Zim Sod Wetland Mitigation Site

Wetland Mitigation Plan

Poly Met Mining Inc.

May 2014

Zim Sod Wetland Mitigation Site
Wetland Mitigation Plan

May 2014

Contents

List of Tables

List of Figures

List of Appendices

1.0 Introduction

On behalf of PolyMet Mining Inc. (PolyMet), Barr Engineering Company (Barr) has prepared the following project-specific wetland mitigation plan for the Zim Sod Wetland Mitigation Site (Site). The Site is located in two separate units on approximately 569 acres of land, much of which is proposed to be restored for wetland mitigation credits for the NorthMet Project (Project). The two units will be developed concurrently and are hereby collectively referred to as the Site. The Site is located in St. Louis County in the St. Louis River major watershed (#3) within the Lake Superior basin (Bank Service Area #1) and southwest of Eveleth (Figure 1). The North Unit is about 481 acres and the South Unit is about 88 acres.

The Site is currently an active sod farm that has been drained with ditches and sub-surface drain tiles. The project-specific mitigation plan includes the following methods of restoration to receive wetland mitigation credits, additional details are provided in Table 1 and Table 2:

- Restoration of 401.5 acres of drained wetland to receive 100 percent mitigation credit or 401.5 credits;
- Hydrologic restoration of 48.1 acres of partially-drained wooded wetlands to receive 50 percent credit or 24.1 credits;
- Restoration of natural surface grade and wetland conditions in 21.5 acres of ditches which will be filled to receive 50 percent credit or 10.7 credits; and
- Restoration of native vegetation on 22.6 acres of upland buffers within drained fields and filled ditches, each of which will remain drained due to open ditches that cannot be filled, for 5.7 credits based on the 25 percent credit calculation for upland buffer.
- Easement protection of 28.8 acres of native coniferous bog communities at 12.5 percent credit for a total of 3.6 credits for preservation.

A total of 454 compensatory wetland mitigation credits are proposed from the Site. A permanent conservation easement, including legal access, will be prepared and recorded to protect the Site within one year after initiating the restoration activities.

This mitigation plan includes discussions of the project-specific wetland mitigation site, wetland restoration goals, construction activities, and performance standards. The plan is being submitted to the U.S. Army Corps of Engineers (USACE) as part of the Section 404 Clean Water Act Permit application and the Minnesota Department of Natural Resources (MDNR), which acts as the administrator of the Minnesota Wetland Conservation Act (WCA) (Minnesota Rules 8420) for mining activities.

2.0 Wetland Mitigation Site Description

2.1 Mitigation Site Selection

The Site is within the same Bank Service Area and major watershed as the Project (Figure 1). The Project lies within the headwaters of the St. Louis River major watershed (#3) in St. Louis County and within Bank Service Area #1, which encompasses the watershed of Lake Superior.

The Site was selected for several reasons, including:

- Private land ownership with wetland mitigation potential that is located near large areas of tax-forfeit or state-owned land,
- The lack of roads or other public infrastructure that could be affected by wetland restoration,
- The presence of sub-surface drain tiles installed to lower the water table and prevent soil saturation at the ground surface thereby effectively draining wetlands,
- A high density of ditching within the site, and
- Minimal effect on neighboring properties by altering site drainage.

The Site is located in central St. Louis County, between the towns of Zim and Sax. The proposed wetland restoration area is located within Sections 2, 3, 10, 11, 26, 27, and 34; Township 55 North; Range 18 West. Currently the Site is owned by two parties, but the entirety will be acquired by one party following the issuance of permits for the Project and will be controlled by PolyMet for the sole purpose of wetland mitigation during the required monitoring period.

2.2 Zim Sod Site History

2.2.1 Pre-Agricultural History

Available data were reviewed to determine information on site history and pre-settlement conditions. The Original Public Lands Survey Plat Map from 1867 (Reference (1)) and a map created from the original plat maps (Reference (2)) each show that the majority of the area was a coniferous bog or swamp, with some areas of open bog. These data are reliable indicators of regional vegetation types, though are not accurate predictors of site-specific design parameters.

2.2.2 Agricultural and Land Use History

Based on a review of historic aerial photos, it is evident that ditches have been present at the Site since before 1939. Only some portions of the North Unit along County Highway 7 had been cleared and cultivated for agriculture as of 1939. In each photo reviewed since 1939, it is evident that additional areas were added to the cultivation on the North unit. By 1981, the majority of the agricultural portions of the South Unit were developed and under intensive management for crop or sod production; likewise for the North Unit in the 1989 photo. According to the current landowner, much of the Site has been in operation as a sod farm for 40-50 years, though some portions were developed within the last 10 years.

2.3 Zim Sod Geology, Hydrology, and Ecology

2.3.1 Geology and Soils

According to soil mapping by the United States Department of Agriculture – Natural Resources Conservation Service (USDA-NRCS), the entire Site is mapped as the Greenwood soil series (Reference (3)). The Greenwood soil (Dysic, frigid Typic Haplohemist) is a very poorly drained hydric soil formed in organic deposits more than 51 inches thick. The official soil series description for this soil is provided in Appendix A. The organic deposits in the area accumulated over lacustrine sediment, mostly silt, deposited by Glacial Lake Upham (Reference (4)). However, at the Site, the underlying lacustrine deposits were observed to be gleyed clay. The Greenwood soil series is described as having a pH ranging from 3.5 to 4.5 and the typical vegetation is composed of bog species including: black spruce (*Picea mariana*), tamarack (*Larix laricina*), bog rosemary (*Andromeda polifolia*), bog laurel (*Kalmia polifolia*), leatherleaf (*Chamaedaphne calyculata*), blueberries (*Vaccinium* spp.), and sphagnum (*Sphagnum* spp.)

2.3.2 Topography

A topographic survey was completed in November 2010 and the one-foot contours based on the survey data are provided in Appendix B and in Figure 2 and Figure 3. Ditches are the most noticeable topographic features on the Site, ranging from 2 to 9 feet in elevation lower than the surrounding field surface. The USGS quadrangle maps show ground elevations just northeast of the North Unit at 1330 feet Mean Sea Level (ft MSL) sloping downward, to the south and west, to about 1315 ft MSL within the South Unit (Figure 2). The on-site topographic survey indicates that ground surface elevations within the North Unit have subtle variations ranging from 1326 ft MSL along the north edge to 1321 ft MSL in the southwest corner of the Site. The county ditch along the western edge of the North Unit decreases from 1319 ft MSL at the northern end to about 1313 ft MSL at the southern end. The field surface elevation within the South Unit varies from 1314 ft MSL in the northeast corner to 1308 ft MSL in the southwest corner. The lowest elevation within the South Unit is the bottom of the ditch in the southwest corner at 1300 ft MSL, which is eight feet lower than the adjacent field (Figure 3).

2.3.3 Climate

The average annual precipitation for Zim, Minnesota, is 27.9 inches based on the 30-year normal period 1971 to 2000. The average annual temperature in this area is about 37.7 degrees Fahrenheit.

2.3.4 Hydrology

The Site lies near the middle of a large peatland complex that encompasses approximately 130 square miles, which is roughly bound by the Swan River to the west, U.S. Routes 2 to the south, 169 to the north, and 53 on the east. The hydrology in the majority of the peatland system has not been significantly altered by ditching or draining, although the area immediately to the south and east of the Site has ditches approximately every mile (on the section lines). Hydrology on the Site is likely to be primarily driven by direct precipitation and localized shallow groundwater with predictable annual declines in groundwater elevations during the summer. Groundwater in this peatland likely would contain very low mineral nutrients. Without mineral nutrients to buffer it, the soil water tends to be very acidic, which supports conditions appropriate for a bog community. Soil and/or water pH analyses will be completed

prior to restoration to provide additional soil information. In particular, if the soil is acidic (below pH 4.2) the Site is expected to support bog communities.

According to information from the current landowner, drain tiles are present throughout the Site within each field. The current landowner and operator of all sod production activities reports that the drain tiles are spaced 50 to 100 feet apart at depths of 4 to 5 feet and effectively drain the area for sod production. In some years, irrigation is necessary to maintain soil moisture for growing sod grasses. An estimated location of these drain tiles was created using a review of historic aerial photos (Figure 4 and Figure 5). In many of these photos, distinct parallel signatures are evident within the fields that appear to be caused by subsurface drainage. Additional information will be gathered on-site to verify drain tile locations and abundance by locating outlets in the ditches and confirming their presence below ground.

The primary water discharge within the Site and the general area is to the south and west through a system of drainage ditches which receive water from the subsurface drain tiles. The majority of these ditches are private ditches that only affect the drainage on the Site and primarily transmit water into a public, county ditch along County Highway 7 along the west edge of both units of the Site. The ditch along the eastern edge of the North Unit, flowing along the section line, is also a public ditch. Within the North Unit, the ditches along the north and south lines of Section 11 (along Dibbell Road and Ellsmere Road) are both public ditches. Public ditches and private ditches that facilitate drainage for the adjacent properties or the homesteads on the Site would not be impacted by restoration activities for this mitigation project as discussed later in this report. The South Unit has only one primary east-west ditch, which flows directly west into the county ditch along Highway 7.

The ditches are generally between 2 and 6 feet deep relative to the adjacent fields and are mostly well-maintained to be clear of obstructions. The county ditch along Highway 7 is the deepest and widest ditch on the Site and at the southern end of the South Unit it is up to 9 feet lower in elevation than the adjacent field. Within the private ditches, there are several control structures that maintain water levels within about 18 inches of the soil surface for sod production.

2.3.5 Natural Communities

The MDNR Ecological Classification System (Reference (4)) considers this region of the state to be the Tamarack Lowlands Subsection. This area is characterized by the level peatlands that occur in the bed of former Glacial Lake Upham. Most of the natural communities in this sub-section are coniferous bog or swamp wetlands that are dominated by black spruce and tamarack as well as extensive open bogs and sedge meadows. The wetlands on-site and nearby are primarily tamarack and black spruce bog communities. This area is also identified as the Sax-Zim Bog Important Bird Area (IBA) (Reference (5)) due to a rich diversity of bird species and a large number of owls residing in the area.

2.3.6 Site Constraints

One utility easement crossing a portion of the North Unit is a Northern Natural Gas (NNG) underground pipeline. Two utility easements cross portions of the South Unit: the NNG pipeline and a Minnesota Power overhead transmission line. Typically, within these types of easements, tree and shrub growth is not

allowed. The companies holding these easements will be contacted prior to restoration activities for specific information regarding the easements and any limitations. If necessary, credit calculations will be adjusted to reflect the appropriate area of each of these utilities.

In the North Unit, two homes are located within the Site boundary and two additional properties with homes are outside of, but adjacent to the Site boundary. These homes are elevated above the wetland restoration areas and the drainage on each of these properties will be maintained to protect the buildings from increased water levels. Additional analysis will be completed to ensure the homeowners will not be affected the hydrologic restoration on the Site.

2.4 Existing Wetlands

The site was evaluated for the presence of wetlands in November, 2010. Wetland data forms are provided in Appendix C documenting that evaluation. All of the sod fields on the Site are identified as drained wetland, which is maintained by an intensive system of subsurface drain tiles and ditches (Figure 2 and Figure 3). The fields have been systematically drained for many years and managed primarily for sod production. The ditches are considered degraded wetlands. Partially-drained wetlands on the Site are likely present within the wooded areas, which have not been cleared for sod farming, but have been affected by the drainage system.

2.5 Additional Site Information Needed

Prior to restoration, additional information will be collected for the final restoration design and planning. Ecologists will visit the Site to verify the effects and extent of existing drainage systems, soil, and vegetation. The following information will be collected:

- Drain tile outlets will be located and subsurface drain tiles mapped in representative portions of the Site.
- Shallow monitoring wells will be installed within some of the fields and in the forested areas to confirm the effects of the drainage.
- Vegetation will be reviewed in areas adjacent to the mitigation Site to help establish target communities.
- Soil and groundwater pH will be tested to determine suitability for bog restoration.

Information will be used for planning final restoration methods and to determine the final estimate of compensatory mitigation credits available for the Site.

3.0 Wetland Mitigation Goals and Credit Allocation

To the degree feasible, the primary goal of the wetland restoration on the Site is to restore a native wetland plant community. The plan for the restoration will also include an adaptive management plan to account for the natural development and to recognize changing conditions and unpredictable factors contributing to the dynamics of the Site. Restoration methods will be designed to restore a coniferous bog community (Reference (6)); however, developing a bog community is highly dependent on soil and groundwater parameters that are difficult to control. Therefore, a coniferous swamp community will be the contingent community if the soil and groundwater conditions are not adequate for bog regeneration. Coniferous bog or swamp is the target for the majority of the Site, from which 438 forested wetland credits will be established.

Historically, portions of this landscape were open, emergent wetland communities. Trees may not become established in some portions of the Site with excess soil moisture or where easements prevent planting. Where trees do not successfully establish, the target community will be an open bog or sedge meadow. Credit allocation may be modified in the future for areas where trees do not develop.

Shallow open water communities will be the target communities in the ponds created on the Site. These ponds will be excavated in order to gather borrow materials used to backfill ditches elsewhere on the Site to eliminate drainage. Shallow open water communities will be created on 8.3 acres.

The target communities described below include four primary wetland types that may become established. Credit allocation calculations are provided in Table 1 and Table 2; a map of the conceptual restoration plan showing the anticipated restoration is provided in Figure 4 and Figure 5.

3.1 Target Plant Communities

The majority of the Zim Sod Site will be restored to a coniferous bog or swamp community. The restoration of coniferous bogs and swamps are somewhat experimental in nature as few such projects have been successfully completed in Minnesota, making it difficult to determine realistic goals and performance criteria. As such, performance standards for the Site will be somewhat general in that the primary target is a forested native wetland community.

3.1.1 Coniferous Bog

Coniferous bogs occur where an accumulation of peat becomes isolated from mineral-rich groundwater such that the majority of the water and all mineral inputs come from precipitation. The peat continues to accumulate upward in the bog from the growth and deposition of sphagnum moss and other vegetation. Black spruce and several other bog species are sensitive to extended periods of high water, but are able to survive within the bog because the upper levels of peat remain aerated, especially in the middle of summer as the water table drops below the peat surface. The groundwater in the bog tends to be very acidic because there are very few minerals to act as a buffer (Reference (4)).

Sphagnum moss is difficult to establish and will be a limiting component for the restoration of a true bog community. A dense mat of sphagnum is an important component responsible for maintaining the appropriate soil pH, hydrologic, and peat conditions for the coniferous bog community. Coniferous bogs are dominated by black spruce and tamarack trees, though the trees are often stunted and slow-growing and canopy cover is often less than 50 percent. The ground layer is dominated by sphagnum mosses, sedges (*Carex* spp.), and various low ericaceous shrubs such as leather leaf and small cranberry (*Vaccinium oxycoccos*). Restoration of these and other bog dominants is difficult, because the species are difficult to propagate and many are not available commercially.

In order to restore sphagnum, the moss must be harvested from a donor site by shredding and collecting the upper 4 to 6 inches of sphagnum and applying the materials to the restoration site, which is still an unreliable practice. Furthermore, the accumulation of the sphagnum can be slow when applied to a heavily disturbed agricultural site, especially a site in which the soil has been regularly stripped for sod farming.

3.1.2 Coniferous Swamp

Although coniferous bog restoration techniques will be implemented throughout the Site, the development of the bog community is not guaranteed. Therefore, the coniferous swamp community will be the contingency community for development. Coniferous swamps have a poorly developed sphagnum mat and a greater predominance of minerotrophic species than a bog. Furthermore, many species present in a coniferous swamp are available commercially; whereas, bog species are much more difficult to re-introduce.

Coniferous swamp communities occur in peat soils with no direct contact to mineral soil, though mineral-rich groundwater contributes some nutrients to the plants and buffers the acidity of the peat. Typically, in large peatland systems, this community type would occur adjacent to mineral-rich discharge or between bog communities and uplands. It generally occurs in areas where the high water table is more stable than that in a bog, leading to longer periods of surface soil saturation.

It is unlikely that mineral-rich groundwater is near the soil surface in the Site because it occurs within such a large complex of deep peat soil. However, there are two reasons a coniferous swamp may be more appropriate for the Site than a bog community. First, farming practices have physically and chemically altered the soil and hydrology and some of the peat topsoil has been stripped as part of the sod farming, thereby lowering the elevation relative to the regional groundwater table. Second, the residual mineral fertilizer is likely to favor species that would not otherwise thrive in a mineral-deficient peat soil. In this geomorphic setting, it is expected that a bog community will develop, but that process is difficult to control because it depends on the groundwater inputs and soil chemistry and may only occur after many years under natural conditions.

3.1.3 Sedge Meadow or Open Bog

The degree of soil moisture may be somewhat variable across the Site, though this is difficult to predict. It is expected that the majority of the Site will have saturated soil throughout most of the year, with

seasonal draw-downs, especially during drought periods. Such hydrology will support black spruce and tamaracks, which tolerate considerable soil moisture, but require some periods of aerobic soil conditions. However, where the soil surface is saturated for the entire growing season, these tree species may not establish or growth will be slow. It is unclear which areas may not support trees, so the sedge meadow or open bog communities are presented as a contingency target community in the event that some areas are better suited for emergent wetland community types. Sphagnum would be a dominant ground cover in an open bog, though this may take many years to develop even with sphagnum introduction.

A community similar to a sedge meadow may develop if the soil and hydrology are more favorable to minerotrophic species and trees are unable to become established. The dominant plants in a sedge meadow include bluejoint grass (*Calamagrostis canadensis*), sedges (*Carex* spp.), and bulrushes (*Scirpus* spp.). Sedge meadows occur in a wide range of soils, including deep peats, though there is usually input from ground or surface water containing dissolved minerals. At the Site such mineral inputs are unlikely, though residual nutrients from fertilizer may provide this condition.

3.1.4 Shallow Open Water

Besides providing soil to restore hydrology and return ditches to natural condition, the open water will provide some additional wildlife habitat on the Site, ideal for waterfowl and amphibians. The ponds will receive full mitigation credit because each occurs in an area that naturally would be wetland. The shallow open water community would be dominated by submergent and floating-leaved plant species. Typical species would include pondweeds (*Potamogeton* spp.), coontail (*Ceratophyllum demersum*), and duckweeds (*Lemna* spp.). The fringes of these ponds would also support species commonly present in deep and shallow marsh communities.

3.2 Hydrologic Restoration

Restoration of the original hydrology is the primary goal at the Site. The majority of the internal private ditches on the Site will be filled with soil excavated from elsewhere on the Site. Filling these ditches will eliminate the drainage effects and plug the end of the drain tiles that discharge into the ditches. As a result, groundwater elevations are expected to rise within the fields and runoff from precipitation will no longer drain through subsurface tiles and the ditches. The majority of the water that will saturate the peat will come from precipitation that falls directly on the Site. Some groundwater will also contribute as it flows into the Site well as some groundwater flow from the large peatland complex to the north and east.

Ditches will be filled with soil excavated from areas adjacent to the ditches and from excavations on the Site. Material scraped from the edge of the ditches will not be excavated deeper than 1 foot below the presumed natural grade. Some ditches have shallow mounds from the ditch spoils; these will pushed back into the ditch to recreate the level peatland grade. Because natural hydrology is being restored within the filled ditches and the elimination of the ditches recreates the natural landscape, the ditches will receive partial credit (50 percent).

Mineral and peat soils will be place in appropriate layers within the backfilled ditches. Clay and other mineral soil will be placed in the bottom of the ditch to plug the drain tiles, ensuring that the artificial

drainage will be eliminated. The majority of the mineral soils will come from the deeper portions of the excavations, though some may be present in spoil mounds adjacent to each ditch. Peat soils will be placed in the upper portions of the filled ditches. The peat will also effectively restrict flow and help return a near natural grade to the land. Much of the peat will come from the upper layers in the excavations, but may also be pushed in from the edge of each ditch.

Some ditches within or adjacent to the Site will not be filled because they are public ditches or protect neighboring private property from flooding. For ditches that cannot be filled, the drain tiles that flow into that ditch will be broken and removed near the outlet into the ditch. At least 20 feet of drain tile will be removed near the outlet into the ditch, and additional segments will be removed upslope when necessary. Because most of the tiles are placed in very level fields, removing a single segment should be sufficient for most tiles. Additional information on the tile location, flow, and elevation change will be reviewed prior to removal.

The lateral effect of the open ditches has been calculated to help determine wetland credits. Lateral effects are based on the van Schilfgaarde Equation (Reference (7)) and the results for ditches at varying drainage depths are provided in Appendix D. These drainage effects were calculated for the Greenwood and Wabuse soil series assuming there are no obstructions in the ditches and that they can drain free to the ditch bottom or to the bottom of the nearest downstream culvert. Ditches that remain open will not be eligible for mitigation credit and the adjacent areas drained by the lateral effect of these ditches will be eligible for the upland buffer credit (25 percent).

For wooded areas affected by the drainage system on the Site, hydrologic restoration will be the primary action for mitigation credit. These areas are already forested with coniferous bog or swamp species, but the adjacent drainage system has eliminated wetland hydrology or reduced the period of saturation. For the areas not surrounded by ditches, the lateral effects were calculated to determine how much the area is affected by the existing drainage. Ditch filling will restore these forested wetland areas. Because some portions of these wooded areas are still wetland but partially-drained, mitigation credits are projected based on restoration of partially-drained wetlands (50 percent).

3.3 Partially-drained wetlands

Several wooded areas occur within the scope and effect of the existing Zim Sod drainage system. These wooded areas are dominated by wetland trees, including tamaracks and black spruce, but are drained fully or partially by the nearby ditches and subsurface drain tiles. Once the drainage system is disabled, bog hydrology will return to these forests. Also, if necessary, portions of these forests may be managed to control invasive species or to encourage re-colonization by native species. The forests will also be within the area protected by a conservation easement and will be managed to eliminate invasive species. Therefore, these wooded are eligible for restoration of partially-drained wetlands.

3.4 Excavated Ponds

In order to fill the ditches, soil will be collected from excavated ponds scattered throughout the Site, which will become shallow open water communities. The ponds will be shallow enough to maintain

rooted vegetation which will be allowed to establish naturally. Each of the ponds will be odd-shaped and have uneven bottom contours to provide some variability and natural character to the ponds. Besides providing soil, the open water will provide some additional wildlife habitat on the Site, ideal for waterfowl and amphibians. The ponds will receive full mitigation credit.

3.5 Wetland Preservation

Two forested wetland areas outside the effects of the drainage system will be protected under an easement in order to receive credits for wetland preservation. These areas are currently subject to logging, peat harvest, and drainage, much like nearby sites have been used for peat harvest and logging activities. The preservation area is coniferous bog, which will be protected from potential future degradation by a permanent conservation easement. The preservation areas will also be managed to control invasive species as part of this plan.

3.6 Credit Allocation

Mitigation credits are based on acreages shown in Table 1 and Table 2 and in Figure 4 and Figure 5, which were calculated primarily based on the on-site topographic survey and site mapping from aerial photos as verified by on-site assessments. The majority of the credits are proposed from the restoration of drained wetlands that are currently used for sod farming, from which there will be 100 percent credit for the areas restored. Credit from the removal of drainage and subsequent management of the partially-drained forested wetlands currently on the Site is allocated at 50 percent. Filled ditches will also receive 50 percent credit because the ditches will be restored to the natural hydrology regime with native vegetation. Areas near the public ditches will still be drained by the lateral effect of the open ditches; these areas will still be preserved as upland buffer. Thus, the credit allocation within the area of the ditch lateral effect will be based on credits for upland buffers, or 25 percent of the total area. Preservation areas will receive 12.5 percent credit for the areas within the legal easement boundaries.

The summary of the credits is as follows (all numbers are approximate):

- 401.5 credits for drained wetland restoration on 351.5 acres within the North Unit and 50.0 acres within the South Unit;
- 8.3 credits for the excavated ponds: 7.0 acres in the North Unit and 1.3 acre in the South Unit.
- 10.8 credits for filling ditches: 18.3 acres in the North Unit and 3.2 acres in the South Unit;
- 24.1 credits for restoration of partially-drained wooded areas: 43.6 acres in the North Unit and 4.5 acres in the South Unit;
- 5.7 credits for upland buffers in the ditch lateral effect area: 12.3 acres in the North Unit and 10.4 acres in the South Unit; and
- 3.6 credits for preservation of forested wetland areas: 11.6 acres in the North Unit and 17.2 acres in the South Unit.

In addition, ditches that remain open and roads that will be used to maintain access to the Site will not be eligible for credit.

4.0 Wetland Restoration Plan

The vegetation and hydrology will be restored to the Site over a one- to two-year construction phase followed by 20 years of management. Coniferous bog or swamp communities will be established using bog restoration methods. The whole site will be treated with similar methods because soil and hydrology are expected to be quite similar throughout. The interior ditches will be filled, raised berms will be leveled, and drain tiles will be disabled to restore wetland hydrology. Native, harvested bog materials will be spread throughout the Site to facilitate the re-introduction of sphagnum mosses and other bog species that cannot be easily re-introduced by seed. Natural re-generation of the herbaceous ground cover, in combination with the addition of bog harvest materials, will be supported by intensive weed management. Tree and shrub seedlings will be installed by hand throughout the Site. The Site will be carefully monitored and managed and supplemental plantings and seeding may be used to encourage development until performance standards are met.

4.1 General Site Preparation

At the beginning of the restoration, it is expected that all of the sod will have been recently removed and bare soil will be present throughout the Site. For any areas that are not bare, the vegetation will be removed to bare soil, especially non-native and invasive species. Soils may be cultivated as part of the weed control and for surface preparation for sphagnum spreading. Prior to the start of construction and hydrologic alterations, water levels will be lowered using the existing control structures to provide dry soil for safe machinery access.

4.2 Site Grading and Hydrology Restoration

Construction activities on the Site are intended to remove or minimize the effect of the artificial drainage features and return the hydrology to the original conditions. The existing drainage is largely maintained by subsurface drain tiles that lead to a system of ditches. To minimize drainage, the majority of the ditches will be filled with soils obtained from elsewhere on the Site, which will plug the ends of the subsurface drain tiles and prevent flow in the ditches. Some of the ditches cannot be filled because they affect other properties, so any subsurface drain tiles that flow into these ditches will be broken and disabled. The plan for construction activities is shown on the plan sheets in Appendix B.

Restoration activities will be initiated through site grading to fill ditches and break drain tiles. Ditch fill material will be collected from existing spoil banks and from pond excavations identified throughout the restoration area. Some topsoil may be pushed into the ditches from adjacent fields into the ditches, grading down no more than one-foot below existing surface elevation (except on spoil mounds). Mineral soils, preferably clay, will be placed in the bottom of the ditches up to the top of drain tile outlets or higher. Peat soils will be placed on top of the mineral soils, similar to the natural soil horizons. Ditches will be filled to near the existing grade or mounded higher to account for settling. Subsurface drain tiles that flow into ditches that will remain open will be broken and segments removed to prevent drainage into the ditches.

As soon as the ditches are filled and tiles are broken, bog materials will be spread onto the disturbed areas by side-casting as much as possible to minimize compaction. These activities will be performed immediately after the ditches are filled assuming the soil does not become too saturated for machinery access (see detailed bog restoration methods Section 4.3).

4.3 Bog Restoration Methods

The sphagnum moss restoration methods planned for the Site have been largely planned based on methods presented in the Peatland Restoration Guide (Reference (8)) and based on information from peatland restoration projects by the Natural Resources Research Institute (NRRI), located near Zim. The study by Johnson, et al. (Reference (9)) to evaluate the effects of planting time, mulch application, and planting of companion *Carex* species on the establishment of sphagnum mosses was evaluated and considered in the development of this plan.

Suitable donor site(s) for bog harvest materials will be selected based on a review of sites on the proposed NorthMet mine (Mine Site) and from other sites near the mitigation Site. A suitable site would have a large area of a sphagnum mat, at least 12 inches thick and with relatively few trees and shrubs. The donor site would also need to be relatively accessible by machinery for harvest and loading the materials for transport. The ideal bog donor site(s) would occur at the proposed Mine Site in bogs that are proposed to be impacted by the mining activity. However, that would require transport of the bog materials from a considerable distance and may require many truckloads of materials. Therefore, sites closer to the mitigation Site would also be reviewed. If sufficient suitable sites are not found on the proposed Mine Site or transportation is considered to be impractical, a donor site closer to the mitigation Site may be used. For donor sites not located on the Mine Site, PolyMet would confer with the USACE and the MDNR before harvest of materials.

The donor site(s) will be characterized in the summer or fall prior to bog material harvest to identify existing cover of plants and mosses. Based on current research, the appropriate amount of sphagnum plant material needed for application at the restoration site is the equivalent of what can be collected from an area approximately 1/10 the size of the restoration area. Therefore, approximately 42 acres will be required to collect sufficient plant material.

Bog restoration would be completed as follows:

- Mitigation site surface preparation
    - Existing vegetation will be removed by mechanical removal or herbicide treatment in the summer and fall prior to spreading bog harvest material in the spring.
    - Loose sod remnants and peat will be removed to form a smooth soil surface.
- Bog harvest material collection

- Plant material will be collected in late fall, winter, or early spring before the frost has melted. Sphagnum fragments and additional materials collected in late fall or winter will be stored over winter for use the following spring.
- The top 4 to 6 inches of the bog surface will be shredded with a Rotovator or other equipment appropriate to shred surface vegetation. Shredded bog vegetation will be windrowed using a dozer or back-scraper and will be loaded in trucks using a front-end loader.
- The plant material will be transported to the restoration site and stockpiled close to the restoration area to minimize multiple hauls.

- Bog material spreading
  - The plant fragments will be spread over the site with a standard box manure spreader, ideally in early spring over frozen ground.
  - The restoration site soil surface will be covered with a uniform 1 to 5 cm thick, fluffy layer of plant fragments.
- Straw spreading
  - Clean, fresh, straw mulch will be applied over plant fragments as soon as possible after plant spreading (the same day) to improve growing conditions for plant fragments by creating a wetter and cooler air layer at the peat surface.
  - Attempts will be made to utilize equipment that allows straw to be spread without traveling on top of plant fragments, such as a sideways straw bale spreader with a mulch pass made after plant spreading from adjacent areas not yet completed.
  - Straw application rate: 2,500 lbs/ac, 10 to 12 – 4-foot diameter round bales or 7 to 8 – 5-foot diameter round bales per acre.
- Fertilizer application
  - Slow-release phosphate rock fertilizer (P_2O_5) will be applied to approximately one-half of the restoration areas with a conic spreader at 17.5 pounds/acre available phosphate to provide adequate nutrients to favor a rapid establishment of a sphagnum mat. Because current research is not conclusive regarding the benefits of fertilizer, it will only be applied to one-half of the Site to determine the effectiveness of this treatment and the potential for deleterious effects of promoting invasive vegetation establishment. If additional information becomes available prior to restoration this treatment may be eliminated or added to the Site.

- Equipment that allows fertilizer to be spread without traveling on top of plant fragments and straw mulch will be used, such as with a conic spreader pulled behind an all-terrain vehicle, after mulch spreading has been completed.

4.4 Tree and Shrub Installation

Approximately, one to three years following bog harvest material installation, tree and shrub seedlings will be planted on the Site. The trees will be installed into the peat soil, through the newly establishing sphagnum and herbaceous community. After three years of monitoring the tree plantings, supplemental plantings may be recommended in certain areas, especially if maintenance activities or invasive species are problematic. Black spruce and tamarack will be the primary trees targeted for the planting, but other species may be considered based on their prevalence in bogs as shown in Table 3.

4.5 Excavated Ponds

Several ponds will be excavated to provide fill material for the existing ditches and will become shallow open water communities. Water in the ponds will be less than 6 feet deep, so that these still qualify as wetland communities and will still support rooted vegetation. The slopes within the ponds will be gradual, no steeper than 5:1 slopes (horizontal to vertical), ideally 8:1. The bottoms will be uneven and the shape of each pond will be irregular to maintain natural appearance and structure. The majority of the substrate in the ponds will be mineral soil, primarily clay, though some peat will be returned after the excavation to provide a natural muck layer. However, this layer would likely settle into the deepest portions and could not be maintained evenly throughout the bottom.

The ponds will be managed similar to other portions of the Site except some herbaceous species will be planted to encourage establishment. Some emergent and floating-leaved species will be installed along the edges of the ponds. The majority of the vegetation is expected to colonize naturally and invasive species will be managed, when feasible and appropriate.

4.6 Natural Regeneration and Bog Establishment

The general restoration strategy for the majority of the native herbaceous community is to promote natural regeneration during the first two to three years after hydrologic restoration. To the extent practicable, the majority of the weed control will be completed by hand, ATV, or aerial application to minimize the impact on the developing sphagnum and the young trees. The proposed vegetation establishment and maintenance activities anticipated to meet the goals of the plan are listed for the conditions described, as appropriate for the restoration schedule:

- **Presence of invasive species.** Apply appropriate herbicides within wetland restoration areas containing more than 10% areal coverage of reed canary grass or other invasive species. Depending on the density of each species in a given area, selective or broad-spectrum herbicides may be used. A list of invasive species is provided in Table 4. Mowing may also be used to prevent seed set, especially for annuals.

- **Vegetation characterization.** Characterize vegetation in each wetland restoration area twice each year between May and September to determine necessary management and establishment procedures. Vegetation characterization will include documenting problem species present and the approximate areal coverage of each species.
- **Spot treatment.** Spot spray up to three times annually to control reed canary grass and other perennial non-native or invasive species for 10 years or longer following initial restoration. Extensive treatments may not be needed after a sustainable wetland dominated by characteristic native vegetation is established such that the performance standards are achieved.
- **General weed control**. Continue treatments 1, 2, and 3 annually until non-native or invasive species are adequately controlled.

4.7 Supplemental Planting and Seeding

Careful monitoring of vegetation development on the Site will be completed annually to determine where problems are occurring and, to the degree possible, to determine the cause of those problems. Beginning in the third growing season after planting, supplemental trees and shrubs may be installed if performance standards are not met. Seed additions may also be used, beginning in the third growing season, if areas are present where suitable native vegetation has not developed. As such, native seed mixes would be used similar to those recommended by the Minnesota Board of Water and Soil Resources (BWSR) and applied after appropriate measures have been taken to control the invasive species.

5.0 Wetland Mitigation Performance Standards

Performance standards have been developed for the Site to guide the restoration activities and to measure success. The performance standards are appropriate for either a coniferous bog or swamp community because the conditions for each are generally similar. The performance criteria include measures to evaluate whether or not the hydrology and vegetation meet the plan goals. If the performance standards are not met during the 20-year monitoring period for the forested communities, a proposal will be submitted describing the corrective actions proposed and an implementation schedule or monitoring may continue for a longer duration.

5.1 Performance Standards

5.1.1 General

Nearby reference wetlands will be identified prior to monitoring of the restored wetlands. Reference wetlands will be used to provide local context to supplement available information, expertise, and knowledge on natural wetland communities that are similar types as the mitigation wetlands. It is expected that the Site will meet these minimum general performance standards:

- More than 75 percent of the vegetation in each wetland shall be facultative (FAC) or wetter (FACW, OBL).
- Invasive plant species shall not comprise more than 10 percent cumulative areal coverage within any wetland community by the end of the eighth full growing season. Invasive species include those provided in Table 4.
- Vegetative coverage will comprise at least 90 percent areal coverage by the end of the second full growing season to ensure adequate soil coverage, except in shallow open water communities.

5.1.2 Coniferous Bog or Swamp

The coniferous bog or swamp community will meet these minimum performance standards:

- There will be at least 108 living tree stems per acre by the end of the tenth full growing season. The trees will be dominated by tamarack and or black spruce, but other species may be present.
- Invasive plant species shall not comprise more than 10 percent cumulative areal coverage within any wetland community by the end of the eighth full growing season. Invasive species include those provided in Table 4.
- Vegetative coverage will comprise at least 90 percent areal cover by the end of the fifth full growing season to ensure adequate soil coverage, except in shallow open water communities.

5.1.3 Sedge Meadow or Open Bog

In the event that trees do not become well-established in certain portions of the Site and supplemental plantings are not expected to be successful, the target community will be modified to a sedge meadow or

open bog and the new target area will be described and enumerated in the annual monitoring reports. The sedge meadow or open bog community will meet the following performance standard:

- By the end of the fifth full growing season, the herbaceous plant coverage will be comprised of at least 10 native grass, sedge, fern, rush, and/or forb species in sedge meadow communities and 5 native, herbaceous species within open bog communities; or will have a vegetative diversity/integrity rating of high quality using the Minnesota Routine Assessment Method for Evaluating Wetland Functions (MnRAM).
- Hydrology will be similar to that which is recorded in a nearby reference wetland site. This will likely consist of a water table within 12 inches of the soil surface for at least half of the growing season except during growing seasons with precipitation below the range of normal (driest 30 percent of most recent 30-year period of precipitation records).

5.1.4 Shallow Open Water

The ponds will be excavated below the groundwater table and therefore will have standing water throughout most of the area. The edges of the ponds will be more similar to a shallow or deep marsh community, but are not separated here for practical purposes. The majority of the ponds will meet the following performance standard:

- By the end of the fifth full growing season, the plant coverage will be comprised of at least 4 native emergent or floating-leaved species.
- Ponds shall be inundated by at least 36 inches of water (in the deepest part) throughout the growing season except during growing seasons with precipitation below the range of normal (driest 30 percent of most recent 30-year period of precipitation records).

6.0 Wetland Restoration and Management Schedule

The following schedule represents a preliminary plan of the expected activities to restore wetlands at the Site. However, with an adaptive management perspective, it should be recognized that the timing of specific establishment and management activities are likely to change as the restoration progresses. The overall schedule for restoration activities is to complete the restoration work within the first 2 years of the Project. Within the first year after permit issuance, the Year 1 restoration work will be completed. The remaining restoration activities will generally follow the conceptual schedule provided below.

The wetlands restored on the Site will require regular management to become established. This is critical in the first 5 to 8 years and should be recognized as integral to the wetland restoration success. Management will include eliminating invasive species, creating ideal conditions for the native plants to flourish, and seeding/planting to supplement natural regeneration. Weed removal and careful monitoring is important during the early stages of the restoration. All management activities described below apply to the management of the entire Site, including areas receiving credit for restoration of drained and partially-drained wetlands, preservation, and upland buffers.

After certification from the permitting agencies that construction was completed as planned, a permanent conservation easement will be recorded and documentation will be provided to the USACE, the WCA administrator, and other appropriate regulatory agencies.

6.1 Preparation – Year 0

6.1.1 Fall and Winter

- Lower existing water control structures to reduce water levels in the ditches prior to being filled with soil.
- Remove all existing sod or other crops from the Site and eliminate all vegetation down to bare soil using herbicide applications, mowing, and cultivation where needed.
- Harvest sphagnum from the donor site, Mine Site or other local site, and store at the Site through the winter.
- Fill ditches and break subsurface drain tiles to restore site hydrology.

6.2 Year 1

6.2.1 Early Spring

- Spread donor sphagnum material onto the site prior to melting frost.
- Monitor water levels in restored wetlands.

6.2.2 Spring/Summer

- Assess the presence of potentially problematic weeds and implement appropriate management methods including spot treatments with selective herbicides.
- Complete construction repairs, as needed.

6.2.3 Fall—End of First Full Growing Season

- Complete monitoring report, including documentation of wetland establishment activities during the year in comparison to the plan and recommend actions for the following year.
- Apply herbicides as necessary to control non-native and invasive species in all communities.
- Report on water levels in restored wetlands from the full growing season.
- Prepare as-built survey and report following construction completion and request certification of construction.
- Complete construction repairs, as needed.

6.3 Year 2

6.3.1 Spring/Summer

- Monitor water levels in wetlands.
- If hydrologic conditions have stabilized and are appropriate, plant trees and shrubs, otherwise wait until spring of Year 3.
- Apply appropriate herbicides to control invasive species.

6.3.2 Fall—End of Second Full Growing Season

- Complete monitoring report, including documentation of wetland establishment activities completed during the year in comparison to the plan and recommend actions for the following year.
- Apply herbicides as necessary to control invasive species.
- Report on water levels in restored wetlands from the full growing season.

6.4 Year 3

6.4.1 Spring/Summer

- Monitor water levels in wetlands.
- Apply appropriate herbicides to control invasive species.

6.4.2 Fall—End of Third Full Growing Season

- Apply herbicides as necessary to control invasive species.
- Complete monitoring report, including documentation of wetland establishment activities completed during the year in comparison to the plan and recommend actions for the following year.
- Report on water levels in restored wetlands from the full growing season. Determine if the hydrology performance standard has been met or if the groundwater has sufficiently stabilized such that no further groundwater monitoring is necessary.
- If large areas of invasive species are still present, those areas should be aggressively controlled and seeding and/or other remedial activities should be planned.
- If trees and shrubs are not meeting performance criteria, re-planting efforts should be planned for next spring. If high groundwater is problematic in certain areas, the target communities in those areas should be altered to sedge meadow or open bog.

6.5 Years 4 through 20

Many of the management activities described for Year 3 will be continued in Years 4-20. Monitoring reports will be completed in years 1, 3, 5, 10, and 20, if necessary. Hydrology monitoring wells will be removed from the Site at the end of year 5, assuming the hydrology performance standards are met. The monitoring report completed after the tenth growing season will assess whether or not the restoration is sufficiently complete and, if additional monitoring and reporting are warranted.

7.0 Wetland Mitigation Monitoring

The Site will be monitored for 20 years beginning in the first full growing season after completing hydrologic restoration. The purpose of the monitoring is to document the progress and condition of the restored wetland communities. Monitoring reports will be prepared and submitted in Years 1, 2, 3, 5, 10, and 20. The monitoring reports will assess whether or not the restored wetlands are in conformance with performance standards and determine whether continued monitoring is required. Monitoring visits will include review of the areas receiving credit for restoration of partially-drained wetlands and in the preservation areas to identify potential problems with invasive species or other forms of degradation.

Hydrologic parameters will be evaluated in the mitigation areas more intensively during the first two years and then at a level appropriate to the hydrologic characteristics of each area thereafter. Any significant modifications to the monitoring frequency proposed herein will be described in a revised monitoring plan to be submitted for review and approval prior to implementation. In addition to monitoring the restored wetlands, one reference wetland of each wetland restoration community type (if available) will be monitored within the general area of the restoration site in areas with relatively natural hydrologic conditions. A monitoring plan will be submitted for review and approval that will include proposed locations of reference wetlands prior to implementing the monitoring program. Continuous recording wells will be utilized to the extent feasible.

7.1 Hydrologic Monitoring

Hydrologic monitoring in these generally saturated wetland communities will be conducted using shallow wells placed throughout the Site sufficient to characterize hydrology through year 5. Water elevations will be recorded at least once per week from May through mid-July and monthly thereafter until the end of the growing season.

7.2 Vegetation Monitoring

A detailed vegetation survey will be conducted once per year (typically July-August) in each wetland mitigation community, as well as the reference wetland communities, to evaluate the success of the restoration during the appropriate monitoring period for each community type. At least 10 permanent monitoring points will be established throughout the Site (at least 2 plots in the South Unit). Vegetation sampling at each of these points will be completed based on guidance from the 1987 Wetland Delineation Manual (Reference (10)) and the Northcentral and Northeast Regional Supplement (Reference (11)) or appropriate updated version. Monitoring within the established plots will include a count of living trees and shrubs to estimate survivorship rates. Meander surveys will also be incorporated during the site visits to identify the overall vegetation and the presence of invasive species throughout the Site. Documentation photographs will also be taken during monitoring from fixed reference points around each restored wetland area.

7.3 Monitoring Report

A monitoring report will be prepared following growing seasons in years 1, 2, 3, 5, 10, and 20. The report will describe the status of the wetland mitigation and summarize the results of the vegetative and hydrologic monitoring. Additionally, the report will document all management activities and corrective actions conducted during the previous year and describe those activities planned for the following year. The report will be submitted by January 31 of the year following monitoring. The annual report will include the following information at a minimum:

- A brief description of the wetland mitigation areas; including location, size, vegetative and hydrologic monitoring data, current wetland types, and desired wetland types.
- An as-built survey will be provided in the first-year report along with a comparison of the as-built survey to the approved plans.
- A summary of water level measurements taken to date and a determination whether the hydrology in the wetlands meets the design elevations and wetland hydrology criteria as defined in the performance standards.
- Vegetation survey information, including species and percent areal coverage within each restored wetland community and each upland buffer community and a determination of whether the vegetation meets the performance criteria.
- A map of the various plant communities present within the restoration areas will be prepared as distinctly different communities develop.
- Annual color photographs of the wetland mitigation sites taken during vegetation monitoring at designated photo-reference points.
- A summary of management activities and/or corrective actions conducted in the wetlands during the previous year and activities planned for the following year.

8.0 References

1. **Minnesota Historical Society.** Minnesota Maps Online: Original Land Survey Maps. *Minnesota Historical Society.* [Online] 1867. [Cited: February 9, 2011.] http://www.mnhs.org/collections/digitalmaps/index.htm.

2. **Marschner, F J.** The original vegetation of Minnesota, a map compiled in 1930 by F.J. Marschner under the direction of M.L. Heinselman of the U.S. Forest Service: St. Paul, Minnesota, Cartography Lab of the Department of Geography, University of Minnesota. *The DNR Data Deli.* [Online] 1974. [Cited: February 9, 2011.]

3. **Natural Resources Conservation Service.** Soil Survey Geographic (SSURGO) database for St. Louis County, Minnesota, Meadowlands Part. *United States Department of Agriculture – Natural Resources Conservation Service. Fort Worth, TX: mn619.* [Online] 2009. http://soildatamart.nrcs.usda.gov/.

4. **Minnesota Department of Natural Resources.** Ecological Classification System. [Online] 2010. [Cited: December 29, 2010.] http://www.dnr.state.mn.us/ecs/index.html.

5. **National Audubon Society.** Important Bird Areas in the U.S: Sax-Zim Bog IBA. *Audubon.* [Online] 2010. [Cited: December 28, 2010.]

6. **Eggers, S.D. and D.M. Reed.** Wetland Plants and Plant Communities of Minnesota and Wisconsin: Second Edition. U.S. Army Corps of Engineers, St. Paul District. 1997.

7. **U.S. Department of Agriculture - Natural Resources Conservation Service.** Hydrology Tools for Wetland Determination. Minnesota Supplement to the National Engineering Handbook. Part 650. Engineering Field Handbook. Chapter 19. 2011.

8. **Quinty, F and Rochefort, L.** *Peatland Restoration Guide.* Second. Quebec : Canadian Sphagnum Peat Moss Association and New Brunswick Department of Natural Resources and Energy, 2003.

9. *Effects of mulch, companion species, and planting time on restoration of post-harvested Minnesota peatlands, U.S.A.* **Johnson, K W, Maly, C C and Malterer, T J.** [ed.] L. Rochefort and J-Y. Daigle. Quebec City, Canada : s.n., August 6-12, 2000. Sustaining our Peatlands: Proceedings of the 11th International Peat Congress. pp. 699-704.

10. **U.S. Army Corps of Engineers, Environmental Laboratory.** Corps of Engineers Wetlands Delineation Manual. Technical Report Y-87-1. U.S. Army Engineer Waterways Experiment Station, Vicksburg, MS. 1987.

11. —. Interim Regional Supplement to the Corps of Engineers Wetlands Delineation Manual. ERDC/EL TR-09-19. Vicksburg, MS: U.S. Army Corps of Engineers: Engineer Research and Development Center, Wetlands Regulatory Assistance Program. 2009.

12. **Minnesota Department of Natural Resources, Ecological Services Division.** Vascular Plants of Minnesota. September 25, 2002.

Tables

Table 1 Wetland Mitigation Credits on the North Unit of the Zim Sod Site

Field Number/Feature Type	Area (acres)	Credit
N01	16.1	16.1
N02	17.8	17.8
N03	2.2	2.2
N04	18.8	18.8
N05	21.1	21.1
N06	17.8	17.8
N07	17.6	17.6
N08	21.5	21.5
N09	23.1	23.1
N10	13.6	13.6
N11	19.0	19.0
N12	20.9	20.9
N13	19.2	19.2
N14	22.2	22.2
N15	22.9	22.9
N16	26.1	26.1
N17	21.9	21.9
N18	29.9	29.9
North Unit Drained Fields Total (100% Credit)	*351.5*	*351.5*
N03	2.1	2.1
N05	0.3	0.3
N10	2.4	2.4
N16	0.5	0.5
N17	1.7	1.7
North Unit Total Excavations (100% Credit)	*7.0*	*7.0*
Wooded areas - partially drained (50% Credit)	*43.6*	*21.8*
Ditch fill (50% Credit)	*18.3*	*9.2*
Upland Buffer - Ditch Lateral Effect (25% Credit)	*12.3*	*3.1*
Preservation areas	*11.6*	*1.4*
Open Ditches (0% Credit)	*2.3*	-
Road (0% Credit)	*5.3*	-
Additional land - no credits	*28.7*	-
North Unit Totals	**480.6**	**394.0**

Table 2 Wetland Mitigation Credits on the South Unit of the Zim Sod Site

Field Number/Feature Type	Area (acres)	Credit (acres)
S01	6.3	6.3
S02	39.6	39.6
S03	4.2	4.2
South Unit Drained Fields Total (100% Credit)	*50.0*	*50.0*
S02	1.3	1.3
South Unit Excavations Total (100% Credit)	*1.3*	*1.3*
Wooded areas - partially drained (50% Credit)	*4.5*	*2.3*
Ditch fill (50% Credit)	*3.2*	*1.6*
Upland Buffer - Ditch Lateral Effect (25% Credit)	*10.4*	*2.6*
Preservation (12.5% Credit)	*17.2*	*2.2*
Open Ditches (0% Credit)	*1.5*	-
Road (0% Credit)	*0.4*	-
South Unit Totals	**88.5**	**59.9**

Table 3 Potential Tree Species that may be Planted at the Zim Sod Site

Common Name	Scientific Name	Expected occurrence in:	
		Coniferous Swamp	Coniferous Bogs
Red Maple	*Acer rubrum*	Infrequent	Rare
Paper Birch	*Betula papyrifera*	Common	Rare
Black Ash	*Fraxinus nigra*	Infrequent	Rare
Quaking aspen	*Populus tremuloides*	Infrequent	Rare
Balsam fir	*Abies balsamifera*	Common	Rare
Tamarack	*Larix laricina*	Abundant	Common
Black spruce	*Picea nigra*	Abundant	Abundant
White cedar	*Thuja occidentalis*	Common	Rare
Speckled alder	*Alnus incana*	Common	Rare
Bog birch	*Betula pumila*	Common	Rare
Juneberries	*Amelanchier* spp.	Infrequent	Rare

Table 4 Potentially Problematic Invasive Species for the Zim Sod Site

Common Name	Scientific Name
Bird's Foot trefoil	*Lotus corniculatus*
Blue cattail	*Typha* x *glauca*
Buckthorns	*Rhamnus* spp
Canada thistle	*Cirsium arvense*
Common reed	*Phragmites australis*
Common tansy	*Tanacetum vulgare*
Curly dock	*Rumex crispus*
Flowering rush	*Botomus umbellatus*
Foxtail	*Setaria* spp.
Narrowleaf cattail	*Typha angustifolia*
Perennial sow thistle	*Sonchus arvensis*
Purple loosestrife	*Lythrum salicaria*
Reed canary grass	*Phalaris arundinacea*
Smooth brome grass	*Bromus inermis*
Sweet clover	*Melilotus alba*
Yellow iris	*Iris pseudacorus*

Also includes other non-native species based on Reference (12).

Figures

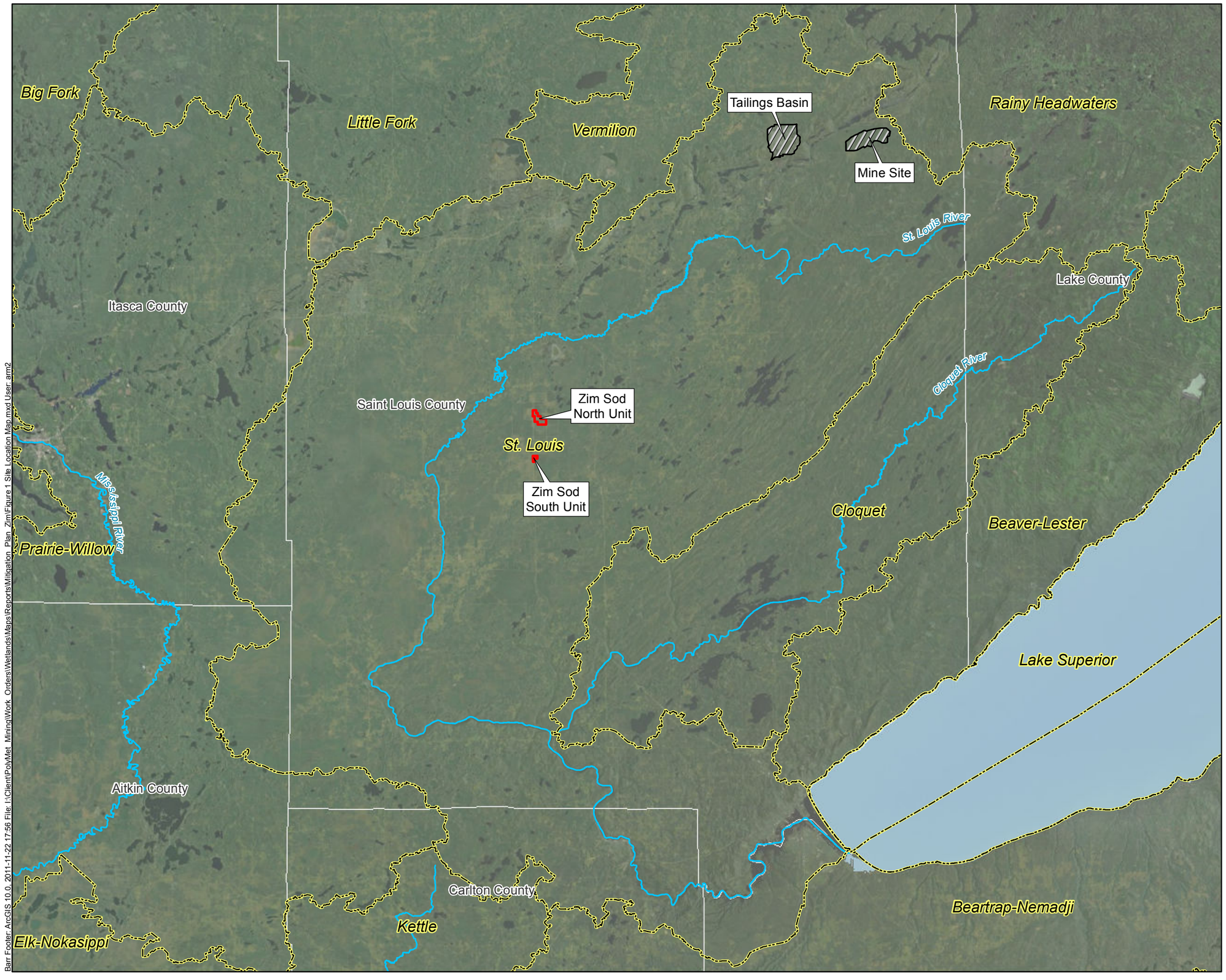


Figure 1
ZIM SOD LOCATION MAP
NorthMet Project
PolyMet Mining, Inc
St. Louis County, Minnesota

Symbol	Map Unit Name
B14A	Greenwood soils, upham basin, 0 to 1 percent slopes

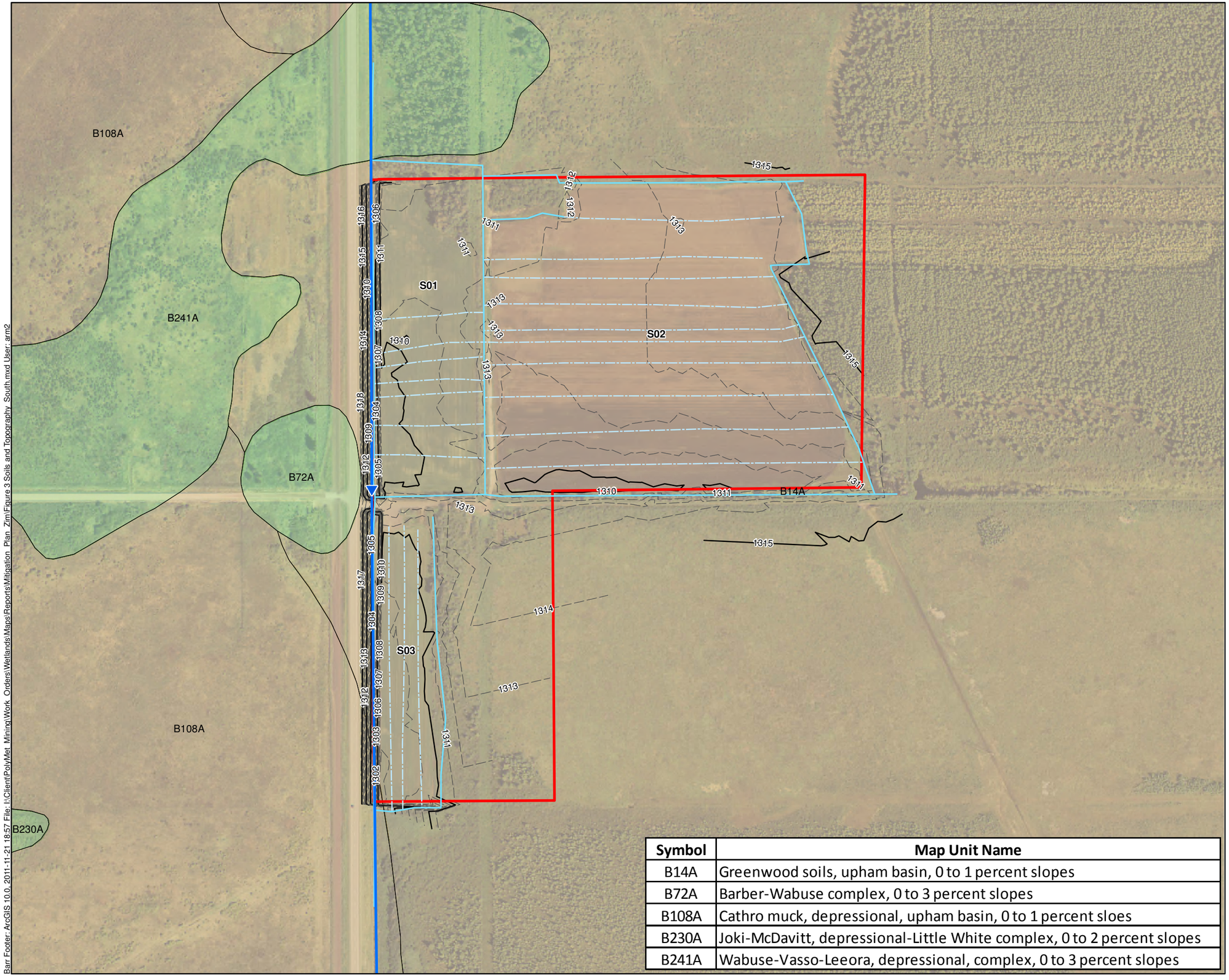
N01 N02 N04 N05 N06 N07 N08 N09 N10 N11 N12 N13 N14 N15 N16 N17 N18

Ditches
County Ditches
Estimated Drain Tiles
Topography
5-foot contour
1-foot contour
North Unit Boundary
Soil Map Unit
All Hydric Soils

0 350 700 1,400
Feet

Figure 2
NORTH UNIT SOIL, TOPOGRAPHY, AND DRAINAGE MAP
NorthMet Project
PolyMet Mining, Inc
St. Louis County, Minnesota

Barr Footer: ArcGIS 10.0, 2011-11-22 16:46 File: I:\Client\PolyMet Mining\Work Orders\Wetlands\Maps\Reports\Mitigation Plan Zim\Figure 2 Soils and Topography North.mxd User: arm2



Symbol	Map Unit Name
B14A	Greenwood soils, upham basin, 0 to 1 percent slopes
B72A	Barber-Wabuse complex, 0 to 3 percent slopes
B108A	Cathro muck, depressional, upham basin, 0 to 1 percent sloes
B230A	Joki-McDavitt, depressional-Little White complex, 0 to 2 percent slopes
B241A	Wabuse-Vasso-Leeora, depressional, complex, 0 to 3 percent slopes

Figure 3
SOUTH UNIT SOIL, TOPOGRAPHY, AND DRAINAGE MAP
NorthMet Project
PolyMet Mining, Inc
St. Louis County, Minnesota

Ditches
County Ditches
Estimated Drain Tiles
North Unit Boundary

Restoration Method

Restore Drained Fields - 100% Credit
Excavated Ponds - 100% Credit
Filled Ditches - 50% Credit
Restore Partial Drainage - 50% Credit
Upland Buffer/Ditch Lateral Effect - 25% Credit
Preservation - 12.5% Credit
Open Ditches - 0% Credit
Roads - 0% Credit
0% Credit

0 350 700 1,400
Feet

Figure 4

NORTH UNIT CONCEPTUAL PLAN
CREDIT AREAS
NorthMet Project
PolyMet Mining, Inc
St. Louis County, Minnesota

Barr Footer: ArcGIS 10.0, 2011-11-22 16:31 File: I:\Client\PolyMet_Mining\Work_Orders\Wetlands\Maps\Reports\Mitigation_Plan_Zim\Figure4 Concept Mitigation Plan_North.mxd User: arm2

Ditches
County Ditches
Estimated Drain Tiles
South Unit Boundary

Restoration Method

Restore Drained Fields - 100% Credit
Excavated Ponds - 100% Credit
Filled Ditches - 50% Credit
Restore Partial Drainage - 50% Credit
Upland Buffer/Ditch Lateral Effect - 25% Credit
Preservation - 12.5% Credit
Open Ditches - 0% Credit
Roads - 0% Credit
0% Credit

N

0 200 400 800
Feet

Figure 5
SOUTH UNIT CONCEPTUAL PLAN
CREDIT AREAS
NorthMet Project
PolyMet Mining, Inc
St. Louis County, Minnesota

Appendices

Appendix A

Greenwood Soil Series Official Soil Description

LOCATION GREENWOOD MI+MA ME MN NH NY WI

Established Series
Rev. LWB-WEF-LMC
11/2004

GREENWOOD SERIES

The Greenwood series consists of very deep ,very poorly drained soils formed in organic deposits more than 51 inches thick on outwash plains, till floored lake plains, or lake plains. These soils have moderate or moderately rapid permeability. Slopes range from 0 to 2 percent. Mean annual precipitation is about 29 inches, and mean annual temperature is about 43 degrees F.

TAXONOMIC CLASS: Dysic, frigid Typic Haplohemists

TYPICAL PEDON: Greenwood mucky peat - on a 1 percent slope in a forested area. (Colors are for moist soil unless otherwise stated.)

Oi--0 to 6 inches; brown (7.5YR 4/4) peat (fibric material); about 95 percent fiber, about 90 percent rubbed; massive; friable; primarily live roots and sphagnum moss; extremely acid; clear smooth boundary.

Oe1--6 to 10 inches; very dark brown (10YR 2/2) broken face and rubbed mucky peat (hemic material); about 80 percent fiber, about 20 percent rubbed; massive; friable; primarily herbaceous fibers; extremely acid; gradual smooth boundary.

Oe2--10 to 35 inches; dark brown (7.5YR 3/2) broken face and rubbed mucky peat (hemic material); about 80 percent fibers, about 20 percent rubbed; massive; friable; primarily herbaceous fibers; extremely acid; gradual smooth boundary.

Oe3--35 to 60 inches; dark brown (7.5YR 3/2) broken face and rubbed mucky peat (hemic material); about 90 percent fibers, about 35 percent rubbed; massive; friable; primarily herbaceous fibers; very strongly acid.

TYPE LOCATION: Clare County, Michigan; about 5 miles south and 1 mile west of Temple; 300 feet east and 825 feet south of the northwest corner, sec. 16, T. 18 N., R. 6 W.

RANGE IN CHARACTERISTICS: The organic layers are more than 51 inches thick. The surface tier is commonly peat (fibric material) derived from sphagnum moss. In some places, these layers are largely undecomposed sphagnum moss and in others they are stratified muck, mucky peat, and peat derived from both herbaceous plants and sphagnum moss. Muck, mucky peat, and peat types have been recognized. The O layers have hue of 10YR to 5YR, value of 2 to 6, and chroma of 1 to 4; colors become darker upon brief exposure to air. Oi layers have the highest values and chromas. In some pedons, colors after rubbing change from 0.5 to 1 unit in value or chroma or both. The layers in the subsurface and bottom tiers are dominantly mucky peat (hemic material) derived from herbaceous plants. In some pedons, layers of peat or muck have a combined thickness of less than 10 inches in the lower two tiers. These layers have pH of 4.5 or less in 0.01M calcium chloride and commonly range from pH 3.5 to 4.5. Fragments of woody material ranging from about 1 to 8 inches in diameter are throughout the control section. Woody fibers comprise less than 50 percent of the organic volume after

rubbing. There is no mineral soil material recognized in the profile.

COMPETING SERIES: There are none. The Burnt Vly, Citypoint, Dawson, Loxley and Pleasant Lake soils are in closely related families. All of these soils are dominantly composed of sapric materials. In addition,the Citypoint series has a lithic or paralithic contact within 60 inches and the Burnt Vly and Dawson soils have sandy mineral soil within 51 inches of the surface.

GEOGRAPHIC SETTING: Greenwood soils are in depressions that range in size from small enclosed bogs in moraines to areas of about 1,000 acres in size. The larger areas commonly are on outwash plains, till floored lake plains, or lake plains. The mineral soils in the surrounding upland are generally derived from acid parent materials. Slopes range from 0 to 2 percent. Then mean annual precipitation ranges from about 22 to 35 inches, and the mean annual temperature is about 36 to 45 degrees F. Frost free days range from 88 to 150. Elevation above sea level ranges from 600 to 1,600 feet.

GEOGRAPHICALLY ASSOCIATED SOILS: These are the Dawson, Deford, Kinross, and Roscommon soils. Dawson soils are shallow organic soils in similar landscape positions underlain by sand at a depth of 16 to 50 inches. The Deford, Kinross and Roscommon soils are poorly or very poorly drained sandy mineral soils in slightly higher landscape positions.

DRAINAGE AND PERMEABILITY: Very poorly drained. The representative depth to wet soil moisture status is at the surface to 1 foot below the surface at some time throughout the year. The representative depth of ponding is from 0 to 1.0 foot at some time throughout the year. Surface runoff is negligible. Permeability is moderate or moderately rapid.

USE AND VEGETATION: Very little use is made of these soils because of the extreme acidity and high water table. Few trees except some black spruce and tamarack grow on these soils. Ground cover is blueberries, bog rosemary, laurel, leatherleaf, and sphagnum mosses.

DISTRIBUTION AND EXTENT: Minnesota, Wisconsin, New Hampshire, New York, and the northern Lower Peninsula and Upper Peninsula of Michigan. The soil is of large extent.

MLRA SOIL SURVEY REGIONAL OFFICE (MO) RESPONSIBLE: St. Paul, Minnesota

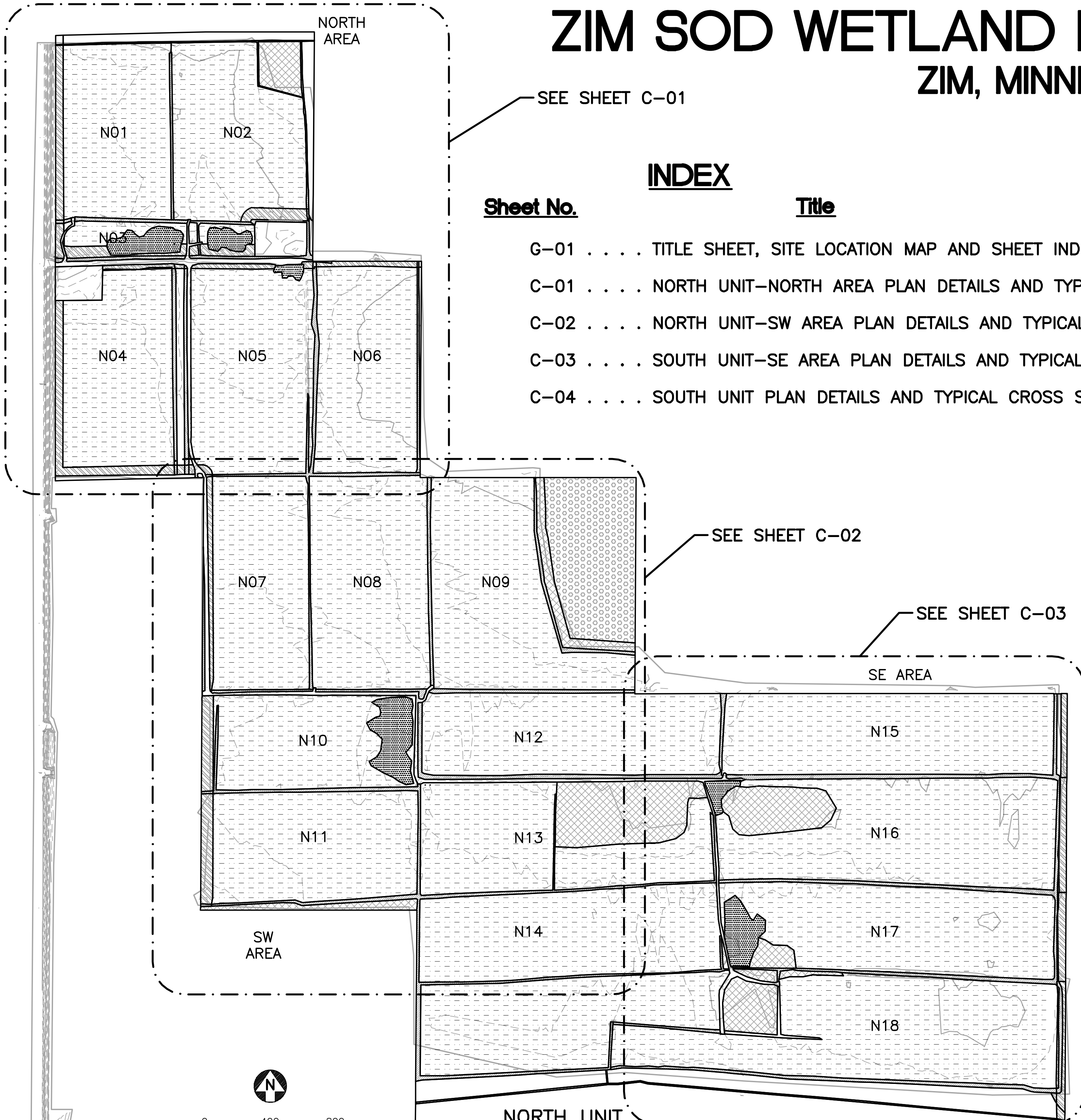
SERIES ESTABLISHED: Ogemaw County, Michigan, 1923.

National Cooperative Soil Survey
U.S.A.

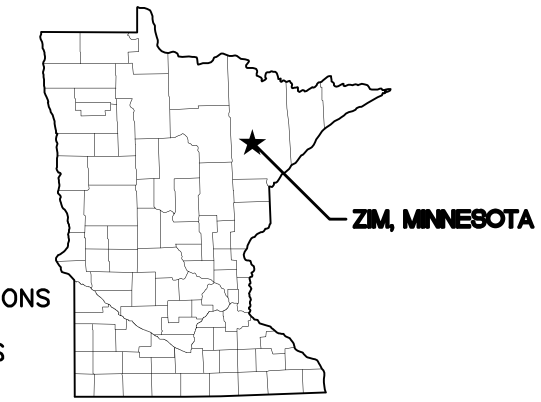
Appendix B

Wetland Mitigation Plan Drawings

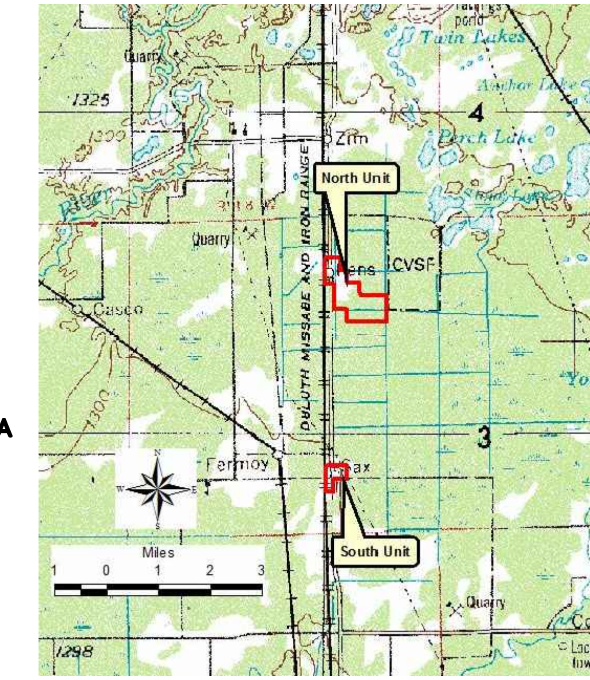
POLYMET
ZIM SOD WETLAND MITIGATION PLANS
ZIM, MINNESOTA



INDEX

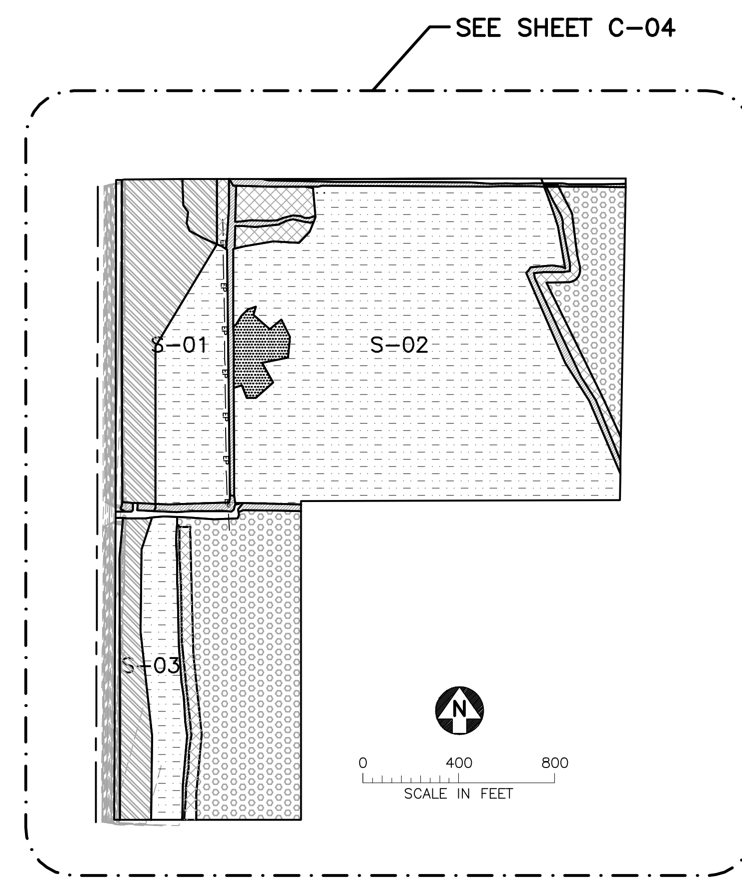


STATE MAP



SITE LOCATION MAP

CALL 48 HOURS BEFORE DIGGING
GOPHER STATE ONE CALL
TWIN CITIES AREA 651-454-0002
MN TOLL FREE 1-800-252-1166



SOUTH UNIT

PRELIMINARY DRAFT

CADD USER: John M. Warner FILE: 23690862_G-01.DWG PLOT SCALE: 1:2 PLOT DATE: 11/23/2011 12:16 PM

NO.	BY	CHK.	APP.	DATE	REVISION DESCRIPTION

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

SIGNATURE ______
PRINTED NAME ______
DATE ______ REG. NO. ______

RELEASED TO/FOR	A	B	C	0	1	2	3
CLIENT							
BID							
CONSTRUCTION							
	DATE RELEASED						

BARR
Corporate Headquarters: Minneapolis, Minnesota Ph: 1-800-632-2277

Project Office:
BARR ENGINEERING CO.
4700 WEST 77TH STREET
MINNEAPOLIS, MN.
55435-4803
Ph: 1-800-632-2277
Fax: (952) 832-2601
www.barr.com

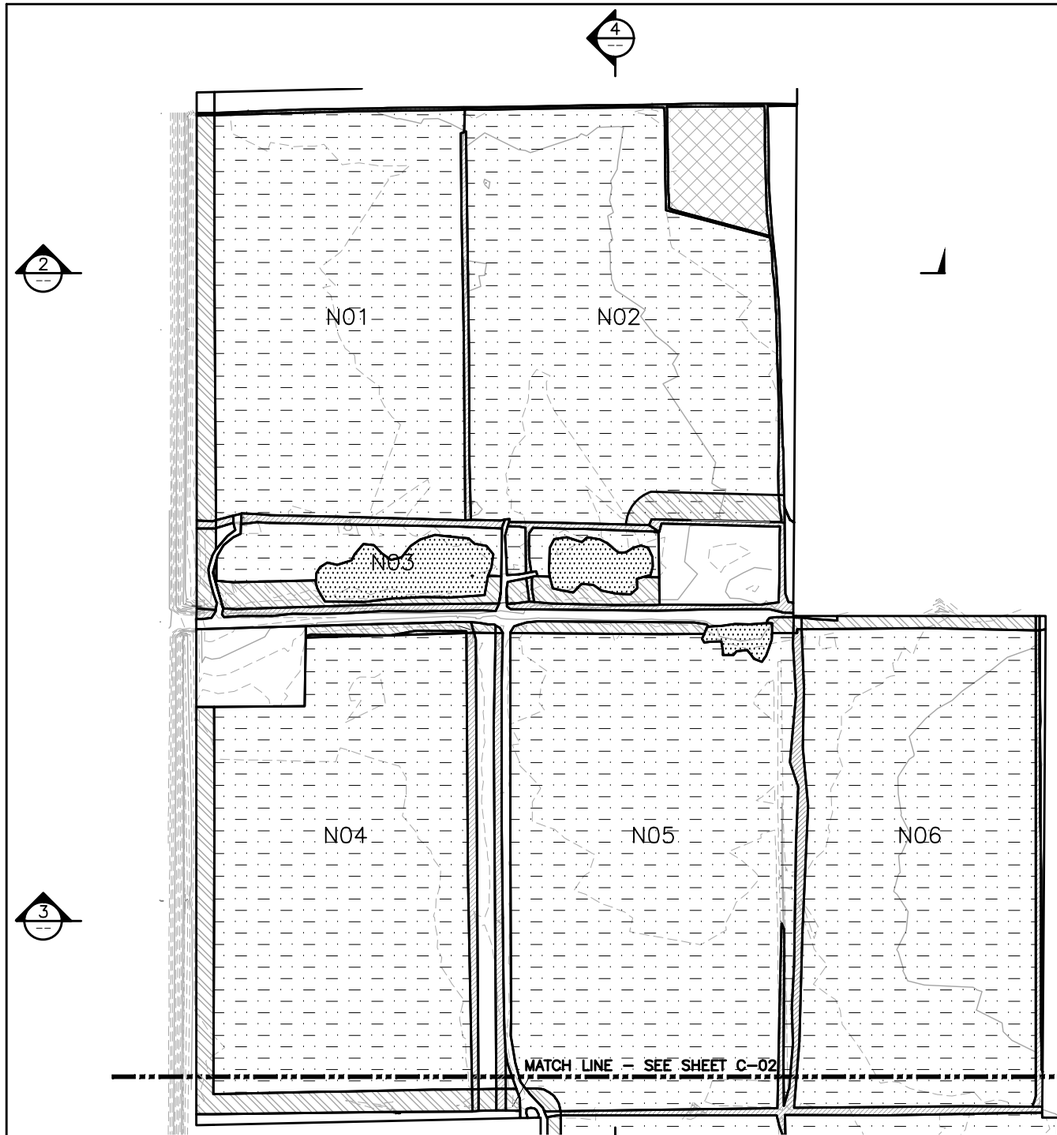
Scale	AS SHOWN
Date	12/27/10
Drawn	JMW
Checked	MAJ
Designed	MAJ
Approved	MAJ

POLYMET

ZIM SOD WETLAND MITIGATION PLANS
ZIM, MINNESOTA

TITLE SHEET, SITE LOCATION MAP, AND SHEET INDEX

BARR PROJECT No. 23690862
CLIENT PROJECT No.
DWG. No. G-01
REV. No. A



1 PLAN: NORTH UNIT–NORTH AREA

0 200 400
SCALE IN FEET

LEGEND

- RESTORE DRAINED WETLAND – 100% CREDIT
- RESTORE HYDROLOGY TO PARTIALLY DRAINED WETLAND – 50% CREDIT
- FUTURE ROAD ACCESS – NO CREDIT
- DITCH FILL – 50% CREDIT
- DITCH LATERAL EFFECT – 25% CREDIT
- PRESERVATION – 12.5% CREDIT
- EXCAVATION – 100% CREDIT

5
0
0 200
SCALE IN FEET
40X VERTICAL EXAGGERATION

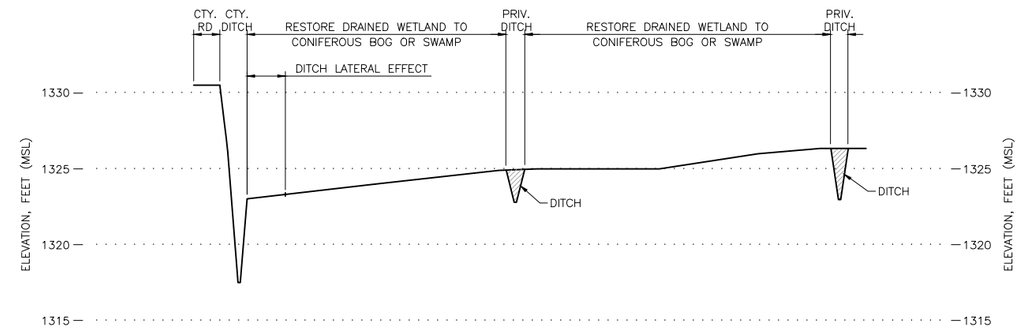
CONSTRUCTION NOTES:

1. FILL DITCHES, TO MATCH GRADE USING LOCAL MATERIALS.

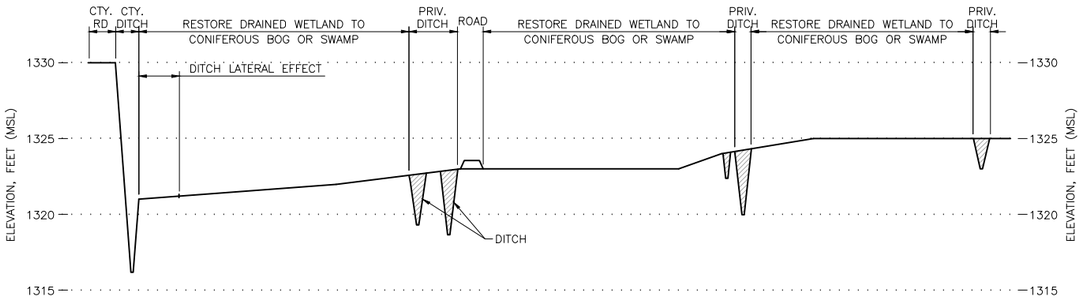
LEGEND

- REMOVE
- FILL

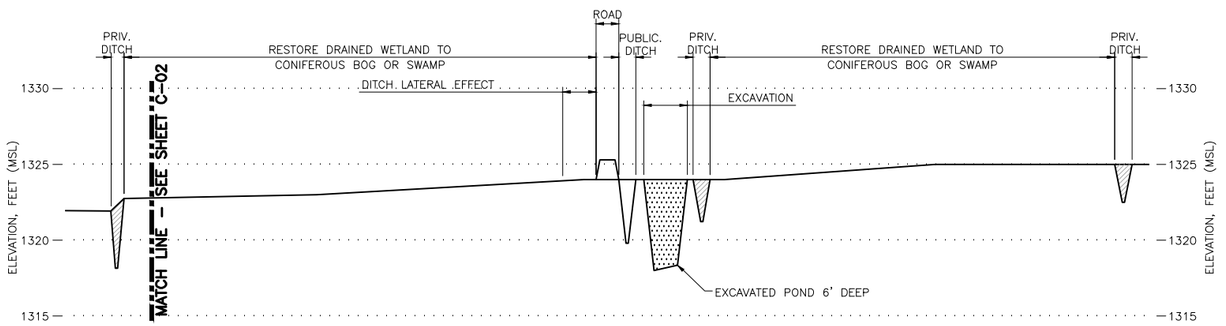
NOTES:
- FIELD WIDTHS TO SCALE
- REMOVAL AND DITCH WIDTHS EXAGGERATED
- DITCH DEPTHS TO SCALE



2 TYPICAL CROSS SECTION – FIELDS N01 & N02



3 TYPICAL CROSS SECTION – FIELDS N04, N05 & N06



4 TYPICAL CROSS SECTION – FIELDS N02, N03 & N05

PRELIMINARY DRAFT

CADD USER: John M. Warner FILE: 23690862_C-01.DWG PLOT SCALE: 1:2 PLOT DATE: 11/23/2011 11:27 AM
Xrefs in Drawing – K:\Design\NorthMet\23690862_BASE.dwg
JMW M:\AdeptWork\JMW\23690862_C-01.dwg Plot at 0 11/23/2011 11:26:32

NO.	BY	CHK.	APP.	DATE	REVISION DESCRIPTION

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

SIGNATURE _____

PRINTED NAME _____

DATE _____ REG. NO. _____

RELEASED TO/FOR: CLIENT, BID, CONSTRUCTION

DATE RELEASED: A B C 0 1 2 3

BARR
Corporate Headquarters:
Minneapolis, Minnesota
Ph: 1-800-632-2277

Project Office:
BARR ENGINEERING CO.
4700 WEST 77TH STREET
MINNEAPOLIS, MN.
55435-4803
Ph: 1-800-632-2277
Fax: (952) 832-2601
www.barr.com

Scale	AS SHOWN
Date	12/27/10
Drawn	JMW
Checked	MAJ
Designed	MAJ
Approved	MAJ

POLYMET

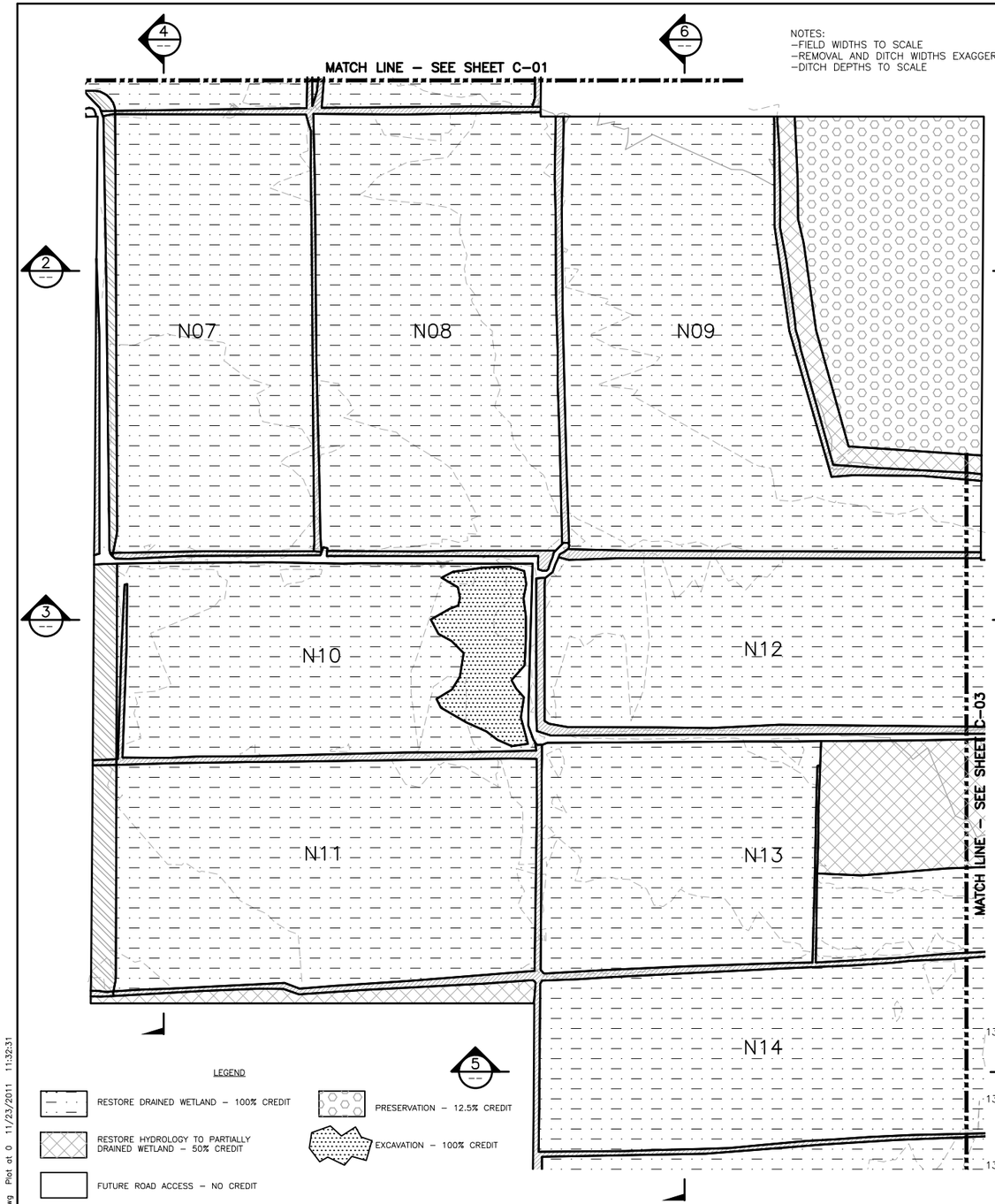
ZIM SOD WETLAND MITIGATION PLANS
ZIM, MINNESOTA

NORTH UNIT–NORTH AREA PLAN DETAILS AND TYPICAL CROSS SECTIONS

BARR PROJECT No. 23690862
CLIENT PROJECT No.
DWG. No. C-01
REV. No. A

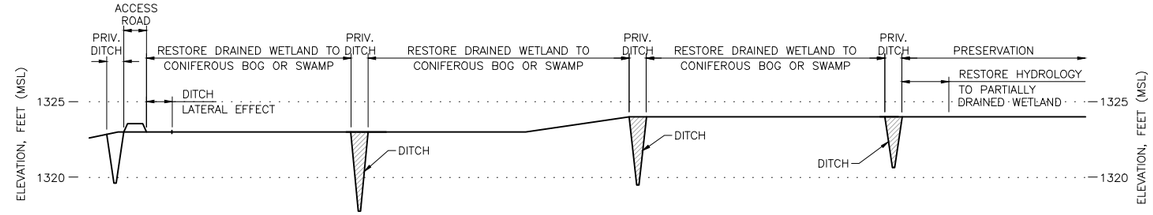
NOTES:
-FIELD WIDTHS TO SCALE
-REMOVAL AND DITCH WIDTHS EXAGGERATED
-DITCH DEPTHS TO SCALE

LEGEND
REMOVE
FILL

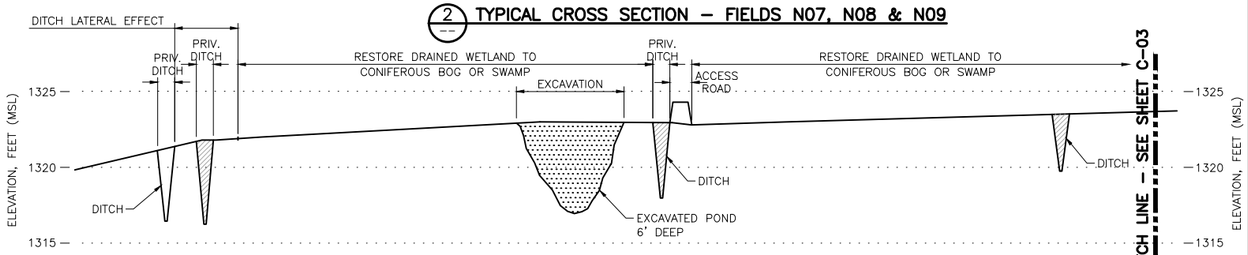


1 PLAN: NORTH UNIT–SW AREA

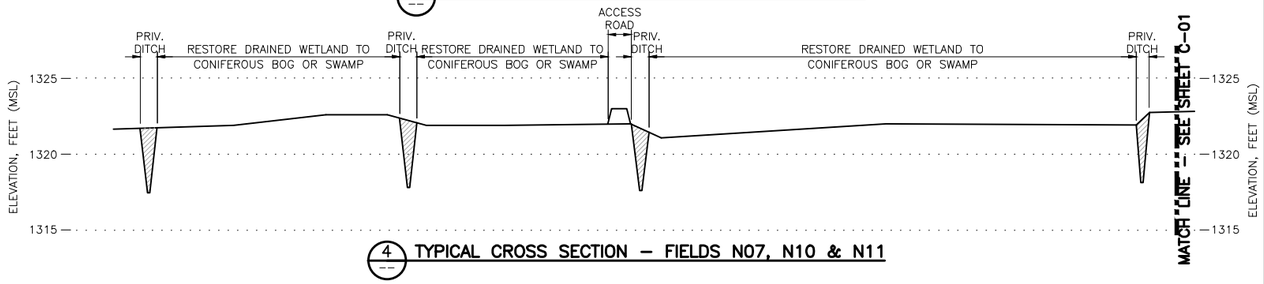
0 200 400
SCALE IN FEET



2 TYPICAL CROSS SECTION – FIELDS N07, N08 & N09

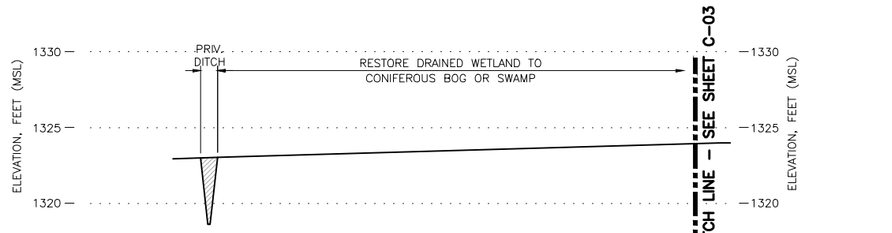


3 TYPICAL CROSS SECTION – FIELDS N10 & N12

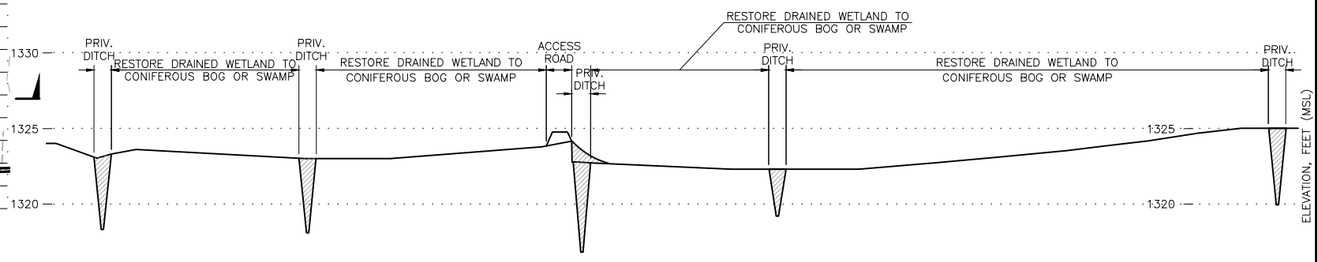


4 TYPICAL CROSS SECTION – FIELDS N07, N10 & N11

5
0
0 200
SCALE IN FEET
40X VERTICAL EXAGGERATION



5 TYPICAL CROSS SECTION – FIELD N14



6 TYPICAL CROSS SECTION – FIELDS N09, N12, N13 & N14

PRELIMINARY DRAFT

NO.	BY	CHK.	APP.	DATE	REVISION DESCRIPTION

I HEREBY CERTIFY THAT THIS PLAN, SPECIFICATION, OR REPORT WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA.
SIGNATURE
PRINTED NAME
DATE ____-____-____ REG. NO. ____-____

RELEASED TO/FOR	A	B	C	0	1	2	3
CLIENT							
BID							
CONSTRUCTION							
DATE RELEASED							

BARR
Corporate Headquarters: Minneapolis, Minnesota
Ph: 1-800-632-2277

Project Office:
BARR ENGINEERING CO.
4700 WEST 77TH STREET
MINNEAPOLIS, MN.
55435-4803
Ph: 1-800-632-2277
Fax: (952) 832-2601
www.barr.com

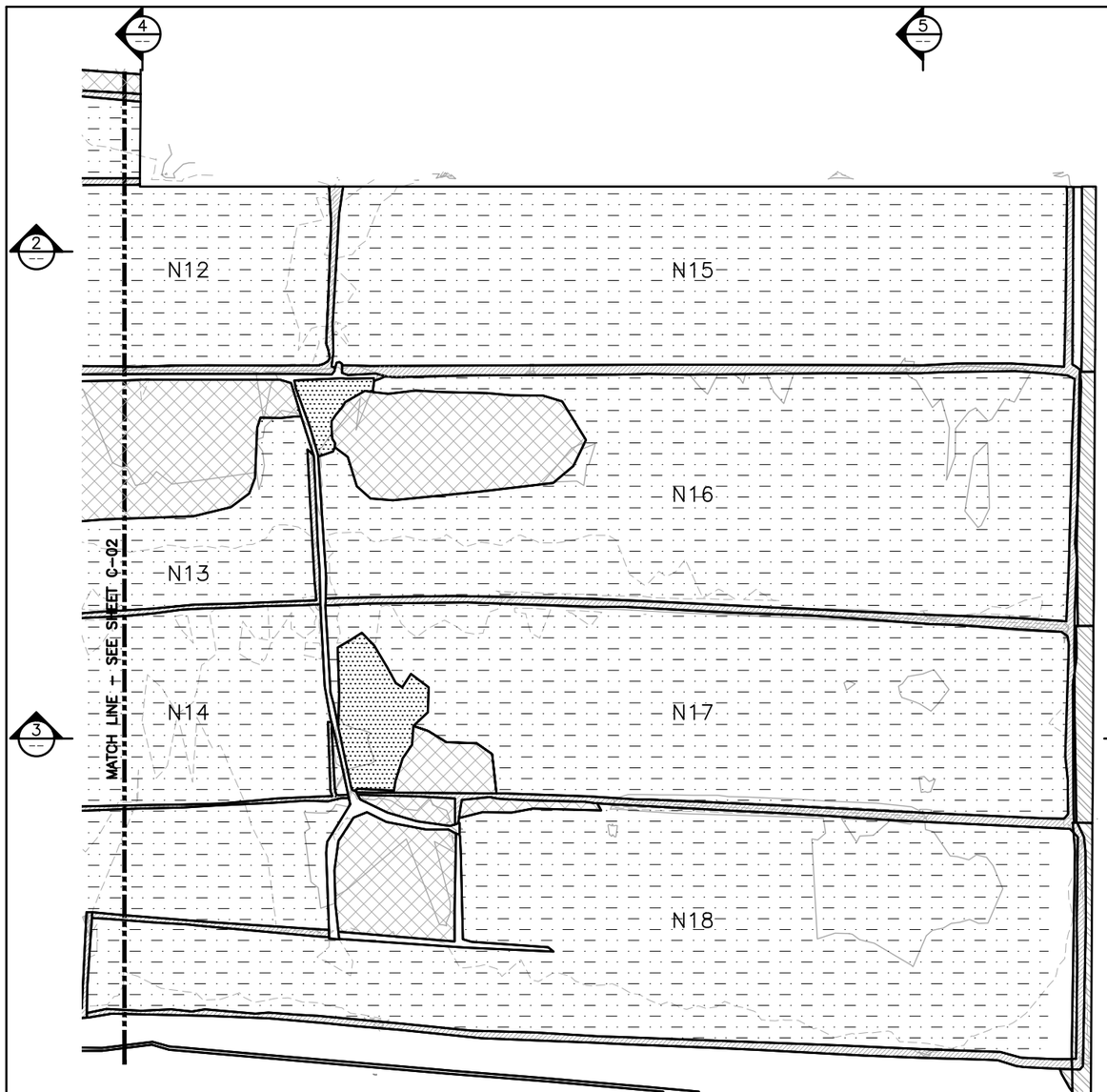
Scale	AS SHOWN
Date	12/27/10
Drawn	JMW
Checked	MAJ
Designed	MAJ
Approved	MAJ

POLYMET

ZIM SOD WETLAND MITIGATION PLANS
ZIM, MINNESOTA

NORTH UNIT–SW PLAN DETAILS AND TYPICAL CROSS SECTIONS

BARR PROJECT No.	
23690862	
CLIENT PROJECT No.	
DWG. No.	REV. No.
C-02	A



1 PLAN: NORTH UNIT–SE AREA

0 200 400
SCALE IN FEET

LEGEND

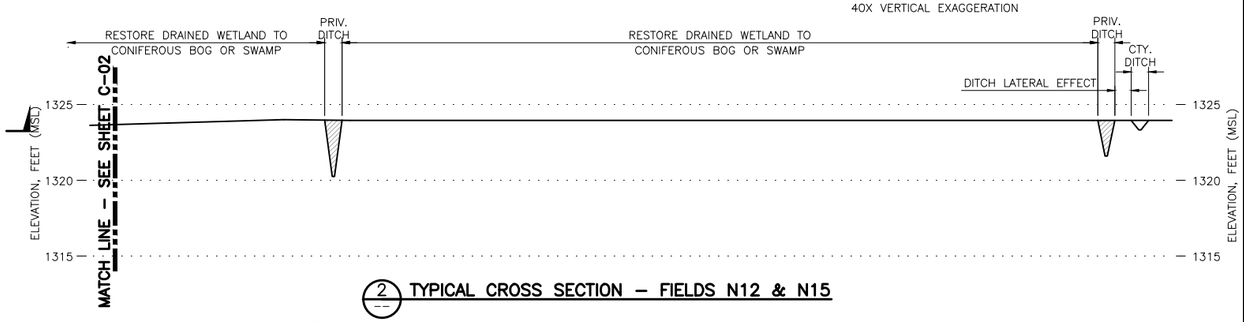
- RESTORE DRAINED WETLAND – 100% CREDIT
- RESTORE HYDROLOGY TO PARTIALLY DRAINED WETLAND – 50% CREDIT
- FUTURE ROAD ACCESS – NO CREDIT
- DITCH FILL – 50% CREDIT
- DITCH LATERAL EFFECT – 25% CREDIT
- PRESERVATION – 12.5% CREDIT
- EXCAVATION – 100% CREDIT

LEGEND

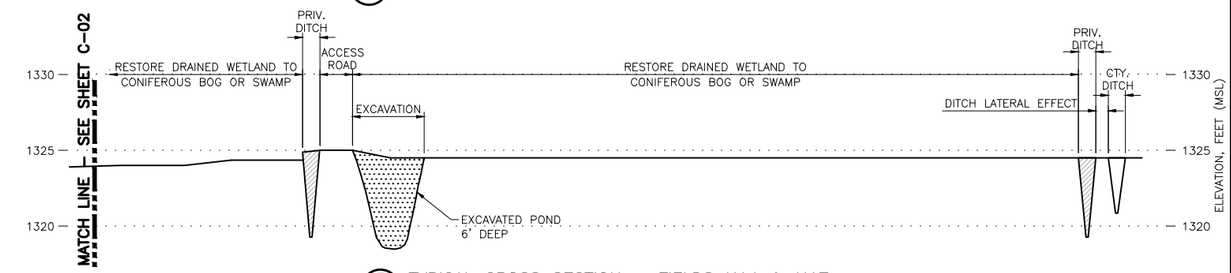
- REMOVE
- FILL

NOTES:
- FIELD WIDTHS TO SCALE
- REMOVAL AND DITCH WIDTHS EXAGGERATED
- DITCH DEPTHS TO SCALE

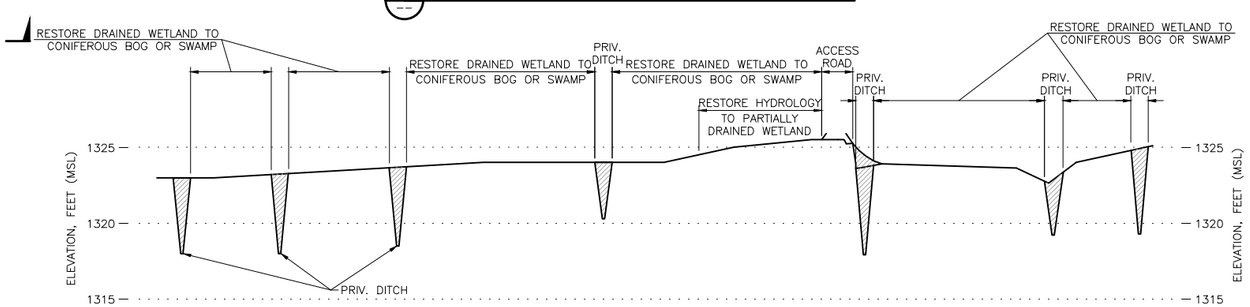
5
0
0 200
SCALE IN FEET
40X VERTICAL EXAGGERATION



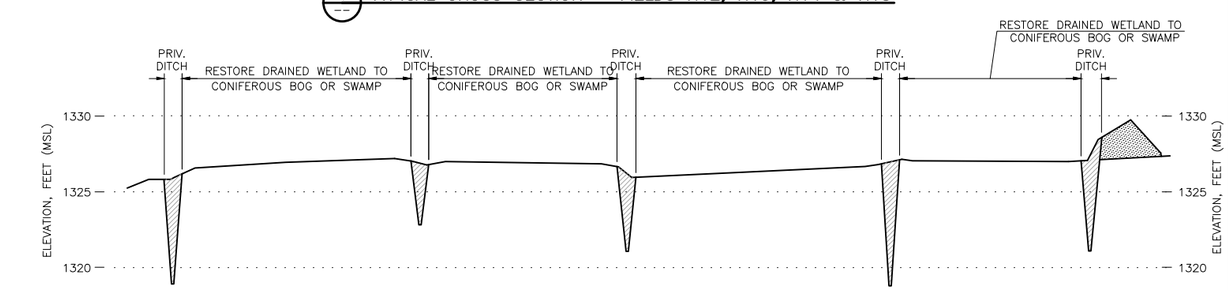
2 TYPICAL CROSS SECTION – FIELDS N12 & N15



3 TYPICAL CROSS SECTION – FIELDS N14 & N17



4 TYPICAL CROSS SECTION – FIELDS N12, N13, N14 & N18



5 TYPICAL CROSS SECTION – FIELDS N15, N16, N17 & N18

PRELIMINARY DRAFT

NO.	BY	CHK.	APP.	DATE	REVISION DESCRIPTION

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

SIGNATURE _____

PRINTED NAME _____

DATE _____ REG. NO. _____

CLIENT
BID
CONSTRUCTION

RELEASED TO/FOR

A	B	C	0	1	2	3

DATE RELEASED

BARR
Corporate Headquarters:
Minneapolis, Minnesota
Ph: 1-800-632-2277

Project Office:
BARR ENGINEERING CO.
4700 WEST 77TH STREET
MINNEAPOLIS, MN.
55435-4803
Ph: 1-800-632-2277
Fax: (952) 832-2601
www.barr.com

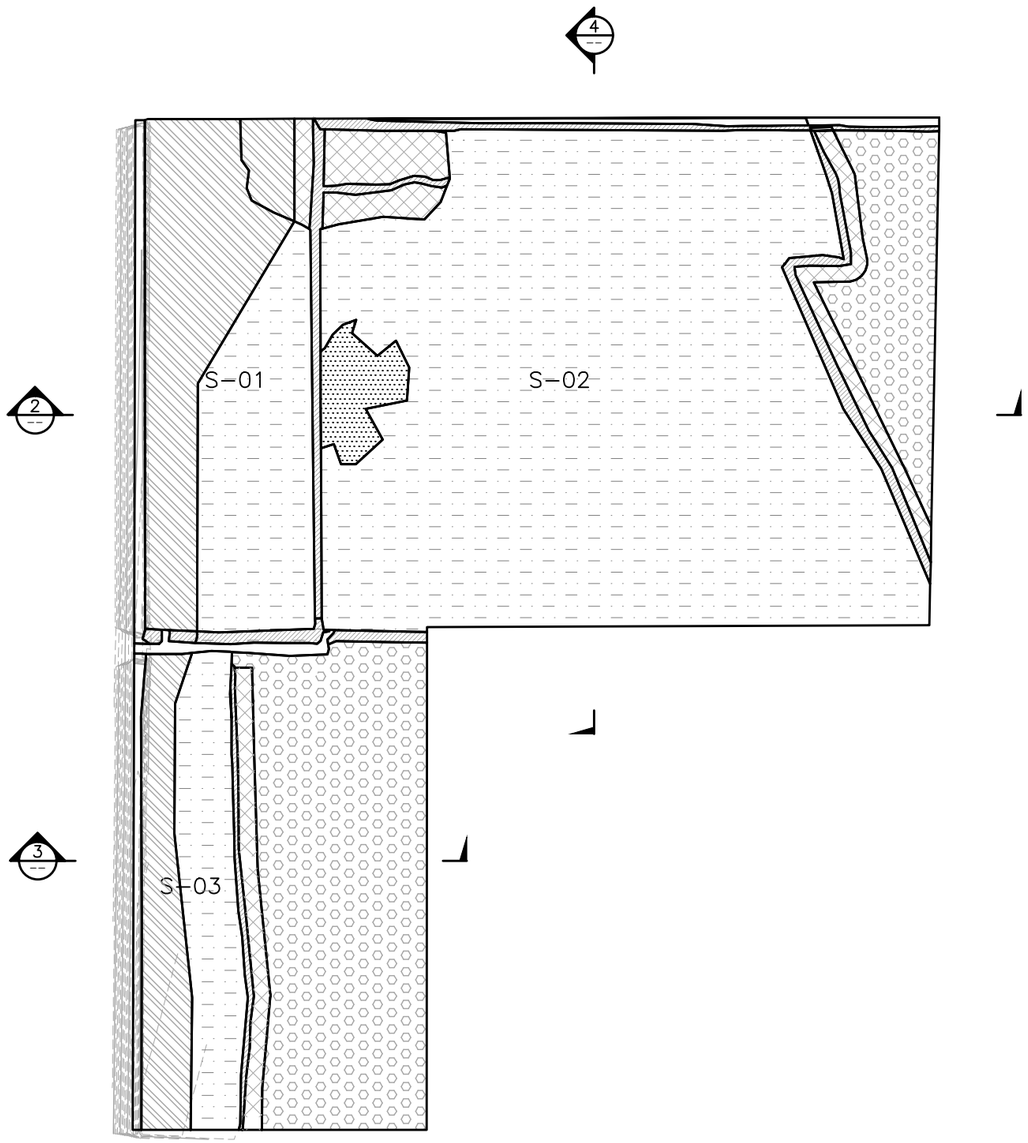
Scale	AS SHOWN
Date	12/27/10
Drawn	JMW
Checked	MAJ
Designed	MAJ
Approved	MAJ

POLYMET

ZIM SOD WETLAND MITIGATION PLANS
ZIM, MINNESOTA

NORTH UNIT–SE AREA PLAN DETAILS AND TYPICAL CROSS SECTIONS

BARR PROJECT No. 23690862
CLIENT PROJECT No.
DWG. No. C-03
REV. No. A



1 PLAN: SOUTH UNIT

0 200 400
SCALE IN FEET

LEGEND

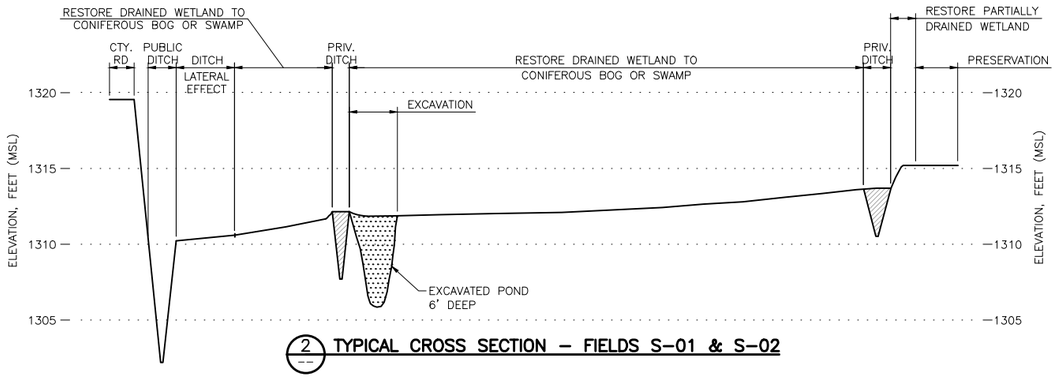
- RESTORE DRAINED WETLAND – 100% CREDIT
- RESTORE HYDROLOGY TO PARTIALLY DRAINED WETLAND – 50% CREDIT
- FUTURE ROAD ACCESS – NO CREDIT
- DITCH FILL – 50% CREDIT
- DITCH LATERAL EFFECT – 25% CREDIT
- PRESERVATION – 12.5% CREDIT
- EXCAVATION – 100% CREDIT

5
0
0 200
SCALE IN FEET
40X VERTICAL EXAGGERATION

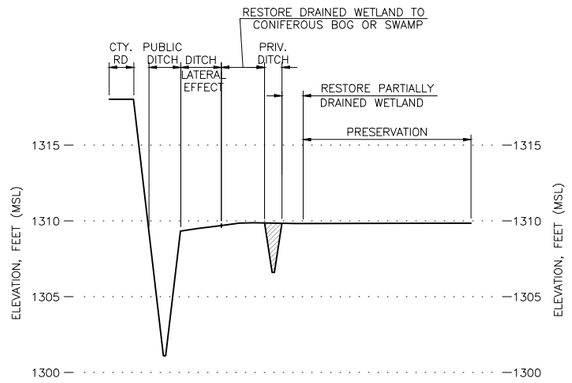
LEGEND

- REMOVE
- FILL

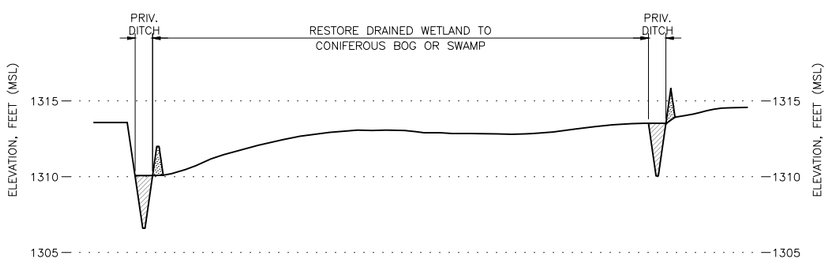
NOTES:
–FIELD WIDTHS TO SCALE
–REMOVAL AND DITCH WIDTHS EXAGGERATED
–DITCH DEPTHS TO SCALE



2 TYPICAL CROSS SECTION – FIELDS S-01 & S-02



3 TYPICAL CROSS SECTION – FIELD S-03



4 TYPICAL CROSS SECTION – FIELD S-02

PRELIMINARY DRAFT

CADD USER: John M. Warner FILE: 23690862_C-04.DWG PLOT SCALE: 1:2 PLOT DATE: 11/23/2011 12:28 PM
Xrefs in Drawing – M:\Vespa\Work\JMW\23690862_BASE.dwg
JMW M:\ADEPTWORK\JMW\23690862_C-04.dwg Plot at 0 12/29/2010 13:33:17

NO.	BY	CHK.	APP.	DATE	REVISION DESCRIPTION

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

SIGNATURE _____

PRINTED NAME _____

DATE _____ REG. NO. _____

RELEASED TO/FOR: CLIENT, BID, CONSTRUCTION

A	B	C	0	1	2	3

DATE RELEASED

BARR
Corporate Headquarters:
Minneapolis, Minnesota
Ph: 1-800-632-2277

Project Office:
BARR ENGINEERING CO.
4700 WEST 77TH STREET
MINNEAPOLIS, MN.
55435-4803
Ph: 1-800-632-2277
Fax: (952) 832-2601
www.barr.com

Scale	AS SHOWN
Date	12/27/10
Drawn	JMW
Checked	MAJ
Designed	MAJ
Approved	MAJ

POLYMET

ZIM SOD WETLAND MITIGATION PLANS
ZIM, MINNESOTA

SOUTH UNIT PLAN DETAILS AND TYPICAL CROSS SECTIONS

BARR PROJECT No. 23690862
CLIENT PROJECT No.
DWG. No. C-04
REV. No. A

Appendix C

Wetland Data Forms

WETLAND DETERMINATION DATA FORM - Northcentral and Northeast Region

Project/Site: Zim Sod | Applicant/Owner: Zim Sod | City/County: St. Louis | State: MN | Sampling Date: 11/18/10

Investigator(s): TPT | Section: 35 | Township: 55 | Range: 18 | Sampling Point: #01 S03

Land Form: Terrace | Local Relief: None | Slope %: | Soil Map Unit Name: Greenwood Soils B14A

Subregion (LRR): k | Latitude: | Longitude: | Datum:

NWI/Cowardin Classification: | Circular 39 Classification: up

Are climatic/hydrologic conditions on the site typical for this time of year? Yes (If no, explain in remarks)

Eggers & Reed (primary): Upland

Eggers & Reed (secondary):

Eggers & Reed (tertiary):

Eggers & Reed (quaternary):

Are vegetation	Yes	Soil	Yes	Hydrology	Yes	significantly disturbed?	Are "normal circumstances" present? Yes
Are vegetation	No	Soil	No	Hydrology	No	naturally problematic?	

SUMMARY OF FINDINGS - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic vegetation present? Yes

Hydric soil present? Yes

Wetland hydrology present? No

Is the sampled area within a wetland? No

Remarks (explain any answers if needed): This is a sod field - Owl Field -with a managed drainage system and managed vegetation. Soil sample was taken in the field

If yes, optional Wetland Site ID:

VEGETATION

	Tree Stratum (Plot Size:)	Absolute % Cover	Dominant Species?	Indicator Status *
1.		0		
2.		0		
3.		0		
4.		0		
	Total Cover:	0		

	Sapling/Shrub Stratum (Plot Size:)			
1.		0		
2.		0		
3.		0		
4.		0		
5.		0		
	Total Cover:	0		

	Herb Stratum (Plot Size:)			
1.	Poa pratensis	99	Yes	FAC
2.		0		
3.		0		
4.		0		
5.		0		
6.		0		
7.		0		
8.		0		
	Total Cover:	99		

	Woody Vine Stratum (Plot Size:)			
1.		0		
2.		0		
	Total Cover:	0		

* In USFWS Region 3

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW or FAC:	1	(A)
Total Number of Dominant Species Across All Strata:	1	(B)
Percent of Dominant Species That Are OBL, FACW or FAC:	100.00%	(A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL Species	0	X 1	0
FACW Species	0	X 2	0
FAC Species	99	X 3	297
FACU Species	0	X 4	0
UPL Species	0	X 5	0
Column Totals:	99 (A)		297 (B)
Prevalence Index = B/A =			3.00

Hydrophytic Vegetation Indicators:

No	Rapid Test for Hydrophytic Vegetation
Yes	Dominance Test is >50%
Yes	Prevelance Index ≤ 3.0 [1]
No	Morphological Adaptations [1] (provide supporting data in vegetation remarks or on a separate sheet)
No	Problematic Hydrophytic Vegetation [1] (Explain)

[1] Indicators of hydric soil & wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic vegetation present? Yes

Remarks:
(include photo numbers here or on a separate sheet)

Edge of sod field across ditch. Vegetation across ditch is tamarack, trembling aspen, willow sp. And reed canary

WETLAND DETERMINATION DATA FORM - Northcentral and Northeast Region

SOIL

Sampling Point: #01 S03

Profile Description: (Describe to the depth needed to document the indicator or confirm the abscence of indicators).

	Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type [1]	Loc [2]	Texture	Remarks
1.	0 - 10	10yr 2/1						fibric peat	
2.	10 - 20	10yr 2/1						fibric peat	5% had bright fibers
3.	20 - 28	10yr 2/1						fibric peat	15% bright fibers
4.	-								
5.	-								
6.	-								

[1] Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains **[2] Location: PL=Pore Lining, M=Matrix.**

Hydric Soil Indicators: (applicable to all LRRs, unless otherwise noted)

- [x] Histosol (A1)
- [ ] Histic Epipedon (A2)
- [ ] Black Histic (A3)
- [ ] Hydrogen Sulfide (A4)
- [ ] Stratified Layers (A5)
- [ ] Depleted Below Dark Surface (A11)
- [ ] Thick Dark Surface (A12)
- [ ] Sandy Mucky Mineral (S1)
- [ ] Sandy Gleyed Matrix (S4)
- [ ] Sandy Redox (S5)
- [ ] Stripped Matrix (S6)
- [ ] Dark Surface (S7) (LRR R, MLRA 149B)
- [ ] Polyvalue Below Surface (S8) (LRR R, MLRA 149B)
- [ ] Thin Dark Surface (S9) (LRR R, MLRA 149B)
- [ ] Loamy Mucky Mineral (F1) (LRR K, L)
- [ ] Loamy Gleyed Matrix (F2)
- [ ] Depleted Matrix (F3)
- [ ] Redox Dark Surface (F6)
- [ ] Depleted Dark Surface (F7)
- [ ] Redox Depressions (F8)

Indicators for Problematic Hydric Soils [3]:

- [ ] 2 cm Muck (A10) (LRR K, L, MLRA 149B)
- [ ] Coast Prairie Redox (A16) (LRR K, L, R)
- [ ] 5 cm Mucky Peat or Peat (S3) (LRR K, L, R)
- [ ] Dark Surface (S7) (LRR K, L)
- [ ] Polyvalue Below Surface (S8) (LRR K, L)
- [ ] Thin Dark Surface (S9) (LRR K, L)
- [ ] Iron-Manganese Masses (F12) (LRR K, L, R)
- [ ] Piedmont Floodplain Soils (F19) (MLRA 149B)
- [ ] Mesic Spodic (TA6) (MLRA 144A, 145, 149B)
- [ ] Red Parent Material (TF2)
- [ ] Very Shallow Dark Surface (TF12)
- [ ] Other (explain in soil remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present): **Type:** _____ **Depth (inches):** -

Hydric soil present? Yes

Remarks: Soil was moist but not saturated.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- [ ] Surface Water (A1)
- [ ] High Water Table (A2)
- [ ] Saturation (A3)
- [ ] Water Marks (B1)
- [ ] Sediment Deposits (B2)
- [ ] Drift Deposits (B3)
- [ ] Algal Mat or Crust (B4)
- [ ] Iron Deposits (B5)
- [ ] Inundation Visible on Aerial Imagery (B7)
- [ ] Sparsely Vegetated Concave Surface (B8)
- [ ] Water-Stained Leaves (B9)
- [ ] Aquatic Fauna (B13)
- [ ] Marl Deposits (B15)
- [ ] Hydrogen Sulfide Odor (C1)
- [ ] Oxidized Rhizospheres on Living Roots (where not tilled) (C3)
- [ ] Presence of Reduced Iron (C4)
- [ ] Recent Iron Reduction in Tilled Soils (C6)
- [ ] Thin Muck Surface (C7)
- [ ] Other (explain in remarks)

Secondary Indicators (minimum of two required)

- [ ] Surface Soil Cracks (B6)
- [ ] Drainage Patterns (B10)
- [ ] Moss Trim Lines (B16)
- [ ] Dry-Season Water Table (C2)
- [ ] Crayfish Burrows (C8)
- [ ] Saturation Visible on Aerial Imagery (C9)
- [ ] Stunted or Stressed Plants (D1)
- [ ] Geomorphic Position (D2)
- [ ] Shallow Aquitard (D3)
- [ ] Microtopographic Relief (D4)
- [ ] FAC-Neutral Test (D5)

Field Observations:

Surface water present? [ ] **Surface Water Depth (inches):** _____

Water table present? [ ] **Water Table Depth (inches):** _____

Saturation present? (includes capillary fringe) [ ] **Saturation Depth (inches):** _____

Wetland hydrology present? No

Describe Recorded Data:

Recorded Data: [ ] Aerial Photo [ ] Monitoring Well [ ] Stream Gauge [ ] Previous Inspections

Hydrology Remarks: Brightly colored peat fibers at 10-20" 10yr 5/8 5% - 15% below 20" tiled field

WETLAND DETERMINATION DATA FORM - Northcentral and Northeast Region

Project/Site: Zim Sod | Applicant/Owner: Zim Sod | City/County: St. Louis | State: MN | Sampling Date: 11/18/10

Investigator(s): TPT | Section: 35 | Township: 55 | Range: 18 | Sampling Point: #02 East of S03

Land Form: Terrace | Local Relief: None | Slope %: | Soil Map Unit Name: Greenwood Soils B14A

Subregion (LRR): K | Latitude: | Longitude: | Datum:

NWI/Cowardin Classification: | Circular 39 Classification: 6

Are climatic/hydrologic conditions on the site typical for this time of year? Yes (If no, explain in remarks)

Are vegetation No Soil No Hydrology No significantly disturbed? Are "normal circumstances" present? Yes

Are vegetation No Soil No Hydrology No naturally problematic?

Eggers & Reed (primary): Shrub-Carr

Eggers & Reed (secondary):

Eggers & Reed (tertiary):

Eggers & Reed (quaternary):

SUMMARY OF FINDINGS - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic vegetation present? Yes

Hydric soil present? Yes

Wetland hydrology present? Yes

Is the sampled area within a wetland? Yes

Remarks (explain any answers if needed): Comparable wetland behind Owl field on the back side of the pipeline r/w

If yes, optional Wetland Site ID:

VEGETATION

	Tree Stratum (Plot Size:)	Absolute % Cover	Dominant Species?	Indicator Status *
1.	Larix laricina	10	Yes	FACW
2.		0		
3.		0		
4.		0		
	Total Cover:	10		

	Sapling/Shrub Stratum (Plot Size:)			
1.	Betula pumila	15	Yes	OBL
2.	Rubus idaeus ssp. strigosus	20	Yes	FACW
3.		0		
4.		0		
5.		0		
	Total Cover:	35		

	Herb Stratum (Plot Size:)			
1.	Phalaris arundinacea	15	Yes	FACW
2.		0		
3.		0		
4.		0		
5.		0		
6.		0		
7.		0		
8.		0		
	Total Cover:	15		

	Woody Vine Stratum (Plot Size:)			
1.		0		
2.		0		
	Total Cover:	0		

* In USFWS Region 3

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW or FAC: 4 (A)

Total Number of Dominant Species Across All Strata: 4 (B)

Percent of Dominant Species That Are OBL, FACW or FAC: 100.00% (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL Species	15	X 1	15
FACW Species	45	X 2	90
FAC Species	0	X 3	0
FACU Species	0	X 4	0
UPL Species	0	X 5	0
Column Totals:	60 (A)		105 (B)

Prevalence Index = B/A = 1.75

Hydrophytic Vegetation Indicators:

- Yes — Rapid Test for Hydrophytic Vegetation
- Yes — Dominance Test is >50%
- Yes — Prevelance Index ≤ 3.0 [1]
- No — Morphological Adaptations [1] (provide supporting data in vegetation remarks or on a separate sheet)
- No — Problematic Hydrophytic Vegetation [1] (Explain)

[1] Indicators of hydric soil & wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic vegetation present? Yes

Remarks:
(include photo numbers here or on a separate sheet)

WETLAND DETERMINATION DATA FORM - Northcentral and Northeast Region

SOIL

Sampling Point: #02 East of S03

Profile Description: (Describe to the depth needed to document the indicator or confirm the abscence of indicators).

	Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type [1]	Loc [2]	Texture	Remarks
1.	0 - 4	10yr 2/1						Fibric peat	saturated to surface
2.	4 - 9	10yr 2/1						Fibric peat	
3.	-								
4.	-								
5.	-								
6.	-								

[1] Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains **[2] Location: PL=Pore Lining, M=Matrix.**

Hydric Soil Indicators: (applicable to all LRRs, unless otherwise noted)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☑ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Dark Surface (S7) (LRR R, MLRA 149B)
- ☐ Polyvalue Below Surface (S8) (LRR R, MLRA 149B)
- ☐ Thin Dark Surface (S9) (LRR R, MLRA 149B)
- ☐ Loamy Mucky Mineral (F1) (LRR K, L)
- ☐ Loamy Gleyed Matrix (F2)
- ☐ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils [3]:

- ☐ 2 cm Muck (A10) (LRR K, L, MLRA 149B)
- ☐ Coast Prairie Redox (A16) (LRR K, L, R)
- ☐ 5 cm Mucky Peat or Peat (S3) (LRR K, L, R)
- ☐ Dark Surface (S7) (LRR K, L)
- ☐ Polyvalue Below Surface (S8) (LRR K, L)
- ☐ Thin Dark Surface (S9) (LRR K, L)
- ☐ Iron-Manganese Masses (F12) (LRR K, L, R)
- ☐ Piedmont Floodplain Soils (F19) (MLRA 149B)
- ☐ Mesic Spodic (TA6) (MLRA 144A, 145, 149B)
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (explain in soil remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present): **Type:** _____ **Depth (inches):** -

Hydric soil present? Yes

Remarks: Peat has brightly colored fibers 15% 10yr 5/8 below 4 inches

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☑ Surface Water (A1)
- ☐ High Water Table (A2)
- ☑ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ Marl Deposits (B15)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres on Living Roots (where not tilled) (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Thin Muck Surface (C7)
- ☐ Other (explain in remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines (B16)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Stunted or Stressed Plants (D1)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ Microtopographic Relief (D4)
- ☐ FAC-Neutral Test (D5)

Field Observations:

Surface water present? ☑ **Surface Water Depth (inches):** 0

Water table present? ☐ **Water Table Depth (inches):** _____

Saturation present? (includes capillary fringe) ☑ **Saturation Depth (inches):** 0

Wetland hydrology present? Yes

Describe Recorded Data:

Recorded Data: ☐ Aerial Photo ☐ Monitoring Well ☐ Stream Gauge ☐ Previous Inspections

Hydrology Remarks: Saturated to surface

WETLAND DETERMINATION DATA FORM - Northcentral and Northeast Region

Project/Site: Zim Sod | Applicant/Owner: Zim Sod | City/County: St. Louis | State: MN | Sampling Date: 11/18/10

Investigator(s): TPT | Section: 26 | Township: 55 | Range: 18 | Sampling Point: #03 East of S02

Land Form: Terrace | Local Relief: None | Slope %: | Soil Map Unit Name: Greenwood Soils B14A

Subregion (LRR): K | Latitude: | Longitude: | Datum:

NWI/Cowardin Classification: | Circular 39 Classification: 7

Are climatic/hydrologic conditions on the site typical for this time of year? Yes (If no, explain in remarks)

Are vegetation No Soil No Hydrology No significantly disturbed? Are "normal circumstances" present? Yes

Are vegetation No Soil No Hydrology No naturally problematic?

Eggers & Reed (primary): Coniferous Swamp

Eggers & Reed (secondary):

Eggers & Reed (tertiary):

Eggers & Reed (quaternary):

SUMMARY OF FINDINGS - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic vegetation present? Yes

Hydric soil present? Yes

Wetland hydrology present? Yes

Is the sampled area within a wetland? Yes

Remarks (explain any answers if needed): There is some ditching within 100 feet of this sample.

If yes, optional Wetland Site ID:

VEGETATION

	Tree Stratum (Plot Size:)	Absolute % Cover	Dominant Species?	Indicator Status *
1.	Larix laricina	90	Yes	FACW
2.	Picea mariana	3	No	FACW
3.		0		
4.		0		
	Total Cover:	93		

	Sapling/Shrub Stratum (Plot Size:)			
1.	Ledum groenlandicum	50	Yes	OBL
2.	Rubus idaeus ssp. strigosus	15	Yes	FACW
3.		0		
4.		0		
5.		0		
	Total Cover:	65		

	Herb Stratum (Plot Size:)			
1.	Sphagnum sp.	90	Yes	
2.		0		
3.		0		
4.		0		
5.		0		
6.		0		
7.		0		
8.		0		
	Total Cover:	90		

	Woody Vine Stratum (Plot Size:)			
1.		0		
2.		0		
	Total Cover:	0		

* In USFWS Region 3

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW or FAC: 3 (A)

Total Number of Dominant Species Across All Strata: 4 (B)

Percent of Dominant Species That Are OBL, FACW or FAC: 75.00% (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL Species	50	X 1	50
FACW Species	108	X 2	216
FAC Species	0	X 3	0
FACU Species	0	X 4	0
UPL Species	0	X 5	0
Column Totals:	158 (A)		266 (B)

Prevalence Index = B/A = 1.68

Hydrophytic Vegetation Indicators:

- Yes — Rapid Test for Hydrophytic Vegetation
- Yes — Dominance Test is >50%
- Yes — Prevelance Index ≤ 3.0 [1]
- No — Morphological Adaptations [1] (provide supporting data in vegetation remarks or on a separate sheet)
- No — Problematic Hydrophytic Vegetation [1] (Explain)

[1] Indicators of hydric soil & wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic vegetation present? Yes

Remarks:
(include photo numbers here or on a separate sheet)

WETLAND DETERMINATION DATA FORM - Northcentral and Northeast Region

SOIL

Sampling Point: #03 East of S02

Profile Description: (Describe to the depth needed to document the indicator or confirm the abscence of indicators).

	Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type [1]	Loc [2]	Texture	Remarks
1.	0 - 18	10yr 2/1						Fibric peat	
2.	-								
3.	-								
4.	-								
5.	-								
6.	-								

[1] Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains **[2] Location: PL=Pore Lining, M=Matrix.**

Hydric Soil Indicators: (applicable to all LRRs, unless otherwise noted)

- [x] Histosol (A1)
- [ ] Histic Epipedon (A2)
- [ ] Black Histic (A3)
- [ ] Hydrogen Sulfide (A4)
- [ ] Stratified Layers (A5)
- [ ] Depleted Below Dark Surface (A11)
- [ ] Thick Dark Surface (A12)
- [ ] Sandy Mucky Mineral (S1)
- [ ] Sandy Gleyed Matrix (S4)
- [ ] Sandy Redox (S5)
- [ ] Stripped Matrix (S6)
- [ ] Dark Surface (S7) (LRR R, MLRA 149B)
- [ ] Polyvalue Below Surface (S8) (LRR R, MLRA 149B)
- [ ] Thin Dark Surface (S9) (LRR R, MLRA 149B)
- [ ] Loamy Mucky Mineral (F1) (LRR K, L)
- [ ] Loamy Gleyed Matrix (F2)
- [ ] Depleted Matrix (F3)
- [ ] Redox Dark Surface (F6)
- [ ] Depleted Dark Surface (F7)
- [ ] Redox Depressions (F8)

Indicators for Problematic Hydric Soils [3]:

- [ ] 2 cm Muck (A10) (LRR K, L, MLRA 149B)
- [ ] Coast Prairie Redox (A16) (LRR K, L, R)
- [ ] 5 cm Mucky Peat or Peat (S3) (LRR K, L, R)
- [ ] Dark Surface (S7) (LRR K, L)
- [ ] Polyvalue Below Surface (S8) (LRR K, L)
- [ ] Thin Dark Surface (S9) (LRR K, L)
- [ ] Iron-Manganese Masses (F12) (LRR K, L, R)
- [ ] Piedmont Floodplain Soils (F19) (MLRA 149B)
- [ ] Mesic Spodic (TA6) (MLRA 144A, 145, 149B)
- [ ] Red Parent Material (TF2)
- [ ] Very Shallow Dark Surface (TF12)
- [ ] Other (explain in soil remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present): **Type:** _____ **Depth (inches):** -

Hydric soil present? Yes

Remarks: Saturated at 6" below surface

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- [ ] Surface Water (A1)
- [ ] High Water Table (A2)
- [x] Saturation (A3)
- [ ] Water Marks (B1)
- [ ] Sediment Deposits (B2)
- [ ] Drift Deposits (B3)
- [ ] Algal Mat or Crust (B4)
- [ ] Iron Deposits (B5)
- [ ] Inundation Visible on Aerial Imagery (B7)
- [ ] Sparsely Vegetated Concave Surface (B8)
- [ ] Water-Stained Leaves (B9)
- [ ] Aquatic Fauna (B13)
- [ ] Marl Deposits (B15)
- [ ] Hydrogen Sulfide Odor (C1)
- [ ] Oxidized Rhizospheres on Living Roots (where not tilled) (C3)
- [ ] Presence of Reduced Iron (C4)
- [ ] Recent Iron Reduction in Tilled Soils (C6)
- [ ] Thin Muck Surface (C7)
- [ ] Other (explain in remarks)

Secondary Indicators (minimum of two required)

- [ ] Surface Soil Cracks (B6)
- [ ] Drainage Patterns (B10)
- [ ] Moss Trim Lines (B16)
- [ ] Dry-Season Water Table (C2)
- [ ] Crayfish Burrows (C8)
- [ ] Saturation Visible on Aerial Imagery (C9)
- [ ] Stunted or Stressed Plants (D1)
- [ ] Geomorphic Position (D2)
- [ ] Shallow Aquitard (D3)
- [ ] Microtopographic Relief (D4)
- [ ] FAC-Neutral Test (D5)

Field Observations:

Surface water present? [ ] **Surface Water Depth (inches):**

Water table present? [ ] **Water Table Depth (inches):**

Saturation present? (includes capillary fringe) [x] **Saturation Depth (inches):** 6

Wetland hydrology present? Yes

Describe Recorded Data:

Recorded Data: [ ] Aerial Photo [ ] Monitoring Well [ ] Stream Gauge [ ] Previous Inspections

Hydrology Remarks: There was a ditch approximately 100' away.

WETLAND DETERMINATION DATA FORM - Northcentral and Northeast Region

Project/Site: Zim Sod | Applicant/Owner: Zim Sod | City/County: St. Louis | State: MN | Sampling Date: 11/18/10

Investigator(s): TPT | Section: 26 | Township: 55 | Range: 18 | Sampling Point: #04 S01

Land Form: Terrace | Local Relief: None | Slope %: | Soil Map Unit Name: Greenwood soils B14A

Subregion (LRR): K | Latitude: | Longitude: | Datum:

NWI/Cowardin Classification: | Circular 39 Classification: up

Are climatic/hydrologic conditions on the site typical for this time of year? Yes (If no, explain in remarks)

Eggers & Reed (primary): Upland

Eggers & Reed (secondary):

Eggers & Reed (tertiary):

Eggers & Reed (quaternary):

Are vegetation	Yes	Soil	Yes	Hydrology	Yes	significantly disturbed?	Are "normal circumstances" present? Yes
Are vegetation	No	Soil	No	Hydrology	No	naturally problematic?	

SUMMARY OF FINDINGS - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic vegetation present? Yes

Hydric soil present? Yes

Wetland hydrology present? No

Is the sampled area within a wetland? No

Remarks (explain any answers if needed): Tile drained sod field

If yes, optional Wetland Site ID:

VEGETATION

Tree Stratum (Plot Size:)

		Absolute % Cover	Dominant Species?	Indicator Status *
1.		0		
2.		0		
3.		0		
4.		0		
	Total Cover:	0		

Sapling/Shrub Stratum (Plot Size:)

1.		0		
2.		0		
3.		0		
4.		0		
5.		0		
	Total Cover:	0		

Herb Stratum (Plot Size:)

1.	Poa pratensis	99	Yes	FAC
2.		0		
3.		0		
4.		0		
5.		0		
6.		0		
7.		0		
8.		0		
	Total Cover:	99		

Woody Vine Stratum (Plot Size:)

1.		0		
2.		0		
	Total Cover:	0		

* In USFWS Region 3

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW or FAC: 100.00% (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL Species	0	X 1	0
FACW Species	0	X 2	0
FAC Species	99	X 3	297
FACU Species	0	X 4	0
UPL Species	0	X 5	0
Column Totals:	99 (A)		297 (B)

Prevalence Index = B/A = 3.00

Hydrophytic Vegetation Indicators:

No	Rapid Test for Hydrophytic Vegetation
Yes	Dominance Test is >50%
Yes	Prevelance Index ≤ 3.0 [1]
No	Morphological Adaptations [1] (provide supporting data in vegetation remarks or on a separate sheet)
No	Problematic Hydrophytic Vegetation [1] (Explain)

[1] Indicators of hydric soil & wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic vegetation present? Yes

Remarks: (include photo numbers here or on a separate sheet)

Vegetation adjacent to field - 30% populus trem. With aspen understory 30%, willow sp15% and rubus sp15%. Reed canarygrass 30%

WETLAND DETERMINATION DATA FORM - Northcentral and Northeast Region

SOIL

Sampling Point: #04 S01

Profile Description: (Describe to the depth needed to document the indicator or confirm the abscence of indicators).

	Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type [1]	Loc [2]	Texture	Remarks
1.	0 - 9	10yr 2/2						loamy sand	
2.	9 - 20	10yr 4/2	70	10yr 4/6	30			sandy loam	
3.	-								
4.	-								
5.	-								
6.	-								

[1] Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains **[2] Location: PL=Pore Lining, M=Matrix.**

Hydric Soil Indicators: (applicable to all LRRs, unless otherwise noted)

- ☐ Histosol (A1)
- ☐ Histic Epipedon (A2)
- ☐ Black Histic (A3)
- ☐ Hydrogen Sulfide (A4)
- ☐ Stratified Layers (A5)
- ☐ Depleted Below Dark Surface (A11)
- ☐ Thick Dark Surface (A12)
- ☐ Sandy Mucky Mineral (S1)
- ☐ Sandy Gleyed Matrix (S4)
- ☐ Sandy Redox (S5)
- ☐ Stripped Matrix (S6)
- ☐ Dark Surface (S7) (LRR R, MLRA 149B)
- ☐ Polyvalue Below Surface (S8) (LRR R, MLRA 149B)
- ☐ Thin Dark Surface (S9) (LRR R, MLRA 149B)
- ☐ Loamy Mucky Mineral (F1) (LRR K, L)
- ☐ Loamy Gleyed Matrix (F2)
- ☑ Depleted Matrix (F3)
- ☐ Redox Dark Surface (F6)
- ☐ Depleted Dark Surface (F7)
- ☐ Redox Depressions (F8)

Indicators for Problematic Hydric Soils [3]:

- ☐ 2 cm Muck (A10) (LRR K, L, MLRA 149B)
- ☐ Coast Prairie Redox (A16) (LRR K, L, R)
- ☐ 5 cm Mucky Peat or Peat (S3) (LRR K, L, R)
- ☐ Dark Surface (S7) (LRR K, L)
- ☐ Polyvalue Below Surface (S8) (LRR K, L)
- ☐ Thin Dark Surface (S9) (LRR K, L)
- ☐ Iron-Manganese Masses (F12) (LRR K, L, R)
- ☐ Piedmont Floodplain Soils (F19) (MLRA 149B)
- ☐ Mesic Spodic (TA6) (MLRA 144A, 145, 149B)
- ☐ Red Parent Material (TF2)
- ☐ Very Shallow Dark Surface (TF12)
- ☐ Other (explain in soil remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present): **Type:** _____ **Depth (inches):** -

Hydric soil present? Yes

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ☐ Surface Water (A1)
- ☐ High Water Table (A2)
- ☐ Saturation (A3)
- ☐ Water Marks (B1)
- ☐ Sediment Deposits (B2)
- ☐ Drift Deposits (B3)
- ☐ Algal Mat or Crust (B4)
- ☐ Iron Deposits (B5)
- ☐ Inundation Visible on Aerial Imagery (B7)
- ☐ Sparsely Vegetated Concave Surface (B8)
- ☐ Water-Stained Leaves (B9)
- ☐ Aquatic Fauna (B13)
- ☐ Marl Deposits (B15)
- ☐ Hydrogen Sulfide Odor (C1)
- ☐ Oxidized Rhizospheres on Living Roots (where not tilled) (C3)
- ☐ Presence of Reduced Iron (C4)
- ☐ Recent Iron Reduction in Tilled Soils (C6)
- ☐ Thin Muck Surface (C7)
- ☐ Other (explain in remarks)

Secondary Indicators (minimum of two required)

- ☐ Surface Soil Cracks (B6)
- ☐ Drainage Patterns (B10)
- ☐ Moss Trim Lines (B16)
- ☐ Dry-Season Water Table (C2)
- ☐ Crayfish Burrows (C8)
- ☐ Saturation Visible on Aerial Imagery (C9)
- ☐ Stunted or Stressed Plants (D1)
- ☐ Geomorphic Position (D2)
- ☐ Shallow Aquitard (D3)
- ☐ Microtopographic Relief (D4)
- ☐ FAC-Neutral Test (D5)

Field Observations:

Surface water present? ☐ **Surface Water Depth (inches):** _____

Water table present? ☐ **Water Table Depth (inches):** _____

Saturation present? (includes capillary fringe) ☐ **Saturation Depth (inches):** _____

Wetland hydrology present? No

Describe Recorded Data:

Recorded Data: ☐ Aerial Photo ☐ Monitoring Well ☐ Stream Gauge ☐ Previous Inspections

Hydrology Remarks: Tile Drained soil

WETLAND DETERMINATION DATA FORM - Northcentral and Northeast Region

Project/Site: Zim Sod | Applicant/Owner: Zim Sod | City/County: St. Louis | State: MN | Sampling Date: 11/18/10

Investigator(s): TPT | Section: 26 | Township: 55 | Range: 18 | Sampling Point: #05 S01

Land Form: | Local Relief: | Slope %: | Soil Map Unit Name: Greenwood soils B14A

Subregion (LRR): K | Latitude: | Longitude: | Datum:

NWI/Cowardin Classification: | Circular 39 Classification: up

Are climatic/hydrologic conditions on the site typical for this time of year? Yes (If no, explain in remarks)

Eggers & Reed (primary): Upland

Eggers & Reed (secondary):

Eggers & Reed (tertiary):

Eggers & Reed (quaternary):

Are vegetation	Yes	Soil	Yes	Hydrology	Yes	significantly disturbed?	Are "normal circumstances" present? Yes
Are vegetation	No	Soil	No	Hydrology	No	naturally problematic?	

SUMMARY OF FINDINGS - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic vegetation present? Yes
Hydric soil present? Yes
Wetland hydrology present? No
Is the sampled area within a wetland? No

Remarks (explain any answers if needed): Tile drained sod field

If yes, optional Wetland Site ID:

VEGETATION

Tree Stratum (Plot Size:)

		Absolute % Cover	Dominant Species?	Indicator Status *
1.		0		
2.		0		
3.		0		
4.		0		
	Total Cover:	0		

Sapling/Shrub Stratum (Plot Size:)

1.		0		
2.		0		
3.		0		
4.		0		
5.		0		
	Total Cover:	0		

Herb Stratum (Plot Size:)

1.	Poa pratensis	99	Yes	FAC
2.		0		
3.		0		
4.		0		
5.		0		
6.		0		
7.		0		
8.		0		
	Total Cover:	99		

Woody Vine Stratum (Plot Size:)

1.		0		
2.		0		
	Total Cover:	0		

* In USFWS Region 3

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW or FAC: 100.00% (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL Species	0	X 1	0
FACW Species	0	X 2	0
FAC Species	99	X 3	297
FACU Species	0	X 4	0
UPL Species	0	X 5	0
Column Totals:	99 (A)		297 (B)

Prevalence Index = B/A = 3.00

Hydrophytic Vegetation Indicators:

No	Rapid Test for Hydrophytic Vegetation
Yes	Dominance Test is >50%
Yes	Prevelance Index ≤ 3.0 [1]
No	Morphological Adaptations [1] (provide supporting data in vegetation remarks or on a separate sheet)
No	Problematic Hydrophytic Vegetation [1] (Explain)

[1] Indicators of hydric soil & wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic vegetation present? Yes

Remarks:
(include photo numbers here or on a separate sheet)

WETLAND DETERMINATION DATA FORM - Northcentral and Northeast Region

SOIL

Sampling Point: #05 S01

Profile Description: (Describe to the depth needed to document the indicator or confirm the abscence of indicators).

	Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type [1]	Loc [2]	Texture	Remarks
1.	0 - 16	10yr 2/1						Fibric peat	
2.	-								
3.	-								
4.	-								
5.	-								
6.	-								

[1] Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains **[2] Location: PL=Pore Lining, M=Matrix.**

Hydric Soil Indicators: (applicable to all LRRs, unless otherwise noted)

- [x] Histosol (A1)
- [ ] Histic Epipedon (A2)
- [ ] Black Histic (A3)
- [ ] Hydrogen Sulfide (A4)
- [ ] Stratified Layers (A5)
- [ ] Depleted Below Dark Surface (A11)
- [ ] Thick Dark Surface (A12)
- [ ] Sandy Mucky Mineral (S1)
- [ ] Sandy Gleyed Matrix (S4)
- [ ] Sandy Redox (S5)
- [ ] Stripped Matrix (S6)
- [ ] Dark Surface (S7) (LRR R, MLRA 149B)
- [ ] Polyvalue Below Surface (S8) (LRR R, MLRA 149B)
- [ ] Thin Dark Surface (S9) (LRR R, MLRA 149B)
- [ ] Loamy Mucky Mineral (F1) (LRR K, L)
- [ ] Loamy Gleyed Matrix (F2)
- [ ] Depleted Matrix (F3)
- [ ] Redox Dark Surface (F6)
- [ ] Depleted Dark Surface (F7)
- [ ] Redox Depressions (F8)

Indicators for Problematic Hydric Soils [3]:

- [ ] 2 cm Muck (A10) (LRR K, L, MLRA 149B)
- [ ] Coast Prairie Redox (A16) (LRR K, L, R)
- [ ] 5 cm Mucky Peat or Peat (S3) (LRR K, L, R)
- [ ] Dark Surface (S7) (LRR K, L)
- [ ] Polyvalue Below Surface (S8) (LRR K, L)
- [ ] Thin Dark Surface (S9) (LRR K, L)
- [ ] Iron-Manganese Masses (F12) (LRR K, L, R)
- [ ] Piedmont Floodplain Soils (F19) (MLRA 149B)
- [ ] Mesic Spodic (TA6) (MLRA 144A, 145, 149B)
- [ ] Red Parent Material (TF2)
- [ ] Very Shallow Dark Surface (TF12)
- [ ] Other (explain in soil remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present): **Type:** _____ **Depth (inches):** -

Hydric soil present? Yes

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- [ ] Surface Water (A1)
- [ ] High Water Table (A2)
- [ ] Saturation (A3)
- [ ] Water Marks (B1)
- [ ] Sediment Deposits (B2)
- [ ] Drift Deposits (B3)
- [ ] Algal Mat or Crust (B4)
- [ ] Iron Deposits (B5)
- [ ] Inundation Visible on Aerial Imagery (B7)
- [ ] Sparsely Vegetated Concave Surface (B8)
- [ ] Water-Stained Leaves (B9)
- [ ] Aquatic Fauna (B13)
- [ ] Marl Deposits (B15)
- [ ] Hydrogen Sulfide Odor (C1)
- [ ] Oxidized Rhizospheres on Living Roots (where not tilled) (C3)
- [ ] Presence of Reduced Iron (C4)
- [ ] Recent Iron Reduction in Tilled Soils (C6)
- [ ] Thin Muck Surface (C7)
- [ ] Other (explain in remarks)

Secondary Indicators (minimum of two required)

- [ ] Surface Soil Cracks (B6)
- [ ] Drainage Patterns (B10)
- [ ] Moss Trim Lines (B16)
- [ ] Dry-Season Water Table (C2)
- [ ] Crayfish Burrows (C8)
- [ ] Saturation Visible on Aerial Imagery (C9)
- [ ] Stunted or Stressed Plants (D1)
- [ ] Geomorphic Position (D2)
- [ ] Shallow Aquitard (D3)
- [ ] Microtopographic Relief (D4)
- [ ] FAC-Neutral Test (D5)

Field Observations:

Surface water present? [ ] **Surface Water Depth (inches):**

Water table present? [ ] **Water Table Depth (inches):**

Saturation present? (includes capillary fringe) [ ] **Saturation Depth (inches):**

Wetland hydrology present? No

Describe Recorded Data:

Recorded Data: [ ] Aerial Photo [ ] Monitoring Well [ ] Stream Gauge [ ] Previous Inspections

Hydrology Remarks: Tile Drained field

WETLAND DETERMINATION DATA FORM - Northcentral and Northeast Region

Project/Site: Zim Sod | Applicant/Owner: Zim Sod | City/County: St. Louis | State: MN | Sampling Date: 11/18/10

Investigator(s): TPT | Section: 11 | Township: 55 | Range: 18 | Sampling Point: #06 N18 in Tamaracks

Land Form: | Local Relief: | Slope %: | Soil Map Unit Name: Greenwood soils B14A

Subregion (LRR): K | Latitude: | Longitude: | Datum:

NWI/Cowardin Classification: | Circular 39 Classification: 7

Are climatic/hydrologic conditions on the site typical for this time of year? Yes (If no, explain in remarks)

Are vegetation No Soil No Hydrology No significantly disturbed? Are "normal circumstances" present? Yes

Are vegetation No Soil No Hydrology No naturally problematic?

Eggers & Reed (primary): Coniferous Swamp

Eggers & Reed (secondary):

Eggers & Reed (tertiary):

Eggers & Reed (quaternary):

SUMMARY OF FINDINGS - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic vegetation present? Yes

Hydric soil present? Yes

Wetland hydrology present? Yes

Is the sampled area within a wetland? Yes

Remarks (explain any answers if needed): Tamarack island west end of Elk field

If yes, optional Wetland Site ID:

VEGETATION

	Tree Stratum (Plot Size:)	Absolute % Cover	Dominant Species?	Indicator Status *
1.	Larix laricina	30	Yes	FACW
2.		0		
3.		0		
4.		0		
	Total Cover:	30		

	Sapling/Shrub Stratum (Plot Size:)			
1.	Larix laricina	30	Yes	FACW
2.	Cornus sericea ssp. sericea	30	Yes	FACW
3.	Rubus idaeus ssp. strigosus	15	Yes	FACW
4.		0		
5.		0		
	Total Cover:	75		

	Herb Stratum (Plot Size:)			
1.		0		
2.		0		
3.		0		
4.		0		
5.		0		
6.		0		
7.		0		
8.		0		
	Total Cover:	0		

	Woody Vine Stratum (Plot Size:)			
1.		0		
2.		0		
	Total Cover:	0		

* In USFWS Region 3

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW or FAC: 3 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW or FAC: 100.00% (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL Species	0	X 1	0
FACW Species	105	X 2	210
FAC Species	0	X 3	0
FACU Species	0	X 4	0
UPL Species	0	X 5	0
Column Totals:	105 (A)		210 (B)

Prevalence Index = B/A = 2.00

Hydrophytic Vegetation Indicators:

- Yes — Rapid Test for Hydrophytic Vegetation
- Yes — Dominance Test is >50%
- Yes — Prevelance Index ≤ 3.0 [1]
- No — Morphological Adaptations [1] (provide supporting data in vegetation remarks or on a separate sheet)
- No — Problematic Hydrophytic Vegetation [1] (Explain)

[1] Indicators of hydric soil & wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic vegetation present? Yes

Remarks:
(include photo numbers here or on a separate sheet)

WETLAND DETERMINATION DATA FORM - Northcentral and Northeast Region

SOIL

Sampling Point: #06 N18 in Tamaracks

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators).

	Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type [1]	Loc [2]	Texture	Remarks
1.	0 - 16	10yr 2/1						Fibric peat	Saturated at 12"
2.	-								
3.	-								
4.	-								
5.	-								
6.	-								

[1] Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains **[2] Location: PL=Pore Lining, M=Matrix.**

Hydric Soil Indicators: (applicable to all LRRs, unless otherwise noted)

- [x] Histosol (A1)
- [ ] Histic Epipedon (A2)
- [ ] Black Histic (A3)
- [ ] Hydrogen Sulfide (A4)
- [ ] Stratified Layers (A5)
- [ ] Depleted Below Dark Surface (A11)
- [ ] Thick Dark Surface (A12)
- [ ] Sandy Mucky Mineral (S1)
- [ ] Sandy Gleyed Matrix (S4)
- [ ] Sandy Redox (S5)
- [ ] Stripped Matrix (S6)
- [ ] Dark Surface (S7) (LRR R, MLRA 149B)
- [ ] Polyvalue Below Surface (S8) (LRR R, MLRA 149B)
- [ ] Thin Dark Surface (S9) (LRR R, MLRA 149B)
- [ ] Loamy Mucky Mineral (F1) (LRR K, L)
- [ ] Loamy Gleyed Matrix (F2)
- [ ] Depleted Matrix (F3)
- [ ] Redox Dark Surface (F6)
- [ ] Depleted Dark Surface (F7)
- [ ] Redox Depressions (F8)

Indicators for Problematic Hydric Soils [3]:

- [ ] 2 cm Muck (A10) (LRR K, L, MLRA 149B)
- [ ] Coast Prairie Redox (A16) (LRR K, L, R)
- [ ] 5 cm Mucky Peat or Peat (S3) (LRR K, L, R)
- [ ] Dark Surface (S7) (LRR K, L)
- [ ] Polyvalue Below Surface (S8) (LRR K, L)
- [ ] Thin Dark Surface (S9) (LRR K, L)
- [ ] Iron-Manganese Masses (F12) (LRR K, L, R)
- [ ] Piedmont Floodplain Soils (F19) (MLRA 149B)
- [ ] Mesic Spodic (TA6) (MLRA 144A, 145, 149B)
- [ ] Red Parent Material (TF2)
- [ ] Very Shallow Dark Surface (TF12)
- [ ] Other (explain in soil remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present): **Type:** _____ **Depth (inches):** -

Hydric soil present? Yes

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- [ ] Surface Water (A1)
- [ ] High Water Table (A2)
- [ ] Saturation (A3)
- [ ] Water Marks (B1)
- [ ] Sediment Deposits (B2)
- [ ] Drift Deposits (B3)
- [ ] Algal Mat or Crust (B4)
- [ ] Iron Deposits (B5)
- [ ] Inundation Visible on Aerial Imagery (B7)
- [ ] Sparsely Vegetated Concave Surface (B8)
- [ ] Water-Stained Leaves (B9)
- [ ] Aquatic Fauna (B13)
- [ ] Marl Deposits (B15)
- [ ] Hydrogen Sulfide Odor (C1)
- [ ] Oxidized Rhizospheres on Living Roots (where not tilled) (C3)
- [ ] Presence of Reduced Iron (C4)
- [ ] Recent Iron Reduction in Tilled Soils (C6)
- [ ] Thin Muck Surface (C7)
- [ ] Other (explain in remarks)

Secondary Indicators (minimum of two required)

- [ ] Surface Soil Cracks (B6)
- [ ] Drainage Patterns (B10)
- [ ] Moss Trim Lines (B16)
- [ ] Dry-Season Water Table (C2)
- [ ] Crayfish Burrows (C8)
- [ ] Saturation Visible on Aerial Imagery (C9)
- [ ] Stunted or Stressed Plants (D1)
- [ ] Geomorphic Position (D2)
- [ ] Shallow Aquitard (D3)
- [ ] Microtopographic Relief (D4)
- [ ] FAC-Neutral Test (D5)

Field Observations:

Surface water present? [ ] **Surface Water Depth (inches):**

Water table present? [ ] **Water Table Depth (inches):**

Saturation present? (includes capillary fringe) [x] **Saturation Depth (inches):** 12

Wetland hydrology present? Yes

Describe Recorded Data:

Recorded Data: [ ] Aerial Photo [ ] Monitoring Well [ ] Stream Gauge [ ] Previous Inspections

Hydrology Remarks: This stand may be affected by tile drainage in adjacent sod fields.

WETLAND DETERMINATION DATA FORM - Northcentral and Northeast Region

Project/Site: Zim Sod | Applicant/Owner: Zim Sod | City/County: St. Louis | State: MN | Sampling Date: 11/18/10

Investigator(s): MAJ | Section: 11 | Township: 55 | Range: 18 | Sampling Point: #07 Center of N09

Land Form: Terrace | Local Relief: | Slope %: | Soil Map Unit Name: Greenwood B14A

Subregion (LRR): k | Latitude: | Longitude: | Datum:

NWI/Cowardin Classification: upland | Circular 39 Classification: upland

Are climatic/hydrologic conditions on the site typical for this time of year? Yes (If no, explain in remarks)

Eggers & Reed (primary): Upland

Eggers & Reed (secondary):

Eggers & Reed (tertiary):

Eggers & Reed (quaternary):

Are vegetation	Yes	Soil	Yes	Hydrology	Yes	significantly disturbed?	Are "normal circumstances" present? Yes
Are vegetation	No	Soil	No	Hydrology	No	naturally problematic?	

SUMMARY OF FINDINGS - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic vegetation present? Yes
Hydric soil present? Yes
Wetland hydrology present? No
Is the sampled area within a wetland? No

Remarks (explain any answers if needed): Tile drained sod field. Middle of Bear Paw field.

If yes, optional Wetland Site ID:

VEGETATION

	Tree Stratum (Plot Size:)	Absolute % Cover	Dominant Species?	Indicator Status *
1.		0		
2.		0		
3.		0		
4.		0		
	Total Cover:	0		

	Sapling/Shrub Stratum (Plot Size:)			
1.		0		
2.		0		
3.		0		
4.		0		
5.		0		
	Total Cover:	0		

	Herb Stratum (Plot Size:)			
1.	Poa pratensis	95	Yes	FAC
2.		0		
3.		0		
4.		0		
5.		0		
6.		0		
7.		0		
8.		0		
	Total Cover:	95		

	Woody Vine Stratum (Plot Size:)			
1.		0		
2.		0		
	Total Cover:	0		

* In USFWS Region 3

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW or FAC:	1	(A)
Total Number of Dominant Species Across All Strata:	1	(B)
Percent of Dominant Species That Are OBL, FACW or FAC:	100.00%	(A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL Species	0	X 1	0
FACW Species	0	X 2	0
FAC Species	95	X 3	285
FACU Species	0	X 4	0
UPL Species	0	X 5	0
Column Totals:	95	(A)	285 (B)
Prevalence Index = B/A =			3.00

Hydrophytic Vegetation Indicators:

No	Rapid Test for Hydrophytic Vegetation
Yes	Dominance Test is >50%
Yes	Prevelance Index ≤ 3.0 [1]
No	Morphological Adaptations [1] (provide supporting data in vegetation remarks or on a separate sheet)
No	Problematic Hydrophytic Vegetation [1] (Explain)

[1] Indicators of hydric soil & wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic vegetation present? Yes

Remarks:
(include photo numbers here or on a separate sheet)

WETLAND DETERMINATION DATA FORM - Northcentral and Northeast Region

SOIL

Sampling Point: #07 Center of N09

Profile Description: (Describe to the depth needed to document the indicator or confirm the abscence of indicators).

	Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type [1]	Loc [2]	Texture	Remarks
1.	0 - 10	10yr2/1						hemic peat	
2.	10 - 32	10yr2/1						fibric peat	woody frags at 18"
3.	32 - 36	10yr2/1						hemic peat	moist at 36" not sat
4.	-								
5.	-								
6.	-								

[1] Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains **[2] Location: PL=Pore Lining, M=Matrix.**

Hydric Soil Indicators: (applicable to all LRRs, unless otherwise noted)

- [x] Histosol (A1)
- [ ] Histic Epipedon (A2)
- [ ] Black Histic (A3)
- [ ] Hydrogen Sulfide (A4)
- [ ] Stratified Layers (A5)
- [ ] Depleted Below Dark Surface (A11)
- [ ] Thick Dark Surface (A12)
- [ ] Sandy Mucky Mineral (S1)
- [ ] Sandy Gleyed Matrix (S4)
- [ ] Sandy Redox (S5)
- [ ] Stripped Matrix (S6)
- [ ] Dark Surface (S7) (LRR R, MLRA 149B)
- [ ] Polyvalue Below Surface (S8) (LRR R, MLRA 149B)
- [ ] Thin Dark Surface (S9) (LRR R, MLRA 149B)
- [ ] Loamy Mucky Mineral (F1) (LRR K, L)
- [ ] Loamy Gleyed Matrix (F2)
- [ ] Depleted Matrix (F3)
- [ ] Redox Dark Surface (F6)
- [ ] Depleted Dark Surface (F7)
- [ ] Redox Depressions (F8)

Indicators for Problematic Hydric Soils [3]:

- [ ] 2 cm Muck (A10) (LRR K, L, MLRA 149B)
- [ ] Coast Prairie Redox (A16) (LRR K, L, R)
- [ ] 5 cm Mucky Peat or Peat (S3) (LRR K, L, R)
- [ ] Dark Surface (S7) (LRR K, L)
- [ ] Polyvalue Below Surface (S8) (LRR K, L)
- [ ] Thin Dark Surface (S9) (LRR K, L)
- [ ] Iron-Manganese Masses (F12) (LRR K, L, R)
- [ ] Piedmont Floodplain Soils (F19) (MLRA 149B)
- [ ] Mesic Spodic (TA6) (MLRA 144A, 145, 149B)
- [ ] Red Parent Material (TF2)
- [ ] Very Shallow Dark Surface (TF12)
- [ ] Other (explain in soil remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present): **Type:** _____ **Depth (inches):** -

Hydric soil present? Yes

Remarks: not saturated

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- [ ] Surface Water (A1)
- [ ] High Water Table (A2)
- [ ] Saturation (A3)
- [ ] Water Marks (B1)
- [ ] Sediment Deposits (B2)
- [ ] Drift Deposits (B3)
- [ ] Algal Mat or Crust (B4)
- [ ] Iron Deposits (B5)
- [ ] Inundation Visible on Aerial Imagery (B7)
- [ ] Sparsely Vegetated Concave Surface (B8)
- [ ] Water-Stained Leaves (B9)
- [ ] Aquatic Fauna (B13)
- [ ] Marl Deposits (B15)
- [ ] Hydrogen Sulfide Odor (C1)
- [ ] Oxidized Rhizospheres on Living Roots (where not tilled) (C3)
- [ ] Presence of Reduced Iron (C4)
- [ ] Recent Iron Reduction in Tilled Soils (C6)
- [ ] Thin Muck Surface (C7)
- [ ] Other (explain in remarks)

Secondary Indicators (minimum of two required)

- [ ] Surface Soil Cracks (B6)
- [ ] Drainage Patterns (B10)
- [ ] Moss Trim Lines (B16)
- [ ] Dry-Season Water Table (C2)
- [ ] Crayfish Burrows (C8)
- [ ] Saturation Visible on Aerial Imagery (C9)
- [ ] Stunted or Stressed Plants (D1)
- [ ] Geomorphic Position (D2)
- [ ] Shallow Aquitard (D3)
- [ ] Microtopographic Relief (D4)
- [ ] FAC-Neutral Test (D5)

Field Observations:

Surface water present? [ ] **Surface Water Depth (inches):**

Water table present? [ ] **Water Table Depth (inches):**

Saturation present? (includes capillary fringe) [ ] **Saturation Depth (inches):**

Wetland hydrology present? No

Describe Recorded Data:

Recorded Data: [ ] Aerial Photo [ ] Monitoring Well [ ] Stream Gauge [ ] Previous Inspections

Hydrology Remarks: Soil moist at 34-36 but not saturated.

11/23/2011 1:47:56 PM

WETLAND DETERMINATION DATA FORM - Northcentral and Northeast Region

Project/Site: Zim Sod | Applicant/Owner: Zim Sod | City/County: St. Louis | State: MN | Sampling Date: 11/18/10

Investigator(s): TPT | Section: 11 | Township: 55 | Range: 18 | Sampling Point: #08 N16 west end

Land Form: Terrace | Local Relief: | Slope %: | Soil Map Unit Name: Greenwood soils B14A

Subregion (LRR): k | Latitude: | Longitude: | Datum:

NWI/Cowardin Classification: | Circular 39 Classification: 7

Are climatic/hydrologic conditions on the site typical for this time of year? Yes (If no, explain in remarks)

Are vegetation No Soil No Hydrology No significantly disturbed? Are "normal circumstances" present? Yes

Are vegetation No Soil No Hydrology No naturally problematic?

Eggers & Reed (primary): Coniferous Swamp

Eggers & Reed (secondary):

Eggers & Reed (tertiary):

Eggers & Reed (quaternary):

SUMMARY OF FINDINGS - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic vegetation present? Yes

Hydric soil present? Yes

Wetland hydrology present? Yes

Is the sampled area within a wetland? Yes

Remarks (explain any answers if needed): West end of Moosehorn field.

If yes, optional Wetland Site ID:

VEGETATION

	Tree Stratum (Plot Size:)	Absolute % Cover	Dominant Species?	Indicator Status *
1.	Larix laricina	30	Yes	FACW
2.		0		
3.		0		
4.		0		
	Total Cover:	30		

	Sapling/Shrub Stratum (Plot Size:)			
1.	Larix laricina	80	Yes	FACW
2.	Picea mariana	10	No	FACW
3.	Chamaedaphne calyculata	5	No	OBL
4.		0		
5.		0		
	Total Cover:	95		

	Herb Stratum (Plot Size:)			
1.		0		
2.		0		
3.		0		
4.		0		
5.		0		
6.		0		
7.		0		
8.		0		
	Total Cover:	0		

	Woody Vine Stratum (Plot Size:)			
1.		0		
2.		0		
	Total Cover:	0		

* In USFWS Region 3

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW or FAC: 100.00% (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL Species	5	X 1	5
FACW Species	120	X 2	240
FAC Species	0	X 3	0
FACU Species	0	X 4	0
UPL Species	0	X 5	0
Column Totals:	125 (A)		245 (B)

Prevalence Index = B/A = 1.96

Hydrophytic Vegetation Indicators:

- Yes — Rapid Test for Hydrophytic Vegetation
- Yes — Dominance Test is >50%
- Yes — Prevelance Index ≤ 3.0 [1]
- No — Morphological Adaptations [1] (provide supporting data in vegetation remarks or on a separate sheet)
- No — Problematic Hydrophytic Vegetation [1] (Explain)

[1] Indicators of hydric soil & wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic vegetation present? Yes

Remarks:
(include photo numbers here or on a separate sheet)

WETLAND DETERMINATION DATA FORM - Northcentral and Northeast Region

SOIL

Sampling Point: #08 N16 west end

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators).

	Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type [1]	Loc [2]	Texture	Remarks
1.	0 - 6	10yr 2/1						Fibric peat	moist
2.	6 - 21	10yr 2/1						Fibric peat	saturated
3.	-								
4.	-								
5.	-								
6.	-								

[1] Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains **[2] Location: PL=Pore Lining, M=Matrix.**

Hydric Soil Indicators: (applicable to all LRRs, unless otherwise noted)

- [x] Histosol (A1)
- [ ] Histic Epipedon (A2)
- [ ] Black Histic (A3)
- [ ] Hydrogen Sulfide (A4)
- [ ] Stratified Layers (A5)
- [ ] Depleted Below Dark Surface (A11)
- [ ] Thick Dark Surface (A12)
- [ ] Sandy Mucky Mineral (S1)
- [ ] Sandy Gleyed Matrix (S4)
- [ ] Sandy Redox (S5)
- [ ] Stripped Matrix (S6)
- [ ] Dark Surface (S7) (LRR R, MLRA 149B)
- [ ] Polyvalue Below Surface (S8) (LRR R, MLRA 149B)
- [ ] Thin Dark Surface (S9) (LRR R, MLRA 149B)
- [ ] Loamy Mucky Mineral (F1) (LRR K, L)
- [ ] Loamy Gleyed Matrix (F2)
- [ ] Depleted Matrix (F3)
- [ ] Redox Dark Surface (F6)
- [ ] Depleted Dark Surface (F7)
- [ ] Redox Depressions (F8)

Indicators for Problematic Hydric Soils [3]:

- [ ] 2 cm Muck (A10) (LRR K, L, MLRA 149B)
- [ ] Coast Prairie Redox (A16) (LRR K, L, R)
- [ ] 5 cm Mucky Peat or Peat (S3) (LRR K, L, R)
- [ ] Dark Surface (S7) (LRR K, L)
- [ ] Polyvalue Below Surface (S8) (LRR K, L)
- [ ] Thin Dark Surface (S9) (LRR K, L)
- [ ] Iron-Manganese Masses (F12) (LRR K, L, R)
- [ ] Piedmont Floodplain Soils (F19) (MLRA 149B)
- [ ] Mesic Spodic (TA6) (MLRA 144A, 145, 149B)
- [ ] Red Parent Material (TF2)
- [ ] Very Shallow Dark Surface (TF12)
- [ ] Other (explain in soil remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present): **Type:** _____ **Depth (inches):** -

Hydric soil present? Yes

Remarks: Saturated at -6"

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- [ ] Surface Water (A1)
- [ ] High Water Table (A2)
- [ ] Saturation (A3)
- [ ] Water Marks (B1)
- [ ] Sediment Deposits (B2)
- [ ] Drift Deposits (B3)
- [ ] Algal Mat or Crust (B4)
- [ ] Iron Deposits (B5)
- [ ] Inundation Visible on Aerial Imagery (B7)
- [ ] Sparsely Vegetated Concave Surface (B8)
- [ ] Water-Stained Leaves (B9)
- [ ] Aquatic Fauna (B13)
- [ ] Marl Deposits (B15)
- [ ] Hydrogen Sulfide Odor (C1)
- [ ] Oxidized Rhizospheres on Living Roots (where not tilled) (C3)
- [ ] Presence of Reduced Iron (C4)
- [ ] Recent Iron Reduction in Tilled Soils (C6)
- [ ] Thin Muck Surface (C7)
- [ ] Other (explain in remarks)

Secondary Indicators (minimum of two required)

- [ ] Surface Soil Cracks (B6)
- [ ] Drainage Patterns (B10)
- [ ] Moss Trim Lines (B16)
- [ ] Dry-Season Water Table (C2)
- [ ] Crayfish Burrows (C8)
- [ ] Saturation Visible on Aerial Imagery (C9)
- [ ] Stunted or Stressed Plants (D1)
- [ ] Geomorphic Position (D2)
- [ ] Shallow Aquitard (D3)
- [ ] Microtopographic Relief (D4)
- [ ] FAC-Neutral Test (D5)

Field Observations:

Surface water present? [ ] **Surface Water Depth (inches):** _____

Water table present? [ ] **Water Table Depth (inches):** _____

Saturation present? (includes capillary fringe) [x] **Saturation Depth (inches):** 6

Wetland hydrology present? Yes

Describe Recorded Data:

Recorded Data: [ ] Aerial Photo [ ] Monitoring Well [ ] Stream Gauge [ ] Previous Inspections

Hydrology Remarks: Saturated at -6"

WETLAND DETERMINATION DATA FORM - Northcentral and Northeast Region

Project/Site: Zim Sod | Applicant/Owner: Zim Sod | City/County: St. Louis | State: MN | Sampling Date: 11/18/10

Investigator(s): TPT | Section: 11 | Township: 55 | Range: 18 | Sampling Point: #09 N16

Land Form: Terrace | Local Relief: | Slope %: | Soil Map Unit Name: Greenwood soils B14A

Subregion (LRR): k | Latitude: | Longitude: | Datum:

NWI/Cowardin Classification: | Circular 39 Classification: up

Are climatic/hydrologic conditions on the site typical for this time of year? Yes (If no, explain in remarks)

Eggers & Reed (primary): Upland

Eggers & Reed (secondary):

Eggers & Reed (tertiary):

Eggers & Reed (quaternary):

Are vegetation	Yes	Soil	Yes	Hydrology	Yes	significantly disturbed?	Are "normal circumstances" present? Yes
Are vegetation	No	Soil	No	Hydrology	No	naturally problematic?	

SUMMARY OF FINDINGS - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic vegetation present? Yes

Hydric soil present? Yes

Wetland hydrology present? No

Is the sampled area within a wetland? No

Remarks (explain any answers if needed): Tile drained sod field - in Moosehorn field

If yes, optional Wetland Site ID:

VEGETATION

Tree Stratum (Plot Size:)

		Absolute % Cover	Dominant Species?	Indicator Status *
1.		0		
2.		0		
3.		0		
4.		0		
	Total Cover:	0		

Sapling/Shrub Stratum (Plot Size:)

1.		0		
2.		0		
3.		0		
4.		0		
5.		0		
	Total Cover:	0		

Herb Stratum (Plot Size:)

1.	Poa pratensis	99	Yes	FAC
2.		0		
3.		0		
4.		0		
5.		0		
6.		0		
7.		0		
8.		0		
	Total Cover:	99		

Woody Vine Stratum (Plot Size:)

1.		0		
2.		0		
	Total Cover:	0		

* In USFWS Region 3

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW or FAC: 100.00% (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL Species	0	X 1	0
FACW Species	0	X 2	0
FAC Species	99	X 3	297
FACU Species	0	X 4	0
UPL Species	0	X 5	0
Column Totals:	99 (A)		297 (B)

Prevalence Index = B/A = 3.00

Hydrophytic Vegetation Indicators:

No	Rapid Test for Hydrophytic Vegetation
Yes	Dominance Test is >50%
Yes	Prevelance Index ≤ 3.0 [1]
No	Morphological Adaptations [1] (provide supporting data in vegetation remarks or on a separate sheet)
No	Problematic Hydrophytic Vegetation [1] (Explain)

[1] Indicators of hydric soil & wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic vegetation present? Yes

Remarks:
(include photo numbers here or on a separate sheet)

WETLAND DETERMINATION DATA FORM - Northcentral and Northeast Region

SOIL

Sampling Point: #09 N16

Profile Description: (Describe to the depth needed to document the indicator or confirm the abscence of indicators).

	Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type [1]	Loc [2]	Texture	Remarks
1.	0 - 18	10yr 2/1						Fibric peat	very moist @ 12"
2.	-								
3.	-								
4.	-								
5.	-								
6.	-								

[1] Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains **[2] Location: PL=Pore Lining, M=Matrix.**

Hydric Soil Indicators: (applicable to all LRRs, unless otherwise noted)

- [x] Histosol (A1)
- [ ] Histic Epipedon (A2)
- [ ] Black Histic (A3)
- [ ] Hydrogen Sulfide (A4)
- [ ] Stratified Layers (A5)
- [ ] Depleted Below Dark Surface (A11)
- [ ] Thick Dark Surface (A12)
- [ ] Sandy Mucky Mineral (S1)
- [ ] Sandy Gleyed Matrix (S4)
- [ ] Sandy Redox (S5)
- [ ] Stripped Matrix (S6)
- [ ] Dark Surface (S7) (LRR R, MLRA 149B)
- [ ] Polyvalue Below Surface (S8) (LRR R, MLRA 149B)
- [ ] Thin Dark Surface (S9) (LRR R, MLRA 149B)
- [ ] Loamy Mucky Mineral (F1) (LRR K, L)
- [ ] Loamy Gleyed Matrix (F2)
- [ ] Depleted Matrix (F3)
- [ ] Redox Dark Surface (F6)
- [ ] Depleted Dark Surface (F7)
- [ ] Redox Depressions (F8)

Indicators for Problematic Hydric Soils [3]:

- [ ] 2 cm Muck (A10) (LRR K, L, MLRA 149B)
- [ ] Coast Prairie Redox (A16) (LRR K, L, R)
- [ ] 5 cm Mucky Peat or Peat (S3) (LRR K, L, R)
- [ ] Dark Surface (S7) (LRR K, L)
- [ ] Polyvalue Below Surface (S8) (LRR K, L)
- [ ] Thin Dark Surface (S9) (LRR K, L)
- [ ] Iron-Manganese Masses (F12) (LRR K, L, R)
- [ ] Piedmont Floodplain Soils (F19) (MLRA 149B)
- [ ] Mesic Spodic (TA6) (MLRA 144A, 145, 149B)
- [ ] Red Parent Material (TF2)
- [ ] Very Shallow Dark Surface (TF12)
- [ ] Other (explain in soil remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present): **Type:** _____ **Depth (inches):** -

Hydric soil present? Yes

Remarks: Very moist at 12" but not saturated

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- [ ] Surface Water (A1)
- [ ] High Water Table (A2)
- [ ] Saturation (A3)
- [ ] Water Marks (B1)
- [ ] Sediment Deposits (B2)
- [ ] Drift Deposits (B3)
- [ ] Algal Mat or Crust (B4)
- [ ] Iron Deposits (B5)
- [ ] Inundation Visible on Aerial Imagery (B7)
- [ ] Sparsely Vegetated Concave Surface (B8)
- [ ] Water-Stained Leaves (B9)
- [ ] Aquatic Fauna (B13)
- [ ] Marl Deposits (B15)
- [ ] Hydrogen Sulfide Odor (C1)
- [ ] Oxidized Rhizospheres on Living Roots (where not tilled) (C3)
- [ ] Presence of Reduced Iron (C4)
- [ ] Recent Iron Reduction in Tilled Soils (C6)
- [ ] Thin Muck Surface (C7)
- [ ] Other (explain in remarks)

Secondary Indicators (minimum of two required)

- [ ] Surface Soil Cracks (B6)
- [ ] Drainage Patterns (B10)
- [ ] Moss Trim Lines (B16)
- [ ] Dry-Season Water Table (C2)
- [ ] Crayfish Burrows (C8)
- [ ] Saturation Visible on Aerial Imagery (C9)
- [ ] Stunted or Stressed Plants (D1)
- [ ] Geomorphic Position (D2)
- [ ] Shallow Aquitard (D3)
- [ ] Microtopographic Relief (D4)
- [ ] FAC-Neutral Test (D5)

Field Observations:

Surface water present? [ ] **Surface Water Depth (inches):**

Water table present? [ ] **Water Table Depth (inches):**

Saturation present? (includes capillary fringe) [ ] **Saturation Depth (inches):**

Wetland hydrology present? No

Describe Recorded Data:

Recorded Data: [ ] Aerial Photo [ ] Monitoring Well [ ] Stream Gauge [ ] Previous Inspections

Hydrology Remarks: Very moist at 12" but not saturated - tile drained field

WETLAND DETERMINATION DATA FORM - Northcentral and Northeast Region

Project/Site: Zim Sod | Applicant/Owner: Zim Sod | City/County: St. Louis | State: MN | Sampling Date: 11/18/10

Investigator(s): TPT | Section: 11 | Township: 55 | Range: 18 | Sampling Point: #10 N07

Land Form: Terrace | Local Relief: | Slope %: | Soil Map Unit Name: Greenwood soils B14A

Subregion (LRR): k | Latitude: | Longitude: | Datum:

NWI/Cowardin Classification: | Circular 39 Classification: up

Are climatic/hydrologic conditions on the site typical for this time of year? Yes (If no, explain in remarks)

Eggers & Reed (primary): Upland

Eggers & Reed (secondary):

Eggers & Reed (tertiary):

Eggers & Reed (quaternary):

Are vegetation	Yes	Soil	Yes	Hydrology	Yes	significantly disturbed?	Are "normal circumstances" present? Yes
Are vegetation	No	Soil	No	Hydrology	No	naturally problematic?	

SUMMARY OF FINDINGS - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic vegetation present? Yes

Hydric soil present? Yes

Wetland hydrology present? No

Is the sampled area within a wetland? No

Remarks (explain any answers if needed): Tile Drained Field (Otter field) with a managed drainage system and managed vegetation.

If yes, optional Wetland Site ID:

VEGETATION

Tree Stratum (Plot Size:)

		Absolute % Cover	Dominant Species?	Indicator Status *
1.		0		
2.		0		
3.		0		
4.		0		
	Total Cover:	0		

Sapling/Shrub Stratum (Plot Size:)

1.		0		
2.		0		
3.		0		
4.		0		
5.		0		
	Total Cover:	0		

Herb Stratum (Plot Size:)

1.	Poa pratensis	99	Yes	FAC
2.		0		
3.		0		
4.		0		
5.		0		
6.		0		
7.		0		
8.		0		
	Total Cover:	99		

Woody Vine Stratum (Plot Size:)

1.		0		
2.		0		
	Total Cover:	0		

* In USFWS Region 3

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW or FAC: 100.00% (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL Species	0	X 1	0
FACW Species	0	X 2	0
FAC Species	99	X 3	297
FACU Species	0	X 4	0
UPL Species	0	X 5	0
Column Totals:	99 (A)		297 (B)

Prevalence Index = B/A = 3.00

Hydrophytic Vegetation Indicators:

No	Rapid Test for Hydrophytic Vegetation
Yes	Dominance Test is >50%
Yes	Prevelance Index ≤ 3.0 [1]
No	Morphological Adaptations [1] (provide supporting data in vegetation remarks or on a separate sheet)
No	Problematic Hydrophytic Vegetation [1] (Explain)

[1] Indicators of hydric soil & wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic vegetation present? Yes

Remarks:
(include photo numbers here or on a separate sheet)

WETLAND DETERMINATION DATA FORM - Northcentral and Northeast Region

SOIL

Sampling Point: #10 N07

Profile Description: (Describe to the depth needed to document the indicator or confirm the abscence of indicators).

	Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type [1]	Loc [2]	Texture	Remarks
1.	0 - 12	10yr 2/1						Fibric peat	
2.	12 - 20	10yr 2/1						Fibric peat	bright fibers10%
3.	-								
4.	-								
5.	-								
6.	-								

[1] Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains **[2] Location: PL=Pore Lining, M=Matrix.**

Hydric Soil Indicators: (applicable to all LRRs, unless otherwise noted)

- [x] Histosol (A1)
- [ ] Histic Epipedon (A2)
- [ ] Black Histic (A3)
- [ ] Hydrogen Sulfide (A4)
- [ ] Stratified Layers (A5)
- [ ] Depleted Below Dark Surface (A11)
- [ ] Thick Dark Surface (A12)
- [ ] Sandy Mucky Mineral (S1)
- [ ] Sandy Gleyed Matrix (S4)
- [ ] Sandy Redox (S5)
- [ ] Stripped Matrix (S6)
- [ ] Dark Surface (S7) (LRR R, MLRA 149B)
- [ ] Polyvalue Below Surface (S8) (LRR R, MLRA 149B)
- [ ] Thin Dark Surface (S9) (LRR R, MLRA 149B)
- [ ] Loamy Mucky Mineral (F1) (LRR K, L)
- [ ] Loamy Gleyed Matrix (F2)
- [ ] Depleted Matrix (F3)
- [ ] Redox Dark Surface (F6)
- [ ] Depleted Dark Surface (F7)
- [ ] Redox Depressions (F8)

Indicators for Problematic Hydric Soils [3]:

- [ ] 2 cm Muck (A10) (LRR K, L, MLRA 149B)
- [ ] Coast Prairie Redox (A16) (LRR K, L, R)
- [ ] 5 cm Mucky Peat or Peat (S3) (LRR K, L, R)
- [ ] Dark Surface (S7) (LRR K, L)
- [ ] Polyvalue Below Surface (S8) (LRR K, L)
- [ ] Thin Dark Surface (S9) (LRR K, L)
- [ ] Iron-Manganese Masses (F12) (LRR K, L, R)
- [ ] Piedmont Floodplain Soils (F19) (MLRA 149B)
- [ ] Mesic Spodic (TA6) (MLRA 144A, 145, 149B)
- [ ] Red Parent Material (TF2)
- [ ] Very Shallow Dark Surface (TF12)
- [ ] Other (explain in soil remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present): **Type:** _____ **Depth (inches):** -

Hydric soil present? Yes

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- [ ] Surface Water (A1)
- [ ] High Water Table (A2)
- [ ] Saturation (A3)
- [ ] Water Marks (B1)
- [ ] Sediment Deposits (B2)
- [ ] Drift Deposits (B3)
- [ ] Algal Mat or Crust (B4)
- [ ] Iron Deposits (B5)
- [ ] Inundation Visible on Aerial Imagery (B7)
- [ ] Sparsely Vegetated Concave Surface (B8)
- [ ] Water-Stained Leaves (B9)
- [ ] Aquatic Fauna (B13)
- [ ] Marl Deposits (B15)
- [ ] Hydrogen Sulfide Odor (C1)
- [ ] Oxidized Rhizospheres on Living Roots (where not tilled) (C3)
- [ ] Presence of Reduced Iron (C4)
- [ ] Recent Iron Reduction in Tilled Soils (C6)
- [ ] Thin Muck Surface (C7)
- [ ] Other (explain in remarks)

Secondary Indicators (minimum of two required)

- [ ] Surface Soil Cracks (B6)
- [ ] Drainage Patterns (B10)
- [ ] Moss Trim Lines (B16)
- [ ] Dry-Season Water Table (C2)
- [ ] Crayfish Burrows (C8)
- [ ] Saturation Visible on Aerial Imagery (C9)
- [ ] Stunted or Stressed Plants (D1)
- [ ] Geomorphic Position (D2)
- [ ] Shallow Aquitard (D3)
- [ ] Microtopographic Relief (D4)
- [ ] FAC-Neutral Test (D5)

Field Observations:

Surface water present? [ ] **Surface Water Depth (inches):**

Water table present? [ ] **Water Table Depth (inches):**

Saturation present? (includes capillary fringe) [ ] **Saturation Depth (inches):**

Wetland hydrology present? No

Describe Recorded Data:

Recorded Data: [ ] Aerial Photo [ ] Monitoring Well [ ] Stream Gauge [ ] Previous Inspections

Hydrology Remarks: Tile drained field

WETLAND DETERMINATION DATA FORM - Northcentral and Northeast Region

Project/Site: Zim Sod | Applicant/Owner: Zim Sod | City/County: St. Louis | State: MN | Sampling Date: 11/18/10

Investigator(s): TPT | Section: 11 | Township: 55 | Range: 18 | Sampling Point: #11East of N06

Land Form: Terrace | Local Relief: | Slope %: | Soil Map Unit Name: Greenwood soils B14A

Subregion (LRR): k | Latitude: | Longitude: | Datum:

NWI/Cowardin Classification: | Circular 39 Classification: 8

Are climatic/hydrologic conditions on the site typical for this time of year? Yes (If no, explain in remarks)

Are vegetation No Soil No Hydrology No significantly disturbed? Are "normal circumstances" present? Yes

Are vegetation No Soil No Hydrology No naturally problematic?

Eggers & Reed (primary): Coniferous Bog

Eggers & Reed (secondary):

Eggers & Reed (tertiary):

Eggers & Reed (quaternary):

SUMMARY OF FINDINGS - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic vegetation present? Yes

Hydric soil present? Yes

Wetland hydrology present? Yes

Is the sampled area within a wetland? Yes

Remarks (explain any answers if needed): East of Mallard field

If yes, optional Wetland Site ID:

VEGETATION

	Tree Stratum (Plot Size:)	Absolute % Cover	Dominant Species?	Indicator Status *
1.	Larix laricina	30	Yes	FACW
2.		0		
3.		0		
4.		0		
	Total Cover:	30		

	Sapling/Shrub Stratum (Plot Size:)			
1.	Larix laricina	10	Yes	FACW
2.	Picea mariana	10	Yes	FACW
3.	Betula pumila	10	Yes	OBL
4.	Ledum groenlandicum	25	Yes	OBL
5.	Rubus idaeus ssp. strigosus	10	Yes	FACW
	Total Cover:	65		

	Herb Stratum (Plot Size:)			
1.	Sphagnum sp.	30	Yes	
2.		0		
3.		0		
4.		0		
5.		0		
6.		0		
7.		0		
8.		0		
	Total Cover:	30		

	Woody Vine Stratum (Plot Size:)			
1.		0		
2.		0		
	Total Cover:	0		

* In USFWS Region 3

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW or FAC: 6 (A)

Total Number of Dominant Species Across All Strata: 7 (B)

Percent of Dominant Species That Are OBL, FACW or FAC: 85.71% (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL Species	35	X 1	35
FACW Species	60	X 2	120
FAC Species	0	X 3	0
FACU Species	0	X 4	0
UPL Species	0	X 5	0
Column Totals:	95 (A)		155 (B)

Prevalence Index = B/A = 1.63

Hydrophytic Vegetation Indicators:

- Yes — Rapid Test for Hydrophytic Vegetation
- Yes — Dominance Test is >50%
- Yes — Prevelance Index ≤ 3.0 [1]
- No — Morphological Adaptations [1] (provide supporting data in vegetation remarks or on a separate sheet)
- No — Problematic Hydrophytic Vegetation [1] (Explain)

[1] Indicators of hydric soil & wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic vegetation present? Yes

Remarks:
(include photo numbers here or on a separate sheet)

WETLAND DETERMINATION DATA FORM - Northcentral and Northeast Region

SOIL

Sampling Point: #11East of N06

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators).

	Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type [1]	Loc [2]	Texture	Remarks
1.	0 - 12	10yr 2/1						Fibric peat	saturated at 4"
2.	12 - 18	10yr 2/1						Fibric peat	10% bright fibers
3.	-								
4.	-								
5.	-								
6.	-								

[1] Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains **[2] Location: PL=Pore Lining, M=Matrix.**

Hydric Soil Indicators: (applicable to all LRRs, unless otherwise noted)

- [x] Histosol (A1)
- [ ] Histic Epipedon (A2)
- [ ] Black Histic (A3)
- [ ] Hydrogen Sulfide (A4)
- [ ] Stratified Layers (A5)
- [ ] Depleted Below Dark Surface (A11)
- [ ] Thick Dark Surface (A12)
- [ ] Sandy Mucky Mineral (S1)
- [ ] Sandy Gleyed Matrix (S4)
- [ ] Sandy Redox (S5)
- [ ] Stripped Matrix (S6)
- [ ] Dark Surface (S7) (LRR R, MLRA 149B)
- [ ] Polyvalue Below Surface (S8) (LRR R, MLRA 149B)
- [ ] Thin Dark Surface (S9) (LRR R, MLRA 149B)
- [ ] Loamy Mucky Mineral (F1) (LRR K, L)
- [ ] Loamy Gleyed Matrix (F2)
- [ ] Depleted Matrix (F3)
- [ ] Redox Dark Surface (F6)
- [ ] Depleted Dark Surface (F7)
- [ ] Redox Depressions (F8)

Indicators for Problematic Hydric Soils [3]:

- [ ] 2 cm Muck (A10) (LRR K, L, MLRA 149B)
- [ ] Coast Prairie Redox (A16) (LRR K, L, R)
- [ ] 5 cm Mucky Peat or Peat (S3) (LRR K, L, R)
- [ ] Dark Surface (S7) (LRR K, L)
- [ ] Polyvalue Below Surface (S8) (LRR K, L)
- [ ] Thin Dark Surface (S9) (LRR K, L)
- [ ] Iron-Manganese Masses (F12) (LRR K, L, R)
- [ ] Piedmont Floodplain Soils (F19) (MLRA 149B)
- [ ] Mesic Spodic (TA6) (MLRA 144A, 145, 149B)
- [ ] Red Parent Material (TF2)
- [ ] Very Shallow Dark Surface (TF12)
- [ ] Other (explain in soil remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present): **Type:** _____ **Depth (inches):** -

Hydric soil present? Yes

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- [ ] Surface Water (A1)
- [ ] High Water Table (A2)
- [x] Saturation (A3)
- [ ] Water Marks (B1)
- [ ] Sediment Deposits (B2)
- [ ] Drift Deposits (B3)
- [ ] Algal Mat or Crust (B4)
- [ ] Iron Deposits (B5)
- [ ] Inundation Visible on Aerial Imagery (B7)
- [ ] Sparsely Vegetated Concave Surface (B8)
- [ ] Water-Stained Leaves (B9)
- [ ] Aquatic Fauna (B13)
- [ ] Marl Deposits (B15)
- [ ] Hydrogen Sulfide Odor (C1)
- [ ] Oxidized Rhizospheres on Living Roots (where not tilled) (C3)
- [ ] Presence of Reduced Iron (C4)
- [ ] Recent Iron Reduction in Tilled Soils (C6)
- [ ] Thin Muck Surface (C7)
- [ ] Other (explain in remarks)

Secondary Indicators (minimum of two required)

- [ ] Surface Soil Cracks (B6)
- [ ] Drainage Patterns (B10)
- [ ] Moss Trim Lines (B16)
- [ ] Dry-Season Water Table (C2)
- [ ] Crayfish Burrows (C8)
- [ ] Saturation Visible on Aerial Imagery (C9)
- [ ] Stunted or Stressed Plants (D1)
- [ ] Geomorphic Position (D2)
- [ ] Shallow Aquitard (D3)
- [ ] Microtopographic Relief (D4)
- [ ] FAC-Neutral Test (D5)

Field Observations:

Surface water present? [ ] **Surface Water Depth (inches):**

Water table present? [ ] **Water Table Depth (inches):**

Saturation present? (includes capillary fringe) [x] **Saturation Depth (inches):** 4

Wetland hydrology present? Yes

Describe Recorded Data:

Recorded Data: [ ] Aerial Photo [ ] Monitoring Well [ ] Stream Gauge [ ] Previous Inspections

Hydrology Remarks: Saturation at -4"

11/23/2011 1:47:56 PM

WETLAND DETERMINATION DATA FORM - Northcentral and Northeast Region

Project/Site: Zim Sod | Applicant/Owner: Zim Sod | City/County: St. Louis | State: MN | Sampling Date: 11/18/10

Investigator(s): TPT | Section: 3 | Township: 55 | Range: 18 | Sampling Point: #12 N of N01

Land Form: Terrace | Local Relief: | Slope %: | Soil Map Unit Name: Greenwood soils B14A

Subregion (LRR): k | Latitude: | Longitude: | Datum:

NWI/Cowardin Classification: | Circular 39 Classification: 8

Are climatic/hydrologic conditions on the site typical for this time of year? Yes (If no, explain in remarks)

Eggers & Reed (primary): Coniferous Bog

Eggers & Reed (secondary):

Eggers & Reed (tertiary):

Eggers & Reed (quaternary):

Are vegetation No Soil No Hydrology No significantly disturbed? Are "normal circumstances" present? Yes

Are vegetation No Soil No Hydrology No naturally problematic?

SUMMARY OF FINDINGS - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic vegetation present? Yes

Hydric soil present? Yes

Wetland hydrology present? Yes

Is the sampled area within a wetland? Yes

Remarks (explain any answers if needed): North of Bald eagle field

If yes, optional Wetland Site ID:

VEGETATION

	Tree Stratum (Plot Size:)	Absolute % Cover	Dominant Species?	Indicator Status *
1.	Picea mariana	60	Yes	FACW
2.	Larix laricina	40	Yes	FACW
3.		0		
4.		0		
	Total Cover:	100		

	Sapling/Shrub Stratum (Plot Size:)			
1.	Salix sp.	15	Yes	FAC
2.	Ledum groenlandicum	35	Yes	OBL
3.	Rubus idaeus ssp. strigosus	15	Yes	FACW
4.		0		
5.		0		
	Total Cover:	65		

	Herb Stratum (Plot Size:)			
1.	Sphagnum sp.	20	Yes	
2.		0		
3.		0		
4.		0		
5.		0		
6.		0		
7.		0		
8.		0		
	Total Cover:	20		

	Woody Vine Stratum (Plot Size:)			
1.		0		
2.		0		
	Total Cover:	0		

* In USFWS Region 3

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW or FAC: 5 (A)

Total Number of Dominant Species Across All Strata: 6 (B)

Percent of Dominant Species That Are OBL, FACW or FAC: 83.33% (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL Species	35	X 1	35
FACW Species	115	X 2	230
FAC Species	15	X 3	45
FACU Species	0	X 4	0
UPL Species	0	X 5	0
Column Totals:	165 (A)		310 (B)

Prevalence Index = B/A = 1.88

Hydrophytic Vegetation Indicators:

Yes	Rapid Test for Hydrophytic Vegetation
Yes	Dominance Test is >50%
Yes	Prevelance Index ≤ 3.0 [1]
No	Morphological Adaptations [1] (provide supporting data in vegetation remarks or on a separate sheet)
No	Problematic Hydrophytic Vegetation [1] (Explain)

[1] Indicators of hydric soil & wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic vegetation present? Yes

Remarks:
(include photo numbers here or on a separate sheet)

WETLAND DETERMINATION DATA FORM - Northcentral and Northeast Region

SOIL

Sampling Point: #12 N of N01

Profile Description: (Describe to the depth needed to document the indicator or confirm the abscence of indicators).

	Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type [1]	Loc [2]	Texture	Remarks
1.	0 - 18	10yr 2/1						Fibric peat	sat to surface
2.	-								
3.	-								
4.	-								
5.	-								
6.	-								

[1] Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains **[2] Location: PL=Pore Lining, M=Matrix.**

Hydric Soil Indicators: (applicable to all LRRs, unless otherwise noted)

- [x] Histosol (A1)
- [ ] Histic Epipedon (A2)
- [ ] Black Histic (A3)
- [ ] Hydrogen Sulfide (A4)
- [ ] Stratified Layers (A5)
- [ ] Depleted Below Dark Surface (A11)
- [ ] Thick Dark Surface (A12)
- [ ] Sandy Mucky Mineral (S1)
- [ ] Sandy Gleyed Matrix (S4)
- [ ] Sandy Redox (S5)
- [ ] Stripped Matrix (S6)
- [ ] Dark Surface (S7) (LRR R, MLRA 149B)
- [ ] Polyvalue Below Surface (S8) (LRR R, MLRA 149B)
- [ ] Thin Dark Surface (S9) (LRR R, MLRA 149B)
- [ ] Loamy Mucky Mineral (F1) (LRR K, L)
- [ ] Loamy Gleyed Matrix (F2)
- [ ] Depleted Matrix (F3)
- [ ] Redox Dark Surface (F6)
- [ ] Depleted Dark Surface (F7)
- [ ] Redox Depressions (F8)

Indicators for Problematic Hydric Soils [3]:

- [ ] 2 cm Muck (A10) (LRR K, L, MLRA 149B)
- [ ] Coast Prairie Redox (A16) (LRR K, L, R)
- [ ] 5 cm Mucky Peat or Peat (S3) (LRR K, L, R)
- [ ] Dark Surface (S7) (LRR K, L)
- [ ] Polyvalue Below Surface (S8) (LRR K, L)
- [ ] Thin Dark Surface (S9) (LRR K, L)
- [ ] Iron-Manganese Masses (F12) (LRR K, L, R)
- [ ] Piedmont Floodplain Soils (F19) (MLRA 149B)
- [ ] Mesic Spodic (TA6) (MLRA 144A, 145, 149B)
- [ ] Red Parent Material (TF2)
- [ ] Very Shallow Dark Surface (TF12)
- [ ] Other (explain in soil remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present): **Type:** _____ **Depth (inches):** -

Hydric soil present? Yes

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- [ ] Surface Water (A1)
- [ ] High Water Table (A2)
- [x] Saturation (A3)
- [ ] Water Marks (B1)
- [ ] Sediment Deposits (B2)
- [ ] Drift Deposits (B3)
- [ ] Algal Mat or Crust (B4)
- [ ] Iron Deposits (B5)
- [ ] Inundation Visible on Aerial Imagery (B7)
- [ ] Sparsely Vegetated Concave Surface (B8)
- [ ] Water-Stained Leaves (B9)
- [ ] Aquatic Fauna (B13)
- [ ] Marl Deposits (B15)
- [ ] Hydrogen Sulfide Odor (C1)
- [ ] Oxidized Rhizospheres on Living Roots (where not tilled) (C3)
- [ ] Presence of Reduced Iron (C4)
- [ ] Recent Iron Reduction in Tilled Soils (C6)
- [ ] Thin Muck Surface (C7)
- [ ] Other (explain in remarks)

Secondary Indicators (minimum of two required)

- [ ] Surface Soil Cracks (B6)
- [ ] Drainage Patterns (B10)
- [ ] Moss Trim Lines (B16)
- [ ] Dry-Season Water Table (C2)
- [ ] Crayfish Burrows (C8)
- [ ] Saturation Visible on Aerial Imagery (C9)
- [ ] Stunted or Stressed Plants (D1)
- [ ] Geomorphic Position (D2)
- [ ] Shallow Aquitard (D3)
- [ ] Microtopographic Relief (D4)
- [ ] FAC-Neutral Test (D5)

Field Observations:

Surface water present? [ ] **Surface Water Depth (inches):**

Water table present? [ ] **Water Table Depth (inches):**

Saturation present? (includes capillary fringe) [x] **Saturation Depth (inches):** 0

Wetland hydrology present? Yes

Describe Recorded Data:

Recorded Data: [ ] Aerial Photo [ ] Monitoring Well [ ] Stream Gauge [ ] Previous Inspections

Hydrology Remarks: Saturated to surface

11/23/2011 1:47:56 PM

WETLAND DETERMINATION DATA FORM - Northcentral and Northeast Region

Project/Site: Zim Sod | Applicant/Owner: Zim Sod | City/County: St. Louis | State: MN | Sampling Date: 11/18/10

Investigator(s): TPT | Section: 11 | Township: 55 | Range: 18 | Sampling Point: #13 E of N02

Land Form: Terrace | Local Relief: | Slope %: | Soil Map Unit Name: Greenwood soils B14A

Subregion (LRR): k | Latitude: | Longitude: | Datum:

NWI/Cowardin Classification: | Circular 39 Classification: 7

Are climatic/hydrologic conditions on the site typical for this time of year? Yes (If no, explain in remarks)

Are vegetation No | Soil No | Hydrology No | significantly disturbed? | Are "normal circumstances" present? Yes

Are vegetation No | Soil No | Hydrology No | naturally problematic?

Eggers & Reed (primary): Coniferous Swamp

Eggers & Reed (secondary):

Eggers & Reed (tertiary):

Eggers & Reed (quaternary):

SUMMARY OF FINDINGS - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic vegetation present? Yes

Hydric soil present? Yes

Wetland hydrology present? Yes

Is the sampled area within a wetland? Yes

Remarks (explain any answers if needed): East of Osprey field

If yes, optional Wetland Site ID:

VEGETATION

	Tree Stratum (Plot Size:)	Absolute % Cover	Dominant Species?	Indicator Status *
1.	Picea mariana	90	Yes	FACW
2.		0		
3.		0		
4.		0		
	Total Cover:	90		

	Sapling/Shrub Stratum (Plot Size:)			
1.	Ledum groenlandicum	25	Yes	OBL
2.	Chamaedaphne calyculata	10	Yes	OBL
3.	Cornus sericea ssp. sericea	10	Yes	FACW
4.	Betula pumila	10	Yes	OBL
5.		0		
	Total Cover:	55		

	Herb Stratum (Plot Size:)			
1.	Sphagnum sp.	30	Yes	
2.		0		
3.		0		
4.		0		
5.		0		
6.		0		
7.		0		
8.		0		
	Total Cover:	30		

	Woody Vine Stratum (Plot Size:)			
1.		0		
2.		0		
	Total Cover:	0		

* In USFWS Region 3

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW or FAC: 5 (A)

Total Number of Dominant Species Across All Strata: 6 (B)

Percent of Dominant Species That Are OBL, FACW or FAC: 83.33% (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL Species	45	X 1	45
FACW Species	100	X 2	200
FAC Species	0	X 3	0
FACU Species	0	X 4	0
UPL Species	0	X 5	0
Column Totals:	145 (A)		245 (B)

Prevalence Index = B/A = 1.69

Hydrophytic Vegetation Indicators:

Yes — Rapid Test for Hydrophytic Vegetation

Yes — Dominance Test is >50%

Yes — Prevelance Index ≤ 3.0 [1]

No — Morphological Adaptations [1] (provide supporting data in vegetation remarks or on a separate sheet)

No — Problematic Hydrophytic Vegetation [1] (Explain)

[1] Indicators of hydric soil & wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic vegetation present? Yes

Remarks:
(include photo numbers here or on a separate sheet)

WETLAND DETERMINATION DATA FORM - Northcentral and Northeast Region

SOIL

Sampling Point: #13 E of N02

Profile Description: (Describe to the depth needed to document the indicator or confirm the abscence of indicators).

	Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type [1]	Loc [2]	Texture	Remarks
1.	0 - 12	10yr 2/1						Fibric peat	
2.	12 - 22	10yr 2/2						Fibric peat	
3.	-								
4.	-								
5.	-								
6.	-								

[1] Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains **[2] Location: PL=Pore Lining, M=Matrix.**

Hydric Soil Indicators: (applicable to all LRRs, unless otherwise noted)

- [x] Histosol (A1)
- [ ] Histic Epipedon (A2)
- [ ] Black Histic (A3)
- [ ] Hydrogen Sulfide (A4)
- [ ] Stratified Layers (A5)
- [ ] Depleted Below Dark Surface (A11)
- [ ] Thick Dark Surface (A12)
- [ ] Sandy Mucky Mineral (S1)
- [ ] Sandy Gleyed Matrix (S4)
- [ ] Sandy Redox (S5)
- [ ] Stripped Matrix (S6)
- [ ] Dark Surface (S7) (LRR R, MLRA 149B)
- [ ] Polyvalue Below Surface (S8) (LRR R, MLRA 149B)
- [ ] Thin Dark Surface (S9) (LRR R, MLRA 149B)
- [ ] Loamy Mucky Mineral (F1) (LRR K, L)
- [ ] Loamy Gleyed Matrix (F2)
- [ ] Depleted Matrix (F3)
- [ ] Redox Dark Surface (F6)
- [ ] Depleted Dark Surface (F7)
- [ ] Redox Depressions (F8)

Indicators for Problematic Hydric Soils [3]:

- [ ] 2 cm Muck (A10) (LRR K, L, MLRA 149B)
- [ ] Coast Prairie Redox (A16) (LRR K, L, R)
- [ ] 5 cm Mucky Peat or Peat (S3) (LRR K, L, R)
- [ ] Dark Surface (S7) (LRR K, L)
- [ ] Polyvalue Below Surface (S8) (LRR K, L)
- [ ] Thin Dark Surface (S9) (LRR K, L)
- [ ] Iron-Manganese Masses (F12) (LRR K, L, R)
- [ ] Piedmont Floodplain Soils (F19) (MLRA 149B)
- [ ] Mesic Spodic (TA6) (MLRA 144A, 145, 149B)
- [ ] Red Parent Material (TF2)
- [ ] Very Shallow Dark Surface (TF12)
- [ ] Other (explain in soil remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present): **Type:** _____ **Depth (inches):** -

Hydric soil present? Yes

Remarks: Saturated to surface

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- [ ] Surface Water (A1)
- [ ] High Water Table (A2)
- [x] Saturation (A3)
- [ ] Water Marks (B1)
- [ ] Sediment Deposits (B2)
- [ ] Drift Deposits (B3)
- [ ] Algal Mat or Crust (B4)
- [ ] Iron Deposits (B5)
- [ ] Inundation Visible on Aerial Imagery (B7)
- [ ] Sparsely Vegetated Concave Surface (B8)
- [ ] Water-Stained Leaves (B9)
- [ ] Aquatic Fauna (B13)
- [ ] Marl Deposits (B15)
- [ ] Hydrogen Sulfide Odor (C1)
- [ ] Oxidized Rhizospheres on Living Roots (where not tilled) (C3)
- [ ] Presence of Reduced Iron (C4)
- [ ] Recent Iron Reduction in Tilled Soils (C6)
- [ ] Thin Muck Surface (C7)
- [ ] Other (explain in remarks)

Secondary Indicators (minimum of two required)

- [ ] Surface Soil Cracks (B6)
- [ ] Drainage Patterns (B10)
- [ ] Moss Trim Lines (B16)
- [ ] Dry-Season Water Table (C2)
- [ ] Crayfish Burrows (C8)
- [ ] Saturation Visible on Aerial Imagery (C9)
- [ ] Stunted or Stressed Plants (D1)
- [ ] Geomorphic Position (D2)
- [ ] Shallow Aquitard (D3)
- [ ] Microtopographic Relief (D4)
- [ ] FAC-Neutral Test (D5)

Field Observations:

Surface water present? [ ] **Surface Water Depth (inches):**

Water table present? [ ] **Water Table Depth (inches):**

Saturation present? (includes capillary fringe) [x] **Saturation Depth (inches):** 0

Wetland hydrology present? Yes

Describe Recorded Data:

Recorded Data: [ ] Aerial Photo [ ] Monitoring Well [ ] Stream Gauge [ ] Previous Inspections

Hydrology Remarks: Saturated to surface

WETLAND DETERMINATION DATA FORM - Northcentral and Northeast Region

Project/Site: Zim Sod | Applicant/Owner: Zim Sod | City/County: St. Louis | State: MN | Sampling Date: 11/18/10

Investigator(s): TPT | Section: 11 | Township: 55 | Range: 18 | Sampling Point: #14 E of N13

Land Form: Terrace | Local Relief: | Slope %: | Soil Map Unit Name: Greenwood soils B14A

Subregion (LRR): K | Latitude: | Longitude: | Datum:

NWI/Cowardin Classification: | Circular 39 Classification: 7

Are climatic/hydrologic conditions on the site typical for this time of year? Yes (If no, explain in remarks)

Are vegetation No | Soil No | Hydrology No | significantly disturbed? | Are "normal circumstances" present? Yes

Are vegetation No | Soil No | Hydrology No | naturally problematic?

Eggers & Reed (primary): Coniferous Swamp

Eggers & Reed (secondary):

Eggers & Reed (tertiary):

Eggers & Reed (quaternary):

SUMMARY OF FINDINGS - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic vegetation present? Yes

Hydric soil present? Yes

Wetland hydrology present? Yes

Is the sampled area within a wetland? Yes

Remarks (explain any answers if needed):

If yes, optional Wetland Site ID:

VEGETATION

	Tree Stratum (Plot Size:)	Absolute % Cover	Dominant Species?	Indicator Status *
1.	Larix laricina	40	Yes	FACW
2.		0		
3.		0		
4.		0		
	Total Cover:	40		

	Sapling/Shrub Stratum (Plot Size:)			
1.	Larix laricina	60	Yes	FACW
2.	Rubus idaeus ssp. strigosus	15	Yes	FACW
3.		0		
4.		0		
5.		0		
	Total Cover:	75		

	Herb Stratum (Plot Size:)			
1.		0		
2.		0		
3.		0		
4.		0		
5.		0		
6.		0		
7.		0		
8.		0		
	Total Cover:	0		

	Woody Vine Stratum (Plot Size:)			
1.		0		
2.		0		
	Total Cover:	0		

* In USFWS Region 3

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW or FAC: 3 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW or FAC: 100.00% (A/B)

Prevalence Index Worksheet:

Total % Cover of:			Multiply by:	
OBL Species	0	X 1	0	
FACW Species	115	X 2	230	
FAC Species	0	X 3	0	
FACU Species	0	X 4	0	
UPL Species	0	X 5	0	
Column Totals:	115	(A)	230	(B)
Prevalence Index = B/A =			2.00	

Hydrophytic Vegetation Indicators:

Yes	Rapid Test for Hydrophytic Vegetation
Yes	Dominance Test is >50%
Yes	Prevelance Index ≤ 3.0 [1]
No	Morphological Adaptations [1] (provide supporting data in vegetation remarks or on a separate sheet)
No	Problematic Hydrophytic Vegetation [1] (Explain)

[1] Indicators of hydric soil & wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic vegetation present? Yes

Remarks:
(include photo numbers here or on a separate sheet)

WETLAND DETERMINATION DATA FORM - Northcentral and Northeast Region

SOIL

Sampling Point: #14 E of N13

Profile Description: (Describe to the depth needed to document the indicator or confirm the abscence of indicators).

	Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type [1]	Loc [2]	Texture	Remarks
1.	0 - 8	10yr 2/1						Fibric peat	
2.	8 - 18	10yr 2/1						Fibric peat	Saturated to 8"
3.	-								
4.	-								
5.	-								
6.	-								

[1] Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains **[2] Location: PL=Pore Lining, M=Matrix.**

Hydric Soil Indicators: (applicable to all LRRs, unless otherwise noted)

- [x] Histosol (A1)
- [ ] Histic Epipedon (A2)
- [ ] Black Histic (A3)
- [ ] Hydrogen Sulfide (A4)
- [ ] Stratified Layers (A5)
- [ ] Depleted Below Dark Surface (A11)
- [ ] Thick Dark Surface (A12)
- [ ] Sandy Mucky Mineral (S1)
- [ ] Sandy Gleyed Matrix (S4)
- [ ] Sandy Redox (S5)
- [ ] Stripped Matrix (S6)
- [ ] Dark Surface (S7) (LRR R, MLRA 149B)
- [ ] Polyvalue Below Surface (S8) (LRR R, MLRA 149B)
- [ ] Thin Dark Surface (S9) (LRR R, MLRA 149B)
- [ ] Loamy Mucky Mineral (F1) (LRR K, L)
- [ ] Loamy Gleyed Matrix (F2)
- [ ] Depleted Matrix (F3)
- [ ] Redox Dark Surface (F6)
- [ ] Depleted Dark Surface (F7)
- [ ] Redox Depressions (F8)

Indicators for Problematic Hydric Soils [3]:

- [ ] 2 cm Muck (A10) (LRR K, L, MLRA 149B)
- [ ] Coast Prairie Redox (A16) (LRR K, L, R)
- [ ] 5 cm Mucky Peat or Peat (S3) (LRR K, L, R)
- [ ] Dark Surface (S7) (LRR K, L)
- [ ] Polyvalue Below Surface (S8) (LRR K, L)
- [ ] Thin Dark Surface (S9) (LRR K, L)
- [ ] Iron-Manganese Masses (F12) (LRR K, L, R)
- [ ] Piedmont Floodplain Soils (F19) (MLRA 149B)
- [ ] Mesic Spodic (TA6) (MLRA 144A, 145, 149B)
- [ ] Red Parent Material (TF2)
- [ ] Very Shallow Dark Surface (TF12)
- [ ] Other (explain in soil remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present): **Type:** _____ **Depth (inches):** -

Hydric soil present? Yes

Remarks: Saturated to 8"

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- [ ] Surface Water (A1)
- [ ] High Water Table (A2)
- [x] Saturation (A3)
- [ ] Water Marks (B1)
- [ ] Sediment Deposits (B2)
- [ ] Drift Deposits (B3)
- [ ] Algal Mat or Crust (B4)
- [ ] Iron Deposits (B5)
- [ ] Inundation Visible on Aerial Imagery (B7)
- [ ] Sparsely Vegetated Concave Surface (B8)
- [ ] Water-Stained Leaves (B9)
- [ ] Aquatic Fauna (B13)
- [ ] Marl Deposits (B15)
- [ ] Hydrogen Sulfide Odor (C1)
- [ ] Oxidized Rhizospheres on Living Roots (where not tilled) (C3)
- [ ] Presence of Reduced Iron (C4)
- [ ] Recent Iron Reduction in Tilled Soils (C6)
- [ ] Thin Muck Surface (C7)
- [ ] Other (explain in remarks)

Secondary Indicators (minimum of two required)

- [ ] Surface Soil Cracks (B6)
- [ ] Drainage Patterns (B10)
- [ ] Moss Trim Lines (B16)
- [ ] Dry-Season Water Table (C2)
- [ ] Crayfish Burrows (C8)
- [ ] Saturation Visible on Aerial Imagery (C9)
- [ ] Stunted or Stressed Plants (D1)
- [ ] Geomorphic Position (D2)
- [ ] Shallow Aquitard (D3)
- [ ] Microtopographic Relief (D4)
- [ ] FAC-Neutral Test (D5)

Field Observations:

Surface water present? [ ] **Surface Water Depth (inches):**

Water table present? [ ] **Water Table Depth (inches):**

Saturation present? (includes capillary fringe) [x] **Saturation Depth (inches):** 8

Wetland hydrology present? Yes

Describe Recorded Data:

Recorded Data: [ ] Aerial Photo [ ] Monitoring Well [ ] Stream Gauge [ ] Previous Inspections

Hydrology Remarks: Saturated to within 8" - may have some lateral effect from adjacent sod fields

WETLAND DETERMINATION DATA FORM - Northcentral and Northeast Region

Project/Site: Zim Sod | Applicant/Owner: Zim Sod | City/County: St. Louis | State: MN | Sampling Date: 11/18/10

Investigator(s): MAJ | Section: 11 | Township: 55 | Range: 18 | Sampling Point: #15 NE Corner of N08

Land Form: Terrace | Local Relief: | Slope %: | Soil Map Unit Name: Greenwood B14A

Subregion (LRR): k | Latitude: | Longitude: | Datum:

NWI/Cowardin Classification: upland | Circular 39 Classification: upland

Are climatic/hydrologic conditions on the site typical for this time of year? Yes (If no, explain in remarks)

Eggers & Reed (primary): Upland

Eggers & Reed (secondary):

Eggers & Reed (tertiary):

Eggers & Reed (quaternary):

Are vegetation	Yes	Soil	Yes	Hydrology	Yes	significantly disturbed?	Are "normal circumstances" present? Yes
Are vegetation	No	Soil	No	Hydrology	No	naturally problematic?	

SUMMARY OF FINDINGS - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic vegetation present? Yes
Hydric soil present? Yes
Wetland hydrology present? No
Is the sampled area within a wetland? No

Remarks (explain any answers if needed): Tile drained sod field. NE corner of Red Fox field.

If yes, optional Wetland Site ID:

VEGETATION

	Tree Stratum (Plot Size:)	Absolute % Cover	Dominant Species?	Indicator Status *
1.		0		
2.		0		
3.		0		
4.		0		
	Total Cover:	0		

	Sapling/Shrub Stratum (Plot Size:)			
1.		0		
2.		0		
3.		0		
4.		0		
5.		0		
	Total Cover:	0		

	Herb Stratum (Plot Size:)			
1.	Poa pratensis	95	Yes	FAC
2.		0		
3.		0		
4.		0		
5.		0		
6.		0		
7.		0		
8.		0		
	Total Cover:	95		

	Woody Vine Stratum (Plot Size:)			
1.		0		
2.		0		
	Total Cover:	0		

* In USFWS Region 3

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW or FAC:	1	(A)
Total Number of Dominant Species Across All Strata:	1	(B)
Percent of Dominant Species That Are OBL, FACW or FAC:	100.00%	(A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL Species	0	X 1	0
FACW Species	0	X 2	0
FAC Species	95	X 3	285
FACU Species	0	X 4	0
UPL Species	0	X 5	0
Column Totals:	95 (A)		285 (B)
Prevalence Index = B/A =			3.00

Hydrophytic Vegetation Indicators:

No	Rapid Test for Hydrophytic Vegetation
Yes	Dominance Test is >50%
Yes	Prevelance Index ≤ 3.0 [1]
No	Morphological Adaptations [1] (provide supporting data in vegetation remarks or on a separate sheet)
No	Problematic Hydrophytic Vegetation [1] (Explain)

[1] Indicators of hydric soil & wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic vegetation present? Yes

Remarks:
(include photo numbers here or on a separate sheet)

WETLAND DETERMINATION DATA FORM - Northcentral and Northeast Region

SOIL

Sampling Point: #15 NE Corner of N08

Profile Description: (Describe to the depth needed to document the indicator or confirm the abscence of indicators).

	Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type [1]	Loc [2]	Texture	Remarks
1.	0 - 36	10yr2/1						fibric peat mostly	some hemic below 30"
2.	-								
3.	-								
4.	-								
5.	-								
6.	-								

[1] Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (applicable to all LRRs, unless otherwise noted)

- [x] Histosol (A1)
- [ ] Histic Epipedon (A2)
- [ ] Black Histic (A3)
- [ ] Hydrogen Sulfide (A4)
- [ ] Stratified Layers (A5)
- [ ] Depleted Below Dark Surface (A11)
- [ ] Thick Dark Surface (A12)
- [ ] Sandy Mucky Mineral (S1)
- [ ] Sandy Gleyed Matrix (S4)
- [ ] Sandy Redox (S5)
- [ ] Stripped Matrix (S6)
- [ ] Dark Surface (S7) (LRR R, MLRA 149B)
- [ ] Polyvalue Below Surface (S8) (LRR R, MLRA 149B)
- [ ] Thin Dark Surface (S9) (LRR R, MLRA 149B)
- [ ] Loamy Mucky Mineral (F1) (LRR K, L)
- [ ] Loamy Gleyed Matrix (F2)
- [ ] Depleted Matrix (F3)
- [ ] Redox Dark Surface (F6)
- [ ] Depleted Dark Surface (F7)
- [ ] Redox Depressions (F8)

Indicators for Problematic Hydric Soils [3]:

- [ ] 2 cm Muck (A10) (LRR K, L, MLRA 149B)
- [ ] Coast Prairie Redox (A16) (LRR K, L, R)
- [ ] 5 cm Mucky Peat or Peat (S3) (LRR K, L, R)
- [ ] Dark Surface (S7) (LRR K, L)
- [ ] Polyvalue Below Surface (S8) (LRR K, L)
- [ ] Thin Dark Surface (S9) (LRR K, L)
- [ ] Iron-Manganese Masses (F12) (LRR K, L, R)
- [ ] Piedmont Floodplain Soils (F19) (MLRA 149B)
- [ ] Mesic Spodic (TA6) (MLRA 144A, 145, 149B)
- [ ] Red Parent Material (TF2)
- [ ] Very Shallow Dark Surface (TF12)
- [ ] Other (explain in soil remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present): Type: _____ Depth (inches): -

Hydric soil present? Yes

Remarks: Saturated at 34"

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- [ ] Surface Water (A1)
- [ ] High Water Table (A2)
- [ ] Saturation (A3)
- [ ] Water Marks (B1)
- [ ] Sediment Deposits (B2)
- [ ] Drift Deposits (B3)
- [ ] Algal Mat or Crust (B4)
- [ ] Iron Deposits (B5)
- [ ] Inundation Visible on Aerial Imagery (B7)
- [ ] Sparsely Vegetated Concave Surface (B8)
- [ ] Water-Stained Leaves (B9)
- [ ] Aquatic Fauna (B13)
- [ ] Marl Deposits (B15)
- [ ] Hydrogen Sulfide Odor (C1)
- [ ] Oxidized Rhizospheres on Living Roots (where not tilled) (C3)
- [ ] Presence of Reduced Iron (C4)
- [ ] Recent Iron Reduction in Tilled Soils (C6)
- [ ] Thin Muck Surface (C7)
- [ ] Other (explain in remarks)

Secondary Indicators (minimum of two required)

- [ ] Surface Soil Cracks (B6)
- [ ] Drainage Patterns (B10)
- [ ] Moss Trim Lines (B16)
- [ ] Dry-Season Water Table (C2)
- [ ] Crayfish Burrows (C8)
- [ ] Saturation Visible on Aerial Imagery (C9)
- [ ] Stunted or Stressed Plants (D1)
- [ ] Geomorphic Position (D2)
- [ ] Shallow Aquitard (D3)
- [ ] Microtopographic Relief (D4)
- [ ] FAC-Neutral Test (D5)

Field Observations:

Surface water present? [ ] **Surface Water Depth (inches):**

Water table present? [ ] **Water Table Depth (inches):**

Saturation present? (includes capillary fringe) [ ] **Saturation Depth (inches):**

Wetland hydrology present? No

Describe Recorded Data:

Recorded Data: [ ] Aerial Photo [ ] Monitoring Well [ ] Stream Gauge [ ] Previous Inspections

Hydrology Remarks:

WETLAND DETERMINATION DATA FORM - Northcentral and Northeast Region

Project/Site: Zim Sod | Applicant/Owner: Zim Sod | City/County: St. Louis | State: MN | Sampling Date: 11/18/10

Investigator(s): MAJ | Section: 11 | Township: 55 | Range: 18 | Sampling Point: #16 NW Corner of N12

Land Form: Terrace | Local Relief: | Slope %: | Soil Map Unit Name: Greenwood Soils B14A

Subregion (LRR): k | Latitude: | Longitude: | Datum:

NWI/Cowardin Classification: upland | Circular 39 Classification: upland

Are climatic/hydrologic conditions on the site typical for this time of year? Yes (If no, explain in remarks)

Are vegetation	Yes	Soil	Yes	Hydrology	Yes	significantly disturbed?	Are "normal circumstances" present? Yes
Are vegetation	No	Soil	No	Hydrology	No	naturally problematic?	

Eggers & Reed (primary): Upland
Eggers & Reed (secondary):
Eggers & Reed (tertiary):
Eggers & Reed (quaternary):

SUMMARY OF FINDINGS - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic vegetation present? Yes
Hydric soil present? Yes
Wetland hydrology present? No
Is the sampled area within a wetland? No
If yes, optional Wetland Site ID:

Remarks (explain any answers if needed): Tile drained sod field

VEGETATION

Tree Stratum (Plot Size:)

		Absolute % Cover	Dominant Species?	Indicator Status *
1.		0		
2.		0		
3.		0		
4.		0		
	Total Cover:	0		

Sapling/Shrub Stratum (Plot Size:)

1.		0		
2.		0		
3.		0		
4.		0		
5.		0		
	Total Cover:	0		

Herb Stratum (Plot Size:)

1.	Poa pratensis	95	Yes	FAC
2.		0		
3.		0		
4.		0		
5.		0		
6.		0		
7.		0		
8.		0		
	Total Cover:	95		

Woody Vine Stratum (Plot Size:)

1.		0		
2.		0		
	Total Cover:	0		

* In USFWS Region 3

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW or FAC: 100.00% (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL Species	0	X 1	0
FACW Species	0	X 2	0
FAC Species	95	X 3	285
FACU Species	0	X 4	0
UPL Species	0	X 5	0
Column Totals:	95 (A)		285 (B)

Prevalence Index = B/A = 3.00

Hydrophytic Vegetation Indicators:

No	Rapid Test for Hydrophytic Vegetation
Yes	Dominance Test is >50%
Yes	Prevelance Index ≤ 3.0 [1]
No	Morphological Adaptations [1] (provide supporting data in vegetation remarks or on a separate sheet)
No	Problematic Hydrophytic Vegetation [1] (Explain)

[1] Indicators of hydric soil & wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic vegetation present? Yes

Remarks:
(include photo numbers here or on a separate sheet)

WETLAND DETERMINATION DATA FORM - Northcentral and Northeast Region

SOIL

Sampling Point: #16 NW Corner of N12

Profile Description: (Describe to the depth needed to document the indicator or confirm the abscence of indicators).

	Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type [1]	Loc [2]	Texture	Remarks
1.	0 - 36	10yr2/1						fibric & hemic peat	woody frags 30-36"
2.	-								
3.	-								
4.	-								
5.	-								
6.	-								

[1] Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains **[2] Location: PL=Pore Lining, M=Matrix.**

Hydric Soil Indicators: (applicable to all LRRs, unless otherwise noted)

- [x] Histosol (A1)
- [ ] Histic Epipedon (A2)
- [ ] Black Histic (A3)
- [ ] Hydrogen Sulfide (A4)
- [ ] Stratified Layers (A5)
- [ ] Depleted Below Dark Surface (A11)
- [ ] Thick Dark Surface (A12)
- [ ] Sandy Mucky Mineral (S1)
- [ ] Sandy Gleyed Matrix (S4)
- [ ] Sandy Redox (S5)
- [ ] Stripped Matrix (S6)
- [ ] Dark Surface (S7) (LRR R, MLRA 149B)
- [ ] Polyvalue Below Surface (S8) (LRR R, MLRA 149B)
- [ ] Thin Dark Surface (S9) (LRR R, MLRA 149B)
- [ ] Loamy Mucky Mineral (F1) (LRR K, L)
- [ ] Loamy Gleyed Matrix (F2)
- [ ] Depleted Matrix (F3)
- [ ] Redox Dark Surface (F6)
- [ ] Depleted Dark Surface (F7)
- [ ] Redox Depressions (F8)

Indicators for Problematic Hydric Soils [3]:

- [ ] 2 cm Muck (A10) (LRR K, L, MLRA 149B)
- [ ] Coast Prairie Redox (A16) (LRR K, L, R)
- [ ] 5 cm Mucky Peat or Peat (S3) (LRR K, L, R)
- [ ] Dark Surface (S7) (LRR K, L)
- [ ] Polyvalue Below Surface (S8) (LRR K, L)
- [ ] Thin Dark Surface (S9) (LRR K, L)
- [ ] Iron-Manganese Masses (F12) (LRR K, L, R)
- [ ] Piedmont Floodplain Soils (F19) (MLRA 149B)
- [ ] Mesic Spodic (TA6) (MLRA 144A, 145, 149B)
- [ ] Red Parent Material (TF2)
- [ ] Very Shallow Dark Surface (TF12)
- [ ] Other (explain in soil remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present): **Type:** _____ **Depth (inches):** -

Hydric soil present? Yes

Remarks: Nearly saturated @ 36" but not above

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- [ ] Surface Water (A1)
- [ ] High Water Table (A2)
- [ ] Saturation (A3)
- [ ] Water Marks (B1)
- [ ] Sediment Deposits (B2)
- [ ] Drift Deposits (B3)
- [ ] Algal Mat or Crust (B4)
- [ ] Iron Deposits (B5)
- [ ] Inundation Visible on Aerial Imagery (B7)
- [ ] Sparsely Vegetated Concave Surface (B8)
- [ ] Water-Stained Leaves (B9)
- [ ] Aquatic Fauna (B13)
- [ ] Marl Deposits (B15)
- [ ] Hydrogen Sulfide Odor (C1)
- [ ] Oxidized Rhizospheres on Living Roots (where not tilled) (C3)
- [ ] Presence of Reduced Iron (C4)
- [ ] Recent Iron Reduction in Tilled Soils (C6)
- [ ] Thin Muck Surface (C7)
- [ ] Other (explain in remarks)

Secondary Indicators (minimum of two required)

- [ ] Surface Soil Cracks (B6)
- [ ] Drainage Patterns (B10)
- [ ] Moss Trim Lines (B16)
- [ ] Dry-Season Water Table (C2)
- [ ] Crayfish Burrows (C8)
- [ ] Saturation Visible on Aerial Imagery (C9)
- [ ] Stunted or Stressed Plants (D1)
- [ ] Geomorphic Position (D2)
- [ ] Shallow Aquitard (D3)
- [ ] Microtopographic Relief (D4)
- [ ] FAC-Neutral Test (D5)

Field Observations:

Surface water present? [ ] **Surface Water Depth (inches):** _____

Water table present? [ ] **Water Table Depth (inches):** _____

Saturation present? (includes capillary fringe) [ ] **Saturation Depth (inches):** _____

Wetland hydrology present? No

Describe Recorded Data:

Recorded Data: [ ] Aerial Photo [ ] Monitoring Well [ ] Stream Gauge [ ] Previous Inspections

Hydrology Remarks:

WETLAND DETERMINATION DATA FORM - Northcentral and Northeast Region

Project/Site: Zim Sod | Applicant/Owner: Zim Sod | City/County: St. Louis | State: MN | Sampling Date: 11/18/10

Investigator(s): MAJ | Section: 11 | Township: 55 | Range: 18 | Sampling Point: #17 S of SW corner of N14

Land Form: Terrace | Local Relief: | Slope %: | Soil Map Unit Name: Greenwood B14A

Subregion (LRR): k | Latitude: | Longitude: | Datum:

NWI/Cowardin Classification: | Circular 39 Classification: 7

Are climatic/hydrologic conditions on the site typical for this time of year? Yes (If no, explain in remarks)

Eggers & Reed (primary): Coniferous Swamp

Eggers & Reed (secondary):

Eggers & Reed (tertiary):

Eggers & Reed (quaternary):

Are vegetation	No	Soil	No	Hydrology	No	significantly disturbed?	Are "normal circumstances" present? Yes
Are vegetation	No	Soil	No	Hydrology	No	naturally problematic?	

SUMMARY OF FINDINGS - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic vegetation present? Yes

Hydric soil present? Yes

Wetland hydrology present? Yes

Is the sampled area within a wetland? Yes

If yes, optional Wetland Site ID:

Remarks (explain any answers if needed): South of Porcupine field

VEGETATION

	Tree Stratum (Plot Size:)	Absolute % Cover	Dominant Species?	Indicator Status *
1.	Larix laricina	60	Yes	FACW
2.	Picea mariana	20	Yes	FACW
3.		0		
4.		0		
	Total Cover:	80		

	Sapling/Shrub Stratum (Plot Size:)			
1.		0		
2.		0		
3.		0		
4.		0		
5.		0		
	Total Cover:	0		

	Herb Stratum (Plot Size:)			
1.	Calamagrostis canadensis	10	No	OBL
2.	Sphagnum sp.	60	Yes	
3.	Carex lasiocarpa	10	No	OBL
4.		0		
5.		0		
6.		0		
7.		0		
8.		0		
	Total Cover:	80		

	Woody Vine Stratum (Plot Size:)			
1.		0		
2.		0		
	Total Cover:	0		

* In USFWS Region 3

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW or FAC: 66.67% (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL Species	20	X 1	20
FACW Species	80	X 2	160
FAC Species	0	X 3	0
FACU Species	0	X 4	0
UPL Species	0	X 5	0
Column Totals:	100 (A)		180 (B)

Prevalence Index = B/A = 1.80

Hydrophytic Vegetation Indicators:

Yes	Rapid Test for Hydrophytic Vegetation
Yes	Dominance Test is >50%
Yes	Prevelance Index ≤ 3.0 [1]
No	Morphological Adaptations [1] (provide supporting data in vegetation remarks or on a separate sheet)
No	Problematic Hydrophytic Vegetation [1] (Explain)

[1] Indicators of hydric soil & wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic vegetation present? Yes

Remarks:
(include photo numbers here or on a separate sheet)

WETLAND DETERMINATION DATA FORM - Northcentral and Northeast Region

SOIL

Sampling Point: #17 S of SW corner of N14

Profile Description: (Describe to the depth needed to document the indicator or confirm the abscence of indicators).

	Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type [1]	Loc [2]	Texture	Remarks
1.	0 - 8	10yr2/1						hemic peat	
2.	8 - 36	10yr2/1						fibric peat	
3.	-								
4.	-								
5.	-								
6.	-								

[1] Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains **[2] Location: PL=Pore Lining, M=Matrix.**

Hydric Soil Indicators: (applicable to all LRRs, unless otherwise noted)

- [x] Histosol (A1)
- [ ] Histic Epipedon (A2)
- [ ] Black Histic (A3)
- [ ] Hydrogen Sulfide (A4)
- [ ] Stratified Layers (A5)
- [ ] Depleted Below Dark Surface (A11)
- [ ] Thick Dark Surface (A12)
- [ ] Sandy Mucky Mineral (S1)
- [ ] Sandy Gleyed Matrix (S4)
- [ ] Sandy Redox (S5)
- [ ] Stripped Matrix (S6)
- [ ] Dark Surface (S7) (LRR R, MLRA 149B)
- [ ] Polyvalue Below Surface (S8) (LRR R, MLRA 149B)
- [ ] Thin Dark Surface (S9) (LRR R, MLRA 149B)
- [ ] Loamy Mucky Mineral (F1) (LRR K, L)
- [ ] Loamy Gleyed Matrix (F2)
- [ ] Depleted Matrix (F3)
- [ ] Redox Dark Surface (F6)
- [ ] Depleted Dark Surface (F7)
- [ ] Redox Depressions (F8)

Indicators for Problematic Hydric Soils [3]:

- [ ] 2 cm Muck (A10) (LRR K, L, MLRA 149B)
- [ ] Coast Prairie Redox (A16) (LRR K, L, R)
- [ ] 5 cm Mucky Peat or Peat (S3) (LRR K, L, R)
- [ ] Dark Surface (S7) (LRR K, L)
- [ ] Polyvalue Below Surface (S8) (LRR K, L)
- [ ] Thin Dark Surface (S9) (LRR K, L)
- [ ] Iron-Manganese Masses (F12) (LRR K, L, R)
- [ ] Piedmont Floodplain Soils (F19) (MLRA 149B)
- [ ] Mesic Spodic (TA6) (MLRA 144A, 145, 149B)
- [ ] Red Parent Material (TF2)
- [ ] Very Shallow Dark Surface (TF12)
- [ ] Other (explain in soil remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present): **Type:** _____ **Depth (inches):** -

Hydric soil present? Yes

Remarks: saturated to surface, waterlogged at surface.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- [ ] Surface Water (A1)
- [ ] High Water Table (A2)
- [x] Saturation (A3)
- [ ] Water Marks (B1)
- [ ] Sediment Deposits (B2)
- [ ] Drift Deposits (B3)
- [ ] Algal Mat or Crust (B4)
- [ ] Iron Deposits (B5)
- [ ] Inundation Visible on Aerial Imagery (B7)
- [ ] Sparsely Vegetated Concave Surface (B8)
- [ ] Water-Stained Leaves (B9)
- [ ] Aquatic Fauna (B13)
- [ ] Marl Deposits (B15)
- [ ] Hydrogen Sulfide Odor (C1)
- [ ] Oxidized Rhizospheres on Living Roots (where not tilled) (C3)
- [ ] Presence of Reduced Iron (C4)
- [ ] Recent Iron Reduction in Tilled Soils (C6)
- [ ] Thin Muck Surface (C7)
- [ ] Other (explain in remarks)

Secondary Indicators (minimum of two required)

- [ ] Surface Soil Cracks (B6)
- [ ] Drainage Patterns (B10)
- [ ] Moss Trim Lines (B16)
- [ ] Dry-Season Water Table (C2)
- [ ] Crayfish Burrows (C8)
- [ ] Saturation Visible on Aerial Imagery (C9)
- [ ] Stunted or Stressed Plants (D1)
- [ ] Geomorphic Position (D2)
- [ ] Shallow Aquitard (D3)
- [ ] Microtopographic Relief (D4)
- [ ] FAC-Neutral Test (D5)

Field Observations:

Surface water present? [ ] **Surface Water Depth (inches):**

Water table present? [ ] **Water Table Depth (inches):**

Saturation present? (includes capillary fringe) [x] **Saturation Depth (inches):** 0

Wetland hydrology present? Yes

Describe Recorded Data:

Recorded Data: [ ] Aerial Photo [ ] Monitoring Well [ ] Stream Gauge [ ] Previous Inspections

Hydrology Remarks: Saturated to surface, waterlogged at surface

WETLAND DETERMINATION DATA FORM - Northcentral and Northeast Region

Project/Site: Zim Sod | Applicant/Owner: Zim Sod | City/County: St. Louis | State: MN | Sampling Date: 11/18/10

Investigator(s): MAJ | Section: 11 | Township: 55 | Range: 18 | Sampling Point: #18 W of N14/Elsner Rd

Land Form: Terrace | Local Relief: | Slope %: | Soil Map Unit Name: Greenwood B14A

Subregion (LRR): k | Latitude: | Longitude: | Datum:

NWI/Cowardin Classification: | Circular 39 Classification: 6

Are climatic/hydrologic conditions on the site typical for this time of year? Yes (If no, explain in remarks)

Are vegetation No Soil No Hydrology No significantly disturbed? Are "normal circumstances" present? Yes

Are vegetation No Soil No Hydrology No naturally problematic?

Eggers & Reed (primary): Shrub-Carr

Eggers & Reed (secondary):

Eggers & Reed (tertiary):

Eggers & Reed (quaternary):

SUMMARY OF FINDINGS - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic vegetation present? Yes

Hydric soil present? Yes

Wetland hydrology present? Yes

Is the sampled area within a wetland? Yes

Remarks (explain any answers if needed): West of Porcupine field

If yes, optional Wetland Site ID:

VEGETATION

	Tree Stratum (Plot Size:)	Absolute % Cover	Dominant Species?	Indicator Status *
1.	Larix laricina	10	Yes	FACW
2.		0		
3.		0		
4.		0		
	Total Cover:	10		

	Sapling/Shrub Stratum (Plot Size:)			
1.	Salix sp.	0		FAC
2.		0		
3.		0		
4.		0		
5.		0		
	Total Cover:	0		

	Herb Stratum (Plot Size:)			
1.	Calamagrostis canadensis	20	Yes	OBL
2.	Spirea alba	15	Yes	NI
3.	Sphagnum sp.	30	Yes	
4.		0		
5.		0		
6.		0		
7.		0		
8.		0		
	Total Cover:	65		

	Woody Vine Stratum (Plot Size:)			
1.		0		
2.		0		
	Total Cover:	0		

* In USFWS Region 3

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 4 (B)

Percent of Dominant Species That Are OBL, FACW or FAC: 50.00% (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL Species	20	X 1	20
FACW Species	10	X 2	20
FAC Species	0	X 3	0
FACU Species	0	X 4	0
UPL Species	0	X 5	0
Column Totals:	30 (A)		40 (B)

Prevalence Index = B/A = 1.33

Hydrophytic Vegetation Indicators:

- No — Rapid Test for Hydrophytic Vegetation
- No — Dominance Test is >50%
- Yes — Prevelance Index ≤ 3.0 [1]
- No — Morphological Adaptations [1] (provide supporting data in vegetation remarks or on a separate sheet)
- No — Problematic Hydrophytic Vegetation [1] (Explain)

[1] Indicators of hydric soil & wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic vegetation present? Yes

Remarks:
(include photo numbers here or on a separate sheet)

WETLAND DETERMINATION DATA FORM - Northcentral and Northeast Region

SOIL

Sampling Point: #18 W of N14/Elsner Rd

Profile Description: (Describe to the depth needed to document the indicator or confirm the abscence of indicators).

	Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type [1]	Loc [2]	Texture	Remarks
1.	0 - 10	10yr2/1						hemic peat	
2.	10 - 36	10yr2/1						mostly fibric peat	
3.	-								
4.	-								
5.	-								
6.	-								

[1] Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains **[2] Location: PL=Pore Lining, M=Matrix.**

Hydric Soil Indicators: (applicable to all LRRs, unless otherwise noted)

- [x] Histosol (A1)
- [ ] Histic Epipedon (A2)
- [ ] Black Histic (A3)
- [ ] Hydrogen Sulfide (A4)
- [ ] Stratified Layers (A5)
- [ ] Depleted Below Dark Surface (A11)
- [ ] Thick Dark Surface (A12)
- [ ] Sandy Mucky Mineral (S1)
- [ ] Sandy Gleyed Matrix (S4)
- [ ] Sandy Redox (S5)
- [ ] Stripped Matrix (S6)
- [ ] Dark Surface (S7) (LRR R, MLRA 149B)
- [ ] Polyvalue Below Surface (S8) (LRR R, MLRA 149B)
- [ ] Thin Dark Surface (S9) (LRR R, MLRA 149B)
- [ ] Loamy Mucky Mineral (F1) (LRR K, L)
- [ ] Loamy Gleyed Matrix (F2)
- [ ] Depleted Matrix (F3)
- [ ] Redox Dark Surface (F6)
- [ ] Depleted Dark Surface (F7)
- [ ] Redox Depressions (F8)

Indicators for Problematic Hydric Soils [3]:

- [ ] 2 cm Muck (A10) (LRR K, L, MLRA 149B)
- [ ] Coast Prairie Redox (A16) (LRR K, L, R)
- [ ] 5 cm Mucky Peat or Peat (S3) (LRR K, L, R)
- [ ] Dark Surface (S7) (LRR K, L)
- [ ] Polyvalue Below Surface (S8) (LRR K, L)
- [ ] Thin Dark Surface (S9) (LRR K, L)
- [ ] Iron-Manganese Masses (F12) (LRR K, L, R)
- [ ] Piedmont Floodplain Soils (F19) (MLRA 149B)
- [ ] Mesic Spodic (TA6) (MLRA 144A, 145, 149B)
- [ ] Red Parent Material (TF2)
- [ ] Very Shallow Dark Surface (TF12)
- [ ] Other (explain in soil remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present): **Type:** _____ **Depth (inches):** -

Hydric soil present? Yes

Remarks: saturated at 6"

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- [ ] Surface Water (A1)
- [ ] High Water Table (A2)
- [x] Saturation (A3)
- [ ] Water Marks (B1)
- [ ] Sediment Deposits (B2)
- [ ] Drift Deposits (B3)
- [ ] Algal Mat or Crust (B4)
- [ ] Iron Deposits (B5)
- [ ] Inundation Visible on Aerial Imagery (B7)
- [ ] Sparsely Vegetated Concave Surface (B8)
- [ ] Water-Stained Leaves (B9)
- [ ] Aquatic Fauna (B13)
- [ ] Marl Deposits (B15)
- [ ] Hydrogen Sulfide Odor (C1)
- [ ] Oxidized Rhizospheres on Living Roots (where not tilled) (C3)
- [ ] Presence of Reduced Iron (C4)
- [ ] Recent Iron Reduction in Tilled Soils (C6)
- [ ] Thin Muck Surface (C7)
- [ ] Other (explain in remarks)

Secondary Indicators (minimum of two required)

- [ ] Surface Soil Cracks (B6)
- [ ] Drainage Patterns (B10)
- [ ] Moss Trim Lines (B16)
- [ ] Dry-Season Water Table (C2)
- [ ] Crayfish Burrows (C8)
- [ ] Saturation Visible on Aerial Imagery (C9)
- [ ] Stunted or Stressed Plants (D1)
- [ ] Geomorphic Position (D2)
- [ ] Shallow Aquitard (D3)
- [ ] Microtopographic Relief (D4)
- [ ] FAC-Neutral Test (D5)

Field Observations:

Surface water present? [ ] **Surface Water Depth (inches):**

Water table present? [ ] **Water Table Depth (inches):**

Saturation present? (includes capillary fringe) [x] **Saturation Depth (inches):** 6

Wetland hydrology present? Yes

Describe Recorded Data:

Recorded Data: [ ] Aerial Photo [ ] Monitoring Well [ ] Stream Gauge [ ] Previous Inspections

Hydrology Remarks: saturated at 6 inches

11/23/2011 1:47:56 PM

WETLAND DETERMINATION DATA FORM - Northcentral and Northeast Region

Project/Site: Zim Sod | Applicant/Owner: Zim Sod | City/County: St. Louis | State: MN | Sampling Date: 11/18/10

Investigator(s): MAJ | Section: 11 | Township: 55 | Range: 18 | Sampling Point: #19 Wetland East of N09

Land Form: Terrace | Local Relief: | Slope %: | Soil Map Unit Name: Greenwood B14A

Subregion (LRR): k | Latitude: | Longitude: | Datum:

NWI/Cowardin Classification: | Circular 39 Classification: 8

Are climatic/hydrologic conditions on the site typical for this time of year? Yes (If no, explain in remarks)

Are vegetation No Soil No Hydrology No significantly disturbed? Are "normal circumstances" present? Yes

Are vegetation No Soil No Hydrology No naturally problematic?

Eggers & Reed (primary): Coniferous Bog

Eggers & Reed (secondary):

Eggers & Reed (tertiary):

Eggers & Reed (quaternary):

SUMMARY OF FINDINGS - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic vegetation present? Yes

Hydric soil present? Yes

Wetland hydrology present? Yes

Is the sampled area within a wetland? Yes

Remarks (explain any answers if needed): East of Bear Paw field

If yes, optional Wetland Site ID:

VEGETATION

Tree Stratum (Plot Size: 30 ft radius)

		Absolute % Cover	Dominant Species?	Indicator Status *
1.	Larix laricina	75	Yes	FACW
2.	Picea mariana	15	No	FACW
3.		0		
4.		0		
	Total Cover:	90		

Sapling/Shrub Stratum (Plot Size: 15 ft radius)

1.	Cornus sericea ssp. sericea	5	No	FACW
2.	Rubus idaeus	10	Yes	FACU
3.	Ledum groenlandicum	30	Yes	OBL
4.		0		
5.		0		
	Total Cover:	45		

Herb Stratum (Plot Size: 5 ft radius)

1.	Calamagrostis canadensis	15	Yes	OBL
2.	Sphagnum sp.	0		
3.		0		
4.		0		
5.		0		
6.		0		
7.		0		
8.		0		
	Total Cover:	15		

Woody Vine Stratum (Plot Size:)

1.		0		
2.		0		
	Total Cover:	0		

* In USFWS Region 3

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW or FAC: 3 (A)

Total Number of Dominant Species Across All Strata: 4 (B)

Percent of Dominant Species That Are OBL, FACW or FAC: 75.00% (A/B)

Prevalence Index Worksheet:

Total % Cover of:		Multiply by:	
OBL Species	45	X 1	45
FACW Species	95	X 2	190
FAC Species	0	X 3	0
FACU Species	10	X 4	40
UPL Species	0	X 5	0
Column Totals:	150 (A)		275 (B)

Prevalence Index = B/A = 1.83

Hydrophytic Vegetation Indicators:

- Yes — Rapid Test for Hydrophytic Vegetation
- Yes — Dominance Test is >50%
- Yes — Prevelance Index ≤ 3.0 [1]
- No — Morphological Adaptations [1] (provide supporting data in vegetation remarks or on a separate sheet)
- No — Problematic Hydrophytic Vegetation [1] (Explain)

[1] Indicators of hydric soil & wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic vegetation present? Yes

Remarks:
(include photo numbers here or on a separate sheet)

WETLAND DETERMINATION DATA FORM - Northcentral and Northeast Region

SOIL

Sampling Point: #19 Wetland East of N09

Profile Description: (Describe to the depth needed to document the indicator or confirm the abscence of indicators).

	Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type [1]	Loc [2]	Texture	Remarks
1.	0 - 10	10yr2/1						hemic peat	
2.	10 - 32	10yr2/1						fibric peat	
3.	32 - 36	10yr2/1						hemic peat	
4.	-								
5.	-								
6.	-								

[1] Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains **[2] Location: PL=Pore Lining, M=Matrix.**

Hydric Soil Indicators: (applicable to all LRRs, unless otherwise noted)

- [x] Histosol (A1)
- [ ] Histic Epipedon (A2)
- [ ] Black Histic (A3)
- [ ] Hydrogen Sulfide (A4)
- [ ] Stratified Layers (A5)
- [ ] Depleted Below Dark Surface (A11)
- [ ] Thick Dark Surface (A12)
- [ ] Sandy Mucky Mineral (S1)
- [ ] Sandy Gleyed Matrix (S4)
- [ ] Sandy Redox (S5)
- [ ] Stripped Matrix (S6)
- [ ] Dark Surface (S7) (LRR R, MLRA 149B)
- [ ] Polyvalue Below Surface (S8) (LRR R, MLRA 149B)
- [ ] Thin Dark Surface (S9) (LRR R, MLRA 149B)
- [ ] Loamy Mucky Mineral (F1) (LRR K, L)
- [ ] Loamy Gleyed Matrix (F2)
- [ ] Depleted Matrix (F3)
- [ ] Redox Dark Surface (F6)
- [ ] Depleted Dark Surface (F7)
- [ ] Redox Depressions (F8)

Indicators for Problematic Hydric Soils [3]:

- [ ] 2 cm Muck (A10) (LRR K, L, MLRA 149B)
- [ ] Coast Prairie Redox (A16) (LRR K, L, R)
- [ ] 5 cm Mucky Peat or Peat (S3) (LRR K, L, R)
- [ ] Dark Surface (S7) (LRR K, L)
- [ ] Polyvalue Below Surface (S8) (LRR K, L)
- [ ] Thin Dark Surface (S9) (LRR K, L)
- [ ] Iron-Manganese Masses (F12) (LRR K, L, R)
- [ ] Piedmont Floodplain Soils (F19) (MLRA 149B)
- [ ] Mesic Spodic (TA6) (MLRA 144A, 145, 149B)
- [ ] Red Parent Material (TF2)
- [ ] Very Shallow Dark Surface (TF12)
- [ ] Other (explain in soil remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present): **Type:** _____ **Depth (inches):** -

Hydric soil present? Yes

Remarks: saturated to surface

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- [ ] Surface Water (A1)
- [ ] High Water Table (A2)
- [x] Saturation (A3)
- [ ] Water Marks (B1)
- [ ] Sediment Deposits (B2)
- [ ] Drift Deposits (B3)
- [ ] Algal Mat or Crust (B4)
- [ ] Iron Deposits (B5)
- [ ] Inundation Visible on Aerial Imagery (B7)
- [ ] Sparsely Vegetated Concave Surface (B8)
- [ ] Water-Stained Leaves (B9)
- [ ] Aquatic Fauna (B13)
- [ ] Marl Deposits (B15)
- [ ] Hydrogen Sulfide Odor (C1)
- [ ] Oxidized Rhizospheres on Living Roots (where not tilled) (C3)
- [ ] Presence of Reduced Iron (C4)
- [ ] Recent Iron Reduction in Tilled Soils (C6)
- [ ] Thin Muck Surface (C7)
- [ ] Other (explain in remarks)

Secondary Indicators (minimum of two required)

- [ ] Surface Soil Cracks (B6)
- [ ] Drainage Patterns (B10)
- [ ] Moss Trim Lines (B16)
- [ ] Dry-Season Water Table (C2)
- [ ] Crayfish Burrows (C8)
- [ ] Saturation Visible on Aerial Imagery (C9)
- [ ] Stunted or Stressed Plants (D1)
- [ ] Geomorphic Position (D2)
- [ ] Shallow Aquitard (D3)
- [ ] Microtopographic Relief (D4)
- [ ] FAC-Neutral Test (D5)

Field Observations:

Surface water present? [ ] **Surface Water Depth (inches):**

Water table present? [ ] **Water Table Depth (inches):**

Saturation present? (includes capillary fringe) [x] **Saturation Depth (inches):** 0

Wetland hydrology present? Yes

Describe Recorded Data:

Recorded Data: [ ] Aerial Photo [ ] Monitoring Well [ ] Stream Gauge [ ] Previous Inspections

Hydrology Remarks: Saturated to surface

Appendix D

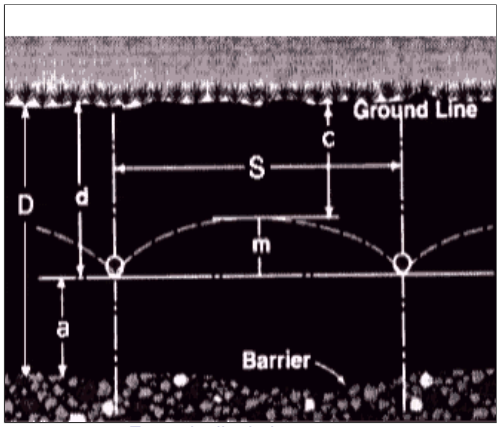
Ditch Lateral Effect Calculations

USDA United States Department of Agriculture
Natural Resources Conservation Service
NRCS Helping People Help the Land

Identifying Wetland Boundaries

Schilfgaarde_java.html

van Schilfgaarde Equation



Example tile drainage system

Input Parameters

d = 2 ft | D = 6 ft
f = 0.5 | s = 0.1 in
m_0 = 2 ft | m = 1 ft
t = 14 days | Ditch (any size)
Tile | Drain tube
t = N/A in | n = N/A in
K = 3.3 in/h | Calculate K N/A

Intermediary Results

a = 4 ft | d_e = 3.9804477 ft
f' = 0.5083333 | r_e = 1 ft

Final Results

S = 105 ft | L_e = 52.5 ft

Compute | Reset | Help | About

Hydrology Tools Main Page | Ellipse Equation | Hooghoudt Equation | Kirkham's Equation

User Name : null
Reset Name

Session # : 2
Time: 13:08
Date:
11../../index.html16../../index.html2011

Notes

Greenwood soils, 2 ft deep ditch

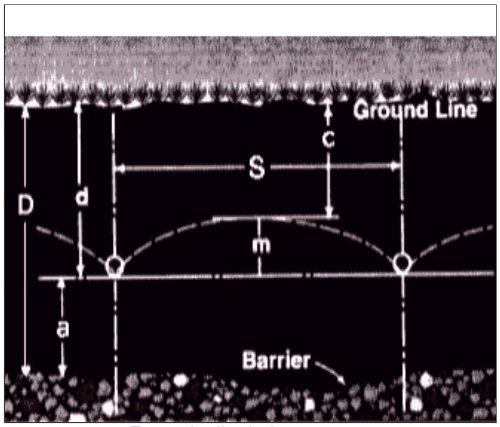
Last Modified: 10/28/2011

USDA United States Department of Agriculture
Natural Resources Conservation Service
NRCS Helping People Help the Land

Identifying Wetland Boundaries

Schilfgaarde_java.html

van Schilfgaarde Equation



Example tile drainage system

Input Parameters

d = 2.5 ft		D = 6 ft	
f = 0.5		s = 0.1 in	
m_0 = 2.5 ft		m = 1.5 ft	
t = 14 days		Ditch (any size)	
Tile		Drain tube	
t = N/A in		n = N/A in	
K = 3.3 in/h		Calculate K N/A	

Intermediary Results

a = 3.5 ft		d_e = 3.5215556 ft	
f' = 0.5083333		r_e = 1 ft	

Final Results

S = 120 ft		L_e = 60 ft	

Compute Reset Help About

Hydrology Tools Main Page | Ellipse Equation | Hooghoudt Equation | Kirkham's Equation

User Name : null
Reset Name

Session # : 2
Time: 13:08
Date:
11../../index.html16../../index.html2011

Notes

Greenwood soils, 2.5 ft deep ditch

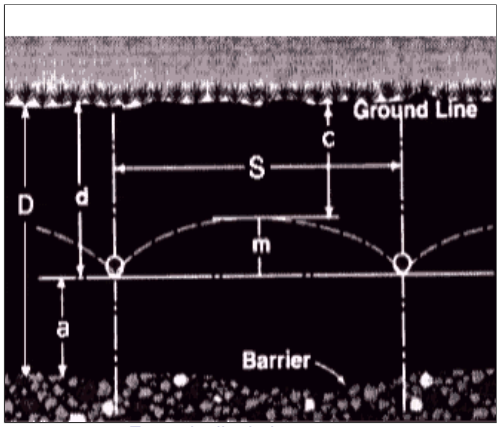
Last Modified: 10/28/2011

USDA United States Department of Agriculture
Natural Resources Conservation Service
NRCS Helping People Help the Land

Identifying Wetland Boundaries

Schilfgaarde_java.html

van Schilfgaarde Equation



Example tile drainage system

Input Parameters

d = 3 ft | D = 6 ft
f = 0.5 | s = 0.1 in
m_0 = 3 ft | m = 2 ft
t = 14 days | Ditch (any size)
Tile | Drain tube
t = N/A in | n = N/A in
K = 3.3 in/h | Calculate K
N/A

Intermediary Results

a = 3 ft | d_e = 3.0419656 ft
f' = 0.5083333 | r_e = 1 ft

Final Results

S = 131 ft | L_e = 65.5 ft

Compute | Reset | Help | About

Hydrology Tools Main Page | Ellipse Equation | Hooghoudt Equation | Kirkham's Equation

User Name : null
Reset Name

Session # : 2
Time: 13:08
Date:
11../../index.html16../../index.html2011

Notes

Greenwood soils, 3 ft deep ditch

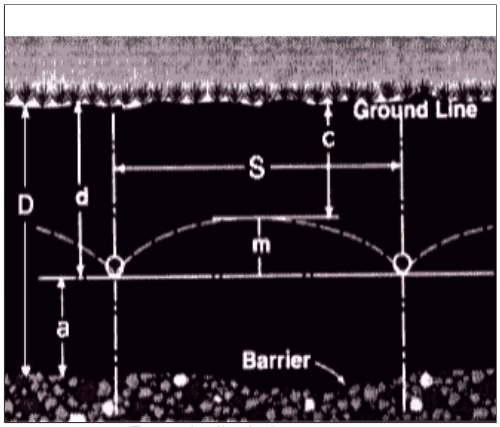
Last Modified: 10/28/2011

USDA United States Department of Agriculture
Natural Resources Conservation Service
NRCS Helping People Help the Land

Identifying Wetland Boundaries

Schilfgaarde_java.html

van Schilfgaarde Equation



Example tile drainage system

Input Parameters

d = 3.5 ft | D = 6 ft
f = 0.5 | s = 0.1 in
m_0 = 3.5 ft | m = 2.5 ft
t = 14 days | Ditch (any size)
Tile t = N/A in | Drain tube n = N/A in
K = 3.3 in/h | Calculate K N/A

Intermediary Results

a = 2.5 ft | d_e = 2.5489006 ft
f' = 0.5083333 | r_e = 1 ft

Final Results

S = 140 ft | L_e = 70 ft

Compute | Reset | Help | About

Hydrology Tools Main Page | Ellipse Equation | Hooghoudt Equation | Kirkham's Equation

User Name : null
Reset Name

Session # : 2
Time: 13:08
Date:
11../../index.html16../../index.html2011

Notes

Greenwood soils, 3.5 ft deep ditch

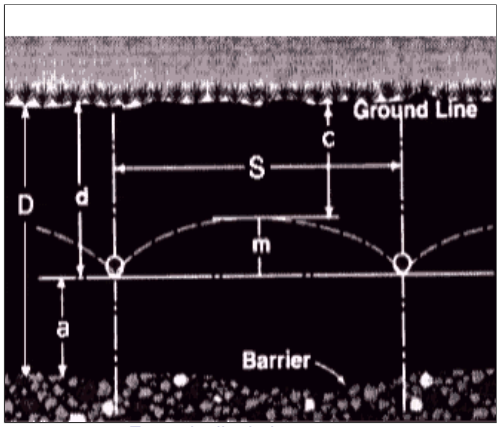
Last Modified: 10/28/2011

USDA United States Department of Agriculture
Natural Resources Conservation Service
NRCS Helping People Help the Land

Identifying Wetland Boundaries

Schilfgaarde_java.html

van Schilfgaarde Equation



Example tile drainage system

Input Parameters

d = 4 ft | D = 6 ft
f = 0.5 | s = 0.1 in
m_0 = 4 ft | m = 3 ft
t = 14 days | Ditch (any size)
Tile | Drain tube
t = N/A in | n = N/A in
K = 3.3 in/h | Calculate K N/A

Intermediary Results

a = 2 ft | d_e = 2.0458183 ft
f' = 0.5083333 | r_e = 1 ft

Final Results

S = 147 ft | L_e = 73.5 ft

Compute | Reset | Help | About

Hydrology Tools Main Page | Ellipse Equation | Hooghoudt Equation | Kirkham's Equation

User Name : null
Reset Name

Session # : 2
Time: 13:08
Date:
11../../index.html16../../index.html2011

Notes

Greenwood soils, 4 ft deep ditch

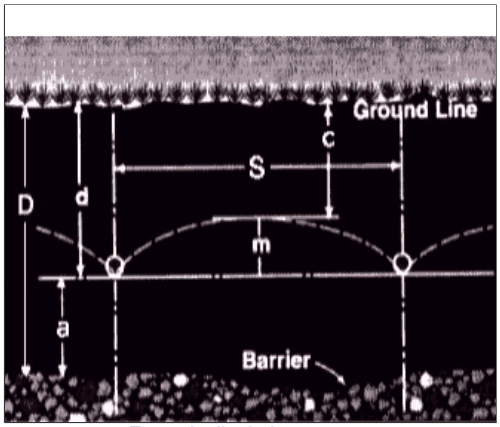
Last Modified: 10/28/2011

USDA United States Department of Agriculture
Natural Resources Conservation Service
NRCS Helping People Help the Land

Identifying Wetland Boundaries

Schilfgaarde_java.html

van Schilfgaarde Equation



Example tile drainage system

Input Parameters

d = 4.5 ft | D = 6 ft
f = 0.5 | s = 0.1 in
m_0 = 4.5 ft | m = 3.5 ft
t = 14 days | Ditch (any size)
Tile t = N/A in | Drain tube n = N/A in
K = 3.3 in/h | Calculate K N/A

Intermediary Results

a = 1.5 ft | d_e = 1.5361268 ft
f' = 0.5083333 | r_e = 1 ft

Final Results

S = 151 ft | L_e = 75.5 ft

Compute | Reset | Help | About

Hydrology Tools Main Page | Ellipse Equation | Hooghoudt Equation | Kirkham's Equation

User Name : null
Reset Name

Session # : 2
Time: 13:08
Date:
11../../index.html16../../index.html2011

Notes

Greenwood soils, 4.5 ft deep ditch

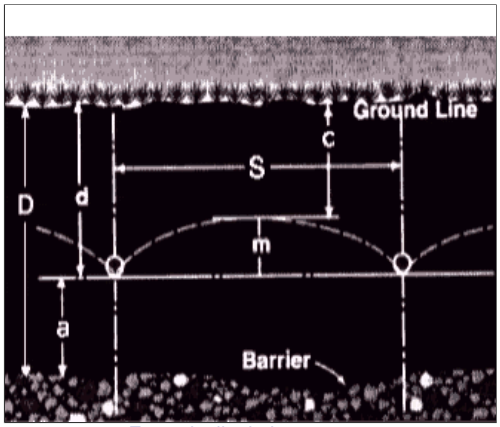
Last Modified: 10/28/2011

USDA United States Department of Agriculture
Natural Resources Conservation Service
NRCS Helping People Help the Land

Identifying Wetland Boundaries

Schilfgaarde_java.html

van Schilfgaarde Equation



Example tile drainage system

Input Parameters

d = 5 ft | D = 6 ft
f = 0.5 | s = 0.1 in
m_0 = 5 ft | m = 4 ft
t = 14 days | Ditch (any size)
Tile t = N/A in | Drain tube n = N/A in
K = 3.3 in/h | Calculate K N/A

Intermediary Results

a = 1 ft | d_e = 1.0225763 ft
f' = 0.5083333 | r_e = 1 ft

Final Results

S = 155 ft | L_e = 77.5 ft

Compute | Reset | Help | About

Hydrology Tools Main Page | Ellipse Equation | Hooghoudt Equation | Kirkham's Equation

User Name : null
Reset Name

Session # : 2
Time: 13:08
Date:
11../../index.html16../../index.html2011

Notes

Greenwood soils, 5 ft deep ditch

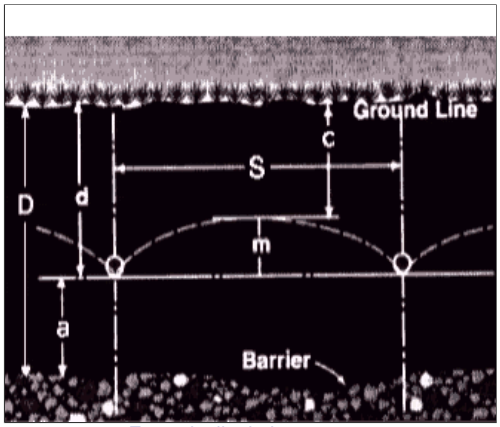
Last Modified: 10/28/2011

USDA United States Department of Agriculture
Natural Resources Conservation Service
NRCS Helping People Help the Land

Identifying Wetland Boundaries

Schilfgaarde_java.html

van Schilfgaarde Equation



Example tile drainage system

Input Parameters

d = 5.5 ft		D = 6 ft	
f = 0.5		s = 0.1 in	
m_0 = 5.5 ft		m = 4.5 ft	
t = 14 days		Ditch (any size)	
Tile		Drain tube	
t = N/A in		n = N/A in	
K = 3.3 in/h		Calculate K N/A	

Intermediary Results

a = 0.5 ft		d_e = 0.5084167 ft	
f' = 0.5083333		r_e = 1 ft	

Final Results

S = 156 ft		L_e = 78 ft	

Compute Reset Help About

Hydrology Tools Main Page | Ellipse Equation | Hooghoudt Equation | Kirkham's Equation

User Name : null
Reset Name

Session # : 2
Time: 13:08
Date:
11../../index.html16../../index.html2011

Notes

Greenwood soils, 5.5 ft deep ditch

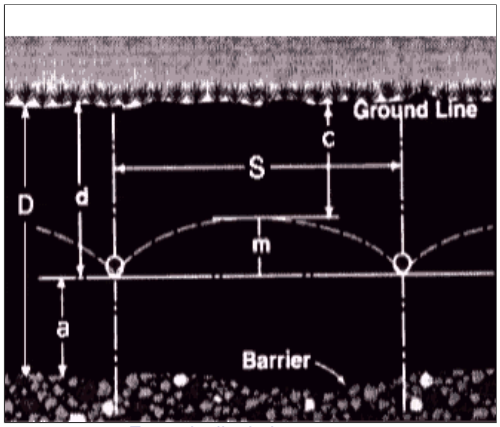
Last Modified: 10/28/2011

USDA United States Department of Agriculture
Natural Resources Conservation Service
NRCS Helping People Help the Land

Identifying Wetland Boundaries

Schilfgaarde_java.html

van Schilfgaarde Equation



Example tile drainage system

Input Parameters

d = 6.5 ft		D = 8 ft	
f = 0.5		s = 0.1 in	
m_0 = 6.5 ft		m = 5.5 ft	
t = 14 days		Ditch (any size)	
Tile		Drain tube	
t = N/A in		n = N/A in	
K = 3.3 in/h		Calculate K N/A	

Intermediary Results

a = 1.5 ft		d_e = 1.5258023 ft	
f' = 0.5083333		r_e = 1 ft	

Final Results

S = 210 ft		L_e = 105 ft	

Compute Reset Help About

Hydrology Tools Main Page | Ellipse Equation | Hooghoudt Equation | Kirkham's Equation

User Name : null
Reset Name

Session # : 2
Time: 13:08
Date:
11../../index.html16../../index.html2011

Notes

Greenwood soils, 6.5 ft deep ditch

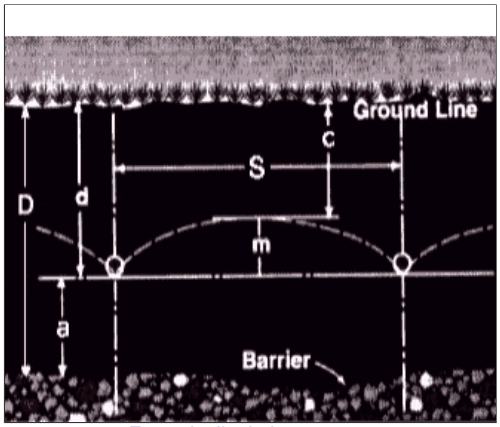
Last Modified: 10/28/2011

USDA United States Department of Agriculture
Natural Resources Conservation Service
NRCS Helping People Help the Land

Identifying Wetland Boundaries

Schilfgaarde_java.html

van Schilfgaarde Equation



Example tile drainage system

Input Parameters

d = 8 ft | D = 12 ft
f = 0.5 | s = 0.1 in
m_0 = 8 ft | m = 7 ft
t = 14 days | Ditch (any size)
Tile | Drain tube
t = N/A in | n = N/A in
K = 3.3 in/h | Calculate K
N/A

Intermediary Results

a = 4 ft | d_e = 3.9932493 ft
f' = 0.5083333 | r_e = 1 ft

Final Results

S = 308 ft | L_e = 154 ft

Compute | Reset | Help | About

Hydrology Tools Main Page | Ellipse Equation | Hooghoudt Equation | Kirkham's Equation

User Name : null
Reset Name

Session # : 2
Time: 13:08
Date:
11../../index.html16../../index.html2011

Notes

Greenwood soils, 8 ft deep ditch

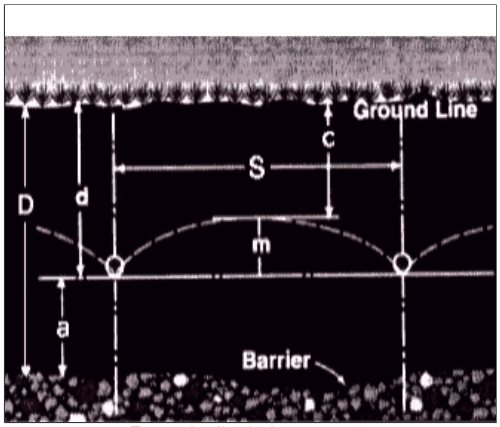
Last Modified: 10/28/2011

USDA United States Department of Agriculture
Natural Resources Conservation Service
NRCS Helping People Help the Land

Identifying Wetland Boundaries

Schilfgaarde_java.html

van Schilfgaarde Equation



Example tile drainage system

Input Parameters

d = 9 ft | D = 12 ft
f = 0.5 | s = 0.1 in
m_0 = 9 ft | m = 8 ft
t = 14 days | Ditch (any size)
Tile | Drain tube
t = N/A in | n = N/A in
K = 3.3 in/h | Calculate K N/A

Intermediary Results

a = 3 ft | d_e = 3.0172010 ft
f' = 0.5083333 | r_e = 1 ft

Final Results

S = 318 ft | L_e = 159 ft

Compute | Reset | Help | About

Hydrology Tools Main Page | Ellipse Equation | Hooghoudt Equation | Kirkham's Equation

User Name : null
Reset Name

Session # : 2
Time: 13:08
Date:
11../../index.html16../../index.html2011

Notes

Greenwood soils, 9 ft deep ditch

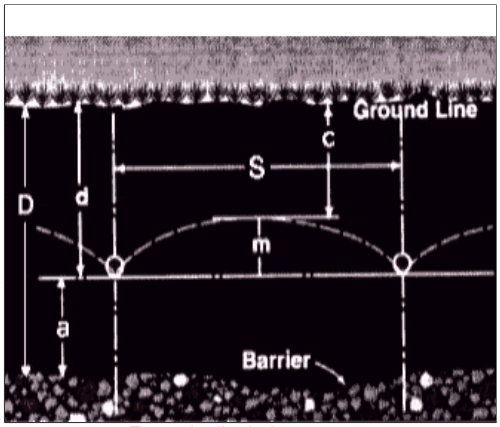
Last Modified: 10/28/2011

USDA United States Department of Agriculture
Natural Resources Conservation Service
NRCS Helping People Help the Land

Identifying Wetland Boundaries

Schilfgaarde_java.html

van Schilfgaarde Equation



Example tile drainage system

Input Parameters

d = 9 ft		D = 12 ft	
f = 0.16		s = 0.1 in	
m_0 = 9 ft		m = 8 ft	
t = 14 days		Ditch (any size)	
Tile		Drain tube	
t = N/A in		n = N/A in	
K = 7.7 in/h		Calculate K N/A	

Intermediary Results

a = 3 ft		d_e = 3.0064528 ft	
f' = 0.1683333		r_e = 1 ft	

Final Results

S = 842 ft		L_e = 421 ft	

Compute Reset Help About

Hydrology Tools Main Page | Ellipse Equation | Hooghoudt Equation | Kirkham's Equation

User Name : null
Reset Name

Session # : 2
Time: 13:08
Date:
11../../index.html16../../index.html2011

Notes

Wabuse soils, 9 ft deep ditch

Last Modified: 10/28/2011