, alleys, stormwater conveyance ditches, one-lane dirt access/ATV roads, and residential and industrial development. Power lines run through the property (overhead) and pipelines run underground through the property. The ATV trails were used year round (in winter by snowmobiles). For security reasons, however, this area was fenced. Lack of travel on the route will result in the area potentially changing from meadow to shrub or forested habitat, similar to adjacent habitat types, if not otherwise developed.

Between assessments in 2002, 2005, and 2007, the abundance of exotic and invasive plants in the shrub carr, seasonally wet forest, and wet meadow habitats has significantly increased. *Phalaris arundinacea* (reed canary grass), *Cirsium spp.* (thistles), and *Tanacetum vulgare* (tansy) have all increased in abundance. Between 2005 and 2007, a greater abundance of state listed rare plants were observed.

Three consecutive years of drought may be contributing to the invasion of thistles and reed canary grass in wetland habitats, thus some elements of this invasion may not have been present during the 2002 assessment.

The project area is not mapped within the National Flood Insurance Program (NFIP) floodplain, but wetlands, streams, and drainages are shown on topographical maps (Figure 1) and the Wisconsin Wetland Inventory (Figure 2). This wetland is not subject to the City of Superior Shoreland Wetland Zoning Ordinance, due to the proximity of the wetland to qualified waters, and does not meet the conditions pursuant to the City’s ordinance.

### Table 2
Summary Functional Assessment (Superior RAM)

<table>
<thead>
<tr>
<th>Wetland S4-35-24</th>
<th>Functional Index Score</th>
<th>Functional Index Rating</th>
<th>Comments</th>
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</thead>
<tbody>
<tr>
<td>Plant Community Integrity</td>
<td>5.8</td>
<td>Medium</td>
<td>(weighted score)</td>
</tr>
<tr>
<td>Plant Community 1</td>
<td>60%</td>
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<td>Medium</td>
</tr>
<tr>
<td>Plant Community 2</td>
<td>20%</td>
<td>7.0</td>
<td>High</td>
</tr>
<tr>
<td>Plant Community 3</td>
<td>20%</td>
<td>7.0</td>
<td>High</td>
</tr>
<tr>
<td>Hydrologic Integrity</td>
<td>1.7</td>
<td>Low</td>
<td></td>
</tr>
<tr>
<td>Wildlife Habitat Integrity</td>
<td>4.0</td>
<td>Medium</td>
<td></td>
</tr>
<tr>
<td>Functions</td>
<td>Functional Index Score</td>
<td>Functional Index Rating</td>
<td>Comments</td>
</tr>
<tr>
<td>-----------------------------------</td>
<td>------------------------</td>
<td>-------------------------</td>
<td>------------------------</td>
</tr>
<tr>
<td>Plant Community Integrity</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Plant Comm. 1</td>
<td>6.8</td>
<td>Medium</td>
<td>(weighted score)</td>
</tr>
<tr>
<td>Plant Comm. 2</td>
<td>8.0</td>
<td>High</td>
<td>Alder Thicket/Shrub Carr</td>
</tr>
<tr>
<td>Plant Comm. 3</td>
<td>2.0</td>
<td>Low</td>
<td>Wet Meadow</td>
</tr>
<tr>
<td>Hydrologic Integrity</td>
<td>2.3</td>
<td>Low</td>
<td></td>
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<td>Wildlife Habitat Integrity</td>
<td>4.4</td>
<td>Medium</td>
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</tr>
<tr>
<td>Flood and Stormwater Attenuation</td>
<td>3.7</td>
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<tr>
<td>Water Quality Protection</td>
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<td></td>
</tr>
<tr>
<td>Aesthetics/Rec./Edu./Cultural</td>
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<td>Medium</td>
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</tr>
<tr>
<td>Special Features?</td>
<td></td>
<td></td>
<td>Yes: State listed rare plant occurrences</td>
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</table>

Wetland S4-30-22
FIGURES
FIGURE 3
DOUGLAS COUNTY SOIL SURVEY MAP

Legend

Project Areas
- Project Area 1 - Hill Avenue
- Project Area 2 - Stinson Avenue
- Project Area 3 - 10th Avenue

Natural Resources
- Railroads
- Streets

Douglas County Soil Survey
- MUSYM
- 262B
- 274C
- 274D
- 347A
- 405A
- 5A
- 6A
- 92F

0 400 800 1,200 1,600 Feet
0 200 400 800 1,200 1,600 Feet

ENBRIDGE ENERGY LP
COMPREHENSIVE WETLAND EVALUATION
SUPERIOR, WISCONSIN

FIGURE 3
DOUGLAS COUNTY SOIL SURVEY MAP

RJH 08/07 RJH 08/07 CJD 08/07

NO. DATE ISSUES/REVISIONS DRAWN BY DESIGN QC CHECK

PROJ NO. AENR08001
DATE 08/15/07
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