Appendix C: Geotechnical Report

AMERICAN ENGINEERING TESTING, INC.

CONSULTANTS
· ENVIRONMENTAL
· GEOTECHNICAL
· MATERIALS
· FORENSICS

August 17, 2020

Ms. Paige Attarian
City of Skyline
164 S Skyline Drive
Mankato, MN 56001
paigecpa@charter.net

RE: Geotechnical Exploration and Review
Elevated Water Storage Tank
Skyline, Minnesota
AET #08-20737

Dear Ms. Attarian:

This letter report presents the results of the standard penetration test borings conducted on August 4, 2020 in Skyline, Minnesota. The work was performed in accordance with our proposal dated June 29, 2020. The scope of work related to this request includes the following:

- Two (2) standard penetration test borings to depths of 50 feet.
- Soil laboratory testing (water content, density, unconfined compressive strength).
- Preparation of this letter report, discussing the in-place soil and ground water conditions encountered and general comments on foundation support of proposed elevated water storage tank.

We have included one electronic copy of our report. Additional copies are being sent on your behalf as noted below.

1.0 Project Information

We understand that you are planning to construct a 50,000 gallon pedosphere-style or hydrocone-style elevated water tower structure. We do not have any specific structural loading information; we assume moderate to heavy loads for a structure of this type. We assume that the finished grade for the structure will be within one to two feet of the current surface grade.

As discussed in our proposal dated June 29, 2020; we understand after the final elevated storage tank location is selected an additional soil boring will be performed and a final Geotechnical Engineering Report will be completed for the structure.

2.0 Site Exploration

Logs of the test borings are attached. The logs contain information concerning soil layering, soil classification, geologic description, and moisture condition. Relatively density or consistency is also noted, which is based on the standard penetration resistance (N-value).

We refer you to the standard sheet entitled "Exploration/Classification Methods" for details on the drilling and the sampling methods, and the water level measurement methods. Data sheets concerning the Unified Soils Classification System, the descriptive terminology, and the symbols used on the boring logs are also attached.

The test boring locations are shown on Figure 2. The surface elevations shown on the logs were provided by ISG personnel.

3.0 Conditions Encountered

3.1 Soils

The site geology consists of fill with clay till present at depth.

The surficial fill layer was about 1' to 2' deep at the boring locations. The fill consisted of black and gray organic lean clay to brown and dark brown sandy lean clay.

Sandy lean clay and clayey sand, glacial till was encountered from below the surficial fill to the boring termination depth. The till varied in color form brown and gray mottled to brown in the upper soil profile to gray at depth. Additionally, the till contained some gravel and numerous lenses and layers of sand. The consistency of the till varied from firm to hard.

3.2 Groundwater

Subsurface water was noted at boring location B-1 at 46.6 feet below existing site grade at the time our field work was performed. Groundwater levels fluctuate due to varying seasonal and annual rainfall and snow melt amounts, as well as other factors.

Based upon our previous experience with clay till soils in the general project area, it is our opinion that the subsurface water levels at the site could be quite near the ground surface during periods of significant precipitation, particularly during the spring of the year. It should also be recognized that groundwater levels can fluctuate due to natural seasonal variations in rainfall and snowmelt amounts.

4.0 Geotechnical Review

We understand that you are planning to construct a 50,000 gallon pedosphere-style or hydrocone-style with a ring foundation, elevated water tower structure. As discussed in our proposal dated June 29, 2020; two proposed borings were advanced at the staked locations, one at each of the possible locations. Boring B-1 was advanced just west of the existing water tower and B-2 was advanced approximately 100 feet to the east of the existing water tower.

Based on the soil boring information obtained, the proposed elevated water storage tower can be suitably supported at either location. We anticipate typical elevated water storage tower ring wall foundations will be 6 to 8 feet below finished grade. The naturally occurring soils encountered within both soil borings at these proposed foundation support depths should be suitable for support for the proposed elevated water storage tank. We anticipate soil contact pressures in the range of 2,000 to 3,000 psf can be obtained. We understand after the final site is selected a second soil boring will be advanced within the foundation area of the proposed elevated water storage tank. Based on the results of both soil borings, a final Geotechnical Engineering Report can be prepared specific earthwork recommendations, foundation soil contact pressures, and anticipated settlements.

The proposed construction is located on fairly level topography adjacent to fairly steep hillsides/ravines sloping downward to the south and east, away from the project area. The existing water tower and other structures in the area are also located adjacent to the hillside and we are not aware of the any significant problems that have occurred. The risk of detrimental movement is, however, present along such hillsides. Based upon the boring information and our knowledge of the site history, it does not appear that a deep seated, slope failure is a significant risk at this site. Deeper penetration borings and a slope stability analysis would be required to better define the magnitude of risk.

Also, of concern is the possibility of shallow movement due to saturation of the upper soils. The magnitude of risk for this type of movement is very difficult to quantify although the risk is certainly present at this site. Prudent measures that should be taken to reduce the risk of a shallow, surface slide include maintaining surface vegetation and trees along the hillside and diverting surface runoff away from the hillside and ravine areas.

5.0 Limitations

Within the limitations of scope, budget, and schedule, our services have been conducted according to generally accepted geotechnical engineering practices at this time and location. Other than this, no warranty, either expressed or implied, is intended.

Important information regarding risk management and proper use of this report is given in the attached sheet entitled “Geotechnical Report Limitations and Guidelines for Use”.

6.0 Remarks

We appreciate being giving the opportunity to work with you on your project. If you have any questions regarding the work reported herein, please do not hesitate to contact us at (507) 387-2222 or gguyer@amengtest.com.

Sincerely,
American Engineering Testing, Inc.

Gregory A. Guyer, PE
Manager – Mankato
MN Reg. No. 44618
gguyer@amengtest.com

Report Reviewed By:
American Engineering Testing, Inc.

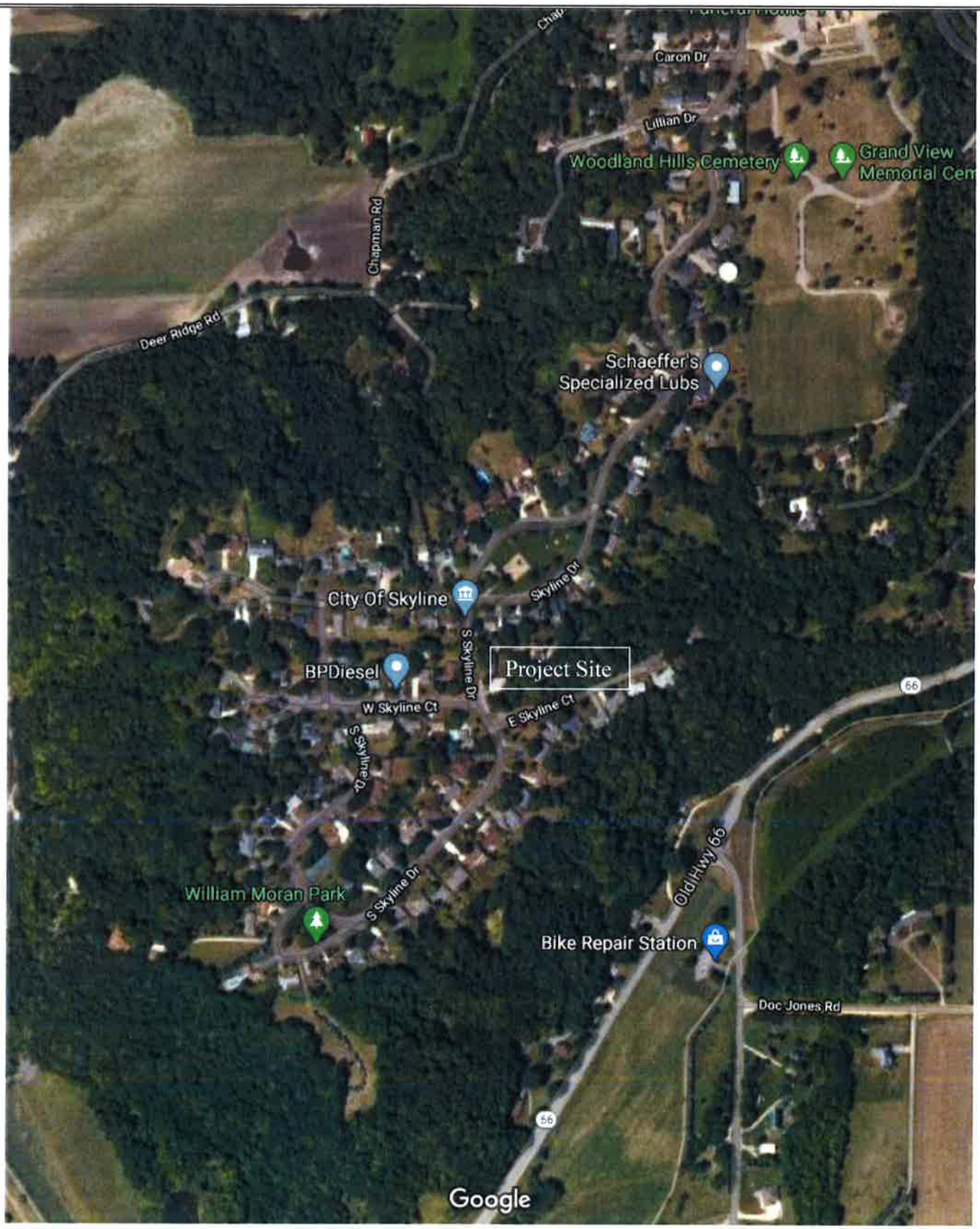
Steven J. Ruesink, PE
Regional Manager
MN Reg. No. 19431
sruesink@amengtest.com

GAG/SJR/lmh

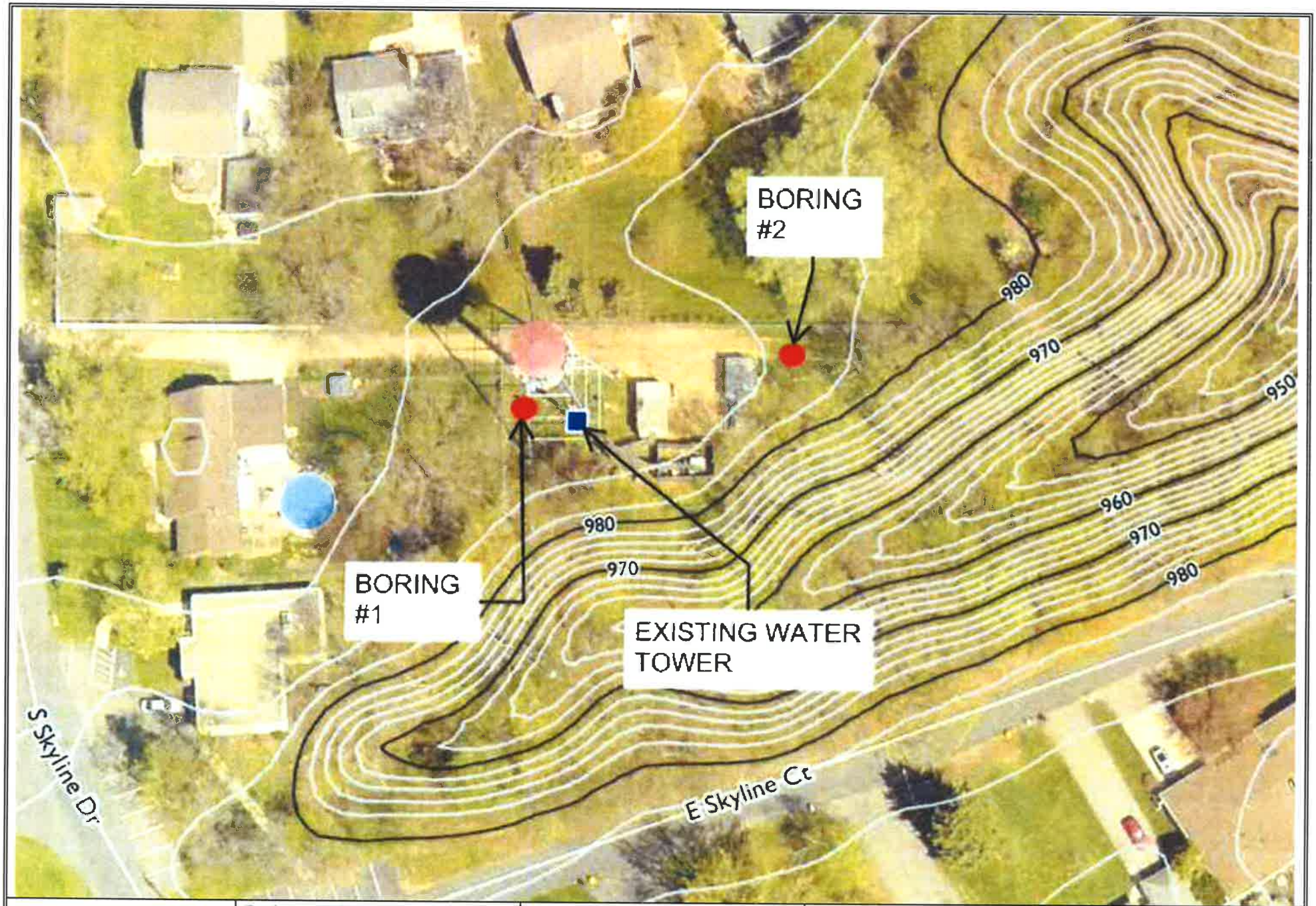
cc: ISG - Bryan Petzel

Attachments

- Figure 1 – Site Location
- Figure 2 – Boring Locations
- Subsurface Boring Logs
- Exploration/Classification Methods
- Boring Log Notes
- Unified Soil Classification System
- Geotechnical Report Limitations and Guidelines For Use



American Engineering Testing, Inc.	Project: Elevated Water Storage Tank Skyline, MN			AET Job No. 08-20737
	Subject: Site Location			Date: Aug. 17, 2020
	Scale: NTS	Drawn By: GG	Checked By: SR	Figure: 1



American Engineering Testing, Inc.	Project: Elevated Water Storage Tank Skyline, MN	Subject: Boring Locations	AET Job No: 08-20737	Date: Aug. 17, 2020
	Scale: NTS	Drawn By: GG	Checked By: SR	Figure 2

AMERICAN ENGINEERING TESTING, INC.

SUBSURFACE BORING LOG

AET No: **08-20737** Log of Boring No. **B-1 (p. 1 of 1)**

Project: **Elevated Water Storage Tank; Syline, Minnesota**

Surface Elevation **984.1'**

DEPTH IN FEET	MATERIAL DESCRIPTION	GEOLOGY	N	MC	SAMPLE TYPE	REC IN.	FIELD & LABORATORY TESTS WC	DEN	qp	qu
1-2	FILL, sandy lean clay w/visible organics, dark brown	FILL		M	FA					
3-4	FILL, sandy lean clay, brown	TILL	8	M	SS	15	22			
5	SANDY LEAN CLAY, brown, firm (CL)		9	M	SS	18	23			
6-7	SANDY LEAN CLAY, brown and gray mottled, stiff (CL)		12	M	SS	20	22			
8-11	SANDY LEAN CLAY, a little gravel, brown w/red iron staining, stiff (CL)		12	M	SS	20	22			
12-14			11	M	SS	20	23			
15-18				M	TW	18	24	93		3800
19-21	SANDY LEAN CLAY, brown, hard, sand seam at 20' (CL)		31	W	SS	12				
22-25	SANDY LEAN CLAY, gray, very stiff (CL)		28	M	SS	18	18			
26-30	CLAYEY SAND, a little gravel, gray, stiff to hard (SC)		36	W	SS	3				
31-35			13	M	SS	20	22			
36-40			13	M	SS	24				
41-45			16	M	SS	24				
46-50			24	M	SS	24				
51	**END OF BORING**									

DEPTH: DRILLING METHOD

0-49½' 3.25" HSA

BORING COMPLETED: **8/4/20**

DR: **TW** LG: **CH** Rig: **84R**

WATER LEVEL MEASUREMENTS

DATE	TIME	SAMPLED DEPTH	CASING DEPTH	CAVE-IN DEPTH	DRILLING FLUID LEVEL	WATER LEVEL
8/4/20	**10:30**	**51'**	**49.5'**	**49.5'**	**None**	**50.2'**
8/4/20	**10:45**	**51'**	**49.5'**	**49.5'**	**None**	**46.6'**

NOTE: REFER TO THE ATTACHED SHEETS FOR AN EXPLANATION OF TERMINOLOGY ON THIS LOG

AET_CORP 08-20737.ELEVATED WATER STORAGE TANK - SKYLINE.GPJ AET+CPT+WELL.GDT 8/17/20

AMERICAN ENGINEERING TESTING, INC.

SUBSURFACE BORING LOG

AET No: **08-20737** Log of Boring No. **B-2 (p. 1 of 1)**

Project: **Elevated Water Storage Tank; Syline, Minnesota**

DEPTH IN FEET	Surface Elevation **982.9'** MATERIAL DESCRIPTION	GEOLOGY	N	MC	SAMPLE TYPE	REC IN.	FIELD & LABORATORY TESTS WC	DEN	qp	qu
1	FILL, organic lean clay, black and gray	FILL		M	FA					
2	SANDY LEAN CLAY, brown, firm (CL)	TILL								
3	SANDY LEAN CLAY, a little gravel, brown, stiff (CL)		8	M	SS	15	24			
5	SANDY LEAN CLAY, a little gravel, brown, stiff (CL)		10	M	SS	20	21			
7	SANDY LEAN CLAY, brown and gray mottled, stiff (CL)		10	M	SS	20	23			
10			12	M	SS	20				
13			11	M	SS	20	20			
18				M	TW	23	25	92		4260
20	SANDY LEAN CLAY, dark brown, very stiff (CL)		16	M	SS	20	22			
25			20	M	SS	20	18			
30	SANDY LEAN CLAY, gray w/red rust staining, very stiff (CL)		25	M	SS	24	23			
35	SANDY LEAN CLAY, a little gravel, gray, stiff to very stiff (CL)		15	M	SS	20	20			
40			20	M	SS	20				
45			21	M	SS	24				
50			24	M	SS	24				
51	**END OF BORING**									

DEPTH: DRILLING METHOD	WATER LEVEL MEASUREMENTS							NOTE: REFER TO THE ATTACHED SHEETS FOR AN EXPLANATION OF TERMINOLOGY ON THIS LOG
	DATE	TIME	SAMPLED DEPTH	CASING DEPTH	CAVE-IN DEPTH	DRILLING FLUID LEVEL	WATER LEVEL	
0-49½' 3.25" HSA	**8/4/20**	**1:45**	**51'**	**49.5'**	**49.5'**	**None**	**None**	
	8/4/20	**2:00**	**51'**	**--**	**--**	**None**	**None**	
BORING COMPLETED: **8/4/20**								
DR: **TW** LG: **CH** Rig: **84R**								

AET_CORP 08-20737.ELEVATED WATER STORAGE TANK - SKYLINE.GPJ AET+CPT+WELL.GDT 8/17/20

EXPLORATION/CLASSIFICATION METHODS

SAMPLING METHODS

Split-Spoon Samples (SS)

Standard penetration (split-spoon) samples were collected in general accordance with ASTM:D1586. This method consists of driving a 2" O.D. split barrel sampler into the in-situ soil with a 140-pound hammer dropped from a height of 30". The sampler is driven a total of 18" into the soil. After an initial set of 6", the number of hammer blows to drive the sampler the final 12" is known as the standard penetration resistance or N-value.

Disturbed Samples (DS)/Spin-up Samples (SU)

Sample types described as "DS" or "SU" on the boring logs are disturbed samples, which are taken from the flights of the auger. Because the auger disturbs the samples, possible soil layering and contact depths should be considered approximate.

Sampling Limitations

Unless actually observed in a sample, contacts between soil layers are estimated based on the spacing of samples and the action of drilling tools. Cobbles, boulders, and other large objects generally cannot be recovered from test borings, and they may be present in the ground even if they are not noted on the boring logs.

CLASSIFICATION METHODS

Soil classifications shown on the boring logs are based on the Unified Soil Classification (USC) system. The USC system is described in ASTM:D2487 and D2488. Where laboratory classification tests (sieve analysis or Atterberg Limits) have been performed, accurate classifications per ASTM: D2487 are possible. Otherwise, soil classifications shown on the boring logs are visual-manual judgments. Charts are attached which provide information on the USC system, the descriptive terminology, and the symbols used on the boring logs.

The boring logs include descriptions of apparent geology. The geologic depositional origin of each soil layer is interpreted primarily by observation of the soil samples, which can be limited. Observations of the surrounding topography, vegetation, and development can sometimes aid this judgment.

WATER LEVEL MEASUREMENTS

The ground water level measurements are shown at the bottom of the boring logs. The following information appears under "Water Level Measurements" on the logs:

- Date and Time of measurement
- Sampled Depth: lowest depth of soil sampling at the time of measurement
- Casing Depth: depth to bottom of casing or hollow-stem auger at time of measurement
- Cave-in Depth: depth at which measuring tape stops in the borehole
- Water Level: depth in the borehole where free water is encountered
- Drilling Fluid Level: same as Water Level, except that the liquid in the borehole is drilling fluid

The true location of the water table at the boring locations may be different than the water levels measured in the boreholes. This is possible because there are several factors that can affect the water level measurements in the borehole. Some of these factors include: permeability of each soil layer in profile, presence of perched water, amount of time between water level readings, presence of drilling fluid, weather conditions, and use of borehole casing.

SAMPLE STORAGE

Unless notified to do otherwise, we routinely retain representative samples of the soils recovered from the borings for a period of 30 days.

BORING LOG NOTES

DRILLING AND SAMPLING SYMBOLS

Symbol	Definition
AR:	Sample of material obtained from cuttings blown out the top of the borehole during air rotary procedure.
B, H, N:	Size of flush-joint casing
CAS:	Pipe casing, number indicates nominal diameter in inches
COT:	Clean-out tube
DC:	Drive casing; number indicates diameter in inches
DM:	Drilling mud or bentonite slurry
DR:	Driller (initials)
DS:	Disturbed sample from auger flights
DP:	Direct push drilling; a 2.125 inch OD outer casing with an inner 1½ inch ID plastic tube is driven continuously into the ground.
FA:	Flight auger; number indicates outside diameter in inches
HA:	Hand auger; number indicates outside diameter
HSA:	Hollow stem auger; number indicates inside diameter in inches
LG:	Field logger (initials)
MC:	Column used to describe moisture condition of samples and for the ground water level symbols
N (BPF):	Standard penetration resistance (N-value) in blows per foot (see notes)
NQ:	NQ wireline core barrel
PQ:	PQ wireline core barrel
RDA:	Rotary drilling with compressed air and roller or drag bit.
RDF:	Rotary drilling with drilling fluid and roller or drag bit
REC:	In split-spoon (see notes), direct push and thin-walled tube sampling, the recovered length (in inches) of sample. In rock coring, the length of core recovered (expressed as percent of the total core run). Zero indicates no sample recovered.
SS:	Standard split-spoon sampler (steel; 1.5" is inside diameter; 2" outside diameter); unless indicated otherwise
SU	Spin-up sample from hollow stem auger
TW:	Thin-walled tube; number indicates inside diameter in inches
WASH:	Sample of material obtained by screening returning rotary drilling fluid or by which has collected inside the borehole after "falling" through drilling fluid
WH:	Sampler advanced by static weight of drill rod and hammer
WR:	Sampler advanced by static weight of drill rod
94mm:	94 millimeter wireline core barrel
▼:	Water level directly measured in boring
▽:	Estimated water level based solely on sample appearance

TEST SYMBOLS

Symbol	Definition
CONS:	One-dimensional consolidation test
DEN:	Dry density, pcf
DST:	Direct shear test
E:	Pressuremeter Modulus, tsf
HYD:	Hydrometer analysis
LL:	Liquid Limit, %
LP:	Pressuremeter Limit Pressure, tsf
OC:	Organic Content, %
PERM:	Coefficient of permeability (K) test; F - Field; L - Laboratory
PL:	Plastic Limit, %
q_p:	Pocket Penetrometer strength, tsf (approximate)
q_c:	Static cone bearing pressure, tsf
q_u:	Unconfined compressive strength, psf
R:	Electrical Resistivity, ohm-cms
RQD:	Rock Quality Designation of Rock Core, in percent (aggregate length of core pieces 4" or more in length as a percent of total core run)
SA:	Sieve analysis
TRX:	Triaxial compression test
VSR:	Vane shear strength, remolded (field), psf
VSU:	Vane shear strength, undisturbed (field), psf
WC:	Water content, as percent of dry weight
%-200:	Percent of material finer than #200 sieve

STANDARD PENETRATION TEST NOTES
(Calibrated Hammer Weight)

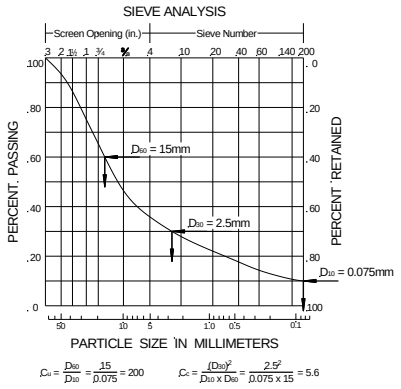
The standard penetration test consists of driving a split-spoon sampler with a drop hammer (calibrated weight varies to provide N_{60} values) and counting the number of blows applied in each of three 6" increments of penetration. If the sampler is driven less than 18" (usually in highly resistant material), permitted in ASTM: D1586, the blows for each complete 6" increment and for each partial increment is on the boring log. For partial increments, the number of blows is shown to the nearest 0.1' below the slash.

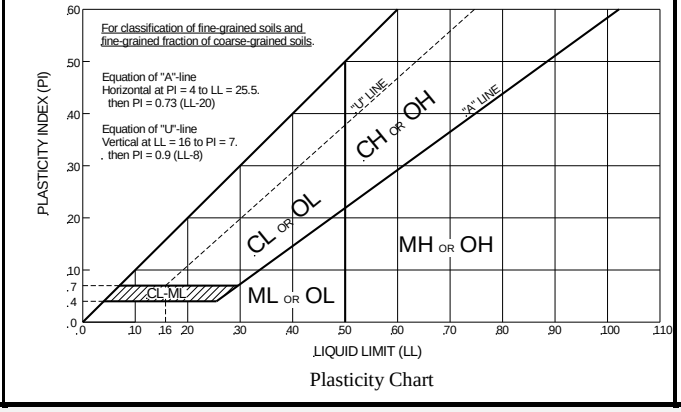
The length of sample recovered, as shown on the "REC" column, may be greater than the distance indicated in the N column. The disparity is because the N-value is recorded below the initial 6" set (unless partial penetration defined in ASTM: D1586 is encountered) whereas the length of sample recovered is for the entire sampler drive (which may even extend more than 18").

UNIFIED SOIL CLASSIFICATION SYSTEM
ASTM Designations: D 2487, D2488

AMERICAN ENGINEERING TESTING, INC.

Criteria for Assigning Group Symbols and Group Names Using Laboratory Tests[A]				Soil Classification: Group Symbol	Soil Classification: Group Name[B]
Coarse-Grained Soils More than 50% retained on No. 200 sieve	Gravels More than 50% coarse fraction retained on No. 4 sieve	Clean Gravels Less than 5% fines[C]	Cu≥4 and 1≤Cc≤3[E]	GW	Well graded gravel[F]
			Cu<4 and/or 1>Cc>3[E]	GP	Poorly graded gravel[F]
		Gravels with Fines more than 12% fines[C]	Fines classify as ML or MH	GM	Silty gravel[F,G,H]
			Fines classify as CL or CH	GC	Clayey gravel[F,G,H]
	Sands 50% or more of coarse fraction passes No. 4 sieve	Clean Sands Less than 5% fines[D]	Cu≥6 and 1≤Cc≤3[E]	SW	Well-graded sand[I]
			Cu<6 and/or 1>Cc>3[E]	SP	Poorly-graded sand[I]
		Sands with Fines more than 12% fines[D]	Fines classify as ML or MH	SM	Silty sand[G,H,I]
			Fines classify as CL or CH	SC	Clayey sand[G,H,I]
Fine-Grained Soils 50% or more passes the No. 200 sieve (see Plasticity Chart below)	Silts and Clays Liquid limit less than 50	inorganic	PI>7 and plots on or above "A" line[J]	CL	Lean clay[K,L,M]
			PI<4 or plots below "A" line[J]	ML	Silt[K,L,M]
		organic	Liquid limit–oven dried / Liquid limit – not dried <0.75	OL	Organic clay[K,L,M,N] / Organic silt[K,L,M,O]
	Silts and Clays Liquid limit 50 or more	inorganic	PI plots on or above "A" line	CH	Fat clay[K,L,M]
			PI plots below "A" line	MH	Elastic silt[K,L,M]
		organic	Liquid limit–oven dried / Liquid limit – not dried <0.75	OH	Organic clay[K,L,M,P] / Organic silt[K,L,M,Q]
Highly organic soil			Primarily organic matter, dark in color, and organic in odor	PT	Peat[R]





Plasticity Chart

Notes

[A]Based on the material passing the 3-in (75-mm) sieve.
[B]If field sample contained cobbles or boulders, or both, add "with cobbles or boulders, or both" to group name.
[C]Gravels with 5 to 12% fines require dual symbols:
GW-GM well-graded gravel with silt
GW-GC well-graded gravel with clay
GP-GM poorly graded gravel with silt
GP-GC poorly graded gravel with clay
[D]Sands with 5 to 12% fines require dual symbols:
SW-SM well-graded sand with silt
SW-SC well-graded sand with clay
SP-SM poorly graded sand with silt
SP-SC poorly graded sand with clay

[E]$Cu = D_{60} / D_{10}$, $Cc = \frac{(D_{30})^2}{D_{10} \times D_{60}}$

[F]If soil contains ≥15% sand, add "with sand" to group name.
[G]If fines classify as CL-ML, use dual symbol GC-GM, or SC-SM.
[H]If fines are organic, add "with organic fines" to group name.
[I]If soil contains ≥15% gravel, add "with gravel" to group name.
[J]If Atterberg limits plot is hatched area, soils is a CL-ML silty clay.
[K]If soil contains 15 to 29% plus No. 200 add "with sand" or "with gravel", whichever is predominant.
[L]If soil contains ≥30% plus No. 200, predominantly sand, add "sandy" to group name.
[M]If soil contains ≥30% plus No. 200, predominantly gravel, add "gravelly" to group name.
[N]PI≥4 and plots on or above "A" line.
[O]PI<4 or plots below "A" line.
[P]PI plots on or above "A" line.
[Q]PI plots below "A" line.
[R]Fiber Content description shown below.

ADDITIONAL TERMINOLOGY NOTES USED BY AET FOR SOIL IDENTIFICATION AND DESCRIPTION

Grain Size

Term	Particle Size
Boulders	Over 12"
Cobbles	3" to 12"
Gravel	#4 sieve to 3"
Sand	#200 to #4 sieve
Fines (silt & clay)	Pass #200 sieve

Gravel Percentages

Term	Percent
A Little Gravel	3% - 14%
With Gravel	15% - 29%
Gravelly	30% - 50%

Consistency of Plastic Soils

Term	N-Value, BPF
Very Soft	less than 2
Soft	2 - 4
Firm	5 - 8
Stiff	9 - 15
Very Stiff	16 - 30
Hard	Greater than 30

Relative Density of Non-Plastic Soils

Term	N-Value, BPF
Very Loose	0 - 4
Loose	5 - 10
Medium Dense	11 - 30
Dense	31 - 50
Very Dense	Greater than 50

Moisture/Frost Condition

(MC Column)

D (Dry): Absence of moisture, dusty, dry to touch.
M (Moist): Damp, although free water not visible. Soil may still have a high water content (over "optimum").
W (Wet/ Waterbearing): Free water visible intended to describe non-plastic soils. Waterbearing usually relates to sands and sand with silt.
F (Frozen): Soil frozen

Layering Notes

Laminations: Layers less than ½" thick of differing material or color.
Lenses: Pockets or layers greater than ½" thick of differing material or color.

Peat Description

Term	Fiber Content (Visual Estimate)
Fibric Peat:	Greater than 67%
Hemic Peat:	33 – 67%
Sapric Peat:	Less than 33%

Organic Description (if no lab tests)

Soils are described as *organic*, if soil is not peat and is judged to have sufficient organic fines content to influence the Liquid Limit properties. *Slightly organic* used for borderline cases.

Root Inclusions

With roots: Judged to have sufficient quantity of roots to influence the soil properties.
Trace roots: Small roots present, but not judged to be in sufficient quantity to significantly affect soil properties.

B.1 REFERENCE

This appendix provides information to help you manage your risks relating to subsurface problems which are caused by construction delays, cost overruns, claims, and disputes. This information was developed and provided by ASFE[1], of which, we are a member firm.

B.2 RISK MANAGEMENT INFORMATION

B.2.1 Geotechnical Services are Performed for Specific Purposes, Persons, and Projects

Geotechnical engineers structure their services to meet the specific needs of their clients. A geotechnical engineering study conducted for a civil engineer may not fulfill the needs of a construction contractor or even another civil engineer. Because each geotechnical engineering study is unique, each geotechnical engineering report is unique, prepared solely for the client. No one except you should rely on your geotechnical engineering report without first conferring with the geotechnical engineer who prepared it. And no one, not even you, should apply the report for any purpose or project except the one originally contemplated.

B.2.2 Read the Full Report

Serious problems have occurred because those relying on a geotechnical engineering report did not read it all. Do not rely on an executive summary. Do not read selected elements only.

B.2.3 A Geotechnical Engineering Report is Based on A Unique Set of Project-Specific Factors

Geotechnical engineers consider a number of unique, project-specific factors when establishing the scope of a study. Typically factors include: the client's goals, objectives, and risk management preferences; the general nature of the structure involved, its size, and configuration; the location of the structure on the site; and other planned or existing site improvements, such as access roads, parking lots, and underground utilities. Unless the geotechnical engineer who conducted the study specifically indicates otherwise, do not rely on a geotechnical engineering report that was:

- not prepared for you,
- not prepared for your project,
- not prepared for the specific site explored, or
- completed before important project changes were made.

Typical changes that can erode the reliability of an existing geotechnical engineering report include those that affect:

- the function of the proposed structure, as when it's changed from a parking garage to an office building, or from a light industrial plant to a refrigerated warehouse,
- elevation, configuration, location, orientation, or weight of the proposed structure,
- composition of the design team, or
- project ownership.

As a general rule, always inform your geotechnical engineer of project changes, even minor ones, and request an assessment of their impact. Geotechnical engineers cannot accept responsibility or liability for problems that occur because their reports do not consider developments of which they were not informed.

B.2.4 Subsurface Conditions Can Change

A geotechnical engineering report is based on conditions that existed at the time the study was performed. Do not rely on a geotechnical engineering report whose adequacy may have been affected by: the passage of time; by man-made events, such as construction on or adjacent to the site; or by natural events, such as floods, earthquakes, or groundwater fluctuations. Always contact the geotechnical engineer before applying the report to determine if it is still reliable. A minor amount of additional testing or analysis could prevent major problems.

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1 ASFE, 8811 Colesville Road/Suite G106, Silver Spring, MD 20910
Telephone: 301/565-2733: www.asfe.org

B.2.5 Most Geotechnical Findings Are Professional Opinions
Site exploration identified subsurface conditions only at those points where subsurface tests are conducted or samples are taken. Geotechnical engineers review field and laboratory data and then apply their professional judgment to render an opinion about subsurface conditions throughout the site. Actual subsurface conditions may differ, sometimes significantly, from those indicated in your report. Retaining the geotechnical engineer who developed your report to provide construction observation is the most effective method of managing the risks associated with unanticipated conditions.

B.2.6 A Report's Recommendations Are Not Final
Do not overrely on the construction recommendations included in your report. Those recommendations are not final, because geotechnical engineers develop them principally from judgment and opinion. Geotechnical engineers can finalize their recommendations only by observing actual subsurface conditions revealed during construction. The geotechnical engineer who developed your report cannot assume responsibility or liability for the report's recommendations if that engineer does not perform construction observation.

B.2.7 A Geotechnical Engineering Report Is Subject to Misinterpretation
Other design team members' misinterpretation of geotechnical engineering reports has resulted in costly problems. Lower that risk by having your geotechnical engineer confer with appropriate members of the design team after submitting the report. Also retain your geotechnical engineer to review pertinent elements of the design team's plans and specifications. Contractors can also misinterpret a geotechnical engineering report. Reduce that risk by having your geotechnical engineer participate in prebid and preconstruction conferences, and by providing construction observation.

B.2.8 Do Not Redraw the Engineer's Logs
Geotechnical engineers prepare final boring and testing logs based upon their interpretation of field logs and laboratory data. To prevent errors or omissions, the logs included in a geotechnical engineering report should never be redrawn for inclusion in architectural or other design drawings. Only photographic or electronic reproduction is acceptable, but recognizes that separating logs from the report can elevate risk.

B.2.9 Give Contractors a Complete Report and Guidance
Some owners and design professionals mistakenly believe they can make contractors liable for unanticipated subsurface conditions by limiting what they provide for bid preparation. To help prevent costly problems, give contractors the complete geotechnical engineering report, but preface it with a clearly written letter of transmittal. In the letter, advise contractors that the report was not prepared for purposes of bid development and that the report's accuracy is limited; encourage them to confer with the geotechnical engineer who prepared the report (a modest fee may be required) and/or to conduct additional study to obtain the specific types of information they need or prefer. A prebid conference can also be valuable. Be sure contractors have sufficient time to perform additional study. Only then might you be in a position to give contractors the best information available to you, while requiring them to at least share some of the financial responsibilities stemming from unanticipated conditions.

B.2.10 Read Responsibility Provisions Closely
Some clients, design professionals, and contractors do not recognize that geotechnical engineering is far less exact than other engineering disciplines. This lack of understanding has created unrealistic expectations that have led to disappointments, claims, and disputes. To help reduce the risk of such outcomes, geotechnical engineers commonly include a variety of explanatory provisions in their report. Sometimes labeled "limitations" many of these provisions indicate where geotechnical engineers' responsibilities begin and end, to help others recognize their own responsibilities and risks. Read these provisions closely. Ask questions. Your geotechnical engineer should respond fully and frankly.

B.2.11 Geoenvironmental Concerns Are Not Covered
The equipment, techniques, and personnel used to perform a geoenvironmental study differ significantly from those used to perform a geotechnical study. For that reason, a geotechnical engineering report does not usually relate any geoenvironmental findings, conclusions, or recommendations; e.g., about the likelihood of encountering underground storage tanks or regulated contaminants. Unanticipated environmental problems have led to numerous project failures. If you have not yet obtained your own geoenvironmental information, ask your geotechnical consultant for risk management guidance. Do not rely on an environmental report prepared for someone else

Appendix D: MDH Well Reports

Minnesota Unique Well Number

147952

County Blue Earth
Quad Mankato
Quad ID 56A

MINNESOTA DEPARTMENT OF HEALTH

WELL AND BORING REPORT

Minnesota Statutes Chapter 1031

Entry Date 06/17/1997
Update Date 02/02/2016
Received Date

Well Name	Township	Range	Dir	Section	Subsection
SKYLINE 2	108	27	W	23	DADBCB

Elevation 983.7 **Elev. Method** LiDAR 3m DEM (MNDNR)

Address

C/W MANKATO MN 56001

Stratigraphy Information

Geological Material	From	To (ft.)	Color	Hardness
DRIFT	0	261	BROWN	
SHALE, LIME ROCK	261	480	GRAY	
JORDAN SANDSTONE	480	501	WHITE	

Remarks

Well Depth 501 ft. **Depth Completed** 501 ft. **Date Well Completed** 08/15/1977

Drill Method Cable Tool **Drill Fluid**

Use public supply/community **Status** Active

Well Hydrofractured? Yes ☐ No ☐ **From** **To**

Casing Type Step down **Joint** Welded

Drive Shoe? Yes ☒ No ☐ **Above/Below** 0 ft.

Casing Diameter			Weight	
8	in. To	297 ft.		lbs./ft.
12	in. To	263 ft.	49.5	lbs./ft.

Open Hole From 263 ft. To 501 ft.

Screen? ☐ **Type** **Make**

Static Water Level

220 ft. land surface Measure 08/15/1977

Pumping Level (below land surface)

Wellhead Completion

Pitless adapter manufacturer Model

☐ Casing Protection ☒ 12 in. above grade

☐ At-grade (Environmental Wells and Borings ONLY)

Grouting Information Well Grouted? ☒ Yes ☐ No ☐ Not Specified

Material	Amount	From	To
neat cement	4.96 Cubic yards	0 ft.	297 ft.

Nearest Known Source of Contamination

feet Direction Type

Well disinfected upon completion? ☒ Yes ☐ No

Pump ☐ Not Installed Date Installed 08/15/1977

Manufacturer's name FLOWAY

Model Number 6JKL HP 25 Volt 220

Length of drop pipe 275 ft Capacity 150 g.p. Typ Submersible

Abandoned

Does property have any not in use and not sealed well(s)? ☐ Yes ☐ No

Variance

Was a variance granted from the MDH for this well? ☐ Yes ☐ No

Miscellaneous

First Bedrock St.Lawrence Formation Aquifer Tunnel City-

Last Strat Wonewoc Sandstone Depth to Bedrock 261 ft

Located by Minnesota Department of Health

Locate Method Digitization (Screen) - Map (1:12,000) (>15 meters)

System UTM - NAD83, Zone 15, Meters X 417525 Y 4888173

Unique Number Verification Info/GPS from data Input Date 08/31/1993

Angled Drill Hole

Well Contractor

Mccarthy Well Co. 27022 MCARTHY, M.

Licensee Business Lic. or Reg. No. Name of Driller

Minnesota Unique Well Number

240110

County Blue Earth
Quad Mankato
Quad ID 56A

MINNESOTA DEPARTMENT OF HEALTH

WELL AND BORING REPORT

Minnesota Statutes Chapter 1031

Entry Date 12/19/2000
Update Date 02/02/2016
Received Date

Well Name	Township	Range	Dir	Section	Subsection
SKYLINE 1	108	27	W	23	DACDBA

Elevation 988.1 **Elev. Method** LiDAR 3m DEM (MNDNR)

Address

Stratigraphy Information

Geological Material	From	To (ft.)	Color	Hardness
NO RECORDS	0	440		

Remarks

Well Depth 440 ft. **Depth Completed** 440 ft. **Date Well Completed** 00/00/1953

Drill Method Cable Tool **Drill Fluid**

Use public supply/community **Status** Active

Well Hydrofractured? **Yes** ☐ **No** ☐ **From** **To**

Casing Type Single casing **Joint**
Drive Shoe? **Yes** ☐ **No** ☐ **Above/Below**

Casing Diameter	Weight	Hole Diameter
8 in. To 258 ft.	lbs./ft.	in. To ft.

Open Hole From 258 ft. To 440 ft.

Screen? ☐ **Type** **Make**

Static Water Level

Pumping Level (below land surface)

Wellhead Completion

Pitless adapter manufacturer Model

☐ Casing Protection ☐ 12 in. above grade
☐ At-grade (Environmental Wells and Borings ONLY)

Grouting Information Well Grouted? ☐ Yes ☐ No ☐ Not Specified

Nearest Known Source of Contamination

feet Direction Type

Well disinfected upon completion? ☐ Yes ☐ No

Pump ☐ Not Installed Date Installed

Manufacturer's name

Model Number HP Volt

Length of drop pipe ft Capacity 55 g.p. Typ Submersible

Abandoned

Does property have any not in use and not sealed well(s)? ☐ Yes ☐ No

Variance

Was a variance granted from the MDH for this well? ☐ Yes ☐ No

Miscellaneous

First Bedrock Aquifer Tunnel City-
Last Strat no record Depth to Bedrock ft
Located by Minnesota Department of Health
Locate Method Digitization (Screen) - Map (1:12,000) (>15 meters)
System UTM - NAD83, Zone 15, Meters X 417444 Y 4888123
Unique Number Verification Info/GPS from data Input Date 08/31/1993

Angled Drill Hole

Well Contractor

Minnesota Department of — MDH
Licensee Business — Lic. or Reg. No. — Name of Driller

Appendix E: Tower Inspection

aguire Iron, Inc.

P.O. Box 1446
Sioux Falls, SD 57101
Phone (605) 334-9749
Fax (605) 334-9752

www.maguireiron.com

2018 Inspection Report
Skyline, MN
50,000 Gallon Cone top

Prepared by:
Chad Edwards
Maguire Iron Field Representative
605-759-4957 cell

Box 1446
x Falls, SD 57101
ne (605) 334-9749
(605) 334-9752

Maguire Iron, Inc.

WATER TOWER SPECIALISTS
Established 1915
New and Used Tanks
www.maguireiron.com

Inspection Report

11/30/2018

Skyline Minnesota

RE: Water Storage Tank Inspection

50,000 gallon cone top

The water storage tank was cleaned and inspected by our crew as per contract. Enclosed please find an inspection report for your file.

We would submit the following recommendations and estimates that may assist you in planning for future tank maintenance:

Interior Painting: Visual inspection of interior was difficult due to the tower being full and the heavy staining did not allow for clarity of condition.

Exterior Painting: Exterior paint appears to have typical areas of failures. The amount of antennas on this handrail exceeds the load limit for safety by leaps and bounds. This is very unsafe and OSHA would impose fines if they saw this. The cat walk has electronics blocking proper movement around the tower.

Safety Upgrades: Ladders are not up to OSHA standards. All ladders need a cable style safety climb for OSHA standards.

Thank you for the opportunity of servicing your tank. Should you require any additional information or documentation, contact our offices.

Sincerely,

Chad Edwards
605-759-4957
Field Representative

0 N. Minnesota Ave
ux Falls, SD 57104
ne (605) 334-9749
(605) 334-9752

Maguire Iron, Inc.

WATER TOWER SPECIALISTS
Established 1915
New and Used Tanks
www.maguireiron.com

Customer Acceptance Form

Foreman: Michael Reynolds Date: 11/30/2018

The improvement work performed by Maguire Iron, Inc. for
Skyline Minnesota
is hereby approved and accepted as having been performed in compliance with the agreement(s) thereto.

Brief description of work performed:
Rov inspection

Did we leave a Pressure Relief Valve? ☐ Yes ☒ No
If yes, Qty: _____ x $ 750.00 = Total: $ 0.00

$750.00 will be billed to the Owner for each Pressure Relief Valves (PRV) that is left behind. After the PRV(s) is returned, we will credit the $750.00 per PRV back to the Owner: Please mail them back to our physical address at the top of this form to receive your account credit. Mark your package clearly to assure the credit goes to the proper account.

Official: City clerk
Title: Water superintendent
Phone: 507-345-5390

Signature: City clerk was not available

O. Box 1446
oux Falls, SD 57101
hone (605) 334-9749
x (605) 334-9752

Maguire Iron, Inc.

WATER TOWER SPECIALISTS
Established 1915
New and Used Tanks
www.maguireiron.com

Inspection Report

ER: Skyline Minnesota Date: 11/30/2018 Inspection Type: ROV

K INFORMATION

Style: Cone Tank Size: 50,000 gallons Low Water Line: feet
ion/Access: In town Fence: Yes Power Lines (10ft): No

NDATION

Vegetation Encroachment: No Foundation Condition: Good Grout Condition: Fair
E VAULT: Gate Valve Size: " Diameter

R

rial: Steel Pipe Size: 8" Dia. Large Dia Riser: N/A Drum Diameter: ' Diameter
Cat-Walk: No Frost Jacket: ISO (Foam) Top Collar: Yes
sion Joint: Yes Re-Circ System: No Mixer System: No

R FLOW

rial: Steel Size: 4 " Dia. Flapper/Screen: Screen Ground Level: Yes
out Plug: T-Plug Clean-Out Line: No No-Freeze Valve: No

E

: Cone Roof Support: No Attachment: Brackets - Fair Eave Gaps: No
Condition: Good Spider Rods & Hub: Yes Lap Seams: Good
Hatch Lock: Locked Penetrations: No --> Describe:
Safety Rail: No Antennas: Yes --> Describe: On hand rail. Very unsafe load on tower hand rail.

K EXTERIOR

ng Type: Aluminum Coating Condition: Good Ladder: Yes
y Climb: No Anti-Climb: Leg Plates Lettering/Logo: Block letters
ribe: Typical corrosion areas. All the antennas pose an unsafe exposure while on the balcony as well as the amount of weight being added to the handrail.

K INTERIOR - WET

ng Type: Epoxy Coating Condition: Fair Active Pitting: Yes
er: No Safety Climb: No Riser Safety: None Present
ribe: Hard to get a good inspection when the tower is full of water.

K INTERIOR - DRY

ng Type: N/A Coating Condition: N/A Lighting: N/A
er: N/A Safety Climb: N/A
ribe:

A / AWWA INSPECTION

ers: Non-Compliant Safety Climb: Non-Compliant Anti-Climb: Compliant
Hatch: Compliant 2nd Access: Non-Compliant Vent: Non-Compliant
Hatch: Compliant Overflow: Compliant Railings: Non-Compliant
TARY CONDITION: Compliant Amount & Type of Sediment: Sand
FECTION: No Amount of HTH Used:
ECTED BY: Michael Reynolds REVIEWED BY: Chad Edwards DATE: 11/30/2018

P.O. Box 1446
Sioux Falls, SD 57101
Phone (605) 334-9749
Fax (605) 334-9752

Maguire Iron, Inc.

WATER TOWER SPECIALISTS
Established 1915
New and Used Tanks
www.maguireiron.com

OSHA & AWWA Checklist for Safety and Sanitation
Potable Water Tanks and Towers

Owner: Skyline Minnesota Date: 11/30/2018 Leg Height: ____

Tank Size: 50,000 gallons Tank Style: Cone Tank Height: ____

Check	Inspected Item	Standard	Actual	Comment	Need (Check)
	Ladders:				
	Rung Size	3/4"	3/4"		
	Width	16"	16"		
	Step Height	12"	12"		
	Side Rails	2" x 3/8"	2" x 3/8"		
	Toe Space	7"	5.5"		
	Roof Ladder	Secured	Y		
	Shell Ladder	Secured	Y		
	Leg Ladder	Required	Yes		
	Safety Climb	Required	No	Needs cable style safety climb device on all ladd	✓
	Anti-Climb Gate	Required	Leg Plates		
	Handrailings:				
	Height	42"	35"	Not tall enough for OSHA compliance	✓
	Mid-Rail	2" x 1/4"	NONE	No midrail on handrail "V" type handrail	✓
	Toe Board	4" x 1/4"	2.75"	Not tall enough for OSHA compliance	✓
	Pass-Through	Required	Y		
	Chains	Required	No	Needs safety chains for climber safety	✓
	Openings:				
	Roof Man Way	24"	24"		
	Second Access	24"	NONE	Needs second egress for OSHA compliance	✓
	Curb Height	4"	6"		
	Overhang	2"	2"		
	Vent	Size	No vent	Finial ball, roof vents at the eve to shell connecti	✓
	Screen	Frost-Proof	NO	Needs frost free vent.	✓
	Riser Man Way	24"	NO		
	Overflow:				
	Size		4 " Dia.		
	Screen	Required	Y		
	To ground	12" - 24"	12"		

wners water tank and structure have been inspected and documented for compliance with the current
merican Water Works Association (AWWA), Occupation Safety & Health Act (OSHA) and the appropriate
te Sanitation Code for Potable Water Tanks.

fficiencies are noted and upon request, recommendations will be made to bring the tank and structure into compliance.

Inspected by: Michael Reynolds

guire Iron is not responsible for errors or omissions in the code, and has been diligent in assessing the
ve structure to the standards applicable at the time of the inspection.

Notes for Salesman:

Notes for Next Clean Out:

Foreman: Michael Reynolds Date: 11/30/2018

Appendix F: Cost Estimates

WATER SYSTEM IMPROVEMENTS

SKYLINE, MN

ALTERNATIVE 1 - WATER SUPPLY AND TREATMENT

Location: Skyline, Minnesota

ISG Project #: 20-24060

Date: September 2020

ENGINEER'S OPINION OF PROBABLE COST

ITEM NO.	CONSTRUCTION ITEM	UNIT	QUANTITY	UNIT PRICE	TOTAL AMOUNT
1	MOBILIZATION (15%)	LS	1	$ 35,250	$ 35,250
2	*SITE IMPROVEMENTS	LS	1	$ 20,000	$ 20,000
3	WELL PUMP REPLACEMENT	EA	2	$ 12,000	$ 24,000
4	WELL #1 REMEDIATION	LS	1	$ 25,000	$ 25,000
5	REPLACE PUMP HOUSE PIPING	LS	1	$ 30,000	$ 30,000
6	CHEMICAL FEED PUMPS, PIPING, AND SECONDARY CONTAINMENT	LS	1	$ 36,000	$ 36,000
7	GENERATOR, SITE ELECTRICAL SERVICES, & CONTROLS	LS	1	$ 100,000	$ 100,000
				CONSTRUCTION COSTS	**$ 270,250**
				10% CONTINGENCY	**$ 27,025**
				ENGINEERING PROFESSIONAL SERVICES	**$ 70,000**
				TOTAL PROJECT COST	**$ 367,275**

*YARD PIPING, CONNECTIONS, VALVES, HYDRANTS, ROCK, MATERIAL TESTING, TRAFFIC CONTROL

WATER SYSTEM IMPROVEMENTS

SKYLINE, MN

ALTERNATIVE 2 - WATER SUPPLY, TREATMENT, AND TOWER REHABILITATION

Location: Skyline, Minnesota

ISG Project #: 20-24060

Date: September 2020

ENGINEER'S OPINION OF PROBABLE COST

ITEM NO.	CONSTRUCTION ITEM	UNIT	QUANTITY	UNIT PRICE	TOTAL AMOUNT
1	MOBILIZATION (7.5%)	LS	1	$ 42,375	$ 42,375
2	*SITE IMPROVEMENTS	LS	1	$ 20,000	$ 20,000
3	WELL PUMP REPLACEMENT	EA	2	$ 12,000	$ 24,000
4	WELL #1 REMEDIATION	LS	1	$ 25,000	$ 25,000
5	REPLACE PUMP HOUE PIPING	LS	1	$ 30,000	$ 30,000
6	CHEMICAL FEED PUMPS, PIPING, AND SECONDARY CONTAINMENT	LS	1	$ 36,000	$ 36,000
7	50,000 GALLON WATER TOWER INTERIOR & EXTERIOR COATINGS	LS	1	$ 225,000	$ 225,000
8	WATER TOWER SAFETY UPGRADES, TELEMETRY & CONTROLS	LS	1	$ 70,000	$ 70,000
9	REPLACE WATER TOWER RISER PIPE	LS	1	$ 35,000	$ 35,000
10	GENERATOR, SITE ELECTRICAL SERVICES, & CONTROLS	LS	1	$ 100,000	$ 100,000
				CONSTRUCTION COSTS	**$ 607,375**
				10% CONTINGENCY	**$ 60,738**
				ENGINEERING PROFESSIONAL SERVICES	**$ 100,000**
				TANK INSPECTION SERVICES	**$ 50,000**
				TOTAL PROJECT COST	**$ 818,113**

*YARD PIPING, CONNECTIONS, VALVES, HYDRANTS, ROCK, MATERIAL TESTING, TRAFFIC CONTROL

WATER SYSTEM IMPROVEMENTS
SKYLINE, MN
ALTERNATIVE 3 - WATER TOWER REPLACEMENT

Location: Skyline, Minnesota

ISG Project #: 20-24060

Date: September 2020

ENGINEER'S OPINION OF PROBABLE COST

ITEM NO.	CONSTRUCTION ITEM	UNIT	QUANTITY	UNIT PRICE	TOTAL AMOUNT
1	MOBILIZATION (5%)	LS	1	$ 38,500	$ 38,500
2	*SITE IMPROVEMENTS	LS	1	$ 35,000	$ 35,000
3	50,000 GALLON WATER TOWER (w/FOUNDATION, PAINT, TANK ELECTRICAL, AND BASED ON THE EAST LOCATION ON-SITE)	LS	1	$ 560,000	$ 560,000
4	MIXING AND RECIRCULATION SYSTEM	LS	1	$ 35,000	$ 35,000
5	EXISTING WATER TOWER DEMOLITION	LS	1	$ 40,000	$ 40,000
6	GENERATOR, SITE ELECTRICAL SERVICES, & CONTROLS	LS	1	$ 100,000	$ 100,000
				CONSTRUCTION COSTS	**$ 808,500**
				10% CONTINGENCY	**$ 80,850**
				ENGINEERING PROFESSIONAL SERVICES	**$ 115,000**
				TANK INSPECTION SERVICES	**$ 70,000**
				TOTAL PROJECT COST	**$ 1,074,350**

*YARD PIPING, CONNECTIONS, VALVES, HYDRANTS, ROCK, MATERIAL TESTING, TRAFFIC CONTROL

WATER SYSTEM IMPROVEMENTS

SKYLINE, MN

ALTERNATIVE 4 - WATER SUPPLY, TREATMENT REHABILITATION, AND TOWER REPLACEMENT

Location: Skyline, Minnesota

ISG Project #: 20-24060

Date: September 2020

ENGINEER'S OPINION OF PROBABLE COST

ITEM NO.	CONSTRUCTION ITEM	UNIT	QUANTITY	UNIT PRICE	TOTAL AMOUNT
1	MOBILIZATION (5%)	LS	1	$ 44,250	$ 44,250
2	*SITE IMPROVEMENTS	LS	1	$ 35,000	$ 35,000
3	WELL PUMP REPLACEMENT	EA	2	$ 12,000	$ 24,000
4	WELL #1 REMEDIATION	LS	1	$ 25,000	$ 25,000
5	REPLACE PUMP HOUSE PIPING	LS	1	$ 30,000	$ 30,000
6	CHEMICAL FEED PUMPS, PIPING, AND SECONDARY CONTAINMENT	LS	1	$ 36,000	$ 36,000
7	50,000 GALLON WATER TOWER (w/FOUNDATION, PAINT, TANK ELECTRICAL, AND BASED ON THE EAST LOCATION ON-SITE)	LS	1	$ 560,000	$ 560,000
8	MIXING AND RECIRCULATION SYSTEM	LS	1	$ 35,000	$ 35,000
9	EXISTING WATER TOWER DEMOLITION	LS	1	$ 40,000	$ 40,000
10	GENERATOR, SITE ELECTRICAL SERVICES, & CONTROLS	LS	1	$ 100,000	$ 100,000
				CONSTRUCTION COSTS	**$ 929,250**
				10% CONTINGENCY	**$ 92,925**
				ENGINEERING PROFESSIONAL SERVICES	**$ 115,000**
				TANK INSPECTION SERVICES	**$ 70,000**
				TOTAL PROJECT COST	**$ 1,207,175**

*YARD PIPING, CONNECTIONS, VALVES, HYDRANTS, ROCK, MATERIAL TESTING, TRAFFIC CONTROL