Report

Copper Park Business and Recreation Area Work Plan

Project I.D.: 08F777

Flambeau Mining Company
Ladysmith, Wisconsin

May 2011

Foth

Foth

May 12, 2011

Ms. Jana Murphy
Flambeau Mining Company
N1400 Highway 27
Ladysmith, WI 54848

Dear Ms. Murphy:

RE: Copper Park Business and Recreation Area Work Plan,
Reclaimed Flambeau Mine, Ladysmith, Wisconsin

Foth Infrastructure & Environment, LLC (Foth) is pleased to present the following *Copper Park Business and Recreation Area Work Plan* (*Work Plan*) for the Reclaimed Flambeau Mine located in Ladysmith, Wisconsin.

Pursuant to discussions with the Wisconsin Department of Natural Resources (WDNR), Foth has prepared this Work Plan on behalf of Flambeau Mining Company (Flambeau). The *Work Plan* addresses stormwater management at the site and is submitted under the authority of the Mining Permit. The *Work Plan* has five major elements:

- Removal of a portion of remaining rail spur berm and culverts between Copper Park Lane and Highway 27; and attendant grading activity.
- Conversion of the 0.9-acre Biofilter (artificial wetland pursuant to NR 103.06(4)(a)) to an infiltration basin;
- Creation of two additional infiltration basins in the area north of the 0.9-acre Biofilter and in areas of isolated artificial wetlands (NR 103.06) on the west side of the asphalted area of the Copper Park Business and Recreation Area.
- Restoration of wetlands in the area of historical wetlands.
- Enhance stormwater management across the *Work Plan* Project Area.

Additionally, Flambeau is submitting the following applications:

- Water Resources Application for Project Permits (includes Chapter 30); and
- Wisconsin Department of Transportation Permit to Work on Highway Right-of-Way.

Flambeau is submitting the Individual Chapter 30 application out of an excess of caution. With regard to the Chapter 30 application, Flambeau objects to the Department's jurisdiction as it does not consider Intermittent Stream C to be navigable in the area that grading and

2737 S. Ridge Rd., Ste. 600 • PO Box 12326 • Green Bay, WI 54307-2326 • (920) 497-2500 • Fax: (920) 497-8516

alteration activity is taking place. With regard to the wetland restoration activity, Flambeau does not believe jurisdictional "fill" activity will occur as a result of any of the above described activities.

If you have any questions regarding this report, please contact us at (920) 497-2500.

Sincerely,

Foth Infrastructure & Environment, LLC

James B. Hutchison, P.E.
Lead Environmental Engineer

Sharon V.F. Kozicki, P.G., C.E.M.
Lead Geologist

Stephen V. Donohue, P.H.
Director

Enclosures

2737 S. Ridge Rd., Ste. 600 • PO Box 12326 • Green Bay, WI 54307-2326 • (920) 497-2500 • Fax: (920) 497-8516

Copper Park Business and Recreation Area Work Plan

Project ID: 08F777

Prepared for
Flambeau Mining Company
N4100 Highway 27
Ladysmith, WI 54848

Prepared by
Foth Infrastructure & Environment, LLC

May 2011

2737 South Ridge Road, Suite 600 • P.O. Box 12326 • Green Bay, WI 54307-2326 • (920) 497-2500 • Fax: (920) 497-8516

Copper Park Business and Recreation Area Work Plan

Contents

Figures

Appendices

List of Abbreviations, Acronyms, and Symbols

BMPs	Best Management Practices
CEM	Certified Environmental Manager
COC	Certificate of Completion
Flambeau	Flambeau Mining Company
Foth	Foth Infrastructure & Environment, LLC
hr	hour
NLS	Northern Lake Services
NOC	Notice of Completion
P.E.	Professional Engineer
P.G.	Professional Geologist
P.H.	Professional Hydrologist
TSS	total suspended solids
WDNR	Wisconsin Department of Natural Resources
WDOT	Wisconsin Department of Transportation
Wis. Admin. Code	Wisconsin Administrative Code
Work Plan	Copper Park Business and Recreation Area Work Plan
yr	year

1 Introduction

Foth Infrastructure & Environment, LLC (Foth) has prepared the *Copper Park Business and Recreation Area Stormwater Work Plan* (*Work Plan*) at the request of Flambeau Mining Company (Flambeau).

On January 14, 1991, after an exhaustive permitting process including extensive opportunity for public input, Flambeau received eleven permits from the Wisconsin Department of Natural Resources (WDNR) to operate an open pit copper mine in Rusk County, Wisconsin. Flambeau operated the open pit copper mine between 1993 and 1997. The location of the reclaimed mine is shown on Figure 1-1. Over the life of the mine, 181,000 tons of copper, 3.3 million ounces of silver, and 334,000 ounces of gold were mined.

Backfilling of the open pit began in earnest in early 1997 and in 1998 surface reclamation began. Reclamation activities started in 1998 included seeding, plug planting, tree planting, erosion control, mowing, invasive species control, trail construction, and prescribed burning. During 2001, Flambeau completed the planting plan and submitted the Notice of Completion (NOC) to the Department. Concurrent with the submittal of the NOC, the reclaimed Flambeau Mine nature trails were opened to the public for non-motorized recreational activities. The city of Ladysmith had partnered with Flambeau to develop the four-mile nature trail system. In 2005, the Equestrian Trailhead and driveway were constructed in the Industrial Outlot.

During 2007, Flambeau petitioned the WDNR for Certificate of Completion (COC). The COC process included a preconference hearing, public hearing and contested case hearing. At the contested case hearing, the parties negotiated an agreement and entered into a stipulation which was subsequently accepted by the administrative law judge and resulted in a signed order. The order granted a COC to Flambeau for 149 acres of the Flambeau Mine site that includes the backfilled pit but did not include the 32-acre area known as the Industrial Outlot. These areas are shown on Figure 1-2.

During 2008 and 2009 Flambeau completed extensive monitoring as required by the 2007 COC stipulation and also supplemental monitoring on a voluntary basis. The 2008 – 2010 monitoring that has been completed documents that the Flambeau River remains fully protected and Flambeau maintains compliance with its permits.

The proposed work described in this Plan focuses on the Copper Park Business and Recreation Area. This area is also known as the Industrial Outlot (Project Area).

1.1 Purpose

The purpose of this work is to:

- Removal of a portion of remaining rail spur berm and culverts between Copper Park Lane and Highway 27; and attendant grading activity.

- Conversion of the 0.9-acre Biofilter (artificial wetland pursuant to NR 103.06(4)(a)) to an infiltration basin.

- Creation of two additional infiltration basins in the area north of the 0.9-acre Biofilter and in areas of isolated artificial wetlands (NR 103.06) on the west side of the asphalted area of the Copper Park Business and Recreation Area.

- Restoration of wetlands in an area of historical wetlands.

- Enhancement of stormwater management across the *Work Plan* Project Area.

Additionally, Flambeau is submitting the following applications:

- Water Resources Application for Project Permits (includes Chapter 30); and
- Wisconsin Department of Transportation Application to Work on Highway Right-of-Way.

1.2 Scope of Work

The scope of work includes:

- Removal of portions of the former rail spur west of Highway 27 and wetland restoration of this area.

- Removal of sediment from the 0.9-acre Biofilter.

- Conversion of the 0.9-acre Biofilter to a stormwater infiltration basin.

- Construction of a stormwater infiltration basin on the west side of the *Work Plan* Project Area.

- Enhancements to the rock-lined drainage swale north of the asphalt area, if necessary.

- Construction of a stormwater infiltration basin north of the existing 0.9-acre Biofilter.

- Removal of two culverts on Intermittent Stream C underneath the former rail spur berm.

- Removal of the small culvert within Intermittent Stream C between Copper Park Lane and the rail spur.

- Removal of the 0.9-acre Biofilter outlet.

The design of the defined scope is described in more detail in Section 2.2.

1.3 Report Organization

Appendix A	Site Grading Plan
Appendix B	Stormwater Management and Erosion Control Plan
Appendix C	Wetland Restoration Plan
Appendix D	Landscape Design and Planting Plan
Appendix E	Dewatering Plan

In addition, WDNR permit application documents are provided in the Appendices as follows:

Appendix F	Water Resources Application for Project Permits (Includes Individual Chapter 30)
Appendix G	Wisconsin Department of Transportation Application to Work on Highway Right-of-Way

Figures for this *Work Plan* are presented as follows:

Figures 2-1 through 2-4 show the existing conditions and the proposed project.
Figures 2-5 through 2-8 show details of erosion control items.
Figure 2-9 shows the proposed characterization sample locations.

2 Background Information

The following section provides a history of the project area and a description of the key project elements.

2.1 Work Plan Project Area History

The *Work Plan* Project Area is currently used as a business park and recreation area and is known as the Industrial Outlot. This title, Industrial Outlot, is a misnomer as the area has never supported any actual industrial activities. Since 2009, the area has also been referred to as the Copper Park Business and Recreation Area.

During mining activities many of the supporting mining facilities; including the mine administration offices, laboratory, wastewater treatment facilities as well as ancillary services; including a run-off pond, a surge pond, septic drain field, storage areas, truck ready line, and parking areas were located within the *Work Plan* Project Area.

Upon mine closure most of the building structures were left in place. The waste water treatment plant was eventually renovated and currently houses Xcel Energy's line maintenance shop and storage area for the WDNR, the former administration building and laboratory were renovated and are now occupied by the Ladysmith WDNR Service Center, the truck ready line was removed, the run-off pond was removed, and the surge pond was converted into the current 0.9-acre Biofilter to reduce suspended solids and other contaminants resulting from precipitation. In 2000, another building was constructed in the project area between the Service Center and former water treatment plant to house additional equipment for the Service Center.

In 2005, a portion of the former Industrial Outlot was converted into a driveway access and Equestrian Trailhead to be utilized for recreational purposes as an access way to non-motorized trails that have been developed on property owned by Flambeau.

2.2 Description of Key Project Elements

The following section provides a brief description of the key project elements. More detailed descriptions are provided in the Appendices.

2.2.1 Business Park Drainage Swale

The existing rock-lined swale along the north side of the asphalt parking lot will be converted into a vegetated swale. The swale will be re-graded with a high point in the center so that it drains to both the east and the west. The swales will serve as pre-treatment devices by removing total suspended solids (TSS) prior to runoff entering the infiltration basins.

2.2.2 Rail Spur and Culverts Removal

Approximately 240 linear feet of the former rail spur will be removed immediately to the west of Highway 27. The existing culverts underneath the rail spur to the northeast of the 0.9-acre Biofilter and the small culvert between the rail spur and Copper Park Lane will also be removed. The removal of the culverts and rail spur will return drainage for runoff from the east of Highway 27 to pre-construction conditions.

2.2.3 Vegetative Sediment Knock out Areas

Vegetated buffers will be installed around portions of the West Copper Park and East Copper Park Infiltration Basins. The 35 – 50 foot wide buffers will serve to remove TSS in runoff from the parking lot and road areas that drain directly to the infiltration basins.

2.2.4 Infiltration Basins

Three infiltration basins will be constructed at the Copper Park Business and Recreation Area. The basins will be referred to as the West, North, and East Copper Park Infiltration Basins, respectively, and will collect and infiltrate runoff from the Copper Park Business and Recreation Area for storms up to and including the 100-year (yr), 24-hour (hr) storm event.

2.2.4.1 East Copper Park Infiltration Basin

The existing 0.9-acre Biofilter will be converted into the East Copper Park Infiltration Basin. The basin conversion will involve the excavation of soil and accumulated sediment from the existing 0.9-acre Biofilter, as well as the removal of the existing liner. The excavated material will be replaced with a mixture of sand, topsoil, and possibly compost, which will promote infiltration and filtering underneath the newly constructed infiltration basin. Dewatering activities will be conducted to drain the 0.9-acre Biofilter and when working below the water table while removing the liner.

The East Copper Park Infiltration Basin will receive runoff from approximately the eastern two-thirds of the parking lot, from the western half of the Equestrian Trailhead area, and from miscellaneous grassed and dirt roads in the area. The basin will also receive any overflow from the North Copper Park Infiltration Basin. The infiltration basin will be approximately 1.0 acre in size, and the 100-yr, 24-hr storm event will be fully contained within the basin with zero discharge. Storms larger than the 100-yr, 24-hr storm event will overflow the berm on the east side of the basin and will discharge via overland flow to Intermittent Stream C.

2.2.4.2 North Copper Park Infiltration Basin

The North Copper Park Infiltration Basin will be located to the north of the existing 0.9-acre Biofilter. The basin will receive runoff from the approximately 9.4 acre watershed along the west side of Highway 27, as well as from the eastern half of the Equestrian Trailhead area. The infiltration basin will be approximately 0.60 acres in size, and the100-yr, 24-hr storm event will produce a small discharge from the basin. This discharge, as well as the discharge for storms larger than the 100-yr, 24-hr storm event, will flow via an earthen weir and channel into the East Copper Park Infiltration Basin.

2.2.4.3 West Copper Park Infiltration Basin

The West Copper Park Infiltration Basin will be located to the west of the Xcel/WDNR Service Center building. The basin will receive runoff from approximately the western one-third of the parking asphalt area, as well as the grassed and dirt road areas to the west of the lot. The infiltration basin will be approximately 0.64 acres in size, and the 100-yr, 24-hr storm event will be fully contained within the basin with zero discharge. Storms larger than the 100-yr, 24-hr storm event will cause runoff to backup into the drainage swale, eventually over-topping the swale and producing overland flow.

2.3 Regulatory Background

The *Work Plan* addresses stormwater management at the site and is submitted under the authority of the Mining Permit.

Flambeau is submitting the Individual Chapter 30 application out of an excess of caution. With regard to the Chapter 30 application, Flambeau objects to the Department's jurisdiction as it does not consider Stream C to be navigable in the area that grading and alteration activity is taking place. With regard to the wetland restoration activity, Flambeau does not believe jurisdictional "fill" activity will occur as a result of any of the above described activities.

The proposed project includes work within 300 feet of a waterway that is considered to be navigable by the WDNR and is in excess of 10,000 square feet. Therefore, a Water Resources Application for Project Permits including an Individual Permit Application under Chapter 30.19 Wisconsin Administrative Code (Wis. Admin. Code) was prepared. Included as part of the Water Resources Application for Project Permits are Applications for an Individual Permit for Grading in Excess of 10,000 Square Feet and Stream Realignment and An Application for Wetland Water Quality Certification under ch. NR 103, Wis Admin. Code.

The proposed project is exempt from the post-construction stormwater management requirements under ch. NR 151.12(2)(3): "A post-construction site with less than 10% connected imperviousness based on complete development of the post-construction site, provided the cumulative area of all parking lots is less than one acre."

There are no erosion control ordinances for the city of Ladysmith or Rusk County that apply to this project.

3 Completed Plans and Permit Applications

The following section provides a summary of the completed plans and permit applications provided in Appendices A through G.

3.1 Site Grading Plan

The overall site grading plan is discussed in detail in Appendix A.

3.2 Erosion Control and Stormwater Management Plan

The Erosion Control and Stormwater Management Plan is located in Appendix B. More detailed information on erosion control and stormwater management during and after construction can be found in that plan. A summary of that plan is presented below.

Construction site erosion control is required by ch. NR 151, Wis. Admin. Code for any construction site with greater than one acre of land disturbing construction activity. ch. NR 151, Wis. Adm Code also requires a reduction of 80%, to the maximum extent practicable, of the sediment load carried in runoff, on an average annual basis, as compared with no sediment controls, until the construction site has undergone final stabilization. The 80% sediment load reduction will be achieved by applying a combination of Best Management Practices (BMP) in compliance with their respective WDNR Technical Standards. Proposed erosion control BMPs for the site include the installation of stone tracking pads at construction site entrances, silt fences, temporary ditch checks, and seeding, fertilizing, and mulching.

Even though the proposed project is exempt from the post-construction stormwater management requirement under ch. NR 151.12(2)(d). The proposed stormwater management plan for the site will still comply with the water quality, peak control, and infiltration requirements of ch. NR 151.12. These requirements will be met through the installation of vegetated swales and buffers to remove suspended solids, and three infiltration basins to eliminate discharge and provide for infiltration for storms up to and including the 100-yr, 24-hr storm event.

3.3 Wetland Restoration Plan

The *Wetland Restoration Plan* is provided in Appendix C. When the rail spur was originally constructed, the wetland area that was impacted, along with other wetland areas across the site affected by mine site construction were mitigated by construction of the 8.5-acre wetland on the north side of the property. As part of the removal of the former railspur, and culverts within Intermittent Stream C, Flambeau would like to restore this area wetland since wetland existed in this location prior to mining activities. The wetland restoration project area consists of the area west of Highway 27, north of Copper Park Lane, the former rail spur, and the 0.9-acre Biofilter. This area is shown in Figure 2 of the *Wetland Restoration Plan*.

Wetland restoration activities include the following:

- A low berm will be constructed north of the rail spur in order to divert water from under Highway 27 from flowing into the ditch north of the rail spur and encourage flow to Intermittent Stream C. This berm will be constructed in accordance with Natural

Resources Conservation Service Field Office Technical Guide Standard Conservation Practice 657 – Wetland Restoration.

- Post European settlement soil that makes up the bed of the former rail spur will be removed to enhance hydraulic diversity.

- The bed of the former rail spur will be removed altering the hydrology of the area closer to pre-construction conditions.

- The wetland restoration project area will be replanted with native wetland species. Invasive plant species will be controlled through cutting, removing, destroying, or suppressing.

3.4 Landscape Design and Planting Plan

A landscaping and planting plan was prepared by Stantec (Rice Lake, Wisconsin) and is provided in Appendix D.

3.5 Dewatering Plan

Part of the proposed work to remove the existing liner beneath the 0.9-acre Biofilter will include drainage of the 0.9-acre Biofilter and work below the water table. As part of this work, dewatering will be conducted. A *Dewatering Plan* for these activities is provided in Appendix E.

3.6 Water Resources Application (Includes Chapter 30)

During previous reviews of the site by the WDNR, Intermittent Stream C was determined to be a navigable waterway by the WDNR. While Flambeau believes this determination is incorrect for that part of Stream C just north of Copper Park Lane, such a determination would require a permit for work in public waters under Chapter 30 Wisconsin Statues and Chapters NR 310 and 341, Wis. Admin. Code for the portion of the proposed project in the vicinity of the Intermittent Stream C stream bank.

Therefore, without waiving any right to challenge that determination Flambeau is submitting such permit application.

Work within 300 feet of the stream bank of Intermittent Stream C includes the removal of portions of the railspur west of Highway 27; construction of a stormwater infiltration basin north of the existing 0.9-acre Biofilter; removal of two culverts on Intermittent Stream C between Highway 27 and Copper Park Lane; removal of the 0.9-acre Biofilter outlet, removal of the small culvert within Intermittent Stream C between Copper Park Lane and the rail spur; realignment of Intermittent Stream C; and associated grading, landscaping, erosion and sediment control, and final stabilization activities. The locations of the proposed activities are shown on Figures 2-1, 2-2, and 2-3. The site grading and erosion control (including erosion and sediment control BMPs) and stormwater design plans are described in greater detail in Sections 3.1 and 3.2, respectively. Design calculations are included in the *Stormwater Management and Erosion Control Plan* in Appendix B.

The existing stream bank and the ordinary high water mark for Intermittent Stream C were determined by analyzing the existing site topography in compliance with ch. NR 341.035, Wis. Admin. Code. Based on the topographic analysis, the rail spur removal and associated grading will disturb approximately 102,900 square feet of the stream bank within 300 feet of the ordinary high water mark along Intermittent Stream C. Less than 500 linear feet of Intermittent Stream C bank will be in areas of construction. Therefore, according to the Department's position, an Individual Permit for Grading in Excess of 10,000 Square Feet is required for this project. Also, according to the Department's position, the removal of culverts and the realignment of Intermittent Stream C requires an Individual Permit for Stream Realignment.

An Application for Wetland Water Quality Certification is required for work within the Wetland Restoration Project Area. The proposed measures to protect wetland water quality in compliance with ch. NR 103, Wis. Admin. Code during Project activities are described in greater detail in the *Erosion Control and Stormwater Management Plan* in Appendix B, *Wetland Restoration Plan* in Appendix C, and *Dewatering Plan* in Appendix E. Wetland restoration fill activities and rail spur removal encompass less than 500 feet^2.

Surface water quality from the 2010 spring and fall Biofilter monitoring activities were compared to Chapter NR 140 Groundwater Quality Standards. Based on this evaluation, surface water quality typical of the runoff from the Copper Park Business and Recreation Area meets water quality standards for the monitored parameters (Copper, Manganese, Sulfate, and Zinc), or as in the case of Iron, are consistent with regional groundwater quality.

Copies of the Water Resources Application for Project Permits (Form 3500-053) and the Application for Grading in Excess of 10,000 Square Feet (Form 3500-053c)/Application for Stream Realignment (Form 3500-053k) and an Application for Wetland Water Quality certification (form 3500-053N) are located in Appendix F.

3.7 Wisconsin Department of Transportation Right-of-Way Permit Application

A Wisconsin Department of Transportation (WDOT) right-of-way permit application packet is provided in Appendix G.

4 Sampling and Documentation

The following section discusses the sample activities to be completed to characterize soils prior to excavation and documentation of construction activities.

4.1 Sampling

Hand auger cores will be collected from each of the following areas of construction:

1. Six cores from the area of the proposed West Copper Park Infiltration Basin.
2. Six cores from the area of the proposed North Copper Park Infiltration Basin.
3. Six cores along the area of proposed excavation of the rail spur west of Highway 27.

Proposed sample locations are shown on Figure 2-9.

The cores will be collected using hand auger techniques to the proposed depth of excavation. Six-inch intervals will be composited and sent to Northern Lake Services (NLS), located in Crandon, Wisconsin.

Samples will be tested for:

- Total copper
- Total iron
- Total manganese
- Total zinc
- Other parameters as determined by the landfill

This characterization will occur prior to excavation activities commence so that the proper handling of excavated soils can be assessed for beneficial reuse options or landfill disposal.

The accumulated sediment in the 0.9-acre Biofilter above the liner will be excavated and landfilled. The fill beneath the liner is expected to be clean fill. Upon removal of the accumulated sediment four test pits will be dug to the anticipated depth of excavation and composite samples will be collected and sent to NLS:

Samples will be tested for:

- Total copper
- Total iron
- Total manganese
- Total zinc
- Other parameters as determined by the landfill

Proposed test pit locations are shown on Figure 2-9.

Based on the results of this testing, the proper handling of fill beneath the liner of the 0.9-acre Biofilter will be assessed for beneficial reuse options or landfill disposal.

4.2 Documentation

All construction activities will be overseen by a qualified construction observer who will document and coordinate activities including:

- Daily activity logs
- Photographic logs of activities
- Document general adherence to the *Work Plan*
- Coordinate site safety activities

Overall, work will be managed by a Professional Engineer (P.E.) who will ultimately be responsible for general adherence to the design plans.

Upon completion of the activities described in this plan, the work completed will be summarized in a Construction Documentation Report which will be submitted to the WDNR within 90 days of project completion.

Since the proposed project is exempt from ch. NR 151, Wis. Admin. Code post-construction stormwater management requirements under ch. NR 151.12(2)(d), a plan detailing the maintenance and inspection schedule of the stormwater facilities is not required. County and local ordinances also do not require an operation and maintenance plan.

However, in order to maximize the performance of BMPs to be installed at the site, the importance of maintenance on the BMPs is recognized. WDNR Technical Standard 1003 (Infiltration Basins), WDNR Technical Standard 1005 (Vegetated Infiltration Swale), and WDNR Technical Standard 1061-Dewatering list maintenance items to be performed on these BMPs. This maintenance program will be followed at the site. Various maintenance activities may include mowing the grass on basin side slopes, inspecting basins and swales for erosion, maintaining vegetation, inspecting swale and culvert outfall for clogging, or silt removal.

A description of maintenance activities that will be completed as part of the revegetation activities is discussed in the Landscape and Planting Plan, which is provided as Appendix D.

5 References

Wisconsin Department of Natural Resources Chapter NR 353 Wisconsin Administrative Code.

Wisconsin Department of Natural Resources Chapter NR 310 Wisconsin Administrative Code.

Wisconsin Department of Natural Resources Chapter NR 341 Wisconsin Administrative Code.

Wisconsin Department of Natural Resources Chapter 30 Wisconsin Administrative Code.

WDNR, 2003. *Vegetative Buffer for Construction Sites (1054).* May, 2003. Wisconsin Department of Natural Resources Conservation Practice Standard.

WDNR, 2004a. *Site Evaluation for Stormwater Infiltration (1002).* February, 2004. Wisconsin Department of Natural Resources Conservation Practice Standard.

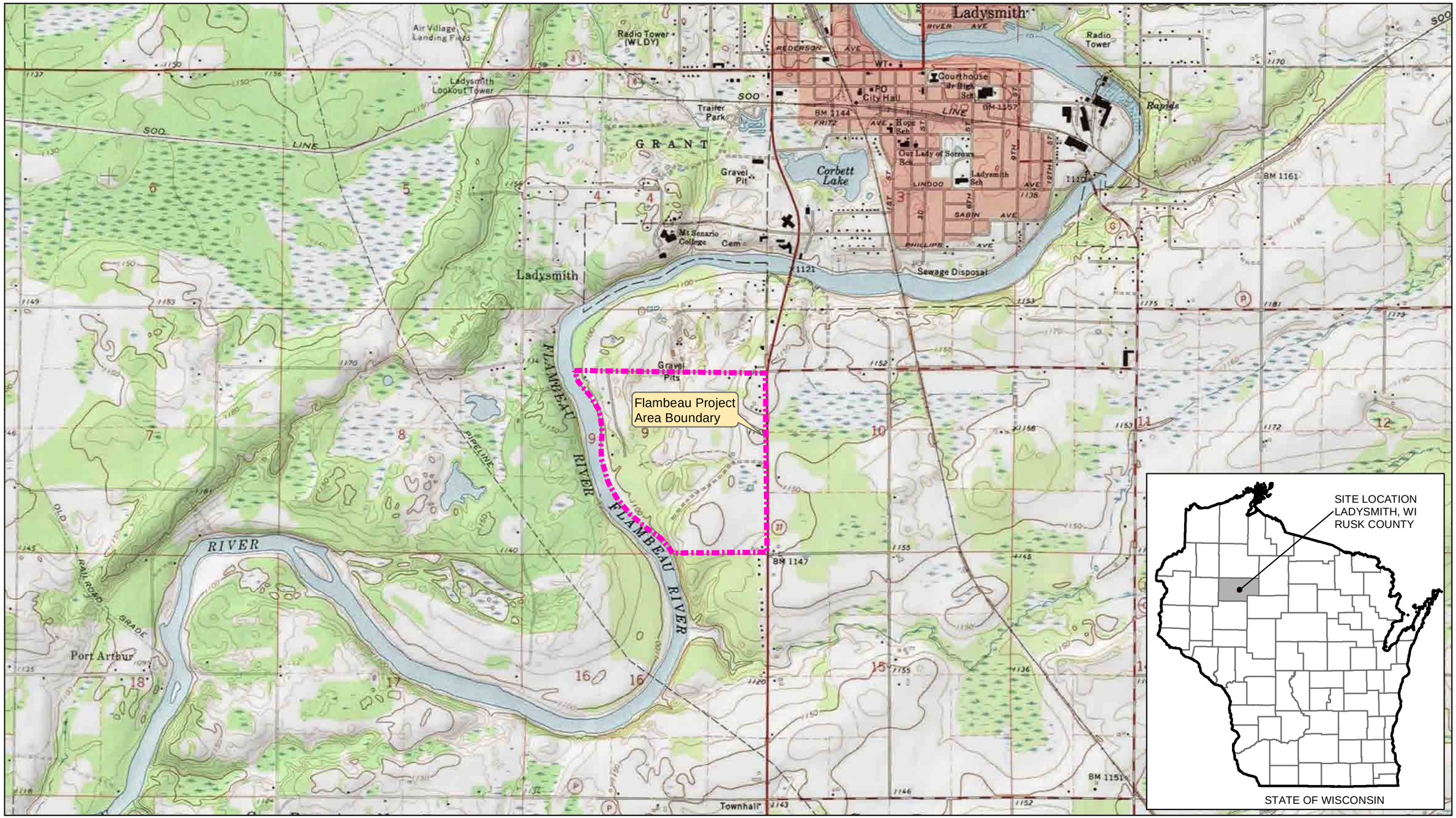
WDNR, 2004b. *Infiltration Basin (1003).* October, 2004. Wisconsin Department of Natural Resources Conservation Practice Standard.

WDNR, 2006. *Bioretention for Infiltration (1004).* July, 2006. Wisconsin Department of Natural Resources Conservation Practice Standard.

WDNR, 2007. *Vegetated Infiltration Swale (1005).* May, 2007. Wisconsin Department of Natural Resources Conservation Practice Standard.

WDNR, 2007. *Dewatering (1061).* April, 2007. Wisconsin Department of Natural Resources Conservation Practice Standard.

Figures



NOTES

1. Horizontal datum based on NAD 1983.
   Horizontal coordinates based on Wisconsin State Plane North (Feet).

LEGEND

Flambeau Project Area Boundary

N

Foth Infrastructure & Environment, LLC

REVISED	DATE	BY	DESCRIPTION

CHECKED BY:	SVF	DATE:	MAY '11
APPROVED BY:	JBH1	DATE:	MAY '11
APPROVED BY:		DATE:	

FLAMBEAU MINING COMPANY

FIGURE 1-1
FLAMBEAU MINE
COPPER PARK BUSINESS AND
RECREATION AREA WORK PLAN
SITE LOCATION MAP

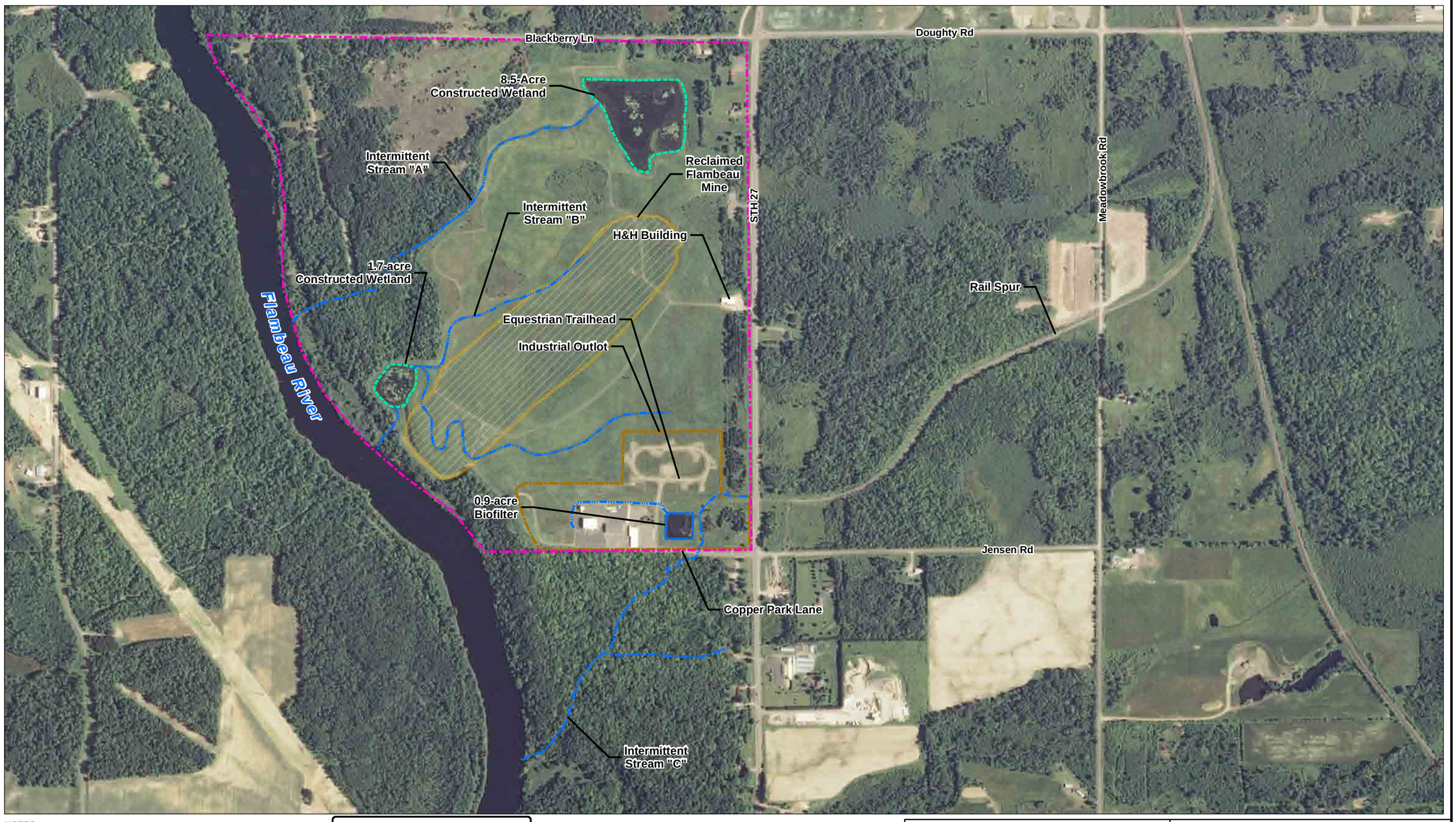
Scale: 0 1,000 2,000 Feet

Date: MAY, 2011

Prepared by: DAT

Project No: 08F777

Path: X:\GB\E\2008\08F777\GIS\mxd\SWMP2011\WetlandPlan_USGS.mxd Date: 5/12/2011



NOTES

1. Aerial photography base map downloaded from USDA Geospatial Data Gateway. (2008 1 Meter NAIP Imagery)
2. Horizontal datum based on NAD 1983. Horizontal coordinates based on Wisconsin State Plane North (Feet).

Legend

- Intermittent Stream
- Flambeau Project Area Boundary
- Wetland Boundary
- Biofilter Boundary
- Industrial Outlot Boundary (Comprises the Work Plan Project Area)
- Reclaimed Flambeau Mine Area

Foth
Foth Infrastructure & Environment, LLC

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Foth Infrastructure & Environment, LLC

REVISED	DATE	BY	DESCRIPTION

CHECKED BY: SVF	DATE: MAY '11
APPROVED BY: JBH1	DATE: MAY '11
APPROVED BY:	DATE:

FLAMBEAU MINING COMPANY

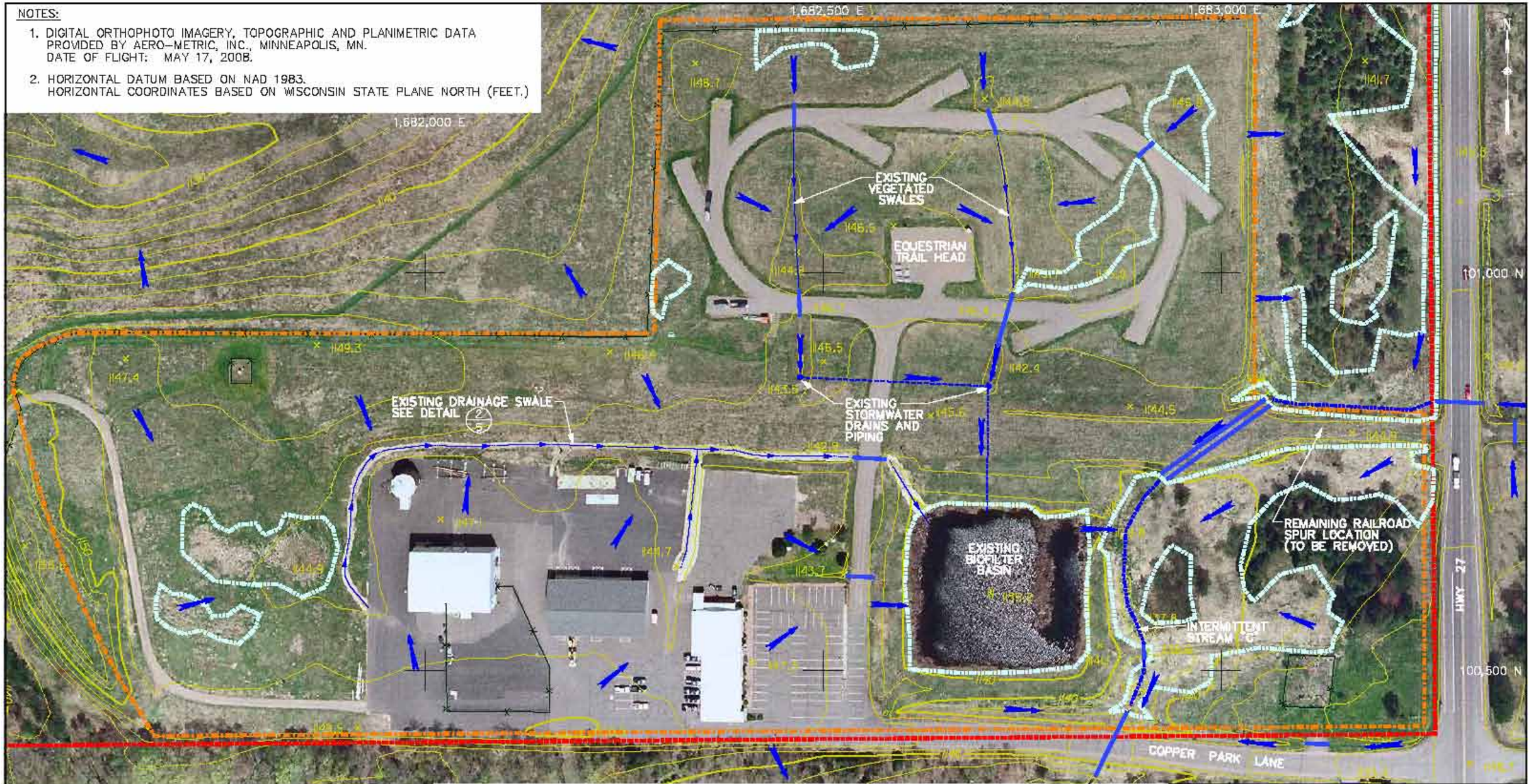
FIGURE 1-2
FLAMBEAU MINE
COPPER PARK BUSINESS AND
RECREATION AREA WORK PLAN
PROJECT LOCATION MAP

Scale: 0 350 700 Feet
Date: MAY, 2011
Prepared by: DAT
Project No: 08F777

Path: X:\GB\IE\2008\08F777\GIS\mxd\SWMP2011\SWMP_ProjectArea.mxd Date: 5/12/2011

NOTES:

1. DIGITAL ORTHOPHOTO IMAGERY, TOPOGRAPHIC AND PLANIMETRIC DATA PROVIDED BY AERO-METRIC, INC., MINNEAPOLIS, MN. DATE OF FLIGHT: MAY 17, 2008.
2. HORIZONTAL DATUM BASED ON NAD 1983. HORIZONTAL COORDINATES BASED ON WISCONSIN STATE PLANE NORTH (FEET.)



LEGEND

- EXISTING SPOT ELEVATION (x 1147.1)
- EXISTING 2' ELEVATION CONTOURS (1150)
- EXISTING FENCE
- FLAMBEAU MINE AREA BOUNDARY
- INDUSTRIAL OUTLOT LIMITS
- INTERMITTENT STEAM LOCATION
- FIELD DELINEATED WETLAND BOUNDARY
- EXISTING CULVERT LOCATION
- EXISTING DRAINAGE LOCATION AND FLOW DIRECTION
- EXISTING WATER FLOW DIRECTION

Foth Infrastructure & Environment, LLC			
REVISED	DATE	BY	DESCRIPTION

CHECKED BY:	SVF	DATE:	MAY '11
APPROVED BY:	JBH1	DATE:	MAY '11
APPROVED BY:		DATE:	

Foth
Foth Infrastructure & Environment, LLC

FLAMBEAU MINING COMPANY

FIGURE 2-1

EXISTING SITE CONDITIONS

Scale:	0 60' 120'	Date:	MAY, 2011
Prepared By: JRB2		Project No:	08F777

X:\GB\E\2008\08F777\cad\Stormwater Plan\Figures\Fig_2-1_Existing Conditions.dgn
5/12/2011 JRB2

NOTES:

1. TOPOGRAPHIC AND PLANIMETRIC DATA PROVIDED BY AERO-METRIC, INC., MINNEAPOLIS, MN. DATE OF FLIGHT: MAY 17, 2008.
2. HORIZONTAL DATUM BASED ON NAD 1983. HORIZONTAL COORDINATES BASED ON WISCONSIN STATE PLANE NORTH (FEET.)

1,681,500 E
1,682,000 E
1,682,500 E
1,683,000 E
101,000 N
100,500 N
N
HWY 27
COPPER PARK LANE

EXISTING VEGETATED SWALES TO BE ENHANCED
EXISTING STORMWATER DRAINS AND PIPING
EXISTING NATURAL RETENTION AREA
PROPOSED DIVERSION BERM SEE DETAIL (2/6)
BOTTOM ELEVATION AFTER CONTRUCTION = 1134.0
PROPOSED NORTH COPPER PARK INFILTRATION BASIN
OVERFLOW OUTLET
OVERFLOW OUTLET BLOCKED
REMAINING RAILROAD SPUR AND CULVERTS TO BE REMOVED
PROPOSED DRAINAGE SWALES HIGH POINT
REMOVE EXISTING 18" CMP AND REPLACE WITH 24" CMP
PROPOSED VEGETATIVE SWALE SEE DETAIL (1/6)
PROPOSED VEGETATIVE BUFFER (SEDIMENT KNOCK OUT AREA)
PROPOSED VEGETATIVE BUFFER (SEDIMENT KNOCK OUT AREA)
BOTTOM ELEVATION AFTER CONTRUCTION = 1138.0
PROPOSED WEST COPPER PARK INFILTRATION BASIN
PROPOSED EAST COPPER PARK INFILTRATION BASIN (BOTTOM ELEVATION AFTER CONSTRUCTION = 1133.0)
APPROXIMATE AREA OF START OF INTERMITTENT STREAM "C" AFTER CONSTRUCTION
EXISTING CMP TO BE REMOVED AND AREA REGRADED

LEGEND

- EXISTING SPOT ELEVATION (1147.4)
- EXISTING 2' ELEVATION CONTOURS (1150)
- EXISTING FENCE
- EXISTING TREE
- EXISTING TREE LINE
- EXISTING BUILDING
- EXISTING EDGE OF GRAVEL
- EXISTING EDGE OF PAVEMENT
- EXISTING CULVERT LOCATION
- FLAMBEAU MINE AREA BOUNDARY
- INDUSTRIAL OUTLOT LIMITS
- RAILROAD SPUR REMOVAL AREA
- EXISTING VEGETATED SWALE
- PROPOSED VEGETATED BUFFER
- PROPOSED VEGETATED DRAINAGE SWALE
- PROPOSED MAXIMUM WATER LEVEL IN INFILTATION BASINS
- EXISTING NATURAL RETENTION AREA
- PROPOSED DRAINAGE FLOW DIRECTION
- INTERMITTENT STEAM LOCATION
- PROPOSED GRADING CONTOUR (1140)

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REVISED	DATE	BY	DESCRIPTION

CHECKED BY:	MAN	DATE:	MAY '11
APPROVED BY:	JBH1	DATE:	MAY '11
APPROVED BY:		DATE:	

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FIGURE 2-2

GRADING PLANS AND VEGETATIVE COVER AREAS

Scale:	0 60' 120'	Date:	MAY, 2011
Prepared By:	JRB2	Project No:	08F777

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5/12/2011 JRB2

NOTES:

1. TOPOGRAPHIC AND PLANIMETRIC DATA PROVIDED BY AERO-METRIC, INC., MINNEAPOLIS, MN. DATE OF FLIGHT: MAY 17, 2008.
2. HORIZONTAL DATUM BASED ON NAD 1983. HORIZONTAL COORDINATES BASED ON WISCONSIN STATE PLANE NORTH (FEET.)

1,681,500 E
1,682,000 E
1,682,500 E
1,683,000 E
101,000 N
100,500 N
N
HWY 27
COPPER PARK LANE

EXISTING VEGETATED SWALES TO BE ENHANCED
EXISTING NATURAL RETENTION AREA
INSTALL INLET PROTECTION SEE DETAIL 3/6
EXISTING STORMWATER DRAINS AND PIPING
BOTTOM ELEVATION AFTER CONTRUCTION = 1134.0
CAP STORMWATER DRAIN
PROPOSED NORTH COPPER PARK INFILTRATION BASIN
PROPOSED DRAINAGE SWALES HIGH POINT
REMOVE EXISTING 18" CMP AND REPLACE WITH 24" CMP
BOTTOM ELEVATION AFTER CONTRUCTION = 1138.0
PROPOSED VEGETATIVE SWALE SEE DETAIL 1/6
PROPOSED VEGETATIVE BUFFER (SEDIMENT KNOCK OUT AREA)
PROPOSED VEGETATIVE BUFFER (SEDIMENT KNOCK OUT AREA)
OVERFLOW OUTLET
PROPOSED WEST COPPER PARK INFILTRATION BASIN
PROPOSED EAST COPPER PARK INFILTRATION BASIN (BOTTOM ELEVATION AFTER CONSTRUCTION = 1133.0)
APPROXIMATE AREA OF START OF INTERMITTENT STREAM "C" AFTER CONSTRUCTION
PROPOSED SILT FENCE LOCATION SEE DETAIL 1/5
PROPOSED STONE TRACKING PADS SEE DETAIL 2/7
INSTALL INLET PROTECTION
PROPOSED ROCK FILLED FILTER BAG DITCH CHECK LOCATIONS SEE DETAIL 1/8

LEGEND

- EXISTING SPOT ELEVATION
- EXISTING 2' ELEVATION CONTOURS
- EXISTING FENCE
- EXISTING BUILDING
- EXISTING EDGE OF GRAVEL
- EXISTING EDGE OF PAVEMENT
- EXISTING CULVERT LOCATION
- FLAMBEAU MINE AREA BOUNDARY
- INDUSTRIAL OUTLOT LIMITS
- PROPOSED STONE TRACKING PADS
- PROPOSED EROSION BALES LOCATION
- PROPOSED SILT FENCE LOCATION
- EXISTING VEGETATED SWALE
- PROPOSED VEGETATED BUFFER
- PROPOSED VEGETATED DRAINAGE SWALE
- PROPOSED MAXIMUM WATER LEVEL IN INFILTATION BASINS
- EXISTING NATURAL RETENTION AREA
- PROPOSED GRADING CONTOUR
- PROPOSED DRAINAGE FLOW DIRECTION
- PROPOSED FLOW DIRECTION
- INTERMITTENT STEAM LOCATION

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CHECKED BY:	MJP1	DATE:	MAY '11
APPROVED BY:	JBH1	DATE:	MAY '11
APPROVED BY:		DATE:	

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FIGURE 2-3

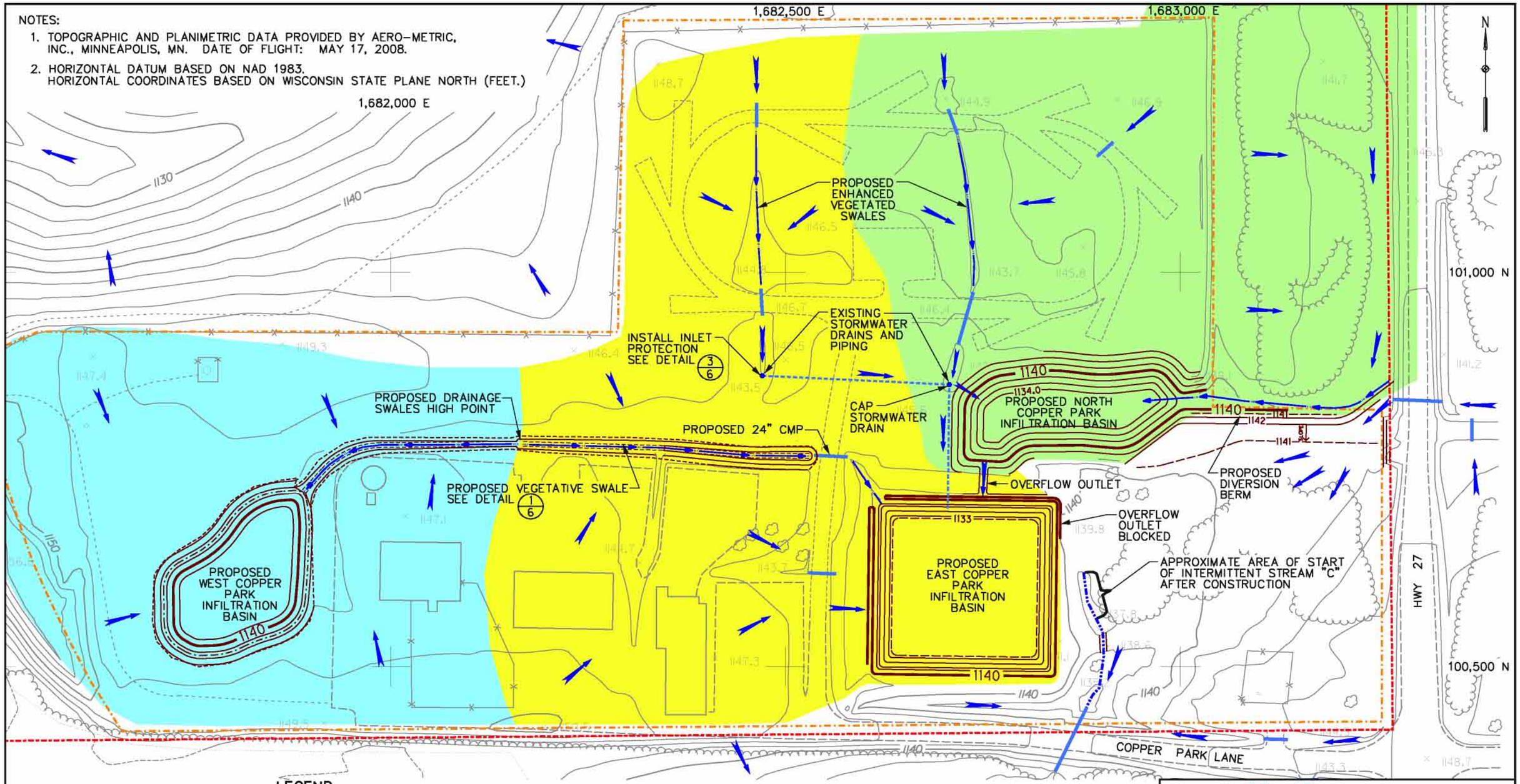
EROSION CONTROL AND SURFACE WATER MANAGEMENT PLAN

Scale: 0 60' 120'		Date:	MAY, 2011
Prepared By: JRB2		Project No:	08F777

X:\GB\IE\2008\08F777\cad\Stormwater Plan\Figures\Fig.2-3_Surface Water Plan.dgn
5/12/2011 JRB2

NOTES:

1. TOPOGRAPHIC AND PLANIMETRIC DATA PROVIDED BY AERO-METRIC, INC., MINNEAPOLIS, MN. DATE OF FLIGHT: MAY 17, 2008.
2. HORIZONTAL DATUM BASED ON NAD 1983. HORIZONTAL COORDINATES BASED ON WISCONSIN STATE PLANE NORTH (FEET.)



LEGEND

- EXISTING SPOT ELEVATION (× 1147.1)
- EXISTING 2' ELEVATION CONTOURS (1150)
- EXISTING FENCE
- EXISTING TREE
- EXISTING TREE LINE
- EXISTING BUILDING
- EXISTING EDGE OF GRAVEL
- EXISTING EDGE OF PAVEMENT
- EXISTING CULVERT LOCATION
- FLAMBEAU MINE AREA BOUNDARY
- INDUSTRIAL OUTLOT LIMITS
- WEST SEDIMENTATION DRAINAGE BASIN
- EAST SEDIMENTATION DRAINAGE BASIN
- NORTH SEDIMENTATION DRAINAGE BASIN
- PROPOSED DRAINAGE FLOW DIRECTION
- PROPOSED FLOW DIRECTION
- PROPOSED GRADING CONTOUR (1140)

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REVISED	DATE	BY	DESCRIPTION
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APPROVED BY:		DATE:	

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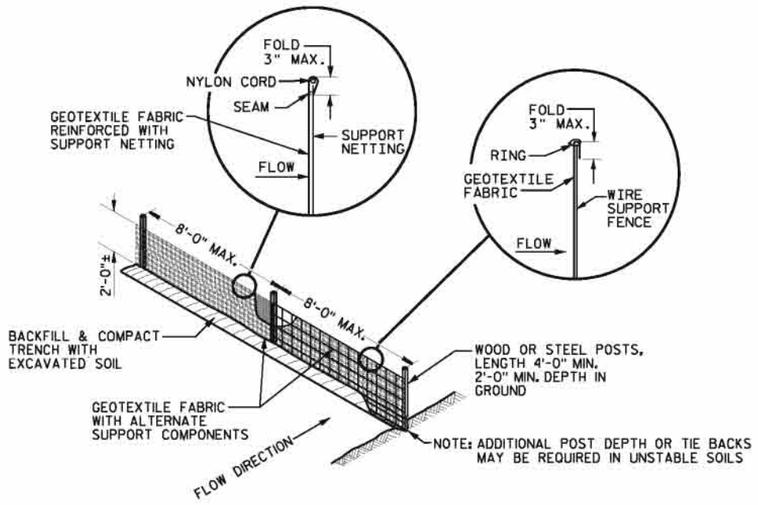
FIGURE 2-4

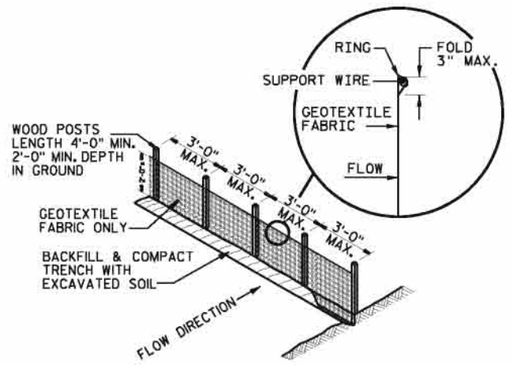
POST CONSTRUCTION DRAINGAGE BASINS

Scale: 0 60' 120'		Date:	MAY, 2011
Prepared By: JRB2		Project No:	08F777

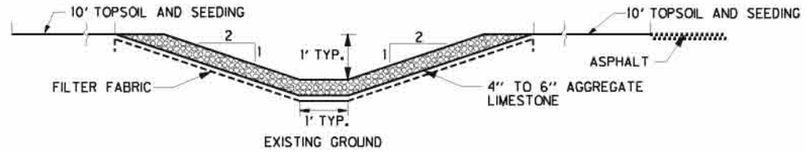
X:\GB\IE\2008\08F777\cad\Stormwater Plan\Figures\Fig_2-4_Drainage basins.dgn
5/12/2011 JRB2



ALTERNATE "A"

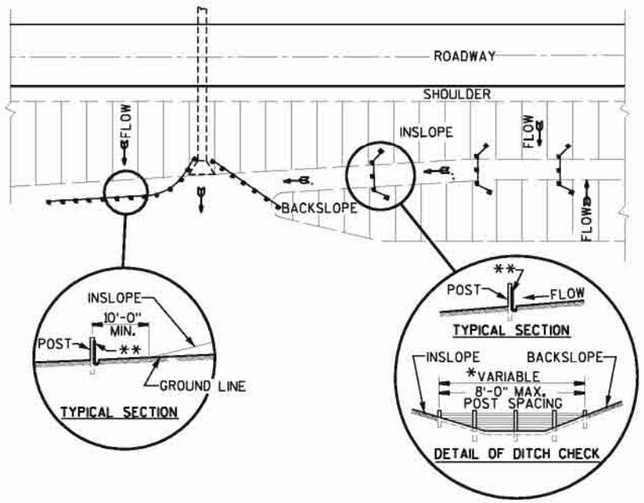


ALTERNATE "B"

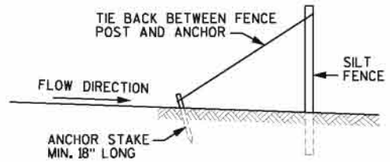


2/5 TYPICAL EXISTING PERIMETER DRAINAGE DITCH DETAIL

NOT TO SCALE

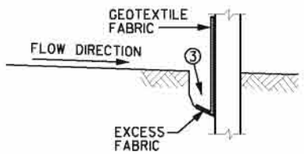


PLAN – AT CULVERTS



SILT FENCE TIE BACK DETAIL

(WHEN REQUIRED)



FABRIC ANCHOR TRENCH DETAIL

1/5 PROPOSED SILT FENCE DETAIL

NOT TO SCALE

GENERAL NOTE:

THE SILT FENCE SHOULD BE CONSTRUCTED IN AN ARC OR HORSESHOE SHAPE, WITH THE ENDS POINTING UPSLOPE TO MAXIMIZE BOTH STRENGTH AND EFFECTIVENESS.

Erosion Control Plan During Construction

Best Management Practices (BMPs) address erosion control during construction. The BMPs will be maintained during project construction and as appropriate throughout the life of the project.

Best Management Practices (BMPs)
The project has been designed with an efficient storm water collection system that routes storm water to infiltration basins.

BMPS to be implemented follow the materials and methods specified in ch NR 151, WIS Adm code and are summarized below:

Silt fencing will be installed before construction activity begins. Fencing will envelope the entire border of the project.

Land clearing will be performed taking care not to disturb areas beyond the clearing and grubbing limits. Clearing (removing trees) and grubbing (removing stumps and roots) will be performed in a single operation, as necessary, to minimize disturbance. Unmarketable timber, herbaceous plants, dead wood, stumps, and other vegetation will be disposed of by the contractor. Stumps too large to chip will be stockpiled and burned on-site with appropriate burn permits. Contractor is required to obtain all necessary burn permits.

Topsoil stripping and stockpiling and excess soil stockpiling will be performed on the site. Topsoil is defined as the A-horizon of the soil in which organic matter accumulates. Any material not placed will be stockpiled in a prepared area that has silt fencing installed around the entire stockpile. Piles will be developed with side slope shallower than a ratio of 3 horizontal to 1 vertical (3H:1V) to minimize erosion. Conventional earth-moving equipment will be used. Seeding will take place after the stockpile surface is roughened (i.e. driving a bulldozer up and down the slope to leave a pattern of track imprints parallel to the slope contours). Seeding will be accomplished in accordance with WDNR standard #1059 "seeding". Seed mixtures will include temporary species such as oats or perennial rye grass that germinate quickly and act as a nurse crop until the perennial species germinate and mature.

Ditch installation will be performed at the appropriate time to route storm water runoff to the basins. Mulching and seeding will take place as soon as possible to maintain ditch surfaces. Rock-filled filter bags, erosion bales, and erosion mats will be used as needed.

Installation of gravel/aggregate on vehicle traffic areas will be constructed in accordance with details and sections from the drawings and specifications. Traffic area of the main facility will be lined with gravel. During construction, BMPs will be maintained daily and undergo formal inspection.

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REVISED	DATE	BY	DESCRIPTION

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APPROVED BY:	JBH1	DATE:	MAY '11
APPROVED BY:		DATE:	

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FIGURE 2-5

EROSION CONTROL DETAILS
(1 of 4)

Scale:	NOT TO SCALE	Date:	MAY, 2011
Prepared By:	JRB2	Project No:	08F777

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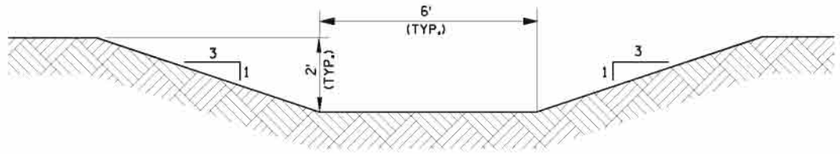
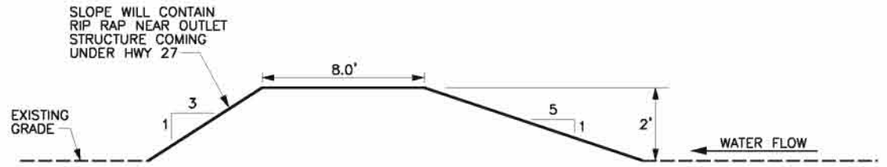
5/12/2011 JRB2



1/6 TYPICAL PROPOSED DRAINAGE DITCH DETAIL

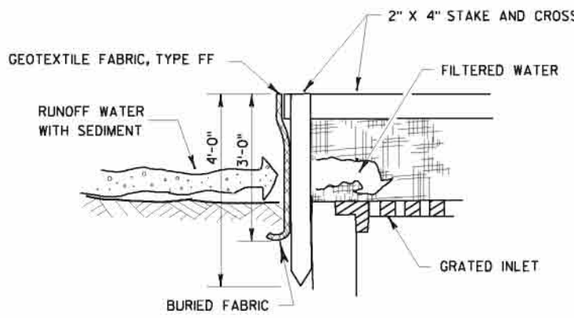
NOT TO SCALE

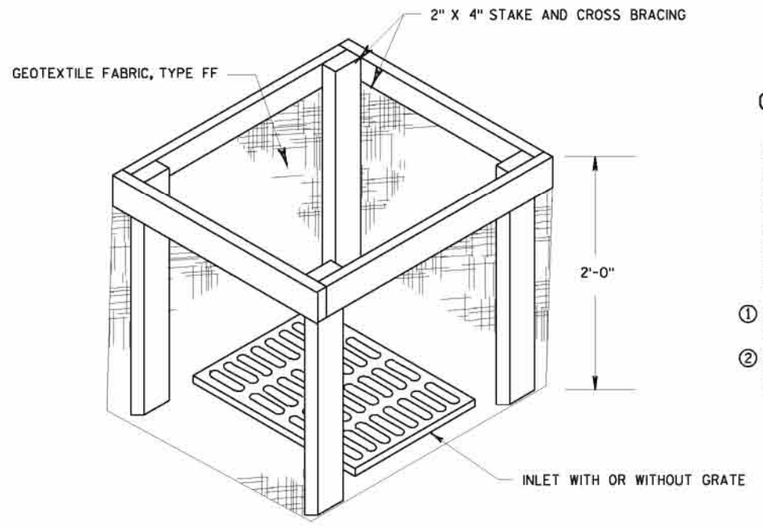


2/6 TYPICAL PROPOSED DIVERSION BERM DETAIL

NOT TO SCALE

NOTE: ATTACH GEOTEXTILE FABRIC, TYPE FF TO THE TOP OF STAKES AND CROSS BRACINGS.





3/6 PROPOSED INLET PROTECTION DETAIL

NOT TO SCALE

GENERAL NOTES:

FABRIC SHALL BE REPLACED AT THE ENGINEERS DISCRETION.

MANUFACTURED ALTERNATIVES APPROVED AND LISTED ON THE DEPARTMENT'S EROSION CONTROL PRODUCT ACCEPTIBILITY LIST MAY BE SUBSTITUTED FOR THE INLET PROTECTION TYPE SPECIFIED.

WHEN REMOVING OR MAINTAINING INLET PROTECTION, CARE SHALL BE TAKEN SO THAT THE SEDIMENT TRAPPED ON THE GEOTEXTILE FABRIC DOES NOT FALL INTO THE INLET. ANY MATERIAL FALLING INTO THE INLET SHALL BE REMOVED IMMEDIATELY.

① FABRIC SIZE SHALL BE 8" (MIN) GREATER ON ALL SIDES OF THE INLET COVER TO PROVIDE A HAND HOLD WHEN MAINTENANCE OR REMOVAL IS REQUIRED.

② FOR INLET PROTECTION, TYPE C, WITH A CURB BOX, AN ADDITIONAL 18" OF FABRIC IS WRAPPED AROUND THE WOOD AND SECURED WITH STAPLES. THE WOOD SHALL NOT BLOCK THE ENTIRE HEIGHT OF THE CURB BOX.

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APPROVED BY:	JBH1	DATE:	MAY '11
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FIGURE 2-6
EROSION CONTROL DETAILS (2 of 4)

Scale:	NOT TO SCALE	Date:	MAY, 2011
Prepared By:	JRB2	Project No:	08F777

$$$$DGNSPEC$$$$$$$$$$$$$$$$$$
$$DAT$$$$ $USRN$

GENERAL NOTES

VARIATIONS IN THE DIMENSIONS OR MATERIALS SHOWN HEREON MAY BE PERMITTED IF THEY PROVIDE EQUIVALENT PROTECTION AND MATERIAL STRENGTH AND IF PRIOR APPROVAL OF THE ENGINEER IS OBTAINED.

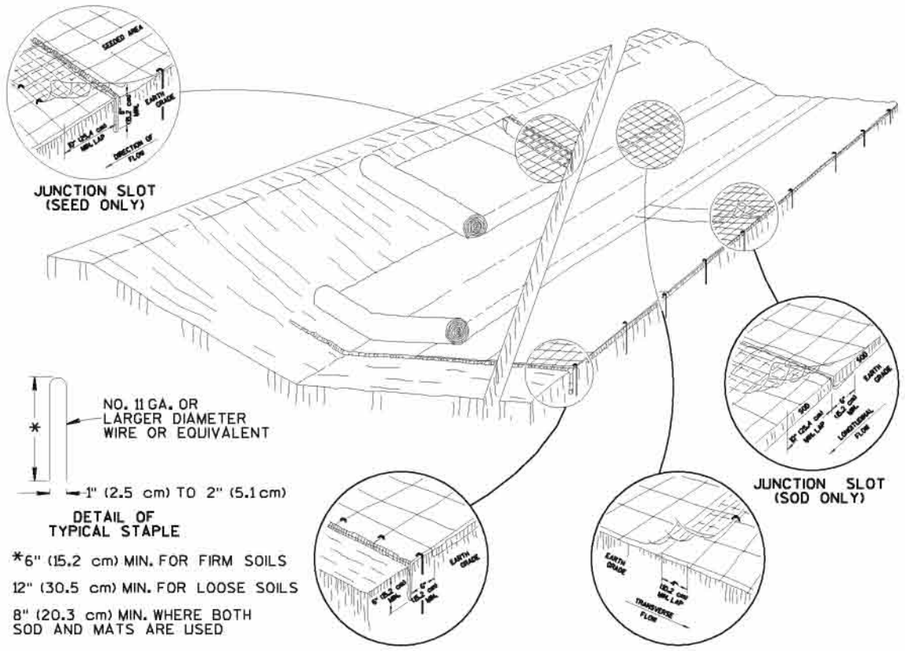
PLACE LAP JOINTS IN THE BOTTOM OF V-SHAPED DITCHES.

STAGGER JUNCTION SLOTS ON ADJACENT STRIPS OF MATTING A MINIMUM OF 4 FEET (1.219 m) APART.

EDGES OF THE EROSION MAT SHALL BE IMPRESSED IN THE SOIL.

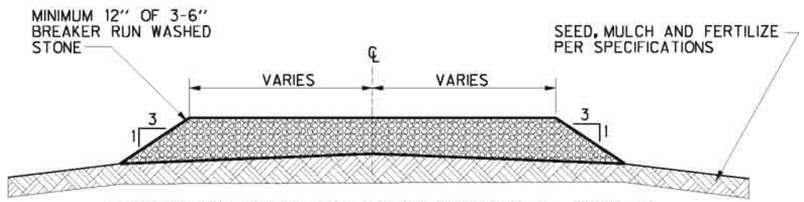
EROSION MAT OVER SEEDING

JUNCTION OR ANCHOR SLOTS SHALL BE AT MINIMUM INTERVALS OF 100 FEET (30.48 m) ON GRADES UP TO AND INCLUDING 3 PERCENT, AND 50 FEET (15.24 m) ON GRADES EXCEEDING 3 PERCENT.



4/7 PROPOSED EROSION MAT

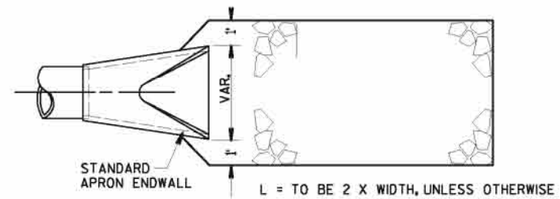
NOT TO SCALE



NOTE: TRACKING PAD TO BE A MINIMUM LENGTH OF 50'. WIDTH OF TRACKING PAD SHALL EXTEND TO EXISTING EDGE OF PAVEMENT.

2/7 PROPOSED TYPICAL TRACKING PAD

NOT TO SCALE



3/7 PROPOSED RIPRAP DETAIL

NOT TO SCALE

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APPROVED BY:	JBH1	DATE:	MAY '11
APPROVED BY:		DATE:	

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FLAMBEAU MINING COMPANY

FIGURE 2-7

EROSION CONTROL DETAILS
(3 of 4)

Scale:	NOT TO SCALE	Date:	MAY, 2011
Prepared By:	JRB2	Project No:	08F777

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5/12/2011 JRB2

GENERAL NOTES:

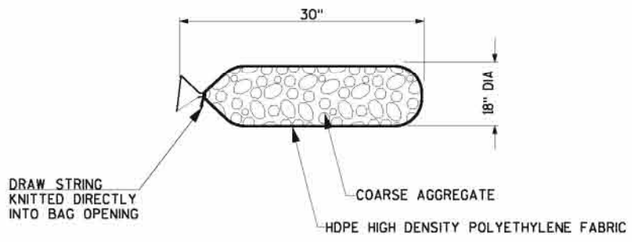
1. 18" X 30" ROCK FILLED FILTER BAG SHALL BE COMPRISED OF THE FOLLOWING:
   a. HDPE HIGH DENSITY POLYETHYLENE
   b. HDPE HIGH DENSITY POLYETHYLENE DRAW STRING KNITTED DIRECTLY INTO BAG OPENING.
   c. 80% FABRIC CLOSURE WITH APPARENT OPENING SIZE NO LARGER THAN 1/8" X 1/8"
   d. ROLLED SEAM USING A MINIMUM OF 480 DENIER POLYESTER SEWING YARN FOR STRENGTH AND DURABILITY.

AGGREGATE TO BE WELL GRADED COURSE AGGREGATE CONFORMING TO THE FOLLOWING GRADATION REQUIREMENTS:

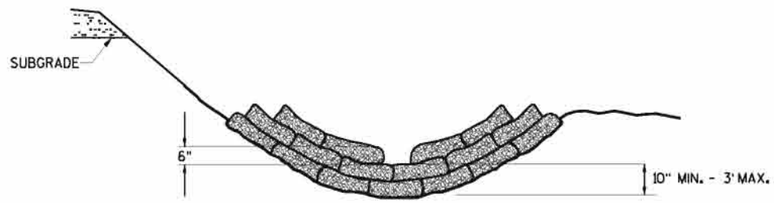
SIEVE SIZE	SIZE NO. AASHTO No. 67 [1]
2 INCH (50 mm)	-
1 1/2 INCH (37.5mm)	-
1 INCH (25.0 mm)	100
3/4 INCH (19.0mm)	90-100
3/8 INCH (9.5mm)	20-55
No. 4 (4.75mm)	0-10
No. 8 (2.36mm)	0-5

[1] SIZE No. ACCORDING TO AASHTO M 43

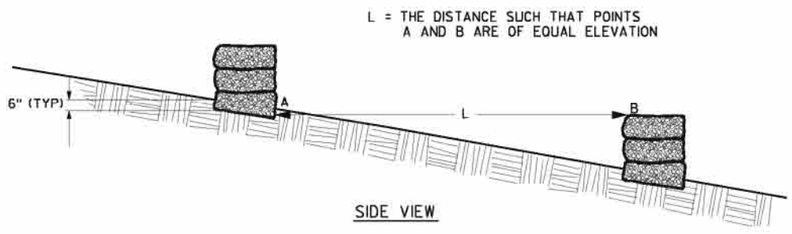
COURSE AGGREGATE INFORMATION



FILTER BAG DETAIL
(PRIOR TO INSTALLATION)



CROSS SECTIONAL VIEW



SIDE VIEW

DITCH CHECK DETAIL

1/8 PROPOSED ROCK FILLED FILTER BAG

NOT TO SCALE

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FIGURE 2-8

EROSION CONTROL DETAILS
(4 of 4)

Scale: NOT TO SCALE	Date: MAY, 2011
Prepared By: JRB2	Project No: 08F777

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5/12/2011 JRB2

NOTES:

1. TOPOGRAPHIC AND PLANIMETRIC DATA PROVIDED BY AERO-METRIC, INC., MINNEAPOLIS, MN. DATE OF FLIGHT: MAY 17, 2008.
2. HORIZONTAL DATUM BASED ON NAD 1983. HORIZONTAL COORDINATES BASED ON WISCONSIN STATE PLANE NORTH (FEET.)

1,681,500 E
1,682,000 E
1,682,500 E
1,683,000 E
101,000 N
100,500 N
N
HWY 27
COPPER PARK LANE

EXISTING VEGETATED SWALES TO BE ENHANCED
EXISTING NATURAL RETENTION AREA
PROPOSED DIVERSION BERM SEE DETAIL (2/6)
PROPOSED NORTH COPPER PARK INFILTRATION BASIN
BOTTOM ELEVATION AFTER CONTRUCTION = 1134.0
EXISTING STORMWATER DRAINS AND PIPING
PROPOSED DRAINAGE SWALES HIGH POINT
REMOVE EXISTING 18" CMP AND REPLACE WITH 24" CMP
BOTTOM ELEVATION AFTER CONTRUCTION = 1138.0
PROPOSED VEGETATIVE SWALE SEE DETAIL (1/6)
PROPOSED VEGETATIVE BUFFER (SEDIMENT KNOCK OUT AREA)
PROPOSED VEGETATIVE BUFFER (SEDIMENT KNOCK OUT AREA)
PROPOSED WEST COPPER PARK INFILTRATION BASIN
PROPOSED EAST COPPER PARK INFILTRATION BASIN (BOTTOM ELEVATION AFTER CONSTRUCTION = 1133.0)
OVERFLOW OUTLET
OVERFLOW OUTLET BLOCKED
REMAINING RAILROAD SPUR AND CULVERTS TO BE REMOVED
APPROXIMATE AREA OF START OF INTERMITTENT STREAM "C" AFTER CONSTRUCTION
EXISTING CMP TO BE REMOVED AND AREA REGRADED

LEGEND

- EXISTING SPOT ELEVATION (x 1147.1)
- EXISTING 2' ELEVATION CONTOURS (1150)
- EXISTING FENCE
- EXISTING TREE LINE
- EXISTING BUILDING
- EXISTING EDGE OF PAVEMENT
- EXISTING CULVERT LOCATION
- FLAMBEAU MINE AREA BOUNDARY
- INDUSTRIAL OUTLOT LIMITS
- INTERMITTENT STEAM LOCATION
- PROPOSED GRADING CONTOUR (1140)
- RAILROAD SPUR REMOVAL AREA
- EXISTING VEGETATED SWALE
- PROPOSED VEGETATED BUFFER
- PROPOSED VEGETATED DRAINAGE SWALE
- PROPOSED MAXIMUM WATER LEVEL IN INFILTATION BASINS
- EXISTING NATURAL RETENTION AREA
- PROPOSED DRAINAGE FLOW DIRECTION
- PROPOSED SOIL BORING LOCATION
- PROPOSED TEST PIT LOCATION

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FIGURE 2-9
PROPOSED SOIL CHARACTERIZATION TESTING LOCATIONS

Scale:	0 60' 120'	Date:	MAY, 2011
Prepared By:	JRB2	Project No:	08F777

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5/12/2011 JRB2

Appendix A

Site Grading Plan
Reclaimed Flambeau Mine
Rusk County, Wisconsin

Memorandum

May 12, 2011

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Master File, 08F777-10000

FR: Mike Nimmer, Foth Infrastructure & Environment, LLC
Jim Hutchison, Foth Infrastructure & Environment, LLC

RE: Site Grading Plan, Reclaimed Flambeau Mine Site, Rusk County, Wisconsin

On behalf of the Flambeau Mining Company (Flambeau), Foth Infrastructure and Environment, LLC (Foth) has prepared this memorandum summarizing the grading plan associated with the *Copper Park Business and Recreation Area Work Plan* (*Work Plan*) for the Reclaimed Flambeau Mine site in Ladysmith, Wisconsin.

Construction Overview

Site construction activities involve the excavation of two new infiltration basins, the conversion of the 0.9-acre Biofilter to an infiltration basin, the removal a portion of the former rail spur and existing culverts, between Copper Park Lane and Highway 27, the installation of vegetated buffers adjacent to two infiltration basins, the regrading of the ditch/swale to the north of the asphalt parking lot, and attendant grading activity.

The site grading plan is presented in Figure 2-3 of the *Work Plan*.

Construction Component Details

Construction components include vegetated swales, the West Copper Park Infiltration Basin, the East Copper Park Infiltration Basin, the North Copper Park Infiltration Basin, vegetated buffers, railspur removal, culvert removal, and topsoil replacement.

Each component is described below.

Vegetated Swales

The existing rock lined ditch along the north side of the asphalt parking lot will be converted into a vegetated swale. The swale will be regraded with a high point in the center so that it drains to both the east and the west of the asphalted area. The swale will flow approximately 360 feet to the east and 280 feet to the west from the high point. The swale in both directions will be trapezoidal in shape with a six foot bottom width, 3:1 horizontal to vertical side slopes, and a grade of approximately 0.5%. The existing 18-inch diameter corrugated metal pipe (CMP) under the road to the Equestrian Trailhead will also be replaced with a 24-inch diameter CMP.

Construction of the swales will produce approximately 130 cubic yards (cy) of cut and will require approximately 80 cy of fill. Additionally, approximately 110 cy of rock will be removed from the swale. The swale will be revegetated to provide for suspended sediment removal.

West Copper Park Infiltration Basin

The West Copper Park Infiltration Basin will be located to the west of the parking lot. The infiltration basin will be approximately 0.64 acres in size at the maximum water storage elevation of 1,143.0 feet mean sea level (ft msl), and the basin floor will be at an elevation of 1,138.0 ft msl. Construction of the basin will produce approximately 6,430 cy of cut.

North Copper Park Infiltration Basin

The North Copper Park Infiltration Basin will be located to the north of the existing 0.9-acre Biofilter. The infiltration basin will be approximately 0.60 acres in size at the maximum water storage elevation of 1,142.0 ft msl, and the basin floor will be at an elevation of 1,134.0 ft msl. Construction of the basin will produce approximately 9,100 cy of cut.

East Copper Park Infiltration Basin

The existing biofilter will be converted into the East Copper Park Infiltration Basin. The basin conversion will involve the excavation of approximately 9 - 11 feet of soil and accumulated sediment from the existing biofilter. The existing liner will also be removed, which is located at an elevation of 1,124.0 ft msl. The excavated material will be replaced with approximately 9 feet of a mixture of sand, topsoil, and potentially compost, so that the floor of the future infiltration basin will be at an elevation of 1,133.0 ft msl.

The East Copper Park Infiltration Basin will be approximately 1.0 acre in size at the maximum water storage elevation of 1,138.0 ft msl, and the basin floor will be at an elevation of 1,133.0 ft msl. Construction of the basin will produce approximately 13,600 cy of cut and will require approximately 7,770 cy of fill.

Vegetated Buffers

Vegetated buffers will be installed between the parking lot and access road and the proposed West and East Copper Park Infiltration Basins. Light grading and shaping of these areas will be required in order to establish the vegetation. It is estimated that approximately 37,000 square feet of vegetated buffers will be created.

Rail Spur Removal

Approximately 240 linear feet of the former rail spur will be removed immediately to the west of Highway 27. The existing culverts underneath the rail spur to the northeast of the 0.9-acre Biofilter will also be removed. A small berm at elevation 1,142.0 ft msl will be installed between Highway 27 and the North Copper Park Infiltration Basin. Construction in the area will produce approximately 710 cy of cut.

Culvert Removal

The two existing culverts under the rail spur and the culvert in Intermittent Stream C near the southeast corner of the 0.9-acre Biofilter will be removed during construction activities. The culverts under the rail spur will be removed during the rail spur excavation. The removal of the small culvert in Intermittent Stream C near the southeast corner of the 0.9-acre Biofilter will require minor excavation or grading to create a channel for intermittent Stream C.

Topsoil

Topsoil will be obtained from the onsite stockpile located on the western side of the project. Approximately 2,650 cy of topsoil will be placed between 4 and 6 inches deep across disturbed areas. If there is not sufficient topsoil available on site, the contractor shall obtain additional clean top soil from local supplies.

Report

Stormwater Management and Erosion Control Plan

Copper Park Business and Recreation Area

Project I.D.: 08F777

Flambeau Mining Company
Ladysmith, Wisconsin

May 2011

Stormwater Management and Erosion Control Plan

Project ID: 08F777

Prepared for
Flambeau Mining Company

Ladysmith, WI

Prepared by
Foth Infrastructure & Environment, LLC

May 2011

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Stormwater Management and Erosion Control Plan

Contents

Figures

Appendices

Stormwater Management and Erosion Control Plan

Executive Summary

The purpose of this *Stormwater Management and Erosion Control Plan* (*SWMECP*) is to show that the Copper Park Business and Recreation Area project located at the Reclaimed Flambeau Mine, in Ladysmith, Wisconsin, is in compliance with state and local stormwater management and erosion control regulations and ordinances.

The proposed project is exempt from ch. NR 151, Wisconsin Administrative Code (Wis. Admin. Code) post-construction stormwater management requirements under ch. NR 151.12(2)(d): "A post-construction site with less than 10% connected imperviousness based on complete development of the post-construction site, provided the cumulative area of all parking lots and rooftops is less than one acre."

The state of Wisconsin erosion control requirements are met through the implementation of Best Management Practices (BMP). For this project, the proposed BMPs include silt fences, stone tracking pads, channel erosion mat, temporary ditch checks, seeding, fertilizing, and mulching. These BMPs will be installed in accordance with ch. NR 151, Wis. Admin. Code.

List of Abbreviations, Acronyms, and Symbols

%	percent
ac-ft	acre feet
BMP	Best Management Practices
ch.	Chapter
CMP	corrugated metal pipe
COC	Certificate of Completion
Flambeau	Flambeau Mining Company
Foth	Foth Infrastructure & Environment, LLC
hr	hour
HSG	hydrologic soil group
in.	inches
in/hr	inch/hour
NOC	Notice of Completion
RCN	Runoff curve number
SWMECP	Stormwater Management and Erosion Control Plan
T_c	Time of concentration
TSS	Total Suspended Solids
USLE	Universal Soil Loss Equation
WDNR	Wisconsin Department of Natural Resources
WinSLAMM	Windows Source Loading and Management Model
Wis. Admin. Code	Wisconsin Administrative Code
WRAPP	Water Resources Application for Project Permits
yr	year
Work Plan	Copper Park Business and Recreation Area Work Plan

1 Introduction

Foth Infrastructure & Environment, LLC (Foth) has prepared this *Stormwater Management and Erosion Control Plan* (*SWMECP*) at the request of Flambeau Mining Company (Flambeau) as part of the *Copper Park Business and Recreation Area Stormwater Work Plan* (*Work Plan*).

The project will include removal of the remaining rail spur and culverts between Copper Park Lane and Highway 27, conversion of the 0.9-acre Biofilter (artificial wetland) to an infiltration basin, enhancements to existing vegetated swales north of the asphalted area and within the Equestrian Trailhead area, and the creation of two additional infiltration basins in areas of artificial wetlands on the west side of the asphalted area of the Copper Park Business and Recreation Area and north of the 0.9-acre Biofilter.

1.1 Purpose

The purpose of this *SWMECP* is to show that the *Work Plan* located at the Reclaimed Flambeau Mine in Ladysmith, Wisconsin, is in compliance with state and local stormwater management and erosion control regulations and ordinances.

1.2 Regulatory Requirements

This *SWMECP* has been completed in compliance with ch. NR 151, Wisconsin Administrative Code (Wis. Admin. Code).

The proposed project is exempt from the post-construction stormwater management requirements under ch. NR 151.12(2)(d): "A post-construction site with less than 10% connected imperviousness based on complete development of the post-construction site, provided the cumulative area of all parking lots and rooftops is less than one acre.".

There are no erosion control ordinances for the city of Ladysmith or Rusk County that apply to this project.

2 Project Description

The grading project has five major elements:

- Removal of a portion of remaining rail spur berm and culverts between Copper Park Lane and Highway 27; and attendant grading activity.
- Conversion of the 0.9-acre Biofilter (artificial wetland pursuant to NR 103.06(4)(a) to an infiltration basin;
- Creation of two additional infiltration basins in the area north of the 0.9-acre Biofilter and in areas of isolated artificial wetlands (NR 103.06) on the west side of the asphalted area of the Copper Park Business and Recreation Area.
- Restoration of wetlands in the area of historical wetlands.
- Enhance stormwater management across the *Work Plan* Project Area.

Throughout each phase of the mine project, samples have been collected from the Flambeau River and include water quality, sediments, fish, and macroinvertebrates. Continued protection of the Flambeau River, located 140 feet from the backfilled pit, has been documented throughout the Flambeau project by extensive monitoring.

Approximately 4.8 acres of the project site will be disturbed during construction. Construction activity (in order of completion) will include the following:

1. Erosion control installation.
2. Clearing, grubbing, and topsoil stripping.
3. Soil excavation and stockpiling.
4. Site grading.
5. Vegetative cover placement.
6. Maintenance and monitoring.

The construction activity for this project is anticipated to begin in July 2011 and be completed by November 2011.

A photograph log of existing site conditions is presented in Appendix A.

3 Methods

The following section describes the methods that were used to design the stormwater management and erosion control of the *Work Plan*.

3.1 Stormwater Quantity

The peak runoff flow rates and stormwater hydrographs were determined using the Haestad PondPack Version 09.00.077.00 Urban Hydrology and Detention Pond Modeling Software. The longest flow path for each drainage area was determined by analyzing the topography of the site map. Flow lengths and slopes from the flow path analyses were input into the PondPack program to calculate the time of concentration (Tc). Runoff Curve Numbers (RCN) and weighted RCNs were then determined for each drainage area. The values calculated for the drainage area, Tc, and RCN were then used to calculate the tabular hydrograph and peak discharge and volume. Calculations were run for the 100-year (yr), 24-hour (hr) storm event, since this was the design storm desired to be retained on-site.

3.1.1 Existing Conditions

Peak runoff flow rates and stormwater hydrographs were analyzed for the existing conditions on the site. The existing site topography and ground cover were evaluated using maps, photographs and site reconnaissance.

3.1.2 Post-Construction Conditions

Peak runoff flow rates and stormwater hydrographs were also analyzed for the site conditions following construction. The post-construction alterations to the site topography and ground cover were evaluated using the project design and construction drawings.

3.2 Stormwater Quality

Ch. NR 151, Wis. Adm. Code requires that Best Management Practices (BMP) be designed, installed, and maintained to control total suspended solids carried in runoff from post-construction sites. New development sites must reduce, to the maximum extent practicable, the total suspended solids load by 80% based on average annual rainfall, as compared to no runoff management controls. Sediment control can be achieved through the use of BMPs such as wet detention basins, sedimentation basins, grass lined swales, street sweeping, proprietary devices, etc.

The performance of the BMPs was modeled using the Windows Source Loading and Management Model (WinSLAMM) Version 9.3.0 (Pitt and Voorhees, 2009).

3.3 Design of Stormwater Facilities

Ch. NR 151, Wis. Admin. Code requires that BMPs be employed to maintain or reduce peak runoff discharge rates and to infiltrate runoff to the maximum extent practicable.

3.3.1 Infiltration Basins/Bioretention

Typically, stormwater quantity design requirements are met through the use of detention storage or infiltration. Detention storage is the temporary storage of stormwater accompanied by a controlled release. Infiltration basins serve to infiltrate a portion of the detained storage. Infiltration basins are open impoundments (greater than 15-feet wide in its minimum dimension) created either by excavation or embankment with a flat, densely vegetated floor dedicated to the infiltration of runoff through the ground surface. In addition to being used to meet infiltration requirements, infiltration basins can also be used for pollutant removal. Infiltration basins are designed in compliance with Wisconsin Department of Natural Resources (WDNR) Technical Standard 1003 (WDNR, 2004b). The infiltration performance is modeled using WinSLAMM Version 2.3 bioretention/raingarden sizing program. Their pollutant removal performance is modeled using WinSLAMM or calculated using Stokes Law.

Bioretention devices are infiltration devices consisting of an excavated area that is backfilled with an engineered soil, covered with a mulch layer and planted with a diversity of woody and herbaceous vegetation. Stormwater directed to the device percolates through the mulch and engineered soil, where it is treated by a variety of physical, chemical, and biological processes before infiltrating into the native soil. Bioretention devices are designed in compliance with WDNR Technical Standard 1004 (WDNR, 2006). Their infiltration performance is modeled using WinSLAMM. Their pollutant removal performance is modeled using WinSLAMM.

3.3.2 Additional Best Management Practices

Additional BMPs can be implemented to achieve the ch. NR 151, Wis. Admin. Code goal of 80% total suspended solids (TSS) reduction. These BMPs include vegetated swales, infiltration basins, bioretention, and proprietary devices.

The purpose of drainage swales is to collect overland flow and transmit it to larger, open stormwater drainage channels or to subsurface conveyance facilities. Drainage swales are generally grass lined or vegetated, but may be paved or rock-lined to prevent erosion on steep slopes. Vegetated swales meeting certain criteria may also be considered BMPs with the potential to promote infiltration and pollutant filtering, thereby reducing pollutants and improving water quality. Vegetated swales are designed to provide capacity for the 25-yr, 24-hr storm event. Typically, vegetated swales are designed following WDNR Technical Standard 1005 (WDNR, 2007). The hydraulic capacity of the swales is determined using Haestad FlowMaster 2005, Version 8.0045 (Bentley, 2009). The pollutant removal performance is modeled using WinSLAMM.

3.3.3 Culverts

Inlets and roadside culverts were designed to provide sufficient capacity to intake and pass all flow in the tributary ditches or swales from storms up to and including the service level chosen for the drainage basin (25-yr, 24-hr event for culverts).

Culvert performance was assessed using Haestad CulvertMaster Version 3.3 software (Bentley, 2008a).

3.4 Infiltration

Ch. NR 151, Wis. Admin. Code requires that non-residential developments infiltrate sufficient runoff so that the post development shall be at least 60% of the pre-development infiltration volume from roof-top and parking lot areas, based on an average annual rainfall. However, when designing appropriate infiltration systems to meet this requirement, no more than 2% of the project site is required as an effective infiltration area.

Runoff from the following areas is prohibited from being infiltrated: tier 1 and 2 industrial facilities, fueling and vehicle maintenance areas; areas within 1,000-feet upgradient and 100-feet downgradient of karst features; areas with less than three feet of separation distance from the bottom of the infiltration system to the elevation of the seasonal high water table or the top of bedrock; areas with runoff from industrial, commercial, and institutional parking lots and roads and residential arterial roads with less than five feet of separation distance from the bottom of the infiltration system to the elevation of the seasonal high groundwater or the top of bedrock; areas with runoff infiltrated from commercial, industrial, and institutional land uses or regional devices for residential development within 400 feet of a community water system well or within 100 feet of a private well; areas where contaminants of concern are present within the soil through which infiltration will occur; and any area where the soil does not contain at least a three-foot soil layer with 20% fines or greater or at least a five-foot soil layer with 10% fines or greater between the bottom of the infiltration system and the seasonal high groundwater and top of bedrock areas.

Areas exempted from meeting the ch. NR 151, Wis. Admin. Code infiltration requirements include sites with soils with infiltration rates less than 0.6 inches per hour; parking areas and access roads less than 5,000 square feet for commercial and industrial developments; redevelopment post-construction sites; in-fill development areas less than five acres; infiltration areas during periods when the soil is frozen; and roads in commercial, industrial, and institutional land uses, and arterial roads.

The infiltration requirements are met through the use of grass lined swales, infiltration basins, infiltration trenches, bioretention devices, pervious pavement, and rain gardens. The infiltration facilities are designed in compliance with their respective WDNR Technical Standards. Their performance is modeled using WinSLAMM.

3.5 Maintenance

Since the proposed project is exempt from ch. NR 151, Wis. Admin. Code post-construction stormwater management requirements under ss. NR 151.12(2)(d), a plan detailing the maintenance and inspection schedule of the stormwater facilities is not required. County and local ordinances also do not require an operation and maintenance plan.

However, in order to maximize the performance of BMPs to be installed at the site, the importance of maintenance on the BMPs is recognized. WDNR Technical Standard 1003 (Infiltration Basins) (WDNR, 2004b) and WDNR Technical Standard 1005 (Vegetated Infiltration Swale) (WDNR, 2007) list maintenance items to be performed on these BMPs. This maintenance program will be followed at the site. Various maintenance activities may include

mowing the grass on basin side slopes, inspecting basins and swales for erosion, maintaining vegetation, inspecting swale and culvert outfall for clogging, or silt removal.

3.6 Erosion Control

Construction site erosion control is required by ch. NR 151, Wis. Admin. Code for any construction site with greater than one acre of land disturbing construction activity. Ch. NR 151, Wis. Admin. Code also requires a reduction of 80%, to the maximum extent practicable, of the sediment load carried in runoff, on an average annual basis, as compared with no sediment controls, until the construction site has undergone final stabilization.

The 80% sediment load reduction is achieved by applying a combination of BMPs in compliance with their respective WDNR Technical Standards. Erosion control BMPs may include erosion mat, ditch checks, construction site diversion, dust control, polymers, mulching, bale barriers, sedimentation basins, sediment traps, seeding, silt fence, stone tracking pads, inlet protection, or vegetative buffers.

4 Discussion

The following section discusses the *SWMECP* details.

4.1 Stormwater Quantity

This proposed project is exempt from the post-construction stormwater management requirements under ch. NR 151.12(2)(d): "A post-construction site with less than 10% connected imperviousness based on complete development of the post-construction site, provided the cumulative area of all parking lots and rooftops is less than one acre."

The proposed project will not result in a net increase in the impervious area at the site, and therefore, will not increase the existing peak runoff rates.

4.1.1 Existing Conditions

The existing site contains two sub-watersheds: the 32-acre former Industrial Outlot and the 9.4-acre area immediately adjacent to Highway 27. The former Industrial Outlot watershed consists of a parking lot and buildings, grassland and meadow areas, the 0.9-acre Biofilter, and dirt roads. The watershed currently drains via overland flow and ditches toward the existing 0.9-acre Biofilter. The watershed adjacent to Highway 27 consists of trees, brush/grass mix, and the western half of Highway 27, and drains to the existing culvert under the former rail spur.

The RCNs for hydrologic soil group (HSG) C soils were used for existing conditions in the Copper Park Business and Recreation Area, due to surficial fill material having been compacted during construction of the former outlot. Type B soils were used for the watershed to the west of Highway 27 as the area was outside of the limits of the Copper Park Business and Recreation Area.

PondPack analyses for the existing site conditions for the 100-yr, 24-hr storm are included in Appendix B.

4.1.2 Post-Construction Conditions

Site construction activities involve the excavation of two new infiltration basins, the conversion of the 0.9-acre Biofilter to an infiltration basin, the removal of the former rail spur, and the re-grading of the ditch/swale to the north of the parking lot. The future site conditions are shown on Figure 2 of the *Work Plan*. The future site conditions will not contain increased impervious area compared to existing conditions.

The proposed three infiltration basins have been designed to store runoff from the 100-yr, 24-hr storm event without discharging or overtopping. Therefore, there will be zero discharge from the site for storms up to and including the 100-yr, 24-hr event. PondPack analyses for the developed site conditions are included in Appendix B.

4.2 Stormwater Quality

Upon completion of construction, the Copper Park Business and Recreation Area will meet the TSS removal performance standard under ch. NR 151, Wis. Admin. Code through the use of vegetated swales and buffers and infiltration basins.

Runoff from the parking lot and rooftops will be directed to a vegetated treatment swale on the north side of the parking lot (see Figure 2 of the *Work Plan*). The swale will be re-graded with a high point in the center so that it drains to both the east and the west. The swales will provide for suspended solids removal before runoff enters the east and west infiltration basins. Additionally, the east and west infiltration basins will contain vegetated buffers between the basins and the parking lot to provide suspended solids removal for the smaller volume of direct runoff from the parking lot. Two existing vegetative swales located in the equestrian area will also be enhanced to provide total suspended solids removal from runoff prior to entering the north and east infiltration basins.

The performance of the vegetated swales and infiltration basins was modeled by WinSLAMM. The WinSLAMM analyses, included in Appendix C, indicate that the overall site TSS reduction is 100%.

4.3 Design of Stormwater Facilities

Three infiltration basins will be constructed at the Copper Park Business and Recreation Area (see Figure 2-2 of the *Work Plan*). The basins will be referred to as the West, North, and East Copper Park Infiltration Basins, and will collect and infiltrate runoff from the Copper Park Business and Recreation Area for storms up to and including the 100-yr, 24-hr storm event. All PondPack calculations for the basin design are included in Appendix B.

4.3.1 Infiltration Basins

The following sections describe the proposed infiltration basins.

4.3.1.1 West Copper Park Infiltration Basin

The West Copper Park Infiltration Basin will be located to the west of the asphalted area. The basin will receive runoff from approximately the western one-third of the asphalted area, as well as the grassed and dirt road areas to the west of the asphalt. A portion of the asphalted area runoff will flow via overland flow directly into the basin. A vegetated buffer will be placed between the asphalted area and the basin in this area for pre-treatment. The remaining runoff from the asphalted area will be collected by a vegetated swale to the north of the asphalt. The existing ditch to the north of the asphalted area will be re-graded and converted into a vegetated swale to provide for pre-treatment prior to the infiltration basin. The infiltration basin will be approximately 0.64 acres in size, and the 100-yr, 24-hr storm event will produce a peak storage of 2.25 acre feet (ac-ft) and 4.6 feet in depth. The 100-yr, 24-hr storm event will be fully contained within the basin with zero discharge. Storms larger than the 100-yr, 24-hr storm event will cause runoff to backup into the drainage swale, eventually over-topping the swale and producing overland flow.

4.3.1.2 North Copper Park Infiltration Basin

The North Copper Park Infiltration Basin will be located to the north of the existing 0.9-acre Biofilter. The basin will receive runoff from the approximately 9.4 acre watershed along the west side of Highway 27, as well as from the eastern half of the Equestrian Trailhead area. Runoff from along the west side of Highway 27 will initially pond in the natural low area to the north of the former rail spur. This area will retain smaller storm events and will provide for sediment removal. Larger storm events will then discharge into the North Copper Park Infiltration Basin. Runoff from most of the eastern half of the Equestrian Trailhead area will be collected by the existing vegetated swale prior to discharging to the north infiltration basin. A small amount of runoff from the area will discharge directly to the north infiltration basin. The North Copper Park Infiltration Basin will be approximately 0.60 acres in size, and the 100-yr, 24-hr storm event will produce a peak storage of 2.30 ac-ft and 5.4 feet in depth. The 100-yr, 24-hr storm event will produce a peak discharge from the basin of approximately 0.8 cfs. This discharge, as well as the discharge for storms larger than the 100-yr, 24-hr storm event, will flow via an earthen weir and channel into the East Copper Park Infiltration Basin.

4.3.1.3 East Copper Park Infiltration Basin (Biofilter Conversion)

The existing 0.9-acre Biofilter will be converted into the East Copper Park Infiltration Basin. The basin conversion will involve the excavation of approximately eleven feet of soil and accumulated sediment from the existing 0.9-acre Biofilter (Figure 1). The excavated material will be disposed of at an appropriate landfill.

The existing liner will also be removed, which is located at an elevation of 1,124.0 feet. It is estimated that in addition to the initial draining of the 0.9-acre Biofilter, dewatering of the 0.9-acre Biofilter will need to occur during liner removal activities, since the liner is approximately 2 – 4 feet below the water table. Details of a dewatering plan can be found in Appendix E of the *Work Plan*. Water pumped during the conversion of the 0.9-acre Biofilter will be sent to the West Copper Park Infiltration Basin. Following dewatering activities, sediment will be removed from the West Copper Park Infiltrations Basin, and final grading and re-vegetation activities will be completed.

The 2 – 4 feet of excavated material below the water table under the 0.9-acre Biofilter will be replaced with sand or gravel. The 5 – 7 feet of excavated material above the water table will be replaced with a mixture of 40% sand, 20-30% topsoil, and 30-40% compost, in compliance with the engineered soil mixture found in WDNR Technical Standard 1004 – Bioretention for Infiltration (WDNR, 2006). The floor of the future infiltration basin will be at an elevation of 1,133.0 feet, which will be greater than five feet above the groundwater table (Figure 1). The existing 0.9-acre Biofilter discharge ditch will be filled so no discharges from the East Copper Park Infiltration Basin will occur for storms up to and including the 100-yr, 24-hr event.

The East Copper Park Infiltration Basin will receive runoff from approximately the eastern two-thirds of the asphalted area, from the western half of the Equestrian Trailhead area, and from miscellaneous grassed and dirt roads in the area. The basin will also receive any overflow from the North Copper Park Infiltration Basin. The vegetated swale to be constructed to the north of the asphalted area will provide pretreatment for runoff from most of the asphalt. Runoff from the far eastern portion of the asphalt will be treated by a vegetated buffer that will be placed

between the asphalted area and the basin. Runoff from most of the western half of the Equestrian Trailhead area will be collected by the existing vegetated swale prior to discharging to the infiltration basin. The infiltration basin will be approximately 1.0 acre in size, and the 100-yr, 24-hr storm event will produce a peak storage of 3.74 ac-ft and 4.4 feet in depth. The 100-yr, 24-hr storm event will be fully contained within the basin with zero discharge. Storms larger than the 100-yr, 24-hr storm event will overflow the berm on the east side of the basin and will discharge via overland flow to Intermittent Stream C.

4.3.2 Additional Best Management Practices

The grass-lined swale along the north side of the asphalted area was designed in accordance with WDNR Technical Standard 1005 (WDNR, 2007). The existing ditch will be re-graded to create the swale, and a high point will be created to split the flow so that one swale directs runoff to the east, and one swale directs runoff to the west. The swales were designed to provide capacity for the 25-yr, 24-hr storm. Hydraulic calculations from the FlowMaster program (Bentley, 2009) are included in Appendix B.

The swale design parameters were also input into WinSLAMM to determine the overall site TSS removal. The WinSLAMM calculations are included in Appendix C.

4.3.3 Culverts

The existing 18 inch diameter corrugated metal pipe (CMP) carrying runoff to the 0.9-acre Biofilter under the road to the Equestrian Trailhead will be replaced with a 24 inch diameter CMP. The larger culvert will allow for a lowered velocity through the pipe (which will promote sediment removal), and will allow for a reduced capacity due to sedimentation. The culvert capacity was designed for the 25-yr, 24-hr storm event, and calculations from the CulvertMaster software can be found in Appendix B.

4.4 Infiltration

The three infiltration basins will provide infiltration for runoff at the Copper Park Business and Recreation Area. Infiltration rates were estimated by a review of the soil survey, previous soil boring logs, and particle size analysis results on soil samples collected on-site.

The boring log from piezometer PZ-1008, located approximately 450 feet from the proposed infiltration basin, indicates silty sand material with some fine to coarse-grained gravel. On May 25, 2010, two hand-auger borings were completed to a depth of three feet in the area of the proposed western infiltration basin. A particle size analysis was run on both samples, and they were shown to be classified as: GM – silty gravel with sand, and SM – silty sand for soil borings one and two, respectively.

An estimate of infiltration rates under the basins can be obtained by using the WDNR Conservation Practice Standard 1002 (Site Evaluation for Stormwater Infiltration). The particle size analysis performed on the two samples collected in the area of the proposed western infiltration basin showed the least permeable soil to be classified as a silty sand. Using the infiltration rate in Table 2 of Standard 1002 (loamy sand: 1.63 inch/hour [in/hr]), and the correction factor in Table 3 of Standard 1002 (2.5), the estimated infiltration rate equals

0.65 in/hr (1.63 in/hr / 2.5 = 0.65 in/hr). As a conservative measure, an infiltration rate of 0.50 in/hr was used.

Since the basins were designed to contain runoff from the 100-yr, 24-hr storm event, all runoff from this event or smaller will be infiltrated or removed from the basins via evapotranspiration.

Infiltration will also occur in the vegetated swales and buffers. However, as a conservative measure, infiltration was assumed to be zero in these areas.

4.5 Maintenance

All site stormwater facilities will be inspected and maintained by the site owner. The grass-lined swales and infiltration basins will be inspected for vegetation growth, erosion, debris and sedimentation.

4.6 Erosion Control

Best Management Practices (BMP) will be implemented in accordance with ch. NR 151, Wis. Admin. Code. Proposed erosion control during construction activities BMPs include the installation of stone tracking pads at construction site entrances, silt fence, temporary ditch checks, and seeding, fertilizing, and mulching. The locations of the proposed BMPs are included on Figure 2 of the *Work Plan*.

Inspections of the erosion control BMPs will be performed at a minimum of once weekly in compliance with ch. NR 151, Wis. Admin. Code during construction activities. A copy of the WDNR Erosion Control Inspection Form is included in Appendix D.

5 Conclusions

The stormwater management facilities designed for the Copper Park Business and Recreation Area comply with the stormwater quality and quantity regulations of ch. NR 151, Wis. Admin Code. The 80% TSS reduction and infiltration requirements will be met through the use of vegetated swales and buffers and infiltration basins. The proposed project is exempt from ch. NR 151, Wis. Admin. Code post-construction stormwater management requirements under ch. NR 151.12(2)(d): "A post-construction site with less than 10% connected imperviousness based on complete development of the post-construction site, provided the cumulative area of all parking lots and rooftops is less than one acre.".

State of Wisconsin erosion control requirements are met through the implementation of BMPs. For the Copper Park Business and Recreation Area, the proposed BMPs include stone tracking pads, silt fences, temporary ditch checks, and seeding, fertilizing, and mulching. These BMPs will be installed in accordance with ch. NR 151, Wis. Admin. Code.

6 References

Bentley, 2008a. Bentley CulvertMaster, Bentley Systems, Inc., Watertown, CT.

Bentley, 2008b. Bentley PondPack, Bentley Systems, Inc., Watertown, CT.

Bentley, 2009. Bentley FlowMaster, Bentley Systems, Inc., Watertown, CT.

Pitt and Voorhees, 2009. Source Loading and Management Model for Windows. PV and Associates, LLC, Madison, WI.

WDNR, 2003. *Vegetative Buffer for Construction Sites (1054).* May, 2003. Wisconsin Department of Natural Resources Conservation Practice Standard.

WDNR, 2004a. *Site Evaluation for Stormwater Infiltration (1002).* February, 2004. Wisconsin Department of Natural Resources Conservation Practice Standard.

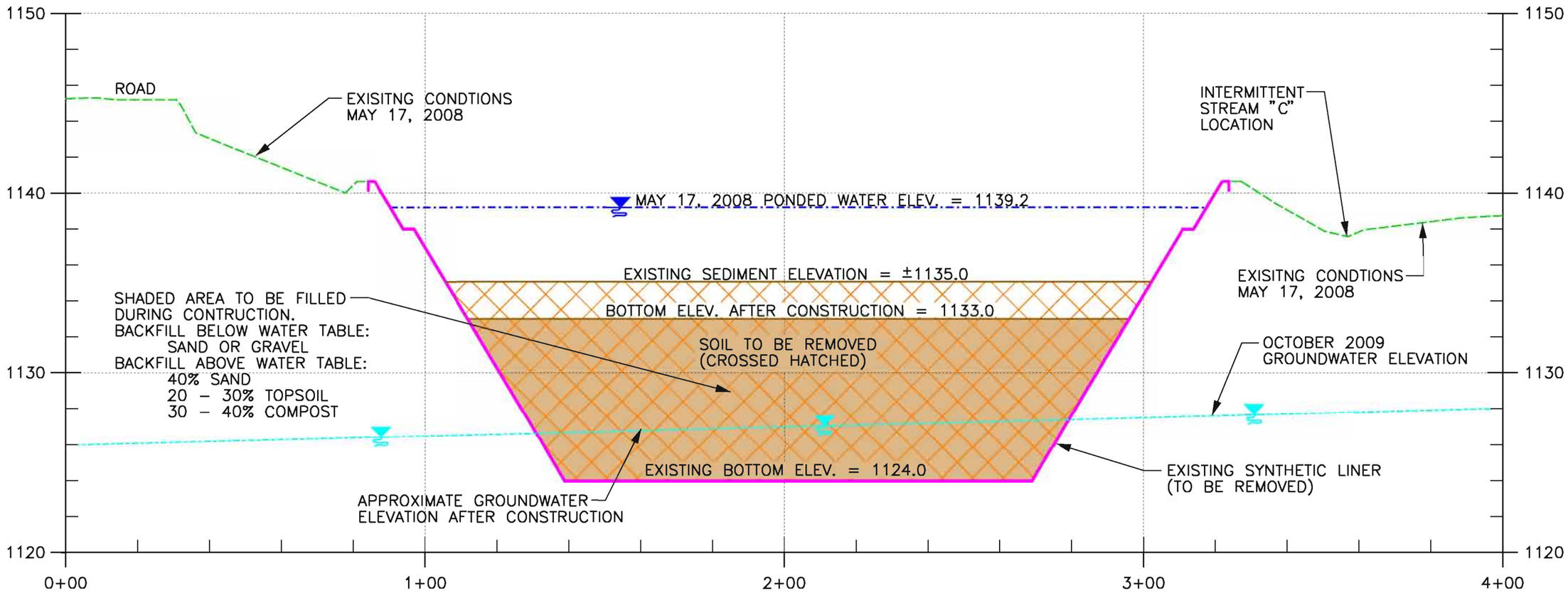
WDNR, 2004b. *Infiltration Basin (1003).* October, 2004. Wisconsin Department of Natural Resources Conservation Practice Standard.

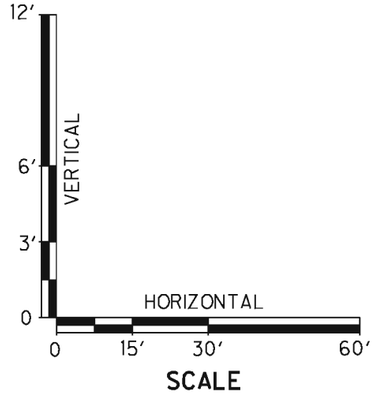
WDNR, 2006. *Bioretention for Infiltration (1004).* July, 2006. Wisconsin Department of Natural Resources Conservation Practice Standard.

WDNR, 2007. *Vegetated Infiltration Swale (1005).* May, 2007. Wisconsin Department of Natural Resources Conservation Practice Standard.

WDNR, 2007. *Dewatering(1061).* April, 2007. Wisconsin Department of Natural Resources Conservation Practice Standard.

Figures





Foth Infrastructure & Environment, LLC			
REVISED	DATE	BY	DESCRIPTION

CHECKED BY:	MAN	DATE:	MAY '11
APPROVED BY:	JBH1	DATE:	MAY '11
APPROVED BY:		DATE:	

Foth
Foth Infrastructure & Environment, LLC

FLAMBEAU MINING COMPANY

FIGURE 1

PROPOSED EAST COPPER PARK
INFILTRATION BASIN CROSS SECTION
(LOOKING NORTH)

Scale:	SEE BAR SCALE	Date:	MAY, 2011
Prepared By:	JRB2	Project No:	08F777

$$$$DGNSPEC$$$$$$$$$$$$$$$$$$
$$DAT$$$$ $USRN$

Appendix A

Existing Conditions Site Photographs

PHOTOGRAPHIC LOG

Facility Name:	Site Location:	Project No.
Copper Park Business & Rec. Area	Ladysmith, WI	08F777

Photo No.	Date:
1	5/25/10

Direction Photo Taken:

Southeast

Description:

Proposed West Copper Park Infiltration Basin location.

Photo No.	Date:
2	5/25/10

Direction Photo Taken:

East

Description:

Proposed East Copper Park Infiltration Basin.

PHOTOGRAPHIC LOG

Facility Name:	Site Location:	Project No.
Copper Park Business & Rec. Area	Ladysmith, WI	08F777

Photo No.	Date:
3	5/25/10

Direction Photo Taken:

West

Description:

Existing area of proposed North Copper Park Infiltration Basin.

Photo No.	Date:
4	5/25/10

Direction Photo Taken:

West

Description:

Existing railspur. North wetland to right, south wetland to left.

PHOTOGRAPHIC LOG

Facility Name:	Site Location:	Project No.
Copper Park Business & Rec. Area	Ladysmith, WI	08F777

Photo No.	Date:
5	

Direction Photo Taken:

Northeast

Description:

Wetland area to the north and east of the railspur.

Photo No.	Date:
6	5/25/10

Direction Photo Taken:

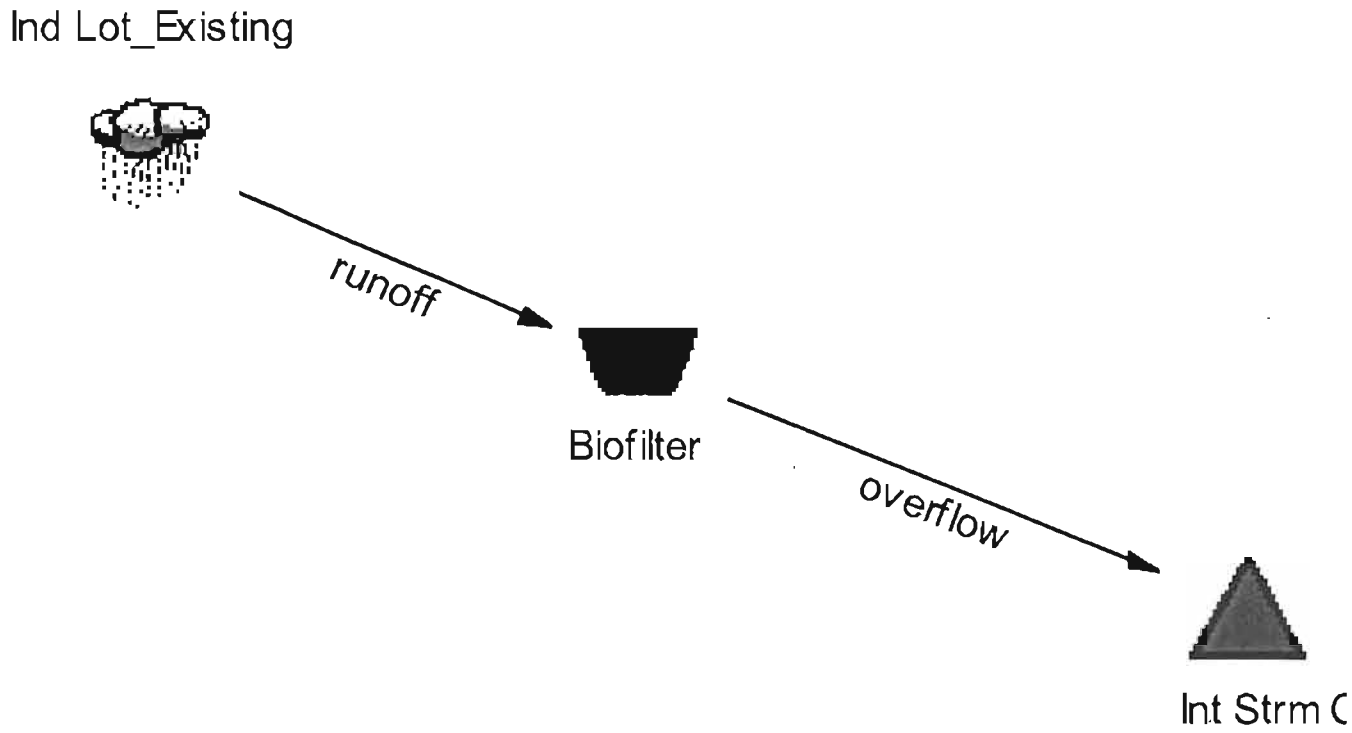
South

Description:

Intermittent Stream C, to the east of the biofilter (proposed East Copper Park Infiltration Basin) south wetland to left.

Appendix B

Stormwater Quantity Calculations


Ind Lot_Existing
runoff
Biofilter
overflow
Int Strm C

SCS UNIT HYDROGRAPH METHOD

STORM EVENT: 100 year storm
Duration = 24.0000 hrs Rain Depth = 5.9800 in
Rain Dir = \\GB1\GBProjects\IE\2008\08F777\12000 data & calcs\Stormwate
Rain File -ID = - TypeII 24hr
Unit Hyd Type = Default Curvilinear
HYG Dir = \\GB1\GBProjects\IE\2008\08F777\12000 data & calcs\Stormwate
HYG File - ID = - IND LOT_EXISTING 100
Tc = .1104 hrs
Drainage Area = 21.180 acres Runoff CN= 82

Computational Time Increment = .01473 hrs
Computed Peak Time = 11.9425 hrs
Computed Peak Flow = 124.05 cfs

Time Increment for HYG File = .0500 hrs
Peak Time, Interpolated Output = 11.9500 hrs
Peak Flow, Interpolated Output = 122.85 cfs

DRAINAGE AREA
ID:IND LOT_EXISTING
CN = 82
Area = 21.180 acres
S = 2.1951 in
0.2S = .4390 in

Cumulative Runoff
3.9687 in
7.005 ac-ft

HYG Volume... 7.005 ac-ft (area under HYG curve)

***** SCS UNIT HYDROGRAPH PARAMETERS *****

Time Concentration, Tc = .11044 hrs (ID: IND LOT_EXISTING)
Computational Incr, Tm = .01473 hrs = 0.20000 Tp

Unit Hyd. Shape Factor = 483.432 (37.46% under rising limb)
K = 483.43/645.333, K = .7491 (also, K = 2/(1+(Tr/Tp))
Receding/Rising, Tr/Tp = 1.6698 (solved from K = .7491)

Unit peak, qp = 217.29 cfs
Unit peak time Tp = .07363 hrs
Unit receding limb, Tr = .29451 hrs
Total unit time, Tb = .36814 hrs

RUNOFF CURVE NUMBER DATA

Soil/Surface Description	CN	Area acres	Impervious Adjustment %C	%UC	Adjusted CN
Meadow - cont. grass (non grazed) -	71	11.530			71.00
Impervious Areas - Dirt (w/ right-o	87	2.050			87.00
Pavement/Buildings	98	7.600			98.00
COMPOSITE AREA & WEIGHTED CN --->		21.180			82.24 (82)

TIME OF CONCENTRATION CALCULATOR

Segment #1: Tc: TR-55 Sheet

Mannings n	.0110	
Hydraulic Length	50.00	ft
2yr, 24hr P	2.7700	in
Slope	.040000	ft/ft
Avg.Velocity	1.47	ft/sec

Segment #1 Time: .0094 hrs

Segment #2: Tc: TR-55 Shallow

Hydraulic Length	370.00	ft
Slope	.005400	ft/ft
Unpaved		
Avg.Velocity	1.19	ft/sec

Segment #2 Time: .0867 hrs

Segment #3: Tc: TR-55 Channel

Flow Area	10.0000	sq.ft
Wetted Perimeter	10.00	ft
Hydraulic Radius	1.00	ft
Slope	.002200	ft/ft
Mannings n	.0050	
Hydraulic Length	720.00	ft
Avg.Velocity	13.98	ft/sec

Segment #3 Time: .0143 hrs

Total Tc: .1104 hrs

Tc Equations used...

==== SCS TR-55 Sheet Flow ====

Tc = (.007 * ((n * Lf)**0.8)) / ((P**.5) * (Sf**.4))

Where: Tc = Time of concentration, hrs
n = Mannings n
Lf = Flow length, ft
P = 2yr, 24hr Rain depth, inches
Sf = Slope, %

==== SCS TR-55 Shallow Concentrated Flow ====

Unpaved surface:
V = 16.1345 * (Sf**0.5)

Paved surface:
V = 20.3282 * (Sf**0.5)

Tc = (Lf / V) / (3600sec/hr)

Where: V = Velocity, ft/sec
Sf = Slope, ft/ft
Tc = Time of concentration, hrs
Lf = Flow length, ft

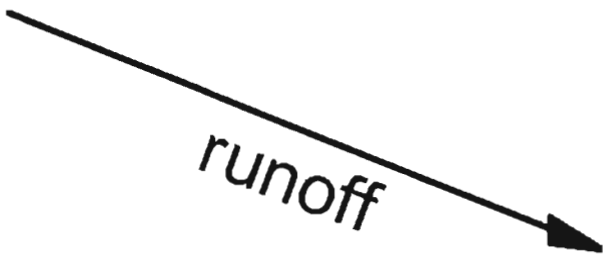
==== SCS Channel Flow ==========

R = Aq / Wp
V = (1.49 * (R**(2/3)) * (Sf**-0.5)) / n

Tc = (Lf / V) / (3600sec/hr)

Where: R = Hydraulic radius
Aq = Flow area, sq.ft.
Wp = Wetted perimeter, ft
V = Velocity, ft/sec
Sf = Slope, ft/ft
n = Mannings n
Tc = Time of concentration, hrs
Lf = Flow length, ft

W Hw y27_existing



Int Strm C

SCS UNIT HYDROGRAPH METHOD

STORM EVENT: 100 year storm
Duration = 24.0000 hrs Rain Depth = 5.9800 in
Rain Dir = \\GB1\GBProjects\IE\2008\08F777\12000 data & calcs\Stormwate
Rain File -ID = - TypeII 24hr
Unit Hyd Type = Default Curvilinear
HYG Dir = \\GB1\GBProjects\IE\2008\08F777\12000 data & calcs\Stormwate
HYG File - ID = - W HWY27_EXISTING 100
Tc = .4943 hrs
Drainage Area = 9.390 acres Runoff CN= 61

==========
Computational Time Increment = .06591 hrs
Computed Peak Time = 12.1928 hrs
Computed Peak Flow = 15.14 cfs

Time Increment for HYG File = .0250 hrs
Peak Time, Interpolated Output = 12.2000 hrs
Peak Flow, Interpolated Output = 15.08 cfs
==========

DRAINAGE AREA

ID:W HWY27_EXISTING
CN = 61
Area = 9.390 acres
S = 6.3934 in
0.2S = 1.2787 in

Cumulative Runoff

1.9921 in
1.559 ac-ft

HYG Volume... 1.559 ac-ft (area under HYG curve)

***** SCS UNIT HYDROGRAPH PARAMETERS *****

Time Concentration, Tc = .49430 hrs (ID: W HWY27_EXISTING)
Computational Incr, Tm = .06591 hrs = 0.20000 Tp

Unit Hyd. Shape Factor = 483.432 (37.46% under rising limb)
K = 483.43/645.333, K = .7491 (also, K = 2/(1+(Tr/Tp))
Receding/Rising, Tr/Tp = 1.6698 (solved from K = .7491)

Unit peak, qp = 21.52 cfs
Unit peak time Tp = .32954 hrs
Unit receding limb, Tr = 1.31814 hrs
Total unit time, Tb = 1.64768 hrs

RUNOFF CURVE NUMBER DATA

Soil/Surface Description	CN	Area acres	Impervious Adjustment %C	Impervious Adjustment %UC	Adjusted CN
Woods - fair	60	3.640			60.00
Brush - brush, weed, grass mix - fa	56	5.000			56.00
Pavement/Buildings	98	.750			98.00
COMPOSITE AREA & WEIGHTED CN --->		9.390			60.91 (61)

Tc Equations used...

==== SCS TR-55 Sheet Flow ==========

Tc = (.007 * ((n * Lf)**0.8)) / ((P**.5) * (Sf**.4))

Where: Tc = Time of concentration, hrs
n = Mannings n
Lf = Flow length, ft
P = 2yr, 24hr Rain depth, inches
Sf = Slope, %

==== SCS TR-55 Shallow Concentrated Flow ==========

Unpaved surface:
V = 16.1345 * (Sf**0.5)

Paved surface:
V = 20.3282 * (Sf**0.5)

Tc = (Lf / V) / (3600sec/hr)

Where: V = Velocity, ft/sec
Sf = Slope, ft/ft
Tc = Time of concentration, hrs
Lf = Flow length, ft

TIME OF CONCENTRATION CALCULATOR

Segment #1: Tc: TR-55 Sheet

Mannings n	.1500	
Hydraulic Length	100.00	ft
2yr, 24hr P	2.7700	in
Slope	.020000	ft/ft
Avg.Velocity	.16	ft/sec

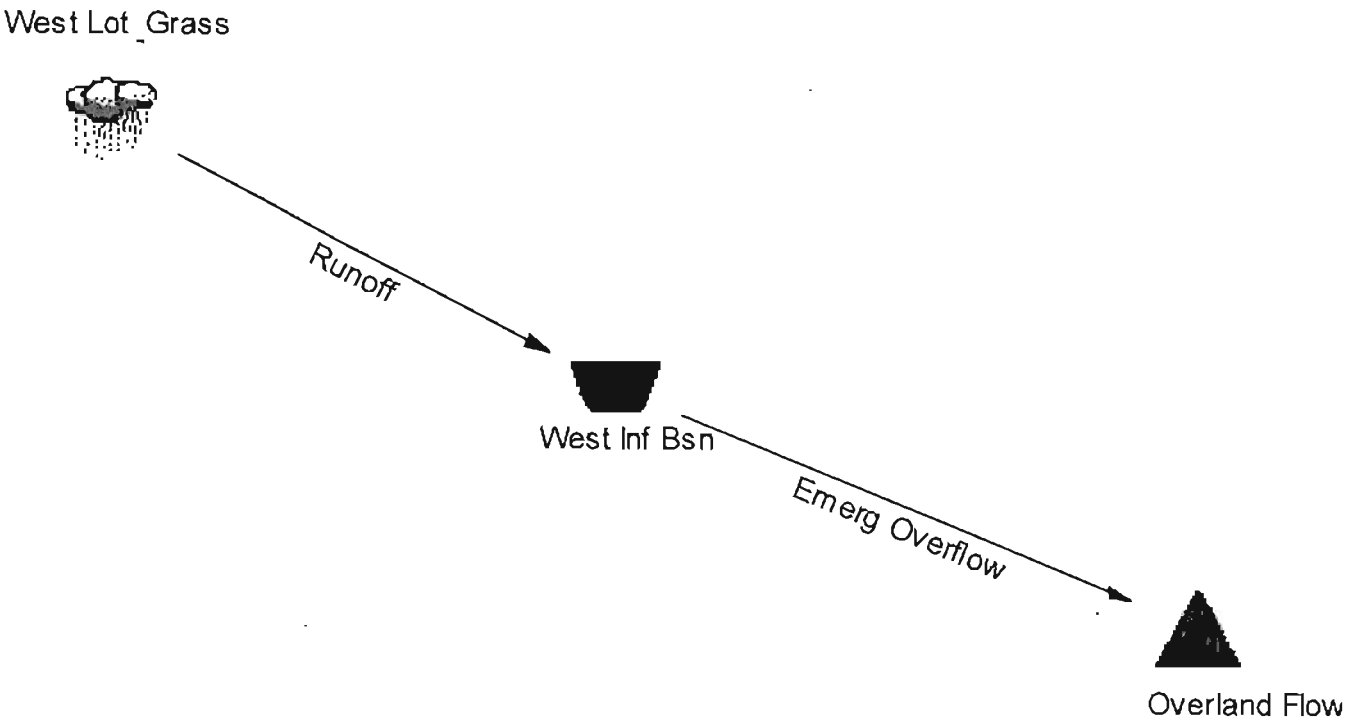
Segment #1 Time: .1755 hrs

Segment #2: Tc: TR-55 Shallow

Hydraulic Length	1200.00	ft
Slope	.004200	ft/ft
Unpaved		
Avg.Velocity	1.05	ft/sec

Segment #2 Time: .3188 hrs

Total Tc: .4943 hrs


West Lot_Grass
Runoff
West Inf Bsn
Emerg Overflow
Overland Flow

SCS UNIT HYDROGRAPH METHOD

STORM EVENT: 100 year storm
Duration = 24.0000 hrs Rain Depth = 5.9800 in
Rain Dir = \\GBI\GBProjects\IE\2008\08F777\12000 data & calcs\Stormwate
Rain File -ID = - TypeII 24hr
Unit Hyd Type = Default Curvilinear
HYG Dir = \\GBI\GBProjects\IE\2008\08F777\12000 data & calcs\Stormwate
HYG File - ID = - WEST LOT & GRASS 100
Tc = .1228 hrs
Drainage Area = 6.800 acres Runoff CN= 82

Computational Time Increment = .01638 hrs
Computed Peak Time = 11.9390 hrs
Computed Peak Flow = 38.90 cfs

Time Increment for HYG File = .0500 hrs
Peak Time, Interpolated Output = 11.9500 hrs
Peak Flow, Interpolated Output = 38.85 cfs

DRAINAGE AREA
ID:WEST LOT & GRASS
CN = 82
Area = 6.800 acres
S = 2.1951 in
0.2S = .4390 in

Cumulative Runoff
3.9687 in
2.249 ac-ft

HYG Volume... 2.249 ac-ft (area under HYG curve)

***** SCS UNIT HYDROGRAPH PARAMETERS *****

Time Concentration, Tc = .12283 hrs (ID: WEST LOT & GRASS)
Computational Incr, Tm = .01638 hrs = 0.20000 Tp

Unit Hyd. Shape Factor = 483.432 (37.46% under rising limb)
K = 483.43/645.333, K = .7491 (also, K = 2/(1+(Tr/Tp))
Receding/Rising, Tr/Tp = 1.6698 (solved from K = .7491)

Unit peak, qp = 62.73 cfs
Unit peak time Tp = .08189 hrs
Unit receding limb, Tr = .32754 hrs
Total unit time, Tb = .40943 hrs

RUNOFF CURVE NUMBER DATA

Soil/Surface Description	CN	Area acres	Impervious Adjustment %C	%UC	Adjusted CN
Meadow - cont. grass (non grazed) -	71	3.750			71.00
Impervious Areas - Dirt (w/ right-o	87	.550			87.00
Pavement/Buildings	98	2.500			98.00
COMPOSITE AREA & WEIGHTED CN --->		6.800			82.22 (82)

TIME OF CONCENTRATION CALCULATOR

Segment #1: Tc: TR-55 Sheet

Mannings n	.0110	
Hydraulic Length	50.00	ft
2yr, 24hr P	2.7700	in
Slope	.040000	ft/ft
Avg.Velocity	1.47	ft/sec

Segment #1 Time: .0094 hrs

Segment #2: Tc: TR-55 Shallow

Hydraulic Length	330.00	ft
Slope	.006100	ft/ft
Paved		
Avg.Velocity	1.59	ft/sec

Segment #2 Time: .0577 hrs

Segment #3: Tc: TR-55 Channel

Flow Area	10.0000	sq.ft
Wetted Perimeter	10.00	ft
Hydraulic Radius	1.00	ft
Slope	.002200	ft/ft
Mannings n	.0400	
Hydraulic Length	350.00	ft
Avg.Velocity	1.75	ft/sec

Segment #3 Time: .0556 hrs

Total Tc: .1228 hrs

==== SCS Channel Flow ==========

R = Aq / Wp
V = (1.49 * (R**(2/3)) * (Sf**-0.5)) / n

Tc = (Lf / V) / (3600sec/hr)

Where: R = Hydraulic radius
Aq = Flow area, sq.ft.
Wp = Wetted perimeter, ft
V = Velocity, ft/sec
Sf = Slope, ft/ft
n = Mannings n
Tc = Time of concentration, hrs
Lf = Flow length, ft

LEVEL POOL ROUTING SUMMARY

HYG Dir = \\GB1\GBProjects\IE\2008\08F777\12000 data & calcs\Stormwater Design_M
Inflow HYG file = NONE STORED - WEST INF BSN IN 100
Outflow HYG file = NONE STORED - WEST INF BSN OUT 100

Pond Node Data = WEST INF BSN
Pond Volume Data = WEST INF BSN
Pond Outlet Data = Emerg Overflow

No Infiltration

INITIAL CONDITIONS

Starting WS Elev	= 1138.00	ft
Starting Volume	= .000	ac-ft
Starting Outflow	= .00	cfs
Starting Infiltr.	= .00	cfs
Starting Total Qout	= .00	cfs
Time Increment	= .0500	hrs

INFLOW/OUTFLOW HYDROGRAPH SUMMARY

Peak Inflow	= 38.85	cfs	at	11.9500 hrs
Peak Outflow	= .00	cfs	at	5.7500 hrs
Peak Elevation	= 1142.64	ft		
Peak Storage	= 2.249	ac-ft		

MASS BALANCE (ac-ft)

+ Initial Vol	=	.000
+ HYG Vol IN	=	2.249
- Infiltration	=	.000
- HYG Vol OUT	=	.000
- Retained Vol	=	2.249
Unrouted Vol	=	-.000 ac-ft (.004% of Inflow Volume)

Elevation (ft)	Planimeter (sq.in)	Area (acres)	A1+A2+sqr(A1*A2) (acres)	Volume (ac-ft)	Volume Sum (ac-ft)
1138.00	-----	.3670	.0000	.000	.000
1143.00	-----	.6350	1.4847	2.475	2.475

POND VOLUME EQUATIONS

* Incremental volume computed by the Conic Method for Reservoir Volumes.

Volume = (1/3) * (EL2-EL1) * (Area1 + Area2 + sq.rt.(Area1*Area2))

where: EL1, EL2 = Lower and upper elevations of the increment
Area1,Area2 = Areas computed for EL1, EL2, respectively
Volume = Incremental volume between EL1 and EL2

REQUESTED POND WS ELEVATIONS:

Min. Elev.= 1138.00 ft
Increment = .10 ft
Max. Elev.= 1143.00 ft

****
OUTLET CONNECTIVITY
****

---> Forward Flow Only (UpStream to DnStream)
<--- Reverse Flow Only (DnStream to UpStream)
<---> Forward and Reverse Both Allowed

Structure	No.		Outfall	E1, ft	E2, ft
Weir-Rectangular	W0	--->	TW	1143.000	1143.000

TW SETUP, DS Channel

OUTLET STRUCTURE INPUT DATA

Structure ID = WO
Structure Type = Weir-Rectangular

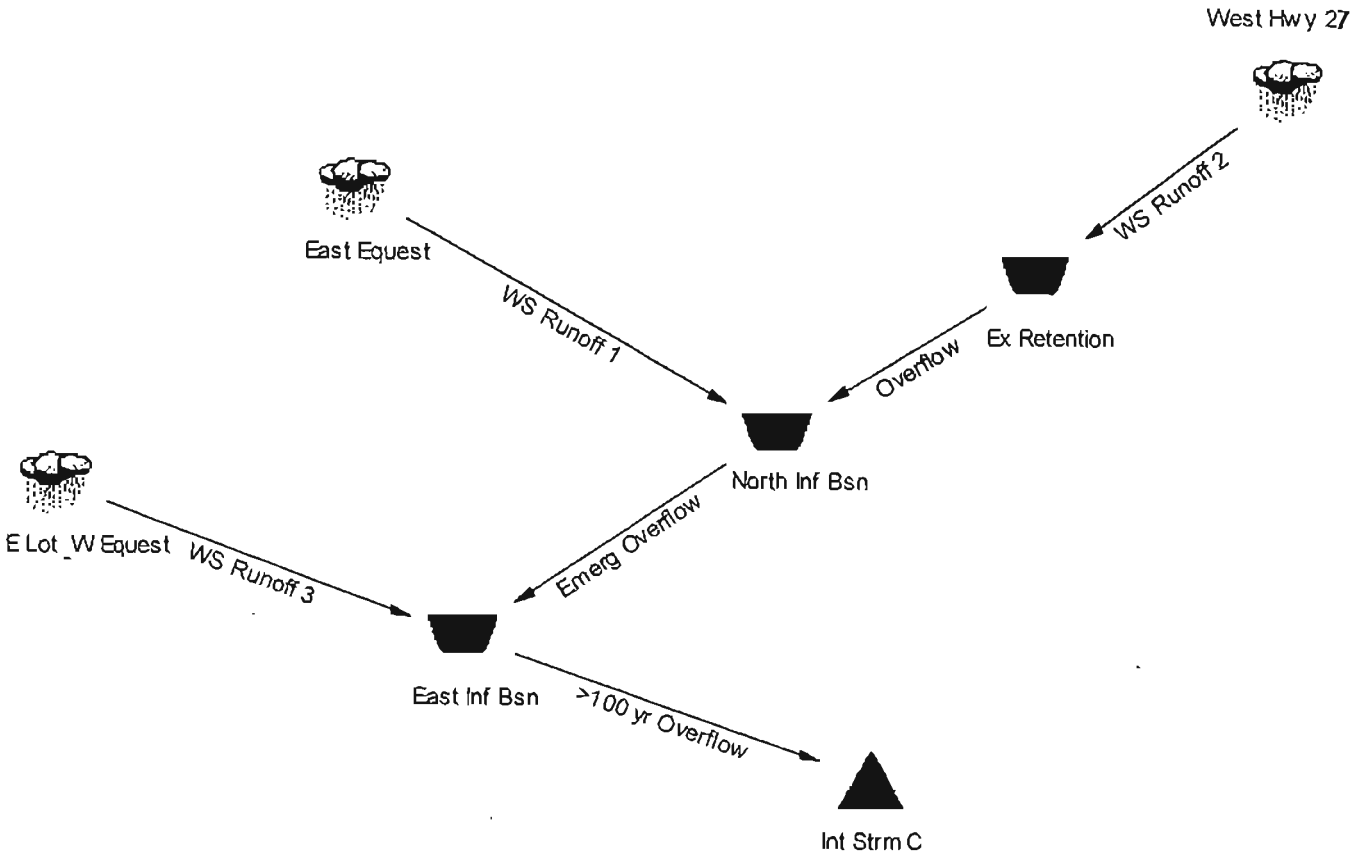
# of Openings = 1
Crest Elev. = 1143.00 ft
Weir Length = 15.00 ft
Weir Coeff. = 3.000000

Weir TW effects (Use adjustment equation)

Structure ID = TW
Structure Type = TW SETUP, DS Channel

FREE OUTFALL CONDITIONS SPECIFIED

CONVERGENCE TOLERANCES...
Maximum Iterations= 40
Min. TW tolerance = .01 ft
Max. TW tolerance = .01 ft
Min. HW tolerance = .01 ft
Max. HW tolerance = .01 ft
Min. Q tolerance = .00 cfs
Max. Q tolerance = .00 cfs


West Hwy 27
East Equest
WS Runoff 1
WS Runoff 2
Overflow
Ex Retention
North Inf Bsn
E Lot_W Equest
WS Runoff 3
Emerg Overflow
East Inf Bsn
>100 yr Overflow
Int Strm C

SCS UNIT HYDROGRAPH METHOD

STORM EVENT: 100 year storm
Duration = 24.0000 hrs Rain Depth = 5.9800 in
Rain Dir = \\GB1\GBProjects\IE\2008\08F777\12000 data & calcs\Stormwate
Rain File -ID = - TypeII 24hr
Unit Hyd Type = Default Curvilinear
HYG Dir = \\GB1\GBProjects\IE\2008\08F777\12000 data & calcs\Stormwate
HYG File - ID = - E LOT & W EQUEST 100
Tc = .2340 hrs
Drainage Area = 9.270 acres Runoff CN= 86

Computational Time Increment = .03120 hrs
Computed Peak Time = 12.0105 hrs
Computed Peak Flow = 48.91 cfs

Time Increment for HYG File = .0250 hrs
Peak Time, Interpolated Output = 12.0250 hrs
Peak Flow, Interpolated Output = 48.88 cfs

DRAINAGE AREA
ID:E LOT & W EQUEST
CN = 86
Area = 9.270 acres
S = 1.6279 in
0.2S = .3256 in

Cumulative Runoff
4.3904 in
3.392 ac-ft

HYG Volume... 3.392 ac-ft (area under HYG curve)

***** SCS UNIT HYDROGRAPH PARAMETERS *****

Time Concentration, Tc = .23397 hrs (ID: E LOT & W EQUEST)
Computational Incr, Tm = .03120 hrs = 0.20000 Tp

Unit Hyd. Shape Factor = 483.432 (37.46% under rising limb)
K = 483.43/645.333, K = .7491 (also, K = 2/(1+(Tr/Tp))
Receding/Rising, Tr/Tp = 1.6698 (solved from K = .7491)

Unit peak, qp = 44.89 cfs
Unit peak time Tp = .15598 hrs
Unit receding limb, Tr = .62392 hrs
Total unit time, Tb = .77990 hrs

RUNOFF CURVE NUMBER DATA

Soil/Surface Description	CN	Area acres	Impervious Adjustment %C	%UC	Adjusted CN
Meadow - cont. grass (non grazed) -	71	3.920			71.00
Impervious Areas - Dirt (w/ right-o	87	.750			87.00
Impervious Areas - Paved parking lo	98	4.600			98.00
COMPOSITE AREA & WEIGHTED CN --->		9.270			85.69 (86)

TIME OF CONCENTRATION CALCULATOR

Segment #1: Tc: TR-55 Sheet

Mannings n	.1500	
Hydraulic Length	50.00	ft
2yr, 24hr P	2.7700	in
Slope	.010000	ft/ft
Avg.Velocity	.10	ft/sec

Segment #1 Time: .1330 hrs

Segment #2: Tc: TR-55 Shallow

Hydraulic Length	500.00	ft
Slope	.012000	ft/ft
Unpaved		
Avg.Velocity	1.77	ft/sec

Segment #2 Time: .0786 hrs

Segment #3: Tc: TR-55 Channel

Flow Area	10.0000	sq.ft
Wetted Perimeter	10.00	ft
Hydraulic Radius	1.00	ft
Slope	.010000	ft/ft
Mannings n	.0400	
Hydraulic Length	300.00	ft
Avg.Velocity	3.73	ft/sec

Segment #3 Time: .0224 hrs

Total Tc: .2340 hrs

Tc Equations used...

==== SCS TR-55 Sheet Flow ====

Tc = (.007 * ((n * Lf)**0.8)) / ((P**.5) * (Sf**.4))

Where: Tc = Time of concentration, hrs
n = Mannings n
Lf = Flow length, ft
P = 2yr, 24hr Rain depth, inches
Sf = Slope, %

==== SCS TR-55 Shallow Concentrated Flow ====

Unpaved surface:
V = 16.1345 * (Sf**0.5)

Paved surface:
V = 20.3282 * (Sf**0.5)

Tc = (Lf / V) / (3600sec/hr)

Where: V = Velocity, ft/sec
Sf = Slope, ft/ft
Tc = Time of concentration, hrs
Lf = Flow length, ft

==== SCS Channel Flow ==========

R = Aq / Wp
V = (1.49 * (R**(2/3)) * (Sf**-0.5)) / n

Tc = (Lf / V) / (3600sec/hr)

Where: R = Hydraulic radius
Aq = Flow area, sq.ft.
Wp = Wetted perimeter, ft
V = Velocity, ft/sec
Sf = Slope, ft/ft
n = Mannings n
Tc = Time of concentration, hrs
Lf = Flow length, ft

SCS UNIT HYDROGRAPH METHOD

STORM EVENT: 100 year storm
Duration = 24.0000 hrs Rain Depth = 5.9800 in
Rain Dir = \\GB1\GBProjects\IE\2008\08F777\12000 data & calcs\Stormwate
Rain File -ID = - TypeII 24hr
Unit Hyd Type = Default Curvilinear
HYG Dir = \\GB1\GBProjects\IE\2008\08F777\12000 data & calcs\Stormwate
HYG File - ID = - EAST EQUEST 100
Tc = .1920 hrs
Drainage Area = 5.110 acres Runoff CN= 76

Computational Time Increment = .02559 hrs
Computed Peak Time = 12.0035 hrs
Computed Peak Flow = 22.74 cfs

Time Increment for HYG File = .0250 hrs
Peak Time, Interpolated Output = 12.0000 hrs
Peak Flow, Interpolated Output = 22.67 cfs

DRAINAGE AREA
ID:EAST EQUEST
CN = 76
Area = 5.110 acres
S = 3.1579 in
0.2S = .6316 in

Cumulative Runoff
3.3629 in
1.432 ac-ft

HYG Volume... 1.432 ac-ft (area under HYG curve)

***** SCS UNIT HYDROGRAPH PARAMETERS *****

Time Concentration, Tc = .19195 hrs (ID: EAST EQUEST)
Computational Incr, Tm = .02559 hrs = 0.20000 Tp

Unit Hyd. Shape Factor = 483.432 (37.46% under rising limb)
K = 483.43/645.333, K = .7491 (also, K = 2/(1+(Tr/Tp))
Receding/Rising, Tr/Tp = 1.6698 (solved from K = .7491)

Unit peak, qp = 30.16 cfs
Unit peak time Tp = .12797 hrs
Unit receding limb, Tr = .51188 hrs
Total unit time, Tb = .63984 hrs

RUNOFF CURVE NUMBER DATA

Soil/Surface Description	CN	Area acres	Impervious Adjustment %C	%UC	Adjusted CN
Meadow - cont. grass (non grazed) -	71	3.860			71.00
Impervious Areas - Dirt (w/ right-o	87	.750			87.00
Impervious Areas - Paved parking lo	98	.500			98.00
COMPOSITE AREA & WEIGHTED CN --->		5.110			75.99 (76)

TIME OF CONCENTRATION CALCULATOR

Segment #1: Tc: TR-55 Sheet

Mannings n	.1500	
Hydraulic Length	50.00	ft
2yr, 24hr P	2.7700	in
Slope	.010000	ft/ft
Avg.Velocity	.10	ft/sec

Segment #1 Time: .1330 hrs

Segment #2: Tc: TR-55 Shallow

Hydraulic Length	375.00	ft
Slope	.012000	ft/ft
Unpaved		
Avg.Velocity	1.77	ft/sec

Segment #2 Time: .0589 hrs

Total Tc: .1920 hrs

Tc Equations used...

==== SCS TR-55 Sheet Flow ==========

Tc = (.007 * ((n * Lf)**0.8)) / ((P**.5) * (Sf**.4))

Where: Tc = Time of concentration, hrs
n = Mannings n
Lf = Flow length, ft
P = 2yr, 24hr Rain depth, inches
Sf = Slope, %

==== SCS TR-55 Shallow Concentrated Flow ==========

Unpaved surface:
V = 16.1345 * (Sf**0.5)

Paved surface:
V = 20.3282 * (Sf**0.5)

Tc = (Lf / V) / (3600sec/hr)

Where: V = Velocity, ft/sec
Sf = Slope, ft/ft
Tc = Time of concentration, hrs
Lf = Flow length, ft

SCS UNIT HYDROGRAPH METHOD

STORM EVENT: 100 year storm
Duration = 24.0000 hrs Rain Depth = 5.9800 in
Rain Dir = \\GB1\GBProjects\IE\2008\08F777\12000 data & calcs\Stormwate
Rain File -ID = - TypeII 24hr
Unit Hyd Type = Default Curvilinear
HYG Dir = \\GB1\GBProjects\IE\2008\08F777\12000 data & calcs\Stormwate
HYG File - ID = - WEST HWY 27 100
Tc = .4943 hrs
Drainage Area = 9.390 acres Runoff CN= 61

Computational Time Increment = .06591 hrs
Computed Peak Time = 12.1928 hrs
Computed Peak Flow = 15.14 cfs

Time Increment for HYG File = .0250 hrs
Peak Time, Interpolated Output = 12.2000 hrs
Peak Flow, Interpolated Output = 15.08 cfs

DRAINAGE AREA
ID:WEST HWY 27
CN = 61
Area = 9.390 acres
S = 6.3934 in
0.2S = 1.2787 in

Cumulative Runoff
1.9921 in
1.559 ac-ft

HYG Volume... 1.559 ac-ft (area under HYG curve)

***** SCS UNIT HYDROGRAPH PARAMETERS *****

Time Concentration, Tc = .49430 hrs (ID: WEST HWY 27)
Computational Incr, Tm = .06591 hrs = 0.20000 Tp

Unit Hyd. Shape Factor = 483.432 (37.46% under rising limb)
K = 483.43/645.333, K = .7491 (also, K = 2/(1+(Tr/Tp))
Receding/Rising, Tr/Tp = 1.6698 (solved from K = .7491)

Unit peak, qp = 21.52 cfs
Unit peak time Tp = .32954 hrs
Unit receding limb, Tr = 1.31814 hrs
Total unit time, Tb = 1.64768 hrs

RUNOFF CURVE NUMBER DATA

Soil/Surface Description	CN	Area acres	Impervious Adjustment %C	%UC	Adjusted CN
Woods - fair	60	3.640			60.00
Brush - brush, weed, grass mix - fa	56	5.000			56.00
Pavement/Buildings	98	.750			98.00
COMPOSITE AREA & WEIGHTED CN --->		9.390			60.91 (61)

::
TIME OF CONCENTRATION CALCULATOR
::

Segment #1: Tc: TR-55 Sheet

Mannings n	.1500	
Hydraulic Length	100.00	ft
2yr, 24hr P	2.7700	in
Slope	.020000	ft/ft
Avg.Velocity	.16	ft/sec

Segment #1 Time: .1755 hrs

Segment #2: Tc: TR-55 Shallow

Hydraulic Length	1200.00	ft
Slope	.004200	ft/ft
Unpaved		
Avg.Velocity	1.05	ft/sec

Segment #2 Time: .3188 hrs

==========
Total Tc: .4943 hrs
==========

Tc Equations used...

==== SCS TR-55 Sheet Flow ==========

Tc = (.007 * ((n * Lf)**0.8)) / ((P**.5) * (Sf**.4))

Where: Tc = Time of concentration, hrs
n = Mannings n
Lf = Flow length, ft
P = 2yr, 24hr Rain depth, inches
Sf = Slope, %

==== SCS TR-55 Shallow Concentrated Flow ==========

Unpaved surface:
V = 16.1345 * (Sf**0.5)

Paved surface:
V = 20.3282 * (Sf**0.5)

Tc = (Lf / V) / (3600sec/hr)

Where: V = Velocity, ft/sec
Sf = Slope, ft/ft
Tc = Time of concentration, hrs
Lf = Flow length, ft

LEVEL POOL ROUTING SUMMARY

HYG Dir = \\GBI\GBProjects\IE\2008\08F777\12000 data & calcs\Stormwater Design_M
Inflow HYG file = NONE STORED - EX RETENTION IN 100
Outflow HYG file = NONE STORED - EX RETENTION OUT 100

Pond Node Data = EX RETENTION
Pond Volume Data = EX RETENTION
Pond Outlet Data = overflow 10 yr

No Infiltration

INITIAL CONDITIONS

Starting WS Elev	= 1140.00	ft
Starting Volume	= .000	ac-ft
Starting Outflow	= .00	cfs
Starting Infiltr.	= .00	cfs
Starting Total Qout	= .00	cfs
Time Increment	= .0250	hrs

INFLOW/OUTFLOW HYDROGRAPH SUMMARY

Peak Inflow	= 15.08	cfs	at	12.2000 hrs
Peak Outflow	= 3.74	cfs	at	12.8500 hrs
Peak Elevation	= 1141.29	ft		
Peak Storage	= .651	ac-ft		

MASS BALANCE (ac-ft)

+ Initial Vol	= .000	
+ HYG Vol IN	= 1.559	
- Infiltration	= .000	
- HYG Vol OUT	= 1.147	
- Retained Vol	= .412	
Unrouted Vol	= -.000	ac-ft (.002% of Inflow Volume)

Elevation (ft)	Planimeter (sq.in)	Area (acres)	A1+A2+sqr(A1*A2) (acres)	Volume (ac-ft)	Volume Sum (ac-ft)
1140.00	-----	.1500	.0000	.000	.000
1141.00	-----	.7500	1.2354	.412	.412
1142.00	-----	1.3600	3.1200	1.040	1.452

POND VOLUME EQUATIONS

* Incremental volume computed by the Conic Method for Reservoir Volumes.

Volume = (1/3) * (EL2-EL1) * (Area1 + Area2 + sq.rt.(Area1*Area2))

where: EL1, EL2 = Lower and upper elevations of the increment
Area1,Area2 = Areas computed for EL1, EL2, respectively
Volume = Incremental volume between EL1 and EL2

REQUESTED POND WS ELEVATIONS:

Min. Elev.= 1140.00 ft
Increment = .10 ft
Max. Elev.= 1142.00 ft

****
OUTLET CONNECTIVITY
****

---> Forward Flow Only (UpStream to DnStream)
<--- Reverse Flow Only (DnStream to UpStream)
<---> Forward and Reverse Both Allowed

Structure	No.		Outfall	E1, ft	E2, ft
Weir-Rectangular	W0	--->	TW	1141.000	1142.000

TW SETUP, DS Channel

OUTLET STRUCTURE INPUT DATA

Structure ID = W0
Structure Type = Weir-Rectangular

# of Openings = 1
Crest Elev. = 1141.00 ft
Weir Length = 8.00 ft
Weir Coeff. = 3.000000

Weir TW effects (Use adjustment equation)

Structure ID = TW
Structure Type = TW SETUP, DS Channel

FREE OUTFALL CONDITIONS SPECIFIED

CONVERGENCE TOLERANCES...
Maximum Iterations= 40
Min. TW tolerance = .01 ft
Max. TW tolerance = .01 ft
Min. HW tolerance = .01 ft
Max. HW tolerance = .01 ft
Min. Q tolerance = .00 cfs
Max. Q tolerance = .00 cfs

LEVEL POOL ROUTING SUMMARY

HYG Dir = \\GB1\GBProjects\IE\2008\08F777\12000 data & calcs\Stormwater Design_M
Inflow HYG file = NONE STORED - NORTH INF BSNIN 100
Outflow HYG file = NONE STORED - NORTH INF BSNOUT 100

Pond Node Data = NORTH INF BSN
Pond Volume Data = NORTH INF BSN
Pond Outlet Data = emerg overflow

No Infiltration

INITIAL CONDITIONS

Starting WS Elev	= 1136.50	ft
Starting Volume	= .000	ac-ft
Starting Outflow	= .00	cfs
Starting Infiltr.	= .00	cfs
Starting Total Qout	= .00	cfs
Time Increment	= .0250	hrs

INFLOW/OUTFLOW HYDROGRAPH SUMMARY

Peak Inflow	= 22.67	cfs	at	12.0000 hrs
Peak Outflow	= .79	cfs	at	22.4000 hrs
Peak Elevation	= 1141.87	ft		
Peak Storage	= 2.298	ac-ft		

MASS BALANCE (ac-ft)

+ Initial Vol	= .000	
+ HYG Vol IN	= 2.579	
- Infiltration	= .000	
- HYG Vol OUT	= .350	
- Retained Vol	= 2.229	
Unrouted Vol	= -.000	ac-ft (.000% of Inflow Volume)

Elevation (ft)	Planimeter (sq.in)	Area (acres)	A1+A2+sqr(A1*A2) (acres)	Volume (ac-ft)	Volume Sum (ac-ft)
1136.50	-----	.2570	.0000	.000	.000
1140.00	-----	.4940	1.1073	1.292	1.292
1142.00	-----	.5900	1.6239	1.083	2.374

POND VOLUME EQUATIONS

* Incremental volume computed by the Conic Method for Reservoir Volumes.

Volume = (1/3) * (EL2-EL1) * (Area1 + Area2 + sq.rt.(Area1*Area2))

where: EL1, EL2 = Lower and upper elevations of the increment
Area1,Area2 = Areas computed for EL1, EL2, respectively
Volume = Incremental volume between EL1 and EL2

REQUESTED POND WS ELEVATIONS:

Min. Elev.= 1136.50 ft
Increment = .10 ft
Max. Elev.= 1142.00 ft

****
OUTLET CONNECTIVITY
****

---> Forward Flow Only (UpStream to DnStream)
<--- Reverse Flow Only (DnStream to UpStream)
<---> Forward and Reverse Both Allowed

Structure	No.		Outfall	E1, ft	E2, ft
Weir-Rectangular	W0	--->	TW	1141.750	1142.000

TW SETUP, DS Channel

OUTLET STRUCTURE INPUT DATA

Structure ID = W0
Structure Type = Weir-Rectangular

# of Openings = 1
Crest Elev. = 1141.75 ft
Weir Length = 6.00 ft
Weir Coeff. = 3.000000

Weir TW effects (Use adjustment equation)

Structure ID = TW
Structure Type = TW SETUP, DS Channel

FREE OUTFALL CONDITIONS SPECIFIED

CONVERGENCE TOLERANCES...
Maximum Iterations= 40
Min. TW tolerance = .01 ft
Max. TW tolerance = .01 ft
Min. HW tolerance = .01 ft
Max. HW tolerance = .01 ft
Min. Q tolerance = .00 cfs
Max. Q tolerance = .00 cfs

LEVEL POOL ROUTING SUMMARY

HYG Dir = \\GB1\GBProjects\IE\2008\08F777\12000 data & calcs\Stormwater Design_M
Inflow HYG file = NONE STORED - EAST INF BSN IN 100
Outflow HYG file = NONE STORED - EAST INF BSN OUT 100

Pond Node Data = EAST INF BSN
Pond Volume Data = EAST INF BSN
Pond Outlet Data = >100 yr overflow

No Infiltration

INITIAL CONDITIONS

Starting WS Elev	=	1133.00 ft
Starting Volume	=	.000 ac-ft
Starting Outflow	=	.00 cfs
Starting Infiltr.	=	.00 cfs
Starting Total Qout	=	.00 cfs
Time Increment	=	.0250 hrs

INFLOW/OUTFLOW HYDROGRAPH SUMMARY

Peak Inflow	=	48.88 cfs	at	12.0250 hrs
Peak Outflow	=	.00 cfs	at	4.5750 hrs
Peak Elevation	=	1137.41 ft		
Peak Storage	=	3.742 ac-ft		

MASS BALANCE (ac-ft)

+ Initial Vol	=	.000
+ HYG Vol IN	=	3.742
- Infiltration	=	.000
- HYG Vol OUT	=	.000
- Retained Vol	=	3.742
Unrouted Vol	=	.000 ac-ft (.000% of Inflow Volume)

Elevation (ft)	Planimeter (sq.in)	Area (acres)	A1+A2+sqr(A1*A2) (acres)	Volume (ac-ft)	Volume Sum (ac-ft)
1133.00	-----	.7340	.0000	.000	.000
1138.00	-----	1.0000	2.5907	4.318	4.318
1140.00	-----	1.1000	3.1488	2.099	6.417

POND VOLUME EQUATIONS

* Incremental volume computed by the Conic Method for Reservoir Volumes.

Volume = (1/3) * (EL2-EL1) * (Area1 + Area2 + sq.rt.(Area1*Area2))

where: EL1, EL2 = Lower and upper elevations of the increment
Area1,Area2 = Areas computed for EL1, EL2, respectively
Volume = Incremental volume between EL1 and EL2

REQUESTED POND WS ELEVATIONS:

Min. Elev.= 1133.00 ft
Increment = .01 ft
Max. Elev.= 1140.00 ft

****
OUTLET CONNECTIVITY
****

---> Forward Flow Only (UpStream to DnStream)
<--- Reverse Flow Only (DnStream to UpStream)
<---> Forward and Reverse Both Allowed

Structure	No.		Outfall	E1, ft	E2, ft
Weir-Rectangular	W0	--->	TW	1140.000	1140.000

TW SETUP, DS Channel

OUTLET STRUCTURE INPUT DATA

Structure ID = W0
Structure Type = Weir-Rectangular

# of Openings = 1
Crest Elev. = 1140.00 ft
Weir Length = 15.00 ft
Weir Coeff. = 3.000000

Weir TW effects (Use adjustment equation)

Structure ID = TW
Structure Type = TW SETUP, DS Channel

FREE OUTFALL CONDITIONS SPECIFIED

CONVERGENCE TOLERANCES...
Maximum Iterations= 40
Min. TW tolerance = .01 ft
Max. TW tolerance = .01 ft
Min. HW tolerance = .01 ft
Max. HW tolerance = .01 ft
Min. Q tolerance = .00 cfs
Max. Q tolerance = .00 cfs

East Parking Lot Swale (25-yr, 24-hr)

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.050	
Channel Slope	0.00500	ft/ft
Left Side Slope	3.00	ft/ft (H:V)
Right Side Slope	3.00	ft/ft (H:V)
Bottom Width	6.00	ft
Discharge	17.00	ft^3/s

Results

Normal Depth	1.06	ft
Flow Area	9.68	ft^2
Wetted Perimeter	12.68	ft
Hydraulic Radius	0.76	ft
Top Width	12.34	ft
Critical Depth	0.57	ft
Critical Slope	0.04821	ft/ft
Velocity	1.76	ft/s
Velocity Head	0.05	ft
Specific Energy	1.10	ft
Froude Number	0.35	
Flow Type	Subcritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	1.06	ft
Critical Depth	0.57	ft
Channel Slope	0.00500	ft/ft

East Parking Lot Swale (25-yr, 24-hr)

GVF Output Data

Critical Slope	0.04821	ft/ft

West Parking Lot Swale (25-yr, 24-hr)

Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.050	
Channel Slope	0.00500	ft/ft
Left Side Slope	3.00	ft/ft (H:V)
Right Side Slope	3.00	ft/ft (H:V)
Bottom Width	6.00	ft
Discharge	14.00	ft^3/s

Results

Normal Depth	0.95	ft
Flow Area	8.44	ft^2
Wetted Perimeter	12.02	ft
Hydraulic Radius	0.70	ft
Top Width	11.71	ft
Critical Depth	0.51	ft
Critical Slope	0.04979	ft/ft
Velocity	1.66	ft/s
Velocity Head	0.04	ft
Specific Energy	1.00	ft
Froude Number	0.34	
Flow Type	Subcritical	

GVF Input Data

Downstream Depth	0.00	ft
Length	0.00	ft
Number Of Steps	0	

GVF Output Data

Upstream Depth	0.00	ft
Profile Description		
Profile Headloss	0.00	ft
Downstream Velocity	Infinity	ft/s
Upstream Velocity	Infinity	ft/s
Normal Depth	0.95	ft
Critical Depth	0.51	ft
Channel Slope	0.00500	ft/ft

West Parking Lot Swale (25-yr, 24-hr)

GVF Output Data

Critical Slope	0.04979	ft/ft

Culvert Calculator Report
East Parking Lot Swale (25-yr, 24-hr)

Solve For: Section Size

Culvert Summary			
Allowable HW Elevation	1,144.60 ft	Headwater Depth/Height	1.37
Computed Headwater Elev	1,144.58 ft	Discharge	17.00 cfs
Inlet Control HW Elev.	1,144.17 ft	Tailwater Elevation	1.00 ft
Outlet Control HW Elev.	1,144.58 ft	Control Type	Outlet Control

Grades			
Upstream Invert	1,141.83 ft	Downstream Invert	1,141.73 ft
Length	30.00 ft	Constructed Slope	0.003333 ft/ft

Hydraulic Profile			
Profile	CompositeM2PressureProfile	Depth, Downstream	1.49 ft
Slope Type	Mild	Normal Depth	N/A ft
Flow Regime	Subcritical	Critical Depth	1.49 ft
Velocity Downstream	6.79 ft/s	Critical Slope	0.023639 ft/ft

Section			
Section Shape	Circular	Mannings Coefficient	0.024
Section Material	CMP	Span	2.00 ft
Section Size	24 inch	Rise	2.00 ft
Number Sections	1		

Outlet Control Properties			
Outlet Control HW Elev.	1,144.58 ft	Upstream Velocity Head	0.46 ft
Ke	0.20	Entrance Loss	0.09 ft

Inlet Control Properties			
Inlet Control HW Elev.	1,144.17 ft	Flow Control	Transition
Inlet Type	Beveled ring, 33.7° (1.5:1) bevels	Area Full	3.1 ft²
K	0.00180	HDS 5 Chart	3
M	2.50000	HDS 5 Scale	B
C	0.02430	Equation Form	1
Y	0.83000		

Appendix C

Stormwater Quality Calculations

Data file name: C:\Program Files\WinSLAMM\Flambeau North and East Watershed Swale Only.dat
SLAMM Version 9.3.0
Rain file name: C:\Program Files\WinSLAMM\Rain Files\WisReg - Minneapolis MN 1959.RAN
Particulate Solids Concentration file name: C:\Program Files\WinSLAMM \WI_AVG01.psc
Runoff Coefficient file name: C:\Program Files\WinSLAMM\WI_SL06 Dec06.rsv
Particulate Residue Delivery file name: C:\Program Files\WinSLAMM \WI_DLV01.prr
Residential Street Delivery file name: C:\Program Files\WinSLAMM\WI_Res and Other Urban Dec06.std
Institutional Street Delivery file name: C:\Program Files\WinSLAMM \WI_Com Inst Indust Dec06.std
Commercial Street Delivery file name: C:\Program Files\WinSLAMM\WI_Com Inst Indust Dec06.std
Industrial Street Delivery file name: C:\Program Files\WinSLAMM\WI_Com Inst Indust Dec06.std
Other Urban Street Delivery file name: C:\Program Files\WinSLAMM\WI_Res and Other Urban Dec06.std
Freeway Street Delivery file name: C:\Program Files\WinSLAMM\Freeway Dec06.std
Apply Street Delivery Files to Adjust the After Event Load Street Dirt Mass Balance: False
Pollutant Relative Concentration file name: C:\Program Files\WinSLAMM \WI_GEO01.ppd
Seed for random number generator: -42
Study period starting date: 01/02/59 Study period ending date: 12/28/59
Start of Winter Season: 11/04 End of Winter Season: 03/13
Date: 03-23-2011 Time: 09:38:52
Fraction of each type of Drainage System serving study area:

1. Grass Swales 0.85
2. Undeveloped roadside 0

Curb and Gutters, `valleys', or sealed swales in:

3. Poor condition (or very flat) 0
4. Fair condition 0.15
5. Good condition (or very steep) 0

Site information: 08F777, Flambeau Mining Company, Copper Park Business and Recreation Area Stormwater Managment Plan, North and East Inflitration Basin Watershed, Swale Pollutant Removal Calculations, Revised 03/17/2011

	<===== Areas for each Source (acres) =====>				
Source Area	Resi-dential Areas	Institu-tional Areas	Commercial Areas	Industrial Areas	Other Urban Areas
Roofs 1	0.00	0.00	0.00	0.21	0.00
Roofs 2	0.00	0.00	0.00	0.19	0.00
Roofs 3	0.00	0.00	0.00	0.00	0.00
Roofs 4	0.00	0.00	0.00	0.00	0.00
Roofs 5	0.00	0.00	0.00	0.00	0.00
Paved Parking/Storage 1	0.00	0.00	0.00	4.20	0.00
Paved Parking/Storage 2	0.00	0.00	0.00	0.50	0.00
Paved Parking/Storage 3	0.00	0.00	0.00	0.75	0.00
Unpaved Prkng/Storage 1	0.00	0.00	0.00	0.00	0.00
Unpaved Prkng/Storage 2	0.00	0.00	0.00	0.00	0.00
Playground 1	0.00	0.00	0.00	0.00	0.00
Playground 2	0.00	0.00	0.00	0.00	0.00
Driveways 1	0.00	0.00	0.00	0.75	0.00

Driveways 2	0.00	0.00	0.00	0.75	0.00
Driveways 3	0.00	0.00	0.00	0.00	0.00
Sidewalks/Walks 1	0.00	0.00	0.00	0.00	0.00
Sidewalks/Walks 2	0.00	0.00	0.00	0.00	0.00
Street Area 1	0.00	0.00	0.00	0.00	0.00
Street Area 2	0.00	0.00	0.00	0.00	0.00
Street Area 3	0.00	0.00	0.00	0.00	0.00
Large Landscaped Area 1	0.00	0.00	0.00	0.00	0.00
Large Landscaped Area 2	0.00	0.00	0.00	0.00	0.00
Undeveloped Area	0.00	0.00	0.00	16.42	0.00
Small Landscaped Area 1	0.00	0.00	0.00	0.00	0.00
Small Landscaped Area 2	0.00	0.00	0.00	0.00	0.00
Small Landscaped Area 3	0.00	0.00	0.00	0.00	0.00
Isolated/Water Body Area	0.00	0.00	0.00	0.00	0.00
Other Pervious Area	0.00	0.00	0.00	0.00	0.00
Other Dir Cnctd Imp Area	0.00	0.00	0.00	0.00	0.00
Other Part Cnctd Imp Area	0.00	0.00	0.00	0.00	0.00
Total	0.00	0.00	0.00	23.77	0.00

Freeway Source Area	Area (acres)
Pavd Lane & Shldr Area 1	0.00
Pavd Lane & Shldr Area 2	0.00
Pavd Lane & Shldr Area 3	0.00
Pavd Lane & Shldr Area 4	0.00
Pavd Lane & Shldr Area 5	0.00
Large Turf Areas	0.00
Undeveloped Areas	0.00
Other Pervious Areas	0.00
Other Directly Conctd Imp	0.00
Other Partially Conctd Imp	0.00
Total	0.00

Total of All Source Areas	23.77
Total of All Source Areas less All Isolated Areas	23.77

Source Area Control Practice Information

Land Use: Industrial

Roofs 1 Source area number: 91

The roof is pitched

The Source Area is directly connected or draining to a directly connected area

Roofs 2 Source area number: 92

The roof is flat

The Source Area is directly connected or draining to a directly connected area

Paved Parking/Storage 1 Source area number: 96

The Source Area is draining to a pervious area (partially connected impervious area)

The SCS Hydrologic Soil Type is Sandy

Paved Parking/Storage 2 Source area number: 97

The Source Area is draining to a pervious area (partially connected impervious area)

The SCS Hydrologic Soil Type is Sandy

Paved Parking/Storage 3 Source area number: 98

```
         The Source Area is draining to a pervious area (partially
connected impervious area)
         The SCS Hydrologic Soil Type is Sandy
   Driveways 1    Source area number:  103
         The Source Area is draining to a pervious area (partially
connected impervious area)
         The SCS Hydrologic Soil Type is Sandy
   Driveways 2    Source area number:  104
         The Source Area is draining to a pervious area (partially
connected impervious area)
         The SCS Hydrologic Soil Type is Sandy
   Undeveloped Area    Source area number:  113
         The SCS Hydrologic Soil Type is Sandy

Drainage System
      Control Practice 1 :  Grass Swale
                                          Residential   Institutional
Commercial   Industrial   Other Urban   Freeway
                                            Land Use   Land Use   Land Use
Land Use   Land Use   Land Use
              Total area in Land Use (ac):
                              0             0             0
23.77         0             0
              Area served by swales (ac):
                              0             0             0
20.2          0             0
              Swale density (ft/ac):
                              0             0             0
52.47525      0             0
              Total swale length (ft):
                              0             0             0
1060          0             0
              Typical bottom width (ft):
                              0             0             0
6             0             0
              Typical side slope (_ ft H: 1 ft V):
                              0             0             0
3             0             0
              Typical longitudinal slope (ft/ft):
                              0             0             0
0.006         0             0
              Swale retardance factor:
                                                                    B
              Typical grass height (inches):
                              0             0             0
4             0             0
              Swale infiltration rate (in/hr):
                              0             0             0
0.5           0             0
              Typical swale depth (ft):
                              0             0             0
0             0             0
              Residential Land Use Particle Size File:
              Institutional Land Use Particle Size File:
              Commercial Land Use Particle Size File:
              Industrial Land Use Particle Size File:  C:\Program Files
\WinSLAMM\NURP.CPZ
              Other Urban Land Use Particle Size File:
              Freeway Land Use Particle Size File:

Outfall
```

Pollutants to be Analyzed and Printed:

Pollutant Name	Pollutant Type
Solids	Particulate
Copper	Particulate

SLAMM for Windows Version 9.3.0

Data file name: C:\Program Files\WinSLAMM\Flambeau North and East Watershed Swale Only.dat
Data file description: 08F777, Flambeau Mining Company, Copper Park Business and Recreation Area Stormwater Managment Plan, North and East Inflitration Basin Watershed, Swale Pollutant Removal Calculations, Revised 03/17/2011
Rain file name: C:\Program Files\WinSLAMM\Rain Files\WisReg - Minneapolis MN 1959.RAN
Particulate Solids Concentration file name: C:\Program Files\WinSLAMM\WI_AVG01.psc
Runoff Coefficient file name: C:\Program Files\WinSLAMM\WI_SL06 Dec06.rsv
Particulate Residue Delivery file name: C:\Program Files\WinSLAMM\WI_DLV01.prr
Residential Street Delivery file name: C:\Program Files\WinSLAMM\WI_Res and Other Urban Dec06.std
Institutional Street Delivery file name: C:\Program Files\WinSLAMM\WI_Com Inst Indust Dec06.std
Commercial Street Delivery file name: C:\Program Files\WinSLAMM\WI_Com Inst Indust Dec06.std
Industrial Street Delivery file name: C:\Program Files\WinSLAMM\WI_Com Inst Indust Dec06.std
Other Urban Street Delivery file name: C:\Program Files\WinSLAMM\WI_Res and Other Urban Dec06.std
Freeway Street Delivery file name: C:\Program Files\WinSLAMM\Freeway Dec06.std
Pollutant Relative Concentration file name: C:\Program Files\WinSLAMM\WI_GEO01.ppd
Apply Street Delivery Files to Adjust the After Event Load Street Dirt Mass Balance: False
Model Run Start Date: 01/02/59 Model Run End Date: 12/28/59
Date of run: 03-23-2011 Time of run: 09:38:33
Total Area Modeled (acres): 23.77
Years in Model Run: 0.99

	Runoff Volume (cu ft)	Percent Runoff Volume Reduction	Particulate Solids Conc. (mg/L)	Particulate Solids Yield (lbs)	Percent Particulate Solids Reduction
Source Area Total without Controls:	47903	0 %	48.96	146.3	0 %
Total Before Drainage System:	47903	0.00%	48.96	146.3	0.00%
Total After Drainage System:	13789	71.21%	46.67	40.14	72.56%
Total After Outfall Controls:	13789	71.21%	46.67	40.14	72.56%
Annualized Total After Outfall Controls:	13980			40.70	

Data file name: C:\Program Files\WinSLAMM\Flambeau North and East Watershed.dat
SLAMM Version 9.3.0
Rain file name: C:\Program Files\WinSLAMM\Rain Files\WisReg - Minneapolis MN 1959.RAN
Particulate Solids Concentration file name: C:\Program Files\WinSLAMM \WI_AVG01.psc
Runoff Coefficient file name: C:\Program Files\WinSLAMM\WI_SL06 Dec06.rsv
Particulate Residue Delivery file name: C:\Program Files\WinSLAMM \WI_DLV01.prr
Residential Street Delivery file name: C:\Program Files\WinSLAMM\WI_Res and Other Urban Dec06.std
Institutional Street Delivery file name: C:\Program Files\WinSLAMM \WI_Com Inst Indust Dec06.std
Commercial Street Delivery file name: C:\Program Files\WinSLAMM\WI_Com Inst Indust Dec06.std
Industrial Street Delivery file name: C:\Program Files\WinSLAMM\WI_Com Inst Indust Dec06.std
Other Urban Street Delivery file name: C:\Program Files\WinSLAMM\WI_Res and Other Urban Dec06.std
Freeway Street Delivery file name: C:\Program Files\WinSLAMM\Freeway Dec06.std
Apply Street Delivery Files to Adjust the After Event Load Street Dirt Mass Balance: False
Pollutant Relative Concentration file name: C:\Program Files\WinSLAMM \WI_GEO01.ppd
Seed for random number generator: -42
Study period starting date: 01/02/59 Study period ending date: 12/28/59
Start of Winter Season: 11/04 End of Winter Season: 03/13
Date: 03-23-2011 Time: 09:41:59
Fraction of each type of Drainage System serving study area:
1. Grass Swales 0.85
2. Undeveloped roadside 0
Curb and Gutters, `valleys', or sealed swales in:
3. Poor condition (or very flat) 0
4. Fair condition 0.15
5. Good condition (or very steep) 0
Site information: 08F777, Flambeau Mining Company, Copper Park Business and Recreation Area Stormwater Managment Plan, North and East Inflitration Basin Watershed, Pollutant Removal Calculations With Infiltration Basins, Revised 03/18/2011

	<===== Areas for each Source (acres) =====>				
Source Area	Residential Areas	Institutional Areas	Commercial Areas	Industrial Areas	Other Urban Areas
Roofs 1	0.00	0.00	0.00	0.21	0.00
Roofs 2	0.00	0.00	0.00	0.19	0.00
Roofs 3	0.00	0.00	0.00	0.00	0.00
Roofs 4	0.00	0.00	0.00	0.00	0.00
Roofs 5	0.00	0.00	0.00	0.00	0.00
Paved Parking/Storage 1	0.00	0.00	0.00	4.20	0.00
Paved Parking/Storage 2	0.00	0.00	0.00	0.50	0.00
Paved Parking/Storage 3	0.00	0.00	0.00	0.75	0.00
Unpaved Prkng/Storage 1	0.00	0.00	0.00	0.00	0.00
Unpaved Prkng/Storage 2	0.00	0.00	0.00	0.00	0.00
Playground 1	0.00	0.00	0.00	0.00	0.00
Playground 2	0.00	0.00	0.00	0.00	0.00
Driveways 1	0.00	0.00	0.00	0.75	0.00

Driveways 2	0.00	0.00	0.00	0.75	0.00
Driveways 3	0.00	0.00	0.00	0.00	0.00
Sidewalks/Walks 1	0.00	0.00	0.00	0.00	0.00
Sidewalks/Walks 2	0.00	0.00	0.00	0.00	0.00
Street Area 1	0.00	0.00	0.00	0.00	0.00
Street Area 2	0.00	0.00	0.00	0.00	0.00
Street Area 3	0.00	0.00	0.00	0.00	0.00
Large Landscaped Area 1	0.00	0.00	0.00	0.00	0.00
Large Landscaped Area 2	0.00	0.00	0.00	0.00	0.00
Undeveloped Area	0.00	0.00	0.00	16.42	0.00
Small Landscaped Area 1	0.00	0.00	0.00	0.00	0.00
Small Landscaped Area 2	0.00	0.00	0.00	0.00	0.00
Small Landscaped Area 3	0.00	0.00	0.00	0.00	0.00
Isolated/Water Body Area	0.00	0.00	0.00	0.00	0.00
Other Pervious Area	0.00	0.00	0.00	0.00	0.00
Other Dir Cnctd Imp Area	0.00	0.00	0.00	0.00	0.00
Other Part Cnctd Imp Area	0.00	0.00	0.00	0.00	0.00
Total	0.00	0.00	0.00	23.77	0.00

Freeway Source Area	Area (acres)
Pavd Lane & Shldr Area 1	0.00
Pavd Lane & Shldr Area 2	0.00
Pavd Lane & Shldr Area 3	0.00
Pavd Lane & Shldr Area 4	0.00
Pavd Lane & Shldr Area 5	0.00
Large Turf Areas	0.00
Undeveloped Areas	0.00
Other Pervious Areas	0.00
Other Directly Conctd Imp	0.00
Other Partially Conctd Imp	0.00
Total	0.00

Total of All Source Areas	23.77
Total of All Source Areas less All Isolated Areas	23.77

Drainage System Control Practice: Biofiltration Device
Fraction of Runoff From Selected Source Areas Routed to Land Use Biofilters: 0.62
Source Areas from Land Use that Contribute Runoff to Biofiltration Control Device
Control Practice 3 : Biofiltration Device
1. Top Area (square feet) = 25700
2. Bottom Area (square feet) = 11195
3. Depth (ft): 5.5
4. Depth of Biofilter that is Rock Filled (ft) 0
5. Fraction of Rock Filled Volume as Voids = 0
6. Engineered Soil Depth (ft) = 0
7. Engineered Soil Void Ratio = 0
8. Infiltration Rate (in/hr) = 1
9. Infiltration Rate Coefficient of Variation 0
10. Random Infiltration Rate Generation? No
11. Infiltration Rate Fraction (Side): 1
12. Infiltration Rate Fraction (Bottom): 1
13. Biofilter Width (ft) - for Cost Purposes Only: 50

```
         14. Number of Biofiltration Control Devices =  1
         15. Biofilter Peak to Average Flow Ratio =  3.8
         16. Percent Solids Reduction Due to Flow Through Engineered
Soil =  49
         17. Particle Size Distribution File:  C:\Program Files\WinSLAMM
\NURP.CPZ
         18. Engineered Soil Media:  Loam Soil
         19. Engineered Soil Infiltration Rate:   0.15
         20. Biofilter Outlet/Discharge Characteristics:
              Biofilter Outlet/Discharge Option Number 1
                Outlet type:  Broad Crested Weir
                     1.  Weir crest length (ft):   6
                     2.  Weir crest width (ft):   10
                     3.  Height of datum to bottom of weir opening:
5.25
                     4.  Default weir coefficients:    Yes
                         Weir Coefficient:   0
      Industrial Control Practice:  Biofiltration Device
         Fraction of Runoff From Selected Source Areas Routed to Land
Use Biofilters:   0.38
         Source Areas from Land Use that Contribute Runoff to
Biofiltration Control Device
              Roofs 1
              Roofs 2
              Paved Parking/Storage 1
              Driveways 1
              Undeveloped Area
      Control Practice 4 :  Biofiltration Device
         1.  Top Area (square feet) =  25700
         2.  Bottom Area (square feet) =  11195
         3.  Depth (ft):   5.5
         4.  Depth of Biofilter that is Rock Filled (ft) 0
         5.  Fraction of Rock Filled Volume as Voids =  0
         6.  Engineered Soil Depth (ft) =  0
         7.  Engineered Soil Void Ratio =  0
         8.  Infiltration Rate (in/hr) =  1
         9.  Infiltration Rate Coefficient of Variation   0
         10. Random Infiltration Rate Generation?  No
         11. Infiltration Rate Fraction (Side):   1
         12. Infiltration Rate Fraction (Bottom):   1
         13. Biofilter Width (ft) - for Cost Purposes Only:   50
         14. Number of Biofiltration Control Devices =  1
         15. Biofilter Peak to Average Flow Ratio =  3.8
         16. Percent Solids Reduction Due to Flow Through Engineered
Soil =  49
         17. Particle Size Distribution File:  C:\Program Files\WinSLAMM
\NURP.CPZ
         18. Engineered Soil Media:  Loam Soil
         19. Engineered Soil Infiltration Rate:   0.15
         20. Biofilter Outlet/Discharge Characteristics:
              Biofilter Outlet/Discharge Option Number 1
                Outlet type:  Broad Crested Weir
                     1.  Weir crest length (ft):   6
                     2.  Weir crest width (ft):   10
                     3.  Height of datum to bottom of weir opening:
5.25
                     4.  Default weir coefficients:    Yes
                         Weir Coefficient:   0
                  Source Area Control Practice Information
Land Use:  Industrial
   Roofs 1    Source area number:  91
```

```
         The roof is pitched
         The Source Area is directly connected or draining to a directly
connected area
   Roofs 2    Source area number:  92
         The roof is flat
         The Source Area is directly connected or draining to a directly
connected area
   Paved Parking/Storage 1    Source area number:  96
         The Source Area is draining to a pervious area (partially
connected impervious area)
         The SCS Hydrologic Soil Type is Sandy
   Paved Parking/Storage 2    Source area number:  97
         The Source Area is draining to a pervious area (partially
connected impervious area)
         The SCS Hydrologic Soil Type is Sandy
   Paved Parking/Storage 3    Source area number:  98
         The Source Area is draining to a pervious area (partially
connected impervious area)
         The SCS Hydrologic Soil Type is Sandy
   Driveways 1    Source area number:  103
         The Source Area is draining to a pervious area (partially
connected impervious area)
         The SCS Hydrologic Soil Type is Sandy
   Driveways 2    Source area number:  104
         The Source Area is draining to a pervious area (partially
connected impervious area)
         The SCS Hydrologic Soil Type is Sandy
   Undeveloped Area    Source area number:  113
         The SCS Hydrologic Soil Type is Sandy

Drainage System
      Control Practice 1 :  Grass Swale
                                          Residential   Institutional
Commercial   Industrial   Other Urban   Freeway
                                          Land Use   Land Use   Land Use
Land Use   Land Use   Land Use
            Total area in Land Use (ac):
                              0             0             0
23.77          0             0
            Area served by swales (ac):
                              0             0             0
20.2           0             0
            Swale density (ft/ac):
                              0             0             0
52.47525       0             0
            Total swale length (ft):
                              0             0             0
1060           0             0
            Typical bottom width (ft):
                              0             0             0
6              0             0
            Typical side slope (_ ft H: 1 ft V):
                              0             0             0
3              0             0
            Typical longitudinal slope (ft/ft):
                              0             0             0
0.006          0             0
            Swale retardance factor:
                                                                      B
            Typical grass height (inches):
                              0             0             0
```

```
4               0               0
                Swale infiltration rate (in/hr):
                                  0               0               0
0.5             0               0
                Typical swale depth (ft):
                                  0               0               0
0               0               0
                Residential Land Use Particle Size File:
                Institutional Land Use Particle Size File:
                Commercial Land Use Particle Size File:
                Industrial Land Use Particle Size File:  C:\Program Files
\WinSLAMM\NURP.CPZ
                Other Urban Land Use Particle Size File:
                Freeway Land Use Particle Size File:
      Control Practice 2 :  Biofiltration Device
         1.  Top Area (square feet) =  25700
         2.  Bottom Area (square feet) =  11195
         3.  Depth (ft):   5.5
         4.  Depth of Biofilter that is Rock Filled (ft) 0
         5.  Fraction of Rock Filled Volume as Voids =  0
         6.  Engineered Soil Depth (ft) =  0
         7.  Engineered Soil Void Ratio =  0
         8.  Infiltration Rate (in/hr) =  1
         9.  Infiltration Rate Coefficient of Variation   0
         10. Random Infiltration Rate Generation?  No
         11. Infiltration Rate Fraction (Side):   1
         12. Infiltration Rate Fraction (Bottom):   1
         13. Biofilter Width (ft) - for Cost Purposes Only:   50
         14. Number of Biofiltration Control Devices =  1
         15. Biofilter Peak to Average Flow Ratio =  3.8
         16. Percent Solids Reduction Due to Flow Through Engineered
Soil =  49
         17. Particle Size Distribution File:  C:\Program Files\WinSLAMM
\NURP.CPZ
         18. Engineered Soil Media:  Loam Soil
         19. Engineered Soil Infiltration Rate:   0.15
         20. Biofilter Outlet/Discharge Characteristics:
              Biofilter Outlet/Discharge Option Number 1
                Outlet type:  Broad Crested Weir
                     1.  Weir crest length (ft):   6
                     2.  Weir crest width (ft):   10
                     3.  Height of datum to bottom of weir opening:
5.25
                     4.  Default weir coefficients:    Yes
                         Weir Coefficient:   0

Outfall

Pollutants to be Analyzed and Printed:
         Pollutant Name                 Pollutant Type
         --------------                 --------------
          Solids                        Particulate
          Copper                        Particulate
```

SLAMM for Windows Version 9.3.0

Data file name: C:\Program Files\WinSLAMM\Flambeau North and East Watershed.dat
Data file description: 08F777, Flambeau Mining Company, Copper Park Business and Recreation Area Stormwater Managment Plan, North and East Inflitration Basin Watershed, Pollutant Removal Calculations With Infiltration Basins, Revised 03/18/2011
Rain file name: C:\Program Files\WinSLAMM\Rain Files\WisReg - Minneapolis MN 1959.RAN
Particulate Solids Concentration file name: C:\Program Files\WinSLAMM\WI_AVG01.psc
Runoff Coefficient file name: C:\Program Files\WinSLAMM\WI_SL06 Dec06.rsv
Particulate Residue Delivery file name: C:\Program Files\WinSLAMM\WI_DLV01.prr
Residential Street Delivery file name: C:\Program Files\WinSLAMM\WI_Res and Other Urban Dec06.std
Institutional Street Delivery file name: C:\Program Files\WinSLAMM\WI_Com Inst Indust Dec06.std
Commercial Street Delivery file name: C:\Program Files\WinSLAMM\WI_Com Inst Indust Dec06.std
Industrial Street Delivery file name: C:\Program Files\WinSLAMM\WI_Com Inst Indust Dec06.std
Other Urban Street Delivery file name: C:\Program Files\WinSLAMM\WI_Res and Other Urban Dec06.std
Freeway Street Delivery file name: C:\Program Files\WinSLAMM\Freeway Dec06.std
Pollutant Relative Concentration file name: C:\Program Files\WinSLAMM\WI_GEO01.ppd
Apply Street Delivery Files to Adjust the After Event Load Street Dirt Mass Balance: False
Model Run Start Date: 01/02/59 Model Run End Date: 12/28/59
Date of run: 03-23-2011 Time of run: 09:41:44
Total Area Modeled (acres): 23.77
Years in Model Run: 0.99

	Runoff Volume (cu ft)	Percent Runoff Volume Reduction	Particulate Solids Conc. (mg/L)	Particulate Solids Yield (lbs)	Percent Particulate Solids Reduction
Source Area Total without Controls:	47902	0 %	48.96	146.3	0 %
Total Before Drainage System:	30297	36.75%	52.22	98.70	32.54%
Total After Drainage System:	0	100.00%	0	0	100.00%
Total After Outfall Controls:	0	100.00%	0	0	100.00%
Annualized Total After Outfall Controls:	0			0	

Data file name: C:\Program Files\WinSLAMM\Flambeau West Watershed Swale Only.dat
SLAMM Version 9.3.0
Rain file name: C:\Program Files\WinSLAMM\Rain Files\WisReg - Minneapolis MN 1959.RAN
Particulate Solids Concentration file name: C:\Program Files\WinSLAMM \WI_AVG01.psc
Runoff Coefficient file name: C:\Program Files\WinSLAMM\WI_SL06 Dec06.rsv
Particulate Residue Delivery file name: C:\Program Files\WinSLAMM \WI_DLV01.prr
Residential Street Delivery file name: C:\Program Files\WinSLAMM\WI_Res and Other Urban Dec06.std
Institutional Street Delivery file name: C:\Program Files\WinSLAMM \WI_Com Inst Indust Dec06.std
Commercial Street Delivery file name: C:\Program Files\WinSLAMM\WI_Com Inst Indust Dec06.std
Industrial Street Delivery file name: C:\Program Files\WinSLAMM\WI_Com Inst Indust Dec06.std
Other Urban Street Delivery file name: C:\Program Files\WinSLAMM\WI_Res and Other Urban Dec06.std
Freeway Street Delivery file name: C:\Program Files\WinSLAMM\Freeway Dec06.std
Apply Street Delivery Files to Adjust the After Event Load Street Dirt Mass Balance: False
Pollutant Relative Concentration file name: C:\Program Files\WinSLAMM \WI_GEO01.ppd
Seed for random number generator: -42
Study period starting date: 01/02/59 Study period ending date: 12/28/59
Start of Winter Season: 11/04 End of Winter Season: 03/13
Date: 03-23-2011 Time: 09:46:10
Fraction of each type of Drainage System serving study area:

1. Grass Swales 0.872
2. Undeveloped roadside 0

Curb and Gutters, `valleys', or sealed swales in:

3. Poor condition (or very flat) 0
4. Fair condition 0.128
5. Good condition (or very steep) 0

Site information: 08F777, Flambeau Mining Company, Copper Park Business and Recreation Area Stormwater Managment Plan, West Infiltration Basin Watershed, Swale Pollutant Removal Calculations, Revised 03/17/2011

	<===== Areas for each Source (acres) =====>				
Source Area	Resi-dential Areas	Institu-tional Areas	Commercial Areas	Industrial Areas	Other Urban Areas
Roofs 1	0.00	0.00	0.00	0.18	0.00
Roofs 2	0.00	0.00	0.00	0.07	0.00
Roofs 3	0.00	0.00	0.00	0.00	0.00
Roofs 4	0.00	0.00	0.00	0.00	0.00
Roofs 5	0.00	0.00	0.00	0.00	0.00
Paved Parking/Storage 1	0.00	0.00	0.00	2.25	0.00
Paved Parking/Storage 2	0.00	0.00	0.00	0.00	0.00
Paved Parking/Storage 3	0.00	0.00	0.00	0.00	0.00
Unpaved Prkng/Storage 1	0.00	0.00	0.00	0.00	0.00
Unpaved Prkng/Storage 2	0.00	0.00	0.00	0.00	0.00
Playground 1	0.00	0.00	0.00	0.00	0.00
Playground 2	0.00	0.00	0.00	0.00	0.00
Driveways 1	0.00	0.00	0.00	0.55	0.00
Driveways 2	0.00	0.00	0.00	0.00	0.00

Driveways 3	0.00	0.00	0.00	0.00	0.00
Sidewalks/Walks 1	0.00	0.00	0.00	0.00	0.00
Sidewalks/Walks 2	0.00	0.00	0.00	0.00	0.00
Street Area 1	0.00	0.00	0.00	0.00	0.00
Street Area 2	0.00	0.00	0.00	0.00	0.00
Street Area 3	0.00	0.00	0.00	0.00	0.00
Large Landscaped Area 1	0.00	0.00	0.00	0.00	0.00
Large Landscaped Area 2	0.00	0.00	0.00	0.00	0.00
Undeveloped Area	0.00	0.00	0.00	3.75	0.00
Small Landscaped Area 1	0.00	0.00	0.00	0.00	0.00
Small Landscaped Area 2	0.00	0.00	0.00	0.00	0.00
Small Landscaped Area 3	0.00	0.00	0.00	0.00	0.00
Isolated/Water Body Area	0.00	0.00	0.00	0.00	0.00
Other Pervious Area	0.00	0.00	0.00	0.00	0.00
Other Dir Cnctd Imp Area	0.00	0.00	0.00	0.00	0.00
Other Part Cnctd Imp Area	0.00	0.00	0.00	0.00	0.00
Total	0.00	0.00	0.00	6.79	0.00

Freeway Source Area	Area (acres)
Pavd Lane & Shldr Area 1	0.00
Pavd Lane & Shldr Area 2	0.00
Pavd Lane & Shldr Area 3	0.00
Pavd Lane & Shldr Area 4	0.00
Pavd Lane & Shldr Area 5	0.00
Large Turf Areas	0.00
Undeveloped Areas	0.00
Other Pervious Areas	0.00
Other Directly Conctd Imp	0.00
Other Partially Conctd Imp	0.00
Total	0.00

Total of All Source Areas	6.79
Total of All Source Areas less All Isolated Areas	6.79

Source Area Control Practice Information

Land Use: Industrial

Roofs 1 Source area number: 91

The roof is flat

The Source Area is directly connected or draining to a directly connected area

Roofs 2 Source area number: 92

The roof is flat

The Source Area is directly connected or draining to a directly connected area

Paved Parking/Storage 1 Source area number: 96

The Source Area is draining to a pervious area (partially connected impervious area)

The SCS Hydrologic Soil Type is Sandy

Driveways 1 Source area number: 103

The Source Area is draining to a pervious area (partially connected impervious area)

The SCS Hydrologic Soil Type is Sandy

Undeveloped Area Source area number: 113

The SCS Hydrologic Soil Type is Sandy

Drainage System

Control Practice 1 : Grass Swale

	Residential Land Use	Institutional Land Use	Commercial Land Use	Industrial Land Use	Other Urban Land Use	Freeway Land Use
Total area in Land Use (ac):	0	0	0	6.79	0	0
Area served by swales (ac):	0	0	0	5.92	0	0
Swale density (ft/ac):	0	0	0	53.57	0	0
Total swale length (ft):	0	0	0	300	0	0
Typical bottom width (ft):	0	0	0	6	0	0
Typical side slope (_ ft H: 1 ft V):	0	0	0	3	0	0
Typical longitudinal slope (ft/ft):	0	0	0	0.006	0	0
Swale retardance factor:						B
Typical grass height (inches):	0	0	0	4	0	0
Swale infiltration rate (in/hr):	0	0	0	0.5	0	0
Typical swale depth (ft):	0	0	0	0	0	0

Residential Land Use Particle Size File:
Institutional Land Use Particle Size File:
Commercial Land Use Particle Size File:
Industrial Land Use Particle Size File: C:\Program Files\WinSLAMM\NURP.CPZ
Other Urban Land Use Particle Size File:
Freeway Land Use Particle Size File:

Outfall

Pollutants to be Analyzed and Printed:

Pollutant Name	Pollutant Type
Solids	Particulate
Copper	Particulate

SLAMM for Windows Version 9.3.0

Data file name: C:\Program Files\WinSLAMM\Flambeau West Watershed Swale Only.dat
Data file description: 08F777, Flambeau Mining Company, Copper Park Business and Recreation Area Stormwater Managment Plan, West Infiltration Basin Watershed, Swale Pollutant Removal Calculations, Revised 03/17/2011
Rain file name: C:\Program Files\WinSLAMM\Rain Files\WisReg - Minneapolis MN 1959.RAN
Particulate Solids Concentration file name: C:\Program Files\WinSLAMM\WI_AVG01.psc
Runoff Coefficient file name: C:\Program Files\WinSLAMM\WI_SL06 Dec06.rsv
Particulate Residue Delivery file name: C:\Program Files\WinSLAMM\WI_DLV01.prr
Residential Street Delivery file name: C:\Program Files\WinSLAMM\WI_Res and Other Urban Dec06.std
Institutional Street Delivery file name: C:\Program Files\WinSLAMM\WI_Com Inst Indust Dec06.std
Commercial Street Delivery file name: C:\Program Files\WinSLAMM\WI_Com Inst Indust Dec06.std
Industrial Street Delivery file name: C:\Program Files\WinSLAMM\WI_Com Inst Indust Dec06.std
Other Urban Street Delivery file name: C:\Program Files\WinSLAMM\WI_Res and Other Urban Dec06.std
Freeway Street Delivery file name: C:\Program Files\WinSLAMM\Freeway Dec06.std
Pollutant Relative Concentration file name: C:\Program Files\WinSLAMM\WI_GEO01.ppd
Apply Street Delivery Files to Adjust the After Event Load Street Dirt Mass Balance: False
Model Run Start Date: 01/02/59 Model Run End Date: 12/28/59
Date of run: 03-23-2011 Time of run: 09:46:02
Total Area Modeled (acres): 6.794
Years in Model Run: 0.99

	Runoff Volume (cu ft)	Percent Runoff Volume Reduction	Particulate Solids Conc. (mg/L)	Particulate Solids Yield (lbs)	Percent Particulate Solids Reduction
Source Area Total without Controls:	21350	0 %	48.82	65.03	0 %
Total Before Drainage System:	21349	0.00%	48.82	65.03	0.00%
Total After Drainage System:	8077	62.17%	45.50	22.92	64.75%
Total After Outfall Controls:	8077	62.17%	45.50	22.92	64.75%
Annualized Total After Outfall Controls:	8190			23.24	

Data file name: C:\Program Files\WinSLAMM\Flambeau West Watershed.dat
SLAMM Version 9.3.0
Rain file name: C:\Program Files\WinSLAMM\Rain Files\WisReg - Minneapolis MN 1959.RAN
Particulate Solids Concentration file name: C:\Program Files\WinSLAMM \WI_AVG01.psc
Runoff Coefficient file name: C:\Program Files\WinSLAMM\WI_SL06 Dec06.rsv
Particulate Residue Delivery file name: C:\Program Files\WinSLAMM \WI_DLV01.prr
Residential Street Delivery file name: C:\Program Files\WinSLAMM\WI_Res and Other Urban Dec06.std
Institutional Street Delivery file name: C:\Program Files\WinSLAMM \WI_Com Inst Indust Dec06.std
Commercial Street Delivery file name: C:\Program Files\WinSLAMM\WI_Com Inst Indust Dec06.std
Industrial Street Delivery file name: C:\Program Files\WinSLAMM\WI_Com Inst Indust Dec06.std
Other Urban Street Delivery file name: C:\Program Files\WinSLAMM\WI_Res and Other Urban Dec06.std
Freeway Street Delivery file name: C:\Program Files\WinSLAMM\Freeway Dec06.std
Apply Street Delivery Files to Adjust the After Event Load Street Dirt Mass Balance: False
Pollutant Relative Concentration file name: C:\Program Files\WinSLAMM \WI_GEO01.ppd
Seed for random number generator: -42
Study period starting date: 01/02/59 Study period ending date: 12/28/59
Start of Winter Season: 11/04 End of Winter Season: 03/13
Date: 03-23-2011 Time: 09:49:22
Fraction of each type of Drainage System serving study area:
1. Grass Swales 0.872
2. Undeveloped roadside 0
Curb and Gutters, `valleys', or sealed swales in:
3. Poor condition (or very flat) 0
4. Fair condition 0.128
5. Good condition (or very steep) 0
Site information: 08F777, Flambeau Mining Company, Copper Park Business and Recreation Area Stormwater Managment Plan, West Infiltration Basin Watershed, Pollutant Removal Calculations with Infiltration Basin, Revised 03/18/2011

	|<===== Areas for each Source (acres) =====>|				
Source Area	Resi-dential Areas	Institu-tional Areas	Commercial Areas	Industrial Areas	Other Urban Areas
Roofs 1	0.00	0.00	0.00	0.18	0.00
Roofs 2	0.00	0.00	0.00	0.07	0.00
Roofs 3	0.00	0.00	0.00	0.00	0.00
Roofs 4	0.00	0.00	0.00	0.00	0.00
Roofs 5	0.00	0.00	0.00	0.00	0.00
Paved Parking/Storage 1	0.00	0.00	0.00	2.25	0.00
Paved Parking/Storage 2	0.00	0.00	0.00	0.00	0.00
Paved Parking/Storage 3	0.00	0.00	0.00	0.00	0.00
Unpaved Prkng/Storage 1	0.00	0.00	0.00	0.00	0.00
Unpaved Prkng/Storage 2	0.00	0.00	0.00	0.00	0.00
Playground 1	0.00	0.00	0.00	0.00	0.00
Playground 2	0.00	0.00	0.00	0.00	0.00
Driveways 1	0.00	0.00	0.00	0.55	0.00
Driveways 2	0.00	0.00	0.00	0.00	0.00

Driveways 3	0.00	0.00	0.00	0.00	0.00
Sidewalks/Walks 1	0.00	0.00	0.00	0.00	0.00
Sidewalks/Walks 2	0.00	0.00	0.00	0.00	0.00
Street Area 1	0.00	0.00	0.00	0.00	0.00
Street Area 2	0.00	0.00	0.00	0.00	0.00
Street Area 3	0.00	0.00	0.00	0.00	0.00
Large Landscaped Area 1	0.00	0.00	0.00	0.00	0.00
Large Landscaped Area 2	0.00	0.00	0.00	0.00	0.00
Undeveloped Area	0.00	0.00	0.00	3.75	0.00
Small Landscaped Area 1	0.00	0.00	0.00	0.00	0.00
Small Landscaped Area 2	0.00	0.00	0.00	0.00	0.00
Small Landscaped Area 3	0.00	0.00	0.00	0.00	0.00
Isolated/Water Body Area	0.00	0.00	0.00	0.00	0.00
Other Pervious Area	0.00	0.00	0.00	0.00	0.00
Other Dir Cnctd Imp Area	0.00	0.00	0.00	0.00	0.00
Other Part Cnctd Imp Area	0.00	0.00	0.00	0.00	0.00
Total	0.00	0.00	0.00	6.79	0.00

Freeway Source Area	Area (acres)
Pavd Lane & Shldr Area 1	0.00
Pavd Lane & Shldr Area 2	0.00
Pavd Lane & Shldr Area 3	0.00
Pavd Lane & Shldr Area 4	0.00
Pavd Lane & Shldr Area 5	0.00
Large Turf Areas	0.00
Undeveloped Areas	0.00
Other Pervious Areas	0.00
Other Directly Conctd Imp	0.00
Other Partially Conctd Imp	0.00
Total	0.00

Total of All Source Areas	6.79
Total of All Source Areas less All Isolated Areas	6.79

Industrial Control Practice: Biofiltration Device
Fraction of Runoff From Selected Source Areas Routed to Land Use Biofilters: 1
Source Areas from Land Use that Contribute Runoff to Biofiltration Control Device
Roofs 1
Roofs 2
Paved Parking/Storage 1
Driveways 1
Undeveloped Area

1. Top Area (square feet) = 27661
2. Bottom Area (square feet) = 15
3. Depth (ft): 5
4. Depth of Biofilter that is Rock Filled (ft) 0
5. Fraction of Rock Filled Volume as Voids = 0
6. Engineered Soil Depth (ft) = 0
7. Engineered Soil Void Ratio = 0
8. Infiltration Rate (in/hr) = 1
9. Infiltration Rate Coefficient of Variation 0
10. Random Infiltration Rate Generation? No

```
          11. Infiltration Rate Fraction (Side):   1
          12. Infiltration Rate Fraction (Bottom):   1
          13. Biofilter Width (ft) - for Cost Purposes Only:   100
          14. Number of Biofiltration Control Devices =  1
          15. Biofilter Peak to Average Flow Ratio =  3.8
          16. Percent Solids Reduction Due to Flow Through Engineered
Soil =  49
          17. Particle Size Distribution File:  C:\Program Files\WinSLAMM
\NURP.CPZ
          18. Engineered Soil Media:
          19. Engineered Soil Infiltration Rate:   0
          20. Biofilter Outlet/Discharge Characteristics:
               Biofilter Outlet/Discharge Option Number 1
                 Outlet type:  Broad Crested Weir
                      1.  Weir crest length (ft):   15
                      2.  Weir crest width (ft):   10
                      3.  Height of datum to bottom of weir opening:
4.9
                      4.  Default weir coefficients:    Yes
                          Weir Coefficient:   0
                    Source Area Control Practice Information
Land Use:  Industrial
   Roofs 1    Source area number:  91
         The roof is flat
         The Source Area is directly connected or draining to a directly
connected area
   Roofs 2    Source area number:  92
         The roof is flat
         The Source Area is directly connected or draining to a directly
connected area
   Paved Parking/Storage 1    Source area number:  96
         The Source Area is draining to a pervious area (partially
connected impervious area)
         The SCS Hydrologic Soil Type is Sandy
   Driveways 1    Source area number:  103
         The Source Area is draining to a pervious area (partially
connected impervious area)
         The SCS Hydrologic Soil Type is Sandy
   Undeveloped Area    Source area number:  113
         The SCS Hydrologic Soil Type is Sandy

Drainage System
      Control Practice 1 :  Grass Swale
                                          Residential   Institutional
Commercial   Industrial   Other Urban   Freeway
                                            Land Use   Land Use   Land Use
Land Use   Land Use   Land Use
             Total area in Land Use (ac):
                              0             0             0
6.79         0            0
             Area served by swales (ac):
                              0             0             0
5.92         0            0
             Swale density (ft/ac):
                              0             0             0
53.57        0            0
             Total swale length (ft):
                              0             0             0
300          0            0
             Typical bottom width (ft):
                              0             0             0
```

```
6               0               0
                Typical side slope (_ ft H: 1 ft V):
                                  0               0               0
3               0               0
                Typical longitudinal slope (ft/ft):
                                  0               0               0
0.006           0               0
                Swale retardance factor:
                                                                                  B
                Typical grass height (inches):
                                  0               0               0
4               0               0
                Swale infiltration rate (in/hr):
                                  0               0               0
0.5             0               0
                Typical swale depth (ft):
                                  0               0               0
0               0               0
                Residential Land Use Particle Size File:
                Institutional Land Use Particle Size File:
                Commercial Land Use Particle Size File:
                Industrial Land Use Particle Size File:  C:\Program Files
\WinSLAMM\NURP.CPZ
                Other Urban Land Use Particle Size File:
                Freeway Land Use Particle Size File:

Outfall

Pollutants to be Analyzed and Printed:
          Pollutant Name                Pollutant Type
          --------------                --------------
           Solids                       Particulate
           Copper                       Particulate
```

SLAMM for Windows Version 9.3.0

Data file name: C:\Program Files\WinSLAMM\Flambeau West Watershed.dat
Data file description: 08F777, Flambeau Mining Company, Copper Park Business and Recreation Area Stormwater Managment Plan, West Infiltration Basin Watershed, Pollutant Removal Calculations with Infiltration Basin, Revised 03/18/2011
Rain file name: C:\Program Files\WinSLAMM\Rain Files\WisReg - Minneapolis MN 1959.RAN
Particulate Solids Concentration file name: C:\Program Files\WinSLAMM\WI_AVG01.psc
Runoff Coefficient file name: C:\Program Files\WinSLAMM\WI_SL06 Dec06.rsv
Particulate Residue Delivery file name: C:\Program Files\WinSLAMM\WI_DLV01.prr
Residential Street Delivery file name: C:\Program Files\WinSLAMM\WI_Res and Other Urban Dec06.std
Institutional Street Delivery file name: C:\Program Files\WinSLAMM\WI_Com Inst Indust Dec06.std
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Other Urban Street Delivery file name: C:\Program Files\WinSLAMM\WI_Res and Other Urban Dec06.std
Freeway Street Delivery file name: C:\Program Files\WinSLAMM\Freeway Dec06.std
Pollutant Relative Concentration file name: C:\Program Files\WinSLAMM\WI_GEO01.ppd
Apply Street Delivery Files to Adjust the After Event Load Street Dirt Mass Balance: False
Model Run Start Date: 01/02/59 Model Run End Date: 12/28/59
Date of run: 03-23-2011 Time of run: 09:49:10
Total Area Modeled (acres): 6.794
Years in Model Run: 0.99

	Runoff Volume (cu ft)	Percent Runoff Volume Reduction	Particulate Solids Conc. (mg/L)	Particulate Solids Yield (lbs)	Percent Particulate Solids Reduction
Source Area Total without Controls:	21350	0 %	48.82	65.03	0 %
Total Before Drainage System:	0	100.00%	0	0	100.00%
Total After Drainage System:	0	100.00%	0	0	100.00%
Total After Outfall Controls:	0	100.00%	0	0	100.00%
Annualized Total After Outfall Controls:	0			0	

Appendix D

WDNR Construction Site Inspection Report

State of Wisconsin
Department of Natural Resources
dnr.wi.gov

CONSTRUCTION SITE INSPECTION REPORT

Form 3400-187 (rev. 9/04)

Notice: Use of this specific form is voluntary, but the information contained on this form must be collected and kept by the permittee under s. NR 216.48(4), Wis. Adm. Code, for a construction site covered under the General WPDES Construction Site Storm Water Discharge Permit, Permit No. WI-0067831-2. This form is provided for the convenience of the permittee to meet the requirements of s. NR 216.48(4), Wis. Adm. Code. Multiple copies of this form may be made to compile the inspection report.

Inspections of implemented erosion and sediment control best management practices must be performed weekly and within 24 hours after a precipitation event 0.5 inches or greater which results in runoff.

Weekly written reports of all inspections conducted by or for the permittee must be maintained throughout the period of general permit coverage.

The information maintained in accordance with s. NR 216.48 (4) must be submitted to the Department upon request.

Name of Permittee:	
Construction Site Name (Project):	**Construction Site ID No.:**
Location:	**County:**
Contractor:	**Field Office Phone:**

Note: Weekly inspection reports, along with erosion control and stormwater management plans, are required to be maintained on site and made available upon request.

Date of inspection (mm/dd/yy): _____ **Time of inspection: Start: _____ a.m./p.m.** **End: _____ a.m./p.m.**	**Type of inspection: ☐ Weekly ☐ Precipitation Event ☐ Other (specify)** _____ **Name(s) of individual(s) performing inspection:**
Weather:	
Description of present phase of construction:	

Modifications Required	Yes	No	Not Applicable	**Comments/Recommendations** about the overall effectiveness of the erosion and sediment control measures. **Note**: For each item checked "Yes", complete the follow-up information on page 2.
Ditch Checks	☐	☐	☐	
Erosion Control Plan	☐	☐	☐	
Erosion Mat	☐	☐	☐	
Grading Practices	☐	☐	☐	
Inlet Protection	☐	☐	☐	
Mulch	☐	☐	☐	
Offsite Sediment	☐	☐	☐	
Permanent Seeding	☐	☐	☐	
Schedule / Phasing	☐	☐	☐	
Silt Fence	☐	☐	☐	
Silt Screen	☐	☐	☐	
Sod	☐	☐	☐	
Stabilized Outlet	☐	☐	☐	
Temp. Diversion Channel	☐	☐	☐	
Temp. Settling Basin	☐	☐	☐	
Temporary Seeding	☐	☐	☐	
Tracking Pads	☐	☐	☐	
Turbidity Barrier	☐	☐	☐	
Other (specify) _____	☐	☐	☐	

Name of Permittee:	
Construction Site Name (Project):	**Construction Site ID No.:**

Use the space below for detailed follow-up action items.

Exact place of erosion/sediment control inspected	**Type of erosion/sediment control and its observed condition**	**Description of any necessary maintenance or repair to erosion/sediment control, including anticipated date of completion**

Report

Wetland Restoration Plan

Project I.D.: 08F777

Flambeau Mining Company
Ladysmith, Wisconsin

May 2011

Wetland Restoration Plan

Project ID: 08F777

Prepared for
Flambeau Mining Company
N4100 Highway 27
Ladysmith, WI 54848

Prepared by
Foth Infrastructure & Environment, LLC

May 2011

2737 South Ridge Road, Suite 600 • P.O. Box 12326 • Green Bay, WI 54307-2326 • (920) 497-2500 • Fax: (920) 497-8516

Wetland Restoration Plan

Contents

Figures

Appendices

List of Abbreviations, Acronyms, and Symbols

EIR	Environmental Impact Report
Flambeau	Flambeau Mining Company
Foth	Foth Infrastructure & Environment, LLC
NR	Natural Resources
NRCS	Natural Resources Conservation Services
WDNR	Wisconsin Department of Natural Resources
Work Plan	Copper Park Business and Recreation Area Work Plan

1 Introduction

Foth Infrastructure and Environment, LLC (Foth) has prepared this *Wetland Restoration Plan* at the request of Flambeau Mining Company (Flambeau). A 1:24,000 United States Geological survey map of the project area is provided as Figure 1.

1.1 Purpose

The *Wetland Restoration Plan* is part of the *Copper Park Business and Recreation Area Work Plan* (*Work Plan*) which is being submitted as a plan to address:

- Removal of a portion of remaining rail spur berm and culverts between Copper Park Lane and Highway 27; and attendant grading activity.
- Conversion of the 0.9-acre Biofilter (artificial wetland pursuant to NR 103.06(4)(a) to an infiltration basin;
- Creation of two additional infiltration basins in the area north of the 0.9-acre Biofilter and in areas of isolated artificial wetlands (NR 103.06) on the west side of the asphalted area of the Copper Park Business and Recreation Area.
- Restoration of wetlands in the area of historical wetlands.
- Enhance stormwater management across the *Work Plan* Project Area.

One element of the *Work Plan* includes removal of a portion of the remaining rail spur west of Highway 27 and removal of two culverts along Intermittent Stream C in order to restore the area, including Intermittent Stream C, closer to pre-construction conditions. These areas encompass the wetland restoration project area, which is shown in Figure 2.

Prior to mining activities, much of the proposed wetland restoration area was classified as wetland. The 8.5-acre wetland was constructed to balance the disturbed wetland areas, including the rail spur area, which were disturbed by construction of the mine site.

A summary of the history of the project area, including the wetland restoration area, is provided in Section 2 of the *Work Plan*. A delineation of the wetlands was completed in 2010 by Stantec (Rice Lake, Wisconsin). This report is included in Appendix A.

1.2 Scope of Work

The wetland restoration activities include:

- Removal of a portion of the rail spur west of Highway 27.
- Removal of the two culverts under the rail spur west of Highway 27.
- Removal of the culvert between Copper Park Lane and the rail spur.
- Mitigation of construction activities within existing natural wetland areas.
- Wetland restoration in the area of the rail spur.
- Regrade the rail spur to allow Intermittent Stream C to follow a more natural course.

1.3 Schedule

Work is anticipated to begin sometime between July 2011 and October 2011 with work completion in November 2011.

1.4 Goals and Objectives

The goals and objectives of this project are:

- Restoration of the area closer to pre-construction conditions.
- Restoration of wetlands within the wetland restoration area.
- Mitigation of construction activities within existing natural wetland areas in the wetland restoration area.
- Restoration of Intermittent Stream C between Copper Park Lane and Highway 27 close to pre-construction conditions.

1.5 Regulatory Background

The proposed wetland restoration and mitigation project is being completed as part of a larger scope of work discussed in the *Work Plan*. The proposed wetland restoration project was designed in accordance with Chapter 30 and Chapter Natural Resources (NR) 353 Wisconsin Administrative Code (NR 353) Wetland Conservation Activities. Work is anticipated to be completed under the Water Quality Certification and Chapter 30 Permit. Permit Application documents are being submitted along with this plan.

NR 353 general permit application documents are included as Appendix B.

2 Background Information

The requirements of NR 353.04 (1) are met as listed below:

(a) The project purpose is wetland conservation.

(b) The project proponent has demonstrated that site conditions exhibit impacts to topography, soil, native vegetation or hydrology that have degraded a wetland and are potentially reversible.

(c) The project proponent has demonstrated that the project involves only listed wetland conservation activities as specified in s. NR 353.05. These activities include (3), (4), (5) and (6):

(3) A low berm will be constructed north of the rail spur in order to divert water from under Highway 27 from flowing into the ditch north of the rail spur and encourage flow to Intermittent Stream C. This berm will be constructed in accordance with Natural Resources Conservation Service Field Office Technical Guide Standard Conservation Practice 657 – Wetland Restoration.

(4) Post European settlement soil that makes up the berm of the former rail spur will be removed to enhance hydraulic diversity.

(5) The berm of the former rail spur will be removed altering the hydrology of the area closer to pre-mining conditions.

(6) The wetland restoration project area will be replanted with native wetland species and invasive plant species will be controlled through cutting, removing, destroying, or suppressing. The Landscaping and Planting Plan prepared by Stantec is presented in Appendix D of the *Work Plan*.

(d) The project involves activities in waters that have been determined to be navigable but the activities will not cause adverse impacts to the waters they are being completed to enhance those waters.

(e) Cold water communities as defined in s. NR 102.04 (3) (a) are not present within the project area.

(f) No spawning areas are present within the wetland restoration project area.

(g) No threatened or endangered resources are present within the project area as documented in Section 3.9.5 of the *Environmental Impact Report* (*EIR*), Foth & Van Dyke, April 1989.

(h) No historical or cultural resources are present within the project area as documented in Section 3.3 of the *EIR*, Foth & Van Dyke, April 1989.

(i) The proposed berm will have a height less that 6 feet measured from natural ground to design top of the structure and the storage area behind the proposed berm will not increase.

(j) The project does not involve the planned introduction of non-native or invasive wetland plants.

(k) The project does not involve the control of native wetland plant species.

Also, the project meets the following conditions listed in NR 353.04 (2):

(a) Invasive wetland species dominate the project area as described in the *Wetland Delineation Report* presented in Appendix A.

(b) The proposed activities will not cause significant adverse impacts to undisturbed wetland plant communities because mitigation steps to protect the undisturbed wetlands adjacent to the work, as described in the next section, will be taken during wetland restoration activities.

2.1 Site Description

The site consists of a reclaimed open pit mine located approximately 2 miles south of Ladysmith, Wisconsin, in Rusk County. It is bounded by Highway 27 on the east, the Flambeau River on the west, Blackberry Lane on the north, and Copper Park Lane on the south. The site has been extensively graded through the mining activities and subsequent reclamation activities. The features present on the site include an open prairie in the vicinity of the reclaimed open pit, forested area, and an asphalted area contained numerous buildings that are still in use. There are two constructed wetlands in the northeast and southwest area of the site and a biofilter east of the asphalted area. There is a berm that runs east-west parallel to Copper Park Lane which is an abandoned railroad spur that was used during mining activities to haul ore out for processing.

The topography is relatively flat and slopes gently to the southwest towards the Flambeau River. Site elevations range from 1,140 to 1,150 feet mean sea level with topographic highs in the north and west.

The site was evaluated as part of the wetland delineation study completed by Mr. James Engelhardt, from Stantec, on May 17, 2010. Much of the information provided below has been incorporated from this site visit and is presented in detail in the *Wetland Delineation Report* by Stantec in Appendix A.

2.1.1 Soils

As described in the *Wetland Delineation Report* completed by Stantec (Appendix A), soils mapped on the Study Area by the Natural Resources Conservation Service (NRCS) Soil Survey of Rusk County include udorthents and udipsamments, cut or fill (2030). The soil type identified is representative of areas that have been significantly disturbed from grading activities and normally do not show characteristics of the native soil descriptions. Because the area is disturbed the NRCS soil survey does not list hydric qualities or hydric inclusions for this soil type.

2.1.2 Hydraulic Conditions

There are three unnamed intermittent streams on the site which are referred to as Intermittent Stream A, B, and C, respectively. Surface water from the reclaimed mine is drained by the watersheds of Intermittent Streams A and B. The wetland restoration project area is drained by the watershed of Intermittent Stream C. These watersheds are secondary watersheds of the Flambeau River tributary in the Chippewa River watershed.

2.1.3 Land Use

Since the completion of mine reclamation activities land use on the site includes a business park and recreation area.

2.1.4 Wetland Delineation

Seven wetlands were identified and delineated as part of the wetland delineation completed by Stantec. These wetlands are described in detail in the *Wetland Delineation Report* included in Appendix A.

2.1.5 Plant Communities

Vegetation in the wetlands near the wetland restoration area is dominated by invasive wetland species. Further descriptions are provided in the *Wetland Delineation Report* in Appendix A.

2.2 Project Description

The project involves the removal of the former rail spur immediately west of Highway 27, the removal of two culverts under the rail spur, the removal of the culvert in Intermittent Stream C near the southeast corner of the 0.9-acre Biofilter, the grading of a low berm along the northern edge of the former rail spur, placing riprap at the outlet of the culvert under Highway 27, and revegetation of the disturbed area.

3 Wetland Restoration Methods

The following section discusses the wetland restoration methods that will be used during the project.

3.1 Construction Erosion Control and Wetland Mitigation

Construction activities during removal of the rail spur will be limited to the immediate area of the spur. Construction equipment will enter and exit the area from the west, and removal of the spur will occur from east to west. Excavated soil will not be stockpiled, but will be immediately removed from the rail spur area.

Silt fences will be installed to the north and south of the rail spur along the entire length of the rail spur to be removed as shown in Figure 3. In addition, inlet protection will be installed on the culvert under Copper Park Lane. Rock riprap will also be installed at the outlet of the culvert under Highway 27. A temporary ditch will also be installed following the riprap running north-south immediately to the west of Highway 27. The temporary ditch will divert runoff around the excavated rail spur area until construction activities are complete and vegetation has been re-established.

3.2 Conservation and Restoration Activities

Removal of the rail spur will restore the pre-mining hydrology of runoff discharging from the culvert under Highway 27. After exiting the culvert, runoff will spread out via overland flow across the former rail spur area. Runoff will eventually follow the Intermittent Stream C low area to the east of the current biofilter.

A two foot berm will separate runoff from the east of Highway 27 with runoff from along west of Highway 27 to the north as shown in Figure 4, Cross Section A-A'. The berm will be constructed according to Natural Resources Conservation Service Field Office Technical Guide Standard Conservation Practice 657 – Wetland Restoration. The berm and surrounding wetland restoration project area will be replanted with native wetland species and invasive plant species will be controlled through cutting, removing, destroying, or suppressing. Additional information on the revegetation of the area is presented in the *Landscape Design and Planting Plan* prepared by Stantec and presented as Appendix D of the *Work Plan*.

3.3 Disposal of Excavated Material

Material excavated from the rail spur will either remain on-site for beneficial re-use as surface cover or stockpiled on upland areas and then disposed in accordance with Wisconsin Department of Natural Resources' (WDNR) regulation for disposal of non-hazardous materials.

4 Documentation and Long-term Monitoring

A constructed documentation report will be submitted to the WDNR to document the activities completed as part of the proposed wetland restoration plan.

Monitoring of the wetland restoration area, including invasive species mitigation, is presented in the *Landscape Design and Planting Plan* prepared by Stantec and presented as Appendix D of the *Work Plan*.

5 References

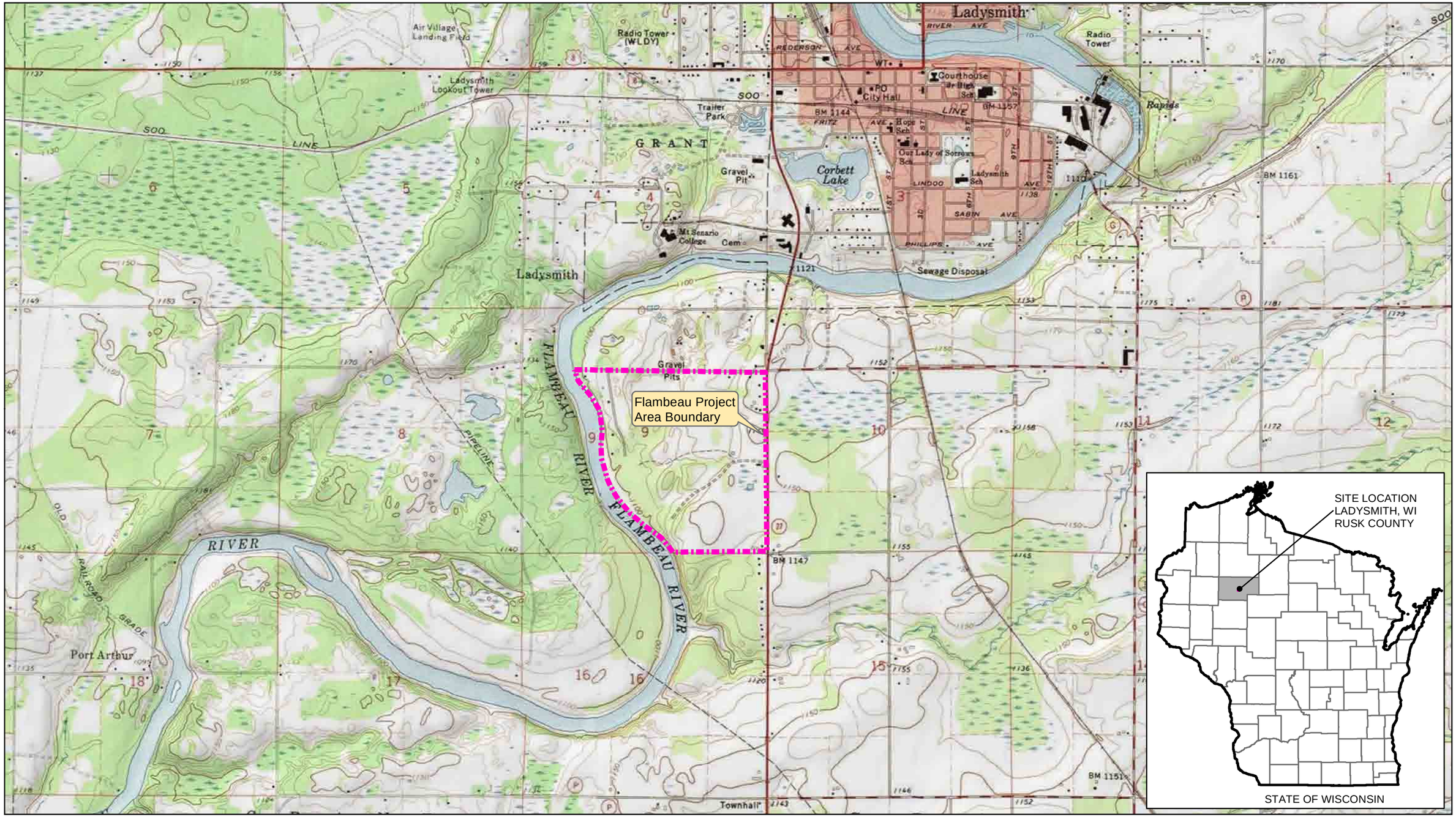
Foth & Van Dyke and Associates, Inc. April 1989. *Environmental Impact Report* (*EIR*).

Wisconsin Department of Natural Resources. Chapter NR 353 Wisconsin Administrative Code.

Wisconsin Department of Natural Resources. Natural Resources Conservation Service Field Office Technical Guide Standard Conservation Practice 657 – Wetland Restoration.

Wisconsin Department of Natural Resources. Chapter 30.19 Wisconsin Administrative Code.

Figures



NOTES

1. Horizontal datum based on NAD 1983.
   Horizontal coordinates based on Wisconsin State Plane North (Feet).

LEGEND

Flambeau Project Area Boundary

N

Foth Infrastructure & Environment, LLC

REVISED	DATE	BY	DESCRIPTION

CHECKED BY:	SVF	DATE:	MAY '11
APPROVED BY:	JBH1	DATE:	MAY '11
APPROVED BY:		DATE:	

FLAMBEAU MINING COMPANY

FIGURE 1
FLAMBEAU MINE
WETLAND RESTORATION PLAN
SITE LOCATION MAP

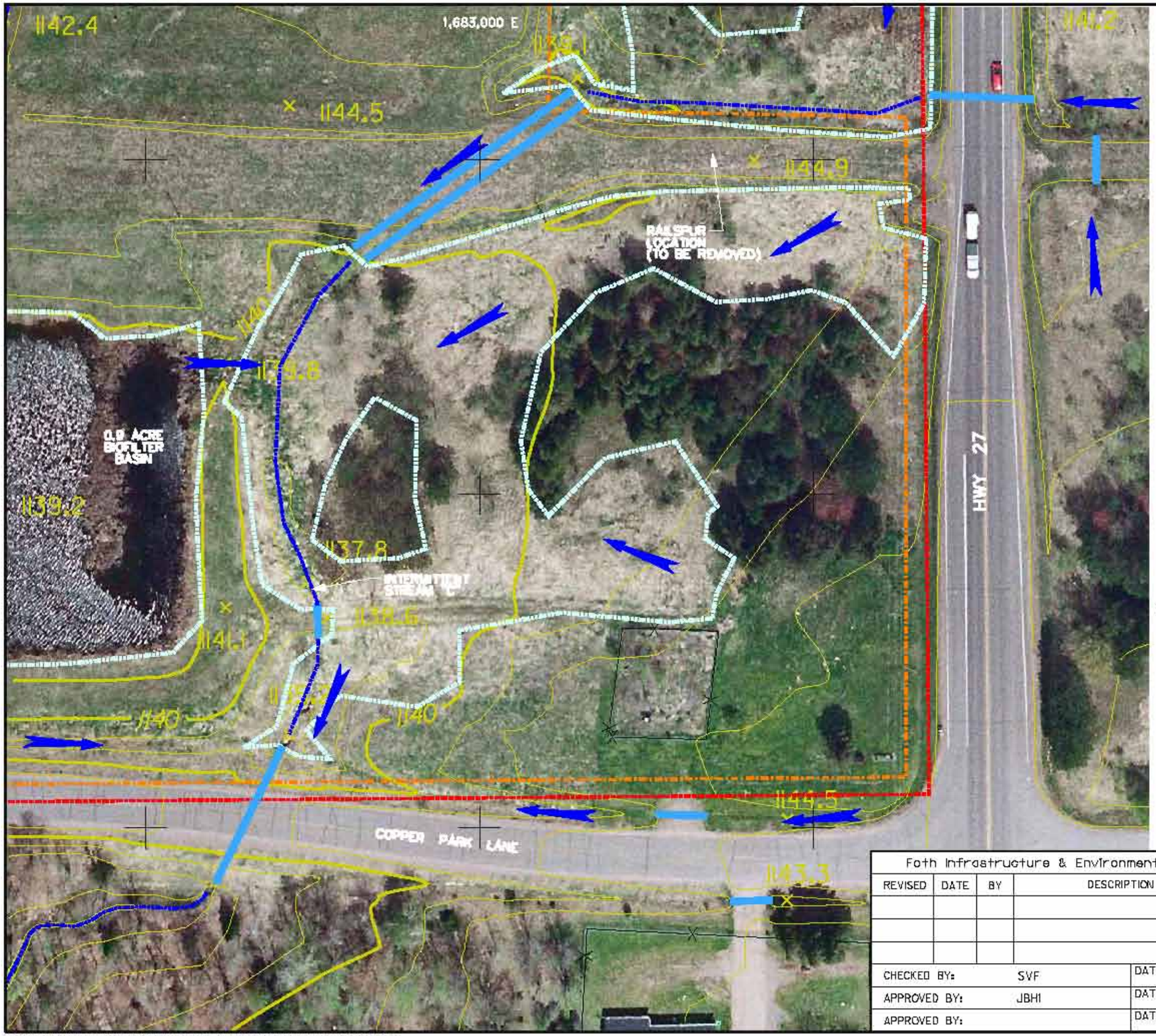
Scale: 0 1,000 2,000 Feet

Date: MAY, 2011

Prepared by: DAT

Project No: 08F777

Path: X:\GB\E\2008\08F777\GIS\mxd\SWMP2011\SWMP_USGS.mxd Date: 5/12/2011



N

LEGEND

- EXISTING SPOT ELEVATION (× 1147.1)
- EXISTING 2' ELEVATION CONTOURS (1150)
- EXISTING FENCE
- FLAMBEAU MINE AREA BOUNDARY
- INDUSTRIAL OUTLOT LIMITS
- FIELD DELINEATED WETLAND BOUNDARY
- INTERMITTENT STREAM LOCATION
- EXISTING CULVERT LOCATION
- EXISTING WATER FLOW DIRECTION

NOTES:

1. DIGITAL ORTHOPHOTO IMAGERY, TOPOGRAPHIC AND PLANIMETRIC DATA PROVIDED BY AERO-METRIC, INC., MINNEAPOLIS, MN. DATE OF FLIGHT: MAY 17, 2008.
2. HORIZONTAL DATUM BASED ON NAD 1983. HORIZONTAL COORDINATES BASED ON WISCONSIN STATE PLANE NORTH (FEET.)

Foth Infrastructure & Environment, LLC

REVISED	DATE	BY	DESCRIPTION

CHECKED BY:	SVF	DATE: MAY '11
APPROVED BY:	JBH1	DATE: MAY '11
APPROVED BY:		DATE:

Foth
Foth Infrastructure & Environment, LLC

FLAMBEAU MINING COMPANY

FIGURE 2
EXISTING WETLAND RESTORATION AREA CONDITIONS

Scale:	0 30' 60'	Date:	MAY, 2011
Prepared By: JRB2		Project No:	08F777

X:\GB\IE\2008\08F777\cad\Stormwater Plan\Figures\Fig_2_Wetland Existing.dgn
5/12/2011 JRB2

1,682,800 E

1,683,000 E

1,683,200 E

PROPOSED SILT FENCE LOCATION SEE DETAIL 1/5

PROPOSED DIVERSION BERM SEE DETAIL 2/6

PROPOSED RIP RAP PLACEMENTAREA (8' x 60' = 480 sq. ft.)

PROPOSED NORTH COPPER PARK INFILTRATION BASIN

PROPOSED TEMPORARY DITCH

100,800 N

OVERFLOW OUTLET

CROSS SECTION SEE FIGURE 4

EXISTING OUTLET TO BE BLOCKED

RAILROAD SPUR AND EXISTING CULVERTS TO BE REMOVED

PROPOSED SILT FENCE LOCATION SEE DETAIL 1/5

PROPOSED EAST COPPER PARK INFILTRATION BASIN

APPROXIMATE AREA OF START OF INTERMITTENT STREAM "C" AFTER CONSTRUCTION

EXISTING CULVERT TO BE REMOVED AND AREA GRADED FOR DRAINAGAE DITCH SEE DETAIL 1/6

PROPOSED INSTALLATION OF INLET PROTECTION

COPPER PARK LANE

100,400 N

HWY 27

N

LEGEND

- EXISTING SPOT ELEVATION
- EXISTING 2' ELEVATION CONTOURS
- EXISTING FENCE
- EXISTING TREE
- EXISTING TREE LINE
- EXISTING EDGE OF PAVEMENT
- EXISTING CULVERT LOCATION
- INTERMITTENT STREAM LOCATION
- FLAMBEAU MINE AREA BOUNDARY
- INDUSTRIAL OUTLOT LIMITS
- RAILROAD SPUR REMOVAL AREA
- PROPOSED VEGETATED BUFFER
- PROPOSED MAXIMUM WATER LEVEL IN INFILTATION BASINS
- EXISTING NATURAL RETENTION AREA
- PROPOSED DRAINAGE FLOW DIRECTION
- PROPOSED SILT FENCE LOCATION
- PROPOSED GRADING CONTOUR
- PROPOSED RIP RAP

NOTES:

1. TOPOGRAPHIC AND PLANIMETRIC DATA PROVIDED BY AERO-METRIC, INC., MINNEAPOLIS, MN. DATE OF FLIGHT: MAY 17, 2008.
2. HORIZONTAL DATUM BASED ON NAD 1983. HORIZONTAL COORDINATES BASED ON WISCONSIN STATE PLANE NORTH (FEET.)

Foth Infrastructure & Environment, LLC

REVISED	DATE	BY	DESCRIPTION

CHECKED BY:	MAN	DATE:	MAY '11
APPROVED BY:	JBH1	DATE:	MAY '11
APPROVED BY:		DATE:	

Foth Infrastructure & Environment, LLC

FLAMBEAU MINING COMPANY

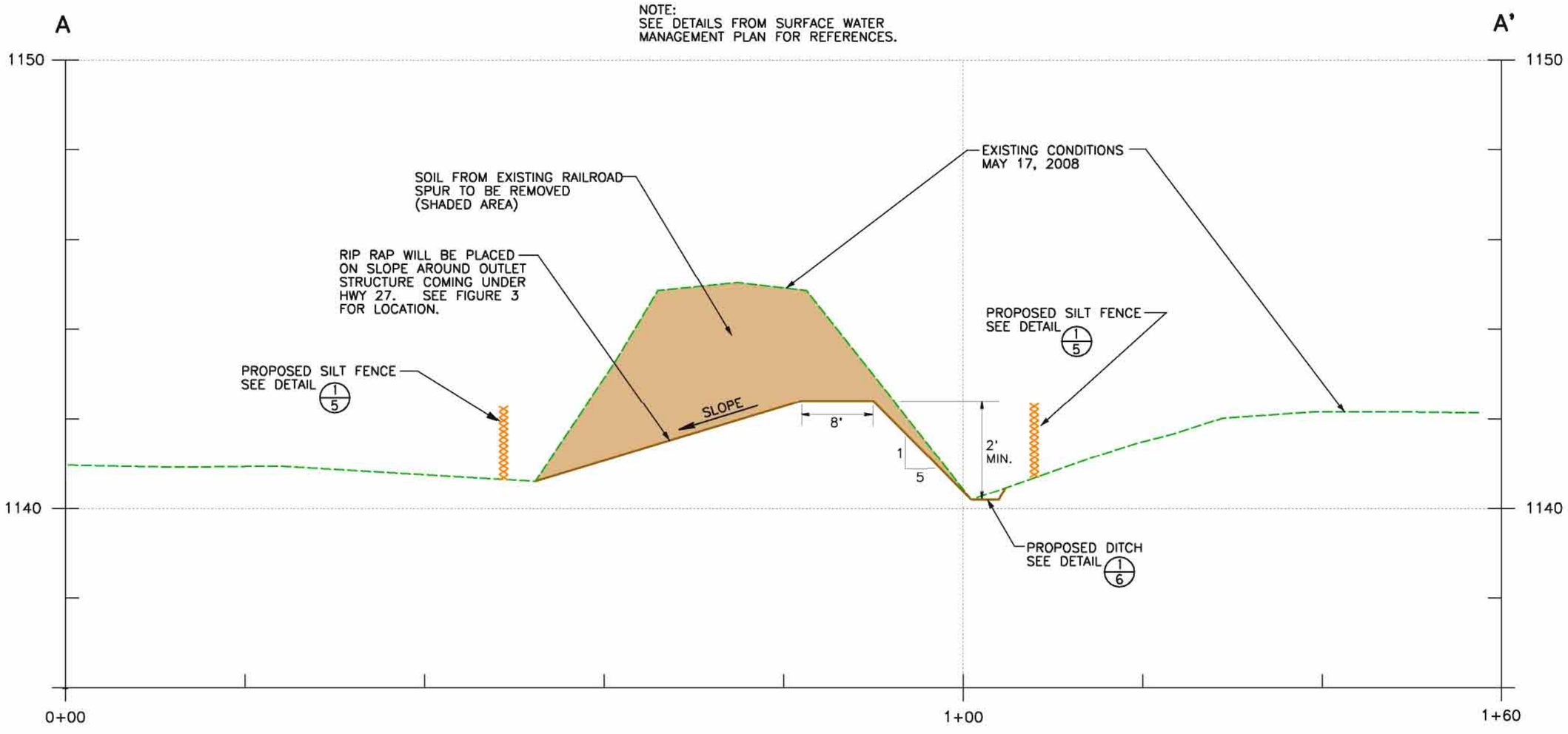
FIGURE 3

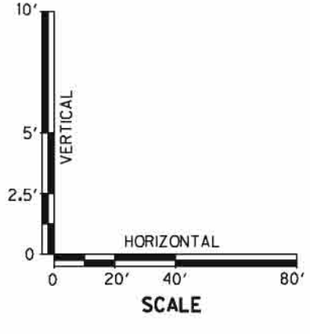
WETLAND RESTORATION PLAN

Scale: 0 30' 60'		Date:	MAY, 2011
Prepared By: JRB2		Project No:	08F777

X:\GB\IE\2008\08F777\cad\Stormwater Plan\Figures\Fig_3_Wetland Restoration.dgn
5/12/2011 JRB2

NOTE:
SEE DETAILS FROM SURFACE WATER MANAGEMENT PLAN FOR REFERENCES.





Foth Infrastructure & Environment, LLC			
REVISED	DATE	BY	DESCRIPTION

CHECKED BY:	MAN	DATE:	MAY '11
APPROVED BY:	JBH1	DATE:	MAY '11
APPROVED BY:		DATE:	

Foth
Foth Infrastructure & Environment, LLC

FLAMBEAU MINING COMPANY

FIGURE 4
WETLAND RESTORATION
CROSS SECTION A - A'
(LOOKING WEST)

Scale:	SEE BAR SCALE	Date:	MAY, 2011
Prepared By:	JRB2	Project No:	08F777

$$$$DGNSPEC$$$$$$$$$$$$$$$$$$
$$DAT$$$$ $USRN$

Appendix A

Wetland Delineation Report

WETLAND DELINEATION REPORT

FLAMBEAU MINING COMPANY – INDUSTRIAL OUTLOT
CITY OF LADYSMITH, RUSK COUNTY, WISCONSIN

February 17, 2011

Prepared For:

Ms. Jana Murphy
Flambeau Mining Company
N4100 Highway 27
Ladysmith, WI 54848

Prepared By:

NRC
Natural Resources Consulting, Inc.

Now

Stantec

Stantec Consulting Services Inc.
610B West Avenue
Rice Lake, Wisconsin 54868
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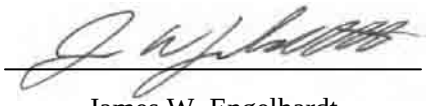

James W. Engelhardt
Environmental Scientist

TABLE OF CONTENTS

INTRODUCTION

Stantec performed a wetland determination and delineation of a portion of the Flambeau Mining Company property referred to as the Industrial Outlot (the "Study Area") on behalf of Jana Murphy, Environmental & Reclamation Manager for the Flambeau Mining Company. The Study Area is approximately 26 acres located in Section 9, Township 34 North, Range 6 West, City of Ladysmith, Rusk County, Wisconsin (Figure 1).

The purpose and objective of the wetland determination and delineation was to identify the extent and spatial arrangement of wetlands within the Study Area. The wetland delineation was completed by James W. Engelhardt, of Stantec on May 17, 2010. Seven wetland areas were identified within the Study Area.

Wetlands that are considered waters of the U.S. are subject to regulation under Section 404 of the Clean Water Act (CWA) and the jurisdictional regulatory authority lies with the United States Army Corps of Engineers (USACE). Additionally, the Wisconsin Department of Natural Resources (WDNR) has regulatory authority over wetlands, navigable waters, and adjacent lands under Chapter 30 Wisconsin State Statutes, Act 6, and Wisconsin Administrative Code NR 103. If requested, this report will be submitted to the WDNR, USACE, and if necessary, the local zoning office.

METHODS

Wetland determinations were based on the criteria and methods outlined in the *United States Corps of Engineers Wetlands Delineation Manual,* Technical Report Y-87-1 (1987), subsequent guidance documents (USACE 1991, 1992), Guidelines for Submitting Wetland Delineations in Wisconsin to the St. Paul District Corps of Engineers (USACE 1996), the *Basic Guide to Wisconsin's Wetlands and their Boundaries* (Wisconsin Department of Administration Coastal Management Program 1995), and the Interim Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Northcentral and Northeast Region (USACE 2009).

The wetland determination involved the use of available resources to assist in the assessment such as USGS topographic maps, Natural Resources Conservation Service (NRCS) soil survey, Wisconsin Wetland Inventory (WWI) mapping and aerial photography.

On-site wetland determinations were made using the three criteria (vegetation, soil and hydrology) based on the technical approach defined in the USACE 1987 Manual and the 2009 Interim Northcentral and Northeast Supplement to the USACE Manual. According to procedures described in the 1987 Manual and the 2009 Interim Supplement, areas that under normal circumstances reflect a predominance of hydrophytic vegetation, hydric soils, and wetland hydrology (e.g., inundated or saturated soils) are considered wetlands.

The uppermost wetland boundaries were identified with delineation flagging. The wetland boundaries were surveyed with a Global Positioning System (GPS) capable of sub-meter accuracy and mapped using Geographical Information System (GIS) software. Subject to weathering, the flagging will remain in the field for use during a USACE / WDNR site review and as a guide during construction.

RESULTS

Site Description

The Study Area is a reclaimed open pit mine which has been extensively graded and restored as mesic prairie. The Study Area is comprised of several commercial buildings, asphalt parking lots, equestrian trailhead, mesic prairie, wet meadow, and a surface water biofilter. Therefore, the Study Area does not represent native topographic conditions. The current topography is relatively flat with minor topographic highs in the western and northern portions of the Study Area near 1150 feet msl. The Study Area has topographic lows of approximately 1140 feet msl where the property slopes slightly towards the unnamed intermittent waterway near the east boundary of the Study Area. The Study Area is bordered by northern mesic forest and the Flambeau River to the west; mesic prairie to the north; STH 27, wetland, and mesic forest to the east; and northern mesic forest to the south.

Soils mapped on the Study Area by the *NRCS Soil Survey of Rusk County* include udorthents and udipsamments, cut or fill (2030) (Figure 2). The soil type identified is representative of areas that have been significantly disturbed from grading activities and normally do not show characteristics of the native soil descriptions. Because the area is disturbed the NRCS soil survey does not list hydric qualities or hydric inclusions for this soil type.

The Wisconsin Wetland Inventory (WWI) map does not identify any wetlands within the Study Area (Figure 3).

Wetlands

Seven wetlands were identified and delineated within the Study Area. USACE data sheets were completed for 16 sample points along transects through the wetlands and adjacent uplands and are contained in Appendix A. Representative photographs of the wetlands and adjacent lands are contained in Appendix B. The wetland boundary and sample point locations are shown on Figure 4. The wetlands are summarized in Table 1 and described in detail in the following sections.

Table 1. Summary of Wetlands Identified within the Property.

Wetland	Wetland Type	Adjacent Surface Waters	Acreage (on-site)
Wetland 1 (W1)	Wet Meadow	Drains north through rip rap lined ditch to Biofilter. No inlets observed.	0.34 acres
Wetland 2 (W2)	Wet Meadow	No inlets or outlets observed.	0.11 acres
Wetland 3 (W3)	Wet Meadow	No inlets or outlets observed.	0.04 acres
Wetland 4 (W4)	Wet Meadow	No inlets or outlets observed.	0.11 acres

Wetland 5 (W5)	Wet Meadow	Drains west to shallow ditch in equestrian trailhead area. No inlets observed.	0.21 acres
Wetland 6 (W6)	Wet Meadow	Drains southwest through culvert into W5. No inlets observed.	0.17 acres
Wetland 7 (W7)	Wet Meadow (native)	Connected to unnamed intermittent waterway to the south. No inlets observed.	1.42 acres

Wetlands 1, 2, 3, 4, 5, & 6 (W-1 through W-6)

Wetlands 1 through 6 are similar wet meadow wetlands occurring in shallow depressions throughout the reclaimed mine and equestrian trailhead areas. Each of these wetlands appears to be isolated with no connection to navigable surface waters. Each of these wetland areas were created following mine reclamation activities that resulted in uneven grading leaving shallow depressions on the relatively flat topography. Because these wetlands were unintentionally created by recent human activities they are considered "recently developed wetlands" and were therefore delineated following procedures for difficult wetland situations outlined in the Interim Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Northcentral and Northeast Region (USACE 2009).

Vegetation

Dominant plant species identified at the sample points completed within the representative wet meadow wetlands consist of meadow willow (*Salix petiolaris*), wool-grass (*Scirpus cyperinus*), soft rush (*Juncus effusus*), marsh straw sedge (*Carex tenera*), reed canary grass (*Phalaris arundinacea*), and switchgrass (*Panicum virgatum*). Other common species identified in the wetlands are listed on the data forms contained in Appendix A. The dominant species within the wetlands are comprised of hydrophytic vegetation (OBL, FACW, and/or FAC) and meet the hydrophytic vegetation criterion.

Hydrology

The wetlands appear to have a seasonally inundated/saturated hydroperiod. Surface water (A1) and saturation within the upper 12 inches of the soil profile (A3) were observed as primary indicators of wetland hydrology. Secondary indicators of wetland hydrology included geomorphic position (D2) and FAC-neutral test (D5). Therefore, the wetland hydrology criterion was met.

Soils

Soils within the wetlands are mapped by the NRCS as udorthents and udipsamments, cut or fill (2030) (Figure 2). The soils observed at the representative sample points consisted of silty clay loam and clay loam intermixed with gravel and were consistent with cut or fill soil characteristics. No NRCS field indicators of hydric soil were identified at any of the representative sample points. Therefore, the hydric soil criterion was not satisfied at any of the representative sample points. Wetlands W-1 through W-6 are considered recently developed wetlands. Recently developed wetlands may lack hydric soil indicators because insufficient time has passed for their development.

Wetland Boundary

The wetland boundary was determined based on distinct differences in vegetation, hydrology, and topography consisting of the following: 1) Transition from a wet meadow wetland community dominated by meadow willow, wool-grass, soft rush, marsh straw sedge, reed canary grass, and switchgrass to upland communities dominated by; Kentucky bluegrass (*Poa pratensis*), Canada golden-rod (*Solidago canadensis*), common yarrow (*Achillea millefolium*), white clover (*Trifolium repens*), timothy (*Phleum pratense*), birds-foot trefoil (*Lotus corniculatus*), and common dandelion (*Taraxacum officinale*); 2) Transition from inundated or saturated soils within the wetlands to areas with no wetland hydrology indicators in the adjacent uplands; and 3) Transition from wetland to upland hydrology and vegetation characteristics generally correlating with a gradual topographic break.

Wetland 7 (W-7)

Wetland 7 is a native wet meadow wetland located on the eastern portion of the Study Area. Wetland 7 drains to the south via an intermittent waterway that flows under Copper Park Lane on the east side of the Study Area. A description of the unnamed intermittent waterway is discussed in the Waterway section below.

Vegetation

Dominant plant species identified at sample points completed within the wet meadow wetland consist of reed canary grass and giant goldenrod (*Solidago gigantea*). Other common species identified in the wetland are listed on the data forms contained in Appendix A. The dominant species within the wetland are comprised of hydrophytic vegetation (OBL, FACW, and/or FAC) and meet the hydrophytic vegetation criterion.

Hydrology

The wetland appears to have a seasonally inundated/saturated hydroperiod due to its connection with the intermittent waterway along its west border. Saturation within the upper 12 inches (A3) was observed as a primary indicator of wetland hydrology. Secondary indicators of wetland hydrology included drainage patterns (B10), geomorphic position (D2), and the FAC-neutral test (D5). Therefore, the wetland hydrology criterion was met.

Soils

Soils within the wetland are mapped by the NRCS as udorthents and udipsamments, cut or fill (2030) (Figure 2). The silt loam soil observed at the wetland sample point was not consistent with the cut or fill material characteristics observed at other sample points within the Study Area. Field indicators of hydric soil identified consisted of NRCS Field Indicator F6-Redox Dark Surface. Therefore, the hydric soil criterion was satisfied.

Wetland Boundary

The wetland boundary was determined based on distinct differences in vegetation, hydrology, soils and topography consisting of the following: 1) Transition from a wet meadow wetland dominated by hydrophytic vegetation to an old field upland community to the south dominated by common goldenrod and Kentucky bluegrass; 2) Transition from saturated soils within the wetland to lack of wetland

hydrology indicators within the adjacent upland; and 3) Transition from soils showing hydric indicators to non-hydric soils. 4) The transition from wetland to upland characteristics generally correlated with a well-defined topographic break.

Waterways

One unnamed intermittent waterway is located near the southwest edge of Wetland 7 as shown on the map in Figure 4. The waterway is not identified on the USGS topographic map or the WDNR 24k hydro layer mapping. Field investigation of the waterway shows that it originates from the northwest corner of Wetland 7 through a large culvert under the abandoned rail spur. At this point, there is no apparent bed or bank established in Wetland 7, only a relatively flat wetland area on the west side of Wetland 7. The waterway does not become visibly channelized until it reaches another culvert under a short stub road north of Copper Park Drive. South of the stub road culvert the waterway is confined to a well defined channel with a bed and bank and flows south through another culvert under Copper Park Lane. The waterway continues south off the Study Area as a tributary to the Flambeau River.

Surface Water Biofilter

The surface water biofilter and associated ditches were constructed throughout the Study Area to assist in sediment detention of storm water runoff from the reclaimed mine site. The biofilter was constructed utilizing the former surge pond. The surge pond was an HDPE lined collection basin used as a part of the operating mine's water treatment system. Surface water levels in the biofilter range from 6 inches near its perimeter to approximately 4 feet at its deepest point. Hydrophytic vegetation has become established in areas of shallow water in the sediment accumulated on the liner. Although wetland hydrology and hydrophytic vegetation are present in the biofilter it meets the definition of an "artificial wetland" as described in Wisconsin Adm. Code NR 103.02 (1m) and would therefore be exempt from provisions of Wisconsin Adm. Code NR 103.

Uplands

Uplands on the Study Area consist of mesic prairie, old field, and northern mesic forest. The old field and mesic prairie communities are dominated by the grasses and forbs listed above in the wetland boundary discussion. Other common species identified in the uplands are listed on the data forms contained in Appendix A. Soils within the uplands are mapped by NRCS as udorthents and udipsamments, cut or fill. Soils were consistent with the cut or fill soil characteristics described by the NRCS soil survey and lacked hydric soil indicators. The upland areas were determined to be non-wetland based on conditions including a lack of hydric soils and wetland hydrology.

Other Environmental Considerations

This report is limited to the identification of state and/or federally regulated wetlands within the Study Area. However, there may be other regulated environmental features within the Study Area, including but not limited to, historical or archeological features, endangered or threatened species, navigable waters, floodplains, shorelands, etc. Federal, state, and local units of government and regional planning organizations may have regulatory authority to control or restrict land uses within or in close proximity to these features. Stantec can assist with identification and/or assessment of additional regulated resources at your request, to the extent that the work is within our range of expertise.

CONCLUSION

Stantec performed a wetland determination and delineation of a portion of the Flambeau Mining Company property referred to as the Industrial Outlot (the "Study Area") on behalf of Jana Murphy, Environmental & Reclamation Manager for the Flambeau Mining Company. The Study Area is approximately 26 acres located in Section 9, Township 34 North, Range 6 West, City of Ladysmith, Rusk County, Wisconsin. The purpose and objective of the wetland determination and delineation was to identify the extent and spatial arrangement of wetlands within the Study Area.

Seven wetlands were identified and delineated within the Study Area in accordance with state and federal guidelines and applicable supplements. Wetland communities are composed of wet meadow wetlands. Adjacent uplands are composed of old field. A combined total of approximately 2.4 acres of wetlands were identified within the Study Area. Wetlands and their boundaries were flagged, located with GPS and mapped.

The USACE has regulatory authority over waters of the U.S. including adjacent wetlands, and the WDNR has regulatory authority over wetlands, navigable waters, and adjacent lands under Chapter 30 Wisconsin State Statutes, Act 6, and NR 103 Wisconsin Administrative Code. Local jurisdictions may have additional regulatory authority through shoreland or wetland zoning ordinances.

Prior to beginning work at this site or disturbing or altering wetlands, waterways, or adjacent lands in any way, Stantec recommends that the owner obtain the necessary permits or other agency regulatory review and concurrence with regard to the proposed work to comply with applicable regulations. Stantec can assist with identification and/or assessment of additional regulated resources at your request, to the extent that the work is within our range of expertise.

The information provided by Stantec regarding wetland boundaries is a scientific-based analysis of the wetland and upland conditions present on the site at the time of the fieldwork. The delineation was performed by experienced and qualified professionals using standard practices and sound professional judgment. The ultimate decision on wetland boundaries rests with the USACE and, in some cases, the WDNR or a local unit of government. As a result, there may be adjustments to boundaries based upon review by a regulatory agency. An agency determination can vary from time to time depending on various factors including, but not limited to recent precipitation patterns and the season of the year. In addition, the physical characteristics of the site can change over time, depending on the weather, vegetation patterns, drainage activities on adjacent parcels, or other events. Any of these factors can change the nature and extent of wetlands on the site.

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FIGURES

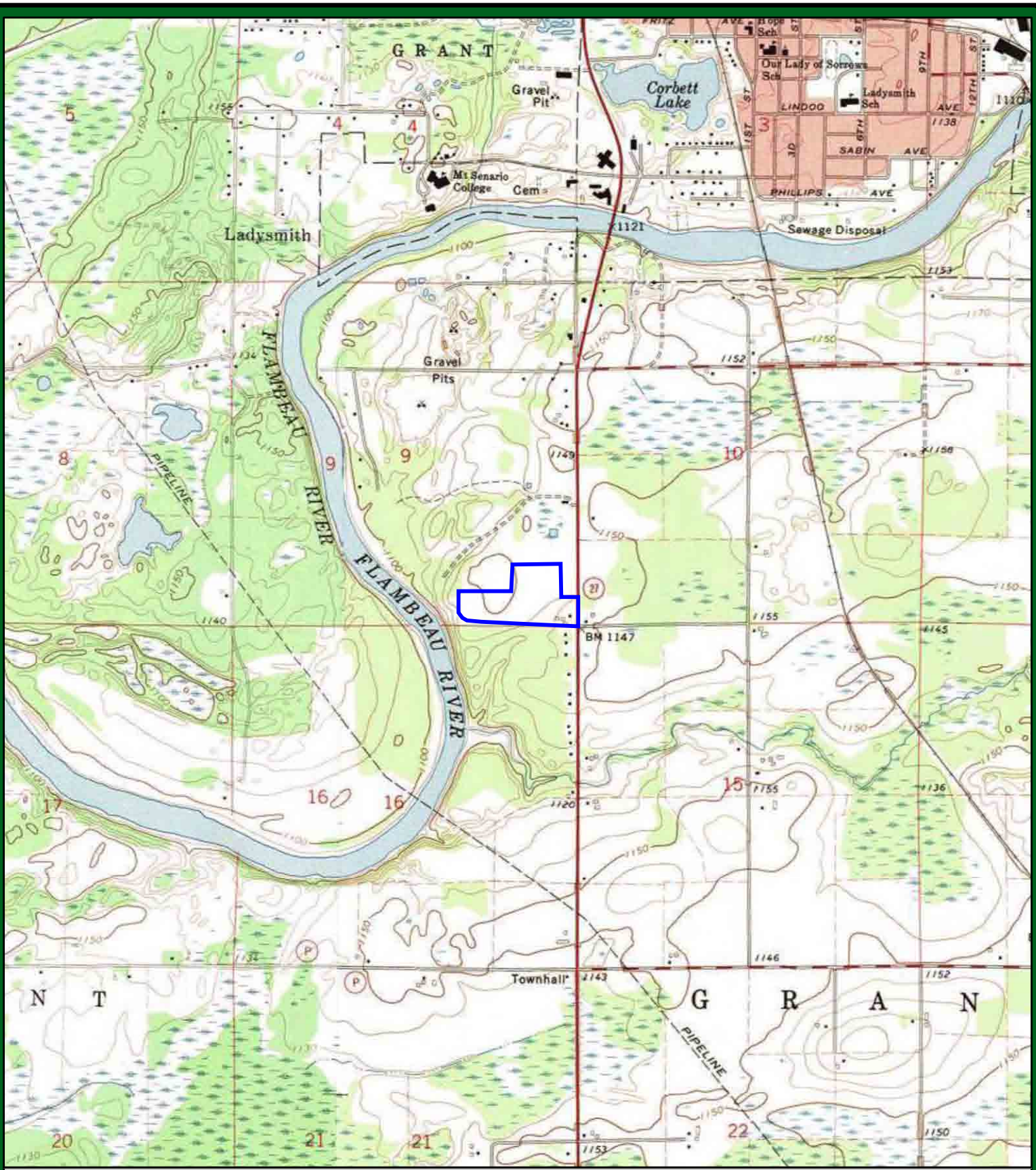
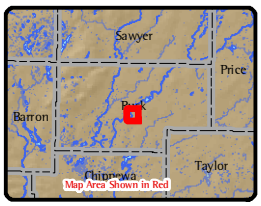


Figure 1. Project Location and Topography
Flambeau Mine Site - Industrial Outlot



Location
S9, T34N, R6W
Town of Grant, Rusk County, WI
0 1,000 2,000 Feet

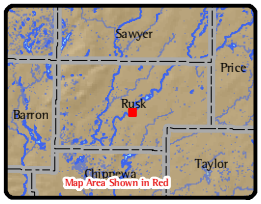
Project Information
Project Number : 0010-0163-01
Modified June 24, 2010

Legend
Approx. Study Area

NRC
Natural Resources Consulting, Inc.
209 Commerce Parkway
P.O. Box 128
Cottage Grove, WI 53527-0128
phone: 608-839-1998
fax: 608-839-1995
www.nrcdifference.com

Data Sources include USGS 7.5' Topographic Quadrangle : Thornapple and Ladysmith

Figure 2. NRCS Soil Survey Data
Flambeau Mine Site - Industrial Outlot



Location
S9, T34N, R6W
Town of Grant, Rusk County, WI
0 150 300 Feet

Project Information
Project Number : 0010-0163-01
Modified June 24, 2010

Legend
- Approx. Study Area
- Section Line

NRCS Soil Survey Data
- Hydric Soils
- Poss. Hydric Inclusions
- Non-Hydric Soils

DNR 24k Hydrography
- Perennial Stream
- Intermittent Stream
- Waterbody

NRC
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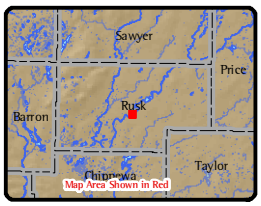
phone: 608-839-1998
fax: 608-839-1995
www.nrcdifference.com

Data Sources include USGS, WDOT, WDNR, NRCS and 2008 USDA NAIP Orthophotography

Figure 3. Wisconsin Wetland Inventory Data
Flambeau Mine Site - Industrial Outlot



Location
S9, T34N, R6W
Town of Grant, Rusk County, WI
0 150 300 Feet

Project Information
Project Number : 0010-0163-01
Modified June 24, 2010

Legend
- Approx. Study Area
- WWI Data*
- Section Line

DNR 24k Hydrography
- Perennial Stream
- Intermittent Stream
- Waterbody

* No WWI data in map view

NRC
Natural Resources Consulting, Inc.
209 Commerce Parkway
P.O. Box 128
Cottage Grove, WI 53527-0128
phone: 608-839-1998
fax: 608-839-1995
www.nrcdifference.com

Data Sources include USGS, WDOT, WDNR, NRCS and 2008 USDA NAIP Orthophotography

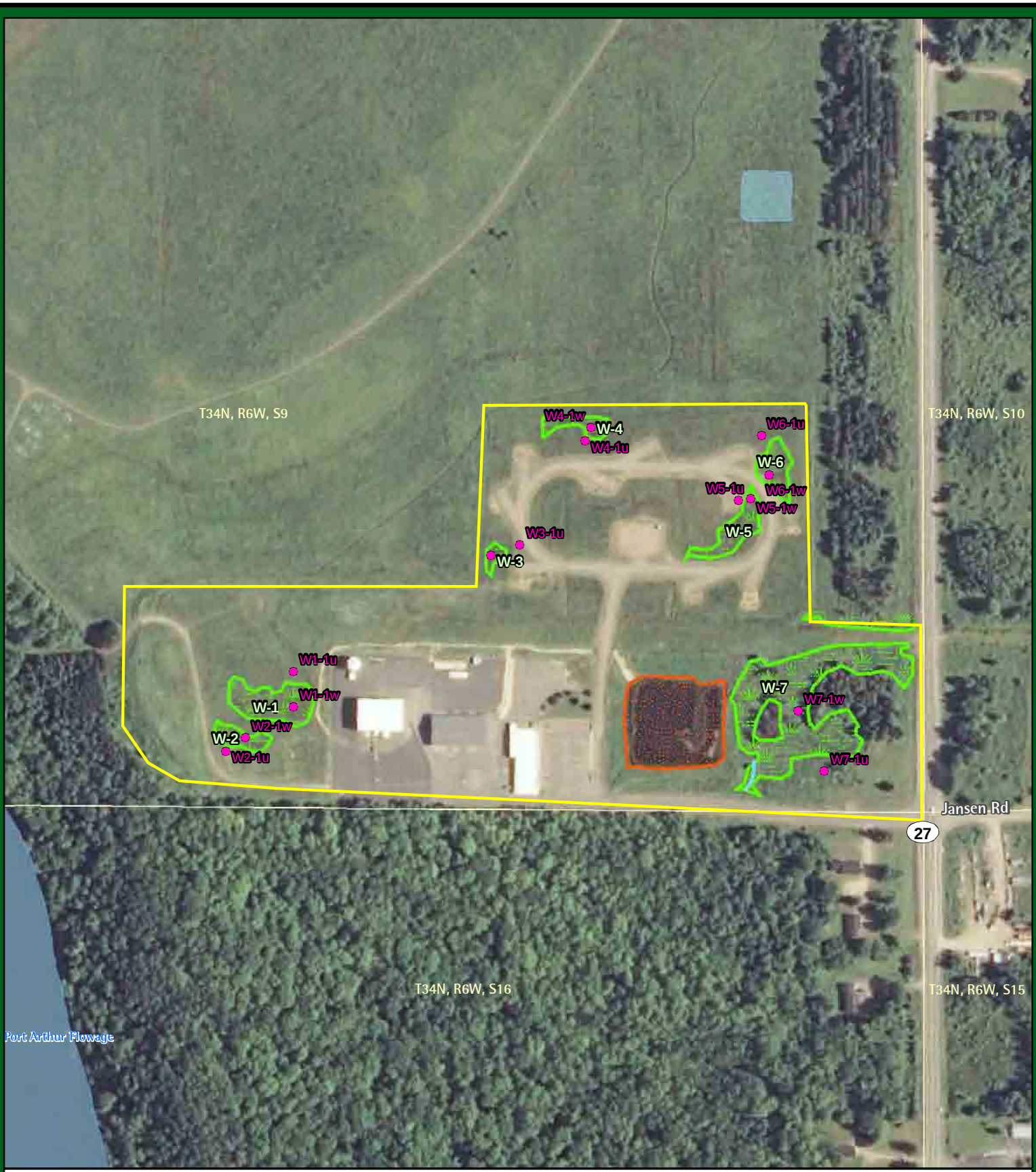


Figure 4. Field Delineated Wetlands
Flambeau Mine Site - Industrial Outlot

Location
S9, T34N, R6W
Town of Grant, Rusk County, WI

0 150 300 Feet

Project Information
Project Number : 0010-0163-01
Modified March 21, 2011

Legend

- Approx. Study Area
- Sample Point
- Field Delineated Waterway
- Field Delineated Wetland
- Section Line
- Biofilter
- DNR 24k Hydrography
- Perennial Stream
- Intermittent Stream
- Waterbody

Data Sources include USGS, WDOT, WDNR, NRCS and 2008 USDA NAIP Orthophotography

NRC
Stantec
209 Commerce Parkway
P.O. Box 128
Cottage Grove, WI 53527-0128
phone: 608-839-1998
fax: 608-839-1995
www.nrcdifference.com

APPENDIX A
US ARMY CORPS OF ENGINEERS DATA SHEETS

WETLAND DETERMINATION DATA FORM
Northcentral and Northeast Region

Stantec

Project/Site:	Flambeau Mining Company - Industrial Outlot	Stantec Project #:	0010-0163-01
Applicant:	Jana Murphy		
Investigator #1:	Engelhardt, J.	Investigator #2:	--
Soil Unit:	Cut and fill	NWI/WWI Classification:	None
Landform:	Depressional	Local Relief:	Gently sloping
Slope (%):	N/A	Latitude: N/A	Longitude: N/A Datum: N/A

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

Are Vegetation ☐ , Soil ☑, or Hydrology ☐ significantly disturbed?
Are Vegetation ☐ , Soil ☐, or Hydrology ☐ naturally problematic?

Are normal circumstances present? ☐ Yes ☑ No

Date:	05/17/10
County:	Rusk
State:	Wisconsin
Wetland ID:	W1
Sample Point:	1w
Community ID:	Wet Meadow
Section:	9
Township:	34 N
Range:	6 Dir: W

SUMMARY OF FINDINGS

Hydrophytic Vegetation Present? ☑ Yes ☐ No
Wetland Hydrology Present? ☑ Yes ☐ No
Hydric Soils Present? ☐ Yes ☑ No
Is This Sampling Point Within A Wetland? ☑ **Yes** ☐ **No**

Remarks: Applied procedures from Northcentral and Northeast Region Supplement to address problem hydric soils in this area.

HYDROLOGY

Wetland Hydrology Indicators (Check here if indicators are not present ☐):

Primary:
- ☑ A1 - Surface Water
- ☐ A2 - High Water Table
- ☑ A3 - Saturation
- ☐ B1 - Water Marks
- ☐ B2 - Sediment Deposits
- ☐ B3 - Drift Deposits
- ☐ B4 - Algal Mat or Crust
- ☐ B5 - Iron Deposits
- ☐ B7 - Inundation Visible on Aerial Imagery
- ☐ B8 - Sparsely Vegetated Concave Surface
- ☐ B9 - Water-Stained Leaves
- ☐ B13 - Aquatic Fauna
- ☐ B15 - Marl Deposits
- ☐ C1 - Hydrogen Sulfide Odor
- ☐ C3 - Oxidized Rhizospheres on Living Roots
- ☐ C4 - Presence of Reduced Iron
- ☐ C6 - Recent Iron Reduction in Tilled Soils
- ☐ C7 - Thin Muck Surface
- ☐ Other (Explain)

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

Field Observations:

Surface Water Present?	☑ Yes ☐ No	Depth:	4	(in.)
Water Table Present?	☐ Yes ☑ No	Depth:	0	(in.)
Saturation Present?	☑ Yes ☐ No	Depth:	0	(in.)

Wetland Hydrology Present? ☑ Yes ☐ No

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available: N/A

Remarks: Surface water accumulation is due to irregular grading during reclamation activites which has created low spots over this portion of the Study Area.

SOILS

Map Unit Name: Cut and fill — Series Drainage Class: moderately well

Taxonomy (Subgroup): NA — Field Observations Confirm Mapped Type? ☑ Yes ☐ No

Profile Description (Describe to the depth needed to document the indicator or confirm the absence of indicators.) (Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered/Coated Sand Grains; Locaiton: PL=Pore Lining, M=Matrix)

Top Depth	Bottom Depth	Horizon	Matrix Color (Moist)	Matrix %	Mottles Color (Moist)	Mottles Color (Moist)	Mottles %	Mottles Type	Mottles Location	Texture (e.g. clay, sand, loam)
0	4	1	10YR 3/3	100	--	--	--	--	--	sandy clay loam
4	21	2	10YR 4/3	100	--	--	--	--	--	sandy loam/gravel
--	--	--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--	--	--

NRCS Hydric Soil Field Indicators (check here if indicators are not present ☐):
- ☐ A1- Histosol
- ☐ A2 - Histic Epipedon
- ☐ A3 - Black Histic
- ☐ A4 - Hydrogen Sulfide
- ☐ A5 - Stratified Layers
- ☐ A11 - Depleted Below Dark Surface
- ☐ A12 - Thick Dark Surface
- ☐ S1 - Sandy Muck Mineral
- ☐ S4 - Sandy Gleyed Matrix
- ☐ S5 - Sandy Redox
- ☐ S6 - Stripped Matrix
- ☐ S7 - Dark Surface (**LRR R, MLRA 149B**)
- ☐ S8 - Polyvalue Below Surface (**LRR R, MLRA 149B**)
- ☐ S9 - Thin Dark Surface (**LRR R, MLRA 149B**)
- ☐ F1 - Loamy Muck Mineral (**LRR K, L**)
- ☐ F2 - Loamy Gleyed Matrix
- ☐ F3 - Depleted Matrix
- ☐ F6 - Redox Dark Surface
- ☐ F7 - Depleted Dark Surface
- ☐ F8 - Redox Depressions

Indicators for Problematic Soils [1]
- ☐ A10 - 2 cm Muck (**LRR K, L, MLRA149B**)
- ☐ A16 - Coast Prairie Redox (**LRR K, L, R**)
- ☐ S3 - 5cm Mucky Peat of Peat (**LRR K, L, R**)
- ☐ S7 - Dark Surface (**LRR K, L**)
- ☐ S8 - Polyvalue Below Surface (**LRR K, L**)
- ☐ S9 - Thin Dark Surface (**LRR K, L**)
- ☐ F12 - Iron-Manganese Masses (**LRR K, L, R**)
- ☐ F19 - Piedmont Floodplain Soils (**MLRA 149B**)
- ☐ TA6 - Mesic Spodic (**MLRA 144A, 145, 149B**)
- ☐ TF2 - Red Parent Material
- ☐ TF12 - Very Shallow Dark Surface
- ☐ Other (Explain in Remarks)

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

Restrictive Layer (If Observed) Type: N/A Depth: N/A

Hydric Soil Present? ☐ Yes ☑ No

Remarks: Soil profile is consistent with mixed gravelly fill.

WETLAND DETERMINATION DATA FORM

Northcentral and Northeast Region

Project/Site: Flambeau Mining Company - Industrial Outlot | Wetland ID: W1 | Sample Point: 1w

VEGETATION (Species identified in all uppercase are non-native species.)

Tree Stratum (Plot size: 10 meter radius)

	Species Name	% Cover	Dominant	Ind.Status
1.	--	--	--	--
2.	--	--	--	--
3.	--	--	--	--
4.	--	--	--	--
5.	--	--	--	--
6.	--	--	--	--
7.	--	--	--	--
8.	--	--	--	--
9.	--	--	--	--
10.	--	--	--	--
	Total Cover =	0		

Sapling/Shrub Stratum (Plot size: 5 meter radius)

1.	*Salix petiolaris*	2	Y	FACW
2.	--	--	--	--
3.	--	--	--	--
4.	--	--	--	--
5.	--	--	--	--
6.	--	--	--	--
7.	--	--	--	--
8.	--	--	--	--
9.	--	--	--	--
10.	--	--	--	--
	Total Cover =	2		

Herb Stratum (Plot size: 2 meter radius)

1.	*Scirpus cyperinus*	40	Y	OBL
2.	*Panicum virgatum*	35	Y	FAC
3.	*Potamogeton natans*	5	N	OBL
4.	*Typha latifolia*	2	N	OBL
5.	--	--	--	--
6	--	--	--	--
7.	--	--	--	--
8.	--	--	--	--
9.	--	--	--	--
10.	--	--	--	--
11.	--	--	--	--
12.	--	--	--	--
13.	--	--	--	--
14.	--	--	--	--
15.	--	--	--	--
	Total Cover =	82		

Woody Vine Stratum (Plot size: 10 meter radius)

1.	--	--	--	--
2.	--	--	--	--
3.	--	--	--	--
5.	--	--	--	--
4.	--	--	--	--
	Total Cover =	0		

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: ***100.0%*** (A/B)

Prevalence Index Worksheet

Total % Cover of:		Multiply by:	
OBL spp.	47	x 1 =	47
FACW spp.	2	x 2 =	4
FAC spp.	35	x 3 =	105
FACU spp.	0	x 4 =	0
UPL spp.	0	x 5 =	0
Total	84 (A)		156 (B)

Prevalence Index = B/A = ***1.857***

Hydrophytic Vegetation Indicators:

- ☑ Yes ☐ No Rapid Test for Hydrophytic Vegetation
- ☑ Yes ☐ No Dominance Test is > 50%
- ☑ Yes ☐ No Prevalence Index is ≤ 3.0 *
- ☐ Yes ☑ No Morphological Adaptations (Explain) *
- ☐ Yes ☑ No Problem Hydrophytic Vegetation (Explain) *

* Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants 3 in. (7.6cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub - Woody plants less than 3 in. DBH and greater than 3.28 ft. tall.

Herb - All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft. tall.

Woody Vines - All woody vines greater than 3.28 ft. in height.

Hydrophytic Vegetation Present ☑ Yes ☐ No

Remarks: Area seeded with mesic prairie seed mix following reclamation activities.

Additional Remarks:

Hydric soils not present. Area is wetland based on Northcentral and Northeast Regional Supplement.

WETLAND DETERMINATION DATA FORM
Northcentral and Northeast Region

Stantec

Project/Site:	Flambeau Mining Company - Industrial Outlot	Stantec Project #:	0010-0163-01
Applicant:	Jana Murphy		
Investigator #1:	Engelhardt, J.	Investigator #2:	--
Soil Unit:	Cut and fill	NWI/WWI Classification:	None
Landform:		Local Relief:	Gently sloping
Slope (%):	N/A	Latitude: N/A	Longitude: N/A Datum: N/A

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

Are Vegetation ☐ , Soil ☑, or Hydrology ☐ significantly disturbed?
Are Vegetation ☐ , Soil ☐, or Hydrology ☐ naturally problematic?

Are normal circumstances present? ☐ Yes ☑ No

Date:	05/17/10
County:	Rusk
State:	Wisconsin
Wetland ID:	W1
Sample Point:	1u
Community ID:	Old Field
Section:	9
Township:	34 N
Range:	6 Dir: W

SUMMARY OF FINDINGS

Hydrophytic Vegetation Present? ☑ Yes ☐ No
Wetland Hydrology Present? ☐ Yes ☑ No
Hydric Soils Present? ☐ Yes ☑ No
Is This Sampling Point Within A Wetland? ☐ **Yes** ☑ **No**

Remarks: Upland old field/Mesic prairie on west end of Study Area.

HYDROLOGY

Wetland Hydrology Indicators (Check here if indicators are not present ☐):

Primary:
- ☐ A1 - Surface Water
- ☐ A2 - High Water Table
- ☐ A3 - Saturation
- ☐ B1 - Water Marks
- ☐ B2 - Sediment Deposits
- ☐ B3 - Drift Deposits
- ☐ B4 - Algal Mat or Crust
- ☐ B5 - Iron Deposits
- ☐ B7 - Inundation Visible on Aerial Imagery
- ☐ B8 - Sparsely Vegetated Concave Surface
- ☐ B9 - Water-Stained Leaves
- ☐ B13 - Aquatic Fauna
- ☐ B15 - Marl Deposits
- ☐ C1 - Hydrogen Sulfide Odor
- ☐ C3 - Oxidized Rhizospheres on Living Roots
- ☐ C4 - Presence of Reduced Iron
- ☐ C6 - Recent Iron Reduction in Tilled Soils
- ☐ C7 - Thin Muck Surface
- ☐ Other (Explain)

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

Field Observations:

Surface Water Present?	☐ Yes	☑ No	Depth: 0	(in.)
Water Table Present?	☐ Yes	☑ No	Depth: 0	(in.)
Saturation Present?	☐ Yes	☑ No	Depth: 0	(in.)

Wetland Hydrology Present? ☐ Yes ☑ No

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available: N/A

Remarks: One secondary indicator wetland hydrology indicator (FAC-Neutral Test) is present.

SOILS

Map Unit Name: Cut and fill — Series Drainage Class: moderately well

Taxonomy (Subgroup): NA — Field Observations Confirm Mapped Type? ☑ Yes ☐ No

Profile Description (Describe to the depth needed to document the indicator or confirm the absence of indicators.) (Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered/Coated Sand Grains; Locaiton: PL=Pore Lining, M=Matrix)

Top Depth	Bottom Depth	Horizon	Matrix Color (Moist)	Matrix %	Mottles Color (Moist)	Mottles %	Mottles Type	Mottles Location	Texture (e.g. clay, sand, loam)
0	7	1	10YR 3/3	100	--	--	--	--	Clay Loam
7	14	2	10YR 3/3	80	10YR 4/6	20	C	M	Clay Loam
14	18	3	10YR 3/3	100	--	--	--	--	Clay Loam/Gravel
--	--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--	--

NRCS Hydric Soil Field Indicators (check here if indicators are not present ☑):
- ☐ A1- Histosol
- ☐ A2 - Histic Epipedon
- ☐ A3 - Black Histic
- ☐ A4 - Hydrogen Sulfide
- ☐ A5 - Stratified Layers
- ☐ A11 - Depleted Below Dark Surface
- ☐ A12 - Thick Dark Surface
- ☐ S1 - Sandy Muck Mineral
- ☐ S4 - Sandy Gleyed Matrix
- ☐ S5 - Sandy Redox
- ☐ S6 - Stripped Matrix
- ☐ S7 - Dark Surface (**LRR R, MLRA 149B**)
- ☐ S8 - Polyvalue Below Surface (**LRR R, MLRA 149B**)
- ☐ S9 - Thin Dark Surface (**LRR R, MLRA 149B**)
- ☐ F1 - Loamy Muck Mineral (**LRR K, L**)
- ☐ F2 - Loamy Gleyed Matrix
- ☐ F3 - Depleted Matrix
- ☐ F6 - Redox Dark Surface
- ☐ F7 - Depleted Dark Surface
- ☐ F8 - Redox Depressions

Indicators for Problematic Soils [1]
- ☐ A10 - 2 cm Muck (**LRR K, L, MLRA149B**)
- ☐ A16 - Coast Prairie Redox (**LRR K, L, R**)
- ☐ S3 - 5cm Mucky Peat of Peat (**LRR K, L, R**)
- ☐ S7 - Dark Surface (**LRR K, L**)
- ☐ S8 - Polyvalue Below Surface (**LRR K, L**)
- ☐ S9 - Thin Dark Surface (**LRR K, L**)
- ☐ F12 - Iron-Manganese Masses (**LRR K, L, R**)
- ☐ F19 - Piedmont Floodplain Soils (**MLRA 149B**)
- ☐ TA6 - Mesic Spodic (**MLRA 144A, 145, 149B**)
- ☐ TF2 - Red Parent Material
- ☐ TF12 - Very Shallow Dark Surface
- ☐ Other (Explain in Remarks)

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

Restrictive Layer (If Observed) Type: N/A Depth: N/A

Hydric Soil Present? ☐ Yes ☑ No

Remarks: No hydric soils identified.

WETLAND DETERMINATION DATA FORM

Northcentral and Northeast Region

Project/Site: Flambeau Mining Company - Industrial Outlot | Wetland ID: W1 | Sample Point: 1u

VEGETATION (Species identified in all uppercase are non-native species.)

Tree Stratum (Plot size: 10 meter radius)

	Species Name	% Cover	Dominant	Ind.Status
1.	--	--	--	--
2.	--	--	--	--
3.	--	--	--	--
4.	--	--	--	--
5.	--	--	--	--
6.	--	--	--	--
7.	--	--	--	--
8.	--	--	--	--
9.	--	--	--	--
10.	--	--	--	--
	Total Cover =	0		

Sapling/Shrub Stratum (Plot size: 5 meter radius)

1.	--	--	--	--
2.	--	--	--	--
3.	--	--	--	--
4.	--	--	--	--
5.	--	--	--	--
6.	--	--	--	--
7.	--	--	--	--
8.	--	--	--	--
9.	--	--	--	--
10.	--	--	--	--
	Total Cover =	0		

Herb Stratum (Plot size: 2 meter radius)

1.	*POA PRATENSIS*	40	Y	FAC
2.	*LOTUS CORNICULATA*	20	Y	FAC
3.	*TARAXACUM OFFICINALE*	15	N	FACU
4.	*TANACETUM VULGARE*	5	N	NI
5.	*BARBAREA VULGARIS*	15	N	FAC
6	*Rudbeckia hirta*	5	N	FACU
7.	--	--	--	--
8.	--	--	--	--
9.	--	--	--	--
10.	--	--	--	--
11.	--	--	--	--
12.	--	--	--	--
13.	--	--	--	--
14.	--	--	--	--
15.	--	--	--	--
	Total Cover =	100		

Woody Vine Stratum (Plot size: 10 meter radius)

1.	--	--	--	--
2.	--	--	--	--
3.	--	--	--	--
5.	--	--	--	--
4.	--	--	--	--
	Total Cover =	0		

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: ***100.0%*** (A/B)

Prevalence Index Worksheet

Total % Cover of:		Multiply by:	
OBL spp.	0	x 1 =	0
FACW spp.	0	x 2 =	0
FAC spp.	75	x 3 =	225
FACU spp.	20	x 4 =	80
UPL spp.	5	x 5 =	25
Total	100 (A)		330 (B)

Prevalence Index = B/A = ***3.300***

Hydrophytic Vegetation Indicators:

- ☐ Yes ☑ No Rapid Test for Hydrophytic Vegetation
- ☑ Yes ☐ No Dominance Test is > 50%
- ☐ Yes ☑ No Prevalence Index is ≤ 3.0 *
- ☐ Yes ☑ No Morphological Adaptations (Explain) *
- ☐ Yes ☑ No Problem Hydrophytic Vegetation (Explain) *

* Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants 3 in. (7.6cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub - Woody plants less than 3 in. DBH and greater than 3.28 ft. tall.

Herb - All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft. tall.

Woody Vines - All woody vines greater than 3.28 ft. in height.

Hydrophytic Vegetation Present ☑ Yes ☐ No

Remarks: Wetland vegetation is dominant according to the 50/20 rule.

Additional Remarks:

Soils in the area were disturbed during active mining. The upland in this area is relatively undisturbed and was previously seeded with a mesic prairie mix.

WETLAND DETERMINATION DATA FORM
Northcentral and Northeast Region

Stantec

Project/Site:	Flambeau Mining Company - Industrial Outlot	Stantec Project #:	0010-0163-01
Applicant:	Jana Murphy		
Investigator #1:	Engelhardt, J.	Investigator #2:	--
Soil Unit:	Cut and fill	NWI/WWI Classification:	None
Landform:	Depressional	Local Relief:	Gently sloping
Slope (%):	N/A	Latitude: N/A	Longitude: N/A Datum: N/A

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

Are Vegetation ☐ , Soil ☑, or Hydrology ☐ significantly disturbed?
Are Vegetation ☐ , Soil ☐, or Hydrology ☐ naturally problematic?

Are normal circumstances present? ☐ Yes ☑ No

Date:	05/17/10
County:	Rusk
State:	Wisconsin
Wetland ID:	W2
Sample Point:	1w
Community ID:	Wet Meadow
Section:	9
Township:	34 N
Range:	6 Dir: W

SUMMARY OF FINDINGS

Hydrophytic Vegetation Present? ☑ Yes ☐ No
Wetland Hydrology Present? ☑ Yes ☐ No
Hydric Soils Present? ☐ Yes ☑ No
Is This Sampling Point Within A Wetland? ☑ **Yes** ☐ **No**

Remarks: Applied procedures from Northcentral and Northeast Region Supplement to address problem hydric soils in this area.

HYDROLOGY

Wetland Hydrology Indicators (Check here if indicators are not present ☐):

Primary:
- ☐ A1 - Surface Water
- ☐ A2 - High Water Table
- ☑ A3 - Saturation
- ☐ B1 - Water Marks
- ☐ B2 - Sediment Deposits
- ☐ B3 - Drift Deposits
- ☐ B4 - Algal Mat or Crust
- ☐ B5 - Iron Deposits
- ☐ B7 - Inundation Visible on Aerial Imagery
- ☐ B8 - Sparsely Vegetated Concave Surface
- ☐ B9 - Water-Stained Leaves
- ☐ B13 - Aquatic Fauna
- ☐ B15 - Marl Deposits
- ☐ C1 - Hydrogen Sulfide Odor
- ☐ C3 - Oxidized Rhizospheres on Living Roots
- ☐ C4 - Presence of Reduced Iron
- ☐ C6 - Recent Iron Reduction in Tilled Soils
- ☐ C7 - Thin Muck Surface
- ☐ Other (Explain)

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

Field Observations:

Surface Water Present?	☐ Yes	☑ No	Depth: 0	(in.)
Water Table Present?	☐ Yes	☑ No	Depth: 0	(in.)
Saturation Present?	☑ Yes	☐ No	Depth: 7	(in.)

Wetland Hydrology Present? ☑ Yes ☐ No

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available: N/A

Remarks: Surface water accumulation is due to irregular grading during reclamation activites which has created low spots over this portion of the Study Area.

SOILS

Map Unit Name: Cut and fill — Series Drainage Class: moderately well

Taxonomy (Subgroup): NA — Field Observations Confirm Mapped Type? ☑ Yes ☐ No

Profile Description (Describe to the depth needed to document the indicator or confirm the absence of indicators.) (Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered/Coated Sand Grains; Locaiton: PL=Pore Lining, M=Matrix)

Top Depth	Bottom Depth	Horizon	Matrix Color (Moist)	Matrix %	Mottles Color (Moist)	Mottles Color (Moist)	Mottles %	Mottles Type	Mottles Location	Texture (e.g. clay, sand, loam)
0	8	1	10YR 3/3	100	--	--	--	--	--	sandy clay loam
8	18	2	10YR 4/3	100	--	--	--	--	--	sandy loam/gravel
--	--	--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--	--	--

NRCS Hydric Soil Field Indicators (check here if indicators are not present ☐):
- ☐ A1- Histosol
- ☐ A2 - Histic Epipedon
- ☐ A3 - Black Histic
- ☐ A4 - Hydrogen Sulfide
- ☐ A5 - Stratified Layers
- ☐ A11 - Depleted Below Dark Surface
- ☐ A12 - Thick Dark Surface
- ☐ S1 - Sandy Muck Mineral
- ☐ S4 - Sandy Gleyed Matrix
- ☐ S5 - Sandy Redox
- ☐ S6 - Stripped Matrix
- ☐ S7 - Dark Surface (**LRR R, MLRA 149B**)
- ☐ S8 - Polyvalue Below Surface (**LRR R, MLRA 149B**)
- ☐ S9 - Thin Dark Surface (**LRR R, MLRA 149B**)
- ☐ F1 - Loamy Muck Mineral (**LRR K, L**)
- ☐ F2 - Loamy Gleyed Matrix
- ☐ F3 - Depleted Matrix
- ☐ F6 - Redox Dark Surface
- ☐ F7 - Depleted Dark Surface
- ☐ F8 - Redox Depressions

Indicators for Problematic Soils [1]
- ☐ A10 - 2 cm Muck (**LRR K, L, MLRA149B**)
- ☐ A16 - Coast Prairie Redox (**LRR K, L, R**)
- ☐ S3 - 5cm Mucky Peat of Peat (**LRR K, L, R**)
- ☐ S7 - Dark Surface (**LRR K, L**)
- ☐ S8 - Polyvalue Below Surface (**LRR K, L**)
- ☐ S9 - Thin Dark Surface (**LRR K, L**)
- ☐ F12 - Iron-Manganese Masses (**LRR K, L, R**)
- ☐ F19 - Piedmont Floodplain Soils (**MLRA 149B**)
- ☐ TA6 - Mesic Spodic (**MLRA 144A, 145, 149B**)
- ☐ TF2 - Red Parent Material
- ☐ TF12 - Very Shallow Dark Surface
- ☐ Other (Explain in Remarks)

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

Restrictive Layer (If Observed) Type: N/A Depth: N/A

Hydric Soil Present? ☐ Yes ☑ No

Remarks: Soil profile is consistent with mixed gravelly fill.

WETLAND DETERMINATION DATA FORM

Northcentral and Northeast Region

Project/Site: Flambeau Mining Company - Industrial Outlot | Wetland ID: W2 | Sample Point: 1w

VEGETATION (Species identified in all uppercase are non-native species.)

Tree Stratum (Plot size: 10 meter radius)

	Species Name	% Cover	Dominant	Ind.Status
1.	--	--	--	--
2.	--	--	--	--
3.	--	--	--	--
4.	--	--	--	--
5.	--	--	--	--
6.	--	--	--	--
7.	--	--	--	--
8.	--	--	--	--
9.	--	--	--	--
10.	--	--	--	--
	Total Cover =	0		

Sapling/Shrub Stratum (Plot size: 5 meter radius)

1.	*Salix petiolaris*	2	Y	FACW
2.	--	--	--	--
3.	--	--	--	--
4.	--	--	--	--
5.	--	--	--	--
6.	--	--	--	--
7.	--	--	--	--
8.	--	--	--	--
9.	--	--	--	--
10.	--	--	--	--
	Total Cover =	2		

Herb Stratum (Plot size: 2 meter radius)

1.	*Scirpus cyperinus*	20	Y	OBL
2.	*Panicum virgatum*	40	Y	FAC
3.	*AGROSTIS GIGANTEA*	15	N	FACW
4.	*PHALARIS ARUNDINACEA*	10	N	FACW
5.	*RUMEX CRISPUS*	5	N	FAC
6	*Solidago gigantea*	10	N	FACW
7.	--	--	--	--
8.	--	--	--	--
9.	--	--	--	--
10.	--	--	--	--
11.	--	--	--	--
12.	--	--	--	--
13.	--	--	--	--
14.	--	--	--	--
15.	--	--	--	--
	Total Cover =	100		

Woody Vine Stratum (Plot size: 10 meter radius)

1.	--	--	--	--
2.	--	--	--	--
3.	--	--	--	--
5.	--	--	--	--
4.	--	--	--	--
	Total Cover =	0		

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: ***100.0%*** (A/B)

Prevalence Index Worksheet

Total % Cover of:		Multiply by:	
OBL spp.	20	x 1 =	20
FACW spp.	37	x 2 =	74
FAC spp.	45	x 3 =	135
FACU spp.	0	x 4 =	0
UPL spp.	0	x 5 =	0
Total	102 (A)		229 (B)

Prevalence Index = B/A = ***2.245***

Hydrophytic Vegetation Indicators:

- ☑ Yes ☐ No Rapid Test for Hydrophytic Vegetation
- ☑ Yes ☐ No Dominance Test is > 50%
- ☑ Yes ☐ No Prevalence Index is ≤ 3.0 *
- ☐ Yes ☑ No Morphological Adaptations (Explain) *
- ☐ Yes ☑ No Problem Hydrophytic Vegetation (Explain) *

* Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants 3 in. (7.6cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub - Woody plants less than 3 in. DBH and greater than 3.28 ft. tall.

Herb - All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft. tall.

Woody Vines - All woody vines greater than 3.28 ft. in height.

Hydrophytic Vegetation Present ☑ Yes ☐ No

Remarks: Area seeded with mesic prairie seed mix following reclamation activities.

Additional Remarks:

Hydric soils not present. Area is wetland based on Northcentral and Northeast Regional Supplement.

WETLAND DETERMINATION DATA FORM
Northcentral and Northeast Region

Stantec

Project/Site:	Flambeau Mining Company - Industrial Outlot	Stantec Project #:	0010-0163-01
Applicant:	Jana Murphy		
Investigator #1:	Engelhardt, J.	Investigator #2:	--
Soil Unit:	Cut and fill	NWI/WWI Classification:	None
Landform:		Local Relief:	Gently sloping
Slope (%):	N/A	Latitude: N/A	Longitude: N/A Datum: N/A

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

Are Vegetation ☐ , Soil ☑, or Hydrology ☐ significantly disturbed?
Are Vegetation ☐ , Soil ☐, or Hydrology ☐ naturally problematic?

Are normal circumstances present? ☐ Yes ☑ No

Date:	05/17/10
County:	Rusk
State:	Wisconsin
Wetland ID:	W2
Sample Point:	1u
Community ID:	Old Field
Section:	9
Township:	34 N
Range:	6 Dir: W

SUMMARY OF FINDINGS

Hydrophytic Vegetation Present? ☑ Yes ☐ No
Wetland Hydrology Present? ☐ Yes ☑ No
Hydric Soils Present? ☐ Yes ☑ No
Is This Sampling Point Within A Wetland? ☐ **Yes** ☑ **No**

Remarks: Upland old field/Mesic prairie on west end of Study Area.

HYDROLOGY

Wetland Hydrology Indicators (Check here if indicators are not present ☑):

Primary:
- ☐ A1 - Surface Water
- ☐ A2 - High Water Table
- ☐ A3 - Saturation
- ☐ B1 - Water Marks
- ☐ B2 - Sediment Deposits
- ☐ B3 - Drift Deposits
- ☐ B4 - Algal Mat or Crust
- ☐ B5 - Iron Deposits
- ☐ B7 - Inundation Visible on Aerial Imagery
- ☐ B8 - Sparsely Vegetated Concave Surface
- ☐ B9 - Water-Stained Leaves
- ☐ B13 - Aquatic Fauna
- ☐ B15 - Marl Deposits
- ☐ C1 - Hydrogen Sulfide Odor
- ☐ C3 - Oxidized Rhizospheres on Living Roots
- ☐ C4 - Presence of Reduced Iron
- ☐ C6 - Recent Iron Reduction in Tilled Soils
- ☐ C7 - Thin Muck Surface
- ☐ Other (Explain)

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

Field Observations:

Surface Water Present?	☐ Yes	☑ No	Depth: 0	(in.)
Water Table Present?	☐ Yes	☑ No	Depth: 0	(in.)
Saturation Present?	☐ Yes	☑ No	Depth: 0	(in.)

Wetland Hydrology Present? ☐ Yes ☑ No

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available: N/A

Remarks: One secondary indicator (FAC-Neutral Test) is present.

SOILS

Map Unit Name: Cut and fill
Series Drainage Class: moderately well
Taxonomy (Subgroup): NA
Field Observations Confirm Mapped Type? ☑ Yes ☐ No

Profile Description (Describe to the depth needed to document the indicator or confirm the absence of indicators.) (Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered/Coated Sand Grains; Locaiton: PL=Pore Lining, M=Matrix)

Top Depth	Bottom Depth	Horizon	Matrix Color (Moist)	Matrix %	Mottles Color (Moist)	Mottles %	Mottles Type	Mottles Location	Texture (e.g. clay, sand, loam)
0	13	1	10YR 3/3	80	10YR 3/6	20	--	--	Clay Loam/Fill
13	18	2	10YR 4/4	70	10YR 4/6	30	--	--	Sandy Clay Loam/Fill
--	--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--	--

NRCS Hydric Soil Field Indicators (check here if indicators are not present ☑):
- ☐ A1- Histosol
- ☐ A2 - Histic Epipedon
- ☐ A3 - Black Histic
- ☐ A4 - Hydrogen Sulfide
- ☐ A5 - Stratified Layers
- ☐ A11 - Depleted Below Dark Surface
- ☐ A12 - Thick Dark Surface
- ☐ S1 - Sandy Muck Mineral
- ☐ S4 - Sandy Gleyed Matrix
- ☐ S5 - Sandy Redox
- ☐ S6 - Stripped Matrix
- ☐ S7 - Dark Surface (**LRR R, MLRA 149B**)
- ☐ S8 - Polyvalue Below Surface (**LRR R, MLRA 149B**)
- ☐ S9 - Thin Dark Surface (**LRR R, MLRA 149B**)
- ☐ F1 - Loamy Muck Mineral (**LRR K, L**)
- ☐ F2 - Loamy Gleyed Matrix
- ☐ F3 - Depleted Matrix
- ☐ F6 - Redox Dark Surface
- ☐ F7 - Depleted Dark Surface
- ☐ F8 - Redox Depressions

Indicators for Problematic Soils [1]
- ☐ A10 - 2 cm Muck (**LRR K, L, MLRA149B**)
- ☐ A16 - Coast Prairie Redox (**LRR K, L, R**)
- ☐ S3 - 5cm Mucky Peat of Peat (**LRR K, L, R**)
- ☐ S7 - Dark Surface (**LRR K, L**)
- ☐ S8 - Polyvalue Below Surface (**LRR K, L**)
- ☐ S9 - Thin Dark Surface (**LRR K, L**)
- ☐ F12 - Iron-Manganese Masses (**LRR K, L, R**)
- ☐ F19 - Piedmont Floodplain Soils (**MLRA 149B**)
- ☐ TA6 - Mesic Spodic (**MLRA 144A, 145, 149B**)
- ☐ TF2 - Red Parent Material
- ☐ TF12 - Very Shallow Dark Surface
- ☐ Other (Explain in Remarks)

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

Restrictive Layer (If Observed) Type: N/A Depth: N/A

Hydric Soil Present? ☐ Yes ☑ No

Remarks: Soils mixed (fill) from 13 - 18 inches. Secondary soil colors are not refferring to mottles but the mixed characteristics of the fill material. No hydric soils identified.

WETLAND DETERMINATION DATA FORM

Northcentral and Northeast Region

Project/Site: Flambeau Mining Company - Industrial Outlot | Wetland ID: W2 | Sample Point: 1u

VEGETATION (Species identified in all uppercase are non-native species.)

Tree Stratum (Plot size: 10 meter radius)

	Species Name	% Cover	Dominant	Ind.Status
1.	--	--	--	--
2.	--	--	--	--
3.	--	--	--	--
4.	--	--	--	--
5.	--	--	--	--
6.	--	--	--	--
7.	--	--	--	--
8.	--	--	--	--
9.	--	--	--	--
10.	--	--	--	--
	Total Cover =	0		

Sapling/Shrub Stratum (Plot size: 5 meter radius)

1.	--	--	--	--
2.	--	--	--	--
3.	--	--	--	--
4.	--	--	--	--
5.	--	--	--	--
6.	--	--	--	--
7.	--	--	--	--
8.	--	--	--	--
9.	--	--	--	--
10.	--	--	--	--
	Total Cover =	0		

Herb Stratum (Plot size: 2 meter radius)

1.	*POA PRATENSIS*	40	Y	FAC
2.	*LOTUS CORNICULATA*	20	Y	FAC
3.	*TARAXACUM OFFICINALE*	5	N	FACU
4.	*Achillea millefolium*	10	N	FACU
5.	*BARBAREA VULGARIS*	15	N	FAC
6	*Solidago canadensis*	5	N	FACU
7.	*PLANTAGO MAJOR*	5	N	FAC
8.	--	--	--	--
9.	--	--	--	--
10.	--	--	--	--
11.	--	--	--	--
12.	--	--	--	--
13.	--	--	--	--
14.	--	--	--	--
15.	--	--	--	--
	Total Cover =	100		

Woody Vine Stratum (Plot size: 10 meter radius)

1.	--	--	--	--
2.	--	--	--	--
3.	--	--	--	--
5.	--	--	--	--
4.	--	--	--	--
	Total Cover =	0		

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: ***100.0%*** (A/B)

Prevalence Index Worksheet

Total % Cover of:		Multiply by:	
OBL spp.	0	x 1 =	0
FACW spp.	0	x 2 =	0
FAC spp.	80	x 3 =	240
FACU spp.	20	x 4 =	80
UPL spp.	0	x 5 =	0
Total	100 (A)		320 (B)

Prevalence Index = B/A = ***3.200***

Hydrophytic Vegetation Indicators:

- ☐ Yes ☑ No Rapid Test for Hydrophytic Vegetation
- ☑ Yes ☐ No Dominance Test is > 50%
- ☐ Yes ☑ No Prevalence Index is ≤ 3.0 *
- ☐ Yes ☑ No Morphological Adaptations (Explain) *
- ☐ Yes ☑ No Problem Hydrophytic Vegetation (Explain) *

* Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants 3 in. (7.6cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub - Woody plants less than 3 in. DBH and greater than 3.28 ft. tall.

Herb - All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft. tall.

Woody Vines - All woody vines greater than 3.28 ft. in height.

Hydrophytic Vegetation Present ☑ Yes ☐ No

Remarks: Wetland vegetation is dominant according to the 50/20 rule.

Additional Remarks:

Soils in the area were disturbed during active mining. The upland in this area is relatively undisturbed and was previously seeded with a mesic prairie mix.

WETLAND DETERMINATION DATA FORM
Northcentral and Northeast Region

Stantec

Project/Site:	Flambeau Mining Company - Industrial Outlot	Stantec Project #:	0010-0163-01
Applicant:	Jana Murphy		
Investigator #1:	Engelhardt, J.	Investigator #2:	--
Soil Unit:	Cut and fill	NWI/WWI Classification:	None
Landform:	Depressional	Local Relief:	Gently sloping
Slope (%):	N/A	Latitude: N/A	Longitude: N/A Datum: N/A

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

Are Vegetation ☐ , Soil ☑, or Hydrology ☐ significantly disturbed?
Are Vegetation ☐ , Soil ☐, or Hydrology ☐ naturally problematic?

Are normal circumstances present? ☐ Yes ☑ No

Date:	05/17/10
County:	Rusk
State:	Wisconsin
Wetland ID:	W3
Sample Point:	1w
Community ID:	Wet Meadow
Section:	9
Township:	34 N
Range:	6 Dir: W

SUMMARY OF FINDINGS

Hydrophytic Vegetation Present? ☑ Yes ☐ No
Wetland Hydrology Present? ☑ Yes ☐ No
Hydric Soils Present? ☐ Yes ☑ No
Is This Sampling Point Within A Wetland? ☑ **Yes** ☐ **No**

Remarks: Applied procedures from Northcentral and Northeast Region Supplement to address problem hydric soils in this area.

HYDROLOGY

Wetland Hydrology Indicators (Check here if indicators are not present ☐):

Primary:
- ☑ A1 - Surface Water
- ☐ A2 - High Water Table
- ☑ A3 - Saturation
- ☐ B1 - Water Marks
- ☐ B2 - Sediment Deposits
- ☐ B3 - Drift Deposits
- ☐ B4 - Algal Mat or Crust
- ☐ B5 - Iron Deposits
- ☐ B7 - Inundation Visible on Aerial Imagery
- ☐ B8 - Sparsely Vegetated Concave Surface
- ☐ B9 - Water-Stained Leaves
- ☐ B13 - Aquatic Fauna
- ☐ B15 - Marl Deposits
- ☐ C1 - Hydrogen Sulfide Odor
- ☐ C3 - Oxidized Rhizospheres on Living Roots
- ☐ C4 - Presence of Reduced Iron
- ☐ C6 - Recent Iron Reduction in Tilled Soils
- ☐ C7 - Thin Muck Surface
- ☐ Other (Explain)

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

Field Observations:

Surface Water Present?	☑ Yes ☐ No	Depth:	0.5	(in.)
Water Table Present?	☐ Yes ☑ No	Depth:	0	(in.)
Saturation Present?	☑ Yes ☐ No	Depth:	0	(in.)

Wetland Hydrology Present? ☑ Yes ☐ No

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available: N/A

Remarks: Surface water accumulation is due to irregular grading during reclamation activites which has created low spots over this portion of the Study Area.

SOILS

Map Unit Name: Cut and fill — Series Drainage Class: moderately well

Taxonomy (Subgroup): NA — Field Observations Confirm Mapped Type? ☑ Yes ☐ No

Profile Description (Describe to the depth needed to document the indicator or confirm the absence of indicators.) (Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered/Coated Sand Grains; Locaiton: PL=Pore Lining, M=Matrix)

Top Depth	Bottom Depth	Horizon	Matrix Color (Moist)	Matrix %	Mottles Color (Moist)	Mottles %	Mottles Type	Mottles Location	Texture (e.g. clay, sand, loam)
0	8	1	10YR 4/2	90	10YR 4/6	10	C	M	clay loam/gravel
8	21	2	10YR 4/3	100	--	--	--	--	sandy clay loam
--	--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--	--

NRCS Hydric Soil Field Indicators (check here if indicators are not present ☐):
- ☐ A1- Histosol
- ☐ A2 - Histic Epipedon
- ☐ A3 - Black Histic
- ☐ A4 - Hydrogen Sulfide
- ☐ A5 - Stratified Layers
- ☐ A11 - Depleted Below Dark Surface
- ☐ A12 - Thick Dark Surface
- ☐ S1 - Sandy Muck Mineral
- ☐ S4 - Sandy Gleyed Matrix
- ☐ S5 - Sandy Redox
- ☐ S6 - Stripped Matrix
- ☐ S7 - Dark Surface (**LRR R, MLRA 149B**)
- ☐ S8 - Polyvalue Below Surface (**LRR R, MLRA 149B**)
- ☐ S9 - Thin Dark Surface (**LRR R, MLRA 149B**)
- ☐ F1 - Loamy Muck Mineral (**LRR K, L**)
- ☐ F2 - Loamy Gleyed Matrix
- ☐ F3 - Depleted Matrix
- ☐ F6 - Redox Dark Surface
- ☐ F7 - Depleted Dark Surface
- ☐ F8 - Redox Depressions

Indicators for Problematic Soils [1]
- ☐ A10 - 2 cm Muck (**LRR K, L, MLRA149B**)
- ☐ A16 - Coast Prairie Redox (**LRR K, L, R**)
- ☐ S3 - 5cm Mucky Peat of Peat (**LRR K, L, R**)
- ☐ S7 - Dark Surface (**LRR K, L**)
- ☐ S8 - Polyvalue Below Surface (**LRR K, L**)
- ☐ S9 - Thin Dark Surface (**LRR K, L**)
- ☐ F12 - Iron-Manganese Masses (**LRR K, L, R**)
- ☐ F19 - Piedmont Floodplain Soils (**MLRA 149B**)
- ☐ TA6 - Mesic Spodic (**MLRA 144A, 145, 149B**)
- ☐ TF2 - Red Parent Material
- ☐ TF12 - Very Shallow Dark Surface
- ☐ Other (Explain in Remarks)

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

Restrictive Layer (If Observed) Type: N/A Depth: N/A

Hydric Soil Present? ☐ Yes ☑ No

Remarks: Soil profile is consistent with mixed gravelly fill.

WETLAND DETERMINATION DATA FORM

Northcentral and Northeast Region

Project/Site: Flambeau Mining Company - Industrial Outlot | Wetland ID: W3 | Sample Point: 1w

VEGETATION (Species identified in all uppercase are non-native species.)

Tree Stratum (Plot size: 10 meter radius)

	Species Name	% Cover	Dominant	Ind.Status
1.	--	--	--	--
2.	--	--	--	--
3.	--	--	--	--
4.	--	--	--	--
5.	--	--	--	--
6.	--	--	--	--
7.	--	--	--	--
8.	--	--	--	--
9.	--	--	--	--
10.	--	--	--	--
	Total Cover =	0		

Sapling/Shrub Stratum (Plot size: 5 meter radius)

1.	*Salix petiolaris*	15	Y	FACW
2.	--	--	--	--
3.	--	--	--	--
4.	--	--	--	--
5.	--	--	--	--
6.	--	--	--	--
7.	--	--	--	--
8.	--	--	--	--
9.	--	--	--	--
10.	--	--	--	--
	Total Cover =	15		

Herb Stratum (Plot size: 2 meter radius)

1.	*Scirpus cyperinus*	25	Y	OBL
2.	*Panicum virgatum*	30	Y	FAC
3.	*Juncus effusus*	15	N	OBL
4.	*PHALARIS ARUNDINACEA*	10	N	FACW
5.	*LOTUS CORNICULATA*	10	N	FAC
6	--	--	--	--
7.	--	--	--	--
8.	--	--	--	--
9.	--	--	--	--
10.	--	--	--	--
11.	--	--	--	--
12.	--	--	--	--
13.	--	--	--	--
14.	--	--	--	--
15.	--	--	--	--
	Total Cover =	90		

Woody Vine Stratum (Plot size: 10 meter radius)

1.	--	--	--	--
2.	--	--	--	--
3.	--	--	--	--
5.	--	--	--	--
4.	--	--	--	--
	Total Cover =	0		

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: ***100.0%*** (A/B)

Prevalence Index Worksheet

Total % Cover of:		Multiply by:	
OBL spp.	40	x 1 =	40
FACW spp.	25	x 2 =	50
FAC spp.	40	x 3 =	120
FACU spp.	0	x 4 =	0
UPL spp.	0	x 5 =	0
Total	105 (A)		210 (B)

Prevalence Index = B/A = ***2.000***

Hydrophytic Vegetation Indicators:

- ☑ Yes ☐ No Rapid Test for Hydrophytic Vegetation
- ☑ Yes ☐ No Dominance Test is > 50%
- ☑ Yes ☐ No Prevalence Index is ≤ 3.0 *
- ☐ Yes ☑ No Morphological Adaptations (Explain) *
- ☐ Yes ☑ No Problem Hydrophytic Vegetation (Explain) *

* Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants 3 in. (7.6cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub - Woody plants less than 3 in. DBH and greater than 3.28 ft. tall.

Herb - All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft. tall.

Woody Vines - All woody vines greater than 3.28 ft. in height.

Hydrophytic Vegetation Present ☑ Yes ☐ No

Remarks: Area seeded with mesic prairie seed mix following reclamation activities.

Additional Remarks:

Hydric soils not present. Area is wetland based on Northcentral and Northeast Regional Supplement.

WETLAND DETERMINATION DATA FORM
Northcentral and Northeast Region

Stantec

Project/Site:	Flambeau Mining Company - Industrial Outlot	Stantec Project #:	0010-0163-01
Applicant:	Jana Murphy		
Investigator #1:	Engelhardt, J.	Investigator #2:	--
Soil Unit:	Cut and fill	NWI/WWI Classification:	None
Landform:		Local Relief:	Gently sloping
Slope (%):	N/A	Latitude: N/A	Longitude: N/A Datum: N/A

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

Are Vegetation ☐ , Soil ☑, or Hydrology ☐ significantly disturbed?
Are Vegetation ☐ , Soil ☐, or Hydrology ☐ naturally problematic?

Are normal circumstances present? ☐ Yes ☑ No

Date:	05/17/10
County:	Rusk
State:	Wisconsin
Wetland ID:	W3
Sample Point:	1u
Community ID:	Old Field
Section:	9
Township:	34 N
Range:	6 Dir: W

SUMMARY OF FINDINGS

Hydrophytic Vegetation Present? ☐ Yes ☑ No
Wetland Hydrology Present? ☐ Yes ☑ No
Hydric Soils Present? ☐ Yes ☑ No
Is This Sampling Point Within A Wetland? ☐ **Yes** ☑ **No**

Remarks: Mowed upland old field within equestrian trailhead area.

HYDROLOGY

Wetland Hydrology Indicators (Check here if indicators are not present ☐):

Primary:
- ☐ A1 - Surface Water
- ☐ A2 - High Water Table
- ☐ A3 - Saturation
- ☐ B1 - Water Marks
- ☐ B2 - Sediment Deposits
- ☐ B3 - Drift Deposits
- ☐ B4 - Algal Mat or Crust
- ☐ B5 - Iron Deposits
- ☐ B7 - Inundation Visible on Aerial Imagery
- ☐ B8 - Sparsely Vegetated Concave Surface
- ☐ B9 - Water-Stained Leaves
- ☐ B13 - Aquatic Fauna
- ☐ B15 - Marl Deposits
- ☐ C1 - Hydrogen Sulfide Odor
- ☐ C3 - Oxidized Rhizospheres on Living Roots
- ☐ C4 - Presence of Reduced Iron
- ☐ C6 - Recent Iron Reduction in Tilled Soils
- ☐ C7 - Thin Muck Surface
- ☐ Other (Explain)

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

Field Observations:

Surface Water Present?	☐ Yes ☑ No	Depth:	0	(in.)
Water Table Present?	☐ Yes ☑ No	Depth:	0	(in.)
Saturation Present?	☐ Yes ☑ No	Depth:	0	(in.)

Wetland Hydrology Present? ☐ Yes ☑ No

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available: N/A

Remarks: One secondary wetland indicator (FAC-Neutral Test) is present.

SOILS

Map Unit Name: Cut and fill
Series Drainage Class: moderately well
Taxonomy (Subgroup): NA
Field Observations Confirm Mapped Type? ☑ Yes ☐ No

Profile Description (Describe to the depth needed to document the indicator or confirm the absence of indicators.) (Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered/Coated Sand Grains; Locaiton: PL=Pore Lining, M=Matrix)

Top Depth	Bottom Depth	Horizon	Matrix Color (Moist)	Matrix %	Mottles Color (Moist)	Mottles %	Mottles Type	Mottles Location	Texture (e.g. clay, sand, loam)
0	8	1	10YR 4/2	60	10YR 4/6	--	--	--	Clay Loam/Mixed Fill
8	15	2	10YR 4/2	80	10YR 5/3	--	--	--	Clay Loam/Mixed Fill
15	18	3	10YR 4/3	100	--	--	--	--	Sandy Clay Loam/Fill
--	--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--	--

NRCS Hydric Soil Field Indicators (check here if indicators are not present ☑):
- ☐ A1- Histosol
- ☐ A2 - Histic Epipedon
- ☐ A3 - Black Histic
- ☐ A4 - Hydrogen Sulfide
- ☐ A5 - Stratified Layers
- ☐ A11 - Depleted Below Dark Surface
- ☐ A12 - Thick Dark Surface
- ☐ S1 - Sandy Muck Mineral
- ☐ S4 - Sandy Gleyed Matrix
- ☐ S5 - Sandy Redox
- ☐ S6 - Stripped Matrix
- ☐ S7 - Dark Surface (**LRR R, MLRA 149B**)
- ☐ S8 - Polyvalue Below Surface (**LRR R, MLRA 149B**)
- ☐ S9 - Thin Dark Surface (**LRR R, MLRA 149B**)
- ☐ F1 - Loamy Muck Mineral (**LRR K, L**)
- ☐ F2 - Loamy Gleyed Matrix
- ☐ F3 - Depleted Matrix
- ☐ F6 - Redox Dark Surface
- ☐ F7 - Depleted Dark Surface
- ☐ F8 - Redox Depressions

Indicators for Problematic Soils [1]
- ☐ A10 - 2 cm Muck (**LRR K, L, MLRA149B**)
- ☐ A16 - Coast Prairie Redox (**LRR K, L, R**)
- ☐ S3 - 5cm Mucky Peat of Peat (**LRR K, L, R**)
- ☐ S7 - Dark Surface (**LRR K, L**)
- ☐ S8 - Polyvalue Below Surface (**LRR K, L**)
- ☐ S9 - Thin Dark Surface (**LRR K, L**)
- ☐ F12 - Iron-Manganese Masses (**LRR K, L, R**)
- ☐ F19 - Piedmont Floodplain Soils (**MLRA 149B**)
- ☐ TA6 - Mesic Spodic (**MLRA 144A, 145, 149B**)
- ☐ TF2 - Red Parent Material
- ☐ TF12 - Very Shallow Dark Surface
- ☐ Other (Explain in Remarks)

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

Restrictive Layer (If Observed) Type: N/A Depth: N/A

Hydric Soil Present? ☐ Yes ☑ No

Remarks: Soils mixed (fill) to 18 inches. Secondary soil colors are not refferring to mottles but the mixed characteristics of the fill material. No hydric soils identified.

WETLAND DETERMINATION DATA FORM

Northcentral and Northeast Region

Project/Site: Flambeau Mining Company - Industrial Outlot | Wetland ID: W3 | Sample Point: 1u

VEGETATION (Species identified in all uppercase are non-native species.)

Tree Stratum (Plot size: 10 meter radius)

	Species Name	% Cover	Dominant	Ind.Status
1.	--	--	--	--
2.	--	--	--	--
3.	--	--	--	--
4.	--	--	--	--
5.	--	--	--	--
6.	--	--	--	--
7.	--	--	--	--
8.	--	--	--	--
9.	--	--	--	--
10.	--	--	--	--
	Total Cover =	0		

Sapling/Shrub Stratum (Plot size: 5 meter radius)

1.	--	--	--	--
2.	--	--	--	--
3.	--	--	--	--
4.	--	--	--	--
5.	--	--	--	--
6.	--	--	--	--
7.	--	--	--	--
8.	--	--	--	--
9.	--	--	--	--
10.	--	--	--	--
	Total Cover =	0		

Herb Stratum (Plot size: 2 meter radius)

1.	*POA PRATENSIS*	55	Y	FAC
2.	*LOTUS CORNICULATA*	10	N	FAC
3.	*TARAXACUM OFFICINALE*	15	N	FACU
4.	*HIERACIUM AURANTIACUM*	5	N	UPL
5.	*BARBAREA VULGARIS*	5	N	FAC
6	*TRIFOLIUM REPENS*	10	N	FACU
7.	--	--	--	--
8.	--	--	--	--
9.	--	--	--	--
10.	--	--	--	--
11.	--	--	--	--
12.	--	--	--	--
13.	--	--	--	--
14.	--	--	--	--
15.	--	--	--	--
	Total Cover =	100		

Woody Vine Stratum (Plot size: 10 meter radius)

1.	--	--	--	--
2.	--	--	--	--
3.	--	--	--	--
5.	--	--	--	--
4.	--	--	--	--
	Total Cover =	0		

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: ***100.0%*** (A/B)

Prevalence Index Worksheet

Total % Cover of:		Multiply by:	
OBL spp.	0	x 1 =	0
FACW spp.	0	x 2 =	0
FAC spp.	70	x 3 =	210
FACU spp.	25	x 4 =	100
UPL spp.	5	x 5 =	25
Total	100 (A)		335 (B)

Prevalence Index = B/A = ***3.350***

Hydrophytic Vegetation Indicators:

- ☐ Yes ☑ No Rapid Test for Hydrophytic Vegetation
- ☑ Yes ☐ No Dominance Test is > 50%
- ☐ Yes ☑ No Prevalence Index is ≤ 3.0 *
- ☐ Yes ☑ No Morphological Adaptations (Explain) *
- ☐ Yes ☑ No Problem Hydrophytic Vegetation (Explain) *

* Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants 3 in. (7.6cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub - Woody plants less than 3 in. DBH and greater than 3.28 ft. tall.

Herb - All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft. tall.

Woody Vines - All woody vines greater than 3.28 ft. in height.

Hydrophytic Vegetation Present ☐ Yes ☑ No

Remarks: Wetland vegetation is dominant according to the 50/20 rule.

Additional Remarks:

Soils in the area were likely disturbed during active mining. The site is currently mowed. Area is an upland old field community.

WETLAND DETERMINATION DATA FORM
Northcentral and Northeast Region

Stantec

Project/Site:	Flambeau Mining Company - Industrial Outlot	Stantec Project #:	0010-0163-01
Applicant:	Jana Murphy		
Investigator #1:	Engelhardt, J.	Investigator #2:	--
Soil Unit:	Cut and fill	NWI/WWI Classification:	None
Landform:	Depressional	Local Relief:	Gently sloping
Slope (%):	N/A	Latitude: N/A	Longitude: N/A Datum: N/A

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

Are Vegetation ☐ , Soil ☑, or Hydrology ☐ significantly disturbed?
Are Vegetation ☐ , Soil ☐, or Hydrology ☐ naturally problematic?

Are normal circumstances present? ☐ Yes ☑ No

Date:	05/17/10
County:	Rusk
State:	Wisconsin
Wetland ID:	W4
Sample Point:	1w
Community ID:	Wet Meadow
Section:	9
Township:	34 N
Range:	6 Dir: W

SUMMARY OF FINDINGS

Hydrophytic Vegetation Present? ☑ Yes ☐ No
Wetland Hydrology Present? ☑ Yes ☐ No
Hydric Soils Present? ☐ Yes ☑ No
Is This Sampling Point Within A Wetland? ☑ **Yes** ☐ **No**

Remarks: Applied procedures from Northcentral and Northeast Region Supplement to address problem hydric soils in this area.

HYDROLOGY

Wetland Hydrology Indicators (Check here if indicators are not present ☐):

Primary:
- ☑ A1 - Surface Water
- ☐ A2 - High Water Table
- ☑ A3 - Saturation
- ☐ B1 - Water Marks
- ☐ B2 - Sediment Deposits
- ☐ B3 - Drift Deposits
- ☐ B4 - Algal Mat or Crust
- ☐ B5 - Iron Deposits
- ☐ B7 - Inundation Visible on Aerial Imagery
- ☐ B8 - Sparsely Vegetated Concave Surface
- ☐ B9 - Water-Stained Leaves
- ☐ B13 - Aquatic Fauna
- ☐ B15 - Marl Deposits
- ☐ C1 - Hydrogen Sulfide Odor
- ☐ C3 - Oxidized Rhizospheres on Living Roots
- ☐ C4 - Presence of Reduced Iron
- ☐ C6 - Recent Iron Reduction in Tilled Soils
- ☐ C7 - Thin Muck Surface
- ☐ Other (Explain)

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

Field Observations:

Surface Water Present?	☑ Yes ☐ No	Depth:	4	(in.)
Water Table Present?	☐ Yes ☑ No	Depth:	0	(in.)
Saturation Present?	☑ Yes ☐ No	Depth:	0	(in.)

Wetland Hydrology Present? ☑ Yes ☐ No

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available: N/A

Remarks: Surface water accumulation is due to irregular grading during reclamation activites which has created low spots over this portion of the Study Area.

SOILS

Map Unit Name: Cut and fill — Series Drainage Class: moderately well

Taxonomy (Subgroup): NA — Field Observations Confirm Mapped Type? ☑ Yes ☐ No

Profile Description (Describe to the depth needed to document the indicator or confirm the absence of indicators.) (Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered/Coated Sand Grains; Locaiton: PL=Pore Lining, M=Matrix)

Top Depth	Bottom Depth	Horizon	Matrix Color (Moist)	Matrix %	Mottles Color (Moist)	Mottles Color (Moist)	Mottles %	Mottles Type	Mottles Location	Texture (e.g. clay, sand, loam)
0	6	1	10YR 4/3	100	--	--	--	--	--	silty clay
6	18	2	10YR 4/4	100	--	--	--	--	--	sandy clay loam/gravel
--	--	--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--	--	--

NRCS Hydric Soil Field Indicators (check here if indicators are not present ☐):
- ☐ A1- Histosol
- ☐ A2 - Histic Epipedon
- ☐ A3 - Black Histic
- ☐ A4 - Hydrogen Sulfide
- ☐ A5 - Stratified Layers
- ☐ A11 - Depleted Below Dark Surface
- ☐ A12 - Thick Dark Surface
- ☐ S1 - Sandy Muck Mineral
- ☐ S4 - Sandy Gleyed Matrix
- ☐ S5 - Sandy Redox
- ☐ S6 - Stripped Matrix
- ☐ S7 - Dark Surface (**LRR R, MLRA 149B**)
- ☐ S8 - Polyvalue Below Surface (**LRR R, MLRA 149B**)
- ☐ S9 - Thin Dark Surface (**LRR R, MLRA 149B**)
- ☐ F1 - Loamy Muck Mineral (**LRR K, L**)
- ☐ F2 - Loamy Gleyed Matrix
- ☐ F3 - Depleted Matrix
- ☐ F6 - Redox Dark Surface
- ☐ F7 - Depleted Dark Surface
- ☐ F8 - Redox Depressions

Indicators for Problematic Soils [1]
- ☐ A10 - 2 cm Muck (**LRR K, L, MLRA149B**)
- ☐ A16 - Coast Prairie Redox (**LRR K, L, R**)
- ☐ S3 - 5cm Mucky Peat of Peat (**LRR K, L, R**)
- ☐ S7 - Dark Surface (**LRR K, L**)
- ☐ S8 - Polyvalue Below Surface (**LRR K, L**)
- ☐ S9 - Thin Dark Surface (**LRR K, L**)
- ☐ F12 - Iron-Manganese Masses (**LRR K, L, R**)
- ☐ F19 - Piedmont Floodplain Soils (**MLRA 149B**)
- ☐ TA6 - Mesic Spodic (**MLRA 144A, 145, 149B**)
- ☐ TF2 - Red Parent Material
- ☐ TF12 - Very Shallow Dark Surface
- ☐ Other (Explain in Remarks)

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

Restrictive Layer (If Observed) Type: N/A Depth: N/A

Hydric Soil Present? ☐ Yes ☑ No

Remarks: Soil profile is consistent with mixed gravelly fill.

WETLAND DETERMINATION DATA FORM

Northcentral and Northeast Region

Project/Site: Flambeau Mining Company - Industrial Outlot | Wetland ID: W4 | Sample Point: 1w

VEGETATION (Species identified in all uppercase are non-native species.)

Tree Stratum (Plot size: 10 meter radius)

	Species Name	% Cover	Dominant	Ind.Status
1.	--	--	--	--
2.	--	--	--	--
3.	--	--	--	--
4.	--	--	--	--
5.	--	--	--	--
6.	--	--	--	--
7.	--	--	--	--
8.	--	--	--	--
9.	--	--	--	--
10.	--	--	--	--
	Total Cover =	0		

Sapling/Shrub Stratum (Plot size: 5 meter radius)

1.	*Salix petiolaris*	15	Y	FACW
2.	--	--	--	--
3.	--	--	--	--
4.	--	--	--	--
5.	--	--	--	--
6.	--	--	--	--
7.	--	--	--	--
8.	--	--	--	--
9.	--	--	--	--
10.	--	--	--	--
	Total Cover =	15		

Herb Stratum (Plot size: 2 meter radius)

1.	*Scirpus cyperinus*	20	Y	OBL
2.	*Panicum virgatum*	40	Y	FAC
3.	*Juncus effusus*	25	Y	OBL
4.	*PHALARIS ARUNDINACEA*	15	N	FACW
5.	--	--	--	--
6	--	--	--	--
7.	--	--	--	--
8.	--	--	--	--
9.	--	--	--	--
10.	--	--	--	--
11.	--	--	--	--
12.	--	--	--	--
13.	--	--	--	--
14.	--	--	--	--
15.	--	--	--	--
	Total Cover =	100		

Woody Vine Stratum (Plot size: 10 meter radius)

1.	--	--	--	--
2.	--	--	--	--
3.	--	--	--	--
5.	--	--	--	--
4.	--	--	--	--
	Total Cover =	0		

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: ***100.0%*** (A/B)

Prevalence Index Worksheet

Total % Cover of:		Multiply by:	
OBL spp.	45	x 1 =	45
FACW spp.	30	x 2 =	60
FAC spp.	40	x 3 =	120
FACU spp.	0	x 4 =	0
UPL spp.	0	x 5 =	0
Total	115 (A)		225 (B)

Prevalence Index = B/A = ***1.957***

Hydrophytic Vegetation Indicators:

- ☑ Yes ☐ No Rapid Test for Hydrophytic Vegetation
- ☑ Yes ☐ No Dominance Test is > 50%
- ☑ Yes ☐ No Prevalence Index is ≤ 3.0 *
- ☐ Yes ☑ No Morphological Adaptations (Explain) *
- ☐ Yes ☑ No Problem Hydrophytic Vegetation (Explain) *

* Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants 3 in. (7.6cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub - Woody plants less than 3 in. DBH and greater than 3.28 ft. tall.

Herb - All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft. tall.

Woody Vines - All woody vines greater than 3.28 ft. in height.

Hydrophytic Vegetation Present ☑ Yes ☐ No

Remarks: Area seeded with mesic prairie seed mix following reclamation activities.

Additional Remarks:

Hydric soils not present. Area is wetland based on Northcentral and Northeast Regional Supplement.

WETLAND DETERMINATION DATA FORM
Northcentral and Northeast Region

Stantec

Project/Site:	Flambeau Mining Company - Industrial Outlot	Stantec Project #:	0010-0163-01
Applicant:	Jana Murphy		
Investigator #1:	Engelhardt, J.	Investigator #2:	--
Soil Unit:	Cut and fill	NWI/WWI Classification:	None
Landform:		Local Relief:	Gently sloping
Slope (%):	N/A	Latitude: N/A	Longitude: N/A Datum: N/A

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

Are Vegetation ☐ , Soil ☑, or Hydrology ☐ significantly disturbed?
Are Vegetation ☐ , Soil ☐, or Hydrology ☐ naturally problematic?

Are normal circumstances present? ☐ Yes ☑ No

Date:	05/17/10
County:	Rusk
State:	Wisconsin
Wetland ID:	W4
Sample Point:	1u
Community ID:	Old Field
Section:	9
Township:	34 N
Range:	6 Dir: W

SUMMARY OF FINDINGS

Hydrophytic Vegetation Present? ☑ Yes ☐ No
Wetland Hydrology Present? ☐ Yes ☑ No
Hydric Soils Present? ☐ Yes ☑ No
Is This Sampling Point Within A Wetland? ☐ **Yes** ☑ **No**

Remarks: Mowed upland old field within equestrian trailhead area.

HYDROLOGY

Wetland Hydrology Indicators (Check here if indicators are not present ☐):

Primary:
- ☐ A1 - Surface Water
- ☐ A2 - High Water Table
- ☑ A3 - Saturation
- ☐ B1 - Water Marks
- ☐ B2 - Sediment Deposits
- ☐ B3 - Drift Deposits
- ☐ B4 - Algal Mat or Crust
- ☐ B5 - Iron Deposits
- ☐ B7 - Inundation Visible on Aerial Imagery
- ☐ B8 - Sparsely Vegetated Concave Surface
- ☐ B9 - Water-Stained Leaves
- ☐ B13 - Aquatic Fauna
- ☐ B15 - Marl Deposits
- ☐ C1 - Hydrogen Sulfide Odor
- ☐ C3 - Oxidized Rhizospheres on Living Roots
- ☐ C4 - Presence of Reduced Iron
- ☐ C6 - Recent Iron Reduction in Tilled Soils
- ☐ C7 - Thin Muck Surface
- ☐ Other (Explain)

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

Field Observations:

Surface Water Present?	☐ Yes	☑ No	Depth: 0	(in.)
Water Table Present?	☐ Yes	☑ No	Depth: 0	(in.)
Saturation Present?	☑ Yes	☐ No	Depth: 0	(in.)

Wetland Hydrology Present? ☐ Yes ☑ No

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available: N/A

Remarks: One secondary wetland indicator (FAC-Neutral Test) is present.

SOILS

Map Unit Name: Cut and fill — Series Drainage Class: moderately well

Taxonomy (Subgroup): NA — Field Observations Confirm Mapped Type? ☑ Yes ☐ No

Profile Description (Describe to the depth needed to document the indicator or confirm the absence of indicators.) (Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered/Coated Sand Grains; Locaiton: PL=Pore Lining, M=Matrix)

Top Depth	Bottom Depth	Horizon	Matrix Color (Moist)	Matrix %	Mottles Color (Moist)	Mottles %	Mottles Type	Mottles Location	Texture (e.g. clay, sand, loam)
0	5	1	10YR 3/2	100	--	--	--	--	Loam
5	12	2	10YR 4/3	90	10YR 5/6	10	C	M	Sandy Clay Loam
12	18	3	7.5YR 4/3	100	--	--	--	--	Sandy Clay Loam
--	--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--	--

NRCS Hydric Soil Field Indicators (check here if indicators are not present ☑):
- ☐ A1- Histosol
- ☐ A2 - Histic Epipedon
- ☐ A3 - Black Histic
- ☐ A4 - Hydrogen Sulfide
- ☐ A5 - Stratified Layers
- ☐ A11 - Depleted Below Dark Surface
- ☐ A12 - Thick Dark Surface
- ☐ S1 - Sandy Muck Mineral
- ☐ S4 - Sandy Gleyed Matrix
- ☐ S5 - Sandy Redox
- ☐ S6 - Stripped Matrix
- ☐ S7 - Dark Surface (**LRR R, MLRA 149B**)
- ☐ S8 - Polyvalue Below Surface (**LRR R, MLRA 149B**)
- ☐ S9 - Thin Dark Surface (**LRR R, MLRA 149B**)
- ☐ F1 - Loamy Muck Mineral (**LRR K, L**)
- ☐ F2 - Loamy Gleyed Matrix
- ☐ F3 - Depleted Matrix
- ☐ F6 - Redox Dark Surface
- ☐ F7 - Depleted Dark Surface
- ☐ F8 - Redox Depressions

Indicators for Problematic Soils [1]
- ☐ A10 - 2 cm Muck (**LRR K, L, MLRA149B**)
- ☐ A16 - Coast Prairie Redox (**LRR K, L, R**)
- ☐ S3 - 5cm Mucky Peat of Peat (**LRR K, L, R**)
- ☐ S7 - Dark Surface (**LRR K, L**)
- ☐ S8 - Polyvalue Below Surface (**LRR K, L**)
- ☐ S9 - Thin Dark Surface (**LRR K, L**)
- ☐ F12 - Iron-Manganese Masses (**LRR K, L, R**)
- ☐ F19 - Piedmont Floodplain Soils (**MLRA 149B**)
- ☐ TA6 - Mesic Spodic (**MLRA 144A, 145, 149B**)
- ☐ TF2 - Red Parent Material
- ☐ TF12 - Very Shallow Dark Surface
- ☐ Other (Explain in Remarks)

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

Restrictive Layer (If Observed) Type: N/A Depth: N/A

Hydric Soil Present? ☐ Yes ☑ No

Remarks: No hydric soils identified.

WETLAND DETERMINATION DATA FORM

Northcentral and Northeast Region

Project/Site: Flambeau Mining Company - Industrial Outlot | Wetland ID: W4 | Sample Point: 1u

VEGETATION (Species identified in all uppercase are non-native species.)

Tree Stratum (Plot size: 10 meter radius)

	Species Name	% Cover	Dominant	Ind.Status
1.	--	--	--	--
2.	--	--	--	--
3.	--	--	--	--
4.	--	--	--	--
5.	--	--	--	--
6.	--	--	--	--
7.	--	--	--	--
8.	--	--	--	--
9.	--	--	--	--
10.	--	--	--	--
	Total Cover =	0		

Sapling/Shrub Stratum (Plot size: 5 meter radius)

1.	--	--	--	--
2.	--	--	--	--
3.	--	--	--	--
4.	--	--	--	--
5.	--	--	--	--
6.	--	--	--	--
7.	--	--	--	--
8.	--	--	--	--
9.	--	--	--	--
10.	--	--	--	--
	Total Cover =	0		

Herb Stratum (Plot size: 2 meter radius)

1.	*POA PRATENSIS*	40	Y	FAC
2.	*LOTUS CORNICULATA*	15	Y	FAC
3.	*BROMUS INERMIS*	5	N	UPL
4.	*PHALARIS ARUNDINACEA*	10	N	FACW
5.	*BARBAREA VULGARIS*	5	N	FAC
6	*Panicum virgatum*	10	N	FAC
7.	*TARAXACUM OFFICINALE*	15	Y	FACU
8.	--	--	--	--
9.	--	--	--	--
10.	--	--	--	--
11.	--	--	--	--
12.	--	--	--	--
13.	--	--	--	--
14.	--	--	--	--
15.	--	--	--	--
	Total Cover =	100		

Woody Vine Stratum (Plot size: 10 meter radius)

1.	--	--	--	--
2.	--	--	--	--
3.	--	--	--	--
5.	--	--	--	--
4.	--	--	--	--
	Total Cover =	0		

Remarks: Wetland vegetation is dominant according to the 50/20 rule.

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: ***66.7%*** (A/B)

Prevalence Index Worksheet

Total % Cover of:		Multiply by:	
OBL spp.	0	x 1 =	0
FACW spp.	10	x 2 =	20
FAC spp.	70	x 3 =	210
FACU spp.	15	x 4 =	60
UPL spp.	5	x 5 =	25
Total	100 (A)		315 (B)

Prevalence Index = B/A = ***3.150***

Hydrophytic Vegetation Indicators:

- ☐ Yes ☑ No Rapid Test for Hydrophytic Vegetation
- ☑ Yes ☐ No Dominance Test is > 50%
- ☐ Yes ☑ No Prevalence Index is ≤ 3.0 *
- ☐ Yes ☑ No Morphological Adaptations (Explain) *
- ☐ Yes ☑ No Problem Hydrophytic Vegetation (Explain) *

* Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants 3 in. (7.6cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub - Woody plants less than 3 in. DBH and greater than 3.28 ft. tall.

Herb - All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft. tall.

Woody Vines - All woody vines greater than 3.28 ft. in height.

Hydrophytic Vegetation Present ☑ Yes ☐ No

Additional Remarks:

Soils in the area were likely disturbed during active mining. The site is currently mowed. Area is an upland old field community.

WETLAND DETERMINATION DATA FORM
Northcentral and Northeast Region

Stantec

Project/Site:	Flambeau Mining Company - Industrial Outlot	Stantec Project #:	0010-0163-01
Applicant:	Jana Murphy		
Investigator #1:	Engelhardt, J.	Investigator #2:	--
Soil Unit:	Cut and fill	NWI/WWI Classification:	None
Landform:	Depressional	Local Relief:	Gently sloping
Slope (%):	N/A	Latitude: N/A	Longitude: N/A Datum: N/A

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

Are Vegetation ☐ , Soil ☑, or Hydrology ☐ significantly disturbed?
Are Vegetation ☐ , Soil ☐, or Hydrology ☐ naturally problematic?

Are normal circumstances present? ☐ Yes ☑ No

Date:	05/17/10
County:	Rusk
State:	Wisconsin
Wetland ID:	W5
Sample Point:	1w
Community ID:	Wet Meadow
Section:	9
Township:	34 N
Range:	6 Dir: W

SUMMARY OF FINDINGS

Hydrophytic Vegetation Present? ☑ Yes ☐ No
Wetland Hydrology Present? ☑ Yes ☐ No
Hydric Soils Present? ☐ Yes ☑ No
Is This Sampling Point Within A Wetland? ☑ **Yes** ☐ **No**

Remarks: Applied procedures from Northcentral and Northeast Region Supplement to address problem hydric soils in this area.

HYDROLOGY

Wetland Hydrology Indicators (Check here if indicators are not present ☐):

Primary:
- ☑ A1 - Surface Water
- ☐ A2 - High Water Table
- ☑ A3 - Saturation
- ☐ B1 - Water Marks
- ☐ B2 - Sediment Deposits
- ☐ B3 - Drift Deposits
- ☐ B4 - Algal Mat or Crust
- ☐ B5 - Iron Deposits
- ☐ B7 - Inundation Visible on Aerial Imagery
- ☐ B8 - Sparsely Vegetated Concave Surface
- ☐ B9 - Water-Stained Leaves
- ☐ B13 - Aquatic Fauna
- ☐ B15 - Marl Deposits
- ☐ C1 - Hydrogen Sulfide Odor
- ☐ C3 - Oxidized Rhizospheres on Living Roots
- ☐ C4 - Presence of Reduced Iron
- ☐ C6 - Recent Iron Reduction in Tilled Soils
- ☐ C7 - Thin Muck Surface
- ☐ Other (Explain)

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

Field Observations:

Surface Water Present?	☑ Yes ☐ No	Depth:	0.5	(in.)
Water Table Present?	☐ Yes ☑ No	Depth:	0	(in.)
Saturation Present?	☑ Yes ☐ No	Depth:	0	(in.)

Wetland Hydrology Present? ☑ Yes ☐ No

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available: N/A

Remarks: Surface water accumulation is due to irregular grading during reclamation activites which has created low spots over this portion of the Study Area.

SOILS

Map Unit Name: Cut and fill — Series Drainage Class: moderately well

Taxonomy (Subgroup): NA — Field Observations Confirm Mapped Type? ☑ Yes ☐ No

Profile Description (Describe to the depth needed to document the indicator or confirm the absence of indicators.) (Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered/Coated Sand Grains; Locaiton: PL=Pore Lining, M=Matrix)

Top Depth	Bottom Depth	Horizon	Matrix Color (Moist)	Matrix %	Mottles Color (Moist)	Mottles %	Mottles Type	Mottles Location	Texture (e.g. clay, sand, loam)
0	4	1	10YR 3/2	100	--	--	--	--	loam
4	12	2	10YR 4/4	90	10YR 4/6	10	C	M	sandy clay loam
12	18	3	10YR 4/4	100	--	--	--	--	sandy clay loam/gravel
--	--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--	--

NRCS Hydric Soil Field Indicators (check here if indicators are not present ☐):
- ☐ A1- Histosol
- ☐ A2 - Histic Epipedon
- ☐ A3 - Black Histic
- ☐ A4 - Hydrogen Sulfide
- ☐ A5 - Stratified Layers
- ☐ A11 - Depleted Below Dark Surface
- ☐ A12 - Thick Dark Surface
- ☐ S1 - Sandy Muck Mineral
- ☐ S4 - Sandy Gleyed Matrix
- ☐ S5 - Sandy Redox
- ☐ S6 - Stripped Matrix
- ☐ S7 - Dark Surface (**LRR R, MLRA 149B**)
- ☐ S8 - Polyvalue Below Surface (**LRR R, MLRA 149B**)
- ☐ S9 - Thin Dark Surface (**LRR R, MLRA 149B**)
- ☐ F1 - Loamy Muck Mineral (**LRR K, L**)
- ☐ F2 - Loamy Gleyed Matrix
- ☐ F3 - Depleted Matrix
- ☐ F6 - Redox Dark Surface
- ☐ F7 - Depleted Dark Surface
- ☐ F8 - Redox Depressions

Indicators for Problematic Soils [1]
- ☐ A10 - 2 cm Muck (**LRR K, L, MLRA149B**)
- ☐ A16 - Coast Prairie Redox (**LRR K, L, R**)
- ☐ S3 - 5cm Mucky Peat of Peat (**LRR K, L, R**)
- ☐ S7 - Dark Surface (**LRR K, L**)
- ☐ S8 - Polyvalue Below Surface (**LRR K, L**)
- ☐ S9 - Thin Dark Surface (**LRR K, L**)
- ☐ F12 - Iron-Manganese Masses (**LRR K, L, R**)
- ☐ F19 - Piedmont Floodplain Soils (**MLRA 149B**)
- ☐ TA6 - Mesic Spodic (**MLRA 144A, 145, 149B**)
- ☐ TF2 - Red Parent Material
- ☐ TF12 - Very Shallow Dark Surface
- ☐ Other (Explain in Remarks)

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

Restrictive Layer (If Observed) Type: N/A Depth: N/A

Hydric Soil Present? ☐ Yes ☑ No

Remarks: Soil profile is consistent with mixed gravelly fill.

WETLAND DETERMINATION DATA FORM

Northcentral and Northeast Region

Project/Site: Flambeau Mining Company - Industrial Outlot | Wetland ID: W5 | Sample Point: 1w

VEGETATION (Species identified in all uppercase are non-native species.)

Tree Stratum (Plot size: 10 meter radius)

	Species Name	% Cover	Dominant	Ind.Status
1.	--	--	--	--
2.	--	--	--	--
3.	--	--	--	--
4.	--	--	--	--
5.	--	--	--	--
6.	--	--	--	--
7.	--	--	--	--
8.	--	--	--	--
9.	--	--	--	--
10.	--	--	--	--
	Total Cover =	0		

Sapling/Shrub Stratum (Plot size: 5 meter radius)

1.	*Salix petiolaris*	15	Y	FACW
2.	--	--	--	--
3.	--	--	--	--
4.	--	--	--	--
5.	--	--	--	--
6.	--	--	--	--
7.	--	--	--	--
8.	--	--	--	--
9.	--	--	--	--
10.	--	--	--	--
	Total Cover =	15		

Herb Stratum (Plot size: 2 meter radius)

1.	*Scirpus cyperinus*	10	N	OBL
2.	*Panicum virgatum*	25	Y	FAC
3.	*Carex tenera*	25	Y	FAC
4.	*Polygonum hydropiperoides*	10	N	OBL
5.	*Potamogeton natans*	5	N	OBL
6	--	--	--	--
7.	--	--	--	--
8.	--	--	--	--
9.	--	--	--	--
10.	--	--	--	--
11.	--	--	--	--
12.	--	--	--	--
13.	--	--	--	--
14.	--	--	--	--
15.	--	--	--	--
	Total Cover =	75		

Woody Vine Stratum (Plot size: 10 meter radius)

1.	--	--	--	--
2.	--	--	--	--
3.	--	--	--	--
5.	--	--	--	--
4.	--	--	--	--
	Total Cover =	0		

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: ***100.0%*** (A/B)

Prevalence Index Worksheet

Total % Cover of:		Multiply by:	
OBL spp.	25	x 1 =	25
FACW spp.	15	x 2 =	30
FAC spp.	50	x 3 =	150
FACU spp.	0	x 4 =	0
UPL spp.	0	x 5 =	0
Total	90 (A)		205 (B)

Prevalence Index = B/A = ***2.278***

Hydrophytic Vegetation Indicators:

- ☐ Yes ☑ No Rapid Test for Hydrophytic Vegetation
- ☑ Yes ☐ No Dominance Test is > 50%
- ☑ Yes ☐ No Prevalence Index is ≤ 3.0 *
- ☐ Yes ☑ No Morphological Adaptations (Explain) *
- ☐ Yes ☑ No Problem Hydrophytic Vegetation (Explain) *

* Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants 3 in. (7.6cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub - Woody plants less than 3 in. DBH and greater than 3.28 ft. tall.

Herb - All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft. tall.

Woody Vines - All woody vines greater than 3.28 ft. in height.

Hydrophytic Vegetation Present ☑ Yes ☐ No

Remarks: Area seeded with mesic prairie seed mix following reclamation activities.

Additional Remarks:

Hydric soils not present. Area is wetland based on Northcentral and Northeast Regional Supplement.

WETLAND DETERMINATION DATA FORM
Northcentral and Northeast Region

Stantec

Project/Site:	Flambeau Mining Company - Industrial Outlot	Stantec Project #:	0010-0163-01
Applicant:	Jana Murphy		
Investigator #1:	Engelhardt, J.	Investigator #2:	--
Soil Unit:	Cut and fill	NWI/WWI Classification:	None
Landform:		Local Relief:	Gently sloping
Slope (%):	N/A	Latitude: N/A	Longitude: N/A Datum: N/A

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

Are Vegetation ☐ , Soil ☑, or Hydrology ☐ significantly disturbed?
Are Vegetation ☐ , Soil ☐, or Hydrology ☐ naturally problematic?

Are normal circumstances present? ☐ Yes ☑ No

Date:	05/17/10
County:	Rusk
State:	Wisconsin
Wetland ID:	W5
Sample Point:	1u
Community ID:	Old Field
Section:	9
Township:	34 N
Range:	6 Dir: W

SUMMARY OF FINDINGS

Hydrophytic Vegetation Present? ☐ Yes ☑ No
Wetland Hydrology Present? ☐ Yes ☑ No
Hydric Soils Present? ☐ Yes ☑ No
Is This Sampling Point Within A Wetland? ☐ **Yes** ☑ **No**

Remarks: Mowed upland old field within equestrian trailhead area.

HYDROLOGY

Wetland Hydrology Indicators (Check here if indicators are not present ☑):

Primary:
- ☐ A1 - Surface Water
- ☐ A2 - High Water Table
- ☐ A3 - Saturation
- ☐ B1 - Water Marks
- ☐ B2 - Sediment Deposits
- ☐ B3 - Drift Deposits
- ☐ B4 - Algal Mat or Crust
- ☐ B5 - Iron Deposits
- ☐ B7 - Inundation Visible on Aerial Imagery
- ☐ B8 - Sparsely Vegetated Concave Surface
- ☐ B9 - Water-Stained Leaves
- ☐ B13 - Aquatic Fauna
- ☐ B15 - Marl Deposits
- ☐ C1 - Hydrogen Sulfide Odor
- ☐ C3 - Oxidized Rhizospheres on Living Roots
- ☐ C4 - Presence of Reduced Iron
- ☐ C6 - Recent Iron Reduction in Tilled Soils
- ☐ C7 - Thin Muck Surface
- ☐ Other (Explain)

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

Field Observations:

Surface Water Present?	☐ Yes ☑ No	Depth:	0	(in.)
Water Table Present?	☐ Yes ☑ No	Depth:	0	(in.)
Saturation Present?	☐ Yes ☑ No	Depth:	0	(in.)

Wetland Hydrology Present? ☐ Yes ☑ No

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available: N/A

Remarks: No wetland hydrology present.

SOILS

Map Unit Name: Cut and fill — Series Drainage Class: moderately well

Taxonomy (Subgroup): NA — Field Observations Confirm Mapped Type? ☑ Yes ☐ No

Profile Description (Describe to the depth needed to document the indicator or confirm the absence of indicators.) (Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered/Coated Sand Grains; Locaiton: PL=Pore Lining, M=Matrix)

Top Depth	Bottom Depth	Horizon	Matrix Color (Moist)	Matrix %	Mottles Color (Moist)	Mottles Color (Moist)	Mottles %	Mottles Type	Mottles Location	Texture (e.g. clay, sand, loam)
0	10	1	10YR 3/2	100	--	--	--	--	--	Loam
10	18	2	10YR 4/4	100	--	--	--	--	--	Sandy Clay Loam
--	--	--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--	--	--

NRCS Hydric Soil Field Indicators (check here if indicators are not present ☑):
- ☐ A1- Histosol
- ☐ A2 - Histic Epipedon
- ☐ A3 - Black Histic
- ☐ A4 - Hydrogen Sulfide
- ☐ A5 - Stratified Layers
- ☐ A11 - Depleted Below Dark Surface
- ☐ A12 - Thick Dark Surface
- ☐ S1 - Sandy Muck Mineral
- ☐ S4 - Sandy Gleyed Matrix
- ☐ S5 - Sandy Redox
- ☐ S6 - Stripped Matrix
- ☐ S7 - Dark Surface (**LRR R, MLRA 149B**)
- ☐ S8 - Polyvalue Below Surface (**LRR R, MLRA 149B**)
- ☐ S9 - Thin Dark Surface (**LRR R, MLRA 149B**)
- ☐ F1 - Loamy Muck Mineral (**LRR K, L**)
- ☐ F2 - Loamy Gleyed Matrix
- ☐ F3 - Depleted Matrix
- ☐ F6 - Redox Dark Surface
- ☐ F7 - Depleted Dark Surface
- ☐ F8 - Redox Depressions

Indicators for Problematic Soils [1]
- ☐ A10 - 2 cm Muck (**LRR K, L, MLRA149B**)
- ☐ A16 - Coast Prairie Redox (**LRR K, L, R**)
- ☐ S3 - 5cm Mucky Peat of Peat (**LRR K, L, R**)
- ☐ S7 - Dark Surface (**LRR K, L**)
- ☐ S8 - Polyvalue Below Surface (**LRR K, L**)
- ☐ S9 - Thin Dark Surface (**LRR K, L**)
- ☐ F12 - Iron-Manganese Masses (**LRR K, L, R**)
- ☐ F19 - Piedmont Floodplain Soils (**MLRA 149B**)
- ☐ TA6 - Mesic Spodic (**MLRA 144A, 145, 149B**)
- ☐ TF2 - Red Parent Material
- ☐ TF12 - Very Shallow Dark Surface
- ☐ Other (Explain in Remarks)

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

Restrictive Layer (If Observed) Type: N/A Depth: N/A

Hydric Soil Present? ☐ Yes ☑ No

Remarks: No hydric soils identified.

WETLAND DETERMINATION DATA FORM

Northcentral and Northeast Region

Project/Site: Flambeau Mining Company - Industrial Outlot | Wetland ID: W5 | Sample Point: 1u

VEGETATION (Species identified in all uppercase are non-native species.)

Tree Stratum (Plot size: 10 meter radius)

	Species Name	% Cover	Dominant	Ind.Status
1.	--	--	--	--
2.	--	--	--	--
3.	--	--	--	--
4.	--	--	--	--
5.	--	--	--	--
6.	--	--	--	--
7.	--	--	--	--
8.	--	--	--	--
9.	--	--	--	--
10.	--	--	--	--
	Total Cover =	0		

Sapling/Shrub Stratum (Plot size: 5 meter radius)

1.	--	--	--	--
2.	--	--	--	--
3.	--	--	--	--
4.	--	--	--	--
5.	--	--	--	--
6.	--	--	--	--
7.	--	--	--	--
8.	--	--	--	--
9.	--	--	--	--
10.	--	--	--	--
	Total Cover =	0		

Herb Stratum (Plot size: 2 meter radius)

1.	*POA PRATENSIS*	30	Y	FAC
2.	*Achillea millefolium*	10	N	FACU
3.	*TRIFOLIUM REPENS*	5	N	FACU
4.	*PHALARIS ARUNDINACEA*	5	N	FACW
5.	*BARBAREA VULGARIS*	5	N	FAC
6	*PHLEUM PRATENSE*	25	Y	FACU
7.	*TARAXACUM OFFICINALE*	10	N	FACU
8.	*Panicum virgatum*	10	N	FAC
9.	--	--	--	--
10.	--	--	--	--
11.	--	--	--	--
12.	--	--	--	--
13.	--	--	--	--
14.	--	--	--	--
15.	--	--	--	--
	Total Cover =	100		

Woody Vine Stratum (Plot size: 10 meter radius)

1.	--	--	--	--
2.	--	--	--	--
3.	--	--	--	--
5.	--	--	--	--
4.	--	--	--	--
	Total Cover =	0		

Dominance Test Worksheet

Number of Dominant Species that are OBL, FACW, or FAC: 1 (A)

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

Percent of Dominant Species That Are OBL, FACW, or FAC: ***50.0%*** (A/B)

Prevalence Index Worksheet

Total % Cover of:		Multiply by:	
OBL spp.	0	x 1 =	0
FACW spp.	5	x 2 =	10
FAC spp.	45	x 3 =	135
FACU spp.	50	x 4 =	200
UPL spp.	0	x 5 =	0
Total	100 (A)		345 (B)

Prevalence Index = B/A = ***3.450***

Hydrophytic Vegetation Indicators:

- ☐ Yes ☑ No Rapid Test for Hydrophytic Vegetation
- ☐ Yes ☑ No Dominance Test is > 50%
- ☐ Yes ☑ No Prevalence Index is ≤ 3.0 *
- ☐ Yes ☑ No Morphological Adaptations (Explain) *
- ☐ Yes ☑ No Problem Hydrophytic Vegetation (Explain) *

* Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants 3 in. (7.6cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub - Woody plants less than 3 in. DBH and greater than 3.28 ft. tall.

Herb - All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft. tall.

Woody Vines - All woody vines greater than 3.28 ft. in height.

Hydrophytic Vegetation Present ☐ Yes ☑ No

Remarks: Upland vegetation dominant.

Additional Remarks:

Soils in the area were likely disturbed during active mining. The site is currently mowed. Area is an upland old field community.

WETLAND DETERMINATION DATA FORM
Northcentral and Northeast Region

Stantec

Project/Site:	Flambeau Mining Company - Industrial Outlot	Stantec Project #:	0010-0163-01
Applicant:	Jana Murphy		
Investigator #1:	Engelhardt, J.	Investigator #2:	--
Soil Unit:	Cut and fill	NWI/WWI Classification:	None
Landform:	Depressional	Local Relief:	Gently sloping
Slope (%):	N/A	Latitude: N/A	Longitude: N/A Datum: N/A

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

Are Vegetation ☐ , Soil ☑, or Hydrology ☐ significantly disturbed?
Are Vegetation ☐ , Soil ☐, or Hydrology ☐ naturally problematic?

Are normal circumstances present? ☐ Yes ☑ No

Date:	05/17/10
County:	Rusk
State:	Wisconsin
Wetland ID:	W6
Sample Point:	1w
Community ID:	Wet Meadow
Section:	9
Township:	34 N
Range:	6 Dir: W

SUMMARY OF FINDINGS

Hydrophytic Vegetation Present? ☑ Yes ☐ No
Wetland Hydrology Present? ☑ Yes ☐ No
Hydric Soils Present? ☐ Yes ☑ No
Is This Sampling Point Within A Wetland? ☑ **Yes** ☐ **No**

Remarks: Applied procedures from Northcentral and Northeast Region Supplement to address problem hydric soils in this area.

HYDROLOGY

Wetland Hydrology Indicators (Check here if indicators are not present ☐):

Primary:
- ☑ A1 - Surface Water
- ☐ A2 - High Water Table
- ☑ A3 - Saturation
- ☐ B1 - Water Marks
- ☐ B2 - Sediment Deposits
- ☐ B3 - Drift Deposits
- ☐ B4 - Algal Mat or Crust
- ☐ B5 - Iron Deposits
- ☐ B7 - Inundation Visible on Aerial Imagery
- ☐ B8 - Sparsely Vegetated Concave Surface
- ☐ B9 - Water-Stained Leaves
- ☐ B13 - Aquatic Fauna
- ☐ B15 - Marl Deposits
- ☐ C1 - Hydrogen Sulfide Odor
- ☐ C3 - Oxidized Rhizospheres on Living Roots
- ☐ C4 - Presence of Reduced Iron
- ☐ C6 - Recent Iron Reduction in Tilled Soils
- ☐ C7 - Thin Muck Surface
- ☐ Other (Explain)

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

Field Observations:

Surface Water Present?	☑ Yes ☐ No	Depth:	3	(in.)
Water Table Present?	☐ Yes ☑ No	Depth:	0	(in.)
Saturation Present?	☑ Yes ☐ No	Depth:	0	(in.)

Wetland Hydrology Present? ☑ Yes ☐ No

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available: N/A

Remarks: Surface water accumulation is due to irregular grading during reclamation activites which has created low spots over this portion of the Study Area.

SOILS

Map Unit Name: Cut and fill — Series Drainage Class: moderately well

Taxonomy (Subgroup): NA — Field Observations Confirm Mapped Type? ☑ Yes ☐ No

Profile Description (Describe to the depth needed to document the indicator or confirm the absence of indicators.) (Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered/Coated Sand Grains; Locaiton: PL=Pore Lining, M=Matrix)

Top Depth	Bottom Depth	Horizon	Matrix Color (Moist)	Matrix %	Mottles Color (Moist)	Mottles Color (Moist)	Mottles %	Mottles Type	Mottles Location	Texture (e.g. clay, sand, loam)
0	3	1	10YR 4/2	100	--	--	--	--	--	loam
3	18	2	10YR 3/3	100	--	--	--	--	--	sandy clay loam/gravel
--	--	--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--	--	--

NRCS Hydric Soil Field Indicators (check here if indicators are not present ☐):
- ☐ A1- Histosol
- ☐ A2 - Histic Epipedon
- ☐ A3 - Black Histic
- ☐ A4 - Hydrogen Sulfide
- ☐ A5 - Stratified Layers
- ☐ A11 - Depleted Below Dark Surface
- ☐ A12 - Thick Dark Surface
- ☐ S1 - Sandy Muck Mineral
- ☐ S4 - Sandy Gleyed Matrix
- ☐ S5 - Sandy Redox
- ☐ S6 - Stripped Matrix
- ☐ S7 - Dark Surface (**LRR R, MLRA 149B**)
- ☐ S8 - Polyvalue Below Surface (**LRR R, MLRA 149B**)
- ☐ S9 - Thin Dark Surface (**LRR R, MLRA 149B**)
- ☐ F1 - Loamy Muck Mineral (**LRR K, L**)
- ☐ F2 - Loamy Gleyed Matrix
- ☐ F3 - Depleted Matrix
- ☐ F6 - Redox Dark Surface
- ☐ F7 - Depleted Dark Surface
- ☐ F8 - Redox Depressions

Indicators for Problematic Soils [1]
- ☐ A10 - 2 cm Muck (**LRR K, L, MLRA149B**)
- ☐ A16 - Coast Prairie Redox (**LRR K, L, R**)
- ☐ S3 - 5cm Mucky Peat of Peat (**LRR K, L, R**)
- ☐ S7 - Dark Surface (**LRR K, L**)
- ☐ S8 - Polyvalue Below Surface (**LRR K, L**)
- ☐ S9 - Thin Dark Surface (**LRR K, L**)
- ☐ F12 - Iron-Manganese Masses (**LRR K, L, R**)
- ☐ F19 - Piedmont Floodplain Soils (**MLRA 149B**)
- ☐ TA6 - Mesic Spodic (**MLRA 144A, 145, 149B**)
- ☐ TF2 - Red Parent Material
- ☐ TF12 - Very Shallow Dark Surface
- ☐ Other (Explain in Remarks)

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

Restrictive Layer (If Observed) Type: N/A Depth: N/A

Hydric Soil Present? ☐ Yes ☑ No

Remarks: Soil profile is consistent with mixed gravelly fill.

WETLAND DETERMINATION DATA FORM

Northcentral and Northeast Region

Project/Site: Flambeau Mining Company - Industrial Outlot | Wetland ID: W6 | Sample Point: 1w

VEGETATION (Species identified in all uppercase are non-native species.)

Tree Stratum (Plot size: 10 meter radius)

	Species Name	% Cover	Dominant	Ind.Status
1.	--	--	--	--
2.	--	--	--	--
3.	--	--	--	--
4.	--	--	--	--
5.	--	--	--	--
6.	--	--	--	--
7.	--	--	--	--
8.	--	--	--	--
9.	--	--	--	--
10.	--	--	--	--
	Total Cover =	0		

Sapling/Shrub Stratum (Plot size: 5 meter radius)

1.	*Salix petiolaris*	5	Y	FACW
2.	--	--	--	--
3.	--	--	--	--
4.	--	--	--	--
5.	--	--	--	--
6.	--	--	--	--
7.	--	--	--	--
8.	--	--	--	--
9.	--	--	--	--
10.	--	--	--	--
	Total Cover =	5		

Herb Stratum (Plot size: 2 meter radius)

1.	*Carex scoparia*	15	N	FACW
2.	*Panicum virgatum*	35	Y	FAC
3.	*Carex tenera*	40	Y	FAC
4.	*PHALARIS ARUNDINACEA*	10	N	FACW
5.	--	--	--	--
6	--	--	--	--
7.	--	--	--	--
8.	--	--	--	--
9.	--	--	--	--
10.	--	--	--	--
11.	--	--	--	--
12.	--	--	--	--
13.	--	--	--	--
14.	--	--	--	--
15.	--	--	--	--
	Total Cover =	100		

Woody Vine Stratum (Plot size: 10 meter radius)

1.	--	--	--	--
2.	--	--	--	--
3.	--	--	--	--
5.	--	--	--	--
4.	--	--	--	--
	Total Cover =	0		

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: ***100.0%*** (A/B)

Prevalence Index Worksheet

Total % Cover of:		Multiply by:	
OBL spp.	0	x 1 =	0
FACW spp.	30	x 2 =	60
FAC spp.	75	x 3 =	225
FACU spp.	0	x 4 =	0
UPL spp.	0	x 5 =	0
Total	105 (A)		285 (B)

Prevalence Index = B/A = ***2.714***

Hydrophytic Vegetation Indicators:

- ☐ Yes ☑ No Rapid Test for Hydrophytic Vegetation
- ☑ Yes ☐ No Dominance Test is > 50%
- ☑ Yes ☐ No Prevalence Index is ≤ 3.0 *
- ☐ Yes ☑ No Morphological Adaptations (Explain) *
- ☐ Yes ☑ No Problem Hydrophytic Vegetation (Explain) *

* Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants 3 in. (7.6cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub - Woody plants less than 3 in. DBH and greater than 3.28 ft. tall.

Herb - All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft. tall.

Woody Vines - All woody vines greater than 3.28 ft. in height.

Hydrophytic Vegetation Present ☑ Yes ☐ No

Remarks: Area seeded with mesic prairie seed mix following reclamation activities.

Additional Remarks:

Hydric soils not present. Area is wetland based on Northcentral and Northeast Regional Supplement.

WETLAND DETERMINATION DATA FORM
Northcentral and Northeast Region

Stantec

Project/Site:	Flambeau Mining Company - Industrial Outlot	Stantec Project #:	0010-0163-01
Applicant:	Jana Murphy		
Investigator #1:	Engelhardt, J.	Investigator #2:	--
Soil Unit:	Cut and fill	NWI/WWI Classification:	None
Landform:		Local Relief:	Gently sloping
Slope (%):	N/A	Latitude: N/A	Longitude: N/A Datum: N/A

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

Are Vegetation ☐ , Soil ☑, or Hydrology ☐ significantly disturbed?
Are Vegetation ☐ , Soil ☐, or Hydrology ☐ naturally problematic?

Are normal circumstances present? ☐ Yes ☑ No

Date:	05/17/10
County:	Rusk
State:	Wisconsin
Wetland ID:	W6
Sample Point:	1u
Community ID:	Old Field
Section:	9
Township:	34 N
Range:	6 Dir: W

SUMMARY OF FINDINGS

Hydrophytic Vegetation Present? ☐ Yes ☑ No
Wetland Hydrology Present? ☐ Yes ☑ No
Hydric Soils Present? ☐ Yes ☑ No
Is This Sampling Point Within A Wetland? ☐ **Yes** ☑ **No**

Remarks: Mowed upland old field within equestrian trailhead area.

HYDROLOGY

Wetland Hydrology Indicators (Check here if indicators are not present ☑):

Primary:
- ☐ A1 - Surface Water
- ☐ A2 - High Water Table
- ☐ A3 - Saturation
- ☐ B1 - Water Marks
- ☐ B2 - Sediment Deposits
- ☐ B3 - Drift Deposits
- ☐ B4 - Algal Mat or Crust
- ☐ B5 - Iron Deposits
- ☐ B7 - Inundation Visible on Aerial Imagery
- ☐ B8 - Sparsely Vegetated Concave Surface
- ☐ B9 - Water-Stained Leaves
- ☐ B13 - Aquatic Fauna
- ☐ B15 - Marl Deposits
- ☐ C1 - Hydrogen Sulfide Odor
- ☐ C3 - Oxidized Rhizospheres on Living Roots
- ☐ C4 - Presence of Reduced Iron
- ☐ C6 - Recent Iron Reduction in Tilled Soils
- ☐ C7 - Thin Muck Surface
- ☐ Other (Explain)

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

Field Observations:

Surface Water Present?	☐ Yes ☑ No	Depth:	0	(in.)
Water Table Present?	☐ Yes ☑ No	Depth:	0	(in.)
Saturation Present?	☐ Yes ☑ No	Depth:	0	(in.)

Wetland Hydrology Present? ☐ Yes ☑ No

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available: N/A

Remarks: No wetland hydrology present.

SOILS

Map Unit Name: Cut and fill
Series Drainage Class: moderately well
Taxonomy (Subgroup): NA
Field Observations Confirm Mapped Type? ☑ Yes ☐ No

Profile Description (Describe to the depth needed to document the indicator or confirm the absence of indicators.) (Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered/Coated Sand Grains; Locaiton: PL=Pore Lining, M=Matrix)

Top Depth	Bottom Depth	Horizon	Matrix Color (Moist)	Matrix %	Mottles Color (Moist)	Mottles %	Mottles Type	Mottles Location	Texture (e.g. clay, sand, loam)
0	4	1	10YR 3/2	100	--	--	--	--	Loam
4	18	2	10YR 3/4	80	10YR 4/6	15	C	M	Sandy Clay Loam
--	--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--	--

NRCS Hydric Soil Field Indicators (check here if indicators are not present ☑):
- ☐ A1- Histosol
- ☐ A2 - Histic Epipedon
- ☐ A3 - Black Histic
- ☐ A4 - Hydrogen Sulfide
- ☐ A5 - Stratified Layers
- ☐ A11 - Depleted Below Dark Surface
- ☐ A12 - Thick Dark Surface
- ☐ S1 - Sandy Muck Mineral
- ☐ S4 - Sandy Gleyed Matrix
- ☐ S5 - Sandy Redox
- ☐ S6 - Stripped Matrix
- ☐ S7 - Dark Surface (**LRR R, MLRA 149B**)
- ☐ S8 - Polyvalue Below Surface (**LRR R, MLRA 149B**)
- ☐ S9 - Thin Dark Surface (**LRR R, MLRA 149B**)
- ☐ F1 - Loamy Muck Mineral (**LRR K, L**)
- ☐ F2 - Loamy Gleyed Matrix
- ☐ F3 - Depleted Matrix
- ☐ F6 - Redox Dark Surface
- ☐ F7 - Depleted Dark Surface
- ☐ F8 - Redox Depressions

Indicators for Problematic Soils [1]
- ☐ A10 - 2 cm Muck (**LRR K, L, MLRA149B**)
- ☐ A16 - Coast Prairie Redox (**LRR K, L, R**)
- ☐ S3 - 5cm Mucky Peat of Peat (**LRR K, L, R**)
- ☐ S7 - Dark Surface (**LRR K, L**)
- ☐ S8 - Polyvalue Below Surface (**LRR K, L**)
- ☐ S9 - Thin Dark Surface (**LRR K, L**)
- ☐ F12 - Iron-Manganese Masses (**LRR K, L, R**)
- ☐ F19 - Piedmont Floodplain Soils (**MLRA 149B**)
- ☐ TA6 - Mesic Spodic (**MLRA 144A, 145, 149B**)
- ☐ TF2 - Red Parent Material
- ☐ TF12 - Very Shallow Dark Surface
- ☐ Other (Explain in Remarks)

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

Restrictive Layer (If Observed) Type: N/A Depth: N/A

Hydric Soil Present? ☐ Yes ☑ No

Remarks: No hydric soils identified.

WETLAND DETERMINATION DATA FORM

Northcentral and Northeast Region

Project/Site: Flambeau Mining Company - Industrial Outlot | Wetland ID: W6 | Sample Point: 1u

VEGETATION (Species identified in all uppercase are non-native species.)

Tree Stratum (Plot size: 10 meter radius)

	Species Name	% Cover	Dominant	Ind.Status
1.	--	--	--	--
2.	--	--	--	--
3.	--	--	--	--
4.	--	--	--	--
5.	--	--	--	--
6.	--	--	--	--
7.	--	--	--	--
8.	--	--	--	--
9.	--	--	--	--
10.	--	--	--	--
	Total Cover =	0		

Sapling/Shrub Stratum (Plot size: 5 meter radius)

1.	--	--	--	--
2.	--	--	--	--
3.	--	--	--	--
4.	--	--	--	--
5.	--	--	--	--
6.	--	--	--	--
7.	--	--	--	--
8.	--	--	--	--
9.	--	--	--	--
10.	--	--	--	--
	Total Cover =	0		

Herb Stratum (Plot size: 2 meter radius)

1.	*POA PRATENSIS*	40	Y	FAC
2.	*Achillea millefolium*	15	Y	FACU
3.	*TRIFOLIUM REPENS*	15	Y	FACU
4.	*Panicum virgatum*	5	N	FAC
5.	*BARBAREA VULGARIS*	10	N	FAC
6	*LOTUS CORNICULATA*	10	N	FAC
7.	*TARAXACUM OFFICINALE*	5	N	FACU
8.	--	--	--	--
9.	--	--	--	--
10.	--	--	--	--
11.	--	--	--	--
12.	--	--	--	--
13.	--	--	--	--
14.	--	--	--	--
15.	--	--	--	--
	Total Cover =	100		

Woody Vine Stratum (Plot size: 10 meter radius)

1.	--	--	--	--
2.	--	--	--	--
3.	--	--	--	--
5.	--	--	--	--
4.	--	--	--	--
	Total Cover =	0		

Remarks: Upland vegetation dominant.

Dominance Test Worksheet

Number of Dominant Species that are OBL, FACW, or FAC: 1 (A)

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

Percent of Dominant Species That Are OBL, FACW, or FAC: ***33.3%*** (A/B)

Prevalence Index Worksheet

Total % Cover of:		Multiply by:	
OBL spp.	0	x 1 =	0
FACW spp.	0	x 2 =	0
FAC spp.	65	x 3 =	195
FACU spp.	35	x 4 =	140
UPL spp.	0	x 5 =	0
Total	100 (A)		335 (B)

Prevalence Index = B/A = ***3.350***

Hydrophytic Vegetation Indicators:

- ☐ Yes ☑ No Rapid Test for Hydrophytic Vegetation
- ☐ Yes ☑ No Dominance Test is > 50%
- ☐ Yes ☑ No Prevalence Index is ≤ 3.0 *
- ☐ Yes ☑ No Morphological Adaptations (Explain) *
- ☐ Yes ☑ No Problem Hydrophytic Vegetation (Explain) *

* Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants 3 in. (7.6cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub - Woody plants less than 3 in. DBH and greater than 3.28 ft. tall.

Herb - All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft. tall.

Woody Vines - All woody vines greater than 3.28 ft. in height.

Hydrophytic Vegetation Present ☐ Yes ☑ No

Additional Remarks:

Soils in the area were likely disturbed during active mining. The site is currently mowed. Area is an upland old field community.

WETLAND DETERMINATION DATA FORM
Northcentral and Northeast Region

Stantec

Project/Site:	Flambeau Mining Company - Industrial Outlot	Stantec Project #:	0010-0163-01
Applicant:	Jana Murphy		
Investigator #1:	Engelhardt, J.	Investigator #2:	--
Soil Unit:	Cut and fill	NWI/WWI Classification:	None
Landform:	Depressional	Local Relief:	Gently sloping
Slope (%):	N/A	Latitude: N/A	Longitude: N/A Datum: N/A

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

Are Vegetation ☐ , Soil ☐, or Hydrology ☐ significantly disturbed?
Are Vegetation ☐ , Soil ☐, or Hydrology ☐ naturally problematic?

Are normal circumstances present? ☑ Yes ☐ No

Date:	05/17/10
County:	Rusk
State:	Wisconsin
Wetland ID:	W7
Sample Point:	1w
Community ID:	Wet Meadow
Section:	9
Township:	34 N
Range:	6 Dir: W

SUMMARY OF FINDINGS

Hydrophytic Vegetation Present? ☑ Yes ☐ No
Wetland Hydrology Present? ☑ Yes ☐ No
Hydric Soils Present? ☑ Yes ☐ No
Is This Sampling Point Within A Wetland? ☑ **Yes** ☐ **No**

Remarks: Native wetland in undistrubed area on east end of Study Area.

HYDROLOGY

Wetland Hydrology Indicators (Check here if indicators are not present ☐):

Primary:
- ☐ A1 - Surface Water
- ☐ A2 - High Water Table
- ☑ A3 - Saturation
- ☐ B1 - Water Marks
- ☐ B2 - Sediment Deposits
- ☐ B3 - Drift Deposits
- ☐ B4 - Algal Mat or Crust
- ☐ B5 - Iron Deposits
- ☐ B7 - Inundation Visible on Aerial Imagery
- ☐ B8 - Sparsely Vegetated Concave Surface
- ☐ B9 - Water-Stained Leaves
- ☐ B13 - Aquatic Fauna
- ☐ B15 - Marl Deposits
- ☐ C1 - Hydrogen Sulfide Odor
- ☑ C3 - Oxidized Rhizospheres on Living Roots
- ☐ C4 - Presence of Reduced Iron
- ☐ C6 - Recent Iron Reduction in Tilled Soils
- ☐ C7 - Thin Muck Surface
- ☐ Other (Explain)

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

Field Observations:

Surface Water Present?	☐ Yes	☑ No	Depth: 0	(in.)
Water Table Present?	☐ Yes	☑ No	Depth: 0	(in.)
Saturation Present?	☑ Yes	☐ No	Depth: 4	(in.)

Wetland Hydrology Present? ☑ Yes ☐ No

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available: N/A

Remarks: Wetland is connected to intermittent stream on east end of Study Area.

SOILS

Map Unit Name: Cut and fill — Series Drainage Class: moderately well

Taxonomy (Subgroup): NA — Field Observations Confirm Mapped Type? ☐ Yes ☑ No

Profile Description (Describe to the depth needed to document the indicator or confirm the absence of indicators.) (Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered/Coated Sand Grains; Locaiton: PL=Pore Lining, M=Matrix)

Top Depth	Bottom Depth	Horizon	Matrix Color (Moist)	Matrix %	Mottles Color (Moist)	Mottles %	Mottles Type	Mottles Location	Texture (e.g. clay, sand, loam)
0	8	1	10YR 3/2	100	--	--	--	--	silt loam
8	12	2	10YR 3/2	80	5YR 3/4	20	C	M	silt loam
12	21	3	2.5Y 4/2	90	10YR 4/6	10	C	M	silt loam
--	--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--	--

NRCS Hydric Soil Field Indicators (check here if indicators are not present ☐):
- ☐ A1- Histosol
- ☐ A2 - Histic Epipedon
- ☐ A3 - Black Histic
- ☐ A4 - Hydrogen Sulfide
- ☐ A5 - Stratified Layers
- ☐ A11 - Depleted Below Dark Surface
- ☐ A12 - Thick Dark Surface
- ☐ S1 - Sandy Muck Mineral
- ☐ S4 - Sandy Gleyed Matrix
- ☐ S5 - Sandy Redox
- ☐ S6 - Stripped Matrix
- ☐ S7 - Dark Surface (**LRR R, MLRA 149B**)
- ☐ S8 - Polyvalue Below Surface (**LRR R, MLRA 149B**)
- ☐ S9 - Thin Dark Surface (**LRR R, MLRA 149B**)
- ☐ F1 - Loamy Muck Mineral (**LRR K, L**)
- ☐ F2 - Loamy Gleyed Matrix
- ☐ F3 - Depleted Matrix
- ☑ F6 - Redox Dark Surface
- ☐ F7 - Depleted Dark Surface
- ☐ F8 - Redox Depressions

Indicators for Problematic Soils [1]
- ☐ A10 - 2 cm Muck (**LRR K, L, MLRA149B**)
- ☐ A16 - Coast Prairie Redox (**LRR K, L, R**)
- ☐ S3 - 5cm Mucky Peat of Peat (**LRR K, L, R**)
- ☐ S7 - Dark Surface (**LRR K, L**)
- ☐ S8 - Polyvalue Below Surface (**LRR K, L**)
- ☐ S9 - Thin Dark Surface (**LRR K, L**)
- ☐ F12 - Iron-Manganese Masses (**LRR K, L, R**)
- ☐ F19 - Piedmont Floodplain Soils (**MLRA 149B**)
- ☐ TA6 - Mesic Spodic (**MLRA 144A, 145, 149B**)
- ☐ TF2 - Red Parent Material
- ☐ TF12 - Very Shallow Dark Surface
- ☐ Other (Explain in Remarks)

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

Restrictive Layer (If Observed) Type: N/A Depth: N/A

Hydric Soil Present? ☑ Yes ☐ No

Remarks: Native hydric soils identified.

WETLAND DETERMINATION DATA FORM

Northcentral and Northeast Region

Project/Site: Flambeau Mining Company - Industrial Outlot | Wetland ID: W7 | Sample Point: 1w

VEGETATION (Species identified in all uppercase are non-native species.)

Tree Stratum (Plot size: 10 meter radius)

	Species Name	% Cover	Dominant	Ind.Status
1.	--	--	--	--
2.	--	--	--	--
3.	--	--	--	--
4.	--	--	--	--
5.	--	--	--	--
6.	--	--	--	--
7.	--	--	--	--
8.	--	--	--	--
9.	--	--	--	--
10.	--	--	--	--
	Total Cover =	0		

Sapling/Shrub Stratum (Plot size: 5 meter radius)

1.	--	--	--	--
2.	--	--	--	--
3.	--	--	--	--
4.	--	--	--	--
5.	--	--	--	--
6.	--	--	--	--
7.	--	--	--	--
8.	--	--	--	--
9.	--	--	--	--
10.	--	--	--	--
	Total Cover =	0		

Herb Stratum (Plot size: 2 meter radius)

1.	*Solidago gigantea*	25	Y	FACW
2.	*PHALARIS ARUNDINACEA*	65	Y	FACW
3.	*Poa palustris*	5	N	FACW
4.	*AGROSTIS GIGANTEA*	5	N	FACW
5.	--	--	--	--
6	--	--	--	--
7.	--	--	--	--
8.	--	--	--	--
9.	--	--	--	--
10.	--	--	--	--
11.	--	--	--	--
12.	--	--	--	--
13.	--	--	--	--
14.	--	--	--	--
15.	--	--	--	--
	Total Cover =	100		

Woody Vine Stratum (Plot size: 10 meter radius)

1.	--	--	--	--
2.	--	--	--	--
3.	--	--	--	--
5.	--	--	--	--
4.	--	--	--	--
	Total Cover =	0		

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: ***100.0%*** (A/B)

Prevalence Index Worksheet

Total % Cover of:		Multiply by:	
OBL spp.	0	x 1 =	0
FACW spp.	100	x 2 =	200
FAC spp.	0	x 3 =	0
FACU spp.	0	x 4 =	0
UPL spp.	0	x 5 =	0
Total	100 (A)		200 (B)

Prevalence Index = B/A = ***2.000***

Hydrophytic Vegetation Indicators:

- ☑ Yes ☐ No Rapid Test for Hydrophytic Vegetation
- ☑ Yes ☐ No Dominance Test is > 50%
- ☑ Yes ☐ No Prevalence Index is ≤ 3.0 *
- ☐ Yes ☑ No Morphological Adaptations (Explain) *
- ☐ Yes ☑ No Problem Hydrophytic Vegetation (Explain) *

* Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants 3 in. (7.6cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub - Woody plants less than 3 in. DBH and greater than 3.28 ft. tall.

Herb - All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft. tall.

Woody Vines - All woody vines greater than 3.28 ft. in height.

Hydrophytic Vegetation Present ☑ Yes ☐ No

Remarks: Area was not considerably disturbed during mining or reclamation activities.

Additional Remarks:

Area is a relatively undisturbed native wet meadow wetland.

WETLAND DETERMINATION DATA FORM
Northcentral and Northeast Region

Stantec

Project/Site:	Flambeau Mining Company - Industrial Outlot	Stantec Project #:	0010-0163-01
Applicant:	Jana Murphy		
Investigator #1:	Engelhardt, J.	Investigator #2:	--
Soil Unit:	Cut and fill	NWI/WWI Classification:	None
Landform:		Local Relief:	Gently sloping
Slope (%):	N/A	Latitude: N/A	Longitude: N/A Datum: N/A

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

Are Vegetation ☐ , Soil ☑, or Hydrology ☐ significantly disturbed?
Are Vegetation ☐ , Soil ☐, or Hydrology ☐ naturally problematic?

Are normal circumstances present? ☐ Yes ☑ No

Date:	05/17/10
County:	Rusk
State:	Wisconsin
Wetland ID:	W7
Sample Point:	1u
Community ID:	Old Field
Section:	9
Township:	34 N
Range:	6 Dir: W

SUMMARY OF FINDINGS

Hydrophytic Vegetation Present? ☐ Yes ☑ No
Wetland Hydrology Present? ☐ Yes ☑ No
Hydric Soils Present? ☐ Yes ☑ No
Is This Sampling Point Within A Wetland? ☐ **Yes** ☑ **No**

Remarks: Mowed upland old field between W7-1w and Copper Park Drive.

HYDROLOGY

Wetland Hydrology Indicators (Check here if indicators are not present ☑):

Primary:
- ☐ A1 - Surface Water
- ☐ A2 - High Water Table
- ☐ A3 - Saturation
- ☐ B1 - Water Marks
- ☐ B2 - Sediment Deposits
- ☐ B3 - Drift Deposits
- ☐ B4 - Algal Mat or Crust
- ☐ B5 - Iron Deposits
- ☐ B7 - Inundation Visible on Aerial Imagery
- ☐ B8 - Sparsely Vegetated Concave Surface
- ☐ B9 - Water-Stained Leaves
- ☐ B13 - Aquatic Fauna
- ☐ B15 - Marl Deposits
- ☐ C1 - Hydrogen Sulfide Odor
- ☐ C3 - Oxidized Rhizospheres on Living Roots
- ☐ C4 - Presence of Reduced Iron
- ☐ C6 - Recent Iron Reduction in Tilled Soils
- ☐ C7 - Thin Muck Surface
- ☐ Other (Explain)

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

Field Observations:

Surface Water Present?	☐ Yes ☑ No	Depth:	0	(in.)
Water Table Present?	☐ Yes ☑ No	Depth:	0	(in.)
Saturation Present?	☐ Yes ☑ No	Depth:	0	(in.)

Wetland Hydrology Present? ☐ Yes ☑ No

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available: N/A

Remarks: No wetland hydrology present.

SOILS

Map Unit Name: Cut and fill
Series Drainage Class: moderately well
Taxonomy (Subgroup): NA
Field Observations Confirm Mapped Type? ☑ Yes ☐ No

Profile Description (Describe to the depth needed to document the indicator or confirm the absence of indicators.) (Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered/Coated Sand Grains; Locaiton: PL=Pore Lining, M=Matrix)

Top Depth	Bottom Depth	Horizon	Matrix Color (Moist)	Matrix %	Mottles Color (Moist)	Mottles %	Mottles Type	Mottles Location	Texture (e.g. clay, sand, loam)
0	9	1	10YR 4/3	100	--	--	--	--	Loam
9	18	2	10YR 5/3	80	10YR 4/6	15	C	M	Sandy Loam/gravel
--	--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--	--
--	--	--	--	--	--	--	--	--	--

NRCS Hydric Soil Field Indicators (check here if indicators are not present ☑):
- ☐ A1- Histosol
- ☐ A2 - Histic Epipedon
- ☐ A3 - Black Histic
- ☐ A4 - Hydrogen Sulfide
- ☐ A5 - Stratified Layers
- ☐ A11 - Depleted Below Dark Surface
- ☐ A12 - Thick Dark Surface
- ☐ S1 - Sandy Muck Mineral
- ☐ S4 - Sandy Gleyed Matrix
- ☐ S5 - Sandy Redox
- ☐ S6 - Stripped Matrix
- ☐ S7 - Dark Surface (**LRR R, MLRA 149B**)
- ☐ S8 - Polyvalue Below Surface (**LRR R, MLRA 149B**)
- ☐ S9 - Thin Dark Surface (**LRR R, MLRA 149B**)
- ☐ F1 - Loamy Muck Mineral (**LRR K, L**)
- ☐ F2 - Loamy Gleyed Matrix
- ☐ F3 - Depleted Matrix
- ☐ F6 - Redox Dark Surface
- ☐ F7 - Depleted Dark Surface
- ☐ F8 - Redox Depressions

Indicators for Problematic Soils [1]
- ☐ A10 - 2 cm Muck (**LRR K, L, MLRA149B**)
- ☐ A16 - Coast Prairie Redox (**LRR K, L, R**)
- ☐ S3 - 5cm Mucky Peat of Peat (**LRR K, L, R**)
- ☐ S7 - Dark Surface (**LRR K, L**)
- ☐ S8 - Polyvalue Below Surface (**LRR K, L**)
- ☐ S9 - Thin Dark Surface (**LRR K, L**)
- ☐ F12 - Iron-Manganese Masses (**LRR K, L, R**)
- ☐ F19 - Piedmont Floodplain Soils (**MLRA 149B**)
- ☐ TA6 - Mesic Spodic (**MLRA 144A, 145, 149B**)
- ☐ TF2 - Red Parent Material
- ☐ TF12 - Very Shallow Dark Surface
- ☐ Other (Explain in Remarks)

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

Restrictive Layer (If Observed) Type: N/A Depth: N/A

Hydric Soil Present? ☐ Yes ☑ No

Remarks: No hydric soils identified.

WETLAND DETERMINATION DATA FORM

Northcentral and Northeast Region

Project/Site: Flambeau Mining Company - Industrial Outlot | Wetland ID: W7 | Sample Point: 1u

VEGETATION (Species identified in all uppercase are non-native species.)

Tree Stratum (Plot size: 10 meter radius)

	Species Name	% Cover	Dominant	Ind.Status
1.	--	--	--	--
2.	--	--	--	--
3.	--	--	--	--
4.	--	--	--	--
5.	--	--	--	--
6.	--	--	--	--
7.	--	--	--	--
8.	--	--	--	--
9.	--	--	--	--
10.	--	--	--	--
	Total Cover =	0		

Sapling/Shrub Stratum (Plot size: 5 meter radius)

1.	--	--	--	--
2.	--	--	--	--
3.	--	--	--	--
4.	--	--	--	--
5.	--	--	--	--
6.	--	--	--	--
7.	--	--	--	--
8.	--	--	--	--
9.	--	--	--	--
10.	--	--	--	--
	Total Cover =	0		

Herb Stratum (Plot size: 2 meter radius)

1.	*POA PRATENSIS*	35	Y	FAC
2.	*PHALARIS ARUNDINACEA*	10	N	FACW
3.	*Solidago canadensis*	30	Y	FACU
4.	*AGROSTIS GIGANTEA*	15	N	FACW
5.	*CIRSIUM ARVENSE*	5	N	FACU
6	*ELYTRIGIA REPENS*	10	N	FACU
7.	*Achillea millefolium*	5	N	FACU
8.	--	--	--	--
9.	--	--	--	--
10.	--	--	--	--
11.	--	--	--	--
12.	--	--	--	--
13.	--	--	--	--
14.	--	--	--	--
15.	--	--	--	--
	Total Cover =	110		

Woody Vine Stratum (Plot size: 10 meter radius)

1.	--	--	--	--
2.	--	--	--	--
3.	--	--	--	--
5.	--	--	--	--
4.	--	--	--	--
	Total Cover =	0		

Remarks: Upland vegetation dominant.

Dominance Test Worksheet

Number of Dominant Species that are OBL, FACW, or FAC: 1 (A)

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

Percent of Dominant Species That Are OBL, FACW, or FAC: ***50.0%*** (A/B)

Prevalence Index Worksheet

Total % Cover of:		Multiply by:	
OBL spp.	0	x 1 =	0
FACW spp.	25	x 2 =	50
FAC spp.	35	x 3 =	105
FACU spp.	50	x 4 =	200
UPL spp.	0	x 5 =	0
Total	110 (A)		355 (B)

Prevalence Index = B/A = ***3.227***

Hydrophytic Vegetation Indicators:

- ☐ Yes ☑ No Rapid Test for Hydrophytic Vegetation
- ☐ Yes ☑ No Dominance Test is > 50%
- ☐ Yes ☑ No Prevalence Index is ≤ 3.0 *
- ☐ Yes ☑ No Morphological Adaptations (Explain) *
- ☐ Yes ☑ No Problem Hydrophytic Vegetation (Explain) *

* Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants 3 in. (7.6cm) or more in diameter at breast height (DBH), regardless of height.

Sapling/Shrub - Woody plants less than 3 in. DBH and greater than 3.28 ft. tall.

Herb - All herbaceous (non-woody) plants, regardless of size, and woody plants less than 3.28 ft. tall.

Woody Vines - All woody vines greater than 3.28 ft. in height.

Hydrophytic Vegetation Present ☐ Yes ☑ No

Additional Remarks:

Soils in the area were likely disturbed during active mining. The site is currently mowed. Area is an upland old field community.

APPENDIX B
SITE PHOTOGRAPHS

Photo 1 - Looking W at W1-1w

Photo 2 - Looking W at W2-1w

Photo 3 - Looking W at W3-1w

Photo 4 - Looking W at W4-1w

Photo 5 - Looking S at W5-1w

Photo 6 - Looking E at W6-1w

Photo 7 - Looking N at W7-1w and Intermittent Waterway

Appendix D

Landscape Design and Planting Plan, Reclaimed Flambeau Mine Rusk County, Wisconsin

Stantec Consulting Services Inc.
706 W. Midway Rd.
Menasha WI 54952
Tel: (920) 558-4393

May 13, 2011

Jim Hutchison
Foth Infrastructure & Environmental, LLC
2737 South Ridge Road
Suite 600, P.O. Box 12326
Green Bay, WI 54307-2326

RE: Landscape Design and Planting Plan, Reclaimed Flambeau Mine, Rusk County, Wisconsin

Dear Mr. Hutchison:

On behalf of Foth Infrastructure & Environmental, LLC (Foth), Stantec Consulting Services, Inc. (Stantec) has completed a landscape design and planting plan for stormwater management and associated conveyance features at the Copper Park Business and Recreation Area on the Flambeau Mining Company property (the "Property"). The Property is approximately 32 acres located in Section 9, Township 34 North, Range 6 West, City of Ladysmith, Rusk County, Wisconsin (Figure 1). Stormwater management and associated conveyance features such as drainage swales, infiltration basins and adjacent buffers, will be located throughout the Property, and are designed to provide enhanced water quality, ecological function and aesthetic appeal through native plantings. The objective of this planting plan is to provide species lists, generalized planting instructions (including work schedule), and short and long term management recommendations for the stormwater management features and adjacent buffers located on the Property.

SITE DESCRIPTION

Extensive grading from historic mining operations has occurred throughout much of the Property. The current topography is relatively flat with minor topographic highs in the western and northern portions of the Property near 1150 feet msl. Topographic lows of approximately 1140 feet msl are located near the unnamed intermittent waterway (Stream C) along the eastern boundary of the Property. The Property is bordered by northern mesic forest and the Flambeau River to the west; mesic prairie to the north; STH 27, wetland, and mesic forest to the east; and northern mesic forest to the south.

Soils mapped on the Property by the *NRCS Soil Survey of Rusk County* include udorthents and udipsamments, cut or fill (2030) (Figure 2). The soil type identified is representative of areas that have been significantly disturbed from grading activities and normally do not show characteristics of native soil descriptions.

EXISTING CONDITIONS

Site conditions were evaluated by Stantec during a wetland delineation that was conducted in May, 2010. The Property is comprised of several commercial buildings, asphalt parking lots, the Equestrian Trailhead, mesic prairie, wet meadow, upland forest, old field and a surface water biofilter. Seven wetlands, totaling 2.4 acres, were identified and delineated within the Property (Figure 2). Wetlands W-1 through W-6 are disturbed shallow wet meadow depressions created from uneven grading activities associated with historic mining operations. Dominant plant species identified within these shallow depressions includes; scattered meadow willow (*Salix petiolaris*) in the shrub layer; and wool-grass (*Scirpus cyperinus*), switch grass (*Panicum virgatum*), soft rush (*Juncus effusus*), marsh straw sedge (*Carex tenera*), reed canary grass (*Phalaris arundinacea*) and less commonly red top (*Agrostis gigantea*), bird's-foot trefoil (*Lotus corniculatus*), broom sedge (*Carex scoparia*), false water-pepper (*Polygonum hydropiperoides*) and giant goldenrod (*Solidago gigantea*) in the herbaceous layer. Soils observed within these wetland areas consisted of silty clay loam and clay loam intermixed with gravel and were consistent with cut or fill soil characteristics. Wetland W-7 is a native wet meadow wetland located in a previously undisturbed area within the eastern portion of the Property. Dominant plant species include reed canary grass and giant goldenrod, and less commonly marsh bluegrass (*Poa palustris*) and red top. Soils within W-7 are mapped by the NRCS as udorthents and udipsamments, cut or fill (2030) (Figure 2). The silt loam soil observed within the wetland was not consistent with the cut or fill material characteristics observed at other sample points within the Property, confirming that this area was previously undisturbed from mining operations.

Upland communities within the Property consist of mesic prairie, upland forest and old field type vegetation (Figure 2).The mesic prairie community was created as part of the re-vegetation phase of mining reclamation activities and is located in the western portion of the Property. Dominant vegetation includes big blue-stem (*Andropogon gerardii*) and switch grass (*Panicum virgatum*), along with a number of native perennial forb species. Non-native grass species such as red top, quackgrass (*Elytrigia repens*), timothy (*Phleum pratense*) and Kentucky bluegrass (*Poa pratensis*) are also common. Two upland forest pockets, consisting of Northern Mesic Forest and Northern Dry Forest are located in the eastern portion of the Property, adjacent to W-7. The Northern Mesic Forest is dominated by sugar maple (*Acer saccharum*), paper birch (*Betula papyrifera*), Pennsylvania sedge (*Carex pensylvanica*) and other native species while the Northern Dry Forest is dominated by red pine (*Pinus resinosa*). The old field type vegetation is located in the northern and eastern portion of the Property, adjacent to the equestrian trailhead. This community is dominated by Kentucky bluegrass (*Poa pratensis*), Canada golden-rod (*Solidago canadensis*), common yarrow (*Achillea millefolium*), white clover (*Trifolium repens*), timothy, birds-foot trefoil (*Lotus corniculatus*), and common dandelion (*Taraxacum officinale*).

DESIGN FEATURES

The proposed stormwater management and conveyance features are designed to provide sufficient drainage and increase infiltration potential within the Property. Design features include re-grading the existing biofilter, creating two additional infiltration basins and associated buffers, creating drainage swales, enhancing existing drainage swales and removing an existing railroad spur (Figure 3). The East Copper Park Infiltration Basin, located east of the commercial buildings, will encompass a total area of 1 acre, and is designed to provide a maximum ponding depth of 1.2 feet

with a drawdown time of 29 hours during typical precipitation events. The West Copper Park Infiltration Basin, located west of the commercial buildings, will encompass a total area of 0.6 acres and is designed to provide a similar ponding depth and drawdown time as the East Copper Park Infiltration Basin. The North Copper Park Infiltration Basin, located north of the East Copper Park Infiltration Basin will encompass a total area of 0.65 acres and is designed to provide for no ponding during typical precipitation events. A drainage swale located north of the parking lot and commercial buildings is designed to channel water to the infiltration basins. This swale is designed to convey a 25 year storm event. The swale is expected to drain shortly after normal precipitation events. Drainage swale design will include 3:1 side slopes will, with a 6 foot bottom sloped at 0.5%. An existing railroad spur located in the eastern portion of the Property will be removed and subsequently restored to native wetland vegetation. All graded areas shall be planted with an aggressive mix of native grass, sedge and forb species native to Northern Wisconsin.

GRADING AND SITE PREPARATION

Site construction will be initiated in summer/fall 2011 in accordance with the design plans and specifications developed by Foth. The construction sequence will begin with rough grading, followed by final grading, placement of subsoil and top soil as needed, seeding of native vegetation and installation of erosion control blankets. Rough grading will involve clearing and grubbing all shrubs and associated root systems located within the proposed grading area. All woody material shall be disposed of offsite. Subsequent to rough grading, additional fine sand and gravel may be added as needed to promote infiltration, and 4 to 6 inches of topsoil will be placed over the subsoil to provide a suitable planting medium for the native plantings. Site re-vegetation will focus on native plants indigenous to the Northern Hardwood Province of the Northwest Wisconsin eco region (Plant Hardiness Zone 4) as identified below. The anticipated plant communities for the graded areas include wet meadow and wet-mesic herbaceous communities. Site re-vegetation will be completed immediately following site grading in late-fall 2011, and will include direct seeding a mixture of native wetland grasses, sedges, and forbs along with a cover crop of annual rye. All graded and seeded areas shall be stabilized by placing an erosion control blanket over the entire seeded area, to maintain good soil seed contact and hold seed in place of over the winter and into the spring. Erosion control blankets will be installed by the earthmoving contractors, and will be installed immediately following seeding.

PLANTING AND VEGETATION ESTABLISHMENT

The planting plan for the stormwater management and conveyance features incorporates three different combinations of seeding that will be used to correspond with the design features and proposed hydrologic regime. Native seed will be installed in the fall of 2011 assuming that final grading is completed between early-October and mid-November. The work shall be performed by a contractor specializing in seeding and maintenance procedures for native species with a minimum of three years experience in seeding and maintaining similar projects.

Based on site conditions and terrain it is expected the majority of seed will be installed with a tractor and no-till drill. Limited broadcasting may be needed in areas that are not accessible with a tractor. Prior to seeding, each seed mix shall be mixed with a moist inert material, such as sharp clean sand, perlite, or vermiculite at a ratio two parts seed carrier to one part seed such that seeds are evenly distributed throughout the seed carrier irrespective of seed size.

A wet meadow seed mix is proposed for the bottom of the three infiltration basins, which encompasses 2.23 acres (blue areas illustrated on Figure 4). The species in the mix were specifically selected because they germinate quickly, have high growth rates and are suitable for the specific hydrology proposed for the infiltration basins. The seeding rate is 100 seeds per square foot. The mix consists of 40% grasses, 40% sedges and rushes and 20% forbs (Table 1).

Table 1. Wet Meadow Planting Mix (2.23 acres)

Scientific Name	Common Name	Planting Rate (oz./acre)
Grasses		
Andropogon gerardii	Big Bluestem	21.78
Andropogon scoparius	Little Bluestem	21.78
Bromus ciliatus	Fringed Brome	10.89
Calamagrostis canadensis	Blue Joint Grass	0.78
Elymus virginicus	Virginia Wild Rye	38.89
Glyceria grandis	Reed Manna Grass	3.40
Glyceria striata	Fowl Manna Grass	1.36
Panicum virgatum	Switch Grass	15.56
Sedges		
Carex bebbii	Bebb's Oval Sedge	1.97
Carex comosa	Bristly Sedge	2.23
Carex crinita	Fringed Sedge	1.46
Carex hystericina	Porcupine Sedge	2.23
Carex scoparia	Lance-fruited Oval Sedge	1.60
Carex stipata	Common Fox Sedge	1.97
Carex vulpinoidea	Brown Fox Sedge	1.34
Eleocharis acicularis	Spike Rush	0.48
Juncus effusus	Common Rush	0.13
Juncus tenuis	Path Rush	0.13
Juncus torreyi	Torrey's Rush	0.08
Scirpus atrovirens	Dark-green Bulrush	0.87
Scirpus cyperinus	Wool Grass	0.20
Forbs		
Alisma subcordatum	Mud Plantain	0.58
Anemone canadensis	Canada Anemone	1.09
Asclepias incarnata	Swamp Milkweed	1.82
Aster novae-angliae	New England Aster	0.53
Aster puniceus	Swamp Aster	0.44
Aster simplex	Panicled Aster	0.11
Aster umbellatus	Upland White Aster	0.26
Epilobium angustifolium	Fireweed	0.03
Epilobium coloratum	Cinnamon Willow Herb	0.14
Eupatorium maculatum	Joe Pye Weed	0.37
Eupatorium perfoliatum	Boneset	0.22
Helenium autumnale	Sneezeweed	0.27
Lobelia siphilitica	Great Blue Lobelia	0.14

Table 1. Wet Meadow Planting Mix (2.23 acres)		
Scientific Name	**Common Name**	**Planting Rate (oz./acre)**
Lycopus americanus	Water Horehound	0.54
Mimulus ringens	Monkey Flower	0.03
Monarda fistulosa	Wild Bergamot	1.00
Penthorum sedoides	Ditch Stonecrop	0.05
Physostegia virginiana	Obedient Plant	0.79
Pycnanthemum virginianum	Mountain Mint	0.16
Rudbeckia hirta	Black-eyed Susan	0.38
Rudbeckia laciniata	Wild Golden Glow	1.24
Silphium perfoliatum	Cup Plant	6.22
Spiraea tomentosa	Steeplebush	0.17
Verbena hastata	Blue Vervain	0.37
Vernonia fasciculata	Common Ironweed	0.73

A wet-mesic seed mix is proposed for the vegetated buffer and railroad spur areas, which encompasses 1.68 acres (green areas illustrated on Figure 4). As with the wet meadow mix, these species were specifically selected because they are suitable for the site and are successful in wet-mesic restorations. The seeding rate is 100 seeds per square foot. The mix consists of 60% grasses, 10% sedges and rushes and 30% forbs (Table 2).

Table 2. Wet-Mesic Planting Mix (1.68 acres)		
Scientific Name	**Common Name**	**Planting Rate (oz./acre)**
Grasses		
Andropogon gerardii	Big Bluestem	52.27
Andropogon scoparius	Little Bluestem	34.85
Elymus canadensis	Canada Wild Rye	100.52
Panicum virgatum	Switch Grass	37.34
Sorghastrum nutans	Indian Grass	43.56
Sedges		
Carex bebbii	Bebb's Oval Sedge	1.60
Carex scoparia	Lance-fruited Oval Sedge	0.65
Scirpus atrovirens	Dark-green Bulrush	0.36
Scirpus cyperinus	Wool Grass	0.10
Forbs		
Aster azureus	Sky Blue Aster	0.91
Aster ericoides	Heath Aster	0.04
Aster novae-angliae	New England Aster	1.10
Aster pilosus	Frost Aster	0.54
Aster simplex	Panicled Aster	0.60
Epilobium angustifolium	Fireweed	0.11
Helianthus occidentalis	Western Sunflower	0.52

Table 2. Wet-Mesic Planting Mix (1.68 acres)		
Scientific Name	**Common Name**	**Planting Rate (oz./acre)**
Heliopsis helianthoides	Early Sunflower	11.52
Lupinus perennis	Wild Lupine	3.30
Monarda fistulosa	Wild Bergamot	2.07
Petalostemum purpureum	Purple Prairie Clover	7.06
Ratibida pinnata	Yellow Coneflower	3.63
Rosa blanda	Early Wild Rose	1.40
Rudbeckia hirta	Black-eyed Susan	1.58
Solidago rigida	Stiff Goldenrod	3.54
Tradescantia ohiensis	Ohio Spiderwort	0.91
Verbena stricta	Hoary Vervain	5.19
Zizia aurea	Golden Alexanders	1.65

A similar wet-mesic seed mix is proposed for the drainage swale areas, which encompasses 0.31 acres (pink areas illustrated on Figure 4). These species were specifically selected because they are suitable for the site and are successful in wet-mesic restorations; but also because they are successful at stabilizing soils and preventing erosion, which is important for areas designed to channel water. The seeding rate is 100 seeds per square foot. The mix consists of 50% grasses, 40% sedges and rushes and 10% forbs (Table 3).

Table 3. Wet-Mesic Planting Mix (0.31 acres)		
Scientific Name	**Common Name**	**Planting Rate (oz./acre)**
Grasses		
Andropogon gerardii	Big Bluestem	47.64
Andropogon scoparius	Little Bluestem	18.15
Calamagrostis canadensis	Blue Joint Grass	0.97
Elymus canadensis	Canada Wild Rye	52.36
Elymus virginicus	Virginia Wild Rye	64.82
Glyceria grandis	Reed Manna Grass	5.10
Panicum virgatum	Switch Grass	9.72
Spartina pectinata	Cord Grass	10.31
Sedges		
Carex bebbii	Bebb's Oval Sedge	4.27
Carex scoparia	Lance-fruited Oval Sedge	1.73
Carex stipata	Common Fox Sedge	4.27
Carex vulpinoidea	Brown Fox Sedge	2.90
Scirpus atrovirens	Dark-green Bulrush	1.10
Scirpus cyperinus	Wool Grass	0.30
Forbs		
Alisma subcordatum	Mud Plantain	0.12
Asclepias incarnata	Swamp Milkweed	0.38
Aster novae-angliae	New England Aster	0.14
Eupatorium maculatum	Joe Pye Weed	0.08

Table 3. Wet-Mesic Planting Mix (0.31 acres)		
Scientific Name	**Common Name**	**Planting Rate (oz./acre)**
Eupatorium perfoliatum	Boneset	0.05
Helenium autumnale	Sneezeweed	0.06
Heliopsis helianthoides	Early Sunflower	1.44
Polygonum pennsylvanicum	Pinkweed	0.56
Pycnanthemum virginianum	Mountain Mint	0.04
Ratibida pinnata	Yellow Coneflower	0.30
Rudbeckia laciniata	Wild Golden Glow	0.52
Thalictrum dasycarpum	Purple Meadow Rue	0.33
Verbena hastata	Blue Vervain	0.08
Vernonia fasciculata	Common Ironweed	0.30
Veronicastrum virginicum	Culver's Root	0.01

SITE MONITORING AND MAINTENANCE

It is recommended that a qualified ecologist and/or engineer assist with coordinating the implementation and provide construction oversight during the construction phase of this project. Proper measures should be taken to assure the following:

- proposed grading details are properly implemented;
- potential hydrology issues are identified and resolved early in the construction phase;
- potential erosion/sediment issues are identified and quickly resolved; and
- all seed material is properly installed.

With typical native seed installations, site maintenance usually includes a combination of herbicide applications, controlled burning, mowing, replanting or reseeding, and erosion control as needed. For this Property, maintenance activities shall include a combination of mowing and spot-spray herbicide applications. The need for controlled burning and reseeding shall be evaluated as the site develops. Vegetation maintenance and management shall be performed for the duration of two year followings seed installation (2012-2013). The following tentative schedule details the proposed timing for major management activities.

Year 1 (2012)

- Mow new plantings 2 times (June and August): used to control annual weeds and increase sunlight available for the new seedlings.
- Invasive species control 2 times (April through October): used to control invasive perennial weed species that pose a long term threat to native species establishment. Methods used to control invasives will be determined based on the species present and its abundance and distribution within the affected area. Typical methods include both spot and boom spraying of herbicides to the affected areas.
- Enhancement seeding, as needed.
- Invasive species assessments 2 times (May/June and August/September); used to provide follow-up recommendations.

Year 2 (2013)

- Mow planted areas 1 time during the growing season.
- Invasive species control 2 times (April through October): used to control invasive perennial weed species that pose a long term threat to native species establishment.
- Enhancement seeding, as needed
- Invasive species assessments 2 times (May/June and August/September): used to provide follow-up recommendations.

The need for additional maintenance and management beyond two years will be subject to site conditions and restoration success.

SUMMARY

This landscape design and planting plan was prepared to support landscape management activities for the stormwater management and associated conveyance features at the Industrial Outlot on the Flambeau Mining Company property near the City of Ladysmith, Rusk County, Wisconsin. This plan was prepared in accordance with the design plans and specifications developed by Foth. Three infiltration basins, drainage swales and adjacent buffers shall be created and planted with native vegetation typical of Northern Wisconsin. Subsequent management activities, including mowing and herbicide treatment shall be performed for the duration of two year post installation to ensure these areas develop into sustainable plant communities.

If you have any questions, or require any additional information, please call me at (715) 736-1438 or Melissa Curran at (920) 558-4393.

Sincerely,

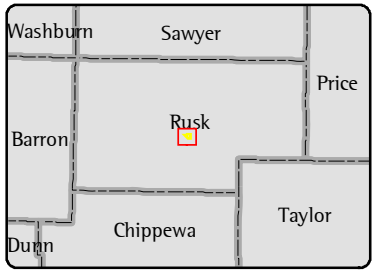
Stantec Consulting Services, Inc.

James W. Engelhardt
Environmental Scientist

Melissa Curran
Environmental Scientist/Botanist

Enclosures: Figure 1 – Project Location and Topography
Figure 2 – Existing Site Conditions
Figure 3 – Surface Water Grading Plan and Vegetative Cover Areas
Figure 4 – Proposed Planting Areas

Figure 1.
Project Location and Topography
Flambeau Mining Company



Map Area Shown in Red

Location

S9, T34N, R6W
Town of Grant, Rusk County, WI

0 1,000 2,000 Feet

Project Information

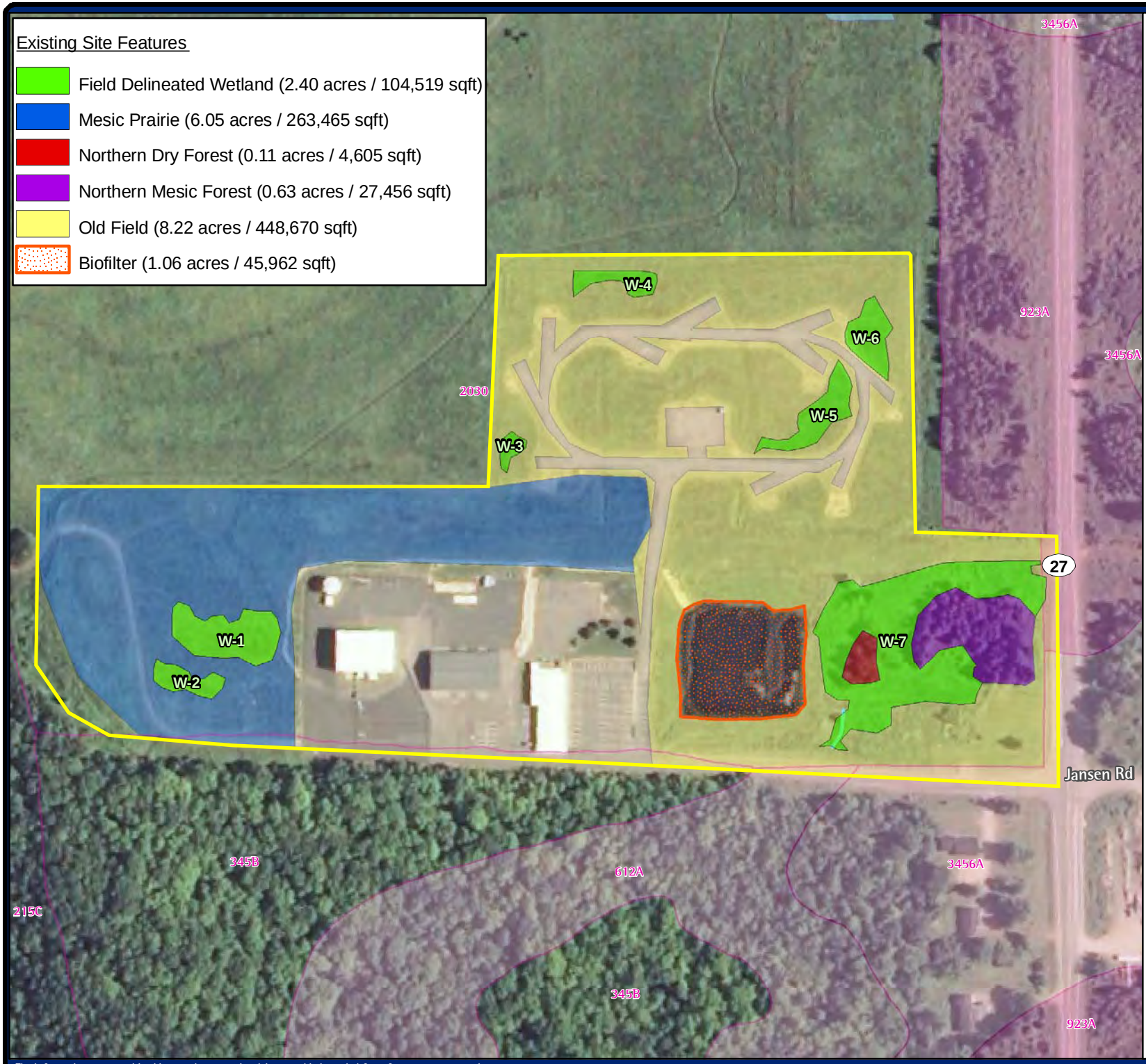
Project Number : 193701172
Modified March 24, 2011

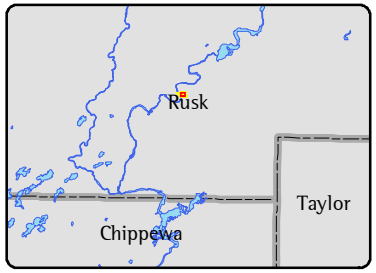
Legend

Approx. Study Area

Stantec
209 Commerce Parkway
P.O. Box 128
Cottage Grove, WI 53527-0128
phone: 608-839-1998
fax: 608-839-1995
www.Stantec.com

Figure 2.
Existing Site Conditions
Flambeau Mining Company





Map Area Shown in Red

Location

S9, T34N, R6W
Town of Grant, Rusk County, WI

0 100 200 Feet

Project Information

Project Number : 193701172
Modified March 24, 2011

Legend

- Approx. Study Area
- Field Delineated Waterway

NRCS Soil Survey Data

- Hydric Soils
- Poss. Hydric Inclusions
- Non-Hydric Soils

DNR 24k Hydrography

- Perennial Stream
- Intermittent Stream
- Waterbody

Stantec
209 Commerce Parkway
P.O. Box 128
Cottage Grove, WI 53527-0128
phone: 608-839-1998
fax: 608-839-1995
www.Stantec.com

NOTES:

1. TOPOGRAPHIC AND PLANIMETRIC DATA PROVIDED BY AERO-METRIC, INC., MINNEAPOLIS, MN. DATE OF FLIGHT: MAY 17, 2008.
2. HORIZONTAL DATUM BASED ON NAD 1983. HORIZONTAL COORDINATES BASED ON WISCONSIN STATE PLANE NORTH (FEET.)

1,681,500 E
1,682,000 E
1,682,500 E
1,683,000 E
101,000 N
100,500 N
N

EXISTING VEGETATED SWALES TO BE ENHANCED
EXISTING STORMWATER DRAINS AND PIPING
EXISTING NATURAL RETENTION AREA
PROPOSED DIVERSION BERM SEE DETAIL (2/6)
BOTTOM ELEVATION AFTER CONTRUCTION = 1134.0
PROPOSED NORTH COPPER PARK INFILTRATION BASIN
OVERFLOW OUTLET
OVERFLOW OUTLET BLOCKED
REMAINING RAILROAD SPUR AND CULVERTS TO BE REMOVED
PROPOSED DRAINAGE SWALES HIGH POINT
REMOVE EXISTING 18" CMP AND REPLACE WITH 24" CMP
PROPOSED VEGETATIVE SWALE SEE DETAIL (1/6)
PROPOSED VEGETATIVE BUFFER (SEDIMENT KNOCK OUT AREA)
BOTTOM ELEVATION AFTER CONTRUCTION = 1138.0
PROPOSED WEST COPPER PARK INFILTRATION BASIN
PROPOSED EAST COPPER PARK INFILTRATION BASIN (BOTTOM ELEVATION AFTER CONSTRUCTION = 1133.0)
APPROXIMATE AREA OF START OF INTERMITTENT STREAM "C" AFTER CONSTRUCTION
EXISTING CMP TO BE REMOVED AND AREA REGRADED
HWY 27
COPPER PARK LANE

LEGEND

- EXISTING SPOT ELEVATION
- EXISTING 2' ELEVATION CONTOURS
- EXISTING FENCE
- EXISTING TREE
- EXISTING TREE LINE
- EXISTING BUILDING
- EXISTING EDGE OF GRAVEL
- EXISTING EDGE OF PAVEMENT
- EXISTING CULVERT LOCATION
- FLAMBEAU MINE AREA BOUNDARY
- INDUSTRIAL OUTLOT LIMITS
- RAILROAD SPUR REMOVAL AREA
- EXISTING VEGETATED SWALE
- PROPOSED VEGETATED BUFFER
- PROPOSED VEGETATED DRAINAGE SWALE
- PROPOSED MAXIMUM WATER LEVEL IN INFILTATION BASINS
- EXISTING NATURAL RETENTION AREA
- PROPOSED DRAINAGE FLOW DIRECTION
- INTERMITTENT STEAM LOCATION
- PROPOSED GRADING CONTOUR

Foth Infrastructure & Environment, LLC

REVISED	DATE	BY	DESCRIPTION

CHECKED BY:	MAN	DATE:	MAY '11
APPROVED BY:	JBH1	DATE:	MAY '11
APPROVED BY:		DATE:	

Foth Infrastructure & Environment, LLC

FLAMBEAU MINING COMPANY

FIGURE 3

SURFACE WATER GRADING PLAN AND VEGETATIVE COVER AREAS

Scale:	0 60' 120'	Date:	MAY, 2011
Prepared By: JRB2		Project No:	08F777

X:\GB\IE\2008\08F777\cad\Stormwater Plan\Figures\Fig_2-2_Grading Plan.dgn
5/13/2011 JRB2

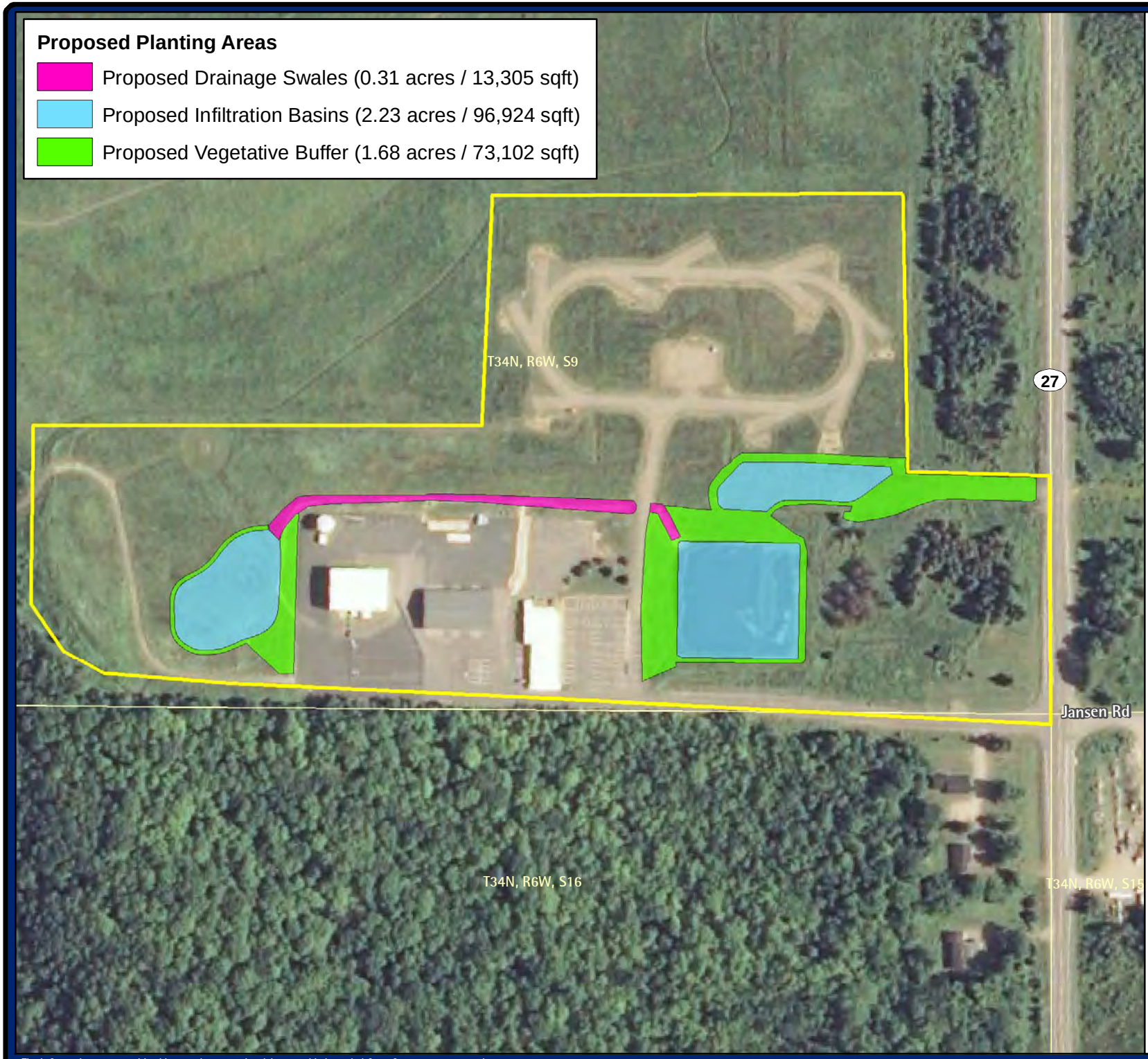
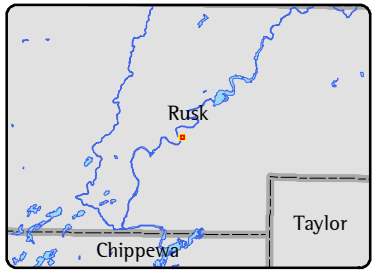


Figure 4.
Proposed Planting Areas

Flambeau Mining Company



Map Area Shown in Red

Location

S9, T34N, R6W
Town of Grant, Rusk County, WI

0 100 200 Feet

Project Information

Project Number : 193701172
Modified March 24, 2011

Legend

- Approx. Study Area (27.38 acres)
- Section Line

DNR 24k Hydrography

- Perennial Stream
- Intermittent Stream
- Waterbody

Stantec
209 Commerce Parkway
P.O. Box 128
Cottage Grove, WI 53527-0128
phone: 608-839-1998
fax: 608-839-1995
www.Stantec.com

Appendix E

Dewatering Plan

Memorandum

May 12, 2011

TO: Jana Murphy, Flambeau Mining Company

CC: Steve Donohue, Foth Infrastructure & Environment, LLC
Sharon V.F. Kozicki, Foth Infrastructure & Environment, LLC
Hank Handzel, DeWitt, Ross & Stevens
Timm Speerschneider, DeWitt, Ross & Stevens
Master File, 08F777-10000

FR: Mike Nimmer, Foth Infrastructure & Environment, LLC
Jim Hutchison, Foth Infrastructure & Environment, LLC

RE: Dewatering Plan, Reclaimed Flambeau Mine Site,
Rusk County, Wisconsin

On behalf of the Flambeau Mining Company (Flambeau), Foth Infrastructure and Environment (Foth) has prepared this memorandum summarizing the dewatering plan associated with the *Copper Park Business and Recreation Area Work Plan* (*Work Plan*) for the Reclaimed Flambeau Mine site in Ladysmith, Wisconsin.

Dewatering Plan Overview

Dewatering will need to occur during the conversion of the 0.9-acre Biofilter to the East Copper Park Infiltration Basin. Dewatering is needed for the following reasons:

1) The ponded water needs to be removed prior to construction activities.
2) Removal of the existing liner will require excavation below the water table.

Dewatering Plan Details

0.9-acre Biofilter Ponded Water Volume

The existing ponded water elevation of the 0.9-acre Biofilter is approximately 1,138.0 feet mean seal level (ft msl). The top of sediment elevation is approximately 1,135.0 ft msl. A conservative estimate of the ponded water volume in the 0.9-acre Biofilter is approximately 900,000 gallons (3.0 ft by 0.9 acres with appropriate unit conversions). The actual volume will be slightly less than this based on side slopes and infilled area.

Biofilter Groundwater Inflow Rate

The basin conversion will involve the excavation of approximately five feet of soil from below the water table in order to remove the existing liner. The liner is located at an elevation of 1,124.0 ft msl, and the water table is at an elevation of approximately 1,129.0 ft msl.

An estimate of water inflow to the basin during excavation can be found using Darcy's Law.

$$Q = K * I * A \quad (1)$$

where:

Q = pumping rate – cubic feet per day (ft^3/day)
K = hydraulic conductivity – feet per day(ft/day)
I = water table gradient – feet per foot (ft/ft)
A = cross-sectional area of flow – square feet (ft^2)

Using a K of 26 ft/day, a gradient of 0.0133 ft/ft, and an area of 5.0 ft x 800 ft (5 feet of drawdown between 1,129.0 and 1,124.0 ft and the basin perimeter of 200 ft per side), the inflow to the excavation is estimated to be 1,386 ft^3/day, or 7.2 gallons per minute (gpm).

As a check, the inflow can also be estimated using the Thiem equation (Schwartz, et al., 2003). Solving for head near the pumping rate (Q), the Thiem equation is as follows:

$$Q = \frac{(h_2^{\,2} - h_1^{\,2})(\pi * K)}{\ln \frac{r_2}{r_1}} \quad (2)$$

where:

Q = pumping rate (ft^3/day)
h_1 = head at distance r_1, or at edge of basin (ft)
h_2 = head at distance r_2, located outside the basin (ft)
r_1 = distance from basin center to basin edge (ft)
r_2 = distance of measured head from basin edge (ft)
K = hydraulic conductivity (ft/day)

Using the following parameters: K = 26 ft/day, h_1 = 0.5 ft, h_2 = 4.5 ft, r_1 = 100 ft, and r_2 = 250 ft, the inflow to the excavation is estimated to be 1,783 ft^3/day, or 9.3 gallons per minute (gpm).

Dewatering Operations

The dewatering operations will be conducted in accordance with the Wisconsin Department of Natural Resources (WDNR) Standard 1061 – Dewatering. Water removed from the 0.9-acre Biofilter will be pumped to the West Copper Park Infiltration Basin (west basin).

The west basin will be excavated to the design depth prior to dewatering activities. However, the basin will not be vegetated prior to being used as storage for the 0.9-acre Biofilter dewatering. It is expected that dewatering activities will add a sediment load to the west basin. Therefore, once the dewatering activities are completed, any sediment accumulated during dewatering will be removed. Then final grading and re-vegetation work in the west basin will be completed.

The west basin will be large enough to contain the water volume pumped from the 0.9-acre Biofilter. Since the west basin will be large enough to store the pumped water volume with zero discharge, the basin will be effective at removing and retaining sediment. Water collected in the west basin will infiltrate and evaporate over time. Once the basin is completely drained, the final grading and re-vegetation work in the west basin will be completed.

Pursuant to WDNR Standard 1061 (Dewatering), a daily log is to be kept during dewatering activities that shall document the following:

- Discharge duration
- Pumping rate
- Water table depth
- Maintenance activities

References

Schwartz, F.W, and H. Zhang. 2003. *Fundamentals of Groundwater*. John Wiley and Sons.

WDNR, 2007. *Dewatering (1061)*. April, 2007. Wisconsin Department of Natural Resources Conservation Practice Standard.

Appendix F

Water Resources Application for Project Permits (Includes Individual Chapter 30 Permit Application)

State of Wisconsin
Department of Natural Resources
dnr.wi.gov

Water Resources Application for Project Permits

Use this form for (check all that apply):

- ☒ Work in public waters (DNR – ch. 30, Wis. Stats.)
- ☐ Work in waters of the U.S (Corps of Engineers)
- ☐ Permit for Wetland Fill (DNR or Corps of Engineers)
- ☐ Storm water NOI – New land disturbing construction activity
  - ☐ Storm water NOI – Renewal FIN #
- ☐ Dam projects (DNR or Corps of Engineers)

Read all instructions provided before completing. If additional space is needed, attach additional pages.

Notice: This form is used to apply for coverage under the state construction site storm water runoff general permit, and to apply for a state or federal permit or certification for waterway and wetland projects or dam projects. This application form is authorized by chs 30 and 31, Wis. Stats, for Alterations to Public Waterways, ch. 281, Wis. Stats, for Wetland Fill and s. 283.33, Wis. Stats., for Storm Water Discharges. Personally identifiable information on this form may be used for other program purposes and may be made available to requestors under Wisconsin's Public Records laws and be posted on the Department website. This form and any required attachments constitute the permit application. Failure to complete and submit this application form may result in a fine and/or imprisonment or forfeiture under the provisions of applicable laws.

Section 1: Applicant Information

Applicant Name (Indiv., Org. or Entity)	Authorized Representative	Title	
Flambeau Mining Company	**Jana Murphy**	**Envr & Reclamation Manager**	
Mailing Address	City	State	Postal Code
N4100 Highway 27	**Ladysmith**	**WI**	**54848**
E-mail address	Telephone Number (include area code)	Fax Number (include area code)	
jana-murphy@clearwire.net	**(715) 532-6690**	**(715) 532-6885**	

Section 2: Landowner Information (if different than Applicant)

Name (Organization or Entity)	Contact Person	Title	
Flambeau Mining, Inc.			
Mailing Address	City	State	Postal Code
N4100 Highway 27	**Ladysmith**	**WI**	**54848**
E-mail address	Telephone Number (include area code)	Fax Number (include area code)	

Section 3: Other Contact Information (check one):

☒ Consultant or Plan Preparer ☐ Contractor ☐ Agent ☐ Other — If Other, specify:

Name (Organization or Entity)	Contact Person	Title	
Foth Infrastructure & Environment	**Brian Stanul**	**Project Environmental Engineer**	
Mailing Address	City	State	Postal Code
1402 Pankratz Street, Suite 300	**Madison**	**WI**	**53704**
E-mail address	Telephone Number (include area code)	Fax Number (include area code)	
brian.stanul@foth.com	**(608) 242-5920**	**(608) 242-5999**	

Section 4: Project or Site Location

Site Name (if any)	County	Municipality
Copper Park Business and Recreation Area Work Plan	**Rusk**	**Grant**
Location Address/Description		
Approximately 500 feet northwest of the intersection of State Highway 27 and Copper Park Lane		☐ City ☐ Village ☒ Township

Section 5: Location Information

Create a map depicting the perimeter of the construction site (land disturbance) and relationship to nearby water resources using the Surface Water Data Viewer http://dnr.wi.gov/org/water/data_viewer.htm or a 7.5-minute series topographic map. You can print the map and then draw the location on the map.

Provide the section, range, township information and if available, the Latitude and Longitude information.

PLSS (Public Land Survey System) **Method**

Quarter-Quarter		Quarter		Section	Township	Range	Direction	If this site is not wholly contained on the quarter-quarter section, more description:
☐ NW	☐ NE	☐ NW	☐ NE	**9**	**34** N	6	☐ E	
☒ SW	☐ SE	☒ SW	☐ SE				☒ W	

Applicant/Project Name: **Copper Park Business and Recreation Area Work Plan** | County: **Rusk**

Latitude and Longitude Method (if available)

	Degrees	Minutes	Seconds	Method of Determining
Latitude	**45**	**26**	**15**	☐ GPS ☒ DNR's Surface Water Data Viewer ☐ Other (specify):
Longitude	**91**	**6**	**44**	

Section 6: Waterways and Wetlands (see Instructions about potential additional application requirements)

Name (description if unnamed) of closest waterbodies	Type	Special status
Intermittent Stream C	☐ Lake ☒ Stream	☐ ORW/ERW ☐ 303(d) listed

Yes No Wetlands:

☒ ☐ Wetlands will be filled, excavated, or disturbed during construction or as part of this project.

The presence of wetlands has been evaluated using: (check all that apply)

☒ Wisconsin Wetlands Inventory ☒ Wetland Delineation (attach report)

☒ Wetland Locator Tool http://dnr.wi.gov/wetlands/locating.html ☐ Soils (NRCS maps) ☐ Other (specify)

Section 7: Project Information (Attach additional sheets as necessary)

Duration:	Anticipated Project Start Date (month/day/year)	Projected Project End Date (month/year)
	07/05/2011	November 2011

Photos: Provide photographs of the "before" condition. Date of Photographs: May 25, 2010

Site Name: **Copper Park Business and Recreation Area Work Plan** | County: **Rusk**

Narrative of the Project:

Provide a one to two paragraph description of the proposed project, including land and water alterations and intended use(s) of the project.

The proposed Copper Park Business and Recreation Area Work Plan project includes the removal of portions of the former railspur west of State Highway 27 and wetland restoration of this area; conversion of the 0.9-acre Biofilter to a stormwater infiltration basin; construction of a stormwater infiltration basin north of the existing 0.9-acre Biofilter; removal of two culverts on Intermittent Stream C underneath the former railspur berm; removal of the small culvert within Intermittent Stream C between Copper Park Lane and the railspur; realignment of Intermittent Stream C; and associated grading, landscaping, erosion and sediment control, and final stabilization activities.

The purpose of this project is to return the property closer to pre-construction conditions by removing man-made structures in and along Intermittent Stream C and restoring wetlands.

This Water Resources Application for Project Permits for work in public waters (DNR – ch. 30 Wis. Stats.) consists of Applications for an Individual Permit for Grading in Excess of 10,000 Square Feet and Stream Realignment and an Application for Wetland Water Quality Certification.

Section 8: Attachments and Permit Access (Include appropriate attachments for each proposed activity.)

The following attachments, together with this form, constitute this permit application: (include all that apply)

Attachment Name(s)

Application for Grading in Excess of 10,000 Square Feet/Application for Stream Realignment (Form 3500-053c/3500-053K), Application for Wetland Water Quality Certification (Form 3500-053N), Fee for Applications to Alter Lakes, Streams or Wetlands (Form 3500-053A)

☒ I have obtained a copy of the construction site storm water runoff general permit from the department's Internet site. http://dnr.wi.gov/runoff/pdf/stormwater/permits/construction/construction_permit_S067831-3.pdf

Section 9: Certification & Permission

Certification: I hereby certify that I am the owner or authorized representative of the owner of the property which is the subject of this Permit Application. I certify that the information contained in this form and attachments is true and accurate. I understand that failure to comply with any or all of the provisions of the permit may result in permit revocation and a fine and/or imprisonment or forfeiture under the provisions of applicable laws.

Permission: I hereby give the Department permission to enter and inspect the property at reasonable times, to evaluate this notice and application, and to determine compliance with any resulting permit coverage.

Name of Owner/Authorized Representative (Print or Type)	Title	Telephone Number
Jana E. Murphy	Environmental & Reclamation Manager	
Signature: Jana E. Murphy		Date Signed: May 12, 2011

Site Name: **Copper Park Business and Recreation Area Work Plan** | County: **Rusk**

LEAVE BLANK - AGENCY USE ONLY

Date Received	Fee Received $	Construction Site ID#	Docket #	Corps #

Initial screening:

☐ Completeness ☐ Historic checked ☐ Rare species (NHI) checked ☐ Wetlands checked

State of Wisconsin
Department of Natural Resources

APPLICATION FOR WETLAND WATER QUALITY CERTIFICATION
Form 3500-53N (R 1/2002)

INFORMATIONAL REQUIREMENTS FOR PRACTICABLE ALTERNATIVES ANALYSIS

All of the questions must be answered in detail and supported with documentation (attach additional sheets if needed).

I. Background/Description of Project

A. Describe the purpose and need for the project.

The purpose of the Copper Park Business and Recreation Work Plan Project is to return the property closer to pre-construction conditions and restore wetlands.

B. Is your project an expansion of existing work or is it new construction? Explain.

New construction.

C. When did you start to develop a plan for your project?

The Project work plan has been in development since 2010.

D. Explain why the project must be located in or adjacent to wetlands.

The relocation of Intermittent Stream C and the wetland restoration of the former railspur are wetland dependent activities.

II. Alternatives (your analysis should address the following questions).

A. How could you redesign or reduce your project to avoid the wetland, and still meet your basic project purpose?

Because the Project is wetland dependent, there are no alternatives that avoid impact to wetlands. The Project has been designed to minimize fill activities in the wetlands.

B. Other sites

1. What geographical area(s) was searched for alternative sites?

   N/A

2. Were other sites considered?

   N/A

3. Have you sold any lands in recent years that are located within the vicinity of the project? If so, why were they unsuitable for the project?

   N/A

C. For each of the alternatives you identified, explain why you eliminated the alternative from consideration (include cost comparisons, logistical, technological, and any other reasons).

N/A

D. What are the consequences of not building the project? (include social and economic consequences):

The consequences of not building this Project are that the Property is not returned closer to pre-construction conditions, and wetlands in the Project Area will not be restored.

If you have chosen an alternative that would result in wetland impacts:

E. Summarize why your alternative was selected.

Please refer to the Wetland Restoration Plan.

F. Explain what you plan to do to minimize adverse effects on the wetlands during your project (e.g. erosion control, best management practices, setbacks, etc.).

Please refer to the Wetland Restoration Plan.

State of Wisconsin
Department of Natural Resources
(Return to appropriate DNR Regional/Service Center Office)

State / Federal Application for Water Regulatory Permits and Approvals

Form 3500-053 (R 4/01)

PLEASE COMPLETE BOTH PAGES 1 & 2 OF THIS APPLICATION. PRINT OR TYPE. The Department requires use of this form for any application filed pursuant to Chapter 30, Wis. Stats. The Department will not consider your application unless you complete and submit this application form. Personally identifiable information on this form will not be used for any other purpose, but it must be made available to requesters under Wisconsin's open records law [s. 19.31-19.39, Wis. Stats.].

1. Applicant (Individual or corporate name): Flambeau Mining Company
   Address: N4100 Highway 27
   City, State, Zip Code: Ladysmith, WI 54848
   Fire Number:
   Telephone No. (Include area code): (715) 532-6690
   Tax Parcel Number: 014-00270-0000

2. Agent/Contractor (firm name): Foth Infrastructure & Environment, LLC
   Address: 2737 S. Ridge Road, Suite 600
   City, State, Zip Code: Green Bay, WI 54307
   Telephone No. (Include area code): (920) 497-2500

3. If applicant is not owner of the property where the proposed activity will be conducted, provide name and address of owner and include letter of authorization from owner. Owner must be the applicant or co-applicant for structure, diversion and stream realignment activities.

Owner's Name	Address	City, State, Zip Code
Flambeau Mining, Inc.	N4100 Highway 27	Ladysmith, WI 54848

4. Is the applicant a business? [X] Yes [ ] No
   If YES, is the permit or approval you are applying for necessary for you to conduct this business in the State of Wisconsin? [ ] Yes [X] No
   If YES, please explain why (attach additional sheets if necessary):

5. Project Locatiou
   Address: N4100 Highway 27
   Village/City/Town: Ladysmith, WI
   Fire Number: _____ Tax Parcel Number: 014-00270-0000
   Waterway: Unnamed referred to as Intermittent Stream C
   County: Rusk
   Govt. Lot _____ OR SW 1/4, SW 1/4, of Section 9,
   Township 34 North, Range 6 (East) (West)

6. Adjoining Riparian (Neighboring Waterfront Property Owner) Information

Name of Riparian	Address	City, State, Zip Code
#1 Flambeau Mining, Inc.	N4100 Highway 27	Ladysmith, WI 54848
#2		

7. Projeet Information (Attach additional sheets if necessary)
   (a) Describe proposed activity (include how this project will be constructed)
   See attached narrative
   (b) Purpose, need and intended use of project
   See attached narrative
   (c) I have applied for or received permits from the following agencies: (Check all that apply)
   [ ] Municipal [ ] County [X] Wis. DNR [ ] Corps of Engineers
   (d) Date activity will begin if pennit is issued July 2011; be completed: November 2011.
   (e) Is any portion of the requested project now complete? [ ] Yes [X] No
   If yes, identify the completed portion on the enclosed drawings and indieate here the date activity was completed:

I hereby certify that the information contained herein is true and aceurate. I also certify that I am entitled to apply for a permit, or that I am the duly authorized representative or agent of an applicant who is entitled to apply for a permit. Any inaccurate information submitted may result in permit revocation, the imposition of a forfeiture(s) and requirement of restoration.

Signature of Applieant(s) or Duly Authorized Agent	Date Signed
Jana E. Murphy	May 12, 2011

LEAVE BLANK - FOR RECEIVING AGENCY USE ONLY

Corps of Engineers Process No.	Wisconsin DNR File No.	
Received By	Date Received	Date Application Was Complete

State / Federal Application for Water Regulatory Permits and Approvals

Form 3500-053 (R 4/01)

Drawings of proposed activity should be prepared in accordance with sample drawing.

Proposed Materials

Location Sketch (Indicate scale)
Show route to project site: include nearest main road and crossroad.

N 1" = _____ ft.

Fire Number _____

See Attached Figures

Project Plans (Include top view and typical cross sections. Clearly identify features and dimensions or indicate scale.)
Use additional sheets if necessary.

N 1" = _____ ft.

Top View

See Attached Figures

Cross Section

Fee for Applications to Alter Lakes, Streams or Wetlands

FEE INFORMATION

Information about Fees for Applications to Alter Lakes, Streams or Wetlands

State law requires that the Department charge a fee for processing your request to make changes to public waters and wetlands. The Department begins review of each application for completeness only after the correct fee is received. Please review the application information for the activity you are applying for in order to determine the correct fee. This information is available on the Department's web site at www.dnr.wi.gov under the topic Waterway and Wetland Permits.

*** Please see Page 8 of this Application for Applicable Fees ***

*** COMPLETE BOTH SIDES OF THIS FORM AND SUBMIT WITH YOUR APPLICATION ***

For purposes of determining permit application fees, a "single project" is defined as an activity that affects a single waterway, waterbody or wetland within a single county. **After exemption determinations and general permit deadlines are met, individual applications are reviewed on a first in - first out basis.**

An optional **expedited decision process** is available for a supplemental fee of $2000. The expedited permit review guarantees a decision by a mutually agreed-upon date between the applicant and the Department. If you wish to request an expedited permit review, submit a letter with your application describing the time frame that will meet your needs, along with a check for the applicable permit fee and a separate check for the supplemental fee. Supplemental fees are based on county boundaries. If your project involves alterations to the landscape in 2 separate counties your supplemental fee will be $4,000. (The supplemental fee funds permit reviewers specifically designated for expedited decision-making). Within twenty days we will respond in writing, specifying any additional information needed for an expedited decision on your proposal, and the date by which we can make a decision once the application is complete.

After-the-fact applications, for permits or approvals submitted after work has been commenced or completed, require twice the usual fee. Projects started or completed without obtaining the appropriate permits are subject to enforcement actions (e.g. monetary forfeitures, mandatory abatement, mandatory restoration).

Refunds of standard fees are made only if the applicant withdraws their application and requests a refund before we determine that the application is complete.

Note: Personally identifiable information on this form is not used for any other purpose than filing of this application but it may be made available to requesters under Wisconsin's open records law [s. 19.31-19.39, Wis. Stats.].

Activity Applied for	Amount Enclosed
Individual Permit for Grading in Excess of 10,000 Square Feet, Individual Permit for Stream Realignment, Application for Wetland Water Quality Certification	$ 1,500.00 Make checks payable to "Wisconsin DNR"

LEAVE BLANK – DEPARTMENT OF NATURAL RESOURCES USE ONLY		
Fee Received $_____	☐ Check ☐ Money Order	Check/Order Number
Received by		Docket Number

Fee for Applications to Alter Lakes, Streams or Wetlands

Please review the permit application materials closely to see if your project is eligible for a General Permit (GP) or an Individual Permit (IP). This will make a difference in your fee, and in the permit processing time. For projects that require multiple permits or approvals, use the right hand columns to calculate your total fee. **The following projects do not require fees:** Waterway projects funded in whole or in part by any Federal or State agency, dam or wetland projects conducted by any Federal or State agency.

Activity	Quantity	Amount	Subtotal
Activities requiring a $50 fee:			
GP for biological shore erosion control structure			
GP for boat landing (public only)			
GP for clear-span bridge			
GP for dredging- manual or less than 25 cubic yards from a river or stream			
GP for dredging- plant and animal nuisance removal in "outlying waters"			
GP for dredging - previously permitted drainage district maintenance			
GP for dry fire hydrant			
GP for fish crib, half log, spawning reef, tree drop, wing deflector)			
GP for ford			
GP for piling			
GP for pond-landscape (not located in a wetland)			
GP for pond-wildlife / wetland conservation (meeting criteria in NR 353.04 and NR 353.05)			
GP for new riprap on moderate and high energy lakes and flowages			
GP for riprap repair or replacement on inland lakes and flowages			
GP for seawall replacement or seawall replacement with riprap or vegetated armoring			
GP for temporary in-stream crossing			
GP for weed rake			
GP for wildlife habitat structure (nesting structure)			
Boathouse / fixed houseboat repair certification			
Total Quantity		x $50	= $
Activities requiring a $300 fee:			
GP for a new culvert			
GP for dredging-each open trench utility crossing or dredging a previously dredged area			
GP for grading greater than 10,000 square feet on the bank			
GP for intake-outfall structure			
GP for pond-stormwater			
Total Quantity		x $300	= $
Activities requiring a $300 fee:			
Individual Permit (IP) for fish/wildlife habitat structures			
IP for non-metallic mining in Marathon County			
IP for piling			
Boathouse certification for an exception	single project	$300	= $300
Permits requiring a $500 fee:			
All Individual Permits (IP) unless otherwise specified			
Dam construction or modification approval	2	$500	= $1,000
Dam transfer ownership and/or financial responsibility approval			
Declaratory rulings			
Municipal bulkhead line approval			
Water level or flow order			
Water Quality Certification (e.g. wetland draining, dredging, filling)	single project	$500	= $500
	Subtotal	$	
After-the-fact Permit Fee: double the applicable fee (these fees are non-refundable)		$	
Optional Request for Expedited Permit Decision: Supplement Fee of $2000 per county		$	
Make checks payable to "Wisconsin DNR" TOTAL	3	$ 500	=$1,500

Attachment 1

Property Deed

Transmission Line Easement vol. 465 pg. 284 and vol. 465 pg. 292
Stipulation - Vol. 260 - p. 285 - 291
Certificate of Compliance - Vol. 270 p 305 thru 325

222744 VOL 260 PAGE 270

DEED
(Flambeau Project)

KENNECOTT MINERALS COMPANY, a Delaware corporation (hereinafter designated "Grantor"), hereby quitclaims to FLAMBEAU MINING INC., a Delaware corporation, whose address is 10 East Temple, P.O. Box 11248, Salt Lake, Utah 84147 (hereinafter designated "Grantee"), for the sum of Ten Dollars ($10.00) and other good and valuable consideration, the receipt and sufficiency of which are hereby acknowledged by Grantor, the following described real property, and including all patented mining claims and unpatented mining claims and interests therein and all riparian and littoral rights pertaining thereto (herein designated the "Subject Properties") situated in Grant Township, Rusk County, State of Wisconsin:

See Exhibit A attached hereto
and hereby incorporated herein.

For the same consideration, Grantor hereby transfers and conveys or agrees to cause to be transferred or conveyed to Grantee, without warranty, any and all additional right, title or interest in or to the Subject Properties which Grantor may now have or at any time hereafter acquire.

IN WITNESS WHEREOF, Grantor has caused its corporate name and seal to be hereunto affixed this 30th day of June, 1989. 22nd day of June, 1989, to be effective the 1st day of June, 1989.

KENNECOTT MINERALS COMPANY

TRANSFER
$ 17.00
FEE

By: G. J. Dunn
Title: Vice President

ATTEST:

By: P.S. Gibbs
P.S. Gibbs
Title: Assistant Secretary

REGISTER'S OFFICE } SS.
RUSK COUNTY }
Received for Record the 30th
day of June A D 1989
at 2:00 o'clock P M and
recorded in Vol. 260 of
Records on page 270-275
Mary Lu Reid
Mary Lu Reid
Register of Deeds

MICRO

4

EXHIBIT A

The Northeast Quarter of the Northeast Quarter, the Northwest Quarter of the Southeast Quarter, the Southeast Quarter of the Southeast Quarter, the Southeast Quarter of the Southwest Quarter of Section Eight (8), Township Thirty-five (35) North, Range Six (6) West.

The Northeast Quarter of the Northeast Quarter, the Northwest Quarter of the Northeast Quarter, that part of the Northwest Quarter of the Northwest Quarter lying East of the Railroad right-of-way, that part of the Northeast Quarter of the Northwest Quarter lying West of the Railroad right-of-way, the Northwest Quarter of the Northwest Quarter, the Southwest Quarter of the Northwest Quarter, that part of the Southeast Quarter of the Northwest Quarter lying West of the Railroad right-of-way, that part of the Southeast Quarter of the Northwest Quarter lying East of the Railroad right-of-way, the Southwest Quarter of the Northeast Quarter, the Southeast Quarter of the Northeast Quarter of Section Seventeen (17), Township Thirty-five (35) North, Range Six (6).

The Northeast Quarter of the Northeast Quarter of Section Eighteen (18), Township Thirty-five (35) North, Range Six (6) West.

Located in the Township of Flambeau, Rusk County, State of Wisconsin.

STATE OF Ohio)
)
Cuyahoga COUNTY)

On this, the 23rd day of June, 1989, before me, the undersigned officer, personally appeared G.J. Dunn, P.S. Gibbs and _____, who acknowledged themselves to be the Vice President and Asst. Secretary, respectively, of KENNECOTT MINERALS COMPANY, a corporation, and that they, as such officers, being authorized so to do, executed the foregoing instruments on behalf of said corporation, for the purposes therein contained.

IN WITNESS WHEREOF, I have set hereunto my hand and official seal.

[NOTARIAL SEAL]

Name: Eileen Gawlik
Notary Public, _____ County
STATE OF _____
My Commission:

EILEEN GAWLIK
Notary Public, State of Ohio
Recorded in Cuyahoga County
My Comm. Expires 10-23-90

This instrument was drafted by and after recording should be returned to David S. Lott, Foley & Lardner, 777 East Wisconsin Avenue, Milwaukee, Wisconsin 53202.

EXHIBIT A

The real estate premises are described as follows:

The South one-half of the South one-half of the Northeast Quarter of the Northeast Quarter, the Northwest Quarter of the Northeast Quarter, except beginning at the Northeast (NE) corner of said Northwest Quarter of the Northeast Quarter, thence West along the South line of the existing road Four Hundred Ten (410') feet, thence South Two Hundred Twelve and 5/10 (212.5') feet, thence East Four Hundred Ten (410') feet, thence North Two Hundred Twelve and 5/10 (212.5') feet to the point of beginning, the Southeast Quarter of the Northeast Quarter, the Northeast Quarter of the Southeast Quarter, the Southeast Quarter of the Southeast Quarter, Government Lots Three (3), Four (4), Five (5), Six (6), Seven (7), and Eight (8), Section Nine (9), Township Thirty-four (34) North, Range Six (6) West.

That part of the Northwest Quarter of the Northeast Quarter lying East of the Railroad, Section Ten (10), Township Thirty-four (34) North, Range Six (6) West, except that part of Lot One (1) of Certified Survey Map, Page 284; That part of Government Lot Seven (7), Section Three (3), Township Thirty-four (34), Range Six (6) West lying West of Railroad, that Part of the Northwest Quarter of the Northeast Quarter of Section Ten (10), Township Thirty-four (34) North, Range Six (6) West lying West of Railroad; that Part of the Southwest Quarter of the Northeast Quarter lying East of Railroad, that Part of the Southwest Quarter of the Northeast Quarter lying West of Railroad, the Southeast Quarter of the Northeast Quarter, the NOrtheast Quarter of the Northwest Quarter, that Part of the Northwest Quarter of the Northwest Quarter lying East of State Highway 27, excepting parcels described as follows:

A parcel in the Northwest Quarter of the Northwest Quarter commencing at the Northeast corner, thence 200 feet West, thence 66 feet South, thence 200 feet East, thence 66 feet North to the point of beginning; and

Commencing at the intersection of the South right-of-way line of a Town Road with the East right-of-way line of State Highway 27; thence Southerly along said East right-of-way line 175 feet, thence Easterly at right angle, 150 feet, thence Northerly at right angles and parallel to said East right-of-way line, 215 feet to the South line of Town Road, thence Westerly along town road 156 feet, to the point of beginning; and

Commencing at the intersection of the South right-of-way line of a Town Road with the East right-of-way line of State Highway 27, thence Southerly along said East right-of-way line, 175 feet, to the point of beginning of the land to be herein described; thence Southerly along the East line of Highway 208.7 feet, thence Easterly at right angles, 208.7 feet, thence Northerly at right angles and parallel to said East right-of-way line, 208.7 feet; thence Westerly at right angles, 208.7 feet to the point of beginning.

The Southwest Quarter of the Northwest Quarter, the Southeast Quarter of the Northwest Quarter, the Northeast Quarter of ths Southwest Quarter, the Northwest Quarter of the Southwest Quarter, the Southwest Quarter of the Southwest Quarter, the Southeast Quarter of the Southwest Quarter, the Northeast Quarter of the Southeast Quarter, the Northwest Quarter of the Southeast Quarter lying East of Railroad, the Northwest Quarter of the Southeast Quarter lying West of Railroad, the Southwest Quarter of the Southeast Quarter lying East of Railroad, the Southweet Quarter of the Southeast Quarter lying West of Railroad, the Southeast Quarter of the Southeast Quarter of Section Ten (10), Township Thirty-four (34) North, Range Six (6) West.

Government Lots One (1), Two (2) except a parcel of land lying within Government Lot Two (2), Section Sixteen (16), Township Thirty-four (34) North, Range Six (6) West described as follows: Commencing at the Northwest corner of said Section Sixteen (16), said corner baing the center line of North and South Town Road and intersection of East and West fence, thence North 89°0'E along the North line of Section Sixteen (16) a distance of 594.4 feet; thence South 37°30'E a distance of 2860.9 feet; thence South 56°15'E a distance of 341.1 feet to the point of beginning; thence South 33°45'W a distance of 50.0 feet, thence South 56°15'E a distance of 197.0 feet to an intersection with the Northwesterly edge of the Flambeau River; thence North 37°11'E a distance of 50.09 feet; thence North 27°17'E a distance of 150.96 feet, thence North 56°15'W a distance of 183.0 feet; thence South 33°45'W a distance of 150.0 feet to the point of beginning, Three (3),

Four (4), Five (5), Six (6) except a parcel of land lying within Government Lot Six (6), Section Sixteen (16), Township Thirty-four (34) North, Range Six (6) West, said parcel being more particularly described as follows: Commencing at the southeast corner of said Section Sixteen (16), said corner being the intersection of the corner line of State Highway 27 and the center line of County Road T, thence north no (0) degrees, three (03) minutes west along the center line of State Highway 27 a distance of eight hundred forty and one-tenths (840.0) feet; thence north fifty-three (53) degrees fifty-one (51) minutes west a distance of eighteen hundred fifty-four and two-tenths (1854.2) feet; thence north fifty-six (56) degrees, fifteen (15) minutes west a distance of six hundred forty-seven and no-tenths (647.0) feet to the point of beginning; thence south thrity-three (33) degrees forty-five (45) minutes west a distance of fifty and no-tenths (50.0) feet; thence north fifty-six (56) degrees, fifteen (15) minutes west a distance of one hundred ninety eight and two-tenths (198.2) feet to an intersection with the southeasterly edge of the Flambeau River; thence north thirty-one (31) degrees, forty-one (41) minutes east a distance of fifty and three one-hundredths (50.03) feet; thence north thirty (30) degrees forty (40) minutes east a distance of one hundred fifty and twenty-two one-hundredths (150.22) feet, thence south fifty-six (56) degrees, fifteen (15) minutes east a distance of two hundred eight and 08/100 (208.08) feet, thence south thirty-three (33) degrees, forty-five (45) minutes west a distance of one hundred fifty and no-tenths (150.0) feet to the point of beginning, Seven (7), and Eight (8); the Northwest Quarter of the Northwest Quarter, the Northeast Quarter of the Southeast Quarter, the Southwest Quarter of the Southeast Quarter, the Southeast Quarter of the Southeast Quarter of Section Sixteen (16), Township Thirty-four (34) North, Range Six (6) West.

Government Lots Three (3), Four (4), Five (5), Six (6), and Seven (7), the Northeast Quarter of the Northeast Quarter, the Northwest Quarter of the Northeast Quarter, of Section Seventeen (17), Township Thirty-four (34) North, Range Six (6) West.

The Northeast Quarter of the Northeast Quarter, the Southwest Quarter of the Northeast Quarter, the Southeast Quarter of the Northeast Quarter, the East one-half of the East one-half of the Northwest Quarter, the Northeast Quarter of the Southeast Quarter of Section Twenty (20), Township Thirty-four (34) North, Range Six (6) West.

the Southwest Quarter of the Southeast Quarter,

The Northeast Quarter of the Northeast Quarter, the Northwest Quarter of the Northeast Quarter, the Southwest Quarter of the Northeast Quarter, the Southeast Quarter of the Northeast Quarter, the Northeast Quarter of the Northwest Quarter, the Northwest Quarter of the Northwest Quarter, the Southwest Quarter of the Northwest Quarter, the Southeast Quarter of the Northwest Quarter, the Northeast Quarter of the Southwest Quarter, the Northwest Quarter of the Southwest Quarter, the Northeast Quarter of the Southeast Quarter, the Northwest Quarter of the Southeast Quarter, the Southwest Quarter of the Southeast Quarter of Section Twenty-one (21), Township Thirty-four (34) North, Range Six (6) West.

The Southwest Quarter of the Northwest Quarter, and the Northwest Quarter of the Southwest Quarter of Section Twenty-two (22), Township Thirty-four (34) North, Range Six (6) West.

Located in the City of Ladysmith, and Township of Grant, Rusk County, State of Wisconsin.

Attachment 2

Site Photographs

Foth

PHOTOGRAPHIC LOG

Facility Name:	Site Location:	Project No.
Copper Park Business & Rec. Area	Ladysmith, WI	08F777

Photo No.	Date:
1	5/25/10

Direction Photo Taken:

East

Description:

Existing Biofilter Basin.

Photo No.	Date:
2	5/25/10

Direction Photo Taken:

East

Description:

Railspur and wetland area to north.

Foth

PHOTOGRAPHIC LOG

Facility Name:	Site Location:	Project No.
Copper Park Business & Rec. Area	Ladysmith, WI	08F777

Photo No.	Date:
3	5/25/10

Direction Photo Taken:

Northeast

Description:

Existing Biofilter Basin.

Photo No.	Date:
4	5/25/10

Direction Photo Taken:

South

Description:

East side of Existing Biolfilter berm and Copper Park Lane.

Foth

PHOTOGRAPHIC LOG

Facility Name:	Site Location:	Project No.
Copper Park Business & Rec. Area	Ladysmith, WI	08F777

Photo No.	Date:
5	5/25/10

Direction Photo Taken:

South

Description:

Intermittent Stream C, Biofilter, and Copper Park Lane.

Photo No.	Date:
6	5/25/10

Direction Photo Taken:

West

Description:

Existing railspur.

Foth

PHOTOGRAPHIC LOG

Facility Name:	Site Location:	Project No.
Copper Park Business & Rec. Area	Ladysmith, WI	08F777

Photo No.	Date:
7	5/25/10

Direction Photo Taken:

West

Description:

Existing railspur.

Photo No.	Date:
8	5/25/10

Direction Photo Taken:

Northeast

Description:

Wetland area to the north and east of the railspur.

Foth

PHOTOGRAPHIC LOG

Facility Name:	Site Location:	Project No.
Copper Park Business & Rec. Area	Ladysmith, WI	08F777

Photo No.	Date:
9	5/25/10

Direction Photo Taken:

West

Description:

Existing railspur.

Attachment 3

Project Narrative

Project Description

The proposed project includes the removal of portions of the former rail spur west of State Highway 27 and wetland restoration of this area; conversion of the 0.9-acre Biofilter to a stormwater infiltration basin; construction of a stormwater infiltration basin north of the existing 0.9-acre Biofilter; removal of two culverts on Intermittent Stream C underneath the former rail spur berm; removal of the small culvert within Intermittent Stream C between Copper Park Lane and the railspur; realignment of Intermittent Stream C; and associated grading, landscaping, erosion and sediment control, and final stabilization activities.

The purpose of this project is to return the property closer to pre-construction conditions by removing man-made structures in and along Intermittent Stream C and restore historical wetlands.

During previous reviews of the site by the WDNR, Intermittent Stream C was determined to be a navigable waterway. While Flambeau does not agree with this determination, under such an interpretation the portion of the proposed project in the vicinity of the Intermittent Stream C stream bank would require a permit for work in public waters under Chapter 30 Wis. Stats. and Chapters NR 310 and 341, Wis. Adm. Code.

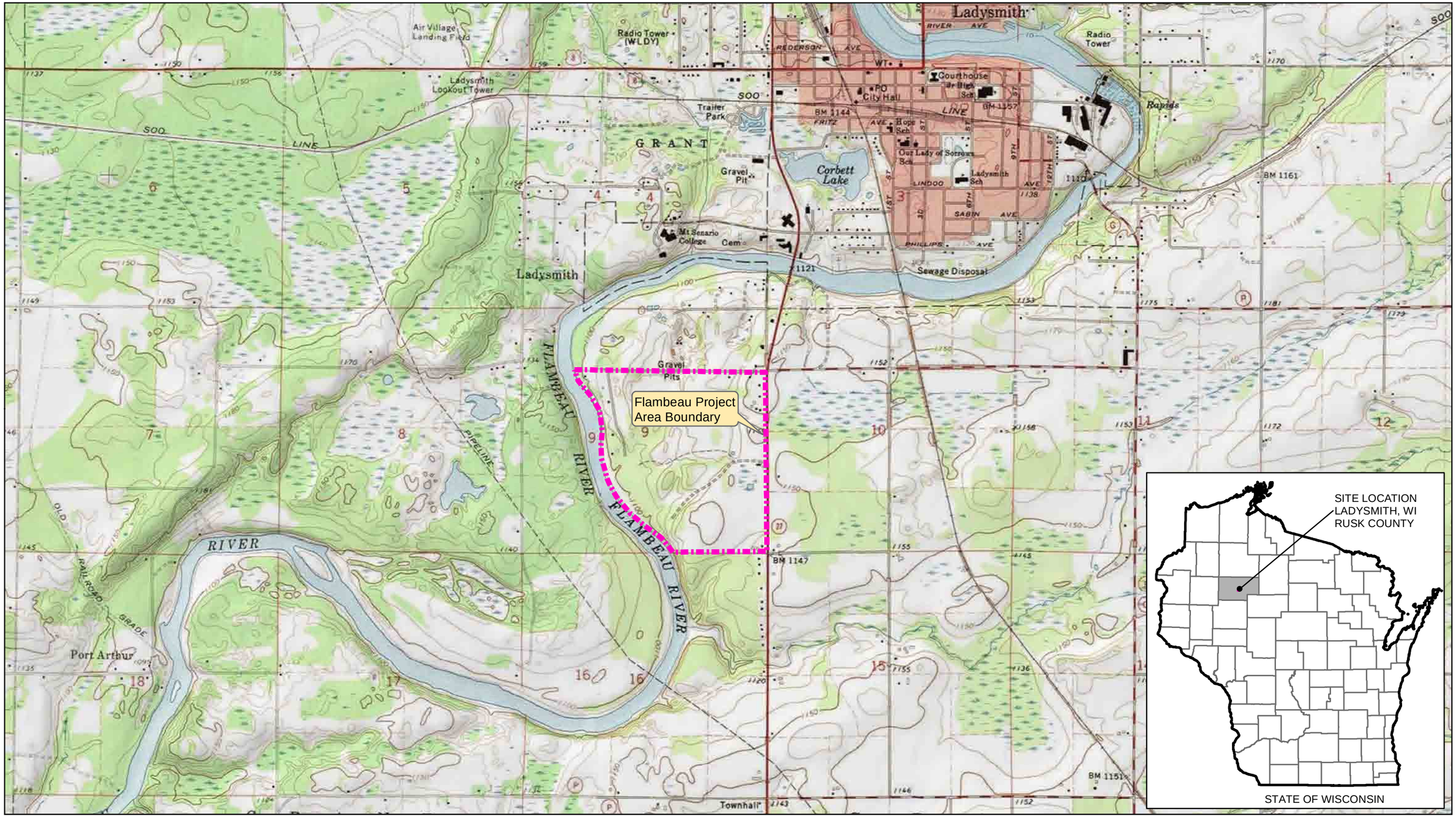
Work within 300 feet of the stream bank of Intermittent Stream C includes the removal of portions of the former rail spur west of Highway 27 and wetland restoration of this area; construction of a stormwater infiltration basin north of the existing 0.9 acre Biofilter; removal of two culverts on Intermittent Stream C underneath the former rail spur berm; removal of the 0.9-acre Biofilter outlet; removal of the small culvert within Intermittent Stream C between Copper Park Lane and the rail spur; realignment of Intermittent Stream C; and associated grading, landscaping, erosion and sediment control, and final stabilization activities. The locations of the proposed activities are shown on Figures 1, 2, 3, and 4 and proposed erosion and sediment control details are included in Figures 5 through 7. The site grading plan is described in detail in Section 3.1 of the Work Plan (submitted with this permit application). The *Erosion Control and Stormwater Management Design Plan*, located in Appendix B of the Work Plan, also contains more detailed descriptions of the proposed erosion and sediment control BMPs for this project and stormwater design calculations. A copy of the Property deed is provided as Attachment 1, photographs of the existing site conditions are included in Attachment 2, five copies of Form 3500-053C/3500-053K, and five copies of the site drawings are also included with this permit application.

Proposed erosion control BMPs for this project include stone tracking pads, inlet protection, ditch checks, vegetative buffers, silt fencing, erosion mat, and the use of the infiltration basins as sediment basins during construction activities.

The existing stream bank and the ordinary high water mark for Intermittent Stream C were determined by analyzing the existing site topography in compliance with ch. NR 341.035, Wis. Adm. Code. Based on the topographic analysis, the rail spur removal and associated grading will disturb approximately 11,000 square feet of the stream bank within 75 feet of the ordinary high water mark along Intermittent Stream C, therefore, according to the Department's position, an Individual Permit for Grading in Excess of 10,000 Square Feet would be required for this project. Also, according to the Department's position, the removal of two culverts and the realignment of Intermittent Stream C requires an Individual Permit for Stream Realignment. This submittal also includes an Application for Wetland Water Quality Certification. The Work Plan and the *Wetlands Restoration Plan* are provided to show compliance with the wetland water quality standards of ch. NR 103, Wis. Adm. Code.

Attachment 4

Site Drawings



NOTES

1. Horizontal datum based on NAD 1983.
   Horizontal coordinates based on Wisconsin State Plane North (Feet).

LEGEND

Flambeau Project Area Boundary

N

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REVISED	DATE	BY	DESCRIPTION

CHECKED BY:	SVF	DATE:	MAY '11
APPROVED BY:	JBH1	DATE:	MAY '11
APPROVED BY:		DATE:	

FLAMBEAU MINING COMPANY

FIGURE 1
FLAMBEAU MINE
WETLAND RESTORATION PLAN
SITE LOCATION MAP

Scale: 0 1,000 2,000 Feet

Date: MAY, 2011

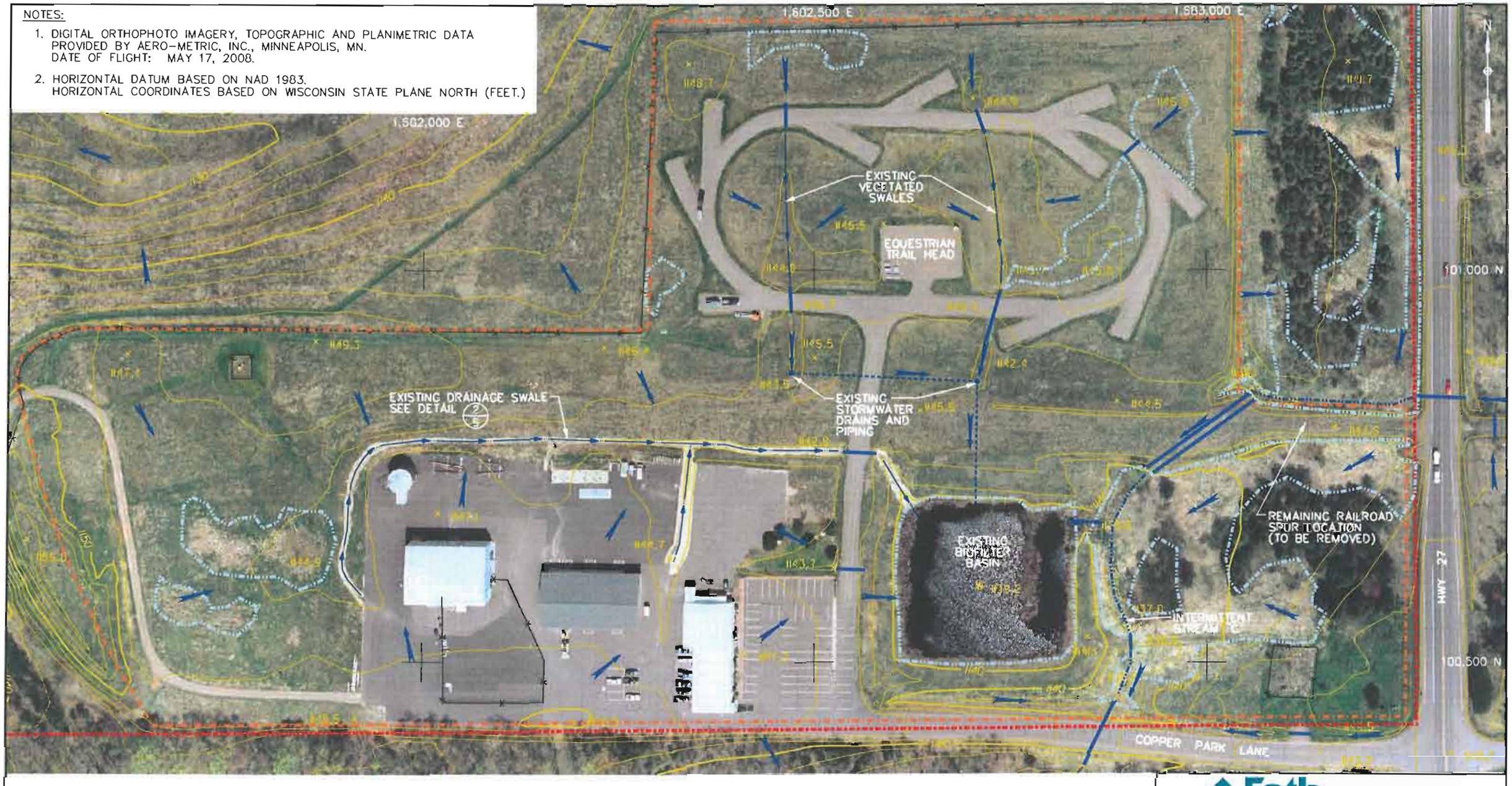
Prepared by: DAT

Project No: 08F777

Path: X:\GB\E\2008\08F777\GIS\mxd\SWMP2011\SWMP_USGS.mxd Date: 5/12/2011

NOTES:

1. DIGITAL ORTHOPHOTO IMAGERY, TOPOGRAPHIC AND PLANIMETRIC DATA PROVIDED BY AERO-METRIC, INC., MINNEAPOLIS, MN.
   DATE OF FLIGHT: MAY 17, 2008.
2. HORIZONTAL DATUM BASED ON NAD 1983.
   HORIZONTAL COORDINATES BASED ON WISCONSIN STATE PLANE NORTH (FEET.)



LEGEND

- EXISTING SPOT ELEVATION
- EXISTING 2' ELEVATION CONTOURS
- EXISTING FENCE
- FLAMBEAU MINE AREA BOUNDARY
- INDUSTRIAL OUTLOT LIMITS
- INTERMITTENT STEAM LOCATION
- FIELD DELINEATED WETLAND BOUNDARY
- EXISTING CULVERT LOCATION
- EXISTING DRAINAGE LOCATION AND FLOW DIRECTION
- EXISTING WATER FLOW DIRECTION

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REVISED	DATE	BY	DESCRIPTION

CHECKED BY:	SVF	DATE: MAY '11
APPROVED BY:	JBH1	DATE: MAY '11
APPROVED BY:		DATE:

Foth
Foth Infrastructure & Environment, LLC

FLAMBEAU MINING COMPANY

FIGURE 2

EXISTING SITE CONDITIONS

Scale: 0 60' 120' | Date: MAY, 2011

Prepared By: JRB2 | Project No: 08F777

X:\GB\IE\2008\08F777\cad\Stormwater Plan\Figures\Fig_2-1_Existing Conditions.dgn

NOTES:

1. TOPOGRAPHIC AND PLANIMETRIC DATA PROVIDED BY AERO-METRIC, INC., MINNEAPOLIS, MN. DATE OF FLIGHT: MAY 17, 2008.
2. HORIZONTAL DATUM BASED ON NAD 1983. HORIZONTAL COORDINATES BASED ON WISCONSIN STATE PLANE NORTH (FEET.)

1,681,500 E
1,682,000 E
1,682,500 E
1,683,000 E
101,000 N
100,500 N
N
HWY 27
COPPER PARK LANE

EXISTING VEGETATED SWALES TO BE ENHANCED
EXISTING NATURAL RETENTION AREA
PROPOSED DIVERSION BERM SEE DETAIL 2/6
EXISTING STORMWATER DRAINS AND PIPING
BOTTOM ELEVATION AFTER CONTRUCTION = 1134.0
PROPOSED NORTH COPPER PARK INFILTRATION BASIN
PROPOSED DRAINAGE SWALES HIGH POINT
REMOVE EXISTING 18" CMP AND REPLACE WITH 24" CMP
PROPOSED VEGETATIVE SWALE SEE DETAIL 1/6
PROPOSED VEGETATIVE BUFFER (SEDIMENT KNOCK OUT AREA)
BOTTOM ELEVATION AFTER CONTRUCTION = 1138.0
PROPOSED WEST COPPER PARK INFILTRATION BASIN
PROPOSED EAST COPPER PARK INFILTRATION BASIN (BOTTOM ELEVATION AFTER CONSTRUCTION = 1133.0)
OVERFLOW OUTLET
OVERFLOW OUTLET BLOCKED
REMAINING RAILROAD SPUR AND CULVERTS TO BE REMOVED
APPROXIMATE AREA OF START OF INTERMITTENT STREAM "C" AFTER CONSTRUCTION
EXISTING CMP TO BE REMOVED AND AREA REGRADED

LEGEND

- EXISTING SPOT ELEVATION
- EXISTING 2' ELEVATION CONTOURS
- EXISTING FENCE
- EXISTING TREE
- EXISTING TREE LINE
- EXISTING BUILDING
- EXISTING EDGE OF GRAVEL
- EXISTING EDGE OF PAVEMENT
- EXISTING CULVERT LOCATION
- FLAMBEAU MINE AREA BOUNDARY
- INDUSTRIAL OUTLOT LIMITS
- RAILROAD SPUR REMOVAL AREA
- EXISTING VEGETATED SWALE
- PROPOSED VEGETATED BUFFER
- PROPOSED VEGETATED DRAINAGE SWALE
- PROPOSED MAXIMUM WATER LEVEL IN INFILTATION BASINS
- EXISTING NATURAL RETENTION AREA
- PROPOSED DRAINAGE FLOW DIRECTION
- INTERMITTENT STEAM LOCATION
- PROPOSED GRADING CONTOUR

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REVISED	DATE	BY	DESCRIPTION

CHECKED BY:	MAN	DATE:	MAY '11
APPROVED BY:	JBH1	DATE:	MAY '11
APPROVED BY:		DATE:	

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FIGURE 3

GRADING PLANS AND VEGETATIVE COVER AREAS

Scale:	0 60' 120'	Date:	MAY, 2011
Prepared By:	JRB2	Project No:	08F777

X:\GB\IE\2008\08F777\cad\Stormwater Plan\Figures\Fig_2-2_Grading Plan.dgn

NOTES:

1. TOPOGRAPHIC AND PLANIMETRIC DATA PROVIDED BY AERO-METRIC, INC., MINNEAPOLIS, MN. DATE OF FLIGHT: MAY 17, 2008.
2. HORIZONTAL DATUM BASED ON NAD 1983. HORIZONTAL COORDINATES BASED ON WISCONSIN STATE PLANE NORTH (FEET.)

1,681,500 E
1,682,000 E
1,682,500 E
1,683,000 E
101,000 N
100,500 N
N
HWY 27
COPPER PARK LANE

EXISTING VEGETATED SWALES TO BE ENHANCED
EXISTING NATURAL RETENTION AREA
INSTALL INLET PROTECTION SEE DETAIL 3/6
EXISTING STORMWATER DRAINS AND PIPING
BOTTOM ELEVATION AFTER CONTRUCTION = 1134.0
PROPOSED NORTH COPPER PARK INFILTRATION BASIN
CAP STORMWATER DRAIN
PROPOSED DRAINAGE SWALES HIGH POINT
REMOVE EXISTING 18" CMP AND REPLACE WITH 24" CMP
PROPOSED VEGETATIVE SWALE SEE DETAIL 1/6
PROPOSED VEGETATIVE BUFFER (SEDIMENT KNOCK OUT AREA)
OVERFLOW OUTLET
BOTTOM ELEVATION AFTER CONTRUCTION = 1138.0
PROPOSED WEST COPPER PARK INFILTRATION BASIN
PROPOSED EAST COPPER PARK INFILTRATION BASIN (BOTTOM ELEVATION AFTER CONSTRUCTION = 1133.0)
PROPOSED STONE TRACKING PADS SEE DETAIL 2/7
APPROXIMATE AREA OF START OF INTERMITTENT STREAM "C" AFTER CONSTRUCTION
PROPOSED SILT FENCE LOCATION SEE DETAIL 1/5
INSTALL INLET PROTECTION
PROPOSED ROCK FILLED FILTER BAG DITCH CHECK LOCATIONS SEE DETAIL 1/8

LEGEND

- EXISTING SPOT ELEVATION
- EXISTING 2' ELEVATION CONTOURS
- EXISTING FENCE
- EXISTING BUILDING
- EXISTING EDGE OF GRAVEL
- EXISTING EDGE OF PAVEMENT
- EXISTING CULVERT LOCATION
- FLAMBEAU MINE AREA BOUNDARY
- INDUSTRIAL OUTLOT LIMITS
- PROPOSED STONE TRACKING PADS
- PROPOSED EROSION BALES LOCATION
- PROPOSED SILT FENCE LOCATION
- EXISTING VEGETATED SWALE
- PROPOSED VEGETATED BUFFER
- PROPOSED VEGETATED DRAINAGE SWALE
- PROPOSED MAXIMUM WATER LEVEL IN INFILTATION BASINS
- EXISTING NATURAL RETENTION AREA
- PROPOSED GRADING CONTOUR
- PROPOSED DRAINAGE FLOW DIRECTION
- PROPOSED FLOW DIRECTION
- INTERMITTENT STEAM LOCATION

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REVISED	DATE	BY	DESCRIPTION

CHECKED BY:	MJP1	DATE:	MAY '11
APPROVED BY:	JBH1	DATE:	MAY '11
APPROVED BY:		DATE:	

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FIGURE 4

EROSION CONTROL AND SURFACE WATER MANAGEMENT PLAN

Scale:	0 60' 120'	Date:	MAY, 2011
Prepared By:	JRB2	Project No:	08F777

X:\GB\IE\2008\08F777\cad\Stormwater Plan\Figures\Fig_2-3_Surface Water Plan.dgn

NOTES:

1. TOPOGRAPHIC AND PLANIMETRIC DATA PROVIDED BY AERO-METRIC, INC., MINNEAPOLIS, MN. DATE OF FLIGHT: MAY 17, 2008.
2. HORIZONTAL DATUM BASED ON NAD 1983. HORIZONTAL COORDINATES BASED ON WISCONSIN STATE PLANE NORTH (FEET.)

1,682,000 E
1,682,500 E
1,683,000 E
101,000 N
100,500 N
N

PROPOSED ENHANCED VEGETATED SWALES
INSTALL INLET PROTECTION SEE DETAIL 3/6
EXISTING STORMWATER DRAINS AND PIPING
PROPOSED DRAINAGE SWALES HIGH POINT
PROPOSED 24" CMP
CAP STORMWATER DRAIN
PROPOSED NORTH COPPER PARK INFILTRATION BASIN
PROPOSED VEGETATIVE SWALE SEE DETAIL 1/6
OVERFLOW OUTLET
OVERFLOW OUTLET BLOCKED
PROPOSED DIVERSION BERM
PROPOSED WEST COPPER PARK INFILTRATION BASIN
PROPOSED EAST COPPER PARK INFILTRATION BASIN
APPROXIMATE AREA OF START OF INTERMITTENT STREAM "C" AFTER CONSTRUCTION
HWY 27
COPPER PARK LANE

LEGEND

- EXISTING SPOT ELEVATION (× 1147.1)
- EXISTING 2' ELEVATION CONTOURS (1150)
- EXISTING FENCE
- EXISTING TREE
- EXISTING TREE LINE
- EXISTING BUILDING
- EXISTING EDGE OF GRAVEL
- EXISTING EDGE OF PAVEMENT
- EXISTING CULVERT LOCATION
- FLAMBEAU MINE AREA BOUNDARY
- INDUSTRIAL OUTLOT LIMITS
- WEST SEDIMENTATION DRAINAGE BASIN
- EAST SEDIMENTATION DRAINAGE BASIN
- NORTH SEDIMENTATION DRAINAGE BASIN
- PROPOSED DRAINAGE FLOW DIRECTION
- PROPOSED FLOW DIRECTION
- PROPOSED GRADING CONTOUR (1140)

Foth Infrastructure & Environment, LLC

REVISED	DATE	BY	DESCRIPTION

CHECKED BY:	MAN	DATE: MAY '11
APPROVED BY:	JBH1	DATE: MAY '11
APPROVED BY:		DATE:

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FIGURE 5

POST CONSTRUCTION DRAINGAGE BASINS

Scale: 0 60' 120'
Date: MAY, 2011
Prepared By: JRB2
Project No: 08F777

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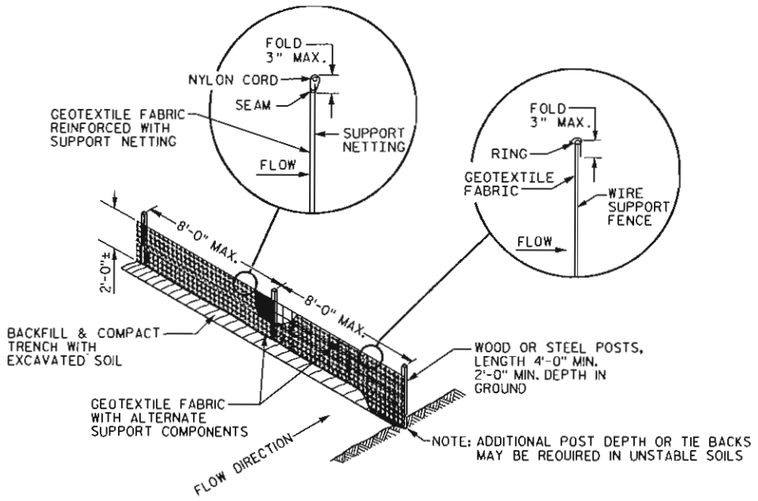
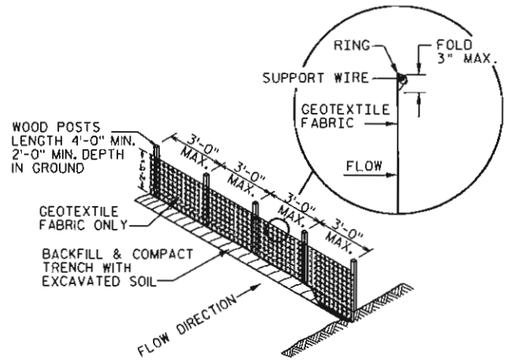
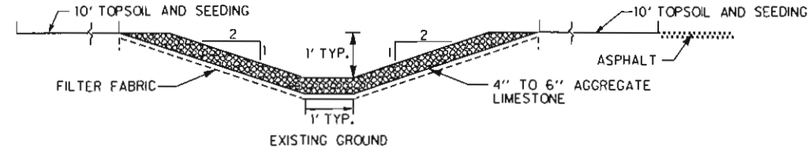


ALTERNATE "A"

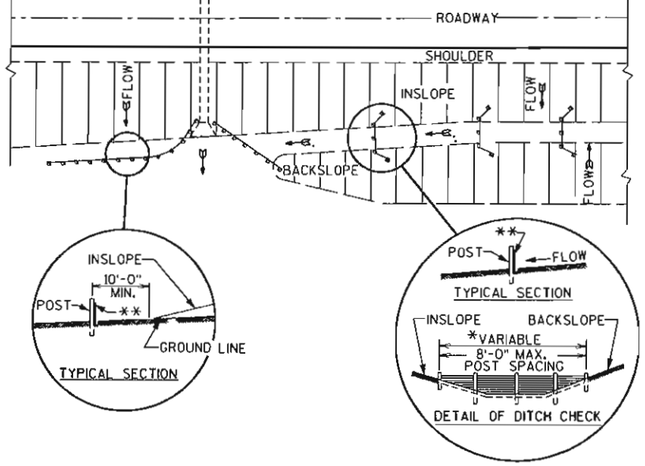


ALTERNATE "B"

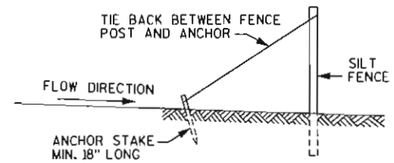


2/5 TYPICAL EXISTING PERIMETER DRAINAGE DITCH DETAIL

NOT TO SCALE

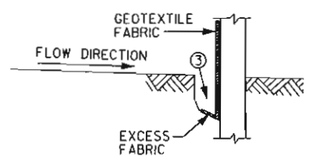


PLAN – AT CULVERTS



SILT FENCE TIE BACK DETAIL

(WHEN REQUIRED)



FABRIC ANCHOR TRENCH DETAIL

1/5 PROPOSED SILT FENCE DETAIL

NOT TO SCALE

GENERAL NOTE:

THE SILT FENCE SHOULD BE CONSTRUCTED IN AN ARC OR HORSESHOE SHAPE, WITH THE ENDS POINTING UPSLOPE TO MAXIMIZE BOTH STRENGTH AND EFFECTIVENESS.

Erosion Control Plan During Construction

Best Management Practices (BMPs) address erosion control during construction. The BMPs will be maintained during project construction and as appropriate throughout the life of the project.

Best Management Practices (BMPs)
The project has been designed with an efficient storm water collection system that routes storm water to infiltration basins.

BMPS to be implemented follow the materials and methods specified in ch NR 151, WIS Adm code and are summarized below:

Silt fencing will be installed before construction activity begins. Fencing will envelope the entire border of the project.

Land clearing will be performed taking care not to disturb areas beyond the clearing and grubbing limits. Clearing (removing trees) and grubbing (removing stumps and roots) will be performed in a single operation, as necessary, to minimize disturbance. Unmarketable timber, herbaceous plants, dead wood, stumps, and other vegetation will be disposed of by the contractor. Stumps too large to chip will be stockpiled and burned on-site with appropriate burn permits. Contractor is required to obtain all necessary burn permits.

Topsoil stripping and stockpiling and excess soil stockpiling will be performed on the site. Topsoil is defined as the A-horizon of the soil in which organic matter accumulates. Any material not placed will be stockpiled in a prepared area that has silt fencing installed around the entire stockpile. Piles will be developed with side slope shallower than a ratio of 3 horizontal to 1 vertical (3H:1V) to minimize erosion. Conventional earth-moving equipment will be used. Seeding will take place after the stockpile surface is roughened (i.e. driving a bulldozer up and down the slope to leave a pattern of track imprints parallel to the slope contours). Seeding will be accomplished in accordance with WDNR standard #1059 "seeding". Seed mixtures will include temporary species such as oats or perennial rye grass that germinate quickly and act as a nurse crop until the perennial species germinate and mature.

Ditch installation will be performed at the appropriate time to route storm water runoff to the basins. Mulching and seeding will take place as soon as possible to maintain ditch surfaces. Rock-filled filter bags, erosion bales, and erosion mats will be used as needed.

Installation of gravel/aggregate on vehicle traffic areas will be constructed in accordance with details and sections from the drawings and specifications. Traffic area of the main facility will be lined with gravel.
During construction, BMPs will be maintained daily and undergo formal inspection.

Foth Infrastructure & Environment, LLC

REVISED	DATE	BY	DESCRIPTION

CHECKED BY:	MJP1	DATE:	MAY '11
APPROVED BY:	JBH1	DATE:	MAY '11
APPROVED BY:		DATE:	

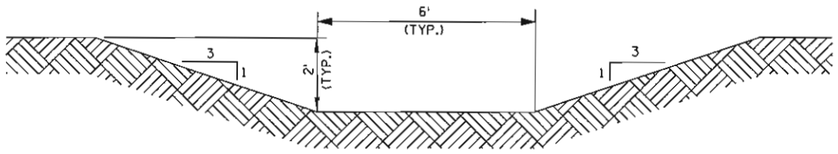
Foth Infrastructure & Environment, LLC

FLAMBEAU MINING COMPANY

FIGURE 6
EROSION CONTROL DETAILS
(1 of 4)

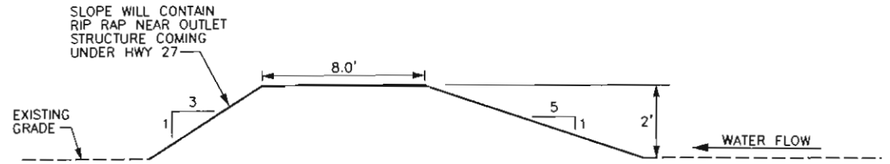
Scale:	NOT TO SCALE	Date:	MAY, 2011
Prepared By:	JRB2	Project No:	08F777

X:\GB\IE\2008\08F777\cad\Stormwater Plan\Figures\Fig_2-5_Erosion_control-1_details.dgn



1/6 TYPICAL PROPOSED DRAINAGE DITCH DETAIL

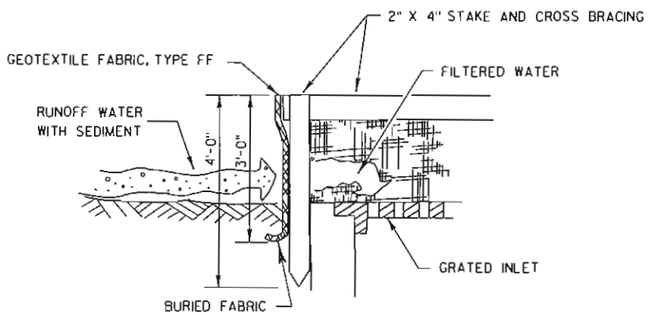
NOT TO SCALE

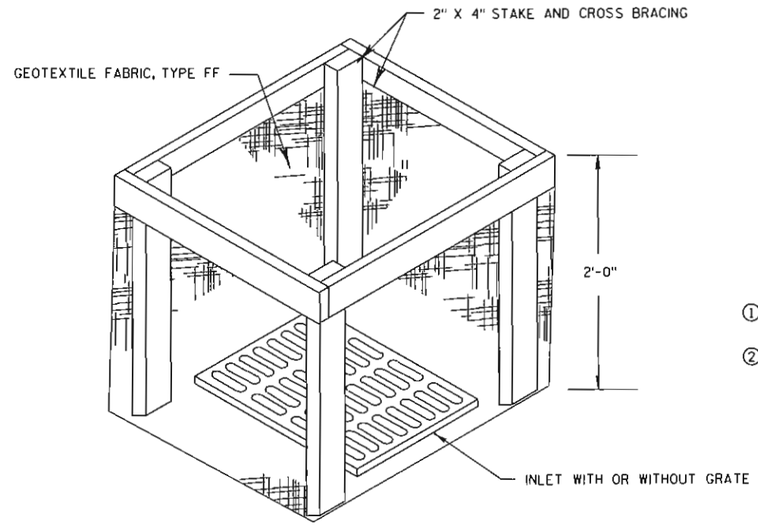


2/6 TYPICAL PROPOSED DIVERSION BERM DETAIL

NOT TO SCALE

NOTE: ATTACH GEOTEXTILE FABRIC, TYPE FF TO THE TOP OF STAKES AND CROSS BRACINGS.





3/6 PROPOSED INLET PROTECTION DETAIL

NOT TO SCALE

GENERAL NOTES:

FABRIC SHALL BE REPLACED AT THE ENGINEERS DISCRETION.

MANUFACTURED ALTERNATIVES APPROVED AND LISTED ON THE DEPARTMENT'S EROSION CONTROL PRODUCT ACCEPTIBILITY LIST MAY BE SUBSTITUTED FOR THE INLET PROTECTION TYPE SPECIFIED.

WHEN REMOVING OR MAINTAINING INLET PROTECTION, CARE SHALL BE TAKEN SO THAT THE SEDIMENT TRAPPED ON THE GEOTEXTILE FABRIC DOES NOT FALL INTO THE INLET. ANY MATERIAL FALLING INTO THE INLET SHALL BE REMOVED IMMEDIATELY.

① FABRIC SIZE SHALL BE 8" (MIN) GREATER ON ALL SIDES OF THE INLET COVER TO PROVIDE A HAND HOLD WHEN MAINTENANCE OR REMOVAL IS REQUIRED.

② FOR INLET PROTECTION, TYPE C, WITH A CURB BOX, AN ADDITIONAL 18" OF FABRIC IS WRAPPED AROUND THE WOOD AND SECURED WITH STAPLES. THE WOOD SHALL NOT BLOCK THE ENTIRE HEIGHT OF THE CURB BOX.

Foth Infrastructure & Environment, LLC

REVISED	DATE	BY	DESCRIPTION

CHECKED BY:	MJP1	DATE: MAY '11
APPROVED BY:	JBH1	DATE: MAY '11
APPROVED BY:		DATE:

Foth Infrastructure & Environment, LLC

FLAMBEAU MINING COMPANY

FIGURE 7

EROSION CONTROL DETAILS
(2 of 4)

Scale: NOT TO SCALE	Date: MAY, 2011
Prepared By: JRB2	Project No: 08F777

X:\GB\IE\2008\08F777\cad\Stormwater Plan\Figures\Fig.2-6_Erosion_control-2_details.dgn

GENERAL NOTES

VARIATIONS IN THE DIMENSIONS OR MATERIALS SHOWN HEREON MAY BE PERMITTED IF THEY PROVIDE EQUIVALENT PROTECTION AND MATERIAL STRENGTH AND IF PRIOR APPROVAL OF THE ENGINEER IS OBTAINED.

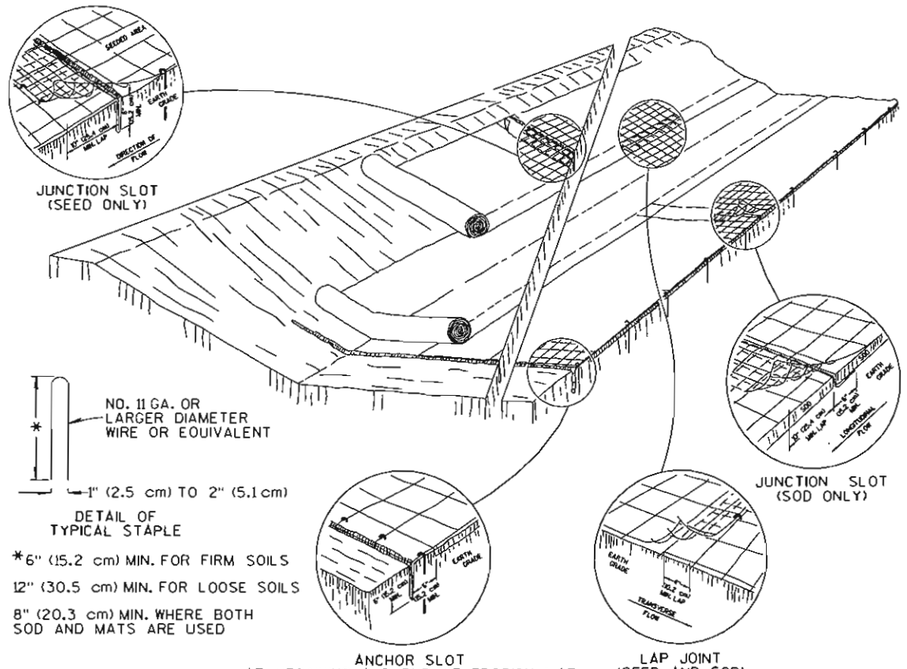
PLACE LAP JOINTS IN THE BOTTOM OF V-SHAPED DITCHES.

STAGGER JUNCTION SLOTS ON ADJACENT STRIPS OF MATTING A MINIMUM OF 4 FEET (1.219 m) APART.

EDGES OF THE EROSION MAT SHALL BE IMPRESSED IN THE SOIL.

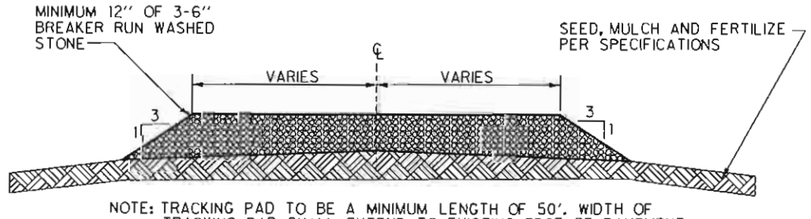
EROSION MAT OVER SEEDING

JUNCTION OR ANCHOR SLOTS SHALL BE AT MINIMUM INTERVALS OF 100 FEET (30.48 m) ON GRADES UP TO AND INCLUDING 3 PERCENT, AND 50 FEET (15.24 m) ON GRADES EXCEEDING 3 PERCENT.



4/7 PROPOSED EROSION MAT

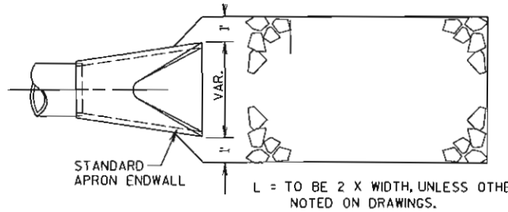
NOT TO SCALE

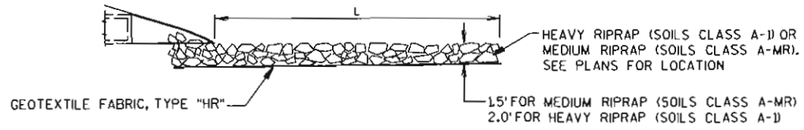


NOTE: TRACKING PAD TO BE A MINIMUM LENGTH OF 50'. WIDTH OF TRACKING PAD SHALL EXTEND TO EXISTING EDGE OF PAVEMENT.

2/7 PROPOSED TYPICAL TRACKING PAD

NOT TO SCALE





3/7 PROPOSED RIPRAP DETAIL

NOT TO SCALE

Foth Infrastructure & Environment, LLC

REVISED	DATE	BY	DESCRIPTION

CHECKED BY:	MJP1	DATE: MAY '11	
APPROVED BY:	JBH1	DATE: MAY '11	
APPROVED BY:		DATE:	

Foth Infrastructure & Environment, LLC

FLAMBEAU MINING COMPANY

FIGURE 8

EROSION CONTROL DETAILS
(3 of 4)

Scale:	NOT TO SCALE	Date:	MAY, 2011
Prepared By:	JRB2	Project No:	08F777

X:\GB\IE\2008\08F777\cad\Stormwater Plan\Figures\Fig_2-7_Erosion_control-3_details.dgn

GENERAL NOTES:

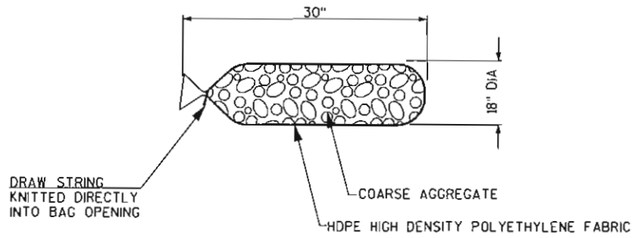
1. 18" X 30" ROCK FILLED FILTER BAG SHALL BE COMPRISED OF THE FOLLOWING:
   a. HDPE HIGH DENSITY POLYETHYLENE
   b. HDPE HIGH DENSITY POLYETHYLENE DRAW STRING KNITTED DIRECTLY INTO BAG OPENING.
   c. 80% FABRIC CLOSURE WITH APPARENT OPENING SIZE NO LARGER THAN 1/8" X 1/8"
   d. ROLLED SEAM USING A MINIMUM OF 480 DENIER POLYESTER SEWING YARN FOR STRENGTH AND DURABILITY.

AGGREGATE TO BE WELL GRADED COURSE AGGREGATE CONFORMING TO THE FOLLOWING GRADATION REQUIREMENTS:

SIEVE SIZE	SIZE NO. AASHTO No. 67 [B]
2 INCH (50 mm)	-
1 1/2 INCH (37.5mm)	-
1INCH (25.0 mm)	100
3/4 INCH (19.0mm)	90-100
3/8 INCH (9.5mm)	20-55
No. 4 (4.75mm)	0-10
No. 8 (2.36mm)	0-5

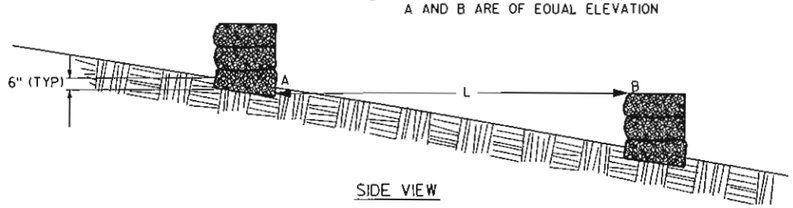
[B] SIZE No. ACCORDING TO AASHTO M 43

COURSE AGGREGATE INFORMATION



FILTER BAG DETAIL
(PRIOR TO INSTALLATION)

CROSS SECTIONAL VIEW



SIDE VIEW

DITCH CHECK DETAIL

1/8 PROPOSED ROCK FILLED FILTER BAG
NOT TO SCALE

Foth Infrastructure & Environment, LLC			
REVISED	DATE	BY	DESCRIPTION

CHECKED BY:	MJP1	DATE: MAY '11
APPROVED BY:	JBH1	DATE: MAY '11
APPROVED BY:		DATE:

Foth Infrastructure & Environment, LLC

FLAMBEAU MINING COMPANY

FIGURE 9

EROSION CONTROL DETAILS
(4 of 4)

Scale: NOT TO SCALE	Date: MAY, 2011
Prepared By: JRB2	Project No: 08F777

X:\GB\IE\2008\08F777\cad\Stormwater Plan\Figures\Fig_2-8_Erosion_control-4_details.dgn

Appendix G

Wisconsin Department of Transportation
Application to Work on Highway Right-of-Way

APPLICATION/PERMIT TO WORK ON HIGHWAY RIGHT-OF-WAY

Wisconsin Department of Transportation (WisDOT)
DT1812 6/2006 s.86.07(2), 86.16 and other applicable Wis. Stats.

To each copy of the application, attach one copy of the sketch showing location.

Location Description - quarter section, section, township, range, etc.	Proposed Work Location	
SW 1/4 1/4, SW 1/4, Sec 9, T34N, R6W	☒ Town ☐ Village ☐ City of Grant	
	County Rusk	
Aoplicant Name and Address	Starting Date	Highway
Flambeau Mining Inc. N4100 Hwy 27 Ladysmith WI 54848	July 5, 2011	☒ STH 27
	Completion Date November 30, 2011	☐ USH
		☐ Interstate

Type of Work Proposed

The proposed Copper Park Business and Recreation Area Work Plan includes the removal of remaining portions of the railspur west of Highway 27 and wetland restoration and associated grading, landscaping, erosion and sediment control, and final stabilization activities.

The purpose of this project is to remove sediment containing copper from the 0.9-acre biofilter, return the property closer to pre-mining conditions by removing man-made structures in and along Intermittent Stream C and restoring historical wetlands, and enhance stormwater management across the Project Area.

Work in the vicinity of the stream bank of Intermittent Stream C includes the removal of portions of the railspur west of Highway 27 and associated grading, landscaping, erosion and sediment control, and final stabilization activities. The locations of the proposed activities are shown on Figures 1, 2, and 3 and proposed erosion and sediment control details are included in Figures 4 through 8.

Proposed erosion control BMPs for this project include stone tracking pads, inlet protection, ditch checks, vegetative buffers, silt fencing, erosion mat, and the use of the infiltration basins as sediment basins during construction activities.

It is understood and agreed that approval is subject to the applicant's full compliance with the pertinent Statutes, as well as any codes, rules, regulations, and permit requirements of other jurisdictional agencies. The applicant shall also comply with all permit provisions, superimposed notes, and detail drawings, which may be added by WisDOT. Any alteration of this form by the applicant is prohibited and may be cause to revoke this permit.

Foth Infrastructure & Environment, LLC

(Main Contractor, If applicable) Jim Hutchison

Jim Hutchison, P.E. Lead Environmental Engineer
(Contractor Representative/Title)

920-497-2500
(Office Telephone Number) (Cellular Telephone Number)

X Jana E. Murphy

(Applicant or Authorized Representative) (Date)
(If Computer-filled, Brush Script Font)

Jana Murphy Environmental & Reclamation Manager
(Printed Name) (Title)

715-532-6690
(Telephone Number)

* If the work described is not completed by the "Completion Date" specified, this permit is null and void and the work shall not be completed unless authorized through a subsequent permit or an approved time extension.

Transportation Regional Location and Telephone Number

Date Application Received by WisDOT

☐ The applicant shall contact the Transportation Regional Office at the Telephone Number given at right NOT LESS THAN 3 WORKING DAYS prior to the start of the permitted work to arrange for a Regional Representative to locate and mark the existing traffic signal lines. No work under this permit shall be accomplished prior to the Regional Representative's arrival.

Special Telephone Number

Wisconsin Department of Transportation Permit Approval

☐ This permit is issued in conjunction with:

☐ This permit voids and supersedes: Permit # Issued

Permit Number	Issuance Date

X _____

(WisDOT Authorized Representative)
(If Computer-filled, Brush Script Font)

THIS PERMIT IS REVOCABLE

INDEMNIFICATION

The Applicant shall save and hold the State, its officers, employees, agents, and all private and governmental contractors and subcontractors with the State under Chapter 84 Wisconsin Statutes, harmless from actions of any nature whatsoever (including any by Applicant itself) which arise out of, or are connected with, or are claimed to arise out of or be connected with any of the work done by the Applicant, or the construction or maintenance of facilities by the Applicant, pursuant to this permit or any other permit issued by the State for location of property, lines or facilities on highway right-of-way, (1) while the Applicant is performing its work, or (2) while any of the Applicant's property, equipment, or personnel, are in or about such place or the vicinity thereof, or (3) while any property constructed, placed or operated by or on behalf of Applicant remains on the State's property or right-of-way pursuant to this permit or any other permit issued by the State for location of property, lines or facilities on highway right-of-way; including without limiting the generality of the foregoing, all liability, damages, loss, expense, claims, demands and actions on account of personal injury, death or property loss to the State, its officers, employees, agents, contractors, subcontractors or frequenters; to the Applicant, its employees, agents, contractors, subcontractors, or frequenters; or to any other persons, whether based upon, or claimed to be based upon, statutory (including, without limiting the generality of the foregoing, worker's compensation), contractual, tort, or whether or not caused or claimed to have been caused by active or inactive negligence or other breach of duty by the State, its officers, employees, agents, contractors, subcontractors or frequenters; Applicant, its employees, agents, contractors, subcontractors or frequenters; or any other person. Without limiting the generality of the foregoing, the liability, damage, loss, expense, claims, demands and actions indemnified against shall include all liability, damage, loss, expense, claims, demands and actions for damage to any property, lines or facilities placed by or on behalf of the Applicant pursuant to this permit or any other permit issued by the State for location of property, lines or facilities on highway right-of-way in the past or present, or that are located on any highway or State property or right-of-way with or without a permit issued by the State, for any loss of data, information, or material; for trademark, copyright or patent infringement; for unfair competition or infringement of personal or property rights of any kind whatever. The Applicant shall at its own expense investigate all such claims and demands, attend to their settlement or other disposition, defend all actions based thereon and pay all charges of attorneys and all other costs and expenses of any kind arising from any such liability, damage, loss, claims, demands and actions.

Any transfer, whether voluntary or involuntary, of ownership or control of any property constructed, placed or operated by or on behalf of the Applicant that remains on the State's property or right-of-way pursuant to this permit shall not release Applicant from any of the indemnification requirements of this permit, unless the State is notified of such transfer in writing. Any acceptance by any other person or entity, whether voluntary or involuntary, of ownership or control of any property constructed, placed or operated by or on behalf of the Applicant that remains on the State's property or right-of-way pursuant to this permit, shall include acceptance of all of the indemnification requirements of this permit by the other person or entity receiving ownership or control.

Notwithstanding the foregoing, a private contractor or subcontractor with the State under Chapter 84 Wisconsin Statutes, that fails to comply with sections 66.047 and 182.0175 Wisconsin Statutes (1985-1986), remains subject to the payment to the Applicant of the actual cost of repair of intentional or negligent damage by the contractor or subcontractor to any property, lines or facilities placed by or on behalf of the Applicant pursuant to this permit or any other permit issued by the State for location of property, lines or facilities on highway right-of-way, and remains subject to payment to the Applicant for losses due to personal injury or death resulting from negligence by the contractor or subcontractor.

Notwithstanding the foregoing, if the State, or its officers, employees and agents, fail to comply with sections 66.047 and 182.0175 Wisconsin Statutes (1985-1986), the State or its officers, employees and agents, remain subject to the payment to the Applicant of the actual cost of repair of willful and intentional damage by the State, or its officers, employees and agents, to any property, lines or facilities placed by or on behalf of the Applicant pursuant to this permit or any other permit issued by the State for location of property, lines or facilities on highway right-of-way, and remain subject to payment to the Applicant for losses due to personal injury or death resulting from negligence by the State, its officers, employees and agents.

No indemnification of private contractors or subcontractors with the State under Chapter 84 Wisconsin Statutes, shall apply in the event of willful and intentional damage by such private contractors or subcontractors to the property, lines and facilities of the Applicant located on the highway right-of-way pursuant to this permit or any other permit issued by the State for the location of property, lines or facilities on highway right-of-way.

PERMIT PROVISIONS AND CONDITIONS OF APPROVAL

Pursuant to the Wisconsin Statutes, this permit is granted to allow performance of that specific work described over which WisDOT has permit authority. The following provisions and any attached provisions shall govern.

1. No part of the permitted work shall be commenced until warning signs, devices and methods adequate to protect the public are in place and fully functional. Warning signs and devices shall conform to the appropriate sizes, designs and arrangements specified within the Wisconsin Manual on Uniform Traffic Control Devices, current edition. It shall be the responsibility of the applicant to provide and maintain at least the quantity of signs and devices therein described, but to also supplement those with such additional signs, devices and flaggers as are necessary to functionally protect persons and property from injury or damage at all times and under all conditions, including changed or changing conditions. Warning signs, devices and methods shall be in place and protectively functional prior to the commencement of any of the permitted works within the limits of the highway right-of-way, and shall protect the public until all permit-associated works are complete.

2. Vehicles, equipment and materials shall be regulated by the applicant to assure consistently safe conditions. Particular care shall be exercised at all times to assure a safe traffic environment at and near the site of the work. These requirements pertain while the work operations are in active progress, as well as during periods of work shut down. Any discovered violation of this permit, and particularly as regards any failing to maintain a safe traffic and general public environment will require an immediate cure by the applicant of the fault discovered, could result in an order by WisDOT to stop further progress of the work, and may result in revocation of the permit and expulsion from the highway right-of-way.

3. Holiday and seasonal work restrictions apply to the permitted works. The applicant should obtain a copy of the applicable restrictions from the Transportation Regional Office identified on the face of this permit.

4. The permitted work shall be coordinated, and in no case interfere, with any highway improvement project being undertaken at the same time.

5. Blasting within the limits of the state highway right-of-way is expressly prohibited, unless specifically authorized by WisDOT.

6. The applicant shall provide the supervisor of the permitted work(s) with a copy of this permit and is responsible to assure that the supervisor is familiar with all the permit's details and requirements. A complete copy of the permit shall be in the possession of the work force at all times that work is being performed within the right-of-way. The applicant shall be responsible to the State for any failure to comply with any part of this permit.

7. It shall be the responsibility of the applicant to determine the location of, and protect or cause to be protected from any damage, any facilities existing in the area to be influenced by the permitted work. All notifications to others are likewise a responsibility of the applicant.

8. All operations shall be performed without obstructing nor closing all or any part of any highway traffic lane unless specifically sanctioned by WisDOT.

9. All costs for constructing and maintaining the permitted facilities shall be the obligation of the applicant. The permitted facilities shall, if necessary, be altered at the expense of the applicant to facilitate alteration, improvement, safety control, or maintenance of the highway, as may be ordered by WisDOT.

10. The permit does not transfer any land; nor give, grant or convey any land right, right in land, nor easement.

11. The permit authorizes only the described works of and for the applicant indicated on the face of the permit. It does not grant authority for the facilities of any other, either by present or future installation.

12. Any disturbance to, operation within, or use of a highway median is expressly prohibited, unless specifically sanctioned by WisDOT.

13. Construction methods and restorations shall be in accordance with applicable parts of WisDOT Standard Specifications for Road and Bridge Construction, current edition.

14. The applicant shall assure that proper erosion control measures are implemented prior to and at all times during work operations. The applicant shall also be responsible for providing and maintaining erosion control measures to protect all restored areas upon completion of the permitted works until the replacement vegetation achieves sustained growth.

15. No direct access for the installation, maintenance or repair of the permitted facility shall derive from the travel lane or shoulder of any freeway, nor from any ramp or loop or an interchange, except access rendered imperative by an actual emergency. In the latter event, contact shall be established by the applicant with the Wisconsin State Patrol and with the Transportation Regional Office indicated on the face of this permit by the earliest means possible.

16. Permitted facilities shall be located as defined within this permit. Any part of the facility found to be otherwise located shall be subject to correction by and at the cost of the applicant to such extent as WisDOT may specify. Any facility or part thereof which is located other than as the permit defines occupies such location solely at the risk of the applicant. Accordingly, if the same is undetected or is suffered to remain in variance to the permit, the applicant agrees to hold the State, its employees, agents and officers harmless and free of any cost, claim or liability associated with any accidental damage to such facility which may result from a highway construction, maintenance, traffic control, or right-of-way management function.

17. All highway facilities disturbed by the permitted works or associated operations shall be restored promptly. If restoration is not accomplished voluntarily, without delay, WisDOT may issue a notice setting a time-certain by which the restoration must be complete. If the applicant fails to satisfactorily complete all restorations within the time thus established, WisDOT may arrange directly for all needful restorations, and all costs associated with such restorations and the arrangements therefore shall be a cost-obligation of the applicant. The applicant agrees to pay any and all such costs.

18. Any brush, trash or waste materials resulting from the permitted works shall be removed from the highway right-of-way. No tree or shrub shall be cut, trimmed or damaged to facilitate the installation or maintenance of the permitted facility except as authorized by the owner of such tree or shrub. See Wisconsin Statutes 86.03(2),(4), 86.16(3), and 182.017(5). Disposal of such materials off the right-of-way shall be in accordance with applicable solid waste disposal regulations.

19. Upon completion of the work and restorations, written notice shall be filed within 10 calendar days with the authorized Department representative who approved the permit.

20. Operations and safety precautions pertinent to any trenching, tunneling, or excavation activities shall comply with the most strict requirements of all applicable regulations and codes, including, but not limited to, those of the Wisconsin Department of Workforce Development.

21. Smooth and finished slopes shall be constructed at any location where any regraded portion of the highway right-of-way meets the lands of the adjacent property owner.

22. Any excavation authorized within the limits of any normal highway pavement or shoulder area shall be backfilled with suitable granular material, placed in lifts or layers 12" or less each in depth, and compacted mechanically to the compaction of the adjacent and undisturbed ground or material. Water flooding and the use of moisture in excess of necessity to facilitate mechanical compaction are prohibited. Any subsequent heavings, settlings, or other faultings attributable to the permitted works shall be repaired to the satisfaction of WisDOT at the applicant's expense. Temporary sheeting and shoring shall be used as necessary to prevent soil caving in trenches and tunnels.

23. Any curb, gutter, sidewalk, driveway, gravel base, ballast or shoulder material, or other element of the highway right-of-way or facility disturbed by the permitted works shall be restored in kind to the qualities, grades, compactions and conditions at least equal to those prevailing ahead of the permitted work operations and all to the satisfaction of WisDOT.

24. Any turfed area of the right-of-way disturbed by the permitted works and operations shall be restored with fine-graded topsoil having a depth of not less than 4 inches, and reseeded to perennial grass, or sodded to the satisfaction of WisDOT.

25. If, in the opinion of WisDOT, the permitted works or facilities obstruct highway drainage, unduly in-crease the difficulty of highway maintenance, or in any other manner adversely affect a highway interest, the applicant shall, upon notice, cure the fault as directed, and restore the highway facility to the satisfaction of WisDOT.

26. For jacked or augered installations across and beneath any freeway, no vehicle, equipment nor material shall be any nearer to any freeway travel lane than the jacking pits; and no jacking pit shall be any nearer to the outer edge of the nearest freeway lane than 30 feet.

27. The applicant is responsible to assure that the site of construction is secure against any hazard to the public, both when the site is attended and during off-hours, any holiday, and the hours of night when the site is unattended.

28. The applicant should be aware that future upgrading of the highway may require the adjustment of part or all of the permitted facility in order to conform to the State's Utility Accommodation Policy.

29. The covers of manholes, shut-off and regulator valves, and like facilities shall be adjusted to the level of the immediately adjacent grades.

30. No vehicle, equipment or material relating to the permitted work shall be parked or stored within the limits of the highway right-of-way except such as are actively engaged in the work operation.

31. No greater length of trench shall be open at any time than is necessary to maintain essential progress of the work.

SPECIAL PERMIT PROVISIONS

The following checked provisions apply to this permit:

GENERAL

☐ 1. The applicant shall contact the Transportation Regional Office at the address and telephone number indicated on the face of this permit to arrange for a Regional representative to inspect the work site. No work under this permit shall be accomplished prior to his/her arrival.

☐ 2. The applicant shall notify the Transportation Regional Office at the address and telephone number indicated on the face of this permit prior to the completion of the work authorized and at a time that enables Regional personnel ample opportunity to inspect the work before the applicant's employees leave the site.

☐ 3. Construction by open-trench methods is authorized only if the permitted installation can be accomplished in advance of the highway paving. If this cannot be accomplished, the permitted facility shall be jacked and/or dry augured.

☐ 4. At any location where open-trench installation across highway pavement is authorized, the surfacing shall be saw-cut full depth to enable it to be restored with smooth joints.

☐ 5. All excavations shall be back-filled in accordance with the attached detail.

TRIMMING/CUTTING OF VEGETATION

☐ 6. Vegetation shall not be cut or trimmed without the consent of the owner. Non-target trees and shrubs shall not be damaged.

☐ 7. Trimming is limited to only that which is necessary to afford safe clearance. This does not authorize clear swath cutting.

☐ 8. The vegetation to be removed shall be surveyed and inspected jointly with a Department representative prior to any work commencing on the highway right-of-way.

ROADSIDE PLANTING

☐ 9. Trees and other plant materials may be planted only in such locations and in such species as indicated on the attached plans or as specified in the field by WisDOT.

☐ 10. The applicant shall maintain all plantings by watering and mulching when necessary during the first growing season. The applicant may replace dead or dying plantings at any time during this period.

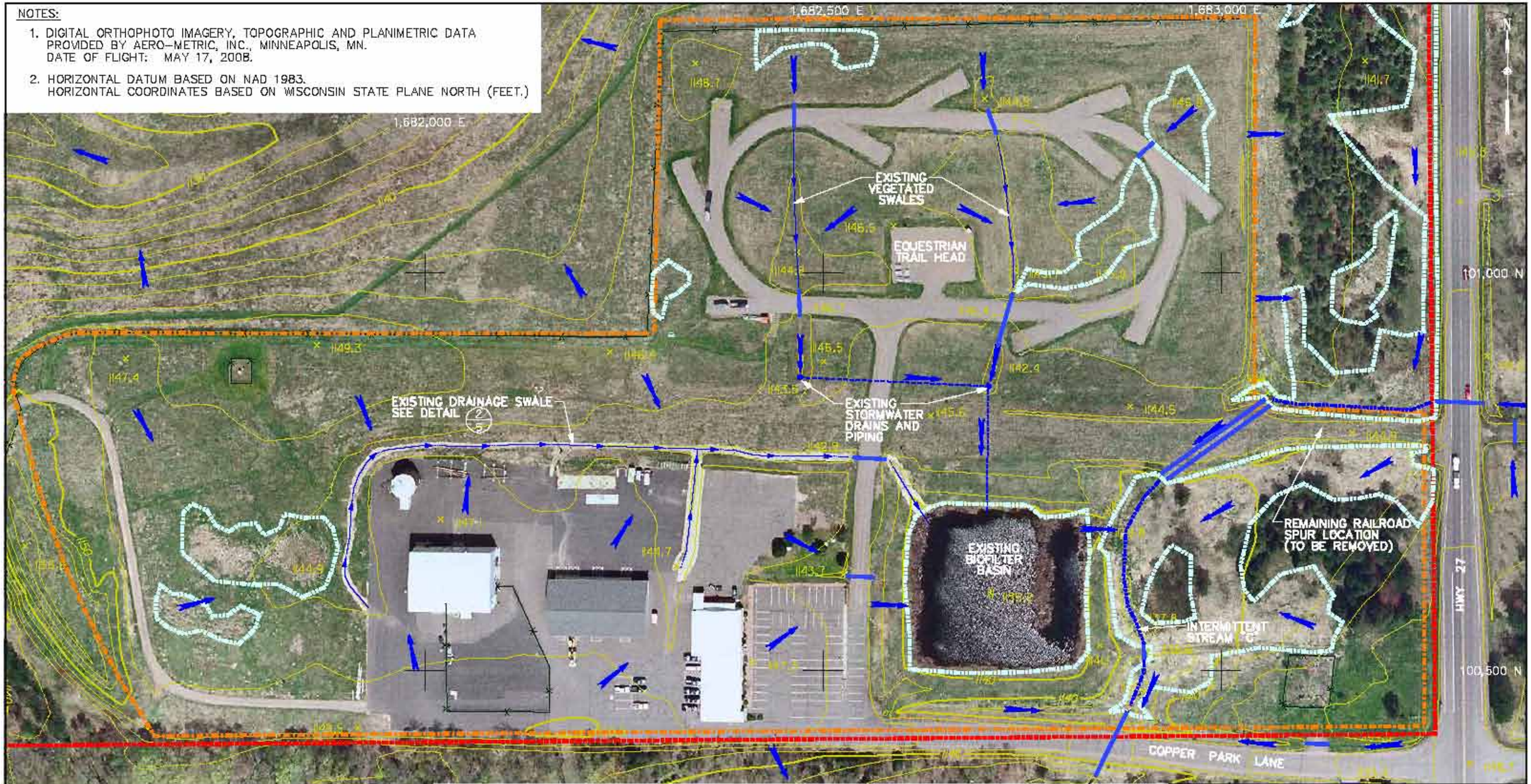
☐ 11. No sign or marker identifying the plantings may be placed within the limits of the highway right-of-way.

☐ 12. WisDOT agrees to provide reasonable care and maintenance of the plantings to the extent of its usual and customary procedure in relation to any and all roadside vegetation.

☐ 13. WisDOT accepts no responsibility for loss that may occur to the plantings. The applicant shall be fully aware that the plantings are subject to mortality; thinning; normal hazards due to maintenance operations, snow control, and public utility installation or alteration; trimming or removal if and when the plantings cause restrictions to sight distance or hazardous snow and ice conditions on the highway; possible destruction should reconstruction of the highway be undertaken; and possible partial or complete abandonment or obliteration or return to private ownership if future changes in highway location should be made.

NOTES:

1. DIGITAL ORTHOPHOTO IMAGERY, TOPOGRAPHIC AND PLANIMETRIC DATA PROVIDED BY AERO-METRIC, INC., MINNEAPOLIS, MN. DATE OF FLIGHT: MAY 17, 2008.
2. HORIZONTAL DATUM BASED ON NAD 1983. HORIZONTAL COORDINATES BASED ON WISCONSIN STATE PLANE NORTH (FEET.)



LEGEND

- EXISTING SPOT ELEVATION (x 1147.1)
- EXISTING 2' ELEVATION CONTOURS (1150)
- EXISTING FENCE
- FLAMBEAU MINE AREA BOUNDARY
- INDUSTRIAL OUTLOT LIMITS
- INTERMITTENT STEAM LOCATION
- FIELD DELINEATED WETLAND BOUNDARY
- EXISTING CULVERT LOCATION
- EXISTING DRAINAGE LOCATION AND FLOW DIRECTION
- EXISTING WATER FLOW DIRECTION

Foth Infrastructure & Environment, LLC			
REVISED	DATE	BY	DESCRIPTION

CHECKED BY:	SVF	DATE:	MAY '11
APPROVED BY:	JBH1	DATE:	MAY '11
APPROVED BY:		DATE:	

Foth
Foth Infrastructure & Environment, LLC

FLAMBEAU MINING COMPANY

FIGURE 1

EXISTING SITE CONDITIONS

Scale:	0 60' 120'	Date:	MAY, 2011
Prepared By: JRB2		Project No:	08F777

X:\GB\E\2008\08F777\cad\Stormwater Plan\Figures\Fig_2-1_Existing Conditions.dgn
5/12/2011 JRB2

NOTES:

1. TOPOGRAPHIC AND PLANIMETRIC DATA PROVIDED BY AERO-METRIC, INC., MINNEAPOLIS, MN. DATE OF FLIGHT: MAY 17, 2008.
2. HORIZONTAL DATUM BASED ON NAD 1983. HORIZONTAL COORDINATES BASED ON WISCONSIN STATE PLANE NORTH (FEET.)

1,681,500 E
1,682,000 E
1,682,500 E
1,683,000 E
101,000 N
100,500 N
N
HWY 27
COPPER PARK LANE

EXISTING VEGETATED SWALES TO BE ENHANCED
EXISTING STORMWATER DRAINS AND PIPING
EXISTING NATURAL RETENTION AREA
PROPOSED DIVERSION BERM SEE DETAIL (2/6)
BOTTOM ELEVATION AFTER CONTRUCTION = 1134.0
PROPOSED NORTH COPPER PARK INFILTRATION BASIN
OVERFLOW OUTLET
OVERFLOW OUTLET BLOCKED
REMAINING RAILROAD SPUR AND CULVERTS TO BE REMOVED
PROPOSED DRAINAGE SWALES HIGH POINT
REMOVE EXISTING 18" CMP AND REPLACE WITH 24" CMP
PROPOSED VEGETATIVE SWALE SEE DETAIL (1/6)
PROPOSED VEGETATIVE BUFFER (SEDIMENT KNOCK OUT AREA)
PROPOSED VEGETATIVE BUFFER (SEDIMENT KNOCK OUT AREA)
BOTTOM ELEVATION AFTER CONTRUCTION = 1138.0
PROPOSED WEST COPPER PARK INFILTRATION BASIN
PROPOSED EAST COPPER PARK INFILTRATION BASIN (BOTTOM ELEVATION AFTER CONSTRUCTION = 1133.0)
APPROXIMATE AREA OF START OF INTERMITTENT STREAM "C" AFTER CONSTRUCTION
EXISTING CMP TO BE REMOVED AND AREA REGRADED

LEGEND

- EXISTING SPOT ELEVATION (1147.4)
- EXISTING 2' ELEVATION CONTOURS (1150)
- EXISTING FENCE
- EXISTING TREE
- EXISTING TREE LINE
- EXISTING BUILDING
- EXISTING EDGE OF GRAVEL
- EXISTING EDGE OF PAVEMENT
- EXISTING CULVERT LOCATION
- FLAMBEAU MINE AREA BOUNDARY
- INDUSTRIAL OUTLOT LIMITS
- RAILROAD SPUR REMOVAL AREA
- EXISTING VEGETATED SWALE
- PROPOSED VEGETATED BUFFER
- PROPOSED VEGETATED DRAINAGE SWALE
- PROPOSED MAXIMUM WATER LEVEL IN INFILTATION BASINS
- EXISTING NATURAL RETENTION AREA
- PROPOSED DRAINAGE FLOW DIRECTION
- INTERMITTENT STEAM LOCATION
- PROPOSED GRADING CONTOUR (1140)

Foth Infrastructure & Environment, LLC

REVISED	DATE	BY	DESCRIPTION

CHECKED BY:	MAN	DATE:	MAY '11
APPROVED BY:	JBH1	DATE:	MAY '11
APPROVED BY:		DATE:	

Foth
Foth Infrastructure & Environment, LLC

FLAMBEAU MINING COMPANY

FIGURE 2

GRADING PLANS AND VEGETATIVE COVER AREAS

Scale:	0 60' 120'	Date:	MAY, 2011
Prepared By:	JRB2	Project No:	08F777

X:\GB\IE\2008\08F777\cad\Stormwater Plan\Figures\Fig.2-2_Grading Plan.dgn
5/12/2011 JRB2

NOTES:

1. TOPOGRAPHIC AND PLANIMETRIC DATA PROVIDED BY AERO-METRIC, INC., MINNEAPOLIS, MN. DATE OF FLIGHT: MAY 17, 2008.
2. HORIZONTAL DATUM BASED ON NAD 1983. HORIZONTAL COORDINATES BASED ON WISCONSIN STATE PLANE NORTH (FEET.)

1,681,500 E
1,682,000 E
1,682,500 E
1,683,000 E
101,000 N
100,500 N
N
HWY 27
COPPER PARK LANE

EXISTING VEGETATED SWALES TO BE ENHANCED
EXISTING NATURAL RETENTION AREA
INSTALL INLET PROTECTION SEE DETAIL 3/6
EXISTING STORMWATER DRAINS AND PIPING
BOTTOM ELEVATION AFTER CONTRUCTION = 1134.0
CAP STORMWATER DRAIN
PROPOSED NORTH COPPER PARK INFILTRATION BASIN
PROPOSED DRAINAGE SWALES HIGH POINT
REMOVE EXISTING 18" CMP AND REPLACE WITH 24" CMP
BOTTOM ELEVATION AFTER CONTRUCTION = 1138.0
PROPOSED VEGETATIVE SWALE SEE DETAIL 1/6
PROPOSED VEGETATIVE BUFFER (SEDIMENT KNOCK OUT AREA)
PROPOSED VEGETATIVE BUFFER (SEDIMENT KNOCK OUT AREA)
OVERFLOW OUTLET
PROPOSED WEST COPPER PARK INFILTRATION BASIN
PROPOSED EAST COPPER PARK INFILTRATION BASIN (BOTTOM ELEVATION AFTER CONSTRUCTION = 1133.0)
APPROXIMATE AREA OF START OF INTERMITTENT STREAM "C" AFTER CONSTRUCTION
PROPOSED SILT FENCE LOCATION SEE DETAIL 1/5
PROPOSED STONE TRACKING PADS SEE DETAIL 2/7
INSTALL INLET PROTECTION
PROPOSED ROCK FILLED FILTER BAG DITCH CHECK LOCATIONS SEE DETAIL 1/8

LEGEND

- EXISTING SPOT ELEVATION
- EXISTING 2' ELEVATION CONTOURS
- EXISTING FENCE
- EXISTING BUILDING
- EXISTING EDGE OF GRAVEL
- EXISTING EDGE OF PAVEMENT
- EXISTING CULVERT LOCATION
- FLAMBEAU MINE AREA BOUNDARY
- INDUSTRIAL OUTLOT LIMITS
- PROPOSED STONE TRACKING PADS
- PROPOSED EROSION BALES LOCATION
- PROPOSED SILT FENCE LOCATION
- EXISTING VEGETATED SWALE
- PROPOSED VEGETATED BUFFER
- PROPOSED VEGETATED DRAINAGE SWALE
- PROPOSED MAXIMUM WATER LEVEL IN INFILTATION BASINS
- EXISTING NATURAL RETENTION AREA
- PROPOSED GRADING CONTOUR
- PROPOSED DRAINAGE FLOW DIRECTION
- PROPOSED FLOW DIRECTION
- INTERMITTENT STEAM LOCATION

Foth Infrastructure & Environment, LLC

REVISED	DATE	BY	DESCRIPTION

CHECKED BY:	MJP1	DATE:	MAY '11
APPROVED BY:	JBH1	DATE:	MAY '11
APPROVED BY:		DATE:	

Foth
Foth Infrastructure & Environment, LLC

FLAMBEAU MINING COMPANY

FIGURE 3

EROSION CONTROL AND SURFACE WATER MANAGEMENT PLAN

Scale: 0 60' 120'		Date:	MAY, 2011
Prepared By: JRB2		Project No:	08F777

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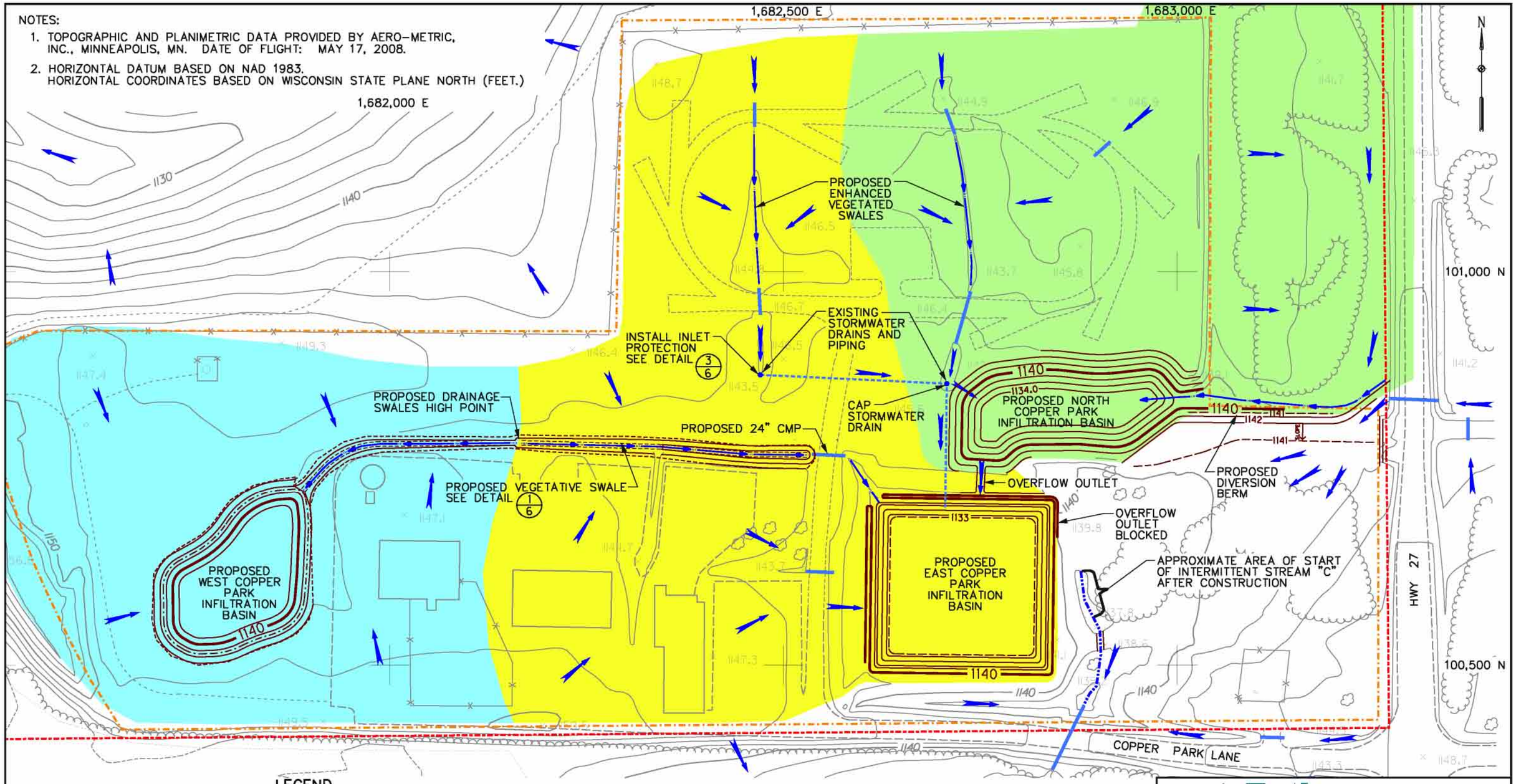
5/12/2011 JRB2

NOTES:

1. TOPOGRAPHIC AND PLANIMETRIC DATA PROVIDED BY AERO-METRIC, INC., MINNEAPOLIS, MN. DATE OF FLIGHT: MAY 17, 2008.
2. HORIZONTAL DATUM BASED ON NAD 1983. HORIZONTAL COORDINATES BASED ON WISCONSIN STATE PLANE NORTH (FEET.)



LEGEND

- EXISTING SPOT ELEVATION (× 1147.1)
- EXISTING 2' ELEVATION CONTOURS (1150)
- EXISTING FENCE
- EXISTING TREE
- EXISTING TREE LINE
- EXISTING BUILDING
- EXISTING EDGE OF GRAVEL
- EXISTING EDGE OF PAVEMENT
- EXISTING CULVERT LOCATION
- FLAMBEAU MINE AREA BOUNDARY
- INDUSTRIAL OUTLOT LIMITS
- WEST SEDIMENTATION DRAINAGE BASIN
- EAST SEDIMENTATION DRAINAGE BASIN
- NORTH SEDIMENTATION DRAINAGE BASIN
- PROPOSED DRAINAGE FLOW DIRECTION
- PROPOSED FLOW DIRECTION
- PROPOSED GRADING CONTOUR (1140)

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REVISED	DATE	BY	DESCRIPTION

CHECKED BY:	MAN	DATE: MAY '11
APPROVED BY:	JBH1	DATE: MAY '11
APPROVED BY:		DATE:

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FIGURE 4

POST CONSTRUCTION DRAINGAGE BASINS

Scale: 0 60' 120'	Date: MAY, 2011
Prepared By: JRB2	Project No: 08F777

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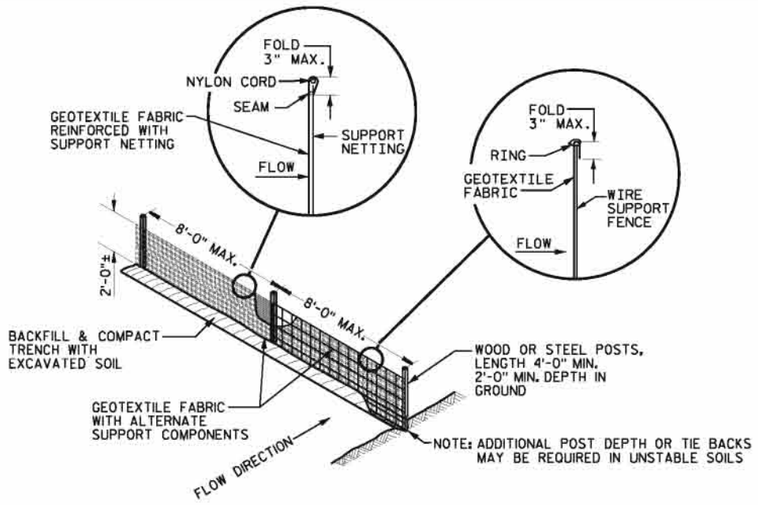
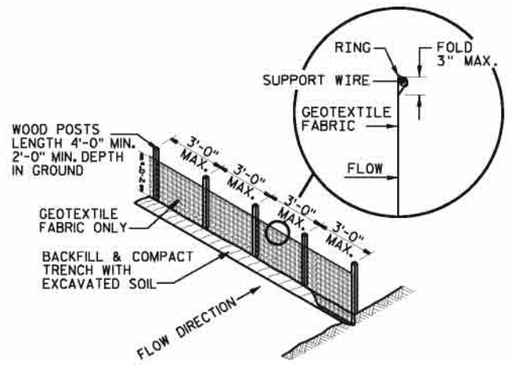
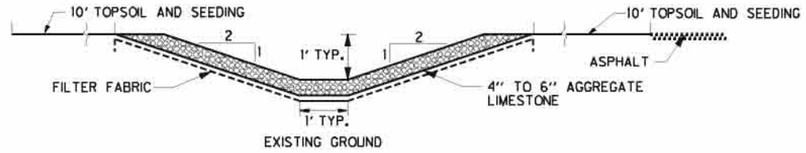


ALTERNATE "A"

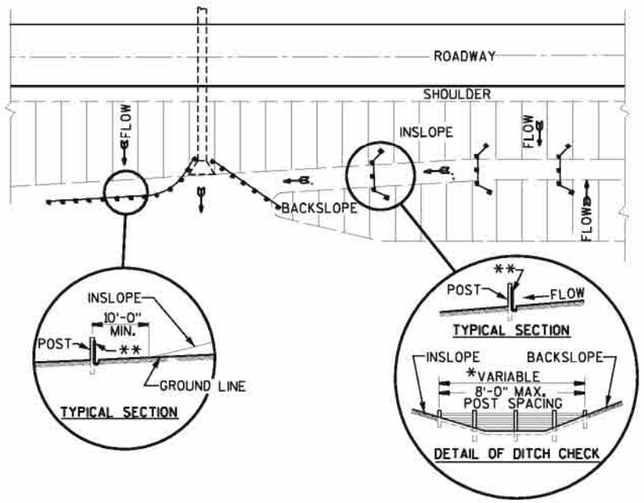


ALTERNATE "B"

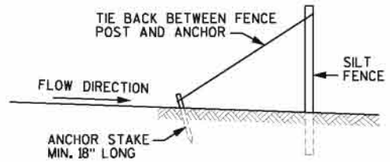


2/5 TYPICAL EXISTING PERIMETER DRAINAGE DITCH DETAIL

NOT TO SCALE

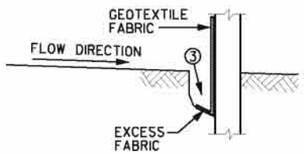


PLAN – AT CULVERTS



SILT FENCE TIE BACK DETAIL

(WHEN REQUIRED)



FABRIC ANCHOR TRENCH DETAIL

1/5 PROPOSED SILT FENCE DETAIL

NOT TO SCALE

GENERAL NOTE:

THE SILT FENCE SHOULD BE CONSTRUCTED IN AN ARC OR HORSESHOE SHAPE, WITH THE ENDS POINTING UPSLOPE TO MAXIMIZE BOTH STRENGTH AND EFFECTIVENESS.

Erosion Control Plan During Construction

Best Management Practices (BMPs) address erosion control during construction. The BMPs will be maintained during project construction and as appropriate throughout the life of the project.

Best Management Practices (BMPs)
The project has been designed with an efficient storm water collection system that routes storm water to infiltration basins.

BMPS to be implemented follow the materials and methods specified in ch NR 151, WIS Adm code and are summarized below:

Silt fencing will be installed before construction activity begins. Fencing will envelope the entire border of the project.

Land clearing will be performed taking care not to disturb areas beyond the clearing and grubbing limits. Clearing (removing trees) and grubbing (removing stumps and roots) will be performed in a single operation, as necessary, to minimize disturbance. Unmarketable timber, herbaceous plants, dead wood, stumps, and other vegetation will be disposed of by the contractor. Stumps too large to chip will be stockpiled and burned on-site with appropriate burn permits. Contractor is required to obtain all necessary burn permits.

Topsoil stripping and stockpiling and excess soil stockpiling will be performed on the site. Topsoil is defined as the A-horizon of the soil in which organic matter accumulates. Any material not placed will be stockpiled in a prepared area that has silt fencing installed around the entire stockpile. Piles will be developed with side slope shallower than a ratio of 3 horizontal to 1 vertical (3H:1V) to minimize erosion. Conventional earth-moving equipment will be used. Seeding will take place after the stockpile surface is roughened (i.e. driving a bulldozer up and down the slope to leave a pattern of track imprints parallel to the slope contours). Seeding will be accomplished in accordance with WDNR standard #1059 "seeding". Seed mixtures will include temporary species such as oats or perennial rye grass that germinate quickly and act as a nurse crop until the perennial species germinate and mature.

Ditch installation will be performed at the appropriate time to route storm water runoff to the basins. Mulching and seeding will take place as soon as possible to maintain ditch surfaces. Rock-filled filter bags, erosion bales, and erosion mats will be used as needed.

Installation of gravel/aggregate on vehicle traffic areas will be constructed in accordance with details and sections from the drawings and specifications. Traffic area of the main facility will be lined with gravel. During construction, BMPs will be maintained daily and undergo formal inspection.

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FIGURE 5

EROSION CONTROL DETAILS (1 of 4)

Scale:	NOT TO SCALE	Date:	MAY, 2011
Prepared By:	JRB2	Project No:	08F777

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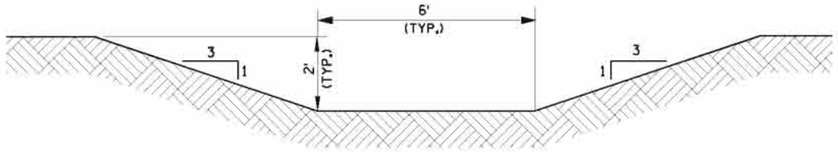
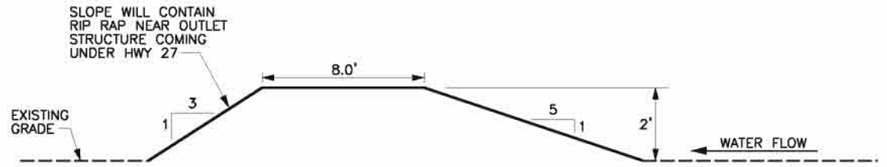


1/6 TYPICAL PROPOSED DRAINAGE DITCH DETAIL

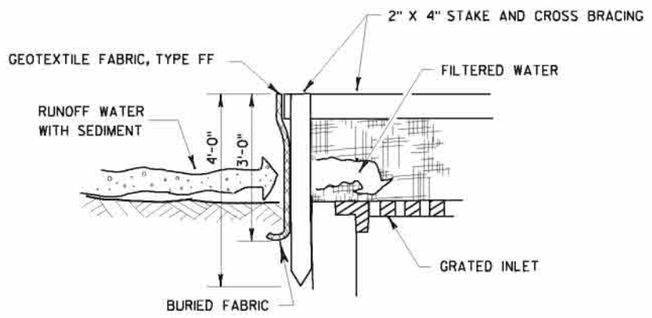
NOT TO SCALE

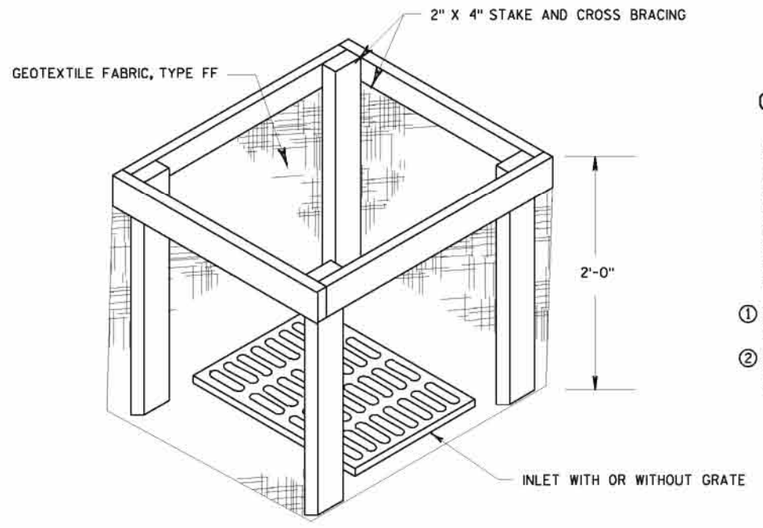


2/6 TYPICAL PROPOSED DIVERSION BERM DETAIL

NOT TO SCALE

NOTE: ATTACH GEOTEXTILE FABRIC, TYPE FF TO THE TOP OF STAKES AND CROSS BRACINGS.





3/6 PROPOSED INLET PROTECTION DETAIL

NOT TO SCALE

GENERAL NOTES:

FABRIC SHALL BE REPLACED AT THE ENGINEERS DISCRETION.

MANUFACTURED ALTERNATIVES APPROVED AND LISTED ON THE DEPARTMENT'S EROSION CONTROL PRODUCT ACCEPTIBILITY LIST MAY BE SUBSTITUTED FOR THE INLET PROTECTION TYPE SPECIFIED.

WHEN REMOVING OR MAINTAINING INLET PROTECTION, CARE SHALL BE TAKEN SO THAT THE SEDIMENT TRAPPED ON THE GEOTEXTILE FABRIC DOES NOT FALL INTO THE INLET. ANY MATERIAL FALLING INTO THE INLET SHALL BE REMOVED IMMEDIATELY.

① FABRIC SIZE SHALL BE 8" (MIN) GREATER ON ALL SIDES OF THE INLET COVER TO PROVIDE A HAND HOLD WHEN MAINTENANCE OR REMOVAL IS REQUIRED.

② FOR INLET PROTECTION, TYPE C, WITH A CURB BOX, AN ADDITIONAL 18" OF FABRIC IS WRAPPED AROUND THE WOOD AND SECURED WITH STAPLES. THE WOOD SHALL NOT BLOCK THE ENTIRE HEIGHT OF THE CURB BOX.

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REVISED	DATE	BY	DESCRIPTION

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FIGURE 6
EROSION CONTROL DETAILS (2 of 4)

Scale:	NOT TO SCALE	Date:	MAY, 2011
Prepared By:	JRB2	Project No:	08F777

$$$$DGNSPEC$$$$$$$$$$$$$$$$$$
$$DAT$$$$ $USRN$

GENERAL NOTES

VARIATIONS IN THE DIMENSIONS OR MATERIALS SHOWN HEREON MAY BE PERMITTED IF THEY PROVIDE EQUIVALENT PROTECTION AND MATERIAL STRENGTH AND IF PRIOR APPROVAL OF THE ENGINEER IS OBTAINED.

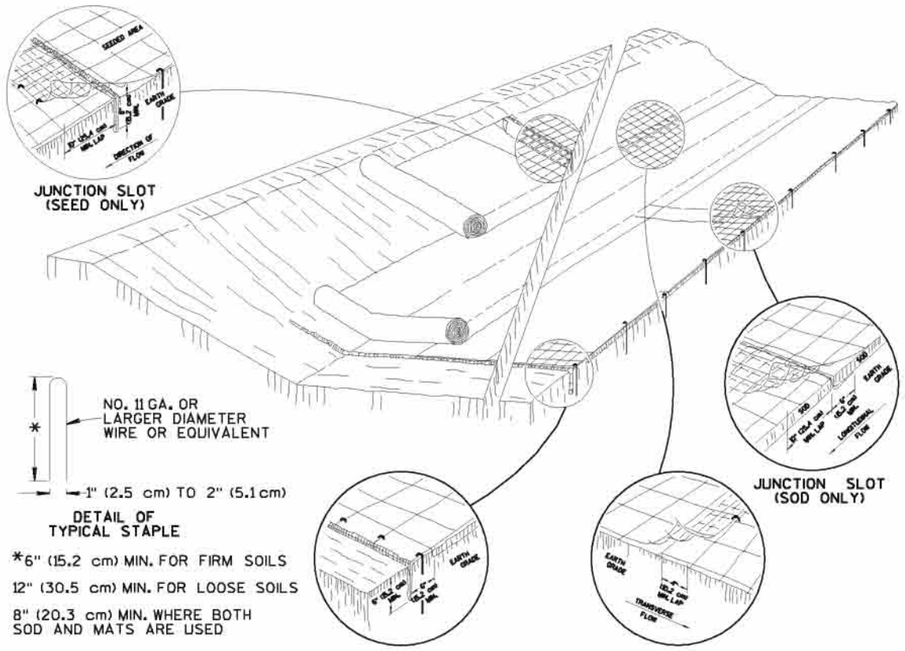
PLACE LAP JOINTS IN THE BOTTOM OF V-SHAPED DITCHES.

STAGGER JUNCTION SLOTS ON ADJACENT STRIPS OF MATTING A MINIMUM OF 4 FEET (1.219 m) APART.

EDGES OF THE EROSION MAT SHALL BE IMPRESSED IN THE SOIL.

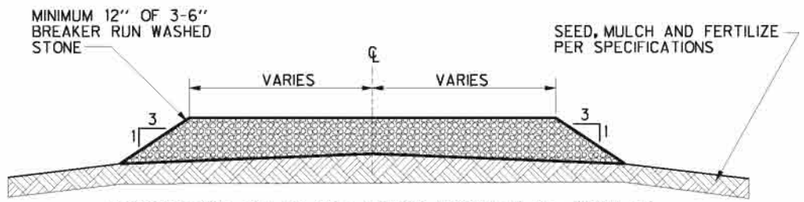
EROSION MAT OVER SEEDING

JUNCTION OR ANCHOR SLOTS SHALL BE AT MINIMUM INTERVALS OF 100 FEET (30.48 m) ON GRADES UP TO AND INCLUDING 3 PERCENT, AND 50 FEET (15.24 m) ON GRADES EXCEEDING 3 PERCENT.



4/7 PROPOSED EROSION MAT

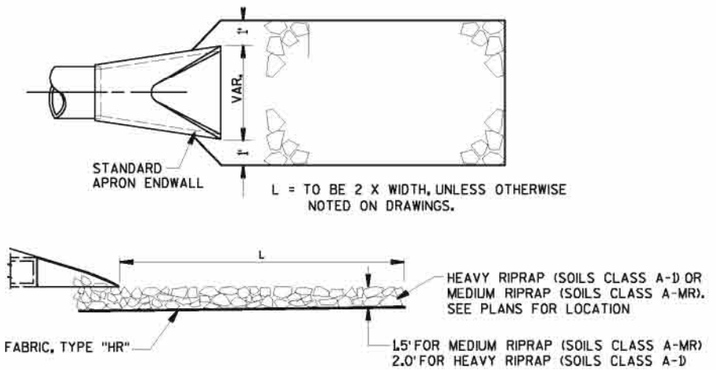
NOT TO SCALE



NOTE: TRACKING PAD TO BE A MINIMUM LENGTH OF 50'. WIDTH OF TRACKING PAD SHALL EXTEND TO EXISTING EDGE OF PAVEMENT.

2/7 PROPOSED TYPICAL TRACKING PAD

NOT TO SCALE



3/7 PROPOSED RIPRAP DETAIL

NOT TO SCALE

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FIGURE 7

EROSION CONTROL DETAILS
(3 of 4)

Scale:	NOT TO SCALE	Date:	MAY, 2011
Prepared By:	JRB2	Project No:	08F777

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5/12/2011 JRB2

GENERAL NOTES:

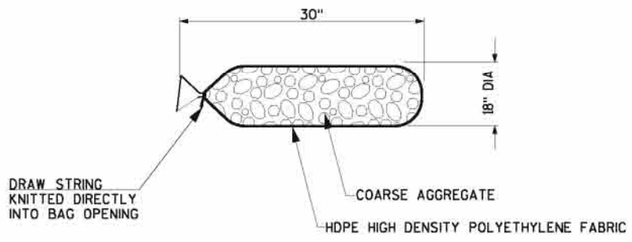
1. 18" X 30" ROCK FILLED FILTER BAG SHALL BE COMPRISED OF THE FOLLOWING:
   a. HDPE HIGH DENSITY POLYETHYLENE
   b. HDPE HIGH DENSITY POLYETHYLENE DRAW STRING KNITTED DIRECTLY INTO BAG OPENING.
   c. 80% FABRIC CLOSURE WITH APPARENT OPENING SIZE NO LARGER THAN 1/8" X 1/8"
   d. ROLLED SEAM USING A MINIMUM OF 480 DENIER POLYESTER SEWING YARN FOR STRENGTH AND DURABILITY.

AGGREGATE TO BE WELL GRADED COURSE AGGREGATE CONFORMING TO THE FOLLOWING GRADATION REQUIREMENTS:

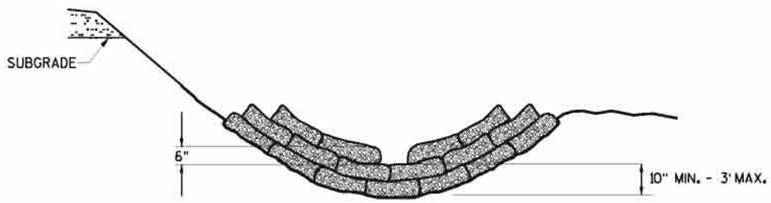
SIEVE SIZE	SIZE NO. AASHTO No. 67 [1]
2 INCH (50 mm)	-
1 1/2 INCH (37.5mm)	-
1 INCH (25.0 mm)	100
3/4 INCH (19.0mm)	90-100
3/8 INCH (9.5mm)	20-55
No. 4 (4.75mm)	0-10
No. 8 (2.36mm)	0-5

[1] SIZE No. ACCORDING TO AASHTO M 43

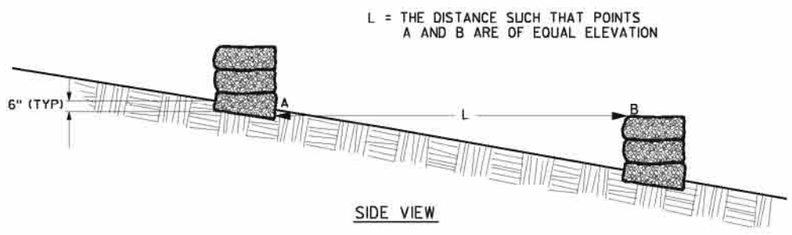
COURSE AGGREGATE INFORMATION



FILTER BAG DETAIL
(PRIOR TO INSTALLATION)



CROSS SECTIONAL VIEW



SIDE VIEW

DITCH CHECK DETAIL

1/8 PROPOSED ROCK FILLED FILTER BAG

NOT TO SCALE

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FIGURE 8

EROSION CONTROL DETAILS
(4 of 4)

Scale: NOT TO SCALE	Date: MAY, 2011
Prepared By: JRB2	Project No: 08F777

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