

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.

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Page: 2
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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.

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Page: 3
Project: 23/70-1014

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.

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Page: 4
Project: 23/70-1014

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 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.

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Page: 5
Project: 23/70-1014

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.

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Page: 6
Project: 23/70-1014

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

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Page: 7
Project: 23/70-1014

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 1 mine-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

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Page: 8
Project: 23/70-1014

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

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

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Page: 9
Project: 23/70-1014

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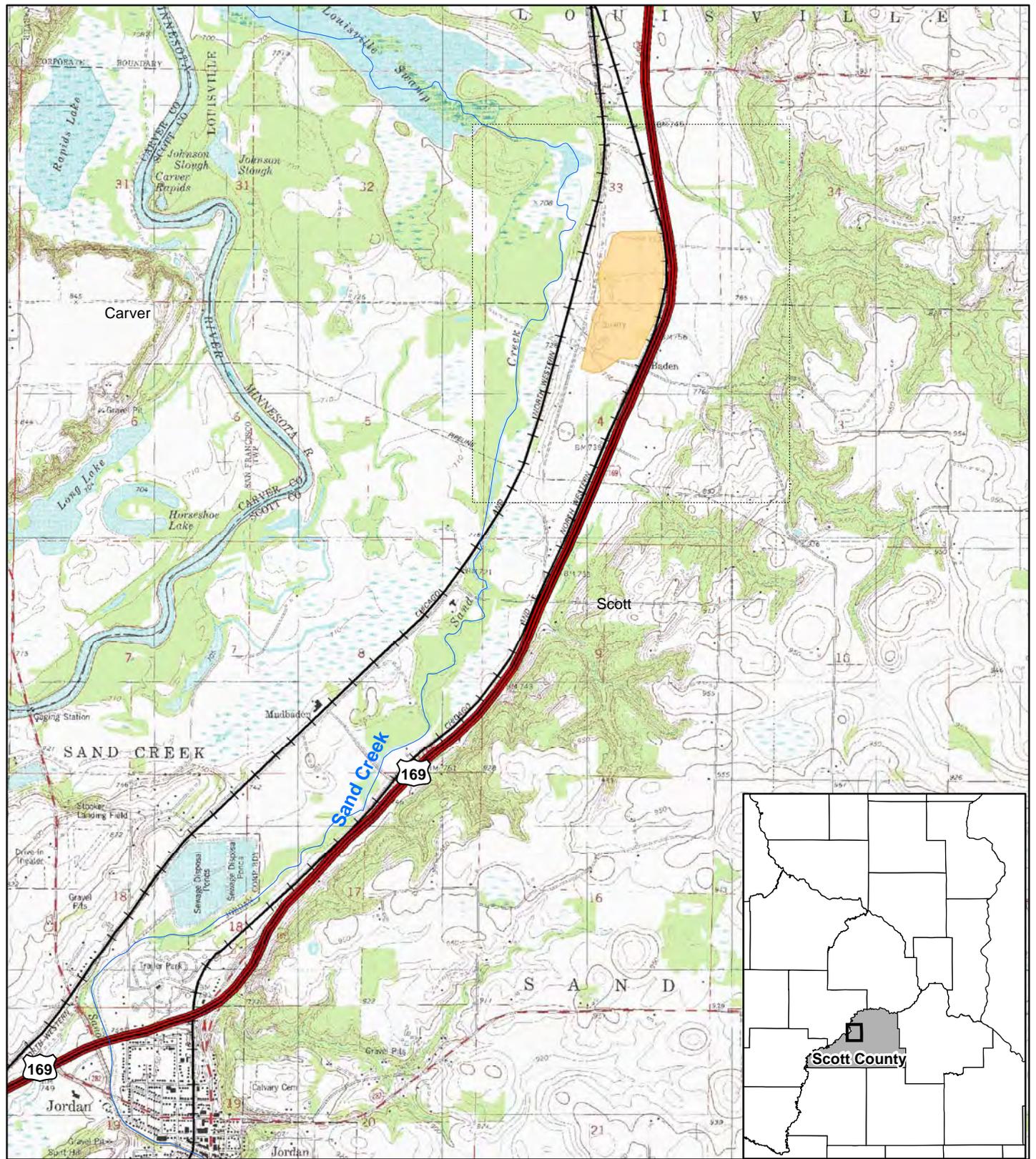
Table 1
 Simulated Baseflow in Sand Creek During Mining Phases
 Great Plains Sand Mining
 Progressive Rail, Inc.
 Jordan, MN

Mining Phase	Sand Creek Baseflow		Percent Baseflow Reduction from Pre-mining Phase
	cfs	gpm	
Pre-mining	14.27	6405	--
Mining	14.00	6283	1.9
Reclamation	14.33	6430	-0.4

Notes:

cfs = cubic feet per second

gpm = gallons per minute



Base Map: U.S. Geological Survey DRG, 2002

-  County Line
-  Mining Area (Approx.)
-  Sand Creek
-  U.S. Highway
-  Rail Line



Feet

3,000 0 3,000

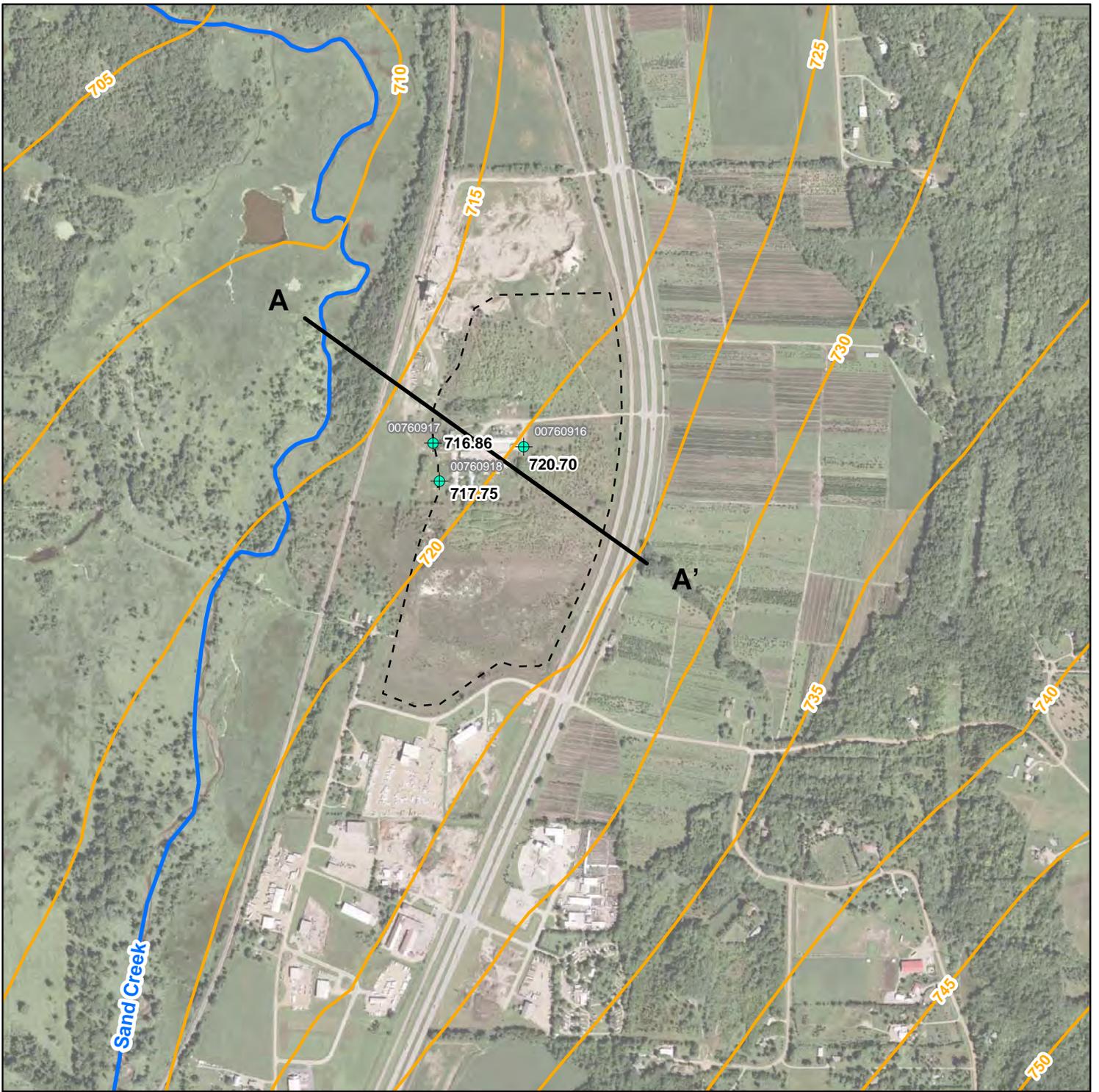


Meters

1,000 0 1,000



Figure 1
 PROPERTY LOCATION
 Great Plains Sand Mining
 Progressive Rail, Inc.
 Jordan, MN



-  Mining Area (Approx.)
-  Hydraulic Head, ft MSL
-  Conceptual Cross Section Line
-  Sand Creek
-  Head Calibration Targets

Imagery: Aerials Express, 2006

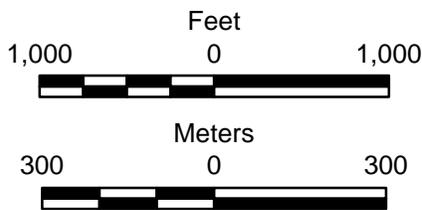
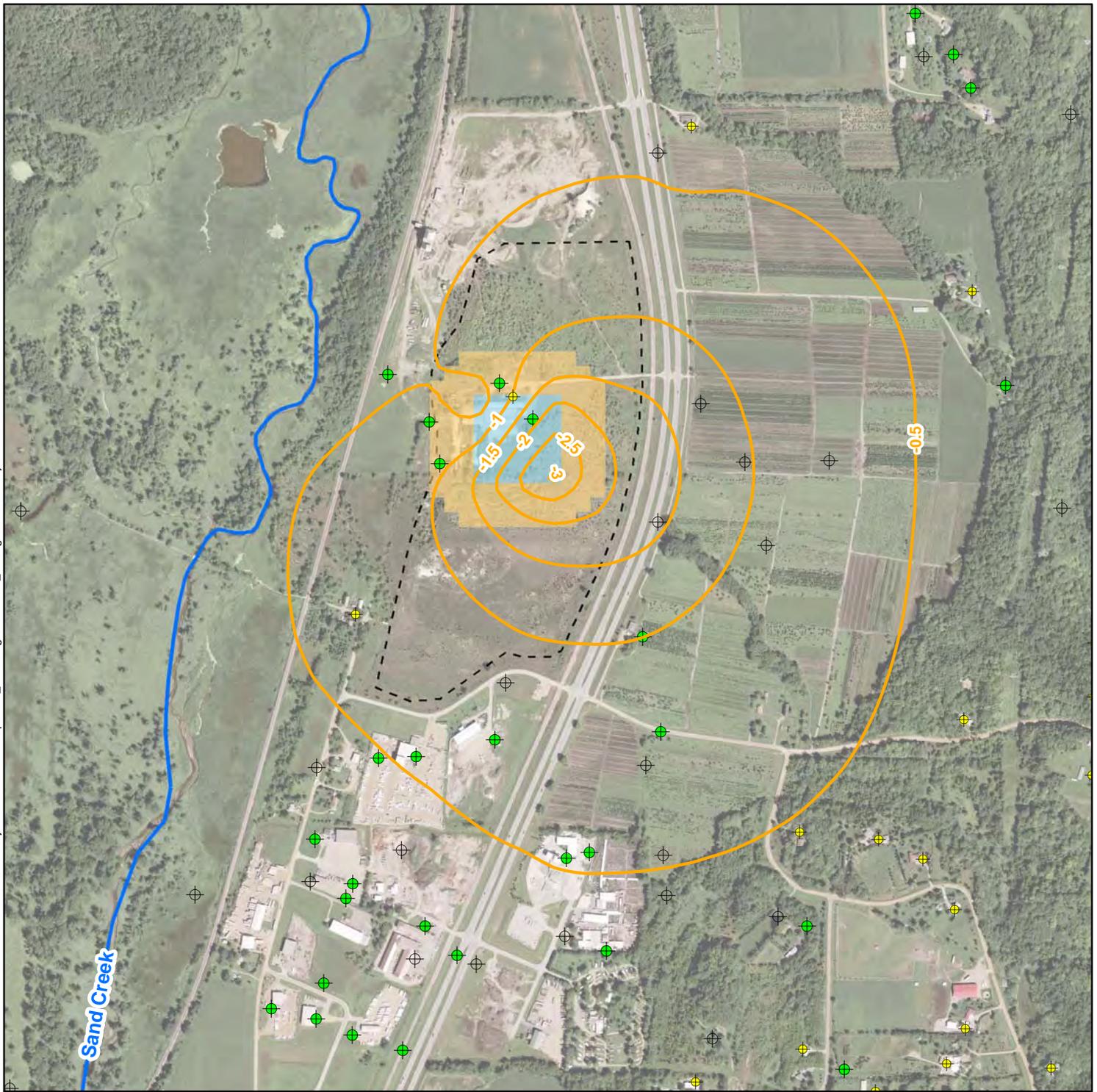


Figure 2
SIMULATED HEAD IN
JORDAN SANDSTONE:
PRE-MINING PHASE
Great Plains Sand Mining
Progressive Rail, Inc.
Jordan, MN



- Mining Area (Approx.)
- Simulated Above-Ground Mining Area
- Simulated Mine Pit Lake
- Head Change from Pre-Mining, ft (0.5 ft contour interval)
- Sand Creek
- Well Log Available (CWI)
- Other Potential Well *
- Possible Residential Well *

* No well listed at this location in the CWI. Based on a review of aerial photographs and County parcel data it appears likely that there may be a well at this location.

Imagery: Aerials Express, 2006

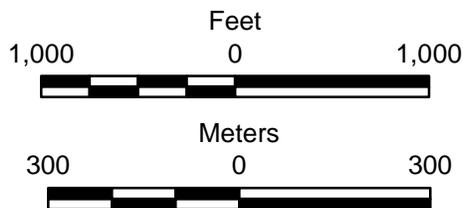
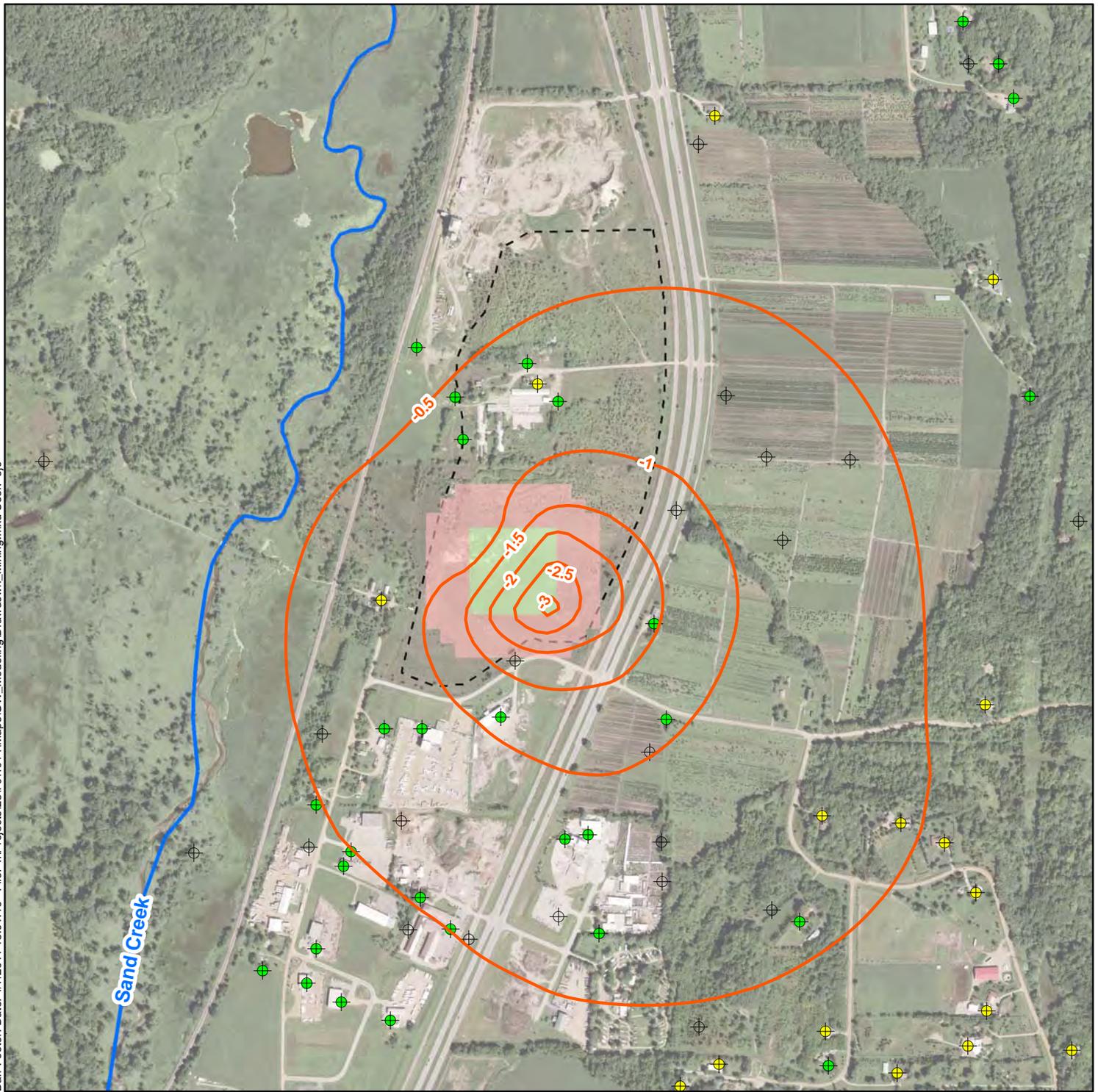


Figure 3a
**SIMULATED HEAD CHANGE
 IN JORDAN SANDSTONE:
 "AVERAGE" MINING PHASE**
 Great Plains Sand Mining
 Progressive Rail, Inc.
 Jordan, MN



- Mining Area (Approx.)
- Simulated Mine-Pit Lake
- Simulated Above-Ground Mining Area
- Head Change from Pre-Mining, ft (0.5 ft contour interval)
- Sand Creek
- Well Log Available (CWI)
- Other Potential Well *
- Possible Residential Well *

Imagery: Aerials Express, 2006

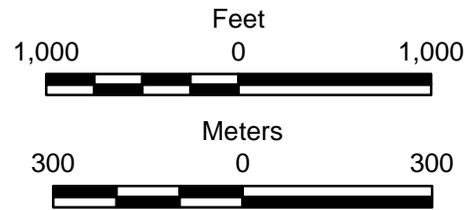
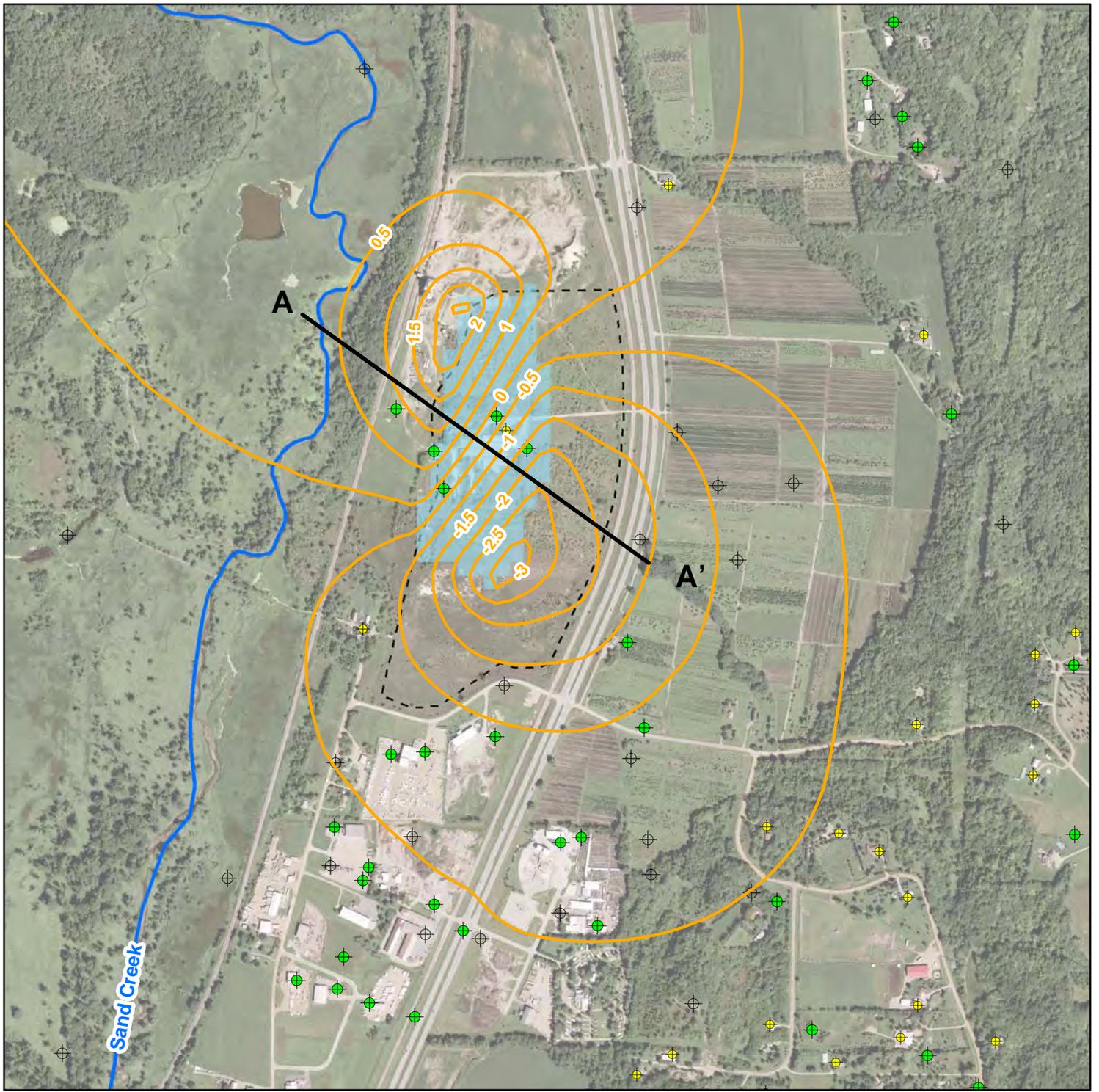


Figure 3b
 SIMULATED HEAD CHANGE
 IN JORDAN SANDSTONE:
 "SOUTH" MINING PHASE
 Great Plains Sand Mining
 Progressive Rail, Inc.
 Jordan, MN

* No well listed at this location in the CWI. Based on a review of aerial photographs and County parcel data it appears likely that there may be a well at this location.



- Mining Area (Approx.)
- Simulated End-Use Lake
- Head Change from Pre-Mining, ft (0.5 ft contour interval)
- Sand Creek
- Conceptual Cross Section Line
- Well Log Available (CWI)
- Other Potential Well *
- Possible Residential Well *

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Imagery: Aerials Express, 2006

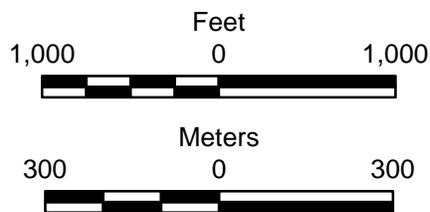


Figure 4
 SIMULATED HEAD CHANGE
 IN JORDAN SANDSTONE:
 RECLAMATION PHASE
 Great Plains Sand Mining
 Progressive Rail, Inc.
 Jordan, MN

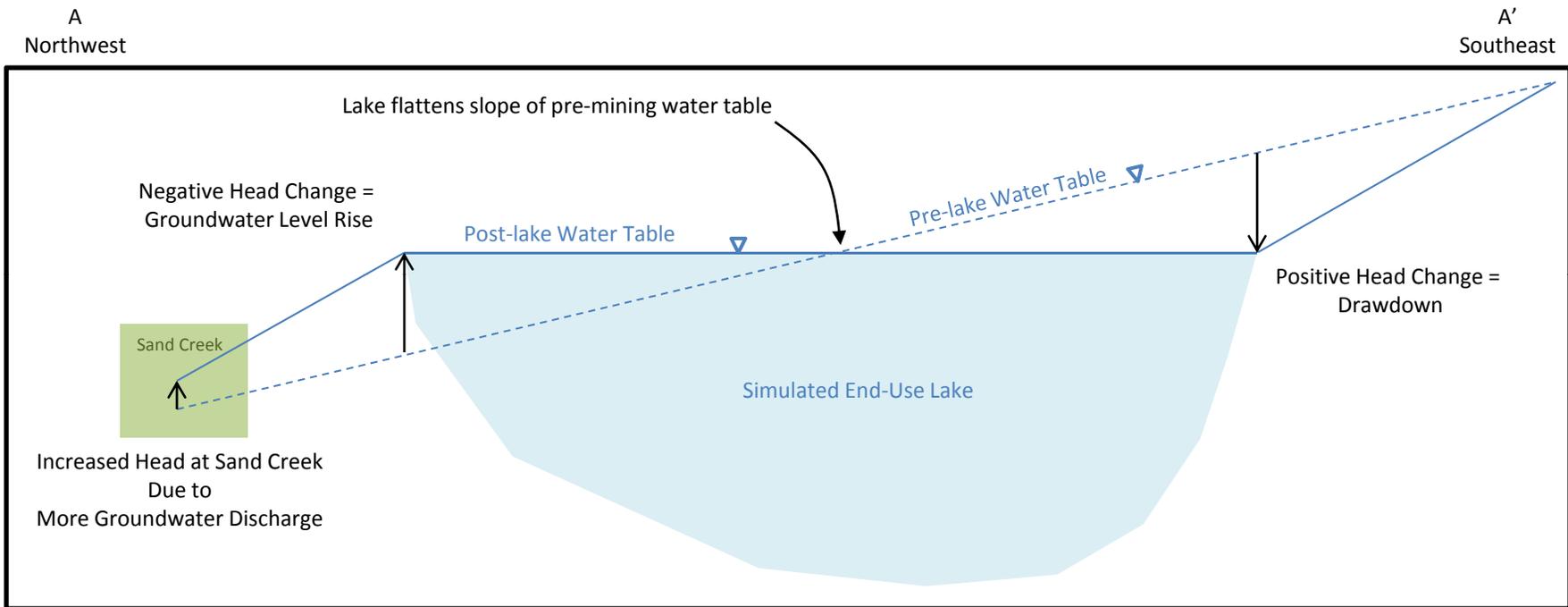
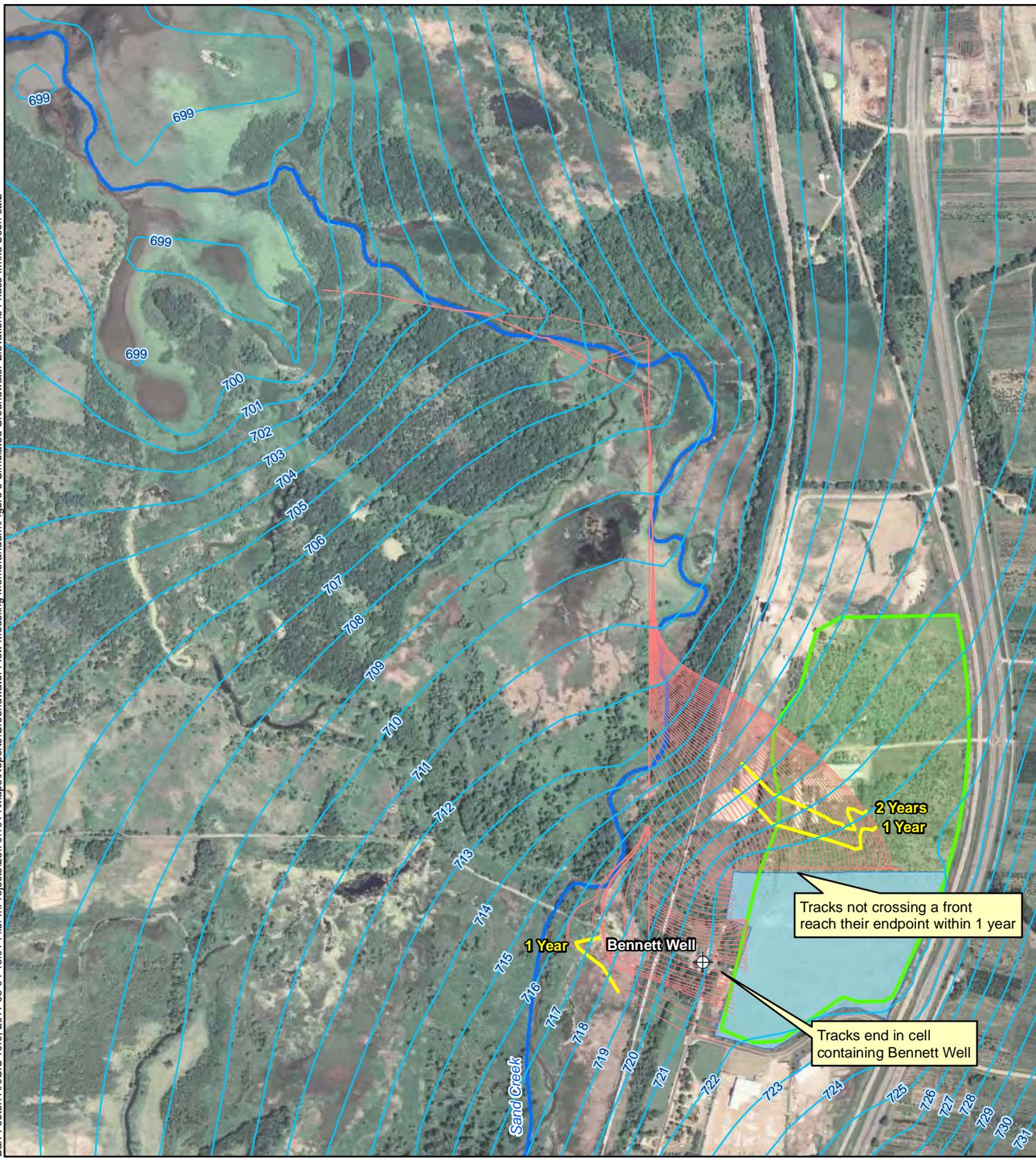


Figure 5
 CONCEPTUAL CROSS SECTION
 SIMULATED CHANGE IN GROUNDWATER LEVEL DURING RECLAMATION PHASE
 Great Plains Sand Mining
 Progressive Rail, Inc.
 Jordan, MN

Not to scale



- Residential Well
- Groundwater Elevation Contours (ft)
- Groundwater Flowpaths
- 1 and 2 Year Travel Times
- Mining Area (Approximate)
- Phase 1 Pit Area
- Sand Creek

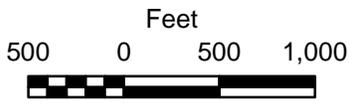
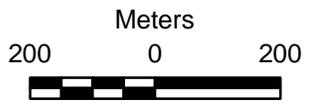
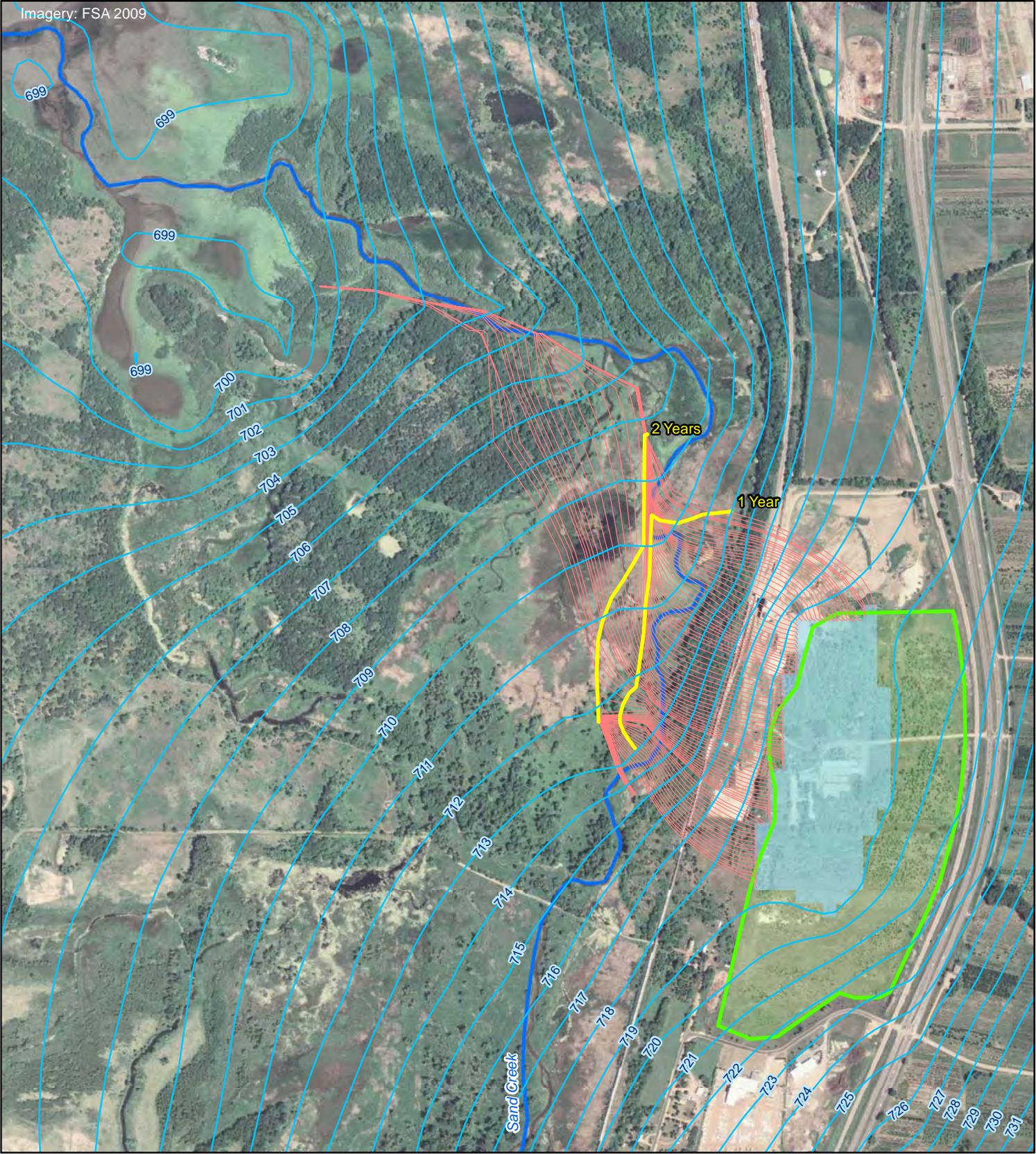


Figure 6

STEADY-STATE SIMULATIONS
 OF GROUNDWATER ELEVATION,
 GROUNDWATER FLOW PATHS, AND
 GROUNDWATER TIME-OF-TRAVEL,
 PHASE 1
 Jordan Frac Sand Mining
 Progressive Rail, Inc.
 Jordan, MN



-  Groundwater Elevation Contours (ft)
-  Groundwater Flowpaths
-  1 and 2 Year Travel Times
-  Mining Area (Approximate)
-  Simulated End-Use Lake
-  Sand Creek

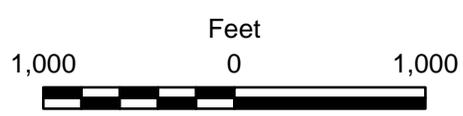
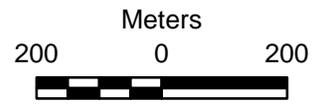


Figure 7

STEADY-STATE SIMULATIONS
 OF GROUNDWATER ELEVATION,
 GROUNDWATER FLOW PATHS, AND
 GROUNDWATER TIME-OF-TRAVEL,
 RECLAMATION PHASE
 Great Plains Sand Mining
 Progressive Rail, Inc.
 Jordan, MN

Minnesota Unique Well No.

178518

County Scott
 Quad Jordan East
 Quad ID 90A

MINNESOTA DEPARTMENT OF HEALTH
WELL AND BORING RECORD
 Minnesota Statutes Chapter 103I

Entry Date 02/11/1988
 Update Date 02/05/1996
 Received Date

Well Name MINN. FRAC. SAND NO. 2 Township Range Dir Section Subsections Elevation 741 ft. 114 23 W 4 BDACCB Elevation Method 7.5 minute topographic map (+/- 5 feet)	Well Depth 65 ft. Depth Completed 65 ft. Date Well Completed 04/28/1981 Drilling Method Non-specified Rotary															
<table style="width:100%; border-collapse: collapse;"> <tr> <td style="width:25%;">Geological Material</td> <td style="width:15%;">Color</td> <td style="width:15%;">Hardness</td> <td style="width:10%;">From</td> <td style="width:10%;">To</td> </tr> <tr> <td>SAND & CLAY LAYERS</td> <td>BROWN</td> <td>MEDIUM</td> <td>0</td> <td>58</td> </tr> <tr> <td>FINE SAND</td> <td>BROWN</td> <td>MEDIUM</td> <td>58</td> <td>65</td> </tr> </table>	Geological Material	Color	Hardness	From	To	SAND & CLAY LAYERS	BROWN	MEDIUM	0	58	FINE SAND	BROWN	MEDIUM	58	65	Drilling Fluid -- Well Hydrofractured? <input type="checkbox"/> Yes <input type="checkbox"/> No From Ft. to Ft.
	Geological Material	Color	Hardness	From	To											
	SAND & CLAY LAYERS	BROWN	MEDIUM	0	58											
	FINE SAND	BROWN	MEDIUM	58	65											
	Use Other (specify in remarks)	Casing Type Steel (black or low carbon) Joint Threaded Drive Shoe? <input checked="" type="checkbox"/>														
	Yes <input type="checkbox"/> No Above/Below 1 ft.	<table style="width:100%; border-collapse: collapse;"> <tr> <td style="width:33%;">Casing Diameter</td> <td style="width:33%;">Weight</td> <td style="width:33%;">Hole Diameter</td> </tr> <tr> <td>4 in. to 60 ft.</td> <td>lbs./ft.</td> <td>6 in. to 60 ft.</td> </tr> <tr> <td></td> <td></td> <td>4 in. to 65 ft.</td> </tr> </table>	Casing Diameter	Weight	Hole Diameter	4 in. to 60 ft.	lbs./ft.	6 in. to 60 ft.			4 in. to 65 ft.					
	Casing Diameter	Weight	Hole Diameter													
	4 in. to 60 ft.	lbs./ft.	6 in. to 60 ft.													
			4 in. to 65 ft.													
	Open Hole from ft. to ft.	Screen YES Make JOHNSON Type stainless steel														
Diameter 3.8 Slot/Gauze 10 Length 7 Set Between 60 ft. and 65 ft.	Static Water Level 35 ft. from Land surface Date Measured 04/28/1981															
PUMPING LEVEL (below land surface) 58 ft. after hrs. pumping 12 g.p.m.	Well Head Completion Pitless adapter manufacturer Model <input type="checkbox"/> Casing Protection <input type="checkbox"/> 12 in. above grade <input type="checkbox"/> At-grade (Environmental Wells and Borings ONLY)															
NO REMARKS	Grouting Information Well Grouted? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No Grout Material: Bentonite from 0 to 55 ft. 0															
Located by: Minnesota Geological Survey Method: Digitized - scale 1:24,000 or larger (Digitizing Table) Unique Number Input Date: 03/10/1995 Verification: Information from owner System: UTM - Nad83, Zone15, Meters X: 452913 Y: 4951277	Nearest Known Source of Contamination _feet _direction _type Well disinfected upon completion? <input type="checkbox"/> Yes <input type="checkbox"/> No Pump <input type="checkbox"/> Not Installed Date Installed Manufacturer's name Model number HP 0 Volts Length of drop Pipe _ft. Capacity _g.p.m Type Material															
First Bedrock Aquifer Quat. Buried Artes. Aquifer Last Strat Sand-brown Depth to Bedrock ft.	Abandoned Wells Does property have any not in use and not sealed well(s)? <input type="checkbox"/> Yes <input type="checkbox"/> No Variance Was a variance granted from the MDH for this well? <input type="checkbox"/> Yes <input type="checkbox"/> No Well Contractor Certification Hartmann, Donald 40175 JAECHELS, R. License Business Name Lic. Or Reg. No. Name of Driller															

County Well Index Online Report

178518

Printed 4/22/2011
 HE-01205-07

Minnesota Unique Well No.

216749

County Scott
 Quad Jordan East
 Quad ID 90A

MINNESOTA DEPARTMENT OF HEALTH
**WELL AND BORING
 RECORD**
 Minnesota Statutes Chapter 103I

Entry Date 02/23/1989
 Update Date 11/20/2006
 Received Date

Well Name K.O.A. CAMP Township Range Dir Section Subsections Elevation 755 ft. 114 23 W 4 DBDACC Elevation Method 7.5 minute topographic map (+/- 5 feet)		Well Depth 84 ft. Depth Completed 84 ft. Date Well Completed 07/11/1970
Well Address 3315 JOHNSON MEMORIAL DR JORDAN MN 55352		Drilling Method -- Drilling Fluid -- Well Hydrofractured? <input type="checkbox"/> Yes <input type="checkbox"/> No From Ft. to Ft.
Geological Material Color Hardness From To MOSTLY CLAY 0 20 COARSE SAND 20 84 BOULDER 84 84		Use Public Supply/non-comm.-transient PWS ID Source Casing Type Joint No Information Drive Shoe? <input type="checkbox"/> Yes <input type="checkbox"/> No No Above/Below 0 ft.
		Casing Diameter Weight Hole Diameter 6 in. to 74 ft. lbs./ft.
		Open Hole from ft. to ft. Screen YES Make Type stainless steel Diameter Slot/Gauze Length Set Between 6 20 10 74 ft. and 84 ft.
		Static Water Level 27 ft. from Land surface Date Measured 07/11/1970
		PUMPING LEVEL (below land surface) ft. after hrs. pumping g.p.m.
		Well Head Completion Pitless adapter manufacturer Model <input type="checkbox"/> Casing Protection <input type="checkbox"/> 12 in. above grade <input type="checkbox"/> At-grade (Environmental Wells and Borings ONLY)
NO REMARKS Located by: Minnesota Geological Survey Method: GPS SA Off (averaged) Unique Number Verification: N/A Input Date: 05/20/2005 System: UTM - Nad83, Zone15, Meters X: 453405 Y: 4950699		Grouting Information Well Grouted? <input type="checkbox"/> Yes <input type="checkbox"/> No Nearest Known Source of Contamination _feet _direction _type Well disinfected upon completion? <input type="checkbox"/> Yes <input type="checkbox"/> No
		Pump <input checked="" type="checkbox"/> Not Installed Date Installed Manufacturer's name Model number __ HP 3 Volts Length of drop Pipe 69 ft. Capacity _g.p.m. Type Submersible Material
		Abandoned Wells Does property have any not in use and not sealed well(s)? <input type="checkbox"/> Yes <input type="checkbox"/> No
		Variance Was a variance granted from the MDH for this well? <input type="checkbox"/> Yes <input type="checkbox"/> No
First Bedrock Last Strat Boulder or boulders Aquifer Quat. Buried Unconf. Aquife Depth to Bedrock ft.		Well Contractor Certification Hartmann Well Co. 40174 License Business Name Lic. Or Reg. No. Name of Driller
County Well Index Online Report		216749 Printed 4/22/2011 HE-01205-07

Minnesota Unique Well No.

530123

County Scott
 Quad Jordan East
 Quad ID 90A

MINNESOTA DEPARTMENT OF HEALTH

WELL AND BORING RECORD

Entry Date 01/09/1994
 Update Date 05/02/2005
 Received Date

Minnesota Statutes Chapter 103I

<p>Well Name NOWACKI, LEANN Township Range Dir Section Subsections Elevation 800 ft. 115 23 W 34 CCDAAD Elevation Method CALC FROM 2-FOOT COUNTY DEM</p>	<p>Well Depth 120 ft. Depth Completed 120 ft. Date Well Completed 07/08/1993</p> <p>Drilling Method Non-specified Rotary</p>																																																					
<p>Well Address 15751 JOHNSON MEMORIAL DR SHAKOPEE MN 55379</p> <p>Geological Material</p> <table style="width:100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: left;">Geological Material</th> <th style="text-align: left;">Color</th> <th style="text-align: left;">Hardness</th> <th style="text-align: left;">From</th> <th style="text-align: left;">To</th> </tr> </thead> <tbody> <tr> <td>SAND & CLAY</td> <td>BROWN</td> <td>SOFT</td> <td>0</td> <td>29</td> </tr> <tr> <td>LARGE ROCKS & GRAVEL</td> <td>BROWN</td> <td>HARD</td> <td>29</td> <td>34</td> </tr> <tr> <td>SAND & CLAY</td> <td>BROWN</td> <td>MEDIUM</td> <td>34</td> <td>41</td> </tr> <tr> <td>CLAY</td> <td>BLUE</td> <td>HARD</td> <td>41</td> <td>81</td> </tr> <tr> <td>SANDROCK</td> <td>YEL/WHT</td> <td>HARD</td> <td>81</td> <td>120</td> </tr> </tbody> </table>	Geological Material	Color	Hardness	From	To	SAND & CLAY	BROWN	SOFT	0	29	LARGE ROCKS & GRAVEL	BROWN	HARD	29	34	SAND & CLAY	BROWN	MEDIUM	34	41	CLAY	BLUE	HARD	41	81	SANDROCK	YEL/WHT	HARD	81	120	<p>Drilling Fluid Owik gel</p> <p>Well Hydrofractured? <input type="checkbox"/> Yes <input type="checkbox"/> No From Ft. to Ft.</p> <p>Use Domestic</p> <p>Casing Type Steel (black or low carbon) Joint Threaded Drive Shoe? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No Above/Below ft.</p> <table style="width:100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: left;">Casing Diameter</th> <th style="text-align: left;">Weight</th> <th style="text-align: left;">Hole Diameter</th> </tr> </thead> <tbody> <tr> <td>4 in. to 90 ft.</td> <td>11 lbs./ft.</td> <td>6 in. to 89 ft.</td> </tr> <tr> <td></td> <td></td> <td>4 in. to 120 ft.</td> </tr> </tbody> </table> <p>Open Hole from 90 ft. to 120 ft.</p> <table style="width:100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: left;">Screen NO</th> <th style="text-align: left;">Make</th> <th style="text-align: left;">Type</th> </tr> </thead> <tbody> <tr> <td></td> <td></td> <td></td> </tr> </tbody> </table> <table style="width:100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: left;">Diameter</th> <th style="text-align: left;">Slot/Gauze</th> <th style="text-align: left;">Length</th> <th style="text-align: left;">Set Between</th> </tr> </thead> <tbody> <tr> <td></td> <td></td> <td></td> <td></td> </tr> </tbody> </table> <p>Static Water Level 66 ft. from Land surface Date Measured 07/08/1993</p> <p>PUMPING LEVEL (below land surface) ft. after hrs. pumping g.p.m.</p> <p>Well Head Completion Pitless adapter manufacturer MONITOR Model <input type="checkbox"/> Casing Protection <input type="checkbox"/> 12 in. above grade <input type="checkbox"/> At-grade (Environmental Wells and Borings ONLY)</p>	Casing Diameter	Weight	Hole Diameter	4 in. to 90 ft.	11 lbs./ft.	6 in. to 89 ft.			4 in. to 120 ft.	Screen NO	Make	Type				Diameter	Slot/Gauze	Length	Set Between				
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Screen NO	Make	Type																																																				
Diameter	Slot/Gauze	Length	Set Between																																																			
<p>REMARKS FORMER OWNER VERNON PICHA.</p> <p>Located by: Minnesota Geological Survey Method: Digitization (Screen) - Map (1:24,000)</p> <p>Unique Number Verification: Address verification Input Date: 12/03/2004</p> <p>System: UTM - Nad83, Zone15, Meters X: 454290 Y: 4951993</p>	<p>Grouting Information Well Grouted? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>Grout Material: Bentonite from 0 to 89 ft. 3 bags</p> <p>Nearest Known Source of Contamination 25 feet South West direction Sewer type Well disinfected upon completion? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>Pump <input type="checkbox"/> Not Installed Date Installed 07/16/1993 Manufacturer's name FLINT & WALLING Model number 4F10B07 HP 0.75 Volts 220 Length of drop Pipe 93 ft. Capacity 10 g.p.m Type Submersible Material</p> <p>Abandoned Wells Does property have any not in use and not sealed well(s)? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No</p> <p>Variance Was a variance granted from the MDH for this well? <input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>Well Contractor Certification Hartmann Well Co. 40174 HARTMANN, K. License Business Name Lic. Or Reg. No. Name of Driller</p>																																																					
<p>First Bedrock Jordan Aquifer Jordan Last Strat Jordan Depth to Bedrock 81 ft.</p>	<p>County Well Index Online Report</p>																																																					
<p>530123</p>																																																						
<p>Printed 4/22/2011 HE-01205-07</p>																																																						

Minnesota Unique Well No.

546804

County Scott
 Quad Jordan East
 Quad ID 90A

MINNESOTA DEPARTMENT OF HEALTH
WELL AND BORING RECORD
 Minnesota Statutes Chapter 103I

Entry Date 04/11/1995
 Update Date 09/27/2005
 Received Date

Well Name SCHMIDT, CLARENCE Township Range Dir Section Subsections Elevation 750 ft. 114 23 W 4 ACDDCA Elevation Method 7.5 minute topographic map (+/- 5 feet)	Well Depth 90 ft. Depth Completed 90 ft. Date Well Completed 09/06/1994 Drilling Method Non-specified Rotary																																										
Well Address 3350 166TH ST W JORDAN MN <table style="width:100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: left;">Geological Material</th> <th style="text-align: left;">Color</th> <th style="text-align: left;">Hardness</th> <th style="text-align: left;">From</th> <th style="text-align: left;">To</th> </tr> </thead> <tbody> <tr> <td>SAND</td> <td>BROWN</td> <td>SOFT</td> <td>0</td> <td>35</td> </tr> <tr> <td>GRAVEL AND STONES</td> <td>BROWN</td> <td>SOFT</td> <td>35</td> <td>43</td> </tr> <tr> <td>SAND AND CLAY</td> <td>GRAY</td> <td>SOFT</td> <td>43</td> <td>80</td> </tr> <tr> <td>SAND</td> <td>BROWN</td> <td>SOFT</td> <td>80</td> <td>90</td> </tr> </tbody> </table>	Geological Material	Color	Hardness	From	To	SAND	BROWN	SOFT	0	35	GRAVEL AND STONES	BROWN	SOFT	35	43	SAND AND CLAY	GRAY	SOFT	43	80	SAND	BROWN	SOFT	80	90	Drilling Fluid Owik gel Well Hydrofractured? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No From Ft. to Ft. Use Domestic Casing Type Steel (black or low carbon) Joint Threaded Drive Shoe? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No Above/Below ft. <table style="width:100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: left;">Casing Diameter</th> <th style="text-align: left;">Weight</th> <th style="text-align: left;">Hole Diameter</th> </tr> </thead> <tbody> <tr> <td>6 in. to 82 ft.</td> <td>11 lbs./ft.</td> <td>12 in. to 80 ft.</td> </tr> <tr> <td></td> <td></td> <td>8 in. to 90 ft.</td> </tr> </tbody> </table> Open Hole from ft. to ft. Screen YES Make JOHNSON Type stainless steel <table style="width:100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: left;">Diameter</th> <th style="text-align: left;">Slot/Gauze</th> <th style="text-align: left;">Length</th> <th style="text-align: left;">Set Between</th> </tr> </thead> <tbody> <tr> <td>3</td> <td>18</td> <td>8</td> <td>80 ft. and 90 ft.</td> </tr> </tbody> </table> Static Water Level 25 ft. from Land surface Date Measured 09/06/1994 PUMPING LEVEL (below land surface) 30 ft. after 1 hrs. pumping 50 g.p.m. Well Head Completion Pitless adapter manufacturer MONITOR Model PS 45 <input type="checkbox"/> Casing Protection <input type="checkbox"/> 12 in. above grade <input type="checkbox"/> At-grade (Environmental Wells and Borings ONLY)	Casing Diameter	Weight	Hole Diameter	6 in. to 82 ft.	11 lbs./ft.	12 in. to 80 ft.			8 in. to 90 ft.	Diameter	Slot/Gauze	Length	Set Between	3	18	8	80 ft. and 90 ft.
Geological Material	Color	Hardness	From	To																																							
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NO REMARKS Located by: Minnesota Geological Survey Method: Digitization (Screen) - Map (1:24,000) Unique Number Verification: Information from owner Input Date: 07/20/2005 System: UTM - Nad83, Zone15, Meters X: 453345 Y: 4951046	Grouting Information Well Grouted? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No Grout Material: Bentonite from to 80 ft. Nearest Known Source of Contamination 25 feet E direction Sewer type Well disinfected upon completion? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No Pump <input type="checkbox"/> Not Installed Date Installed Manufacturer's name GRUNFOS Model number __ HP 3 Volts 220 Length of drop Pipe 62.1 ft. Capacity 30 g.p.m Type Submersible Material																																										
First Bedrock Last Strat Sand-brown Aquifer Quat. Buried Artes. Aquifer Depth to Bedrock ft.	Abandoned Wells Does property have any not in use and not sealed well(s)? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No Variance Was a variance granted from the MDH for this well? <input type="checkbox"/> Yes <input type="checkbox"/> No Well Contractor Certification <table style="width:100%; border-collapse: collapse;"> <tr> <td style="text-align: center;"><u>Leuthner Well Co.</u></td> <td style="text-align: center;"><u>10125</u></td> <td style="text-align: center;"><u>SCHMIEG, K.</u></td> </tr> <tr> <td style="text-align: center;">License Business Name</td> <td style="text-align: center;">Lic. Or Reg. No.</td> <td style="text-align: center;">Name of Driller</td> </tr> </table>	<u>Leuthner Well Co.</u>	<u>10125</u>	<u>SCHMIEG, K.</u>	License Business Name	Lic. Or Reg. No.	Name of Driller																																				
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County Well Index Online Report	546804	Printed 4/22/2011 HE-01205-07																																									

Minnesota Unique Well No.

552820

County Scott
 Quad Jordan East
 Quad ID 90A

MINNESOTA DEPARTMENT OF HEALTH
WELL AND BORING RECORD
 Minnesota Statutes Chapter 103I

Entry Date 04/11/1995
 Update Date 09/27/2005
 Received Date

Well Name INTERLOCK CONCRETE PROD. Township Range Dir Section Subsections Elevation 745 ft. 114 23 W 4 BDACAD Elevation Method 7.5 minute topographic map (+/- 5 feet)	Well Depth 76 ft. Depth Completed 76 ft. Date Well Completed 10/27/1994 Drilling Method Non-specified Rotary														
Well Address 3535 BLUFF DR JORDAN MN Geological Material SAND, GRAVEL, AND ROCKS CLAY SAND AND GRAVEL CLAY SAND AND GRAVEL	Drilling Fluid Qwik gel Well Hydrofractured? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No From Ft. to Ft. Use Domestic Casing Type Steel (black or low carbon) Joint Threaded Drive Shoe? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No Above/Below ft. <table style="width:100%; border-collapse: collapse;"> <tr> <th style="text-align: left;">Casing Diameter</th> <th style="text-align: left;">Weight</th> <th style="text-align: left;">Hole Diameter</th> </tr> <tr> <td>4 in. to 70 ft.</td> <td>11 lbs./ft.</td> <td>6 in. to 69 ft.</td> </tr> </table> Open Hole from ft. to ft. Screen YES Make JOHNSON Type stainless steel <table style="width:100%; border-collapse: collapse;"> <tr> <th style="text-align: left;">Diameter</th> <th style="text-align: left;">Slot/Gauze</th> <th style="text-align: left;">Length</th> <th style="text-align: left;">Set Between</th> </tr> <tr> <td>3.5</td> <td>12</td> <td>5</td> <td>71 ft. and 76 ft.</td> </tr> </table> Static Water Level 29 ft. from Land surface Date Measured 10/27/1994 PUMPING LEVEL (below land surface) ft. after hrs. pumping g.p.m. Well Head Completion Pitless adapter manufacturer MONITOR Model <input type="checkbox"/> Casing Protection <input type="checkbox"/> 12 in. above grade <input type="checkbox"/> At-grade (Environmental Wells and Borings ONLY)	Casing Diameter	Weight	Hole Diameter	4 in. to 70 ft.	11 lbs./ft.	6 in. to 69 ft.	Diameter	Slot/Gauze	Length	Set Between	3.5	12	5	71 ft. and 76 ft.
Casing Diameter	Weight	Hole Diameter													
4 in. to 70 ft.	11 lbs./ft.	6 in. to 69 ft.													
Diameter	Slot/Gauze	Length	Set Between												
3.5	12	5	71 ft. and 76 ft.												
NO REMARKS Located by: Minnesota Geological Survey Method: Digitization (Screen) - Map (1:24,000) Unique Number Verification: Information from owner Input Date: 07/20/2005 System: UTM - Nad83, Zone15, Meters X: 452994 Y: 4951276	Grouting Information Well Grouted? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No Grout Material: Bentonite from to 69 ft. 4 bags Nearest Known Source of Contamination 51 feet N direction Sewer type Well disinfected upon completion? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No Pump <input type="checkbox"/> Not Installed Date Installed 12/05/1994 Manufacturer's name AERMOTOR Model number A19-150 HP 1.5 Volts 220 Length of drop Pipe 59 ft. Capacity 19 g.p.m Type Submersible Material														
First Bedrock Last Strat Sand & larger-brown	Abandoned Wells Does property have any not in use and not sealed well(s)? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No Variance Was a variance granted from the MDH for this well? <input type="checkbox"/> Yes <input type="checkbox"/> No Well Contractor Certification Hartmann Well Co. 40174 HARTMANN, K. License Business Name Lic. or Reg. No. Name of Driller Aquifer Quat. Buried Artes. Aquifer Depth to Bedrock ft.														
County Well Index Online Report	552820														
Printed 4/22/2011 HE-01205-07															

Minnesota Unique Well No.

559622

County Scott
 Quad Jordan East
 Quad ID 90A

MINNESOTA DEPARTMENT OF HEALTH

WELL AND BORING RECORD

Entry Date 06/12/1996
 Update Date 05/03/2005
 Received Date

Minnesota Statutes Chapter 103I

Well Name KOHMAN, FLOYD Township Range Dir Section Subsections Elevation 751 ft. 114 23 W 4 ACBCAB Elevation Method CALC FROM 2-FOOT COUNTY DEM	Well Depth Depth Completed Date Well Completed 80 ft. 80 ft. 04/11/1995									
Drilling Method Non-specified Rotary										
Well Address 3441 BLUFF DR SHAKOPEE MN 55379	Drilling Fluid Well Hydrofractured? <input type="checkbox"/> Yes <input type="checkbox"/> No Owik gel From Ft. to Ft.									
Use Domestic										
Geological Material Color Hardness From To SAND BROWN SOFT 0 13 CLAY BROWN SOFT 13 46 CLAY & SAND BROWN SOFT 46 60 SAND & GRAVEL BROWN SOFT 60 80	Casing Type Plastic Joint No Information Drive Shoe? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No Above/Below ft.									
<table style="width:100%; border-collapse: collapse;"> <tr> <td style="width:33%;">Casing Diameter</td> <td style="width:33%;">Weight</td> <td style="width:33%;">Hole Diameter</td> </tr> <tr> <td>4 in. to 60 ft.</td> <td>1.9 lbs./ft.</td> <td>8.5 in. to 30 ft.</td> </tr> <tr> <td></td> <td></td> <td>6.25 in. to 80 ft.</td> </tr> </table>		Casing Diameter	Weight	Hole Diameter	4 in. to 60 ft.	1.9 lbs./ft.	8.5 in. to 30 ft.			6.25 in. to 80 ft.
Casing Diameter	Weight	Hole Diameter								
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		6.25 in. to 80 ft.								
Open Hole from ft. to ft.										
Screen YES Make CRESLINE Type plastic										
<table style="width:100%; border-collapse: collapse;"> <tr> <td style="width:25%;">Diameter</td> <td style="width:25%;">Slot/Gauze</td> <td style="width:25%;">Length</td> <td style="width:25%;">Set Between</td> </tr> <tr> <td>4</td> <td>18</td> <td>20</td> <td>60 ft. and 80 ft.</td> </tr> </table>		Diameter	Slot/Gauze	Length	Set Between	4	18	20	60 ft. and 80 ft.	
Diameter	Slot/Gauze	Length	Set Between							
4	18	20	60 ft. and 80 ft.							
Static Water Level 25 ft. from Land surface Date Measured 04/11/1995										
PUMPING LEVEL (below land surface) 30 ft. after 1 hrs. pumping 50 g.p.m.										
Well Head Completion Pitless adapter manufacturer WHITEWATER Model SU 45.5 <input type="checkbox"/> Casing Protection <input type="checkbox"/> 12 in. above grade <input type="checkbox"/> At-grade (Environmental Wells and Borings ONLY)										
NO REMARKS Located by: Minnesota Geological Survey Method: Digitization (Screen) - Map (1:24,000) Unique Number Verification: Address Input Date: 12/07/2004 verification System: UTM - Nad83, Zone15, Meters X: 453161 Y: 4951299	Grouting Information Well Grouted? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No Grout Material: Bentonite from to 30 ft.									
Nearest Known Source of Contamination 40 feet W direction Septic tank/drain field type Well disinfected upon completion? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No										
Pump <input type="checkbox"/> Not Installed Date Installed Manufacturer's name AERMOTOR Model number HP 0.75 Volts 220 Length of drop Pipe 68 ft. Capacity 10 g.p.m Type Submersible Material										
Abandoned Wells Does property have any not in use and not sealed well(s)? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No										
Variance Was a variance granted from the MDH for this well? <input type="checkbox"/> Yes <input type="checkbox"/> No										
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License Business Name	Lic. Or Reg. No.	Name of Driller								
First Bedrock Last Strat Sand & larger-brown Aquifer Quat. Buried Artes. Aquifer Depth to Bedrock ft.	<table style="width:100%; border-collapse: collapse;"> <tr> <td style="width:50%;">County Well Index Online Report</td> <td style="width:25%; text-align: center; font-size: 24pt;">559622</td> <td style="width:25%; text-align: right;">Printed 4/22/2011 HE-01205-07</td> </tr> </table>	County Well Index Online Report	559622	Printed 4/22/2011 HE-01205-07						
County Well Index Online Report	559622	Printed 4/22/2011 HE-01205-07								

Minnesota Unique Well No.

585391

County Scott
 Quad Jordan East
 Quad ID 90A

MINNESOTA DEPARTMENT OF HEALTH
**WELL AND BORING
 RECORD**
 Minnesota Statutes Chapter 103I

Entry Date 07/28/1998
 Update Date 05/02/2005
 Received Date

<p>Well Name HOVER, DAVE Township Range Dir Section Subsections Elevation 736 ft. 114 23 W 4 CBDAAC Elevation Method CALC FROM 2-FOOT COUNTY DEM</p>	<p>Well Depth 92 ft. Depth Completed 92 ft. Date Well Completed 02/11/1997</p> <p>Drilling Method Non-specified Rotary</p>																	
<p>Well Address 16640 JORDAN AV JORDAN MN 55352</p> <p>Geological Material DIRT GRAVEL, CLAY BOULDER, GRAVEL GRAVEL, SAND SAND, ROCK ST. LAWRENCE GRN BRN PK</p>	<p>Drilling Fluid Bentonite Well Hydrofractured? <input type="checkbox"/> Yes <input type="checkbox"/> No From Ft. to Ft.</p> <p>Use Domestic</p> <p>Casing Type Steel (black or low carbon) Joint Threaded Drive Shoe? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No Above/Below ft.</p> <table style="width:100%; border-collapse: collapse;"> <tr> <th style="text-align: left;">Casing Diameter</th> <th style="text-align: left;">Weight</th> <th style="text-align: left;">Hole Diameter</th> </tr> <tr> <td>4 in. to 82 ft.</td> <td>11 lbs./ft.</td> <td>6.25 in. to 82 ft.</td> </tr> <tr> <td></td> <td></td> <td>4 in. to 92 ft.</td> </tr> </table> <p>Open Hole from 82 ft. to 92 ft.</p> <table style="width:100%; border-collapse: collapse;"> <tr> <th style="text-align: left;">Diameter</th> <th style="text-align: left;">Slot/Gauze</th> <th style="text-align: left;">Length</th> <th style="text-align: left;">Set Between</th> </tr> <tr> <td> </td> <td> </td> <td> </td> <td> </td> </tr> </table> <p>Static Water Level 20 ft. from Land surface Date Measured 02/11/1997</p> <p>PUMPING LEVEL (below land surface) 20 ft. after hrs. pumping 30 g.p.m.</p> <p>Well Head Completion Pitless adapter manufacturer WHITEWATER Model <input type="checkbox"/> Casing Protection <input type="checkbox"/> 12 in. above grade <input type="checkbox"/> At-grade (Environmental Wells and Borings ONLY)</p>	Casing Diameter	Weight	Hole Diameter	4 in. to 82 ft.	11 lbs./ft.	6.25 in. to 82 ft.			4 in. to 92 ft.	Diameter	Slot/Gauze	Length	Set Between				
Casing Diameter	Weight	Hole Diameter																
4 in. to 82 ft.	11 lbs./ft.	6.25 in. to 82 ft.																
		4 in. to 92 ft.																
Diameter	Slot/Gauze	Length	Set Between															
<p style="text-align: center;"><i>NO REMARKS</i></p> <p>Located by: Minnesota Geological Survey Method: Digitization (Screen) - Map (1:24,000)</p> <p>Unique Number Verification: Address verification Input Date: 12/07/2004</p> <p>System: UTM - Nad83, Zone15, Meters X: 452654 Y: 4950757</p>	<p>Grouting Information Well Grouted? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>Grout Material: High solids bentonite from 10 to 40 ft. 4 bags</p> <p>Nearest Known Source of Contamination 30 feet E direction Septic tank/drain field type Well disinfected upon completion? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>Pump <input type="checkbox"/> Not Installed Date Installed 02/17/1997 Manufacturer's name FLINT & WALLING Model number HP 0.5 Volts 220 Length of drop Pipe 42 ft. Capacity g.p.m. Type Submersible Material</p>																	
<p>First Bedrock Last Strat Sand & larger Aquifer Quat. Water Table Aquifer Depth to Bedrock ft.</p>	<p>Abandoned Wells Does property have any not in use and not sealed well(s)? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>Variance Was a variance granted from the MDH for this well? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No</p> <p>Well Contractor Certification Bohn Well Co. 70350 VON BANK, B. License Business Name Lic. Or Reg. No. Name of Driller</p>																	
<p>County Well Index Online Report</p>	<p>585391</p>	<p>Printed 4/22/2011 HE-01205-07</p>																

Minnesota Unique Well No.

628725

County Scott
 Quad Jordan East
 Quad ID 90A

MINNESOTA DEPARTMENT OF HEALTH

WELL AND BORING RECORD

Entry Date 01/10/2000
 Update Date 05/03/2005
 Received Date

Minnesota Statutes Chapter 103I

Well Name HARVIEUX, JEROME Township Range Dir Section Subsections Elevation 759 ft. 114 23 W 4 ABDDAD Elevation Method CALC FROM 2-FOOT COUNTY DEM		Well Depth 120 ft. Depth Completed 120 ft. Date Well Completed 07/22/1999
Well Address 3260 BLUFF DR SHAKOPEE MN 55379		Drilling Method Non-specified Rotary Drilling Fluid Bentonite Well Hydrofractured? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No From Ft. to Ft.
Geological Material SANDY SOIL & ROCKS SANDROCK (COARSE) SANDROCK & SHALE (FINE) YEL BRN GN		Use Domestic Casing Type Steel (black or low carbon) Joint Threaded Drive Shoe? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No Above/Below ft.
Color HardnessFromTo BROWN MEDIUM 0 7 YELLOWMEDIUM 7 75 VARIED M.SOFT 75 120		Casing Diameter 4 in. to 95 ft. Weight 11 lbs./ft. Hole Diameter 8.5 in. to 83 ft. 4 in. to 120 ft.
NO REMARKS		Open Hole from 95 ft. to 120 ft. Screen NO Make Type Diameter Slot/Gauze Length Set Between
Located by: Minnesota Geological Survey Method: Digitization (Screen) - Map (1:24,000) Unique Number Verification: Address Input Date: 12/07/2004 System: UTM - Nad83, Zone15, Meters X: 453488 Y: 4951499		Static Water Level 36 ft. from Land surface Date Measured 07/22/1999 PUMPING LEVEL (below land surface) ft. after hrs. pumping g.p.m.
Well Head Completion Pitless adapter manufacturer MONITOR Model <input type="checkbox"/> Casing Protection <input type="checkbox"/> 12 in. above grade <input type="checkbox"/> At-grade (Environmental Wells and Borings ONLY)		Grouting Information Well Grouted? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No Grout Material: Neat Cement from 10 to 83 ft. 1 yds.
Nearest Known Source of Contamination 53 feet N direction Septic tank/drain field type Well disinfected upon completion? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No		Pump <input type="checkbox"/> Not Installed Date Installed 07/01/1999 Manufacturer's name AERMOTOR Model number A12-75 HP 0.75 Volts 230 Length of drop Pipe 72 ft. Capacity 12 g.p.m Type Submersible Material
First Bedrock Jordan Aquifer Jordan-St.Lawrence Last Strat Jordan-St.Lawrence Depth to Bedrock 75 ft.		Abandoned Wells Does property have any not in use and not sealed well(s)? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
County Well Index Online Report		Variance Was a variance granted from the MDH for this well? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No Well Contractor Certification Hartmann Well Co. 40174 PETERSON, D. License Business Name Lic. Or Reg. No. Name of Driller
628725		Printed 4/22/2011 HE-01205-07

Minnesota Unique Well No.

633567

County Scott
 Quad Jordan East
 Quad ID 90A

MINNESOTA DEPARTMENT OF HEALTH
**WELL AND BORING
 RECORD**
 Minnesota Statutes Chapter 103I

Entry Date 04/20/2000
 Update Date 05/02/2005
 Received Date

Well Name THUENING, MIKE Township Range Dir Section Subsections Elevation 793 ft. 115 23 W 34 BCDDBC Elevation Method CALC FROM 2-FOOT COUNTY DEM		Well Depth 155 ft. Depth Completed 155 ft. Date Well Completed 10/10/1999
Well Address 15499 MINN. VALLEY BLUFF DR SHAKOPEE MN 55379		Drilling Method Non-specified Rotary Drilling Fluid Owik gel Well Hydrofractured? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No From Ft. to Ft.
Geological Material Color Hardness From To SAND BROWN SOFT 0 48 CLAY & SAND GRAY SOFT 48 82 SAND & CLAY BROWN SOFT 82 144 SAND BROWN SOFT 144 155		Use Domestic Casing Type Plastic Joint No Information Drive Shoe? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No Above/Below ft.
		Casing Diameter Weight Hole Diameter 4 in. to 145 ft. 1.9 lbs./ft. 8.5 in. to 30 ft. 6.25 in. to 155 ft.
		Open Hole from ft. to ft. Screen YES Make CRESLINE Type plastic Diameter Slot/Gauze Length Set Between 4 15 10 145 ft. and 155 ft.
		Static Water Level 75 ft. from Land surface Date Measured 10/10/1999 PUMPING LEVEL (below land surface) 80 ft. after 1 hrs. pumping 40 g.p.m.
		Well Head Completion Pitless adapter manufacturer WHITEWATER Model SU45.5 <input type="checkbox"/> Casing Protection <input type="checkbox"/> 12 in. above grade <input type="checkbox"/> At-grade (Environmental Wells and Borings ONLY)
NO REMARKS Located by: Minnesota Geological Survey Method: Digitization (Screen) - Map (1:24,000) Unique Number Verification: Address Input Date: 12/03/2004 System: UTM - Nad83, Zone15, Meters X: 454217 Y: 4952703		Grouting Information Well Grouted? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No Grout Material: High solids bentonite from 0 to 30 ft. 4 bags
		Nearest Known Source of Contamination 120 feet North East direction Septic tank/drain field_type Well disinfected upon completion? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
		Pump <input type="checkbox"/> Not Installed Date Installed Manufacturer's name AERMOTOR Model number HP 0.75 Volts 220 Length of drop Pipe 105 ft. Capacity 12 g.p.m Type Submersible Material
		Abandoned Wells Does property have any not in use and not sealed well(s)? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
		Variance Was a variance granted from the MDH for this well? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
First Bedrock Last Strat Sand-brown Aquifer Quat. Buried Artes. Aquifer Depth to Bedrock ft.		Well Contractor Certification Leuthner Well Co. 10125 LEUTHNER, M. License Business Name Lic. Or Reg. No. Name of Driller
County Well Index Online Report		633567 Printed 4/22/2011 HE-01205-07

Minnesota Unique Well No.

760916

County Scott
 Quad Jordan East
 Quad ID 90A

MINNESOTA DEPARTMENT OF HEALTH
**WELL AND BORING
 RECORD**
 Minnesota Statutes Chapter 103I

Entry Date 02/21/2008
 Update Date 12/30/2009
 Received Date 02/05/2008

Well Name MW-1 Township Range Dir Section Subsections Elevation 773 ft. 115 23 W 33 DCCADB Elevation Method 7.5 minute topographic map (+/- 5 feet)		Well Depth 66 ft.	Depth Completed 56 ft.	Date Well Completed 01/09/2008
Well Address 15870 JOHNSON MEMORIAL DR JORDAN MN 55379		Drilling Method Vibracore/rotasonic		
Geological Material SILTY SAND BROWN MEDIUM 0 8 SAND & ROCKS BROWN MEDIUM 8 20 CEMENTED SANDSTONE TAN HARD 20 29 SANDSTONE TAN MEDIUM 29 38 CEMENTED SANDSTONE TAN HARD 38 40 SANDSTONE TAN MEDIUM 40 66		Drilling Fluid Other Well Hydrofractured? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No From Ft. to Ft.		
Use Monitor well		Casing Type Steel (black or low carbon) Joint Threaded Drive Shoe? <input type="checkbox"/> Yes <input type="checkbox"/> No Above/Below 2 ft.		
		Casing Diameter 2 in. to 46 ft.	Weight 3.65 lbs./ft.	Hole Diameter 7 in. to 60 ft. 4 in. to 66 ft.
		Open Hole from ft. to ft.		
		Screen YES Make JOHNSON Type stainless steel		
		Diameter 2	Slot/Gauze 10	Length 10 Set Between 46 ft. and 56 ft.
		Static Water Level 44 ft. from Land surface Date Measured 01/09/2008		
		PUMPING LEVEL (below land surface) ft. after hrs. pumping g.p.m.		
REMARKS FLUID: SUPER GEL X. MW 1 WELLHEAD, CASING PROTECTION 8" STEEL, 24 INCH ABOVE GRADE Located by: Minnesota Geological Survey Method: Digitization (Screen) - Map (1:24,000) Unique Number Verification: Info/GPS from data source Input Date: 02/21/2008 System: UTM - Nad83, Zone15, Meters X: 453276 Y: 4951977		Well Head Completion Pitless adapter manufacturer Model <input checked="" type="checkbox"/> Casing Protection Y <input type="checkbox"/> 12 in. above grade <input type="checkbox"/> At-grade (Environmental Wells and Borings ONLY)		
		Grouting Information Well Grouted? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No Grout Material: Neat Cement from to 42 ft. 18 bags		
		Nearest Known Source of Contamination _feet _direction _type Well disinfected upon completion? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No		
		Pump <input type="checkbox"/> Not Installed Date Installed Manufacturer's name Model number HP Volts Length of drop Pipe ft. Capacity g.p.m. Type Material		
		Abandoned Wells Does property have any not in use and not sealed well(s)? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No		
		Variance Was a variance granted from the MDH for this well? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No		
First Bedrock Jordan Last Strat Jordan		Well Contractor Certification Mark J Traut Wells, Inc. 1404 ANDERSON, M. License Business Name Lic. Or Reg. No. Name of Driller		
Aquifer Jordan Depth to Bedrock 20 ft.		County Well Index Online Report		
		760916		Printed 4/22/2011 HE-01205-07

Minnesota Unique Well No.

760917

County Scott
 Quad Jordan East
 Quad ID 90A

MINNESOTA DEPARTMENT OF HEALTH
WELL AND BORING RECORD
 Minnesota Statutes Chapter 103I

Entry Date 02/21/2008
 Update Date 12/30/2009
 Received Date 02/05/2008

<p>Well Name MW-2 Township Range Dir Section Subsections Elevation 757 ft. 115 23 W 33 CDDADB Elevation Method 7.5 minute topographic map (+/- 5 feet)</p>	<p>Well Depth 55 ft. Depth Completed 53 ft. Date Well Completed 01/10/2008 Drilling Method Vibracore/rotasonic</p>																														
<p>Well Address 15870 JOHNSON MEMORIAL DR JORDAN MN 55379</p>	<p>Drilling Fluid Other Well Hydrofractured? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No From Ft. to Ft.</p>																														
<p>Geological Material</p> <table border="1" style="width:100%; border-collapse: collapse;"> <thead> <tr> <th>Geological Material</th> <th>Color</th> <th>Hardness</th> <th>From</th> <th>To</th> </tr> </thead> <tbody> <tr> <td>TOP SOIL</td> <td>BLACK</td> <td>MEDIUM</td> <td>0</td> <td>2</td> </tr> <tr> <td>SAND & GRAVEL & ROCK</td> <td>BROWN</td> <td>MEDIUM</td> <td>2</td> <td>31</td> </tr> <tr> <td>SANDSTONE</td> <td>BROWN</td> <td>MEDIUM</td> <td>31</td> <td>39</td> </tr> <tr> <td>SANDSTONE</td> <td>PINK</td> <td>MEDIUM</td> <td>39</td> <td>41</td> </tr> <tr> <td>SANDSTONE</td> <td>TAN</td> <td>MEDIUM</td> <td>41</td> <td>55</td> </tr> </tbody> </table>	Geological Material	Color	Hardness	From	To	TOP SOIL	BLACK	MEDIUM	0	2	SAND & GRAVEL & ROCK	BROWN	MEDIUM	2	31	SANDSTONE	BROWN	MEDIUM	31	39	SANDSTONE	PINK	MEDIUM	39	41	SANDSTONE	TAN	MEDIUM	41	55	<p>Use Monitor well</p> <p>Casing Type Steel (black or low carbon) <input type="checkbox"/> Joint Threaded Drive Shoe? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No Above/Below ft.</p> <p>Casing Diameter 2 in. to 43 ft. Weight 3.65 lbs./ft. Hole Diameter 7 in. to 55 ft.</p> <p>Open Hole from ft. to ft.</p> <p>Screen YES Make JOHNSON Type stainless steel</p> <p>Diameter 2 Slot/Gauze 10 Length 10 Set Between 43 ft. and 53 ft.</p> <p>Static Water Level 43 ft. from Land surface Date Measured 01/10/2008</p> <p>PUMPING LEVEL (below land surface) ft. after hrs. pumping g.p.m.</p> <p>Well Head Completion Pitless adapter manufacturer Model <input checked="" type="checkbox"/> Casing Protection Y <input type="checkbox"/> 12 in. above grade <input type="checkbox"/> At-grade (Environmental Wells and Borings ONLY)</p>
Geological Material	Color	Hardness	From	To																											
TOP SOIL	BLACK	MEDIUM	0	2																											
SAND & GRAVEL & ROCK	BROWN	MEDIUM	2	31																											
SANDSTONE	BROWN	MEDIUM	31	39																											
SANDSTONE	PINK	MEDIUM	39	41																											
SANDSTONE	TAN	MEDIUM	41	55																											
<p>REMARKS FLUID: SUPER GEL X. MW 2 WELLHEAD, CASING PROTECTION 8" STEEL, 24 INCH ABOVE GRADE</p> <p>Located by: Minnesota Geological Survey Method: Digitization (Screen) - Map (1:24,000)</p> <p>Unique Number Verification: Info/GPS from data source Input Date: 02/21/2008</p> <p>System: UTM - Nad83, Zone15, Meters X: 453061 Y: 4951985</p>	<p>Grouting Information Well Grouted? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>Grout Material: Neat Cement from to 39 ft. 18 bags</p> <p>Nearest Known Source of Contamination _feet _direction _type</p> <p>Well disinfected upon completion? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No</p> <p>Pump <input type="checkbox"/> Not Installed Date Installed Manufacturer's name Model number HP Volts Length of drop Pipe _ft. Capacity _g.p.m Type Material</p>																														
<p>First Bedrock Jordan Aquifer Jordan Last Strat Jordan Depth to Bedrock 31 ft.</p>	<p>Abandoned Wells Does property have any not in use and not sealed well(s)? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No</p> <p>Variance Was a variance granted from the MDH for this well? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No</p> <p>Well Contractor Certification <u>Mark J Traut Wells, Inc.</u> <u>1404</u> <u>ANDERSON, M.</u> License Business Name Lic. Or Reg. No. Name of Driller</p>																														
<p>County Well Index Online Report</p>	<p>760917</p>																														
<p>Printed 4/22/2011 HE-01205-07</p>																															

Minnesota Unique Well No.

760918

County Scott
 Quad Jordan East
 Quad ID 90A

MINNESOTA DEPARTMENT OF HEALTH
**WELL AND BORING
 RECORD**
 Minnesota Statutes Chapter 103I

Entry Date 02/21/2008
 Update Date 12/30/2009
 Received Date 02/05/2008

<p>Well Name MW-3 Township Range Dir Section Subsections Elevation 762 ft. 115 23 W 33 CDDAD Elevation Method 7.5 minute topographic map (+/- 5 feet)</p>	<p>Well Depth 55 ft. Depth Completed 54 ft. Date Well Completed 01/14/2008 Drilling Method Vibracore/rotasonic</p>																																		
<p>Well Address 15870 JOHNSON MEMORIAL DR JORDAN MN 55379</p> <p>Geological Material</p> <table style="width:100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: left;">Geological Material</th> <th style="text-align: left;">Color</th> <th style="text-align: left;">Hardness</th> <th style="text-align: left;">From</th> <th style="text-align: left;">To</th> </tr> </thead> <tbody> <tr> <td>TOP SOIL</td> <td>BLACK</td> <td>MEDIUM</td> <td>0</td> <td>1</td> </tr> <tr> <td>SAND & GRAVEL & ROCK</td> <td>BROWN</td> <td>MEDIUM</td> <td>1</td> <td>22</td> </tr> <tr> <td>SANDSTONE CEMENTED LAYERS</td> <td>TAN</td> <td>HARD</td> <td>22</td> <td>55</td> </tr> </tbody> </table>	Geological Material	Color	Hardness	From	To	TOP SOIL	BLACK	MEDIUM	0	1	SAND & GRAVEL & ROCK	BROWN	MEDIUM	1	22	SANDSTONE CEMENTED LAYERS	TAN	HARD	22	55	<p>Drilling Fluid Other Well Hydrofractured? <input type="checkbox"/> Yes <input type="checkbox"/> No From Ft. to Ft.</p> <p>Use Monitor well</p> <p>Casing Type Steel (black or low carbon) Joint Threaded Drive Shoe? <input type="checkbox"/> Yes <input type="checkbox"/> No Above/Below ft.</p> <table style="width:100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: left;">Casing Diameter</th> <th style="text-align: left;">Weight</th> <th style="text-align: left;">Hole Diameter</th> </tr> </thead> <tbody> <tr> <td>2 in. to 44 ft.</td> <td>3.65 lbs./ft.</td> <td>7 in. to 55 ft.</td> </tr> </tbody> </table> <p>Open Hole from ft. to ft.</p> <p>Screen YES Make JOHNSON Type stainless steel</p> <table style="width:100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: left;">Diameter</th> <th style="text-align: left;">Slot/Gauze</th> <th style="text-align: left;">Length</th> <th style="text-align: left;">Set Between</th> </tr> </thead> <tbody> <tr> <td>2</td> <td>10</td> <td>10</td> <td>44 ft. and 54 ft.</td> </tr> </tbody> </table> <p>Static Water Level 43 ft. from Land surface Date Measured 01/14/2008</p> <p>PUMPING LEVEL (below land surface) ft. after hrs. pumping g.p.m.</p> <p>Well Head Completion Pitless adapter manufacturer Model <input checked="" type="checkbox"/> Casing Protection Y <input type="checkbox"/> 12 in. above grade <input type="checkbox"/> At-grade (Environmental Wells and Borings ONLY)</p>	Casing Diameter	Weight	Hole Diameter	2 in. to 44 ft.	3.65 lbs./ft.	7 in. to 55 ft.	Diameter	Slot/Gauze	Length	Set Between	2	10	10	44 ft. and 54 ft.
Geological Material	Color	Hardness	From	To																															
TOP SOIL	BLACK	MEDIUM	0	1																															
SAND & GRAVEL & ROCK	BROWN	MEDIUM	1	22																															
SANDSTONE CEMENTED LAYERS	TAN	HARD	22	55																															
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2	10	10	44 ft. and 54 ft.																																
<p>REMARKS OTHER FLUID: SUPER GEL X. MW 3 WELLHEAD, CASING PROTECTION 8" STEEL, 24 INCH ABOVE GRADE</p> <p>Located by: Minnesota Geological Survey Method: Digitization (Screen) - Map (1:24,000)</p> <p>Unique Number Verification: Info/GPS from data source Input Date: 02/21/2008</p> <p>System: UTM - Nad83, Zone15, Meters X: 453076 Y: 4951894</p>	<p>Grouting Information Well Grouted? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>Grout Material: Neat Cement from to 40 ft. 18 bags</p> <p>Nearest Known Source of Contamination _feet _direction _type</p> <p>Well disinfected upon completion? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No</p> <p>Pump <input type="checkbox"/> Not Installed Date Installed Manufacturer's name Model number HP Volts Length of drop Pipe _ft. Capacity _g.p.m. Type Material</p> <p>Abandoned Wells Does property have any not in use and not sealed well(s)? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No</p> <p>Variance Was a variance granted from the MDH for this well? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No</p> <p>Well Contractor Certification <u>Mark J Traut Wells, Inc.</u> <u>1404</u> <u>ANDERSON, M.</u> License Business Name Lic. Or Reg. No. Name of Driller</p>																																		
<p>First Bedrock Jordan Aquifer Jordan Last Strat Jordan Depth to Bedrock 22 ft.</p>	<p>County Well Index Online Report 760918 Printed 4/22/2011 HE-01205-07</p>																																		

Minnesota Unique Well No.

498543

County Scott
 Quad Jordan East
 Quad ID 90A

MINNESOTA DEPARTMENT OF HEALTH

WELL AND BORING RECORD

Entry Date 06/04/1992
 Update Date 05/03/2005
 Received Date

Minnesota Statutes Chapter 103I

Well Name HERMAN, WES Township Range Dir Section Subsections Elevation 744 ft. 114 23 W 4 CAABDD Elevation Method CALC FROM 2-FOOT COUNTY DEM		Well Depth 76 ft. Depth Completed 76 ft. Date Well Completed 12/31/1991
Well Address 16586 JOHNSON MEMORIAL DR JORDAN MN 55352		Drilling Method Non-specified Rotary Drilling Fluid Owik gel Well Hydrofractured? <input type="checkbox"/> Yes <input type="checkbox"/> No From Ft. to Ft.
Geological Material CLAY SAND & GRAVEL	Color YELLOW BROWN	Hardness SOFT SOFT
From 0 To 2 To 76	Use Domestic Casing Type Steel (black or low carbon) Joint Threaded Drive Shoe? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No Above/Below 1 ft.	
Casing Diameter 4 in. to 70 ft. Weight 11 lbs./ft. Hole Diameter 6 in. to 69 ft.		
Open Hole from ft. to ft. Screen YES Make HOWARD SMITH Type stainless steel		
Diameter 3.5 Slot/Gauze 12 Length 7 Set Between 71 ft. and 76 ft.		
Static Water Level 33 ft. from Land surface Date Measured 12/31/1991		
PUMPING LEVEL (below land surface) ft. after hrs. pumping g.p.m.		
Well Head Completion Pitless adapter manufacturer MONITOR Model <input type="checkbox"/> Casing Protection <input type="checkbox"/> 12 in. above grade <input type="checkbox"/> At-grade (Environmental Wells and Borings ONLY)		
NO REMARKS		Grouting Information Well Grouted? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No Grout Material: Cuttings from to 0 ft. Grout Material: Bentonite from to 69 ft.
Located by: Minnesota Geological Survey Method: Digitization (Screen) - Map (1:24,000) Unique Number Verification: Address verification Input Date: 12/07/2004 System: UTM - Nad83, Zone15, Meters X: 452990 Y: 4950910		Nearest Known Source of Contamination 70 feet North West direction Septic tank/drain field type Well disinfected upon completion? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
		Pump <input type="checkbox"/> Not Installed Date Installed 01/07/1992 Manufacturer's name AERMOTOR Model number A12-75 HP 0.75 Volts 220 Length of drop Pipe 57 ft. Capacity 12 g.p.m. Type Submersible Material Galvanized
First Bedrock Last Strat Sand & larger-brown		Abandoned Wells Does property have any not in use and not sealed well(s)? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Aquifer Quat. Water Table Aquifer Depth to Bedrock ft.		Variance Was a variance granted from the MDH for this well? <input type="checkbox"/> Yes <input type="checkbox"/> No Well Contractor Certification Hartmann Well Co. 40174 HARTMANN, K. License Business Name Lic. Or Reg. No. Name of Driller
County Well Index Online Report		498543 Printed 4/22/2011 HE-01205-07