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## NON-METALLIC MINING RECLAMATION PLAN

**Chippewa Sand Company LLC**  
**Chippewa County, Wisconsin**

May 17, 2018

File No. 20.0154893.00



### PREPARED FOR:

Chippewa Sand Company LLC  
New Auburn, Wisconsin



### GZA GeoEnvironmental, Inc.

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May 17, 2018  
File No. 20.0154893.00

Ms. Michele Karlstad, General Manager  
Chippewa Sand Company LLC  
105 Highway Q  
New Auburn, Wisconsin 54757

Re: Non-Metallic Mining Reclamation Plan  
Chippewa Sand Company LCC  
Chippewa County, Wisconsin

Dear Ms. Karlstad:

GZA GeoEnvironmental, Inc. is pleased to submit this Non-Metallic Mining Reclamation Plan to Chippewa Sand Company LLC, for the industrial sand mine located in the Town of Cooks Valley, Chippewa County, Wisconsin (the "Site"). The Site is located in Sections 8, 9, and 10, Township 30 North, Range 10 West, Town of Cooks Valley, approximately 4 miles west of Bloomer, Wisconsin. The reclamation plan applies to approximately 1,085 acres owned by the following:

- J & L Mining LLC;
- Robinson Panosian Mining LLC;
- Thomas Short and Anthony Pecha; and
- 27K Sand LLC.

The Reclamation Plan replaces the February 9, 2011, *Non-Metallic Mining Reclamation Plan Narrative* and maps entitled, "Initial Site Map," "Operations Site Map," and "Final Site Maps"; May 5, 2011, *Chippewa County Nonmetallic Mining Permit 2010-01*.

The Reclamation Plan was prepared in accordance with Wisconsin Administrative Code Chapter NR 135; July 2007, Plan Specifications, and Reclamation Standards for Non-Metallic Mines in Chippewa County; September 17, 2009, Chippewa County, Land Conservation Committee Guidance; Plan Content, Specifications and Engineering Requirements for Non-metallic Mine Construction in Bedrock; and the March 13, 2012, Chippewa County Ordinance, Chapter 30 Environment.

If you have any questions pertaining to the contents of the Site Reclamation Plan, please contact the undersigned at 262-754-2560.

Very truly yours,

**GZA GeoEnvironmental, Inc.**

Mark J. Krumenacher, P.G.  
Senior Principal/Senior Vice President

Michael A. DeVasto, P.G.  
Geologist/Assistant Project Manager

Kara L. Koch, P.E.  
Water Resource Engineer/Assistant Project Manager

J:\154800to154899\154893 Chippewa Sand\2018 Reclamation Plan\1-Plan Appx Tables and Figures\2018May17\_ChippewaSandCompany\_NMMReclamationPlan.docx

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## 1.0 INTRODUCTION

The Non-Metallic Mining Reclamation Plan ("Reclamation Plan") was prepared by GZA GeoEnvironmental, Inc. (GZA) for Chippewa Sand Company LLC (CSC) for the industrial sand mining operation located in the Town of Cooks Valley, Chippewa County, Wisconsin (the "Site"). The Reclamation Plan was prepared in a format that follows the order and nomenclature of the July 2007, Reclamation Standards For Non-Metallic Mines In Chippewa County Appendix II, Plan Specifications for Non-Metallic Mines in Chippewa County ("Reclamation Standards") as closely as possible and in general accordance with Wisconsin Administrative Code (WAC) Chapter NR135 Nonmetallic Mining Reclamation. In addition, GZA reviewed and considered the following Chippewa County Ordinances and documents.

- Revised July 2007, *Plan Specifications for Non-Metallic Mines in Chippewa County*, excerpted from Non-Metallic Mining Reclamation Ordinance, Appendix II ("Plan Specifications").
- September 17, 2009, Chippewa County, Land Conservation Committee Guidance; *Plan Content, Specifications and Engineering Requirements for Non-metallic Mine Construction in Bedrock*, original dated April 15, 2009, amended September 17, 2009 (the "Guidance").
- March 13, 2012, Chippewa County Ordinance, Chapter 30 Environment (the "Ordinance").

## 2.0 PLAN SPECIFICATIONS FOR NON-METALLIC MINES IN CHIPPEWA COUNTY

The referenced Reclamation Plan drawings were prepared to show locations and activities referenced in the supporting text below. The specific components of the July 2007 Plan Specifications are reproduced with supporting text provided in the following sections and on the attached Reclamation Plan drawings. Where applicable in the sections below, the Reclamation Standards are referenced and addressed.

### 1. Initial Site Plan

*The Initial Site Plan shall include an initial site map and supporting text.*

The attached Existing Site Plan Figure 2A and 2B depict the existing conditions at the time of Reclamation Plan preparation. Supporting text is provided below.

#### (a) **Initial Site Maps, to include:**

1. *Location map to indicate general location of the project in the county or township;*

A Location Map is included on Figure 1 of the Reclamation Plan drawings.

2. *Topographic map of affected lands;*

Topography of the Site is included on Figures 2A and 2B for the western and eastern portions of the Site, respectively. Topography is also included on Figures 3A and 3B.

3. *Property boundaries showing the land under consideration and neighboring parcels located within 660 feet of the project site;*

Figures 2A and 2B show the property boundaries of the Site and the neighboring parcels located within 660 feet of the Site.



4. *Roads located on or within 660 feet of the project site, with road names indicated;*

Figures 2A and 2B show the roads, road names located within 660 feet of the Site, and entrances. The main entrance to the Site is located on County Highway A. There are two additional existing field entrances located on County Highway A and one field entrance located on 50<sup>th</sup> Street.

5. *Road right-of-way lines;*

Figures 2A and 2B show the road right-of-way lines.

6. *Locations of all structures within 660 feet of the site and the use of each structure;*

Figures 2A and 2B identify each structure within 660 feet of the Site. The structures near the Site are residential dwellings, garages and shed or farm buildings

7. *Locations and names of all intermittent and perennial streams and lakes as indicated on USGS 7.5 min topographic maps;*

Figures 2A and 2B include intermittent streams identified on USGS 7.5-minute quadrangle maps. The intermittent streams on and near the Site are not named.

8. *Areas which convey concentrated flows to or from the site;*

Surface water flow directions across the Site to intermittent streams are shown on Figures 2A and 2B.

9. *Locations of all wetlands within 660 feet of the site;*

The locations of wetlands on and within 660 feet of the Site are shown on Figures 2A and 2B derived from the Wisconsin Department of Natural Resources (DNR) Surface Water Data Viewer. A formal wetland delineation will be performed at the entire Site. After DNR concurrence of the mapped wetland boundaries, Figures 2A and 2B will be updated and provided to the County.

10. *Boundaries of previous excavations on the site;*

The boundaries of previous mining limits are shown on Figure 2A as of October 2017.

11. *Wells within 660 feet of the site;*

The location of water supply wells within 660 feet of the Site are shown on Figures 2A and 2B. The source of the well information is from well records obtained from the Wisconsin Geologic and Natural History Survey (WGNHS). Where no well information was available, water supply wells were assumed to exist at the location of residences

12. *Groundwater elevation at the site and source of the information (boring, county groundwater map, well data, etc.);*

Due to the wide range of ground surface elevations, the groundwater elevations vary across the Site by as much as 50 feet. Groundwater elevations are measured in five on-Site monitoring wells quarterly and range in elevation from approximately 1,030 to 1,070 feet as shown in Figure 2A. The groundwater elevation data from these five monitoring wells will be used to develop a Site-specific groundwater elevation map to be submitted with the Annual Report and Activities Plan.

Groundwater elevation contours derived from the Wisconsin Geological and Natural History Survey's Generalized Water-Table Elevation map for Chippewa County are included in Figures 2A and 2B. The proposed mining will be above the groundwater table surface and will not impact groundwater gradients and flow patterns, surface water or stream base flow down gradient of the mine. Based on the



topography of the Site and the proposed mine plan, supplemental groundwater monitoring wells will be installed before mining progresses past Phase 5 (Figure 2A and 2B).

13. *Locations of all utilities at the site.*

There are no public utilities at the Site.

**(b) Supporting Information for Initial Site Description:**

1. *Owner and Applicant Information: The name and address of the landowner and name and address of the applicant (if other than the landowner)*

Applicant:

- Chippewa Sand Company LCC, 105 County Highway Q, New Auburn, WI 54757

Owners

- J&L Mining LLC, 3182 County HWY A Bloomer, WI 54724
- Robinson Panosian Mining LLC, 2725 W Highland Blvd STE 219 Milwaukee, WI 53208
- Thomas Short, 16595 County Highway DD Bloomer, WI 54724 and Anthony Pecha, 16686 County Highway DD Bloomer, WI 54724
- 27K Sand, LLC 2713 28 3/8 Street Birchwood, WI 54817

2. *Lease(s): A copy of the signed lease(s) which authorizes an operator to enter upon the lessor's land for mining. The expiration date of the lease shall be clearly indicated thereon. A substitute form may be used to verify that a lease is in effect without requiring the entire lease.*

Memoranda of Rights Under Sand Lease Agreements contained in Appendix A provide verification of lease agreements between Chippewa Sand Company LLC and property owners.

3. *Legal Description: A legal description and tax parcel numbers of property subject to application*

Legal Descriptions for each property are included in Appendix A. Tax parcel numbers are included in Appendix A and on Figures 2A and 2B.

4. *Parties of interest: List of names and addresses of parties of interest within 660 feet of the project site.*

Names and addresses of property owners within 660 feet of the Site are contained in Appendix B.

5. *Soil Information: Thicknesses of the A & B soil horizons and the method of determination.*

The Natural Resource Conservation Survey (NRCS) Web Soil Survey Custom Soil Resources Report (NRCS Report) prepared for the Site is contained in Appendix C. The NRCS report indicates that 39 soil types are present at the Site and vicinity.

2. **Site Operation Plan:** The Site Operations Plan shall include a Site Operations Map and supporting text.

**(a) Site Operations Maps, to include:**

1. *Location and description of mining site boundary;*

Figures 2A, 2B, 3A, and 3B show the Mining Site Boundary which corresponds to the property described above in Section 1(b)1, 2, and 3; and is the area subject to the town of Cooks Valley non-metallic mining permit (the 'Permit') and the Reclamation Plan. The approximate maximum vertical extent of the mine excavation is an elevation of 1,090 feet.





2. *Locations of separation boundaries and separation dimensions (from structures, public roads, rights-of-way, zoning districts, etc.) as referenced in Mine Siting Standards;*

Figures 3A and 3B will be updated following the 2018 wetland delineation to reflect the 100-foot setback. Regulated wetlands present at the mine property that cannot be avoided by operations will be appropriately addressed through the state and US Army Corps of Engineers wetland permitting processes. Specific Chippewa County Mine Siting Standards referenced in this section were not identified.

3. *Planned cell boundaries;*

Recognize that the variable topography and the current business decision to not utilize drilling and blasting methods presents a unique challenge to mine planning. The mine plan is dynamic and subject to change based on the actual geological and operating conditions encountered as mining progresses. The general Mine Phase boundaries 1 through 13 are shown on Figures 3A and 3B and represent the current understanding of the Mine Phases and their progression, but not necessarily a final mine cell sequencing.

The previously mined area that was subsequently used for stormwater management under the previous Permit, is designated Mine Phase 1. Additional mining in Phase 1 may occur after the proposed stormwater management system is constructed and fully functional and the existing stormwater management structures in that area are removed. Additional mining in Mine Phase 1 may be performed concurrent with Mine Phase 2 and concurrent with or after Mine Phase 3. The Operator and the Site conditions will determine the detailed sequence of mining.

Within each Mine Phase, mine cells will be planned prior to mining to fit the geology of the area and the needs of the Operator at that time. More details associated with mine planning and sequencing is provided below in Section 2. (b)8.

4. *Location and extent of disturbed areas including the area of excavation, spoils piles, topsoil stock-piles, wash ponds, and/or sediment basins;*

The previous excavations, overburden stockpiles, topsoil stockpiles, process water ponds, and stormwater management ponds as of October 2017 are shown on Figure 3A. Future mining is proposed to include contemporaneous reclamation with overburden used for reclamation and not stored in stockpiles or screening berms. In the event that overburden may need to be stockpiled before it can be used for reclamation, stockpiles will be within the permitted area and adhere to county and state regulations. A potential anticipated temporary overburden stockpile location is shown southwest of Phase 3 on Figure 3A

Figures 3A also includes the proposed extent of future mineral extraction areas, and proposed stormwater management systems for the western portion of the Site. The approximate boundaries of the future mineral extraction areas of the eastern portion of the Site are shown on Figure 3B. Future stormwater management systems for the eastern portion of the Site will be properly sited and follow appropriate standards and permitting. The location of the future stormwater management system cannot be finalized at this time, but may be located generally where shown on Figure 3B and will be designed and built to optimize existing conditions and will be within the Permit and Reclamation boundaries.

5. *Processing facilities;*





The processing facilities are shown on Figure 3A. Industrial sand processing at the Site is limited to sand washing. Sand drying occurs off site at a separate facility.

6. *Location and discharge point of site dewatering systems;*

The stormwater management system is shown on Figure 3A. The stormwater management system will be used to manage stormwater during mining, with discharge to a vegetated drainage swale immediately downstream of Pond #1.

7. *Arrows indicating the directions of flow of surface runoff internal and external to the site;*

Surface water flow directions across the Site to intermittent streams are shown on Figures 3A and 3B. Surface water flow will be diverted away from the active mining areas where possible using diversion berms and swales as necessary. As the mine is developed, precipitation and groundwater infiltration that enters the mine will be managed using diversion berms, swales, sediment basins, and the infiltration pond system with remaining water discharged from Pond #1. In future cells, water may be discharged from additional stormwater treatment ponds (location shown on Figure 3B).

8. *Vegetative (i.e. trees) and structural (i.e. berms) measures to be taken to screen the operation from view of surrounding land uses, where required;*

The Operator will plant trees, in accordance with Section B (1) "Screening" (Appendix B – Siting and Development Standards, Mine Siting Standards), 5 years in advance of proposed mining within 1,000 feet of County A and 50<sup>th</sup> Street.

9. *Roads, culverts, and all points of public road access; and*

The locations of public road access to County Highway A and 50<sup>th</sup> Street are shown on Figures 3A and 3B. There are culverts at each public road access location.

10. *Practices to limit onsite erosion and offsite sediment delivery during excavation. Temporary measures may include but need not be limited to the following: water diversions, grassed waterways, sediment basins, filter strips, silt fencing, bale check dams, sod strips, rock riprap, temporary seeding, and mulching.*

The proposed stormwater management system for the processing plant and western portion of the mining Site is shown on Figure 3A. Future locations of stormwater management systems for the eastern portion of the mining Site cannot be finalized at this time but will be designed and built to optimize existing conditions and will be within the Permit and Reclamation boundaries.

**(b) Description of Site Operations**

1. *Description or list of the type of materials to be extracted;*

The materials to be excavated consists of topsoil, unconsolidated overburden, Tunnel City Formation bedrock overburden, and Wonewoc Sandstone. Most of the topsoil and unconsolidated overburden overlying either the Wonewoc or Tunnel City is comprised of sand or sandy loam topsoil and in some areas unconsolidated sand. The Tunnel City is present at higher elevations over the Wonewoc and is a fine-to medium-grained, silty, and glauconitic sandstone that is not a target for mineral resources.

The Wonewoc is a fine-grained quartz sandstone and the target mineral that will be mined and processed. The Wonewoc is present at the Site generally between elevations 1,200 and 1,100 feet. The approximate maximum vertical extent of the mine excavation is an elevation of 1,090 feet.

2. *Description or list of the type of extraction and processing activities to be conducted at the site;*



Extraction consists of topsoil/subsoil/overburden removal using excavators, bull dozers, trucks, and other heavy equipment, and stockpiling of that material for future reclamation. When the Wonewoc is exposed, bulldozers equipped with rippers break the sandstone and front-end loaders and excavators load the raw sand into haul trucks for transport to the wet plant. If geological, market, or other conditions warrant, drilling and blasting and / or other methods may be used to extract raw sand.

Raw sand is screened, sorted, and washed, at the wash plant. The washed sand is conveyed to a stockpile where it settles out and is later transported to an off-site facility. Water that settles out from the stockpile is captured in drain tiles and piped to the freshwater ponds to be recycled. Currently the wash water is pumped through a filter press to remove the solids and the water is recycled. Within the life of the mine, other methods for removing solids from the wash water will be evaluated and may be used. The removed solids are typically placed directly in the mine for reclamation.

3. *Estimated volume of materials to be extracted during the operation of each cell, during the permit period, and during the full life of the operation;*

During the permit period and life of the operation the estimated volume of overburden and sandstone to be extracted is 24 million cubic yards and 69 million cubic yards, respectively.

4. *Methods for site dewatering and effluent discharge. Discharges may require a Wisconsin Pollution Discharge Elimination System permit;*

Mining is not proposed to occur below the groundwater table surface estimated at elevations ranging from 1,030 to 1,070 feet, so dewatering will not be required. The Site will not be dewatered by intercepting the groundwater table. The Site will be externally drained. The stormwater management system will be used to manage stormwater with discharge to a vegetated drainage swale immediately downstream of Pond #1. Refer to the Stormwater Management Plan (SWMP) for additional details (Appendix D).

5. *Stormwater permits required by other agencies;*

Prior to off-Site discharge from the stormwater management system, a Notice of Intent (NOI) will be submitted for coverage under the General Permit to Discharge under the Wisconsin Pollutant Discharge Elimination System Permit (WPDES) WPDES Permit No. WI-B046515-6. Sheet flow, diversion berms and swales will direct water within the mine to settling ponds then drain to stormwater management system through Pond #1. In future cells, water may be discharged from additional stormwater treatment ponds (location shown in Figure 3A). A Storm Water Pollution Prevention Plan (SWPPP) will be prepared in accordance with the WPDES General Permit.

6. *Erosion control permits required by other agencies;*

The WPDES General Permit requires Best Management Practices (BMPs) for the control of soil erosion and sedimentation to be designed, installed, and maintained in accordance with the construction site performance standards in s. NR 151.11(6m), Wis. Adm. Code, and in accordance with the WDNR Construction Site Erosion and Sediment Control Technical Standards. There are no additional erosion control permits required by other agencies.

**Note:** *County permits may be granted contingent on receipt of all other required permits for effluent discharge, stormwater management, erosion control, and highway road access.*

7. *Description of reclamation activities to be conducted during mining operations. This includes but is not limited to a description of topsoil stripping, stabilization, and conservation methods to be used during operations. Reclamation activities are to be conducted on an ongoing and progressive basis;*



The new Permit and Reclamation Plan will allow for contemporaneous reclamation to occur during mining. The previous permitting and reclamation plan was not conceived for that process to occur. Reclamation activities will include, to the extent practicable, backfilling mined out areas of the Site with non-marketable material and overburden, topsoil and then be seeded and mulched or planted with woody vegetation, as appropriate. Activities described below will be performed in general accordance with the Reclamation Standards.

The topsoil within each mining Phase will be systematically stripped by mining Cell using heavy equipment and where present and feasible, the A and B Horizon components will be stored in separate stockpiles with stable slopes, and seeded to stabilize. Although the Reclamation Standards require that a minimum of 8 inches of topsoil be stripped and stockpiled, the average topsoil thickness in the mining areas may be less than 8 inches. As mining commences for each Phase, the actual topsoil thickness will be estimated within each mining Cell based on the NRCS report and supplemented by hand borings and test pits. The Reclamation Plan does not include importation of topsoil and will manage the existing topsoil as efficiently as possible in general accordance with the Reclamation Standards.

The stabilization treatments will be followed in general accordance with the Reclamation Standards. Seeding will follow topsoil reapplication, as appropriate and mulch will be applied to seeded areas greater than 10:1 (10 percent) slope, as needed. Woody vegetation compatible with site characteristics may be planted as determined by the operator. Flat areas or slopes flatter than 6:1 (17 percent) trees may be planted without seeding the Site. Final reclamation along the northern boundary will be a high-angle bedrock slope.

Sodding, rip-rap, or other appropriate measures may be required for areas of drainageways which convey concentrated flow to, across or from the Site, and for critical erosion areas as needed to correct a problem on the Site. Silt fence, sediment basins, rock weirs and similar structures and methods which require ongoing maintenance are not included in the long-term reclamation design. The intent of final reclamation is to leave the site in a maintenance free and stable condition. The Reclamation Plan incorporates designs to prevent soil, sediment, and debris from the mine Site from migrating beyond the boundaries of the Site.

8. *The sequence of progression through and between planned cells;*

The Mine Phases shown on Figures 3A and 3B represent the current understanding of the mining areas. The general sequence of mining and reclamation but not necessarily the rigorous, final mine sequencing by Mine Cell, is shown in Figures 6 and 7. Site conditions and markets will determine the detailed sequence of mining within each Mine Phase, and Mine Cells will be planned prior to mining to fit the geology and other of the Mine Phase.

The mine sequencing as shown by the Mine Phase boundaries may change, and the Mine Cells within a Mine Phase may coalesce or be split as conditions warrant. Mining at this time is not expected to expand beyond the Potential Mineral Extraction Area shown on Figures 3A and 3B however; this does not mean other land on the property will not be used for indirect mining needs such as haul roads, overburden storage, and/or infrastructure development.

9. *A timetable for the commencement and cessation of nonmetallic mining operations. The timetable shall document the sequence of excavation and reclamation during operation of each cell, during the permit period, and during the projected life of the site.*

Mining operations are ongoing in Phases 1 and 2. Based on the estimated mineral reserves, the planned Mine Phases, and the present production and market conditions, mining may continue for 60 years. In general, mining will proceed from Phase 2 through Phase 13. When mining commences for each Phase, the actual topsoil thickness will be estimated within each mining Cell based on the NRCS report and supplemented by



hand borings and test pits. Following the construction of the proposed stormwater management system and ponds, Portions of Phase 1 may be reclaimed. Following mining in Phase 2, mining will then commence in Phase 3, then Phase 4, then proceed east. Final mine reclamation will follow mining in Phase 3, 4, etc. Table 1 is the estimated timetable of mineral extraction for each mine phase; each mine phase is designed to represent approximately 4 years of mining. Estimated volume and mass are based on assumptions provided in the table.

3. ***Final Site Plan:*** *The Final Site Plan shall include a final site map and text describing measures to be used to restore the site. Site reclamation shall comply with county Reclamation Standards.*

***(a) Final Site Maps***

1. *Final depths, final slope angles, and slope stabilization measures;*

Figures 4 and 5 depict the Final Site Plan, which is a conceptual design of final depths, slope angles, and stabilization measures, where applicable. After backfilling and grading, the final slope angles will also vary depending on the location within the mine. Slope stabilization measures will range from none on high angle slopes to seeding and mulching, as needed.

The proposed final site reclamation for the northern Site boundary is a high angle bedrock slope. Refer to the Figures 4 and 5 which define and depict the anticipated geometry and architecture of the northern Site boundary. A GZA Professional Engineer observed the existing high-angle rock slopes and prepared an engineering analysis contained in Appendix E.

2. *Areas which convey concentrated flow to, across, or from the site;*

Anticipated surface water flow directions across the Site to intermittent streams are shown on Figures 4A and 4B.

3. *Locations of facilities or structures to remain in place;*

No facilities or structures are anticipated to be left on the Site.

4. *Locations of planned development features on the site following closure;*

There are no planned developments at this time.

5. *Cross sections through the site – sufficient sections to show current ground surface, final slopes, groundwater elevation, and significant ground elevations*

Cross section(s) through the proposed reclaimed Site are provided on Figure 5. The Engineering analysis contained in Appendix E includes a conceptual profile for the proposed high angle rock slopes.

***(b) Description of Final Reclamation***

1. *Description of plans for disposition of surface structures, roads, and related facilities after cessation of mining;*

At the completion of mining, surface structures and facilities will be decommissioned and removed from the Site. Ponds, berms, and other earthen features will be graded. Land beneath former structures and features will be reclaimed following the Reclamation Plan as shown on Figures 4A and 4B. The entrance and all or portions of the paved road will be decommissioned and restored to match the planned reclamation for the immediate area (e.g. topography, vegetation, etc.).



2. *Description of topsoil reapplication;*

Topsoil reapplication and stabilization treatments will be in general accordance with the Reclamation Standards and are detailed below, Section 4 E. Although the Reclamation Standards require that a minimum of 8 inches of topsoil be stripped and stockpiled, the average topsoil thickness in the mining areas may be less than 8 inches. As mining commences for each Phase, the actual topsoil thickness will be estimated within each mining Cell based on the NRCS report and supplemented by hand borings and test pits. The Reclamation Plan does not include importation of topsoil and will manage the existing topsoil as efficiently as possible in general accordance with the Reclamation Standards.

Seeding will follow topsoil reapplication and mulch will be applied as needed, to seeded areas with slopes greater than 10:1 (10 percent) slope. On flat areas, defined in the Reclamation Standards as slopes flatter than 6:1 (17 percent), trees may be planted without seeding. Figures 4A and 4B show areas where reclamation will include reapplication of topsoil followed by seeding and mulching and areas where woody vegetation will be the predominant reclamation. Areas of dominate woody vegetation will receive topsoil commensurate with the thicknesses removed from the site.

3. *A description of how the reclamation plan addresses the long-term safety of the reclaimed mining site. The description shall include a discussion of site-specific safety measures to be implemented at the site and include measures that address public safety with regard to adjacent land uses;*

The Site will remain private property with no public access and may be posted. As stated above, surface structures and facilities, if not retained by the owner, will be decommissioned, and removed from the Site.

In accordance with WAC NR 135, and the Reclamation Standards, the proposed final grades may include high angle slopes or other unmined and undisturbed natural solid bedrock as stable and safe and not in need of reclamation or designate other areas affected by mining including slopes comprised of unconsolidated materials that exceed a 3:1 slope, whether or not graded, as stable and safe. As in the natural landscapes and along highway road cuts, further institutional or physical measures such as visual warnings and physical barriers are not required or proposed.

A GZA Professional Engineer observed the existing high angle rock slopes and prepared an engineering analysis contained in Appendix E. Included in the engineering analysis is a recommended reclamation mine slope conceptual geometry. Based on the observed performance of the existing high angle rock slopes, the distances from the proposed highwalls to streams and wetlands, and the proposed reclamation topography and vegetation between the proposed high angle slopes and streams and wetlands, the standards for environmental and surface water protection described in NR 135.06(5) and NR 135.07 will be achieved.

**Note:** *Safety measures include: visual warnings, physical barriers, slope modifications such as reclamation blasting, scaling of the rock face, creation of benches. Other measures may be employed if found to be equivalent by a registered professional engineer.*

4. *Seeding plan which shall include a seeding schedule, seeding type and rates, mulching, netting, tree plantings, and other techniques needed to accomplish soil and slope stabilization;*

The objective of site revegetation will be to reclaim disturbed acreage to recreation and wildlife habitat with a grassland, prairie, and forest savannah land cover. Mulching, seeding, and planting of trees will be in general accordance with Appendix XI, WisDOT Standard Specifications; NRCS Critical Area Planting Code 342; Wisconsin Agronomy Technical Note 5 ("Technical Note 5") contained in Appendix F and the Site Rehabilitation and Vegetative Management Plan described below.



Rocks and brush piles generated during mine site preparation may be utilized in the revegetation plan to create natural diversity in habitats for wildlife. An organic mat of hay/straw may be applied as needed, prior to seeding. Mulch will be applied to be loose enough to allow some sunlight to penetrate yet thick enough to provide shade and protection from desiccation and raindrop impact and erosion.

Areas to be seeded will be revegetated following the final grading by a prairie grass and forb seed mix based on Technical Note 5. Tables 11, 12, and 13 from Technical Note 5 will be the template used to establish an appropriate seeding mixture(s). The native prairie species will benefit from the effect of annual Canada Wild Rye used for soil stabilization, weed competition, and improved root structure soil profile, and will become more prevalent in subsequent years. Baseline requirements for prairie restoration include:

1. The seed mix will contain approximately 25 species, including up to 20 native prairie forbs and 5 native prairie grasses.
2. The seed mix will consist of approximately 25% forbs by weight, and 75% grasses by weight.
3. No individual forb species will consist of more than 5% of the total seed mix by weight.
4. No individual grass species will consist of more than 25% of the seed mix by weight.
5. Seed will be acquired on a Pure Live Seed (PLS) basis.
6. Prairie seed will be from genetic stock suitable for adaptability to the local climatic conditions.
7. Prairie seeding will take place prior to July or between September 15 and December 15. A temporary stabilization seed mix (such as Canada Wild Rye) may be used as a cover crop if a mine phase reaches reclamation grade before or after the prairie seeding dates. The cover crop may need to be plowed under prior to seeding with the prairie mix.

Using Tables 1 through 9 in Wisconsin Agronomy Technical Note 8, woody seed mix(es) will be planted in copses as determined appropriate by Operators sole discretion. Technical Note 8 indicates that tree species to be planted on a given site will be randomly mixed according to tables 1-9 and site conditions. Baseline planting specifications for planting of woody seedlings include:

1. Planting tree and shrub material will be from genetic stock suitable for adaptability to the local climate conditions.
2. Tree stock will be six to 12-inch or taller seedlings.
3. Trees and shrubs will be planted in early spring (April) or late summer (early September) for maximum opportunity of success.
4. Trees will be watered in thoroughly at the time of planting.

Site Rehabilitation and Vegetative Management Plan describes the management practices, methods, and techniques that will be used to:

1. Recondition the disturbed "mine soil" and prepare the seed bed to assure the success of the vegetative planting.

After backfilling and grading of an area is completed, the area will be scarified prior to redistribution of A and B horizon soils to limit compaction promote integration of subsoil and topsoil and recondition the mine soil to improve overall infiltration.

2. Manage site vegetation to achieve the sustainability of selected plant communities.





Routine monitoring during reclamation will be done to evaluate plant viability and survival and additional planting completed as necessary to sustain selected plant communities.

3. Monitor and control noxious weeds and invasive species to target levels.

Routine monitoring during reclamation will be done to control noxious weeds and invasive species to target levels. Noxious weeds will be eradicated from the seeded areas as soon as they become evident by hand pulling or by applying a post-emergence herbicide.

5. *Description of anticipated future use of the site.*

The owners have expressed a desire that the future land use of the Site be for recreation and natural wildlife habitat. Final reclamation use is not intended to be suitable for agricultural use or row cropping.

6. *Criteria for completed reclamation*

The completion of successful reclamation shall be determined through physical site inspections. In making the determination of successful reclamation, the Department may take into account other supporting information, provided by the Operator, including information generated from other areas of the mine site that have been previously reclaimed.

Specific criteria for determining successful reclamation may include:

1. Site stability
2. Plant density and species diversity
3. Soil chemistry, fertility, and type & amount of soil organic matter
4. Soil depth, plant rooting depth, and soil infiltration
5. Other alternative criteria, as agreed to by the permitted mine operator and County

Compliance of the proposed reclamation activities shall be determined by:

1. On-site inspections by the regulatory authority, its agent; or if necessary an independent third-party;
2. The Annual Reclamation and Activities Report (Appendix G);
3. Documented Reclamation Inspections (Appendix H); and/or
4. A combination of inspections and reports.

#### 4. **Other Information**

*The county may require other information as may be necessary to determine the nature of the extraction operation and proposed reclamation.*

The following sections address the 2009 Guidance, Item 2.

1. *Additional minimum requirements for mines in bedrock:*

- A. Groundwater Management (NR135.08 & 135.19)

- (i). *Depth to water table*





Due to the wide range of ground surface elevations, the depth to groundwater varies across the Site by as much as 50 feet. Groundwater elevations are measured in five on-Site monitoring wells quarterly and range in elevation from approximately 1,030 to 1,070 feet as shown in Figure 2A. The groundwater elevation data from these five monitoring wells will be used to develop a Site-specific groundwater elevation map to be submitted with the Annual Report and Activities Plan.

Groundwater elevation contours derived from the Wisconsin Geological and Natural History Survey's Generalized Water-Table Elevation map for Chippewa County are included in Figures 2A and 2B. The proposed mining will be above the groundwater table surface and will not impact groundwater gradients and flow patterns, surface water or stream base flow down gradient of the mine. Based on the topography of the Site and the proposed mine plan, supplemental groundwater monitoring wells will be installed before mining progresses past Phase 5 (Figure 2A and 2B).

(ii). *Volumetric storage capacity of unsaturated bedrock.*

*Note: Volumetric storage capacity is only required when the water table is within 20 feet of the proposed final floor elevation of the mine.*

The final mine floor elevation will be greater than 20 feet from the groundwater table surface.

(iii). *Groundwater elevations and Range of seasonal and historic groundwater fluctuations.*

*Note: Groundwater elevations are only required when the water table is within 20 feet of the proposed final floor elevation of the mine.*

The final mine floor elevation will be greater than 20 feet from the groundwater table surface

(iv). *Infiltration rate of bedrock.*

*Note: Infiltration rates are only required when stormwater ponds are proposed in bedrock.*

Stormwater ponds are not proposed in bedrock.

B. Surface Water and Stormwater Management (NR135.07 & 135.19)

(i). *Percentage of runoff routed to stormwater ponds, versus infiltration, versus internal site drainage.*

Water will be diverted away from the active mine Site using diversion berms and swales or collected internally and pumped. Water that enters the mine will be allowed to infiltrate into the mine floor, be diverted using diversion berms and swales, or collected in a sump and pumped to a stormwater management system designed to retain the 100-year, 24-hour precipitation event.

(ii). *Diversion of existing surface water flows.*

No surface water diversions are proposed. As described above, stormwater diversion berms and swales will be used as appropriate to divert contaminated stormwater from the active mine to the stormwater management system. Due to the topography of the site, surface water diversions for uncontaminated stormwater is limited and will have to be managed in the stormwater ponds.

(iii). *Water detention ponds.*

- Size: area, depth

The stormwater management ponds will consist of a large retention pond and one infiltration pond. The forebay pond will be 6 feet deep with an area of approximately 210,430 square feet ("South



Pond"). The volume of the South Pond is designed to retain 25 ac-ft of stormwater. The infiltration pond has a maximum depth of 2' and an area of approximately 22,500 square feet.

- Hydrologic budget (for 100-year event): inflow, outflow, seepage, evaporation, etc.

HydroCAD was used to develop the hydrologic budget for the stormwater ponds and does not account for evaporation. A model was evaluated for each Mining Phase 1 thru 5. For the worst-case scenario during the 100-year, 24-hour rainfall event, the South Pond will have a peak inflow of 103.61 cubic feet per second (cfs) at time 13.26 hours and a peak outflow of 0 cfs. The South Pond was designed with an infiltration rate of 0.32 in/hr. During the worst-case scenario, the South Pond will infiltrate a volume of 4.5 ac-ft of water and the pond will retain 24.9 ac-ft of water.

- The worst-case scenario was assumed to be during phase 4 which has the second largest watershed with the largest inflow to the South Pond versus the other phases. Inflow and outflow: channels, piped, pumped

The inflow to the stormwater ponds are generated from the runoff from the mine Site from Phases 1 thru 5. The outflow of the South Pond will be controlled by a manual valve which will discharge into the infiltration pond. The outflow of the infiltration pond will be channelized through a drainage ditch which evolves into a tributary south of County Highway A.

- Design for settling of solids;

The South Pond is designed for infiltration and to retain the 100 year, 24 hour precipitation event. The South Pond will allow the water to settle suspended solids as it is retained prior to discharging via a manual valve. The manual valve will be closed prior to a storm event and will remain closed until solids have dissipated. The infiltration pond will act as a secondary defense to settling solids if the South Pond overflows or the valve is prematurely opened.

*Note: Design for settling of solids only applies when the mine will be externally drained. (WI-DNR Non-Metallic Mining Operations General Permit No. 0046515-05)*

- Inlet and outlet protection

The pond's inlets and outlets are designed to be protected with WisDOT medium or large rip-rap (typical). The discharge from the South Pond and the toe of the infiltration pond are designed with a dissipation structure with 1 to 2 feet thick WisDOT large rip rap. The drainage swales approaching the ponds and discharge swale downstream of the ponds are protected with WisDOT SEED Mix No. 75.

- Emergency spillway

The emergency spillways are designed with WisDOT medium rip rap (typical).

- Pond maintenance requirements, including sediment removal and disposal

The ponds are designed for infiltration and will be maintained to keep the infiltration rate per design.

*Note: Water detention pond details are only required when stormwater ponds are proposed to meet the requirements of NR 216.22*

(iv). Provide a copy of proof of coverage for the site under WPDES Permit for Nonmetallic Mining, under NR216.21, or other required state stormwater permit.

Proof of coverage will be provided following submittal of the NOI for coverage under the General Permit to Discharge under the WPDES Permit No. WI-B046515-6.



C. Soil and Overburden Management (NR 135.09 & NR 135.19)

- (i). *Document thickness and volumes of topsoil (A horizon), subsoil (B horizon), and overburden to be stripped and stored.*

*Note: Thickness and volume of “overburden” (material not including A-horizon & B-horizon soils) is only required for mines greater than 20 feet deep with a high angle slope as defined in NR135.03.*

As mining commences for each Phase, the actual overburden and topsoil horizon thickness will be estimated within each mining Cell based on the NRCS report and supplemented by hand borings and test pits.

- (ii). *Stripping process for topsoil, subsoil, and overburden over the full extent and life of the mine.*

Refer to Section 2(b).

- (iii). *Separate stockpiling of each soil horizon and overburden over the full extent and life of the mine.*

Refer to Section 2(a)4 and Section 2(b).

- (iv). *Stockpile location, construction, and stabilization.*

Refer to Section 2(a) and Figure 3A.

- (v). *Screening berms: location, dimensions, erosion control, seeding.*

Screening berms are not proposed. The Operator will plant trees, in accordance with Section B (1) “Screening”, 5 years in advance of proposed mining within 1,000 feet of County A and 50th Street.

- (vi). *Interim management of externally generated soil materials (examples include processing fines or topsoil substitute).*

Externally generated soil materials brought to the Site will be used for mine reclamation in a timely manner or stored as described below. Stockpiles of suitable reclamation soils, including A horizon, B horizon, overburden, and clean processing materials, will be maintained in clearly marked segregated piles on stable ground clear of drainageways and depressions. Stockpiles will be treated as necessary to prevent the establishment of weeds and may be temporarily stabilized by seeding with native prairie seeds and an innocuous cover crop.

- (vii). *Vertical management of mining (# of lifts, etc.)*

*Note: Vertical management of mining is only required for mines greater than 20 feet deep.*

Mine depth is a relative term. The mine will have little if any discernable depth as approached from the south. The mining methods, used currently and anticipated in the immediate future, rely on ripping and grading techniques mining from the high ground until the desired bottom elevation is reached. Other mining methods may also be used in the future.



D. Slope Reconstruction (NR135.10 & NR135.19)

*Note: Section D, only required for mines greater than 20 feet deep with a high angle slope as defined in NR135.03.*

*(i). General sequence.*

High angle slopes may remain along portions of the northern boundary of the Site. The slopes will be scaled and not reconstructed. The portions of the mine not reclaimed as a high angle slope will be graded relatively flat or sloped generally to the south following the preexisting natural grades.

*(ii). Material source(s). Examples include overburden, rejected mine material on site, hauled in fill materials. Hauled in materials may include processing fines or fill materials from other sources.*

The material sources for finish grading will include overburden and reject material.

*(iii). Offsite materials and testing. Provide a testing protocol, in advance, for hauled in fill materials, solid wastes, or other materials proposed for use in reclamation.*

No garbage, refuse, or sludge from waste treatment or water supply treatment plants, will be hauled to the Site.

Non-metallic mining reject, such as waste soil, rock, and other natural material resulting from the non-metallic mining operation, that is generated on or off site may be used for reclamation. Material that is brought to the site will be evaluated and, if warranted, samples analyzed at a state certified laboratory.

*(iv). Estimate of volume of overburden available for slope reconstruction; relation to volume of material needs for slope reconstruction.*

The estimated available overburden for slope reconstruction is approximately 24 million cubic yards.

*(v). Details of slope construction process.*

Soil management and reconstruction techniques will be implemented to minimize the compaction of soil and regraded areas. Operations will not be conducted under wet conditions. Vehicle traffic on replaced soil will be minimized. Low pressure bulldozers will be preferred for soil grading on reclaimed surfaces.

Overburden, rejected mine material, clean fill and processing fines will be used to achieve the rough final grade. Final grading will use stockpiles A and B horizon soils will be used for final grading. If necessary, the final reclamation surface will be tilled or scarified to reduce compaction, promote rooting depth, prevent abrupt textural boundaries, and create surface stability.

A combination of non-channel erosion mat, channel erosion mat, silt fencing, sediment bale barriers and/or ditch checks will be placed around areas with newly-laid A and B soil horizons to minimize loss of soil and to protect on-site surface water as needed. The soil may be watered depending on conditions.

*(vi). Management of inactive unreclaimed mine faces.*

High angle slopes left as unreclaimed mine faces will be left in-place as deemed safe by a professional engineer consistent with WAC NR 135.



E. Topsoil Reestablishment (NR135.11 & NR135.19)

(i). *Details of soil application process.*

Refer to Section D (v) above.

(ii). *Reestablishment of soil horizons, i.e. topsoil (A horizon) and subsoil (B horizon).*

Refer to Section D (v) above.

(iii). *Measures to limit compaction.*

*Note: Measures to limit compaction are only required for mines with slopes longer than 60 feet.*

Refer to Section D (v) above.

(iv). *Vegetation rooting depth for selected vegetation types.*

The grasses and forbs selected for reclamation have rooting depths of 5 to 15 feet. Tree rooting depths may reach 100 feet.

(v). *Erosion control.*

Erosion control and stormwater management will be implemented in accordance with the conditions of the WPDES Permit No. WI-B046515-6 (or current revision). Specific erosion control devices utilized will be determined by referencing the Channel Erosion Control Matrix and Slope Erosion Matrix from the Wisconsin Department of Transportation Facilities Development Manual (Appendix IX, or current edition). Temporary erosion control measures employed at the site will follow current BMPs (WDNR Conservation Practice Standards are in parentheses):

- Erosion bales and sediment logs may be placed as ditch checks in swales and ditches (Sediment Bale Barrier - 1055, Ditch Checks - 1062).
- Silt fence may be installed at the edges of berms and stockpiles and outside the active mine area, where it may not be protected by previously installed erosion control measures (Silt Fence - 1056).
- Seed and mulch may be applied on berms, permanent stockpiles, diversions, and channels, located outside the active mine area, and mine area that is no longer active (Seeding - 1059, Mulching - 1058).
- Erosion mats may be placed in concentrated flow channels and on slopes greater than 4:1 (Channel Erosion Mat - 1053, Non-Channel Erosion Mat - 1052).
- Rock rip-rap may be placed where necessary as ditch checks, channel liners, and at inlet/outlet structures (Ditch Checks - 1062).
- Stone tracking pads may be used at the site access point. (Stone Tracking Pad - 1057).

Erosion control Best Management Practices (BMPs) will be inspected weekly and within 24 hours after rainfall events of 1/2 inch or greater during a 24-hour period until the drainage area has been either temporarily or permanently reclaimed. Weekly inspections occur seasonally. In the event of slope failures, failed seeding, or persistent erosion problems, additional BMPs will be assessed and applied where practicable. BMPs may include hydro seeding, silt fence, erosion control mats, turf reinforcement mats, water diversions, rock lined chutes, slope breaks, soil stabilizers, and inlet protection.



**F. Site Revegetation (NR135.12 & NR135.19)**

*Note: Section F is only required for mines with slopes longer than 60 feet.*

The Reclamation Standards Section C (2) refer to flat areas as slopes less than 6:1 (17 percent). As shown in Figures 4A, 4B and 5, the slopes requiring revegetation will be less than 6:1.

**G. Long-Term Slope Stability (Function of Slope % and Slope Length) (NR135.10 & NR135.19)**

The Reclamation Standards Section C (2) refer to flat areas as slopes less than 6:1 (17 percent). As shown in Figures 4A, 4B and 5, the slopes requiring revegetation will be less than 6:1.

**5. Other Information Continued – 2009 Guidance Monitoring and Reporting Requirements**

**1. Reclamation and Construction Inspection Plan**

A Reclamation Inspection Plan is contained in Appendix H.

**2. Annual Reclamation Report and Activities Plan.**

The Annual Reclamation Report and Activities Plan (Contained in Appendix H) will document the reclamation activities completed throughout the past year and the activities planned for the upcoming year. The report will be filed with the Department of Land Conservation & Forest Management for each calendar year and be submitted by January 31. The Annual Reclamation Report and Activities Plan will be the basis for establishing successful reclamation pursuant NR 135.13. Following NR 135.36, an operator shall submit an annual report for every non-metallic mining site with a reclamation permit to the regulatory authority. The annual report shall include all of the following:

- a. The name and mailing address of the operator
- b. The location of the nonmetallic mining site, including legal description, tax key number or parcel identification number if available.
- c. The identification number of the applicable nonmetallic mining permit, if assigned by the regulatory authority.
- d. The acreage currently affected by nonmetallic mining extraction and not yet reclaimed
- e. The amount of acreage that has been reclaimed to date, on a permanent basis and the amount reclaimed on an interim basis
- f. A plan, map or diagram accurately showing the acreage described in pars. (e) and (f).
- g. The following certification, signed by the operator:

"I certify that this information is true and accurate, and that the nonmetallic mining site described herein complies with all conditions of the applicable nonmetallic mining permit and Chapter NR 135, Wisconsin Administrative Code."

**3. Financial Assurance**

Financial Assurance in the form of Surety Bond or Irrevocable Letter of Credit meeting the requirements of the Chippewa County Nonmetallic Mining Reclamation Ordinance and NR135.40 is required throughout the life of the mine. The financial assurance will be estimated annually.



For mining completed through December 2017, the financial assurance was estimated to be \$2,175,250 as shown in Table 2. The financial assurance estimate includes 10 percent markup for Chippewa County Administration of design and reclamation oversight.