COUNTY OF BUFFALO
BOARD OF ADJUSTMENT

IN RE: Seven Sands, LLC Application for CUP for Frac Sand Mining and Wash Plant	**REQUEST TO DENY APPLICATION FOR CONDITIONAL USE PERMIT**

TO: THE BUFFALO COUNTY BOARD OF ADJUSTMENT

INTRODUCTION

Petitioners John and Nettie Rosenow urge the Buffalo County Board of Adjustment (the "Board") to deny the application for a conditional use permit ("CUP") for the development of industrial frac sand mining operations submitted by Seven Sands, LLC ("Seven Sands"). At base, frac sand mining is not allowed under any circumstances under the County's Zoning Ordinance. There simply is nothing in the Ordinance that allows the type of large-scale, industrial sand mining being proposed by Seven Sands, or any other entity. Moreover, the Rosenows and many other residents of the County believe strongly that Seven Sands' application is not in the best interests of the community (*see* Ordinance, § 212) and that the current moratorium precludes consideration of frac sand proposals such as this one.

The Board should deny Seven Sands' CUP application for the following reasons, each of which is addressed in greater detail below:

- This Board has no jurisdiction to consider a frac sand mining proposal, even as a conditional use, since the only extractive operation allowed under the Zoning Ordinance is one for "aggregate purposes," which frac sand is not.
- Neither Seven Sands nor the County has adequately studied or addressed the environmental, reclamation, health, safety, and traffic-related concerns posed by frac sand mining in general and this proposed mine in particular, despite the Board's duty to make decisions regarding the health, safety and welfare of County residents.
- Seven Sands' skeletal application, hastily submitted on March 16, 2012, fails to include the detail needed for sound public decision-making on a project of this scale and consequence or for the preparation of adequate permit terms and conditions to protect the public interest. (Ordinance, § 213.)

- Seven Sands' application does not constitute a "complete application" within the wording and intent of Section 285 of the Moratorium Ordinance, both because of its own substantive inadequacy and because it is not accompanied by an application for a reclamation permit under the County's Nonmetallic Mining Ordinance.

- The County lacks a Zoning Administrator to review any application, and is missing other key positions; as a result, it lacks capacity to review an industrial mining operation of this size and scope.

- Before any application is processed, questions regarding the financial capacity of the principals in the project must be resolved, and the amount and nature of the financial assurance adequate to reclaim an industrial mine of this size must be determined.

BACKGROUND

In recent months, Buffalo County has seen a sharp increase in applications from companies seeking to open industrial frac sand—or silica sand—mines in our communities. Consistent with the concerns of the Rosenows and many other residents, the Buffalo County Board of Supervisors passed a seven-month moratorium on the commencement and expansion of nonmetallic mining in the county, which took effect on March 29, 2012 (the "Moratorium"). The statements and findings that the Board made in support of the Moratorium included:

- "The purpose of this moratorium is to allow the County adequate time to study the possible impacts that nonmetallic mining operations may have on the health, safety and welfare of the residents of Buffalo County including air quality and water quality concerns and potential impact to the infrastructure of the County, to determine the advisability of amending its Comprehensive Use Plan Strategy and to review and consider amending or adopting other police power or zoning ordinances so as to effectively regulate nonmetallic mining operations in the public interest";

- "[T]he mining, processing and transporting of crystalline silica sand may have an impact on air and water quality, which may affect the health and safety of county residents and could impact roads and infrastructure within the County";

- "[D]ue to the increased demand for crystalline silica sand and the potential for large-scale nonmetallic mining operations, it is critical that all necessary regulations and safeguards be in place before such nonmetallic mining operations expand or commence"; and

- "[T]he current Buffalo County Zoning Ordinance and other current regulatory ordinances may not adequately address the health, safety and welfare of Buffalo

> County residents and the enhanced strain on the County infrastructure as a result of crystalline silica (frac) sand mining/nonmetallic operations."

In support of its plans to operate a frac sand mine, including a processing plant, storm water settlement pond, water recycling pond, and conveyors and other facilities for 190 daily truck loads of sand, Seven Sands has provided a mere ten lines of narrative explaining the project and operations and eight basic maps modified from existing public records. The application is almost silent on the scale of operations, the staging of operations and, even, the type of equipment to be deployed in operations. Seven Sands also has not applied for the Nonmetallic Mining Reclamation Permit, which it is legally required to obtain prior to commencement of any mining operations. As a result, the County and its residents have received none of the information they would ordinarily need to assess the long-term implications of the proposed mine, including what the mine operator will leave behind when it ceases operation.

ANALYSIS

I. The Buffalo County Zoning Ordinance does not allow frac sand mining under any circumstances.

The plain language of the Buffalo County Zoning Ordinance (the "Zoning Ordinance" or "Ordinance") does not allow frac sand mining or processing as a conditional use on agriculturally zoned land. Instead, the Ordinance, drafted long before the advent of industrial frac sand mining, limits conditional uses to the "[m]anufacturing and processing of natural mineral resources indigenous to Buffalo County incidental to the extraction of sand and gravel and the quarrying of limestone and other rock **for aggregate purposes** . . . ." (Ordinance, § 41(1) (emphasis added).) In order to give meaning to all provisions of the Ordinance as required by law (*Lake City Corp. v. City of Mequon*, 207 Wis. 2d 155, 162-63 (1997)), the phrase "aggregate purposes" must mean the purpose for which the sand and gravel are being put. Here, the only possible meaning is for end use as concrete, asphalt, cement, and black top. Importantly, the

limitations that follow relating to "the storage of cement, asphalt, or road oils or the mixing of concrete or black top or related materials" clearly indicate that the phrase "aggregate purposes" envisions exclusively road and construction materials. (Ordinance, § 41(1).)

Frac sand does not have an "aggregate purpose" for construction materials or roads. And frac sand is admittedly not used in construction. To the contrary, frac sand is mined exclusively to be disaggregated—that is, separated from clay, silts and other minerals—and subject to further processing. Stated differently, the phrase "aggregate purpose" would have no meaning at all if frac sand were deemed to fall within its scope.[1] Accordingly, frac sand mining it is not an allowed conditional use on agricultural land.

This limitation on the type of mining allowed in the County is both logical and critical to maintaining the agricultural essence of the communities zoned as such. Mining that occurs for "aggregate purposes" is most commonly done on a small scale and is only carried out on an as needed basis to meet local demand. Such mining is consistent with the agricultural character of the surrounding land. Frac sand mining is anything but small scale and local. Instead, it is a major industrial undertaking, presumably to be carried out continuously, twenty-four hours a day, for years to come. This is a proposed use of the sort that the County has never before seen and which was never contemplated by its Zoning Ordinance.[2] Indeed, had such mining been

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[1] In an April 18, 2012 letter to the Board, attorneys for Glacier Sands, LLC, asserted that frac sand was an aggregate, so it satisfied the Ordinance. This interpretation, however, renders the phrase "aggregate purposes" a meaningless redundancy, something that is precluded by well-settled law governing statutory interpretation.

[2] In their April 18 letter, Glacier Sands asserted that the Ordinance allows frac sand mines because the provision contains the language "incidental to" and that the clause somehow modified the requirement that the sand and gravel be used for "aggregate purposes." But the provision must be read as a whole. Under the Ordinance, the sand, gravel and rock, must be put to "aggregate purposes." Given that the industrial production of frac sand for use in hydrocarbon extraction is a new phenomenon, there is no legal basis to read the Zoning Ordinance to allow large-scale industrial mining as a conditional use in agriculturally zoned areas.

contemplated, one would have expected more detail in the requirements to obtain a CUP for such an extensive operation.

II. Neither Seven Sands nor any other CUP application for a frac sand mine at this time can satisfy the conditions required by the Zoning Ordinance.

Before this Board can issue a CUP, it must consider seven enumerated factors, including the "relationship [of the proposed special use] to the public interest, the purpose and intent of this ordinance and substantial justice to all parties concerned." (Ordinance § 212.) The very first enumerated purpose of the Ordinance is "to promote the public health, safety and general welfare." Given that the entire reason for the Moratorium was the Board's determination that there are currently too many unanswered questions about the health, safety and welfare effects of frac sand mining, the Board cannot properly grant Seven Sands a CUP at this time.

In the Moratorium, the Board of Supervisors found the County to be incapable of determining whether frac sand mines are consistent with the public health, safety and welfare. In fact, the Board of Supervisors acknowledged that frac sand mining "may have an impact on air and water quality, which may affect the health and safety of county residents." (Emphasis added.) The Board of Supervisors additionally concluded that the Ordinance itself may be inadequate to address legitimate health, safety and welfare concerns associated with frac sand mining. The Board of Supervisors concluded that further time was needed to study the health, safety and infrastructure impacts of large-scale frac sand mines and associated processing facilities and to decide whether to put in place "necessary regulations and safeguards" regarding those industrial operations. To date, the review contemplated by the Moratorium has not concluded, and no decisions regarding additional regulations or safeguards have been made.

By the County's own admission, the Board lacks the ability to conclude that the proposed mine is consistent with public health, safety and welfare. Absent some new and compelling

studies, regulations, and/or safeguards, this Board would be acting contrary to its unambiguous duties under the Ordinance if it grants Seven Sands' application.

III. Even if a frac sand mine CUP application could be properly considered, the "application" submitted by Seven Sands is not complete.

Under the Moratorium Ordinance, Section 285, "[a]n applicant who has submitted *an application for a mining reclamation permit and/ or a conditional use permit* for Non-Metallic Mining on or before the effective date of the moratorium [March 29, 2012] that is determined to be **in complete conformity with all zoning requirements in effect**, as of the date of the application, shall not be affected by the terms of the moratorium * * *" (emphasis added). Seven Sands' application fails to qualify for exemption from the moratorium on two counts: (i) no reclamation permit application, under the County Non-Metallic Mining Ordinance, was submitted before the March 29, 2012 deadline, so that this prong of the moratorium exemption was not satisfied; and (ii) the CUP application itself was so grossly incomplete under the County Zoning Ordinance, Section 211, requiring such "evidence" as the Board may need "to base its determination" as to fail the "conformity" requirement of the exemption provision in the Moratorium Ordinance.

With regard to the CUP itself, Seven Sands' application furnishes no details regarding the existing natural and physical conditions of the site, or of its biological resources. The application also contains no details from which the Board could determine the mine's compatibility with existing uses on neighboring land. (Ordinance, § 212(4).) Without such detail, full consideration of and reasoned decision-making on the application is impossible. To illustrate the environmental and land use issues critical to the County's CUP approval process, Petitioners submit with this Request a preliminary analysis of the Seven Sands application by the environmental consulting firm Liesch Associates, Inc. (attached as Exhibit A). The preliminary analysis identifies the many issues Seven Sands completely ignores in its application. These and

other issues should be addressed by qualified consultants, whose reports and recommendations for both the CUP application and the reclamation permit must form the core of any responsible land use submission for a project of this type, size, and scale.

To illustrate the inadequacy of the information submitted by Seven Sands, the Rosenows attach as Exhibit B excerpts from reports prepared on behalf of the developer of a different proposed frac sand mine in nearby Scott County, Minnesota.[3] Notably, that mine, Great Plain Sands, is only a fraction of the size of the mine that Seven Sands aspires to open in Buffalo County. The most cursory comparison of this material with Seven Sands' "application" is enough to demonstrate the complete inadequacy of Seven Sands' "application."[4]

Seven Sands' "bare-bones" CUP application displays the level of regard in which it holds the County's review process and its regard for environmental and land use values generally. It is a transparent attempt to minimize its own effort and expense. Seven Sands apparently believes that it can win acceptance and a cloak of inevitability by providing only minimal information, as long as it proclaims its message of "jobs"—likely a largely empty promise, in the end—in a loud and public way. Once it has an initial CUP approval, it may then make the submissions called for by the Nonmetallic Mining Ordinance. By then, of course, Seven Sands expects that the

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[3] Complete documentation on this proposal can be found at http://www.co.scott.mn.us/ParksLibraryEnv/environment/EnvReview/greatplainsminingeaw/Pages/home.aspx.

[4] An application to the County for a simple residential building permit must contain far more information than is contained in the Seven Sands application. In addition to providing details about the house and the contractors doing the work, the "application package" requires a site plan and detailed plans and drawings for the foundation, floor plan, structural support, elevation as well as heat loss calculations. (*See*: "Building Permit Application Package, http://www.buffalocounty.com/Zoning%20Applications%20and%20Permits.htm.) If Seven Sands' application is deemed sufficient, the Board necessarily is concluding that the information needed to approve construction of a single story, three bedroom house is far more extensive than to obtain approval to operate an industrial sand mine in the County.

issue will be over: with its CUP in hand, it expects its reclamation plan to be viewed and necessarily approved as a mere formality.

IV. A complete application for a reclamation permit should have been submitted for County review and approval in tandem with Seven Sands' CUP application.

Even if the County could find Seven Sands' "application" for a CUP somehow sufficiently "complete," it is clear from the County's Nonmetallic Mining Ordinance that a complete application for a reclamation permit should have been submitted to the County in tandem with a CUP application. "No person may engage in nonmetallic mining * * * without possessing a nonmetallic mining reclamation permit" issued under that ordinance. (Nonmetallic Mining Ordinance, § 12.00.) To claim otherwise would be to assert that a CUP for a sand mine could be approved without approval of the reclamation of the same mine, a logical absurdity contrary to the plain language of the Ordinance.

The Wisconsin DNR interprets the State's Nonmetallic Mining Law, under which the County's ordinance was adopted (*see* Wis. Stat. Chapter 295), to require both applications to be submitted contemporaneously, not one after the other. According to the DNR, the intent of the State's nonmetallic mining law is that reclamation-plan hearings be conducted at the same time as zoning-related hearings on the same site whenever possible. "This way the regulatory authority may jointly consider the reclamation-related testimony and so simultaneously fulfill the requirement for public hearing for a nonmetallic mining reclamation permit." (Nonmetallic Mine Reclamation Plans, http://dnr.wi.gov/topic/Mines/Reclamation.html.)

The County should see through Seven Sands' tactics. As noted above, to fall within the exemption provision of the Moratorium, a complete application for a reclamation plan should have been submitted to the County, prior to March 29, 2012, for consideration in tandem with its CUP application. Even if the County could find otherwise, it should require that the March 16, 2012 CUP "application" itself be complete to a level of detail similar to that required for a

reclamation plan. Additional detail specific to public health and safety of *operational* aspects of the project, such as dust and particulate generation during sand excavation, storm and wastewater discharges, and noise (among other things), likewise should have been furnished at the same level of specificity for the CUP as is required for a reclamation plan. Without this information, the Board cannot approve the CUP.

V. A complete, conforming CUP application must, like a reclamation permit application, be sufficiently detailed to allow the County to prescribe permit terms and conditions to the mine site and its operation

To put the inadequacy of Seven Sands CUP application into practical perspective, the County will, in its review of any such application, need to craft appropriate site-specific permit terms and conditions, to be incorporated into the permit itself. As Seven Sands well knows, this process typically precedes, not follows, any final land use approval. While the Ordinance furnishes comparatively little detail on the permit drafting and negotiation process, the more specific Non-Metallic Mining Ordinance provides a level of detail that illustrates how this process should work.

That ordinance calls for the up-front submission by the "operator" of detailed site information, as well as a detailed "reclamation plan," which must be the subject of public notice and hearing. Section 16.50 specifies that approval of a reclamation permit may include "site specific conditions if needed to assure compliance with the nonmetallic mining reclamation requirements of this chapter." Thus, not only must the County have sufficient site-specific data on which to base its "conditions," but it is to be expected that negotiations between the County and the applicant, and permit drafting, will take place during the interval specified in Section 16.20 between the County's receipt of a complete reclamation permit application and the time prescribed in that Section for permit approval or denial. As noted above, the CUP application,

should contain equally "site specific" data—otherwise, the necessary and parallel formulation and negotiation of CUP terms and conditions will be impossible.

As a concrete example of the terms of a CUP drafted (and presumably negotiated) in response to a technically complete application, containing appropriate site-specific terms and conditions, the Rosenows attach as Exhibit C the "Interim Use Permit," equivalent to a CUP, for the Great Plains Sand project referenced above.

VI. Without a Zoning Administrator, no CUP application may be considered by the Board and the absence of County technical review staff renders its administration of the Nonmetallic Mining Ordinance impossible.

According to the Zoning Ordinance, Buffalo County must have a Zoning Administrator whose duty it is to "administer, supervise, and enforce" the provisions of the Ordinance. (Ordinance § 190.) That position, however, has been vacant for some time. Most notably for Seven Sands' application, a CUP may not be approved in Buffalo County unless an application is made through the Zoning Administrator. (Ordinance § 210.) Since there is no Zoning Administrator to receive and process Seven Sands' application, neither this application nor any other CUP application can be validly processed or issued by this Board.

Further, the County lacks the staff needed to process and analyze any frac sand mine or other CUP application under both its Zoning Ordinance and its Nonmetallic Mining Ordinance. A visit to the County's web site reveals the following positions are currently vacant:

- Nonmetallic mining staff;
- Conservation technician; and
- Zoning technician/inspector.

Just as important, the County Board Chairman is currently serving as County Administrator, in plain violation of Wis. Stat. § 59.18(1).

For the County to review the Seven Sands' proposal in the absence of any technical review capacity contravenes both the Zoning Ordinance and the Nonmetallic Mining Ordinance. These positions exist for a reason—to provide technical support to the Board as it makes important and far-reaching zoning determinations. Without technical staff, the County simply cannot make the decision Seven Sands' application seeks. Such incapacity also raises issues under the Wisconsin DNR's Nonmetallic Mining regulation, N.R. 135, as to whether the County program could withstand a WDNR audit under N.R. 135.47. Indeed, the County's lack of technical staff raises questions as to whether grounds exist for the revocation of the County's authority to administer its reclamation ordinance and program. (*See* N.R.135.48, N.R. 135.49 and N.R. 135.50.

VII. The backgrounds of certain Seven Sands' promoters suggest substantial risk to the County and its citizens if the Seven Sands mine is permitted to proceed.

Contrary to the messages it has been sending through its local public relations campaign, Seven Sands (and related businesses) do not have the best long-term interests of Buffalo County and its residents at heart. For example, Bryan Iverson of Wayzata, Minnesota, is listed as Glacier Sands Vice President, Acquisitions. Mr. Iverson, however, went through a Chapter 7 bankruptcy proceeding less than two years ago to discharge more than $21 million in debt, the vast majority of which stemmed from his past business ventures and personal guaranties he gave as security for business loans. (D. Minn. Bankr. Case No. 10-45621.) Neither Mr. Iverson nor any other affiliated individual has provided information to the County that would suggest that Seven Sands is appropriately capitalized or has the financial means to stand fully behind any obligations it may incur to the County for site reclamation, road repairs, and other damage caused by its operations. Indeed, such a substantial bankruptcy in Mr. Iverson's recent past suggests precisely the opposite.

In addition, in the process of trying to get in on the nascent frac sand business, Mr. Iverson has been accused of securities fraud and self-dealing. Specifically, Mr. Iverson and two other frac sand companies he controls, Silica Mining, Inc. and Western Industrial Minerals, LLC, were recently sued in Montana by individuals whom Mr. Iverson recruited as investors in his frac sand ventures in that state. (Beaverhead County, MT Court File No. DV-12-13609.) Among other things, the complaint accuses Mr. Iverson of misleading investors, paying himself a substantial and unauthorized salary from companies he claimed to be working to launch, misusing the funds invested by others for the Montana businesses for personal gain and to explore frac sand mining opportunities in Wisconsin, and disregarding the wishes and actions of the board of directors. A copy of this complaint is attached as Exhibit D.

The County must approach the Seven Sand proposal both cautiously and skeptically. If large-scale sand mining is allowed, the landscape and viewscape of the picturesque Waumandee Valley may be permanently blighted. Restoring a damaged landscape to its natural environment, as well as restoring local roads and public infrastructure, is the legal responsibility of Seven Sands. The County needs to carefully scrutinize Seven Sands' ability to carry this out—including the financial assurance it offers and the "track record" of its principals. In light of the publicly available information about Mr. Iverson—including his history of walking away from substantial business debts—there is little reason to trust Seven Sands' or Mr. Iverson's promises to repair Buffalo County roads and mining sites years in the future. Moreover, there is no reason for such blind trust, as the Non-Metallic Mining Ordinance requires proper financial security in the event Seven Sands leaves behind a damaged countryside and takes refuge in federal bankruptcy protections, having already made all of the money it can from the mine.

At a minimum, to protect the public interest, the County should retain a qualified expert (at the expense of Seven Sands) to assist it in specifying the terms and to review the adequacy of

any financial assurance proposed by Seven Sands in accordance with Section 14 of the Non-Metallic Mining Ordinance.

VIII. The Rosenows request that their attorney be given 15 minutes to speak at the public hearing on July 17, 2012.

In prior hearings, members of the public and their attorneys have been limited to two minutes to make a presentation to the Board. In contrast, representatives of the mines and their attorneys have been allowed unrestricted opportunity to speak and, even, rebut arguments made against the mines. In connection with the R&J Rolling Acres application, the undersigned counsel was advised that he would be given two minutes to speak, even though the Rosenows filed a specific request that the permit be denied. Here, because the proposed Seven Sands mine is adjacent to the Rosenow's property and agricultural operations, they have a direct and substantial interest in the pending application. It is therefore only fair and reasonable that their attorney be given sufficient time to advance the legal arguments against the mine before the Board. Indeed, based on prior hearings, the fifteen minutes requested still will be substantially less than mining representatives and attorneys will have to make their initial presentation and provide rebuttal.[5]

[5] The Rosenows also may have the public hearing transcribed by a certified court reporter for the purpose of memorializing the record.

CONCLUSION AND REQUEST FOR RELIEF

The County has no basis, in either law or fact, upon which to consider or approve the Seven Sands "application" for a Conditional Use Permit. For the foregoing reasons, the Rosenows request that the Seven Sands application for a CUP be denied.[6]

DATED: July 2, 2012

LINDQUIST & VENNUM P.L.L.P.

By _____
John C. Ekman, #1031034 (WI)

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ATTORNEYS FOR PETITIONERS JOHN AND NETTIE ROSENOW

[6] The Rosenows reserve the right to supplement this Request following receipt of the records that are due to them under a recent Open Records Requests to which the County has not yet responded.

EXHIBIT A

REPORT OF LIESCH ASSOCIATES, INC.

LIESCH

Liesch Associates, Inc. ■ 13400 15th Avenue North ■ Minneapolis, MN 55441
Phone: (763) 489-3100 ■ Toll Free: (800) 338-7914 ■ Fax: (763) 489-3101

MEMORANDUM

TO: **John Ekman, Karla Vehrs – Lindquist & Vennum**
FROM: **Bruce Rehwaldt, Liesch**
CC: **Jon Scoll – Lindquist & Vennum; Dana Wagner - Liesch**
DATE: **June 22, 2012**
RE: **Seven Sands, LLC Frac Sand Mining CUP Application**

1. Background

A conditional use permit (CUP) application has been submitted to the Buffalo County (WI) Board of Adjustment by Seven Sands, LLC for a frac mining operation near the Towns of Montana and Waumandee. Potential impacts associated with frac sand mining operations are summarized in Section 5 of the WDNR's January 2012 document entitled "Silica Sand Mining in Wisconsin." The legal framework and regulations applicable to such operations are summarized in Section 6. They include those affecting the: air, water resources (surface, ground water, and wetlands); fisheries; recreation and local activities; endangered and threatened species and habitats; archaeological and historical resources; socio-economics (including depressed property values); and transportation (including service life, noise, and dust). Based upon a review of the available information on the mine, currently limited to the conditional use permit application, of the issues outlined above, the primary issues for the Seven Sands, LLC proposal are likely to include:

a. increased traffic and its impact on noise, air quality (including dust), safety, service life, and quality of life (nuisance);

b. water use and management, including potential impacts on surface (including wetland) and ground water quantity and quality, and potential impacts to nearby Waumandee Creek, portions of which are designated as a Class III trout stream;

c. noise, air quality (including dust), and lighting impacts associated with the proposed around-the-clock mining operation; and

d. timely, appropriate, and comprehensive reclamation of mined areas.

2. Environmental Issues Deserving Additional Analysis

Liesch has identified the following summary of environmental issues deserving comprehensive environmental analysis prior to issuance of a CUP to Seven Sands. These issues may be addressed through other permits or procedures, but should be available to the County to review and consider before making any decisions on the CUP to allow the County to establish appropriate conditions for the operation.

a. Pumping of groundwater

As noted in the referenced WDNR document, the effects of groundwater pumping are highly site-specific and vary based on local geology, hydrogeology, and proximity to surface waters. Due to its proximity to Waumandee Creek, portions of which are designated as a Class III trout stream, evaluation of potential impacts associated with high capacity groundwater pumping, as is anticipated for this mine, is critical to ensuring that the water quantity and quality of this important resource, and area private water supply wells, are retained. The analysis should include an evaluation of well design and performance in this environment, as well as groundwater flow modeling to evaluation potential impacts on the local aquifer, area wells, and nearby surface water, including area wetlands.

b. Stormwater and process water discharge

Operation of a frac sand mine has the potential to negatively impact adjacent receiving waters, including wetlands and streams. These impacts can include deposition and transport of sediments that might result in siltration, erosion, and the loss of fish and aquatic life habitat. Due to the proposed mine's proximity to Waumandee Creek, temperature of the discharge may also have an impact on the fishery. Evaluation of potential impacts associated with surface water discharges from the mine are critical to ensuring that the water quantity and quality of these important resources, are also retained.

c. Air emissions

Frac sand mining and processing sites have the potential to emit air pollutants, primarily fugitive dust, from several operations, including but not limited to excavation, crushing, loading, unloading and transportation. An air permit will be required for the mine with limitations on allowable fugitive dust emissions. While fugitive dust emissions are likely controllable on site and during transportation using appropriate Best Management Practices (BMPs), e.g. watering of roads and covering loads during transportation, there is no specific information, e.g. ambient dispersion modeling or BMP efficiency, provided in the CUP application that allows for their evaluation. The CUP application should include a comprehensive Fugitive Dust Prevention Plan for review by the County and area residents.

d. Impact on wetlands

The CUP application states that there are no wetlands, only soils conducive to wetlands, on the property. However, a review of the National and Wisconsin Wetlands Inventories included in the CUP application suggests that there are, in fact, freshwater emergent wetlands and ponds on the properties proposed to be mined. The CUP application does not identify any specific mining limits or finished grades, so it is not possible to evaluate potential impacts based on the CUP application. The proposer may need to obtain a "preliminary assessment of the scope for an analysis of alternatives and the potential for compliance" with Wisconsin's wetland standards from the DNR under NR 103.08(1)a. Depending on the findings of that determination, the proposer may also need to apply for a wetland water quality certification, which would include a practical alternatives analysis.

e. Threat to endangered Eastern Massasauga rattlesnake

An endangered and threatened species and an archaeological review of the mine and processing sites should be completed. Although there are no known archaeological sites in the area of the proposed mine, a review of the Federally-listed endangered, threatened, proposed and candidate species list for Wisconsin counties indicates that the Eastern Massasauga rattlesnake, a candidate species, is present in Buffalo County and known to inhabit wet prairies, marshes, low areas along rivers and lakes, open to forested wetlands and adjacent uplands, conditions that are consistent with the proposed mine site. Any mining proposal in Buffalo County that considers disruption of potential habitat for this species should, therefore, include an Endangered Resources Review (ER) to determine if the specifies is present and, if so, the extent to which it would be impacted.

f. Effects of heavy truck traffic (highway safety, noise, emissions, degradation of roads)

Noise, traffic safety, and road maintenance are critical in rural areas and the haul roads for the proposed Seven Sands, LLC mine pass directly through the Town of Waumandee and past several residences in close proximity to the roadways. The mining proposal should include a Transportation Plan that evaluates and establishes appropriate BMPs for control of fugitive dust emissions, noise, and safety associated with transportation through the rural community.

The Wisconsin Department of Transportation (WisDOT) recently contracted for a traffic safety analysis of STH 88 for another proposed mine. Portions of this same road would be used to haul product from the Seven Sands, LLC mine to the proposed drying facility at STH 35. Areas of the STH 88 were determined to be of concern and in need of additional

safety analysis. That analysis should be expanded to include the connecting roads to the Seven Sands mine also.

In addition to evaluating safety, the analysis should include a traffic impact analysis to provide the County with information on potential costs for road repair and maintenance, which could be used in the preparation of a road use agreement with the mine.

g. Reclamation plan and related financial assurance

Seven Sands, LLC has indicated that it is its intent to limit the scope of the operation to 5-10 acres at a time. This is clearly to limit the amount of bonding that the County requires to ensure that reclamation is completed. In order for the County to establish appropriate financial assurance for reclamation, as outlined in NR 135, in addition to a reclamation plan, the County should require Seven Sands to submit a phased development plan. The phased development plan should include information on the depth of excavation, volume to be removed, site life, screening methods, and stormwater best management practices (BMPs), to include information on temporary and permanent stabilization of disturbed areas of the mine. Financial assurance should be provided for more than just one 5-10 acre operating phase, as operations will be initiated in at least one additional phase before the current phase is reclaimed. It would not be unreasonable to require financial assurance for reclamation of the three largest phases of the plan.

3. Seven Sands and the Drying Plan CUP Applications Must Be Considered Together

Although physically and legally separate, the Seven Sands mining and the Glacier Sands drying plant CUP applications must be analyzed together for environmental (and possibly CUP) purposes, as neither facility can as a practical matter be developed without the other. This memorandum addresses reflects a review of the mining CUP application only. A review of the drying plant CUP application will be prepared in a separate memorandum.

4. Conclusion and Recommendations

a. Only after a thorough environmental analysis has been completed, and mine-specific phased development, operation, reclamation, and pollution prevention plans been reviewed by the County, or its technical advisors, can the County reasonably evaluate the significance of these impacts and develop appropriate conditions, including site reclamation bonding, to incorporate into the County's CUP. The CUP application must include complete information addressing these impacts; not just summary conclusions.

b. A number of regulatory permits will also likely be required in order for the mine to operate at this location, including: a high capacity well permit, if the well(s) produce greater than 70 gallons per minute; a National Pollutant Discharge Elimination System (NPDES) stormwater permit; and an air quality permit to address fugitive dust and potential exposure issues associated with crystalline silica, a serious issue at both the mine site and along any truck routes from the mine. These permits should be applied for before, not after, the County has issued a CUP to the mine and copies provided to the County for its use in establishing e conditions for the CUP that are consistent with the other permits required for the mine operation.

c. Due to the potential complexity of the above-described issues, the County may want to consider requiring applicant to pay fees of an independent reviewer (engineer) to evaluate engineering / environmental submissions by the applicant.

EXHIBIT B

EXCERPTS FROM DEVELOPER STUDIES
GREAT PLAINS MINING, SCOTT COUNTY, MN

BLAST MONITORING PLAN

PROGRESSIVE RAIL, INC.
GREAT PLAINS SAND, LLC

PROPOSED MINING OPERTATION
LOUISVILLE AND SAND CREEK TOWNSHIPS,
SCOTT COUNTY, MN

SUNDE ENGINEERING, PLLC
10830 Nesbitt Avenue South
Bloomington, MN 55437-3100
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BLAST MONITORING PLAN

1.0 INTRODUCTION

Blasting of the sandstone will be necessary as some layers of the Jordan Sandstone are tightly cemented and to insure viable recovery using a dragline, dredge or backhoe, blasting will be necessary. The blasting is performed to provide just enough energy to break the cemented sand grains apart to facilitate removal with the mining equipment. Blasting is commonly used in the metropolitan area in association with limestone quarries. In Scott County, limestone quarries with active blasting are located in Louisville and Jackson Townships. All blasting creates some vibration and noise. However, these effects have been studied for over 100 years and safe levels established. The purpose of this Blast Monitoring Plan is to:

1.1 Describe the anticipated blast process;

1.2 Discuss industry standards in terms of acceptable limits of ground vibrations and air blasts established to provide protection to infrastructure and structures;

1.3 Establish a monitoring program for the project that will provide the framework for documentation of the existing condition of adjacent structures, set forth blasting standards protective of structures and infrastructure adjacent to the Great Plains Sands Site, establish monitoring as a means to collect ground vibration and air blast data, establish a schedule for submission of independent experts analysis and their expert opinions on the process that can be submitted to the County and the Great Plains Sand Advisory Committee for review; develop contingency actions to be followed in the event a blasting standard is not achieved.

2.0 BLASTING PROCESS

The Jordan Sandstone varies from a loosely cemented to tightly cemented deposit. Geologic investigation and past mining of the Site has determined that there are layers of tightly cemented sandstone at this location that will require blasting. After overburden has been removed, sandstone will be blasted as necessary. Blasting will be required in the sandstone both above and below the water table. Blasting will be performed approximately 3-4 times per week depending upon the location and geology encountered in the active phase of the mining operation. A typical blast may last roughly 1.5 seconds, making the total blasting impacts from the site only a few seconds a week.

The purpose of the blasting is to fracture the sandstone through the use of explosives to facilitate rock removal with conventional mining equipment. Holes are drilled into the rock, carefully loaded with explosives by trained blasters from an independent blasting company. A timing sequence is engineered to progressively detonate the explosives loaded in the holes, this timing sequence, reduces overall vibration, reduces noise impacts and improves fracturing the sandstone. These sequences are engineering by professionals with experience in many similar operations. The actual blasting is then conducted and tracked with data collected by the seismographs and adjusted as necessary for any changing quarry conditions. The blast immediately fractures the rock and the explosives are consumed.

Blasting causes ground vibrations as the energy from the blasts travels through the ground and eventually dissipate. Blasting also creates an air blast or impulse noise. Both ground vibrations and air blasts have been studied by the Office of Surface Mining and the United States Bureau of Mines to establish safe levels which will not cause damage to adjacent receptors. Ground vibrations and air blasts are measured during each blast so that the blasting program can be adapted to the changing geologic condition, the location of the blast in the mine, as well as changes such as location relative to receptors. For example, larger blasts in the central portion of the mine may be modified by increasing the number of blast holes or changing the timing sequence, these actions help to minimize the number of total blasts required. However as the mining reaches the perimeter of the facility and is in closer proximity to adjacent buildings adjustments are also made to reduce the overall vibration levels near those buildings.

Blasting is accomplished by first drilling a series of holes, typically 3-5 inches in diameter into the rock. A small booster charge and blasting cap is placed in the hole followed by the blasting agent. A booster provides just enough energy to detonate the blasting agent. Boosters in each hole are detonated individually by the blasting caps that have built in time delay. Using delays just thousands of a second apart is enough to greatly disperse the energy released by the total amount of explosives involved. To an observer, a blast seems to happen instantaneously. What actually takes place, however, is a rapid progression of smaller explosions. The blasting agent is a mixture of ammonium nitrate and fuel oil (ANFO) or a manufactured emulsion product that is non-water sensitive for areas of underwater mining. Careful engineering goes into determining a precise pattern for these holes and the timing sequence, taking in to account the distance to the nearest structures, since this is a major factor in achieving desirable results.

The three environmental effects that can result from blasting include; ground vibration, airblast and flyrock. The majority of energy in a well-designed blast is absorbed as it fractures and moves the rock away from the mine face into a pile for loading. . This efficiency is achieved by adjusting the amount of explosives to match the amount of rock to be broken and utilizing the per delay intervals, to control ground vibration and frequency of the blast. Ground vibration is measured in inches per second and is a measure of the vibration of individual rock particles. Structural damage can occur when particles vibrate at levels greater than current blasting standards. Ground vibrations decrease by a mathematical formula and very rapidly as the distances from the source increase.

Seismographs placed on mine property, closer to the blast than adjoining properties measure ground vibration and air blast. This information allows professional blasting engineers to calculate vibration at neighboring structures. This information is used to verify blasting design expectations, adjust or modify subsequent blasts if required and verify that ground vibrations at the structures are within nationally recognized standards for safe blasting. These standards have been tested and proven to be safe for structures, pipelines and transportation systems. Several decades of research by the United States Bureau of Mines and the Office of Surface Mining have resulted in the establishment of ground vibration standards that are protective of nearby structures.

"Airblast" is a term that describes air movement (pressure change) created by the breaking and movement of the rock through the expansion of the blasting agents. This pressure change travelling through the air transmits noise from a blast, although most of the energy is below the frequency range of human hearing. Airblast is measured in decibels. Although the airblast may not be audible, it may be felt. The lower frequency air pressure may cause windows to rattle, which is then a sound that is noticed by the receptor.

"Fly rock" is a term used to describe pieces of rock that could be ejected from the blast area. Fly rock is controlled by properly engineering the blast design, proper explosive volume per volume of rock to be moved and , providing sufficient stemming materials, (rock fill located in the top of the drill holes to contain the blast).

3.0 BLASTING STANDARDS:

3.1 Ground Vibration: Blasting standards have been developed by the United States Bureau of Mines and the Office of Surface Mining (OSM), based on decades of research, to establish acceptable levels of ground vibration and airblasts that offer protection of nearby structures. Research has verified that at lower blast vibration frequencies the thresholds at which cosmetic damage may begin to occur (with appropriate safety factors) are lower than higher blast vibration frequencies. This is because structural resonance (a condition in which a response is amplified) is associated with low frequency vibrations.[1] As a result, blasting standards are frequency dependent.

Chart 1, from the OSM Blasting Performance Standards, Airblast limits, in Code 30 of Federal Regulations, illustrates the allowable ground vibration particle velocities at various frequencies that have been established to provide protection of structures. Ground vibration is measured as the peak particle velocity. Seismographs will record the particle velocity of each blast performed on the Great Plains Sand site. Particle velocity will be recorded in three mutually perpendicular directions. The maximum allowable peak particle velocity shall be the vector sum of the three. In all blasting operations, the maximum ground vibration shall not exceed the values indicated in the blasting-level Chart 1 below at adjacent structures. A stricter standard will be used for historic structures of 0.5 in/sec for low frequencies (less than 40Hz) and 2.0 for in/sec for higher frequencies (40 Hz or greater).

[1] Konya, Calvin J. 1995 Blasting Control at Meridian Aggregates. Precision Blasting Services Montville, OH 44064

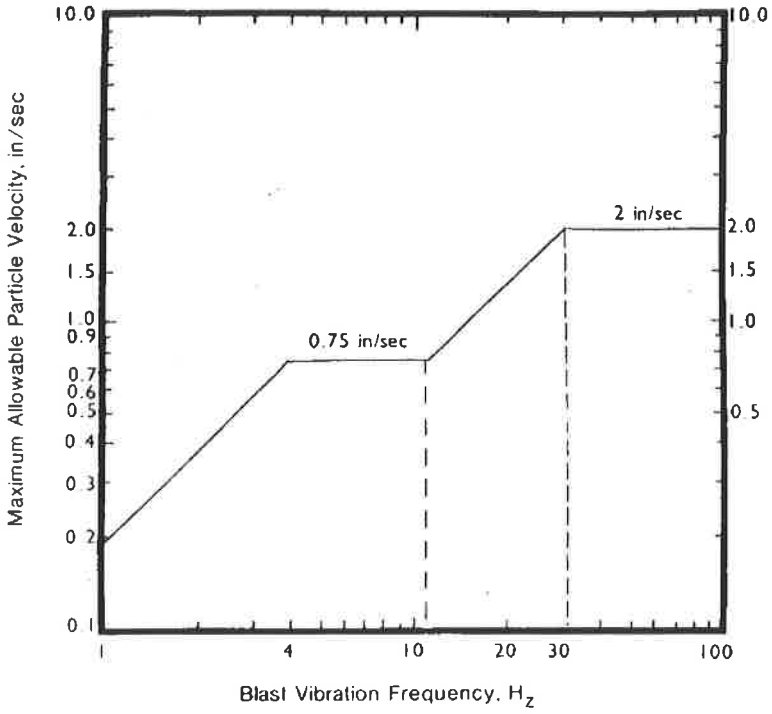

Chart 1. BLASTING LEVEL CRITERIA

OSM Blasting Performance Standards, Airblast limits, in Code 30 of Federal Regulations
Source: Modified from figure B1, Bureau of Mines RI 8507)

3.2 Airblast: shall not exceed the maximum limits listed below at the location of any dwelling, public building, school, church, or community or institutional building, or historic structures outside the project boundary.

Lower frequency limit of measuring system, in Hz (+/- 3 dB)	Maximum level, in dB
2 Hz or lower--flat response	133 peak

3.3 Flyrock: Flyrock shall be controlled by blasting design

4.0 MONITORING PROGRAM

Great Plains Sand has developed the following blast monitoring program to be followed throughout the mining operation.

4.1 Pre-Blast Surveys: Pre-blast surveys will be conducted to document the existing condition of nearby structures and log any pre-mining defects and structural issues to establish a starting

point for independent professional review should any damage be claimed. Pre-Blast surveys will be conducted by an independent contractor. Owners of structures located within 0.5 miles of the proposed blasting limits will be contacted by Great Plains Sand at least 15 days prior to initial blasting operations with instructions as to how a pre-blast survey may be conducted. Survey requests received more than 10 days before the initiation of blasting will be conducted before blasting begins. Those received less than 10 days before the initiation of blasting will be conducted within 30 days of receipt of a survey request. Pre-Blast surveys will be conducted by an independent contractor on those structures where property owners grant permission. The pre-blast survey inspects the exterior and interior of a structure, including basements and foundations. These surveys provide documentation of the pre-blast condition of the structure. A copy of the pre-blast survey will be provided to the property owner and one will be kept in the offices of Great Plains Sand.

4.2 General: Blasting will be conducted to prevent injury to persons, damage to public or private property outside the permit area.

4.3 Hours: Blasting will be limited to the hours of 10 am to 6 pm Monday through Saturday.

4.4 Blasting will be performed by an independent blasting specialist.

4.5 Monitoring: at least two seismographs will be utilized to record each blast. The seismographs will be placed at a location between the nearest structure and the blast site and a location roughly 90 degrees to that orientation. Seismographs will record the airblast and particle velocity. Locations of monitoring points will change as mining progresses to provide comprehensive monitoring of all adjacent structures.

4.6 Records: Records will be maintained of each blasting event. The records will record:

1. Date and time of blast;

2. Type of explosive used;

3. Blast hole layout and time intervals of delay;

4. Pounds of explosives per each delay of eight milliseconds or more;

5. Total pounds of explosives;

.

6. Monitoring locations and results

7. Meteorological conditions, including temperature inversions, wind speed, and directions as can
be determined from the U. S. Weather Bureau, and ground-based observations;

4.7 Maximum acceptable levels: The results of each blast will be reviewed for compliance with the standards outlined in Section 3.0 above.

4.8 Results will be subject to an annual independent professional review. The report will be submitted to the County and the advisory committee on an annual basis.

4.9. In the event that a blast exceeds the standards outlined above, the county will be notified within seven days and results of the next three blasts will be submitted for review.

4.10 Any complaints related to blasting at the Great Plains Sand site will be addressed through the advisory committee.

Fugitive Dust Control Plan

Great Plains Sand, LLC

Shakopee, MN

Wenck File #2771-01

Prepared for:

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Jordan, MN 55352

Prepared by:

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February 2012

Wenck

Table of Contents

1.0 Introduction

Great Plains Sand, LLC (Great Plains) submitted a State Air Permit Application to the Minnesota Pollution Control Agency on February 8, 2012 for the construction and operation of an industrial sand processing facility to be located in Shakopee, Minnesota. The application addressed operations from the mine and the processing facility.

This Plan has been developed to control emissions from drilling and blasting, backhoe operation, bulldozing, outdoor sand piles, outdoor material handling, crushing, truck loading, truck hauling and employee vehicle traffic at the proposed mine and processing facility. Compliance with the control of particulate emissions will be maintained by Great Plains through regular observations of fugitive dust conditions attributable to Great Plain's activities and application of reasonable mitigation measures. At daily intervals, and upon receiving a complaint, Great Plains will investigate fugitive dust conditions. Great Plain's observation of fugitive dust conditions and valid dust complaints are to be addressed by reasonable and appropriate mitigation measures. Great Plains shall record its observations and mitigation measures, as well as any complaints received and mitigation measures taken in response to such complaints.

The designated on-site contact for purposes of compliance with this Plan is listed below:

Mr. Doug Wermerskirchen Operations Manager Great Plains Sands, LLC Phone: (952) 917-9802

It is assumed that the fugitive particulate emissions control season is approximately March 15th through November 21st of each calendar year, and also during non-freezing weather conditions during the remainder of the calendar year.

2.0 Fugitive Particulate Emissions Sources

Sources of fugitive particulate emissions at the mine and processing facility include drilling and blasting, backhoe and bulldozer operation, rock breaking, outdoor sand storage piles, uncontrolled material handling and transfer, crushing, and vehicle traffic on the unpaved roads. Fugitive dust will be controlled in order to prevent significant exposure of particulate matter to the general public. The sources of fugitive particulate emissions are described in this section.

2.1 DRILLING AND BLASTING

In situations where the sand-bearing geological formation at the mine is tightly cemented, it may be necessary to utilize drilling and blasting to make the sand more amenable to removal. Blasting, using an explosive agent, may be conducted frequently during the mining season. Fugitive emissions will be generated during the drilling and blasting activities.

2.2 BACKHOE AND BULLDOZING OPERATIONS

A backhoe will be utilized at the mine to transfer sand from the pit to the haul trucks or to the sand storage pile. The bulldozer and/or backhoe will be utilized during the overburden removal and berm construction.

2.3 ROCK BREAKING

It may be necessary for Great Plains to utilize a rock breaker in order to break up the large chunks of rock at the mine prior to processing in the facility. The rock breaker will be attached to a front-end loader and moved as necessary around the current phase of the mine. Fugitive emissions will be generated during the operation of the rock breaking activities.

2.4 SAND STORAGE PILES

There are six outdoor sand storage piles at the Great Plains site that are labeled in Figure 1, found in Appendix A. The excavated sand from the mine can be stockpiled in a storage pile located at the mine. After being transferred to the facility, the sand can be fed directly to the grizzly or stockpiled in a surge pile of raw material located outside the building. This stockpile will contain approximately 20,000 cubic yards of raw material which is fed into a pre-screening and crushing unit. This pre-screening and crushing unit generates two small stockpiles (roughly 3,500 cubic yards each) which are fed to the wet plant. After processing, the material will be stockpiled outside using two 150' radial stackers. These stockpiles will contain approximately 100,000 cubic yards of material each, reaching heights of 40-50 feet. The maximum stockpile volumes will only be reached in the fall of the year to provide a supply of washed material to the dryer on a year round basis. By the spring, these stockpiles will be significantly depleted and then replenished again over the course of the subsequent summer and fall. Wind erosion may be a source of fugitive particulate emissions throughout the year. Fugitive particulate emissions from the sand storage piles are also potentially generated from the stacking and reclaiming of sand to and from the pile(s).

2.5 UNCONTROLLED MATERIAL HANDLING AND TRANSFER

Material handling and transfer operations with the potential to generate fugitive particulate emissions include transfer of sand via the front-end loaders and the conveyance of sand from one piece of equipment to the next (conveyors, belts, feeders, etc.). The majority of these material transfer points transfer points will occur at the mine and the processing facility prior to the dryer. Because the natural moisture content of the sand will be approximately 2%, fugitive emissions from the transfer points are anticipated to be minimal based on information outlined in AP-42 Chapter 11.19.2 regarding the processing of wet sand.

2.6 JAW CRUSHER EQUIPMENT

The sand deposit being mined is composed of agglomerated grains of sand. The majority of this material is broken down to individual grains of sand during blasting or by the grizzly feeder. Great Plains may utilize a jaw crusher to further deagglomerate this material. The crusher may generate fugitive particulate emissions; although significant emissions are not anticipated based on the natural moisture content of the material.

2.7 ON-SITE VEHICLE TRAFFIC TRAVELING ON UNPAVED ROADS

All roads at the facility will be unpaved. These roads include the haul road from the mine to the processing plant, the front-end loader routes at the mine and the processing plant and the product loadout and employee traffic road.

Included in Appendix A is a site-layout illustrating the various sources of fugitive emissions as described above.

3.0 Control Measures for Fugitive Particulate Emissions

The primary control measures for fugitive particulate emissions from various Great Plains fugitive dust sources are described in this section.

3.1 DRILLING AND BLASTING

Great Plains will conduct drilling and blasting up to frequently during the mining season. Blasting activities will be a relatively small source of fugitive emissions.

3.1.1 Emission Control

For fugitive dust control, the space between the explosive and the top of the drilled hole will be filled with a stemming material. Stemming material is an inactive material used to backfill a hole for the purpose of containing the explosive energy. The stemming material also acts to minimize fugitive emissions from the blast. The drilling equipment that the facility is planning to purchase comes equipped with a wet suppression system or other equivalent control. Additionally, the natural moisture content of the sand will aid in minimizing fugitive emissions.

3.2 BACKHOE AND BULLDOZER OPERATION

A backhoe will be utilized at the mine to transfer sand from the pit to the haul trucks or to the sand storage pile. The bulldozer and/or backhoe will be utilized during the overburden removal and berm construction. Emissions from these operations are not expected to be significant.

3.2.1 Emission Control

The natural moisture content of the sand and/or overburden serves as the best control for backhoe and bulldozer operations. If necessary, additional dust control will occur through use of watering techniques.

3.3 ROCK BREAKING

Great Plains may utilize a rock breaker in order to break up the large chunks of rock at the mine prior to processing in the facility. The rock breaker will be attached to a front-end loader and moved as necessary around the current phase of the mine. Fugitive emissions from this operation are not expected to be significant.

3.3.1 Emission Control

The natural moisture content of the sand serves as the best control for rock breaking operations. If necessary, additional dust control will occur through use of watering techniques.

3.4 SAND STORAGE PILES

Great Plains stores sand in outdoor piles throughout the year. Sand is transferred to and from the storage piles by a front-end loader for all piles prior to the wet plant and a product stacker after the wet plant. The natural moisture content of the four storage piles prior to the wet plant is greater than two percent, while the sand dropping to the two piles post wet plant is completely saturated. Because of the saturated sand, there are negligible emissions from the stacking conveyor drop to the piles. The sand's moisture content in the piles then drain down to five percent prior to being fed into the dryer. Wind erosion is anticipated to be the largest source of fugitive emissions from the sand storage piles.

3.4.1 Emission Control

Wind erosion is minimized when the exterior or the pile is kept damp. The natural moisture content of the sand will aid in reducing fugitive dust emissions. Additionally, it is estimated that there are over 105 days that are naturally defined "wet" (an average number of days with

perception greater than or equal to 0.25 mm or 0.01 inches based on precipitation data) at the location of the mine and processing facility. During exceptionally dry periods or upon any significant amounts of fugitive dust, the sand piles will be watered to minimize the effect of wind erosion. An exception will be made for freezing conditions that would present a safety hazard to workers or vehicles.

Great Plains Sands will perform on-site visible emission checks at least once daily to verify that visible emissions are at or below 10 percent. Visible emissions do not signal noncompliance with applicable requirements, but visible emissions over 10% will trigger additional watering of the piles.

3.5 MATERIAL HANDLING AND TRANSFER

Material will be transported from the mine, storage piles and wet plant via feeders, belts, conveyors, etc. Material handling and transfer points as not anticipated to result in significant emissions as the natural sand moisture content will be 2 percent or greater.

3.5.1 Emission Control

The natural moisture content of the sand serves as the best control for material handling operations. If required for opacity limitations, additional dust control will occur through use of water or suitable chemicals.

Additionally, as a preventative control measure, Great Plains will clean up spills of commodities on the facility property to reduce fugitive particulate emissions. It should also be noted that 40 CFR Part 60, Subpart OOO (NSPS OOO) applies to the conveyors and other transfer equipment following the crusher and therefore will be subject to opacity limits as defined by the rule.

3.6 JAW CRUSHER

Before being processed in the facility, the incoming sand from the mine will be passed through a grizzly feeder and then a jaw crusher to process a small portion of the sand that is not deagglomerated during blasting or by the grizzly feeder. The crusher process will be a source of fugitive emissions.

3.6.1 Emission Control

The crusher will process sand at or near the moisture content at which it was mined. Additionally, the crusher will only deagglomerate the sand. No actual "crushing" of the sand grains will occur. Therefore, no new "dry" surfaces will be exposed during the process. Although it is anticipated that the natural moisture content of the material will be sufficient to prevent fugitive dust emissions, a water spray system to control fugitive dust emissions during loading, conveying, and crushing to minimize visible emissions will be utilized, if necessary.

It should also be noted that NSPS OOO applies to jaw crusher and therefore will be subject to opacity limits as defined by the rule.

3.7 ON-SITE VEHICLE TRAFFIC TRAVELING ON UNPAVED ROADS

All roads at the facility will be unpaved and the surfaces of the roads are composed of sand. Truck and heavy equipment traffic over these surfaces is the main sources of fugitive dust from the unpaved roads. There are several vehicle routes that contribute to the fugitive emissions. The facility will utilize a haul truck to transfer sand from the mine to the processing plant. The route of the haul truck will be dependent on the current phase of the mine. There will also be two main front-end loader routes at the facility and two at the mine, along with an employee and product loadout route into and out of the facility.

3.7.1 Emission Control

In order to reduce emissions from unpaved roads, Great Plains Sand has proposed the application of water to control these emissions from the site. This is a standard method for controlling air emissions from these types of sources.

The control efficiency of watering is dependent on the vehicle traffic on the route, the intensity of the application of the water and the frequency of the watering. In order to achieve the appropriate control efficiencies for permitting purposes, it will be necessary for the facility to water the main haul truck route and the front-end loader routes at the mine and the processing facility once per day. The product loadout and employee traffic route will need to be watered once per week. All routes have been proposed at an application intensity of 0.10 gallon per square foot. It is also proposed that any precipitation of greater than 0.10 inches will substitute for one day of watering. This precipitation will be measured using local national weather service data or an on-site rainfall gauge. In addition, Great Plains will perform on-site visible emission checks at least once daily to verify that visible emissions are at or below 10 percent. If visible emissions are observed, the facility will investigate the condition and take appropriate corrective active to reduce the visible emissions. Visible emissions do not signal noncompliance with applicable requirements, but visible emissions over 10% will trigger additional watering of the roads. The observation of fugitive emissions could trigger additional watering – over and above the levels identified above.

To demonstrate compliance with this procedure, Great Plains Sand will be required to maintain records of watering frequency and intensity. Great Plains will keep daily records of water truck use and documentation of meteorological conditions. As noted above, watering will not occur on "wet" days (> 0.10 inches of precipitation) unless visible emissions from the roads are observed to be above 10% by the visible emissions reader or on days that unpaved roads are not being used (e.g., occasional and seasonal mine closures).

4.0 Recordkeeping

Great Plains will maintain records to demonstrate compliance with this fugitive dust control plan. Mitigation measures will be taken as needed in order to prevent avoidable amounts of particulate matter from becoming airborne.

If fugitive dust complaints are received, Great Plains will investigate the merit of the complaint, and take appropriate and reasonable measures as soon as practicable. Great Plains will keep a record of complaints received and mitigation measures taken.

GROUNDWATER AND
SURFACE WATER MONITORING AND MITIGATION PLAN

I. INTRODUCTION

This Groundwater and Surface Water Monitoring and Mitigation Plan (Plan) has been developed for the Progressive Rail, Inc.'s proposed sandstone mining facility in Louisville and Sand Creek Townships (Site). Mining activity at the Site will include the removal of aggregate materials below the water table. Removal will be accomplished by using excavators and/or dragline or dredging equipment and therefore will not involve dewatering.

An Environmental Assessment Worksheet prepared for the Site includes an assessment (Barr Assessment) of the potential impacts to groundwater flow, elevations, and quality prepared by Barr Engineering[1]. This monitoring plan addresses the potential issues related to groundwater as a result of the proposed mining and processing activities that were identified within Barr's Assessment. A mining operation has the potential to impact groundwater flow rates, groundwater elevation, and groundwater quality. Because dewatering is not proposed as part of this operation, and recycling of process water minimizes the volume of groundwater withdrawals, groundwater analysis performed for the EAW indicated that the operation would not cause a significant change in water levels in surrounding wells or surface water features. The analysis in EAW concluded therefore that the project is unlikely to adversely impact nearby wells or base flow to Sand Creek. This document establishes a monitoring program to verify that mining activities are not causing a significant impact to nearby water well supplies or groundwater dependent surface waters.

Mining operations that mine into the water table, creating a lake or pond also have the potential to increase the risk of impacts to groundwater quality. Surface soils are removed and the excavation creates an exposure of the water table. Best Management Practices, (BMPs), and Spill Prevention and Response Plans and Site reclamation help to minimize this risk. Groundwater monitoring will be implemented to provide protection to potable groundwater supplies downgradient from the Site. Barr's Assessment included an analysis of travel times to downgradient receptors which was utilized in developing the Plan.

Potential mitigation measures are identified in the Plan to address scenarios of impacts to water flow, level, and quality. Cost estimates will be provided as part of the Interim Use Permit (IUP) process to allow the County to require a sufficient bond amount as part of the IUP to assure that appropriate mitigation measures can be implemented, should the need ever arise.

[1] Barr Technical Memorandum dated August 8, 2011

II. SURROUNDING WATER SUPPLY WELLS:

Past hydrogeologic work has confirmed that the direction of groundwater flow beneath the Site is from the southeast to northwest towards the discharge region of the Minnesota River. The elevation of the water table beneath the Site varies from approximately 725 feet above mean sea level in the southeastern corner of the Site to 714 feet above mean sea level in the northwestern portion of the Site. There are several wells located within 1 mile of the Site, the vast majority of the wells are located either upgradient or side gradient of the Site, with only one well located downgradient of the Site (the Bennett well). Figure 1 illustrates the location of wells identified in the County Well Index (CWI) and probable well locations based on structures and tax parcel information. The CWI database is not entirely comprehensive, and additional wells exist that are not accounted for in the CWI. The area surrounding the Site is not served by municipal water so probable well locations were identified based on residential or commercial structures. Appendix 1 lists well information for the CWI wells and the assumed well locations based on GIS and tax parcel data from Scott County. The majority of the surrounding wells are completed in the Quaternary Drift, Jordan Sandstone or Franconia Formation geologic units.

Groundwater modeling performed by Barr Engineering indicates that wells that are approximately 0.5 miles or greater distance from the groundwater withdrawal area will experience drawdowns of less than 0.5 feet at the well as a result of site operations. Wells that are closer to the site are predicted to experience drawdowns of 0.5-2.0 feet as a result of operations. Drawdowns of this magnitude are not sufficient to cause a water supply issue with wells that are properly installed and maintained. There is only one residential well located downgradient of the Site.

III. SURROUNDING GROUNDWATER DEPENDENT SURFACE WATERS:

The Site is situated just to the east of a significant discharge area within the Minnesota River Valley. Floodplain wetland complexes extend north-south alongside the western edge of the site. The wetlands are located west of the western most property line and railroad track and are not located on the Site itself. The wetlands are sustained in part by flooding episodes of the Minnesota River, precipitation and runoff flowing to the wetlands, groundwater contributions, and stream flow via a control structure located further downstream between the site and the confluence of the Sand Creek and the Minnesota River. According to InterFluv's Sand Creek Geomorphic Assessment[2] (Sand

[2] InterFluv, 2008. Sand Creek, MN Final Report - Fluvial Geomorphic Assessment

Creek Assessment) the water control structure holds water in the Swamp to allow the wetland to function somewhat normally.

Historical aerial photographs show that the wetlands closest to the site are periodically flooded with standing water readily visible (Figure 2) and at other times there is much less standing water and more emergent vegetation visible. Normal seasonal fluctuations in groundwater create variability in the groundwater contribution as well. Barr's analysis predicts a temporary reduction in the groundwater head on the order of approximately 0-1.0 feet in the wetland area and near Sand Creek. This is a change in the pressure head, the actual impact to water levels is likely to be less since the pressure head is typically above the water level in the wetland. Groundwater is only one contributor to the inflows of the wetland complex. The change in pressure head is within the range of normal seasonal fluctuations and will only occur when the site is being actively mined and the wet plant is operating, from April – November.

Sand Creek flows through the Louisville Swamp area west of the Site to the confluence with the Minnesota River. Sand Creek, from the confluence of Sand Creek with the Minnesota River to the reach west of the Site, is designated as Reaches 1 – 3 in the Sand Creek Assessment. The Assessment describes stream habitat as poor and documents that these reaches have been altered between 1855 and 1937. In fact, Sand Creek was ditched to drain into Louisville Swamp altering its natural outfall to the MN River, originally located south of the Site.

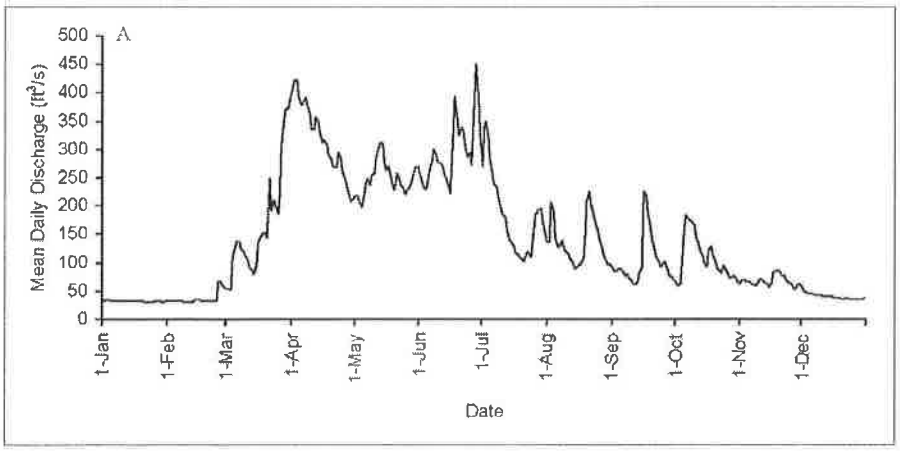
The reach immediately west of the Site is Reach 3 described in the Sand Creek Assessment as follows:

> *Sand Creek, Reach 3*
> *Reach 3 extends for approximately 2 miles through the Louisville Swamp from Station 16000 to 27000, the boundary of the Minnesota Valley National Wildlife Refuge. This reach maintains a rectangular, sand-bed, wetland channel with reed canarygrass dominating the floodplains that are approximately 5 feet above the channel bed (Figure 16). The channel through this reach was excavated between 1855 and 1935 to channel water into the Louisville Swamp. There is little channel and habitat complexity in this reach with no riffles, canopy cover, large woody debris, or variation in sediment size.*

Reduction in base flow to Sand Creek is estimated by Barr's modeling to be less than 2%. This reduction will occur seasonally on a temporary basis during the active mining months of March – November. This corresponds to the time when Sand Creek is normally fed by snowmelt and stormwater runoff between March and November. Chart 1 is from the Sand Creek Assessment and illustrates the stormwater runoff contribution versus the base flow of the winter months. During the winter months when baseflow is sustained by groundwater flow, and the base flow falls to 30-50 ft^3/s, there will be no impact to groundwater levels from Site activities. The control structure located just

downstream from the area west of the Site regulates the summer flows and therefore no significant impact to the overall hydrology of the wetlands or Sand Creek is anticipated.

Chart 1



Average annual hydrograph for Sand based on mean daily discharge

Sand Creek Annual Hydrograph
(From Sand Creek Assessment)

IV. GROUNDWATER MONITORING PLAN:

The groundwater monitoring plan has been developed to monitor impacts to water quantity and water quality as a result of the proposed mining operations.

A. Monitoring Network:

Groundwater modeling has been performed by Barr Engineering to predict the impact to water levels in surrounding wells and surface water features as a result of the proposed ground water appropriation necessary to support mining and processing activities. Average projected operational water use at the Site as a result of mining activity, processing activity and employee use is estimated to be 250 gpm or less. The model predicts very modest impacts to adjacent water supply wells as well as to Sand Creek. A monitoring network, illustrated on Figure 3, will be established to monitor the impacts of the mining operation and verify that the model is a reasonable representation of actual hydrologic conditions. The network will consist of upgradient and downgradient wells, open water sampling points, and a stream gage. Some monitoring points will be used to monitor just water levels and other monitoring points will be used to monitor water levels and water quality. The monitoring program will be implemented once the Interim Use Permit (IUP) has been obtained from the County.

1. Monitoring Wells

Three monitoring wells (MW-1, MW-2, and MW-3) currently located on the Q Prime property were constructed as part of the Remedial Investigation work previously conducted on this property. These wells will be incorporated into the monitoring well network. All three wells will be monitored for water levels. One well will be used as an upgradient water quality monitoring well. They eventually will need to be abandoned as the progression of mining (approximately during Phase 3) necessitates their removal. Prior to sealing these wells, a new upgradient well will be installed in the reclaimed area of Phase 1.

A monitoring well network will be established that will include downgradient and upgradient wells. The wells will be finished in the upper water table aquifer. One downgradient well (MW-4) will be located between the mining limits and the residential well (Bennett Well) located downgradient of Phase 1. A second downgradient well (MW-5) will be constructed along the western edge of the property line, south of the processing building, to monitor water between the mining and processing operations and Sand Creek. A third monitoring well (MW-6) will be located upgradient of the mine area in the Southeast corner of the property. These wells are anticipated to be finished in the upper ten feet of the water table and less than 60' deep. They are anticipated to be 2" PVC or steel wells (as required by Minnesota Well Code) to be used for water level and water quality monitoring.

2. Mining Area Open Water Sample:

A grab sample will be taken from the open water created by the mining operation. The location of this sampling point will change as mining and reclamation progresses across the site.

3. Photo Monitoring Points

Three photo monitoring points will be established to monitor the wetland complex associated with the MN River Valley located just west of the Site. These photo monitoring points will be used to compare vegetation and overall appearance of the wetland complex from year to year during mining operations. Photo monitoring points will be located within the wetland complex downgradient of the mining area on Q Prime property west of the railroad tracks (Figure 4). A staff gage will be located at a photo monitoring point (PMP-1) to visually track water level variations over time.

Water Quality Monitoring Network Water Level Network

Monitoring Point ID	Monitoring Point ID
	MW-1
MW-4	MW-2
MW-5	MW-3
MW-6	MW-4
Mining Pond grab sample	MW-5
	MW-6

Wetland Photo Monitoring Points (PMP)

PMP–1
PMP-2
PMP-3
Staff gage

B. Parameters:

Water quality analysis will be performed for pH, specific conductance, total coliform bacteria, nitrates, chloride, and diesel range organics (DRO). Sampling and analysis will be performed by a qualified analytical laboratory.

C. Frequency:

Water Quality: Upon receipt of the IUP, Progressive Rail will install both the upgradient and the down gradient monitoring wells, MW-4, MW-5 and MW-6. Upon completion of the well installation, baseline sampling will begin. At least two rounds of water quality samples will be taken at least two weeks apart to establish a baseline of pre-mining groundwater quality in the area. Thereafter, the monitoring schedule on Table 1 will be followed. This monitoring schedule was developed based on information contained in Barr's assessment of particle travel time which indicates travel times to the Bennett Well are predicted to be between 117-133 day (4 months+/-).

Monitoring ID	Water Quality	Water Levels
MW-1	NA	Quarterly
MW-2	NA	Quarterly
MW-3	NA	Quarterly
MW-4	Quarterly**	Quarterly
MW-5	Quarterly	Quarterly
MW-6	Quarterly	Quarterly
Created Waterbody	Quarterly	Quarterly

Water Level Monitoring: Water levels will be monitored quarterly for the life of the mine starting with two initial events as described above for new wells. In addition, historical water level data available in the public domain (e.g. DNR observation well data) will be used along with existing on-site monitoring wells will to establish a baseline for water levels at the site.

Photo monitoring points will be monitored and the staff gauge read two times a year during the growing season; one time in July and one time in September. If flooding events prevent access to the wetland photo monitoring points, that monitoring period will be adjusted to a later time when access is possible.

V. Contingency Plan

A. Water Level Monitoring:

The project is not anticipated to significantly alter long term flow patterns, impact wetlands or alter surface water. However, water level monitoring will be conducted during the life of the mine as described above. The purpose of the monitoring is to provide early warning of the potential for excessive drawdown and lowered water levels before they can adversely affect surrounding wells or wetlands.

Threshold Levels

The water level data will be plotted using a control chart that is based on the historical regional water levels along with the predicted maximum average drawdown for each perimeter well location at the site. The regional data will be supplied from local, municipal, MPCA, or DNR observations wells in the area. The control chart limit will include a threshold that is at least one foot below the predicted maximum average drawdown at the site based on the Barr modeling results. If during mining operations, a decline in water levels which is not a result of normal seasonal fluctuation in the groundwater level (as determined using a background monitoring well) and is one foot greater than the drawdown predicted by the groundwater model at that location is observed, temporary conditional actions will be taken to moderate the impact on groundwater levels.

If water levels drop below this elevation additional steps will be required. As monitoring continues and additional background data is collected, the threshold level will be adjusted to account for natural or ambient changes in the water table that are not the result of pumping at the Site.

Potential Actions:

If during mining operations, a decline in water levels is noted in excess of one foot below the predicted maximum drawdown level, temporary conditional actions will be taken to moderate the impact on groundwater levels.

The first action will be to remeasure the well to verify the result within 24 hours of the initial measurement. If the measurement is verified at the downgradient edge of the mine site, the monitoring frequency will be increased over the next seven days and will include daily measurements at the downgradient wells. If the effect is confirmed additional actions may be instituted including installation of additional downgradient or upgradient wells. If drawdown effects are determined to be radiating outward from the mining area after three months of operation, additional steps will be taken such as limiting withdrawals and redirecting recharge may be implemented to reduce drawdown at the Site.

B. Water Quantity:

The project is not anticipated to cause any impacts to water supply in surrounding wells. However, if adjacent wells within 1,000 feet of the mining limits (modeled drawdown of 1.0 feet or less) experience well interference issues, they will be investigated promptly.

Threshold Levels

If a resident or business within 1000 feet reports problems with their well, the report will be validated against water level data collected from the Site. If declines are present, Great Plains Sand will authorize a well contractor to evaluate the private well to determine if it is in working order and if there are potential problems with the well installation or operation.

Potential Actions

If the results of the investigation indicate that the private well is underperforming due to pumping at the Site, Great Plains Sands will supply impacted residents or businesses with bottled water as an interim mitigation measure until an investigation can be completed. If the investigation finds the results are caused in any by Great Plains Sands, the pump will be lowered or the well deepened or replaced to the satisfaction of Scott County.

C. Water Quality:

There is one residential well (Bennett Well) located down gradient of the Site. MW-4 will be constructed in the upper portion of the water table aquifer to provide early detection of potential groundwater impairments. The wells will be monitored for the parameters listed above on a quarterly basis.

Threshold Levels

Chloride, pH, specific conductance, and Total Coliform bacteria results will be used to evaluate general groundwater quality. These are indicator parameters. These data will be compared to results of previous events. If there is a documented increasing trend in the data (or decreasing trend in pH) verified by resampling then the data will be statistically evaluated to determine whether the concentrations are related to naturally occurring background. There are no health risk limits established for these parameters. There are also currently no HRL's established for DRO. If DRO is detected above 2.0 mg/l, the well will be resampled. Depending upon resampling results, either increased frequency of monitoring, monitoring of an expanded list of parameters (BETX, PAHs), or continued monitoring of trends will be adopted based upon discussion with Scott County Environmental Health.

The only parameters to be tested that have a Minnesota Department of Health; Health Risk Limit (HRL) established is Nitrate + Nitrite. Increased Nitrate + Nitrite levels to within ½ of the HRL in the will be used as a basis for additional investigation. If base line sampling indicates that upgradient and/or pre-mining Nitrate + Nitrite levels are already above ½ of the HRL, the action limit will be adjusted accordingly per approval from Scott County Environmental Health. Nitrate and bacterial problems are sometimes caused by structural flaws in the well which allow contaminated surface water to enter the well. The down gradient residential well may be an older well, or may be located in relative proximity to an older septic system. Repairing the well or constructing a new, deeper well often results in a significant reduction in the nitrate level.

If the concentrations evaluate above are determined to be related to the Site, additional actions will be required.

Potential Additional Actions

If groundwater sampling results indicate contamination from the Project as defined below, in the down gradient monitoring well, the well will be resampled within two weeks of receiving the initial results to verify the sampling results. In addition a, a sample will also be taken from the Bennett Well for analysis.

If monitoring detects the presence of groundwater contamination and subsequent investigation confirms the source is the mining operation, from the Progressive Rail Site, a work plan for investigation, response and alternatives analysis will be prepared and submitted to the Minnesota Pollution Control Agency within 90 days. This work plan will also be submitted to the Scott County Department of Health for review within 90 days. If contaminants found to be coming from the mining operation are detected in the residential well at concentrations that are near or exceed the State's drinking water standards, an alternative supply of drinking water will be provided to that residence. This alternative source will be provided until a permanent alternative has been

implemented. The alternative source of water will likely be the connection of the residential well to the existing Mt. Simon Hinckley well, located south of the processing building. This well was originally constructed to supply water for the original processing plant. Currently, water appropriations for industrial uses are not allowed from the Mt. Simon-Hinckley well in the metropolitan area. However, it may be used as a potable residential water supply. In addition, groundwater remediation may be required to meet drinking water standards as necessary to meet MPCA requirements.

V. REPORTING

Water Quality data and water level data will be summarized an annual report and submitted to the Scott County Environmental Health Department.

VI. IMPORT OF SOILS

Only clean, uncontaminated soils free of debris, concrete, rubble, bituminous, asbestos, or any other contamination will be considered for import to the site. The source of any materials imported to the site will be determined prior to acceptance. Soils originating from redevelopment projects will be subject to testing for petroleum contamination at the borrow source. Import of soils from cleanup sites will not be considered for acceptance. All loads of imported soils will be visually inspected to insure compliance with the requirements. Any loads containing any evidence of rubble or petroleum contamination will be rejected.

Only on-site granular material will be used for reclamation purposes below the water table elevation in accordance with specifications established by a qualified soils engineering firm. Organic soils or soils considered unsuitable to support future development will not be used to achieve reclamation grades. Organic soils may be used in the topsoil layers and sideslope backfills.

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BARR

Technical Memorandum

To: Lon Van Gemert
Cc: Kirsten Pauly
From: Jonathon T. Carter, Ellen Considine, Jim Aiken, Dave Dahlstrom
Subject: Groundwater Modeling of Great Plains Sand Mining Phases
Date: August 8, 2011
Project: 23/70-1014

Introduction

A groundwater flow model (Site Model) was developed to evaluate the effects of mining operations and proposed reclamation plans on groundwater and surface water resources near a proposed frac sand mine near Jordan, Minnesota (Figure 1). The purpose of the model is to evaluate potential drawdown, potential for groundwater contamination, and potential impacts to nearby wells as a result of dredging from a mine-pit lake. Specific concerns that have been identified include the potential for interference with private water supply wells and potential impacts to Sand Creek and nearby wetlands. This technical memorandum describes model construction, simulations, and results.

Results Summary

Simulations of the calibrated groundwater flow model indicate that the proposed mining activities and site reclamation do have the potential to affect downgradient receptors, specifically that a contaminant introduced into the Phase 1 mine-pit lake could reach the Bennett Well. Given the assumptions and limitations of the calibrated groundwater model, simulations indicate that changes to the water table elevation as a result of mining and reclamation activities are unlikely to adversely affect nearby wells or baseflow to Sand Creek.

Background

The proposed mining operation will include both dry mining and wet mining as described in the Interim Use Application to be submitted to Scott County. The dry mining phase will consist of stripping overburden and mining sand to within several feet above the water table within the Jordan Formation.

The dry mining operations are anticipated to require minimal amounts of water for a short period of time prior to the wet mining phase. The wet mining operations will commence once the dry mining has been completed. Mining below the water table will be accomplished with an excavator and/or a barge dredge. Excavated material will be placed near the open water excavation, allowed to drain and then hauled via haul trucks to the processing area. Once the sand has been sorted and separated, return water will be conveyed back into the mine-pit area along with off-specification fines from the sandstone.

The anticipated net withdrawal from the mine-pit lake is approximately 250 gallons per minute (GPM). This water represents approximately 150 gpm of water lost to the product during processing and 100 gpm lost through the dredging process. Actual water use through the plant is approximately 5,000 gpm with 4,850 gpm recycled back to the open water excavation in conjunction with fine sands return. 250 gpm represents the total make-up water required due to losses in process from evaporation and the water maintained within the sand product.

Model Construction

The model for the site (Site Model) uses the computer code MODFLOW (McDonald and Harbaugh, 1988) to simulate three-dimensional, steady-state groundwater flow. The Site Model was constructed by refining the Twin Cities Metropolitan Area Regional Groundwater Flow Model, Version 2 (Metro Model 2; Metropolitan Council, 2008), which is based on an extensive collection of geologic and hydrogeologic data from the seven-county metropolitan area including Scott County.

Site Model boundaries were set at sufficient distance from the mining area that the effects of the model boundary conditions would not affect simulation of mining phases. The TMR procedure (Anderson and Woessner, 1992) was used to extract constant-head boundary conditions from the Metro Model 2.

The Site Model was refined to show more detail than the Metro Model 2. Grid spacing at and near the Site was reduced from 500 x 500 m to 31 x 31 m to allow detailed representation of planned mining features; grid spacing away from the Site was kept at 500 x 500 m. The spatial distribution of hydraulic parameters and recharge and the locations of surface water features were refined using existing geospatial data and recent aerial photos.

In order to accommodate the mine-pit lake and end use lake in the Site Model, the model layer containing the Jordan Sandstone (Layer 4) was subdivided into two layers, with the base of the upper layer generally five feet above the base of the Jordan Sandstone. This configuration is consistent with past site investigations (Lehmann et al, 1980) and with the planned base elevation of mining.

Wells from the Metro Model 2 within the bounds of the Site Model were incorporated, and a water supply well southeast of the Site at the Cemstone plant (Unique No = 00603624, Pumping Rate = 50 gpm) that was not included in the Metro Model 2 was added to the Site Model.

Model Calibration

Model calibration is performed to improve a model's ability to simulate groundwater flow by adjusting parameter values until the best fit to field data (i.e., observations) is achieved. The Site Model was calibrated using the SVD-Assist methodology of the model-independent parameter estimation code PEST (Doherty, 2009).

Parameters

Horizontal and vertical hydraulic conductivity, river conductance, and lake conductance were included in the calibration as adjustable parameters. Within each hydraulic conductivity zone, vertical hydraulic conductivity was allowed to vary proportionately to horizontal hydraulic, thereby preserving the anisotropy of each zone. Conductance values for all river reaches and lake zones were allowed to vary.

Observations

Observations included in the calibration include hydraulic head and river flux data from the Metro Model 2. Head observations represented the monitoring and water supply wells at the Site, as well as static water levels for supply wells listed in the County Well Index (MGS, 2006). Well logs for onsite and nearby wells are included in Appendix A. Because the Site wells represent recent information, and are surveyed to the nearest 0.01 foot vertically and the nearest 0.001 foot horizontally, head observations for the Site wells were weighted fifteen times more heavily than other head observations. Flux observations for the reaches of Sand Creek closest to the Site were weighted ten times more heavily than other reaches. The weights of head observations were scaled so that their total contribution approximately equaled that of the flux observations.

Calibration Results

In order for the model to be used to reliably simulate future conditions, the model must be tested against known data representing current conditions. This process is known as calibration. If the calibration indicates that that the model varies with regard to a particular parameter the values of those parameters are adjusted and the model is re-run to check the overall model balance. When this is done for multiple parameters and the model can match the real world data, it is considered to be calibrated. As shown on Figure 2, the simulated head for the pre-mining condition provides good agreement with the field-measured heads observed in monitoring wells within the proposed mining area. Because the model simulates field-measured heads reasonably accurately it can also be used to simulate future conditions.

Technical details on the calibration are as follows:

With optimized parameter values, the Site Model simulates heads that match observed values without apparent systematic bias. Of the seven flux targets (i.e. river reaches) with contributing reaches fully included in the Site Model, one has a residual (observed flux minus simulated flux) that is within 25% of the observed value, two have residuals within 25 – 50%, three have residuals within 50 – 100%, and one has a residual that is greater than 100% of the observed flux. In general simulated river baseflow was reasonably close to actual river baseflow.

Optimized hydraulic conductivity for the Jordan Sandstone in the vicinity of the Site is 164 ft/day. This value is somewhat high compared to other values in the region, but may be due to the location of the Site near the erosional boundary of the Jordan Sandstone.

Simulation of Mining Phases

The calibrated model was used to simulate steady-state groundwater flow during the pre-mining, mining, and reclamation phases of the proposed mine operation. In addition, particle tracking was used to evaluate the potential for transport of contaminants from the mine-pit lake to downgradient receptors. Because particle tracking only accounts for contaminant transport by advection and does not consider dispersion, the travel times predicted by particle tracking are extremely conservative estimates. Particle tracking is representative of the travel times and travel paths for conservative tracers such as salt.

Pre-Mining Phase

The pre-mining phase was simulated as the baseline case using the Site Model. The results of the pre-mining phase were used as a reference for evaluating impacts of the mining and reclamation phases.

Mining Phase

Simulation of the mining phase includes representation of the mine-pit lake created by mining below the water table and the adjacent above-ground mining area. The proposed mining plan requires the net withdrawal of 250 gallons per minute (gpm) from the mine-pit lake created during mining below the water table. The mine-pit lake was simulated by a zone of high hydraulic conductivity (hydraulic conductivity equal to 1000x higher than the surrounding material). Withdrawal from the mine-pit lake during mining operations was simulated with a well in the middle of the high hydraulic conductivity zone.

The dry-mining phase immediately surrounding the mine-pit lake was included in the simulation to represent an averaged effect of the progression of mining phases across the Site. Recharge to the mine-pit lake was simulated as annual average precipitation minus evaporation. Runoff to the mine-pit lake was assumed to be negligible due to the enhanced infiltration capacity of the disturbed material in the surrounding above-ground mining area and anticipated stormwater drainage away from the edges of the mine-pit lake.

The mining phase was simulated under two scenarios. The first, "average", scenario assumed a mine-pit lake at the center of the proposed mining extent, thereby simulating typical effects of mining. The second, "south", scenario assumed a mine-pit lake in the southern portion of the proposed mining extent, thereby simulating a worst-case scenario where more wells near the southern site boundary would be affected.

Particle Tracking

The potential for contamination of the Phase 1 mine-pit lake (simulated as a zone of very high hydraulic conductivity; shown on Figure 6) to reach downgradient receptors was evaluated by tracking particles from the downgradient portion of the shoreline. In particular the potential for contaminant transport to the Bennett Well (not listed in the CWI) was evaluated. The discharge and screened interval of this well are not known. It was simulated as pumping at 400 gallons per day from the uppermost active layer of the groundwater model, which are conservative assumptions.

Reclamation Phase

Features of the reclamation phase simulated with the Site Model include the end-use lake, stormwater infiltration basins, and planned future industrial land use. The end-use lake was simulated using a high conductivity zone. The depth of the end-use lake was assumed to be the same as that for the mine-pit lake. The stormwater infiltration basins and future industrial land use were incorporated into the Site Model by adjusting the recharge rates for the associated model cells. Stormwater infiltration was assumed to increase steady-state recharge by less than 10 percent, and industrial land use was assumed to decrease steady-state recharge by 20 percent.

Particle Tracking

The potential for contamination of the end-use lake (simulated as a zone of very high hydraulic conductivity; shown on Figure 7)to reach downgradient receptors was evaluated by tracking particles from the downgradient portion of the shoreline. The potential for contaminant transport to Sand Creek was evaluated in this scenario.

Results

Results of the simulations are described below. The results are grouped into three categories: drawdown effects on nearby wells, drawdown effect on Sand Creek, and potential for contaminant transport to downgradient receptors. Model results for both the mining phase and the reclamation phase are provided.

Drawdown Effects on Nearby Wells

The head change predicted during mining activities is generally less than 1.5 ft outside of the mining area boundary (Figures 3a and 3b); as much as 1.5 ft of drawdown (lowering of hydraulic head) may occur at the nearby domestic well (00628725) during the mining phase. Depending on the amount of drawdown normally observed in wells during normal operations, an additional 1.5 ft of drawdown would likely not be noticeable if the well was properly installed and maintained. The most likely adverse effect for a drawdown of 1-2 feet would likely be if the well has a preceding history of performance issues (e.g., pump intake set too shallow or insufficient well depth).

During the reclamation phase, simulations indicate that the end-use lake will flatten the regional hydraulic gradient from southeast to northwest (Figure 4), resulting in drawdown on the southeast corner of the Site (upgradient of the end-use lake) and a head increase on the northwest corner of the Site (downgradient of

the end-use lake) (Figure 5). During this phase drawdown at the nearest private well is predicted to be approximately 1.5 ft.

Drawdown Effect on Sand Creek

The simulation results indicate that mining operations and reclamation will result in small changes to the groundwater contribution to nearby surface water features (i.e. baseflow). Simulated baseflow to Sand Creek was calculated over a reach extending from the Jordan monitoring station (Metropolitan Council, 2004) to the confluence with the Minnesota River. Simulated baseflow during the pre-mining phase was 14.27 cfs, which is generally in agreement with flow records from the Metropolitan Council Environmental Services monitoring station on the Sand Creek in Jordan (Metropolitan Council, 2004). Drawdown in the water table aquifer during mining operations is predicted to result in a decrease in Sand Creek baseflow of about 2% from pre-mining baseflow, or approximately 0.27 cfs. Conversely, the reclamation phase produces an increase in head downgradient of the end-use lake, resulting in an estimated 1% increase in Sand Creek baseflow, or approximately 0.06 cfs, relative to the pre-mining baseline (Table 1). Therefore, at final reclamation, the simulation predicts that there will be a long-term gain of 0.06 cfs in baseflow to Sand Creek compared to the pre-mining baseline.

Potential for Contaminant Transport to Downgradient Receptors

The particle tracking was done using both the option to stop at weak sinks (model cells that do not have flow toward them from all directions) and to pass through weak sinks. As discussed by Pollock (1994), groundwater may discharge to a weak sink or flow through the weak sink. Tracking the particles beyond weak sinks indicates the maximum distance of travel in the aquifer because the particles will only stop when they reach a strong sink (model cells in which flow is toward the cell from all directions). In both scenarios, the particles are tracked to a strong sink in a wetland area northwest of the Site. In actuality it is unlikely that water seeping from the groundwater from the Phase 1mine- pit lake or the end-use lake would travel to the wetland area before discharging to Sand Creek.

The groundwater flow paths inferred from the particle tracking from the Phase 1 mine-pit lake are shown on Figure 6, as are the position of the particles 1 year and 2 years after their release in the simulated flow field. Some of the particles track to the model cell in which the Bennett Well is simulated. Simulated travel times from the Phase 1 mine-pit lake to the Bennett well range from 117 to 133 days. The rest of

the particles that were included in the simulation discharge to Sand Creek, with travel times ranging from 133 to 28,500 days.

The groundwater flow paths inferred from the particle tracking from the end-use lake are shown on Figure 7, as are the position of the particles 1 year and 2 years after their release in the simulated flow field. The particles all discharge to Sand Creek, with travel times ranging from 46 to 16,800 days.

Summary

- The calibrated Site Model matches observed groundwater elevations in the vicinity of the Site to within less than a meter and acceptably matches river fluxes. Therefore the Site Model appears to be an appropriate tool for evaluating changes in the magnitude and extent of groundwater elevation and creek baseflow changes as a result of mining operations and site reclamation.
- Drawdown in the water table aquifer as a result of mining operations is predicted to be 1 to 2 feet at the well nearest the Site and less than 1 foot at most nearby wells (within 0.5 miles of the Site). Therefore mining and site reclamation are not anticipated to interfere significantly with nearby private wells.
- Drawdown in the water table aquifer as a result of mining operations and site reclamation is predicted to cause relatively small (< 2%) changes to groundwater baseflow in Sand Creek.
- Potential contaminants from the Phase 1 mine-pit lake would migrate toward the Bennett Well and Sand Creek. Potential contaminants from the end-use lake would migrate toward Sand Creek. In both scenarios, which represent a worst-case (i.e. fastest) travel time for a conservative tracer (i.e. a non-reactive contaminant that is not adsorbed or otherwise diluted), the simulations predict that a contaminant could reach the downgradient receptor in less than a year.

References

Anderson, M.P. and Woessner, W.W., 1992. Applied Groundwater Modeling: Simulation of Flow and Advective Transport. Academic Press. 381 p.

Barr Engineering. 2009. Supplemental Groundwater Investigation Report and Revised Response Action Plan, Former Flood Brothers Parcel. Prepared for Q Prime, Inc., March 2009.

Geotechnical Evaluation Report

Great Plains Sand Mine
15870 Johnson Memorial Drive (US Highway 169)
Jordan, Minnesota

Prepared for

Monroe Moxness Berg PA

Professional Certification:
I hereby certify that this plan, specification, or report was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.

Joel C. Kurpius, PE
Project Engineer
License Number: 43523
February 15, 2012

Project SP-11-00429

Braun Intertec Corporation

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February 15, 2012

Project SP-11-0042

Mr. Gerald Duffy
Monroe Moxness Berg PA
800 Norman Center Drive, Suite 1000
Minneapolis, MN 55437

Re: Geotechnical Evaluation
Great Plains Sand Mine
15870 Johnson Memorial Drive (US Highway 169)
Jordan, Minnesota

Dear Mr. Duffy:

We are pleased to present this Geotechnical Evaluation Report for the reclamation phase of the Gre Plains Sand Mine operation in Sand Creek Township and Louisville Township, Minnesota. In brief, th purpose of this evaluation was to (1) characterize the engineering parameters of the native soils on t site and the processed soils generated from mining operations that will be used to restore the site, a (2) provide recommendations to help develop a restoration plan. It is our understanding that it is planned to restore the mined portion of the site for typical light-industrial development.

A summary of our results, and a summary of our recommendations in light of the geotechnical issue influencing design and construction, is presented below. More detailed information and recommendations follow.

Summary of Subsurface Exploration

Our firm performed seven soil borings for this evaluation. The borings were drilled to depths ranging from about 5 to 40 feet below the existing ground surface. Six of seven borings terminated on suspe bedrock, while the remaining boring was terminated at a depth of about 16 feet in glacial soils. The purpose of the soil borings was to obtain samples of the native soils for classification and evaluation

The borings initially encountered topsoil consisting of silty sand having thicknesses ranging from abc 1/2 to 3 feet. Below the topsoil, the borings encountered terrace deposits consisting of poorly grade sand, poorly graded sand with silt and silty sand to depths ranging from 5 to 12 feet. The terrace de were typically brown and moist, but were locally wet.

Below the terrace deposits, six of the seven borings encountered glacial deposits prior to their termination depth. The glacial soils consisted of mostly poorly graded sand and, to a lesser extent, c sand and silty clayey sand. The glacial soils were typically moist, contained trace amounts of gravel a were various shades of brown.

Six of the seven borings were advanced to auger refusal. We suspect that the refusal was generally to bedrock. At one of the six locations, we were able to penetrate about 7 feet into the bedrock. Fro the samples obtained at that location, it appeared the bedrock consisted of Jordon sandstone.

Based on penetration test results, the terrace deposits were overall loose to very loose, the glacial sands were overall medium dense and glacial clays were overall rather stiff to stiff.

Groundwater was not observed in the boreholes as the borings were advanced, or after withdrawal of auger. Based on the water level observations and soil moisture contents, it appears the groundwater surface is currently located at some depth below the termination depths of the borings. A previous report provided to us indicates that groundwater ranges in elevations of 723 along the eastern edge of the site down to 712 along the western edge. Seasonal and annual fluctuations of groundwater, however, should be anticipated. Also of note, given the layered nature of the native soils encountered, and as suggested by the wet silty sand encountered at Boring ST-4, it should be anticipated that groundwater could also be locally perched across the site at various depths/elevations.

Our field personnel also obtained samples of Jordan sandstone from an area the site south of Boring ST-1 where a vertical face of sandstone was exposed.

Overview of Mining Operation

As reported to us, the proposed mining operation will initially consist of removing native soils to expose Jordan sandstone. Once exposed, the Jordan sandstone will be excavated to depths as great as 50 feet below the groundwater surface. The mined sandstone will be processed to extract a certain range of sand granules, which will then be sold within the fracturing sand industry. The remaining portion of the mined materials and onsite terrace and glacial soils will then be reused to restore the site.

Key material descriptions/definitions used herein are:

- Native soils –the terrace and glacial soils that will be stripped away to gain access to the underlying Jordan sandstone.

- Jordan sandstone – bedrock that will be excavated down to depths as great as 50 feet below the groundwater surface. The Jordan sandstone will be processed to extract a certain range of sand granules, which will then be sold to the fracturing sand, or "frac sand," industry.

- Processed Fine Sand and Belt Press Fines– materials generated from the processing of the Jordan sandstone that will not be exported off site and will be used to restore the site. Processed Fine Sand is generally comprised of particles passing the No. 70 sieve, of which about 15 percent passing the No. 200 sieve. The Belt Press Fines are comprised of finer-grained particles that area passing the No. 200 Sieve (silt and clay).

- Hydraulic Fill – Processed Fine Sand and native soils that will be placed below and up to about 2 to 6 feet above the groundwater surface. Hydraulic fill will not be mechanically compacted when it is placed.

- Embankment Fill – Material that will be placed on top of the Hydraulic Fill to achieve design surface grades. Embankment Fill will be placed in thin lifts and will be mechanically compacted.

- Surcharge Fill: Material that will be placed on top of the Embankment Fill to help acce consolidation of the underlying materials (the reason for which is presented in greater in our report). Surcharge fill will remain in place in one area for a duration of time and t will be moved to another area for a similar duration of time.

Summary of Recommendations

Restoration Plan

The goal of the restoration plan is to provide the developer with alternatives to help induce settlem within the Hydraulic Fill (that material that will be placed below the water table, where it will not b possible to compact using more traditional methods) such that long term settlements below buildir and roadways will not exceed tolerable levels. It is our opinion that the general approach of induci settlement within the Hydraulic Fill from embankment and surcharge loading is likely the most feas approach to restore this site in order to support future light industrial development.

Our analysis indicates that the thickness of Surcharge Fill will depend on the thickness of Hydraulic With that, in areas where no more than 20 feet of Hydraulic Fill is placed, we recommend placing a surcharge of at least 10 feet on top of the Embankment Fill. In areas where more than 20 feet of Hydraulic Fill is placed, we recommend placing a surcharge of at least 15 feet on top of the Embank Fill. We estimate that the surcharge will remain in place on the order of 2 years to reduce the risk o future long-term settlement exceeding tolerable limits (assumed to be inch in this case).

Surcharge Monitoring

We recommend developing a program to monitor the progression of settlement within the Hydrau and overlying Embankment Fill. The program should include installation of settlement plates in clos proximity to the Hydraulic Fill surface and near the surface of the Embankment Fill.

The settlement plates should be monitored at regular intervals from the time the hydraulic filling h been completed to beyond the completion of the surcharge placement. Settlement data should be obtained by a licensed surveyor and provided to a geotechnical engineer for review and commenta the restorative timelines provided in the following report are estimated values, decisions based on grading and development schedules will ultimately be determined by review of the settlement data

Reuse of Processed and On-site Soils

We recommend removing topsoil from the mined areas and reusing it only as replacement topsoil.

We recommend that clayey materials, such as those classifying as silty clayey sand and clayey sand, Belt Press Fines be reused only as Embankment Fill and Surcharge Fill. However, because those ma are fine-grained and are particularly susceptible to moisture and disturbance related issues, we recommend against placing those materials within 3 feet above the groundwater table and within of proposed surface grades.

Remarks

Thank you for making Braun Intertec your geotechnical consultant for this project. If you have questions about this report, or if there are other services that we can provide in support of our work to date, please call Bob Janssen at 651.487.7017.

Sincerely,

BRAUN INTERTEC CORPORATION

Robert J. Janssen, PE
President – Principal Engineer

Joel C. Kurpius, PE
Project Engineer

c: Ms. Kirsten Pauly, Sunde Engineering
Mr. Don Vry, Don Vry PE

SP1100429

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A. Introduction

A.1. Project Description

This Geotechnical Evaluation Report addresses the restoration phase of the Great Plains Sand Mine in Sand Creek Township and Louisville Township, Minnesota. The site encompasses a total footprint of about 140 acres to the west of US Highway 169 and north of Bluff Road, just south and east of the Louisville Swamp. The defined sandstone reserve (actual mining area) encompasses a footprint area about 100 acres.

The site was subject of a geological study performed during the late 1970s into the early 1980s for t J.L. Shiely Company. To help us research the site and prepare this report, our firm was provided witl excerpts from that geologic study.

We understand that a southern portion of the sandstone reserve had been previously mined; howe mining excavations in that area did not extend below the groundwater surface.

'es.

As reported to us, the proposed mining operations will consist of the following procedure

- Native soils will be removed to expose Jordan sandstone.
- Jordan sandstone will be mined down to depths as great as 50 feet below the groundw table.
- The mined sandstone will be processed to extract a certain range of sand granules, whi then be sold within the fracturing sand, or *frac sand*, industry. The remaining portion of sandstone will be further processed into Fine Processed Sand and Belt Press Fines, both which will be used to restore the site. The gradation of the Fine Processed Sand and Be Press Fines is discussed in Section B.3.b this report.
- The mine excavation below the groundwater surface will be backfilled with Fine Proces Sands and granular native soils to a height of about 2 to 6 feet above the groundwater surface. The Fine Processed Sands will be pumped in place in slurry form and the granu

- Above the Hydraulic Fill, native clayey and granular soils, and Belt Press Fines will be pla to achieve design surface grades. Materials placed within this zone are referred to herei as Embankment Fill and will be mechanically compacted.

Once the mining operations have been completed, it is our understanding that it is desired to restor area to a relatively level surface that can support typical light industrial development consisting of o to two-story warehouse/office type buildings and roadways. As reported to us, it is likely that desig surface grades will generally be about 8 to 10 feet above the groundwater surface.

Regarding the duration of the mining process, we understand that it is planned to keep the mine operating for a period of about 15 to 20 years. Although much of the site restoration will be comple phases while the mine is operational, it is anticipated that the final restoration phase will be comple after the mine has closed.

A.2. Purpose

The purpose of this geotechnical evaluation is to characterize the native soils, Processed Fine Sand a Belt Press Fines that will be used to restore the site and provide recommendations to help your civil consultants develop a restoration plan and schedule. We emphasize that this report does not addre mining procedures associated with this project, but focuses only on the restoration phase of the pro

A.3. Background Information and Reference Documents

To facilitate our evaluation, we were provided with or reviewed the following information or docun

- *Geologic Atlas, Scott County, Minnesota,* University of Minnesota, 1982.
- Excerpts from *Geology and Ore Reserves of the Merriam Junction Silica-Sand Deposit,* E K. Lehmann & Associates, 1980.
- Series of civil drawings taken from the Lehmann report, namely:
  - East–West Cross Sections
  - Isopach of Sandstone Below the Water Table
  - Structure Contour Map of Water Surface
  - Topographic Map
  - Isopach of Sandstone above Water Table

- Electronic base drawing provided by Sunde Engineering; base drawing plan shows existi topography and horizontal and vertical limits of the mining excavation. We understand the vertical excavation limits are planned to be extend down to depths as great as 50 fe below the groundwater surface.

- *Time Dependent Settlements in Hydraulic Fills,* Shailesh Singh and Nagaratnam Sivakuga *International Journal of Geotechnical Engineering,* 2008.

- Meeting notes from a March 23, 2011, team meeting, and various follow-up electronic correspondences.

- Meeting notes from a February 8, 2012, meeting attended by Mr. Don Vry of Don Vry P an engineer from our firm.

- Average/anticipated gradation of Processed Fine Sands and Belt Press Fines provided b Don Vry PE.

A.4. Site Conditions

Our referenced documents indicate that the surficial geology of the area consists mostly of terrace glacial deposits underlain by Jordan Sandstone, and St. Lawrance Dolostone at depth. As reported b Lehmann, the Jordan Sandstone is normally divided into two members, the upper Van Oser and the lower Norwalk members; however, Lehmann indicated that only the Norwalk member is present o site. Lehmann indicated that the Jordan Sandstone generally becomes finer-grained with depth, th Lehmann also indicated that it was difficult to determine specific gradation trends. As shown on Lehmann's Sandstone Surface map, the surface of the Jordan formation ranges in elevations from a 705 along the western and southern edges of the site to about 750 to 760 throughout most of the

The central portion of the site is relatively flat, with most of this area containing surface elevations ranging from about 760 to 765. The western edge of the site typically slopes down to about elevation 740, while the steeper southern edge slopes down to elevations ranging from about 720 to 730 (down into the area previously mined). The eastern edge of the property gradually slopes downward to intersect with US Highway 169. The northern edge of the property gradually slopes upward to elevations ranging from 770 to 775. Railroad tracks are located along the western and eastern edges of the property. The site is covered with groups of trees and brush, and also remnants of several homesteads.

Lehmann's Water Surface map indicates that the groundwater table generally trends downward from east to west. The surface of the groundwater table ranges from about elevation 723 along the eastern edge of this site down to elevation 712 along the western edge. Thus, the groundwater table is down about 30 to 60 feet below existing grades. In relation to the Jordan sandstone, the groundwater table is about 20 to 40 feet below the surface of the Jordan sandstone throughout most of the eastern two-thirds of the site, and is down about 5 to 15 feet below the surface of the Jordan sandstone within the western third of the site.

A.5. Scope of Services

Our scope of services for this project was originally submitted in a February 1, 2011, Proposal to Mr. Gerald Duffy of Monroe Moxness Berg PA. We received authorization to proceed from Mr. Duffy on February 2, 2011. Tasks completed in accordance with our authorized scope of services are described below.

Our scope of services was performed under the terms of our June 15, 2006, General Conditions.

A.5.a. Reconnaissance

We performed a reconnaissance of the site primarily to evaluate equipment access to exploration locations.

A.5.b. Staking and Surveying

Exploration locations and surface elevations at the exploration locations were determined by our firm using GPS (Global Positioning System) technology that utilizes the Minnesota Department of Transportation's permanent GPS Virtual Reference Network (VRN).

A.5.c. Utility Clearance

After the exploration locations were staked and surveyed, prior to commencing with our subsurface exploration activities, we cleared the exploration locations of underground utilities through Gopher One Call.

A.5.d. Subsurface Exploration

We performed seven penetration test borings at the approximate locations shown on Figure 1 in the Appendix. The borings were staked about 600 to 700 lineal feet apart from each other. The borings ultimately extended to depths ranging from about 5 to 40 feet below the current ground surface. Six of the seven borings were advanced until they met auger refusal at depths ranging from about 5 to 40 with one of the borings terminating in overburden soils at a depth of about 15 feet.

Coring or alternative drilling methods were not performed once auger refusal occurred.

Bulk bag samples were taken of the geologic materials that were encountered at Borings ST-4 and ST-5. The bulk samples obtained appeared to be representative of the predominant terrace and glacial sand encountered across the site.

A.5.e. Sandstone Sampling

Our field personnel obtained bulk bag samples of Jordan sandstone from the exposed bedrock face located south of Boring ST-1, which is located within the southern area of the proposed mine. Samples were obtained from the upper portion of the exposed face at elevations ranging from about 755 to 760 and from the lower portion of the exposed face at elevations ranging from about 735 to 740.

A.5.f. Laboratory Testing

We performed the following laboratory tests on selected penetration test samples and bulk samples of the local overburden and sandstone.

- Four sieve analyses with hydrometer were performed on both bulk samples of overburden and both sandstone samples.
- Two consolidation tests were performed, one on a composite sample of overburden soils and one on a composite sandstone sample that was processed to resemble the proces

- Three permeability tests were performed, two on bulk samples of overburden and one on a composite sandstone sample (again, after it was processed to resemble the processed fine sand).
- Two minimum-maximum dry density tests were performed on bulk samples of the overburden.
- Three moisture content tests were performed on three selected penetration test samples.
- Three sieve analyses (through the No. 200 sieve only) were performed on selected penetration test samples.
- Two Atterberg limits test were performed on two selected penetration test samples.

A.5.g. Geotechnical Evaluation, Analysis and Reporting

Information obtained from the soil borings, laboratory tests and research documents was used to develop recommendations pertaining to the reuse of native soils, Processed Fine Sand and Belt Press Fines, and for development of a restoration plan that would enable the support of light industrial development.

B. Results

B.1. Exploration Logs

B.1.a. Log of Boring Sheets

Log of Boring sheets for our penetration test borings are included in the Appendix. The logs identify and describe the geologic materials that were penetrated, and present the results of penetration resistance and performed within them, laboratory tests performed on penetration test and bulk samples retrieved from them and groundwater measurements.

Strata boundaries were inferred from changes in the penetration test samples and the auger cuttings. Because sampling was not performed continuously, the strata boundary depths are only approximate. The boundary depths likely vary away from the boring locations, and the boundaries themselves may also occur as gradual rather than abrupt transitions.

B.1.b. Geologic Origins

Geologic origins assigned to the materials shown on the logs and referenced within this report were based on: (1) a review of the background information and reference documents cited previously, (2 visual classification of the various geologic material samples retrieved during the course of our subsurface exploration, (3) penetration resistance testing performed for the project, (4) laboratory t results, and (5) available common knowledge of the geologic processes and environments that have impacted the site and surrounding area in the past.

B.2. Geologic Profile

As revealed by the soil borings, the site is underlain with a variety of geologic materials including ter deposits, glacial deposits and sandstone bedrock.

B.2.a. Topsoil

The borings initially encountered about 1/2 to 3 feet of topsoil consisting of silty sand (SM) that was brown, was moist and contained trace amounts of roots.

B.2.b. Terrace Deposits

Below the topsoil, the borings encountered terrace deposits to depths ranging from about 5 to 12 fe The terrace deposits consisted of predominately poorly graded sand (SP) and poorly graded sand wi (SP-SM) and, to a lesser extent, silty sand. The terrace deposits were various shades of brown, were typically moist, and locally wet at Boring ST-4, and sporadically contained trace amounts of gravel.

B.2.c. Glacial Outwash

With the exception of Borings ST-6 and ST-7, the borings encountered deposits of glacial outwash tl consisted of poorly graded sand and was overall fine- to coarse-grained, was light brown to brown, typically contained trace amounts of gravel. As noted on the Log of Boring sheets, we suspect that t glacial outwash is locally entrained with cobbles or bedrock fragments (in close proximity to the bec surface).

B.2.d. Glacial Till

Below the glacial outwash, Borings ST-1, ST-3 and ST-6 encountered scattered layers of glacial till

B.2.e. Bedrock

All but two of the borings, Boring ST-1 and Boring ST-3, met refusal. Boring ST-1 terminated in glacial till. Boring ST-3 was advanced about 7 feet into the Jordan sandstone. Based on the documents provided to us, and review of the penetration samples obtained from Boring ST-3, it appears that the refusal was due to bedrock. Table 1, below, summarizes the depths and elevations to auger refusal/suspected bedrock.

Table 1. Depth to Auger Refusal/Suspected Bedrock

Boring	Surface Elevation	Approximate Depth to Auger Refusal/Suspected Bedrock (ft)	Corresponding Elevation[a]
ST-2	765.3	25	741
ST-3	766.4	33[b]	733
ST-4	766.4	16	751
ST-5	762.9	10	753
ST-6	764.8	6 1/2	759
ST-7	765.9	5	761

a Corresponding elevations round up to the nearest foot.

b Boring ST-3 was drilled about 7 feet into apparent Jordan sandstone before meeting refusal.

B.2.f. Penetration Resistance Testing

The results of our penetration resistance testing are summarized below in Table 2. Comments are provided to qualify the significance of the results.

Table 2. Penetration Resistance Data

Geologic Material	Classification	Range of Penetration Resistances	Comments
Terrace Deposits	SP, SP-SM, SM	4 to 16 BPF, most values less than 11 BPF	Overall very loose to loose, but locally medium dense.
Glacial Outwash	SP	10 to 39 BPF, most values exceeding 10 BPF	Overall medium dense to dense, locally loose.
Glacial Till	SC-SM, SC	6 to 20 BPF, moist values greater than 9 BPF	Overall rather stiff to very stiff, locally medium.

B.2.g. Groundwater

Groundwater was not observed as our borings were advanced. Based on the moisture contents of the geologic materials encountered, it appears that groundwater was below the depths explored, which, as mentioned previously, ranges in elevations of 723 along the eastern edge of the site down to 712 along the western edge.

Seasonal and annual fluctuations of groundwater, however, should be anticipated.

Given the layered nature of the native soils encountered, and as suggested by the wet silty sand encountered at Boring ST-4, it should be anticipated that groundwater could also become locally perched across the site at various depths/elevations.

B.3. Gradation of Sandstone, Processed Fine Sand and Belt Press Fines

B.3.a. Gradation of Sandstone

The gradation for the Jordan sandstone is shown below in Table 3. This gradation information was provided to us by Don Vry PE.

Table 3. Gradation of Sandstone

Sieve	Percent Passing		
	Reserve Above Water Table	Reserve Below Water Table	Average Combined
20	100	100	100
40	69	83	76
50	38	54	46
60	26	36	31
140	8	8	8
200	7	7	7

B.3.b. Gradation of Processed Fine Sand and Belt Press Fines

Regarding fracturing sand, we understand that the particles extracted from the sandstone larger than the No. 70 sieve are considered usable product. After those particles have been extracted from the sandstone, the remaining material consisting of particles passing the No. 70 sieve are further processed into two subsequent materials, Processed Fine Sand and Belt Press Fines. In general, the Processed Fine Sand is the coarser portion of the material and is comprised of particles falling between the No. 70 sieve and No. 250 sieve. The following gradation information presented below in Table 4 for the Processed Fine Sand was provided to us by Don Vry PE.

Table 4. Gradation of Processed Fine Sand

Sieve	Percent Passing
20	100
40	100
50	100
60	100
140	27
200	15

The Belt Press Fines is the finer material which is comprised of particles passing the No. 250 sieve.

B.4. Laboratory Test Results

Results of our laboratory tests are presented below in Tables 5 and 6. We note that the permeability, consolidation and density tests performed on the composite sandstone sample were performed on a sample processed to resemble of the anticipated Processed Fine Sand.

Of note, at the time our laboratory tests were conducted, the anticipated gradation for the Processed Fine Sand consisted of 39 percent of the particles by weight passing the No. 140 sieve and 34 percent of the particles by weight passing the No. 200 sieve. Since that time, the anticipated gradation has been revised to what is shown in Table 4. In our opinion, the tests results obtained from using the initial gradation are appropriate for this project; however, the results and recommendations derived from them may be slightly more conservative than had the gradation shown above in Table 4 been used.

Table 5. Laboratory Classification and Permeability Test Results

Location	Sample Depth (ft)	Class.	Minimum/ Maximum Dry Density (pcf)	Moisture Content (%)	Percent Passing the No. 200 Sieve	LL	PI	Perm. (cm/s)
ST-4	Bulk	SP-SM	101 / 120	--	4	--	--	1×10^{-2}
ST-5	Bulk	SP-SM	102 / 121	--	9	--	--	2×10^{-3}
Sandstone[a]	Comp.	BR	82 / 109	--	40	--	--	6×10^{-3}
ST-1	5	SP-SM	--	13	11	--	--	--
ST-1	12 1/2	SC-SM	--	11	40	16	4	--
ST-6	5	SC	--	16	33	25	11	--

a Composite sandstone samples were processed to resemble the anticipated Processed Fine Sand.

Table 6. Consolidation Test Results

Sample	Classification	Load Range (psf)		Average Percent Strain for Load Range[a]
		Low	High	
Native Soils (Average)	SP-SM	90	300	4.5
		300	500	7.5
		500	1,000	9.5
		1,000	2,000	10.5
		2,000	4,000	12.0
		4,000	8,000	13.5
		8,000	16,000	14.5
Processed Fine Sand[b]	SM	80	240	1.5
		240	460	4.5
		460	980	7.5
		980	1,960	9.5
		1,960	3,980	11.0
		3,980	8,000	12.5
		8,000	16,000	14.5

a Rounded up to the nearest 0.5 percent.

b Bedrock samples were processed to resemble the initial gradation for the Processed Fine Sand.

C. Basis for Recommendations

C.1. Understanding of Future Development

It is our understanding that it is desired by governing agencies to zone the reclaimed mining area for commercial/industrial use. Since specific plans pertaining to the design of buildings are not yet available, we have assumed that construction will likely consist of one- to two-story office/warehouse buildings, bituminous and/or concrete roadways and parking lots, and other infrastructure (water main, sanitary sewer, etc.). We have assumed that structural loads associated with those buildings will range from about 150 to 300 kips per column and about 4 to 8 kips per lineal foot of wall. We have also assumed that the buildings can tolerate up to 1 inch of total settlement.

We have attempted to describe our understanding of future construction to the extent it was report us by others. Depending on the extent of available information, assumptions may have been made b on our experience with similar projects. If we have not correctly recorded or interpreted the project details, we should be notified. New or changed information could require additional evaluation, ana and/or recommendations.

C.2. Settlement Analysis and Restoration Plan

As described previously in Section A, the proposed mining operation will initially consist of removing native soils to expose Jordan sandstone. Once exposed, the Jordan sandstone will be excavated to d as great as 50 feet below the groundwater surface. The mined sandstone will be processed to extra certain range of sand granules, which will then be sold within the fracturing sand industry. The rema portion of the mined materials and onsite materials will then be reused to restore the site. The min excavation below the groundwater surface will be backfilled with Fine Processed Sands and granular native soils to a height ranging from about 2 to 6 feet above the groundwater surface. The Fine Processed Sands will be pumped in place in slurry form and the granular native soils will be dumped place. Materials placed within this zone are referred to herein as Hydraulic Fill and will not be mechanically compacted. Materials placed above this zone to achieve design grades are referred to Embankment Fill and will be placed in thin lifts and will be mechanically compacted.

Settlement of Hydraulic Backfill is induced by its own weight and the stress exerted on it by overlyin overburden soils. Based on a conventional consolidation analysis, it appears that Processed Fine San experience strain on the order of about 10 percent, the actual magnitude of which is dependent on on the loading stresses (from self-weight of Hydraulic Fill and the Embankment Fill). It appears that consolidation characteristics, i.e., measured strain, will likely be similar for the native sands as comp to the Processed Fine Sand.

Conventional consolidation theory also suggests that there are typically two components of resultir settlement—primary, or short-term, and secondary, or long-term. From our research and review of *Dependent Settlements in Hydraulic Fills,* Sing and Sivakugan suggest that about two-thirds of a fill's strain/settlement will occur fairly quickly over the short term. The remaining one-third of strain/settlement will then occur long-term. For descriptive purposes, short-term is generally thoug

Since total settlement will vary based on the thickness of the Hydraulic Fill and the stress applied to it (including the stress from its own weight), and given that not all excavations will be extended down to the same depths below the groundwater surface, total settlements will vary from area to area across the site. To promote uniform building and roadway performance across the site, and to limit long-term settlement to tolerable levels by accelerating the rate of settlement, regardless of the thickness of Embankment Fill placed over the Hydraulic Fill to achieve design grades, we recommend placing a surcharge of material on top of the Embankment Fill. We estimate that the surcharges having thicknesses ranging from 10 to 15 feet will need to be left in place for a period on the order of 2 years to reduce future long-term settlement to tolerable limits (assumed to be 1 inch for this project).

C.3. Settlement Monitoring

A program should be developed to monitor the progression of settlement within the Hydraulic Fill and Embankment Fill. The program should include installation of settlement plates in close proximity to the Hydraulic Fill contact and near the surface of the Embankment Fill (before the surcharge material is placed). The settlement plates should be monitored at regular intervals from the time the hydraulic filling has been completed to beyond the completion of the surcharge placement. Frequency of readings should be greater near the beginning of the monitoring period. Settlement data should be obtained by a licensed surveyor and provided to a geotechnical engineer for review and commentary. As the restorative surcharge duration of on the order of 2 years is an estimated value, decisions based on grading and development schedules shall ultimately be determined by review of the settlement data.

C.4. Commentary on Processed Fine Sand

As previously mentioned, after the usable granules of the sandstone have been extracted, the remaining material will be further processed into Processed Fine Sand and Belt Press Sand. Based on the gradation information as described previously in Table 4 of Section B.3.b, the Processed Fine Sand will generally classify as fine-grained silty sand. Due to its fine-grained nature, in the event that Processed Fine Sand is placed as Embankment Fill on top of the Hydraulic Fill, we recommend against placing it within 3 feet of proposed surface grades.

C.5. Commentary on Belt Press Fines

It is our understanding that it is planned to mix Belt Press Fines (the fine-grained material that was removed from the Fine Process Sand and will generally consist of particles passing the No. 200 sieve- and clay particles) with granular native soils prior to being placed as Embankment Fill. In the event th Belt Press Fines alone are placed as Embankment Fill, we recommend that it be separated from the t of the Hydraulic Fill and from proposed surface grades by at least 3 feet of coarser material classifyin poorly graded sand, poorly graded sand with silt or silty sand having no more than 20 percent of the particles by weight passing the No. 200 sieve, with no more than 60 percent of the particles by weigh passing the No. 40 sieve.

C.6. Reuse of On-site Soils

C.6.a. Topsoil

In our opinion, the topsoil should not be considered for reuse as Hydraulic Backfill or Embankment Fill. We recommend that the topsoil should be removed, stockpiled on site and reused only replacem topsoil.

C.6.b. Clayey Soils

In our opinion, the clayey glacial soils (due to their cohesive nature) should not be reused as Hydrau Backfill. However, it may be placed as Embankment Fill on top of the Hydraulic Fill provided that it is separated from the top of the Hydraulic Fill by at least 3 feet of coarser material classifying as poorly graded sand, poorly graded sand with silt or silty sand having no more than 20 percent of the particl weight passing the No. 200 sieve, with no more than 60 percent of the particles passing the No. 40 s Additionally, we recommend against placing this material within feet of proposed subgrade elevat

C.6.c. Granular Soils

The native granular soils classifying as poorly graded sand, poorly graded sand with silt and silty san be used as Hydraulic Fill and Embankment Fill. We understand that the native granular soils will like

D. Recommendations

D.1. Selection of Fill Material

D.1.a. Topsoil

We recommend stripping topsoil from the mining area and stockpiling it. We recommend that it not be used as structural fill or mixed with other materials for reuse as structural backfill. We recommend that it only be used only as replacement topsoil after the restoration is complete.

D.1.b. Processed Fine Sand

In our opinion, Processed Fine Sand may be used as both Hydraulic Fill and Embankment Fill. If placed as Embankment Fill, we recommend against placing it within 3 feet of proposed design subgrade elevations.

D.1.c. Belt Press Fines

As mentioned previously, we understand that Belt Press Fines will be mixed with granular native soils prior to being placed as Embankment Fill. In our opinion, given the gradation of the predominant granular materials on this site, this particular approach for reuse of the Belt Press Fines is appropriate.

If Belt Press Fines alone are placed as Embankment Fill, we recommend, however, they be separated from the Hydraulic Fill surface by at least 3 feet of coarser granular soil classifying as poorly graded sand or poorly graded sand with silt having no more than 60 percent of the particles by weight passing the No. 40 sieve. Because fine-grained materials are susceptible to losing strength when disturbed, we also recommend against placing unblended Belt Press Fines within the upper 3 feet of design surface grades.

D.1.d. Clayey Materials

We recommend against using native clayey materials classifying as silty clayey sand (SC-SM), clayey sand (SC) and sandy lean clay (CL) as Hydraulic Backfill. We recommend that clayey materials be reused only as Embankment and Surcharge Fill, provided that they are separated from the Hydraulic Fill surface with at least 3 feet of granular soil classifying as poorly graded sand or poorly graded sand with silt, or silty sand having no more than 20 percent of the particles by weight passing the No. 200 sieve, with no more than 60 percent of the particles passing the No. 40 sieve.

Because clayey materials are susceptible to losing strength when disturbed, we also recommend against placing clayey materials within the upper 3 feet of design surface grades.

D.1.e. Granular Materials

In our opinion, on-site granular materials classifying as poorly graded sand (SP), poorly graded sand silt (SP-SM), and silty sand (SM) having less than 20 percent of the particles by weight passing the N 200 sieve may be reused as Hydraulic Fill, Embankment Fill and Surcharge Fill.

D.1.f. Imported Material

If needed to balance the site, we recommend importing backfill consisting of sand, silty sand, claye or sandy lean clay. We recommend that the plastic index of these materials not exceed 15. If clays a imported, similar restrictions as provided above should be applied for their reuse.

D.2. Placement and Compaction of Embankment Fill

We recommend that all Embankment Fill placed on top of Hydraulic Fill be placed in thin lifts and tl soils should be mechanically compacted.

We recommend spreading Embankment Fill in loose lifts of no more than 8 inches. We recommenc placing soils having no more than 12 percent of the particles by weight passing the No. 200 sieve a moisture content within 3 percentage points below to 3 percentage points above their optimum moisture content. We recommend placing soils having more than 12 percent of the materials by w passing the No. 200 sieve at a moisture content within 1 percentage point below to 3 percentage p above their optimum moisture contents. We recommend compacting fill to at least 98 percent of i maximum dry density as determined by the standard Proctor method (ASTM D 698).

Because clayey soils, Fine Processed Sand and Belt Press Fines are susceptible to losing strength wl disturbed, we recommend placing granular soils having less than 20 percent of the particles by we passing the No. 200 sieve and less than 60 percent of the particles by weight passing the No. 40 sie within three feet of design surface grades (upper 3 feet of Embankment Fill).

D.3. Restoration Plan and Surcharge Design

D.3.a. Restoration Plan

Our restoration plan accommodates three main variables, which are height of hydraulic fill, thickn surcharge and time. The goal of this plan is to provide the developer with alternatives to help in

As discussed in Section C, it is our opinion that the general approach of inducing settlement within the hydraulic fill from overburden and surcharge loading is likely the most feasible approach to restore this site in order to support future light industrial development. Regardless of the thickness of material placed over the hydraulic fill to achieve design grades, we recommend placing a surcharge of material on top of the overburden.

Our analysis indicates that the thickness of surcharge material will depend on the thickness of hydraulic fill. With that, in areas where no more than 20 feet of hydraulic fill is placed, we recommend placing a surcharge of at least 10 feet. In areas where more than 20 feet of hydraulic fill is placed, we recommend placing a surcharge of at least 15 feet.

As discussed previously in Section C, total consolidation and duration will depend on many factors, mainly the thickness, composition and uniformity of the Hydraulic, Embankment and Surcharge Fill materials. We recommend that consolidation/performance of the Hydraulic and Embankment Fills be monitored by a geotechnical engineer through review of settlement plate data. Since the surcharge duration on the order of 2 years is an estimated range of time, decisions based on grading and development schedules shall ultimately be determined by review of the settlement data.

D.3.b. Surcharge Design and Fill Placement

For the surcharge itself, we recommend that it be sized such that upper perimeter of the surcharge extends out a horizontal distance equivalent to the height of the surcharge beyond the limits of the surcharged area. We recommend that embankment sideslopes be constructed with gradients of 1 1/2:1 (h:v) or flatter. In our opinion, a roving surcharge approach, where surcharge materials are moved from one area of the site to another, is appropriate for this site. We recommend that the outer perimeter of the top of the surcharge align with previous adjacent top of surcharges.

For the lowest 5 feet of the Surcharge Fill, we recommend placing granular soil having no more than 20 percent of the materials by weight passing the No. 200 sieve and no more than 60 percent of the particles by weigh passing the No. 40 sieve, we recommend spreading it in loose lifts of no more than 8 inches, and we recommend compacting it to at least 98 percent of its maximum dry density as determined by the standard Proctor method (ASTM D 698). Furthermore, we recommend soils having more than 12 percent of the materials by weight passing the No. 200 sieve at a moisture content within 1 percentage point below to 3 percentage points above their optimum moisture contents. We recommend placing soils having no more than 12 percent of the particles by weight passing the No. 200 sieve at a moisture content within 3 percentage points below to 3 percentage points above their optimum moisture content.

It is not necessary to compact the upper portion of the surcharge.

D.4. Settlement Monitoring

We recommend that settlement plates be installed both on top of the hydraulic fill and also on top of the proposed embankment materials (prior to placement of the surcharge material). We recommend that one to two sets of plates (lower and upper) be placed for every acre of surcharge area (depending on how much area is surcharged). We recommend installing a plastic slip form around the metal rod.

We recommend that the settlement plates be installed immediately after filling begins over the hydraulic fill (lower plate) and prior to placing the surcharge (upper plate). We recommend that the plates be surveyed by a licensed engineer with initial measures including surface elevations (i.e., bottom-of-plate elevation) and horizontal GPS coordinates. We recommend that the plates be surveyed at a frequency of twice per week for a period of 1 to 2 months, one time every 2 weeks for a period 2 to 3 months, then once per month thereafter.

Regarding the monitoring schedule, the actual frequency could also depend on what grading activities are occurring. For example, if embankment fill will not be placed over the hydraulic fill for a period of several months, then the frequency of measurements may be revised during that period. In any case, we recommend providing a geotechnical engineer with a restoration schedule to help in determining a monitor schedule.

We recommend that the survey information be provided to a geotechnical engineer for review and commentary. Review and evaluation of the survey data will ultimately determine when surcharges can be removed and when construction can begin.

D.5. Preliminary Design Data

D.5.a. Net Allowable Bearing Pressure

Assuming the recommendations presented herein are implemented, it is our opinion that foundations for proposed future buildings can be sized to exert a maximum net allowable bearing pressures ranging from 2,000, to 3,000 pounds per square foot.

D.5.b. Building Settlement

Assuming the implementation of the recommendations discussed herein, we estimate that total settlements among buildings and pavements will amount to less than 1 inch.

D.6. Construction Quality Control

D.6.a. Earthwork Observations

We recommend having a geotechnical engineer observe all excavations related to subgrade and surcharge preparation.

D.6.b. Materials Testing

We recommend density tests be taken on the Embankment Fill and the lowest 5 feet of Surcharge Fill.

D.6.c. Cold Weather Precautions

If site grading and construction is anticipated during cold weather, all snow and ice should be removed from cut and fill areas prior to additional grading. No fill should be placed on frozen subgrades. No frozen soils should be used as fill.

E. Procedures

E.1. Penetration Test Borings

The penetration test borings were drilled with a carrier-mounted core and auger drill equipped with hollow-stem auger. The borings were performed in accordance with ASTM D 1586. Penetration test samples were taken at 2 1/2- or 5-foot intervals. Actual sample intervals and corresponding depths are shown on the boring logs.

E.2. Material Classification and Testing

E.2.a. Visual and Manual Classification

The geologic materials encountered were visually and manually classified in accordance with ASTM Standard Practice D 2488. A chart explaining the classification system is attached. Samples were placed in jars or bags and returned to our facility for review and storage.

E.2.b. Laboratory Testing

Laboratory tests were performed in accordance with ASTM procedures.

E.3. Groundwater Measurements

The drillers checked for groundwater as the penetration test borings were advanced, and again after auger withdrawal, where allowed. The boreholes were then backfilled or grouted.

F. Qualifications

F.1. Variations in Subsurface Conditions

F.1.a. Material Strata

Our evaluation, analyses and recommendations were developed from a limited amount of site and subsurface information. It is not standard engineering practice to retrieve material samples from exploration locations continuously with depth, and therefore strata boundaries and thicknesses must be inferred to some extent. Strata boundaries may also be gradual transitions, and can be expected to vary in depth, elevation and thickness away from the exploration locations.

Variations in subsurface conditions present between exploration locations may not be revealed until additional exploration work is completed, or construction commences. If any such variations are revealed, our recommendations should be re-evaluated. Such variations could increase construction costs, and a contingency should be provided to accommodate them.

F.1.b. Groundwater Levels

Groundwater measurements were made under the conditions reported herein and shown on the exploration logs, and interpreted in the text of this report. It should be noted that the observation periods were relatively short, and groundwater can be expected to fluctuate in response to rainfall, flooding, irrigation, seasonal freezing and thawing, surface drainage modifications and other seasonal and annual factors.

F.2. Continuity of Professional Responsibility

F.2.a. Plan Review

This report is based on a limited amount of information, and a number of assumptions were necessary to help us develop our recommendations. It is recommended that our firm review the geotechnical aspects of the designs and specifications, and evaluate whether the design is as expected, if any design changes have affected the validity of our recommendations, and if our recommendations have been correctly interpreted and implemented in the designs and specifications.

F.2.b. Construction Observations and Testing

It is recommended that we be retained to perform observations and tests during construction. This will allow correlation of the subsurface conditions encountered during construction with those encountered by the borings, and provide continuity of professional responsibility.

F.3. Use of Report

This report is for the exclusive use of the parties to which it has been addressed. Without written approval, we assume no responsibility to other parties regarding this report. Our evaluation, analyses and recommendations may not be appropriate for other parties or projects.

F.4. Standard of Care

In performing its services, Braun Intertec used that degree of care and skill ordinarily exercised under similar circumstances by reputable members of its profession currently practicing in the same locality. No warranty, express or implied, is made.

EXHIBIT C

GREAT PLAINS SAND (SCOTT COUNTY, MN)
INTERIM USE PERMIT

SCOTT COUNTY
STATE OF MINNESOTA

INTERIM USE PERMIT
GREAT PLAINS SAND, LLC MINING AND PROCESSING FACILITY

LOUISVILLE & SAND CREEK TOWNSHIPS

May 1, 2012

CONDITIONS FOR MINING AND PROCESSING FACILITY

Project Name: Great Plains Sand, LLC Mining and Processing Facility

Location: The legal description for the land subject to this Interim Use Permit (IUP) is as legally described on attached Exhibit a which is incorporated herein by reference (hereinafter referred to as the "Subject Property").

I. GENERAL CONDITIONS

A. Legal Compliance:

1. Prior to the start of each operation and certain construction activities identified on Exhibit d, Great Plains Sand, LLC hereinafter "Operator" shall obtain any required Federal, State, County, Township and other local permits for each operation and/or construction activity, including, but not limited to, from the Minnesota Pollution Control Agency, Minnesota Department of Natural Resources, and Scott County and any other applicable government agency, as applicable to each operation and/or construction activity. Operator shall submit evidence of all required permits to Scott County. If the County reasonably determines that work on the Subject Property does not comply with specific permit requirements, the County shall provide written notice to the Operator specifying any asserted non-compliance and the Operator shall have twenty-one (21) days from the date of such notice (unless a longer term is permitted by the County or the Great Plains Sand Mining Review Committee (hereinafter referred to as the "Committee")) to cure any asserted non-compliance. In the event the County reasonably determines that Operator has not remedied the specified non-compliance upon expiration of such cure period, then the County may, at its option, refuse to allow continued mining activities pursuant to this IUP until the Operator so complies. Upon the County's

demand, the Operator shall cease all work until there is compliance as reasonably determined by the County. All costs associated with any permit review and submission of monitoring reports to the County and the Committee shall be the sole responsibility of the Operator.

2. Operator shall comply with all applicable federal, state, county and township ordinances, rules, regulations and permits including, but not limited to, the standards of the Minnesota Pollution Control Agency "MPCA" and other regulations and standards applicable to the mining operation.

3. The Interim Use Permit for Great Plains Sand, LLC mining and processing operations shall comply with the plans and mining narrative attached to this permit collectively referred to as the "Approved Plans" which are all incorporated herein by reference. The Operator shall have the right to request modifications, as appropriate, to the Approved Plans and mining narrative so long as such modifications continue to substantially comply with the approved plans and narrative. The County staff shall have the authority to determine whether changes requested by the Operator substantially comply with the approved plans and mining narrative. The County shall give notice to the Committee of any modifications granted to the Approved Plans. If the Approved Plans vary for the written terms of this IUP, the terms that are the most conservative shall control. The Approved Plans are as follows:

Exhibit Index

a. Subject Property Legal Description

b. Interim Use Permit Application dated March 12, 2012

c. Interim Use Permit Application Figures 1-11

d. Certain specified construction activities

e. Resource Management Plan dated April 19, 2012 Sheets 1 & 6 dated March 21, 2012, Sheets 3-5 dated April 18, 2012 and Sheet 2 dated April 23, 2012 prepared by Sunde Engineering (hereinafter referred to as the "RMP")

f. Groundwater and Surface Water Monitoring and Mitigation Plan dated April 24, 2012 prepared by Sunde Engineering, PLLC

g. Fugitive Dust Control Plan dated February 2012 prepared by Wenck Associates, Inc.

h. Blast Monitoring Plan dated April 24, 2012 prepared by Sunde Engineering, PLLC

i. PM10 Ambient Air Monitoring Plan dated February 2012, Revised April 2012 prepared by Wenck Associates, Inc.

j. Photometric Plan dated March 8, 2012 prepared by Parsons

k. Subject Property Maps A-D prepared by Sunde Engineering, PLLC

l. Expected Traffic Description prepared by Great Plains Sand, LLC

m. Parameters for Annual Report

n. Braun Intertec Geotechnical Evaluation dated February 15, 2012, addendum dated February 29, 2012 and letter dated December 15, 2011

o. David Braslau Noise Assessment dated August 23, 2011

p. Noise Testing and Mitigation Plan to be develop by the Operator and approved by the Mining Review Committee prior to operation of the processing facility.

q. Developer's Agreement dated May 1, 2012

r. Narrative from the Proposed Mining Operational Overview dated February 24, 2012 prepared by Great Plains Sand, LLC

s. Narrative from the Supplement to Proposed Mining Operational Overview dated February 29, 2012 prepared by Great Plains Sand, LLC

t. Additional Structures Receiving Pre-Blast Surveys

u. Reclamation Plan dated March 12, 2012 prepared by Sunde Engineering, PLLC.

v. MNDOT Recommendation

4. Operator shall comply with all obligations contained in the Developer's Agreement dated May 1, 2012 attached hereto as Exhibit Q including, but not limited to, the establishment of the Committee, payment of County and Townships' costs and expenses, the establishment of an escrow fund and security for the project.

B. Permit Review:

1. This IUP shall be reviewed as provided by the Scott County Zoning Ordinance and may be amended at any time in the event that the Scott County Board of Commissioners, through the proper public hearing process as provided for in the Scott County Zoning Ordinance and this IUP, reasonably determines that the actual operations of the mine and/or information gained through studies such as the EIS currently being completed for the Merriam Junction Sands project present a material adverse impact to health and/or human safety that relates specifically to the operations on the Subject Property and is not able to be addressed or mitigated through the Approved Plans identified above or the provisions of this IUP.

2. Operator shall prepare an annual Great Plains Sand Mining Report for the mine for submission to the Committee, the County and the Townships. The Committee upon receipt of the Report, may forward their recommendations, if any, for the review of the Scott County Planning Commission, the Townships and the Scott County Board of Commissioners. See Exhibit m for topics to be covered in the Annual Report.

3. Any proposed modifications to monitoring plans required in this IUP shall be included in the annual report.

C. Great Plains Sand Mining Review Committee:

Operator shall participate as a member of the Committee to review issues and present recommendations to the Scott County Board of Commissioners on issues that may arise as a result of operations on the Subject Property. Section 4 of Exhibit q, the Developer's Agreement, lists the general make-up and powers of the Committee.

D. Incorporation of Environmental Assessment Worksheet:

The Environmental Assessment Worksheet, ("EAW") and comments received were reviewed by the Scott County Board on March 13, 2012. The Board considered the comments and Staff response to comments, the Findings of Fact and Conclusions and determined that the EAW was adequate and an Environmental Impact Statement was not required. Staff Response to Comments and Findings of Fact and Conclusions as presented to the Board on March 13, 2012 are hereby incorporated by reference to be used as a guidance document, including all mitigation measures identified therein.

E. Costs

All costs associated with any permit review and submission of monitoring reports to the County, the Townships and the Committee shall be the sole responsibility of the Operator. All costs associated with remediation activities and development and operation of the site in compliance with the Approved Plans shall also be the sole responsibility of the Operator.

F. Required Notifications

All notifications, reports and other correspondence required herein shall be provided by the Operator to the County, the Townships and the Committee.

G. General Conditions:

1. Operator shall identify a person within the company for the residents, the Louisville and Sand Creek Town Boards or Scott County to contact regarding concerns regarding the IUP.

2. This Interim Use Permit is issued specifically to Great Plains Sand, LLC or its assigns.

3. Mining, for the purposes of this IUP, will be limited to dirt moving, berm construction, pond construction, overburden removal, drilling, stripping, digging, rock breaking, screening, blasting, processing, loading and the on-site movement of materials. Any activity not enumerated shall require prior written approval of the Committee.

4. All signage shall conform to the Scott County Sign Ordinance.

5. The property shall be maintained in a neat and orderly manner.

6. All mobile equipment, vehicles and miscellaneous storage shall be located on site and screened from view. Only equipment used in the mining, processing and loading operations shall be allowed to be stored on site.

7. The stockpiled topsoil must be re-spread on the site and shall not be sold or removed.

8. The Operator shall provide to the Scott County Auditor's Office appropriate payment due for gravel tax in accordance with State and County regulations. Operator shall provide the Townships with monthly reports of sand tonnage being shipped from the Subject Property.

9. If future actions by the County Board require all gravel mining operations to pay an annual license fee the owner/operator shall pay such fee.

10. Prior to constructing/relocating the office building presently on the Subject Property a septic system must be identified by a licensed septic designer and protected during mine operations.

11. A hazardous waste license shall be obtained if required by Scott County. Best Management Practices shall be implemented limiting onsite maintenance of equipment.

12. Truck traffic shall be limited to the traffic described in the Expected Traffic Description included as Exhibit l.

13. Operator shall secure an access permit from the Minnesota Department of Transportation (MnDOT) and comply with all permit and access requirements imposed by MnDOT. Any improvements required by MnDOT shall be constructed at the sole expense of the Operator unless otherwise paid for by MnDOT or another party. If the improvements required by MnDOT result in the need to have the primary access to the site via Bluff Drive, then the applicant shall apply for and secure an amendment to this IUP prior to transporting product via any method other than rail. The MnDOT permit requirements when received shall be attached hereto as Exhibit v. Nothing in this paragraph shall restrict the Operator's ability to use rail at the subject property.

14. Buildings not used for the mining operations shall be removed.

15. The area shown on Exhibit u (Reclamation Plan) identifying the location of the future septic site for the Subject Property shall not be disturbed and shall be protected during all phases of mining activities.

16. Perimeter fencing shall be maintained at all times along the border of the Subject Property with Bluff Drive and the Bennett homestead and shall be installed and maintained in phases as mining progresses along the border of the Subject Property with TH 169. Upon approval by

the County, Operator shall also install and maintain fencing along the northern boundary of the County's property immediately north of the Subject Property.

II. MINE OPERATIONS

A. Setbacks:

1. Mining Setbacks: Mining activity, including removal of overburden, shall be setback a minimum distance as described below, except for where the adjoining property owner has agreed in writing to a lesser distance, or where Operator is the adjoining property owner.

   a. Material processing shall not be conducted closer than 100 feet from a property line except for items specifically shown on Exhibit c Figure 4 "Processing Area Site Plan" of the Interim Use Permit Application dated March 12, 2012, nor closer than 500 feet to any residential structure.

   b. Mining operations shall not be conducted closer than 200 feet to any residence or residential zoning district boundary existing on the approval date of the mining interim use permit.

   c. Mining operations shall not be conducted closer than 30 feet to any property line, or within 30 feet of the right-of-way line of any existing or proposed street or highway. The recommendations of Braun Intertec contained in their report dated December 15, 2011 shall be followed for any existing or proposed right of way. Side slopes of the mining operation shall be in conformance with the Approved Plans.

B. Hours of Operation

1. The processing of materials shall be permitted on Monday through Saturday 24 hours per day. Processing of materials shall not take place on Sundays or holidays without Committee approval. After processing operations have commenced for at least 6 months (but in no event prior to June 1, 2013), Operator may request that the Committee consider granting its approval to process materials without the Sunday restriction. In determining whether or not to grant Operator's request, the Committee will review Operator's compliance with Minnesota State noise standards as well as the

nuisance level of impulse noises. The Committee shall permit the processing of materials 24 hours per day, seven days a week if the Operator's processing activities meet Minnesota State nighttime noise standards and the Operator establishes and implements a plan to address nuisance impulse noise. Further, Operator shall comply with the restrictions on certain operations in accordance with paragraphs II.B.2–4 below.

2. All blasting shall be conducted between the hours of 10:00 A.M. and 6:00 P.M. Monday through Saturday. Operator shall make every effort possible, to limit the blasts to between the hours of 10:00 A.M. and 3:00 P.M. No blasting is permitted on Sundays or holidays without special Committee approval.

3. All quarry operations including overburden removal shall be conducted between the hours of 7:00 A.M. and 7:00 P.M. No quarry operations are permitted on Sundays and holidays without special Committee approval.

4. Berm construction shall be confined to the hours of 7:00 A.M. to 7:00 P.M. No berm construction is permitted on Sundays and holidays without special Committee approval.

5. Mitigation measures necessary to control fugitive dust and other nuisances maybe conducted at any time including Sundays and Holidays.

III. SURFACE WATER QUALITY AND QUANTITY

A. Surface Water Quality:

1. Operator shall comply with all provisions of any required National Pollutant Discharge Elimination System (NPDES) permit for the mine. A copy of the current construction storm water and industrial storm water/NPDES permit(s) shall be provided by Operator to Scott County to be kept on file for review by County officials or the public.

2. A Groundwater and Surface water Monitoring and Mitigation Plan prepared by Sunde Engineering is attached hereto as Exhibit f. The Groundwater and Surface Water Monitoring and Mitigation Plan shall be followed for the duration of the mine unless amended by the Committee. Operator shall provide the County, the Townships and

the Committee with copies of all groundwater and surface water monitoring reports within 30 days of receipt of those reports.

3. Contaminant Management. Operator shall review and reevaluate its Groundwater and Surface Water Monitoring and Mitigation Plan annually.

4. Storm water runoff from the mine to surrounding properties shall not exceed predevelopment runoff rates based on 2, 10, and 100 year storm events. All areas used to convey storm water runoff shall be covered by permanent, dense vegetative cover or other permanent structural controls.

5. Storm water facilities to accommodate drainage from the Scott County owned parcel (PID #70260010) and Scott Land Company Parcel (PID #70290010) as shown in the approved RMP will be constructed at the commencement of the operation. The facilities will provide rate control for the 2, 10, and 100 year events assuming both parcels fully develop to 75% impervious to pre-settlement rates. Volume controls (infiltration) necessary to comply with this requirement will also be provided.

6. The Operator must provide a drainage and utility easement in favor of the public covering the storm water facilities in Section III.A.5. The easement also must include access to the facilities across or through the mine site, as well as allow for future connections to the facilities from the Scott County Owned parcel (PID #70260010).

7. Operator shall implement during all phases of mining, all applicable Best Storm Water Management Practices (BMPs) as may be necessary to protect surface water quality. These BMPs include but are not limited to:

    a. All berms shall be seeded with vegetation as defined in the approved RMP in a timely manner after completion of berm construction.

    b. Reclamation shall proceed in a continuous manner consistent with the phasing of mining operations on the Subject Property.

    c. Stormwater ponds and infiltration areas shall be constructed within the mining area as identified in the RMP.

d. All oils, solvents and other hazardous waste shall be managed and disposed of in accordance with the Scott County Hazardous Waste Management rules.

IV. GROUNDWATER QUALITY AND QUANTITY

A. Ground Water:

1. Operator shall secure a DNR water appropriations permit(s). Operator shall be in compliance at all times with the conditions or rules of an Appropriation of Waters of the State permit.

2. Dewatering is not allowed, other than as stated in the EAW and as permitted by the DNR water appropriations permit(s).

3. Mining in the water table to a depth of fifty (50) feet is allowed but the lowest five (5) feet of the Jordan Sandstone shall not be excavated.

4. A Groundwater and Surface water Monitoring and Mitigation Plan prepared by Sunde Engineering is attached hereto as Exhibit f. The Groundwater and Surface Water Monitoring and Mitigation Plan shall be followed for the duration of the mine unless amended by the Committee. Operator shall provide the County, the Townships and the Committee with copies of all groundwater and surface water monitoring reports.

5. Monitoring wells.

   a. Operator shall comply with Groundwater and Surface Water Monitoring and Mitigation Plan for the mine.

   b. When the advancement of mining necessitates the removal of monitoring wells Operator shall be responsible for sealing all monitoring wells not in use. Further, Operator shall be responsible for sealing all monitoring wells upon the completion of mining and reclamation activities in the area.

   c. Monitoring results shall be submitted annually and presented within the annual report to the Committee unless a current report is requested by the Committee in which case Operator shall provide the requested report within 14 days of obtaining the analytical results.

d. All costs associated with the groundwater monitoring program are to be paid fully by Operator.

e. If requested by the Committee, for a period of two (2) years (or such lesser period terminating upon development of a substantial portion of the Subject Property for an end use), Operator shall keep some monitoring wells active after mining activities have ended to monitor any problems of contaminate entering into the lake to be created according to the Approved Plans.

6. Mitigation of Adverse Effects on Water Wells.

a. The installed and active monitoring wells within the identified Groundwater and Surface Water Monitoring and Mitigation Plan for the mine will generally be used to determine if mine activities are having a specific impact on static water levels or contamination in domestic drinking water wells.

b. Should a domestic water or irrigation well develop problems reasonably believed to be a result of Operator's mining activities, the procedures outlined in the Developer's Agreement attached hereto as Exhibit Q shall be followed.

c. Any wells that become unused and/or unsealed as a result of Operator's mining activities shall either be put back into service or be sealed by a licensed well contractor, in accordance to Minnesota Rules, Chapter 4725.

7. Petroleum or chemical storage tanks.

a. No petroleum based or chemical products shall be stored in the excavation area of the Subject Property. Petroleum fuel tanks on mobile equipment shall be excluded from this restriction.

b. Fueling or vehicle maintenance stations shall be located on an impervious or paved surface.

c. Above ground petroleum tanks shall be equipped with secondary containment structures or double-walled tanks as

approved by the Minnesota Pollution Control Agency (MPCA). An impervious surface shall be provided for parking of any mobile fuel or chemical tanks. All spills must be reported as required by state law.

d. Below ground petroleum or chemical storage tanks shall be prohibited. Any existing below ground storage tanks shall be brought up to current leak detection standards as prescribed by the MPCA.

8. All waste oil products shall be properly recycled.

9. All minimum setbacks as prescribed by the MPCA and MDH shall be observed between water wells and petroleum or chemical storage tanks or other potential contaminant sources.

V. OPERATIONAL NOISE

A. Noise

1. A Noise Assessment of the project was prepared by David Braslau dated August 23, 2011 attached hereto as Exhibit o. Sound level mitigation measures identified in this plan shall be implemented to reduce the potential impact from noise on residences and the Minnesota Valley Wildlife Refuge.

2. Prior to operation of the processing facility, a Noise Testing and Mitigation Plan shall be developed for the site. The noise plan shall be reviewed by the Committee and will be incorporated herein by reference as Exhibit p upon approval by the majority of the Committee members.

3. Use of all production equipment will be designed to meet the federal and MPCA noise standards at the nearest receptor. The Operator will be immediately notified in the event County staff or any member of the Committee receives a complaint regarding noise generated by mining operations. If the Committee or County staff reasonably believes the complaint is valid, then the complaint will be addressed using the process set forth in the Noise Testing and Mitigation Plan.

4. Operator shall exercise its best efforts to control noise to minimum practical levels. Backup horns, bells, strobe lights, and other warning devices shall be adjusted to the minimum level required by law. Further, Operator shall use broadband or white noise backup alarms on all of its mobile equipment. This restriction shall not apply for third-party contractor equipment operated on the Subject Property so long as such equipment is utilized only between the hours of 7:00 A.M. and 7:00 P.M.

5. Operator shall construct screening berms as shown on the Approved Plans where such a berm is necessary to screen the mining activities from public view. Construction of the berm shall be completed on a phased basis as set forth in Exhibit c Figure 3 of the Interim Use Permit Application dated March 12, 2012 during overburden removal before each sand mining phase so as to screen mining activities from public view to the extent reasonably possible. The berm shall remain in place until mining ceases and final reclamation begins, at which time the berm shall be removed.

VI. BLASTING

A. Pre-blast Structural surveys

1. Operator shall conduct pre-blast structural surveys of all residences located within one-half mile of the Subject Property for which approval is granted from the property owner, prior to commencing mining operations. Copies of the pre-blast surveys shall be submitted to the Committee and Scott County.

2. Operator shall perform additional pre-blast structural surveys for buildings that are either newly-constructed or are remodels or additions affecting structural components of the building within one-half mile of the Subject Property during the operation of the mine (which survey shall occur immediately prior to issuing the certificate of occupancy for such structures) for which approval is granted from the property owner and for those structures specifically identified on Exhibit t for which approval is granted from the property owner.

3. The Operator shall provide the County prior notice of all proposed surveys, and the Committee shall have the right to accompany the inspector.

B. Blasting Standards

1. A Blast Monitoring Plan prepared by Sunde Engineering is attached hereto as Exhibit h. The Blast Monitoring Plan shall be followed for the duration of the mine unless amended by the Committee. Operator shall provide the County and the Committee with copies of all blast reports and blast monitoring reports.

2. All blasts shall be designed and conducted so as not to cause damage to private or public property. The Operator will be immediately notified in the event County staff or any member of the Committee receives a complaint regarding damage caused by blasting. If the Committee or County staff reasonably believes the complaint is valid, then the complaint will be addressed using the process set forth in the Blast Monitoring Plan.

3. The County or the Committee shall have the authority to engage an independent blasting consultant as mutually agreed to by all members of the Committee to review the Operator's blasting procedures on an annual basis. All costs associated with such consultant shall be paid by Operator.

4. Seismic data gathered for each blasting event shall be reviewed, analyzed for compliance parameters and signed by Operator's licensed blaster. If analysis of the data suggests a violation, then corrective actions shall be taken as required by the Blast Monitoring Plan attached hereto as Exhibit h.

5. Operator will designate the location of two seismic monitoring sites for each blast to monitor blasts. No more than two additional seismic monitoring sites may be designated within one-half mile of the Subject Property by either Scott County and/or the Committee to address specific complaints from the public.

6. Detailed blasting records shall be kept by Operator. These records are to locate where each blast is taking place, delay pattern, and the identification, direction and distance to structures. GPS coordinates shall be used to identify blast locations, which may then be utilized to determine the distance of blasts to any structure. These blast records are to be made available to Scott County, the Townships and the Committee upon request.

C. Additional Blasting Compliance Measures:

1. Operator will use all industry standard measures to control fly rock with the intent that fly rock not leave the Subject Property.

2. If seismic data analysis indicates an exceedance of the limits set forth in the Blast Monitoring Plan at a structure outside the Subject Property, Operator shall notify both Scott County and the Committee within one week of receiving the analysis and provide a summary of a review of their blast design procedures and a plan to eliminate future exceedances. Any vibration exceedance at a structure outside the Subject Property shall also be noted in the annual report.

3. Operator shall obtain all required permits from the Scott County Sheriff's Office.

4. Committee members and neighbors identified by committee members shall be notified at least 24 hours prior to a blasting event. It is recognized that the exact timing of proposed blasts may not be ascertainable prior to the day blasting occurs due to the influences of weather and other conditions on blast timing.

VII. AIR QUALITY

A. Air Emissions Permit:

1. A Total Facility Operating Permit for operations located within the mine permit area shall be secured from the MPCA and Operator shall comply with all terms and conditions of such permit.

2. Monitoring shall be performed in compliance with the procedures outlined in the Ambient Air Monitoring Plan attached hereto as Exhibit i to establish ambient dust conditions around the mine prior to mining operations beginning. This information must be presented to the County and the Committee to summarize findings for current conditions defining monitoring process and conditions during monitoring. After operations begin, monitoring must be completed to establish post operational dust conditions with data and results being delivered to the County and to the Committee. Data and results will be compared to MPCA standards to verify compliance with the Total Facility Operating Permit.

3. The results of all monitoring activities shall be presented in the Annual Report to Scott County, the Townships and the Committee.

B. Dust Control:

1. Erosion and dust control measures shall be applied as necessary to control fugitive dust. Operator shall follow the Fugitive Dust Control Plan prepared by Wenck, attached hereto as Exhibit g. Operator shall provide the County, the Townships and the Committee with copies of all dust monitoring reports required under VII.A above.

2. In any exposed areas outside of the quarry that have not been covered by permanent vegetation Operator shall water these exposed areas within the permitted area during those periods when weather conditions are generating fugitive dust.

3. Haul roads within mine permit area boundaries shall be sprayed with water or other permitted dust suppressants as needed to control fugitive dust.

4. Operator shall provide environmentally friendly dust control by application of GreenGuard or other approved dust suppressant, as necessary for unpaved township roads if these roads are being used by truck traffic originating from and as a result of the mining operations within the project site.

5. A site-specific PM10 Ambient Air Monitoring Plan prepared by Wenck Associates, Inc. dated February 2012 is attached hereto as Exhibit i. This Air Monitoring Plan shall be followed for the duration of the mine unless amended by the Committee.

6. If the State of Minnesota adopts standards for ambient silica dust, Operator shall be required to comply with those standards.

VIII. RECLAMATION

A. Reclamation Plan:

1. Reclamation shall be in substantial conformance with Exhibit u of the Interim Use Permit Application dated March 12, 2012.

2. When mining is completed, a registered engineer shall certify to the County and Townships that the site has been restored in accordance with the Reclamation Plan dated March 12, 2012 attached hereto as Exhibit U and the Braun Intertec Geotechnical Evaluation Reports attached hereto as Exhibit n.

3. Operator shall be ultimately responsible for all means and methods utilized in the implementation of all mining, processing and reclamation plans. Operator shall implement a process substantially similar to Braun Intertec's reclamation recommendations as stated in Braun's evaluation attached as Exhibit n to the IUP.

4. The Reclamation Plan shall include a frontage road in the location identified on Exhibit u of the Interim Use Permit Application dated March 12, 2012. The Operator shall dedicate the right-of–way for the frontage road in a location reasonably acceptable to the Townships and shall be responsible for the cost of constructing the frontage road to the Townships' road specifications at the time the property is developed for its end use. It is understood that the frontage road will not be constructed until the mining operation is complete, at the earliest.

5. Buildings not used for the mining operations shall be removed. At the conclusion of the mining operation the processing plant shall be removed from the site unless an acceptable use can be identified for the building in the sole discretion of the County. Security for reclamation shall remain in place until the processing plant is removed or an alternate use is identified for the building.

6. The stockpiled topsoil must be re-spread on the site and shall not be sold or removed.

B. Reclamation Standards:

1. Reclamation shall be conducted in the general sequence and manner as described in the Reclamation Plan included herein as Exhibit u.

2. Reclamation shall be on-going with back filling of areas and establishment of vegetation proceeding as soon as practical after a mining area has been completed.

3. Reclamation shall follow the RMP vegetation requirements.

4. Any revision in content of the above referenced reclamation plans will require Operator to submit the proposed revisions to the plan to Scott County Planning and Zoning and receive approval from the Scott County Board prior to implementation of the revised plan.

5. Operator shall report all reclamation activities in the Annual Report to be submitted to Scott County, the Townships and the Committee.

6. Operator shall engage a geotechnical engineer to design and periodically observe the reclamation backfilling and monitoring processes (including surcharge monitoring) and provide reports on such activities to the County, the Townships and the Committee when received by Operator from the geotechnical engineer.

7. At the conclusion of the reclamation process the Operator's geotechnical engineer must perform a post reclamation evaluation and certify to the County, the Townships and the Committee that the reclaimed areas are suitable for future end use of the Subject Property. In the case of Township road corridors in reclaimed areas, the geotechnical engineer must provide certification to the Operator and the Townships that settlements shall not exceed the maximum projected limits referenced in Section D of in Braun's evaluation attached as Exhibit n to this IUP, specifically limiting anticipated settlements to less than 1 inch for pavements and buildings for the final condition. The settlement must be evenly distributed such that spot settlements or shear settlements shall not occur.

IX. LIGHTING

All lighting at the mine shall comply with the Photometric Plan attached hereto as Exhibit j. Further, prior to installing any new or temporary outdoor lighting not referenced in Exhibit j, other than emergency lighting, Operator shall submit an outdoor lighting plan to both Scott County, the Townships and the Committee and receive approval prior to implementation of the revised plan, which approval shall not be unreasonably withheld.

X. INSPECTIONS

The premises and operations shall be available for inspections by the authorized County inspectors, as specified by the County Board and members of the Committee and Township Officers, within normal company working hours upon reasonable advance notice to the Operator. Any inspectors must identify themselves to an employee of the Operator before entering onto the property and must be escorted by an employee of the Operator at all times to ensure the safety of the inspectors. Inspectors shall receive hardhats, safety glasses and reflective vests from the Operator upon arrival. Inspectors will be required to provide all other safety equipment they may desire are that may be required in compliance with the applicable State and Federal laws and regulations.

EXHIBIT D

COMPLAINT vs. BRYAN IVERSON

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Attorneys for Plaintiffs

MONTANA FIFTH JUDICIAL DISTRICT COURT, BEAVERHEAD COUNTY

LEANNE PAULSON, TRUSTEE OF THE LEANNE L. PAULSON REVOCABLE TRUST , JEFF PAULSON, CHARLES PAULSON, TRUSTEE OF THE PAULSON FAMILY TRUST DATED AUGUST 24, 2006, JEFF PETERSON, and TIM MEYER,

Plaintiffs,

v.

BRIAN IVERSON, SILICA MINING, INC., and WESTERN INDUSTRIAL MINERALS, LLC,

Defendants.

Cause No. DV-12-13609

COMPLAINT

* *

For their complaint against defendants, plaintiffs allege:

1. Plaintiff Charles Paulson is a resident of the state of Wisconsin. All other Plaintiffs are residents of the state of South Dakota and all plaintiffs are individually and collectively minority shareholders in Silica Mining, Inc.

2. Brian Iverson ("Iverson") is a resident of the state of Minnesota or the state of Montana and is the putative majority shareholder in Silica Mining, Inc.

3. Silica Mining, Inc. ("Silica Mining") is a Montana corporation whose assets are located in Beaverhead County, Montana. Iverson arranged for the formation of Silica Mining through an incorporator, All Day $49 Montana Registered Agent, LLC. The Articles of Incorporation authorized 10,000 shares of common stock. By-laws were prepared, apparently by the registered agent, but signed copies of the by-laws have not been provided to the Secretary of the corporation.

4. Western Industrial Minerals, LLC ("WIM") is a Montana limited liability company with assets located in Beaverhead County, Montana. Silica Mining owns an undetermined but controlling interest in WIM.

5. After Silica Mining was formed by Iverson, Silica Mining obtained an option to purchase patented mining claims south of Dillon, Montana known as Barretts Rock Quarry Placer, MS 1586 and Quarry Spur Placer, MS 1587, which contain quartzite silica deposits suitable for production of sand used in oil and gas drilling fracking operations. Silica Mining also obtained the rights to a mothballed garnet mill south of Dillon for processing of the quartzite material into frac sands.

6. In order to raise capital for the development for the mining and milling operations, Iverson wrote a Private Placement Memorandum ("PPM") to sell up to 30,000 shares in Silica Mining for $1,500,000 to investors. Upon the sale of that stock, Iverson was to remain the 51% shareholder in Silica Mining. The PPM contained a specific business plan for the development, mining and marketing of frac sand from the silica deposits and use of the proceeds from the stock sale for completing the purchase of said mining claims and mill, for drilling, testing, and engineering of the deposit, and for appraisal of the project. The PPM and Iverson also represented that the corporation would secure additional funds with a second stock offering and financing for capital expenditures and development costs necessary to bring the project into

production. The PPM also contained the logo of WIM, indicated that Iverson was negotiating leases on BLM property in the area which also contained silica deposits, and represented that Iverson obtaining those leases was part of the business plan of Silica Mining. Iverson failed to disclose that he had recently been involved in bankruptcy proceedings which would be a barrier to conventional financing for the company and failed to disclose his personal gain that he would derive from self-dealing as a promoter of the project. As alleged herein, the PPM written by Iverson contained significant misrepresentations and omissions. Relying upon the representations contained in the PPM, other documents provided by Iverson, and oral representations about Silica Mining by Iverson, plaintiffs and additional investors agreed to purchase stock in Silica Mining.

7. The stock offering resulted in the sale of $950,000 in Silica Mining stock. Iverson personally retained 20% of that amount, or $190,000, as stated in the PPM. Following the sale of this stock, Iverson contends that he is the holder of 46,000 shares of the corporation or 66% of the issued shares for which his capital contribution was $96,886.78.

8. The net proceeds of the stock sale to plaintiffs and other investors was used, in part, for drilling, testing and engineering work for the eventual mine, milling and marketing of frac sand.

9. A board of directors of Silica Mining ostensibly was formed consisting of Jeff Paulson, Meyer and Quenton McEntee.

10. Iverson was made president of Silica Mining with responsibilities for representing Silica Mining's interests in seeking additional investors in the corporation and financing to develop the silica deposits into marketable frac sand. He started paying himself a monthly salary of $10,000 without Board approval. Iverson declared that Quenton McEntee would be Vice

President and would have some responsibility for obtaining financing. Iverson solicited an investment in the corporation from Ike and Ryan Thomas of Texas, who had experience with frac sand reserves and who had recently sold a sand production facility.

11. Iverson, acting without seeking board approval, began deviating from Silica Mining's business plan as set forth in the PPM. Iverson controlled the bank account where company funds were deposited and used those funds, *inter alia*, to travel and investigate frac sand production in Wisconsin and discuss a possible joint venture with the group owning that operation, to explore marketing agreements with competing frac sand ventures, and to incur significant travel expenses for questionable reasons. Iverson failed to set up an accounting system for his use of corporate funds, and he failed to keep the Board and other shareholders advised of his efforts to procure project development funds and to engage in other activities on behalf of the corporation.

12. Ike and Ryan Thomas attempted to negotiate the purchase of stock to make a significant investment in the company. Through the Board, the Thomases offered to purchase $2,000,000 in stock, their experience in a frac sand production facility, and the additional incentive of obtaining a $20 million non-recourse loan for the corporation through an affiliated bank. The Board took the Thomas offer to Iverson, who vetoed the proposal, insisting upon a $4,000,000 investment. When the Thomases offered to increase their investment to $3,000,000, Iverson still would not agree. Ultimately, the Thomas family decided not to buy stock or otherwise invest in Silica Mining. Despite assuring plaintiffs and the other minority shareholders that he could obtain the necessary financing, Iverson was unsuccessful in finding additional investors or obtaining bank financing for development of the mining properties.

13. Iverson's unapproved activities and inability to obtain necessary development financing led to friction with the Board and minority shareholders, resulting in Iverson's demand that Tim Meyer be replaced on the Board of Directors. Iverson also notified Quenton McEntee that he was no longer necessary as Vice-President and no longer responsible for financing, as he claimed to have retained a broker to find financing for the project.

14. Iverson started using Silica Mining assets for personal gain and for his involvement in other ventures and enterprises which were not affiliated with Silica Mining. Iverson entered into an enterprise with Ike and Ryan Thomas known as Glacier Sands which is involved in businesses which compete with Silica Mining. Iverson misrepresented to the Thomases that the Board was not interested in having them invest in Silica Mining. Following this, the Thomases would no longer consider an investment in Silica Mining, even though Board members had previously with them personally in Texas for that purpose at Iverson's request. Iverson also became involved in another competing entity known as Frac Sand Resources and listed both of those entities on his emails, along with Silica Mining. Although plaintiffs objected to this conflict of interest, Iverson continued this practice. Iverson promoted Glacier Sands and Frac Sands Resources utilizing Silica Mining assets.

15. Iverson furthered deviated from Silica Mining's business plan in the PPM by undertaking negotiations to purchase property adjacent to the mining claims known as the Grasshopper Creek Ranch.

16. Based upon Iverson's inability to obtain bank financing or other third-party financing and Iverson's failure to move the project forward, the Board felt it had no choice but to turn from developing the Silica Mining project into an operating frac sand production company towards the concept of selling the assets of Silica Mining to a third party.

17. Iverson's actions caused grave concern and consternation among plaintiffs and the minority shareholders, as they invested in Silica Mining on the premise that development and mining activities would occur, leading to production and marketing of frac sand. The remaining payment on the option to purchase the patented mining claims was due by January 15, 2012, and some of the plaintiffs initiated efforts using their credit status to obtain financing of $1,500,000 to obtain title to said mining claims and the mill.

18. In the course of pursuing financing on behalf of the corporation, the status of Silica Mining's ownership of WIM came into question. Iverson disclosed that the mining rights to the BLM leases were obtained in the name of WIM, but he claimed personal ownership of 85% of WIM along with two other persons who were not shareholders in Silica Mining. When minority shareholders raised concerns about misrepresentations which Iverson had made about Silica Mining's ownership of WIM, Iverson offered to assign a 75% interest in WIM to Silica Mining, retaining a 10% ownership interest himself. Iverson had been using Silica Mining assets to fund WIM's acquisition of the BLM leases and issues arising therefrom. When pressed further, Iverson agreed to have the mining rights to the BLM leases assigned to Silica Mining. The right to mine the deposits under the BLM leases had been challenged by BLM and was the subject of litigation. Further, there were issues with possible claims for production royalties which might be due if mining occurred on the BLM property.

19. A shareholder's meeting was called for December 19, 2011, and all shareholders attended either in person or by proxy. Several resolutions were considered by the shareholders. Resolutions were passed (1) authorizing efforts to obtain short-term financing from a bank in Sioux Falls, South Dakota, supported by personal guaranties from the Board members and Tim Meyer and the deposit of those funds at that bank under the control of the Board only; (2)

directing Iverson to assign the mining rights under the BLM leases to Silica Mining; (3) pursuing a sale of Silica Mining through broker Meagher Energy Advisers and suspending the efforts to mine the deposits and build a production facility; and (4) suspending all monthly salary payments to Iverson starting January 1, 2012. Resolutions were also considered to allow amendment of the by-laws to give each shareholder a vote no matter the number of shares held, rather than to have shareholder voting performed by number of shares held. Iverson, the putative majority shareholder abstained from voting on these resolutions, thus they failed to pass.

20. The Sioux Falls bank would not provide the requested financing, principally because Iverson was the putative majority shareholder, and the bank would not accept a personal guaranty from him. The urgency for financing still existed as Silica Mining needed to pay the balance of the option price to obtain title to the patented mining claims by January 15. Iverson could not obtain financing for Silica Mining.

21. Iverson had made efforts to obtain ranch property known as the Grasshopper Creek Ranch adjacent to the patented mining claims for the purported purpose of having an area to deposit overburden removed to reach the silica deposits and to construct a different production mill for the sand. The other shareholders were opposed to this acquisition, particularly once all shareholders had agreed to sell the company rather than proceed to development and production of frac sand. Despite the position of the minority shareholders and the Board, Iverson proceeded to sign a Buy-Sell Agreement on December 28 for Silica Mining to purchase the Grasshopper Creek Ranch without the prior knowledge or approval of the Board or other shareholders.

22. When short-term financing could not be obtained, the Board announced that it was in favor or raising the necessary money through a cash call on shareholders. Iverson refused

to take a position on the proposed cash call despite efforts of the other shareholders to contact him to determine his position.

23. Iverson finally responded to the cash call proposal by offering to sell his stock for cash and a percentage of the proposed sale of the company. Iverson made several different offers, none of which were acceptable to the other shareholders. A review of the company records during this time revealed that Iverson had used Silica Mining funds in support of Iverson's other personal, conflicting ventures and that Iverson had continued to draw a salary as president in January despite the suspension of his salary by resolution passed on December 19.

24. Iverson did obtain an extension to March 15 for the payment of the balloon payment owed on the patented mining claims, and he signed the brokerage agreement with Meagher Energy Advisors to market the sale of Silica Mining's assets.

25. At the end of January, the Board made a counteroffer to Iverson for the purchase of his stock in Silica Mining, giving him 3 days to accept the offer. The following day, a judge ruled against the BLM, allowing mining on the BLM leases to proceed. Iverson then withdrew his previous offer to sell his stock.

26. Following this the Board became concerned about Iverson taking actions to bind the corporation to financing or to a sale of the company assets without Board approval. As a result the Board held a special Board meeting on February 16, 2012 in which the Board voted to remove Iverson as President of Silica Mining. Iverson was notified of this Board action thereafter.

27. Iverson responded by calling a Special Meeting of Shareholders for Whitefish, Montana for February 29, 2012 for the purpose of removing the existing directors and electing new directors, increasing the authorized shares of the corporation, changing the corporation's

registered office, and approving loans to the corporation. The Notice of this special meeting was defective, *inter alia*, in that the meeting was to be held at the office of the registered agent of the corporation in Whitefish, Montana, but Iverson used an incorrect address for that office in the Notice.

COUNT ONE
(Declaratory Judgment)

28. Plaintiffs reallege and incorporate by reference their allegations in paragraph 1-27 as if fully set forth herein.

29. An actual controversy has arisen between plaintiffs and defendants relating to the following matters:

(a) the status and extent of Iverson's stock ownership in Silica Mining;

(b) the control of the Board of Directors of Silica Mining over Iverson as president of the corporation;

(c) who controls the governance and operations of the Silica Mining;

(d) whether by-law were ever properly adopted or amended and whether corporate actions taken pursuant to by-laws were valid;

(e) Silica Mining's and Iverson's ownership interests in WIM;

(f) The status of the Silica Mining's ownership interest in the mining rights to the BLM leases;

(g) Whether any action taken at the Special Meeting of Shareholders on February 29, 2012 is valid.

30. Plaintiffs request this court to enter a declaratory judgment determining the rights

and responsibilities of the parties as to these issues and any others brought before this court.

COUNT TWO
(Breach of Trust and Confidence and Fiduciary Duty)

31. Plaintiffs reallege and incorporate by reference their allegations in paragraph 1-30 as if fully set forth herein.

32. As President and putative majority shareholder of the corporation, Iverson held positions of trust and confidence with respect to the other shareholders, owed fiduciary duties to the Board of Directors and to the minority shareholders to act in good faith and deal fairly, as an ordinarily prudent person would act and in the best interests of the shareholders and the Board in his actions taken on behalf of the corporation.

33. Iverson breached his trust and confidence position and breached his fiduciary duties by taking actions which were not in the best interests of the Board and other shareholders, including making substantial deviations from the business plan of the corporation, failing to obtain necessary financing to develop an operational frac sand production facility, and using corporate assets for personal reasons and not in furtherance of the business of the corporation. These acts and omissions constitute oppression of the minority shareholders of the corporation.

34. Plaintiffs have suffered actual damages caused by Iverson's breach of his position of trust and confidence and by breaching his fiduciary duties.

35. Iverson's engaged in actual fraud and/or actual malice in the breach of position of trust and confidence and breach of his fiduciary duties and should be liable for punitive damages in addition to actual damages.

COUNT THREE
(Breach of the Duty of Loyalty, Self-Dealing)

36. Plaintiffs reallege and incorporate by reference their allegations in paragraph 1-35 as if fully set forth herein.

37. Iverson owed a duty of loyalty to the shareholders and board members of Silica Mining. That duty of loyalty required Iverson to refrain from taking actions which would be contrary to the best interests of Silica Mining, to provide his undivided loyalty to Silica Mining, and to refrain from becoming involved in other ventures which might be in competition with Silica Mining.

38. Iverson breached his duty of loyalty by deviating from the business plan he developed for Silica Mining and represented to the minority shareholders, by refusing the legitimate offers of Ike and Ryan Thomas to invest in the company and obtain development financing necessary to create a frac sand production company, by becoming involved in competing businesses while purportedly serving as the President of Silica Mining, and by utilizing assets belonging to Silica Mining to pursue other, sometimes competing, business interests.

39. Plaintiffs have suffered actual damages caused by Iverson's breach of the duty of loyalty and his own self-dealing.

40. Iverson engaged in actual fraud and/or actual malice in breaching the duty of loyalty and his own self-dealing and should be liable for punitive damages as a result.

COUNT FOUR
(Securities Fraud)

41. Plaintiffs reallege and incorporate by reference their allegations in paragraph 1-40 as if fully set forth herein.

42. It is unlawful under Montana law for any person to offer to sell securities by making untrue statements of fact or omit material facts necessary to make representations about securities not misleading, or to engage in any act, practice, or course of business that would operate as a fraud or deceit to persons who purchase such securities.

43. Iverson created a Private Placement Memorandum ("PPM") for the sale of stock in Silica Mining and otherwise made representations to plaintiffs and other investors about Silica Mining. The PPM contained untrue or misleading statements and Iverson made misrepresentations about Silica Mining as follows: (a) Proceeds from the sale of shares would be used to purchase the patented mining claims and the garnet mill owned by Montana Pride; (b) Silica Mining owned or controlled Western Industrial Minerals; (c) The BLM leases to the east of Interstate 15 were part of the development and mining plan for Silica Mining; (d) The project would become fully operational within 4 months of the sale of stock from the offering. In addition, Iverson failed to disclose that he had given shares of stock to Quenton McEntee for procuring plaintiffs and other minority shareholders to invest in the corporation, his involvement in a bankruptcy which would make it difficult for the corporation to obtain financing, and that Iverson had sold stock in Silica Mining to his parents at a significantly reduced price.

44. The statements were untrue or misleading for the following reasons: (a) The patented mining claims and Montana Pride mill have not been acquired Silica Mining as of this date. Substantial money is still owed on payments being made on the mining claims and mill, and the corporation is almost out of money raised in the stock offering; (b) Several months after money was raised by the sale of shares from the stock offering, Iverson notified Silica Mining investors that he and two other individuals owned WIM and that Silica Mining had no ownership interest in Silica Mining. (c) After the sale of stock from the stock offering, Iverson notified

Silica Mining investors that WIM held the mining rights to the BLM leases to the east of Interstate 15; (d) Operations have yet to commence on the project.

45. Iverson made these untrue statements of facts and misleading statements with the knowledge that the statements were false or with sufficient information that he knew or should have known that the statements were materially misleading. Iverson failed to disclose the true facts known to him, knowing that plaintiffs and other investors would rely on the representations he made in making their decisions to purchase the offered stock. Plaintiffs, in fact, did rely on the representations made by Iverson in the PPM and otherwise in deciding to purchase the offered stock.

46. Iverson failed to register the stock of Silica Mining with the Montana Securities Division before offering it for sale under the terms of the PPM.

47. Plaintiffs have suffered actual damages resulting from the securities fraud undertaken by Iverson.

COUNT FIVE
(Appointment of a Custodian)

48. Plaintiffs reallege and incorporate by reference their allegations in paragraph 1-47 as if fully set forth herein.

49. Silica Mining's Board and Iverson have clashed over the proper direction for the corporation. Although the shareholders have passed resolutions confirming that the assets of the company will be sold, Iverson will not act in accordance with the resolutions. Iverson continued to draw a salary after the Board suspended all salaries by resolution.

50. The corporate records of Silica Mining are not well maintained, and there are questions about proper governance of the corporation in accord with adopted and signed by-laws.

51. Iverson has squandered assets of the corporation and has used corporate assets to pursue other personal business ventures, some of which conflict with the planned operations of Silica Mining.

52. Although plaintiffs do not seek to dissolve the corporation at this time, they seek to invoke the equity jurisdiction of this court to appoint a custodian to control and run the affairs of the corporation during the pendency of this action and as necessary to preserve and sell the assets of the corporation to protect its shareholders.

COUNT SIX
(Equitable Relief Other Than Dissolution)

53. Plaintiffs reallege and incorporate by reference their allegations in paragraph 1-52 as if fully set forth herein.

54. Montana law recognizes the equity powers of a district court to fashion a remedy to protect shareholders short of dissolution of the corporation and liquidation of its assets. That power has been codified, in part, by the Montana legislature.

55. Due to Iverson's brazen manipulation of principles of corporate governance, his self-dealing, securities fraud, and breaches of his duties to the minority shareholders, plaintiffs request that this Court prohibit and enjoin Iverson from taking any further action, either as a putative majority shareholder, officer, or Board member, to assert control over the corporation or its assets and to issue an order cancelling any actions taken by Iverson which jeopardize the assets of the corporation or otherwise impair or prevent plaintiffs from realizing the full value of their stock in the corporation.

56. Plaintiffs request this Court to invalidate any action taken at the Special Meeting of Shareholders on February 29, 2012 or any action taken thereafter by Iverson.

57. Plaintiffs further request this court to issue an order allowing them or the corporation to purchase the stock held by Iverson at a fair value less the damages he has caused to plaintiffs and other minority shareholders by the acts and omissions set forth in this Complaint or which may otherwise be proven in this action.

WHEREFORE, plaintiffs pray for the following relief:

1. For actual and punitive damages against Iverson for his breach of trust and confidence, breach of fiduciary duty, breach of the duty of loyalty, his own self-dealing, and for his oppression of minority shareholders.

2. For actual damages for the securities fraud committed by Iverson.

3. For appointment of a custodian to direct and control the activities of Silica Mining during the pendency of this action.

4. For an order prohibiting and enjoining Iverson from taking any further action, either as a putative majority shareholder, officer, or Board member, to assert control over the corporation or its assets and to issue an order cancelling any actions taken by Iverson which jeopardize the assets of the corporation or otherwise impair or prevent plaintiffs from realizing the full value of their stock in the corporation.

5. For an order allowing plaintiffs or the corporation to purchase the stock held by Iverson at a fair value less the damages he has caused to plaintiffs and other minority shareholders by the acts and omissions set forth in this Complaint or which may otherwise be proven in this action.

6. For an order invalidating any action taken at the Special Meeting of Shareholders on February 29, 2012 and any action taken by Iverson on behalf of the corporation without proper authority before or after that date.

7. For a declaratory judgment determining proper governance of Silica Mining, the extent of Iverson's ownership interest, Silica Mining's ownership interest in Western Industrial Materials, and the ownership of mining rights on the BLM leases.

8. For an award of attorney fees and costs.

9. For such other relief which seems just to the court.

DATED this 1 day of March, 2012.

CORETTE POHLMAN & KEBE

By _____
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Attorneys for Plaintiffs