GEOTECHNICAL INVESTIGATION REPORT
PROPOSED RESIDENTIAL BUILDING
2288 VIA APRILLIA

Del Mar Terrace, California

Prepared for:
MR. TIM RANDELL

Prepared by:
GEOBODEN INC.
Irvine, CA 92620

March 27, 2020

Project No. GB 101-1

GEOBODEN INC.

GEOTECHNICAL INVESTIGATION REPORT
PROPOSED RESIDENTIAL BUILDING
2288 VIA APRILLIA
DEL MAR TERRACE, CALIFORNIA

MR. TIM RANDELL

Prepared by:

GEOBODEN INC.
5 Hodgenville
Irvine, California 92620

March 27, 2020

J.N. GB 101-1

GEOBODEN, INC.
Geotechnical Consultants

March 27, 2020 Project No. GB 101-1

Attention: MR. TIM RANDELL

Subject: Geotechnical Investigation Report
Proposed Residential Building
2288 Via Aprilia
Del Mar Terrace, California

GeoBoden, Inc. is pleased to provide you with this report on our geotechnical investigation for the proposed Residential Building to be constructed on the subject site.

Based upon the findings of our investigations, we have concluded that the proposed addition and site improvements are feasible from the geotechnical perspectives.

Please do not hesitate to contact the undersigned if you have any questions or if we may be of any additional assistance. We look forward to assisting you during the construction of the proposed site improvements.

Respectfully submitted,
GEOBODEN INC.

REGISTERED PROFESSIONAL ENGINEER
SHAHROKH E. RADVAR
2742
GEOTECHNICAL
STATE OF CALIFORNIA

CERTIFIED ENGINEERING GEOLOGIST
JAMES Mac GREGOR RENFREW JR.
No. 1970
Exp:
STATE OF CALIFORNIA

Cyrus Radvar
Principal Engineer, G.E. 2742
Expires: 06/30/2020

James Renfrew
Engineering Geologist, CEG 1970
Expires: 09/30/2021

Copies: 4/Addressee

5 Hodgenville | Irvine, CA 92620 | Off 949-872-9565 | Fax 949-743-2935

GEOTECHNICAL INVESTIGATION REPORT

PROPOSED RESIDENTIAL BUILDING
2288 VIA APRILIA
DEL MAR TERRACE, CALIFORNIA

TABLE OF CONTENTS

1.0 INTRODUCTION 1

2.0 SITE LOCATION AND DESCRIPTION 1

3.0 PROPOSED CONSTRUCTION AND GRADING 1

4.0 GEOTECHNICAL INVESTIGATION 2

4.1 FIELD EXPLORATION PROGRAM 2
4.2 LABORATORY TESTING 2

5.0 DISCUSSION OF FINDINGS 2

5.1 GEOLOGIC HAZARDS 2
5.2 GROUNDWATER CONDITIONS 3
5.3 FAULTING AND SEISMICITY 3
5.4 LIQUEFACTION POTENTIAL 4

6.0 DESIGN RECOMMENDATIONS 5

6.1 EARTHWORK 5
6.2 SITE AND FOUNDATION PREPARATION 5
6.3 FILL PLACEMENT AND COMPACTION REQUIREMENTS 6
6.4 IMPORTED SOILS 6
6.5 SHALLOW FOUNDATIONS 6
6.5.1 Bearing Capacity and Settlement 6
6.5.2 Lateral Load Resistance 7
6.5.3 Footing Reinforcement 7
6.6 RETAINING WALLS AND WALLS BELOW GRADE 7
6.6.1 Lateral Earth Pressures 8
6.6.2 Drainage and Waterproofing 9
6.7 CONCRETE SLAB ON-GRADE 10
6.8 SOLUBLE SULFATES AND SOIL CORROSIVITY 11
6.9 UTILITY TRENCHES 11

7.0 CONSTRUCTION CONSIDERATIONS 12

7.1 TEMPORARY DEWATERING 12
7.2 CONSTRUCTION SLOPES 12
7.3 TEMPORARY SHORING 13
7.3.1 TEMPORARY LATERAL EARTH PRESSURES 13
7.3.2 SOLDIER PILES AND LAGGING 14
7.3.4 SHEET PILES 14
7.3.5 INTERNAL BRACING 14
7.3.6 DEFLECTION 15
7.3.7 MONITORING 15

8.0 CLOSURE **15**

9.0 REFERENCES **17**

FIGURES

Figure 1	Vicinity Map
Figure 2	Boring Location Plan
Figure 3	Recommended Earth Pressures for Temporary Shoring System

APPENDIXES

Appendix A	Boring Logs
Appendix B	Laboratory Testing

GEOTECHNICAL INVESTIGATION REPORT
PROPOSED RESIDENTIAL BUILDING
2288 VIA APRILIA
Del Mar Terrace, California

1.0 INTRODUCTION

This report presents the results of our geotechnical investigation performed by GeoBoden, Inc. (GeoBoden) for the proposed deck and Residential Building to be constructed at 2288 Via Aprilia in the city of Del Mar Terrace, California. The general location of the project is shown on Figures 1.

The purposes of this investigation were to determine the geotechnical properties of subsurface soil conditions, to evaluate their in-place characteristics, evaluate site seismicity, and to provide geotechnical recommendations with respect to design and construction of the proposed deck and Residential Building foundations.

The scope of the authorized investigation included performing a site reconnaissance, conducting field exploration and laboratory testing programs, performing engineering analyses, and preparing this Geotechnical Investigation Report. Evaluation of environmental issues or the potential presence of hazardous materials was not within the scope of services provided.

2.0 SITE LOCATION AND DESCRIPTION

The subject site is located at 2288 Via Aprilia in the city of Del Mar Terrace, California. The site is currently occupied by an existing residential building. The site is bounded by a rear yard descending slope. The descending slope descends down from the adjoining property on the north and is approximately 15 feet in maximum height at an approximate maximum inclination of 2:1 (H:V). The site is also bounded on the south by Via Aprilia.

3.0 PROPOSED CONSTRUCTION AND GRADING

Based on information provided in the project plans (Figure 2), it is our understanding that a portion of the existing residence along with existing retaining walls will be removed to accommodate the new construction of residential building and new retaining walls. The proposed residential building will be of wood-frame construction with basement and will be supported on shallow foundation systems.

4.0 GEOTECHNICAL INVESTIGATION

Our geotechnical investigation included a field exploration program and a laboratory testing programs. These programs were performed in accordance with our scope of services. The field exploration and laboratory testing programs are described below.

4.1 FIELD EXPLORATION PROGRAM

The field exploration program involved drilling of one hand-auger boring to depth 5.5 feet below existing ground surfaces. Soil materials encountered were visually classified and logged in accordance with the Unified Soil Classification System. Approximate location of the boring is depicted on Figure 2.

Associated with the subsurface exploration was the collection of soil sample of the on-site soil materials for laboratory testing. The soil sample was placed in sealed plastic bag and was transported to laboratory for testing.

4.2 LABORATORY TESTING

Selected samples collected during drilling activities were tested in the laboratory to assist in evaluating controlling engineering properties of subsurface materials at the site. Physical tests performed included moisture determination, direct shear, and corrosion testing. The results of the laboratory testing are presented in Appendix B.

5.0 DISCUSSION OF FINDINGS

According to a review of existing geologic and geotechnical literature, the site is underlain by terrace deposits underlain by marine silty sandstone of bedrock deposits.

Subsurface materials encountered in the exploratory boring generally consisted of a thin layer of topsoil consisting of light olive brown silty sand underlain by silty sandstone bedrock to the explored depth of approximately 5.5 feet bgs. The descriptions of the soil materials observed in our exploratory boring are provided in Appendix A.

5.1 GEOLOGIC HAZARDS

The site is not located within a seismic hazard zone for potential slope instability. The site is not located within a landslide hazard zone. The site is also not within a seismic hazard zone for potential liquefaction as designated by the State.

The most significant geologic hazard to the project is the potential for moderate ground shaking resulting from earthquakes generated on the faults within the vicinity of the site. The discussion of these faults is included in the following section of this report.

5.2 GROUNDWATER CONDITIONS

Groundwater was not encountered within our exploratory boring. Fluctuations of the groundwater level, localized zones of perched water, and soil moisture content should be anticipated during and following the rainy season. Irrigation of landscaped areas on or adjacent to the site can also cause a fluctuation of soil moisture content and local groundwater levels.

5.3 FAULTING AND SEISMICITY

We consider the most significant geologic hazard to the project to be the potential for moderate to strong seismic shaking that is likely to occur during the design life of the proposed project. The project site is located in the highly seismic Southern California region within the influence of several fault systems that are considered to be active or potentially active. An active fault is defined by the State of California as a "sufficiently active and well defined fault" that has exhibited surface displacement within the Holocene time (about the last 11,000 years). A potentially active fault is defined by the State as a fault with a history of movement within Pleistocene time (between 11,000 and 1.6 million years ago).

These active and potentially active faults are capable of producing potentially damaging seismic shaking at the site. It is anticipated that the project site will periodically experience ground acceleration as the result of small to moderate magnitude earthquakes. Other active faults without surface expression (blind faults) or other potentially active seismic sources are not currently zoned and may be capable of generating an earthquake are known to be locally present under the region.

Faults identified by the State as being either active or potentially active are not known to be present at the surface of the site. The site is not located within a State of California-designated Earthquake Fault-Rupture Hazard Zone where a site-specific investigation would be required. The site is not listed as being in a Seismic Hazard Zone for potential slope instability by the State.

Based on our review of published and unpublished geotechnical maps and literature pertaining to site, Rose Canyon fault is about 3.71 kilometers from the site and presents a ground rupture hazard with an anticipated maximum moment magnitude (Mw) of 6.8.

The site is located at approximately 32.9345 Latitude and -117.2532 Longitude. Site spectral accelerations (Sa and S1), for 0.2 and 1.0 second periods and 2 percent probability of exceedance in 50 years (MCE) for a Class "C" site, was determined from the ASCE 7 HAZARD TOOL Website (https://asce7hazardtool.online/). The results are presented in the following table:

SITE SEISMIC PARAMETERS	
Mapped 0.2 sec Period Spectral Acceleration, S_a	1.228g
Mapped 1.0 sec Period Spectral Acceleration, S_1	0.434g
Site Coefficient for Site Class "C", F_a	1.2
Site Coefficient for Site Class "C", F_v	1.5
Maximum Considered Earthquake Spectral Response Acceleration Parameter at 0.2 Second, S_{MS}	1.473g
Maximum Considered Earthquake Spectral Response Acceleration Parameter at 1 second, S_{M1}	0.651g
Design Spectral Response Acceleration Parameter for 0.2 Second, S_{DS}	0.982g
Design Spectral Response Acceleration Parameter for 1.0 Second, S_{D1}	0.434g

The actual method of seismic design should be determined by the Structural Engineer.

5.4 LIQUEFACTION POTENTIAL

For liquefaction to occur, all of three key ingredients are required: liquefaction-susceptible soils, groundwater within a depth of 50 feet or less, and strong earthquake shaking. The site is not located within an area identified as having a potential for liquefaction. Soils susceptible to liquefaction are not present on site due to presence of bedrock. Accordingly, it is our opinion the potential for liquefaction at the site is remote.

6.0 DESIGN RECOMMENDATIONS

Based upon the results of our investigation, the proposed Residential Building is considered geotechnically feasible provided the recommendations presented herein are incorporated into the design and construction. If changes in the design of the structure are made or variations or changed conditions are encountered during construction, GeoBoden should be contacted to evaluate their effects on these recommendations. The following geotechnical engineering recommendations for the proposed the Residential Building are based on observations from the field investigation program and the physical test results.

6.1 EARTHWORK

All earthworks, including excavation, backfill and preparation of subgrade, should be performed in accordance with the geotechnical recommendations presented in this report and applicable portions of the grading code of local regulatory agencies. All earthwork should be performed under the observation and testing of a qualified geotechnical engineer.

6.2 SITE AND FOUNDATION PREPARATION

The construction area should be cleared of any vegetation and stripped of miscellaneous debris and other deleterious material. Organic matter and all other material that may interfere with the completion of the work should be removed from the limits of the construction area. Vegetation, construction debris, and organic matter should not be incorporated into engineered fill.

In general, all fill soils within the proposed building footprints should be overexcavated and replaced with engineered fill. As a minimum, removals should extend to competent native soils. Prior to placing structural fill, exposed bottom surfaces in each removal area approved for fill should first be scarified to a depth of at least 6 inches, water or air dried as necessary to achieve near optimum moisture conditions, and then recompacted in place to a minimum relative compaction of 90 percent.

Where grading is interrupted by rain, fill operations should not be resumed until the moisture content and dry density of the placed fill are satisfactory. Also, clay soils should not be allowed to dry out and crack; if they do, they should be excavated down to the depth of drying, moisture conditioned, and compacted.

6.3 FILL PLACEMENT AND COMPACTION REQUIREMENTS

Material for engineered fill should be select free of organic material, debris, and other deleterious substances, and should not contain fragments greater than 3 inches in maximum dimension. On-site excavated soils that meet these requirements may be used to backfill the excavated building pad area.

All fill should be placed in 6-inch-thick maximum lifts, watered or air dried as necessary to achieve near optimum moisture conditions, and then compacted in place to a maximum relative compaction of 90 percent. The laboratory maximum dry density and optimum moisture content for each change in soil type should be determined in accordance with Test Method ASTM D 1557. A representative of the project consultant should be present on-site during grading operations to verify proper placement and compaction of all fill, as well as to verify compliance with the other geotechnical recommendations presented herein.

6.4 IMPORTED SOILS

If imported soils are required to complete the planned grading, these soils should consist of clean materials devoid of rock exceeding a maximum dimension of 8 inches, as well as organics, trash and similar deleterious materials. Imported soils should also exhibit an expansion potential no greater than LOW, as determined in accordance with ASTM D4829. Prospective import soils should be observed, tested and approved by this firm prior to importing the soils to the site.

6.5 SHALLOW FOUNDATIONS

Following the site and foundation preparation recommended above, foundation for load bearing walls and interior columns may be designed as discussed below.

6.5.1 Bearing Capacity and Settlement

Load bearing walls and interior columns may be supported on continuous spread footings and isolated spread footings, respectively, and should bear entirely upon properly engineered fill or competent native soils. Continuous and isolated footings should have a minimum width of 14 inches and 24 inches, respectively. All footings should be embedded a minimum depth of 24 inches measured from the lowest adjacent finish grade. Continuous and isolated footings placed on such materials may be designed using an allowable (net) bearing capacity of 2,000 pounds per square foot (psf). Allowable increases of 250 psf for each additional 1 foot in width and 250 psf for each additional 6 inches in depth may be utilized, if desired. The maximum allowable bearing pressure should be 3,000 psf. The maximum bearing value applies to combined dead and sustained live loads. The allowable bearing pressure may be increased by one-third when considering transient live loads, including seismic and wind forces.

Based on the allowable bearing value recommended above, total settlement of the shallow footings are anticipated to be less than one inch, provided foundation preparations conform to the recommendations described in this report. Differential settlement is anticipated to be approximately half the total settlement for similarly loaded footings spaced up to approximately 30 feet apart.

6.5.2 Lateral Load Resistance

Lateral load resistance for the spread footings will be developed by passive soil pressure against sides of footings below grade and by friction acting at the base of the concrete footings bearing on compacted fill. An allowable passive pressure of 250 psf per foot of depth may be used for design purposes. An allowable coefficient of friction 0.30 may be used for dead and sustained live load forces to compute the frictional resistance of the footings constructed directly on compacted fill. Safety factors of 2.0 and 1.5 have been incorporated in development of allowable passive and frictional resistance values, respectively. Under seismic and wind loading conditions, the passive pressure and frictional resistance may be increased by one-third.

6.5.3 Footing Reinforcement

Reinforcement for footings should be designed by the structural engineer based on the anticipated loading conditions. Footings for lightly loaded wood-frame structures that are supported in low expansive soils should have No. 4 bars, two top and two bottom.

6.6 RETAINING WALLS AND WALLS BELOW GRADE

The project includes walls below grade for the basement and may also include shallow retaining walls supporting soil materials. These wall heights are anticipated to be of maximum height of approximately 12 feet in height. Retaining walls for the basement levels can be founded on shallow foundations in accordance with the recommendations presented in Foundation Section of this report. Design lateral earth pressure, backfill criteria, and drainage recommendations for walls below grade are presented below.

6.6.1 Lateral Earth Pressures

The earth pressure behind retaining walls depends primarily on the allowable wall movement, wall inclination, type of backfill materials, backfill slopes, surcharges, and any hydrostatic pressure. The potential pressure components of subterranean walls include a uniform surcharge pressures for traffic or surcharges, active and restrained horizontal pressure components, and pressures from compaction effort.

Walls below grade should be designed to resist the applicable lateral earth pressures. On-site soil materials may be used as backfill behind retaining walls; however, these onsite soils are low expansive. Therefore, if these materials are used as backfill, at-rest earth pressures of 60 pcf and 95 pounds per cubic foot (equivalent fluid pressures) for drained and undrained conditions should be used, respectively. All walls should be designed to support any adjacent structural surcharge loads imposed by other nearby walls or footings in addition to the above recommended active and at-rest earth pressures.

Where sufficient area exists behind the proposed walls, imported clean sand exhibiting a sand equivalent value (SE) of 30 or greater, or pea gravel or crushed rock may be used for wall backfill to reduce the lateral earth pressures provided these granular backfill materials extend behind the walls to a minimum horizontal distance equal to one-half the wall height. In addition, the sand, pea gravel or rock backfill materials should extend behind the walls to a minimum horizontal distance of 2 feet at the base of the wall or to a horizontal distance equal to the heel width of the footing, whichever is greater. For the above conditions, at-rest earth pressures equivalent to fluids having densities of 45 pcf and for drained and 80 pcf for undrained conditions are recommended for design of restrained walls supporting a level backfill. Furthermore, as with native soil backfill, the walls should be designed to support any adjacent structural surcharge loads imposed by other nearby walls or footings in addition to the above recommended active and at-rest earth pressures, if the loads fall within a 1:1 projection of wall foundations.

We have used ½ of 2/3 the PGAM in our analysis (2/6)*0.665g = 0.222. Evaluation of lateral earth pressures under static and seismic loading conditions is based on using the Coulomb (1776) and Mononobe-Okabe (1929) Methods for frictional backfill materials with little to zero cohesion. For a level backfill, we recommend using a high frictional soil material which exhibits friction angle 30 degrees. If this material is used, we recommend using combined of static and dynamic active equivalent earth pressure 54 pcf. For walls with a retained height over 6 feet, or where otherwise required by Code or deemed appropriate by the structural engineer, we recommend that the wall designs be checked seismically using an additive seismic Equivalent Fluid Pressure (EFP) of 22 pcf. Such walls that are to be designed in the static case assuming the at-rest condition should be checked seismically using this additive seismic EFP added to the active condition (i.e., the additive seismic EFP is not added to the at-rest EFP). The additive seismic EFP should be applied with a standard EFP pressure distribution (i.e., it is not an inverted triangle).

6.6.2 Drainage and Waterproofing

If walls are designed for drained earth pressures, adequate drainage should be provided behind the walls. This can be accomplished by installing subdrains at the base of the walls. Wall backdrains should consist of a system of filter material and perforated pipe and should be approved by GeoBoden. The perforated pipe system should consist of 4-inch diameter, schedule 40, PVC pipe or equivalent, embedded in 1 cubic foot of Class II Permeable Material (CALTRANS Standard Specifications, latest edition) or equivalent per lineal foot of pipe. Alternatively, ¾-inch open graded gravel or crushed rock enveloped in Mirafi 140 geofabric or equivalent may be used instead of the Class II Permeable Material. The pipe should be placed at the base of the wall, have a gradient of approximately 2 percent, and should be connected to the subdrains and then routed to a suitable area for discharge of accumulated water.

Wall backfill should be protected against infiltration of surface water. Backfill adjacent to walls should be sloped so that surface water drains freely away from the wall and will not pond. Waterproofing of walls below grade is recommended.

If the walls are not formed and are shotcreted, the drainage system may consist of continuous Miradrain (Miradrain 6000 or equivalent) panels placed at a depth starting at about 4 feet below the existing grade. The Miradrain panels should be connected to weep holes at the bottom of the excavation. The weep holes should consist of solid pipes that are spaced at about 8 to 10 feet on centers. At the connection of the weep holes and the Miradrain, the weep holes should be embedded into a 1 cubic foot pocket of granular filter material placed into the face of the excavation. The granular filter material should be surrounded by a filter fabric. The weep holes should drain into a solid pipe placed beneath the edges of the floor slab. The pipe may drain into a sump-pump system that drains into the nearest storm drain. The filter gravel should meet the requirements of Class 2 Permeable Material as defined in the current State of California, Department of Transportation, Standard Specifications. If Class 2 Permeable Material is not available, ¾-inch crushed rock or gravel separated from the on-site by an appropriate filter fabric can be used. The crushed rock or gravel should have less than 5% passing a No. 200 sieve.

6.7 CONCRETE SLAB ON-GRADE

Concrete slabs will be placed on properly compacted fill as outlined in Section 7.2. Moisture content of subgrade soils should be maintained near optimum moisture content. At the time of the concrete pour, subgrade soils should be firm and relatively unyielding. Any disturbed soils should be excavated and then replaced and compacted to a minimum of 90 percent relative compaction.

Slabs should be designed to accommodate low expansive fill soils. The structural engineer should determine the minimum slab thickness and reinforcing depending upon the expansive soil condition intended use. Unless a more stringent design is recommended by the structural engineer, we recommend a minimum slab thickness of 4 inches, and reinforcement consisting of No. 3 bars spaced a maximum of 18 inches on centers, both ways. All slab reinforcement should be supported on concrete chairs or brick to ensure the desired placement near mid depth.

If moisture-sensitive floor covering is planned, a layer of open-graded gravel, at least 4 inches thick, should be placed below the concrete slab to form a capillary break. Alternately, moisture-proof membrane (such as 10-mil) may be utilized. The vapor barrier should be placed between sand layers (2 inches above and below) to protect the membrane from damage during construction. Gravel for use under a concrete floor slab should be clean, crushed rock that meets the gradation requirements presented on the next page.

Sieve Size	Percentage
1 inch	100
¾ inch	90-100
No. 4	0-10

6.8 SOLUBLE SULFATES AND SOIL CORROSIVITY

The soluble sulfate, pH, and chloride concentration tests were performed on a sample of the on-site soils. Corrosion test results are presented in Appendix B. Results of the minimum resistivity tests indicate that on-site soils have low corrosive potential when in contact with ferrous materials. Typical recommendations for mitigation of the corrosive potential of the soil in contact with building materials are the following:

- Below grade ferrous metals should be given a high quality protective coating, such as an 18 mil plastic tape, extruded polyethylene, coal tar enamel, or Portland cement mortar.

- Below grade ferrous metals should be electrically insulated (isolated) from above grade ferrous metals and other dissimilar metals, by means of dielectric fittings in utilities and exposed metal structures breaking grade.

- Steel and wire reinforcement within concrete in contact with the site soils should have at least two inches of concrete cover.

If ferrous building materials are expected to be placed in contact with site soils, it may be desirable to consult a corrosion specialist regarding chosen construction materials, and/or protection design for the proposed facility.

Corrosion test results also indicate that the surficial soils at the site have negligible sulfate attack potential on concrete. No sulfate-resistant cement will be necessary for concrete placed in contact with the on-site soils.

6.9 UTILITY TRENCHES

It is anticipated that the on-site soils will provide suitable support for underground utilities and piping that may be installed. Any soft and/or unstable material encountered at the bottom of excavations for such facilities should be removed and be replaced with an adequate bedding material.

The on-site soils generally are not considered suitable for bedding or shading of utilities and piping. We recommend that a non-expansive granular material with a sand equivalent greater than 30 be imported for this purpose.

The on-site soils are suitable for backfill of utility and pipe trenches from one foot above the top of the pipe to the final ground surface, provided the material is free of organic matter and deleterious substances. Trench backfill should be mechanically placed and compacted in thin lifts to at least 90 percent of the maximum dry density as determined by ASTM Test Method D1557. Flooding or jetting for placement and compaction of backfill is not recommended.

7.0 CONSTRUCTION CONSIDERATIONS

Based on our field exploration program, earthwork can be performed with conventional construction equipment.

7.1 TEMPORARY DEWATERING

Groundwater was not encountered in our boring. Based on the anticipated excavation depths, the need for temporary dewatering is considered very low.

7.2 CONSTRUCTION SLOPES

Excavations during construction should be conducted so that slope failure and excessive ground movement will not occur. The short-term stability of excavation depends on many factors, including slope angle, engineering characteristics of the subsoils, height of the excavation and length of time the excavation remains unsupported and exposed to equipment vibrations, rainfall and desiccation.

Where space permits, and providing that adjacent facilities are adequately supported, open excavations may be considered. In general, unsupported slopes for temporary construction excavations should not be expected to stand at an inclination steeper than 1:1 (horizontal:vertical). The temporary excavation side walls may be cut vertically to a height of 5 feet and then laid back at a 1:1 slope ratio above a height of 5 feet.

Surcharge loads should be kept away from the top of temporary excavations a horizontal distance equal to at least one-half the depth of excavation. Surface drainage should be controlled along the top of temporary excavations to preclude wetting of the soils and erosion of the excavation faces. Even with the implementation of the above recommendations, sloughing of the surface of the temporary excavations may still occur, and workmen should be adequately protected from such sloughing.

7.3 TEMPORARY SHORING

Based on the anticipated depths of excavations of approximately 12 feet below ground surface for construction of the basement wall, it appears that there may be insufficient space for sloped excavations in all areas of the site. In these areas shoring should be used to support the excavations. Cantilever or braced shoring may be considered at this site. Cantilevered shoring can be utilized where some deflection is acceptable. However, where shoring will support adjacent improvements or facilities and excessive deflection can lead to settlement, braced shoring should be utilized.

Settlement of structures or facilities founded adjacent to the shoring will occur in proportion to both the distance between the shoring and the facilities, and the amount of horizontal deflection of the shoring system. The vertical settlement will be a maximum at the shoring face and decrease as the horizontal distance from the shoring increases. Beyond a distance from the shoring equal to the height of the shoring, the settlement is expected to be negligible. The maximum vertical settlement is expected to be about 75 percent of the horizontal deflection of the shoring system.

Prior to excavation, it is recommended that walls, structures, or portions of structures within a horizontal distance of 1.5 times the depth of the excavation be inspected to determine their present condition. For documentation purposes, photographs should be taken of preconstruction distress conditions and level surveys of adjacent grade and pavement should be performed. During construction, deflection of the shoring system should be monitored initially on a frequent (weekly) basis until it can be demonstrated that no movement is occurring. At that time, less frequent monitoring can be performed. In addition, the structures should be periodically inspected for signs of distress. Adjacent grade and pavement should be monitored to determine the amount of movement resulting from the construction activities. In the event that distress or settlement is noted, an investigation should be performed and correction measures taken so that continued or worsened distress or settlement is mitigated.

7.3.1 Temporary Lateral Earth Pressures

Cantilever or braced shoring should be designed for the lateral earth pressures shown on Figure 3. These values are based on the assumption that (1) the shored soil material is level at ground surface, (2) the exposed height of the shoring is less than 20 feet, (3) there are no hydrostatic pressures above the bottom of excavation, and (4) the shoring is temporary, and will not be required to support the soil longer than six months. Surcharge coefficients of 0.3 and 0.5

may be used with uniform vertical surcharges for cantilever and braced shoring lateral earth pressures, respectively. These surcharge pressures should be added to the lateral earth pressures (Figure 3) for design.

7.3.2 Soldier Piles and Lagging

For the design of soldier piles spaced at least 2.5 diameters on centers, allowable lateral bearing values (passive values) are provided in Figure 3. Soldier piles spaced less than 2.5 diameters on center should be designed based upon the allowable passive values recommended for sheet piles in Subsection 8.3.1. Passive resistance should be discounted to a depth of at least one diameter of the soldier pile below the lowest adjacent excavation level, as shown on Figure 3. The above lateral bearing values incorporate a factor of safety of 2.0.

For drilled soldier piles, the portion of the piles below the lowest excavated level should be concreted to provide firm contact between the pile and supporting soils. To develop firm contact between the upper portion of the shoring and the retained soils, the upper portion of the soldier pile excavation should be filled with a lean mix concrete or sand-cement slurry.

To limit sloughing and caving of the site soils, it is recommended that lagging or gunite be used between soldier piles. All lumber to be left in the ground should be pressure-treated in accordance with Specification C-2 of the American Wood Preserves Association (AWPA). Sand-cement slurry pumped in behind lagging to support cohesionless soils and adjacent facilities and utilities is recommended when sloughing occurs.

7.3.4 Sheet Piles

If solid sheet piles or a similar continuous shoring system is used, it should be designed using the allowable lateral bearing values (passive values) provided in Figure 3. The bearing values incorporate a factor of safety of 2.0. Based on the blow counts obtained during the soil sampling, installation of sheet piles in the loose to medium dense native soils should not be significantly difficult.

7.3.5 Internal Bracing

Raker bracing may be used to internally brace the soldier piles. If used, raker bracing could be supported laterally by temporary concrete footing (deadmen) or by the permanent interior footings. For design of such temporary footings, poured with the bearing surface normal to the rakers inclined at 45 to 60 degrees with the vertical, a bearing value of 2,500 pounds per square foot may be used, provided the shallowest point of the footing is at least 1 foot below the lowest adjacent grade. To reduce the movement of the shoring, the rakers should be tightly wedged against the footings and/or shoring system.

7.3.6 Deflection

It is difficult to accurately predict the amount of deflection of a shored embankment. It should be realized, however, that some deflection will occur. We recommend that the deflection be limited to ½ inch at the top of the shored embankment. If greater deflection occurs during construction, additional bracing may be necessary to minimize settlement of the utilities in the adjacent streets. If it is desired to reduce the deflection of the shoring, a greater active pressure could be used in the shoring design.

7.3.7 Monitoring

Some means of monitoring the performance of the shoring system is recommended. The monitoring should consist of periodic surveying of the lateral and vertical locations of the tops of all the soldier piles. We will be pleased to discuss this further with the design consultants and the contractor when the design of the shoring system has been finalized.

In addition, we recommend that the adjacent existing buildings be surveyed for horizontal and vertical locations. Also, a careful survey of existing cracks and offsets in the adjacent buildings would be prudent and recorded and photographic records made to document the pre-construction conditions of the existing buildings.

8.0 CLOSURE

The conclusions, recommendations, and opinions presented herein are: (1) based upon our evaluation and interpretation of the limited data obtained from our field and laboratory programs; (2) based upon an interpolation of soil conditions between and beyond the boring; (3) are subject to confirmation of the actual conditions encountered during construction; and, (4) are based upon the assumption that sufficient observation and testing will be provided during construction.

If parties other than GeoBoden are engaged to provide construction geotechnical services, they must be notified that they will be required to assume complete responsibility for the geotechnical phase of the project by concurring with the findings and recommendations in this report or providing alternate recommendations.

If pertinent changes are made in the project plans or conditions are encountered during construction that appear to be different than indicated by this report, please contact this office. Significant variations may necessitate a re-evaluation of the recommendations presented in this report.

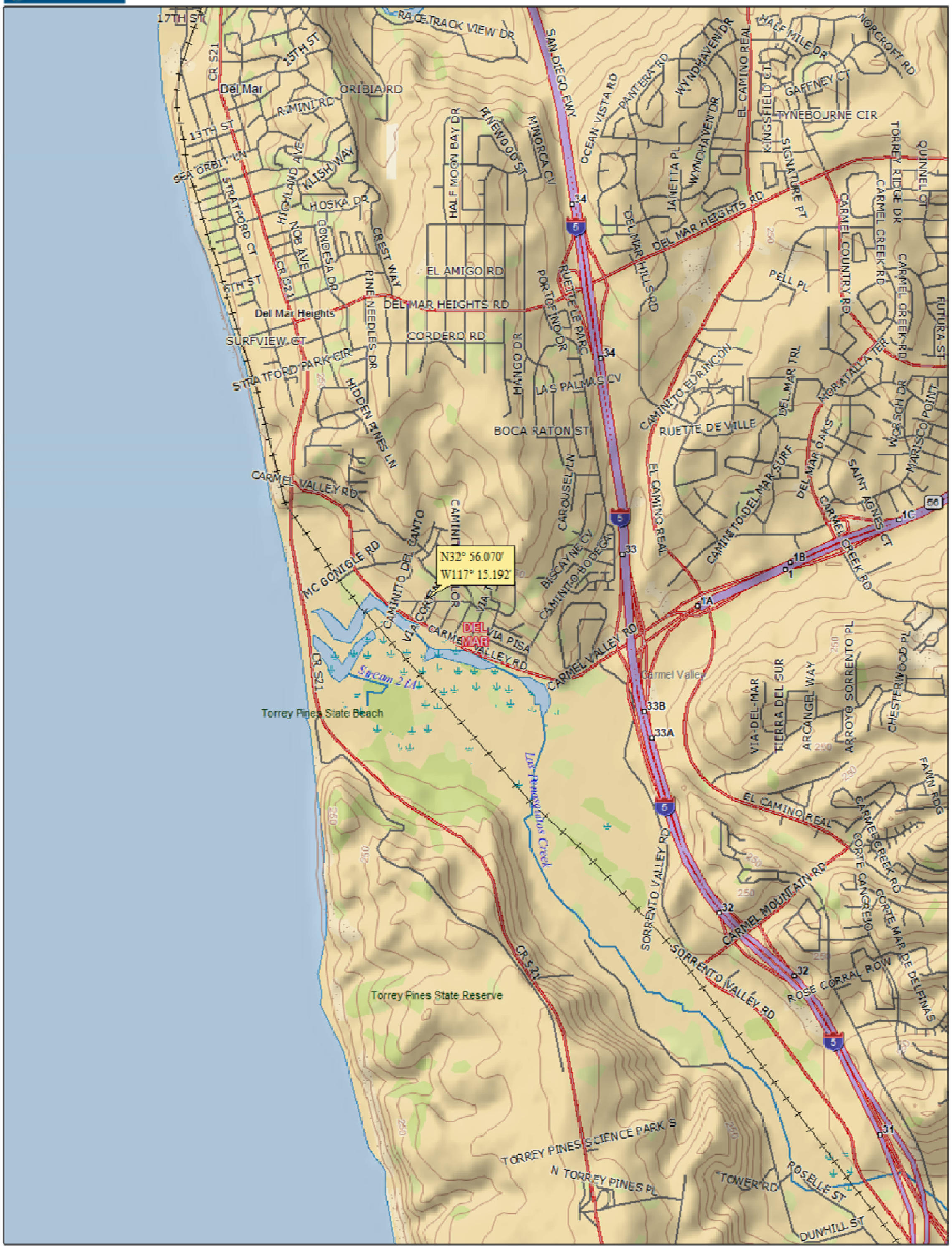
9.0 REFERENCES

California Building Code, 2019 Volume 2.

FIGURES

DELORME

DeLorme Topo USA® 7.0



Data use subject to license.

© DeLorme. DeLorme Topo USA® 7.0.

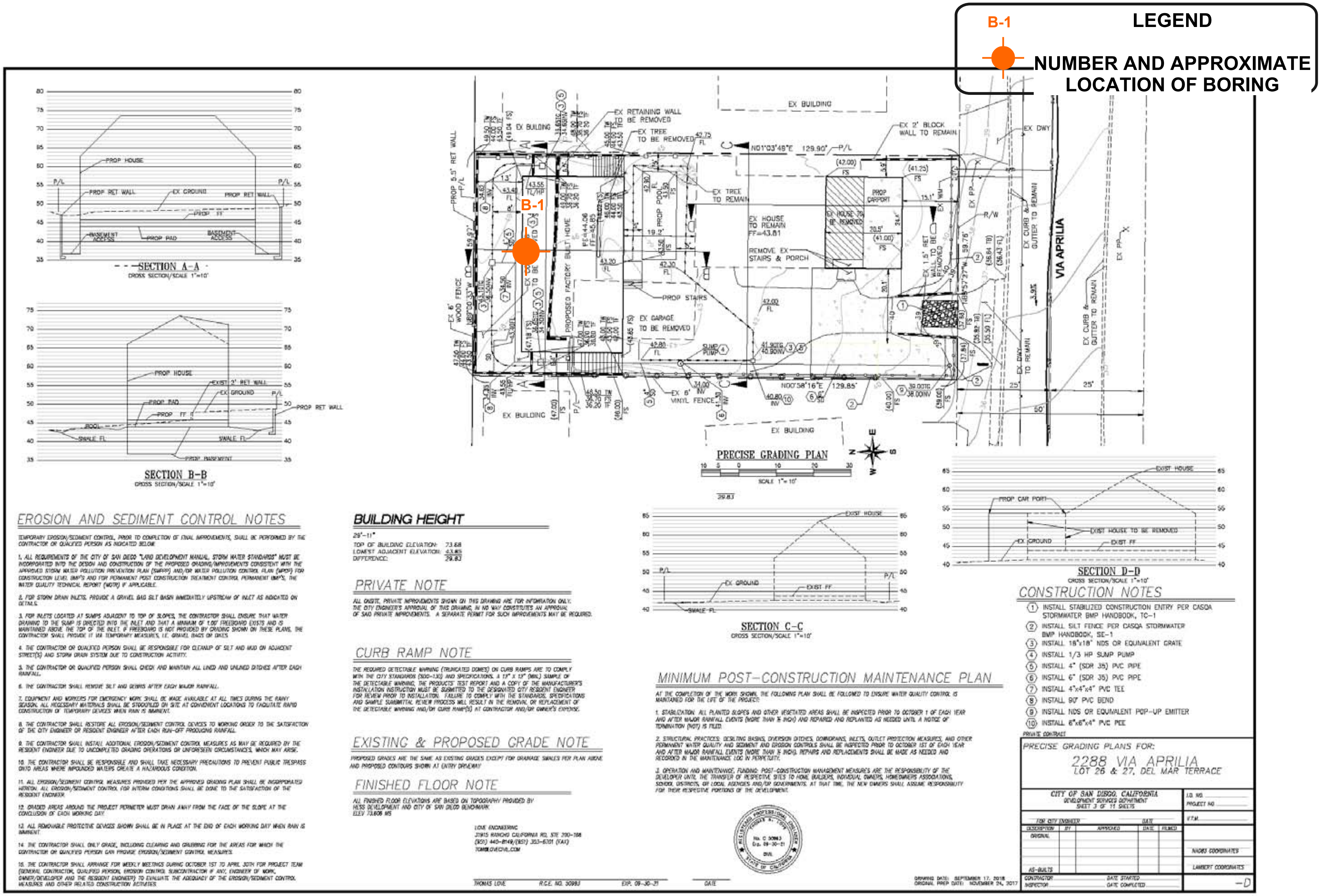
www.delorme.com

MN (11.4° E)

0 800 1600 2400 3200 4000 ft

Data Zoom 12-7

GEOBODEN INC. Geotechnical Consultants	SITE VICINITY MAP Proposed Residential Building 2288 Via Aprilia Del Mar Terrace, California	Figure By S.R. Map No. XX Date 03-27-20	Project No. GB 101-1 Figure No. 1



Development Services Department, City of San Diego 2/1/2012 1:08 PM BDR-GRD_other.dwg

GEOBODEN INC. Geotechnical Consultants	BORING LOCATION PLAN Proposed Residential Building 2288 Via Aprilia Del Mar Terrace, California	Figure By S.R. Map No. XX Date 03-27-20	Project No. GB 101-1 Figure No. 2

GENERAL NOTES

1. APPROVAL OF THESE PLANS BY THE CITY ENGINEER DOES NOT AUTHORIZE ANY WORK TO BE PERFORMED UNTIL *A PERMIT/ *A NOTICE TO PROCEED HAS BEEN ISSUED.

2. THE APPROVAL OF THIS PLAN OR ISSUANCE OF A PERMIT BY THE CITY OF SAN DIEGO DOES NOT AUTHORIZE THE SUBDIVIDER AND OWNER TO VIOLATE ANY FEDERAL, STATE OR CITY LAWS, ORDINANCES, REGULATIONS, OR POLICIES, INCLUDING, BUT NOT LIMITED TO, THE FEDERAL ENDANGERED SPECIES ACT OF 1973 AND AMENDMENTS THERETO (16 USC SECTION 1531 ET.SEQ.).

3. THE CONTRACTOR SHALL BE RESPONSIBLE FOR SURVEY MONUMENTS AND/OR VERTICAL CONTROL BENCHMARKS WHICH ARE DISTURBED OR DESTROYED BY CONSTRUCTION. A LAND SURVEYOR MUST FIELD LOCATE, REFERENCE, AND/OR PRESERVE ALL HISTORICAL OR CONTROLLING MONUMENTS PRIOR TO ANY EARTHWORK. IF DESTROYED, A LAND SURVEYOR SHALL REPLACE SUCH MONUMENTS WITH APPROPRIATE MONUMENTS. A CORNER RECORD OR RECORD OF SURVEY, AS APPROPRIATE, SHALL BE FILED AS REQUIRED BY THE PROFESSIONAL LAND SURVEYORS ACT, SECTION 8771 OF THE BUSINESS AND PROFESSIONS CODE OF THE STATE OF CALIFORNIA. IF ANY VERTICAL CONTROL IS TO BE DISTURBED OR DESTROYED, THE CITY OF SAN DIEGO FIELD SURVEY SECTION MUST BE NOTIFIED, IN WRITING, AT LEAST 3 DAYS PRIOR TO THE CONSTRUCTION. THE CONTRACTOR WILL BE RESPONSIBLE FOR THE COST OF REPLACING ANY VERTICAL CONTROL BENCHMARKS DESTROYED BY THE CONSTRUCTION.

4. IMPORTANT NOTICE: SECTION 4216 OF THE GOVERNMENT CODE REQUIRES A DIG ALERT IDENTIFICATION NUMBER BE ISSUED BEFORE A "PERMIT TO EXCAVATE" WILL BE VALID. FOR YOUR DIG ALERT I.D. NUMBER, CALL UNDERGROUND SERVICE ALERT, TOLL FREE 1-800-422-4133, TWO DAYS BEFORE YOU DIG.

5. CONTRACTOR SHALL IMPLEMENT AN EROSION AND SEDIMENT CONTROL PROGRAM DURING THE PROJECT GRADING AND/OR CONSTRUCTION ACTIVITIES. THE PROGRAM SHALL MEET ALL APPLICABLE REQUIREMENTS OF THE STATE WATER RESOURCE CONTROL BOARD AND THE CITY OF SAN DIEGO MUNICIPAL CODE AND STORM WATER STANDARDS MANUAL.

6. "PUBLIC IMPROVEMENT SUBJECT TO DESUETUDE OR DAMAGE." IF REPAIR OR REPLACEMENT OF SUCH PUBLIC IMPROVEMENTS IS REQUIRED, THE OWNER SHALL OBTAIN THE REQUIRED PERMITS FOR WORK IN THE PUBLIC RIGHT-OF-WAY, SATISFACTORY TO THE PERMIT- ISSUING AUTHORITY.

7. ALL EXISTING AND/OR PROPOSED PUBLIC UTILITY SYSTEM AND SERVICE FACILITIES SHALL BE INSTALLED UNDERGROUND IN ACCORDANCE WITH SECTION 144.0240 OF THE MUNICIPAL CODE.

8. PRIOR TO ANY DISTURBANCE TO THE SITE, EXCLUDING UTILITY MARK-OUTS AND SURVEYING, THE CONTRACTOR SHALL MAKE ARRANGEMENTS FOR A PRE-CONSTRUCTION MEETING WITH THE CITY OF SAN DIEGO FIELD ENGINEERING DIVISION (858) 627-3200.

9. DEVIATIONS FROM THESE SIGNED PLANS WILL NOT BE ALLOWED UNLESS A CONSTRUCTION CHANGE IS APPROVED BY THE CITY ENGINEER OR THE CHANGE IS REQUIRED BY THE CITY INSPECTOR.

10. AS-BUILT DRAWINGS MUST BE SUBMITTED TO THE RESIDENT ENGINEER PRIOR TO ACCEPTANCE OF THIS PROJECT BY THE CITY OF SAN DIEGO.

11. AN AS-GRADED GEOTECHNICAL REPORT AND A SET OF THE REDLINE GRADING PLANS SHALL BE SUBMITTED AT AREA 3 ON THE THIRD FLOOR OF DEVELOPMENT SERVICES WITHIN 30 CALENDAR DAYS OF THE COMPLETION OF GRADING. AN ADDITIONAL SET SHALL BE PROVIDED TO THE RESIDENT ENGINEER OF THE FIELD ENGINEERING DIVISION AT 9485 AERO DR.

12. THE AREA WHICH IS DEFINED AS A NON GRADING AREA AND WHICH IS NOT TO BE DISTURBED SHALL BE STAKED PRIOR TO START OF THE WORK. THE PERMIT APPLICANT AND ALL OF THEIR REPRESENTATIVES OR CONTRACTORS SHALL COMPLY WITH THE REQUIREMENTS FOR PROTECTION OF THIS AREA AS REQUIRED BY ANY APPLICABLE AGENCY. ISSUANCE OF THE CITY'S GRADING PERMIT SHALL NOT RELIEVE THE APPLICANT OR ANY OF THEIR REPRESENTATIVES OR CONTRACTORS FROM COMPLYING WITH ANY STATE OR FEDERAL AGENCY REQUIREMENTS INCLUDING BUT NOT LIMITED TO CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD, CALIFORNIA DEPARTMENT OF FISH AND GAME. COMPLIANCE MAY INCLUDE OBTAINING PERMITS, OTHER AUTHORIZATIONS, OR COMPLIANCE WITH MANDATES BY ANY APPLICABLE STATE OR FEDERAL AGENCY.

13. CONTRACTOR SHALL REMOVE AND REPLACE ALL UTILITY BOXES SERVING AS HANDHOLES THAT ARE NOT IN "AS-NEW" CONDITION IN PROPOSED SIDEWALK. DAMAGED BOXES, OR THOSE THAT ARE NOT IN COMPLIANCE WITH CURRENT CODE SHALL BE REMOVED AND REPLACED WITH NEW BOXES, INCLUDING WATER, SEWER, TRAFFIC SIGNALS, STREET LIGHTS, DRY UTILITIES-SDG&E, COX, ETC. ALL NEW METAL LIDS SHALL BE SLIP RESISTANT (FRICTION FACTOR >/= 0.50) AND INSTALLED FLUSH WITH PROPOSED SIDEWALK GRADE. IF A SLIP RESISTANT METAL LID IS NOT COMMERCIALLY AVAILABLE FOR THAT USE, NEW BOXES AND LIDS SHALL BE INSTALLED.

GRADING NOTES

1. GRADING AS SHOWN ON THESE PLANS SHALL BE IN CONFORMANCE WITH CURRENT STANDARD SPECIFICATIONS AND CHAPTER 14, ARTICLE 2, DIVISION 1, OF THE SAN DIEGO MUNICIPAL CODE.

2. PLANT AND IRRIGATE ALL CUT AND FILL SLOPES AS REQUIRED BY ARTICLE 2, DIVISION 4, SECTION 142.0411 OF THE SAN DIEGO LAND DEVELOPMENT CODE AND ACCORDING TO SECTION IV OR THE LAND DEVELOPMENT MANUAL LANDSCAPE STANDARDS.

3. GRADED, DISTURBED, OR ERODED AREAS THAT WILL NOT BE PERMANENTLY PAVED, COVERED BY STRUCTURE, OR PLANTED FOR A PERIOD OVER 90 DAYS SHALL BE TEMPORARILY RE-VEGETATED WITH A NON-IRRIGATED HYDROSEED MIX, GROUND COVER, OR EQUIVALENT MATERIAL. SEE SHEET ___ FOR MIX AND SPECIFICATIONS.

GROUND WATER DISCHARGE NOTES

1. ALL GROUND WATER EXTRACTION AND SIMILAR WASTE DISCHARGES TO SURFACE WATERS NOT TRIBUTARY TO THE SAN DIEGO BAY ARE PROHIBITED UNTIL IT CAN BE DEMONSTRATED THAT THE OWNER HAS APPLIED AND OBTAINED AUTHORIZATION FROM THE STATE OF CALIFORNIA VIA AN OFFICIAL "ENROLLMENT LETTER" FROM THE REGIONAL WATER QUALITY CONTROL BOARD IN ACCORDANCE WITH THE TERMS, PROVISIONS AND CONDITIONS OF STATE ORDER NO R9-2008-0002 NPDES CAG919002.

2. THE ESTIMATED MAXIMUM DISCHARGE RATES MUST NOT EXCEED THE LIMITS SET IN THE OFFICIAL "ENROLLMENT LETTER" FROM THE REGIONAL BOARD UNLESS PRIOR NOTIFICATION AND SUBSEQUENT AUTHORIZATION HAS BEEN OBTAINED, AND DISCHARGE OPERATIONS MODIFIED TO ACCOMMODATE THE INCREASED RATES.

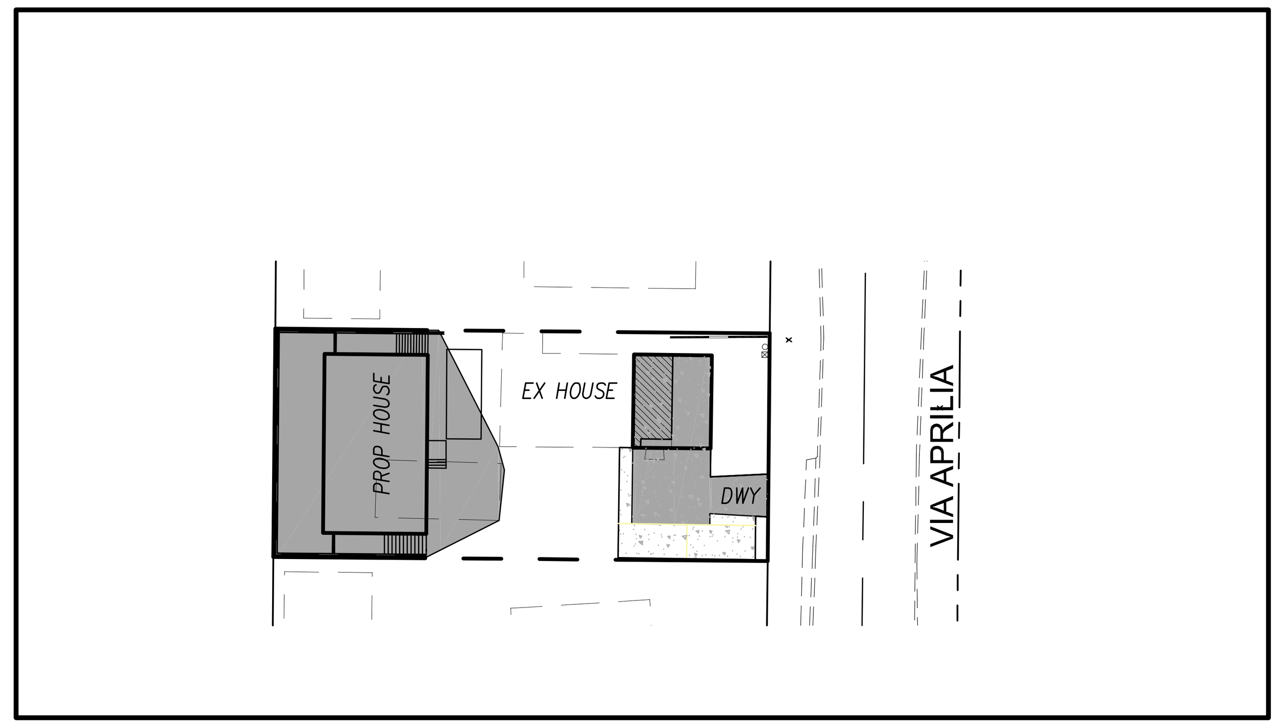
3. ALL GROUND WATER EXTRACTIONS AND SIMILAR WASTE DISCHARGES TO SURFACE WATERS TRIBUTARY TO THE SAN DIEGO BAY ARE PROHIBITED UNTIL IT CAN BE DEMONSTRATED THAT THE OWNER HAS APPLIED AND OBTAINED AUTHORIZATION FROM THE STATE OF CALIFORNIA VIA AN OFFICIAL "ENROLLMENT LETTER" FROM THE REGIONAL WATER QUALITY CONTROL BOARD IN ACCORDANCE WITH THE TERMS, PROVISIONS AND CONDITIONS OF STATE ORDER NO R9-2007-0034 NPDES NO. CAG919001.

BMP DESCRIPTION	POST-CONSTRUCTION PERMANENT BMP OPERATION & MAINTENANCE PROCEDURE DETAILS				
	STORM WATER MANAGEMENT AND DISCHARGE CONTROL MAINTENANCE AGREEMENT APPROVAL NO.:				
	O&M RESPONSIBLE PARTY DESIGNEE: PROPERTY OWNER				
	INSPECTION FREQUENCY	MAINTENANCE FREQUENCY	MAINTENANCE METHOD	QUANTITY	SHEET NUMBER(S)
SITE DESIGN					
ROOF RUNOFF CONTROLS	BI-MONTHLY	BI-ANNUALLY	REMOVE DEBRIS, REPAIR AS NECESSARY		
EFFICIENT IRRIGATION	BI-MONTHLY	BI-ANNUALLY	MONITOR FOR LEAKS & REPLACE MULCH		
VEGETATED SWALE	BI-MONTHLY	BI-ANNUALLY	REMOVE DEBRIS, REPLANT AS NECESSARY		
HMP FACILITY					

*

PRECISE GRADING PLANS FOR:

2288 VIA APRILIA



KEY MAP

1"=40'

GRADING & GEOTECHNICAL SPECIFICATIONS

1. ALL GRADING SHALL BE DONE UNDER OBSERVATION AND TESTING BY A QUALIFIED CIVIL ENGINEER OR GEOTECHNICAL ENGINEER AND, IF REQUIRED, BOTH A QUALIFIED CIVIL ENGINEER OR GEOTECHNICAL ENGINEER AND AN ENGINEERING GEOLOGIST. ALL GRADING MUST BE PERFORMED IN ACCORDANCE WITH APPLICABLE CITY ORDINANCE AND THE RECOMMENDATIONS AND SPECIFICATIONS SET FORTH IN THE SOILS REPORT OR GEOLOGICAL/GEOTECHNICAL INVESTIGATION ENTITLED

REPORT TITLE, PROJECT NAME, PROJECT LOCATION, PREPARED BY (COMPANY NAME), DATED (THEIR COMPANY PROJECT NO.)

2. ALL FILL MATERIAL SHALL BE COMPACTED TO A MINIMUM OF 90% OF THE MAXIMUM DRY DENSITY AS DETERMINED BY THE MOST RECENT VERSION OF A.S.T.M. D-1557 OR AN APPROVED ALTERNATIVE STANDARD.

3. AT THE COMPLETION OF THE GRADING OPERATIONS FOR THE EARTHWORK SHOWN ON THIS PLAN, AN AS-GRADED SOILS REPORT, OR IF REQUIRED, AN AS-GRADED GEOTECHNICAL REPORT WILL BE PREPARED IN ACCORDANCE WITH THE MOST RECENT EDITION OF THE CITY OF SAN DIEGO TECHNICAL GUIDELINES FOR GEOTECHNICAL REPORTS. THE FINAL "AS-GRADED" GEOTECHNICAL REPORT WILL BE SUBMITTED TO THE FIELD ENGINEERING SECTION OF ENGINEERING AND CAPITAL PROJECTS DEPARTMENT AND A SECOND COPY TO THE GEOLOGY SECTION OF THE DEVELOPMENT SERVICES DEPARTMENT WITHIN 30 DAYS OF THE COMPLETION OF GRADING. WHERE GEOLOGIC INSPECTION IS INDICATED IN THE PERMIT OR PROJECT PLANS, REPORTS OR SPECIFICATIONS, THE FINAL REPORT MUST ALSO BE REVIEWED AND SIGNED BY A CALIFORNIA CERTIFIED ENGINEERING GEOLOGIST.

4. IF THE GEOTECHNICAL CONSULTANT OF RECORD IS CHANGED FOR THE PROJECT, THE WORK SHALL BE STOPPED UNTIL THE REPLACEMENT HAS AGREED IN WRITING TO ACCEPT THE RESPONSIBILITY WITHIN THE AREA OF THEIR TECHNICAL COMPETENCE FOR APPROVAL UPON COMPLETION OF THE WORK. IT SHALL BE THE DUTY OF THE PERMITTEE TO NOTIFY THE CITY ENGINEER AND THE GEOLOGY SECTION OF DEVELOPMENT SERVICES IN WRITING OF SUCH CHANGE PRIOR TO THE RECOMMENCEMENT OF GRADING.

5. THESE GRADING PLANS HAVE BEEN REVIEWED BY THE UNDERSIGNED AND FOUND TO BE IN CONFORMANCE WITH THE RECOMMENDATIONS AND SPECIFICATIONS CONTAINED IN THE REFERENCED GEOTECHNICAL REPORT(S) PREPARED FOR THIS PROJECT.

(SIGNATURE)
ENGINEER'S NAME — R.C.E. OR G.E. — DATE

(SIGNATURE)
GEOLOGIST'S NAME — C.E.G. — DATE

COMPANY NAME*
ADDRESS
TELEPHONE NUMBER

*IF THE SOILS ENGINEER (R.C.E. OR G.E.) AND CERTIFIED ENGINEERING GEOLOGIST (C.E.G.) SIGNING THIS STATEMENT ARE NOT FROM THE SAME COMPANY, BOTH COMPANY NAMES AND PHONE NUMBERS MUST BE PROVIDED.

6. FOR SOIL FILE SEE CITY RECORD S - XXXXXX

DECLARATION OF RESPONSIBLE CHARGE

I HEREBY DECLARE THAT I AM THE ENGINEER OF WORK FOR THIS PROJECT, THAT I HAVE EXERCISED RESPONSIBLE CHARGE OVER THE DESIGN OF THE PROJECT AS DEFINED IN SECTION 6703 OF THE BUSINESS AND PROFESSIONS CODE, AND THAT THE DESIGN IS CONSISTENT WITH CURRENT STANDARDS.

I UNDERSTAND THAT THE CHECK OF PROJECT DRAWINGS AND SPECIFICATIONS BY THE CITY OF SAN DIEGO IS CONFINED TO A REVIEW ONLY AND DOES NOT RELIEVE ME, AS ENGINEER OF WORK, OF MY RESPONSIBILITIES FOR PROJECT DESIGN.

LOVE ENGINEERING
31915 RANCHO CALIFORNIA RD, STE 200-166
(951) 440-8149/(951) 303-6701 (FAX)
TOM@LOVECIVIL.COM

REGISTERED PROFESSIONAL ENGINEER — THOMAS S. LOVE — No. C 50993 — Exp. 09-30-21 — CIVIL — STATE OF CALIFORNIA

THOMAS S. LOVE — R.C.E. NO. 50993 — EXP. 09-30-21 — DATE

OWNER/APPLICANT

TIMOTHY RANDALL & SVETLANA NOVAKOVIC
2288 VIA APRILIA
DEL MAR, CA 92014
T: (909) 210-4798

REFERENCE DRAWINGS

REFERENCE DRAWING DESCRIPTION — DRAWING NUMBER

SITE ADDRESS

2288 VIA APRILIA, DEL MAR. CA 92014

TOPOGRAPHY SOURCE

HESS DEVELOPMENT INC.
28039 SCOTT ROAD, SUITE D-387
MURRIETA, CA 92563
(951) 325-2200

BENCHMARK

BENCHMARK IS CITY OF SAN DIEGO AT THE SWBP OF DEL MAR SCENIC PARKWAY AND CAMINITO DEL CANTO
ELEV=73.606

TOTAL DISTURBED AREA

0.09 ACRES

GRADING QUANTITIES

GRADED AREA	0.06 [ACRES]	MAX. CUT DEPTH	8.0 [FT]
CUT QUANTITIES	100 [CYD]	MAX CUT SLOPE RATIO (2:1MAX)	2:1
FILL QUANTITIES	100 [CYD]	MAX. FILL DEPTH	2.0 [FT]
IMPORT/EXPORT	0 [CYD]	MAX FILL SLOPE RATIO (2:1MAX)	2:1

THIS PROJECT PROPOSES TO EXPORT 0 CUBIC YARDS OF MATERIAL FROM THIS SITE. ALL EXPORT MATERIAL SHALL BE DISCHARGED TO A LEGAL DISPOSAL SITE. THE APPROVAL OF THIS PROJECT DOES NOT ALLOW PROCESSING AND SALE OF THE MATERIAL. ALL SUCH ACTIVITIES REQUIRE A SEPARATE CONDITIONAL USE PERMIT.

ASSESSORS PARCEL NUMBER

301-081-15-00

EXISTING LEGAL DESCRIPTION

LOTS 26 AND 27 IN BLOCK 1 OF DEL MAR TERRACE, IN THE CITY OF SAN DIEGO, COUNTY OF SAN DIEGO, STATE OF CALIFORNIA, ACCORDING TO MAP THEREOF NO. 1527, FILED IN THE OFFICE OF THE COUNTY RECORDER OF SAN DIEGO, FEBRUARY 5, 1913.

SHEET INDEX

TITLE SHEET.................. 1/2
PRECISE GRADING PLAN............ 2/2

PRIVATE WATER AND WASTEWATER*

THE PRIVATE WATER/SEWER SYSTEM IS DESIGNED IN ACCORDANCE WITH THE CALIFORNIA PLUMBING CODE AND IS SHOWN ON THESE PLANS AS "INFORMATION ONLY". A SEPARATE PLUMBING PERMIT IS REQUIRED FOR CONSTRUCTION AND INSPECTION OF THE SYSTEM.

TRAFFIC CONTROL NOTE*

(DELETE IF GREATER THAN 5000 ADT)

THE CONTRACTOR SHALL SUBMIT A TRAFFIC CONTROL PLAN (11"X17") FOR APPROVAL PRIOR TO STARTING WORK. THE PLAN SHOULD BE SUBMITTED TO THE TRAFFIC CONTROL PERMIT COUNTER, 3RD FLOOR, BOOTH 22, BUILDING, SAFETY & CONSTRUCTION DIVISION, DEVELOPMENT SERVICES CENTER, 1222 FIRST AVENUE, SAN DIEGO (619-446-5150). CONTRACTOR SHALL OBTAIN A TRAFFIC CONTROL PERMIT A MINIMUM OF TWO (2) WORKING DAYS PRIOR TO STARTING WORK, AND A MINIMUM OF FIVE (5) DAYS IF WORK WILL AFFECT A BUS STOP OR AN EXISTING TRAFFIC SIGNAL, OR IF WORK WILL REQUIRE A ROAD OR ALLEY CLOSURE.

STORM WATER PROTECTION NOTES

1. THIS PROJECT IS SUBJECT TO MUNICIPAL STORM WATER PERMIT ORDER NO.2009-0009-DWQ; AND RISK LEVEL/TYPE: CHECK ONE BELOW

- ☐ WPCP
- ☐ CGP RISK LEVEL 1
- ☐ CGP RISK LEVEL 2
- ☐ CGP RISK LEVEL 3
- ☐ CGP LUP TYPE 1
- ☐ CGP LUP TYPE 2
- ☐ CGP LUP TYPE 3

2. CHECK ONE

- ☐ THIS PROJECT WILL EXCEED THE MAXIMUM DISTURBED AREA LIMIT, THEREFORE A WEATHER TRIGGERED ACTION PLAN (WTAP) IS REQUIRED.
- ☐ THIS PROJECT WILL FOLLOW PHASED GRADING NOT TO EXCEED FIVE (5) ACRES PER PHASE.
- ☒ NOT APPLICABLE

3. THE CONTRACTOR SHALL COMPLY WITH THE REQUIREMENTS OF THE WPCP OR SWPPP AS APPLICABLE.

WORK TO BE DONE

THE IMPROVEMENTS CONSIST OF THE FOLLOWING WORK TO BE DONE ACCORDING TO THESE PLANS AND THE SPECIFICATIONS AND STANDARD DRAWINGS OF THE CITY OF SAN DIEGO.

STANDARD SPECIFICATIONS:

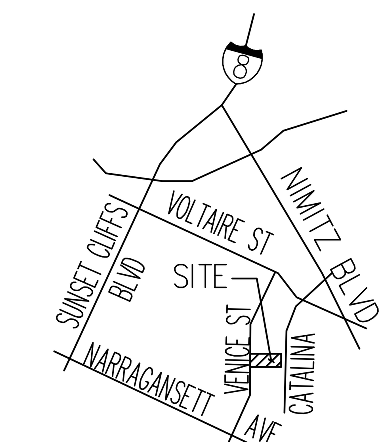
DOCUMENT NO.	DESCRIPTION
PITS070112-01	STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION (GREENBOOK), 2012 EDITION
PITS070112-02	CITY OF SAN DIEGO STANDARD SPECIFICATIONS FOR PUBLICWORKS CONSTRUCTION (WHITEBOOK), 2012 EDITION
PITS070112-04	CALIFORNIA DEPARTMENT OF TRANSPORTATION MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES, 2012 EDITION
PITS070112-06	CALIFORNIA DEPARTMENT OF TRANSPORTATION U.S CUSTOMARY STANDARD SPECIFICATIONS, 2010 EDITION

STANDARD DRAWINGS:

DOCUMENT NO.	DESCRIPTION
PITS070112-03	CITY OF SAN DIEGO STANDARD DRAWINGS FOR PUBLIC WORKS CONSTRUCTION, 2012 EDITION
PITS070112-05	CALIFORNIA DEPARTMENT OF TRANSPORTATION U.S CUSTOMARY STANDARD PLANS, 2010 EDITION

LEGEND

BOUNDARY
CENTERLINE
EX CONTOUR — 1275
EX CURB
R/W
SILT FENCE
SWALE FLOWLINE
EX POWER POLE
EX WATER METER — W
EX TREE
DISTURBED AREA
STABILIZED CONSTRUCTION ENTRANCE
CONCRETE



VICINITY MAP

NO SCALE

ENGINEERING PERMIT NO:______________

DISCRETIONARY PERMIT NO:______________

WBS NO:______________

RETAINING WALL PROJECT NO:______________

CONSTRUCTION SITE STORM WATER PRIORITY:______________

PRIVATE CONTRACT

DRAWING DATE: SEPTEMBER 17, 2018
ORIGINAL PREP DATE: NOVEMBER 24, 2017

PRECISE GRADING PLANS FOR
2288 VIA APRILIA
LOT 26 & 27, DEL MAR TERRACE

CITY OF SAN DIEGO, CALIFORNIA
Development Services Department
SHEET 2 OF 11 SHEETS

I.O. NO. ______
PROJECT NO. ______
V.T.M. ______

FOR CITY ENGINEER — DATE

DESCRIPTION	BY	APPROVED	DATE	FILMED
ORIGINAL				
AS-BUILTS				

NAD83 COORDINATES

LAMBERT COORDINATES

CONTRACTOR ______ DATE STARTED ______
INSPECTOR ______ DATE COMPLETED ______

CONSTRUCTION CHANGE TABLE

CHANGE	DATE	EFFECTED OR ADDED SHEET NUMBERS	APPROVAL NO.	PROJECT NO.

WARNING

0 1/2 1

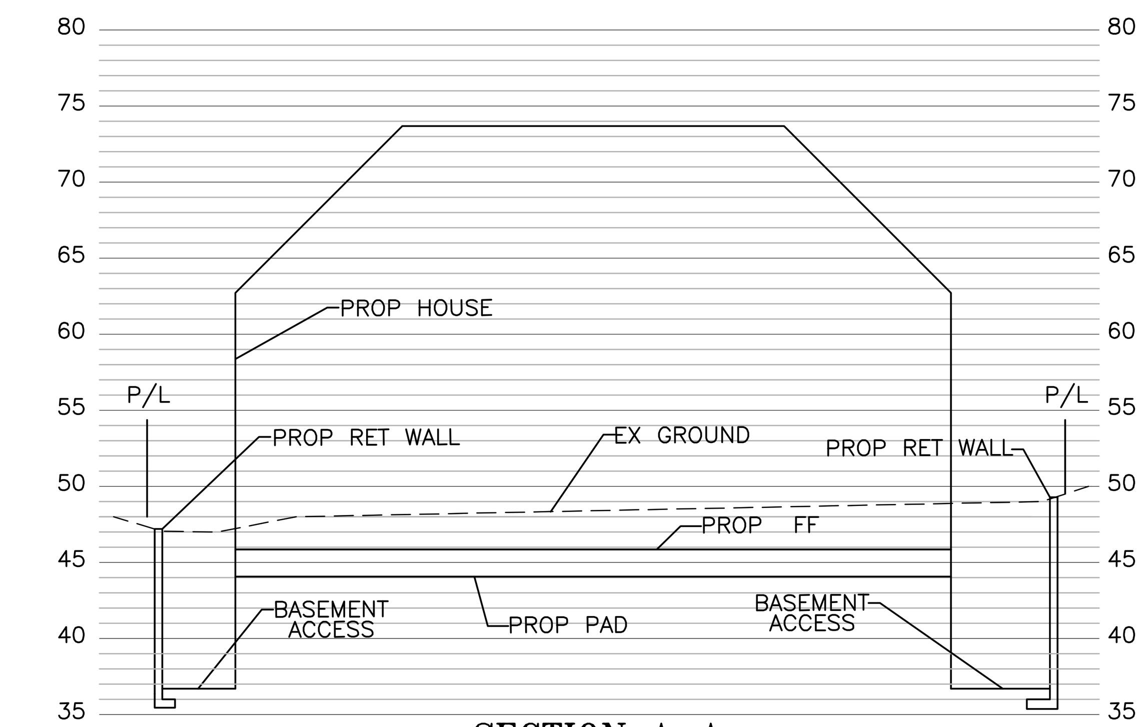
IF THIS BAR DOES NOT MEASURE 1" THEN DRAWING IS NOT TO SCALE.

CITY OF SAN DIEGO
DEVELOPMENT SERVICES DEPARTMENT

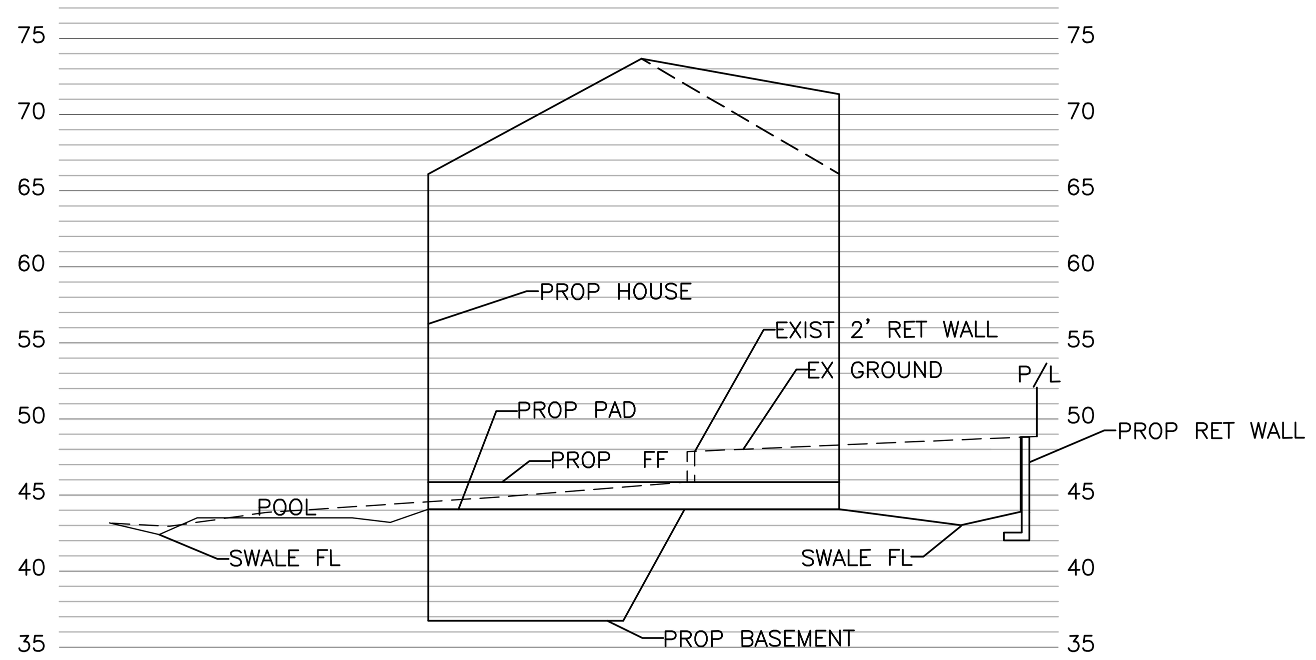
THE CITY OF SAN DIEGO · STATE OF CALIFORNIA · SEMPER VIGILANS

STREET DATA TABLE

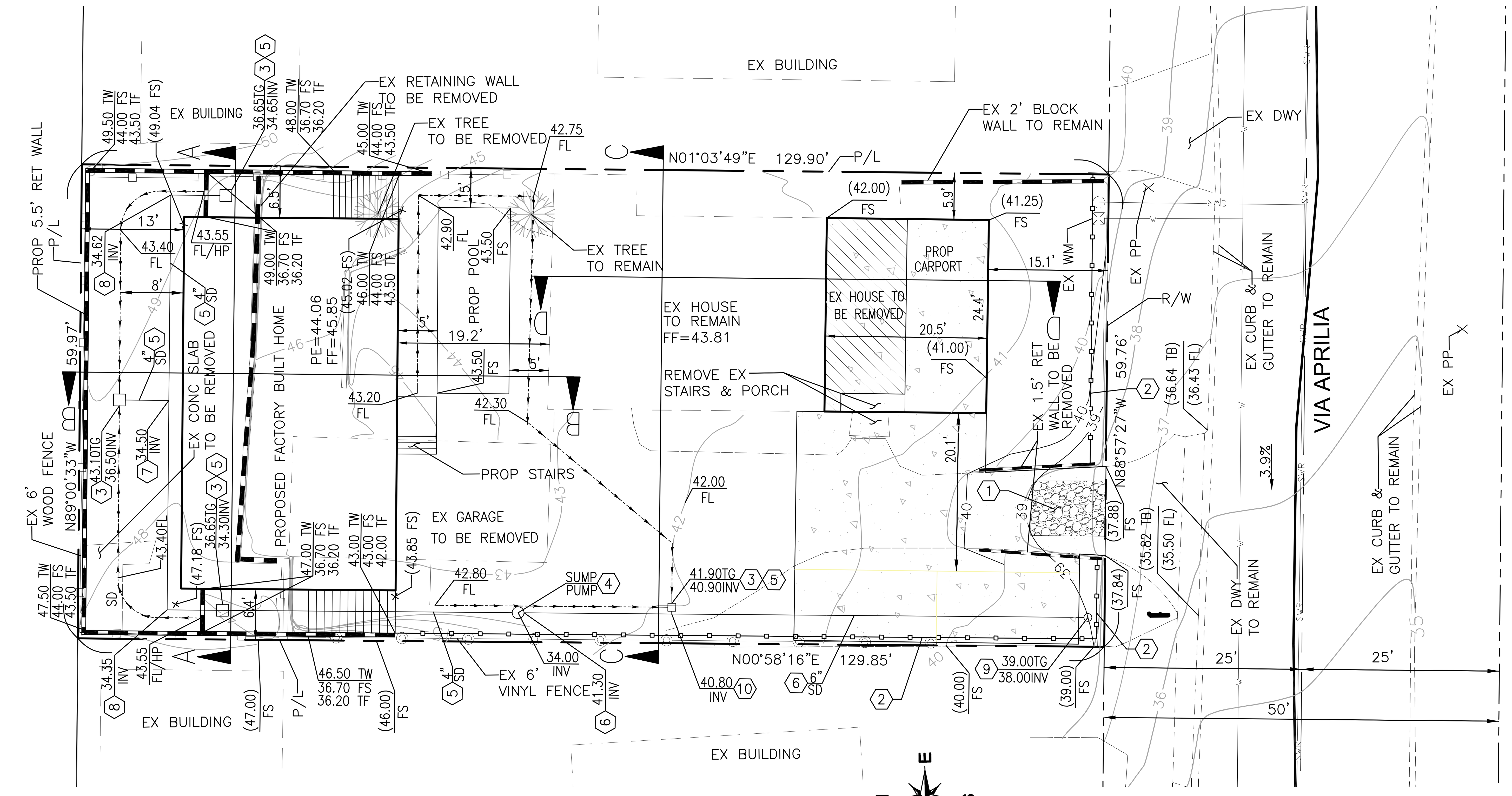
STREET NAME	CLASSIFICATION	SPEED (MPH)	ADT (VEHICLES)	R/W (FT)



SECTION A-A
CROSS SECTION/SCALE 1"=10'

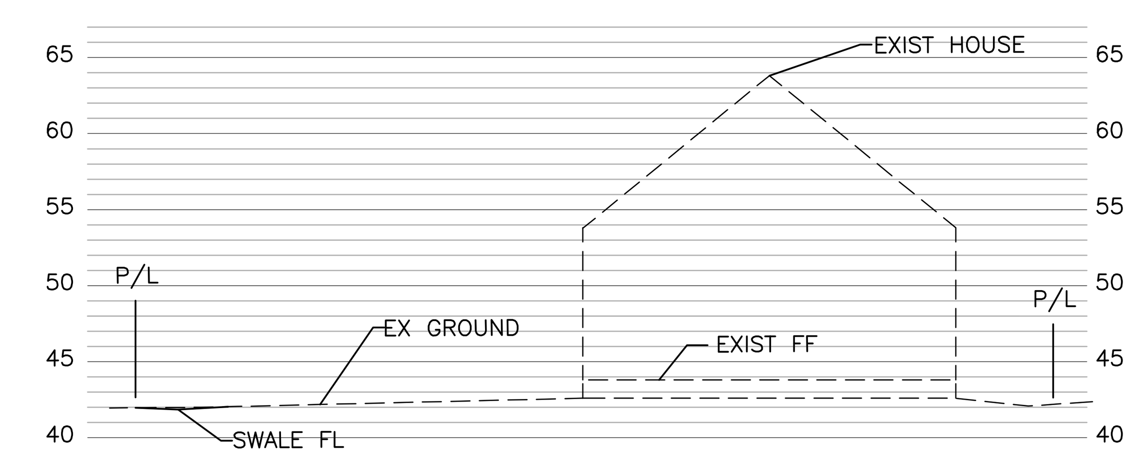


SECTION B-B
CROSS SECTION/SCALE 1"=10'

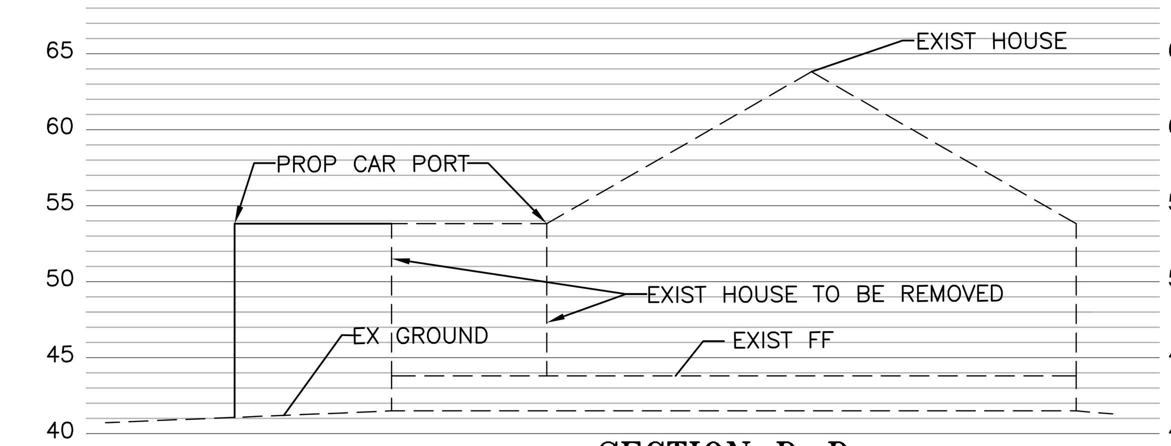


PRECISE GRADING PLAN
10 5 0 10 20 30
SCALE 1"=10'

29.83



SECTION C-C
CROSS SECTION/SCALE 1"=10'



SECTION D-D
CROSS SECTION/SCALE 1"=10'

EROSION AND SEDIMENT CONTROL NOTES

TEMPORARY EROSION/SEDIMENT CONTROL, PRIOR TO COMPLETION OF FINAL IMPROVEMENTS, SHALL BE PERFORMED BY THE CONTRACTOR OR QUALIFIED PERSON AS INDICATED BELOW:

1. ALL REQUIREMENTS OF THE CITY OF SAN DIEGO "LAND DEVELOPMENT MANUAL, STORM WATER STANDARDS" MUST BE INCORPORATED INTO THE DESIGN AND CONSTRUCTION OF THE PROPOSED GRADING/IMPROVEMENTS CONSISTENT WITH THE APPROVED STORM WATER POLLUTION PREVENTION PLAN (SWPPP) AND/OR WATER POLLUTION CONTROL PLAN (WPCP) FOR CONSTRUCTION LEVEL BMP'S AND FOR PERMANENT POST CONSTRUCTION TREATMENT CONTROL PERMANENT BMP'S, THE WATER QUALITY TECHNICAL REPORT (WQTR) IF APPLICABLE.

2. FOR STORM DRAIN INLETS, PROVIDE A GRAVEL BAG SILT BASIN IMMEDIATELY UPSTREAM OF INLET AS INDICATED ON DETAILS.

3. FOR INLETS LOCATED AT SUMPS ADJACENT TO TOP OF SLOPES, THE CONTRACTOR SHALL ENSURE THAT WATER DRAINING TO THE SUMP IS DIRECTED INTO THE INLET AND THAT A MINIMUM OF 1.00' FREEBOARD EXISTS AND IS MAINTAINED ABOVE THE TOP OF THE INLET. IF FREEBOARD IS NOT PROVIDED BY GRADING SHOWN ON THESE PLANS, THE CONTRACTOR SHALL PROVIDE IT VIA TEMPORARY MEASURES, I.E. GRAVEL BAGS OR DIKES.

4. THE CONTRACTOR OR QUALIFIED PERSON SHALL BE RESPONSIBLE FOR CLEANUP OF SILT AND MUD ON ADJACENT STREET(S) AND STORM DRAIN SYSTEM DUE TO CONSTRUCTION ACTIVITY.

5. THE CONTRACTOR OR QUALIFIED PERSON SHALL CHECK AND MAINTAIN ALL LINED AND UNLINED DITCHES AFTER EACH RAINFALL.

6. THE CONTRACTOR SHALL REMOVE SILT AND DEBRIS AFTER EACH MAJOR RAINFALL.

7. EQUIPMENT AND WORKERS FOR EMERGENCY WORK SHALL BE MADE AVAILABLE AT ALL TIMES DURING THE RAINY SEASON. ALL NECESSARY MATERIALS SHALL BE STOCKPILED ON SITE AT CONVENIENT LOCATIONS TO FACILITATE RAPID CONSTRUCTION OF TEMPORARY DEVICES WHEN RAIN IS IMMINENT.

8. THE CONTRACTOR SHALL RESTORE ALL EROSION/SEDIMENT CONTROL DEVICES TO WORKING ORDER TO THE SATISFACTION OF THE CITY ENGINEER OR RESIDENT ENGINEER AFTER EACH RUN-OFF PRODUCING RAINFALL.

9. THE CONTRACTOR SHALL INSTALL ADDITIONAL EROSION/SEDIMENT CONTROL MEASURES AS MAY BE REQUIRED BY THE RESIDENT ENGINEER DUE TO UNCOMPLETED GRADING OPERATIONS OR UNFORESEEN CIRCUMSTANCES, WHICH MAY ARISE.

10. THE CONTRACTOR SHALL BE RESPONSIBLE AND SHALL TAKE NECESSARY PRECAUTIONS TO PREVENT PUBLIC TRESPASS ONTO AREAS WHERE IMPOUNDED WATERS CREATE A HAZARDOUS CONDITION.

11. ALL EROSION/SEDIMENT CONTROL MEASURES PROVIDED PER THE APPROVED GRADING PLAN SHALL BE INCORPORATED HEREON. ALL EROSION/SEDIMENT CONTROL FOR INTERIM CONDITIONS SHALL BE DONE TO THE SATISFACTION OF THE RESIDENT ENGINEER.

12. GRADED AREAS AROUND THE PROJECT PERIMETER MUST DRAIN AWAY FROM THE FACE OF THE SLOPE AT THE CONCLUSION OF EACH WORKING DAY.

13. ALL REMOVABLE PROTECTIVE DEVICES SHOWN SHALL BE IN PLACE AT THE END OF EACH WORKING DAY WHEN RAIN IS IMMINENT.

14. THE CONTRACTOR SHALL ONLY GRADE, INCLUDING CLEARING AND GRUBBING FOR THE AREAS FOR WHICH THE CONTRACTOR OR QUALIFIED PERSON CAN PROVIDE EROSION/SEDIMENT CONTROL MEASURES.

15. THE CONTRACTOR SHALL ARRANGE FOR WEEKLY MEETINGS DURING OCTOBER 1ST TO APRIL 30TH FOR PROJECT TEAM (GENERAL CONTRACTOR, QUALIFIED PERSON, EROSION CONTROL SUBCONTRACTOR IF ANY, ENGINEER OF WORK, OWNER/DEVELOPER AND THE RESIDENT ENGINEER) TO EVALUATE THE ADEQUACY OF THE EROSION/SEDIMENT CONTROL MEASURES AND OTHER RELATED CONSTRUCTION ACTIVITIES.

BUILDING HEIGHT

29'-11"

TOP OF BUILDING ELEVATION:	73.68
LOWEST ADJACENT ELEVATION:	43.85
DIFFERENCE:	29.83

PRIVATE NOTE

ALL ONSITE, PRIVATE IMPROVEMENTS SHOWN ON THIS DRAWING ARE FOR INFOMRATION ONLY. THE CITY ENGINEER'S APPROVAL OF THIS DRAWING, IN NO WAY CONSTITUTES AN APPROVAL OF SAID PRIVATE IMPROVEMENTS. A SEPARATE PERMIT FOR SUCH IMPROVEMENTS MAY BE REQUIRED.

CURB RAMP NOTE

THE REQUIRED DETECTABLE WARNING (TRUNCATED DOMES) ON CURB RAMPS ARE TO COMPLY WITH THE CITY STANDARDS (SDG-130) AND SPECIFICATIONS. A 12" X 12" (MIN.) SAMPLE OF THE DETECTABLE WARNING, THE PRODUCTS' TEST REPORT AND A COPY OF THE MANUFACTURER'S INSTALLATION INSTRUCTION MUST BE SUBMITTED TO THE DESIGNATED CITY RESIDENT ENGINEER FOR REVIEW PRIOR TO INSTALLATION. FAILURE TO COMPLY WITH THE STANDARDS, SPECIFICATIONS AND SAMPLE SUMBMITTAL REVIEW PROCESS WILL RESULT IN THE REMOVAL OR REPLACEMENT OF THE DETECTABLE WARNING AND/OR CURB RAMP(S) AT CONTRACTOR AND/OR OWNER'S EXPENSE.

EXISTING & PROPOSED GRADE NOTE

PROPOSED GRADES ARE THE SAME AS EXISTING GRADES EXCEPT FOR DRAINAGE SWALES PER PLAN ABOVE AND PROPOSED CONTOURS SHOWN AT ENTRY DRIVEWAY

FINISHED FLOOR NOTE

ALL FINISHED FLOOR ELEVATIONS ARE BASED ON TOPOGRAPHY PROVIDED BY HESS DEVELOPMENT AND CITY OF SAN DIEGO BENCHMARK ELEV 73.606 MS

LOVE ENGINEERING
31915 RANCHO CALIFORNIA RD, STE 200-166
(951) 440-8149/(951) 303-6701 (FAX)
TOM@LOVECIVIL.COM

MINIMUM POST-CONSTRUCTION MAINTENANCE PLAN

AT THE COMPLETION OF THE WORK SHOWN, THE FOLLOWING PLAN SHALL BE FOLLOWED TO ENSURE WATER QUALITY CONTROL IS MAINTAINED FOR THE LIFE OF THE PROJECT:

1. STABILIZATION: ALL PLANTED SLOPES AND OTHER VEGETATED AREAS SHALL BE INSPECTED PRIOR TO OCTOBER 1 OF EACH YEAR AND AFTER MAJOR RAINFALL EVENTS (MORE THAN ½ INCH) AND REPAIRED AND REPLANTED AS NEEDED UNTIL A NOTICE OF TERMINATION (NOT) IS FILED.

2. STRUCTURAL PRACTICES: DESILTING BASINS, DIVERSION DITCHES, DOWNDRAINS, INLETS, OUTLET PROTECTION MEASURES, AND OTHER PERMANENT WATER QUALITY AND SEDIMENT AND EROSION CONTROLS SHALL BE INSPECTED PRIOR TO OCTOBER 1ST OF EACH YEAR AND AFTER MAJOR RAINFALL EVENTS (MORE THAN ½ INCH). REPAIRS AND REPLACEMENTS SHALL BE MADE AS NEEDED AND RECORDED IN THE MAINTENANCE LOG IN PERPETUITY.

3. OPERATION AND MAINTENANCE, FUNDING: POST-CONSTRUCTION MANAGEMENT MEASURES ARE THE RESPONSIBILITY OF THE DEVELOPER UNTIL THE TRANSFER OF RESPECTIVE SITES TO HOME BUILDERS, INDIVIDUAL OWNERS, HOMEOWNERS ASSOCIATIONS, SCHOOL DISTRICTS, OR LOCAL AGENCIES AND/OR GOVERNMENTS. AT THAT TIME, THE NEW OWNERS SHALL ASSUME RESPONSIBILITY FOR THEIR RESPECTIVE PORTIONS OF THE DEVELOPMENT.

CONSTRUCTION NOTES

1. INSTALL STABILIZED CONSTRUCTION ENTRY PER CASQA STORMWATER BMP HANDBOOK, TC-1
2. INSTALL SILT FENCE PER CASQA STORMWATER BMP HANDBOOK, SE-1
3. INSTALL 18"x18" NDS OR EQUIVALENT GRATE
4. INSTALL 1/3 HP SUMP PUMP
5. INSTALL 4" (SDR 35) PVC PIPE
6. INSTALL 6" (SDR 35) PVC PIPE
7. INSTALL 4"x4"x4" PVC TEE
8. INSTALL 90° PVC BEND
9. INSTALL NDS OR EQUIVALENT POP-UP EMITTER
10. INSTALL 6"x6"x4" PVC PEE

PRIVATE CONTRACT

PRECISE GRADING PLANS FOR:

2288 VIA APRILIA

LOT 26 & 27, DEL MAR TERRACE

CITY OF SAN DIEGO, CALIFORNIA
DEVELOPMENT SERVICES DEPARTMENT
SHEET 3 OF 11 SHEETS

I.O. NO. ____
PROJECT NO. ____

FOR CITY ENGINEER ____ DATE ____

V.T.M. ____

DESCRIPTION	BY	APPROVED	DATE	FILMED
ORIGINAL				
AS-BUILTS				

NAD83 COORDINATES

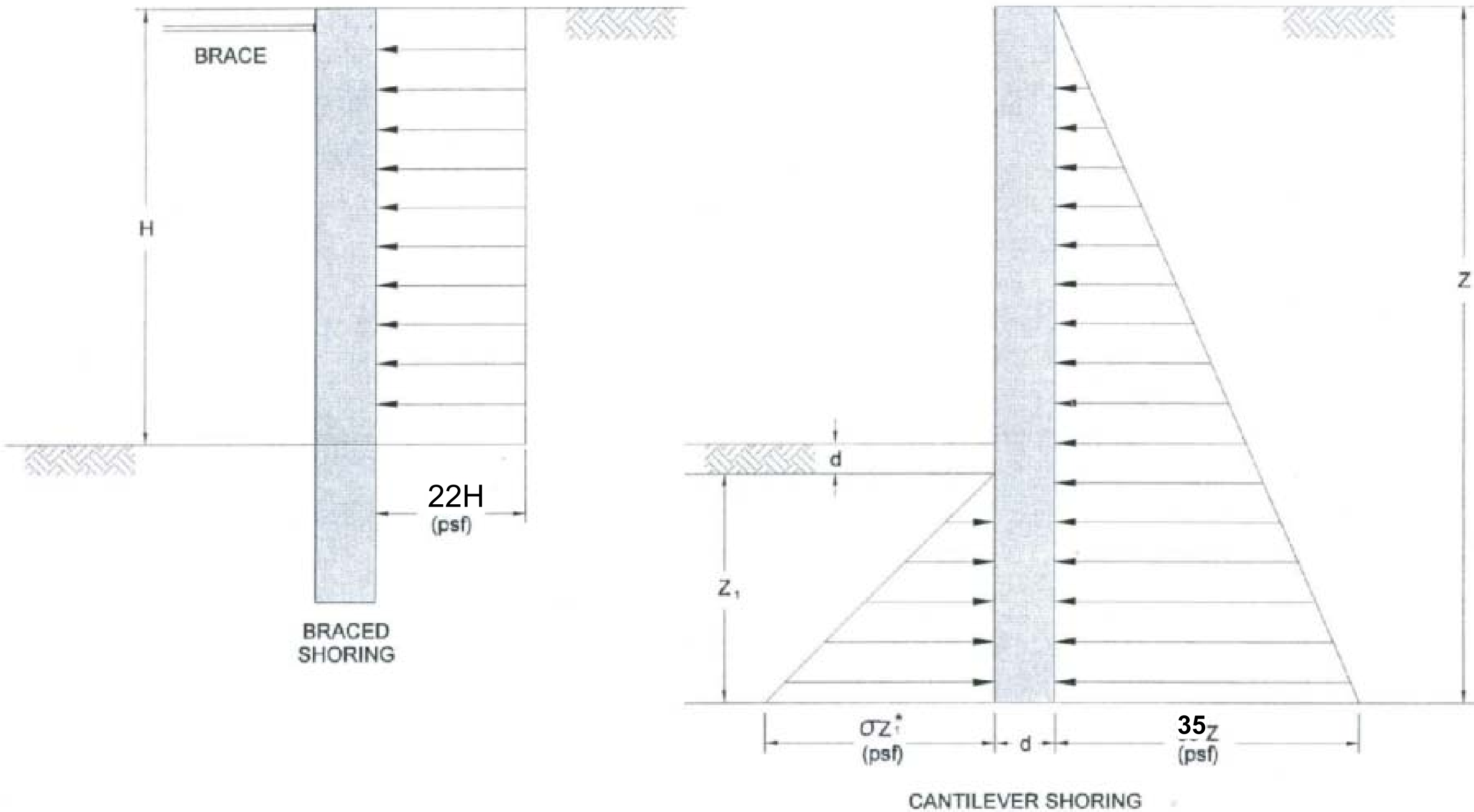
LAMBERT COORDINATES

CONTRACTOR ____ DATE STARTED ____
INSPECTOR ____ DATE COMPLETED ____

-D

THOMAS LOVE R.C.E. NO. 50993 EXP. 09-30-21 DATE

DRAWING DATE: SEPTEMBER 17. 2018
ORIGINAL PREP DATE: NOVEMBER 24, 2017



*σ = 250 pcf for Sheet Piles

σ = 500pcf for Isolated Soldier Piles

NOTE:

EARTH PRESSURES BASED ON GROUNDWATER BELOW BOTTOM OF SHORING ELEMENTS

GEOBODEN INC. Geotechnical Consultants	RECOMMENDED EARTH PRESSURES FOR TEMPORARY SHORING SYSTEM 2288 Via Aprilia Del Mar Terrace, California	Figure By S.R.	Project No. GB 101-1
		Map No. XX	Figure No.
		Date 03-27-20	3

APPENDIX A
BORING LOGS

GEOBODEN, INC.

BORING NUMBER B-1

CLIENT Tim Randell
PROJECT NAME Proposed Residential Building
PROJECT NUMBER GB 101-1
PROJECT LOCATION 2288 Via Aprilia, Del Mar Terrace
DATE STARTED 3/7/20 **COMPLETED** 3/7/20
GROUND ELEVATION **HOLE SIZE** 3 inches
DRILLING CONTRACTOR GeoBoden Inc.
GROUND WATER LEVELS:
DRILLING METHOD Hand Auger Boring
AT TIME OF DRILLING ---
LOGGED BY S.R. **CHECKED BY**
AT END OF DRILLING ---
NOTES
AFTER DRILLING ---

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS: LIQUID LIMIT	ATTERBERG LIMITS: PLASTIC LIMIT	ATTERBERG LIMITS: PLASTICITY INDEX	FINES CONTENT (%)
0.0		SILTY SAND (SM): brown, moist [FILL]										
2.5		BEDROCK: yellowish brown, hard, silty sandstone	MC R-1				113	8				
5.0												

Bottom of boring at 5.5 feet below ground surface (bgs) due to refusal in bedrock. Ground water was not encountered at the time of drilling. Boring was backfilled with cuttings.

Bottom of borehole at 5.5 feet.

APPENDIX B
LABORATORY TESTING

APPENDIX B
LABORATORY TESTING

PROPOSED RESIDENTIAL BUILDING
2288 VIA APRILIA
DEL MAR TERRACE, CALIFORNIA

Laboratory tests were performed on selected samples to assess the engineering properties and physical characteristics of soils at the site. The following tests were performed:

- moisture content and dry density
- direct shear
- corrosion potential

Test results are summarized on laboratory data sheets or presented in tabular form in this appendix.

Moisture Density Tests

The field moisture contents, as a percentage of the dry weight of the soils, were determined by weighing samples before and after oven drying. The dry density, in pounds per cubic foot, was also determined fir all relatively undisturbed ring samples collected. These analyses were performed in accordance with ASTM D 2937. The results of these determinations are shown on the boring logs in Appendix A.

Direct Shear

Direct shear tests were performed on undisturbed sample of bedrock. A different normal stress was applied vertically to each soil sample ring which was then sheared in a horizontal direction. The resulting shear strength for the corresponding normal stress was measured at a maximum constant rate of strain of 0.005 inches per minute. The direct shear results are shown graphically on a laboratory data sheet included in this appendix.

Corrosion Potential

The near surface soil was tested to determine the corrosivity of the site soil to steel and concrete. The soil samples were tested for soluble sulfate (Caltrans 417), soluble chloride (Caltrans 422), and pH and minimum resistivity (Caltrans 643). The results of corrosion tests are summarized in Table B-1.

TABLE B-1 (Corrosion Test Results)

Boring No.	Depth (ft)	Chloride Content (Calif. 422)	Sulfate Content (Calif. 417) % by Weight	pH (Calif. 643)	Resistivity (Calif. 643) Ohm*cm
B-1	0-5	34	0.0135	7.3	1,670

GEOBODEN, INC.

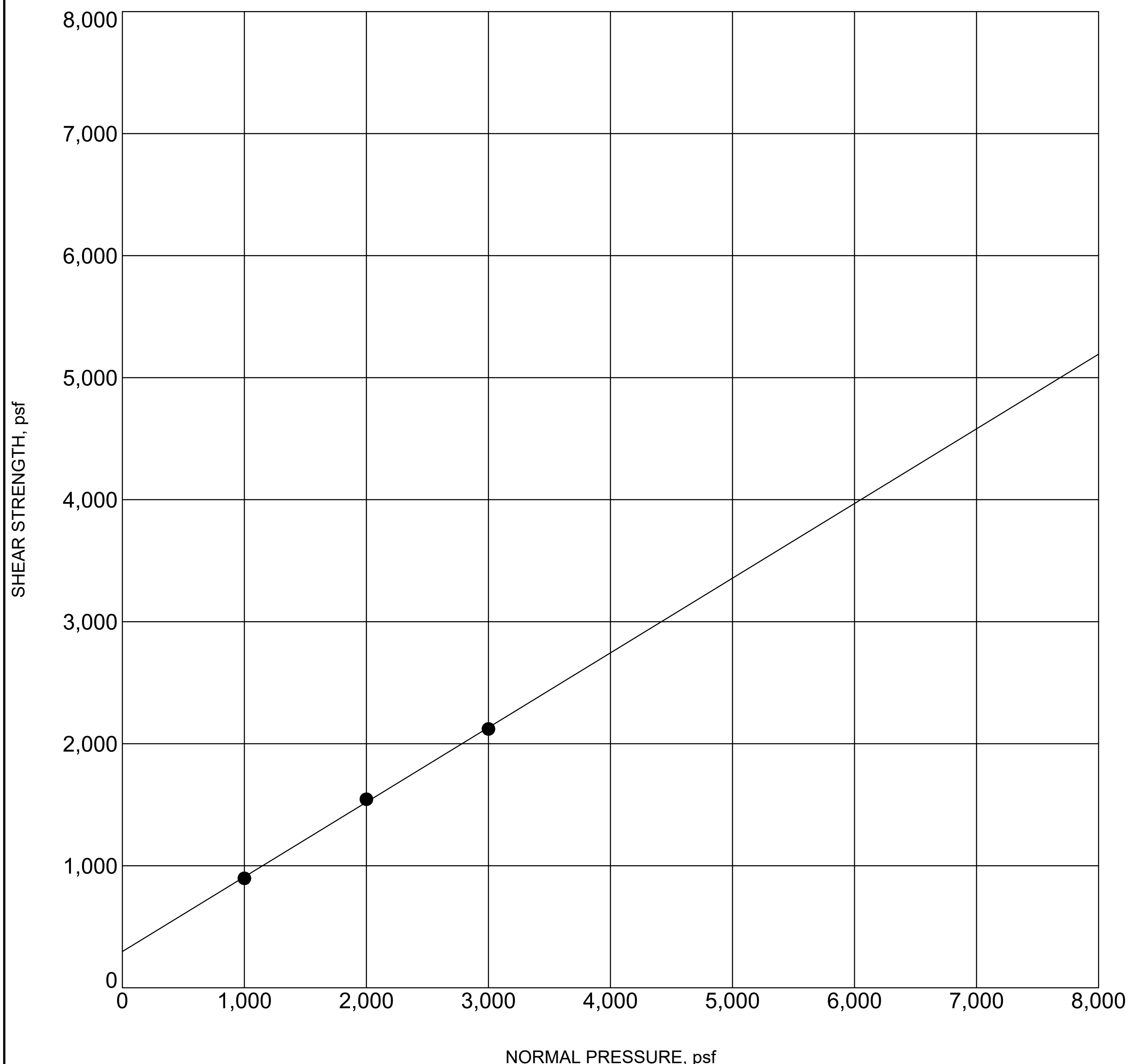
DIRECT SHEAR TEST

CLIENT Tim Randell

PROJECT NAME Proposed Residential Building

PROJECT NUMBER GB 101-1

PROJECT LOCATION 2288 Via Aprilia, Del Mar Terrace



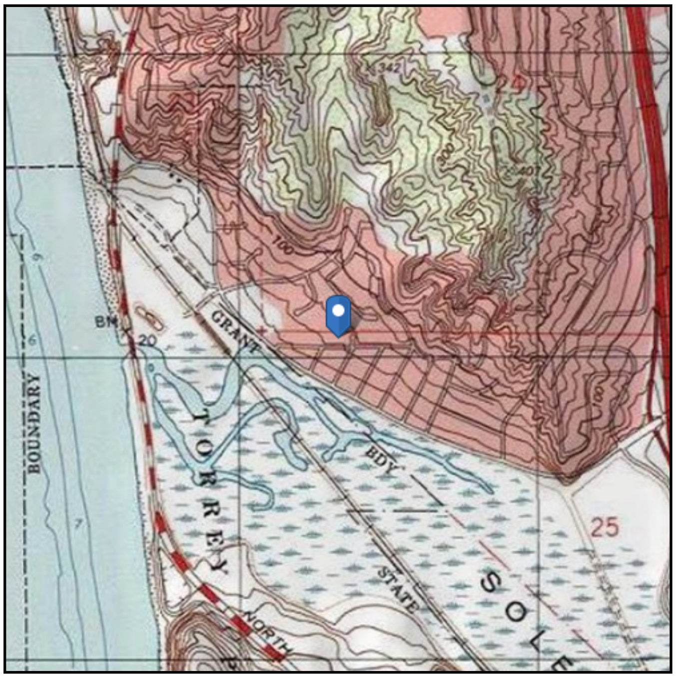
	Specimen Identification		Classification	γ_d	MC%	c	ϕ
●	B-1	2.0	BEDROCK: SILTY SANDSTONE	113	8	297.0	31

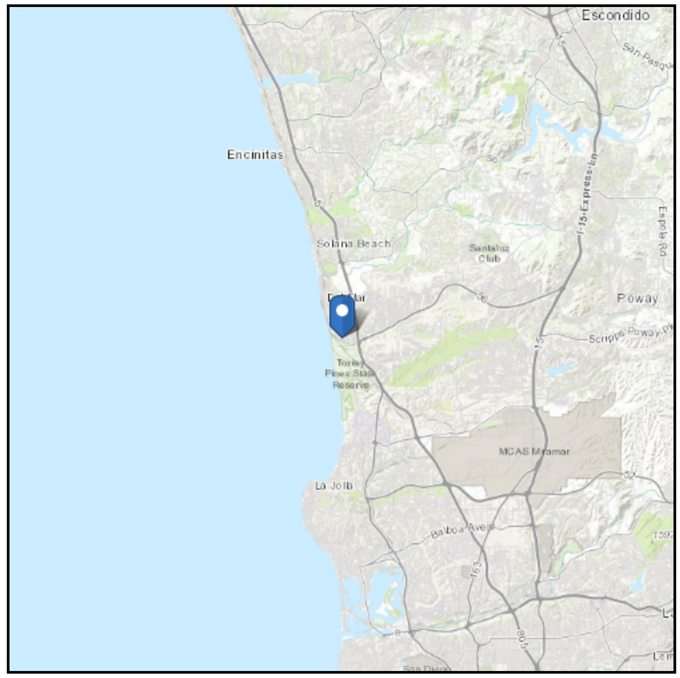
ASCE 7 Hazards Report

Address:
No Address at This Location

Standard: ASCE/SEI 7-16
Risk Category: III
Soil Class: C - Very Dense Soil and Soft Rock

Elevation: 43.62 ft (NAVD 88)
Latitude: 32.9345
Longitude: -117.2532





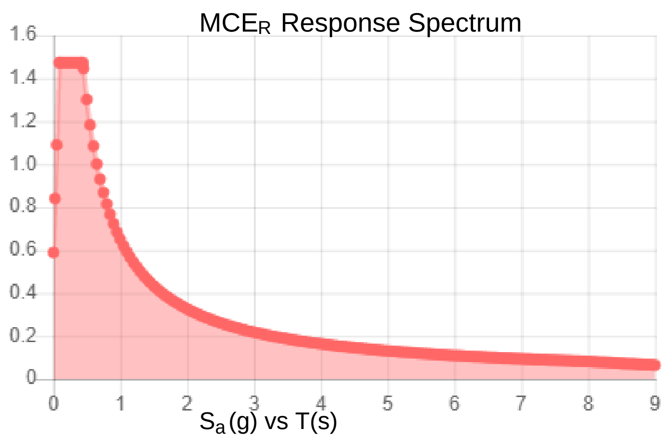
Seismic

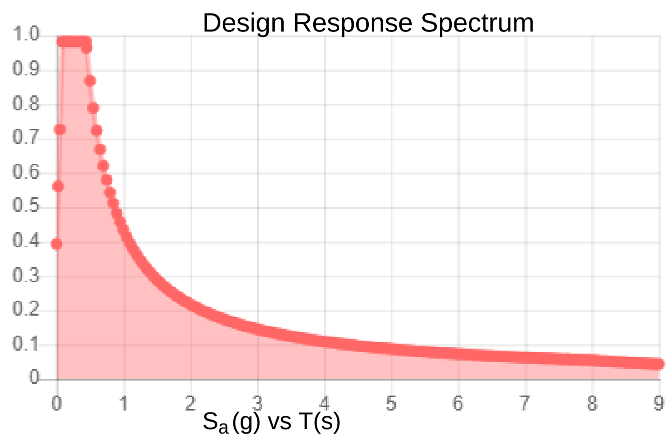
Site Soil Class: C - Very Dense Soil and Soft Rock

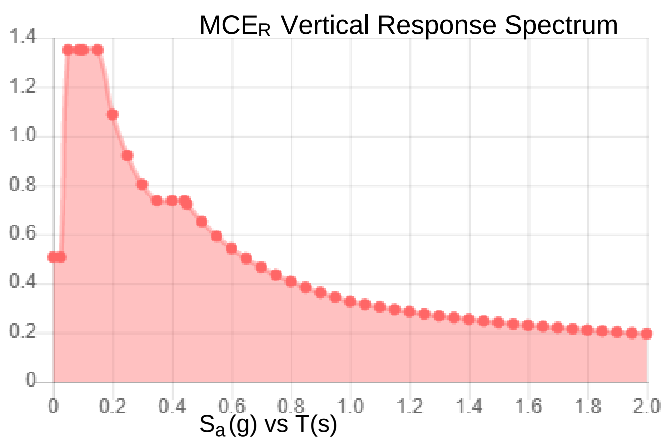
Results:

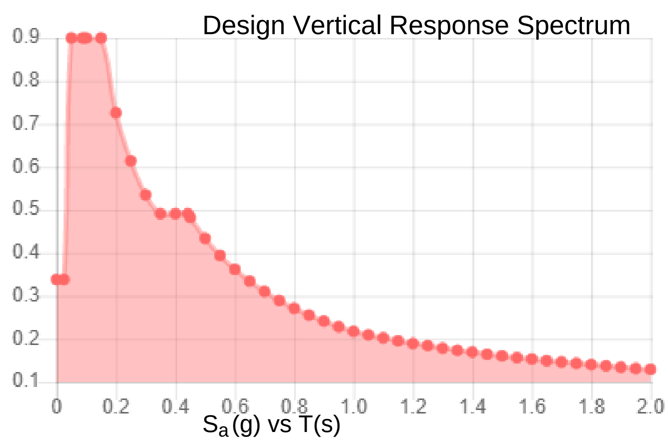
S_S :	1.228	S_{D1} :	0.434
S_1 :	0.434	T_L :	8
F_a :	1.2	PGA :	0.555
F_v :	1.5	PGA_M :	0.665
S_{MS} :	1.473	F_{PGA} :	1.2
S_{M1} :	0.651	I_e :	1.25
S_{DS} :	0.982	C_v :	1.146

Seismic Design Category D









Data Accessed: Fri Mar 27 2020

Date Source: USGS Seismic Design Maps based on ASCE/SEI 7-16 and ASCE/SEI 7-16 Table 1.5-2. Additional data for site-specific ground motion procedures in accordance with ASCE/SEI 7-16 Ch. 21 are available from USGS.

The ASCE 7 Hazard Tool is provided for your convenience, for informational purposes only, and is provided "as is" and without warranties of any kind. The location data included herein has been obtained from information developed, produced, and maintained by third party providers; or has been extrapolated from maps incorporated in the ASCE 7 standard. While ASCE has made every effort to use data obtained from reliable sources or methodologies, ASCE does not make any representations or warranties as to the accuracy, completeness, reliability, currency, or quality of any data provided herein. Any third-party links provided by this Tool should not be construed as an endorsement, affiliation, relationship, or sponsorship of such third-party content by or from ASCE.

ASCE does not intend, nor should anyone interpret, the results provided by this Tool to replace the sound judgment of a competent professional, having knowledge and experience in the appropriate field(s) of practice, nor to substitute for the standard of care required of such professionals in interpreting and applying the contents of this Tool or the ASCE 7 standard.

In using this Tool, you expressly assume all risks associated with your use. Under no circumstances shall ASCE or its officers, directors, employees, members, affiliates, or agents be liable to you or any other person for any direct, indirect, special, incidental, or consequential damages arising from or related to your use of, or reliance on, the Tool or any information obtained therein. To the fullest extent permitted by law, you agree to release and hold harmless ASCE from any and all liability of any nature arising out of or resulting from any use of data provided by the ASCE 7 Hazard Tool.