# Table of Attachments

<table>
<thead>
<tr>
<th>Attachment</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Study on Heavy Vehicle Traffic Impacts on Roads</td>
</tr>
<tr>
<td>B</td>
<td>Summary Report of Silica Sand Mining in Wisconsin</td>
</tr>
<tr>
<td>C</td>
<td>Winona County Traffic and Road Impact Study Requirements</td>
</tr>
<tr>
<td>D</td>
<td>Winona County Silica Sand Mining Committee Information</td>
</tr>
<tr>
<td>E</td>
<td>Houston County Draft Traffic Impact Ordinance</td>
</tr>
<tr>
<td>F</td>
<td>Wisconsin Agreement with Chippewa Sands</td>
</tr>
<tr>
<td>G</td>
<td>Wisconsin Agreement with EOG Resources</td>
</tr>
<tr>
<td>H</td>
<td>Wisconsin Agreement with Houston Sands</td>
</tr>
</tbody>
</table>
ATTACHMENT A

STUDY ON HEAVY VEHICLE TRAFFIC IMPACTS ON ROADS
Effect of Heavy Loads on Pavements
Houston County Board of Commissioners Meeting
19 March 2012

Dr. W. James Wilde, P.E.
Professor, Minnesota State University
Director, Center for Transportation Research and Implementation
Mankato, Minnesota
Background

• Minnesota State University, Mankato
• Center for Transportation Research and Implementation
• Local Road Research Board
• Recent Projects
  – Traffic Generating Development and Roadway Life Consumption
  – Effects of Heavy Vehicles on Local Roadways
Basics of Pavement Deterioration

- Wheel Loads
- Deflection
- Stress, Strain, and Fatigue
- Cracking, Rutting, etc.
Basics of Pavement Deterioration

All wheel loads cause damage to the pavement

But...

All wheel loads are not created equal.
Vehicle Loads

- 1000 lb
- 1000 lb
- 3500 lb
- 2500 lb
- 12,000 lb
- 34,000 lb
- 34,000 lb
- 12,000 lb
Relative Pavement Damage

• Pavement damage follows approximately a 4\textsuperscript{th}-power rule.

• This means that if the load is doubled (x2) the damage is 2\textsuperscript{4} (x16)!

• If the load is increased by 20\%, the damage is doubled!
Loads and Deflections
Loads and Deflections
Stress, Strain, and Fatigue
Minnesota LRRB – Loads and Roads

http://www.mnltap.umn.edu/about/programs/truckweight/videos/
Example from Houston County

- A single sand mine may produce 270,000 tons of sand per year
- 11,740 trucks per year at 23 tons/truck
- A typical roadway in Houston County may be designed for 50,000 trucks over its entire lifetime
Example from Houston County

- The additional trucks can “consume” the designed life of the pavement in less than 5 years.
Pavement Condition

• Unplanned heavy trucks beginning in year 10
Pavement Condition

- Unplanned heavy trucks beginning in year 0
Summary

• All loads stress the pavement layers
• Heavier loads cause much higher stress
• Higher stress results in fewer allowable repetitions before failure (cracking, rutting, etc.)

http://www.lrrb.org/trafcalc.aspx
http://www.mnltap.umn.edu/about/programs/truckweight/videos/
Questions?

![Graph showing the condition of pavement over age with two lines: one for Standard Design and another for Heavy trucks starting at year 0.]
ATTACHMENT B

SUMMARY REPORT OF SILICA SAND MINING IN WISCONSIN
1.0 Introduction
Sand mining has occurred in Wisconsin for hundreds of years; however, recently there has been a dramatic increase in the number of mining proposals. This increase is attributed to a surge in hydrofracking, a technique used by the petroleum industry to extract natural gas and/or crude oil from rock formations, which requires a certain quality of sand in the process. Wisconsin possesses high-quality sand resources and therefore is seeing a substantial rise in mining permit requests to mine for frac sand. Consequently, the topic of sand mining in Wisconsin has generated interest from regulators, legislators, local government, and the general public.

2.0 Purpose of this document
This is an informational document that summarizes our best current information on the mining process, possible environmental impacts, and applicable regulations. There are no oil or gas wells located in Wisconsin, thus this document does not address the effects of the hydrofracking technique. This document is intended to be a dynamic document and will be updated periodically as new significant information becomes available.

3.0 Background Information Hydrofracking, Frac Sand and Frac Sand Mining in Wisconsin

3.1 What is Hydrofracking?
Hydrofracking is also referred to as hydraulic fracturing or fracing. The technique involves drilling a typical oil or natural gas well thousands of feet below the earth’s surface and using explosives to create small cracks in the rock. Then water, frac sand, and chemicals are pumped under high pressure into the well for the purpose of expanding the cracks and holding them open. By fracturing the rock and then holding these fractures open it is possible to more easily remove the resources sequestered in the rock. Hydraulic fracturing has been around for over 60 years but recent developments in directional boring and other technologies in combination with hydraulic fracturing now allow for the extraction of natural gas and oil that was previously not extractable. Use of these techniques has also made it more economical to extract oil and gas from formations that were previously too expensive to mine. Because of this, there has been a large increase in hydraulic fracing and thus an increase in demand for frac sand. Most of the natural gas shale rock wells are located in Texas, Oklahoma, Mississippi, Arkansas, New York, North Dakota and Pennsylvania.
Figure 1, Clockwise: Trailers of sand and compressor trucks around a well during a hydrofrac job. Lower right, well rounded pure quartz sand typical of Wisconsin Cambrian sandstones. Lower left, basic principles of hydrofracking. Fracturing low permeability gas bearing shale with fluid pressure, sand is injected as a proppant to hold fractures open and allow gas to flow from rock.

Figure 2, Locations of major shale gas resources (American Petroleum Institute)
3.2 What is Frac Sand?

Frac sand is silica sand or silicon dioxide ($\text{SiO}_2$), also referred to as quartz. Silica sand has been mined for thousands of years as it has many uses, from paving roads to filtering drinking water. It is also used in the hydrofracking process: fluid pressure fractures the rock and opens natural fractures and pores that would normally be closed due to the weight of the overlying rock, the sand grains are then carried into these fractures and prop them open after the fluid pressure is released. Hence the name *proppant*; a term commonly applied to frac sand.

Not all silica sands can be used for hydrofracking. To meet the industry specifications, frac sand needs to be nearly pure quartz, very well rounded, and must meet tight size gradation standards. The sand must also have a high compressive strength, generally between 6,000 psi and 14,000 psi. Sands that meet these specifications are mined from poorly cemented Cambrian and Ordovician sandstones and from unconsolidated alluvial sands locally derived from these sandstones. Sands derived from Quaternary glacial deposits, and most beach and riverbank sands are too impure and too angular to be used as frac sand. Wisconsin has areas which contain high-quality silica sands which are desirable for use in hydrofracking.

3.3 Sand Mining in Wisconsin

Wisconsin has abundant resources of sand that range in age from Quaternary glacial deposits to marine sandstones of Cambrian age (500 million years). Sand has been mined in Wisconsin since the arrival of the first permanent settlers. The oldest continuing use has been as fine aggregate for mortar and concrete. Molding sand has been mined since the beginnings of the foundry industry in the 19th century. Sand has also been mined for filter beds for drinking water and wastewater treatment, well screen packing, glass manufacture, and bedding sand for dairy operations.

Frac sand for use in the petroleum industry has been produced in Wisconsin for over 40 years. However, the demand for frac sand has increased exponentially in the past two to three years. Wisconsin has approximately 60 mining operations involved in extraction of frac sand and approximately 30 processing facilities operating or under construction. Current mining operations are primarily located in West Central Wisconsin but there are also facilities in Burnett, Green Lake and Waupaca Counties. This does not include very small operations or the frac sand being removed and sold as a result of excavations associated with cranberry culture.

A conservative estimate of Wisconsin frac sand mining capacity based on existing mines, mines under construction, and processing plants would be in excess of 12 million tons per year. Currently there are approximately 20 new mining operations being proposed and the impacted counties report considerable interest and many mine and processing plant proposals are under consideration.
3.4 Location of Frac Sand in Wisconsin

Sand that will meet frac sand specifications is found in the Cambrian: Jordan; Wonewoc; and Mt. Simon Formations; and in the younger Ordovician-age St. Peter Formation (Figure 4 and 5).

Principal areas of interest for sand mining have been in western Wisconsin, from Burnett and Chippewa Counties in the north to Trempealeau, Jackson and Monroe Counties in the south.

Activity in the north, primarily in Barron and Chippewa Counties has concentrated on mining Jordan Sandstone from exposures on hilltops, and on mining Wonewoc Sandstone on lower hillsides. The lower part of the Jordan Formation, the Norwalk Member, and the underlying St. Lawrence dolomite and Tunnel City sandstones are too fine grained and contain impurities such as feldspar which make them unsuitable for use as frac sand.

In Pierce County, Jordan Sandstone (the upper coarser grained Van Oser member) has been mined underground for many years from tunnels driven into the bluffs beneath the Prairie du Chien Dolomite. The fact that the Van Oser Member is near the top of the Jordan has created interest in mining it from the floor of depleted Prairie du Chien dolomite quarries on ridge tops in Dunn, St. Croix, and Buffalo Counties.
**BEDROCK SAND RESOURCES**

**Cambrian Wonewoc Fm.**
Important producer and potential resource in west, not exposed elsewhere.

**Cambrian Jordan Fm.**
Extensive potential in west, currently important source of frac sand from underground mines. Poor exposure in east.

**Ordovician St. Peter Fm.**
Long production history and good potential in south and east. Channels can make prospecting a challenge in the northeast.

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**Figure 4.** Stratigraphic column for Wisconsin showing position of Cambrian and Ordovician sandstones mined for frac sand. *(WGNHS Educational series 51, 2011)*

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**GEOLOGY AND SAND PRODUCTION SITES IN WEST-CENTRAL WISCONSIN**

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**Figure 5.** Regional geologic map showing Cambrian sand outcrop area in yellow and St. Peter Sandstone in green in west-central Wisconsin. *(From USGS Geologic Map of USA)*
Figure 5 shows the distribution of the formations that are targets for frac sand development in western Wisconsin. The rocks are essentially flat lying, with a slight dip to the west. The pattern on the map is due to erosion that has cut down through the layers, exposing the older rocks in the valleys. This is the coulee topography typical of the Driftless area, a region of Wisconsin not covered by the Quaternary glaciers.

The Jordan Formation forms a narrow outcrop band on the upper slopes of the ridges, and is exposed in the valleys of southern Pierce County and along the western side of the Chippewa Valley. The Wonewoc forms a wider outcrop area on the lower slopes.

Most new mines under development or proposed in Trempealeau, Dunn, Buffalo, Jackson, and Monroe Counties are in the Wonewoc. The Wonewoc is finer in average grain size than the Van Oser Member of the Jordan, but high purity makes some of the material that is too fine for frac sand suitable for the glass industry. Although the Wonewoc has more material not suited for frac sand, it is easier to mine in the southern region because of the much greater surface exposure, which eliminates the need to mine underground.

Figure 6, Sand mine in the cranberry growing area of Monroe County. Sand is part bedrock and part alluvial sand derived from weathering local bedrock. (Photo by B.A. Brown, WGNHS)
4.0 A Typical Sand Mining Operation

Although there is a great amount of variability in how sand is mined, this section describes a typical sand mine and sand processing plant. Note there are several mining facilities in operation and several proposed that mine or would mine below the groundwater level utilizing hydraulic dredging to remove the sand. The overview of the sand mining process provided below is descriptive of a more common dry mine although in both cases many of the same additional processing steps would take place with both mining methods.

4.1 OVERBURDEN REMOVAL/EXCAVATION

Prior to any actual mining being done at a site, it is necessary to remove overburden from the top of the sand formation. Overburden is topsoil or subsoil that is mainly composed of silt, loam, clay, or combinations of the three. Overburden thickness is highly variable, but as has been stated above, a desirable trait of Wisconsin’s frac sand formations is that they are close to the surface, meaning there is little overburden to remove.

Removal is performed by scrapers or tracked excavators and off-road haul trucks. The overburden is often hauled to the perimeter of the mine site and piled into berms. Topsoil is kept separate and used on top of the berms once they have reached their final elevation. Finally the berms are seeded and mulched. The berms have multiple purposes; they provide storage for overburden until the mine is reclaimed, they provide a visual barrier between the active mine and roads or adjoining properties, they screen light pollution should the mine be operated after dark, and they act as a noise barrier.

4.2 EXCAVATION

Once the overburden has been removed, the sand is excavated. Depending upon the geological formation, blasting may be used to make the sand containing material more amenable to excavation. Excavation is typically performed by large tracked excavators or rubber-tired front end loaders. The excavated material may be taken directly to the washing process, stockpiled on site for later processing, trucked to a processing facility or trucked to a rail load-out where it would be taken by rail to a processing plant. Stockpiles may be formed by conveyors, or trucks may deposit the sand in a pile and a dozer or rubber-tired loader will push the sand, gradually building a large pile that the trucks drive on top of to deposit more sand.

4.3 BLASTING

In situations where the sand-bearing geological formation is tightly cemented it may be necessary to utilize blasting to make the sand more amenable to removal. Blasting practices can result in noise, vibration, and fugitive dust emissions. Blasting at mines will vary with site specific geology. It may be conducted as frequently as every day or only once every few months.
It is difficult to describe an average blast scenario since it is specific to each mining operation and the particular geological formation. An example of typical sand mine blast might consist of drilling 40 holes, 2 to 3 inches in diameter into the formation to be blasted. The holes could be 50 to 150 feet deep and located in a grid 20’x 20’ (example only). A charge of explosive (types of explosive vary depending upon the intended result of the blast) is placed at the bottom of the hole. A detonation cord is connected and run to the top of the hole. The space between the charge and the top of the hole is filled with stemming material. Stemming material is an inert material used to backfill a borehole for the purpose of containing the explosive energy. The stemming material also acts to minimize fugitive dust (airblast) emissions from the explosion. The type of stemming used is dependant on what is readily available at the mine site and may be composed of such things as sand or crushed rock. After the stemming material has been placed a blasting cap is attached to the detonation cord and all of the blasting caps are connected to a detonator. In modern blasting techniques the detonators are typically electronically sequenced to detonate individual blasting caps milliseconds apart. This sequencing improves the effectiveness of the blasts and reduces off site vibrations, minimizing impacts to nearby structures.

Federal Mine Safety and Health Administration (MSHA) rules require the use of water injection when drilling the blasting holes in order to control drilling dust. Prior to drilling, sand mine operators usually remove overburden, which also lessens the amount of fine material that can become airborne by blasting. If needed during summer periods, water may also be sprayed onto blast areas to minimize fugitive dust emissions.

Impacts to nearby neighbors from blasting can be minimized by using proper blasting techniques, notifying neighbors of blasts, and limiting blasting to daylight hours.

The Wisconsin Department of Safety and Professional Services regulates blasting activities. Blasting regulations in Wisconsin are found in SPS 307, Wis. Adm. Code. SBS 307 regulates licensing of individuals involved in blasting activity, allowable blasting explosives and methods, recordkeeping of blasts, notification of neighbors, monitoring of seismic and airblast energy and sets allowable seismic and airblast energy limits. This code applies to all nonmetallic mines including frac sand mine sites.

The State Mine Safety program is also administered by the Department of Safety and Professional Services. Their charge is to inspect mining operations, training, complaint response enforcement of state code and liaison with federal Mine Safety and Health Administration (MSHA).

4.4 CRUSHING
If the formation is of such a nature that it requires blasting, it is likely that the material will then need to be crushed to reduce the size of the particles for later handling. After blasting, the sand is in a mix of rocks and boulders on the floor of the mine. This material is often referred to as shot rock. A mobile crushing unit is brought to the mine and is placed close to the blast area in order to minimize the distance the shot rock needs to be hauled to be loaded into the crusher. Larger mines may have a permanently placed crushing plant. In these cases the shot rock is either conveyed or hauled to the crusher by haul trucks loaded by front end loaders or large excavators.
Crushing plants are usually composed of a primary crushing unit and a secondary crusher with a screen plant. Crushing plants are powered by either a large diesel engine, or by a generator. The shot rock is picked up by front end loaders from the blast area and carried to the primary crusher. The primary crusher breaks the shot rock into what is referred to as \textit{breaker run}. Breaker run is conveyed to the secondary crusher where it is further broken down. The resulting material is fed to a screen plant where it is sorted by size. Smaller particles of a targeted size are carried away to stockpiles. Larger particles are recycled within the plant to the secondary crusher and screens until they have reached the desired size.

4.5 PROCESSING

To be used for the hydrofracking technique, sand usually has to undergo further processing. Frac sand, as has been stated above, must be of uniform size and shape. To achieve this uniformity the sand is run through a processing plant. The plant will wash, dry, sort, and store the sand.

The sand is washed to remove fine particles. Washing is done by spraying the sand with water as it is carried over a vibrating screen. The fine particles are washed off the sand and the coarse particles are carried along the screen by the vibration. Some processing operations also use what is called an upflow clarifier to wash the sand. An upflow clarifier is essentially a tank where water and sand are continuously directed into the tank. The water washes the sand and the overflow water along with the fines overflow the tank while the washed sand falls by gravity to the bottom of the tank and is sent for further processing.

After washing the sand is then sent to a surge pile where much of the water adhering to the sand particles infiltrates back into the ground. In Wisconsin the wet portion of the processing facilities typically runs from April to mid November. The drying portion of the process can operate year round thus necessitating stockpiling of washed sand adequate to last through the winter processing months.

From the surge pile the sand is sent to the dryer and screening operation. The sand may be dried by feeding it into a large rotating drum. This drum has hot air blasted into it by burning natural gas or liquid propane. Fins inside the drum agitate the sand and carry it forward through the dryer. When it reaches the end of the drum the sand is cooled and may be further sorted by screening. Another newer drying technology is the fluidized bed dryer. Sand is introduced into the dryer and heated gas from combustion of natural gas or propane is introduced through holes in plates in the bottom of the dryer. This gas lifts or fluidizes the sand and the heated gas dries the sand. Once the sand is dried it is cooled and may be further sorted by screening. This sorting is performed so that sand particles of similar sizes may be selected and stored. Sand that is suitable for fracing is kept, and sand that is not suitable may be sold to industry for other uses that have been listed above.

Some specialized processing plants may further treat the sand by applying a resin coating to the sand particles. This coating helps the sand to flow as a slurry, and increases the crush strength.
Processing plants may be located on the same site as the mine or in some cases the processing plant is located separate from a number of mines which support the processing facility. In the later scenario the sand is transported to the processing plant by dump trucks or tractor-trailer units.

4.6 TRANSPORTATION
Transportation of sand from the time it is mined, processed, and eventually delivered to the location where it is going to be used can take many forms depending upon the location of the mine, the processing facility and the destination where the sand will ultimately be used. Within the mine the sand may be transported by front end loaders, large open-topped off-road trucks, or dump trucks. Open-topped dump trucks and closed gondola compartmentalized trucks (similar to grain trucks) are currently being used to transport sand directly to rail spurs for shipment or to processing facilities.

Vehicular traffic on local roads will have an impact on the service life and condition of the roads. The degree of road deterioration will depend on the amount of traffic, the type of vehicles, and the design of the road.

Rail currently seems to be the preferred method of transporting sand from the mine or from the processing plant to the location of final use. Most of the rail cars being used are open-topped, while some are compartmentalized bottom unloading gondola type cars. Reportedly one operation is trucking sand to Minnesota where it is being processed, then this sand is loaded onto barges and transported to market down the Mississippi River.

4.7 RECLAMATION
NR 135 Wis. Adm. Code requires all counties in the state of Wisconsin to implement a nonmetallic mining reclamation permit program including adoption of an ordinance and administration of a mining reclamation program. The purpose of this program is to assure mining sites are reclaimed to a post mining land use. Nonmetallic mining permits are subject to uniform reclamation standards that are provided in NR 135 Wis. Adm. Code.

NR 340 Wis. Adm. Code is administered by WDNR and it also has reclamation requirements. This law applies to a mine or portions of a mine that are adjacent to navigable waterways.

Because large frac sand mines are designed to be mined and reclaimed in phases there will, in most cases, be on-going contemporaneous reclamation. In any case, when the supply of sand at the mine site has been exhausted, the mine owner/permittee is required to reclaim the mine area. Mine reclamation is administered by the county regulatory authorities (RA) where the mine is located. There is some variation in what counties require for reclamation, but generally the site will be graded so that slopes do not exceed a 3:1 slope. This generally applies to slopes that will receive topsoil or substitute plant growth material but steeper slopes may be approved by the RA based on test plots or other justification. Vertical or near vertical highwalls may be approved by the county RA, if shown to be safe and stable, or if the highwall was in existence before NR135. Once grading is complete the site will have topsoil applied, and then be seeded and mulched. In some instances a mine will be converted to a building site or a farm field.
Mine owners are required to provide the RA with a bond or some other form of financial assurance as a condition of the NR 135 permit. The financial assurance must be in place prior to initiating mine development activities and must be payable to the county RA. This ensures that should an operator fail to fulfill their obligation under the reclamation plan that the County will have sufficient funding available to carry out the approved reclamation plan. It is important that County RAs periodically check to ensure that the dollar amount continues to be adequate to perform all reclamation activities necessary to comply with the uniform statewide reclamation standards in NR 135, the county reclamation ordinance, and the approved reclamation plan.
5.0 Environmental Impacts

The environmental impacts of a sand mining facility will vary by location and type of operation. This document summarizes the types of impacts that could occur.

5.1 AIR IMPACTS

Nonmetallic mining sites and frac sand processing facilities have two types of air emissions. The first is from dust that may be emitted during the mining and handling of sand. The second is from various pollutants emitted from equipment used to mine, handle, and/or process the sand.

Each mine and/or processing plant may differ within the industry. An industrial sand mine may consist of the following operational equipment:

- Blasting
- Overburden Removal and Excavation
- Backfilling
- Crushers
- Pumps
- Washing
- Stockpiles
- Conveyors
- Loading/Unloading
- Mobile Equipment Traffic
- Generators (Electrical Generating Units)

The processing of sand may consist of the following operational equipment, which could also include those processes identified above for mining operations:

- Conveyors
- Dryers
- Screening
- Storage Bins/Silos
- Loading/Unloading

Each subsection below includes an evaluation and explanation of air emissions and potential regulations as it applies to each part of the construction phase or operation.

5.1.1 Construction Impacts

No major air impacts are expected during site development. Excavation and earth work is anticipated for planned new facilities. Fugitive dust during construction would be minimized by BMPs which include paving or placing gravel on access roads and watering down roads or work areas with tanker trucks as needed. Diesel emissions from construction equipment would be temporary and minor.

5.1.2 Operational Impacts
5.1.2.1 Blasting

Depending upon the geological formations, blasting may be used to make the sand more amenable to removal. Blasting activities are likely to be performed on an intermittent basis at mining sites. Air pollution emissions related to this activity are commonly considered fugitive in nature and insignificant, and may be controlled through various methods.

Mining operators would be required to maintain a fugitive dust prevention plan, whereby methods to minimize fugitive dust emissions resulting from blasting operations would be described and followed. The WDNR can review, make suggestions, and approve these methods and typically facilities will work with their surrounding community on awareness of such events. Materials used in blasting are also regulated by the department or the department of industry, labor and human relations.

Allowable fugitive dust emissions from blasting are covered by the facility’s air management permit issued by the WDNR and are limited to 10% opacity. Opacity is defined as the degree to which emissions reduce the transmission of light and obscure the view of an object in the background. Limited observation at existing mine sites by WDNR inspectors has shown fugitive dust emissions from blasting are not significant.

5.1.2.2 Overburden Removal, Excavation, and Crushers

The removal and protection of topsoil and subsoils that lie above the target sandstone is typically required through NR 135 reclamation permits when a new mine or phase of a mine is opened during mine expansion. This work may be accomplished by using hydraulic excavators, trucks, dozers, and scrapers. Extraction is performed by front-end loaders in less consolidated deposits while blasting is required in others. When blasting is necessary, the process begins by drilling holes into the sandstone in order to allow breaking it into smaller more workable pieces by blasting with explosives (see Blasting section above). Materials will then be excavated by front-end loaders and, depending on the conglomeration of such material, a crusher unit may be utilized to further reduce particle size. Resulting materials would then be conveyed, likely by slurry transport, to further processing (see Pumps and Washing sections below). The soils are typically stored and protected in stockpiles or vegetated berms.

Air pollution resulting from this activity would include minor combustion emissions from equipment and fugitive dust (particulate). Combustion emissions are typically considered insignificant per s. NR 407.05(4)(c)9.f. Wis. Adm. Code. Those emissions may be minimized through routine maintenance of equipment to operate most effectively and efficiently. Water trucks or recycled water from the pumps and slurry system (washing operations) may be used to eliminate fugitive dust concerns during removal and excavation. Water bars or other wetting techniques may be used to minimize dust from crusher units. Soil stockpiles are seeded and mulched for revegetation as soon as the season’s work is complete, which helps minimize and eliminate fugitive dust.

These activities are typically located further within the mine area rather than near property boundaries. Therefore, it is uncommon for fugitive dust to escape off-site except during periods of strong winds and dry conditions. BMPs and fugitive dust control plans are utilized to minimize fugitive dust. These practices or plans are requirements under NR 415 Wis. Adm. Code, with specific requirements for industrial
sand mines under s. NR 415.075(6), Wis. Adm. Code, for mines that produce 2,000 tons per month or more. Facilities that implement such practices and/or plans reduce potential impacts to public health, and are subject to review and approval by the WDNR and may be made available to the public upon request.

Finally, any facility that operates a crusher unit is subject to the New Source Performance Standards (NSPS) under s. NR 440.688, Wis. Adm. Code. These units would be subject to a limitation of no greater than 15% opacity. Since most crushers do not utilize any capture system associated with their operation/emissions, the unit is considered a fugitive source of emissions. Beyond the requirements of the NSPS, the unit would also be covered by the fugitive dust prevention plan (previously discussed above).

5.1.2.3 Pumps and Washing

Some facilities utilize a slurry pump and washing system to further prepare the sand for storage, drying or loading (transport). Once the mined sand is collected and has gone through a crusher (if required), the sand is converted to a slurry by the addition of water typically provided by a closed-loop (onsite water reuse). A slurry system may require approximately 3,000 gpm of water (this can differ greatly depending on the type of slurry system utilized at each site). To the extent possible, water will be conserved and recycled by means of a settling pond. Please refer to the Storm water/Wastewater section for more information regarding wastewater discharge.

Processing is conducted with equipment which may include screening, hydrocyclones and other wet processing methods. Flocculents (chemical additives) may be used to treat colloidal clays. The materials (mainly sand) processed are within a closed-loop system, and are wet. Therefore, there will be very minimal, if any, associated air pollution emissions from this process; and this is typically considered an insignificant activity. Finished sand from the wet process will be a coarse graded material that will be stored in a stockpile.

5.1.2.4 Stockpiles

Stockpiles seen at mining or processing sites typically contain the coarse sand raw material that will eventually be fed to a dryer. The stockpiled sand is typically wet at first, but then may dry out as it sits in the open environment. Moving sand from the stockpiles and to a dryer is usually done with front end loaders and material conveyors. Please refer to the conveyor section below for more information on that activity.

Air pollution resulting from this activity would include fugitive dust (particulate). Operators would be required to maintain and follow a fugitive dust prevention plan. Depending on the processing steps taken prior to stockpiling, the grain size of the sand in the stockpiles are typically larger than PM (PM, or particulate matter, is defined as any airborne finely divided solid or liquid material with an aerodynamic diameter smaller than 100 micrometers); especially if hydrosizers are utilized during the washing phase.

5.1.2.5 Loading/Unloading – Mining Operations

Loading operations at a mine may include the transfer of raw materials into trucks or railcars for transport. Unloading operations at a mine may include the dumping of fines/reject sand brought from processing plants or other operations. Loading operations
may or may not be within an enclosed structure. Material is loaded in an enclosed structure to reduce fugitive emissions and/or assist in the capture and return of raw materials back into the process (less loss of material that could be used further down the process line). Unloading typically is done in the open environment as a fugitive source.

Activities resulting in fugitive emissions would need to follow a fugitive dust prevention plan, whereby methods to minimize fugitive dust emissions resulting from the activity would be described and followed. Such activities are considered significant and may be further regulated by specific emission limitations; whereby the limitations and compliance demonstration methods would be described by any air pollution control permit issued to the facility. Those operations that are captured and/or controlled would also be considered a significant activity, and would follow the same protocol for regulation as above.

5.1.2.6 Mobile Equipment Traffic (Fugitive Particulate & Diesel Particulate)

Mines and processing plants will include mobile equipment traffic on-site (e.g., front-end loaders, trucks, etc.). The WDNR does not account for mobile equipment emissions off-site, but has regulations for the minimization of fugitive dust that may apply to any transportation. Air pollution resulting from this activity would include minor combustion emissions from equipment and fugitive dust (particulate). Combustion emissions are typically considered insignificant per s. NR 407.05(4)(c)9.f., Wis. Adm. Code. Those emissions may be minimized through routine maintenance of equipment.

Roadway fugitive dust emissions, associated with truck traffic, may be controlled through BMPs included within a fugitive dust prevention plan. Control measures may include: (1) paving roadways, (2) spraying of water on dusty roads or sweeping of dust laden roadways, (3) utilization of a wheel wash or tire bath at the entrance/exit of the facility, (4) posting and maintenance of a low speed limit on paved or unpaved roads or other areas used by haul trucks inside the facility’s property line, and (5) covering, treatment or securing of materials likely to become airborne from haul trucks during transport, prior to any transportation off site from the quarry or mine (precautions to prevent particulate matter from becoming airborne, according to s. NR 415.075(2)(a), Wis. Adm. Code).

Diesel exhaust emissions off-site are not regulated by stationary source air pollution control permits. Emissions from diesel exhaust specific to a facility/project are not directly included in an air quality dispersion modeling analysis. They are included indirectly through inclusion of background. Diesel exhaust (mobile source) emissions are included in the air quality dispersion model only as part of the background concentrations and are added to the total impact from the stationary source emission impacts and do show attainment of the ambient air quality standards. Federal EPA regulations apply to diesel engine manufacturers for the minimization of diesel particulate or other types of emissions, and consequently those emissions are not regulated by WDNR.

5.1.2.7 Generators (Electrical Generating Units)

Most mining operations include the utilization of an electrical generator to supply electricity to equipment such as pumps, conveyors, and crushers/screen plants. The generators typically combust diesel fuel. The engines usually have very short exhaust stacks and could have relatively high potential emissions if operated 24 hours per day, 7 days a week. However, most units do not operate year round and when operated at a
location within the mine within a timeframe established by the operator and WDNR, will attain and maintain ambient air standards.

Depending on the use and portable status of the units, several regulations (Federal and State) may apply, which would further minimize pollution and ambient air impacts. One common best management practice (BMP) to meet these standards is the firing of ultra-low sulfur diesel fuel, although this is not required by Federal law. Emissions from such units are included in the WDNR’s air dispersion analysis (see section 5.1.3), which is used to establish permit requirements to assure attainment of ambient air standards.

5.1.2.8 Conveyors

Conveyors are used throughout the mine and processing plant. They are used to transport sand short distances to different operations on the sites or to stockpile material. Sand conveyed from the active mining area to storage piles is typically wet and would not require any further BMPs. However, sand conveyed from the storage piles to further processing (transfer to dryers) is typically dry and would require fugitive dust minimization practices.

Air pollution resulting from this activity would include fugitive dust (particulate). Operators would be required to maintain and follow a fugitive dust prevention plan, whereby methods to minimize fugitive dust emissions resulting from the conveyors would be described and followed. Some conveyors at larger operations would also be subject to a visible emission limitation (visible dust plume), thereby potentially making the fugitive dust prevention practices more stringent or requiring utilization of better controls (e.g., covering of conveyors).

5.1.2.9 Dryers

Prior to sand being sized and stored as a final product, it typically goes through a drying process to reduce the moisture content. Sand is brought from stockpiles to the dryer via conveyors. The dryers operate on natural gas (or propane fuel as backup) and heat the sand to evaporate water. Emissions from the drying process are typically controlled by some mechanical collector (cyclone or baghouse), reducing particulate matter exhausted through a stack. The dried sand is then fed by conveyors to storage bins or directly to a screen house via conveyors.

Air pollution resulting from this activity would include combustion emissions and particulate. Combustion emissions are minimized by firing clean burning fuels such as natural gas or propane. Resulting particulate (mainly sand and very small quantities of combustion particulate) from the drying process is typically controlled by the use of a cyclone or baghouse. These devices are able to achieve a control efficiency of at least 95% or better (some baghouses can achieve 99.5% or better control). Collected materials in the baghouse will be disposed of at the mine site as fines or reject material.

Emissions from the dryer are subject to the new source performance standards (NSPS) in s. NR 440.73, Wis. Adm. Code. Particulate matter and PM$_{10}$ (particles smaller than 10 microns) emissions from the drying process are limited to 0.057 grams per dry standard cubic meter (g/dscm), according to s. NR 440.73(3)(a), Wis. Adm. Code. Furthermore, emissions are also subject to a visible emissions limit of 10 percent opacity, per s. NR 440.73(3)(b), Wis. Adm. Code. Typically by complying with the particulate matter limit
and utilization of a control technology, the visible emission limitation will be met. However, some facilities will also be required to either utilize a continuous opacity monitoring system to measure and record the opacity of emissions discharged, or have a certified visible emissions observer measure and record 3-6 minute averages of the opacity of visible emissions to the atmosphere each day of operation.

5.1.2.10 Screening

Sand is transferred from dry storage bins or directly from the dryer and then passed through vibrating screens. The sand is screened into one of several grades (sizes) and then conveyed to storage or to trucks for shipping. The screen house may contain the following pick-up points (dust collection points): bucket elevators, screens, and conveyors. The pick-up points within the screening area are typically routed to a mechanical control device.

Air pollution resulting from this activity would include particulate, stacked and/or fugitive. Resulting particulate from the screening process is typically controlled by the use of a cyclone or baghouse. Some facilities enclose the screening operation within a building, further minimizing fugitive emissions from the pick-up points.

The screening process may be subject to the NSPS in s. NR 440.688, Wis. Adm. Code if the processing plant has a capacity greater than 25 tons per hour. The NSPS applies to each crusher, grinding mill, screening operation, bucket elevator, belt conveyor, bagging operation, storage bin, enclosed truck or railcar loading station, per s. NR 440.688(1), Wis. Adm. Code. The NSPS provides limitations on visible emissions (opacity) of no greater than 7 percent.

Operators would be required to maintain and follow a fugitive dust prevention plan, whereby methods to minimize fugitive dust emissions resulting from the screening would be described and followed.

5.1.2.11 Storage Bins/Silos

Storage bins or silos are located throughout the processing plant and are utilized to store raw materials or final product. Materials or product are transferred to these devices via conveyors.

Air pollution resulting from this activity would include particulate, stacked and/or fugitive. Resulting particulate from the storage (loading of bins/silos) process could be controlled by the use of a cyclone or baghouse, and the bins/silos may be equipped with an air displacement vent filter. Operators may be required to maintain and follow a fugitive dust prevention plan for any fugitive emissions, whereby methods to minimize fugitive dust emissions resulting from the storage activities would be described and followed.

The storage bins/silos may be subject to the NSPS in s. NR 440.688, Wis. Adm. Code, if the processing plant has a capacity greater than 25 tons per hour.
5.1.2.12 Loading/Unloading – Processing Plant Operations

A processing plant located at a mine will not have unloading operations, whereas a processing plant that is located in a different location than the mine(s) will have truck or rail unloading of raw materials. The processing plant will have loading operations regardless of its location relative to a mine. Unloading operations typically consist of a dump station that may be enclosed to capture most fugitive emissions. Unloaded sand is dumped into an auger or conveying system which transports the sand to storage piles or bins/silos. Loading operations typically consist of a conveyor system (from storage bins/silos) to a spout over trucks or railcars. The conveyor system and spout may be enclosed to capture particulate or minimize fugitive particulate dust.

Air pollution resulting from this activity would include particulate matter from either stacks or fugitive sources. Resulting particulate from the loading and unloading processes could be controlled by the use of a cyclone or baghouse, or unloading processes through underground or covered conveyor systems. Operators may be required to maintain and follow a fugitive dust prevention plan for any fugitive emissions, whereby methods to minimize fugitive dust emissions resulting from the loading/unloading activities would be described and followed.

5.1.3 Potential Emissions, Ambient Air Dispersion Modeling and Risk Analysis

The WDNR uses dispersion modeling to evaluate the ambient air impact of air pollution sources. The following is a brief description of how the modeling process works. A model is a mathematical simulation, designed to predict what can or will happen in real-world scenarios. Atmospheric dispersion modeling is useful in predicting the impact a particular facility will have with respect to a given pollutant. The major benefit of dispersion modeling is that it is an inexpensive way to assess the impact of a source. This information is vital in assessing a facility’s compliance with respect to the National and State Ambient Air Quality Standards (NAAQS) and increments as well as the various Hazardous Air Pollutant (HAP) standards, both federal and state. Dispersion modeling incorporates information about a facility, such as source/stack parameters, facility layout information and emission rates, along with 5 years of meteorological data in order to predict concentrations of pollutants in the vicinity of the facility. The point of highest impact is determined through the use of a receptor grid that is set up by the modeler, and could be the result of (besides other factors) inversions. The pollutant concentration at the point of highest impact is added to a previously determined background concentration and then is compared to the corresponding ambient air quality standard. The emissions from the facility (and nearby sources that contribute to impacts) must attain and maintain the NAAQS, which are set to protect public health and welfare, in order for any permit to be considered approvable by the WDNR. Those standards (NAAQS) are set at levels such that the most susceptible populations (children, elderly, and people with respiratory conditions) are protected.

All modeling completed in the State of Wisconsin for use by WDNR is conducted in accordance with these WDNR procedures as well as guidance contained in the Guideline on Air Quality Models, EPA document 40 CFR part 51, Appendix W. The present EPA approved dispersion model is AERMOD. This model is used for all dispersion modeling conducted for or by the WDNR.
The air quality analysis (air dispersion modeling) uses the worse-case maximum potential emissions from the facility. Those emissions are based on several factors, including: fuel type and characteristics, emission factors, operational design and control equipment, and any enforceable operational and/or emission limitations. The conditions that demonstrate compliance with the NAAQS will be set in the air pollution control permit as enforceable emission limits, control device operations, operational parameters (fuel type and amounts used), among other requirements. Any future expansion or increase in production or combustion sought by the facility, above what may already be approved in a permit, may result in a new air pollution control permitting action, which would again analyze all aspects of compliance with all air pollution rules and regulations.

5.1.3.1 Ambient Air Dispersion Modeling for Mining and Processing Operations

Depending on project specific conditions and proposals, an air analysis may include analysis of point (stack) and fugitive sources, soil and vegetation impacts, or visibility impairment.

Fugitive based particulate emissions, including PM$_{10}$ and PM$_{2.5}$, from truck traffic onsite may be included in the model as a volume source.

Any facility emitting SO$_{2}$, PM/PM$_{10}$, and/or NO$_{X}$ may have a potential adverse impact on visibility through atmospheric discoloration or reduction of visual range due to increased haze. The Clean Air Act Amendments require evaluation of visibility impairment in the vicinity of PSD Class I area due to emissions from new or modified air pollution sources. (Note: A Class I area is an area that is afforded additional protect under the Clean Air Act from the impacts of air pollution. National Parks, National Wilderness Areas and National Monuments are all designated as Class I areas.) If a PSD Class I area is located within 100 kilometers of the site, visibility impacts on distant Class I areas will be assessed.

Near the proposed project site, under certain meteorological conditions, the stacks will emit a visible steam plume that, after traveling a relatively short distance, will dissipate by dispersion and evaporation. A visible steam plume can be expected to occur when ambient air temperatures are relatively low with respect to plume temperature, thus promoting plume cooling and condensation, and when ambient humidity levels are relatively high, preventing evaporation of the water in the plume. The persistence of the plume is dependent upon wind speed and the time required for evaporation.

An ‘Air Dispersion Analysis’ Correspondence/Memorandum is generated for each project in order to demonstrate the impact of the proposed project on State or Federal ambient air quality standards. The WDNR may not issue an air pollution control permit to a facility that can’t demonstrate attainment and maintaining ambient air quality standards. Assuming the results of the modeling analysis demonstrate that the primary standard for the listed pollutants will be met, the health of "sensitive" populations such as asthmatics, children, and the elderly will be protected. Additionally, the welfare of the public is also protected, including protection against decreased visibility, damage to animals, crops, vegetation, and buildings.
5.1.3.2 Inhalation Risk and Non-Carcinogenic Effects Screening for Hazardous Air Pollutant Emissions

Depending on project specific conditions and proposals, an inhalation risk and screening analysis may be conducted. Hazardous air pollutant (HAP) emissions are known to occur from sand mining and processing operations. Reviews of existing and proposed projects have identified that all HAPs are from combustion sources, and are expected to be minimal. HAPs are regulated by ch. NR 445, Wis. Adm. Code, and/or regulated by any established federal National Emission Standards for Hazardous Air Pollutants (NESHAPs), whichever is more stringent.

Crystalline silica is not currently a regulated HAP under Federal or State regulations. However, crystalline silica emissions from these operations would be considered a particulate matter type and form of pollutant, for which regulations exist and apply. Furthermore, particulate matter emission control measures (emission control equipment such as baghouses, and fugitive dust control measures) reduce emissions of crystalline silica as well. WDNR has completed a study on the pollutant in 2011, and the results of that study are available on the WDNR’s website. State regulated HAPs are included within NR 445, Wis. Adm. Code (which also includes all Federal HAPs).

5.1.4 Potentially Applicable Air Pollution Regulations


5.1.5 Cumulative Air Impacts

The WDNR considers cumulative air impacts and includes impacts generated by the project in addition to those from the nearby local industries. DNR's independent review of cumulative air impacts from stationary sources includes analyzing ambient air impacts of emissions from other nearby sources in addition to the proposed facility (please refer to the Ambient Air Dispersion Modeling and Risk Analysis section 5.1.3 for more information.) The review is conducted to assure that the cumulative impacts from all sources considered will result in attainment of all ambient air quality standards when the sources operate in compliance with their existing or proposed air pollution control permits.

5.1.6 Conclusion for Air Impacts

Air quality impacts must be expected to be within acceptable and permittable standards. The WDNR will require enforceable operational controls as permit conditions, in addition to air emission monitoring equipment, protocol to monitor, and following a department approved fugitive dust prevention plan to assure this. Based on WDNR’s analysis and considering enforceable permit requirements the proposed action is expected to achieve compliance with applicable air quality standards and regulations and maintain air quality.
5.2 IMPACTS TO WATER RESOURCES

A sand mine can have multiple interactions with water. The site may be located near a river, stream, or wetland; or groundwater may be encountered as the site is excavated.

Water may also be used during the mining or processing stages. Material will be washed to remove fines. Washing may require the installation of a high capacity well. Wash water may be reused or discharged after washing to the ground surface, surface or surface waters depending on the volume and design of the operation. Sand excavated from below the water table may be saturated with water. As this material is stockpiled the water will run off the pile and leach into the ground or may be directed to on-site settling ponds. In addition, if the mine has buildings on-site a well may be present to supply water for cleaning, cooking, drinking, or sanitation.

The sites also receive water in the form of rain or snow that may be collected or allowed to run off depending on the volume and design of the operation. Steps must be taken to ensure that this storm water is handled properly so that sediment-laden water does not leave the site and possibly contaminate water resources or wetlands.

The following sections detail how water is used in a sand mining setting, the potential for impacts as well as how that use is regulated to help prevent impacts.

5.2.1 Groundwater

5.2.1.1 Process water

Silica sand mining and processing plants are likely to utilize groundwater to some extent. Potential uses of process water at mines and processing facilities include transporting, cleaning, and sorting sand, as well as dust control. For five planned sand mines in northwest Wisconsin proposed pumping capacities range from 700 to 1380 gallons per minute (gpm). Expected average water use ranges from 420,500 gallons per day to 2 million gallons per day (292-1380 gpm). These volumes are typical of closed-loop processing systems, where evaporation and incorporation into product are the main sources of water loss. By contrast, open-loop systems that do not recycle process water could use 2000-3700 gpm. All of these wells would be classified as high capacity wells, subject to state permit requirements. Any smaller-volume wells must meet state well construction standards.

The effects of groundwater pumping are highly site-specific and vary based on local geology, hydrogeology, and proximity to surface waters. A cone of depression forms around any well when it is pumped, lowering the groundwater level to an extent based generally on the well construction and pumping regime. Depending on well construction, pumping regime, and local geology, groundwater quality may be subject to change. Wells may become a conduit for contamination of groundwater if not properly constructed and maintained.

All wells must meet construction requirements mainly designed to prevent pollutants at the land surface from entering the underlying aquifer and to protect the quality of the water being discharged from the wells (Ch 281.17 Wis. Stats., and is specifically described in NR 812 Wis. Adm. Code). The WDNR may specify more stringent well
location, well construction, and pump installation requirements when deemed necessary for the protection of public safety, safe drinking water, and the groundwater resource. The WDNR may deny, grant a limited approval, or modify an approval under which the location, depth, pumping capacity or rate of flow and ultimate use is restricted so that the supply of water for any public utility will not be impaired. Process water may not be discharged to any well including any bored, drilled or driven shaft, dug hole whose depth is greater than its largest surface dimension, improved sinkhole or subsurface fluid distribution system (NR 815, Wis. Adm. Code.)

All high capacity wells are routinely screened for potential impacts to waters of the state. Any WDNR approval for a high capacity well operation identified as having the potential to cause significant impacts to trout streams, outstanding resource waters, exceptional resource waters, or other waters of the state will contain additional conditions designed to prevent significant adverse impacts. High capacity wells proposed near springs will be reviewed to determine whether construction and operation will result in substantially reduced flow from the spring. For springs that typically flow at rates greater than 1 cubic foot per second (cfs), the WDNR may not approve a proposed well that will reduce annual spring flow by more than 20%.

A detailed water balance may be required to determine the approximate water loss related to applications for high capacity wells that may result in a water loss exceeding 95%. However, this provision is not expected to apply to nonmetallic mining operations, since the average estimated water loss from nonmetallic mining in the Great Lakes Basin is 10% (Shaffer and Runkle, 2007).

Concerns have been raised about high capacity withdrawals affecting water levels in nearby private wells. During the high capacity well screening process, the WDNR will attempt to identify nearby private wells where significant groundwater drawdowns could occur. In cases where the WDNR discovers or receives concrete scientific evidence linking the proposed well(s) to a potentially significant adverse impact to private water supplies, any high capacity well approval would be conditioned, through permit conditions, to avoid such impacts. The WDNR also recommends that private well owners establish baseline information on static water levels and water quality parameters such as arsenic, nitrate, and iron. This information should be shared with mining officials prior to any new high capacity well operations. Information on sampling and certified labs is available on the WDNR website (dnr.wi.gov).

5.2.1.3 Dewatering water

If sand mining operations are performed below the water table, they may require significant additional groundwater pumping in order to dewater the active mining area. This can lead to an increased potential for impacts to groundwater and surface water resources. The majority of sand mining in Wisconsin is done above the level of the water table where no dewatering is required.

Mines that clean or process sand commonly use polyacrylamides as a flocculent to remove unwanted minerals and fines from the sand. Acrylamide may be present in frac sand wash water if they are using it as a flocculent in their wash operations. Acrylamides appear to be biodegradable in aerated soils. As a result, unless polyacrylamide levels are very high in the wash wastewater there may not be a great potential for acrylamide to contaminate groundwater at sand wash water storage/discharge sites. The types of
ponds and the minerals removed may also affect the potential for groundwater impacts. Sealed ponds will have very little potential for groundwater impacts. Unsealed ponds will likely seal themselves with the fines that are removed from the frac sand. Dewatering water may not be discharged to any well including any bored, drilled or driven shaft, dug hole whose depth is greater than its largest surface dimension, improved sinkhole or subsurface fluid distribution system (NR 815, Wis. Adm. Code.) More research is needed to determine concentrations of acrylamides in frac sand wash water when mines are using polyacrylamide polymer flocculation products.

The US Environmental Protection Agency (EPA) has set a Maximum Contaminant Level Goal (MCLG) of zero for acrylamides in public drinking water. Wisconsin does not have groundwater standards for acrylamide under NR 140, Wis. Adm. Code. Because of the difficulty of testing for such compounds at very low levels, EPA limits the amount of acrylamide in the polymeric coagulant aids used by public drinking water systems to 0.05% by weight and the dosage of polymeric coagulant aid which can be added to raw water to remove particulates, to 1ppm. Some people who drink water containing high levels of acrylamide over a long period of time could have problems with their nervous system or blood, and may have an increased risk of getting cancer.

5.2.1.3 Drinking water

Any new well will, at a minimum, be subject to construction standards found in NR 812, Wis. Adm. Code (Well Construction and Pump Installation). If any of these new wells are determined to be a public system, then construction standards of NR 812, Wis. Adm. Code, and operation standards and maintenance of public water systems of NR 810, Wis. Adm. Code, will also apply. A public water system is defined as a system that has at least 15 service connections or that regularly serves an average of at least 25 individuals daily at least 60 days out of the year. All public water systems are regulated by the Department to assure safe reliable drinking water.

If a mining or processing operation provides drinking water to more than 25 people and has drinking water available more 6 months a year it would be regulated as a Non-community non-transient water system and be subject to conditions and testing in NR 809 and NR 810 Wis. Adm. Code. These water systems would need a certified operator and would need to sample at least annually for bacteria and nitrates. Sampling for other parameters such as lead, copper, inorganics, and volatile organic compounds (VOC’s) would be set by NR 809 Wis. Adm. Code.

In addition to operator and sampling requirements, NR 810 Wis. Adm. Code would also regulate distribution systems and system capacity. A WDNR public water system specialist would be assigned to the facility. The facility would be inspected every five years.

5.2.2 Surface Water Resources

Wisconsin is home to about 84,000 miles of streams and 1.2 million acres of lakes. Although more than 47% of Wisconsin’s original wetlands have been lost, more than 5.3 million acres of wetland are still present across the state. Due to the state’s numerous wetlands and streams, combined with the rapid expansion of sand mining, it is likely that some mines will be located near Wisconsin surface water resources.
The construction and operation of a nonmetallic mining site in proximity to surface water has the potential to affect surface water through a variety of mechanisms. The most direct impact is the removal of nonmetallic material directly from the stream channel, lakebed, or the immediate stream bank or lake bank. This activity changes the process of deposition and transport of sand, gravel, and other bottom material which can lead to increases in siltation, erosion, and the loss of fish and aquatic life habitat. Active construction within the stream channel and on stream banks results in the direct mortality of aquatic life, increases turbidity, and may suspend contaminated sediments. Construction or expansion of mining operations into waterways may also alter the chemical properties of the water body. In some cases these alterations may be significant enough to effect the composition of aquatic life in the waterway.

Indirect impacts to surface waters from nonmetallic mining sites include the discharge of contaminated storm water runoff from the mine, dewatering processes taking place in the mine, or inadvertent releases from wastewater storage ponds. Other indirect impacts include the interception and contamination of groundwater that flows to streams and lakes, loss of wildlife habitat near stream corridors, and degradation of natural scenic beauty associated with our public waterways.

Storm water discharges from nonmetallic mining sites are regulated by the state through WPDES Permits. However, because of the scale of frac sand surface mines it should be recognized that the NR 135 nonmetallic mining reclamation plan, enforceable by the NR135 Reclamation Permit, includes provision for the control of surface water and erosion that takes place both during site development and site reclamation. The statewide standards require that measures protective of surface waters are included in the reclamation plan and invoked during site development to protect surface water and to have no adverse effect on adjacent properties. Such measures include diverting unaffected surface flows around the disturbed area, prior to the removal, and protection of topsoil or surficial soil materials (as defined in s. NR 135.02). Such protective measures must be in place before any site disturbance and are addressed in the approved reclamation plan, enforceable under the NR 135 Reclamation Permit. Because of the magnitude of frac sand surface mines, the approved reclamation plans will involve a phased development and contemporaneous reclamation sequence to minimize the footprint of the operation and the potential for erosion due to surface water and wind.

Most nonmetallic mines are designed to be internally drained to capture and contain all storm water discharges within the active mining project site. However, the majority of mines are only designed to contain up to a 10- or 25-year rain event. During larger rain events, silt, sand, and even gravel can be washed from the mine site into surface waters.

Dewatering discharges are regulated by the WDNR and have a limit of 40 mg/l for total suspended solids (TSS). Although this TSS limit exists, dewatering discharges may contain high amounts of small particles that are not included in the TSS analysis, but can still cause significant turbidity issues at the point of discharge. Dewatering discharges must also meet a pH range of 6.0 to 9.0 and oil and grease limits of 15 mg/l or less.

Few studies have explored the impacts of nonmetallic mining sites where groundwater is intercepted and either pumped (via mine dewatering) directly to surface water or a settling pond, which then, through seepage, recharges groundwater and ultimately feeds a nearby stream. In either case, groundwater may be warmed, and thermal affects may be
seen in cool or cold water streams. Other considerations include chemical changes such as increases in biological demand (decreased oxygen concentrations) and ammonia when groundwater is diverted to a surface water pond.

5.2.2.1 Permit jurisdiction in or near surface waters

A number of environmental regulations are in place to restrict mining activities and protect waters of the state including:

- Wisconsin Pollutant Discharge Elimination System (WPDES) Storm Water Permits
- Ch. 30 and 31 Wis. Stats. waterway permits

For all nonmetallic mines, Wisconsin nonmetallic mine law (NR 340 Wis. Adm. Code) applies to any sand mines where an activity regulated by Ch. 30 or Ch. 31 Wis. Stats. is proposed. For typical sand mines, this includes activities such as:

- Ponds within 500 feet or connected to navigable water
- Grading on or near the bank of a navigable water (distance varies based on the waterway)
- Realignment of a navigable stream
- Dredging from streams and lakes
- The construction of culverts or bridges on navigable waterways

Wisconsin’s nonmetallic mining code recognizes that “…without adequate controls serious degradation of water quality, fish and wildlife habitat, and public interests in recreation and scenic beauty could occur during and after the excavation, dredging or grading in or near navigable waterways.” The code goes further and substantially restricts the mining of sand and aggregates from within stream channels and from the immediate banks of Wisconsin’s navigable streams. Section NR 340.15, Wis. Adm. Code, directs the WDNR to assume that excavation from stream channels and immediate banks shall be avoided where reasonable alternatives exist.

5.2.2.2 Cranberry exemption

Some of the counties in central Wisconsin that are seeing an increase in frac sand mining are also home to much of the state’s cranberry farming. Mining sand is a routine practice in the process of raising cranberries. Growers use sand in the cranberry beds to provide adequate drainage for the roots of the cranberry plants. The sand prevents root rot and fosters plant growth.

Chapter 94.26, Wis. Stats, was established in 1867 and exempts cranberry growers from much of the laws applying to waters of the state under Chapter 30, Wis. Stats. With this exemption in place cranberry growers can, in theory, mine sand wherever and however they desire for use in cranberry production. Some cranberry growers are taking advantage of the high demand for sand and are selling their sand on the frac sand market. However, the Department has recently determined that the exemption in Ch. 94.26, Wis. Stats., from portions of Chapters 30 and 31, Wis. Stats., for cranberry culture is not applicable to non-metallic mining sites where a NR 216,Wis. Adm. Code, stormwater permit is required. For those non-metallic mining operations where the material is sold and hauled off site, Chapters 30 and 31, Wis. Stats., jurisdiction will be applied.
5.2.3 Wetlands
Wetlands are a valuable natural resource and are important to the ecology and economy of Wisconsin. They are protected by state law and recognized as providing a variety of values and functions including:

- Storm and flood water storage
- Groundwater recharge and discharge
- Filtering capability
- Shoreline protection
- Habitat for aquatic organisms and wildlife
- Recreational, cultural, educational, scientific, and natural scenic beauty

State statutes define a wetland as "an area where water is at, near or above the land surface long enough to be capable of supporting aquatic or hydrophytic vegetation and which has soils indicative of wet conditions.” This definition, along with delineation procedures described in *The 1987 U.S. Army Corps of Engineers Wetland Delineation Manual* and appropriate regional supplements are used to identify and delineate wetlands.

A high percentage of the State’s wetlands are associated with a stream, river, or lake. One of the targeted areas for silica sand mining is the alluvial deposits near or within these wetlands which are found in central Wisconsin. The counties included in this area have a significant percentage of the total land surface area mapped as wetland. For example, 17% of Jackson County and 10% of Monroe County are mapped as wetland. Because of the extensive network of waterways and wetlands in this region, it is challenging for a silica sand operation to completely avoid wetland impacts within the direct footprint of the mining site and the necessary transportation infrastructure.

### 5.2.3.1 Locating wetlands

To determine if wetlands are likely present on a potential sand mining property, the WDNR recommends that applicants use the Wisconsin Wetland Inventory maps, the hydric soil layer, and other maps located on the WDNR’s [Surface Water Data Viewer](#). These maps should only be used as guides and an onsite investigation by a professional wetland delineator is required to verify the presence or absence of wetlands.

### 5.2.3.2 Impacts to wetlands

Adverse impacts to wetlands related to a sand mine site can be classified as either direct or indirect. Direct impacts are caused by the physical alteration of a wetland by the discharge of fill material or excavation within the wetland to mine the sand deposit. Discharges may also be related to infrastructure development such as roads, railroads, utilities and to a lesser extent the sand handling and processing site. Both types of alterations result in loss of the wetland and the associated values and functions.

Indirect impacts typically involve changes to the landscape that affect the local hydrology by altering surface drainage patterns as well as changing groundwater levels. This can have the affect of starving a wetland of the necessary water; reducing its ability to support hydrophytic vegetation. Impacts to adjacent wetlands can be minimized if there is no dewatering of the excavation site or if the dewatering or wash water process is
developed with a closed system so all the pumped water stays on site and is not discharged to adjacent surface waters.

5.2.3.3 Wetland permitting

The excavating or placement of any material in wetlands requires a WDNR approval known as a Water Quality Certification. The WDNR reviews a project to determine if it complies with the requirements of Chapters NR 299 and NR 103, Wis. Adm. Code. State regulations require that wetland impacts be avoided if possible. As such, permit applicants will need to demonstrate that they cannot avoid or reduce wetland impacts, and that the project will not have significant adverse impacts on wetland functions and values including secondary impacts.

In addition to state regulations, the US Army Corps of Engineers may assert jurisdiction over a wetland that is connected to a federally navigable waterway. If jurisdiction is asserted, the facility would be required to attain a permit from the Corps under section 404 of the Clean Water Act.

5.2.4 Storm Water/Wastewater Management

Water generated by or contaminated with sediment as a result of frac sand operations is handled primarily with two general WPDES permits: the Nonmetallic Mining Operations Permit (NMM) (Permit No. WI-0046515-05) and the Construction Site Storm water Discharge Permit (Permit No. WI-S067831-3).

Mining activity for the purposes of the NMM begins the first time ground is broken at a mine site. This negates the need for an operator to obtain a duplicative construction site storm water discharge permit for the same area.

The NMM permit is considered an operations permit and regulates discharges of storm water and wastewater from the mine sites from the initial commencement of site development and lasts until the site has been reclaimed.

In addition to using the NMM permit to regulate the actual removal of material from the ground, the WDNR has also used it to cover adjacent/proximal processing facilities where wet and dry sorting may occur.

5.2.4.1 Storm water

Should the site discharge storm water offsite and/or to surface waters of the state, the operator is required to prepare and implement a Storm Water Pollution Prevention Plan (SWPPP) that will specify the use of standard Best Management Practices (BMPs) to be installed to control sediment in storm water runoff (defined as externally drained). If the site does not discharge offsite or to surface waters of the state, meaning all storm water runoff is directed into seepage areas where there is enough storage for the 10-year/24-hour rain event, no SWPPP is required and storm water requirements are minimal (defined as internally drained).
When new mines are opened, it is common for them to start out as externally drained. Initial operations when opening a mine include stripping topsoil, overburden, and building perimeter berm. In this beginning phase it is difficult to manage the site so that storm water drains internally. However, as the site matures the goal is usually to develop an internally drained operation.

**5.2.4.2 Wastewater**

The WDNR regulates a number of wastewater discharges at mine sites. The most common discharges include pit dewatering (regardless of whether the water results from precipitation or groundwater) and wash water generated from mine processes. The primary pollutant being regulated is sediment in suspension, so the requirements for the discharges vary depending on the resource being discharged to. Discharges to surface waters are more stringently regulated than are wastewater discharges to groundwater via seepage.

**5.2.4.3 Construction site storm water and erosion control**

The WDNR has typically required this permit only for operations where a stand-alone processing plant is being constructed or for the construction of rail spurs to service mines or processing plants. Requirements for a construction site permit include preparing an erosion control plan that details the BMPs that will be used to control erosion during construction as well as a storm water management plan that details how sediment will be controlled once construction is complete.

**5.2.5 Contaminated sites**

The DNR Remediation and Redevelopment program regulates sites that have been contaminated due to spills or leaks of hazardous substances from fuel storage tanks, landfills, industrial sites, etc. Ch. 292.11, Wis. Stats., assigns responsibility for cleanup of hazardous substances. A mine operator could incur liability for cleanup, if mine operations cause the release of a hazardous substance, or mobilize or alter the movement of an existing plume of hazardous substance in groundwater.

**5.3 FISHERIES IMPACTS**

Nonmetallic mining has not had significant negative impacts to fisheries resources in the past. This can mainly be attributed to the relatively low number of sand mines in the state. However, with the recent boom in frac sand mining the number of nonmetallic mines throughout the state has increased. In many instances they are located close to coldwater resources or in the floodplains of river systems. The following fisheries impacts may need to be considered:

- Runoff from the mine site and settling ponds into a coldwater resource causing high levels of turbidity especially in headwater streams where there is natural reproduction of trout.
- Runoff from the mine site and settling ponds causing sedimentation in streams
- If sedimentation/turbidity occurs during fall spawning period, sedimentation would cover/suffocate eggs, leading to no reproduction for that year.
- Amount of warm water runoff from settling ponds could potentially increase the water temperature of coldwater resources.
- Warmer water temperatures could cause coldwater tolerant species of fish and invertebrates to disappear.
- High capacity well withdrawals could decrease stream flows.
- Reduced spring volume could also have thermal impacts on streams.
- Entrapment of fish in ponds located within a floodplain.
- Conversion of riverine or stream habitat to a lake habitat in cases where bed excavation/enlargements and realignments of channels occur.

### 5.4 SOLID WASTE MANAGEMENT/SPILLS HANDLING

Mining and processing activities generate solid wastes similar to any business or industry including: paper and packaging from office or shop activities and break room wastes such as paper and plastic bags, paper toweling, fast food containers, plastic and aluminum beverage containers, and food wastes. These wastes should be recycled or disposed of at a licensed sanitary landfill.

Vehicles, heavy equipment, and processing equipment will also generate wastes as a result of repair or maintenance activities. These wastes will likely include engine oils, transmission and cooling fluids, hydraulic fluids, filters, parts cleaning solvents, and paints. These wastes can generally be recycled with the exception of the parts cleaning solvent which, if generated, will need to be characterized and potentially handled and disposed of as a hazardous waste. It is likely that if maintenance activities are conducted at a facility it would be classified as a Very Small Quantity Generator (VSQG) of hazardous waste and would need to comply with VSQG regulations. There are a number of companies who service VSQGs to pick up and properly dispose of or recycle small quantities of hazardous waste.

Facilities which utilize a wet process to wash the sand will generate nonmetallic mineral fines as a waste product. Section NR 500.08(2)(b), Wis. Adm. Code, exempts disposal of spoils from sand, gravel or crushed stone quarry operations and nonmetallic earth materials from most solid waste regulations. Use of these fines for mine reclamation, provided their use is consistent with the mines reclamation plan approved by the respective county under NR 135, Wis. Adm. Code, is acceptable to the WDNR.

As with any industry that uses vehicles and heavy machinery the potential for spills of gasoline, diesel fuel and hydraulic fluids exists. Chapter NR 706, Wis. Adm. Code, specifies when a spill must be reported to the WDNR. But whether a spill is reportable or not, all spills need to be cleaned up to the extent possible and contaminated materials need to be properly disposed of.
5.5 RECREATION AND MANAGED LANDS

Proximity of mining operations to state-owned and managed lands may be of concern due to potential impacts to Nature Based Outdoor Activities (NBOA’s) such as hunting, trapping, fishing, hiking and cross-country skiing, as well as other “quiet” outdoor recreational pursuits (e.g., nature study, biking, etc.). There are also concerns with regard to mine operation impacts on resident wildlife. The magnitude of the impact depends on proximity of the sand mine to the given property, the type of mining operation and the hours of operation.

Specific impacts that may need to be considered include:

5.5.1 Noise

Noise from equipment operation, vehicle use (both on site and on the area road system) and blasting can impact the quality of the recreational user experience on a given property potentially diminishing the quality of that site for a particular endeavor.

Noise may also affect wildlife usage of the property. Chronic or episodic noise-related disturbance may result in wildlife movement away from the source of disturbance, potentially impacting reproductive success as well as the quality of wildlife-based recreation – hunting, trapping, and nature study.

5.5.2 Dust

Generation of airborne dust may result in aesthetic impacts to a property (vegetation, facilities covered with dust) and impacts to visitors (dust inhalation, settling on vehicles).

5.5.3 Lighting

Sand mines operating at night may require lighting that could negatively impact the quality of a park or recreation area user’s experience. Lighting at night may also constitute a disturbance sufficient to affect wildlife usage patterns on a given property.

5.5.4 Traffic

Increased traffic to and from the mine will result in increased levels of noise. Depending on traffic routes and volumes, user access to a property could be impacted. Increased levels of mine related traffic may also result in higher levels of incidental wildlife mortality due to road kill.

5.5.5 Air quality

Exhaust and dust from mine operations (equipment and traffic), if detectable, may negatively impact recreational users of a property.

5.5.6 Forests

Forest cover must be removed to accommodate active mining as well as overburden storage. Forest products can be recovered and marketed during the mine development
phase, but the practice of forestry and mining are mutually exclusive because of the loss of forests.

Forest loss and the loss of associated habitats may be temporary and could be restored through mine reclamation after mining ceases. While a forested condition may be restored, it is likely that it would be different from the original forest because of changes in soil depth, soil profile, topography, depth to groundwater, etc.

5.6 ENDANGERED AND THREATENED SPECIES AND HABITATS

Wisconsin’s Endangered Species Law (http://dnr.wi.gov/org/land/er/laws/, s. 29.604, Wis. Stats.) requires the protection of our state’s endangered and threatened species and directs the WDNR to determine whether any activity the WDNR conducts, funds, or approves may affect endangered or threatened species. As part of the permit approval process, an Endangered Resources Review (ER Review) is required from the WDNR to make this determination. In addition, regardless of whether a WDNR permit or approval is required or funding is involved, Wisconsin’s Endangered Species Law still applies to all projects.

5.6.1 ER Reviews

An ER review may be completed in two ways: permitting staff may conduct an ER Review as part of their permit process or a project proponent may request a review for their project directly from the Bureau of Endangered Resources (BER). The ER review considers several tools or sources of information to ensure compliance with state and federal laws. One of the primary tools is a search of the Wisconsin Natural Heritage Inventory (NHI) database to determine what federal and state endangered and threatened species have been confirmed in the proposed project area. The project area evaluated consists of both the specific project site and a buffer area surrounding the site. The size of the buffer varies depending on the ecological and land use characteristics of the site and surrounding area. Records from the buffer area are considered because most lands and waters in the state, especially private lands, have not been surveyed. Considering records from the surrounding landscape provides the best representation of species and communities that may be present on a specific site.

Other sources of information should be considered in the review, including information about the project site, wildlife and plant databases, and species experts. Habitat assessments or surveys may be necessary to determine whether state or federally listed species occur within a project area or to confirm whether suitable habitat is present for an identified species or community.

The NHI database includes the following information:

- Animals and plants federally listed as Endangered or Threatened, those Proposed or Candidates for federal listing, and their Proposed or Designated critical habitats. Federally listed animals are protected on all lands. Federally listed plants are protected only on federal lands or on projects that include federal funding (http://www.fws.gov/endangered/laws-policies/index.html). If federally protected species or habitats are likely to be impacted by a project, consultation with the United States Fish and Wildlife Service (USFWS) should occur. An exception to this pertains to the Karner Blue Butterfly (KBB), a federally listed butterfly,
which falls under special provisions of a Habitat Conservation Plan (HCP) that is administered by the WDNR.  (http://dnr.wi.gov/forestry/karner/).

• Animals (vertebrate and invertebrate) listed as Endangered or Threatened in Wisconsin are protected by Wisconsin’s Endangered Species Law on all lands and waters of the state. If state protected animals are likely to be impacted by a project, consultation with the WDNR should occur.

• Plants listed as Endangered or Threatened in Wisconsin are protected by Wisconsin’s Endangered Species Law on public lands and on lands that the person does not own or lease, except in the course of forestry, agriculture or utility actions. If state protected plants are likely to be impacted by a project and are not covered by one of the exemptions above, consultation with the WDNR should occur.

• Special Concern Species, examples of high-quality natural communities (sometimes called High Conservation Value areas), and natural features (e.g., caves and animal aggregation sites) are also included in the NHI database. These resources are not legally protected by state or federal endangered species laws. However, other laws, granting, or permitting processes may require or strongly encourage protection of these resources. The main purpose of the Special Concern classification is to focus attention on species about which some problem of abundance or distribution is suspected before they become endangered or threatened.

5.6.2 Incidental Take

The Wisconsin Endangered Species Law allows the WDNR to authorize the taking of state endangered or threatened species if the taking is not for the purpose of, but will be only incidental to, the carrying out of an otherwise lawful activity, and will not jeopardize the continued existence of the species in the state (http://dnr.wi.gov/org/land/er/take/). Authorization generally occurs through an Incidental Take Permit, which requires an application, a Conservation Plan with required elements (including minimization and mitigation measures) and a 30-day public notice period prior to authorization.

5.7 ARCHEOLOGICAL AND HISTORIC IMPACTS

Under provisions of Wisconsin statutes, state agencies (including WDNR) are directed to cooperate with the Wisconsin Historical Society (WHS) in order to identify and protect any WHS-recorded archaeological sites, historic structures, and other cultural resources which may be adversely impacted by agency actions such as permitting. Protection of these resources may be accomplished through avoidance or required field investigations (as directed by WDNR, after internal review).

If such a project is federally funded, licensed, or permitted, additional investigations to identify and protect recorded and unrecorded cultural resources may also be required under provisions of federal law.
5.8 SOCIO-ECONOMIC IMPACTS

Construction and operation of mines and processing facilities and transportation of sand by truck or rail will have the potential to cause significant socio-economic impacts on nearby neighbors particularly in rural locations where the existing land use is predominantly agricultural. Impacts may include: noise from mining and transport operations, increase in traffic and road deterioration, visual impacts, light disturbance from night mining, and property value impacts. For those properties with deposits of frac sand present, prices exceeding $10,000 per acre have been reported.

In the long term, mines are eventually closed and reclaimed. The reclamation plans for many mines involve replacement of the stockpiled topsoil and either a conversion to or a return to agricultural use. Where this is not feasible some mines have been reclaimed into prairie or oak savannah and provide wildlife habitat. At a very minimum mine sites need to be reclaimed by stabilizing and revegetating the area.

Construction and operation of the mines and processing facilities and transportation of the sand has the potential to have significant direct and secondary beneficial impacts on Wisconsin’s economy. It is difficult to put exact numbers on the economic impact since the mines and processing operations vary in size and design but the Wisconsin Economic Development Corporation estimates that the average processing facility will create 50-80 new jobs. It is also estimated that the average mine will create around 10 new jobs. This does not include the secondary jobs that will be created by the need to transport the sand. It is estimated that the average starting wage for general laborers will be approximately $13.50 per hour plus $1.00 per hour in standard benefits. More skilled laborers such as welders and mechanics are estimated to make about $20.00 per hour. Managers, engineers, and geologists will make the competitive prevailing wage for their profession.

The Wisconsin Economic Development Corporation estimates that the average processing plant will require an investment of between $20-$40 million dollars for equipment, buildings, and infrastructure and up to $100 million for a processing facility that includes resin coating.

Short term secondary impacts will occur in the building and trades sectors as these facilities are being constructed. There is also potential for an increase in sales of mining and other heavy equipment such as dump trucks. There will also be the typical secondary economic impacts that would be expected as a result of any new business coming to Wisconsin and bringing new jobs.

5.9 TRANSPORTATION IMPACTS

Vehicular traffic on local roads will have an impact on the service life and condition of the roads. The degree of road deterioration will depend on the amount of traffic resulting from sand mining operations, the type of vehicles transporting the sand and the design specification the road was constructed to.

Additionally there may be terrestrial and water resource impacts as a result of creating new transportation infrastructure such as roads and rail spurs to support the mine or
processing facilities. The WDNR will work with developers to assure the impact of this infrastructure will take into consideration and comply with regulations set to protect threatened and endangered species. The developer will also need to comply with wetland regulations described in this document administered by the WDNR and local shoreland zoning regulations administered by the appropriate county as applicable.

As mentioned earlier, the preferred and most economical method of transporting frac sand is by rail. Most of the processing facilities are being located near or adjacent to existing rail lines. Planners with both the Wisconsin Department of Transportation and within the railroad industry did not anticipate the significant increase in demand for rail transport that resulted from Wisconsin’s expanding frac sand mining industry. At this point no new major rail line routes are being proposed. However, a number of existing rail routes will need to be upgraded to handle the increase in rail traffic. Furthermore, some major spurs or rail sidings to stage rail cars at the processing facilities have been constructed or are under consideration.

At the present time there is no discussion of converting recreational trails back to railroads but that is a possibility.
6.0 Legal Framework

The following information is a listing of regulations that may apply to sand mining in the State of Wisconsin.

6.1 LOCAL AND COUNTY ZONING ORDINANCES

Sand mines may be regulated by local ordinances, depending on the County or Township where the facility is sited.

6.1.1 Shoreland zoning

The shoreland zoning ordinance adopted by each county in Wisconsin provides development standards for shorelands in unincorporated areas to limit impacts on water quality, fish and wildlife habitat, recreation, navigation and natural scenic beauty. NR 115 Wis. Adm. Code sets minimum standards for the local ordinances, but many counties have adopted standards that are more restrictive than the state minimum standards. Shoreland zoning pertains to lands within 1,000 feet of the ordinary high-water mark (OHWM) of a navigable lake, pond or flowage and lands within 300 feet or within the floodplain of a navigable river or stream, whichever distance is greater.

Each county’s development standards may vary, but generally a permit or variance would be required for:

• A permit would be required for any “structure” within the shoreland zone
• A variance would be required for “structures” that are within 75 feet of the OHWM of a navigable waterway.
• A permit or vegetation management plan may be required for removal of shoreline vegetation that exceeds certain limits.
• Filling, grading, lagooning, dredging, ditching or excavating in a shoreland zone
• Filling or grading of more than 2000 square feet is typically regulated with a conditional use or special exception permit.
• A permit is needed to fill any area that is a wetland. If there is a practicable alternative to filling the wetland, the permit may not be granted.

6.1.2 Conditional Use permit

Each zoning district, as defined in a municipality’s zoning code, has two types of uses. The first type of use is the permitted uses. These do not require additional review other than the zoning review for issuance of a building permit. The second type of use is a conditional use. These are uses not permitted outright but may be allowed if certain standards and conditions are met and the municipality grants approval.

Conditional uses assure property owners that uses of adjacent properties will be as compatible as possible with property uses established in their neighborhood.

A frac sand mine would likely be classified as an industrial facility. If a property is not zoned for this use the mine developer would have to apply for and receive a conditional
use permit from the county. These permits are usually considered at a county board
meeting, which may provide an opportunity for public input on the permit decision.

6.2 WDNR REGULATIONS

6.2.1 Nonmetallic Mining
- **NR 135**: Requires reclamation of nonmetallic mining sites. Reclamation is
tested through a reclamation permit issued by the county. Reclamation may
occur contemporaneously with the development of new mining phases, especially
in large surface mining projects, or upon the cessation of mining operations. In
either case, reclamation proceeds according to an approved reclamation plan
developed to achieve a specific post mining land use. Implementation of the
reclamation plan is enforceable by the reclamation permit and guaranteed through
the positing of a financial assurance instrument payable exclusively to the county.

- **NR 340**: Establishes consistency in the application of state statute chapter 30 to
nonmetallic mining to avoid unnecessary adverse effects caused by nonmetallic
mining in or near navigable waterways.

6.2.2 Air
- **NR 407**: Regarding operation permits and permit applications for direct stationary
sources.

- **NR 415**: Categorizes particulate matter air contaminant sources and to establish
emission limitations for these sources in order to protect air quality.

- **NR 440**: Enables the WDNR to implement and enforce standards for new
stationary sources promulgated by the US EPA.

- **NR 445**: Establishes emission limitations for hazardous contaminants from
stationary sources.

6.2.3 Groundwater and Drinking Water

- **NR 135**: Reclamation standards in NR 135.08, provide that there be no adverse
impact on groundwater quantity or quality, referencing NR 140, from site
reclamation. This provision often applies upon cessation of mining, in the typical
limestone quarry (static in terms of its footprint throughout its operation), but may
apply to various phases of on-going reclamation in large surface mines where
areas are being opened up for mining while a previous mined-out phase is being
contemporaneously reclaimed.

- **NR 140**: Establishes groundwater quality standards for substances detected in
groundwater. Specifies procedures for groundwater standards, monitoring, and
WDNR response. Provides exemptions.

- **NR 299**: Establishes procedures and criteria for the application, processing and
review of state water quality certifications required by the provisions of the
federal water pollution control act.
• **NR 809**: Establishes minimum standards and procedures for the protection of public drinking water.

• **NR 810**: Governs the operation and maintenance of all public water systems to provide safe drinking water to consumers.

• **NR 812**: Establishes uniform minimum standards and methods to extract groundwater for any purpose while protecting groundwater and aquifers from contamination.

• **NR 815**: Prohibits the injection or discharge of fluids to any well including any bored, drilled or driven shaft, dug hole whose depth is greater than its largest surface dimension, improved sinkhole or subsurface fluid distribution system.

• **NR 820**: Requirements to avoid, minimize, and manage impacts from groundwater withdrawals.

• **NR 850**: Establishes annual fees for water withdrawals from the state.

• **NR 856**: Establishes requirements for registering water withdrawals and collecting and reporting of accurate water withdrawal data to support management of the state’s water resources.

• **State Statute Chapter 280**: Pure Drinking Water

### 6.2.4 Navigable Waters

• **NR 340**: Establishes consistency in the application of state statute chapter 30 to nonmetallic mining. The WDNR permit regulates both the operation and reclamation of nonmetallic mines. It is intended to avoid unnecessary adverse effects caused by nonmetallic mining near navigable waterways and to restrict excavation, dredging and grading where the adverse effects cannot be minimized or avoided.

• **State Statute Chapter 30**: Navigable Waters Harbors and Navigation

• **State Statute Chapter 31**: Regulation of Dams and Bridges Affecting Navigable Waterways

• **State Statute Chapter 281**: Water and Sewage.

### 6.2.5 Wetlands

• **NR 103**: Establishes water quality standards for wetlands

• **NR 299**: Establishes procedures and criteria for the application, processing and review of state water quality certifications required by the provisions of the federal water pollution control act.
• **NR 350**: Establishes standards for development, monitoring, and long term maintenance of wetland mitigation projects that are approved by the WDNR.

• **NR 351**: Identifies and incorporates by rule any federal regulation for determining whether certain activities in nonfederal wetlands are eligible for exemption state statute.

• **NR 352**: Designates the wetland delineation manual procedures to be used to delineate nonfederal wetlands.

• **NR 353**: Facilitates the regulation of projects whose purpose is wetland conservation.

• **State Statute Chapter 281. Water and Sewage.**

6.2.6 Stormwater

• **NR 216**: Regulates stormwater on site by controlling erosion and sedimentation through a Non Metallic Mining Operations General Permit - WPDES GP WI-0046515-4.

6.2.7 Wastewater

• **NR 216**: Also regulates discharge of other wastewaters from a non metallic mining operation through the General Non Metallic Mining WPDES permit. These wastewaters include waters generated from washing the sand, equipment washing and any non contact cooling waters.

6.2.8 Endangered Resources

• **Chapter 29: Wild Animals and Plants**

6.2.9 Solid Waste

• **NR 500**: Provides definitions, submittal requirements, exemptions and other general information relating to solid waste facilities.

• **State Statute Chapter 287**: Solid waste reduction, recovery and recycling.

• **State Statute Chapter 289**: Solid waste facilities.

6.2.10 Hazardous Waste

• **NR 600**: Provides definitions, exemptions and requirements for the identification, management and disposal of solid wastes which are determined to be hazardous wastes.

• **State Statute Chapter 291**: Hazardous waste management.

6.2.11 Hazardous substances spills

• **NR 700-749** Establishes requirements for emergency and interim actions, public information, site investigations, design and operation of remedial action systems, and case closure.

• **State Statute Chapter 292.11** Hazardous substances spill law.
6.2.12 Forestry

- NR 48 and s. 28.11(11) Wis. Stats. establish requirements and procedures for withdrawal of lands from the county forest law program prior to such lands being used for purposes contrary to the law. Commercial sand mining is a contrary purpose. Lands can only be withdrawn from the program if they can exhibit a higher and better public benefit out of the program.

- NR 46 and s. 77 Wis. Stats. subchapters I and VI establish requirements and procedures for withdrawal of lands designated under the Forest Cropland (FCL; subchapter I) and the Managed Forest Lands (MFL; subchapter VI) programs prior to such lands being used for purposes contrary to the law. Commercial sand mining is a contrary purpose. Withdrawal taxes and fees are assessed to the owner of record at the time of withdrawal.

6.2.13 WDNR Enforcement

With the multitude of regulations the WDNR may have over a nonmetallic mine, it is important to note that there are times when permits are either not acquired prior to an activity taking place, or permit conditions are not being followed. The most common violations with regard to nonmetallic mining are a lack of attention to erosion control or storm water management, and not obtaining the proper permits for the operation. Permitting is sometimes neglected either because of a lack of information, or because of changing conditions in the mine.

A common issue regarding mine permits arises when a mine owner obtains a permit under NR 135, Wis. Adm. Code, but as the mine continues to expand over time it reaches a wetland or navigable waterway where a Chapter 30 permit, Wis. Stats., is required in addition to the NR 135 permit. Since the mine is already permitted under NR 135 permit, the owner may not be aware of the need to attain a Chapter 30 permit.

Enforcement options for violations can include use of the Department’s stepped enforcement process, the issuance of civil citations, or a combination of the two.

6.3 OTHER STATE PERMITS

6.3.1 Department of Safety and Professional Services

- Has jurisdiction on building construction and any fuel storage tanks on mine or processing plant property and Blasting.

6.3.2 Department of Transportation

- DOT has authority on licensing truck drivers transporting the sand as well as truck safety, load limits, and size restrictions.

6.4 FEDERAL REGULATIONS

6.4.1 Clean Air Act, Clean Water Act, and Safe Drinking Water Act

- Wisconsin has the responsibility to implement the Federal Clean Air Act, the Federal Safe Drinking Water Act and the Federal Clean Water Act (with the
exception of wetlands regulation which are jointly regulated by the WDNR and the US Army Corps of Engineers). If enforcement actions are necessary, the federal government may take its own action, or may work in conjunction with the state.

6.4.2 Section 7 of the Endangered and Threatened Species Act
- The previously mentioned Endangered and Threatened Species Act of 1973 is jointly administered by the Wisconsin DNR and the US Fish and Wildlife Service through a formalized cooperative agreement.

6.4.3 Mine Safety and Health Administration
- Has responsibility for worker health and safety when the mine is in production.
7.0 Conclusions

The widespread use of the hydraulic fracturing technique by the oil and gas industry has resulted in the rapid expansion of frac sand mining in Wisconsin. The current non-metallic mining regulations implemented at the county level, as well as the various environmental regulations implemented by the department are adequate to ensure that permits for individual sand mining operations and processing facilities are protective of public health and the environment. As the number of sand mines and processing facilities increase, especially if clusters of these facilities begin to occur, the department may consider examining cumulative environmental impacts.

However, most sand mine siting is controlled through local zoning decisions. Unless the mine is intended to be sited in or adjacent to a navigable water, DNR authorities will not impact most siting decisions. Public comments in response to the operations sited to date have frequently focused on several impacts that the state has no authority to regulate. These impacts include: noise, lights, hours of operation, damage and excessive wear to roads from trucking traffic, public safety concerns from the volume of truck traffic, possible damage and annoyance resulting from blasting, as well as concerns regarding aesthetics and land use changes.
8.0 Links for readers to go to for more information:

- Silica sand in Wisconsin [http://wisconsingeologica lsurvey.org/silica-sand.htm](http://wisconsingeologica lsurvey.org/silica-sand.htm)
- Frac sand mining would add jobs in Wood County, study finds [http://www.wisconsinrapidstribune.com/article/20111014/WRT0101/110140662/Frac-sand-mining-would-add-jobs-Wood-County-study-finds?odyssey=tab%7Ctopnews%7Cimg%7CFRONTPAGE](http://www.wisconsinrapidstribune.com/article/20111014/WRT0101/110140662/Frac-sand-mining-would-add-jobs-Wood-County-study-finds?odyssey=tab%7Ctopnews%7Cimg%7CFRONTPAGE)
- Study on the economic impacts of frac sand mining [http://centralwisconsinhub.wausaudailyherald.com/assets/pdf/U01805151013.PDF](http://centralwisconsinhub.wausaudailyherald.com/assets/pdf/U01805151013.PDF)
ATTACHMENT C

WINONA COUNTY TRAFFIC AND ROAD IMPACT STUDY REQUIREMENTS
Winona County Traffic and Road Impact Study Requirements
For
High Intensity Mining Operations Impacting Winona County’s Transportation Infrastructure System

Introduction
The following outline is provided for guidance in articulating a condition of approval for non-metallic mining conditional use permits in order to meet the requirements of the Winona County Zoning Ordinance, section 5.5.4.1, subp. 1. The use will not create an excessive burden on existing parks, schools, streets/roads and other public facilities and utilities which serve or are proposed to serve the area.

Additionally, the proposed requirement for a traffic and road impact study is recommended to alleviate undue burden on the County’s financial resources and in conformance with County Board action, require mining companies to bear the burden of the costs associated with road infrastructure impact.

1. Terms of Contractual Services
   a. Responsibilities. The proposer of a non metal mine shall be responsible for the costs of an independent study, contracted by the County, for preparation of a comprehensive analysis of road and traffic impact for the proposed mining operations.
   b. Payment. The proposer shall be responsible for payment to the County 100% of the proposed consulting fees for services outlined herein as proposed and estimated by a qualified professional traffic engineering firm.
   c. Schedule for Payment. The proposer shall provide the County with funding for these services before the comprehensive traffic and road impact study is contracted and commenced, upon receipt of an invoice by the County Finance Department.
   d. Contractual Services Selection/ Qualifications. The County shall have the right to approve or deny the consultant based on qualifications to complete the requirements of the study.

2. Scope of Traffic and Road Impact Analysis
   a. Intersections. All intersections of local, county and state highways affected by traffic generated from the proposed mining operations shall be studied and recommendations made for safety and level of service of handling the proposed traffic intensity of the mining operations.
   b. Local roads. Local roads serving the proposed mining operation shall be studied and recommendations made for safety and level of service of improvements for handling the proposed traffic intensity of the mining operations.
   c. County Highways. County highways serving the proposed mining operations shall be studied and recommendations made for safety and level of service for handling the proposed traffic intensity of the mining operations.
d. Pavements. Pavements of county highways and local roads serving the proposed mining operations shall be studied to determine existing conditions and improvements needed to withstand the hauling of products and equipment. Where existing pavements will structurally accommodate the mine traffic without upgrade, the study shall identify a fair-share cost assignment for the proposer/developer to bear the proportion of the pavement life consumed compared to external traffic, or the improvement necessary to restore the pavement life consumed.

e. Access locations. All drive approaches onto public roadways serving the proposed mining operations shall be studied and recommendations made for safety and level of service for handling the proposed traffic intensity of the mining operations including but not limited to deceleration lanes, turning lanes, emergency pull-outs, shoulder conditions, etc. The study shall determine sight distances at all access points and shall make recommendations for improvements where inadequate or non-compliant conditions exist.

f. Geographic Range. The study shall include recommendations for the entire geographic area where the proposed mining operations may have significant impact as determined and advised by the County Highway Engineer. The County reserves the right to enter into an intergovernmental agreement with neighboring counties to determine and mitigate adverse impacts in adjoining jurisdictions.

g. Existing Deficiencies. The County reserves the right to identify existing roadway related issues or problems that require study for correction in order for the proposed mining operations to operate safely and to maintain levels of service. Where deficiencies are identified, only that portion caused by the proposed mining operations shall be borne by the proposer/developer and the County may choose to cost-share to make the necessary corrections, pending adequate resources and appropriations.

h. Time Frame. Projected traffic demands shall be based on fully operational conditions during each phase of operations.

i. External Factors. External traffic pressures and growth shall be considered in achieving fair-share cost assignment to the proposer/developer.

3. Contents of Study
   a. Introductory Materials
      i. Preparers Name, Team Members and Qualifications
      ii. Project Description
      iii. Identification of Peak Hours and Traffic Projections
      iv. Map of routes and study area
      v. Location of all access points
      vi. Map of Adjacent Land Uses

   b. Existing Traffic Conditions
      i. Description of transportation network including intersections and access points serving the proposed mining operations
      ii. Existing traffic counts
      iii. Gap or queue length information where requested
c. Proposed Mining Operation Traffic Generation
   i. Trip generation rates used
   ii. Traffic generation at peak/full capacity
   iii. Source of generation data

d. Traffic distribution
   i. Estimated site traffic movements by direction
   ii. Narrative of assumptions/methods

e. External Traffic Projections
   i. Identification of existing and known proposed traffic generators effecting impacts
   ii. Adjustments made for external traffic impacts
   iii. Forecast data

f. Traffic Assignments
   i. Assignment of peak period traffic at intersections and access points
   ii. Figures for existing and peak impact hours and total traffic
   iii. Recommended access improvements

g. Site Plan
   i. Parking layout
   ii. Loading/Staging Areas
   iii. Recommendations

h. Improvements and Upgrades. Identification of costs likely to be incurred to establish and maintain safe and desirable traffic conditions along with roadway surface conditions, including but not limited to
   i. Improvements at entrances and intersections
   ii. Upgrading or replacing pavement sections
      1. Identification of the optimum timeframe for upgrades or replacement, such as whether that may be prior to or at the beginning of operations; or whether that may sometime during or at the end of operations.
      2. Identification if the pavement is designed for full normal mine traffic (or reduced loads/no mine traffic) during annual spring load restrictions
   iii. Improvements to the roadway cross section or alignment

i. Extraordinary Maintenance. Identification of likely extraordinary maintenance costs, above normal maintenance requirements, attributable to the proposed traffic of the mining operations.
   i. Identification of surface repair or reconditioning, street cleaning/sweeping, shoulder repair, etc.

j. Right of Way Needs
   i. Identification of costs likely to be incurred for right of way acquisition to maintain safe and desirable roadway conditions during operations attributable to the proposed traffic intensity of the proposed mining operations.

k. Engineering Needs
i. Identification of costs likely to be incurred for engineering services to maintain safe and desirable roadway conditions during operations attributable to the proposed traffic intensity of the proposed mining operations.

I. Findings and Recommendations
   i. Summary of all deficiencies and recommended improvements/corrections
   ii. An estimate of costs for all recommended improvements and corrections, itemized by improvement and totaled for entire project.
   iii. An estimate of existing deficiencies, external traffic considerations and all factors considered in assigning rough proportionality of costs to the proposed mining operations.

4. Review
   a. The County reserved the right to review the traffic impact analysis in-house or elect to choose a consultant to perform an independent review. If the County chooses to hire a consultant, the review consultant will be hired at the proposer/developers expense.
**February 15, 2012**

**APPROXIMATE TIMELINE OF EVENTS RELATED TO SILICA SAND MINING IN WINONA COUNTY**

<table>
<thead>
<tr>
<th>DATE</th>
<th>EVENT</th>
</tr>
</thead>
<tbody>
<tr>
<td>AUGUST 2011</td>
<td>Jason Gilman corresponds with County Administrator on silica sand mining issues and considerations-Howard Agreement from Chippewa County is sent to Winona County.</td>
</tr>
<tr>
<td>SEPTEMBER, 2011</td>
<td>Three applications are received for mining the St. Peter formation in Saratoga Township.</td>
</tr>
<tr>
<td>SEPTEMBER 26, 2011</td>
<td>Planning Department organizes a interdepartmental meeting with staff and elected officials to discuss silica sand issues including road impact, dust and air quality, reclamation, groundwater, property values, seismology, stockpiling, bluff protection, hours of operation and others.</td>
</tr>
<tr>
<td>SEPTEMBER, 2011</td>
<td>County Planning Commission tables applications to research information on silica sand mining (60 days).</td>
</tr>
<tr>
<td>OCTOBER, 2011</td>
<td>Planning Department meets with City of Winona Officials to discuss long term traffic impact issues related to the industry.</td>
</tr>
<tr>
<td>OCTOBER 2011</td>
<td>County Attorney issues a briefing on the evaluation of the Conditional Use Permit Application process in dealing with various issues.</td>
</tr>
<tr>
<td>NOVEMBER 2011</td>
<td>County Planning Commission tables applications another 60 days to continue research-Planning Department provides a list of 26 recommended conditions of approval (currently 29).</td>
</tr>
<tr>
<td>NOVEMBER, 2011</td>
<td>Planning Department publishes a Silica Sand Mining Questions and Answers Paper on the County Website.</td>
</tr>
</tbody>
</table>
DECEMBER, 2011  Planning Director attend the City of Winona Chamber of Commerce. Forum, providing detailed notes to the County Board.

DECEMBER, 2011  County Planning Commission and Board hold hearings on potential moratorium/interim ordinance for all silica sand mining, processing and transportation uses.

DECEMBER, 2011  Planning Department organizes and hold two public forums-one in Winona and one in Lewiston with guest speakers Tony Runkel (U of M), Jeff Green and Scott Johnson (MNDNR Water Specialists) Karl Green of UW Extension and Toby Dogweiler of Winona State University. The event is generally for public information about potential threats to hydrology from mining.

DECEMBER, 2011  County Assessor starts looking into property value impacts-so far inconclusive (note Buffalo County method)

JANUARY 10  Jason Gilman attends a St. Charles Board meeting discussing sand mining and other County Planning issues.

JANUARY 19, 2012  County staff meet with St. Charles officials on potential processing site-little detail is known at the time.

JANUARY, 2012  5 more sand mine applications and a potential processing site application is delivered to the County.

JANUARY 24, 2011  County Planning Department sends a letter to Mr. Ed Behrens rejecting the application for a 300 acre processing site near St. Charles.

JANUARY 2012  County Board enacts a 3 month moratorium to conduct a land use study related to silica sand mining, processing and transportation

JANUARY 12, 2012  Winona County holds an invitational meeting with County technical staff from Olmsted, Fillmore, Wabasha, Goodhue, Rice, Houston, Winona, Buffalo, Trempealeau and La Crosse Counties.

FEBRUARY, 2012  County Highway Department publishes a study on silica sand mining road impacts on the County's website.

OCT, 2011-FEB, 2012  Winona County staff attend SWCD meetings, Basin Alliance (BALMM) panels, Whitewater JPB Board and
numerous city and township board meetings and adjacent County meetings to discuss sand issues.

<table>
<thead>
<tr>
<th>Date</th>
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</tr>
</thead>
<tbody>
<tr>
<td>SEPT, 2011-FEB, 2012</td>
<td>Refinement of conditions of approval based on information received from reliable sources.</td>
</tr>
<tr>
<td>SEPT, 2011-FEB, 2012</td>
<td>County hears from many citizens and diverse interests related to sand mining from those with environmental and health concerns to those that see the industry as a economic gain for the County and those that do not want over-regulation, defending property rights for mineral extraction.</td>
</tr>
<tr>
<td>FEB, 2012</td>
<td>County enacts a three month moratorium through May 1, 2012. Staff studies potential impacts of industry including but not limited to traffic impact, road impact, hydrologic impact, erosion impact, air quality impact, habitat and biological impact, neighboring land use impact such as noise, odor and glare, potential cumulative impacts, property value impacts, reclamation issues, staff resource impacts.</td>
</tr>
<tr>
<td>MARCH, 2012</td>
<td>Planning Department publishes a MNDNR fact sheet on silica sand mining on County website.</td>
</tr>
<tr>
<td>MAY, 2012</td>
<td>County Planning Department in concert with the County Attorney's Office and County Highway Office, releases a comprehensive policy paper on silica sand mining regulation accompanied by a comprehensive application packet.</td>
</tr>
</tbody>
</table>
SEPT, 2011-APRIL, 2012

Additional Research Resources:

- Meetings with concerned citizens (numerous)
- Meetings with concerned neighbor to the Reiman Site
- E-mail correspondence with local, county, state officials
- Review of research and reports:
  - Air Quality, Dr. Crispin Pierce, UW Eau Claire
  - Economic Impacts, Industry information, Chamber feedback, Processing Owners
  - Water Quality: MPCA Factsheet, February 2012
  - Environmental Impact, MN and WI DNR Papers
  - Road and Traffic Impact, Jackson County Study, Buffalo and Trempealeau Co proposals, La Crosse County Highway Dept. findings, Wilde Powerpoint, Minnesota State University Mankato
  - Bedrock Geology Panels, USGS
  - EIS and EAW Review-MN Environmental Quality Board Guidance Manual
  - Geologic Impacts-Winona County Geographic Information Systems Studies/Maps
  - Reclamation: Handbook for Reclaiming Sand and Gravel Pits in Minnesota, MNDNR
  - Mining Agreements: Town of Howard Chippewa County Agreement
  - Zoning Code, County Comprehensive Plan and Water Plan Land Use Study, Winona County Planning Department
  - Economics: University of Wisconsin Extension Economic Multiplier Study of Frac Sand Mining Operations and Stability of Mining Study
  - Environmental Impact-WisDNR Silica Sand Mining in Wisconsin, January 2012 Report.
  - US Market Demand-US Geological Service Industrial Sand and Gravel Data Sheet
  - General Overview of Issues: Bruce Brown, Senior Geologist Wisconsin Geological and Natural History Survey WCCA Conference Presentation, October, 2011
  - Wisconsin Activity: Report to the Natural Resources Board Silica Study, August 2011.
  - Webinar: Regulating Sand and Gravel Mining: Lessons From Michigan
- Association of Minnesota Counties-County Officers Meeting-Presentation
- SWCD Board Q&A
- Town Officers Meetings Q&A
- City of Winona Masons Presentation
- City of Winona Lions Club Presentation
- St. Charles Board Presentation
- Township Board Meetings Presentations
- Industry Reps. Rowekamp, Broberg, Behrens, Van Eijl, Superior Sands, Hammel, Frick
- PREP, Recorders and Title Company Regional Meeting Presentation
- Regional Assessors Meeting Presentation
- Basin Alliance Lower Mississippi BAALM meeting, Rochester Panel Discussion
- Houston County Correspondence
- Minnesota Public Radio-Interviews
- The Wall Street Journal-Interviews
- KARE Interview
- Winona Radio Interviews
- Winona Daily News Stories/Interviews
- Winona Civic Organization Presentation
- Land Stewardship Office Discussions
- Winona Kiwanis Presentation
- City of Winona Officials Meetings
- Olmsted County Correspondence
- St. Charles Neighborhood Meetings (2)
- MNDOT Freight Presentation
- KTTC Rochester Interview
WHAT IS INDUSTRIAL SILICA SAND (FRAC SAND)? Industrial silica sand refers to sand having the composition and grain-size distribution required for industrial applications. Specifically, industrial silica sand consists of well-rounded, sand composed of almost pure quartz grains. Quartz, or silicon dioxide (SiO2), is one of the most common minerals found on the Earth’s surface and is found in rocks like granite, gneiss, and sandstone. Industrial silica sand is a higher value product than sand and gravel used in the construction industry.

WHERE IS INDUSTRIAL SILICA SAND FOUND? Industrial silica sand is mined from sandstones occurring in portions of Minnesota, Wisconsin, Iowa, and Illinois. In Minnesota, glacial drift and other bedrock layers commonly exist on top of the sandstone. Three sandstone formations have potential for producing high quality industrial silica sand. The Jordan and Wonewoc sandstones are the most sought after sources followed by the St. Peter sandstone.*

WHAT IS THE CURRENT STATUS OF INDUSTRIAL SAND MINING IN MINNESOTA? Industrial silica sand is found in the southeastern portion of the state. Six mining operations are currently known to extract industrial silica sand. Mines may or may not process the sand on-site. Three off-site processing plants are currently known to receive silica sand from various mining operations in Minnesota and Wisconsin. To date, five counties, Winona, Goodhue, Wabasha, Houston, and Fillmore, passed moratoria on new permits for industrial silica sand mining.

HOW IS IT MINED? In Minnesota, all industrial silica sand mines operate as surface quarries. However, both surface quarries and underground mines exist in other states.

WHAT TYPES OF INDUSTRIES USE SILICA SAND? Industrial silica sand has been mined in the Upper Midwest for over a century. Uses for this resource include a variety of products and applications like glass-making, abrasives, golf course sand traps, and frac sand. Over the past decade, a sharp increase in demand for industrial silica sand corresponded with a rapid expansion of shale oil and gas development. An extraction method called hydraulic fracturing is used to produce oil and gas from shale bedrock and requires approximately 10,000 tons of industrial silica sand per well. Due to increased demand, permits for new industrial silica sand mines and expansion of existing mines are being submitted across the southeastern portion of Minnesota.

*Dustman, J.E., Gulbranson, B., Bell, P., Gregg, W., 2011: Characteristics of high quality frac sand, and where to find it in the upper Midwest., Geological Society of America Abstracts with Programs, Vol. 43, No 5.
WHAT IS “FRACKING”? Fracking is slang for hydraulic fracturing. In the hydraulic fracturing process, a mixture of industrial silica sand (frac sand), water, and chemicals is injected under high pressures to maintain fractures in shale bedrock. The sand-filled cracks and fissures create conduits for fluids and gas to flow into an oil and gas well.

IS FRACKING OCCURRING IN MINNESOTA? No. Sand used for hydraulic fracturing is mined and/or processed in Minnesota. The sand is then transported out of the state by rail to oil and natural gas producing regions (e.g. Western North Dakota, Pennsylvania, and New York).

WHY HERE? WHAT MAKES OUR SAND SO UNIQUE? Even though sand can be found all over the world, sandstones found in the Upper Midwest have several unique physical properties (listed below). It is one of a few places on Earth where this resource occurs, making it a globally desired commodity.

- **Composition:** Sand usually contains many different rock types; however, industrial silica sand produced in this region consists of nearly 99% quartz.
- **Strength:** Quartz is a very hard mineral and able to withstand high pressures produced during the hydraulic fracturing process without breaking.
- **Shape:** The sand grains are shaped like little ball bearings which allow for oil and gas to flow between individual grains without clogging the fractured rock.
- **Size:** The sand grains are fairly uniform in size. When washed and screened, the sands meet the precise grain-size distribution required for hydraulic fracturing.

WHO REGULATES INDUSTRIAL SILICA SAND MINING? Counties, townships, or municipalities are the responsible governmental unit (RGU) for administering permits to mine for industrial silica sand. Conditional land use permits, sometimes called special use permits, may be required from local planning and zoning offices.

WHO ARE THE OTHER REGULATING AUTHORITIES? Depending on size and scope, the proposed mining operation may be subject to the following state and federal permits and regulations:

- **Department of Natural Resources (DNR)**- Water Appropriation Permit; Public Waters Work Permit; Burning Permit; and Endangered or Threatened Species Taking Permit.
- **Pollution Control Agency (MPCA)**- Section 401 Certification; Storm Water, Wastewater, and Air Quality Regulations.
- **Board of Water and Soil Resources (BWSR)**- Wetland Conservation Act.
- **US Army Corps of Engineers**- Section 404 Permit (discharge of dredged or fill material or excavation within waters and wetlands may require approval of the US Army Corps of Engineers).
- **Environmental Quality Board (EQB)**: Conducts environmental reviews in the form of an Environmental Assessment Worksheet (EAW) for operations excavating 40 or more acres of land at a mean depth of 10 feet and Environmental Impact Statement (EIS) for operations exceeding 160 acres.
Sand Mining Road Impacts

Committee of the Board
February 7, 2012

This presentation is available at the Winona County website www.co.winona.mn.us under Departments > Public Works > Highway > Reports and Documents.
Roadway Impacts

- Traffic Congestion
- Safety Concerns
- Pavement Deterioration

On:
- State Highways (Interstate, U.S., Mn Highways)
- County Highways aka County Roads
  - County State-Aid Highways (state-aid & local funding)
  - County Highways (local funding only)
- City Streets
- Town Roads
Pavement Impact

1 Legal Truck is equivalent to 9600 cars

1 Truck Overloaded 20% is equivalent to 19,000 cars

Source: Minnesota Truck Weight Education Program
Williston, North Dakota experience.

http://www.msnbc.msn.com/id/21134540/vp/45150953#45150953
January 2012

Proposed Mining Sites
21.5 Miles on County Roads
Minnesota Highway Users Tax Distribution Fund

2012 total $1,751,350,667

2012 Winona County State-Aid Apportionment
$4,912,970
0.28% of total
Roughly $3 per $1,000 of state road user taxes
$28.05 per $10,000 of taxes
County State-Aid Highways

• Financed by both state-aid and local funding.
  – State-aid amount is fixed by MN constitution and statutes.
  – Any incremental increase in costs, if not collected from mine operations, will be borne by local taxpayers (or by shifts from other projects which are ultimately borne by local taxpayers).
What are others doing about this?

• We queried County Engineers for the other 86 Minnesota counties.
• Multiple conversations with southeastern MN and western WI counties.
• Planning Director Jason Gilman hosted a January 12, 2012 roundtable attended by staff and elected officials from area counties.
Best Practices: Managing Interactions between Local Authorities and Major Traffic Generators

Significant hauling of heavy loads puts your roadway surface at risk of damage. Leveraging the experience of several County Engineers, the Local Road Research Board recently funded the development of an online document that presents step-by-step guidelines for Minnesota county engineers on how to interact with developers of “wind farms” (technically known as large wind energy conversion systems or LWECS) regarding road-related issues. Construction of LWECS requires hauling of a significant number of heavy loads on local roadways, potentially causing damage to the roadway surface. This document provides county engineers with guidance on how to work with LWECS developers to preserve the roadway surfaces. The committee that provided input for this document was comprised of Minnesota county engineers that are currently going through or have completed this process along with Mn/DOT and regional planners.

This document contains a wide range on information contained in a single, downloadable interactive document. The document allows easy access to the following content:

- Web links and reports
- Sample ordinances, permits, agreements and maps
- Traffic calculator to quantify the traffic impact on roads
- Policy options to recapture roadway maintenance costs
- Experience from current or past projects
- Research information

http://www.lrrb.org/trafcalc.aspx

County engineers in other states, other road authorities, and wind power developers themselves also may find this information valuable. While this tool is focused on LWECS’s, it is broad enough that it could also be used when a county is dealing with any other enterprise that impacts the roads under its jurisdiction.

The interactive document discussed above can be downloaded here:

**Major Traffic Generators Interactive Document (in zip format)**
[Right mouse click, “Save As” and unzip to your own folder.]

In addition, the Traffic Calculator Tool (to help quantify impacts to roads) can be found here:

**Major Traffic Generators-Impact Tool (In xls format)**
[save to your folder. Once opened, you must enable macros so spreadsheet will work as intended.]

NOTE: A final report, #2010RIC11, is expected soon.
1D7. Detail: Permit/Fee

Before a county can go further, it must decide on a methodology for assessing and recouping the costs of road damage caused by wind farm development. Four methodologies are in common use:

1. Charge per-use fees.
2. Charge a blanket “haul route” fee for the entire development project.
3. Quantify and charge for damage by calculating the number of ESALs construction activity will take out of the road’s intended life. Click CALCULATOR for a tool that can be used to calculate the amount of damage done to asphalt-surfaced roads by wind farm development.
4. Conduct pre- and post-construction assessments of the road, including some combination of the items listed in 2B2a [link] through 2B2f [link] of this document. This information allows the county to charge for the actual cost incurred to restore the road to the previous (or other agreed-upon) condition.

However, none of the above four methods can stand on its own to assess and recoup costs of road damage. Often, counties choose one method from among 1-3 above — and possibly 4 as well. But each county must define its own strategy. The steps shown in the remainder of this document may or may not apply to a given project, depending on which methodology is chosen.
January 3, 2012 Road & Bridge Committee
Consensus – focus on:

• Aggregate Tax, or
• A similar per Ton or per Cubic Yard concept.
• Keep it straightforward.
298.75 AGGREGATE MATERIAL REMOVAL; PRODUCTION TAX.

Subdivision 1. Definitions. Except as may otherwise be provided, the following words, when used in this section, shall have the meanings herein ascribed to them.

(a) "Aggregate material" means:

(1) nonmetallic natural mineral aggregate including, but not limited to sand, silica sand, gravel, crushed rock, limestone, granite, and borrow, but only if the borrow is transported on a public road, street, or highway, provided that nonmetallic aggregate material does not include dimension stone and dimension granite; and

(2) taconite tailings, crushed rock, and architectural or dimension stone and dimension granite removed from a taconite mine or the site of a previously operated taconite mine.

Aggregate material must be measured or weighed after it has been extracted from the pit, quarry, or deposit.

(b) "Person" means any individual, firm, partnership, corporation, organization, trustee, association, or other entity.

(c) "Operator" means any person engaged in the business of removing aggregate material from the surface or subsurface of the soil, for the purpose of sale, either directly or indirectly, through the use of the aggregate material in a marketable product or service.

(d) "Extraction site" means a pit, quarry, or deposit containing aggregate material and any contiguous property to the pit, quarry, or deposit which is used by the operator for stockpiling the aggregate material.

(e) "Importer" means any person who buys aggregate material excavated from a county not listed in paragraph (f) or another state and causes the aggregate material to be imported into a county in this state which imposes a tax on aggregate material.

(f) "County" means the counties of Pope, Stearns, Benton, Sherburne, Carver, Scott, Dakota, Le Sueur, Kittson, Marshall, Pennington, Red Lake, Polk, Norman, Mahnomen, Clay, Becker, Carlton, St. Louis, Rock, Murray, Wilkin, Big Stone, Sibley, Hennepin, Washington, Chisago, and Ramsey. County also means any other county whose board has voted after a public hearing to impose the tax under this section and has notified the commissioner of revenue of the imposition of the tax.

(g) "Borrow" means granular borrow, consisting of durable particles of gravel and sand, crushed quarry or mine rock, crushed gravel or stone, or any combination thereof, the ratio of the portion passing the (#200) sieve divided by the portion passing the (1 inch) sieve may not exceed 20 percent by mass.

Subd. 2. Tax imposed. (a) Except as provided in paragraph (e), a county that imposes the aggregate production tax shall impose upon every operator a production tax of 21.5 cents per cubic yard or 15 cents per ton of aggregate material excavated in the county except that the county board may decide not to impose this tax if it determines that in the previous year operators removed less than 20,000 tons or 14,000 cubic yards of aggregate material from that county. The tax shall not be imposed on aggregate material excavated in the county until the aggregate material is transported from the extraction site or sold, whichever occurs first. When aggregate material is stored in a stockpile within the state of Minnesota and a public highway, road or street is not used for transporting the aggregate material, the tax shall not be imposed until either when
the aggregate material is sold, or when it is transported from the stockpile site, or when it is used from the stockpile, whichever occurs first.

(b) Except as provided in paragraph (e), a county that imposes the aggregate production tax under paragraph (a) shall impose upon every importer a production tax of 21.5 cents per cubic yard or 15 cents per ton of aggregate material imported into the county. The tax shall be imposed when the aggregate material is imported from the extraction site or sold. When imported aggregate material is stored in a stockpile within the state of Minnesota and a public highway, road, or street is not used for transporting the aggregate material, the tax shall be imposed either when the aggregate material is sold, when it is transported from the stockpile site, or when it is used from the stockpile, whichever occurs first. The tax shall be imposed on an importer when the aggregate material is imported into the county that imposes the tax.

(c) If the aggregate material is transported directly from the extraction site to a waterway, railway, or another mode of transportation other than a highway, road or street, the tax imposed by this section shall be apportioned equally between the county where the aggregate material is extracted and the county to which the aggregate material is originally transported. If that destination is not located in Minnesota, then the county where the aggregate material was extracted shall receive all of the proceeds of the tax.

(d) A county, city, or town that receives revenue under this section is prohibited from imposing any additional host community fees on aggregate production within that county, city, or town.

(e) A county that borders two other states and that is not contiguous to a county that imposes a tax under this section may impose the taxes under paragraphs (a) and (b) at the rate of ten cents per cubic yard or seven cents per ton. This paragraph expires December 31, 2014.

Subd. 3. Report and remittance. (a) By the 14th day following the last day of each calendar quarter, every operator or importer shall make and file with the county auditor of the county in which the aggregate material is removed or imported, a correct report under oath, in such form and containing such information as the auditor shall require relative to the quantity of aggregate material removed or imported during the preceding calendar quarter. The report shall be accompanied by a remittance of the amount of tax due.

(b) If any of the proceeds of the tax is to be apportioned as provided in subdivision 2, the operator or importer shall also include on the report any relevant information concerning the amount of aggregate material transported, the tax and the county of destination. The county auditor shall notify the county treasurer of the amount of such tax and the county to which it is due. The county treasurer shall remit the tax to the appropriate county within 30 days, except as provided in paragraph (c).

(c) The proceeds of the tax on aggregate material as defined in subdivision 1, paragraph (a), clause (2), must be remitted to the commissioner of Iron Range resources and rehabilitation to be deposited in the taconite area environmental protection fund under section 298.223, and used for the purposes of that fund.

Subd. 4. Auditor estimate; statement of objections. If the county auditor has not received the report by the 15th day after the last day of each calendar quarter from the operator or importer as required by subdivision 3 or has received an erroneous report, the county auditor shall estimate the amount of tax due and notify the operator or importer by registered mail of the amount of tax
so estimated within the next 14 days. An operator or importer may, within 30 days from the date
of mailing the notice, and upon payment of the amount of tax determined to be due, file in the
office of the county auditor a written statement of objections to the amount of taxes determined
to be due. The statement of objections shall be deemed to be a petition within the meaning of
chapter 278, and shall be governed by sections 278.02 to 278.13.

Subd. 5. Failure to file and pay; penalty. Failure to file the report and submit payment shall
result in a penalty of $5 for each of the first 30 days, beginning on the 15th day after the last day
of each calendar quarter, for which the report and payment is due and no statement of objection
has been filed as provided in subdivision 4, and a penalty of $10 for each subsequent day shall
be assessed against the operator or importer who is required to file the report. The penalties
imposed by this subdivision shall be collected as part of the tax and credited to the county revenue
fund. If neither the report nor a statement of objection has been filed after more than 60 days
have elapsed from the date when the notice was sent, the operator or importer who is required
to file the report is guilty of a misdemeanor.

Subd. 6. Penalties; removal of aggregate if previous tax not paid; false report. It is a
misdemeanor for any operator or importer to remove aggregate material from a pit, quarry, or
deposit or for any importer to import aggregate material unless all taxes due under this section for
all previous reporting periods have been paid or objections thereto have been filed pursuant to
subdivision 4.

It is a misdemeanor for the operator or importer who is required to file a report to file a false
report with intent to evade the tax.

Subd. 7. Proceeds of taxes. (a) All money collected as taxes under this section on aggregate
material as defined in subdivision 1, paragraph (a), clause (1), shall be deposited in the county
treasury and credited according to this subdivision.

(b) The county auditor may retain an annual administrative fee of up to five percent of
the total taxes collected in any year.

(c) The balance of the taxes, after any deduction under paragraph (b), shall be credited
as follows:

1) 42.5 percent to the county road and bridge fund for expenditure for the maintenance,
construction and reconstruction of roads, highways and bridges;

2) 42.5 percent to the general fund of the city or town in which the mine is located, or
to the county, if the mine is located in an unorganized town, to be expended for maintenance,
construction and reconstruction of roads, highways and bridges; and

3) 15 percent to a special reserve fund which is hereby established, for expenditure for the
restoration of abandoned pits, quarries, or deposits located within the county.

If there are no abandoned pits, quarries or deposits located within the county, this portion
of the tax shall be used for any other unmet reclamation need or for conservation or other
environmental needs.

Subd. 8. Examination of records; maintenance of records. The county auditor or its duly
authorized agent may examine records, including computer records, maintained by an importer
or operator. The term "record" includes, but is not limited to, all accounts of an importer or
operator. The county auditor must have access at all reasonable times to inspect and copy all
business records related to an importer's or operator's collection, transportation, and disposal of aggregate to the extent necessary to ensure that all aggregate material production taxes required to be paid have been remitted to the county. The records must be maintained by the importer or operator for no less than six years.

Subd. 9. Tax may be imposed; St. Louis County towns. (a) If the St. Louis County Board does not approve Laws 1997, chapter 231, article 8, section 12, as provided in Laws 1997, chapter 231, article 8, section 18, each of the following towns in St. Louis County may impose the aggregate materials tax under this section: the towns of Alden, Brevator, Canosia, Duluth, Fredenburg, Gnesen, Grand Lake, Industrial, Lakewood, Midway, Normanna, North Star, Rice Lake, and Solway.

(b) For purposes of exercising the powers contained in this section, the "town" is deemed to be the "county."

(c) In those towns located in St. Louis County that impose the tax under this section, all provisions in this section shall apply to those towns, except that in lieu of the distribution of the tax proceeds under subdivision 7, all proceeds from this tax shall be retained by each of the towns that impose the tax.

(d) A tax imposed under this subdivision is effective in the town that approves it the day after compliance by the town with the requirements of section 645.021, subdivision 3.

Subd. 10. MS 2006 [Never effective, 2006 c 259 art 12 s 14]

Subd. 11. Tax may be imposed; Otter Tail County. (a) If Otter Tail County does not impose a tax under this section and approves imposition of the tax under this subdivision, the town of Scambler in Otter Tail County may impose the aggregate materials tax under this section.

(b) For purposes of exercising the powers contained in this section, the "town" is deemed to be the "county."

(c) All provisions in this section apply to the town of Scambler, except that all proceeds of the tax must be retained by the town and used for the purposes described in subdivision 7.

(d) If Otter Tail County imposes an aggregate materials tax under this section, the tax imposed by the town of Scambler under this subdivision is repealed on the effective date of the Otter Tail County tax.

History: 1980 c 607 art 19 s 5; 1Sp1981 c 1 art 10 s 17-19; 1982 c 523 art 13 s 1; 1983 c 342 art 14 s 1; 1984 c 652 s 1; 1986 c 403 s 1,2; 1993 c 375 art 9 s 41,42; 1995 c 264 art 16 s 15; 1996 c 471 art 13 s 15; 1997 c 231 art 8 s 12-15; 1Sp2001 c 5 art 6 s 35,36; 2003 c 127 art 14 s 11; 2006 c 259 art 12 s 14; 2008 c 154 art 8 s 15-17; art 16 s 8; 2008 c 366 art 6 s 36-39; 2009 c 88 art 12 s 10
ESAL – Equivalent Single Axle Load

**ESAL Defined:** One ESAL represents a single standardized load application. Each ESAL is known to cause a quantifiable and standardized amount of damage to the pavement structure equivalent to one pass of a single 18,000-pound, dual-tire axle with all four tires inflated to 110 psi.

What is an ESAL?
THE CALCULATIONS

If you think this equation is complicated...It is

Generalized Fourth Power Law

\[
\left( \frac{30,000 \ lb}{18,000 \ lb} \right)^4 = 7.7
\]

Flexible Pavement ESAL Equation

\[
\frac{W_x}{W_{18}} = \left[ \frac{L_{18} + L_{2s}}{L_x + L_{2x}} \right]^{4.79} \left[ \frac{10^{\frac{G/\beta_x}{\beta_{18}}}}{10^{\frac{G/\beta_{18}}}} \right]^{4.33}
\]

http://training.ce.washington.edu/WSDOT/Modules/04_design_parameters/04-3_body.htm#esal

Jackson County Highway Department
## ESAL Typical Load Equivalency Factors

<table>
<thead>
<tr>
<th>Axle Type</th>
<th>Axle Load</th>
<th>Load Equivalency Factor (from AASHTO, 1993)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Flexible</td>
</tr>
<tr>
<td></td>
<td>(kN)</td>
<td>(lbs)</td>
</tr>
<tr>
<td>Single axle</td>
<td>8.9</td>
<td>2,000</td>
</tr>
<tr>
<td></td>
<td>44.5</td>
<td>10,000</td>
</tr>
<tr>
<td></td>
<td>62.3</td>
<td>14,000</td>
</tr>
<tr>
<td></td>
<td>80.0</td>
<td>18,000</td>
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<tr>
<td></td>
<td>89.0</td>
<td>20,000</td>
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<tr>
<td></td>
<td>133.4</td>
<td>30,000</td>
</tr>
<tr>
<td>Tandem axle</td>
<td>8.9</td>
<td>2,000</td>
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<tr>
<td></td>
<td>44.5</td>
<td>10,000</td>
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<td></td>
<td>62.3</td>
<td>14,000</td>
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<td>80.0</td>
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<td></td>
<td>89.0</td>
<td>20,000</td>
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<td>133.4</td>
<td>30,000</td>
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<td></td>
<td>151.2</td>
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<td>177.9</td>
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<tr>
<td></td>
<td>222.4</td>
<td>50,000</td>
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[http://training.ce.washington.edu/WSDOT/Modules/04_design_parameters/04-3_body.htm#esal](http://training.ce.washington.edu/WSDOT/Modules/04_design_parameters/04-3_body.htm#esal)
## Jackson County Construction Cost Trends

### Jackson County Rural Construction Costs Per ESAL / MILE

<table>
<thead>
<tr>
<th>Roadway</th>
<th>Construction Year</th>
<th>Location</th>
<th>Length</th>
<th>Project Cost</th>
<th>Cost Per Mile</th>
<th>20 year Design</th>
<th>$ cost per ESAL per Mile</th>
</tr>
</thead>
<tbody>
<tr>
<td>CSAH 34</td>
<td>2000-2001</td>
<td>Hwy 71 to East County Line</td>
<td>6.89</td>
<td>$2,618,066</td>
<td>$379,980.55</td>
<td>180,334</td>
<td>$2.11</td>
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<tr>
<td>CSAH 34</td>
<td>2003-2004</td>
<td>West County Line to CSAH 9</td>
<td>7</td>
<td>$2,505,991</td>
<td>$357,998.71</td>
<td>82,653</td>
<td>$4.33</td>
</tr>
<tr>
<td>CSAH 34</td>
<td>2004-2005</td>
<td>CSAH 9 to Hwy 86</td>
<td>7</td>
<td>$3,601,303</td>
<td>$514,471.86</td>
<td>77,644</td>
<td>$6.63</td>
</tr>
<tr>
<td>CSAH 34</td>
<td>2006-2007</td>
<td>Hwy 86 to HWY 71</td>
<td>9</td>
<td>$5,754,281</td>
<td>$639,364.56</td>
<td>76,391</td>
<td>$8.37</td>
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</tbody>
</table>

**Cost per ESAL / Mile Forecasted for Year 2010**

$11.51
Assumptions for Funding Scenario

• Based on typical existing pavements with current 500 ADT and designed for 110,529 ESALs; pavement cost based on reclaiming and asphalt paving at $200,000/mile.

• 2 sand mines; 70 + 60 = 130 truckloads/day; 6 days/week; 7 months/yr; 23 tons on 80,000 lb truck that is 2.4 ESALs; trucks travel 10 miles on county roads.
Paving New Asphalt Over Reclaimed Asphalt
Approximately $200,000 per mile.
### Funding Scenario

<table>
<thead>
<tr>
<th>Project Type</th>
<th>Cost/Mile</th>
<th>Design ESALs</th>
<th>Cost/Mile/ESAL</th>
<th>Cost/Ton 1</th>
<th>Cost/Ton 2</th>
<th>Truckloads/Year 3</th>
<th>Ton/Year 3</th>
<th>Road Cost/Year</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reclaim and Pave Asphalt</td>
<td>$200,000</td>
<td>110,529</td>
<td>$1.81</td>
<td>$0.19</td>
<td>$1.89</td>
<td>23,725</td>
<td>545,675</td>
<td>$1,030,318</td>
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</table>

### Aggregate Tax

<table>
<thead>
<tr>
<th>$/Ton</th>
<th>Mine Share</th>
<th>Taxpayer Share</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>% of Levy 4</td>
<td></td>
</tr>
<tr>
<td>$0.00</td>
<td>$0</td>
<td>$1,030,318</td>
</tr>
<tr>
<td>$0.06375</td>
<td>$34,787</td>
<td>$995,531</td>
</tr>
<tr>
<td>$0.25</td>
<td>$136,419</td>
<td>$893,899</td>
</tr>
<tr>
<td>$0.50</td>
<td>$272,838</td>
<td>$757,480</td>
</tr>
</tbody>
</table>

1. Assuming 23 Tons on an 80,000 lb semi that is 2.4 ESALs.
2. Assuming 10 miles on County Roads (County Highways and County State-Aid Highways).
3. Assuming 2 mines, 70 + 60 = 130 truckloads/day; 6 days/week; 7 months/yr; 23 tons/truck.
4. Based on 2012 levy $16,972,674.
5. Aggregate Tax amount per ton to the County Road & Bridge Fund is $0.06375 per ton.
6. Based on current traffic of 500 vehicles per day; 20-year design; traffic grows to 550 vehicles/day during the 20 years.

<table>
<thead>
<tr>
<th>Project Type</th>
<th>ESALs</th>
<th>Percent of Pavement Life Consumed in One Year</th>
</tr>
</thead>
<tbody>
<tr>
<td>Normal Traffic</td>
<td>5,526</td>
<td>5%</td>
</tr>
<tr>
<td>Sand Trucks 3</td>
<td>56,940</td>
<td>52%</td>
</tr>
</tbody>
</table>
Things to Keep in Mind

• Cost/Mile/ESAL will vary with the pavement and project type.
  – Cost/Mile/ESAL would be more for a $700,000/mile reconstruction project (including grading) designed for the same 500 vehicles/day.
  – Cost/Mile/ESAL would be less for a $1,000,000/mile project designed for several million ESALs.

• Increasing the number of mines keeps the mine and taxpayer % shares the same, but the % of Levy required for the taxpayer share increases.

• Decreasing the miles on county roads while keeping the $/ton the same increases the mine % share. And vice versa.
Proposed General Approach

• As roads need rebuilding, use a design that is efficient in cost/ESAL and able to withstand unknown increases in heavy traffic.
  – Cash flow projects with a combination of collected fees, state-aid advance, reserves, and bonding.
  – Refund/pay off projects with collected fees and/or increased property tax (per board policy).
• As turn lanes/bypass lanes are needed, retrofit on existing roads, or include in reconstruction projects as applicable.
  – Funded by mine operations.
• Township roads used for quarry access are maintained by the quarry (blading, dust control, adding rock).
Winona County Traffic and Road Impact Study Requirements
For
High Intensity Mining Operations Impacting Winona County’s Transportation Infrastructure System

Introduction
The following outline is provided for guidance in articulating a condition of approval for non-metallic mining conditional use permits in order to meet the requirements of the Winona County Zoning Ordinance, section 5.5.4.1, subp. 1. The use will not create an excessive burden on existing parks, schools, streets/roads and other public facilities and utilities which serve or are proposed to serve the area.

Additionally, the proposed requirement for a traffic and road impact study is recommended to alleviate undue burden on the County’s financial resources and in conformance with County Board action, require mining companies to bear the burden of the costs associated with road infrastructure impact.

1. Terms of Contractual Services
   a. Responsibilities. The proposer of a non-metallic mine shall be responsible for the costs of an independent study, contracted by the County, for preparation of a comprehensive analysis of road and traffic impact for the proposed mining operations.
   b. Payment. The proposer shall be responsible for payment to the County 100% of the proposed consulting fees for services outlined herein as proposed and estimated by a qualified professional traffic engineering firm.
   c. Schedule for Payment. The proposer shall provide the County with funding for these services before the comprehensive traffic and road impact study is contracted and commenced, upon receipt of an invoice by the County Finance Department.
   d. Contractual Services Selection/Qualifications. The County shall have the right to approve or deny the consultant based on qualifications to complete the requirements of the study.

2. Scope of Traffic and Road Impact Analysis
   a. Intersections. All intersections of local, county and state highways affected by traffic generated from the proposed mining operations shall be studied and recommendations made for safety and level of service of handling the proposed traffic intensity of the mining operations.
   b. Local roads. Local roads serving the proposed mining operation shall be studied and recommendations made for safety and level of service of improvements for handling the proposed traffic intensity of the mining operations.
   c. County Highways. County highways serving the proposed mining operations shall be studied and recommendations made for safety and level of service for handling the proposed traffic intensity of the mining operations.
d. Pavements. Pavements of county highways and local roads serving the proposed mining operations shall be studied to determine existing conditions and improvements needed to withstand the hauling of products and equipment. Where existing pavements will structurally accommodate the mine traffic without upgrade, the study shall identify a fair-share cost assignment for the proposer/developer to bear the proportion of the pavement life consumed compared to external traffic, or the improvement necessary to restore the pavement life consumed.

e. Access locations. All drive approaches onto public roadways serving the proposed mining operations shall be studied and recommendations made for safety and level of service for handling the proposed traffic intensity of the mining operations including but not limited to deceleration lanes, turning lanes, emergency pull-outs, shoulder conditions, etc. The study shall determine sight distances at all access points and shall make recommendations for improvements where inadequate or non-compliant conditions exist.

f. Geographic Range. The study shall include recommendations for the entire geographic area where the proposed mining operations may have significant impact as determined and advised by the County Highway Engineer. The County reserves the right to enter into an intergovernmental agreement with neighboring counties to determine and mitigate adverse impacts in adjoining jurisdictions.

g. Existing Deficiencies. The County reserves the right to identify existing roadway related issues or problems that require study for correction in order for the proposed mining operations to operate safely and to maintain levels of service. Where deficiencies are identified, only that portion caused by the proposed mining operations shall be borne by the proposer/developer and the County may choose to cost-share to make the necessary corrections, pending adequate resources and appropriations.

h. Time Frame. Projected traffic demands shall be based on fully operational conditions during each phase of operations.

i. External Factors. External traffic pressures and growth shall be considered in achieving fair-share cost assignment to the proposer/developer.

3. Contents of Study

   a. Introductory Materials

      i. Preparers Name, Team Members and Qualifications

      ii. Project Description

      iii. Identification of Peak Hours and Traffic Projections

      iv. Map of routes and study area

      v. Location of all access points

      vi. Map of Adjacent Land Uses

   b. Existing Traffic Conditions

      i. Description of transportation network including intersections and access points serving the proposed mining operations

      ii. Existing traffic counts

      iii. Gap or que length information where requested
c. Proposed Mining Operation Traffic Generation
   i. Trip generation rates used
   ii. Traffic generation at peak/full capacity
   iii. Source of generation data

d. Traffic distribution
   i. Estimated site traffic movements by direction
   ii. Narrative of assumptions/methods

e. External Traffic Projections
   i. Identification of existing and known proposed traffic generators effecting impacts
   ii. Adjustments made for external traffic impacts
   iii. Forecast data

f. Traffic Assignments
   i. Assignment of peak period traffic at intersections and access points
   ii. Figures for existing and peak impact hours and total traffic
   iii. Recommended access improvements

g. Site Plan
   i. Parking layout
   ii. Loading/Staging Areas
   iii. Recommendations

h. Improvements and Upgrades. Identification of costs likely to be incurred to establish and maintain safe and desirable traffic conditions along with roadway surface conditions, including but not limited to
   i. Improvements at entrances and intersections
   ii. Upgrading or replacing pavement sections
      1. Identification of the optimum timeframe for upgrades or replacement, such as whether that may be prior to or at the beginning of operations; or whether that may sometime during or at the end of operations.
      2. Identification if the pavement is designed for full normal mine traffic (or reduced loads/no mine traffic) during annual spring load restrictions
   iii. Improvements to the roadway cross section or alignment

i. Extraordinary Maintenance. Identification of likely extraordinary maintenance costs, above normal maintenance requirements, attributable to the proposed traffic of the mining operations.
   i. Identification of surface repair or reconditioning, street cleaning/sweeping, shoulder repair, etc.

j. Right of Way Needs
   i. Identification of costs likely to be incurred for right of way acquisition to maintain safe and desirable roadway conditions during operations attributable to the proposed traffic intensity of the proposed mining operations.

k. Engineering Needs
i. Identification of costs likely to be incurred for engineering services to maintain safe and desirable roadway conditions during operations attributable to the proposed traffic intensity of the proposed mining operations.

I. Findings and Recommendations
   i. Summary of all deficiencies and recommended improvements/corrections
   ii. An estimate of costs for all recommended improvements and corrections, itemized by improvement and totaled for entire project.
   iii. An estimate of existing deficiencies, external traffic considerations and all factors considered in assigning rough proportionality of costs to the proposed mining operations.

4. Review
   a. The County reserved the right to review the traffic impact analysis in-house or elect to choose a consultant to perform an independent review. If the County chooses to hire a consultant, the review consultant will be hired at the proposer/developers expense.
Winona County Traffic and Road Impact Agreement Requirements
For
High Intensity Mining Operations Impacting Winona County’s Transportation Infrastructure System

The following outline is provided for guidance in articulating a condition of approval for non-metallic mining conditional use permits in order to meet the requirements of the Winona County Zoning Ordinance, section 5.5.4.1, subp. 1. *The use will not create an excessive burden on existing parks, schools, streets/roads and other public facilities and utilities which serve or are proposed to serve the area.*

Additionally, the proposed requirement for a traffic and road impact agreement is recommended to alleviate undue burden on the County’s financial resources and in conformance with County Board action, require mining companies to bear the burden of the costs associated with road infrastructure impact.

According to the Chippewa County Highway Commissioner, a good agreement will include recitals; identify terms and conditions; identify the roadway routes to be used; identify the owner and authorized representatives; identify the local government and authorized representatives; contain terms for payments of both roadway improvements and long term roadway maintenance; indicate cooperation and potential emergency actions; contain provisions for insurances, remedies and enforcement; contain severability clauses; discuss assignability; contain processes for modifications; and the process for termination.

Outline of Agreement Components

1. Title and Date of Agreement
2. Recitals
   a. Whereas...definition of project
   b. Whereas....relationship of proposed project to County’s infrastructure
   c. Whereas.....Authority for road/traffic impact agreement requirement
   d. Whereas.....Parties desire to enter into agreement
   e. Whereas.....Application of agreement (jurisdiction)
3. Terms
   a. Commencement date and operators schedule
   b. Summary of pavement upgrades
   c. Summary of geometric improvements
   d. Summary of structure improvements (such as culverts or bridges) if applicable
   e. Costs of engineering plans if applicable
   f. Costs of right of way acquisitions if applicable
   g. Costs of exceptional maintenance costs above normal maintenance requirements, attributable to the mining operations
h. Compensation
   i. Payment bond requirement for cumulative impact
   ii. Payment by the Operator for required improvements periodically (e.g. quarterly) based on cost estimates and adjusted for actual costs
   iii. An account held by the County for exceptional maintenance
   iv. 30 day invoicing for
      1. Additional Requirements as Needed imposed by any regulatory agency
      2. Actual costs in excess of cost estimate
      3. Operator’s fair-share proportional costs of improvements (such as turn lanes) for which the Operator’s traffic did not solely warrant the improvements but is part of cumulative traffic warranting the improvements.
   v. The payment bond released when Operator funds received cover all actual and anticipated improvements and maintenance
   vi. Return of unused funds to the Operator

i. County Responsibilities
   i. Review Traffic and Road Impact Study
   ii. Review County Required Permit Applications
   iii. Coordination with Operator/Representative
   iv. Perform all Maintenance and Improvements Pursuant Agreement (schedule permitting?)
   v. Keep all County Roads open to vehicles meeting statutory requirements for weight and size, except during annual spring load restrictions (if applicable depending on the pavement design) or during emergency situations.
   vi. County reserves the right to establish appropriate traffic control devices including speed limits.
   vii. Agreement to exclusively use payments received for their intended use

j. Routing and Access Approval
   i. Based on Proposed Haul Routes
   ii. Procedure for changing haul routes
   iii. Assignment of costs for changing haul routes
   iv. Incidental Use of non-designated routes/county roads

k. Construction Cooperation
   i. Operator Responsibilities for Disclosure of Operational Needs
   ii. County responsibilities for meetings, communications to applicants or repair or closures

l. Emergency Actions
   i. County may unilaterally close roads upon determination of damage that renders roadway unsafe to public for repair
   ii. Both party acknowledgement of County Authority

m. Indemnification
   i. Operator holds County harmless
ii. Limitations of liability
iii. Required Insurances
n. Remedies and Enforcement
   i. Default provisions
   ii. Performance Bond
   iii. Injunctive Relief
o. Severability
p. Entire Agreement
   i. Supercede clause
   ii. No additional terms
q. Assignment/ Consent to all successors and assigns
r. Choice of Law and Forum/ Resolution of Conflict Provision
s. Waiver of Terms and Conditions
t. Cooperation
u. Signatures
Example Roadway Surface Costs for Sand Mining Haul Routes

Information for the Winona County Committee of the Board
March 6, 2012
Prepared by David Kramer, Winona County Engineer

$0.23/ton/mile, from Minnesota Local Road Research Board, Traffic Impact Calculator Tool

Based on the Major Traffic Generators Impact Tool spreadsheet at [http://www.lrrb.org/trafcalc.aspx](http://www.lrrb.org/trafcalc.aspx), using default spreadsheet values and actual pavement design data from 2006 CSAH 6 and CSAH 33 repaving project plans in locations of plausible haul routes. Using calculation method 1 of 3, the “GE Difference Method.” Based on 300,000 tons of sand hauled; 23 tons/load on 80,000 pound gross-weight trucks; 13,043 loads. Output from the software is attached.

$0.22/ton/mile, from the funding scenario in the February 7 presentation to the County Board

The funding scenario had an interim calculation of $0.19 cost/mile/ton. Based on a construction cost of $200,000/mile to reclaim and pave an asphalt roadway; based on a pavement design of 500 vehicles/day; 20-year design; traffic grows to 550 vehicles/day during the 20 years; 20-year design ESALs of 110,529; 23 tons/load on 80,000 pound gross-weight trucks that are 2.4 ESALs. The $200,000/mile cost is for the construction contract only. Adding 16% for preliminary engineering and construction engineering gives a cost of $0.22/ton/mile.

$0.25/ton/mile, Buffalo County, WI draft road use agreement.

In a draft road use agreement that had been verbally agreed to but as of February 13, 2012 had not been signed. Based on $1.00/ton; 4 mile segment of County Rd P impacted; $250,000/mile project necessary to upgrade the road to handle the mine traffic.
## Developer Information

<table>
<thead>
<tr>
<th>Segment Number</th>
<th>Existing Road Segment</th>
<th>Segment Length, Miles</th>
<th>Road Authority</th>
<th>Number of Turbines</th>
<th>Aggregate</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>33, CR14 to Utica</td>
<td>2.23</td>
<td>W.C.</td>
<td></td>
<td>13043</td>
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<tr>
<td>2</td>
<td>33 in Utica</td>
<td>0.60</td>
<td>W.C.</td>
<td></td>
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<td>3</td>
<td>6, CR35 to 2 mi. W</td>
<td>2.00</td>
<td>W.C.</td>
<td></td>
<td>13043</td>
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<tr>
<td><strong>Total</strong></td>
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<td><strong>4.83</strong></td>
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## Agency Information

<table>
<thead>
<tr>
<th>Segment Number</th>
<th>Existing Road Segment</th>
<th>Pavement Type (P=paved, G=gravel)</th>
<th>Subgrade R-Value</th>
<th>Cumulative ESALs Since Last Reconstruction</th>
<th>Design ESALs from Previous Design</th>
<th>20-Yr Projected ESALs Without Development</th>
<th>Existing Pavement GE</th>
<th>Effective GE, % of Original GE</th>
<th>Selected Design Method</th>
<th>Cost, by Selected Method</th>
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<td>33, CR14 to Utica</td>
<td>P</td>
<td>15</td>
<td>133,138</td>
<td>443,794</td>
<td>443,794</td>
<td>32.9</td>
<td>100%</td>
<td>GE Diff.</td>
<td>$ 156,100</td>
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<tr>
<td>2</td>
<td>33 in Utica</td>
<td>P</td>
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<td>133,138</td>
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<td>443,794</td>
<td>29.9</td>
<td>100%</td>
<td>GE Diff.</td>
<td>$ 42,000</td>
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<tr>
<td>3</td>
<td>6, CR35 to 2 mi. W</td>
<td>P</td>
<td>15</td>
<td>107,033</td>
<td>356,776</td>
<td>356,776</td>
<td>26.4</td>
<td>100%</td>
<td>GE Diff.</td>
<td>$ 140,000</td>
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<tr>
<td><strong>Total</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>$ 338,100</td>
</tr>
</tbody>
</table>
ATTACHMENT E

HOUSTON COUNTY DRAFT TRAFFIC IMPACT ORDINANCE
Add to 2.02 Definitions

Haul Route: The set of public roads used for transporting materials in heavy commercial vehicles, extending from the access onto the first abutting pubic road of the property from which the heavy vehicle traffic originates, to the final destination, or to a state highway constructed to a ten-ton standard that leads to the final destination.

Road Use Agreement: An agreement between a developer or property owner and a road authority identifying the road improvements, road impacts, and impact mitigation and remediation measures necessary to preserve the condition of road infrastructure and to make such improvements as may be necessary to handle the volume, weight, size, turning radius, and other attributes of the truck traffic generated by a land use. The Agreement may address, but is not limited to, any of the following road infrastructure matters:
1. Responsibility for upgrading
   a. Pavement sections, bridges, and culverts structural condition
   b. Geometric design, including entrances, intersections, railroad and pedestrian/bicycle facility crossings, geometric design of bridges and culverts, and typical road cross-sections;
2. Responsibility for exceptional maintenance attributable to the use, estimated based on Minnesota Local Road Research Board (LRRB) Pavement Impacts of Large Traffic Generators methodology;
3. Responsibility for clean-up of spillage and public road dust control along haul routes;
4. Establishment of financial accounts to address costs associated with upgrading and exceptional maintenance costs;
5. Delineation of haul routes;
6. Schedules of operation and hauling, including construction operations;
7. Methods to verify and report type, number, and weight of truck loads;
8. Emergency conditions creating a need for immediate road repairs or road closing;
9. Required insurance; and
10. Remedies and enforcement measures.

Section 10.48 TRANSPORTATION IMPACT REPORTS:

A. Purpose: The intent of this section is to provide the information necessary to allow decision-makers to assess the transportation implications of traffic associated with a proposed development in relation to safety, the existing and proposed capacity and condition of the street system, congestion, and the quality of life of neighboring residents. This section establishes requirements for the analysis and evaluation of transportation impacts associated with proposed developments. Traffic studies should identify what improvements, if any, are needed to:
   1. insure safe ingress to and egress from a site;
   2. maintain adequate street capacity on public streets serving the development;
3. ensure safe and reasonable traffic operating conditions on streets and at intersections in the vicinity of a proposed development;
4. avoid creation of or mitigate existing hazardous traffic conditions;
5. minimize the impact of non-residential traffic on residential uses in the vicinity; and
6. protect the public investment in the existing street system.

B. **When Required:** Except for temporary uses associated with road construction, a development application for a use with any of the following traffic or land use characteristics shall be accompanied by a transportation impact report prepared consistent with the provisions of this section unless the requirement is waived by the relevant road authority under the provisions of 10.48.C. No application shall be considered complete unless accompanied by such a report if required.

1. Uses that generate more than 500 vehicle trips per day according to the Institute of Transportation Engineers most recent Trip Generation Manual or 30 heavy vehicle trips per day based on the best available data. Where the development proposed cannot be adequately described by ITE, trip generation should be estimated based on data collected from other developments of similar size and scope, with a minimum of three independent data samples provided.

2. Proposed land use plan amendments
   
   i. from the Resource Protection designation to the Suburban Development, Potential Suburban, Suburban Mixed Use, or Rural Mixed Use designations; or
   
   ii. from the Potential Suburban designation to the Suburban Development or Suburban Mixed Use designations; or
   
   iii. from any designation to the Urban Service Area designation.

   Transportation impact studies for land use plan amendments to the Urban Service Area designation shall identify the road system investments to the County and State road systems necessary to serve anticipated urban development in the Urban Service Area.

3. Zone change requests to zoning districts which include uses (other than conditional uses) whose trip generation exceeds 500 total vehicle trips per day according to the Institute of Transportation Engineers most recent Trip Generation Manual, or which may generate more than 30 heavy vehicle trips per day according to the best available truck trip generation information.

4. Residential General Development Plans with 25 or more dwellings whose primary access beyond the limits of the development will be a gravel surfaced road, or 50 or more dwellings where the primary access beyond the limits of the development will be a paved road.
5. Developments having direct access onto existing or planned Interstate, Interregional, Strategic Arterial or Major Arterial highway as designated by the adopted Functional Designation Map in the ROCOG Long Range Transportation Plan.

C. Jurisdictional Responsibility: The Engineer of the road authority for the access road shall have the final authority for determining the need and adequacy of the Transportation Impact Report, except that

1. If a County road is part of any of the identified haul routes, the County Engineer shall have the final authority for determining the need for and adequacy of a Transportation Impact Report for that part of the haul route; and

2. Any road authority having authority over a portion of a haul route may require a road use agreement covering that part of the haul route, whether or not that road authority has jurisdictional responsibility for determining the need for and adequacy of the Transportation Impact Report.

D. Waiver: The requirement for a Transportation Impact Report may be waived by the Road Authority Representative with responsibility for the public access road, after consulting with Road Authority Representatives with roads comprising any designated haul routes (the County Highway Engineer for affected County roads in Olmsted County, the County Highway Engineer for affected County roads in adjacent counties, the City Engineer for an affected City, the District Engineer of Mn/DOT District 6 for State or Federal Highways, or the Town Board or its Designee for township roads), if it is determined

1. that a Transportation Impact Report is not necessary to determine needed road improvements on access roads or the portions of haul routes under their jurisdiction, and that for access roads and the intersections along haul routes under their jurisdiction, no unsafe or hazardous conditions will be created by the development as proposed; or

2. the applicant has provided performance bonds or other guarantees providing adequate assurance that anticipated damage to roads can be mitigated and/or that unsafe conditions can be mitigated or avoided; or

3. the use is a seasonal use with peak daily trip generation that exceeds the thresholds in Section B, but whose annual average trip generation does not pose a risk to the road infrastructure or traffic safety of the facility and adjacent road network based on evaluation of the cumulative pavement impact expected and geometric design of the roadway.

This waiver shall not preempt the authority of the Minnesota Department of Transportation to require a traffic study under the requirements of the State Access Management Guidelines on any state or federal highway nor the authority of an affected jurisdiction to require a traffic study under an applicable access management ordinance.

E. Complete Application: No application for a development identified as requiring a Transportation Impact Report will be determined to be complete
unless it is accompanied by an appropriate traffic study except if a waiver has been granted by the road authority Engineer after consultation with affected Road Authority Representatives.

F. Contents: All roads and intersections serving a proposed use must be determined to be capable of handling the estimated share of projected traffic generated by the use. A Transportation Impact Report shall include the following:

1. An analysis of traffic operations and intersection improvement needs at all site access points under projected traffic loads. This operational evaluation shall include on-site circulation as it may affect access, on-site and off-site turning and acceleration/deceleration lanes and required vehicle storage, the potential need for signalization, medians, streetlights, pavement striping, or other traffic control, review of sight distance, turning radii, and other intersection safety aspects; and review of shoulder width and condition. The proposed access plan should be consistent with the standards of the Olmsted County Access Management Ordinance for Olmsted County roads or with other Access Management regulations that may apply for other roads whether within Olmsted County under the authority of other jurisdictions, or outside Olmsted County.

2. An analysis of the impact of site-generated traffic on the level of service of affected intersections and public streets in the vicinity of the site. Affected intersections are any road segment or intersection where the additional traffic volume created by the proposed development is greater than 10 percent of the current traffic volume (for road segments) or the current entering volume (for intersections). The Road Authority representative may choose to waive study of certain intersections.

3. For developments expected to generate more than 30 truck trips per day, the applicant must identify any routes to be used by trucks entering or leaving the site in as much detail as possible. For each segment of a haul route or public road used for access, the applicant must prepare
   i. A geometrics and traffic analysis of the intersections and road segments these trucks would use to reach the year-round ten ton route system from the site, addressing structural capacity, impacts of slow moving vehicles on roadway safety, adequacy of sight distance at intersections and railroad crossings, and the need for intersection operation improvements to accommodate truck traffic; and
   ii. To determine structural adequacy, the applicant must prepare an analysis of existing and projected cumulative equivalent single axle loads (ESALs) using the Minnesota Local Road Research Board (LRRB) Pavement Impacts of Large Traffic Generators methodology; and
   iii. To determine adequacy of bridges and culverts, a structural analysis shall be completed for any bridge or culvert along a public road used for a haul or access route if identified as at risk for structural failure due to increased ESAL loadings from the proposed use.
iv. For any public road used for access or haul routes identified as part of the application, if the ratio of projected equivalent single axle loads with the development to the projected ESALs without the development of 1.2 or greater over the projected life of the development, the applicant must prepare a mitigation plan addressing measures to mitigate or prevent road damage.

v. Analyses of structural adequacy must be conducted for any public road used as a haul route regardless of road authority or of location within Olmsted County or in an adjacent county, unless waived by the relevant road authority.

4. An analysis of the impact of the proposed development on residential streets in the vicinity of the site to identify any potential adverse effects of the proposed development and mitigation measures to address any impacts. Examples of possible effects include, but are not limited to, non-residential traffic impacts on residential neighborhoods, pedestrian and bicyclist safety hazards (especially at points where haul routes intersect with facilities having high levels of pedestrian or bicycle traffic), traffic noise, or turning movement conflicts with other driveways or local access roads.

5. A detailed list of the transportation infrastructure improvements needed to meet access management standards of the applicable road authority (or those of the Olmsted County Access Management Ordinance, if a road authority has not adopted an Access Management Ordinance) and to mitigate the impact of the development and estimated costs of these improvements.

6. A list of roadbed, ride surface, or drainage improvements that are needed to increase the structural stability of roads and any substructure, superstructure or deck improvements needed to increase the structural stability of bridges and culverts.

G. Preparation: The applicant may choose to have a transportation study prepared by a Traffic or Transportation Engineer, or other qualified professional with experience in the preparation of such analysis, or may choose to have the Zoning Administrator prepare a report once the development application is submitted. At his or her discretion, the Zoning Administrator may decline to prepare the study. When the applicant chooses to have the Zoning Administrator prepare the study, and the Zoning Administrator agrees to prepare the study, the application triggering the need for a TIR shall be considered incomplete until 45 days after the request is made to the Zoning Administrator to complete the TIR, in order to provide time to prepare the study. The applicant shall be responsible for the costs of preparation of the transportation study incurred by the Zoning Administrator, as identified in the Fee Schedule.

H. Traffic Service Standards: The standards for traffic service that shall be used to evaluate the findings of traffic impact reports are:
1. **Capacity:** The following table shall be used to assess the impact of the proposed development on the capacity of the roadway system. Development traffic when combined with projected 20 year background traffic growth shall not cause the volume to capacity (V/C) ratio to be exceeded. The listed ADT (Average Daily Traffic) capacity should be used as a first test to determine whether V/C limits might be approached; if so, a more detailed analysis of V/C should be completed using methods in the Highway Capacity Manual or similar techniques.

<table>
<thead>
<tr>
<th>Land Use Area (1)</th>
<th>V/C Ratio</th>
<th>Roadway Type</th>
<th>Road Character</th>
<th>ADT Capacity</th>
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<tbody>
<tr>
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<td>2 Lane Highway</td>
<td>Level with shoulders</td>
<td>4800</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Rolling or Level with limited or no shoulders</td>
<td>2900</td>
</tr>
<tr>
<td>Urban Influence</td>
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<td>2 Lane Highway</td>
<td>Level</td>
<td>6500</td>
</tr>
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<td></td>
<td></td>
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<td>All Areas</td>
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<td>Local Collector Road</td>
<td>All</td>
<td>1200</td>
</tr>
<tr>
<td>All Areas</td>
<td>NA</td>
<td>Local Residential Road</td>
<td>All</td>
<td>800</td>
</tr>
</tbody>
</table>

(1) Land Use Areas are defined in Chapter 4A of the ROCOG Long Range Transportation Plan

2. **Level of Service:** The Level of Service Standard for all highway corridor operations (including freeway mainline, merging areas and ramp junctions, and arterial and collector intersections or corridors) should meet the Level of Service standards listed in the table below. Level of Service should be calculated using the Highway Capacity manual or equivalent techniques. Where the existing Level of Service is below these standards, a transportation impact report shall identify those improvements needed to maintain the existing level of service, and what additional improvements would be needed to raise the level of service to the standards indicated.

<table>
<thead>
<tr>
<th>Level of Service</th>
</tr>
</thead>
<tbody>
<tr>
<td>Small cities</td>
</tr>
<tr>
<td>Rochester</td>
</tr>
</tbody>
</table>

3. **Number of Access Points:** The number of access points shall be the minimum needed to provide adequate access capacity for the site. The spacing of access points shall be consistent with the road authority’s access management ordinance. If the road authority has not adopted an access management ordinance, then there shall be 500 feet, or the maximum available distance if less than 500 feet, between access points and the
nearest adjoining intersection or driveway on adjacent parcels and 200 feet between driveways on the same parcel.

4. Residential Street Impact: Non-residential development shall contribute no more than 20% of the traffic on any local street for which residentially zoned property makes up more than 50% of the street frontage.

5. Vehicle Storage: The capacity of storage bays and auxiliary lanes for turning traffic shall be adequate to insure turning traffic will not interfere with through traffic flows on any public street.

6. Internal Circulation: On-site vehicle circulation and parking patterns shall be designed so as not to interfere with the flow of traffic on any public street and shall accommodate all anticipated types of site traffic.

7. Safety: Access points shall be located and designed to provide for adequate intersection and stopping sight distance and appropriate facilities to accommodate acceleration and deceleration of site traffic. The geometric design of access points shall meet the standards of the Olmsted County Access Management Ordinance, or the Access Management Ordinance adopted by the Road Authority, if applicable.

Section 4.02

A. Criteria for Granting Conditional Uses: In granting a conditional use, the Planning Advisory Commission shall consider the effect of the proposed use on the Comprehensive Plan and upon the health, safety and general welfare of occupants of surrounding lands. Among other things, the Commission shall consider the following:

1. The proposed use will not be injurious to the use and enjoyment of other property in the neighborhood and will not significantly diminish or impair the values of such property.

2. The proposed use will not impede the normal and orderly development and improvements of the surrounding property.

3. Adequate utilities, parking, drainage and other necessary facilities will be provided.

4. Adequate ingress and egress will be provided to minimize traffic congestion in the public streets.

5. Based on a transportation impact analysis, if required under Section 10.48 of this Ordinance, or (if the requirement for a transportation impact analysis has been waived) considering the recommendation of the responsible road authority engineer as defined in that Section, the traffic generated by the proposed use either

- can be safely accommodated on existing or planned street systems and the existing public roads providing access to the site will not need to be upgraded or improved by the Township or County or other affected
jurisdictions in order to handle the additional traffic generated by the use; or

- a road use agreement has been entered into specifying responsibility for improving and maintaining the roads of affected jurisdictions including remediation of damaged roads and specification of designated haul routes to limit truck traffic to structurally adequate corridors.

6. Adequate measures have been taken or proposed to prevent or control offensive odor, fumes, dust, noise, vibration, or lighting which would otherwise disturb the use of neighboring property.

7. The special criteria or requirements indicated in Article X, General Regulations, are complied with;

8. The water and sanitary systems are or would be adequate to prevent disease, contamination and unsanitary conditions; and

9. The proposed use will comply with other applicable county, township ordinances, state and federal permits.
ATTACHMENT F

WISCONSIN AGREEMENT WITH CHIPPEWA SANDS
COUNTY ROAD UPGRADE AND MAINTENANCE AGREEMENT

This COUNTY ROAD UPGRADE AND MAINTENANCE AGREEMENT (this “Agreement”) is made and entered into this 16th day of February, 2012 by and between Chippewa County, a Wisconsin governmental entity (the “County”), and Chippewa Sand Company LLC, a Wisconsin limited liability company (the “Operator”). Each of the Operator and the County is sometimes referred to herein individually as a “Party” and collectively as the “Parties”. The term “Operator’s Representatives” shall include Operator’s contractors, subcontractors, agents, employees, suppliers and designees.

RECITALS

WHEREAS, Operator is in the business of mining and production of silica sand, and is in the process of constructing, developing, operating, maintaining and reclaiming a non-metallic mining facility (the “Project”) in Chippewa County, Wisconsin, and was granted a Non-metallic Mining Reclamation Permit for the Project from the Chippewa County Land Conservation and Forest Management Department in accordance with the Non-metallic Mining Reclamation Ordinance of Chippewa County, and

WHEREAS, in connection with the construction, development, operation, maintenance and reclamation of the Project, the Parties desire to address certain issues relating to the roads owned, operated and maintained by the County (collectively, the “County Roads”) over which it will be necessary for Operator and Operator’s Representatives to, among other things, transport heavy equipment and certain locally sourced materials, including, but not limited to, silica sand, over certain County Roads, which may in certain cases be in excess of the design limits of the County Roads; and both parties acknowledge that certain of the County Roads may not be constructed to withstand the frequency and weight of shipments necessary for the Operator to transport its products and equipment, and

WHEREAS, Wis. Stat. § 349.16(1)(c) authorizes the County highway commissioner to enter into an agreement on behalf of County with any owner or operator of any vehicle being operated on a highway maintained by County that provides that County will be reimbursed for any damage done to the highway, and

WHEREAS, Operator has provided to County a site layout plan for the Project that shows the access road entrances, a copy of which is attached as Exhibit A (the “Plan”), and

WHEREAS, Operator and County wish to set forth their understanding and agreement as to the road issues relating to the construction, development, operation, maintenance and reclamation of the Project, and

WHEREAS, this Agreement shall apply to those County Roads listed on the attached Exhibit B and, subject to Section 4.B. herein, any other County Road(s) used by Operator or Operator’s Representatives in direct support of the construction, development, operation, maintenance and reclamation of the Project.
AGREEMENT

NOW, THEREFORE, in consideration of the mutual promises and covenants herein set forth, the parties, intending to be legally bound, agree as follows:

Section 1. Term of Agreement.

This Agreement shall commence upon the date indicated above (the “Effective Date”) and shall continue in full force and effect until Operator’s Non-metallic Mining Reclamation Permit has expired, has been terminated, or until Operator has fully discontinued its construction, development, operation, maintenance and reclamation of the Project and any and all transportation activities related thereto on the County Roads listed on Exhibit B, whichever occurs later.

Section 2. Operator, in respect of the Project constructed, developed, operated, maintained and reclaimed by it, acknowledges and agrees the Project will require County to undertake the following activities in order to preserve County Roads and that the Operator shall be financially responsible for the costs of said activities to the extent, and only to the extent, provided for under the terms of this Agreement:

A. Upgrading Pavement Sections on County Roads to a design standard as directed by the WIDOT, Facilities Development Manual, Section 11-40, to withstand the hauling of products and equipment that are necessary for the Project.

B. Upgrading the geometric design of the County Roads to a standard as directed by the WIDOT, Facilities Development Manual, Section 11-40, that will safely and efficiently accommodate the traffic that Operator has indicated the Project will generate; including improvements at entrances, intersections and to the typical cross-section. Geometric improvements shall also include any improvements to Structures and Culverts necessary to accommodate the increased traffic from the Project.

C. Providing Engineering Plans for all improvements needed under Sections 2.A. and 2.B. above, including any Right-of-Way needed.

D. Operator shall be responsible for all exceptional maintenance costs, above normal maintenance requirements, that are attributable to damage to County Roads from the hauling of products and equipment related to the Project. Said maintenance cost may occur either before or after any of the improvements to County Roads indicated in Sections 2.A., 2.B. and 2.C. above are made. County shall inform Operator if it has a good faith basis to believe any exceptional maintenance costs become necessary and provide a good faith estimate of costs to Operator prior to commencing work.
Reimbursement for costs under this section shall be paid from the Maintenance Account described in Section 2.E. of this Agreement.

E. In order to reimburse County for repairs needed as a result of Operator's use and to accomplish the work indicated in Sections 2.A., 2.B., 2.C. and 2.D. above, Operator shall make payment to County at the time of execution of this Agreement in the amount of Three Million Eight-Hundred Thousand Dollars ($3,800,000.00) into a uniquely identified construction project account (the "Construction Account"). The Three Million Eight-Hundred Thousand Dollars ($3,800,000.00) is the County's good faith cost estimate, based on the 2012 numbers and data available to the County, for the work described in Sections 2.A., 2.B. and 2.C., which estimate is attached hereto as Exhibit C. Payment will be used by the County to improve County Road A, from the Mine entrance to STH 40, on approximately the existing alignment, County Road Q from County Road SS to the plant entrance, and to make geometric improvements to the Mine entrance on County Road A and the processing plant entrance on County Road Q. If actual cost of the improvements exceeds Three Million Eight-Hundred Thousand Dollars ($3,800,000.00) Operator will be billed for the additional costs with payment due within 30 days of receipt of the bill.

Any unused funds from the Three Million Eight-Hundred Thousand Dollars ($3,800,000.00) paid for improvements to CTH A and CTH Q shall be transferred to the Maintenance Account described in Section 2.E. of this Agreement.

Operator shall make annual payments to County beginning on the Effective Date and on the first day of each calendar year thereafter in the amount of Thirty-five Thousand Dollars ($35,000.00) in order to compensate County for work indicated in Section 2.D. above. Payments shall be deposited in a County Maintenance Account (the "Maintenance Account") dedicated to maintenance on haul routes indicated in Exhibit B. Operator will be allowed to suspend payments when the Maintenance Account reaches Five-Hundred Thousand Dollars ($500,000.00). Maintenance Account payments shall resume on the first day of the first calendar year following the date on which the balance of the Maintenance Account is depleted to One-Hundred Thousand Dollars ($100,000.00) or less.

From the date of this Agreement to the date the work described in Sections 2.A. or 2.B. is completed, if the Maintenance Account is fully depleted by the exceptional maintenance costs described in Section 2.D., the Operator will be billed for the additional costs with payment due within 30 days of receipt of the bill. In the event payment for any additional costs is not received by County from Operator within 30 days of receipt of the bill by Operator, County reserves the right to suspend the permit of Operator
issued pursuant to Section 3.F. until such time as payment is received by County.

Upon expiration of the Term of this Agreement as provided in Section 1, any remaining funds in the Maintenance Account will be returned to the Operator within thirty (30) days of project audit by County. County audit will be completed according to Generally Accepted Accounting Principles for County Highway Departments in the State of Wisconsin.

The Parties agree that improvements to the Progressive Rail, Inc. railroad crossing on CTH Q near the intersection of CTH SS may be necessary due to the increased truck traffic and train traffic associated with the Project. Operator acknowledges and agrees that the cost of any necessary improvements shall be the sole responsibility of the Operator and shall be in addition to the payments made as part of 2.E. of this Agreement.

Section 3. County, in accordance with the terms of this Agreement, agrees to:

A. Review for approval all access points to the County Road system by giving consideration to sight distances, drainage and proximity to other entrances, in a reasonable manner, and in accordance with accepted engineering practices;

B. Review for approval permits for all utility encroachments on County rights-of-way in a reasonable manner, and in accordance with accepted engineering practices;

C. Provide copies of all Project Estimates and Engineering Plans for the work described in Sections 2.A. and 2.B. on a 30%, 60% and 90% progress schedule;

D. Coordinate with Operator and Operator's Representatives so as to minimize the impact of their use of the County Road system;

E. Perform all maintenance and construction of all improvements pursuant to this Agreement on the County Roads used for the construction, development, operation, maintenance and reclamation of the Project.

F. At the time of full execution of this Agreement by the Parties, issue a permit pursuant to Wis. Stat. § 348.17 to Operator to haul products and equipment related to the Project on those County Roads listed on the attached Exhibit B of this Agreement for the entire term of this Agreement without further restrictions, other than those indicated in this Agreement, and subject to the suspension provision under Section 2.E., for all vehicles meeting Wisconsin statutory requirements for weight, width, height and length. Said permit shall be attached to this Agreement as Exhibit D. County shall retain the right and its authority to establish and set
traffic speed limits in accordance with generally accepted highway standards and safety practices.

Section 4.  

Road Inventory.

A. Routing and Access Approval.

Operator shall be restricted to hauling on those County Roads listed on the attached Exhibit B of this Agreement. If conditions or circumstances change and Operator requests to change haul routes, it must first request authorization from the County. All expenses for additional haul routes are not part of this Agreement and shall be negotiated by the Operator and County in a separate agreement in the event any changes are requested.

B. Incidental Use

The Parties recognize that the Project traffic may, either through mistake or with the consent of County, use County Roads other than those listed on Exhibit B of this Agreement. Repairs for damage caused by Operator or Operator’s Representatives during such mistaken or permitted use shall be treated as exceptional maintenance under Section 2.D. and the cost for any maintenance or repair of damaged roads shall be reimbursed from the Maintenance Account as described in Section 2.E. of this Agreement.

Section 5.  

Construction Cooperation.

A. Operator.

Operator shall provide County a schedule of planned activities that affect the County Roads. Said Schedule shall reasonably indicate the estimated number of trucks that will be hauling products and equipment and daily hours of operation. Operator shall submit the Schedule to County within two (2) weeks of execution of this Agreement. Operator shall further provide County with an updated Schedule within two (2) weeks of any material changes being made with the Project. Operator understands that County Road construction and maintenance activities will be on-going while Project hauling is occurring, and that while County Roads will be open to traffic, Operator acknowledges these activities may slow hauling operations.

B. County.

During the term of this Agreement, County and Operator shall meet as needed to discuss Project activities and County Road construction and maintenance schedules. County agrees to keep those County Roads specified in Exhibit B open to Project traffic during County Road construction and maintenance activities, except that County may temporarily close any of the County Roads specified in Exhibit B for
replacement of a culvert, structure or due to an emergency. County will provide a temporary alternate haul route when reasonably practicable. Maintenance required on temporary haul route will be reimbursed from the Maintenance Account described in Section 2.E.

County agrees to exclusively use any payments received from Operator as part of 2.E. of this Agreement on County Roads used as haul routes by the Operator.

C. **Emergency Actions.**

Notwithstanding the foregoing, in the event Operator or Operator’s Representatives have caused damage to County Roads of a magnitude sufficiently great to create a hazard to the motoring public, which in County’s opinion warrants an immediate repair or County Road closing, County may unilaterally close those County Road(s) affected and make or authorize repair, with the reasonable, documented costs thereof paid for by Operator from the Maintenance Account as described in Section 2.E. of this Agreement.

Both Parties acknowledge that while County is the Jurisdictional Authority for those County Roads listed in Exhibit B, certain emergency situation may arise that fall under law enforcement, fire district or emergency management control. In such situations the road may be closed to traffic, including traffic from the Project, outside the control of County. County shall not be responsible for any harm to Operator, Operator’s Representatives or the Project that may result from County Road closings that occur due to such emergencies.

Section 6. **Required Insurance.**

Operator shall procure and maintain throughout the Term of this Agreement, Commercial General Liability insurance including bodily injury, property damage and personal injury in an amount not less than Five Million Dollars ($5,000,000.00) per occurrence. This policy shall also provide contractual liability insurance in the same amount. Operator’s coverage shall be primary and list Chippewa County, its officers, officials, agents and employees as additional insureds. Operator shall, at the time of execution of this Agreement, provide County with certificate(s) of insurance showing the type, amount, class of operations covered, effective dates and expiration dates of the policy.

Section 7. **Remedies and Enforcement.**

Each of the Parties hereto covenant and agree that in the event of default of any of the terms, provisions or conditions of this Agreement by any party (the “Defaulting Party”), which default is not caused by the Party seeking to enforce said provisions (the “Non-Defaulting Party”) and which
default has not been cured after notice and reasonable opportunity to cure has been provided to the Defaulting Party, then in such an event, the Non-Defaulting Party shall have the right of specific performance. The remedy of specific performance and injunctive relief shall not be exclusive of any other remedy available at law or in equity.

Section 8. Due Authorization.

Operator hereby represents and warrants that this Agreement has been duly authorized, executed and delivered on behalf of Operator. County hereby represents and warrants that this Agreement has been duly authorized, executed and delivered on behalf of County.


It is mutually agreed by the Parties that in the event any provision of this Agreement is determined by any court of law of competent jurisdiction to be unconstitutional, invalid, illegal or unenforceable in any respect, it is the intention of the parties that such unconstitutionality, invalidity, illegality or unenforceability shall not affect the other provisions, and the Agreement shall be construed as if such unconstitutional, invalid, illegal or unenforceable provision had never been contained in this Agreement.

Operator makes no representations or warranties relating to whether the work described in this Agreement must comply with Wisconsin’s competitive bidding laws, including but not limited to, Wis. Stat. §§ 66.0901 and 83.04. County agrees to indemnify Operator from any damages assessed against Operator by a court of law of competent jurisdiction (including attorneys’ fees) that arise from any third party claiming the work described in this Agreement must comply with Wisconsin’s competitive bidding laws, including but not limited to, Wis. Stat. §§ 66.0901 and 83.04.

Section 10. Entire Agreement.

This Agreement and the exhibits attached thereto constitute the entire agreement among the Parties hereto with respect to the subject matter hereof, and supersede any prior understandings or written or oral agreements between the parties with respect to the subject matter of this Agreement. No amendment, modification, cancellation or alteration of the terms of this Agreement shall be binding on any party hereto unless the same is in writing, dated subsequent to the date hereof and is duly authorized and executed by the Parties hereto.

Section 11. Designated Representative.

Operator designates Eric Strang as Agent with primary responsibility for the performance of this Agreement. In the event this Agent is replaced by
another for any reason, Operator will designate another Agent within seven (7) calendar days and provide notice to County of replacement pursuant to the procedure set forth in Section 12, Notices.

Section 12. Notices.

All notices to be given under the terms of this Agreement shall be in writing and signed by the person serving the notice and shall be sent (a) via registered or certified mail, return receipt requested, postage prepaid (b) via a reputable courier firm (such as FedEx or UPS), or (c) via hand delivery to the addresses of the parties listed below. Notice shall be deemed to have been received on the date of receipt as shown on the return receipt or other written evidence of receipt.

FOR COUNTY: Bruce Stelzner
Chippewa County Highway Commissioner
801 East Grand Avenue
Chippewa Falls, WI 54729

FOR OPERATOR: Eric Strang
Chippewa Sands Company, LLC
415 Cass Street, Suite 2A
Traverse City, MI 49684

Section 13. Assignability/Consent.

This Agreement shall be binding on the Parties hereto, their respective heirs, devisees and successors. Except as otherwise provided herein, or except as may be hereafter determined by the Parties, Operator may not sell, assign or transfer its interest in this Agreement, or any of its rights, duties or obligations hereunder, without the prior written consent of County. Whenever the consent or the approval of County is required herein, County shall not unreasonably withhold, delay or deny such consent or approval.

Section 14. Force Majeure.

The performance of this Agreement shall be subject to events of force majeure. Events of force majeure shall mean any contingency or cause beyond the reasonable control of a Party including, without limitation, acts of God or the public enemy, war, riot, civil commotion, insurrection, government or de facto government action (unless caused by acts of omissions of the party), fires, explosions, rain or other weather delays, floods, strikes, slowdowns or work stoppages.
Section 15. Modification

No modification of this Agreement or of any covenant, condition or limitation herein contained shall be valid unless in writing and duly executed by the party to be charged therewith. No evidence of any modification shall be offered or received in evidence in any proceeding arising between the Parties hereto out of or affecting this Agreement, or the rights or obligations of the Parties hereunder, unless such modification is in writing and duly executed. The parties further agree that the provisions of this Section 15 will not be waived unless herein set forth.

Section 16. Counterparts.

This Agreement may be executed in any number of counterparts, each of which shall be deemed an original, with the same effect as if the signatures thereto and hereto were upon the instrument. Delivery of an executed counterpart of a signature page to this Agreement by telecopier or via email in “.pdf” format shall be as effective as delivery of a manually signed counterpart to this Agreement.

Section 17. Choice of Law and Forum Selection.

This Agreement shall be governed by, and construed, interpreted and enforced in accordance with the laws of the State of Wisconsin. The Parties agree, for any claim or suit or other dispute relating to this Agreement that cannot be mutually resolved, the venue shall be in the Circuit Court of Chippewa County, a court of competent jurisdiction within the State of Wisconsin, and the parties further agree to submit themselves to the jurisdiction of said court, to the exclusion of any other judicial district that may have jurisdiction over such a dispute according to any law.

Section 18. Default Termination.

In the event Operator shall default in any of the covenants, agreements, commitments, conditions or obligations herein contained, and any such default shall continue unremedied for a period of ten (10) calendar days after written notice thereof to Operator, County may, at its option and in addition to all other rights and remedies which it may have at law or in equity against Operator, including expressly the specific enforcement hereof, forthwith have the cumulative right to immediately terminate this Agreement and all rights of Operator under this Agreement.
Section 19. **Waiver of Terms and Conditions.**

The failure of County to enforce or insist upon compliance with any of the terms or conditions of this Agreement shall not constitute a general waiver or relinquishment of any such terms or conditions, but the same shall be and remain at all times in full force and effect.

Section 20. **Compliance with Applicable Laws.**

Operator shall become familiar with, and shall at all times comply with and observe all federal, state and local laws, ordinances and regulations which in any manner affect the conduct or performance of Operator and its agents and employees of the terms and obligations under this Agreement.

Section 21. **Captions.**

The captions contained in this Agreement are for informational purposes only and shall not in any way affect the substantive terms or conditions of this Agreement.

Section 22. **Cooperation.**

The Parties agree to cooperate with each other in addressing any unforeseen or extraordinary events caused by Operator's activity that would result in significant impacts to the County Roads. The parties further agree to cooperate with each other in addressing any unforeseen impact to Operator's ability to utilize the haul route or any alternative route provided for in this Agreement.

IN WITNESS WHEREOF, the parties hereto have executed this Agreement the day and year first written above.

OPERATOR:

Chippewa Sand Company LLC, a Wisconsin limited liability company

By: Eric Strang, Manager
COUNTY:

Chippewa County, a Wisconsin governmental entity

By: Bruce G. Stelzer
Chippewa County Highway Commissioner
EXHIBIT A
GENERAL NOTES

ELEVATIONS SHOWN ON THE PLAN ARE REFERENCED TO THE APPROPRIATE USAGE DATUM.


THE LOCATION OF EXISTING AND PROPOSED UTILITY INSTALLATIONS AS SHOWN ON THE PLAN IS APPROXIMATE, THERE MAY BE OTHER UTILITY INSTALLATIONS WITHIN THE PROJECT AREA THAT ARE NOT SHOWN.

AS THERE ARE SHAPES TO BE REMOVE WITHOUT THE APPROVAL OF THE ENGINEER.

THE EXACT LOCATION OF THE EROSION CONTROL DEVICES SHALL BE DETERMINED IN THE FIELD.

DISTURBED AREAS SHALL BE EROSION CONTROL DEVICES SHALL BE DETERMINED IN THE FIELD.

ALL SIDE ROAD EARTHWORK QUANTITIES ARE INCLUDED IN THE EXISTING EARTHWORK QUANTITIES.

A VERTICAL SURFACE SHALL BE MADE THROUGH EXISTING GRADING AND PAVING AT NORMAL LEVELS.

ASPHALTIC SURFACE SHALL BE CONSTRUCTED WITH A SMOOTH SURFACE AND A LAYERED LAYER.

SILT FENCE IS TO BE PLACED AS SHOWN ON THE PLAN OR AS DIRECTED BY THE ENGINEER, AND IN PLACE PRIOR TO EROSION REMOVAL.

BEAVERN SHOWN ON THE PLAN ARE REFERENCED TO THE EXISTING POWERWAY CENTERLINE AND ARE ASSUMED.

UTILITY CONTACTS

BLUERIDGE TELEPHONE CO
1101 S 1ST STREET
BLOOMER, WI 54724
TELEPHONE: 715-779-1212
ATTENTION: WOODY CLARK
EMAIL: wclark@blueridge.com

KICL COMMUNITY
PO BOX 2
3340 WELDaffer AVE
PUYALLUP, WA 98371-3340
TELEPHONE: 253-836-1111
ATTENTION: NANCY SCHMIDT
EMAIL: nschmid@kicl.com

RIGGERS CUSTOM
120 FARMINGTON DRIVE
DEERFIELD, IL 60015
TELEPHONE: 847-512-6000
ATTENTION: JEFF RIGGERS
EMAIL: jriggers@riggers.com

DESIGN CONTACT

DESIGNED
E & L Enzyme DRIVE
CHIPPEWA FALLS, WI 54729
TELEPHONE: 715-726-1234
ATTENTION: BILL SCHOEPF
EMAIL: bschoepf@enzyme-drive.com

DRAWN CONTACT

KICL, DEPARTMENT OF NATURAL RESOURCES
710 WELDaffer AVE
PUYALLUP, WA 98371
TELEPHONE: 253-836-1111
ATTENTION: BILLY BROWN
EMAIL: bhbrown@kicl.com

FILE NAME: Chip3-DRAW/Sheet4.DWG
PROJECT: NO: CTH A
COUNTY: CHIPPEWA
GENERAL NOTES

FILE DATE: 1/19/2013
PLOT DATE: 2/13/2013
PLOT BY: T.D. MAYS
PLOT NAME: Sheet4.DWG
PLOT SCALE: 1/240
**Typical Finished Section**

**Station A**

STA 24+15.00 to STA 30+03.10*

*Concrete curbs and gutter ends at station 30+50 RT

**Typical Finished Section**

**Station A**

STA 21+09.80 to STA 14+02.00

PROJECT NO: 114425  
COUNTY: CHIPPENDALE  
TYPICAL SECTIONS  
SHEET E
8E8: Typical Installations of Erosion Bales/Temporary Ditch Checks

GENERAL NOTES
DETAILS OF CONSTRUCTION MATERIALS AND WORKMANSHIP NOT SHOWN ON THIS DRAWING SHALL CONFORM TO THE PERTINENT REQUIREMENTS OF THE STANDARD SPECIFICATIONS AND THE APPLICABLE SPECIAL PROVISIONS.

1. TEMPORARY DITCH CHECKS OTHER THAN EROSION BALES OR MANUFACTURED SHALL BE FABRICATED UNDER THE DOIT OF TEMPORARY DITCH CHECKS. THE CONSTRUCTION IS NOT FOR TEMPORARY DITCH CHECKS CONSISTING OF A SINGLE ROW OF EROSION BALE.

FOR SCOUR PROTECTION USE EROSION MAT OR OTHER DEVICE WHEN DIRECTED BY THE ENGINEER.

PLAN VIEW
WHEN ALTERING THE DIRECTION OF FLOW

PLAN VIEW
TIE OF SLOPE

FRONT ELEVATION
WHEN EXISTING GROUND SLOPES AWAY FROM FILL SLOPE

EROSION BALE FOR SHEET FLOW

TYPICAL INSTALLATIONS OF EROSION BALES / TEMPORARY DITCH CHECKS

STATE OF WISCONSIN
DEPARTMENT OF TRANSPORTATION

APPROVED
DATE

SLOPE 1:1

EROSION BALE FOR SHEET FLOW

FRONT ELEVATION

STUFF JOINTS BETWEEN ADJACENT RINGS OF BALE.

STUFF JOINTS WITH A DOUBLE ROW.

GENERAL NOTES
DETAILS OF CONSTRUCTION MATERIALS AND WORKMANSHIP NOT SHOWN ON THIS DRAWING SHALL CONFORM TO THE PERTINENT REQUIREMENTS OF THE STANDARD SPECIFICATIONS AND THE APPLICABLE SPECIAL PROVISIONS.

1. TEMPORARY DITCH CHECKS OTHER THAN EROSION BALE OR MANUFACTURED SHALL BE FABRICATED UNDER THE DOIT OF TEMPORARY DITCH CHECKS. THE CONSTRUCTION IS NOT FOR TEMPORARY DITCH CHECKS CONSISTING OF A SINGLE ROW OF EROSION BALE.

FOR SCOUR PROTECTION USE EROSION MAT OR OTHER DEVICE WHEN DIRECTED BY THE ENGINEER.

PLAN VIEW
WHEN ALTERING THE DIRECTION OF FLOW

PLAN VIEW
TIE OF SLOPE

FRONT ELEVATION
WHEN EXISTING GROUND SLOPES AWAY FROM FILL SLOPE

EROSION BALE FOR SHEET FLOW

TYPICAL INSTALLATIONS OF EROSION BALES / TEMPORARY DITCH CHECKS

STATE OF WISCONSIN
DEPARTMENT OF TRANSPORTATION

APPROVED
DATE

SLOPE 1:1

EROSION BALE FOR SHEET FLOW

FRONT ELEVATION

STUFF JOINTS BETWEEN ADJACENT RINGS OF BALE.

STUFF JOINTS WITH A DOUBLE ROW.

8E9: Silt Fence

**GENERAL NOTES**

Details of construction not shown on this drawing shall conform to the pertinent requirements of the standard specifications and applicable special provisions.

1. Horizontal space required with 2" x 4" wooden frame or equivalent at top of posts.
2. For manual installation, the trench shall be a minimum of 3' wide & 6' deep to keep and anchor the geotextile fabric. Field material to fit trench & backfill & compact trench with excavated soil.
3. Wood posts shall be a minimum size of 2" x 4" x 6' long or hardware.
4. Silt fence to extend across the top of the pipe.
5. Construct silt fence from a continuous roll if possible by cutting lengths to field joints. If a joint is necessary use one of the following two methods. Allow at least 300 degrees between the end of each silt fence length.

**PLAN VIEW**

**Typical Application of Silt Fence**

- Note: Additional post depth on tie backs may be required in unstable soils.
- Wood posts: length 8'-0" + 2'-0" wall depth in ground.
- Geotextile fabric only.
- Bagfill & compact trench with excavated soil.
- Attach the fabric to the posts with wire staples or wooden lath and nails.

**Silt Fence at Median Surface Drains**

- Flow direction
- Geotextile fabric
- Wood post
- Trench detail
- Twist method
- Hook method

**Joining Two Lengths of Silt Fence**

- Flow direction
- Geotextile fabric
- Wood post
- Silt fence tie back when required by the engineer.
### Metal Apron Endwalls

<table>
<thead>
<tr>
<th>Type</th>
<th>Width (in)</th>
<th>Depth (in)</th>
<th>Height (ft)</th>
<th>Slope</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>4</td>
<td>8</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>2</td>
<td>6</td>
<td>12</td>
<td>2</td>
<td>2</td>
</tr>
</tbody>
</table>

### Reinforced Concrete Apron Endwalls

<table>
<thead>
<tr>
<th>Type</th>
<th>Width (in)</th>
<th>Depth (in)</th>
<th>Height (ft)</th>
<th>Slope</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>4</td>
<td>8</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>2</td>
<td>6</td>
<td>12</td>
<td>2</td>
<td>2</td>
</tr>
</tbody>
</table>

### Alternate for Type I Connection

**End Section Connector Strap**

- Measured Length of Culvert
- Threaded 3/8" dia. hole at end of strap to be filled with grout

### Section A-A

**Threaded 3/8" dia. hole at end of strap to be filled with grout**

### General Notes

- **Detail of Construction, Inspection, and Repair** are not shown on this drawing. Compliance with the specifications of the applicable standard conditions is expected.

- **Concrete Apron Endwalls** must be used with galvanized steel or aluminum endplates. TheKinedale galvanized steel or aluminum endplates can be installed in culvert pipe of this same size.

- **All welds shall be made by an approved process**. All welds shall be made by a process that meets the requirements of the applicable standard conditions. The welds shall be made by an approved process and shall be made by an approved process that meets the requirements of the applicable standard conditions.

- **Welds shall be made by an approved process**. All welds shall be made by an approved process that meets the requirements of the applicable standard conditions.

- **Connection Details**

### Apron Endwalls for Culvert Pipe

**State of Wisconsin**

**Department of Transportation**

**Approved**

**SDD 8 F 1-7**
9A1 sheet a: At-Grade Side Road Intersection, Types "B1", "B2", "C" and "D" and Tee Intersection Bypass Lane

**General Notes**

Design may be used interchangeably in combination or separately for any one complete intersection depending upon intersection angle and surfacing of each approach roadway.

**Side Road Surfacing Note**

When the side road is not presently paved, pavement shall be placed to the limits shown unless otherwise provided in the contract, where the construction limits are beyond the paving limits, crossed aggregate surfacing shall be placed between the paving limits and construction limits. When the side road is presently paved, new pavement shall be placed to the limits of design shown and beyond, if necessary, to meet existing pavement.

When the side road is the construction project, the intersection surfacing shall be the same as for the project.

**Existing Surface**

**Section A-A**

*Planning Bypass Lane and Shoulder*

**Tee Intersection Bypass Lane Detail**

- **Concrete Curb & Gutter**
  - 10' Taper
  - Curb Height:
    - 0' to 1' = 1/2 Widest at End of Curb & Gutter Sections, When Specified Closer Than in the Contract
  - Precast Curb Spacing and Flange

<table>
<thead>
<tr>
<th>Width</th>
<th>R1</th>
<th>R2</th>
</tr>
</thead>
<tbody>
<tr>
<td>30'</td>
<td>10</td>
<td>10</td>
</tr>
<tr>
<td>40'</td>
<td>15</td>
<td>15</td>
</tr>
<tr>
<td>50'</td>
<td>20</td>
<td>20</td>
</tr>
<tr>
<td>60'</td>
<td>25</td>
<td>25</td>
</tr>
<tr>
<td>70'</td>
<td>30</td>
<td>30</td>
</tr>
<tr>
<td>80'</td>
<td>35</td>
<td>35</td>
</tr>
</tbody>
</table>

This control line is established by a 10' taper extended from the edge of the curb and located farthest from the through highway.

**Type D**

This control line is established by a 10' taper extended from the edge of the curb and located farthest from the through highway.
GENERAL NOTES

1. HALF-CYCLE LENGTHS (50") WITH 2-MANUAL STRIPE LENGTHS SHALL BE PROVIDED ON
   ROADWAYS EXCLUDING TEMPORARY TRAVELLED RWAYS WITH INCLUSION CURVATURE
   OF OVER 5 DEGREES OR WHEN DIRECTED BY THE DEPARTMENT TO MAKE UNUSUAL ALIGNMENT
   OF THE TRAVELLED RWAYS.

2. NO PASSING ZONE TEMPORARY PAVEMENT MARKING IS REQUIRED TO BE PLACED, WHERE
   APPROPRIATE, ALONG WITH CENTERLINE PAVEMENT MARKING WHEN A SAME DAY PAVEMENT
   MARKING ITEM IS INCLUDED IN THE CONTRACT.

3. NO PASSING ZONE MARKINGS ARE PLACED ACCORDING TO "T" MARKINGS. IF EXISTING NO
   PASSING ZONE ITEM SIGNS ARE BEYOND 50 FEET IN EITHER DIRECTION, THE SIGNS SHALL BE MOVED TO
   THE "T" MARKINGS.

NOTE

ARROW SYMBOL — SHOWS DIRECTION OF TRAVEL

WET REFLECTIVE TAPE SUPPLEMENT TO SPRAYED OR NON WET REFLECTIVE TAPE LANE LINE

LEGEND

- "T" MARKING

- POST MOUNTED SIGN

PAVEMENT MARKING (MAINLINE)

STATE OF WISCONSIN
DEPARTMENT OF TRANSPORTATION

APPROVED: 3-5-85
STATE TRAFFIC ENGINEER OF DESIGN

P.D.M. 8-1-86

S.D.D. 4-8-1986

S.D.D. 4-8-1986

S.D.D. 4-8-1986

S.D.D. 4-8-1986
**TWO-LANE ROADWAY**

**SYMBOLS**

- WORK AREA
- FLAGGER, EQUIPPED WITH STOP/SLOW PADDLE FASTENED ON SUPPORT STAFF
- SIGN ON PORTABLE OR PERMANENT SUPPORT

**GENERAL NOTES**

- DETAILS OF TRAFFIC CONTROL DEVICES AND INSTALLATION NOT SHOWN ON THIS DRAWING SHALL CONFORM TO THE PERTINENT REQUIREMENTS OF THE STANDARD SPECIFICATIONS, THE SPECIAL PROVISIONS, AND THE MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES.

- THE EXACT NUMBER, LOCATION AND SPACING OF ALL SIGNS AND DEVICES AND THE LOCATION OF ALL flags SHALL BE ADJUSTED TO FIT FIELD CONDITIONS AS APPROVED BY THE ENGINEER.

- THE FIRST ADVANCE WARNING SIGN SHOULD TYPICALLY BE LOCATED IN ADVANCE OF THE ANTICIPATED TRAFFIC SHUTDOWN BY ODDS.

- WHEN A SIDE ROAD OR RAMP INTERSECTS THE FACILITY ON WHICH THE WORK IS BEING PERFORMED, ADDITIONAL TRAFFIC CONTROLS SHALL BE PROVIDED AS SPECIFIED IN THE PLANS AND/OR THE SPECIFIC PROVISIONS OR AS APPROVED BY THE ENGINEER.

- WORK AREA SIGNS SHALL BE IN WHITE OF EACH SIDE OR IN DIRECT VISION AT ALL TIMES; THEY SHALL BE EQUIPPED WITH STOP/SLOW PADDLES FASTENED ON SUPPORT STAFFS. WHEN THE flagging operation is not in effect, the flagger area, the mobile work area and the one lane road without signs shall be covered or removed and the highway restored to normal operation.

- ALL SIGNS ARE 48 X 48 UNLESS OTHERWISE NOTED.

**TRAFFIC CONTROL FOR LANE CLOSURE (SUITABLE FOR MOVING OPERATIONS)**

**STATE OF WISCONSIN**

**DEPARTMENT OF TRANSPORTATION**

**APPROVED**

**ENGINEER**

**S.D.D. 15 G 12-3**
NOTES
2. Color:
   Background - Red
   Message - White
3. Message Series - C
CHSAC-115752
PLAN OF PROPOSED IMPROVEMENT

CTH Q IMPROVEMENTS
FOR CHIPPEWA SANDS
CHIPPEWA COUNTY

PROJECT LOCATION

CONVENTIONAL SYMBOLS
COUNTY LINE
PROPERTY LINE
LNR LINE
LIMITED ACCESS
CURBWORK BALANCE POINT
ELECTING DEPTH OF WALL
PRINTED ON NEW LNR LINE
SURVEY LINE
SLOPE INTERCEPT
JLENTH, GRAVITY
WATER ON ROADS PROFILE
NEW NOTE OR POINT
WATER AREA
MOSSER OR SLOW WATER

CHSAC-115752
TYPICAL SECTION AND DETAILS
CHIPPEWA SANDS
CHIPPEWA COUNTY

TOTAL SHEETS: 22

COORDINATES ON THIS SHEET ARE REFERENCED TO THE WISCONSIN COUNTY COORDINATE SYSTEM (U.T.M., CHIPPEWA COUNTY)
GENERAL NOTES

Details of construction, materials and workmanship not shown on this drawing shall comply with the requirements of the contract.

Payment limits and tie bars shall be expressly shown on the plans and specifications.

Concrete Curb & Gutter shall conform to the details shown for concrete curb & gutter unless otherwise specified.

Concrete curb & gutter shall be cast in place, with the exception of the longitudinal joint, where tie bars are placed perpendicularly to the curb face. The longitudinal joint is not required when integral curb & gutter are used.

Integral Curb & Gutter shall be cast in place, with the exception of the longitudinal joint, where tie bars are placed perpendicularly to the curb face. The longitudinal joint is not required when integral curb & gutter are used.

Integral Curb & Gutter shall be cast in place, with the exception of the longitudinal joint, where tie bars are placed perpendicularly to the curb face. The longitudinal joint is not required when integral curb & gutter are used.

Concrete Curb & Gutter 38°

Reverse Slope Gutter

Partial Section of Pavement with Integral Curb & Gutter

Concrete Curb, Concrete Curb & Gutter and Ties

State of Wisconsin
Department of Transportation

Curb & Gutter

For Chippewa Sands
Chippewa County, Wisconsin

Details

File No. 0013-1271-20

Approved:

Chippewa Falls, WI 54729

SEH
### GENERAL NOTES

- Road lines shall be omitted through intersections. Edge lines shall be continued through intersections.
- When distance 'A' is less than 750 feet, omit lane line.
- When distance 'B' is less than 200 feet, omit channelizing lane line.
- Additional markings shall be provided if specified in the contract.
- Typical situations where the markings may be required are shown on the intersection or on a reduced area such that the edge line may be mitigated to the motorist or passenger from sight.
- The edge line in the taper areas of the bypass lane and the bypass lane shall be located from edge of facility to the outside edge of edge line.

### MINOR INTERSECTION WITHOUT CURBS

<table>
<thead>
<tr>
<th>POSTED SPEED (MPH)</th>
<th>MINIMUM DISTANCE BETWEEN ZONES (FEET)</th>
</tr>
</thead>
<tbody>
<tr>
<td>25 - 30</td>
<td>0</td>
</tr>
<tr>
<td>35 - 45</td>
<td>6</td>
</tr>
<tr>
<td>45 - 50</td>
<td>6</td>
</tr>
<tr>
<td>55</td>
<td>6</td>
</tr>
</tbody>
</table>

### MAJOR INTERSECTIONS

(INTERSECTION WITH FULL RIGHT TURN LANE OR BYPASS LANES)

### MINOR INTERSECTION WITH CURBS

(TYPICAL MARKING)

### MINOR INTERSECTION WITH CURBS

(TYPICAL MARKING)

### PAYMENT MARKING

(INTERSECTIONS)

STATE OF WISCONSIN
DEPARTMENT OF TRANSPORTATION

CTH O IMPROVEMENTS FOR CHIPPENWA SANDS
CHIPPENWA COUNTY, WISCONSIN
NOTES

1. Sign is Type II - Type H Reflective - reference
   WIS DOT Standard Specification for HIGHWAY
   and STRUCTURE CONSTRUCTION latest edition.
2. Color:
   Background - Red
   Message - White
3. Message Series - C

| SURF | L | R | C | D | E | F | G | H | I | J | K | L | W | N | O | P | Q | R | S | T | U | V | W | X | Z |
| 1    | 24 |   |   | 8 | 10 | 45 |   | 30 | 1/4 |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| 25   | 30 |   |   | 10 | 17 1/2 | 45 |   | 2 1/4 |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| 200  | 36 |   |   | 12 | 15 | 45 | 15 1/4 |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| 3    | 36 |   |   | 12 | 15 | 45 | 15 1/4 |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| 4    | 48 |   |   | 15 | 20 | 45 | 20 1/2 |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| 5    | 48 |   |   | 15 | 20 | 45 | 20 1/2 |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| 6    | 16 |   |   | 6 1/4 | 15 | 45 | 1 3/4 |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
| 7    | 12 |   |   | 1/4 | 4 | 5 | 45 | 5 1/4 |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |

STANDARD SIGN
RI-1

WISCONSIN DEPT OF TRANSPORTATION

DATE: 12/03/10
PLATE NO. RI-12

CTH Q IMPROVEMENTS
FOR CHIPPEWA SANDS
CHIPPEWA COUNTY, WISCONSIN

SEH
**The existence of curb and gutter does not in itself mandate the vertical clearance illustrated.**

That height is typically measured where there is sidewalk adjacent to the roadway or parking is permitted. In the absence of sidewalk vertical clearance is measured from the top of the curb. Offset of signs is measured from the flow line.

*6 feet from edge of a paved shoulder or 12 feet from the edge of pavement (edge line location) or 2 feet from outside edge of gravel, whichever is greater unless directed by project engineer.*

**TYPICAL INSTALLATION OF PERMANENT TYPE II SIGNS ON SINGLE POSTS**

**URBAN AREA**

2' Min - 4' Max (See Note 5)

**Curb Flowline**

**RURAL AREA (See Note 2)**

**White Edgeline Location**

**6' - 3" (d)**

**Outside Edge of Gravel**

**White Edgeline Location**

**2' Min - 4' Max (See Note 5)**

**Curb Flowline**

**TYPICAL INSTALLATION OF PERMANENT TYPE II SIGNS ON SINGLE POSTS**

**POST EMBEDMENT DEPTH**

<table>
<thead>
<tr>
<th>Area of Sign Installation (Sq. Ft.)</th>
<th>D (in.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>20 or Less</td>
<td>4'</td>
</tr>
<tr>
<td>Greater than 20</td>
<td>5'</td>
</tr>
</tbody>
</table>

**GENERAL NOTES**

1. Signs wider than 4 feet or larger than 20 sq. ft. shall be mounted on multiple posts. Refer to plate A4-4.
2. For expressways and freeways, mounting height is 7'-3" (e) or 6'-3" (h) depending upon existence of a sub-sign.
3. Minimum mounting height for J assemblies (A4-5) is 7'-3" (e) or 6'-3" (h) per urban or rural detail respectively.
4. Minimum mounting height for signs mounted on traffic signal poles is 5'-3" (e).
5. Offset distance shall be consistent with existing signs or consistent throughout length of project.
6. The (e) tolerance for mounting height is 3 inches.
7. Folding stop signs (R-1F) shall be mounted at a height of 5'-3" (e) or as directed by the Engineer.
8. The Double Arrow sign (W2-1) shall be mounted at a height of 2'-3" (e). The Chevron sign (W1-8), Roundabout Chevron panel (W1-8A), Clearance Markers (W5-52), Mile Markers (D10 series) & End of Road Markers (W5-58 & W5-58A) shall be mounted at a height of 4'-3" (e).
EXHIBIT B
Exhibit B
Haul Routes

County Highway Haul Routes:

CTH A, from Mine Entrance to STH 40
CTH M, from USH 53 to CTH SS
CTH SS, from CTH M to CTH Q
CTH Q, from CTH SS to Plant Entrance
EXHIBIT C
CHIPPEWA SANDS COST ESTIMATE (2011 Costs)

No detailed quantities or Engineering Analysis have been completed, cost estimate below is based on the costs paid for by Federal Aid program and County for the Rehabilitation of CTH B from 90th St to 110th St, designed in 2010 and constructed in summer of 2011.

CTH B – 90th St to 110th St
Length of project = 2.25 miles.

<table>
<thead>
<tr>
<th>Item</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Project Construction Costs by County</td>
<td>$1,100,000</td>
</tr>
<tr>
<td>Construction Costs Subcontractors</td>
<td>$102,751</td>
</tr>
<tr>
<td>Design Costs</td>
<td>$75,471</td>
</tr>
<tr>
<td>Construction Inspection</td>
<td>$50,000</td>
</tr>
<tr>
<td>Utilities and ROW</td>
<td>$20,000</td>
</tr>
<tr>
<td><strong>Total Cost for Project</strong></td>
<td><strong>$1,348,221</strong></td>
</tr>
</tbody>
</table>

Cost per mile for Rehabilitation of CTH B

<table>
<thead>
<tr>
<th>Total Cost</th>
<th>Project Length (miles)</th>
<th>Cost per Mile</th>
</tr>
</thead>
<tbody>
<tr>
<td>$1,348,221</td>
<td>2.25</td>
<td><strong>$599,209</strong></td>
</tr>
</tbody>
</table>

CTH A Cost based on CTH B Cost

<table>
<thead>
<tr>
<th>Distance</th>
<th>Cost per Mile</th>
<th>Total Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.97</td>
<td>$599,209</td>
<td>$1,779,652</td>
</tr>
</tbody>
</table>

Differential Costs for Increased Pavement Thickness: CTH B-HMA = 4.25" Depth, AET report with no restrictions we anticipate 9.5" of HMA required on CTH A. (20 year life) Tonnage and costs for 5.25" increase in HMA depth and Safety Edge calculated below.

COST OF ADDITIONAL CONSTRUCTION AND PAVEMENT REQUIRED ABOVE COSTS ON CTH B

<table>
<thead>
<tr>
<th>Road</th>
<th>Segment</th>
<th>Distance (mi.)</th>
<th>HMA (inches)</th>
<th>HMA Width (ft)</th>
<th>Quantity HMA (tons)</th>
<th>Unit Cost HMA</th>
<th>Cost HMA (Segment)</th>
</tr>
</thead>
<tbody>
<tr>
<td>CTH A</td>
<td>Driveway to 50th St</td>
<td>1.63</td>
<td>5.25</td>
<td>25.00</td>
<td>7,201</td>
<td>$55.00</td>
<td>$396,062</td>
</tr>
<tr>
<td>CTH A</td>
<td>50th St to 30th St</td>
<td>1.34</td>
<td>5.25</td>
<td>25.00</td>
<td>5,920</td>
<td>$55.00</td>
<td>$325,597</td>
</tr>
</tbody>
</table>

Miscellaneous Items

- Grading to accommodate 9.5" HMA = 2.97 miles $100,000/mile $297,000
- Pavement Recycle, Full Depth = 39,000.00 $0.55 Included in CTH B Estimate
- Shoulder, Add'l for 9.5" HMA = $140,000
- Painting, Signs, Misc. = Included in CTH B Estimate
- Add'l Design/Eng Costs Anticipated to Accommodate 9.5" profile change. = $165,000
- Anticipated Add'l Right-of-Way needed = $65,000
- Entrance on CTH A, (S.E.H. Estimate) = $250,761
- Entrance on CTH Q, (S.E.H. Estimate) = $199,825

Total Cost Estimate (2011 Prices) = $3,618,898

Inflation Factor for 2012 Construction @ 5% Total 2012 Estimated Construction Costs = **$3,799,843**
EXHIBIT D
<table>
<thead>
<tr>
<th>VEHICLE INFORMATION</th>
<th>TRIP INFORMATION</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>License Plate</strong>:</td>
<td><strong>Complete if Return</strong></td>
</tr>
<tr>
<td><strong>Number</strong>: Any</td>
<td><strong>To City, Village, Township</strong></td>
</tr>
<tr>
<td><strong>State</strong>:</td>
<td><strong>Tanggal</strong></td>
</tr>
<tr>
<td><strong>Make</strong>: Any</td>
<td><strong>Chargeable Conditions</strong>:</td>
</tr>
<tr>
<td><strong>Model</strong>: Any</td>
<td><strong>1. The applicant, certify that the statements contained in this application are true and correct, and that if granted a permit, I will comply with all terms and conditions which apply. I further agree that this permit shall remain with the towing vehicle during the actual transfer.</strong></td>
</tr>
</tbody>
</table>

**PERMIT REQUESTED FOR:**
- VEHICLE INFORMATION (Towing Vehicle)
- Permit:
  - CTH A, M, SS & Q
  - 24 hours per day
  - Unending

**AUTHORIZATION/SPECIAL CONDITIONS FOR ISSUANCE OF PERMIT:**
- Permit Holder may reproduce for trucking activities related to their operation. Permit can be reproduced as needed. Pursuant to the requirements of the Wisconsin Department of Transportation, the permit shall remain with the towing vehicle during the actual transfer.

**Permit Effective Date**: 2/18/12
**Permit Expiration Date**: Un Ending
**Date**: 2/18/12
ATTACHMENT G

WISCONSIN AGREEMENT WITH EOG RESOURCES
MINING AGREEMENT

RECITALS

A. EOG Resources, Inc. (“EOG”), a Delaware corporation, desires to engage in nonmetallic mining on the property (“Property”) located in the Town of Howard (“Town”), Chippewa County, Wisconsin, and described in the attached Exhibit A.

B. The Property is owned by Robert Schindler and Jeffrey Sikora (collectively, the “Owners”).

C. EOG desires certain exceptions from and modifications of the requirements of chapter 17 of the Town’s code of ordinances (“Mine Ordinance”).

D. The Town is willing to grant such exceptions and modifications under the conditions set forth below.

AGREEMENT

THEREFORE, the Owners, EOG and the Town agree as follows:

1. License

1.1. The Town acknowledges receipt of the fee and materials sufficient to fulfill the application requirements of sections 17.05 and 17.06 of the Mine Ordinance and chapter 15 of the Town’s code of ordinances (“Blasting Ordinance”). See Exhibit B.

1.2. By signing this Mining Agreement (“Agreement”), the Town grants a license to mine and a blasting permit for the term of this agreement. This Agreement is intended to satisfy the requirements of a Development Agreement for purposes of Town Mine Ordinance.

2. Term

2.1. This Agreement shall be effective upon signing by all parties.

2.2. This Agreement shall terminate at 11:59 p.m. on December 31, 2031.

2.3. The obligations of the Owners and EOG and the Town’s rights under this Agreement shall survive termination of the Agreement.

3. Operation

3.1. Except as provided below, EOG shall comply with the restrictions on hours of operation in section 17.07(2)(e) of the Mining Ordinance.

3.2. For an approximate six (6) month period (“Transport Period”) from October 15 to end of following year’s spring frost road ban pursuant to Wis. Stat. § 349.16, or April 30th of each year, whichever comes later. If there is no applicable road ban in place by April
30th the Transport Period will end on April 30th. EOG may engage in transportation activities twenty-four (24) hours per day from Monday to Saturday inclusive, except during peak traffic times.

3.2.1 For 2011 (start-up year) only, Transport Period will begin on September 1, 2011.

3.3. EOG shall not transport mineral aggregates, nonmetallic minerals, other products or waste materials to or from the Property except during the Transport Period.

3.4. EOG shall not transport more than 600,000 tons of material from the Property during any Transport Period. EOG shall provide the Town monthly written accounts of the amount of material transported the previous month. EOG shall provide scale records if requested by the Town.

3.5. EOG shall use best management practices to keep noise from nonmetallic mining activity at or below sixty (60) decibels (dba) at the property boundary. These practices include the use of mining, safety and health administration (MSHA) approved “white noise,” back up alarms, and properly maintained mufflers on mining equipment. Earthen berms will be built in accordance with the approved reclamation plan which will provide a substantial reduction of sound at the property boundary. Should the aforementioned measures fail to keep noise levels at or below 60 decibels, EOG will plant small trees or shrubs along the top of the berm to further reduce noise levels. In conjunction with Section 10 of this Agreement, EOG will also meet with Town officials and work towards reducing any other noise levels which are determined to be above the 60 dba level.

Exceptions to this section are blasting activities permitted by Chapter 15 of the Town’s Ordinances, haul trucks entering and leaving the site and work projects done on the screening berms, drainage ditches or Town and County road ditches.

3.6. EOG shall use back-up signals creating the least offensive noise audible to persons residing near the Property consistent with legal requirements.

3.7. Within the Town, trucks traveling to or from the Property;
   3.7.1. Shall use only county trunk highways;
   3.7.2. Shall not use compression release engine brakes, commonly known as Jake brakes; and
   3.7.3. Shall adhere to all posted speed limits.

3.8. EOG shall comply with the WDNR Air Permit, which is attached hereto as Exhibit C and incorporated herein by reference.
3.9. The berms constructed by EOG on and adjacent to the Property shall be maintained in their present configuration in a good and erosion free condition. During 2011, analysis will be conducted to determine if other vegetation including small trees should be planted on the berms to improve dust migration. Berms only serve purpose during life of mine so trees will not be permanent fixtures.

3.10. Mining activities as they relate to surface and ground water will occur in accordance with the Reclamation Plan for the Property and any amendments to that Reclamation Plan filed with and approved by Chippewa County Land Conservation Department (“Reclamation Plan”), which is incorporated herein by reference.

3.11. All lights must have full cut-off shrouds so that no light is directed upward or at structures not on the Property. Portable lighting shall be used only as necessary to illuminate work areas.

3.12. Sand taken from the Property may be returned to the Property. In addition, EOG and Town understand and agree that fines or waste sand from other Wisconsin mines may be returned to the Property, provided that the total amount of reject sand (including fines and waste sand) being returned to the Property shall not exceed the proportion of reject sand generated from the Property. For example, if 70% of the sand produced from the Property is product and 30% is reject sand, and 600,000 tons of sand is removed from the site, then 180,000 tons of reject sand (30% of 600,000 tons) of reject sand may be returned to the site.

3.13. EOG shall at all times have an agent, whose name, fax number, email address and telephone numbers are made known to the Town Clerk, available to respond to complaints and problems and the notice required under section B.2. of the Property Value Guarantee (Exhibit D).

4. **Storm Water Management**

4.1. EOG shall comply with the Storm Water Management and Erosion Control plan included in the Reclamation Plan which is incorporated by reference.

4.2. EOG shall repair any damage to, and remove sediment from town road ditches and other drainage ways adjacent the Property.

4.3. EOG shall maintain the detention and retention ponds per the Reclamation Plan which is incorporated herein by reference.

5. **Groundwater**

5.1. EOG shall comply with the groundwater monitoring plan in Reclamation Plan plus one modification to testing scope which is the addition of acrylamide.
5.2. All test results shall be reported to the Town. In addition, test results of samples taken from private wells shall be reported to the owners of the wells. Private wells south of the Property and within one-fourth (1/4) mile perimeter of the mining boundary shall be tested once every three years. This obligation shall begin at the commencement of mining.

5.3 In lieu of Section 17.10 and 17.11 of the Ordinance, private well owners described in Section 5.2 shall also be eligible for reimbursement related to well repair or re-drilling costs in the event that: (a) a preventive action limit or enforcement standard is exceeded in the well, or (b) there is a substantial adverse impact on the quantity of water, including but not limited to, the inability of any such well to provide water on a continuous basis. Any property owner seeking a remedy shall file a written notice with the Town and EOG of the occurrence of either of the above events.

Upon written notice to EOG of a violation under the aforementioned (a) or (b), EOG retains the right to consult with a qualified professional, acceptable to the private well owner, within a 30 day time period to determine whether the well water impact is attributable to EOG’s mining operations. In the event the professional determines the well impact is not a result of EOG’s mining operations, EOG shall not be responsible for repair of well drilling and/or repair costs or the purchase of any alternative water sources for private well owners.

The private well owner shall immediately upon notification from EOG that it will reimburse the costs for re-drilling and/or repairing the well, retain a certified plumber or licensed well driller to re-drill and/or repair the well. The private well owner then shall provide EOG with a copy of the receipt and EOG will pay the actual cost related to the repair and/or re-drilling and shall make payment directly to the vendor within 60 days of receipt of invoice. EOG shall also reimburse private well owners for alternative drinking water costs between the time period upon which written notice is provided to EOG and the time in which the well drilling and/or well repair is completed. Well owners must present a receipt from a vendor demonstrating the costs of alternative water as part of reimbursement eligibility. Nothing in this paragraph precludes an owner from seeking reimbursement if the owner retains a certified plumber or licensed well driller prior to the notification from EOG regarding reimbursement.

This Section only applies to residential wells and not commercial and agricultural wells.

6. Blasting

6.1. Blasting as defined in chapter 15 of the Town’s code of ordinances and shall occur between the hours of 10:00 a.m. and 3:00 p.m. Except that blasting may occur after 3:00 p.m. if required for safety reasons beyond the reasonable control of EOG and its contractors.

6.2. Blasting velocities shall not exceed those specified in NFPA 495 and Wisconsin Administrative Code § COMM 7.
6.3. The restrictions in this section 6 are in addition to, and not in lieu of, other provisions of this Agreement, including but not limited to section 9.

7. Property Value Assurance

7.1. EOG hereby grants the property owners specified in the attached Exhibit E the Property Value Guaranty set forth in the attached Exhibit D.

7.2. The property owners listed in Exhibit E are third party beneficiaries of section 7.1.

8. Restoration

8.1. EOG shall complete sequential restoration of the Property as set forth in the Reclamation Plan which is incorporated herein by reference.

9. Laws to be Observed

9.1. EOG shall at all times comply with all federal, state, county, and local laws, regulations and ordinances applicable to EOG’s operations on the Property which are in effect or which may become effective in the future.

9.2. This Agreement modifies certain requirements of the Mine Ordinance relating to license application requirements pursuant to Section 17.06(5) and minimum standards of operation pursuant to Section 17.07(5). Any sections not specifically modified by this Agreement remain in effect.

9.3. EOG shall provide the Town with copies of all such permits or licenses and all related application materials and reports submitted by or on behalf of EOG or the Owners and all documents and other materials provided to EOG or the Owners by such federal, state or local authorities. The providing of these reports shall satisfy Section 17.08(1).

10. Reimbursement and Enforcement

10.1. This section is intended to satisfy the requirements of a Development Agreement and thereby satisfy the requirements in Section 17.09.

10.2. Reimbursement. EOG shall reimburse the Town for all consulting, inspection, engineering and legal fees incurred in connection with the drafting of this Agreement.

10.1.1. Any amounts due under this Agreement which are not paid within 30 days of billing shall accrue interest at the rate of one percent per month.

10.3. Inspection and Right of Entry. EOG shall, upon request by the Town, provide the Town’s officers, agents, employees and contractors with access to the Property for purposes of determining or enforcing compliance with this Agreement or as otherwise provided by law or this Agreement. In the event of EOG’s failure or refusal to permit access to the
Property, the Town may obtain an inspection warrant, injunction or other relief from a court to enforce its right to access.

10.4 Notice of Default. In the event that EOG fails to perform any of its obligations under this Agreement, the Town shall provide a notice of default and the parties shall hold an initial meeting within ten (10) days following notice of such default for purposes of attempting to resolve the default on an amicable basis unless the Town determines that threats to health, safety or property require a shorter notice period. If the parties cannot so resolve the matter the Town may elect to enforce the remedies provided for herein.

10.5 Disputes Concerning Agreement. Any dispute concerning any provision of this Agreement, other than a default under 10.4, shall be resolved as follows: The party which asserts a dispute shall first give notice thereof to the other party and specify the nature of the dispute and shall meet with such other party, within 30 days of the event giving rise to the dispute. Such notice shall set forth all reasons supporting the basis of the dispute. Within 30 days following the date of the notice, a meeting between the Parties shall be held to attempt in good faith to negotiate a resolution of the dispute or controversy.

10.6 Remedies

A. Corrective Orders. The Town may issue a notice of violation and order that specifies the action to be taken to remedy a default and the time period for curing the default.

B. Remediation and Reimbursement. In the event EOG fails to perform any of its obligations under this Agreement, including, but not limited to, maintenance of storm water management facilities and restoration of the Property, the Town may, but shall not be required to, perform such obligations at EOG’s expense. Before performing EOG’s obligations, the Town shall give EOG at least 30 days written notice unless the Town determines that threats to health, safety or property require a shorter notice period. EOG shall reimburse the Town for all expenses incurred for materials, contractors, engineers, attorneys and other consultants in connection with performing EOG’s obligations within 30 days of billing therefor.

C. Legal Action. The Town retains the right to commence legal action to enforce the terms of this Agreement and seek remedies which include: termination of the Agreement for a default, specific performance of the obligations under this Agreement, penalties and/or damages in an amount determined by the court, and/or injunctive relief.

10.7 Preservation of Remedies. The remedies provided herein shall not be exclusive of other remedies. A failure by the Town to take action on any past violation(s) shall not constitute a waiver of the Town’s right to take action on any subsequent violation(s).
11. **Obligations to Run with the Land**

11.1. EOG warrants that the Owners have authorized EOG to engage in nonmetallic mining on the Property and to enter into this Agreement.

11.2. EOG and the persons signing for EOG warrant that EOG has full right and authority to enter into this Agreement.

11.3. The obligations of EOG or either of them under this Agreement shall run with the land and be binding on the Owners and EOG and their heirs, grantees, representatives, successors and assigns.

11.4. The Town may record a copy of this Agreement with the Register of Deeds. The cost of recording shall be paid by EOG.

12. **Miscellaneous Provisions**

12.1. All parties participated in negotiating the terms of this Agreement. No party shall benefit from not having drafted this Agreement. If any term, section or other portion of this Agreement is reviewed by an administrative agency, court, mediator, arbitrator or other judicial or quasi-judicial entity, such entity shall treat this Agreement as having been jointly drafted by the parties.

12.2. No waiver of any provision of this Agreement shall be deemed or constitute a waiver of any other provision, nor will it be deemed or constitute a continuing waiver unless expressly provided for by a written amendment to this Agreement signed by both the Town and EOG, nor shall the waiver of any default under this Agreement be deemed a waiver of any subsequent default or defaults of the same type. The Town’s failure to exercise any right under this Agreement shall not constitute approval of any breach or wrongful act by EOG.

12.3. Any notice required or permitted by this Agreement, except the notice required under the Property Value Guarantee (Exhibit D), shall be deemed effective when personally delivered in writing, or three (3) days after notice is deposited with the U.S. Postal Service, postage prepaid, and addressed as follows:

If to EOG: EOG Resources, Inc.
619 Bridge Street Suite 101
Chippewa Falls, WI 54729

If to Owners: Robert J. Schindler Jr.
11472 55th Street
Colfax, WI 54730
Jeffrey R. Sikora  
11731 52nd Street  
Colfax, WI 54730

If to the Town:  Town Clerk, Town of Howard

Sue Haake  
9750 30th St.  
Colfax, WI 54730

Any party may change the address to which notices must be sent by giving notices as provided herein.

12.4. This Agreement shall be governed by and construed in accordance with the laws of the state of Wisconsin. All disputes arising under this Agreement shall be venued in a Wisconsin court of competent jurisdiction.

12.5. No changes, amendments, alterations or modifications to this Agreement shall be effective unless in writing and signed by both Parties and, if required, upon approval by competent governing authorities of each Party.

12.6. This Agreement is entered into with EOG for the Property for the purposes of nonmetallic mining. EOG may assign or transfer its rights and obligations under this Agreement to any entity with the prior written consent of the Town which shall not unreasonably be withheld, providing the property will continue to be used for mining activities, the assignee assumes in writing the obligations of EOG pursuant to this Agreement and provides a copy of such Agreement to the Town prior to the transfer, and the assignee demonstrates that it has the financial wherewithal to fulfill the obligations of this Agreement. In the event EOG transfers its rights and obligations for a purpose other than nonmetallic mining, the Agreement shall be terminated.

[Signature pages follow]
Dated: ______________________, 2011
EOG RESOURCES, INC.
a Delaware corporation

By: ______________________________
Name/Title: ________________________

STATE OF TEXAS
COUNTY OF TARRANT

Personally came before me this _____ day of ________________, 2011 the above-named
____________________ and ______________________, to me known to be the
____________________ and ______________________ of EOG Resources, Inc., and the persons
who executed the foregoing instrument and acknowledge the same.

____________________________________  
Print Name: ______________________________  (SEAL)
Notary Public, State of Texas
My commission expires ________________
Dated: __________________, 2011

TOWN OF HOWARD
Chippewa County, Wisconsin

By: ________________________________
Name/Title:________________________

By: ________________________________
Name/Title:________________________

STATE OF WISCONSIN
COUNTY OF CHIPPEWA

Personally came before me this _____ day of __________________, 2011 the above-named ____________________________ and ____________________________, to me known to be the ____________________________ and ____________________________ of the Town of Howard, and the persons who executed the foregoing instrument and acknowledge the same.

____________________________________
Print Name: __________________________ (SEAL)
Notary Public, State of Wisconsin
My commission expires ___________________
EXHIBIT A

PROPERTY DESCRIPTION
EXHIBIT B

BLASTING ORDINANCE
EXHIBIT C

WDNR AIR PERMIT

S&S (800,000 TON/YR) MINE
EXHIBIT D

PROPERTY VALUE GUARANTY
PROPERTY VALUE GUARANTY

Upon the execution of the attached Agreement ("Effective Date") and until December 31, 2031 ("Termination Date"), EOG Resources, Inc. (hereinafter referred to as "EOG"), will provide property value Guarantee ("Guaranty") to the owners of parcels of land, identified on the attached Exhibit E, subject to the following terms and conditions.

A. Determination of Fair Market Value.

1) An owner desiring to sell property shall notify EOG of that fact not later than March 1, 2031.

2) The owner and EOG shall then agree on an appraiser who is licensed as a real estate appraiser in Wisconsin.

3) In the event EOG and the owner cannot agree on an appraiser, the owner shall select a bank or credit union in Chippewa County, with whom the owner does not do business, to provide the name of an appraiser it regularly employs to do appraisals.

4) The appraiser selected pursuant to 2) or 3) above shall provide EOG and the owner with an appraisal of the fair market value of the property, assuming EOG’s sand mine did not exist ("Fair Market Value").

5) EOG shall pay for the appraisal.

B. Sale of Property.

1) The owner shall then enter into a listing contract with a Wisconsin licensed real estate broker. The listing contract shall exclude EOG as a potential buyer so that if EOG purchases the property, no commission shall be due.

2) Before accepting any offer of less than the Fair Market Value, the owner shall give two (2) business days’ notice by fax, email or personal delivery with a copy of the offer to EOG’s agent as designated in Section 3.13. If notice is by fax or e-mail, it shall also require confirmed receipt by EOG that the notice has been received within two (2) business days. If EOG objects in writing within two (2) business days, the owner shall not accept such offer.

3) If the owner sells the property for less than the Fair Market Value, EOG shall pay the owner the difference between the selling price and the Fair Market Value less the realtor’s commission that would have been payable on that difference. EOG shall make the payment within 30 days of the recording of the conveyance of the property.
4) If the property is not sold within 180 days of the date of the listing contract, EOG shall immediately purchase the property for the Fair Market Value less the realtor’s commission that would have been paid if sold under the listing contract.

C. Applicability.

1) The Guaranty shall apply only once for any property identified in Exhibit F and shall only be available to the property owners as of the Effective Date.

2) Property which is for sale on the Effective Date shall not be eligible for the Guaranty.

3) Properties do not qualify for the Guaranty in the event the property owner wishes to sell or otherwise convey the property to a third-party by a transaction which is not considered an arm’s-length transaction (such as a sale or gift to a relative).
EXHIBIT E

PROPERTY OWNERS
# PROPERTY OWNERS

<table>
<thead>
<tr>
<th>Name</th>
<th>Address</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wayne Schindler</td>
<td>5101 County Highway B</td>
</tr>
<tr>
<td></td>
<td>Colfax, WI 54730</td>
</tr>
<tr>
<td>Jeffrey Bennesch</td>
<td>4983 County Hwy B</td>
</tr>
<tr>
<td></td>
<td>Colfax, WI 54730</td>
</tr>
<tr>
<td>Vernon and Mary Schindler</td>
<td>4674 100th Avenue</td>
</tr>
<tr>
<td></td>
<td>Colfax, WI 54730</td>
</tr>
<tr>
<td>Gilmore / Sikora Trust</td>
<td>11507 55th Street</td>
</tr>
<tr>
<td></td>
<td>Colfax, WI 54730</td>
</tr>
<tr>
<td>Charles and Frances Schindler</td>
<td>5281 County Hwy B</td>
</tr>
<tr>
<td></td>
<td>Colfax, WI 54730</td>
</tr>
<tr>
<td>Chad and Brandalee Sikora</td>
<td>11689 52nd Street</td>
</tr>
<tr>
<td></td>
<td>Colfax, WI 54730</td>
</tr>
<tr>
<td>Edward and Kim Dachel</td>
<td>5585 County Hwy B</td>
</tr>
<tr>
<td></td>
<td>Chippewa Falls, WI 54729</td>
</tr>
<tr>
<td>David Loew</td>
<td>4364 County Hwy B</td>
</tr>
<tr>
<td></td>
<td>Colfax, WI 54730</td>
</tr>
<tr>
<td>Cynthia Loew</td>
<td>10929 County Hwy T</td>
</tr>
<tr>
<td></td>
<td>Chippewa Falls, WI 54729</td>
</tr>
<tr>
<td>Charlie and Tracy Crawford</td>
<td>5221 County Hwy B</td>
</tr>
<tr>
<td>(formerly Deutsch Bank Property)</td>
<td></td>
</tr>
<tr>
<td>Thomas R. and Marie J. Dachel</td>
<td>307 West Dell Street</td>
</tr>
<tr>
<td></td>
<td>New Auburn, WI 54757</td>
</tr>
</tbody>
</table>
ATTACHMENT H

WISCONSIN AGREEMENT WITH HOUSTON SANDS
COUNTY ROAD UPGRADE AND MAINTENANCE AGREEMENT

This COUNTY ROAD UPGRADE AND MAINTENANCE AGREEMENT (this “Agreement”) is made and entered into this 19th day of May, 2011 by and between Chippewa County (the “County”), and Superior Silica Sands, LLC, a Texas Limited Liability Company (the “Operator”). Each of the Operator and the County are sometimes referred to herein individually as a “Party” and collectively as the “Parties”. The term “Operator’s Representatives” shall include Operator’s contractors, sub-contractors, agents, employees, suppliers and designees.

RECITALS

WHEREAS, Operator is in the business of mining and production of silica sand, and is in the process of constructing, developing, operating, maintaining and reclaiming a non-metallic mining facility (the “Project”) in Chippewa County, Wisconsin, and has submitted an application for a Non-metallic Mining Reclamation Permit for the Project with the Chippewa County Land Conservation and Forest Management Department in accordance with the Non-metallic Mining Reclamation Ordinance of Chippewa County, and

WHEREAS, in connection with the construction, development, operation, maintenance and reclamation of the Project, the Parties desire to address certain issues relating to the roads owned, operated and maintained by the County (collectively, the “County Roads”) over which it will be necessary for Operator and Operator’s Representatives to, among other things, transport heavy equipment and certain locally sourced materials, including, but not limited to, silica sand, over certain County Roads, which may in certain cases be in excess of the design limits of the County Roads; and both parties acknowledge that certain of the County Roads may not be constructed to withstand the frequency and weight of shipments necessary for the Operator to transport its products and equipment.

WHEREAS, Wis. Stat. §349.16(1)(c) authorizes the County highway commissioner to enter into an agreement on behalf of County with any owner or operator of any vehicle being operated on a highway maintained by County that provides that the County will be reimbursed for any damage done to the highway, and

WHEREAS, Operator has provided to County a site layout plan for the Project that shows the access road entrances, a copy of which is attached as Exhibit A (the “Plan”), and

WHEREAS, Operator and County wish to set forth their understanding and agreement as to the road issues relating to the construction, development, operation, maintenance and reclamation of the Project, and

WHEREAS, this Agreement shall apply to those County Roads listed on the attached Exhibit B and, subject to Section 4.B. herein, any other County Road(s) used by Operator or Operator’s Representatives in direct support of the construction, development, operation, maintenance and reclamation of the Project.
AGREEMENT

NOW, THEREFORE, in consideration of the mutual promises and covenants herein set forth, the parties, intending to be legally bound, agree as follows:

Section 1. Term of Agreement.

This Agreement shall commence upon the date indicated above (the “Effective Date”) and shall continue in full force and effect until Operator’s Non-metallic Mining Reclamation Permit has expired, has been terminated, or until Operator has fully discontinued its construction, development, operation, maintenance and reclamation of the Project and any and all transportation activities related thereto on the County Roads listed on Exhibit B, whichever occurs later.

Section 2. Operator, in respect of the Project constructed, developed, operated, maintained and reclaimed by it, acknowledges and agrees the Project may require County to undertake the following activities in order to preserve County Roads and that the Operator shall be financially responsible for the costs of said activities to the extent provided for under the terms of this Agreement:

A. Upgrading Pavement Sections on County Roads to a design standard as directed by the WIDOT, Facilities Development Manual, Section 11-40, to withstand the hauling of products and equipment that are necessary for the Project.

B. Upgrading the geometric design of the County Roads to a standard as directed by the WIDOT, Facilities Development Manual, Section 11-40, that will safely and efficiently accommodate the traffic that Operator has indicated the Project will generate; including improvements at entrances, intersections and to the typical cross-section. Geometric improvements shall also include any improvements to Structures and Culverts necessary to accommodate the increased traffic from the Project.

C. Providing Engineering Plans for all improvements needed under Sections 2.A. and 2.B. above, including any Right-of-Way needed.

D. Operator shall be responsible for all exceptional maintenance costs, above normal maintenance requirements, that are attributable to damage to County Roads from the hauling of products and equipment related to the Project. Said maintenance cost may occur either before or after any of the improvements to County Roads indicated in Sections 2.A., 2.B. and 2.C. above are made. County shall inform Operator if it has a good faith basis to believe any exceptional maintenance costs become necessary and
provide a good faith estimate of costs to Operator prior to commencing work.

County will invoice the Operator for exceptional maintenance costs incurred as the work is completed. Operator shall have thirty (30) days from the date of invoicing to make payment to County.

E. In order to compensate County for repairs needed as a result of Operator’s use and to accomplish the work indicated in Sections 2.A., 2.B. and 2.C. above, Operator shall make a payment to County of Three Hundred Eleven Thousand Five Hundred Ten Dollars ($311,510.00) at the time of execution of this Agreement. Based on the construction plans provided by the Operator and cost estimate agreed upon by both parties, the payment amount should be sufficient for County to make needed improvements to the Haul Route.

Notwithstanding the above, Operator acknowledges that conditions may be encountered or additional requirements imposed by the WIDOT or other regulatory agency that require additional work by the County and that the cost of all additional work is the responsibility of the Operator. When improvements are complete the County will invoice the Operator for any additional costs incurred. Operator shall have thirty (30) days from the date of invoicing to make payment to County.

After construction of the improvements is complete any remaining funds will be returned to Operator within thirty (30) days of project audit by County.

Section 3. County, in accordance with the terms of this Agreement, agrees to:

A. Review for approval all access points to the County Road system by giving consideration to sight distances, drainage and proximity to other entrances, in a reasonable manner, and in accordance with accepted engineering practices;

B. Review for approval permits for all utility encroachments on County rights-of-way in a reasonable manner, and in accordance with accepted engineering practices;

C. Coordinate with Operator and Operator’s Representatives so as to minimize the impact of their use of the County Road system;

D. Perform all maintenance and construction of all improvements pursuant to this Agreement on the County Roads used for the construction, development, operation, maintenance and reclamation of the Project.
E. Keep those County Roads listed on the attached Exhibit B of this Agreement open to Operator to haul products and equipment related to the Project for the entire term of this Agreement without further restrictions, other than those indicated in this Agreement, for all vehicles meeting statutory requirements for weight, width, height and length. County shall retain the right and its authority to establish and set traffic speed limits in accordance with generally accepted highway standards and safety practices.

Section 4. Road Inventory.

A. Routing and Access Approval.

This Agreement applies only to the County Roads listed on the attached Exhibit B of this Agreement. If conditions or circumstances change and Operator desires to change haul routes, it must first request authorization from the County. All expenses for additional haul routes are not part of this Agreement and shall be negotiated by the Operator and County in a separate agreement in the event any changes are requested.

B. Incidental Use

The Parties recognize that the Project traffic may, either through mistake or with the consent of County, use County Roads other than those listed on Exhibit B of this Agreement. Repairs for damage caused by Operator or Operator’s Representatives during such mistaken or permitted use shall be treated as exceptional maintenance under Section 2.D. above.

Section 5. Construction Cooperation.

A. Operator.

Operator shall submit to County a schedule with planned activities that affect the County Roads. Said Schedule shall reasonably indicate the estimated number of trucks that will be hauling products and equipment and daily hours of operation. Operator shall submit the Schedule to County within two (2) weeks of execution of this Agreement. Operator shall further provide County with an updated Schedule within two (2) weeks of any material changes being made with the Project. Operator understands that County Road construction and maintenance activities will be on-going while Project hauling is occurring, and that while County Roads will be open to traffic, Operator acknowledges that these activities may slow hauling operations.

B. County:
During the term of this Agreement, County and Operator shall meet as needed to discuss Project activities and County Road construction and maintenance schedules. County agrees to keep those County Roads specified in Exhibit B open to Project traffic during County Road construction and maintenance activities, except that County may temporarily close any of the County Roads specified in Exhibit B for replacement of a culvert, structure or due to an emergency. County will provide a temporary alternate haul route when reasonably practicable. Annual seasonal weight limitations shall apply to all haul routes in Exhibit B and to any alternate routes approved by County.

County agrees to exclusively use any payments received from Operator as part of 2(E) of this Agreement on County Roads used as haul routes by the Operator.

C. Emergency Actions.

Notwithstanding the foregoing, in the event Operator or Operator’s Representatives have caused damage to County Roads of a magnitude sufficiently great to create a hazard to the motoring public, which in County’s opinion warrants an immediate repair or County Road closing, County may unilaterally close those County Road(s) affected and make or authorize repair, with the reasonable, documented costs thereof paid for by Operator.

Both Parties acknowledge that while County is the Jurisdictional Authority for those County Roads listed in Exhibit B, certain emergency situations may arise that fall under law enforcement, fire district or emergency management control. In such situations the road may be closed to traffic, including traffic from the Project, outside the control of County. County shall not be responsible for any harm to Operator, Operator’s Representatives or the Project that may result from County Road closings that occur due to such emergencies.


A. Indemnification by Operator. Operator hereby releases and agrees to indemnify and hold harmless County and its respective officers, employees, elected or appointed officials, and agents, and their respective heirs, executor, administrators, successors and assigns (hereinafter collectively “County Releasees”) from any and all third party actions, causes of action, suits, claims, expenses (including reasonable attorney’s fees) and demands against County Releasees arising out of or relating to the performance by Operator of its obligations under this Agreement. More particularly, but without in any way limiting the foregoing, Operator hereby releases County
Releasees and agrees to indemnify and hold harmless County Releasees from any and all third party actions, causes of action, suits, claims, expenses (including reasonable attorney’s fees) and demands arising directly or indirectly from any personal injury, death or property damage arising out of the use by Operator or Operator’s Representatives of any County Road subject to this Agreement.

1. Limitations of Liability. In no event shall County or any of their Board, officers, elected or appointed officials, agents, investors, principals, shareholders, members or employees be liable (in contract or in tort, involving negligence, strict liability, or otherwise) to any other party or their contractors, suppliers, employees, members and shareholders for indirect, incidental, consequential or punitive damages resulting from the performance, non-performance or delay in performance under this Agreement.

2. Required Insurance. Operator shall at all times throughout the term of this Agreement maintain in full force and effect commercial general liability insurance, naming County, its Board, officers, elected or appointed officials, agents and employees as an additional insured, in the aggregate amount equal to Ten Million Dollars ($10,000,000). Operator may utilize any combination of primary and/or excess insurance to satisfy this requirement.

Section 7. Remedies and Enforcement.

Each of the Parties hereto covenant and agree that in the event of default of any of the terms, provisions or conditions of this Agreement by any party (the “Defaulting Party”), which default is not caused by the party seeking to enforce said provisions (the “Non-Defaulting Party”) and after notice and reasonable opportunity to cure has been provided to the Defaulting Party, then in such an event, the Non-Defaulting Party shall have the right of specific performance. The remedy of specific performance and injunctive relief shall not be exclusive of any other remedy available at law or in equity.

Section 8. Due Authorization.

Operator hereby represents and warrants that this Agreement has been duly authorized, executed and delivered on behalf of Operator. County hereby represents and warrants that this Agreement has been duly authorized, executed and delivered on behalf of County.

Section 9. Savings/Severability.
It is mutually agreed by the Parties that in the event any provision of this Agreement is determined by any court of law of competent jurisdiction to be unconstitutional, invalid, illegal or unenforceable in any respect, it is the intention of the parties that such unconstitutionality, invalidity, illegality or unenforceability shall not affect the other provisions, and the Agreement shall be construed as if such unconstitutional, invalid, illegal or unenforceable provision had never been contained in this Agreement.

Section 10. Entire Agreement.

This Agreement and the exhibits attached thereto constitute the entire agreement among the Parties hereto with respect to the subject matter hereof, and supersede any prior understandings or written or oral agreements between the parties with respect to the subject matter of this Agreement. No amendment, modification, cancellation or alteration of the terms of this Agreement shall be binding on any party hereto unless the same is in writing, dated subsequent to the date hereof and is duly authorized and executed by the Parties hereto.

Section 11. Designated Representative.

Operator designates _________________________ as Agent with primary responsibility for the performance of this Agreement. In the event this Agent is replaced by another for any reason, Operator will designate another Agent within seven (7) calendar days and provide notice to County of replacement pursuant to the procedure set forth in Section 14, Notices.

Section 12. Notices.

All notices to be given under the terms of this Agreement shall be in writing and signed by the person serving the notice and shall be sent via registered or certified mail, return receipt requested, postage prepaid, or hand delivered to the addresses of the parties listed below. Notice shall be deemed to have been received on the date of receipt as shown on the return receipt or other written evidence of receipt.

FOR COUNTY: Bruce Stelzner  
Chippewa County Highway Commissioner  
801 East Grand Avenue  
Chippewa Falls, WI 54729

FOR OPERATOR: James Walker  
Superior Silica Sands
Section 13. **Assignability/Consent.**

This Agreement shall be binding on the Parties hereto, their respective heirs, devisees and successors. Except as otherwise provided herein, or except as may be hereafter determined by the Parties, Operator may not sell, assign or transfer its interest in this Agreement, or any of its rights, duties or obligations hereunder, without the prior written consent of County. Whenever the consent or the approval of County is required herein, County shall not unreasonably withhold, delay or deny such consent or approval.

Section 14. **Force Majeure.**

The performance of this Agreement shall be subject to events of force majeure. Events of force majeure shall mean any contingency or cause beyond the reasonable control of a Party including, without limitation, acts of God or the public enemy, war, riot, civil commotion, insurrection, government or de facto government action (unless caused by acts of omissions of the party), fires, explosions, rain or other weather delays, floods, strikes, slowdowns or work stoppages.

Section 15. **Modification**

No modification of this Agreement or of any covenant, condition or limitation herein contained shall be valid unless in writing and duly executed by the party to be charged therewith. No evidence of any modification shall be offered or received in evidence in any proceeding arising between the Parties hereto out of or affecting this Agreement, or the rights or obligations of the Parties hereunder, unless such modification is in writing and duly executed. The parties further agree that the provisions of this Section 15 will not be waived unless herein set forth.

Section 16. **Counterparts.**

This Agreement may be executed in any number of counterparts, each of which shall be deemed an original, with the same effect as if the signatures thereto and hereto were upon the instrument. Delivery of an executed
counterpart of a signature page to this Agreement by telecopier shall be as effective as delivery of a manually signed counterpart to this Agreement.

Section 17. **Choice of Law and Forum Selection.**

This Agreement shall be governed by, and construed, interpreted and enforced in accordance with the laws of the State of Wisconsin. The Parties agree, for any claim or suit or other dispute relating to this Agreement that cannot be mutually resolved, the venue shall be in the Circuit Court of Chippewa County, a court of competent jurisdiction within the State of Wisconsin, and the parties further agree to submit themselves to the jurisdiction of said court, to the exclusion of any other judicial district that may have jurisdiction over such a dispute according to any law.

Section 18. **Default Termination.**

In the event Operator shall default in any of the covenants, agreements, commitments, conditions or obligations herein contained, and any such default shall continue unremedied for a period of ten (10) calendar days after written notice thereof to Operator, County may, at its option and in addition to all other rights and remedies which it may have at law or in equity against Operator, including expressly the specific enforcement hereof, forthwith have the cumulative right to immediately terminate this Agreement and all rights of Operator under this Agreement.

Section 19. **Waiver of Terms and Conditions.**

The failure of County to enforce or insist upon compliance with any of the terms or conditions of this Agreement shall not constitute a general waiver or relinquishment of any such terms or conditions, but the same shall be and remain at all times in full force and effect.

Section 20. **Compliance with Applicable Laws.**

Operator shall become familiar with, and shall at all times comply with and observe all federal, state and local laws, ordinances and regulations which in any manner affect the conduct or performance of Operator and its agents and employees of the terms and obligations under this Agreement.

Section 21. **Captions.**
The captions contained in this Agreement are for informational purposes only and shall not in any way affect the substantive terms or conditions of this Agreement.

Section 22. Cooperation.

The Parties agree to cooperate with each other in addressing any unforeseen or extraordinary events caused by Operator’s activity that would result in significant impacts to the County Roads. The parties further agree to cooperate with each other in addressing any unforeseen impact to Operator’s ability to utilize the haul route or any alternative route provided for in this Agreement.

IN WITNESS WHEREOF, the parties hereto have executed this Agreement the day and year first written above.

OPERATOR:

Superior Silica Sands.

By: James D. Walker

Its Director of Operations

COUNTY:

Chippewa County, a municipal corporation

By: Bruce G. Stelzner
Chippewa County Highway Commissioner
EXHIBIT B

Haul Routes

1.) CTH DD, from STH 64 south to Superior Silica Sands permitted mine entrance.