Appendix F

Infiltration/Percolation Testing for Stormwater Retention

GEOBODEN, INC.
Geotechnical Consultants

December 30, 2017
Lake Elsinore-1-01

Attention: Mr. Ron Kassab

Subject: **Infiltration/Percolation Testing for Stormwater Retention**
Proposed Kassab Travel Center
29301 Riverside Drive
Lake Elsinore, California

As requested, we have performed percolation/infiltration testing on the subject site in order to determine the infiltration potential of the surface soils. The percolation rates determined should be useful in assessing stormwater retention needs. It is our understanding that on-site stormwater retention will be required. It is proposed to collect the stormwater runoff within subsurface percolation chambers. This report presents the results of our study, discussion of our findings, and provides percolation rates for the subject system.

PURPOSE AND SCOPE OF SERVICES

The purpose of this study was to determine the general percolation rates and physical characteristics of the onsite soils in order to provide design parameters for the proposed onsite infiltration system. Services provided for this study are in accordance with our agreement and consisted of the following:

- Site exploration consisting of the excavation and logging of three test holes;
- Percolation testing in the test holes (P-1, P-2 and P-3);
- Compilation of this report, which presents the results of our study and provides percolation rates for the design of an onsite infiltration system.

SITE DESCRIPTION AND PROPOSED DEVELOPMENT

The site is located at 29301 Riverside Drive in Lake Elsinore, California. The subject property is presently occupied by a vacant land. The project consists of construction of Gas Station, RV Fueling Station and associated improvements. Further information regarding proposed development and test hole locations is shown on Figure 1, Percolation Test Holes Location Map.

FIELD INVESTIGATION

Our field investigation consisted of excavating three shallow exploratory test holes, which were also used as percolation test holes. Hollow-stem drilled equipment was utilized to excavate the exploratory test holes. An engineer logged and observed the test holes excavations. Soil classification was based on visual observation. The approximate locations of the exploratory and

percolation test holes are shown on Figure 1 (Percolation Test Holes Location Map). Logs of the exploratory test holes are presented in Appendix A.

SUBSURFACE SOILS CONDITIONS

SOIL PROFILE

The soils encountered within our test holes consisted of native soil materials. Native soils encountered within the exploratory test holes consisted primarily of sandy clay and clay. A more detailed description of these materials is provided in the exploratory test holes logs included in the enclosed Appendix A. Soils encountered were classified according to the Unified Soil Classification System (USCS).

GROUNDWATER

Groundwater was not encountered within the exploratory test holes to the maximum explored depth of 5 feet below ground surface (bgs). Fluctuations of the groundwater table, localized zones of perched water, and rise in soil moisture content should be anticipated during the rainy season. Irrigation of landscaped areas can also lead to an increase in soil moisture content and fluctuations of intermittent shallow perched groundwater levels.

PERCOLATION TESTING AND PROCEDURE

Percolation testing was performed to assess the general percolation rates of the onsite soils for the design of an onsite infiltration system.

The continuous pre-soak (falling-head) test procedure was utilized for testing. Water was allowed to presoak in each test hole prior to obtaining test readings. Following the presoak period, the drop in water level in each hole was monitored every 10 to 30 minutes to determine the appropriate method for testing. Test holes were refilled following each reading or when the water depth was below 6 inches. Test times ranged from 120 to 150 minutes. The drop in water level was recorded to the nearest $1/10^{th}$ inch to produce conservative water level readings.

SUMMARY OF PERCOLATION TEST RESULTS

Tests results are summarized below:

Test Hole No.	Rate (Inch/Hour)
1	1.3
2	1.4
3	1.2

Based on the obtained field data, 1.2 inches per hour should be utilized in the design of the proposed onsite drain system. The base of the system should be founded into natural soils.

It should be noted that the infiltration rates determined are ultimate rates based upon field test results. An appropriate safety factor should be applied to account for subsoil inconsistencies and potential silting of the percolating soils. The safety factor should be determined with consideration to other factors in the stormwater retention system design (particularly stormwater volume estimates) and the safety factors associated with those design components.

The Storm water Manager's Resource Center (SMRC) web site (http://www.stormwatercenter.net/) includes guidelines for disposal of storm water with respect to setback of structures. It is included in the criteria that infiltration facilities should be setback 10 feet down-gradient from structures. In order to avoid potential adversely impacting any existing structures, we recommend that any infiltration system be kept a horizontal distance of at least 10 feet from the edge of new building and the property line.

LIMITATIONS

The findings and recommendations of this report were prepared in accordance with generally accepted professional engineering and engineering geologic principals and practice within our opinion at this time in Southern California. Our conclusions and recommendations are based on the results of the field investigations, combined with an interpolation of subsurface conditions between and beyond exploration locations.

As the project evolves, our continued consultation and construction monitoring should be considered. GeoBoden should review plans and specifications to ensure the recommendations presented herein have been appropriately interpreted, and that the design assumptions used in this study are valid. Where significant design changes occur, GeoBoden may be required to augment or modify these recommendations. Subsurface conditions may differ in some locations from those encountered in the explorations, and may require additional analyses and/or modified recommendations. This report was written for Client, and the design team members, and only for the proposed development described herein. We are not responsible for technical interpretations made by others, or exploratory information that has not been described or documented in this report. Specific questions or interpretations concerning our findings and conclusions may require written clarification.

We appreciate the opportunity to provide service to you on this project. If you have questions regarding this letter or the data included, please contact the undersigned.

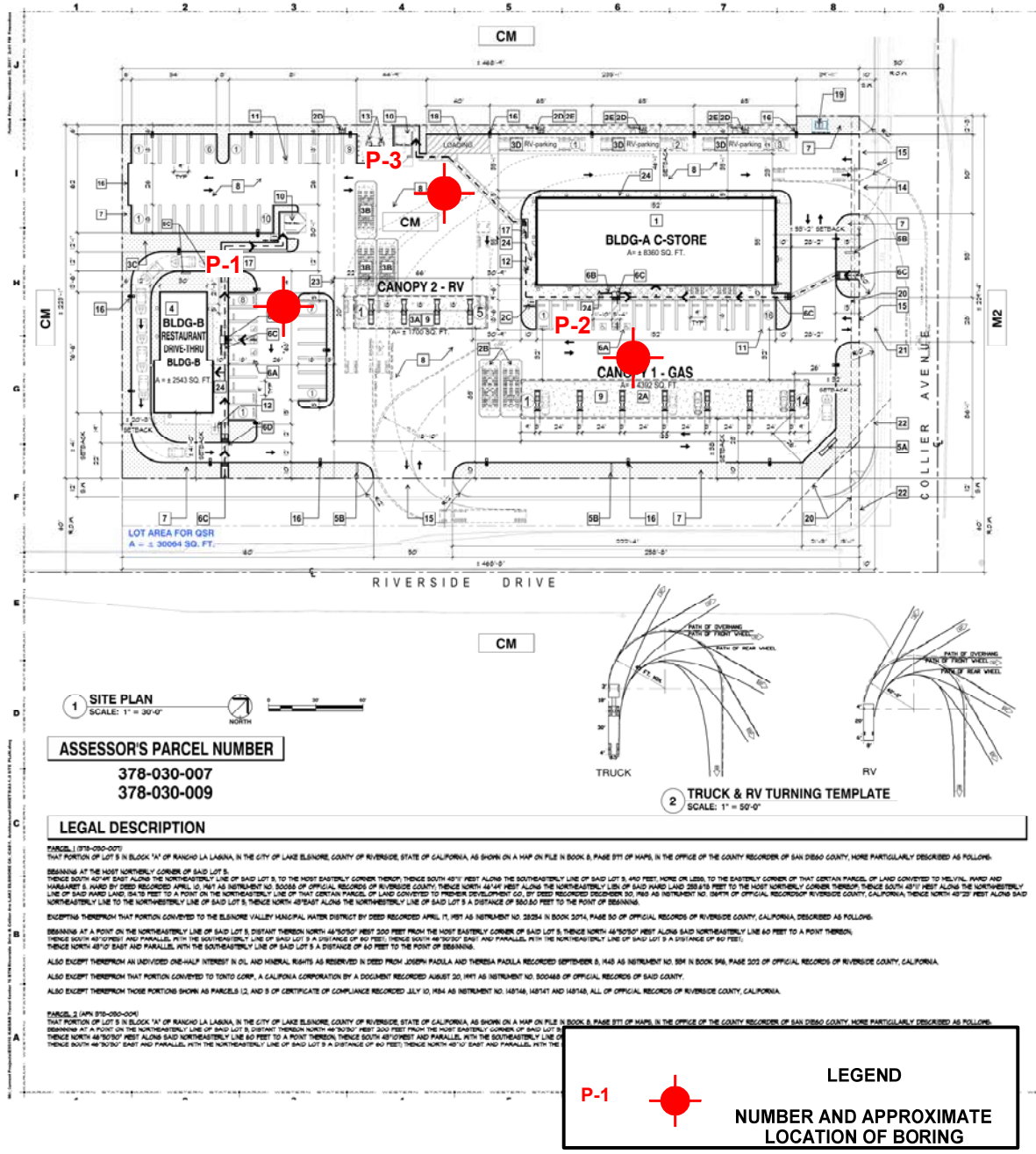
Sincerely,
GEOBODEN, INC.

Cyrus Radvar
Principal Engineer, G.E. 2742

Copies: 3/Addressee

Attachments:

Figure 1 – Percolation Test Holes Location Map
Appendix A – Test Holes Logs



ASSESSOR'S PARCEL NUMBER

378-030-007
378-030-009

LEGAL DESCRIPTION

PARCEL 1 (378-030-007)
THAT PORTION OF LOT 5 IN BLOCK "A" OF RANCHO LA LAGUNA, IN THE CITY OF LAKE ELSINORE, COUNTY OF RIVERSIDE, STATE OF CALIFORNIA, AS SHOWN ON A MAP ON FILE IN BOOK 8, PAGE 871 OF MAPS, IN THE OFFICE OF THE COUNTY RECORDER OF SAN DIEGO COUNTY, MORE PARTICULARLY DESCRIBED AS FOLLOWS:

BEGINNING AT THE MOST NORTHERLY CORNER OF SAID LOT 5;
THENCE SOUTH 40°49' EAST ALONG THE NORTHEASTERLY LINE OF SAID LOT 5, TO THE MOST EASTERLY CORNER THEREOF; THENCE SOUTH 49°11' WEST ALONG THE SOUTHEASTERLY LINE OF SAID LOT 5, 440 FEET, MORE OR LESS, TO THE EASTERLY CORNER OF THAT CERTAIN PARCEL OF LAND CONVEYED TO MELVIN L. WARD AND MARGARET S. WARD BY DEED RECORDED APRIL 10, 1961 AS INSTRUMENT NO. 30058 OF OFFICIAL RECORDS OF RIVERSIDE COUNTY; THENCE NORTH 40°49' WEST ALONG THE NORTHEASTERLY LINE OF SAID WARD LAND, 259.75 FEET TO A POINT ON THE NORTHEASTERLY LINE OF THAT CERTAIN PARCEL OF LAND CONVEYED TO PIONEER DEVELOPMENT CO., BY DEED RECORDED DECEMBER 30, 1960 AS INSTRUMENT NO. 138479 OF OFFICIAL RECORDSOF RIVERSIDE COUNTY, CALIFORNIA; THENCE NORTH 49°23' WEST ALONG SAID NORTHEASTERLY LINE TO THE NORTHWESTERLY LINE OF SAID LOT 5; THENCE NORTH 49°EAST ALONG THE NORTHWESTERLY LINE OF SAID LOT 5 A DISTANCE OF 550.50 FEET TO THE POINT OF BEGINNING.

EXCEPTING THEREFROM THAT PORTION CONVEYED TO THE ELSINORE VALLEY MUNICIPAL WATER DISTRICT BY DEED RECORDED APRIL 17, 1957 AS INSTRUMENT NO. 28254 IN BOOK 2074, PAGE 50 OF OFFICIAL RECORDS OF RIVERSIDE COUNTY, CALIFORNIA, DESCRIBED AS FOLLOWS:

BEGINNING AT A POINT ON THE NORTHEASTERLY LINE OF SAID LOT 5, DISTANT THEREON NORTH 40°50'50" WEST 300 FEET FROM THE MOST EASTERLY CORNER OF SAID LOT 5; THENCE NORTH 49°50'50" WEST ALONG SAID NORTHEASTERLY LINE 60 FEET TO A POINT THEREON;
THENCE SOUTH 40°10' WEST AND PARALLEL WITH THE SOUTHEASTERLY LINE OF SAID LOT 5 A DISTANCE OF 60 FEET; THENCE SOUTH 49°50'50" EAST AND PARALLEL WITH THE NORTHEASTERLY LINE OF SAID LOT 5 A DISTANCE OF 60 FEET;
THENCE NORTH 40°10' EAST AND PARALLEL WITH THE SOUTHEASTERLY LINE OF SAID LOT 5 A DISTANCE OF 60 FEET TO THE POINT OF BEGINNING.

ALSO EXCEPT THEREFROM AN UNDIVIDED ONE-HALF INTEREST IN OIL AND MINERAL RIGHTS AS RESERVED IN DEED FROM JOSEPH PADILLA AND THERESA PADILLA RECORDED SEPTEMBER 8, 1948 AS INSTRUMENT NO. 594 IN BOOK 596, PAGE 202 OF OFFICIAL RECORDS OF RIVERSIDE COUNTY, CALIFORNIA.

ALSO EXCEPT THEREFROM THAT PORTION CONVEYED TO TONTO CORP., A CALIFONIA CORPORATION BY A DOCUMENT RECORDED AUGUST 20, 1991 AS INSTRUMENT NO. 300468 OF OFFICIAL RECORDS OF SAID COUNTY.

ALSO EXCEPT THEREFROM THOSE PORTIONS SHOWN AS PARCELS 12, AND 9 OF CERTIFICATE OF COMPLIANCE RECORDED JULY 10, 1984 AS INSTRUMENT NO. 148746, 148747 AND 148748, ALL OF OFFICIAL RECORDS OF RIVERSIDE COUNTY, CALIFORNIA.

PARCEL 2 (APN 378-030-004)
THAT PORTION OF LOT 5 IN BLOCK "A" OF RANCHO LA LAGUNA, IN THE CITY OF LAKE ELSINORE, COUNTY OF RIVERSIDE, STATE OF CALIFORNIA, AS SHOWN ON A MAP ON FILE IN BOOK 8, PAGE 871 OF MAPS, IN THE OFFICE OF THE COUNTY RECORDER OF SAN DIEGO COUNTY, MORE PARTICULARLY DESCRIBED AS FOLLOWS:
BEGINNING AT A POINT ON THE NORTHEASTERLY LINE OF SAID LOT 5, DISTANT THEREON NORTH 40°50'50" WEST 300 FEET FROM THE MOST EASTERLY CORNER OF SAID LOT 5;
THENCE NORTH 49°50'50" WEST ALONG SAID NORTHEASTERLY LINE 60 FEET TO A POINT THEREON; THENCE SOUTH 40°10' WEST AND PARALLEL WITH THE SOUTHEASTERLY LINE
THENCE SOUTH 49°50'50" EAST AND PARALLEL WITH THE NORTHEASTERLY LINE OF SAID LOT 5 A DISTANCE OF 60 FEET; THENCE NORTH 40°10' EAST AND PARALLEL WITH THE

P-1 — **LEGEND**

NUMBER AND APPROXIMATE LOCATION OF BORING

LEGEND

- NO. OF PARKING SPACES
- ACCESSIBLE PARKING
- PROPERTY LINE (BEFORE R.O.W. DEDICATION)
- PROPERTY LINE (AFTER R.O.W. DEDICATION)
- HANDICAP PATH OF TRAVEL
- CONCRETE PAVING AREA
- LANDSCAPED AREA
- DECORATIVE STAMPED CONCRETE
- WALL MOUNTED AREA LIGHTS
- DIRECTIONAL ARROW
- AREA LIGHTS
- (E) FIRE HYDRANT

SITE KEY NOTES

1 CONVENIENCE STORE
2A GAS STATION CANOPY AND FUEL DISPENSERS FOR AUTOS
2B UNDERGROUND STORAGE TANK
2C VENT RISER WITH CARBON CANISTER
2D AIR & WATER UNIT
2E TRASH BIN
3A GAS STATION CANOPY AND FUEL DISPENSERS OR R.V. & TRUCKS
3B UNDERGROUND STORAGE TANK
3C VENT RISER WITH CARBON CANISTER
3D RV PARKING W/ DUMP STATION
4 FASTFOOD WITH DRIVE-THRU
5A MONUMENT SIGN (UNDER SEPARATE PERMIT)
5B PRICE SIGN (UNDER SEPARATE PERMIT)
5C DRIVE THRU MENU BOARD SIGN
6A ACCESSIBLE PARKING (WITH WHEELCHAIR WHERE REQUIRED)
6B ACCESSIBLE PARKING SIGN
6C ADA ACCESSIBLE RAMP & TRUNCATED DOME PAVER
6D ADA ACCESSIBLE PATH STRIPING (2% MAX CROSS SLOPE)
7 LANDSCAPE WITH 6" CONCRETE CURB
8 ASPHALT PAVING - ALL WEATHER SURFACE TO SUPPORT 75,000 LBS PER FIRE DEPT REQUIREMENTS
9 CONCRETE PAVING - ALL WEATHER SURFACE TO SUPPORT 75,000 LBS PER FIRE DEPT REQUIREMENTS
10 TRASH ENCLOSURE PER CITY STANDARD WHERE APPLICABLE)
11 PARKING STRIPING AS PER CITY STANDARDS (WITH WHEELSTOP WHERE REQUIRED)
12 BIKE PARKING RACK
13 PROPANE TANK
14 (E) DRIVEWAY TO REMOVE, CONSTRUCT (N) SIDEWALK PER CITY STANDARDS
15 (N) DRIVEWAY PER CITY STANDARDS NO. 108A
16 AREA LIGHTS
17 SERVICE RAMP
18 SERVICE LOADING AREA
19 PROPOSED LOCATION OF TRANSFORMER
20 (E) WATER & TELEPHONE EASEMENT
21 (E) POWER POLE (TO BE RELOCATED PER CITY R.O.W. WIDENING)
22 (E) CURB, GUTTER & SIDEWALK (TO BE RELOCATED PER CITY R.O.W. WIDENING)
23 PROPOSED NEW PARCEL LINE FOR QSR WITH DRIVE-THRU
24 CONCRETE WALKWAY

VICINITY MAP

PROJECT DATA

ZONING	C-M (COMMERCIAL MANUFACTURING)	
LAND USE	COMMERCIAL	
AREA OF SITE	± 124,045 S.F. (± 2.85 ACRES) (BEFORE R.O.W. DEDICATION) ± 104,824 S.F. (± 2.34 ACRES) (AFTER R.O.W. DEDICATION)	
BLDG SETBACKS	REQUIRED	PROPOSED
FRONT	20'-0"	20'-0" / 41'-0"
REAR	0'-0" (5'-0" IF ADJACENT TO R-ZONE)	46'-1"
SIDE (YARD)	0'-0" (5'-0" IF ADJACENT TO R-ZONE)	20'-9"
SIDE (STREET)	15'-0"	52'-0" / 51'-0"
LANDSCAPE AREA	12%	16.45% (± 17,140 S.F.)
FLOOR AREA RATIO	-	0.152
LOT COVERAGE	-	18.2%
MAXIMUM HEIGHT	45'-0"	± 26'-0"
PARKING (SEE PARKING COMPUTATION BELOW)	64	75

BUILDING DATA

(N) BLDG-A CONVENIENCE STORE

AREA	± 8,360 SF
OCCUPANCY	M
TYPE OF CONST	V-B
NUMBER OF STORY	1
BLDG HEIGHT	± 26'-0"
FIRE SPRINKLER	YES

(N) BLDG CANOPY (FOR AUTOS)

AREA	± 4,312 SF
OCCUPANCY	M
TYPE OF CONST	II-B
NUMBER OF STORY	1
BLDG HEIGHT	± 18'-0"
(CANOPY CLEARANCE)	± 13'-0"
FIRE SPRINKLER	NONE

(N) BLDG CANOPY (FOR R.V.s)

AREA	± 1,700 SF
OCCUPANCY	M
TYPE OF CONST	II-B
NUMBER OF STORY	1
BLDG HEIGHT	± 14'-8"
(CANOPY CLEARANCE)	± 13'-0"
FIRE SPRINKLER	NONE

(N) BLDG-B FASTFOOD REATAURANT W/ DRIVE-THRU

AREA	± 2,543 SF
OCCUPANCY	A-2
TYPE OF CONST	V-B
NUMBER OF STORY	1
BLDG HEIGHT	± 22'-2"
FIRE SPRINKLER	NONE

PARKING ANALYSIS

PARKING STANDARDS

TYPE	SIZE
REGULAR	9'-0" X 18'-0"
PARALLEL	8'-0" X 23'-0"
HANDICAP	11'-0" X 18'-0" VAN ACCESSIBLE
LOADING	12'-0" X 40'-0" (TYPE-B)

PARKING REQUIREMENTS

USE	REQUIRED	PROPOSED
C-STORE (RETAIL AREA) (± 8,760 SF)	17	14 (6 CANOPIES)
FORMULA: 1 SP PER 400 SF (CM-DISTRICT)		
C-STORE (QSR AREA) (± 1,800 SF)	21	25
FORMULA: 1 SP PER 45 SF OF CUSTOMER AREA, PLUS 1 SP PER 200 SF OF NON-CUSTOMER AREA		
FASTFOOD RESTAURANT	21	31
FORMULA: 1 SP PER 45 SF OF CUSTOMER AREA, PLUS 1 SP PER 200 SF OF NON-CUSTOMER AREA		

HANDICAP PARKING REQUIREMENTS

FORMULA	REQUIRED	PROPOSED
51-75 PARKING SPACES (3)		(4)

CLEAN AIR VEHICLE PARKING

FORMULA	REQUIRED	PROPOSED
51-75 PARKING SPACES (6)		(6)

TOTAL PARKING SPACES	64	75

KARAKI WSe
WESTERN STATES ENGINEERING
A DESIGN-BUILD COMPANY
4667 E. LA PALMA STE. 707
TEL: (714)693-9300 FAX: (714)693-1002
CONSULTANT/ SEALS

SUBMITTAL
NO. DESCRIPTION BY DATE
1
2
3
4

REVISIONS
NO. DESCRIPTION BY DATE
△
△
△
△

OWNER NAME & ADDRESS
MR. RON KASSAB

PROJECT NAME & ADDRESS
THE KASSAB TRAVEL CENTER
Gas Station, RV Fueling Station
QSR w/ Drive-Thru
29301 RIVERSIDE DRIVE
LAKE ELSINORE CA 92530

NOTE TO CONTRACTOR

CONFIDENTIALITY STATEMENT

DESIGNED BY: WS
DRAWN BY: WS
CHECKED BY: JK
DATE DRAWN: 11.03.17
SCALE: 1" = 30'-0"
SHEET TITLE
SITE PLAN

BLDG SHEET NUMBER
AS-1.0
JOB No E95010
CUP No. CUP NO.

GEOBODEN INC. Geotechnical Consultants	PERCOLATION BORING LOCATION PLAN Proposed Kassab Travel Center 29301 Riverside Drive Lake Elsinore, California	Figure By S.R.	Project No. Lake Elsinore
		Map No. XX	Figure No. 2
		Date 12-30-17	

GEOBODEN, INC.

BORING NUMBER P-1

CLIENT Mr. Ron Kassab
PROJECT NAME Proposed Kassab Travel Center
PROJECT NUMBER Lake Elsinore-1-01
PROJECT LOCATION 29301 Riverside Drive, Lake Elsinore, CA
DATE STARTED 12/18/17 **COMPLETED** 12/18/17
GROUND ELEVATION **HOLE SIZE** 8 inches
DRILLING CONTRACTOR GeoBoden Inc.
GROUND WATER LEVELS:
DRILLING METHOD HSA
AT TIME OF DRILLING ---
LOGGED BY C.R. **CHECKED BY**
AT END OF DRILLING ---
NOTES
AFTER DRILLING ---

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS: LIQUID LIMIT	ATTERBERG LIMITS: PLASTIC LIMIT	ATTERBERG LIMITS: PLASTICITY INDEX	FINES CONTENT (%)
0.0		SANDY CLAY (CL): yellowish brown, moist, ~30% sand, ~70% fines										
2.5												
5.0		Bottom of borehole at 5 feet below ground surface. Ground water was not encountered. Boring was backfilled with cuttings. Bottom of borehole at 5.0 feet.										

GEOBODEN, INC.

BORING NUMBER P-2

CLIENT Mr. Ron Kassab
PROJECT NAME Proposed Kassab Travel Center
PROJECT NUMBER Lake Elsinore-1-01
PROJECT LOCATION 29301 Riverside Drive, Lake Elsinore, CA
DATE STARTED 12/18/17 **COMPLETED** 12/18/17
GROUND ELEVATION **HOLE SIZE** 8 inches
DRILLING CONTRACTOR GeoBoden Inc.
GROUND WATER LEVELS:
DRILLING METHOD HSA
AT TIME OF DRILLING ---
LOGGED BY C.R. **CHECKED BY**
AT END OF DRILLING ---
NOTES
AFTER DRILLING ---

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS: LIQUID LIMIT	ATTERBERG LIMITS: PLASTIC LIMIT	ATTERBERG LIMITS: PLASTICITY INDEX	FINES CONTENT (%)
0.0		SANDY CLAY (CL): brown, moist, fine sand										
2.5												
5.0		Bottom of borehole at 5 feet below ground surface. Ground water was not encountered. Boring was backfilled with cuttings. Bottom of borehole at 5.0 feet.										

GEOBODEN, INC.

BORING NUMBER P-3

CLIENT Mr. Ron Kassab
PROJECT NAME Proposed Kassab Travel Center
PROJECT NUMBER Lake Elsinore-1-01
PROJECT LOCATION 29301 Riverside Drive, Lake Elsinore, CA
DATE STARTED 12/18/17 **COMPLETED** 12/18/17
GROUND ELEVATION **HOLE SIZE** 8 inches
DRILLING CONTRACTOR GeoBoden Inc.
GROUND WATER LEVELS:
DRILLING METHOD HSA
AT TIME OF DRILLING ---
LOGGED BY C.R. **CHECKED BY**
AT END OF DRILLING ---
NOTES
AFTER DRILLING ---

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS: LIQUID LIMIT	ATTERBERG LIMITS: PLASTIC LIMIT	ATTERBERG LIMITS: PLASTICITY INDEX	FINES CONTENT (%)
0.0		SANDY CLAY (CL): strong brown, moist, fine sand										
2.5												
5.0		Bottom of borehole at 5 feet below ground surface. Ground water was not encountered. Boring was backfilled with cuttings. Bottom of borehole at 5.0 feet.										