CHRISTIAN WHEELER
ENGINEERING

October 9, 2025

Touchstone Communities
9815 Mira Mesa Boulevard
San Diego, California 92131
Attention: Mike Wagner

CWE 2240339.04

Subject: **Update of Report of Geotechnical Investigation**
Pasqual Heights Subdivision, 830 Idaho Avenue, Escondido, California

References:
1) Christian Wheeler Engineering, Report of Geotechnical Investigation, Pasqual Heights Subdivision, 830 Idaho Avenue, Escondido, California, dated October 25, 2024.
2) Touchstone Development, Preliminary Grading Plan, Pasqual Heights, County of San Diego Tract TM 5657, PDS2024-TM-5657, dated July 2025.

Ladies and Gentlemen:

In accordance with your request, we have prepared this report to update our referenced Geotechnical Investigation based on the referenced Grading Plan. We understand that the site layout has changed significantly from the layout that was originally contemplated at the time of our investigation. The new layout is depicted on our updated Site Plan and Geotechnical Map, which is included herewith as Plate No. 1. Based our review of the revised plan, it is our opinion that the conclusion and recommendations presented in our referenced report remain applicable to referenced grading plan and no additional investigation or recommendations are needed at this time.

If you should have any questions regarding this report, please do not hesitate to contact this office. This opportunity to be of professional service is sincerely appreciated.

Respectfully submitted,
CHRISTIAN WHEELER ENGINEERING

Shawn Caya, R.G.E. #2748

Attachment: Plate 1 Site Plan and Geotechnical Map

ec: Mike Wagner

PRELIMINARY GRADING PLAN

PASQUAL HEIGHTS

PDS2024-TM-5657

PREPARED BY:

TOUCHSTONE DEVELOPMENT

PROJECT ADDRESS
830 IDAHO AVE, ESCONDIDO CA 92025

ASSESSOR'S PARCEL NO:
234-160-25

OWNER/APPLICANT:
TOUCHTONE COMMUNITIES
KERRY GARZA
9815 MIRA MESA BLVD.
SAN DIEGO, CA 92131
858-204-1342

PROJECT DESCRIPTION
42 SINGLE FAMILY HOMES

NO.	DATE	REVISIONS
1	11/2024	1ST SUBMITTAL
2	02/2025	UPDATE
3	07/2025	2ND SUBMITTAL

SHEET 3 OF 5

CWE LEGEND

B-6	APPROXIMATE BORING LOCATION
T-13	APPROXIMATE TEST TRENCH LOCATION
Qyal Qoal Kgr	YOUNGER ALLUVIUM over OLDER ALLUVIUM over WEATHERED GRANITICS
Qoal Kgr	OLDER ALLUVIUM over WEATHERED GRANITICS
Qcol Kgr	COLLUVIUM over WEATHERED GRANITICS
	ESTIMATED GEOLOGIC CONTACT
	APPROXIMATE SEISMIC TRAVERSE LOCATION
	GEOLOGIC CROSS-SECTION

Note: Shallow Surficial Fills Not Mapped

W+E

0 100 200

SCALE: 1" = 100'

SITE PLAN AND GEOTECHNICAL MAP

PASQUAL HEIGHTS SUBDIVISION
830 IDAHO AVENUE
ESCONDIDO, CALIFORNIA

DATE: OCTOBER 2025	REPORT NO.: 2240339.04
BY: SCC	PLATE NO.: 1

CHRISTIAN WHEELER ENGINEERING

CHRISTIAN WHEELER
ENGINEERING

REPORT OF GEOTECHNICAL INVESTIGATION

PASQUAL HEIGHTS SUBDIVISION
830 IDAHO AVENUE
ESCONDIDO, CALIFORNIA

PREPARED FOR

TOUCHSTONE COMMUNITIES
9815 MIRA MESA BOULEVARD
SAN DIEGO, CALIFORNIA 92131

PREPARED BY

CHRISTIAN WHEELER ENGINEERING
3980 HOME AVENUE
SAN DIEGO, CALIFORNIA 92105

CHRISTIAN WHEELER
ENGINEERING

October 25, 2024

Touchstone Communities
9815 Mira Mesa Boulevard
San Diego, California 92131

CWE 2240339.01

Subject: **Report of Geotechnical Investigation**
Pasqual Heights Subdivision, 830 Idaho Avenue, Escondido, California

In accordance with your request and our proposal dated June 3, 2024, we have completed a geotechnical investigation for the subject project. We are presenting herein our findings and recommendations.

In general, we found the subject property suitable for the proposed construction, provided the recommendations provided herein are followed. Marginally rippable granitic rock is expected to be encountered in the deeper cut areas. Compressible surficial soils, including shallow areas of existing fill soils, topsoil/colluvium, and younger alluvium will need to be removed and replaced as properly compacted fill during the site grading. Specific recommendations for remedial grading as well as foundations, retaining walls, and pavements are presented in the following report.

If you have any questions after reviewing this report, please do not hesitate to contact our office. This opportunity to be of professional service is sincerely appreciated.

Respectfully submitted,
CHRISTIAN WHEELER ENGINEERING

Shawn Caya, R.G.E. #2748

SCC:scc:drr
Distribution: Client via email

REGISTERED PROFESSIONAL ENGINEER
SHAWN C. CAYA
GE2748
GEOTECHNICAL
STATE OF CALIFORNIA

David R. Russell, C.E.G. #2215

CERTIFIED ENGINEERING GEOLOGIST
DAVID R. RUSSELL
No. 2215
STATE OF CALIFORNIA

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CHRISTIAN WHEELER
ENGINEERING

REPORT OF GEOTECHNICAL INVESTIGATION

PASQUAL HEIGHTS SUBDIVISION
830 IDAHO AVENUE
ESCONDIDO, CALIFORNIA

INTRODUCTION AND PROJECT DESCRIPTION

This report presents the results of a geotechnical investigation performed for a proposed residential subdivision to be constructed in the Escondido area of San Diego County, California. The subject site is a located at the address of 830 Idaho Avenue. The following Figure Number 1 presents a vicinity map showing the location of the project.

To assist us in the preparation of this report, we have been provided with a Conceptual Development Plan, including a topographic survey and site grading, prepared by Touchstone Development (undated). This plan has been used as the base for our geotechnical mapping presented on Plate No. 1 of this report.

We understand that the site is proposed to be subdivided into 42 residential parcels, with each parcel to receive a new single-family residence and associated improvements. Two private roads with cul-de-sacs are proposed to access the new parcels, running northwest from Idaho Avenue. Additional improvements are to include retaining walls along the northeast and southeast edges of the site, a stormwater basin in the eastern corner, engineered slopes across the site, and a private sewer lift station adjacent to the southeastern property line. We anticipate that the proposed residential structures will be of conventional, wood-frame construction with flooring to be on-grade concrete slabs. We also anticipate that the proposed residential structures and retaining walls will be supported by conventional shallow foundations. Grading to accommodate the proposed construction is expected to consist of cuts up to 28 feet and fills up to 16 feet from existing site grades.

This report has been prepared for the exclusive use of Touchstone Communities and its consultants for specific application to the project described herein. Should the project be modified, the new plans should be submitted to Christian Wheeler Engineering for review to determine whether the findings and recommendations presented herein remain applicable and if any additional subsurface investigation,

laboratory testing and/or recommendations are necessary. Our professional services have been performed, our findings obtained, and our recommendations prepared in accordance with generally accepted engineering principles and practices. This warranty is in lieu of all other warranties, expressed or implied.

PROJECT SCOPE

Our geotechnical investigation consisted of surface reconnaissance, subsurface exploration, obtaining representative soil samples, laboratory testing, analysis of field and laboratory data, and review of relevant, readily available geologic literature. More specifically, our intent was to provide the services listed below.

- Excavate 13 (maximum 10 feet deep) test trenches using a backhoe to explore the subsurface conditions of the site and to obtain samples for laboratory testing.
- Backfill the trenches with the removed soil. It should be noted that the soil was not mechanically compacted and will have to be removed and replaced as compacted fill during the future site grading.
- Drill six small-diameter (maximum 20 feet deep) borings using a truck-mounted drill rig.
- Place three lines of geophone detectors longitudinally across the site and perform seismic refraction surveys along each line to evaluate the rippability of the bedrock in the deep cut areas.
- Evaluate, by laboratory tests and our experience with similar soil types, the engineering properties of the various soil strata that may influence the proposed construction, including bearing capacities, expansive characteristics, and settlement potential.
- Describe the general geology at the site, including possible geologic hazards that could have an effect on the proposed construction, and provide the seismic design parameters in accordance with the 2022 edition of the California Building Code.
- Discuss potential construction difficulties that may be encountered due to soil conditions, groundwater, or geologic hazards, and provide geotechnical recommendations to mitigate identified construction difficulties.
- Address the global stability of the proposed site development.
- Provide site preparations and grading recommendations for the anticipated work, and an evaluation of bedrock rippability.
- Provide shored and unshored temporary cut slope recommendations.
- Provide foundation recommendations for the type of construction anticipated and develop soil engineering design criteria for the recommended foundation designs.
- Provide earth retaining wall design recommendations.
- Provide preliminary pavement section recommendations.

- Prepare this report, which includes, in addition to our conclusions and recommendations, a plot plan showing the areal extent of the geological units and the locations our trenches, exploration logs, and a summary of the laboratory test results.

FINDINGS

SITE DESCRIPTION

The subject site is a relatively large developed residential lot, identified as Assessor's Parcel Number 234-160-25, which is located northwest of Idaho Avenue and southwest of San Pasqual Valley Road, in the unincorporated Escondido community of the County of San Diego, California. The site currently supports a one-story, single-family residence with a detached garage, driveway, and other normally associated improvements. A well is located adjacent to the eastern corner of the site, and along the northeastern property line is a cleared area currently used as an on-grade parking lot. An excavated pit, possibly used for the disposal of waste, is located adjacent to the southwest property line. Topographically, the site is characterized by a gentle to moderate, easterly descending slope, with a relatively level pad that supports the existing improvements in the southern portion of the site. Approximate elevations across the site range from 712 feet in the eastern corner to 795 feet in the western corner. Elevation information was obtained from the Conceptual Development Plan (Touchstone Development, undated).

GENERAL GEOLOGY AND SUBSURFACE CONDITIONS

GEOLOGIC SETTING AND SOIL DESCRIPTION: The subject site is located in the Foothills Physiographic Province of San Diego County. Based upon the results of our subsurface exploration, analysis of readily available, pertinent geologic literature, it was determined that the project area is underlain by shallow man-placed and agriculturally disturbed artificial fill soil, surficial deposits of topsoil/colluvium and younger alluvium, Quaternary-age older alluvium, and Cretaceous-age granitic rock. These materials are described below.

> **ARTIFICAL FILL (unmapped):** A thin and irregular veneer of man-placed fill soils were encountered within the lower, eastern portions of the subject site. The fill was noted to generally consist of light brown to grayish-brown, silty sands (SM) that were generally dry and loose. Where encountered, the fill was noted to have a maximum thickness of 2 feet; however localized areas of somewhat deeper fills should be expected. The fill materials are judged to have a very low to low expansion potential (EI≤50).

TOPSOIL/COLLUVIUM (Qcol): Approximately 2½ to 6 feet of undifferentiated topsoil and colluvium was observed to overlie the underlying the granitic materials across the central and western portions of the site. Portions of these materials appear to have been disturbed by past agricultural plowing of the site and adjacent areas. The topsoil/colluvium was noted to predominantly consist of brown to dark brown, dry to damp, loose to medium dense, silty sand (SM). Within test trench T-8, the lower portions of the topsoil/colluvium were noted to consist of dark brown, clayey sand (SC), which was damp to moist and medium dense, in consistency. The colluvial materials are judged to have a very low to low expansion potential (EI≤50).

YOUNGER ALLUVIUM (Qyal): A relatively shallow deposit of recent or younger alluvium was encountered within the lower, eastern portions of the subject site (See Plate No. 1). The younger alluvium was noted to generally consist of reddish-brown, silty sands (SM) that were generally dry to damp and loose to medium dense, in consistency. Within our explorations the alluvium was noted to extend to depths of 4 to 7 feet below existing site grades. However, areas of deeper younger alluvium deposits should be expected. The younger alluvium is judged to have a very low to low expansion potential (EI≤50).

OLDER ALLUVIUM (Qoal): Quaternary-age, older alluvium underlies the surficial fills and younger alluvium within the lower, eastern portion of the subject site. These materials were noted to generally consist of reddish-brown, silty sands (SM) and clayey sands (SC) that were damp to moist and dense to very dense, in consistency. The older alluvial deposits are judged to have a very low to low expansion potential (EI≤50).

GRANITICS (Kgr): Cretaceous-age granitic rock in varying degrees of weathering was encountered underlying the surficial soils throughout the site. When excavated, the granitic rock exposed in the trenches consisted primarily of yellowish-brown to grayish-brown, dry to damp, dense to very dense, well-graded sand with silt (SW-SM). Practical refusal was encountered in the granitic material in our test trenches (dug with a Cat 480 F backhoe equipped with a 24-inch bucket) at depths ranging from about 4 feet to 7 feet below existing grade. Cuttings from the exploratory borings drilled into the granitics appeared to be highly pulverized. Rippability characteristics of the granitic rock are described on pages 6 through 8 of his report. The granitic rock was judged to have a very low Expansion Index (EI<20).

GROUNDWATER: No groundwater was encountered in any of our subsurface explorations. Depending on when site grading occurs, localized areas of shallow, perched groundwater may be encountered within the lower portions of the younger alluvium. It should also be recognized that minor groundwater seepage problems might occur after development of a site even where none were present before development. These are usually minor phenomena and are often the result of an alteration in drainage patterns and/or an increase in irrigation water. Based on the permeability characteristics of the soil and the anticipated usage and development, it is our opinion that any seepage problems which may occur will be minor in extent. It is further our opinion that these problems can be most effectively corrected on an individual basis if and when they occur.

TECTONIC SETTING: No active faults are known to traverse the subject site. It should be noted that much of Southern California, including the San Diego County area, is characterized by a series of Quaternary-age fault zones that consist of several individual, en echelon faults that generally strike in a northerly to northwesterly direction. Some of these fault zones (and the individual faults within the zone) are classified as "active" according to the criteria of the According to the 2018 revision of *'Special Publication 42, Earthquake Fault Zones'* by the California Geologic Survey (CGS), a three-tier fault classification system is used:

- *'Holocene-active faults'*; Faults with displacement within the Holocene epoch (the last 11,700 years)
- *'Pre-Holocene faults'*; Faults with displacement with the Pleistocene epoch (between 11,700 to 2.6 million years ago), but not within the Holocene epoch. Previously terminology by the CGS referred to these faults as *'potentially active',* however this terminology is being phased out.
- *'Age-undetermined faults'*; Faults with displacement unconstrained by dating methods or limitations in stratigraphic resolution.

Faults older than Quaternary-age are not specifically defined in Special Publication 42, however, it is generally accepted that faults showing no movement during the Quaternary period (up to 2.6 million years) may be considered to be *'inactive'*.

Projects near *Holocene-active faults* are regulated by the Alquist-Priolo Earthquake Fault Zoning Act of 1972. The Act prohibits the development of structures for human occupancy across the surface trace of an active fault in California, with certain exceptions. Faults determined by the CGS as *sufficiently active* and *well-defined* are identified on Alquist-Priolo regulatory maps as *Active Fault Traces* and bounded by buffers called *Earthquake Fault Zones*. Sites within these zones are required to undergo fault hazard studies as part of the geotechnical investigation. Review of the local Alquist-Priolo regulatory maps indicates that the subject site is not underlain by a known active fault and is not within an Earthquake Fault Zone.

It should be recognized that the active Newport-Inglewood-Rose Canyon and Elsinore Fault Zones are located approximately 17 and 16 miles west and northeast of the site, respectively. Other active fault zones in the region that could possibly affect the site include the Coronado Bank Fault Zone to the southwest, the San Diego Trough and San Clemente Fault Zones to the west; the Palos Verdes Fault Zone to the northwest; and the San Jacinto and San Andreas Fault Zones to the northeast.

RIPPABILITY CHARACTERISTICS

SEISMIC TRAVERSE: Three seismic refraction traverses were performed using a Geometrics Geode (ES-125) two channel signal enhancement seismograph. The locations of the seismic traverses are shown on the Site Plan and Geotechnical Map included herein as Plate Number 1. The results of the seismic traverses are summarized below in Table I. Our interpretations are based on the rippability characteristics of the granitic rock as described hereinafter. The apparent velocities were measured at each end of the seismic traverse, and the seismic traverse performed in the opposite directions is designated with the letter "R" after the traverse number.

TABLE I: RESULTS OF SEISMIC REFRACTION TRAVERSE

Traverse Number	Apparent Velocities (ft/sec)	Comments
ST-1 (SE-NW)		
0'-2'	650	Topsoil/Colluvium
2'-9'	2,100	Rippable Granitic Rock
9'-26'	4,500	Rippable to Marginally Rippable Granitic Rock
ST-1R (NW-SE)		
0'-2'	650	Topsoil/Colluvium
2'-8'	2,100	Rippable Granitic Rock
8'-26'	4,900	Marginally Rippable Granitic Rock
ST-2 (SW-NE)		
0'-3½'	950	Topsoil/Colluvium
3½'-15'	3,800	Rippable Granitic Rock
ST-2R (NE-SW)		
0'-2'	900	Topsoil/Colluvium/Rippable Granitic Rock
2'-15'	2,500	Rippable Granitic Rock
ST-3 (SW-NE)		
0'-3'	700	Topsoil/Colluvium
3'-25'	3,400	Rippable Granitic Rock
ST-3R (NE-SW)		
0'-3'	700	Topsoil/Colluvium
3'-25'	3,100	Rippable Granitic Rock

The seismograph's depth of investigation is closely related to the length of the seismic traverse. For a particular length of traverse, using a ratio of 3:1 between the length and depth, we conclude that an 80-foot length of survey line will detect materials of varying density to a depth of approximately 26 feet. The length of the traverses in this survey ranged from 45 feet to 80 feet dependent on the depths of anticipated cuts at each location.

RIPPABILITY CHARACTERISTICS OF GRANITIC ROCK: The following presents a discussion of the velocity ranges used to determine the boundaries of rippable, marginally rippable, and non-rippable granitic rock. The evaluations given are based on using a Caterpillar D-9 dozer or equivalent for the excavations. Use of lesser or smaller equipment for excavations will change the given evaluations. Excavation is dependent to a great degree on the condition and type of excavation equipment and on operator technique, as well as on rock weathering and fracturing.

RIPPABLE CONDITION (0 - 4,500 ft./sec.): This velocity range indicates rippable materials, which may consist of decomposed granitics at lower velocities to only slightly decomposed, fractured rock at the higher velocities. Although considered to be rippable, materials may be produced by excavation that will not be usable as structural fill. However, the material may be usable as structural fill if processed by adding fines. Experience has shown that material within the range of 4,000 to 4,500 fps most often consists of severely to moderately fractured rock with little fines or no fines and sizeable quantities of plus three-inch material. For materials within the velocity range of from 3,500 to 4,500 fps, rippability will be difficult for backhoes and other light trenching equipment.

MARGINALLY RIPPABLE CONDITION (4,500 - 5,500 ft./sec.): Excavations in this range would be extremely time consuming or impractical and would produce fractured rock with little or no fines with or without blasting. The higher velocities will most likely require blasting. Trenching equipment might not function well and trench excavations, even with larger track mounted excavators, will be very time consuming. In the higher range of this category, trenching may not be economically practical.

NON-RIPPABLE CONDITION (5,500 ft./sec. and Greater): Granitic rock with seismic velocities over 5,500 feet per second may include moderately to slightly fractured rock which will require blasting for excavations. The materials produced by blasting will consist of a high percentage of oversize and angular rock and few fines.

SEISMIC TRAVERSE LIMITATIONS: The results of the seismic survey for this investigation reflect rippability conditions only for the area of the traverse. However, the conditions of the various soil-rock units appear to be similar for the remainder of the site and may be assumed to possess similar characteristics.

Our reporting is presently limited in that refraction seismic surveys do not allow for prediction of a percentage of expectable oversize or hardrock floaters. Subsurface variations in the degree of weathered rock to fractured rock are not accurately predictable. Excavation is dependent to a great degree on the condition and type of excavation equipment and on operator technique, as well as on rock weathering and fracturing.

The seismic refraction method requires that materials become increasingly dense with depth. In areas where denser, higher velocity materials are underlain by lower velocity materials, the lower velocity materials would not be indicated by our survey.

All of the velocities used as upper limits for rippability are subject to fluctuation depending upon such local variations in rock conditions as:

a) Fractures, faults, and planes of weakness of any kind.
b) Weathering and degree of decomposition.
c) Brittleness and crystalline nature.
d) Grain size.

Further, the range of rippability using Caterpillar equipment may be increased using different equipment. However, it should be noted that ripping of higher velocity materials may become totally dependent on the time available and the economics of the project. Ripping of higher velocity materials can be achieved, but it may become economically infeasible.

DISCUSSION OF SEISMIC TRAVERSE RESULTS: Our seismic refraction traverses indicate that the granitic rock materials that underlie the locations of seismic traverses ST-2 and ST-3 are generally rippable to depths of about 15 feet to 25 feet below existing grades, respectively. In the area of our seismic traverse ST-1, the granitic rock materials are generally rippable to depths of about 8 feet to 9 feet below existing grades. Below these depths, the granitic rock is considered to be rippable to marginally rippable. It should also be noted that zones of hardrock and hardrock "floaters" may be encountered at higher elevations within the weathered granitic rock that will require splitting and/or blasting to excavate.

GEOLOGIC HAZARDS

SEISMIC HAZARD: A likely geologic hazard to affect the site is ground shaking as a result of movement along one of the major active fault zones mentioned in the "Tectonic Setting" section of this report. Seismic design parameters were determined in accordance with Chapter 16 of the *2022 California Building Code (CBC)* and the applicable sections of *ASCE/SEI 7-16 Minimum Design Loads and Associated Criteria for Buildings and Other Structures*. For the subject site, most of the lots will be constructed in cut or shallow fill areas that expose competent very old paralic deposits and/or San Diego formation within the upper 100 feet of geologic subgrade. These lots can be characterized as Soil Site Class C. Lots where deeper fills are planned and/or alluvium is present can be characterized as Soil Site Class D.

TABLE II: CBC 2022/ASCE 7-16 – SEISMIC DESIGN PARAMETERS

CBC – Chapter 16 Section	Seismic Design Parameter	Lots 1-31, 42	Lots 32-41
Section 1613.2.2	Soil Site Class	D	C
Figure 1613.2.1 (1)	MCE_R Acceleration for Short Periods (0.2 sec), S_s	0.899 g	0.899 g
Figure 1613.2.1 (2)	MCE_R Acceleration for 1.0 Sec Periods (1.0 sec), S_1	0.328 g	0.328 g
Table 1613.2.3 (1)	Site Coefficient, F_a	1.140	1.2
Table 1613.3.3 (2)	Site Coefficient, F_v	1.972	1.5
Section 1613.2.3	S_{MS} = MCE_R Spectral Response at 0.2 sec. = $(S_s)(F_a)$	1.025 g	1.079 g
Section 1613.2.3	S_{M1} = MCE_R Spectral Response at 1.0 sec. = $(S_1)(F_v)$	0.647 g	0.492 g
Section 1613.2.4	S_{DS} = Design Spectral Response at 0.2 sec. = $2/3(S_{MS})$	0.683 g	0.719 g
Section 1613.2.4	S_{D1} = Design Spectral Response at 1.0 sec. = $2/3(S_{M1})$	0.431 g	0.328 g
Section 1613.2.5	Seismic Design Category	D	D
ASCE 7-16 Fig. 22-14	Mapped Long-Period Transition Period, T_L	8 sec	8 sec
Section 1803.2.12	PGA_M per Section 11.8.3 of ASCE 7	0.47 g	0.47 g

In accordance with Section 11.4.8 of ASCE/SEI 7-16, structures on Soil Site Class D or E sites that have a mapped MCE_R spectral response acceleration parameter (S_1) value greater than or equal to 0.2 require a site-specific ground motion hazard analysis or the seismic response coefficient (C_S) must be adjusted to adequately characterize the site response (Exception 2). The above Table II presents the seismic design parameters based on Exception 2 in Section 11.4.8.

LANDSLIDE POTENTIAL AND SLOPE STABILITY: As part of this investigation we reviewed the publication, "Landslide Hazards in the Northern Part of the San Diego Metropolitan Area" by Tan and Giffen, 1995. This reference is a comprehensive study that classifies San Diego County into areas of relative landslide susceptibility. The subject site is located in Area 3-1, which is considered to be "generally susceptible" to slope failures. Based on our findings, the competent nature of the older alluvium and granitics underlying th

e site, and the proposed construction, it is our opinion that the likelihood of slope stability related problems at the site is very low.

LIQUEFACTION: Given the fact that the shallow, younger alluvium will be removed during planned site grading, the earth materials that will underlie the site are not considered subject to liquefaction due to such factors as soil density, grain-size distribution, the absence of shallow groundwater conditions.

FLOODING: As delineated the Flood Insurance Rate Map (FIRM) prepared by the Federal Emergency Management Agency, the site is in Zone X which is considered to be an "area of minimal flood hazard." Areas of minimal flood hazards are located outside of the boundaries of both the 100-year and 500-year flood zones.

TSUNAMIS: Tsunamis are great sea waves produced by submarine earthquakes or volcanic eruptions. Due to the site's setback from the ocean and elevation, it will not be affected by a tsunami.

SEICHES: Seiches are periodic oscillations in large bodies of water such as lakes, harbors, bays or reservoirs. Due to the site's location, it will not be affected by seiches.

CONCLUSIONS

Based on our investigation, it is our opinion that the subject property is suitable for the proposed development provided the geotechnical recommendations presented in this report are followed. The main geotechnical conditions affecting the proposed development are summarized below.

- The site is underlain by competent granitic bedrock and older alluvial deposits that are overlain by a layer of surficial soils consisting of younger alluvium, colluvium and/or fill. The surficial soils are potentially compressible and are considered to be unsuitable in their present condition to support new fill and/or settlement-sensitive improvements. Where it is not removed by the planned grading, the surficial soil will need to be overexcavated and replaced as properly compacted fill.
- Transitions between cut and fill are anticipated for several building pads. In order to mitigate the potential for differential settlement, the cut portions of the transition pads will need to be undercut and replaced with properly compacted fill as discussed in the following section.
- Based on the results of our seismic traverses, it should be anticipated that the granitic material within the deeper cut areas in the eastern portion of the project are marginally rippable to the anticipated cut

depths. Additionally, zones of granitic hardrock and/or hardrock "floaters" may be encountered in the matrix of rippable material that will require splitting and/or blasting to excavate. The presence of such material near the planned finish grade will make it difficult to excavate for foundations and/or utilities using light trenching equipment. In that case, the building pads and utility alleys could be undercut and the excavated material replaced as properly compacted fill in order to facilitate trenching with light equipment.

- The planned cuts will likely produce oversized material that will require special handling. Specific recommendations regarding oversized material are presented in the following section of this report.
- The site is located in an area that is relatively free of geologic hazards that will have a significant effect on the proposed development. The most likely geologic hazard that could affect the site is ground shaking due to seismic activity along one of the regional active faults. However, construction in accordance with the requirements of the most recent edition of the California Building Code and the local governmental agencies should provide a level of life-safety suitable for the type of development proposed.
- Based on the presence of an existing water well/groundwater basin located with 100 feet of the planned storm water retention basin, it is our opinion that infiltration should be restricted by providing an impermeable liner within the basin.

RECOMMENDATIONS

GRADING AND EARTHWORK

GENERAL: All grading should conform to the guidelines presented in Appendix J of the California Building Code, the minimum requirements of the County of San Diego, and the recommended Grading Specifications and Special Provisions attached hereto, except where specifically superseded in the text of this report. Prior to grading, a representative of Christian Wheeler Engineering should be present at the pre-construction meeting to provide additional grading guidelines, if necessary, and to review the earthwork schedule.

OBSERVATION OF GRADING: Continuous observation by the Geotechnical Consultant is essential during the grading operation to confirm conditions anticipated by our investigation, to allow adjustments in design criteria to reflect actual field conditions exposed, and to determine that the grading proceeds in general accordance with the recommendations contained herein.

CLEARING AND GRUBBING: Site preparation should begin with the stripping and removal of vegetation, construction debris and other deleterious materials from the site. This should include all significant root material. The resulting materials should be disposed of off-site in a legal dumpsite.

REMEDIAL GRADING: It is recommended that existing surficial soil (fill soil, topsoil, younger alluvium and colluvium), that is not removed by the planned grading, be overexcavated to the contact with competent granitics or older alluvium, and be replaced as properly compacted fill. This should include areas to support proposed structures, site improvements, and new fills. Based on the results of our subsurface explorations we expect the surficial soils to extend about 3 to 7 feet below the existing grades; however, deeper removals may be necessary in areas of the site not investigated or due to unforeseen conditions. Lateral removals limits should extend across the entire building pad and at least 5 feet outside site retaining wall footings, and also include any settlement-sensitive improvements and/or new fills. No removals are recommended beyond project limits. All excavated areas should be approved by the geotechnical engineer or his representative prior to replacing any of the excavated soils. The excavated material can be replaced as properly compacted fill provided that it is free of deleterious debris. Fill soils should be compacted in accordance with the recommendations presented in the "Compaction and Method of Filling" section of this report.

PROCESSING OF REMOVAL BOTTOM: Prior to placing any new fill soils or constructing any new improvements in areas that have been overexcavated as recommended in the "Remedial Grading" section of this report, the exposed soils should be scarified to a depth of 12 inches, moisture conditioned, and compacted to at least 90 percent relative compaction. In areas to support fill slopes, keyways should be cut into the competent older alluvium or granitics. The keyways should be at least 12 feet wide and be sloped back at least 2 percent. The keyways should extend at least 1 foot into the competent materials. Where the existing ground has a slope of 5:1 (horizontal to vertical) or steeper, it should be benched into as the fill extends upward from the keyways. The benching should remove all loose surficial soils and should create level areas on which to place the fill material. For reference, we have attached a Fill Slope Keyway Detail as Plate No. 3 of this report.

TRANSITION PAD UNDERCUT: Support of structures partly on cut and partly on fill is not recommended. In order to provide a more uniform bearing condition beneath the structures, the cut portion of cut/fill transition pads should be undercut to a depth of 4 feet below the finish pad grade or 2 feet below the lowest bottom-of-footing elevation, whichever depth is greater, and be replaced as uniformly compacted, structural fill material. In this case, the overexcavated area should be sloped at an inclination of at least 2 percent towards the fill side of the pad, in such a manner that water does not become trapped in the overexcavated zone. For reference, we have attached a Pad Undercut Detail as Plate No. 4 of this report.

CUT LOT UNDERCUT: Where very dense decomposed granitics and/or granitic hardrock is exposed on cut lots, it is suggested that the building pads be undercut to a depth of 1 foot below the foundation bottom and/or lowest utility and be replaced as uniformly compacted, structural fill material in a similar manner as the cut/fill transition lots. This would allow the foundations and on-lot utility trenches to be excavated using normal trenching equipment. As is the case for the transition undercut, the overexcavated area should be sloped at an inclination of at least two percent towards the lower portion of the site, in such a manner that water does not become trapped in the overexcavated zone.

UTILITY ALLEYS: Where very dense decomposed granitics and/or granitic hardrock is expected to occur in the proposed street areas that will make trenching for utilities difficult or not economically practical, it is suggested that the utility allies be undercut and the excavated materials replaced as compacted fill material. The undercut should be to a depth of at least one foot below the bottom of the deepest utility. The undercut allies should include the area of all buried utilities, including any buried utilities that are behind the curb lines.

OVERSIZED ROCK: Oversized rock is defined as rock exceeding 6 inches in maximum dimension. Oversized rock should be broken into pieces so that it complies with the "Compaction and Method of Filling" section of this report if it is to be incorporated into fills. Otherwise, oversize material should be segregated and removed from the site or used for other purposes such as site landscaping.

TEST TRENCH BACKFILL: Backfill associated with previous subsurface explorations underlying settlement-sensitive improvements not removed as part of site preparation operations should be removed and replaced as compacted fill.

STABILIZATION: If soft, pumping, or otherwise unsuitable soils are encountered that cannot be properly compacted, it will be necessary to remove the unstable soil to a competent stratum and replace it with soil that is suitable for compaction. Alternatively, wet soil can be allowed to dry back to a moisture content that allows proper compaction. Other methods of stabilization such as geosynthetic reinforcement, rock blankets, or chemical admixture can be discussed during construction upon request.

FILL SOIL AND METHOD OF COMPACTION: Fill and backfill soil should be thoroughly mixed and placed at a moisture content at least 2 percent above optimum moisture content, in loose lifts 6 to 8 inches thick, with each lift compacted by mechanical means. Fills should consist of approved earth material, free of trash or debris, roots, vegetation, or other materials determined to be unsuitable by our field personnel. Fill material should be free of rocks or lumps of soil in excess of 6 inches in maximum dimension; however, this should be reduced to 3 inches within 3 feet of the planned pad or subgrade elevation.

SUBGRADE PREPARATION: Subgrade is considered to be the upper 12 inches of soil in areas to support surface improvements such as vehicular pavements other roadway structures, flatwork, curbs and gutters, driveways, or sidewalks. Preparation of subgrade should be performed just prior to the placement of subbase, aggregate base, or the surface improvement, and should not be considered to be completed as part of the mass grading requirements or operation. The preparation of subgrade should result in a uniform soil having a moisture content that is minus 1 percent of optimum or wetter just prior to compaction. Achieving this condition will likely require the contractor to scarify, overexcavate, or otherwise loosen the subgrade soil and perform moisture-conditioning by adding water or allowing the existing material to dry. The moisture-conditioned material should be thoroughly mixed and compacted. Proof rolling with a fully loaded water truck may be requested in order to verify that a uniform, stable subgrade has been achieved. Areas that exhibit rutting, pumping, yielding, and/or low compaction should be stabilized as discussed above.

COMPACTION REQUIREMENTS: All structural fill placed at the site should be compacted to a relative compaction of at least 90 percent of its maximum dry density as determined by ASTM Laboratory Test D1557. In areas to support vehicular pavements, the upper 12 inches of subgrade should be compacted to at least 95 percent of the material's maximum dry density. Aggregate base courses below flexible pavements (asphalt concrete) should be compacted to at least 95 percent of the material's maximum dry density.

IMPORTED FILL MATERIAL: Soils to be imported to the site should be evaluated and approved by the Geotechnical Consultant prior to being imported. At least five working days-notice of a potential import source should be given to the Geotechnical Consultant so that appropriate testing can be accomplished. The type of material considered most desirable for import is granular material containing some silt or clay binder, which has an Expansion Index of less than 50. Less than 25 percent of the material should be larger than the Standard #4 sieve, and less than 25 percent finer than the Standard # 200 sieve. Soils not meeting these criteria should not be used for structural fill or backfill.

SLOPE CONSTRUCTION: Fill and cut slopes may be constructed at an inclination of 2:1 or flatter (horizontal to vertical). Compaction of fill slopes should be performed by back-rolling with a sheepsfoot compactor at vertical intervals of 4 feet or less as the fill is being placed, and track-walking the face of the slope when the slope is completed. As an alternative, the fill slopes may be overfilled by at least 3 feet and then cut back to the compacted core at the design line and grade. Keys should be made at the toe of fill slopes in accordance with the recommendations presented above under "Processing of Removal Bottom."

The presence of cohesionless soils at the face of slopes should be avoided. Slopes should be planted as soon as feasible after grading. Sloughing, deep rilling and slumping of surficial soils may be anticipated if slopes are left

unplanted or without erosion control, especially during the rainy season. Irrigation of slopes should be carefully monitored to ensure that only the minimum amount necessary to sustain plant life is used. Over-irrigating could be extremely erosive and should be avoided.

TEMPORARY CUT SLOPES: The contractor is solely responsible for designing and constructing stable, temporary excavations and will need to shore, slope, or bench the sides of trench excavations as required to maintain the stability of the excavation sides. The contractor's "competent person", as defined in the OSHA Construction Standards for Excavations, 29 CFR, Part 1926, should evaluate the soil exposed in the excavations as part of the contractor's safety process. We anticipate that the existing on-site surficial soils will consist of Type C material while the older alluvial deposits and granitics will consist of Type B material. Our firm should be contacted to observe all temporary cut slopes during grading to ascertain that no unforeseen adverse conditions exist. No surcharge loads such as foundation loads, or soil or equipment stockpiles, vehicles, etc. should be allowed within a distance from the top of temporary slopes equal to half the slope height.

SURFACE DRAINAGE: The ground around the proposed structure should be graded so that surface water flows rapidly away from the structure without ponding. In general, we recommend that the ground adjacent to structure slope away at a gradient of at least 5 percent for a minimum distance of 10 feet. If the minimum distance of 10 feet cannot be achieved, an alternative method of drainage runoff away from the building at the termination of the 5 percent slope will need to be used. Swales and impervious surfaces that are located within 10 feet of the building should have a minimum slope of 2 percent. Rain gutters with downspouts that discharge runoff away from the structure into controlled drainage devices are also recommended.

Surface runoff into downslope natural areas and graded areas should be minimized. Where possible, drainage should be directed to suitable disposal areas via non-erodible devices such as paved swales, gunited brow ditches, and storm drains.

Homeowners should be advised that drainage patterns approved at the time of fine grading should be maintained throughout the life of the proposed structures. They should also be advised to limit site irrigation to the minimum necessary to sustain landscape growth. Should excessive irrigation, impaired drainage, or unusually high rainfall occur, saturated zones of perched groundwater conditions might occur.

GRADING PLAN REVIEW: The final grading plans should be submitted to this office for review in order to ascertain that the recommendations of this report have been implemented, and that no additional recommendations are needed due to changes in the anticipated development plans.

CONVENTIONAL SHALLOW FOUNDATIONS

GENERAL: It is our opinion that the proposed residences may be supported by conventional continuous and isolated spread footings. The following recommendations are considered the minimum based on the anticipated soil conditions anticipated after the recommendations contained in this report are implemented and are not intended to be in lieu of structural considerations. All foundations should be designed by a qualified structural engineer.

DIMENSIONS: New spread footings supporting the proposed residences should be embedded at least 12 inches below the finish pad grade. Continuous and isolated footings should have minimum widths of 12 and 24 inches, respectively. Footings with these dimensions may be designed for an allowable soil bearing pressure of 2,500 pounds per square foot (psf). This value may be increased by 400 psf for each additional foot of embedment depth or width, up to a maximum of 4,000 psf. The allowable bearing capacity may be increased by one-third for combinations of temporary loads, such as those due to wind or seismic loads.

FOOTING SETBACK: If footings for structures, including retaining walls, are proposed adjacent to the top of slopes, we recommend that a minimum horizontal setback of 10 feet be provided from the bottom, outer edge of the footing to the adjacent slope face. The setback distance from the top of slopes may be achieved by using deepened footings. Footing setback is measured from competent soil and should neglect any loose or soft native soils that may occur at the top or face of a natural slope. Plans for any footings that will not comply with the specified setbacks should be submitted to the Geotechnical Engineer for specific review and approval prior to construction.

FOOTING REINFORCING: Reinforcement requirements for foundations should be provided by a structural engineer. However, based on the anticipated soil conditions, we recommend that the minimum reinforcing for continuous footings consist of at least two No. 5 bars positioned near the bottom of the footing and at least two No. 5 bars positioned near the top of the footing.

LATERAL LOAD RESISTANCE: Lateral loads against foundations may be resisted by friction between the bottom of the footing and the supporting soil, and by the passive pressure against the footing. The coefficient of friction between concrete and soil may be considered to be 0.35. The passive resistance may be considered to be equal to an equivalent fluid weight of 350 pounds per cubic foot. This assumes the footings are poured tight against undisturbed soil. If a combination of the passive pressure and friction is used, the friction value should be reduced by one-third.

SETTLEMENT CHARACTERISTICS: Provided the recommendations presented in this report are followed, the anticipated total and differential foundation settlement is expected to be less than about 1 inch and 1 inch over 40 feet, respectively. It should be recognized that minor cracks normally occur in concrete slabs and foundations due to shrinkage during curing or redistribution of stresses, therefore some cracks should be anticipated. Such cracks are not necessarily an indication of excessive vertical movements.

EXPANSIVE CHARACTERISTICS: The anticipated foundation soils are expected to have a low expansion potential (EI<50). The recommendations presented in this report reflect this condition.

FOUNDATION PLAN REVIEW

The final foundation plan and accompanying details and notes should be submitted to this office for review. The intent of our review will be to verify that the plans used for construction reflect the minimum dimensioning and reinforcing criteria presented in this section and that no additional criteria are required due to changes in the foundation type or layout. It is not our intent to review structural plans, notes, details, or calculations to verify that the design engineer has correctly applied the geotechnical design values. It is the responsibility of the design engineer to properly design/specify the foundations and other structural elements based on the requirements of the structure and considering the information presented in this report.

FOUNDATION EXCAVATION OBSERVATION

All foundation excavations should be observed by the Geotechnical Consultant prior to placing reinforcing steel or formwork in order to determine if the foundation recommendations presented herein are followed. All footing excavations should be excavated neat, level, and square. All loose or unsuitable material should be removed prior to the placement of concrete.

CORROSIVITY

The water-soluble sulfate and chloride content was determined in accordance with California Test Method 417 and 422 respectively for two representative soil samples from the site. Additionally, pH and resistivity testing on the sample was determined in accordance with California Test Method 643. Results are presented in Appendix B. The results of these tests indicate that the on-site soils may be categorized as negligible (S0) per *ACI 318: Building Code Requirements for Structural Concrete.* Additionally, the chloride content is considered to be negligible.

It should be understood Christian Wheeler Engineering does not practice corrosion engineering. If such an analysis is considered necessary, we recommend that the client retain an engineering firm that specializes in this field to consult with them on this matter. The results of our tests should only be used as a guideline to determine if additional testing and analysis is necessary.

ON-GRADE SLABS

GENERAL: It is our understanding that the floor system of each residence will consist of a concrete slab-on-grade. The following recommendations are considered the minimum slab requirements based on the soil conditions and are not intended to be in lieu of structural considerations.

INTERIOR SLAB: We recommend that the interior slab-on-grade floors be at least 4 inches thick and should be reinforced with at least No. 3 bars spaced at 18 inches on center each way. The reinforcing bars should extend at least six inches into the foundations and should be supported by chairs and be positioned in the center of the slab. The owner and the project structural engineer should determine if the on-grade slabs need to be designed for special loading conditions. For such cases, a subgrade modulus of 150 pounds per cubic inch can be assumed for the subgrade provided it is prepared as recommended in this report.

UNDER-SLAB VAPOR RETARDERS: Where floor coverings are installed, steps should be taken to minimize the transmission of moisture vapor from the subsoil through the interior slabs where it can potentially damage the interior floor coverings. We recommend that the owner/contractor follow national standards for the installation of vapor retarders below interior slabs as presented in currently published standards including ACI 302, "Guide to Concrete Floor and Slab Construction" and ASTM E1643, "Standard Practice for Installation of Water Vapor Retarder Used in Contact with Earth or Granular Fill Under Concrete Slabs".

EXTERIOR CONCRETE FLATWORK: Exterior concrete slabs on grade not subject to vehicular loads should have a minimum thickness of 4 inches. All slabs should be provided with weakened plane joints in accordance with the American Concrete Institute (ACI) guidelines. Special attention should be paid to the method of concrete curing to reduce the potential for excessive shrinkage cracking. It should be recognized that minor cracks occur normally in concrete slabs due to shrinkage. Some shrinkage cracks should be expected and are not necessarily an indication of excessive movement or structural distress.

EARTH RETAINING WALLS

FOUNDATIONS: Foundations for retaining walls can be designed in accordance with the foundation recommendations previously presented.

EQUIVALENT FLUID PRESSURES: The active soil pressure for the design of unrestrained earth retaining structures with level backfill surface may be assumed to be equivalent to the pressure of a fluid weighing 30 pounds per cubic foot. An additional 15 pounds per cubic foot can be added to the above value for 2:1 (H:V) sloping backfill. Thirty percent of any area surcharge placed adjacent to the retaining wall may be assumed to act as a uniform horizontal pressure against the wall. Where vehicles will be allowed within ten feet of the retaining wall, a uniform horizontal pressure of 100 pounds per square foot should be added to the upper 10 feet of the retaining wall to account for the effects of adjacent traffic. Special cases such as a combination of shored and sloping temporary slopes, or other surcharge loads not described above, may require an increase in the design values recommended above. These conditions should be evaluated by the project geotechnical engineer on a case-by-case basis. If any other loads are anticipated, the Geotechnical Consultant should be contacted for the necessary increase in soil pressure. All values are based on a drained backfill condition.

If it is necessary to consider seismic pressure, it may be assumed to be equivalent to the pressure of a fluid weighing 8 pounds per cubic foot.

PASSIVE PRESSURE: The passive pressure for the anticipated foundation soils may be considered to be 350 pounds per square foot per foot of depth. The upper foot of embedment should be neglected when calculating passive pressures, unless the foundation abuts a hard surface such as a concrete slab. The passive pressure may be increased by one-third for seismic loading. The coefficient of friction for concrete to soil may be assumed to be 0.35 for the resistance to lateral movement. When combining frictional and passive resistance, the friction should be reduced by one-third.

WATERPROOFING AND SUBDRAINS: The project architect should provide (or coordinate) waterproofing details for the retaining walls. The design values presented above are based on a drained backfill condition and do not consider hydrostatic pressures. Unless hydrostatic pressures are incorporated into the design, the retaining wall designer should provide a subdrain detail. A typical retaining wall subdrain detail is presented as Plate No. 5 of this report. Additionally, outlet points for the retaining wall subdrains should be coordinated by the project civil engineer.

BACKFILL: All retaining wall backfill should be compacted to at least 90 percent relative compaction. It is anticipated that the on-site soils are suitable for use as backfill material provided the design parameters given herein are used in the wall design. Wall backfill material should be free of rocks or lumps of soil in excess of three inches in maximum dimension. Retaining walls should not be backfilled until the masonry/concrete has reached an adequate strength.

PRELIMINARY PAVEMENT SECTIONS

GENERAL: We expect that new asphalt concrete (AC) pavement and/or concrete (PCC) will be installed for the new private access roads. The pavement sections provided below should be considered preliminary and should be used for planning purposes only. Final pavement designs should be determined after R-value tests have been performed in the actual subgrade material in place after grading. Presuming the grading recommendations presented previously are followed, we estimate that the subgrade soils will have an R-Value of at least 25. The Traffic Index and Traffic Categories shown below are assumed. The project client and/or civil engineer should determine whether these assumed values are appropriate for the traffic conditions. Remedial grading for the roads and other paved areas should be performed in accordance the "Remedial Grading" section of this report.

ASPHALT CONCRETE PAVEMENTS: We expect that the private driveways will primarily support passenger vehicles, with heavily loaded vehicles such as garbage trucks and delivery vans on average three times per day. The asphalt concrete pavement section was calculated using the Caltrans design method using an assumed Traffic Index of 5.5.

TABLE III: ASPHALT CONCRETE PAVEMENT SECTIONS

Pavement Type	Traffic Index	Pavement[1] Thickness	Base Thickness	Base Material	Subgrade Compaction
Asphalt Concrete	5.5	3.0 in.	8.0 in.	CAB or Class II	95% in upper 12"

1. Add ½ inch of AC for each 1 percent increase in grade over 10 percent. As an alternative use concrete pavement.

Prior to placing the base material beneath asphalt concrete pavements, the subgrade soil should be scarified to a depth of 12 inches and compacted to at least 95 percent of its maximum dry density at a moisture content near optimum.

The base material could consist of Crushed Aggregate Base (CAB) or Class II Aggregate Base. The Crushed Aggregate Base should conform to the requirements set forth in Section 200-2.2 of the Standard

Specifications for Public Works Construction. The Class II Aggregate Base should conform to requirements set forth in Section 26-1.02A of the Standard Specifications for California Department of Transportation. Asphalt concrete should be placed in accordance with 'Standard Specifications for Public Works Construction (Greenbook), Section 302-5. Asphalt concrete pavement should be compacted to at least 95 % of Hveem density.

CONCRETE PAVEMENTS: Portland cement concrete (PCC) pavement should have a minimum thickness of 6 inches. The PCC pavement section was determined in general accordance with the procedure recommended within the American Concrete Institute report ACI-330R-08 Guide for Design and Construction of Concrete Parking Lots. We recommend that the referenced ACI-330R Guide be used to determine the appropriate requirements for control joint configuration, reinforcing, and dowelling of the construction joints. Portland Cement Concrete pavement placed in front of trash enclosures should be reinforced with at least No. 4 bars placed at 12 inches on center each way.

Prior to placing concrete pavement, the subgrade soils should be scarified to a depth of 12 inches and compacted to at least 95 percent of their maximum dry density at a moisture content one to three percent above optimum. Concrete pavement construction should comply with the requirements set forth in Sections 201-1.1.2 and 302-6 of the Standard Specifications for Public Works Construction (concrete Class 560-C-3250).

The outside edge of concrete slabs that will support wheel loads should have a thickened edge or integral curb. The thickened edge should be at least 2 inches thicker than the slab and should taper back to the recommended slab thickness 3 feet from the edge of the slab.

LIMITATIONS

REVIEW, OBSERVATION AND TESTING

The recommendations presented in this report are contingent upon our review of final plans and specifications. Such plans and specifications should be made available to the geotechnical engineer and engineering geologist so that they may review and verify their compliance with this report and with the California Building Code.
It is recommended that Christian Wheeler Engineering be retained to provide continuous soil engineering services during the earthwork operations. This is to verify compliance with the design concepts, specifications or recommendations and to allow design changes in the event that subsurface conditions differ from those anticipated prior to start of construction.

UNIFORMITY OF CONDITIONS

The recommendations and opinions expressed in this report reflect our best estimate of the project requirements based on an evaluation of the subsurface soil conditions encountered at the subsurface exploration locations and on the assumption that the soil conditions do not deviate appreciably from those encountered. It should be recognized that the performance of the foundations and/or cut and fill slopes may be influenced by undisclosed or unforeseen variations in the soil conditions that may occur in the intermediate and unexplored areas. Any unusual conditions not covered in this report that may be encountered during site development should be brought to the attention of the geotechnical engineer so that he may make modifications if necessary.

CHANGE IN SCOPE

This office should be advised of any changes in the project scope or proposed site grading so that we may determine if the recommendations contained herein are appropriate. This should be verified in writing or modified by a written addendum.

TIME LIMITATIONS

The findings of this report are valid as of this date. Changes in the condition of a property can, however, occur with the passage of time, whether they be due to natural processes or the work of man on this or adjacent properties. In addition, changes in the Standards-of-Practice and/or Government Codes may occur. Due to such changes, the findings of this report may be invalidated wholly or in part by changes beyond our control. Therefore, this report should not be relied upon after a period of two years without a review by us verifying the suitability of the conclusions and recommendations.

PROFESSIONAL STANDARD

In the performance of our professional services, we comply with that level of care and skill ordinarily exercised by members of our profession currently practicing under similar conditions and in the same locality. The client recognizes that subsurface conditions may vary from those encountered at the locations where our test pits, surveys, and explorations are made, and that our data, interpretations, and recommendations be based solely on the information obtained by us. We will be responsible for those data, interpretations, and recommendations, but shall not be responsible for the interpretations by others of the information developed. Our services consist of professional consultation and observation only, and no warranty of any kind whatsoever, express or implied, is

made or intended in connection with the work performed or to be performed by us, or by our proposal for consulting or other services, or by our furnishing of oral or written reports or findings.

CLIENT'S RESPONSIBILITY

It is the client's responsibility, or its representatives, to ensure that the information and recommendations contained herein are brought to the attention of the structural engineer and architect for the project and incorporated into the project's plans and specifications. It is further their responsibility to take the necessary measures to ensure that the contractor and his subcontractors carry out such recommendations during construction.

FIELD EXPLORATIONS

Nineteen subsurface explorations were made during our investigation at the locations indicated on the Site Plan and Geotechnical Map included herewith as Plate No. 1. These explorations consisted of small-diameter, hollow stem borings drilled using an Ingersol-Rand A300 truck-mounted drill rig and test trenches excavated using a Caterpillar 430F backhoe on October 2 and 21, 2024, respectively. The fieldwork was conducted under the observation and direction of our engineering geology personnel.

The borings were carefully logged when made. The boring logs are presented in the attached Appendix A. The soils are described in accordance with the Unified Soils Classification. In addition, a verbal textural description, the wet color, the apparent moisture and the density or consistency are provided. The density of granular soils is given as either very loose, loose, medium dense, dense or very dense. The consistency of silts or clays is given as either very soft, soft, medium stiff, stiff, very stiff, or hard. Undisturbed samples of typical and representative soils were obtained and returned to the laboratory for testing. The undisturbed samples were obtained by driving a 2 ⅜-inch inside diameter split-tube sampler ahead of the auger using a 140-pound weight free-falling a distance of 30 inches. The number of blows required to drive the sampler each foot was recorded and this value is presented on the attached boring logs as "Penetration Resistance." Bulk samples of disturbed soil were also collected in bags from the auger cuttings during the advancement of the borings and transported to the laboratory for testing.

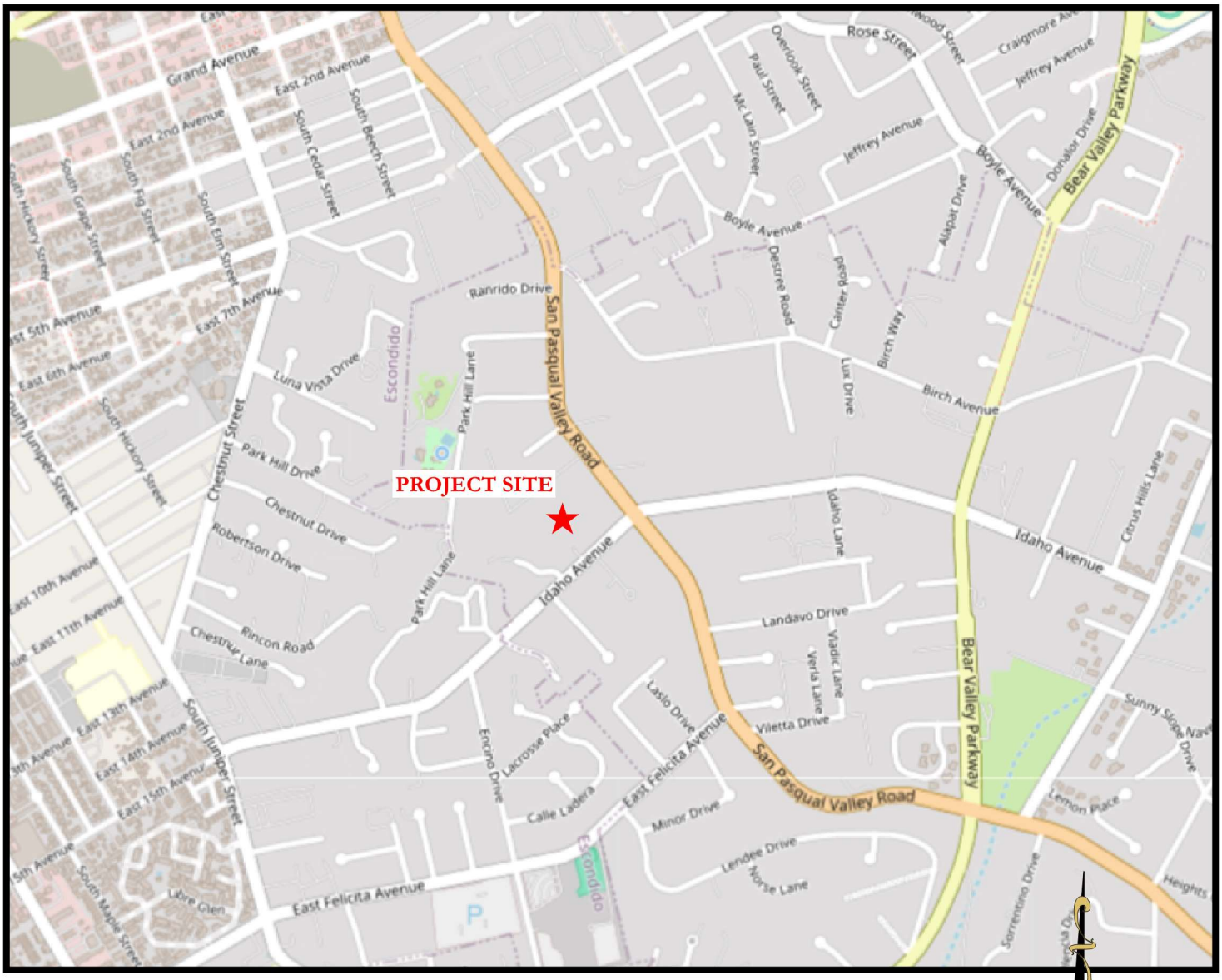
The trenches were carefully logged when made. The trench logs are presented in the attached Appendix A. The soils are described in accordance with the Unified Soils Classification System. In addition, a verbal textural description, the wet color, the apparent moisture and the density or consistency are provided. The density of granular soils is given as either very loose, loose, medium dense, dense or very dense. The consistency of silts or

clays is given as either very soft, soft, medium stiff, stiff, very stiff, or hard. Undisturbed "chunk" samples of typical and representative soils were obtained and returned to the laboratory for testing. Bulk samples of disturbed soil were also collected in bags from the excavation and transported to the laboratory for testing.

LABORATORY TESTING

Laboratory tests were performed in accordance with the generally accepted American Society for Testing and Materials (ASTM) test methods or suggested procedures. A brief description of the tests performed and the subsequent results are presented in Appendix B.

SITE VICINITY



PASQUAL HEIGHTS SUBDIVISION 830 IDAHO AVENUE ESCONDIDO, CALIFORNIA	
DATE: OCTOBER 2024	REPORT NO.: 2240339.01
BY: SD	FIGURE NO.: 1

CHRISTIAN WHEELER ENGINEERING

TOUCHSTONE DEVELOPMENT

CWE LEGEND

B-6	APPROXIMATE BORING LOCATION
T-13	APPROXIMATE TEST TRENCH LOCATION
Qyal / Qoal / Kgr	YOUNGER ALLUVIUM over OLDER ALLUVIUM over WEATHERED GRANITICS
Qoal / Kgr	OLDER ALLUVIUM over WEATHERED GRANITICS
Qcol / Kgr	COLLUVIUM over WEATHERED GRANITICS
	ESTIMATED GEOLOGIC CONTACT
	APPROXIMATE SEISMIC TRAVERSE LOCATION
	GEOLOGIC CROSS-SECTION

Note: Shallow Surficial Fills Not Mapped

W-E

0 100 200

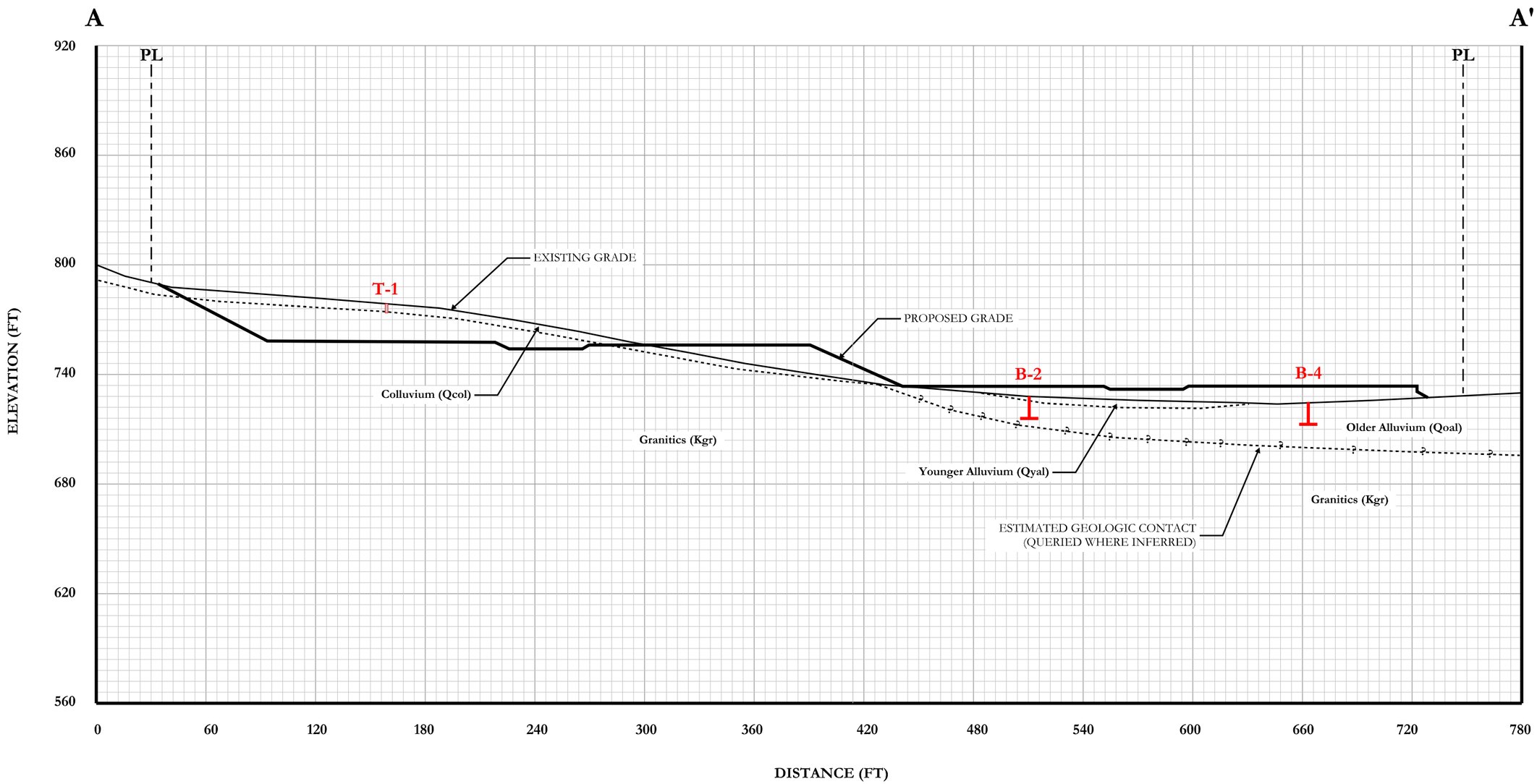
SCALE: 1" = 100'

SITE PLAN AND GEOTECHNICAL MAP

PASQUAL HEIGHTS SUBDIVISION
830 IDAHO AVENUE
ESCONDIDO, CALIFORNIA

DATE: OCTOBER 2024	REPORT NO.: 2240339.01
BY: SCC	PLATE NO.: 1

CHRISTIAN WHEELER ENGINEERING



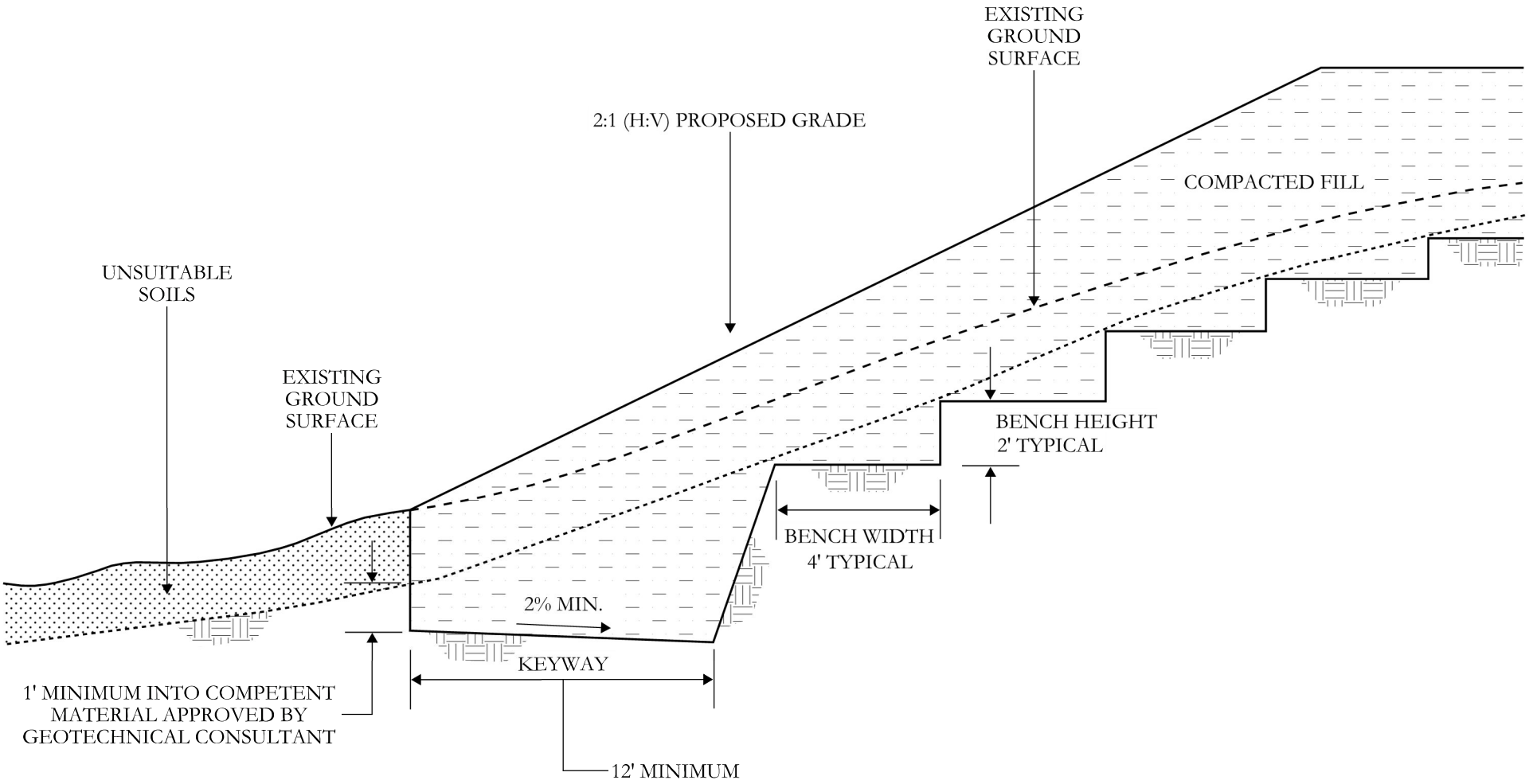
SCALE: 1" = 60'

GEOLOGIC CROSS-SECTION A-A'

PASQUAL HEIGHTS SUBDIVISION
830 IDAHO AVENUE
ESCONDIDO, CALIFORNIA

DATE: OCTOBER 2024	REPORT NO.: 2240339.01
BY: SCC	PLATE NO.: 2

CHRISTIAN WHEELER
ENGINEERING



NO SCALE

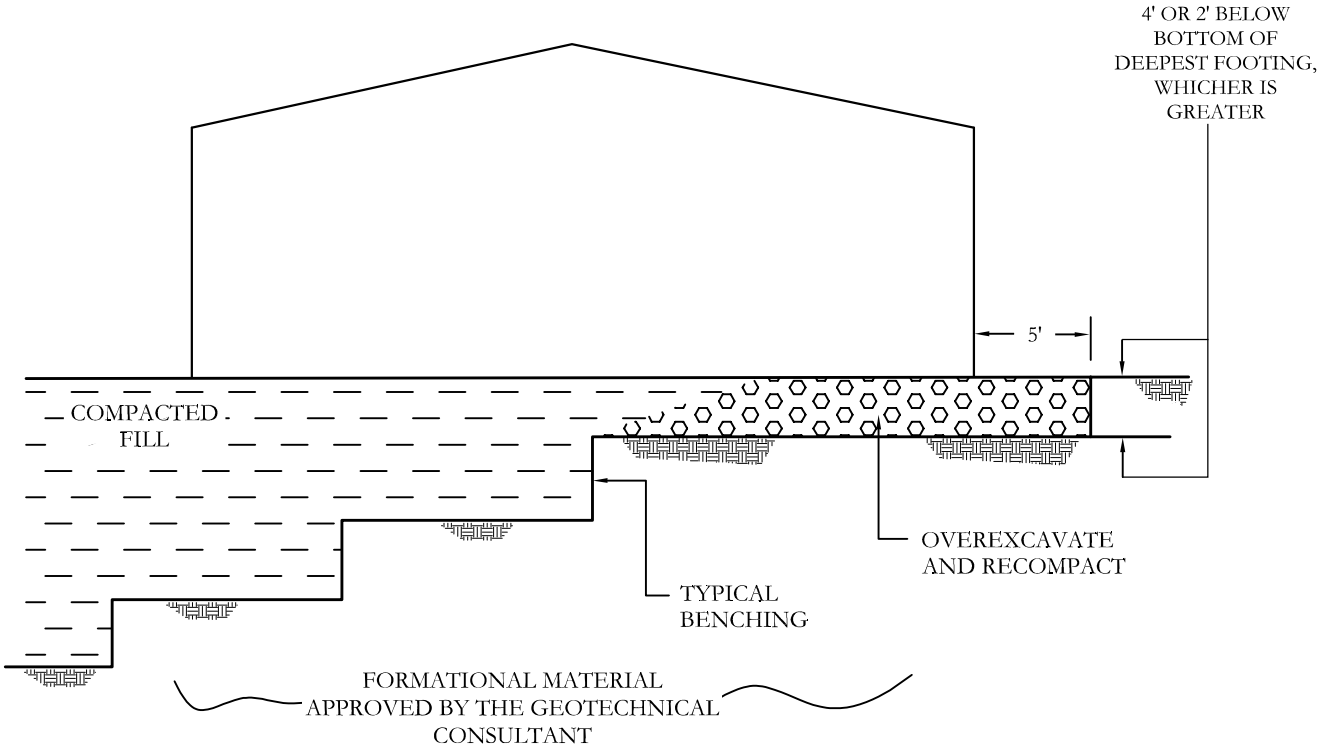
FILL SLOPE KEYWAY DETAIL

PASQUAL HEIGHTS SUBDIVISION
830 IDAHO AVENUE
ESCONDIDO, CALIFORNIA

DATE: OCTOBER 2024	REPORT NO.: 2240339.01
BY: SCC	PLATE NO.: 3

CHRISTIAN WHEELER
ENGINEERING

CUT-FILL TRANSITION LOT OVEREXCAVATION



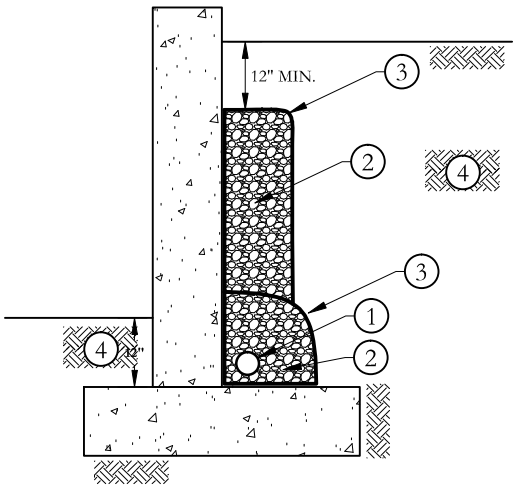
NO SCALE

PAD UNDERCUT DETAIL

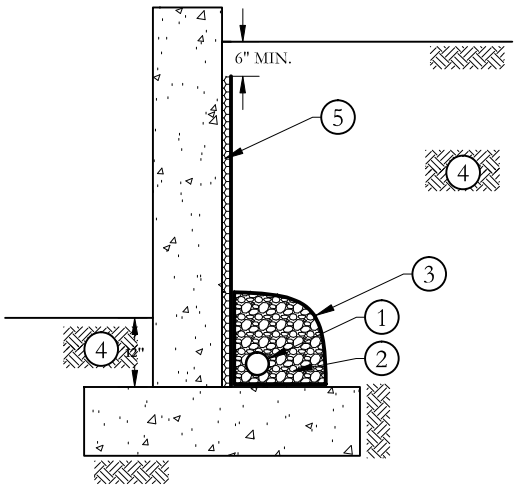
PASQUAL HEIGHTS SUBDIVISION
830 IDAHO AVENUE
ESCONDIDO, CALIFORNIA

DATE: OCTOBER 2024	REPORT NO.: 2240339.01
BY: SCC	PLATE NO.: 4

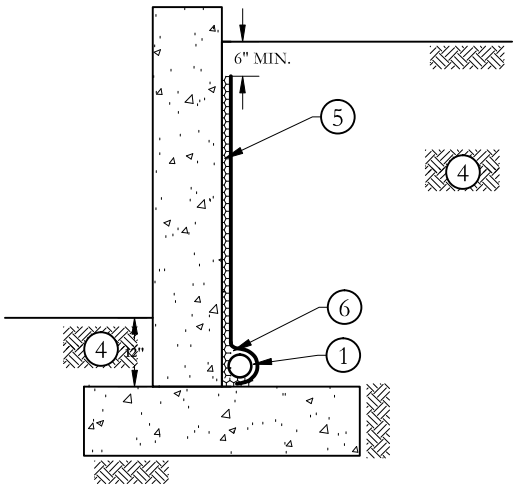
CHRISTIAN WHEELER
ENGINEERING



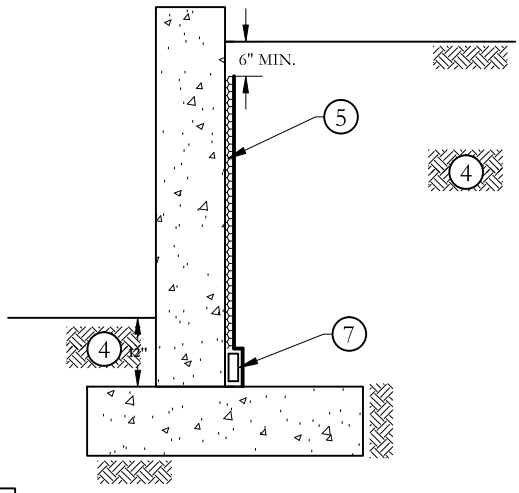
1 DETAIL



2 DETAIL



3 DETAIL



4 DETAIL

NOTES AND DETAILS

GENERAL NOTES:

1) THE NEED FOR WATERPROOFING SHOULD BE EVALUATED BY OTHERS.
2) WATERPROOFING TO BE DESIGNED BY OTHERS (CWE CAN PROVIDE A DESIGN IF REQUESTED).
3) EXTEND DRAIN TO SUITABLE DISCHARGE POINT PER CIVIL ENGINEER.
4) DO NOT CONNECT SURFACE DRAINS TO SUBDRAIN SYSTEM.

DETAILS:

1. 4-INCH PERFORATED PVC PIPE ON TOP OF FOOTING, HOLES POSITIONED DOWNWARD (SDR 35, SCHEDULE 40, OR EQUIVALENT).
2. ¾ INCH OPEN-GRADED CRUSHED AGGREGATE.
3. GEOFARBRIC WRAPPED COMPLETELY AROUND ROCK.
4. PROPERLY COMPACTED BACKFILL SOIL.
5. WALL DRAINAGE PANELS (MIRADRAIN OR EQUIVALENT) PLACED PER MANUFACTURER'S REC'S.
6. UNDERLAY SUBDRAIN WITH AND CUT FABRIC BACK FROM DRAINAGE PANELS AND WRAP FABRIC AROUND PIPE.
7. COLLECTION DRAIN (TOTAL DRAIN OR EQUIVALENT) LOCATED AT BASE OF WALL DRAINAGE PANEL PER MANUFACTURER'S RECOMMENDATIONS.

CANTILEVER RETAINING WALL DRAINAGE SYSTEMS

PASQUAL HEIGHTS SUBDIVISION
830 IDAHO AVENUE
ESCONDIDO, CALIFORNIA

DATE: OCTOBER 2024	REPORT NO.: 2240339.01
BY: SCC	PLATE NO.: 5

CHRISTIAN WHEELER ENGINEERING

Appendix A

Boring and Trench Logs

LOG OF TEST BORING B-1

Date Logged:	10/2/24	Equipment:	IR A-300
Logged By:	DJF	Auger Type:	8" hollow stem
Existing Elevation:	728'	Drive Type:	140lbs/30" drop
Finish Elevation:	738.3'	Depth to Water:	N/A

Sample Type and Laboratory Test Legend

Cal	Modified California Sampler	CK	Chunk
SPT	Standard Penetration Test	DR	Drive Ring
ST	Shelby Tube		
MD	Max Density	DS	Direct Shear
SO_4	Soluble Sulfates	Con	Consolidation
SA	Sieve Analysis	EI	Expansion Index
HA	Hydrometer	R-Val	Resistance Value
SE	Sand Equivalent	Chl	Soluble Chlorides
PI	Plasticity Index	Res	pH & Resistivity
CP	Collapse Potential	SD	Sample Density

DEPTH (ft)	USCS SYMBOL	SUMMARY OF SUBSURFACE CONDITIONS (based on Unified Soil Classification System)	PENETRATION (blows per foot)	SAMPLE TYPE	BULK	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	RELATIVE COMPACTION (%)	LABORATORY TESTS
1	SM	**Artificial Fill (Qaf):** Grayish-brown, dry, loose, very fine - to coarse-grained, SILTY SAND with gravel.							
2	SM	**Older Alluvium (Qoal):** Reddish-brown, dry, very dense, very fine- to coarse-grained, SILTY SAND.	69	Cal					
3									
4		Damp.							
5	SC	Reddish-brown, moist, very dense, very fine- to coarse-grained, CLAYEY SAND.	50/5"	Cal					
6									
7									
8									
9									
10			50/5"	Cal					
11									
12									
13									
14		Moist to very moist, very dense, increase in moisture and grayish mottling.							
15			76	Cal					
16									
17									
18	SM	Reddish-brown, moist to very moist, dense, very fine- to coarse-grained, SILTY SAND with grayish mottling.							
19			57	Cal					
20		Terminated at 19.5 feet. No groundwater or seepage encountered.							
21									
22									
23									
24									

Notes:

Symbol Legend

- ▽ Groundwater Level During Drilling
- ▼ Groundwater Level After Drilling
- ⁘ Apparent Seepage
- * No Sample Recovery
- ** Non-representative Blow Count (rocks present)

PROPOSED PASQUAL HEIGHTS SUBDIVISION
830 IDAHO AVENUE
ESCONDIDO, CALIFORNIA

DATE:	OCTOBER 2024	JOB NO.:	2240339.01
BY:	SD	APPENDIX:	A-1

CHRISTIAN WHEELER ENGINEERING

LOG OF TEST BORING B-2

Date Logged:	10/2/24	Equipment:	IR A-300
Logged By:	DJF	Auger Type:	8" hollow stem
Existing Elevation:	730'	Drive Type:	140lbs/30" drop
Finish Elevation:	734'	Depth to Water:	N/A

Sample Type and Laboratory Test Legend

Cal	Modified California Sampler	CK	Chunk
SPT	Standard Penetration Test	DR	Drive Ring
ST	Shelby Tube		
MD	Max Density	DS	Direct Shear
SO_4	Soluble Sulfates	Con	Consolidation
SA	Sieve Analysis	EI	Expansion Index
HA	Hydrometer	R-Val	Resistance Value
SE	Sand Equivalent	Chl	Soluble Chlorides
PI	Plasticity Index	Res	pH & Resistivity
CP	Collapse Potential	SD	Sample Density

DEPTH (ft)	ELEVATION (ft)	GRAPHIC LOG	USCS SYMBOL	SUMMARY OF SUBSURFACE CONDITIONS (based on Unified Soil Classification System)	PENETRATION (blows per foot)	SAMPLE TYPE	BULK	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	RELATIVE COMPACTION (%)	LABORATORY TESTS
1			SM	**Younger Alluvium (Qyal):** Reddish-brown, dry, loose, very fine- to coarse-grained, SILTY SAND, porous.							SA
2				Medium dense.							MD SO4
3					20	Cal					Chl Res DS
4											
5			SC	**Older Alluvium (Qoal):** Reddish-brown, moist, dense to very dense, very fine- to coarse-grained, CLAYEY SAND.							
6											
7					50	Cal					
8											
9											
10											
11					50/4"	Cal					
12				Terminated at 11.5 feet. No groundwater or seepage encountered.							
13											
14											
15											
16											
17											
18											
19											
20											
21											
22											
23											
24											

Notes:

Symbol Legend

- ▽ Groundwater Level During Drilling
- ▼ Groundwater Level After Drilling
- ⁘ Apparent Seepage
- * No Sample Recovery
- ** Non-representative Blow Count (rocks present)

PROPOSED PASQUAL HEIGHTS SUBDIVISION
830 IDAHO AVENUE
ESCONDIDO, CALIFORNIA

DATE:	OCTOBER 2024	JOB NO.:	2240339.01
BY:	SD	APPENDIX:	A-2

CHRISTIAN WHEELER ENGINEERING

LOG OF TEST BORING B-3

Date Logged:	10/2/24	Equipment:	IR A-300
Logged By:	DJF	Auger Type:	8" hollow stem
Existing Elevation:	774'	Drive Type:	140lbs/30" drop
Finish Elevation:	762.5'	Depth to Water:	N/A

Sample Type and Laboratory Test Legend

Cal	Modified California Sampler	CK	Chunk
SPT	Standard Penetration Test	DR	Drive Ring
ST	Shelby Tube		
MD	Max Density	DS	Direct Shear
SO_4	Soluble Sulfates	Con	Consolidation
SA	Sieve Analysis	EI	Expansion Index
HA	Hydrometer	R-Val	Resistance Value
SE	Sand Equivalent	Chl	Soluble Chlorides
PI	Plasticity Index	Res	pH & Resistivity
CP	Collapse Potential	SD	Sample Density

DEPTH (ft)	ELEVATION (ft)	GRAPHIC LOG	USCS SYMBOL	SUMMARY OF SUBSURFACE CONDITIONS (based on Unified Soil Classification System)	PENETRATION (blows per foot)	SAMPLE TYPE	BULK	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	RELATIVE COMPACTION (%)	LABORATORY TESTS
1			SM	**Topsoil/Colluvium (Qcol):** Reddish-brown, dry, loose, very fine- to coarse-grained, SILTY SAND, upper 12" contains abundant animal burrows.							SA
2				Very dense.	50/5"	Cal					
3											
4			SM	**Weathered Granitics (Kgr):** Olive brown to light gray, dry, very dense, very fine- to coarse-grained, SILTY SAND.							
5				Unweathered Kgr boulders near boring up to ±5' in diameter.							
6					50/4"	Cal					
7											
8											
9											
10											SA MD SO4
11											Chl
12											Res DS
13											
14											
15											
16				Terminated at 15 feet. No groundwater or seepage encountered.							
17											
18											
19											
20											
21											
22											
23											
24											

Notes:

Symbol Legend

- ▽ Groundwater Level During Drilling
- ▼ Groundwater Level After Drilling
- ⁘ Apparent Seepage
- * No Sample Recovery
- ** Non-representative Blow Count (rocks present)

PROPOSED PASQUAL HEIGHTS SUBDIVISION
830 IDAHO AVENUE
ESCONDIDO, CALIFORNIA

DATE:	OCTOBER 2024	JOB NO.:	2240339.01
BY:	SD	APPENDIX:	A-3

CHRISTIAN WHEELER ENGINEERING

LOG OF TEST BORING B-4

Date Logged:	10/2/24	Equipment:	IR A-300
Logged By:	DJF	Auger Type:	8" hollow stem
Existing Elevation:	722'	Drive Type:	140lbs/30" drop
Finish Elevation:	730'	Depth to Water:	N/A

Sample Type and Laboratory Test Legend

Cal	Modified California Sampler	CK	Chunk
SPT	Standard Penetration Test	DR	Drive Ring
ST	Shelby Tube		
MD	Max Density	DS	Direct Shear
SO_4	Soluble Sulfates	Con	Consolidation
SA	Sieve Analysis	EI	Expansion Index
HA	Hydrometer	R-Val	Resistance Value
SE	Sand Equivalent	Chl	Soluble Chlorides
PI	Plasticity Index	Res	pH & Resistivity
CP	Collapse Potential	SD	Sample Density

DEPTH (ft)	ELEVATION (ft)	GRAPHIC LOG	USCS SYMBOL	SUMMARY OF SUBSURFACE CONDITIONS (based on Unified Soil Classification System)	PENETRATION (blows per foot)	SAMPLE TYPE	BULK	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	RELATIVE COMPACTION (%)	LABORATORY TESTS
1			SM	**Artificial Fill (Qaf):** Grayish-brown, dry, loose, very fine- to coarse-grained, SILTY SAND with gravels.							
2			SM	**Older Alluvium (Qoal):** Reddish-brown, damp, very dense, very fine - to coarse-grained, SILTY SAND.	50/5"	Cal					
3											
4											
5					83	Cal					
6			SC	Reddish-brown, moist, very dense, very fine- to coarse-grained, CLAYEY SAND.							
7											
8											
9											
10											
11					50/3"	Cal					
12				Terminated at 11 feet. No groundwater or seepage encountered.							
13											
14											
15											
16											
17											
18											
19											
20											
21											
22											
23											
24											

Notes:

Symbol Legend

- ▽ Groundwater Level During Drilling
- ▼ Groundwater Level After Drilling
- ⁘ Apparent Seepage
- * No Sample Recovery
- ** Non-representative Blow Count (rocks present)

PROPOSED PASQUAL HEIGHTS SUBDIVISION
830 IDAHO AVENUE
ESCONDIDO, CALIFORNIA

DATE:	OCTOBER 2024	JOB NO.:	2240339.01
BY:	SD	APPENDIX:	A-4

CHRISTIAN WHEELER ENGINEERING

LOG OF TEST BORING B-5

Date Logged:	10/2/24	Equipment:	IR A-300
Logged By:	DJF	Auger Type:	8" hollow stem
Existing Elevation:	724'	Drive Type:	140lbs/30" drop
Finish Elevation:	726.5'	Depth to Water:	N/A

Sample Type and Laboratory Test Legend

Cal	Modified California Sampler	CK	Chunk
SPT	Standard Penetration Test	DR	Drive Ring
ST	Shelby Tube		
MD	Max Density	DS	Direct Shear
SO_4	Soluble Sulfates	Con	Consolidation
SA	Sieve Analysis	EI	Expansion Index
HA	Hydrometer	R-Val	Resistance Value
SE	Sand Equivalent	Chl	Soluble Chlorides
PI	Plasticity Index	Res	pH & Resistivity
CP	Collapse Potential	SD	Sample Density

DEPTH (ft)	ELEVATION (ft)	GRAPHIC LOG	USCS SYMBOL	SUMMARY OF SUBSURFACE CONDITIONS (based on Unified Soil Classification System)	PENETRATION (blows per foot)	SAMPLE TYPE	BULK	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	RELATIVE COMPACTION (%)	LABORATORY TESTS
1			SM	**Older Alluvium (Qoal):** Reddish-brown, dry, loose, very fine- to coarse-grained, SILTY SAND with animal burrows in upper 12".							
2				Becomes dense to very dense.	50/3"	Cal					
3											
4			SM	**Weathered Granitics (Kgr):** Olive brown to light gray, dry, very dense, very fine- to coarse-grained, SILTY SAND.	50/5"	Cal					
5											
6				Terminated at 6 feet. No groundwater or seepage encountered.							
7											
8											
9											
10											
11											
12											
13											
14											
15											
16											
17											
18											
19											
20											
21											
22											
23											
24											

Notes:

Symbol Legend

- ▽ Groundwater Level During Drilling
- ▼ Groundwater Level After Drilling
- ⁘ Apparent Seepage
- * No Sample Recovery
- ** Non-representative Blow Count (rocks present)

PROPOSED PASQUAL HEIGHTS SUBDIVISION
830 IDAHO AVENUE
ESCONDIDO, CALIFORNIA

DATE:	OCTOBER 2024	JOB NO.:	2240339.01
BY:	SD	APPENDIX:	A-5

CHRISTIAN WHEELER ENGINEERING

LOG OF TEST BORING B-6

Date Logged:	10/2/24	Equipment:	IR A-300
Logged By:	DJF	Auger Type:	8" hollow stem
Existing Elevation:	712'	Drive Type:	140lbs/30" drop
Finish Elevation:	724.4'	Depth to Water:	N/A

Sample Type and Laboratory Test Legend

Cal	Modified California Sampler	CK	Chunk
SPT	Standard Penetration Test	DR	Drive Ring
ST	Shelby Tube		
MD	Max Density	DS	Direct Shear
SO_4	Soluble Sulfates	Con	Consolidation
SA	Sieve Analysis	EI	Expansion Index
HA	Hydrometer	R-Val	Resistance Value
SE	Sand Equivalent	Chl	Soluble Chlorides
PI	Plasticity Index	Res	pH & Resistivity
CP	Collapse Potential	SD	Sample Density

DEPTH (ft)	ELEVATION (ft)	GRAPHIC LOG	USCS SYMBOL	SUMMARY OF SUBSURFACE CONDITIONS (based on Unified Soil Classification System)	PENETRATION (blows per foot)	SAMPLE TYPE	BULK	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	RELATIVE COMPACTION (%)	LABORATORY TESTS
1			SM	**Artificial Fill (Qaf):** Grayish-brown, dry, loose, very fine- to coarse-grained, SILTY SAND.							
2			SM	**Younger Alluvium (Qyal):** Reddish-brown, dry, medium dense, very fine- to coarse-grained, SILTY SAND.							
3					29	Cal					
4											
5				Damp.	26	Cal		7.1	118.7		CP
6											
7											
8			SC	**Older Alluvium (Qoal):** Reddish-brown, moist, dense, very fine- to coarse-grained, CLAYEY SAND.							
9											
10					57	Cal					
11											
12											
13											
14					50/5"	Cal					
15				Terminated at 14.5 feet. No groundwater or seepage encountered.							
16											
17											
18											
19											
20											
21											
22											
23											
24											

Notes:

Symbol Legend

- ▽ Groundwater Level During Drilling
- ▼ Groundwater Level After Drilling
- ⁘ Apparent Seepage
- * No Sample Recovery
- ** Non-representative Blow Count (rocks present)

PROPOSED PASQUAL HEIGHTS SUBDIVISION
830 IDAHO AVENUE
ESCONDIDO, CALIFORNIA

DATE:	OCTOBER 2024	JOB NO.:	2240339.01
BY:	SD	APPENDIX:	A-6

CHRISTIAN WHEELER ENGINEERING

LOG OF TEST TRENCH T-1

Date Logged:	10/21/24	Equipment:	CAT 480F Backhoe
Logged By:	JMM	Auger Type:	N/A
Existing Elevation:	774'	Drive Type:	N/A
Finish Elevation:	755.2'	Depth to Water:	N/A

Sample Type and Laboratory Test Legend

Cal	Modified California Sampler	CK	Chunk
SPT	Standard Penetration Test	DR	Drive Ring
ST	Shelby Tube		
MD	Max Density	DS	Direct Shear
SO_4	Soluble Sulfates	Con	Consolidation
SA	Sieve Analysis	EI	Expansion Index
HA	Hydrometer	R-Val	Resistance Value
SE	Sand Equivalent	Chl	Soluble Chlorides
PI	Plasticity Index	Res	pH & Resistivity
CP	Collapse Potential	SD	Sample Density

DEPTH (ft)	ELEVATION (ft)	GRAPHIC LOG	USCS SYMBOL	SUMMARY OF SUBSURFACE CONDITIONS (based on Unified Soil Classification System)	PENETRATION (blows per foot)	SAMPLE TYPE	BULK	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	RELATIVE COMPACTION (%)	LABORATORY TESTS
0.5			SM	**Topsoil/Colluvium (Qcol):** Brown to reddish-brown, damp, loose, SILTY SAND.		CK					
1				Upper 24" disturbed.							
1.5											
2											
2.5											
3											
3.5			SW-SM	**Weathered Granitics (Kgr):** Brown to yellowish-brown, damp, dense, well-graded SAND with SILT.							
4						CK					
4.5				Relatively fresh below 4.75'							
5				Refusal at 5 feet.							
5.5				No groundwater or seepage encountered.							
6											
6.5											
7											
7.5											
8											
8.5											
9											
9.5											
10											
10.5											
11											
11.5											
12											

Notes:

Symbol Legend

- ▽ Groundwater Level During Drilling
- ▼ Groundwater Level After Drilling
- ⁘ Apparent Seepage
- * No Sample Recovery
- ** Non-representative Blow Count (rocks present)

PROPOSED PASQUAL HEIGHTS SUBDIVISION
830 IDAHO AVENUE
ESCONDIDO, CALIFORNIA

DATE:	OCTOBER 2024	JOB NO.:	2240339.01
BY:	SD	APPENDIX:	A-7

CHRISTIAN WHEELER ENGINEERING

LOG OF TEST TRENCH T-2

Date Logged:	10/21/24	Equipment:	CAT 480F Backhoe
Logged By:	KMS/JMM	Auger Type:	N/A
Existing Elevation:	787'	Drive Type:	N/A
Finish Elevation:	768'	Depth to Water:	N/A

Sample Type and Laboratory Test Legend

Cal	Modified California Sampler	CK	Chunk
SPT	Standard Penetration Test	DR	Drive Ring
ST	Shelby Tube		
MD	Max Density	DS	Direct Shear
SO_4	Soluble Sulfates	Con	Consolidation
SA	Sieve Analysis	EI	Expansion Index
HA	Hydrometer	R-Val	Resistance Value
SE	Sand Equivalent	Chl	Soluble Chlorides
PI	Plasticity Index	Res	pH & Resistivity
CP	Collapse Potential	SD	Sample Density

DEPTH (ft)	ELEVATION (ft)	GRAPHIC LOG	USCS SYMBOL	SUMMARY OF SUBSURFACE CONDITIONS (based on Unified Soil Classification System)	PENETRATION (blows per foot)	SAMPLE TYPE	BULK	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	RELATIVE COMPACTION (%)	LABORATORY TESTS
0.5			SM	**Topsoil/Colluvium (Qcol):** Brown to reddish-brown, damp, loose, SILTY SAND.							
1						CK					
1.5				Upper 24" disturbed.							
2				Medium dense.							
2.5											
3											
3.5			SW-SM	**Weathered Granitics (Kgr):** Brown to yellowish-brown, dry to damp, dense, well-graded SAND with SILT.							
4											
4.5						CK					
5				Very dense, relatively fresh below 4.75'							
5.5				Refusal at 5 feet. No groundwater or seepage encountered.							
6											
6.5											
7											
7.5											
8											
8.5											
9											
9.5											
10											
10.5											
11											
11.5											
12											

Notes:

Symbol Legend

- ▽ Groundwater Level During Drilling
- ▼ Groundwater Level After Drilling
- ⁘ Apparent Seepage
- * No Sample Recovery
- ** Non-representative Blow Count (rocks present)

PROPOSED PASQUAL HEIGHTS SUBDIVISION
830 IDAHO AVENUE
ESCONDIDO, CALIFORNIA

DATE:	OCTOBER 2024	JOB NO.:	2240339.01
BY:	SD	APPENDIX:	A-8

CHRISTIAN WHEELER ENGINEERING

LOG OF TEST TRENCH T-3

Date Logged:	10/21/24	Equipment:	CAT 480F Backhoe
Logged By:	KMS/JMM	Auger Type:	N/A
Existing Elevation:	784'	Drive Type:	N/A
Finish Elevation:	772'	Depth to Water:	N/A

Sample Type and Laboratory Test Legend

Cal	Modified California Sampler	CK	Chunk
SPT	Standard Penetration Test	DR	Drive Ring
ST	Shelby Tube		
MD	Max Density	DS	Direct Shear
SO_4	Soluble Sulfates	Con	Consolidation
SA	Sieve Analysis	EI	Expansion Index
HA	Hydrometer	R-Val	Resistance Value
SE	Sand Equivalent	Chl	Soluble Chlorides
PI	Plasticity Index	Res	pH & Resistivity
CP	Collapse Potential	SD	Sample Density

DEPTH (ft)	ELEVATION (ft)	GRAPHIC LOG	USCS SYMBOL	SUMMARY OF SUBSURFACE CONDITIONS (based on Unified Soil Classification System)	PENETRATION (blows per foot)	SAMPLE TYPE	BULK	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	RELATIVE COMPACTION (%)	LABORATORY TESTS
0.5			SM	**Topsoil/Colluvium (Qcol):** Brown to reddish-brown, dry to damp, loose, SILTY SAND.							
1				Upper 24" disturbed.		CK					
1.5											
2											
2.5											
3			SC	Dark brown, damp to moist, medium dense, CLAYEY SAND.		CK					
3.5											
4			SW-SM	**Weathered Granitics (Kgr):** Brown to yellowish-brown, dry to damp, dense, well-graded SAND with SILT, relatively fresh below 4.25'.		CK					
4.5				Refusal at 4.5 feet. No groundwater or seepage encountered.							
5											
5.5											
6											
6.5											
7											
7.5											
8											
8.5											
9											
9.5											
10											
10.5											
11											
11.5											
12											

Notes:

Symbol Legend

- ▽ Groundwater Level During Drilling
- ▼ Groundwater Level After Drilling
- ⁘ Apparent Seepage
- * No Sample Recovery
- ** Non-representative Blow Count (rocks present)

PROPOSED PASQUAL HEIGHTS SUBDIVISION
830 IDAHO AVENUE
ESCONDIDO, CALIFORNIA

DATE:	OCTOBER 2024	JOB NO.:	2240339.01
BY:	SD	APPENDIX:	A-9

CHRISTIAN WHEELER ENGINEERING

LOG OF TEST TRENCH T-4

Date Logged:	10/21/24	Equipment:	CAT 480F Backhoe
Logged By:	KMS/JMM	Auger Type:	N/A
Existing Elevation:	761'	Drive Type:	N/A
Finish Elevation:	763'	Depth to Water:	N/A

Sample Type and Laboratory Test Legend

Cal	Modified California Sampler	CK	Chunk
SPT	Standard Penetration Test	DR	Drive Ring
ST	Shelby Tube		
MD	Max Density	DS	Direct Shear
SO_4	Soluble Sulfates	Con	Consolidation
SA	Sieve Analysis	EI	Expansion Index
HA	Hydrometer	R-Val	Resistance Value
SE	Sand Equivalent	Chl	Soluble Chlorides
PI	Plasticity Index	Res	pH & Resistivity
CP	Collapse Potential	SD	Sample Density

DEPTH (ft)	ELEVATION (ft)	GRAPHIC LOG	USCS SYMBOL	SUMMARY OF SUBSURFACE CONDITIONS (based on Unified Soil Classification System)	PENETRATION (blows per foot)	SAMPLE TYPE	BULK	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	RELATIVE COMPACTION (%)	LABORATORY TESTS
0.5			SM	**Topsoil/Colluvium (Qcol):** Brown to reddish-brown, damp, loose, SILTY SAND.							
1				Upper 24" disturbed.							
1.5											
2											
2.5											
3											
3.5											
4			SC	**Weathered Granitics (Kgr):** Dark brown, damp to moist, medium stiff, CLAYEY SAND.		CK					
4.5											
5											
5.5				Gradational contact.							
6			SW-SM	Brown to yellowish-brown, damp, dense, well-graded SAND with SILT.							
6.5											
7				Very dense, relatively fresh below 6.75'.							
7.5				Refusal at 7 feet. No groundwater or seepage encountered.							
8											
8.5											
9											
9.5											
10											
10.5											
11											
11.5											
12											

Notes:

Symbol Legend

- ▽ Groundwater Level During Drilling
- ▼ Groundwater Level After Drilling
- ⁘ Apparent Seepage
- * No Sample Recovery
- ** Non-representative Blow Count (rocks present)

PROPOSED PASQUAL HEIGHTS SUBDIVISION
830 IDAHO AVENUE
ESCONDIDO, CALIFORNIA

DATE:	OCTOBER 2024	JOB NO.:	2240339.01
BY:	SD	APPENDIX:	A-10

CHRISTIAN WHEELER ENGINEERING

LOG OF TEST TRENCH T-5

Date Logged:	10/21/24	Equipment:	CAT 480F Backhoe
Logged By:	KMS/JMM	Auger Type:	N/A
Existing Elevation:	760'	Drive Type:	N/A
Finish Elevation:	760'	Depth to Water:	N/A

Sample Type and Laboratory Test Legend

Cal	Modified California Sampler	CK	Chunk
SPT	Standard Penetration Test	DR	Drive Ring
ST	Shelby Tube		
MD	Max Density	DS	Direct Shear
SO_4	Soluble Sulfates	Con	Consolidation
SA	Sieve Analysis	EI	Expansion Index
HA	Hydrometer	R-Val	Resistance Value
SE	Sand Equivalent	Chl	Soluble Chlorides
PI	Plasticity Index	Res	pH & Resistivity
CP	Collapse Potential	SD	Sample Density

DEPTH (ft)	ELEVATION (ft)	GRAPHIC LOG	USCS SYMBOL	SUMMARY OF SUBSURFACE CONDITIONS (based on Unified Soil Classification System)	PENETRATION (blows per foot)	SAMPLE TYPE	BULK	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	RELATIVE COMPACTION (%)	LABORATORY TESTS
0.5			SM	**Topsoil/Colluvium (Qcol):** Brown to reddish-brown, damp, loose, SILTY SAND.							
1				Upper 24" disturbed.							
1.5											
2											
2.5											
3			SW-SM	**Weathered Granitics (Kgr):** Brown to yellowish-brown, damp, dense, well-graded SAND with SILT.							
3.5											
4											
4.5											
5											
5.5											
6											
6.5				Very dense, relatively fresh below 6.5'.							
7				Refusal at 7 feet. No groundwater or seepage encountered.							
7.5											
8											
8.5											
9											
9.5											
10											
10.5											
11											
11.5											
12											

Notes:

Symbol Legend

- ▽ Groundwater Level During Drilling
- ▼ Groundwater Level After Drilling
- ⁘ Apparent Seepage
- * No Sample Recovery
- ** Non-representative Blow Count (rocks present)

PROPOSED PASQUAL HEIGHTS SUBDIVISION
830 IDAHO AVENUE
ESCONDIDO, CALIFORNIA

DATE:	OCTOBER 2024	JOB NO.:	2240339.01
BY:	SD	APPENDIX:	A-11

CHRISTIAN WHEELER ENGINEERING

LOG OF TEST TRENCH T-6

Date Logged:	10/21/24	Equipment:	CAT 480F Backhoe
Logged By:	KMS/JMM	Auger Type:	N/A
Existing Elevation:	780'	Drive Type:	N/A
Finish Elevation:	766'	Depth to Water:	N/A

Sample Type and Laboratory Test Legend

Cal	Modified California Sampler	CK	Chunk
SPT	Standard Penetration Test	DR	Drive Ring
ST	Shelby Tube		
MD	Max Density	DS	Direct Shear
SO_4	Soluble Sulfates	Con	Consolidation
SA	Sieve Analysis	EI	Expansion Index
HA	Hydrometer	R-Val	Resistance Value
SE	Sand Equivalent	Chl	Soluble Chlorides
PI	Plasticity Index	Res	pH & Resistivity
CP	Collapse Potential	SD	Sample Density

DEPTH (ft)	ELEVATION (ft)	GRAPHIC LOG	USCS SYMBOL	SUMMARY OF SUBSURFACE CONDITIONS (based on Unified Soil Classification System)	PENETRATION (blows per foot)	SAMPLE TYPE	BULK	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	RELATIVE COMPACTION (%)	LABORATORY TESTS
0 – 3.5			SM	**Topsoil/Colluvium (Qcol):** Brown to reddish-brown, damp, loose, SILTY SAND. Upper 24" disturbed.							
3.5 – 5.5			SW-SM	**Weathered Granitics (Kgr):** Brown to yellowish-brown, dry to damp, dense, well-graded SAND with SILT. Very dense, relatively fresh below 5.25'.							
5.5 – 12				Refusal at 5.5 feet. No groundwater or seepage encountered.							

Notes:

Symbol Legend

- ▽ Groundwater Level During Drilling
- ▼ Groundwater Level After Drilling
- ⁘ Apparent Seepage
- * No Sample Recovery
- ** Non-representative Blow Count (rocks present)

PROPOSED PASQUAL HEIGHTS SUBDIVISION
830 IDAHO AVENUE
ESCONDIDO, CALIFORNIA

DATE:	OCTOBER 2024	JOB NO.:	2240339.01
BY:	SD	APPENDIX:	A-12

CHRISTIAN WHEELER ENGINEERING

LOG OF TEST TRENCH T-7

Date Logged:	10/21/24	Equipment:	CAT 480F Backhoe
Logged By:	KMS/JMM	Auger Type:	N/A
Existing Elevation:	746'	Drive Type:	N/A
Finish Elevation:	737.5'	Depth to Water:	N/A

Sample Type and Laboratory Test Legend

Cal	Modified California Sampler	CK	Chunk
SPT	Standard Penetration Test	DR	Drive Ring
ST	Shelby Tube		
MD	Max Density	DS	Direct Shear
SO_4	Soluble Sulfates	Con	Consolidation
SA	Sieve Analysis	EI	Expansion Index
HA	Hydrometer	R-Val	Resistance Value
SE	Sand Equivalent	Chl	Soluble Chlorides
PI	Plasticity Index	Res	pH & Resistivity
CP	Collapse Potential	SD	Sample Density

DEPTH (ft)	ELEVATION (ft)	GRAPHIC LOG	USCS SYMBOL	SUMMARY OF SUBSURFACE CONDITIONS (based on Unified Soil Classification System)	PENETRATION (blows per foot)	SAMPLE TYPE	BULK	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	RELATIVE COMPACTION (%)	LABORATORY TESTS
0			SM	**Topsoil/Colluvium (Qcol):** Brown to reddish-brown, damp, loose, SILTY SAND.							
0.5				Upper 24" disturbed.							
1											
1.5											
2											
2.5											
3											
3.5											
4			SW-SM	**Weathered Granitics (Kgr):** Brown to yellowish-brown, damp, dense, well-graded SAND with SILT.							
4.5											
5											
5.5											
6											
6.5				Very dense, relatively fresh below 6.75'.							
7				Refusal at 7 feet.							
7.5				No groundwater or seepage encountered.							
8											
8.5											
9											
9.5											
10											
10.5											
11											
11.5											
12											

Notes:

Symbol Legend

- ▽ Groundwater Level During Drilling
- ▼ Groundwater Level After Drilling
- ⁘ Apparent Seepage
- * No Sample Recovery
- ** Non-representative Blow Count (rocks present)

PROPOSED PASQUAL HEIGHTS SUBDIVISION
830 IDAHO AVENUE
ESCONDIDO, CALIFORNIA

DATE:	OCTOBER 2024	JOB NO.:	2240339.01
BY:	SD	APPENDIX:	A-13

CHRISTIAN WHEELER ENGINEERING

LOG OF TEST TRENCH T-8

Date Logged:	10/21/24	Equipment:	CAT 480F Backhoe
Logged By:	KMS/JMM	Auger Type:	N/A
Existing Elevation:	756'	Drive Type:	N/A
Finish Elevation:	747.7'	Depth to Water:	N/A

Sample Type and Laboratory Test Legend

Cal	Modified California Sampler	CK	Chunk
SPT	Standard Penetration Test	DR	Drive Ring
ST	Shelby Tube		
MD	Max Density	DS	Direct Shear
SO_4	Soluble Sulfates	Con	Consolidation
SA	Sieve Analysis	EI	Expansion Index
HA	Hydrometer	R-Val	Resistance Value
SE	Sand Equivalent	Chl	Soluble Chlorides
PI	Plasticity Index	Res	pH & Resistivity
CP	Collapse Potential	SD	Sample Density

DEPTH (ft)	ELEVATION (ft)	GRAPHIC LOG	USCS SYMBOL	SUMMARY OF SUBSURFACE CONDITIONS (based on Unified Soil Classification System)	PENETRATION (blows per foot)	SAMPLE TYPE	BULK	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	RELATIVE COMPACTION (%)	LABORATORY TESTS
0			SM	**Topsoil/Colluvium (Qcol):** Brown to reddish-brown, damp, loose, SILTY SAND.							
0.5				Upper 30" disturbed.							
1											
1.5											
2											
2.5											
3											
3.5											
4			SC	Dark brown, damp to moist, medium dense, CLAYEY SAND.							
4.5											
5			SW-SM	Brown to yellowish-brown, damp, dense, well-graded SAND with SILT.							
5.5											
6						CK					
6.5				Very dense, relatively fresh below 6.5'.							
7				Refusal at 7 feet.							
7.5				No groundwater or seepage encountered.							
8											
8.5											
9											
9.5											
10											
10.5											
11											
11.5											
12											

Notes:

Symbol Legend

- ▽ Groundwater Level During Drilling
- ▼ Groundwater Level After Drilling
- ⁘ Apparent Seepage
- * No Sample Recovery
- ** Non-representative Blow Count (rocks present)

PROPOSED PASQUAL HEIGHTS SUBDIVISION
830 IDAHO AVENUE
ESCONDIDO, CALIFORNIA

DATE:	OCTOBER 2024	JOB NO.:	2240339.01
BY:	SD	APPENDIX:	A-14

CHRISTIAN WHEELER ENGINEERING

LOG OF TEST TRENCH T-9

Date Logged:	10/21/24	Equipment:	CAT 480F Backhoe
Logged By:	KMS/JMM	Auger Type:	N/A
Existing Elevation:	753'	Drive Type:	N/A
Finish Elevation:	753.2'	Depth to Water:	N/A

Sample Type and Laboratory Test Legend

Cal	Modified California Sampler	CK	Chunk
SPT	Standard Penetration Test	DR	Drive Ring
ST	Shelby Tube		
MD	Max Density	DS	Direct Shear
SO_4	Soluble Sulfates	Con	Consolidation
SA	Sieve Analysis	EI	Expansion Index
HA	Hydrometer	R-Val	Resistance Value
SE	Sand Equivalent	Chl	Soluble Chlorides
PI	Plasticity Index	Res	pH & Resistivity
CP	Collapse Potential	SD	Sample Density

DEPTH (ft)	ELEVATION (ft)	GRAPHIC LOG	USCS SYMBOL	SUMMARY OF SUBSURFACE CONDITIONS (based on Unified Soil Classification System)	PENETRATION (blows per foot)	SAMPLE TYPE	BULK	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	RELATIVE COMPACTION (%)	LABORATORY TESTS
0.5			SM	**Topsoil/Colluvium (Qcol):** Brown to reddish-brown, damp, loose, SILTY SAND.							
1				Upper 24" disturbed.							
1.5											
2											
2.5											
3			SW-SM	**Weathered Granitics (Kgr):** Brown to yellowish-brown to grayish-brown, damp, dense, well-graded SAND with SILT.							
3.5											
4											
4.5											
5											
5.5											
6											
6.5				Very dense, relatively fresh below 6.5'.							
7				Refusal at 7 feet.							
7.5				No groundwater or seepage encountered.							
8											
8.5											
9											
9.5											
10											
10.5											
11											
11.5											
12											

Notes:

Symbol Legend

- ▽ Groundwater Level During Drilling
- ▼ Groundwater Level After Drilling
- ⁘ Apparent Seepage
- * No Sample Recovery
- ** Non-representative Blow Count (rocks present)

PROPOSED PASQUAL HEIGHTS SUBDIVISION
830 IDAHO AVENUE
ESCONDIDO, CALIFORNIA

DATE:	OCTOBER 2024	JOB NO.:	2240339.01
BY:	SD	APPENDIX:	A-15

CHRISTIAN WHEELER ENGINEERING

LOG OF TEST TRENCH T-10

Date Logged:	10/21/24	Equipment:	CAT 480F Backhoe
Logged By:	KMS/JMM	Auger Type:	N/A
Existing Elevation:	730'	Drive Type:	N/A
Finish Elevation:	730.6'	Depth to Water:	N/A

Sample Type and Laboratory Test Legend

Cal	Modified California Sampler	CK	Chunk
SPT	Standard Penetration Test	DR	Drive Ring
ST	Shelby Tube		
MD	Max Density	DS	Direct Shear
SO_4	Soluble Sulfates	Con	Consolidation
SA	Sieve Analysis	EI	Expansion Index
HA	Hydrometer	R-Val	Resistance Value
SE	Sand Equivalent	Chl	Soluble Chlorides
PI	Plasticity Index	Res	pH & Resistivity
CP	Collapse Potential	SD	Sample Density

DEPTH (ft)	ELEVATION (ft)	GRAPHIC LOG	USCS SYMBOL	SUMMARY OF SUBSURFACE CONDITIONS (based on Unified Soil Classification System)	PENETRATION (blows per foot)	SAMPLE TYPE	BULK	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	RELATIVE COMPACTION (%)	LABORATORY TESTS
0.5			SM	**Artificial Fill (Qaf):** Brown to light brown, dry, very loose to loose, SILTY SAND, 5% angular gravel, trace angular cobbles.							
1											
1.5				3" layer of aggregate base.							
2			SC	**Older Alluvium (Qoal):** Dark brown to dark reddish-brown, damp to moist, dense, CLAYEY SAND.							
2.5											
3						CK					
3.5											
4											
4.5											
5											
5.5				Gradational contact.							
6			SW-SM	Brown to yellowish-brown, damp, dense, well-graded SAND with SILT.							
6.5				Very dense, relatively fresh below 6.5'.							
7				Refusal at 6.75 feet.							
7.5				No groundwater or seepage encountered.							
8											
8.5											
9											
9.5											
10											
10.5											
11											
11.5											
12											

Notes:

Symbol Legend

- ▽ Groundwater Level During Drilling
- ▼ Groundwater Level After Drilling
- ⁘ Apparent Seepage
- * No Sample Recovery
- ** Non-representative Blow Count (rocks present)

PROPOSED PASQUAL HEIGHTS SUBDIVISION
830 IDAHO AVENUE
ESCONDIDO, CALIFORNIA

DATE:	OCTOBER 2024	JOB NO.:	2240339.01
BY:	SD	APPENDIX:	A-16

CHRISTIAN WHEELER ENGINEERING

LOG OF TEST TRENCH T-11

Date Logged:	10/21/24	Equipment:	CAT 480F Backhoe
Logged By:	KMS/JMM	Auger Type:	N/A
Existing Elevation:	740'	Drive Type:	N/A
Finish Elevation:	740.2'	Depth to Water:	N/A

Sample Type and Laboratory Test Legend

Cal	Modified California Sampler	CK	Chunk
SPT	Standard Penetration Test	DR	Drive Ring
ST	Shelby Tube		
MD	Max Density	DS	Direct Shear
SO_4	Soluble Sulfates	Con	Consolidation
SA	Sieve Analysis	EI	Expansion Index
HA	Hydrometer	R-Val	Resistance Value
SE	Sand Equivalent	Chl	Soluble Chlorides
PI	Plasticity Index	Res	pH & Resistivity
CP	Collapse Potential	SD	Sample Density

DEPTH (ft)	ELEVATION (ft)	GRAPHIC LOG	USCS SYMBOL	SUMMARY OF SUBSURFACE CONDITIONS (based on Unified Soil Classification System)	PENETRATION (blows per foot)	SAMPLE TYPE	BULK	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	RELATIVE COMPACTION (%)	LABORATORY TESTS
0			SM	**Topsoil/Colluvium (Qcol):** Brown to reddish-brown, dry to damp, loose, SILTY SAND.							
0.5				Upper 24" - 30" disturbed.							
1											
1.5											
2											
2.5											
3			SC	**Colluvium (Qcol):** Dark brown to dark reddish-brown, damp to moist, dense, CLAYEY SAND.							
3.5											
4											
4.5											
5						CK					
5.5											
6											
6.5											
7											
7.5											
8											
8.5											
9											
9.5											
10											
10.5											
11											
11.5											
12				Refusal at 12 feet. No groundwater or seepage encountered.							

Notes:

Symbol Legend

- ▽ Groundwater Level During Drilling
- ▼ Groundwater Level After Drilling
- ⁘ Apparent Seepage
- * No Sample Recovery
- ** Non-representative Blow Count (rocks present)

PROPOSED PASQUAL HEIGHTS SUBDIVISION
830 IDAHO AVENUE
ESCONDIDO, CALIFORNIA

DATE:	OCTOBER 2024	JOB NO.:	2240339.01
BY:	SD	APPENDIX:	A-17

CHRISTIAN WHEELER ENGINEERING

LOG OF TEST TRENCH T-12

Date Logged:	10/21/24	Equipment:	CAT 480F Backhoe
Logged By:	KMS/JMM	Auger Type:	N/A
Existing Elevation:	722'	Drive Type:	N/A
Finish Elevation:	722.5'	Depth to Water:	N/A

Sample Type and Laboratory Test Legend

Cal	Modified California Sampler	CK	Chunk
SPT	Standard Penetration Test	DR	Drive Ring
ST	Shelby Tube		
MD	Max Density	DS	Direct Shear
SO_4	Soluble Sulfates	Con	Consolidation
SA	Sieve Analysis	EI	Expansion Index
HA	Hydrometer	R-Val	Resistance Value
SE	Sand Equivalent	Chl	Soluble Chlorides
PI	Plasticity Index	Res	pH & Resistivity
CP	Collapse Potential	SD	Sample Density

DEPTH (ft)	ELEVATION (ft)	GRAPHIC LOG	USCS SYMBOL	SUMMARY OF SUBSURFACE CONDITIONS (based on Unified Soil Classification System)	PENETRATION (blows per foot)	SAMPLE TYPE	BULK	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	RELATIVE COMPACTION (%)	LABORATORY TESTS
0.5			SM	**Topsoil/Colluvium (Qcol):** Brown to reddish-brown, damp, loose, SILTY SAND.							
1				Upper 12 " disturbed.							
1.5											
2			SC	**Colluvium (Qcol):** Dark brown to dark reddish-brown, damp to moist, dense, CLAYEY SAND.		CK					
2.5											
3			SW-SM	**Weathered Granitics (Kgr):** Brown to yellowish-brown, damp, dense, well-graded SAND with SILT.							
3.5											
4											
4.5											
5											
5.5						CK					
6											
6.5				Refusal at 6 feet. No groundwater or seepage encountered.							
7											
7.5											
8											
8.5											
9											
9.5											
10											
10.5											
11											
11.5											
12											

Notes:

Symbol Legend

- ▽ Groundwater Level During Drilling
- ▼ Groundwater Level After Drilling
- ⁘ Apparent Seepage
- * No Sample Recovery
- ** Non-representative Blow Count (rocks present)

PROPOSED PASQUAL HEIGHTS SUBDIVISION
830 IDAHO AVENUE
ESCONDIDO, CALIFORNIA

DATE:	OCTOBER 2024	JOB NO.:	2240339.01
BY:	SD	APPENDIX:	A-18

CHRISTIAN WHEELER ENGINEERING

LOG OF TEST TRENCH T-13

Date Logged:	10/21/24	Equipment:	CAT 480F Backhoe
Logged By:	KMS/JMM	Auger Type:	N/A
Existing Elevation:	748'	Drive Type:	N/A
Finish Elevation:	747.7'	Depth to Water:	N/A

Sample Type and Laboratory Test Legend

Cal	Modified California Sampler	CK	Chunk
SPT	Standard Penetration Test	DR	Drive Ring
ST	Shelby Tube		
MD	Max Density	DS	Direct Shear
SO_4	Soluble Sulfates	Con	Consolidation
SA	Sieve Analysis	EI	Expansion Index
HA	Hydrometer	R-Val	Resistance Value
SE	Sand Equivalent	Chl	Soluble Chlorides
PI	Plasticity Index	Res	pH & Resistivity
CP	Collapse Potential	SD	Sample Density

DEPTH (ft)	ELEVATION (ft)	GRAPHIC LOG	USCS SYMBOL	SUMMARY OF SUBSURFACE CONDITIONS (based on Unified Soil Classification System)	PENETRATION (blows per foot)	SAMPLE TYPE	BULK	MOISTURE CONTENT (%)	DRY DENSITY (pcf)	RELATIVE COMPACTION (%)	LABORATORY TESTS
0.5			SM	**Topsoil/Colluvium (Qcol):** Brown to reddish-brown, damp, loose, SILTY SAND.							
1				Upper 30" disturbed.							
1.5											
2											
2.5											
3											
3.5											
4			SW-SM	**Weathered Granitics (Kgr):** Brown to yellowish-brown, damp, dense, well-graded SAND with SILT.							
4.5											
5											
5.5											
6											
6.5											
7											
7.5				Very dense, relatively fresh at 7.5'.							
8				Refusal at 8 feet. No groundwater or seepage encountered.							
8.5											
9											
9.5											
10											
10.5											
11											
11.5											
12											

Notes:

Symbol Legend

- ▽ Groundwater Level During Drilling
- ▼ Groundwater Level After Drilling
- ⁘ Apparent Seepage
- * No Sample Recovery
- ** Non-representative Blow Count (rocks present)

PROPOSED PASQUAL HEIGHTS SUBDIVISION
830 IDAHO AVENUE
ESCONDIDO, CALIFORNIA

DATE:	OCTOBER 2024	JOB NO.:	2240339.01
BY:	SD	APPENDIX:	A-19

CHRISTIAN WHEELER ENGINEERING

Appendix B

Laboratory Test Results

LABORATORY TEST DESCRIPTION

Laboratory tests were performed in accordance with the generally accepted American Society for Testing and Materials (ASTM) test methods or suggested procedures. Brief descriptions of the tests performed are presented below:

a) **CLASSIFICATION:** Field classifications were verified in the laboratory by visual examination. The final soil classifications are in accordance with the Unified Soil Classification System and are presented on the exploration logs in Appendix A.

b) **MOISTURE-DENSITY:** In-place moisture contents and dry densities were determined for selected soil samples in accordance with ATM D1188 and D2937. The results are summarized in the exploration logs presented in Appendix A.

c) **MAXIMUM DRY DENSITY AND OPTIMUM MOISTURE CONTENT TEST:** The maximum dry density and optimum moisture content of selected soil samples were determined in the laboratory in accordance with ASTM D1557, Method A.

d) **DIRECT SHEAR:** Two direct shear tests were performed on selected samples of the on-site soils in accordance with ASTM D3080.

e) **GRAIN SIZE DISTRIBUTION:** The grain size distributions of selected soil samples were determined in accordance with ASTM C136 and/or ASTM D422.

f) **COROSSION ANALYSIS:** Two samples of on-site soils were tested for soluble sulfates in accordance with California Test Method 417, soluble chlorides in accordance with California Test Method 422, and pH and minimum resistivity in accordance with California Test Method 643.

g) **COLLAPSE POTENTIAL:** Collapse potential test was performed on a selected undisturbed soil sample. The test was generally performed in accordance with ASTM D 5333.

PASQUAL HEIGHTS SUBDIVISION 830 IDAHO AVENUE ESCONDIDO, CALIFORNIA	CHRISTIAN WHEELER ENGINEERING
DATE: OCTOBER 2024	REPORT NO.: 2240339.01
BY: SD	FIGURE NO.: B-1

LABORATORY TEST SUMMARY

MAXIMUM DRY DENSITY AND OPTIMUM MOISTURE CONTENT (ASTM D1557)

Sample Location	**Boring B-2 @ 0-4'**	**Boring B-3 @ 9'-14'**
Sample Description	Reddish-brown, silty sand (SM)	Light gray, silty sand (SM)
Maximum Density	132.3 pcf	125.8 pcf
Optimum Moisture	7.5 %	10.4 %

DIRECT SHEAR (ASTM D3080)

Sample Location	**Boring B-2 @ 0-4'**	**Boring B-3 @ 9'-14'**
Sample Type	Remolded to 90%	Remolded to 90%
Friction Angle	28^{O}	27^{O}
Cohesion	375 psf	425 psf

GRAIN SIZE DISTRIBUTION (ASTM D422)

Sample Location	**Boring B-2 @ 0-4'**	**Boring B-3 @ 0-3'**	**Boring B-3 @ 9'-14'**
Sieve Size	*Percent Passing*	*Percent Passing*	*Percent Passing*
3/8"	100		
#4	99	100	100
#8	97	98	99
#16	91	94	95
#30	83	86	88
#50	70	74	78
#100	52	57	66
#200	39	43	55

SOLUBLE SULFATES (CALIFORNIA TEST 417), CHLORIDES (CALIFORNIA TEST 422), PH AND RESISTIVITY (CALIFORNIA TEST 643)

Sample Location	**Boring B-2 @ 0-4'**	**Boring B-3 @ 9'-14'**
Soluble Sulfates	<0.003 % (SO_4)	<0.003 % (SO_4)
Soluble Chlorides	0.002 % (Cl^-)	0.003 % (Cl^-)
pH	7.6	8.1
Minimum resistivity	3900 ohm-cm	2600 ohm-cm

COLLAPSE TEST (ASTM D5333)

Sample Location	**Boring B-6 @ 5'**
Initial Moisture	12.4%
Initial Dry Density	105.2 pcf
Final Moisture	23.4%
Axial Stress	2.86 ksf
Collapse	0.97%

PASQUAL HEIGHTS SUBDIVISION
830 IDAHO AVENUE
ESCONDIDO, CALIFORNIA

DATE: OCTOBER 2024	REPORT NO.: 2240339.01
BY: SD	FIGURE NO.: B-2

CHRISTIAN WHEELER
ENGINEERING

Appendix C

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Appendix D

Recommended Grading Specifications – General Provisions

RECOMMENDED GRADING SPECIFICATIONS - GENERAL PROVISIONS

PASQUAL HEIGHTS SUBDIVISION
830 IDAHO AVENUE
ESCONDIDO, CALIFORNIA

GENERAL INTENT

The intent of these specifications is to establish procedures for clearing, compacting natural ground, preparing areas to be filled, and placing and compacting fill soils to the lines and grades shown on the accepted plans. The recommendations contained in the preliminary geotechnical investigation report and/or the attached Special Provisions are a part of the Recommended Grading Specifications and shall supersede the provisions contained hereinafter in the case of conflict. These specifications shall only be used in conjunction with the geotechnical report for which they are a part. No deviation from these specifications will be allowed, except where specified in the geotechnical report or in other written communication signed by the Geotechnical Engineer.

OBSERVATION AND TESTING

Christian Wheeler Engineering shall be retained as the Geotechnical Engineer to observe and test the earthwork in accordance with these specifications. It will be necessary that the Geotechnical Engineer or his representative provide adequate observation so that he may provide his opinion as to whether or not the work was accomplished as specified. It shall be the responsibility of the contractor to assist the Geotechnical Engineer and to keep him appraised of work schedules, changes and new information and data so that he may provide these opinions. In the event that any unusual conditions not covered by the special provisions or preliminary geotechnical report are encountered during the grading operations, the Geotechnical Engineer shall be contacted for further recommendations.

If, in the opinion of the Geotechnical Engineer, substandard conditions are encountered, such as questionable or unsuitable soil, unacceptable moisture content, inadequate compaction, adverse weather, etc., construction should be stopped until the conditions are remedied or corrected or he shall recommend rejection of this work.

Tests used to determine the degree of compaction should be performed in accordance with the following American Society for Testing and Materials test methods:

Maximum Density & Optimum Moisture Content - ASTM D-1557-91
Density of Soil In-Place - ASTM D-1556-90 or ASTM D-2922

All densities shall be expressed in terms of Relative Compaction as determined by the foregoing ASTM testing procedures.

PREPARATION OF AREAS TO RECEIVE FILL

All vegetation, brush and debris derived from clearing operations shall be removed, and legally disposed of. All areas disturbed by site grading should be left in a neat and finished appearance, free from unsightly debris.

After clearing or benching the natural ground, the areas to be filled shall be scarified to a depth of 6 inches, brought to the proper moisture content, compacted and tested for the specified minimum degree of compaction. All loose soils in excess of 6 inches thick should be removed to firm natural ground which is defined as natural soil which possesses an in-situ density of at least 90 percent of its maximum dry density.

When the slope of the natural ground receiving fill exceeds 20 percent (5 horizontal units to 1 vertical unit), the original ground shall be stepped or benched. Benches shall be cut to a firm competent formational soil. The lower bench shall be at least 10 feet wide or 1-1/2 times the equipment width, whichever is greater, and shall be sloped back into the hillside at a gradient of not less than two (2) percent. All other benches should be at least 6 feet wide. The horizontal portion of each bench shall be compacted prior to receiving fill as specified herein for compacted natural ground. Ground slopes flatter than 20 percent shall be benched when considered necessary by the Geotechnical Engineer.

Any abandoned buried structures encountered during grading operations must be totally removed. All underground utilities to be abandoned beneath any proposed structure should be removed from within 10 feet of the structure and properly capped off. The resulting depressions from the above-described procedure should be backfilled with acceptable soil that is compacted to the requirements of the Geotechnical Engineer. This includes, but is not limited to, septic tanks, fuel tanks, sewer lines or leach lines, storm drains and water lines. Any buried structures or utilities not to be abandoned should be brought to the attention of the Geotechnical Engineer so that he may determine if any special recommendation will be necessary.

All water wells which will be abandoned should be backfilled and capped in accordance to the requirements set forth by the Geotechnical Engineer. The top of the cap should be at least 4 feet below finish grade or 3 feet below the bottom of footing whichever is greater. The type of cap will depend on the diameter of the well and should be determined by the Geotechnical Engineer and/or a qualified Structural Engineer.

FILL MATERIAL

Materials to be placed in the fill shall be approved by the Geotechnical Engineer and shall be free of vegetable matter and other deleterious substances. Granular soil shall contain sufficient fine material to fill the voids. The definition and disposition of oversized rocks and expansive or detrimental soils are covered in the geotechnical report or Special Provisions. Expansive soils, soils of poor gradation, or soils with low strength characteristics may be thoroughly mixed with other soils to provide satisfactory fill material, but only with the explicit consent of the Geotechnical Engineer. Any import material shall be approved by the Geotechnical Engineer before being brought to the site.

PLACING AND COMPACTION OF FILL

Approved fill material shall be placed in areas prepared to receive fill in layers not to exceed 6 inches in compacted thickness. Each layer shall have a uniform moisture content in the range that will allow the compaction effort to be efficiently applied to achieve the specified degree of compaction. Each layer shall be uniformly compacted to the specified minimum degree of compaction with equipment of adequate size to economically compact the layer. Compaction equipment should either be specifically designed for soil compaction or of proven reliability. The minimum degree of compaction to be achieved is specified in either the Special Provisions or the recommendations contained in the preliminary geotechnical investigation report.

When the structural fill material includes rocks, no rocks will be allowed to nest and all voids must be carefully filled with soil such that the minimum degree of compaction recommended in the Special Provisions is achieved. The maximum size and spacing of rock permitted in structural fills and in non-structural fills is discussed in the geotechnical report, when applicable.

Field observation and compaction tests to estimate the degree of compaction of the fill will be taken by the Geotechnical Engineer or his representative. The location and frequency of the tests shall be at the Geotechnical Engineer's discretion. When the compaction test indicates that a particular layer is at less

than the required degree of compaction, the layer shall be reworked to the satisfaction of the Geotechnical Engineer and until the desired relative compaction has been obtained.

Fill slopes shall be compacted by means of sheepsfoot rollers or other suitable equipment. Compaction by sheepsfoot roller shall be at vertical intervals of not greater than four feet. In addition, fill slopes at a ratio of two horizontal to one vertical or flatter, should be trackrolled. Steeper fill slopes shall be over-built and cut-back to finish contours after the slope has been constructed. Slope compaction operations shall result in all fill material six or more inches inward from the finished face of the slope having a relative compaction of at least 90 percent of maximum dry density or the degree of compaction specified in the Special Provisions section of this specification. The compaction operation on the slopes shall be continued until the Geotechnical Engineer is of the opinion that the slopes will be surficially stable.

Density tests in the slopes will be made by the Geotechnical Engineer during construction of the slopes to determine if the required compaction is being achieved. Where failing tests occur or other field problems arise, the Contractor will be notified that day of such conditions by written communication from the Geotechnical Engineer or his representative in the form of a daily field report.

If the method of achieving the required slope compaction selected by the Contractor fails to produce the necessary results, the Contractor shall rework or rebuild such slopes until the required degree of compaction is obtained, at no cost to the Owner or Geotechnical Engineer.

CUT SLOPES

The Engineering Geologist shall inspect cut slopes excavated in rock or lithified formational material during the grading operations at intervals determined at his discretion. If any conditions not anticipated in the preliminary report such as perched water, seepage, lenticular or confined strata of a potentially adverse nature, unfavorably inclined bedding, joints or fault planes are encountered during grading, these conditions shall be analyzed by the Engineering Geologist and Geotechnical Engineer to determine if mitigating measures are necessary.

Unless otherwise specified in the geotechnical report, no cut slopes shall be excavated higher or steeper than that allowed by the ordinances of the controlling governmental agency.

ENGINEERING OBSERVATION

Field observation by the Geotechnical Engineer or his representative shall be made during the filling and compaction operations so that he can express his opinion regarding the conformance of the grading with acceptable standards of practice. Neither the presence of the Geotechnical Engineer or his representative or the observation and testing shall release the Grading Contractor from his duty to compact all fill material to the specified degree of compaction.

SEASON LIMITS

Fill shall not be placed during unfavorable weather conditions. When work is interrupted by heavy rain, filling operations shall not be resumed until the proper moisture content and density of the fill materials can be achieved. Damaged site conditions resulting from weather or acts of God shall be repaired before acceptance of work.

RECOMMENDED GRADING SPECIFICATIONS - SPECIAL PROVISIONS

RELATIVE COMPACTION: The minimum degree of compaction to be obtained in compacted natural ground, compacted fill, and compacted backfill shall be at least 90 percent. For street and parking lot subgrade, the upper twelve inches should be compacted to at least 95 percent relative compaction.

EXPANSIVE SOILS: Detrimentally expansive soil is defined as clayey soil which has an expansion index of 50 or greater when tested in accordance with the American Society of Testing Materials (ASTM) Laboratory Test D4829-95.

OVERSIZED MATERIAL: Oversized fill material is generally defined herein as rocks or lumps of soil over six inches in diameter. Oversized materials should not be placed in fill unless recommendations of placement of such material is provided by the Geotechnical Engineer. At least 40 percent of the fill soils shall pass through a No. 4 U.S. Standard Sieve.

TRANSITION LOTS: Where transitions between cut and fill occur within the proposed building pad, the cut portion should be undercut a minimum of one foot below the base of the proposed footings and recompacted as structural backfill. In certain cases that would be addressed in the geotechnical report, special footing reinforcement or a combination of special footing reinforcement and undercutting may be required.

Appendix E

Infiltration Restriction Worksheet

Appendix D Geotechnical Engineer Analysis

D.1 Analysis of Infiltration Restrictions

This section is only applicable if the analysis of infiltration restrictions is performed by a licensed engineer practicing in geotechnical engineering. The SWQMP Preparer and Geotechnical Engineer must work collaboratively to identify any infiltration restrictions identified in Table D.1-1 below. Upon completion of this section, the Geotechnical Engineer must characterize each DMA as Restricted or Unrestricted for infiltration and provide adequate support/discussion in the geotechnical report. A DMA is considered restricted when one or more restrictions exist which cannot be reasonably resolved through site design changes.

Table D.1-1: Considerations for Geotechnical Analysis of Infiltration Restrictions

Restriction Element		Is Element Applicable? (Yes/No)
Mandatory Considerations	BMP is within 100' of Contaminated Soils	No
	BMP is within 100' of Industrial Activities Lacking Source Control	No
	BMP is within 100' of Well/Groundwater Basin	Yes
	BMP is within 50' of Septic Tanks/Leach Fields	No
	BMP is within 10' of Structures/Tanks/Walls	No
	BMP is within 10' of Sewer Utilities	No
	BMP is within 10' of Groundwater Table	No
	BMP is within Hydric Soils	No
	BMP is within Highly Liquefiable Soils and has Connectivity to Structures	No
	BMP is within 1.5 Times the Height of Adjacent Steep Slopes (≥25%)	No
	County Staff has Assigned "Restricted" Infiltration Category	No
Optional Considerations	BMP is within Predominantly Type D Soil	No
	BMP is within 10' of Property Line	No
	BMP is within Fill Depths of ≥5' (Existing or Proposed)	No
	BMP is within 10' of Underground Utilities	No
	BMP is within 250' of Ephemeral Stream	No
	Other (Provide detailed geotechnical support)	No
Result	Based on examination of the best available information, I have **not identified any restrictions** above.	☐ **Unrestricted**
	Based on examination of the best available information, I have **identified one or more restrictions** above.	☑ **Restricted**

Table D.1-1 is divided into Mandatory Considerations and Optional Considerations. Mandatory

Analysis of Infiltration Restrictions for BMP-1 (Biofiltration Basin) = Restricted