GEOTECHNICAL INVESTIGATION REPORT

GEOTECHNICAL INVESTIGATION
Proposed Industrial Warehouse
NE Corner of Cardova Road and Dachshund Avenue
Apple Valley, CA

Prepared for Redwood West
Submitted by Merrell Johnson Geotechnical, Inc.
December 1, 2023

MERRELL JOHNSON

Merrell Johnson Geotechnical
12277 Apple Valley Rd. #291, Apple Valley, CA 92308
760 240 8000 | www.merrelljohnson.com

December 1, 2023

Butterfly Equity Partners and /or
RW Apple Valley II and /or
Assignee, and/or Linkup, LLC
220 Newport Center Drive, Ste 11-557
Newport Beach, CA 92660

Re: Geotechnical Investigation Report | Proposed Industrial Warehouse | NE Corner of Cardova Road and Dachshund Avenue, Apple Valley, CA 92307 | M.J.G. Project No. 3813.006.500

Ladies and Gentlemen:

This letter transmits Merrell Johnson Geotechnical's Geotechnical Investigation Report for the subject industrial warehouse building. The investigation was planned and performed based on the proposed project development illustrated on the Conceptual Grading Plan prepared by Merrell Johnson, dated September 18, 2023.

We trust that the enclosed information will be useful for the design and construction phases of this project. If you have any questions, please do not hesitate to contact our firm.

Sincerely,

Merrell Johnson Companies

Brad S. Merrell, P.E., President
Merrell Johnson Geotechnical, Inc.
R.C.E. 49423

Jeff S. Burns, Project Manager
Merrell Johnson Geotechnical, Inc.

CONTENTS

APPENDICES

INTRODUCTION

Project Description

This report presents the results of the geotechnical investigation Merrell Johnson Geotechnical (MJG) performed for the new warehouse planned for the 68.2-acre parcel located on the northeast corner of Cardova and Dachshund Avenue, Apple Valley, CA. The location of the proposed development is shown on the Site Vicinity Map, Google Earth Site Image, Site Plan, and Conceptual Grading Plan, included with this report as Appendix A, Figures 1-4.

The proposed industrial warehouse will occupy a plan area of 1,346,270 square feet (SF) and includes a 26,880 SF mezzanine. Proposed site improvements will include truck loading docks, truck trailer parking, automobile parking, driveways, retention basin, utilities, and other ancillary improvements. Maximum cut and fill depths required to grade the site are anticipated to be about 15 feet and 10 feet, respectively, plus building pad overexcavation.

Proposed off-site improvements will include installing utilities and paving Dachshund Avenue from Quarry Road south to Johnson Road and Cardova Road westward from the project's southeast corner to Dale Evans Parkway.

Scope of Services

The scope of work for this project consisted of field exploration, laboratory testing, engineering analyses, and preparation of this report. The results of the field exploration and laboratory test programs were analyzed to develop conclusions and recommendations regarding:

- Subsurface conditions underlying areas to be developed
- Site preparation and grading
- Excavation conditions
- Foundation support for the new structure along with soils engineering criteria for foundation design
- Support for slab-on-grade floors
- Concrete and flexible pavement structural sections for parking and driveway/fire lanes
- Flexible pavement structural sections for Dachshund Avenue and Cardova Road off-site street improvements

FIELD EXPLORATION AND LABORATORY TESTING

Field Exploration

Subsurface conditions were explored by drilling five (5) test borings within the warehouse building limits, one (1) to a depth of 50 feet and four (4) to a depth of 25 feet. The 50-foot-deep test boring was also used to evaluate the soil liquefaction potential.

Outside the limits of the proposed warehouse, two 10-feet-deep test borings were drilled within the proposed retention basin, six 5-feet-deep test borings within the onsite loading/parking areas, and four 5-feet-deep testing borings within the off-site Cardova and Dachshund Avenue improvement areas.

The locations of the test borings are shown on Conceptual Grading Plan, Figure 3 in Appendix A. The borings were logged by an MJG's representative, who also collected samples of the materials encountered for examination and laboratory testing.

Bulk samples were collected from drill cuttings. Relatively undisturbed samples were obtained by driving a 2.5-inch inside diameter modified California sampler with a 140-pound hammer falling 30 inches. Blow counts required to drive the sampler each 6 inches of an 18-inch (or less) drive are noted on the boring logs as "N" value.

Standard Penetration Tests (SPTs) were performed at selected depths by driving a 1.4-inch inside diameter sampler 18 inches with a 140-pound hammer falling 30 inches. The blow counts required to drive the sampler each 6 inches of the drive are noted on the boring logs as "N" value. Disturbed samples were collected from the SPT sampler at the time of driving.

The logs of the test borings are in Appendix B. Soils are described according to the Unified Soil Classification System explained in Appendix B.

Laboratory Testing

The laboratory program included the following tests:

- ASTM D 422 - Grain Size Analysis
- ASTM D 1557 - Maximum Density
- ASTM D 2419 – Sand Equivalent
- ASTM D 2435 / CT-219 - Consolidation of Soils
- ASTM D 2844 / CT 301 - Resistance to R-value
- ASTM D 2937 - In-place Moisture Content and Dry Density
- ASTM D 3080 - Direct Shear
- ASTM D 4829 - Expansion Index of Soil
- G51/CT643, CT417, CT422 - Corrosion Potential

The results of the laboratory tests are summarized in Appendix C.

SITE AND SUBSURFACE CONDITIONS

Site Conditions

The 68.2-acre site is located on the northeast corner of Cardova and Dachshund Avenue. The property is undeveloped and covered with sparce desert vegetation. The ground surface slopes (descends) gradually towards the southwest at an inclination of about 1.5 percent. Cardova and Dachshund Avenue are unpaved. Quarry Road bounds the north side of the site. Quarry Road is a paved private road with no legal paved access to the project site.

Subsurface Conditions

The site is blanketed by medium dense silty sand (SM) to a depth of about 3 feet where it becomes dense. At a depth of about 5 feet, dense poorly graded sand with silt with some gravel and cobbles (SP-SM) was encountered and extended to the depth explored (50 feet). A boulder was encountered in Boring No. 1 at a depth of 30 feet.

Expansion Potential

Results of an expansion index test (ASTM D4829) performed on a near-surface soil sample from Boring No. 3 within the proposed warehouse limits exhibited an expansion index of 2, which corresponds to a very low expansion potential.

Geologic Setting

The subject site is located within a natural geomorphic province in southern California known as the Mojave Desert. This province consists of a broad interior region of isolated mountain ranges separated by expanses of desert plains and is characterized by the numerous interior enclosed drainages and playas. The Mojave Desert is in large, bounded structurally on the southwest by the San Andreas Fault and on the northwest by the Garlock Faults, and is ill-defined along the east where the structural patterns resemble the Basin and Range Province to the north and east. This province exhibits interior drainage, including the Mojave River, which has its source in the San Bernardino Mountains and would extend into Death Valley if there was enough water.

The geologic units of this region generally consist of three main divisions being: 1) Crystalline rocks of pre-Tertiary age; 2) sediments and volcanic rocks of Tertiary age; and 3) sediments and basalt flows of Quaternary age. Regionally, the site is located along a large alluvial plain, locally underlain by Quaternary age alluvium and older that has been derived predominantly as outwash from the adjacent highlands to the north and east along Sidewinder Valley. These sediments are believed to be less than 500± feet locally (Subsurface Surveys, 1990).

Locally as mapped by Hernandez and Tan (2007), the subject site is shown to be underlain by late Pleistocene age older alluvium. These deposits are generally described as being comprised of a fine- to medium-grained sand and fine to medium gravel of inactive fans.

CBC Ground Motion Analysis

Included for this study was an assessment of the seismic ground motion parameters of the subject site with respect to the most recently adopted 2022 California Building Code (CBC) and ASCE/SEI Standard 7-22 (ASCE, 2022) as partially summarized and tabulated below. Geographically, the proposed construction area is centrally located at Latitude 34.610365 and Longitude -117.196553.

Site Classification (CBC 1613.3.2) – Based on the presence of mapped Quaternary age alluvial deposits underlying the site and the absence of site-specific shear-wave data, the design Site Class is *estimated* to be **"D."** This Class is defined as having the upper 100 feet (30 meters) of the subsurface being underlain by "Stiff Soil" with average shear-wave velocities of 600 to 1,200 feet/second (180 to 360 meters/second). In accordance with the CBC, the proposed warehouse is considered a Risk Category II structure.

TABLE 1: SUMMARY OF SEISMIC DESIGN PARAMETERS

Factor or Coefficient	***Value***
S_S	1.16g
S_1	0.39g
S_{DS}	1.0g
S_{D1}	0.67
S_{MS}	1.5g
S_{M1}	1.0
T_L	12 Seconds
PGA_M	0.55g
V_{S30}	260
Site Class	D

Groundwater

The study area lies within the Upper Mojave River Groundwater Basin of southern California. The Mojave River Basin is part of the Mojave Desert region and is bordered by the San Bernardino and San Gabriel Mountains to the south and extends to Afton Canyon to the northeast, with Lucerne Valley and Antelope Valleys bordering the east and west, respectively. The Mojave River, which is located to the west, is the principal source of water recharge to the basin, which originates from the junctions of Deep Creek and West Fork Mojave River at the northern foot of the San Bernardino Mountains. Other sources of recharge include other lesser river tributaries from the San Bernardino and San Gabriel Mountains, the adjacent highlands to the north and east, as well as deep percolation from rainwater and other artificial means.

The water-bearing deposits are principally unconsolidated and partially consolidated continental sedimentary deposits that form two aquifers (Stamos and Predmore, 1995), the upper one being shallow alluvium (200± feet thick, within 1± mile of the Mojave River), with the regional aquifer underlying most of the basin at depth. The regional aquifer is comprised of unconsolidated older alluvium and fan deposits of Pleistocene to Tertiary age, and partly consolidated to consolidated sediments of Tertiary age. These deposits are as much as 1,000 feet thick in some places and their permeability generally decreases with depth.

Based on groundwater data provided by the California Department of Water Resources (2023), the closest measured well is approximately 1,300± feet to the west (State Well No. 06N03W16C001S), which had a water level of 39 feet in 1957 (only measurement). Other wells in the nearby vicinity show groundwater depth around 87 feet in depth (State Well No. 06N03W16D001S) located approximately 2,400± feet to the west, and 52 feet in depth (State Well No. 06N03W09N001S) located approximately 2,400± feet to the northwest.

Faulting

There are at least thirty-five major "potentially active/active" (late Quaternary) faults that are within a 100-kilometer (62 mile) radius of the site as shown on Figure 1 below (site shown as small dot in middle).

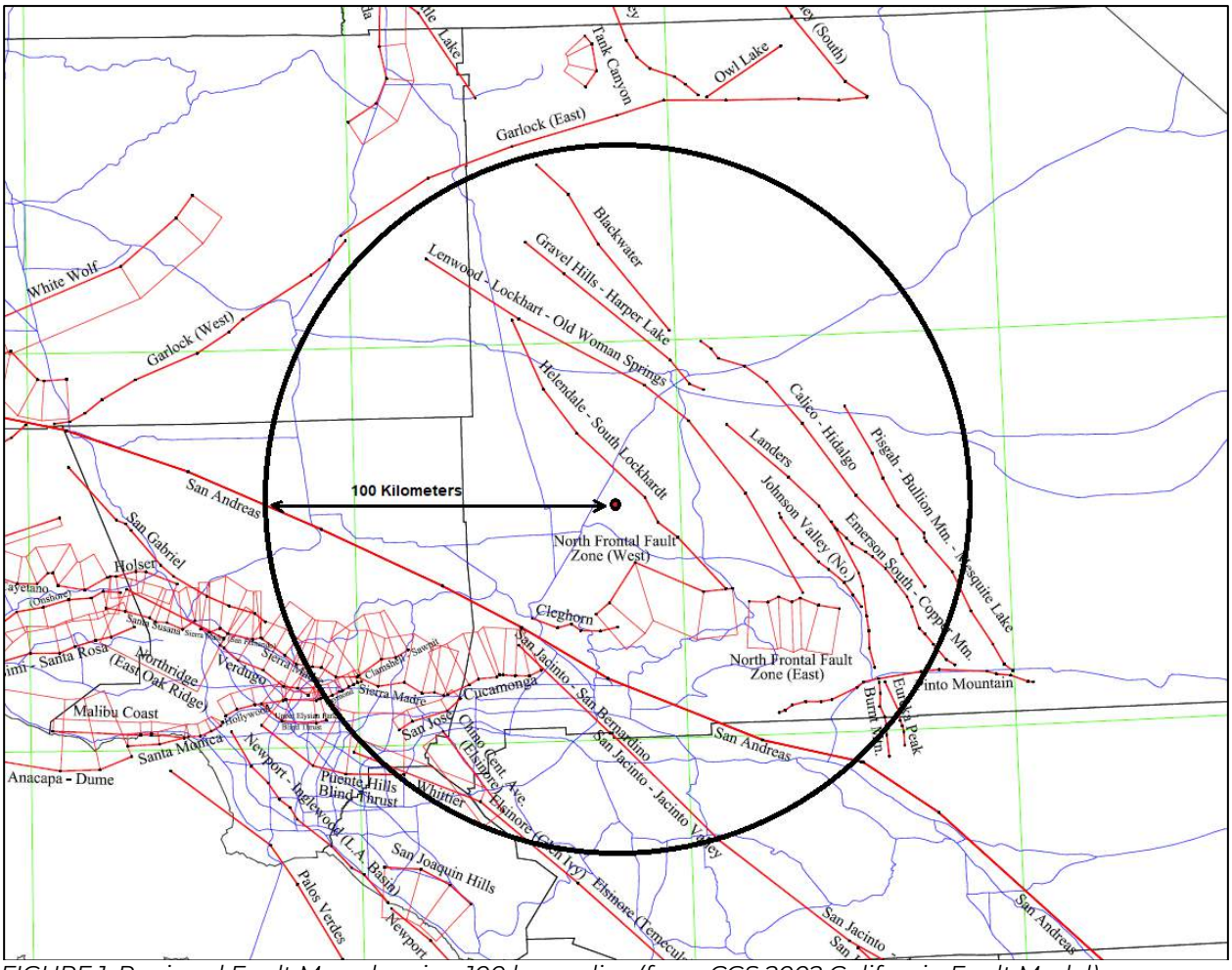


FIGURE 1: Regional Fault Map showing 100 km radius (from CGS 2002 California Fault Model)

Of these, there are no active faults known to traverse the site based on published literature. In addition, the subject site is not located within a State of California “Alquist-Priolo Earthquake Fault Zone” for surface fault rupture hazards (CGS, 2018).

The nearest mapped “active” fault zoned by the State of California is for the Helendale-South Lockhart Fault, located approximately 2½±-miles to the northeast. The Helendale-South Lockhart Fault is a right-lateral, strike-slip fault, being approximately 97 kilometers in length, with an associated slip-rate of 0.6 ±0.4 mm/year (C.D.M.G., 1996 and Cao, et al., 2003).

CONCLUSIONS AND RECOMMENDATIONS

The existing surface soils are medium dense to a depth of about 3 feet. Below 3 feet, the native soils are generally dense and are considered adequate for support of the new facilities.

The site is not within an Alquist Priolo Earthquake Fault Zone. The soils are medium dense to dense, and groundwater is deep below this site. The liquefaction potential consequently is very low. The potential for dynamically induced settlement of the granular soils is also very low. In addition, the soils have a very low potential for expansion due to changes in moisture content.

The potential for encountering groundwater within the anticipated relatively shallow excavations is minimal. There is a potential for minor amounts of water to enter open excavations because of direct rainfall and runoff.

Earthwork

At the time of MJG's investigation, the site was covered with sparce desert vegetation. Any debris, vegetation, and other deleterious materials should be stripped and removed from the site prior to grading work. Organic materials should be disposed of off-site in accordance with the owner's instructions. Roots should be removed to a depth of 6 inches below foundation and pavement subgrade elevations.

Areas to receive fill should be scarified to a depth of 12 inches, brought to within 2 percentage points above or below optimum moisture content, and compacted to a minimum of 95% relative compaction based on the ASTM D1557 laboratory test method. All references to optimum moisture content and relative compaction in this report are based on this test method.

Compacted Fill Placement

Fill should be placed in 8-inch-thick loose lifts, moisture conditioned to within 2 percentage points above or below optimum moisture content and compacted to a minimum of 95% relative compaction.

Imported Soils

Imported soils, if needed, should consist of predominantly granular material with an expansion index less than 20 when tested in accordance with ASTM D4829, and should have a minimum R-value of 40. Imported material should be inspected and approved by an MJG's representative prior to being brought to the site.

Shallow Foundation and Building Slab-On-Grade Support

The existing soils below and within five (5) feet of the proposed warehouse building should be over-excavated to a depth of at least three feet below the existing ground surface or 12 inches below the proposed footing base grade, whichever depth is greater. The bottom of the over-excavation should be scarified to a depth of at least 6 inches, moistened to within 2 percent of the optimum moisture content, and compacted to a relative compaction of at least 95 percent (ASTM D 1557).

Fill should be placed in 8-inch-thick loose lifts, moisture conditioned to within 2 percentage points above or below optimum moisture content and compacted to a minimum of 95% relative compaction.

The planned structures can be supported on shallow spread footings with bottom levels in the compacted fill at a minimum depth of 18 inches below the lowest adjacent finished grade.

A minimum width of 18 inches is recommended for continuous footings. Isolated footings should be at least 24 inches wide. Footings can be designed for an allowable bearing pressure of 2500 pounds per square foot (psf) for dead plus long-term live loads. This value can be increased by ⅓ when considering the total of all loads, including wind or seismic forces.

Total post-construction settlement is estimated to be approximately ¾ inch. Post-construction differential settlements are anticipated to be ½ inch or less between isolated footings, and between the middle and end of a continuous footing.

Continuous (strip) foundations should be reinforced with a minimum of #5 deformed reinforcing bars at the top and bottom of the footings.

Spread footing reinforcement should be designed by the structural engineer for punching shear and bending. As a minimum, the spread footings should be reinforced with a #5 deformed reinforcing bars, spaced 18 inches on center each way and placed 3 inches above the bottom of the spread footing.

All grade beam reinforcement should be designed and specified by the building's designer/structural engineer.

Foundations should be reinforced as necessary to reduce the potential for distress caused by differential foundation movement. The use of joints at openings or other discontinuities in masonry walls is recommended.

Footing excavations should be observed by an MJG's representative to check bearing materials and cleaning.

Lateral Loading

Resistance to lateral loads will be provided by passive earth pressure against the faces of footings and other structural elements below grade, and by friction along the bases of footings and slabs. Passive earth pressure can be taken as 350 pounds per square foot (psf) per foot of depth. Base friction can be taken as 0.35 times the actual dead load. Base friction and passive earth pressure can be combined without reduction. Retaining structures free to rotate at the top should be designed for an active equivalent fluid pressure of 35 psf per foot of height, plus any additional building or equipment surcharge. MJG should be notified if retaining walls greater than 10 feet in height, restrained walls, or tieback walls are planned so that geotechnical recommendations specific to wall conditions can be developed.

Building Floor Slabs

During grading operations, the building pad soils should be compacted to a relative compaction of at least 95 percent (ASTM D 1557). Prior to placing the slab-on-grade concrete, the final pad surfaces should be proof-rolled to provide a smooth, dense surface upon which to place the concrete.

A 15-mil vapor retarder membrane, conforming to ASTM E 1745 and installed per ASTM E 1643, should be placed beneath concrete slabs-on-grade covered with moisture sensitive or impervious floor coverings, or where the slab will support equipment or materials sensitive to moisture. When conditions warrant the use of a vapor retarder, the slab designer should refer to

ACI 302 and/or ACI 360 for procedures and cautions regarding the use and placement of a vapor retarder.

Reinforcing for slabs-on-grade should be designed by the project structural engineer based on anticipated storage and forklift loads. A modulus of subgrade reaction of 150 pounds per cubic inch (pci) can be used. Reinforcing should extend down into the footings. Concrete construction (i.e. jointing, etc.) should be in conformance with the American Concrete Institute Manual of Concrete Practice Design and Construction Standards.

Minimum reinforcing for 4-inch-thick slabs-on-grade should consist of 6" x 6" W1.4 /1.4 welded wire fabric supported mid height in the slab by concrete blocks or dobies. Positioning the wire fabric by lifting after concrete placement should not be allowed. Minimum reinforcing for 6-inch-thick slabs-on-grade should consist of at least #4 deformed reinforcing bars at 12 inches on center each way placed at mid-height in the slab.

Where the project's structural engineer's reinforcement recommendations exceed MJG's above minimum slab reinforcement recommendations, the structural engineer's recommendations should be followed.

Saw-cut control joints should be placed in the slab to help control the location and extent of cracking. For additional recommendations refer to the ACI Design Manual. Joints or cracks should be sealed with a waterproof, non-extruding compressible compound specifically recommended for heavy duty concrete pavement and wet environments.

Where floor slabs are tied to perimeter walls or turn-down slabs to meet structural or other construction objectives, our experience indicates differential movement between the walls and slabs will likely be observed in adjacent slab expansion joints or floor slab cracks beyond the length of the structural dowels. The structural engineer should account for potential differential settlement through use of sufficient control joints, appropriate reinforcing, or other means.

Surface Drainage

It is important that water be kept a minimum of 5 feet from structures and slabs. No ponding adjacent to buildings and structures should be allowed. Final surfaces should have a positive 2 percent minimum slope away from structures.

Retaining walls should be designed to resist hydrostatic pressures or be provided with a back-drain, weep holes or other drainage facilities. If a basement or underground structure is constructed, a subsurface drainage system is recommended.

Concrete and Flexible Asphalt Concrete Pavement Subgrade Preparation

Soils should be scarified to a depth of at least 12 inches, moistened to within 2 percent of the optimum moisture content and compacted to a relative compaction of at least 95 percent (ASTM D1557). Any additional fill required to prepare the finish subgrade should be placed in maximum 8-inch-thick lifts, each lift moistened to within two (2) percent of the optimum moisture content and compacted to a relative compaction of at least 95 percent.

Flexible Pavement Structural Sections

New flexible pavement structural sections were determined following California Department of Transportation (Caltrans) procedures.

ONSITE FLEXIBLE PAVEMENT

Onsite flexible pavement for automobiles and light trucks are planned for the north and south sides of the project site. MJG's review of the Conceptual Site Plan indicates that most of the heavy truck driveways, trailer parking areas, and loading docks will be located on the east and west sides of the warehouse and paved with rigid portland cement concrete pavement. The automobile and truck trailer parking areas will be connected by onsite access driveways.

Six test borings were drilled around the perimeter of the proposed warehouse. Sieve analyses (ASTM D422, D1140 & D2487) and sand equivalent tests (ASTM D 2844) were performed from soil samples collected in each of these borings. The soil samples containing the largest percentage of fines (soil fraction passing the #200 sieve) and the lowest sand equivalent value were selected and tested for R-value (ASTM D 2844).

The most critical soil samples were collected in Boring Nos. 10 and 12 located on the east and west sides of the warehouse, respectively. R-value tests were performed from the soil samples collected in these two borings. The sieve analysis, sand equivalent, and R-value test data are summarized in Table 2 below.

TABLE 2: ONSITE SIEVE AND R-VALUE TEST RESULTS

Boring No.	***% Passing the 200 Sieve (ASTM D422, D1140, & D2487)***	***Sand Equivalent ASTM D 2844***	***R-value ASTM D2844***
8	10.1	71	--
9	12.4	36	--
10	13.9	24	25
11	18.4	24	--
12	17.4	17	17
13	14.9	37	--

Based on the above soil test data, the most critical R-value of 17 was used to calculate the recommended onsite flexible pavement sections for the project. In addition, the Traffic Indexes for the flexible pavement areas was selected as follows:

- Automobiles and light truck traffic: TI = 5
- Heavy truck traffic: TI = 8

Recommended onsite flexible pavement structural sections are listed in Table 3 below.

TABLE 3: ONSITE FLEXIBLE PAVEMENT STRUCTURAL SECTIONS			
Pavement Area	***Traffic Index***	***Asphalt Concrete (inches)***	***Base Course (inches)***
Autos & Light Truck Traffic	5	3	8
Heavy Truck Traffic	8	6	12

OFF-SITE FLEXIBLE PAVEMENT FOR CARDOVA AND DACHSHUND AVENUE

Off-site flexible pavement is proposed for Cardova Road and Dachshund Avenue adjacent the subject warehouse site. Additionally, the paving of Cardova and Dachshund Avenue will be extended from the southwest corner of the warehouse site westward to Dale Evans Parkway and southward to Johnson Road, respectively.

Two test borings were excavated along the alignment of Cardova Road and two along Dachshund Avenue (4 total). Samples from the four test borings were collected and tested for sieve analysis (ASTM D422, D1140 & D2487). The samples containing the largest percentage of fines from each street (soil fraction passing the #200 sieve) were selected and tested for R-value (ASTM D 2844).

The most critical soil samples were collected in Boring Nos. 14 and 15 located on Cardova Road and Dachshund Avenue, respectively. R-value tests were performed from the soil samples collected in these two borings. The sieve analysis and R-value test data are summarized in Table 4 below.

TABLE 4: OFF-SITE ROADWAY SIEVE AND R-VALUE RESULTS			
Boring No.	***Roadway***	***% Passing the 200 Sieve (ASTM D422, D1140, & D2487)***	***R-value ASTM D2844***
14	Dachshund Avenue	23.4	58
15	Cardova Road	27.4	52
16	Cardova Road	15.4	--
17	Dachshund Avenue	20.1	--

Based on the above soil test data, the most critical R-values of 52 and 58 were used to calculate the recommended off-site flexible pavement sections for Cardova and Dachshund Avenue, respectfully. The Traffic Index used to calculate the roadway pavement sections was:

- Automobiles and Heavy truck traffic: TI = 9

Recommended off-stie flexible pavement structural sections for Cardova and Dachshund Avenue are presented in Table 5 below.

TABLE 5: ONSITE FLEXIBLE PAVEMENT STRUCTURAL SECTIONS			
Roadway	***Traffic Index***	***Asphalt Concrete (inches)***	***Base Course (inches)***
Cardova Road	9	5	6
Dachshund Avenue	9	5.5	4

Alternative pavement sections can also be considered. Merrell Johnson should review the design pavement sections if traffic loads will be different from those currently anticipated.

PORTLAND CEMENT CONCRETE PAVEMENTS AND FLATWORK

The subgrade surface beneath rigid (portland cement concrete) pavements should be proof-rolled with a smooth-wheel roller to form a dense, uniform surface. Any pumping or yielding areas should be excavated and replaced with compacted fill.

Rigid pavements to support automobile and light truck traffic should be a minimum of 6 inches thick and reinforced with a minimum of #4 deformed reinforcing bars spaced 12 inches on center each way. Joints should be provided at intervals of no more than 12 feet. Smooth dowels should be provided across pavement joints.

Rigid pavement to support heavy truck traffic should be a minimum of 8 inches thick and reinforced with #4 deformed reinforcing bars spaced 12 inches of center each way. Joints should be provided at intervals of no more than 12 feet. Smooth dowels should be provided across pavement joints.

Pedestrian walkways and other lightly loaded concrete flatwork areas should be proof rolled as described above. The flatwork in these areas should have a minimum thickness of 4 inches and be provided with doweled joints at no more than 12-foot intervals. Minimum reinforcement should consist of 6 x 6 W1.4/1.4 welded wire fabric supported mid height in the slab by concrete blocks or dobies. Positioning the wire fabric by lifting after concrete placement should not be allowed.

UTILITY EXCAVATIONS

Excavations for this project will require sloping sidewalls or shoring. Excavations should be made in accordance with California Administrative Code, Title 8, Industrial Relations, Chapter 4, Division of Industrial Safety, Subchapter 4, Construction Safety Orders, Article 6. Temporary excavations should be shored or sloped in accordance with Cal OSHA requirements. On-site soils can be considered Type C for purposes of excavation design.

In general, temporary excavations in on-site soils should be sloped no steeper than 1.5 horizontal to 1 vertical for excavations up to 20 feet in depth. Compound excavations with vertical sides in lower portions should be properly shielded to a minimum height of 18 inches above the top of the vertical side, with the upper portion having a maximum slope of 1.5 horizontal to 1 vertical. A Registered Professional Engineer should design slopes or benching for excavations greater than 20 feet in depth.

Temporary excavation slopes should be inspected twice daily by the contractor's competent person before personnel are allowed to enter the excavation. If sloughing, raveling or other evidence for slope instability is noted, corrective measures should be implemented.

Temporary shoring will be required for those excavations where temporary cut slopes as described above are not feasible. Cantilever shoring, and shoring with 1 level of bracing, can be designed to resist an equivalent fluid pressure of 30 psf per foot of depth. For shoring with multiple levels of bracing, a uniform lateral pressure equal to 25H in psf, where H is the height of shoring in feet, should be used. The recommended soil pressure applies to level soil conditions behind the shoring. Where a combination of sloped embankment and shoring is used, the soil pressure will be greater and should be evaluated for actual conditions.

In addition to the above recommended lateral earth pressures, a minimum uniform lateral pressure of 125 psf should be incorporated in the design of the upper 10 feet of shoring when normal traffic is permitted within 10 feet of the shoring. The design of temporary shoring should also include the surcharge loads from delivery and construction equipment, as appropriate.

CORROSIVITY

Laboratory test results indicate that resistivity of the soils sampled exhibit resistivities ranging from 260 to 1,500 ohms-cm, which indicates the soils have a corrosion potential with respect to reinforced concrete and ferrous metals. For this reason, Type II modified, or Type V cement is recommended for use in concrete in contact with the ground. Foundations should be designed with continuous reinforcing steel top and bottom. Reinforcing steel should maintain minimum clearances specified by applicable codes and good construction practice. Appropriate corrosion protection, including consultation with a qualified corrosion engineer, should be implemented anywhere ferrous metal is in contact with the soils.

LIMITATIONS

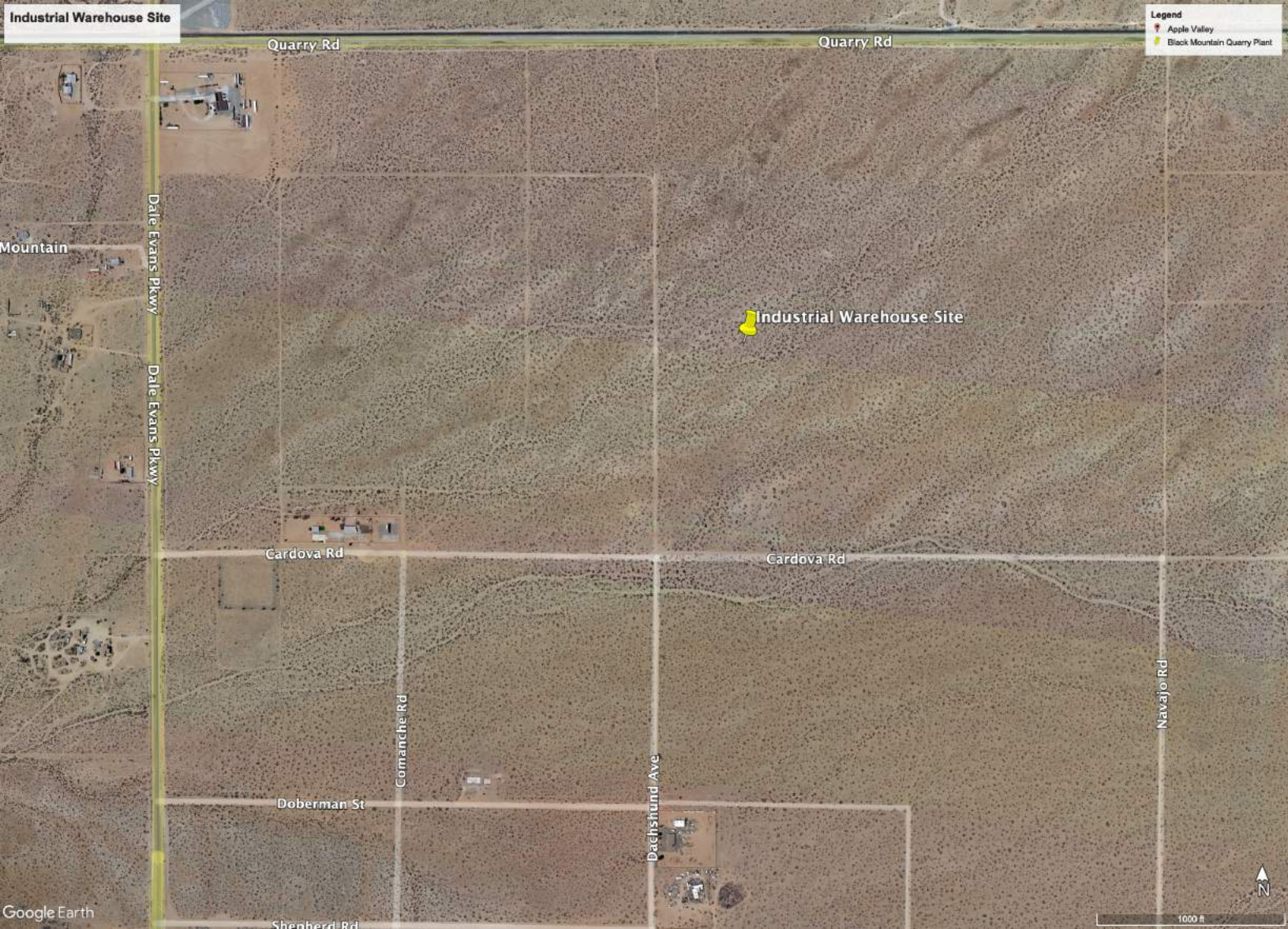
The recommendations in this report are based on results of the field exploration and laboratory test programs, combined with interpolation and extrapolation of subsurface conditions between and beyond boring locations. The nature and extent of variations in these conditions may not become evident until construction. If variations are encountered during construction, MJ should be notified so these variations can be reviewed and the recommendations in this report modified if necessary. If changes in the nature, design or location of the structures are planned, these changes should be reviewed by MJ so that modifications to the recommendations in this report can be made if needed.

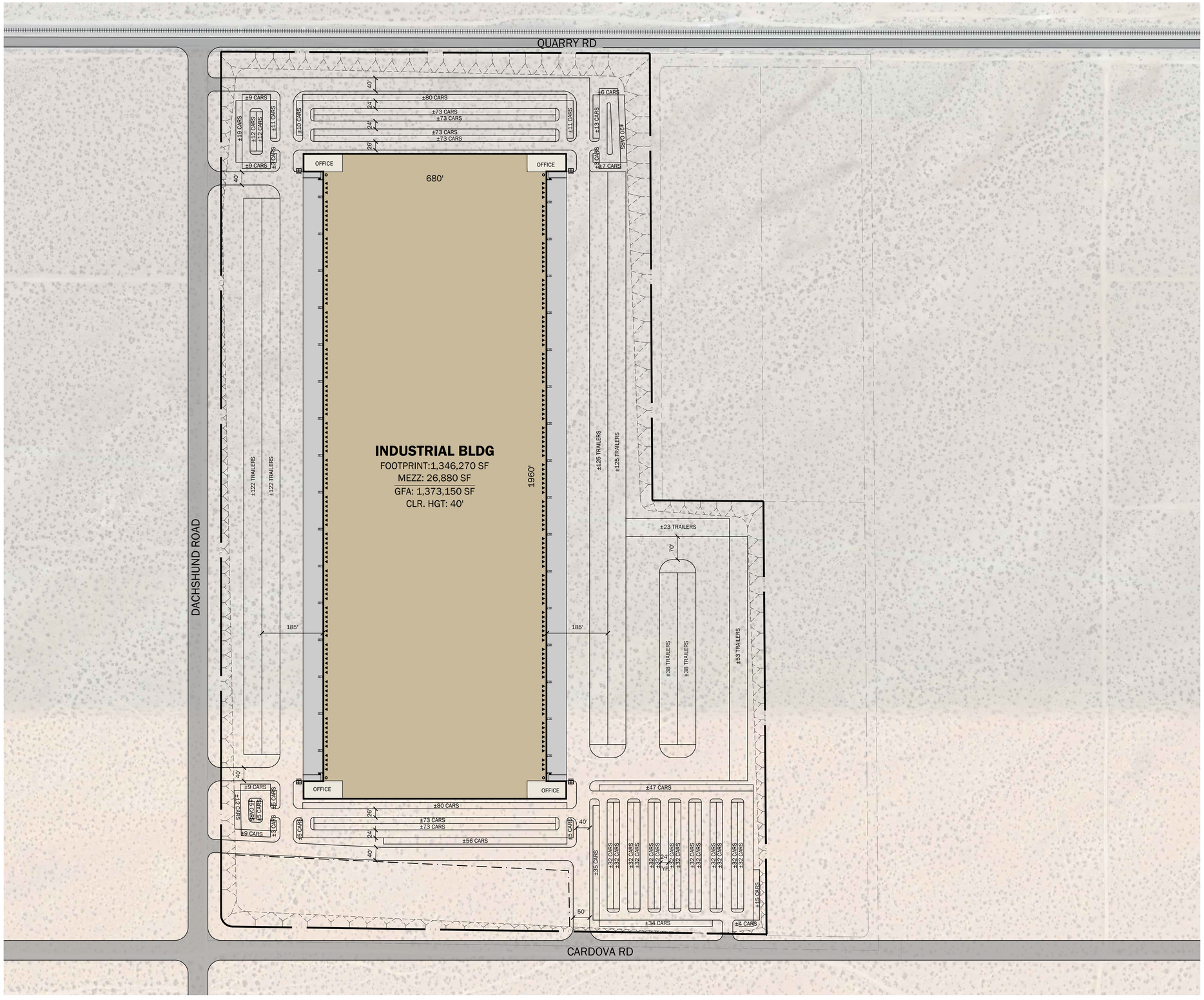
Our professional services have been performed using the degree of care and skill ordinarily exercised under similar circumstances by reputable engineering consultants practicing in this or similar localities. No other warranty, express or implied, is made as to the professional advice or data included in this report. This report has not been prepared for use by other parties and may not contain sufficient information for purposes of other parties or other uses.

APPENDIX A

Figure 1 – Site Vicinity Map
Figure 2 – Plot Plan / Satellite Site Image
Figure 3 – Architectural Site Plan
Figure 4 – Conceptual Grading Plan


Industrial Warehouse Site
Legend
Apple Valley
Black Mountain Quarry Plant
Black Mountain Quarry Plant
Industrial Warehouse Site
Bell Mountain
15
18
Victorville
DESERT KNOLLS
Apple Valley
Apple Valley
Spring Valley Lake
Google Earth
N
2 mi


Industrial Warehouse Site
Legend
Apple Valley
Black Mountain Quarry Plant
Quarry Rd
Quarry Rd
Dale Evans Pkwy
Dale Evans Pkwy
Mountain
Industrial Warehouse Site
Cardova Rd
Cardova Rd
Comanche Rd
Dachshund Ave
Navajo Rd
Doberman St
Shepherd Rd
Google Earth
N
1000 ft



DEVELOPMENT STANDARDS

Zoning

Jurisdiction		Apple Valley, CA
Zoning Designation		I-SP (Specific Plan)
Max Coverage		45% [4]
Max Height		100 FT
Building Setbacks		[1]
Landscape Setbacks		[4]
Parking Standards		
	Min Stall Size	9X19
	Drive Aisle	24 FT
Required Parking		
	Office	1/250 SF [5]
	Manufacturing	1/500 SF [3]
	Non-Specified	3/1000 SF [6]
	Warehouse	1/500 SF [2]
	≤10000 SF	1/500 SF
	10000≥# SF	1/1000 SF

PROJECT DATA

Site Summary

Gross Site Area	3,927,102 SF	90.15 AC
Total Building Area(s)	Gross Floor Area	1,373,150 SF
	Footprint	1,346,270 SF
Coverage	Gross	34%
FAR	Gross	0.35

Building 1

Building Area(s)	Footprint	1,346,270 SF
	Mezzanine	26,880 SF
	Gross Floor Area	1,373,150 SF
Cars Required	@4% Office	1,383 Stalls
Cars Provided	*@1.05/1,000 SF*	1,440 Stalls
	Req. Accessible	29 Stalls
Drive-in Doors		4
Docks	*@1.63/10,000 SF*	224
Trailers		619 Stalls

Notes

1. From major or secondary streets, the setback is 50 FT. From local industrial streets, the setback is

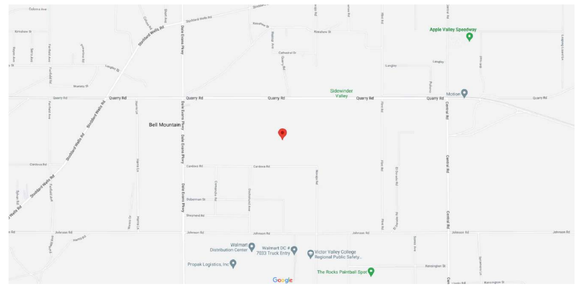
2. 1 space per 500 SF of GFA for the first 10,000 SF and beyond that, 1 space per 1,000 SF of GFA; for office area that exceeds 25%, provide 1 space per 200 SF in excess of 25%

3. 1 space per 500 SF of GFA or 1 space per 2 employees on the largest shift, whichever is greater; for office area that exceeds 25%, provide 1 space per 200 SF in excess of 25%

4. To be determined by city.

5. Minimum required number of parking spaces: 4

6. 3 spaces per 1000 SF of GFA or 1 space per 2 employees on the largest shift, whichever is greater; for office area that exceeds 25%, provide 1 space per 200 SF in excess of 25%



1" =120'

0 60 120 300 600

NORTH

This conceptual design is based upon a preliminary review of entitlement requirements and on unverified and possibly incomplete site and/or building information, and is intended merely to assist in exploring how the project might be developed.

Boundary Source:
PDF ALTA SURVEY

Stormwater Management Design:

SCHEME: 03

Conceptual Site Plan

Redwood West Cordova Apple Valley

Cardova Rd, Apple Valley, CA 92307

WARE MALCOMB

IRV23-0142-00
2023.08.02

PAGE
01

NOTE:
QUARRY ROAD IS A PRIVATE ROAD.
THERE IS NO LEGAL PAVED ACCESS TO THE SITE.

APN 0463-071-16
OWNER: ZADNICK ETAL

APN 0463-071-17
OWNER: WONG

APN 0463-071-19
OWNER: KHAN

APN 0463-071-20
OWNER: BAEK

APN 0463-071-22 OWNER: CEMEX

QUARRY RD.

EXISTING AC PAVING

PROPOSED 20' UTILITY EASEMENT

PROPOSED 16" WATER

CONNECT TO WATER ON NAVAJO RD.

POHONO ROAD

SCALE: 1" = 80'

PROPOSED 40' RIGHT-OF-WAY

PROPOSED CURB FACE

PROPOSED SEWER

PROPOSED 16" WATER

PROPOSED AC PAVING

EXIST. 8" WATER

PROPOSED CURB FACE

PROPOSED 40' RIGHT-OF-WAY

APN 0463-441-07
OWNER: BLAIR-LIV TR

APN 0463-441-15
OWNER: Q.I.D., INC

APN 0463-441-16
OWNER: CABLE REV TR

APN 0463-441-08
OWNER: GHANCHI

APN 0463-441-10
OWNER: OLMEDO

APN 0463-441-12
OWNER: RAKE, LIV TR

APN 0463-441-14
OWNER: RAMIREZ

APN 0463-213-29
OWNER: VVLIG US HOLDINGS

APN 0463-213-33
OWNER: VVLIG US HOLDINGS

APN 0463-213-34
OWNER: VVLIG US HOLDINGS

APN 0463-213-35
OWNER: VVLIG US HOLDINGS

APN 0463-213-36
OWNER: VVLIG US HOLDINGS

APN 0463-213-05
OWNER: VVLIG US HOLDINGS

APN 0463-213-37
OWNER: VVLIG US HOLDINGS

APN: 0463-213-01
DOC# 2021-0503765

APN: 0463-213-32
DOC# 2012-0538941, O.R.

B-1 (25')
B-2 (25')
B-3 (50")
B-4 (25')
B-5 (25')
B-6 (10')
B-7 (10')
B-8 (5')
B-9 (5')
B-10 (5')
B-11 (5')
B-12 (5')
B-13 (5')
B-14 (5')
B-15 (5')
B-16 (5')
B-17 (5')

FF 86.00
PE 85.25

RETENTION BASIN
BOT. ELEV.=70.00
VOL.=583,450 CF

PATH OF TRAVEL

STORM DRAIN LOW PT. (TYP.)

RIBBON GUTTER

LOW PT. CURB DRAINS

SPREADING BASIN

PRE-TREATMENT

RIP-RAP

JOSHUA

CONTINUE SEWER TO JOHNSON RD., THEN WEST ON JOHNSON TO CONNECTION POINT

CONNECT WATER TO 16" WATER ON JOHNSON RD.

LEGEND

- E ⊡ INDICATES ELECTRIC BOX
- FH • INDICATES FIRE HYDRANT
- T ⊡ INDICATES TELEPHONE BOX
- W ⊠ INDICATES WATER METER
- W • INDICATES WATER VALVE
- 3040 INDICATES EXISTING CONTOUR
- 3040 INDICATES PROPOSED CONTOUR
- INDICATES PROPOSED 4' FENCE
- INDICATES PROPOSED PATH OF TRAVEL, 4' MINIMUM WIDTH & LESS THAT 5% SLOPE ALONG PATH & LESS THAN 2% CROSS SLOPE
- INDICATES PROPOSED BUILDING
- INDICATES PROPOSED PROPERTY LINE
- INDICATES EXISTING PROPERTY LINE
- INDICATES BUILDING SETBACK LINE
- INDICATES EXISTING ASPHALT ROAD
- INDICATES PROPOSED ASPHALT ROAD
- INDICATES PROPOSED RIP-RAP

Test Boring, typical

NOTE:

THIS GRADING PLAN COVERS PORTIONS OF TWO SEPARATE LOTS AND WILL REQUIRE A REPLAT ON A SEPARATE PLAN.

THE TWO LOTS ARE:

APN 0463-231-01 (AREA) 3,649,179.23 S.F. (83.77 AC.)

APN 0463-213-32 (AREA) 405,718.42 S.F. (9.31 AC.)

THE NEW LOT TO BE DEVELOPED WILL HAVE AN AREA OF: 3,927,169.77 S.F (68.03 AC.)

NOT FOR CONSTRUCTION

OWNER :

BUTTERFLY EQUITY PARTNERS AND/OR
RW APPLEVALLEY II AND/OR LINKUP, LLC
220 NEWPORT CENTER DRIVE, STE 11-557
NEWPORT BEACH, CA 92660

DATE	DELTA	REVISION DESCRIPTION	APPROVAL DATE	APPROVAL BY

MERRELL JOHNSON

MERRELL JOHNSON ENGINEERING, INC.
22221 U.S. HIGHWAY 18, APPLE VALLEY, CA 92307
760 240 8000 | MERRELLJOHNSON.COM

CONCEPTUAL GRADING PLAN
WAREHOUSE
CARDOVA RD & DACHSHUND AVE.
68.2 ACRES

FOR:
REDWOOD WEST

DRAWN BY: EKJ
DATE: 9/18/23

JOB NO. 3813.006

SHEET 1 OF 1

ejohnson 11:10am 18 September 2023 C:\Users\ejohnson\Documents\MJE\3813.006 Redwood West\GRADING\ROUGH-GR-3813.006.dwg - 30X42 RG Merrell Johnson Companies

APPENDIX B

Exploratory Logs

Soil Classification Key

Unified Soil Classification System (USCS) and Particle Size Limits

Project Number:	3813.006.500
Project Title:	Industrial Building
Project Location:	Apple Valley, CA
Client:	Redwood West

Report Date:	12/01/23
Sheet:	1 of 1
Appendix:	B
Permit No:	
Client Project No:	
Other:	
DSA File No:	
DSA Application No:	
DSA LEA No:	

Unified Soil Classification System (USCS)

Coarse Grained Soils More Than 50% Is Larger Than No. 200 Sieve	Gravel and Gravelly Soils More Than 50% Retained on No. 4 Sieve	Clean Gravels Little Or No Fines	GW		Well-graded gravels, gravel-sand mixtures, little or no fines
			GP		Poorly-graded gravels, gravel-sand mixtures, little or no fines
		Gravels w/ Fines Appreciable Amount	GM		Silty gravels, gravel-sand-silt mixtures
			GC		Clayey gravels, gravel-sand-clay mixtures
	Sand and Sandy Soils More Than 50% Passing No. 4 Sieve	Clean Sand Little Or No Fines	SW		Well-graded sands, gravelly sands, little or no fines
			SP		Poorly-graded sands, gravelly sands, little or no fines
		Sands w/ Fines Appreciable Amount	SM		Silty-sands, sand-silt mixtures
			SC		Clayey sands, sand-clay mixtures
Fine Grained Soils More Than 50% Is Smaller Than No. 200 Sieve	Silts and Clays Liquid Limit Less Than 50		ML		Inorganic silts and very fine sands, rock flour, silty or clayey fine sands or clayey silts with slight plasticity
			CL		Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays
			OL		Organic silts and organic silty clays of low placticity
	Silts and Clays Liquid Limit Greater Than 50		MH		Inorganic silts, micaceous or diatomaceous fine sand or silty soils
			CH		Inorganic clays of high plasticity, fat clays
			OH		Organic clays of medium to high plasticity, organic silts
	Highly Organic Soils		PT		Peat, humus, swamp soils with high organic contents

Particle Size Limits

Divison	Silt or Clay	Sand			Gravel		Cobbles	Boulders
		Fine	Medium	Coarse	Fine	Coarse		
U.S. Sieve		No. 200	No. 40	No. 10	No. 4	3/4"	3"	12"
Grain (mm)		0.075	0.420	2.00	4.76	19.1	76.2	305

Soils possessing characteristics of two classifications are designated by group symbol combination. Soils may be classified initially using the visual manual procedure prior to laboratory test.

Merrell Johnson®

engineering | surveying | testing | inspection

Merrell Engineering Company, Inc. | 22221 US Highway 18, Apple Valley, Ca. 92308 t)760.256.2068 f)760.256.0418 w)www.merrelljohnson.com

Exploratory Log

ASTM D5434, D1452, D1586, D1587, D2488 (USCS), D3550

Project Number:	3813.006.500
Project Title:	Industrial Building
Project Location:	Apple Valley, CA
Client:	Redwood West

Report Date:	12/01/23
Sheet:	1 of 2
Appendix:	B
Permit No:	
Client Project No:	
USA Ticket No:	
DSA File No:	
DSA Application No:	
DSA LEA No:	

Location No:	B1	**Start Date/Time:**	10/25/23 0730	**End Date/Time:**	10/25/23 0825

Conducted By:	J. Albornoz	**Excavation Type:**	Auger Hole	**Elevation:**	2868
Operator:	A. Lara	**Dimensions:**	8" x 50'	**Groundwater:**	Not Encountered
Equipment Type:	CME-75-HSA	**Advance Assist:**	None	**Recent Weather:**	Clear
Drive Weight (lb)**:**	140	**Field Tests:**	D3550	**Sampler Insertion:**	Driven
Drive Drop (in)**:**	30	**Shoring Type:**	None	**Preservation:**	D4220

Depth (ft)	'N' Value	Sample (1)	Moisture (%)	Density (pcf)	Class (USCS)	Graphic	Description / Comments	Lab Tests (2)
0					SM		Light Brown, Dry, Dense, Silty Sand	
	20, 21, 26		4.1	95.4			Bulk Sample at 0' to 5' - JDA10252301	SA, MD, DS
							Tube Sample at 1' - JDA10252302	TD
	30, 32, 50		4.6	96.6			Tube Sample at 3'- JDA10252303	TD
5	32, 50 (3")		3.2	99.3	SPSM		Tube Sample at 5' - JDA10252304	TD
							Light Brown, Dry, Very Dense, Poorly Graded Sand with Silt	
10	50 (4")		2.8	104.8			Tube Sample at 10' - JDA10252305 (One Tube Recovered)	TD
15	50 (5")						SPT at 15'	
20	50 (4")						SPT at 20', No Recovery	
25	50 (3")						SPT at 25', No recovery Difficulty Drilling	

Comments: "N" Value Based on 2.5" diameter modified California Tube Sampler (ASTM D3550) or SPT (ASTM D1586) as noted on log. Some boulder/rock encountered during drilling operations. Partial caving of hole observed.

(1) =Bulk =Driven

(2) **DS** =Direct Shear **EI** =Expansion Index **SA** =Sieve Analysis **CR** =Corrosion **MD** =Max Density **RV** =R-Value **AL** =Atterberg Limits **SE** =Sand Equivalent **CN** =Consolidation **TD** =Tube Density

Merrell Johnson®

engineering | surveying | testing | inspection

Merrell Engineering Company, Inc. | 22221 US Highway 18, Apple Valley, Ca. 92308 t)760.256.2068 f)760.256.0418 w)www.merrelljohnson.com

Exploratory Log

ASTM D5434, D1452, D1586, D1587, D2488 (USCS), D3550

Project Number:	3813.006.500
Project Title:	Industrial Building
Project Location:	Apple Valley, CA
Client:	Redwood West

Report Date:	12/01/23
Sheet:	2 of 2
Appendix:	B
Permit No:	
Client Project No:	
USA Ticket No:	
DSA File No:	
DSA Application No:	
DSA LEA No:	

Location No:	B1 (Cont.)	**Start Date/Time:**	10/25/23 0730	**End Date/Time:**	10/25/23 0825

Conducted By:	J. Albornoz	**Excavation Type:**	Auger Hole	**Elevation:**	2868
Operator:	A. Lara	**Dimensions:**	8" x 50'	**Groundwater:**	Not Encountered
Equipment Type:	CME-75 HSA	**Advance Assist:**	None	**Recent Weather:**	Clear
Drive Weight (lb)**:**	140	**Field Tests:**	D3550	**Sampler Insertion:**	Driven
Drive Drop (in)**:**	30	**Shoring Type:**	None	**Preservation:**	D4220

Depth (ft)	'N' Value	Sample (1)	Moisture (%)	Density (pcf)	Class (USCS)	Graphic	Description / Comments	Lab Tests (2)
30	50 (2")				SPSM		SPT at 30' Boulder/Rock Encountered	
35								
40	50 (3")						SPT at 40'	
45							Very Difficult Drilling	
50	50 (2")						SPT at 50' *Drilling Terminated at Approximately 50'*	
55								

Comments: "N" Value Based on 2.5" diameter modified California Tube Sampler (ASTM D3550) or SPT (ASTM D1586) as noted on log. Some boulder/rock encountered during drilling operations. Partial caving of hole observed.

(1) =Bulk =Driven

(2) **DS** =Direct Shear **EI** =Expansion Index **SA** =Sieve Analysis **CR** =Corrosion **MD** =Max Density **RV** =R-Value **AL** =Atterberg Limits **SE** =Sand Equivalent **CN** =Consolidation **TD** =Tube Density

Merrell Johnson®

engineering | surveying | testing | inspection

Merrell Engineering Company, Inc. | 22221 US Highway 18, Apple Valley, Ca. 92308 t)760.256.2068 f)760.256.0418 w)www.merrelljohnson.com

Exploratory Log

ASTM D5434, D1452, D1586, D1587, D2488 (USCS), D3550

Project Number:	3813.006.500
Project Title:	Industrial Building
Project Location:	Apple Valley, CA
Client:	Redwood West

Report Date:	12/01/23
Sheet:	1 of 1
Appendix:	B
Permit No:	
Client Project No:	
USA Ticket No:	
DSA File No:	
DSA Application No:	
DSA LEA No:	

Location No:	B2	**Start Date/Time:**	10/25/23 0920	**End Date/Time:**	10/25/2023 0950

Conducted By:	J. Albornoz	**Excavation Type:**	Auger Hole	**Elevation:**	2869
Operator:	A. Lara	**Dimensions:**	8" x 25'	**Groundwater:**	Not Encountered
Equipment Type:	CME-75 HSA	**Advance Assist:**	None	**Recent Weather:**	Clear
Drive Weight (lb)**:**	140	**Field Tests:**	D3550	**Sampler Insertion:**	Driven
Drive Drop (in)**:**	30	**Shoring Type:**	None	**Preservation:**	D4220

Depth (ft)	'N' Value	Sample (1)	Moisture (%)	Density (pcf)	Class (USCS)	Graphic	Description / Comments	Lab Tests (2)
0					SM		Light Brown, Dry, Medium Dense, Silty Sand	
	10, 10		3.4	94.2			Bulk Sample at 0' to 5' - JDA10252306	SA
	11						Tube Sample at 1' - JDA10252307	TD
	10, 12,		2.5	107.2			Tube Sample at 3' - JDA10252308	TD
	18							
5	27,		3.9	96.7			Tube Sample at 5' - JDA10252309	TD
	50 (3")						Very Dense	
							Bulk Sample at 5' to 10' - JDA10252310	SA, CN, CR
					SPSM		Light Brown, Dry, Very Dense, Poorly Graded Sand with Silt	
10	50 (3")						Tube Sample at 10' - No Recovery	
15	50 (3")						SPT at 15'	
							Bedrock Encountered	
20	50 (3")						SPT at 20'	
25	50 (4")						SPT at 25'	
							Drilling Terminated at Approximately 25'	

Comments: "N" Value Based on 2.5" diameter modified California Tube Sampler (ASTM D3550) or SPT (ASTM D1586) as noted on log. Some boulder/rock encountered during drilling operations. Partial caving of hole observed.

(1) =Bulk, =Driven

(2) **DS** =Direct Shear, **EI** =Expansion Index, **SA** =Sieve Analysis, **CR** =Corrosion, **MD** =Max Density, **RV** =R-Value, **AL** =Atterberg Limits, **SE** =Sand Equivalent, **CN** =Consolidation, **TD** =Tube Density

Merrell Johnson®

engineering | surveying | testing | inspection

Merrell Engineering Company, Inc. | 22221 US Highway 18, Apple Valley, Ca. 92308 t)760.256.2068 f)760.256.0418 w)www.merrelljohnson.com

Exploratory Log

ASTM D5434, D1452, D1586, D1587, D2488 (USCS), D3550

Project Number:	3813.006.500
Project Title:	Industrial Building
Project Location:	Apple Valley, CA
Client:	Redwood West

Report Date:	12/01/23
Sheet:	1 of 1
Appendix:	B
Permit No:	
Client Project No:	
USA Ticket No:	
DSA File No:	
DSA Application No:	
DSA LEA No:	

Location No:	B3	**Start Date/Time:**	10/25/23 1010	**End Date/Time:**	10/25/23 1040

Conducted By:	J. Albornoz	**Excavation Type:**	Auger Hole	**Elevation:**	2863
Operator:	A. Lara	**Dimensions:**	8" x 25'	**Groundwater:**	Not Encountered
Equipment Type:	CME-75 HSA	**Advance Assist:**	None	**Recent Weather:**	Clear
Drive Weight (lb)**:**	140	**Field Tests:**	D3550	**Sampler Insertion:**	Driven
Drive Drop (in)**:**	30	**Shoring Type:**	None	**Preservation:**	D4220

Depth (ft)	'N' Value	Sample (1)	Moisture (%)	Density (pcf)	Class (USCS)	Graphic	Description / Comments	Lab Tests (2)
0							Light Brown, Dry, Very Dense, Silty Sand	
	35, 50 (5")		4.3	98.0			Bulk Sample at 0' to 5' - JDA10252311	MD, CR, EI
							Tube Sample at 1' - JDA10252312	TD
	33, 30, 34		7.7	84.3			Tube Sample at 3' - JDA10252313	TD
							Whitish brown	
5	19, 26, 39		6.5	85.2			Tube Sample at 5' - JDA10252314	TD
10	33, 50 (4")		2.9	97.5			Tube Sample at 10' - JDA10252315	TD
							Light Brown, Dry, Very Dense, Poorly Graded Sand with Silt	
15	50 (4")						SPT at 15'	
20	50 (4")						SPT at 20'	
25	50 (3")						SPT at 25' - No Recovery *Drilling Terminated at Approximately 25'*	

Comments: "N" Value Based on 2.5" diameter modified California Tube Sampler (ASTM D3550) or SPT (ASTM D1586) as noted on log. Some boulder/rock encountered during drilling operations. Partial caving of hole observed.

(1) =Bulk =Driven

(2) **DS** =Direct Shear **EI** =Expansion Index **SA** =Sieve Analysis **CR** =Corrosion **MD** =Max Density **RV** =R-Value **AL** =Atterberg Limits **SE** =Sand Equivalent **CN** =Consolidation **TD** =Tube Density

Merrell Johnson®

engineering | surveying | testing | inspection

Merrell Engineering Company, Inc. | 22221 US Highway 18, Apple Valley, Ca. 92308 t)760.256.2068 f)760.256.0418 w)www.merrelljohnson.com

Exploratory Log

ASTM D5434, D1452, D1586, D1587, D2488 (USCS), D3550

Project Number:	3813.006.500
Project Title:	Industrial Building
Project Location:	Apple Valley, CA
Client:	Redwood West

Report Date:	12/01/23
Sheet:	1 of 1
Appendix:	B
Permit No:	
Client Project No:	
USA Ticket No:	
DSA File No:	
DSA Application No:	
DSA LEA No:	

Location No:	B4	**Start Date/Time:**	10/25/23 1100	**End Date/Time:**	10/25/2023 1130

Conducted By:	J. Albornoz	**Excavation Type:**	Auger Hole	**Elevation:**	2861
Operator:	A. Lara	**Dimensions:**	8" x 25'	**Groundwater:**	Not Encountered
Equipment Type:	CME-75 HSA	**Advance Assist:**	None	**Recent Weather:**	Clear
Drive Weight (lb)**:**	140	**Field Tests:**	D3550	**Sampler Insertion:**	Driven
Drive Drop (in)**:**	30	**Shoring Type:**	None	**Preservation:**	D4220

Depth (ft)	'N' Value	Sample (1)	Moisture (%)	Density (pcf)	Class (USCS)	Graphic	Description / Comments	Lab Tests (2)
0	50 (6")		2.6	102.0			Light Brown, Dry, Poorly Graded Sand with Silt Bulk Sample at 0' to 5' - JDA10252315 Tube Sample at 1' - JDA10252316 (One Tube Recovered)	MD, DS TD
	50 (4")						Tube Sample at 3' - No Recovery	
5	50 (2")						Tube Sample at 5' - No Recovery Grayish Brown, Poorly Graded Sand Bedrock Encountered	
10	50 (3")						Tube Sample at 10' - No Recovery	
15	50 (4")						SPT at 15'	
20	50 (3")						SPT at 20'	
25	50 (4")						SPT at 25' - No Recovery *Drilling Terminated at Approximately 25'*	

Comments: "N" Value Based on 2.5" diameter modified California Tube Sampler (ASTM D3550) or SPT (ASTM D1586) as noted on log. Some boulder/rock encountered during drilling operations. Partial caving of hole observed.

(1) =Bulk =Driven

(2) **DS** =Direct Shear **EI** =Expansion Index **SA** =Sieve Analysis **CR** =Corrosion **MD** =Max Density **RV** =R-Value **AL** =Atterberg Limits **SE** =Sand Equivalent **CN** =Consolidation **TD** =Tube Density

Merrell Johnson®

engineering | surveying | testing | inspection

Merrell Engineering Company, Inc. | 22221 US Highway 18, Apple Valley, Ca. 92308 t)760.256.2068 f)760.256.0418 w)www.merrelljohnson.com

Exploratory Log

ASTM D5434, D1452, D1586, D1587, D2488 (USCS), D3550

Project Number:	3813.006.500
Project Title:	Industrial Building
Project Location:	Apple Valley, CA
Client:	Redwood West

Report Date:	12/01/23
Sheet:	1 of 1
Appendix:	B
Permit No:	
Client Project No:	
USA Ticket No:	
DSA File No:	
DSA Application No:	
DSA LEA No:	

Location No:	B5	**Start Date/Time:**	10/25/23 1155	**End Date/Time:**	10/25/23 1220

Conducted By:	J. Albornoz	**Excavation Type:**	Auger Hole	**Elevation:**	2863
Operator:	A. Lara	**Dimensions:**	8" x 25'	**Groundwater:**	Not Encountered
Equipment Type:	CME-75 HSA	**Advance Assist:**	None	**Recent Weather:**	Clear
Drive Weight (lb)**:**	140	**Field Tests:**	D3550	**Sampler Insertion:**	Driven
Drive Drop (in)**:**	30	**Shoring Type:**	None	**Preservation:**	D4220

Depth (ft)	'N' Value	Sample (1)	Moisture (%)	Density (pcf)	Class (USCS)	Graphic	Description / Comments	Lab Tests (2)
0							Light Brown, Dry, Silty Sand	
	50 (6")		3.7	104.6			Bulk Sample at 0' to 5' - JDA10252317	SA
							Tube Sample at 1' - JDA10252318	TD
5	50 (4")		2.8	101.6			Tube Sample at 5' - JDA102523219 (One Tube Recovered)	TD
							Light Brown, Dry, Poorly Graded Sand with Silt	
							Bedrock Encountered	
10	50 (6")		4.2	96.8			Tube Sample at 10' - JDA10252320 (One Tube Recovered)	TD
15	50 (3")						SPT at 15'	
							Difficulty Drilling	
20	50 (3")						SPT at 20' - No Recovery	
25	50 (3")						SPT at 25'	
							Drilling Terminated at Approximately 25'	

Comments: "N" Value Based on 2.5" diameter modified California Tube Sampler (ASTM D3550) or SPT (ASTM D1586) as noted on log. Some boulder/rock encountered during drilling operations. Partial caving of hole observed.

(1) =Bulk, =Driven

(2) **DS** =Direct Shear, **EI** =Expansion Index, **SA** =Sieve Analysis, **CR** =Corrosion, **MD** =Max Density, **RV** =R-Value, **AL** =Atterberg Limits, **SE** =Sand Equivalent, **CN** =Consolidation, **TD** =Tube Density

Merrell Johnson®

engineering | surveying | testing | inspection

Merrell Engineering Company, Inc. | 22221 US Highway 18, Apple Valley, Ca. 92308 t)760.256.2068 f)760.256.0418 w)www.merrelljohnson.com

Exploratory Log

ASTM D5434, D1452, D1586, D1587, D2488 (USCS), D3550

Report Date:	12/01/23
Sheet:	1 of 1
Appendix:	B
Permit No:	
Client Project No:	
USA Ticket No:	
DSA File No:	
DSA Application No:	
DSA LEA No:	

Project Number:	3813.006.500
Project Title:	Industrial Building
Project Location:	Apple Valley, CA
Client:	Redwood West

Location No:	B6 (Perc.)	**Start Date/Time:**	10/25/23 1240	**End Date/Time:**	10/25/23 1300

Conducted By:	J. Albornoz	**Excavation Type:**	Auger Hole	**Elevation:**	2862
Operator:	A. Lara	**Dimensions:**	8" x 10'	**Groundwater:**	Not Encountered
Equipment Type:	CME-75 HSA	**Advance Assist:**	None	**Recent Weather:**	Clear
Drive Weight (lb)**:**	140	**Field Tests:**	D3550	**Sampler Insertion:**	Driven
Drive Drop (in)**:**	30	**Shoring Type:**	None	**Preservation:**	D4220

Depth (ft)	'N' Value	Sample (1)	Moisture (%)	Density (pcf)	Class (USCS)	Graphic	Description / Comments	Lab Tests (2)
0							Light Brown, Dry, Poorly Graded Sand with Silt	
5							Bulk Sample at 5' to 10' - JDA10252321	SA
10							*Drilling Terminated at Approximately 10'*	
15								
20								
25								

Comments: "N" Value Based on 2.5" diameter modified California Tube Sampler (ASTM D3550) or SPT (ASTM D1586) as noted on log. Some boulder/rock encountered during drilling operations. Partial caving of hole observed.

(1) =Bulk =Driven

(2) **DS** =Direct Shear **EI** =Expansion Index **SA** =Sieve Analysis **CR** =Corrosion **MD** =Max Density **RV** =R-Value **AL** =Atterberg Limits **SE** =Sand Equivalent **CN** =Consolidation **TD** =Tube Density

Merrell Johnson®

engineering | surveying | testing | inspection

Merrell Engineering Company, Inc. | 22221 US Highway 18, Apple Valley, Ca. 92308 t)760.256.2068 f)760.256.0418 w)www.merrelljohnson.com

Exploratory Log

ASTM D5434, D1452, D1586, D1587, D2488 (USCS), D3550

Report Date:	12/01/23
Sheet:	1 of 1
Appendix:	B
Permit No:	
Client Project No:	
USA Ticket No:	
DSA File No:	
DSA Application No:	
DSA LEA No:	

Project Number:	3813.006.500
Project Title:	Industrial Building
Project Location:	Apple Valley, CA
Client:	Redwood West

Location No:	B7 (Perc.)	**Start Date/Time:**	10/25/23 1315	**End Date/Time:**	10/25/23 1330

Conducted By:	J. Albornoz	**Excavation Type:**	Auger Hole	**Elevation:**	2863
Operator:	A. Lara	**Dimensions:**	8" x 10'	**Groundwater:**	Not Encountered
Equipment Type:	CME-75 HSA	**Advance Assist:**	None	**Recent Weather:**	Clear
Drive Weight (lb)**:**	140	**Field Tests:**	D3550	**Sampler Insertion:**	Driven
Drive Drop (in)**:**	30	**Shoring Type:**	None	**Preservation:**	D4220

Depth (ft)	'N' Value	Sample (1)	Moisture (%)	Density (pcf)	Class (USCS)	Graphic	Description / Comments	Lab Tests (2)
0							Light Brown, Dry, Poorly Graded Sand with Silt Rock Encountered	
5							Bulk Sample 5' to 10' - JDA10252322	SA
10							*Drilling Terminated at Approximately 10'*	
15								
20								
25								

Comments: "N" Value Based on 2.5" diameter modified California Tube Sampler (ASTM D3550) or SPT (ASTM D1586) as noted on log. Some boulder/rock encountered during drilling operations. Partial caving of hole observed.

(1) =Bulk, =Driven

(2) **DS** =Direct Shear, **EI** =Expansion Index, **SA** =Sieve Analysis, **CR** =Corrosion, **MD** =Max Density, **RV** =R-Value, **AL** =Atterberg Limits, **SE** =Sand Equivalent, **CN** =Consolidation, **TD** =Tube Density

Merrell Johnson®

engineering | surveying | testing | inspection

Merrell Engineering Company, Inc. | 22221 US Highway 18, Apple Valley, Ca. 92308 t)760.256.2068 f)760.256.0418 w)www.merrelljohnson.com

Exploratory Log

ASTM D5434, D1452, D1586, D1587, D2488 (USCS), D3550

Report Date:	12/01/23
Sheet:	1 of 1
Appendix:	B
Permit No:	
Client Project No:	
USA Ticket No:	
DSA File No:	
DSA Application No:	
DSA LEA No:	

Project Number:	3813.006.500
Project Title:	Industrial Building
Project Location:	Apple Valley, CA
Client:	Redwood West

Location No:	B8	**Start Date/Time:**	10/25/23 1335	**End Date/Time:**	10/25/23 1345

Conducted By:	J. Albornoz	**Excavation Type:**	Auger Hole	**Elevation:**	2862
Operator:	A. Lara	**Dimensions:**	8" x 5'	**Groundwater:**	Not Encountered
Equipment Type:	CME-75 HSA	**Advance Assist:**	None	**Recent Weather:**	Clear
Drive Weight (lb)**:**	140	**Field Tests:**	D3550	**Sampler Insertion:**	Driven
Drive Drop (in)**:**	30	**Shoring Type:**	None	**Preservation:**	D4220

Depth (ft)	'N' Value	Sample (1)	Moisture (%)	Density (pcf)	Class (USCS)	Graphic	Description / Comments	Lab Tests (2)
0							Light Brown, Dry, Poorly Graded Sand with Silt Bulk Sample at 0' to 5' - JDA10252323	SA, SE
5							*Drilling Terminated at Approximately 5'*	
10								
15								
20								
25								

Comments: "N" Value Based on 2.5" diameter modified California Tube Sampler (ASTM D3550) or SPT (ASTM D1586) as noted on log. Some boulder/rock encountered during drilling operations. Partial caving of hole observed.

(1) =Bulk =Driven

(2) **DS** =Direct Shear **EI** =Expansion Index **SA** =Sieve Analysis **CR** =Corrosion **MD** =Max Density **RV** =R-Value **AL** =Atterberg Limits **SE** =Sand Equivalent **CN** =Consolidation **TD** =Tube Density

Merrell Johnson®

engineering | surveying | testing | inspection

Merrell Engineering Company, Inc. | 22221 US Highway 18, Apple Valley, Ca. 92308 t)760.256.2068 f)760.256.0418 w)www.merrelljohnson.com

Exploratory Log

ASTM D5434, D1452, D1586, D1587, D2488 (USCS), D3550

Report Date:	12/01/23
Sheet:	1 of 1
Appendix:	B
Permit No:	
Client Project No:	
USA Ticket No:	
DSA File No:	
DSA Application No:	
DSA LEA No:	

Project Number:	3813.006.500
Project Title:	Industrial Building
Project Location:	Apple Valley, CA
Client:	Redwood West

Location No:	B9	**Start Date/Time:**	10/25/23 1350	**End Date/Time:**	10/25/23 1355

Conducted By:	J. Albornoz	**Excavation Type:**	Auger Hole	**Elevation:**	2865
Operator:	A. Lara	**Dimensions:**	8" x 5'	**Groundwater:**	Not Encountered
Equipment Type:	CME-75 HSA	**Advance Assist:**	None	**Recent Weather:**	Clear
Drive Weight (lb)**:**	140	**Field Tests:**	D3550	**Sampler Insertion:**	Driven
Drive Drop (in)**:**	30	**Shoring Type:**	None	**Preservation:**	D4220

Depth (ft)	'N' Value	Sample (1)	Moisture (%)	Density (pcf)	Class (USCS)	Graphic	Description / Comments	Lab Tests (2)
0							Light Brown, Dry, Silty Sand Bulk Sample at 0' to 5' - JDA10252324	SA, SE
5							*Drilling Terminated at Approximately 5'*	
10								
15								
20								
25								

Comments: "N" Value Based on 2.5" diameter modified California Tube Sampler (ASTM D3550) or SPT (ASTM D1586) as noted on log. Some boulder/rock encountered during drilling operations. Partial caving of hole observed.

(1) =Bulk =Driven

(2) **DS** =Direct Shear **EI** =Expansion Index **SA** =Sieve Analysis **CR** =Corrosion **MD** =Max Density **RV** =R-Value **AL** =Atterberg Limits **SE** =Sand Equivalent **CN** =Consolidation **TD** =Tube Density

Merrell Johnson®

engineering | surveying | testing | inspection

Merrell Engineering Company, Inc. | 22221 US Highway 18, Apple Valley, Ca. 92308 t)760.256.2068 f)760.256.0418 w)www.merrelljohnson.com

Exploratory Log

ASTM D5434, D1452, D1586, D1587, D2488 (USCS), D3550

Report Date:	12/01/23
Sheet:	1 of 1
Appendix:	B
Permit No:	
Client Project No:	
USA Ticket No:	
DSA File No:	
DSA Application No:	
DSA LEA No:	

Project Number:	3813.006.500
Project Title:	Industrial Building
Project Location:	Apple Valley, CA
Client:	Redwood West

Location No:	B10	**Start Date/Time:**	10/25/23 1400	**End Date/Time:**	10/25/23 1405

Conducted By:	J. Albornoz	**Excavation Type:**	Auger Hole	**Elevation:**	2864
Operator:	A. Lara	**Dimensions:**	8" x 5'	**Groundwater:**	Not Encountered
Equipment Type:	CME-75 HSA	**Advance Assist:**	None	**Recent Weather:**	Clear
Drive Weight (lb)**:**	140	**Field Tests:**	D3550	**Sampler Insertion:**	Driven
Drive Drop (in)**:**	30	**Shoring Type:**	None	**Preservation:**	D4220

Depth (ft)	'N' Value	Sample (1)	Moisture (%)	Density (pcf)	Class (USCS)	Graphic	Description / Comments	Lab Tests (2)
0							Whitish Brown, Dry, Silty Sand with Gravel Bulk Sample at 0' to 5' - JDA10252325	SA, SE, RV
5							*Drilling Terminated at Approximately 5'*	
10								
15								
20								
25								

Comments: "N" Value Based on 2.5" diameter modified California Tube Sampler (ASTM D3550) or SPT (ASTM D1586) as noted on log. Some boulder/rock encountered during drilling operations. Partial caving of hole observed.

(1) =Bulk, =Driven

(2) **DS** =Direct Shear, **EI** =Expansion Index, **SA** =Sieve Analysis, **CR** =Corrosion, **MD** =Max Density, **RV** =R-Value, **AL** =Atterberg Limits, **SE** =Sand Equivalent, **CN** =Consolidation, **TD** =Tube Density

Merrell Johnson®

engineering | surveying | testing | inspection

Merrell Engineering Company, Inc. | 22221 US Highway 18, Apple Valley, Ca. 92308 t)760.256.2068 f)760.256.0418 w)www.merrelljohnson.com

Exploratory Log

ASTM D5434, D1452, D1586, D1587, D2488 (USCS), D3550

Report Date:	12/01/23
Sheet:	1 of 1
Appendix:	B
Permit No:	
Client Project No:	
USA Ticket No:	
DSA File No:	
DSA Application No:	
DSA LEA No:	

Project Number:	3813.006.500
Project Title:	Industrial Building
Project Location:	Apple Valley, CA
Client:	Redwood West

Location No:	B11	**Start Date/Time:**	10/25/23 1407	**End Date/Time:**	10/25/23 1410

Conducted By:	J. Albornoz	**Excavation Type:**	Auger Hole	**Elevation:**	2867
Operator:	A. Lara	**Dimensions:**	8" x 5'	**Groundwater:**	Not Encountered
Equipment Type:	CME-75 HSA	**Advance Assist:**	None	**Recent Weather:**	Clear
Drive Weight (lb)**:**	140	**Field Tests:**	D3550	**Sampler Insertion:**	Driven
Drive Drop (in)**:**	30	**Shoring Type:**	None	**Preservation:**	D4220

Depth (ft)	'N' Value	Sample (1)	Moisture (%)	Density (pcf)	Class (USCS)	Graphic	Description / Comments	Lab Tests (2)
0							Whitish Brown, Dry, Silty Sand with Gravel Bulk Sample 0' to 5' - JDA10252326	SA, SE
5							*Drilling Terminated at Approximately 5'*	
10								
15								
20								
25								

Comments: "N" Value Based on 2.5" diameter modified California Tube Sampler (ASTM D3550) or SPT (ASTM D1586) as noted on log. Some boulder/rock encountered during drilling operations. Partial caving of hole observed.

(1) =Bulk =Driven

(2) **DS** =Direct Shear **EI** =Expansion Index **SA** =Sieve Analysis **CR** =Corrosion **MD** =Max Density **RV** =R-Value **AL** =Atterberg Limits **SE** =Sand Equivalent **CN** =Consolidation **TD** =Tube Density

Merrell Johnson®

engineering | surveying | testing | inspection

Merrell Engineering Company, Inc. | 22221 US Highway 18, Apple Valley, Ca. 92308 t)760.256.2068 f)760.256.0418 w)www.merrelljohnson.com

Exploratory Log

ASTM D5434, D1452, D1586, D1587, D2488 (USCS), D3550

Project Number:	3813.006.500
Project Title:	Industrial Building
Project Location:	Apple Valley, CA
Client:	Redwood West

Report Date:	12/01/23
Sheet:	1 of 1
Appendix:	B
Permit No:	
Client Project No:	
USA Ticket No:	
DSA File No:	
DSA Application No:	
DSA LEA No:	

Location No:	B12	**Start Date/Time:**	10/25/23 1416	**End Date/Time:**	10/25/23 1420

Conducted By:	J. Albornoz	**Excavation Type:**	Auger Hole	**Elevation:**	2864
Operator:	A. Lara	**Dimensions:**	8" x 5'	**Groundwater:**	Not Encountered
Equipment Type:	CME-75 HSA	**Advance Assist:**	None	**Recent Weather:**	Clear
Drive Weight (lb)**:**	140	**Field Tests:**	D3550	**Sampler Insertion:**	Driven
Drive Drop (in)**:**	30	**Shoring Type:**	None	**Preservation:**	D4220

Depth (ft)	'N' Value	Sample (1)	Moisture (%)	Density (pcf)	Class (USCS)	Graphic	Description / Comments	Lab Tests (2)
0							Light Brown, Dry, Silty Sand Bulk Sample at 0' to 5' - JDA10252327	SA, SE
5							*Drilling Terminated at Approximately 5'*	
10								
15								
20								
25								

Comments: "N" Value Based on 2.5" diameter modified California Tube Sampler (ASTM D3550) or SPT (ASTM D1586) as noted on log. Some boulder/rock encountered during drilling operations. Partial caving of hole observed.

(1) =Bulk =Driven

(2) **DS** =Direct Shear **EI** =Expansion Index **SA** =Sieve Analysis **CR** =Corrosion **MD** =Max Density **RV** =R-Value **AL** =Atterberg Limits **SE** =Sand Equivalent **CN** =Consolidation **TD** =Tube Density

Merrell Johnson®

engineering | surveying | testing | inspection

Merrell Engineering Company, Inc. | 22221 US Highway 18, Apple Valley, Ca. 92308 t)760.256.2068 f)760.256.0418 w)www.merrelljohnson.com

Exploratory Log

ASTM D5434, D1452, D1586, D1587, D2488 (USCS), D3550

Project Number:	3813.006.500
Project Title:	Industrial Building
Project Location:	Apple Valley, CA
Client:	Redwood West

Report Date:	12/01/23
Sheet:	1 of 1
Appendix:	B
Permit No:	
Client Project No:	
USA Ticket No:	
DSA File No:	
DSA Application No:	
DSA LEA No:	

Location No:	B13	**Start Date/Time:**	10/25/23 1425	**End Date/Time:**	10/25/23 1430

Conducted By:	J. Albornoz	**Excavation Type:**	Auger Hole	**Elevation:**	2862
Operator:	A. Lara	**Dimensions:**	8" x 5'	**Groundwater:**	Not Encountered
Equipment Type:	CME-75	**Advance Assist:**	None	**Recent Weather:**	Clear
Drive Weight (lb)**:**	140	**Field Tests:**	D3550	**Sampler Insertion:**	Driven
Drive Drop (in)**:**	30	**Shoring Type:**	None	**Preservation:**	D4220

Depth (ft)	'N' Value	Sample (1)	Moisture (%)	Density (pcf)	Class (USCS)	Graphic	Description / Comments	Lab Tests (2)
0							Light Brown, Dry, Silty Sand Bulk Sample at 0' to 5' - JDA10252328	SA, SE
5							*Drilling Terminated at Approximately 5'*	
10								
15								
20								
25								

Comments: "N" Value Based on 2.5" diameter modified California Tube Sampler (ASTM D3550) or SPT (ASTM D1586) as noted on log. Some boulder/rock encountered during drilling operations. Partial caving of hole observed.

(1) =Bulk =Driven

(2) **DS** =Direct Shear **EI** =Expansion Index **SA** =Sieve Analysis **CR** =Corrosion **MD** =Max Density **RV** =R-Value **AL** =Atterberg Limits **SE** =Sand Equivalent **CN** =Consolidation **TD** =Tube Density

Merrell Johnson®

engineering | surveying | testing | inspection

Merrell Engineering Company, Inc. | 22221 US Highway 18, Apple Valley, Ca. 92308 t)760.256.2068 f)760.256.0418 w)www.merrelljohnson.com

Exploratory Log

ASTM D5434, D1452, D1586, D1587, D2488 (USCS), D3550

Project Number:	3813.006.500
Project Title:	Industrial Building
Project Location:	Apple Valley, CA
Client:	Redwood West

Report Date:	12/01/23
Sheet:	1 of 1
Appendix:	B
Permit No:	
Client Project No:	
USA Ticket No:	
DSA File No:	
DSA Application No:	
DSA LEA No:	

Location No: B14 Dachshund Avenue **Start Date/Time:** 10/25/23 1425 **End Date/Time:** 10/25/23 1430

Conducted By:	J. Albornoz	**Excavation Type:**	Auger Hole	**Elevation:**	2862
Operator:	A. Lara	**Dimensions:**	8" x 5'	**Groundwater:**	Not Encountered
Equipment Type:	CME-75	**Advance Assist:**	None	**Recent Weather:**	Clear
Drive Weight (lb)**:**	140	**Field Tests:**	D3550	**Sampler Insertion:**	Driven
Drive Drop (in)**:**	30	**Shoring Type:**	None	**Preservation:**	D4220

Depth (ft)	'N' Value	Sample (1)	Moisture (%)	Density (pcf)	Class (USCS)	Graphic	Description / Comments	Lab Tests (2)
0							Light Brown, Dry, Silty Sand Bulk Sample at 0' to 5' - JDA10252328	SA, SE
5							*Drilling Terminated at Approximately 5'*	
10								
15								
20								
25								

Comments: "N" Value Based on 2.5" diameter modified California Tube Sampler (ASTM D3550) or SPT (ASTM D1586) as noted on log. Some boulder/rock encountered during drilling operations. Partial caving of hole observed.

(1) =Bulk =Driven

(2) **DS** =Direct Shear **EI** =Expansion Index **SA** =Sieve Analysis **CR** =Corrosion **MD** =Max Density **RV** =R-Value **AL** =Atterberg Limits **SE** =Sand Equivalent **CN** =Consolidation **TD** =Tube Density

Merrell Johnson®

engineering | surveying | testing | inspection

Merrell Engineering Company, Inc. | 22221 US Highway 18, Apple Valley, Ca. 92308 t)760.256.2068 f)760.256.0418 w)www.merrelljohnson.com

Exploratory Log

ASTM D5434, D1452, D1586, D1587, D2488 (USCS), D3550

Project Number:	3813.006.500
Project Title:	Industrial Building
Project Location:	Apple Valley, CA
Client:	Redwood West

Report Date:	12/01/23
Sheet:	1 of 1
Appendix:	B
Permit No:	
Client Project No:	
USA Ticket No:	
DSA File No:	
DSA Application No:	
DSA LEA No:	

Location No:	B15, Cardova Road	**Start Date/Time:**	10/25/23 1425	**End Date/Time:**	10/25/23 1430

Conducted By:	J. Albornoz	**Excavation Type:**	Auger Hole	**Elevation:**	2862
Operator:	A. Lara	**Dimensions:**	8" x 5'	**Groundwater:**	Not Encountered
Equipment Type:	CME-75	**Advance Assist:**	None	**Recent Weather:**	Clear
Drive Weight (lb)**:**	140	**Field Tests:**	D3550	**Sampler Insertion:**	Driven
Drive Drop (in)**:**	30	**Shoring Type:**	None	**Preservation:**	D4220

Depth (ft)	'N' Value	Sample (1)	Moisture (%)	Density (pcf)	Class (USCS)	Graphic	Description / Comments	Lab Tests (2)
0							Light Brown, Dry, Silty Sand Bulk Sample at 0' to 5' - JDA10252328	SA, SE
5							*Drilling Terminated at Approximately 5'*	
10								
15								
20								
25								

Comments: "N" Value Based on 2.5" diameter modified California Tube Sampler (ASTM D3550) or SPT (ASTM D1586) as noted on log. Some boulder/rock encountered during drilling operations. Partial caving of hole observed.

(1) =Bulk =Driven

(2) **DS** =Direct Shear **EI** =Expansion Index **SA** =Sieve Analysis **CR** =Corrosion **MD** =Max Density **RV** =R-Value **AL** =Atterberg Limits **SE** =Sand Equivalent **CN** =Consolidation **TD** =Tube Density

Merrell Johnson®

engineering | surveying | testing | inspection

Merrell Engineering Company, Inc. | 22221 US Highway 18, Apple Valley, Ca. 92308 t)760.256.2068 f)760.256.0418 w)www.merrelljohnson.com

Exploratory Log

ASTM D5434, D1452, D1586, D1587, D2488 (USCS), D3550

Project Number:	3813.006.500
Project Title:	Industrial Building
Project Location:	Apple Valley, CA
Client:	Redwood West

Report Date:	12/01/23
Sheet:	1 of 1
Appendix:	B
Permit No:	
Client Project No:	
USA Ticket No:	
DSA File No:	
DSA Application No:	
DSA LEA No:	

Location No:	B16, Cardova Road	**Start Date/Time:**	10/25/23 1425	**End Date/Time:**	10/25/23 1430

Conducted By:	J. Albornoz	**Excavation Type:**	Auger Hole	**Elevation:**	2862
Operator:	A. Lara	**Dimensions:**	8" x 5'	**Groundwater:**	Not Encountered
Equipment Type:	CME-75	**Advance Assist:**	None	**Recent Weather:**	Clear
Drive Weight (lb)**:**	140	**Field Tests:**	D3550	**Sampler Insertion:**	Driven
Drive Drop (in)**:**	30	**Shoring Type:**	None	**Preservation:**	D4220

Depth (ft)	'N' Value	Sample (1)	Moisture (%)	Density (pcf)	Class (USCS)	Graphic	Description / Comments	Lab Tests (2)
0							Light Brown, Dry, Silty Sand Bulk Sample at 0' to 5' - JDA10252328	SA, SE
5							*Drilling Terminated at Approximately 5'*	
10								
15								
20								
25								

Comments: "N" Value Based on 2.5" diameter modified California Tube Sampler (ASTM D3550) or SPT (ASTM D1586) as noted on log. Some boulder/rock encountered during drilling operations. Partial caving of hole observed.

(1) =Bulk =Driven

(2) **DS** =Direct Shear **EI** =Expansion Index **SA** =Sieve Analysis **CR** =Corrosion **MD** =Max Density **RV** =R-Value **AL** =Atterberg Limits **SE** =Sand Equivalent **CN** =Consolidation **TD** =Tube Density

Merrell Johnson®

engineering | surveying | testing | inspection

Merrell Engineering Company, Inc. | 22221 US Highway 18, Apple Valley, Ca. 92308 t)760.256.2068 f)760.256.0418 w)www.merrelljohnson.com

Exploratory Log

ASTM D5434, D1452, D1586, D1587, D2488 (USCS), D3550

Project Number:	3813.006.500
Project Title:	Industrial Building
Project Location:	Apple Valley, CA
Client:	Redwood West

Report Date:	12/01/23
Sheet:	1 of 1
Appendix:	B
Permit No:	
Client Project No:	
USA Ticket No:	
DSA File No:	
DSA Application No:	
DSA LEA No:	

Location No: B17, Dachshund Avenue **Start Date/Time:** 10/25/23 1425 **End Date/Time:** 10/25/23 1430

Conducted By:	J. Albornoz	**Excavation Type:**	Auger Hole	**Elevation:**	2862
Operator:	A. Lara	**Dimensions:**	8" x 5'	**Groundwater:**	Not Encountered
Equipment Type:	CME-75	**Advance Assist:**	None	**Recent Weather:**	Clear
Drive Weight (lb)**:**	140	**Field Tests:**	D3550	**Sampler Insertion:**	Driven
Drive Drop (in)**:**	30	**Shoring Type:**	None	**Preservation:**	D4220

Depth (ft)	'N' Value	Sample (1)	Moisture (%)	Density (pcf)	Class (USCS)	Graphic	Description / Comments	Lab Tests (2)
0							Light Brown, Dry, Silty Sand Bulk Sample at 0' to 5' - JDA10252328	SA, SE
5							*Drilling Terminated at Approximately 5'*	
10								
15								
20								
25								

Comments: "N" Value Based on 2.5" diameter modified California Tube Sampler (ASTM D3550) or SPT (ASTM D1586) as noted on log. Some boulder/rock encountered during drilling operations. Partial caving of hole observed.

(1) =Bulk =Driven

(2) **DS** =Direct Shear **EI** =Expansion Index **SA** =Sieve Analysis **CR** =Corrosion **MD** =Max Density **RV** =R-Value **AL** =Atterberg Limits **SE** =Sand Equivalent **CN** =Consolidation **TD** =Tube Density

Merrell Johnson®

engineering | surveying | testing | inspection

Merrell Engineering Company, Inc. | 22221 US Highway 18, Apple Valley, Ca. 92308 t)760.256.2068 f)760.256.0418 w)www.merrelljohnson.com

APPENDIX C

Laboratory Testing

Particle-Size Analysis of Soil

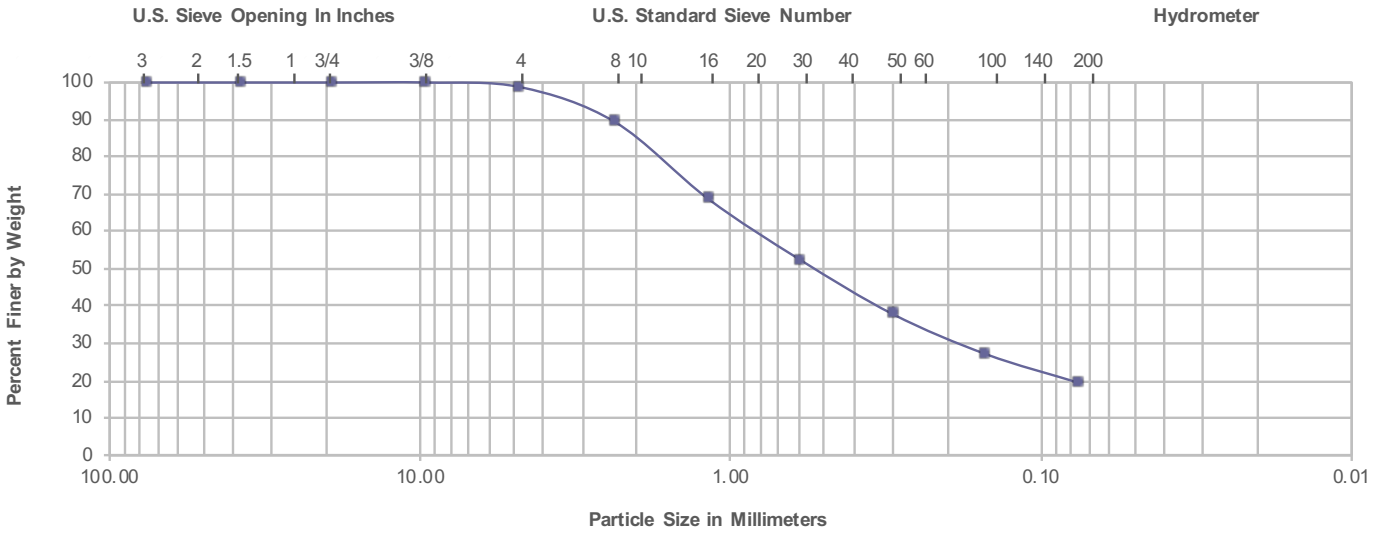
D422, D1140, D2487

Report Date:	12/01/23
Sheet:	1 of 1
Appendix:	C
Permit No:	
Client Project No:	
Other:	
DSA File No:	
DSA Application No:	
DSA LEA No:	

Project Number:	3813.006.500
Project Title:	Industrial Building
Project Location:	Apple Valley, CA
Client:	Redwood West

Sample ID: JDA10252301 **Gravel** (%): 1.2% **Sand** (%): 79.4% **Fines** (%): 19.3%

Classification, ASTM D2487:	(SM) Silty sand
Sample Origin:	Boring One at 0' to 5'
Laboratory Remarks:	



C_u	C_c	Moisture	D_{100}	D_{60}	D_{30}	D_{10}	LL	PL	PI	SG	FM	SE
NA	NA	4.2%	5.692	0.832	0.191	0.000	ND	ND	ND	ND	ND	ND

Method / Procudure Used:	D422, D1140
Size of Initial Dry Mass (g):	497.0
Determination of Dry Mass:	D2216
Particles; Shape, Hardness:	ND
Dispersion Device/Period:	Manual/2 hr
Type & Amount of Agent:	Defloc. & 1.0
Laboratory Comments:	

The Material ☐ Was ☐ Was Not Sampled & tested in accordance with the reqs. of the DSA approved documents.
The Material Tested ☐ Met ☐ Did Not Meet The requirements of the DSA approved documents.
cc: Project Architect, Structural Engineer, Project Inspector, DSA Regional Office, School District

Merrell Johnson engineering | surveying | testing | inspection

Merrell Engineering Company, Inc. | 22221 US Highway 18, Apple Valley, Ca. 92308 t)760.256.2068 f)760.256.0418 w)www.merrelljohnson.com

Particle-Size Analysis of Soil

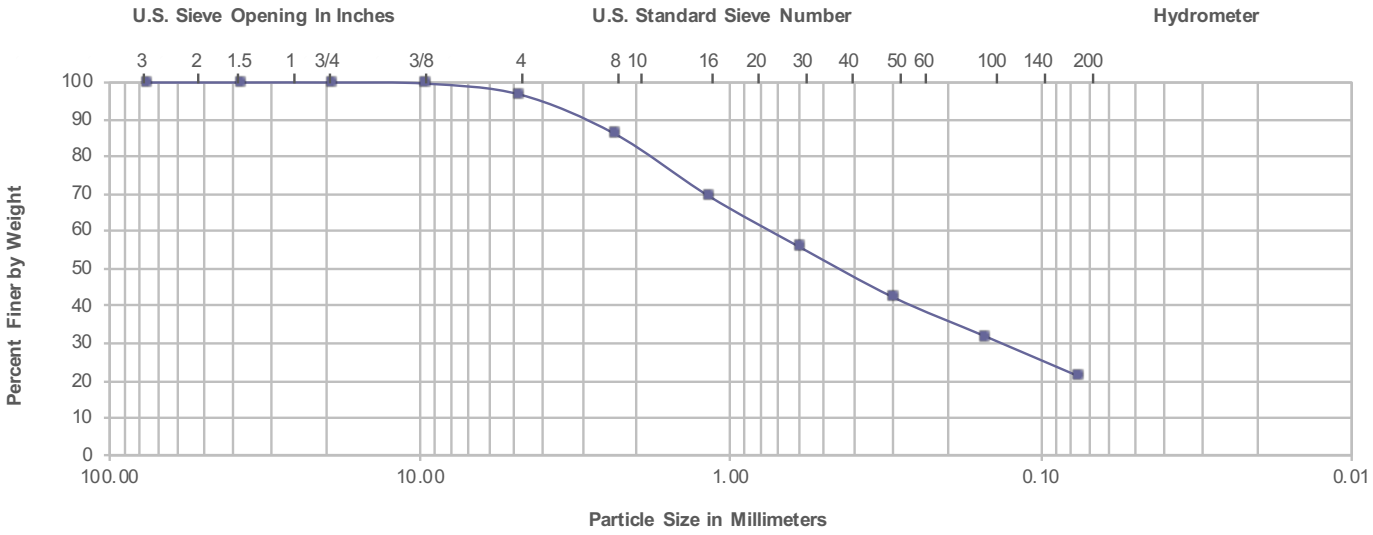
D422, D1140, D2487

Report Date:	12/01/23
Sheet:	1 of 1
Appendix:	C
Permit No:	
Client Project No:	
Other:	
DSA File No:	
DSA Application No:	
DSA LEA No:	

Project Number:	3813.006.500
Project Title:	Industrial Building
Project Location:	Apple Valley, CA
Client:	Redwood West

Sample ID: JDA10252306 **Gravel (%):** 3.3% **Sand (%):** 75.7% **Fines (%):** 21.0%

Classification, ASTM D2487:	(SM) Silty sand
Sample Origin:	Boring Two at 0' to 5'
Laboratory Remarks:	



C_u	C_c	Moisture	D_{100}	D_{60}	D_{30}	D_{10}	LL	PL	PI	SG	FM	SE
NA	NA	3.8%	8.398	0.733	0.138	0.000	ND	ND	ND	ND	ND	ND

Method / Procudure Used:	D422, D1140
Size of Initial Dry Mass (g):	512.5
Determination of Dry Mass:	D2216
Particles; Shape, Hardness:	ND
Dispersion Device/Period:	Manual/2 hr
Type & Amount of Agent:	Defloc. & 1.0
Laboratory Comments:	

The Material ☐ Was ☐ Was Not Sampled & tested in accordance with the reqs. of the DSA approved documents.
The Material Tested ☐ Met ☐ Did Not Meet The requirements of the DSA approved documents.
cc: Project Architect, Structural Engineer, Project Inspector, DSA Regional Office, School District

Merrell Johnson. engineering | surveying | testing | inspection

Merrell Engineering Company, Inc. | 22221 US Highway 18, Apple Valley, Ca. 92308 t)760.256.2068 f)760.256.0418 w)www.merrelljohnson.com

Particle-Size Analysis of Soil

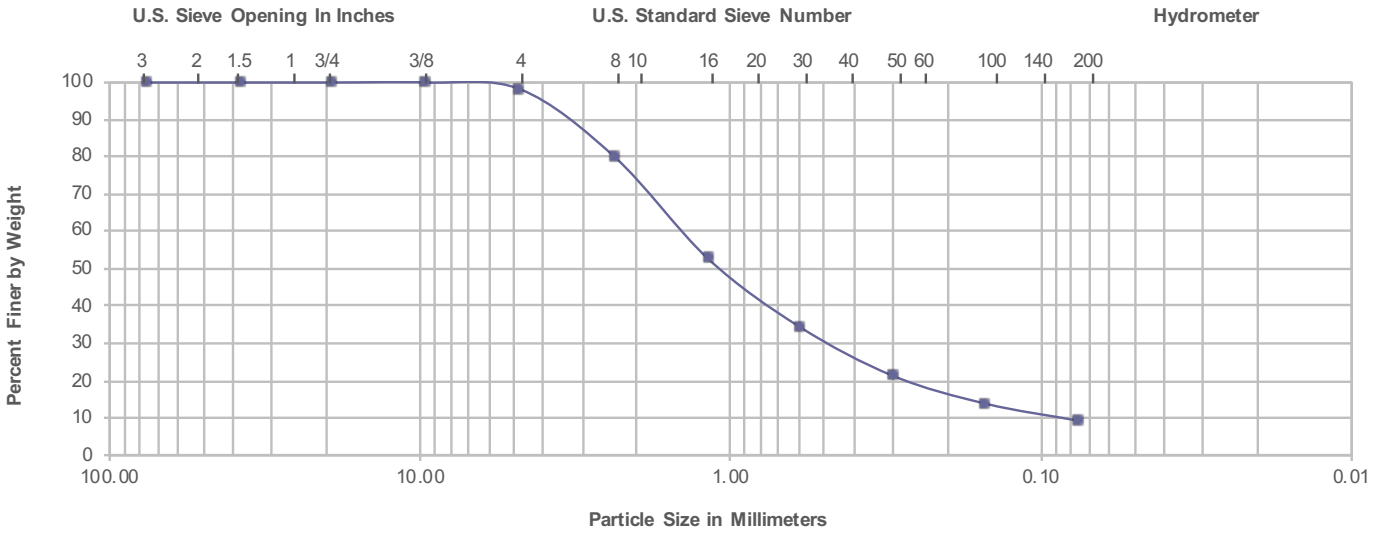
D422, D1140, D2487

Report Date:	12/01/23
Sheet:	1 of 1
Appendix:	C
Permit No:	
Client Project No:	
Other:	
DSA File No:	
DSA Application No:	
DSA LEA No:	

Project Number:	3813.006.500
Project Title:	Industrial Building
Project Location:	Apple Valley, CA
Client:	Redwood West

Sample ID: JDA10252310 **Gravel** (%): 1.8% **Sand** (%): 89.0% **Fines** (%): 9.2%

Classification, ASTM D2487:	(SPSM) Poorly graded sand with silt
Sample Origin:	Boring Two at 5' to 10'
Laboratory Remarks:	



C_u	C_c	Moisture	D_{100}	D_{60}	D_{30}	D_{10}	LL	PL	PI	SG	FM	SE
17	2	3.1%	5.231	1.498	0.499	0.089	ND	ND	ND	ND	ND	ND

Method / Procudure Used:	D422, D1140
Size of Initial Dry Mass (g):	509.0
Determination of Dry Mass:	D2216
Particles; Shape, Hardness:	ND
Dispersion Device/Period:	Manual/2 hr
Type & Amount of Agent:	Defloc. & 1.0
Laboratory Comments:	

The Material ☐ Was ☐ Was Not Sampled & tested in accordance with the reqs. of the DSA approved documents.
The Material Tested ☐ Met ☐ Did Not Meet The requirements of the DSA approved documents.
cc: Project Architect, Structural Engineer, Project Inspector, DSA Regional Office, School District

Merrell Johnson. engineering | surveying | testing | inspection

Merrell Engineering Company, Inc. | 22221 US Highway 18, Apple Valley, Ca. 92308 t)760.256.2068 f)760.256.0418 w)www.merrelljohnson.com

Particle-Size Analysis of Soil

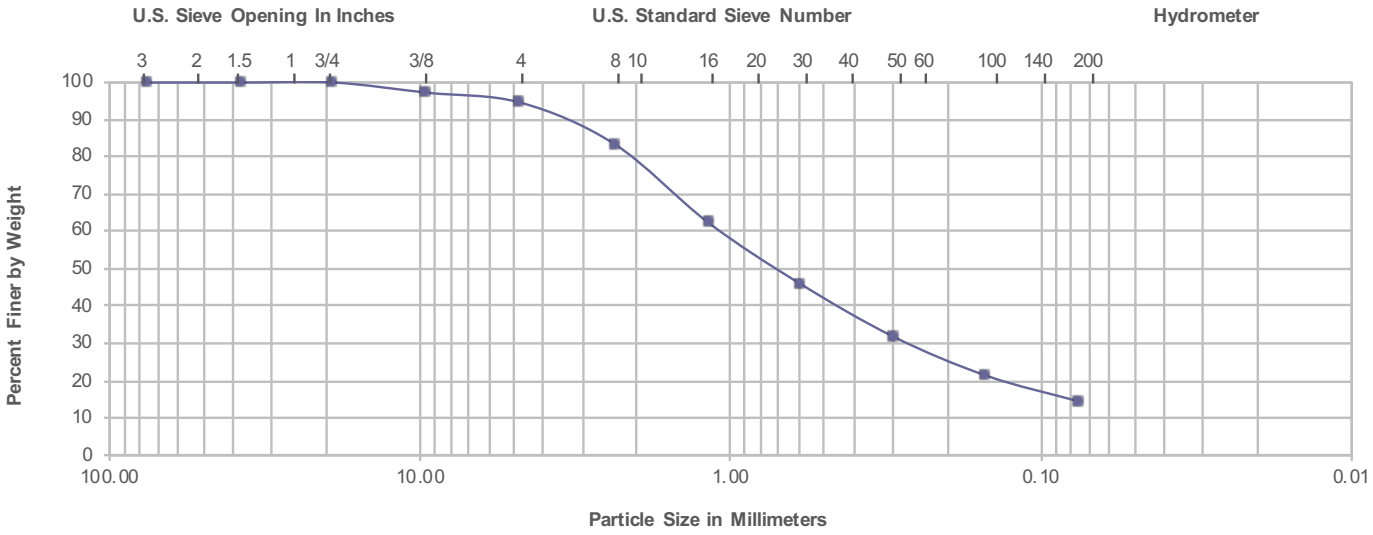
D422, D1140, D2487

Report Date:	12/01/23
Sheet:	1 of 1
Appendix:	C
Permit No:	
Client Project No:	
Other:	
DSA File No:	
DSA Application No:	
DSA LEA No:	

Project Number:	3813.006.500
Project Title:	Industrial Building
Project Location:	Apple Valley, CA
Client:	Redwood West

Sample ID: JDA10252317 **Gravel (%):** 5.4% **Sand (%):** 80.3% **Fines (%):** 14.3%

Classification, ASTM D2487:	(SM) Silty sand
Sample Origin:	Boring Five at 0' to 5'
Laboratory Remarks:	



C_u	C_c	Moisture	D_{100}	D_{60}	D_{30}	D_{10}	LL	PL	PI	SG	FM	SE
NA	NA	4.0%	15.519	1.095	0.274	0.000	ND	ND	ND	ND	ND	ND

Method / Procudure Used:	D422, D1140
Size of Initial Dry Mass (g):	483.6
Determination of Dry Mass:	D2216
Particles; Shape, Hardness:	ND
Dispersion Device/Period:	Manual/2 hr
Type & Amount of Agent:	Defloc. & 1.0
Laboratory Comments:	

The Material ☐ Was ☐ Was Not Sampled & tested in accordance with the reqs. of the DSA approved documents.
The Material Tested ☐ Met ☐ Did Not Meet The requirements of the DSA approved documents.

cc: Project Architect, Structural Engineer, Project Inspector, DSA Regional Office, School District

Merrell Johnson. engineering | surveying | testing | inspection

Merrell Engineering Company, Inc. | 22221 US Highway 18, Apple Valley, Ca. 92308 t)760.256.2068 f)760.256.0418 w)www.merrelljohnson.com

Particle-Size Analysis of Soil

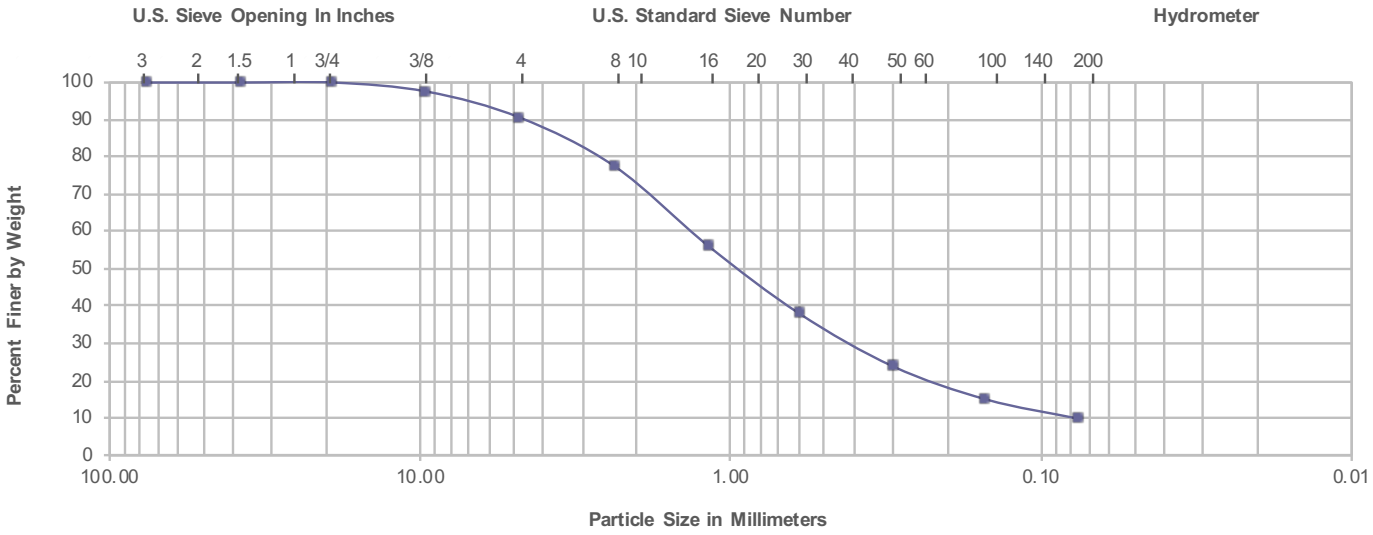
D422, D1140, D2487

Report Date:	12/01/23
Sheet:	1 of 1
Appendix:	C
Permit No:	
Client Project No:	
Other:	
DSA File No:	
DSA Application No:	
DSA LEA No:	

Project Number:	3813.006.500
Project Title:	Industrial Building
Project Location:	Apple Valley, CA
Client:	Redwood West

Sample ID: JDA10252321 **Gravel (%):** 9.5% **Sand (%):** 80.8% **Fines (%):** 9.7%

Classification, ASTM D2487:	(SPSM) Poorly graded sand with silt
Sample Origin:	Boring Six at 5' to 10'
Laboratory Remarks:	



C_u	C_c	Moisture	D_{100}	D_{60}	D_{30}	D_{10}	LL	PL	PI	SG	FM	SE
NA	NA	2.3%	15.109	1.394	0.431	0.000	ND	ND	ND	ND	ND	ND

Method / Procudure Used:	D422, D1140
Size of Initial Dry Mass (g):	528.3
Determination of Dry Mass:	D2216
Particles; Shape, Hardness:	ND
Dispersion Device/Period:	Manual/2 hr
Type & Amount of Agent:	Defloc. & 1.0
Laboratory Comments:	

The Material ☐ Was ☐ Was Not Sampled & tested in accordance with the reqs. of the DSA approved documents.
The Material Tested ☐ Met ☐ Did Not Meet The requirements of the DSA approved documents.
cc: Project Architect, Structural Engineer, Project Inspector, DSA Regional Office, School District

Merrell Johnson. engineering | surveying | testing | inspection

Merrell Engineering Company, Inc. | 22221 US Highway 18, Apple Valley, Ca. 92308 t)760.256.2068 f)760.256.0418 w)www.merrelljohnson.com

Particle-Size Analysis of Soil

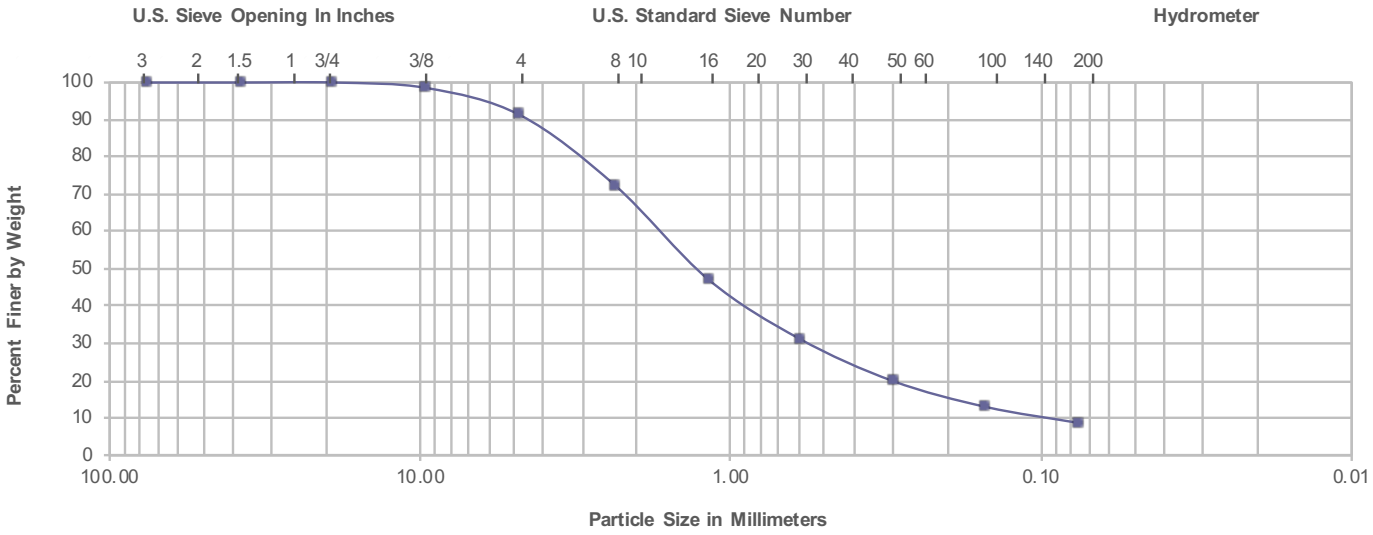
D422, D1140, D2487

Report Date:	12/01/23
Sheet:	1 of 1
Appendix:	C
Permit No:	
Client Project No:	
Other:	
DSA File No:	
DSA Application No:	
DSA LEA No:	

Project Number:	3813.006.500
Project Title:	Industrial Building
Project Location:	Apple Valley, CA
Client:	Redwood West

Sample ID: JDA10252322 **Gravel (%):** 8.8% **Sand (%):** 82.6% **Fines (%):** 8.6%

Classification, ASTM D2487:	(SPSM) Poorly graded sand with silt
Sample Origin:	Boring Seven at 5' to 10'
Laboratory Remarks:	



C_u	C_c	Moisture	D_{100}	D_{60}	D_{30}	D_{10}	LL	PL	PI	SG	FM	SE
19	2	2.0%	12.605	1.780	0.568	0.095	ND	ND	ND	ND	ND	ND

Method / Procudure Used:	D422, D1140
Size of Initial Dry Mass (g):	511.6
Determination of Dry Mass:	D2216
Particles; Shape, Hardness:	ND
Dispersion Device/Period:	Manual/2 hr
Type & Amount of Agent:	Defloc. & 1.0
Laboratory Comments:	

The Material ☐ Was ☐ Was Not Sampled & tested in accordance with the reqs. of the DSA approved documents.
The Material Tested ☐ Met ☐ Did Not Meet The requirements of the DSA approved documents.
cc: Project Architect, Structural Engineer, Project Inspector, DSA Regional Office, School District

Merrell Johnson engineering | surveying | testing | inspection

Merrell Engineering Company, Inc. | 22221 US Highway 18, Apple Valley, Ca. 92308 t)760.256.2068 f)760.256.0418 w)www.merrelljohnson.com

Particle-Size Analysis of Soil

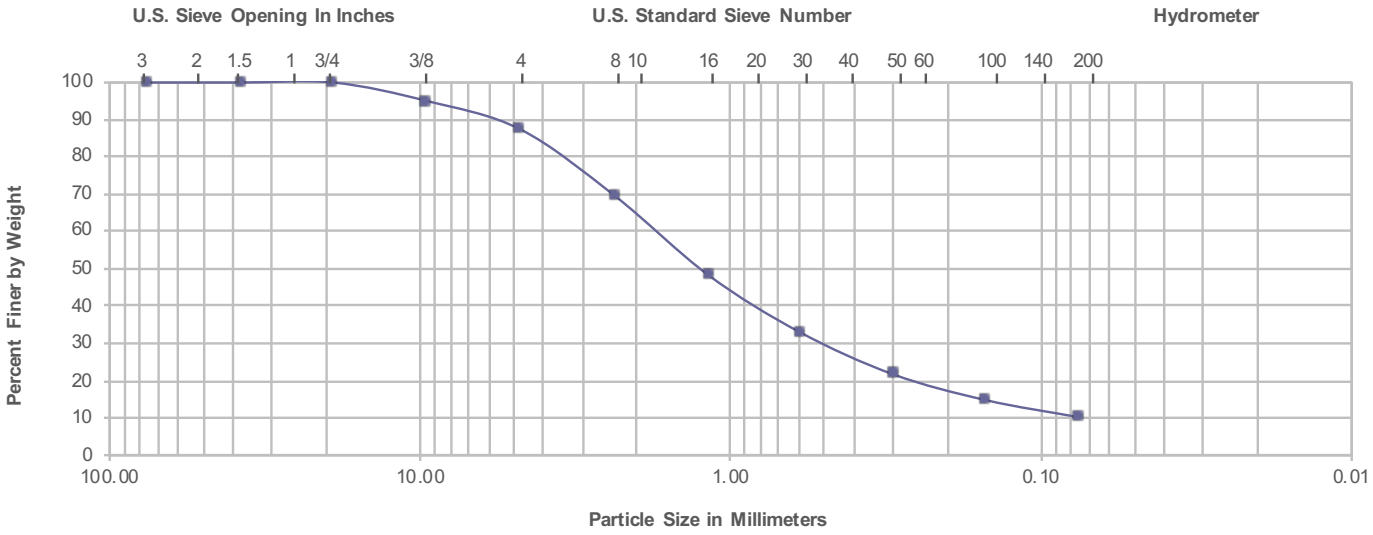
D422, D1140, D2487

Report Date:	12/01/23
Sheet:	1 of 1
Appendix:	C
Permit No:	
Client Project No:	
Other:	
DSA File No:	
DSA Application No:	
DSA LEA No:	

Project Number:	3813.006.500
Project Title:	Industrial Building
Project Location:	Apple Valley, CA
Client:	Redwood West

Sample ID: JDA10252323 **Gravel (%):** 12.6% **Sand (%):** 77.3% **Fines (%):** 10.1%

Classification, ASTM D2487:	(SPSM) Poorly graded sand with silt
Sample Origin:	Boring Eight at 0' to 5'
Laboratory Remarks:	



C_u	C_c	Moisture	D_{100}	D_{60}	D_{30}	D_{10}	LL	PL	PI	SG	FM	SE
NA	NA	1.7%	17.084	1.773	0.520	0.000	ND	ND	ND	ND	ND	ND

Method / Procudure Used:	D422, D1140
Size of Initial Dry Mass (g):	500.1
Determination of Dry Mass:	D2216
Particles; Shape, Hardness:	ND
Dispersion Device/Period:	Manual/2 hr
Type & Amount of Agent:	Defloc. & 1.0
Laboratory Comments:	

The Material ☐ Was ☐ Was Not Sampled & tested in accordance with the reqs. of the DSA approved documents.
The Material Tested ☐ Met ☐ Did Not Meet The requirements of the DSA approved documents.

cc: Project Architect, Structural Engineer, Project Inspector, DSA Regional Office, School District

Merrell Johnson engineering | surveying | testing | inspection

Merrell Engineering Company, Inc. | 22221 US Highway 18, Apple Valley, Ca. 92308 t)760.256.2068 f)760.256.0418 w)www.merrelljohnson.com

Particle-Size Analysis of Soil

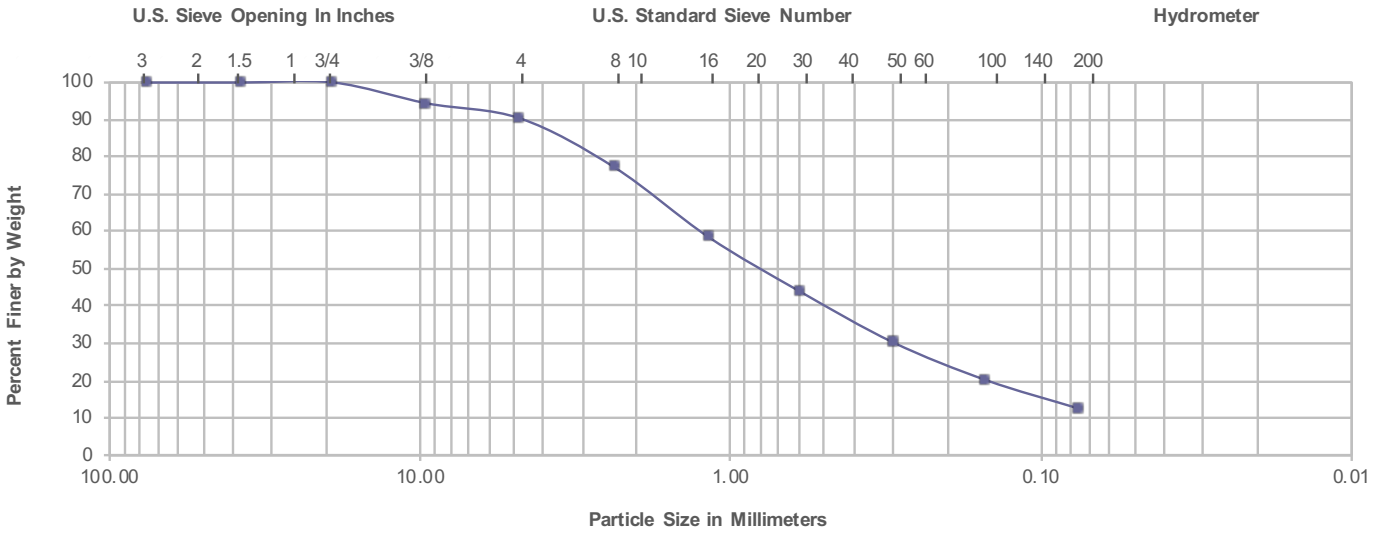
D422, D1140, D2487

Report Date:	12/01/23
Sheet:	1 of 1
Appendix:	C
Permit No:	
Client Project No:	
Other:	
DSA File No:	
DSA Application No:	
DSA LEA No:	

Project Number:	3813.006.500
Project Title:	Industrial Building
Project Location:	Apple Valley, CA
Client:	Redwood West

Sample ID: JDA10252324 **Gravel (%):** 9.7% **Sand (%):** 77.9% **Fines (%):** 12.4%

Classification, ASTM D2487:	(SM) Silty sand
Sample Origin:	Boring Nine at 0' to 5'
Laboratory Remarks:	



C_u	C_c	Moisture	D_{100}	D_{60}	D_{30}	D_{10}	LL	PL	PI	SG	FM	SE
NA	NA	2.3%	17.303	1.272	0.296	0.000	ND	ND	ND	ND	ND	ND

Method / Procudure Used:	D422, D1140
Size of Initial Dry Mass (g):	498.5
Determination of Dry Mass:	D2216
Particles; Shape, Hardness:	ND
Dispersion Device/Period:	Manual/2 hr
Type & Amount of Agent:	Defloc. & 1.0
Laboratory Comments:	

The Material ☐ Was ☐ Was Not Sampled & tested in accordance with the reqs. of the DSA approved documents.
The Material Tested ☐ Met ☐ Did Not Meet The requirements of the DSA approved documents.
cc: Project Architect, Structural Engineer, Project Inspector, DSA Regional Office, School District

Merrell Johnson. engineering | surveying | testing | inspection

Merrell Engineering Company, Inc. | 22221 US Highway 18, Apple Valley, Ca. 92308 t)760.256.2068 f)760.256.0418 w)www.merrelljohnson.com

Particle-Size Analysis of Soil

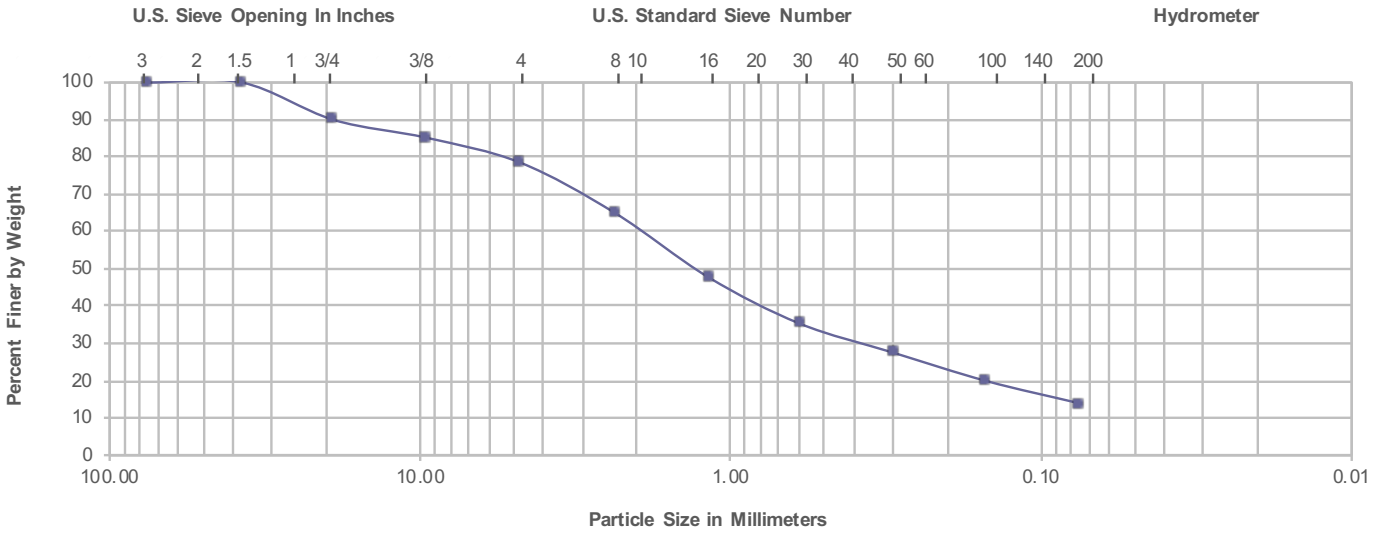
D422, D1140, D2487

Report Date:	12/01/23
Sheet:	1 of 1
Appendix:	C
Permit No:	
Client Project No:	
Other:	
DSA File No:	
DSA Application No:	
DSA LEA No:	

Project Number:	3813.006.500
Project Title:	Industrial Building
Project Location:	Apple Valley, CA
Client:	Redwood West

Sample ID: JDA10252325 **Gravel (%):** 21.5% **Sand (%):** 64.6% **Fines (%):** 13.9%

Classification, ASTM D2487:	(SM) Silty sand with gravel
Sample Origin:	Boring Ten at 0' to 5'
Laboratory Remarks:	



C_u	C_c	Moisture	D_{100}	D_{60}	D_{30}	D_{10}	LL	PL	PI	SG	FM	SE
NA	NA	6.5%	35.655	1.949	0.395	0.000	ND	ND	ND	ND	ND	ND

Method / Procudure Used:	D422, D1140
Size of Initial Dry Mass (g):	507.8
Determination of Dry Mass:	D2216
Particles; Shape, Hardness:	ND
Dispersion Device/Period:	Manual/2 hr
Type & Amount of Agent:	Defloc. & 1.0
Laboratory Comments:	

The Material ☐ Was ☐ Was Not Sampled & tested in accordance with the reqs. of the DSA approved documents.
The Material Tested ☐ Met ☐ Did Not Meet The requirements of the DSA approved documents.

cc: Project Architect, Structural Engineer, Project Inspector, DSA Regional Office, School District

Merrell Johnson engineering | surveying | testing | inspection

Merrell Engineering Company, Inc. | 22221 US Highway 18, Apple Valley, Ca. 92308 t)760.256.2068 f)760.256.0418 w)www.merrelljohnson.com

Particle-Size Analysis of Soil

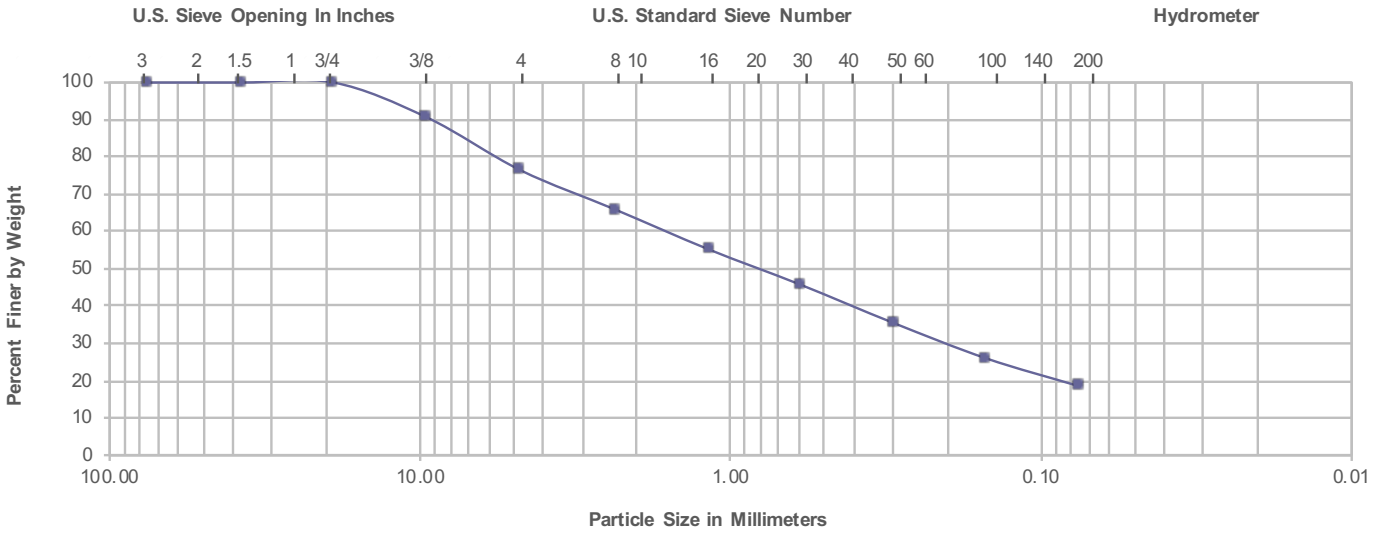
D422, D1140, D2487

Report Date:	12/01/23
Sheet:	1 of 1
Appendix:	C
Permit No:	
Client Project No:	
Other:	
DSA File No:	
DSA Application No:	
DSA LEA No:	

Project Number:	3813.006.500
Project Title:	Industrial Building
Project Location:	Apple Valley, CA
Client:	Redwood West

Sample ID: JDA10252326 **Gravel** (%): 23.6% **Sand** (%): 58.0% **Fines** (%): 18.4%

Classification, ASTM D2487:	(SM) Silty sand with gravel
Sample Origin:	Boring Eleven at 0' to 5'
Laboratory Remarks:	



C_u	C_c	Moisture	D_{100}	D_{60}	D_{30}	D_{10}	LL	PL	PI	SG	FM	SE
NA	NA	5.0%	17.988	1.703	0.214	0.000	ND	ND	ND	ND	ND	ND

Method / Procudure Used:	D422, D1140
Size of Initial Dry Mass (g):	504.9
Determination of Dry Mass:	D2216
Particles; Shape, Hardness:	ND
Dispersion Device/Period:	Manual/2 hr
Type & Amount of Agent:	Defloc. & 1.0
Laboratory Comments:	

The Material ☐ Was ☐ Was Not Sampled & tested in accordance with the reqs. of the DSA approved documents.
The Material Tested ☐ Met ☐ Did Not Meet The requirements of the DSA approved documents.
cc: Project Architect, Structural Engineer, Project Inspector, DSA Regional Office, School District

Merrell Johnson. engineering | surveying | testing | inspection

Merrell Engineering Company, Inc. | 22221 US Highway 18, Apple Valley, Ca. 92308 t)760.256.2068 f)760.256.0418 w)www.merrelljohnson.com

Particle-Size Analysis of Soil

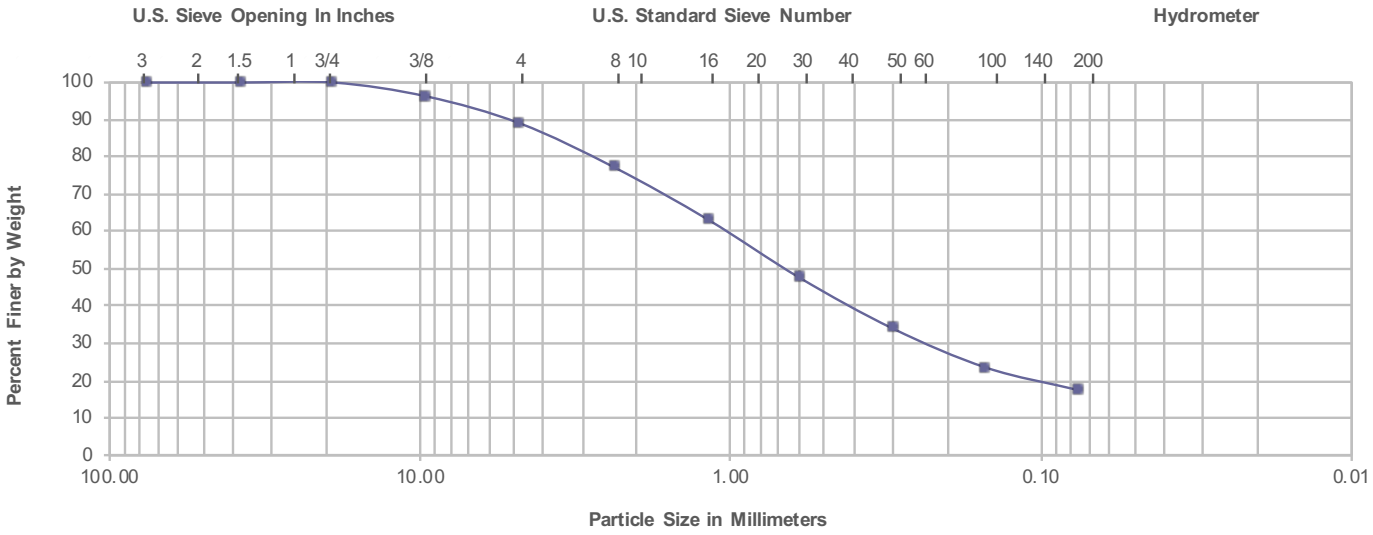
D422, D1140, D2487

Report Date: 12/01/23
Sheet: 1 of 1
Appendix: C
Permit No:
Client Project No:
Other:
DSA File No:
DSA Application No:
DSA LEA No:

Project Number: 3813.006.500
Project Title: Industrial Building
Project Location: Apple Valley, CA
Client: Redwood West

Sample ID:	Gravel (%):	Sand (%):	Fines (%):
JDA10252327	11.0%	71.6%	17.4%

Classification, ASTM D2487: (SM) Silty sand
Sample Origin: Boring Twelve at 0' to 5'
Laboratory Remarks:



C_u	C_c	Moisture	D_{100}	D_{60}	D_{30}	D_{10}	LL	PL	PI	SG	FM	SE
NA	NA	5.8%	16.471	1.025	0.244	0.000	ND	ND	ND	ND	ND	ND

Method / Procudure Used: D422, D1140
Size of Initial Dry Mass (g): 505.8
Determination of Dry Mass: D2216
Particles; Shape, Hardness: ND
Dispersion Device/Period: Manual/2 hr
Type & Amount of Agent: Defloc. & 1.0
Laboratory Comments:

The Material ☐ Was ☐ Was Not Sampled & tested in accordance with the reqs. of the DSA approved documents.
The Material Tested ☐ Met ☐ Did Not Meet The requirements of the DSA approved documents.
cc: Project Architect, Structural Engineer, Project Inspector, DSA Regional Office, School District

Merrell Johnson engineering | surveying | testing | inspection

Merrell Engineering Company, Inc. | 22221 US Highway 18, Apple Valley, Ca. 92308 t)760.256.2068 f)760.256.0418 w)www.merrelljohnson.com

Particle-Size Analysis of Soil

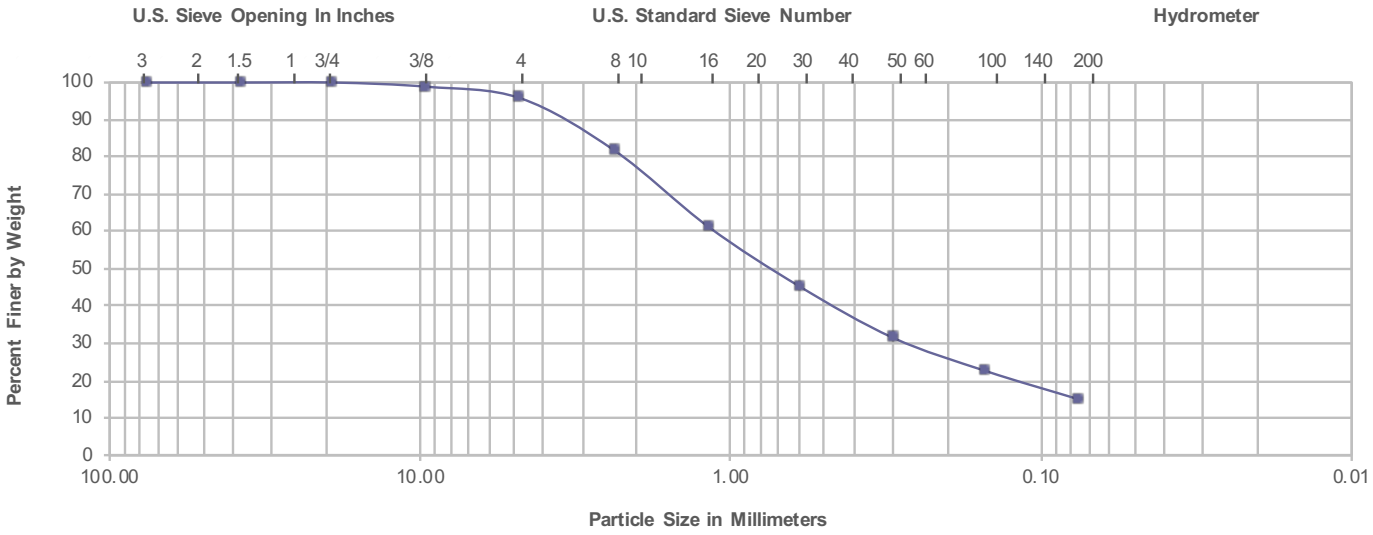
D422, D1140, D2487

Report Date:	12/01/23
Sheet:	1 of 1
Appendix:	C
Permit No:	
Client Project No:	
Other:	
DSA File No:	
DSA Application No:	
DSA LEA No:	

Project Number:	3813.006.500
Project Title:	Industrial Building
Project Location:	Apple Valley, CA
Client:	Redwood West

Sample ID: JDA10252328 **Gravel (%):** 4.2% **Sand (%):** 80.9% **Fines (%):** 14.9%

Classification, ASTM D2487:	(SM) Silty sand
Sample Origin:	Boring Thirteen at 0' to 5'
Laboratory Remarks:	



C_u	C_c	Moisture	D_{100}	D_{60}	D_{30}	D_{10}	LL	PL	PI	SG	FM	SE
NA	NA	2.2%	10.647	1.133	0.275	0.000	ND	ND	ND	ND	ND	ND

Method / Procudure Used:	D422, D1140
Size of Initial Dry Mass (g):	536.3
Determination of Dry Mass:	D2216
Particles; Shape, Hardness:	ND
Dispersion Device/Period:	Manual/2 hr
Type & Amount of Agent:	Defloc. & 1.0
Laboratory Comments:	

The Material ☐ Was ☐ Was Not Sampled & tested in accordance with the reqs. of the DSA approved documents.
The Material Tested ☐ Met ☐ Did Not Meet The requirements of the DSA approved documents.

cc: Project Architect, Structural Engineer, Project Inspector, DSA Regional Office, School District

Merrell Johnson engineering | surveying | testing | inspection

Merrell Engineering Company, Inc. | 22221 US Highway 18, Apple Valley, Ca. 92308 t)760.256.2068 f)760.256.0418 w)www.merrelljohnson.com

Particle-Size Analysis of Soil

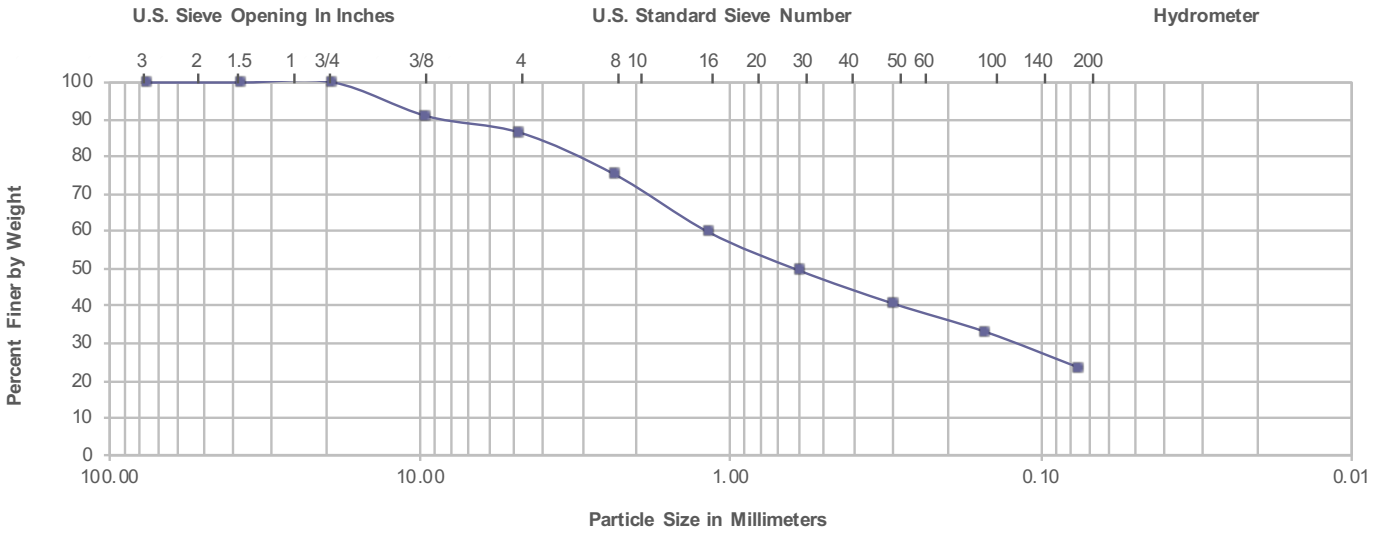
D422, D1140, D2487

Project Number:	3813.006.500
Project Title:	Industrial Building
Project Location:	Apple Valley, CA
Client:	Redwood West

Report Date:	
Sheet:	1 of 1
Appendix:	C
Permit No:	
Client Project No:	
Other:	
DSA File No:	
DSA Application No:	
DSA LEA No:	

Sample ID: JDA11292302 **Gravel** (%): 13.5% **Sand** (%): 63.1% **Fines** (%): 23.4%

Classification, ASTM D2487: (SM) Silty sand
Sample Origin: Boring Fourteen at 0' to 5'
Laboratory Remarks: Cardona Road



C_u	C_c	Moisture	D_{100}	D_{60}	D_{30}	D_{10}	LL	PL	PI	SG	FM	SE
NA	NA	1.8%	17.950	1.131	0.119	0.000	ND	ND	ND	ND	ND	ND

Method / Procudure Used: D422, D1140
Size of Initial Dry Mass (g): 694.0
Determination of Dry Mass: D2216
Particles; Shape, Hardness: ND
Dispersion Device/Period: Manual/2 hr
Type & Amount of Agent: Defloc. & 1.0
Laboratory Comments:

The Material ☐ Was ☐ Was Not Sampled & tested in accordance with the reqs. of the DSA approved documents.
The Material Tested ☐ Met ☐ Did Not Meet The requirements of the DSA approved documents.
cc: Project Architect, Structural Engineer, Project Inspector, DSA Regional Office, School District

Merrell Johnson® engineering | surveying | testing | inspection

Merrell Engineering Company, Inc. | 22221 US Highway 18, Apple Valley, Ca. 92308 t)760.256.2068 f)760.256.0418 w)www.merrelljohnson.com

Particle-Size Analysis of Soil

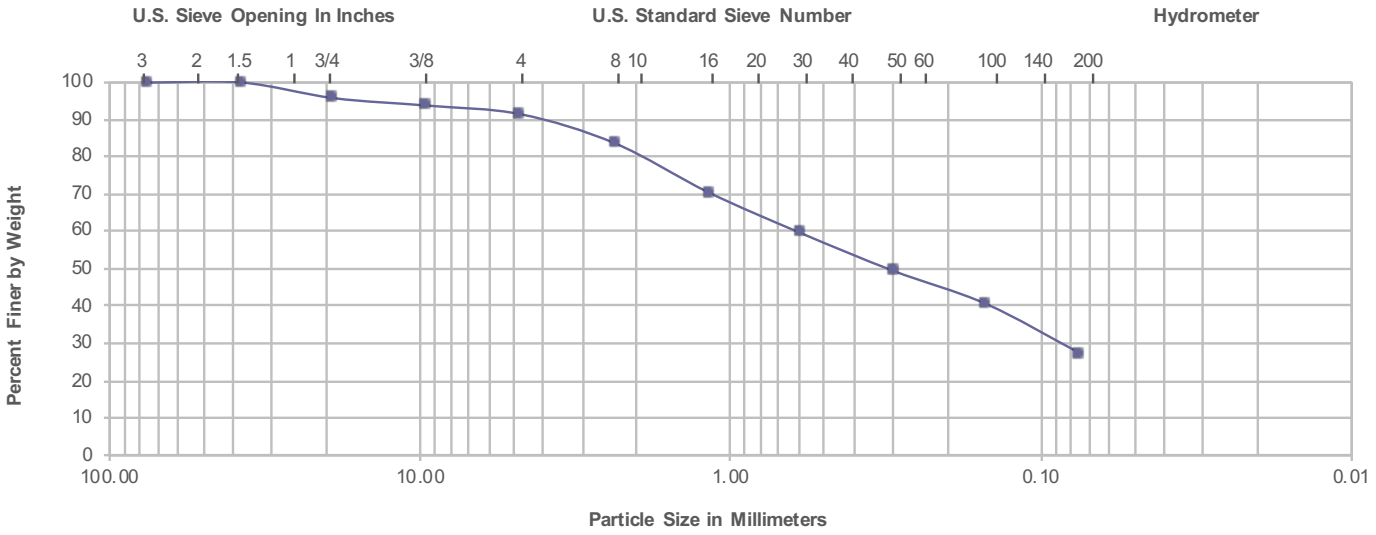
D422, D1140, D2487

Project Number:	3813.006.500
Project Title:	Industrial Building
Project Location:	Apple Valley, CA
Client:	Redwood West

Report Date:	
Sheet:	1 of 1
Appendix:	C
Permit No:	
Client Project No:	
Other:	
DSA File No:	
DSA Application No:	
DSA LEA No:	

Sample ID: JDA11292303 **Gravel** (%): 8.5% **Sand** (%): 64.1% **Fines** (%): 27.4%

Classification, ASTM D2487: (SM) Silty sand
Sample Origin: Boring Fifteen at 0' to 5'
Laboratory Remarks: Dachshund Avenue



C_u	C_c	Moisture	D_{100}	D_{60}	D_{30}	D_{10}	LL	PL	PI	SG	FM	SE
NA	NA	1.7%	33.086	0.560	0.084	0.000	ND	ND	ND	ND	ND	ND

Method / Procudure Used: D422, D1140
Size of Initial Dry Mass (g): 734.9
Determination of Dry Mass: D2216
Particles; Shape, Hardness: ND
Dispersion Device/Period: Manual/2 hr
Type & Amount of Agent: Defloc. & 1.0
Laboratory Comments:

The Material ☐ Was ☐ Was Not Sampled & tested in accordance with the reqs. of the DSA approved documents.
The Material Tested ☐ Met ☐ Did Not Meet The requirements of the DSA approved documents.
cc: Project Architect, Structural Engineer, Project Inspector, DSA Regional Office, School District

Merrell Johnson® engineering | surveying | testing | inspection

Merrell Engineering Company, Inc. | 22221 US Highway 18, Apple Valley, Ca. 92308 t)760.256.2068 f)760.256.0418 w)www.merrelljohnson.com

Particle-Size Analysis of Soil

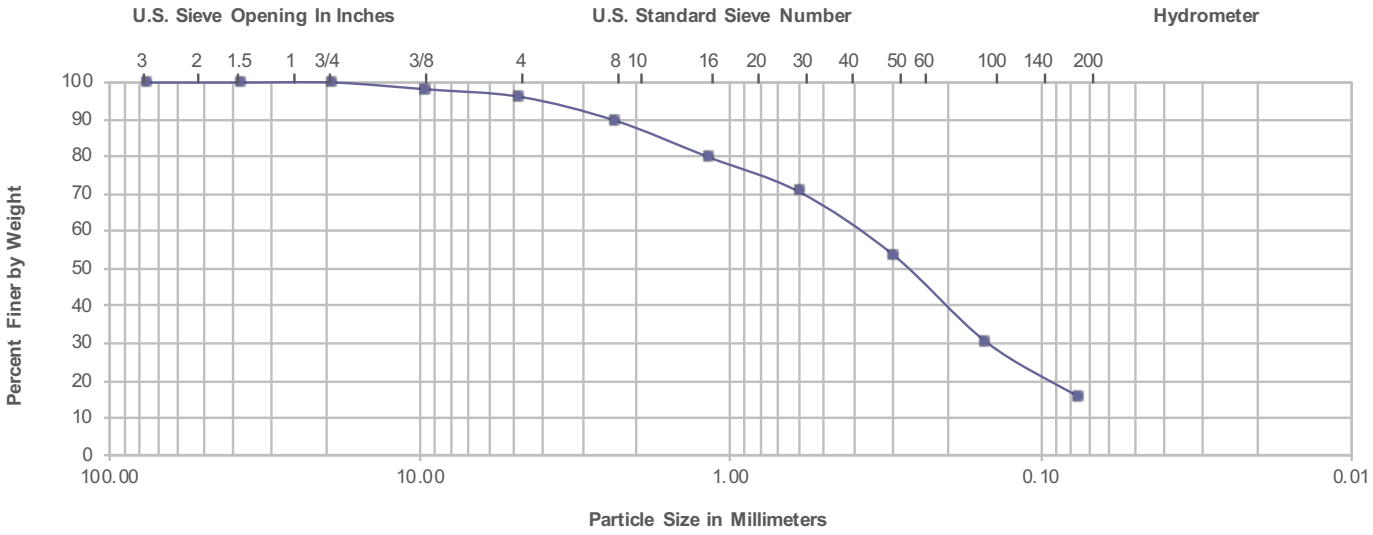
D422, D1140, D2487

Report Date:	12/01/23
Sheet:	1 of 1
Appendix:	C
Permit No:	
Client Project No:	
Other:	
DSA File No:	
DSA Application No:	
DSA LEA No:	

Project Number:	3813.006.500
Project Title:	Industrial Building
Project Location:	Apple Valley, CA
Client:	Redwood West

Sample ID: JDA11292304 **Gravel (%):** 3.9% **Sand (%):** 80.7% **Fines (%):** 15.4%

Classification, ASTM D2487:	(SM) Silty sand
Sample Origin:	Boring Sixteen at 0' to 5'
Laboratory Remarks:	Cardona Road



C_u	C_c	Moisture	D_{100}	D_{60}	D_{30}	D_{10}	LL	PL	PI	SG	FM	SE
NA	NA	6.0%	13.850	0.393	0.143	0.000	ND	ND	ND	ND	ND	ND

Method / Procudure Used:	D422, D1140
Size of Initial Dry Mass (g):	688.5
Determination of Dry Mass:	D2216
Particles; Shape, Hardness:	ND
Dispersion Device/Period:	Manual/2 hr
Type & Amount of Agent:	Defloc. & 1.0
Laboratory Comments:	

The Material ☐ Was ☐ Was Not Sampled & tested in accordance with the reqs. of the DSA approved documents.
The Material Tested ☐ Met ☐ Did Not Meet The requirements of the DSA approved documents.
cc: Project Architect, Structural Engineer, Project Inspector, DSA Regional Office, School District

Merrell Johnson® engineering | surveying | testing | inspection

Merrell Engineering Company, Inc. | 22221 US Highway 18, Apple Valley, Ca. 92308 t)760.256.2068 f)760.256.0418 w)www.merrelljohnson.com

Particle-Size Analysis of Soil

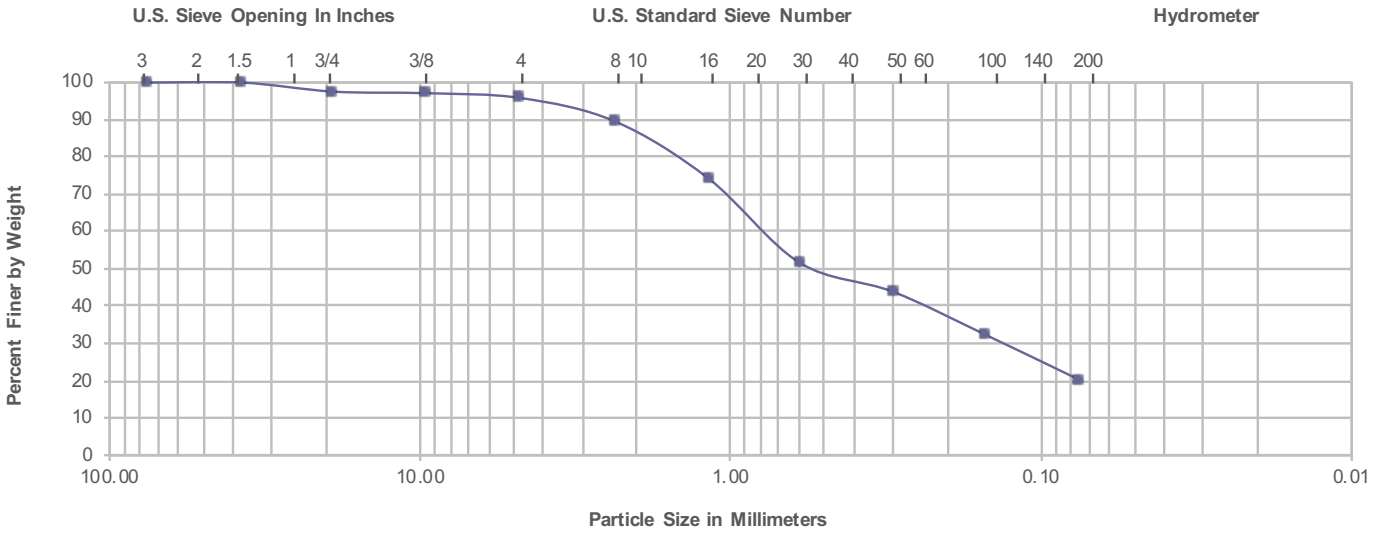
D422, D1140, D2487

Report Date:	12/01/23
Sheet:	1 of 1
Appendix:	C
Permit No:	
Client Project No:	
Other:	
DSA File No:	
DSA Application No:	
DSA LEA No:	

Project Number:	3813.006.500
Project Title:	Industrial Building
Project Location:	Apple Valley, CA
Client:	Redwood West

Sample ID: JDA11292301 **Gravel (%):** 4.2% **Sand (%):** 75.7% **Fines (%):** 20.1%

Classification, ASTM D2487:	(SM) Silty sand
Sample Origin:	Boring Seventeen at 0' to 5'
Laboratory Remarks:	Dachsund Avenue



C_u	C_c	Moisture	D_{100}	D_{60}	D_{30}	D_{10}	LL	PL	PI	SG	FM	SE
NA	NA	1.2%	29.922	0.788	0.130	0.000	ND	ND	ND	ND	ND	ND

Method / Procudure Used:	D422, D1140
Size of Initial Dry Mass (g):	1015.9
Determination of Dry Mass:	D2216
Particles; Shape, Hardness:	ND
Dispersion Device/Period:	Manual/2 hr
Type & Amount of Agent:	Defloc. & 1.0
Laboratory Comments:	

The Material ☐ Was ☐ Was Not Sampled & tested in accordance with the reqs. of the DSA approved documents.
The Material Tested ☐ Met ☐ Did Not Meet The requirements of the DSA approved documents.
cc: Project Architect, Structural Engineer, Project Inspector, DSA Regional Office, School District

Merrell Johnson® engineering | surveying | testing | inspection

Merrell Engineering Company, Inc. | 22221 US Highway 18, Apple Valley, Ca. 92308 t)760.256.2068 f)760.256.0418 w)www.merrelljohnson.com

Laboratory Compaction Characteristics

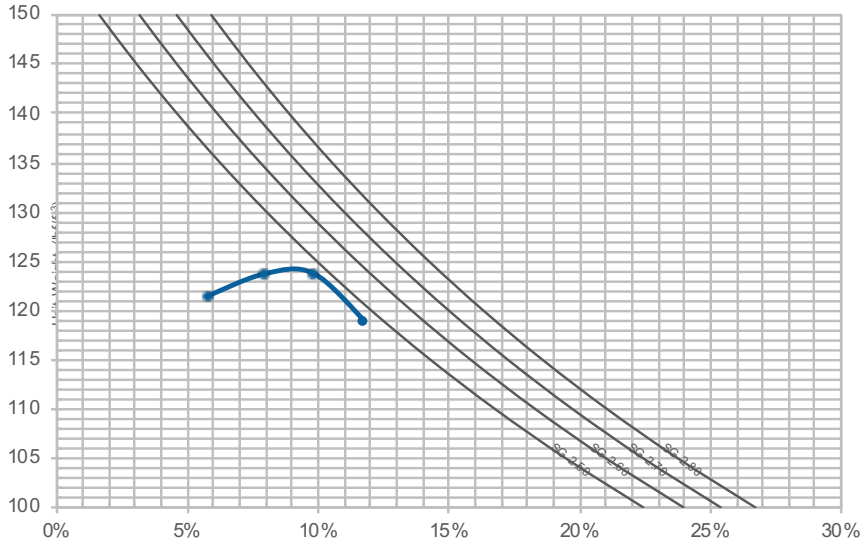
ASTM D1557, D2488

Project Number:	3813.006.600
Project Title:	Industrial Building
Project Location:	Apple Valley, CA
Client:	Redwood West

Report Date:	12/01/23
Sheet:	1 of 1
Attachment:	C
Permit No.:	
Client Project No.:	
Other:	
DSA File No.:	
DSA Application No.:	
DSA LEA No.:	

Sample ID: JDA10252301 **Maximum Dry Unit Weight** (lbf/ft³): 124.1 **Optimum Moisture Content** (%): 9.2

Classification, ASTM D2488: (SM) Silty sand
Sample Origin: Boring One at 0' to 5'
Laboratory Remarks:



Tested By:	DRS
Received Moisture:	3.8%
Preparation:	Wet
Specific Gravity:	
SG Method:	
Start Weight (lb):	35.0
Retained on 3/4" (lb):	0.2
Retained on 3/8" (lb):	0.7
Retained on No. 4 (lb):	1.9
Retained on 3/4" (%):	0.6%
Retained on 3/8" (%):	2.0%
Retained on No. 4 (%):	5.4%
Oversize Correction:	
Mold Volume Factor:	29.94
Tare Weight (lb):	4.35
Rammer Used:	Mechanical
Method Used:	☐ A ☑ B ☐ C

Weight of Soil and Tare (lb):	8.64	8.81	8.89	8.79
Wet Weight (g):	349.4	311.7	373.1	347.5
Dry Weight (g):	330.4	288.8	339.8	310.9
Moisture Content (%):	5.8%	7.9%	9.8%	11.8%
Dry Unit Weight (flb/ft³):	121.5	123.7	123.8	118.9

The Material ☐ Was ☐ Was Not Sampled & tested in accordance with the reqs. of the DSA approved documents.
The Material Tested ☐ Met ☐ Did Not Meet The requirements of the DSA approved documents.
cc: Project Architect, Structural Engineer, Project Inspector, DSA Regional Office, School District

Reviewed By (Signature)

Jeremy Beissner / Laboratory Manager
Name / Title

Merrell Johnson COMPANIES

concept to completion
ENGINEERING | SURVEYING | TESTING | INSPECTION

t)760.256.2068 f)760.256.0418 w)www.merrelljohnson.com

Laboratory Compaction Characteristics

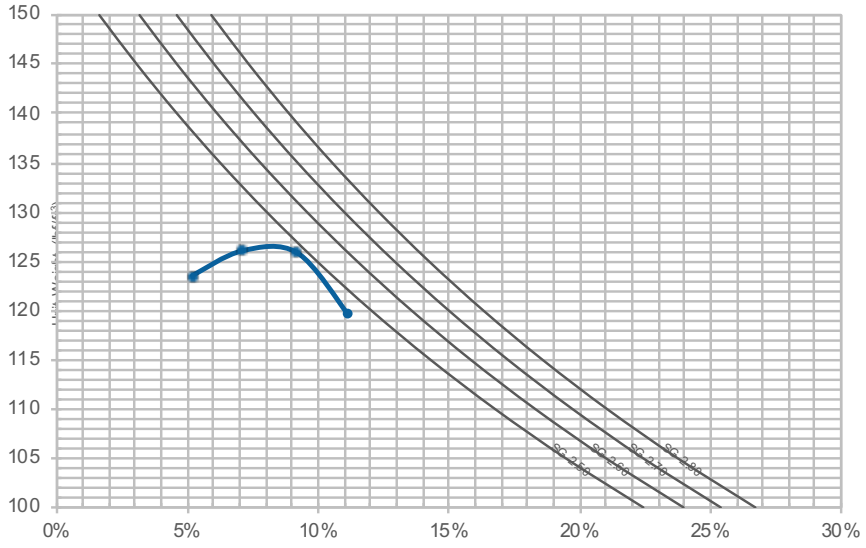
ASTM D1557, D2488

Project Number:	3813.006.600
Project Title:	Industrial Building
Project Location:	Apple Valley, CA
Client:	Redwood West

Report Date:	12/01/23
Sheet:	1 of 1
Attachment:	C
Permit No.:	
Client Project No.:	
Other:	
DSA File No.:	
DSA Application No.:	
DSA LEA No.:	

Sample ID: JDA10252310 **Maximum Dry Unit Weight** (lbf/ft³): 126.5 **Optimum Moisture Content** (%): 9.4

Classification, ASTM D2488: (SPSM) Poorly graded sand with silt
Sample Origin: Boring Two at 5' to 10'
Laboratory Remarks:



Tested By:	DRS
Received Moisture:	3.6%
Preparation:	Wet
Specific Gravity:	
SG Method:	
Start Weight (lb):	35.0
Retained on 3/4" (lb):	0.0
Retained on 3/8" (lb):	0.2
Retained on No. 4 (lb):	1.4
Retained on 3/4" (%):	
Retained on 3/8" (%):	0.6%
Retained on No. 4 (%):	4.0%
Oversize Correction:	
Mold Volume Factor:	29.94
Tare Weight (lb):	4.35
Rammer Used:	Mechanical
Method Used:	☑ A ☐ B ☐ C

Weight of Soil and Tare (lb):	8.69	8.86	8.94	8.79
Wet Weight (g):	323.0	321.2	317.1	339.4
Dry Weight (g):	307.1	299.9	290.4	305.4
Moisture Content (%):	5.2%	7.1%	9.2%	11.1%
Dry Unit Weight (flb/ft³):	123.5	126.1	125.9	119.6

The Material ☐ Was ☐ Was Not Sampled & tested in accordance with the reqs. of the DSA approved documents.
The Material Tested ☐ Met ☐ Did Not Meet The requirements of the DSA approved documents.
cc: Project Architect, Structural Engineer, Project Inspector, DSA Regional Office, School District

Reviewed By (Signature)

Jeremy Beissner / Laboratory Manager
Name / Title

Merrell Johnson COMPANIES
concept to completion
ENGINEERING | SURVEYING | TESTING | INSPECTION

t)760.256.2068 f)760.256.0418 w)www.merrelljohnson.com

Laboratory Compaction Characteristics

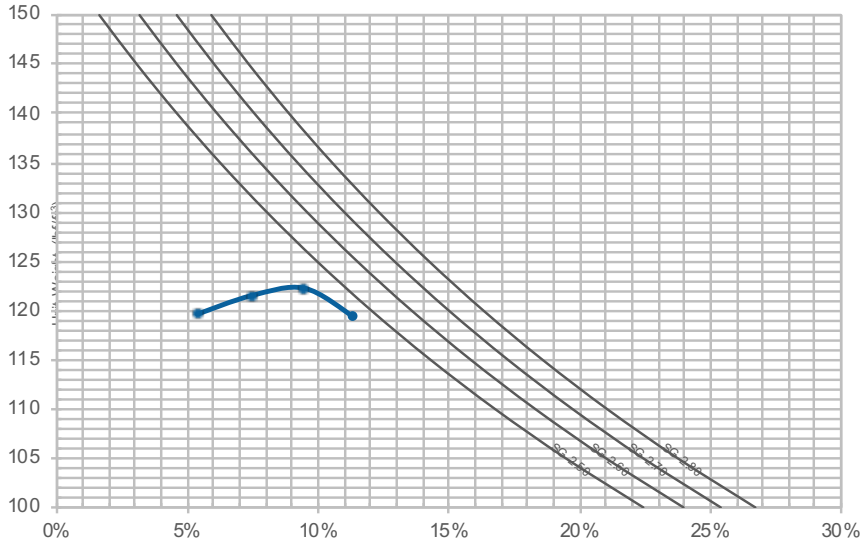
ASTM D1557, D2488

Project Number:	3813.006.600
Project Title:	Industrial Building
Project Location:	Apple Valley, CA
Client:	Redwood West

Report Date:	12/01/23
Sheet:	1 of 1
Attachment:	C
Permit No.:	
Client Project No.:	
Other:	
DSA File No.:	
DSA Application No.:	
DSA LEA No.:	

Sample ID: JDA10252311 **Maximum Dry Unit Weight** (lbf/ft³): 122.5 **Optimum Moisture Content** (%): 9.1

Classification, ASTM D2488: (SPSM) Poorly graded sand with silt
Sample Origin: Boring Three at 0' to 5'
Laboratory Remarks:



Tested By:	DRS
Received Moisture:	3.4%
Preparation:	Wet
Specific Gravity:	
SG Method:	
Start Weight (lb):	25.0
Retained on 3/4" (lb):	0.3
Retained on 3/8" (lb):	1.1
Retained on No. 4 (lb):	2.6
Retained on 3/4" (%):	1.2%
Retained on 3/8" (%):	4.4%
Retained on No. 4 (%):	10.4%
Oversize Correction:	
Mold Volume Factor:	29.94
Tare Weight (lb):	4.35
Rammer Used:	Mechanical
Method Used:	☐ A ☑ B ☐ C

Weight of Soil and Tare (lb):	8.56	8.71	8.82	8.79
Wet Weight (g):	349.4	320.8	332.2	321.8
Dry Weight (g):	331.6	298.6	303.5	289.1
Moisture Content (%):	5.4%	7.4%	9.5%	11.3%
Dry Unit Weight (flb/ft³):	119.6	121.5	122.3	119.4

The Material ☐ Was ☐ Was Not Sampled & tested in accordance with the reqs. of the DSA approved documents.
The Material Tested ☐ Met ☐ Did Not Meet The requirements of the DSA approved documents.
cc: Project Architect, Structural Engineer, Project Inspector, DSA Regional Office, School District

Reviewed By (Signature)

Jeremy Beissner / Laboratory Manager
Name / Title

Merrell Johnson COMPANIES

concept to completion
ENGINEERING | SURVEYING | TESTING | INSPECTION

t)760.256.2068 f)760.256.0418 w)www.merrelljohnson.com

Laboratory Compaction Characteristics

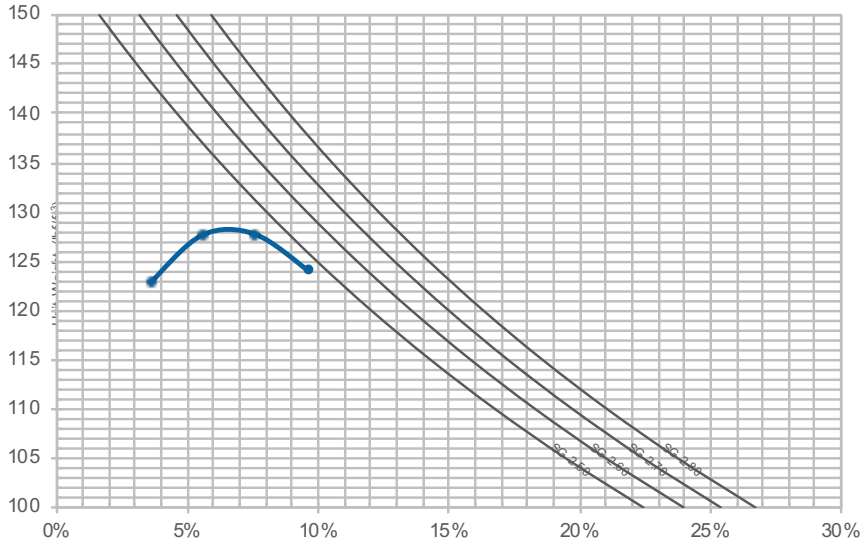
ASTM D1557, D2488

Project Number:	3813.006.600
Project Title:	Industrial Building
Project Location:	Apple Valley, CA
Client:	Redwood West

Report Date:	12/01/23
Sheet:	1 of 1
Attachment:	C
Permit No.:	
Client Project No.:	
Other:	
DSA File No.:	
DSA Application No.:	
DSA LEA No.:	

Sample ID: JDA10252315 **Maximum Dry Unit Weight** (lbf/ft³): 128.1 **Optimum Moisture Content** (%): 6.5

Classification, ASTM D2488: (SM) Silty sand
Sample Origin: Boring Four at 0' to 5'
Laboratory Remarks:



Tested By:	DRS
Received Moisture:	3.6%
Preparation:	Wet
Specific Gravity:	
SG Method:	
Start Weight (lb):	31.0
Retained on 3/4" (lb):	0.4
Retained on 3/8" (lb):	0.8
Retained on No. 4 (lb):	1.6
Retained on 3/4" (%):	1.3%
Retained on 3/8" (%):	2.6%
Retained on No. 4 (%):	5.2%
Oversize Correction:	
Mold Volume Factor:	29.94
Tare Weight (lb):	4.35
Rammer Used:	Mechanical
Method Used:	☐ A ☑ B ☐ C

Weight of Soil and Tare (lb):	8.60	8.85	8.94	8.89
Wet Weight (g):	323.7	308.2	318.4	343.2
Dry Weight (g):	312.5	292.0	296.0	313.0
Moisture Content (%):	3.6%	5.5%	7.6%	9.6%
Dry Unit Weight (flb/ft³):	122.8	127.6	127.8	124.0

The Material ☐ Was ☐ Was Not Sampled & tested in accordance with the reqs. of the DSA approved documents.
The Material Tested ☐ Met ☐ Did Not Meet The requirements of the DSA approved documents.
cc: Project Architect, Structural Engineer, Project Inspector, DSA Regional Office, School District

Reviewed By (Signature)

Jeremy Beissner / Laboratory Manager
Name / Title

Merrell Johnson COMPANIES
concept to completion
ENGINEERING | SURVEYING | TESTING | INSPECTION

t)760.256.2068 f)760.256.0418 w)www.merrelljohnson.com

Sand Equivalent of Soils and Fine Aggregate

ASTM D2419

Project Number:	3813.006.500
Project Title:	Industrial Building
Project Location:	Apple Valley, CA
Client:	Redwood West

Report Date:	12/01/23
Sheet:	1 *of* 1
Attachment:	C
Permit No.:	
Client Project No.:	
Other:	
DSA File No.:	
DSA Application No.:	
DSA LEA No.:	

Sample ID: JDA10252323 ☐ **General Compliance** ☐ **Non-Compliance** ☐ **Not Specified**

Desription:	(SPSM) Poorly graded sand with silt
Sample Origin:	Boring Eight at 0' to 5'
Laboratory Remarks:	
Tested By:	JJB
Mechanical/Manual Shaker:	Mechanical

Sand Equivalent Value	**Ammount/Value Allowable**
71	-

Ammount/Value Allowable Based On:

The Material ☐ Was ☐ Was Not Sampled & tested in accordance with the reqs. of the DSA approved documents.
The Material Tested ☐ Met ☐ Did Not Meet The requirements of the DSA approved documents.

cc: Project Architect, Structural Engineer, Project Inspector, DSA Regional Office, School District

Reviewed By (Signature)

Jeremy Beissner/ Laboratory Manager
Name / Title

t)760.256.2068 f)760.256.0418 w)www.merrelljohnson.com

Sand Equivalent of Soils and Fine Aggregate

ASTM D2419

Project Number:	3813.006.500
Project Title:	Industrial Building
Project Location:	Apple Valley, CA
Client:	Redwood West

Report Date:	12/01/23
Sheet:	1 *of* 1
Attachment:	C
Permit No.:	
Client Project No.:	
Other:	
DSA File No.:	
DSA Application No.:	
DSA LEA No.:	

Sample ID: JDA10252324 ☐ **General Compliance** ☐ **Non-Compliance** ☐ **Not Specified**

Desription:	(SM) Silty sand with
Sample Origin:	Boring Nine at 0' to 5'
Laboratory Remarks:	
Tested By:	JJB
Mechanical/Manual Shaker:	Mechanical

Sand Equivalent Value	**Ammount/Value Allowable**
36	**-**

Ammount/Value Allowable Based On:

The Material ☐ Was ☐ Was Not Sampled & tested in accordance with the reqs. of the DSA approved documents.
The Material Tested ☐ Met ☐ Did Not Meet The requirements of the DSA approved documents.

cc: Project Architect, Structural Engineer, Project Inspector, DSA Regional Office, School District

Reviewed By (Signature)

Jeremy Beissner/ Laboratory Manager
Name / Title

t)760.256.2068 f)760.256.0418 w)www.merrelljohnson.com

Sand Equivalent of Soils and Fine Aggregate

ASTM D2419

Project Number:	3813.006.500
Project Title:	Industrial Building
Project Location:	Apple Valley, CA
Client:	Redwood West

Report Date:	12/01/23
Sheet:	1 *of* 1
Attachment:	
Permit No.:	C
Client Project No.:	
Other:	
DSA File No.:	
DSA Application No.:	
DSA LEA No.:	

Sample ID: JDA10252325 ☐ **General Compliance** ☐ **Non-Compliance** ☐ **Not Specified**

Desription:	(SM) Silty sand with gravel
Sample Origin:	Boring Ten at 0' to 5'
Laboratory Remarks:	
Tested By:	JJB
Mechanical/Manual Shaker:	Mechanical

Sand Equivalent Value	**Ammount/Value Allowable**
24	**-**

Ammount/Value Allowable Based On:

The Material	☐ Was	☐ Was Not	Sampled & tested in accordance with the reqs. of the DSA approved documents.
The Material Tested	☐ Met	☐ Did Not Meet	The requirements of the DSA approved documents.

cc: Project Architect, Structural Engineer, Project Inspector, DSA Regional Office, School District

Reviewed By (Signature)

Jeremy Beissner/ Laboratory Manager

Name / Title

Sand Equivalent of Soils and Fine Aggregate

ASTM D2419

Project Number:	3813.006.500
Project Title:	Industrial Building
Project Location:	Apple Valley, CA
Client:	Redwood West

Report Date:	12/01/23
Sheet:	1 *of* 1
Attachment:	C
Permit No.:	
Client Project No.:	
Other:	
DSA File No.:	
DSA Application No.:	
DSA LEA No.:	

Sample ID: JDA10252326 ☐ **General Compliance** ☐ **Non-Compliance** ☐ **Not Specified**

Desription:	(SM) Silty sand with gravel
Sample Origin:	Boring Eleven at 0' to 5'
Laboratory Remarks:	
Tested By:	JJB
Mechanical/Manual Shaker:	Mechanical

Sand Equivalent Value	**Ammount/Value Allowable**
24	**-**

Ammount/Value Allowable Based On:

The Material ☐ Was ☐ Was Not Sampled & tested in accordance with the reqs. of the DSA approved documents.
The Material Tested ☐ Met ☐ Did Not Meet The requirements of the DSA approved documents.

cc: Project Architect, Structural Engineer, Project Inspector, DSA Regional Office, School District

Reviewed By (Signature)

Jeremy Beissner/ Laboratory Manager
Name / Title

t)760.256.2068 f)760.256.0418 w)www.merrelljohnson.com

Sand Equivalent of Soils and Fine Aggregate

ASTM D2419

Project Number:	3813.006.500
Project Title:	Industrial Building
Project Location:	Apple Valley, CA
Client:	Redwood West

Report Date:	12/01/23
Sheet:	1 *of* 1
Attachment:	C
Permit No.:	
Client Project No.:	
Other:	
DSA File No.:	
DSA Application No.:	
DSA LEA No.:	

Sample ID: JDA10252327 ☐ **General Compliance** ☐ **Non-Compliance** ☐ **Not Specified**

Desription:	(SM) Silty sand
Sample Origin:	Boring Twelve at 0' to 5'
Laboratory Remarks:	
Tested By:	JJB
Mechanical/Manual Shaker:	Mechanical

Sand Equivalent Value	**Ammount/Value Allowable**
17	**-**

Ammount/Value Allowable Based On:

The Material	☐ Was	☐ Was Not	Sampled & tested in accordance with the reqs. of the DSA approved documents.
The Material Tested	☐ Met	☐ Did Not Meet	The requirements of the DSA approved documents.

cc: Project Architect, Structural Engineer, Project Inspector, DSA Regional Office, School District

Reviewed By (Signature)

Jeremy Beissner/ Laboratory Manager

Name / Title

Sand Equivalent of Soils and Fine Aggregate

ASTM D2419

Project Number:	3813.006.500
Project Title:	Industrial Building
Project Location:	Apple Valley, CA
Client:	Redwood West

Report Date:	12/01/23
Sheet:	1 *of* 1
Attachment:	C
Permit No.:	
Client Project No.:	
Other:	
DSA File No.:	
DSA Application No.:	
DSA LEA No.:	

Sample ID: JDA10252328 ☐ **General Compliance** ☐ **Non-Compliance** ☐ **Not Specified**

Desription:	(SM) Silty sand with
Sample Origin:	Boring Thirteen at 0' to 5'
Laboratory Remarks:	
Tested By:	JJB
Mechanical/Manual Shaker:	Mechanical

Sand Equivalent Value	**Ammount/Value Allowable**
37	-

Ammount/Value Allowable Based On:

The Material	☐ Was	☐ Was Not	Sampled & tested in accordance with the reqs. of the DSA approved documents.
The Material Tested	☐ Met	☐ Did Not Meet	The requirements of the DSA approved documents.

cc: Project Architect, Structural Engineer, Project Inspector, DSA Regional Office, School District

Reviewed By (Signature)

Jeremy Beissner/ Laboratory Manager

Name / Title

Consolidation Properties of Soils

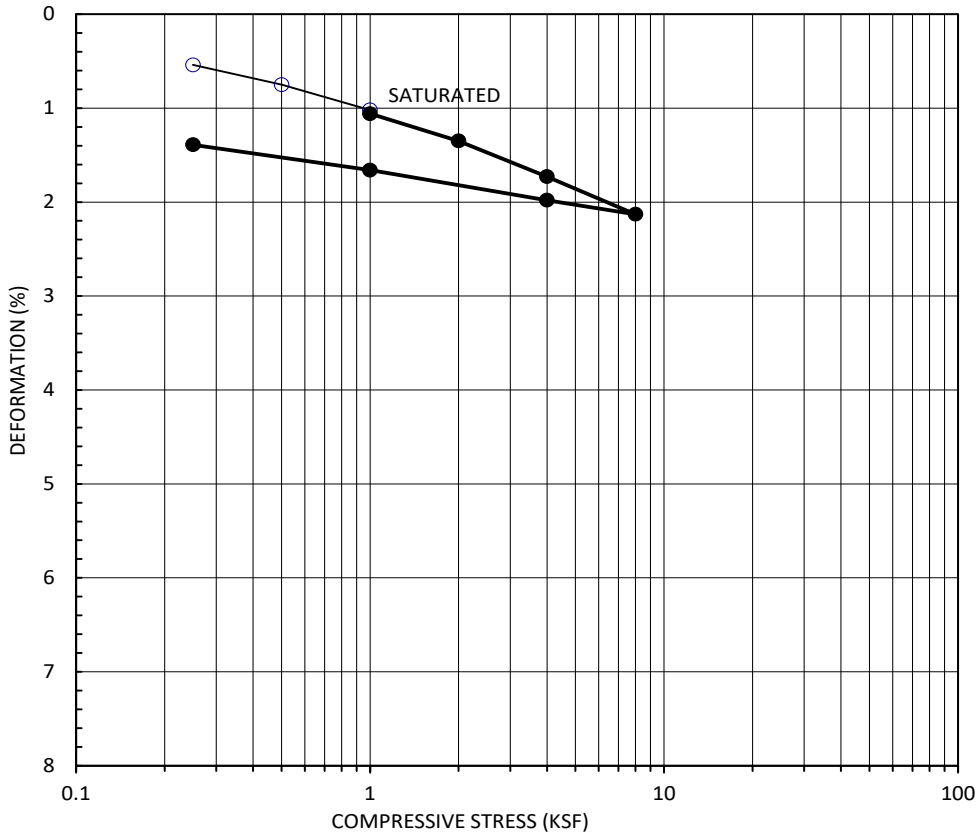
ASTM D2435

Project Number:	3813.006.500
Project Title:	Industrial Building
Project Location:	Apple Valley, CA
Client:	Redwood West

Report Date:	12/01/23
Sheet:	1 of 1
Appendix:	C
Permit No:	
Client Project No:	
Other:	
DSA File No:	
DSA Application No:	
DSA LEA No:	

Sample ID: JDA10252310 **Initial Moisture Content** (%): **9.4** **Initial Dry Density** (pcf): **120.2** **Initial Void Ratio:** **0.401**

Classification, ASTM D2488: (SPSM) Poorly graded sand with silt
Sample Origin: Boring Two at 5' to 10'
Laboratory Remarks:



The Material ☐ Was ☐ Was Not Sampled & tested in accordance with the reqs. of the DSA approved documents.
The Material Tested ☐ Met ☐ Did Not Meet The requirements of the DSA approved documents.
cc: Project Architect, Structural Engineer, Project Inspector, DSA Regional Office, School District

Reviewd By (Signature)

Jeremy Beissner/ Laboratory Manager
Name / Title

MerrellJohnson. engineering | surveying | testing | inspection

Merrell Engineering Company, Inc. | 22221 US Highway 18, Apple Valley, Ca. 92308 t)760.256.2068 f)760.256.0418 w)www.merrelljohnson.com

R-Value and Expansion Pressure of Compacted Soils

ASTM D2844

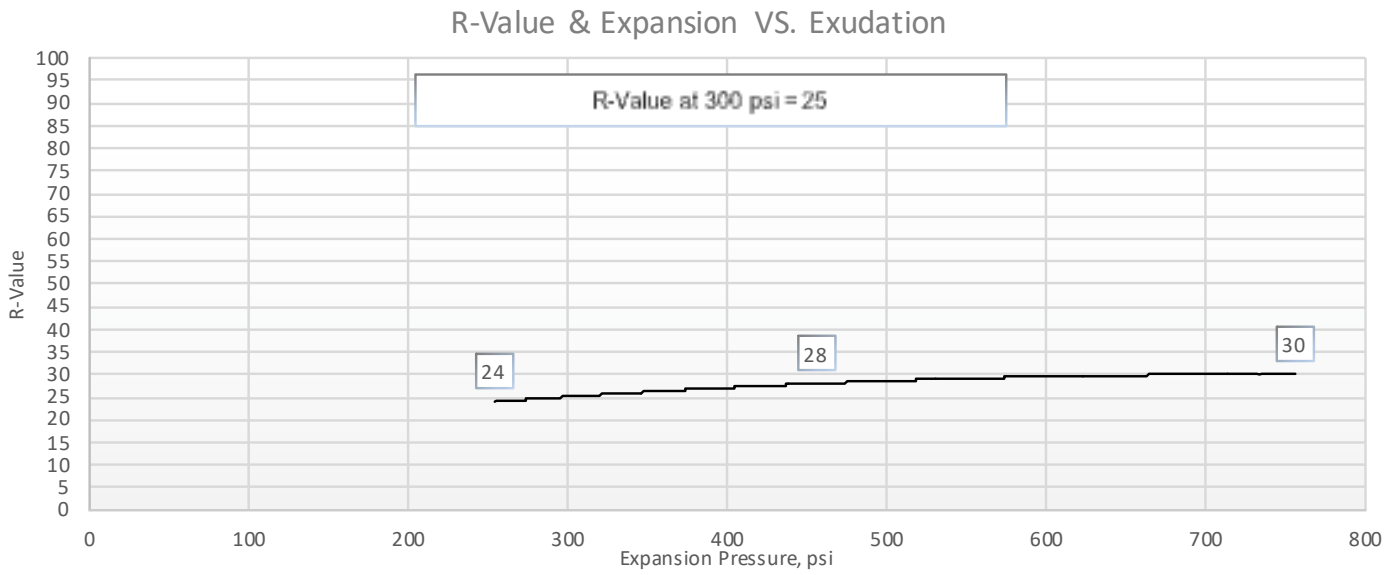
Report Date:	12/01/23
Sheet:	1 *of* 1
Appendix:	C
Permit No.:	
Client Project No.:	
Other:	
DSA File No.:	
DSA Application No.:	
DSA LEA No.:	

Project Number:	3813.006.600
Project Title:	Industrial Building
Project Location:	Apple Valley, CA
Client:	Redwood West

Sample ID: JDA10252325 ☐ **General Compliance** ☐ **Non-Compliance** ☐ **Not Specified**

Desription, D2847:	(SM) Silty sand with gravel
Sample Origin:	Boring Ten at 0' to 5' , East Side of Warehouse
Tested By:	JJB

Briguette Number:	1	2	3
Moisture Content (%):	12.9	15.1	14.8
Dry Density (pcf):	124.4	118.9	128.6
Exudation Pressure (psi):	756	456	254
Expansion Pressure (psf):	0	0	0
R-Value:	30	28	24



The Material ☐ Was ☐ Was Not Sampled & tested in accordance with the reqs. of the DSA approved documents.
The Material Tested ☐ Met ☐ Did Not Meet The requirements of the DSA approved documents.

cc: Project Architect, Structural Engineer, Project Inspector, DSA Regional Office, School District

Reviewed By (Signature)

Jeremy Beissner / Laboratory Manager
Name / Title

R-Value and Expansion Pressure of Compacted Soils

ASTM D2844

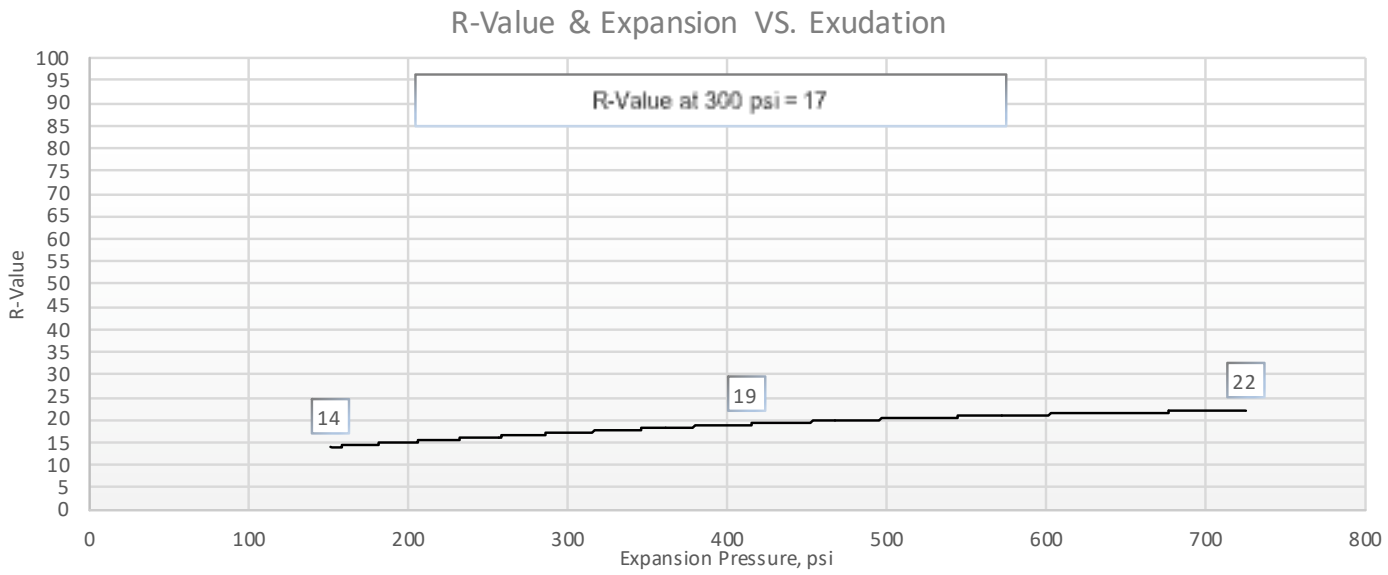
Project Number:	3813.006.600
Project Title:	Industrial Building
Project Location:	Apple Valley, CA
Client:	Redwood West

Report Date:	12/01/23
Sheet:	1 *of* 1
Appendix:	C
Permit No.:	
Client Project No.:	
Other:	
DSA File No.:	
DSA Application No.:	
DSA LEA No.:	

Sample ID: JDA10252327 ☐ **General Compliance** ☐ **Non-Compliance** ☐ **Not Specified**

Desription, D2847:	(SM) Silty sand
Sample Origin:	Boring Twelve at 0' to 5', West Side of Warehouse
Tested By:	JJB

Briguette Number:	1	2	3
Moisture Content (%):	10.7	11.8	15.8
Dry Density (pcf):	126.3	125.6	112.4
Exudation Pressure (psi):	725	412	151
Expansion Pressure (psf):	0	0	0
R-Value:	22	19	14



The Material ☐ Was ☐ Was Not Sampled & tested in accordance with the reqs. of the DSA approved documents.
The Material Tested ☐ Met ☐ Did Not Meet The requirements of the DSA approved documents.

cc: Project Architect, Structural Engineer, Project Inspector, DSA Regional Office, School District

Reviewed By (Signature)

Jeremy Beissner / Laboratory Manager
Name / Title

R-Value and Expansion Pressure of Compacted Soils

ASTM D2844

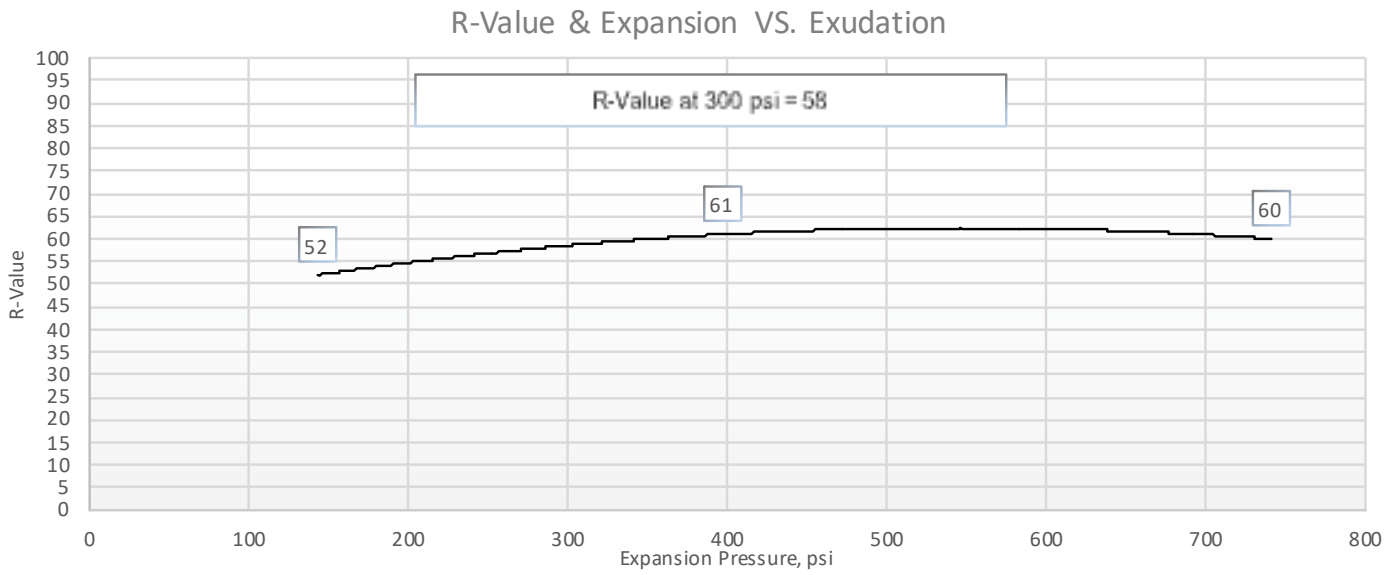
Report Date:	12/01/23
Sheet:	1 *of* 1
Appendix:	C
Permit No.:	
Client Project No.:	
Other:	
DSA File No.:	
DSA Application No.:	
DSA LEA No.:	

Project Number:	3813.006.500
Project Title:	Industrial Building
Project Location:	Apple Valley, CA
Client:	Redwood West

Sample ID: JDA11292302 ☐ **General Compliance** ☐ **Non-Compliance** ☐ **Not Specified**

Desription, D2847:	(SM) Silty sand
Sample Origin:	Boring Fourteen at 0' to 5' , Dachund Avenue
Tested By:	JJB

Briguette Number:	1	2	3
Moisture Content (%):	7.0	7.5	9.1
Dry Density (pcf):	129.1	130.9	127.9
Exudation Pressure (psi):	741	397	143
Expansion Pressure (psf):	0.0135	0.0169	0.0194
R-Value:	60	61	52



The Material ☐ Was ☐ Was Not Sampled & tested in accordance with the reqs. of the DSA approved documents.
The Material Tested ☐ Met ☐ Did Not Meet The requirements of the DSA approved documents.

cc: Project Architect, Structural Engineer, Project Inspector, DSA Regional Office, School District

Reviewed By (Signature)

Jeremy Beissner / Laboratory Manager
Name / Title

Merrell Johnson COMPANIES

concept to completion
ENGINEERING | SURVEYING | TESTING | INSPECTION

t)760.256.2068 f)760.256.0418 w)www.merrelljohnson.com

R-Value and Expansion Pressure of Compacted Soils

ASTM D2844

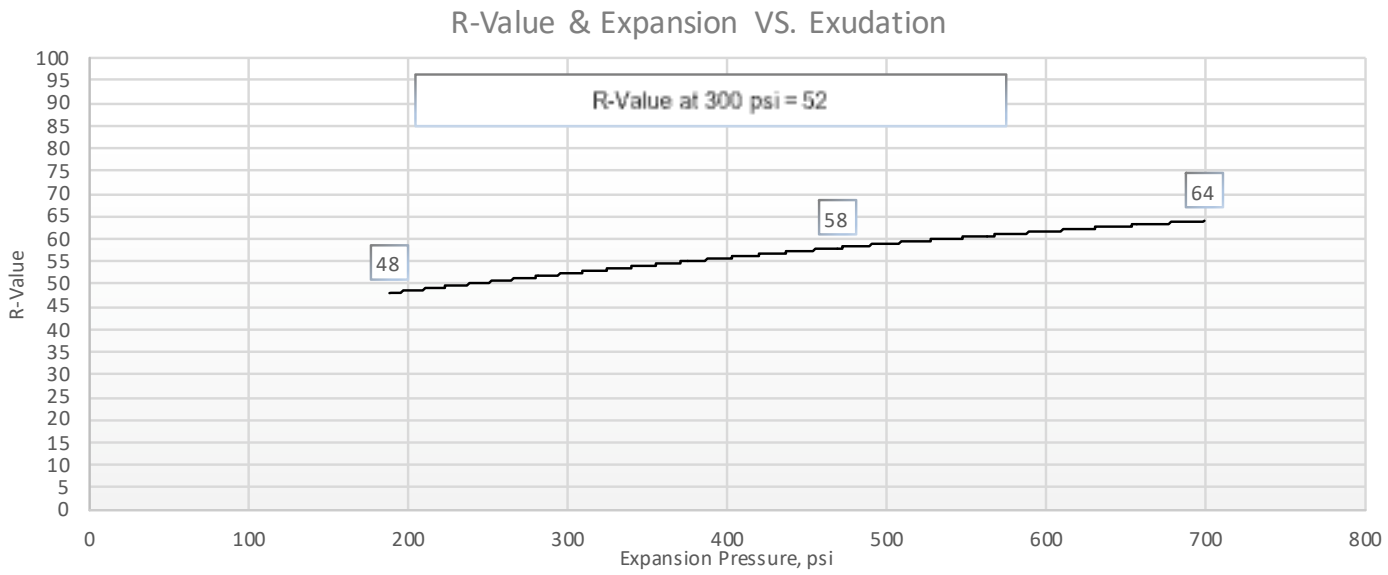
Project Number:	3813.006.500
Project Title:	Industrial Building
Project Location:	Apple Valley, CA
Client:	Redwood West

Report Date:	
Sheet:	1 *of* 1
Appendix:	C
Permit No.:	
Client Project No.:	
Other:	
DSA File No.:	
DSA Application No.:	
DSA LEA No.:	

Sample ID: JDA11292303 ☐ **General Compliance** ☐ **Non-Compliance** ☐ **Not Specified**

Desription, D2847:	(SM) Silty sand
Sample Origin:	Boring Fifteen at 0' to 5' Cardova Avenue
Tested By:	JJB

Briguette Number:	1	2	3
Moisture Content (%):	7.5	8.1	8.8
Dry Density (pcf):	129.9	130.5	127.8
Exudation Pressure (psi):	699	469	188
Expansion Pressure (psf):	0.0031	0.0017	0.0008
R-Value:	64	58	48



The Material ☐ Was ☐ Was Not Sampled & tested in accordance with the reqs. of the DSA approved documents.
The Material Tested ☐ Met ☐ Did Not Meet The requirements of the DSA approved documents.

cc: Project Architect, Structural Engineer, Project Inspector, DSA Regional Office, School District

Reviewed By (Signature)

Jeremy Beissner / Laboratory Manager
Name / Title

Merrell Johnson COMPANIES

concept to completion
ENGINEERING | SURVEYING | TESTING | INSPECTION

t)760.256.2068 f)760.256.0418 w)www.merrelljohnson.com

Direct Shear Test of Soils

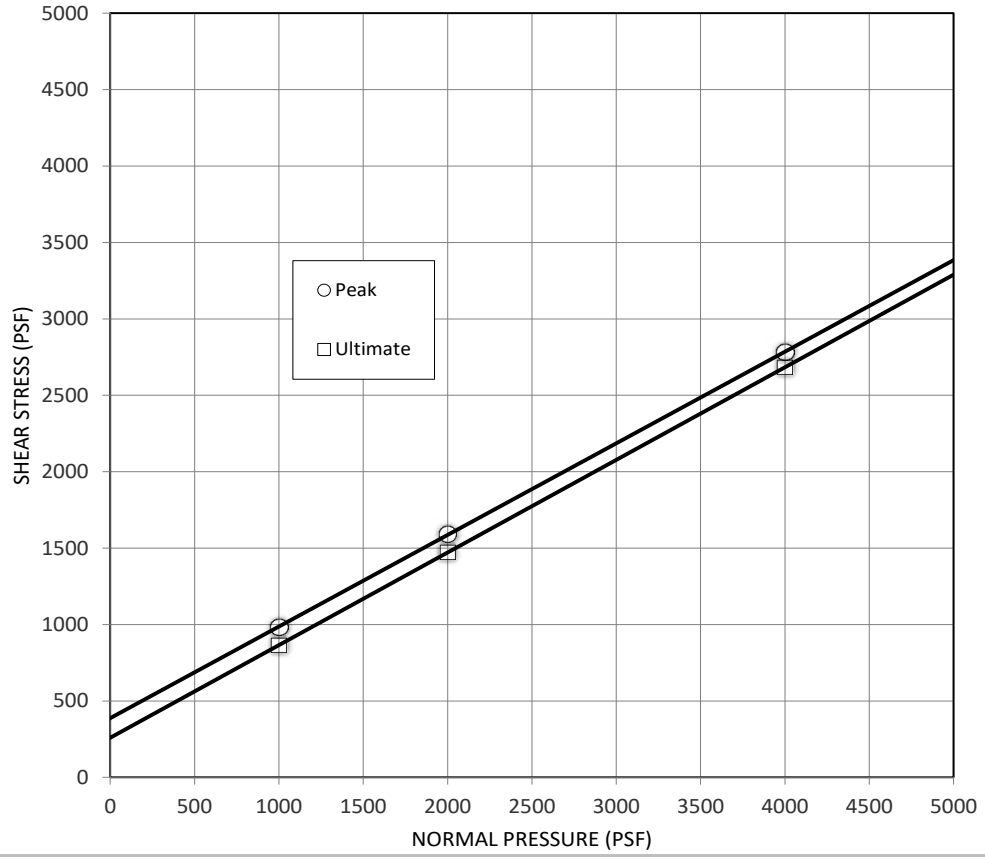
ASTM D3080

Project Number:	3813.006.500
Project Title:	Industrial Building
Project Location:	Apple Valley, CA
Client:	Redwood West

Report Date:	12/01/23
Sheet:	1 of 1
Appendix:	C
Permit No:	
Client Project No:	
Other:	
DSA File No:	
DSA Application No:	
DSA LEA No:	

Sample ID: JDA10252301 **Angle of Internal Friction** (°)**:** 31 **Peak Cohesion** (psf)**:** 388 **Ultimate Cohesion** (psf)**:** 260

Classification, ASTM D2488:	(SM) Silty sand
Sample Origin:	Boring One at 0' to 5'
Laboratory Remarks:	Sample was remolded to 95% relative compaction and optimum moisture. Maximum Dry Density: 124.1 pcf Optimum Moisture: 9.2%



The Material	☐ Was	☐ Was Not	Sampled & tested in accordance with the reqs. of the DSA approved documents.
The Material Tested	☐ Met	☐ Did Not Meet	The requirements of the DSA approved documents.

cc: Project Architect, Structural Engineer, Project Inspector, DSA Regional Office, School District

Reviewd By (Signature)

Jeremy Beissner/ Laboratory Manager
Name / Title

MerrellJohnson®

engineering | surveying | testing | inspection

Merrell Engineering Company, Inc. | 22221 US Highway 18, Apple Valley, Ca. 92308 t)760.256.2068 f)760.256.0418 w)www.merrelljohnson.com

Direct Shear Test of Soils

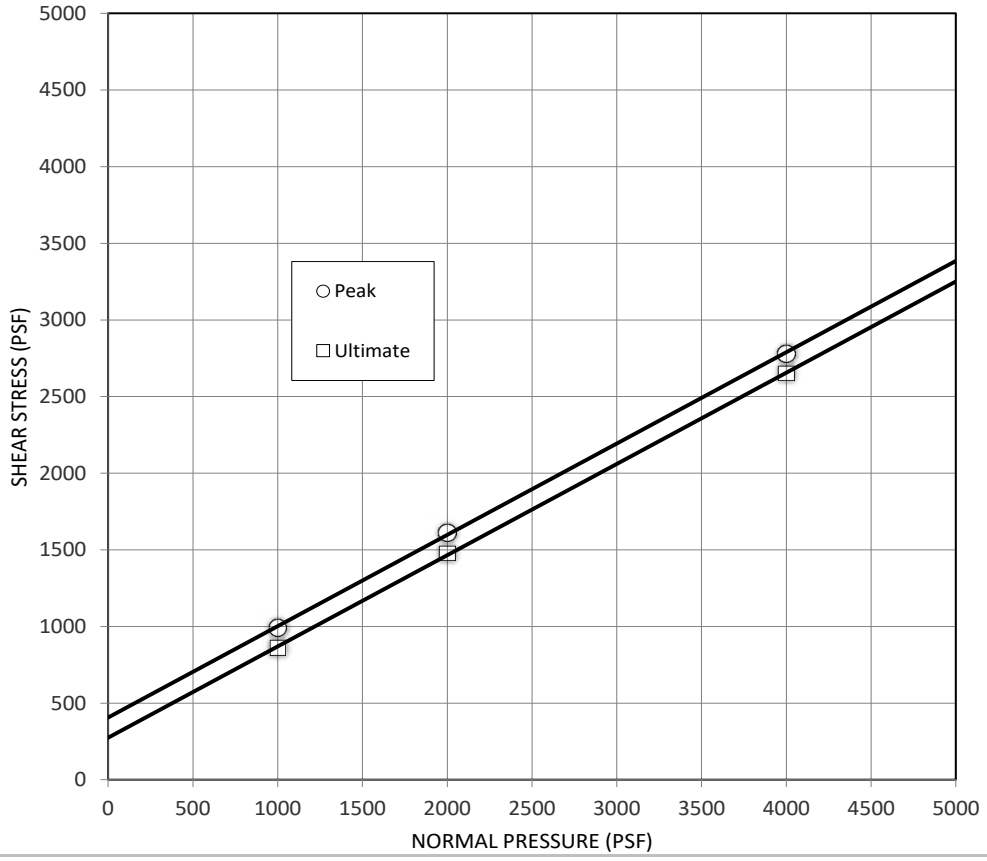
ASTM D3080

Report Date:	12/01/23
Sheet:	1 of 1
Appendix:	C
Permit No:	
Client Project No:	
Other:	
DSA File No:	
DSA Application No:	
DSA LEA No:	

Project Number:	3813.006.500
Project Title:	Industrial Building
Project Location:	Apple Valley, CA
Client:	Redwood West

Sample ID: JDA10252315 **Angle of Internal Friction** (°)**:** 31 **Peak Cohesion** (psf)**:** 406 **Ultimate Cohesion** (psf)**:** 275

Classification, ASTM D2488:	(SM) Silty sand
Sample Origin:	Boring Four at 0' to 5'
Laboratory Remarks:	Sample was remolded to 95% relative compaction and optimum moisture. Maximum Dry Density: 128.1 pcf Optimum Moisture: 6.5%



The Material	☐ Was	☐ Was Not	Sampled & tested in accordance with the reqs. of the DSA approved documents.
The Material Tested	☐ Met	☐ Did Not Meet	The requirements of the DSA approved documents.

cc: Project Architect, Structural Engineer, Project Inspector, DSA Regional Office, School District

Reviewd By (Signature)

Jeremy Beissner/ Laboratory Manager
Name / Title

MerrellJohnson®

engineering | surveying | testing | inspection

Merrell Engineering Company, Inc. | 22221 US Highway 18, Apple Valley, Ca. 92308 t)760.256.2068 f)760.256.0418 w)www.merrelljohnson.com

Expansion Index

ASTM D4829

Project Number:	3813.006.500
Project Title:	Industrial Building
Project Location:	Apple Valley, CA
Client:	Redwood West

Report Date:	12/01/23
Sheet:	1 *of* 1
Attachment:	C
Permit No.:	
Client Project No.:	
Other:	
DSA File No.:	
DSA Application No.:	
DSA LEA No.:	

Sample ID: JDA10252311 ☐ **General Compliance** ☐ **Non-Compliance** ☐ **Not Specified**

Classification, ASTM D2487:	(SPSM) Poorly graded sand with silt
Sample Origin:	Boring Three at 0' to 5'
Laboratory Remarks:	
Tested By:	JJB
Method/Procedure:	ASTM D4829

Expansion Index

Value: 2

Expansion Index	Potention Expansion
0 - 20	Very Low
21 - 50	Low
51 - 90	Medium
91 - 130	High
> 130	Very High

The Material ☐ Was ☐ Was Not Sampled & tested in accordance with the reqs. of the DSA approved documents.
The Material Tested ☐ Met ☐ Did Not Meet The requirements of the DSA approved documents.

cc: Project Architect, Structural Engineer, Project Inspector, DSA Regional Office, School District

Reviewed By (Signature)

Jeremy Beissner / Laboratory Manager
Name / Title

Corrosion Potential

CT 643, 422, 417, 643

Report Date: 12/01/23
Sheet: 1 of 1
Appendix: C
Permit No:
Client Project No:
Other:
DSA File No:
DSA Application No:
DSA LEA No:

Project Number: 3813.006.500
Project Title: Industrial Building
Project Location: Apple Valley, CA
Client: Redwood West

Sample ID: JDA10252310

Classification, ASTM D2487: (SPSM) Poorly graded sand with silt
Sample Origin: Boring Two at 5' to 10'
Laboratory Remarks:

Analysis	Result	Units	Test Method
Minimum Resistivity	1,500	ohm-cm	CT 643
Chloride Content	260	ppm	CT 422
Sulfate Content	0.006	%	CT 417
pH	8.85	pH units	CT 643

The Material ☐ Was ☐ Was Not Sampled & tested in accordance with the reqs. of the DSA approved documents.
The Material Tested ☐ Met ☐ Did Not Meet The requirements of the DSA approved documents.
cc: Project Architect, Structural Engineer, Project Inspector, DSA Regional Office, School District

Reviewd By (Signature)

Jeremy Beissner/ Laboratory Manager
Name / Title

Merrell Johnson®

engineering | surveying | testing | inspection

Merrell Engineering Company, Inc. | 22221 US Highway 18, Apple Valley, Ca. 92308 t)760.256.2068 f)760.256.0418 w)www.merrelljohnson.com

Corrosion Potential

CT 643, 422, 417, 643

Report Date: 12/01/23
Sheet: 1 of 1
Appendix: C
Permit No:
Client Project No:
Other:
DSA File No:
DSA Application No:
DSA LEA No:

Project Number: 3813.006.500
Project Title: Industrial Building
Project Location: Apple Valley, CA
Client: Redwood West

Sample ID: JDA10252311

Classification, ASTM D2487: (SPSM) Poorly graded sand with silt
Sample Origin: Boring Three at 0' to 5'
Laboratory Remarks:

Analysis	Result	Units	Test Method
Minimum Resistivity	260	ohm-cm	CT 643
Chloride Content	1230	ppm	CT 422
Sulfate Content	0.177	%	CT 417
pH	7.86	pH units	CT 643

The Material ☐ Was ☐ Was Not Sampled & tested in accordance with the reqs. of the DSA approved documents.
The Material Tested ☐ Met ☐ Did Not Meet The requirements of the DSA approved documents.
cc: Project Architect, Structural Engineer, Project Inspector, DSA Regional Office, School District

Reviewd By (Signature)

Jeremy Beissner/ Laboratory Manager
Name / Title

Merrell Johnson®

engineering | surveying | testing | inspection

Merrell Engineering Company, Inc. | 22221 US Highway 18, Apple Valley, Ca. 92308 t)760.256.2068 f)760.256.0418 w)www.merrelljohnson.com

MERRELL JOHNSON

12277 Apple Valley Rd. #291, Apple Valley, CA 92308
760-256-2068 | www.merrelljohnson.com