GEOTEK

Preliminary Geotechnical Evaluation

For

Proposed Convenience Store and Carwash
3060 Carmel Valley Road
San Diego, California 92130

PREPARED FOR

KA ENTERPRISES
5820 OBERLIN DRIVE SUITE 201
SAN DIEGO, CALIFORNIA 92121

PREPARED BY

GEOTEK, INC.
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PROJECT NO. 3778-SD **JUNE 23, 2022**

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June 23, 2022
Project No. 3778-SD

KA Enterprises
5820 Oberlin Drive Suite 201
San Diego, California 92121

Attention: Mr. Eugene Marini

Subject: Preliminary Geotechnical Evaluation
Proposed Convenience Store and Carwash
3060 Carmel Valley Road
San Diego, California 92130

Dear Mr. Marini:

GeoTek, Inc. (GeoTek) is pleased to provide herein the results of a preliminary geotechnical evaluation for the subject project located in the City of San Diego, California. This report presents the results of GeoTek's evaluation and provides preliminary geotechnical recommendations for earthwork, foundation design, and construction. Based upon review, site development appears feasible from a geotechnical viewpoint provided that the recommendations included herein are incorporated into the design and construction phases of site development.

The opportunity to be of service is sincerely appreciated. If you should have any questions, please do not hesitate to call GeoTek.

Respectfully submitted,
GeoTek, Inc.

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TABLE OF CONTENTS

TABLE OF CONTENTS

1. PURPOSE AND SCOPE OF SERVICES

The purpose of this study was to evaluate the geotechnical conditions of the project site. Services provided for this study included the following:

- Research and review of available geologic and geotechnical data, and general information pertinent to the site.
- Excavation of six exploratory borings and collection of relatively undisturbed ring and bulk soil samples for subsequent laboratory testing.
- Laboratory testing of the soil samples collected during the field investigation.
- Compilation of this geotechnical report which presents GeoTek's findings of pertinent site geotechnical conditions and geotechnical recommendations for site development.

2. SITE DESCRIPTION AND PROPOSED DEVELOPMENT

2.1 SITE DESCRIPTION

The subject property is located at the address of 3060 Carmel Valley Road, San Diego, California 92130 (see Figure 1). The subject site is bounded to the north by a descending driveway, to the west by the I-5 freeway, to the east by Old El Camino Real, and to the south by Carmel Valley Road. The site is currently improved with a gas station in the southeast, a True-zero Hydrogen Fuel station in the northeast, a convenience store in the west, a few parking spaces in the southwest, and a vacant asphalt pad in the north which is enclosed by a metal fence. Topography relief across the entire site ranges from 46 to 33 feet above mean sea level (msl). Surface drainage is directed towards the south.

2.2 PROPOSED DEVELOPMENT

Based on the conceptual grading plan provided by Barghausen Consulting Engineers, Inc. (BCEI, 2021), proposed improvements include demolition of the existing store facility (fuel canopy and underground storage tanks will remain) and a new convenience store and new car wash. Multiple vacuum stalls with be constructed along with additional parking spaces and a car wash driveway entrance in the north, off Old El Camino Real. A proposed BMP stormwater tank is anticipated in the southwest portion of the subject site. Assumed improvements for the building pads are considered to include a single-story commercial building, underground wet and dry utilities and some landscaping. Cuts and fills are proposed to be within a few feet of existing grades.

It is anticipated that the convenience store and car wash will be of wood frame construction and will be supported by conventional shallow foundations (continuous and isolated pad) and a conventional slab on-grade or raised-wood floor. For the purposes of this report, it is assumed maximum column and wall loads will be approximately 25 kips and 2 kips per foot, respectively. Once actual loads are known that information should be provided to GeoTek to determine if modifications to the recommendations presented in this report are warranted.

As site planning progresses and additional or revised plans become available, they should be provided to GeoTek for review and comment. If plans vary significantly, additional geotechnical field exploration, laboratory testing and engineering analyses may be necessary to provide specific earthwork recommendations and geotechnical design parameters for actual site development plans.

3. FIELD EXPLORATION AND LABORATORY TESTING

3.1 FIELD EXPLORATION

GeoTek's field study, conducted on April 8th, 2022, consisted of a site reconnaissance and excavation of six exploratory borings with a truck mounted drill rig. Borings B-1 through B-6 were drilled to depths ranging between 15 to 30 feet below existing grade. A representative from GeoTek visually logged the test borings, collected ring, standard penetration test (SPT), and loose bulk soil samples for laboratory analysis, and transported the samples to GeoTek's laboratory. Approximate locations of the exploratory borings and percolation test holes are presented on the Geotechnical Map, Figure 2. A description of material encountered in the test pits is included in the Boring Logs in Appendix A.

3.2 LABORATORY TESTING

Laboratory testing was performed on ring, SPT, and bulk soil samples collected during the field explorations. The purpose of the laboratory testing was to evaluate their physical and chemical properties for use in engineering design and analysis. Results of the laboratory testing program, along with a brief description and relevant information regarding testing procedures, are included in Appendix B.

4. GEOLOGIC AND SOILS CONDITIONS

4.1 REGIONAL SETTING

The subject property is located in the Peninsular Ranges geomorphic province. The Peninsular Ranges province is one of the largest geomorphic units in western North America. It extends roughly 975 miles from the north and northeasterly adjacent the Transverse Ranges geomorphic province to the peninsula of Baja California. This province varies in width from about 30 to 100 miles. It is bounded on the west by the Pacific Ocean, on the south by the Gulf of California and on the east by the Colorado Desert Province.

The Peninsular Ranges are essentially a series of northwest-southeast oriented fault blocks. Several major fault zones are found in this province. The Elsinore Fault zone and the San Jacinto Fault zones trend northwest-southeast and are found in the near the middle of the province. The San Andreas Fault zone borders the northeasterly margin of the province. The Newport-Inglewood-Rose Canyon Fault zone meanders the southwest margin of the province. No faults are shown in the immediate site vicinity on the map reviewed for the area.

4.2 EARTH MATERIALS

A brief description of the earth materials encountered during the current subsurface exploration is presented in the following sections. Based on the field observations and review of published geologic maps the subject site is locally underlain by artificial fill and young alluvial flood plain deposits over Torrey Sandstone.

4.2.1 Artificial Fill (Map Symbol Af)

Artificial fill was encountered in all borings to a maximum depth of 5 feet from existing grades. The artificial fill consisted of silty fine to medium sand, dry, very loose, with some surficial vegetation and roots in the upper 6 inches for some of the borings (SM soil type). The fill was observed to increase in moisture with depth.

4.2.2 Young Alluvial Flood-Plain Deposits (Map Symbol Qya)

Young alluvial deposits were encountered in all the exploratory borings at depths ranging between 1.5 and 29 feet below existing grades. The alluvial deposits consisted of silty fine to medium sand, light brown to dark brown in color, damp to saturated, loose to very dense with depth, and some surficial vegetation and roots in the upper 6 inches (SM soil type). The density and moisture of the deposits were observed to increase with depth until sandstone material was encountered or the hole was terminated. Localized perched groundwater tables were encountered in borings B-2 through B-6 within this earth material at depths ranging between 12 to 25 feet below existing grades.

4.2.3 Torrey Sandstone (Map Symbol Tt)

Torrey Sandstone was encountered in boring, B-5, at a depth of 29 feet below existing grades. This material consisted of sandstone, light brown with green siltstone gravel, slightly moist, and very dense (SP soil type based upon USCS). The formation was found to be slightly weathered at the upper half foot but became less weathered with depth.

4.3 SURFACE WATER AND GROUNDWATER

4.3.1 Surface Water

Surface water was not observed during the recent site exploration. If encountered during earthwork construction, surface water on this site will most likely be the result of precipitation. Overall site area drainage is in a southeastern direction. Provisions for surface drainage will need to be accounted for by the project civil engineer.

4.3.2 Groundwater

Perched groundwater was encountered during exploration of the subject site in Borings B-2 through B-6 at depths ranging between 12 and 25 feet below existing grades. Based on the anticipated depth of removals and the underlying sandstone formation, groundwater is not anticipated to be a factor in site development.

4.4 EARTHQUAKE HAZARDS

4.4.1 Surface Fault Rupture

The geologic structure of the entire southern California area is dominated mainly by northwest-trending faults associated with the San Andreas system. The site is not in a seismically active region. No active or potentially active fault is known to exist at this site nor is the site situated within an *"Alquist-Priolo"* Earthquake Fault Zone or a Special Studies Zone (Bryant and Hart, 2007). No faults transecting the site were identified on the readily available geologic maps reviewed. The nearest known active fault is the Newport Inglewood-Rose Canyon fault located about 2.63 miles to the southeast of the site.

5. CONCLUSIONS AND RECOMMENDATIONS

5.1 GENERAL

Development of the site appears feasible from a geotechnical viewpoint provided that the following recommendations are incorporated in the design and construction phases of the development. The following sections present general recommendations for currently anticipated site development plans.

5.2 EARTHWORK CONSIDERATIONS

5.2.1 General

Earthwork and grading should be performed in accordance with the applicable grading ordinances of the City of San Diego, the 2019 (or current) California Building Code (CBC), and recommendations contained in this report. The Grading Guidelines included in Appendix C outline general procedures and do not anticipate all site-specific situations. In the event of conflict, the recommendations presented in the text of this report should supersede those contained in Appendix C.

5.2.2 Site Clearing and Preparation

Site preparation should start with removal of existing improvements conflict with the proposed improvements, deleterious materials, vegetations, and trees/shrubs in the proposed improvement areas. These materials should be disposed of properly off site. Any existing underground improvements, utilities and trench backfill should also be removed or be further evaluated as part of site development operations.

5.2.3 Remedial Grading

Prior to placement of fill materials and in all structural areas, the upper variable, potentially compressible materials should be removed. Removals should include at a minimum the upper 3 feet of artificial fill or young alluvium below existing grade or proposed grade, or 2 ft below bottom of footing, whichever is deeper. The bottom of the removals should be observed by a GeoTek representative prior to processing the bottom for receiving placement of compacted fills. Depending on actual field conditions encountered during grading, locally deeper and/or shallower areas of removal may be necessary.

Prior to fill placement, the bottom of all removals should be scarified to a minimum depth of six (6) inches, moisture conditioned to slightly above optimum moisture content, and then compacted to at least 90% of the soil's maximum dry density as determined by ASTM D1557 test procedures. The resultant voids from remedial grading/over-excavation should be filled with materials placed in general accordance with Section 5.2.4 Engineered Fill of this report.

5.2.4 Engineered Fill

Onsite materials are generally considered suitable for reuse as engineered fill provided they are free from vegetation, roots, debris, and rock/concrete or hard lumps greater than six (6) inches in maximum dimension. The earthwork contractor should have the proposed excavated materials to be used as engineered fill at this project approved by the soils engineer prior to placement.

Engineered fill materials should be moisture conditioned to at or above optimum moisture content and compacted in horizontal lifts not exceeding 8 inch in loose thickness to a minimum relative compaction of 90% as determined by ASTM D1557 test procedures.

If fill is being placed on slopes steeper than 5:1 (horizontal : vertical), the fill should be properly benched into the existing slopes and a sufficient size keyway shall be constructed in accordance with grading guidelines presented in Appendix C.

5.2.5 Excavation Characteristics

Excavations in the onsite materials can generally be accomplished with medium-duty earthmoving or excavating equipment in good operating condition.

5.2.6 Shrinkage and Bulking

Several factors will impact earthwork balancing on the site, including undocumented fill shrinkage, trench spoil from utilities and footing excavations, as well as the accuracy of topography. Shrinkage and bulking are largely dependent upon the degree of compactive effort achieved during construction. For planning purposes, a shrinkage factor of 5 percent may be considered for fills generated from alluvial and colluvial sources. Subsidence should not be a factor on the subject site due to the proposed improvements and proposed improvements and recommendations presented herein are completed as recommended.

5.2.7 Trench Excavations and Backfill

Temporary excavations within the onsite materials should be stable at 1:1 inclinations for short durations during construction, and where cuts do not exceed 10 feet in height. Temporary cuts to a maximum height of 4 feet can be excavated vertically. The contractor should anticipate encounter caving alluvial soils.

Trench excavations should conform to Cal-OSHA regulations. The contractor should have a competent person, per OSHA requirements, on site during construction to observe conditions and to make the appropriate recommendations.

Utility trench backfill should be compacted to at least 90% relative compaction of the maximum dry density as determined by ASTM D1557 test procedures. Under-slab trenches should also be compacted to project specifications.

Onsite materials may not be suitable for use as bedding material but should be suitable as backfill provided particles larger than 6± inches are removed.

Compaction should be achieved with a mechanical compaction device. Ponding or jetting of trench backfill is not recommended. If backfill soils have dried out, they should be thoroughly moisture conditioned prior to placement in trenches.

5.3 DESIGN RECOMMENDATIONS

5.3.1 Stormwater Infiltration

Many factors control infiltration of surface waters into the subsurface, such as consistency of native soils and bedrock, geologic structure, fill consistency, material density differences, and existing groundwater conditions. Current conceptual site plans indicate a proposed BMP stormwater tank in the southwest portion of the subject site. Due to the historic site use and proposed continued use as a fuel facility (Hydrocarbon) infiltration of surface waters is not a recommendation.

5.3.2 Foundation Design Criteria

Preliminary foundation design criteria, in general conformance with the 2019 CBC, are presented herein. These are typical design criteria and are not intended to supersede the design by the structural engineer. The preliminary recommendations presented below.

Based on visual classification of materials encountered onsite and as verified by laboratory testing, site soils are anticipated to exhibit a "very low" (EI < 20) expansion index per ASTM D4829. The following criteria for design of foundations are preliminary. Additional laboratory testing of the samples obtained during grading should be performed and final recommendations should be based on as-graded soil conditions.

MINIMUM DESIGN PARAMETERS FOR CONVENTIONALLY REINFORCED FOUNDATIONS	
Expansion Potential	**"Very Low" Expansion Potential (EI ≤ 20)**
Foundation Embedment Depth or Minimum Perimeter Beam Depth (inches below lowest adjacent finished grade)	12 - Inches
Minimum Foundation Width for continuous / perimeter footings*	12 - Inches
Minimum Foundation Width for isolated / column footings*	18 – Inches (Square)
Minimum Foundation Embedment for Interior Foundations	12- Inches
Minimum Slab Thickness (actual)	4 inches
Minimum Slab Reinforcing	No. 3 rebar 16" on-center, each way, placed in the middle one-third of the slab thickness
Minimum Footing Reinforcement	Two No. 4 reinforcing bars, two top and two bottom
Pre-saturation of Subgrade Soil (percent of optimum moisture content)	Minimum 100% to a depth of 12 inches

*Code minimums per Table 1809.7 of the 2019 CBC should be complied with.

It should be noted that the above recommendations are based on soil support characteristics only. The structural engineer should design the slab and beam reinforcement based on actual loading conditions.

The following recommendations should be implemented into the design:

- An allowable bearing capacity of 2,000 pounds per square foot (psf) may be considered for design of continuous and perimeter footings that meet the depth and width requirements in the table above. This value may be increased by 300 psf for each additional 12 inches in depth and 300 psf for each additional 12 inches in width to a maximum value of 3,000 psf. Additionally, an increase of one-third may be applied when considering short-term live loads (e.g., seismic and wind loads).

- Structural foundations may be designed in accordance with 2019 CBC, and to withstand a total settlement of 1 inch and maximum differential settlement of one-half of the total settlement over a horizontal distance of 40 feet. Seismically induced settlement is considered to be minimal.

- The passive earth pressure may preliminarily be computed as an equivalent fluid having a density of 350 psf per foot of depth, to a maximum earth pressure of 2,000 psf for footings founded on engineered fill. A coefficient of friction between soil and concrete of 0.35 may be used with dead load forces. When combining passive pressure and frictional resistance, the passive pressure component should be reduced by one-third.

- A grade beam should be utilized across large entrances. The beam should be a minimum of 12 inches wide and be at the same elevation as the bottom of the adjoining footings.

5.3.3 Under Slab Moisture Membrane

A moisture and vapor retarding system should be placed below slabs-on-grade where moisture migration through the slab is undesirable. Guidelines for these are provided in the 2019 California Green Building Standards Code (CALGreen) Section 4.505.2 and the 2019 CBC Section 1907.1

It should be realized that the effectiveness of the vapor retarding membrane can be adversely impacted as a result of construction related punctures (e.g., stake penetrations, tears, punctures from walking on the vapor retarder placed atop the underlying aggregate layer, etc.). These occurrences should be limited as much as possible during construction. Thicker membranes are generally more resistant to accidental puncture that thinner ones. Products specifically designed for use as moisture/vapor retarders may also be more puncture resistant. Although the CBC specifies a 6-mil vapor retarder membrane, it is GeoTek's opinion that a minimum 10 mil membrane with joints properly overlapped and sealed should be considered, unless otherwise specified by the slab design professional.

Moisture and vapor retarding systems are intended to provide a certain level of resistance to vapor and moisture transmission through the concrete, but do not eliminate it. The acceptable level of moisture transmission through the slab is to a large extent based on the type of flooring used and environmental conditions. Ultimately, the vapor retarding system should be comprised of suitable elements to limit migration of water and reduce transmission of water vapor through the slab to acceptable levels. The selected elements should have suitable properties (i.e., thickness, composition, strength, and permeability) to achieve the desired performance level.

Moisture retarders can reduce, but not eliminate, moisture vapor rise from the underlying soils up through the slab. Moisture retarder systems should be designed and constructed in accordance with applicable American Concrete Institute, Portland Cement Association, Post-Tensioning Concrete Institute, ASTM and California Building Code requirements and guidelines.

GeoTek does not practice in the field of moisture vapor transmission evaluation/migration since that practice is not a geotechnical discipline. Therefore, GeoTek recommends that a qualified person, such as the flooring contractor, structural engineer, architect, and/or other experts specializing in moisture control within the building be consulted to evaluate the general and specific moisture and vapor transmission paths and associated potential impact on the proposed construction. That person (or persons) should provide recommendations relative to the slab moisture and vapor retarder systems and for migration of potential adverse impact of moisture vapor transmission on various components of the structures, as deemed appropriate. In addition, the recommendations in this report and GeoTek's services in general are not intended to address mold prevention; since GeoTek, along with geotechnical consultants in general, do not practice in the area of mold prevention. If specific recommendations addressing potential mold issues are desired, then a professional mold prevention consultant should be contacted.

5.3.4 Miscellaneous Foundation Recommendations

- To reduce moisture penetration beneath the slab on grade areas, utility trenches should be backfilled with engineered fill, lean concrete, or concrete slurry where they intercept the perimeter footing or thickened slab edge.

- Spoils from the footing excavations should not be placed in the slab-on-grade areas unless properly moisture-conditioned, compacted and tested. The excavations should be free of loose/sloughed materials and be neatly trimmed at the time of concrete placement.

5.3.5 Foundation Setbacks

Where applicable, the following setbacks should apply to all foundations. Any improvements not conforming to these setbacks may be subject to lateral movements and/or differential settlements:

- The outside bottom edge of all footings should be set back a minimum of H/3 (where H is the slope height) from the face of any descending slope. The setback should be at least 7 feet and need not exceed 40 feet.

- The bottom of all footings for structures near retaining walls should be deepened so as to extend below a 1:1 projection upward from the bottom inside edge of the wall stem. This applies to the existing retaining walls along the perimeter if they are to remain.

- The bottom of any existing foundations for structures should be deepened to extend below a 1:1 projection upward from the bottom of the nearest excavation.

5.3.6 Seismic Design Parameters

The site is located at approximately 33.2440 degrees west latitude and -117.2658 degrees north longitude. Site spectral accelerations (Ss and S1), for 0.2 and 1.0 second periods for a risk targeted two (2) percent probability of exceedance in 50 years (MCER) were determined using the web interface provided by SEAOC/OSHPD (https://seismicmaps.org) to access the USGS Seismic Design Parameters. Due to the apparent density of the underlying fill material, a Site Class "D" is considered appropriate for this site. The results, based on NEHRP-2015 and the 2019 CBC, are presented in the following table:

SITE SEISMIC PARAMETERS	
Mapped 0.2 sec Period Spectral Acceleration, S_s	1.169g
Mapped 1.0 sec Period Spectral Acceleration, S_1	0.414g
Site Coefficient for Site Class "D", F_a	1.032
Site Coefficient for Site Class "D", F_v	1.886
Maximum Considered Earthquake (MCE_R) Spectral Response Acceleration for 0.2 Second, S_{MS}	1.207g
Maximum Considered Earthquake (MCE_R) Spectral Response Acceleration for 1.0 Second, S_{M1}	0.781g
5% Damped Design Spectral Response Acceleration Parameter at 0.2 Second, S_{DS}	0.805g
5% Damped Design Spectral Response Acceleration Parameter at 1 second, S_{D1}	0.521g
Site Modified Peak Ground Acceleration (PGA_M)	0.577g
Seismic Design Category	D

5.3.7 Soil Sulfate Content

Sulfate content test results indicate water soluble sulfate is less than 0.1 percent by weight, which is considered "S0" as per Table 19.3.1.1 of ACI 318-14. Based upon the test results, no special recommendations for concrete are required for this project due to soil sulfate exposure.

5.3.8 Preliminary Pavement Design

Traffic indices have not been provided during this stage of site planning. In addition, site conditions have not been graded to a final design to evaluate specific pavement subgrade conditions. Therefore, the minimum structural sections based on the City of San Diego's Standard Drawings Criteria (City of San Diego, 2016) are presented below.

PRELIMINARY ASPHALT PAVEMENT STRUCTURAL SECTION FOR SUBJECT SITE		
Design Criteria	Asphaltic Concrete (AC) Thickness (inches)	Aggregate Base (AB) Thickness (inches)
Local (Low Volume Road)	3.0	5.0
Local (Residential)	3.0	5.0

As noted in the Standard Drawings document, actual structural pavement design is to be determined by the geotechnical engineer's testing (R-Value) of the 12" material located immediately below the first layer of base, or pavement. Thus, the actual R-Value of the subgrade soils can only be determined at the completion of grading for street subgrades and the above values are subject to change based on laboratory testing of the as-graded soils near subgrade elevations.

Asphalt concrete and aggregate base should conform to current Caltrans Standard Specifications Section 39 and 26-1.02, respectively. As an alternative, asphalt concrete can conform to Section 203-6 of the current Standard Specifications for Public Work (Green Book). Crushed aggregate base or crushed miscellaneous base can conform to Section 200-2.2 and 200-2.4 of the Green Book, respectively. Pavement base should be compacted to at least 95 percent of the ASTM D1557 laboratory maximum dry density as determined by ASTM D 1557 test procedures

All pavement installation, including preparation and compaction of subgrade, compaction of base material, placement and rolling of asphaltic concrete, should be done in accordance with the City of San Diego specifications, and under the observation and testing of GeoTek and a City Inspector where required. Jurisdictional minimum compaction requirements in excess of the aforementioned minimums may govern.

5.3.9 Portland Cement Concrete (PCC)

As an option, Portland Cement concrete (PCC) pavements could also be used at the site for the pavement areas. Based on the traffic loading provided, the following recommended minimum PCC pavement section is provided for these areas:

6 Inches Portland Cement Concrete (PCC) over
6 Inches Aggregate Base (AB) over
12-inches compacted subgrade to 95% per ASTM D 1557

For the PCC options, it is recommended concrete having a minimum 28-day flexural strength of 650 psi be used. A maximum joint spacing of 15 feet is also recommended.

5.4 RETAINING WALL DESIGN AND CONSTRUCTION

5.4.1 General Design Criteria

Preliminary grading plans are not yet available. If retaining walls are added at a later date, the recommendations presented herein may apply to typical masonry or concrete vertical retaining walls to a maximum height of 6 feet. The 2019 CBC only requires the additional earthquake induced lateral force be considered on retaining walls in excess of six (6) feet in height. Therefore, additional review and recommendations should be requested for higher walls.

Retaining wall foundations embedded a minimum of 18 inches into engineered fill or dense formational materials should be designed using an allowable bearing capacity of 2,000 psf. This value may be increased by 300 psf for each additional 12 inches in depth and 300 psf for each additional 12 inches in width to a maximum value of 3,000 psf. An increase of one-third may be applied when considering short-term live loads (e.g., seismic and wind loads). The passive earth pressure may be computed as an equivalent fluid having a density of 350 psf per foot of depth, to a maximum earth pressure of 3,500 psf. A coefficient of friction between soil and concrete of 0.35 may be used with dead load forces. When combining passive pressure and frictional resistance, the passive pressure component should be reduced by one-third.

An equivalent fluid pressure approach may be used to compute the horizontal active pressure against the wall. The appropriate fluid unit weights are given in the table below for specific slope gradients of retained materials utilizing on site materials.

Surface Slope of Retained Materials (H:V)	Equivalent Fluid Pressure (PCF) Select Backfill*
Level	40
2:1	65

*Select backfill should consist of approved materials with an EI≤20 and should be provided throughout the active zone.

The above equivalent fluid weights do not include other superimposed loading conditions such as expansive soil, vehicular traffic, structures, seismic conditions or adverse geologic conditions.

5.4.2 Restrained Retaining Walls

Any retaining wall that will be restrained prior to placing backfill or walls that have male or reentrant corners should be designed for at-rest soil conditions using an equivalent fluid pressure of 65 pcf (select backfill), plus any applicable surcharge loading. For areas having male or reentrant corners, the restrained wall design should extend a minimum distance equal to twice the height of the wall laterally from the corner, or as otherwise determined by the structural engineer.

5.4.3 Wall Backfill and Drainage

Wall backfill should include a minimum one (1) foot wide section of ¾ to 1-inch clean crushed rock (or approved equivalent). The rock should be placed immediately adjacent to the back of wall and extend up from the backdrain to within approximately 12 inches of finish grade. The upper 12 inches should consist of compacted onsite materials. If the walls are designed using the "select" backfill design parameters, then the "select" materials shall be placed within the active zone as defined by a 1:1 (H:V) projection from the back of the retaining wall footing up to the retained surface behind the wall. Presence of other materials might necessitate revision to the parameters provided and modification of wall designs.

The backfill materials should be placed in lifts no greater than 8-inches in thickness and compacted to a minimum of 90% of the maximum dry density as determined in accordance with ASTM Test Method D 1557. Proper surface drainage needs to be provided and maintained. Water should not be allowed to pond behind retaining walls. Waterproofing of site walls should be performed where moisture migration through the wall is undesirable.

Retaining walls should be provided with an adequate pipe and gravel back drain system to reduce the potential for hydrostatic pressures to develop. A 4-inch diameter perforated collector pipe (Schedule 40 PVC, or approved equivalent) in a minimum of one (1) cubic foot per lineal foot of 3/8 to one (1) inch clean crushed rock or equivalent, wrapped in filter fabric should be placed near the bottom of the backfill and be directed (via a solid outlet pipe) to an appropriate disposal area.

As an alternative to the drain, rock and fabric, a pre-manufactured wall drainage product (example: Mira Drain 6000 or approved equivalent) may be used behind the retaining wall. The wall drainage product should extend from the base of the wall to within two (2) feet of the ground surface. The subdrain should be placed in direct contact with the wall drainage product.

Drain outlets should be maintained over the life of the project and should not be obstructed or plugged by adjacent improvements.

6. CONCRETE FLATWORK

6.1 GENERAL CONCRETE FLATWORK

6.1.1 Exterior Concrete Slabs and Sidewalks

Exterior concrete slabs, sidewalks and driveways should be designed using a four-inch minimum thickness. Some shrinkage and cracking of the concrete should be anticipated because of typical mix designs and curing practices typically utilized in construction.

Sidewalks and driveways may be under the jurisdiction of the governing agency. If so, jurisdictional design and construction criteria would apply, if more restrictive than the recommendations presented in this report.
Subgrade soils should be pre-moistened prior to placing concrete. The subgrade soils below exterior slabs, sidewalks, driveways, etc. should be pre-saturated to a minimum of 100 percent (for "very low" expansivity) of the optimum moisture content to a depth of 12 inches.

All concrete installation, including preparation and compaction of subgrade, should be done in accordance with the City of San Diego specifications, and under the observation and testing of GeoTek, Inc. and a City inspector, if necessary.

6.1.2 Concrete Performance

Concrete cracks should be expected. These cracks can vary from sizes that are essentially unnoticeable to more than 1/8 inch in width. Most cracks in concrete, while unsightly, do not significantly impact long-term performance. While it is possible to take measures (proper concrete mix, placement, curing, control joints, etc.) to reduce the extent and size of cracks that occur, some cracking will occur despite the best efforts to minimize it. Concrete undergoes chemical processes that are dependent on a wide range of variables, which are difficult, at best, to control. Concrete, while seemingly a stable material, is subject to internal expansion and contraction due to external changes over time.

One of the simplest means to control cracking is to provide weakened control joints for cracking to occur along. These do not prevent cracks from developing; they simply provide a relief point for the stresses that develop. These joints are a widely accepted means to control cracks but are not always effective. Control joints are more effective the more closely spaced they are. GeoTek, Inc. suggests that control joints be placed in two directions and located a distance apart approximately equal to 24 to 36 times the slab thickness.

7. POST CONSTRUCTION CONSIDERATIONS

7.1 LANDSCAPE MAINTENANCE AND PLANTING

Water has been shown to weaken the inherent strength of soil, and slope stability is significantly reduced by overly wet conditions. Positive surface drainage away from graded slopes should be maintained and only the amount of irrigation necessary to sustain plant life should be provided for planted slopes. Controlling surface drainage and runoff and maintaining a suitable vegetation cover can minimize erosion. Plants selected for landscaping should be lightweight, deep-rooted types that require little water and are capable of surviving the prevailing climate.

Overwatering should be avoided. The soils should be maintained in a solid to semi-solid state as defined by the materials Atterberg Limits. Care should be taken when adding soil amendments to avoid excessive watering. Leaching as a method of soil preparation prior to planting is not recommended. An abatement program to control ground-burrowing rodents should be implemented and maintained. This is critical as burrowing rodents can decreased the long-term performance of slopes.

It is common for planting to be placed adjacent to structures in planter or lawn areas. This will result in the introduction of water into the ground adjacent to the foundation. This type of landscaping should be avoided. If used, then extreme care should be exercised with regard to the irrigation and drainage in these areas. Waterproofing of the foundation and/or subdrains may be warranted and advisable. GeoTek could discuss these issues, if desired, when plans are made available.

7.2 DRAINAGE

The need to maintain proper surface drainage and subsurface systems cannot be overly emphasized. Positive site drainage should be maintained at all times. Drainage should not flow uncontrolled down any descending slope. Water should be directed away from foundations and not allowed to pond or seep into the ground adjacent to the footings. Site drainage should conform to Section 1804.4 of the 2019 CBC. Roof gutters and downspouts should discharge onto paved surfaces sloping away from the structure or into a closed pipe system which outfalls to the street gutter pan or directly to the storm drain system. Pad drainage should be directed toward approved areas and not be blocked by other improvements.

7.3 PLAN REVIEW AND CONSTRUCTION OBSERVATIONS

GeoTek recommends that site grading, specifications, retaining wall/shoring plans and foundation plans be reviewed by this office prior to construction to check for conformance with the recommendations of this report. Additional recommendations may be necessary based on these reviews. It is also recommended that GeoTek representatives be present during site grading and foundation construction to check for proper implementation of the geotechnical recommendations. The owner/developer should have GeoTek's representative perform at least the following duties:

- Observe site clearing and grubbing operations for proper removal of unsuitable materials.
- Observe and bottom of removals prior to fill placement.
- Evaluate the suitability of on-site and import materials for fill placement and collect soil samples for laboratory testing when necessary.
- Observe the fill for uniformity during placement, including utility trenches.
- Observe and test the fill for field density and relative compaction.
- Observe and probe foundation excavations to confirm suitability of bearing materials.

If requested, a construction observation and compaction report can be provided by GeoTek, which can comply with the requirements of the governmental agencies having jurisdiction over the project. GeoTek recommends that these agencies be notified prior to commencement of construction so that necessary grading permits can be obtained.

8. LIMITATIONS

The scope of this evaluation is limited to the area explored that is shown on the Geotechnical Map (Figure 2). This evaluation does not and should in no way be construed to encompass any areas beyond the specific area of proposed construction as indicated to us by the client. The scope is based on GeoTek's understanding of the project and the client's needs, GeoTek's proposal (Proposal No. P-0200522-SD) dated February 14th, 2022, and geotechnical engineering standards normally used on similar projects in this region.

The materials observed on the project site appear to be representative of the area; however, soil and bedrock materials vary in character between excavations and natural outcrops, or conditions exposed during site construction. Site conditions may vary due to seasonal changes or other factors. GeoTek, Inc. assumes no responsibility or liability for work, testing or recommendations performed or provided by others.

Since GeoTek's recommendations are based on the site conditions observed and encountered, and laboratory testing, GeoTek's conclusions and recommendations are professional opinions that are limited to the extent of the available data. Observations during construction are important to allow for any change in recommendations found to be warranted. These opinions have been derived in accordance with current standards of practice and no warranty is expressed or implied. Standards of practice are subject to change with time.

9. SELECTED REFERENCES

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KA Enterprises 3060 Carmel Vally Road San Diego, California		Figure 1 Site Location Map	GEOTEK 1384 Poinsettia Avenue, Suite A Vista, California 92081
PN: 3778-SD	DATE: June 2022		

LEGEND

B-6	Approximate Location of Boring
Af	Artificial Fill
Qya	Quaternary Young Alluvial Flood Plain Deposits, Circled where Buried
	Approximate Limits of Study, this report

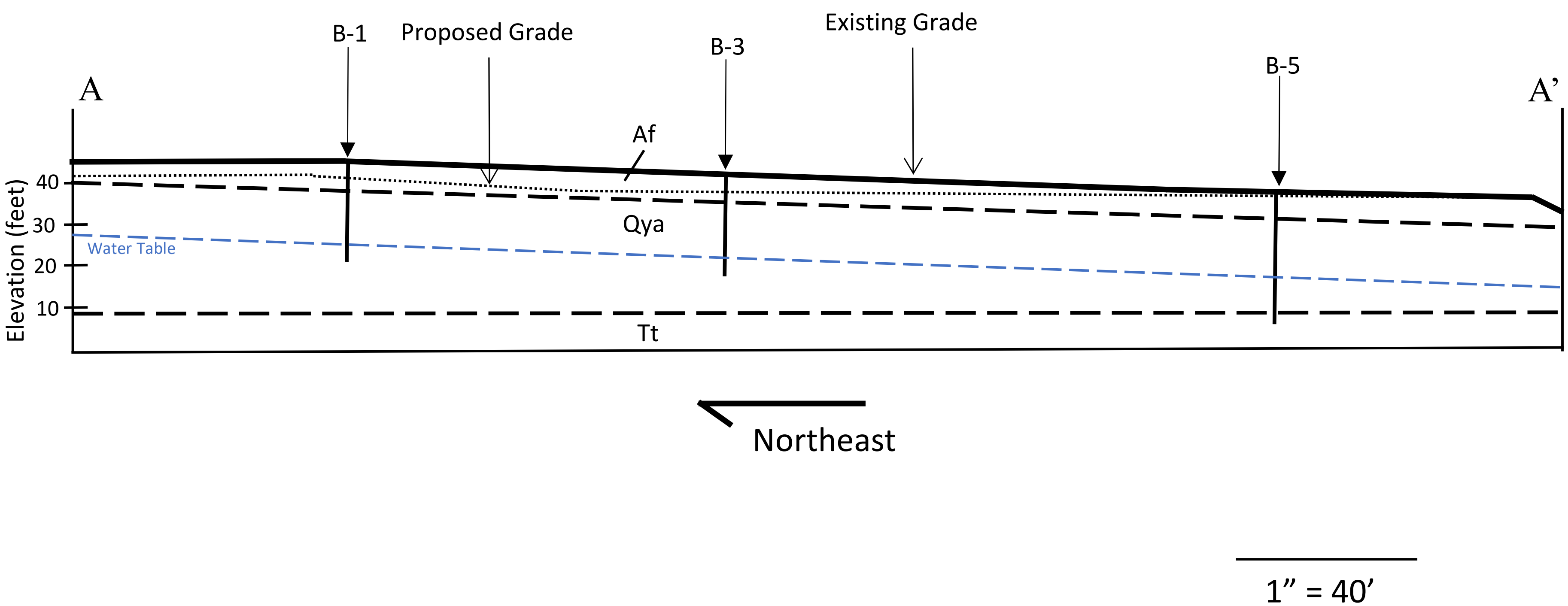
Scale: 1" = 40'

0 20 40 80

N

Plan adapted from "Conceptual Grading Plan" by Barghausen Consulting Engineers, Inc.

KA Enterprises 3060 Carmel Vally Road San Diego, California PN: 3778-SD DATE: June 2022	Figure 2 Geotechnical Map	GEOTEK 1384 Poinsettia Avenue, Suite A Vista, California 92081



LEGEND

B-1	Approximate Borehole Location
Af	Artificial Fill
Qya	Quaternary Young Alluvium
Tt	Tertiary Torrey Sandstone

GEOTEK
1384 Poinsettia Avenue, Suite A
Vista, California 92081

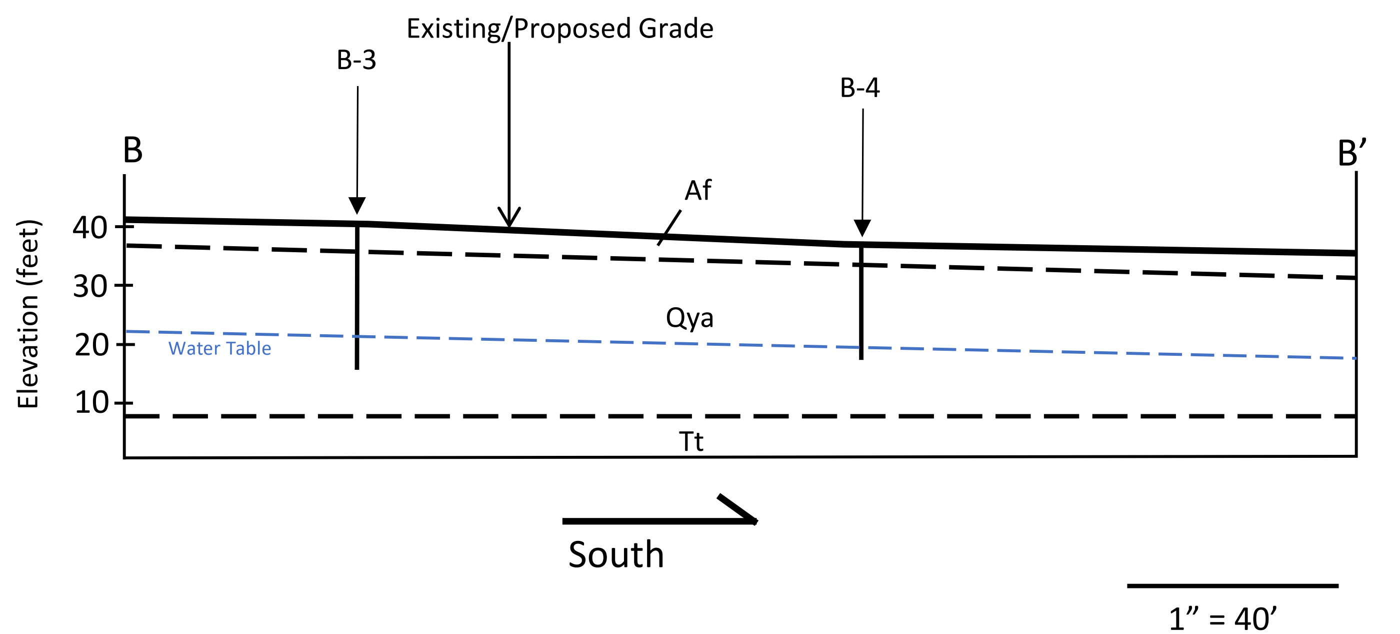
Figure 3

Geologic Cross Section A-A’

KA Enterprises
3060 Carmel Valley Rd.
San Diego, California

June 2022

PN: 3778-SD



LEGEND

B-3	Approximate Borehole Location
Af	Artificial Fill
Qya	Quaternary Young Alluvium
Tt	Tertiary Torrey Sandstone

GEOTEK

1384 Poinsettia Avenue,
Suite A
Vista, California 92081

Figure 4
Geologic Cross
Section B-B'

KA Enterprises
3060 Carmel Valley Rd.
San Diego, California

June 2022

PN: 3778-SD

APPENDIX A

BORING LOGS

GEOTEK

A - FIELD TESTING AND SAMPLING PROCEDURES

Ring Samples
These samples are normally airtight cylinders 6" in length containing 6 thin rings weighing approximately 45 grams each. These rings are sampled by means of the modified California Sampler (3" outer diameter, 2.5" inner diameter) to determine in-situ moisture content, density, and classification indices.

Bulk Samples (SPT)
These samples are normally airtight plastic bag samples containing less than 5 pounds in weight of earth materials collected from the field. These samples were collected by means of Standard Penetration Tests (SPT) to determine moisture content, density, and classification indices.

Bulk Samples (Large)
These samples are normally large bags of earth materials over 20 pounds in weight collected from the field by means of hand digging or exploratory cuttings.

B – BORING/TRENCH LOG LEGEND

The following abbreviations and symbols often appear in the classification and description of soil and rock on the logs of borings/trenches:

SOILS

USCS	Unified Soil Classification System
f-c	Fine to coarse
f-m	Fine to medium

GEOLOGIC

B: Attitudes	Bedding: strike/dip
J: Attitudes	Joint: strike/dip
C: Contact line	
………..	Dashed line denotes USCS material change
———	Solid Line denotes unit / formational change
━━━	Thick solid line denotes end of boring/trench

(Additional denotations and symbols are provided on the log of borings/trenches)

GeoTek, Inc.
LOG OF EXPLORATORY BORING

CLIENT:	KA Enterprises	**DRILLER:**	Baja Exploration	**LOGGED BY:**	CH
PROJECT NAME:	3060 Carmel Valley Rd	**DRILL METHOD:**	8" Hollow-Stem Auger	**OPERATOR:**	Victor
PROJECT NO.:	3778-SD	**HAMMER:**	140lbs/30in	**RIG TYPE:**	CME-75 Drill Rig
LOCATION:	See Geotechnical Map	**ELEVATION:**	44 Ft	**DATE:**	4/8/2022

BORING NO.: B-1

Depth (ft)	SAMPLES: Sample Type	Blows/ 6 in	Sample Number	USCS Symbol	MATERIAL DESCRIPTION AND COMMENTS	Laboratory Testing: Water Content (%)	Dry Density (pcf)	Others
					6" asphalt and base **Artificial Fill (Af)**			
				CK	Silty fine to medium SAND, dark brown, dry, very loose			
			BB-1					EI, SR
		2 3 5	R-1			7	129.4	
				SM	Silty fine to medium SAND, dark brown, dry, very loose			
5		3 3 3	S-1	SP	**Young Alluvial Flood-Plain Deposits (Qya)** Fine to medium SAND, light brown, dry to slightly moist, loose			
10						8.3	121.2	
		8 12 17	R-2	SP	Fine to medium SAND, light brown, moist to very moist with depth, medium dense			
15		4 4 7	S-2 S-2	SP	Fine to medium SAND, light brown, moist to very moist, loose, medium dense			
20					**HOLE TERMINATED AT 20 FEET** No groundwater encountered Backfilled with soil cuttings			
25								
30								

LEGEND

Sample type: ---Ring ---SPT ---Small Bulk ---Large Bulk ---No Recovery ---Water Table

Lab testing:
AL = Atterberg Limits | EI = Expansion Index | SA = Sieve Analysis | RV = R-Value Test
SR = Sulfate/Resisitivity Test | SH = Shear Test | CO = Consolidation test | MD = Maximum Density

GeoTek, Inc.

LOG OF EXPLORATORY BORING

CLIENT:	KA Enterprises	**DRILLER:**	Baja Exploration	**LOGGED BY:**	CH
PROJECT NAME:	3060 Carmel Valley Rd	**DRILL METHOD:**	8" Hollow-Stem Auger	**OPERATOR:**	Victor
PROJECT NO.:	3778-SD	**HAMMER:**	140lbs/30in	**RIG TYPE:**	CME-75 Drill Rig
LOCATION:	See Geotechnical Map	**ELEVATION:**	42 Ft	**DATE:**	4/8/2022

BORING NO.: B-2

Depth (ft)	SAMPLES: Sample Type	SAMPLES: Blows/ 6 in	SAMPLES: Sample Number	USCS Symbol	MATERIAL DESCRIPTION AND COMMENTS	Laboratory Testing: Water Content (%)	Laboratory Testing: Dry Density (pcf)	Laboratory Testing: Others
				SP	**Artificial Fill (Af)** Fine to medium SAND, light brown, slightly moist, loose, moisture increasing with depth			
					Young Alluvial Flood-Plain Deposits (Qya)			
5	SPT	3 4 5	S-1	SP	Fine to medium SAND, light brown, slightly moist, loose			
10	Ring	8 13 14	R-1	SP	Fine to medium SAND, light brown, slightly moist, loose, moisture increasing with depth	9.8	106.3	
15	SPT	3 5 5	S-2	SP	Fine to medium SAND, light brown, slightly moist, loose, moisture increasing with depth			
20				▽	Groundwater encountered			
					HOLE TERMINATED AT 20.5 FEET Groundwater encountered at 20.5 feet Backfilled with soil cuttings			
25								
30								

LEGEND

Sample type: ---Ring ---SPT ---Small Bulk ---Large Bulk ---No Recovery ---Water Table

Lab testing:

AL = Atterberg Limits	EI = Expansion Index	SA = Sieve Analysis	RV = R-Value Test
SR = Sulfate/Resisitivity Test	SH = Shear Test	CO = Consolidation test	MD = Maximum Density

GeoTek, Inc.
LOG OF EXPLORATORY BORING

CLIENT:	KA Enterprises	**DRILLER:**	Baja Exploration	**LOGGED BY:**	CH
PROJECT NAME:	3060 Carmel Valley Rd	**DRILL METHOD:**	8" Hollow-Stem Auger	**OPERATOR:**	Victor
PROJECT NO.:	3778-SD	**HAMMER:**	140lbs/30in	**RIG TYPE:**	CME-75 Drill Rig
LOCATION:	See Geotechnical Map	**ELEVATION:**	41 Ft	**DATE:**	4/8/2022

BORING NO.: B-3

Depth (ft)	Sample Type	Blows/ 6 in	Sample Number	USCS Symbol	MATERIAL DESCRIPTION AND COMMENTS	Water Content (%)	Dry Density (pcf)	Others
			BB-1	SP	**Artificial Fill (Af)** Fine to medium SAND, light brown, dry, loose to medium dense			
		8 13 15	R-1	SP	**Young Alluvial Flood Plain Deposits (Qya)** Fine SAND, light brown, dry, medium dense	3.7	133.8	
5		6 6 7	S-1 BB-2	SP	Fine SAND, light brown, dry, medium dense, poor recovery, sample falls out			MD, DS
10		8 8 14	R-2	SP	Fine SAND, light brown, dry to moist, loose, moist increasing with depth, medium dense	1.6	131.3	
15		4 3 3	S-2	SP	Fine SAND, light brown, moist, loose, groundwater encountered at 19 feet			
20		3 4 10	R-3	SP	Fine SAND, light brown, very moist, loose	16.1	134.6	
25		3 6 7	S-3	SP	Fine SAND, light brown, very moist, medium dense , moisture starting to decrease with depth			
30					**HOLE TERMINATED AT 26.5 FEET** Groundwater encountered at 19 feet Backfilled with soil cuttings			

LEGEND

Sample type: ---Ring ---SPT ---Small Bulk ---Large Bulk ---No Recovery ---Water Table

Lab testing:

AL = Atterberg Limits	EI = Expansion Index	SA = Sieve Analysis	RV = R-Value Test
SR = Sulfate/Resisitivity Test	SH = Shear Test	CO = Consolidation test	MD = Maximum Density

GeoTek, Inc.
LOG OF EXPLORATORY BORING

CLIENT:	KA Enterprises	**DRILLER:**	Baja Exploration	**LOGGED BY:**	CH
PROJECT NAME:	3060 Carmel Valley Rd	**DRILL METHOD:**	8" Hollow-Stem Auger	**OPERATOR:**	Victor
PROJECT NO.:	3778-SD	**HAMMER:**	140lbs/30in	**RIG TYPE:**	CME-75 Drill Rig
LOCATION:	See Geotechnical Map	**ELEVATION:**	37 Ft	**DATE:**	4/8/2022

BORING NO.: B-4

Depth (ft)	SAMPLES: Sample Type	Blows/ 6 in	Sample Number	USCS Symbol	MATERIAL DESCRIPTION AND COMMENTS	Laboratory Testing: Water Content (%)	Dry Density (pcf)	Others
	Large Bulk		BB-1	SP	Asphalt and Base in upper 6" **<u>Artifical Fill (Af)</u>** Fine to medium SAND, light brown, slightly moist, loose			
5	SPT	4 5 5	S-1	SP	**<u>Young Alluvial Flood Plain Deposits (Qya)</u>** Fine to medium SAND, light brown, very moist with moisture increasing with depth, loose			
						17.1	135.6	
10	Ring	5 6 8	R-1	SP	Fine to medium SAND, light brown, very moist, medium dense to dense			
15	SPT	5 14 34	S-2	SP	Fine to medium SAND, light brown,moisture increasing with depth, very dense			
				Water Table	Groundwater encountered, some gravels, no sample recovery			
20					**HOLE TERMINATED AT 20 FEET** Groundwater encountered at 18 feet Backfilled with soil cuttings			
25								
30								

LEGEND

<u>Sample type</u>: ---Ring ---SPT ---Small Bulk ---Large Bulk ---No Recovery ---Water Table

<u>Lab testing:</u>

AL = Atterberg Limits	EI = Expansion Index	SA = Sieve Analysis	RV = R-Value Test
SR = Sulfate/Resisitivity Test	SH = Shear Test	CO = Consolidation test	MD = Maximum Density

GeoTek, Inc.

LOG OF EXPLORATORY BORING

CLIENT:	KA Enterprises	**DRILLER:**	Baja Exploration	**LOGGED BY:**	CH
PROJECT NAME:	3060 Carmel Valley Rd	**DRILL METHOD:**	8" Hollow-Stem Auger	**OPERATOR:**	Victor
PROJECT NO.:	3778-SD	**HAMMER:**	140lbs/30in	**RIG TYPE:**	CME-75 Drill Rig
LOCATION:	See Geotechnical Map	**ELEVATION:**	36 Ft	**DATE:**	4/8/2022

BORING NO.: B-5

Depth (ft)	SAMPLES: Sample Type	Blows/ 6 in	Sample Number	USCS Symbol	MATERIAL DESCRIPTION AND COMMENTS	Laboratory Testing: Water Content (%)	Dry Density (pcf)	Others
				SP	Asphalt and Base in upper 6" **Artifical Fill (Af)** Fine to medium SAND, dark brown, moist, loose			
				SP	**Young Alluvial Flood Plain Deposits (Qya)** Fine to medium SAND, light brown, moist, loose, some gravels, density increasing with depth			
5								
10	SPT	6 7 7	S-1	SP	Fine to medium SAND, light brown, moist to very moist with depth, medium dense, density increasing with depth			
15								
				Water Table	Groundwater encountered	14.8	141.9	
20	Ring	8 19 19	R-1	SP	Fine to medium SAND, light brown, saturated to very moist with depth, medium dense, density increasing with depth			
25				SP	Fine to medium SAND, light brown, very dense, moisture declining to slightly moist with depth			
30					**Torrey Sandstone (Tt)** SANDSTONE, light brown with green tints, slightly moist, very dense			

LEGEND

Sample type: ---Ring ---SPT ---Small Bulk ---Large Bulk ---No Recovery ---Water Table

Lab testing:				
	AL = Atterberg Limits	EI = Expansion Index	SA = Sieve Analysis	RV = R-Value Test
	SR = Sulfate/Resisitivity Test	SH = Shear Test	CO = Consolidation test	MD = Maximum Density

GeoTek, Inc.

LOG OF EXPLORATORY BORING

CLIENT:	KA Enterprises	**DRILLER:**	Baja Exploration	**LOGGED BY:**	CH
PROJECT NAME:	3060 Carmel Valley Rd	**DRILL METHOD:**	8" Hollow-Stem Auger	**OPERATOR:**	Victor
PROJECT NO.:	3778-SD	**HAMMER:**	140lbs/30in	**RIG TYPE:**	CME-75 Drill Rig
LOCATION:	See Geotechnical Map	**ELEVATION:**	36 Ft	**DATE:**	4/8/2022

BORING NO.: B-5 Cont.

Depth (ft)	SAMPLES: Sample Type	Blows/ 6 in	Sample Number	USCS Symbol	MATERIAL DESCRIPTION AND COMMENTS	Laboratory Testing: Water Content (%)	Dry Density (pcf)	Others
30	SPT	19 32 45	S-2		SANDSTONE, light brown with green mottling and oxidization, slightly moist, very dense, slightly weathered in upper 6'			
					HOLE TERMINATED AT 31.5 FEET Groundwater encountered at 18 feet Backfilled with soil cuttings			
35								
40								
45								
50								
55								

LEGEND

Sample type: ---Ring ---SPT ---Small Bulk ---Large Bulk ---No Recovery ---Water Table

Lab testing:
AL = Atterberg Limits EI = Expansion Index SA = Sieve Analysis RV = R-Value Test
SR = Sulfate/Resisitivity Test SH = Shear Test CO = Consolidation test MD = Maximum Density

GeoTek, Inc.

LOG OF EXPLORATORY BORING

CLIENT:	KA Enterprises	**DRILLER:**	Baja Exploration	**LOGGED BY:**	CH
PROJECT NAME:	3060 Carmel Valley Rd	**DRILL METHOD:**	8" Hollow-Stem Auger	**OPERATOR:**	Victor
PROJECT NO.:	3778-SD	**HAMMER:**	140lbs/30in	**RIG TYPE:**	CME-75 Drill Rig
LOCATION:	See Geotechnical Map	**ELEVATION:**	35 Ft	**DATE:**	4/8/2022

BORING NO.: B-6

Depth (ft)	SAMPLES: Sample Type	Blows/ 6 in	Sample Number	USCS Symbol	MATERIAL DESCRIPTION AND COMMENTS	Laboratory Testing: Water Content (%)	Dry Density (pcf)	Others
					Asphalt and Base in upper 6"			
					Artifical Fill (Af)			
				SP	Fine to medium SAND, dark brown, moist, loose			
					Young Alluvial Flood Plain Deposits (Qya)			
				SP	Fine to medium SAND, dark brown, moist, loose			
5	SPT	3 4 5	S-1	SP	Fine to medium SAND, dark brown, moist, loose			
						13.9	129.9	
10	Ring	7 9 9	R-1	SP	Fine to medium SAND, dark brown, very moist to saturated with depth, medium dense			
				⊻	Groundwater encountered			
15	SPT	3 3 7	S-2	SP	Fine to medium SAND, dark brown, very moist to saturated, medium dense			
					HOLE TERMINATED AT 15 FEET			
					Groundwater encountered at 12 feet Backfilled with soil cuttings			
20								
25								
30								

LEGEND

Sample type: ---Ring ---SPT ---Small Bulk ---Large Bulk ---No Recovery ---Water Table

Lab testing:

AL = Atterberg Limits	EI = Expansion Index	SA = Sieve Analysis	RV = R-Value Test
SR = Sulfate/Resisitivity Test	SH = Shear Test	CO = Consolidation test	MD = Maximum Density

APPENDIX B

RESULTS OF LABORATORY TESTING

SUMMARY OF LABORATORY TESTING

Identification and Classification

Soils were identified visually in general accordance with the standard practice for description and identification of soils (ASTM D 2488). The soil identifications and classifications are shown on the Logs of Exploration in Appendix A.

Moisture Density Modified Proctor

Laboratory testing was performed on one sample collected during the subsurface exploration for compaction characteristics. The laboratory maximum dry density and optimum moisture content for the soil was determined in general accordance with ASTM Test Method D 1557 procedures. The test results are graphically presented in Appendix B.

Expansion Index Test

Expansion Index testing was performed on one sample collected during the subsurface exploration from boring B-1. The expansion index was determined in general accordance with ASTM Test Method D 4829 procedures. The test results are presented in Appendix B.

Sulfate Content

A full corrosion series was performed in general accordance with several ASTM Test Methods on one representative sample collected during the subsurface exploration. The sample was obtained from boring B-1 and tested by Project X Engineering.

Direct Shear Remolded

Shear testing was performed in a direct shear machine of the strain-control type in general accordance with ASTM Test Method D 3080 procedures. The rate of deformation is approximately 0.025 inches per minute. The samples were sheared under varying confining loads to determine the coulomb shear strength parameters, angle of internal friction and cohesion. One test was performed on a bulk sample that was remolded to approximately 90 percent of the maximum dry density as determined by ASTM D 1557. The results of the testing are graphically presented in Appendix B.

R-Value

A sample collected during the subsurface exploration was tested for its R-Value in general accordance with California Test Method 301 by Labelle-Marvin Professional Pavement Engineering. The test result is presented in Appendix B.

GEOTEK

EXPANSION INDEX TEST

(ASTM D4829)

Project Name:	3060 Carmel Valley Rd	***Tested/ Checked By:***	***CH*** Lab No 3943
Project Number:	3778-SD	***Date Tested:***	5/23/2022
Project Location:	San Diego, CA	***Sample Source:***	B-1 BB-1
		Sample Description:	Fine Dark Brown Silty Sand

Ring Id: 12 Ring Dia. " : 4" Ring I 1"

Loading weight: 5516. grams

DENSITY DETERMINATION

A	Weight of compacted sample & ring	**772.5**
B	Weight of ring	369.7
C	Net weight of sample	402.8
D	Wet Density, lb / ft3 (C*0.3016)	121.5
E	Dry Density, lb / ft3 (D/1.F)	**111.1**

SATURATION DETERMINATION

	Wet Weight of sample & tare	**248.2**
	Dry Weight of sample & tare	**227.3**
	Tare	**4.8**
F	Initial Moisture Content, %	**9.4**
G	(E*F)	1043.1
H	(E/167.232)	0.66
I	(1.-H)	0.34
J	(62.4*I)	21.0
K	(G/J)= **L** % Saturation	**49.8**

READINGS

DATE	TIME	READING	
5/23/2022	10:44	168	Initial
	10:54	168	10 min/Dry
	10:55	165	1 min/Wet
	11:00	165	5 min/Wet
5/24/2022	10:44	164	Random
	10:54	164	Final

FINAL MOISTURE

Weight of wet sample & tare	Wt. of dry sample & tare	Tare	% Moisture
201.1	176.3	4.8	14.5%

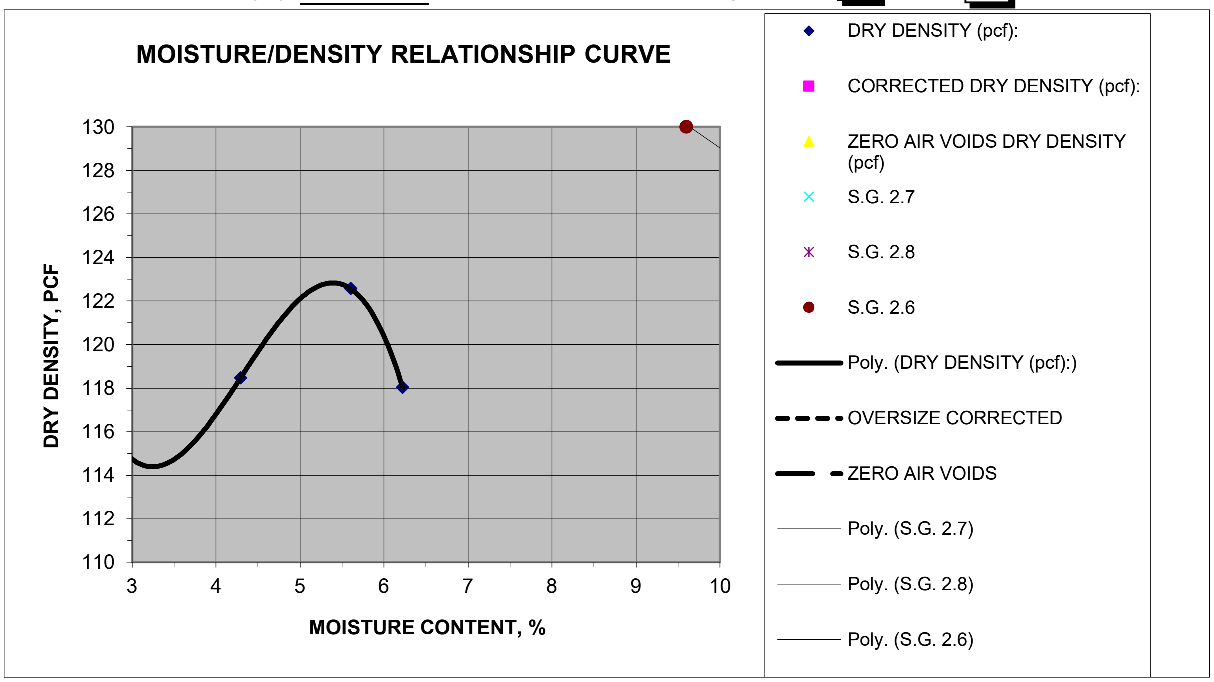
EXPANSION INDEX = 0

MOISTURE/DENSITY RELATIONSHIP

Client:	KA Enterprises	**Job No.:**	3778-SD
Project:	3060 Carmel Valley Rd	**Lab No.:**	3973
Location:	San Diego, CA		
Material Type:	Fine Silty Sand Light Brown		
Material Supplier:	-		
Material Source:	-		
Sample Location:	B-3, BB-2		
	-		
Sampled By:	CH	**Date Sampled:**	4/8/2022
Received By:	CH	**Date Received:**	4/8/2022
Tested By:	FJB	**Date Tested:**	4/29/2022
Reviewed By:	-	**Date Reviewed:**	-

Test Procedure: ASTM D1557 **Method:** A

Oversized Material (%): 0.0 **Correction Required:** [ ] yes [x] no



MOISTURE DENSITY RELATIONSHIP VALUES

Maximum Dry Density, pcf	123.0	**@ Optimum Moisture, %**	5.5
Corrected Maximum Dry Density, pcf		**@ Optimum Moisture, %**	

MATERIAL DESCRIPTION

Grain Size Distribution:

	% Gravel (retained on No. 4)
	% Sand (Passing No. 4, Retained on No. 200)
	% Silt and Clay (Passing No. 200)

Atterberg Limits:

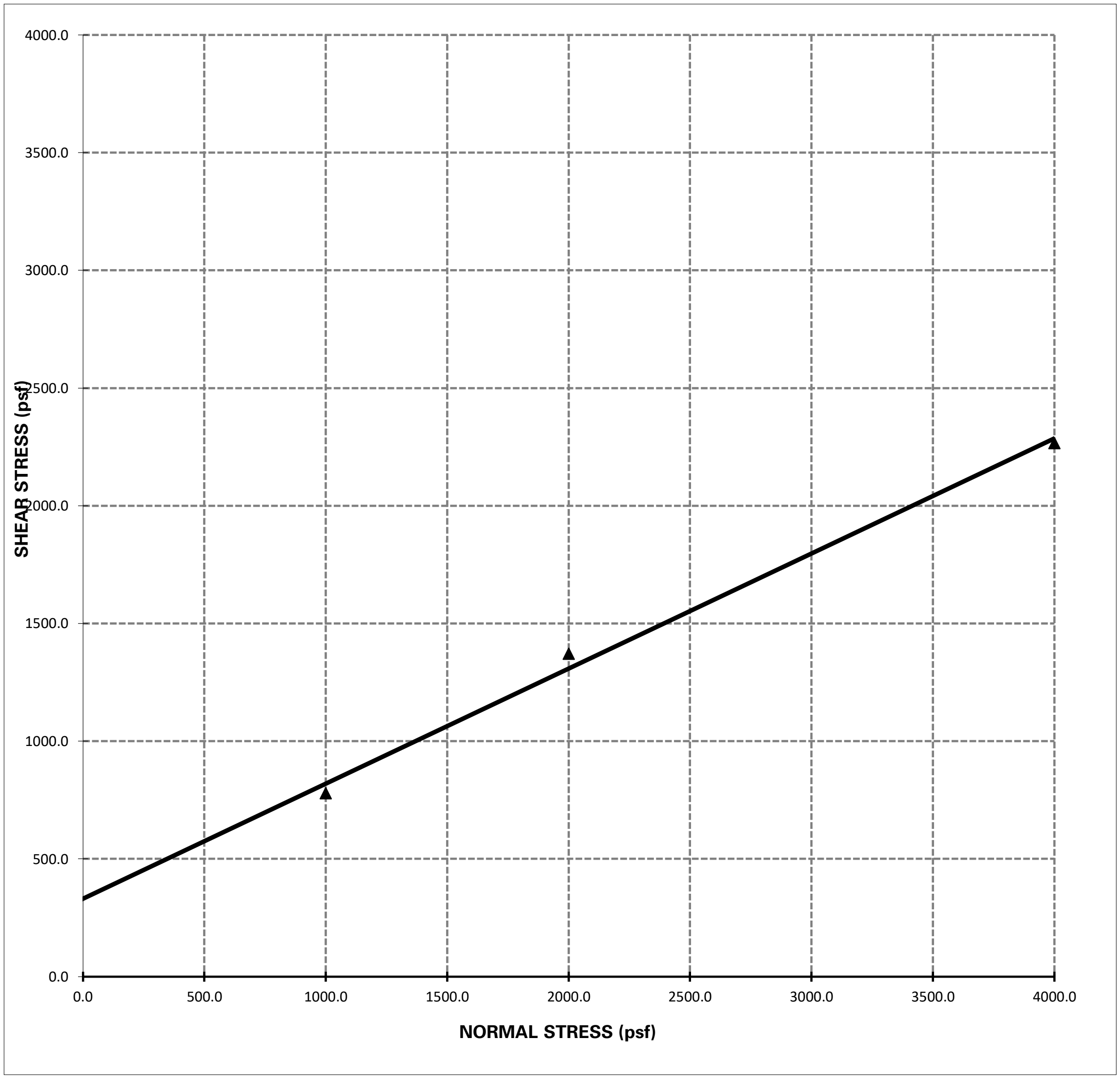
	Liquid Limit, %
	Plastic Limit, %
	Plasticity Index, %

Classification:

Unified Soils Classification: ______

DIRECT SHEAR TEST

Project Name: 3060 Carmel Valley Road
Project Number: 3778-SD
Sample Location: B-3 BB-2 @ 5'-10'
Date Tested: 2/1/2022



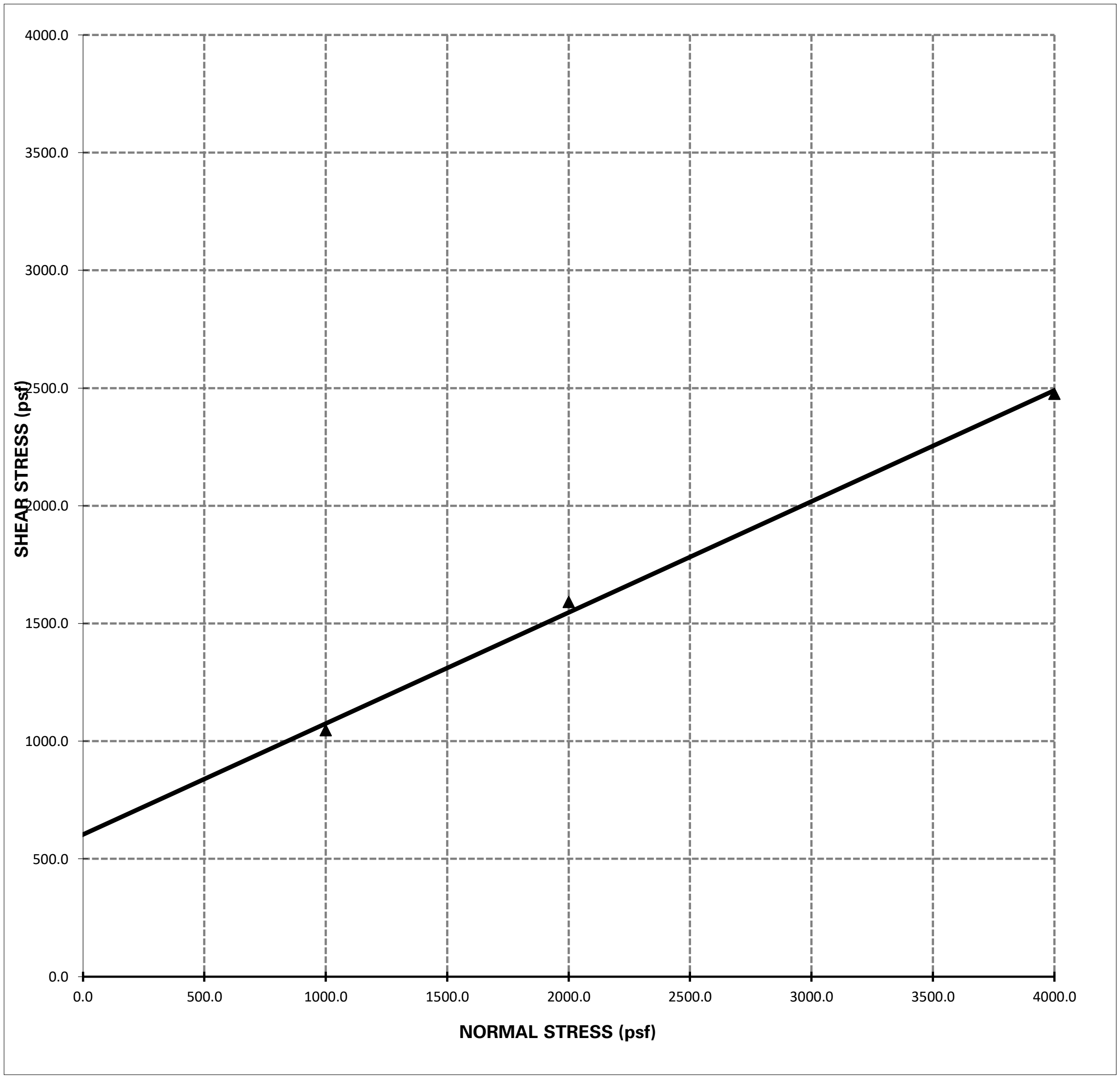
Shear Strength: Φ = 26 ° C = 332 psf

Notes:
1 - The soil specimen used in the shear box was a ring sample remolded to approximately 90% relative compaction from a bulk sample collected during the field investigation.
2 - The above reflect direct shear strength at saturated conditions.
3 - The tests were run at a shear rate of 0.035 in/min.

DIRECT SHEAR TEST

Project Name:	3060 Carmel Valley Road	***Sample Location:***	B-3 BB-2 @ 5'-10'
Project Number:	3778-SD	***Date Tested:***	2/1/2022

PEAK VALUE



Shear Strength: **Φ = 25 ° C = 604 psf**

Notes: 1 - The soil specimen used in the shear box was a ring sample remolded to approximately 90% relative compaction from a bulk sample collected during the field investigation.

2 - The above reflect direct shear strength at saturated conditions.

3 - The tests were run at a shear rate of 0.035 in/min.

Results Only Soil Testing for 3060 Carmel Valley Rd

May 31, 2022

Prepared for:

Chris Livesey
GeoTek, Inc.
1384 Poinsettia Ave, Suite A
Vista, CA, 92081
clivesey@geotekusa.com

Project X Job#: S220527D
Client Job or PO#: 3778-SD

Respectfully Submitted,

Eduardo Hernandez, M.Sc., P.E.
Sr. Corrosion Consultant
NACE Corrosion Technologist #16592
Professional Engineer
California No. M37102
ehernandez@projectxcorrosion.com

REGISTERED PROFESSIONAL ENGINEER
EDUARDO HERNANDEZ
No. M37102
MECHANICAL
STATE OF CALIFORNIA

Soil Analysis Lab Results

Client: GeoTek, Inc.
Job Name: 3060 Carmel Valley Rd
Client Job Number: 3778-SD
Project X Job Number: S220527D
May 31, 2022

	Method	ASTM D4327	
Bore# / Description	**Depth**	**Sulfates** SO_4^{2-}	
	(ft)	**(mg/kg)**	**(wt%)**
B-1 BB-1 Silty Sand Brown	1-4	11.4	0.0011

Cations and Anions, except Sulfide and Bicarbonate, tested with Ion Chromatography
mg/kg = milligrams per kilogram (parts per million) of dry soil weight
ND = 0 = Not Detected | NT = Not Tested | Unk = Unknown
Chemical Analysis performed on 1:3 Soil-To-Water extract
PPM = mg/kg (soil) = mg/L (Liquid)

Project X Corrosion Engineering

Lab Request Sheet Chain of Custody

Ship Samples To: 29990 Technology Dr, Suite 13, Murrieta, CA 92563

Project X Job Number	S220527D Geotek 3778-SD 3060 Carmel 1S04		
IMPORTANT: Please complete Project and Sample Identification Data as you would like it to appear in report & include this form with samples.			
Company Name:	GeoTek, Inc.	Contact Name:	Chris Livesey — Phone No: 949-338-9233
Mailing Address:	1384 Poinsetta Ave, Ste A, Vista, CA 92081	Contact Email:	clivesey@geotekusa.com
Accounting Contact:	Accounts Payable	Invoice Email:	ap@geotekusa.com; lwhite@geotekusa.com
Client Project No:	3778-SD	Project Name:	3060 Carmel Valley Rd
P.O. #:	Vista		
(Business Days) Turn Around Time:	✓		
Results By: ☐ Phone ☐ Fax ☒ Email			
Date & Received by:			
Special Instructions:			

ANALYSIS REQUESTED (Please circle)

Full Corrosion Series — Corr Quad: Soil Resistivity, pH, Sulfate, Chloride

*Keep 3 in. 3 Samples, site map, and groundwater info

Sample ID - Boring #	Description	Depth (ft)	Date Collected	Soil Resistivity	pH	Sulfate	Chloride	Redox Potential	Sulfide	Ammonia	Nitrate	Fluoride	Phosphate	Lithium	Sodium	Potassium	Magnesium	Calcium	BiCarbonate	Full Corrosion Series	Soil Corrosivity Evaluation Report	Water Corrosivity Mini Report	Moisture Content	Total Alkalinity	Thermal Resistivity	Metallurgical Analysis	Langelier Index	Puckorius Index	XRF Elemental Analysis	Water Hardness
394 B-1 BB-1	Silty Sand Brown	1'-4'	4/18/22			✓																								
2																														
4																														
6																														
8																														
10																														
12																														
14																														

<u>APPENDIX C</u>

GENERAL EARTHWORK GRADING GUIDELINES

GEOTEK

GENERAL GRADING GUIDELINES

Guidelines presented herein are intended to address general construction procedures for earthwork construction. Specific situations and conditions often arise which cannot reasonably be discussed in general guidelines, when anticipated these are discussed in the text of the report. Often unanticipated conditions are encountered which may necessitate modification or changes to these guidelines. It is our hope that these will assist the contractor to more efficiently complete the project by providing a reasonable understanding of the procedures that would be expected during earthwork and the testing and observation used to evaluate those procedures.

General

Grading should be performed to at least the minimum requirements of governing agencies, Chapters 18 and 33 of the California Building Code, CBC (2019) and the guidelines presented below.

Preconstruction Meeting

A preconstruction meeting should be held prior to site earthwork. Any questions the contractor has regarding our recommendations, general site conditions, apparent discrepancies between reported and actual conditions and/or differences in procedures the contractor intends to use should be brought up at that meeting. The contractor (including the main onsite representative) should review our report and these guidelines in advance of the meeting. Any comments the contractor may have regarding these guidelines should be brought up at that meeting.

Grading Observation and Testing

1. Observation of the fill placement should be provided by our representative during grading. Verbal communication during the course of each day will be used to inform the contractor of test results. The contractor should receive a copy of the "Daily Field Report" indicating results of field density tests that day. If our representative does not provide the contractor with these reports, our office should be notified.
2. Testing and observation procedures are, by their nature, specific to the work or area observed and location of the tests taken, variability may occur in other locations. The contractor is responsible for the uniformity of the grading operations; our observations and test results are intended to evaluate the contractor’s overall level of efforts during grading. The contractor’s personnel are the only individuals participating in all aspect of site work. Compaction testing and observation should not be considered as relieving the contractor’s responsibility to properly compact the fill.
3. Cleanouts, processed ground to receive fill, key excavations, and subdrains should be observed by our representative prior to placing any fill. It will be the contractor's responsibility to notify our representative or office when such areas are ready for observation.
4. Density tests may be made on the surface material to receive fill, as considered warranted by this firm.
5. In general, density tests would be made at maximum intervals of two feet of fill height or every 1,000 cubic yards of fill placed. Criteria will vary depending on soil conditions and size of the fill. More frequent testing may be performed. In any case, an adequate number of field density tests should be made to evaluate the required compaction and moisture content is generally being obtained.
6. Laboratory testing to support field test procedures will be performed, as considered warranted, based on conditions encountered (e.g. change of material sources, types, etc.) Every effort will

be made to process samples in the laboratory as quickly as possible and in progress construction projects are our first priority. However, laboratory workloads may cause in delays and some soils may require a **minimum of 48 to 72 hours to complete test procedures**. Whenever possible, our representative(s) should be informed in advance of operational changes that might result in different source areas for materials.

7. Procedures for testing of fill slopes are as follows:
   a) Density tests should be taken periodically during grading on the flat surface of the fill, three to five feet horizontally from the face of the slope.
   b) If a method other than over building and cutting back to the compacted core is to be employed, slope compaction testing during construction should include testing the outer six inches to three feet in the slope face to determine if the required compaction is being achieved.
8. Finish grade testing of slopes and pad surfaces should be performed after construction is complete.

Site Clearing

1. All vegetation, and other deleterious materials, should be removed from the site. If material is not immediately removed from the site it should be stockpiled in a designated area(s) well outside of all current work areas and delineated with flagging or other means. Site clearing should be performed in advance of any grading in a specific area.
2. Efforts should be made by the contractor to remove all organic or other deleterious material from the fill, as even the most diligent efforts may result in the incorporation of some materials. This is especially important when grading is occurring near the natural grade. All equipment operators should be aware of these efforts. Laborers may be required as root pickers.
3. Nonorganic debris or concrete may be placed in deeper fill areas provided the procedures used are observed and found acceptable by our representative.

Treatment of Existing Ground

1. Following site clearing, all surficial deposits of alluvium and colluvium as well as weathered or creep effected bedrock, should be removed unless otherwise specifically indicated in the text of this report.
2. In some cases, removal may be recommended to a specified depth (e.g. flat sites where partial alluvial removals may be sufficient). The contractor should not exceed these depths unless directed otherwise by our representative.
3. Groundwater existing in alluvial areas may make excavation difficult. Deeper removals than indicated in the text of the report may be necessary due to saturation during winter months.
4. Subsequent to removals, the natural ground should be processed to a depth of six inches, moistened to near optimum moisture conditions and compacted to fill standards.
5. Exploratory back hoe or dozer trenches still remaining after site removal should be excavated and filled with compacted fill if they can be located.

Fill Placement

1. Unless otherwise indicated, all site soil and bedrock may be reused for compacted fill; however, some special processing or handling may be required (see text of report).
2. Material used in the compacting process should be evenly spread, moisture conditioned, processed, and compacted in thin lifts six (6) to eight (8) inches in compacted thickness to

obtain a uniformly dense layer. The fill should be placed and compacted on a nearly horizontal plane, unless otherwise found acceptable by our representative.

3. If the moisture content or relative density varies from that recommended by this firm, the contractor should rework the fill until it is in accordance with the following:
   a) Moisture content of the fill should be at or above optimum moisture. Moisture should be evenly distributed without wet and dry pockets. Pre-watering of cut or removal areas should be considered in addition to watering during fill placement, particularly in clay or dry surficial soils. The ability of the contractor to obtain the proper moisture content will control production rates.
   b) Each six-inch layer should be compacted to at least 90 percent of the maximum dry density in compliance with the testing method specified by the controlling governmental agency. In most cases, the testing method is ASTM Test Designation D 1557.
4. Rock fragments less than eight inches in diameter may be utilized in the fill, provided:
   a) They are not placed in concentrated pockets;
   b) There is a sufficient percentage of fine-grained material to surround the rocks;
   c) The distribution of the rocks is observed by, and acceptable to, our representative.
5. Rocks exceeding eight (8) inches in diameter should be taken off site, broken into smaller fragments, or placed in accordance with recommendations of this firm in areas designated suitable for rock disposal. On projects where significant large quantities of oversized materials are anticipated, alternate guidelines for placement may be included. If significant oversize materials are encountered during construction, these guidelines should be requested.
6. In clay soil, dry or large chunks or blocks are common. If in excess of eight (8) inches minimum dimension, then they are considered as oversized. Sheepsfoot compactors or other suitable methods should be used to break up blocks. When dry, they should be moisture conditioned to provide a uniform condition with the surrounding fill.

Slope Construction

1. The contractor should obtain a minimum relative compaction of 90 percent out to the finished slope face of fill slopes. This may be achieved by either overbuilding the slope and cutting back to the compacted core, or by direct compaction of the slope face with suitable equipment.
2. Slopes trimmed to the compacted core should be overbuilt by at least three (3) feet with compaction efforts out to the edge of the false slope. Failure to properly compact the outer edge results in trimming not exposing the compacted core and additional compaction after trimming may be necessary.
3. If fill slopes are built "at grade" using direct compaction methods, then the slope construction should be performed so that a constant gradient is maintained throughout construction. Soil should not be "spilled" over the slope face nor should slopes be "pushed out" to obtain grades. Compaction equipment should compact each lift along the immediate top of slope. Slopes should be back rolled or otherwise compacted at approximately every 4 feet vertically as the slope is built.
4. Corners and bends in slopes should have special attention during construction as these are the most difficult areas to obtain proper compaction.
5. Cut slopes should be cut to the finished surface. Excessive undercutting and smoothing of the face with fill may necessitate stabilization.

UTILITY TRENCH CONSTRUCTION AND BACKFILL

Utility trench excavation and backfill is the contractors responsibility. The geotechnical consultant typically provides periodic observation and testing of these operations. While efforts are made to make sufficient observations and tests to verify that the contractors' methods and procedures are adequate to achieve proper compaction, it is typically impractical to observe all backfill procedures. As such, it is critical that the contractor use consistent backfill procedures.

Compaction methods vary for trench compaction and experience indicates many methods can be successful. However, procedures that "worked" on previous projects may or may not prove effective on a given site. The contractor(s) should outline the procedures proposed, so that we may discuss them **prior** to construction. We will offer comments based on our knowledge of site conditions and experience.

1. Utility trench backfill in slopes, structural areas, in streets and beneath flat work or hardscape should be brought to at least optimum moisture and compacted to at least 90 percent of the laboratory standard. Soil should be moisture conditioned prior to placing in the trench.
2. Flooding and jetting are not typically recommended or acceptable for native soils. Flooding or jetting may be used with select sand having a Sand Equivalent (SE) of 30 or higher. This is typically limited to the following uses:
   a) shallow (12 + inches) under slab interior trenches and,
   b) as bedding in pipe zone.

   The water should be allowed to dissipate prior to pouring slabs or completing trench compaction.
3. Care should be taken not to place soils at high moisture content within the upper three feet of the trench backfill in street areas, as overly wet soils may impact subgrade preparation. Moisture may be reduced to 2% below optimum moisture in areas to be paved within the upper three feet below sub grade.
4. Sand backfill should not be allowed in exterior trenches adjacent to and within an area extending below a 1:1 projection from the outside bottom edge of a footing, unless it is similar to the surrounding soil.
5. Trench compaction testing is generally at the discretion of the geotechnical consultant. Testing frequency will be based on trench depth and the contractors procedures. A probing rod would be used to assess the consistency of compaction between tested areas and untested areas. If zones are found that are considered less compact than other areas, this would be brought to the contractors attention.

JOB SAFETY

General

Personnel safety is a primary concern on all job sites. The following summaries are safety considerations for use by all our employees on multi-employer construction sites. On ground personnel are at highest risk of injury and possible fatality on grading construction projects. The company recognizes that construction activities will vary on each site and that job site safety is the contractor's responsibility. However, it is, imperative that all personnel be safety conscious to avoid accidents and potential injury.

In an effort to minimize risks associated with geotechnical testing and observation, the following precautions are to be implemented for the safety of our field personnel on grading and construction projects.

1. Safety Meetings: Our field personnel are directed to attend the contractor's regularly scheduled safety meetings.
2. Safety Vests: Safety vests are provided for and are to be worn by our personnel while on the job site.
3. Safety Flags: Safety flags are provided to our field technicians; one is to be affixed to the vehicle when on site, the other is to be placed atop the spoil pile on all test pits.

In the event that the contractor's representative observes any of our personnel not following the above, we request that it be brought to the attention of our office.

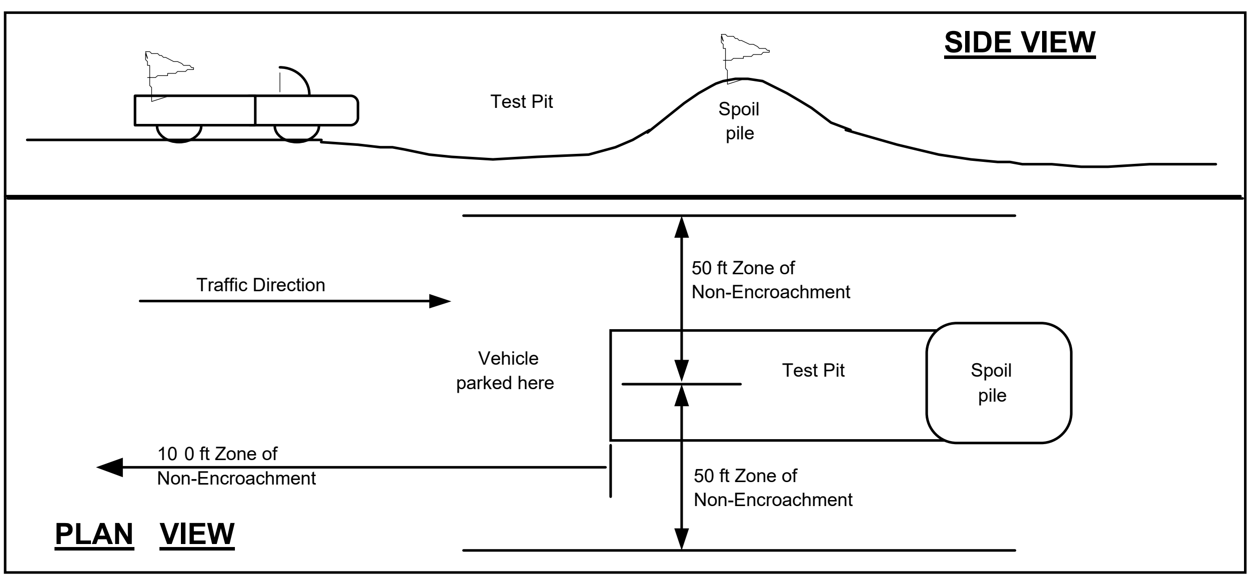
Test Pits Location, Orientation and Clearance

The technician is responsible for selecting test pit locations. The primary concern is the technician's safety. However, it is necessary to take sufficient tests at various locations to obtain a representative sampling of the fill. As such, efforts will be made to coordinate locations with the grading contractors authorized representatives (e.g. dump man, operator, supervisor, grade checker, etc.), and to select locations following or behind the established traffic pattern, preferably outside of current traffic. The contractors authorized representative should direct excavation of the pit and safety during the test period. Again, safety is the paramount concern.

Test pits should be excavated so that the spoil pile is placed away from oncoming traffic. The technician's vehicle is to be placed next to the test pit, opposite the spoil pile. This necessitates that the fill be maintained in a drivable condition. Alternatively, the contractor may opt to park a piece of equipment in front of test pits, particularly in small fill areas or those with limited access.

A zone of non-encroachment should be established for all test pits (see diagram below). No grading equipment should enter this zone during the test procedure. The zone should extend outward to the sides approximately 50 feet from the center of the test pit and 100 feet in the direction of traffic flow. This zone is established both for safety and to avoid excessive ground vibration, which typically decreases test results.

TEST PIT SAFETY PLAN



Slope Tests

When taking slope tests, the technician should park their vehicle directly above or below the test location on the slope. The contractor's representative should effectively keep all equipment at a safe operation distance (e.g. 50 feet) away from the slope during testing.

The technician is directed to withdraw from the active portion of the fill as soon as possible following testing. The technician's vehicle should be parked at the perimeter of the fill in a highly visible location.

Trench Safety

It is the contractor's responsibility to provide safe access into trenches where compaction testing is needed. Trenches for all utilities should be excavated in accordance with CAL-OSHA and any other applicable safety standards. Safe conditions will be required to enable compaction testing of the trench backfill.

All utility trench excavations in excess of 5 feet deep, which a person enters, are to be shored or laid back. Trench access should be provided in accordance with OSHA standards. Our personnel are directed not to enter any trench by being lowered or "riding down" on the equipment.

Our personnel are directed not to enter any excavation which;

1. is 5 feet or deeper unless shored or laid back,
2. exit points or ladders are not provided,
3. displays any evidence of instability, has any loose rock or other debris which could fall into the trench, or
4. displays any other evidence of any unsafe conditions regardless of depth.

If the contractor fails to provide safe access to trenches for compaction testing, our company policy requires that the soil technician withdraws and notifies their supervisor. The contractors representative will then be contacted in an effort to effect a solution. All backfill not tested due to safety concerns or other reasons is subject to reprocessing and/or removal.

Procedures

In the event that the technician's safety is jeopardized or compromised as a result of the contractor's failure to comply with any of the above, the technician is directed to inform both the developer's and contractor's representatives. If the condition is not rectified, the technician is required, by company policy, to immediately withdraw and notify their supervisor. The contractor's representative will then be contacted in an effort to effect a solution. No further testing will be performed until the situation is rectified. Any fill placed in the interim can be considered unacceptable and subject to reprocessing, recompaction or removal.

In the event that the soil technician does not comply with the above or other established safety guidelines, we request that the contractor bring this to technicians attention and notify our project manager or office. Effective communication and coordination between the contractors' representative and the field technician(s) is strongly encouraged in order to implement the above safety program and safety in general.

The safety procedures outlined above should be discussed at the contractor's safety meetings. This will serve to inform and remind equipment operators of these safety procedures particularly the zone of non-encroachment.

The safety procedures outlined above should be discussed at the contractor's safety meetings. This will serve to inform and remind equipment operators of these safety procedures particularly the zone of non-encroachment.

GeoTek, Inc.
1384 Poinsettia Avenue, Suite A Vista, CA 92081-8505
(760) 599-0509 Office (760) 599-0593 Fax www.geotekusa.com

August 3, 2023
Project No.: 3778-SD

KA Enterprises
5820 Oberlin Drive Suite 201
San Diego, California 92121

Attention: Mr. Eugene Marini

Subject: **Response to City of San Diego Geotechnical Review Comments**
Proposed Convenience Store and Carwash
3060 Carmel Valley Road
San Diego, California 92130

Dear Mr. Marini:

This letter has been prepared to respond to Development Services Department-Geology (Project Number 1054862) comments presented by the City of San Diego. A copy of the comment sheet related to geology is included in Appendix A.

Comment No. 146

The project's geotechnical consultant must provide a geotechnical addendum or update letter for the purposes of an environmental review that references the development plans and addresses the following:

Response to Review Comment No. 146

This letter should be considered as a geotechnical addendum. The development plans are referenced. The referenced plans have been updated since GeoTek's 2022 report. The updated plans have been reviewed and have not changed significantly from prior conceptual drawings. An updated project description is not considered necessary.

Comment No. 147

The project's geotechnical consultant should address the liquefaction potential of the site and the potential consequences of soil liquefaction on the proposed project.

Response to Review Comment No. 147

Liquefaction describes a phenomenon in which cyclic stresses, produced by earthquake-induced ground motion, create excess pore pressures in relatively cohesionless soils. These soils may thereby acquire a high degree of mobility, which can lead to lateral movement, sliding, consolidation and settlement of loose sediments, sand boils and other damaging deformations. This phenomenon occurs only below the water table, but, after liquefaction has developed, the effects can propagate upward into overlying non-saturated soil as excess pore water dissipates.

The factors known to influence liquefaction potential include soil type and grain size, relative density, groundwater level, confining pressures, and both intensity and duration of ground shaking. In general, materials that are susceptible to liquefaction are loose, saturated granular soils having low fines content under low confining pressures.

Liquefaction analysis of the site soils was performed to assess the potential seismic settlement. The analysis was performed at Boring B-3. This boring is closest in proximity to the proposed new convenience building. For this analysis, an earthquake induced groundwater depth of 14 feet and a ground acceleration of 0.53g (PGAm) and a mean seismic event of 6.9 were applied. The PGA and earthquake magnitude values were obtained from the USGS website. The computer software program CivilTech was used for liquefaction analyses. State of California Special Publication 117a (SP 117a) indicates a maximum depth of 50 feet should be considered. It may also be noted that Boring B-3 was terminated before reaching 50 feet. Boring B-5 was advanced to encounter bedrock. Bedrock at Boring B-5 was encountered at a depth of 29 feet below adjacent ground surface. Boring B-5 is located south and topographically 6 feet lower than Boring B-3. The local geologic setting can be described as an alluviated estuary channel characterized with a main channel trending from east to west with north-south finger tributaries feeding the main channel. The bedrock contours of the tributaries that feed into the main channel typically increase in elevation further away from the main channel. This is reflected in a revised geologic cross section AA' presented as Figure 3 (attached). The result is bedrock below Boring B-3 can be approximated at a depth of 30 feet. Torrey Sandstone bedrock does not possess low density soils susceptible to seismic settlement. Therefore, analysis below a depth of 26.5 feet is not considered to be necessary.

The results of the liquefaction analysis indicate a total seismic-induced settlement of 5.5 inch is possible. Differential seismic-induced settlement of about 3.0 inches over a 30-foot span is estimated. Liquefaction analysis is presented in Appendix B.

Comment No. 148

The project's geotechnical consultant should provide their liquefaction analysis using peak ground acceleration in accordance with section 1803.5.12.2 of the current CBC.

Response to Review Comment No. 148

Acknowledged. This was performed as a response to comment no. 147.

Comment No. 149

The project's geotechnical consultant should submit their calculations for the liquefaction analysis.

Response to Review Comment No. 149

Liquefaction analysis is presented in Appendix B.

Comment No. 150

The project's geotechnical consultant should address lateral spread or flow slide potential of the site. If impacts are indicated, provide recommended mitigation measures.

Response to Review Comment No. 150

Tall descending slopes are not associated with site conditions, however there are descending slopes offsite. Approximately 30 feet to the west of the western property line, a descending slope approximately 10 feet tall exists. Along the southern property line, a descending slope approximately 6 feet tall exists. Slopes provide an unrestrained boundary condition to lateral movement. Where this unrestrained condition does not exist horizontal displacement of soils is reduced significantly. With no significant descending slopes on site and provided that supplemental foundation recommendations presented in response to comment no. 151 are incorporated in foundation design for the retail building and carwash building, quantitative lateral spread analysis is not considered necessary.

Comment No. 151

The Guidelines for Evaluating and Mitigating Seismic Hazards in California (CGS, Special Publication 117) indicates "the minimum level of mitigation for a project should reduce the risk of ground failure during an earthquake to a level that does not cause the collapse of buildings for human occupancy, but in most cases, not to a level of no ground failure at all." The project's geotechnical consultant should indicate if their recommendations are in accordance with this standard.

Response to Review Comment No. 151

Building foundations (retail mart and carwash buildings) should be designed by a structural engineer and incorporate the preliminary seismic settlement potential in their design. If the structural engineer cannot design the building and foundation in accordance with SPA 117, deepened foundations are a design alternative to shallow spread footings.

Structures may be supported by a grade beam and drilled pier foundation system. Drilled piers should extend at least 5-feet into approved Torrey Sandstone and should have a minimum diameter of 18-inches. Drilled piers founded as recommended may be designed for a dead plus live load end bearing capacity of 5,700 pounds-per-square-foot. This value may be increased by one-third for wind and seismic forces. A skin friction value of 250-pounds-per-square-foot may be assumed in the Torrey Sandstone. Drilled piers should be observed by the Geotechnical Consultant at the time of drilling to ensure that the appropriate bearing materials have been encountered. Drilled pier bore-holes should be cleaned of loose cuttings prior to placement of steel and concrete.

Comment No. 152

Circumscribe the limits of anticipated remedial grading on the geologic/geotechnical map to delineate the proposed footprint of the project.

Response to Review Comment No. 152

The limits of the anticipated remedial grading is presented on Figure 2 Geotechnical Map.

Comment No. 153

The project's geotechnical consultant should provide a conclusion regarding if the proposed development will destabilize or result in settlement of adjacent property or the right of way.

Response to Review Comment No. 153

The proposed development will not destabilize or result in settlement of adjacent property or the right of way. It should be noted that our analysis and conclusions do not take into account offsite conditions, nor should the applicant be responsible for evaluating offsite conditions not directly related to the proposed project.

Comment No. 154

The project's geotechnical consultant should provide a statement as to whether or not the site is suitable for the intended use.

Response to Review Comment No. 154

Provided the geotechnical recommendations presented in GeoTek's 2022 report, this addendum report, and supplemental recommendations (if needed) are incorporated into the design and construction phases, the site is suitable to support the proposed improvements.

LIMITATIONS

GeoTek has prepared this report in a manner consistent with that level of care and skill ordinarily exercised by members of the engineering and science professions currently practicing under similar conditions in the jurisdiction in which the services are provided, subject to the time limits and physical constraints applicable to this report.

Since our recommendations are based on the site conditions observed and encountered, and laboratory testing, our conclusions and recommendations are professional opinions that are limited to the extent of the available data. Observations during construction are important to allow for any change in recommendations found to be warranted. These opinions have been derived in accordance with current standards of practice and no warranty of any kind is expressed or implied. Standards of care/practice are subject to change with time.

The opportunity to be of service is sincerely appreciated. If you should have any questions, please do not hesitate to contact our office.

Respectfully submitted,
GeoTek, Inc.

Christopher D. Livesey	Edwin R. Cunningham
CEG 2733 Exp 05/31/25	RCE 81687, Exp 03/31/24
Vice President	Project Engineer

Distribution: (1) Addressee via email

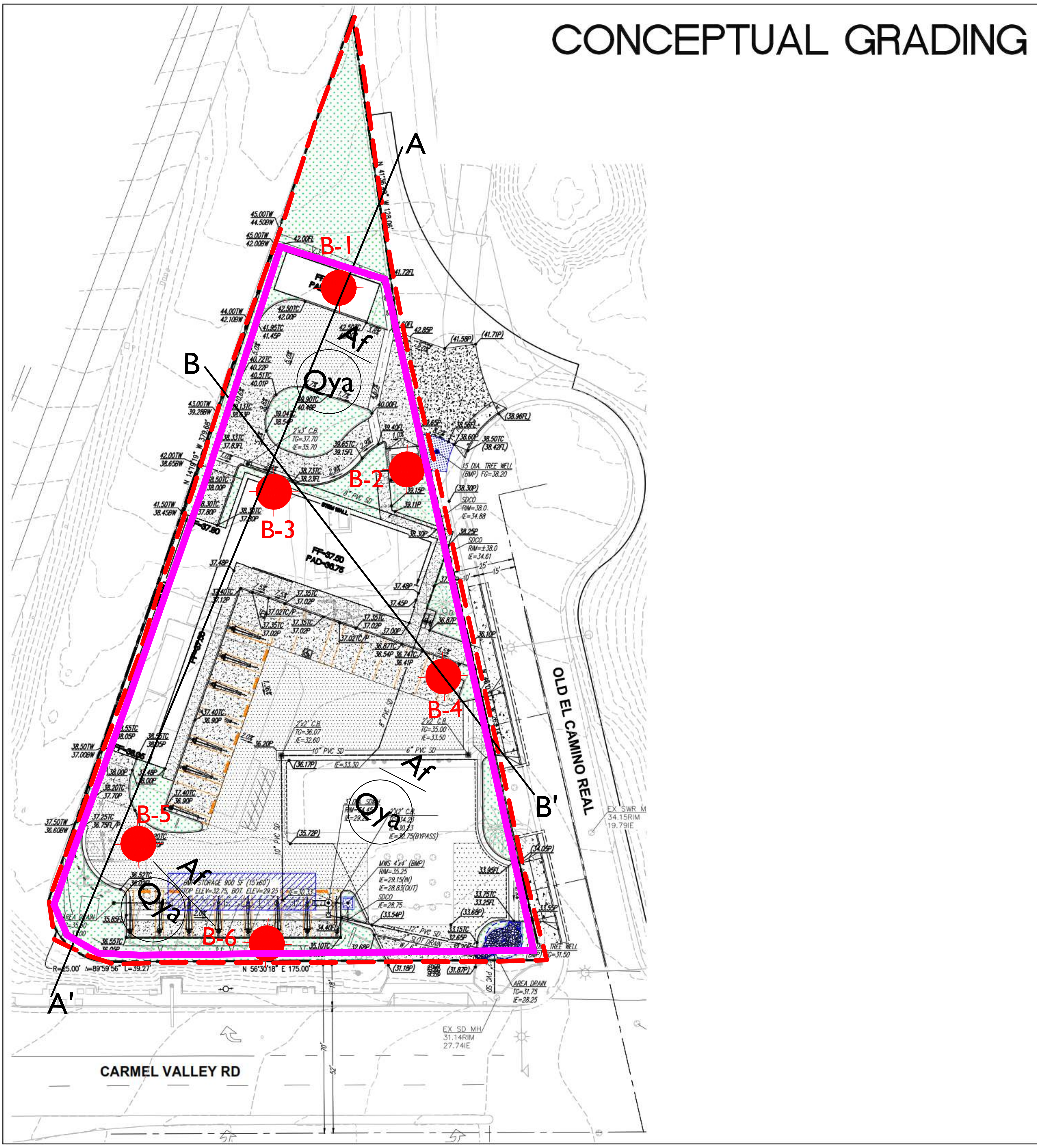
Attachments: Figure 1 – Not Included
Figure 2 – Geotechnical Map
Figure 3 – Cross – Section AA'
Figure 4 – Cross – Section BB'
Appendix A – City Geotechnical Review Comments
Appendix B – Liquefaction Analysis

REFERENCES

GeoTek, Inc., 2021a, "Preliminary Geotechnical Evaluation, Proposed Convenience Store and Carwash, 3060 Carmel Valley Road, San Diego, California," Project No. 3788-SD, dated June 23, 2022.

KA Enterprises, Inc,. Development plans "C-Store and Car Wash, 3060 Carmel Valley Rd, San Diego, California." 17 sheets, Print date of March 22, 2023.

GEOTEK



LEGEND

B-6 Approximate Location of Boring

Af Artificial Fill

Qya Quaternary Young Alluvial Flood Plain Deposits, Circled where Buried

Approximate Limits of Study, this report

Approximate Limits of Remedial Grading

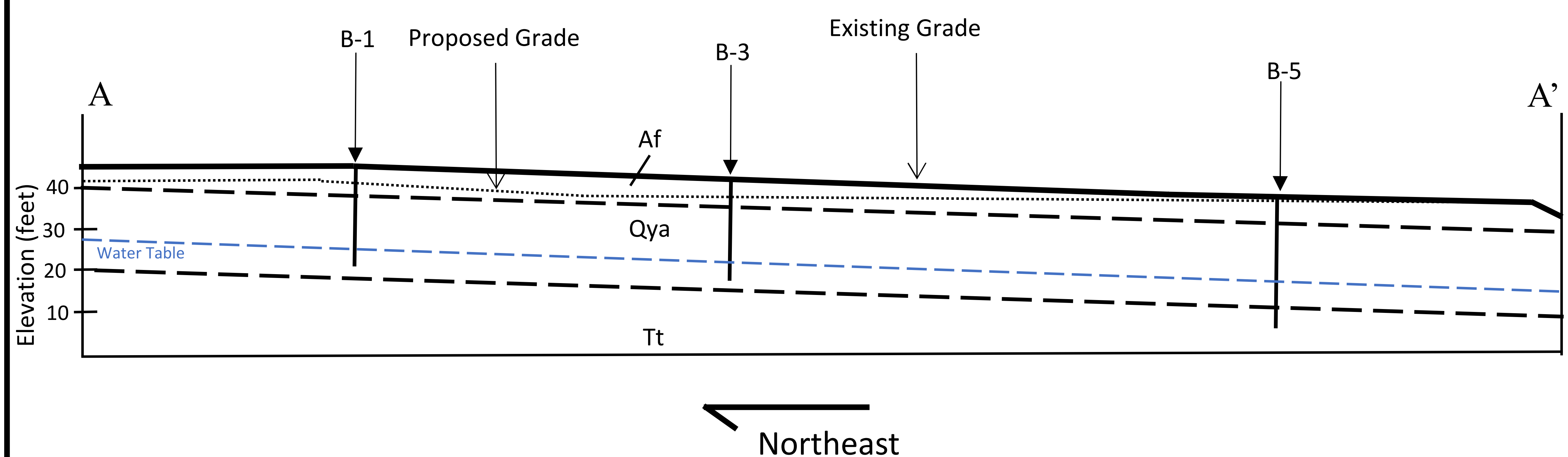
Scale: 1" = 40'

0 20 40 80

N

Plan adapted from "Conceptual Grading Plan" by Barghausen Consulting Engineers, Inc.

KA Enterprises 3060 Carmel Vally Road San Diego, California	Figure 2 Geotechnical Map	GEOTEK 1384 Poinsettia Avenue, Suite A Vista, California 92081
PN: 3778-SD DATE: August 2023		



LEGEND

B-1	Approximate Borehole Location
Af	Artificial Fill
Qya	Quaternary Young Alluvium
Tt	Tertiary Torrey Sandstone

GEOTEK
1384 Poinsettia Avenue, Suite A
Vista, California 92081

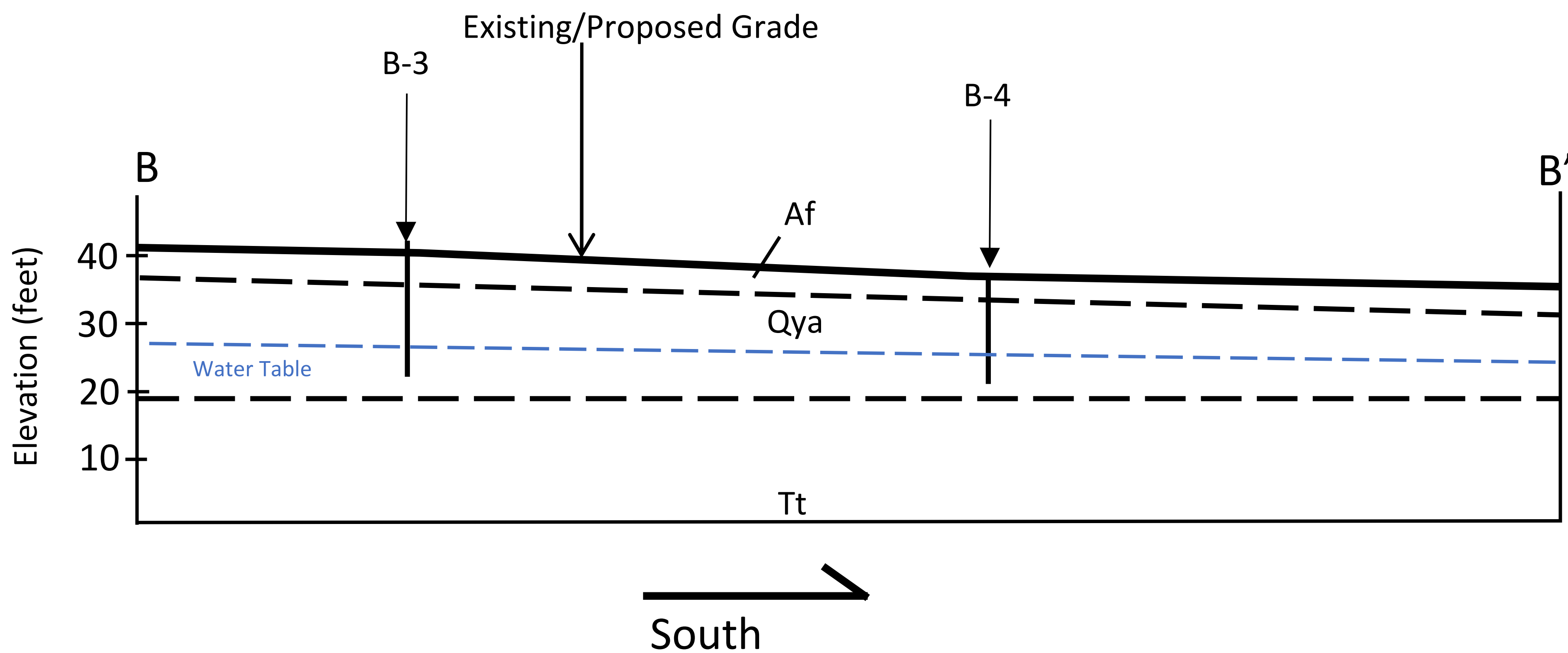
Figure 3

Geologic Cross Section A-A'

KA Enterprises
3060 Carmel Valley Rd.
San Diego, California

August 2023

PN: 3778-SD



LEGEND

B-3	Approximate Borehole Location
Af	Artificial Fill
Qya	Quaternary Young Alluvium
Tt	Tertiary Torrey Sandstone

GEOTEK

1384 Poinsettia Avenue,
Suite A
Vista, California 92081

Figure 4

Geologic Cross Section B-B'

KA Enterprises
3060 Carmel Valley Rd.
San Diego, California

August 2023

PN: 3778-SD

<u>APPENDIX A</u>

City of San Diego Review Comments

Please be aware that the environmental review may change in response to any project changes and/or new information. Additionally, the new information may lead to the requirement of new and/or additional technical studies. A determination as to the appropriate environmental document will be made based on all reviewed and submitted information.

DSD-Geology

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[Comment 00144 | Page]

The project site is located in Geologic Hazard Category 31 as shown on the City's Seismic Safety Study Geologic Hazard Maps and is characterized by a high liquefaction potential.

The Preliminary Geotechnical Evaluation submitted for review does not addresses the liquefaction potential of the subject site and potential consequences of soil liquefaction on the proposed project per the City's Guidelines for Geotechnical Reports and the CBC.

For information regarding geotechnical evaluation of seismic induced ground failure, see Section 6.4.2 of the City's Guidelines for Geotechnical Reports (www.sandiego.gov/sites/default/files/legacy/development-services/pdf/industry/geoguidelines.pdf).

[Comment 00145 | Page]

*Please note, the addendum/update letter requested in this review cycle must be uploaded with the "**Geotechnical Investigation Report Addendum**" PDF file option only.*

Please note, to avoid additional reviews, do not attempt to submit any additional document using the "Geotechnical Investigation Report" PDF file option as this will overwrite the previously submitted record geotechnical document for the project.

Please note, geotechnical documents that are uploaded incorrectly are unacceptable as record documents.

[Comment 00146 | Page]

The project's geotechnical consultant must submit a geotechnical addendum or update letter for the purpose of an environmental review that references the development plans and addresses the following:

[Comment 00147 | Page]

The project's geotechnical consultant should address the liquefaction potential of the site and the potential consequences of soil liquefaction on the proposed project.

[Comment 00148 | Page]

The project's geotechnical consultant should provide their liquefaction analysis using peak ground acceleration in accordance with section 1803.5.12.2 of the current CBC.

[Comment 00149 | Page]

The project's geotechnical consultant should submit their calculations for the liquefaction analysis.

[Comment 00150 | Page]

The project's geotechnical consultant should address lateral spread or flow slide potential of the site. If impacts are indicated, provide recommended mitigation measures.

THE CITY OF SAN DIEGO
Development Services Department
1222 1st Avenue, San Diego, CA 92101

[Comment 00151 | Page]

The Guidelines for Evaluating and Mitigating Seismic Hazards in California (CGS, Special Publication 117) indicates "the minimum level of mitigation for a project should reduce the risk of ground failure during an earthquake to a level that does not cause the collapse of buildings for human occupancy, but in most cases, not to a level of no ground failure at all." The project's geotechnical consultant should indicate if their recommendations are in accordance with this standard.

[Comment 00152 | Page]

Circumscribe the limits of anticipated remedial grading on the geologic/geotechnical map to delineate the proposed footprint of the project.

[Comment 00153 | Page]

The project's geotechnical consultant should provide a conclusion regarding if the proposed development will destabilize or result in settlement of adjacent property or the right of way.

[Comment 00154 | Page]

The project's geotechnical consultant should provide a statement as to whether or not the site is suitable for the intended use.

DSD-Planning Review

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[Comment 00085 | Page]

Info

These comments are drafts and subject to change until presented by the City's assigned Development Project Manager in conjunction with the project Assessment Letter. Staff is unable to process formal, intermediate plan changes and updates outside the full submitted cycle. A formal response to these comments must be made through the resubmittal process in response to the full Assessment Letter. Your DSD Development Project Manager can assist with further questions

[Comment 00095 | Page]

Refuse and Recyclable Material Storage

The refuse and recyclable storage areas shall meet Land Development Code; Sections Comply with Sections 142.0810, 142.0830, and 142.0831. Trash enclosures shall be architecturally compatible with primary buildings. Provide these details on the site plan and square footage as shown in Table 142-08C.

Please refer to the O-21416 strikeout ordinance still active in the Coastal Overlay Zone. Refuse, Organic Waste, and Recyclable Materials Storage Regulations updated ordinance has not yet been adopted in the Coastal Overlay.

DSD-Transportation Development

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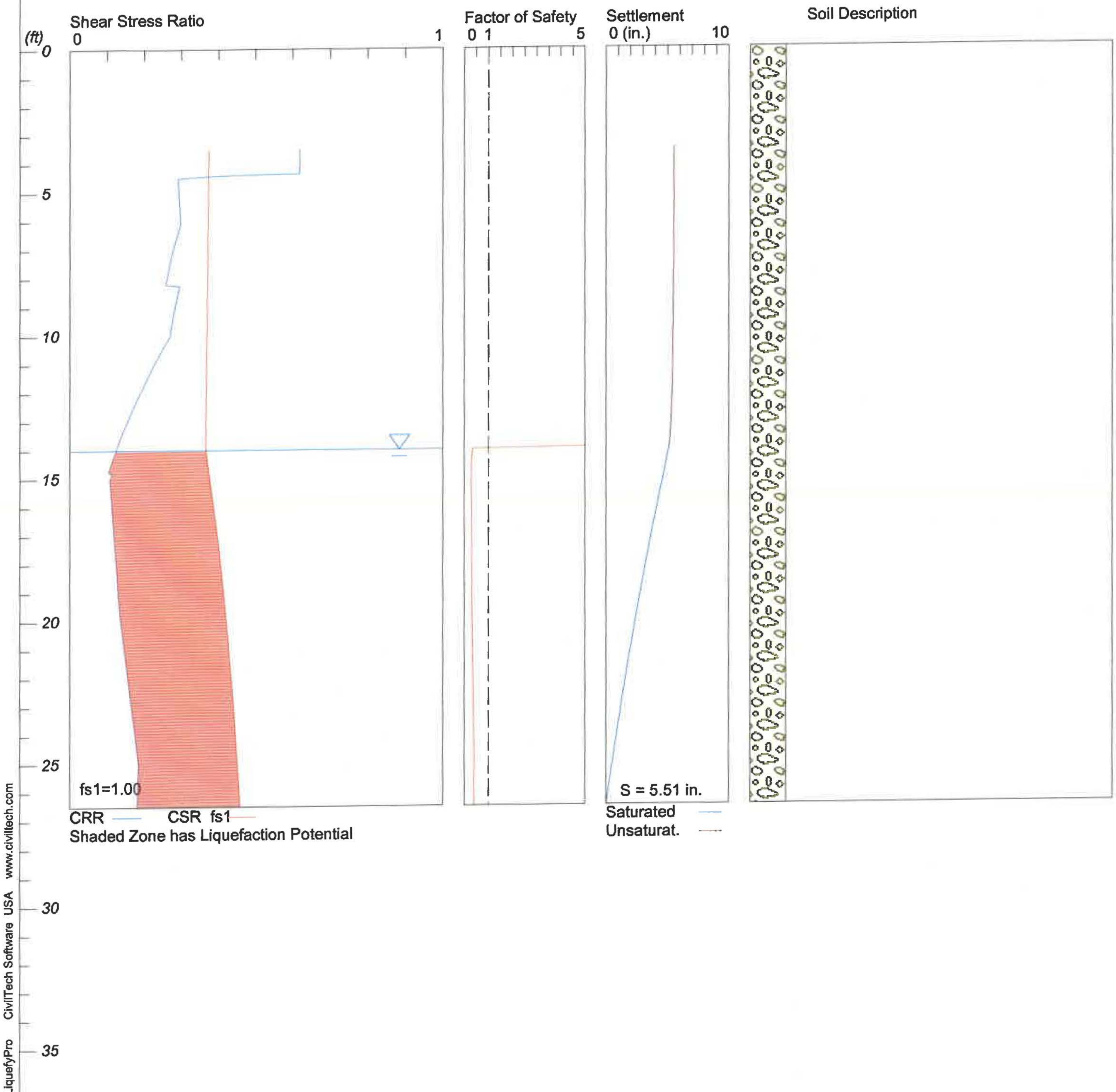
APPENDIX B

Liquefaction Analysis

LIQUEFACTION ANALYSIS
3060 Carmel Valley Road

Hole No.=B-3   Water Depth=14 ft   Surface Elev.=44

Magnitude=6.9
Acceleration=0.58g



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LIQUEFACTION ANALYSIS SUMMARY

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Input File Name: UNTITLED
Title: 3060 Carmel Valley Road
Subtitle: Liquefction

Surface Elev.=44
Hole No.=B-3
Depth of Hole= 26.50 ft
Water Table during Earthquake= 14.00 ft
Water Table during In-Situ Testing= 19.00 ft
Max. Acceleration= 0.58 g
Earthquake Magnitude= 6.90

Input Data:

Surface Elev.=44
Hole No.=B-3
Depth of Hole=26.50 ft
Water Table during Earthquake= 14.00 ft
Water Table during In-Situ Testing= 19.00 ft
Max. Acceleration=0.58 g
Earthquake Magnitude=6.90
No-Liquefiable Soils: CL, OL are Non-Liq. Soil

1. SPT or BPT Calculation.
2. Settlement Analysis Method: Ishihara / Yoshimine
3. Fines Correction for Liquefaction: Idriss/Seed
4. Fine Correction for Settlement: During Liquefaction*
5. Settlement Calculation in: All zones*
6. Hammer Energy Ratio, Ce = 1.3
7. Borehole Diameter, Cb= 1.0
8. Sampling Method, Cs= 1.0
9. User request factor of safety (apply to CSR) , User= 1
   Plot one CSR curve (fs1=User)
10. Use Curve Smoothing: Yes*

* Recommended Options

In-Situ Test Data:

Depth SPT gamma Fines

ft		pcf	%
3.50	50.00	115.00	5.00
4.50	13.00	130.00	5.00
10.00	14.00	133.00	5.00
15.00	6.00	133.00	5.00
20.00	9.00	133.00	5.00
25.00	13.00	133.00	5.00

Output Results:

Settlement of Saturated Sands=5.12 in.
Settlement of Unsaturated Sands=0.39 in.
Total Settlement of Saturated and Unsaturated Sands=5.51 in.
Differential Settlement=2.757 to 3.639 in.

Depth ft	CRRm	CSRfs	F.S.	S_sat. in.	S_dry in.	S_all in.
3.50	0.62	0.37	5.00	5.12	0.39	5.51
4.50	0.29	0.37	5.00	5.12	0.39	5.51
5.50	0.29	0.37	5.00	5.12	0.39	5.50
6.50	0.29	0.37	5.00	5.12	0.38	5.50
7.50	0.27	0.37	5.00	5.12	0.36	5.48
8.50	0.29	0.37	5.00	5.12	0.35	5.47
9.50	0.28	0.37	5.00	5.12	0.33	5.45
10.50	0.25	0.37	5.00	5.12	0.31	5.43
11.50	0.21	0.37	5.00	5.12	0.28	5.40
12.50	0.17	0.37	5.00	5.12	0.23	5.34
13.50	0.14	0.37	5.00	5.12	0.11	5.23
14.50	0.11	0.37	0.30*	4.89	0.00	4.89
15.50	0.11	0.38	0.29*	4.41	0.00	4.41
16.50	0.12	0.39	0.30*	3.94	0.00	3.94
17.50	0.12	0.40	0.30*	3.49	0.00	3.49
18.50	0.13	0.41	0.31*	3.05	0.00	3.05
19.50	0.13	0.42	0.32*	2.63	0.00	2.63
20.50	0.14	0.42	0.33*	2.21	0.00	2.21
21.50	0.15	0.43	0.35*	1.81	0.00	1.81
22.50	0.16	0.44	0.37*	1.43	0.00	1.43
23.50	0.17	0.44	0.39*	1.06	0.00	1.06
24.50	0.18	0.45	0.40*	0.70	0.00	0.70
25.50	0.18	0.45	0.41*	0.35	0.00	0.35
26.50	0.18	0.46	0.40*	0.00	0.00	0.00

* F.S.<1, Liquefaction Potential Zone
(F.S. is limited to 5, CRR is limited to 2, CSR is limited to 2)

Units: Unit: qc, fs, Stress or Pressure = atm (1.0581tsf); Unit Weight = pcf; Depth = ft; Settlement = in.

1 atm (atmosphere) = 1 tsf (ton/ft2)

CRRm	Cyclic resistance ratio from soils
CSRsf	Cyclic stress ratio induced by a given earthquake (with user request factor of safety)
F.S.	Factor of Safety against liquefaction, F.S.=CRRm/CSRsf
S_sat	Settlement from saturated sands
S_dry	Settlement from Unsaturated Sands
S_all	Total Settlement from Saturated and Unsaturated Sands
NoLiq	No-Liquefy Soils