Subterranean Associates LLC
Geology, Environmental and Drafting Services
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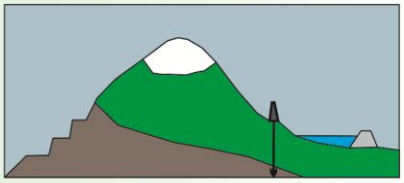

GEOLOGIC EVALUATION
SHANGHAI CANYON SUBDIVISION,
WEBER COUNTY, UTAH

Prepared for:

Shanghai Canyon Subdivision
Weber County, Utah

Prepared By:

Subterranean Associates LLC
7265 South 1950 East, #20
Salt Lake City, UT 84121
801-541-9326

August 10, 2015

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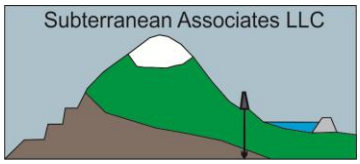
FIGURES (Presented at Back of Document)

TABLES (Presented Within Document)



1.0 INTRODUCTION

This report documents the results of Rock Fall and Debris Flow studies conducted on Shanghai Canyon, a single lot subdivision consisting of 3.392 acres located in Weber County, Utah (Property). The work was conducted at the request of the Weber County Engineering Division for approval of a Building Area on the Property. A Site Map is presented in Figure 1. A Plat Map containing the legal description and Building Area is presented in Figure 2. The Property is identified as Parcel No. 200170003 by Weber County and has a street address of 156 N. Highway 158, Eden, Utah, 84310.

1.1 Scope of Report

The Scope of this Report follows applicable sections of the following Codes and Guidance:

Rock Fall:

1. Weber County Code Section 38-2C, Rock Fall; and
2. Iron County Code 17.59.030 (3). Weber County Code does not provide specific details for conducting a Rock Fall Study, this code was developed in conjunction with the State of Utah Geological Survey (UGS). This code is being used as per personnel communication with Rochelle Pfeaster, Weber County Engineering.

Debris Flow

1. Weber County Code Section 38-2D, Debris Flow; and
2. Guidelines for the Geologic Evaluation of Debris-Flow Hazards in Alluvial Fans in Utah (Giraud, 2005).

This Report contains applicable elements of Guidelines for Preparing Engineering Geologic Reports in Utah (AEG, 1986)

1.2 Land Use

The Property was used as a gravel source during the construction of Pineview Dam and is currently unoccupied. The flat Building Area is located within the boundary of and on the floor of the former gravel extraction area.

A Site Plat is presented in Figure 2. The proposed use of the Property is open space and residential. A one hundred by seventy-five foot Building Area is specified on the Plat.

2.0 PHYSIOGRAPHIC AND GEOLOGIC SETTING

The Property is located near the mouth of Shanghai Creek (intermittent) in the Ogden River Valley of the Wasatch Mountains. A Vicinity Geologic Map is presented in Figure 3. A Site-Scale Geologic Map is presented in Figure 4. A map presenting geologic hazards in the vicinity of the Property as mapped by the State of Utah is presented in Figure 5.

The Shanghai Creek basin has an area of 1.13 square miles (726 acres). Detailed analysis of the basin is presented in Section 4.2.

Dominant vegetation on the North facing slopes is a mixed conifer type consisting of Douglas-fir (*Pseudotsuga menziesii*) and white fir (*Abies concolor).* The dominant vegetation on the south facing slopes is a woodland type consisting of almost exclusively of Gambel oak (*Quercus gambelii).* The basin is located within the Wasatch-Uinta National Forest. No roads or constructed features are located in the basin.

2.1 Soil

Mapped soil boundaries for the vicinity of the Property are presented on Figures 3 and 4.

The primary mapped soil unit within the Property boundary is the Smarts Loam (SfG) which contains the following properties based on Natural Resources Conservation Service (NRCS) online mapping tools (http://www.nrcs.usda.gov/wps/portal/nrcs/site/soils/home/):

- Slope: 40 to 60 percent
- Depth to restrictive feature: More than 80 inches
- Natural drainage class: Well drained
- Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.60 in/hr)
- Depth to water table: More than 80 inches
- Frequency of flooding: None
- Frequency of ponding: None
- Salinity, maximum in profile: Nonsaline (0.0 to 2.0 mmhos/cm)
- Available water storage in profile: Moderate (about 7.1 inches)

The secondary mapped soil unit, occurring only on the northwest portion of the Property is the Nordic Patio association (NVG) which contains the following properties based on NRCS online mapping tools:

- Slope: 30 to 60 percent
- Depth to restrictive feature: More than 80 inches
- Natural drainage class: Well drained

- Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.60 in/hr)
- Depth to water table: More than 80 inches
- Frequency of flooding: None
- Frequency of ponding: None
- Available water storage in profile: Low (about 6.0 inches)

2.2 Surficial Geology

Quadrangle scale (e.g. 7.5 minute, 1"=2000') surficial geology (King and McDonald, 2014) is presented on Figure 3. The following surficial units fall within the Property:

- Qac - Alluvium and colluvium (Holocene)
- Qmc - Colluvium (Holocene to upper Pleistocene)
- Qla - Lacustrine and alluvial deposits, undivided (Holocene to upper Pleistocene)

The following additional units fall within the Shanghai Creek basin:

- Qms - Landslide deposits (Holocene to middle? Pleistocene)
- Qmdf - Debris-flow deposits (Holocene to middle Pleistocene)

In addition to geologic mapping, aerial photographs were examined to identify a visual history of large-scale features in the Shanghai Creek basin. Photographs from the following years were examined:

Table 1 - Aerial Photograph Review

Year **Name** **Scale**	**Source**	**Visible Large Scale Debris Flow or Landslides**	**Comments**
1946 AAJ_2B-50 1:20,000	UGS (1)	No	No large scale debris flows or landslides. Cleared area from gravel extraction is visible.
1963 ELK_2-87 1:15,840	UGS (1)	No	No large scale debris flows or landslides. Cleared area from gravel extraction contains vegetation.
1983 USFS_OC-584 1:6,000	UGS (1)	No	Lower portion of basin only. No large scale debris flows or landslides. Cleared area from gravel extraction contains additional vegetation.

1993 Unknown Name Unknown Scale	Google Earth	No	No large scale debris flows or landslides. Cleared area from gravel extraction contains additional vegetation.
2013 Unknown Name Unknown Scale	Google Earth	No	No large scale debris flows or landslides. Cleared area from gravel extraction contains additional vegetation.

Notes:
(1) Utah Geological Survey Aerial Imagery Collection (http://geology.utah.gov/map-pub/publications/aerial-photographs/)

Elements common t o all photographs:

- All photographs show a minor area of uneven ground that may be indicative of debris flow and/or alluvial deposits in the upper basin near the confluence of the main and two feeder channels. The ground surface in much of this area is obscured be vegetation. This 118- acre area was mapped by King and McDonald (2014) as containing an area of debris flow material. This area was difficult to identify on aerial photography and emanated from a steep feeder channel but did not flow any significant length down the main channel.
- All photographs contain areas that may be indicative of minor landslide activity as indicated by open areas consistent with steep slopes.
- Areas mapped by King and McDonald (2041) indicate areas of landslide deposits.

Surficial geology observations conducted this study are consistent with the Property having been used as a gravel pit. Two test pits were evaluated as part of the Debris Flow portion of this study, descriptions and photographs are presented in Section 4.1.3. The test pits indicate that the Property is underlain by colluvium consistent with geologic mapping by King and McDonald (2014).

2.1 Bedrock Geology

The Property is underlain by the Mississippian Humbug Formation consisting of medium-bedded, commonly crossbedded, medium to fine-grained, gray to pale-brown weathering quartzite, commonly with thin beds and lenses of dark-gray to black chert: interbedded with dark- to light-gray medium bedded dolomite (Sorensen and Crittenden, 1979). This formation consists of the lower plate of the Willard Thrust Fault which is mapped to the northwest of the Property (Sorensen and Crittenden, 1979).

The Shanghai Creek Basin is underlain by the following formations (Sorensen and Crittenden, 1979):

- Tn - Norwood Tuff (Tuff)
- Mh - Mississippian Humbug Formation (Quartzite)

- Zmcc - Precambrian Maple Canyon Formation (Conglomerate)
- Zmcg - Precambrian Maple Canyon Formation (Arkosic Sandstone)
- ZYpg - Precambrian Formation of Perry Canyon (Graywacke Siltstone)
- Xf - Precambrian Formation of Facer Creek (Slate and Phyllite)

The formations occurring in the Shanghai Creek basin are composed of generally competent rock types and not prone to rapid erosion or mass-wasting events.

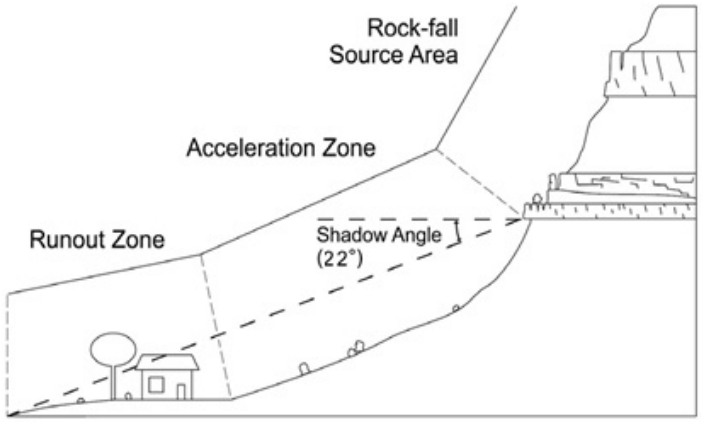
3.0 ROCK FALL STUDY

A Rock Fall Study was conducted at the request of the Weber County Engineering Division . A Site-Scale Geologic Map with topography is presented in Figure 4

3.1 Rock Fall Analysis Methodology

As described in Section 1.1, the Rock Fall Analysis was conducted using Iron County Code 17.59.030 (3) which states:

A rock-fall geologic study area consists of three components: (1) a rock source, in general defined by bedrock geologic units that exhibit relatively consistent patterns of rock-fall susceptibility throughout the study area, (2) an acceleration zone, where rock fall debris detached from the source gain momentum as it travels downslope—this zone often includes a talus slope, which becomes less apparent with decreasing relative hazard and is typically absent where the hazard is low, and finally (3) a runout zone (rock-fall shadow zone), which includes gentler slopes where boulders have rolled or bounced beyond the base of the acceleration zone. (Lund, et al., 2008 in County Code 17.59.030 (3)). Typical components of a rock-fall path profile are presented below (Lund, et al., 2008):



3.2 Outcrop Evaluation

No outcrops are located immediately adjacent to the Building Area. One outcrop is visible in Figure 6. This outcrop has been mapped by Sorensen and Crittenden (1979) and King and McDonald (2014) as Mississippian Humbug Formation. This outcrop has an east-west strike and dips 8 degrees to the north (King and McDonald, 2014). The slope directly above the Building Area consists of colluvium.

A site specific calculation of the shadow angle for the outcrop in Figure 6 is 36 degrees. This angle is due to a consistently steep acceleration zone. An abruptly flat runout zone reduces the extents of potential impacts to the Building Area.

3.2 Rock Fall Analysis

This Section documents the results of a Rock Fall Analysis for the Building Area presented in Figure 2. One outcrop is visible from the Property (Figure 6). There is no well developed talus field below this outcrop. The westernmost portion of the Property falls within the 36 degree shadow angle of the outcrop. Topographic (Figure 3) and visual analysis (Figure 6) indicate that the likely trajectory for rock fall emanating from this outcrop may include the southwest corner of the Property. However, the predominate trajectory would fall to the south of the Property and hence, outside of the Building Area. The likelihood of rock fall emanating from this outcrop and impacts to the Building Area is low as evidenced by the lack of talus.

Although slopewash is technically outside of the purview of a Rock Fall Analysis and not described in the code, the slope above the Building Area was evaluated. The amount of slopewash at the base of the slope in the former gravel floor is minimal. This indicates that the slope has stabilized over time. Vegetation coverage on this slope is approximately 50% and includes mature trees.

3.3 Rock Fall Mitigation

No rock fall mitigation is required.

4.0 DEBRIS FLOW STUDY

This section includes applicable procedures described in Guidelines for the Geologic Evaluation of Debris-Flow Hazards in Alluvial Fans in Utah (Giraud, 2005) and follows applicable site-specific portions of line items one through five of Weber County Code Section 38-2D, Debris Flow, as described below:

1. An analysis of the past history of debris flow at the site based on subsurface exploration to determine the nature and thickness of debris flow and related alluvial fan deposits.
2. An analysis of the drainage basin's potential to produce debris flows based on the presence of debris slides and colluvium-filled slope concavities, and an estimate of the largest probable volumes likely to be produced during a single event.
3. An analysis of the stream channel to determine if the channel will supply additional debris, impede flow, or contain debris flows in the area of the proposed development.
4. An analysis of man-made structures upstream that may divert or deflect debris flows.
5. Recommendations concerning any channel improvements, flow modifications and catchment structures, direct protection structures or flood proofing measures, if necessary, in order to protect the development.
6. Upon approval of the County Engineer, the report shall be presented to the Planning Commission along with review comments for recommendation of approval by the County Commission.

4.1 Past Debris Flow History Analysis and Subsurface Exploration

This Section presents the results of onsite evaluations.

4.1.1 Alluvial Fan Evaluation

Giraud, 2005, describes an evaluation of the alluvial fan as part of a Debris Flow Study. The Property is not located on an alluvial fan. The Property is located on the site of a former gravel extraction pit used during construction of Pineview Dam. This area appears to have the characteristics of a small alluvial fan on quadrangle-scale topographic maps. However, the flat area that encompasses the Building Area is the former floor of the gravel pit. Two topographic profiles with estimates of the original ground surface are presented in Figure 7. Prior to gravel extraction, the topography of the Property likely consisted of a steeply sloping hill and an incised channel similar to the profile for Transect 4 as presented in Figure 8. Transect 4 is located upstream from any areas of human disturbance. Any alluvial fan related deposits would have likely occurred in an area that is now inundated by Pineview Reservoir. Greg McDonald of the UGS agreed with this hypothesis during a site visit on June 18, 2015.

4.1.2 Past Debris Flow History

Due to excavation that occurred during gravel extraction, any debris flow history in the area immediately adjacent to the Building Area would be limited to the last 85 years. Any debris flow occurring prior to gravel extraction would have been confined to the channel. A visual inspection of the area surrounding the Building Area did not result in any observations or indications of debris flow. The channel directly upgradient from the Building Area and Property were inspected for indications of debris flow. No indications of debris flow were observed in this area. Channel profile transects are presented in Figure 8.

Recent geologic mapping by King and McDonald (2014) indicates an area of debris flow material in the middle reaches of the Shanghai Creek basin. This material did not migrate downstream to the Property. The lack of down gradient movement may be related to the average gradient of 18% in the Shanghai Creek basin. A channel profile is presented in Figure 9. Detailed basin characteristics are presented in Section 4.2.

4.1.3 Subsurface Evaluation

Two test pits were evaluated in an area adjacent to the Building Area and Shanghai Creek channel. Test pit locations are presented on Figure 4. Test pit logs are presented in Figure 10. The logs indicate that the Property is underlain by at least five and one-half feet of colluvium. Based on difficult, dense excavating conditions, this material appears to be undisturbed, native material that composed the floor of the gravel extraction area. The colluvium overlies an unknown thickness of Lake Bonneville lacustrine deposits consisting of clay, gravel and cobbles.

No indications of debris flows were observed in the two test pits. One test pit was inspected by Greg McDonald of the UGS during a site visit on June 18, 2015. Mr. McDonald inspected Test Pit 2 and confirmed the occurrence of colluvium and Lake Bonneville lacustrine deposits. Mr. McDonald hypothesized that the lacustrine deposits may be of a transgressive regime.

4.2 Drainage Basin Evaluation

As described in Section 2.0, the Shanghai Creek basin has an area of 1.13 square miles (726 acres). The area of the basin with slopes greater than 30 degrees is approximately 1.04 square miles (668 acres) The creek exits the Property into a culvert at an elevation of approximately 4,920 feet. The maximum elevation of the basin is 7,065 feet. The main channel has a length of 9,950 feet. The average gradient is 0.18 ft/ft (18%). The gradient ranges from 0.27 ft/ft (27%) to 0.11 ft/ft (11 %). A profile is presented in Figure 9. Three primary feeder channels, comprising a cumulative length of 10,719 feet enter the main channel. The basin relief ratio expressed in percent is 20%. In contrast, the average basin relief ratios for twenty-six basins with debris flows presented in Giraud and Castleton (2009) is 42.6%. The lowest value presented in Giraud and Castleton (2009) was 23% with a range of 23 to 65%. It is likely that the 18% average gradient is insufficient for the transport of debris flow material. Due to the low gradient of the basin, fire and rainfall related debris flow volumes were not calculated.

4.2.1 Shallow Landsliding

Areas of shallow landsliding are presented with the map symbol Qms on Figure 3. The mapping presented on Figure 3 does not estimate the thickness of landslide debris. Based on the mapping presented in Figure 3, the susceptibility of the Shanghai Creek basin to shallow landsliding is moderate which is not atypical

for this type of terrain. However, there are no mapped landslide material in areas that would directly impact the Property and Building Area.

4.4 Analysis of Upstream Man-Made Structures

There are no man-made structures upstream of the Property in the Shanghai Creek basin. One well-traveled hiking trail traverses the eastern portion of the basin and one overgrown trail follows the channel.

4.5 Debris Flow and Potential Impacts

This Section discusses the potential risks to the Building Area from debris flows. VanDine (1996) states that:

The profile of a stream, gully, or channel that is subject to channelized debris flows can be broadly divided into three zones: initiation; transportation and erosion; and deposition. Initiation generally requires a channel gradient greater than 25 degrees (47%); transportation and erosion generally require a gradient of greater than 15 degrees (27%); partial deposition, in the form of levees, generally occurs at a gradient of less than 15 degrees (27%); and deposition on the debris fan usually begins once the gradient flattens to less than a 10 degrees (18%) gradient.

As discussed in Section 4.2 and presented on Figure 9, the average gradient of Shanghai Creek is 18%. As stated above transportation and erosion generally require a gradient of greater than 15 degrees (27%) (VanDine, 1996). The gradient of the channel is not sufficient for basin-wide movement of the volumes of material theoretically available for transport. Gradients are summarized in Table 2. The area mapped by King and McDonald (2014) as debris flow material in the upper reaches of the basin, as highlighted in green and presented in Figure 3, indicates that the overall gradient is insufficient for the large-scale transportation of debris flows from the upper to lower zones of the basin. The middle area of the basin with gradients of 14 and 15% inhibits and/or attenuates debris flow emanating in the upper reaches of the basin (Figure 9) from impacting the Building Area.

Table 2 Debris Flow Summary

Zone (1)	Reaches (Figure 9)	Gradient Range	Gradient Required for Flow (1)	Meet Criteria For Debris Flow?
Initiation Zone - Upper Basin	1 - 4	15 - 26%	47%	No
Transportation and Erosion Zone- Middle Basin	5 - 9	14 - 24%	27%	No

Deposition Zone - Lower Basin (3)	10	11	18 (deposition)	Yes (3).

Notes:
(1) As presented in VanDine, 1996 and presented above..
(2) For the purposes of this study, the Property was mapped as this zone. Basin areas below the Property were not addressed by this study.
(3) Based on gradient, this zone meets the requirement for deposition. However as stated in the above paragraph the basin does not contain sufficient gradient to transport material to this zone.

4.6 Debris Flow Recommendations

Due to the low gradient of the Shanghai Creek channel, no recommendations for debris flow mitigation are necessary.

5.0 CONCLUSIONS

Rock Fall

Rock fall risk for the Building Area presented on the Plat Map (Figure 2) is low. This is evidenced by the lack of outcrops and/or talus in areas directly upslope from the Building Area.

Debris Flow

Due to the gradient of the Shanghai Creek basin and channel, the likelihood of a debris flow impacting the Building Area is low.

6.0 REFERENCES

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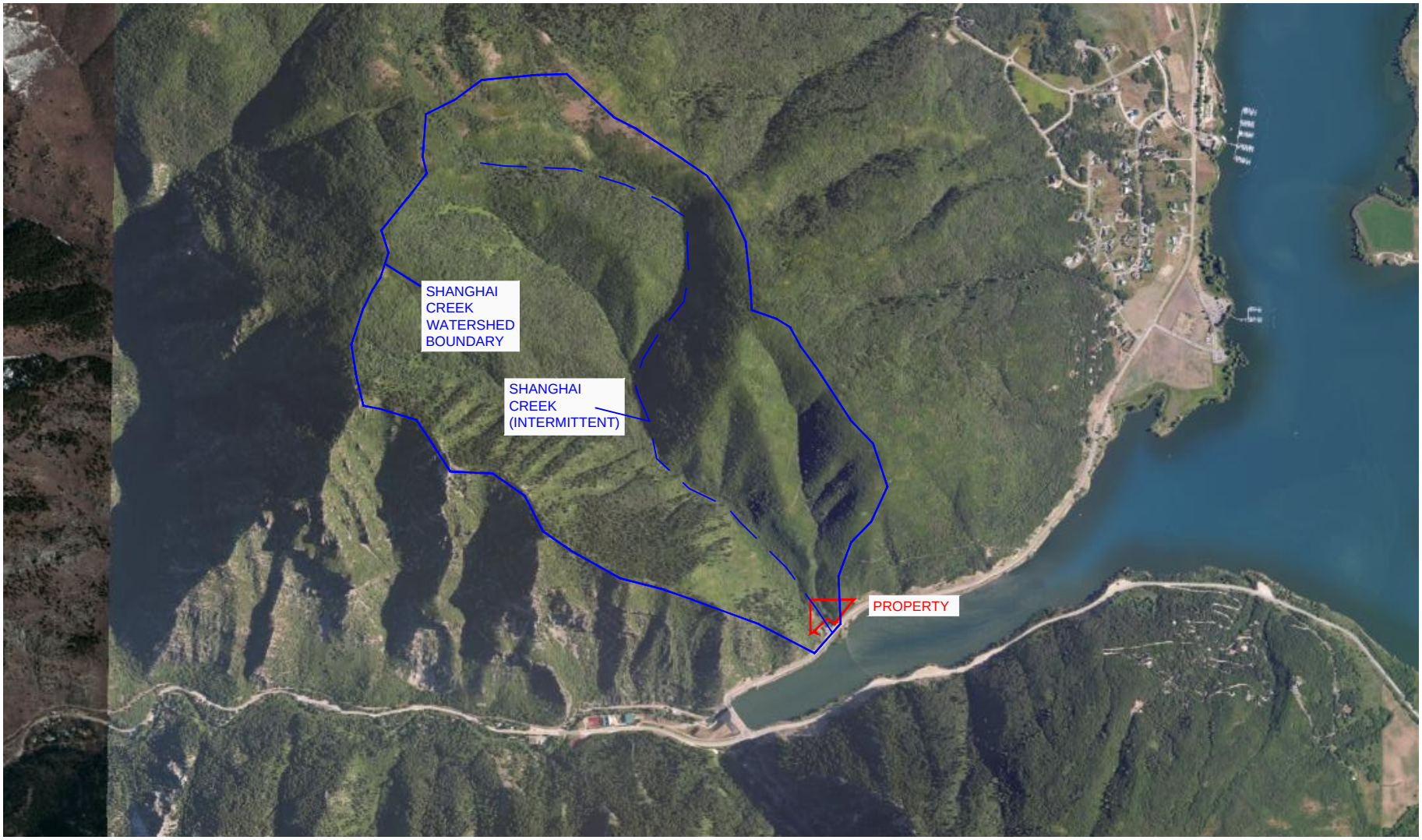
7.0 SIGNATURE

This Report was prepared by a Professional Geologist registered in the State of Utah.

_____

Todd Leeds, P.G.
August 10, 2015



Notes:
Imagery - ERSI GIS Server

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SCALE
0 500 1000 1500 2000
FEET

SHANGHAI CANYON

FIGURE 1 - SHEET 1
SITE MAP

JUNE 2015	SH sitemap1.dwg

SUBTERRANEAN ASSOCIATES LLC
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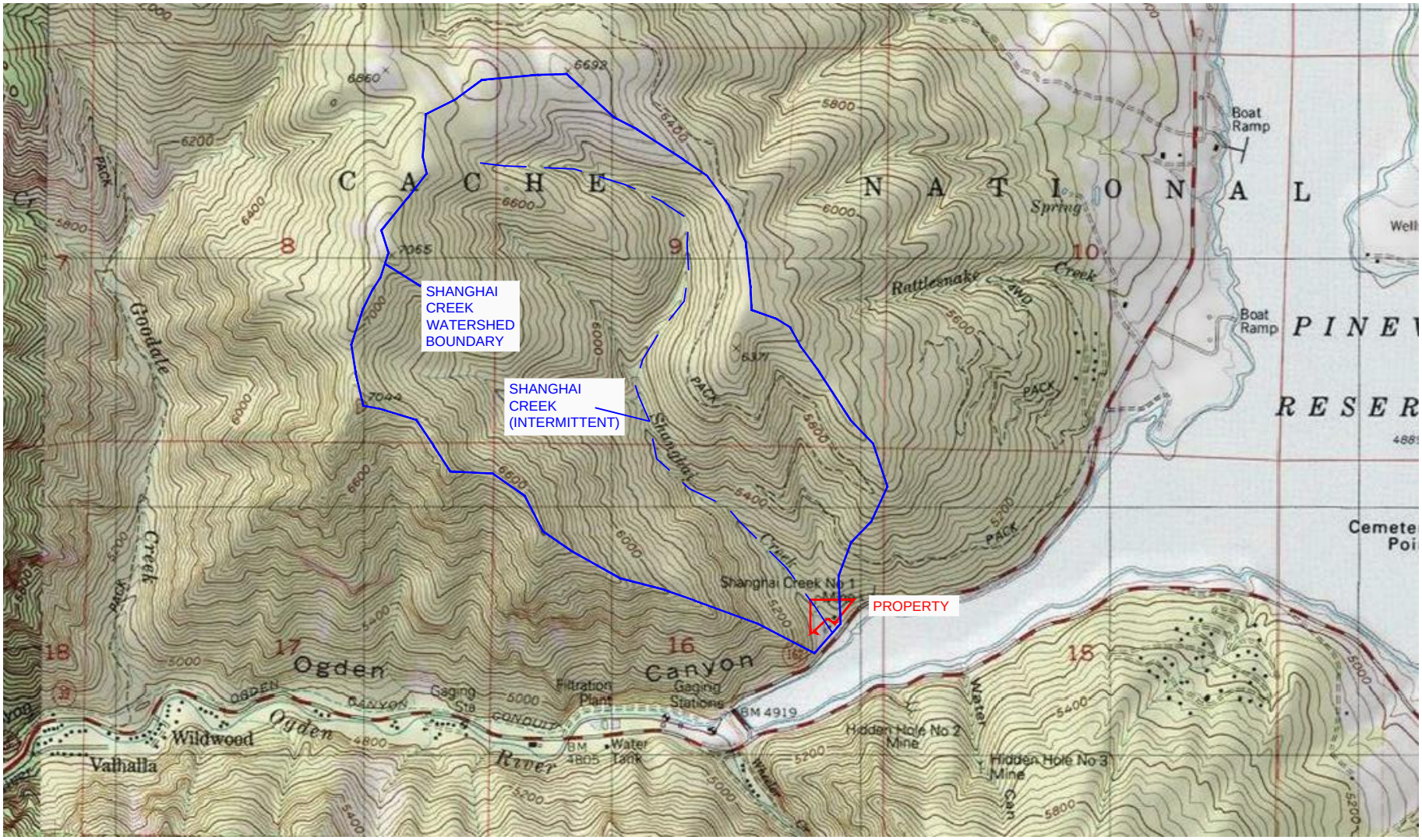
SUBTERRANEAN.ASSOCIATES@GMAIL.COM (801)541-9326



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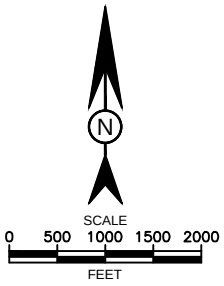

SHANGHAI CANYON

FIGURE 1 - SHEET 2
SITE MAP

JUNE 2015	SH sitemap1.dwg

SUBTERRANEAN ASSOCIATES LLC
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Shanghai Canyon Subdivision

A part of the Northwest 1/4 of Section 16, T6N, R1E, SLB&M, U.S. Survey
Weber County, Utah
May 2015

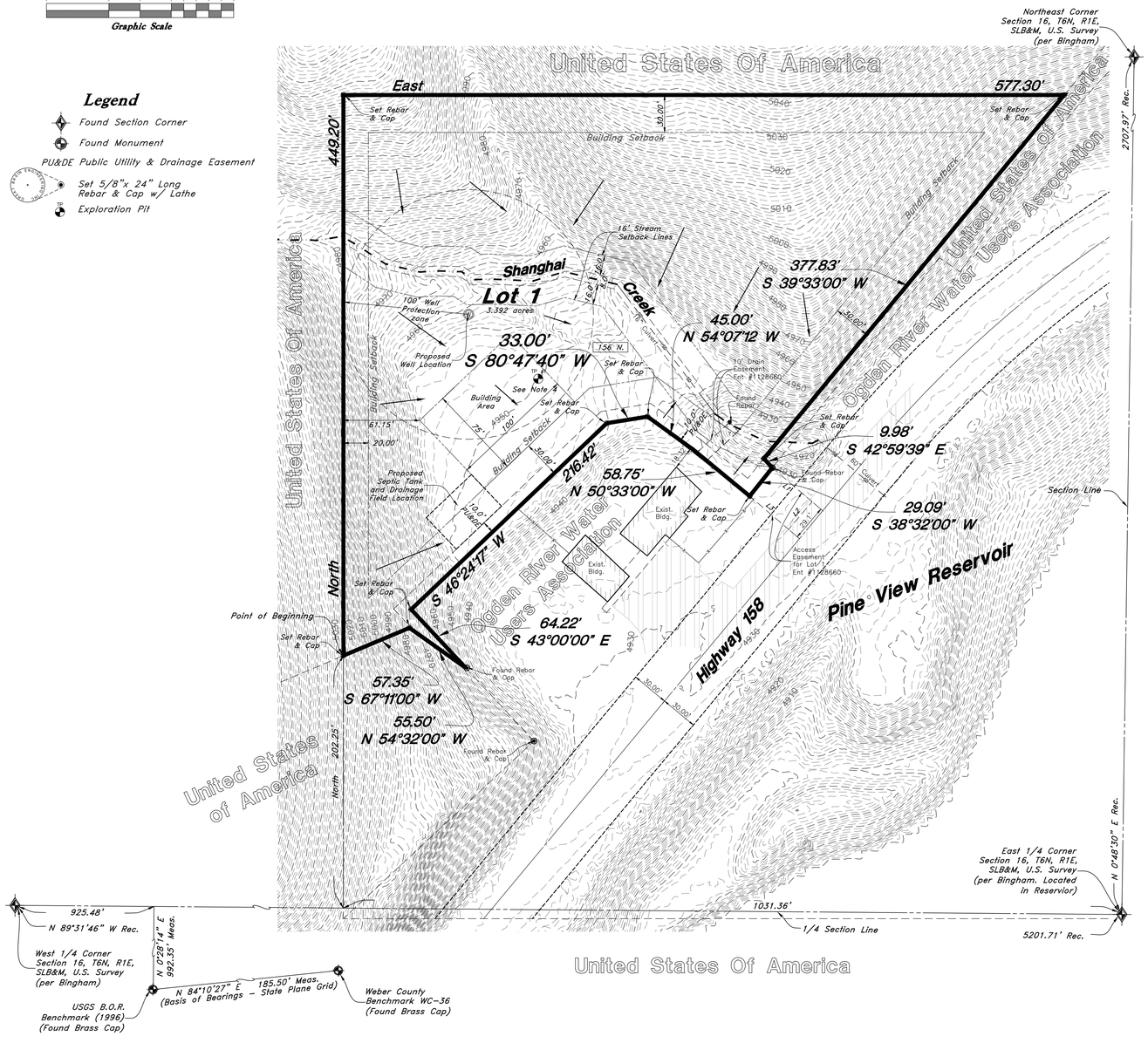
Scale: 1" = 50'

50 0 25 50 60 70 80 90 100

Graphic Scale

Legend

- Found Section Corner
- Found Monument
- PU&DE Public Utility & Drainage Easement
- Set 5/8"x 24" Long Rebar & Cap w/ Lathe
- TP Exploration Pit



EASEMENT LINE DATA		
Line	Length	Bearing
L1	41.98'	N 49°27'00" W
L2	29.07'	N 40°33'00" E
L3	40.96'	S 49°27'00" E

NOTES:

1– Due to the topography and the location of this subdivision, all owners will accept responsibility for any storm water runoff from the road adjacent to this property until curb and gutter is installed.

2– Rights for The 10' wide Drain Easement and the Right of way Easement were defined by a Quit Claim Deed recorded with the Office of Weber County Recorder on January 8, 1991 as Entry No. 1128660.

3– Notice to Purchasers of Lots with Designated Building Areas. Lots with designated "building areas" have been approved subject to the condition that building development shall take place only within such designated areas.

4– If individual well permits are issued by the Utah State Division of Water Rights, one well permit must be obtained along with a letter of feasibility from the Division of Water Rights and the Weber Morgan Health Department, which states that well permits can be issued in the proposed area by the Division of Water Rights for exchange purposes. The owner of record of the proposed subdivision properly shall record a covenant to run with the land which advises the new lot owner of the requirements to be fulfilled before a building permit can be obtained. This shall include but not be limited to:

a. that a well permit must be obtained;
b. the time it may take to obtain the permit;
c. the well must be drilled;
d. water quality to be satisfactory; and
e. water quantity to be sufficient as required by the Weber County Health Department, before a building permit can be obtained.

If well permits cannot be obtained, the lot will no longer be deemed a buildable lot.

5– It is determined that no Stream Alteration Permit will be required for the identified project as long as a the 16–foot setback is honored, any construction or permanent crossing utilizes the existing culvert, and the footprint of the proposed property access road/driveway intersecting the 16–foot stream setback is the same as the existing access.

6– Area of the property that is equal to or less than 25% slope is 36,178 square feet.

7–Exploration Pit #1
0–67" gravelly silt loam, granular structure, 30% gravel
67–90" gravelly silt loam, massive structure, 30% gravel
Required percolation depth(s) 24"

DEVELOPER INFORMATION

David Clapier
7310 S. 950 W.
Willard, UT 843470
(801) 510–3568

WEBER COUNTY PLANNING COMMISSION APPROVAL

This is to certify that this subdivision plat was duly approved by the Weber County Planning Commission.
Signed this day of , 2015.

Chairman, Weber County Planning Comission

SURVEYOR'S CERTIFICATE

I, Andy Hubbard, do hereby certify that I am a Registered Professional Land Surveyor in the State of Utah, and that I hold Certificate No. 6242920 in accordance with Title 58, Chapter 22, of the Professional Engineers and Land Surveyors Licensing Act. I also certify that I have completed a survey of the property described hereon In accordance with Section 17–23–17 and that I have verified all measurements shown hereon this plat of Shanghai Canyon Subdivision in Weber County, Utah and that it has been correctly drawn to the designated scale and is a true and correct representation of the following description of lands included in said subdivision, based on data compiled from records in the Weber County Recorder's Office. Monuments have been found or placed as represented on this plat.

Signed this _____ day of _____, 2015.

6242920
License No.

Andy Hubbard

BOUNDARY DESCRIPTION

A Part of the Northwest Quarter of Section 16, Township 6 North, Range 1 East, Salt Lake Base and Meridian, U.S. Survey, Weber County Utah

Beginning at a point which is 1031.36 feet North 89°31'46" West along the Quarter Section line and 202.25 feet due North from the East Quarter Corner of said Section 16, and running thence due North 449.20 feet; thence due East 577.30 feet; thence South 39°33'00" West 377.83 feet; thence South 42°59'39" East 9.98 feet; thence South 38°32'00" West 29.09 feet; thence North 50°33'00" West 58.75 feet; thence North 54°07'12" West 45.00 feet; thence South 80°47'40" West 33.00 feet; thence South 46°24'17" West 216.42 feet; thence South 43°00'00" East 64.22 feet; thence North 54°32'00" West 55.50 feet; thence South 67°11'00" West 57.35 feet to the point of beginning.

Contains: 3.392 acres

OWNER'S DEDICATION

We, the undersigned owners of the hereon described tract of land, hereby set apart and subdivide the same into Lots as shown on this plat, and name said tract Shanghai Canyon Subdivision and hereby dedicate, grant and convey to Weber County, Utah, those certain strips as easements for public utility and drainage purposes as shown hereon, the same to be used for the installation, maintenance, and operation of public utility service lines and drainage, as may be authorized by Weber County,

Signed this day of , 2015.

David M. Clapier | Keith Bradley Clapier

Barton J. Clapier | Kurt H. Clapier

ACKNOWLEDGMENT

State of Utah
County of Weber } ss

The foregoing instrument was acknowledged before me this_____ day of _____ 20___ by _____.

Residing At:_____
Commission Number:_____
Commission Expires:_____

A Notary Public commissioned in Utah

Print Name

ACKNOWLEDGMENT

State of Utah
County of Weber } ss

The foregoing instrument was acknowledged before me this_____ day of _____ 20___ by _____.

Residing At:_____
Commission Number:_____
Commission Expires:_____

A Notary Public commissioned in Utah

Print Name

NARRATIVE

This survey and subdivision plat were requested by David Clapier for the purpose of Clarifying and establishing the boundaries of the hereon described property.

Several rebar were recovered which were set by a previous survey of the property by Bingham Engineering dated April 6, 2004 and were honored.

The Northeast Corner, East Quarter Corner, and West Quarter Corner were not occupied as part of this survey, but were tied from the found rebars set by Bingham Engineering and recovered by this survey.

A line bearing North 84°10'27" East between USGS B.O.R. Benchmark (1996), Weber County Benchmark WC–36 as shown hereon, was used as Basis of Bearings for this survey.

WEBER COUNTY ENGINEER

I hereby certify that the required public improvement standards and drawings for this subdivision conform with County standards and the amount of the financial guarantee is sufficient for the installation of these improvements.

Weber County Engineer

WEBER COUNTY COMMISSION ACCEPTANCE

This is to certify that this subdivision plat, the dedication of streets and other public ways and financial guarantee of public improvements associated with this subdivision, thereon are hereby approved and accepted by the commissioners of Weber County, Utah.
Signed this day of , 2015.

Chairman, Weber County Comission

Attest: _____
Title: _____

WEBER COUNTY SURVEYOR

I hereby certify that the Weber County Surveyor's Office has reviewed this plat for mathematical correctness, section corner data, and for harmony with lines and monument on record in County Offices. The approval of this plat by the Weber County Surveyor does not relieve the licensed Land Surveyor who executed this plat from the responsibilities and/or liabilities associated therewith.
Signed this day of , 2015.

Weber County Surveyor

WEBER COUNTY ATTORNEY

I have examined the financial guarantee and other documents associated with this subdivision plat, and in my opinion they conform with the County Ordinance applicable thereto and now in force and affect.
Signed this day of , 2015.

Weber County Attorney

WEBER–MORGAN HEALTH DEPARTMENT

I hereby certify that the soils, percolation rates, and site conditions for this subdivision have been investigate by this office and are approved for on–site wastewater disposal systems.
Signed this day of , 2015.

Weber County Surveyor

WEBER COUNTY RECORDER

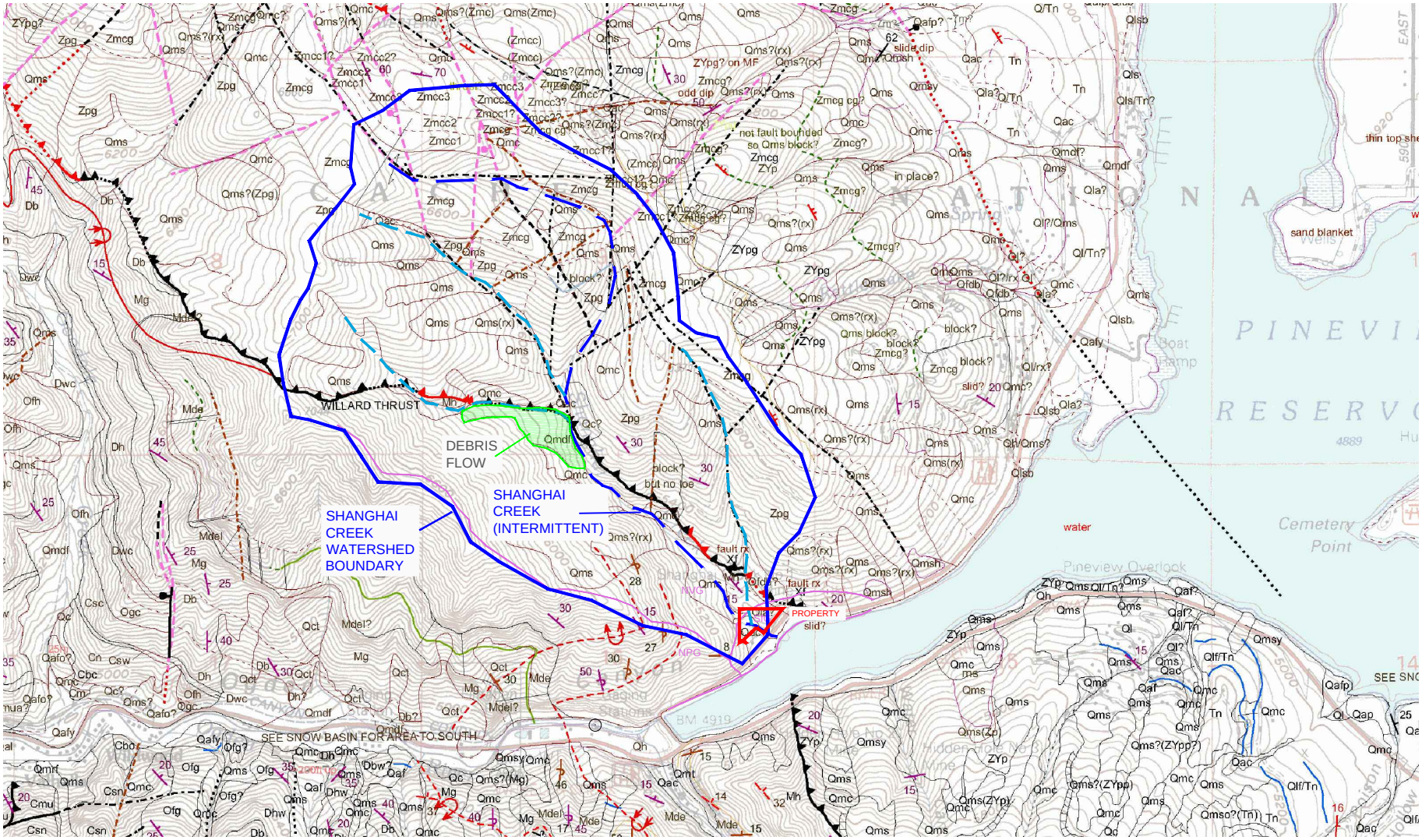
ENTRY NO._____FEE PAID _____FILED FOR RECORD AND RECORDED_____, AT _____ IN BOOK_____ OF OFFICIAL RECORDS, PAGE_____. RECORDED FOR_____

WEBER COUNTY RECORDER

BY:_____
DEPUTY

GREAT BASIN ENGINEERING
5746 South 1475 East Ogden, Utah 84403
Main (801)394-4515 S.L.C (801)521-0222 Fax (801)392-7544
www.greatbasinengineering.com

14N735 – Clapier



LEGEND:

SHANGHAI CREEK (INTERMITTENT)

FEEDER CHANNEL(INTERMITTENT)

Map Source:

King, J.K., and McDonald, G.N., 2014, Progress report geologic map of the Huntsville quadrangle), based on: Sorensen, M.L., and Crittenden, M.D., Jr., 1979, Geologic Map of the Huntsville Quadrangle, Weber and Cache Counties, Utah: U.S. Geological Survey Geologic Quadrangle Series

Map GQ-1503, scale 1:24,000.

Soil Data: NRCS Online Soil Mapping.

See report body for explanation of onsite geologic and soil units.

N

SCALE

0 500 1000 1500 2000

FEET

SHANGHAI CANYON

FIGURE 3
VICINITY GEOLOGY AND SOIL MAP

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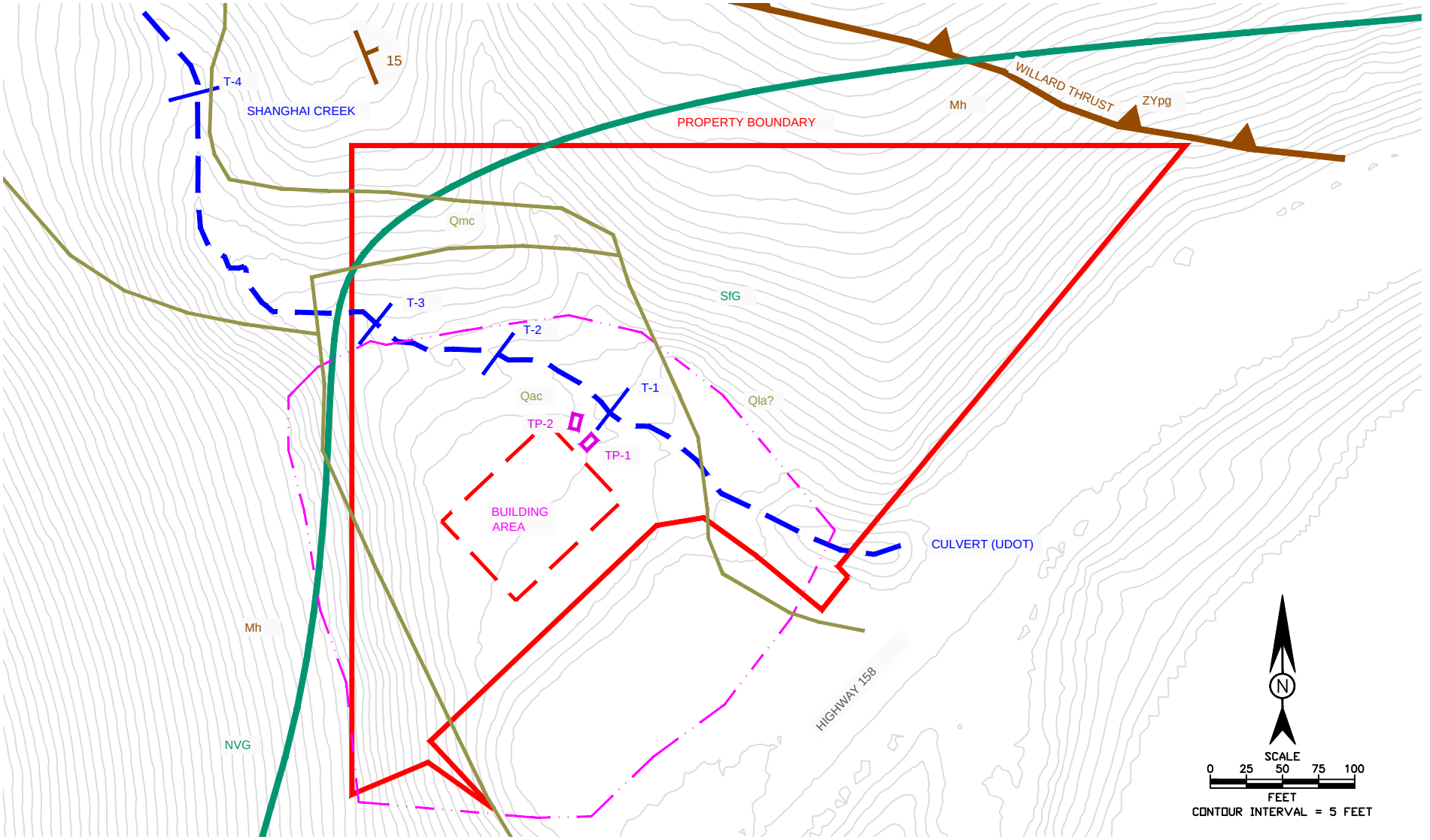

LEGEND

NVG - Nordic Patio Association Soil Group
SfG - Smarts Loam Soil Group
Qac - Holocene Alluvium and Colluvium
Qla - Holocene/Pleistocene Lacustrine & Alluvial Deposits
Qmc - Holocene/Peistocene Colluvium Deposits
Mh - Mississippian Humbug Formation
ZYpg - Precambrian Formation of Perry Canyon

TP-1 TEST PIT LOCATION
T-1 CHANNEL TRANSECT
GRAVEL PIT LIMITS (ESTIMATE.)

Notes;
Topography Source: Site Plat derived from DEM downloaded from State of Utah ARGC.
Locations not surveyed.

SHANGHAI CANYON

FIGURE 4
SITE GEOLOGY

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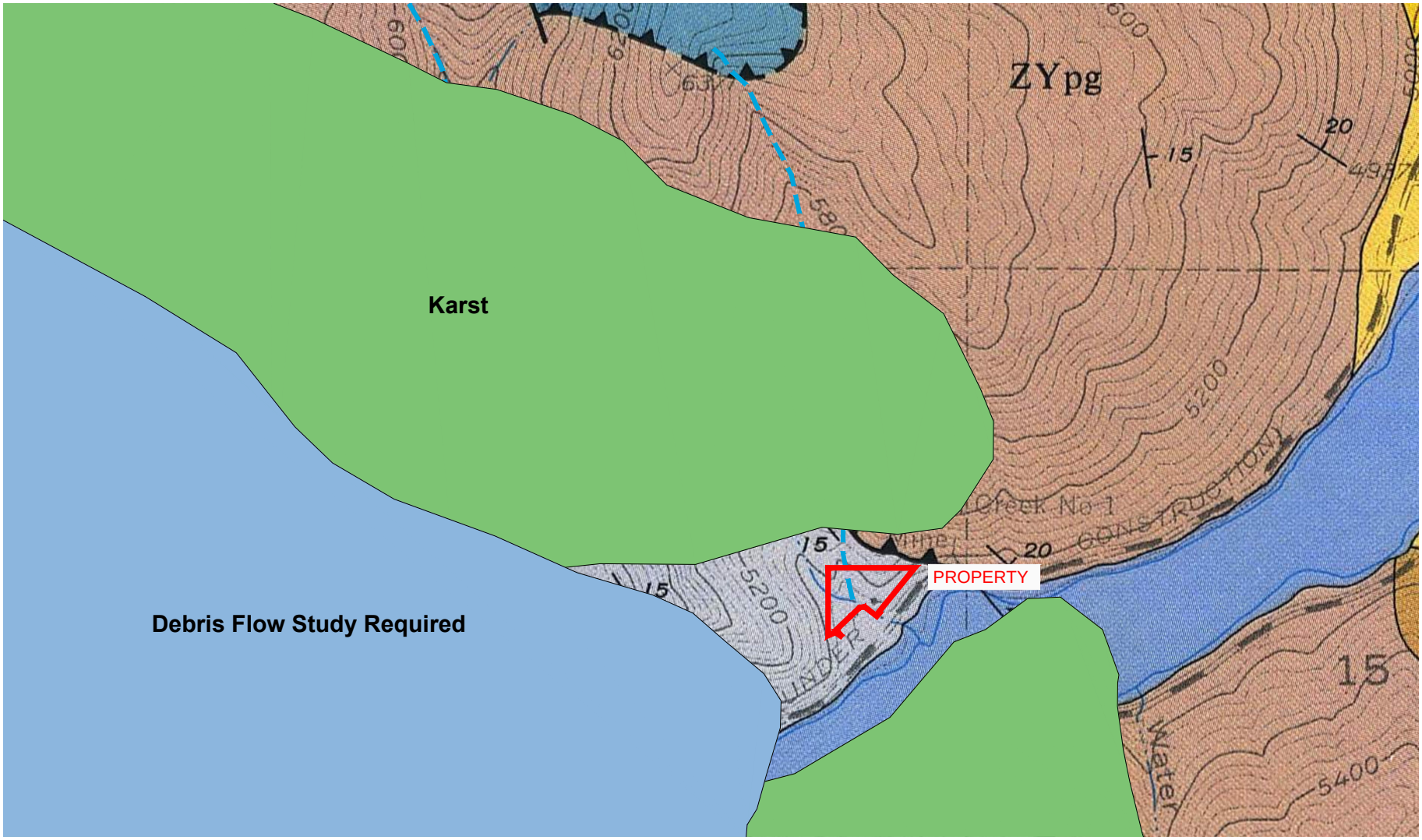

Notes:
Data Source: State of Utah ARGC GIS Downloads.
Map Source: Sorensen, M.L., and Crittenden, M.D., Jr., 1979

SCALE
0 250 500 750 1000
FEET

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FIGURE 5
GEOLOGIC/ENGINEERING HAZARDS

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LOOKING WEST

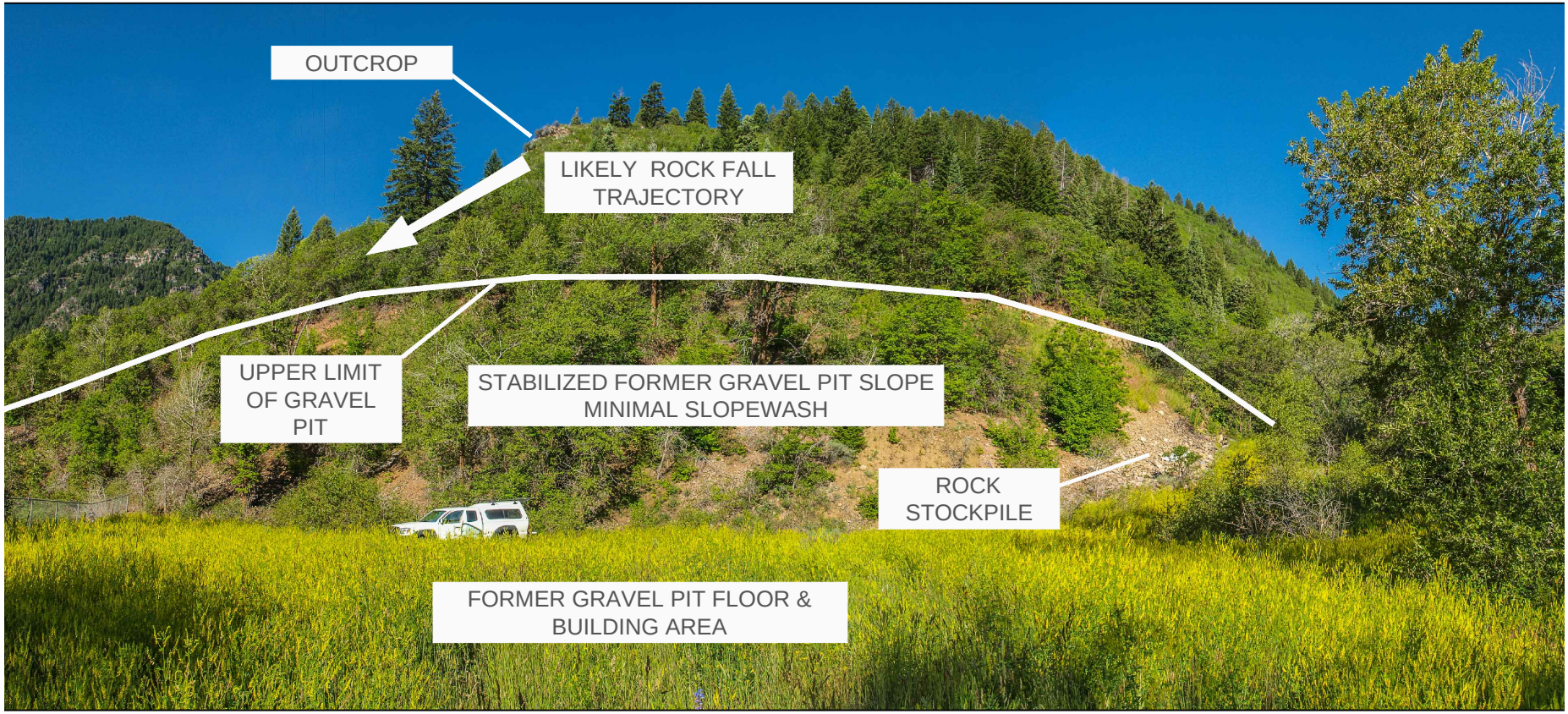

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FIGURE 6
SITE OVERVIEW AND ROCK FALL STUDY

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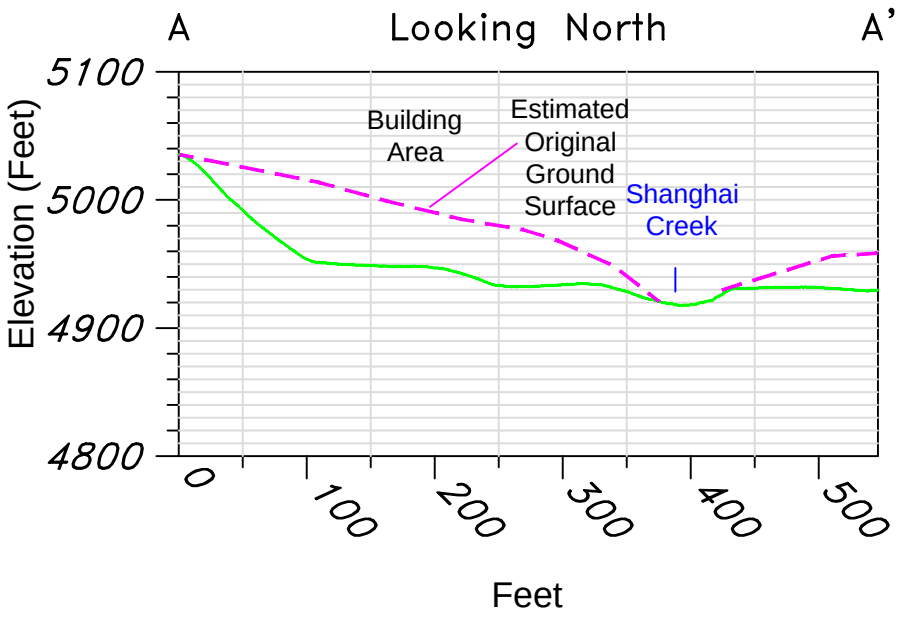

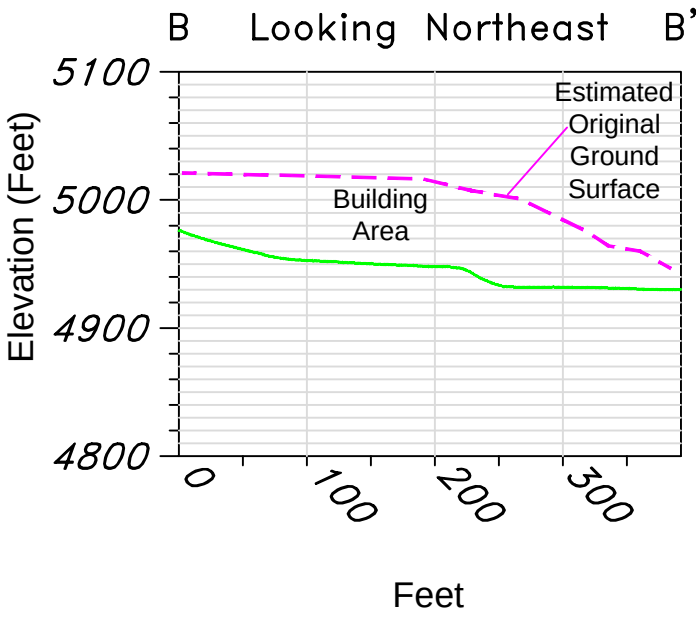

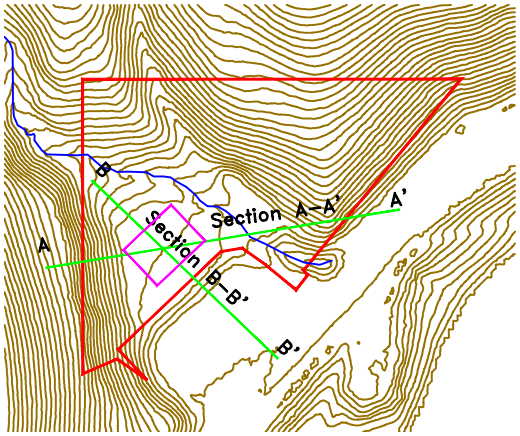

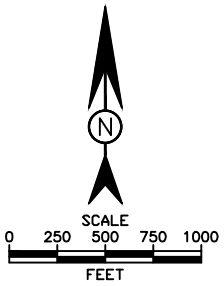

Notes;
Topography Source:
Site Plat derived from DEM downloaded from State of Utah ARGC..

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FIGURE 7
TOPOGRAPHIC PROFILES

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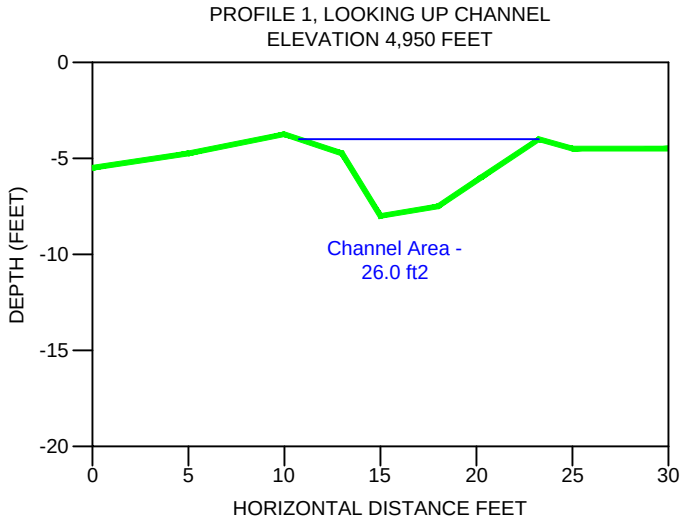

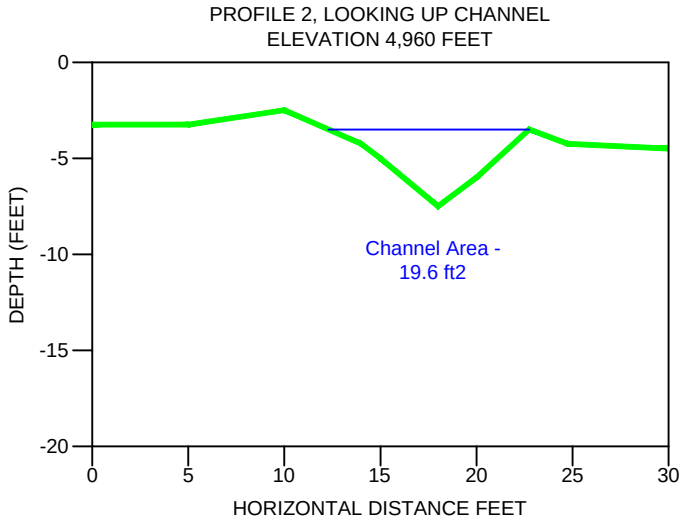

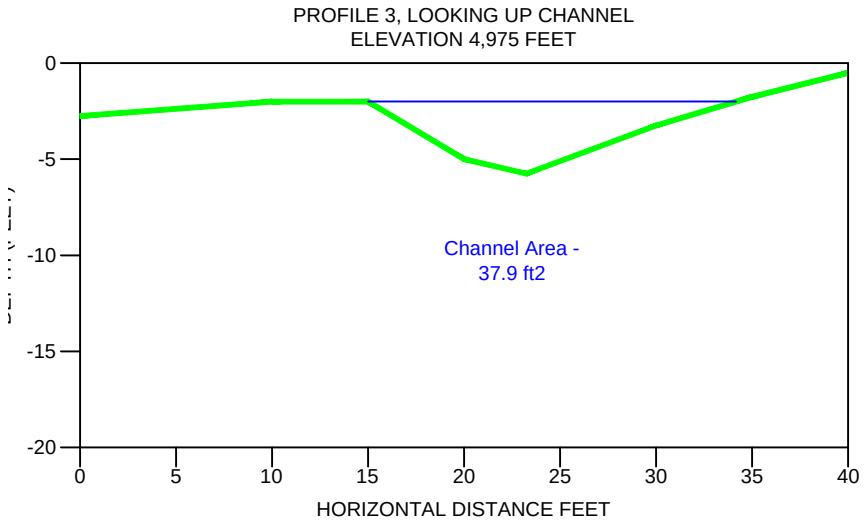

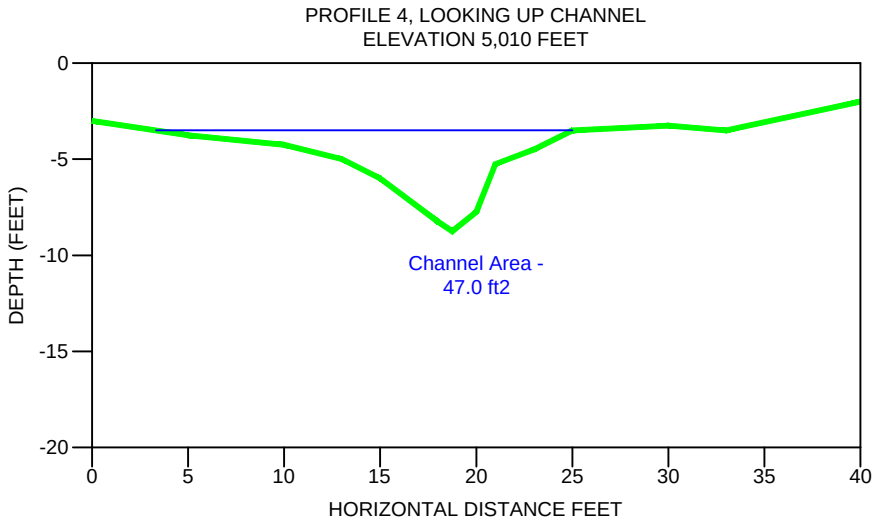

Notes;
See Figure 4 for transect locations.

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FIGURE 8
CHANNEL CROSS SECTION TRANSECTS

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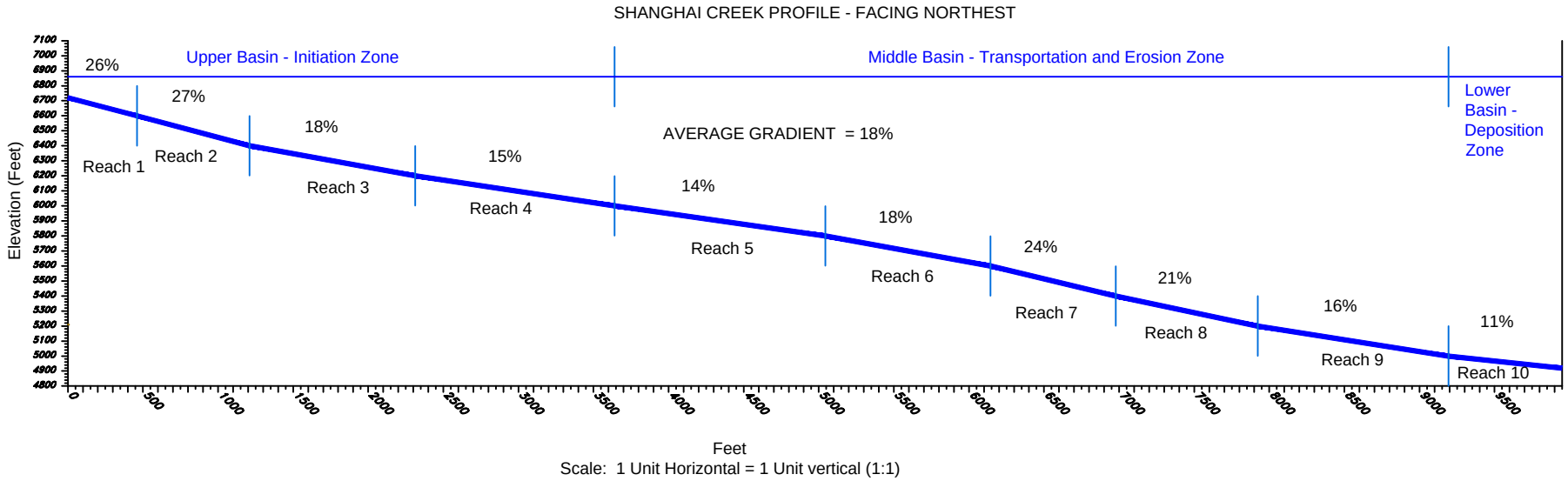
AVERAGE GRADIENT = 0.18 FT/FT



Zone	Reaches (Figure 9)	Gradient Range	Gradient Required for Flow (1)	Meet Criteria For Debris Flow?
Initiation Zone - Upper Basin	1 - 4	15 - 26%	47%	No
Transportation and Erosion Zone- Middle Basin	5 - 9	14 - 24%	27%	No
Deposition Zone - Lower Basin	10	11	18 (deposition)	Yes (2).

Notes:

1. As presented in VanDine, 1996.
2. Based on gradient, this zone meets the requirement for deposition, However as stated in the above paragraph the basin does not contain sufficient gradient to transport material to this zone.

Notes;
Topography Source: USGS Huntsville Quadrangle
Geologic Map.

SHANGHAI CANYON

FIGURE 9
SHANGHAI CREEK PROFILE

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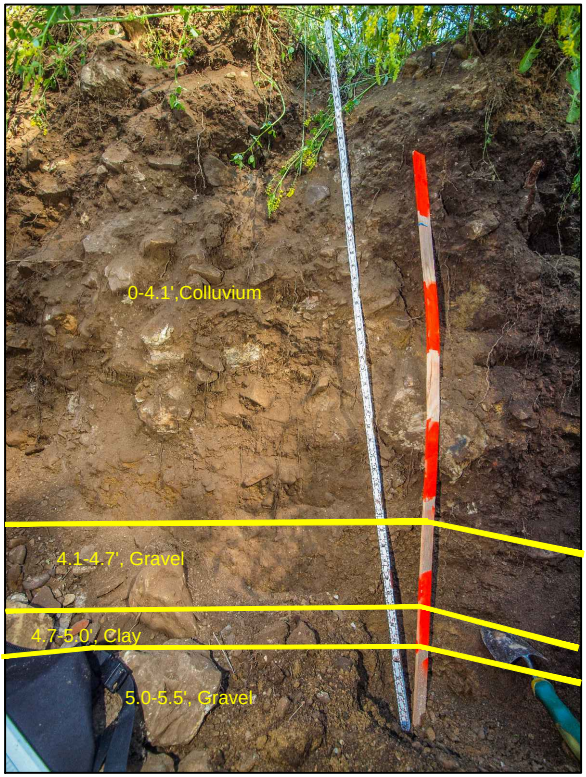
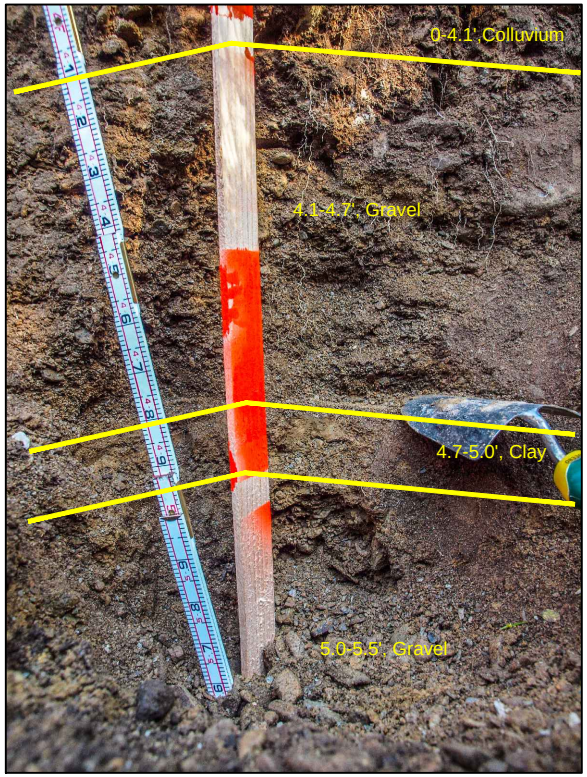
TEST PIT 1
TOTAL DEPTH - 5.5'



TEST PIT 1
DETAIL VIEW



0-4.1',Colluvium, loamy soil with angular to slightly rounded clasts up to 1'. Dense, in place native material.

4.1-4.7', Gravel, Pebbles and weathered shale fragments with sand. Fragments to 1". Loose, Lake Bonneville deposit.

4.7-5.0', Clay, moderately plastic.loose, Lake Bonneville deposit.

5.0-5.5', Gravel, weathered pebbles and shale fragments with sand. Fragments to 1". Loose, Lake Bonneville deposit.

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FIGURE 10, SHEET 1
TEST PIT 1

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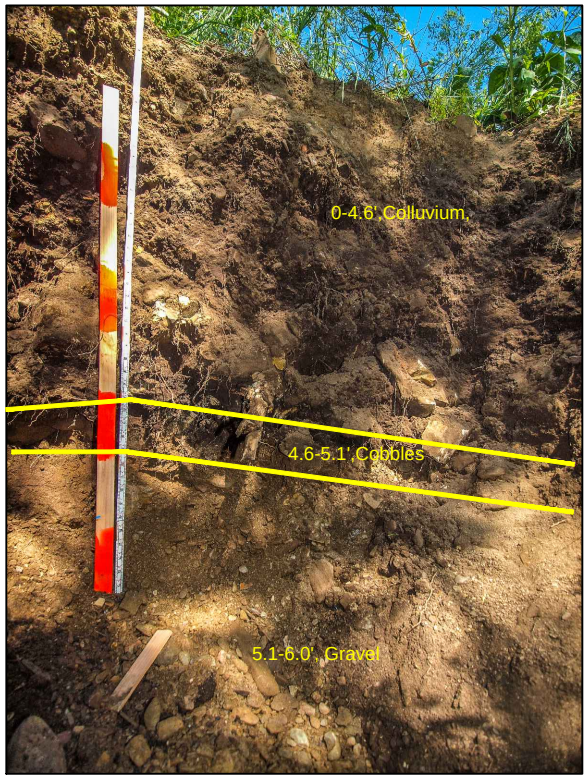
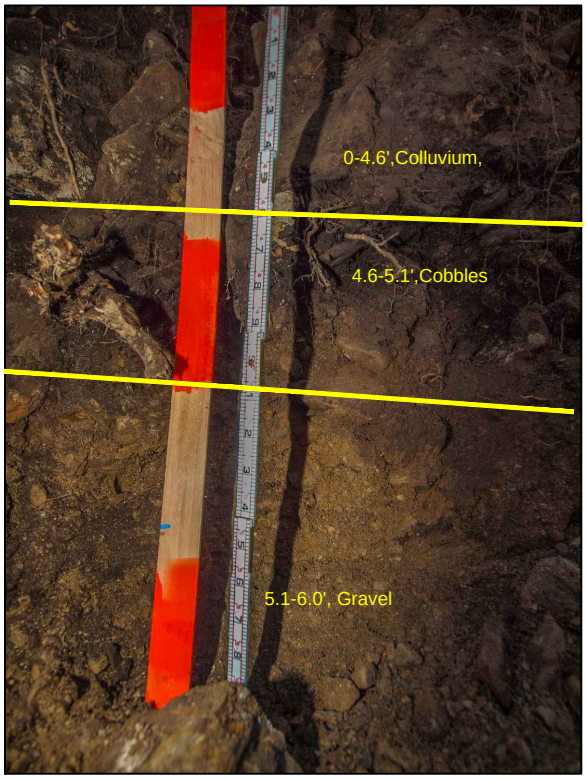
TEST PIT 2
TOTAL DEPTH - 6.0'



TEST PIT 2
DETAIL VIEW



0-4.6',Colluvium, loamy soil with angular to slightly rounded clasts up to 1'. Dense, in place native material.

4.6-5.1',Cobbles with gravel, rounded, Cobbles to 3". Lake Bonneville deposit.

5.1-6.0', Gravel, weathered pebbles and shale fragments with sand. Fragments to 1". Loose, Lake Bonneville deposit.

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FIGURE10, SHEET 2
TEST PIT 2

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