



September 29, 2017

Kent Fowden
kentf@payson.org
Payson City, Utah

RE: Exploratory Sampling for Storm Water Sump
600 West Utah Ave.
Payson, Utah
EPIC PROJECT #: 17-PA-xxx

Dear Mr. Fowden,

This letter summarizes Epic Engineering's finding for the exploratory drilling and soil sampling for the new construction of an underground storm water sump to be located at approximately 600 West between Utah Avenue and 100 South, Payson, Utah (Figure 1). Epic Engineering's scope of work consisted only of the observation of the sampled soil conditions in the proposed location of the underground storm water sump to verify feasibility and depths of suitable soils, depth to groundwater, and buried debris to the extent possible. This letter summarizes the findings of the exploratory drilling observation only and does not address any other geotechnical aspects of this site or surrounding areas.

The undersigned professional from Epic Engineering visited the site on September 18, 2017. At the time of the visit, the borehole locations were marked by Payson City and the western most section of the Elementary soccer field and drill samples collected to depths of 21.5-feet in each of the three marked locations. Native soils below the organic topsoil consisted of very soft to soft silt (ML), loose to medium dense sand (SM), and medium dense to dense gravels (GM) to the full extent of the boreholes. A typical silt to gravel contact ranged from 12-feet below current site grade on the north BH-01, to a depth of 8-feet in BH-03 to the south as seen in the borehole logs (Figures 2-4). Groundwater was not encountered in any of the boreholes at the time of exploration. Soil samples were logged every 2.5-feet and samples retained at the Epic Engineering Laboratory if future soil analysis is needed. Samples will be retained for approximately 3-months unless otherwise directed, or soil samples may be retained by Payson City.

It is recommended that any storm water sump be located at depths extending into the sand (SM) and gravel (GM) units encountered at depths below 8-feet in BH-02 and BH-03, and to a depth of 12-feet in BH-01. Infiltration systems installed above the gravels will cause water to saturate and pond in the silt (ML) and sandy silt (SM) units, and inhibit downward flow into the underlying gravels until the entirety of the units above the gravels are saturated. This may cause ponding to the surface or lateral migration to surrounding properties. For downward infiltrations, the base of the sump should be in at least 1 to 2 feet of the clean sands and/or gravel units across the entirety of the sump.

Great care should be taken in the construction and post-construction process so that additional moisture/water is not added to the excavation and additional water is not allowed to pond in the excavation or infiltrate in the excavation during precipitation events. Grading should be planned and executed to provide positive surface drainage away from embankments and footings, where possible during both construction and post construction.

Epic Engineering's scope of work consisted only of the observation of the exposed soil conditions in the foundation excavation to verify that prior to construction, native vegetation, unsuitable soils, and undocumented backfill



should be completely removed from below all areas which support structural loads. Other site grading activities being completed were not observed as part of this site visit. They are outside of the scope of work and are not addressed in this letter. The observations and recommendations presented in this letter were conducted within the limits prescribed by our client. No other warranty or representation, either expressed or implied, is intended in our proposals, contracts, reports or letters.

This letter concludes our scope of services for Payson City for the new construction of an underground storm water sump to be located at approximately 600 West between Utah Avenue and 100 South, Payson, Utah. Please contact Epic Engineering at (435) 654-6600 if you would like to discuss the results of the excavation observation.

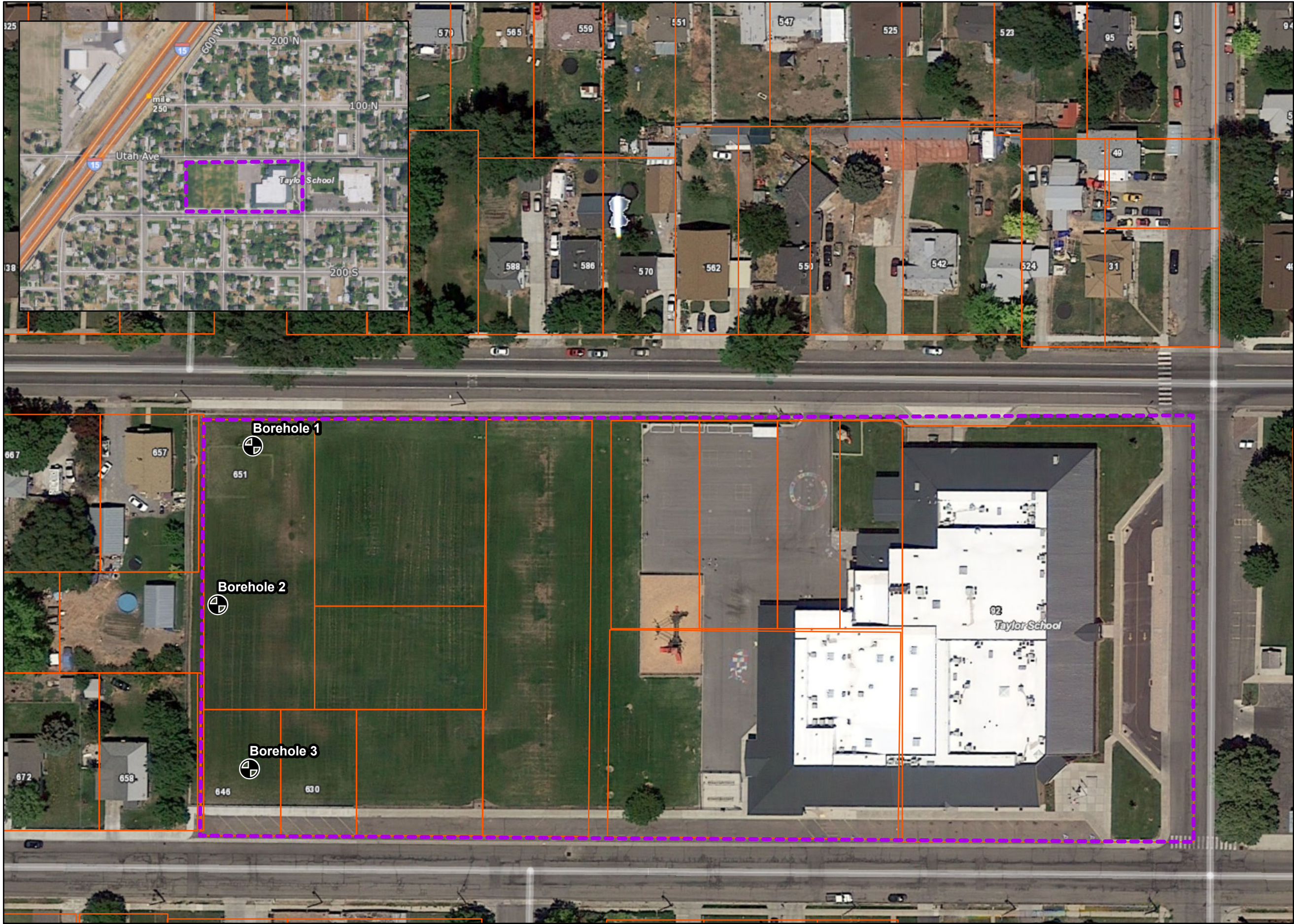
Sincerely,
Epic Engineering
Not Official Unless Stamped and Dated



Torrey Copfer, P.G.
Engineering Geologist

A handwritten signature in blue ink that reads "JN Santos".

Joseph N. Santos, P.E.
Professional Engineer



LEGEND

Site Boundary

Parcels

Subsurface Investigations

Borehole

SOURCES:
Imagery-Utah AGRC
"GoogleEarth Imagery" Acquired July 9, 2016. <https://gis.utah.gov/data/base-map-and-imagery/>
Parcels-Utah County GIS
Tax Parcels Layer. Accessed August 23, 2017. <https://gis.utah.gov/data/cadastre/parcels/>

DATE
9/28/2017

REVISIONS

NO.	DESCRIPTION
1	

DRAWN: JRC
DESIGNER: JRC
REVIEWED: TJC
PROJECT #

SCALES
HORIZ: 1"=75'
(11"x17")

PROJECT NAME:
PAYSON SUMP

SHEET TITLE:
VICINITY & SUBSURFACE INVESTIGATION LOCATIONS

PLAN SET:	FIGURE:
	1

Project Name: <u>Payson Elementary Stormwater Sump Investigation</u> Project Address: <u>600 West Utah Ave, Payson, UT</u> Contractor: <u>Earthcore Drilling</u> Equipment Used: <u>B-80 Mobile 8" hollow stem auger drill</u>	Project Number: <u>17-PA-xxx</u> Sample Date: <u>9-18-2017</u> BH Start Time: <u>12:00 PM</u> Groundwater: <u>>20 ft below grade</u>	Field Log ID: BH-01 Sheet 1 of 1
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Depth (Feet)	Sample	Soil	Sampler Blow Count (in)				% Recovery	Water Level	MATERIAL DESCRIPTION	% Passing 200	Dry Density (pcf)	Moisture Content	Liquid Limit	Plasticity Index
			0/6	6/12	12/18	18/24								
0									12" Topsoil, grass, organics, sandy silt, moist.					
2			2	1	4	75			Sand with Silt (SM) - moist, loose, reddish brown					
4			2	3	5	75								
6														
8			3	3	4	75								
10			3	3	4	60			Silty Sand (SM) - moist, loose, brown					
12									Sand (SM) - moist, loose, brown					
14														
16			2	3	5	70								
18									Gravel with Sand (GM) - moist, medium dense, brown					
20			5	12	12	60								
22									End of Borehole at 21.5-feet					

Project Name: <u>Payson Elementary Stormwater Sump Investigation</u>		Project Number: <u>17-PA-xxx</u>	Field Log ID: BH-02 Sheet 1 of 1
Project Address: <u>600 West Utah Ave, Payson, UT</u>		Sample Date: <u>9-18-2017</u>	
Contractor: <u>Earthcore Drilling</u>		BH Start Time: <u>12:00 PM</u>	
Equipment Used: <u>B-80 Mobile 8" hollow stem auger drill</u>		Groundwater: <u>>20 ft below grade</u>	

Depth (Feet)	Sample	Soil	Sampler Blow Count (in)				% Recovery	Water Level	MATERIAL DESCRIPTION	% Passing 200	Dry Density (pcf)	Moisture Content	Liquid Limit	Plasticity Index
			0/6	6/12	12/18	18/24								
0									12" Topsoil, grass, organics, sandy silt, moist.					
2									Silt (ML) - moist, very soft, reddish brown					
4									Silty Clay (CL-ML) - moist, very soft to soft, reddish brown					
6									Silt with Sand (ML) moist, very soft, reddish brown					
8									Silty Sand (SM) - moist, very soft, reddish brown					
10									Gravel with Silt and Sand (GM) - slightly moist, dense to very dense, grey to brown					
12														
14														
16														
18														
20														
22									End of Borehole at 21.5-feet					

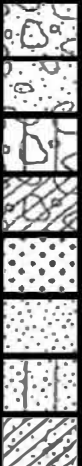
	Logged By: <u>T.Copfer</u>	Latitude:	<div style="display: flex; flex-direction: column; align-items: center;"> <div style="margin-bottom: 5px;"> Split Spoon </div> <div style="margin-bottom: 5px;"> Tube Sample </div> <div> Grab Sample </div> </div>
	Reviewed By: <u>J.Santos</u>	Longitude:	
	Water Table	Elevation:	

Figure:
3

Project Name: <u>Payson Elementary Stormwater Sump Investigation</u>		Project Number: <u>17-PA-xxx</u>	Field Log ID: BH-03 Sheet 1 of 1
Project Address: <u>600 West Utah Ave, Payson, UT</u>		Sample Date: <u>9-18-2017</u>	
Contractor: <u>Earthcore Drilling</u>		BH Start Time: <u>12:00 PM</u>	
Equipment Used: <u>B-80 Mobile 8" hollow stem auger drill</u>		Groundwater: <u>>20 ft below grade</u>	

Depth (Feet)	Sample	Soil	Sampler Blow Count (in)				% Recovery	Water Level	MATERIAL DESCRIPTION	% Passing 200	Dry Density (pcf)	Moisture Content	Liquid Limit	Plasticity Index
			0/6	6/12	12/18	18/24								
0									12" Topsoil, grass, organics, sandy silt, moist.					
2									Silt (ML) - moist, very soft to soft, reddish brown					
4														
6														
8									Gravel with Silt and Sand (GM) - slightly moist, medium dense, grey to brown					
10														
12									Sand with Gravel (SM) - moist, medium dense, brown					
14														
16									Sand (SM) - 6" coarse, 6" fine, 6" coarse, moist medium dense, brown.					
18									Sand with Gravel (SM) - moist, medium dense, brown					
20														
22									End of Borehole at 21.5-feet					





	Logged By: <u>T.Copfer</u>	Latitude:	<div style="display: flex; flex-direction: column; align-items: center;"> <div style="margin-bottom: 5px;"> <input checked="" type="checkbox"/> Split Spoon </div> <div style="margin-bottom: 5px;"> <input checked="" type="checkbox"/> Tube Sample </div> <div> <input checked="" type="checkbox"/> Grab Sample </div> </div>	Figure: 4
	Reviewed By: <u>J.Santos</u>	Longitude:		
	Water Level	Elevation:		

Unified Soil Classification System					Apparent/Relative Density Coarse-Grained & Non Cohesive Soils					
	GW	Clean GRAVELS with < 12% Fines	GRAVEL	Coarse-Grained (More than 50% Retained on No. 200 Sieve)	SPT	Modified California Sampler	Relative Density (%)	Field Test for Test Pits Easily penetrate with 1/2 inches reinforcing rod pushed by hand. Difficult to penetrate with 1/2 inches reinforcing rod pushed by hand. Easily penetrated a foot with 1/2 inches reinforcing rod driven with 5 lb hammer. Difficult to penetrate with 1/2 inches reinforcing rod driven with a 5 lb hammer. Penetrated only a few inches with 1/2 inches reinforcing rod driven with a 5 lb hammer.		
	GP				(# blows per foot)	(#blows per ft)				
	GM				GRAVELS with > 12% Fines	Very Loose	< 4		< 4	0-15
	GC					Loose	4-10		5-12	15-35
	SW	Clean SANDS with < 12% Fines	Medium Dense			10-30	12-35		35-65	
	SP		Dense			30-50	35-60		65-85	
	SM		SANDS with > 12% Fines		Very Dense	> 50	> 60		85-100	
	SC				% gravel > % sand	% sand > % gravel				
Consistency - Fine-Grained and Cohesive Soils										
Fine-Grained (More than 50% passes the No. 200 sieve)										
ML	SILTS and CLAYS (Liquid Limit < 50)	Consistency	SPT (#blows per ft)	Torvane Undrained Shear Strength (tsf)	Pocket Penetrometer Unconfined Compressive Strength (tsf)	Field Test (Test Pits) Easily Penetrated several inches by thumb. Exudes between thumb & finger when squeezed. Easily penetrated one inch by thumb. Molded by light finger pressure. Penetrated over 1/2" by thumb with moderate effort. Molded by strong finger pressure. Indented about 1/2" by thumb but penetrated only with great effort. Readily indented by thumbnail. Indented with difficulty by thumbnail.				
CL-ML										
CL		Very Soft	< 2	< 0.125	< 0.125					
OL		Soft	2-4	0.125 - 0.25	0.25 - 0.5					
MH	SILTS and CLAYS (Liquid Limit >= 50)	Medium Stiff	4-8	0.25 - 0.5	0.5 - 1.0					
CH		Stiff	8-15	0.5 - 1.0	1.0 - 2.0					
OH		Very Stiff	15-30	1.0 - 2.0	2.0 - 4.0					
PT		Hard	> 30	> 2.0	> 4.0					

Moisture Content		Modifiers of Sand and Gravel		Modifiers of Fine Grained Material		Plasticity	
Dry	Absence of moisture, dusty, dry to the touch	Description	% (Based on Weight)	Description	% (Based on Weight)	Term	Plasticity Index
Slightly Moist	Not dusty dry, but not really damp	Trace	< 15	Trace	< 5	Non-Plastic	0
Moist	Damp, but no visible water	Some	15-29	Some	5-12	Low	1-10
Wet	Visible free water	With	> 12	With	> 12	Medium	11-30
						High	> 30

Type of Layer		Thickness		Cementation		Particle Size Identification		
Parting		< 1/16 in.		Weakly	Crumbles or breaks with handling or slight finger pressure	Boulders	Coarse	over 12 inches
Seam		1/16 in. to 0.5 in.		Moderately	Crumbles or breaks with considerable finger pressure	Cobbles	Coarse	3 inches to 12 inches
Layer		0.5 in. to 12 in.		Strongly	Will not crumble or break with finger pressure	Gravel	Coarse	3/4 inch to 3 inches
Stratum		> 12 in.					Fine	No. 4 to 3/4 inch
						Sand	Coarse	No. 4 to No. 10
							Medium	No. 10 to No. 40
							Fine	No. 40 to No. 200
						Silt	Fine	< No. 200, PI < 4 or below "A" line
						Clay	Fine	< No. 200, PI >= 4 and on or above "A" line

General Notes			
1. Lines representing stratification lines are approximate. Actual transitions between soils may be gradual. 2. No warranty is provided as to the continual soil conditions between individual sample locations. 3. Logs represent general soil conditions at the observed point and time of exploration on the data indicated. 4. USCS soil classifications made on logs were based using visual methods only. However, if laboratory tests were conducted, then results were shown and used			

 Water Table Level When First Encountered	 Water Table Level Upon Completion	 Borehole Location	 Test Pit Location
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Heber City
435.654.6600

West Valley City, UT
801.955.5605

Williston, ND
701.774.5200



Killdeer, ND
701.764.7131

Vernal, UT
435.781.2113

Provo, UT
435.315.3742