INLAND FOUNDATION ENGINEERING, INC.
Consulting Geotechnical Engineers and Geologists
www.inlandfoundation.com

August 20, 2021
Project No. N133-001

No Worries! RV and Boat Storage
28447 Witherspoon Parkway
Valencia, California 91355

Attention: Tom Comber

Subject: Geotechnical Investigation Report
RV and Boat Storage Facility
SWC Willard Street and State Highway 79 (Winchester Road)
Riverside County, California
APN 462-182-018 & 462-185-006

Dear Mr. Comber:

This report presents the results of the geotechnical investigation for the proposed RV and boat storage facility to be constructed southwest of and adjacent to the intersection of Willard Street and State Highway 79 in the Winchester area of Riverside County, California. The investigation was conducted in general conformance with our proposal dated June 16, 2021.

This report includes project design and construction recommendations along with the field and laboratory data. The primary geotechnical issues that will require mitigation is the potential for earthquake soil liquefaction and settlement. There is also a significant amount of undocumented fill soil on site that should be removed and recompacted where pavement and settlement-sensitive structures are planned.

We appreciate the opportunity to be of service to you on this project. Please contact our office if you have any questions.

Respectfully,
INLAND FOUNDATION ENGINEERING, INC.

PROFESSIONAL GEOLOGIST
DANIEL R. LIND
NO. 2451
CERTIFIED
ENGINEERING
GEOLOGIST
STATE OF CALIFORNIA

Daniel R. Lind, P.G., C.E.G.
Vice President

REGISTERED PROFESSIONAL ENGINEER
ALLEN D. EVANS
No. 2060
GEOTECHNICAL
STATE OF CALIFORNIA

Allen D. Evans, P.E., G.E.
Principal

DRL:ADE:es
Distribution: Addressee

INTRODUCTION

This report presents the findings of the geotechnical investigation conducted for a proposed RV and boat storage facility to be located southwest of and adjacent to the intersection of Willard Street and State Highway 79 in the Winchester area of Riverside County, California. The following references were used for this project:

- Plan entitled "Conditional Use Permit, County of Riverside, No Worries! RV and Boat Storage", dated April 16, 2021, prepared by Hzayen Design Group, Inc.

- Plan entitled "ALTA/NSPS Land Title Survey for Winchester Road & Willard Street, Winchester, CA 92596", dated April 5, 2021, prepared by Partner Engineering & Science, Inc.

- Phase 1 Environmental Site Assessment Report, Vacant Land, Southwest Corner of Willard Street and Highway 79, Winchester, California 93596, dated March 31, 2021 prepared by Partner Engineering.

Additional references are appended.

SCOPE OF SERVICE

The purpose of this geotechnical investigation is to provide geotechnical parameters and recommendations for design and construction of the proposed RV and boat storage facility. The scope of service included:

- *Review of the general geologic conditions and specific subsurface conditions of the project site.*

- *Evaluation of the engineering and geologic data collected for the project site.*

- *Preparation of this report with geotechnical conclusions and recommendations for design and construction.*

The tasks performed to achieve these objectives included:

- *Subsurface exploration to evaluate the nature and stratigraphy of the subsurface soil and to obtain representative samples for laboratory testing.*

- *Laboratory testing of representative samples to evaluate the classification and engineering properties of the soil.*

- *Analysis of the data collected and the preparation of this report with our geotechnical conclusions and recommendations.*

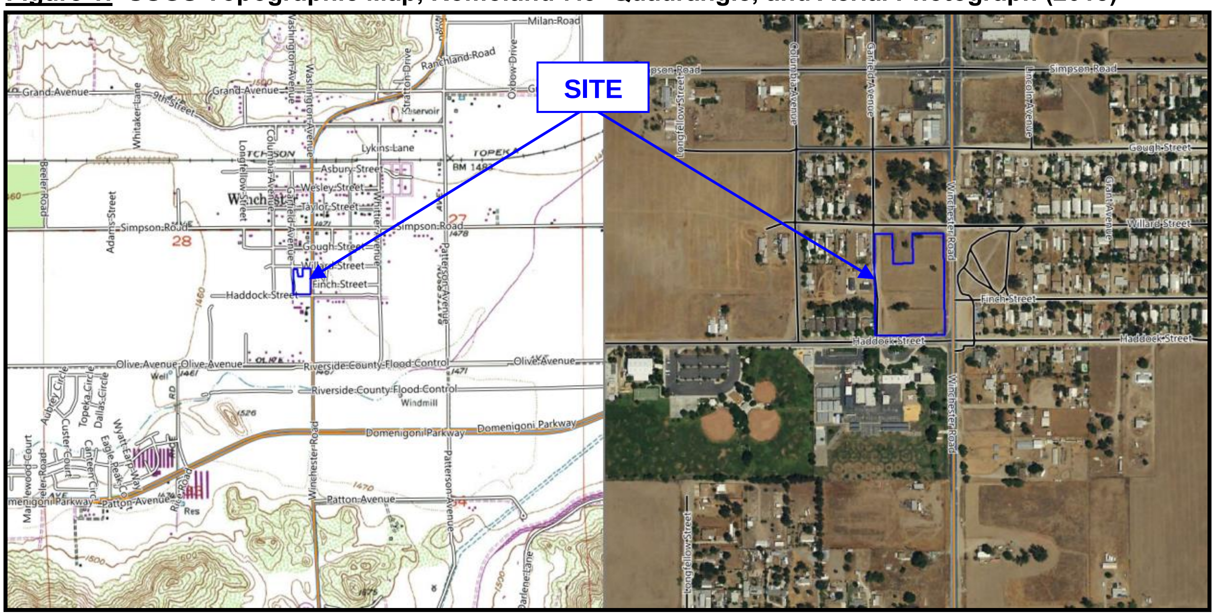
- *Infiltration testing.*

Evaluation of hazardous waste was not within the scope of service provided. An evaluation of faulting and/or seismic hazards on the site also was not within the scope of service provided.

PROJECT AND SITE DESCRIPTION

The subject project will consist of development of an RV and boat storage facility. The approximately ± 3.53 acre site is located southwest of and adjacent to the intersection of Willard Street and Highway 79 in the Winchester area of Riverside County, California. The project site lies within the southeasterly portion of Section 28, Township 5 South, Range 2 West, S.B.B.&M. Figure 1 below shows the location of the project site.

Figure 1: USGS Topographic Map, Romoland 7.5’ Quadrangle, and Aerial Photograph (2018)



A proposed modular office building and RV detail structure are planned on the northwest portion of the site. The remainder of the site will be developed with parking stalls and paved access driveways. Street improvements along Willard Street, Winchester Road, and Haddock Street, including pavement, curb, gutter, and sidewalk, are also planned.

The site is currently undeveloped. The topography of the site is nearly level, with a slight apparent gradient to the south. The site has been previously graded. Prevously graded pads are present on the northerly and southery portions of the site. A graded extension of Finch Street separates the northerly and southerly graded pads. The graded pad areas on the northerly portion of the site are approximately two (2) to four (4) feet higher than the adjacent ground areas. The graded southerly portion of the site is approximately three (3) to five (5) feet higher than adjacent ground areas. The proposed building areas for the office and RV detail structure do not appear to have been previously graded. Generally, cuts and fills of less than four feet are planned, exclusive of any remedial grading recommended in this report.

Site vegetation consists of several mature trees and seasonal grasses and weeds. The surrounding properties consist of State Highway 79 (Winchester Road) to the east, Willard Street and single-family residences to the north, Haddock Street and Winchester Elementary School to the south, and single-family residences to the west.

According to the referenced Phase I Environmental Site Assessment report, a single-family residence was present on the site from 1901 to 1949. Based on historical aerial photographs, it appears that the residence was located on the easterly portion of the property. Several trees were also formerly present on the property.

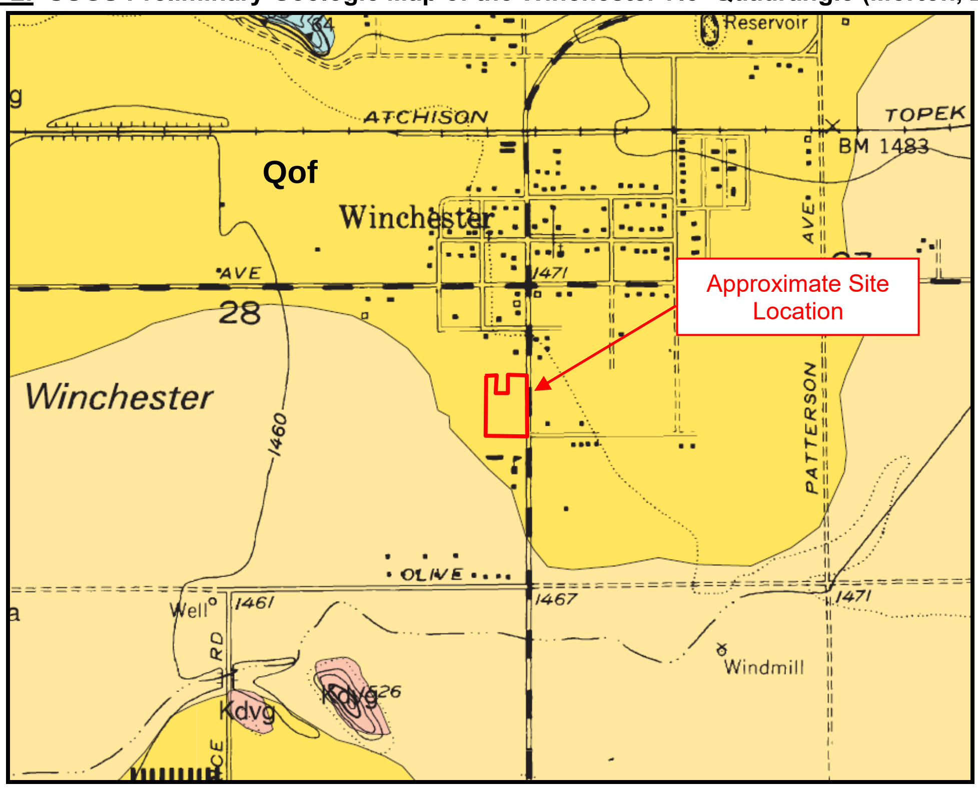
GEOLOGIC SETTING

Regional Geology: The subject site is situated within a natural geomorphic province in southwestern California known as the Peninsular Ranges, which is characterized by steep, elongated ranges and valleys that trend northwesterly. This geomorphic province encompasses an area that extends 125 miles, from the Transverse Ranges and the Los Angeles Basin, south to the Mexican border, and beyond another 795 miles to the tip of Baja California (Norris & Webb, 1990; Harden, 1998). This province is believed to have originated as a thick accumulation of predominantly marine sedimentary and volcanic rocks during the late Paleozoic and early Mesozoic. Following this accumulation, in mid-Cretaceous time, the province underwent a pronounced episode of mountain building. The accumulated rocks were then complexly metamorphosed and intruded by igneous rocks, known locally as the Southern California Batholith. A period of erosion followed the mountain building, and during the late Cretaceous and Cenozoic time, sedimentary and subordinate volcanic rocks were deposited upon the eroded surfaces of the batholithic and pre-batholithic rocks.

Local Geology: More specifically, the site is situated within the Perris Block, an eroded mass of Cretaceous and older crystalline rock. Thin sedimentary and volcanic units mantle the bedrock in a few places with alluvial deposits filling in the lower valley areas. The Perris Block is a structurally stable, internally unfaulted mass of crustal rocks bounded on the west by the Elsinore-Chino fault zones, on the east by the San Jacinto fault zone, and on the north by the Cucamonga fault zone (Woodford, et al., 1971). On the south, the Perris Block is bounded by a series of sedimentary basins that lie between Temecula and Anza (Morton and Matti, 1989).

According to the USGS Preliminary Geologic Map of the Winchester 7.5' Quadrangle (Morton, 2003) the site is underlain by old (late to middle Pleistocene) alluvial fan deposits (map symbol Qof) described as indurated reddish brown gravel and sand alluvial deposits. Figure 2 below shows a portion of the U.S.G.S. Preliminary Geologic Map of the Winchester 7.5' Quadrangle (Morton, 2003), depicting the mapped geologic units in the vicinity of the subject property:

<u>Figure 2:</u> USGS Preliminary Geologic Map of the Winchester 7.5' Quadrangle (Morton, 2003)



Qof

Old alluvial fan deposits (late to middle Pleistocene)—Reddish brown, gravel and sand alluvial fan deposits; indurated, commonly slightly dissected. In places, includes thin alluvial fan deposits of Holocene age

Faulting: There are at least 39 major late Quaternary active/potentially active faults within a 100-kilometer radius of the site. Of these, there are no faults known to traverse the site, based on published literature, nor any photogeologic or surficial geomorphic evidence suggestive of faulting. In addition, the site is not located within a State of California "Alquist-Priolo Earthquake Fault Zone" for fault rupture hazard (CGS, 2018). Current mapping by the Riverside County Land Information System indicates that the site does not lie within a mapped County fault zone.

The nearest known active fault is the Casa Loma Fault (southern branch of the San Jacinto Fault). The Casa Loma Fault is located approximately 12.4 kilometers to the northeast of the project site. The San Jacinto Fault (San Jacinto Valley Segment, U.S.G.S., 2008) is a right-lateral, strike-slip fault, approximately 43 kilometers in length, with an estimated maximum moment magnitude (M_w) earthquake of M_w7.0 and an associated slip-rate of 18 mm/year.

The site and surrounding area have been subject to strong ground shaking related to active faults that traverse the region. The approximate distances to the faults and published maximum earthquake magnitudes are shown in Table 1:

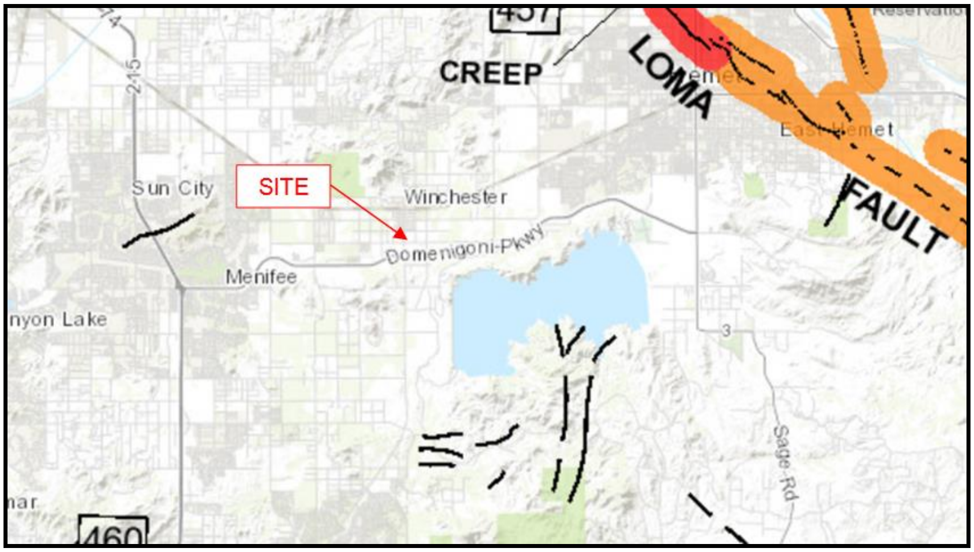
<u>Table 1:</u> Fault Zone, Distances and Maximum Earthquake Magnitudes

Fault Zone	Approximate Distance (Km)	Earthquake Magnitude (M_w)
San Jacinto - San Jacinto Valley	12.4	7.0
San Jacinto - Anza	14.9	7.2
Elsinore - Temecula	19.6	6.8
Elsinore - Glen Ivy	20.1	6.8

For seismic design purposes, based on published parameters for faults in California from the *Working Group on Earthquake Probabilities* (Field and others, 2008; Willis and others, 2008), we are considering that a cascading effect of rupture will occur along the entire length of all the San Jacinto Fault Zone segments. Based on published rupture-model data (Petersen et al., 2008), the total rupture area of these combined faults is 4,017 square kilometers, with an associated Maximum Moment Magnitude (M_W) of 7.8.

Figure 3 is a portion of the CGS 2010 Fault Activity Map of California showing the location of the site and mapped earthquake fault zones in the vicinity of the site.

Figure 3: 2010 Fault Activity Map of California, CGS, 2010



Our review of the potential for surface fault rupture at this site has included an examination of non-stereo and stereo pairs of vertical black and white aerial photographs dating between the years of 1962 and 2018 (see References for a listing). The photogeologic analysis did not reveal observed indicators suggestive of active fault-related features. This included the lack of photolineations and/or no consistent tonal variations observed across the site, or trending toward the site. Our review indicates that no documented active faults are known to traverse toward the subject site, based on published literature, and no surficial indications or geomorphic features were observed within the aerial photographs or field reconnaissance that are suggestive of active faulting.

Ground rupture is generally considered most likely to occur along pre-existing faults. Based on our review of published geologic maps, aerial photograph review, and site reconnaissance, the potential for ground rupture at the site is considered to be low.

Seismic Parameters: The approximate site coordinates (WGS 84) are 33.7042°N / -117.0855°W. The computer program U.S. Seismic Design Maps website (OSHPD, 2021) was used to evaluate the seismic parameters for this project. Table 2 summarizes design criteria obtained from the 2019 California Building Code (CBC), which is based on ASCE 7-16. The values presented in Table 2 are for the risk-targeted maximum considered earthquake (MCE_R).

Table 2: 2019 CBC Seismic Design Parameters

Seismic Parameter	Value
S_s - MCE_R Ground Motion for 0.2-sec Period	1.471
S_1 - MCE_R Ground Motion for 1-sec Period	0.552
SD_S - Numeric Seismic Design Value at 0.2-sec period	1.766
SD_1 - Numeric Seismic Design Value at 1.0-sec period	Null
PGA - MCE_g Peak Ground Acceleration	0.5
F_{PGA} - Site Amplification Factor at PGA	1.2
PGA_M - Site Modified Peak Ground Acceleration	0.6
SITE CLASS	D (Default)

The seismic design parameters recommended above should be discussed with the project structural engineer, as they may significantly impact the structural design of the project. A site-specific ground motion analysis may result in less conservative seismic design parameters than reported above.

Groundwater: The site is located within the Winchester hydrologic sub-area of the Santa Ana hydrologic basin in southwestern Riverside County, California. The Winchester subbasin includes a relatively level alluvial valley floor and is bounded by granitic and undifferentiated metamorphic rocks. Alluvium-filled constrictions are boundaries between the Winchester subbasin and the Perris-South subbasin to the northwest, the Menifee subbasin to the southwest, and the Hemet subbasin to the east. Saturated alluvium that fills the constrictions connects the subbasins hydrologically in the subsurface. Alluvium in the Winchester subbasin is estimated to be as much as 500 to 900 ft. thick (Kaehler & Belitz, 2003).

Groundwater data compiled by the California Department of Water Resources (DWR) reveals that there are several wells in the vicinity of the project. State Well No. 05S02W27N001S, located approximately 1,600 feet to the southeast of the site, was monitored on June 16, 1994. At that time, the depth to groundwater was 8.6 feet. State Well No. 05S02W33C001S, located approximately 2,700 feet to the southwest of the site was monitored on May 16, 1995. At that time, the depth to groundwater was 8.2 feet.

According to a report entitled “Ground Water in the San Jacinto and Temecula Basins, California”, dated 1919 and prepared by Gerald A. Waring, the approximate depth to groundwater beneath the site in 1915 was 10 feet (based on groundwater elevation contours).

Groundwater was encountered within exploratory borings B-01 and B-02 at depths of approximately 15 and 13 feet below the existing ground surface, respectively. Based on the encountered groundwater levels and historical groundwater data reviewed, we estimate a high groundwater level at the site of ten (10) feet bgs for purposes of our analysis.

Secondary Seismic Hazards: The primary geologic hazard affecting the project is ground shaking. Secondary permanent or transient seismic hazards generally associated with severe ground shaking during an earthquake include, but are not necessarily limited to; ground rupture, liquefaction, seiches or tsunamis, landsliding, rockfalls, and debris flow. These are discussed below:

Ground Rupture - Ground rupture is generally considered most likely to occur along pre-existing faults. Since no active faults are known to traverse the site, the probability of ground rupture is low.

Liquefaction and Seismically-Induced Settlement: The project site is located within an area mapped by Riverside County to have a “high” liquefaction potential. In general, liquefaction is a phenomenon that occurs where there is a loss of strength or stiffness in the soil that can result in the settlement of buildings, ground failure, or other hazards. The main factors contributing to this phenomenon are: 1) loose, granular soil (usually of Holocene age); 2) shallow groundwater (generally less than 50 feet); and 3) moderate to high seismic ground shaking.

We analyzed the soil profile logged for exploratory boring B-01. The results of our analysis indicate significant liquefaction potential within the soil profile to a depth of 48 feet bgs. The potential seismically-induced settlement within the soil profile is approximately 6 inches. The estimated differential settlement due to a seismic event is approximately 3 inches in 30 feet horizontal. A discussion of the liquefaction and seismic settlement analysis, with graphic and tabulated results, is included in Appendix C.

Seiches/Tsunamis: A seiche is a standing wave in an enclosed or partially enclosed body of water. In order for a seiche to form, the body of water needs to be at least partially bounded, allowing the formation of the standing wave. Tsunamis are very large ocean waves that are caused by an underwater earth-quake or volcanic eruption, often causing extreme destruction when they strike land.

There are no bodies of water on or adjacent to the project site. Based on the distance to large, open bodies of water and the elevation of the site with respect to sea level, it is our opinion that the potential of seiches/tsunamis does not present a hazard to this project.

Landsliding - Due to the low-lying relief of the site and adjacent areas, landsliding due to seismic shaking is considered nil.

Rockfalls - Since no large rock outcrops are present at or adjacent to the site, the possibility of rockfalls during seismic shaking is nil.

Debris Flows: Debris flows are composed of a slurry-like mass of liquefied debris (ranging up to boulder size) that moves downhill under the force of gravity. Such slurries are dense enough to support very large particles but not solid enough to resist flowing downhill. Debris flows are most common in steep mountain canyons when a mass of mud and debris becomes saturated during a heavy rainstorm and suddenly begins to flow down the canyons (Prothero & Schwab, 1996). Based on the location of the site and the relatively planar topography of the property up-gradient of the site, it is our opinion that the hazard of debris flow should be considered low.

Other Geologic Hazards: There are other geologic hazards not necessarily associated with seismic activity that occur statewide. These hazards include, but are not limited to, methane gas, hydrogen-sulfide gas, tar seeps, Radon-222 gas, and naturally occurring asbestos. Of these hazards, there are none that appear to impact the site.

SUBSURFACE CONDITIONS

Subsurface exploration at the site consisted of nine (9) exploratory borings to depths ranging from approximately 5.5 to 56.5 feet below existing site grades. The field exploration is described in Appendix A. Boring locations are shown on Figure A-12. The soil encountered in the borings generally consisted of alluvial deposits of interbedded layers of silty clayey sand (SC-SM), clayey sand (SC), silty sand (SM), sandy silty clay (CL-ML), and sandy silt (ML). Undocumented artificial fill materials were encountered within exploratory borings B-03, B-04, B-05, B-07 and B-08 to depths ranging from approximately 4.5 to 6 feet below the existing ground surface. The fill generally consists of fine- silty clayey sand (SC-SM), and clayey sand (SC). Areas of deeper artificial fill and debris may be present on other portions of the site.

Groundwater was encountered within exploratory borings B-01 and B-02 at depths of approximately 15 and 13 feet bgs, respectively. Historic high groundwater levels are as shallow as 10 feet bgs.

Analytical testing indicates the concentration of sulfates is 34 ppm, which is negligible with respect to sulfate attack on concrete. The chloride concentration in the tested samples was 31 parts per million (ppm), indicating the soil is not corrosive to ferrous metal. The soil is alkaline with a pH value of 8.3. The minimum saturated resistivity value of 3,330 ohm-cm indicates the soil is moderately corrosive to buried metal. IFE does not practice corrosion engineering. If further information is desired concerning the site corrosion characteristics, a competent corrosion engineer should be consulted.

Expansion index (EI) testing indicates the site soil has a very low expansion potential. Design measures to mitigate the effects of expansive soil are not necessary.

CONCLUSIONS AND RECOMMENDATIONS

On the basis of our field and laboratory investigation, the proposed construction is feasible from a geotechnical engineering standpoint. The primary issues requiring mitigation are the potential for earthquake soil liquefaction and the presence of undocumented artificial fill material to depths of approximately five to six feet across the site. The following sections present our geotechnical recommendations for project design and construction.

Foundation Design: Footings for the proposed modular office building, RV detail structure and other appurtenant structures should be designed with a maximum allowable bearing pressure of 1,700 pounds per square foot (psf). Footings should have a minimum width of 12 inches and be founded a minimum depth of 12 inches below the lowest adjacent grade. The allowable bearing pressure may be increased by 900 psf for each additional foot of depth and by 300 psf for each additional foot of width, to a maximum allowable bearing pressure of 3,000 psf. The allowable bearing capacity may also be increased by ⅓ for short-term transient wind and seismic loads.

Static settlement of footings designed and constructed as recommended herein is expected to be less than one inch. Differential settlement between footings of similar size and load is expected to be less than one-half inch. Potential seismic site settlement was analyzed to be approximately 6 inches. Recommendations to mitigate seismically-induced settlement are presented in the "General Site Grading" section of this report.

Lateral Resistance: Resistance to lateral loads will be provided by a combination of friction acting at the base of the slab or foundation and passive earth pressure. A coefficient of friction of 0.40 between soil and concrete may be used with dead load forces only. A passive earth pressure of 230 psf, per foot of depth, may be used for the sides of footings poured against recompacted or suitably dense native material.

Passive earth pressure should be ignored within the upper one foot except where confined as beneath a floor slab, for example. These values may be increased by ⅓ to provide for lateral loads of short duration such as those caused by wind or seismic forces.

Lateral Earth Pressure: Retaining walls that are backfilled with native on-site soil should be designed for an active earth pressure equivalent to that exerted by a fluid weighing not less than 45 pcf. Any applicable construction or seismic surcharges should be added to this pressure.

Trench Wall Stability: All excavations should be configured per with the requirements of CalOSHA for Type C soil. During construction, the classification of the soil and the shoring and/or slope configuration should be the responsibility of the contractor on the basis of the trench depth and the soil encountered. The contractor should have a "competent person" on-site for the purpose of assuring safety within and about all construction excavations.

Concrete Slabs-on-Grade: Concrete slabs-on-grade should have a minimum thickness of four inches. During final grading and prior to the placement of concrete, all surfaces to receive concrete slabs-on-grade should be compacted to maintain a minimum compacted fill thickness of 12 inches. Load bearing slabs should be designed using a modulus of subgrade reaction not exceeding 100 pounds per square inch per inch.

Slabs should be designed and constructed in accordance with the provisions of the American Concrete Institute (ACI). Shrinkage of concrete should be anticipated and will result in cracks in all concrete slabs-on-grade. Shrinkage cracks may be directed to saw-cut "control joints" spaced on the basis of slab thickness and reinforcement. ACI typically recommend control joint spacings in unreinforced concrete at maximum intervals equal to the slab thickness times 24.

Slabs to receive moisture-sensitive coverings should be provided with a moisture vapor retarder/barrier designed and constructed according to the American Concrete Institute 302.1 R, Concrete Floor and Slab Construction, which addresses moisture vapor retarder/barrier construction. At a minimum, the vapor retarder/barrier should comply with ASTM El745 and have a nominal thickness of at least 10 mils. The vapor retarder/barrier should be properly sealed, per the manufacturer's recommendations, and protected from punctures and other damage.

Preliminary Flexible Pavement Design: Recommended structural pavement sections are shown below in Table 3. The recommended sections are based on a design R-value of 44, current Caltrans design procedures and the traffic index (T.I.) values shown.

Table 3: Preliminary AC Pavement Sections

Service	Asphalt Concrete Thickness (ft.)	Base Course Thickness (ft.)
Light traffic (autos, parking areas, T.I. = 5.0)	0.20	0.35
Local streets (Willard St. Haddock St, T.I. = 5.5)	0.25	0.40
Heavy traffic (trucks, driveways, T.I. =7.0)	0.30	0.55

At the completion of rough grading, pavement subgrade soil should be evaluated, with possible additional R-value testing, to confirm that the recommended pavement sections are suitable.

Inland Foundation Engineering, Inc. does not practice traffic engineering. The TI values used to develop the recommended pavement sections are typical for projects of this type. The project civil engineer or traffic engineer should review the TI's to verify that they are appropriate for this project.

Infiltration: Infiltration testing was performed in the vicinity of the proposed retention basin in the southeastern portion of the site. The testing procedures and test results are described in Appendix C. Table 4 below provides a summary of the test data with values for I_c. Note that the values shown do not include safety factors.

Table 4: Percolation Test Data and Infiltration Rates

Percolation Hole No.	Percolation Rate (Min./Inch)	Depth Below Existing Ground Surface (In.)	Infiltration Rate (I_c) (In./Hr.)
P-1	30	48	0.2
P-2	60	48	0.1

General Site Grading: All grading should be performed per the applicable provisions of the 2019 California Building Code. The following recommendations have been developed on the basis of our field and laboratory testing:

1. **Clearing and Grubbing:** All building and pavement areas and all surfaces to receive compacted fill should be cleared of vegetation, debris, and other unsuitable materials. All such material should be disposed of off-site.

All undocumented fill and loose alluvial soil encountered during site grading should be completed removed. Such material is suitable for replacement as compacted fill as recommended herein. Undocumented artificial fill materials were encountered within exploratory borings B-03, B-04, B-05, B-07 and B-08 to depths ranging from approximately 4.5 to 6 feet below the existing ground surface. Undocumented fill may be present at other locations and depths on the site and may be encountered during site grading.

Any abandoned underground utility lines should be traced out and completely removed from the site. Any abandoned septic systems, including septic tanks, seepage pits and or leachlines, should be removed and backfilled in accordance with these recommendations.

2. **Preparation of Surfaces to Receive Compacted Fill:** All surfaces to receive compacted fill should be evaluated by a representative of this firm. Depending on the observed condition, compaction testing of the unprocessed native soil may be necessary. If roots, deleterious material or other unsuitable conditions are encountered, additional overexcavation may be required. Upon approval, surfaces to receive fill should be scarified, brought to near optimum moisture content, and compacted to a minimum of 90 percent relative compaction.

3. **Placement of Compacted Fill:** Fill materials consisting of on-site soil or approved imported granular soil should be spread in shallow lifts and compacted at near optimum moisture content to a minimum of 90 percent relative compaction, based on ASTM D1557.

4. **Preparation of Building Area:** The building area for the proposed modular office building and RV detail structure should be over-excavated to a depth of at least five (3) feet below finish grade or two (2) feet below the bottom of the deepest footings, whichever is greater. Over-excavation should extend laterally for at least five (5) feet outside of exterior building foundation lines. The excavation bottom should be approved as recommended above.

   To mitigate potential structural damage associated with seismically induced settlement, the building area should be supported by a layered system of compacted fill and Tensar® TX7 geogrid, or equivalent. Two (2) geogrid layers should be placed within the compacted building pad at vertical intervals of 12 inches. The bottom layer of geogrid reinforcement should be placed directly on the prepared excavation bottom. Care should be taken during fill placement and compaction not to damage the geogrid. The geogrid supplier/manufacturer should review the final design and provide specific installation recommendations.

5. **Preparation of Slab and Paving Areas:** During final grading and immediately prior to the placement of concrete or a base course, all surfaces to receive asphalt concrete paving or concrete slabs-on-grade should be processed and tested to assure compaction for a depth of at least of 12 inches. This may be accomplished by a combination of over-excavation, scarification and recompaction of the surface, and replacement of the excavated material as controlled compacted fill. Compaction of slab areas should be to a minimum of 90 percent relative compaction. Compaction within proposed pavement areas should be to a minimum of 95 percent relative compaction for both the subgrade and base course.

6. **Utility Trench Backfill:** Utility trench backfill consisting of the on-site soil types should be placed by mechanical compaction to a minimum of 90 percent relative compaction. This is with the exception of the upper 12 inches under pavement areas where the minimum relative compaction should be 95 percent. Jetting of the native soils is not recommended.

7. **Testing and Observation:** During grading tests and observations should be performed by a representative of this firm to verify that the grading is performed per the project specifications. Field density testing should be performed per the current ASTM D1556 or ASTM D6938 test methods. The minimum acceptable degree of compaction should be 90 percent of the maximum dry density, based on ASTM D1557, except where superseded by more stringent requirements, such as beneath pavement. Where testing indicates insufficient density, additional compactive effort should be applied until retesting indicates satisfactory compaction.

GENERAL

The findings and recommendations presented in this report are based upon the soil conditions encountered at an accessible location adjacent to the proposed structure. Should conditions be encountered during grading that appear to be different than those indicated by this report, this office should be notified.

This report was prepared prior to the preparation of a grading plan for the project. We recommend that a pre-job conference be held on the site prior to the initiation of site grading. The purpose of this meeting will be to assure a complete understanding of the recommendations presented in this report as they apply to the actual grading performed.

This report was prepared for No Worries! RV and Boat Storage for their use in the design of the proposed cultivation and processing facility as described herein. This report may only be used by No Worries! RV and Boat Storage for this purpose. The use of this report by parties or for other purposes is not authorized without written permission by Inland Foundation Engineering, Inc. Inland Foundation Engineering, Inc. will not be liable for any projects connected with the unauthorized use of this report.

The recommendations of this report are considered to be preliminary. The final design parameters may only be determined or confirmed at the completion of site grading on the basis of observations made during the site grading operation. To this extent, this report is not considered to be complete until the completion of both the design process and the site preparation.

LIMITATIONS

The findings and recommendations of this report are based upon an interpolation of soil conditions between test locations. It is possible that conditions may be encountered that are different than those indicated in this report. Should such conditions be encountered during construction, our office should be notified in order to determine if revisions or retesting are warranted.

Evaluation of hazardous waste was not within the scope of services provided. The information in this report represents professional opinions that have been developed using that degree of care and skill ordinarily exercised, under similar circumstances, by reputable geotechnical consultants practicing in this or similar localities. No other warranty, either expressed or implied, is made as to the professional advice included in this report.

REFERENCES

ASCE/SEI, 2017, ASCE Standard 7-16, Minimum Design Loads and Associated Criteria for Buildings and Other Structures.

Blake, T.F. 1989-2000a, EQSEARCH, A Computer Program for the Estimation of Peak Horizontal Acceleration from Southern California Historical Earthquake Catalog, Version 3.00b.

California Building Standards Commission, 2019, California Building Code (CBC), California Code of Regulations, Title 24, Part 2, Volume 2.

California Geological Survey (CGS), 2008, Guidelines for Evaluating and Mitigating Seismic Hazards in California, CGS Special Publication 117A.

California Geological Survey (CGS), 2010, 2010 Fault Activity Map of California, Geologic Map No. 6.

California State Water Resources Control Board, Geotracker website, https://geotracker.waterboards.ca.gov/

Harden, D.R., 1998, California Geology: Prentice Hall, Inc.

Jennings, C.W., 1994, Fault Activity Map of California and Adjacent Areas, C.D.M.G. Geologic Data Map No. 6, 1:750,000 scale.

Kaeler, C.A., and Belitz, K., 2003, Tracing Reclaimed Water in the Menifee, Winchester, and Perris South Ground-Water Subbasins, Riverside County, California, USGS Water Resources Investigations Report, 03-4039.

Larson, R., and Slosson, J., 1992, The Role of Seismic Hazard Evaluation in Engineering Reports, *in* Engineering Geology Practice in Southern California, AEG Special Publication No. 4, pp. 191-194.

Lancaster, et al., 2012, CGS Preliminary Geologic Map of Quaternary Deposits, Palm Springs 30 x 60’ Quadrangle.

Larson, R., and Slosson, J., 1992, The Role of Seismic Hazard Evaluation in Engineering Reports, *in* Engineering Geology Practice in Southern California, AEG Special Publication No. 4, pp. 191-194.

Morton, D.M., 2013, Preliminary Geologic Map of the Winchester 7.5' Quadrangle, U.S.G.S. Open File Report 03-188.

Norris, R.M. and R.W. Webb, 1990, Geology of California (second edition).

Peterson, et al., 2008, Documentation for the 2008 Update of the United States National Seismic Hazard Maps, USGS Open File Report 2008-1128.

Prothero, D.R., & Schwab, F., 1996, Sedimentary Geology, an Introduction to Sedimentary Rocks and Stratigraphy.

OSHPD, 2021, U.S. Seismic Design Maps, https://seismicmaps.org/

Riverside County Land Information System GIS Maps, 2021.

Tensar, Information Bulletin IB/Earthquake_Foundation, 2013.

Waring, G.A., 1919, Ground Water in the San Jacinto and Temecula Basins, California, USGS Water-Supply Paper 429.

Watermaster Support Services, 2019, Cooperative Well Measurement Program, Fall 2019.

AERIAL PHOTOGRAPHS UTILIZED

Riverside County Flood Control District, 1962, Photo Nos. 3-368 and 3-369, Scale 1" = 2,000', January 29, 1962.

Riverside County Flood Control District, 1974, Photo Nos. 589 and 590, Scale 1" = 2,000', June 20, 1974.

Riverside County Flood Control District, 1980, Photo Nos. 627 and 628, Scale 1" = 2,000', April 15, 1980.

Riverside County Flood Control District, 1990, Photo Nos. 12-27 and 12-28, Scale 1" = 2,000', January 25, 1990.

Riverside County Flood Control District, 1995, Photo Nos. 12-28 and 12-29, Scale 1" = 1,600', January 30, 1995.

Riverside County Flood Control District, 2000, Photo Nos. 12-28 and 12-29, Scale 1" = 1,600', March 18, 2000.

Riverside County Flood Control District, 2005, Photo Nos. 12-26 and 12-27, Scale 1" = 1,600', July 27, 2005.

Riverside County Flood Control District, 2010, Photo Nos. 12-27 and 12-28, Scale 1" = 1,600', March 29, 2010.

Terrain Navigator, Orthophoto Map, Winchester Quadrangle, CA, USGS Ref. Code 33117-F1-TF-012, dated 2018.

APPENDIX A – Field Exploration

APPENDIX A
FIELD EXPLORATION

Field exploration consisted of nine exploratory borings with a truck-mounted drill rig at the approximate locations shown on Figure A-12. Logs of the materials encountered were recorded during drilling by a staff geologist and are presented on Figures A-3 through A-11.

Representative soil samples were obtained within the borings by driving a thin-walled steel penetration sampler with successive 30-inch drops of a 140-pound hammer. The numbers of blows required to achieve each six inches of penetration were recorded on the boring logs. Two different samplers were used; a Standard Penetration Test (SPT) sampler and a modified California sampler with brass sample rings. Representative bulk soil samples were also obtained from the auger cuttings. Samples were placed in moisture sealed containers and transported to our laboratory for further testing and evaluation. Laboratory tests results are discussed and included in Appendix B.

UNIFIED SOIL CLASSIFICATION SYSTEM (ASTM D2487)

PRIMARY DIVISIONS			GROUP SYMBOLS	SECONDARY DIVISIONS
COARSE GRAINED SOILS MORE THAN HALF OF MATERIALS IS LARGER THAN #200 SIEVE SIZE	GRAVELS MORE THAN HALF OF COARSE FRACTION IS LARGER THAN #4 SIEVE	CLEAN GRAVELS (LESS THAN) 5% FINES	GW	WELL GRADED GRAVELS, GRAVEL-SAND MIXTURES, LITTLE OR NO FINES
			GP	POORLY GRADED GRAVELS OR GRAVEL-SAND MIXTURES, LITTLE OR NO FINES
		GRAVEL WITH FINES	GM	SILTY GRAVELS, GRAVEL-SAND-SILT MIXTURES
			GC	CLAYEY GRAVELS, GRAVEL-SAND-CLAY MIXTURES
	SANDS MORE THAN HALF OF COARSE FRACTION IS SMALLER THAN #4 SIEVE	CLEAN SANDS (LESS THAN) 5% FINES	SW	WELL GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES
			SP	POORLY GRADED SANDS OR GRAVELLY SANDS, LITTLE OR NO FINES
		SANDS WITH FINES	SM	SILTY SANDS, SAND-SILT MIXTURES
			SC	CLAYEY SANDS, SAND-CLAY MIXTURES
FINE GRAINED SOILS MORE THAN HALF OF MATERIALS IS SMALLER THAN #200 SIEVE SIZE	SILTS AND CLAYS	LIQUID LIMIT IS LESS THAN 50	ML	INORGANIC SILTS, VERY FINE SANDS, ROCK FLOUR, SILTY OR CLAYEY FINE SANDS
			CL	INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, GRAVELLY CLAYS, SANDY CLAYS, SILTY CLAYS, LEAN CLAYS
			OL	ORGANIC SILTS AND ORGANIC SILT-CLAYS OF LOW PLASTICITY
	SILTS AND CLAYS	LIQUID LIMIT IS GREATER THAN 50	MH	INORGANIC SILTS, MICACEOUS OR DIATOMACEOUS FINE SANDS OR SILTS, ELASTIC SILTS
			CH	INORGANIC CLAYS OF HIGH PLASTICITY, FAT CLAYS
			OH	ORGANIC CLAYS OF MEDIUM TO HIGH PLASTICITY, ORGANIC SILTS
	HIGHLY ORGANIC SOILS		PT	PEAT, MUCK AND OTHER HIGHLY ORGANIC SOILS
TYPICAL FORMATIONAL MATERIALS	SANDSTONES		SS	
	SILTSTONES		SH	
	CLAYSTONES		CS	
	LIMESTONES		LS	
	SHALE		SL	

CONSISTENCY CRITERIA BASES ON FIELD TESTS

RELATIVE DENSITY – COARSE – GRAIN SOIL

RELATIVE DENSITY	SPT * (# BLOWS/FT)	RELATIVE DENSITY (%)
VERY LOOSE	<4	0-15
LOOSE	4-10	15-35
MEDIUM DENSE	10-30	35-65
DENSE	30-50	65-85
VERY DENSE	>50	85-100

CONSISTENCY – FINE-GRAIN SOIL

CONSISTENCY	SPT* (# BLOWS/FT)	TORVANE UNDRAINED SHEAR STRENGTH (tsf)	POCKET ** PENETROMETER UNCONFINED COMPRESSIVE STRENGTH (tsf)
Very Soft	<2	<0.13	<0.25
Soft	2-4	0.13-0.25	0.25-0.5
Medium Stiff	4-8	0.25-0.5	0.5-1.0
Stiff	8-15	0.5-1.0	1.0-2.0
Very Stiff	15-30	1.0-2.0	2.0-4.0
Hard	>30	>2.0	>4.0

* NUMBER OF BLOWS OF 140 POUND HAMMER FALLING 30 INCHES TO DRIVE A 2 INCH O.D. (1 3/8 INCH I.D.) SPLIT BARREL SAMPLER (ASTM -1586 STANDARD PENETRATION TEST)

** UNCONFINED COMPRESSIVE STRENGTH IN TONS/SQ.FT. READ FROM POCKET PENETROMETER

MOISTURE CONTENT

DESCRIPTION	FIELD TEST
DRY	Absence of moisture, dusty, dry to the touch
MOIST	Damp but no visible water
WET	Visible free water, usually soil is below water table

CEMENTATION

DESCRIPTION	FIELD TEST
Weakly	Crumbled or breaks with handling or slight finger pressure
Moderately	Crumbles or breaks with considerable finger pressure
Strongly	Will not crumble or break with finger pressure

EXPLANATION OF LOGS

LOG OF BORING B-01

DRILLING RIG	**Mobile B-61**	HAMMER TYPE	**Auto-Trip**
DRILLING METHOD	**Rotary Auger**	HAMMER WEIGHT	**140-lb.**
LOGGED BY	**FWC**	HAMMER DROP	**30-inches**
GROUND ELEVATION	**+/-**	BORING DIAMETER	**8-inches**
DATE DRILLED	**6/30/21**		

SUMMARY OF SUBSURFACE CONDITIONS

This summary applies only at the location of the boring and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered and is representative of interpretations made during drilling. Contrasting data derived from laboratory analysis may not be reflected in these representations.

DEPTH (ft)	U.S.C.S.	SUMMARY OF SUBSURFACE CONDITIONS
	SC	**CLAYEY SAND,** fine- to medium, dark grayish-brown (10YR 4/2), slightly moist to moist, dense.
5	SC	**CLAYEY SAND,** very fine- to fine, dark grayish-brown (10YR 4/2), moist, dense, with thin interbeds of sandy clay.
	SM	**SILTY SAND,** fine- to medium, dark grayish-brown (10YR 4/2), moist, medium dense.
10	SC	**CLAYEY SAND,** very fine- to fine, dark grayish-brown (10YR 4/2), moist to very moist, medium dense.
15	SC	**CLAYEY SAND,** very fine- to fine, dark grayish-brown (10YR 4/2), moist to wet, medium dense.
20	CL-ML	**SANDY SILTY CLAY,** light yellowish-brown (2.5Y 6/3), wet, soft.
25 / 30	SC	**CLAYEY SAND,** very fine- to fine, dark grayish-brown (10YR 4/2), moist to very wet, loose to medium dense.
35	SM	**SILTY SAND,** fine- to very coarse, dark grayish-brown (10YR 4/2), wet, medium dense.
40 / 45	SC	**CLAYEY SAND,** very fine- to fine, dark grayish-brown (10YR 4/2), wet, medium dense.
	ML	**SANDY SILT,** very fine- to fine, dark grayish-brown (10YR 4/2), wet, stiff.
50	SC-SM	**SILTY, CLAYEY SAND,** very fine- to fine, dark grayish-brown (10YR 4/2), wet, medium dense.

End of boring at 51.5 feet. Groundwater encountered at 14.75 feet. Backfilled with native soils.

SAMPLE TYPE	BLOW COUNTS /6"	MOISTURE (%)	DRY UNIT WT. (pcf)
AU			
SS	17 25	9	128
AU			
SS	13 19	10	129
AU			
SS	7 9	7	113
AU			
SS	6 10	16	121
AU			
SS	5 10	22	111
AU			
SPT	1 2	39	
SPT	1 3	23	
SPT	5 10	19	
SPT	12 12	15	
SPT	6 10	23	
SPT	6 10	18	
SPT	24 25	17	

Inland Foundation Engineering, Inc.

Est. 1978

CLIENT	**No Worries! RV & Boat Storage**
PROJECT NAME	**RV & Boat Storage Facility**
PROJECT LOCATION	**SWC Willard St. and Highway 79**
	Winchester, CA
PROJECT NUMBER	**N133-001**

FIGURE NO. A-3

LOG OF BORING B-02

DRILLING RIG	**Mobile B-61**	DATE DRILLED	**6/30/21**	HAMMER TYPE	**Auto-Trip**
DRILLING METHOD	**Rotary Auger**			HAMMER WEIGHT	**140-lb.**
LOGGED BY	**FWC**			HAMMER DROP	**30-inches**
GROUND ELEVATION	**+/-**			BORING DIAMETER	**8-inches**

SUMMARY OF SUBSURFACE CONDITIONS

This summary applies only at the location of the boring and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered and is representative of interpretations made during drilling. Contrasting data derived from laboratory analysis may not be reflected in these representations.

DEPTH (ft)	U.S.C.S.	GRAPHIC LOG	SUMMARY OF SUBSURFACE CONDITIONS	BULK SAMPLE	DRIVE SAMPLE	SAMPLE TYPE	BLOW COUNTS /6"	MOISTURE (%)	DRY UNIT WT. (pcf)
	SM		**SILTY SAND,** with trace clay, very fine- to fine, dark grayish-brown (2.5Y 3/2), slightly moist, medium dense to dense.						
	SC		**CLAYEY SAND,** very fine- to fine, dark grayish-brown (2.5Y 3/2), moist, medium dense to dense.		X	SS	16 21	11	128
5					X	SS	7 11	13	119
	SM		**SILTY SAND,** with trace clay, fine- to coarsee, dark grayish-brown (10YR 4/2), moist, medium dense, with thin interbeds of sand.						
	SM		**SILTY SAND,** fine- to medium, dark grayish-brown (10YR 4/2), moist, medium dense.		X	SS	8 9	20	105
10	CL-ML		**SILTY SAND,** fine- to medium, dark grayish-brown (10YR 4/2), moist, medium dense.						
	SC		**CLAYEY SAND,** fine- to medium, dark grayish-brown (10YR 4/2), very moist, medium dense.		X	SS	11 15	21	113
	SM		**SILTY SAND,** fine- to very coarse, dark grayish-brown (10YR 4/2), wet, medium dense.						
15					X	SS	15 17	16	121
	SC		**CLAYEY SAND,** very fine- to fine, light olive-brow (2.5Y 5/4), wet, medium dense.						
20					X	SS	4 7	27	100
			End of boring at 20.5 feet. Groundwater encountered at 16 feet. Groundwater on 7/1/21 at 13.17 feet. Backfilled with native soils.						

Inland Foundation Engineering, Inc.

CLIENT	**No Worries! RV & Boat Storage**
PROJECT NAME	**RV & Boat Storage Facility**
PROJECT LOCATION	**SWC Willard St. and Highway 79**
	Winchester, CA
PROJECT NUMBER	**N133-001**

FIGURE NO. A-4

LOG OF BORING B-03

DRILLING RIG	Mobile B-61	DATE DRILLED	6/30/21	HAMMER TYPE	Auto-Trip
DRILLING METHOD	Rotary Auger			HAMMER WEIGHT	140-lb.
LOGGED BY	FWC			HAMMER DROP	30-inches
GROUND ELEVATION	+/-			BORING DIAMETER	8-inches

SUMMARY OF SUBSURFACE CONDITIONS

This summary applies only at the location of the boring and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered and is representative of interpretations made during drilling. Contrasting data derived from laboratory analysis may not be reflected in these representations.

DEPTH (ft)	U.S.C.S.	GRAPHIC LOG	SUMMARY OF SUBSURFACE CONDITIONS	BULK SAMPLE	DRIVE SAMPLE	SAMPLE TYPE	BLOW COUNTS /6"	MOISTURE (%)	DRY UNIT WT. (pcf)
	SC		**ARTIFICIAL FILL,** CLAYEY SAND, very fine- to fine, dark grayish-brown (10YR 4/2), slightly moist, dense, storngly cemented.			AU			
						SS	21 37	5	134
5									
	SC		**CLAYEY SAND,** very fine- to fine, dark grayish-brown (10YR 4/2), slightly moist, dense, moderately cemented.			SS	12 22	8	131
			End of boring at 5.5 feet. No groundwater encountered. Backfilled with native soils.						

Inland Foundation Engineering, Inc.

Est. 1978

CLIENT	No Worries! RV & Boat Storage	FIGURE NO.
PROJECT NAME	RV & Boat Storage Facility	
PROJECT LOCATION	SWC Willard St. and Highway 79 Winchester, CA	
PROJECT NUMBER	N133-001	A-5

LOG OF BORING B-04

DRILLING RIG	**Mobile B-61**	DATE DRILLED	**6/30/21**
DRILLING METHOD	**Rotary Auger**	HAMMER TYPE	**Auto-Trip**
LOGGED BY	**FWC**	HAMMER WEIGHT	**140-lb.**
GROUND ELEVATION	**+/-**	HAMMER DROP	**30-inches**
		BORING DIAMETER	**8-inches**

DEPTH (ft)	U.S.C.S.	GRAPHIC LOG	SUMMARY OF SUBSURFACE CONDITIONS This summary applies only at the location of the boring and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered and is representative of interpretations made during drilling. Contrasting data derived from laboratory analysis may not be reflected in these representations.	BULK SAMPLE	DRIVE SAMPLE	SAMPLE TYPE	BLOW COUNTS /6"	MOISTURE (%)	DRY UNIT WT. (pcf)
	SC		**ARTIFICIAL FILL,** CLAYEY SAND, very fine- to fine, dark grayish-brown (10YR 4/2), slightly moist, dense.			AU			
						SS	15 24	5	129
5									
	SC-SM		**SILTY, CLAYEY SAND,** very fine- to fine, dark grayish-brown (10YR 4/2), slightly moist, dense.			SS	15 17	7	128

Inland Foundation Engineering, Inc.

CLIENT	**No Worries! RV & Boat Storage**
PROJECT NAME	**RV & Boat Storage Facility**
PROJECT LOCATION	**SWC Willard St. and Highway 79**
	Winchester, CA
PROJECT NUMBER	**N133-001**

FIGURE NO.

A-6

LOG OF BORING B-05

DRILLING RIG	**Mobile B-61**	HAMMER TYPE	**Auto-Trip**
DRILLING METHOD	**Rotary Auger**	HAMMER WEIGHT	**140-lb.**
LOGGED BY	**FWC**	HAMMER DROP	**30-inches**
GROUND ELEVATION	**+/-**	BORING DIAMETER	**8-inches**

DATE DRILLED **6/30/21**

DEPTH (ft)	U.S.C.S.	GRAPHIC LOG	SUMMARY OF SUBSURFACE CONDITIONS This summary applies only at the location of the boring and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered and is representative of interpretations made during drilling. Contrasting data derived from laboratory analysis may not be reflected in these representations.	BULK SAMPLE	DRIVE SAMPLE	SAMPLE TYPE	BLOW COUNTS /6"	MOISTURE (%)	DRY UNIT WT. (pcf)
	SC		**ARTIFICIAL FILL,** CLAYEY SAND, very fine- to fine, dark grayish-brown (10YR 4/2), slightly moist, dense, weakly cemented.			AU			
						SS	21 27	5	124
5	SC-SM		**SILTY,CLAYEY SAND,** very fine- to fine, dark grayish-brown (10YR 4/2), slightly moist, dense.						
						SS	17 20	7	133
			End of boring at 6.5 feet. No groundwater encountered. Backfilled with native soils.						

Inland Foundation Engineering, Inc.

CLIENT	**No Worries! RV & Boat Storage**
PROJECT NAME	**RV & Boat Storage Facility**
PROJECT LOCATION	**SWC Willard St. and Highway 79** **Winchester, CA**
PROJECT NUMBER	**N133-001**

FIGURE NO.

A-7

LOG OF BORING B-06

DRILLING RIG	**Mobile B-61**	DATE DRILLED	**6/30/21**	HAMMER TYPE	**Auto-Trip**
DRILLING METHOD	**Rotary Auger**			HAMMER WEIGHT	**140-lb.**
LOGGED BY	**FWC**			HAMMER DROP	**30-inches**
GROUND ELEVATION	**+/-**			BORING DIAMETER	**8-inches**

SUMMARY OF SUBSURFACE CONDITIONS

This summary applies only at the location of the boring and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered and is representative of interpretations made during drilling. Contrasting data derived from laboratory analysis may not be reflected in these representations.

DEPTH (ft)	U.S.C.S.	GRAPHIC LOG	SUMMARY OF SUBSURFACE CONDITIONS	BULK SAMPLE	DRIVE SAMPLE	SAMPLE TYPE	BLOW COUNTS /6"	MOISTURE (%)	DRY UNIT WT. (pcf)
	SC-SM		**SILTY, CLAYEY SAND,** very fine- to fine, dark grayish-brown (10YR 4/2), slightly moist, loose to medium dense.			AU			
						SS	8 7	4	118
5	SM		**SILTY SAND,** fine- to coarse, dark grayish-brown (10YR 4/2), slightly moist, loose.			SS	6 4	5	115

End of boring at 5.5 feet. No groundwater encountered. Backfilled with native soils.

Inland Foundation Engineering, Inc.

CLIENT	**No Worries! RV & Boat Storage**
PROJECT NAME	**RV & Boat Storage Facility**
PROJECT LOCATION	**SWC Willard St. and Highway 79**
	Winchester, CA
PROJECT NUMBER	**N133-001**

FIGURE NO. A-8

IFE BORING - GINT STD US LAB.GDT - 8/20/21 17:02 - P:\N133\001 SWC WILLARD ST\GINT.GPJ

LOG OF BORING B-07

DRILLING RIG	**Mobile B-61**	DATE DRILLED	**6/30/21**	HAMMER TYPE	**Auto-Trip**
DRILLING METHOD	**Rotary Auger**			HAMMER WEIGHT	**140-lb.**
LOGGED BY	**FWC**			HAMMER DROP	**30-inches**
GROUND ELEVATION	**+/-**			BORING DIAMETER	**8-inches**

DEPTH (ft)	U.S.C.S.	GRAPHIC LOG	SUMMARY OF SUBSURFACE CONDITIONS This summary applies only at the location of the boring and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered and is representative of interpretations made during drilling. Contrasting data derived from laboratory analysis may not be reflected in these representations.	BULK SAMPLE	DRIVE SAMPLE	SAMPLE TYPE	BLOW COUNTS /6"	MOISTURE (%)	DRY UNIT WT. (pcf)
			ARTIFICIAL FILL, CLAYEY SAND, very fine- to fine, dark grayish-brown (10YR 4/2), slightly moist, loose to medium dense.			AU			
	SC					SS	10 10	6	124
5									
	SC		**CLAYEY SAND,** very fine- to fine, dark grayish-brown (10YR 4/2), slightly moist, dense.			SS	19 16	8	126
			End of boring at 6.5 feet. No groundwater encountered. Backfilled with native soils.						

Inland Foundation Engineering, Inc.

CLIENT	**No Worries! RV & Boat Storage**	FIGURE NO.
PROJECT NAME	**RV & Boat Storage Facility**	
PROJECT LOCATION	**SWC Willard St. and Highway 79**	
	Winchester, CA	
PROJECT NUMBER	**N133-001**	A-9

LOG OF BORING B-08

DRILLING RIG	**Mobile B-61**	DATE DRILLED **6/30/21**	HAMMER TYPE	**Auto-Trip**
DRILLING METHOD	**Rotary Auger**		HAMMER WEIGHT	**140-lb.**
LOGGED BY	**FWC**		HAMMER DROP	**30-inches**
GROUND ELEVATION	**+/-**		BORING DIAMETER	**8-inches**

SUMMARY OF SUBSURFACE CONDITIONS

This summary applies only at the location of the boring and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered and is representative of interpretations made during drilling. Contrasting data derived from laboratory analysis may not be reflected in these representations.

DEPTH (ft)	U.S.C.S.	GRAPHIC LOG	SUMMARY OF SUBSURFACE CONDITIONS	BULK SAMPLE	DRIVE SAMPLE	SAMPLE TYPE	BLOW COUNTS /6"	MOISTURE (%)	DRY UNIT WT. (pcf)
	SC-SM		**ARTIFICIAL FILL,** SILTY, CLAYEY SAND, very fine- to fine, dark grayish-brown (10YR 4/2), slightly moist, medium dense to dense.			AU			
						SS	18 23	2	133
5	SM		**SILTY SAND,** with trace clay, very fine- to fine, dark gray (10YR 4/1), slightly moist, medium dense.						
						SS	17 20	7	122
			End of boring at 6.5 feet. No groundwater encountered. Backfilled with native soils.						

Inland Foundation Engineering, Inc.

CLIENT	**No Worries! RV & Boat Storage**
PROJECT NAME	**RV & Boat Storage Facility**
PROJECT LOCATION	**SWC Willard St. and Highway 79** **Winchester, CA**
PROJECT NUMBER	**N133-001**

FIGURE NO.

A-10

LOG OF BORING B-09

DRILLING RIG	Mobile B-61	DATE DRILLED	6/30/21	HAMMER TYPE	Auto-Trip
DRILLING METHOD	Rotary Auger			HAMMER WEIGHT	140-lb.
LOGGED BY	FWC			HAMMER DROP	30-inches
GROUND ELEVATION	+/-			BORING DIAMETER	8-inches

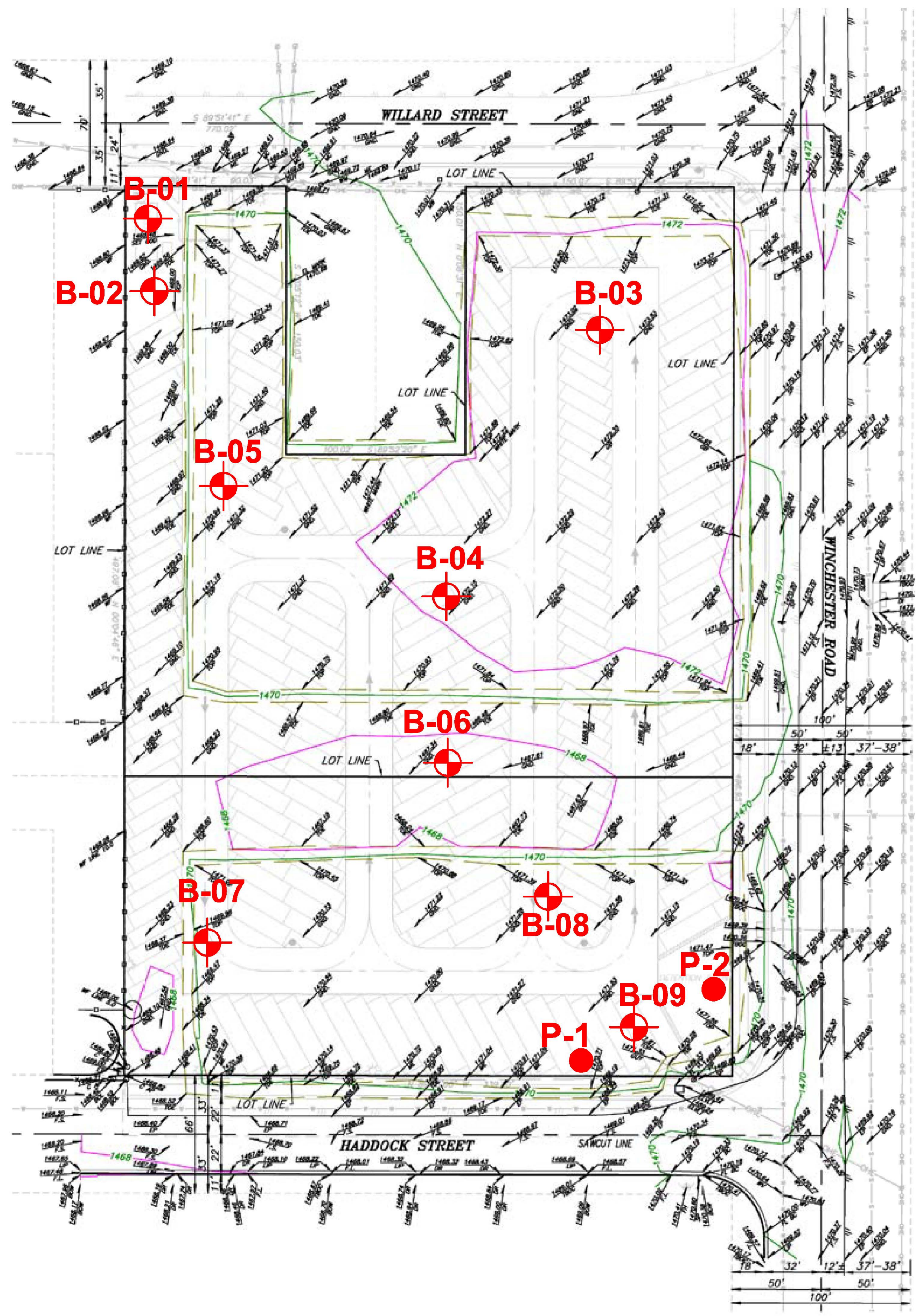
DEPTH (ft)	U.S.C.S.	GRAPHIC LOG	SUMMARY OF SUBSURFACE CONDITIONS This summary applies only at the location of the boring and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered and is representative of interpretations made during drilling. Contrasting data derived from laboratory analysis may not be reflected in these representations.	BULK SAMPLE	DRIVE SAMPLE	SAMPLE TYPE	BLOW COUNTS /6"	MOISTURE (%)	DRY UNIT WT. (pcf)
0–5	SM		**SILTY SAND,** very fine to fine, trace clay, gray brown, slightly moist to moist, medium dense.						
5	SC		**CLAYEY SAND,** fine to medium, dark gray brown, moist, medium dense.						
10	SC		**CLAYEY SAND,** very fine to fine, dark gray brown, slightly moist to very moist, dense.						
15			End of boring at 15 feet. No groundwater encountered.						

Inland Foundation Engineering, Inc.

CLIENT	No Worries! RV & Boat Storage
PROJECT NAME	RV & Boat Storage Facility
PROJECT LOCATION	SWC Willard St. and Highway 79 Winchester, CA
PROJECT NUMBER	N133-001

FIGURE NO. A-11

IFE BORING - GINT STD US LAB.GDT - 8/20/21 17:02 - P:\N133\001 SWC WILLARD ST\GINT.GPJ



Base Map Prepared By: Hzayen Design Group, Inc.

SITE PLAN
NO WORRIES! RV AND BOAT STORAGE
SWC WILLARD STREET AND STATE HIGHWAY 79
RIVERSIDE COUNTY, CALIFORNIA
APN 462-182-018 AND 462-185-006

= Approximate Location of Boring
= Approximate Location of Infiltration Test

INLAND FOUNDATION ENGINEERING, INC.
1310 South Santa Fe Avenue
San Jacinto, California
(951) 654-1555 FAX (951) 654-0551

DRAWN BY: ES	JOB NO.: N133-001	
SCALE: 1" = +/- 100	DATE: August 2021	A-12

APPENDIX B –
Laboratory Testing

APPENDIX B
LABORATORY TESTING

Representative soil samples obtained from our borings were returned to our laboratory for additional observations and testing. Descriptions of the tests performed are provided below.

Unit Weight and Moisture Content: Ring samples were weighed and measured to evaluate their unit weight. A small portion of each sample was then tested for moisture content. The testing was performed per ASTM D2937 and D2216. The results of the testing are shown on the boring logs (Figure Nos. A-3 through A-11).

Maximum Density-Optimum Moisture Content: Two samples were selected for maximum density testing in accordance with ASTM D1557. The test results are presented graphically on Figure B-3.

Sieve Analysis: Five soil samples were selected for sieve analysis testing in accordance with ASTM D6913. These tests provide information for classifying the soil in accordance with the Unified Classification System. This classification system categorizes the soil into groups having similar engineering characteristics. The test results are shown on Figure B-4.

Atterberg Limits: Two samples were selected for Atterberg limits testing in accordance with ASTM D4318. These tests provide information regarding soil plasticity and are also used for classifying the soil in accordance with the Unified Classification System. The results are shown on Figure B-4.

Sand Equivalent: Seven samples were selected for sand equivalent testing in accordance with ASTM D2419. This test is used to indicate the relative proportions of clay-size or plastic fines and dust in granular soil and fine aggregate. Sand equivalent test results are shown in the following table.

Boring No.	Approx. Depth (ft.)	SE
B-01	0.0 - 2.3	19
B-03	0.0 - 5.0	16
B-04	0.0 – 6.0	17
B-05	0.0 – 4.5	18
B-06	0.0 – 5.0	18
B-07	0.0 – 6.0	17
B-08	0.0 – 4.8	17

Consolidation Testing: One sample was selected for consolidation testing in accordance with ASTM D2435. This test is used to evaluate the magnitude and rate of settlement of a structure or earth fill. The results of this testing are presented graphically on Figure No. B-5.

Expansion Index: One sample was selected for expansion index in accordance with ASTM D4829. This test provides information regarding the expansive characteristics of soil under standardized test conditions. The following table presents the results of this testing.

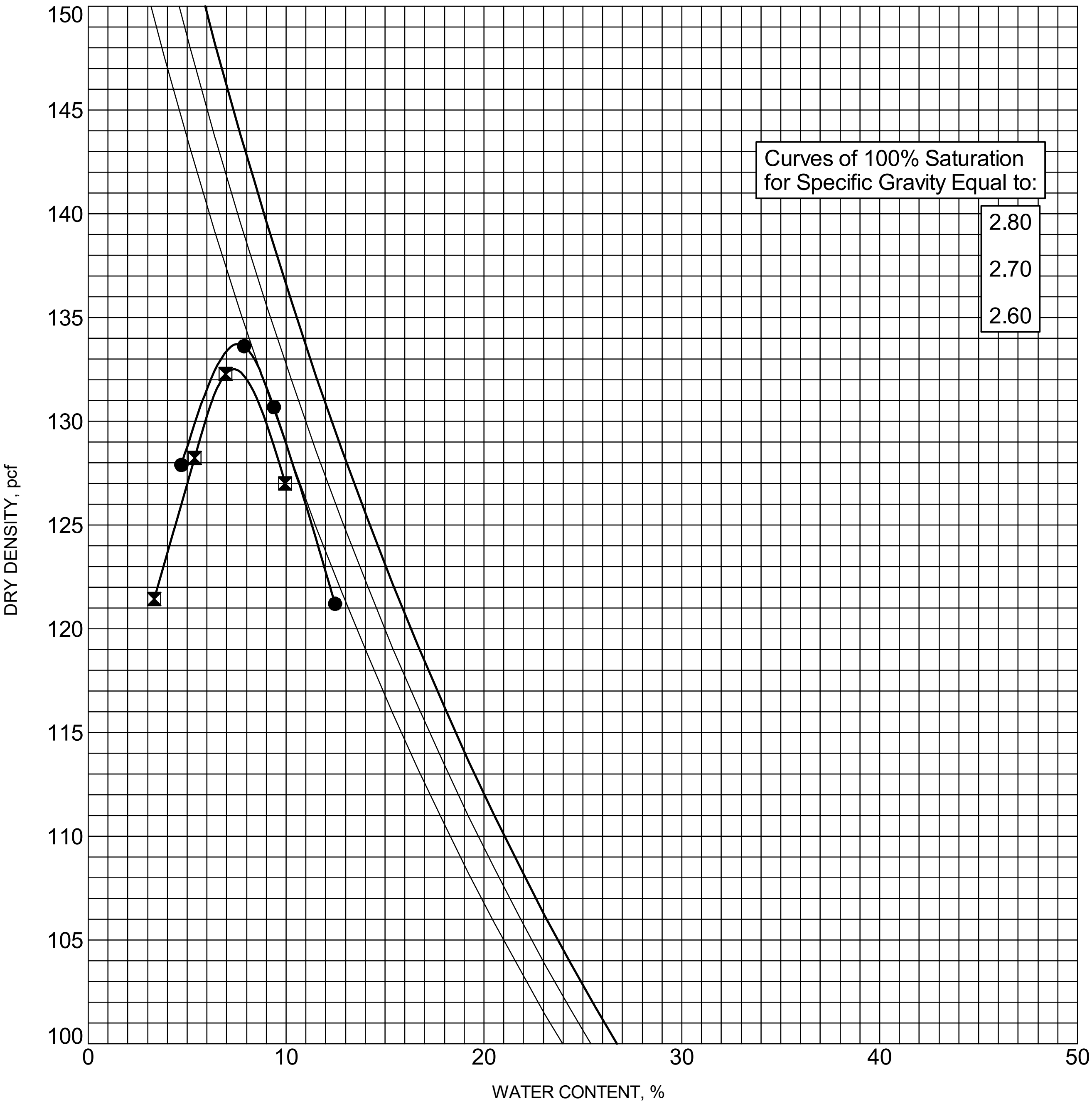
Sample Location	Sample Depth (ft)	Initial Dry Density (pcf)	Initial Moisture Content (%)	Expansion Index	Expansion Class
B-01	0.0 – 2.3	117.3	7.5	0	Very Low

Analytical Testing: One sample was transported to AP Engineering and Testing in Pomona, California to evaluate the concentration of soluble sulfates and chlorides, pH level, and resistivity of and within the on-site soils. The following table presents the results of this testing.

Sample Location	Sample Depth (ft.)	Water-Soluble Sulfates (ppm)	Chlorides (ppm)	Minimum Resistivity (ohm-cm)	pH
B-01	0-2.25	34	31	3,330	8.3

Direct Shear Strength: One sample was transported to AP Engineering and Testing in Pomona, California for direct shear strength testing in accordance with ASTM D3080. This testing measures the shear strength of the soil under various normal pressures and is used to develop parameters for foundation bearing capacity and lateral earth pressure. Test results are shown on Figure B-6.

R-value: One bulk sample was transported to AP Engineering and Testing in Pomona, California for R-value testing in accordance with ASTM D2844. This test measures the potential strength of subgrade, subbase, and base course materials for use in pavements. Test results are shown on Figure No. B-7.



	BOREHOLE	DEPTH	Description of Materials	Max DD	Optimum WC
●	**B-01**	**2.3**	**CLAYEY SAND(SC)**	**133.7 PCF**	**7.5 %**
⧗	**B-08**	**0.0**	**SILTY, CLAYEY SAND (SC-SM)**	**132.5 PCF**	**7.4 %**

Inland Foundation Engineering, Inc.

MOISTURE-DENSITY CURVES (ASTM D1557)

FIGURE NO. B-3

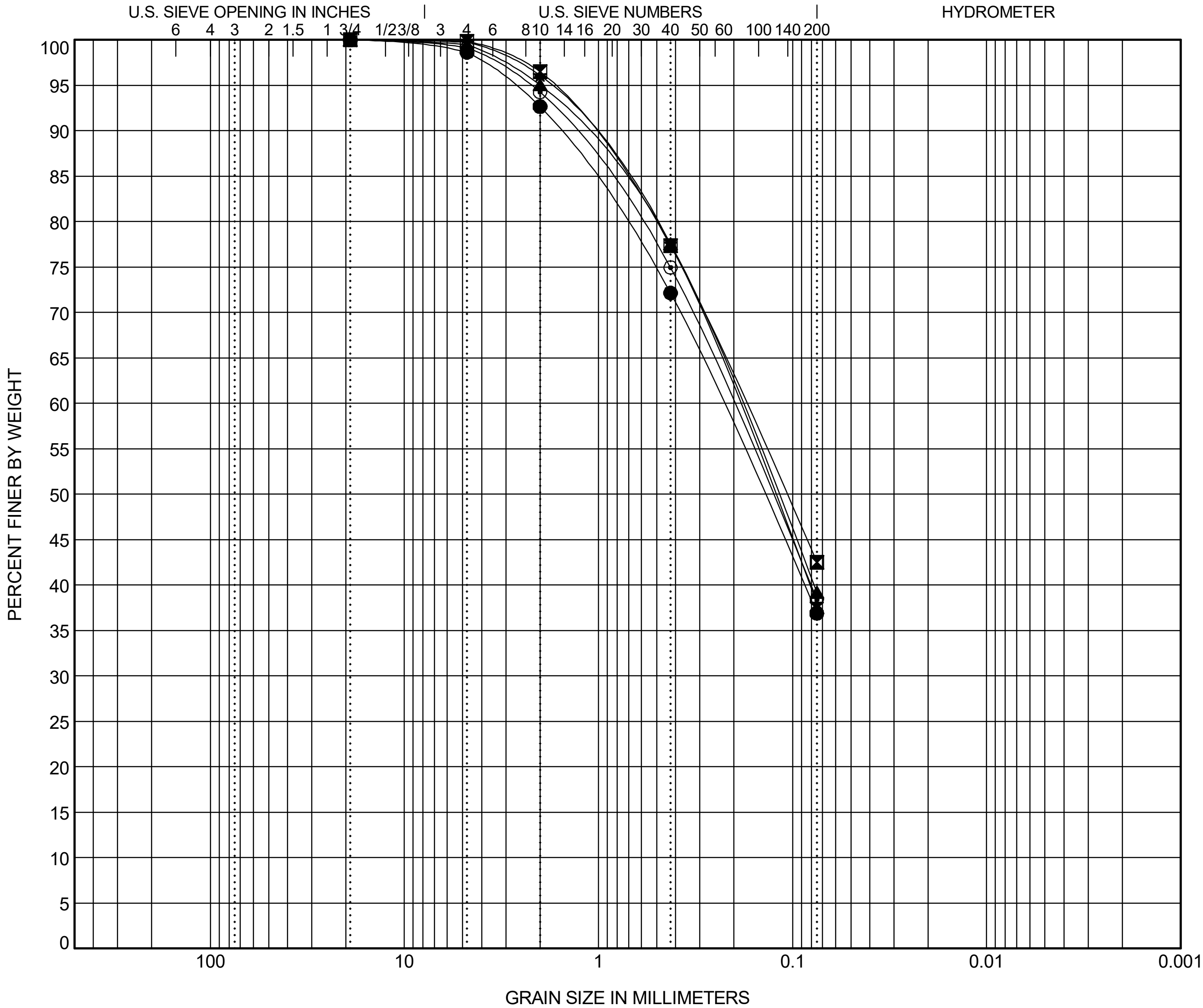
CLIENT No Worries! RV & Boat Storage

PROJECT NAME RV & Boat Storage Facility

PROJECT NUMBER N133-001

PROJECT LOCATION SWC Willard St. and Highway 79
Winchester, CA

IFE COMPACTION - GINT STD US LAB.GDT - 8/20/21 14:36 - P:\N133\001 SWC WILLARD ST\GINT.GPJ



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	BOREHOLE	DEPTH	Classification	LL	PL	PI	Cc	Cu
●	**B-01**	**2.3**	**CLAYEY SAND(SC)**	**23**	**15**	**8**		
⧗	**B-01**	**13.0**	**CLAYEY SAND(SC)**	**30**	**20**	**10**		
▲	**B-03**	**0.0**	**CLAYEY SAND (SC)**					
★	**B-06**	**0.0**	**SILTY, CLAYEY SAND (SC-SM)**					
⊙	**B-08**	**0.0**	**SILTY, CLAYEY SAND (SC-SM)**					

	BOREHOLE	DEPTH	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	**B-01**	**2.3**	**19**	**0.234**			**1.4**	**61.7**	**36.9**	
⧗	**B-01**	**13.0**	**19**	**0.179**			**0.2**	**57.3**	**42.5**	
▲	**B-03**	**0.0**	**19**	**0.192**			**0.5**	**60.3**	**39.2**	
★	**B-06**	**0.0**	**19**	**0.197**			**0.2**	**61.8**	**38.0**	
⊙	**B-08**	**0.0**	**19**	**0.209**			**0.8**	**60.8**	**38.4**	

GRADATION CURVES (ASTM D6913, ASTM D4318)

Inland Foundation Engineering, Inc.

FIGURE NO. B-4

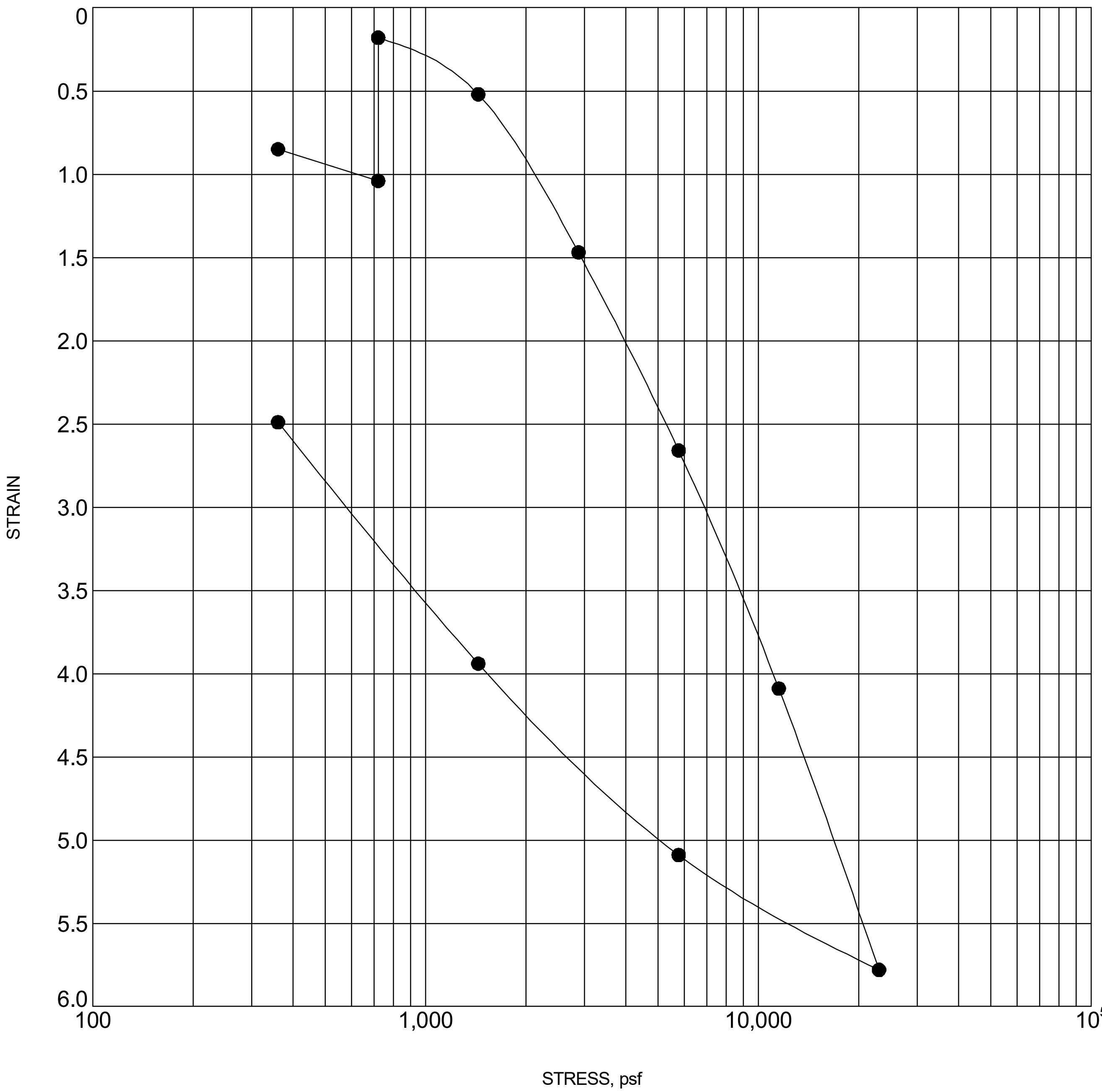
CLIENT No Worries! RV & Boat Storage

PROJECT NAME RV & Boat Storage Facility

PROJECT NUMBER N133-001

PROJECT LOCATION SWC Willard St. and Highway 79
Winchester, CA

IFE SIEVE ANALYSIS - GINT STD US LAB.GDT - 8/20/21 14:37 - P:\N133\001 SWC WILLARD ST\GINT.GPJ



	BOREHOLE	DEPTH	Classification	γ_d	MC%
●	**B-01**	**4.5**	**CLAYEY SAND (SC)**	**122**	**14**

CONSOLIDATION TEST (ASTM D2435)

Inland Foundation Engineering, Inc.

FIGURE NO. B-5

CLIENT No Worries! RV & Boat Storage

PROJECT NUMBER N133-001

PROJECT NAME RV & Boat Storage Facility

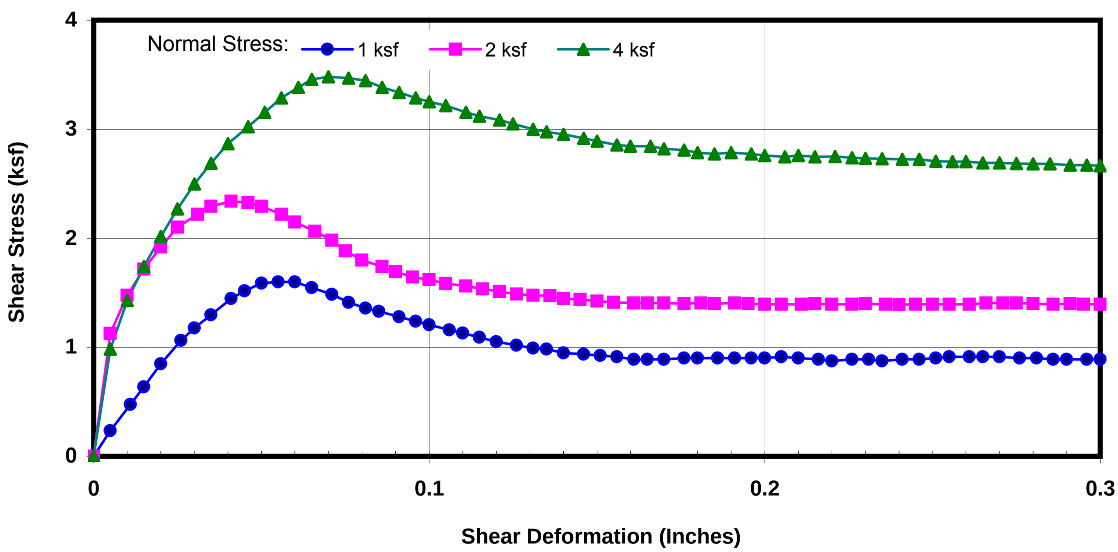
PROJECT LOCATION SWC Willard St. and Highway 79 Winchester, CA

AP Engineering and Testing, Inc.
DBE|MBE|SBE
2607 Pomona Boulevard | Pomona, CA 91768
t. 909.869.6316 | f. 909.869.6318 | www.aplaboratory.com

DIRECT SHEAR TEST RESULTS
ASTM D 3080

Client:	Inland Foundation Engineering	**Tested By:**	ST	**Date:**	07/19/21
Project Name:	No Worries RV & Boat	**Computed By:**	NR	**Date:**	07/20/21
Project No.:	N133-001	**Checked by:**	AP	**Date:**	07/20/21
Boring No.:	B-01				
Sample No.:	- **Depth (ft):** 1.5-2.5				
Sample Type:	Mod. Cal.				
Soil Description:	Sandy Silt w/traces of clay				
Test Condition:	Inundated **Shear Type:** Regular				

Wet Unit Weight (pcf)	Dry Unit Weight (pcf)	Initial Moisture Content (%)	Final Moisture Content (%)	Initial Degree Saturation (%)	Final Degree Saturation (%)	Normal Stress (ksf)	Peak Shear Stress (ksf)	Ultimate Shear Stress (ksf)
132.8	120.9	9.9	14.6	67	100	1	1.599	0.888
						2	2.340	1.395
						4	3.480	2.664



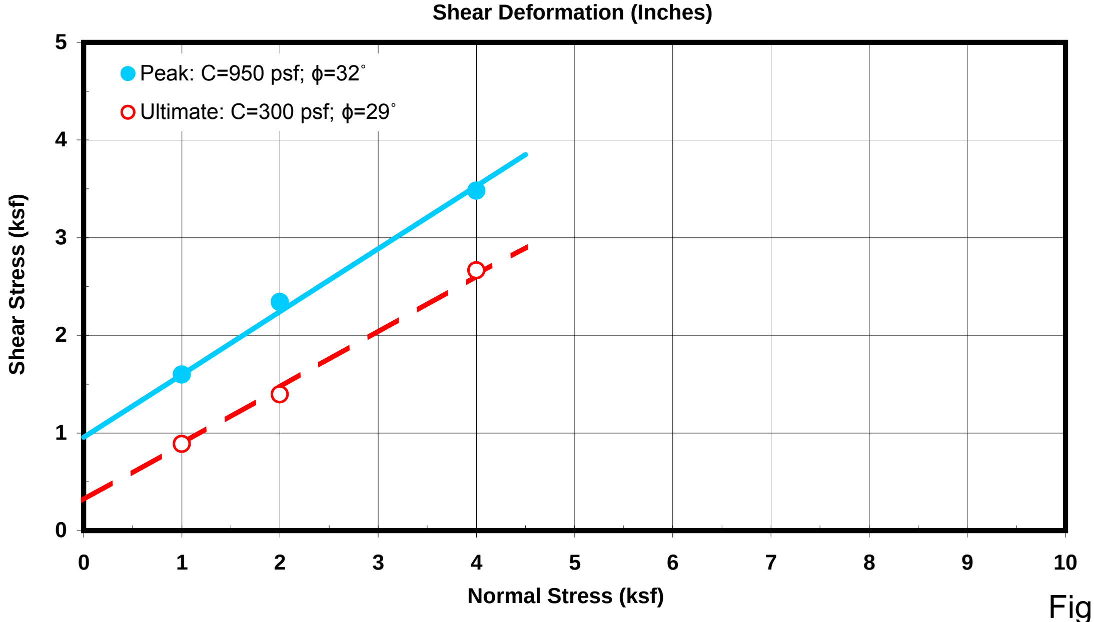


Figure No. B-6

AP Engineering and Testing, Inc.
DBE|MBE|SBE
2607 Pomona Boulevard | Pomona, CA 91768
t. 909.869.6316 | f. 909.869.6318 | www.aplaboratory.com

R-VALUE TEST DATA

ASTM D2844

Project Name:	No Worries RV & Boat	Tested By:	ST	Date:	07/16/21
Project Number:	N133-001	Computed By:	KM	Date:	07/17/21
Boring No.:	B-03	Checked By:	AP	Date:	07/20/21

Sample No.: - Depth (ft.): 0-5

Location: N/A

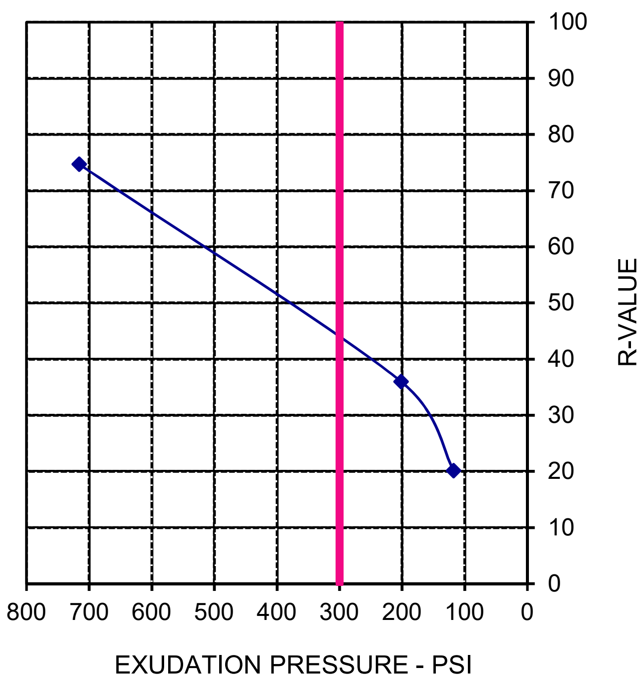
Soil Description: Sandy Silt

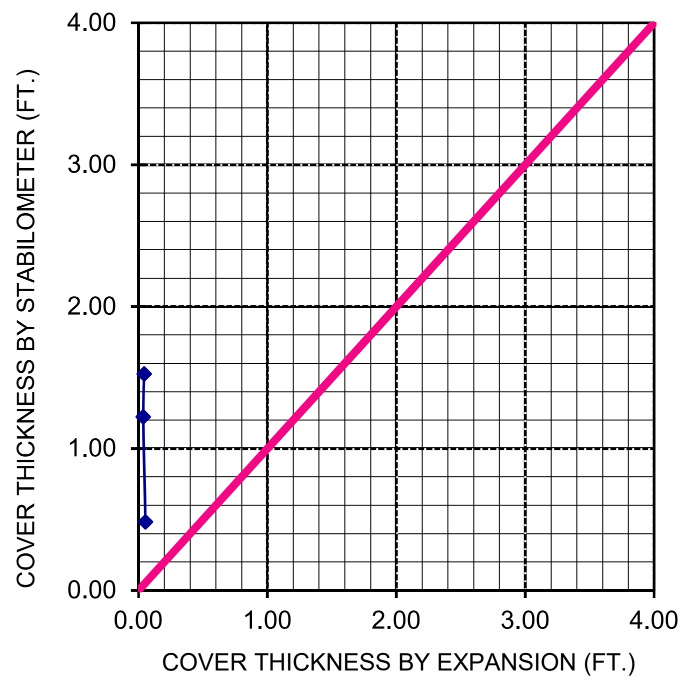
Mold Number	C	A	B	
Water Added, g	50	0	0	
Compact Moisture(%)	12.8	11.3	9.8	
Compaction Gage Pressure, psi	70	250	350	
Exudation Pressure, psi	118	202	716	
Sample Height, Inches	2.5	2.3	2.6	
Gross Weight Mold, g	3077	3025	3133	
Tare Weight Mold, g	1969	1967	1967	
Net Sample Weight, g	1108	1058	1166	
Expansion, inchesx10^{-4}	13	11	16	
Stability 2,000 (160 psi)	48/104	36/71	18/31	
Turns Displacement	5.34	4.55	3.89	
R-Value Uncorrected	20	41	73	
R-Value Corrected	20	36	75	
Dry Density, pcf	119.1	125.2	123.8	
Traffic Index	8.0	8.0	8.0	
G.E. by Stability	1.53	1.22	0.48	
G.E. by Expansion	0.04	0.04	0.05	

R-VALUE		
	By Exudation:	44
	By Expansion:	*N/A
	At Equilibrium: (by Exudation)	44

Remarks

Gf = 1.34, and 0.0 % Retained on the ¾"
*Not Applicable





APPENDIX C – Liquefaction and Seismic Settlement Analysis

APPENDIX C

LIQUEFACTION AND SEISMIC SETTLEMENT ANALYSIS

Liquefaction potential was evaluated using the GeoSuite® computer program (version 2.2.2.14). The seismic parameters included a horizontal acceleration of 0.60g and a Moment Magnitude of 7.8. This is based on published parameters for faults in California from the *Working Group on Earthquake Probabilities* (Field and others, 2008; Willis and others, 2008), considering a cascading effect of rupture along the entire length of the San Jacinto Fault Zone. We analyzed the soil profile logged for exploratory boring B-01. The analysis was based on the simplified procedures developed by Seed and Idriss that were more recently modified by Idriss and Boulanger (2008). The program calculates corrected normalized SPT N-values $(N_1)_{60}$ using the following formula (SCEC, 1999).

$$(N_1)_{60} = N_M C_N C_E C_B C_R C_S$$

Where; N_M = measured standard penetration resistance. Modified California sample blowcounts were converted to SPT blowcounts using Burmister's formula (1948) prior to input in the program. The modified California sample blowcounts were also corrected to account for lined samplers, as described in the C_S factor discussion below.

C_N = depth correction factor. GeoSuite® calculates C_N for each layer in the soil profile using the relationship suggested by Idriss and Boulanger (2008)

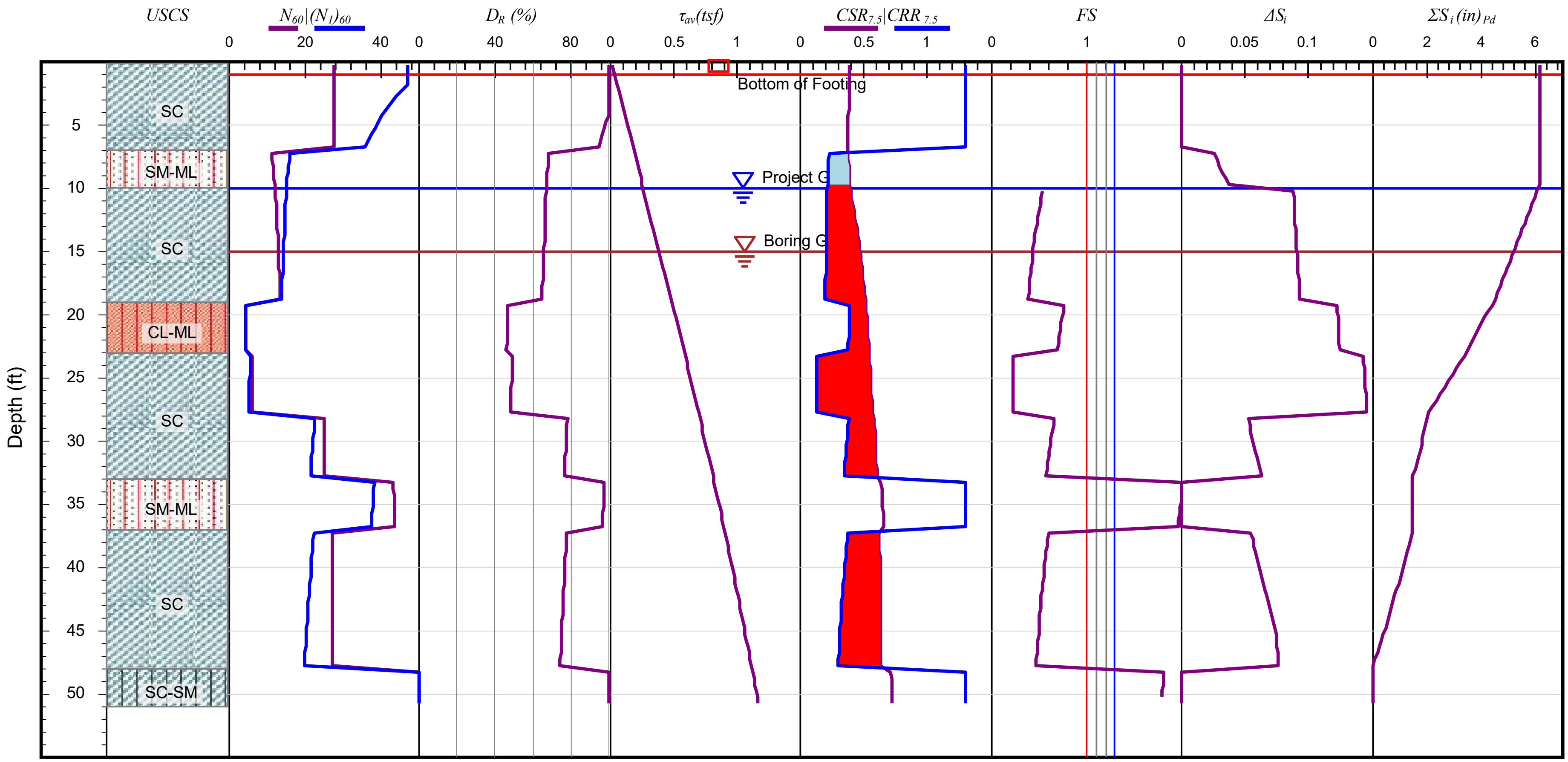
C_E = hammer energy ratio (ER) correction factor. A C_E factor of 1.3 was applied for the automatic trip hammer used during drilling. This was calculated using the relationship suggested by Idriss and Boulanger (2008) and SPT hammer energy measurements provided by the drilling subcontractor.

C_B = borehole diameter correction factor. A C_B factor of 1.0 was applied for the 8-inch diameter hollow-stem augers with inside diameters of four (4) inches (SCEC 1999).

C_R = rod length correction factor. GeoSuite® applies a C_R factor for each layer in the soil profile using the values in Table 5.2 of the 1999 SCEC guidelines, and assuming a rod stick up length (above the ground surface) of 3 feet.

C_S = correction factor for samplers with or without liners. SPT samplers without liners were used for this project. For SPT samplers without liners, GeoSuite® applies a C_S factor for each layer in the soil profile using the relationships from Seed et al. (1984) and suggested by Idriss and Boulanger (2008). Since GeoSuite® applies a C_S factor to all layers in the soil profile, it is necessary to adjust blowcounts for modified California samplers with liners. This was done through an iterative process by initially dividing the modified California sampler blowcounts by an assumed C_S value of 1.2 prior to input in the program. Calculated C_S values were then checked against the assumed values and adjusted where necessary, so that the actual applied C_S value for modified California samples is 1.0.

The results of our analysis are shown on Figure C-3.



SC

CL-ML

SM-ML

SC-SM

Earthquake & Groundwater Information:
Magnitude = 7.8
Max. Acceleration = 0.6 g
Project GW = 10 ft
Maximum Settlement = 6.15 in
Settlement at Bottom of Footing = 6.15 in

Liquefaction: Idriss & Boulanger (2008)
Settl.: Pradel (1998); [sat] Idriss & Boulanger (2008)
Lateral spreading: Idriss & Boulanger (2008)
M correction: [Sand; Clay] Boulanger & Idriss(2004)
σv correction: Idriss & Boulanger (2008)
Stress reduction: Idriss & Boulanger (2008)

P:\N133\001 SWC Willard St\GeoSuite_N133-001.csv

INLAND FOUNDATION ENGINEERING, INC.
Consulting Geotechnical Engineers and Geologists

Liquefaction Potential - SPT Data					
Project:	RV and Boat Storage Facility				
Location:	SWC Willard St. and State Highway 79, Riverside County, California				
Project No.:	N133-001	Boring No.:	B-01	Figure:	C-3

APPENDIX D –
Infiltration Testing

APPENDIX D
INFILTRATION TESTING

Infiltration testing was conducted in general accordance with Appendix A - Infiltration Testing of Riverside County - Low Impact Development BMP Handbook. We performed shallow percolation testing per the Riverside County Department of Environmental Health test procedure. A staff geologist conducted the actual percolation testing with equipment and procedures outlined in the Riverside County Technical Guidance Manual.

Two percolation tests were performed in the vicinity of the proposed retention basin in the southeast portion of the site, at the locations shown on Figure No. A-7. The tests were performed at depths of approximately 48 inches below the existing ground surface. The test holes were excavated approximately eight (8) inches in diameter. Per the specified percolation test procedure, the test holes were filled with water to a depth of at least five (5) times the radius of the test holes. A two-inch thick layer of gravel was placed in the bottom of each test hole. In this case, the test holes were excavated and filled to a depth of at least 20 inches above the top of the gravel.

The test holes were presoaked prior to actual testing. The measured percolation rates ranged from to 30 to 60 minutes per inch at a depth of 48.

Percolation test rates were converted to infiltration rates (I_c) using the Porchet method and the following equation:

$$I_c = \Delta H 60r / \Delta t(r+2H_{avg})$$

Where:

r = Test Hole Radius (in.)
H_{avg} = Average Height of Water during Test Interval (in.)
ΔH = Change in Water Height during Test Interval (in.), and
Δt = Time Interval (in.)

The corresponding calculated infiltration rates (I_c) ranged from 0.2 to 2.1 inches per hour. These values exclude factors of safety. The table below provides a summary of the test data with values for I_c.

Percolation Hole No.	Percolation Rate (Min./Inch)	Depth Below Existing Ground Surface (In.)	Infiltration Rate (I_c) (In./Hr.)
P-1	30	48	0.2
P-2	60	48	0.1