SITE CONSULTING, LLC

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David Hale
Hale Development
1603 West Idaho Street
Boise, Idaho 83702-5226

Revised August 8, 2020
July 22, 2020
Page 1 of 27
File # 20609-A-R1

Re: Updated Preliminary Geotechnical Recommendation Report
Proposed Mountain View Townhomes
Ada County Parcel # S-0536141980, 7.22 Acres
Between Settlers Canal and Fred Meyers
Garden City, Idaho

Mr. Hale:
As per our discussions, we have reviewed your proposed plans for development of the referenced property. We have also reviewed the comments provided by Garden City Engineer, Joe Canning, and the prior geotechnical report prepared in 2014 by this firm for a previously proposed project on the subject property. The original report has been used as a starting point for this new document. This report replaces all prior reports by SITE Consulting, LLC.

On February 25, 2014 SITE staff supervised the drilling of four geotechnical borings on the referenced project. On March 5, 2020 eight additional test pit were excavated. During both field investigations the borings and test pits were logged, and subsurface soils were sampled. Selected soil samples were submitted to our in-house soil laboratory for testing.

Based upon observed conditions and reported development plans, there is no geotechnical concern that will prevent development or construction of the proposed townhouse complex on the referenced parcel. The construction as described in the provided Site Plan and Grading Plan can be completed and not adversely impact the adjacent properties, slopes, and Settler's Canal. After final design is completed, SITE should review the design for compliance with the recommendations contained herein. At that time, additional exploration and / or laboratory testing may be required. A Final Geotechnical Recommendation Report will be issued to address any additional concerns or changes that come up during the design, review, and approval processes.

Design and construction recommendations concerning earthwork, structural fill, foundations, floors and pavements, compaction requirements, storm water disposal, and other concerns are provided. The construction and civil engineering recommendations presented within this report are to be incorporated into the project plans and specifications and adhered to during design and construction. It is noted that extensive inspection and testing are recommended during earthwork operations.

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We appreciate this opportunity to be of service and we look forward to working with you during the design and construction of this development. Should you have any questions or require additional information, please contact our office at your convenience.

Respectfully submitted;
SITE Consulting, LLC
Bob J. Arnold, PE

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INTRODUCTION

PURPOSE AND SCOPE

This report presents the results of a Geotechnical Evaluation performed on a 7.22-acre, Ada County Tax Parcel #S-0536141980 located on the east side of Glenwood Street, north of the Settlers Canal, and south of the Fred Meyers store at Glenwood and Chinden Boulevard. The purpose of this investigation was to evaluate the subsurface soil conditions and provide information to be used to design and evaluate the cost of construction of a planned high-density townhouse complex. Preliminary geotechnical recommendations for earthwork operations, building foundations and civil construction are provided.

The field investigation included a February 2014 subsurface exploration by means of a geotechnical drill rig operated by R. P. Jones Drilling of Boise, Idaho and a March 2020 subsurface exploration utilizing an excavator operated by Aspen Creek Construction.

For the 2014 field work, a CME 75 drill rig with eight-inch outside-diameter hollow stem augers was used to perform the drilling. The drill was equipped with an automatic trip hammer allowing Standard Penetration Tests (SPT's) to be performed. SPTs were performed using 1.5- and 2.0-foot length split spoons run through eight inch, hollow-stem, continuous flight augers. Since the drilling operation was intended to evaluate the structural fill previously placed on the subject property, continuous sampling was employed. Representative samples were obtained using split-spoon sampling procedures in general accordance with ASTM D-1586. The split spoon was driven 1.5 or 2.0 feet ahead of the auger into undisturbed soil. The standard penetration value "N" is defined as the number of blows of a 140-pound hammer, falling thirty inches, required to drive a standard 1½" diameter split spoon sampler one foot into the soil. The number of blows required to drive the sampler is recorded in increments of six inches of penetration. The "N" value is obtained by adding the second and third incremental blow counts and indicates the relative density and provides a basis for evaluating the density and consistency of the soils and the soils bearing capacity. Results of the penetration tests are shown on the boring logs.

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During the March 5, 2020 field exploration, test pits were excavated to depths of 10 to 14 feet. It was assumed foundations will be founded at approximately 36" below the current surface of the pre-graded lots. At this depth, an AMS Dynamic Cone Penetrometer was used to further evaluate the foundation supports soils in place density and bearing capacity. This penetrometer generates N values that are equivalent to Standard Penetration Test, (SPT), values generated with a geotechnical drill rig. N values are reported on the test pit logs.

Representative samples were obtained from both the borings and the test pits, identified as to location and depth, bagged in sealable plastic bags, and delivered to the laboratory for additional testing.

AUTHORIZATION

Verbal authorization to proceed with this geotechnical investigation was received from our client, Mr. David Hale on or about January 10, 2020. Authorization to perform the field work and generate this report, payment for the services rendered, and the use of the recommendations provided herein indicate the client's acceptance of the scope of work, warranty, limitations and general conditions provided herein and within the submitted and approved proposal. Only the client and sub consultants/contractors working on the identified parcel and herein described project are authorized to utilize and duplicate this report without client and SITE authorization.

WARRANTY AND LIMITATIONS

The exploration and evaluation of subsurface conditions documented herein is considered sufficient to form a basis for the provided recommendations. The provided recommendations are based on the available soil information and preliminary design details either assumed or furnished by the client. It is warranted that these recommendations have been promulgated after being prepared in accordance with locally accepted professional engineering and geotechnical engineering practice. No other warranties are implied or expressed.

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BACKGROUND & RESEARCH

GENERAL

As authorized by the former and current clients, this consultant observed the drilling of four borings and excavation of eight test pits on the subject property. An aerial photo of the property from Ada County Assessors website and a hand-held GPS unit were used to locate the boring / test pit locations. The locations were then transferred to the Google Earth Aerial Photo included in the Appendix. Generally, the borings and test pits were randomly placed across the property, but both borings and test pits were specifically placed atop a ditch that crossed the property prior to the prior mass filling.

Prior to our original investigation, SITE was provided copies of numerous reports by local materials testing firms concerning the property. Reports by Rakow Construction Services (5/2009) and Strata, Inc. (8/2007 & 2/2008) - indicate that they provided compaction testing during the placement of the onsite fill materials. Their reports indicate acceptable compaction. It is noted that these reports document failing test results that were subsequently corrected with additional compactive effort and then retested. A more recent report by Materials Testing & Inspection (1/2014) indicates the fill to be unacceptable. Their report was generated after additional fill placement and involved compaction testing within test pits excavated in the completed fill. This method is difficult since excavation equipment disrupts the compacted soil mass and representative laboratory samples can be difficult to identify and isolate. For these reasons, this consultant prefers to utilize a geotechnical drill rig with continuous split spoon sampling and standard penetration testing for evaluation of deep fills. This method showed the onsite fill to be consistent and acceptable in all locations tested.

Review of historical aerial photos available of Google Earth, indicates that filling of the property may have started as early and 2002. In a 2002 photo, a former drainage ditch that crossed the property from east to west is no longer visible. The ditch is clearly visible in a 1999 photo. Unfortunately, no photos are available between these two dates. Photos from 10/2006 and 10/2012 indicate onsite earthwork activities. No documentation was provided for the more recent, 2012 filling efforts.

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FIELD INVESTIGATION

At the time of our investigations, the surface soils on this property were firm and stable allowing complete access with drilling and excavation equipment. During our February 25, 2014 investigation, four borings were advanced to depths of up to 16.5 feet below the existing ground surface. In each boring, the imported fill was penetrated, and the native subgrade soils contacted. Groundwater was encountered in three of the four boring but not in the deepest boring #B-3. During out March 2020 test pit exploration, groundwater was not encountered in any of the test pits that typically were 13-14 feet deep. As indicated, samples were gathered during both field explorations and were submitted for laboratory testing.

Based on observed conditions, it is believed the water encountered in the original borings was perched atop the original native soil surface beneath the onsite structural fill. Numerous monitoring wells are planned and will be monitored through the end of the irrigation season to confirm seasonal high and clearance to stormwater facilities. A groundwater report and evaluation will be published after the end of the irrigation season.

At this time, based upon the observed conditions in our new test pits, it appears the groundwater is at sufficient depth to not impact or be impacted by the planned onsite construction.

LABORATORY TESTING

In the laboratory, sieve analysis, Moisture Content and Liquid Limit, Plastic Limit and Plasticity Index testing were performed on selected samples. Tests were performed in general accordance with the cited ASTM test methods. All test results are included on the logs and reports located in the Appendix.

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OBSERVED CONDITIONS

As indicated, since the early 1990's, multiple contactors have been allowed to place a substantial depth of fill across the entire property. Prior property owners required proper compaction and testing and inspection during these filling operations. Borings and test pits indicate that fills range from 9.5 to greater than 14.0 feet in thickness. The deepest fill area is within a former ditch or canal that crossed the property prior to mass filling and along the north property line. The presence of fill was originally confirmed during the 2014 drilling effort by the presence of asphalt concrete pavement (ACP) pieces in the samples. Nearly all 2020 test pits also contained ACP as well as Portland cement concrete (PCC) pieces. These materials are included in a silty sand or sandy silt soil matrix. SITE's 2014 client reported, and it was confirmed by conversation with Sommers Construction (former employee) and Idaho Sand and Gravel that materials placed on the site were excavated from a Ustick Road improvement project. Both contactors indicated that fill was end dumped, dozed into thin lifts, and then watered and compacted as needed. No information is known about fill placed in 2012. The possibility of undocumented or non-compacted soil on the site surface is addressed herein with construction recommendations.

The fill materials are typically silty sands or sandy silts or sandy silt/clay soils with varying amounts of clay and gravel. As indicated, some construction related debris including pieces of concrete and pavement was observed in the samples. All fill materials were consistent in color, moisture with reasonably consistent Standard Penetration Numbers. Native soils below the fill included a dark brown to black silty sand or sandy silt, pitrun type sand and gravel, and fine silty sand.

Standard penetration tests (N Values) performed during drilling and test pit operations indicate that the structural fill materials placed by the client / owner were well compacted and will support the proposed apartment buildings and driveway pavement section. This opinion is based upon the recommendations provided herein being specified and followed during the planned construction.

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CONSTRUCTION RECOMMENDATIONS

GENERAL EARTHWORK

Discussions with the project civil engineer, (Rock Solid Civil), indicate that only minor regrading of the lot is required for drainage and that street or driveway and parking lots will be excavated into the existing site surface slightly more than the recommended pavement section. Materials cut from pavement area will be placed on the building pads as structural fill. Prior to the placement of fill on the building pads, all end dumped debris, rubbish, and the organic layer (rootzone) is to be removed. It is anticipated that 4-8 inches of the surface will be removed. Deeper excavation will be required where large trees or bushes are rooted. After clearing and grubbing it is recommended the entire site be scarified, watered (as needed), recompacted and compaction tested and inspected. This will address the lack of documentation testing on the last fill placed on the property since 2012. The exposed subgrade surface is to pass compaction testing AND a visual inspection (proof-rolling) by the project geotechnical engineer. Materials to be cut from driveway and parking areas and excavated from infiltration facilities are acceptable for use as structural fill. All exposed subgrade surfaces and each lift of fill is to meet the compaction requirements for structural fill. Note that compaction testing and stability inspection are both recommended. Soils can meet compaction requirements and still be unacceptable if rutting, deflection, or excessive moisture are present.

STRUCTURAL FILL

Any additional imported fill is to be free of organic matter or other deleterious substances with non-expansive and non-plastic fines. Structural fill placed on building pads is to extend laterally outside foundations a distance equal to the total depth of the structural fill. Structural fill should be placed in uniform, thin horizontal lifts; moisture conditioned as necessary, and compacted to a minimum relative compaction of 98% of the maximum dry density as determined by ASTM Method D-698 “Standard Proctor”. Compaction of structural fills should be verified by in place density testing and construction observations. A qualified engineer or his representative should monitor fill placement to ensure the work is performed in accordance with these recommendations. Field nuclear moisture - density testing shall be performed on each lift of compacted fill with at least two tests per building pad.

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EXCAVATIONS

No drilling and blasting or rock trenching will be required to install subsurface utilities, foundations, and stormwater disposal systems on the subject property. Excavation with standard construction equipment and methods is anticipated. It may be necessary to over excavate deep utility trenches to the native soils and backfill with granular structural fill in order to properly support subsurface utilities. It can also be anticipated that some materials excavated from deep utility trenches will be too wet to be used as backfill material. In this situation, imported granular fill is recommended for backfilling trenches. Based upon our test pits, properly shored, or supported tranches are feasible and dewatering is not anticipated.

Shallow excavations and trenches that do not exceed four feet in depth may be constructed with side slopes approaching vertical. Below this depth it is recommended that slopes not exceed a vertical to horizontal ratio of one to one. The ability of the materials on site to maintain a vertical or near vertical excavation when standing open without support over any extended period of time can be expected to be quite variable. This information is provided for planning purposes. It is our opinion that maintaining safe working conditions is the responsibility of the contractor. Jobsite conditions such as soil moisture content, weather condition, earth movements, and equipment type & operation can all affect slope stability. All excavations should be sloped or braced as required by local, state, and federal requirements.

FOUNDATION SYSTEMS

Recommendations are based upon provided, researched, and assumed information. Please contact this consultant if assumptions are incorrect. It is reported that eighteen building structures are planned. Duplex, triplex and fourplex buildings are planned. It is unknown if crawlspaces or slab on grade floors are planned. All proposed residential buildings may be supported on conventional, continuous, and isolated pad foundations founded upon tested and approved onsite soil material or structural fill. Bearing pressures of up to 1500 psf are allowed for foundation design. Provided the recommendations herein are followed, total settlements of less than one inch are anticipated. If this value is unacceptable, contact SITE for additional foundation recommendations.

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FOUNDATION EXCAVATION

After foundation areas have been excavated or graded to design grade it is recommended that the foundation support surface be tested and / or inspected for stability and proper compaction. Recompaction with either hoepac or steel drum type equipment is recommended if compaction is below specified values. Compaction of the foundation supporting soils is to be confirmed by compaction testing (at least two tests) for each building. Compaction is to meet the requirements provide herein for structural fill. In additional to compaction testing, a geotechnical engineer is to inspect the subgrade soils to confirm that conditions are similar to those documented within this report and used for design and that all foundation bearing surfaces are firm and stable. This inspection should verify that any loose fills, excessively wet soils, and all organic materials have been removed and that no excessively soft areas are present. If unacceptable soils are determined to be present at the foundation support elevation it is recommended that foundations be over excavated to acceptable materials or a maximum of two feet and replaced with additional foundation concrete or granular structural fill.

RETAINING WALLS

It is understood that large boulder retaining walls are planned along the east, west, north, and south property lines. Discussions with the client and Focus Engineering indicate the walls will be three to ten feet tall. Theses retaining walls will allow for steeper and more linear transitions between properties or areas with different surface elevations while stabilizing and improving slope stability and drainage. Based on using imported pitrun type materials or native silty sands or sandy silt for wall backfill, the following lateral earth pressures are recommended. Retaining walls free to rotate should be designed using equivalent fluid pressure of 30 psf/f. Walls restrained at the top should be designed using equivalent fluid pressure of 60 psf/f. Soil density of 120 pcf can be assumed for additional soil surcharge. A wall drainage system, such as is shown in the Boulder Wall Detail provided in the Appendix is required.

SEISMIC DESIGN

Soils on site are classified as Site Class D as per ASCE 7, chapter 20. Structures construction on this site are to be design per IBC requirements for such a seismic classification.

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STORM WATER CONTROL

It is recommended that storm runoff be directed away from all open excavations and not be allowed to puddle. If construction is to occur during the wet season, then soft soils must be considered. If the subgrade is wet, traffic with rubber-tired equipment is to be avoided since rubber-tired equipment will increase rutting and deflections of wet or saturated surface soils. It can be anticipated that the soils on the surface will quickly become too wet for any vehicular traffic. It is understood that storm water, including roof runoff, will be directed to standard seepage beds. The seepage beds are to extend through the onsite fill to the native sands and gravels. This may require deep excavation. Any over excavation can be backfilled up to the filter sand layer with clean sand and gravel (pitrun) with less than 10 percent passing a #200 sieve. Monitoring well readings are required to confirm the depth to and clearance above seasonal high groundwater.

SLAB ON GRADE CONCRETE

For all slab on grade concrete including sidewalks, driveways, garage floors, patios and occupied spaces, inspection must confirm that expansive, fat clays and undocumented fill materials are not present in the upper two feet of supporting soils. If present, such soils are to be removed and replaced with at least one foot of granular structural fill. Care must be taken so that all excavations below concrete floors and slabs are properly backfilled in accordance with the structural fill recommendations outlined herein. This is very critical where a slab will extend over utility trenches or retaining wall backfill. Trenches and wall backfill areas are to be filled in lifts and benched each lift so that fill is not placed against a vertical soil face greater than three feet tall. Testing is to confirm that compaction has been achieved. Areas of excessive yielding or deflection should be excavated and backfilled with structural fill. Concrete slab on grade floors, sidewalks, patios, and pavements should be placed atop a minimum of ½ foot of ISPWC ¾” base. This granular mat should be properly compacted to the specification of structural fill. In occupied spaces with slab on grade floors a vapor barrier or retarder is recommended. Any vapor retarder or barrier must meet the requirements of both the local building code and the floor surface manufacturer.

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FLEXIBLE PAVEMENT SECTION

It is recommended that pavements be based upon ACHD's standard section for a residential development. Therefore, within the proposed Mountain View Townhomes a pavement section of 2.5" asphaltic concrete, 4.0" of ¾" road base, and 12.0 inches of sub base is recommended for the driveway and any pavement that will be frequented by large truck traffic such as trash truck, delivery trucks and school busses.

In the parking areas where engineering controls prevent large truck traffic, the pavement section can be reduced to 2.5" asphaltic concrete over 10.0" of ¾" road base. Both pavement sections are to be constructed atop a subgrade confirmed to meet the compaction and stability requirements for structural fill. Materials meeting the requirements of ISPWC are required for any work within this project. It is also anticipated that ACHD may dictate a thicker section for any work in the 53rd Street right of way. This may include matching the existing section or designing a new section based upon ACHD generated / recommended Traffic Index and a locally sampled R-Value.

GENERAL COMMENTS

After the plans and specifications are completed and after the foundation supporting subgrade is prepared for foundation placement, it is recommended that this or another geotechnical consultant be provided the opportunity to review the final design and specifications and inspect the foundation support soils. At that time, it may be necessary to submit supplementary recommendations. Engineering inspection, construction monitoring, and materials testing have been recommended and must be performed to verify conditions and suitability of materials used for structural fills and to confirm subgrade stability and proper placement and compaction. Any revision in the plans for the proposed development from those described in this report or deviations from the noted subsurface conditions should be brought to the attention of this consultant. This report has been prepared for the exclusive use of the identified owner / client and their retained design consultants. Findings and recommendations within this report are for specific application to the proposed subdivision development described here and apply only to the property identified.

APPENDIX FOLLOWS

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APPENDIX

Site Plan

Grading Plan

Boring & Test Pit Locations

Boring Logs

Test Pit Logs

Soil Log Legend

Abbreviations & Acronyms

Standard Proctor on Fill

Boulder Retaining Wall Detail

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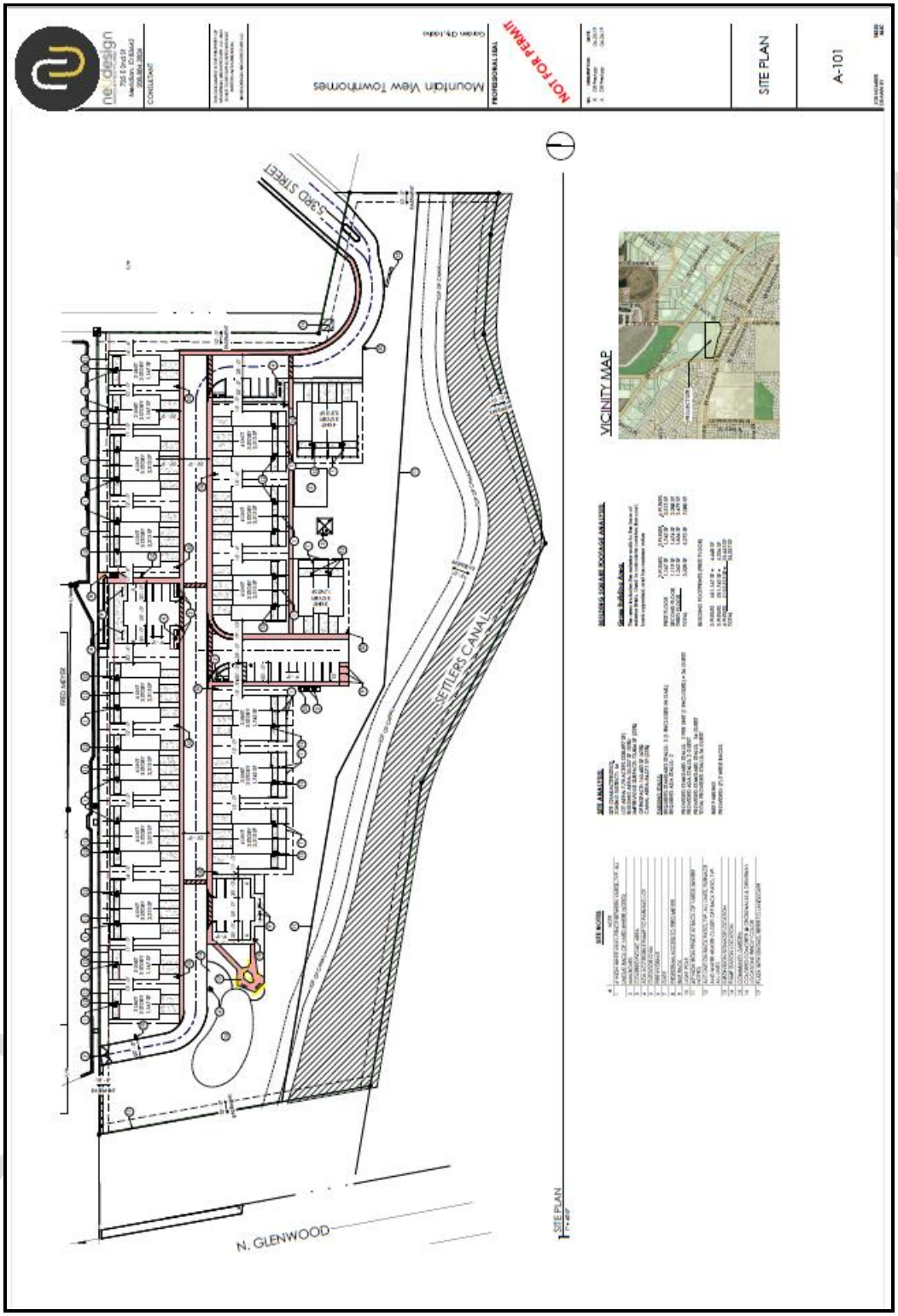
Site Plan



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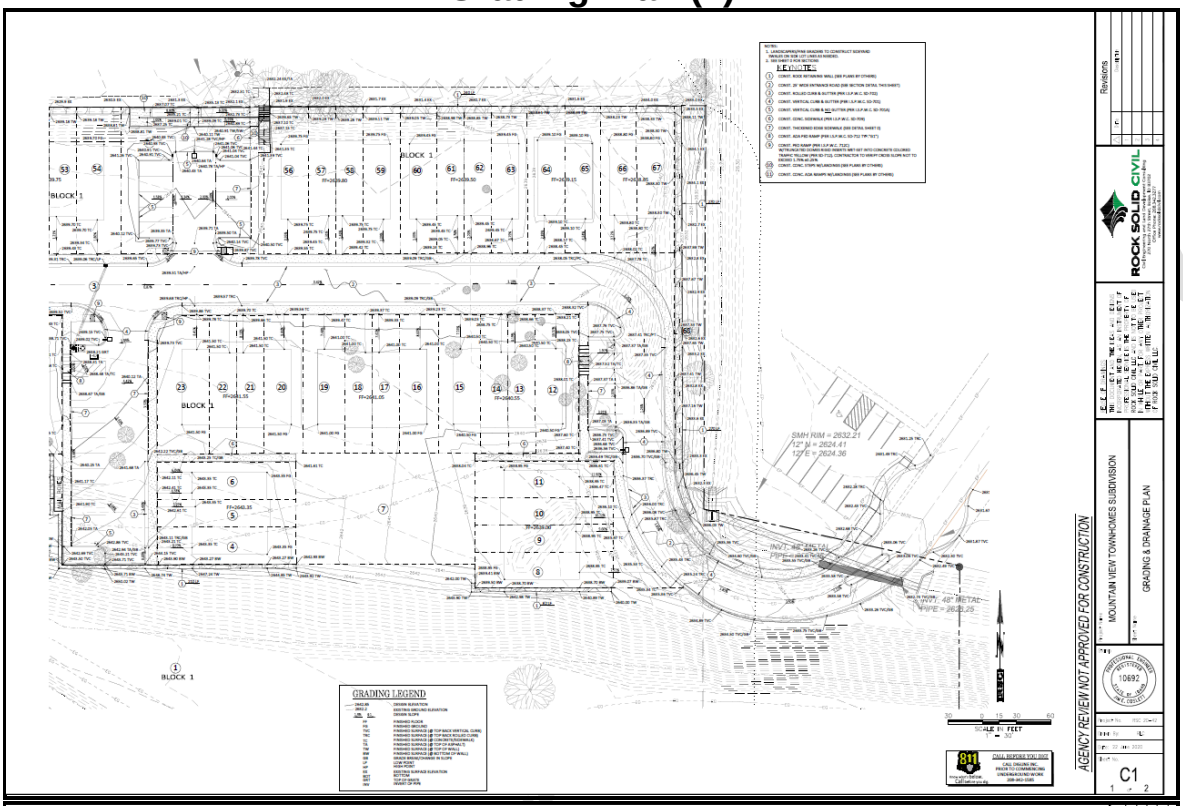
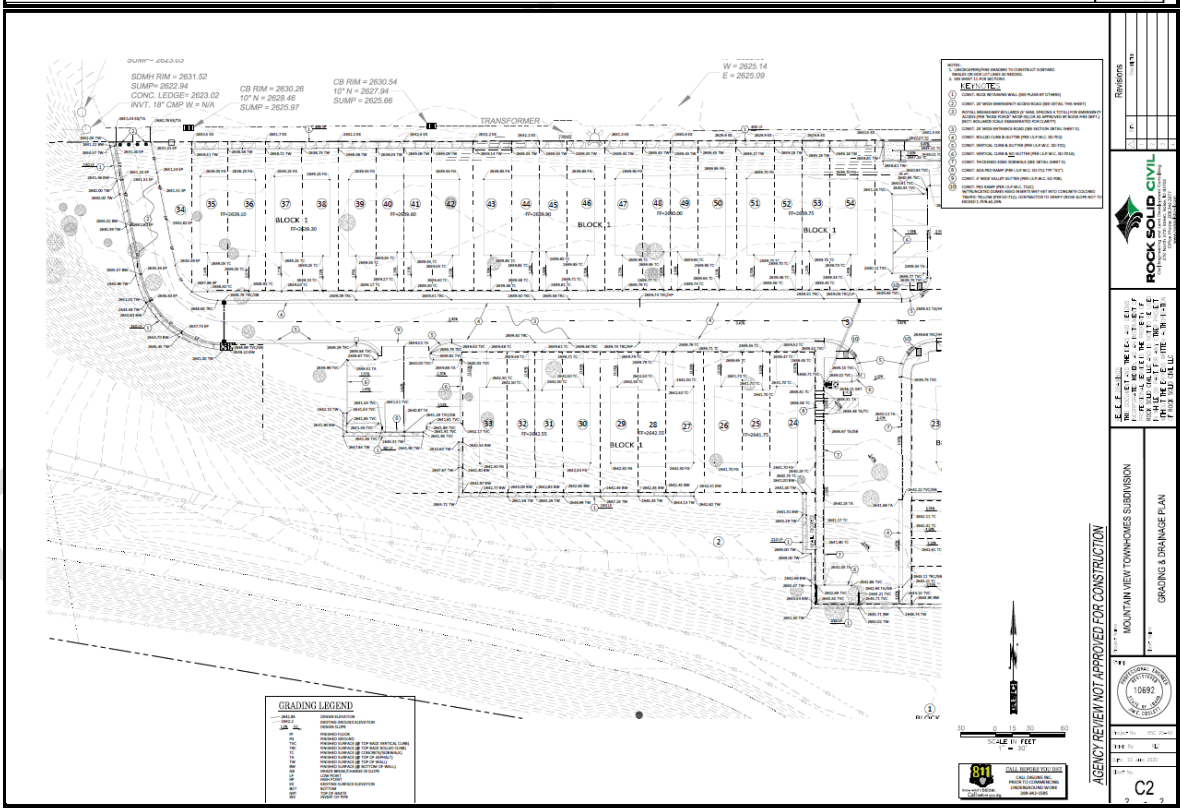
Grading Plan (2)





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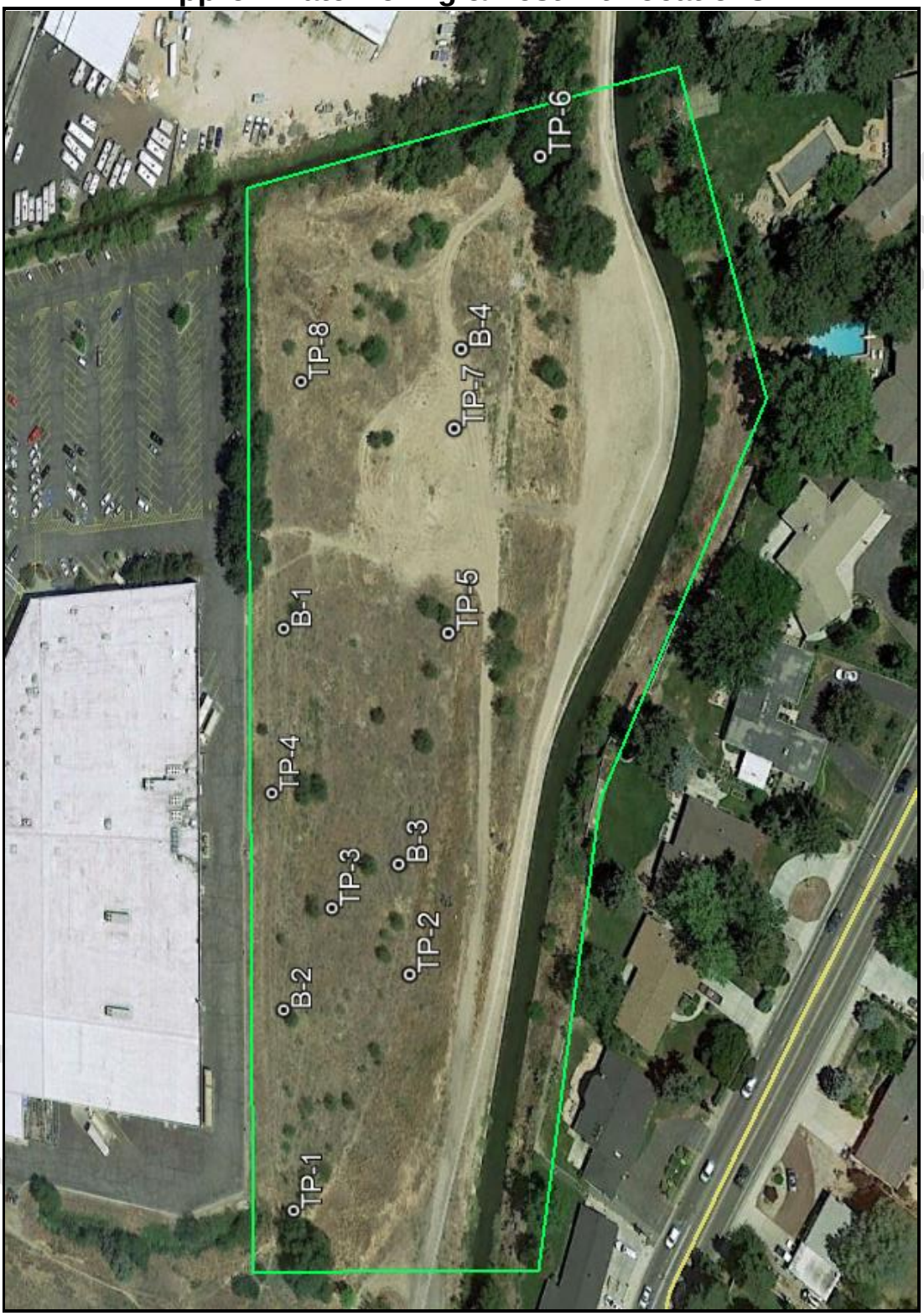
Approximate Boring & Test Pit Locations



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Boring Log

Boring #:	B-1	File:	14038GI001
Client:	Jim Fuhrman	Date Drilled:	February 25, 2014
Project:	Glenwood Townhomes	Driller:	R P Jones
Location:	43 38 41.0N, 116 16 32.1W	Logged By:	Bob Arnold

DEPTH	SOILS DESCRIPTION	N	3/8	#4	#10	#40	200	M	PI	LL
0.0-2.0	FILL - Tan, Moist, Firm, Sandy, SILT with gravel, ACP									
2.0-3.5	FILL - Tan, Moist, Firm, Sandy, SILT with gravel, ACP	12								
3.5-5.0	FILL - Tan, Moist, Firm, Silty, SAND with gravel, ACP	10	77	70	66	50	38.2	13.5	NP	NP
5.0-7.0	FILL - Tan, Moist, Firm, Silty, SAND with gravel, ACP	10								
7.0-8.5	FILL - Tan, Moist, Firm, Silty, SAND with gravel, ACP	13								
8.5-10.0	T-2/3 FILL - Dark Brown, Wet, Sandy, SILT with gravel Native Soils at 9.5 B 1/3 Black, Wet to Saturated, SILT	16	96	91	87	66	51.3	13.7	NP	NP
10.0-12.0	Black, Wet to Saturated, Silty, SAND	35		100	95	73	38.2	12.9	NP	NP
12.0-13.5	Brown, Saturated, Sand & Gravel	45								
15.0-16.5	Light Brown to Tan, Saturated, Fine, SAND	9								
16.5	Bottom of Boring Groundwater at 10.5'									

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Boring Log

Boring #:	B-2	File:	14038GI001
Client:	Jim Fuhrman	Date Drilled:	February 25, 2014
Project:	Glenwood Townhomes	Driller:	R P Jones
Location:	43 38 41.0N, 116 16 36.1W	Logged By:	Bob Arnold

DEPTH	SOILS DESCRIPTION	N	3/8	#4	#10	#40	200	M	PI	LL
0.0-2.0	FILL - Tan, Moist, Firm, Sandy, SILT with gravel, ACP, Concrete									
2.0-3.5	FILL - Tan, Moist, Firm, Silty, SAND with gravel, ACP	17								
3.5-5.0	FILL - Tan, Moist, Firm, Silty, SAND with gravel, ACP	10								
5.0-7.0	FILL - Dark Brown, Wet, SILT with Sand	10	100	99	98	93	84.2	17.7	8.3	33.5
7.0-8.5	FILL - Dark Brown, Wet, SILT with Sand	10								
8.5-10.0	Native Soils at 10.0 Black, Wet to Saturated, Silty, Fine, SAND	11								
10.0-12.0	Black, Wet to Saturated, Silty, Fine, SAND	8								
12.0-13.5	Brown, Saturated, Sand & Gravel	35								
15.0-17.0	Light Brown to Tan, Saturated, Fine, SAND	8								
17.0	Bottom of Boring Groundwater at 10.5'									

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Boring Log

Boring #:	B-3	File:	14038GI001
Client:	Jim Fuhrman	Date Drilled:	February 25, 2014
Project:	Glenwood Townhomes	Driller:	R P Jones
Location:	43 38 39.8N, 116 16 34.5W	Logged By:	Bob Arnold

DEPTH	SOILS DESCRIPTION	N	3/8	#4	#10	#40	200	M	PI	LL
0.0-2.0	FILL - Tan, Moist, Firm, Sandy, SILT with gravel, ACP, Concrete									
3.5-5.0	FILL - Dark Brown, Wet, Silty, SAND	10	91	82	75	58	43.2	13.3	NP	NP
5.0-6.5	FILL - Dark Brown, Wet, SILT with Sand	9								
6.5-8.5	FILL - Dark Brown, Wet, SILT with Sand	10								
8.5-10.0	FILL - Dark Brown, Wet, SILT with Sand	12								
10.0-11.5	T-2/3 Dark Brown, Wet, SILT with sand and gravel Native Soils at 11.0 B 1/3 Black, Wet to Saturated, SILT	9	98	92	91	88	56.6	19.6	6.3	31.5
11.5-13.0	Black, Wet to Saturated, SILT Over native sand and gravel	21								
15.0-16.5	Native Sand & gravel	28								
16.5	Bottom of Boring No water in 16.5' Well									

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Boring Log

Boring #:	B-4	File:	14038GI001
Client:	Jim Fuhrman	Date Drilled:	February 25, 2014
Project:	Glenwood Townhomes	Driller:	R P Jones
Location:	43 38 39.2N, 116 16 29.5W	Logged By:	Bob Arnold

DEPTH	SOILS DESCRIPTION	N	3/8	#4	#10	#40	200	M	PI	LL
0.0-2.5	FILL - Tan, Moist, Firm, Sandy, SILT with gravel, ACP, Concrete									
2.5-4.0	FILL - Tan, Moist, Firm, Sandy, SILT with gravel, ACP, Concrete	7								
5.0-7.0	FILL - Tan, Moist, Firm, Sandy, SILT with gravel, ACP, Concrete	12	98	94	89	70	50.3	15.7	6.3	28.5
7.0-8.5	FILL - Tan, Moist, Firm, Sandy, SILT with gravel, ACP, Concrete	10								
8.5-10.0	FILL - Tan, Moist, Firm, Sandy, SILT with gravel, ACP, Concrete	11								
10.0-12.0	T-3/4 Dark Brown, Wet, SILT with sand and gravel Native Soils at 11.5 B 1/4 Black, Wet to Saturated, SILT	46								
12.0-13.5	NO Recovery	25								
13.5-15.0	Black, Saturated, Silty, SAND	6			100	98	57.9	28.8	NP	NP
15.0-17.0	Black, Saturated, Silty, SAND	5								
16.5	Bottom of Boring Groundwater at 15.3' in well One week after installation									

Location adjusted to match GPS data to field location

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TEST PIT LOG

Test Pit:	TP-1	File #:	20609
Client:	Hale Development	Date Excavated:	3/5/20
Project:	Mountain View	Excavated By:	Aspen Creek - Backhoe
Location:	43 38 40.89 -116 16 38.18	Logged By:	J. Meusch, PM - SITE

DEPTH	SOILS DESCRIPTION											
(feet)	N	3/4"	1/2"	3/8"	# 4	# 10	# 40	# 100	#200	%M	LL	PI
0.0-2.0	Brown, Moist, Sand & Silt											
2.0-8.0	Brown, Moist, Firm, Silty, Sand with Gravel & ACP (SM)											
3.0	14	100	85	76	68	65	49	42	35.5	14.5	NP	NP
8.0-13.0	Dark Brown, Moist, Firm, Silty, Sand (SM)											
10.0				100	98	93	69	35	25.5	13.5	NP	NP
13.0	Bottom of Excavation @ 13.0 No Ground Water Encountered No Monitoring Well in Place											

TEST PIT LOG

Test Pit:	TP-2	File #:	20609
Client:	Hale Development	Date Excavated:	3/5/20
Project:	Mountain View	Excavated By:	Aspen Creek - Backhoe
Location:	43 38 39.70 -116 16 35.58	Logged By:	J. Meusch, PM - SITE

DEPTH	SOILS DESCRIPTION											
(feet)	N	3/4"	1/2"	3/8"	# 4	# 10	# 40	# 100	#200	%M	LL	PI
0.0-2.0	Tan, Moist, Sand & Silt with Gravel & ACP											
2.0-10.0	Dark Brown, Moist, Firm, Sand & Silt											
3.0	20+	100	90	80	71	64	55	48	36.6	13.5	NP	NP
10.0-13.0	Black, Moist, Firm, Silt, Sand, Gravel											
13.0	Bottom of Excavation @ 13.0 No Ground Water Encountered No Monitoring Well in Place											

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TEST PIT LOG

Test Pit:	TP-3	File #:	20609
Client:	Hale Development	Date Excavated:	3/5/20
Project:	Mountain View	Excavated By:	Aspen Creek - Backhoe
Location:	43 38 40.48 -116 16 34.99	Logged By:	J. Meusch, PM - SITE

DEPTH	SOILS DESCRIPTION											
(feet)	N	3/4"	1/2"	3/8"	# 4	# 10	# 40	# 100	#200	%M	LL	PI
0.0-2.0	Brown, Moist, Sand & Silt											
2.0-5.0	Brown, Moist, Firm, Sand & Silt with Gravel, ACP & PCC											
5.0-14.0	Dark Brown, Moist, Firm, Sand & Silt with Gravel											
14.0	Bottom of Excavation @ 14.0 No Ground Water Encountered No Monitoring Well in Place											

TEST PIT LOG

Test Pit:	TP-4	File #:	20609
Client:	Hale Development	Date Excavated:	3/5/20
Project:	Mountain View	Excavated By:	Aspen Creek - Backhoe
Location:	43 38 44.13 -116 16 33.83	Logged By:	J. Meusch, PM - SITE

DEPTH	SOILS DESCRIPTION											
(feet)	N	3/4"	1/2"	3/8"	# 4	# 10	# 40	# 100	#200	%M	LL	PI
0.0-2.0	Brown, Moist, Sand & Silt											
2.0-5.0	Brown, Moist, Firm, Sand, Silt with Gravel & ACP											
5.0-14.0	Dark Brown, Moist, Firm, Sand, Silt											
14.0	Bottom of Excavation @ 14.0 No Ground Water Encountered No Monitoring Well in Place											

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TEST PIT LOG

Test Pit:	TP-5	File #:	20609
Client:	Hale Development	Date Excavated:	3/5/20
Project:	Mountain View	Excavated By:	Aspen Creek - Backhoe
Location:	43 38 39.32 -116 16 32.23	Logged By:	J. Meusch, PM - SITE

DEPTH	SOILS DESCRIPTION											
(feet)	N	3/4"	1/2"	3/8"	# 4	# 10	# 40	# 100	#200	%M	LL	PI
0.0-2.0	Tan, Moist, Sand & Silt with Gravel, ACP & PCC											
2.0-10.0	Dark Brown, Moist, Firm, Silty, Sand (SM)											
3.0	14	100	99	97	93	88	69	60	47.7	14.4	NP	NP
10.0-13.0	Black, Moist, Firm, Silt, Sand & Gravel											
13.0	Bottom of Excavation @ 13.0 No Ground Water Encountered No Monitoring Well in Place											

TEST PIT LOG

Test Pit:	TP-6	File #:	20609
Client:	Hale Development	Date Excavated:	3/5/20
Project:	Mountain View	Excavated By:	Aspen Creek - Backhoe
Location:	43 38 38.49 -116 16 27.84	Logged By:	J. Meusch, PM - SITE

DEPTH	SOILS DESCRIPTION											
(feet)	N	3/4"	1/2"	3/8"	# 4	# 10	# 40	# 100	#200	%M	LL	PI
0.0-2.0	Brown, Moist, Sand & Silt											
2.0-5.0	Brown, Moist, Firm, Sand & Silt with ACP & PCC											
5.0-13.0	Dark Brown, Moist, Firm, Sand, Silt & Gravel with ACP & PCC											
13.0	Bottom of Excavation @ 13.0 No Ground Water Encountered No Monitoring Well in Place											

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TEST PIT LOG

Test Pit:	TP-7	File #:	20609
Client:	Hale Development	Date Excavated:	3/5/20
Project:	Mountain View	Excavated By:	Aspen Creek - Backhoe
Location:	43 38 39.26 -116 16 30.26	Logged By:	J. Meusch, PM - SITE

DEPTH	SOILS DESCRIPTION											
(feet)	N	3/4"	1/2"	3/8"	# 4	# 10	# 40	# 100	#200	%M	LL	PI
0.0-2.0	Brown, Moist, Sand & Silt											
2.0-4.0	Brown, Moist, Firm, Sand & Silt with Gravel & ACP											
4.0-10.0	Tan, Moist, Firm, Sand Gravel, Cobble											
10.0	Bottom of Excavation @ 10.0 (Sluffing Stopped Excavation) No Ground Water Encountered No Monitoring Well in Place											

TEST PIT LOG

Test Pit:	TP-8	File #:	20609
Client:	Hale Development	Date Excavated:	3/5/20
Project:	Mountain View	Excavated By:	Aspen Creek - Backhoe
Location:	43 38 40.81 -116 16 29.54	Logged By:	J. Meusch, PM - SITE

DEPTH	SOILS DESCRIPTION											
(feet)	N	3/4"	1/2"	3/8"	# 4	# 10	# 40	# 100	#200	%M	LL	PI
0.0-10.0	Tan, Moist, Sand & Gravel with ACP & PCC											
3.0	18	100	90	80	73	60	55	42	32.2	11.5	NP	NP
10.0-13.0	Dark Brown, Moist, Firm, Sand, Silt, Gravel											
13.0	Bottom of Excavation @ 13.0 No Ground Water Encountered No Monitoring Well in Place											

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Soil Log Legend

UNIFIED SOIL CLASSIFICATION SYSTEM
(ASTM STANDARD TEST METHOD D 2487 FOR CLASSIFICATION OF SOIL FOR ENGINEERING PURPOSES)

MAJOR DIVISIONS				TYPICAL DESCRIPTIONS
COARSE GRAINED SOILS <50%-#200	GRAVEL & GRAVELLY SOILS <50%-#4	< 5%-#200	GW	Well-graded gravel, gravel-sand mixture, little or no fines.
			GP	Poorly graded gravel, gravel sand mixture, little or no fines
		5-12%-#200	GM	Silty gravel, gravel-sand-silt mixtures
		> 12%-#200	GC	Clayey gravel, gravel-sand-clay mixtures
	SAND & SANDY SOILS ≥50%-# 4	< 5%-#200	SW	Well-graded sand, gravelly sand, little or no fines.
			SP	Poorly graded sand, gravelly sand, little or no fines
		>12%-#200	SM	Silty sand, sand-silt mixtures
			SC	Clayey sand, sand-clay mixtures
FINE GRAINED SOILS ≥50%-#200	SILTS & CLAYS LL< 50%	INORGANIC	ML	Inorganic silt and very fine sand, rock flour, silty or clayey fine sand or clayey silt with slight plasticity
			CL	Lean clay-low to medium plasticity, gravelly clay, sandy clay, silty clay
		ORGANIC	OL	Organic silt and organic silty clay of low plasticity
	SILTS & CLAYS LL≥50%	INORGANIC	MH	Elastic silt, micaceous or diatomaceous fine sand or silty soil.
			CH	Fat clay - high plasticity
		ORGANIC	OH	Organic clay-med. or high plasticity: organic silt
HIGHLY ORGANIC SOILS			PT	Peat, humus, swamp soil with high organic content

Abbreviations and Acronyms

AASHTO	American Association of State Highway & Transportation Officials
ASTM	American Society for Testing and Materials
ACP	Asphaltic Concrete Pavement
ASCE	American Society of Civil Engineers
BH	Bore Hole
IBC	International Building Code
ISPWC	Idaho Standard for Public Works Construction
ITD	Idaho Transportation Department
N	Standard Penetration Test – Blow Counts
NP	Non-Plastic
PCC	Portland Cement Concrete
PCF	Pounds per Cubic Foot
TP	Test Pit
USCS	Unified Soil Classification System

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STANDARD PROCTOR

Jim Fuhrman
1950 East Redwick Court
Meridian, Idaho 83646

Glenwood Property

SITE File #: 14038
Date Sampled: 2/25/2014
Lab Number: 14004

Sample Source: Composite Sample of Fill from FOUR boring Locations

Sieve Analysis Results:

3.0"	100	1.0"	100	3/8"	84	#40	54
2.0"	100	3/4"	96	#4	76	#100	42
1.5"	100	1/2"	88	#10	71	#200	37.8

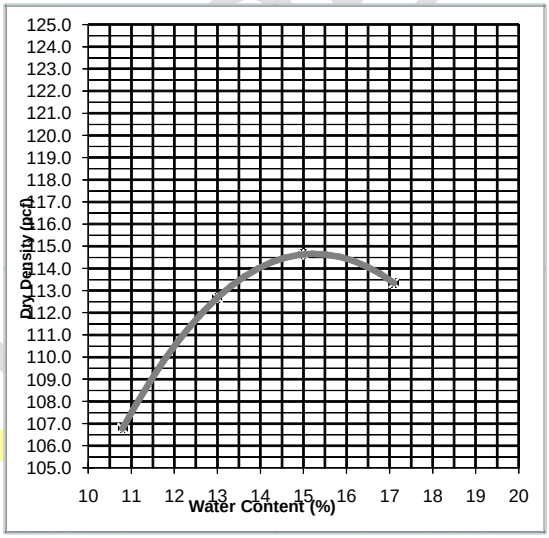
Soil Description:

Silty SAND with gravel

Moisture / Denisty Relationship:

ASTM D-698	X	Method B	X
ASTM-D-1557		Method C	

Trial Number	1
Moisture Content (%)	10.8%
Dry density (lbs/ft3)	106.8



MAXIMUM / OPTIMUM RESULTS

Dry Density (pcf):	**114.7**
Moisture Content (%):	**15.2**

ROCK CORRECTED RESULTS

Percent Rock	Dry Density	Moisture Content
10	118.3	13.9
15	120.2	13.2
20	122.1	12.6

Reviewed by:
Bob J. Arnold, PE

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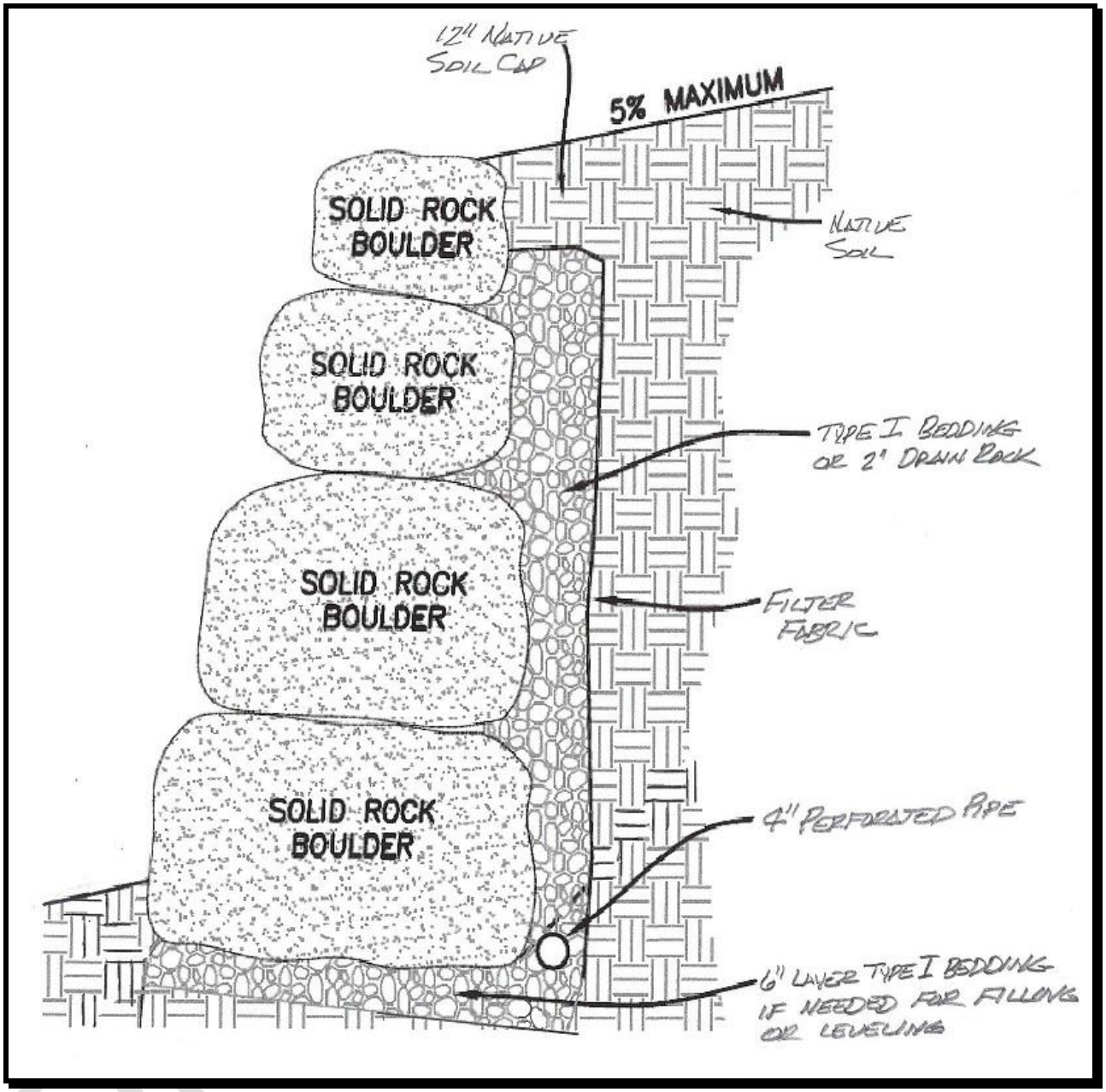
Boulder Retaining Wall Drain Detail



Nothing follows